

spirax sarco

m-CSG

Ultra-compact Clean Steam Generation System

Description

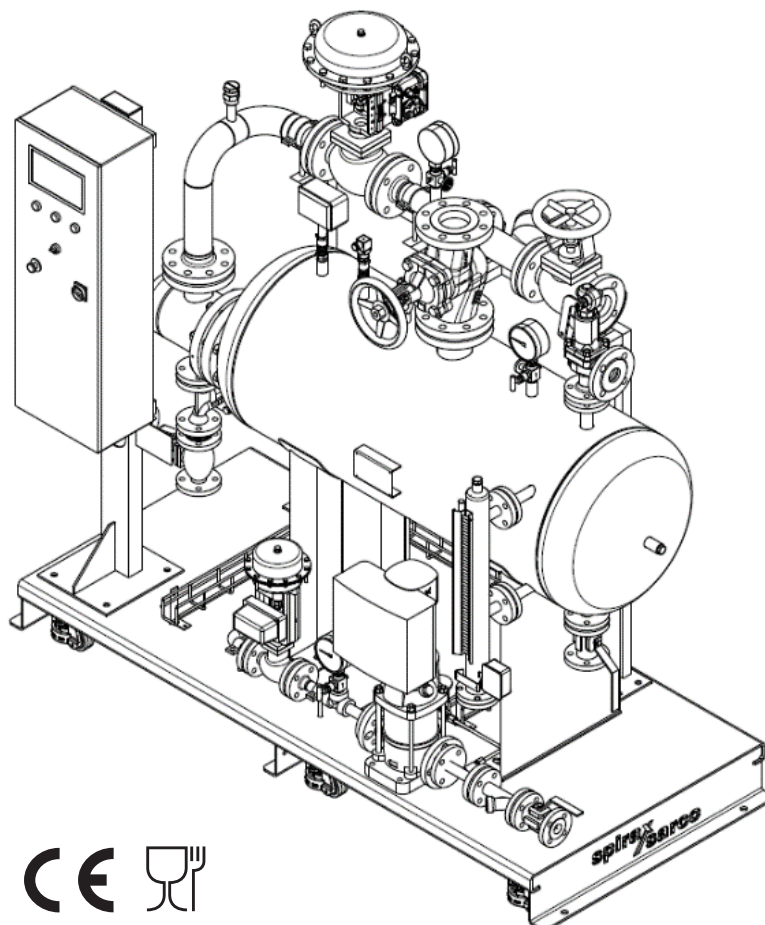
The m-CSG series of indirect mini clean steam generators are very compact units, designed to produce up to 300/600 kg/h (at nominal operating conditions) of clean steam, using plant steam as primary medium. The units are supplied ready for installation into the application.

The Food and Beverage version of this product is 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.


Versions and applications:

Size:	300 Unit for the nominal production of 300 kg/h*
	600 Unit for the nominal production of 600 kg/h*
Versions/ Applications:	H "Humidification" : humidification (AHU), sterilization of containers, generic use of clean steam.
	F "Food&Beverage" - EC 1935/2004 Compliant : direct steam injection in food products (e.g. cooking), other applications where it is required the compliance with the EC directive as products intended to come in contact with food.

(*) max steam production at reference operating conditions: primary steam at 9-10 bar g, production at 3 bar g, feed water at 20 °C.



Construction and main features

- System complete, functional and safe
- Ultra-compact design: space saving
- Modulating pressure and level control: pressure stability and steam quality improvement
- Tube-bundle extractable: possible replacement, easy maintenance
- Packaged system, assembled on a metal base, with on board wired control panel: easy installation
- Gaskets on clean steam and water side in PTFE, FDA compliant
- Stop valves on the inlets/outlets of the fluids: possible partial or total system isolation (e.g. for maintenance)
- Strainers upstream: to protect the control valves, steam traps and other sensitive equipment from possible damage caused by impurities that drag from the fluids
- Heating ramp: to avoid material stress during start-up from cold
- System supplied properly insulated
- Engineered, built and tested by Spirax Sarco Italy, according to the following European Union Directives:
 - 2014/68/EU (PED)
 - 2014/35/EU (LVD)
 - 2014/30/EU (EMC)
- CSG design/construction code: EN 13445
- Unit classified as ASSEMBLY, supplied with a nameplate bearing the  mark and comes complete with EC Declaration of Conformity.
- Spirax Sarco's worldwide service.

Design conditions

Plant steam side (primary)	Design pressure (PS):	12.8 bar g
	Design temperature (TS):	194.4 °C
Clean steam side	Design pressure (PS):	8 bar g
	Design temperature (TS):	194.4 °C
	Safety valve setting:	6 bar g
Feedwater side	Design pressure (PS):	8 bar g
	Design temperature (TS):	110 °C

For a bespoke design, contact Spirax Sarco

Maximum operating conditions

Production	Clean saturated steam, up to 5 bar g at 159 °C	
Primary side	Plant steam, up to 12 bar g/191.7 °C	
Feedwater	Unit without pump	Unit with pump
	P min ≥ P clean steam + 0.5 bar g	Net positive suction head required (refer to IM-P486-21)
	Pmax 8 bar g/Tmax 110 °C	

Minimum ambient temperature : 0 °C

Designed for indoor installation only, protect from freezing.

Utilities

	Without pump	With fixed speed pump 50 Hz	With fixed speed pump 60 Hz	With variable speed pump
Electrical supply: (to electrical cabinet)	1x230V + N 50/60Hz 0,4 kW (inst.)	3x400V + N 50Hz 0,8 kW (inst.)	3x380V + N 60Hz 0,8 kW (inst.)	3x380-500V + N 50/60Hz 0,8 kW (inst.)
Air supply: (to filters)	min. 3 bar - max 15 bar (only for the units with pneumatics actuators)			

Performance of the units

Max clean steam production (kg/h), with feedwater at 20 °C:

300		Clean steam production pressure (bar g)				
		5	4	3	2	1
Plant steam pressure (bar g)	12	260	300/330	320/430	N/A	N/A
	10	180	250	320/330	320/420	N/A
	8	100	160	240	320/340	290
	6	-	75	140	230	290
	4	-	-	-	120	210

600		Clean steam production pressure (bar g)				
		5	4	3	2	1
Plant steam pressure (bar g)	12	490/540	500/660	500/700	N/A	N/A
	10	490	500/660	500/700	470/730	N/A
	8	270	440	500/600	470/730	510/650
	6	-	200	380	470/520	510/650
	4	-	-	-	310	430

Max productions refer to clean generator clean, without blowdowns.

The double flowrate (Q1/Q2) means respectively with supply water at +0.5/1.0 bar g than the pressure of the steam generated.

For the units equipped with pump, consider the production Q2.

N/A = not recommended operating condition, it is necessary to reduce the primary steam pressure.

Dimensions and weights (approximate in mm and kg)

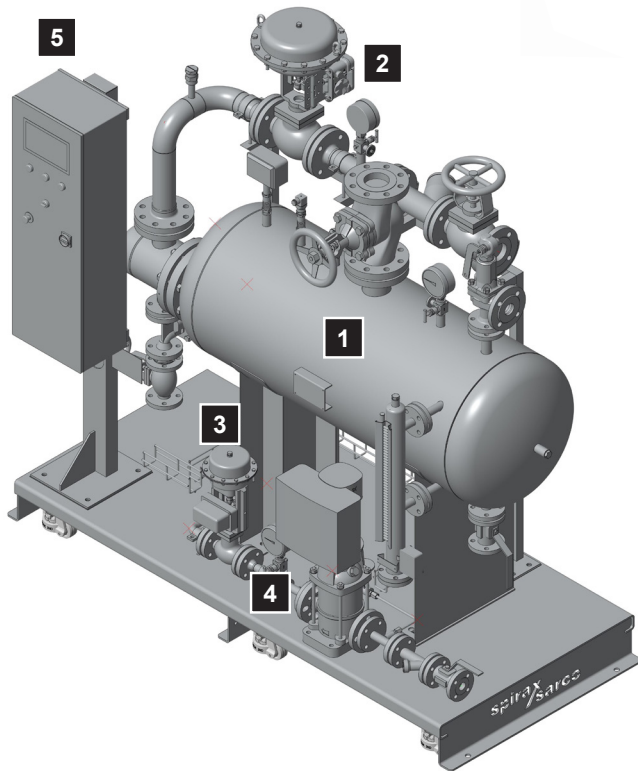
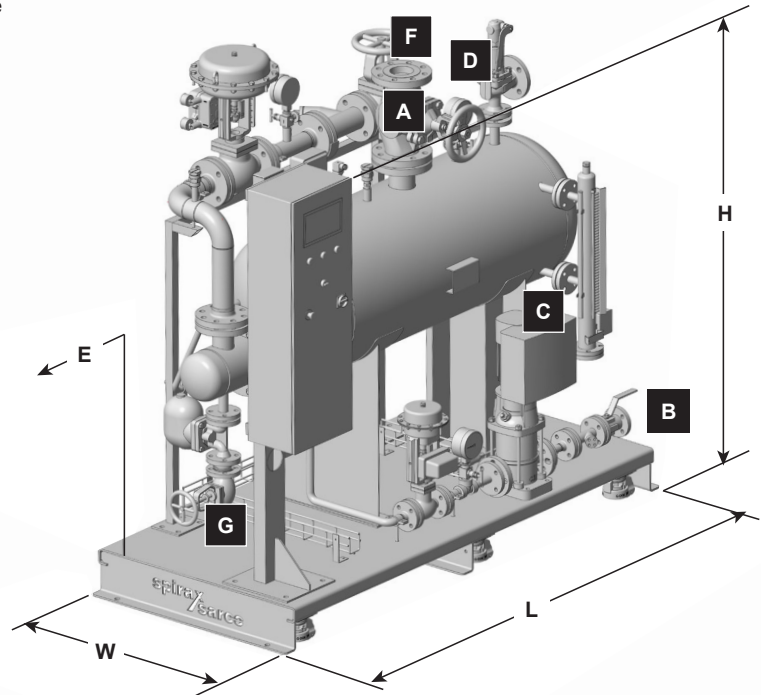
	Dimensions (mm)				Weights (kg)		
	L Length	W Width	H Height	E Clearance for tube bundle extraction	Empty	In operation	Maximum
300	1472	860	1615	950	350-400 *	430-480 *	520-570 *
600	1945	905	1800 - 1950 *	1050	450-500 *	600-650 *	700-750 *
* Depending on what configuration is chosen							

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

Main parts (basic unit)

The unit comprises the following main parts:

1	Steam generator and instrumentation/ accessories, protection and safety devices
2	Primary steam control group and line accessories
3	Steam trap group and line accessories.
4	Feedwater control group and line accessories
5	Electrical control panel



Main connections

		300	600
A	Clean steam outlet:	DN50 PN16	DN80 PN40
B	Feedwater inlet:	DN15 PN16	DN20 PN16
C	Generator drain:	DN25 PN16	DN25 PN16
D	Safety valve discharge:	1" G-F	vers."H": DN40 PN16 vers."F": DN50 PN16
E	(spare)	½"G-F	½"G-F
F	Plant steam inlet (primary):	DN32 PN16	DN50 PN16
G	Condensate outlet:	DN25 PN16	DN25 PN16
H	Primary steam condensate drain: (*)	DN15 PN40	DN15 PN40
I	TDS discharge: (*)	DN15 PN40	DN15 PN40
J	Sample cooler: (*) (cooling water inlet/ outlet – sample outlet)	½" BSP - 6 mm	½" BSP - 6 mm

UNI-EN 1092-1 PN16/40 flanged connections
(*) options

Automation

The unit is equipped with an electrical control panel.





The process variables (pressure and level) are maintained by digital regulators or PLC control logic.

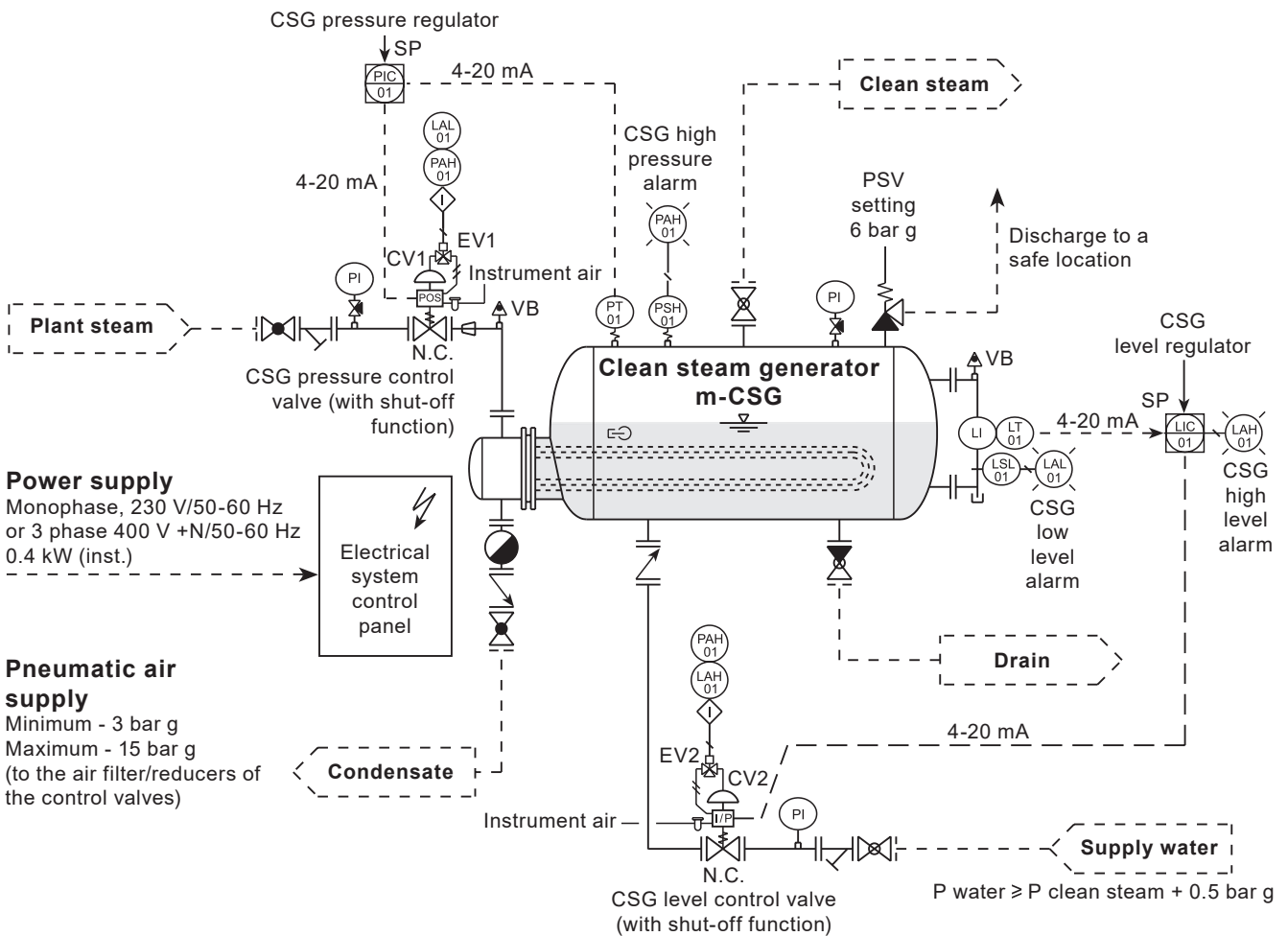
Front panel controls/lights: main switch, emergency push-button, switch for local/remote system start with system in operation light, blocks reset button, power supply and alarms lights.

Feed-back available (SPDT contacts): power supply, system in operation, alarm (cumulative).

Digital input (stable contacts): external consent/alarm, remote system start.

Piping and instrumentation diagram (solution with pneumatic valves and without a pump)

-  On field instrument/probe
-  Electrical controller
-  Alarm with signalling
-  Safety interlock by alarm



Materials

	Body made of AISI 316
	Tube-bundle made of AISI 316
Steam generator	Head (primary) made of carbon steel
	Gasket tube-bundle/body in PTFE
	Mounting supports made of AISI 304
Accessories fitted on board	Equipment with AISI 316 body/parts in contacts
	Gaskets in PTFE
Feedwater line	Equipment with AISI 316 body and internal parts
	Piping schedule 10s made of AISI 316
	Gaskets in PTFE
Primary steam and condensate lines	Equipment with cast iron body and stainless steel internal parts
	Piping schedule 40 made of carbon steel, painted
	Gaskets in graphite, reinforced
Control panel cabinet	Carbon steel, painted RAL 7035 (stainless steel as option)
Skid basement/ supports	Carbon steel, painted Jet-black (stainless steel as option)
Insulation	Ceramic fibre
	Stainless steel (AISI 304) cladding

Available accessories/options:

- Clean steam intake stop valve
- Control valves with electrical actuators
- Timed TDS blow-down system or TDS discontinuous control system with probe and dedicated controller inside control panel
- Sample cooler
- Primary steam pipeline trap group
- Handling wheels
- Feedwater pressurization system with fixed speed pump (50 or 60 Hz) or with variable speed pump with integrated VFD
- Control panel with PLC logic and possible serial-bus communication interface
- Frame and control panel cabinet made of stainless steel
- Feedwater RO system (as an auxiliary unit).

Documentation/certifications

The unit will be supplied complete with:

- Process and instrument diagram (P&ID) with the complete list of associated equipment used to assemble the unit
- Dimensional drawing (G.A. drawing)
- Wiring diagram of the control panel
- Installation and Maintenance Instructions (IMI)
- Additional instructions (e.g. unit with PLC logic)
- Technical specifications and manuals for all of the associated equipment used to assemble the unit
- Assembly 'EC' Declaration of Conformity (PED)
- Assembly EC 1935/2004 Declaration of Conformity ("F" version)

For any other document/certification, please contact: Spirax Sarco Technical Department

Product nomenclature and selection guide

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

		Size		Configuration			Options										
		mCSG	300	-	h	1	1	-	0	0	0	7	0	1	1	0	1
Basic configuration																	
Size:	- 300: Unit for nominal production of 300 kg/h		300														
	- 600: Unit for nominal production of 600 kg/h		600														
Version	- H: "Humidification" - general use of clean steam *				H												
	- F: "Food&Beverage" - EC 19135/2004 compliant				F												
Valves actuation	- Pneumatic (fail-safe) *					1											
	- Electric (fail-safe)					2											
Feedwater group:	- Control valve only (P water > P clean steam+ 0.5 bar g) *						1										
	- Control valve + pump 50 Hz (0.1 bar g < P water < 1 bar g)						2										
	- Control valve + pump 60 Hz (0.1 bar g < P water < 1 bar g)						3										
	- Control valve + pump+ VFD (0.1 bar g < P water < P clean steam)						4										
Options (* = default selection)																	
Clean steam outlet stop valve:	- None *														0		
	- Ball valve (manual)														1		
TDS control/Sampling:	- None *														0		
	- TDS control system w. CP10 probe and BC3150 controller														1		
	- Sample cooler														2		
	- TDS control system (CP10/BC3150) + sample-cooler														3		
	- Timed TDS blowdown (no control)														4		
Plant steam line trap (primary side):	- None *														0		
	- Steam trap station with pocket														1		
Control:	- Electronic controllers SX80 (no more available)														1		
	- Electronic controllers SX90 (with remote SP and PV rtx)														2		
	- PLC logic = ABB AC500 series with 7" display touch-screen														3		
	- PLC logic = Eaton XV102 series with 7" ,display touch-screen														4		
	- PLC logic = Siemens S7.300 series with 7" display touch-screen (no more available)														5		
	- PLC logic = Siemens S7.1200 series with 7" display touch-screen														6		
	- Electronic controller SX1650 *														7		
	- Other (bespoke unit)														9		
Communication interface (only with PLC control logic):	- None * (default with electronic regulators)														0		
	- Modbus RTU														1		
	- BACnet MS/TP														2		
	- Modbus TCP/IP														3		
	- DeviceNet (no more available)														4		
	- CANopen (no more available)														5		
	- BACnet IP														6		
	- Profibus DP														7		
	- Profinet														8		
	- Other (if feasible, bespoke unit)														9		
Unit frame/Control panel cabinet:	- Carbon steel, painted *															1	
	- Stainless steel (AISI 304)															2	
Insulation:	- None															0	
	- Steam generator insulated *															1	
Handling wheels:	- None*															0	
	- Wheels, lockable (carbon steel)															1	
PED test/certification of the assembly (EU Directive 2014/68/EU):	- PED test/certification of the assembly and "CE" marked *																1
Customisation:	- Standard built (default selection) *																
	- Bespoke unit (to be specified)																S

Product selection example

mCSG	300	-	H	1	1	-	0	0	0	7	0	1	1	0	1		
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How to order example

1 off Spirax Sarco mCSG 300-H11-000701101 mini clean steam generation system.