

EFFICIENT WATER TREATMENT SYSTEM SOLUTIONS

GEFRAN





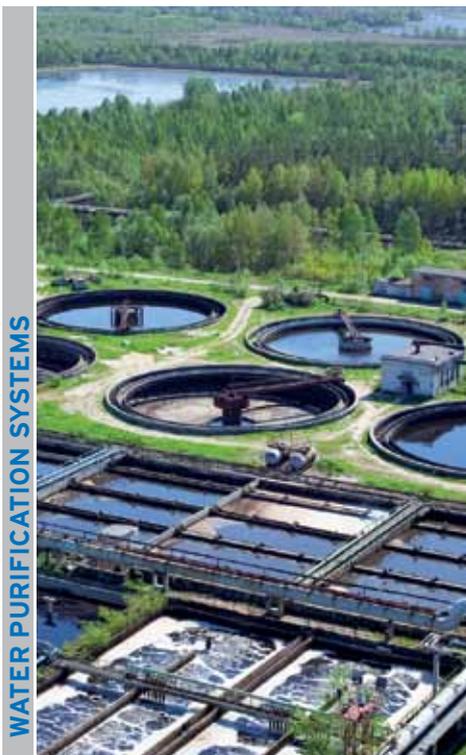
SPECIFIC WATER TREATMENT SYSTEM SOLUTIONS

When building complex systems, optimising the measuring, processing and control of process variables is of fundamental importance.

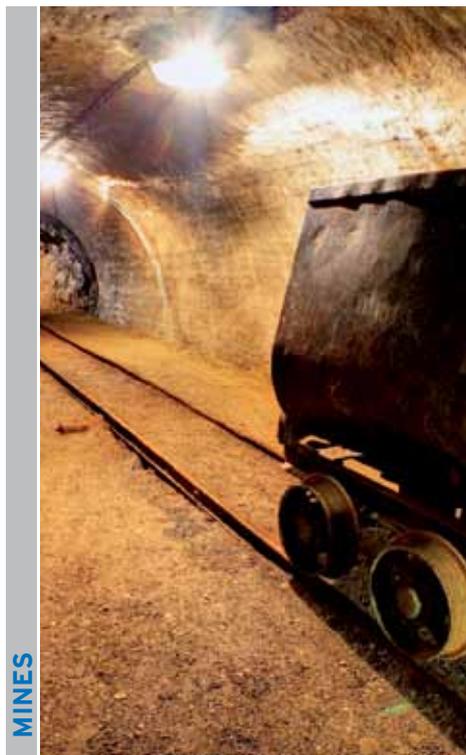
Measurement accuracy, quick response, efficiency and advanced control, are tasks that require effective optimisation, employing specific highly-technological products, enabling system Life Cycle Cost improvements, while guaranteeing the correct functioning of the entire process.

Having homogeneous solutions employing specific products designed to optimise communication, facilitate installation and maintenance, is undoubtedly a unique technological advantage for customers.

Gefran provides solutions offering complete automation, able to efficiently respond to the requirements of major applications in water management and treatment.



WATER PURIFICATION SYSTEMS



MINES



DESALINATION SYSTEMS



INTELLIGENT AND SUSTAINABLE SYSTEMS

Process intelligence, environmental sustainability and economic sustainability are the three musts of modern pumping systems.

> PROCESS INTELLIGENCE

The system should be able to monitor and control main process parameters, such as flow, pressure and level, adapting these to actual demand, preventing typical hydraulic system damage, such as water hammers and cavitation.

> ECONOMIC SUSTAINABILITY

Routine maintenance, periodic maintenance and energy consumption are the cost items with the greatest impact on the system's Life-Cycle-Cost. Inverter controls pump speed based on actual need, and specific Gefran functions improve the process and optimize operating costs.

> ENVIRONMENTAL SUSTAINABILITY

Increasingly strict protocols impose limitations on the production of pollutants. Reducing the amount of electricity consumed will help improve our living environment. By adjusting electric motor speed, the inverter modulates energy consumption and consequently CO₂ emissions.

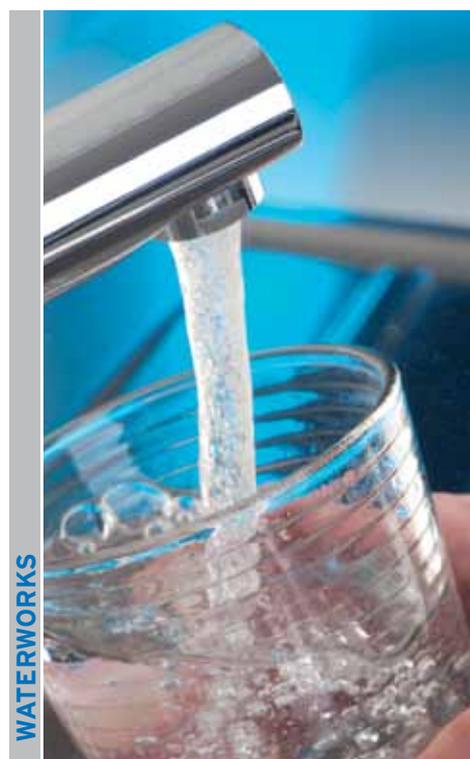
MAIN SECTORS OF APPLICATION



DISTRICT HEATING



FIRE PROTECTION SYSTEMS



WATERWORKS

MEASURING

Sensors designed to ensure suitable accuracy, robustness and quick response are responsible for measuring and enable the entire process to be checked rapidly.

Constant Pressure Application Sensors

The **KS series** is specifically designed for applications requiring quick response and mechanical robustness.

The steel case and integrated damper protect the sensor from mechanical stresses and pressure peak damage (e.g. water hammer).



Constant Level Application Sensors

The **TSA series** reads tank fill levels, "measuring" the water column above the bottom of the tank.

This series is also suitable for applications requiring very low measurement fields, thanks to its use of silicon piezoresistive technology.



CONTROLLER AND PROCESS MONITORING

Operator Panel

The integrated Controller and Operator Panel allows the complete management of automation.

It is destined mainly to operate in an industrial environment on the control panels of production process machines or processes.

Available in 2 versions (35CT 3,5" color touch; 7OCT 7" color touch for horizontal installation), and equipped with a powerful 400 MHz processor.

The operator interacts through a colour touch screen. Depending on the model, the size of the screen is 3.5" or 7" wide.

As an option, the device can be equipped with programmable function buttons.

Thanks to its numerous communication ports (some of which are optional), it is possible to connect a wide range of devices to the controller, such as computers, barcode readers, USB sticks, modems, printers, etc., and connect it to an Ethernet network.



The remote input and output modules (CAN-IO/GILOGIK II) are connected by bus to the CAN port (CANopen).

Other CANopen standard compliant devices can also be connected to the bus.



SPEED CONTROLLER

The controller manages pump speeds or, in more complex systems, the speed of several pumps.

The Drive

The **ADV200 WA** drive is used in pumping systems to enable efficient pump operation, thus avoiding oversizing during the design phase and enabling speed adjustment, in order that process requirements are followed quickly and accurately.

Mechanical part wear and elevated energy consumption caused by repeated on and off cycles, typical of fixed speed systems, has been greatly reduced by means of a continuous speed controller.

Specific functions control main system parameters, compensating for load losses, minimising damage to valves and pipes, and avoiding occasional dry pump operation.

The inverter is an ideal controller for complex multi-pump managed systems. It modulates flow in accordance with actual requirements, distributing operation hours between the various system pumps, thus reducing wear and maintenance costs.

“Custom” applications can be created with the *integrated PLC*, thus responding to any specific process management requirement.



LIFTING



When water is located below the height at which it is to be used, pumps are required. Lifting stations “lift” the water to an elevated level, thus overcoming differences in height (geodesic prevalence).

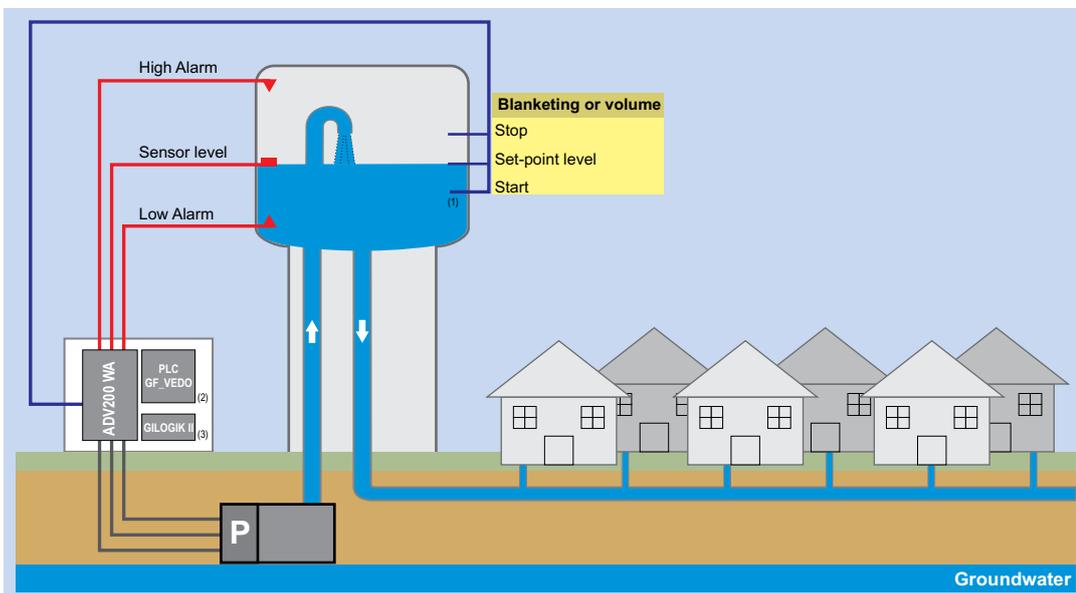
Lifting stations are used to obtain water supplies from groundwater table (captation) for both private and industrial use, as well as from accumulation systems, such as tanks or basins. Lifting stations also play a fundamental role in booster stations, facilitating the flow of sewage and rainwater.

In accumulation systems, the pumping system feeds the tank, maintaining the filling level constant in accordance with user demand, which typically varies during the day.

The inverter ensures that the pumping system works according to “constant level” logics, varying pump speed in accordance with variations in demand and guaranteeing the required accumulation capacity of the tank or underground well.

A sensor fitted externally on the bottom of the tank is responsible for measuring levels.

CONSTANT LEVEL



Through a PID control algorithm, the drive adjusts pump speed in accordance with feedback from the level (1) analog sensor, which indicates level deviation to the drive with respect to the set-point.

Two digital circuit breakers indicate when alarm levels have been reached.

(1) Analog level sensors, Gefran TSA series

(2) GF_VEDO SL series, Gefran's integrated controller (PLC and HMI)

(3) IO remote modules, Gefran GILOGIK II series.

DISTRIBUTION



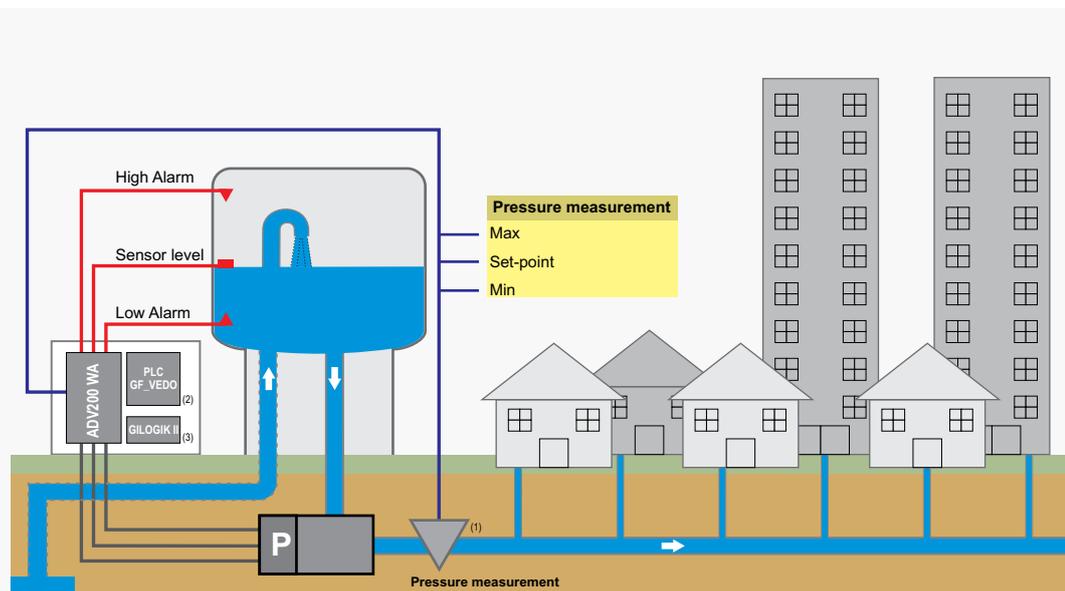
Drinking-water distribution networks branch out following the configuration of the streets in the area in a spider web structure and covering substantially 100% of the locality.

Water is transported from accumulation tanks to each building entrance through the aqueduct's pipelines, while the internal network distributes water to each user inside the building.

Powerful pumping systems keep the pressure constant, as demand changes during the day. The ADV200 WA inverter manages the pumping system in accordance with "constant pressure" logics, adjusting pump speed in order to maintain pressure within a desired range.

Pressure sensors are required to provide feedback commands to the inverter, in order to control the process.

CONSTANT PRESSURE



Through a PID control algorithm, the drive adjusts pump speed in accordance with feedback from the analog pressure sensor, which indicates to the drive the deviation of the pressure measured with respect to the setpoint.

If the recorded pressure increases, the speed of the pump decreases; if the recorded pressure drops, the speed of the pump increases.

- (1) Analog level sensors, Gefran KS series
- (2) GF_VEDO SL series, Gefran's integrated controller (PLC and HMI)
- (3) IO remote modules, Gefran GILOGIK I series.

INTAKE

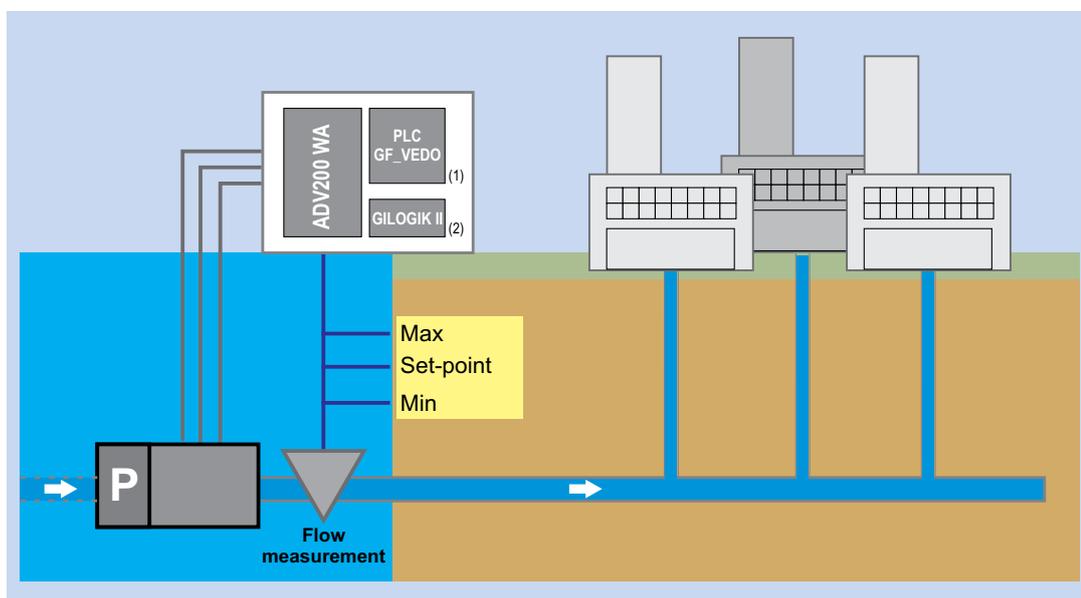


In certain geographical areas, the main water resources consist of natural surface basins, such as rivers, lakes and seas. Water is “captated” by pumping systems and then transported to purification, desalination or accumulation centres.

Water treatment systems often require a constant supply of water to ensure maximum efficiency. The ADV200 WA inverter enables pumping systems to work in accordance with “constant flow” logics, where, upon defining a flow setpoint, speed is adjusted through a PID controller.

Feedback is provided by flow meters measuring flow values, which are communicated directly to the drive.

CONSTANT FLOW



Through a PID control algorithm, the drive adjusts pump speed in accordance with feedback from the flow meter, which indicates to the drive the flow deviation with respect to the setpoint. If the recorded flow increases, the speed of the pump decreases; if the recorded flow drops, the speed of the pump increases.

(1) GF_VEDO SL series, Gefran's integrated controller (PLC and HMI)
 (2) IO remote modules, Gefran GILOGIKII series.

KS • PRESSURE TRANSMITTER



KS transmitters are based on film sensing element deposited on stainless steel diaphragm.

Thanks to the latest state of the art SMD electronics and compact all stainless steel construction, these products are extremely robust and reliable, with SIL2 certification supplied as standard.

KS transmitters are suitable for all industrial applications, specially on hydraulics (presses, pumps, power pack, fluid power, etc.) with severe conditions usually with high level of shock, vibration, and pressure and temperature peaks.

Features

- Ranges: from 0...1 bar to 0...1000 bar
- Accuracy (non-linearity, hysteresis and repeatability) $\leq \pm 0.25\%$ FS typical
- 1/4 gas male or 1/2 gas male process connection
- 0-10 V or 4-20 mA amplified output signal
- SIL2 certification supplied as standard (excluding 0-10V output)
- Overpressure 2 x FS; Bursting strength 4 x FS (max 1500 bar)
- Operating process temperature range -40...+125°C
- Compensated temperature range -20...+85°C
- Zero drift and span $\pm 0.01\%$ FS/°C typical
- IP65/IP67 protection class
- Response time max. < 1 msec
- Reduced dimensions ($\varnothing 22 \times 55$ mm and 80 g weight)
- Shock 100g-11 msec; vibrations 20g from 10-2000 Hz sec. IEC 60068.

SIL CERTIFICATION

(Safety Integrity Level) - FUNCTIONAL SAFETY



Safety is a critical requirement especially for machine builders. The new European Directive 2006/42/EC defines all the essential requirements in this regard.

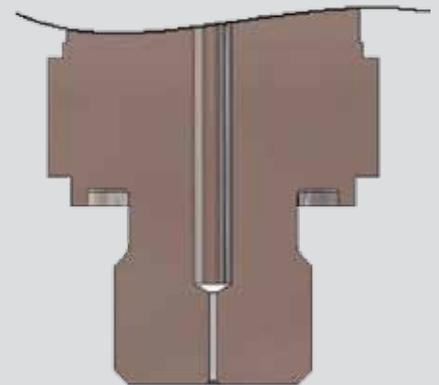
In the context of functional safety, the European directive is received by the technical standard IEC / EN 62061 "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"(SRECS).

KS pressure transmitters are certified SIL CL 2 by the Certification Body TÜV Rheinland with Test Report No.FS 28712235, in accordance with that rule, for use in applications "High Demand Mode" and then may be used in SRECS systems of machinery, where the safety variable to control will be the pressure of a fluid.

NOTES:

- 1) The SIL certification is supplied standard, and is available for pressure ranges from 0 ... 10 bar and above
- 2) For models with voltage amplified output, SIL certification is only available for versions with output at atmospheric pressure greater than zero volts (ie: 0.1 ... 10.1 V)
- 3) Full specifications and installation and user manual of KS certified SIL 2 can be downloaded directly from the website www.gefran.com

PRESSURE PEAKS PROTECTION



Many industrial applications, especially in hydraulics, could present dangerous phenomena like cavitation, liquid hammer or pressure peaks, due for example to pumps start and stop or fast closing of a valve.

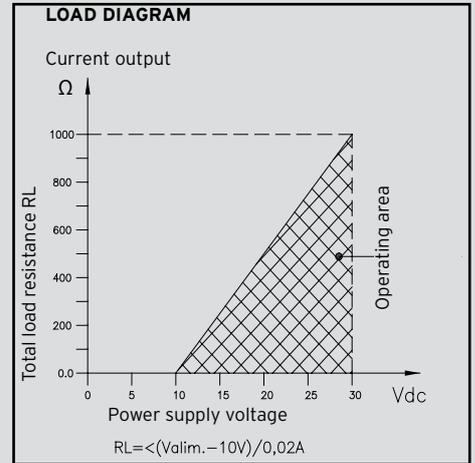
These phenomena can be harmful to the transducer. The KS series, upon request, is available with an integrated pressure snubber which, thanks to a 0.5 mm diameter through hole, eliminates these harmful peaks, to protect the transducer.

Contact Gefran to request the version with pressure snubber.

KS • PRESSURE TRANSMITTER

TECHNICAL DATA

Output signal	VOLTAGE	CURRENT
Non Linearity (BFSL)	± 0.15% FS (typ) ± 0.25% FS (max)	
Hysteresis	+ 0.1% FS (typ) + 0.15% FS (max)	
Repeatability	± 0.025% FS (typ) ± 0.05% FS (max)	
Zero offset tolerance	± 0.15% FS (typ) ± 0.25% FS (max)	
Span offset tolerance	± 0.15% FS (typ) ± 0.25% FS (max)	
Accuracy at room temperature (1)	< ± 0.5% FS	
Pressure ranges (2)	From 1 bar to 1000 bar (See table)	
Resolution	Infinite	
Overpressure (without degrading performance)	See table	
Pressure containment (burst test)	See table	
Pressure Media	Fluids compatible with Stainless Steel AISI 430F and 17-4 PH + o-ring in Viton	
Housing	Stainless Steel AISI 304	
Power supply	15...30Vdc	10...30Vdc
Dielectric strenght	250 Vdc	
Zero output signal	0 V (N); 0.1 V (C)	4 mA (E)
Full scale output signal	10 V (N); 10.1 V (C)	20 mA (E)
Allowed load	≥ 5KΩ	see load diagram
Long term stability	< 0,2% FS/per year	
Operating temperature range (process)	-40...+125°C (-40...+257°F)	
Operating temperature range (ambient)	-40...+105°C (-40...+221°F)	
Compensated temperature range	-20...+85°C (-4...+185°F)	
Storage temperature range	-40...+125°C (-40...+257°F)	
Temperature effects over compensated range (zero)	± 0.01% FS/°C typ. (± 0.02% FS/°C max.)	
Temperature effects over compensated range (span)	± 0.01% FS/°C typ. (± 0.02% FS/°C max.)	
Response time (10...90%FSO)	< 1 msec.	
Warm-up time (3)	< 30 sec.	
Mounting position effects	Negligible	
Humidity	Up to 100%RH non-condensing	
Weight	80-120 gr. nominal	
Mechanical shock	100g/11msec according to IEC 60068-2-27	
Vibrations	20g max at 10...2000 Hz according to IEC 60068-2-6	
Protection degree	IP65/IP67	
Output short circuit and reverse polarity protection	YES	
CE Conformity	According to EC Directive 2004/108/CE	



PRESSURE RANGE	Overpressure	Burst pressure
(Bar)	(Bar)	(Bar)
1	6	9
1,6	6	9
2	6	9
2,5	10	15
4	10	15
6	20	30
10	20	40
16	32	64
20	40	80
25	50	100
40	80	160
60	120	240
100	200	400
160	320	640
200	400	800
250	500	1000
400	800	1500
600	1200	1500
1000	1200	1500

FS = Full scale

(1) Incl. Non-Linearity, Hysteresis, Repeatability, Zero-offset and Span-offset (acc. to IEC 61298-2)

(2) The operating pressure range is intended from 0.5% to 100% FS

(3) Time within which the rated performance is achieved

TSA • PRESSURE TRANSMITTER



Thanks to a silicon piezoresistive sensitive part, the TSA series is able to measure very low ranges, from 0-50 mbar (0-50 cmH₂O) or 0-100 mbar (0-1 mH₂O).

Similar to the KS series, voltage or current outputs can be provided, with various types of threaded fittings and electrical connectors.

TSA pressure transmitters are suitable for constant level applications. In these applications, tanks contain several meters of water columns, which are the equivalent of a few tens or hundreds millibars.

Functions

- Measurement ranges from 0...0.05 to 0...60 bar relative pressure and 0...1 to 0...40 bar absolute pressure
- Accuracy (non-linearity, hysteresis and repeatability) $< \pm 0.25\%$ FS typical (BFSL)
- $\frac{1}{4}$ gas male process connection (+ wide range on request)
- Overpressure 8 x (max. 90 bar)
- Bursting strength 10 x (max. 120 bar)
- Process temperature field -20...+85°C (135°C)
- Compensated temperature field -10...+85°C
- Zero drift and span $\pm 0.01\%$ FS/°C typical (fields > 1 bar)
- New digital electronics
- Wide range of electrical connectors (DIN 43650A and C, M12x1, Cable, etc.)
- Protection degree IP65/IP67
- The new structure and hexagon spanner facilitates problem-free tightening
- Response time (max.) < 1 msec.

Output signal	VOLTAGE	CURRENT
Accuracy (1)	$\pm 0.15\%$ FSO typical; $\pm 0.2\%$ FSO max (gauge ranges) $\pm 0.15\%$ FSO typical; $\pm 0.25\%$ FSO max (absolute ranges)	
Resolution	Infinite	
Overpressure (without degrading performance) (2)	see table	
Pressure containment (Burst test) (3)	see table	
Pressure media	Fluid compatible with AISI 316 Stainless steel, AISI 304, NBR, Viton	
Body materials	AISI 304 Stainless steel	
Power supply	15...30Vdc	10...30Vdc
Supply sensitivity	$< 0.0015\%$ FSO/V	
Insulation resistance	> 1000 M Ω @ 50Vdc	
Zero output signal	B, C, M, N, P, Q, R	4mA (E)
Full scale output signal	B, C, M, N, P, Q, R	20mA (E)
Max current absorption	< 13 mA	< 32 mA
Max allowed load	1mA	See diagram
Long term stability	$< 0.1\%$ FSO/per year (ranges ≥ 250 mbar)	
Operating temperature range (process)	-20...+85°C (-4...+185°F)	
Compensated temperature range	-10...+85°C (+14...+185°F)	
Storage temperature range	-30...+90°C (-22...+194°F)	
Temperature effects over compensated range (zero-span)	$\pm 0.01\%$ FSO/°C typical ($\pm 0.02\%$ FSO/°C max.) ranges > 1 bar $\pm 0.04\%$ FSO/°C typical ranges ≤ 1 bar	
Response time (10...90%FSO)	< 1 msec.	
Start-up time	< 500 msec.	
Mounting position effects	Negligible (ranges ≥ 1 bar)	
Humidity	Up to 100%RH non condensing	
Weight	110 gr. nominal	
Mechanical shock	100 g / 1 msec. according to IEC 60068-2-27	
Vibrations	20 g max a 15-2000Hz according to IEC60068-2-6	
Protection degree	IP65/IP66/IP67	
Output short circuit and reverse polarity protection	YES	

MEASUREMENT RANGE	Overpressure	Burst test
(Bar)	(Bar)	(Bar)
0.05	3	10
0.1	3	10
0.25	2	2.5
0.5	4	5
1	5	10
0.8-1.2	3	10
2	10	20
2.5	12.5	25
4	20	40
5	20	50
6	35	50
7	35	70
10	40	100
16	80	120
20	80	120
25	90	120
30	90	120
40	90	120
50	90	120
60	90	120

Absolute ranges ≥ 2 bar: overpressure 3xFS; burst test > 200 bar

FSO = Full Scale Output

(1) BFSL method (Best Fit Straight Line): includes combined effects of Non-Linearity, Hysteresis and Repeatability

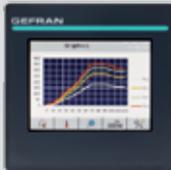
(2) tested for more than 1000 strokes with single duration < 2 msec.

(3) tested for more than 100 strokes with single duration < 2 msec.

GF_VEDO SL SERIES • INTEGRATED CONTROLLERS AND OPERATOR TERMINALS



GF_VEDO SL-70CT



GF_VEDO SL-35CT

Main features

- PLC + HMI in a single product
- Integrated Ethernet port
- Widely available communication ports.
- One single programming environment.

Management

The GF_VEDO SL control and display unit facilitates complete system management. Intuitive and efficient graphics enabling rapid synoptics, in combination with an integrated controller [PLC IEC61131.3], allow a complete control of the entire system.

Data-logging

Data storage and display are fundamental elements. Data can be exported easily using the internal memory and SD card expansion, while color graphical trends enable immediate viewing of performance.

Reporting

Data reports, alarm history and easy export to USB and/or Ethernet line are functions that facilitate proper maintenance and prevention of system failures.

Remote Control

Systems can be controlled and viewed remotely via connections to company LANs, modems.

All parameters are available through different levels of security providing complete system diagnostics.

TECHNICAL DATA

		35CT	70CT
POWER	Operating voltage	24 Vdc ±25%	
	Absorbed current (at 24 Vdc)	300 mA max	350 mA max
	Dissipated power	7.5 W max	8.5 W max
	Protections	Protection for polarity inversion Short circuit	
	Connection	3-pole polarised extractable connector Screw terminals, max wire section 2.5 mm ²	
BACK-UP BATTERY	Type	Ricaricabile Li-AI 3 V 65 mA/h, tipo ML2032, non sostituibile	
	Duration	10 years - in absence of power: 20 months	
CONNECTIONS	CAN port	Opto-isolated Connector: DB9 M Speed: 10 kbit/s ... 1 Mbit/s Termination: to be managed externally	
	Ethernet port (ETH)	Connector: RJ45 Speed: 10 / 100 Mbit/s Signals: green connection LED, yellow data LED	
	RS-485 port (optional)	Opto-isolated Connector: DB9 M Speed: 9.6 kbit/s ... 115 kbit/s	
	RS-232 port (optional)	Connector: DB9 M Speed: 9.6 kbit/s ... 115 kbit/s	
	USB port (optional)	Connector: type A Standard: USB 2.0	
COMMUNICATIONS PROTOCOLS	Ethernet	FTP (File Transfer Protocol) Modbus TCP/IP Master/Slave	
	CAN	CANopen Master	
	Modbus	Modbus RTU Master/Slave	
DISPLAY	Type	TFT touch screen with 4-wires resistive technology	
	Dimensioni (diagonale)	3,5"	7" horizontal
	Resolution in pixels	320 x 240 (QVGA)	800x480(WVGA)
	Display area (W x H)	70 x 52.5 mm	152.4x91.4mm
	Colours	262,000	
	Brightness	400 cd/m ²	240 cd/m ²
	Contrast	400:1	1000:1
	Backlighting	White LEDs, duration 50,000 hours @ 25 °C	
CONFIGURATION ELEMENTS	Procedure software access	16-position dial	
	Keypad (optional)	6 programmable function buttons	10 programmable function buttons
MICROPROCESSOR	Type	ARM9	
	Frequency	400MHz	
MEMORY	System	64 MB, type SDRAM	
		• 12 MB HMI application	
		• 2.5 MB PLC applicative	
	Retentive	• 32 kB retentive variables (FLASH / FRAM)	
	Mass	• 1 MB data logger (FLASH)	
MEMORY	Mass	128 MB, type FLASH	
	Mass extension	• 32 MB for user	
ENVIRONMENTAL CONDITIONS	Operative temperature	0 ... +50 °C (according to IEC 68-2-14)	
	Storage temperature	-20 ... +70 °C (according to IEC 68-2-14)	
	Relative humidity	95% RH non condensing (according to IEC 68-2-3)	
ASSEMBLY		Embedded, in control panels	
DEGREE OF PROTECTION		IP 65 on the front (according to IEC 68-2-3)	
WEIGHT		0.25 kg	0.5 kg
CE STANDARDS	EMC conformity (electromagnetic compatibility)	Observance of directive 2004/108/CE EMC Emission: EN 61000-6-4 EMC Immunity: EN 61131-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	
	LV conformity (low voltage)	Observance of 2006/95/CE Safety LVD: EN 61010-1	

A RANGE FOR EVERY SYSTEM REQUIREMENT



ADV200 WA (Water & Air) draws specific pump, fan and compressor management functions together into a single product for both private and industrial use.

- 7 different mechanical sizes
- Power from 1.5kW to 1.8MW
- Three-phase supply voltage at 400, 575, 690 VAC, 50/60Hz
- Open loop vector control and Voltage/Frequency.

ELECTRICAL PANEL CONFIGURATIONS



Electrical panel inverters with IP31 and IP54 protection ratings are available in "Ready to Use" and "Basic" configurations for power ratings from 90kw to 1800kW.

- **Ready to Use:** complete panel, ready for installation. The panel is pre-assembled with the entire power section, as well as all the necessary auxiliaries and push-button panels at the system start.
- **Basic:** equipped with the power section only, without any auxiliary circuitry. The choice of auxiliary circuit systems is left to the customer, in accordance with their specific needs.

OPTIONS

ADV200 WA manages up to 3 option cards:



> I/O expansions



> Fieldbus interface



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

EXP-CAN-ADV	Expansion card for CANopen® and DeviceNet interface
EXP-PDP-ADV	Expansion card for Profibus-DP interface
EXP-ETH-GD-ADV200	Ethernet GD-net interface expansion card
EXP-ETH-CAT-ADV200	EtherCAT interface expansion card
EXP-ETH-IP-ADV200	Ethernet IP interface expansion card
SBI_LonWorks	LonWorks interface expansion card (*)
SBI_BACnet MS/TP	BACnet interface expansion card for MS/TP networks (*)
SBI_BACnet/IP	BACnet interface expansion card for IP networks (*)

(*) external optional

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=d under EN ISO 13849-1
- SIL 3 under IEC 61508
- EN 954-1 Cat. 3.

PROCESS CONTROL FUNCTIONS



Load loss compensation:

when flow is reduced following a fall in demand, load losses diminish and supply pressures should also be reduced in an attempt to maintain pressure constant at the point of delivery.

PID controller automatic self-calibration:

the optimum combination of Proportional and Integrative gains is calculated, controlling the process in relation to the desired setpoints.

SYSTEM PROTECTION FUNCTIONS



Controlled system filling:

flow can be controlled in order to prevent damage (e.g. water hammer).

Check valve protection:

ramped to prevent valve damage caused by sudden pump shut downs.

Anti-damage pump curve:

the drive allows for the minimum speed to be reached in the shortest possible time.

Dry pump operation alarm:

the drive is capable of indicating whether there is a lack of flow.

Pump cleaning:

the pump cleaning function serves to free the pump from any solid residues in the impeller.

SPECIFIC ENERGY SAVING FUNCTIONS



Pause mode

This feature helps reduce electricity consumption to a minimum.

The pump operates at low speed when flow demand is minimum and the PID controller is still able to maintain the desired reference pressure. The pump will shut down if this condition protracts. The feedback is constantly monitored and when it drops below a predefined threshold, the pump is started again

MULTI-PUMP SYSTEMS



The drive is able to control pumping systems comprising multiple pumps in parallel.

- **Standard configuration:** the master pump is fixed and continuously controlled by the inverter, while the slave pumps are always fixed speed pumps controlled by relays.
- **Master pump configuration:** one single pump does not act as the master pump, rather all of the pumps act as the master pump in rotation, thus distributing wear and allowing for the master pump to be put "out of service" for maintenance.

ADV200 WA



QUICK INSTALLATION AND COMMISSIONING

The man-machine interface is simple and intuitive thanks to the immediate start-up features of the wizard tool available in more than one language.

The interface features two modes - Easy and Expert - satisfying any user level and meeting programming needs of varying complexity.

The inverter is managed with a 4-line, 21 character alphanumeric LCD keypad that displays all of the parameters and provide rapid navigation.

The keypad is able to store up to 5 complete sets of drive parameters, enabling drive configuration uploading and downloading.

ADV200 WA offers programming in 5 languages (English, Italian, French, German, Spanish) as standard.



INTEGRATED PLC FLEXIBILITY AND CUSTOMISATION

Motion Drive Programmable logic controller (MDPlc) is the Gefran software solution that allows for application writing, compiling, downloading and debugging using a graphical interface.

The tool generates the application code directly in machine language, compiling the written application in PLC languages that comply with the IEC 61131-3 international standard, providing the user with 5 languages for the programming of applications:

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

The application can be developed accessing all drive variables and parameters, including system (processor) and adjustment (for example, voltages and instant currents).



All drive and application variables can be accurately viewed numerically and graphically in special windows thanks to 1-ms synchronous acquisition buffering.

The application is able to exchange data directly with the supervisory PC/PLC or remote I/O modules using the fieldbus available in the drive.

A series of diagnostic tools are integrated in the MDPLc tool. These tools optimise application troubleshooting, highlighting programming errors displayed in a special window during compilation.

Applications can be created in certain industrial processes or in waterworks located in small and medium sized urban centres without requiring the installation of external PLCs, thus limiting initial and management costs.

TECHNICAL CHARACTERISTICS

		ADV200 WA-4	ADV200 WA-4-DC	ADV200 WA-6	ADV200 WA-6-DC
Power supply		3 x 380V _{AC} -15% ... 500V _{AC} +5%	450...750V _{DC} ;	3 x 690V _{AC} ±10%; 50-60 Hz ± 2% (5750 ... 61320), 3 x 500...690V _{AC} ±10%; 50-60 Hz ± 2% (71600 ... 1000kW)	840 ... 1120V _{DC} (5750 ... 61320); 600 ... 1120V _{DC} (≥ 71600)
Power ratings		from 1.5kW to 1.2MW	from 22kW to 1.2MW	from 75kW to 1.2MW	from 250kW to 1.2MW
Maximum output voltage		0.98 x U _{LN}	0.98 x U _{LN} (1)	0.95 x U _{LN}	0.95 x U _{LN} (1)
Maximum output frequency f₂		1015...72500: 500Hz ≥ 73150: 200Hz	3220...72500: 500Hz ≥ 73150: 200Hz	5750...6900: 400Hz 61100...61320 : 200Hz 72000: 500Hz ≥ 72500: 200Hz	72000: 500Hz ≥ 72500: 200Hz
IGBT braking unit		Sizes 1015 ... 3300: Internal (with external resistor) Sizes 4370 ... 5750: Internal optional (with external resistor) Sizes ≥ 5900: External optional (BUy series)	External optional (BUy-4 series)	External optional (BUy-6 series)	
Overload		Light Duty: 110 % x I _n (for 60") Heavy Duty: 150 % x I _n (1' each 5'), 180 % x I _n (for 0,5")		Sizes 5750...6900: Light Duty: n.a. Heavy Duty: 136 % x I _n (for 60"), 183 % x I _n (for 0,5") Sizes ≥ 72000: Light Duty: 110 % x I _n (for 60"); Heavy Duty: 150 % x I _n (1' each 5'), 180 % x I _n (for 0,5")	
Control mode		Open-loop vector control Open loop V/f and V/f with feedback			
Schede opzionali		Integration of up to 3 options onboard the drive "Safety STO" card compliant with SIL3 machine safety directive (for ADV200WA-...+SI models) EXP-IO-SENS-100-ADV, EXP-IO-SENS-1000-ADV and EXP-IO-D5R8-ADV cards			
Standard supply configuration	Programming keypad	Integrated KB_ADV			
	Regulation	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Integrated choke DC side (up to 160 kW) • Integrated mains filter • Integrated dynamic braking module (up to 75kW), external optional (>90kW) 			
	Reference resolution	<ul style="list-style-type: none"> • 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 e 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		Complies with the EEC directive concerning low voltage equipment			
		ADV200WA-4 and ADV200WA-4/4A-DC: UL and cULus, Complies with directives for the American and Canadian markets.			

(1) AC Input voltage from separate SM32 or AFE200 power supply unit.

All Gefran products (Drives, Sensors and automation Components) can be managed via a PC using the GF eXpress tool enabling configuration and parameterisation.



The selection of the product to configure is easy and intuitive thanks to a graphical interface featuring real product images sorted by type and function.

The selected product can be configured in several languages in two different ways

- Using a sub-set of predefined parameters
- Using a graphical interface wizard with context menus.

Custom configuration menus can be created following either procedure.

GF eXpress: one software only for configuring

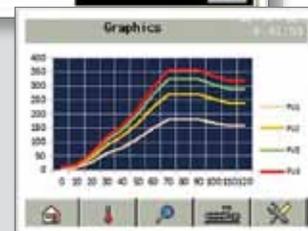


GF_Project LX is the integrated development environment (IDE) for real-time control applications of Gefran automation, sensor and drive devices.

GF_Project LX includes a series of tools to develop various application solutions and all design phases, such as maintenance or integration application software, testing and commissioning

GF_Project LX is able to:

- Develop automation solutions while safeguarding application configuration investments and reducing time to market
- Build applications that fully control machines and systems, as well as graphical interface configurations
- Develop multiplatform solutions
- Reduce learning times, enabling guided development and the elimination of configuration errors by exploiting graphical type configurations
- Easily reuse parts of existing projects.



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