

ADV200-LC LIQUID COOLED  
FIELD-ORIENTED VECTOR INVERTER



**GEFRAN**



With fifty years of experience, Gefran is the world's leading designer and producer of solutions for **measuring, controlling, and driving industrial production processes**.

We have branches in 14 countries and a network of over 80 worldwide distributors.

## QUALITY AND TECHNOLOGY

Gefran components are a **concentration of technology**, the result of constant research and of **cooperation with major research centers**.

This makes Gefran synonymous with quality and expertise in the design and production of:

- **sensors** for measuring main variables such as **temperature, pressure, position and force**
- **state-of-the-art components and solutions for indication and control**, satisfying demands for optimization of processes and intelligent management of energy consumption
- **automation platforms** of various complexities
- **electronic drives and electric motors** in AC and DC for all industrial automation, HVAC, water treatment and lift needs.

**Gefran's know-how and experience guarantee continuity and tangible solutions.**

## SERVICES

A team of Gefran experts works with each customer to select the ideal product for its application and to help install and configure devices ([technohelp@gefran.com](mailto:technohelp@gefran.com)).

Gefran offers a wide range of courses at different levels for the technical-commercial study of its product as well as specific courses *on demand*.



## APPLICATIONS



MINING



PLASTIC



TUNNEL DRILLING



PUMPING STATIONS

In addition to foreseeing the market's application needs, Gefran forms partnerships with its customers to find **the best way to optimise and boost the performance of various applications.**

Gefran products communicate with one another to provide integrated solutions, and can dialogue with devices by other companies thanks to compatibility with numerous fieldbuses.

CANopen

EtherCAT

GDNET  
Gefran Deterministic Network

DeviceNet

EtherNet/IP

Modbus

PROFI  
BUS

PROFI  
NET

PIV  
PROFIBUS - PROFINET

# DESCRIPTION



The ADV200-LC series is used in applications that demand robustness, long life, and maximum reliability.

Liquid cooling systems of electrical and mechanical units, widely used in plastic processing equipment, significantly reduces the size of the electrical drive.

Thanks to a very robust dissipation system, the ADV200-LC series supports the already available air-cooled line and integrates with great flexibility in existing systems.

## POWER RANGE

Models	Power (kW)															
	30	37	45	55	75	90	110	132	160	200	250	315	355	400	800	900
ADV200-LC-4	Size 4		Size 5			Size 6		Size 7			Size 8			Parallel size 8 (*)		

(\*) Inverters of over 800 kW comprise one master MASTER unit and one or more SLAVE units. Higher power ratings on request.

## DRIVE TYPE DESIGNATION

ADV200-LC	-X	XXX	-X	X	X	-X	XX	-SI	-E54
									<b>Version with mounting rear panel heat sink with IP54 protection rating</b>
									<b>Integrated "Safety STO" function</b>
									<b>Total power parallel drive, in kW:</b> 08 = 800.0 kW, 09 = 900.0 kW
									<b>Only for parallel versions:</b> MS = MASTER, SL = SLAVE
									<b>Rated voltage:</b> 4 = 400 Vac
									<b>Software:</b> X = standard
									<b>Braking unit:</b> R = included + integrated braking resistor X = not included B = included
									<b>Keypad:</b> X = not included; K = included
									<b>Drive power, in kW</b>
									<b>Mechanical drive sizes</b>
									<b>Drive ADV200-LC series</b>

## WEIGHTS AND DIMENSIONS



Sizes	Dimensions: Width x Height x Depth		Weight kg (lbs)	Weight (-E54) kg (lbs)
	mm	inches		
4300 ... 4450 (-E54)	200 x 570 x 286 (286 x 586 x 280)	7.87 x 22.44 x 11.26 (11.26 x 23.07 x 11.02)	30 (66)	32 (70.5)
5550 ... 5900 (-E54)	310 x 570 x 286 (396 x 593 x 280)	12.20 x 22.44 x 11.26 (15.6 x 23.35 x 11.02)	42 (92)	45 (99.2)
61100 ... 61320 (-E54)	310 x 920 x 270 (396 x 935.8 x 262.9)	12.20 x 36.22 x 10.63 (15.6 x 36.84 x 10.35)	60 (132)	64 (141.1)
71600 ... 72000 (-E54)	350 x 920 x 320 (436 x 936 x 312.9)	13.78 x 36.22 x 12.60 (17.16 x 36.85 x 12.32)	90 (198)	94.7 (208.8)
82500 ... 84000 (-E54)	358 x 1070 x 396.5 (436 x 1086 x 389.5)	14.09 x 42.12 x 15.61 (17.16 x 42.75 x 15.33)	90 (198)	96 (211.6)
(800 kW -E54)	(882 x 1086 x 389.5)	(34.72 x 42.75 x 15.33)	-	192 (423.2)
(900 kW -E54)	(1038 x 1086 x 389.5)	(51.88 x 42.75 x 15.33)	-	288 (634.8)

# GENERAL CHARACTERISTICS

<b>Power supply</b>	380 Vac -15% ... 500 Vac +5%, 50/60 Hz, ± 5%
<b>Connection to TT and TN networks</b>	yes, standard version
<b>Connection to IT networks</b>	yes, only with dedicated ADV200-LC...-IT version (on request).
<b>Power ratings</b>	30 ... 900kW, higher on request
<b>Maximum output voltage</b>	0.98 x Vin
<b>Maximum output frequency f2</b>	500Hz (sizes 4300 ... 72000), 200Hz (sizes 82500 ... 84000)
<b>Total harmonic distortion (THD)</b>	40% Light Duty, 50% Heavy Duty (at rated current)
<b>IGBT braking unit</b>	Models KBX: external standard with external resistor Models KRX: internal standard with integrated resistor Models KXX: not included; braking torque 150 % MAX;
<b>Overload (for Synchronous motor)</b>	Heavy Duty: 160 % x In (1' each 5'), 200 % x In (for 3") Light Duty: 110 % x In (1' each 5')
<b>Overload (for Asynchronous motor)</b>	Heavy Duty: 150 % x In (1' each 5'), 180 % x In (for 0.5") Light Duty: 110 % x In (1' each 5')
<b>Control mode</b>	Open-loop vector control Vector control with feedback Open loop V/f and V/f with feedback
<b>Integrated "Safety STO" function</b>	Compliant with SIL3 machine safety directive
<b>Optional cards</b>	Integration of up to 3 options onboard the drive
<b>Multi-language programming SW</b>	GF-eXpress (5 languages)
<b>PLC</b>	PLC with advanced IEC61131-3 programming environment
<b>Cooling liquid temperature</b>	0 ... 35°C (45°C with derating / -8°C ... 0°C with 20% Glycol)
<b>Flow Rate</b>	4...35 l/min, depending on drive size
<b>Fieldbus management</b>	DeviceNet, CANopen®, Modbus RTU, EtherCAT, GDnet, PROFIBUS, Ethernet IP, PROFINET

Precision		Control mode	Speed control precision (*)	Control Range
		<b>Asynch.</b>	FOC with feedback	± 0.01% motor speed rating
		Open-loop FOC	± 30% motor slip rating	1 : 100
		V/F	± 60% motor slip rating	1 : 30
	<b>Synch.</b>	FOC with feedback	± 0.01% motor speed rating	1 : 1500
		Open-loop FOC	± 0.1% motor speed rating	1 : 20

(\*) for standard 4-pole motor

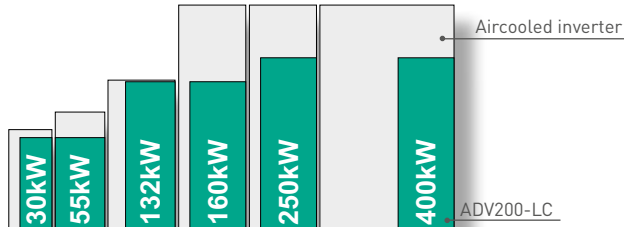
<b>Standard supply configuration</b>	Programming keypad	Integrated KB_ADV2
	Regulation	<ul style="list-style-type: none"> <li>• 2 bipolar analog inputs (Voltage/Current, KTY/PTC sensor)</li> <li>• 2 bipolar analog outputs (1: Voltage/Current, 1: Voltage)</li> <li>• 6 digital inputs (PNP/NPN)</li> <li>• 2 digital outputs (PNP/NPN)</li> <li>• 2 relay outputs, single contact</li> <li>• RS485 serial line (Modbus RTU)</li> </ul>
	Power	<ul style="list-style-type: none"> <li>• Integrated choke DC side (up to 200 kW). External choke inductance mandatory for higher powers.</li> <li>• Integrated mains filter (depending on environment, category C3, with max. 20 meters of shielded motor cable.</li> <li>• Up to 50 meters for sizes 5 and higher</li> <li>• Integrated dynamic braking module (up to 90kW)</li> </ul>
	Reference resolution	<ul style="list-style-type: none"> <li>• Digital = 15bit + sign</li> <li>• Analog input = 11-bit + sign</li> <li>• Analog output = 11-bit + sign</li> </ul>
<b>Conformity</b>	EMC Compatibility	EN61800-3 (EMC conducted: immunity and emissions) Immunity: environment 2, EN12016 Conducted emission: environment 2, categories C2 and C3, EN12015 Radiated emission: determined by cabinet of final application
	Safety standards	Electrical safety: LVD: IEC/EN 61800-5-1; UL: 508C Functional safety: EN 61800-5-2; SIL 3; ISO EN 13849-1, PL "e"
<b>Environmental conditions</b>	Climatic conditions	EN 60721-3-3
	Ambient temperature	-10°C ... +50°C (+14°F...+122°F)
	Altitude	Max 3000 m. (up to 1000 m without derating)
<b>Markings</b>		Complies with the EC directive concerning low voltage equipment (Directive LVD 2014/35/EU, EMC 2014/30/EU, RoHs 2011/65/EU)
		UL, cULus (*). Complies with directives for the American and Canadian markets.

(\*) Sizes 4300 to 84000, parallel excluded.

# GENERAL CHARACTERISTICS

## COMPACT

Considerably smaller than an aircooled inverter.



## INTEGRATED FILTER AND CHOKE

EMC filter standard for entire series, integrated choke up to 200 kW.



## BACK-UP SUPPLY

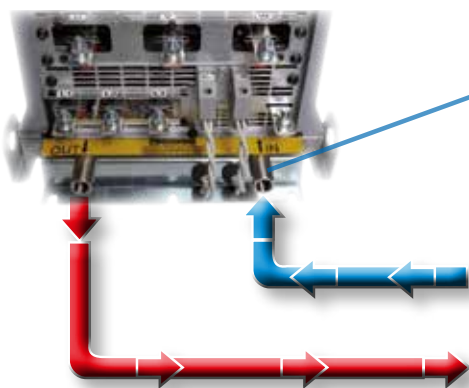
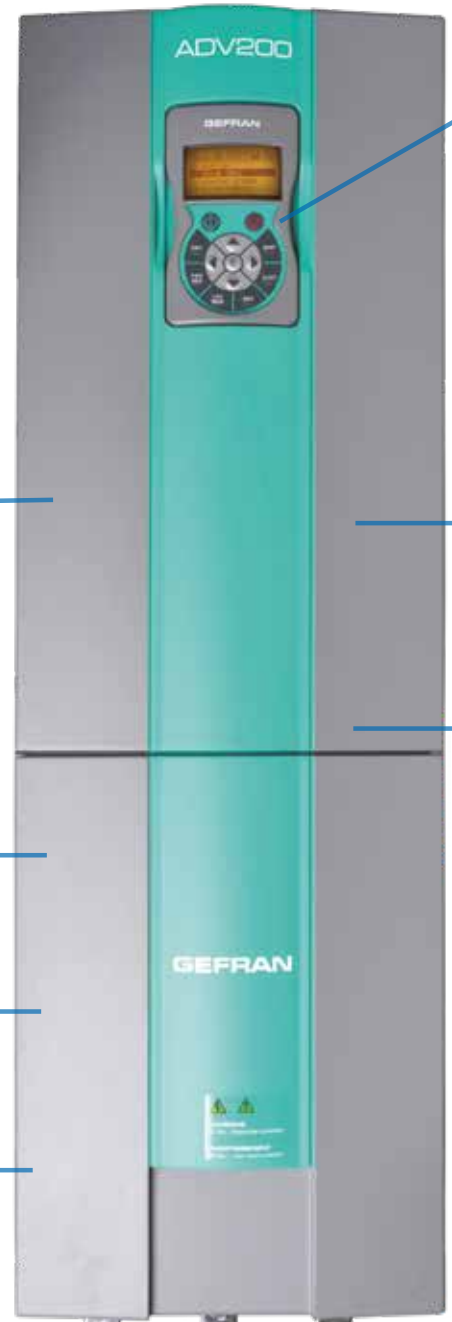
ADV200 can be supplied through an external +24Vdc supply in order to be kept active in case of mains input loss, ensuring in this situation the operation of all monitoring functions, programming and any connected fieldbus network.

## SMART CONNECTIONS

Dedicated accessories and fully removable terminals, ensure simple and fast installation and start-up in compliance with the EMC normative.

## FAST ACCESS

Structured to offer simple and fast management of the product in any situation of installation and mounting. From the terminal access to the rack assembling of the options, each operation is quick and easy.



## LIQUID COOLING

Heatsink with an innovative cooling system.

Liquid cooling provides perfect heat dissipation and optimizes the drive in the electrical panel.

Wide cooling liquid temperature range (up to +45 ° C).

# ADV200-LC LIQUID COOLED FIELD-ORIENTED VECTOR INVERTER

## PROGRAMMING KEYPAD

- > 4 lines display for 21 characters
- > Clear alphanumeric text
- > Full information of any parameters
- > Fast Navigating Keys
- > Key for displaying the last 10 parameters that have been changed
- > DISP key for rapid display of operating parameters
- > Upload - Download and storage of 5 complete sets of drive parameters
- > Remotable up to 10 meters



## CORROSION PROTECTION

Excellent corrosion protection with aluminium cooling pipes, stainless steel connectors and internal separation of electronics and cooling liquid.

## BRAKING RESISTOR

Braking resistor installed directly on heatsink (for sizes up to 55kW).

Connection with external high power resistor is possible.



## PROGRAMMABLE ANTI-CONDENSATION FUNCTION

Real-time measurement of absolute air humidity (through an integrated sensor). Detection of the drive internal air temperature with indication of the coolant temperature.

## REDUCED NOISE & ENERGY SAVING

No internal fan ventilation on power part.  
Less noise during system functioning.

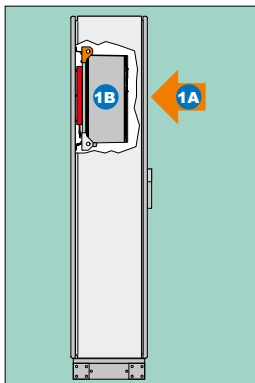
Sizes	Internal braking resistor					
	Type	Code	Total Rbr [ohm]	Resistor power [W]	Enclosure	Q.ty
ADV200-LC-4300-KRX	SRF 1K0 12R	S8T1DE	12	1000	IP54	1
ADV200-LC-4370-KRX	SRF 1K0 12R	S8T1DE	12	1000	IP54	1
ADV200-LC-4450-KRX	SRF 1K0 8R	S8T1DD	8	1000	IP54	1
ADV200-LC-5550-KRX	SRF 1K0 12R	S8T1DE	6	2000	IP54	2
Sizes	External braking resistor					
ADV200-LC-4300-KBX	BRT4K0-11R6	S8T00H	11.6	4000	IP20	1
ADV200-LC-4370-KBX	BR T8K0-7R7	S8T00I	7.7	8000	IP20	1
ADV200-LC-4450-KBX	BR T8K0-7R7	S8T00I	7.7	8000	IP20	1
ADV200-LC-5750-KBX	BRT8K0-9R2	S8T00Q	4.6	16000	IP20	2
ADV200-LC-5900-KBX	BR T8K0-7R7	S8T00I	3.85	16000	IP20	2

## ASSEMBLY

ADV200-LC offers a simple and versatile mechanical solution for installing the drive inside or outside the panel and for positioning the internal or IP54 external heatsink.

### 1) Internal heatsink and insertion from inside:

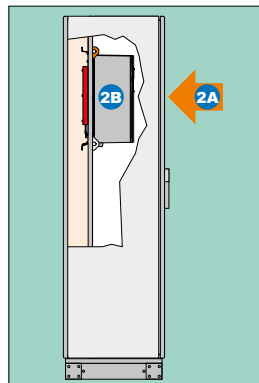
ADV200-LC inverter (1B) is inserted in cabinet (1A) using standard eyebolts; heatsink is inside panel (1B).



### 2) External heatsink and insertion from inside:

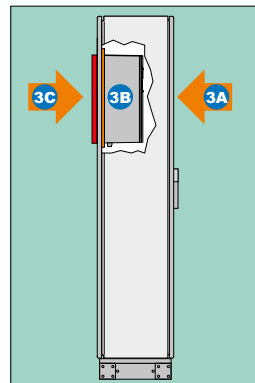
ADV200-LC is inserted in cabinet (2A) using standard eyebolts; heatsink is separated from the internal section of the panel (2B).

Use additional brackets A and B for fastening (Kit Brackets Accessory).



### 3) External heatsink and insertion from inside/outside (IP54):

ADV200-LC-...-E54 inverter (3B) is inserted in cabinet (3A/3C); heatsink is outside panel.



Brackets A and B

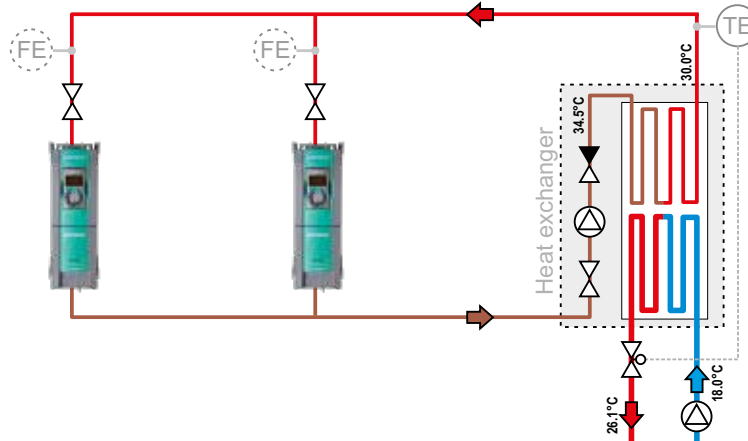


# COOLING SYSTEM

There are two types of circulation systems:

- **Open system:** has no pressure and allows free contact with air.
- **Closed system (recommended):** an Heat Exchanger is used. The circuit is completely air-tight and there is pressure in the pipes. The pipes must be in metal or in specific plastic or rubber with an oxygen barrier.

Gefran advises you to equip the cooling system with flow (FE) and pressure control and a monitor PH.



Closed circuit cooling system (example)

## SPECIFICATIONS OF COOLANT AND ITS CIRCULATION

Sizes	Water temperature at input [°C]	Cooling agents	Cooling liquid temperature	Nominal liquid flow (1) [l/min]	Max. liquid flow [l/min]	Liquid volume [cm <sup>3</sup> ]	Pressure drop plate (2) [mBar]	Maximum pressure [Bar]	Connection System
4300	0°C ... +35°C (+32°F ... 95°F), 35°C ... 45°C (+95°F ... 113°F) with derating (1.5% each degree higher); Condensation not allowed	Drinking water or Water-Glycol mixture or Demineralized water	0 ... 35°C (45°C with derating / -8°C ... 0°C with 20% Glycol)	6	15	190	290	6	3/8 G female
4370				7	15	190	290	6	3/8 G female
4450				8	15	190	290	6	3/8 G female
5550				8	15	332	510	6	3/8 G female
5750				9	15	332	510	6	3/8 G female
5900				10	15	332	510	6	3/8 G female
61100				11	20	405	755	6	3/8 G female
61320				12	20	405	755	6	3/8 G female
71600				24	27	600	1750	6	3/8 G female
72000				25	27	600	1750	6	3/8 G female
82500				30	35	1085	1630	6	1/2 G female
83150				30	35	1085	1630	6	1/2 G female
83550				30	35	1085	1630	6	1/2 G female
84000				30	35	1085	1630	6	1/2 G female

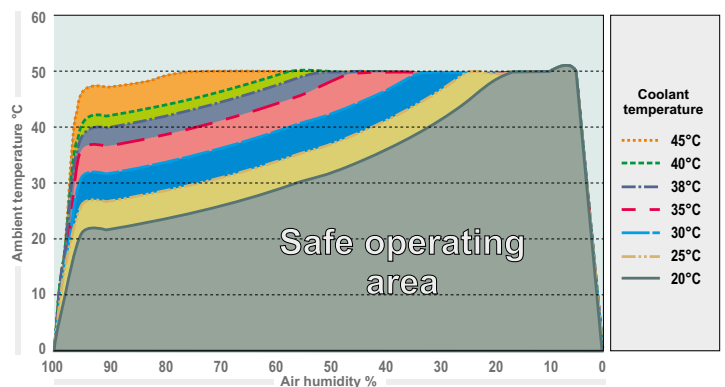
(1) Water/Glycol mixture 80:20

(2) At nominal flow, connectors excluded

## CONDENSATION, SAFE OPERATING AREA

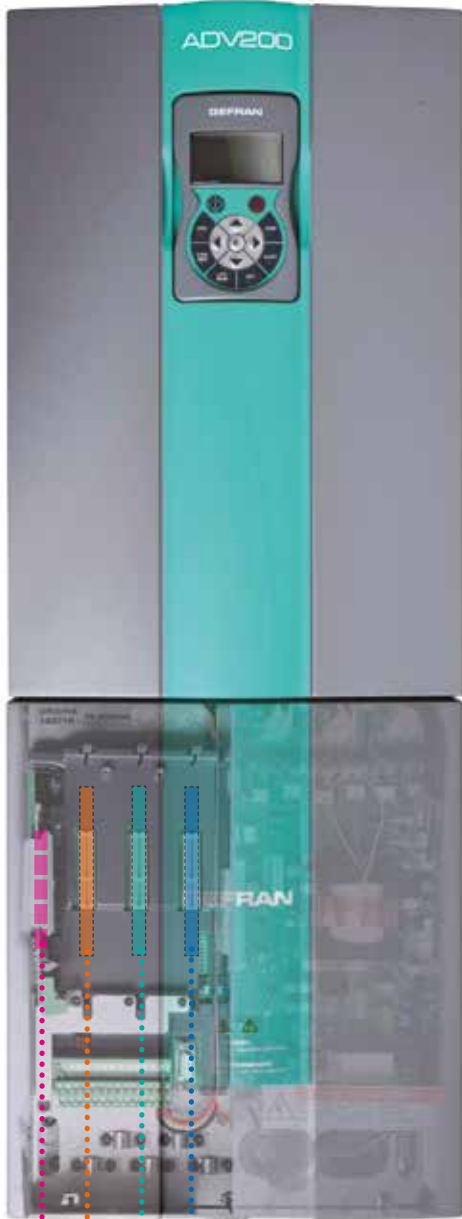
Use the graph on side to calculate whether operating conditions (combination of ambient temperature, humidity and cooling liquid temperature) are safe, or to choose the allowed cooling liquid temperature.

Safe conditions are obtained when the work point is under the respective curve. Otherwise, you have to take adequate precautions to lower the ambient temperature and/or the relative humidity or to raise the cooling liquid temperature.





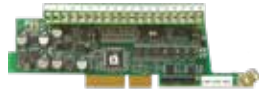
# OPTIONS AND ACCESSORIES



## OPTION CARDS

All of the options available for the ADV200 series can be used. 3 optional cards can be managed simultaneously:

### > Encoder interface



Option	Code	Description
EXP-DE-I1R1F2-ADV	S5L30	TTL/HTL digital incremental encoder expansion card 1 encoder input - 1 encoder output - 2 freeze channels
EXP-DE-I2R1F2-ADV	S5L35	TTL/HTL digital incremental encoder expansion card 2 encoder inputs - 1 encoder output - 2 freeze channels
EXP-SE-I1R1F2-ADV	S5L31	Sinusoidal incremental encoder expansion card 1 encoder input - 1 encoder output - 2 freeze channels
EXP-SESC-I1R1F2-ADV	S5L32	Sincos incremental encoder expansion card 1 encoder input - 1 encoder output - 2 freeze channels
EXP-EN/SSI-I1R1F2-ADV	S5L33	Absolute EnDat/SSI encoder expansion card 1 encoder input - 1 encoder output - 2 freeze channels
EXP-HIP-I1R1F2-ADV	S5L34	Absolute Hiperface encoder expansion card 1 encoder input - 1 encoder output - 2 freeze channels
EXP-ASC-I1-ADV	S5L42	Absolute SinCos expansion card 1 encoder input
EXP-RES-I1R1-ADV	S5L43	Resolver expansion card 1 Resolver input - 1 Resolver repetition output

### > Fieldbus interface



EXP-CAN-ADV	S527L	Expansion card for CANopen ® and DeviceNet interface
EXP-PDP-ADV	S530L	Expansion card for Profibus_DP interface
EXP-ETH-GD-ADV200	S5L29	Ethernet GD-net interface expansion card
EXP-ETH-CAT-ADV200	S5L09	EtherCAT interface expansion card
EXP-ETH-IP-ADV200	S5L19	Ethernet IP interface expansion card
EXP-ETH-PN-ADV	S5L60	Profinet interface expansion card

### > I/O expansions



EXP-IO-D5R8-ADV	S5L38	4 digital inputs / 1 digital output / 8 relay output
EXP-IO-D6A4R1-ADV	S526L	4 digital inputs / 2 digital outputs / 2 analog inputs / 2 analog outputs / 2 double contact relays
EXP-FL-XCAN-ADV	S5L41	Master CAN controller and Fast Link interface
EXP-IO-SENS-100-ADV	S5L40	To acquire signals from PT100 (PT1000), (NI1000), 0-10V, 0/4...20mA, KTY84, PTC
EXP-IO-SENS-1000-ADV	S5L37	



### Integrated "Safety STO" function (-SI models)

The function allows the motor to be disabled without the use of a safety contactor on the drive output. It guarantees compliance with the machine safety directive and meets the following standards:

- > PL=e under EN ISO 13849-1
- > SIL 3 under IEC 61508
- > EN 954-1 Cat. 3.

### Serial Line

Integrated standard RS485 serial line with **Modbus RTU** protocol, for peer-to-peer or multidrop connections (with **OPT-485-ADV** card).

### Modbus

- ... SLOT 1: I/O expansions
- ... SLOT 2: Encoder interface and I/O exp. cards
- ... SLOT 3: Fieldbus and I/O expansions cards
- ... Integrated "Safety STO" function (-SI models)

## ACCESSORIES



Identification	Code	Description
Fast coupling connection kit sizes 4-5-6-7	S728942	The kit consists of Hose barb rapid (no.2) and Rapid connection thread "no leakage" (no.2), inox 303.
Fast coupling connection kit size 8	S728943	



Extension tube sizes 4-5-6	S728952	The kit consists of no.2 extension tubes with male and female swivel connections, inox 303, length 1.5 mt
Extension tube size 7	S728954	
Extension tube size 8	S728955	

Identification	Code	Description
Bracket kit size 4	S728961	The kit consist of no.2 fixing brackets and a series of bolts (no. 2 M10 x 20mm + no. 4 M6 x 20mm) for mounting the inverter in cabinet as indicated on page 7.
Bracket kit sizes 5 - 6	S728962	
Bracket kit size 7	S728964	
Bracket kit size 8	S728965	



# ADV200-LC • CHOOSING THE INVERTER

The combinations of motor power ratings and inverters listed in the table shows 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 (see drive instruction manual).

## INPUT DATA

Sizes	AC input current for continuous operation I <sup>(1)</sup>		DC Input voltage <sup>(1)</sup>		
	Heavy Duty (150% overload)	Light Duty (110% overload)	Input voltage [Arms]	DC input current (2)	
	[Arms]	[Arms]		[Arms]	[Arms]
4300	53	64	450 - 750 Vdc	65	80
4370	64	74		80	90
4450	74	89		90	125
5550	100	143		125	175
5750	143	171		175	210
5900	171	200		210	240
61100	200	238		240	290
61320	238	285		290	350
71600	300	350		370	430X
72000	350	420		430	510
82500	420	580		510	710
83150	580	640		710	780
83550	640	710		780	850
84000	770	900		940	900
800 kW	1510	1710		1840	2090
900 kW	1650	1800		2130	2340

[1] Cosphi motor 0,9 @ 400 VAC

[2] RMS input current in case of power from 6 impulse bridge.

## OUTPUT DATA

Sizes	Inverter Output		P <sub>n</sub> mot (Recommended asynchronous motor rating, fsw = default)			
	Heavy Duty	Light Duty	Heavy Duty		Light Duty	
	[kVA]	[kVA]	@400 Vac [kW]	@460 Vac [Hp]	@400 Vac [kW]	@460 Vac [Hp]
4300	43	52	30	40	37	50
4370	52	60	37	50	45	60
4450	60	73	45	60	55	75
5550	73	104	55	75	75	100
5750	104	125	75	100	90	125
5900	125	145	90	125	110	150
61100	145	173	110	150	132	175
61320	173	208	132	175	160	200
71600	208	267	160	200	200	250
72000	267	319	200	250	250	300
82500	319	409	250	300	315	400
83150	409	450	315	400	355	450
83550	450	506	355	450	400	500
84000	506	603	400	500	500	650
800 kW	956	1109	800	1000	900	1200
900 kW	1108	1247	900	1200	1000	1300

# ADV200-LC LIQUID COOLED FIELD-ORIENTED VECTOR INVERTER

## OUTPUT DATA

Sizes	Rated output current I <sub>n</sub> (For Asynchronous motors)				Rated output current I <sub>n</sub> (For Synchronous motors)			
	Ø400 Vac		Ø460 Vac		Ø400 Vac		Ø460 Vac	
	Heavy Duty	Light Duty	Heavy Duty	Light Duty	Heavy Duty	Light Duty	Heavy Duty	Light Duty
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
4300	62	75	55.8	67.5	56	68	50.4	61.2
4370	75	87	67.5	78.3	68	78	61.2	70.2
4450	87	105	78	94.5	78	95	70.2	85.5
5550	105	150	94.5	135	95	135	85.5	121.5
5750	150	180	135	162	135	162	122	146
5900	180	210	162	189	162	189	146	170
61100	210	250	189	225	189	225	170	203
61320	250	300	225	270	225	270	203	243
71600	300	385	270	347	270	347	243	312
72000	385	460	347	414	347	414	312	373
82500	460	590	414	531	414	531	373	469
83150	590	650	531	585	531	585	469	527
83550	650	730	585	657	585	657	527	591
84000	730	870	657	783	657	783	591	705
800 kW	1380	1600	1242	1440	1242	1440	1118	1296
900 kW	1600	1800	1440	1620	1440	1620	1296	1458

Sizes	Switching frequency f <sub>sw</sub>		Reduction factor								
	Default	Higher	K <sub>v</sub> (1)	K <sub>TL</sub> (2)	K <sub>ALT</sub> (3)	K <sub>f</sub> (4)					
						2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz
4300	4	6, 8, 10, 12	0.9	1.5	1.2	1	1	0.85	0.7	0.6	0.5
4370	4	6, 8, 10, 12	0.9	1.5	1.2	1	1	0.85	0.7	0.6	0.5
4450	4	6, 8, 10, 12	0.9	1.5	1.2	1	1	0.85	0.7	0.6	0.5
5550	4	6, 8	0.9	1.5	1.2	1	1	0.85	0.7	0	0
5750	4	6, 8	0.9	1.5	1.2	1	1	0.85	0.7	0	0
5900	4	6, 8	0.9	1.5	1.2	1	1	0.85	0.7	0	0
61100	4	6, 8	0.9	1.5	1.2	1	1	0.85	0.7	0	0
61320	4	6, 8	0.9	1.5	1.2	1	1	0.85	0.7	0	0
71600	4	-	0.9	1.5	1.2	1	1	0	0	0	0
72000	4	-	0.9	1.5	1.2	1	1	0	0	0	0
82500	4	-	0.9	1.5	1.2	1	1	0	0	0	0
83150	4	-	0.9	1.5	1.2	1	1	0	0	0	0
83550	4	-	0.9	1.5	1.2	1	1	0	0	0	0
84000	4	-	0.9	1.5	1.2	1	1	0	0	0	0
800 kW	4	-	0.9	1.5	1.2	1	1	0	0	0	0
900 kW	4	-	0.9	1.5	1.2	1	1	0	0	0	0

(1) K<sub>v</sub> : Derating factor for mains voltage at 460Vac or AFE200 power supply.

(2) K<sub>TL</sub> : Derating factor for water temperature >35°C. Value to be applied = 1.5% at each centigrade degree increase above 35°C (up to a maximum of 45°C).

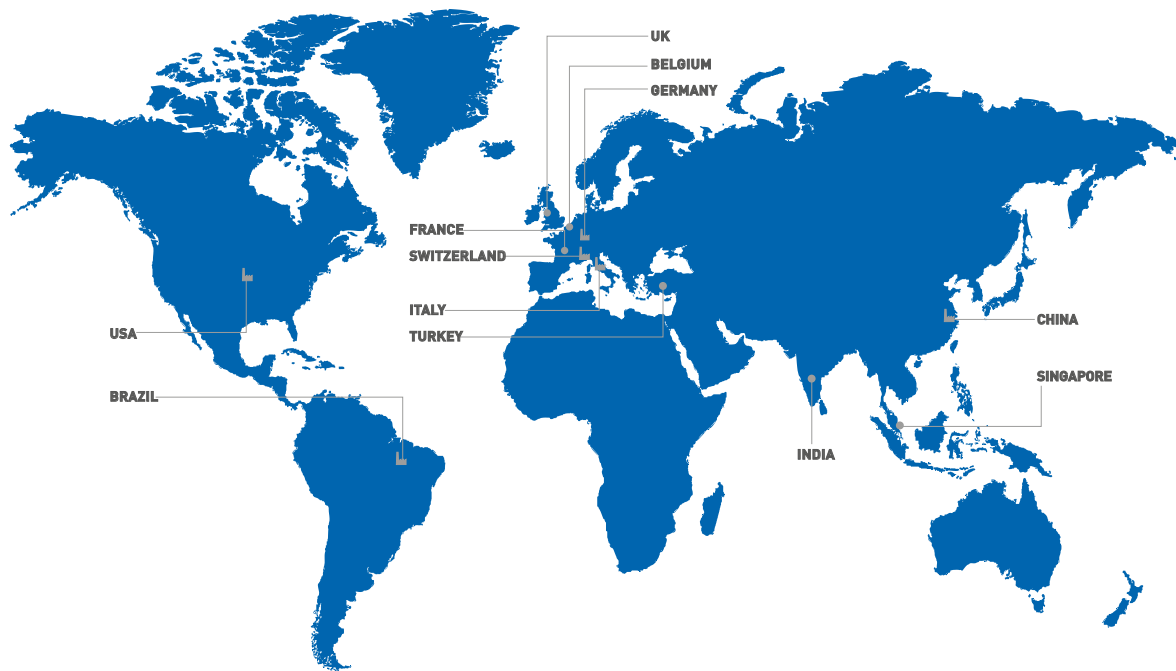
For example: water temperature = 40°C, K<sub>TL</sub> = 1.5% \* (40 - 35) = 7.5% of derating; I<sub>n</sub> derated = 100 - ((7.5\*100)/100) = 92.5% I<sub>n</sub>

(3) K<sub>ALT</sub> : 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 3000 m).

For example: Altitude 2000 m, K<sub>ALT</sub> = 1.2% \* 10 = 12% derating;

I<sub>n</sub> derated = 100 - ((12\*100)/100) = 88 % I<sub>n</sub>

(4) K<sub>f</sub> : Derating factor for higher switching frequency.



#### GEFRAN DEUTSCHLAND GmbH

Philipp-Reis-Straße 9a  
D-63500  
Seligenstadt  
Ph. +49 (0) 61828090  
Fax +49 (0) 6182809222  
vertrieb@gefran.de

#### SIEI AREG - GERMANY

Gottlieb-Daimler Strasse 17/3  
D-74385  
Pleidelsheim  
Ph. +49 (0) 7144 897360  
Fax +49 (0) 7144 8973697  
info@sieiareg.de

#### SENSORMATE AG

Steigweg 8,  
CH-8355 Aadorf, Switzerland  
Ph. +41(0)52-2421818  
Fax +41(0)52-3661884  
http://www.sensormate.ch

#### GEFRAN FRANCE SA

PARC TECHNOLAND  
Bâtiment K - ZI Champ Dolin  
3 Allée des Abruzzes  
69800 Saint-Priest  
Ph. +33 (0) 478770300  
Fax +33 (0) 478770320  
commercial@gefran.fr

#### GEFRAN BENELUX NV

ENA 23 Zone 3, nr. 3910  
Lammerdries-Zuid 14A  
B-2250 OLEN  
Ph. +32 (0) 14248181  
Fax +32 (0) 14248180  
info@gefran.be

#### GEFRAN UK Ltd

Clarendon Court  
Winwick Quay  
Warrington  
WA2 8QP  
Ph. +44 (0) 8452 604555  
Fax +44 (0) 8452 604556  
sales@gefran.co.uk

#### GEFRAN MIDDLE EAST ELEKTRIK VE ELEKTRONIK San. ve Tic. Ltd. Sti

Yesilkoy Mah. Ataturk  
Cad. No: 12/1 B1 Blok K:12  
D: 389 Bakirkoy /Istanbul TURKIYE  
Ph. +90212 465 91 21  
Fax +90212 465 91 22

#### GEFRAN SIEI Drives Technology Co., Ltd

No. 1285, Beihe Road, Jiading  
District, Shanghai,  
China 201807  
Ph. +86 21 69169898  
Fax +86 21 69169333  
info@gefran.com.cn

#### GEFRAN SIEI - ASIA

31 Ubi Road 1  
#02-07,  
Aztech Building,  
Singapore 408694  
Ph. +65 6 8418300  
Fax +65 6 7428300  
info@gefran.com.sg

#### GEFRAN INDIA

Survey No. 191/A/1,  
Chinchwad Station Road,  
Chinchwad,  
Pune-411033, Maharashtra  
Ph. +91 20 6614 6500  
Fax +91 20 6614 6501  
gefran.india@gefran.in

#### GEFRAN Inc.

8 Lowell Avenue  
WINCHESTER - MA 01890  
Toll Free 1-888-888-4474  
Fax +1 (781) 7291468  
info.us@gefran.com

#### GEFRAN BRASIL ELETRÔELETRÔNICA

Avenida Dr. Altino Arantes,  
377 Vila Clementino  
04042-032 SÃO PAULO - SP  
Ph. +55 (0) 1155851133  
Fax +55 (0) 1132974012  
comercial@gefran.com.br

#### GEFRAN HEADQUARTER

Via Sebina, 74  
25050 PROVAGLIO D'ISEO (BS) ITALY  
Ph. +39 03098881  
Fax +39 0309839063

#### GEFRAN DRIVES AND MOTION S.R.L.

Via Carducci, 24  
21040 GERENZANO (VA) ITALY  
Ph. +39 02967601  
Fax +39 029682653  
info.motion@gefran.com  
Technical Assistance:  
technohelp@gefran.com  
Customer Service  
salesmotion@gefran.com



[www.gefran.com](http://www.gefran.com)

# GEFRAN