

ENG

ADV200 SP

AC DRIVE FOR SOLAR WATER PUMPS



COD. 82341B

GEFRAN
BEYOND TECHNOLOGY

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Over fifty years of experience, an organisation highly focused on the customer's needs and constant technological innovation make Gefran a benchmark in the design and production of sensors and components for industrial process automation and control.

Expertise, flexibility and process quality are the factors that distinguish Gefran in the production of integrated tools and systems for specific applications in various industrial fields, with consolidated know-how in the plastics, mobile hydraulics, heating and lift sectors.

Technology, innovation and versatility represent the catalogue's added value in addition to the ability to create specific application solutions in association with the world's leading machine manufacturers.



APPLICATIONS



FLOOD IRRIGATION



PIVOT IRRIGATION



WATER SUPPLY IN RURAL ZONES



WATER EXTRACTION FOR
HUMAN USE



WASTEWATER TREATMENT



FISH FARMING

APPLICATION ORIENTED

Gefran is strongly committed to improving livelihoods, sustainability and energy efficiency in various sectors and geographical areas.

Increasing awareness of the potential benefits of solar technology combined with water pumping systems has generated an ever more widespread need in many different contexts, ranging from developing countries to rural areas.

Leveraging on its high-end technology, its know-how in drives and motion systems and its application-oriented approach, Gefran has developed an effective solution for solar-powered and dual-supply pumping systems.

SOLAR PUMP APPLICATION

Solar-powered water pumping is based on PV technology that converts sunlight into electricity to pump water.

The PV panels are connected to an ADV200 SP drive, which converts the electrical energy supplied by the PV panel into mechanical energy, and this in turn is converted into hydraulic energy by the pump.

Synergies between the ADV200 SP Industrial Drives technology and the company's Solar and Pump application know-how have allowed Gefran to develop a special SW app to optimize the operation of solar pump systems. As a result of the built-in MPPT dynamic search algorithm developed by Gefran, the ADV200 SP drive continuously adapts the System load at maximum output power under varying irradiation and temperature conditions. MPPT is the ideal choice to obtain the maximum pumping supply from photovoltaic cells, under any condition.

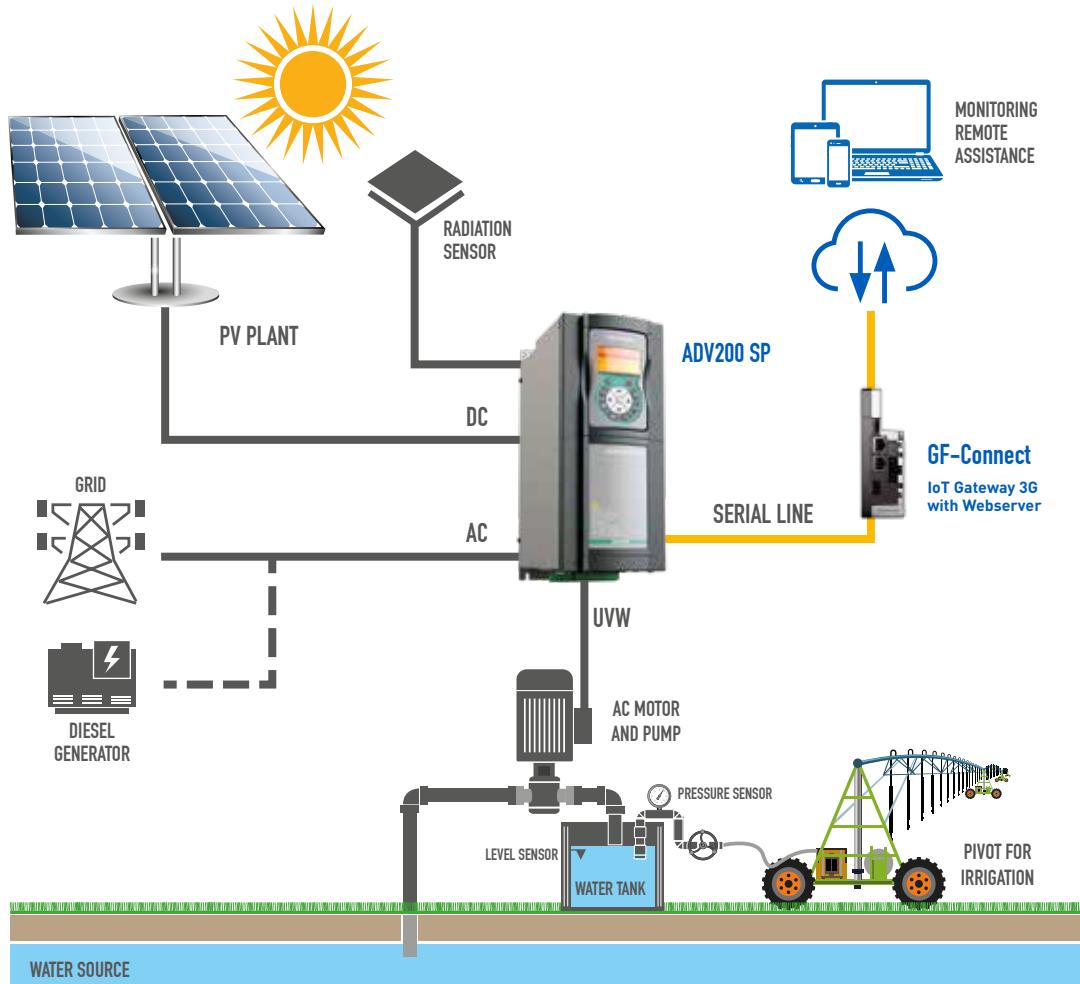
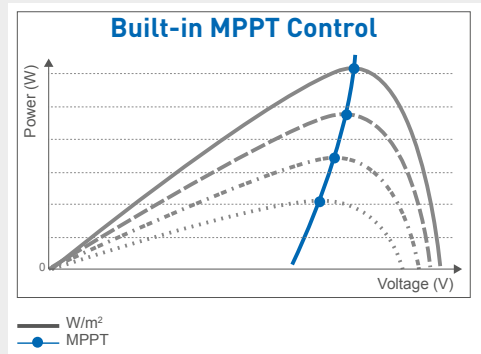
The ADV200 SP manages pumping systems powered by different sources: solar PV panels alone (off-grid), or both PV panels and grid supply (dual supply systems).

MAXIMUM EFFICIENCY AND PERFORMANCE IN ANY RADIATION AND TEMPERATURE CONDITION

The Maximum Power Point Tracking algorithm (MPPT) is an integrated controller ensuring maximum output power from solar panels so as to obtain the best pump performance in any weather condition.

By matching the MPPT controller with the dual-supply operation mode, it is possible to achieve:

- > Performance optimization
- > Continuous operation
- > Energy savings

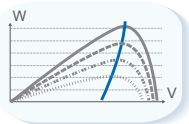


GENERAL CHARACTERISTICS

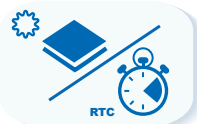
| | | |
|---------------------------------|--|--|
| Power supply | DC: 330...800 Vdc AC: 380 Vac -15% ... 480 Vac +10%, 50/60 Hz, ± 5% | |
| MPPT voltage range | 350...750 Vdc | |
| MPPT efficiency | Up to 99.9% | |
| Power Range | From 1.5 kW to 160 kW | |
| Overload | Light Duty: 110 % x In (for 60") Heavy Duty: 150 % x In (1' each 5'), 180 % x In (for 0.5") | |
| Control mode | Open loop V/f Open-loop vector control | |
| DC Choke | Integrated choke on DC side | |
| Programming keypad | Integrated KB_ADV | |
| Communication | Integrated RS485 serial line (Modbus RTU) | |
| Real Time Clock | Integrated | |
| SW features | Integrated MPPT control and optimisation Dual source control Double PID Specific functions for pump control | |
| 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 |  | Complies with the EC directive concerning low voltage equipment (Directives LVD 2014/35/EU, EMC 2014/30/EU, RoHS 2011/65/EU) |
| |  | UL and cULus, Complies with directives for the American and Canadian markets |

SPECIAL SOLAR PUMP FEATURES

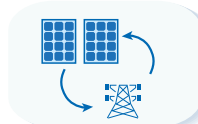
MPPT CONTROL



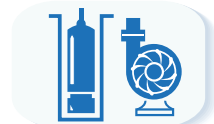
AUTO START & STOP



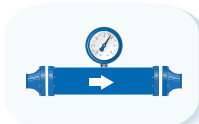
DUAL SOURCE



PUMP TYPES



PRESSURE & FLOW CONTROL



TANK LEVEL CONTROL



DRY RUN



SYSTEM PROTECTION



MONITORING



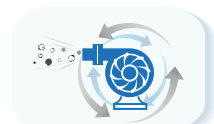
ENERGY SAVINGS



MINIMUM SPEED



PUMP CLEANING



MAIN FEATURES



PRODUCT RANGE

| Size | Power (LD) | DC Choke |
|------|------------|----------|
| 1 | 1.5-5.5 kW | Built-in |
| 2 | 7.5-15 kW | |
| 3 | 18.5-30 kW | |
| 4 | 37-55 kW | |
| 5 | 75-110 kW | |
| 6 | 132-160 kW | |

DC version available under request.



MULTIPLE CONFIGURATIONS

- Stand alone IP20
- External Heatsink
- Case IP54
- Turnkey Cabinet solution



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.

ADV200 SP FOR SOLAR PUMP

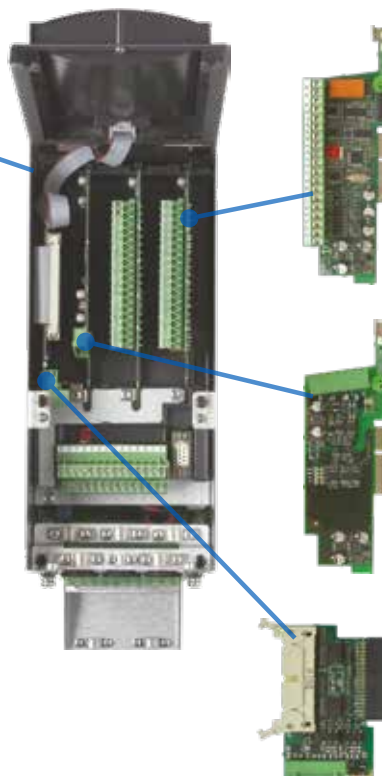


INTEGRATED KEYPAD

- > 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.

OPT CARDS

ADV200 SP manages up to 3 option cards:



> I/O expansions

- **EXP-IO-D6A4R1-ADV:** 4 DI / 2 DO / 2 AI / 2 AO / 2 NO
- **EXP-IO-D5R8-ADV:** 4 DI / 1 DO / 8 NO
- **EXP-IO-SENS-1000-ADV:** 3 AI / 2 AO signals from PT1000, NI1000, 0-10V, 0/4...20mA, KTY84, PTC (motor overtemperature control only)
- **EXP-IO-SENS-100-ADV:** 3 AI / 2 AO signals from PT100, 0-10V, 0/4...20mA, KTY84, PTC (motor overtemperature control only)

> Fieldbus interface



> Safety Card

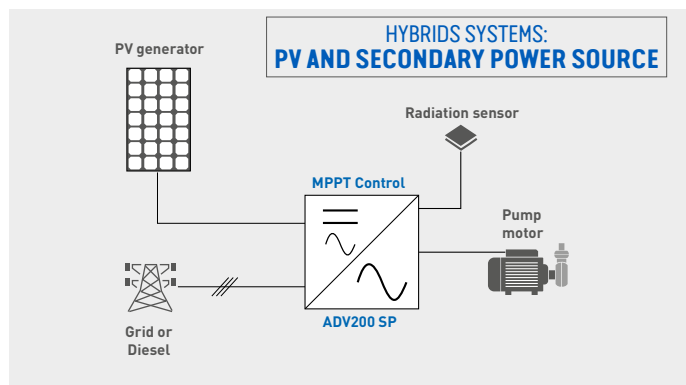
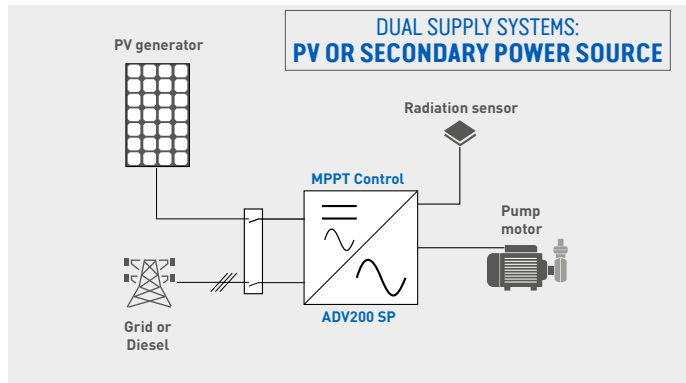
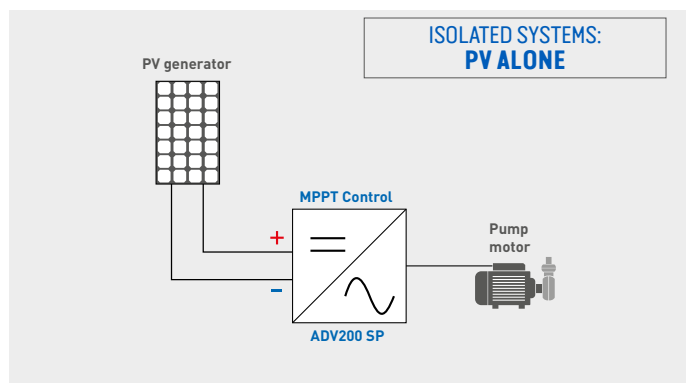
- PL=e under EN ISO 13849-1
- SIL 3 under IEC EN61508
IEC EN61800-5-2

+24 VDC

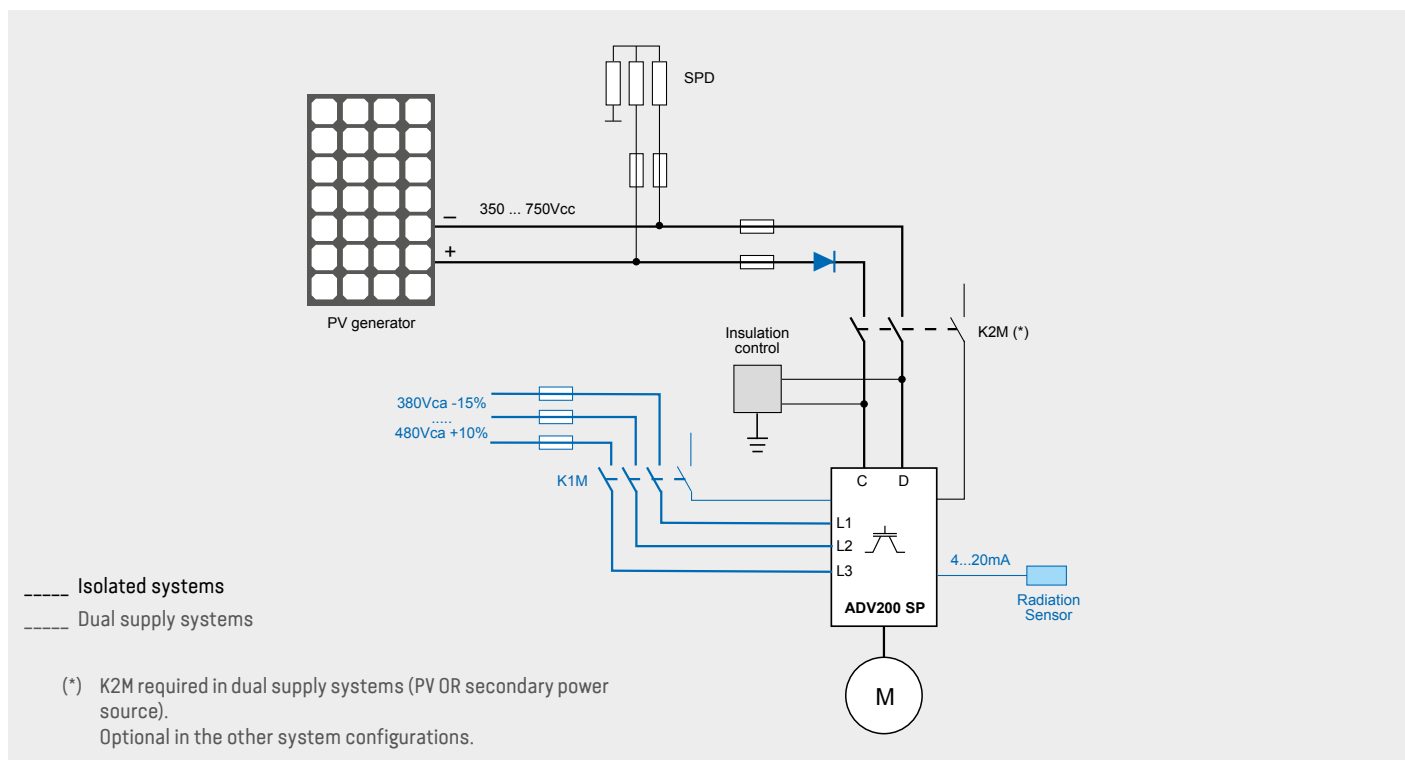
Regulation card external power supply

CONNECTIONS

ADV200 SP for solar pump applications is suitable for both isolated and dual-supply systems (grid-connected or with secondary power source):



STANDARD CONNECTION



INPUT / OUTPUT DATA

Values for Low Duty overload.

The parameters can be set to heavy duty mode; please refer to the manual for HD electrical data.

| Sizes ADP200-SP- | Input data | | | Output data | | | |
|---------------------|---------------------------------------|---------------------------------------|--------------------|------------------------|------------------------|---|------------------------|
| | IN DC input current ⁽¹⁾ | IN AC input current ⁽²⁾ | Inverter output | Pn mot | | I _{2N} Rated output current | |
| | | | | @ 540 Vdc @ 400 Vac | @ 650 Vdc @ 460 Vac | @ 540 Vdc @ 400 Vac | @ 650 Vdc @ 460 Vac |
| [Arms] | [Arms] | [KVA] | [kW] | [Hp] | [A] | [A] | |
| 1015 | 4.7 | 3.7 | 3.0 | 1.5 | 2 | 4.3 | 3.9 |
| 1022 | 6.2 | 4.9 | 4.0 | 2.2 | 3 | 5.8 | 5.2 |
| 1030 | 8.1 | 6.5 | 5.3 | 3 | 5 | 7.6 | 6.8 |
| 1040 | 10 | 8.1 | 6.6 | 4 | 5 | 9.5 | 8.6 |
| 1055 | 14 | 11.1 | 9 | 5.5 | 7.5 | 13 | 11.7 |
| 2075 | 18 | 14.0 | 11.4 | 7.5 | 10 | 16.5 | 14.9 |
| 2110 | 25 | 19.6 | 15.9 | 11 | 15 | 23 | 20.7 |
| 2150 | 33 | 26.4 | 21.5 | 15 | 20 | 31 | 27.9 |
| 3185 | 40 | 32.3 | 26.3 | 18.5 | 25 | 38 | 34.2 |
| 3220 | 48 | 39 | 32 | 22 | 30 | 46 | 41.4 |
| 3300 | 65 | 53 | 43 | 30 | 40 | 62 | 55.8 |
| 4370 | 80 | 64 | 52 | 37 | 50 | 75 | 67.5 |
| 4450 | 90 | 74 | 60 | 45 | 60 | 87 | 78.3 |
| 4550 | 125 | 89 | 73 | 55 | 75 | 105 | 94.5 |
| 5750 | 175 | 143 | 104 | 75 | 100 | 150 | 135 |
| 5900 | 210 | 171 | 125 | 90 | 125 | 180 | 162 |
| 51100 | 240 | 200 | 145 | 110 | 150 | 210 | 189 |
| 61320 | 290 | 238 | 173 | 132 | 175 | 250 | 225 |
| 61600 | 350 | 285 | 208 | 160 | 200 | 300 | 270 |

⁽¹⁾ Motor cos phi 0.9 @ 540 Vdc

⁽²⁾ Motor cos phi 0.9 @ 400 Vac

DIMENSIONS AND WEIGHTS

| Sizes | Dimensions: Width x Height x Depth | | Weight | |
|----------------|------------------------------------|-----------------------|------------------|----------------------|
| | mm | inches | kg | lbs |
| ADP200-SP-1... | 118 x 322 x 235 | 4.65 x 12.7 x 9.25 | 5.8 | 12.8 |
| ADV200-SP-2... | 150 x 392 x 250 | 5.91 x 15.43 x 9.84 | 10.2 | 22.5 |
| ADP200-SP-3... | 180 x 517 x 250 | 7.09 x 20.35 x 9.84 | 16.4 (3220=22kg) | 36.2 (3220=48.5 lbs) |
| ADP200-SP-4... | 268 x 616 x 270 | 10.55 x 24.25 x 10.63 | 32 | 70.6 |
| ADP200-SP-5... | 311 x 767 x 325 | 12.24 x 30.19 x 12.8 | 60 | 132.3 |
| ADP200-SP-6... | 422 x 878 x 360 | 16.61 x 34.6 x 14.2 | 90 | 198.4 |

DRIVE TYPE DESIGNATION AND MODELS

DRIVE TYPE DESIGNATION

ADV200-SP-X XXX -XXX-X-SI

| | | | |
|--|--|---|---|
| EXP-SFTy-ADV safety card | SI = included, [empty] = not included | | |
| Rated voltage: | 4 = 400-480 VAC, 3ph / 50-60 Hz | | |
| Software | X = standard | | |
| Braking unit: | X = not included, B = included | | |
| Keypad: | X = not included, K = included | | |
| Drive 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 = 11kW | 150 = 15kW 185 = 18.5kW 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 |
| Mechanical dimensions of the drive: | 1 = size 1 2 = size 2 | 3 = size 3 4 = size 4 | 5 = size 5 6 = size 6 |
| Inverter ADV200 Solar Pump series | | | |

ADV200-SP-3 030 -KXX-4

| | |
|--|--------------------------|
| Rated voltage: | 4 = 400 VAC, 3ph / 50 Hz |
| Software | X = Standard |
| Braking unit: | X = not included |
| Keypad: | K = included |
| Drive power, in kW: | 030 = 3.0 kW |
| Mechanical dimensions of the drive: | 3 = size 3 |
| Inverter ADV200 Solar Pump series | |

DRIVE MODELS & CODES

| Model | Code | Pn@ 400 Vac (LD) | Configuration |
|-----------------------|---------|------------------|---|
| ADV200-SP-1015-KBX-4 | S9001SP | 1.5 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-1022-KBX-4 | S9002SP | 2.2 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-1030-KBX-4 | S9003SP | 3.0 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-1040-KBX-4 | S9004SP | 4.0 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-1055-KBX-4 | S9005SP | 5.5 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-2075-KBX-4 | S9006SP | 7.5 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-2110-KBX-4 | S9007SP | 11 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-2150-KBX-4 | S9008SP | 15 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-3185-KBX-4 | S9009SP | 18.5 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-3220-KBX-4 | S9010SP | 22 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-3300-KBX-4 | S9011SP | 30 kW | Internal Braking Unit – Built-in DC choke |
| ADV200-SP-4370-KXX-4 | S9012SP | 37 kW | Built-in DC choke |
| ADV200-SP-4450-KXX-4 | S9014SP | 45 kW | Built-in DC choke |
| ADV200-SP-4550-KXX-4 | S9016SP | 55 kW | Built-in DC choke |
| ADV200-SP-5750-KXX-4 | S9018SP | 75 kW | Built-in DC choke |
| ADV200-SP-5900-KXX-4 | S9020SP | 90 kW | Built-in DC choke |
| ADV200-SP-51100-KXX-4 | S9021SP | 110 kW | Built-in DC choke |
| ADV200-SP-61320-KXX-4 | S9022SP | 132 kW | Built-in DC choke |
| ADV200 SP-61600-KXX-4 | S9023SP | 160 kW | Built-in DC choke |

Higher powers under request.

SOFTWARE

GF-eXpress PROGRAMMING SOFTWARE

Applications

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

Features

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

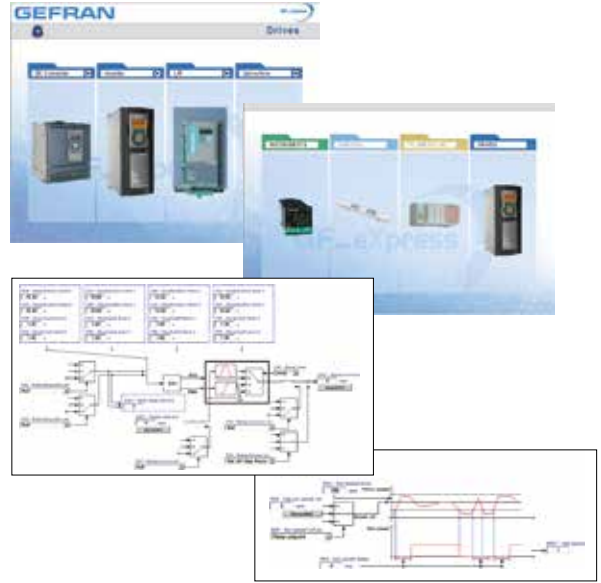
GF_eXpress software configures the parameters of the automation components, drives and sensors in the Gefran catalogue.

The graphic interface makes selecting and configuring parameters easy and intuitive. Devices are grouped according to product type and functions.

Products are searched by means of a context search and a display of product photos.

This provides a single device library for all Gefran products.

Complete configuration information for every device is given in XML format to facilitate expansion of the catalogue and parameters.



SOFTSCOPE

SoftScope is a software oscilloscope with synchronous sampling (buffered with a minimum sampling time of 1ms).

With SoftScope, the user can easily and quickly display a number of specific variables, such as commissioning variables, variables for testing performance levels achieved or for tuning control loops, etc.

SoftScope can be used to define 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.



GF_CONNECT

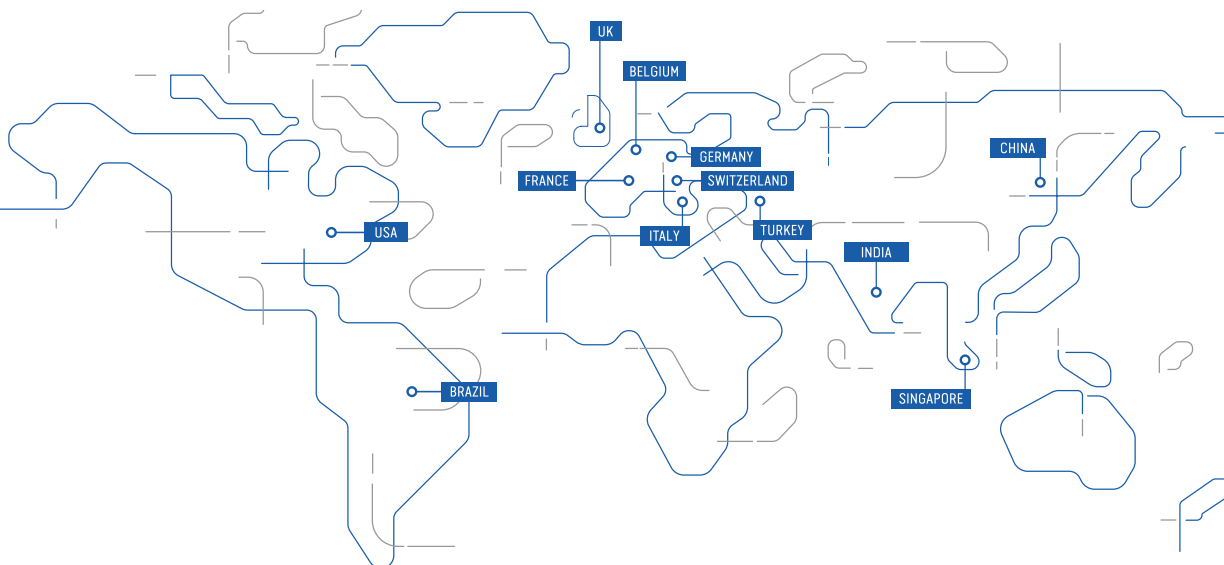
GF_Connect is Gefran's answer to customers who require connectivity and communication services.

Regardless of the type of installation (isolated or dual-supply), with GF_Connect you can make use of advanced connectivity services that allow you to remain connected to your system at all times:

- > Remote access to network or serial connected devices
- > Via tool on secure PC connection with tunnel VPN
- > Access from development environment or configuration tool (also for 485 devices)
- > Email delivery upon event
- > Pdf reports
- > Integrated web server
- > Gateway between various protocols
- > 3G module.



| Dimensions: Width x Height x Depth | | Weight |
|---------------------------------------|--|------------|
| mm (inches) | | kg (lbs) |
| 45 x 134 x 102 (1.77 x 5.27 x 4.01) | | 0.6 (1.32) |



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