

# For Tough Environment




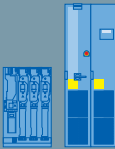

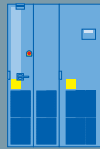
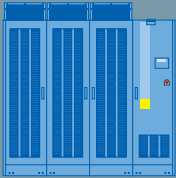
SINAMICS S120 liquid-cooled



## SINAMICS drives

Answers for industry.

**SIEMENS**

Low voltage						Medium voltage
For basic applications	For demanding applications			For sophisticated applications		For applications with high power ratings
						
SINAMICS G110	SINAMICS G120	SINAMICS G120D	SINAMICS G130/G150	SINAMICS S120	SINAMICS S150	SINAMICS GM150/SM150/GL150
V/f control	V/f control/vector control			V/f control/vector control/servo control		V/f control/vector control
0.12–3 kW	0.37–90 kW	0.75–7.5 kW	75–1,500 kW	0.12–4,500 kW	75–1,200 kW	0.8–120 MW
Pumps, fans, conveyor belts	Pumps, fans, conveyor belts, compressors, mixers, crushers, extruders			Production machines – e.g. packaging, textile and printing machines, paper machines, plastics machines, machine tools, plants and process lines	Test stands, crosscutters, centrifuges	Pumps, fans, compressors, mixers, extruders, crushers, rolling mills, mine hoists
Common standard engineering tools						
SIZER – for simple planning and engineering			STARTER – for fast commissioning, optimization and diagnostics			

# SINAMICS – the optimum drive for every task

The drive family for drive solutions that are fit for the future

The SINAMICS® family offers the optimum drive for each and every drive application – and all of the drives can be engineered, parameterized, commissioned and operated in a standard way.

SINAMICS – can tackle any drive application

- Wide range of power ratings from 0.12 kW to 120 MW
- Available in low-voltage and medium-voltage versions
- Standard functionality using a common hardware and software platform
- Standard engineering using just two tools for all drives: SIZER for engineering and STARTER for parameterization and commissioning
- High degree of flexibility and combinability



## Cost-saving and rugged: Liquid-cooled SINAMICS S120

### **SINAMICS S120 liquid-cooled – the alternative for tough ambient conditions**

Liquid-cooled SINAMICS S120 chassis units are predestined for tough conditions. High degrees of protection can be easily implemented. This means that they can confidently handle dirty and aggressive ambient air. When space is tight, the 60 % smaller footprint pays off when compared to air-cooled versions. As a result of the lower envelope dimensions, new modular machine concepts can be implemented. But this isn't all – the liquid-cooled drive systems are especially quiet, efficient and require little maintenance. In many applications, the heat recovery provides additional cost-saving potential. The cooling water that is heated up can be used for process heat, heating or water for general usage.

### **Independent of the ambient air**

The thermal power loss of SINAMICS S120 units can be extremely effectively dissipated to the cooling liquid. This means that hermetically sealed electrical cabinets can be easily implemented in degree of protection IP54 or higher. This protects the drive unit from dusty and aggressive air – but the same is also true for humidity, spray water or salt-laden sea air in marine applications. Even high ambient temperatures are less critical when compared to air-cooled drive units, as it is essentially the cooling water temperature that defines the thermal load. At the same time, the temperature inside the electrical room does not increase. For Ex p hazardous zones, the inside of the cabinet can be pressurized to prevent the ingress of explosive gases.

### **Liquid-cooled SINAMICS S120 – Advantages at a glance**

- Highest power density through efficient cooling
- Predestined for use where space is tight
- High degrees of protection can be easily implemented
- Perfectly suitable for dusty and aggressive ambient air
- Permits modular machine concepts
- Quiet and low maintenance
- Electrical rooms do not have to be climate-controlled
- Additional cost-saving potential by recovering heat



## Compact, low maintenance and highly versatile

### Up to 60% smaller footprint

The liquid-cooled version with its extremely compact design is the optimum choice where space is at a premium (ships, offshore platforms) or where the drive system is mounted in the driven machine. When compared to an air-cooled unit with the same power rating, it has an up to 60% smaller footprint, because the water-cooled drive converter requires significantly less surrounding construction as a result of the more intensive cooling. If the drive units require less space, then the electrical room can also be dimensioned smaller – which in turn reduces construction costs.

### Quiet and lower maintenance

If cooling water is available anyway, it certainly makes sense to also use the water-cooled version at conventional locations. This is because the climate-controlled systems of the room in which the drive converter is installed require less equipment and power. For typically only 52 db (A), no additional noise-damping measures are required. This feature

makes these drive units predestined for drive applications where quiet equipment is mandatory, for example in cruise ships and production workstations close the drive systems. Further, the drive does not have a fan, which means there is no wearing part to fail, therefore increasing the reliability of the drive and in turn the overall plant availability.

### Climate control is not required

For liquid-cooled versions, almost all of the thermal power loss is dissipated through the cooling medium – therefore the temperature around the drive converter hardly increases. This means that expensive climate control systems can be eliminated – an important factor when retrofitting and modernizing drives.

### Additional cost-saving potential by recovering heat

In addition to the cost savings as a result of the efficient cooling concept, there is also the possibility of recovering heat. The cooling water that is heated up as part of the cooling process can be used

as a free-of-charge heating source for process heat, heating or water for general usage. With such a system, the normal heating goes into the dormant mode when the drive is operational. High energy-saving potential is especially obtained if warm water is required for the production process – for example in paper production. The cost savings for heating and warm water for general usage in production and the neighboring office buildings have a positive impact on the wallet. This is the reason that these drive units often pay for themselves in less than two years.

### Range of power ratings

The power ratings of liquid-cooled SINAMICS S120 extend up to 1,200 kW. Even higher ratings can be achieved by connecting units in parallel.





### Sophisticated cooling system

The compact design and the high efficiency of the liquid-cooled SINAMICS S120 are based on a well-conceived cooling system. The cooling circuit cools all of the main components such as power semiconductors, DC link capacitors and balancing resistors. Only a low quantity of cooling liquid – water with drinking water quality – is required. This is because these drive units only require a comparatively low flow rate to achieve an adequate cooling effect. Derating is not even required when antifreeze is used.

### Application-based standard

There is a complete range of components available for the liquid-cooled SINAMICS S120. The standard as well as type-tested components can be adapted to the specific requirements as required and combined to create the optimum solution for the individual application. The supplementary components such as cooling system and piping can be easily integrated. Liquid-cooled SINAMICS S120 drive units can also be mounted horizontally.

### Often the ideal sector solution

The liquid-cooled concept offers significant advantages in the widest range of sectors. Every single square meter counts in shipbuilding and on offshore platforms. In this case, the space-saving design pays off – also due to the fact that the heat generated in the already hot machinery spaces has to be dissipated anyway as part of the cooling process and transferred to the seawater through a heat exchanger. As a result of the hermetically sealed cabinet, the salt-laden atmosphere cannot come into contact with the drive unit electronics. For plastics machines – such as extruders and injection molding machines –, the drives are directly mounted in the machine. For these types of applications, the liquid-cooled SINAMICS S120 permits modular machine concepts as a result of its compact design. The process industry is also predestined for this type of drive solution where a hermetically sealed cabinet solution makes sense because of the prevailing chemically aggressive atmospheres. Other segments where this drive solution is ideal include plants with high levels of dust –

such as cement plants, mining operations, coal-fired power stations – and printing shops. Applications in the food and beverage industry are another prime example where electrical cabinets located in the production area must be cleaned using a water jet for hygiene reasons. For applications in tough environments, the reduced space requirement, the lower costs for controlling the climate of rooms and heat recovery for warm process water and water for general usage certainly pay off.

### Cabinet units in a liquid-cooled version

SINAMICS S120 drives in the liquid-cooled version are also available as cabinet units. These are designed for the specific requirements and represent a tailored all-in-one solution for each and every drive application.

# SINAMICS S120 liquid-cooled

## Available range of units

Input voltage 380–480 V						
Order No.	Rated power	Rated output current	Heat sink design	Required cooling flow <sup>1</sup>	Weight	Dimensions IP00 W x D x H
	kW	A		l/min	kg	mm
AC/AC Power Modules						
6SL3315-1TE32-1AA0	110	210	Stainless steel	9	77	265 x 549 x 835
6SL3315-1TE32-6AA0	132	260	Stainless steel	9	77	265 x 549 x 835
6SL3315-1TE33-1AA0	160	310	Stainless steel	12	108	265 x 549 x 983
6SL3315-1TE35-0AA0	250	490	Stainless steel	12	108	265 x 549 x 983

<sup>1</sup> The value applies for water and water / Antifrogen N mixture cooling with 45 % Antifrogen N.

Input voltage 380–480 V						
Order No.	Rated power	Rated DC link current	Heat sink design	Required cooling flow <sup>1</sup>	Weight	Dimensions IP00 W x D x H
	kW	A		l/min	kg	mm
Basic Line Modules						
6SL3335-1TE37-4AA0	360	740	Aluminum	9	108	160 x 545 x 1,153
6SL3335-1TE41-2AA0	600	1,220	Aluminum	9	108	160 x 545 x 1,153
6SL3335-1TE41-7AA0	830	1,730	Aluminum	12	185	160 x 545 x 1,558
Active Line Modules						
6SL3335-7TE35-0AA0	300	549	Aluminum	12	80	150 x 545 x 1,153
6SL3335-7TE38-4AA0	500	940	Aluminum	13	110	265 x 545 x 984
Motor Modules		Rated output current				
		A				
6SL3325-1TE32-1AA0	110	210	Stainless steel	9	41	160 x 545 x 998
6SL3325-1TE32-6AA0	132	260	Stainless steel	9	41	160 x 545 x 998
6SL3325-1TE33-1AA0	160	310	Stainless steel	12	80	160 x 545 x 1,224
6SL3325-1TG35-5AA0	250	490	Stainless steel	12	80	160 x 545 x 1,224
6SL3325-1TE36-1AA0	315	605	Aluminum	16	110	265 x 545 x 984
6SL3325-1TE38-4AA0	450	840	Aluminum	16	110	265 x 545 x 984
6SL3325-1TE41-0AA0	560	985	Aluminum	27	220	295 x 545 x 1,496
6SL3325-1TE41-4AA0	800	1,405	Aluminum	27	220	295 x 545 x 1,496

<sup>1</sup> The value applies for water and water / Antifrogen N mixture cooling with 45 % Antifrogen N.

Input voltage 500–690 V						
Order No.	Rated power	Rated DC link current	Heat sink design	Required cooling flow <sup>1</sup>	Weight	Dimensions IP00 W x D x H
	kW	A		l/min	kg	mm
Basic Line Modules						
6SL3335-1TG34-2AA0	355	420	Aluminum	9	108	160 x 545 x 1,153
6SL3335-1TG37-3AA0	630	730	Aluminum	9	108	160 x 545 x 1,153
6SL3335-1TG41-3AA0	1,100	1,300	Aluminum	12	185	160 x 545 x 1,508
6SL3335-1TG41-7AA0	1,370	1,650	Aluminum		185	160 x 545 x 1,508
Active Line Modules						
6SL3335-7TG35-8AA0	560	644	Aluminum	16	110	265 x 545 x 984
6SL3335-7TG41-3AA0	1,400	1,422	Aluminum	27	220	295 x 545 x 1,496
Motor Modules		Rated output current				
		A				
6SL3325-1TG31-0AA0	90	100	Stainless steel	9	41	160 x 545 x 998
6SL3325-1TG31-5AA0	132	150	Stainless steel	9	41	160 x 545 x 998
6SL3325-1TG32-2AA0	200	215	Stainless steel	12	80	160 x 545 x 1,224
6SL3325-1TG33-3AA0	315	330	Stainless steel	12	80	160 x 545 x 1,224
6SL3325-1TG35-8AA0	560	575	Aluminum	16	110	265 x 545 x 984
6SL3325-1TG38-1AA0	800	810	Aluminum	27	220	295 x 545 x 1,496
6SL3325-1TG41-0AA0	1,000	1,025	Aluminum	27	220	295 x 545 x 1,496
6SL3325-1TG41-3AA0	1,200	1,270	Aluminum	27	220	295 x 545 x 1,496

<sup>1</sup> The value applies for water and water / Antifrogen N mixture cooling with 45 % Antifrogen N.

Additional information on SINAMICS is  
provided under

**[www.siemens.com/sinamics](http://www.siemens.com/sinamics)**

The addresses and contact partners are  
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**[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)**

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