SIEMENS

SINAMICS V20

The cost-effective, reliable and easy-to-use inverter for basic applications

siemens.com/sinamics-v20

Answers for industry.

SINAMICS V20

The perfect solution for basic applications

SINAMICS V20, the versatile inverter for basic demands

Today, in an increasing number of applications in plant and machinery construction, individual automation and drive solutions are demanded that automate simple motion sequences with low associated requirements.

With its compact SINAMICS V20, the basic performance inverter, Siemens offers a simple and cost-effective drive solution for these types of applications. SINAMICS V20 sets itself apart with its quick commissioning times, ease of operation, robustness and cost-efficiency.

With four frame sizes, it covers a power range extending from 0.12 kW up to 15 kW.

Minimize your costs

Engineering, commissioning and operating costs as well as those in operation must be kept as low as possible. You have precisely the right answer with our SINAMICS V20. To increase energy efficiency, the inverter is equipped with a control technique to achieve optimum energy efficiency through automatic flux reduction. Not only this, it displays the actual energy consumption and has additional, integrated energy-saving functions. This allows energy consumption to be slashed drastically.

Highlights
Easy to install
• Push-through and wall mounting – side-by-side possible for both
• USS and MODBUS RTU at terminals
• Integrated braking chopper for 7.5 kW to 15 kW
Easy to use
• Parameter loading without power supply
• Integrated application and connection macros
• Keep Running Mode for uninterrupted operation
• Wide voltage range, advanced cooling design and coated PCBs increase robustness
Easy to save money
• ECO mode for V/f, V^2/f
• Hibernation mode
• DC coupling

Power range	0.12 kW to 15 kW
Voltage range	1AC 200 V ... 240 V (+ / -10 %) 3AC 380 V ... 480 V (+10 % / -15 %)
Control modes	V/f V^2/f FCC

Typical applications

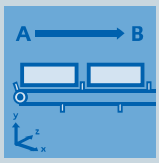
Pumping, ventilating and compressing

- **Centrifugal pumps**
- **Radial/axial fans**
- **Compressors**

Additional advantages:

- High availability through automatic restart and flying restart after power failures
- Broken belt detection by monitoring the load torque
- Pump protection against cavitation
- Hammer start and blockage clearing modes for clogged pumps
- PID controller for process values (e.g. temperature, pressure, level, flow)
- PID auto tuning to optimize controller parameters
- Hibernation mode stops the motor when demand is low
- Motor staging extends the flow range by adding two more fixed-speed drives (cascade)
- Frost and condensation protection prevents moisture in motors under extreme environmental conditions

Moving

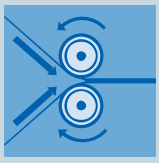


- **Belt conveyors**
- **Roller conveyors**
- **Chain conveyors**

Additional advantages:

- Soft, jerk-free acceleration reduces the stress on the gear units, bearings, drums and rollers
- Super torque start for conveyor belts with high breakaway torque
- Dynamic behavior by using braking resistor or DC braking
- Direct control of mechanical holding brake
- Broken belt detection by monitoring the load torque

Processing



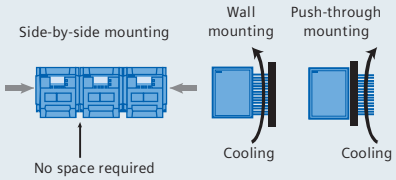
- **Single drives in the process industry**
  such as mills, mixers, kneaders, crushers, agitators, centrifuges
- **Main drives in machines with mechanically coupled axes**
  such as ring spinning machines, braiding machines for textile, ropes and wire

Additional advantages:

- Frost and condensation protection prevents moisture in motors under extreme environmental conditions
- Higher productivity with uninterrupted production due to Keep Running Mode
- Exchange of regenerative energy via the DC link
- Super torque start for machines with a high breakaway torque

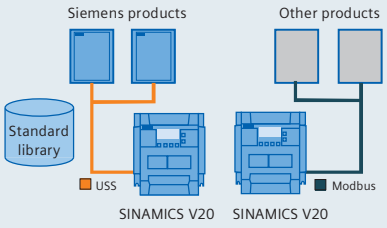
Easy to install

Installation



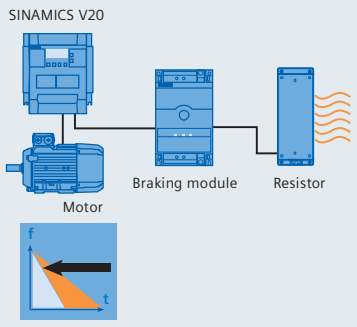
SINAMICS V20 feature	Your benefits
Compact design, side-by-side mounting and flexible device installation for both wall mounting and push-through mounting. Operation without additional option modules possible.	• Compact installation allows smaller cabinets to be used • Push-through mounting allows the cabinet to be cooled more easily • Can be run “out-of-the-box” without other options • Basic operator actions at a built-in BOP (Basic Operator Panel)

Communication



SINAMICS V20 feature	Your benefits
The communication port is available at the terminals. The preset parameters of the USS and MODBUS RTU are defined in the connection macro.	• Easy integration into existing systems • Easy integration into micro automation systems • Easier commissioning through standard libraries and connection macros

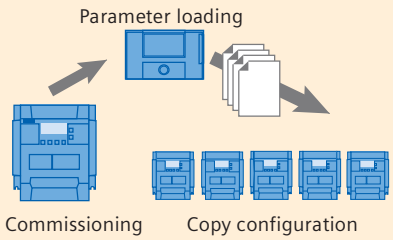
Braking module



SINAMICS V20 feature	Your benefits
The dynamic energy is dissipated as heat in a braking resistor with an adjustable duty cycle of between 5 % and 100 %.	• Possible to use dynamic braking to increase braking performance • Inverters ≥ 7.5 kW have an integrated braking module. In this case, the braking resistor can be directly connected.

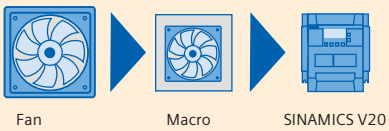
Easy to use

Parameter cloning



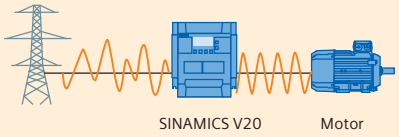
SINAMICS V20 feature	Your benefits
Parameter settings can be easily transferred from one unit to another using the BOP (Basic Operator Panel) interface – or even without power supply by using the parameter loader.	• Less technical support required • Short commissioning time • The product is delivered to the customer already preset

Macro approach



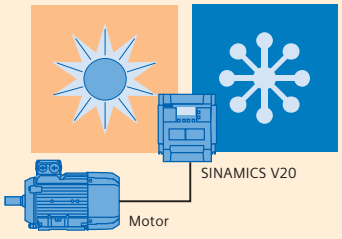
SINAMICS V20 feature	Your benefits
Connection and application macros to simplify I/O configuration and make the appropriate settings.	• Shorter training and commissioning time • Integrated and optimized application setting • Simple connection and application macros can be selected instead of configuring long complicated parameter lists • Errors caused by wrong parameter settings can be avoided

Keep Running Mode



SINAMICS V20 feature	Your benefits
The function provides higher productivity in production by automatic adaptation in the case of unstable line supplies.	• Stable operation under difficult line supply conditions • Higher productivity through prevention of interruptions of the production line • Adaptation to application-relevant reactions through flexible definition in case of fault/alarm

Robustness



SINAMICS V20 feature	Your benefits
Wider voltage range, better cooling design and coated PCB increase robustness of the drive in difficult environments.	• Operation possible when the line supply voltage fluctuates • Reliable operation for line voltages: – 1AC 200 V ... 240 V (-10 % / +10 %) – 3AC 380 V ... 480 V (-15 % / +10 %) • Operation up to an ambient temperature of 60 °C

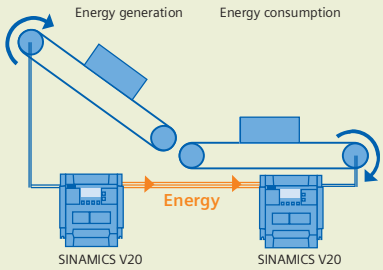
Easy to save money

Energy reduction during operation

*

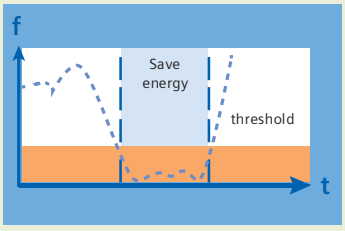
SINAMICS V20 feature	Your benefits
Integrated ECO mode for V/f and V^2/f automatically adapts the flux to save energy. The energy consumption can be shown in kWh, CO_2 or even in the local currency.	• Energy saving during low dynamic load cycles • If the setpoint changes, the ECO mode is automatically deactivated • Tells end users the actual energy that has been saved

Energy reduction during operation – DC coupling



SINAMICS V20 feature	Your benefits
Applications that use SINAMICS V20 drives with the same power rating can share a common DC bus to reuse the regenerative energy.	• Generate and save energy in applications that use coupled motors • Multiple inverters can optimally share resources • Reduce the need for dynamic braking and external components

Energy reduction during standby – hibernation mode

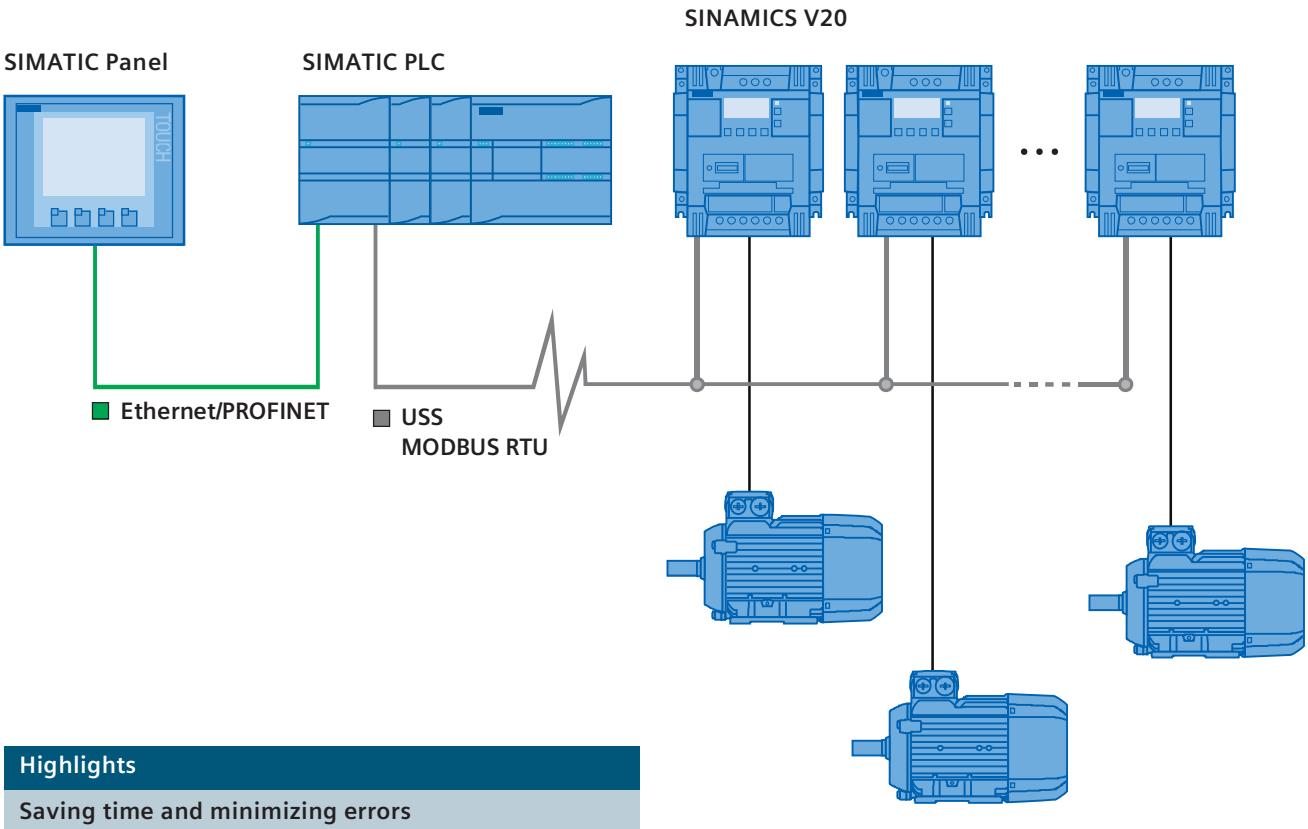


SINAMICS V20 feature	Your benefits
Inverter and motor only operate when the plant or machine requires them to. Hibernation mode will be activated automatically when the frequency demand or the feedback from a sensor drops below a specific threshold.	• Smart hibernation saves energy • Extended lifetime of motor • Reduced pump wear at low speed • Less time to program PLC code for pump/fan applications (PLC)

* Application and machine-type dependent.

Easy automation system

Combining SIMATIC PLC with SINAMICS V20



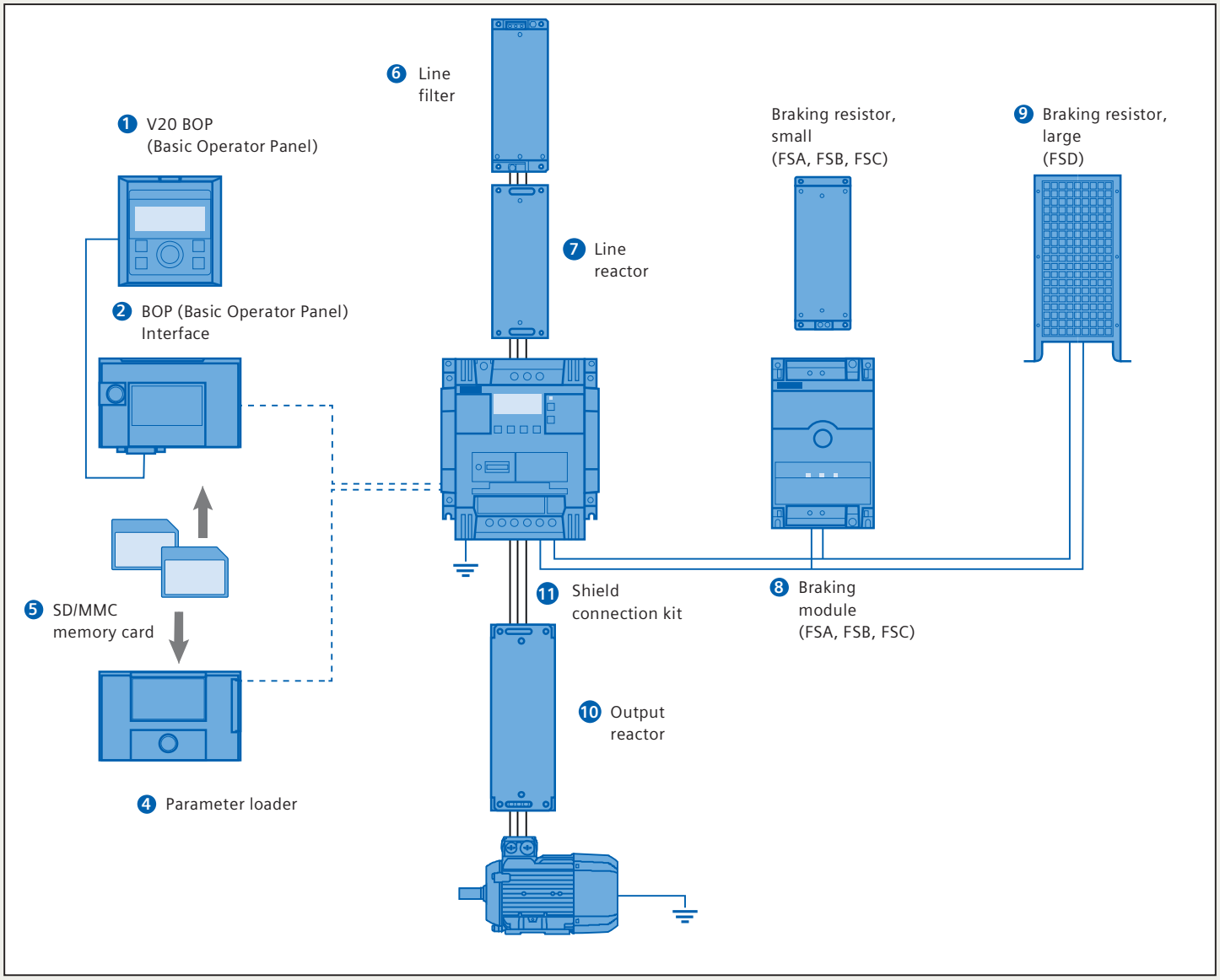
Highlights

Saving time and minimizing errors

- Easy system configuration with harmonized PLC libraries and predefined macros in the inverter
- One cable to connect SINAMICS V20 with USS or MODBUS RTU
- Integrated communication interface

Full range of options

Everything you need...



	Options	
1	V20 BOP	Same function as the integrated BOP (Basic Operator Panel) The value and setpoint are changed by rotating the wheel
2	BOP interface	• Connection between inverter and BOP • Integrated SD/MMC card slot for parameter cloning
3	BOP cable	3 m cable with connectors
4	Parameter loader	Up to 100 parameter sets with parameter settings can be written from the memory card to the inverter or saved from the inverter to the memory card without connecting the inverter to the line supply.
5	Memory card	MMC or SIMATIC SD memory card
6	Line filter	• Improved EMC performance • Longer motor cable for FSA

	Options	
7	Line reactor	• Suppresses the harmonic current • Improves the power factor
8	Braking module	• Shortens the deceleration ramp time • Suitable for 1 AC 230 V and 3 AC 400 V • Adjustable duty cycle from 5 % to 100 % • FSD already has an integrated braking unit
9	Braking resistor	• Dissipates regenerative energy as heat • 5 % duty cycle as default setting
10	Output reactor	• Longer motor cable
11	Shield connection kit	• Optimum shield connection • Strain relief

Technical data

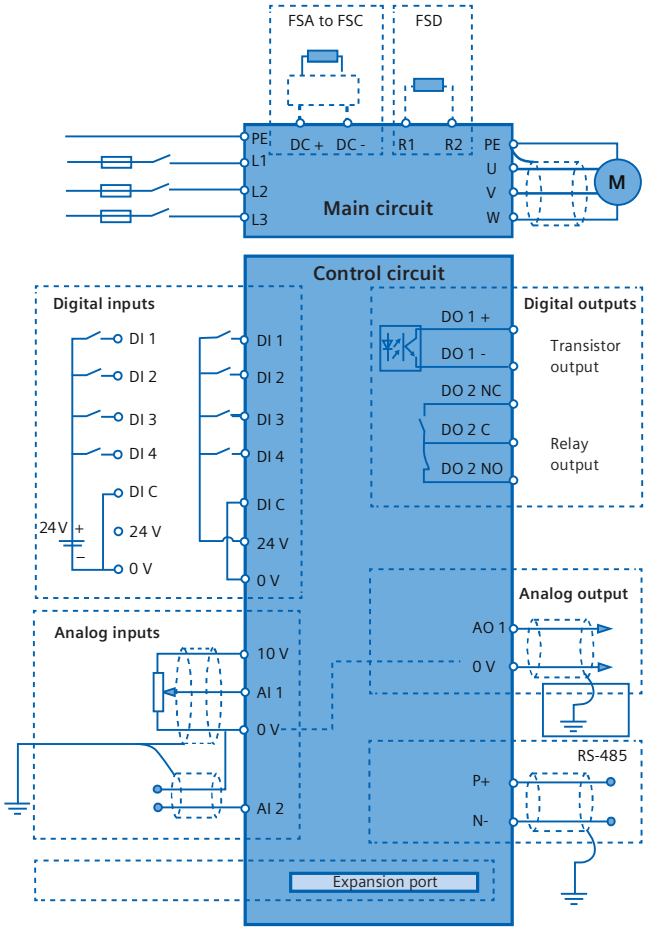
Power and control	
Voltage	1 AC 200 V ... 240 V (-10 % ... +10 %) 3 AC 380 V ... 480 V (-15 % ... +10 %)
Supply frequency	50/60Hz
Line supply type	TN, TT, IT, TT earthed line
Power range	1 AC 230 V 0.12 ... 3.0 kW (0.16 ... 4 hp) 3 AC 400 V 0.37 ... 15.0 kW (0.5 ... 20 hp)
Overload	150 % rated output current for 60 sec
Output frequency	0 ... 599 Hz resolution: 0.01 Hz
Pulse frequency	2 ... 16 kHz
Control modes	Linear V/f, square law V/f, multi-point V/f, flux current control

Standards	
Standards	CE, UL, C-tick, KC
EMC standards	1AC 230 V with integrated line filter according to EN 61800-3 C2 3AC 400 V with integrated line filter according to EN 61800-3 C3

Features	
Ease of use	• Energy consumption monitoring • Automatic restart • Parameter cloning • USS/MODBUS communication • Connection and application macro • Customized default values
Application	• Hibernation mode • Slip compensation • Keep running mode • Kinetic buffering • Flying start • Motor staging • BICO function • Dual ramp • Wobble function • PID controller • Super torque mode • Hammer start • Blockage clearing mode
Protection	• Frost protection • Condensation protection • Cavitation protection • DC-link voltage control • Load failure detection
Control	• ECO mode • Imax control • Flexible boost control • Adjustable PWM modulation

Signal inputs and outputs	
Analog inputs	AI1: bipolar current / voltage mode AI2: unipolar current / voltage mode Can be used as digital inputs
Analog outputs	AO: 0 ... 20 mA
Digital inputs	DI1-DI4, optically isolated PNP/NPN selectable by terminal
Digital outputs	DO1: transistor output DO2: relay output – 250 V AC 0.5 A with resistive load – 30 V DC 0.5 A with resistive load

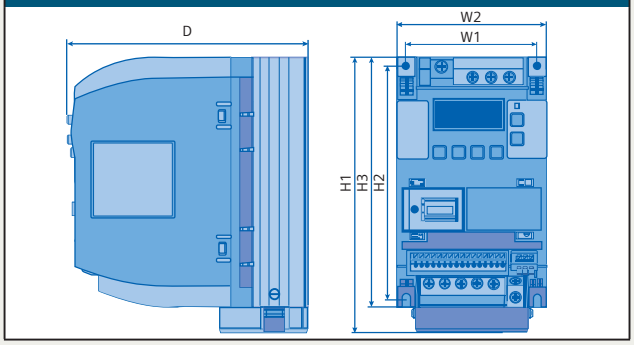
Connection diagram



Mounting and environment	
Degree of protection	IP20
Mounting	Wall mounting, side-by-side mounting, push-through mounting for FSB, C and D
Cooling	• FSA up to 0.75 kW: convection cooling • FSA, FSB, FSC, FSD: power electronics cooled using heat sinks with external fan
Ambient temperature	In operation • 0 ... 60 °C (32 ... 140 °F) • 40 ... 60 °C (104 ... 140 °F) with derating Storage • -40 ... 70 °C (-40 ... 158 °F)
Relative humidity	95 % (non-condensing)
Altitude	• Up to 4000 m above sea level • 1000 ... 4000 m: output current derating • 2000 ... 4000 m: supply voltage derating
Motor cable length	• Unshielded cable: 50 m • Shielded cable: 25 m; 10 m for FSA filtered version
Dynamic braking	Option module for FSA, FSB and FSC; integrated for FSD

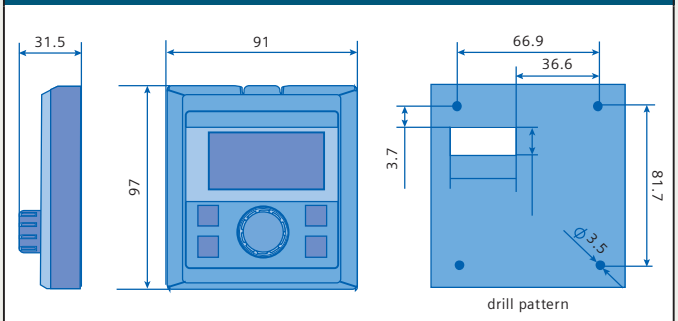
Dimensions

SINAMICS V20

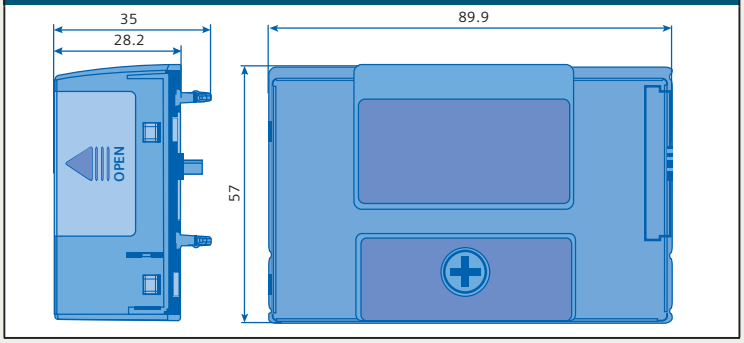


	Width (mm)		Height (mm)			Depth (mm)	Weight (kg)
Frame size	W1	W2	H1	H2	H3	D	WT approx.
FSA without fan	79	90	–	140	150	145.5	1
FSA	79	90	166	140	150	145.5	1.05
FSB	127	140	160	135	–	164.5	1.8
FSC	170	184	182	140	–	169	2.6
FSD	223	240	206.5	166	–	172.5	4.3

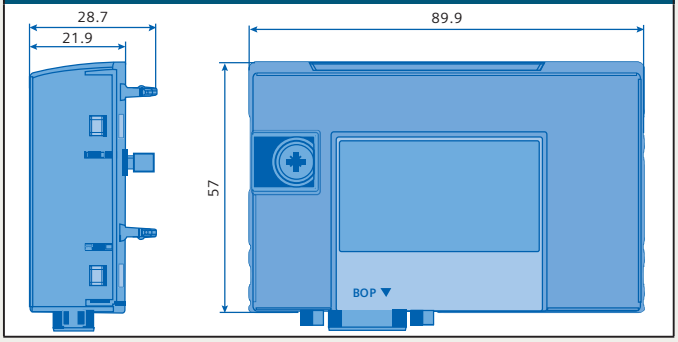
V20 BOP (Basic Operator Panel)



Parameter loader



BOP (Basic Operator Panel) interface



SINAMICS V20 options

		Braking resistors				Input reactors				Output reactors				Braking module			
P_{rated} kW 3AC 400V	FS	W	H	D	WT	W	H	D	WT	W	H	D	WT	W	H	D	WT
0.37	A	72	230	43.5	1	75.5	200	50	0.8	75.5	200	110	2	90	150	80	0.71
0.55																	
0.75																	
1.1																	
1.5																	
2.2		149	239	43.5	1.6	150	213	50	1.3	150	213	70	3.4				
3	B																
4																	
5.5	C	185	285	150	3.8	185	280	50	2.3	150	213	80	5.6				
7.5	D													integrated			
11																	
15		270	515	175	7.4												

FS = Frame Size, WT = Weight in kg , W = width in mm, H = height in mm, D = depth in mm

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SINAMICS V20 service

SINAMICS V20 service is integrated into our well-established global model.

- Global hotline support
- Comprehensive service network of factory-trained repair specialists
- Multiple language web-based support and FAQs

Service & support

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India	+91 22 2760 0150
USA	+1 423 262 5710 / +1 800 333 7421

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