

## Data sheet for SINAMICS G120X

Article No. : 6SL3220-1YH60-1CB0

Client order no. :  
Order no. :  
Offer no. :  
Remarks :

Item no. :  
Consignment no. :  
Project :

Figure similar



### Rated data

#### Input

|                      |                           |                 |
|----------------------|---------------------------|-----------------|
| Number of phases     | 3 AC                      |                 |
| Line voltage         | 500 ... 690 V +10 % -10 % |                 |
| Line frequency       | 47 ... 63 Hz              |                 |
| <b>Rated voltage</b> | <b>690V IEC</b>           | <b>600V NEC</b> |
| Rated current (LO)   | 437.00 A                  | 461.00 A        |
| Rated current (HO)   | 362.00 A                  | 381.00 A        |

#### Output

|                      |                 |                               |
|----------------------|-----------------|-------------------------------|
| Number of phases     | 3 AC            |                               |
| <b>Rated voltage</b> | <b>690V IEC</b> | <b>600V NEC <sup>1)</sup></b> |
| Rated power (LO)     | 400.00 kW       | 450.00 hp                     |
| Rated power (HO)     | 355.00 kW       | 350.00 hp                     |
| Rated current (LO)   | 420.00 A        | 432.00 A                      |
| Rated current (HO)   | 348.00 A        | 367.00 A                      |
| Rated current (IN)   | 453.00 A        |                               |
| Max. output current  | 598.00 A        |                               |

|                                     |              |
|-------------------------------------|--------------|
| Pulse frequency                     | 2 kHz        |
| Output frequency for vector control | 0 ... 100 Hz |
| Output frequency for V/f control    | 0 ... 100 Hz |

#### Overload capability

|                    |                                                                |
|--------------------|----------------------------------------------------------------|
| Low Overload (LO)  | 110% base load current IL for 60 s in a 300 s cycle time       |
| High Overload (HO) | 150% x base load current IH for 60 s within a 300 s cycle time |

### General tech. specifications

|                                   |                                           |
|-----------------------------------|-------------------------------------------|
| Power factor $\lambda$            | 0.75 ... 0.93                             |
| Offset factor $\cos \phi$         | 0.96                                      |
| Efficiency $\eta$                 | 0.98                                      |
| Sound pressure level (1m)         | 74 dB                                     |
| Power loss <sup>3)</sup>          | 7.670 kW                                  |
| Filter class (integrated)         | RFI suppression filter for Category C3    |
| EMC category (with accessories)   | Category C3                               |
| Safety function "Safe Torque Off" | without SIRIUS device (e.g. via S7-1500F) |

### Communication

|               |                               |
|---------------|-------------------------------|
| Communication | USS, Modbus RTU, BACnet MS/TP |
|---------------|-------------------------------|

### Inputs / outputs

#### Standard digital inputs

|                        |       |
|------------------------|-------|
| Number                 | 6     |
| Switching level: 0 → 1 | 11 V  |
| Switching level: 1 → 0 | 5 V   |
| Max. inrush current    | 15 mA |

#### Fail-safe digital inputs

|        |   |
|--------|---|
| Number | 1 |
|--------|---|

#### Digital outputs

|                                    |                |
|------------------------------------|----------------|
| Number as relay changeover contact | 2              |
| Output (resistive load)            | DC 30 V, 5.0 A |
| Number as transistor               | 0              |

#### Analog / digital inputs

|            |                        |
|------------|------------------------|
| Number     | 2 (Differential input) |
| Resolution | 10 bit                 |

#### Switching threshold as digital input

|       |       |
|-------|-------|
| 0 → 1 | 4 V   |
| 1 → 0 | 1.6 V |

#### Analog outputs

|        |                         |
|--------|-------------------------|
| Number | 1 (Non-isolated output) |
|--------|-------------------------|

#### PTC/ KTY interface

|                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------|
| 1 motor temperature sensor input, sensors that can be connected PTC, KTY and Thermo-Click, accuracy $\pm 5^\circ\text{C}$ |
|---------------------------------------------------------------------------------------------------------------------------|

### Closed-loop control techniques

|                                           |     |
|-------------------------------------------|-----|
| V/f linear / square-law / parameterizable | Yes |
| V/f with flux current control (FCC)       | Yes |
| V/f ECO linear / square-law               | Yes |
| Sensorless vector control                 | Yes |
| Vector control, with sensor               | No  |
| Encoderless torque control                | No  |
| Torque control, with encoder              | No  |

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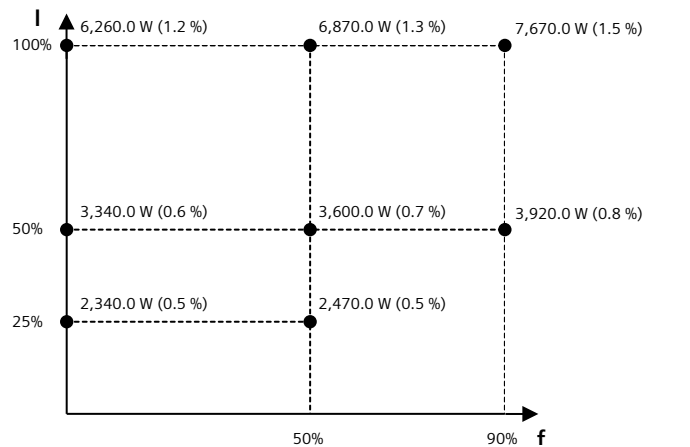
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| Ambient conditions          |                                                                |
|-----------------------------|----------------------------------------------------------------|
| Standard board coating type | Class 3C2, according to IEC 60721-3-3: 2002                    |
| Cooling                     | Air cooling using an integrated fan                            |
| Cooling air requirement     | 0.362 m³/s (12.784 ft³/s)                                      |
| Installation altitude       | 1,000 m (3,280.84 ft)                                          |
| Ambient temperature         |                                                                |
| Operation                   | 0 ... 45 °C (32 ... 113 °F)                                    |
| Transport                   | -40 ... 70 °C (-40 ... 158 °F)                                 |
| Storage                     | -25 ... 55 °C (-13 ... 131 °F)                                 |
| Relative humidity           |                                                                |
| Max. operation              | 95 % At 40 °C (104 °F), condensation and icing not permissible |

| Connections                    |                                              |
|--------------------------------|----------------------------------------------|
| Signal cable                   |                                              |
| Conductor cross-section        | 0.15 ... 1.50 mm² (AWG 24 ... AWG 16)        |
| Line side                      |                                              |
| Version                        | M12 screw                                    |
| Conductor cross-section        | 4 x 240.00 mm² (MCM 2 x 500 ... MCM 4 x 500) |
| Motor end                      |                                              |
| Version                        | M12 screw                                    |
| Conductor cross-section        | 4 x 240.00 mm² (MCM 2 x 500 ... MCM 4 x 500) |
| DC link (for braking resistor) |                                              |
| PE connection                  | M12 screw                                    |
| Max. motor cable length        |                                              |
| Shielded                       | 150 m (492.13 ft)                            |

| Mechanical data           |                                                             |
|---------------------------|-------------------------------------------------------------|
| Degree of protection      | IP20 / UL open type                                         |
| Frame size                | FSH                                                         |
| Net weight                | 162 kg (357.15 lb)                                          |
| Dimensions                |                                                             |
| Width                     | 548 mm (21.57 in)                                           |
| Height                    | 1,695 mm (66.73 in)                                         |
| Depth                     | 393 mm (15.47 in)                                           |
| Standards                 |                                                             |
| Compliance with standards | UL, cUL, CE, C-Tick (RCM), EAC, KCC, SEMI F47, REACH        |
| CE marking                | EMC Directive 2004/108/EC, Low-Voltage Directive 2006/95/EC |

| Converter losses to IEC61800-9-2*                    |        |
|------------------------------------------------------|--------|
| Efficiency class                                     | IE2    |
| Comparison with the reference converter (90% / 100%) | 36.6 % |



The percentage values show the losses in relation to the rated apparent power of the converter.

The diagram shows the losses for the points (as per standard IEC61800-9-2) of the relative torque generating current (I) over the relative motor stator frequency (f). The values are valid for the basic version of the converter without options/components.

\*converted values

<sup>1)</sup>The output current and HP ratings are valid for the voltage range 550V-600V  
<sup>3)</sup>Typical value. More information can be found in the element group "Converter losses to IEC 61800-9-2" in this datasheet.

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### I/O Extension Module

#### Inputs / outputs

##### Digital inputs

|                                        |                                                                                          |
|----------------------------------------|------------------------------------------------------------------------------------------|
| Number of digital inputs <sup>1)</sup> | 2                                                                                        |
| Conductor cross-section                | 0.5 ... 1.5 mm <sup>2</sup> (AWG 21 ... AWG 16)<br>Alternatively 2 x 0.5 mm <sup>2</sup> |
| Input voltage (0→1)                    | 11 V                                                                                     |
| Input voltage (1→0)                    | 5 V                                                                                      |
| Input voltage, max.                    | 30 V                                                                                     |

##### Digital outputs

|                              |                              |
|------------------------------|------------------------------|
| Number of digital outputs    | 4                            |
| Conductor cross-section      | 1.5 mm <sup>2</sup> (AWG 16) |
| Output current <sup>2)</sup> | 2 A                          |

##### Analog inputs

|                                       |                                                                                        |
|---------------------------------------|----------------------------------------------------------------------------------------|
| Number of analog inputs <sup>3)</sup> | 2                                                                                      |
| Conductor cross-section               | 0.5 ... 1.5 mm <sup>2</sup> (AWG 21 ... AWG 16)<br>alternatively 2*0.5 mm <sup>2</sup> |
| Current                               | 0 ... 20 mA                                                                            |

##### Analog outputs

|                                      |                                                                                          |
|--------------------------------------|------------------------------------------------------------------------------------------|
| Number of analog outputs             | 2                                                                                        |
| Type of analog outputs <sup>4)</sup> | Non-isolated output                                                                      |
| Conductor cross-section              | 0.5 ... 1.5 mm <sup>2</sup> (AWG 21 ... AWG 16)<br>Alternatively 2 x 0.5 mm <sup>2</sup> |
| Output voltage                       | 0 ... 10 V                                                                               |
| Output current                       | 0 ... 20 mA                                                                              |

#### Mechanical data

##### Dimensions

|        |                  |
|--------|------------------|
| Width  | 71 mm (2.80 in)  |
| Height | 117 mm (4.61 in) |
| Depth  | 27 mm (1.06 in)  |

<sup>1)</sup>DI 6: digital input; DI 7: P or M switch; DI COM: Input for Control Unit interface (24 V out, max. 250 mA)

<sup>2)</sup>The max. current depends on the temperature and the size of the connected converted. It varies between 2 A and 3 A at 30 V DC.

<sup>3)</sup>2 analog inputs for the connection of Pt1000/Ni1000 temperature sensors. One of which can be optionally used as analog input.

<sup>4)</sup>Switchable between voltage (0 ... 10 V) and current (0 ... 20 mA) using a parameter