### Pressurisation

**Fixed Speed Domestic and Industrial Pressurisation (GP)**

- Introduction
- 2GP AGA
- 2GP CDA
- 2GP 2CDX
- 2GP COMPACT
- 2GP MATRIX
- 2GP CVM
- 2GP HVM
- 3GP CVM
- 3GP HVM
- 2GP 3M
- 2GP EVMG
- 3GP 3M
- 3GP EVMG

**Variable Speed Domestic and Industrial Pressurisation (GPE)**

- 2GPE COMPACT E-power
- 2GPE MATRIX E-power
- 2GPE CVM E-power
- 2GPE MATRIX Hydrocontroller
- 1GPE HVM E-drive
- 1GPE EVMG E-drive
- 2GPE CVM E-drive
- 2GPE HVM E-drive
- 2GPE EVMG E-drive
- 3GPE CVM E-drive
- 3GPE HVM E-drive
- 3GPE EVMG E-drive
- 2GPE 3M EFC
- 2GPE EVMG EFC
- 3GPE 3M EFC
- 3GPE EVMG EFC

### Accessories

**Electrical Enclosures for GP Fixed Speed Units**

- SERIE 2EP
- SERIE 3EP

**Variable Speed Control System**

- E-Power
- Hydrocontroller
- E-Drive

**Electrical Enclosures for GPE Fixed Variable Speed Units**

- SERIE EFC/MFC

**Technical Annex**
DEFINITION AND USE OF PRESSURISATION UNITS
In situations in which a municipal water mains is lacking or insufficient for the proper operation of the services, one must install a pressurisation unit to provide acceptable pressure and flow rates to even in the most unfavourable services. Pressurisation units are used wherever there is a need to increase the pressure, or to pressurise a water circuit. EBARA GP pressurisation units are small automatic systems with 2 or more pumps operating in parallel, designed to provide a simple and reliable solution to the most common requirements for maintenance of water supply pressure for apartment buildings, hotels, centres, offices and schools as well as providing auxiliary service in industrial and agricultural applications. They stand out for their robust construction, compact size, excellent efficiency and silent operation. GP units are equipped for connection to membrane and air cushion autoclaves. They are controlled by pressure switches or, for units with INVERTER control, by the signal from a pressure transducer.

PRINCIPLE OF OPERATION OF GP PRESSURISATION UNITS
When water is demanded, it is first drawn from the autoclave tank (if present). This demand for water, with the pumps stopped, lowers the pressure until the pressure switch with the highest setpoint trips and starts the first electropump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. This happens for all pumps in the unit. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the motors were started up, the number of hourly starts per pump is reduced and they are all used to the same extent. NB: By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

PRINCIPLE OF OPERATION OF GPE PRESSURISATION UNITS
GPE units are designed to operate with a pump controlled by an INVERTER in the electrical enclosure, on board the motor, or in-line. The unit thus maintains constant pressure in the water circuit. There are various versions of GPE unit:
- With INVERTER in the electrical enclosure (Standard EFC version)
- With a single INVERTER controlling a single pump which is alternated with the others at each start up (MFC version, on request, in which each pump is INVERTER controlled).
- With multiple INVERTERS, each pump controlled by its own INVERTER (MFC versions, versions with INVERTER on board motor or in-line INVERTER)

OPERATING CONDITIONS
EBARA GP-GPE pressurisation units can be used, in their standard versions, for civil, industrial and agricultural applications, as follows:
- building service
- water lifting and handling
- A/C
- heating
- irrigation
- washing systems
The conveyed fluid must be: clean, potable, ground or mixed water, free of solid or fibrous suspensions and aggressive chemical substances. The units must be installed under cover, protected from the weather and freezing.
- Conveyed water temperature 0 - 50°C (depending on pumps).
- Ambient operating temperature 0 - 40°C, no higher than 1000 m above sea level.
- Max relative humidity 50% at +40°C.

NB: The system available NPSH must be greater than the NPSH demanded from the pump. For applications with different technical specifications, uses and climatic conditions (type of vector fluid, marine and aggressive industrial conditions), please contact our sales network.

TESTS AND TRIALS
Before shipping, all EBARA pressurisation units are subject to hydraulic, mechanical and electrical testing.

MECHANICAL AND HYDRAULIC TESTS
- Pressure switch calibration
- Pump direction of rotation
- Mechanical testing of moving parts and running noise (on each pump)
- Tightness test with delivery port closed and nameplate rating tests
- MANUAL trials (using button on electrical enclosure) for each pump
- AUTOMATIC trials (using switch on electrical enclosure) for unit

ELECTRICAL TESTS
- Earthing system continuity
- Applied voltage (dielectric rigidity)
- Insulation resistance
**PRINCIPLE OF OPERATION OF GPE PRESSURISATION UNITS WITH E-power, Hydrocontroller and E-drive**

GPE units with E-power, Hydrocontroller or E-drive are designed to operate with pumps controlled by an INVERTER installed on board the motor (E-drive) or of the in-line type (E-power, Hydrocontroller). As the system pressure varies, the MASTER pump varies its rotary speed to restore it to the setpoint.

If the water demand exceeds the capacity of the pump, the second variable speed pump cuts in and, at the same time, the MASTER pump goes into regulation mode to maintain the pressure setpoint; this happens for all the pumps in the unit.

If the water demand drops off, the pressure tends to increase and the MASTER pump gradually reduces its speed to restore the correct operating pressure. This results in the regulation of the speed of the other pumps, until they gradually turn off. Once the system pressure has been restored and the water demand is 0, the MASTER pump switches off automatically.

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**Controlling a unit with an EFC control panel**

**EFC** multiple pump control units power pump n. 1 with the INVERTER to modulate system performance in relation to the reference signal while the other pumps are run at maximum nominal speed (around 2900 rpm) and started and stopped in relation to demand. These means there are two distinct primary electrical circuits:

- **n. 1 - INVERTER startup/control of a single pump**
- **n. 2 - contactor startup (direct or star/delta) of the other pumps**

The system is controlled by an electronic controller in relation to the reference signal supply by a pressure transmitter, flow meter or other unified control signal (4 - 20 mA passive).

If the electronic controller or pressure transducer fails, a system of pressure switches controls the pumps directly (if present).

- In case of water distribution at constant pressure (Fig.1), the electronic controller is connected to the pressure transmitter on the units’ delivery manifold, which outputs a signal proportional to the circuit pressure.

  When the pressure drops due to water demand, the pressure transmitter signal also drops and the controller starts and controls the speed of the first pump with the INVERTER to restore the reference/operating pressure. If the pump’s flow rate is lower than demand, the circuit pressure will continue to drop and the system responds by increasing the pump’s speed.

  Once pump n. 1 reaches its maximum speed and demand is still in excess of its delivery, the controller will start pump n. 2 at maximum speed. The speed of pump n. 1 is immediately modulated so as to establish the operating pressure. If the pressure drops even further and pump n. 1 is once again running at maximum speed, the controller starts up pump n. 3, and so on for all pumps in the unit.

  If the water demand drops off, the pressure tends to increase and the controller reduces the speed of pump n. 1 to restore the correct operating pressure. At this point, the controller will stop one of the pumps running at maximum speed, while the speed of pump n. 1 is modulated to maintain the reference pressure. As the pressure continues to increase due to reduced demand, once the minimum speed of pump n. 1 is reached once more the controller will stop pump n. 1.
The contents of this publication must not be regarded as binding. EBARA Pumps Europe S.p.A. reserves the right to effect any modification it deems necessary, without prior notice.

n. 3 and then pump n. 2.

Once the demand for water has completely ceased, the controller reduces the speed of pump n. 1 to its minimum and after a set delay (around 1 minute) stops this pump too.

The next time the system is started up, the INVERTER controlled pump will no longer be pump n. 1, but n. 2. The INVERTER controlled pump thus rotates through all pumps in sequence.

Controlling a unit with an MFC control panel

MFC multiple pump control panels power each pump with an INVERTER to modulate system performance in relation to the reference signal.

MFC controllers differ from EFC controller from the point of view of their construction, since instead of having a single INVERTER to control all the pumps, each pump has its own INVERTER.

The two types of control panel differ in construction, but they have the same type of operation by the controller, which responds to the reference signal output by a pressure transmitter or other unified control (4 - 20 mA passive).

If the electronic controller or pressure transducer fails, a system of pressure switches controls the INVERTERS directly.

• In case of water distribution at constant starting pressure (Fig.1), the electronic controller is connected to the pressure transmitter on the units’ delivery manifold, which outputs a signal proportional to the circuit pressure.

When the pressure drops due to water demand, the pressure transmitter signal also drops and the controller starts and controls the speed of the first pump with the INVERTER to restore the reference/operating pressure. If the pump’s flow rate is lower than demand, the circuit pressure will continue to drop and the system responds by increasing the pump’s speed. Once pump n. 1 reaches its maximum speed and demand is still in excess of its delivery, the controller will start pump n. 2, also at variable synchronous speed.

The controller will modulate the speed of the two pumps to restore the operating pressure; the modulating frequency is the same for both pumps.

If the pressure drops even further and pumps n. 1 and 2 are once again running at maximum speed, the controller starts up pump n. 3, and then pump n. 4, if present.

When the water demand is reduced the pressure will end to increase, as does the pressure transmitter output value.

The controller thus reduces the speed of pumps n. 1, 2, 3 and 4 (they are all controlled at the same speed) to restore the reference/operating pressure.

If the pumps’ flow rate is greater than demand, the circuit pressure will continue to increase and the system responds by decreasing the speed of the pumps until it reaches the minimum speed setting.

At this point, the controller will stop pump n. 4, while the speed of pumps n. 1, 2 and 3 is modulated to maintain the reference pressure. As the pressure continues to increase due to reduced demand, once the minimum speed setting is reached again, the controller will stop pump n. 3 and modulate the speed of pumps n. 1 and 2.

This continues in sequence as the demand continues to fall, until the unit is completely stopped.

Fig. 1 - TWO PUMP UNIT WITH CONSTANT PRESSURE REGULATION
GP - GPE
PRESSURISATION UNITS

PRESSURISATION UNIT WATER CIRCUIT DIAGRAM

LEGEND
1 Electric pump
2 Intake manifold
3 Intake shut off valve
4 One-way valve
5 Delivery shut off valve
6 Delivery manifold
7 Check valve
8 Pump control pressure switches
9 Pressure gauge
10 Membrane tank (optional *)

PRESSURISATION UNIT DIAGRAM AND COMPONENTS

LEGEND
1 Electric pump
2 Intake manifold
3 Check valve
4 One-way valve
5 Nipple for air feed (GP version only)
6 Check valve
7 Delivery manifold
8 Check valve
9 Pump control pressure switches
10 Pressure gauge
11 Membrane tank (optional *)
12 Control panel
13 Pressure transducers (GPE version only)
14 Bracket/sleeve for mounting manifolds
CE Marked protection and control panel

- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power:
  - single-phase 230V, 50Hz
  - three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

DOMESTIC PRESSURISATION

Units with two horizontal single-impeller self-priming pumps with cast iron hydraulic equipment.

TYPICAL APPLICATIONS

2GP pressurisation units have the following applications:

- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT

- Two AGA series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.75 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure:
  - 6 bar for AGA 0.60-0.75-1.00
  - 10 bar for the rest of the range
- Max fluid temperature: 45°C

PUMP MATERIALS
- Cast iron pump body
- AISI 304 seal disk for AGA 0.60-0.75-1.00, cast iron integrated into motor mount for the rest of the range
- AISI 303 steel shaft (part coming into contact with liquid)
- PPE+glass fibre reinforced PPS impeller for AGA 0.60-0.75-1.00, brass for the rest of the range
- Ceramic/carbon fibre/NBR mechanical seal
- Ejector and diffuser in PPE + glass fibre reinforced PS

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Single-phase voltage 230V ±10%, 50Hz, three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

PRINCIPLE OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in reverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal, and ready for connection to external air supply.
- Packaging
- Installation, user and maintenance instructions

DOMESTIC PRESSURISATION
**TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY**

<table>
<thead>
<tr>
<th>Model</th>
<th>Single-phase 230V</th>
<th>Three-phase 400V</th>
<th>Max absorption A</th>
<th>Q (Flow rate) m³/h</th>
<th>H (m)</th>
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<td>0.75x0.75</td>
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<td>45.0</td>
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<td>AGA 1.50 M</td>
<td>1.1x1.1</td>
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<td>6.4</td>
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<td>7.6</td>
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<td>55.6</td>
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<td>2.2x2.2</td>
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<td>6.3</td>
<td>68.0</td>
<td>64.3</td>
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**PERFORMANCE CURVES for 2GP AGA 1.00 series**

(ISO 9906 Annex A)

**PERFORMANCE CURVES for 2GP AGA 1.50 - 2.00 - 3.00 series**

(ISO 9906 Annex A)
DIMENSIONS

DIMENSION CHART

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<td>560</td>
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<td>2GP AGA 1.50</td>
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<td>230</td>
<td>295</td>
<td>495</td>
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<td>870</td>
<td>470 1130</td>
<td>25</td>
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<td>585</td>
<td>600</td>
<td>G2&quot;</td>
<td>78 78</td>
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<td>230</td>
<td>295</td>
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<td>600</td>
<td>G2&quot;</td>
<td>78 78</td>
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<td>2GP AGA 3.00</td>
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<td>295</td>
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<td>870</td>
<td>470 1130</td>
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<td>600</td>
<td>G2&quot;</td>
<td>82</td>
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</table>

[1]= Three-phase only
[2]= Single-phase only
DOMESTIC PRESSURISATION

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power:
  - single-phase 230V, 50Hz
  - three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with two horizontal dual-impeller pumps in cast iron.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two AGA series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.75 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
DOMESTIC PRESSURISATION

2GP CDA

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure 6 bar for CDA 0.75 - 1.00, 10 bar for the rest of the range
• Max fluid temperature 40°C

PUMP MATERIALS
• Cast iron pump body
• Ceramic/carbon fibre/NBR mechanical seal
• PPE+glass fibre reinforced PS impeller for CDA 0.75-1.00, brass for the rest of the range
• Shaft in AISI 303 for CDA 0.75 - 1.00 - 1.50 - 2.00 - 3.00, AISI 304 for CDA 4.00 - 5.50
• Aluminium mount for CDA 0.75 - 1.00, cast iron for the rest of the range
• AISI 304 seal disk for AGA 0.75-1.00, cast iron integrated into motor mount for the rest of the range

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP44
• Single-phase voltage 230V ±10%
  three-phase voltage 230/400V ± 10%
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
## PERFORMANCE CURVES for 2GP CDA series

(ISO 9906 Annex A)

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<tr>
<td>2GP CDA 2.00 M</td>
<td>1.5+1.5</td>
<td>21.6</td>
<td>9.0</td>
<td>60.5</td>
<td>58.5</td>
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<tr>
<td>2GP CDA 3.00 T</td>
<td>2.2+2.2</td>
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<td>9.8</td>
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<td>4+4</td>
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**TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY**

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<tr>
<th>Model</th>
<th>Performance Curves</th>
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**DIMENSIONS**

**DIMENSION CHART**

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<tr>
<th>Model</th>
<th>Model Dimensions [mm]</th>
<th>Weight [kg]</th>
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<td>1185, 96.0</td>
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<td>2GP CDA 4.00</td>
<td>A 635, B 195, B1 440, C 475, C1 430, D 745, DNA 745, DN1 700, HQ 715, M 390, Q 75, R 1255,</td>
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<td>2GP CDA 5.50</td>
<td>A 635, B 195, B1 440, C 475, C1 430, D 745, DNA 745, DN1 745, HQ 745, M 390, Q 75, R 1255,</td>
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1= Three-phase only
2= Single-phase only
DOMESTIC PRESSURISATION

2GP 2CDX

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power:
  - single-phase 230V, 50Hz
  - three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with two horizontal dual-impeller pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two 2CDX series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.75 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 8 bar
- Max fluid temperature: 50°C

PUMP MATERIALS
Version AISI 304
- Pump body, impeller, shaft, diffuser and seal disk in EN 1.4301 (AISI 304) Version (L) AISI 316
- Pump body, impeller, shaft, diffuser and seal disk in AISI 316

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Single-phase voltage 230V ±10%, 50Hz, three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

TECHNICAL FEATURES

DOMESTIC PRESSURISATION

2GP 2CDX

PRINCIPLE OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GP 2CDX 70 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP 2CDX 120 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP 2CDX 200 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
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**DOMESTIC PRESSURISATION**

**DIMENSIONS**

![Dimensions Diagram]

**DIMENSION CHART**

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[1]= Three-phase only
[2]= Single-phase only
DOMESTIC PRESSURISATION

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power:
  - single-phase 230V, 50Hz
  - three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with two horizontal multi-stage pumps.
Units with two horizontal dual-impeller pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two COMPACT series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.6 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
**DOMESTIC PRESSURISATION**

**PERFORMANCE CURVES for 2GP COMPACT A series**
(ISO 9906 Annex A)

**PERFORMANCE CURVES for 2GP COMPACT B series**
(ISO 9906 Annex A)

**TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY**

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<tr>
<th>Model</th>
<th>Single-phase 230V</th>
<th>Three-phase 400V</th>
<th>Max absorption [A]</th>
<th>U/min</th>
<th>Q = Flow rate [m³/h]</th>
<th>H = Head [m]</th>
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## 2GP COMPACT

### DOMESTIC PRESSURISATION

#### DIMENSIONS

![Diagram of 2GP COMPACT DOMESTIC PRESSURISATION](image)

### DIMENSION CHART

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<th>M</th>
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<th>HQ</th>
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</table>

1= Three-phase only
2= Single-phase only
DOMESTIC PRESSURISATION

2GP MATRIX

CE Marked protection and control panel
• Very low voltage control circuit
• Motor start/stop controlled by two pressure switches
• Optional connection to float switches or minimum pressure switch to prevent dry running
• Switches the start sequence of the pumps at each request
• Power: single-phase 230V, 50Hz
  three-phase 400V, 50 Hz
• Direct start
• Power circuit fuses
• Control circuit fuses
• Protection rating IP 55
• Master circuit breaker with door interlock
• Auto - 0 - Man switches on each pump
• Thermal cutout reset
• Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
• Equipped for alarm signal output

Units with two horizontal multi-stage pumps with stainless steel hydraulic components.

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• Controller: control panel with alternating pump system
• Pressure switch pump regulation
• Corrosion resistant materials for all components in contact with fluids
• Galvanised steel base
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ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GP MATRIX 3 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP MATRIX 5 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP MATRIX 10 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP MATRIX 18 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption [A]</th>
<th>Q = Flow rate m/h</th>
<th>Q = Flow rate l/min</th>
<th>H = Head [m]</th>
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## DOMESTIC PRESSURISATION

![2GP MATRIX Diagram](image-url)
**2GP MATRIX**

**DOMESTIC PRESSURISATION**

**DIMENSION CHART**

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[1] = Single-phase
DOMESTIC PRESSURISATION

2GP CVM

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power: - single-phase 230V, 50Hz
  - three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with two vertical multi-stage pumps.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two CVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.6 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
DOMESTIC PRESSURISATION

2GP CVM

TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 11 bar
- Max fluid temperature: 40°C
- MEI > 0.4

For further information, refer to the Data Books available on www.ebara europe.com

PUMP MATERIALS
- Cast iron pump body and motor mount
- AISI 304 external jacket
- Impeller and diffuser in PPE + glass fibre reinforced PS
- Stages in PPE + glass fibre reinforced PS/PTFE
- AISI 416 shaft

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Single-phase voltage 230V ±10%, 50Hz,
  three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-
  amperometric protection device with automatic rearm for single-
  phase motor

PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

TECHNICAL FEATURES

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ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
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ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
PERFORMANCE CURVES for 2GP CVM B 10 - B 12 - B 15 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP CVM B 20 - B 23 - B 25 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

| Model      | Max absorption [A] | Q = flow rate | | | | H = Head [m] |
|-------------|--------------------|---------------|-----------------|--------------------------|-----------------|-------------------|-----------------|-------------------|-------------------|-------------------|-------------------|
|             | Single-phase 230V  | Single-phase 230V | 40 | 60 | 80 | 100 | 120 | 160 | 200 | 240 |
| Single-phase 230V | Three-phase 400V | [kW] | [l/min] | 2.4 | 3.6 | 4.8 | 6 | 7.2 | 9.6 | 12 | 14.4 |
| 2GP CVM AM/8      | 2GP CVM A/8      | 0.6+0.6 | 8.0 | 3.2 | 42.5 | 39.4 | 35.6 | 31.1 | 25.9 | 12.8 | - | - |
| 2GP CVM AM/10     | 2GP CVM A/10     | 0.75+0.75 | 12.0 | 3.4 | 57.5 | 54.0 | 49.5 | 43.5 | 36.6 | 19.5 | - | - |
| 2GP CVM AM/12     | 2GP CVM A/12     | 0.9+0.9 | 13.0 | 5.0 | 68.0 | 65.0 | 59.5 | 52.5 | 44.0 | 23.4 | - | - |
| 2GP CVM AM/15     | 2GP CVM A/15     | 1.1+1.1 | 14.4 | 5.0 | 80.5 | 75.5 | 69.5 | 61.0 | 51.0 | 27.3 | - | - |
| 2GP CVM AM/18     | 2GP CVM A/18     | 1.3+1.3 | 15.6 | 6.4 | 94.6 | 88.0 | 80.0 | 70.0 | 58.5 | 28.8 | - | - |
| 2GP CVM BM/10     | 2GP CVM B/10     | 0.95+0.95 | 12.2 | 3.4 | - | 36.2 | 35.1 | 33.7 | 32.0 | 27.5 | 21.6 | 14.7 |
| 2GP CVM BM/12     | 2GP CVM B/12     | 0.9+0.9 | 12.4 | 5.0 | - | 48.0 | 46.8 | 45.0 | 42.6 | 38.6 | 28.8 | 19.6 |
| 2GP CVM BM/15     | 2GP CVM B/15     | 1.1+1.5 | 14.8 | 5.0 | - | 60.5 | 58.5 | 56.2 | 53.3 | 45.8 | 36.0 | 24.5 |
| 2GP CVM BM/20     | 2GP CVM B/20     | 1.5+1.5 | 16.6 | 7.4 | - | 74.0 | 72.0 | 69.0 | 65.5 | 56.0 | 44.5 | 30.6 |
| 2GP CVM BM/23     | 2GP CVM B/23     | 1.7+1.7 | 19.2 | 8.0 | - | 86.0 | 84.0 | 80.5 | 76.5 | 65.5 | 51.5 | 35.7 |
| - 2GP CVM B/25    | 1.85+1.85        | - | 9.4 | - | 98.5 | 96.0 | 92.0 | 87.0 | 74.5 | 59.0 | 41.0 | - | - |
# 2GP CVM

## Domestic Pressurisation

### Dimensions

![Dimensions Diagram]

### Dimension Chart

<table>
<thead>
<tr>
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<td>165</td>
<td>865</td>
<td>575</td>
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<td>915</td>
<td>575</td>
<td>625</td>
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<td>625</td>
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<td>940</td>
<td>575</td>
<td>625</td>
<td>-</td>
<td>50 715 725  76.4</td>
</tr>
</tbody>
</table>

- **A**: Three-phase
- **B**: Single-phase

Note: The contents of this publication must not be regarded as binding. EBARA Pumps Europe S.p.A. reserves the right to effect any modification it deems necessary, without prior notice.
2GP HVM

DOMESTIC PRESSURISATION

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power: - single-phase 230V, 50Hz
  - three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with two vertical multi-stage pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two HVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.9 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
DOMESTIC PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 10 bar
- Max fluid temperature: 50°C
- MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
- Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
- External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
- Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Single-phase voltage 230V ±10%, 50Hz, three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermoelectrostatic protection device with automatic rearm for single-phase motor

PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

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CONSIGNMENT
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- Packaging
- Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GP HVM 3 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP HVM 5 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GP HVM A 10 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

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<thead>
<tr>
<th>Model</th>
<th>Max absorption [A]</th>
<th>Q = Flow rate [m³/h]</th>
<th>H = Head [m]</th>
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<td>Three-phase 400V</td>
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### DIMENSIONS

**Model Dimensions [mm]**

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<td>2GP HVM 5-8N1.5M</td>
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<td>800</td>
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<td>G3*</td>
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</table>

[1]= Single-phase only
[2]= Three-phase only

---

**Your Life, our Quality. Worldwide.**

35

Booster
DOMESTIC PRESSURISATION

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
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- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
DOMESTIC PRESSURISATION

3GP CVM

TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 11 bar
- Max fluid temperature: 40°C
- MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
- Cast iron pump body and motor mount
- AISI 304 external jacket
- Impeller and diffuser in PPE + glass fibre reinforced PS
- Stages in PPE + glass fibre reinforced PS/PTFE
- AISI 416 shaft

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the three motors were started up, the number of hourly starts per pump is reduced and they all are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

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- Installation, user and maintenance instructions
DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 3GP CVM A 8 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 3GP CVM A 10 - A 12 - A 15 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 3GP CVM A 18 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.

The contents of this publication must not be regarded as binding. EBARA Pumps Europe S.p.A. reserves the right to effect any modification it deems necessary, without prior notice.
3GP CVM

DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 3GP CVM B 10 - B 12 - B 15 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 3GP CVM B 20 - B 23 - B 25 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption (A)</th>
<th>Flow rate (Q)</th>
<th>Head (H)</th>
</tr>
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<tbody>
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<td>3GP CVM B/12</td>
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<td>3GP CVM B/15</td>
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3GP CVM
DOMESTIC PRESSURISATION

DIMENSIONS

DIMENSION CHART

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>C1</th>
<th>D</th>
<th>M</th>
<th>R</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>260</td>
<td>165</td>
<td>460</td>
<td>150</td>
<td>755</td>
<td>365</td>
<td>870</td>
<td>115.0</td>
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<td>3GP CVM A/10</td>
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<td>190</td>
<td>350</td>
<td>40</td>
<td>755</td>
<td>255</td>
<td>895</td>
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<td>755</td>
<td>255</td>
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<td>365</td>
<td>845</td>
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<tr>
<td>3GP CVM B/12</td>
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<td>460</td>
<td>150</td>
<td>865</td>
<td>365</td>
<td>870</td>
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<tr>
<td>3GP CVM B/15</td>
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<td>190</td>
<td>350</td>
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<td>755</td>
<td>255</td>
<td>895</td>
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<tr>
<td>3GP CVM B/20</td>
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<td>255</td>
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<td>40</td>
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<td>255</td>
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<tr>
<td>3GP CVM B/25</td>
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<td>270</td>
<td>350</td>
<td>40</td>
<td>755</td>
<td>255</td>
<td>975</td>
<td>148.0</td>
</tr>
</tbody>
</table>
DOMESTIC PRESSURISATION

3GP HVM

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power: three-phase 400V, 50 Hz
- Direct start
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with three vertical multi-stage pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
3GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Three HVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.65 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
DOMESTIC PRESSURISATION

PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the three motors were started up, the number of hourly starts per pump is reduced and they all are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebara europe.com

PUMP MATERIALS
• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
• Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermoamperometric protection device with automatic rearm for single-phase motor

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• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermoamperometric protection device with automatic rearm for single-phase motor

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.
PERFORMANCE CURVES for 3GP HVM 3 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 3GP HVM 5 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 3GP HVM A 10 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
### TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption Q = Flow rate [m³/h]</th>
<th>Flow rate [l/min]</th>
<th>400V [kW] Three-phase</th>
<th>400V H = Head [m]</th>
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</thead>
<tbody>
<tr>
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<td>50.0+50.0+50.0</td>
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<td>90.0+90.0+90.0</td>
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<td>3GP HVM 3-8N/1.5</td>
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<td>11.1</td>
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<td>3GP HVM 3-9N/1.5</td>
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<td>54.0</td>
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<td>7.5</td>
<td>-</td>
</tr>
<tr>
<td>3GP HVM 5-8N/1.5</td>
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<td>830</td>
<td>7.5</td>
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</tr>
<tr>
<td>3GP HVM 5-9N/1.5</td>
<td>150+150+150</td>
<td>830</td>
<td>7.5</td>
<td>-</td>
</tr>
<tr>
<td>3GP HVM 10-4N/1.5</td>
<td>150+150+150</td>
<td>830</td>
<td>7.5</td>
<td>-</td>
</tr>
<tr>
<td>3GP HVM 10-5N/1.5</td>
<td>150+150+150</td>
<td>830</td>
<td>7.5</td>
<td>-</td>
</tr>
<tr>
<td>3GP HVM 10-6N/1.5</td>
<td>150+150+150</td>
<td>830</td>
<td>7.5</td>
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<tr>
<td>3GP HVM 10-7N/1.5</td>
<td>150+150+150</td>
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<td>7.5</td>
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<tr>
<td>3GP HVM 10-8N/1.5</td>
<td>150+150+150</td>
<td>830</td>
<td>7.5</td>
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<tr>
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<td>150+150+150</td>
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<td>7.5</td>
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</tr>
</tbody>
</table>

### DIMENSIONS

#### DOMESTIC PRESSURISATION

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GP HVM 3-4N/0.65</td>
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<tr>
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</tbody>
</table>

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**Your Life, our Quality. Worldwide.**

44 Booster
INDUSTRIAL PRESSURISATION

2GP 3M

CE Marked protection and control panel
• Very low voltage control circuit
• Motor start/stop controlled by two pressure switches
• Optional connection to float switches or minimum pressure switch to prevent dry running
• Switches the start sequence of the pumps at each request
• Power: three-phase 400V, 50 Hz
• Starting:
  - direct for powers up to 7.5 kW
  - star/delta for powers over 7.5 kW
• Power circuit fuses
• Control circuit fuses
• Protection rating IP 55
• Master circuit breaker with door interlock
• Auto - 0 - Man switches on each pump
• Thermal cutout reset
• Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
• Equipped for alarm signal output

Units with two horizontal centrifugal pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
• Water supply to building service distribution systems
• Generic industrial water supply
• Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
• Two 3M series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 2.2 kW
• Controller: control panel with alternating pump system
• Pressure switch pump regulation
• Corrosion resistant materials for all components in contact with fluids
• Galvanised steel base
• Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
• Intake/delivery shut-off valves on each pump
• Intake side check valve on each pump
• Delivery side pressure gauge
• Equipped for connection to delivery side accumulation tank
• Equipped for hook up to external air supplies
• Equipped for hookup to dry run protection equipment
INDUSTRIAL PRESSURISATION

2GP 3M

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Pump body, impeller, seal disk and shaft in AISI 304 or AISI 316
• Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Self-ventilated 2-pole and 4-pole motors
• Isolation class F (B for high temperatures)
• Protection rating IP 55
• Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLES OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GP 3M 32 series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model Three-phase 400V</th>
<th>Max absorption [kW]</th>
<th>Q = Flow rate [m³/h]</th>
<th>Head [m]</th>
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<td>2GP 3M 32-200/5.5</td>
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## 2GP 3M

**INDUSTRIAL PRESSURISATION**

### DIMENSIONS

![Diagram of 2GP 3M pump](image)

### DIMENSION CHART

| Model        | A   | B   | B1  | C   | C1  | D   | DNA | DNM | E   | F   | HQ  | L   | M   | N   | O   | P   | Q   | Q1  | R   | T   | Weight [nl] |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------------|
| 2GP 3M 32-160/2.2 | 655 | 250 | 405 | 425 | 380 | 805 | G3  | G2  | G2  | 520 | 370 | 740 | 800 | 305 | 275 | 800 | -  | -   | 1280 | 500 | 110.0 | 103.0 |
| 2GP 3M 32-200/3  | 705 | 280 | 425 | 425 | 380 | 880 | G3  | G2  | G2  | 520 | 370 | 790 | 800 | 305 | 275 | 800 | -  | -   | 1330 | 500 | 123.0 | 118.0 |
| 2GP 3M 32-200/5  | 705 | 280 | 425 | 425 | 380 | 865 | G3  | G2  | G2  | 520 | 370 | 790 | 800 | 305 | 275 | 800 | -  | -   | 1330 | 500 | 131.0 | 133.0 |
| 2GP 3M 32-200/7  | 705 | 280 | 425 | 425 | 380 | 865 | G3  | G2  | G2  | 520 | 370 | 790 | 800 | 305 | 275 | 800 | -  | -   | 1330 | 500 | 158.0 | 155.0 |
| 2GP 3M 40-160/3  | 605 | 250 | 355 | 785 | 660 | 1180 | 125 | 100 | 800 | 420 | 900 | 850 | 665 | 190 | 800 | 25 | 10  | 1225 | 500 | 165.0 | 168.0 |
| 2GP 3M 40-160/4  | 605 | 250 | 355 | 785 | 660 | 1200 | 125 | 100 | 800 | 420 | 900 | 850 | 665 | 190 | 800 | 25 | 35  | 1225 | 500 | 194.0 | 183.0 |
| 2GP 3M 40-160/5.5 | 655 | 280 | 375 | 805 | 780 | 1245 | 125 | 100 | 800 | 420 | 900 | 850 | 685 | 190 | 800 | 25 | 60  | 1285 | 500 | 223.0 | 216.0 |
| 2GP 3M 40-160/7.5  | 655 | 280 | 375 | 805 | 865 | 1245 | 125 | 100 | 800 | 420 | 900 | 850 | 685 | 190 | 800 | 25 | 60  | 1285 | 500 | 224.0 | 229.0 |
| 2GP 3M 40-160/9.2  | 665 | 245 | 420 | 940 | 800 | 1500 | 150 | 125 | 800 | 420 | 1050 | 800 | 820 | 190 | 800 | 25 | 60  | 1325 | 500 | 274.0 | 269.0 |
| 2GP 3M 40-160/15   | 665 | 245 | 420 | 940 | 800 | 1500 | 150 | 125 | 800 | 420 | 1100 | 800 | 820 | 190 | 800 | 25 | 60  | 1325 | 500 | 322.0 | 310.0 |
| 2GP 3M 40-160/18.5 | 665 | 265 | 685 | 1080 | 885 | 1780 | 250 | 200 | 800 | 400 | 1150 | 880 | 890 | 230 | 880 | 25 | 1635 | 800 | 505.0 | 521.0 |
| 2GP 3M 40-200/15   | 655 | 280 | 400 | 940 | 800 | 1380 | 150 | 125 | 800 | 420 | 900 | 850 | 820 | 190 | 800 | 25 | 60  | 1325 | 500 | 243.0 | 243.0 |
| 2GP 3M 40-200/18.5 | 655 | 265 | 685 | 1080 | 885 | 1780 | 250 | 200 | 800 | 400 | 1150 | 880 | 980 | 230 | 880 | 25 | 1635 | 800 | 382.0 | 396.0 |
| 2GP 3M 40-200/22   | 655 | 265 | 685 | 1080 | 885 | 1780 | 250 | 200 | 800 | 400 | 1200 | 880 | 980 | 230 | 880 | 25 | 1635 | 800 | 508.0 | 520.0 |
INDUSTRIAL PRESSURISATION

2GP EVMG

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by two pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
- Power: three-phase 400V, 50Hz
- Starting:
  - direct for powers up to 7.5 kW
  - star/delta for powers over 7.5 kW
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection (three-phase version only)
- Equipped for alarm signal output

Units with two vertical multi-stage pumps with stainless steel hydraulic components and normalised motor.

TYPICAL APPLICATIONS
2GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two EVMG series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 4 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 16 bar (up to 30 bar on request)
- Max fluid temperature: 50°C
- Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
- Maximum chlorine content: 500 ppm
- MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
- Cast iron lower pump body
- External jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
- Linkages and small parts not in contact with fluid in galvanised steel
- AISI 316 shaft
- Bearings in contact with fluid in tungsten carbide
- Cast iron motor mount
- Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
- Cartridge style mechanical seal in SiC/carbon fibre/FPM (models 32-45-64) (F= round counterflanges; N= oval counterflanges)
- PTFE wear rings

MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400V ±10% 50Hz (up to incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)

INDUSTRIAL PRESSURISATION

2GP EVMG

PRINCIPLE OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until it trips the second pressure switch, thus starting the second pump. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the two motors were started up, the number of hourly starts per pump is reduced and they both are used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GP EVMG 10 series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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PERFORMANCE CURVES for 2GP EVMG 45 series (1/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
### PERFORMANCE CURVES for 2GP EVMG 45 series (2/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

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Your Life, our Quality. Worldwide.

Booster
**DIMENSIONS 2GP EVMG 10-18**

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## DIMENSIONS 2GP EVMG 32-45-64

![Diagram of 2GP EVMG 32-45-64](image)

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**3GP 3M**

**INDUSTRIAL PRESSURISATION**

**CE Marked protection and control panel**
- Very low voltage control circuit
- Motor start/stop controlled by 3 pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the main pumps at each request
- Power: three-phase 400V, 50 Hz
- Starting:
  - direct for powers up to 7.5 kW
  - star/delta for powers over 7.5 kW
- Power circuit fuses
- Control circuit fuses
- Protection rating IP 55
- Master circuit breaker with door interlock
- Auto - 0 - Man switches on each pump
- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection
- Equipped for alarm signal output

Inverter controlled units with two horizontal centrifugal pumps with stainless steel hydraulic components.

**TYPICAL APPLICATIONS**
3GP pressurisation units have the following applications:

- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

**UNIT EQUIPMENT**

- Three 3M series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 2.2 kW
- Controller: control panel with alternating pump system
- Pressure switch pump regulation
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are sized in relation to the total flow rate of the pressurisation unit
- Intake/delivery shut-off valves on each pump
- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
INDUSTRIAL PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 10 bar
- Max fluid temperature: 50°C
- MEI > 0.4
For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
- Pump body, impeller, seal disk and shaft in AISI 304 or AISI 316
- Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Self-ventilated 2-pole and 4-pole motors
- Solvent class F (8 for high temperatures)
- Protection rating IP 55
- Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz,
  three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLE OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of this pump, the pressure continues falling until it trips the pressure switch with the second and eventually third highest setpoint, thus starting one or both of the other pumps. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the motors were started up, the number of hourly starts per pump is reduced and they are all used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
PERFORMANCE CURVES for 3GP 3M 32 series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GP 3M 50 series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

| Model          | Max absorption [A] | [kW] | l/min 300 | 450 | 600 | 900 | 1000 | 1080 | 1200 | 1350 | 1500 | 1800 | 2100 | 2400 | 3000 | 3600 |
|----------------|--------------------|------|-----------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|
| 3GP 3M 32-160/2 | 3+3+3              | 13.5 | 35.5     | 34.0| 32.0| 27.0| 25.0 | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 3GP 3M 32-200/3 | 3+3+3              | 18.3 | 42.0     | 40.0| 37.5| 31.0| 28.0 | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 3GP 3M 32-200/4 | 4+4+4              | 26.1 | 53.5     | 52.0| 49.5| 43.5| 40.5 | 38.0 | -    | -    | -    | -    | -    | -    | -    | -    |
| 3GP 3M 32-200/5 | 5.5+5.5+5.5        | 31.2 | 69.0     | 67.5| 65.0| 58.5| -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 3GP 3M 32-200/7 | 7.5+7.5            | 41.1 | 69.0     | 67.5| 65.0| 58.5| 55.5 | 53.0 | 49.0 | 44.0 | -    | -    | -    | -    | -    | -    |
| 3GP 3M 40-160/3 | 3+3+3              | 18.3 | 29.5     | 27.5| 27.0| 26.5| 25.5 | 24.0 | 22.5 | 20.0 | 17.5 | -    | -    | -    | -    | -    |
| 3GP 3M 40-160/4 | 4+4+4              | 26.1 | 38.5     | 37.0| 36.0| 35.5| 34.5 | 33.0 | 32.0 | 29.0 | 25.5 | -    | -    | -    | -    | -    |
| 3GP 3M 40-160/5 | 5.5+5.5+5.5        | 31.2 | 45.5     | 44.0| 43.0| 42.5| 41.0 | 39.5 | 38.0 | 35.0 | 31.0 | -    | -    | -    | -    | -    |
| 3GP 3M 40-160/7 | 7.5+7.5+7.5        | 41.1 | 57.0     | 55.5| 55.0| 54.5| 53.5 | 52.5 | 51.0 | 47.5 | 44.0 | -    | -    | -    | -    | -    |
| 3GP 3M 40-200/11| 11+11+11           | 65.7 | 71.0     | 70.0| 70.0| 69.5| 68.5 | 67.5 | 66.0 | 63.0 | 59.0 | -    | -    | -    | -    | -    |
| 3GP 3M 50-125/4 | 4+4+4              | 26.1 | -        | -   | -   | -   | -    | 26.0 | 25.5 | 25.0 | 24.0 | 22.5 | 21.5 | 17.9 | 14.0 | -    |
| 3GP 3M 50-160/5 | 5.5+5.5+5.5        | 31.2 | -        | -   | -   | -   | -    | 31.0 | 30.5 | 30.0 | 28.5 | 27.0 | 25.5 | 22.0 | 18.0 | -    |
| 3GP 3M 65-200/7 | 7.5+7.5+7.5        | 41.1 | -        | -   | -   | -   | -    | 38.5 | 38.0 | 37.5 | 36.0 | 35.0 | 33.5 | 30.0 | 26.0 | -    |
| 3GP 3M 65-200/9 | 9.2+9.2+9.2        | 50.4 | -        | -   | -   | -   | -    | 50.0 | 49.0 | 47.5 | 45.5 | 43.5 | 40.5 | 34.0 | -    | -    |
| 3GP 3M 65-200/11| 11+11+11           | 65.7 | -        | -   | -   | -   | -    | 56.0 | 55.0 | 54.0 | 52.0 | 48.0 | 42.0 | -    | -    | -    |
| 3GP 3M 65-200/15| 15+15+15           | 90.0 | -        | -   | -   | -   | -    | 70.0 | 69.0 | 68.0 | 66.0 | 62.0 | 57.0 | -    | -    | -    |

**Model**

**Max absorption [A]**

**[kW]**

| l/min 300 | 450 | 600 | 900 | 1000 | 1080 | 1200 | 1350 | 1500 | 1800 | 2100 | 2400 | 3000 | 3600 |
|-----------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|
| 2100      | 2700| 3900| 4500| 5100 | 5700 | 6300 | 6600 | 6900 | 7200 | 342  | 378  | 396  | 414  |

Your Life, our Quality. Worldwide.
### Model Dimensions [mm]

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**INDUSTRIAL PRESSURISATION**

**DIMENSION CHART**

![3GP 3M Diagram](image-url)
3GP EVMG

INDUSTRIAL PRESSURISATION

CE Marked protection and control panel
- Very low voltage control circuit
- Motor start/stop controlled by 3 pressure switches
- Optional connection to float switches or minimum pressure switch to prevent dry running
- Switches the start sequence of the pumps at each request
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- Thermal cutout reset
- Warning leds:
  - power on
  - motor run
  - level alarm (with optional float switch)
  - motor in protection
- Equipped for alarm signal output

Units with three vertical multi-stage pumps with stainless steel hydraulic components and normalised motor.

TYPICAL APPLICATIONS
3GP pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Three EVMG series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 4 kW
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- Intake side check valve on each pump
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hook up to external air supplies
- Equipped for hookup to dry run protection equipment
INDUSTRIAL PRESSURISATION

3GP EVMG

TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 16 bar (up to 30 bar on request)
- Max fluid temperature: 50°C
- Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
- Maximum chlorine content: 500 ppm
- MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
- Cast iron lower pump body
- External jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
- Linkages and small parts not in contact with fluid in galvanised steel
- AISI 316 shaft
- Bearings in contact with fluid in tungsten carbide
- Cast iron motor mount
- Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
- Cartridge style mechanical seal in SiC/carbon fibre/FPM (standard) (models 32-45-64)
- (F= round counterflanges; N= oval counterflanges)
- PTFE wear rings

MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400 ±10% (up to 4 kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLE OF OPERATION
Water delivery from the system, when the pumps are stopped, lowers the pressure and closes the contacts of the pressure switch with the highest setpoint, which starts the first pump. If the output flow is greater than the delivery capacity of this pump, the pressure continues falling until it trips the pressure switch with the second and eventually third highest setpoint, thus starting one or both of the other pumps. When the water demand stops or reduces, the system pressure rises, thus opening the pressure switches sequentially and shutting off the pumps one by one. If this is done in inverse order to that in which the motors were started up, the number of hourly starts per pump is reduced and they are all used to the same extent. By connecting a float switch or minimum pressure switch to the electrical enclosure (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump malfunction: dry running.

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

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The contents of this publication must not be regarded as binding. EBARA Pumps Europe S.p.A. reserves the right to effect any modification it deems necessary, without prior notice.

PERFORMANCE CURVES for 3GP EVMG 10 series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GP EVMG 18 series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GP EVMG 32 series (2/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GP EVMG 4S series (1/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GP EVMG 45 series (2/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GP EVMG 64 series (2/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

| Model       | Max absorption Q | Flow rate | Three-phase [A] | [kW] | m³/h | 225 | 300 | 390 | 450 | 600 | 750 | 900 | 1050 | 1200 | H = Head [m] |
|-------------|------------------|-----------|-----------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 3GP EVMG 10 10/4.0 | 4x4x4        | 23.4      | 105.0           | 94.5 | 88.0 | 66.0 | 39.0 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 10 11/4.0 | 4x4x4        | 23.4      | 116.0           | 104.0 | 97.0 | 72.5 | 43.0 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 18 4F/4.0 | 4x4x4        | 23.4      | 61.5            | 60.5 | 57.0 | 51.5 | 44.0 | 34.3 | 23.2 | 23.2 | 23.2 | 23.2 | 23.2 | 23.2 | 23.2 | 23.2 |
| 3GP EVMG 18 5F/5.5 | 5.5x5.5      | 31.2      | 77.0            | 75.5 | 71.5 | 64.5 | 54.5 | 43.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| 3GP EVMG 18 6F/5.5 | 5.5x5.5      | 31.2      | 92.0            | 91.0 | 85.5 | 77.0 | 65.5 | 51.5 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 |
| 3GP EVMG 18 7F/7.5 | 7.5x5.5+7.5+7.5 | 42.6     | 108.0           | 106.0 | 100.0 | 90.0 | 76.5 | 60.0 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |

### INDUSTRIAL PRESSURISATION

| Model       | Max absorption Q | Flow rate | Three-phase [A] | [kW] | m³/h | 600 | 1050 | 1500 | 1800 | 2100 | 2700 | 3000 | 3600 | 4200 | H = Head [m] |
|-------------|------------------|-----------|-----------------|------|------|-----|------|------|------|------|------|------|------|------|-----|-----|
| 3GP EVMG 32 3F/5 5 | 5.5x5.5+5.5 | 31.2      | 55.5            | 47.5 | 35.2 | 26.1 | 19.7 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 32 3F/7 5 | 5.5x5.5+5.5 | 31.2      | 62.0            | 53.0 | 44.5 | 35.2 | 24.5 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 32 4F/7 7 | 7.5x7.5+7.5+7.5 | 42.6     | 77.0            | 67.0 | 51.5 | 39.4 | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 32 4F/7 7 | 7.5x7.5+7.5+7.5 | 42.6     | 83.5            | 74.5 | 61.0 | 48.5 | 34.2 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 32 5F/7 11 | 11x11x11  | 59.4      | 106.0           | 100.0 | 89.0 | 70.0 | 37.5 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 45 2F/7 7 | 7.5x7.5+7.5+7.5 | 42.6     | 51.5            | 50.0 | 48.0 | 45.0 | 35.4 | 29.1 | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 45 3F/7 11 | 11x11x11  | 59.4      | 64.0            | 61.0 | 58.0 | 53.0 | 37.3 | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 45 3F/9 11 | 11x11x11  | 59.4      | 77.5            | 75.0 | 72.5 | 68.0 | 54.0 | 45.0 | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 45 4F/7 7 | 15x15x15 | 81.6      | 90.0            | 86.0 | 82.0 | 76.0 | 56.0 | 43.0 | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 45 4F/7 7 | 15x15x15 | 81.6      | 103.0           | 100.0 | 96.5 | 91.0 | 73.0 | 60.5 | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 2F/7 11 | 11x11x11  | 59.4      | 53.5            | 53.0 | 52.0 | 49.0 | 46.5 | 39.5 | 30.6 | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 3F/9 11 | 11x11x11  | 59.4      | 64.0            | 62.5 | 61.0 | 55.5 | 51.0 | 39.3 | -   | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 3F/11 15 | 15x15x15 | 81.6      | 75.0            | 74.0 | 72.5 | 68.0 | 64.0 | 53.5 | 40.0 | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 3F/11 15 | 15x15x15 | 81.6      | 80.5            | 79.5 | 78.0 | 74.0 | 70.5 | 60.5 | 47.5 | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 4F/7 7 | 18x18x18  | 99.9      | 91.0            | 89.0 | 87.0 | 80.5 | 75.5 | 60.5 | 42.0 | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 4F/9 7 | 22x22x22  | 117.0     | 102.0           | 101.0 | 98.5 | 93.0 | 88.0 | 74.5 | 57.0 | -   | -   | -   | -   | -   | -   | -   |
| 3GP EVMG 64 4F/9 7 | 22x22x22  | 117.0     | 108.0           | 106.0 | 104.0 | 99.0 | 94.5 | 81.5 | 64.5 | -   | -   | -   | -   | -   | -   | -   |
**INDUSTRIAL PRESSURISATION**

**DIMENSIONS 3GP EVMG 10-18**

**DIMENSION CHART**

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<th>H2</th>
<th>P</th>
<th>P1</th>
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DIMENSIONS 3GP EVMG 32-45-64

**DIMENSION CHART**

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</tbody>
</table>
2GPE COMPACT E-power

DOMESTIC PRESSURISATION

- Power voltage: Single-phase 230V
- Output voltage (pump): three-phase 230V
- Phase current: max 10 A
- Maximum pump power: 2.2 kW
- Output frequency: 5 - 60 Hz
- Display: 2 digit alphanumeric
- Protection rating: IP 65
- Operating temperature: 5 - 40 °C
- Pressure setpoint: 0.3 - 8 bar
- Max overpressure: 12 bar
- Electrical safety: EN60730
- Electromagnetic compatibility: EN61000 (specific standards declared in CE certificate)
- Protections:
  - Dry run
  - Over/under voltage
  - Short circuit
  - Over current
  - Over temperature
  - Insufficient pressure
  - Sensor failure

Inverter controlled units with two horizontal multi-stage pumps.

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two COMPACT series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.6 kW with E-power series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- Automatic INVERTER control of each pump with frequency variation at constant pressure, electronic controller display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Protection against water supply failure
- Equipped for connection to delivery side accumulation tank
- Circuit breaker panel with two thermal cutouts

INVERTER CONTROL UNIT
- Installation on line
- Mounting position: any
- Fittings: 1”¼ male

Your Life, our Quality. Worldwide.
**DOMESTIC PRESSURISATION**

**2GPE COMPACT E-power**

**TECHNICAL FEATURES**

**APPLICATION RANGE**
- Maximum operating pressure: 10 bar
- Max fluid temperature: 40°C

**PUMP MATERIALS**
- Cast iron pump body and support
- AISI 304 external jacket
- Impeller and diffuser in PPE + glass fibre reinforced PS
- Stages in PPE + glass fibre reinforced PS/PTFE
- AISI 416 shaft
- Ceramic/carbon fibre/NBR mechanical seal

**ACCESSORIES**
- Membrane accumulation tank: depending on installation conditions.

**MOTOR SPECIFICATIONS**
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Three-phase voltage 230/400V ± 10%
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

**CONSIGNMENT**
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

**ADVANTAGES**
- Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
- Better, faster response regulation
- Reduced hammering due to gradual startup and shutdown
- Improved heating, A/C and pressurisation system comfort
- Reduced startup current
- Pumps switched at each startup
- Speed modulation of both pumps for optimal regulation

**APPLICATION RANGE**
- Maximum operating pressure: 10 bar
- Max fluid temperature: 40°C

**PUMP MATERIALS**
- Cast iron pump body and support
- AISI 304 external jacket
- Impeller and diffuser in PPE + glass fibre reinforced PS
- Stages in PPE + glass fibre reinforced PS/PTFE
- AISI 416 shaft
- Ceramic/carbon fibre/NBR mechanical seal

**ACCESSORIES**
- Membrane accumulation tank: depending on installation conditions.

**MOTOR SPECIFICATIONS**
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Three-phase voltage 230/400V ± 10%
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

**CONSIGNMENT**
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
### TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption [A]</th>
<th>50</th>
<th>60</th>
<th>80</th>
<th>100</th>
<th>120</th>
<th>160</th>
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<td>[kW]</td>
<td>m³/h</td>
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<td>27.6</td>
</tr>
<tr>
<td>2GPE COMPACT B 15 E-PW</td>
<td>1.1+1.1</td>
<td>9.0</td>
<td>-</td>
<td>58.0</td>
<td>56.0</td>
<td>54.0</td>
<td>51.5</td>
<td>44.5</td>
<td>34.5</td>
</tr>
</tbody>
</table>

### PERFORMANCE CURVES for 2GPE COMPACT A series

*ISO 9906 Annex A*

![Graph for 2GPE COMPACT A series](image)

### PERFORMANCE CURVES for 2GPE COMPACT B series

*ISO 9906 Annex A*

![Graph for 2GPE COMPACT B series](image)
**DOMESTIC PRESSURISATION**

**2GPE MATRIX E-power**

**INVERTER CONTROL UNIT**
- Installation on line
- Mounting position: any
- Fittings: 1”¼ male
- Power voltage: Single-phase 230V
- Output voltage (pump): three-phase 230V
- Phase current: max 10 A
- Maximum pump power: 2.2 kW
- Output frequency: 5 - 60 Hz
- Display: 2 digit alphanumeric
- Protection rating: IP 65
- Operating temperature: 5 - 40 °C
- Pressure setpoint: 0.3 - 8 bar
- Max overpressure: 12 bar
- Electrical safety: EN60730
- Electromagnetic compatibility: EN61000 (specific standards declared in CE certificate)
- Protections:
  - Dry run
  - Over/under voltage
  - Short circuit
  - Over current
  - Over temperature
  - Insufficient pressure
  - Sensor failure

Inverter controlled units with two horizontal multi-stage pumps with stainless steel hydraulic components.

**TYPICAL APPLICATIONS**
GPE pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

**UNIT EQUIPMENT**
- Two MATRIX series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.65 kW with E-power series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- Automatic INVERTER control of each pump with frequency variation at constant pressure, electronic controller displayed
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Protection against water supply failure
- Equipped for connection to delivery side accumulation tank
- Circuit breaker panel with two thermal cutouts
**DOMESTIC PRESSURISATION**

**TECHNICAL FEATURES**

**APPLICATION RANGE**
- Max fluid temperature: 50°C
- Maximum operating pressure: 10 bar
- Maximum chlorine content: 500 ppm

**PUMP MATERIALS**
- Pump body, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
- Mechanical seal made of:
  - Ceramic/carbon fibre/EPDM (standard)
  - Ceramic/graphite/FPM (version H)
  - SiC/SiC/FPM (version HS)
  - Tungsten carbide/SiC/EPDM (version U3Q1EGG)
- Support in EN AB-AISi11Cu2(Fe) (die cast aluminium)

**ADVANTAGES**
- Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
- Better, faster response regulation
- Reduced hammering due to gradual startup and shutdown
- Improved heating, A/C and pressurisation system comfort
- Reduced startup current
- Pumps switched at each startup
- Speed modulation of both pumps for optimal regulation

**ACCESSORIES**
- Membrane accumulation tank: depending on installation conditions

**CONSIGNMENT**
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

**TECHNICAL FEATURES**

**APPLICATION RANGE**
- Max fluid temperature: 50°C
- Maximum operating pressure: 10 bar
- Maximum chlorine content: 500 ppm

**PUMP MATERIALS**
- Pump body, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
- Mechanical seal made of:
  - Ceramic/carbon fibre/EPDM (standard)
  - Ceramic/graphite/FPM (version H)
  - SiC/SiC/FPM (version HS)
  - Tungsten carbide/SiC/EPDM (version U3Q1EGG)
- Support in EN AB-AISi11Cu2(Fe) (die cast aluminium)

**CONSIGNMENT**
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.

### TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption [kW]</th>
<th>[A]</th>
<th>[B]</th>
<th>[C]</th>
<th>[D]</th>
<th>[E]</th>
<th>[F]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GPE MATRIX 3-3T/0.65 E-PW</td>
<td>0.65</td>
<td>5.8</td>
<td>62.5</td>
<td>41.0</td>
<td>24.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 3-4T/0.65 E-PW</td>
<td>0.65+0.65</td>
<td>5.8</td>
<td>62.5</td>
<td>41.0</td>
<td>24.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 3-5T/0.75 E-PW</td>
<td>0.75</td>
<td>5.8</td>
<td>62.5</td>
<td>41.0</td>
<td>24.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 3-6T/0.9 E-PW</td>
<td>0.9+0.9</td>
<td>8.6</td>
<td>82.5</td>
<td>58.5</td>
<td>34.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 3-7T/1.3 E-PW</td>
<td>1.3+1.3</td>
<td>11.0</td>
<td>73.0</td>
<td>47.5</td>
<td>28.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 5-3T/0.65 E-PW</td>
<td>0.9+0.9</td>
<td>5.6</td>
<td>64.5</td>
<td>58.0</td>
<td>32.0</td>
<td>44.0</td>
<td>26.4</td>
</tr>
<tr>
<td>2GPE MATRIX 5-4T/0.9 E-PW</td>
<td>1.3+1.3</td>
<td>8.6</td>
<td>54.0</td>
<td>48.5</td>
<td>34.0</td>
<td>17.6</td>
<td>22.0</td>
</tr>
<tr>
<td>2GPE MATRIX 5-5T/1.3 E-PW</td>
<td>1.3+1.3</td>
<td>11.0</td>
<td>64.5</td>
<td>58.0</td>
<td>32.0</td>
<td>44.0</td>
<td>26.4</td>
</tr>
<tr>
<td>2GPE MATRIX 5-6T/1.3 E-PW</td>
<td>1.5+1.5</td>
<td>11.0</td>
<td>75.5</td>
<td>67.5</td>
<td>51.5</td>
<td>30.8</td>
<td>26.4</td>
</tr>
</tbody>
</table>
## DOMESTIC PRESSURISATION

### 2GPE MATRIX E-power

#### DOMINIONS

![Image of domestic pressurisation setup]

#### DIMENSION CHART

<table>
<thead>
<tr>
<th>Model</th>
<th>C (mm)</th>
<th>C1 (mm)</th>
<th>DNA</th>
<th>Dimensions (mm)</th>
<th>D (mm)</th>
<th>M (mm)</th>
<th>Q (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GPE MATRIX 3-3T/0.65 E-PW</td>
<td>360</td>
<td>310</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>615</td>
<td>360</td>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td>2GPE MATRIX 3-4T/0.65 E-PW</td>
<td>385</td>
<td>335</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>640</td>
<td>385</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td>2GPE MATRIX 3-4T/0.75 E-PW</td>
<td>410</td>
<td>360</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>665</td>
<td>410</td>
<td>5</td>
<td>43</td>
</tr>
<tr>
<td>2GPE MATRIX 3-6T/0.9 E-PW</td>
<td>435</td>
<td>380</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>700</td>
<td>435</td>
<td>15</td>
<td>46</td>
</tr>
<tr>
<td>2GPE MATRIX 3-7T/1.3 E-PW</td>
<td>460</td>
<td>405</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>750</td>
<td>460</td>
<td>40</td>
<td>52</td>
</tr>
<tr>
<td>2GPE MATRIX 3-8T/0.65 E-PW</td>
<td>315</td>
<td>265</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>570</td>
<td>315</td>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td>2GPE MATRIX 3-9T/0.9 E-PW</td>
<td>340</td>
<td>290</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>605</td>
<td>340</td>
<td>15</td>
<td>43</td>
</tr>
<tr>
<td>2GPE MATRIX 5-3T/0.65 E-PW</td>
<td>365</td>
<td>315</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>665</td>
<td>365</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>2GPE MATRIX 5-4T/1.3 E-PW</td>
<td>390</td>
<td>335</td>
<td>G2&quot;</td>
<td>G1½</td>
<td>680</td>
<td>390</td>
<td>40</td>
<td>51</td>
</tr>
</tbody>
</table>
**DOMESTIC PRESSURISATION**

**INVERTER CONTROL UNIT**
- Installation on line
- Mounting position: any
- Fittings: 1"¼ male
- Power voltage: Single-phase 230V
- Output voltage (pump): three-phase 230V
- Phase current: max 10 A
- Maximum pump power: 2.2 kW
- Output frequency: 5 - 60 Hz
- Display: 2 digit alphanumeric
- Protection rating: IP 65
- Operating temperature: 5 - 40 °C
- Pressure setpoint: 0.3 - 8 bar
- Max overpressure: 12 bar
- Electrical safety: EN60730
- Electromagnetic compatibility: EN61000 (specific standards declared in CE certificate)
- Protections:
  - Dry run
  - Over/under voltage
  - Short circuit
  - Over current
  - Over temperature
  - Insufficient pressure
  - Sensor failure

**TYPICAL APPLICATIONS**
GPE pressurisation units have the following applications:
- Water supply to building service distribution systems
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

**UNIT EQUIPMENT**
- Two CVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.75 kW with E-power series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- Automatic INVERTER control of each pump with frequency variation at constant pressure, electronic controller display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Delivery side check valve
- Delivery side pressure gauge
- Protection against water supply failure
- Equipped for connection to delivery side accumulation tank
- Circuit breaker panel with two thermal cutouts

Inverter controlled units with two vertical multi-stage pumps.

Inverter controlled units with two vertical multi-stage pumps.
DOMESTIC PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 11 bar
• Max fluid temperature: 40°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebara.eu

PUMP MATERIALS
• Cast iron pump body and motor mount
• AISI 304 external jacket
• Impeller and diffuser in PPE + glass fibre reinforced PS
• Stages in PPE + glass fibre reinforced PS/PTFE
• AISI 416 shaft

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75 kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP44
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermo- amperometric protection device with automatic rearm for single- phase motor

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

TECHNICAL FEATURES

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• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
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• Packaging
• Installation, user and maintenance instructions
The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
### TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption [kW]</th>
<th>[A]</th>
<th>Flow rate Q (m³/h)</th>
<th>H (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Three-phase 230V</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>2GPE CVM A/10 E-PW</td>
<td>0.75+0.75</td>
<td>5.8</td>
<td>57.5</td>
<td>54.0</td>
</tr>
<tr>
<td>2GPE CVM A/12 E-PW</td>
<td>0.9+0.9</td>
<td>8.6</td>
<td>69.0</td>
<td>65.0</td>
</tr>
<tr>
<td>2GPE CVM B/12 E-PW</td>
<td>0.9+0.9</td>
<td>8.6</td>
<td>-</td>
<td>48.0</td>
</tr>
<tr>
<td>2GPE CVM B/15 E-PW</td>
<td>1.1+1.1</td>
<td>8.6</td>
<td>-</td>
<td>60.5</td>
</tr>
<tr>
<td>2GPE CVM B/20 E-PW</td>
<td>1.5+1.5</td>
<td>12.6</td>
<td>-</td>
<td>74.0</td>
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</table>
DIMENSIONS

DIMENSION CHART

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B1</th>
<th>DNA</th>
<th>Dimensions [mm]</th>
<th>E</th>
<th>HQ</th>
<th>R</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GPE CVM A/1 E-PW</td>
<td>960</td>
<td>875</td>
<td>G 2&quot;</td>
<td>G 1&quot;½</td>
<td>505</td>
<td>1025</td>
<td>1140</td>
<td>52</td>
</tr>
<tr>
<td>2GPE CVM A/12 E-PW</td>
<td>985</td>
<td>900</td>
<td>G 2&quot;</td>
<td>G 1&quot;½</td>
<td>490</td>
<td>1000</td>
<td>1115</td>
<td>55</td>
</tr>
<tr>
<td>2GPE CVM B/12 E-PW</td>
<td>935</td>
<td>890</td>
<td>G 2&quot;</td>
<td>G 1&quot;½</td>
<td>490</td>
<td>1000</td>
<td>1115</td>
<td>53</td>
</tr>
<tr>
<td>2GPE CVM B/20 E-PW</td>
<td>960</td>
<td>875</td>
<td>G 2&quot;</td>
<td>G 1&quot;½</td>
<td>515</td>
<td>1025</td>
<td>1140</td>
<td>54</td>
</tr>
<tr>
<td>2GPE CVM B/20 E-PW</td>
<td>985</td>
<td>900</td>
<td>G 2&quot;</td>
<td>G 1&quot;½</td>
<td>580</td>
<td>1050</td>
<td>1165</td>
<td>64</td>
</tr>
</tbody>
</table>
Inverter controlled units with two horizontal multi-stage pumps with stainless steel hydraulic components.

**TYPICAL APPLICATIONS**
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

**UNIT EQUIPMENT**
- Two MATRIX series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.65 kW with Hydrocontroller series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- Automatic INVERTER control of each pump with frequency variation at constant pressure, electronic controller display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Protection against water supply failure
- Equipped for connection to delivery side accumulation tank
- Circuit breaker panel with two thermal cutouts
DOMESTIC PRESSURISATION

2GPE MATRIX Hydrocontroller

**ADVANTAGES**
- Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
- Better, faster response regulation
- Reduced hammering due to gradual startup and shutdown
- Improved heating, A/C and pressurisation system comfort
- Reduced startup current
- Pumps switched at each startup
- Speed modulation of both pumps for optimal regulation

**ACCESSORIES**
- Membrane accumulation tank: depending on installation conditions

**CONSIGNMENT**
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

**TECHNICAL FEATURES**

**APPLICATION RANGE**
- Max fluid temperature: 50°C
- Maximum operating pressure: 10 bar
- Maximum chlorine content: 500 ppm

**PUMP MATERIALS**
- Pump body, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
- Mechanical seal made of:
  - Ceramic/carbon fibre/EPDM (standard)
  - Ceramic/graphite/FPM (version H)
  - SiC/SiC/FPM (version HS)
  - Tungsten carbide/SiC/EPDM (version U3Q1EGG)
- Support in EN AB-AISI11Cu2(Fe) (die cast aluminium)

**MOTOR SPECIFICATIONS**
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

**APPLICATION RANGE**
- Max fluid temperature: 50°C
- Maximum operating pressure: 10 bar
- Maximum chlorine content: 500 ppm
PERFORMANCE CURVES for 2GPE MATRIX 3 series  

(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GPE MATRIX 5 series  

(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines. The indicated NPSH is a laboratory value related to the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230V [kW]</td>
<td>Three-phase 400V</td>
<td>m³/h</td>
</tr>
<tr>
<td></td>
<td>230V</td>
<td>400V</td>
<td></td>
</tr>
<tr>
<td>2GPE MATRIX 3-3/0.65 HYD</td>
<td>0.65+0.65</td>
<td>3.2</td>
<td>31.4</td>
</tr>
<tr>
<td>2GPE MATRIX 3-4/0.65 HYD</td>
<td>0.65+0.65</td>
<td>3.2</td>
<td>42.0</td>
</tr>
<tr>
<td>2GPE MATRIX 3-5/0.75 HYD</td>
<td>0.75+0.75</td>
<td>3.4</td>
<td>52.5</td>
</tr>
<tr>
<td>2GPE MATRIX 3-6/0.9 HYD</td>
<td>0.9+0.9</td>
<td>5.0</td>
<td>62.5</td>
</tr>
<tr>
<td>2GPE MATRIX 3-7/1.3 HYD</td>
<td>1.3+1.3</td>
<td>6.4</td>
<td>73.0</td>
</tr>
<tr>
<td>2GPE MATRIX 3-8/1.5 HYD</td>
<td>1.3+1.3</td>
<td>6.4</td>
<td>83.5</td>
</tr>
<tr>
<td>2GPE MATRIX 3-9/1.5 HYD</td>
<td>1.5+1.5</td>
<td>7.4</td>
<td>94.0</td>
</tr>
<tr>
<td>2GPE MATRIX 3-10/1.5 HYD</td>
<td>1.5+1.5</td>
<td>7.4</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 5-3/0.65 HYD</td>
<td>0.65+0.65</td>
<td>3.2</td>
<td>-</td>
</tr>
<tr>
<td>2GPE MATRIX 5-4/0.9 HYD</td>
<td>0.9+0.9</td>
<td>5.0</td>
<td>-</td>
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DIMENSIONS

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INVERTER CONTROL UNIT
E-drive is a device for controlling and protecting pumping systems by varying the pump power voltage. E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.

E-drive can also:
• protect the motor from overloads and dry running
• provide soft starts and stops to increase system life and reduce absorption peaks
• register the hours of operation and trip alarms as required
• run one or more pumps at constant speed (DOL: Direct On Line)
• connect to other E-drives for combined operation
• Voltage: - Version MT: - Power voltage: single-phase 230V
  - Output voltage (pump): three-phase 230V
  - Version TT: - Power voltage: three-phase 400V
  - Output voltage (pump): three-phase 400V
• Mains power frequency: 50 - 60 Hz (+/- 2%)
• Max. ambient operating temperature at nominal load: 40°C (104 °F)
• Max. altitude at nominal load: 1000 m
• Protection rating: IP55 (NEMA 4)
• Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2
• Analogue inputs (10 / 15 VDC):
  1. 4-20 mA
  2. 4-20 mA
  3. 4-20 mA / 0 - 10 VDC (configurable)
  4. 4-20 mA / 0 - 10 VDC (configurable)
• 4 digital inputs, configurable NO or NC, for motor start/stop
DOMESTIC PRESSURISATION

1GPE HVM E-drive

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
• Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

PUMP MATERIALS

• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft
• Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS

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DOMESTIC PRESSURISATION

PERFORMANCE CURVES for serie HVM 3 series (0.65 kW to 1.5 kW)
(ISO 9906 Annex A)

PERFORMANCE CURVES for serie HVM 5 series (0.65 kW to 2.2 kW)
(ISO 9906 Annex A)

PERFORMANCE CURVES for serie HVM 10 series (1.5 kW to 3 kW)
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
## 1GPE HVM E-drive

### DOMESTIC PRESSURISATION

#### TABLE OF PERFORMANCE AND ELECTRICAL DATA

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<th>1GPE HVM 3-6N/0.9 Edr-2200 TT</th>
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<th>1GPE HVM 5-5N/1.5 Edr-1500 MT</th>
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<th>1GPE HVM 5-9N/2.2 Edr-2200 TT</th>
<th>1GPE HVM 10-4N/1.5 Edr-1500 MT</th>
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#### DIMENSIONS

[Diagram of the 1GPE HVM E-drive pump with dimensions]
## 1GPE HVM E-drive

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DOMESTIC PRESSURISATION

1GPE EVMG E-drive

INVERTER CONTROL UNIT

E-drive is a device for controlling and protecting pumping systems by varying the pump power voltage. E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.

E-drive can also:
- protect the motor from overloads and dry running
- provide soft starts and stops to increase system life and reduce absorption peaks
- register the hours of operation and trip alarms as required
- run one or more pumps at constant speed (DOL: Direct On Line)
- connect to other E-drives for combined operation

- Voltage: - Version MT: - Power voltage: single-phase 230V
  - Output voltage (pump): three-phase 230V
  - Version TT: - Power voltage: three-phase 400V
  - Output voltage (pump): three-phase 400V

- Mains power frequency: 50 - 60 Hz (+/- 2%)
- Max. ambient operating temperature at nominal load: 40°C (104 °F)
- Max. altitude at nominal load: 1000 m
- Protection rating: IP55 (NEMA 4)
- Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2

Analogue inputs (10 / 15 VDC):
1. 4-20 mA
2. 4-20 mA
3. 4-20 mA / 0 - 10 VDC (configurable)
4. 4-20 mA / 0 - 10 VDC (configurable)

- 4 digital inputs, configurable NO or NC, for motor start/stop

Single electric pump units with inverter control unit.

TYPICAL APPLICATIONS

GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT

- One EVMG series pump with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.75 kW with E-drive series INVERTER
- Control unit: pump equipped with inverter for modulating control
- Automatic INVERTER control with frequency variation at constant pressure, electronic controller display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Delivery side shut-off valve
- Delivery side check valve
- Protection against water supply failure
- Equipped for connection to delivery side accumulation tank
- Circuit breaker panel with thermal cutout
1GPE EVMG E-drive

DOMESTIC PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 16 bar (up to 30 bar on request)
• Max fluid temperature: 50°C
• Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
• Maximum chlorine content: 500 ppm
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Cast iron lower pump body
• external jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
• Linkages and small parts not in contact with fluid in galvanised steel
• AISI 316 shaft
• Bearings in contact with fluid in tungsten carbide
• Cast iron motor mount
• Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
• Cartridge style mechanical seal in SiC/carbon fibre/FPM (standard) (models 32-45-64)
  (F= round counterflanges; N= oval counterflanges)
• PTFE wear rings

MOTOR SPECIFICATIONS
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz (up to incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

PUMP MATERIALS

• Cast iron lower pump body
• external jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
• Linkages and small parts not in contact with fluid in galvanised steel
• AISI 316 shaft
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The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG E-drive (1/2) series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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The contents of this publication must not be regarded as binding. EBARA Pumps Europe S.p.A. reserves the right to effect any modification it deems necessary, without prior notice.

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PERFORMANCE CURVES for 1GPE EVMG 18 E-drive (1/2) series (ISO 9906 Annex A)

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PERFORMANCE CURVES for 1GPE EVMG 18 E-drive (2/2) series (ISO 9906 Annex A)

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PERFORMANCE CURVES for 1GPE EVMG 32 E-drive (1/3) series (ISO 9906 Annex A)

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PERFORMANCE CURVES for 1GPE EVMG 45 E-drive (1/2) series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 45 E-drive (2/2) series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 1GPE EVMG 64 E-drive (1/2) series (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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## Table of Performance and Electrical Data

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<th>Model</th>
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<th>[kW]</th>
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Your Life, our Quality. Worldwide.
## DIMENSIONS 1GPE EVMG E-drive 3 - 5 - 10 - 18

### DIMENSION CHART

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<tr>
<th>Model</th>
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<th>DNA</th>
<th>DNM</th>
<th>Dimensions [mm]</th>
<th>Weight [kg]</th>
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<td>G ½&quot;</td>
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DOMESTIC PRESSURISATION

DIMENSIONS 1GPE EVMG E-drive 32 - 45 - 64

DIMENSION CHART

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<td>260</td>
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<td>1245</td>
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DOMESTIC PRESSURISATION

INVERTER CONTROL UNIT
E-drive is device for controlling and protecting pumping systems by varying the pump power voltage.
E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.

E-drive can also:
- protect the motor from overloads and dry running
- provide soft starts and stops to increase system life and reduce absorption peaks
- register the hours of operation and trip alarms as required
- run one or more pumps at constant speed (DOL: Direct On Line)
- connect to other E-drives for combined operation
- Voltage: - Version **MT**: - Power voltage: single-phase 230V
  - Output voltage (pump): three-phase 230V
- Version **TT**: - Power voltage: three-phase 400V
  - Output voltage (pump): three-phase 400V
- Mains power frequency: 50 - 60 Hz (+/- 2%)
- Max. ambient operating temperature at nominal load: 40°C (104 °F)
- Max. altitude at nominal load: 1000 m
- Protection rating: IP55 (NEMA 4)
- Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2
- Analogue inputs (10 / 15 VDC):
  1. 4-20 mA
  2. 4-20 mA
  3. 4-20 mA / 0 - 10 VDC (configurable)
  4. 4-20 mA / 0 - 10 VDC (configurable)
- 4 digital inputs, configurable NO or NC, for motor start/stop

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two CVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.75 kW with E-drive series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- INVERTER control of each pump with pressure transducer and electronic control display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Delivery side shut-off valve on each pump
- Delivery side check valve
- Protection against water supply failure as standard supply
- Equipped for connection to delivery side accumulation tank

Inverter controlled units with two vertical multi-stage pumps.
DOMESTIC PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 11 bar
• Max fluid temperature: 40°C
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Cast iron pump body and motor mount
• AISI 304 external jacket
• Impeller and diffuser in PPE + glass fibre reinforced PS
• Stages in PPE + glass fibre reinforced PS/PTFE
• AISI 416 shaft

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP44
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

PUMP MATERIALS
• Cast iron pump body and motor mount
• AISI 304 external jacket
• Impeller and diffuser in PPE + glass fibre reinforced PS
• Stages in PPE + glass fibre reinforced PS/PTFE
• AISI 416 shaft

MOTOR SPECIFICATIONS
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• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 2GPE CVM B 15 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GPE CVM B 20 B 23 series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GPE CVM A 10 - A 12 - A 15 series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drops in the valves and lines.
The indicated NPSH is a laboratory value related to the pump alone.
## 2GPE CVM E-drive

### DOMESTIC PRESSURISATION

#### TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model Dimensions [mm]</th>
<th>Weight [kg]</th>
</tr>
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<tbody>
<tr>
<td>MT 2GPE CVM A/10 E-DRIVE 1500</td>
<td>750</td>
</tr>
<tr>
<td>MT 2GPE CVM A/12 E-DRIVE 1500</td>
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<tr>
<td>MT 2GPE CVM A/15 E-DRIVE 1500</td>
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<tr>
<td>MT 2GPE CVM B/15 E-DRIVE 1500</td>
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<td>MT 2GPE CVM B/20 E-DRIVE 1500</td>
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<tr>
<td>MT 2GPE CVM B/23 E-DRIVE 2200</td>
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</table>

#### DIMENSION CHART

<table>
<thead>
<tr>
<th>Model Dimensions [mm]</th>
<th>Weight [kg]</th>
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</thead>
<tbody>
<tr>
<td>MT 2GPE CVM A/10 E-DRIVE 1500</td>
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<tr>
<td>MT 2GPE CVM A/12 E-DRIVE 1500</td>
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<tr>
<td>MT 2GPE CVM A/15 E-DRIVE 1500</td>
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<tr>
<td>MT 2GPE CVM B/15 E-DRIVE 1500</td>
<td>750</td>
</tr>
<tr>
<td>MT 2GPE CVM B/20 E-DRIVE 1500</td>
<td>750</td>
</tr>
<tr>
<td>MT 2GPE CVM B/23 E-DRIVE 2200</td>
<td>750</td>
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</tbody>
</table>
E-drive is device for controlling and protecting pumping systems by varying the pump power voltage. E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.

E-drive can also:
- protect the motor from overloads and dry running
- provide soft starts and stops to increase system life and reduce absorption peaks
- register the hours of operation and trip alarms as required
- run one or more pumps at constant speed (DOL: Direct On Line)
- connect to other E-drives for combined operation
- Voltage: - Version MT: Power voltage: single-phase 230V
  - Output voltage (pump): three-phase 230V
  - Version TT: Power voltage: three-phase 400V
  - Output voltage (pump): three-phase 400V
- Mains power frequency: 50 - 60 Hz (+/- 2%)
- Max. ambient operating temperature at nominal load: 40°C (104 °F)
- Max. altitude at nominal load: 1000 m
- Protection rating: IP55 (NEMA 4)
- Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2
- Analogue inputs (10 / 15 VDC):
  1. 4-20 mA
  2. 4-20 mA
  3. 4-20 mA / 0 - 10 VDC (configurable)
  4. 4-20 mA / 0 - 10 VDC (configurable)
- 4 digital inputs, configurable NO or NC, for motor start/stop

Units with two vertical multi-stage pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two HVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 1.5 kW
- Control unit: pumps equipped with inverters for modulating control
- INVERTER control of each pump with pressure transducer and electronic control display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Protection against water supply failure
- Equipped for connection to delivery side accumulation tank
DOMESTIC PRESSURISATION

2GPE HVM E-drive

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
• Ceramic/carbon fibre/NBR mechanical seal

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
• Ceramic/carbon fibre/NBR mechanical seal

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

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• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
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MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
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• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
• Ceramic/carbon fibre/NBR mechanical seal

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
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• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor
PERFORMANCE CURVES for 2GPE HVM 5 E-drive series
(ISO 9906 Annex A)

PERFORMANCE CURVES for 2GPE HVM A 10 E-drive series
(ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>MT</th>
<th>TT</th>
<th>Max absorption [A]</th>
<th>Q = Flow rate</th>
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<td>400V</td>
<td>60</td>
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- 2GPE HVM 5-7N/1.5 E-DRIVE 1500 MT
  - 2GPE HVM 5-7N/1.5 E-DRIVE 2200 TT 1.5+1.5 12.6 5.4 75.5 71.5 67.5 61.0 51.5 30.8 - - -
  - 2GPE HVM 5-8N/2.2 E-DRIVE 2200 TT 2.2+2.2 - 9.4 86.0 82.0 77.0 69.3 58.5 25.2 - - -
- 2GPE HVM 10-6N/2.2 E-DRIVE 3000 MT
  - 2GPE HVM 10-6N/2.2 E-DRIVE 4000 TT 2.2+2.2 16.2 9.4 - - 66.5 64.5 62.0 57.0 51.0 38.5 17.4
  - 2GPE HVM 10-7N/3.0 E-DRIVE 4000 TT 3+3 - 12.2 - - 77.5 75.0 72.0 66.5 59.5 45.0 20.3
  - 2GPE HVM 10-8N/3.0 E-DRIVE 4000 TT 3+3 - 12.2 - - 89.0 85.5 82.5 76.0 68.0 51.5 23.2

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
### DIMENSIONS 2GPE HVM E-drive

#### VIEW FROM "A"

#### DIMENSION CHART

<table>
<thead>
<tr>
<th>MT</th>
<th>Model</th>
<th>TT</th>
<th>L</th>
<th>R</th>
<th>P</th>
<th>P1</th>
<th>DNA</th>
<th>DNM</th>
<th>H</th>
<th>H1</th>
<th>H2</th>
<th>HQ</th>
<th>Weight [kg]</th>
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</thead>
<tbody>
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<td>2GPE HVM 5-7N/1.5 E-DRIVE 1500 MT</td>
<td>2GPE HVM 5-7N/1.5 E-DRIVE 2200 TT</td>
<td>785 715 805 640</td>
<td>G 2</td>
<td>G 2</td>
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<td>670</td>
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<td>825</td>
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<td>2GPE HVM 5-8N/2.2 E-DRIVE 2300 TT</td>
<td>2GPE HVM 5-8N/2.2 E-DRIVE 2300 TT</td>
<td>785 715 805 640</td>
<td>G 3</td>
<td>G 2</td>
<td>110</td>
<td>670</td>
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<td>825</td>
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<td>2GPE HVM 10-6N/2.2 E-DRIVE 3000 MT</td>
<td>2GPE HVM 10-6N/2.2 E-DRIVE 2200 TT</td>
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<td>G 3</td>
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<td>940</td>
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</table>
INVERTER CONTROL UNIT
E-drive is device for controlling and protecting pumping systems by varying the pump power voltage. E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.

E-drive can also:
- protect the motor from overloads and dry running
- provide soft starts and stops to increase system life and reduce absorption peaks
- register the hours of operation and trip alarms as required
- run one or more pumps at constant speed (DOL: Direct On Line)
- connect to other E-drives for combined operation

Voltage: - Version MT: - Power voltage: single-phase 230V
- Output voltage (pump): three-phase 230V
- Version TT: - Power voltage: three-phase 400V
- Output voltage (pump): three-phase 400V
- Mains power frequency: 50 - 60 Hz (+/- 2%)
- Max. ambient operating temperature at nominal load: 40°C (104 °F)
- Max. altitude at nominal load: 1000 m
- Protection rating: IP55 (NEMA 4)
- Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2
- Analogue inputs (10 / 15 VDC):
  1. 4-20 mA
  2. 4-20 mA
  3. 4-20 mA / 0 - 10 VDC (configurable)
  4. 4-20 mA / 0 - 10 VDC (configurable)
- 4 digital inputs, configurable NO or NC, for motor start/stop

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Two EVMG series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 2.2 kW with E-drive series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- Automatic pump control with pressure switch sensors for rate control.
- Digital final pressure display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Protection against water supply failure as standard supply
- Equipped for connection to delivery side accumulation tank

Units with two vertical multi-stage pumps with stainless steel hydraulic components.
2GPE EVMG E-drive

INDUSTRIAL PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 16 bar (up to 30 bar on request)
• Max fluid temperature: 50°C
• Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
• Maximum chlorine content: 500 ppm
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Cast iron lower pump body
• external jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
• Linkages and small parts not in contact with fluid in galvanised steel
• AISI 316 shaft
• Bearings in contact with fluid in tungsten carbide
• Cast iron motor mount
• Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
• Cartridge style mechanical seal in SiC/carbon fibre/FPM (standard)
  (models 32-45-64)
  (F= round counterflanges; N= oval counterflanges)
• PTFE wear rings

MOTOR SPECIFICATIONS
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz (up to incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

YOUR LIFE, OUR QUALITY. WORLDWIDE.

Your Life, our Quality. Worldwide. 138 Booster
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow rate m³/h</th>
<th>[A]</th>
<th>[kW]</th>
<th>Flow rate [kW]</th>
<th>Head [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GPE EVMG 10 8N5/2 E-DRIVE 2200 TT</td>
<td>9 12 15.6 18 24</td>
<td>63,0 61,0 57,0 53,0 39,5</td>
<td>23,4</td>
<td>30</td>
<td>120</td>
</tr>
<tr>
<td>2GPE EVMG 10 8N5/3 E-DRIVE 4000 TT</td>
<td>3,4</td>
<td>84,0 81,5 75,5 70,5 52,5</td>
<td>31,2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE EVMG 10 T0N5/4 E-DRIVE 4000 TT</td>
<td>4,4</td>
<td>105,0 102,0 94,5 88,0 66,0</td>
<td>39,0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2GPE EVMG 10 4F5/4 E-DRIVE 4000 TT</td>
<td>4,4</td>
<td>15,6</td>
<td>-</td>
<td>61,5 60,5 57,0</td>
<td>51,5 44,0</td>
</tr>
<tr>
<td>2GPE EVMG 10 5F5/5.5 E-DRIVE 5500 TT</td>
<td>5,5+5.5</td>
<td>20,8</td>
<td>-</td>
<td>77,0 75,5 71,5</td>
<td>64,5 54,5</td>
</tr>
<tr>
<td>2GPE EVMG 10 7F5/7.5 E-DRIVE 7500 TT</td>
<td>7,5+7.5</td>
<td>28,4</td>
<td>-</td>
<td>92,0 91,0 85,5</td>
<td>77,0 65,5</td>
</tr>
</tbody>
</table>

## DIMENSIONS 2GPE EVMG 10-18 E-drive

---

**DIMENSION CHART**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GPE EVMG 10 6N5/2 E-DRIVE 2200 TT</td>
<td>830 660 760 935 755 G3 G3 140 800 1090 955 180 131.0</td>
</tr>
<tr>
<td>2GPE EVMG 10 8N5/3 E-DRIVE 4000 TT</td>
<td>830 660 760 935 755 G3 G3 140 910 1140 920 180 157.0</td>
</tr>
<tr>
<td>2GPE EVMG 10 T0N5/4 E-DRIVE 4000 TT</td>
<td>830 660 760 935 755 G3 G3 140 970 1200 1020 180 159.0</td>
</tr>
<tr>
<td>2GPE EVMG 10 4F5/4 E-DRIVE 4000 TT</td>
<td>885 690 780 1110 870 DN100 DN100 150 840 1070 990 180 194.0</td>
</tr>
<tr>
<td>2GPE EVMG 10 5F5/5.5 E-DRIVE 5500 TT</td>
<td>885 690 780 1110 870 DN100 DN100 150 890 1070 990 260 280.0</td>
</tr>
<tr>
<td>2GPE EVMG 10 7F5/7.5 E-DRIVE 7500 TT</td>
<td>885 690 780 1110 870 DN100 DN100 150 950 1170 1065 260 284.0</td>
</tr>
</tbody>
</table>
3GPE CVM E-drive

INDUSTRIAL PRESSURISATION

UNITS WITH THREE VERTICAL MULTI-STAGE PUMPS WITH STAINLESS STEEL HYDRAULIC COMPONENTS.

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Three CVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 11 kW with E-drive series INVERTER
- Control unit: pumps equipped with inverters for modulating control
- Automatic pump control with pressure switch sensors for rate control. Digital final pressure display
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Protection against water supply failure as standard supply
- Equipped for connection to delivery side accumulation tank

INVERTER CONTROL UNIT
E-drive is device for controlling and protecting pumping systems by varying the pump power voltage.
E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.
E-drive can also:
- protect the motor from overloads and dry running
- provide soft starts and stops to increase system life and reduce absorption peaks
- provide information about current absorption and power voltage
- register the hours of operation and trip alarms as required
- run one or more pumps at constant speed (DOL: Direct On Line)
- connect to other E-drives for combined operation

Voltage: - Version MT:
- Power voltage: single-phase 230V
- Output voltage (pump): three-phase 230V
- Version TT:
- Power voltage: three-phase 400V
- Output voltage (pump): three-phase 400V

- Mains power frequency: 50 - 60 Hz (+/- 2%)
- Max. ambient operating temperature at nominal load: 40°C (104 °F)
- Max. altitude at nominal load: 1000 m
- Protection rating: IP55 (NEMA 4)
- Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2
- Analogue inputs (10 / 15 VDC):
  1. 4-20 mA
  2. 4-20 mA
  3. 4-20 mA / 0 - 10 VDC (configurable)
  4. 4-20 mA / 0 - 10 VDC (configurable)
- 4 digital inputs, configurable NO or NC, for motor start/stop

Units with three vertical multi-stage pumps with stainless steel hydraulic components.
TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 11 bar
- Max fluid temperature: 40°C
- MEI > 0.4
For further information, refer to the Data Books available on www.ebara europe.com

PUMP MATERIALS
- Cast iron pump body and motor mount
- External jacket in AISI 304
- Impeller and diffuser in PPE + glass fibre reinforced PS
- Stages in PPE + glass fibre reinforced PS/PTFE
- AISI 416 shaft

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

ADVANTAGES
- Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
- Better, faster response regulation
- Reduced hammering due to gradual startup and shutdown
- Improved heating, A/C and pressurisation system comfort
- Reduced startup current
- Pumps switched at each startup
- Speed modulation of both pumps for optimal regulation

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 11 bar
- Max fluid temperature: 40°C
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ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption [A]</th>
<th>Q = Flow rate [m³/h]</th>
<th>H = Head [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>Three-phase 400V</td>
<td></td>
<td>3.6</td>
<td>5.4</td>
</tr>
<tr>
<td>3GPE CVM B/20 E-DRIVE 2200 TT</td>
<td>1.5x1.5x1.5</td>
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<td>74.0</td>
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<td>3GPE CVM B/23 E-DRIVE 2200 TT</td>
<td>1.7x1.7x1.7</td>
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<td>88.0</td>
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DIMENSIONS 3GPE 3M

DIMENSION CHART

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions [mm]</th>
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<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>3GPE CVM B/20 E-DRIVE 2200 TT</td>
<td>310</td>
</tr>
<tr>
<td>3GPE CVM B/23 E-DRIVE 2200 TT</td>
<td>335</td>
</tr>
</tbody>
</table>
INDUSTRIAL PRESSURISATION

3GPE HVM E-drive

INVERTER CONTROL UNIT
E-drive is device for controlling and protecting pumping systems by varying the pump power voltage.
E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.
E-drive can also:
• protect the motor from overloads and dry running
• provide soft starts and stops to increase system life and reduce absorption peaks
• register the hours of operation and trip alarms as required
• run one or more pumps at constant speed (DOL: Direct On Line)
• connect to other E-drives for combined operation
• Voltage: - Version MT: - Power voltage: single-phase 230V
  - Output voltage (pump): three-phase 230V
  - Version TT: - Power voltage: three-phase 400V
  - Output voltage (pump): three-phase 400V
• Mains power frequency: 50 - 60 Hz (+/- 2%)
• Max. ambient operating temperature at nominal load: 40°C (104 °F)
• Max. altitude at nominal load: 1000 m
• Protection rating: IP55 (NEMA 4)
• Digital outputs configurable as NO or NC:
  1. motor run signal
  2. alarm signal
  3. pump command DOL 1
  4. pump command DOL 2
• Analogue inputs (10 / 15 VDC):
  1. 4-20 mA
  2. 4-20 mA
  3. 4-20 mA / 0 - 10 VDC (configurable)
  4. 4-20 mA / 0 - 10 VDC (configurable)
• 4 digital inputs, configurable NO or NC, for motor start/stop

Units with three vertical multi-stage pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
• Water supply or distribution networks, apartment blocks, schools, hotels, etc.
• Generic industrial water supply
• Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
• Three HVM series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 1.5 kW with E-drive series INVERTER
• Control unit: pumps equipped with inverters for modulating control
• Automatic pump control with pressure switch sensors for rate control.
  Digital final pressure display
• Corrosion resistant materials for all components in contact with fluids
• Galvanised steel base
• Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
• Intake/delivery shut-off valves on each pump
• Intake side check valve
• Delivery side pressure gauge
• Protection against water supply failure as standard supply
• Equipped for connection to delivery side accumulation tank
3GPE HVM E-drive

INDUSTRIAL PRESSURISATION

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Pump body in cast iron EN-GJL 250 EN1561 (cataphoretic coating)
• External jacket, impellers, intermediate stages, gasket disk and shaft (parts in contact with fluid) in EN 1.4301 (AISI 304)
• Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz,
• Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase motor

ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

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ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Max absorption [A]</th>
<th>Q Flow rate [m³/h]</th>
<th>H Head [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GPE HVM 5-7N/1.5 E-DRIVE 2200 TT</td>
<td>1.5+1.5+1.5 11.1</td>
<td>90 135 180 240 300 390 480 600 750</td>
<td>75.5 71.5 67.5 61.0 51.5 30.8  - - -</td>
</tr>
<tr>
<td>3GPE HVM 5-8N/2.2 E-DRIVE 2200 TT</td>
<td>2.2+2.2+2.2 14.1</td>
<td>Three-phase</td>
<td>86.0 82.0 77.0 69.5 58.5 35.2  - - -</td>
</tr>
<tr>
<td>3GPE HVM 10-6N/2.2 E-DRIVE 2200 TT</td>
<td>2.2+2.2+2.2 14.1</td>
<td>1.5+1.5+1.5 11.1</td>
<td>66.5 64.5 62.0 57.0 51.0 38.5 17.4</td>
</tr>
<tr>
<td>3GPE HVM 10-7N/3.0 E-DRIVE 4000 TT</td>
<td>3.0+3.0+3.0 18.3</td>
<td>Three-phase</td>
<td>77.5 75.0 72.0 66.5 59.5 45.0 20.3</td>
</tr>
<tr>
<td>3GPE HVM 10-8N/3.0 E-DRIVE 4000 TT</td>
<td>3.0+3.0+3.0 18.3</td>
<td>Three-phase</td>
<td>89.0 85.5 82.5 76.0 68.0 51.5 23.2</td>
</tr>
</tbody>
</table>

DIMENSIONS 3GPE HVM

DIMENSION CHART

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GPE HVM 5-7N/1.5 E-DRIVE 2200 TT</td>
<td>795 1050 1010 725 880 680 370 DN 65 DN 65 110 670 900 810 164.0</td>
<td></td>
</tr>
<tr>
<td>3GPE HVM 5-8N/2.2 E-DRIVE 2200 TT</td>
<td>795 1050 1010 725 880 680 370 DN 65 DN 65 110 695 920 845 186.0</td>
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<tr>
<td>3GPE HVM 10-6N/2.2 E-DRIVE 2200 TT</td>
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</tr>
<tr>
<td>3GPE HVM 10-7N/3.0 E-DRIVE 4000 TT</td>
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<td></td>
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<tr>
<td>3GPE HVM 10-8N/3.0 E-DRIVE 4000 TT</td>
<td>865 1160 1030 770 1025 785 400 DN 100 DN 100 140 850 1080 960 226.0</td>
<td></td>
</tr>
</tbody>
</table>
3GPE EVMG E-drive
INDUSTRIAL PRESSURISATION

INVERTER CONTROL UNIT
E-drive is device for controlling and protecting pumping systems by varying the pump power voltage. E-drive can be connected to any commercially available pump, and is used to keep a given setting constant (pressure, flow rate, fluid temperature, etc.) as the operating conditions vary. This means that the pump runs only when needed, thus preventing energy wastage and increasing its service life.
E-drive can also:
• protect the motor from overloads and dry running
• provide soft starts and stops to increase system life and reduce absorption peaks
• register the hours of operation and trip alarms as required
• run one or more pumps at constant speed (DOL: Direct On Line)
• connect to other E-drives for combined operation

Voltage: - Version MT:
  - Power voltage: single-phase 230V
  - Output voltage (pump): three-phase 230V

- Version TT:
  - Power voltage: three-phase 400V
  - Output voltage (pump): three-phase 400V

• Mains power frequency: 50 - 60 Hz (+/- 2%)
• Max. ambient operating temperature at nominal load: 40°C (104 °F)
• Max. altitude at nominal load: 1000 m
• Protection rating: IP55 (NEMA 4)

Digital outputs configurable as NO or NC:
1. motor run signal
2. alarm signal
3. pump command DOL 1
4. pump command DOL 2

Analogue inputs (10 / 15 VDC):
1. 4-20 mA
2. 4-20 mA
3. 4-20 mA / 0 - 10 VDC (configurable)
4. 4-20 mA / 0 - 10 VDC (configurable)

4 digital inputs, configurable NO or NC, for motor start/stop

Units with three vertical multi-stage pumps with stainless steel hydraulic components.

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
• Water supply or distribution networks, apartment blocks, schools, hotels, etc.
• Generic industrial water supply
• Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
• Three EVMG series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 2.2 kW with E-drive series INVERTER
• Control unit: pumps equipped with inverters for modulating control
• Automatic pump control with pressure switch sensors for rate control.
• Digital final pressure display
• Corrosion resistant materials for all components in contact with fluids
• Galvanised steel base
• Galvanised steel manifolds (AISI 304, AISI 316 available on request).
  The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
• Intake/delivery shut-off valves on each pump
• Intake side check valve
• Delivery side pressure gauge
• Protection against water supply failure as standard supply
• Equipped for connection to delivery side accumulation tank
ADVANTAGES
• Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
• Better, faster response regulation
• Reduced hammering due to gradual startup and shutdown
• Improved heating, A/C and pressurisation system comfort
• Reduced startup current
• Pumps switched at each startup
• Speed modulation of both pumps for optimal regulation

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions.

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 16 bar (up to 30 bar on request)
• Max fluid temperature: 50°C
• Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
• Maximum chlorine content: 500 ppm
• MEI > 0.4
For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Cast iron lower pump body
• External jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
• Linkages and small parts not in contact with fluid in galvanised steel
• AISI 316 shaft
• Bearings in contact with fluid in tungsten carbide
• Cast iron motor mount
• Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
• Cartridge style mechanical seal in SiC/carbon fibre/FPM (models 32-45-64)
  (F= round counterflanges; N= oval counterflanges)
• PTFE wear rings

MOTOR SPECIFICATIONS
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400V ±10% 50Hz (up to incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)
PERFORMANCE CURVES for 3GPE EVMG 10 E-drive (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GPE EVMG 18 E-drive (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GPE EVMG 32 E-drive (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Min. absorption [A]</th>
<th>225</th>
<th>300</th>
<th>390</th>
<th>450</th>
<th>600</th>
<th>750</th>
<th>900</th>
<th>1050</th>
<th>1200</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>[kW]</td>
<td>m³/h</td>
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<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>3GPE EVMG 10 6N5/2 E-DRIVE 2200 TT</td>
<td>13.2</td>
<td>63.0</td>
<td>61.0</td>
<td>57.0</td>
<td>53.0</td>
<td>39.5</td>
<td>23.4</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
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Model                  | Max absorption [A] | 600 | 1050 | 1500 | 1800 | 2100 | 2700 | 3000 |
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DIMENSIONS 3GPE EVMG 10-18 E-drive

DIMENSION CHART

Your Life, our Quality. Worldwide.

Booster
DIMENSIONS 3GPE EVMG 32 E-drive

DIMENSIONS 3GPE EVMG 45 E-drive
**ELECTRICAL CONTROL PANELS WITH INVERTER**

- **Power voltage:** 400V ±10% 50Hz,
- **Three phase without the use of neutral**
- **Supply frequency:** 50Hz or 60Hz
- **Power for each motor:** from 0.75 kW upwards
- **Types of starting and supply for all pumps:**
  - during the starting phase the inverter supplies the pump with a voltage ramp; the other pumps have direct or star delta starting, depending on their electrical power
  - during emergency operation (controlled by pressure switches) all pumps run at the reduced power used in direct or star delta starting
- **Limits of use (ambient temperature):** -10°C to +40°C
- **Protection rating:**
  - IP55 up to 2.2 kW,
  - IP44 for higher powers
- **Reference standards:**
  - Safety and operational standards applied:
    - EN 60204-1; Safety of electrical equipment
    - EN 60439-1; Assembled protection and control equipment.
  - EMC Standards applied:
    - **IEC EN 61000-6-1; residential, commercial and light industrial immunity**
    - **IEC EN 61000-6-2; industrial immunity**
    - **IEC EN 61000-6-3; residential, commercial and light industrial emissions**
    - **IEC EN 61000-6-4; industrial emissions**
    - **IEC EN 61000-3-2; harmonic current emissions <= 16A (use line inductance XL.L to be installed on request, see ref. 8.1, 8.2)**
- **Emissions:** compliant for residential environments
- **Immunity:** compliant for industrial environments

**Units with two horizontal centrifugal pumps with stainless steel hydraulic components.**

**TYPICAL APPLICATIONS**

GPE pressurisation units have the following applications:

- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

**UNIT EQUIPMENT**

- Two 3M series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 2.2 kW with EFC series INVERTER control panel
- Pumps controlled by single INVERTER with pump switching function - emergency operation with pressure switches
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hookup to dry run protection equipment
TECHNICAL FEATURES

APPLICATION RANGE
- Maximum operating pressure: 10 bar
- Max fluid temperature: 50°C
- MEI > 0.4
For further information, refer to the Data Books available on www.ebara.eu

PUMP MATERIALS
- Pump body, impeller, seal disk and shaft in AISI 304 or AISI 316
- Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Self-ventilated 2-pole and 4-pole asynchronous motors
- Isolation class F (B for high temperatures)
- Protection rating IP 55
- Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLES OF OPERATION
- Operation with electronic controller: the unit responds to the pressure transducer signal and speed control with the inverter of pump n. 1, to keep the system pressure constant
- Pumps can be run in AUTOMATIC and MANUAL modes, or EXCLUDED
- Pump motors protected against overload, phase loss and over/under voltage
- Pumps protected against dry running
- Inverter protected against phase malfunctions, over/under voltage, earth system failure and ambient overtemperature
- Pump n. 1 run in variable speed mode by the inverter; the other pumps are started automatically by electromechanical contactors
- Automatic switching of pump n. 1 with the other pumps (if present) with electromechanical contactors and pressure switches in case of inverter failure
- Timed automatic switching (every 24h) of the start sequence of pumps powered via electromechanical contactors

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GPE 3M 32 EFC (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

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## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

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**DIMENSIONS 2GPE 3M EFC**

**DIMENSION CHART**

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**Notes:**
- The contents of this publication must not be regarded as binding. EBARA Pumps Europe S.p.A. reserves the right to effect any modification it deems necessary, without prior notice.

**Your Life, our Quality. Worldwide.**
2GPE EVMG EFC

INDUSTRIAL PRESSURISATION

ELECTRICAL CONTROL PANELS WITH INVERTER
- Power voltage: 400V ±10% 50Hz,
- Three phase without the use of neutral
- Supply frequency: 50Hz or 60Hz
- Power for each motor: from 0.75 kW upwards
- Types of starting and supply for all pumps:
  - during the starting phase the inverter supplies the pump with a voltage ramp; the other pumps have direct or star delta starting, depending on their electrical power
  - during emergency operation (controlled by pressure switches) all pumps run at the reduced power used in direct or star delta starting
- Limits of use (ambient temperature): -10°C to +40°C
- Protection rating:
  - IP55 up to 2.2 kW,
  - IP44 for higher powers
- Reference standards:
  Safety and operational standards applied:
  - EN 60204-1; Safety of electrical equipment
  - EN 60439-1; Assembled protection and control equipment.
  EMC Standards applied:
  - IEC EN 61000-6-1; residential, commercial and light industrial immunity
  - IEC EN 61000-6-2; industrial immunity
  - IEC EN 61000-6-3; residential, commercial and light industrial emissions
  - IEC EN 61000-6-4; industrial emissions
  - IEC EN 61000-3-2; harmonic current emissions <= 16A (use line inductance XL.L to be installed on request, see ref. 8.1, 8.2)
- Emissions: compliant for residential environments
- Immunity: compliant for industrial environments

UNIT EQUIPMENT
- Two EVMG series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 5.5 kW with EFC series INVERTER control panel
- Pumps controlled by single INVERTER with pump switching function - emergency operation with pressure switches
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hookup to dry run protection equipment

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

Units with two vertical multi-stage pumps with stainless steel hydraulic components and normalised motor.
TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 16 bar (up to 30 bar on request)
• Max fluid temperature: 50°C
• Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
• Maximum chlorine content: 500 ppm
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Cast iron lower pump body
• External jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
• Linkages and small parts not in contact with fluid in galvanised steel
• AISI 316 shaft
• Bearings in contact with fluid in tungsten carbide
• Cast iron motor mount
• Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
• Cartridge style mechanical seal in SiC/carbon fibre/FPM (standard) (models 32-45-64)
  (F= round counterflanges; N= oval counterflanges)
• PTFE wear rings

MOTOR SPECIFICATIONS
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Single-phase voltage 230V ±10%, 50Hz,
  three-phase voltage 230/400 ±10% (up to 4 kW included) 50Hz,
  three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLES OF OPERATION
• Operation with electronic controller: the unit responds to the pressure transducer signal and speed control with the inverter of pump n. 1, to keep the system pressure constant
• Pumps can be run in AUTOMATIC and MANUAL modes, or EXCLUDED
• Pump motors protected against overload, phase loss and over/under voltage
• Pumps protected against dry running
• Inverter protected against phase malfunctions, over/under voltage, earth system failure and ambient overtemperature
• Pump n. 1 run in variable speed mode by the inverter; the other pumps are started automatically by electromechanical contactors
• Automatic switching of pump n. 1 with the other pumps (if present) with electromechanical contactors and pressure switches in case of inverter failure
• Timed automatic switching (every 24h) of the start sequence of pumps powered via electromechanical contactors

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
PERFORMANCE CURVES for 2GPE EVMG 32 EFC (1/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 2GPE EVMG 45 EFC (1/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
## TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

<table>
<thead>
<tr>
<th>Model</th>
<th>Q = Flow rate</th>
<th>H = Head [m]</th>
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### DIMENSIONS 2GPE EVMG 32-45-64 EFC

![Diagram of 2GPE EVMG EFC pumps](image)

#### DIMENSION CHART

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<th>H1</th>
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<td>DN150</td>
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Note: All dimensions are in millimeters (mm).
Units with two horizontal centrifugal pumps with stainless steel hydraulic components.

**TYPICAL APPLICATIONS**

GPE pressurisation units have the following applications:

- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

**UNIT EQUIPMENT**

- Three 3M series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 2.2 kW with EFC series INVERTER control panel
- Pumps controlled by single INVERTER with pump switching function - emergency operation with pressure switches
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hookup to dry run protection equipment

**ELECTRICAL CONTROL PANELS WITH INVERTER**

- Power voltage: 400V ±10% 50Hz,
- Three phase without the use of neutral
- Supply frequency: 50Hz or 60Hz
- Power for each motor: from 0.75 kW upwards
- Types of starting and supply for all pumps:
  - during the starting phase the inverter supplies the pump with a voltage ramp; the other pumps have direct or star delta starting, depending on their electrical power
  - during emergency operation (controlled by pressure switches) all pumps run at the reduced power used in direct or star delta starting
- Limits of use (ambient temperature): -10°C to +40°C
- Protection rating:
  - IP55 up to 2.2 kW,
  - IP44 for higher powers
- Reference standards:
  - Safety and operational standards applied:
    - EN 60204-1; Safety of electrical equipment
    - EN 60439-1; Assembled protection and control equipment.
  - EMC Standards applied:
    - IEC EN 61000-6-1; residential, commercial and light industrial immunity
    - IEC EN 61000-6-2; industrial immunity
    - IEC EN 61000-6-3; residential, commercial and light industrial emissions
    - IEC EN 61000-6-4; industrial emissions
    - IEC EN 61000-3-2; harmonic current emissions <= 16A (use line inductance XL.L to be installed on request, see ref. 8.1, 8.2)
- Emissions: compliant for residential environments
- Immunity: compliant for industrial environments
TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 10 bar
• Max fluid temperature: 50°C
• MEI > 0.4
For further information, refer to the Data Books available on www.ebara.eu

PUMP MATERIALS
• Pump body, impeller, seal disk and shaft in AISI 304 or AISI 316
• Ceramic/carbon fibre/NBR mechanical seal

MOTOR SPECIFICATIONS
• Motors IE2 from 0.75kW
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Self-ventilated 2-pole and 4-pole asynchronous motors
• Isolation class F (B for high temperatures)
• Protection rating IP 55
• Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLES OF OPERATION
• Operation with electronic controller: the unit responds to the pressure transducer signal and speed control with the inverter of pump n. 1, to keep the system pressure constant
• Pumps can be run in AUTOMATIC and MANUAL modes, or EXCLUDED
• Pump motors protected against overload, phase loss and over/under voltage
• Pumps protected against dry running
• Inverter protected against phase malfunctions, over/under voltage, earth system failure and ambient overtemperature
• Pump n. 1 run in variable speed mode by the inverter; the other pumps are started automatically by electromechanical contactors
• Automatic switching of pump n. 1 with the other pumps (if present) with electromechanical contactors and pressure switches in case of inverter failure
• Timed automatic switching (every 24h) of the start sequence of pumps powered via electromechanical contactors

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions
PERFORMANCE CURVES for 3GPE 3M 32 EFC (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GPE 3M 40 EFC (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GPE 3M 50 EFC (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
### 3GPE 3M EFC

**INDUSTRIAL PRESSURISATION**

#### TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

| Model | Three-phase | [kW] | [l/min] 9 | 27 | 54 | 60 | 65 | 72 | 81 | 90 | 108 | 120 | 150 | 180 | 210 | 240 | 300 | 360 |
|-------|-------------|------|-----------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 3GPE 3M 32-160/2.2 | 3x2+2+2.2 | 35.5 | 34.0 | 32.0 | 27.0 | 25.0 | - | - | - | - | - | - | - | - | - | - | - |
| 3GPE 3M 32-200/3.0 | 3x3+3 | 42.0 | 40.0 | 37.5 | 31.0 | 28.0 | - | - | - | - | - | - | - | - | - | - | - |
| 3GPE 3M 32-200/4.0 | 4x4+4 | 53.5 | 52.0 | 49.5 | 43.5 | 40.5 | 38.0 | - | - | - | - | - | - | - | - | - | - | - |
| 3GPE 3M 32-200/5.5 | 5.5x5.5x5.5 | 69.0 | 67.5 | 65.0 | 58.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3GPE 3M 40-160/3.0 | 3x3+3 | - | - | 29.5 | 23.5 | 27.0 | 26.5 | 25.5 | 24.0 | 22.5 | 20.0 | 17.0 | - | - | - | - | - | - |
| 3GPE 3M 40-160/4.0 | 4x4+4 | - | - | 38.5 | 37.0 | 36.0 | 35.5 | 34.5 | 33.0 | 32.0 | 29.0 | 25.5 | - | - | - | - | - | - |
| 3GPE 3M 40-160/5.5 | 5.5x5.5x5.5 | - | - | 45.5 | 44.0 | 43.0 | 42.5 | 41.0 | 39.5 | 38.0 | 35.0 | 31.0 | - | - | - | - | - | - |
| 3GPE 3M 40-200/3.0 | 7.5x7.5x7.5 | - | - | 57.0 | 55.5 | 55.0 | 54.5 | 53.5 | 52.5 | 51.0 | 47.5 | 44.0 | - | - | - | - | - | - |
| 3GPE 3M 40-200/4.0 | 11+11+11 | - | - | 71.0 | 70.0 | 70.0 | 69.5 | 68.5 | 67.5 | 66.0 | 63.0 | 59.0 | - | - | - | - | - | - |
| 3GPE 3M 50-125/4 | 4x4+4 | - | - | - | - | - | 26.0 | 25.5 | 25.0 | 24.0 | 22.5 | 21.5 | 17.9 | 14.0 |
| 3GPE 3M 50-160/5.5 | 5.5x5.5x5.5 | - | - | - | - | - | - | - | 31.0 | 30.5 | 30.0 | 28.5 | 27.0 | 25.5 | 22.5 | 17.9 | 14.0 |
| 3GPE 3M 50-200/7.5 | 7.5x7.5x7.5 | - | - | - | - | - | - | - | 38.5 | 38.0 | 37.5 | 36.0 | 35.0 | 33.5 | 30.0 | 27.0 | 18.0 |
| 3GPE 3M 50-200/9.2 | 9.2x9.2x9.2 | - | - | - | - | - | - | - | - | - | 50.0 | 49.0 | 47.5 | 45.5 | 40.5 | 34.0 |
| 3GPE 3M 50-200/11 | 11+11+11 | - | - | - | - | - | - | - | 56.0 | 55.0 | 54.0 | 52.0 | 48.0 | 42.0 |
| 3GPE 3M 50-200/15 | 15+15+15 | - | - | - | - | - | - | - | - | - | 70.0 | 69.0 | 68.0 | 66.0 | 62.0 | 57.0 |

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**INDUSTRIAL PRESSURISATION**

**3GPE 3M EFC**

Your Life, our Quality. Worldwide.
Units with two vertical multi-stage pumps with stainless steel hydraulic components and normalised motor.

TYPICAL APPLICATIONS
GPE pressurisation units have the following applications:
- Water supply or distribution networks, apartment blocks, schools, hotels, etc.
- Generic industrial water supply
- Irrigation for gardens, parks and sports facilities

UNIT EQUIPMENT
- Three EVMG series pumps with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 5.5 kW with EFC series INVERTER control panel
- Pumps controlled by single INVERTER with pump switching function - emergency operation with pressure switches
- Corrosion resistant materials for all components in contact with fluids
- Galvanised steel base
- Galvanised steel manifolds (AISI 304, AISI 316 available on request). The manifolds are dimensioned in relation to the total hydraulic output of the pressurisation system
- Intake/delivery shut-off valves on each pump
- Intake side check valve
- Delivery side pressure gauge
- Equipped for connection to delivery side accumulation tank
- Equipped for hookup to dry run protection equipment

ELECTRICAL CONTROL PANELS WITH INVERTER
- Power voltage: 400V ±10% 50Hz,
- Three phase without the use of neutral
- Supply frequency: 50Hz or 60Hz
- Power for each motor: from 0.75 kW upwards
- Types of starting and supply for all pumps:
  - during the starting phase the inverter supplies the pump with a voltage ramp; the other pumps have direct or star delta starting, depending on their electrical power
  - during emergency operation (controlled by pressure switches) all pumps run at the reduced power used in direct or star delta starting
- Limits of use (ambient temperature): -10°C to +40°C
- Protection rating:
  - IP55 up to 2.2 kW,
  - IP44 for higher powers
- Reference standards:
  Safety and operational standards applied:
  - EN 60204-1; Safety of electrical equipment
  - EN 60439-1; Assembled protection and control equipment
  EMC Standards applied:
  - IEC EN 61000-6-1; residential, commercial and light industrial immunity
  - IEC EN 61000-6-2; industrial immunity
  - IEC EN 61000-6-3; residential, commercial and light industrial emissions
  - IEC EN 61000-6-4; industrial emissions
  - IEC EN 61000-3-2; harmonic current emissions <= 16A (use line inductance XL.L to be installed on request, see ref. 8.1, 8.2)
- Emissions: compliant for residential environments
- Immunity: compliant for industrial environments
TECHNICAL FEATURES

APPLICATION RANGE
• Maximum operating pressure: 16 bar (up to 30 bar on request)
• Max fluid temperature: 50°C
• Max solid content: 50 ppm (particle size 0.1-0.25 mm or less)
• Maximum chlorine content: 500 ppm
• MEI > 0.4

For further information, refer to the Data Books available on www.ebaraeurope.com

PUMP MATERIALS
• Cast iron lower pump body
• External jacket, gasket disk, impellers, diffusers, shaft jacket, joint cover and small parts in contact with fluid in AISI 304
• Linkages and small parts not in contact with fluid in galvanised steel
• AISI 316 shaft
• Bearings in contact with fluid in tungsten carbide
• Cast iron motor mount
• Mechanical seal in SiC/carbon fibre/EPDM (EVMG 3-5-10-18)
• Cartridge style mechanical seal in SiC/carbon fibre/FPM (standard) (models 32-45-64) (F= round counterflanges; N= oval counterflanges)
• PTFE wear rings

MOTOR SPECIFICATIONS
• High efficiency IE3 motors from 7.5 kW to 22 kW
• Motors IE2 from 0.75kW
• Self-ventilated asynchronous 2-pole motor
• Insulation Class F
• Protection rating IP55
• Three-phase voltage 230/400 ±10% (up to 4 kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above) 50Hz

PRINCIPLES OF OPERATION
• Operation with electronic controller: the unit responds to the pressure transducer signal and speed control with the inverter of pump n. 1, to keep the system pressure constant
• Pumps can be run in AUTOMATIC and MANUAL modes, or EXCLUDED
• Pump motors protected against overload, phase loss and over/under voltage
• Pumps protected against dry running
• Inverter protected against phase malfunctions, over/under voltage, earth system failure and ambient overtemperature
• Pump n. 1 run in variable speed mode by the inverter; the other pumps are started automatically by electromechanical contactors
• Automatic switching of pump n. 1 with the other pumps (if present) with electromechanical contactors and pressure switches in case of inverter failure
• Timed automatic switching (every 24h) of the start sequence of pumps powered via electromechanical contactors

ACCESSORIES
• Membrane accumulation tank: depending on installation conditions

CONSIGNMENT
• Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
• Packaging
• Installation, user and maintenance instructions

INDUSTRIAL PRESSURISATION
PERFORMANCE CURVES for 3GPE EVMG 32 EFC (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
PERFORMANCE CURVES for 3GPE EVMG 32 EFC (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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PERFORMANCE CURVES for 3GPE EVMG 45 EFC (2/2) (ISO 9906 Annex A)

The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone.
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SERIES 2EP

ELECTRICAL ENClosures FOR GP FIXED SPEED UNITS

- SERIES 2EP M UA (single-phase power output)
- SERIES 2EP T UA (three-phase power output)
- SERIES 2EP SD UA (direct star/delta starting)

Electrical enclosure (protection and control) for two electropumps. Manual or automatic operation through pressure switches or floats. The panel is configured to start the two pumps alternately in repose to pressure switch / float switch enable signals. The electrical panel protects the motors against overload and phase failure. Any protection devices that intervene are signalled on the panel itself and remotely through no voltage contacts. The protection device against overload and phase failure resets automatically three times, and manually after the fourth intervention (any interventions, from 1 to 3, are cancelled one hour after the last intervention).

TECHNICAL FEATURES
- P.MIN= Operation against dry running (tripped by a level float or minimum pressure switch) with automatic reset once water supply is restored, with warning lamp.
- PR1= Pump n. 1 start/stop
- PR2= Pump n. 2 start/stop
- Automatic start sequence alternation
- Motor protection against overload with automatic reset for three times and manual reset the fourth time
- Motor line protection against short-circuits with fuses for motor start-up
- Transformer and auxiliary circuit protection with fuses
- Remote signalling, through NC-NO no voltage contact, of the protection devices that intervene

SPECIFICATIONS
- Power:
  - 230V +10-15% - 50/60Hz
  - 400V +10-15% - 50/60Hz
- Temperature limits: -10°C +40°C
- Protection rating IP55
- Reference standards: EN 60204-1, EN 60439-1, EN 61000-6-3, EN 61000-6-1 (for civil environments)
SERIE 3EP

ELECTRICAL ENCLOSURES FOR GP FIXED SPEED UNITS

- SERIES 3EP T UA (three-phase power output)
- SERIES 3EP SD UA (direct or star/delta starting)

Electrical enclosure (protection and control) for three surface electropumps. Manual or automatic operation through pressure switches or floats. The panel is configured to start the three pumps alternately in repose to pressure switch / float switch enable signals. The electrical panel protects the motors against overload and phase failure. Any protection devices that intervene are signalled on the panel itself and remotely through no voltage contacts. The protection device against overload and phase failure resets automatically three times, and manually after the fourth intervention (any interventions, from 1 to 3, are cancelled one hour after the last intervention).

TECHNICAL FEATURES
- P.MIN= Pressure switch against dry running (tripped by a level float or minimum pressure switch) with automatic reset once water supply is restored, with warning lamp.
- PR1= Pump n. 1 start/stop
- PR2= Pump n. 2 start/stop
- PR3= Pump n. 3 start/stop
- Automatic start sequence alternation
- Motor protected against overloads, with manual reset
- Motor line protection against short-circuits with fuses for motor start-up
- Transformer and auxiliary circuit protection with fuses
- Remote signalling, through NC-NO no voltage contact, of the protection devices that intervene

SPECIFICATIONS
- Power: 400V +10-15% - 50/60Hz
- Temperature limits: -10°C +40°C
- Protection rating IP55
- Reference standards: EN 60204-1, EN 60439-1 EN 61000-6-3, EN 61000-6-1 (civil installations)
**E-Power**

**VARIABLE SPEED CONTROL SYSTEM**

In-line electronic device for controlling electropumps, employing inverter technology. Starts and stops the pump and modulates the speed of the motor in relation to the water demand on the system, to maintain the operating pressure setting. Provides excellent comfort for the end user, significant energy savings and increased service life, the typical advantages of inverter controlled autoclave systems.

**TECHNICAL FEATURES**
- Mounts to metal pipe, no need for valves:
  - optimal cooling
  - no pressure drop
- Master/slave operation for units up to 2 pumps
- Very few settings required for commissioning (pressure setpoint, pump current)
- ON/OFF input for minimum level float switch or remote switch
- Output relay for alarm signals or second pump control
- Simple, intuitive user interface
- Soft starts and stops (reduced hammering)
- Numerous protections with programmable automatic rearm

**SPECIFICATIONS**
- Installation: on line
- Mounting position: any
- Fittings: 1” ¼ male
- Power voltage: single-phase 230V
- Output voltage (pump): three-phase 230V
- Phase current: max 10 A
- Maximum pump power: 2.2 kW
- Output frequency: 5 - 60Hz
- Display: 2 digit alphanumeric
- Protection rating: IP 65
- Operating temperature: 5-40 °C
- Pressure setpoint: 0.3-8 bar
- Max overpressure: 12 bar
- Electrical safety: EN60730
- Electromagnetic compatibility: EN61000 (specific standards declared in CE certificate)
- Protections: - Dry run
  - Over/under voltage
  - Short circuit
  - Over current
  - Over temperature
  - Insufficient pressure
  - Sensor failure
- Pressurisation units: up to two pumps
- Weight: 2 kg
Hydrocontroller

Professional in-line electronic device for controlling electropumps, employing inverter technology. Starts and stops the pump and modulates the speed of the motor in relation to the water demand on the system, to maintain the operating pressure setting. Suited to creating pressurisation units up to 8 pumps. Provides excellent comfort for the end user, significant energy savings and increased service life, the typical advantages of inverter controlled autoclave systems.

Technical Features
- Mounts to pipe, no valves: no pressure drop
- Master/slave operation for units up to 8 pumps
- Simple clear interface with 2 line / 16 character display and 4 keys
- Full text display of operating parameters and alarms
- Quick and easy to program
- ON/OFF input for minimum level float switch or remote switch
- Output relay for alarm signals or second pump control
- Soft starts and stops (reduced hammering)
- Numerous protections with programmable automatic rearm

Specifications
- Installation: on line
- Mounting position: any
- Fittings: 1 ¼ female
- Power voltage: three-phase 400V
- Output voltage (pump): three-phase 400V
- Phase current: max 6 A
- Maximum pump power: 2.2 kW
- Output frequency: 10 - 60 Hz
- Display: LCD 2 lines x 16 digits alphanumeric
- Protection rating: IP 65
- Operating temperature: 5-40 °C
- Pressure setpoint: 0.3-7.5 bar
- Max overpressure: 12 bar
- Electrical safety: EN60730
- Electromagnetic compatibility: EN61000 (specific standards declared in CE certificate)
- Protections: - Dry run
  - Over/under voltage
  - Short circuit
  - Over current
  - Over temperature
  - Insufficient pressure
  - Sensor failure
- Pressurisation units: Up to 8 pumps
- Up to 8 pumps: 4 kg
E-Drive

FREQUENCY VARIATOR FOR ELECTRIC PUMP CONTROL

Electronic device with external control for controlling electropumps, employing inverter technology. Starts and stop the pump and modulates the speed of the motor in relation to the water demand on the system, to optimise system operation. Provides excellent comfort for the end user, significant energy savings and increased service life, the typical advantages of inverter controlled autoclave systems.

TECHNICAL FEATURES
- Save money and energy
- Installation on board the motor (reduced footprint)
- Easy to program
- Extended system service life
- Protects the motor from overloads and dry running
- Simple, intuitive user interface
- Soft starts and stops (reduced hammering)
- Controls up to two pumps in DOL (direct online) mode
- Connection to other E-drives (max 8) for combined operation
- Various applications (pressure, flow rate, temperature, differential pressure)
- Wall-mounting option (with optional kit)

SPECIFICATIONS
- Mounting: to motor or wall
- Power voltage: - single-phase 230V for E-drive 1500/3000 - three-phase 400V for the rest of the range
- Output voltage (pump): - three-phase 230V for E-drive 1500/3000 - three-phase 400V for the rest of the range
- Phase current : max 30 A
- Maximum pump power: 15 kW
- Output frequency: 5 - 60Hz
- Display: 16 digit alphanumeric x 2 lines
- Protection rating: IP 55 (NEMA 4)
- Operating temperature: 40 °C
- Protections: - Dry run - Over/under voltage - Over current - Over temperature - Minimum pressure - Maximum pressure - Sensor failure
- Pressurisation units: Up to 8 pumps + 2 DOL
- Pressure sensor: 16 or 25 bar
- Digital outputs: 4 configurable
- Digital inputs: 4 configurable
- Analogue inputs: 4 (2 configurable)
The control panels with EFC/MFC series inverters modulate the operation of electric pumps in response to control by the pressure transducer (transducer measuring flow or other external signal 4-20 mA), regulating the speed of the electric pumps to keep system demand constant.

**VERSION**
- “EFC”: Control panel for two or more electric pumps, with a single inverter but with pump exchange
- “MFC”: Control panel for two or more electric pumps, with an inverter for each individual electric pump

**SPECIFICATIONS**
- Power voltage: 400V ±10% 50Hz,
- Three phase without the use of neutral
- Supply frequency: 50Hz or 60Hz
- Power for each motor: from 0.75 kW upwards
- Types of starting and supply for all pumps:
  - during the starting phase the inverter supplies the pump with a voltage ramp; the other pumps have direct or star delta starting, depending on their electrical power
  - during emergency operation (controlled by pressure switches) all pumps run at the reduced power used in direct or star delta starting
- Limits of use (ambient temperature): -10°C to +40°C
- Protection rating: IP55 up to 3 kW
  IP44 for higher powers
- Reference standards:
  Safety and operational standards applied:
  - EN 60204-1; Safety of electrical equipment
  - EN 60439-1; Assembled protection and control equipment.
  EMC Standards applied:
  - IEC EN 61000-6-1; residential, commercial and light industrial immunity
  - IEC EN 61000-6-2; industrial immunity
  - IEC EN 61000-6-3; residential, commercial and light industrial emissions
  - IEC EN 61000-6-4; industrial emissions
  - IEC EN 61000-3-2; harmonic current emissions <= 16A (use line inductance XL.L to be installed on request, see ref. 8.1, 8.2)
- Emissions: compliant for residential environments
- Immunity: compliant for industrial environments
TECHNICAL ANNEX

NPSH

SELECTING THE PRESSURISATION UNIT
a. The unit must be selected in relation to the maximum flow rate (Q) and head (H) the system will require of it, especially at its most disadvantaged service point
b. When sizing the system and selecting the unit, adopt the criteria of cost and energy saving (e.g. water consumption, time of use, electrical power)
c. The point of operation of the unit at maximum flow rate should not correspond to the point of maximum efficiency, but should be shifted to the right so that the efficiency of the unit remains high in normal operating conditions at lower flow rates
d. To prevent cavitation, we recommend checking that the maximum flow point does not fall in the zone in which the NPSH increases rapidly or outside it.

NPSH (Net Positive Suction Head)
A pump installed above the water level can suck the water due to the atmospheric pressure on the surface itself, which is equivalent to about 10 m of water column. This means that, however great the suction power of the pump, the height from which it can draw up the fluid remains 10 m (for water).

In reality, the limit is lower due to pressure drops in the suction line, the kinetic height of the current and the dynamic effect of the pump’s impeller.

Trying to suck up the fluid from a greater height leads to cavitation in the pump, which is not only seriously damaging to the pump but also prevent further increases in flow rate.

This consists in the sudden creation and collapse of cavities, composed primarily of vapour, as the fluid flows. These cavities are formed, at the operating temperature, in zones in which the fluid pressure approaches the vapour pressure at that temperature. In centrifugal pumps, this occurs mainly at the entrance to the impeller blades where the sudden acceleration of the current leads to a reduction in pressure. The cavities of vapour which result are conveyed onwards by the flow and implode at points where the fluid pressure increases. The implosion of these bubbles of vapour is accompanied by a shock wave, which causes hammering on the surface in question. This can result in fatigue, plastic deformation and removal of material from the surface. The effect can be accelerated by the corrosive action of the fluid being handled.

To characterise the behaviour of a pump in response to cavitation, one determines the NPSH (Net Positive Suction Head) which represents the absolute height or load, net of the fluid’s vapour tension, which must exist in suction to ensure that cavitation does not occur.

It will be immediately evident how important it is to check that the system available NPSH is greater (by at least 1 m) than that required by the pump.

The available NPSH is calculated as follows:

\[ \text{NPSH} = \frac{z + p - p_v}{\gamma} - H_r + \frac{p_b - p}{\gamma} \]

Where:
- \( z \) = level difference (in m), between the axis of the pump’s intake port and the free surface of the fluid in the supply tank, which is:
  - negative in case of negative suction
  - positive in case of positive suction
- \( p_0 \) = relative pressure (in Pa) on the free surface of the fluid in the supply tank. If drawing fluid from an open tank, i.e. one which is contact with the atmosphere, \( p_0 = 0 \)
- \( \gamma \) = specific weight of fluid (in N/m³) at the pumping temperature
- \( H_r \) = pressure drops (in m) along the intake line
- \( p_b \) = barometric pressure (in Pa) in the system in which the pump is installed
- \( p_v \) = vapour tension (in Pa) of the fluid at the pumping temperature

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Determining the FLOW RATE (Q)
The quantity of fluid that passes through a section of area “A” in unit time. The first value to calculate when sizing a pressurisation unit is the total quantity of water it must supply to satisfy the maximum theoretical demand, given by the sum of the water demand at each point of delivery.
The table gives the values of maximum simultaneity of water flows per number of apartments with 1 or 2 WC’s (with cistern or direct flush).

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CAUTION: for seaside areas, one must augment the flow rate by a factor of 20%
Determination of the HEAD (H)
The head is the maximum total difference in level which a pump can elevate a fluid.
The head includes the level difference between the pump and the supply tank, if located at a lower level, and the difference between the pump and the destination tank at a higher level. The route of the pipe has no effect on the total level difference, which depends exclusively on the piezometric difference in height between the surface of the supply fluid and the delivery point. The head is generally expressed in water column metres. The head of a pump is the energy per unit mass supplied by the pump to the fluid. In a closed circuit the head overcomes the pressure drops in the circuit due to friction.

\[ H_{\text{tot}} = H_{\text{p}} + H_{\text{s}} + H_{\text{i}} \]

**Example:**
- \( H_{\text{p}} = 20 \) m
- \( H_{\text{s}} = 15 \) m
- \( H_{\text{i}} = 2 \) m
- \( H_{\text{tot}} = 20 + 15 + 2 = 37 \) m

- \( H_{\text{p}} \): geodetic height of pump suction axis at most elevated service.
- \( H_{\text{s}} \): geodetic height at minimum pressure demand on most elevated service.
- \( H_{\text{i}} \): sum of continuous and local pressure drops.

**Example:**
- \( H_{\text{p}} = 20 \) m
- \( H_{\text{s}} = 15 \) m
- \( H_{\text{i}} = 2 \) m
- \( H_{\text{tot}} = 20 - 15 + 15 + 2 = 22 \) m

- \( H_{\text{p}} \): positive suction head geodetic height.
- \( H_{\text{s}} \): height corresponding to minimum mains supply pressure.
- \( H_{\text{i}} \): height corresponding to minimum pressure demand on most elevated service.
- \( H_{\text{tot}} \): sum of continuous and local pressure drops.

**Example:**
- \( H_{\text{p}} = 20 \) m
- \( H_{\text{s}} = 5 \) m
- \( H_{\text{i}} = 15 \) m
- \( H_{\text{i}} = 2 \) m
- \( H_{\text{tot}} = 20 + 5 + 15 + 2 = 42 \) m

- \( H_{\text{p}} \): positive suction head geodetic height.
- \( H_{\text{s}} \): geodetic height of pump suction axis at most elevated service.
- \( H_{\text{i}} \): height corresponding to minimum pressure demand on most elevated service.
- \( H_{\text{tot}} \): sum of continuous and local pressure drops.
This is the resistance opposed to the flow of the fluid by the walls of a pipe or by variations of diameter of the pipe, or at intersections with bends and valves in the circuit. It is also determined by the fluid temperature and geodetic height of the installation. It is generally expressed in water column metres.

\( P_c = \text{Pressure drop in water column metres per 100 m of new cast iron pipe.} \)

\( V = \text{Speed of fluid in pipe, m/s.} \)

### Technical Annex

#### Pressure Drops

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Pressure drops caused by accessories can be approximated with the following comparisons:

- **Foot value:** 15 m of pipe
- **Check valve:** 10 m of pipe
- **Strainer:** 5 m of pipe
- **Bends and elbows:** 5 m of pipe

For other pipes than new cast iron pipe, multiply the table values by the following factors:

- Stainless steel: 0.8
- PVC: 0.8
- Porcelain: 1.17
- Laminted steel: 0.8
- Galvanized steel: 1.25
- Lightly rusted pipe: 0.6
- Rustled and very encrusted pipe: 2.1

For cast iron pipes:

- For 125 mm to 300 mm: 1.05
- For 315 mm to 500 mm: 1.20
- For 600 mm and above: 1.50

- Booster: 1.75

### Booster

- Recommended delivery dia.
- Recommended intake dia.

---

**Your Life, our Quality. Worldwide.**

* Booster
TECHNICAL ANNEX

ACCIDENTAL PRESSURE DROPS

BALL VALVE

PRESSURE DROP/FLOW RATE DIAGRAM

CHoke VALVE

PRESSURE DROP ΔP DIAGRAM

FOOT VALVE

Kv is the flow rate that causes a pressure drop of 1 bar.

FLOW RATE (m³/h)

FLOW RATE (GPM)

Kv is the flow rate that causes a pressure drop of 1 bar.
ACCIDENTAL PRESSURE DROPS

BRASS CHECK VALVE

FLANGED CHECK VALVE IN CAST IRON

FLOW RATE = l/h

PRESSURE DROP

FLOW GALLON/Min.
### PRESSURE DROP IN EQUIVALENT LENGTH OF PIPE IN METRES OF GALVANISED STEEL PIPE

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DN = Nominal pipe diameter
D = Effective internal diameter of pipe

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN = L

### LOCAL PRESSURE DROPS

![Diagram](image)

### PRESSURE DROPS DUE TO SUDDEN ENLARGEMENT IN WATER COLUMN METRES

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**Note:**
- Numbers in italics indicate pressure drops due to sudden enlargement in water column metres.
- DN = Nominal pipe diameter
- D = Effective internal diameter of pipe
- For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN = L

Your Life, our Quality. Worldwide. 210 Booster
### LOCAL PRESSURE DROPS

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN = L

**PRESSURE DROPS DUE TO SUDDEN RESTRICTION IN WATER COLUMN METRES**

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**DN** = Nominal pipe diameter  
**D** = Effective internal diameter of pipe
**TECHNICAL ANNEX**

**LOCAL PRESSURE DROPS**

DN = Nominal pipe diameter  
D = Effective internal diameter of pipe

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN = L

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**PRESSURE DROPS LOCALISED TO DIVERGENT ISO CONES IN WATER COLUMN METRES**

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**DN2**

**Q**

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PRESSURE DROPS LOCALISED TO CONVERGENT ISO CONES IN WATER COLUMN METRES

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</tbody>
</table>

DN = Nominal pipe diameter
D = Effective internal diameter of pipe

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN = L

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**PROTECTION RATING**

This is identified as IP (Ingress Protection - the degree of protection against the ingress of foreign materials and agents).

CEI EN 60529 (protection rating of housings - IP code) establishes the IP rating to indicate the protection of electrical equipment against access to live components and against penetration by water and foreign solid bodies.

The IP rating is composed of 2 characteristic digits, and may be extended with a supplementary letter if the protection of persons against access to live components is greater than that indicated by the first digit.

Further supplementary letters give additional information relating to the protection of persons or the material.

The IP rating must always be read a digit at a time and not as a single number.

**FIRST CHARACTERISTIC DIGIT - PROTECTION AGAINST THE INGRESS OF FOREIGN BODIES AND AGAINST ACCESS TO HAZARDOUS PARTS**

<table>
<thead>
<tr>
<th>Digit</th>
<th>Test</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td><img src="image" alt="Image" /></td>
<td>No protection</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td><img src="image" alt="Image" /></td>
<td>Protected against solid bodies of size greater than 50 mm</td>
<td>No parts of the human body, such as a hand, nor solid bodies of diameter greater than 50 mm, may penetrate</td>
</tr>
<tr>
<td>2</td>
<td><img src="image" alt="Image" /></td>
<td>Protected against solid bodies of size greater than 12 mm</td>
<td>The fingers, bodies of a similar size of length no more than 80 mm, and solid bodies of diameter greater than 12 mm, may not penetrate</td>
</tr>
<tr>
<td>3</td>
<td><img src="image" alt="Image" /></td>
<td>Protected against solid bodies of size greater than 2.5 mm</td>
<td>Wires of diameter or thickness greater than 2.5 mm, and solid bodies of diameter greater than 2.5 mm, may not penetrate</td>
</tr>
<tr>
<td>4</td>
<td><img src="image" alt="Image" /></td>
<td>Protected against solid bodies of size greater than 1.0 mm</td>
<td>Wires or plates of diameter or thickness greater than 1 mm, and solid bodies of diameter greater than 1 mm, may not penetrate</td>
</tr>
<tr>
<td>5</td>
<td><img src="image" alt="Image" /></td>
<td>Protected against dust</td>
<td>Penetration by dust is not totally excluded, but the amount is such as not to compromise the operation of the material</td>
</tr>
<tr>
<td>6</td>
<td><img src="image" alt="Image" /></td>
<td>Totally protected against dust</td>
<td>No penetration of dust is permitted</td>
</tr>
</tbody>
</table>
## TECHNICAL ANNEX

### PROTECTION RATING

#### SECOND CHARACTERISTIC DIGIT - PROTECTION AGAINST PENETRATION BY WATER

<table>
<thead>
<tr>
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<th>Test</th>
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<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
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<td>No protection</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td><img src="image1.png" alt="Icon" /></td>
<td>Protected against water drops falling vertically</td>
<td>Water drops falling vertically must not cause damage</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2.png" alt="Icon" /></td>
<td>Protected against water falling at an angle of no more than 15°</td>
<td>Water drops falling vertically must not cause damage when the housing is tilted up to 15° away from its original position</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3.png" alt="Icon" /></td>
<td>Protected against rain</td>
<td>Water falling as rain at an angel form the vertical of up to 60° must not cause damage</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4.png" alt="Icon" /></td>
<td>Protected against sprays of water</td>
<td>Water sprayed onto the housing from all directions must not cause damage</td>
</tr>
<tr>
<td>5</td>
<td><img src="image5.png" alt="Icon" /></td>
<td>Protected against jets of water</td>
<td>Water sprayed onto the housing with a nozzle from all directions must not cause damage</td>
</tr>
<tr>
<td>6</td>
<td><img src="image6.png" alt="Icon" /></td>
<td>Protected against powerful jets of water</td>
<td>Waves or powerful jets of water may not penetrate the housing to a damaging extent</td>
</tr>
<tr>
<td>7</td>
<td><img src="image7.png" alt="Icon" /></td>
<td>Protected against temporary immersion</td>
<td>Water may not penetrate to a damaging extent when the housing is immersed at a given pressure and for a given time</td>
</tr>
<tr>
<td>8</td>
<td><img src="image8.png" alt="Icon" /></td>
<td>Protected against continuous immersion</td>
<td>The material is suited for immersion in water under the conditions specified by the manufacturer</td>
</tr>
</tbody>
</table>

#### Supplementary letter

Protection of persons against access using tools, to be used only if:

- the effective protection against access to hazardous parts is greater than that indicated in the first characteristic digit
- only protection against access to hazardous parts is indicated and the first digit is replaced by X
METHODS FOR STARTING ELECTRIC MOTORS

Direct start
Direct starting is the simplest method of starting and is obtained by connecting the motor’s rated voltage to the stator. In general, this is used for small motors which can run up to speed in short time.
Fig. 1 shows the direct starting procedure, obtained by closing connections “1”.

The main disadvantages, as can be seen in the figure, consist in a high current absorption by the rotor when starting, and hence a high current demand from the power supply by the stator, which causes sudden voltage drops and disturbs the mains itself.

The advantages, along with the simplicity of the configuration, consist in good starting torque and minimum starting time.

Star-Delta start (Y - Δ)
This method is used for motor which are powered, when run up to speed, with a delta connection, indicated with the letter Δ.
It consists in starting the motor with a star (Y) winding and then, once the motor has started, switching the windings to the delta configuration (Δ) when the motor is close to running speed.
As can be seen in Fig. 2, connections 2 are closed and connections 3 left open, to configure the windings in a star arrangement, then contacts 1 are closed the motor starts in a star configuration. In this way, the motor absorbs \( \frac{1}{3} \) of the line current compared to the absorption in the delta configuration. The starting torque is also reduced by a factor of 3 compared to delta Δ starting.
When a certain set speed is reached, connections 2 are opened and connections 3 are closed, thus switching the windings into a delta configuration. The torque rises as does the current absorption, in comparison with the Y configuration.
This method is generally used for motors of power from 7 to 50 kW.
**TECHNICAL ANNEX**

**SELECTION AND SIZING OF THE AUTOCLAVE**

The supply tank, or autoclave, is used to limit the number of pump starts per hour by supplying part of its water reserve to the circuit, which is kept pressurized by the air above it. The autoclave may be of the air cushion or membrane type. In the membrane type there is no contact between the air and the water since they are separated by an elastic membrane inside the tank. In the air cushion type, there is no clear separation between the air and the water. Since the air and water tend to mix together to some extent, the separation must be restored by an air supply or compressor. The formula used to determine the volume of an autoclave is:

If we know the maximum circuit absorption in l/min ($A_{\text{max}}$) and the maximum number of pump starts permitted per hour ($N_{\text{max}}$), the table allows us to calculate the necessary size of vessel.

### MEMBRANE AUTOCLAVE

<table>
<thead>
<tr>
<th>$A_{\text{min}}$ (l/min)</th>
<th>$P_{\text{prec}}$</th>
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<th>$1$</th>
<th>$1.3$</th>
<th>$1.3$</th>
<th>$1.8$</th>
<th>$1.8$</th>
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<th>$2.3$</th>
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</table>

The formula

$$\Delta V_t = \left[ M \times A_{\text{min}} \times (P_{\text{max}}+1) \times (P_{\text{min}}+1) \right] / \left[ N_{\text{max}} \times (P_{\text{max}} - P_{\text{min}}) \times (P_{\text{prec}}+1) \right]$$

$V$ = vessel / volume of vessel (l)

$A_{\text{min}}$ = Maximum circuit absorption (l/min)

$M$ = Multiplier (= 16.5 for this calculation model)

$P_{\text{min}}$ = Minimum setting of pressure switch at which the pump starts

$P_{\text{max}}$ = Maximum setting of pressure switch at which the pump stops

$N_{\text{max}}$ = Maximum number of pump starts per hour

$P_{\text{prec}}$ = Preload pressure

All pressures are in bar (relative pressure)

To calculate the volume of the vessel $V$: the following parameters may be modified: $N_{\text{min}}$, $P_{\text{min}}$, $P_{\text{prec}}$

**CAUTION:** adjust the vessel preload pressure to 0.2 - 0.3 bar relative to the pump starting pressure.
TECHNICAL ANNEX

SELECTION AND SIZING OF THE AUTOCLAVE

AIR CUSHION AUTOCLAVE

MOTOR SPECIFICATIONS

- Maximum operating pressure PN: 10 bar at 20°C
- Maximum operating temperature: 50°C
- Fluid: water

\[
V_m = \frac{Q_p}{4 \times Z} \times \frac{1}{\left(\frac{P_{\text{max}}}{P_{\text{min}} - 2}\right)}
\]

where:
- \(V_m\) = Total volume of air cushion autoclave, \(m^3\)
- \(Q_p\) = Mean pump flow rate, \(m^3/h\)
- \(P_{\text{max}}\) = Maximum pressure setpoint (mca)
- \(P_{\text{min}}\) = Minimum pressure setpoint (mca)
- \(Z\) = Maximum number of motor starts permitted per hour

<table>
<thead>
<tr>
<th>Type</th>
<th>Autoclave [l]</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td>210</td>
<td>66</td>
<td>G½</td>
<td>G½</td>
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<tr>
<td>midi</td>
<td>500 - 2000</td>
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<td>108</td>
<td>G½</td>
<td>G¾</td>
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<tr>
<td>maxi</td>
<td>2000 - 4000</td>
<td>406</td>
<td>108</td>
<td>G½</td>
<td>G¾</td>
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</tbody>
</table>

Mean pressure setpoint [bar] | 100 | 200 | 300 | 500 | 700 | 1000 | 1500 | 2000 | 2500 | 3000 | 4000 |
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<td>MIDI</td>
<td>MAXI</td>
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SUPPLY OPERATION SCHEME

The pump is stopped. The air supply is full of water

When the pump starts, it creates an underpressure which allows the water to be drawn from the supply, in turn drawing water from the autoclave. This, passing through the Venturi nozzle, takes air in through the valve

While the water is emptying out, the supply fills with air and the ball sinks to the bottom, closing the hole connecting it to the pump. The supply is now full of water

When the pump stops, thanks to the principle of communicating vessels, the air in the supply, being lighter, goes to the top of the autoclave

LEGEND

1. Tank
2. Shutter valve
3. Hose
4. Pump
5. Special nipple
6. Check valve
7. Hose
8. Air supply
9. Shutter valve
10. Level gauge
PERFORMANCE SPECIFICATIONS
The specifications given herein refer to the curves given in our catalogues and Data Books (see www.ebaraeurope.com). All performance curves have been calculated in compliance with ISO 9906 Annex A.

Tolerances per ISO 9906 Annex A.
The curves refer to the effective speed of the asynchronous motors at 50 Hz.
The measurements were run at a water temperature of 20°C with dynamic viscosity of ν = 1 mm²/s (1 cSt).
The NPSH curve is a mean curve obtained in the same conditions as the performance curves.
The continuous curves represent the recommended working range. The broken curve is only a guide.
To prevent overheating, the pumps should not be used below 10% of the maximum efficiency flow rate.

When selecting the pump, make allowance for a safety margin of at least 1 m.

Symbols:
- Q = Flow rate [m³/h]
- H = Head [m]
- P₁ = Power draw from power line
- P₂ = Power delivery to motor shaft (pump power draw)
- η = Pump efficiency
- NPSH = Net positive suction head required by the pump
- MEI = Minimum Efficiency Index

The minimum efficiency index (MEI) measures the quality of a pump in relation to its efficiency. The minimum efficiency index is based on hydraulic performance and refers to the maximum efficiency point.

The efficiency of a pump with turned impeller is generally lower than that of a pump with full impeller diameter. Turning of the impeller adapts the pump to a fixed work point, resulting in lower energy consumption.

The minimum efficiency index (MEI) is based on the maximum diameter of the impeller.

The operation of the pump for water with variable operating points can be efficient and cost-convenient if it is controlled, for example, through a variable-speed motor that adjusts the pump's operation to the system.