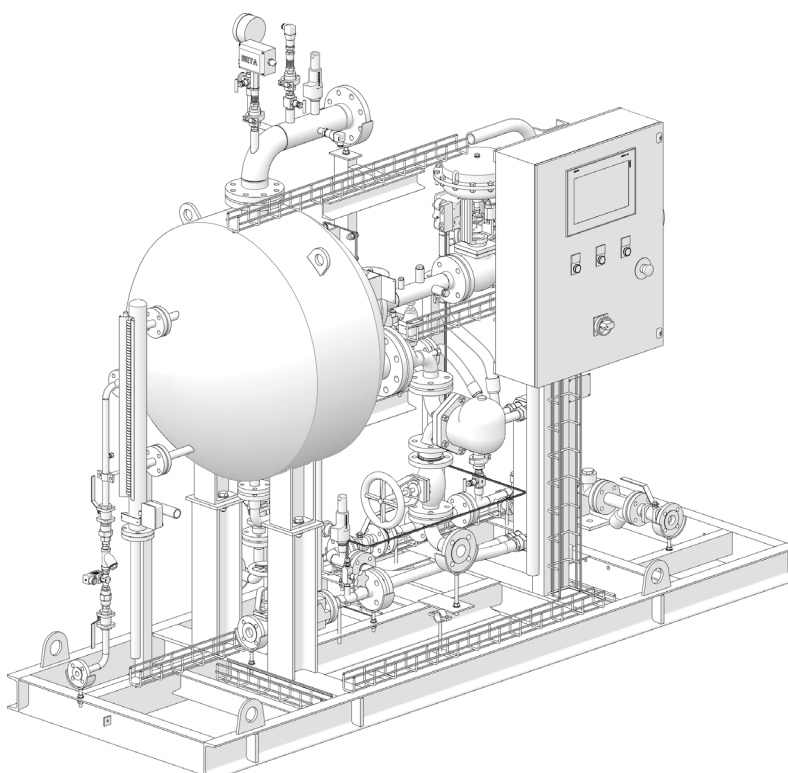




CSG-FBHP

High pressure clean steam generation system for Food & Beverage



Description

Spirax Sarco has created a new range of steam generators to deliver food quality steam, specifically for direct injection processes within the food & beverage industry sector, where steam is considered as an ingredient. Primary heating medium is plant steam and the secondary steam should be generated from either de-mineralised or reverse osmosis quality water. All generators are supplied as packaged solutions ready to install and commission. Designed, manufactured and approved for Steam and Condensate applications. This product complies with EC1935:2004 Food Contact Materials. It also complies with regulation EC2023:2006 on good manufacturing practice for materials and articles intended to come into contact with food.

Product range

	CSG FBHP-130	maximum production capacity	1350 kg/h	(2976 lbs/hr)
	CSG FBHP-185	maximum production capacity	1880 kg/h	(4145 lbs/hr)*
	CSG FBHP-235	maximum production capacity	2350 kg/h	(5180 lbs/hr)*
Size:	CSG FBHP-300	maximum production capacity	3030 kg/h	(6680 lbs/hr)*
	CSG FBHP-375	maximum production capacity	3770 kg/h	(8311 lbs/hr)*
	CSG FBHP-470	maximum production capacity	4710 kg/h	(10,384 lbs/hr)*
	CSG FBHP-600	maximum production capacity	6050 kg/h	(13,338 lbs/hr)*


Versions/Applications: **FBHP** Food and Beverage steam injection for high pressure applications

(*) max steam production at reference operating conditions: primary steam at 12 bar g (174 psi g), production at 8 bar g (116 psi g), feed water at 20 °C (68 °F).

Construction and main features

- System complete, functional and safe
- Compact design
- Modulating pressure and level control: pressure stability and steam quality improvement
- Intelligent PLC with SIMS technology, easy maintenance
- Packaged system with on board wired control panel: easy installation
- Automated start up/commissioning sequence
- Configurable options to suit individual needs
- System diagnostics
- Preventive maintenance
- Spirax Sarco's worldwide service.

Compliances available **but not standard** in all geographies

	EMEA		Americas	
	STD	On request	STD	On request
-  mark with EU declaration of conformity according to the following directives:	-			
- 2014/68/EU (PED)	-			
- 2014/35/EU (LVD)	-			
- 2014/30/EU (EMC)	-			
- EC1935/2004 requirements as products intended to come into contact with food.	-			
- ASME design with U stamp certification			-	
- Materials on clean side compliant with list of FDA approved materials			-	

Design conditions

		EMEA	Americas	
Primary side	Design pressure	13 bar g	(188 psi g)	
	Design temperature	200 °C	(400 °F)	
Secondary side	Design pressure	12 bar g	(180 psi g)	
	Design temperature	200 °C	(400 °F)	
	Safety valve set pressure	10.8 bar g	(15.6 psi g)	
Feedwater	Design pressure	12 bar g	(180 psi g)	
	Design temperature	without pump	200 °C	(400 °F)
		with pump	80 °C	(176 °F)

For a bespoke design, contact Spirax Sarco

Operating limits

	Without pump	With pump			
Production	Clean saturated steam, up to 8 bar g/175 °C (Clean saturated steam, up to 125 psi g /353 °F)		Ambient Temperature: 0-40 °C Designed for indoor installation only, protect from freezing.		
Primary side	Plant steam, up to 13 bar g/196.6 °C (Plant steam, up to 188 psi g/385 °F) See safety valve protection				
Feedwater	P min. ≥ P clean steam + 2 bar g (P min. ≥ P clean steam + 29 psi g)	Net positive suction head required (see IM)			
	P max 12 bar g/T max 200 °C (P max 174 psi g/T max 392 °F)	P max 12 bar g/T max 100 °C P max 174 psi g/T max 212 °F			
	Feedwater quality: pH 5.5 + 7.5 (at 20 °C/68 °F) Hardness ≤ 0.02 mmol/l Chloride Please refer to the table below Conductivity ≤ 20 µS/cm				
	Chlorides concentration limit in inlet feedwater				
	Blowdown set	Inlet feedwater pH		* Note A single leg is taken from the three phase supply to power the PSU, ensure the single leg will have a voltage in the range required for single phase.	
		pH = 5.5	pH = 6.5		pH = 7.5
	5%	≤ 0.5 mg/l	≤ 1 mg/l		≤ 3 mg/l
	10%	≤ 1 mg/l	≤ 2 mg/l		≤ 6 mg/l
	Unit without pump	Unit with pump			
Electrical supply (cabinets)	1 x 90-132 V AC or 1 x 180-264 V AC 50/60 Hz 0.4 kW (instr.)	3 x 200-460 V AC* 50/60 Hz (0.37kW - 5.5kW) + 0.4kW depending upon package size and csg pressure			
Air supply (filters)	Minimum 5 bar g (72.5 psi g) to maximum 7 bar g (101.5 psi g) (only for the unit with pneumatic actuators or Integrity test option)				
Safety valve protection	Safety Valve with 5% overpressure	MAAP: 13 bar g (188.5 psi g) MAWP: 12.38 bar g (180 psi g) Set pressure: 12.38 bar g: (180 psi g)	Note, it is recommended to install a safety valve upstream of the CSG-FBHP to ensure that overpressure can never be supplied to the package. Design pressure of the generator is equivalent to the MAAP (max allowable accumulated pressure).		
	Safety Valve with 10% overpressure	MAAP: 13 bar g (188.5 psi g) MAWP: 11.8 bar g(171.1 psi g) Set pressure: 11.8 bar g (171.1 psi g)	Depending on the type of safety valve used, the MAWP and set pressure can be defined. Normal working pressure to be defined by operator but often 90% of set pressure may be used. Spirax Sarco safety valves are typically 5% overpressure		

Performance of the units

		8	7	6	5
CSG-FBHP-130	10.8	1245	1280	1190	1100
	10.2	1059	1280	1190	1100
	9.6	-	1280	1190	1100
	8.2	-	-	1190	1100
	7.1	-	-	-	1062*
CSG-FBHP-185	10.8	1780	1790	1670	1530
	10.2	1539	1790	1670	1530
	9.5	-	1790	1670	1530
	8.1	-	-	1670	1530
	7	-	-	-	1514*
CSG-FBHP-235	10.8	2288	2230	2090	1920
	10.2	2001	2230	2090	1920
	9.3	-	2230	2090	1920
	8	-	-	2090	1920
	6.8	-	-	-	1920
CSG-FBHP-300	10.8	2869	2870	2680	2460
	10.2	2489	2870	2680	2460
	9.6	-	2870	2680	2460
	8.2	-	-	2642*	2460
	7.1	-	-	-	2338*
CSG-FBHP-375	10.8	3675	3570	3340	3070
	10.2	3225	3570	3340	3070
	9.4	-	3570	3340	3070
	8	-	-	3340	3070
	6.9	-	-	-	3070
CSG-FBHP-470	10.8	4423	4460	4170	3830
	10.2	3806	4460	4170	3830
	9.6	-	4460	4170	3830
	8.2	-	-	4170	3830
	7.1	-	-	-	3830
CSG-FBHP-600	10.8	5107	5740	5360	4930
	10.2	4311	5251*	5286*	4930
	9.9	-	5251*	5286*	4930
	8.6	-	-	4550*	4586*
	7.5	-	-	-	4027*

Note: Plant steam pressure must be sufficiently greater than clean steam pressure for clean steam production

Performance of the units (continued)

		116	102	87	73
CSG-FBHP-130	156	2744	2821	2623	2425
	148	2334	2821	2623	2425
	139	-	2821	2623	2425
	119	-	-	2623	2425
	103	-	-	-	2425
CSG-FBHP-185	156	3924	3946	3681	3373
	148	3393	3946	3681	3373
	138	-	3946	3681	3373
	117	-	-	3681	3373
	102	-	-	-	3373
CSG-FBHP-235	156	5044	4916	4607	4232
	148	4411	4916	4607	4232
	135	-	4916	4607	4232
	116	-	-	4607	4232
	99	-	-	-	4232
CSG-FBHP-300	156	6325	6327	5908	5423
	148	5487	6327	5908	5423
	139	-	6327	5908	5423
	119	-	-	5908	5423
	103	-	-	-	5423
CSG-FBHP-375	156	8102	7870	7870	6768
	148	3225	7870	7870	6768
	136	-	7870	7870	6768
	116	-	-	7870	6768
	100	-	-	-	6768
CSG-FBHP-470	156	9751	9832	9193	8443
	148	8390	9832	9193	8443
	139	-	9832	9193	8443
	119	-	-	9193	8443
	103	-	-	-	8443
CSG-FBHP-600	156	11259	12654	11817	10868
	148	9504	12654	11817	10868
	144	-	12654	11817	10868
	125	-	-	10817	10868
	109	-	-	-	10868

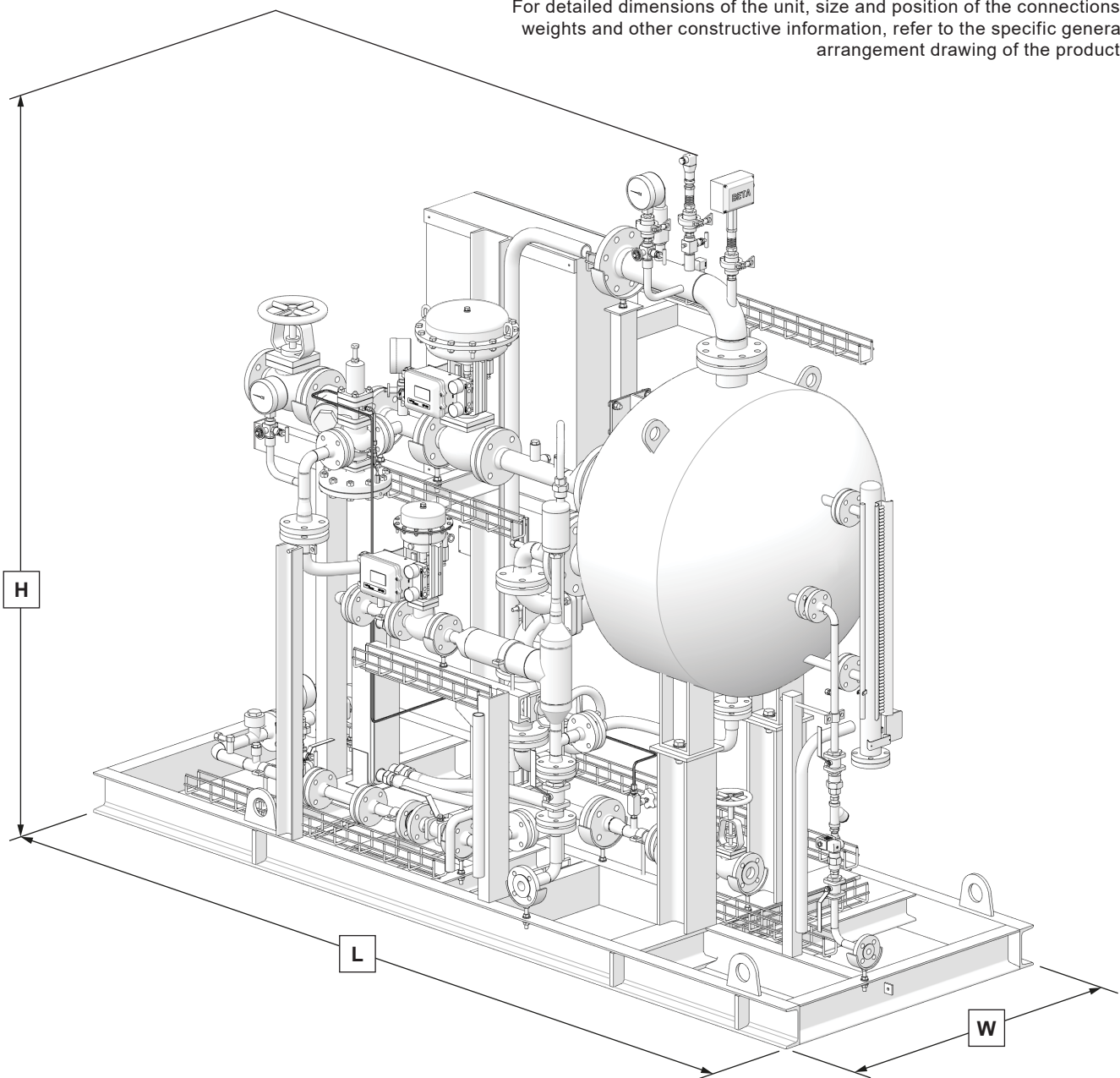
Note: Plant steam pressure must be sufficiently greater than clean steam pressure for clean steam production

Dimensions and weights approximate in mm (inches) and kg (lbs) of a standard unit

	Dimensions mm (inches)			Weights kg (lbs)		
	L Length	W Width	H Height	Empty	In operation	Maximum
130	2800 (110)	1000 (39)	2400 (94)	2100 (4630)	2250 (4960)	2400 (5291)
185	3100 (122)	1000 (39)	2450 (96)	2346 (5172)	2500 (5512)	2700 (5952)
235	3400 (134)	1100 (43)	2550 (100)	2573 (5672)	2750 (6063)	2900 (6393)
300	3700 (146)	1100 (43)	2060 (81)	2800 (6173)	3000 (6614)	3200 (7055)
375	3900 (154)	1100 (43)	2070 (81)	4968 (10953)	5200 (11464)	5400 (11905)
470	4000 (157)	1100 (43)	2080 (82)	5095 (11233)	5300 (11685)	5600 (12346)
600	4200 (165)	1100 (43)	2090 (82)	5350 (11794)	5600 (12346)	5900 (13007)

Indicated dimensions are the maximum dimensions for a specific configuration of the package.

For detailed dimensions of the unit, size and position of the connections, weights and other constructive information, refer to the specific general arrangement drawing of the product.

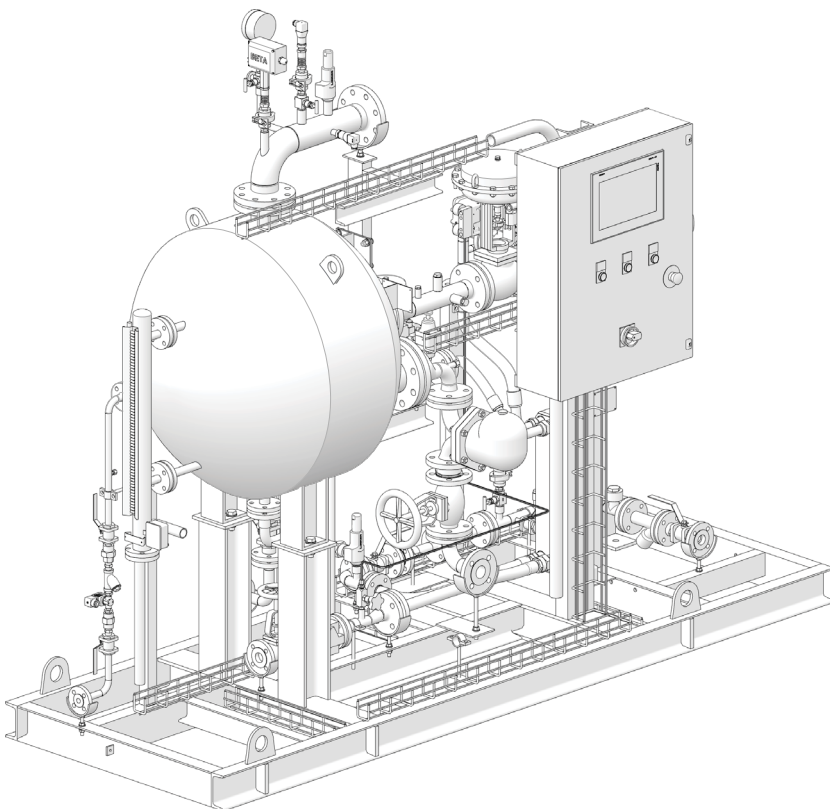


Connections - Metric

	130	185	235	300	375	470	600
Plant steam Inlet	DN50 * PN16	DN65 PN16	DN80 PN16	DN80 PN16	DN100 PN16	DN100 PN16	DN100 PN16
Preheater Condensate Outlet	DN25 PN16	DN25 PN16	DN25 PN16	DN25 PN16	DN25 PN16	DN40 PN16	DN40 PN16
CSG Condensate Outlet	DN40 PN16	DN40 PN16	DN40 PN16	DN40 PN16	DN40 PN16	DN40 PN16	DN50 PN16
Feedwater Inlet	DN25 PN40	DN25 PN40	DN25 PN40	DN32 PN40	DN32 PN40	DN32 PN40	DN32 PN40
Drain Outlet	DN25 PN40	DN25 PN40	DN25 PN40	DN25 PN40	DN32 PN40	DN32 PN40	DN32 PN40
Blowdown Outlet /TDS	DN15 PN40	DN15 PN40	DN15 PN40	DN15 PN40	DN15 PN40	DN15 PN40	DN15 PN40
Clean Steam Outlet	DN80 PN40/PN25**	DN100 PN40/PN25**	DN125 PN40/PN25**	DN125 PN40/PN25**	DN150 PN40/PN25**	DN150 PN40/PN25**	DN200 PN25
Clean Steam Safety Valve Discharge Outlet	¾" NPT-F	¾" NPT-F	¾" NPT-F	1" NPT-F	1" NPT-F	1" NPT-F	1" NPT-F
Plant Steam Condensate Outlet (Drain)	DN15 PN40						
Comp. Air Line for Integrity Test	¼" NPT-F						
Pneumatic Air Supply Inlet	¼" BSP-F						
Sampling system (cooling water in/out-sample out)	½" BSP- 6 mm						
Options							

* If the Auto Plant Steam Isolation is selected, then this should be PN40

** Clean steam outlet connection is PN40 or PN24 on sizes 130, 185, 235, 300, 375 and 470, depending if the option of automatic clean steam isolation is selected. However, PN25 and PN40 flange connections on these sizes are interchangeable.



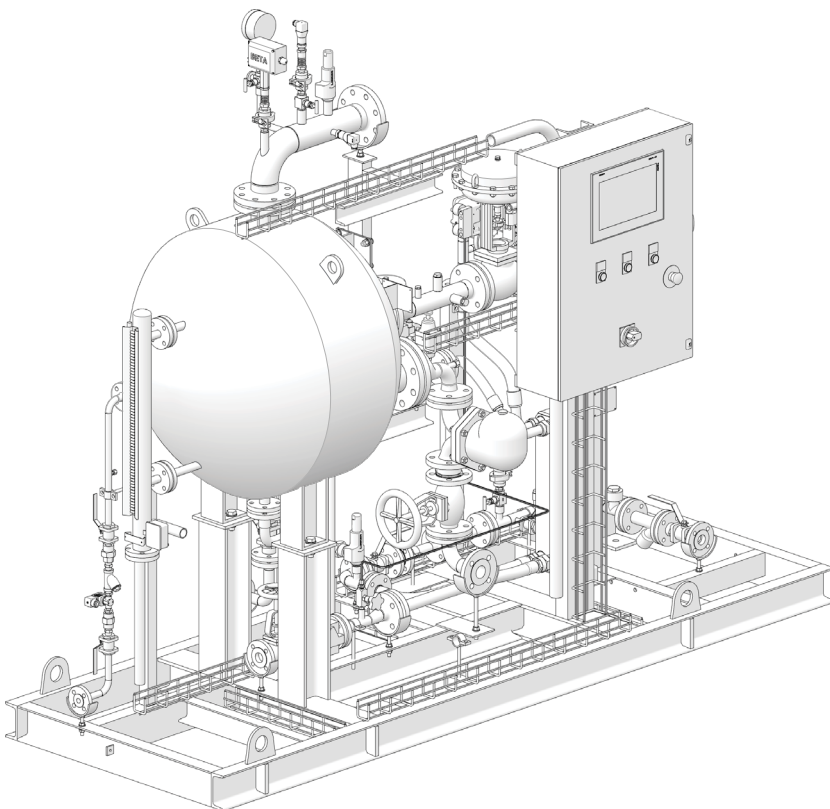
For imperial connections, see next page

Connections - Imperial

	130	185	235	300	375	470	600
Plant steam Inlet	2" * ANSI 150	2½" ANSI 150	3" ANSI 150	3" ANSI 150	4" ANSI 150	4" ANSI 150	4" ANSI 150
Preheater Condensate Outlet	1" ANSI 150	1" ANSI 150	1" ANSI 150	1" ANSI 150	1" ANSI 150	1½" ANSI 150	1½" ANSI 150
CSG Condensate Outlet	1½" ANSI 150	1½" ANSI 150	1½" ANSI 150	1½" ANSI 150	1½" ANSI 150	2" ANSI 150	2" ANSI 150
Feedwater Inlet	1" ANSI 300	1" ANSI 300	1" ANSI 300	1¼" ANSI 300	1¼" ANSI 300	1¼" ANSI 300	1¼" ANSI 300
Drain Outlet	1" ANSI 300	1" ANSI 300	1" ANSI 300	1" ANSI 300	1¼" ANSI 300	1¼" ANSI 300	1¼" ANSI 300
Blowdown Outlet /TDS	½" ANSI 300	½" ANSI 300	½" ANSI 300	½" ANSI 300	½" ANSI 300	½" ANSI 300	½" ANSI 300
Clean Steam Outlet	3" ANSI 150**	4" ANSI 150**	5" ANSI 150**	5" ANSI 150**	6" ANSI 150**	6" ANSI 150**	8" ANSI 150**
Clean Steam Safety Valve Discharge Outlet	¾" NPT-F	¾" NPT-F	¾" NPT-F	1" NPT-F	1" NPT-F	1" NPT-F	1" NPT-F
Plant Steam Condensate Outlet (Drain)	½" ANSI 300						
Comp. Air Line for Integrity Test	¼" NPT-F						
Pneumatic Air Supply Inlet	¼" BSP-F						
Sampling system (cooling water in/out-sample out)	½" BSP - 6 mm						
Options							

* If the Auto Plant Steam Isolation is selected, then this should be PN40

** Clean steam outlet connection is PN40 or PN24 on sizes 130, 185, 235, 300, 375 and 470, depending if the option of automatic clean steam isolation is selected. However, PN25 and PN40 flange connections on these sizes are interchangeable.



For metric connections, see previous page


Product nomenclature and selection guide

The product nomenclature is based on the characteristics of the main elements and options, identified as follows:

Design code	E	EN	E
	A	ASME	
Shell Type	W	Welded – not openable	W
Unit Size	130	Up to 1350 kg/h (2976 lbs/hr)	130
	185	Up to 1850 kg/h (4145 lbs/hr)	
	235	Up to 2350 kg/h (5180 lbs/hr)	
	300	Up to 3030 kg/h (6680 lbs/hr)	
	375	Up to 3770 kg/h (8311 lbs/hr)	
	470	Up to 4710 kg/h (10384 lbs/hr)	
	600	Up to 6050kg/h (13338 lbs/hr)	10
	Plant steam Kv (Cv)	10, 16, 36, 46, 63, 100, 160 (12, 18, 42, 53, 73, 116, 185)	
Control Valve Actuation	Feedwater Kv (Cv)	1, 1.6, 2.5, 4, 6.3 (1.2, 1.8, 2.9, 4.6, 7.3)	1
	PN	Pneumatic (fail safe)	PN
Control	EL	Electric (fail safe)	
	P1	ABB AC500 + 7" Display	P1
	P2	Allen-Bradley CompactLogix 1700 + 7" Display	
P3	Siemens S7.1200 + 7" Display		
Communication interface	C0	None	C0
	C1	BACnet IP	
	C2	Profinet	
	C3	Modbus TCP/IP	
	C4	BACnet MSTP	
	C5	Profibus	
	C6	Modbus RTU	
	C7	BACnet (BTL cert.) IP	
Frame and cabinet	C8	BACnet (BTL cert.) MSTP	
	0	Basement and cabinet made of carbon steel, painted *	0
3	Base and cabinet made of stainless steel (304)		
Control Panel Location	S	Side	S
Insulation	1	Steam Generator Body only to EnEV (100 mm)	1
	3	Steam Generator Body to EnEV + Piping (50mm)	
	0	Not insulated	
Wheels and feet	N	None (plates with anchor holes provided)	N
	F	Adjustable feet	

Product nomenclature and selection guide continued on next page

Product nomenclature and selection guide (continued)

Plant steam inlet shut-off	M	Manual stop valve	M
	AE	Automatic electric isolation valve*	
Plant steam line trapping	N	None	N
	T	Plant steam line trapping station with pocket	
TDS Control	1	Timed TDS Blowdown (no control)	1
	2	TDS Control with external probe (discontinuous metering)	
Sample Cooler	N	None	N
	S	Sample Cooler and Sampling Valve	
Feedwater pressurisation	N	None (water P = clean steam P + 2.0 barg)	N
	P1	Pump with VFD (for 1 bar g clean steam)	
	P2	Pump with VFD (for 2 bar g clean steam)	
	P3	Pump with VFD (for 3 bar g clean steam)	
	P4	Pump with VFD (for 4 bar g clean steam)	
	P5	Pump with VFD (for 5 bar g clean steam)	
	P6	Pump with VFD (for 6 bar g clean steam)	
	P7	Pump with VFD (for 7 bar g clean steam)	
Plant protection	N	None	N
	V	Viscorol with low level limit switch	
Feedwater pre-heating	N	Pre-Heating by primary steam supply	N
Intelligent diagnostics	N	None	N
	I1	System Diagnostics	
	I3	Integrity test	
	I4	System diagnostics + Integrity test	
Clean steam shut off	N	None	N
	M	Manual stop valve	
	AE	Automatic electric isolation valve*	
Test and certification	S	EU PED test and  marking of the assembly	S
	R	UKCA	
Level indicator	V	Viscorol (Magnetic Level Indicator)	V

Product nomenclature example

CSG-FBHP E W 130-10-1 PN P1 C0 O S 1 N M N 1 N N N N N S V

Not all configurations are available in every country. Please contact your local Spirax Sarco representative for more details.