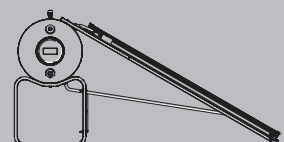
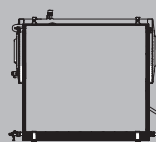


## CSNA Systems 20 RS

Natural circulation solar systems

Production of domestic hot water  
Solar keymark certification according to EN 12976



## CSNA 20 RS systems

### PRODUCT DESCRIPTION

Solutions dedicated to the production of domestic hot water up to 5 people even in not favorable climatic zones.

They have preassembled elements, they do not need a pump and electronic controls, while ensuring a simple and quick installation.

Inside the system we find:

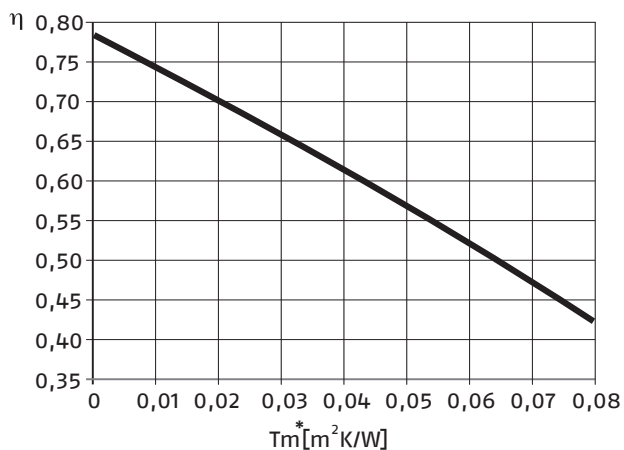
- High efficiency CSAL 20 RS solar collector, insulated, with aluminum absorber with high selective coating
- Double chamber enamelled cylinder with polyurethane insulation and magnesium anode
- Fixing kits for the installation of the system: in parallel to the roof or inclined at an angle of 30° on flat surfaces
- Single-phase electric resistance (can also be used as antifreeze) available as an accessory
- Non-toxic, biodegradable and biocompatible frost-protection liquid.
- Solar system certified according to EN 12976
- 5 year warranty.



### TECHNICAL DATA

SOLAR SYSTEM		CSNA 20 RS 150/1	CSNA 20 RS 200/1	CSNA 20 RS 220/2	CSNA 20 RS 300/2	CSNA 20 RS 300/3
Gross area	m <sup>2</sup> X N. PANELS	1,91 x 1	1,91 x 1	1,91 x 2	1,91 x 2	1,91 x 3
Aperture area	m <sup>2</sup> X N. PANELS	1,78 x 1	1,78 x 1	1,78 x 2	1,78 x 2	1,78 x 3
Absorption surface	m <sup>2</sup> X N. PANELS	1,77 x 1	1,77 x 1	1,77 x 2	1,77 x 2	1,77 x 3
Stagnation temperature	°C	192	192	192	192	192
Storage cylinder capacity	lt	153	202	223	278	278
Magnesium anode	Ø x mm	22 x 300	22 x 300	22 x 300	22 x 400	22 x 400
Heat transfer liquid content	lt	8,5	13,6	16,3	20,3	22,2
Maximum load (with wind or snow)	Pa	1900	1900	1500	1900	1500
Maximum pressure DHW circuit	bar	10	10	10	10	10
Maximum pressure solar circuit	bar	2,5	2,5	2,5	2,5	2,5

### EFFICIENCY CURVE



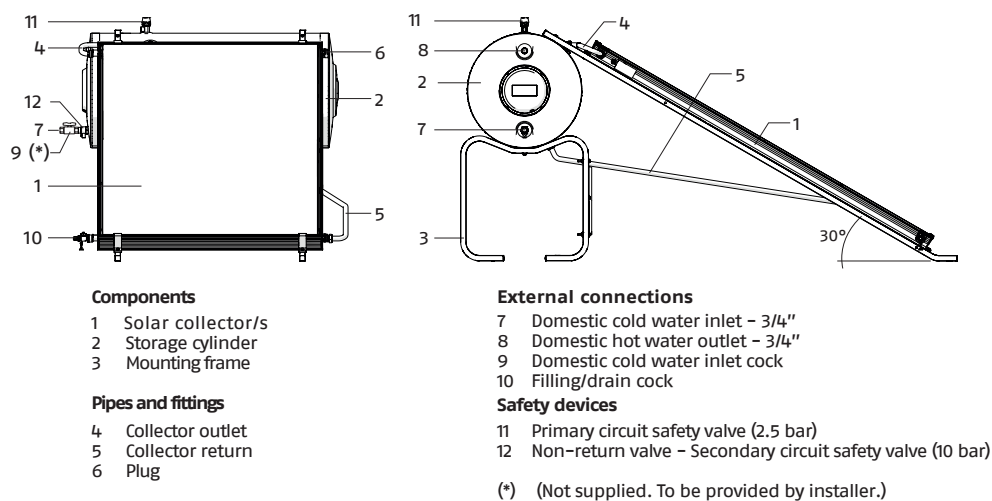
The nominal power curve refers to 800 W / m<sup>2</sup> while the peak power is calculated by norm with an irradiation of 1000 W / m<sup>2</sup>

DESCRIPTION	U / M	
Optical efficiency (η <sub>0</sub> ) (*)	%	0,781
Thermal dispersion factor (a1) (*)	W / (m <sup>2</sup> K)	4,98
Thermal dispersion temperature dependence (a2) (*)	W / (m <sup>2</sup> K)	0,0005
IAM (50°) (*)	-	0,87
Efficiency η (**)	%	0,579

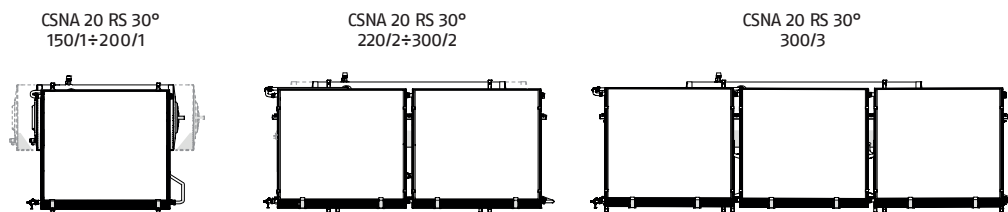
(\*) Tested according to EN 12975, referred to a 33.3% wateryglycol mix, flow rate of 140 l/h, and irradiation G = 800W/m<sup>2</sup>.  
 $T_m = (Coll\_inlet\_temp + Coll\_outlet\_temp) / 2$   
 $T^*m = (T_m - ambient\_temp) / G$

(\*\*) Calculated with a temperature difference of 40K between the solar collector and the surrounding air, and with total solar radiation of 1000 W/m<sup>2</sup> referred to the exposed area.

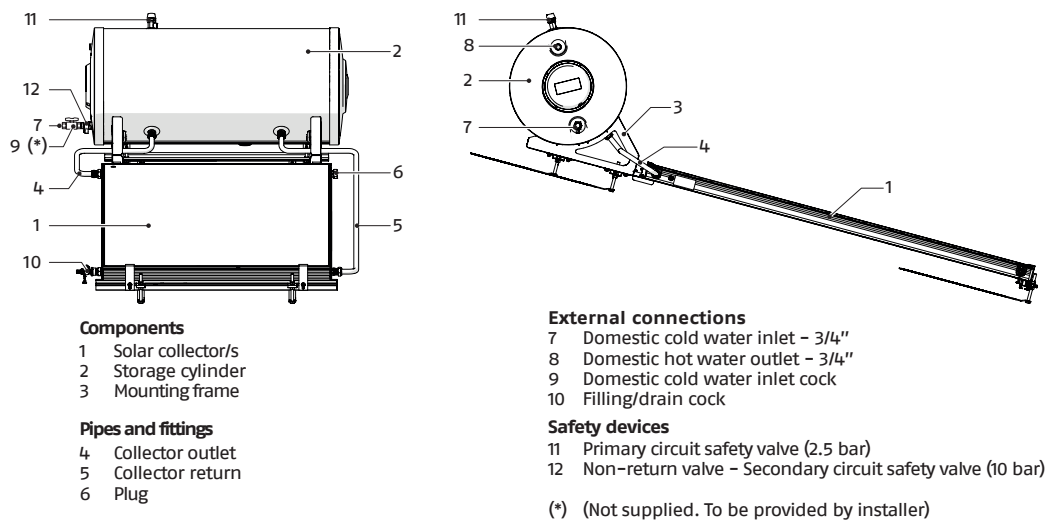
## CSNA 20 RS 30 ° (installation on flat roofs) system layout



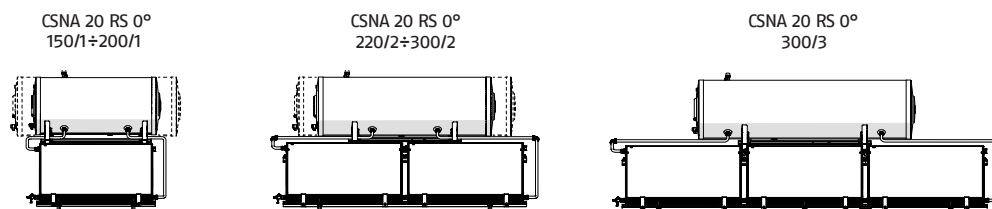
### POSSIBLE CONFIGURATIONS



## SYSTEM STRUCTURE CSNA 20 RS 0° (installation on pitched roofs) system layout



### POSSIBLE CONFIGURATIONS



## SOLAR THERMAL

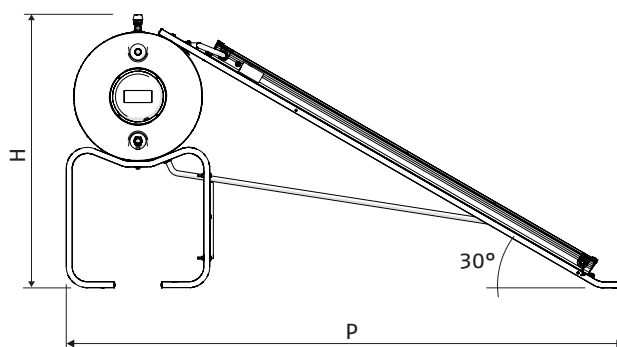
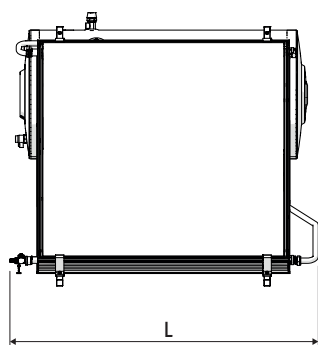
### Natural circulation solar systems

#### SPF SYSTEM SIMULATION WITH POLYSUN

Brief description of the system	Required area ** Number of collectors	Solar efficiency**
Climate: Central Switzerland, collector orientation: south, cold water 10 ° C, hot water 50 °		
<b>Domestic hot water: Fss * = 60%</b> Storage tank 450 l, collectors with an inclination of 45 °, Daily energy requirement 10 kWh (4-6 people) Energy requirement of the reference system 4200 kWh / year	5.85 m <sup>2</sup> 3.2 collectors	434 kWh/m <sup>2</sup>
<b>Domestic hot water with preheating: Fss * = 25%</b> Storage cylinder 450 l, collectors with an Inclination of 45 °, Domestic hot water 10,000 l / day (200 people) Daily heat loss (recirculation & storage) 60 kWh, Energy requirement of the reference system 191'700 kWh / year	73.7 m <sup>2</sup> 40.7 collectors	652 kWh/m <sup>2</sup>
<b>Environment heating: Fss * = 25%</b> Storage cylinder 1200 l, collectors with an Inclination of 45 °, Daily energy requirement 10 kWh (4-6 persons), Building 200 m <sup>2</sup> , strong intermediate construction, well insulated, Heating power requirement 5.8 kW (outdoor temperature -8 ° C), Heating energy demand 12140 kWh / year, Reference system energy requirement 16340 kWh / year	19.6 m <sup>2</sup> 10.8 collectors	274 kWh/m <sup>2</sup>
<p>* Fractional solar savings: Fraction of the final energy that is saved thanks to the solar system compared to a reference system.</p> <p>** Surface requirements and solar efficiency are defined in relation to the aperture area of the collectors.</p>		
<p>SPF Testing, Institut für Solartechnik SPF, Hochschule für Technik Rapperswil HSR, CH-8640 Rapperswil, Switzerland 16.04.2012 / SCFv3.0en <a href="http://www.solarenergy.ch">www.solarenergy.ch</a></p>		

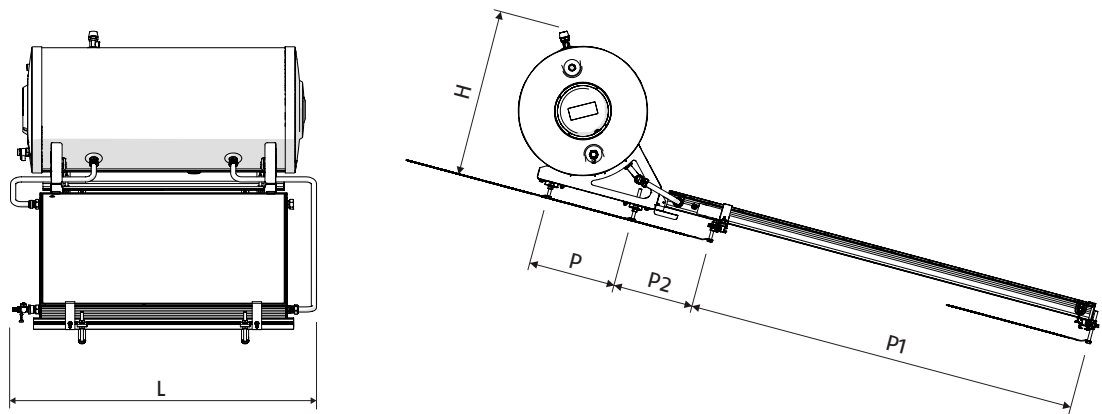
#### DIMENSIONS AND WEIGHTS

##### INSTALLATION ON FLAT ROOF



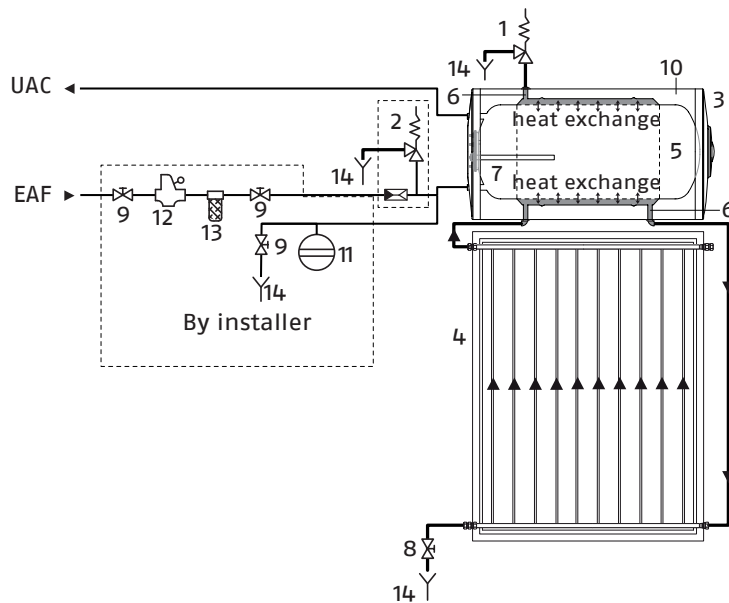
SOLAR SYSTEM		CSNA 20 RS 150/1 30 °	CSNA 20 RS 200/1 30 °	CSNA 20 RS 220/2 30 °	CSNA 20 RS 300/2 30 °	CSNA 20 RS 300/3 30 °
Net weight	kg	112	136	162	198	236
Gross weight	kg	274	352	401	496	597
L	mm	1311	1310	2364	2364	3449
P	mm	2310	2310	2310	2310	2310
H	mm	1130	1130	1130	1130	1130

INSTALLATION ON PITCHED ROOF



SOLAR SYSTEM		CSNA 20 RS 150/1 0 °	CSNA 20 RS 200/1 0 °	CSNA 20 RS 220/2 0 °	CSNA 20 RS 300/2 0 °	CSNA 20 RS 300/3 0 °
Net weight	kg	94	122	143	193	200
Gross weight	kg	256	338	382	491	500
L	mm	1200	1300	2410	2410	3519
P	mm	270	270	360	360	360
P1	mm	1965	1965	1619	1619	1619
P2	mm	-	-	332	332	332
H	mm	1220	720	2325	2325	3500

WATER CIRCUIT



- EAF Domestic hot water inlet  
UAC Domestic hot water outlet
- 1 Primary (solar collector) circuit safety valve (2.5 bar)
  - 2 Non-return valve - safety valve of secondary (DHW) circuit (10 bar) 3 Tank
  - 3 Storage cylinder
  - 4 Collector
  - 5 DHW tank (secondary circuit)
  - 6 Primary circuit
  - 7 Magnesium anode
  - 8 Primary circuit filling/drain cock
  - 9 Tap
  - 10 Storage cylinder insulation
  - 11 Sanitary expansion vessel
  - 12 Pressure reducer
  - 13 Water softener filter
  - 14 Water discharge

### ASSEMBLY OF SOLAR COLLECTORS

#### GENERAL NOTES

Assembly must only take place on sufficiently robust roof surfaces or frames. The strength of structure must be checked on site by an expert before assembling the collectors. In this operation it is necessary to check the suitability of the frame especially the tightness of screw connections that fix the solar collectors. A check of the entire frame according to the local regulations validated by an expert is mandatory in areas with considerable snowfall or in areas exposed to strong winds. It is therefore necessary to take into consideration all the characteristics of the assembly site which can lead to an increase of the total load of the structures. During the installation is very important to check the right inclination of the components of the system so to have the natural circulation.

#### WIND AND SNOW LOADS ON COLLECTORS (indicative values)

INSTALLATION HEIGHT ABOVE GROUND	WIND SPEED	MASS IN KG TO SECURE COLLECTOR AGAINST LIFTING BY WIND		LOAD ON ROOF FROM WIND, SNOW, AND COLLECTOR WEIGHT	
		At angle 45°	At angle 20°	At angle 45°	At angle 20°
0 - 8 m	100 km / h	80 kg	40 kg	320 kg	345 kg
8 - 20 m	130 km / h	180 kg	90 kg	470 kg	430 kg
20 - 100 m	150 km / h	280 kg	150 kg	624 kg	525 kg

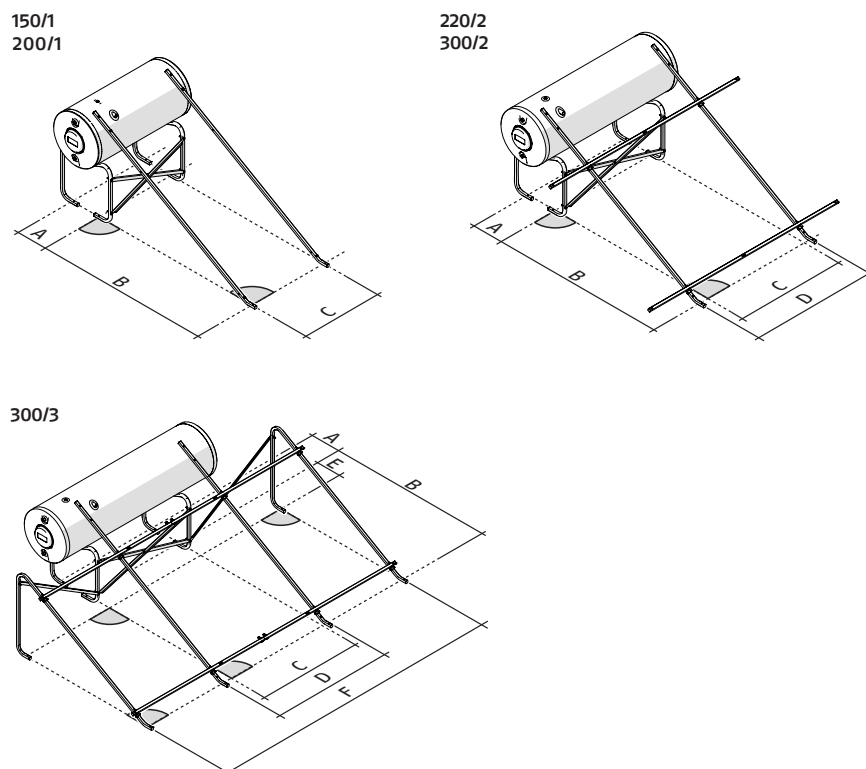
#### LIGHTNING PROTECTION

The metal conduits of the solar circuit must be connected by a conductor (yellow-green) of at least 16 mm<sup>2</sup> Cu (H07 VU or R) with the main potential equalization bar. If a lightning rod is already installed, the collectors can be integrated into the existing system. Otherwise it is possible to use a ground wire. The ground wire must be connected outside the house. The ground wire must also be connected to the compensation bar using a pipe of the same diameter.

#### INCLINATION OF THE COLLECTORS

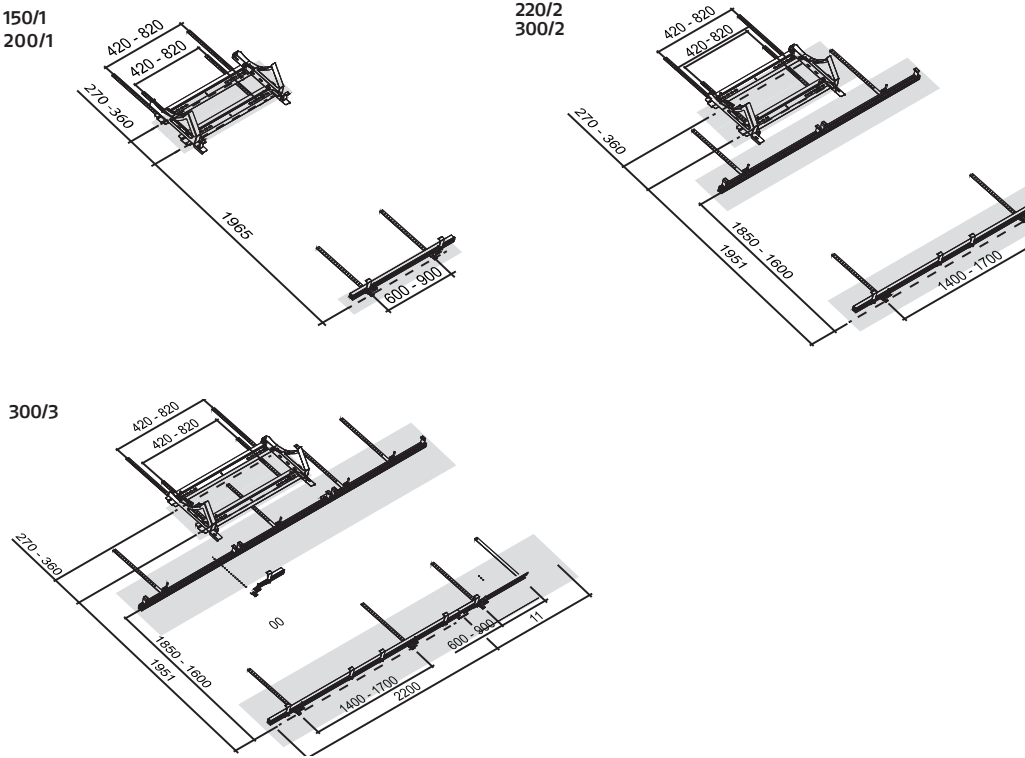
It is advisable to install the collector with a minimum inclination of 15 ° to facilitate the cleaning of the glass and the removal of the snow. The ventilation and exhaust openings of the collectors must not be closed when the system is installed. All collector connections as well as the ventilation and exhaust openings must be protected against impurities.

#### CSNA 20 RS 30 ° MAIN DIMENSIONS



SOLAR SYSTEM		CSNA 20 RS 150/1	CSNA 20 RS 200/1	CSNA 20 RS 220/2	CSNA 20 RS 300/2	CSNA 20 RS 300/3
A	mm	300	300	300	300	300
B	mm	1832	1832	1832	1832	1832
C	mm	860	860	1160	1160	1160
D	mm	-	825	1310	1310	1310
E	mm	-	-	-	-	300
F	mm	-	-	-	-	3216

CSNA 20 RS 0 ° MAIN DIMENSIONS



WATER + GLYCOL PRE-SELECTION

ANTIFREEZE	TEMPERATURE	DENSITY
55%	-40°C	1,048 kg / dm³
50%	-32°C	1.045 kg / dm³
45%	-26°C	1,042 kg / dm³
40%	-21°C	1.037 kg / dm³
35%	-17°C	1.033 kg / dm³
30%	-14°C	1,029 kg / dm³
25%	-10°C	1.023 kg / dm³

## SOLAR THERMAL

### Natural circulation solar systems

#### CSNA 20 RS SYSTEMS

Natural circulation solutions for the production of domestic hot water.

##### CONSTRUCTION DESCRIPTION

Solutions dedicated to the domestic hot water production even in not favorable climatic zones (up to 5 people).

The system has:

- High efficiency CSAL 20 RS solar collector, insulated, with aluminum absorber with high selective coating
- Double chamber enamelled cylinder with polyurethane insulation and magnesium anode
- Fixing kits for the installation of the system: in parallel to the roof or inclined at an angle of 30° on flat surfaces
- Single-phase electric resistance (can also be used as antifreeze) available as an accessory
- Non-toxic, biodegradable and biocompatible frost-protection liquid
- Solar system certified according to EN 12976
- 5 year warranty.

#### ACCESSORIES

The following accessories (not included in the product) are available:

- Electric resistance kit 1,5 kW - 1 "1/4
- Electric resistance single-phase kit 3,0 kW - 1 "1/4
- Glycol kit 2,5 kg
- Glycol kit 5,0 kg





RIELLO SpA - 37045 Legnago (VR)  
tel. +39 0442 630111 - fax +39 0442 630371  
[www.riello.com](http://www.riello.com)

As the company is constantly engaged in the continuous improvement of its entire production, the aesthetic and dimensional features, technical data, equipment and accessories can be subject to variation.

**RIELLO**