

ADV200 AC DRIVE FAMILY REGENERATIVE & DC POWER SUPPLY UNITS



GEFRAV



Gefran, With forty 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).

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



PLASTIC



METAL



TEXTILE



INDUSTRIAL HOISTING



TEST BENCHES



MATERIAL HANDLING



CONVEYORS



MATERIAL RECYCLING MACHINERY



MIXER / HIGH DYNAMICS CENTRIFUGEE

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.



ADV200 • DESCRIPTION



The new inverter series “**ADV200**” represents an innovative concept in drive technology, as a result of the constant technological research and of the experience that the Gefran Group has acquired keeping a constant presence aside that of the major sector players.

The new range has been engineered and developed to satisfy the real needs of System Integrators and OEM's in order to provide them the best innovations and economical competitiveness in the international markets. Based on full mechanical modularity and on a powerful, intuitive and “fully open” programming platform, **ADV200** offers absolute integration flexibility with high-end performance in any system architectures of the most advanced automation environments.



The ADV200 are also available in a range of panel-mounted configurations. It is designed as a compact, ready-for-use solution fully compatible with the maximum operating conditions of the drive.

Panels are available with power ratings from 90 kW to 1.65 MW with standard input bridge or the “Active Front End” solution, in two main versions Ready to use and Basic.

POWER RANGE

Models	Power (kW)																														
	0.75	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	900	1000	1350
ADV200-4	Size 1					Size 2			Size 3			Size 4			Size 5		Size 6		Size 7			Parallel size 7 (*)									
ADV200-DC										Size 3			Size 4			Size 5		Size 6		Size 7			Parallel size 7 (*)								
ADV200-6																S.5		Size 6		Size 7			Parallel size 7 (*)								

Higher power ratings on request.

(*) Inverters of over 400 kW comprise one master MASTER unit and one or more SLAVE units..

GENERAL CHARACTERISTICS

Power supply	ADV200-4: 3 x 380Vac -15% ... 500Vac +5%; 50-60 Hz $\pm$ 5% ADV200-4/4A-DC: 450...750Vdc; ADV200-6/6A-DC: 840 ... 1120Vdc (5750 ... 61320); 600 ... 1120Vdc ($\geq$ 71600). ADV200-6: 3 x 690Vac $\pm$ 10%; 50-60 Hz $\pm$ 5% (5750 ... 61320), 3 x 500...690Vac $\pm$ 10%; 50-60 Hz $\pm$ 5% (71600 ... 1.65MW)		
Power ratings	ADV200-4: from 0.75kW to 1.0MW	ADV200-DC: from 18.5kW to 1.65MW	ADV200-6: from 75kW to 1.65MW
Maximum output voltage	0,98 x Vin		
Maximum output frequency f2	500Hz (1007 ... 72000), 200Hz (72500 ... 1650kW)		
IGBT braking unit	Sizes 1007 ... 5550: Internal (with external resistor); braking torque 150 % MAX Sizes $\geq$ 5750: External optional (BUy series)		
Overload (for Synchronous motor)	ADV200-4, ADV200-4-DC, ADV200-6-DC: Heavy Duty: 160 % x In (1' each 5'), 200 % x In (for 3"). Light Duty: 110 % x In (1' each 5'). ADV200-6 (5750 ... 6110) Heavy Duty: 150 % x In (1' each 5'), 200 % x In (for 3"). Light Duty: n.d. ADV200-6 (72000 ... 1.65MW) Heavy Duty: 160 % x In (1' each 5'), 200 % x In (for 3"). Light Duty: 110 % x In (for 60").		
Overload (for Asynchronous motor)	ADV200-4, ADV200-4-DC, ADV200-6-DC Heavy Duty: 150 % x In (1' each 5'), 180 % x In (for 0.5"). Light Duty: 110 % x In (1' each 5'). ADV200-6 (5750 ... 6110) Heavy Duty: 136 % x In (for 60"), 183 % x In (for 0.5"). Light Duty: n.d. ADV200-6 (72000 ... 1.65MW) Heavy Duty: 150 % x In (for 60"), 180 % x In (for 0.5"). Light Duty: 110 % x In (for 60").		
Control mode	Open-loop vector control Vector control with feedback Open loop V/f and V/f with feedback		
Optional cards	Integration of up to 3 options onboard the drive "Safety STO" card compliant with SIL3 machine safety directive (for ADV200-...+SI models)		
Multi-language programming SW	GF-eXpress (5 languages)		
PLC	PLC with advanced IEC61131-3 programming environment		
Rated protection	IP20-rated protection (IP00 size 7 and parallel)		
Fieldbus management	DeviceNet, CANopen®, Modbus RTU, EtherCAT, Gdnet, PROFIBUS, Ethernet IP, PROFINET		

Precision	Control mode		
	Asynch.	Speed control precision (*)	
		Control Range	
		FOC with feedback	
		Open-loop FOC	

(*) for standard 4-pole motor

Standard supply configuration	Programming keypad	Integrated KB_ADV
	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 side (up to 132 kW) - Integrated mains filter - Integrated dynamic braking module (up to 55kW)
	Reference resolution	- Digital = 15bit + sign - Analog input = 11-bit + sign - Analog output = 11-bit + sign
Conformity	Immunity/Emissions	CEE - EN 61800-3
	Safety standards	EN 50178, EN 61800-5-1, UL508C, UL840 degree of pollution 2 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 derating)
Markings	CE	Complies with the EC directive concerning low voltage equipment (Directives LVD 2014/35/EU, EMC 2014/30/EU, RoHS 2011/65/EU)
	UL cULus	UL and cULus, Complies with directives for the American and Canadian markets (with power supply $\leq$ 600Vac)

GENERAL CHARACTERISTICS

MODULARITY

An innovative concept of integrated technology that offers full modularity. Mountable side by side and with accessories specifically dedicated to system solutions, **ADV200** has been engineered to make installation easy for any operator, both in existing systems and in specific machine solutions, always offering a real reduction of required space in the cabinet and the best manageability.



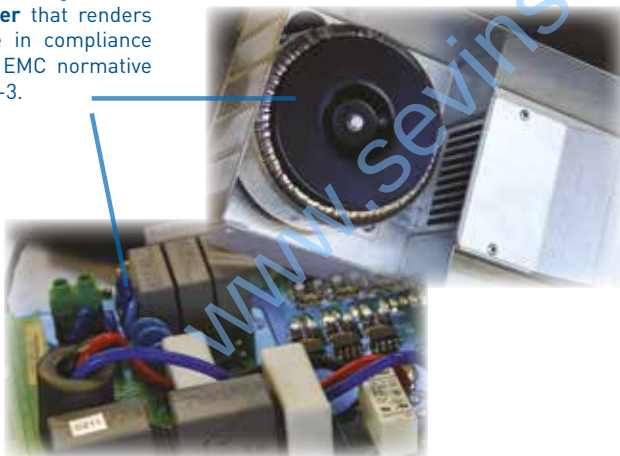
FAST ACCESS

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.

INTEGRATED QUALITY

ADV200 **integrates** the fundamental devices for an absolute quality level, such as the **DC choke** that ensures maximum reliability in any conditions of working and the **input filter** that renders the drive in compliance with the EMC normative EN61800-3.



PROGRAMMING KEYPAD

Structured with 2 setting modes Easy and Expert, to satisfy each level of user's skill and programming needs both for complex or easy installation.

A powerful platform but at the same time with a structure of menu/parameters that offers quick understanding, also facilitated by functionality of the keypad and the display.



Intuitive navigation and **easy start-up function** thanks to the **"Wizard"** tool.

ADV200 offers as standard **10 language** programming (English, Italian, French, German, Spanish, Polish, Romanian, Russian, Turkish and Portuguese).

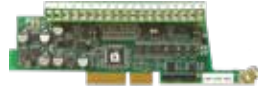
- 4 lines display for 21 characters
- Clear alphanumeric text
- Full information of any parameters
- Fast Navigating Keys
- Key for displaying the last 10 parameters that have been changed
- DISP key for rapid display of operating parameters
- Upload - Download and storage of 5 complete sets of drive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

ADV200 FIELD-ORIENTED VECTOR INVERTER

OPTIONS

ADV200 manages up to 3 option cards:

> 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-DSR8-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	

SAFETY CARD

Integrated on board the drive as the 4th option, the **EXP- SFTy** card 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).

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.

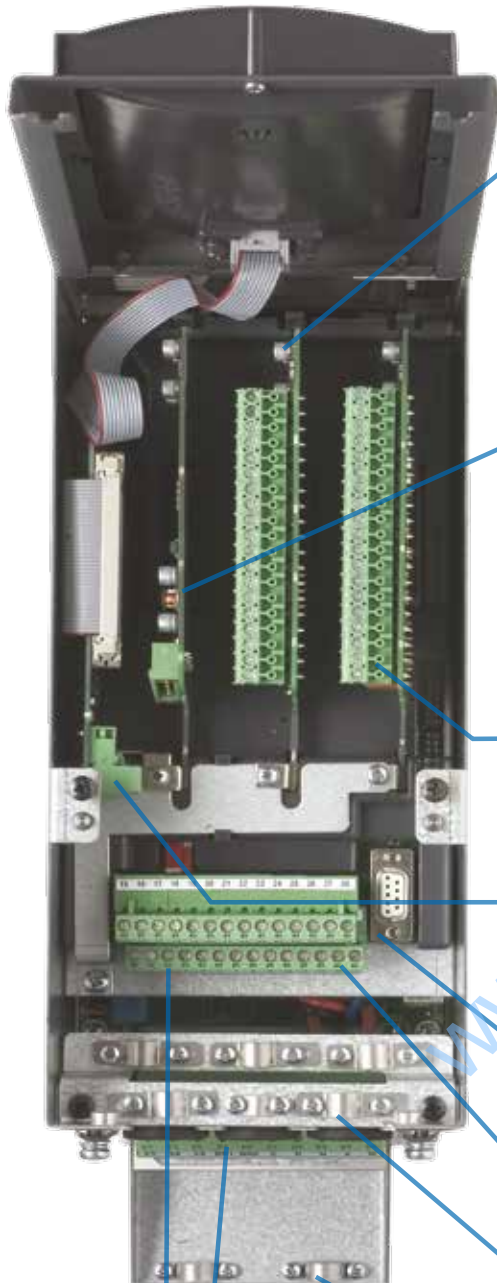
CABLES SHIELD

OMEGA clamp to grounding 360° of shielded cables.

SMART CONNECTIONS

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

Modbus



ADV200-4 • CHOOSING THE INVERTER – INPUT AND OUTPUT DATA

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).

SIZES ADV200-4	AC input current for continuous operation I _N		Inverter Output		P _N mot (Recommended asynchronous motor rating, fsw = default)			
	Heavy Duty (150% overload)	Light Duty (110% overload)	Heavy Duty	Light Duty	Heavy Duty (150% overload)		Light Duty (110% overload)	
	@ 400 V _{AC} [Arms]	@ 400 V _{AC} [Arms]	[kVA]	[kVA]	@ 400 V _{AC} [kW]	@ 460 V _{AC} [HP]	@ 400 V _{AC} [kW]	@ 460 V _{AC} [HP]
1007	2.1	3.7	1.7	3	0.75	1	1.5	2
1015	3.7	4.9	3	4	1.5	2	2.2	3
1022	4.9	6.5	4	5.3	2.2	3	3	5
1030	6.5	8.1	5.3	6.6	3	5	4	5
1040	8.1	11.1	6.6	9	4	5	5.5	7.5
2055	11.1	14	9	11.4	5.5	7.5	7.5	10
2075	14	19.6	11.4	15.9	7.5	10	11	15
2110	19.6	26.4	15.9	21.5	11	15	15	20
3150	26.4	32.3	21.5	26.3	15	20	18.5	25
3185	32.3	39	26.3	32	18.5	25	22	30
3220	39	53	32	43	22	30	30	40
4300	53	64	43	52	30	40	37	50
4370	64	74	52	60	37	50	45	60
4450	74	100	60	73	45	60	55	75
5550	100	143	73	104	55	75	75	100
5750	143	171	104	125	75	100	90	125
5900	171	200	125	145	90	125	110	150
61100	200	238	145	173	110	150	132	175
61320	238	285	173	208	132	175	160	200
71600	300	350	208	267	160	200	200	250
72000	350	420	267	319	200	250	250	300
72500	420	580	319	409	250	300	315	400
73150	580	640	409	450	315	400	355	450
73551	640	710	450	506	355	450	400	500
400 kW	665	800	506	603	400	500	500	650
500 kW	800	1100	603	776	500	650	630	850
630 kW	1100	1215	776	852	630	850	710	950
710 kW	1215	1350	852	956	710	950	800	1100
900 kW	1650	1800	1108	1247	900	1200	1000	1300
1000 kW	1800	2020	1247	1420	1000	1300	1200	1600

ADV200 FIELD-ORIENTED VECTOR INVERTER

SIZES ADV200-4	Rated output current In (fsw = default)								Switching frequency fsw	
	Heavy Duty				Light Duty					
	For Asynchronous motors (150% overload)		For Synchronous motors (160% overload)		For Asynchronous motors (110% overload)		For Synchronous motors (110% overload)		Default	Higher
	Ⓓ400 VAC [A]	Ⓓ460 VAC [A]	Ⓓ400 VAC [A]	Ⓓ460 VAC [A]	Ⓓ400 VAC [A]	Ⓓ460 VAC [A]	Ⓓ400 VAC [A]	Ⓓ460 VAC [A]		
1007	2.5	2.3	2.3	2.1	4.3	3.9	3.9	3.5	8	10, 12
1015	4.3	3.9	3.9	3.5	5.8	5.2	5.2	4.7	8	10, 12
1022	5.8	5.2	5.2	4.7	7.6	6.8	6.8	6.1	4	6, 8, 10, 12
1030	7.6	6.8	6.8	6.1	9.5	8.6	8.6	7.7	4	6, 8, 10, 12
1040	9.5	8.6	8.6	7.7	13	11.7	11.7	10.5	4	6, 8, 10, 12
2055	13	11.7	11.7	10.5	16.5	14.9	15	13.5	4	6, 8, 10, 12
2075	16.5	14.9	15	13.5	23	20.7	21	18.9	4	6, 8, 10, 12
2110	23	20.7	21	18.9	31	27.9	28	25.2	4	6, 8, 10, 12
3150	31	27.9	28	25.2	38	34.2	34	30.6	4	6, 8, 10, 12
3185	38	34.2	34	30.6	46	41.4	41	36.9	4	6, 8, 10, 12
3220	46	41.4	41	36.9	62	55.8	56	50.4	4	6, 8, 10, 12
4300	62	55.8	56	50.4	75	67.5	68	61.2	4	6, 8, 10, 12
4370	75	67.5	68	61.2	87	78.3	78	70.2	4	6, 8, 10, 12
4450	87	78	78	70.2	105	94.5	95	85.5	4	6, 8
5550	105	94.5	95	85.5	150	135	135	121.5	4	6, 8
5750	150	135	135	122	180	162	162	146	4	6, 8
5900	180	162	162	146	210	189	189	170	4	6, 8
61100	210	189	189	170	250	225	225	203	4	6, 8
61320	250	225	225	203	300	270	270	243	4	6, 8
71600	300	270	270	243	385	347	347	312	4	-
72000	385	347	347	312	460	414	414	373	4	-
72500	460	414	414	373	590	531	521	469	2	4
73150	590	531	521	469	650	585	585	527	2	-
73551	650	585	585	527	730	657	657	591	2	-
400 kW	730	657	657	591	870	783	783	705	4	-
500 kW	870	783	783	705	1120	1008	1008	907	2	4
630 kW	1120	1008	1008	907	1230	1107	1107	996	2	-
710 kW	1230	1107	1107	996	1380	1242	1242	1118	2	-
900 kW	1600	1440	1440	1296	1800	1620	1620	1458	2	-
1000 kW	1800	1620	1620	1458	2050	1845	1845	1661	2	-

ADV200-DC • CHOOSING THE INVERTER – INPUT AND OUTPUT DATA

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).

SIZES ADV200-DC	DC input current for continuous operation I_N				Inverter Output		P _n mot (Recommended asynchronous motor rating, fsw = default)					
	Heavy Duty (150% overload)		Light Duty (110% overload)		Heavy Duty	Light Duty	Heavy Duty (150% overload)			Light Duty (110% overload)		
	-4/4A @ 540 V _{DC} [Arms]	-6/6A @ 930 V _{DC} [Arms]	-4/4A @ 540 V _{DC} [Arms]	-6/6A @ 930 V _{DC} [Arms]			(1) [kW]	(2) [HP]	(3) [HP]	(1) [kW]	(2) [HP]	(3) [HP]
3185	39	-	48	-	26.3	32	18.5	25		22	30	
3220	48	-	65	-	32	43	22	30		30	40	
4300	65	-	80	-	43	52	30	40		37	50	
4370	80	-	90	-	52	60	37	50		45	60	
4450	90	-	125	-	60	73	45	60		55	75	
5550	125	-	175	-	73	104	55	75		75	100	
5750	175	-	210	-	104	125	75	100		90	125	
5900	210	-	240	-	125	145	90	125		110	150	
61100	240	-	290	-	145	173	110	150		132	175	
61320	290	-	350	-	173	208	132	175		160	200	
71600	370	190	430	235	208	267	160	200	150	200	250	200
72000	430	235	510	300	267	319	200	250	200	250	300	250
72500	510	300	710	370	319	409	250	300	250	315	400	350
73150	710	370	780	420	409	450	315	400	350	355	450	400
73550 / 73551	780	420	850	470	450	506	355	450	400	400	500	450
400 kW	860	514	1020	637	506	603	400	500	450	500	650	500
500 kW	1020	653	1420	797	603	776	500	650	550	630	850	700
630 kW	1420	814	1560	925	776	852	630	850	700	710	950	800
710 kW	1560	926	1700	1032	852	956	710	950	800	800	1100	900
900 kW	2130	1236	2610	1445	1108	1247	900	1200	1000	1000	1300	1100
1 MW	2340	1445	2550	1542	1247	1420	1000	1300	1100	1200	1600	1300
1.35 MW	-	1684	-	1855	-	-	1350	-	1500	-	-	1600
1.65 MW	-	2058	-	2254	-	-	1650	-	1800	-	-	2000

(1) ADV200-...-4/4A-DC = @400 V_{AC}; ADV200-...-6/6A-DC = @690 V_{AC}.

(2) ADV200-...-4/4A-DC = @460 V_{AC}.

(3) ADV200-...-6/6A-DC = @575 V_{AC}.

ADV200 FIELD-ORIENTED VECTOR INVERTER

SIZES ADV200-DC	Rated output current I_n (fsw = default)											
	Light Duty (110% overload)			Heavy Duty (160% overload)			Light Duty (110% overload)			Light Duty (110% overload)		
	(For Asynchronous motors)			(For Synchronous motors)			(For Asynchronous motors)			(For Synchronous motors)		
	@540 V _{DC} [A]	@650 V _{DC} [A]	@930 V _{DC} [A]	@540 V _{DC} [A]	@650 V _{DC} [A]	@930 V _{DC} [A]	@540 V _{DC} [A]	@650 V _{DC} [A]	@930 V _{DC} [A]	@540 V _{DC} [A]	@650 V _{DC} [A]	@930 V _{DC} [A]
3185	38	34.2	-	34	30.6	-	46	41.4	-	41	36.9	-
3220	46	41.4	-	41	36.9	-	62	55.8	-	56	50.4	-
4300	62	55.8	-	56	50.4	-	75	67.5	-	68	61.2	-
4370	75	67.5	-	68	61.2	-	87	78.3	-	78	70.2	-
4450	87	78	-	78	70.2	-	105	94.5	-	95	85.5	-
5550	105	94.5	-	95	85.5	-	150	135	-	135	121.5	-
5750	150	135	-	135	122	-	180	162	-	162	146	-
5900	180	162	-	162	146	-	210	189	-	189	170	-
61100	210	189	-	189	170	-	250	225	-	225	203	-
61320	250	225	-	225	203	-	300	270	-	270	243	-
71600	300	270	170	270	243	153	385	347	210	347	312	189
72000	385	347	210	347	312	189	460	414	265	414	373	238
72500	460	414	265	414	373	238	590	531	330	521	469	297
73150	590	531	330	521	469	297	650	585	375	585	527	337
73550 / 73551	650	585	375 (3)	585	527	337	730	657	415 (3)	657	591	373
400 kW	730	657	400	657	591	360	870	783	500	783	705	450
500 kW	870	783	500	783	705	450	1120	1008	630	1008	907	567
630 kW	1120	1008	630	1008	907	567	1230	1107	710	1107	996	639
710 kW	1230	1107	710 (3)	1107	996	639	1380	1242	790 (3)	1242	1118	711
900 kW	1600	1440	900	1440	1296	810	1800	1620	1000	1620	1458	900
1 MW	1800	1620	1000 (3)	1620	1458	900	2050	1845	1150 (3)	1845	1661	1035
1.35 MW	-	-	1300 (3)	-	-	1170 (3)	-	-	1450	-	-	1305
1.65 MW	-	-	1600	-	-	1440	-	-	1770	-	-	1593

ADV200-DC-4/4A	Switching frequency fsw	
	Default	Higher
3185 ... 4370	4 kHz	6, 8, 10, 12 kHz
4450 ... 61320	4 kHz	6, 8 kHz
71600 ... 72000	4 kHz	-
72500 ... 73551	2 kHz	- (6)
400 kW	4 kHz (5)	-
500 kW	2 kHz	4 kHz (5)
630 kW ... 1 MW	2 kHz	-

ADV200-DC-6/6A	Switching frequency fsw	
	Maximum (default)	Minimum
71600	2 kHz / 4 kHz (4)	2 kHz
72000	2 kHz / 4 kHz (4)	2 kHz
72500 ... 73550	2 kHz	2 kHz
400 kW ... 1.65 MW	2 kHz	2 kHz

- (3) Current values with an ambient temperature of 35°C.
 (4) 4 kHz in "variable frequency" mode (PAR 568 Switch freq. mode =1).
 from fw 6.03
 (5) 72500 = 4 kHz
 (6)

ADV200-6 • CHOOSING THE INVERTER – INPUT AND OUTPUT DATA

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).

SIZES ADV200-6	AC input current		Pn mot (Recommended asynchronous motor rating, fsw = default)				Rated output current In (for Asynchronous motor) (fsw = default)		Rated output current In (For Synchronous motors) (fsw = default)		Switching frequency "Fixed frequency" mode (PAR 568 Switch freq. mode =0, default)	
	Heavy Duty	Light Duty	Heavy Duty		Light Duty		Heavy Duty	Light Duty	Heavy Duty	Light Duty	Maximum (default)	Minimum
	@ 690 V _{AC} [Arms]	@ 690 V _{AC} [Arms]	@ 690 V _{AC} [kW]	@ 575 V _{AC} [kW]	@ 690 V _{AC} [kW]	@ 575 V _{AC} [kW]	[A]	[A]	[A]	[A]	[kHz]	[kHz]
5750	90	-	75	-	-	-	92	-	75	-	4	2
6900	109	-	90	-	-	-	110	-	90	-	4	2
61100	129	-	110	-	-	-	133	-	110	-	2	2
61320	157	-	132	-	-	-	159	-	130	-	2	2
71600	172	210	160	150	200	200	170	210	153	189	4	2
72000	214	263	200	200	250	250	210	265	189	238	2	2
72500	263	336	250	250	315	350	265	330	238	297	2	2
73150	336	382	315	350	355	400	330	375	297	337	2	2
73550	382	420	355	400	400	450	375 (1)	415	337 (1)	373	2	2
400 kW	420	520	400	450	500	500	400	500	360	450	2	2
500 kW	533	651	500	550	630	700	500	630	450	567	2	2
630 kW	665	755	630	700	710	800	630	710	567	639	2	2
710 kW	756	843	710	800	800	900	710 (1)	790 (1)	639 (1)	711	2	2
900 kW	1009	1180	900	1000	1000	1100	900	1000	810	900	2	2
1 MW	1180	1259	1000	1100	1150	1300	1000 (1)	1150 (1)	900 (1)	1035	2	2
1.35 MW	1375	1515	1350	1500	1500	1600	1300 (1)	1450	1170 (1)	1305	2	2
1.65 MW	1680	1840	1650	1800	1800	2000	1600	1770	1440	1593	2	2

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

WEIGHTS AND DIMENSIONS

SIZES ADV200-4	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
1007...1040	118 x 322 x 235	4.65 x 12.7 x 9.25	5.8	12.8
2055 ... 2110	150 x 392 x 250	5.91 x 15.43 x 9.84	10.2	22.5
3150...3185	180 x 517 x 250	7.09 x 20.35 x 9.84	16.4	36.2
3220	180 x 517 x 250	7.09 x 20.35 x 9.84	22	48.5
4300...4450	268 x 616 x 270	10.55 x 24.25 x 10.63	32	70.6
5550...5900	311 x 767 x 325	12.24 x 30.19 x 12.8	60	132.3
61100 ... 61320	422 x 878 x 360	16.61 x 34.6 x 14.2	90	198.4
71600...72000	417 x 1407 x 485	16.42 x 55.4 x 19.1	130	286.6
72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	140	308.7
73150 ... 73551	417 x 1407 x 485	16.42 x 55.4 x 19.1	150	330.7
400kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	260	573.2
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	280	617.4
630 - 710kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	450	992.1
900kW - 1MW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	450	992.1

SIZES ADV200-DC	Dimensions: Width x Height x Depth		Weight			
	mm	inches	kg		lbs	
3185	180 x 517 x 250	7.09 x 20.35 x 9.84	12		26.5	
3220	180 x 517 x 250	7.09 x 20.35 x 9.84	18		39.7	
4300...4450	268 x 616 x 270	10.55 x 24.25 x 10.63	24		52.9	
5550	311 x 777 x 325	12.24 x 30.59 x 12.8	40		88.2	
5750-5900	311 x 801 x 325	12.24 x 31.53 x 12.8	40		88.2	
61100	421 x 888 x 360	16.57 x 34.96 x 14.17	68		149.9	
61320	421 x 924.5 x 360	16.57 x 36.4 x 14.17	68		149.9	
			(ADV200-...-4-DC)		(ADV200-...-6-DC)	
			kg	lbs	kg	lbs
71600...72000	417 x 1407 x 485	16.42 x 55.4 x 19.1	120	267	135	288
72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	130	287	145	320
73150 ... 73550 / 73551	417 x 1407 x 485	16.42 x 55.4 x 19.1	140	307	155	342
400kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	240	529	270	595
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	260	573	290	639
630 - 710kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	420	926	310	683
900kW - 1MW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	420	926	465	1025
1.35 MW	1677 x 1407 x 485	66.02 x 55.4 x 19.1	-	-	600	1322.7
1.65 MW	2097 x 1407 x 485	82.56 x 55.4 x 19.1	-	-	750	1653.5

SIZES ADV200-6	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		
6900 - 61100 - 61320	520 x 1134 x 319	20.5 x 44.6 x 12.6		
71600...72000	417 x 1407 x 485	16.42 x 55.4 x 19.1	135	298
72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	145	320
73150 ... 73550	417 x 1407 x 485	16.42 x 55.4 x 19.1	155	342
400kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	270	595
500kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	290	639
630 - 710kW	837 x 1407 x 485	33.0 x 55.4 x 19.1	310	683
900kW - 1MW	1257 x 1407 x 485	49.5 x 55.4 x 19.1	465	1025
1.35 MW	1677 x 1407 x 485	66.02 x 55.4 x 19.1	600	1322.7
1.65 MW	2097 x 1407 x 485	82.56 x 55.4 x 19.1	750	1653.5

AFE200 • DESCRIPTION



AFE200 is the range of **regenerative power supply units** incorporating **Active Front End technology**.

Ideal for powering the batteries of drives connected on the same DC Bus or even for managing single-drive configurations.

The AFE200 offers a number of advantages:

- "Clean Power" thanks to the unit power factor and reduced harmonic distortion ($\leq 3\%$)
- Enhanced system dynamics during drive and regeneration
- Considerable energy savings during regeneration transients
- Improved stability of the DC Bus circuit under load changes
- Significant cost-effectiveness with the single power supply system
- Elimination of uneconomical conventional braking systems and braking resistors

The AFE200 range has power ratings of **22kW to 1,65MW** for three-phase power supplies of **400Vac to 690Vac**. Ease of use and intuitive programming make it possible for users of any level to exploit the high-level performance of Active Front End technology for a broad range of applications where there is a need for real energy saving.

POWER RANGE

Models	Power (kW)																
	22	45	90	132	160	200	250	315	355	400	500	630	710	900	1000	1350	1650
AFE200-4	S.3	S.4	S.5	S.6	Size 7					Parallel size 7 (*)							
AFE200-6					Size 7					Parallel size 7 (*)							



Higher power ratings on request.

(*) AFE200 of over 400 kW comprise one master MASTER unit and one or more SLAVE units.

WEIGHTS AND DIMENSIONS

Sizes AFE200	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	18	39.7
4450	268 x 616 x 270	10.55 x 24.25 x 10.63	24	52.9
5900	311 x 801 x 325	12.24 x 31.53 x 12.8	40	88.2
61320	421 x 924.5 x 360	16.57 x 36.4 x 14.17	68	149.9
71600...72000	417 x 1407 x 485	16.42 x 55.4 x 19.1	130	286.6
72500	417 x 1407 x 485	16.42 x 55.4 x 19.1	140	308.7
73150 ... 73550	417 x 1407 x 485	16.42 x 55.4 x 19.1	150	330.7

GENERAL CHARACTERISTICS

FLEXIBLE MODULAR TECHNOLOGY

The AFE200 is also 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 AFE200 is available in 5 hardware sizes

- from 22kW to 355kW in the stand-alone configuration
- from 400kW to 1.65MW in "parallel" configurations.

PRE-LOAD SYSTEM

External management of the intermediate circuit pre-load is a feature of the entire range. The dedicated AFE PRE-CHARGE KITS are supplied complete with fuses, resistors and contactor.

TOTAL EASE OF USE

The AFE200 is designed to enable simple, quick, economical connections to the system to be powered. All structures are extremely easy to handle and the terminal strips and optional card racks are readily accessible.

MANAGEMENT OF OPTIONAL CARDS

The AFE200 uses an intelligent rack system that allows the following optional cards to be installed at the same time:

- Fieldbus interface card
- I/O expansion card.

BACK-UP POWER SUPPLY

The AFE200 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.

DEDICATED ACCESSORIES

The dedicated accessories guarantee elimination of high-frequency harmonics, simple wiring and cable shielding to achieve immediate, EMC-compliant start-ups:

- Dedicated Pre-charge kit (mandatory)
- Mains filter EMI type
- Mains filter LCL type (mandatory)

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.

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.

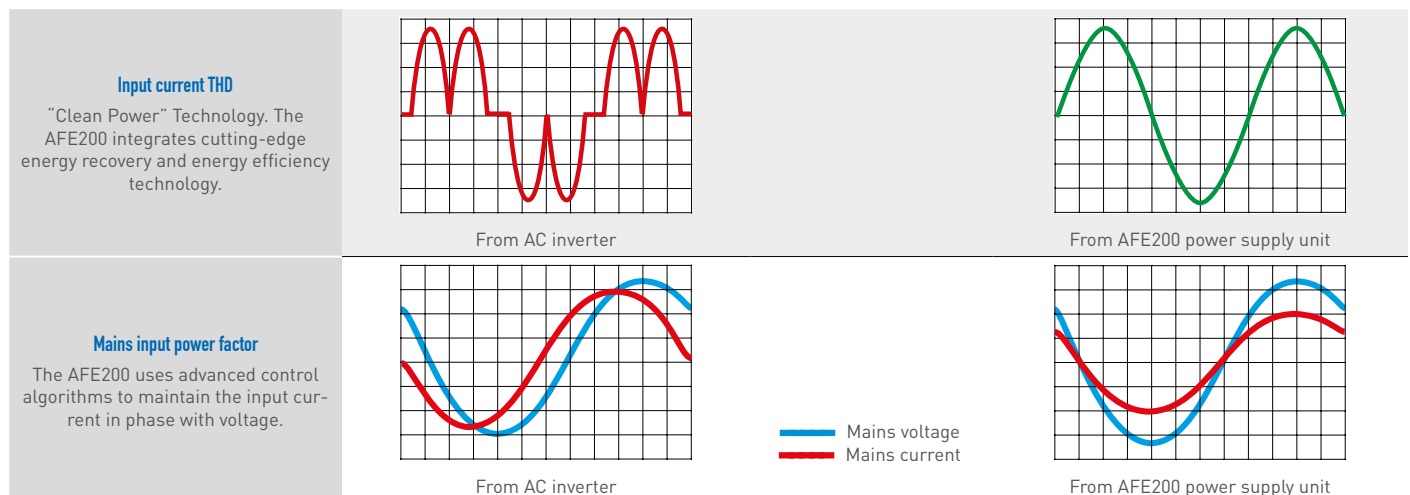
The "Wizard" tool ensures totally user-friendly immediate start-up functions. Standard features of the AFE200 include programming in 10 languages (English, Italian, French, German, Spanish, Polish, Romanian, Russian, Turkish and Portuguese).

- > 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.

GENERAL CHARACTERISTICS

Power supply	AFE200-...-4/4A: 380Vac -15% ...500Vac +5%, 50/60Hz AFE200-...-6/6A: 500Vac -10% ...690Vac +10%, 50/60Hz
DC-link rated voltage	AFE200-...-4/4A: 650...780 Vdc AFE200-...-6/6A: 820...1120 Vdc
Power ratings	from 22kW to 1.65MW
Cosphi	≥ 0,99
THD	≤ 3% [Considering a network with voltage THD of less than 2%].
Overload	- Heavy duty: 150% for 60 sec every 300 sec., 180% 0.5 sec. - Light duty: 110% for 60 sec every 300 sec.
Optional cards	Integration of up to 2 options onboard the drive
Multi-language programming SW	GF-eXpress (5 languages)
Rated protection	IP20-rated protection (IP00 size 7 and parallel)
Reference resolution	Digital = 15bit + sign Analog input = 11-bit + sign Analog output = 11-bit + sign
Fieldbus management	DeviceNet, CANopen, Modbus RTU, EtherCAT, GDnet, ProfiBus, Ethernet IP, PROFINET.

Standard supply configuration	Programming keypad	Integrated KB_ADV
	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)
Options		LCL type line input filter, is composed by one Input choke and one LC filter (mandatory)
		Pre-charge kit, includes fusibles, resistors and pre-load contactor (mandatory)
Conformity		External EMI mains filter
	Climatic conditions	EN 60721-3-3
	Electrical safety	EN 50178, EN 61800-5-1, UL508C, UL840 pollution level 2
	Vibrations	EN 60068-2-6, test Fc.
Environmental conditions	EMC	EN61800-3
	Ambient temperature	-10°C ...+40°C, +40°C...+50°C with derating
	Altitude	Max 2000 m.
Markings		Complies with the EC directive concerning low voltage equipment (Directives LVD 2014/35/EU, EMC 2014/30/EU, RoHs 2011/65/EU)
		Complies with directives for the American and Canadian market (except types AFE200-...-6/6A).



AFE200 • CHOOSING THE POWER SUPPLY UNIT – INPUT DATA

The same engineering criteria apply for operations with additional derating factors (see drive instruction manual).

SIZES AFE200 -4/4A	AC Input current for continuous operation I_N		Switching frequency f_{sw}	
	Heavy Duty (150% overload)	Light Duty (110% overload)	Default	Higher
	@400 V _{AC} [A]	@400 V _{AC} [A]		
3220	40	60	8	-
4450	80	100	8	-
5900	160	200	4	6, 8
61320	230	280	4	6, 8
71600	280	340	4	-
72000	340	400	2	4
72500	400	500	2	4
73150	500	560	2	-
73550	560	600	2	-
400 kW	600	760	2	-
500 kW	760	950	2	-
630 kW	950	1060	2	-
710 kW	1060	1050	2	-
900 kW	1400	1500	2	-
1 MW	1500	1730	2	-

SIZES AFE-...-6/6A	AC Input current for continuous operation I_N		Switching frequency f_{sw}	
	Heavy Duty (150% overload)	Light Duty (110% overload)	Default	Higher
	@690 V _{AC} [A]	@690 V _{AC} [A]		
71600	150	190	4	-
72000	190	240	2	-
72500	240	300	2	-
73150	300	340	2	-
73550	340 [1]	380	2	-
400 kW	360	455	2	-
500 kW	455	570	2	-
630 kW	570	645	2	-
710 kW	645 [1]	720	2	-
900 kW	850	920	2	-
1 MW	920 [1]	1150	2	-
1.35 MW	1200 [1]	1350	2	-
1.65 MW	1470 [1]	1645	2	-

[1] Current values with an ambient temperature of 35°C.

AFE200 • CHOOSING THE POWER SUPPLY UNIT – OUTPUT DATA

SIZES AFE200 -4/4A	Output				Output current rating In (DC) (fsw = default)			
	Heavy Duty		Light Duty		Heavy Duty		Light Duty	
	@ 400 Vac [kW]	@ 460 Vac [kW]	@ 400 Vac [kW]	@ 460 Vac [kW]	650 Vdc [A]	750 Vdc [A]	650 Vdc [A]	750 Vdc [A]
3220	28	29	42	43	43	39	64	57
4450	55	57	69	72	85	76	107	96
5900	110	115	139	143	171	153	213	191
61320	159	165	194	201	245	220	298	268
71600	194	201	236	244	298	268	363	325
72000	236	244	277	287	363	325	426	383
72500	277	287	346	358	426	383	532	477
73150	346	358	388	402	532	477	597	536
73550	388	402	416	430	597	536	640	573
400 kW	416	430	527	545	640	551	811	699
500 kW	527	545	658	681	811	699	1012	873
630 kW	658	681	734	760	1012	873	1129	974
710 kW	734	760	797	825	1129	974	1226	1058
900 kW	970	1004	1039	1075	1492	1287	1598	1378
1 MW	1039	1075	1200	1242	1598	1378	1846	1592

SIZES AFE-...-6/6A	Output		Output current rating In (DC) (fsw = default)	
	Heavy Duty	Light Duty	Heavy Duty	Light Duty
	@ 690 Vac [kW]	@ 690 Vac [kW]	[A]	[A]
71600	179	227	165	210
72000	227	287	210	265
72500	287	358	265	330
73150	358	406	330	375
73550	406	454	375	420
400 kW	430	544	396	500
500 kW	544	681	500	627
630 kW	681	771	627	711
710 kW	771	860	711	792
900 kW	1015	1100	935	1012
1 MW	1100	1255	1012	1155
1.35 MW	1434	1613	1320	1485
1.65 MW	1757	1966	1615	1810

FFE200 • DESCRIPTION



FFE200 series is the GEFran solution for regenerative power supply to be used as an alternative to traditional braking resistors.

Everytime there is no stringent harmonic distortion requirements, which by the way can be addressed by the AFE200 series, the Fundamental Front End technology allows to supply the high power drive through the DC bus. How the FFE application can benefit:

- Cabinet size Reduced
- No Complex filters required being the sole AC Choke enough to guarantee a sufficient level of harmonic distortion.
- Efficiency enhancement of the internal power module
- Limited internal dissipative losses.

POWER RANGE

Sizes FFE200-...-4	550	730	880	2x550	2x730	2x880	3x730	3x880	4x730	4x880	5x730	5x880	
Configuration	550	730	880	550 MS 550 SL	730 MS 730 SL	880 MS 880 SL	730 MS 730 SL	880 MS 880 SL	730 MS 730 SL 730 SL2	880 MS 880 SL 880 SL2	730 MS 730 SL 730 SL2	880 MS 880 SL 880 SL2	
Parallel (*)													

Sizes FFE200-...-6	500	690	760	2x500	2x690	2x760	3x690	3x760	4x690	4x760	5x690	5x760	
Configuration	500	730	760	500 MS 500 SL	690 MS 690 SL	760 MS 760 SL	690 MS 690 SL	760 MS 760 SL	690 MS 690 SL 690 SL2	760 MS 760 SL 760 SL2	690 MS 690 SL 690 SL2	760 MS 760 SL 760 SL2	
Parallel (*)													



Higher sizes on request.

(*) FFE200 of over 2x500 comprise one master MASTER unit and one or more SLAVE units.

WEIGHTS AND DIMENSIONS

Sizes AFE200	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
Size 7	417 x 1407 x 485	16.42 x 55.4 x 19.1	140	309

GENERAL CHARACTERISTICS

FLEXIBLE MODULAR TECHNOLOGY

The FFE200 is also based on a fully modular hardware with power structures that can be installed side by side.

FFE200 is available in one unique mechanical size:

- from 500A to 880A in the stand-alone configuration
- requests from 940A can be addressed by parallel configuration where up to 5 power modules are allowed.

PRE-LOAD SYSTEM

In the FFE200-...+PRC the pre-charge circuit is integrated

TOTAL EASE OF USE

The FFE200 is designed to enable simple, quick, economical connections to the system to be powered.

All structures are extremely easy to handle and the terminal strips and optional card racks are readily accessible.

MANAGEMENT OF OPTIONAL CARDS

The FFE200 uses an intelligent rack system that allows the following optional cards to be installed at the same time:

- Fieldbus interface card
- I/O expansion card.

BACK-UP POWER SUPPLY

The FFE200 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.

DEDICATED ACCESSORIES

During the pre-charge transient, the current is reduced by means of specific accessories. Thanks to this technology it's possible to install the cablings and shielding easier and faster, making the installations compliant with the EMC regulations.

- EMI line filter (external)
- Pre-charge and line choke (mandatory)

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.

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 FFE200 include programming in **10 languages** (English, Italian, French, German, Spanish, Polish, Romanian, Russian, Turkish and Portuguese).

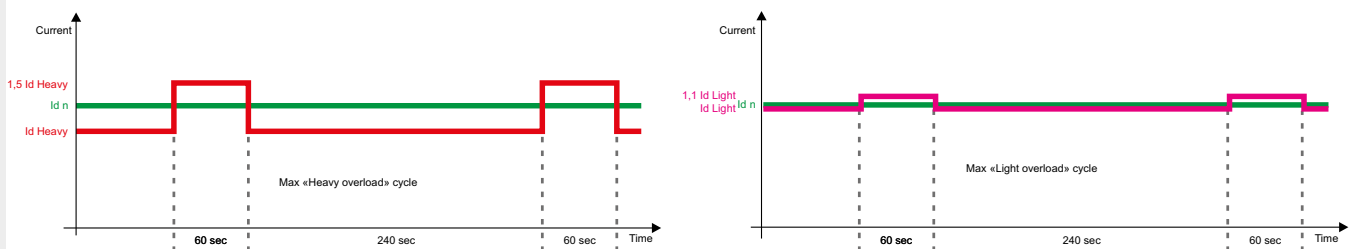
- 4 line x 21 character display
- Alphanumeric plaintext
- Complete information regarding each parameter
- Fast navigation keys
- Key for displaying the last 10 parameters that have been changed
- DISP key for rapid display of operating parameters
- Uploading-Downloading and saving of 5 complete sets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

FFE200 REGENERATIVE FUNDAMENTAL FRONT END POWER SUPPLIERS

Power supply	FFE200-...-4: 380Vac -15% ... 500Vac +5%, 50/60Hz FFE200-...-6: 500Vac -10% ... 690Vac +10%, 50/60Hz Systems TT, TN and IT
DC-link rated voltage	Power Supply U _{ln} x 1.35
Power ratings	FFE200-...-4: 300...475 kW (size 7). Up to 2.1 MW by parallel configurations. FFE200-...-6: 475...700 kW (size 7). Up to 3.4 MW by parallel configurations
Cosphi	≥ 0.99
THD	< 45%
Overload	• Heavy duty: 150% for 60 sec every 300 sec. • Light duty: 110% for 60 sec every 300 sec.
Optional cards	Integration of up to 2 options onboard the drive
Multi-language programming SW	GF-eXpress (5 languages)
Rated protection	Standard IP00
Reference resolution	Digital = 15bit + sign Analog input = 11-bit + sign Analog output = 11-bit + sign
Fieldbus management	DeviceNet, CANopen, Modbus RTU, EtherCAT, Gdnet, ProfiBus, Ethernet IP, PROFINET.

Standard supply configuration	Programming keypad	Integrated KB_ADV
	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)
Options		Pre-charge and line choke EMI filter
Conformity	Climatic conditions	EN 60721-3-3
	Electrical safety	EN 50178, EN 61800-5-1, UL508C, UL840 pollution level 2
	Vibrations	EN 60068-2-6, test Fc.
	EMC	EN61800-3
Environmental conditions	Ambient temperature	-10°C ...+40°C, +40°C...+50°C with derating
	Altitude	Max 4000 m a.s.l. (FFE200-4) Max 3500 m a.s.l. (FFE200-6) Above 2000 m a.s.l. with derating
Markings		Complies with the EC directive concerning low voltage equipment (Directives LVD 2014/35/EU, EMC 2014/30/EU, RoHs 2011/65/EU)
		Complies with directives for the American and Canadian market (with power supply ≤600Vac) (on progress).

Overload curves



FFE200 • CHOOSING THE POWER SUPPLY UNIT – INPUT AND OUTPUT DATA

The same engineering criteria apply for operations with additional derating factors (see drive instruction manual).

INPUT DATA

SIZES FFE200-4	Heavy Duty		Light Duty		SIZES FFE200-6	Heavy Duty		Light Duty	
	An	In	An	In		An	In	An	In
	@380...500 V _{AC} [kVA]	@380...500 V _{AC} [ARMS]	@380...500 V _{AC} [kVA]	@380...500 V _{AC} [ARMS]		@500...690 V _{AC} [kVA]	@500...690 V _{AC} [ARMS]	@500...690 V _{AC} [kVA]	@500...690 V _{AC} [ARMS]
550	322	465	382	552	500	514	430	588	492
730	429	619	501	724	690	696	582	816	682
880	516	746	617	890	760	763	639	889	744
x 2 FFE200-550-4	596	860	708	1021	x 2 FFE200-500-6	950	795	1087	910
x 2 FFE200-730-4	793	1145	927	1339	x 2 FFE200-690-6	1287	1077	1509	1262
x 2 FFE200-880-4	956	1379	1141	1647	x 2 FFE200-760-6	1412	1182	1645	1377
x 3 FFE200-730-4	1190	1717	1391	2008	x 3 FFE200-690-6	1931	1616	2263	1894
x 3 FFE200-880-4	1433	2069	1711	2470	x 3 FFE200-760-6	2118	1772	2468	2065
x 4 FFE200-730-4	1587	2290	1855	2677	x 4 FFE200-690-6	2575	2155	3018	2525
x 4 FFE200-880-4	1911	2758	2282	3294	x 4 FFE200-760-6	2824	2363	3291	2754
x 5 FFE200-730-4	1983	2862	2319	3347	x 5 FFE200-690-6	3219	2693	3772	3156
x 5 FFE200-880-4	2389	3448	2852	4117	x 5 FFE200-760-6	3530	2954	4113	3442

OUTPUT DATA

SIZES FFE200-4	Heavy Duty		Light Duty		SIZES FFE200-6	Heavy Duty		Light Duty	
	P _{dcn}	I _{dcn}	P _{dcn}	I _{dcn}		P _{dcn}	I _{dcn}	P _{dcn}	I _{dcn}
	[kW]	@400 V _{AC} [A]	[kW]	@400 V _{AC} [A]		[kW]	@690 V _{AC} [A]	[kW]	@690 V _{AC} [A]
550	297	550	356	660	500	476	511	549	589
730	396	733	467	865	690	644	691	761	817
880	475	880	574	1063	760	705	757	829	890
x 2 FFE200-550-4	549	1018	659	1221	x 2 FFE200-500-6	881	945	1015	1090
x 2 FFE200-730-4	732	1356	864	1600	x 2 FFE200-690-6	1191	1278	1408	1511
x 2 FFE200-880-4	879	1628	1062	1967	x 2 FFE200-760-6	1304	1400	1534	1647
x 3 FFE200-730-4	1098	2034	1296	2400	x 3 FFE200-690-6	1786	1918	2112	2267
x 3 FFE200-880-4	1319	2442	1593	2950	x 3 FFE200-760-6	1957	2101	2300	2470
x 4 FFE200-730-4	1464	2712	1728	3201	x 4 FFE200-690-6	2382	2557	2816	3023
x 4 FFE200-880-4	1758	3256	2124	3933	x 4 FFE200-760-6	2609	2801	3067	3293
x 5 FFE200-730-4	1831	3390	2160	4001	x 5 FFE200-690-6	2977	3196	3520	3779
x 5 FFE200-880-4	2198	4070	2655	4916	x 5 FFE200-760-6	3261	3501	3834	4116

SMB200 • DESCRIPTION



SMB200 is a 3-phase AC/DC power supply, designed to supply the DC Bus by a constant voltage where one or more drives can be connected. To the same bus one or more braking units and braking resistors can be connected.

How the SMB application can provide benefits:

- Cabinet size Reduced
- Complex filters are not required being the only AC Choke enough to guarantee a sufficient harmonic distortion.
- Enhancement of internal power module efficiency
- Limited internal dissipative losses.

POWER RANGE

Sizes SMB200-...-4	1250	1600	2500	2x1250	2x1600	2x2500	3x1250	3x1600	3x2500	4x1250	4x1600	4x2500
Configuration	1250	1600	2500	1250 1250	1600 1600	2500 2500	1250 1250 1250	1600 1600 1600	2500 2500 2500	1250 1250 1250	1600 1600 1600	2500 2500 2500
Parallel												
Sizes SMB200-...-6	1000	1600	2500	2x1000	2x1600	2x2500	3x1000	3x1600	3x2500	4x1000	4x1600	4x2500
Configuration	1000	1600	2500	1000 1000	1600 1600	2500 2500	1000 1000 1000	1600 1600 1600	2500 2500 2500	1000 1000 1000	1600 1600 1600	2500 2500 2500
Parallel												

Lower / higher sizes on request.

WEIGHTS AND DIMENSIONS

Sizes AFE200	Dimensions: Width x Height x Depth		Weight	
	mm	inches	kg	lbs
SMB200-T-1000	421 x 628 (*) x 360	16.6 x 24.7 x 14.2	70	154
SMB200-T-1250	421 x 628 (*) x 360	16.6 x 24.7 x 14.2	70	154
SMB200-D-1600	421 x 628 (*) x 360	16.6 x 24.7 x 14.2	70	154
SMB200-D-2500	417 x 1243 (*) x 360	16.6 x 48.9 x 14.2	165	364

GENERAL CHARACTERISTICS

FLEXIBLE MODULAR TECHNOLOGY

The SMB200 is also based on a fully modular hardware with power structures that can be installed side by side. Up to 4 power modules can be connected in parallel.

DEDICATED ACCESSORIES

During the pre-charge transient, the current is reduced by means of specific accessories. Thanks to this technology it is possible to realize the cablings and shielding easier and faster, making installations compliant with the EMC regulations.

- Pre-charge and line choke (mandatory)
- M/S Communication cable for parallel configurations.

TOTAL EASE OF USE

The SMB200 is designed to enable simple, quick, economical connections to the system to be powered.

All structures are extremely easy to handle and the terminal strips are readily accessible.

PRE-LOAD SYSTEM

In the SMB200-...+PRC versions the pre-charge circuit is integrated.

With the SMB200-...-T the smooth charge of the DC-Link capacitor is controlled by an integrated auxiliary rectifier SCR circuit.

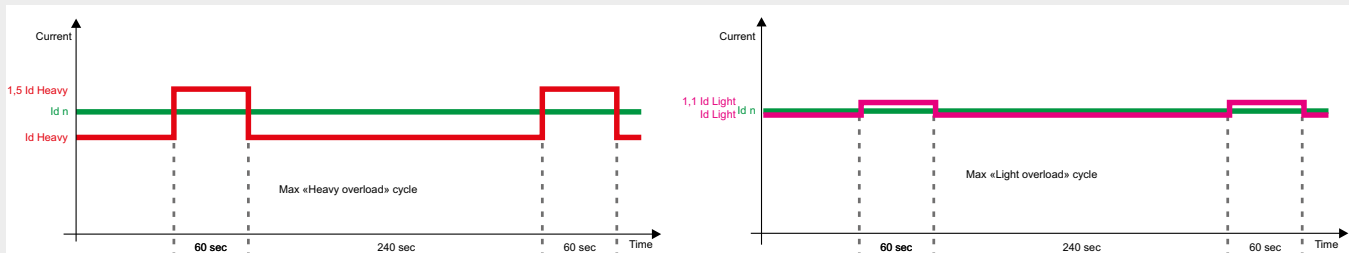


SMB200 AC/DC POWER SUPPLIERS

Power supply	SMB200-...-4: 230 Vac -10% ... 500 Vac +10% (configurable by dip-switch). SMB200-...-6: 230 Vac -10% ... 690 Vac +10% (configurable by dip-switch).
Power Supply Frequencies	50Hz or 60Hz (configurable by dip-switch), $\pm 5\%$
Pre-charge time	50Hz: 8 pre-set times in the min/max window 1.9 to 17.4 s, configurable by dip-switch 60Hz: 8 pre-set times in the min/max window 2 to 24.1 s, configurable by dip-switch
DC-link rated voltage	Power Supply U _{ln} x 1.35
Power ratings	SMB200-...-4: 844 kW ... 6.2 MW SMB200-...-6: 930 kW ... 8.6 MW
Overload	- Heavy duty: 150% for 60 sec every 300 sec. - Light duty: 110% for 60 sec every 300 sec.
THD	$\leq 40\%$
Overload	- Heavy duty: 150% for 60 sec every 300 sec. - Light duty: 110% for 60 sec every 300 sec.
Protection functions (models -T and +PRC only)	Opening of the OK relay in case of: - overtemperature - power supply loss on the regulation card ($\pm 15V$) - power supply loss - completely discharged DC link
Rated protection	IP20 casing, excluded top and lower power connections where protection degree is IP00 (according to EN 60529).

Standard supply configuration	Regulation	• 1 digital input (Enable) • 2 digital outputs: MLP signal (sum of the precharge and of the set undervoltage threshold) and ML signal (Mains voltage monitoring) • 1 Relay outputs: 1 drive OK contact (normally open, closed after the precharge).
Options		Input Choke M/S Communication cable for parallel configurations
Conformity	Climatic conditions	EN 60721-3-3 class 3K3, EN 60068-2-2
	Electrical safety	EN 50178, EN 61800-5-1;
	Vibrations	EN 60068-2-6, test Fc; EN 60721-3-3 class 3M1
	EMC	Immunity: EN61800-3, 2nd environment Conducted Emissions: EN 61800-3, cat. C3
Environmental conditions	Ambient temperature	-10°C ...+40°C, +40°C...+50°C with derating
	Altitude	Max 4000 m. a.s.l. (derating above 2000 m.)
Markings	CE	Complies with the EC directive concerning low voltage equipment (Directives LVD 2014/35/EU, EMC 2014/30/EU, RoHs 2011/65/EU)
	UL c UL us	Complies with directives for the American and Canadian market (with Power Supply ≤ 600 Vac). (on progress)

Overload curves



SMB200 • CHOOSING THE POWER SUPPLY UNIT – INPUT AND OUTPUT DATA

The same engineering criteria apply for operations with additional derating factors (see drive instruction manual).

INPUT DATA

SIZES SMB200-4	ULN @50/60 Hz [V]	IN [Aac]		SIZES SMB200-6	ULN @50/60 Hz [V]	IN [Aac]	
		[Rated for Heavy Duty]	[Rated for Light. Duty]			[Rated for Heavy Duty]	[Rated for Light. Duty]
SMB200-T-1250	230 ... 500	746	984	SMB200-T-1000	230 ... 690	615	779
SMB200-D-1600	230 ... 500	984	1271	SMB200-D-1600	230 ... 690	984	1271
SMB200-D-2500	230 ... 500	1574	1984	SMB200-D-2500	230 ... 690	1574	1984
2 * SMB200-T-1250-4	230 ... 500	1378	1820	2 * SMB200-T-1000-6	230 ... 690	1132	1435
2 * SMB200-D-1600-4	230 ... 500	1820	2345	2 * SMB200-D-1600-6	230 ... 690	1820	2345
2 * SMB200-D-2500-4	230 ... 500	2911	3665	2 * SMB200-D-2500-6	230 ... 690	2911	3665
3 * SMB200-T-1250-4	230 ... 500	2066	2731	3 * SMB200-T-1000-6	230 ... 690	1697	2153
3 * SMB200-D-1600-4	230 ... 500	2731	3518	3 * SMB200-D-1600-6	230 ... 690	2731	3518
3 * SMB200-D-2500-4	230 ... 500	4367	5498	3 * SMB200-D-2500-6	230 ... 690	4367	5498
4 * SMB200-T-1250-4	230 ... 500	2755	3641	4 * SMB200-T-1000-6	230 ... 690	2263	2870
4 * SMB200-D-1600-4	230 ... 500	3641	4690	4 * SMB200-D-1600-6	230 ... 690	3641	4690
4 * SMB200-D-2500-4	230 ... 500	5822	7331	4 * SMB200-D-2500-6	230 ... 690	5822	7331

OUTPUT DATA

SIZES SMB200-4	Pdn (Rated for continuous load) [kW]	DC link rated voltage [Vdc]	SIZES SMB200-6	Pdn (Rated for continuous load) [kW]	DC link rated voltage [Vdc]
SMB200-T-1250	844	ULN x 1.35	SMB200-T-1000	930	ULN x 1.35
SMB200-D-1600	1080		SMB200-D-1600	1488	
SMB200-D-2500	1688		SMB200-D-2500	2325	
2 * SMB200-T-1250-4	1553		2 * SMB200-T-1000-6	1711	
2 * SMB200-D-1600-4	1998		2 * SMB200-D-1600-6	2753	
2 * SMB200-D-2500-4	3119		2 * SMB200-D-2500-6	4297	
3 * SMB200-T-1250-4	2329		3 * SMB200-T-1000-6	2567	
3 * SMB200-D-1600-4	2997		3 * SMB200-D-1600-6	4129	
3 * SMB200-D-2500-4	4678		3 * SMB200-D-2500-6	6445	
4 * SMB200-T-1250-4	3105		4 * SMB200-T-1000-6	3422	
4 * SMB200-D-1600-4	3996		4 * SMB200-D-1600-6	5506	
4 * SMB200-D-2500-4	6237		4 * SMB200-D-2500-6	8593	

SIZES SMB200-4	Udn (Rated) [Vdc]	Idn (Rated for con- tinuous load) [Adc]	Id SP (Rated for Heavy Duty) [Adc]	Id SL (Rated for Light. Duty) [Adc]	SIZES SMB200-6	Udn (Rated) [Vdc]	Idn (Rated for con- tinuous load) [Adc]	Id SP (Rated for Heavy Duty) [Adc]	Id SL (Rated for Light. Duty) [Adc]
SMB200-T-1250	675	1250	910	1200	SMB200-T-1000	930	1000	750	950
SMB200-D-1600	675	1600	1200	1550	SMB200-D-1600	930	1600	1200	1550
SMB200-D-2500	675	2500	1920	2420	SMB200-D-2500	930	2500	1920	2420
2 * SMB200-T-1250-4	675	2300	1680	2220	2 * SMB200-T-1000-6	930	1840	1380	1750
2 * SMB200-D-1600-4	675	2960	2220	2860	2 * SMB200-D-1600-6	930	2960	2220	2860
2 * SMB200-D-2500-4	675	4620	3550	4470	2 * SMB200-D-2500-6	930	4620	3550	4470
3 * SMB200-T-1250-4	675	3450	2520	3330	3 * SMB200-T-1000-6	930	2760	2070	2625
3 * SMB200-D-1600-4	675	4440	3330	4290	3 * SMB200-D-1600-6	930	4440	3330	4290
3 * SMB200-D-2500-4	675	6930	5325	6705	3 * SMB200-D-2500-6	930	6930	5325	6705
4 * SMB200-T-1250-4	675	4600	3360	4440	4 * SMB200-T-1000-6	930	3680	2760	3500
4 * SMB200-D-1600-4	675	5920	4440	5720	4 * SMB200-D-1600-6	930	5920	4440	5720
4 * SMB200-D-2500-4	675	9240	7100	8940	4 * SMB200-D-2500-6	930	9240	7100	8940

TOOLS & SOFTWARE

GF-eXpress PROGRAMMING SOFTWARE

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
- Oscilloscope

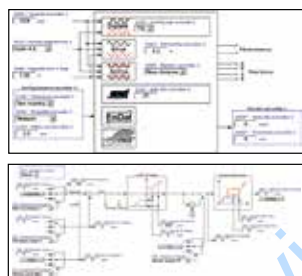
GF_eXpress is the software used to configure the parameters of the automation components, drives and sensors in the Gefran catalogue.

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.



"MDPLC" ADVANCED DEVELOPMENT ENVIRONMENT

The Motion Drive Programmable logic controller (MDPLc) development environment is a tool for the development of industrial applications based on the ADV200 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, 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)

CD-ROM MDPLc
cod. 1S3A56



STANDARD APPLICATIONS

Following applications are available on www.gefran.com web site:

➤ Torque Winder (TW)

Standard Winding/Un-Winding control, torque control in open-loop or closed-loop with load cell.

➤ Positioning control (POS)

Single axis Standard Positioning with Absolute encoder management.

➤ Electric line shaft (ELS)

Standard Electronic Line Shaft control.

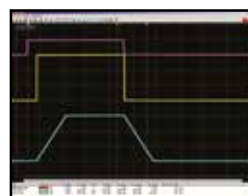
The experience GEFRRAN has acquired in the major application sectors has also produced an extensive range of specific and/or custom solutions for managing the most complex configurations in machines.

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:

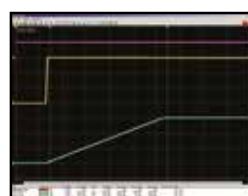
- Trigger conditions (e.g. climbing leading edge of a specific signal)
- Recording quality (a multiple of the basic clock at 1ms)
- Recording duration period
- System sizes to be recorded.



Speed cycle

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

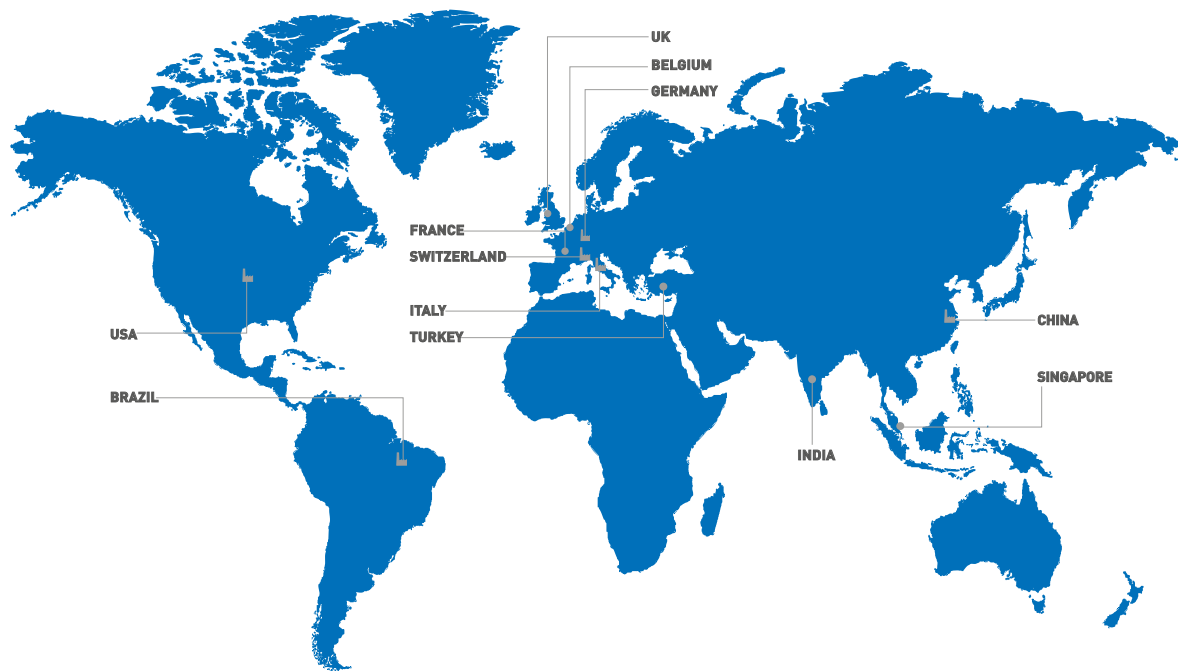
- 1) start command
- 2) ramp input speed reference
- 3) ramp output



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



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