EN

CATALOGUE

AC DRIVE TECHNOLOGY FOR WATER TREATMENT & HVAC SYSTEMS

SIEIDrive ADV200 WA

GEFRAN

Gefran is a leading manufacturer *of automation components*

Forty-five years of experience, an extensive know-how, a **structure precisely geared to our customers' requirements** and continued **investment in R&D**, make **Gefran** a leader in the field of components for automation and industrial process control systems.

Customers know they can always depend on Gefran to provide the best solution for all their needs in terms of sensors, components, automation and motion control.

By working in partnership with **qualified Research Centres and Universities** and continuously **investing in R&D**, the Gefran Group is at the forefront of technology, developing products that anticipate its customers' needs.

Gefran is based in Italy, where it has three engineering and production facilities. The Group has some 800 employees. It is directly present in 12 countries with 7 production plants and a global sales network with more than 70 authorised dealers around the world.

Gefran Spa has been listed on the Milan Stock Exchange since 1998 and has been traded on the Star segment of high requirement shares since 2002.

The **Gefran Drive & Motion Control Unit**, based in Gerenzano (Varese, Italy), designs, develops and manufactures **electric drives and power regeneration systems** used to control motors and application systems in the main industrial sectors, including: plastics, civil lift engineering, water treatment and HVAC, as well as control architectures for renewable energy systems.

The **ADV200 WA** series, offering a complete range of solutions dedicated to the most advanced automated HVAC and water treatment systems, is the fruit of this experience.

GEFRAN technology for the Water Treatment and HVAC sector

Gefran has applied its application experience to the new series of **ADV200 WA** industrial drive inverters for the **Water Treatment** and **HVAC sectors**.

Specific power structures for variable or quadratic loads, combined with intelligent optimisation of energy consumption and specialised functions, offer important advantages in terms of plant design and ease of startup as well as economic benefits.

The **ADV200 WA** is compatible with all 400 Vac to 690 Vac power supplies and available with power ratings of 1.5 kW to 1.2 MW, suitable for use in virtually any kind of solution for controlling state-of-the-art systems.

Thanks to the modular mechanical structure, compact modules and integration of accessories such as EMC filters and input chokes, the system takes up significantly less space, wiring costs are optimised and flexibility is assured.

The **powerful programming platform** is intuitive and "open". It features simplified procedures and shorter commissioning times, with predefined control solutions or specific "**Application macros**" for the many different system requirements.

Advantages and innovation, forged by constant technological research and the experience gained by Gefran through working in partnership with leading operators in the sector.

Main features

Startup and programming

- Advanced programming with integrated IEC 61131-3 MDPlc platform
- Startup wizard.
- Programming via keypad
- Programming and monitoring via PC with the GF_eXpress software
- Multi-language programming

Specific functions

- Advanced V/f and sensorless vector control
- Variable and constant torque operation
- Pump system control functions
- HVAC system control functions
- Application macros structured for specific applications
- Two independent PID controllers with autotuning
- 4 integrated timers with calendar and Real Time Clock.

I/O management

- Up to 3 optional I/O cards
- Direct acquisition by PT100, PT1000, NI1000 temperature sensors (with EXP-IO-SEN-100-ADV and EXP-IO-SEN-1000-ADV cards)
- Cascade control of up to 4 pumps, plus the master device (with EXP-IO-D5R8-ADV card)
- 24 V external control power supply as standard.

Installation and wiring

- Integrated EMC filters on all sizes.
- Integrated DC chokes (up to 160 kW).
- Compact size.
- Fast installation.
- Tropicalised cards for maximum protection.

Programming timer

- Serial communication
- Fieldbus communication (Modbus, CAN, DeviceNet, Profibus, BACnet, LonWorks, Ethernet, Ethercat).

» ***Certified quality***
(Quality Management System complies with the requirements of ISO 9001:2008)

» ***Italian Technology***

» ***User Friendly Performance up to 1.2 MW***

» ***All in One design with integrated EMC filters and choke***

» ***"Clean Power" platform for energy efficiency of automation systems***

HVAC GENERAL FUNCTIONS

Integrated dual PID

The inverter has two independent PID controllers as standard. These can be used together, the first to control the drive, the second to control a generic external process (such as an air lock or valve).

The reference and feedback may come from two different sources, on which arithmetic calculations may be performed.

PID controller autotuning

For both PID controllers, the drive calculates the best combination of P and I gains using an autotuning procedure that sets a motor speed variation and measures fluctuations in the system. Autotuning of the P and I gains cuts commissioning times.

"Anti-wind up"

When the PID output reaches the minimum or maximum motor speed, the integrator value can be blocked so that the drive can react faster when the error is reduced and the feedback signal returns within the control range.

Programming timer

The drive's integrated timers can be used to activate functions timed on a weekly or daily basis (to start the system or change setpoints). In the HVAC inverter there are 2 sets of parameters: time intervals (defined by the day of the week, hour and minute of startup and switching off) and timers, with which one or more time intervals can be associated. Up to 4 time internals and 4 timers can be set (each time interval may be associated with more than one timer).

Special fan functions

Emergency drive control

If this function is activated, the inverter forces the motor at the set speed, even if this means destroying it. It ignores any alarms that have been triggered and keeps the motor running even under emergency conditions (e.g. fume extraction in a motorway tunnel or escape route). If the bypass function is also enabled during the fire condition, the drive only ignores alarms for a set time, after which it activates a digital output (normally connected to a power contactor that bypasses the inverter and connects the motor directly to the mains) and enables the alarms.

Skip resonance frequencies

To prevent the motor from staying at a frequency that could create resonance in the system, up to 3 skipped speed bands can be set on the drive to reduce noise levels and vibrations and enhance comfort.

Belt broken alarm

If the torque required of the motor falls below a set threshold value this could mean that the fan belt is broken: in that case the drive stops and generates an alarm.

Special pump functions

Multiple pump control

The EXP-IO-D5R8-ADV expansion card can be used to control several pumps connected in parallel, one master and up to four slaves with two operating modes: Standard, in which the speed-controlled pump is fixed and the auxiliary on-off pumps are activated in sequence (the operating time of each one is controlled so that wear is shared equally) and Master pump rotation, in which the master pump can be selected from among all the pumps, so that wear is also shared by the master pump; one or more pumps can be placed out of service, including the speed-controlled pump.

Flow compensation

If the pressure transducer is installed in proximity of the pump or fan, the inverter takes system load losses into account and adjusts the motor speed accordingly. The drive estimates the load loss values instant by instant (these vary according to flow capacity), to apply the necessary correction in order to guarantee a constant pressure at the delivery point, thus saving a considerable amount of energy.

Stand-by mode

When this function is enabled, the inverter stops the motor if no flow/pressure is requested for a predeterminable time; if the request exceeds the set threshold for the set time, the drive restarts the motor. If the process value is a pressure, when operating at constant pressure the drive continues to control the motor even following a loss of pressure in the system, if the pressure drops more quickly than a programmable threshold.

Controlled filling

To avoid water hammering when an empty system is filled too quickly, this function can be enabled to fill the system according to a controlled ramp. The inverter is capable of filling systems with both horizontal and vertical pipes, using the appropriate filling method.

Special curve to protect the pump

In applications using immersion pumps, there is a risk of damaging the pumps if these run too slowly for too long: Gefran drives offer a specific function that enables pumps to reach the minimum speed within the shortest possible time.

Check valve protection

To avoid hammering on check valves if the pump is switched off too quickly, the inverter incorporates a specific function that changes the deceleration ramp at a previously defined frequency, to give the check valve time to close properly, before resuming normal ramping until the system is switched off.

Pump cleaning

To remove any residual solid matter that may have got caught in the rotor, the inverter turns the pump alternately in both directions of rotation for a set number of times. You can choose whether to run the cleaning cycle at each startup, after a programmed time interval, when an external command is sent or upon activation of an analog signal (if the threshold is exceeded for longer than the set time).

Dry pump operation alarm

Specific parameters can be used to set the power curve with zero flow, which identifies for each speed the threshold below which the flow capacity is considered zero. These settings prevent dry pump operation, by stopping the pump before a fault can occur.

Loss of pressure alarm

If the motor is running at the maximum speed, but this is not sufficient to generate the required pressure, there may be a leak in the system or a hole in the pipes. In that case, the drive stops after a programmable time and generates an end of curve error.

Application macros

The HVAC inverter features some application macros as standard.
These built-in configurations for specific applications make commissioning easier and allow customisation, where required.
The drive features the following macros:

Standard HVAC configuration

This macro is used to set a basic configuration for the operation of an HVAC building management system (BMS).

Blower fan

This macro can be used to set a basic configuration in applications in which air from the outside is delivered into a room, according to the request sent by a process transducer that acts on the drive's PID controller.

Exhaust fan

This macro can be used to set a basic configuration in applications in which air is extracted from a room via an extraction fan, at the request of the process transducer that controls the amount of air to be extracted.

Liquid cooling control

This macro can be used to control the speed of liquid cooler fans, using the PID controller to keep the temperature constant. The stand-by function allows the fans to be operated only when actually necessary, thus saving energy.

Cooling tower

This macro allows you to use a dedicated program for controlling fans in cooling towers used as heat exchangers. The transducer signal controls the fan speed via the drive.

Control of pumps connected in series

Two or more pumps are usually used in series to limit the problem of cavitation when there is a significant jump in pressure: the macro controls the first, known as the booster pump, which must increase the pressure at the second pump inlet.

Overview of the "ADV200 WA" range

Models	Power (kW)																													
	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	250	315	355	400	500	630	710	800	1000	1200	
ADV200 WA-4	Size 1					Size 2			Size 3			Size 4			Size 5			Size 6		Size 7					Parallel size 7 (*)						
ADV200 WA-4-DC										Size 3		Size 4			Size 5			Size 6		Size 7					Parallel size 7 (*)					
ADV200 WA-6															S.5	Size 6				Size 7					Parallel size 7 (*)					
ADV200 WA-6-DC																				Size 7					Parallel size 7 (*)					

Power ratings of up to 1.5 MW to follow.

(*) Inverters of between 500 kW and 800 kW comprise one master and one slave. Inverters of over 800 kW comprise one master and two slaves.

ADV200 WA-4 • 400...460 Vac Power Supply

ADV200 WA-4-DC • DC bus power supply

ADV200 WA-6 • 690 Vac Power Supply

ADV200 WA-6-DC • DC bus power supply

Programming

Accessories & Options

Gefran Service

1. ADV200 WA-4 • 400...460 Vac Power Supply

1.1 Introduction

ADV200 WA - 4 Vector Inverters offer technologically advanced solutions for automation systems with stand-alone drives.

The range features power ratings from **0.75 kW up to 1.2 MW** for **three-phase power supplies of 400 VAC to 460 VAC.** Integrated accessories such as the filter and mains choke enhance long-term reliability, reduce overall dimensions and lower wiring costs.

Flexible Modular Technology

The ADV200 WA-4 is based on a fully modular hardware with power structures that can be installed side by side. Designed to facilitate installation and guarantee ease of use, project flexibility, optimisation of space and reduction of wiring costs.

The ADV200-4 is available in 7 hardware sizes
- from 1.5kW to 400kW in the stand-alone configuration
- from 500kW to 1.2MW in "parallel" configurations

Integrated reliability

The ADV200 WA-4 features high-quality engineering solutions that guarantee long-term reliability. The integrated input choke on the DC side (up to size ADV61600) reduces THD by up to 40% and the mains filter ensures compliance with EMC EN61800-3.

Total ease of use

Designed with the user in mind. The mechanical structure guarantees simple and fast product management, regardless of installation and assembly conditions. All operations are simple and immediate, from accessing the extractable terminal strips to rack-mounting of options. The dedicated accessories guarantee simple wiring and cable shielding to achieve immediate, EMC-compliant start-ups.

Serial line

The RS485 serial line is incorporated as standard across the range to enable peer-to-peer or multidrop connections using Modbus RTU protocol.

Management of optional cards

The ADV200 WA-4 uses an intelligent rack system that allows 3 optional cards to be installed at the same time.
- Fieldbus interface card
- I/O expansion card

Back-up power supply

The ADV200 WA-4 is compatible with a separate +24VDC external power supply. This solution makes it possible to maintain all display and drive configuration functions and manage the connected fieldbuses in the event of a power failure.

Safety Card – SIL3 Level

ADV200 WA-4-**SI models integrate the** EXP-SFTy-ADV Safety Card (standard in parallel master drives).
The card:
- performs the STO (Safe Torque Off) function, to prevent torque on the motor by blocking IGBT commands;
- can diagnose 99% of internal faults;
- meets the latest legal requirements with the integrated "Safe Torque Off" function:
  - safety integrity level SIL 3 according to EN 61508 and EN61800-5-2 (maximum available for drives)
  - PL d according to EN13849-1

The integrated EXP-SFTy-ADV safety card in the ADV200 WA-4-**SI** series of drives achieves "Prevention of unexpected start-up", according to EN 1037:1995 + A1 ADV: 2008 on safety of machinery.
Drives provided with the safety card are just one element in an STO safety control system, which is the system level function. All system parts and components must be chosen, applied and integrated correctly to achieve the required level of safety.
The safety function may be used to perform an "emergency stop" with the drive still connected to the power supply (stop category 0 according to EN 60204-1).
The integrated safety function replaces the external safety components. The integrated "STO" function may be used to replace the motor contactors for controlling unexpected start-ups, if covered by risk-assessment. The use of the integrated safety function depends on the type of application and applicable standards.

Ideal sizes

The ADV200 WA-4 offers a choice of technical features so that you can choose the drive that represents the best technical and most cost-effective solution depending on the type of application and characteristics of the motor.
- Two overload modes for “servizio pesante” with duty cycle of 150% of In for 1 minute every 5 minutes or for “servizio leggero” (variable and/or quadratic torque) with duty cycle of 110% of In for 1 minute every 5 minutes
- Optimisation of dinamica della modulazione, according to the type of "duty" and drive temperature during duty cycles.

1.2 General Characteristics

- → Power supply: 3 x 380VAC -15% … 500VAC +5%, 50/60Hz ±2%
- → Power ratings: from 0.75kW to 1.2MW
- → Max output voltage 0.98 x Vin
- → Control mode:
  - Open-loop vector control
  - Open loop V/f
- → Light or heavy overload control
- → Integration of up to 3 options onboard the drive
- → "Safety" card compliant with machine safety directives (for ADV200 WA-…-SI models)
- → GF-eXpress multi-language programming SW (5 languages)
- → PLC with advanced IEC61131-3 programming environment
- → Rated protection:
  - IP20
  - IP00 (size 7 and parallel)
  - IP54, cabinet-mounted (upon request)

Fieldbus management

DeviceNet, CANopen®, Modbus, PROFIBUS PROCESS FIELD BUS, LonWorks (External option), BACnet (External option), EtherNet/IP, EtherCAT®

Performance

The ADV200 WA offers state-of-the-art control technology based on the use of a powerful 32-bit microprocessor able to guarantee maximum precision and performance of the motor as well as sophisticated management of the most advanced application systems.

Precision

Control mode	Speed control precision (*)	Control range
Open-loop FOC	± 30% motor slip rating	1 : 100
V/F	± 60% motor slip rating	1 : 30

(*) for standard 4-pole motor

Standard supply configuration

- → Integrated KB_ADV programming keypad
- → Regulation:
  - 2 bipolar analog inputs (Voltage/Current)
  - 2 bipolar analog outputs (1: Voltage/Current, 1: Voltage)
  - 6 digital inputs (PNP/NPN)
  - 2 digital outputs (PNP/NPN)
  - 2 relay outputs, single contact
  - RS485 serial line (Modbus RTU)
- → Power:
  - Integrated choke DC (up to 160 kW)
  - Integrated mains filter
  - Integrated dynamic braking (up to 75kW)
- → Reference resolution: Digital = 15bit + sign
Analog input = 11-bit + sign
Analog output = 11-bit + sign

Conformity

- → Immunity/Emissions: EEC - EN 61800-3
- → Programming: according to IEC 61131-3
- → Safety standards: STO (Safe Torque Off): IEC 61508 SIL 3, EN 954-1 Cat. 3
EN 61508 and EN 61800-5-2

Environmental conditions

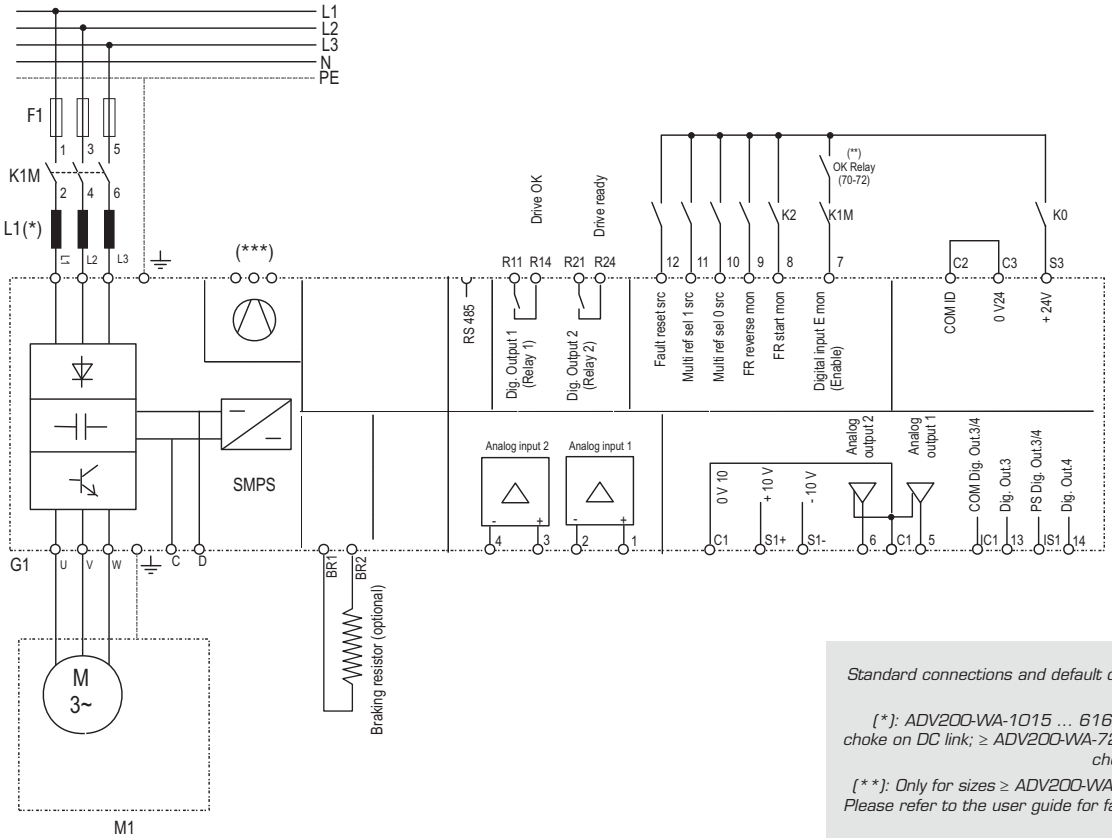
- → Ambient temperature: -10°C … +40°C (+14°F …+104°F), +40°C…+50°C (+104°F…+122°F) with derating
- → Altitude: Max 2000 m. (up to 1000 m without current limitations)

Markings

CE — Complies with the EEC directive concerning low voltage equipment

cULus — Complies with directives for the American and Canadian markets.

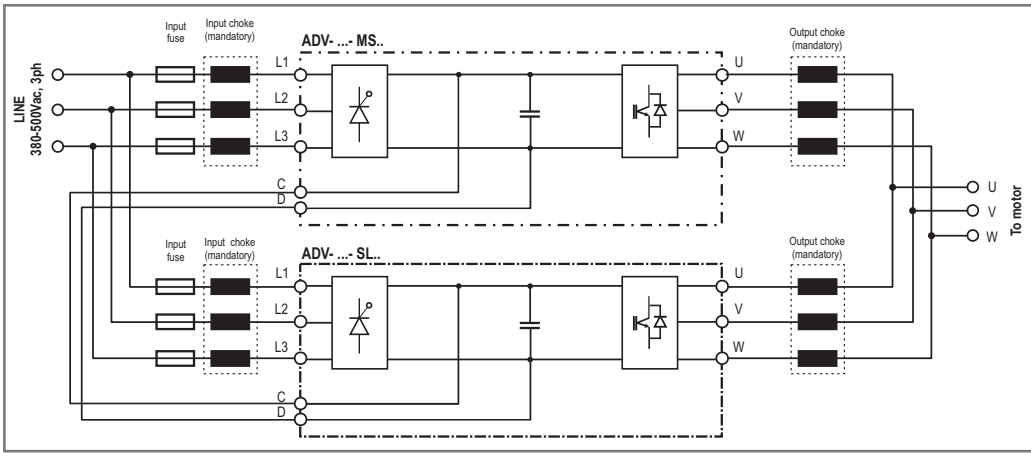
1.3 Standard connections



Standard connections and default drive configuration.

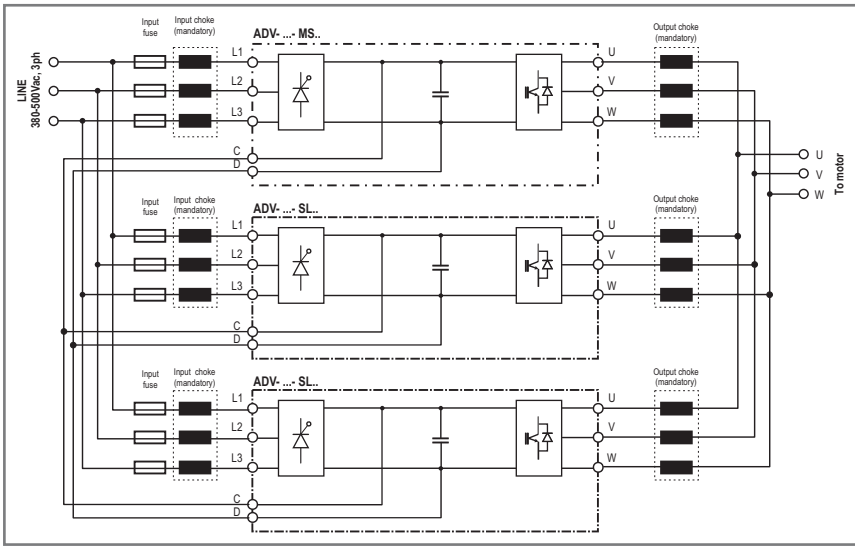
(*): ADV200-WA-1015 ... 61600: Integrated choke on DC link; ≥ ADV200-WA-72000: external choke mandatory

(**): Only for sizes ≥ ADV200-WA72000; (***) Please refer to the user guide for fan connections



Block diagram power section sizes 500 ... 800kW.

See diagram at the top for the regulation section.



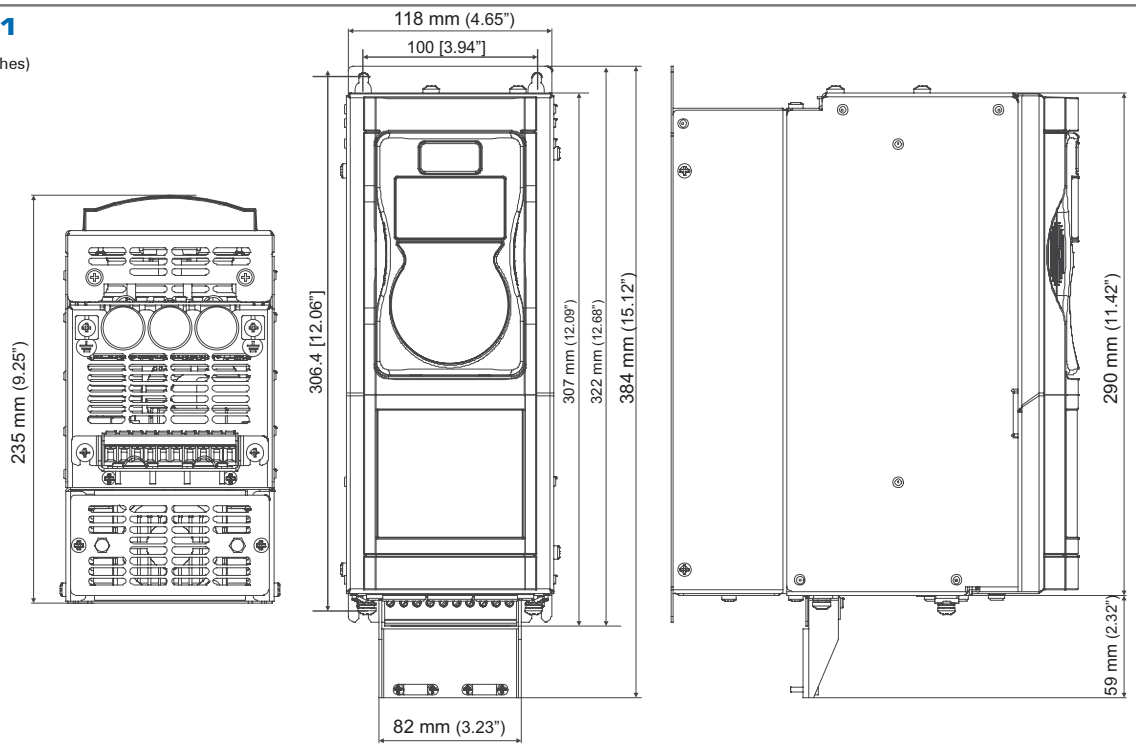
Block diagram power section sizes 1000 ... 1200kW.

See diagram at the top for the regulation section.

1.4 Weights and dimensions

Size 1

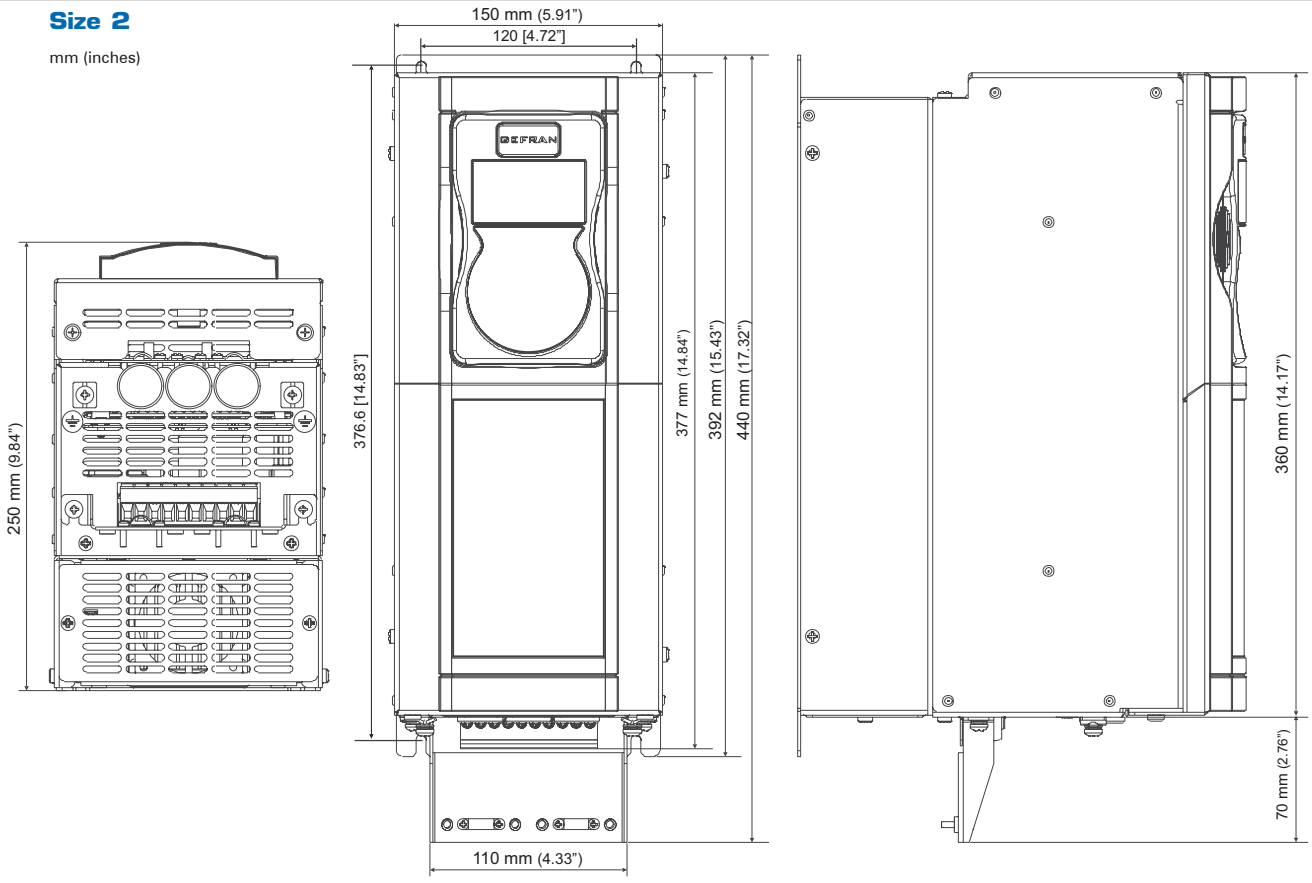
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
1015...1055	118 x 322 x 235	4,65 x 12.7 x 9.25	5.8	12.8

Size 2

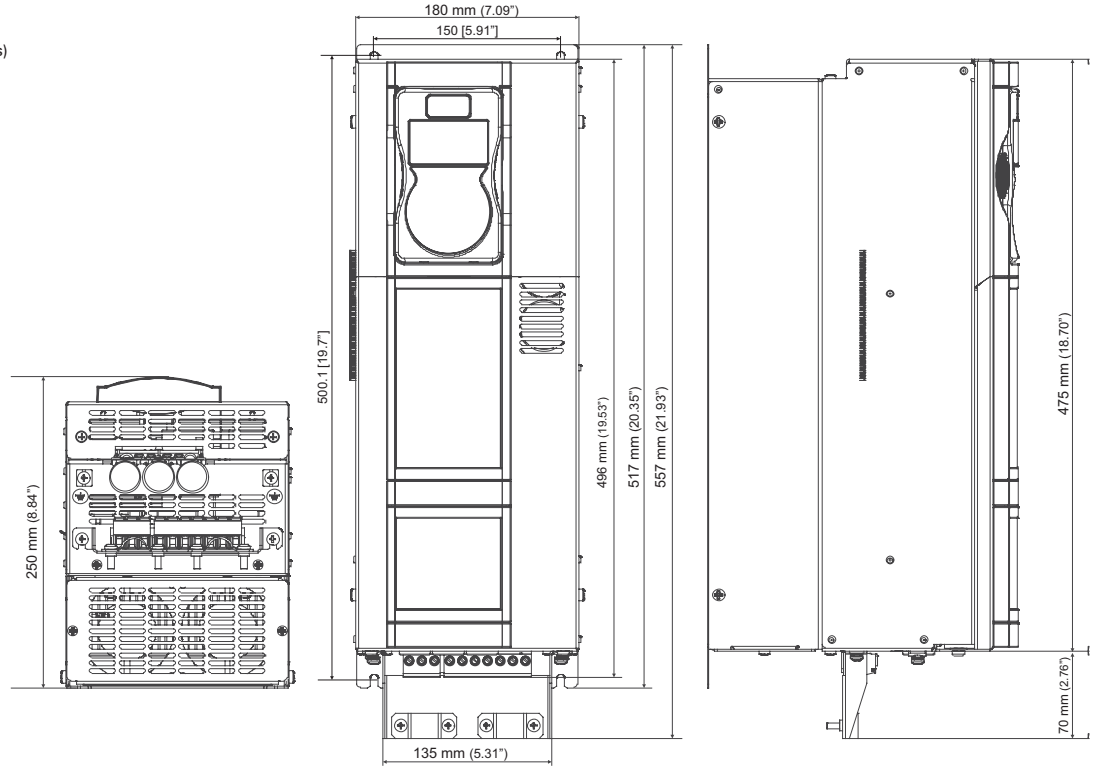
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
2075 ... 2150	150 x 392 x 250	5.91 x 15.43 x 9.84	10.2	22.5

Size 3

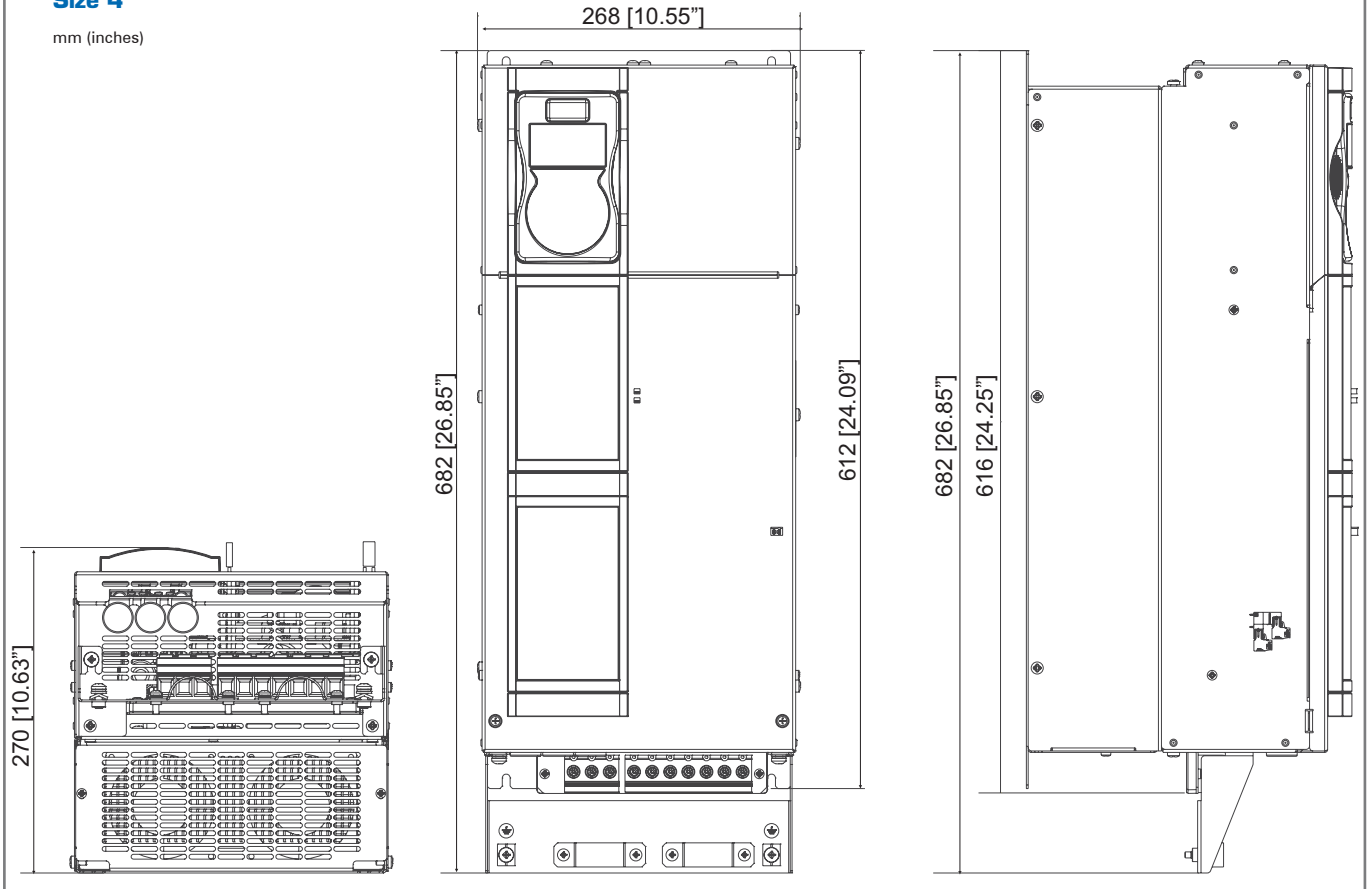
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
3185...3220	180 x 517 x 250	7.09 x 20.35 x 8.84	16.4	36.2
3300			22	48.5

Size 4

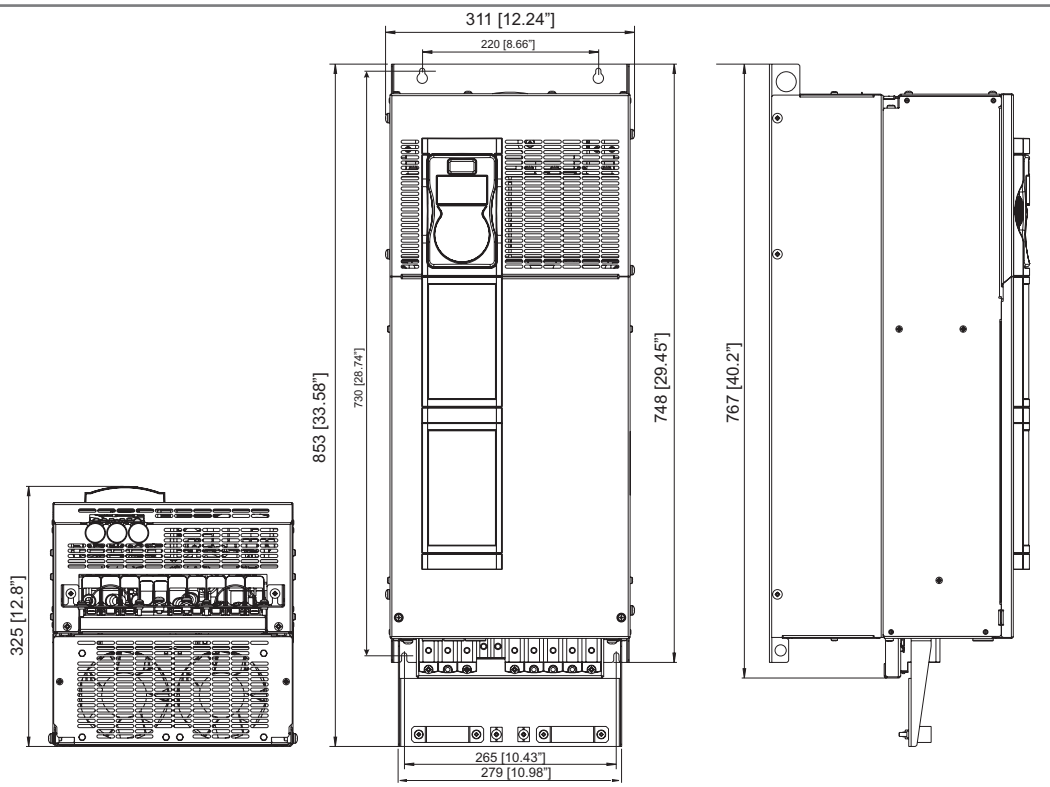
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
4370...4550	268 x 616 x 270	10.55 x 24.25 x 10.63	32	70.6

Size 5

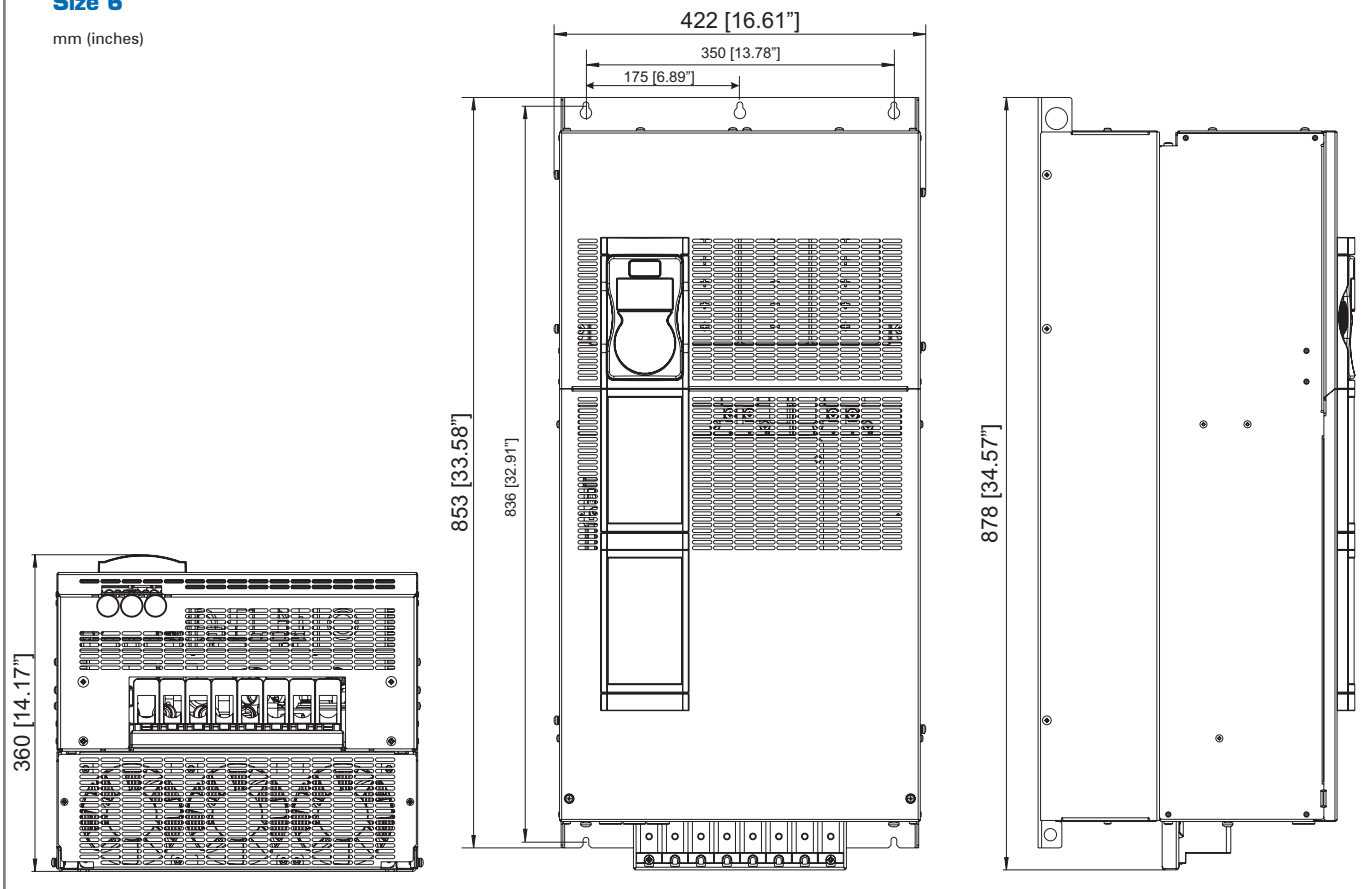
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
5750...51100	311 x 767 x 325	12.24 x 40.2 x 12.8	60	132.3

Size 6

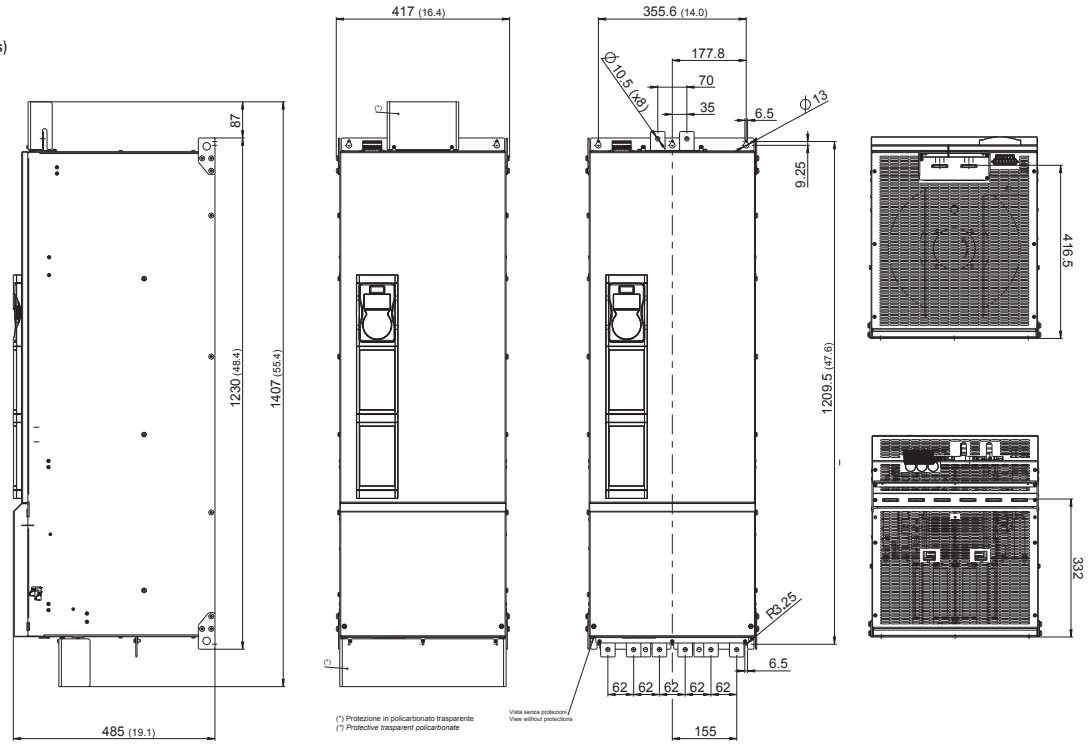
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
61320 ... 61600	422 x 878 x 360	16.61 x 34.6 x 14.2	90	198.4

Size 7

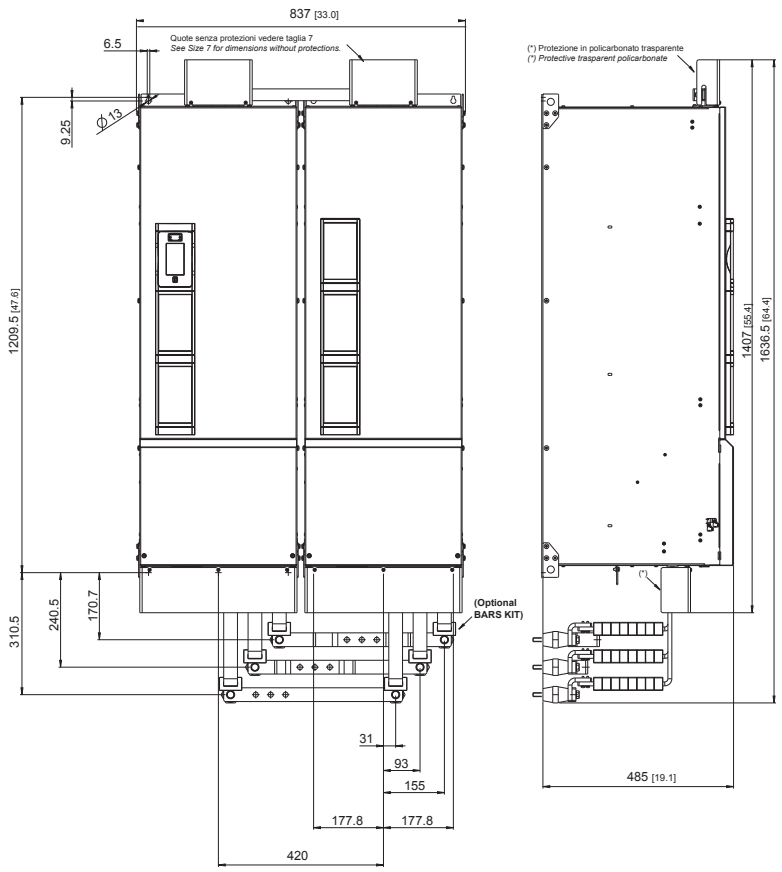
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
72000...72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	130	286.6
73150			140	308.7
73550 ... 74000			150	330.7

Sizes 500 ... 800 kW

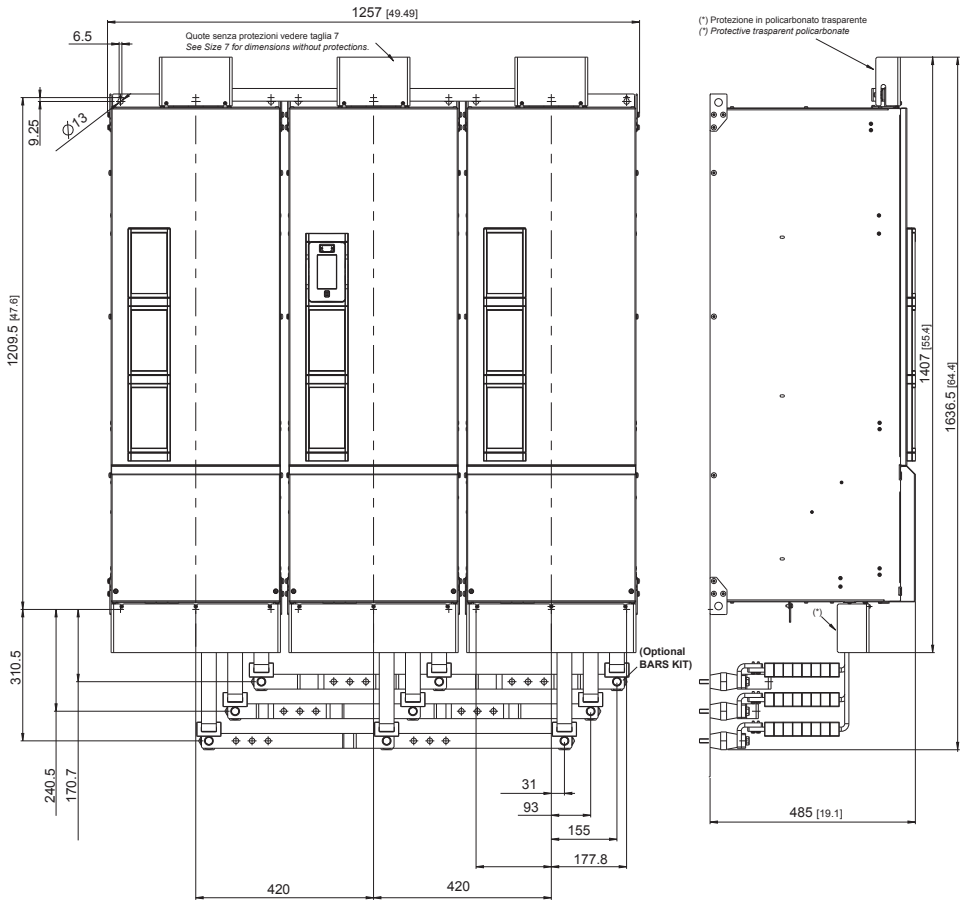
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	260	573.2
630kW			280	617.4
710 - 800kW			300	661.4

Sizes 1000...1200 kW

mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
1000 - 1200kW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	450	992.1

1.5 Choosing the Inverter

The combinations of motor power ratings and inverters listed in the table envisage the use of motors in which the voltage rating is equal to that of the mains power.
For motors with different voltage ratings the inverter must be chosen according to the current rating of the motor.
The combinations listed in the table thus show the current that can be delivered by the drive during continuous operation and overload conditions, according to the mains voltage.

The same engineering criteria apply for operations with additional derating factors:
- Kv Power supply voltage
- Kt Ambient temperature
- Kf Switching frequency
- Kalt Altitude of installation

1.6 Input Data

Sizes ADV200 WA	Input voltage ULN [VAC]	Input frequency [Hz]	Overvoltage threshold (Overvoltage) [VDC]	Undervoltage threshold (Undervoltage) [VDC]	DC-Link Capacity [mF]	Total harmonic distortion [THD] %	AC input current for continuous operation IN Light Duty (110%overload) @ 400 VAC [A]	AC input current for continuous operation IN Heavy Duty (150% overload) @ 400 VAC [A]
1015	Three-phase mains 380 VCA -15% ... 500 VCA +5%	50/60 Hz, ± 2%	820	380	235	40% Light Duty 50% Heavy Duty (at rated current)	3.7	2.1
1022					235		4.9	3.7
1030					340		6.5	4.9
1040					340		8.1	6.5
1055					340		11.1	8.1
2075					680		14.0	11.1
2110					680		19.6	14.0
2150					830		26.4	19.6
3185					1500		32.3	26.4
3220					1500		39	32.3
3300					1500		53	39
4370					2350		64	53
4450					2800		74	64
4550					3400		89	74
5750					4700		143	100
5900					5600		171	143
51100					6800		200	171
61320					11200		238	200
61600					13600		285	238
72000					16800		350	300
72500					16800		420	350
73150					25200		580	420
73550					25200		640	580
74000					25200		710	640
500 kW					2 * 16800		800	665
630 kW					2 * 25200		1100	800
710 kW					2 * 25200		1215	1100
800 kW					2 * 25200		1350	1215
1000 kW					3 * 25200		1800	1650
1200 kW					3 * 25200		2020	1800

1.7 Output Data

Sizes ADV200 WA	Inverter Output		Pn mot (Recommended motor rating, fsw = default)				Maximum output voltage U2	Maximum output frequency f2	IGBT braking unit
	Light Duty	Heavy Duty	Light Duty (110% overload)		Heavy Duty (150% overload)				
	[kVA]	[kVA]	@400 VAC [kW]	@460 VAC [HP]	@400 VAC [kW]	@460 VAC [HP]	[V]	[Hz]	
1015	3.0	1.7	1.5	2	0.75	1	0.98 x Uln (Uln = AC input voltage)	500	Internal (with external resistor); braking torque 150 % MAX
1022	4.0	3.0	2.2	3	1.5	2			
1030	5.3	4.0	3	5	2.2	3			
1040	6.6	5.3	4	5	3.0	5			
1055	9	6.6	5.5	7,5	4.0	5			
2075	11.4	9	7.5	10	5.5	7.5			
2110	15.9	11.4	11	15	7.5	10			
2150	21.5	15.9	15	20	11	15			
3185	26.3	21.5	18.5	25	15	20			
3220	32	26.3	22	30	18.5	25			
3300	43	32	30	40	22	30			
4370	52	43	37	50	30	40			Internal optional (with external resistor)
4450	60	52	45	60	37	50			
4550	73	60	55	75	45	60			
5750	104	73	75	100	55	75			
5900	125	104	90	125	75	100			External optional (BUy series)
51100	145	125	110	150	90	125			
61320	173	145	132	175	110	150			
61600	208	173	160	200	132	175			
72000	267	208	200	250	160	200			
72500	319	267	250	300	200	250			
73150	409	319	315	400	250	300		200	
73550	450	409	355	450	315	400			
74000	506	450	400	500	355	450			
500 kW	603	506	500	650	400	500			
630 kW	776	603	630	850	500	650			
710 kW	852	776	710	950	630	850			
800 kW	956	852	800	1100	710	950			
1000 kW	1247	1108	1000	1300	900	1200			
1200 kW	1420	1247	1200	1600	1000	1300			

Sizes ADV200 WA	Rated output current In (fsw = default)				Switching frequency fsw		Reduction factor			
	Light Duty (110% overload)		Heavy Duty (150% overload)		Default	Higher	Kv	KT	Kf (@ 8 kHz)	KALT
	@400 VAC [A]	@460 VAC [A]	@400 VAC [A]	@460 VAC [A]	[kHz]	[kHz]	(1)	(2)	(3)	(4)
1015	4.3	3.9	2.5	2.3	8	10, 12	0.9		1	1.2
1022	5.8	52	4.3	3.9	8	10, 12	0.9		1	1.2
1030	7.6	6.8	5.8	5.2	4	6, 8, 10, 12	0.9		0.7	1.2
1040	9.5	8.6	7.6	6.8	4	6, 8, 10, 12	0.9		0.7	1.2
1055	13	11.7	9.5	8.6	4	6, 8, 10, 12	0.9		0.7	1.2
2075	16.5	14.9	13	11.7	4	6, 8, 10, 12	0.9		0.7	1.2
2110	23	20.7	16.5	14.9	4	6, 8, 10, 12	0.9		0.7	1.2
2150	31	27.9	23	20.7	4	6, 8, 10, 12	0.9		0.7	1.2
3185	38	34.2	31	27.9	4	6, 8, 10, 12	0.9		0.7	1.2
3220	46	41.4	38	34.2	4	6, 8, 10, 12	0.9		0.7	1.2
3300	62	55.8	46	41.4	4	6, 8, 10, 12	0.9		0.7	1.2
4370	75	67.5	62	55.8	4	6, 8, 10, 12	0.9		0.7	1.2
4450	87	78.3	75	67.5	4	6, 8, 10, 12	0.9		0.7	1.2
4550	105	94.5	87	78	4	6, 8	0.9		0.7	1.2
5750	150	135	105	94.5	4	6, 8	0.9	SP: 0.9	0.7	1.2
5900	180	162	150	135	4	6, 8	0.9	SL: 0.8	0.7	1.2
51100	210	189	180	162	4	6, 8	0.9		0.7	1.2
61320	250	225	210	189	4	6, 8	0.9		0.7	1.2
61600	300	270	250	225	4	6, 8	0.9		0.7	1.2
72000	385	347	300	270	4	-	0.9		0	1.2
72500	460	414	385	347	4	-	0.9		0	1.2
73150	590	531	460	414	2	-	0.9		0	1.2
73550	650	585	590	531	2	-	0.9		0	1.2
74000	730	657	650	585	2	-	0.9		0	1.2
500 kW	870	783	730	657	2	-	0.9		0	1.2
630 kW	1120	1008	870	783	2	-	0.9		0	1.2
710 kW	1230	1107	1120	1008	2	-	0.9		0	1.2
800 kW	1380	1242	1230	1107	2	-	0.9		0	1.2
1000 kW	1800	1620	1600	1440	2	-	0.9		0	1.2
1200 kW	2050	1845	1900	1620	2	-	0.9		0	1.2

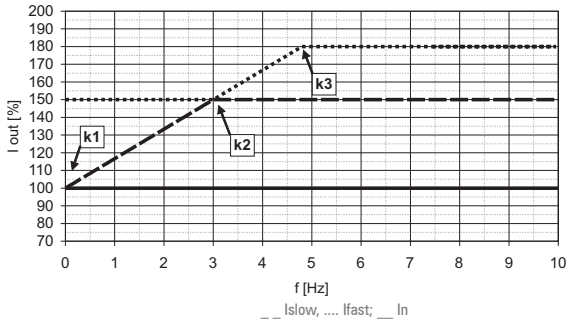
(1) Kv : Derating factor for mains voltage at 460Vac
(2) KT : Derating factor for ambient temperature of 50°C (1% every °C over 40°C with HD and 2% every °C over 40°C with LD)
(3) Kf : Derating factor for higher switching frequency
(4) KALT : Derating factor for installation at altitudes above 1000 meters a.s.l. (up to a maximum of 2000 m). Value to be applied = 1.2% each 100 m increase above 1000 m.
For example: Altitude 2000 m, Kalt = 1.2% * 10 = 12% derating; In derated = (100 - 12) % = 88 % In

Sizes ADV200 WA	Overload			Derating according to switching frequency (HD)						Overload according to output frequency				
	LD 110 % x In (1' every 5')	HD 150 % x In (1' every 5')	HD 180 % x In (for 0,5'')	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	Light Duty		Heavy Duty		
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	K1 LD [%]	K2 LD [Hz]	K1 HD [%]	K2 HD [Hz]	K3 HD [Hz]
1015	4.7	3.75	4.5	2.5	2.5	2.5	2.5	2.1	1.8	100	3	100	3	4.8
1022	6.4	6.5	7.7	4.3	4.3	4.3	4.3	3.7	3	75	3	100	3	4.8
1030	8.4	8.7	10.4	5.8	5.8	4.9	4.1	3.7	3	75	3	100	3	4.8
1040	10.5	11.4	13.7	7.6	7.6	6.5	5.3	4.2	3	80	3	100	3	4.8
1055	14.3	14.3	17.1	9.5	9.5	8.1	6.7	5.7	4.75	100	3	100	3	4.8
2075	18.1	19.5	23.4	13	13	11.1	9.1	7.8	6.5	100	3	100	3	4.8
2110	25.3	24.7	29.7	16.5	16.5	14.0	11.6	9.9	8.25	75	3	100	3	4.8
2150	34.1	34.5	41.4	23	23	19.6	16.1	13.8	11.5	75	5	100	3	4.8
3185	41.8	46.5	55.8	31	31	26.4	21.7	18.6	15.5	75	7	100	5	8
3220	50.6	57	68.4	38	38	32.3	26.6	22.8	19	85	5	100	5	8
3300	68.2	69	82.8	46	46	39.1	32.2	27.6	23	80	5	100	3	4.8
4370	82.5	93	111.6	62	62	52.7	43.4	37.2	31	80	3	100	3	4.8
4450	95.7	113	135	75	75	63.8	52.5	45	37.5	80	3	100	3	4.8
4550	116	131	157	87	87	74	60.9	n.a.	n.a.	80	3	100	3	4.8
5750	165	157	189	105	105	89	74	n.a.	n.a.	85	5	100	3	4.8
5900	198	225	270	150	150	128	105	n.a.	n.a.	85	5	100	5	8
51100	231	270	324	180	180	153	126	n.a.	n.a.	85	5	100	5	8
61320	275	315	378	210	210	179	147	n.a.	n.a.	100	3	100	3	4.8
61600	330	375	540	250	250	213	175	n.a.	n.a.	100	3	100	3	4.8
72000	424	450	540	300	300	n.a.	n.a.	n.a.	n.a.	80	3	100	3	4.8
72500	506	578	693	385	385	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
73150	649	690	828	460	n.a.	n.a.	n.a.	n.a.	n.a.	75	5	100	3	4.8
73550	715	885	1062	590	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
74000	803	975	1170	650	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5
500 kW	957	1095	1314	730	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
630 kW	1232	1305	1566	870	n.a.	n.a.	n.a.	n.a.	n.a.	75	5	100	3	4.8
710 kW	1353	1680	2016	1120	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
800 kW	1518	1845	2214	1230	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5
1000 kW	1980	2400	2880	1600	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
1200 kW	2255	2700	3240	1900	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5

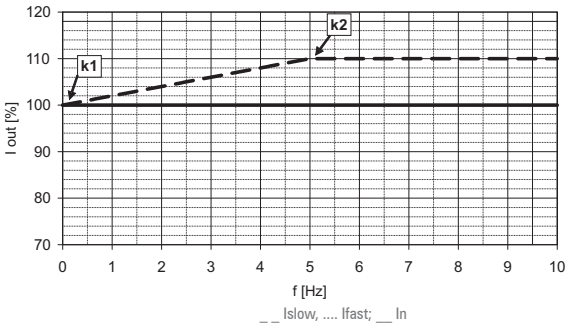
• If the factory setting of PAR 568 Switching freq mode is changed from 0=Fixed to 1=Variable, the switching frequency is controlled by the temperature of the drive heat sink and the output frequency. For further information see the WA Functions and Parameters manual, menu 4.9.

Overload according to output frequency

Overload LD



Overload HD



1.8 Cooling

All inverters are equipped with internal fans.

Size		Dissipated power [W]	Fan capacity	
			Dissipator [m^3/h]	Internal [m^3/h]
	ADV200-WA-1015	60	32	26
	ADV200-WA-1022	90	32	32
	ADV200-WA-1030	100	32	32
	ADV200-WA-1040	120	32	32
	ADV200-WA-1055	160	32	32
	ADV200-WA-2075	200	32	32
	ADV200-WA-2110	250	56 x 2	32
	ADV200-WA-2150	300	56 x 2	32
	ADV200-WA-3185	380	80 x 2	32
	ADV200-WA-3220	460	80 x 2	32
	ADV200-WA-3300	600	80 x 2	32
	ADV200-WA-4370	900	2 x 250	2 x 50
	ADV200-WA-4450	1000	2 x 250	2 x 50
	ADV200-WA-4550	1290	2 x 250	2 x 50
	ADV200-WA-5750	1760	2 x 285	1 x 170
	ADV200-WA-5900	2150	2 x 355	2 x 170
	ADV200-WA-51100	2400	2 x 355	2 x 170
	ADV200-WA-61320	2850	3 x 310	2 x 170
	ADV200-WA-61600	3600	3 x 310	2 x 170
	ADV200-WA-72000	3900	1500	-
	ADV200-WA-72500	4000	1500	-
	ADV200-WA-73150	5200	1500	-
	ADV200-WA-73550	6000	2000	-
	ADV200-WA-74000	6500	2000	-
500 kW	ADV200-WA-72500-KXX-4-MS 05	4000	1500	-
	ADV200-WA-72500-XXX-4-SL	4000	1500	-
630 kW	ADV200-WA-73150-KXX-4-MS 06	5200	1500	-
	ADV200-WA-73150-XXX-4-SL	5200	1500	-
710 kW	ADV200-WA-73550-KXX-4-MS 07	6000	2000	-
	ADV200-WA-73550-XXX-4-SL	6000	2000	-
800 kW	ADV200-WA-73150-KXX-4-MS 08	6500	2000	-
	ADV200-WA-73150-XXX-4-SL	6500	2000	
	ADV200-WA-73150-XXX-4-SL	6500	2000	-
1000 kW	ADV200-WA-73550-KXX-4-MS 10	6000	2000	-
	ADV200-WA-73550-XXX-4-SL	6000	2000	-
	ADV200-WA-73550-XXX-4-SL	6000	2000	
1200 kW	ADV200-WA-74000-KXX-4-MS 12	6500	2000	-
	ADV200-WA-74000-XXX-4-SL	6500	2000	-
	ADV200-WA-74000-XXX-4-SL	6500	2000	

1.9 Order codes

Product identification

ADV200 WA - X XXX - X X X - Y - XX YY - SI

EXP-SFTy-ADV safety card	YES = included	[empty] = not included
Only for parallel versions:	**XX :** MS = MASTER SL = SLAVE	YY : **Inverter power in kW** 05 = 500.0 kW 06 = 630.0 kW 07 = 710.0 kW 08 = 800.0 kW 10 = 1000.0 kW 12 = 1200.0 kW
Rated voltage (factory setting):	4 = 400 Vac / 50 Hz	4A = 460 Vac / 60 Hz
Software:	X = standard	
Braking unit:	X = not included	B = included
Keypad:	X = not included	K = included
Inverter power in kW: 015 = 1.5 kW 022 = 2.2 kW 030 = 3.0 kW 040 = 4.0 kW 055 = 5.5 kW 075 = 7.5 kW 110 = 11.0 kW 150 = 15.0 kW	 185 = 18.5 kW 220 = 22.0 kW 300 = 30.0 kW 370 = 37.0 kW 450 = 45.0 kW 550 = 55.0 kW 750 = 75.0 kW 900 = 90.0 kW	 1100 = 110.0 kW 1320 = 132.0 kW 1600 = 160.0 kW 2000 = 200.0 kW 2500 = 250.0 kW 3150 = 315.0 kW 3550 = 355.0 kW 4000 = 400.0 kW
Mechanical dimensions of the drive: 1 = size 1 2 = size 2 3 = size 3	 4 = size 4 5 = size 5 6 = size 6	 7 = size 7
Inverter, ADV200 WA series		

Example:

ADV200 WA - 1 040 - K B X - 4 - SI

EXP-SFTy-ADV safety card	YES = included
Rated voltage (factory setting):	4 = 400 Vac
Software:	X = standard
Braking unit:	B = included
Keypad:	K = included
Inverter power in kW:	040 = 4.0 kW
Mechanical dimensions of the drive:	1 = size 1
Inverter, ADV200 WA series	

ADV200 - WA Version

- Field-Orientated Vector Inverter
- "KB-ADV" Programming Keypad
- Power Supply 3 x 400VAC (-4) - 3 x 460VAC (-4A)
- LD = Light Duty (Overload 110%), HD = Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9001W	ADV200-WA-1015-KBX-4	1.5kW	0.75kW	Integrated Braking - Integrated Filter - Integrated Choke
S9002W	ADV200-WA-1022-KBX-4	2.2kW	1.5kW	Integrated Braking - Integrated Filter - Integrated Choke
S9003W	ADV200-WA-1030-KBX-4	3kW	2.2kW	Integrated Braking - Integrated Filter - Integrated Choke
S9004W	ADV200-WA-1040-KBX-4	4kW	3kW	Integrated Braking - Integrated Filter - Integrated Choke
S9005W	ADV200-WA-1055-KBX-4	5.5kW	4kW	Integrated Braking - Integrated Filter - Integrated Choke
S9006W	ADV200-WA-2075-KBX-4	7.5kW	5.5kW	Integrated Braking - Integrated Filter - Integrated Choke
S9007W	ADV200-WA-2110-KBX-4	11kW	7.5kW	Integrated Braking - Integrated Filter - Integrated Choke
S9008W	ADV200-WA-2150-KBX-4	15kW	11kW	Integrated Braking - Integrated Filter - Integrated Choke
S9009W	ADV200-WA-3185-KBX-4	18.5kW	15kW	Integrated Braking - Integrated Filter - Integrated Choke
S9010W	ADV200-WA-3220-KBX-4	22kW	18.5kW	Integrated Braking - Integrated Filter - Integrated Choke
S9011W	ADV200-WA-3300-KBX-4	30kW	22kW	Integrated Braking - Integrated Filter - Integrated Choke
S9013W	ADV200-WA-4370-KBX-4	37kW	30kW	Integrated Braking - Integrated Filter - Integrated Choke
S9015W	ADV200-WA-4450-KBX-4	45kW	37kW	Integrated Braking - Integrated Filter - Integrated Choke
S9017W	ADV200-WA-4550-KBX-4	55kW	45kW	Integrated Braking - Integrated Filter - Integrated Choke
S9019W	ADV200-WA-5750-KBX-4	75kW	55kW	Integrated Braking - Integrated Filter - Integrated Choke
S9012W	ADV200-WA-4370-KXX-4	37kW	30kW	Integrated Filter - Integrated Choke
S9014W	ADV200-WA-4450-KXX-4	45kW	37kW	Integrated Filter - Integrated Choke
S9016W	ADV200-WA-4550-KXX-4	55kW	45kW	Integrated Filter - Integrated Choke
S9018W	ADV200-WA-5750-KXX-4	75kW	55kW	Integrated Filter - Integrated Choke
S9020W	ADV200-WA-5900-KXX-4	90kW	75kW	Integrated Filter - Integrated Choke
S9021W	ADV200-WA-51100-KXX-4	110kW	90kW	Integrated Filter - Integrated Choke
S9022W	ADV200-WA-61320-KXX-4	132kW	110kW	Integrated Filter - Integrated Choke
S9023W	ADV200-WA-61600-KXX-4	160kW	132kW	Integrated Filter - Integrated Choke
S9024W	ADV200-WA-72000-KXX-4	200kW	160kW	Integrated Filter
S9025W	ADV200-WA-72500-KXX-4	250kW	200kW	Integrated Filter
S9026W	ADV200-WA-73150-KXX-4	315kW	250kW	Integrated Filter
S9027W	ADV200-WA-73550-KXX-4	355kW	315kW	Integrated Filter . Fan power supply 400VAC / 50Hz.
S9028W	ADV200-WA-74000-KXX-4	400kW	355kW	Integrated Filter - Fan power supply 400VAC / 50Hz.
S9029W	ADV200-WA-73550-KXX-4A	355kW	315kW	Integrated Filter - Fan power supply 460VAC / 60Hz.
S9030W	ADV200-WA-74000-KXX-4A	400kW	355kW	Integrated Filter - Fan power supply 460VAC / 60Hz.

ADV200 - WA Version + SIL3 Safety Card

- Field-Orientated Vector Inverter
- "KB-ADV" Programming Keypad
- Power Supply 3 x 400VAC (-4) - 3 x 460VAC (-4A)
- LD = Light Duty (Overload 110%), HD = Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9001WS	ADV200-WA-1015-KBX-4-SI	1.5kW	0.75kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9002WS	ADV200-WA-1022-KBX-4-SI	2.2kW	1.5kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9003WS	ADV200-WA-1030-KBX-4-SI	3kW	2.2kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9004WS	ADV200-WA-1040-KBX-4-SI	4kW	3kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9005WS	ADV200-WA-1055-KBX-4-SI	5.5kW	4kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9006WS	ADV200-WA-2075-KBX-4-SI	7.5kW	5.5kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9007WS	ADV200-WA-2110-KBX-4-SI	11kW	7.5kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9008WS	ADV200-WA-2150-KBX-4-SI	15kW	11kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9009WS	ADV200-WA-3185-KBX-4-SI	18.5kW	15kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9010WS	ADV200-WA-3220-KBX-4-SI	22kW	18.5kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9011WS	ADV200-WA-3300-KBX-4-SI	30kW	22kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9013WS	ADV200-WA-4370-KBX-4-SI	37kW	30kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9015WS	ADV200-WA-4450-KBX-4-SI	45kW	37kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9017WS	ADV200-WA-4550-KBX-4-SI	55kW	45kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9019WS	ADV200-WA-5750-KBX-4-SI	75kW	55kW	Integrated Braking - Integrated Filter - Integrated Choke + Safety Card
S9012WS	ADV200-WA-4370-KXX-4-SI	37kW	30kW	Integrated Filter - Integrated Choke + Safety Card
S9014WS	ADV200-WA-4450-KXX-4-SI	45kW	37kW	Integrated Filter - Integrated Choke + Safety Card
S9016WS	ADV200-WA-4550-KXX-4-SI	55kW	45kW	Integrated Filter - Integrated Choke + Safety Card
S9018WS	ADV200-WA-5750-KXX-4-SI	75kW	55kW	Integrated Filter - Integrated Choke + Safety Card
S9020WS	ADV200-WA-5900-KXX-4-SI	90kW	75kW	Integrated Filter - Integrated Choke + Safety Card
S9021WS	ADV200-WA-51100-KXX-4-SI	110kW	90kW	Integrated Filter - Integrated Choke + Safety Card
S9022WS	ADV200-WA-61320-KXX-4-SI	132kW	110kW	Integrated Filter - Integrated Choke + Safety Card
S9023WS	ADV200-WA-61600-KXX-4-SI	160kW	132kW	Integrated Filter - Integrated Choke + Safety Card
S9024WS	ADV200-WA-72000-KXX-4-SI	200kW	160kW	Integrated Filter + Safety Card
S9025WS	ADV200-WA-72500-KXX-4-SI	250kW	200kW	Integrated Filter + Safety Card
S9026WS	ADV200-WA-73150-KXX-4-SI	315kW	250kW	Integrated Filter + Safety Card
S9027WS	ADV200-WA-73550-KXX-4-SI	355kW	315kW	Integrated Filter + Safety Card Fan power supply 400VAC / 50Hz.
S9028WS	ADV200-WA-74000-KXX-4-SI	400kW	355kW	Integrated Filter + Safety Card Fan power supply 400VAC / 50Hz.
S9029WS	ADV200-WA-73550-KXX-4A-SI	355kW	315kW	Integrated Filter + Safety Card - Fan power supply 460VAC / 60Hz.
S9030WS	ADV200-WA-74000-KXX-4A-SI	400kW	355kW	Integrated Filter + Safety Card - Fan power supply 460VAC / 60Hz.

ADV200 - WA Parallel Configurations + SIL3 Safety Card

- Field-Orientated Vector Inverter
- "KB-ADV" Programming Keypad
- Power Supply 3 x 400VAC (-4) - 3 x 460VAC (-4A)
- LD = Light Duty (Overload 110%), HD = Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9025WM S9025WS	ADV200-WA-72500-KXX-4-MS 05 -SI ADV200-WA-72500-XXX-4-SL	500kW	400kW	Integrated EMC Filter + Integrated Safety Card
S9026WM S9026WS	ADV200-WA-73150-KXX-4-MS 06 -SI ADV200-WA-73150-XXX-4-SL	630kW	500kW	Integrated EMC Filter + Integrated Safety Card
S9027WM S9027WS	ADV200-WA-73550-KXX-4-MS 07 -SI ADV200-WA-73550-XXX-4-SL	710kW	630kW	Integrated EMC Filter - Integrated Safety Card (No UL Mark) Fan power supply 400VAC / 50Hz.
S9028WM S9028WS	ADV200-WA-74000-KXX-4-MS 08 -SI ADV200-WA-74000-XXX-4-SL	800kW	710kW	Integrated EMC Filter - Integrated Safety Card (No UL Mark) Fan power supply 400VAC / 50Hz.
S9027WM1 S9027WS S9027WS	ADV200-WA-73550-KXX-4-MS 10 -SI ADV200-WA-73550-XXX-4-SL ADV200-WA-73550-XXX-4-SL	1MW	900kW	Integrated EMC Filter - Integrated Safety Card (No UL Mark) Fan power supply 400VAC / 50Hz.
S9028WM1 S9028WS S9028WS	ADV200-WA-74000-KXX-4-MS 12-SI ADV200-WA-74000-XXX-4-SL ADV200-WA-74000-XXX-4-SL	1.2MW	1MW	Integrated EMC Filter - Integrated Safety Card (No UL Mark) Fan power supply 400VAC / 50Hz.
S9029WM S9029WS	ADV200-WA-73550-KXX-4A-MS 07-SI ADV200-WA-73550-XXX-4A -SL	710kW	630kW	Integrated EMC Filter + Integrated Safety Card Fan power supply 460VAC / 60Hz.
S9030WM S9030WS	ADV200-WA-74000-KXX-4A- MS 08-SI ADV200-WA-74000-XXX-4A- SL	800kW	710kW	Integrated EMC Filter + Integrated Safety Card Fan power supply 460VAC / 60Hz.
S9029WM1 S9029WS S9029WS	ADV200-WA-73550-KXX-4A-MS 10-SI ADV200-WA-73550-XXX-4A -SL ADV200-WA-73550-XXX-4A -SL	1MW	900kW	Integrated EMC Filter + Integrated Safety Card Fan power supply 460VAC / 60Hz.
S9030WM1 S9030WS S9030WS	ADV200-WA-74000-KXX-4A- MS 12-SI ADV200-WA-74000-XXX-4A- SL ADV200-WA-74000-XXX-4A- SL	1.2MW	1MW	Integrated EMC Filter + Integrated Safety Card Fan power supply 460VAC / 60Hz.

2. ADV200 WA-4-DC • DC bus power supply

2.1 Introduction

ADV200 WA-4-DC Vector Inverters are optimised for multi-drive or single-drive system configurations on a common DC Bus, supplied by conventional AC/DC power supply units or "Active Front End" regenerative units like the AFE200.

Power ratings range from **22kW to 1.2MW for three-phase external power supplies of 400 VAC...460 VAC**.

Factory-set to achieve the best technical and economic performance, compared to the basic version, the ADV200 WA-DC range does not integrate the three-phase power supply input components:

- AC/DC input rectifier stage
- EMC filter
- choke on DC side

Flexible Modular Technology

The ADV200 WA-4-DC is based on a fully modular hardware and power structures that can be installed side by side. Designed to facilitate installation and guarantee ease of use, project flexibility, optimisation of space and reduction of wiring costs.

The ADV200 WA-4-DC is available in various hardware sizes
- from 22kW to 400kW in the stand-alone configuration
- from 500kW to 1.2MW in "parallel" configurations

Total ease of use

Designed with the user in mind. The mechanical structure guarantees simple and fast product management, regardless of installation and assembly conditions. All operations are simple and immediate, from accessing the extractable terminal strips to rack-mounting of options. The dedicated accessories guarantee simple wiring and cable shielding to achieve immediate, EMC-compliant start-ups.

Serial line

The RS485 serial line is incorporated as standard across the range to enable peer-to-peer or multidrop connections using Modbus RTU protocol.

Management of optional cards

The ADV200 WA-4-DC uses an intelligent rack system that allows up to 3 optional cards to be installed at the same time.
- Fieldbus interface card
- I/O expansion card

Back-up power supply

The ADV200 WA-4-DC is compatible with a separate +24VDC external power supply. This solution makes it possible to maintain all display and drive configuration functions and manage the connected fieldbuses in the event of a power failure.

Safety Card

ADV200 WA-4-DC-**SI** models integrate the EXP-SFTy-ADV Safety Card (standard in parallel master drives).
The card:
- performs the STO (Safe Torque Off) function, to prevent torque on the motor by blocking IGBT commands.
- can diagnose 99% of internal faults.
- meets the latest legal requirements with the integrated "Safe Torque Off" function:
  - safety integrity level SIL 3 according to EN 61508 and EN61800-5-2 (maximum available for drives)
  - PL d according to EN13849-1

The integrated EXP-SFTy-ADV safety card in the ADV200 WA-4-DC-**SI** series of drives is used to achieve "Prevention of unexpected start-up", according to EN 1037:1995 + A1 ADV: 2008 on safety of machinery.
Drives provided with the safety card are just one element in an STO safety control system, which is the system level function. All system parts and components must be chosen, applied and integrated correctly to achieve the required level of safety.
The safety function may be used to perform an "emergency stop" with the drive still connected to the power supply (stop category 0, according to EN 60204-1).
The integrated safety function replaces the external safety components. The integrated "STO" function may be used to replace the motor contactors for controlling unexpected start-ups, if covered by risk-assessment. The use of the integrated safety function depends on the type of application and applicable standards.

Ideal sizes

The ADV200 WA-4-DC offers a choice of technical features so that you can choose the drive that represents the best technical and most cost-effective solution depending on the type of application and characteristics of the motor.

- Two overload modes for "heavy duty" with duty cycle of 150% of In for 1 minute every 5 minutes or for "light duty" (variable and/or quadratic torque) with duty cycle of 110% of In for 1 minute every 5 minutes
- Optimisation of modulation dynamics, according to the type of "duty" and drive temperature during duty cycles.

2.2 General Characteristics

- → Power supply: 450...750VDC
- → Power ratings: from 22kW to 1.2MW
- → Control mode:
  - Open-loop vector control
  - Open loop V/f
- → Light or heavy overload control
- → Integration of up to 3 options onboard the drive
- → "Safety" card compliant with machine safety directives (for ADV200 WA-4-...-SI models)
- → GF-eXpress multi-language programming SW (5 languages)
- → PLC with advanced IEC61131-3 programming environment
- → Rated protection:
  - IP20
  - IP00 (size 7 and parallel)
  - IP54, cabinet-mounted (upon request)

Fieldbus management

DeviceNet, CANopen®, Modbus, PROFIBUS PROCESS FIELD BUS, LonWorks (External option), BACnet (External option), EtherNet/IP, EtherCAT®

Performance

The ADV200 WA-4-DC offers state-of-the-art control technology based on the use of a powerful 32-bit microprocessor able to guarantee maximum precision and performance of the motor as well as sophisticated management of the most advanced application systems.

Precision

Control mode	Speed control precision (*)	Control range
Open-loop FOC	± 30% motor slip rating	1 : 100
V/F	± 60% motor slip rating	1 : 30

(*) for standard 4-pole motor

Standard supply configuration

- → Integrated KB_ADV programming keypad
- → Regulation:
  - 2 bipolar analog inputs (Voltage/Current)
  - 2 bipolar analog outputs (1: Voltage/Current, 1: Voltage)
  - 6 digital inputs (PNP/NPN)
  - 2 digital outputs (PNP/NPN)
  - 2 relay outputs, single contact
  - RS485 serial line (Modbus RTU)
- → Reference resolution: Digital = 15bit + sign
  Analog input = 11-bit + sign
  Analog output = 11-bit + sign

Conformity

- → Immunity/Emissions: EEC - EN 61800-3
- → Programming: according to IEC 61131-3
- → Safety standards: STO (Safe Torque Off): IEC 61508 SIL 3, EN 954-1 Cat. 3
  EN 61508 and EN 61800-5-2

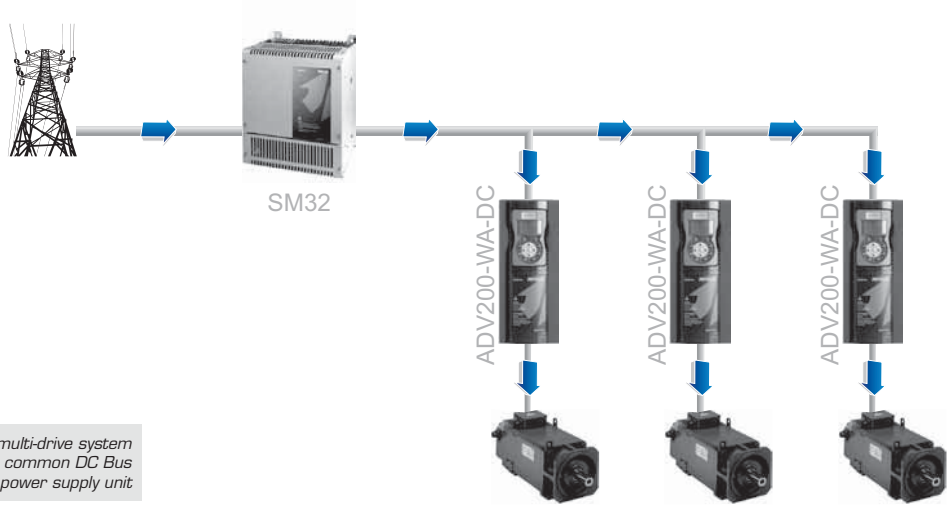
Environmental conditions

- → Ambient temperature: -10°C ... +40°C (+14°F ...+104°F), +40°C...+50°C (+104°F...+122°F) with derating
- → Altitude: Max 2000 m. (up to 1000 m without current limitations)

Markings

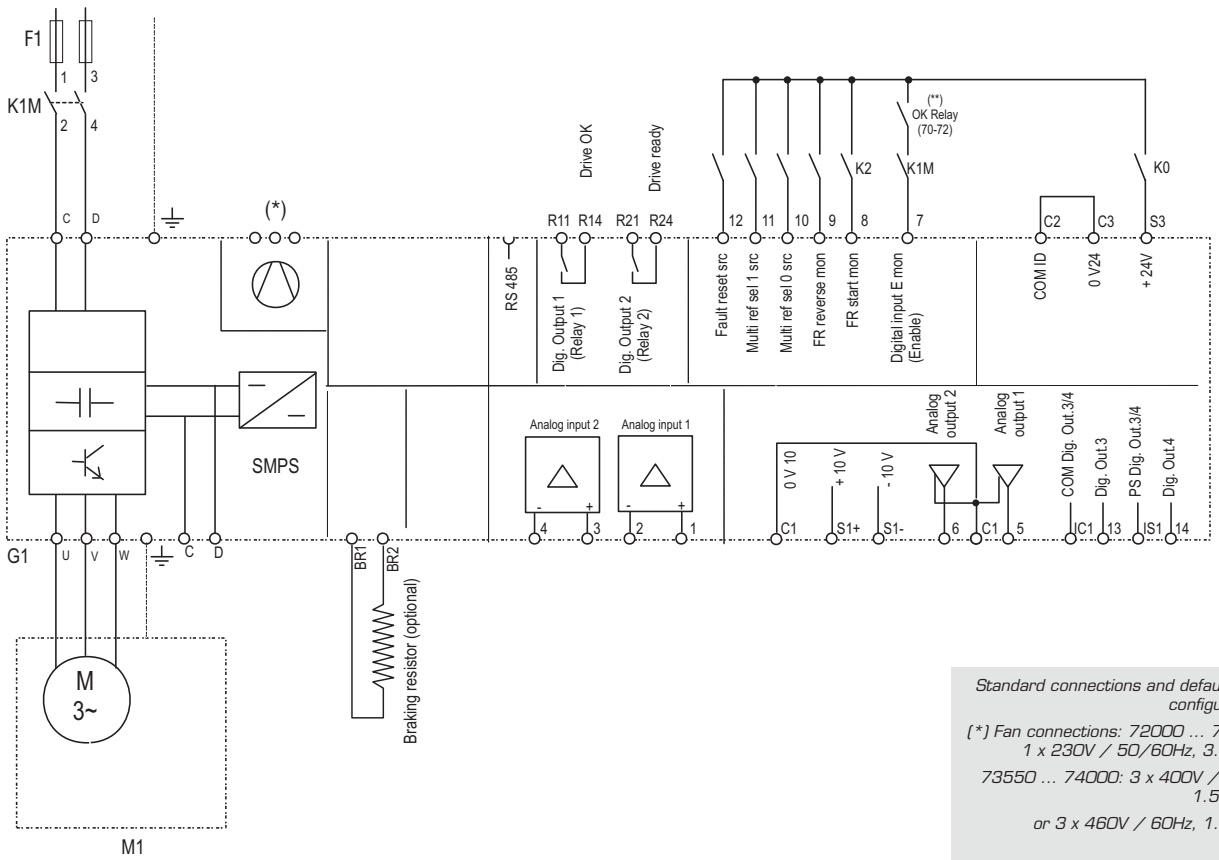
CE — Complies with the EEC directive concerning low voltage equipment

UL, cULus — Complies with directives for the American and Canadian markets.



Example of multi-drive system configuration on a common DC Bus with SM32 power supply unit

2.3 Standard connections



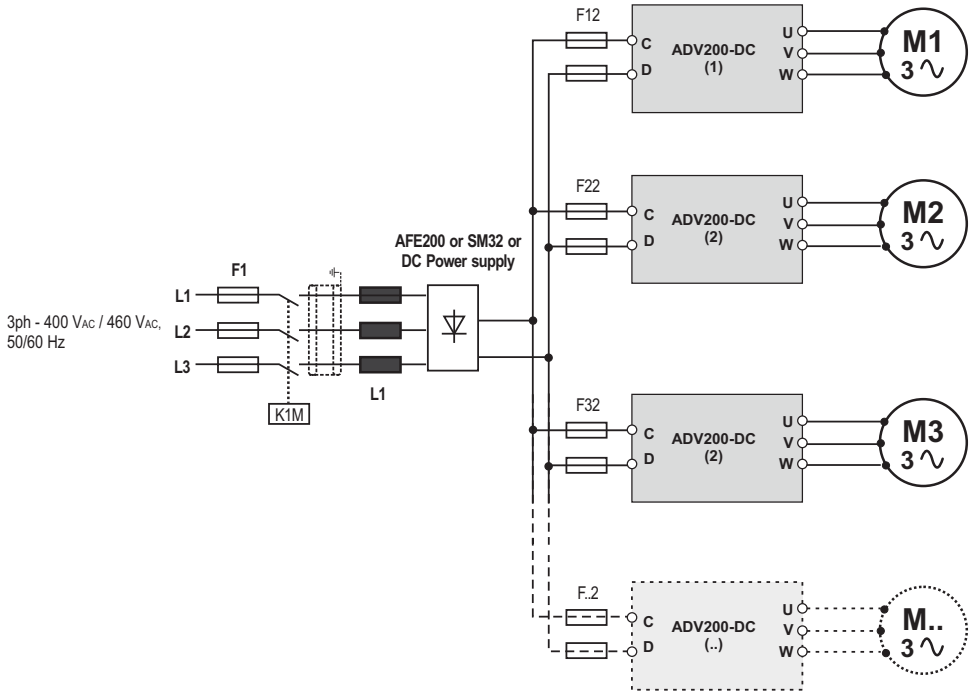
Standard connections and default drive configuration.

(*) Fan connections: 72000 ... 73150: 1 x 230V / 50/60Hz, 3.5Arms

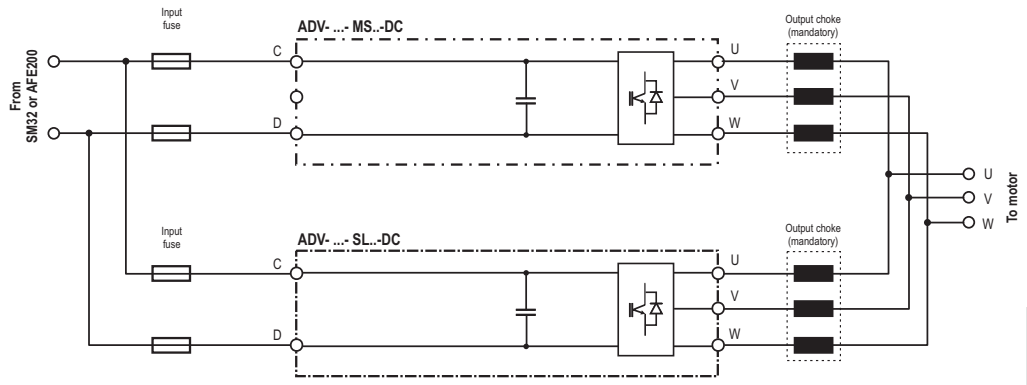
73550 ... 74000: 3 x 400V / 50Hz, 1.55Arms

or 3 x 460V / 60Hz, 1.7Arms

(**): Only for sizes ≥ 72000.

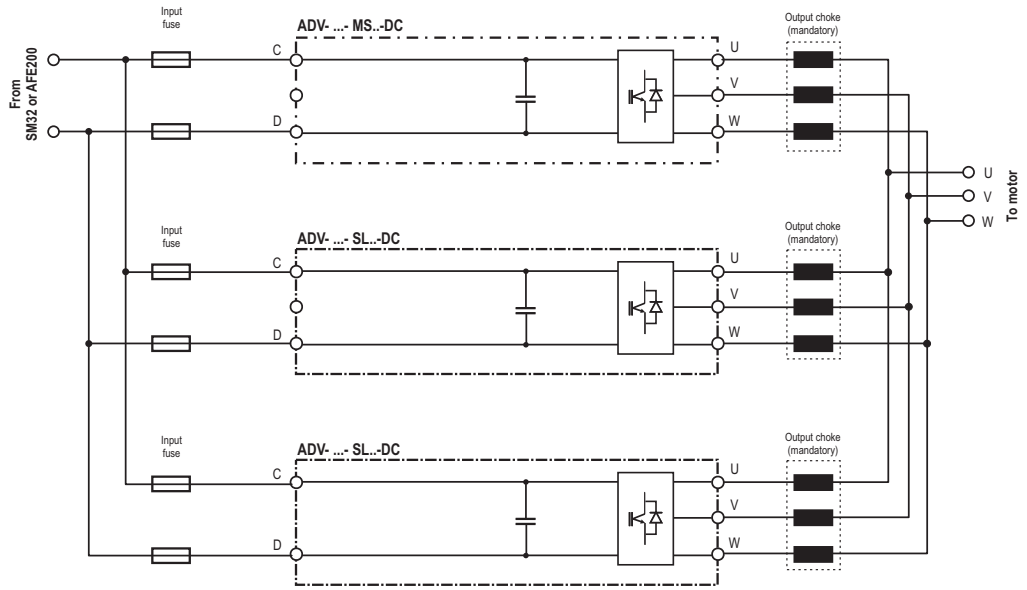


Connection of multi-drive on common DC bus with AC/DC power supply unit (with pre-load).



Block diagram power section sizes 500 ... 800kW.

See diagram at the side for the regulation section.



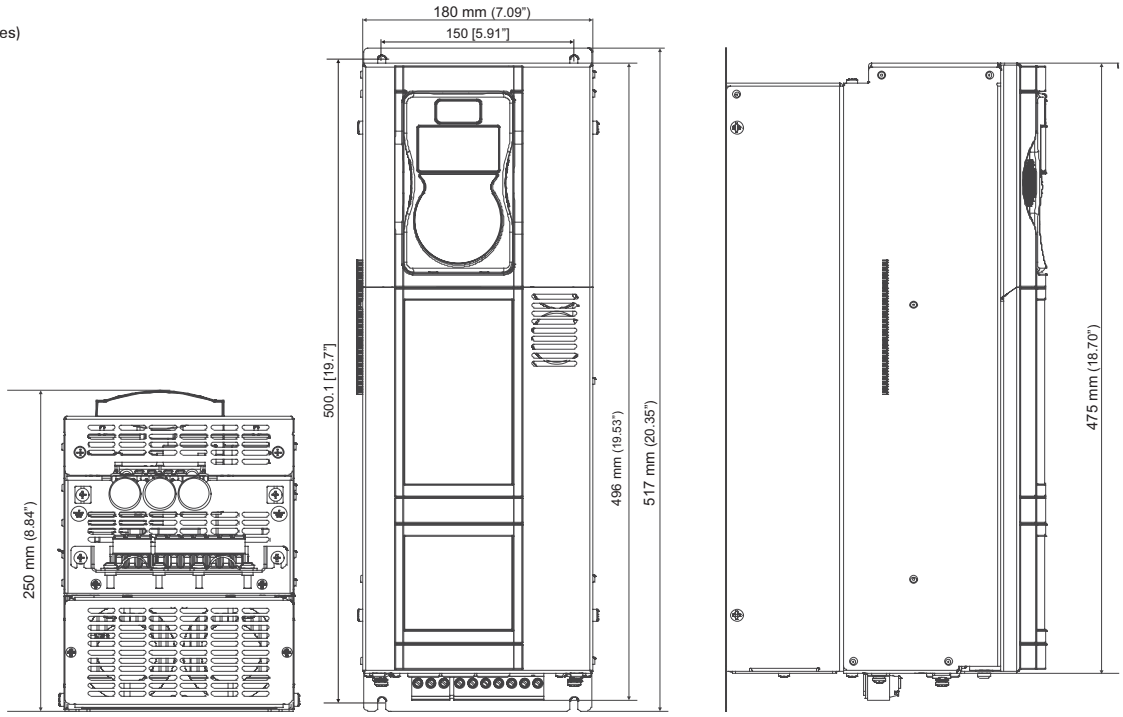
Block diagram power section sizes 1000 ... 1200kW.

See diagram at the side for the regulation section.

2.4 Weights and dimensions

Size 3

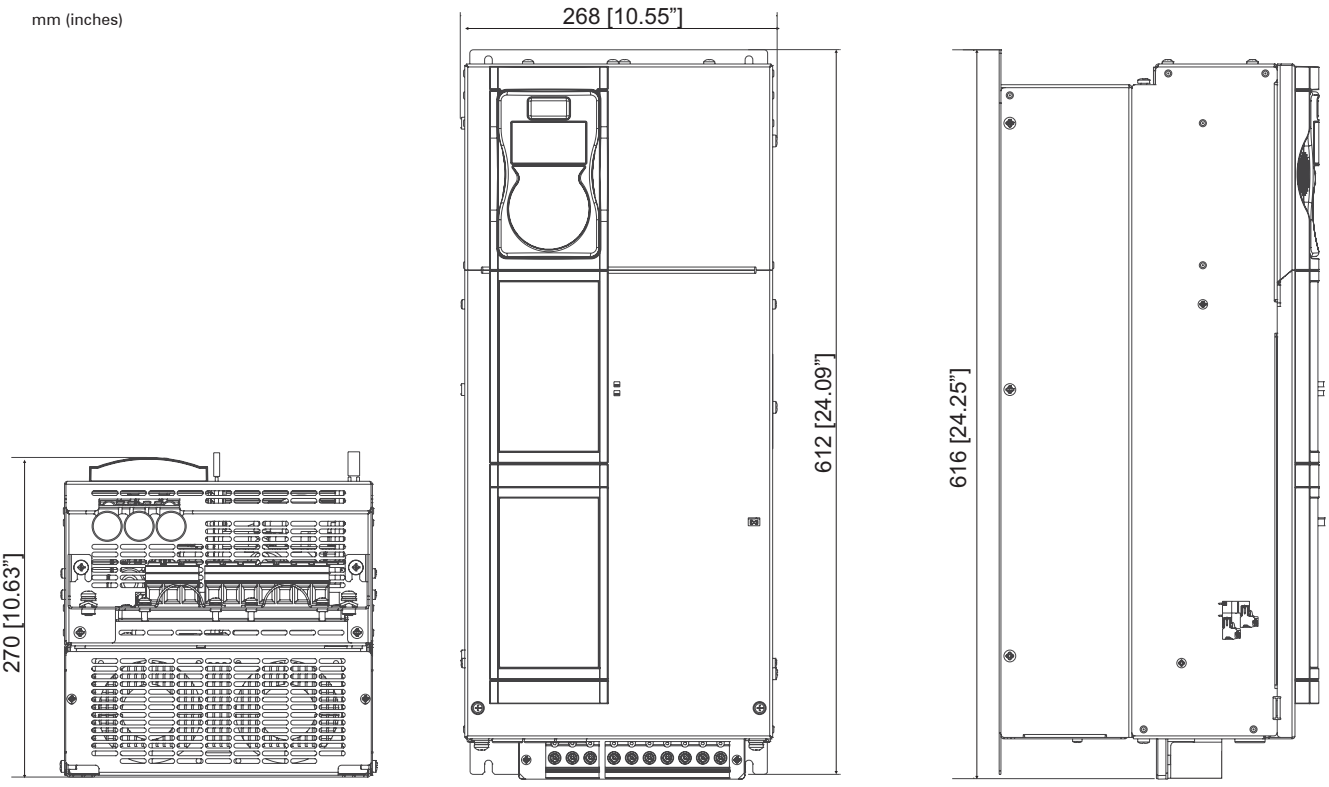
mm (inches)



Size ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
3220	180 x 517 x 250,1	7,09 x 20,35 x 9,85	12	26,5
3300	180 x 517 x 250,1	7,09 x 20,35 x 9,85	18	39,7

Size 4

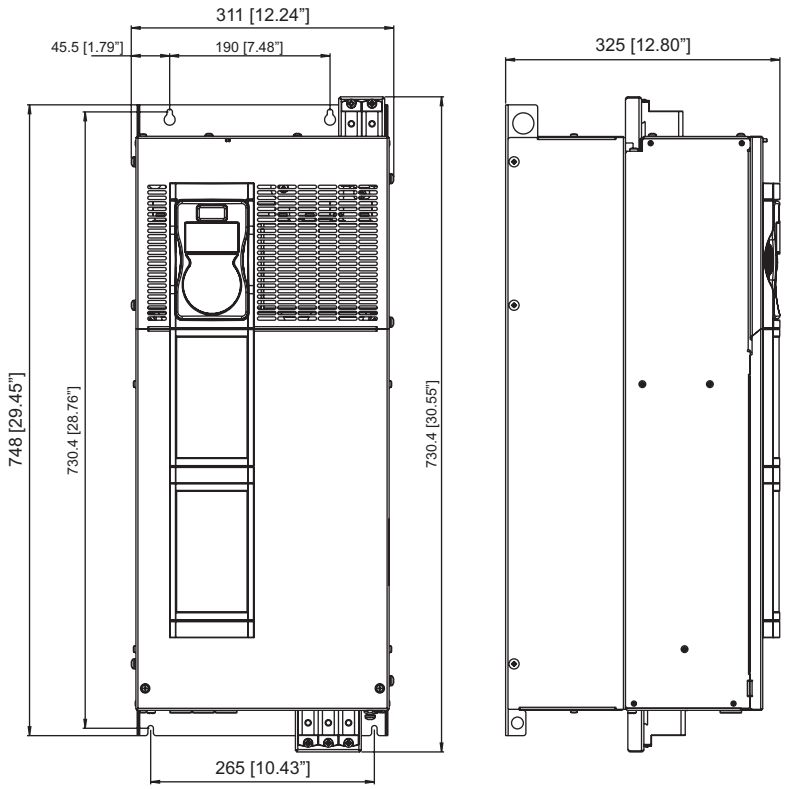
mm (inches)



Size ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
4370...4550	268 x 616 x 270	10.55 x 24.25 x 10.63	24	52.9

Size 5

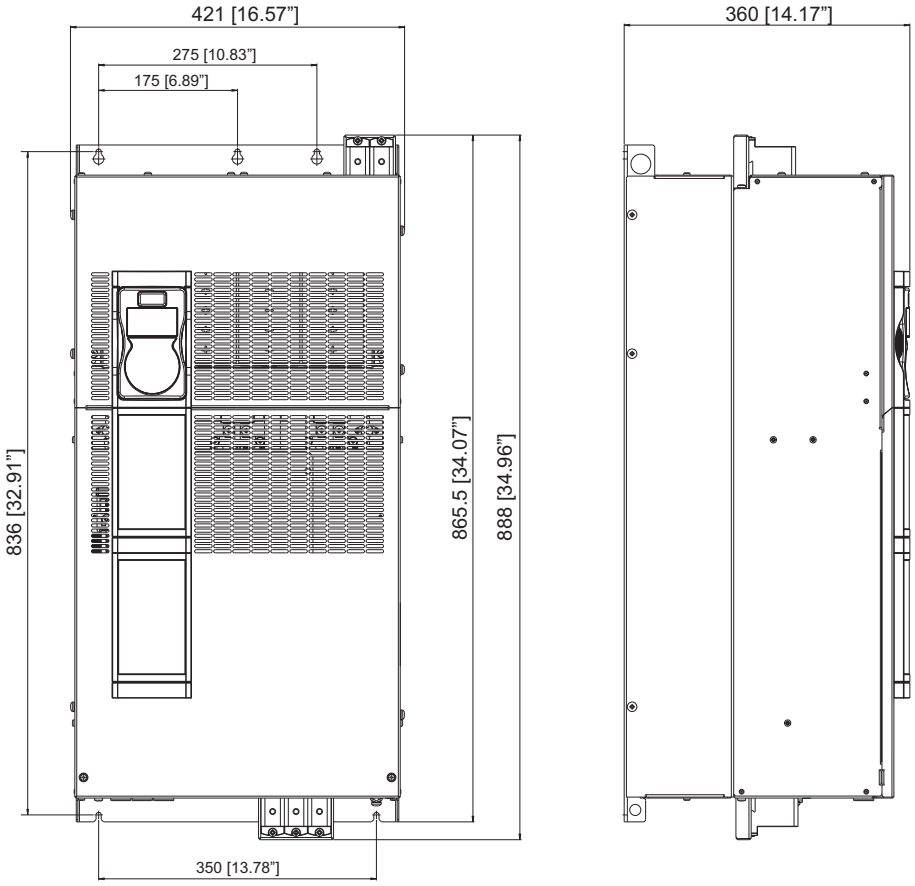
mm (inches)



Size ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
5750 ... 51100	311 x 730.4 x 325	12.24 x 30.55 x 12.8	40	88.2

Size 6

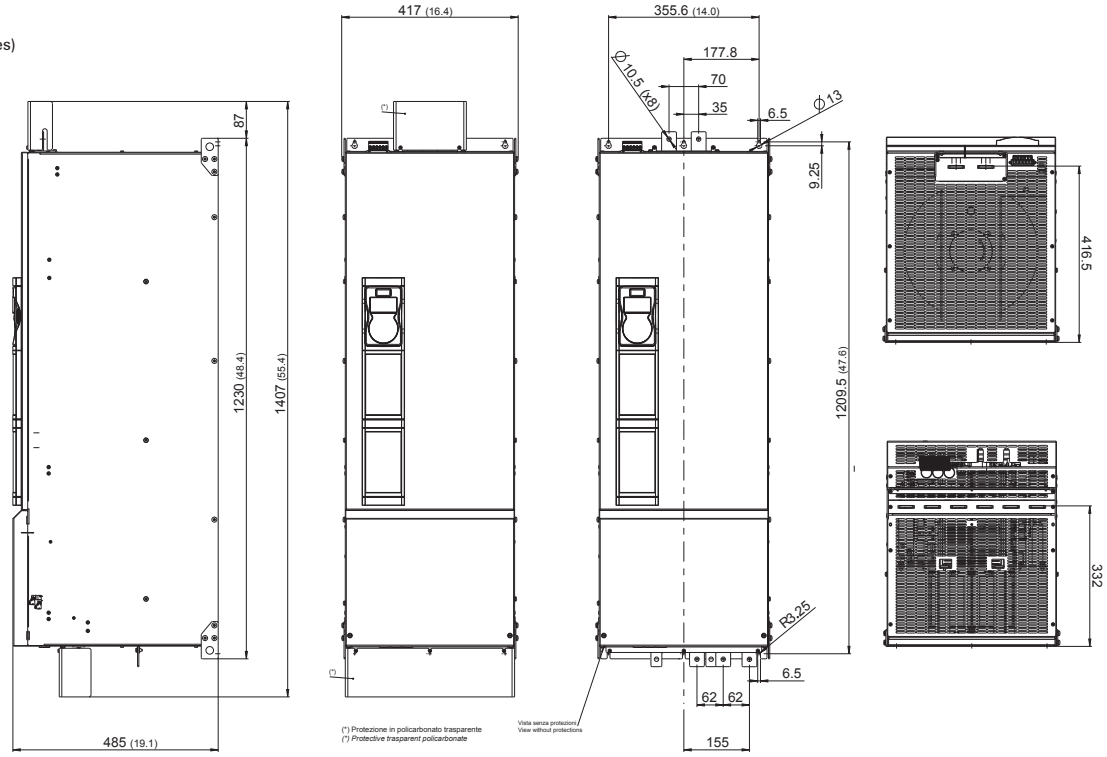
mm (inches)



Size ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
61320	421 x 924.5 x 360	16.57 x 36.4 x 14.17	68	149.9
61600	421 x 924,5 x 360	16,57 x 36,4 x 14,17	68	149,9

Size 7

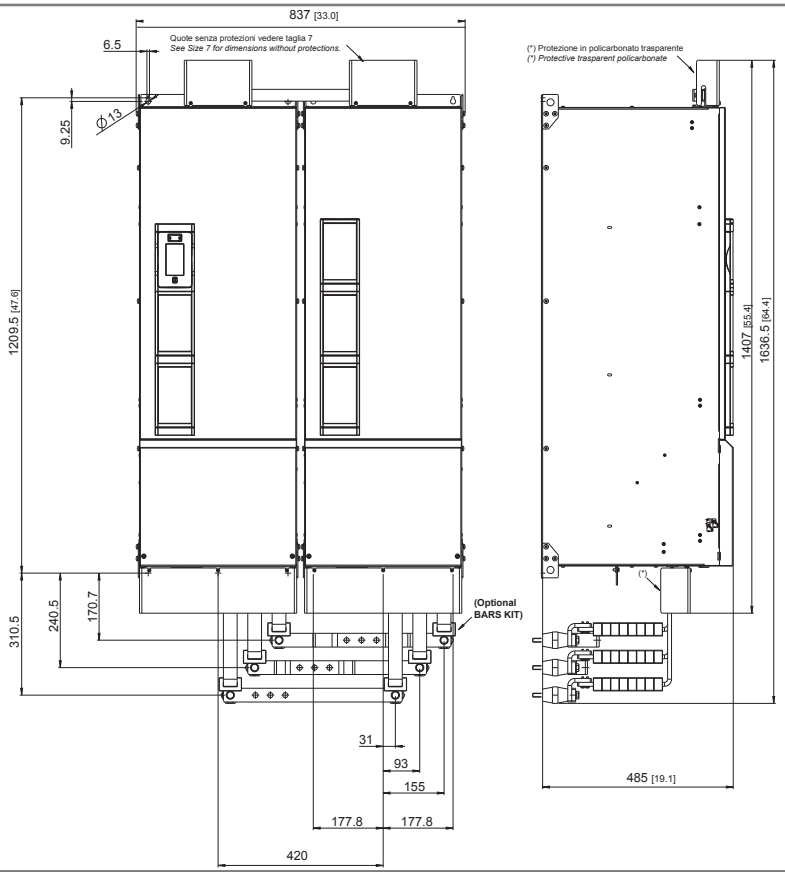
mm (inches)



Sizes ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
72000...72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	120	264,5
73150			130	286,6
73550 ... 74000			140	308,6

Sizes 500 ... 800 kW

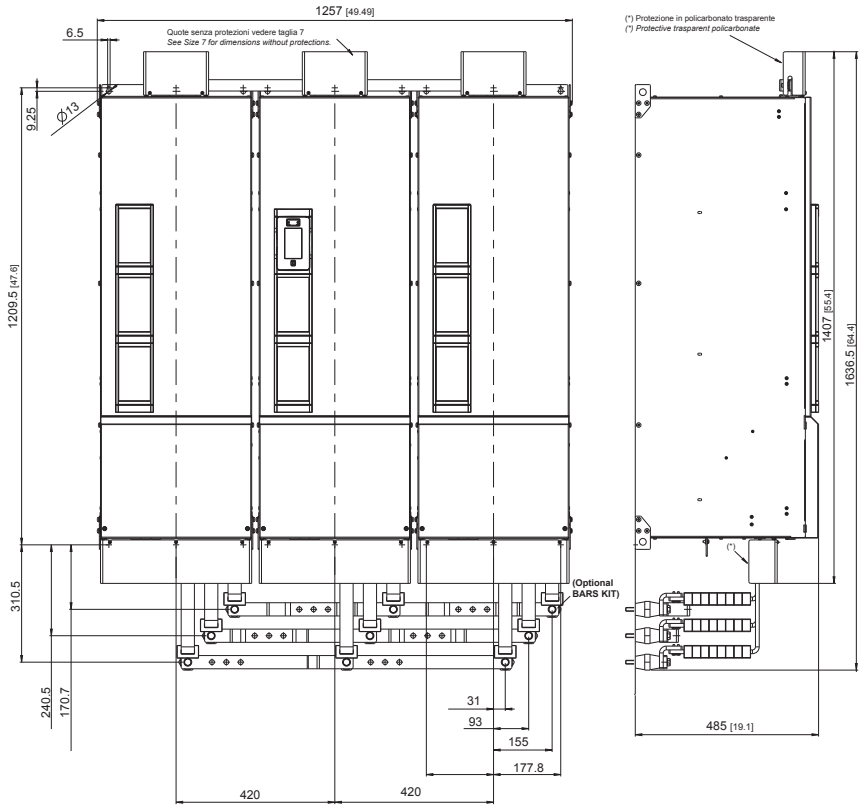
mm (inches)



Sizes ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	240	529,1
630kW			260	573,2
710 - 800kW			280	617,3

Sizes 1000...1200 kW

mm (inches)



Size ADV200 WA-4-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
1000 - 1200kW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	420	925,9

2.5 Choosing the Inverter

The combinations of motor power ratings and inverters listed in the table envisage the use of motors in which the voltage rating is equal to that of the mains power.
For motors with different voltage ratings the inverter must be chosen according to the current rating of the motor.
The combinations listed in the table thus show the current that can be delivered by the drive during continuous operation and overload conditions, according to the mains voltage.

The same engineering criteria apply for operations with additional derating factors:
- KV Power supply voltage
- KT Ambient temperature
- Kf Switching frequency
- KALT Altitude of installation

2.6 Input Data

Sizes ADV200 WA-4-DC	Input voltage ULN [VDC]	Overvoltage threshold (Overvoltage) [Vdc]	Undervoltage threshold (Undervoltage) [Vdc]	DC input current for continuous operation IN		DC-Link Capacity [mF]
				Light Duty (110% overload) @ 540 Vdc [A]	Heavy Duty (150% overload) @ 540 Vdc [A]	
3220	450 ... 750 VCC	820	380	48	39	1500
3300				65	48	1500
4370				80	65	2350
4450				90	80	2800
4550				125	90	3400
5750				175	125	4700
5900				210	175	5600
51100				240	210	6800
61320				290	240	11200
61600				350	290	13600
72000				430	370	16800
72500				510	430	16800
73150				710	510	25200
73550				780	710	25200
74000				850	780	25200
500 kW				1020	860	2 * 16800
630 kW				1420	1020	2 * 25200
710 kW				1560	1420	2 * 25200
800 kW				1700	1560	2 * 25200
1000 kW				2610	2130	3 * 25200
1200 kW				2550	2340	3 * 25200

2.7 Output Data

Sizes ADV200 WA-4-DC	Inverter Output		Pn mot (Recommended motor rating, fsw = default)				Maximum output voltage U2	Maximum output frequency f2	IGBT braking unit
	Light Duty	Heavy Duty	Light Duty (110% overload)		Heavy Duty (150% overload)				
	[kVA]	[kVA]	@400 VAC [kW]	@460 VAC [HP]	@400 Vac [kW]	@460 Vac [HP]	[V]	[Hz]	
3220	32	26.3	22	30	18.5	25	0.98 x ULN (Uln = AC input voltage from separate SM32 or AFE200 power supply unit)	500	Optional external (Buy series)
3300	43	32	30	40	22	30			
4370	52	43	37	50	30	40			
4450	60	52	45	60	37	50			
4550	73	60	55	75	45	60			
5750	104	73	75	100	55	75			
5900	125	104	90	125	75	100			
51100	145	125	110	150	90	125			
61320	173	145	132	175	110	150			
61600	208	173	160	200	132	175			
72000	267	208	200	250	160	200			
72500	319	267	250	300	200	250			
73150	409	319	315	400	250	300		200	
73550	450	409	355	450	315	400			
74000	506	450	400	500	355	450			
500 kW	603	506	500	650	400	500			
630 kW	776	603	630	850	500	650			
710 kW	852	776	710	950	630	850			
800 kW	956	852	800	1100	710	950			
1000 kW	1247	1108	1000	1300	900	1200			
1200 kW	1420	1247	1200	1600	1000	1300			

Sizes ADV200 WA-4-DC	Rated output current In (fsw = default)				Switching frequency fsw		Reduction factor			
	Light Duty (110% overload)		Heavy Duty (150% overload)		Default	Higher	Kv	KT	Kf (@ 8 kHz)	KALT
	@540 VDC [A]	@650 VDC [A]	@540 VDC [A]	@650 VDC [A]	[kHz]	[kHz]	(1)	(2)	(3)	(4)
3220	46	41.4	38	34.2	4	6, 8, 10, 12	0.9	SL=0.8 SP=09	0.7	1.2
3300	62	55.8	46	41.4	4	6, 8, 10, 12	0.9		0.7	1.2
4370	75	67.5	62	55.8	4	6, 8, 10, 12	0.9		0.7	1.2
4450	87	78.3	75	67.5	4	6, 8, 10, 12	0.9		0.7	1.2
4550	105	94.5	87	78	4	6, 8	0.9		0.7	1.2
5750	150	135	105	94.5	4	6, 8	0.9		0.7	1.2
5900	180	162	150	135	4	6, 8	0.9		0.7	1.2
51100	210	189	180	162	4	6, 8	0.9		0.7	1.2
61320	250	225	210	189	4	6, 8	0.9		0.7	1.2
61600	300	270	250	225	4	6, 8	0.9		0.7	1.2
72000	385	347	300	270	4	-	0.9		0	1.2
72500	460	414	385	347	4	-	0.9		0	1.2
73150	590	531	460	414	2	-	0.9		0	1.2
73550	650	585	590	531	2	-	0.9		0	1.2
74000	730	657	650	585	2	-	0.9		0	1.2
500 kW	870	783	730	657	2	-	0.9		0	1.2
630 kW	1120	1008	870	783	2	-	0.9		0	1.2
710 kW	1230	1107	1120	1008	2	-	0.9		0	1.2
800 kW	1380	1242	1230	1107	2	-	0.9		0	1.2
1000 kW	1800	1620	1600	1440	2	-	0.9		0	1.2
1200 kW	2050	1845	1900	1620	2	-	0.9		0	1.2

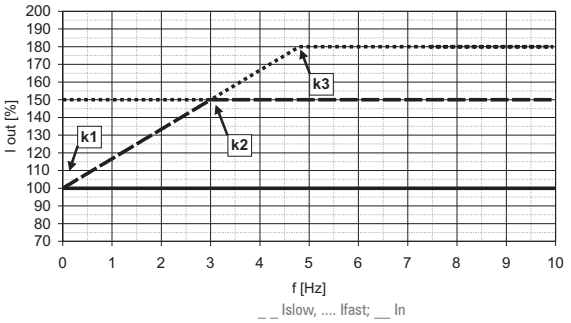
(1) KV : Derating factor for DC-link voltage at 650 Vdc
(2) KT : Derating factor for ambient temperature of 50°C (1% every °C over 40°C with HD and 2% every °C over 40°C with LD)
(3) KF : Derating factor for higher switching frequency
(4) KALT : Derating factor for installation at altitudes above 1000 meters a.s.l. (up to a maximum of 2000 m).Value to be applied = 1.2% each 100 m increase above 1000 m.
For example: Altitude 2000 m, Kalt = 1.2% * 10 = 12% derating; In derated = (100 - 12) % = 88 % In

Sizes ADV200 WA-4-DC	Overload			Derating according to switching frequency (HD)						Overload according to output frequency				
	LD 110 % x In (1' every 5')	HD 150 % x In (1' every 5')	LD 180 % x In (for 0.5")	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	Light Duty		Heavy Duty		
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	K1 LD [%]	K2 LD [Hz]	K1 HD [%]	K2 HD [Hz]	K3 HD [Hz]
3220	50.6	57	68.4	38	38	32.3	26.6	22.8	19	85	5	100	5	8
3300	68.2	69	82.8	46	46	39.1	32.2	27.6	23	80	5	100	3	4.8
4370	82.5	93	111.6	62	62	52.7	43.4	37.2	31	80	3	100	3	4.8
4450	95.7	113	135	75	75	63.8	52.5	45	37.5	80	3	100	3	4.8
4550	116	131	157	87	87	74	60.9	n.a.	n.a.	80	3	100	3	4.8
5750	165	157	189	105	105	89	74	n.a.	n.a.	85	5	100	3	4.8
5900	198	225	270	150	150	128	105	n.a.	n.a.	85	5	100	5	8
51100	231	270	324	180	180	153	126	n.a.	n.a.	85	5	100	5	8
61320	275	315	378	210	210	179	147	n.a.	n.a.	100	3	100	3	4.8
61600	330	375	540	250	250	213	175	n.a.	n.a.	100	3	100	3	4.8
72000	424	450	540	300	300	n.a.	n.a.	n.a.	n.a.	80	3	100	3	4.8
72500	506	578	693	385	385	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
73150	649	690	828	460	n.a.	n.a.	n.a.	n.a.	n.a.	75	5	100	3	4.8
73550	715	885	1062	590	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
74000	803	975	1170	650	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5
500 kW	957	1095	1314	730	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
630 kW	1232	1305	1566	870	n.a.	n.a.	n.a.	n.a.	n.a.	75	5	100	3	4.8
710 kW	1353	1680	2016	1120	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
900 kW	1518	1845	2214	1230	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5
1000 kW	1980	2400	2880	1600	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
1200 kW	2255	2700	3240	1900	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5

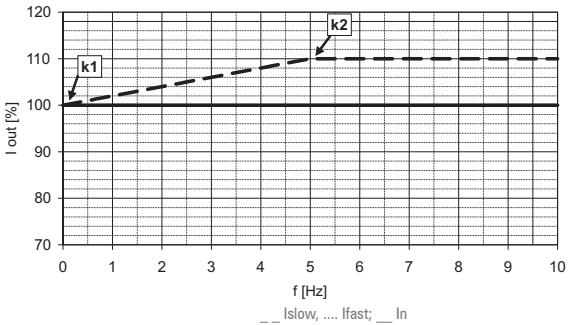
• If the factory setting of PAR 568 Switching freq mode is changed from 0=Fixed to 1=Variable, the switching frequency is controlled by the temperature of the drive heat sink and the output frequency. For further information see the WA Functions and Parameters manual, menu 4.9.

Overload according to output frequency

Overload LD



Overload HD



2.8 Cooling

All inverters are equipped with internal fans.

Size		Dissipated power [W]	Fan capacity Dissipator [m3/h]	Fan capacity Internal [m3/h]
ADV200-WA-4-DC-3220		460	80 x 2	32
ADV200-WA-4-DC-3300		600	80 x 2	32
ADV200-WA-4-DC-4370		900	2 x 250	2 x 50
ADV200-WA-4-DC-4450		1000	2 x 250	2 x 50
ADV200-WA-4-DC-4550		1290	2 x 250	2 x 50
ADV200-WA-4-DC-5750		1760	2 x 285	1 x 170
ADV200-WA-4-DC-5900		2150	2 x 355	2 x 170
ADV200-WA-4-DC-51100		2400	2 x 355	2 x 170
ADV200-WA-4-DC-61320		2850	3 x 310	2 x 170
ADV200-WA-4-DC-61600		3600	3 x 310	2 x 170
ADV200-WA-4-DC-72000		3900	1500	-
ADV200-WA-4-DC-72500		4000	1500	-
ADV200-WA-4-DC-73150		5200	1500	-
ADV200-WA-4-DC-73550		6000	2000	-
ADV200-WA-4-DC-74000		6500	2000	-
500 kW	ADV200-WA-4-DC-72500-KXX-4-MS 05-DC	4000	1500	-
	ADV200-WA-4-DC-72500-XXX-4-SL-DC	4000	1500	-
630 kW	ADV200-WA-4-DC-73150-KXX-4-MS 06-DC	5200	1500	-
	ADV200-WA-4-DC-73150-XXX-4-SL-DC	5200	1500	-
710 kW	ADV200-WA-4-DC-73550-KXX-4-MS 07-DC	6000	2000	-
	ADV200-WA-4-DC-73550-XXX-4-SL-DC	6000	2000	-
800 kW	ADV200-WA-4-DC-74000-KXX-4-MS 08-DC	6500	2000	-
	ADV200-WA-4-DC-74000-XXX-4-SL-DC	6500	2000	-
1000 kW	ADV200-WA-4-DC-73550-KXX-4-MS 010-DC	6000	2000	-
	ADV200-WA-4-DC-73550-XXX-4-SL-DC-DC	6000	2000	-
	ADV200-WA-4-DC-73550-XXX-4-SL-DC-DC	6000	2000	-
1200 kW	ADV200-WA-4-DC-74000-KXX-4-MS 12-DC	6500	2000	-
	ADV200-WA-4-DC-74000-XXX-4-SL-DC	6500	2000	-
	ADV200-WA-4-DC-74000-XXX-4-SL-DC	6500	2000	-

2.9 Order codes

Product identification

ADV200 WA - X XXX - X X X - Y - XX YY -DC - SI

EXP-SFTy-ADV safety card	YES= included	[empty]= not included
DC link power supply versions		
Only for parallel versions:	**XX :** MS = MASTER SL = SLAVE	YY : **Inverter power in kW** 05 = 500.0 kW 06 = 630.0 kW 07 = 710.0 kW 08 = 800.0 kW 10 = 1000.0 kW 12 = 1200.0 kW
Rated voltage from external power supply (factory setting):	4 = 380 Vac / 50 Hz	4A = 460 VAC / 60 Hz
Software:	X = standard	
Braking unit:	X = not included	B = included
Keypad:	X = not included	K = included
Inverter power in kW:	220 = 22.0 kW 300 = 30.0 kW 370 = 37.0 kW 450 = 45.0 kW 550 = 55.0 kW 750 = 75.0 kW 900 = 90.0 kW	1100 = 110.0 kW 1320 = 132.0 kW 1600 = 160.0 kW 2000 = 200.0 kW 2500 = 250.0 kW 3150 = 315.0 kW 3550 = 355.0 kW 4000 = 400.0 kW
Mechanical dimensions of the drive:	3 = size 3 4 = size 4 5 = size 5	6 = size 6 7 = size 7
Inverter, ADV200 WA series		

Example:

ADV200 WA - 3 220 - K B X - 4 -DC

DC link power supply versions	
Rated voltage from external power supply (factory setting):	4 = 380 VAC / 50 Hz
Software:	X = standard
Braking unit:	B = included
Keypad:	K = included
Inverter power in kW:	220 = 22.0 kW
Mechanical dimensions of the drive:	3 = size 3
Inverter, ADV200 WA series	

ADV200 WA-4-DC - Common DC bus power supply

- Field-Orientated Vector Inverter
- Model with "KB-ADV" Programming Keypad
- HD = LD = Light Duty (Overload 110%), Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9010WC	ADV200-WA-3220-KXX-4-DC	22kW	18.5kW	Configuration without rectifier, choke and filter
S9011WC	ADV200-WA-3300-KXX-4-DC	30kW	22kW	Configuration without rectifier, choke and filter
S9012WC	ADV200-WA-4370-KXX-4-DC	37kW	30kW	Configuration without rectifier, choke and filter
S9013WC	ADV200-WA-4450-KXX-4-DC	45kW	37kW	Configuration without rectifier, choke and filter
S9014WC	ADV200-WA-4550-KXX-4-DC	55kW	45kW	Configuration without rectifier, choke and filter
S9015WC	ADV200-WA-5750-KXX-4-DC	75kW	55kW	Configuration without rectifier, choke and filter
S9016WC	ADV200-WA-5900-KXX-4-DC	90kW	75kW	Configuration without rectifier, choke and filter
S9017WC	ADV200-WA-51100-KXX-4-DC	110kW	90kW	Configuration without rectifier, choke and filter
S9018WC	ADV200-WA-61320-KXX-4-DC	132kW	110kW	Configuration without rectifier, choke and filter
S9019WC	ADV200-WA-61600-KXX-4-DC	160kW	132kW	Configuration without rectifier, choke and filter
S9020WC	ADV200-WA-72000-KXX-4-DC	200kW	160kW	Configuration without rectifier, choke and filter
S9021WC	ADV200-WA-72500-KXX-4-DC	250kW	200kW	Configuration without rectifier, choke and filter
S9022WC	ADV200-WA-73150-KXX-4-DC	315kW	250kW	Configuration without rectifier, choke and filter
S9023WC	ADV200-WA-73550-KXX-4-DC	355kW	315kW	Configuration without rectifier, choke and filter
S9024WC	ADV200-WA-74000-KXX-4-DC	400kW	355kW	Configuration without rectifier, choke and filter
S9025WC	ADV200-WA-73550-KXX-4A-DC	355kW	315kW	Conf. without rectifier, choke and filter - 460VAC/60Hz fan power supply
S9026WC	ADV200-WA-74000-KXX-4A-DC	400kW	355kW	Conf. without rectifier, choke and filter - 460VAC/60Hz fan power supply

ADV200 WA-4-DC -SI - Power supply for Common DC Bus + SIL 3 Safety Card

- Field-Orientated Vector Inverter
- Model with "KB-ADV" Programming Keypad
- Integrated safety card
- LD = Light Duty (Overload 110%), Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9010WCS	ADV200-WA-3220-KXX-4-DC-SI	22kW	18.5kW	Configuration without rectifier, choke and filter
S9011WCS	ADV200-WA-3300-KXX-4-DC-SI	30kW	22kW	Configuration without rectifier, choke and filter
S9012WCS	ADV200-WA-4370-KXX-4-DC-SI	37kW	30kW	Configuration without rectifier, choke and filter
S9013WCS	ADV200-WA-4450-KXX-4-DC-SI	45kW	37kW	Configuration without rectifier, choke and filter
S9014WCS	ADV200-WA-4550-KXX-4-DC-SI	55kW	45kW	Configuration without rectifier, choke and filter
S9015WCS	ADV200-WA-5750-KXX-4-DC-SI	75kW	55kW	Configuration without rectifier, choke and filter
S9016WCS	ADV200-WA-5900-KXX-4-DC-SI	90kW	75kW	Configuration without rectifier, choke and filter
S9017WCS	ADV200-WA-51100-KXX-4-DC-SI	110kW	90kW	Configuration without rectifier, choke and filter
S9018WCS	ADV200-WA-61320-KXX-4-DC-SI	132kW	110kW	Configuration without rectifier, choke and filter
S9019WCS	ADV200-WA-61600-KXX-4-DC-SI	160kW	132kW	Configuration without rectifier, choke and filter
S9020WCS	ADV200-WA-72000-KXX-4-DC-SI	200kW	160kW	Configuration without rectifier, choke and filter
S9021WCS	ADV200-WA-72500-KXX-4-DC-SI	250kW	200kW	Configuration without rectifier, choke and filter

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9022WCS	ADV200-WA-73150-KXX-4-DC-SI	315kW	250kW	Configuration without rectifier, choke and filter
S9023WCS	ADV200-WA-73550-KXX-4-DC-SI	355kW	315kW	Configuration without rectifier, choke and filter (No UL Mark)
S9024WCS	ADV200-WA-74000-KXX-4-DC-SI	400kW	355kW	Configuration without rectifier, choke and filter (No UL Mark)
S9025WCS	ADV200-WA-73550-KXX-4A-DC-SI	355kW	315kW	Conf. without rectifier, choke and filter - 460Vac/60Hz fan power supply
S9026WCS	ADV200-WA-74000-KXX-4A-DC-SI	400kW	355kW	Conf. without rectifier, choke and filter - 460Vac/60Hz fan power supply

ADV200 WA-4-DC - Parallel Configurations + SIL3 Safety Card

- Field-Orientated Vector Inverter
- "KB-ADV" Programming Keypad in the Master version (MS)
- Power supply for Common DC Bus
- Integrated safety card
- LD = Light Duty (Overload 110%), Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9025WMC S9025WSC	ADV200-WA-72500-KXX-4-MS 05-DC-SI ADV200-WA-72500-XXX-4-SL-DC	500kW	400kW	Without rectifier - choke - filter + Integrated Safety Card
S9026WMC S9026WSC	ADV200-WA-73150-KXX-4 -MS 06-DC-SI ADV200-WA-73150-XXX-4 -SL-DC	630kW	500kW	Without rectifier - choke - filter + Integrated Safety Card
S9027WMC S9027WSC	ADV200-WA-73550-KXX-4- MS 07-DC-SI ADV200-WA-73550-XXX-4- SL-DC	710kW	630kW	Without rectifier - choke - filter + Integrated Safety Card
S9028WMC S9028WSC	ADV200-WA-74000-KXX-4- MS 08-DC-SI ADV200-WA-74000-XXX-4- SL-DC	800kW	710kW	Without rectifier - choke - filter + Integrated Safety Card
S9027WM2 S9027WSC S9027WSC	ADV200-WA-73550-KXX-4 -MS 10-DC-SI ADV200-WA-73550-XXX-4 -SL-DC ADV200-WA-73550-XXX-4 -SL-DC	1MW	900kW	Without rectifier - choke - filter + Integrated Safety Card
S9028WM2 S9028WSC S9028WSC	ADV200-WA-74000-KXX-4- MS 12-DC-SI ADV200-WA-74000-XXX-4- SL-DC ADV200-WA-74000-XXX-4- SL-DC	1,2MW	1MW	Without rectifier - choke - filter - Integrated Safety Card
S9029WMC S9029WSC	ADV200-WA-73550-KXX-4A- MS 07-DC-SI ADV200-WA-73550-XXX-4A- SL-DC	710kW	630kW	Without rectifier - choke - filter + Integrated Safety Card 460Vac/60Hz fan power supply
S9030WMC S9030WSC	ADV200-WA-74000-KXX-4A- MS 08-DC-SI ADV200-WA-74000-XXX-4A- SL-DC	800kW	710kW	Without rectifier - choke - filter + Integrated Safety Card 460Vac/60Hz fan power supply
S9029WM2 S9029WSC S9029WSC	ADV200-WA-73550-KXX-4A-MS 10-DC-SI ADV200-WA-73550-XXX-4A -SL-DC ADV200-WA-73550-XXX-4A -SL-DC	1MW	900kW	Without rectifier - choke - filter + Integrated Safety Card 460Vac/60Hz fan power supply
S9030WM2 S9030WSC S9030WSC	ADV200-WA-74000-KXX-4A- MS 12-DC-SI ADV200-WA-74000-XXX-4A- SL-DC ADV200-WA-74000-XXX-4A- SL-DC	1,2MW	1MW	Without rectifier - choke - filter + Integrated Safety Card 460Vac/60Hz fan power supply

Note :

3. ADV200 WA-6 • 690 Vac Power Supply

3.1 Introduction

ADV200 WA-6 Vector Inverters offer the best system solutions for drives with stand-alone configuration or common DC Bus power supply.

The range features power ratings of **75kW up to 1.2MW** for **three-phase power supplies of 690 VAC**. Integrated accessories such as the mains choke enhance long-term reliability, reduce overall dimensions and lower wiring costs.

Flexible Modular Technology

The ADV200 WA-6 range reflects the philosophy of the entire ADV range and is based on a fully modular hardware with power structures that have been optimised for modern automation systems.
Designed to facilitate installation and guarantee ease of use, project flexibility, optimisation of space and reduction of wiring costs.

The ADV200 WA-6 is available in various hardware sizes:

- up to 400kW kW in the stand-alone configuration complete with rectifier stage
- from 500 kW to 1.2 MWin parallel configuration.

Integrated reliability

The ADV200 WA-6 features advanced engineering and high-quality components that guarantee long-term reliability; the integrated input choke on the DC side reduces THD by up to 40% (up to size ADV200-WA-6-71320).

Total ease of use

Designed with the user in mind. The mechanical structure ensures simple and fast product management, regardless of installation and assembly conditions. All operations are simple and immediate, from accessing the extractable terminal strips to rack-mounting of options.
The dedicated accessories guarantee simple wiring and cable shielding to achieve immediate, EMC-compliant start-ups.

Serial line

The RS485 serial line is incorporated as standard across the range to enable peer-to-peer or multidrop connections using Modbus RTU protocol.

Management of optional cards

The ADV200 WA-6 uses an intelligent rack system that allows 3 optional cards to be installed at the same time.

- Fieldbus interface card
- I/O expansion card.

Back-up power supply

The ADV200 WA-6 is compatible with a separate +24Vdc external power supply. This solution makes it possible to maintain all display and drive configuration functions and manage the connected fieldbuses in the event of a power failure.

3.2 General Characteristics

- → Power supply: 3 x 690VAC ±10%; 50-60 Hz ± 5%
- → Power ratings: from 75kW to 1.2MW
- → Max output voltage 0.98 x Vin
- → Control mode:
  - Open-loop vector control
  - Open loop V/f
- → Heavy overload control (136% x 1')
- → Integration of up to 3 options onboard the drive
- → GF-eXpress multi-language programming SW (5 languages)
- → PLC with advanced IEC61131-3 programming environment
- → Rated protection:
  - IP20 (ADV200-WA-6-6750 ...-92500)
  - IP00 (ADV200-WA-6-10500 ... -101200)
  - IP54, cabinet-mounted (upon request)

Fieldbus management

DeviceNet™ · CANopen® · Modbus · EtherCAT® · GDNET™ Gefran Deterministic Network · PROFIBUS PROCESS FIELD BUS

Performance

The ADV200 WA-6 offers state-of-the-art control technology based on the use of a powerful 32-bit microprocessor able to guarantee maximum precision and performance of the motor as well as sophisticated management of the most advanced application systems.

Precision

Control mode	Speed control precision (*)	Control range
Open-loop FOC	± 30% motor slip rating	1 : 100
V/F	± 60% motor slip rating	1 : 30

(*)for standard 4-pole motor

Standard supply configuration

- → Integrated KB_ADV programming keypad
- → Regulation:
  - 2 bipolar analog inputs (Voltage/Current)
  - 2 bipolar analog outputs (1: Voltage/Current, 1: Voltage)
  - 6 digital inputs (PNP/NPN)
  - 2 digital outputs (PNP/NPN)
  - 2 relay outputs, single contact
  - RS485 serial line (Modbus RTU)
- → Reference resolution: Digital = 15bit + sign
Analog input = 11-bit + sign
Analog output = 11-bit + sign

Conformity

- → Immunity/Emissions: EEC - EN 61800-3
- → Programming: according to IEC 61131-3
- → Electrical safety: EN 50178, EN 61800-5-1

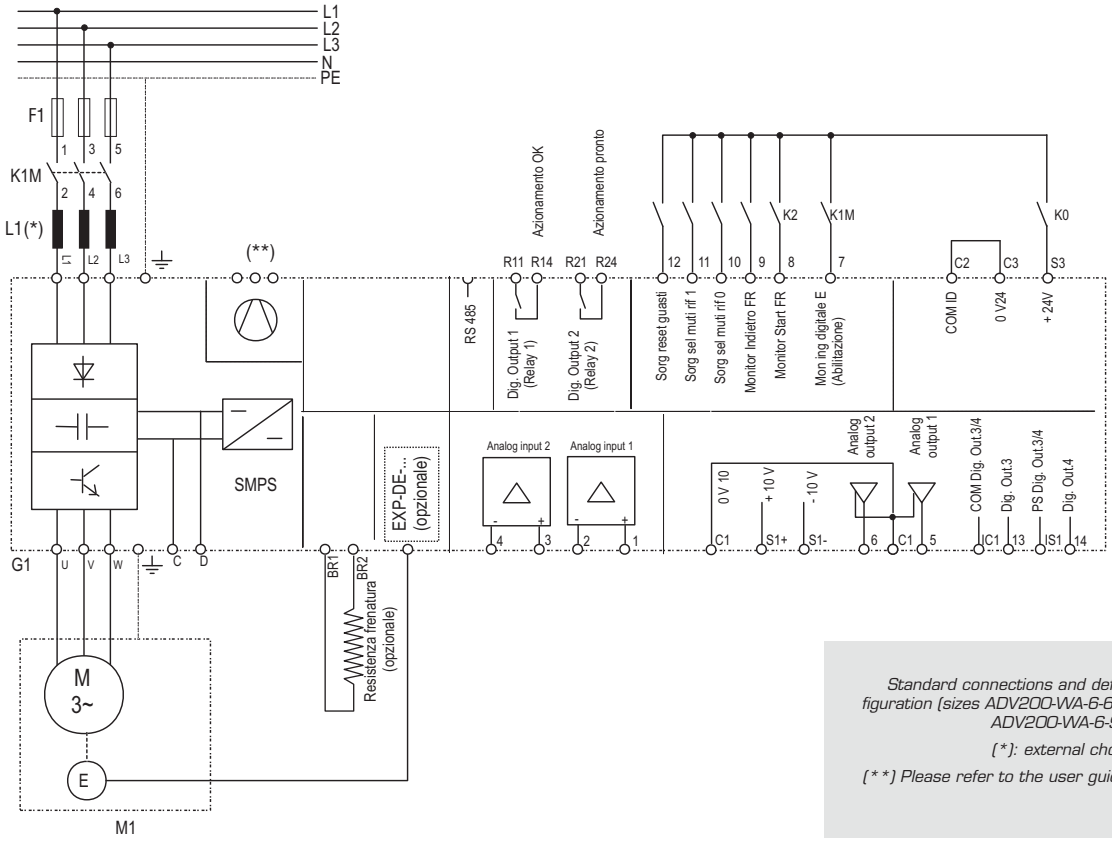
Environmental conditions

- → Ambient temperature: 0 ...+40°C (sizes 5750 ... 61320)
-10...+40°C (sizes 72000 ... 73150)
-10...+35°C (sizes 74000)
+40°C...+50°C (+104°F...+122°F) with derating
- → Altitude: Max 2000 m. (up to 1000 m without current limitations)

Markings

CE — Complies with the EEC directive concerning low voltage equipment

3.3 Standard connections



Standard connections and default drive configuration (sizes ADV200-WA-6-6750-KXX-6 … ADV200-WA-6-92500-KXX-6)

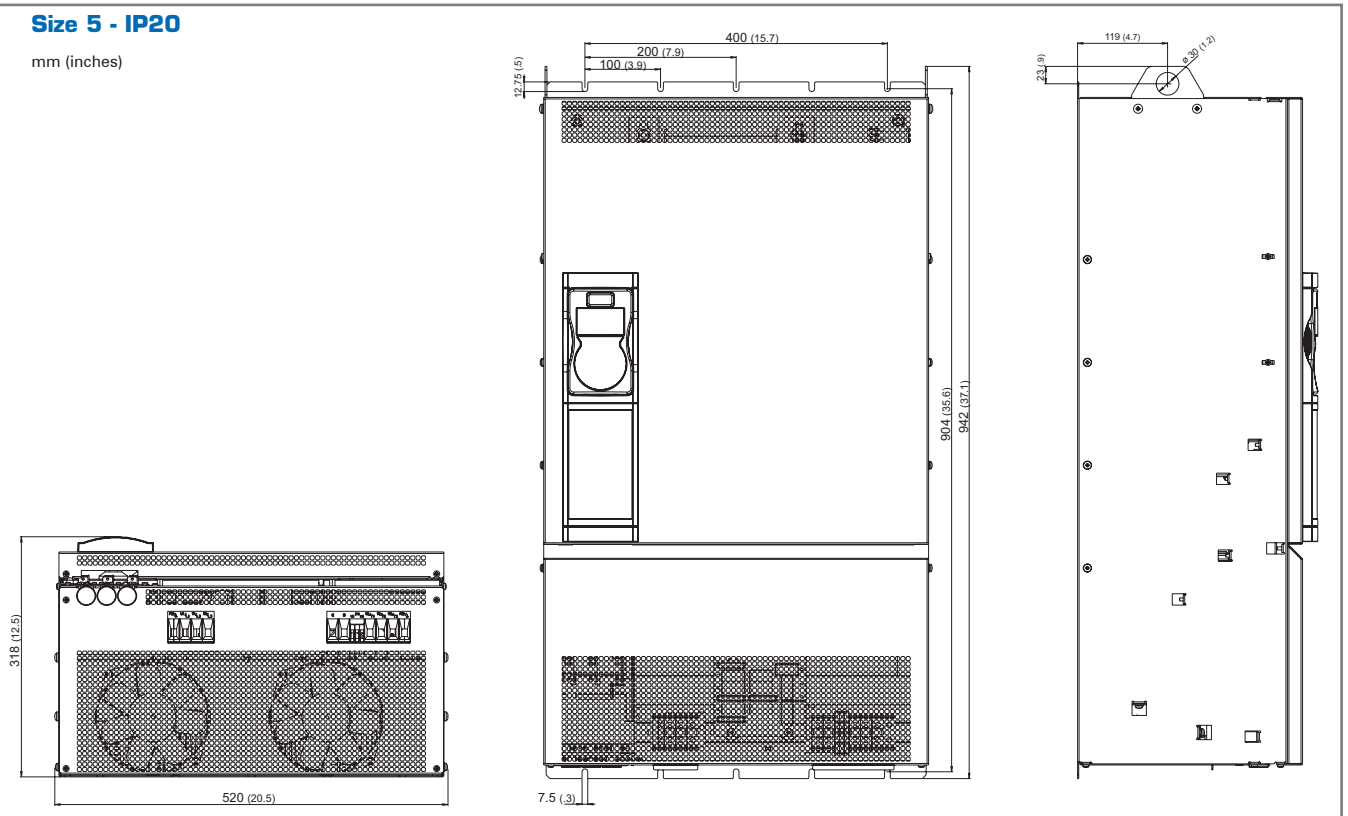
(*): external choke mandatory

(**) Please refer to the user guide for fan connections

3.4 Weights and dimensions

Size 5 - IP20

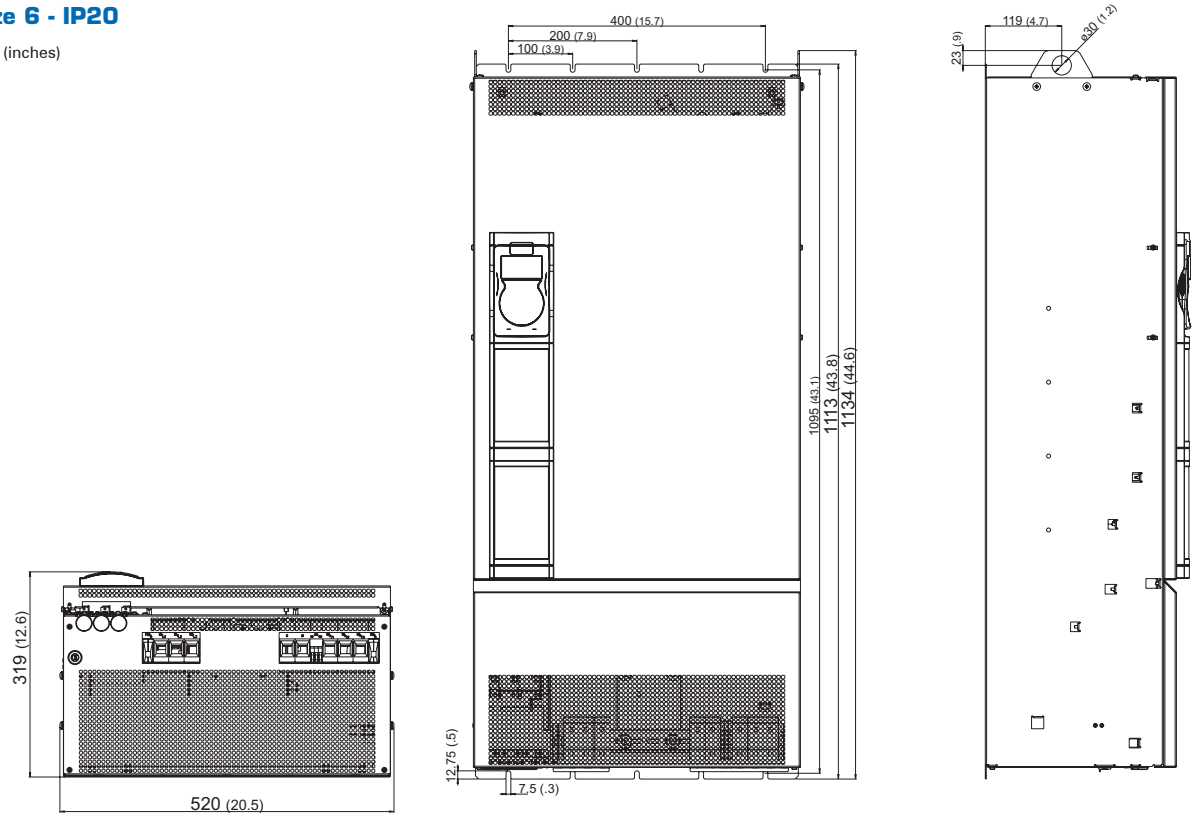
mm (inches)



Sizes ADV200 WA-6	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
5750	520 x 942 x 318	20.5 x 37.1 x 12.5		

Size 6 - IP20

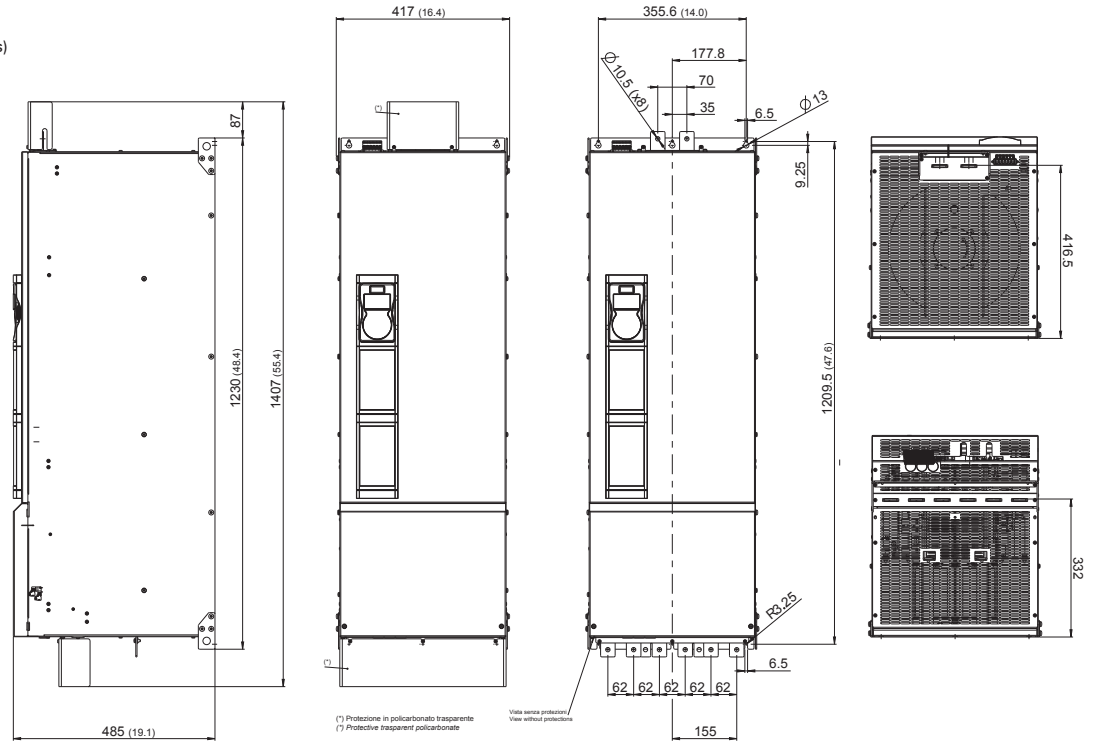
mm (inches)



Sizes ADV200 WA-6	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
6900 - 61100 - 61320	520 x 1134 x 319	20.5 x 44.6 x 12.6		

Size 7

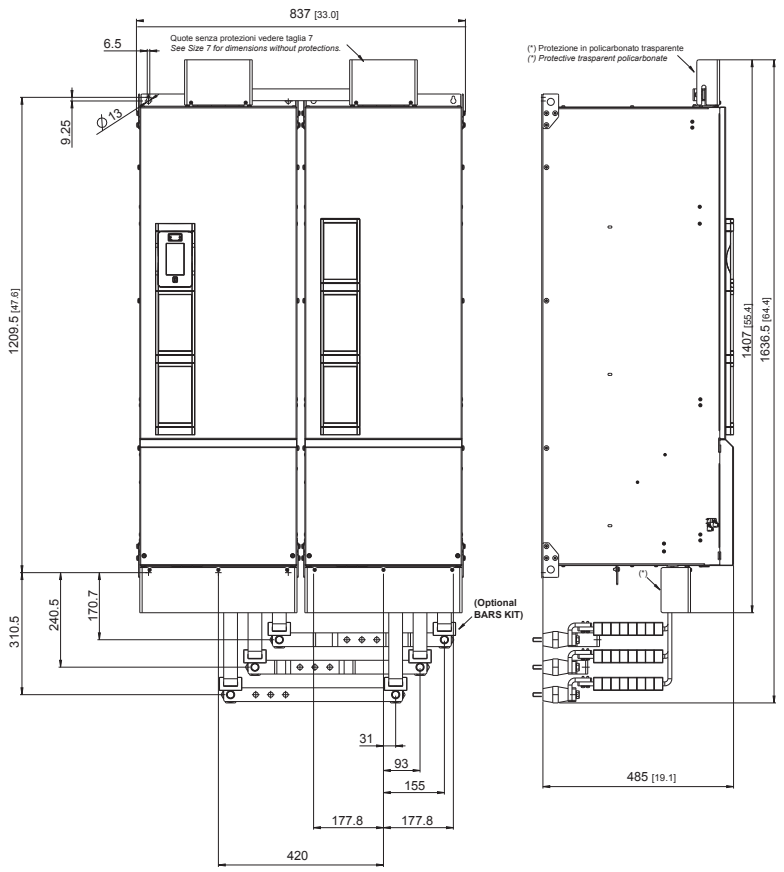
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
72000...72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	135	298
73150			145	320
73550 ... 74000			155	342

Sizes 500 ... 800 kW

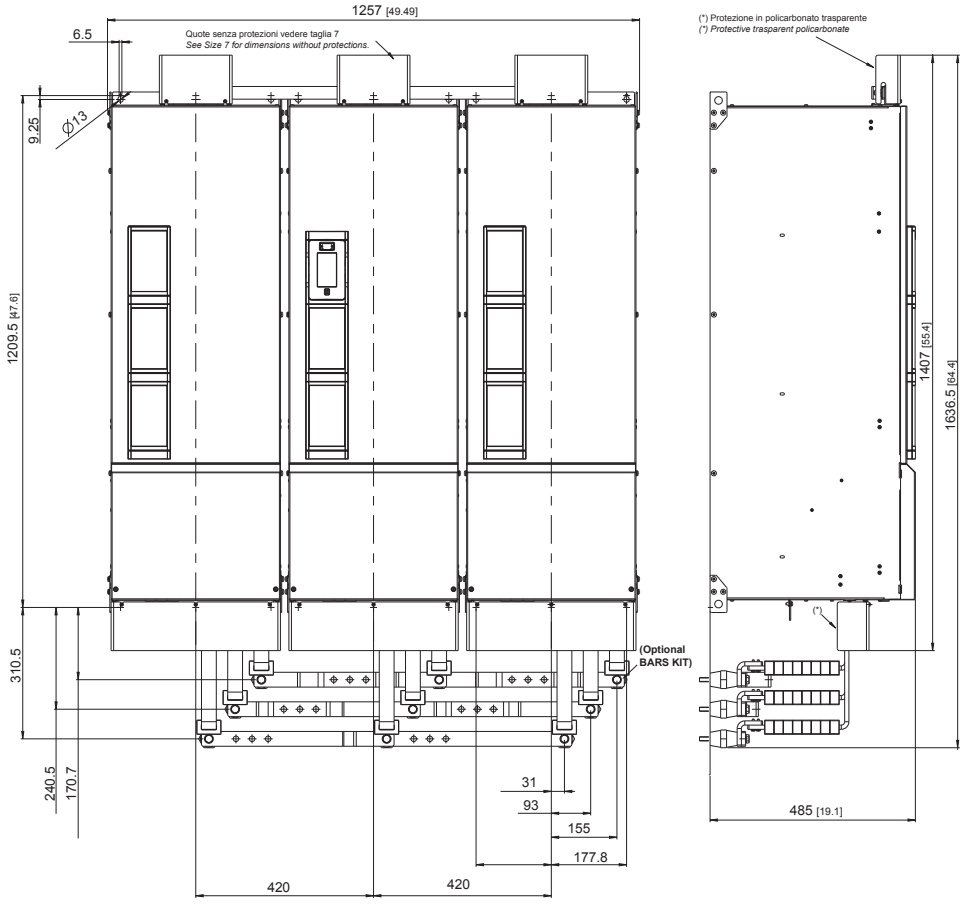
mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	135	298
630kW			145	320
710 - 800kW			155	342

Sizes 1000...1200 kW

mm (inches)



Size ADV200 WA-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
1000 - 1150 kW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	450	992.1

3.5 Choosing the Inverter

The combinations of motor power ratings and inverters listed in the table envisage the use of motors in which the voltage rating is equal to that of the mains power.
For motors with different voltage ratings the inverter must be chosen according to the current rating of the motor.
The combinations listed in the table thus show the current that can be delivered by the drive during continuous operation and overload conditions, according to the mains voltage.

The same engineering criteria apply for operations with additional derating factors:
- KT Ambient temperature
- Kf Switching frequency
- KALT Altitude of installation
- Kv Derating factor for DC power supply

3.6 Input Data

Sizes ADV200 WA-6	Input voltage ULN [VCA]	Overvoltage threshold (Overvoltage) [VCC]	Undervoltage threshold (Undervoltage) [VCC]	DC-Link Capacity [µF]	Total harmonic distortion [THD] %	AC input current	
						Light Duty @ 690 VCA [Arms]	Heavy Duty @ 690 VCA [Arms]
5750	Three-phase mains 690 VAA ±10%, 50/60 Hz, ± 2%	1192	676 (@690 VAC)	4700	40% Light duty, 50% Heavy duty (at rated current)	-	90
6900				6270		-	109
61100				6270		-	129
61320				6270		-	157
72000	Three-phase mains 500 VAC -10% ... 690 VAC +10%, 50/60 Hz ± 2%			11200		210	172
72500				11200		263	214
73150				11200		336	263
73550				11200		382	336
74000				11200		420	282
500 kW				22400		520	420
630 kW				22400		651	533
710 kW				22400		755	665
800 kW				22400		843	756
1000 kW				33600		1180	1009
1150 kW				33600		1259	1180

3.7 Output Data

Sizes ADV200-6	Pn mot ((Recommended motor rating, fsw = default)				Maximum output voltage U2	Maximum output frequency f2	IGBT braking unit
	Light Duty		Heavy Duty				
	@690 Vca [kW]	@575 Vca [kW]	@690 Vca [kW]	@575 Vca [kW]	[V]	[Hz]	
5750	-	-	75	-	0,95 x ULN (ULN = AC voltage input)	400	External optional (BUy...-6 series)
6900	-	-	90	-			
61100	-	-	110	-		200	
61320	-	-	132	-			
72000	200	200	160	150		500	
72500	250	250	200	200		200	
73150	315	350	250	250			
73550	355	400	315	350			
74000	400	450	355	400			
500 kW	500	500	400	450			
630 kW	630	700	500	550			
710 kW	710	800	630	700			
800 kW	800	900	710	800			
1000 kW	1000	1100	900	1000			
1150 kW	1150	1300	1000	1100			

Sizes ADV200-6	Rated output current In (fsw = default)	
	Light Duty	Heavy Duty
	[A]	[A]
5750	-	92
6900	-	110
61100	-	133
61320	-	159
72000	210	170
72500	265	210
73150	330	265
73550	375	330
74000	415	375 (1)
500 kW	500	400
630 kW	630	500
710 kW	710	630
800 kW	790	710 (1)
1000 kW	1000	900
1150 kW	1150	1000 (1)

(1) Current values with an ambient temperature of 35°C.

The derating factors shown in the table below are applied to the rated DC output by the user. They are not automatically implemented by the drive:
Idrive = In x KALT x KT x Kv

Sizes ADV200 WA-6	Reduction factor		
	Kv (2)	KT (3)	KALT % (4)
5750	0.9	SP=0.8 SL=n.d.	1.2
6900	0.9		1.2
61100	0.9		1.2
61320	0.9		1.2
72000	0.87 (5)	SP=0.9 (0.85 for sizes 73550. 710kW and 1000kW) SL=0.8	1.2
72500	1		1.2
73150	0.88		1.2
73550	0.88		1.2
74000	0.88		1.2
500 kW	1		1.2
630 kW	0.88		1.2
710 kW	0.88		1.2
800 kW	0.88		1.2
1000 kW	0.88		1.2
1150 kW	0.88		1.2

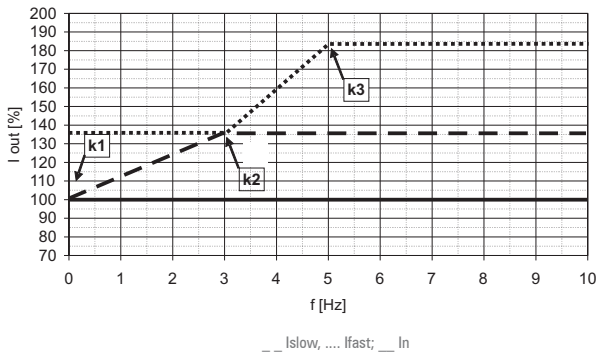
(2) Kv : Derating factor for DC power supply from AFE200 (1120 Vdc), only applied with ambient temperatures of more than 30°C.
(3) KT : Derating factor with an ambient temperature of 50°C (1% every °C over 40°C with HD and 2% every °C over 40°C with LD), >35°C for sizes 73550, 710 kW and 1000 kW.
(4) KALT : Derating factor for installation at altitudes above 1000 meters a.s.l. Value to be applied = 1.2% each 100 m increase above 1000 m (up to a maximum of 2000 m). If the ambient temperature is ≤ 30°C and the application provides for the use of Kv derating, Kalt derating can be avoided.
E.g.: Altitude 2000 m, Kalt = 1.2% * 10 = 12% derating; In derated = (100 - 12) % = 88 % In.
(5) Kv = 1, , with fixed switching frequency set to 2 kHz (default = 4 kHz).

Sizes ADV200 WA -6	Overload		Switching frequency "Fixed frequency" mode (PAR 658 Switch freq. mode =0, default)		Overload according to output frequency				
	Light Duty	Heavy Duty	Maximum (default))	Minimum	Light Duty			Heavy Duty	
	[A]	[A]	(kHz)	(kHz)	K1 SP [%]	K2 SP [Hz]	K3 SP [Hz]	K1 SL [%]	K2 SL [Hz]
5750	n.d.	136% 60 sec. 183% 0.5 sec.	4	2	100	3	4.8	100	3
6900			4	2	100	3	4.8	100	3
61100			2	2	100	3	4.8	100	3
61320			2	2	100	3	4.8	100	3
72000	110% 60 sec.	150% 60 sec. 180% 0.5 sec.	4	2	100	3	4.8	100	3
72500			2	2	100	3	4.8	100	3
73150			2	2	100	3	4.8	100	3
73550			2	2	100	3	4.8	100	3
74000			2	2	100	3	4.8	100	3
500 kW			2	2	100	3	4.8	100	3
630 kW			2	2	100	3	4.8	100	3
710 kW			2	2	100	3	4.8	100	3
800 kW			2	2	100	3	4.8	100	3
1000 kW			2	2	100	3	4.8	100	3
1150 kW			2	2	100	3	4.8	100	3

Overload according to output frequency

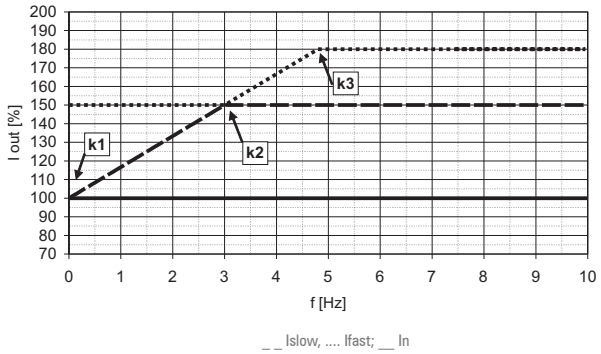
- Sizes 5750 ... 61320

Overload HD

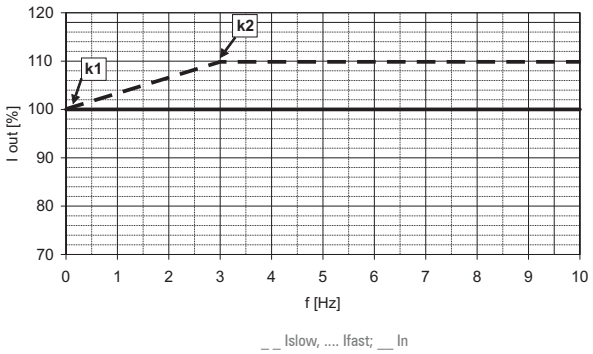


- Sizes ≥ 72000

Overload HD



Overload LD



3.8 Cooling

All inverters are equipped with internal fans.

Sizes ADV200 WA-6	Max dissipated power [W]	Fan capacity	
		Dissipator [m^3/h]	Internal [m^3/h]
5750		1500	2 x 325
6900		2000	3 x 325
61100		2000	3 x 325
61320		2400	3 x 325
72000		3800	1500
72500		4200	1500
73150		4500	1500
73550		5200	2000
74000		5700	2000
500 kW	ADV200-WA-72500-KXX-6-MS 04	4200	1500
	ADV200-WA-72500-XXX-6-SL	4200	1500
630 kW	ADV200-WA-73150-KXX-6-MS 05	4500	1500
	ADV200-WA-73150-XXX-6-SL	4500	1500
710 kW	ADV200-WA-73550-KXX-6-MS 06	5200	2000
	ADV200-WA-73550-XXX-6-SL	5200	2000
800 kW	ADV200-WA-74000-KXX-6-MS 07	5700	2000
	ADV200-WA-74000-XXX-6-SL	5700	2000
1000 kW	ADV200-WA-73550-KXX-6-MS 09	5700	2000
	ADV200-WA-73550-XXX-6-SL	5700	2000
	ADV200-WA-73550-XXX-6-SL	5700	2000
1150 kW	ADV200-WA-74000-KXX-6-MS 10	5700	2000
	ADV200-WA-74000-XXX-6-SL	5700	2000
	ADV200-WA-74000-XXX-6-SL	5700	2000

3.9 Order codes

Product identification

ADV200 WA - X XXX - X X X - 6 - XX YY - SI

EXP-SFTy-ADV safety card	YES= included	[empty]= not included
Only for parallel versions:	**XX :** MS = MASTER SL = SLAVE	YY : **Inverter power in kW** 05 = 500.0 kW 06 = 630.0 kW 07 = 710.0 kW 08 = 800.0 kW 10 = 1000.0 kW 12 = 1150.0 kW
Rated voltage (factory setting):	6 = 690 Vac / 50Hz 6A = 690 Vca / 60Hz	
Software:	X = standard	
Braking unit:	X = not included	B = included
Keypad:	X = not included	K = included
Inverter power in kW:	750 = 75.0 kW 900 = 90.0 kW 1100 = 110.0 kW 1320 = 132.0 kW	2000 = 200.0 kW 2500 = 250.0 kW 3150 = 315.0 kW 3550 = 355.0 kW 4000 = 400.0 kW
Mechanical dimensions of the drive:	5 = size 5 6 = size 6 7 = size 7	
Inverter, ADV200 WA series		

Example:

ADV200 WA - 6 750 - K X X - 6 -DC

DC link power supply versions	
Rated voltage (factory setting):	6 = 690 Vac
Software:	X = standard
Braking unit:	X = not included
Keypad:	K = included
Inverter power in kW:	750 = 75.0 kW
Mechanical dimensions of the drive:	6 = size 6
Inverter, ADV200 WA series	

ADV200 WA-6

- Field-Orientated Vector Inverter
- Model with "KB-ADV" Programming Keypad
- 3 x 690 Vac power supply

CODE	PRODUCT IDENTIFICATION	PN @ 690Vca		CONFIGURATION
		SL	SP	
S9060W	ADV200-WA-5750-KXX-6	not available	75kW	Integrated DC choke
S9061W	ADV200-WA-6900-KXX-6	not available	90kW	Integrated DC choke
S9062W	ADV200-WA-61110-KXX-6	not available	110kW	Integrated DC choke
S9063W	ADV200-WA-61320-KXX-6	not available	132kW	Integrated DC choke
S9075W	ADV200-WA-72000-KXX-6	200kW	160kW	Integrated EMC filter
S9076W	ADV200-WA-72500-KXX-6	250kW	200kW	Integrated EMC filter
S9077W	ADV200-WA-73150-KXX-6	315kW	250kW	Integrated EMC filter
S9078W	ADV200-WA-73550-KXX-6	355kW	315kW	Integrated EMC filter
S9079W	ADV200-WA-74000-KXX-6	400kW	355kW	Integrated EMC filter
S9080W	ADV200-WA-73550-KXX-6A	355kW	315kW	Integrated EMC filter
S9081W	ADV200-WA-74000-KXX-6A	400kW	355kW	Integrated EMC filter

ADV200 WA-6/6A +SI - Parallel Configurations + SIL3 Safety Card

- Field-Orientated Vector Inverter
- "KB-ADV" Programming Keypad in the Master version (MS)
- 3 x 690VAC - 3 x 500 / 575VAC power supply
- Integrated safety card

CODE	PRODUCT IDENTIFICATION	PN @ 690Vca		CONFIGURATION
		SL	SP	
On request	ADV200-WA-72000-KXX-6-MS 05 -SI	500kW	400kW	Integrated EMC filter
"	ADV200-WA-72000-XXX-6-SL			
"	ADV200-WA-72500-KXX-6-MS 06 -SI	630kW	500kW	Integrated EMC filter
"	ADV200-WA-72500-XXX-6-SL			
"	ADV200-WA-73150-KXX-6-MS 07 -SI	710kW	630kW	Integrated EMC filter Fan power supply 400 VAC/50Hz
"	ADV200-WA-73150-XXX-6-SL			
"	ADV200-WA-73550-KXX-6-MS 08 -SI	800kW	710kW	Integrated EMC filter Fan power supply 400 VAC/50Hz
"	ADV200-WA-73550-XXX-6-SL			
"	ADV200-WA-73150-KXX-6-MS 10 -SI	1MW	900kW	Integrated EMC filter Fan power supply 400 VAC/50Hz
"	ADV200-WA-73150-XXX-6-SL			
"	ADV200-WA-73150-XXX-6-SL			
"	ADV200-WA-73550-KXX-6-MS 12-SI	1,15MW	1MW	Integrated EMC filter Fan power supply 400 VAC/50Hz
"	ADV200-WA-73550-XXX-6-SL			
"	ADV200-WA-73550-XXX-6-SL			
"	ADV200-WA-73150-KXX-6A-MS 07-SI	710kW	630kW	Integrated EMC filter Fan power supply 460 VAC/60Hz
"	ADV200-WA-73150KXX-6A -SL			
"	ADV200-WA-73550-KXX-6A- MS 08-SI	800kW	710kW	Integrated EMC filter Fan power supply 460 VAC/60Hz
"	ADV200-WA-73550-KXX-6A- SL			
"	ADV-73150-KXX-6A-MS 10-SI	1MW	900kW	Integrated EMC filter Fan power supply 460 VAC/60Hz
"	ADV-73150-KXX-6A -SL			
"	ADV-73150-KXX-6A -SL			
"	ADV-73550-KXX-6A- MS 12-SI	1,15MW	1MW	Integrated EMC filter Fan power supply 460 VAC/60Hz
"	ADV-73550-KXX-6A- SL			
"	ADV-73550-KXX-6A- SL			

4. ADV200 WA-6-DC • DC bus power supply

4.1 Introduction

ADV200 WA-DC-6 Vector Inverters are optimised for multi-drive or single-drive system configurations on a common DC Bus, supplied by conventional AC/DC power supply units or "Active Front End" regenerative units like the AFE200-6.

Power ratings range from **250kW to 1.2MW for three-phase external power supplies of 500 VAC...690 VAC.**

Factory-set to achieve the best technical and economic performance, compared to the basic version, the ADV200 WA-DC-6 range does not integrate the three-phase power supply input components:

- AC/DC input rectifier stage
- EMC filter
- choke on DC side

Flexible Modular Technology

The ADV200 WA-6-DC is based on a fully modular hardware and power structures that can be installed side by side. Designed to facilitate installation and guarantee ease of use, project flexibility, optimisation of space and reduction of wiring costs.

The ADV200 WA-6-DC is available in various hardware sizes
- from 250kW to 400kW in the stand-alone configuration
- from 500kW to 1.2MW in "parallel" configurations

Total ease of use

Designed with the user in mind. The mechanical structure guarantees simple and fast product management, regardless of installation and assembly conditions. All operations are simple and immediate, from accessing the extractable terminal strips to rack-mounting of options. The dedicated accessories guarantee simple wiring and cable shielding to achieve immediate, EMC-compliant start-ups.

Serial line

The RS485 serial line is incorporated as standard across the range to enable peer-to-peer or multidrop connections using Modbus RTU protocol.

Management of optional cards

The ADV200 WA-6-DC uses an intelligent rack system that allows up to 3 optional cards to be installed at the same time.
- Fieldbus interface card
- I/O expansion card

Back-up power supply

The ADV200 WA-6-DC is compatible with a separate +24VDC external power supply. This solution makes it possible to maintain all display and drive configuration functions and manage the connected fieldbuses in the event of a power failure.

Safety Card

ADV200 WA-6-DC**-SI** models integrate the EXP-SFTy-ADV Safety Card (standard in parallel master drives).
The card:
- performs the STO (Safe Torque Off) function, to prevent torque on the motor by blocking IGBT commands.
- can diagnose 99% of internal faults.
- meets the latest legal requirements with the integrated "Safe Torque Off" function:
  - safety integrity level SIL 3 according to EN 61508 and EN61800-5-2 (maximum available for drives)
  - PL d according to EN13849-1

The integrated EXP-SFTy-ADV safety card in the ADV200 WA-6-DC**-SI** series of drives is used to achieve "Prevention of unexpected start-up", according to EN 1037:1995 + A1 ADV: 2008 on safety of machinery.
Drives provided with the safety card are just one element in an STO safety control system, which is the system level function. All system parts and components must be chosen, applied and integrated correctly to achieve the required level of safety.
The safety function may be used to perform an "emergency stop" with the drive still connected to the power supply (stop category 0, according to EN 60204-1).
The integrated safety function replaces the external safety components. The integrated "STO" function may be used to replace the motor contactors for controlling unexpected start-ups, if covered by risk-assessment. The use of the integrated safety function depends on the type of application and applicable standards.

Ideal sizes

The ADV200 WA-6-DC offers a choice of technical features so that you can choose the drive that represents the best technical and most cost-effective solution depending on the type of application and characteristics of the motor.

- Two overload modes for "heavy duty" with duty cycle of 150% of In for 1 minute every 5 minutes or for "light duty" (variable and/or quadratic torque) with duty cycle of 110% of In for 1 minute every 5 minutes
- Optimisation of modulation dynamics, according to the type of "duty" and drive temperature during duty cycles.

4.2 General Characteristics

- → Power supply:
  - ADV 71600-DC and higher: 840 ... 1120 Vdc
- → Power ratings: from 250kW to 1.2MW
- → Control mode:
  - Open-loop vector control
  - Open loop V/f
- → Light or heavy overload control
- → Integration of up to 3 options onboard the drive
- → "Safety" card compliant with machine safety directives (for ADV200 WA-6-...-SI models)
- → GF-eXpress multi-language programming SW (5 languages)
- → PLC with advanced IEC61131-3 programming environment
- → Rated protection:
  - IP20
  - IP00 (size 7 and parallel)
  - IP54, cabinet-mounted (upon request)

Fieldbus management

DeviceNet™ · CANopen® · Modbus · PROFIBUS PROCESS FIELD BUS · LONWORKS (External option) · BACnet (External option) · EtherNet/IP · EtherCAT®

Performance

The ADV200 WA-6-DC offers state-of-the-art control technology based on the use of a powerful 32-bit microprocessor able to guarantee maximum precision and performance of the motor as well as sophisticated management of the most advanced application systems.

Precision

Control mode	Speed control precision (*)	Control range
Open-loop FOC	± 30% motor slip rating	1 : 100
V/F	± 60% motor slip rating	1 : 30

(*) for standard 4-pole motor

Standard supply configuration

- → Integrated KB_ADV programming keypad
- → Regulation:
  - 2 bipolar analog inputs (Voltage/Current)
  - 2 bipolar analog outputs (1: Voltage/Current, 1: Voltage)
  - 6 digital inputs (PNP/NPN)
  - 2 digital outputs (PNP/NPN)
  - 2 relay outputs, single contact
  - RS485 serial line (Modbus RTU)

Conformity

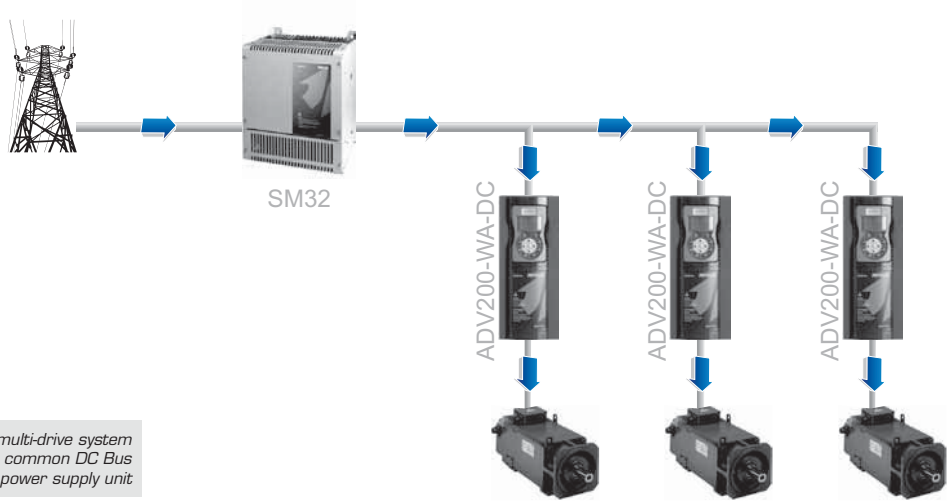
- → Immunity/Emissions: EEC - EN 61800-3
- → Programming: according to IEC 61131-3
- → Safety standards: STO (Safe Torque Off): IEC 61508 SIL 3, EN 954-1 Cat. 3 EN 61508 and EN 61800-5-2

Environmental conditions

- → Ambient temperature: -10°C ... +40°C (+14°F ...+104°F), +40°C...+50°C (+104°F...+122°F) with derating
- → Altitude: Max 2000 m. (up to 1000 m without current limitations)

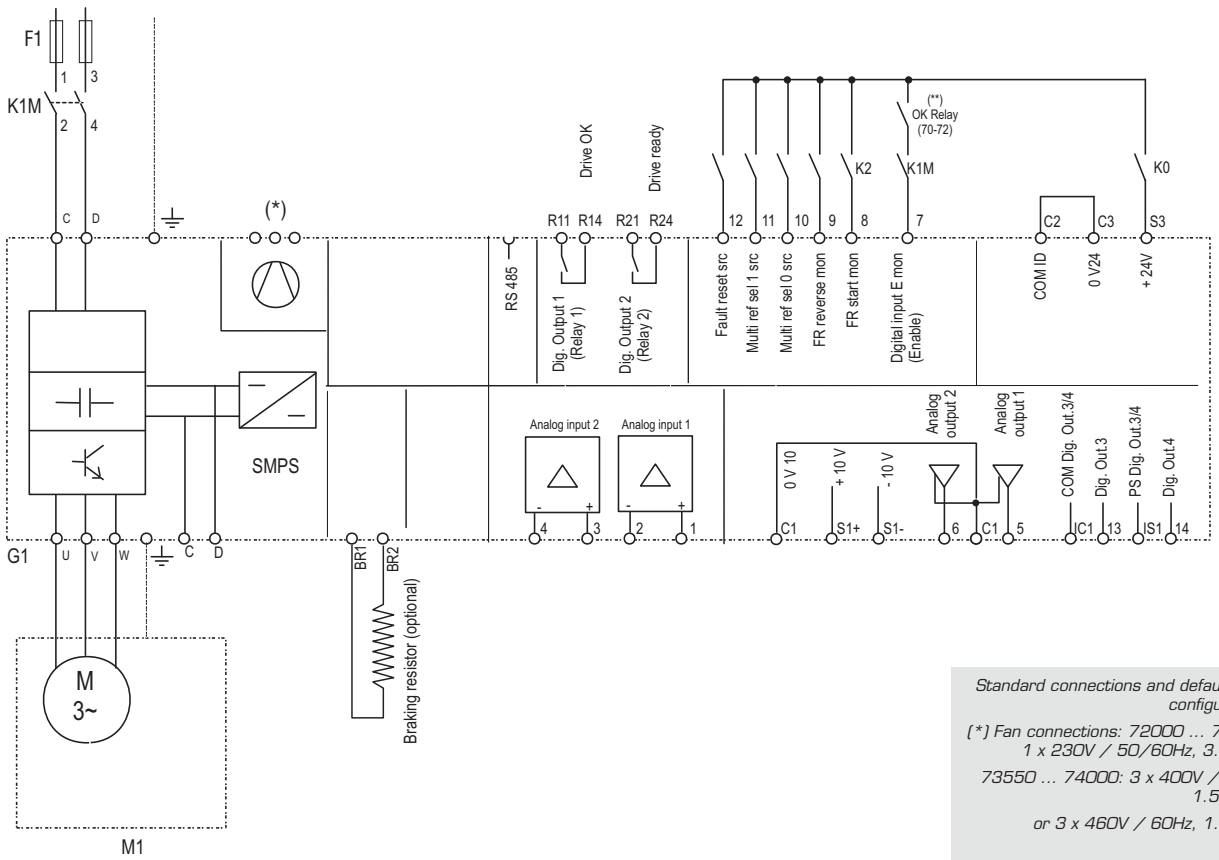
Markings

CE — Complies with the EEC directive concerning low voltage equipment



Example of multi-drive system configuration on a common DC Bus with SM32 power supply unit

4.3 Standard connections



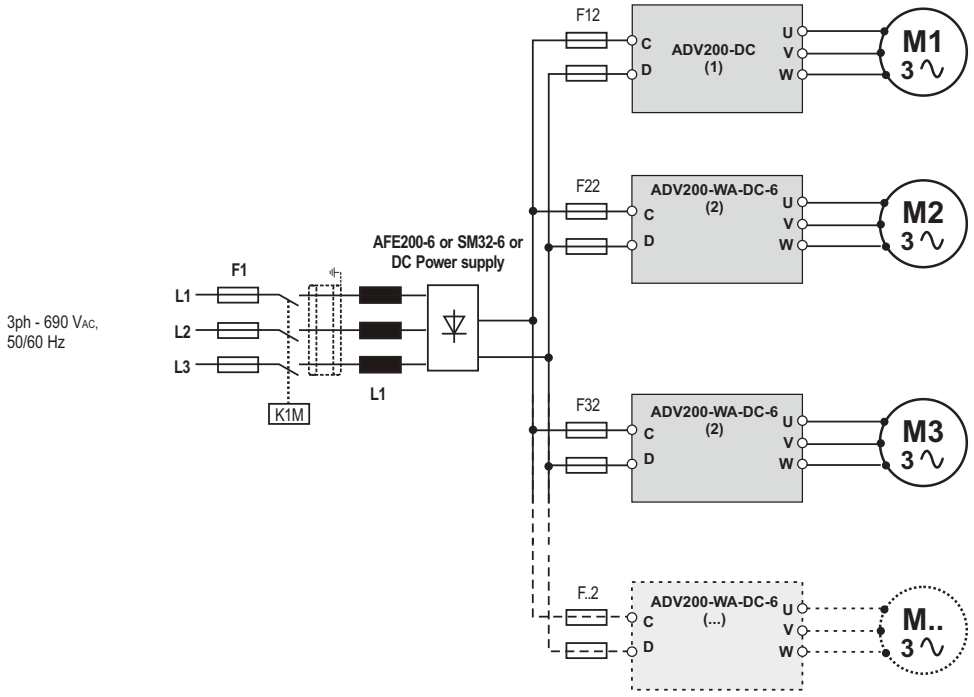
Standard connections and default drive configuration.

(*) Fan connections: 72000 ... 73150: 1 x 230V / 50/60Hz, 3.5Arms

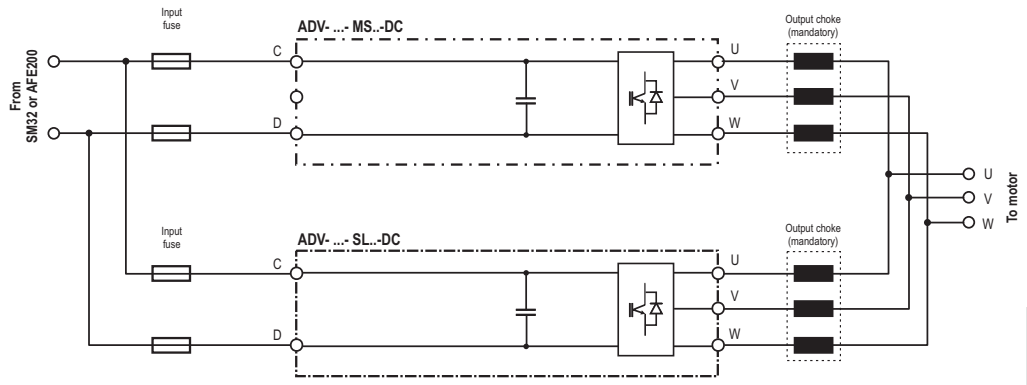
73550 ... 74000: 3 x 400V / 50Hz, 1.55Arms

or 3 x 460V / 60Hz, 1.7Arms

(**): Only for sizes ≥ 72000.

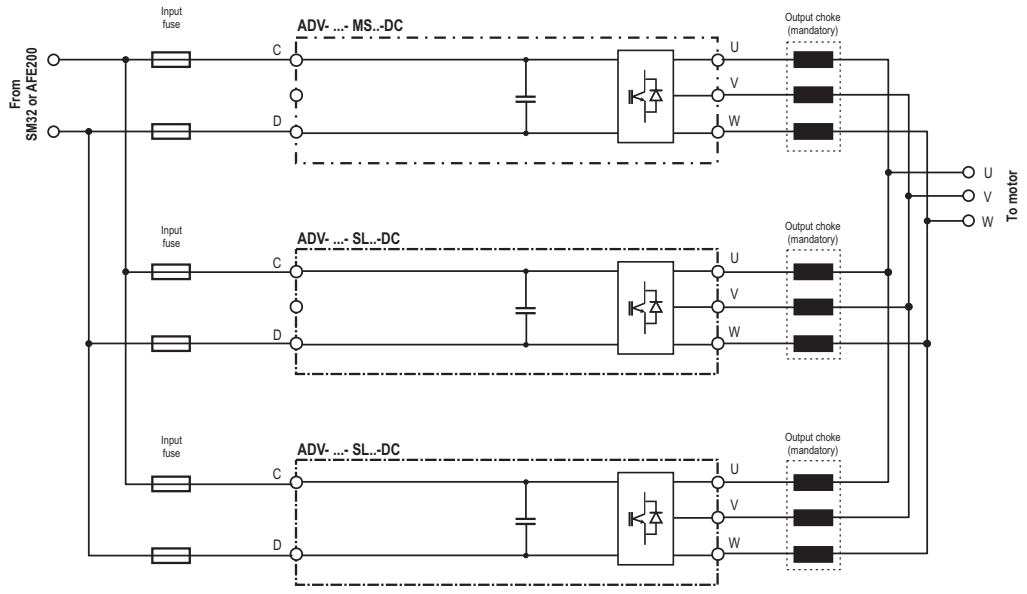


Connection of multi-drive on common DC bus with AC/DC power supply unit (with pre-load).



Block diagram power section sizes 500 ... 800kW.

See diagram at the side for the regulation section.



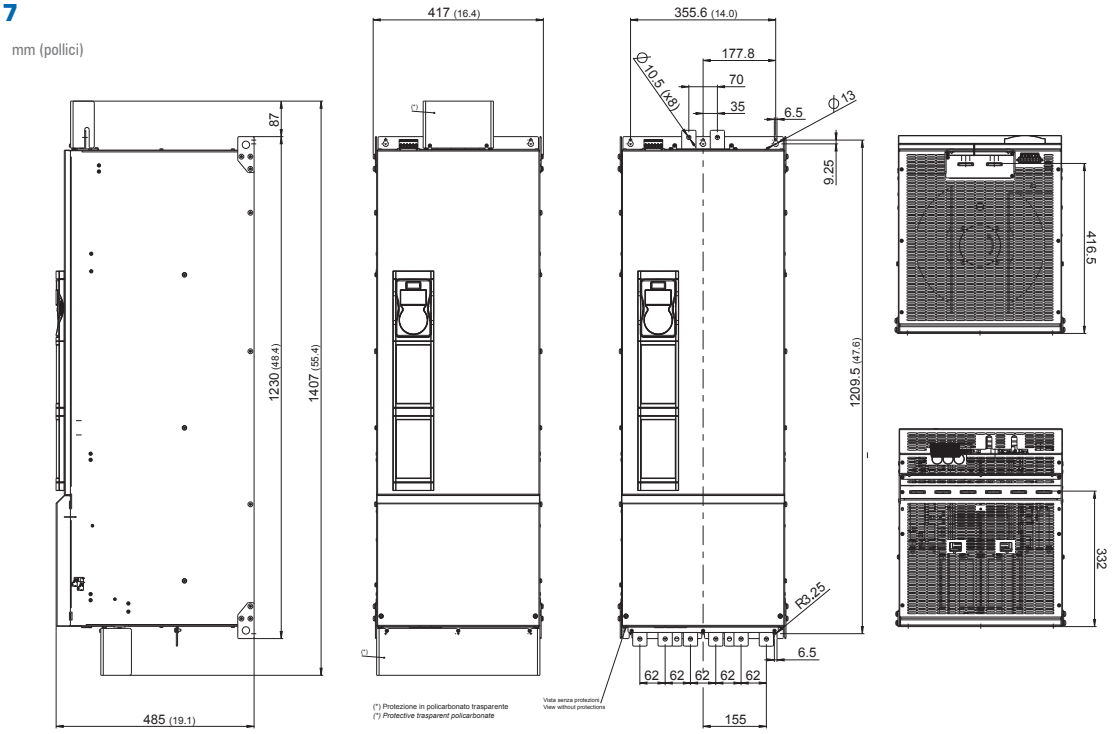
Block diagram power section sizes 1000 ... 1200kW.

See diagram at the side for the regulation section.

4.4 Weights and dimensions

Size 7

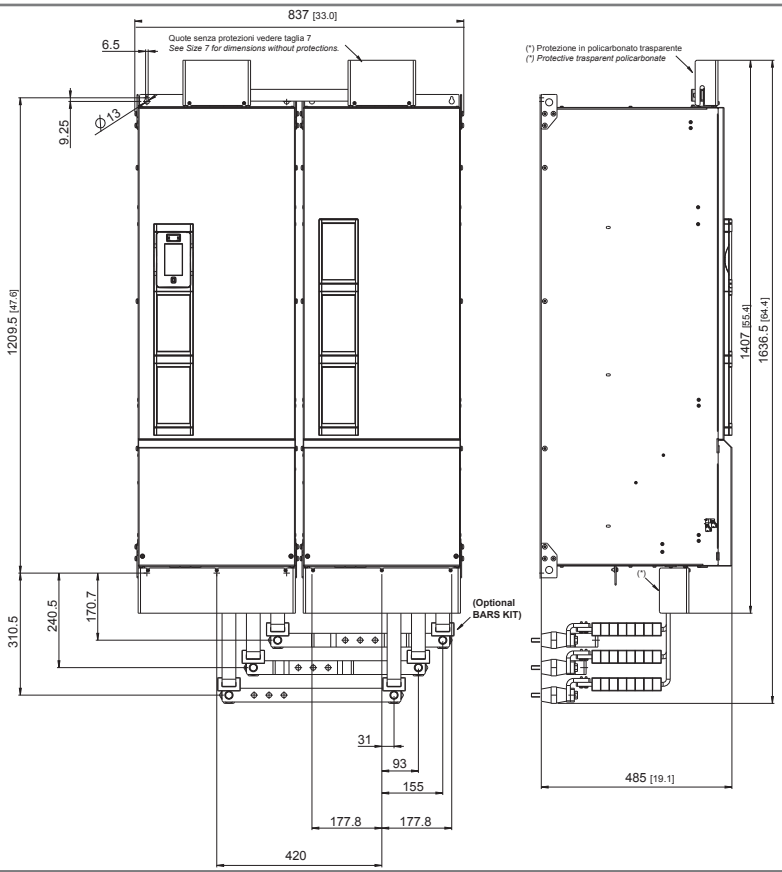
mm (pollici)



Sizes ADV200 WA-6-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
72000...72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	135	298
73150			145	320
73550 ... 74000			155	342

Sizes 500 ... 800 kW

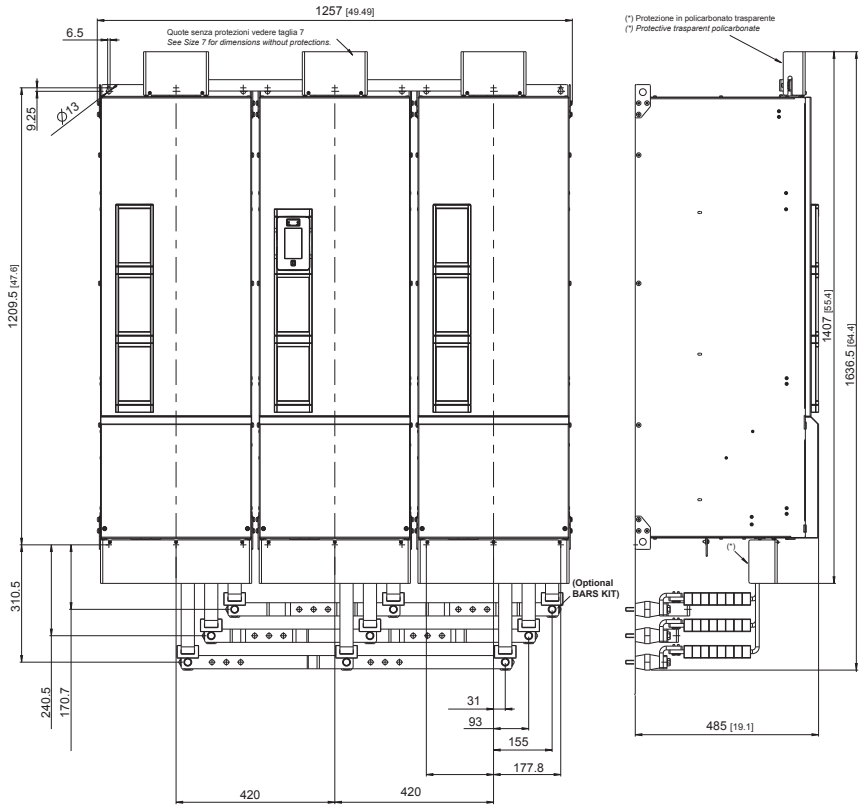
mm (inches)



Sizes ADV200 WA-6-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	270	595
630kW			290	639
710 - 800kW			310	683

Sizes 1000...1200 kW

mm (inches)



Size ADV200 WA-6-DC	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
1000 - 1200kW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	465	1025

4.5 Choosing the Inverter

The combinations of motor power ratings and inverters listed in the table envisage the use of motors in which the voltage rating is equal to that of the mains power.
For motors with different voltage ratings the inverter must be chosen according to the current rating of the motor.
The combinations listed in the table thus show the current that can be delivered by the drive during continuous operation and overload conditions, according to the mains voltage.

The same engineering criteria apply for operations with additional derating factors:
- KV Power supply voltage
- KT Ambient temperature
- Kf Switching frequency
- KALT Altitude of installation

4.6 Input Data

Sizes ADV200 WA-6-DC	Input voltage UDC [VDC]	Overvoltage threshold (Overvoltage) [Vdc]	Undervoltage threshold (Undervoltage) [Vdc]	DC input current (*) Light Duty (110% overload) @ 930 VCC [A]	DC input current (*) Heavy Duty (150% overload) @ 930 VCC [A]	DC-Link Capacity [mF]
72000	600 ... 1120 VCC	1192	676	190	370	16800
72500				235	430	16800
73150				300	510	25200
73550				370	710	25200
74000				420	780	25200
500 kW				514	815	2 * 16800
630 kW				653	980	2 * 25200
710 kW				814	1350	2 * 25200
800 kW				926	1490	2 * 25200
1000 kW				1236	2020	3 * 25200
1200 kW				1445	2200	3 * 25200

4.7 Output Data

Sizes ADV200 WA-6-DC	Inverter Output		Pn mot (Recommended motor rating, fsw = default)				Maximum output voltage U2	Maximum output frequency f2	IGBT braking unit
	Light Duty	Heavy Duty	Light Duty (110% overload)		Heavy Duty (150% overload)				
	[kVA]	[kVA]	@690 Vac [kW]	@575 Vac [Hp]	@690 Vac [kW]	@575 Vac [Hp]	[V]	[Hz]	
72000	267	208	200	250	160	200	0.98 x Uln (Uln = AC input voltage from separate SM32 or AFE200 power supply unit)	500	Optional external (BUy series)
72500	319	267	250	300	200	250		200	
73150	409	319	315	400	250	300			
73550	450	409	355	450	315	400			
74000	506	450	400	500	355	450			
500 kW	603	506	500	650	400	500			
630 kW	776	603	630	850	500	650			
710 kW	852	776	710	950	630	850			
800 kW	956	852	800	1100	710	950			
1000 kW	1247	1108	1000	1300	900	1200			
1200 kW	1420	1247	1200	1600	1000	1300			

Sizes ADV200 WA-6-DC	Rated output current In (fsw = default)					
	Light Duty (110% overload)			Heavy Duty (150% overload)		
	@540 Vdc [A]	@650 Vdc [A]	@930 Vdc [A]	@540 Vdc [A]	@650 Vdc [A]	@930 Vdc [A]
72000	385	347	153	300	270	170
72500	460	414	189	385	347	210
73150	590	531	238	460	414	265
73550	650	585	297	590	531	330
74000	730	657	337	650	585	375 (5)
500 kW	870	783	360	730	657	400
630 kW	1120	1008	450	870	783	500
710 kW	1230	1107	567	1120	1008	630
800 kW	1380	1242	639	1230	1107	710 (5)
1000 kW	1800	1620	810	1600	1440	900
1200 kW	2050	1845	900	1800	1620	1000 (5)

(1) Kv : Derating factor for DC-link voltage at 650 Vdc
(2) Kt: Derating factor with an ambient temperature of 50°C
(3) Kf : Derating factor for higher switching frequency
(4) Kalt : Derating factor for installation at altitudes above 1000 meters a.s.l. (up to a maximum of 2000 m). Value to be applied = 1.2% each 100 m increase above 1000 m.
For example: Altitude 2000 m, Kalt = 1.2% * 10 = 12% derating; In derated = (100 - 12) % = 88 % In
(5) Current values with an ambient temperature of 35°C.

Sizes ADV200 WA-6-DC	Switching frequency fsw		Reduction factor		
	Maximum (default)	Minimum	Kv (5)	Kt (6)	Kalt % (7)
72000	2 kHz /4 kHz (9)	2 kHz	0.87 (8)	SP=0.9 (0.85 for sizes 74000, 800kW and 1200kW) SL=0.8	1.2
72500	2 kHz / 4 kHz (9)	2 kHz	1		
73150 ... 74000	2 kHz	2 kHz	0.88		
500 kW	2 kHz	2 kHz	1		
630 kW ... 1200 kW	2 kHz	2 kHz	0.88		

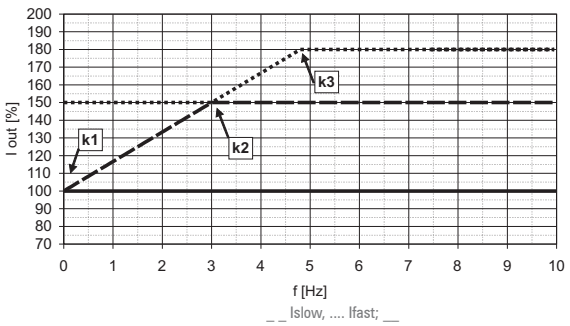
(5) Kv : Derating factor for DC power supply from AFE200 (1120 Vdc), only applied with ambient temperatures of more than 30°C.
(6) Kf : Derating factor with an ambient temperature of 50°C (1% every °C over 40°C with HD and 2% every °C over 40°C with LD), >35°C for sizes 74000, 800kW e 1200kW.
(7) Kalt : Derating factor for installation at altitudes above 1000 meters a.s.l. (up to a maximum of 2000 m). Value to be applied = 1.2% each 100 m increase above 1000 m (up to a maximum of 2000 m). If the ambient temperature is ≤ 30°C and the application provides for the use of Kv derating, Kalt derating can be avoided.
E.g.: Altitude 2000 m, Kalt = 1.2% * 10 = 12% derating; In derated = (100 - 12) % = 88 % In.
(8) Kv =1, with fixed switching frequency set to 2 kHz (default = 4 kHz).
(9) 4 kHz in "variable frequency" mode (PAR 658 Switch freq. mode =1).

Sizes ADV200 WA-6-DC	Overload			Derating according to switching frequency (HD)						Overload according to output frequency				
	LD 110 % x In (1' every 5')	HD 150 % x In (1' every 5')	LD 180 % x In (for 0.5'')	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	Light Duty		Heavy Duty		
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	K1 LD [%]	K2 LD [Hz]	K1 HD [%]	K2 HD [Hz]	K3 HD [Hz]
72000	424	450	540	300	300	n.a.	n.a.	n.a.	n.a.	80	3	100	3	4.8
72500	506	578	693	385	385	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
73150	649	690	828	460	n.a.	n.a.	n.a.	n.a.	n.a.	75	5	100	3	4.8
73550	715	885	1062	590	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
74000	803	975	1170	650	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5
500 kW	957	1095	1314	730	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
630 kW	1232	1305	1566	870	n.a.	n.a.	n.a.	n.a.	n.a.	75	5	100	3	4.8
710 kW	1353	1680	2016	1120	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
900 kW	1518	1845	2214	1230	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5
1000 kW	1980	2400	2880	1600	n.a.	n.a.	n.a.	n.a.	n.a.	100	3	100	3	4.8
1200 kW	2255	2700	3240	1900	n.a.	n.a.	n.a.	n.a.	n.a.	90	5	90	5	7.5

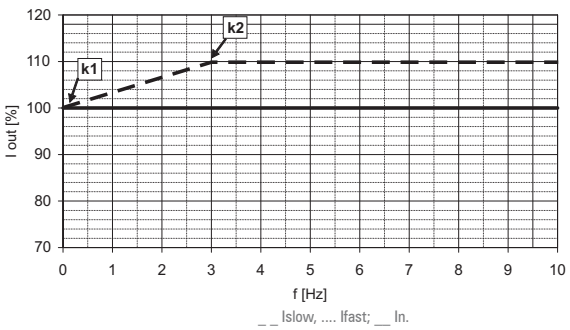
- If the factory setting of Mod freq commutaz, (Switch freq. mode) PAR: 568 is changed from 0=Fixed to 1=Variable, the switching frequency is controlled by the temperature of the drive heat sink and the output frequency. For further information see the ADV200 WA Functions and Parameters manual, menu 4.9.

Overload according to output frequency

Overload HD



Overload LD



4.8 Cooling

All inverters are equipped with internal fans.

Size		Dissipated power [W]	Fan capacity	
			Dissipator [m^3/h]	Internal [m^3/h]
	ADV200-WA-6-DC-72000	3800	1500	-
	ADV200-WA-6-DC-72500	4200	1500	-
	ADV200-WA-6-DC-73150	4500	1500	-
	ADV200-WA-6-DC-73550	5200	2000	-
	ADV200-WA-6-DC-74000	5700	2000	-
500 kW	ADV200-WA-72500-KXX-6-MS 05	4200	1500	-
	ADV200-WA-72500-XXX-6-SL	4200	1500	-
630 kW	ADV200-WA-73150-KXX-6-MS 06	4500	1500	-
	ADV200-WA-73150-XXX-6-SL	4500	1500	-
710 kW	ADV200-WA-73550-KXX-6-MS 07	5200	2000	-
	ADV200-WA-73550-XXX-6-SL	5200	2000	-
800 kW	ADV200-WA-74000-KXX-6-MS 08	5700	2000	-
	ADV200-WA-74000-XXX-6-SL	5700	2000	-
1000 kW	ADV200-WA-73550-KXX-6-MS 10	5700	2000	-
	ADV200-WA-73550-XXX-6-SL	5700	2000	-
	ADV200-WA-73550-XXX-6-SL	5700	2000	-
1200 kW	ADV200-WA-74000-KXX-6-MS 12	5700	2000	-
	ADV200-WA-74000-XXX-6-SL	5700	2000	-
	ADV200-WA-74000-XXX-6-SL	5700	2000	-
	ADV200-WA-4-DC-73550-KXX-4-MS 09-DC	6000	2000	-
1000 kW	ADV200-WA-4-DC-73550-XXX-4-SL-DC-DC	6000	2000	-
	ADV200-WA-4-DC-73550-XXX-4-SL-DC-DC	6000	2000	-
1200 kW	ADV200-WA-4-DC-74000-KXX-4-MS 10-DC	6500	2000	-
	ADV200-WA-4-DC-74000-XXX-4-SL-DC	6500	2000	-
	ADV200-WA-4-DC-74000-XXX-4-SL-DC	6500	2000	-

4.9 Order codes

Product identification

ADV200 WA - X XXX - X X X - Y - XX YY -DC - SI

EXP-SFTy-ADV safety card	YES= included	[empty]= not included
DC link power supply versions		
Only for parallel versions:	**XX :** MS = MASTER SL = SLAVE	YY : **Inverter power in kW** 05 = 500.0 kW 06 = 630.0 kW 07 = 710.0 kW 08 = 800.0 kW 10 = 1000.0 kW 12 = 1200.0 kW
Rated voltage from external power supply (factory setting):	6 = 690 Vac / 50 Hz	6A = 690 VAC / 60 Hz
Software:	X = standard	
Braking unit:	X = not included	B = included
Keypad:	X = not included	K = included
Inverter power in kW:	2000 = 200.0 kW 2500 = 250.0 kW 3150 = 315.0 kW 3550 = 355.0 kW 4000 = 400.0 kW	
Mechanical dimensions of the drive:	7 = size 7	
Inverter, ADV200 WA series		

Example:

ADV200 WA - 7 2000 - K X X - 6 -DC

DC link power supply versions	
Rated voltage from external power supply (factory setting):	6 = 690 VAC / 50 Hz
Software:	X = standard
Braking unit:	X = not included
Keypad:	K = included
Inverter power in kW:	2000 = 200.0 kW
Mechanical dimensions of the drive:	7= size 7
Inverter, ADV200 WA series	

ADV200 WA-6-DC - Common DC bus power supply

- Field-Orientated Vector Inverter
- Model with "KB-ADV" Programming Keypad
- HD = LD = Light Duty (Overload 110%), Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9082W	ADV200-WA-72000-KXX-6-DC	200kW	160kW	Configuration without rectifier, choke and filter
S9083W	ADV200-WA-72500-KXX-6-DC	250kW	200kW	Configuration without rectifier, choke and filter
S9084W	ADV200-WA-73150-KXX-6-DC	315kW	250kW	Configuration without rectifier, choke and filter
S9085W	ADV200-WA-73550-KXX-6-DC	355kW	315kW	Configuration without rectifier, choke and filteR
S9086W	ADV200-WA-74000-KXX-6-DC	400kW	355kW	Configuration without rectifier, choke and filter
S9087W	ADV200-WA-73550-KXX-6A-DC	355kW	315kW	Conf. without rectifier, choke and filter
S9088W	ADV200-WA-74000-KXX-6A-DC	400kW	355kW	Conf. without rectifier, choke and filter

ADV200 WA-6-DC -SI - Power supply for Common DC Bus + SIL 3 Safety Card

- Field-Orientated Vector Inverter
- Model with "KB-ADV" Programming Keypad
- LD = Light Duty (Overload 110%), Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 400Vac		CONFIGURATION
		LD	HD	
S9082WS	ADV200-WA-72000-KXX-6-DC-SI	200kW	160kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card
S9083WS	ADV200-WA-72500-KXX-6-DC-SI	250kW	200kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card
S9084WS	ADV200-WA-73150-KXX-6-DC-SI	315kW	250kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card
S9085WS	ADV200-WA-73550-KXX-6-DC-SI	355kW	315kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card
S9086WS	ADV200-WA-74000-KXX-6-DC-SI	400kW	355kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card
S9087WS	ADV200-WA-73550-KXX-6A-DC-SI	355kW	315kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card
S9088WS	ADV200-WA-74000-KXX-6A-DC-SI	400kW	355kW	Configuration without input rectifier - DC choke - EMC filter + Safety Card

ADV200 WA-6-DC - Parallel Configurations + SIL3 Safety Card

- Field-Orientated Vector Inverter
- "KB-ADV" Programming Keypad in the Master version (MS)
- Power supply for Common DC Bus
- LD = Light Duty (Overload 110%), Heavy Duty (Overload 150%)

CODE	PRODUCT IDENTIFICATION	PN @ 690Vac		CONFIGURATION
		LD	HD	
S9076WMC S9076WSC	ADV200-WA-72500-KXX-6-MS 05 -DC-SI ADV200-WA-72500-XXX-6-SL-DC	500kW	400kW	Without rectifier - choke - filter + Integrated Safety Card
S9077WMC S9077WSC	ADV200-WA-73150-KXX-6-MS 06 -DC-SI ADV200-WA-73150-XXX-6-SL-DC	630kW	500kW	Without rectifier - choke - filter + Integrated Safety Card
S9078WMC S9078WSC	ADV200-WA-73550-KXX-6-MS 07 -DC-SI ADV200-WA-73550-XXX-6-SL-DC	710kW	630kW	Without rectifier - choke - filter + Integrated Safety Card 400VAC/50Hz fan power supply
S9079WMC S9079WSC	ADV200-WA-74000-KXX-6-MS 08 -DC-SI ADV200-WA-74000-XXX-6-SL-DC	800kW	710kW	Without rectifier - choke - filter + Integrated Safety Card 400VAC/50Hz fan power supply
S9078W1C S9078WSC S9078WSC	ADV200-WA-73550-KXX-6-MS 10-DC-SI ADV200-WA-73550-XXX-6-SL-DC ADV200-WA-73550-XXX-6-SL-DC	1MW	900kW	Without rectifier - choke - filter + Integrated Safety Card 400VAC/50Hz fan power supply
S9079W1C S9079WSC S9079WSC	ADV200-WA-74000-KXX-6-MS 12-DC-SI ADV200-WA-74000-XXX-6-SL-DC ADV200-WA-74000-XXX-6-SL-DC	1,2MW	1MW	Without rectifier - choke - filter - Integrated Safety Card 400VAC/50Hz fan power supply
S9080WMC S9080WSC	ADV200-WA-73550-KXX-6A-MS 07 -DC-SI ADV200-WA-73550-XXX-6A-SL-DC	710kW	630kW	Without rectifier - choke - filter + Integrated Safety Card 460VAC/60Hz fan power supply
S9081WMC S9081WSC	ADV200-WA-74000-KXX-6A-MS 08 -DC-SI ADV200-WA-74000-XXX-6A-SL-DC	800kW	710kW	Without rectifier - choke - filter + Integrated Safety Card 460VAC/60Hz fan power supply
S9080W1C S9080WSC S9080WSC	ADV200-WA-73550-KXX-6A-MS 10-DC-SI ADV200-WA-73550-XXX-6A-SL-DC ADV200-WA-73550-XXX-6A-SL-DC	1MW	900kW	Without rectifier - choke - filter + Integrated Safety Card 460VAC/60Hz fan power supply
S9081W1C S9081WSC S9081WSC	ADV200-WA-74000-KXX-6A-MS 12-DC-SI ADV200-WA-74000-XXX-6A-SL-DC ADV200-WA-74000-XXX-6A-SL-DC	1,2MW	1MW	Without rectifier - choke - filter + Integrated Safety Card 460VAC/60Hz fan power supply

Note :

5. Programming

5.1 "GF_eXpress" PC Configuration Tool

Applications

- Parameter configuration of Gefran devices (Instruments, Drives, Sensors)
- Tuning of control parameters with on-line tests and trends
- Management of parameter archive for multiple configuration

Features

- Guided product selection
- Simplified settings
- Multiple languages
- Parameter printout
- Creation and storing of recipes
- Network autoscan

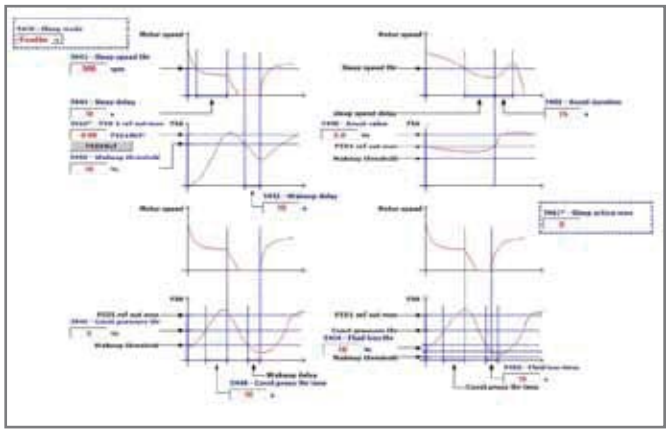
GF_eXpress is the software used to configure the parameters of the automation components, drives and sensors in the Gefran catalogue.

The procedures for selecting and configuring parameters are easy and intuitive, thanks to the graphic interface and devices are grouped according to product type and functions.

Product searches are performed by means of a context search and a visual selection from among actual images of the products.

This makes it possible to have a single library of devices for all Gefran products.

All details for configuration of each single device are set out in XML format to facilitate expansion of the catalogue and parameters.



The selected product can be configured as follows:

- using a sub-set of predefined parameters
- using a guided graphic interface with context menus

The creation of custom parameter menus with a limited sub-set of data is envisaged, to enable better and more effective device configuration.

GF_eXpress is based on HTML technology. The graphic layout and content are intuitive and easy to use.

The interface and descriptions of the configuration parameters are available in multi-language format.

The use and support of UNICODE format, for multi-language management, enables the inclusion of languages that use special characters (Chinese, Korean, Russian, etc.).

GF_eXpress also offers the following functions:

• Autoscan

Device connection parameters can be configured manually or using the Autoscan function.

The Autoscan function automatically searches for the device connected to the development PC, sending serial commands to identify the type and parameters of communication.

• Monitor Window

When the device is connected, the configuration pages display the value of the single parameter in real-time.

Besides displaying the value the Monitor Window also enables parameters to be modified in real-time.

• Recipes

Saving and archiving a list of parameters. This function is used to manage same configurations on different devices or the transfer of configurations between different users.

• Oscilloscope

Simultaneous monitoring of up to 8 curves. The reference value for the curve being displayed can be selected from among all the variables that are available for the selected device.

• Print

Prints the variables that are displayed or selected. The Print function also includes the preview.

• Technical data

Operating systems:

- Windows ® 2000, XP, Vista.

Minimum PC requirements:

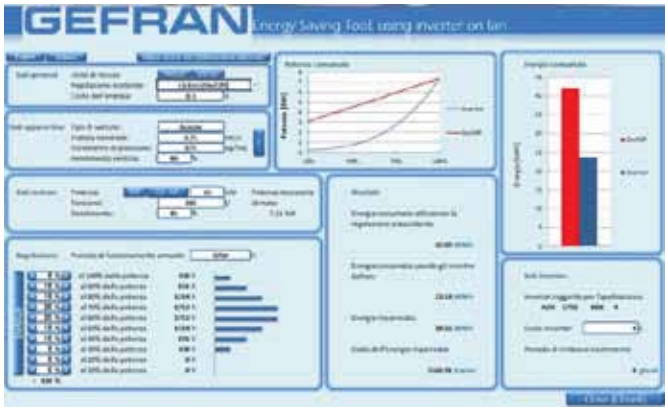
- Pentium class CPU
- 512 MB of RAM
- Free space of > 200MB
- Graphic card min. VGA (1024x768)
- 1 RS232 or USB serial port
- 1 Ethernet port (for other Gefran devices, e.g. Geflex)
- CD-ROM drive

Communication protocols supported:

- Serial communication with the device (Modbus)
- Ethernet communication with TCP Modbus devices

5.2 Energy Saving calculator

Gefran has developed specific tools for pumps and fans that use system data to calculate the amount of energy that could be saved using the SIEIDrive ADV200 WA series of inverters instead of conventional fixed-speed drives.



5.3 Programming Keypad

The KB_ADV programming keypad (supplied as standard) makes the man-machine interface simple, immediate and highly functional.

The programming software is available in 2 modes, Easy and Expert, suitable for users of any level and all programming requirements, however complex.

The powerful platform also features a menu/parameter structure that is easy to interpret and is facilitated by the keypad functions and display.

The **"Wizard"** tool ensures totally user-friendly **immediate start-up functions**. Standard features of the ADV200 WA include programming in **10 languages** (English, Italian, French, German, Spanish, Polish, Romanian, Russian, Turkish and Portuguese).

- 4 line x 21 character display
- Alphanumeric plaintext
- Complete information regarding each parameter
- Fast navigation keys
- Key for displaying the last 10 parameters that have been changed
- DISP key for rapid display of operating parameters
- Uploading-Downloading and saving of 5 complete sets of drive parameters
- Remote control from a distance of up to 10 metres

5.4 Softscope

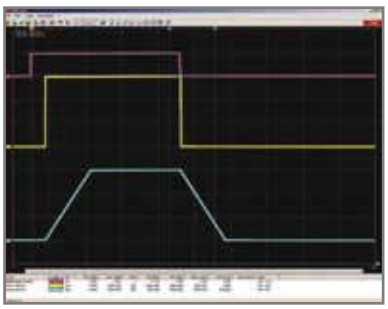
SoftScope is a software oscilloscope with synchronous sampling (buffered with a minimum sampling time of 1ms). Using SoftScope the user can easily display in a fast way some specific variables, for example commissioning variables, variables to test performance levels achieved or to tune the control loops.

SoftScope allows the definition of the following parameters:

- Trigger conditions (e.g. climbing leading edge of a specific signal)
- Recording quality (a multiple of the basic clock at 1ms)
- Recording duration period
- System sizes to be recorded.

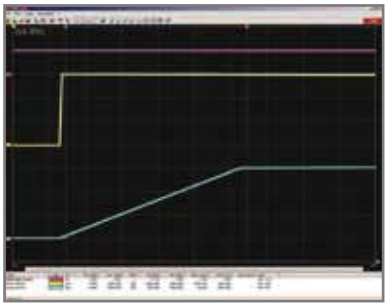
The curves can be displayed with different colours and they can be enabled/disabled. The zoom function allows enlargement of the details. The cursor allows detection of the signal peaks and duration.

The recorded data are displayed as time-based curves and therefore can be analysed. The displayed curves can be printed and stored in ASCII format and can be used with the most common data processing tools (for example Excel, Matlab).



Speed cycle
Start, ramp reference 1500 rpm, ramp output reaches 1500 rpm, Stop, ramp reference 0 rpm, ramp output reaches 0 rpm.

1) start command
2) ramp input speed reference
3) ramp output



Zoom
Ramp output phase from 0 rpm to 1500 rpm of the previous cycle.

1) start command
2) ramp input speed reference
3) ramp output

5.5 "MDPlc" advanced development environment

The **M**otion **D**rive **P**rogrammable logic controller (MDPlc) development environment is a tool for the development of industrial applications based on the SIEIDrive ADV200 WA series of drives.

It is an integrated tool that allows writing, compiling, downloading and debugging of the applications.

MDPlc allows complete personalisation of the drives according to the application requirements using a "friendly" and powerful graphic interface. The importance of the MDPlc's performance is particularly evident when defining advanced applications.

The primary feature of MDPlc is its ability to create an application code for the drives in assembly language, by compiling the application written in the MDPlc environment with PLC languages in compliance with the IEC 61131-3 international standard.

When using an MDPlc application with the ADV200 WA, the drive's **basic functions** continue to be executed. Two MDPlc application programs can be stored on the drive. One of the two applications (1 or 2) is enabled via a parameter.

The languages that can be used to program specific custom applications are:

- Instruction List (IL)
- Structured Text (ST)
- Ladder Diagram (LD)
- Function Block Diagram (FBD)
- Sequential Flow Chart (SFC)

These languages can be used simultaneously within the same application so that the most suitable language is used for each application process.

The application can be structured on different levels, according to the block hierarchy and sequence. The user can also use basic library blocks or create custom blocks to be incorporated into personalised libraries.

The MDPlc editor is very efficient due to specific functions such as syntax, colouring and automatic insertion, together with the ability to include comments thereby making the program easier to be used.

The MDPlc development environment is structured on 5 "tasks" performed with different cycle times:

- Task “Boot”: application boot (initialisation)
- Task “Fast”: cycle at 1ms (high priority)
- Task “Slow”: cycle at 8ms
- Task “Background”: asynchronous execution (low priority)
- Task “Parameter": asynchronous if a parameter is modified

The user can program each task with a high degree of precision in one or more of the IEC 61131 - 3 standard languages, including those with floating-point arithmetic. Depending on the application and in order to obtain the desired performance and accuracy levels, the user can organise the program to take best advantage of the system capacities in terms of languages and calculation times. The user can also access all drive variables and parameters, including the system (processor) and DSP ones (for example, instant voltage and currents).

Inside the MDPlc application the user can define different variables (floating, integers, etc.) and parameters. Again, depending on the application, the user can also define some personalised drive parameter menus that can be used and modified by the GF_eXpress configurator of the drive.

The application can perform a direct data exchange using the available buses (DeviceNet, CanOpen®, Profibus-DP, Fast Link, etc.) both via the supervision PC/Plc and via the I/O remote modules. Typical situations where MDPlc applications have been developed are packaging, automatic warehouse systems, the plastic and glass industry, the textile sector and other applications requiring high reliability, accuracy, programming flexibility and short development times.

CD-ROM MDPlc for ADV200
code 1S3A56

• Debug tools

MDPlc integrates a series of diagnostic tools supporting the application debug, its setting and optimisation. MDPlc allows the display, both numerically and graphically, and in suitable windows of all drive and application variables which have been configured via the drag-and drop mode. The graphic curves are displayed with different colours for clarity; the different colours can be connected to configurable events and conditions (trigger). Because the synchronous acquisitions are buffered at 1ms, the variables are used with high accuracy so as to give a precise analysis of their condition.

During the application development and testing, it is possible to insert some triggers into pre-defined code points, which can be configured via a suitable window. The variables, which are read in a synchronous way with each trigger, can be displayed as numbers, as diagrams or tables. The MDPlc environment supports the application debug by highlighting any programming errors, which are then displayed in a suitable window during the compiling process. The highlighted error is displayed together with its position and error cause showing a direct link to the program section to be analysed.

• Instruction List (IL)

Instruction List is a low-level language, with a structure similar to a simple machine assembler language. It is ideal for solving small straightforward problems where there are few decision points and a limited number of changes in the program execution flow.

IL can be used when the execution time is critical, for example in the MDPlc Fast Task at 1ms.

• Structured Text (ST)

Structured text is a high-level language. It has a syntax that on first appearance is very similar to Pascal language. An ST program is usually organised as continuous text. This is divided and structured into paragraphs, which represent the logic units of the ST program.

The wide range of basic commands satisfies the needs of the data management, computation functions, complex arithmetic calculations and control structure. ST has a comprehensive range of constructs to assign values to variables, to call functions and function blocks, to create expressions, to evaluate conditions (IF, CASE) and to implement iterations and loops (WHILE, REPEAT UNTIL).

ST is recommended in the MDPlc Fast Task at 1 ms, where the execution time is critical.

• Ladder Diagram (LD)

The representation of logical sequences in the form of the ladder diagram originates from the area of electrical plant engineering.

LD is based on the methods used to design relay logic. This form of representation is particularly suitable for implementing relay switching operations in PLC programs.

• Function Block Diagram (FBD)

The basic idea behind PLC programming with the function block diagram is that the program is structured in function-oriented logical sequence cascades (networks). FBD derives from the graphic representation of flow diagrams, hence its ease of use.

FBD is based on viewing a system in terms of the flow of signals, represented in the form of electronic circuit diagrams. Within one network, the execution direction is always from left to right. All input values must always be computed and available before the execution of a function block. The execution and evaluation of a network is not completed until the output values of all elements have been calculated.

• Sequential Flow Chart (SFC)

Sequential Function Chart is a powerful graphical language for the description of the sequential behaviour of a program in terms of states and transitions

SFC describes the sequential aspects of a program and it can be used to divide a control problem so that only relevant aspects to a specific phase are considered.

SFC can be useful for the development of programs with a well-defined "top-down" or "bottom-up" structure. Usually SFC can include functions, function blocks and programs, and also actions and transitions written with languages such as FBD, IL, LD or ST, which are more suitable for descriptions of specific parts of the program and not of the sequential flow, implemented with the SFC program.

6. Accessories & Options

6.1 Fuses

6.1.1. External network side fuses (F1)

Size		Europe		America		ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
		Model	Code	Model	Code				
ADV200 WA-4									
ADV200-WA-1015		GRD2/10	F4D13	A70P10	S7G49	●			
ADV200-WA-1022		GRD2/10	F4D13	A70P10	S7G49	●			
ADV200-WA-1030		GRD2/10	F4D13	A70P10	S7G49	●			
ADV200-WA-1040		GRD2/10	F4D13	A70P10	S7G49	●			
ADV200-WA-1055		GRD2/16	F4D14	A70P20-1	S7G48	●			
ADV200-WA-2075		GRD2/16	F4D14	A70P20-1	S7G48	●			
ADV200-WA-2110		GRD2/25	F4D16	A70P35	S7G86	●			
ADV200-WA-2150		GRD3/35	F4D20	A70P35	S7G86	●			
ADV200-WA-3185		GRD3/50	F4D21	A70P50	S7G53	●			
ADV200-WA-3220		GRD3/50	F4D21	A70P50	S7G53	●			
ADV200-WA-3300		S00C+üf1/80/80A/690V	F4EAF	A70P80	S7G54	●			
ADV200-WA-4370		S00C+üf1/80/80A/690V	F4EAF	A70P80	S7G54	●			
ADV200-WA-4450		S00C+üf1/80/100A/690V	F4G18	A70P100	S7G55	●			
ADV200-WA-4550		S00C+üf1/80/125A/690V	F4EAJ	A70P150	S7G56	●			
ADV200-WA-5750		S00/üf1/80/200A/690V	F4G23	A70P200	S7G58	●			
ADV200-WA-5900		S00/üf1/80/200A/690V	F4G23	A70P200	S7G58	●			
ADV200-WA-51100		S1üf1/110/250A/690V	F4G28	A70P250	S7G59	●			
ADV200-WA-61320		S1üf1/110/315A/690V	F4G30	A70P350	S7G61	●			
ADV200-WA-61600		S2üf1/110/400A/690V	F4G34	A70P400	S7G62	●			
ADV200-WA-72000		S2üf1/110/500A/690V	F4E30	A70P500	S7G63	●			
ADV200-WA-72500		S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●			
ADV200-WA-73150		S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●			
ADV200-WA-73550		S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
ADV200-WA-74000		S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
500 kW	**ADV200-WA-72500-KXX-4-MS 05-...**	S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●			
	ADV200-WA-72500-XXX-4-SL-...	S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●			
630 kW	**ADV200-WA-73150-KXX-4-MS 06-...**	S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●			
	ADV200-WA-73150-XXX-4-SL-...	S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●			
710 kW	**ADV200-WA-73550-KXX-4-MS 07-...**	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
	ADV200-WA-73550-XXX-4-SL-...	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
800 kW	**ADV200-WA-74000-KXX-4-MS 08-...**	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
	ADV200-WA-74000-XXX-4-SL-...	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
1000 kW	**ADV200-WA-73550-KXX-4-MS 10-...**	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
	ADV200-WA-73550-XXX-4-SL-...	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
	ADV200-WA-73550-XXX-4-SL-...	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
1200 kW	**ADV200-WA-74000-KXX-4-MS 12-...**	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
	ADV200-WA-74000-XXX-4-SL-...	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
	ADV200-WA-74000-XXX-4-SL-...	S2üf1/110/800A/690V	F4G87	A70P800	S7813	●			
ADV200 WA-6									
ADV200-WA-5750		S00C+üf1/80/160A/690V	F4EAL	A70P175	S7G57			●	
ADV200-WA-6900		S00C+üf1/80/160A/690V	F4EAL	A70P175	S7G57			●	
ADV200-WA-61100		S00üf1/80/200A/690V	F4G23	A70P200	S7G58			●	
ADV200-WA-61320		S1üf1/110/250A/690V	F4G28	A70P250	S7G59			●	
ADV200-WA-72000		aR 250A/690V IEC/700V UL		aR 250A/690V IEC/700V UL				●	
ADV200-WA-72500		aR 315A/690V IEC/700V UL		aR 315A/690V IEC/700V UL				●	
ADV200-WA-73150		aR 400A/690V IEC/700V UL		aR 400A/690V IEC/700V UL				●	
ADV200-WA-73550		aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL				●	
ADV200-WA-74000		aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL				●	
500 kW	**ADV200-WA-72500-KXX-6-MS 05-...**	aR 315A/690V IEC/700V UL		aR 315A/690V IEC/700V UL				●	
	ADV200-WA-72500-XXX-6-SL-...	aR 315A/690V IEC/700V UL		aR 315A/690V IEC/700V UL				●	
630 kW	**ADV200-WA-73150-KXX-6-MS 06-...**	aR 315A/690V IEC/700V UL		aR 315A/690V IEC/700V UL				●	
	ADV200-WA-73150-XXX-6-SL-...	aR 315A/690V IEC/700V UL		aR 315A/690V IEC/700V UL				●	
710 kW	**ADV200-WA-73550-KXX-6-MS 07-...**	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL				●	
	ADV200-WA-73550-XXX-6-SL-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL				●	

Size		Europe		America		ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
		Model	Code	Model	Code				
800 kW	ADV200-WA-74000-KXX-6-MS 08-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
	ADV200-WA-74000-XXX-6-SL-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
1000 kW	ADV200-WA-73550-KXX-6-MS 10-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
	ADV200-WA-73550-XXX-6-SL-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
	ADV200-WA-73550-XXX-6-SL-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
1200 kW	ADV200-WA-74000-KXX-6-MS 12-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
	ADV200-WA-74000-XXX-6-SL-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	
	ADV200-WA-74000-XXX-6-SL-...	aR 500A/690V IEC/700V UL		aR 500A/690V IEC/700V UL	S7G63			●	

Technical data for fuses, including dimensions, weights, dissipated power, fuse blocks, etc. can be found in the manufacturers' catalogues:

Tipo M... (a coltello), GRD... , Z22... , S...	Jean Müller, Eltville
A70...	Ferraz
FWP...	Bussmann
aR ..	Square body DIN 43653 110 mm stuf mount high speed FUSE

6.1.2. Fuses for the DC connection (F2)

Size		Europe		America		ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
		Model	Code	Model	Code				
ADV200 WA-4 / ADV200 WA-4-DC									
ADV200-WA-1015 ... ADV200-WA-1030		GRD2/10	F4D13	A70P10	S7G49	●			
ADV200-WA-1040		GRD2/16	F4D14	A70P20-1	S7G48	●			
ADV200-WA-1055		GRD2/20	F4D15	A70P20-1	S7G48	●			
ADV200-WA-2075		GRD2/20	F4D15	A70P30-1	S7I50	●			
ADV200-WA-2110		GRD3/35	F4D20	A70P40	S7G52	●			
ADV200-WA-2150		GRD3/50	F4D21	A70P50	S7G53	●			
ADV200-WA-3185 ... ADV200-WA-3300		S00C+/üf1/80/80A/690V	F4EAF	A70P80	S7G54	●			
ADV200-WA-4370		S00C+/üf1/80/100A/690V	F4G18	A70P100	S7G55	●	●		
ADV200-WA-4450		S00C+/üf1/80/125A/690V	F4EAJ	A70P150	S7G56	●	●		
ADV200-WA-4550		S00C+/üf1/80/160A/690V	F4EAL	A70P150	S7G56	●	●		
ADV200-WA-5750		S00/üf1/80/200A/690V	F4G23	A70P200	S7G58	●	●		
ADV200-WA-5900		S1üf1/110/250A/690V	F4G28	A70P250	S7G59	●	●		
ADV200-WA-51100		S1üf1/110/315A/690V	F4G30	A70P350	S7G61	●	●		
ADV200-WA-61320		S2üf1/110/400A/690V	F4G34	A70P400	S7G62	●	●		
ADV200-WA-61600 - ADV200-WA-72000		S2üf1/110/500A/690V	F4E30	A70P500	S7G63	●	●		
ADV200-WA-72500		S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●	●		
ADV200-WA-73150		S3üf1/110/800A/690V	F4H02	A70P800	S7813	●	●		
ADV200-WA-73550 - ADV200-WA-74000		S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●	●		
	ADV200-WA-72500-XXX-4-SL-...	S2üf1/110/630A/690V	F4E31	A70P600	S7G65	●	●		
630 kW	ADV200-WA-73150-KXX-4-MS 05-...	S3üf1/110/800A/690V	F4H02	A70P800	S7813	●	●		
	ADV200-WA-73150-XXX-4-SL-...	S3üf1/110/800A/690V	F4H02	A70P800	S7813	●	●		
710 kW	ADV200-WA-73550-KXX-4-MS 07-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
	ADV200-WA-73550-XXX-4-SL-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
800 kW	ADV200-WA-74000-KXX-4-MS 08-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
	ADV200-WA-74000-XXX-4-SL-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
1000 kW	ADV200-WA-73550-KXX-4-MS 10-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
	ADV200-WA-73550-XXX-4-SL-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
	ADV200-WA-73550-XXX-4-SL-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
1200 kW	ADV200-WA-74000-KXX-4-MS 12-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
	ADV200-WA-74000-XXX-4-SL-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		
	ADV200-WA-74000-XXX-4-SL-...	S3üf1/110/1000A/690V	F4H03	A70P1000	S7812	●	●		

Size		Europe		America		ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
		Model	Code	Model	Code				
ADV200 WA-6 / ADV200 WA-6-DC									
ADV200-WA-5750		S00/üf1/80/200A/690V	F4G23	A70P200	S7G58			●	●
ADV200-WA-6900		S1üf1/110/250A/690V	F4G28	A70P250	S7G59			●	●
ADV200-WA-61100		S1üf1/110/315A/690V	F4G30	A70P350	S7G61			●	●
ADV200-WA-61320		S2üf1/110/400A/690V	F4G34	A70P400	S7G62			●	●
ADV200-WA-72000		aR 400A/1250V IEC/1300V UL		aR 400A/1250V IEC/1300V UL				●	●
ADV200-WA-72500		aR 500A/1250V IEC/1300V UL		aR 500A/1250V IEC/1300V UL				●	●
ADV200-WA-73150		aR 630A/1250V IEC/1300V UL	S85C4	aR 630A/1250V IEC/1300V UL	S85C4			●	●
ADV200-WA-73550		aR 700A/1250V IEC/1300V UL	S85C5	aR 700A/1250V IEC/1300V UL	S85C5			●	●
ADV200-WA-74000		aR 800A/1250V IEC/1300V UL	S85C6	aR 800A/1250V IEC/1300V UL	S85C6			●	●
500 kW	ADV200-WA-72500-KXX-6-MS 05-...	aR 500A/1250V IEC/1300V UL		aR 500A/1250V IEC/1300V UL				●	●
	ADV200-WA-72500-XXX-6-SL-...	aR 500A/1250V IEC/1300V UL		aR 500A/1250V IEC/1300V UL				●	●
630 kW	ADV200-WA-73150-KXX-6-MS 06-...	aR 630A/1250V IEC/1300V UL	S85C4	aR 630A/1250V IEC/1300V UL	S85C4			●	●
	ADV200-WA-73150-XXX-6-SL-...	aR 630A/1250V IEC/1300V UL	S85C4	aR 630A/1250V IEC/1300V UL	S85C4			●	●
710 kW	ADV200-WA-73550-KXX-6-MS 07-...	aR 700A/1250V IEC/1300V UL	S85C5	aR 700A/1250V IEC/1300V UL	S85C5			●	●
	ADV200-WA-73550-XXX-6-SL-...	aR 700A/1250V IEC/1300V UL	S85C5	aR 700A/1250V IEC/1300V UL	S85C5			●	●
800 kW	ADV200-WA-74000-KXX-6-MS 08-...	aR 800A/1250V IEC/1300V UL	S85C6	aR 800A/1250V IEC/1300V UL	S85C6			●	●
	ADV200-WA-74000-XXX-6-SL-...	aR 800A/1250V IEC/1300V UL	S85C6	aR 800A/1250V IEC/1300V UL	S85C6			●	●
1000 kW	ADV200-WA-73550-KXX-6-MS 10-...	aR 700A/1250V IEC/1300V UL	S85C5	aR 700A/1250V IEC/1300V UL	S85C5			●	●
	ADV200-WA-73550-XXX-6-SL-...	aR 700A/1250V IEC/1300V UL	S85C5	aR 700A/1250V IEC/1300V UL	S85C5			●	●
	ADV200-WA-73550-XXX-6-SL-...	aR 700A/1250V IEC/1300V UL	S85C5	aR 700A/1250V IEC/1300V UL	S85C5			●	●
1200 kW	ADV200-WA-74000-KXX-6-MS 12-...	aR 800A/1250V IEC/1300V UL	S85C6	aR 800A/1250V IEC/1300V UL	S85C6			●	●
	ADV200-WA-74000-XXX-6-SL-...	aR 800A/1250V IEC/1300V UL	S85C6	aR 800A/1250V IEC/1300V UL	S85C6			●	●
	ADV200-WA-74000-XXX-6-SL-...	aR 800A/1250V IEC/1300V UL	S85C6	aR 800A/1250V IEC/1300V UL	S85C6			●	●

Technical data for fuses, including dimensions, weights, dissipated power, fuse blocks, etc. can be found in the manufacturers' catalogues:

GRD... , Z22...	Jean Müller, Eltville
A70...	Ferraz
FWP...	Bussmann
aR ..	Square body DIN 43653 110 mm stuf mount high speed FUSE

6.2 Chokes

6.2.1. Input choke (L1 - AC)

A three-phase mains choke is mandatory for sizes of ≥ 160 kW.

Size	Output inverter	Choke rating [mH]	Current rating [A]	Current saturation [A]	Model	Code	Codice	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
ADV200 WA-4											
ADV200-WA-1015 ... ADV200-WA-61600		SP / SL	integrated choke on DC-Link								
ADV200-WA-72000		SP	0.085	309	618	LR3-160	S7D40	●			
		SL	0.085	420	710	LR3-200	S7AE9	●			
ADV200-WA-72000		SP / SL	0.085	420	710	LR3-200	S7AE9	●			
ADV200-WA-73150		SP / SL	0.06	550	1050	LR3-315	S7D28	●			
ADV200-WA-73550		SP / SL	0.04	700	900	LR3-ADV-355	S7LR01	●			
ADV200-WA-74000		SP / SL	0.04	700	900	LR3-ADV-355	S7LR01	●			
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	SP / SL	0.085	420	710	LR3-200	S7AE9	●			
	ADV200-WA-72500-XXX-4-SL-...		0.085	420	710	LR3-200	S7AE9	●			
630 kW	ADV200-WA-73150-KXX-4-MS 06-...	SP / SL	0.06	550	1050	LR3-315	S7D28	●			
	ADV200-WA-73150-XXX-4-SL-...		0.06	550	1050	LR3-315	S7D28	●			
710 kW	ADV200-WA-73550-KXX-4-MS 07-...	SP / SL	0.04	700	900	LR3-ADV-355	S7LR01	●			
	ADV200-WA-73550-XXX-4-SL-...		0.04	700	900	LR3-ADV-355	S7LR01	●			
800 kW	ADV200-WA-74000-KXX-4-MS 08-...	SP / SL	0.04	700	900	LR3-ADV-355	S7LR01	●			
	ADV200-WA-74000-XXX-4-SL-...		0.04	700	900	LR3-ADV-355	S7LR01	●			
1000 kW	ADV200-WA-73550-KXX-4-MS 10-...	SP / SL	0.04	700	900	LR3-ADV-355	S7LR01	●			
	ADV200-WA-73550-XXX-4-SL-...		0.04	700	900	LR3-ADV-355	S7LR01	●			
	ADV200-WA-73550-XXX-4-SL-...		0.04	700	900	LR3-ADV-355	S7LR01	●			
1200 kW	ADV200-WA-74000-KXX-4-MS 12-...	SP / SL	0.04	700	900	LR3-ADV-355	S7LR01	●			
	ADV200-WA-74000-XXX-4-SL-...		0.04	700	900	LR3-ADV-355	S7LR01	●			
	ADV200-WA-74000-XXX-4-SL-...		0.04	700	900	LR3-ADV-355	S7LR01	●			
ADV200 WA-6											
ADV200-WA-5750 ... ADV200-WA-61320		SP / SL	integrated choke on DC-Link							●	
ADV200-WA-72000		SP / SL	0,2	206	398	LR3-6-ADV-160	S7AL07			●	
ADV200-WA-72500		SP / SL	0,16	260	493	LR3-6-ADV-200	S7AL08			●	
ADV200-WA-73150		SP / SL	0,135	335	600	LR3y-6-250	S7AD6			●	
ADV200-WA-73550		SP / SL	0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
ADV200-WA-74000		SP / SL	0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
500 kW	ADV200-WA-72500-KXX-6-MS 05-...	SP / SL	0,16	260	493	LR3-6-ADV-200	S7AL08			●	
	ADV200-WA-72500-XXX-6-SL-...		0,16	260	493	LR3-6-ADV-200	S7AL08			●	
630 kW	ADV200-WA-73150-KXX-6-MS 06-...	SP / SL	0,135	335	600	LR3y-6-250	S7AD6			●	
	ADV200-WA-73150-XXX-6-SL-...		0,135	335	600	LR3y-6-250	S7AD6			●	
710 kW	ADV200-WA-73550-KXX-6-MS 07-...	SP / SL	0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
	ADV200-WA-73550-XXX-6-SL-...		0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
800 kW	ADV200-WA-74000-KXX-6-MS 08-...	SP / SL	0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
	ADV200-WA-74000-XXX-6-SL-...		0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
1000 kW	ADV200-WA-73550-KXX-6-MS 10-...	SP / SL	0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
	ADV200-WA-73550-XXX-6-SL-...		0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
	ADV200-WA-73550-XXX-6-SL-...		0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
1200 kW	ADV200-WA-74000-KXX-6-MS 12-...	SP / SL	0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
	ADV200-WA-74000-XXX-6-SL-...		0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	
	ADV200-WA-74000-XXX-6-SL-...		0,11	405	852	LR3-6-ADV-315-355	S7AL09			●	

Refer to the Gefran Accessories catalogue (1S9I09) for choke weights and dimensions.

6.2.2. Input chokes for conformity to EN61000-3-12 for drives with input currents of between 16A and 75A

Drive	Lac	Code	Value [µH]
1015	LHC-2110-WA	S7HB3	1750
2150	LHC-2150-WA	S7HB0	1300
3185	LHC-3185-WA	S7HB4	1100
3220	LHC-3220-WA	S7HB5	880
3300	LHC-3300-WA	S7HB6	660
4370-4450	LHC-4450-WA	S7HB7	520

With this combination the maximum output voltage falls to Vout = 0.94 Vin

There are no limitations for inverter sizes with output current <= 16A as these are considered to be for professional use. The applicable standard for inverters with output currents of more than 75 A is EN61000-3-4.

6.2.3. Output choke (L2) – ADV200 WA-4 Size 1015 ... 74000

Size	Output inverter	Choke rating [mH]	Current rating [A]	Current saturation [A]	Model	Code	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
ADV200 WA-4/ ADV200 WA-4-DC										
ADV200-WA-1015	SP	1.4	9.5	20	LU3-003	S7FG2	●			
	SL	0.87	16	34	LU3-005	S7FG3	●			
ADV200-WA-1022	SP	1.4	9.5	20	LU3-003	S7FG2	●			
	SL	0.87	16	34	LU3-005	S7FG3	●			
ADV200-WA-1030	SP	1.4	9.5	20	LU3-003	S7FG2	●			
	SL	0.87	16	34	LU3-005	S7FG3	●			
ADV200-WA-1040	SP	1.4	9.5	20	LU3-003	S7FG2	●			
	SL	0.87	16	34	LU3-005	S7FG3	●			
ADV200-WA-1055	SP	1.4	9.5	20	LU3-003	S7FG2	●			
	SL	0.87	16	34	LU3-005	S7FG3	●			
ADV200-WA-2075	SP	0.87	16	34	LU3-005	S7FG3	●			
	SL	0.51	27	57	LU3-011	S7FG4	●			
ADV200-WA-2110	SP	0.51	27	57	LU3-011	S7FG4	●			
	SL	0.43	32	68	LU3-015	S7FM2	●			
ADV200-WA-2150	SP	0.51	27	57	LU3-011	S7FG4	●			
	SL	0.43	32	68	LU3-015	S7FM2	●			
ADV200-WA-3185	SP	0.43	32	68	LU3-015	S7FM2	●			
	SL	0.33	42	72	LU3-022	S7FH3	●	●		
ADV200-WA-3220	SP	0.33	42	72	LU3-022	S7FH3	●	●		
	SL	0.23	58	100	LU3-030	S7FH4	●	●		
ADV200-WA-3300	SP	0.23	58	100	LU3-030	S7FH4	●	●		
	SL	0.24	58	100	LU3-030	S7FH4	●	●		
ADV200-WA-4370	SP	0.24	58	100	LU3-030	S7FH4	●	●		
	SL	0.18	76	130	LU3-037	S7FH5	●	●		
ADV200-WA-4450	SP	0.18	76	130	LU3-037	S7FH5	●	●		
	SL	0.12	120	205	LU3-055	S7FH6	●	●		
ADV200-WA-4550	SP	0.12	120	205	LU3-055	S7FH6	●	●		
	SL	0.07	180	310	LU3-090	S7F10	●	●		
ADV200-WA-5750	SP	0.07	180	310	LU3-090	S7F10	●	●		
	SL	0.07	180	310	LU3-090	S7F10	●	●		

Size	Output inverter	Choke rating [mH]	Current rating [A]	Current saturation [A]	Model	Code	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
ADV200-WA-5900	SP	0.07	180	310	LU3-090	S7F10	●	●		
	SL	0.07	180	310	LU3-090	S7F10	●	●		
ADV200-WA-51100	SP	0.07	180	310	LU3-090	S7F10	●	●		
	SL	0.041	310	540	LU3-160	S7FH8	●	●		
ADV200-WA-61320	SP	0.041	310	540	LU3-160	S7FH8	●	●		
	SL	0.041	310	540	LU3-160	S7FH8	●	●		
ADV200-WA-61600	SP	0.041	310	540	LU3-160	S7FH8	●	●		
	SL	0.041	310	540	LU3-160	S7FH8	●	●		
ADV200-WA-72000	SP	0.041	310	540	LU3-160	S7FH8	●	●		
	SL	0.03	400	770	LU3-200	S7AF0	●	●		
ADV200-WA-72500	SP	0.03	400	770	LU3-200	S7AF0	●	●		
	SL	0.022	580	1100	LU3-315	S7FH9	●	●		
ADV200-WA-73150	SP	0.022	580	1100	LU3-315	S7FH9	●	●		
	SL	0.022	580	1100	LU3-315	S7FH9	●	●		
ADV200-WA-73550	SP	0.015	730	1240	LU3-400	S7FO8	●	●		
	SL	0.015	730	1240	LU3-400	S7FO8	●	●		
ADV200-WA-74000	SP	0.015	730	1240	LU3-400	S7FO8	●	●		
	SL	0.015	730	1240	LU3-400	S7FO8	●	●		

Refer to the Gefran Accessories catalogue (1S9I09) for choke weights and dimensions.
Motor cables up to 80 metres in length.

6.2.4. Output choke (L2) - ADV200 WA-6

Size	Output inverter	Choke rating [μH]	Current rating [A]	Current saturation [A]	Model	Code	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
ADV200 WA-6/ ADV200 WA-6-DC										
ADV200-WA-5750	SP / SL	0.28	102	125	LU3-6-75	S7AE1			●	●
ADV200-WA-6900	SP / SL	0.23	148	180	LU3-6-110	S7AE2			●	●
ADV200-WA-61100	SP / SL	0.23	148	180	LU3-6-110	S7AE2			●	●
ADV200-WA-61320	SP / SL	0.2	160	220	LU3-6-132	a richiesta			●	●
ADV200-WA-72000	SP	85	210	445	LU3-6-200	S7FO17			●	●
	SL	85	210	445	LU3-6-200	S7FO17				
ADV200-WA-72500	SP	85	210	445	LU3-6-200	S7FO17			●	●
	SL	65	265	562	LU3-6-250	S7FO18			●	●
ADV200-WA-73150	SP	65	265	562	LU3-6-250	S7FO18			●	●
	SL	45	400	849	LU3-6-400	S7FO19			●	●
ADV200-WA-73550	SP	45	400	849	LU3-6-400	S7FO19			●	●
	SL	45	400	849	LU3-6-400	S7FO19				
ADV200-WA-74000	SP	45	400	849	LU3-6-400	S7FO19			●	●
	SL	45	400	849	LU3-6-400	S7FO19				

Refer to the Gefran Accessories catalogue (1S9I09) for choke weights and dimensions.
Motor cables up to 50 metres in length.

6.2.5. Output choke (L2) - Models with parallel connection 500... 1200 kW

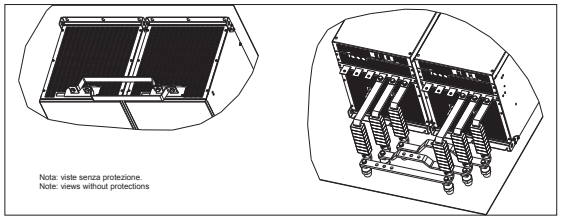
The use of output chokes is mandatory for these sizes; choose according to the application/connection, as follows:

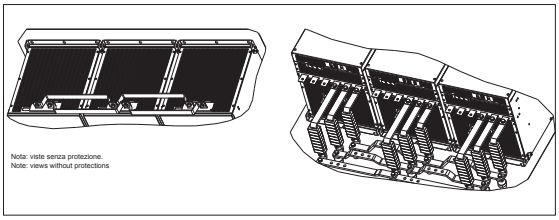
- for applications with short motor cables (≤ 100 m long) bus bars with an integrated choke (see Table 2) or single distributor chokes may be used (see Table 1);
- for applications with long motor cables (> 100 m long) bus bars with an integrated choke (see Table 2) plus the output choke (see Table 3) or single distributor chokes may be used (see Table 1).

Table 1. Distributor chokes

Size		Output inverter	Choke rating [μH]	Current rating [A]	Current saturation [A]	Model	Code	ADV200 WA			
								-4	-4-DC	-6	-6-DC
ADV200 WA-4 / ADV200 WA-4-DC											
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	SP / SL	7.5	450	675	LU3-4-500	S7FFI2	●	●		
	ADV200-WA-72500-XXX-4-SL-...		7.5	450	675	LU3-4-500	S7FFI2	●	●		
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	SP	7.5	450	675	LU3-4-500	S7FFI2	●	●		
	ADV200-WA-72500-XXX-4-SL-...		7.5	450	675	LU3-4-500	S7FFI2	●	●		
630 kW	ADV200-WA-73150-KXX-4-MS 06-...	SL	5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-73150-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
710 kW	ADV200-WA-73550-KXX-4-MS 07-...	SP / SL	5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-73550-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
800 kW	ADV200-WA-74000-KXX-4-MS 08-...	SP / SL	5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-74000-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
1000 kW	ADV200-WA-73550-KXX-4-MS 10-...	SP / SL	5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-73550-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-73550-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
1200 kW	ADV200-WA-74000-KXX-4-MS 12-...	SP / SL	5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-74000-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
	ADV200-WA-74000-XXX-4-SL-...		5.0	730	975	LU3-4-800	S7FFI1	●	●		
ADV200 WA-6 / ADV200 WA-6-DC											
500 kW	ADV200-WA-72500-KXX-6-MS 05-...	SP	85	210	445	LU3-6-200	on demand			●	●
	ADV200-WA-72500-XXX-6-SL-...		85	210	445	LU3-6-200	on demand			●	●
500 kW	ADV200-WA-72500-KXX-6-MS 05-...	SL	65	265	562	LU3-6-250	on demand			●	●
	ADV200-WA-72500-XXX-6-SL-...		65	265	562	LU3-6-250	on demand			●	●
630 kW	ADV200-WA-73150-KXX-6-MS 06-...	SP	65	265	562	LU3-6-250	on demand			●	●
	ADV200-WA-73150-XXX-6-SL-...		65	265	562	LU3-6-250	on demand			●	●
710 kW	ADV200-WA-73550-KXX-6-MS 07-...	SL	45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-73550-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●
710 kW	ADV200-WA-73550-KXX-6-MS 07-...	SP / SL	45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-73550-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●
800 kW	ADV200-WA-74000-KXX-6-MS 08-...	SP / SL	45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-74000-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●
1000 kW	ADV200-WA-73550-KXX-6-MS 10-...	SP / SL	45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-73550-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-73550-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●
1200 kW	ADV200-WA-74000-KXX-6-MS 12-...	SP / SL	45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-74000-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●
	ADV200-WA-74000-XXX-6-SL-...		45	400	849	LU3-6-400	on demand			●	●

Table 2. Bus bars with integrated output chokes





Size	Model	Code	ADV200 WA	
			-4	-4-DC
500 kW	OUT-PW-KIT 2P	S72641	●	●
630 kW	OUT-PW-KIT 2P	S72641	●	●
710 kW	OUT-PW-KIT 2P	S72641	●	●
800 kW	OUT-PW-KIT 2P	S72641	●	●
1000 kW	OUT-PW-KIT 3P	S726411	●	●
1200 kW	OUT-PW-KIT 3P	S726411	●	●

Size	Model	Code	ADV200 WA	
			-6	-6-DC
500 kW	OUT-PW-KIT 2P-690V	S726412	●	●
630 kW	OUT-PW-KIT 2P-690V	S726412	●	●
710 kW	OUT-PW-KIT 2P-690V	S726412	●	●
800 kW	OUT-PW-KIT 2P-690V	S726412	●	●
1000 kW	OUT-PW-KIT 3P-690V	S726413	●	●
1200 kW	OUT-PW-KIT 3P-690V	S726413	●	●

Refer to the Gefran Accessories catalogue (1S9I09) for choke weights and dimensions.

Table 3: Chokes for long cables

Size		Output inverter	Choke rating [μH]	Current rating [A]	Current saturation [A]	Model	Code	ADV200 WA			
								-4	-4-DC	-6	-6-DC
ADV200 WA-4 / ADV200 WA-4-DC											
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	SP	30	400	770	LU3-200	S7AF0	●	●		
	ADV200-WA-72500-XXX-4-SL-...		30	400	770	LU3-200	S7AF0	●	●		
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	SL	22	580	1100	LU3-315	S7FH9	●	●		
	ADV200-WA-72500-XXX-4-SL-...		22	580	1100	LU3-315	S7FH9	●	●		
630 kW	ADV200-WA-73150-KXX-4-MS 06-...	SP / SL	15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-73150-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
710 kW	ADV200-WA-73550-KXX-4-MS 07-...	SP / SL	15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-73550-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
800 kW	ADV200-WA-74000-KXX-4-MS 08-...	SP / SL	15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-74000-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
1000 kW	ADV200-WA-73550-KXX-4-MS 10-...	SP / SL	15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-73550-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-73550-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
1200 kW	ADV200-WA-74000-KXX-4-MS 12-...	SP / SL	15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-74000-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
	ADV200-WA-74000-XXX-4-SL-...		15	730	1240	LU3-400	S7FO8	●	●		
ADV200 WA-6 / ADV200 WA-6-DC											
500 kW	ADV200-WA-72500-KXX-6-MS 05-...	SP	45	400	849	LU3-6-400	S7FO19			●	●
	ADV200-WA-72500-XXX-6-SL-...		45	400	849	LU3-6-400	S7FO19			●	●
500 kW	ADV200-WA-72500-KXX-6-MS 05-...	SL	30	630	1273	LU3-6-630	S7FO20			●	●
	ADV200-WA-72500-XXX-6-SL-...		30	630	1273	LU3-6-630	S7FO20			●	●
630 kW	ADV200-WA-73150-KXX-6-MS 06-...	SP / SL	30	630	1273	LU3-6-630	S7FO20			●	●
	ADV200-WA-73150-XXX-6-SL-...		30	630	1273	LU3-6-630	S7FO20			●	●
710 kW	ADV200-WA-73550-KXX-6-MS 07-...	SP	30	630	1273	LU3-6-630	S7FO20			●	●
	ADV200-WA-73550-XXX-6-SL-...		30	630	1273	LU3-6-630	S7FO20			●	●
710 kW	ADV200-WA-73550-KXX-6-MS 07-...	SL	20	790	1506	LU3-6-800	S7FO21			●	●
	ADV200-WA-73550-XXX-6-SL-...		20	790	1506	LU3-6-800	S7FO21			●	●
800 kW	ADV200-WA-74000-KXX-6-MS 08-...	SP / SL	20	790	1506	LU3-6-800	S7FO21			●	●
	ADV200-WA-74000-XXX-6-SL-...		20	790	1506	LU3-6-800	S7FO21			●	●
1000 kW	ADV200-WA-73550-KXX-6-MS 10-...	SP / SL	15	1150	2121	LU3-6-1000	S7FO16			●	●
	ADV200-WA-73550-XXX-6-SL-...		15	1150	2121	LU3-6-1000	S7FO16			●	●
	ADV200-WA-73550-XXX-6-SL-...		15	1150	2121	LU3-6-1000	S7FO16			●	●
1200 kW	ADV200-WA-74000-KXX-6-MS 12-...	SP / SL	15	1150	2121	LU3-6-1000	S7FO16			●	●
	ADV200-WA-74000-XXX-6-SL-...		15	1150	2121	LU3-6-1000	S7FO16			●	●
	ADV200-WA-74000-XXX-6-SL-...		15	1150	2121	LU3-6-1000	S7FO16			●	●

Refer to the Gefran Accessories catalogue (1S9I09) for choke weights and dimensions.

6.3 External EMC filters

Standard ADV200 WA inverters are provided with an internal filter to guarantee performance levels required by EN 61800-3 (for the second environment, category C3) with a shielded motor cable, maximum 20 metres in length (up to 50 metres for size 5 and bigger).
Optional external filters for different installations are listed in the table below.

Refer to the Gefran Accessories catalogue (1S9I09) for filter weights and dimensions.

Size		Light Duty		Heavy Duty		EN 61800-3 : Category / Environment / Length of motor cables	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
		Model	Code	Model	Code					
ADV200 WA-4 (Supply voltage 3 x 380Vac -15% … 500Vac +5%)										
≥ ADV200-WA-4-1015		ECF3	F4ZZ2	ECF3	F4ZZ2	C4 / 2° / 100 m	●			
ADV200-WA-4-1015		EMI FTF-480-7	S7GHL	EMI FTF-480-7	S7GHL	C2 / 1° / 30 m	●			
ADV200-WA-4-1022		EMI FTF-480-7	S7GHL	EMI FTF-480-7	S7GHL	C2 / 1° / 30 m	●			
ADV200-WA-4-1030		EMI FTF-480-7	S7GHL	EMI FTF-480-7	S7GHL	C2 / 1° / 30 m	●			
ADV200-WA-4-1040		EMI FTF-480-16	S7GHO	EMI FTF-480-7	S7GHL	C2 / 1° / 30 m	●			
ADV200-WA-4-1055		EMI FTF-480-16	S7GHO	EMI FTF-480-16	S7GHO	C2 / 1° / 30 m	●			
ADV200-WA-4-2075		EMI FTF-480-16	S7GHO	EMI FTF-480-16	S7GHO	C2 / 1° / 30 m	●			
ADV200-WA-4-2110		EMI FTF-480-30	S7GHP	EMI FTF-480-16	S7GHO	C2 / 1° / 30 m	●			
ADV200-WA-4-2150		EMI FTF-480-30	S7GHP	EMI FTF-480-30	S7GHP	C2 / 1° / 30 m	●			
ADV200-WA-4-3185		EMI FTF-480-42	S7GOA	EMI FTF-480-30	S7GHP	C2 / 1° / 30 m	●			
ADV200-WA-4-3220		EMI FTF-480-55	S7GOB	EMI FTF-480-42	S7GOA	C2 / 1° / 30 m	●			
ADV200-WA-4-3300		EMI FTF-480-75	S7GOC	EMI FTF-480-55	S7GOB	C2 / 1° / 30 m	●			
ADV200-WA-4-4370		EMI FTF-480-75	S7GOC	EMI FTF-480-75	S7GOC	C2 / 1° / 30 m	●			
ADV200-WA-4-4450		EMI FTF-480-100	S7GOD	EMI FTF-480-75	S7GOC	C2 / 1° / 30 m	●			
ADV200-WA-4-4550		EMI FTF-480-130	S7GOE	EMI FTF-480-100	S7GOD	C2 / 1° / 30 m	●			
ADV200-WA-4-5750		EMI FTF-480-180	S7GOF	EMI FTF-480-130	S7GOE	C3 / 2° / 100 m	●			
ADV200-WA-4-5900		EMI FTF-480-180	S7GOF	EMI FTF-480-180	S7GOF	C3 / 2° / 100 m	●			
ADV200-WA-4-51100		EMI-480-250	S7DGG	EMI FTF-480-180	S7GOF	C3 / 2° / 100 m	●			
ADV200-WA-4-61320		EMI-480-250	S7DGG	EMI-480-250	S7DGG	C3 / 2° / 100 m	●			
ADV200-WA-4-61600		EMI-480-320	S7DGH	EMI-480-250	S7DGG	C3 / 2° / 100 m	●			
ADV200-WA-4-72000		EMI-480-400	S7DGI	EMI-480-400	S7DGI	C3 / 2° / 100 m	●			
ADV200-WA-4-72500		EMI-480-600	S7DGL	EMI-480-400	S7DGI	C3 / 2° / 100 m	●			
ADV200-WA-4-73150		EMI-480-600	S7DGL	EMI-480-600	S7DGL	C3 / 2° / 100 m	●			
ADV200-WA-4-73550		EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
ADV200-WA-4-74000		EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
500 kW	ADV200-WA-72500-KXX-4-MS 05-...	EMI-480-600	S7DGL	EMI-480-400	S7DGI	C3 / 2° / 100 m	●			
	ADV200-WA-72500-XXX-4-SL-...	EMI-480-600	S7DGL	EMI-480-400	S7DGI	C3 / 2° / 100 m	●			
630 kW	ADV200-WA-73150-KXX-4-MS 06-...	EMI-480-600	S7DGL	EMI-480-600	S7DGL	C3 / 2° / 100 m	●			
	ADV200-WA-73150-XXX-4-SL-...	EMI-480-600	S7DGL	EMI-480-600	S7DGL	C3 / 2° / 100 m	●			
710 kW	ADV200-WA-73550-KXX-4-MS 07-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
	ADV200-WA-73550-XXX-4-SL-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
800 kW	ADV200-WA-74000-KXX-4-MS 08-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
	ADV200-WA-74000-XXX-4-SL-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
1000 kW	ADV200-WA-73550-KXX-4-MS 10-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
	ADV200-WA-73550-XXX-4-SL-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
	ADV200-WA-73550-XXX-4-SL-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
1200 kW	ADV200-WA-74000-KXX-4-MS 12-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
	ADV200-WA-74000-XXX-4-SL-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			
	ADV200-WA-74000-XXX-4-SL-...	EMI-480-800	S7DGM	EMI-480-800	S7DGM	C3 / 2° / 100 m	●			

Size	Light Duty		Heavy Duty		EN 61800-3 : Category / Environment / Length of motor cables	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
	Model	Code	Model	Code					
ADV200 WA-6 (Supply voltage 690 ±10%)									
ADV200-WA-6-5750	EMI-690-180	S7DGP	EMI-690-250	S7DGQ	C3 / 2° / 100 m			●	
ADV200-WA-6-6900	EMI-690-180	S7DGP	EMI-690-250	S7DGQ	C3 / 2° / 100 m			●	
ADV200-WA-6-61100	EMI-690-180	S7DGP	EMI-690-250	S7DGQ	C3 / 2° / 100 m			●	
ADV200-WA-6-61320	EMI-690-180	S7DGP	EMI-690-250	S7DGQ	C3 / 2° / 100 m			●	
ADV200-WA-6-72000	EMI-690-180	S7DGP	EMI-690-250	S7DGQ	C3 / 2° / 100 m			●	
ADV200-WA-6-72500	EMI-690-250	S7DGQ	EMI-690-320	S7DGR	C3 / 2° / 100 m			●	
ADV200-WA-6-73150	EMI-690-320	S7DGR	EMI-690-320	S7DGR	C3 / 2° / 100 m			●	
ADV200-WA-6-73550	EMI-690-320	S7DGR	EMI-690-400	S7EMI12	C3 / 2° / 100 m			●	
ADV200-WA-6-74000	EMI-690-400	S7EMI12	EMI-690-400	S7EMI12	C3 / 2° / 100 m			●	

6.4 Braking resistors

Suggested braking resistors for use with an internal braking unit.

Refer to the Gefran Accessories catalogue (Code 1S9I09) for resistor weights and dimensions.

Size	Model	Code	Max. overload 1" - service 10% Ebr (kJ)	Max. overload 30" - service 25% Ebr (kJ)	PBraking resistor power rating Pnbr (W)	Braking resistor value Rbr (Ω)	Housing	ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6-	ADV200 WA-6-DC
ADV200 WA											
ADV200-WA-.-1015	RF 220 T 100R	S8T0CE	1.5	11	220	100	IP44	●	●		
ADV200-WA-.-1022	RF 220 T 100R	S8T0CE	1.5	11	220	100	IP44	●	●		
ADV200-WA-.-1030	RF 300 DT 100R	S8T0CB	2.5	19	300	100	IP44	●	●		
ADV200-WA-.-1040	RF 300 DT 100R	S8T0CB	2.5	19	300	100	IP44	●	●		
ADV200-WA-.-1055	RFPD 750 DT 100R	S8SY4	7.5	38	750	100	IP44	●	●		
ADV200-WA-.-2075	RFPD 750 DT 68R	S8T0CD	7.5	38	750	68	IP44	●	●		
ADV200-WA-.-2110	RFPD 900 DT 68R	S8SY5	9	48	900	68	IP44	●	●		
ADV200-WA-.-2150	RFPD 1100 DT 40R	S8SY6	11	58	1100	40	IP44	●	●		
ADV200-WA-.-3185	RFPR 1900 D 28R	S8SZ5	19	75	1900	28	IP44	●	●		
ADV200-WA-.-3220	BRT4K0-15R4	S8T00G	40	150	4000	15.4	IP20	●	●		
ADV200-WA-.-3300	BRT4K0-15R4	S8T00G	40	150	4000	15.4	IP20	●	●		
ADV200-WA-.-4370	BRT4K0-11R6	S8T00H	40	150	4000	11.6	IP20	●	●		
ADV200-WA-.-4450	BRT4K0-11R6	S8T00H	40	150	4000	11.6	IP20	●	●		
ADV200-WA-.-4550	BRT8K0-7R7	S8T00I	40	150	8000	7.7	IP20	●	●		
ADV200-WA-.-5750	BRT8K0-7R7	S8T00I	40	150	8000	7.7	IP20	●	●		
≥ ADV200-WA-.-5900								(1)	(1)	(2)	(2)

(1) External braking unit (series BUy-..., optional), for information please contact the Gefran Sales Office.
(2) External braking unit (series BUy-....-6, optional), for information please contact the Gefran Sales Office.

6.5 Options

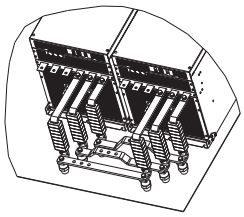
I/O expansion cards

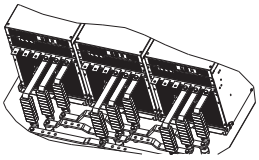
Code	Option	Description	ADV200 WA-4	ADV200 WA-DC	ADV200 WA-6
S526L	EXP-IO-D6A4R1-ADV	4 digital inputs / 2 digital outputs / 2 analog inputs / 2 analog outputs / 2 double contact relays	●	●	●
S5L38X	EXP-IO-D5R8-ADV	4 digital inputs/1 digital output/8 single contact (or 4 double contact, software programmable) relay outputs for cascade control of pumps	●	●	●
S5L37	EXP-IO-SENS-1000-ADV	3 analog inputs/2 analog outputs to acquire signals from PT1000, NI1000, 0-10 V, 0/4…20 mA, KTY84, PTC (motor overtemperature control only)	●	●	●
S5L40	EXP-IO-SENS-100-ADV	3 analog inputs/2 analog outputs to acquire signals from PT100, 0-10 V, 0/4…20 mA, KTY84, PTC (motor overtemperature control only)	●	●	●

Fieldbus expansion cards

S527L	EXP-CAN-ADV	Expansion card for CANopen ® and DeviceNet interface CANopen: - Transmission speed: up to 1 Mbit/s - Data frame: 1 SDO to access all drive parameters, 4 PDO of 4 I/O words for fast access - Bus address: 1...128 DeviceNet: - Transmission speed: 125, 250, 500 kbit/s - Bus address: 1...63 - Data frame: Explicit Messaging for access to all drive parameters, 16 Polling I/O words for fast access	●	●	●
S530L	EXP-PDP-ADV	Expansion card for Profibus_DP interface - Transmission speed 9.6 kbit/s ... 12 Mbit/s - Bus address: 1...125 - Data frame: configuration channel for access to all drive parameters; 16 I/O fast words for fast access - Support Sync and Freeze.	●	●	●
S5L29	EXP-ETH-GD-ADV200	Ethernet GD-net interface expansion card.	●	●	●
S5L09	EXP-ETH-CAT-ADV	EtherCAT interface expansion card.	●	●	●
S5L19	EXP-ETH-IP-ADV200	Ethernet IP interface expansion card	●	●	●
S7BB23	SBI_LonWorks	LonWorks interface expansion card	●	●	●
S7BB21	SBI_BACnet MS/TP	BACnet interface expansion card for MS/TP networks	●	●	●
S7BB22	SBI_BACnet/IP	BACnet interface expansion card for IP networks	●	●	●

Bus bar for parallel connection





See section 6.2.5 in the Appendix for further information

Code	Option	Description	ADV200 WA-4	ADV200 WA-DC	ADV200 WA-6
S72641	OUT-PW-KIT 2P	Bus bar for 2-bridge output power - Includes ferrite transformer	●		
S726412	OUT-PW-KIT 2P-690V				●
S726411	OUT-PW-KIT 3P	Bus bar for 3-bridge output power - Includes ferrite transformer	●		
S726413	OUT-PW-KIT 3P-690V				●

External Braking Unit

S9D55	BUy 1020	Braking unit for 230VAC...480VAC lines In= 20Arms, UL mark	●	●	
S9D56	BUy 1050	Braking unit for 230VAC...480VAC lines In= 50Arms, UL mark	●	●	
S9D57	BUy 1085	Braking unit for 230VAC...480VAC lines In= 85Arms, UL mark	●	●	
S9D30	BUy 1065-6	Braking unit for 690VAC line In= 65Arms			●

AC/DC power supply units

Code	Option	Description	ADV200 WA-4	ADV200 WA-DC	ADV200 WA-6
S9V73	SM32-480-185A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 185A Dimensions (L x H x d - mm): 311mm * 388mm * 270mm Weight: 18 kg		●	
S9V74	SM32-480-280A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 280A Dimensions (L x H x d - mm): 311mm * 388mm * 270mm Weight: 26 kg		●	
S9V75	SM32-480-420A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 420A Dimensions (L x H x d - mm): 311mm * 388mm * 270mm Weight: 30 kg		●	
S9V76	SM32-480-650A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 650A Dimensions (L x H x d - mm): 311mm * 388mm * 305mm Weight: 31 kg		●	
S9V72	SM32-480-1050A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 1,050A Dimensions (L x H x d - mm): 525mm * 554mm * 343mm Weight: 63 kg		●	
S9V71	SM32-480-1500A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 1,500A Dimensions (L x H x d - mm): 551mm * 686mm * 380mm Weight: 85 kg		●	
S9V63X	SM32-480-2000A	Semi-controlled AC/DC power supply unit (internal pre-loading) - In @ 480Vac = 2,000A Dimensions (L x H x d - mm): 500mm * 855mm * 420mm Weight: 75 kg		●	
S9V69	SM32-690-800	AC/DC power supply unit for power ratings of 500kW and 630kW Dimensions (L x H x d - mm [inches]): 500mm [19.69"] * 670mm [26.38"] * 400mm [15.75"] Weight: 49 kg [108.03 lbs]		●	
S9W20	SM32-690-1000A	AC/DC power supply unit for power ratings of 800kW Dimensions (L x H x d - mm [inches]): 500mm [19.69"] * 670mm [26.38"] * 400mm [15.75"] Weight: 49 kg [108.03 lbs]		●	
S9W21	SM32-690-1400A	AC/DC power supply unit for power ratings of 1200kW Dimensions (L x H x d - mm [inches]): 855mm [33.66"] * 670mm [26.38"] * 420mm [16.54"] Weight: 75 kg [165.35lbs]		●	

See the Gefran ADV200/AFE200 catalogue for the choice of AFE200 regenerative converter.

Connection via serial line

Various

Code	Option	Description	ADV200 WA-4	ADV200 WA-DC	ADV200 WA-6
S533L	OPT – RS485 – ADV	Optoisolator for RS485 for Multidrop connections	●	●	●
S50T6	Kit RS485 - PCI COM	Universal kit for RS485 serial line (PCI COM + connection cables)	●	●	●
S560T	PCI COM	Universal RS-232 / RS-485 serial interface	●	●	●
8S8F59	Shielded cable for PCI 485	RS-485 serial interface cable (L = 5 m)	●	●	●
S5A20	USB-RS232 CONVERTER	USB - RS232 serial protocol converter	●	●	●
S576L	PTC-D01	Interface for PTC sensor	●	●	●
S5TT0	KB-ADV Remoting Kit 5m	KB-ADV remoting kit with 5-metre cable	●	●	●
S5TT1	KB-ADV Remoting Kit 10m	KB-ADV remoting kit with 10-metre cable	●	●	●
8S860B	Parallel interface signal cable	Connection of parallel drive. L = 1 m. Two quick coupling male MDR connectors at the ends. Size 400...710kW = 1 cable Size 900-1000kW = 2 cables	●	●	
1S3A56	CD-ROM MDPlc	MDPlc development environment for ADV200	●	●	●
1S9002	CD-ROM Configurator	GF-eXpress + ADV200 Instruction manuals	●	●	●

GEFRAN SERVICE

➔ We guarantee each customer a high-quality, tailored service backed by a wealth of technical and professional expertise, which makes GEFRAN a reliable, flexible partner capable of providing specialised, global support.

“You can be assured that your plant will be backed by a wealth of professional expertise”

Our pre-sales support includes preliminary technical and commercial advice, with recommendations for professional and economically advantageous solutions. Our aim is to provide innovative products and solutions tailored to suit each individual requirement.

Installation and Start-up

Purchasing a GEFRAN product provides access to a global package of exclusive services.

GEFRAN has an international team of engineers who are specialised in the installation and commissioning of proprietary drives and control systems. Customers can always rely on fast, professional service and an efficient telephone support line.

After-sales Service

GEFRAN offers a highly professional after-sales service to customers worldwide.

Customers know they can rely on fast, worldwide support, limiting machine downtimes to a minimum without affecting production capacity.

Calendar of courses and education days

Training addresses internal technical and service personnel of the Gefran Group and system maintenance engineers, machine manufacturers and control system designers

- "Gefran Drive & Motion" training courses are intended to provide industrial automation sector operators with a basic grounding in SIEIDrive DC, AC and Servo-brushless drives.
- The courses are structured so that participants are able to acquire a general theoretical grounding in drives and include a detailed description of Gefran products covering theoretical/practical use of the drives.

Venue of courses

The courses are held at the Gefran S.p.A. production facility - Drive & Motion Control Unit in Gerenzano (Varese), Italy.

For foreign branches, training courses can be organised at other times, directly at the branch or Gefran distributors' facilities.

Education days (on demand)

In addition to scheduled courses, problems and specific aspects of SIEIDrive products can be examined during "Education" days.

These courses, dedicated exclusively to individual requirements, are available on request and must be defined directly with sales staff at Gefran S.p.A.

The duration of "Education" days may vary according to the issues that are dealt with.

Levels

Courses are normally based on three levels of difficulty: level 1 (basic); level 2 (high) and level 3 (advanced) mainly addressing MDPlc application developers.

Frequency and number of participants

The courses planned for 2010 envisage a minimum and maximum number of participants.

The frequency of the courses shown my be changed according to demand.

Reservations

To book a place on these courses, please call us on +39 02 967601 / +39 02 96760500. This service is available at the following times: 9.00 – 12.30 / 13.30 – 17.00 or send an e-mail to: marketing@gefran.com.

Gefran S.p.A. - Drive & Motion Control Unit will book overnight hotel accommodation.

After-sales Service

“ High-level performance, from the first day onwards ”

- Faults must be detected and repaired as soon as possible in order to guarantee continuous operation of industrial production systems.
- GEFRAN responds to this important requirement by offering a highly professional after-sales service to cover each step.

Telephone helpline

The Contact Centre helpline is available to deal with your requests and answer your technical queries.

The dedicated helpline operates from 8 am until 8 pm, from Monday to Saturday.

✆ +39 02 967 60428

Online assistance

GEFRAN also operates an online technical service.

We welcome enquiries from end users, installers and project designers. Contact us any time at technoHelp@gefran.com to receive immediate assistance in the form of technical or commercial advice.

ON-SITE assistance

With offices and service centres throughout the world, GEFRAN guarantees a prompt, reliable service to ensure continuous plant operation.

Repairs are carried out at our works or on-site by skilled technicians.

Inverter Warranty

GEFRAN guarantees the quality and functionality of its products when dispatched and will:

- ➔ replace faulty products with an equivalent or similar product

  or:

- ➔ repair, in good time, any parts that are found to be faulty during the warranty period.

3 years
Warranty

WARRANTY terms and conditions

Products to be replaced must be returned in their original packaging or in other adequate or equivalent packaging.

The customer will be responsible for the cost of forwarding the product to GEFRAN (Drive & Motion Control Unit - Gerenzano (Varese), Italy), while the latter will bear all costs relating to the materials and transport charges to replace all or part of the product.

In case of assistance provided by our technical staff, work may be performed at the GEFRAN facility.

For repairs carried out on-site at the customer's premises, GEFRAN guarantees assistance within 48 working hours following receipt of the written request.

Exclusion of WARRANTY

The warranty does not apply in the following cases, in which GEFRAN declines all responsibility:

- work, modifications or repairs carried out on the customer's own initiative
- use of the product other than for its intended purpose, incorrect use or installation under conditions other than those described in the user guide
- damage caused by foreign bodies (smoke, corrosive substances, etc.) or damage due to unforeseeable circumstances (lightning, overvoltage, damage caused by water, earthquake, fire, war, riots, etc.)
- damage during transportation or in any case occurring after the transfer of risk and damage resulting from incorrect packaging by the customer
- inadequate ventilation
- out-of-pocket expenses (travel, transport, board and lodging) incurred by technical staff in order to carry out repairs at the customer's premises are excluded.

Solutions

GEFRAN system technology

- GEFRAN applies its application experience to the design and development of specific automation systems for a broad range of industrial sectors.
- Innovative technological solutions based on an extensive range of process control products and 45 years of experience, acquired in working alongside leading sector operators.
- GEFRAN offers Drive Cabinet Solutions with the standard "**plug and play**" protocol or, upon request, in the "**clean power energy**" featuring the use of Active Front End regenerative power supply units with IGBT technology.
- "**Custom-built**" single or multiple-drive control systems to individual specifications and hardware and software system architecture for automation systems to control the very latest machines.

Configurations GEFRAN "Drive Cabinet":

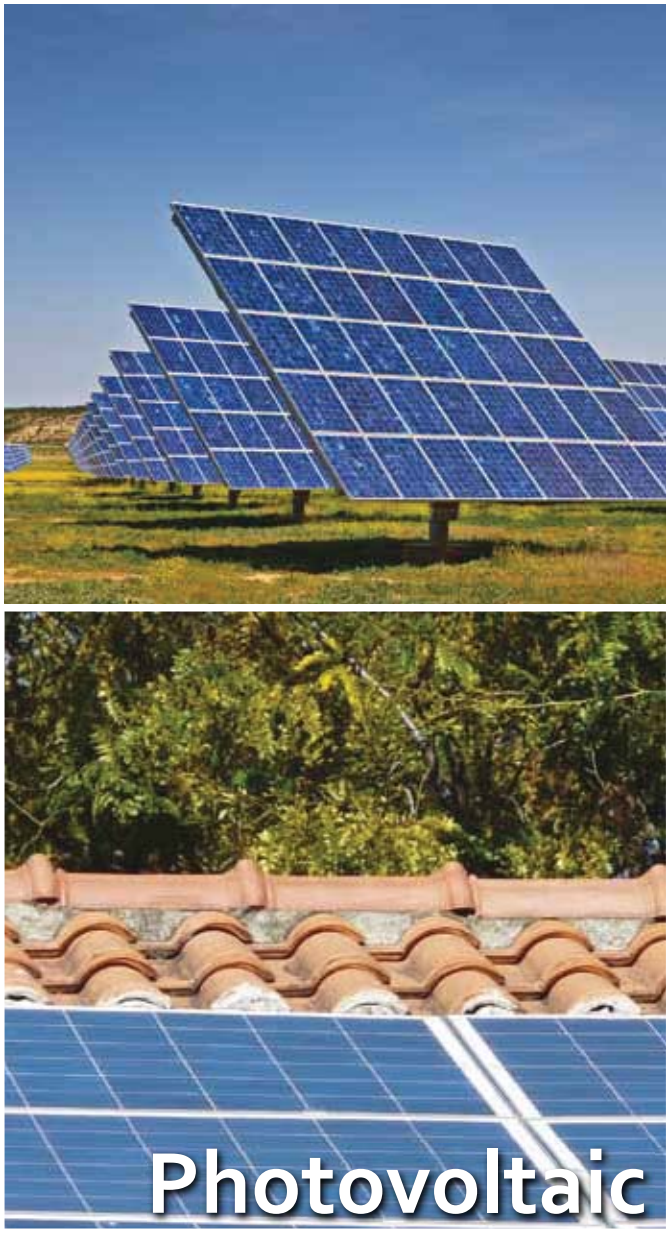
GEFRAN's Power Electronic Drive solutions have always been used with success in the various plastic processing industries.

GEFRAN has acquired a technological know-how in the control of all-electric and hybrid injection presses and of equipment used for blowing, extrusion, film processing, mixing, etc., to consolidate its undisputed leadership in terms of product and sector.

Metal - Sheet metal

GEFRAN's Power Electronic Drive platforms, used in sheet metal, metal wire and metal processing, guarantee system efficiency and offer energy-saving technology for high power industrial machinery.

With its technological products and dedicated application programs, GEFRAN develops complete control systems based on the highly specialised System Drive platform.



Photovoltaic

Photovoltaic production of electricity is now one of the most precise and widespread renewable energy technologies.

Ecologically sustainable systems achieve environmental advantages while also contributing to the global energy balance and offering interesting economic benefits for all business operators.

The GEFRAN **RADIUS** range of PV inverters represents the most advanced technology in the sector for controlling state-of-the-art industrial and civil PV plants.

Remarks :

If you have any suggestions that you think might help us to improve this catalogue, please do not hesitate to contact us at techdoc@gefran.com.

GEFRAN S.p.A. reserves the right to make changes and variations to products, data, dimensions at any time without the obligation of prior notice.

The data indicated are provided for the sole purpose of describing the product and must not be considered as legally binding characteristics.

Certificate No. FM 38167

Gefran S.p.A. (Drive & Motion Control Unit - Gerenzano VA), operates a Quality Management System which complies with the requirements of ISO 9001:2008

The company operates a ISO 9001:2008-certified quality system.
Our primary corporate goal is customer satisfaction: it is from this that mutual collaboration, maximum trust in the company and a consolidated long-standing partnership role stem.

Gefran ensures total support through its technical services (from design and start-up right up to onstream assistance), which are more highly specialised than those which large multisector companies are able to offer.
GEFRAN always meets the demands of high-tech users with the certainty of total quality.

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