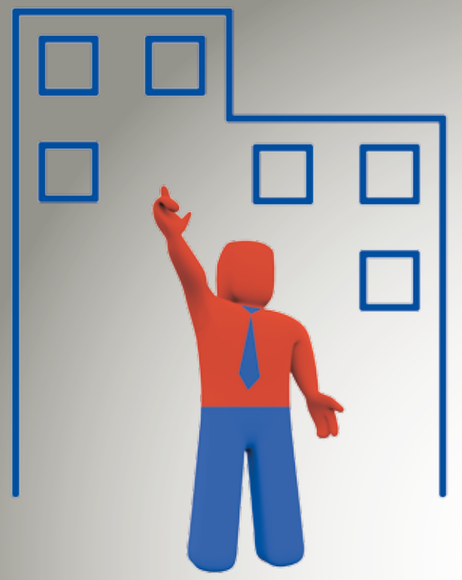
BOOSTER SETS

50 Hz



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GP - GPE

PRESSURISATION UNITS

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.

GP PRESSURISATION UNIT

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

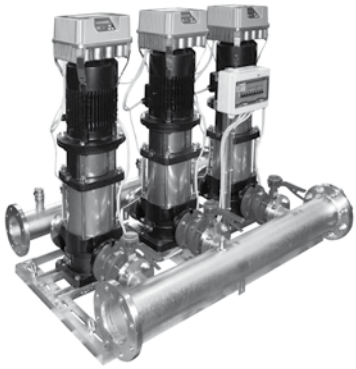
- Earthing system continuity
- Applied voltage (dielectric rigidity)
- Insulation resistance

GP - GPE

PRESSURISATION UNITS

GPE PRESSURISATION UNITS WITH E-POWER

GPE PRESSURISATION UNITS WITH HYDROCONTROLLER



GPE PRESSURISATION UNITS WITH E-DRIVE

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.

GPE PRESSURISATION UNIT WITH EFC - MFC CONTROL PANEL

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

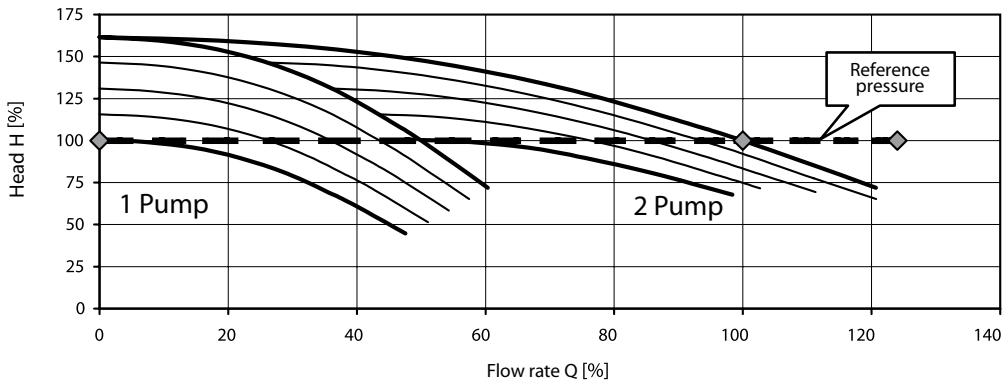
n. 3 and then pump n. 2.
Once the demand for water has completely ceased, the controller reduces the speed of pump n. 1 to its minimum and after a set delay (around 1 minute) stops this pump too.
The next time the system is started up, the INVERTER controlled pump will no longer be pump n. 1, but n. 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.

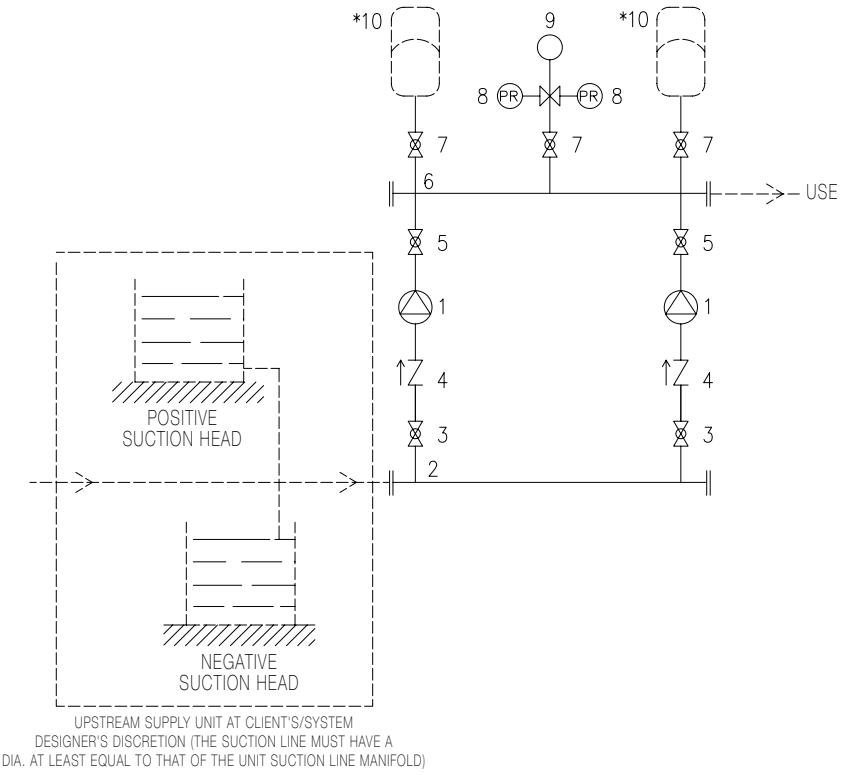
Fig. 1 - TWO PUMP UNIT WITH CONSTANT PRESSURE REGULATION



PRESSURISATION UNITS

PRESSURISATION UNIT WATER CIRCUIT DIAGRAM

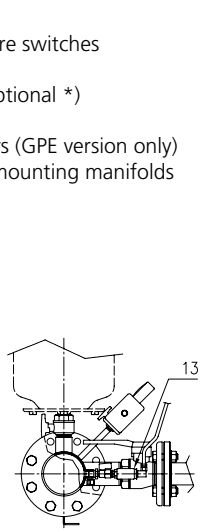
LEGEND
1 Electric pump
2 Intake manifold
3 Intake shut off valve
4 One-way valve
5 Delivery shut off valve
6 Delivery manifold
7 Check valve
8 Pump control pressure switches
9 Pressure gauge
10 Membrane tank (optional *)

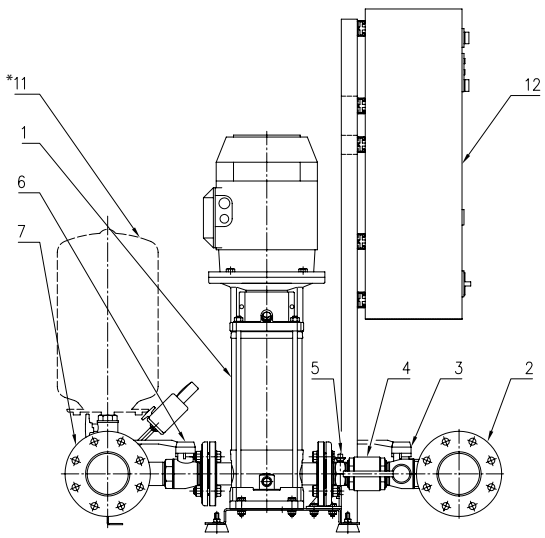


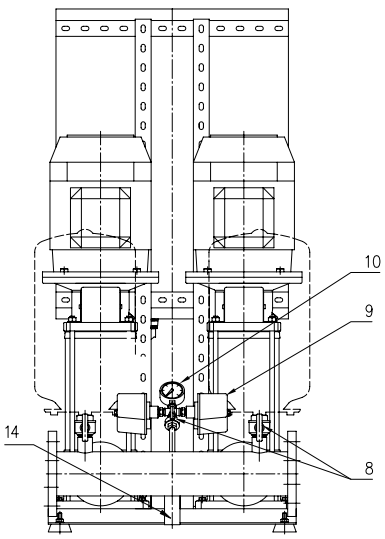
UPSTREAM SUPPLY UNIT AT CLIENT'S/SYSTEM
DESIGNER'S DISCRETION (THE SUCTION LINE MUST HAVE A
DIA. AT LEAST EQUAL TO THAT OF THE UNIT SUCTION LINE MANIFOLD)

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







2GP AGA

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

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

2GP AGA

DOMESTIC PRESSURISATION

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 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.

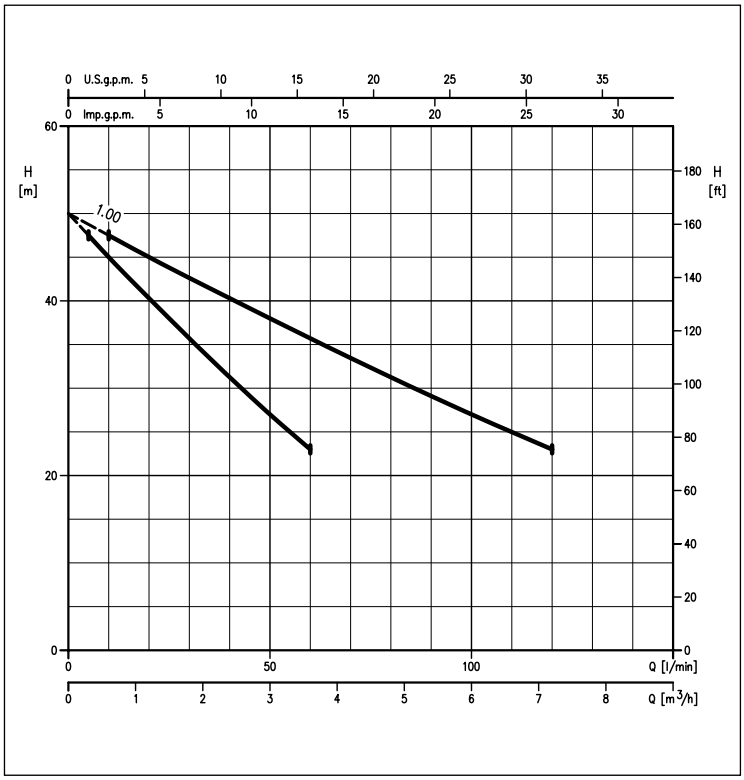
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

2GP AGA

DOMESTIC PRESSURISATION

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)

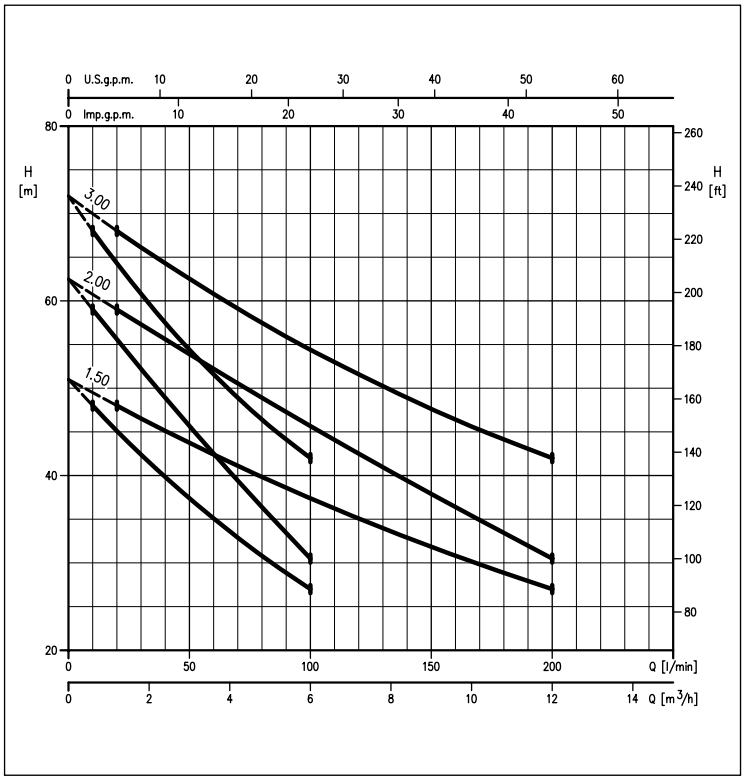


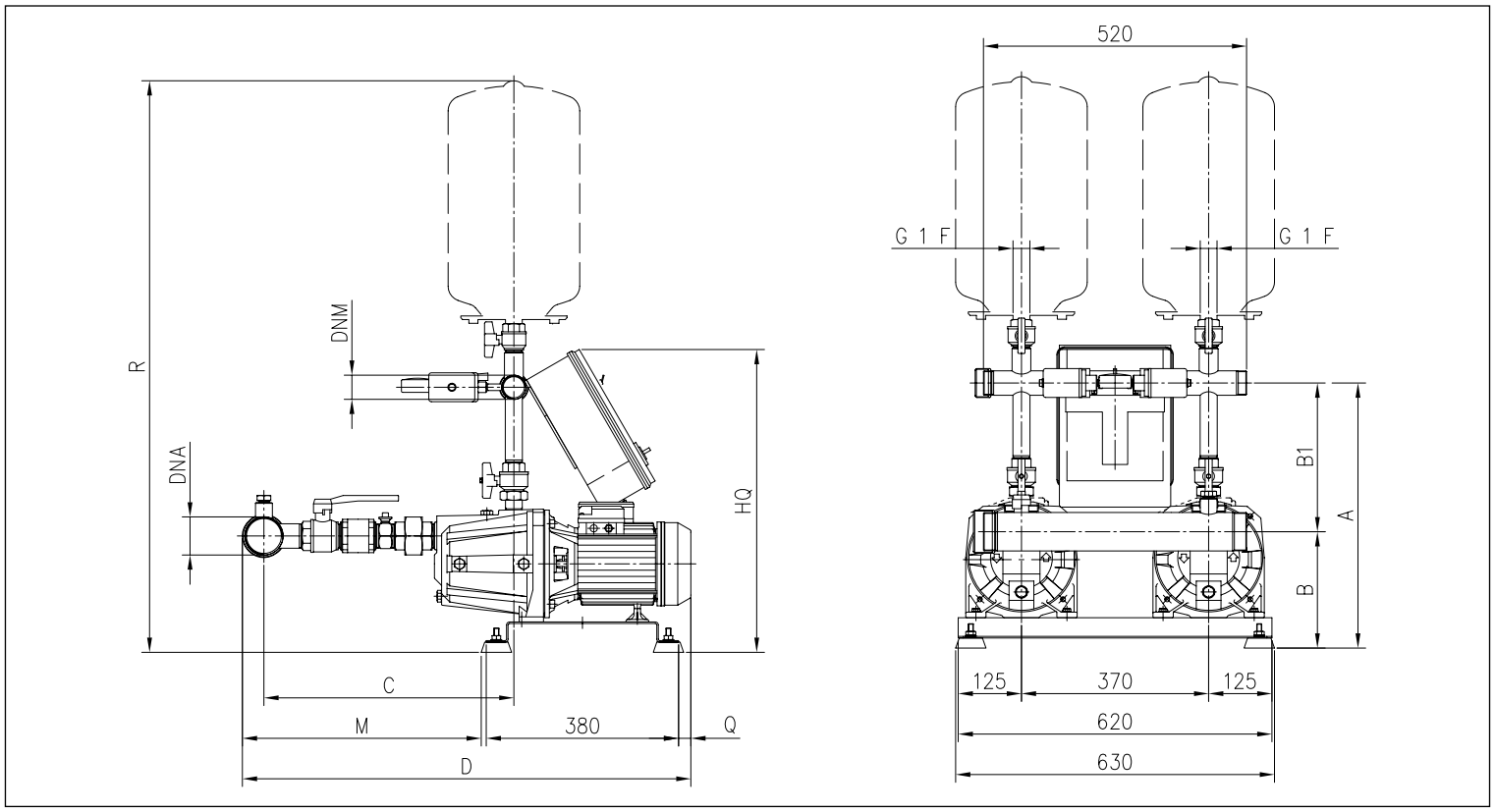
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	10	20	40	60	90	100	120	160	200
					m³/h	0.6	1.2	2.4	3.6	5.4	6	7.2	9.6	12
					H = Head [m]									
AGA 1.00 M	AGA 1.00 T	0.75+0.75	11.0	3.4		47.5	45.0	40.3	35.7	29.1	27.0	23.0	-	-
AGA 1.50 M	AGA 1.50 T	1.1+1.1	16.2	6.4		-	48.0	45.1	42.4	38.6	37.4	35.1	30.8	27.0
AGA 2.00 M	AGA 2.00 T	1.5+1.5	19.6	7.0		-	59.0	55.6	52.2	47.3	45.7	42.5	36.4	30.5
-	AGA 3.00 T	2.2+2.2	-	9.4		-	68.0	64.3	60.8	55.9	54.4	51.6	46.4	42.0

2GP AGA

DOMESTIC PRESSURISATION

DIMENSIONS



DIMENSION CHART

Model	Dimensions [mm]														Weight [kg]	
	A	B	B1	C	D [2]	D [1]	M	R	Q [2]	Q [1]	HQ [2]	HQ [1]	DNA	DNM	[2]	[1]
2GP AGA 1.00 (M)	485	210	275	415	770	770	370	1090	-	-	545	560	G2"	G1" ½	51	53
2GP AGA 1.50 (M)	525	230	295	495	885	870	470	1130	25	10	585	600	G2" ½	G1" ½	78	78
2GP AGA 2.00 (M)	525	230	295	495	885	870	470	1130	25	10	585	600	G2" ½	G1" ½	78	78
2GP AGA 3.00	525	230	295	495	-	885	470	1130	-	25	585	600	G2" ½	G1" ½	-	82

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

2GP CDA

DOMESTIC PRESSURISATION

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

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

2GP CDA

DOMESTIC PRESSURISATION

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

2GP CDA

DOMESTIC PRESSURISATION

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

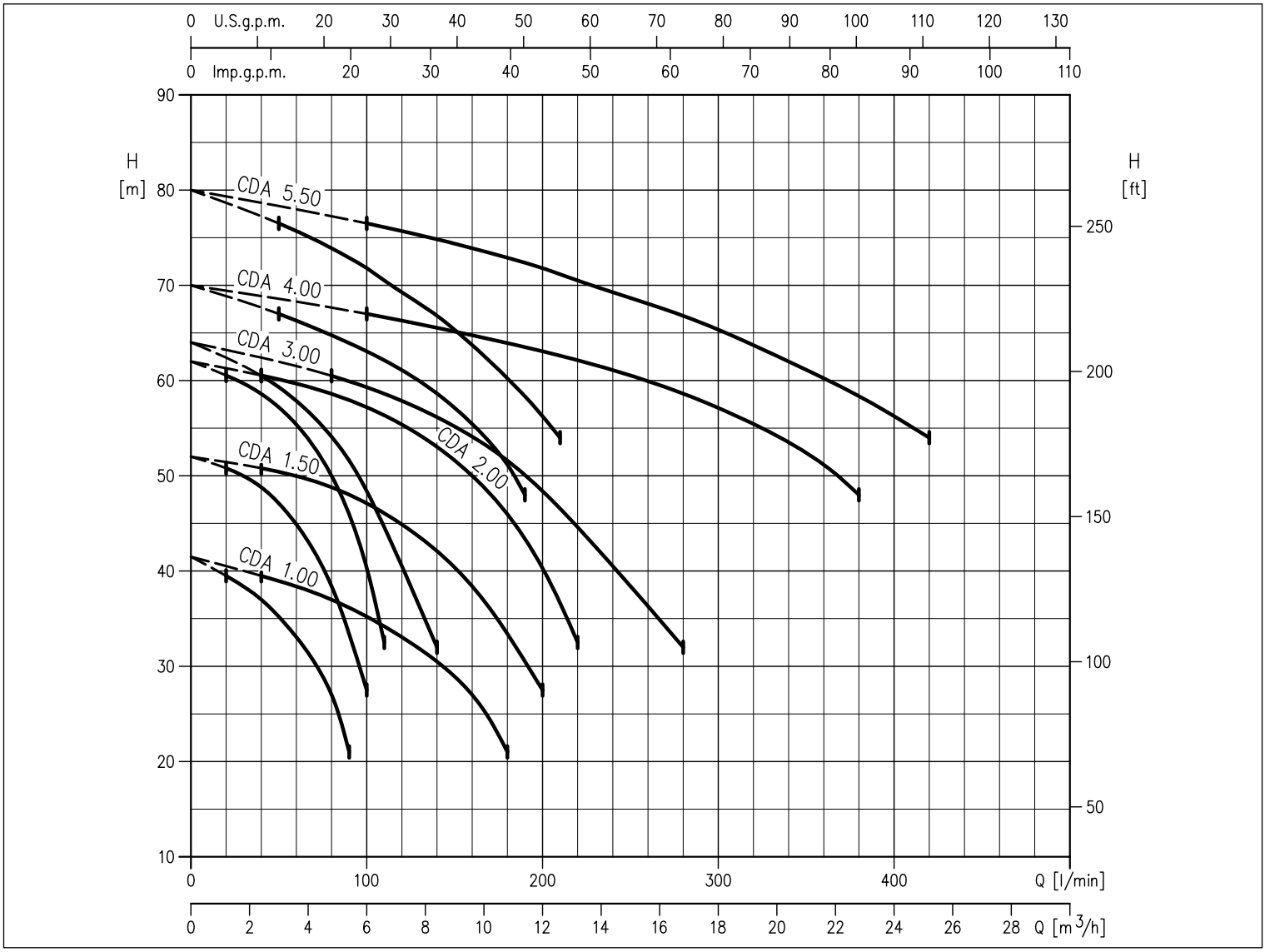


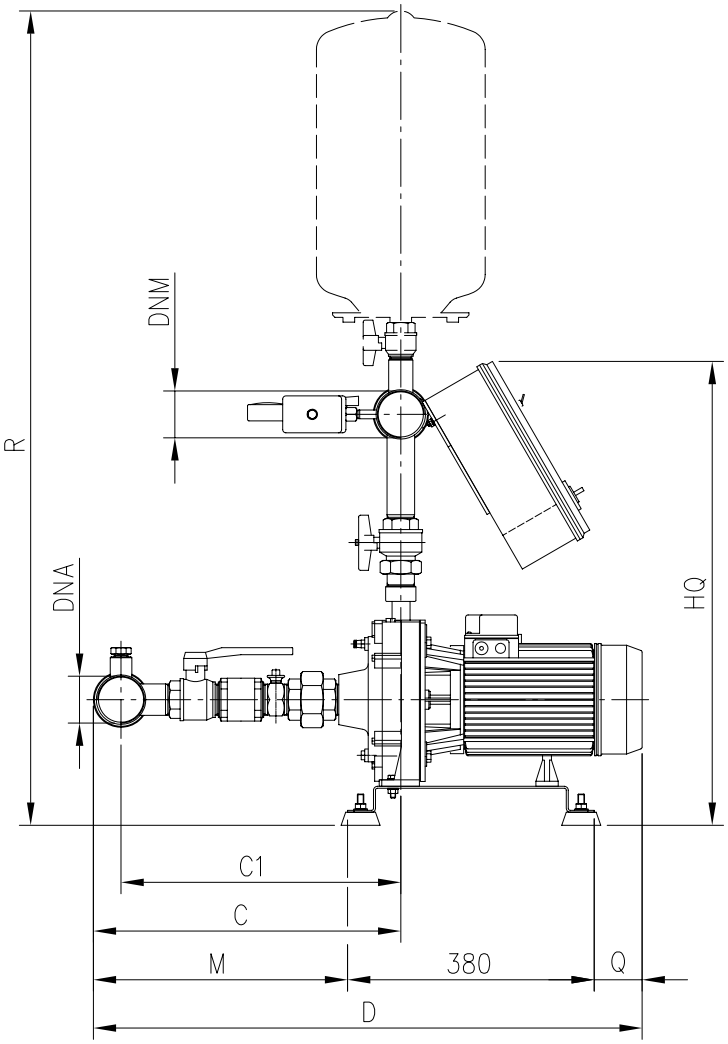
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

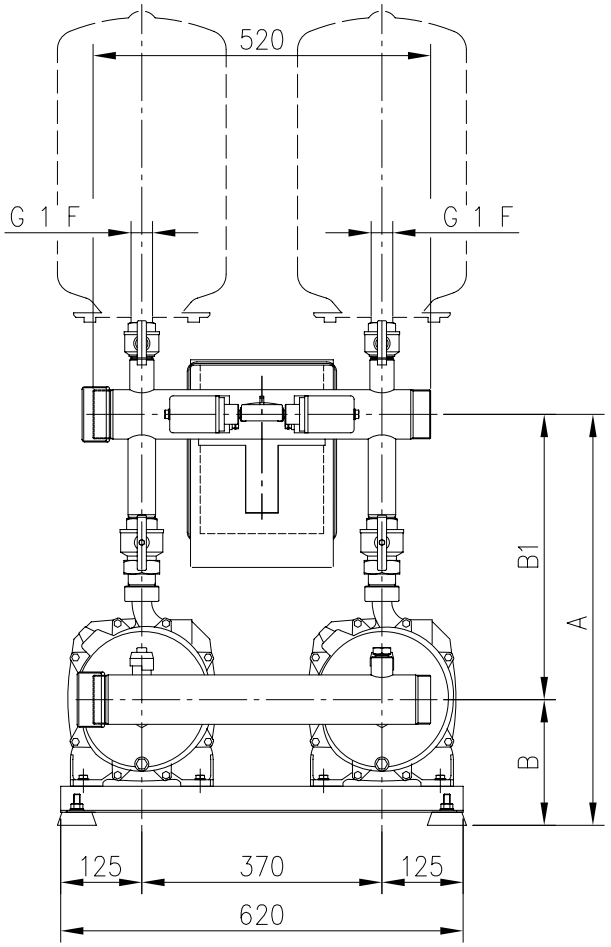
Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	40	80	100	160	180	200	220	240	280	380	420
					m³/h	2.4	4.8	8	9.6	10.8	12	13.2	14.4	16.8	22.8	25.2
					H = Head [m]											
2GP CDA 1.00 M	2GP CDA 1.00 T	0.75+0.75	12.2	4.0		39.5	37.0	35.2	27.0	21.0	-	-	-	-	-	-
2GP CDA 1.50 M	2GP CDA 1.50 T	1.1+1.1	17.2	6.4		50.8	49.0	47.0	38.4	33.4	27.5	-	-	-	-	-
2GP CDA 2.00 M	2GP CDA 2.00 T	1.5+1.5	21.6	9.0		60.5	58.5	57.0	50.0	46.5	40.5	32.5	-	-	-	-
-	2GP CDA 3.00 T	2.2+2.2	-	9.8		-	60.5	59.5	54.0	51.5	48.5	44.5	40.5	32.0	-	-
-	2GP CDA 4.00 T	3+3	-	14.4		-	-	67.0	65.0	64.0	62.5	62.0	61.0	58.0	48.0	-
-	2GP CDA 5.50 T	4+4	-	17.4		-	-	76.5	74.0	73.0	72.0	70.5	69.0	67.0	58.5	54.0

2GP CDA

DOMESTIC PRESSURISATION

DIMENSIONS





DIMENSION CHART

Model	Dimensions [mm]																Weight [kg]	
	A	B	B1	C	C1	D [2]	D [1]	DNA	DNM	HQ [2]	HQ [1]	M	Q [2]	Q [1]	R		[2]	[1]
2GP CDA 1.00 (M)	530	160	370	425	395	730	730	G2"	G1" ½	585	600	350	-	-	1135		66.0	66.0
2GP CDA 1.50 (M)	565	170	395	420	385	745	730	G2"	G1" ½	625	640	340	25	10	1170		92.0	94.0
2GP CDA 2.00 (M)	585	170	415	420	385	745	745	G2"	G2"	635	650	340	30	25	1185		96.0	98.0
2GP CDA 3.00	625	170	455	490	445	-	815	G2" ½	G2" ½	690	705	405	-	30	1245		-	98.0
2GP CDA 4.00	635	195	440	475	430	-	845	G2" ½	G2" ½	700	715	390	-	75	1255		-	135.0
2GP CDA 5.50	635	195	440	475	430	-	885	G2" ½	G2" ½	700	715	390	-	115	1255		-	144.0

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

2GP 2CDX

DOMESTIC PRESSURISATION

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

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

2GP 2CDX

DOMESTIC PRESSURISATION

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

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.

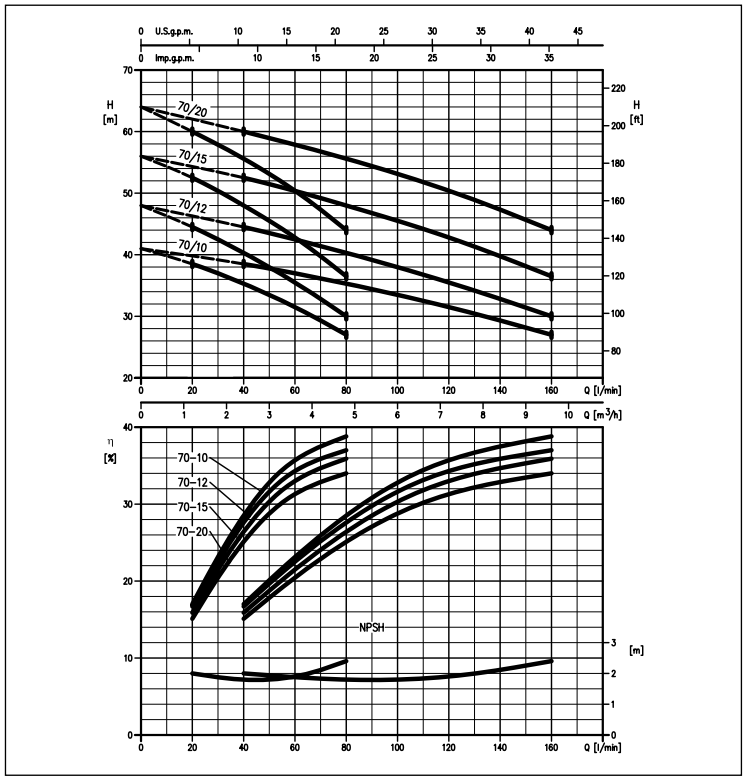
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

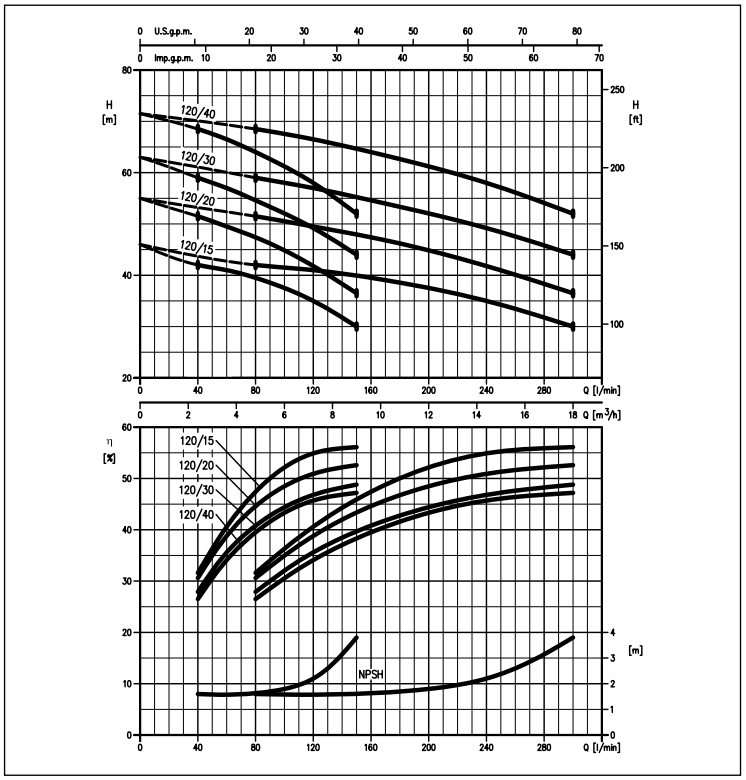
2GP 2CDX

DOMESTIC PRESSURISATION

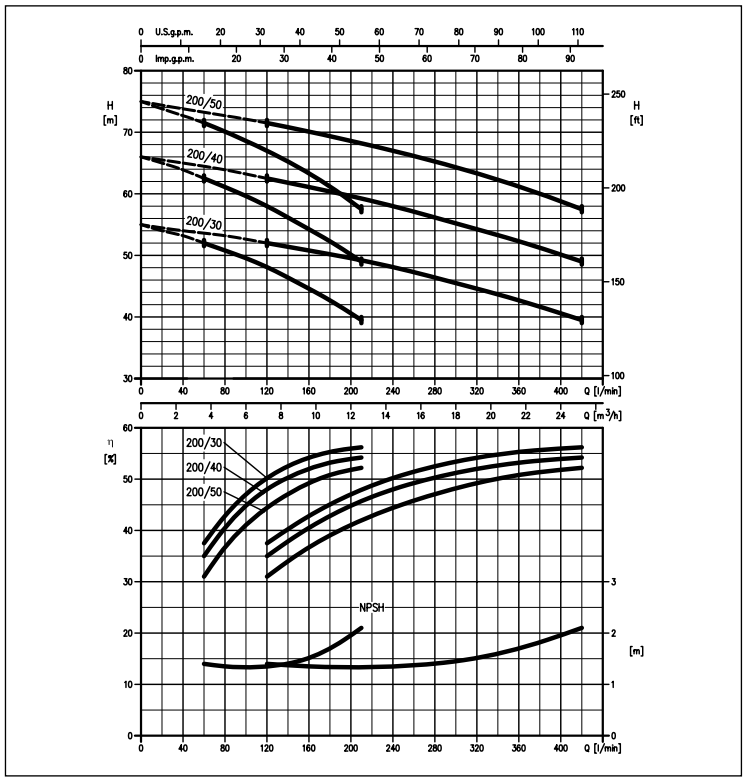
PERFORMANCE CURVES for 2GP 2CDX 70 series
(ISO 9906 Annex A)



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

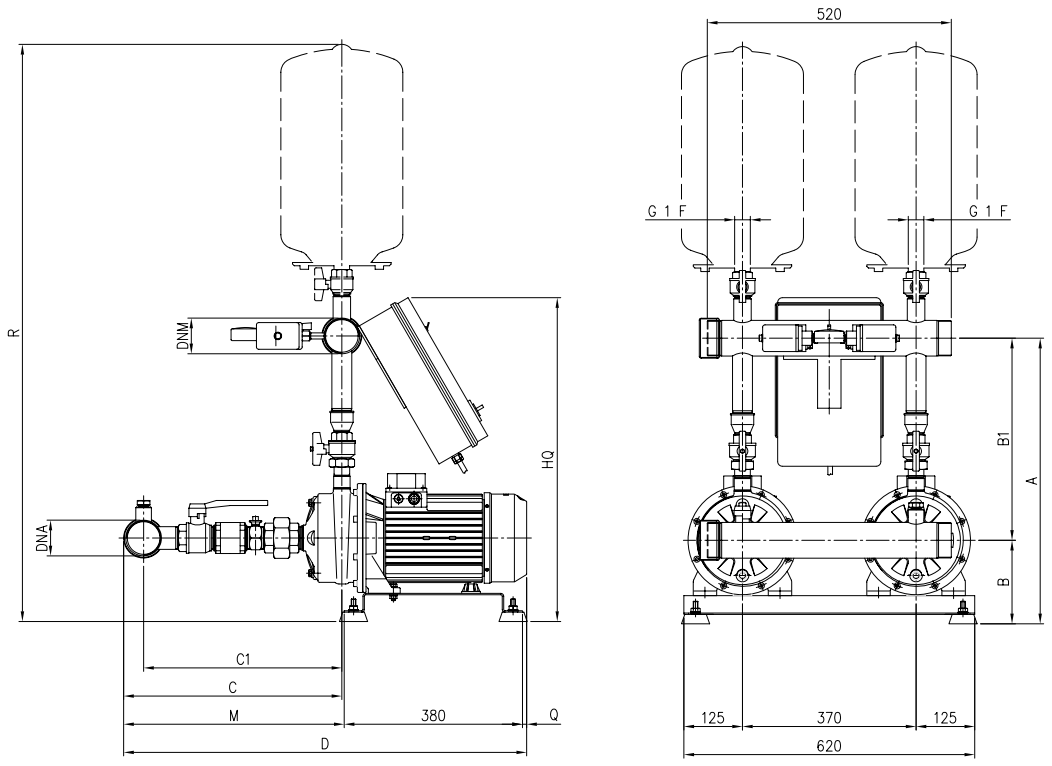
2GP 2CDX

DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min 40	80	120	160	200	240	300	360	420
					m³/h 2.4	4.8	7.2	9.6	12	14.4	18	21.6	25.2
					H = Head [m]								
2GP 2CDXM 70/10	2GP 2CDX 70/10	0.75+0.75	12.0	4.0	38.5	35.0	31.5	27.0	-	-	-	-	-
2GP 2CDXM 70/12	2GP 2CDX 70/12	0.9+0.9	14.0	5.0	44.5	40.3	35.2	29.0	-	-	-	-	-
2GP 2CDXM 70/15	2GP 2CDX 70/15	1.1+1.1	16.2	6.4	52.5	48.0	42.8	36.5	-	-	-	-	-
2GP 2CDXM 70/20	2GP 2CDX 70/20	1.5+1.5	20.0	8.6	60.0	55.6	50.0	44.0	-	-	-	-	-
2GP 2CDXM 120/15	2GP 2CDX 120/15	1.1+1.1	16.6	6.4	-	42.0	41.5	39.5	37.5	35.0	30.0	-	-
2GP 2CDXM 120/20	2GP 2CDX 120/20	1.5+1.5	20.4	8.4	-	51.5	49.5	47.0	45.0	42.0	36.5	-	-
-	2GP 2CDX 120/30	2.2+2.2	-	10.2	-	59.0	57.0	54.6	52.0	49.0	44.0	-	-
-	2GP 2CDX 120/40	3+3	-	12.2	-	68.5	66.5	64.0	61.0	57.5	52.0	-	-
-	2GP 2CDX 200/30	2.2+2.2	-	12.2	-	-	52.0	51.0	49.5	48.0	45.5	42.6	39.5
-	2GP 2CDX 200/40	3+3	-	13.4	-	-	62.5	61.0	59.5	58.0	55.0	52.2	49.0
-	2GP 2CDX 200/50	3.7+3.7	-	17.4	-	-	71.5	70.0	68.5	67.0	64.0	61.3	57.5

DIMENSIONS



DIMENSION CHART

Model	Dimensions [mm] A	B	B1	C	C1	D	DNA	DNM	HQ [2]	HQ [1]	M	R	Q	Weight [kg] [2]	Weight [kg] [1]
2GP 2CDX 70/10 (M)	525	165	360	420	385	790	50	40	585	600	410	1130	-	53.0	53.0
2GP 2CDX 70/12 (M)	525	165	360	420	385	790	50	40	585	600	410	1130	-	53.0	54.0
2GP 2CDX 70/15 (M)	550	180	370	420	385	790	50	40	610	625	410	1155	-	63.0	62.0
2GP 2CDX 70/20 (M)	550	180	370	420	385	790	50	40	610	625	410	1155	-	64.0	66.0
2GP 2CDX 120/15 (M)	535	165	370	485	445	855	65	50	595	610	475	1145	-	64.0	63.0
2GP 2CDX 120/20 (M)	535	165	370	485	445	855	65	50	595	610	475	1145	-	62.0	66.0
2GP 2CDX 120/30	555	180	375	485	445	870	65	50	645	660	490	1165	-	-	78.0
2GP 2CDX 120/40	555	180	375	485	445	870	65	50	645	660	490	1165	-	-	85.0
2GP 2CDX 200/30	585	165	420	465	425	850	65	65	650	665	470	1205	-	-	83.0
2GP 2CDX 200/40	610	180	430	465	425	850	65	65	675	690	470	1230	-	-	86.0
2GP 2CDX 200/50	610	180	430	465	425	860	65	65	675	690	470	1230	10	-	104.0

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

2GP COMPACT

DOMESTIC PRESSURISATION

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

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

2GP COMPACT

DOMESTIC PRESSURISATION

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

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.

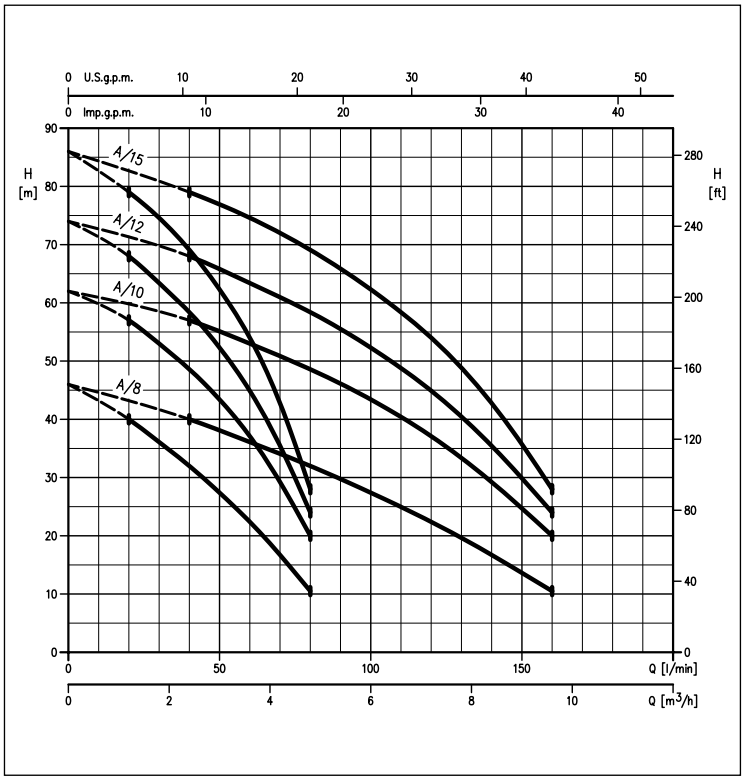
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

2GP COMPACT

DOMESTIC PRESSURISATION

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



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

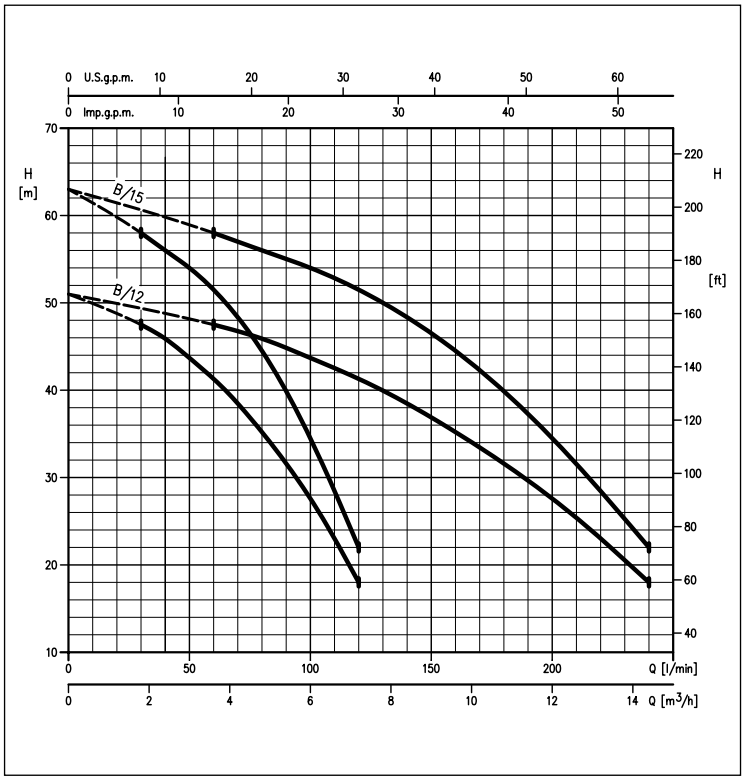


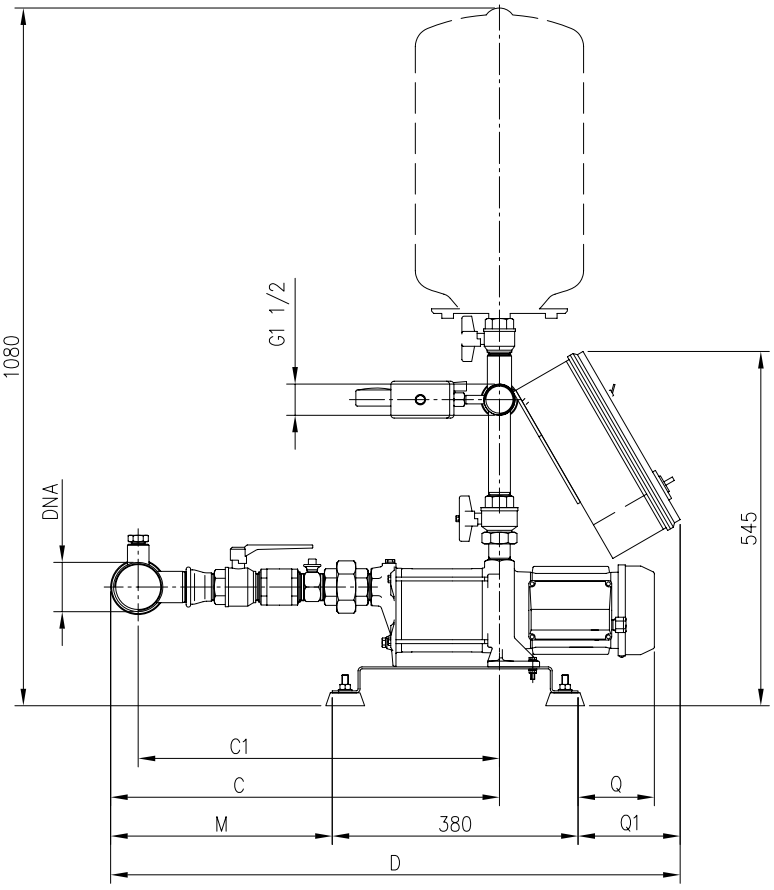
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

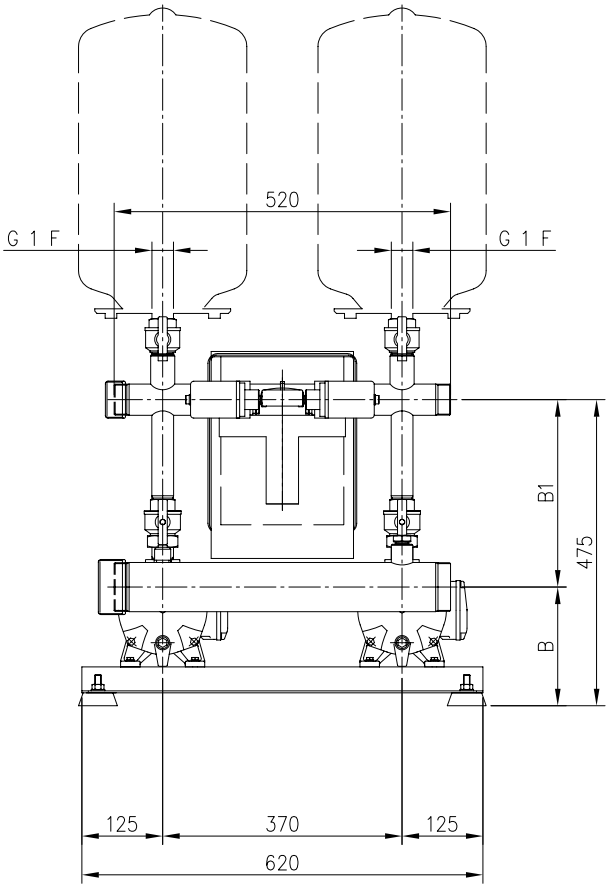
Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	40	60	80	100	120	160	200	240
					m³/h	2.4	3.6	4.8	6	7.2	9.6	12	14.4
					H = Head [m]								
2GP COMPACT AM/8	2GP COMPACT A/8	0.60+0.60	8.0	3.0		39.7	36.1	32.0	27.4	22.4	10.5	-	-
2GP COMPACT AM/10	2GP COMPACT A/10	0.75+0.75	12.0	3.4		56.5	53.0	48.5	43.5	37.1	20.0	-	-
2GP COMPACT AM/12	2GP COMPACT A/12	0.88+0.88	12.4	5.0		67.5	63.5	58.5	52.5	45.0	24.0	-	-
2GP COMPACT AM/15	2GP COMPACT A/15	1.1+1.1	14.6	5.0		79.0	74.5	69.0	62.5	54.0	28.0	-	-
2GP COMPACT BM/12	2GP COMPACT B/12	0.88+0.88	11.6	5.0		-	47.5	46.0	43.5	41.5	35.2	27.6	18.0
2GP COMPACT BM/15	2GP COMPACT B/15	1.1+1.1	14.6	5.0		-	58.0	56.0	54.0	51.5	44.5	34.5	22.0

2GP COMPACT

DOMESTIC PRESSURISATION

DIMENSIONS





DIMENSION CHART

Model	Dimensions [mm]															Weight [kg]	
	B	B1	C	C1	D [2]	D [1]	DNA	M	Q [2]	Q [1]	Q1 [2]	Q1 [1]	HQ [2]	HQ [1]		[2]	[1]
2GP COMPACT A(M)8	190	285	525	490	860	810	G2"	270	65	65	110	160	530	545		52.0	52.0
2GP COMPACT A(M)10	185	290	555	520	785	835	G2"	295	105	105	110	160	530	545		61.0	61.0
2GP COMPACT A(M)12	185	290	580	545	810	860	G2"	320	105	115	110	160	530	545		62.0	64.0
2GP COMPACT A(M)15	185	290	605	570	845	885	G2"	345	120	120	110	160	530	545		65.0	65.0
2GP COMPACT A(M)12	185	290	575	530	805	855	G2" ½	315	105	115	110	160	530	545		63.0	65.0
2GP COMPACT A(M)15	185	290	600	560	845	885	G2" ½	345	120	120	110	160	530	545		66.0	66.0

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

2GP MATRIX

DOMESTIC PRESSURISATION

Units with two horizontal 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 MATRIX 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

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

2GP MATRIX

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-AlSi11Cu2(Fe) (die cast aluminium)

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

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.

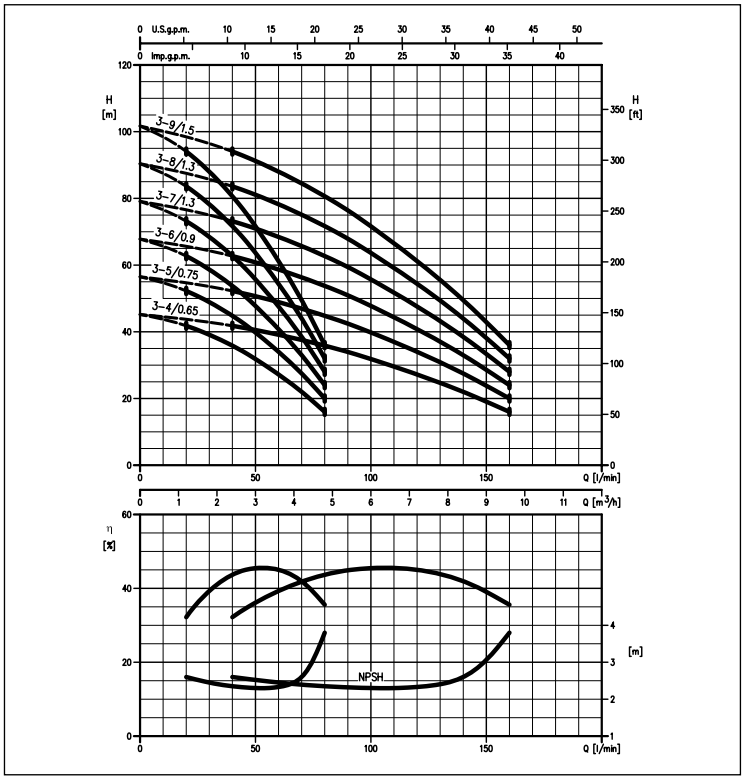
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

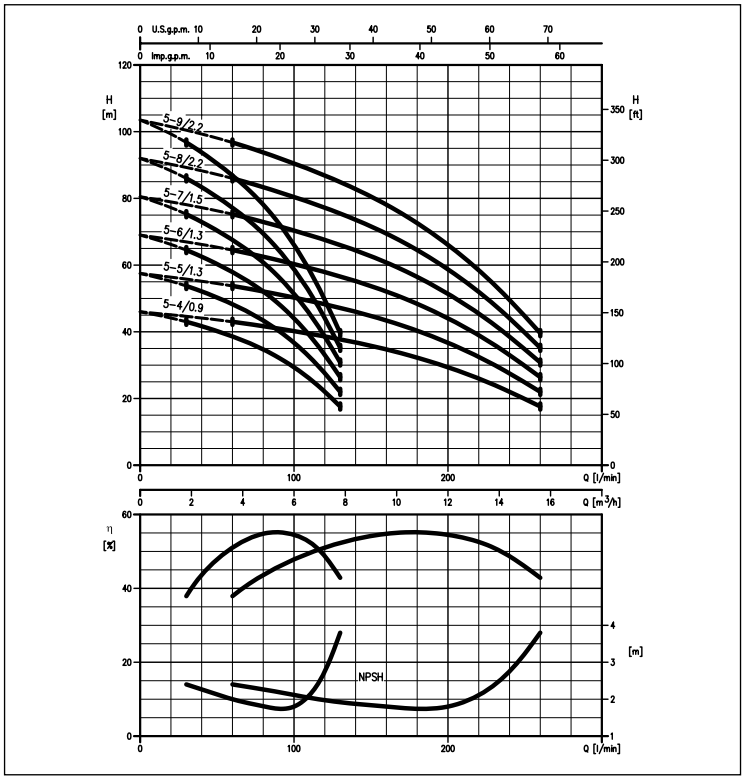
2GP MATRIX

DOMESTIC PRESSURISATION

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
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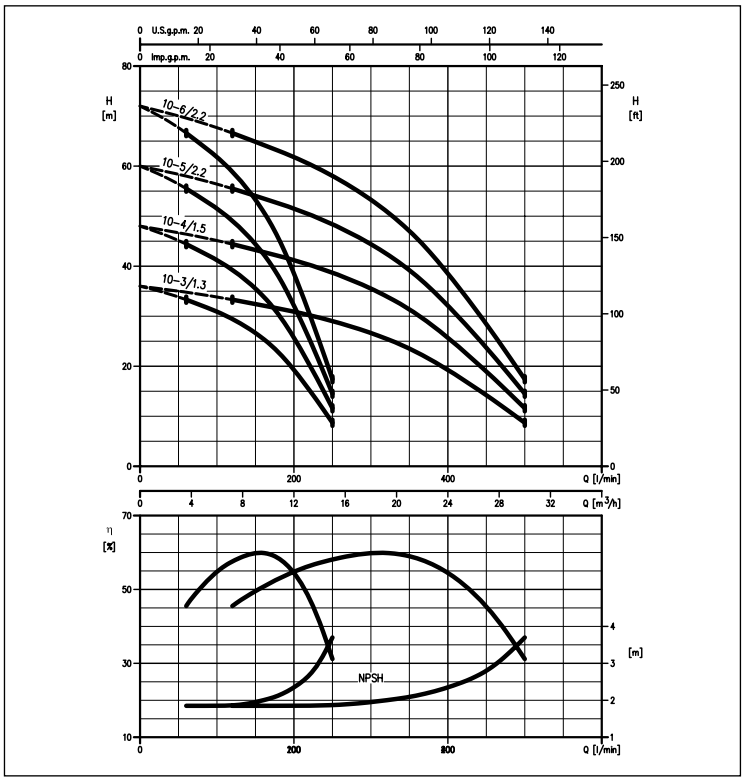
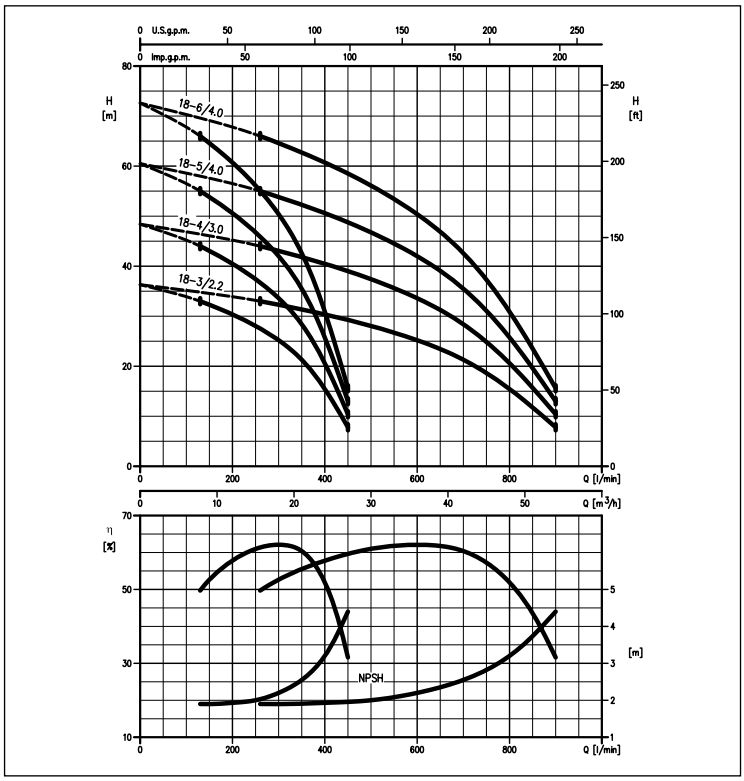


PERFORMANCE CURVES for 2GP MATRIX 18 series
(ISO 9906 Annex A)



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

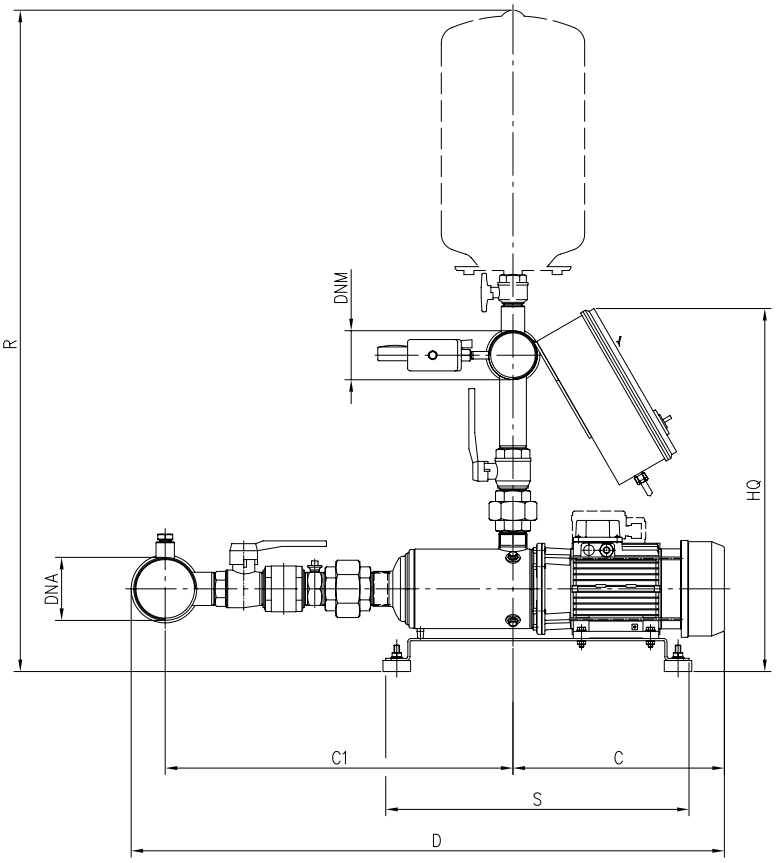
2GP MATRIX

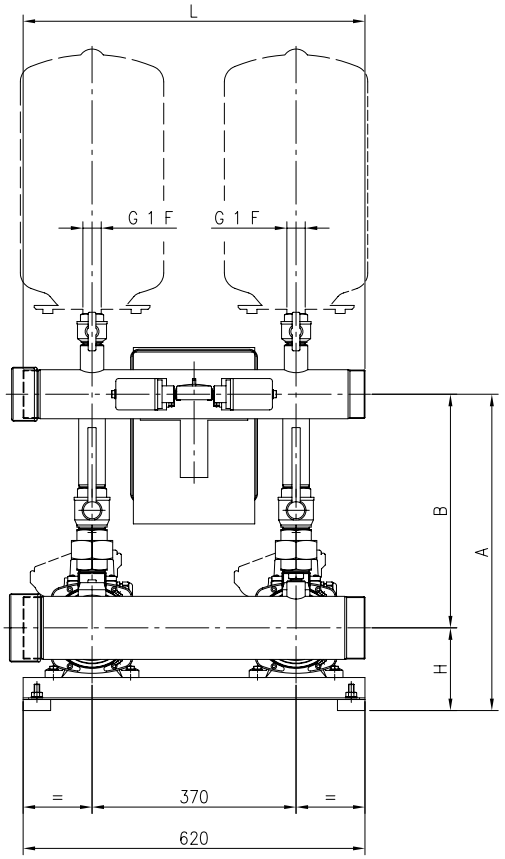
DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	40	60	120	160	200	260	320	400	500	600	700	800	900
					m³/h	2.4	3.6	7.2	9.6	12	15.6	19.2	24	30	36	42	48	54
					H = Head [m]													
2GP MATRIX 3-4/0.65M	2GP MATRIX 3-4/0.65	0.65+0.65	9.0	3.2		42.0	39.1	27.2	16.0	-	-	-	-	-	-	-	-	-
2GP MATRIX 3-5/0.75M	2GP MATRIX 3-5/0.75	0.75+0.75	10.8	3.4		52.5	49.0	34.0	20.0	-	-	-	-	-	-	-	-	-
2GP MATRIX 3-6/0.9M	2GP MATRIX 3-6/0.9	0.9+0.9	11.4	5.0		62.5	58.5	41.0	24.0	-	-	-	-	-	-	-	-	-
2GP MATRIX 3-7/1.3M	2GP MATRIX 3-7/1.3	1.3+1.3	15.6	6.4		73.0	68.5	47.5	28.0	-	-	-	-	-	-	-	-	-
2GP MATRIX 3-8/1.3M	2GP MATRIX 3-8/1.3	1.3+1.3	15.6	6.4		83.5	78.0	54.5	32.0	-	-	-	-	-	-	-	-	-
2GP MATRIX 3-9/1.5M	2GP MATRIX 3-9/1.5	1.5+1.5	17.4	7.4		94.0	88.0	61.0	36.0	-	-	-	-	-	-	-	-	-
2GP MATRIX 5-4/0.9M	2GP MATRIX 5-4/0.9	0.9+0.9	11.4	5.0		-	43.0	38.6	34.7	24.9	17.6	-	-	-	-	-	-	-
2GP MATRIX 5-5/1.3M	2GP MATRIX 5-5/1.3	1.3+1.3	15.6	6.4		-	54.0	48.5	43.5	36.7	22.0	-	-	-	-	-	-	-
2GP MATRIX 5-6/1.3M	2GP MATRIX 5-6/1.3	1.3+1.3	15.6	6.4		-	64.5	58.0	52.0	44.0	26.4	-	-	-	-	-	-	-
2GP MATRIX 5-7/1.5M	2GP MATRIX 5-7/1.5	1.5+1.5	17.4	7.4		-	75.5	67.5	61.0	51.5	30.8	-	-	-	-	-	-	-
2GP MATRIX 5-8/2.2M	2GP MATRIX 5-8/2.2	2.2+2.2	26.0	9.4		-	86.0	77.0	69.5	58.5	35.2	-	-	-	-	-	-	-
2GP MATRIX 5-9/2.2M	2GP MATRIX 5-9/2.2	2.2+2.2	26.0	9.4		-	97.0	87.0	78.0	66.0	39.6	-	-	-	-	-	-	-
2GP MATRIX 10-3/1.3M	2GP MATRIX 10-3/1.3	1.3+1.3	15.6	6.4		-	-	33.3	32.1	30.9	28.6	25.5	19.3	8.7	-	-	-	-
2GP MATRIX 10-4/1.5M	2GP MATRIX 10-4/1.5	1.5+1.5	17.4	7.4		-	-	44.5	43.0	41.0	38.1	34.0	25.7	11.6	-	-	-	-
2GP MATRIX 10-5/2.2M	2GP MATRIX 10-5/2.2	2.2+2.2	26.0	9.4		-	-	55.5	53.5	51.5	47.5	42.5	32.1	14.5	-	-	-	-
2GP MATRIX 10-6/2.2M	2GP MATRIX 10-6/2.2	2.2+2.2	26.0	9.4		-	-	66.5	64.5	62.0	57.0	51.0	38.5	17.4	-	-	-	-
2GP MATRIX 18-3/2.2M	2GP MATRIX 18-3/2.2	2.2+2.2	26.0	9.4		-	-	-	-	-	33.0	31.9	30.4	28.1	25.2	21.3	15.5	7.8
-	2GP MATRIX 18-4/3	3+3	-	12.2		-	-	-	-	-	44.0	42.5	40.5	37.4	33.6	28.4	20.6	10.4
-	2GP MATRIX 18-5/4	4+4	-	17.4		-	-	-	-	-	55.0	53.0	50.5	47.0	42.0	35.5	25.8	13.0
-	2GP MATRIX 18-6/4	4+4	-	14.7		-	-	-	-	-	66.0	64.0	60.5	56.0	50.5	42.5	30.9	15.6

DIMENSIONS





2GP MATRIX

DOMESTIC PRESSURISATION

DIMENSION CHART

Model	Dimensions [mm]																Weight [kg]	
	A	B	H	C		C1	D		DNA	DNM	HQ		L	R	S			
				[2]	[1]		[2]	[1]			[2]	[1]			[2]	[1]	[2]	[1]
2GP MATRIX 3-4T/0.65 (M)	490	340	150	255	255	450	740	740	50	40	550	565	520	1100	380	380	54.0	54.0
2GP MATRIX 3-5T/0.75 (M)	490	340	150	255	255	475	765	765	50	40	550	565	520	1100	380	380	58.0	58.0
2GP MATRIX 3-6T/0.9 (M)	490	340	150	255	270	500	790	800	50	40	550	565	520	1100	380	380	61.0	63.0
2GP MATRIX 3-7T/1.3 (M)	490	340	150	295	295	520	850	850	50	40	550	565	520	1100	550	550	68.0	70.0
2GP MATRIX 3-8T/1.3 (M)	490	340	150	295	295	545	875	875	50	40	550	565	520	1100	550	550	68.0	71.0
2GP MATRIX 3-9T/1.5 (M)	490	340	150	295	305	570	900	910	50	40	550	565	520	1100	550	550	72.0	75.0
2GP MATRIX 5-4T/0.9 (M)	500	350	150	295	270	490	800	800	65	50	560	575	520	1100	380	380	62.0	64.0
2GP MATRIX 5-5T/1.3 (M)	500	350	150	295	295	515	850	850	65	50	560	575	520	1100	380	380	67.0	68.0
2GP MATRIX 5-6T/1.3 (M)	500	350	150	295	295	535	875	875	65	50	560	575	520	1100	380	380	70.0	71.0
2GP MATRIX 5-7T/1.5 (M)	500	350	150	295	305	560	895	310	65	50	560	575	520	1100	550	550	75.0	76.0
2GP MATRIX 5-8T/2.2 (M)	500	350	150	340	305	585	970	935	65	50	575	575	520	1100	550	550	86.0	78.0
2GP MATRIX 5-9T/2.2 (M)	500	350	150	340	305	610	990	960	65	50	575	575	520	1100	550	550	86.0	78.0
2GP MATRIX 10-3T/1.3 (M)	515	365	150	300	300	510	855	855	80	65	585	600	520	1135	380	380	72.0	72.0
2GP MATRIX 10-4T/1.5 (M)	515	365	150	300	310	540	885	900	80	65	585	600	520	1135	380	380	73.0	77.0
2GP MATRIX 10-5T/2.2 (M)	515	365	150	345	310	570	965	930	80	65	600	600	520	1135	550	380	85.0	78.0
2GP MATRIX 10-6T/2.2 (M)	515	365	150	345	310	600	995	960	80	65	600	600	520	1135	550	550	89.0	81.0
2GP MATRIX 18-3T/2.2 (M)	575	425	150	350	315	520	930	895	100	80	660	660	620	1200	550	380	94.0	87.0
2GP MATRIX 18-4T/3	575	425	150	-	385	555	-	1005	100	80	-	660	620	1200	-	550	-	102.0
2GP MATRIX 18-5T/4	585	425	160	-	400	595	-	1015	100	80	-	670	620	1210	-	550	-	125.0
2GP MATRIX 18-6T/4	585	425	160	-	400	630	-	1090	100	80	-	670	620	1210	-	550	-	127.0

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

2GP CVM

DOMESTIC PRESSURISATION

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

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

2GP CVM

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

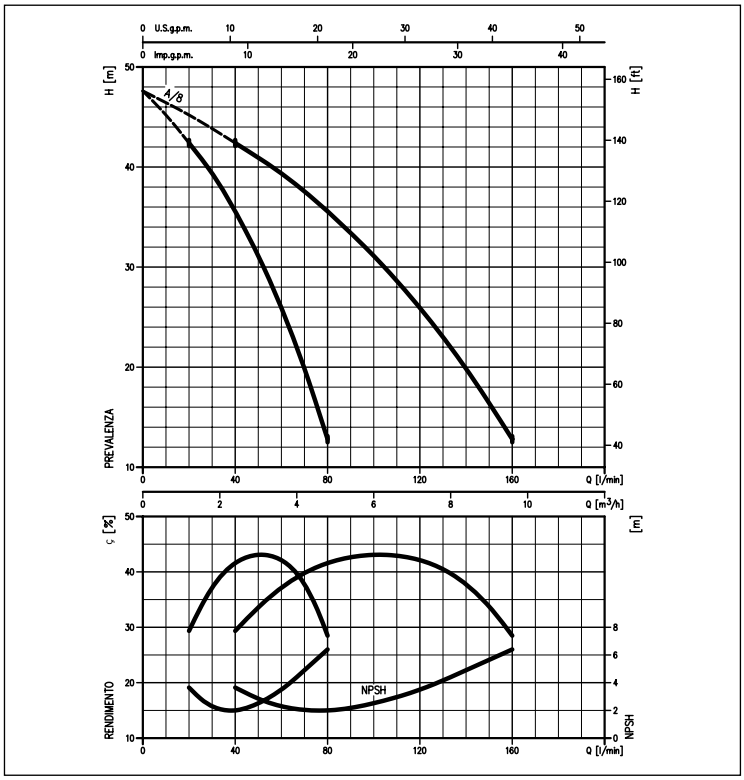
MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Single-phase voltage 230V ±10%, 50Hz, three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-amperometric protection device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

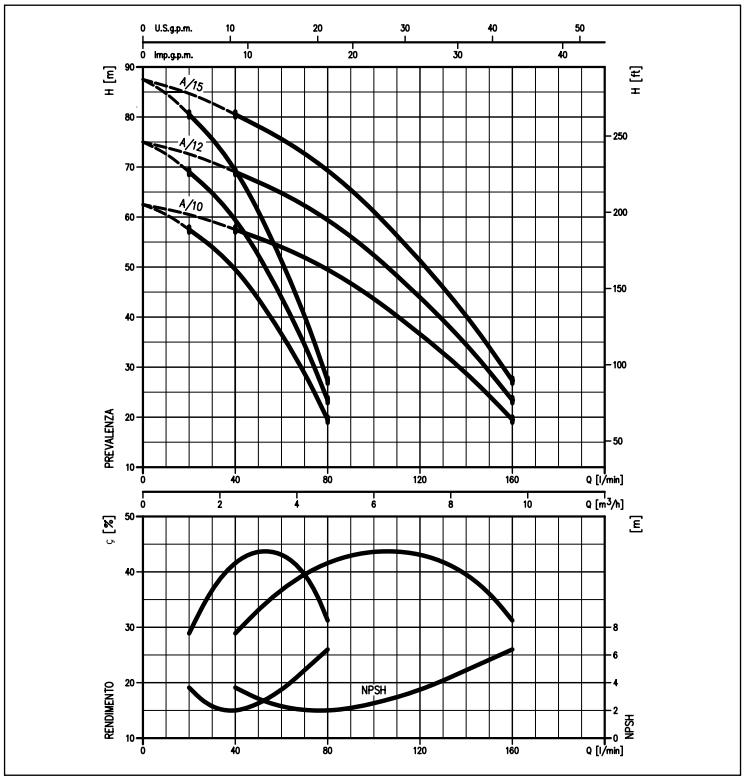
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

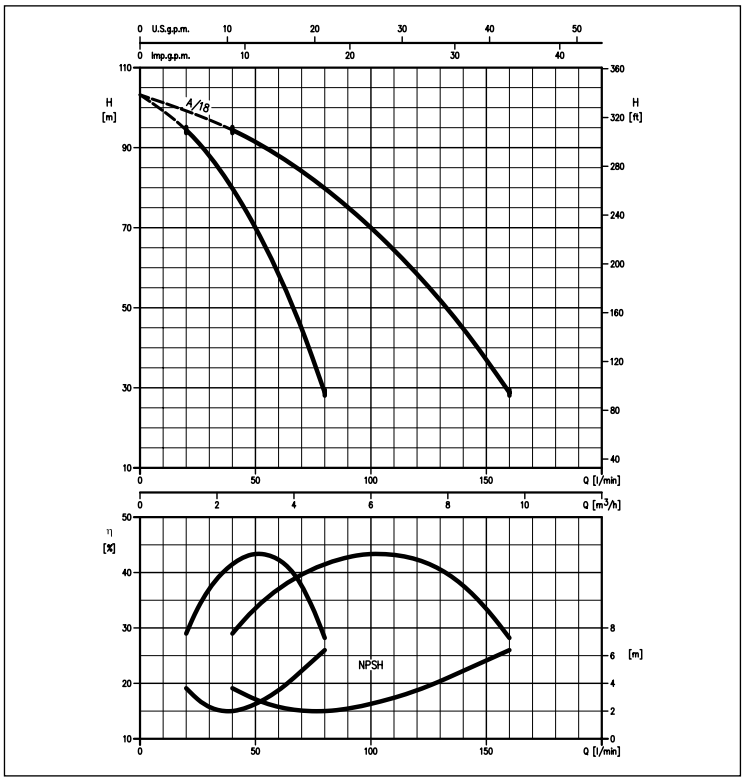
PERFORMANCE CURVES for 2GP CVM A 8 series
(ISO 9906 Annex A)



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



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

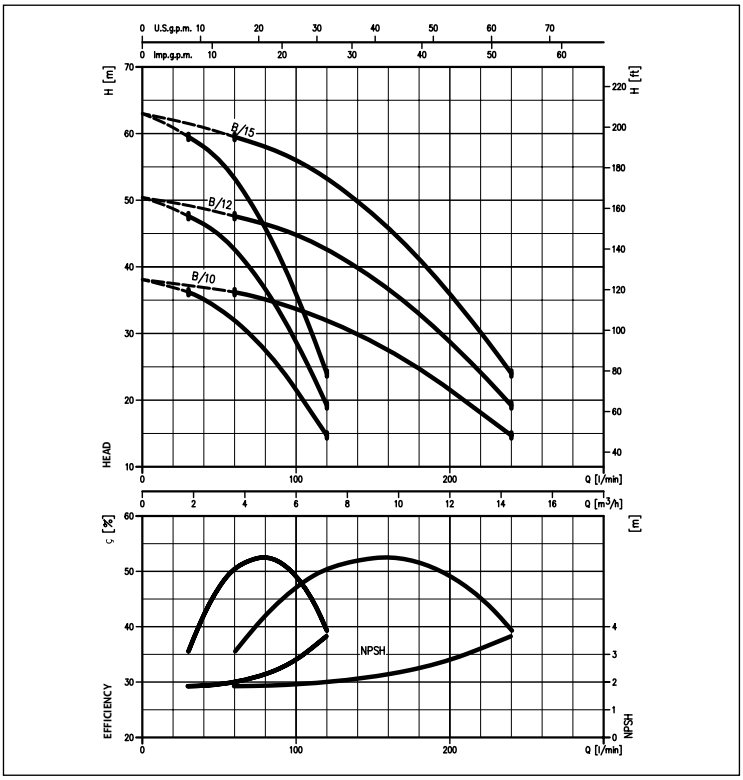


The indicated characteristics do not include the pressure drops in the valves and lines
The indicated NPSH is a laboratory value related to the pump alone

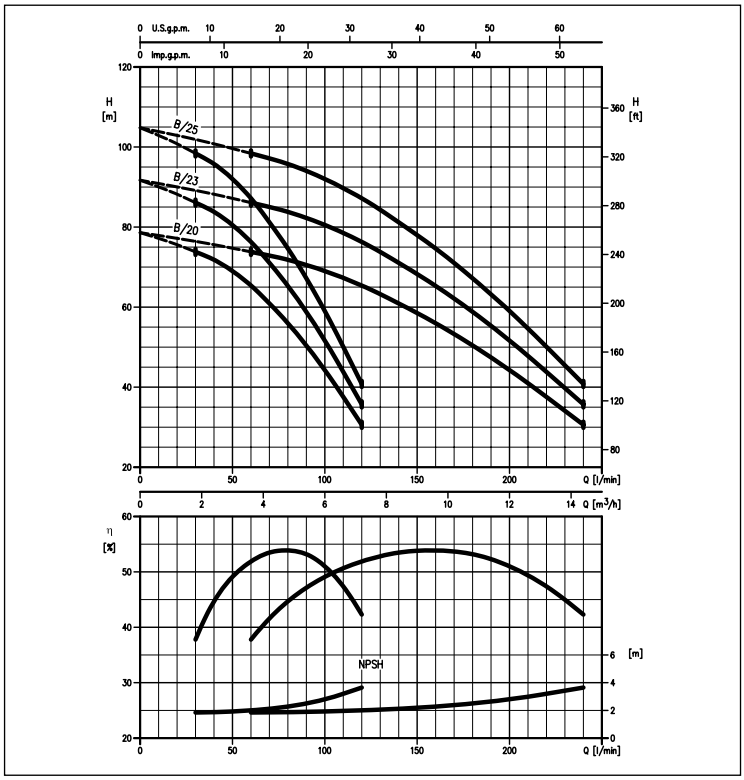
2GP CVM

DOMESTIC PRESSURISATION

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

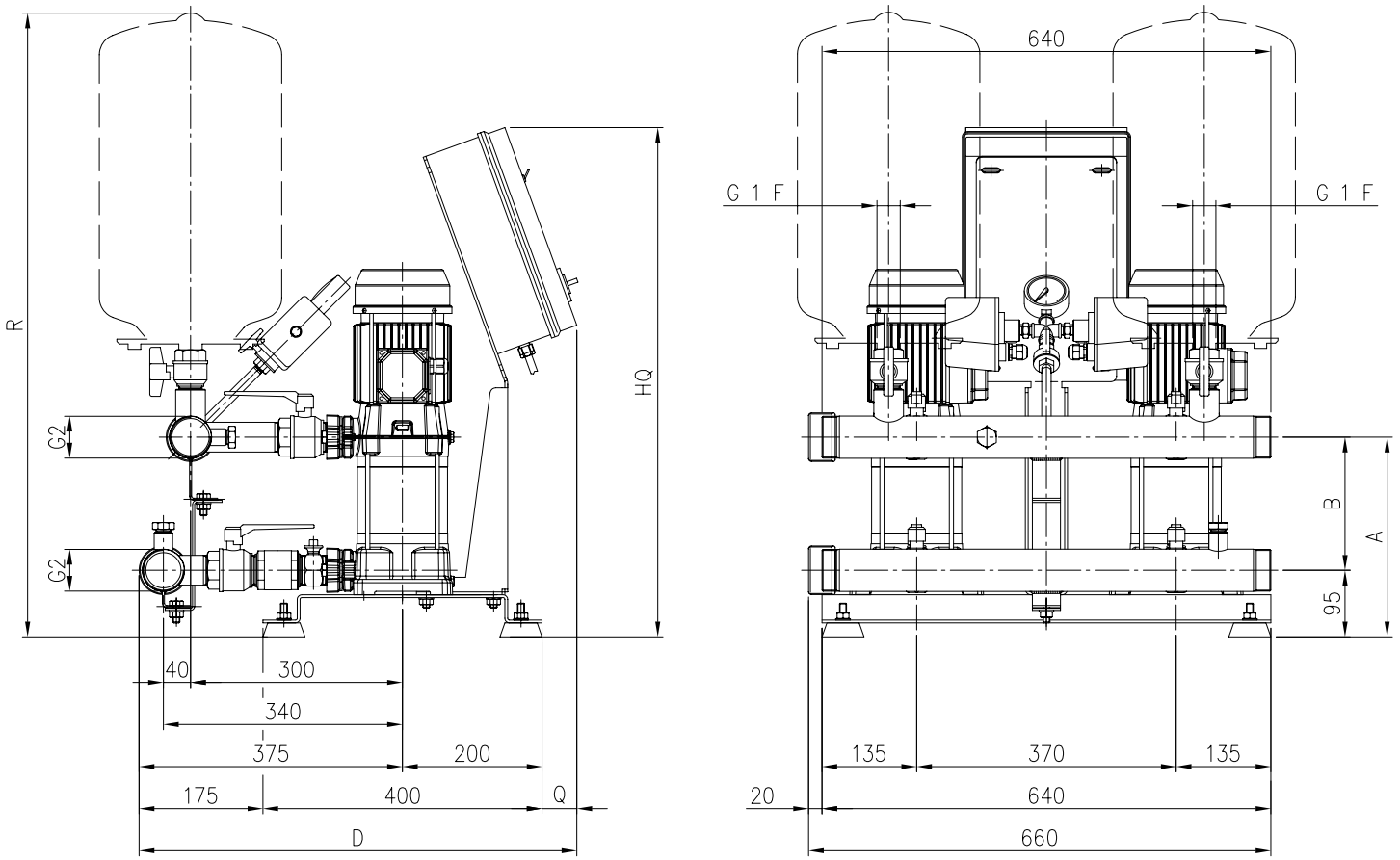
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	40	60	80	100	120	160	200	240
					m³/h	2.4	3.6	4.8	6	7.2	9.6	12	14.4
					H = Head [m]								
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		69.0	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		94.5	88.0	80.0	70.0	58.5	28.8	-	-
2GP CVM BM/10	2GP CVM B/10	0.75+0.75	11.2	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	36.6	28.8	19.6
2GP CVM BM/15	2GP CVM B/15	1.1+1.1	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



DIMENSION CHART

Model	Dimensions [mm] A	B	R	D [2]	D [1]	Q [2]	Q [1]	HQ [2]	HQ [1]	Weight [kg] [2]	Weight [kg] [1]
2GP CVM A(M)8	260	165	865	575	625	-	50	715	725	61.2	61.0
2GP CVM A(M)10	285	190	890	575	625	-	50	715	725	64.8	65.0
2GP CVM A(M)12	310	215	915	575	625	-	50	715	725	66.2	68.0
2GP CVM A(M)15	335	240	940	575	625	-	50	715	725	66.8	67.0
2GP CVM A(M)18	365	270	970	575	625	-	50	715	725	73.0	75.0
2GP CVM B(M)10	235	140	840	575	625	-	50	715	725	64.0	64.0
2GP CVM B(M)12	260	165	865	575	625	-	50	715	725	65.6	67.0
2GP CVM B(M)15	285	190	890	575	625	-	50	715	725	67.8	66.0
2GP CVM B(M)20	310	215	915	575	625	-	50	715	725	72.2	76.0
2GP CVM B(M)23	335	240	940	575	625	-	50	715	725	76.4	78.0
2GP CVM B25	365	270	970	-	625	-	50	-	725	-	78.0

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

2GP HVM

DOMESTIC PRESSURISATION

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

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

2GP HVM

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 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.

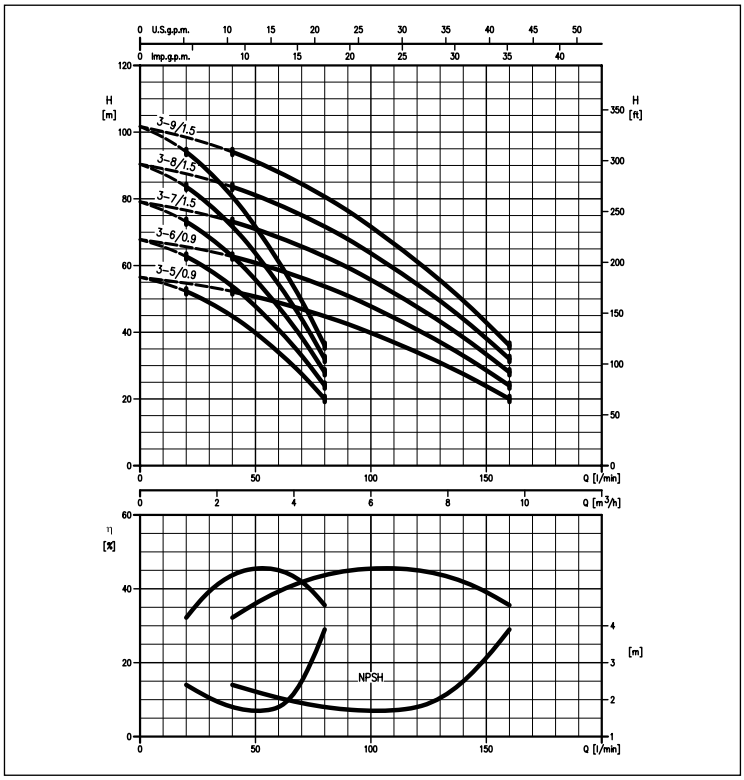
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

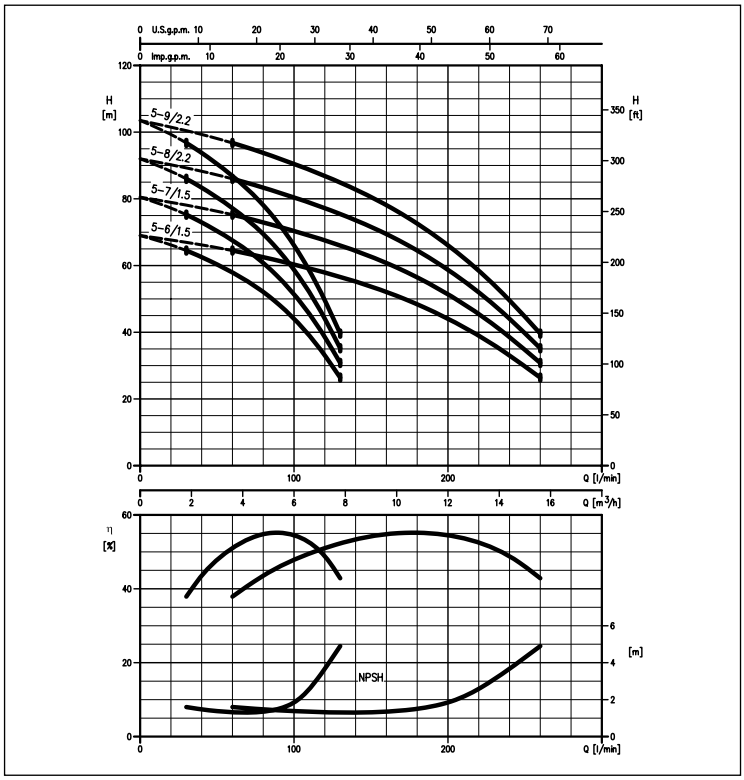
2GP HVM

DOMESTIC PRESSURISATION

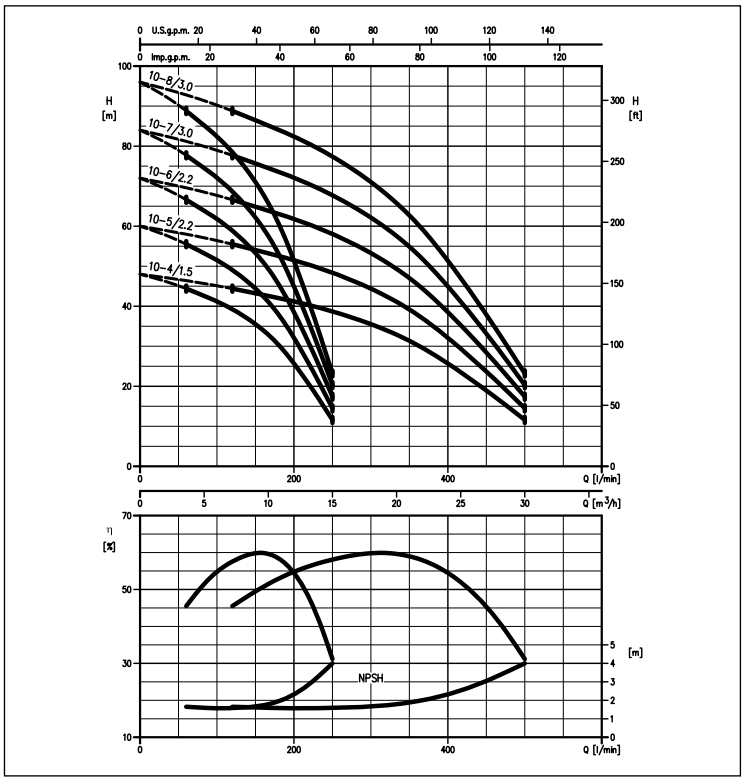
PERFORMANCE CURVES for 2GP HVM 3 series
(ISO 9906 Annex A)



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

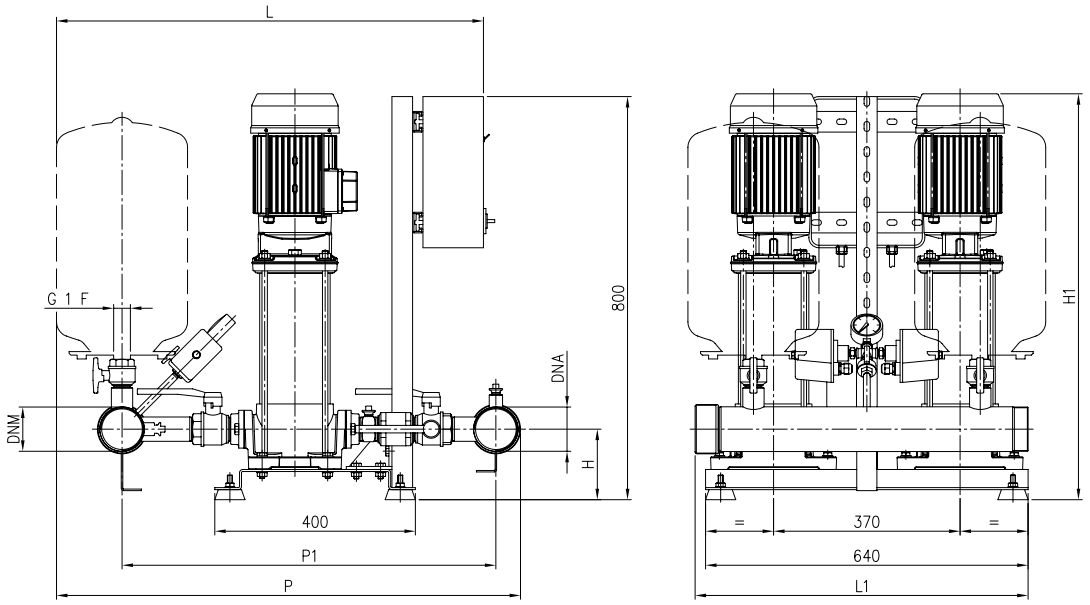
2GP HVM

DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model Single-phase 230V	Model Three-phase 400V	[kW]	Max absorption [A] Single-phase 230V	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	40	60	90	120	160	200	260	320	400	500
					m³/h	2.4	3.6	5.4	7.2	9.6	12	15.6	19.2	24	30
					H = Head [m]										
2GP HVM 3-5N/0.9M	2GP HVM 3-5N/0.9	0.9+0.9	11.4	5.0		52.5	49.0	42.5	34.0	20.0	-	-	-	-	-
2GP HVM 3-6N/0.9M	2GP HVM 3-6N/0.9	0.9+0.9	11.4	5.0		62.5	58.5	51.0	41.0	24.0	-	-	-	-	-
2GP HVM 3-7N/1.5M	2GP HVM 3-7N/1.5	1.5+1.5	17.4	7.4		73.0	68.5	59.5	47.5	28.0	-	-	-	-	-
2GP HVM 3-8N/1.5M	2GP HVM 3-8N/1.5	1.5+1.5	17.4	7.4		83.5	78.0	68.0	54.5	32.0	-	-	-	-	-
2GP HVM 3-9N/1.5M	2GP HVM 3-9N/1.5	1.5+1.5	17.4	7.4		94.0	88.0	76.5	61.0	36.0	-	-	-	-	-
2GP HVM 5-6N/1.5M	2GP HVM 5-6N/1.5	1.5+1.5	17.4	7.4		-	64.5	61.5	58.0	52.0	44.0	26.4	-	-	-
2GP HVM 5-7N/1.5M	2GP HVM 5-7N/1.5	1.5+1.5	17.4	7.4		-	75.5	71.5	67.5	61.0	51.5	30.8	-	-	-
2GP HVM 5-8N/2.2M	2GP HVM 5-8N/2.2	2.2+2.2	26.0	9.4		-	86.0	82.0	77.0	69.5	58.5	35.2	-	-	-
2GP HVM 5-9N/2.2M	2GP HVM 5-9N/2.2	2.2+2.2	26.0	9.4		-	97.0	92.0	87.0	78.0	66.0	39.6	-	-	-
2GP HVM 10-4N/1.5M	2GP HVM 10-4N/1.5	1.5+1.5	17.4	7.4		-	-	-	44.5	43.0	41.0	38.1	34.0	25.7	11.6
2GP HVM 10-5N/2.2M	2GP HVM 10-5N/2.2	2.2+2.2	26.0	9.4		-	-	-	55.5	53.5	51.5	47.5	42.5	32.1	14.5
2GP HVM 10-6N/2.2M	2GP HVM 10-6N/2.2	2.2+2.2	26.0	9.4		-	-	-	66.5	64.5	62.0	57.0	51.0	38.5	17.4
-	2GP HVM 10-7N/3	3.0+3.0	-	12.2		-	-	-	77.5	75.0	72.0	66.5	59.5	45.0	20.3
-	2GP HVM 10-8N/3	3.0+3.0	-	12.2		-	-	-	89.0	85.5	82.5	76.0	68.0	51.5	23.2

DIMENSIONS



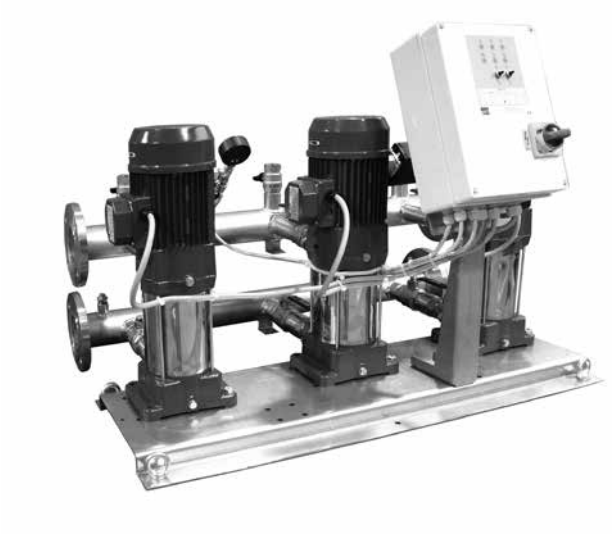
DIMENSION CHART

Model	Dimensions [mm] L [2]	L [1]	H	H1 [2]	H1 [1]	P	P1	L1	DNA	DNM	Weight [kg] [2]	Weight [kg] [1]
2GP HVM 3-5N/0.9	805	835	110	570	585	860	695	660	G 2	G 2	82.0	86.0
2GP HVM 3-6N/0.9	805	835	110	595	610	860	695	660	G 2	G 2	84.0	88.0
2GP HVM 3-7N/1.5	805	835	110	655	670	860	695	660	G 2	G 2	90.0	96.0
2GP HVM 3-8N/1.5	805	835	110	680	690	860	695	660	G 2	G 2	90.0	97.0
2GP HVM 3-9N/1.5	805	835	110	705	715	860	695	660	G 2	G 2	94.0	97.0
2GP HVM 5-6N/1.5	775	805	110	635	645	800	635	660	G 2	G 2	88.0	95.0
2GP HVM 5-7N/1.5	775	805	110	655	670	800	635	660	G 2	G 2	92.0	97.0
2GP HVM 5-8N/2.2	775	805	110	735	695	800	635	660	G 2	G 2	103.0	97.0
2GP HVM 5-9N/2.2	775	805	110	760	720	800	635	660	G 2	G 2	104.0	97.0
2GP HVM 10-4N/1.5	815	845	140	635	650	920	740	670	G3″	G3″	97.0	103.0
2GP HVM 10-5N/2.2	845	845	140	725	680	920	740	670	G3″	G3″	109.0	104.0
2GP HVM 10-6N/2.2	845	845	140	755	710	920	740	670	G3″	G3″	112.0	105.0
2GP HVM 10-7N/3	-	845	140	-	820	920	740	670	G3″	G3″	-	118.0
2GP HVM 10-8N/3	-	845	140	-	850	920	740	670	G3″	G3″	-	120.0

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

3GP CVM

DOMESTIC PRESSURISATION



Units with three vertical multi-stage pumps.

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 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

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

3GP CVM

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

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.

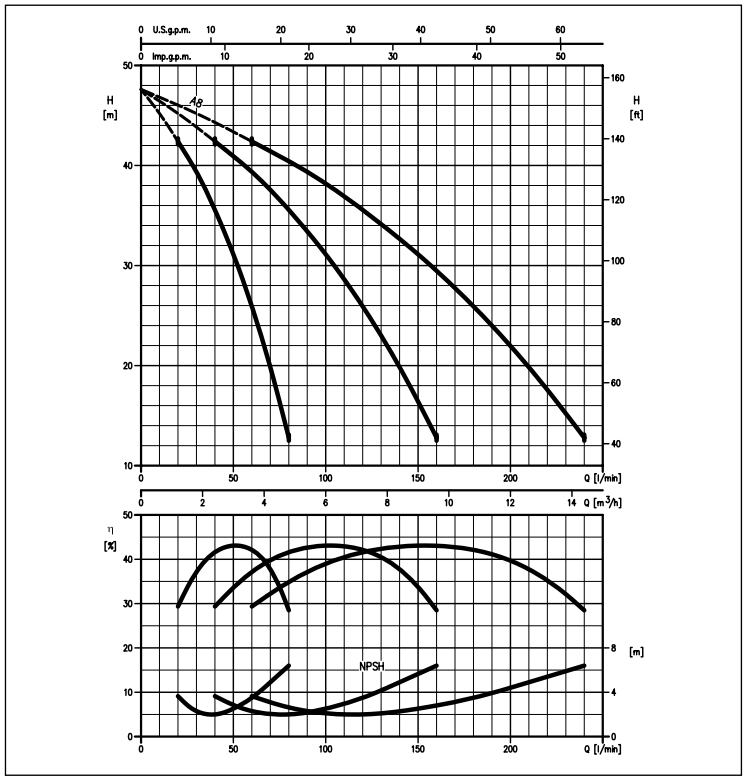
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

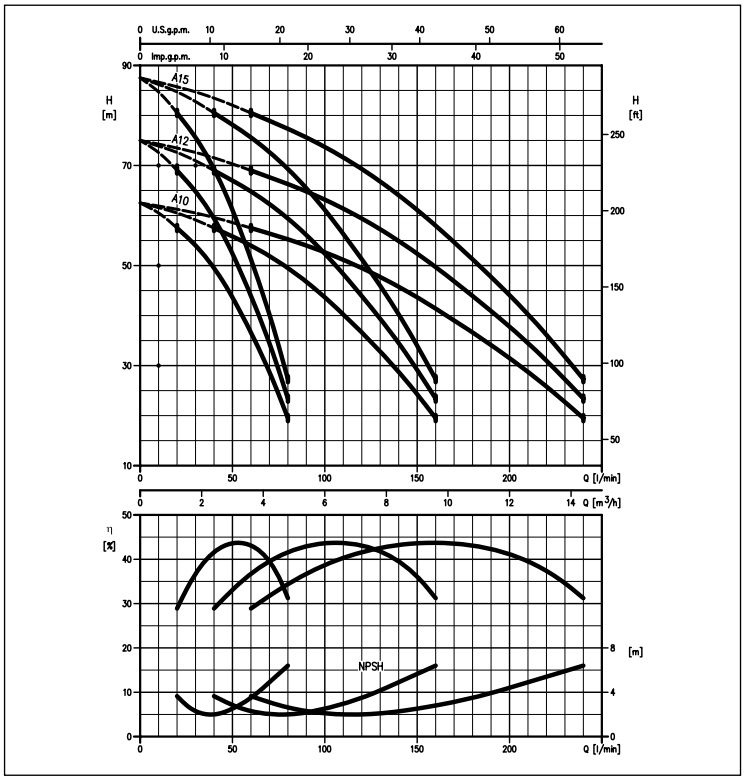
3GP CVM

DOMESTIC PRESSURISATION

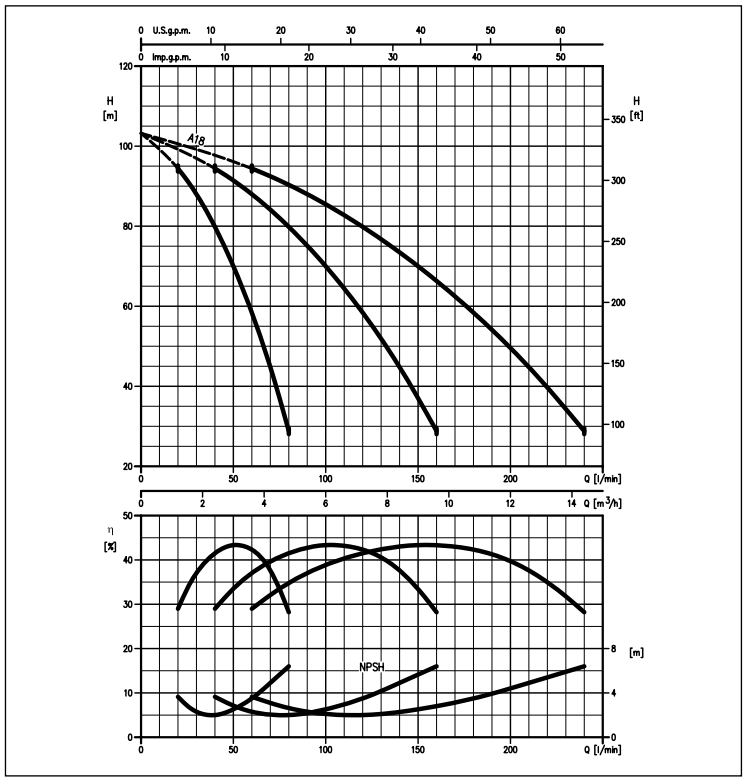
PERFORMANCE CURVES for 3GP CVM A 8 series
(ISO 9906 Annex A)



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)

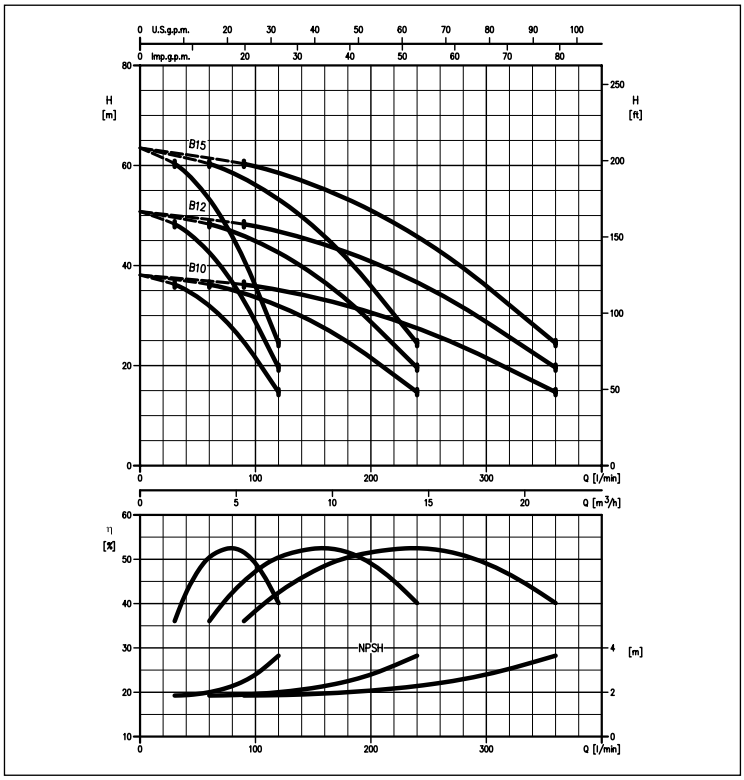


The indicated characteristics do not include the pressure drops in the valves and lines
The indicated NPSH is a laboratory value related to the pump alone

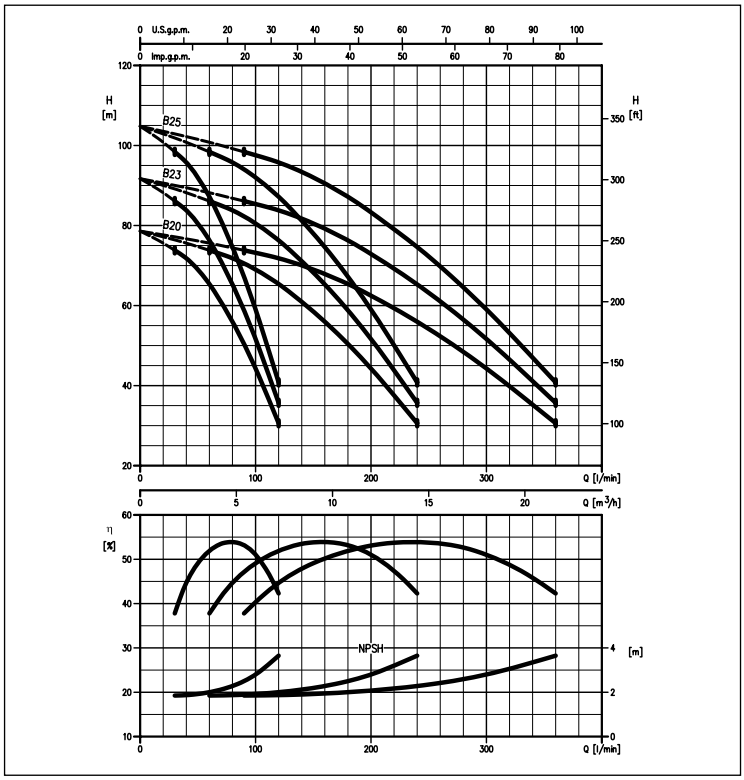
3GP CVM

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

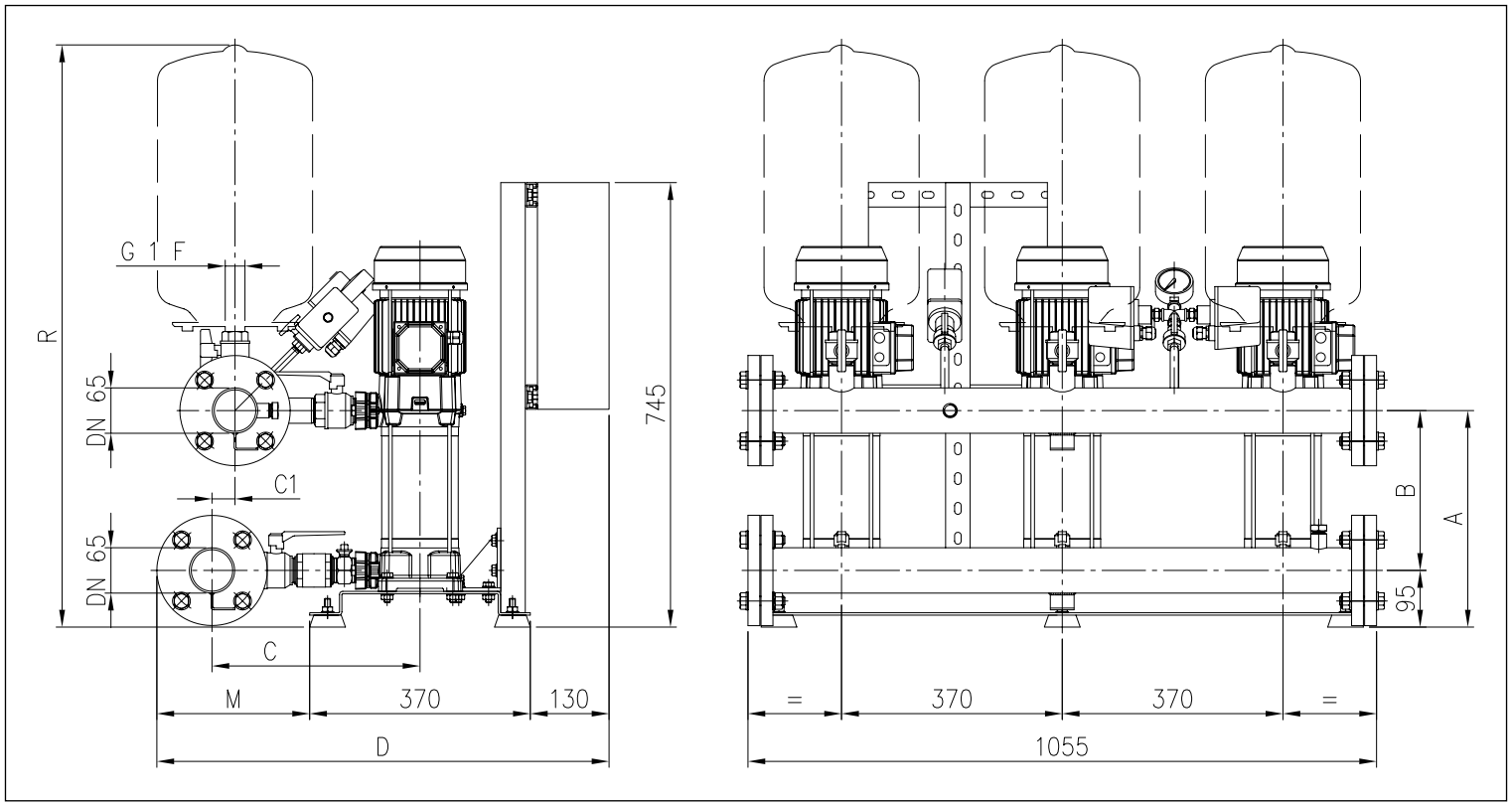
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	60	90	120	150	180	240	300	360
			m³/h	3.6	5.4	7.2	9	10.8	14.4	18	21.6
			H = Head [m]								
3GP CVM A/8	0.6+0.6+0.6	4.8		42.5	39.4	35.6	31.1	25.9	12.8	-	-
3GP CVM A/10	0.75+0.75+0.75	5.1		57.5	54.0	49.5	43.5	36.6	19.5	-	-
3GP CVM A/12	0.9+0.9+0.9	7.5		69.0	65.0	59.5	52.5	44.0	23.4	-	-
3GP CVM A/15	1.1+1.1+1.1	7.5		80.5	75.5	69.5	61.0	51.0	27.3	-	-
3GP CVM A/18	1.3+1.3+1.3	9.6		94.5	88.0	80.0	70.0	58.5	28.8	-	-
3GP CVM B/10	0.75+0.75+0.75	5.1		-	36.2	35.1	33.7	32.0	27.5	21.6	14.7
3GP CVM B/12	0.9+0.9+0.9	7.5		-	48.0	46.8	45.0	42.6	36.6	28.8	19.6
3GP CVM B/15	1.1+1.1+1.1	7.5		-	60.5	58.5	56.2	53.3	45.8	36.0	24.5
3GP CVM B/20	1.5+1.5+1.5	11.1		-	74.0	72.0	69.0	65.5	56.0	44.5	30.6
3GP CVM B/23	1.7+1.7+1.7	12.0		-	86.0	84.0	80.5	76.5	65.5	51.5	35.7
3GP CVM B/25	1.85+1.85+1.85	14.1		-	98.5	96.0	92.0	87.0	74.5	59.0	41.0

3GP CVM

DOMESTIC PRESSURISATION

DIMENSIONS



DIMENSION CHART

Model	Dimensions [mm]							Weight [kg]
	A	B	C	C1	D	M	R	
3GP CVM A/8	260	165	460	150	865	365	870	115.0
3GP CVM A/10	285	190	350	40	755	255	895	127.0
3GP CVM A/12	310	215	350	40	755	255	920	133.0
3GP CVM A/15	335	240	350	40	755	255	945	133.0
3GP CVM A/18	365	270	350	40	755	255	975	144.0
3GP CVM B/10	235	140	460	150	865	365	845	125.0
3GP CVM B/12	260	165	460	150	865	365	870	130.0
3GP CVM B/15	285	190	350	40	755	255	895	131.0
3GP CVM B/20	310	215	350	40	755	255	920	147.0
3GP CVM B/23	335	240	350	40	755	255	945	148.0
3GP CVM B/25	365	270	350	40	755	255	975	148.0

3GP 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: 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

3GP HVM

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
- 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 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.

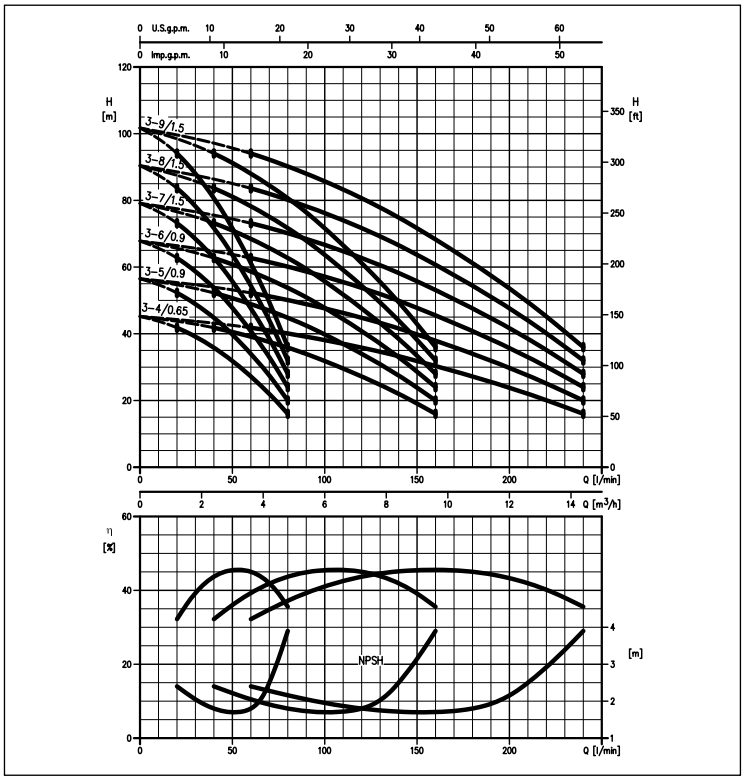
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

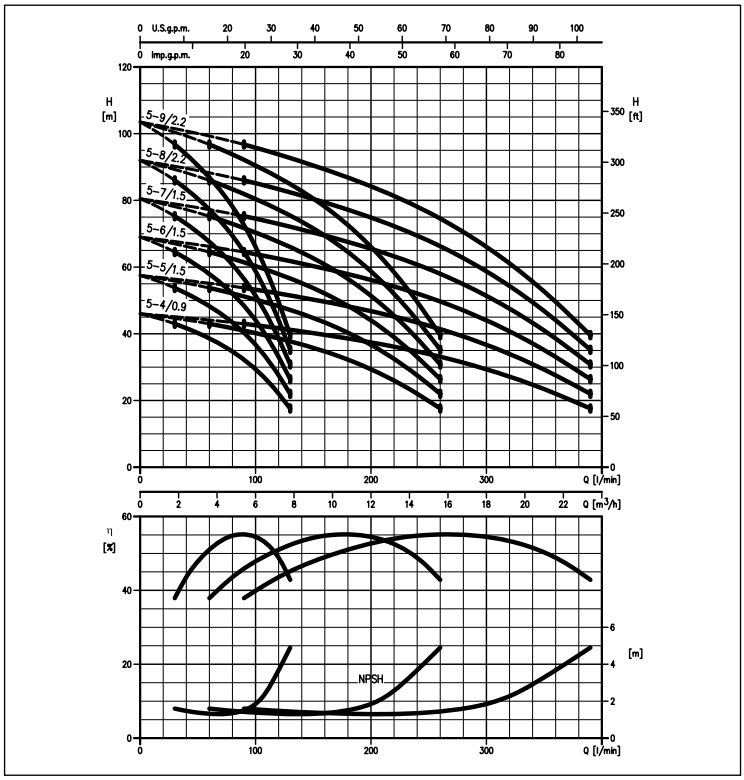
3GP HVM

DOMESTIC PRESSURISATION

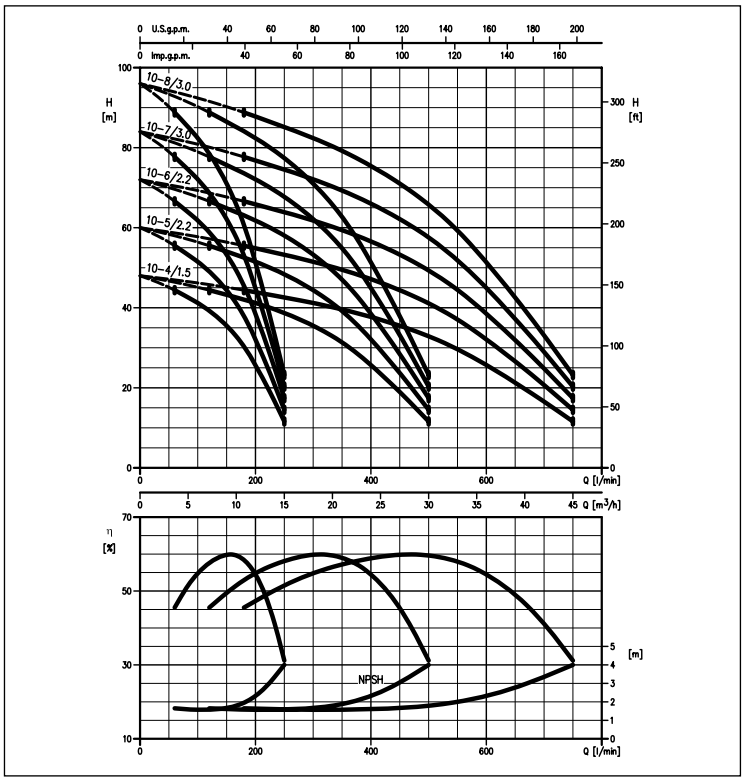
PERFORMANCE CURVES for 3GP HVM 3 series
(ISO 9906 Annex A)



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

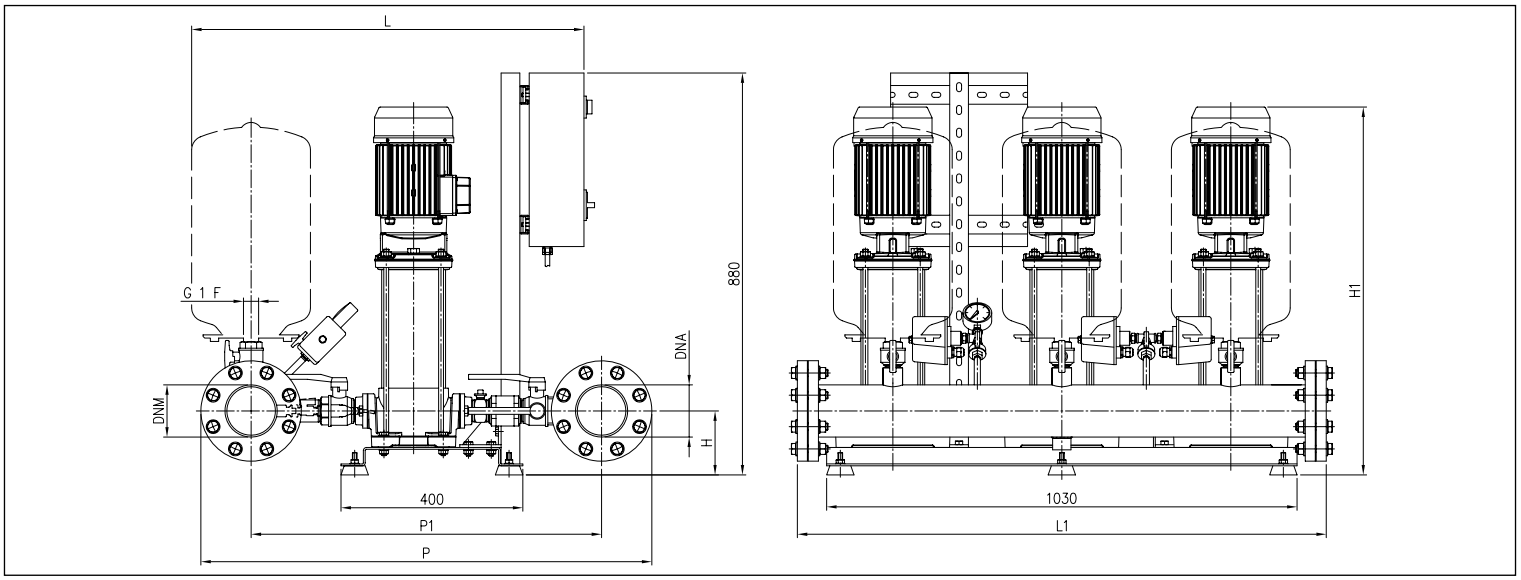
3GP HVM

DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	60	90	135	180	240	300	390	480	600	750
			m³/h	3.6	5.4	8.1	10.8	14.4	18	23.4	28.8	36	45
			H = Head [m]										
3GP HVM 3-4N/0.65	0.65+0.65+0.65	4.8		42.0	39.1	34.0	27.2	16.0	-	-	-	-	-
3GP HVM 3-5N/0.9	0.9+0.9+0.9	7.5		52.5	49.0	42.5	34.0	20.0	-	-	-	-	-
3GP HVM 3-6N/0.9	0.9+0.9+0.9	7.5		62.5	58.5	51.0	41.0	24.0	-	-	-	-	-
3GP HVM 3-7N/1.5	1.5+1.5+1.5	11.1		73.0	68.5	59.5	47.5	28.0	-	-	-	-	-
3GP HVM 3-8N/1.5	1.5+1.5+1.5	11.1		83.5	78.0	68.0	54.5	32.0	-	-	-	-	-
3GP HVM 3-9N/1.5	1.5+1.5+1.5	11.1		94.0	88.0	76.5	61.0	36.0	-	-	-	-	-
3GP HVM 5-4N/0.9	0.9+0.9+0.9	7.5		-	43.0	41.0	38.6	34.7	29.4	17.6	-	-	-
3GP HVM 5-5N/1.5	1.5+1.5+1.5	11.1		-	54.0	51.0	48.5	43.5	36.7	22.0	-	-	-
3GP HVM 5-6N/1.5	1.5+1.5+1.5	11.1		-	64.5	61.5	58.0	52.0	44.0	26.4	-	-	-
3GP HVM 5-7N/1.5	1.5+1.5+1.5	11.1		-	75.5	71.5	67.5	61.0	51.5	30.8	-	-	-
3GP HVM 5-8N/2.2	2.2+2.2+2.2	14.1		-	86.0	82.0	77.0	69.5	58.5	35.2	-	-	-
3GP HVM 5-9N/2.2	2.2+2.2+2.2	14.1		-	97.0	92.0	87.0	78.0	66.0	39.6	-	-	-
3GP HVM 10-4N/1.5	1.5+1.5+1.5	11.1		-	-	-	44.5	43.0	41.0	38.1	34.0	25.7	11.6
3GP HVM 10-5N/2.2	2.2+2.2+2.2	14.1		-	-	-	55.5	53.5	51.5	47.5	42.5	32.1	14.5
3GP HVM 10-6N/2.2	2.2+2.2+2.2	14.1		-	-	-	66.5	64.5	62.0	57.0	51.0	38.5	17.4
3GP HVM 10-7N/3	3.0+3.0+3.0	18.3		-	-	-	77.5	75.0	72.0	66.5	59.5	45.0	20.3
3GP HVM 10-8N/3	3.0+3.0+3.0	18.3		-	-	-	89.0	85.5	82.5	76.0	68.0	51.5	23.2

DIMENSIONS

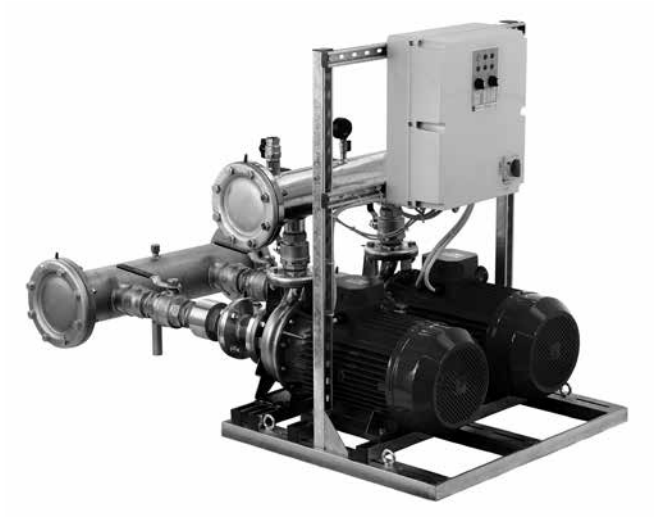


DIMENSION CHART

Model	Dimensions [mm] L	H	H1	P	P1	L1	DNA	DNM	Weight [kg]
3GP HVM 3-4N/0.65	830	110	550	935	710	1050	DN65	DN65	133.0
3GP HVM 3-5N/0.9	830	110	585	935	710	1050	DN65	DN65	142.0
3GP HVM 3-6N/0.9	830	110	610	935	710	1050	DN65	DN65	146.0
3GP HVM 3-7N/1.5	830	110	670	935	710	1050	DN65	DN65	158.0
3GP HVM 3-8N/1.5	830	110	690	935	710	1050	DN65	DN65	160.0
3GP HVM 3-9N/1.5	830	110	715	935	710	1050	DN65	DN65	162.0
3GP HVM 5-4N/0.9	825	110	560	835	650	1050	DN65	DN65	141.0
3GP HVM 5-5N/1.5	825	110	620	835	650	1050	DN65	DN65	153.0
3GP HVM 5-6N/1.5	825	110	645	835	650	1050	DN65	DN65	156.0
3GP HVM 5-7N/1.5	825	110	670	835	650	1050	DN65	DN65	159.0
3GP HVM 5-8N/2.2	825	110	695	835	650	1050	DN65	DN65	159.0
3GP HVM 5-9N/2.2	825	110	720	835	650	1050	DN65	DN65	160.0
3GP HVM 10-4N/1.5	890	140	650	1005	765	1160	DN100	DN100	193.0
3GP HVM 10-5N/2.2	890	140	680	1005	765	1160	DN100	DN100	195.0
3GP HVM 10-6N/2.2	890	140	710	1005	765	1160	DN100	DN100	196.0
3GP HVM 10-7N/3.0	890	140	820	1005	765	1160	DN100	DN100	216.0
3GP HVM 10-8N/3.0	890	140	850	1005	765	1160	DN100	DN100	219.0

2GP 3M

INDUSTRIAL PRESSURISATION



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

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

2GP 3M

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

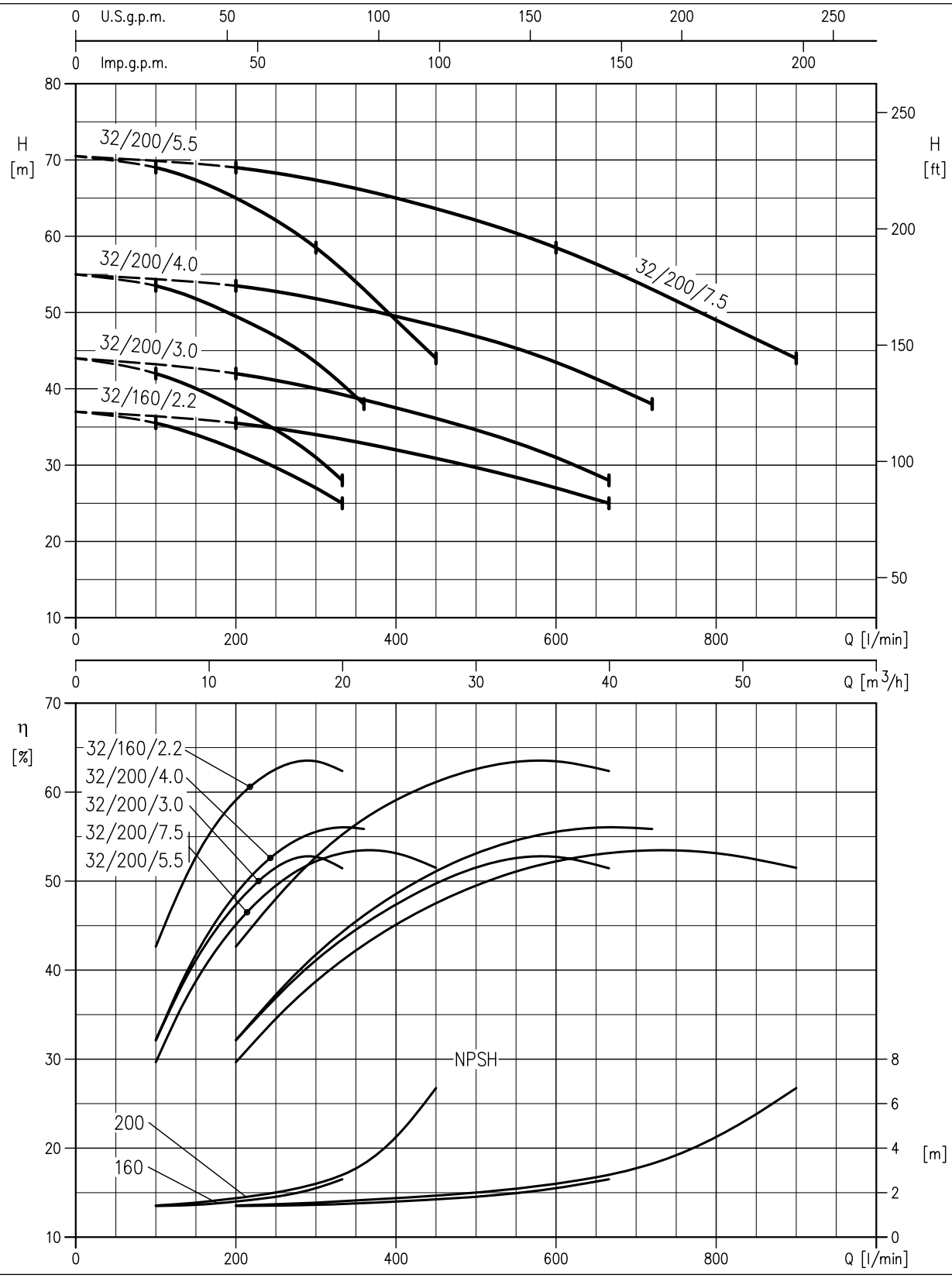
MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Self-ventilated 2-pole and 4-pole motors
- Isolation class F (B for high temperatures)
- Protection rating IP 55
- Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz, three-phase voltage 400/690V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

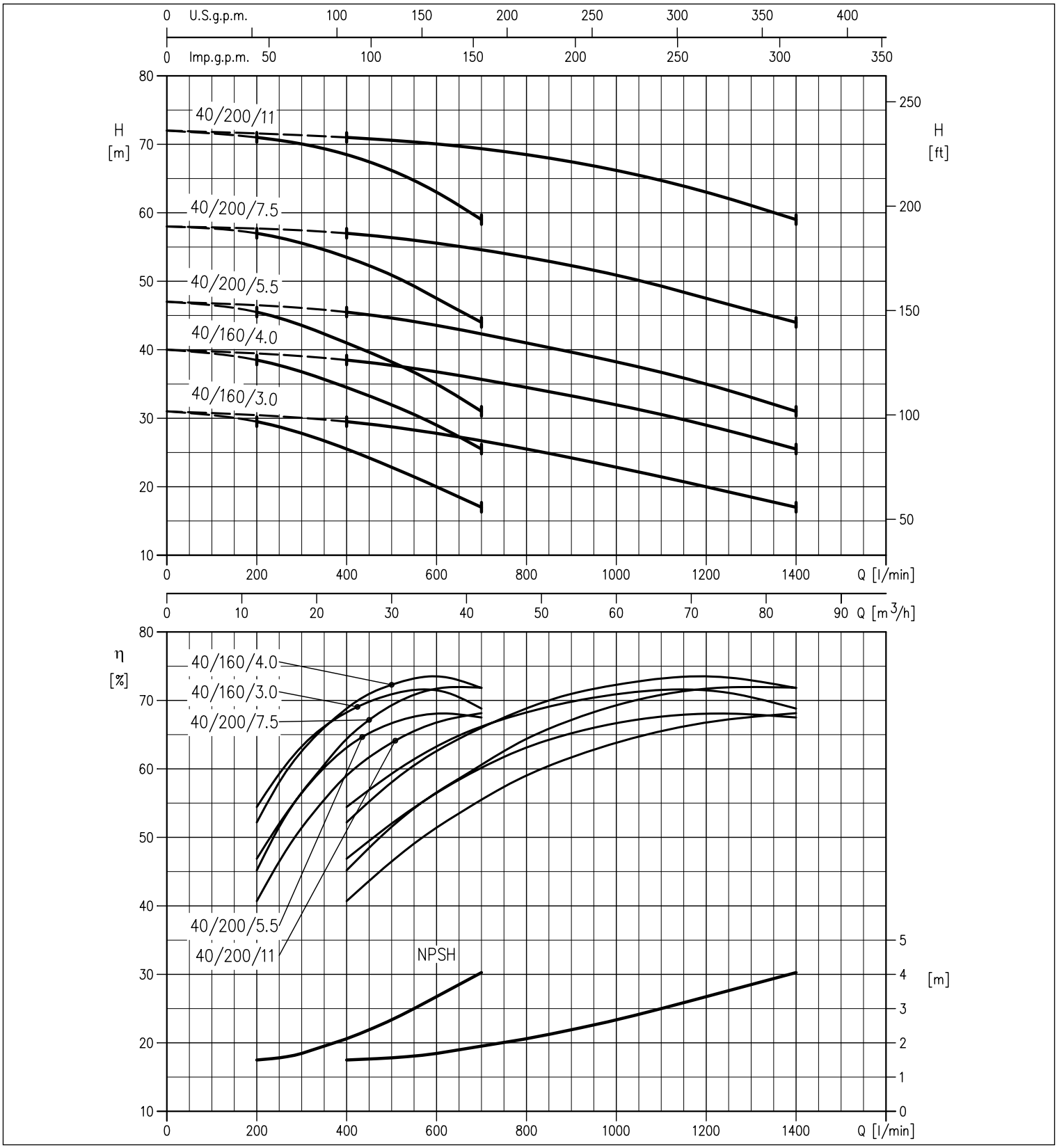
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

PERFORMANCE CURVES for 2GP 3M 32 series (ISO 9906 Annex A)



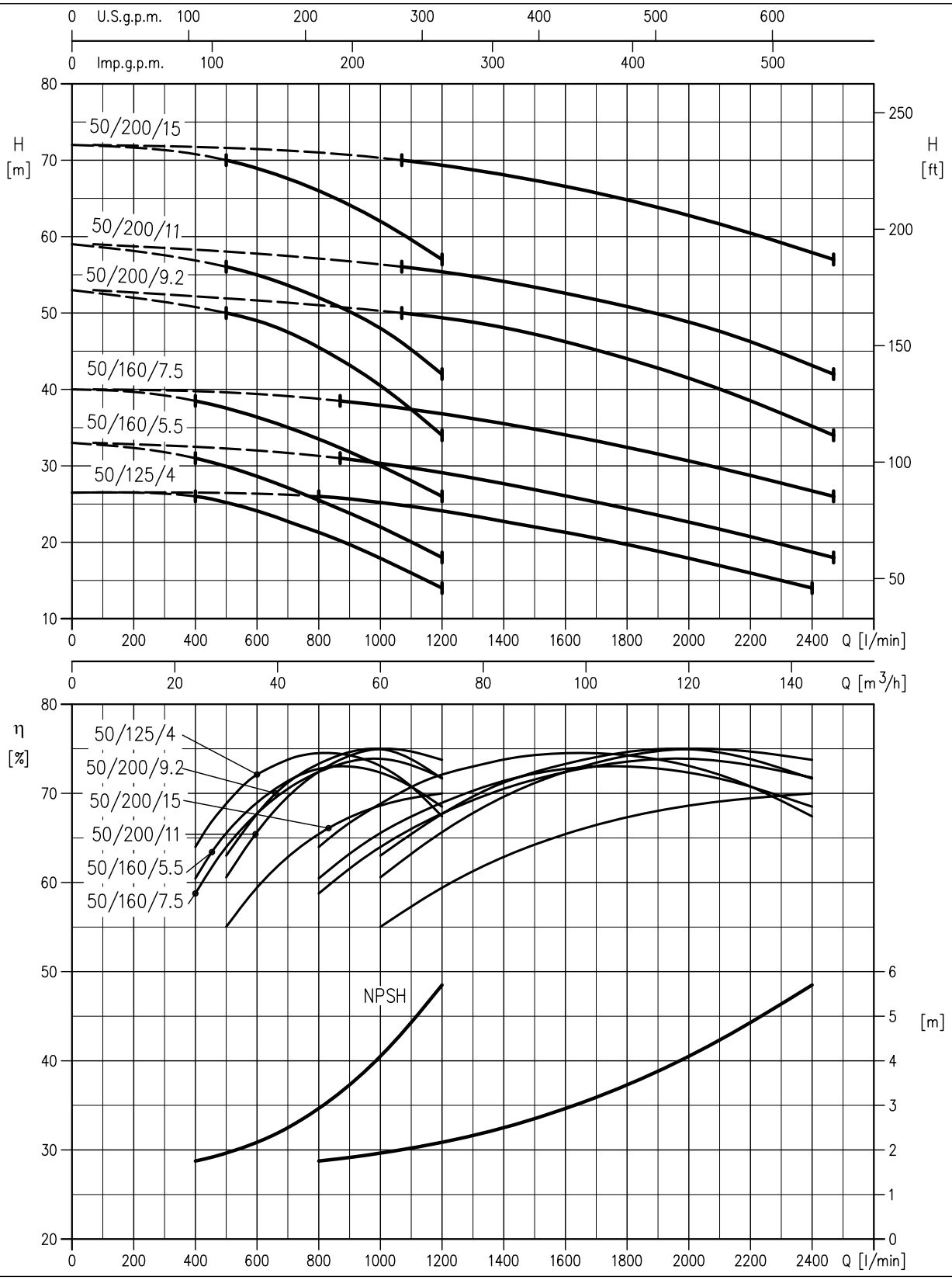
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP 3M 40 series (ISO 9906 Annex A)



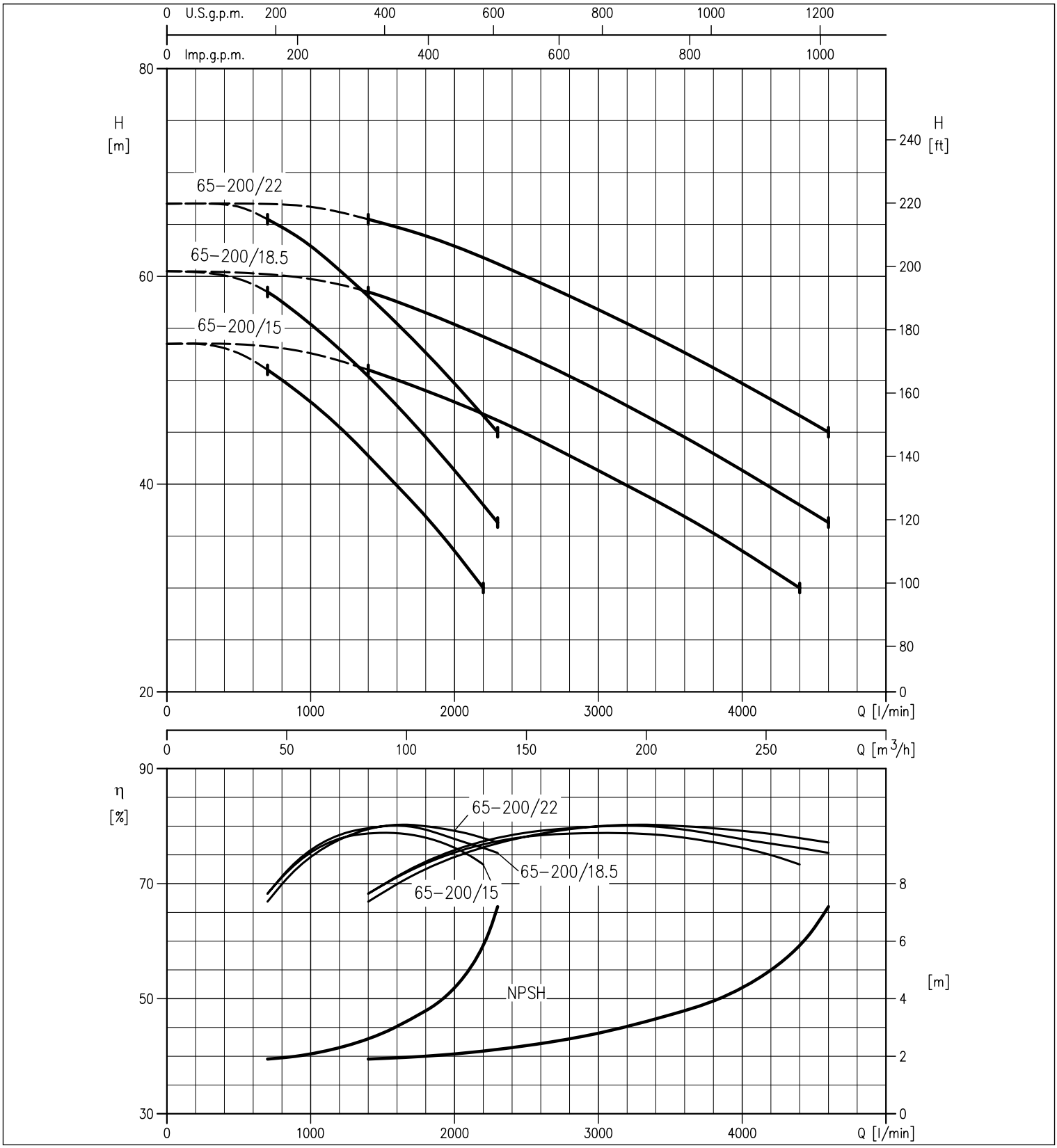
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP 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

PERFORMANCE CURVES for 2GP 3M 65 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

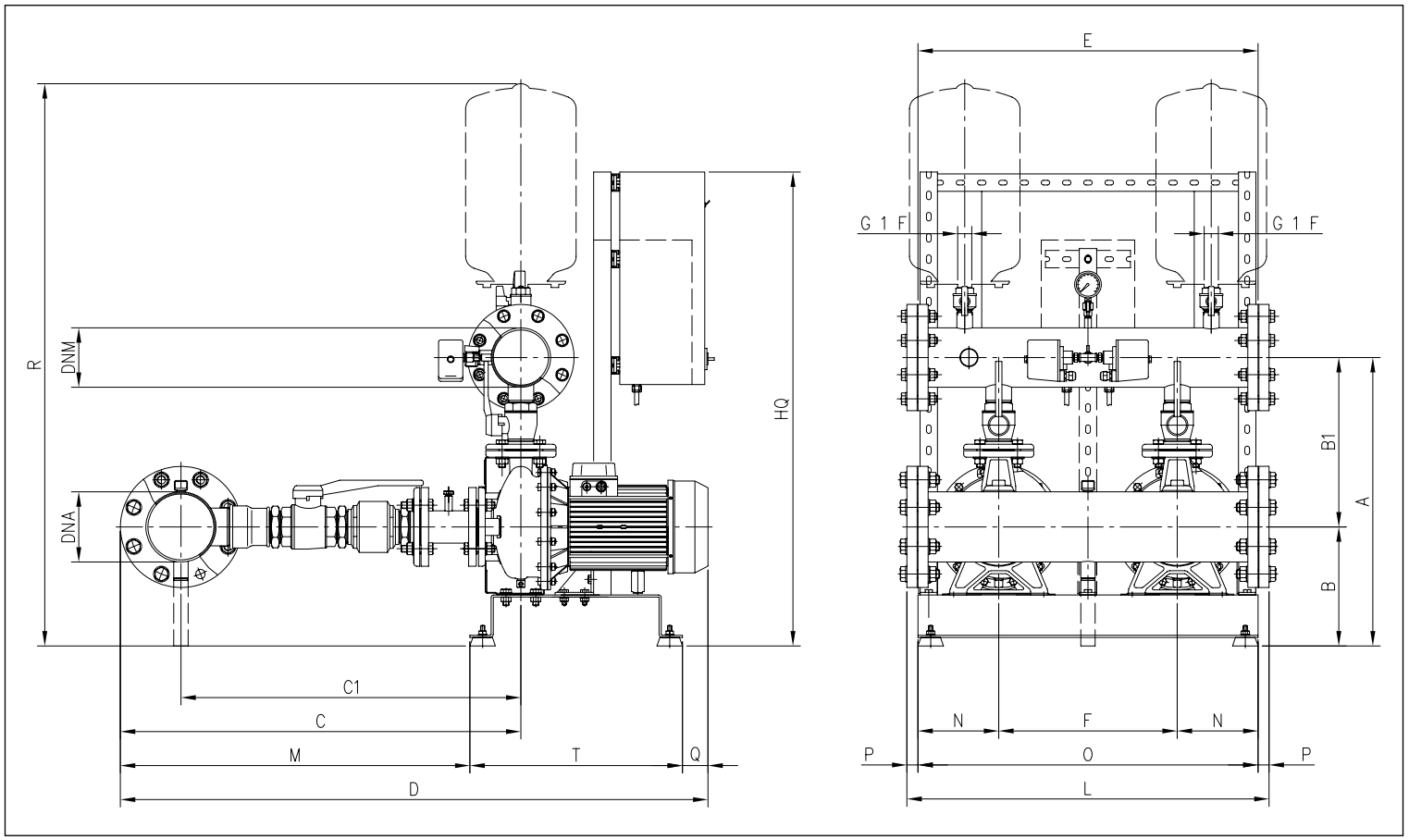
Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	200	300	400	600	666	720	800	900	1000	1200	1400	1600	2000	2400
			m³/h	12	18	24	36	40	43.2	48	54	60	72	84	96	120	144
			H = Head [m]														
2GP 3M 32-160/2.2	2.2+2.2	9.0		35.5	34.0	32.0	27.0	25.0	-	-	-	-	-	-	-	-	-
2GP 3M 32-200/3.0	3+3	12.2		42.0	40.0	37.5	31.0	28.0	-	-	-	-	-	-	-	-	-
2GP 3M 32-200/4.0	4+4	17.4		53.5	52.0	49.5	43.5	40.5	38.0	-	-	-	-	-	-	-	-
2GP 3M 32-200/5.5	5.5+5.5	20.8		69.0	67.5	65.0	58.5	-	-	-	-	-	-	-	-	-	-
2GP 3M 32-200/7.5	7.5+7.5	27.4		69.0	67.5	65.0	58.5	55.5	53.0	49.0	44.0	-	-	-	-	-	-
2GP 3M 40-160/3.0	3+3	12.2		-	-	29.5	27.5	27.0	26.5	25.5	24.0	22.5	20.0	17.0	-	-	-
2GP 3M 40-160/4.0	4+4	17.4		-	-	38.5	37.0	36.0	35.5	34.5	33.0	32.0	29.0	25.5	-	-	-
2GP 3M 40-200/5.5	5.5+5.5	20.8		-	-	45.5	44.0	43.0	42.5	41.0	39.5	38.0	35.0	31.0	-	-	-
2GP 3M 40-200/7.5	7.5+7.5	27.4		-	-	57.0	55.5	55.0	54.5	53.5	52.5	51.0	47.5	44.0	-	-	-
2GP 3M 40-200/11	11+11	43.8		-	-	71.0	70.0	70.0	69.5	68.5	67.5	66.0	63.0	59.0	-	-	-
2GP 3M 50-125/4	4+4	17.4		-	-	-	-	-	-	26.0	25.5	25.0	24.0	22.5	21.5	17.9	14.0
2GP 3M 50-160/5.5	5.5+5.5	20.8		-	-	-	-	-	-	31.0	30.5	30.0	28.5	27.0	25.5	22.0	18.0
2GP 3M 50-160/7.5	7.5+7.5	27.4		-	-	-	-	-	-	38.5	38.0	37.5	36.0	35.0	33.5	30.0	26.0
2GP 3M 50-200/9.2	9.2+9.2	33.6		-	-	-	-	-	-	-	-	50.0	49.0	47.5	45.5	40.5	34.0
2GP 3M 50-200/11	11+11	43.8		-	-	-	-	-	-	-	-	56.0	55.0	54.0	52.0	48.0	42.0
2GP 3M 50-200/15	15+15	60.0		-	-	-	-	-	-	-	-	70.0	69.0	68.0	66.0	62.0	57.0

Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	1400	1800	2600	3000	3400	3800	4200	4400	4600
			m³/h	84	108	156	180	204	228	252	264	276
			H = Head [m]									
2GP 3M 65-200/15	15+15	60.0		51.0	49.0	44.0	41.5	38.4	35.3	31.8	30.0	-
2GP 3M 65-200/18.5	18.5+18.5	72.6		58.5	56.5	51.5	49.0	46.0	43.0	39.7	38.0	36.3
2GP 3M 65-200/22	22+22	81.6		65.5	64.0	59.5	57.0	54.0	51.0	48.0	46.5	45.0

2GP 3M

INDUSTRIAL PRESSURISATION

DIMENSIONS

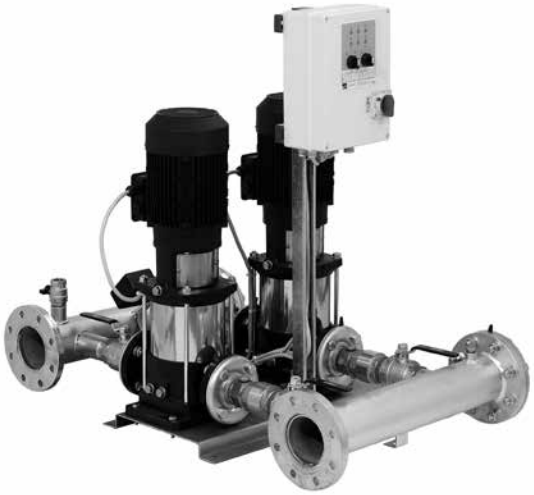


DIMENSION CHART

Model	Dimensions [mm]																					Weight
	A	B	B1	C	C1	D	DNA	DNM	E	F	HQ	L	M	N	O	P	Q	Q1	R	T		[kg]
2GP 3M 32-160/2.2	655	250	405	425	380	805	G3"	G2"½	520	370	740	800	305	215	800	-	-	1280	500	110.0		103.0
2GP 3M 32-200/3	705	280	425	425	380	815	G3"	G2"½	520	370	790	800	305	215	800	-	10	1330	500	123.0		118.0
2GP 3M 32-200/4	705	280	425	425	380	840	G3"	G2"½	520	370	790	800	305	215	800	-	35	1330	500	131.0		133.0
2GP 3M 32-200/5.5	705	280	425	425	380	865	G3"	G2"½	520	370	790	800	305	215	800	-	60	1330	500	158.0		155.0
2GP 3M 32-200/7.5	705	280	425	425	380	865	G3"	G2"½	520	370	790	800	305	215	800	-	60	1330	500	169.0		155.0
2GP 3M 40-160/3	605	250	355	785	660	1180	125	100	800	420	900	850	665	190	800	25	10	1235	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	1235	500	194.0		183.0
2GP 3M 40-200/5.5	655	280	375	805	680	1245	125	100	800	420	900	850	685	190	800	25	60	1285	500	223.0		216.0
2GP 3M 40-200/7.5	655	280	375	805	680	1245	125	100	800	420	900	850	685	190	800	25	60	1285	500	230.0		230.0
2GP 3M 40-200/11	620	245	375	805	680	1370	125	100	800	420	1050	880	570	230	880	-	-	1250	800	294.0		294.0
2GP 3M 50-125/4	630	250	380	940	800	1355	150	125	800	420	790	850	820	190	800	25	35	1275	500	206.0		195.0
2GP 3M 50-160/5.5	680	280	400	940	800	1380	150	125	800	420	900	850	820	190	800	25	60	1325	500	224.0		229.0
2GP 3M 50-160/7.5	680	280	400	940	800	1380	150	125	800	420	900	850	820	190	800	25	60	1325	500	243.0		243.0
2GP 3M 50-200/9.2	665	245	420	940	800	1500	150	125	800	420	1050	880	700	230	880	-	-	1310	800	274.0		269.0
2GP 3M 50-200/11	665	245	420	940	800	1500	150	125	800	420	1050	880	700	230	880	-	-	1310	800	306.0		306.0
2GP 3M 50-200/15	665	245	420	940	800	1655	150	125	800	420	1100	880	855	230	880	-	-	1310	800	372.0		360.0
2GP 3M 65-200/15	950	265	685	1080	885	1780	250	200	800	400	1150	880	980	230	880	-	-	1635	800	382.0		396.0
2GP 3M 65-200/18.5	950	265	685	1080	885	1780	250	200	800	400	1150	880	980	230	880	-	-	1635	800	505.0		521.0
2GP 3M 65-200/22	950	265	685	1080	885	1780	250	200	800	400	1200	880	980	230	880	-	-	1635	800	508.0		520.0

2GP EVMG

INDUSTRIAL PRESSURISATION



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

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

2GP EVMG

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 (models 32-45-64) (F= round counterflanges; N= oval counterflanges)
- PTFE wear rings

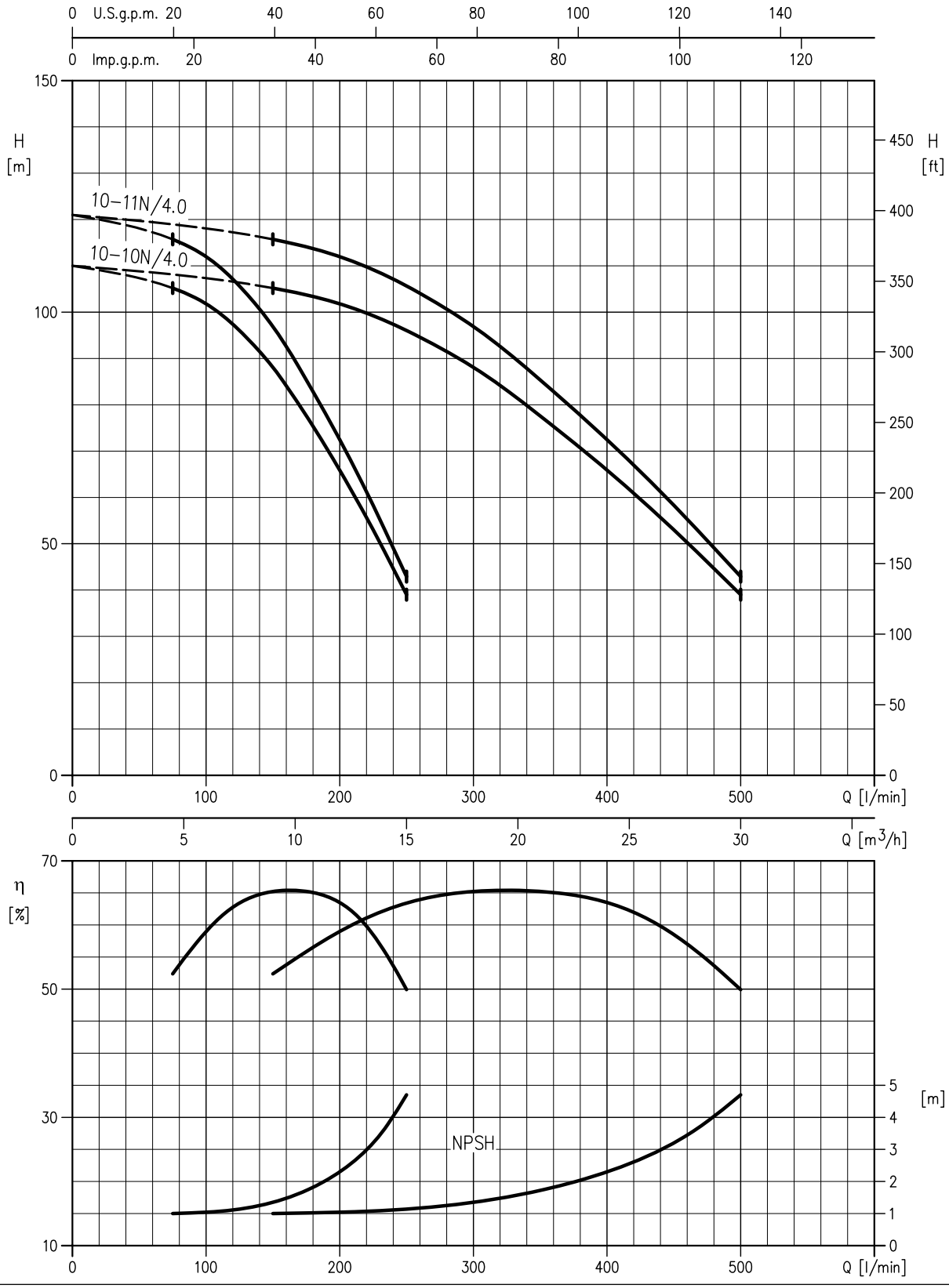
MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400V ±10% 50Hz (up to/incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)

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.

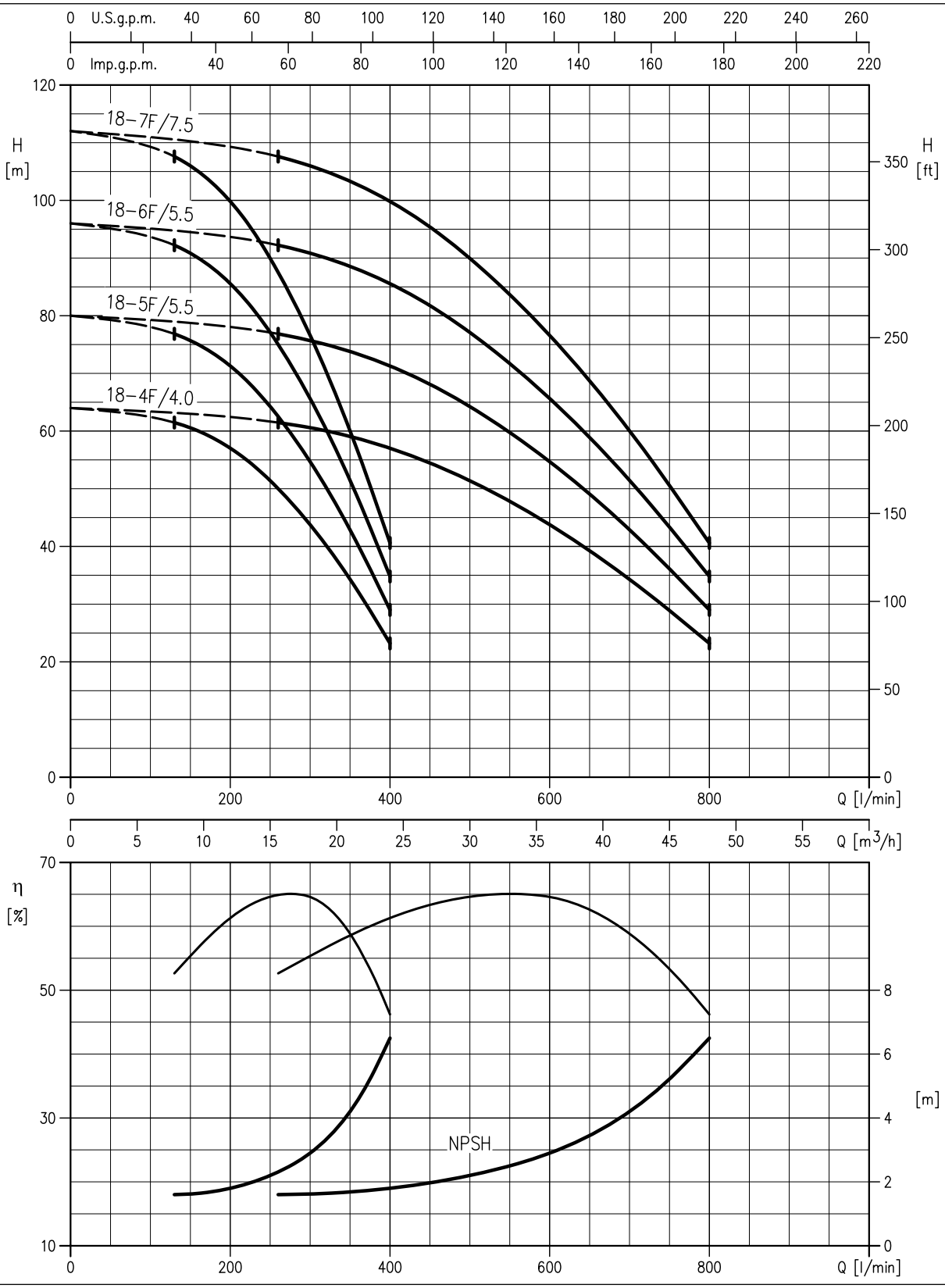
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

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



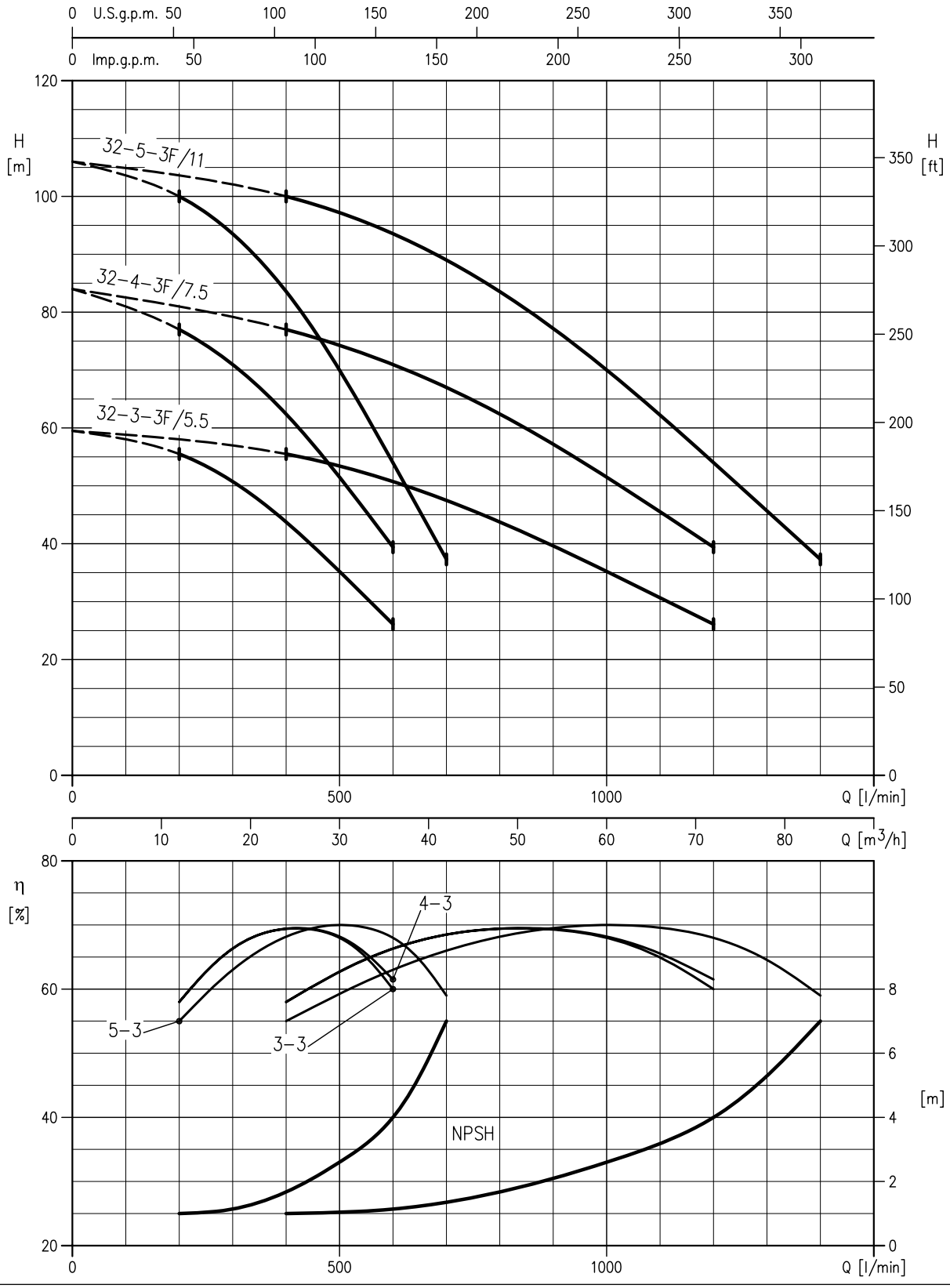
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

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



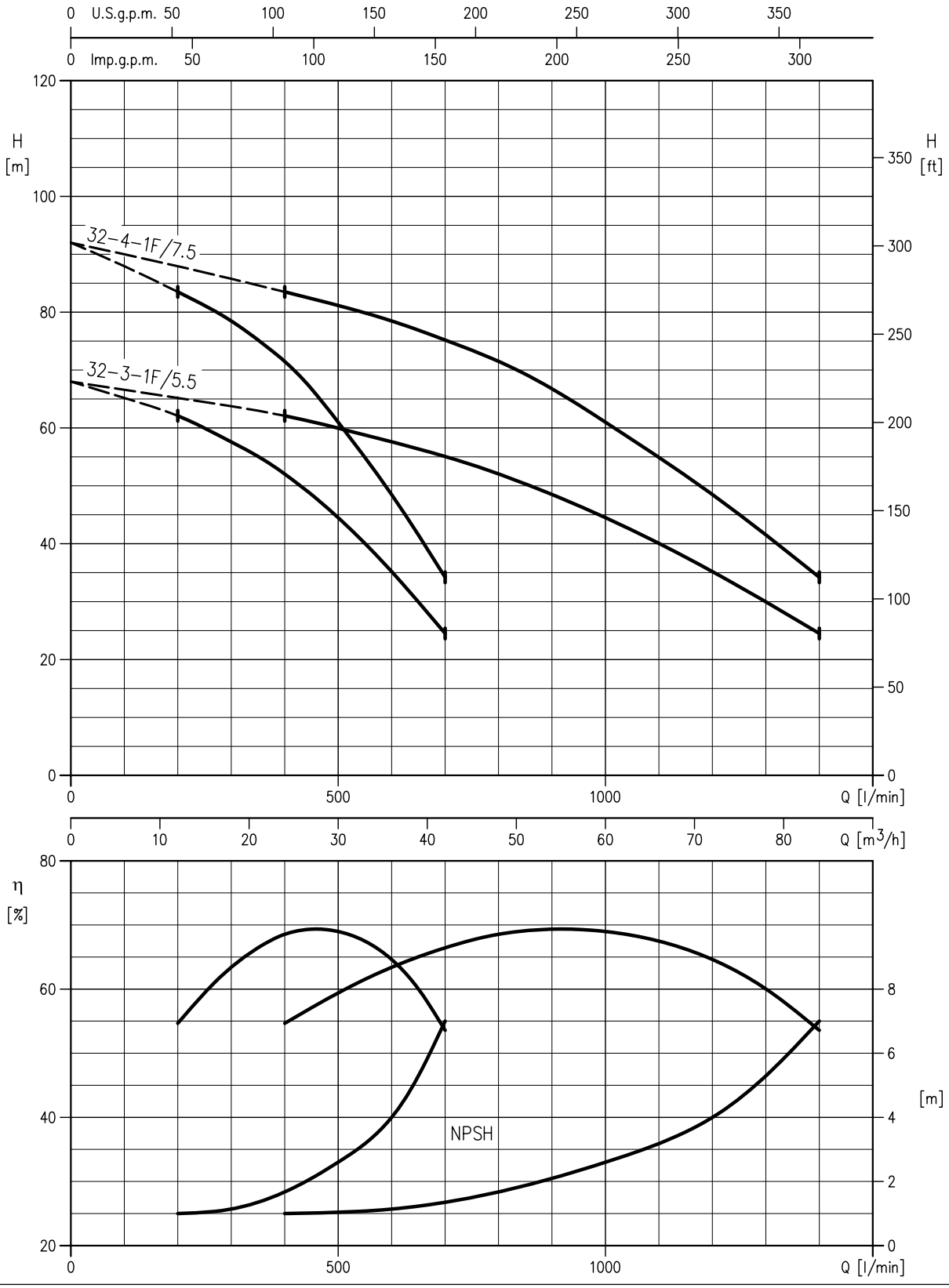
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP EVMG 32 series (1/2) (ISO 9906 Annex A)



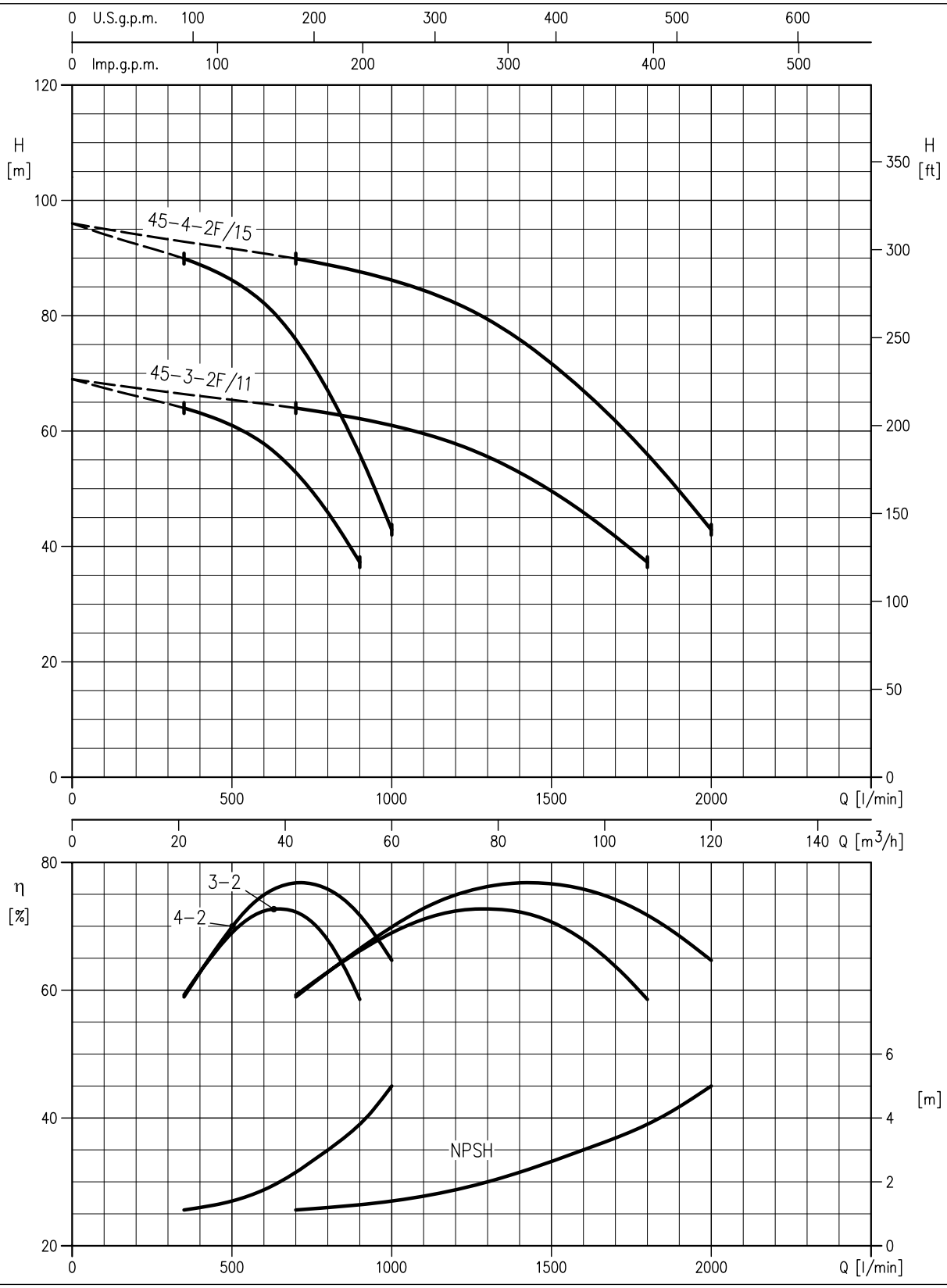
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP EVMG 32 series (2/2) (ISO 9906 Annex A)



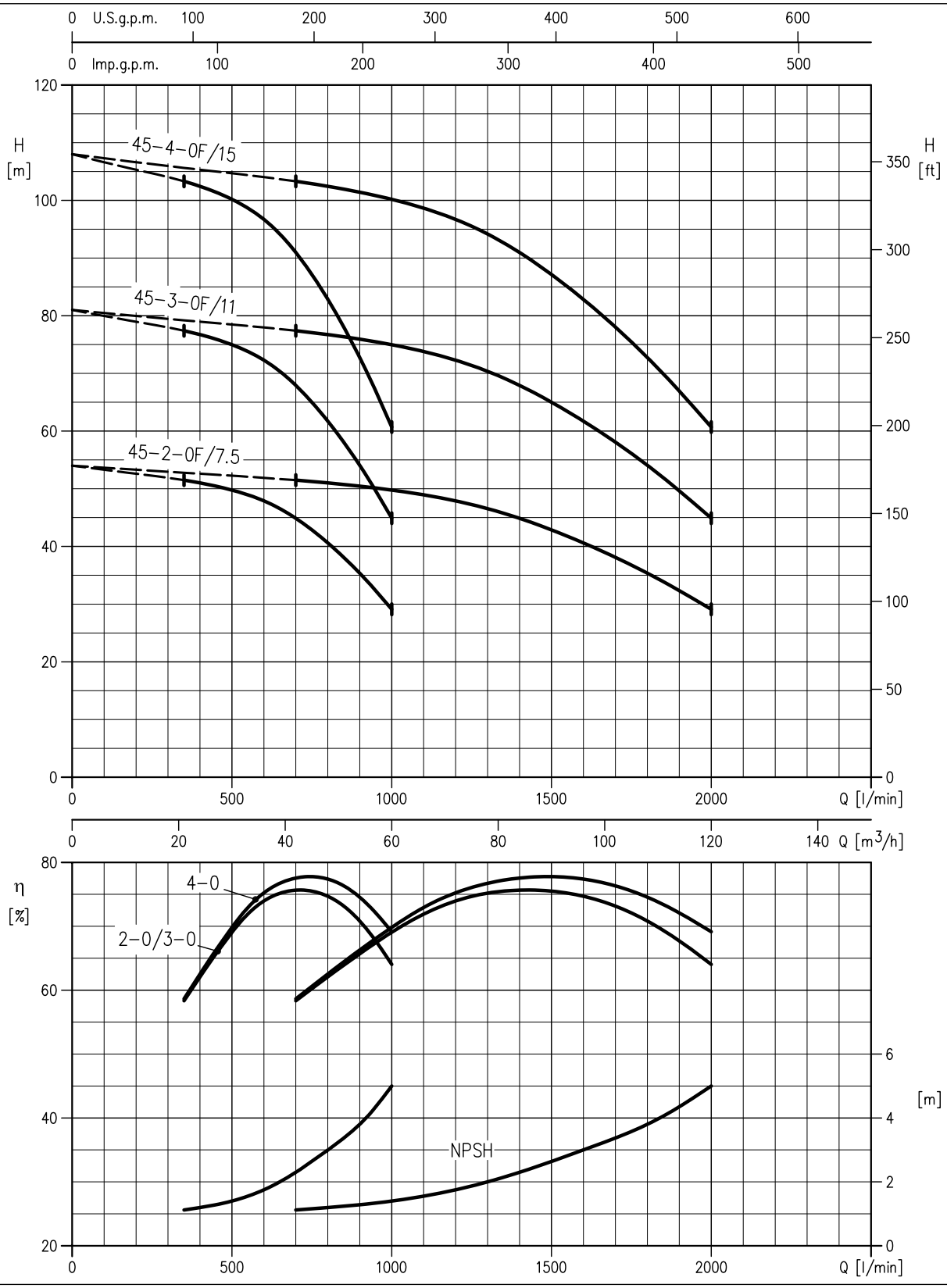
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP EVMG 45 series (1/2) (ISO 9906 Annex A)



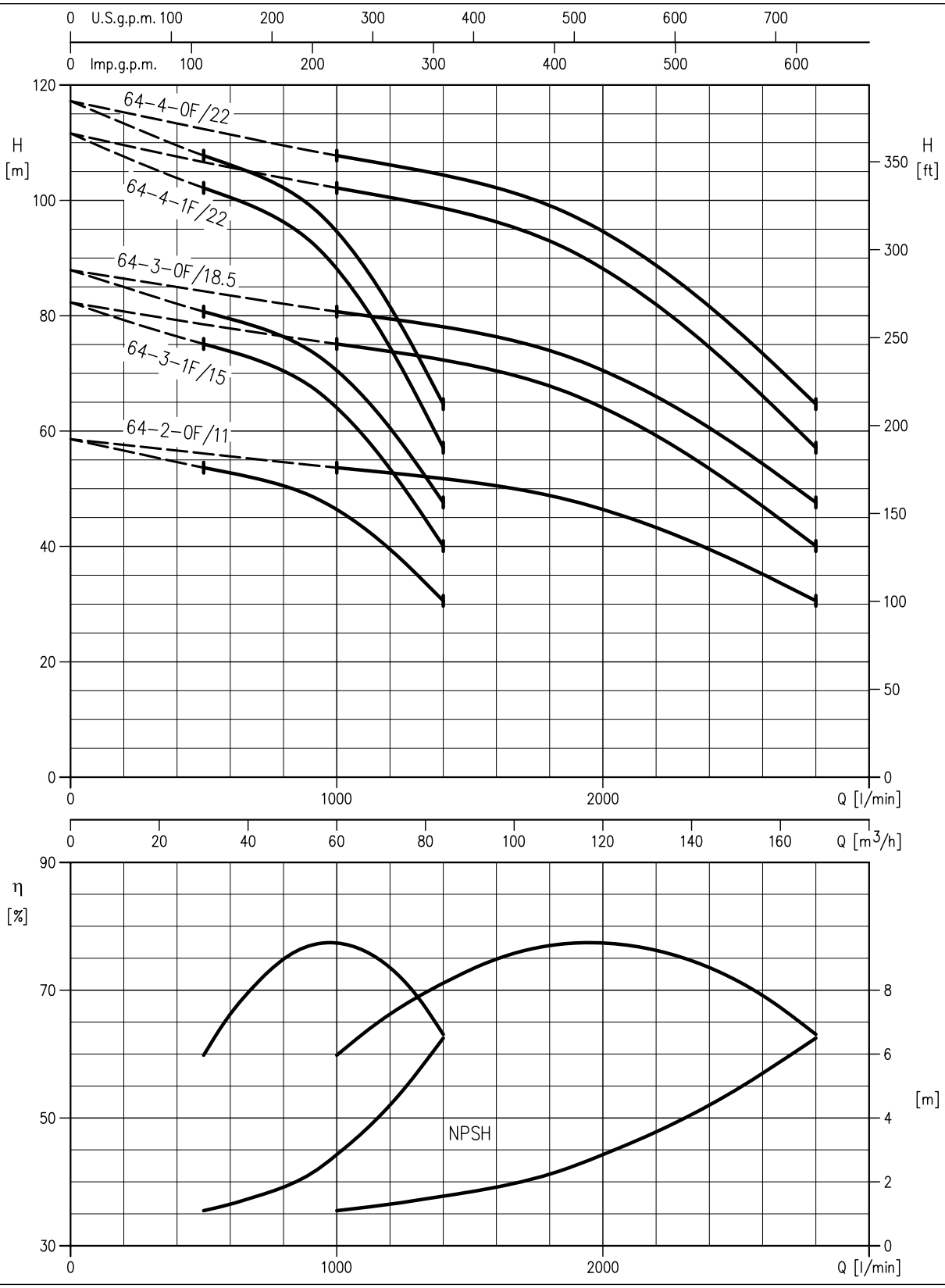
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP EVMG 45 series (2/2) (ISO 9906 Annex A)



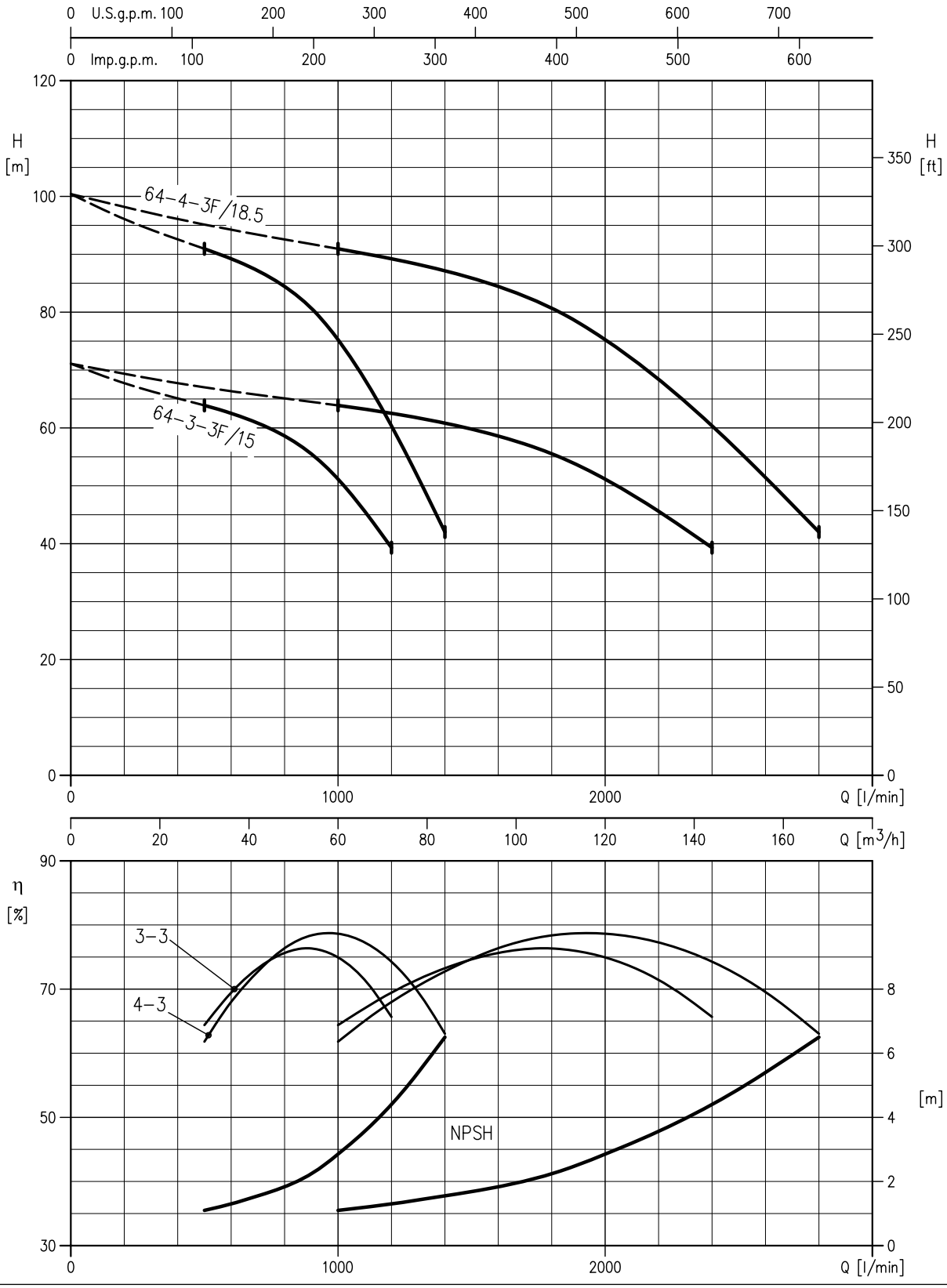
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GP EVMG 64 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 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 TWO PUMPS RUNNING SIMULTANEOUSLY

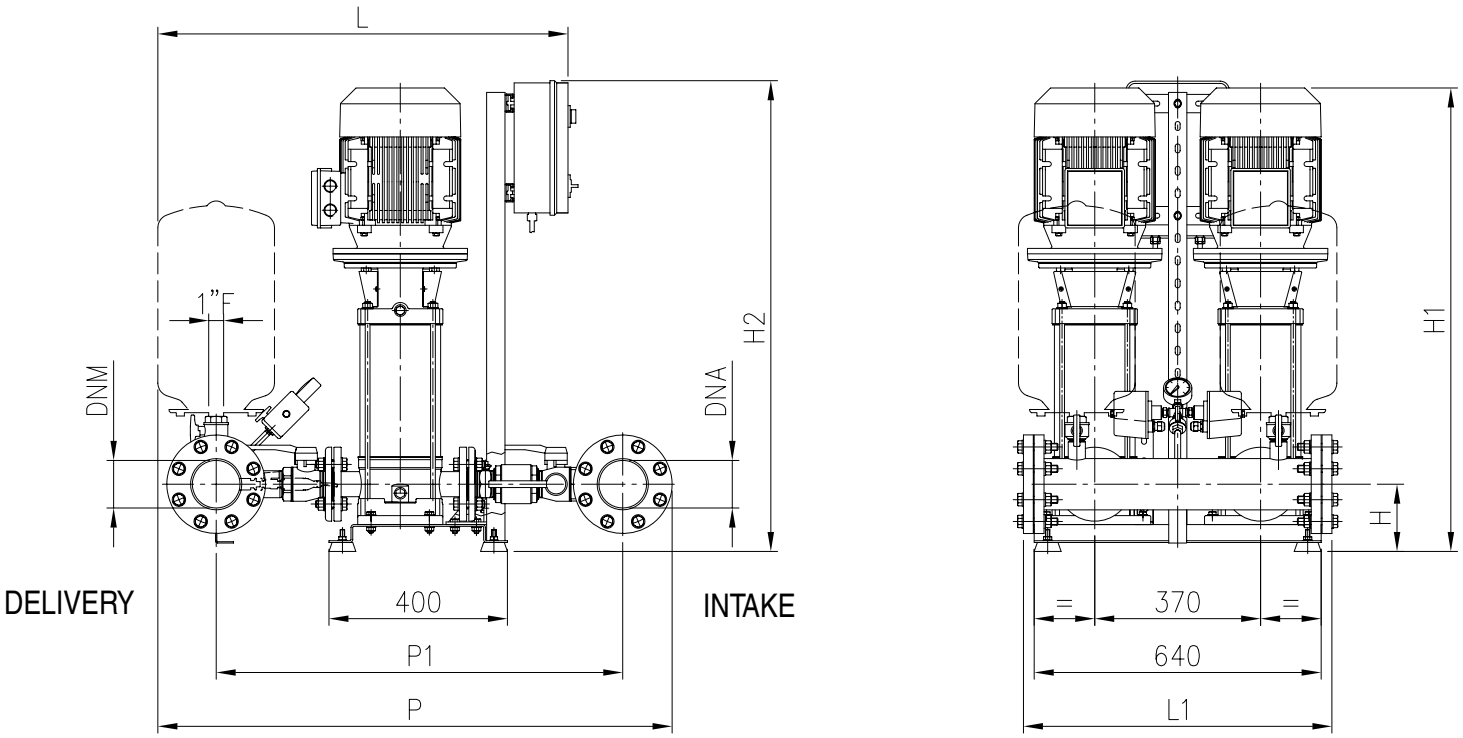
Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	150	200	260	300	400	500	600	700	800
			m³/h	9	12	15.6	18	24	30	36	42	48
			H = Head [m]									
2GP EVMG 10 10N/4.0	4+4	15.6		105.0	102.0	94.5	88.0	66.0	39.0	-	-	-
2GP EVMG 10 11N/4.0	4+4	15.6		116.0	112.0	104.0	97.0	72.5	43.0	-	-	-
2GP EVMG 18 4F/4.0	4+4	15.6		-	-	61.5	60.5	57.0	51.5	44.0	34.3	23.2
2GP EVMG 18 5F/5.5	5.5+5.5	20.8		-	-	77.0	75.5	71.5	64.5	54.5	43.0	29.0
2GP EVMG 18 6F/5.5	5.5+5.5	20.8		-	-	92.0	91.0	85.5	77.0	65.5	51.5	34.8
2GP EVMG 18 7F/7.5	7.5+7.5	28.4		-	-	108.0	106.0	100.0	90.0	76.5	60.0	40.5

Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	400	700	1000	1200	1400	1800	2000	2400	2800
			m³/h	24	42	60	72	84	108	120	144	168
			H = Head [m]									
2GP EVMG 32 3-3F/5.5	5.5+5.5	20.8		55.5	47.5	35.2	26.1	-	-	-	-	-
2GP EVMG 32 3-1F/5.5	5.5+5.5	20.8		62.0	55.0	44.5	35.2	24.5	-	-	-	-
2GP EVMG 32 4-3F/7.5	7.5+7.5	28.4		77.0	67.0	51.5	39.4	-	-	-	-	-
2GP EVMG 32 4-1F/7.5	7.5+7.5	28.4		83.5	74.5	61.0	48.5	34.2	-	-	-	-
2GP EVMG 32 5-3F/11	11+11	39.6		106.0	100.0	89.0	70.0	37.5	-	-	-	-
2GP EVMG 45 2-0F/7.5	7.5+7.5	28.4		-	51.5	50.0	48.0	45.0	35.4	29.1	-	-
2GP EVMG 45 3-2F/11	11+11	39.6		-	64.0	61.0	58.0	53.0	37.3	-	-	-
2GP EVMG 45 3-0F/11	11+11	39.6		-	77.5	75.0	72.5	68.0	54.0	45.0	-	-
2GP EVMG 45 4-2F/15	15+15	54.4		-	90.0	86.0	82.0	76.0	56.0	43.0	-	-
2GP EVMG 45 4-0F/15	15+15	54.4		-	103.0	100.0	96.5	91.0	73.0	60.5	-	-
2GP EVMG 64 2-0F/11	11+11	39.6		-	-	53.5	53.0	52.0	49.0	46.5	39.5	30.6
2GP EVMG 64 3-3F/15	15+15	54.4		-	-	64.0	62.5	61.0	55.5	51.0	39.3	-
2GP EVMG 64 3-2F/15	15+15	54.4		-	-	69.5	68.0	66.5	61.5	57.5	46.5	32.5
2GP EVMG 64 3-1F/15	15+15	54.4		-	-	75.0	74.0	72.5	68.0	64.0	53.5	40.0
2GP EVMG 64 3-0F/18.5	18.5+18.5	66.6		-	-	80.5	79.5	78.0	74.0	70.5	60.5	47.5
2GP EVMG 64 4-3F/18.5	18.5+18.5	66.6		-	-	91.0	89.0	87.0	80.5	75.5	60.5	42.0
2GP EVMG 64 4-1F/22	22+22	78.0		-	-	102.0	101.0	98.5	93.0	88.0	74.5	57.0
2GP EVMG 64 4-0F/22	22+22	78.0		-	-	108.0	106.0	104.0	99.0	94.5	81.5	64.5

2GP EVMG

INDUSTRIAL PRESSURISATION

DIMENSIONS 2GP EVMG 10-18



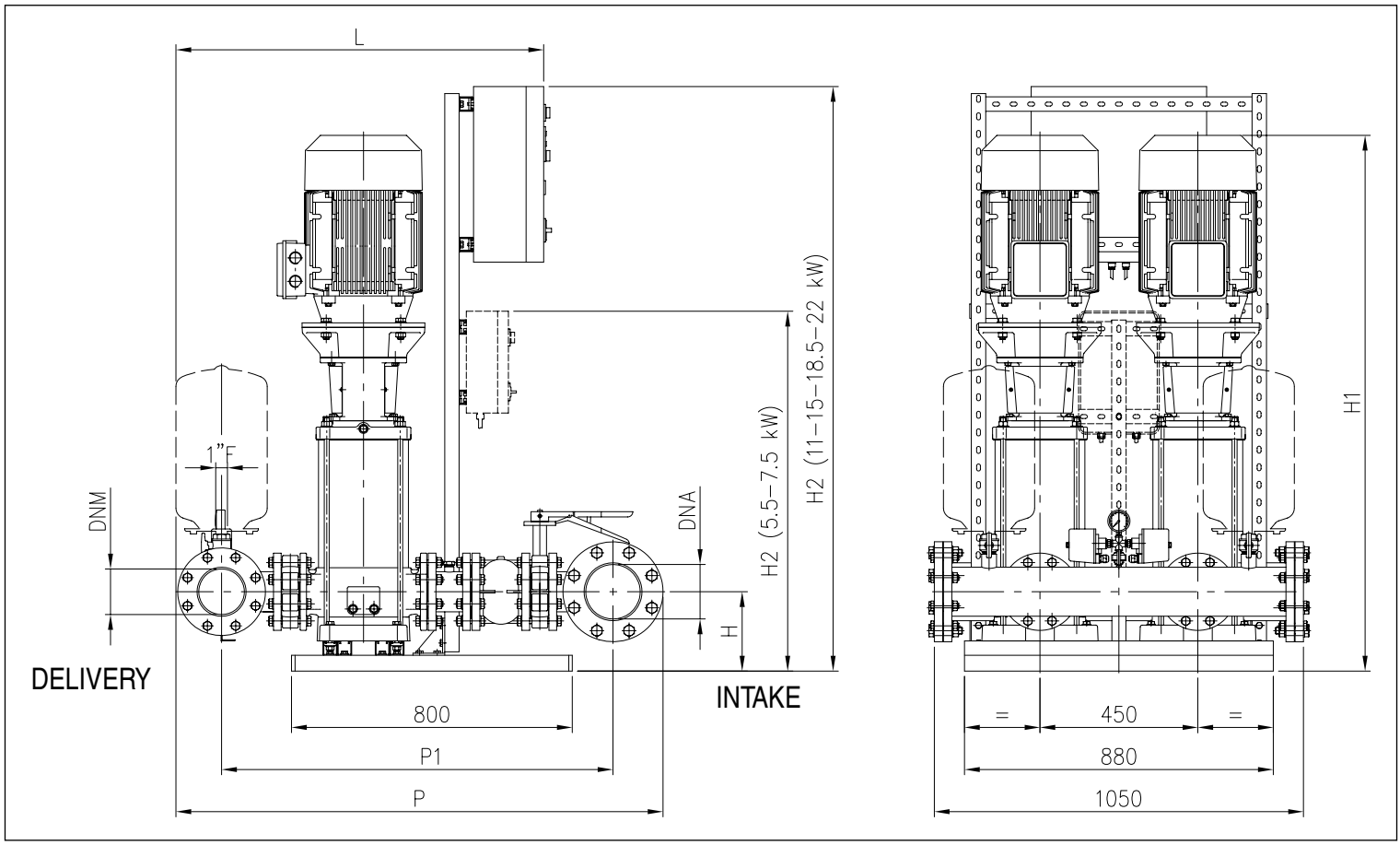
DIMENSION CHART

Model	Dimensions [mm]									Weight [kg]
	L	H	H1	H2	P	P1	L1	DNA	DNM	
2GP EVMG10 10N/4.0	845	140	970	1000	925	735	670	G 3	G 3	153.0
2GP EVMG10 11N/4.0	845	140	1000	1000	925	735	670	G 3	G 3	159.0
2GP EVMG18 4F/4.0	915	150	840	1050	1145	905	690	DN100	DN100	190.0
2GP EVMG18 5F/5.5	915	150	910	1050	1145	905	690	DN100	DN100	252.0
2GP EVMG18 6F/5.5	915	150	950	1050	1145	905	690	DN100	DN100	258.0
2GP EVMG18 7F/7.5	915	150	990	1050	1145	905	690	DN100	DN100	264.0

2GP EVMG

INDUSTRIAL PRESSURISATION

DIMENSIONS 2GP EVMG 32-45-64

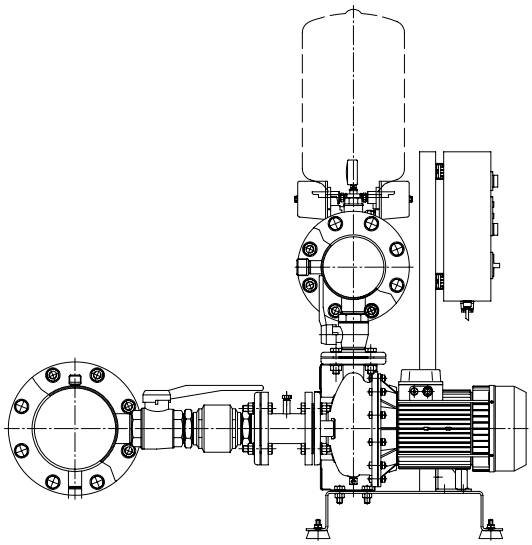


DIMENSION CHART

Model	Dimensions [mm]								Weight [kg]
	L	H	H1	H2	P	P1	DNA	DNM	
2GP EVMG32 3-3F/5.5	1015	190	985	1025	1360	1105	DN125	DN100	421
2GP EVMG32 3-1F/5.5	1015	190	985	1025	1360	1105	DN125	DN100	421
2GP EVMG32 4-3F/7.5	1015	190	1035	1025	1360	1105	DN125	DN100	430
2GP EVMG32 4-1F/7.5	1015	190	1035	1025	1360	1105	DN125	DN100	430
2GP EVMG32 5-3F/11	1095	190	1290	1325	1360	1105	DN125	DN100	555
2GP EVMG45 2-0 F/7.5	1085	225	1030	1175	1470	1195	DN150	DN125	474
2GP EVMG45 3-2 F/11	1145	225	1310	1375	1470	1195	DN150	DN125	596
2GP EVMG45 3-0 F/11	1145	225	1310	1375	1470	1195	DN150	DN125	596
2GP EVMG45 4-2 F/15	1145	225	1475	1475	1470	1195	DN150	DN125	614
2GP EVMG45 4-0 F/15	1145	225	1475	1475	1470	1195	DN150	DN125	614
2GP EVMG64 2-0F/11	1005	225	1240	1375	1390	1115	DN150	DN125	584
2GP EVMG64 3-3F/15	1005	225	1405	1475	1390	1115	DN150	DN125	596
2GP EVMG64 3-2F/15	1005	225	1405	1475	1390	1115	DN150	DN125	596
2GP EVMG64 3-1F/15	1005	225	1405	1475	1390	1115	DN150	DN125	596
2GP EVMG64 3-0F/18.5	1005	225	1450	1625	1390	1115	DN150	DN125	617
2GP EVMG64 4-3F/18.5	1005	225	1520	1625	1390	1115	DN150	DN125	655
2GP EVMG64 4-1F/22	1005	225	1555	1665	1390	1115	DN150	DN125	782
2GP EVMG64 4-0F/22	1005	225	1555	1665	1390	1115	DN150	DN125	782

3GP 3M

INDUSTRIAL PRESSURISATION



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

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

3GP 3M

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

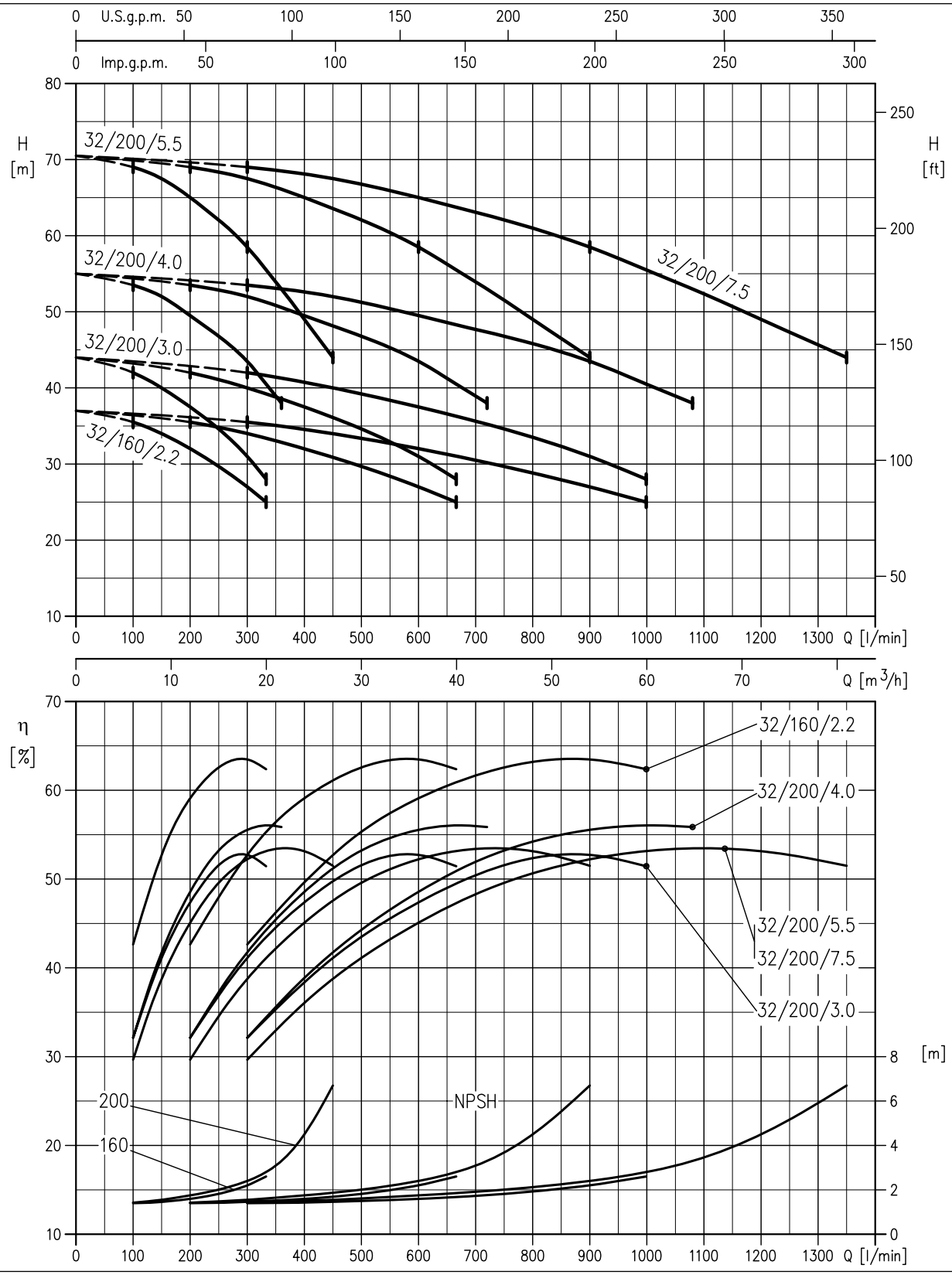
MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Self-ventilated 2-pole and 4-pole motors
- Isolation class F (B for high temperatures)
- Protection rating IP 55
- Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz, three-phase voltage 400/690V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

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.

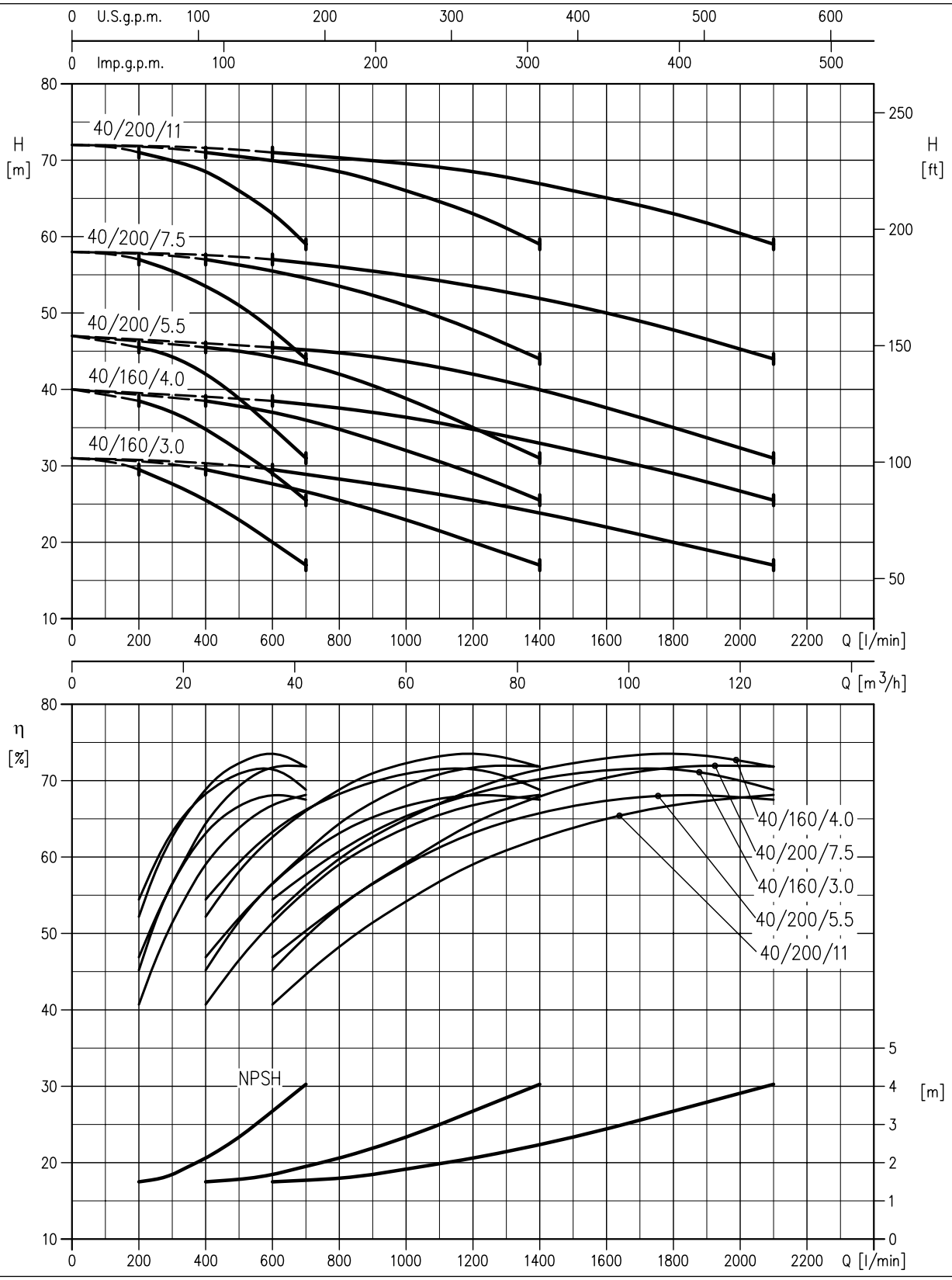
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

PERFORMANCE CURVES for 3GP 3M 32 series (ISO 9906 Annex A)



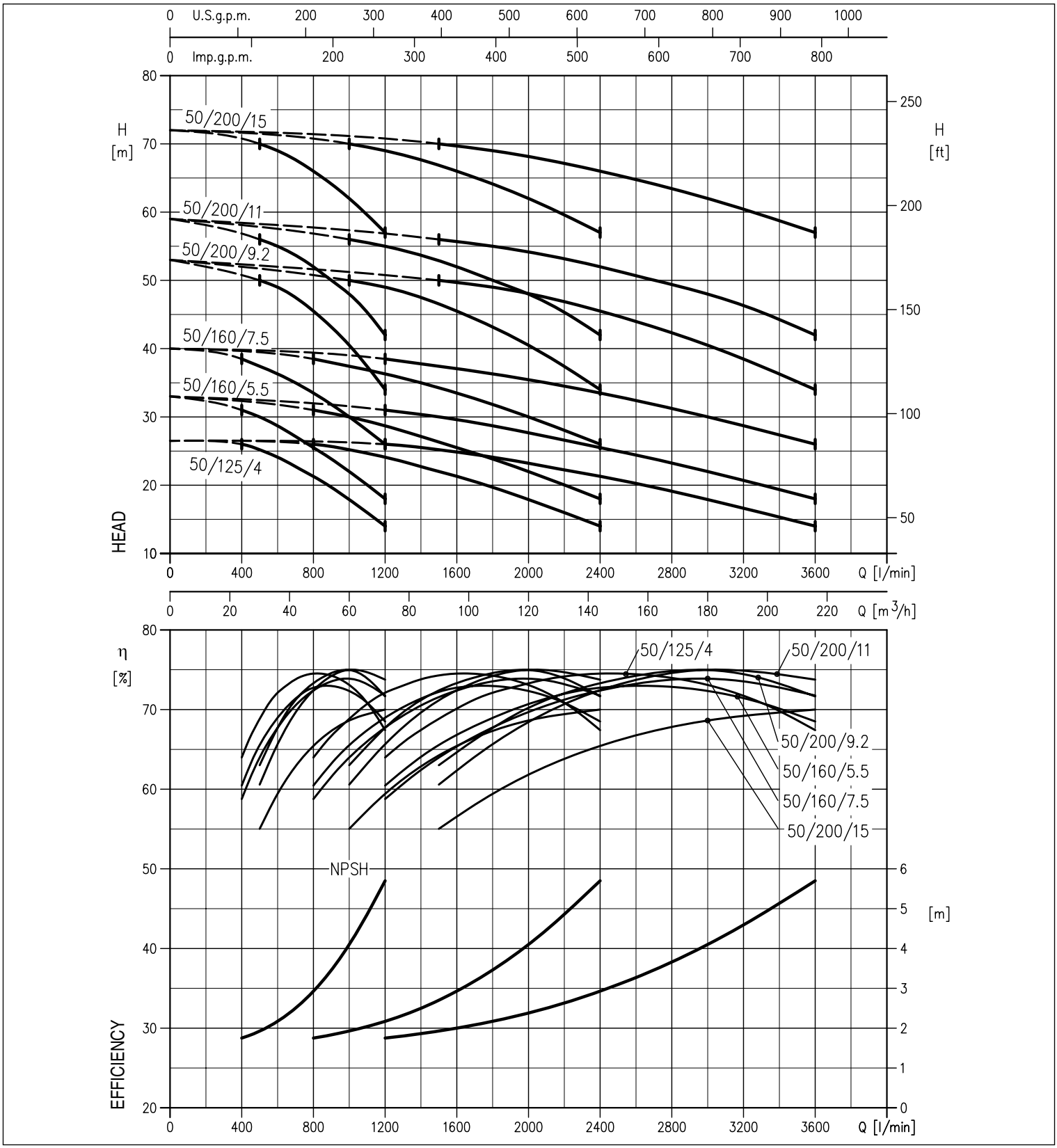
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP 3M 40 series (ISO 9906 Annex A)



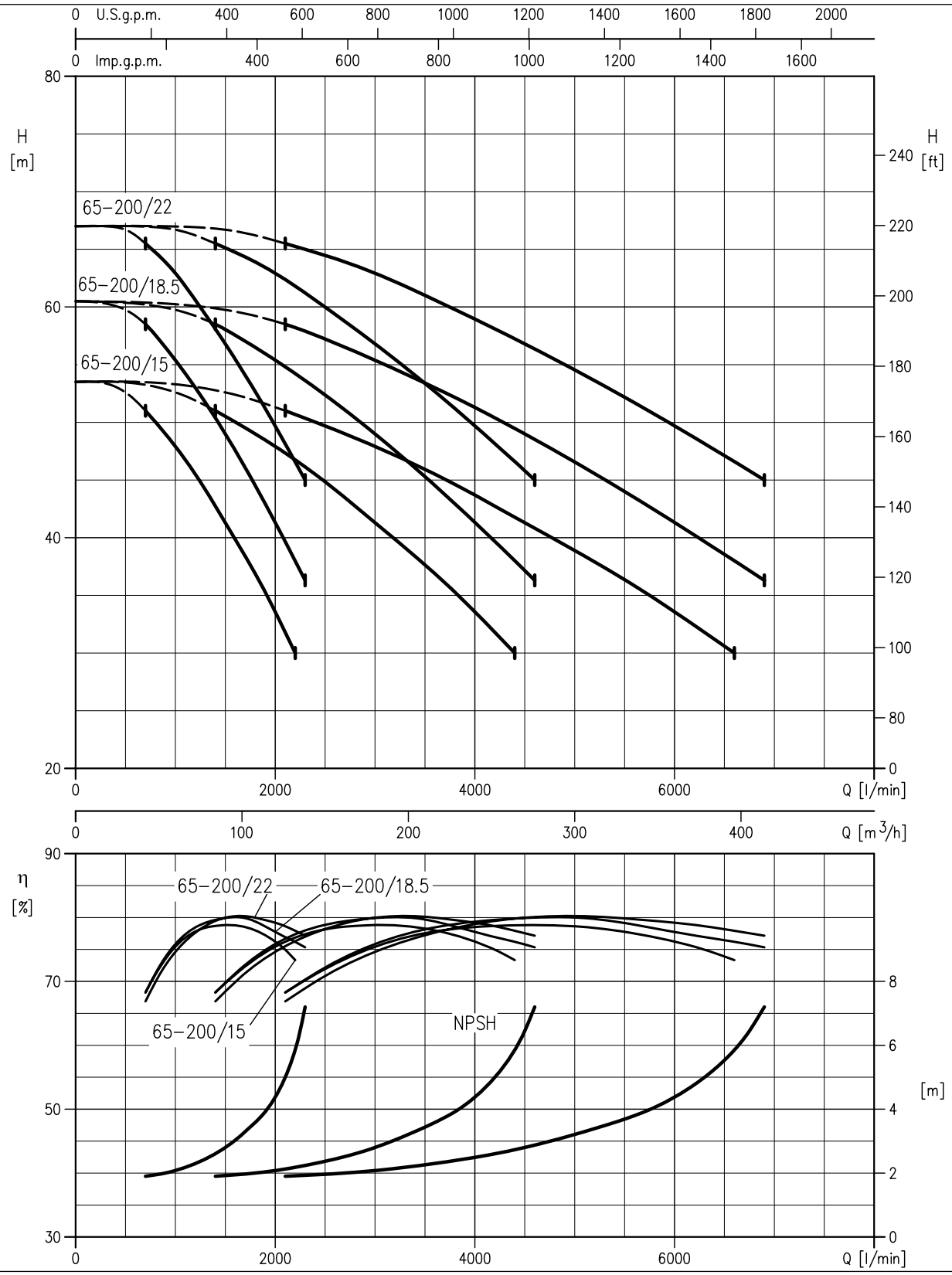
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP 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

PERFORMANCE CURVES for 3GP 3M 65 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

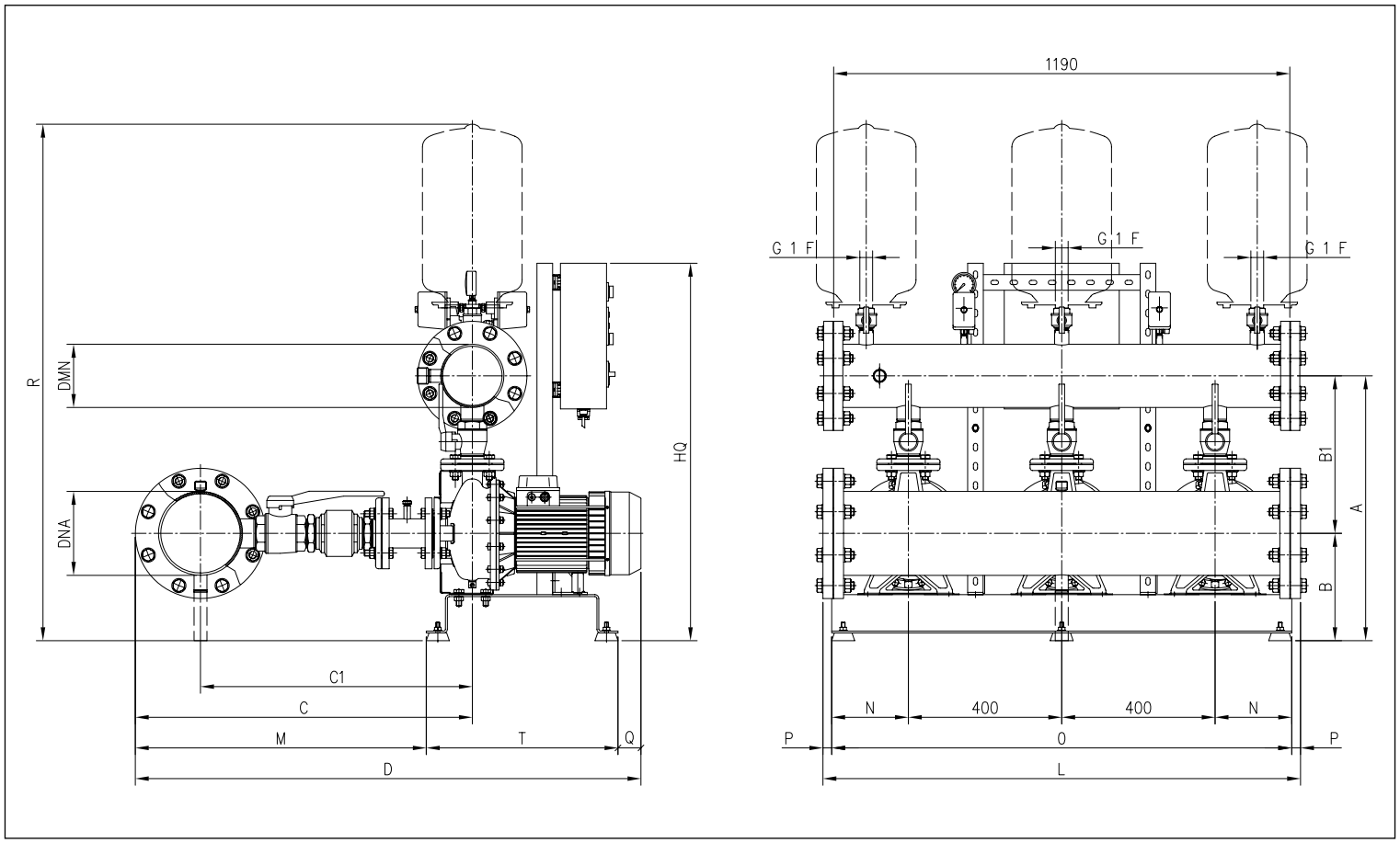
Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	300	450	600	900	1000	1080	1200	1350	1500	1800	2100	2400	3000	3600
			m³/h	9	27	36	54	60	65	72	81	90	108	126	144	180	216
			H = Head [m]														
3GP 3M 32-160/2.2	2.2+2.2+2.2	13.5		35.5	34.0	32.0	27.0	25.0	-	-	-	-	-	-	-	-	-
3GP 3M 32-200/3.0	3+3+3	18.3		42.0	40.0	37.5	31.0	28.0	-	-	-	-	-	-	-	-	-
3GP 3M 32-200/4.0	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+5.5	31.2		69.0	67.5	65.0	58.5	-	-	-	-	-	-	-	-	-	-
3GP 3M 32-200/7.5	7.5+7.5	41.1		69.0	67.5	65.0	58.5	55.5	53.0	49.0	44.0	-	-	-	-	-	-
3GP 3M 40-160/3.0	3+3+3	18.3		-	-	29.5	27.5	27.0	26.5	25.5	24.0	22.5	20.0	17.0	-	-	-
3GP 3M 40-160/4.0	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 40-200/5.5	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 40-200/7.5	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+5.5	31.2		-	-	-	-	-	-	31.0	30.5	30.0	28.5	27.0	25.5	22.0	18.0
3GP 3M 50-160/7.5	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 50-200/9.2	9.2+9.2+9.2	50.4		-	-	-	-	-	-	-	-	50.0	49.0	47.5	45.5	40.5	34.0
3GP 3M 50-200/11	11+11+11	65.7		-	-	-	-	-	-	-	-	56.0	55.0	54.0	52.0	48.0	42.0
3GP 3M 50-200/15	15+15+15	90.0		-	-	-	-	-	-	-	-	70.0	69.0	68.0	66.0	62.0	57.0

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	2100	2700	3900	4500	5100	5700	6300	6600	6900
			m³/h	126	162	234	270	306	342	378	396	414
			H = Head [m]									
3GP 3M 65-200/15	15+15+15	90.0		51.0	49.0	44.0	41.5	38.4	35.3	31.8	30.0	-
3GP 3M 65-200/18.5	18.5+18.5+18.5	108.9		58.5	56.5	51.5	49.0	46.0	43.0	39.7	38.0	36.3
3GP 3M 65-200/22	22+22+22	122.4		65.5	64.0	59.5	57.0	54.0	51.0	48.0	46.5	45.0

3GP 3M

INDUSTRIAL PRESSURISATION

DIMENSIONS 3GP 3M



DIMENSION CHART

Model	Dimensions [mm]																	Weight [kg]
	A	B	B1	C	C1	D	DNA	DNM	HQ	L	M	N	O	P	Q	R	T	
3GP 3M 32-160/2.2	570	250	320	455	390	840	100	80	985	1230	340	200	1200	15	-	1190	500	175.0
3GP 3M 32-200/3	620	280	340	455	390	850	100	80	985	1230	340	200	1200	15	10	1240	500	194.0
3GP 3M 32-200/4	620	280	340	455	390	875	100	80	985	1230	340	200	1200	15	35	1240	500	206.0
3GP 3M 32-200/5.5	620	280	340	455	390	900	100	80	985	1230	340	200	1200	15	60	1240	500	229.0
3GP 3M 32-200/7.5	620	280	340	455	390	900	100	80	985	1230	340	200	1200	15	60	1240	500	243.0
3GP 3M 40-160/3	615	250	365	920	780	1320	150	125	985	1240	810	200	1200	20	10	1260	500	269.0
3GP 3M 40-160/4	615	250	365	920	780	1345	150	125	985	1240	810	200	1200	20	35	1260	500	312.0
3GP 3M 40-200/5.5	665	280	385	940	800	1380	150	125	985	1240	820	200	1200	20	60	1310	500	381.0
3GP 3M 40-200/7.5	665	280	385	940	800	1380	150	125	985	1240	820	200	1200	20	60	1310	500	392.0
3GP 3M 40-200/11	630	245	385	940	800	1505	150	125	1180	1380	705	290	1380	-	-	1275	800	427.0
3GP 3M 50-125/4	645	250	390	880	710	1295	200	150	985	1250	760	200	1200	25	35	1300	500	387.0
3GP 3M 50-160/5.5	690	280	410	880	710	1320	200	150	985	1250	760	200	1200	25	60	1350	500	394.0
3GP 3M 50-160/7.5	690	280	410	880	710	1320	200	150	985	1250	760	200	1200	25	60	1350	500	421.0
3GP 3M 50-200/9.2	675	245	430	880	710	1595	200	150	1230	1380	795	290	1380	-	-	1335	800	442.0
3GP 3M 50-200/11	675	245	430	880	710	1595	200	150	1230	1380	795	290	1380	-	-	1335	800	452.0
3GP 3M 50-200/15	675	245	430	880	710	1595	200	150	1230	1380	795	290	1380	-	-	1335	800	556.0
3GP 3M 65-200/15	950	265	685	1055	710	1755	250	200	1250	1380	955	290	1380	-	-	1635	800	559.0
3GP 3M 65-200/18.5	950	265	685	1055	855	1755	250	200	1250	1380	955	290	1380	-	-	1635	800	582.0
3GP 3M 65-200/22	950	265	685	1055	855	1755	250	200	1250	1380	955	290	1380	-	-	1635	800	584.0

3GP EVMG

INDUSTRIAL PRESSURISATION

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
- 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

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
- 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

3GP EVMG

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

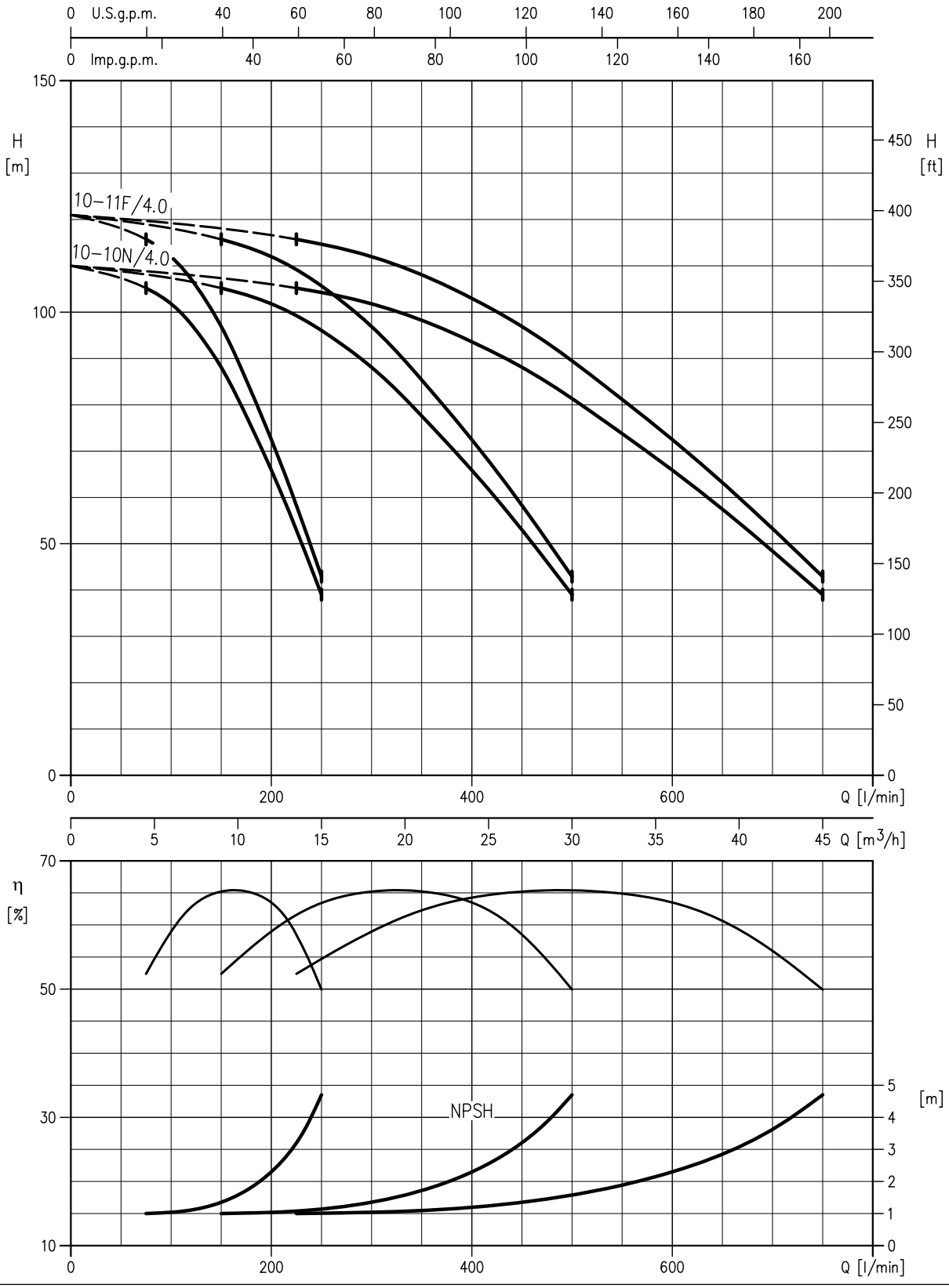
MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400 ±10% (up to 4 kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above)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

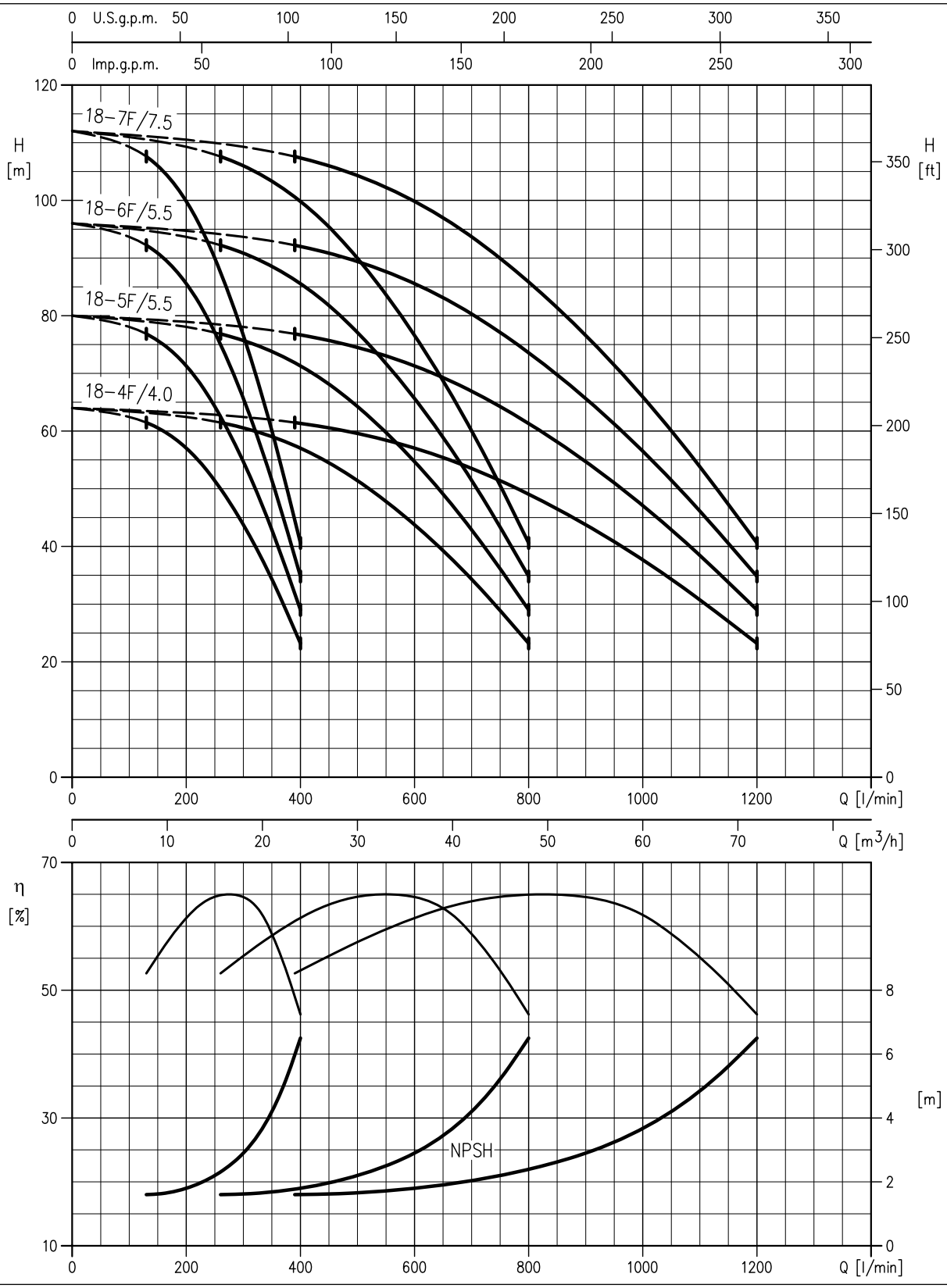
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

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



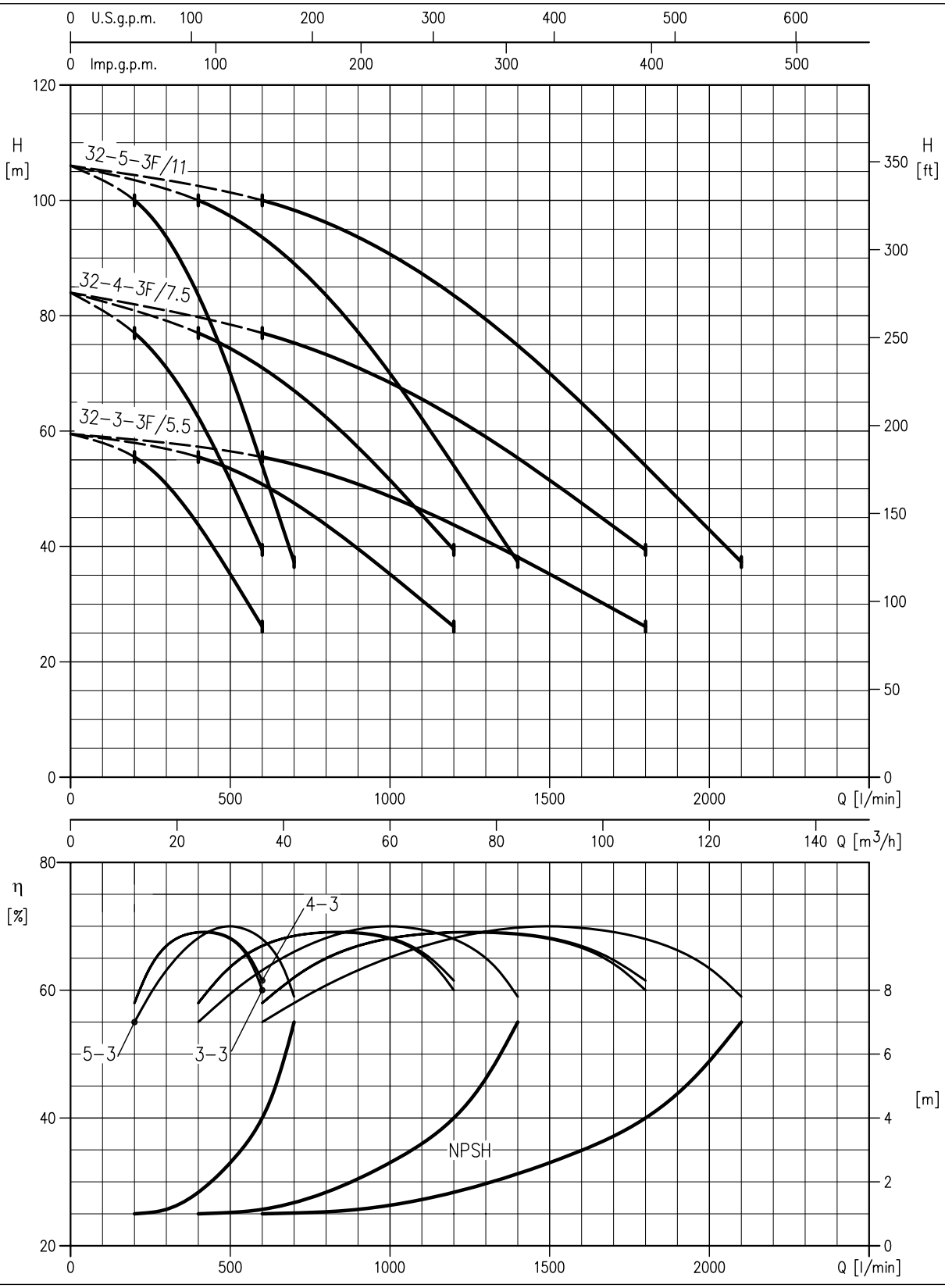
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

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



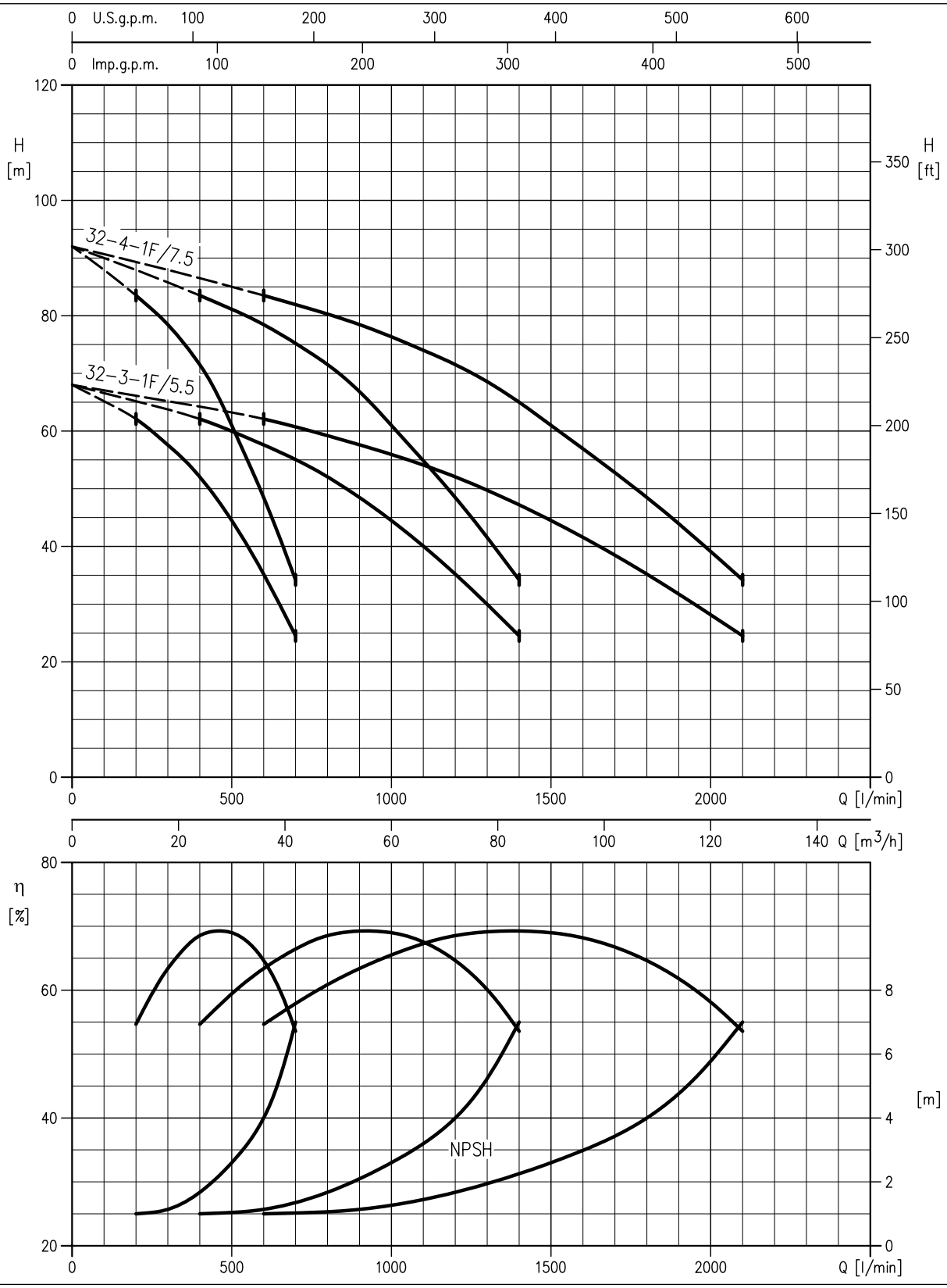
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP EVMG 32 series (1/2) (ISO 9906 Annex A)



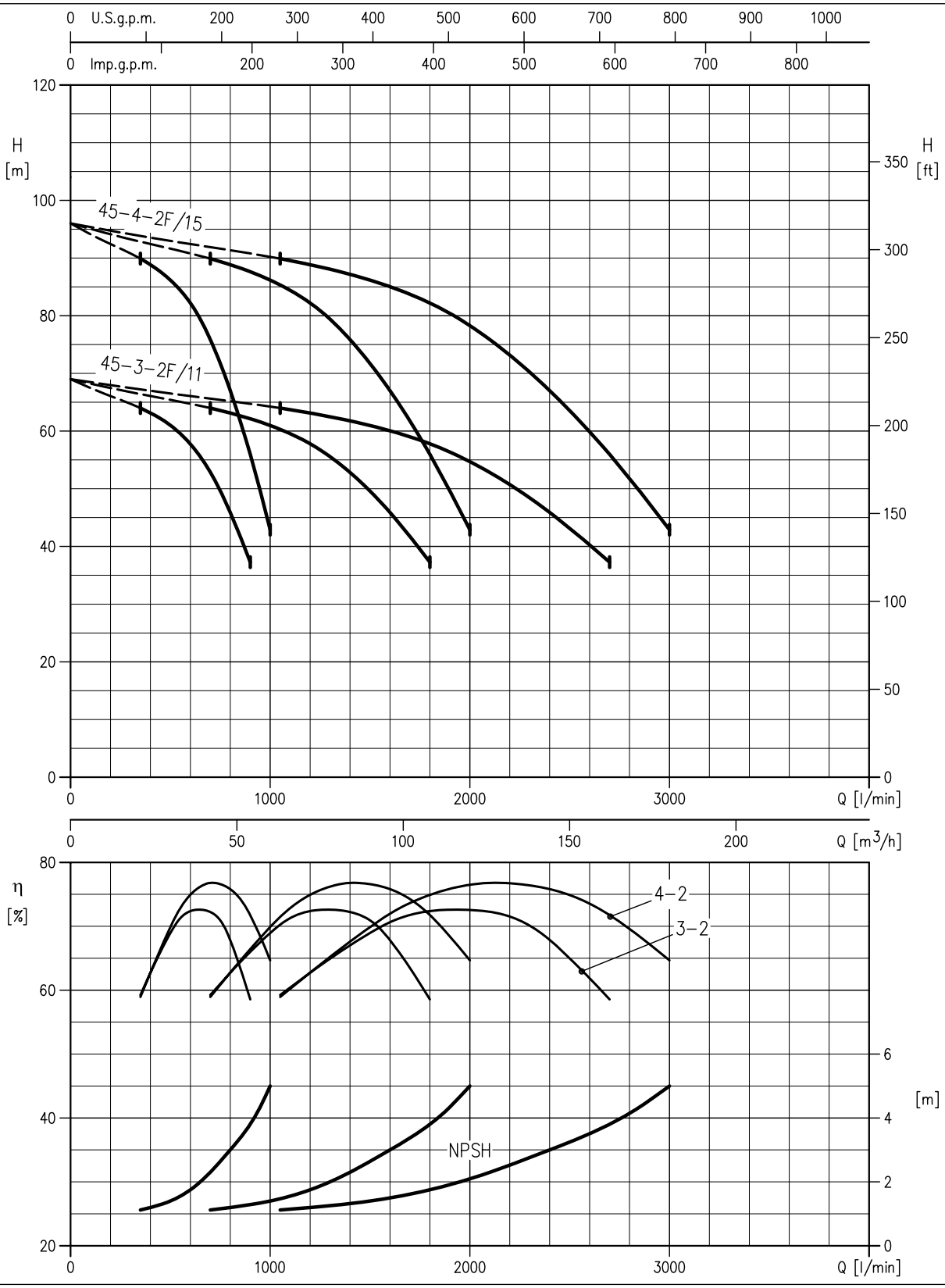
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP EVMG 32 series (2/2) (ISO 9906 Annex A)



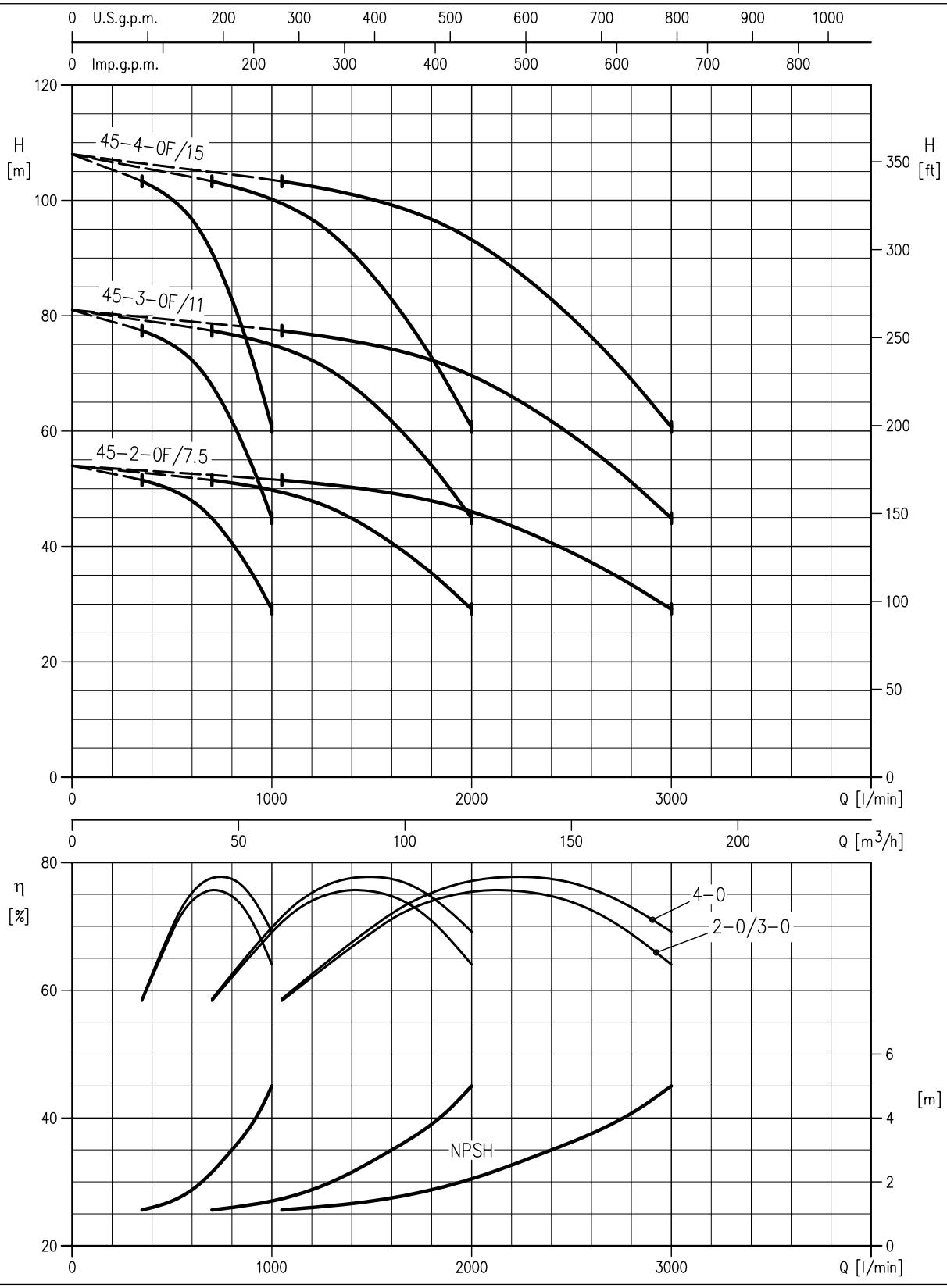
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP EVMG 45 series (1/2) (ISO 9906 Annex A)



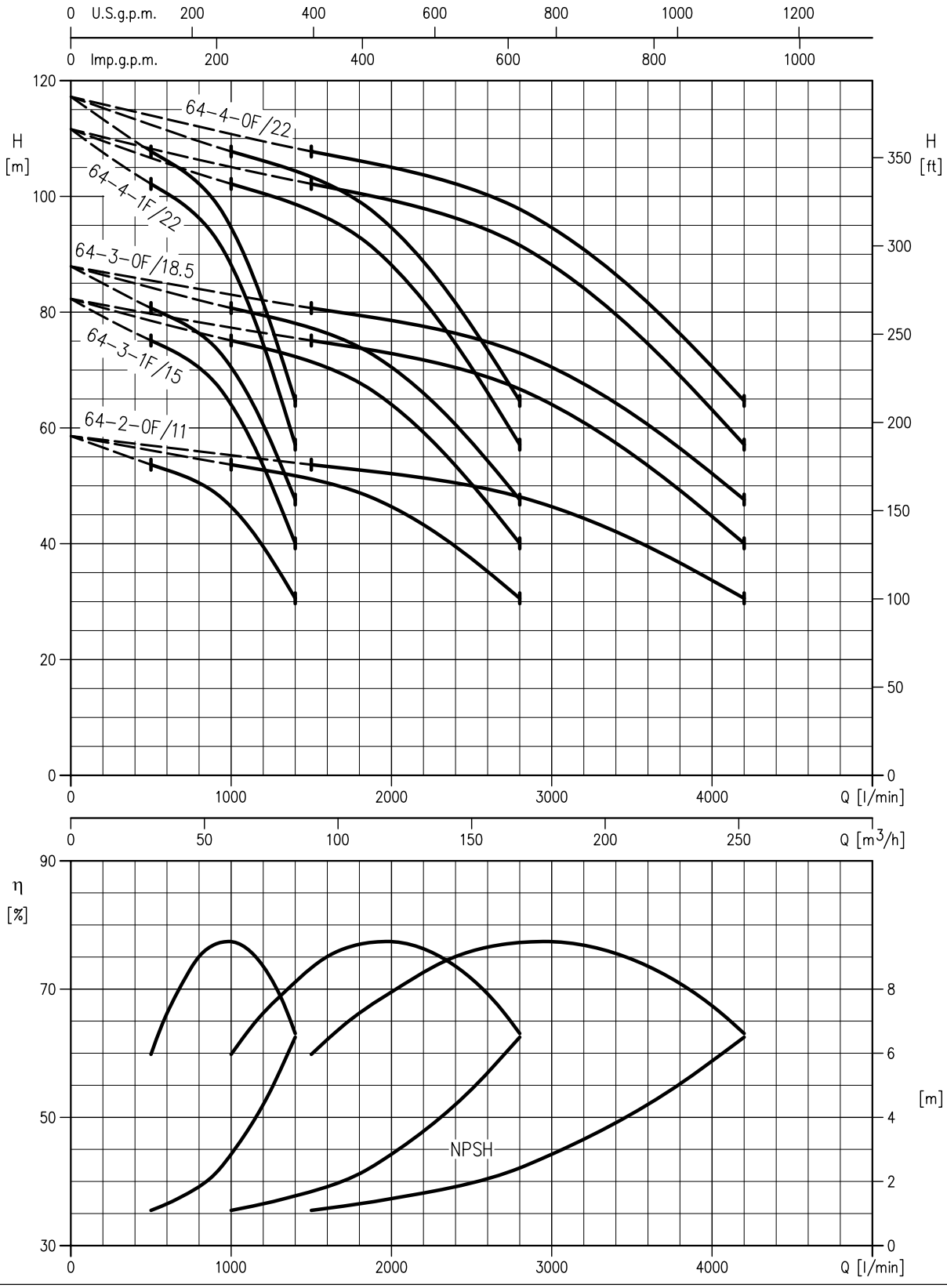
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP EVMG 45 series (2/2) (ISO 9906 Annex A)



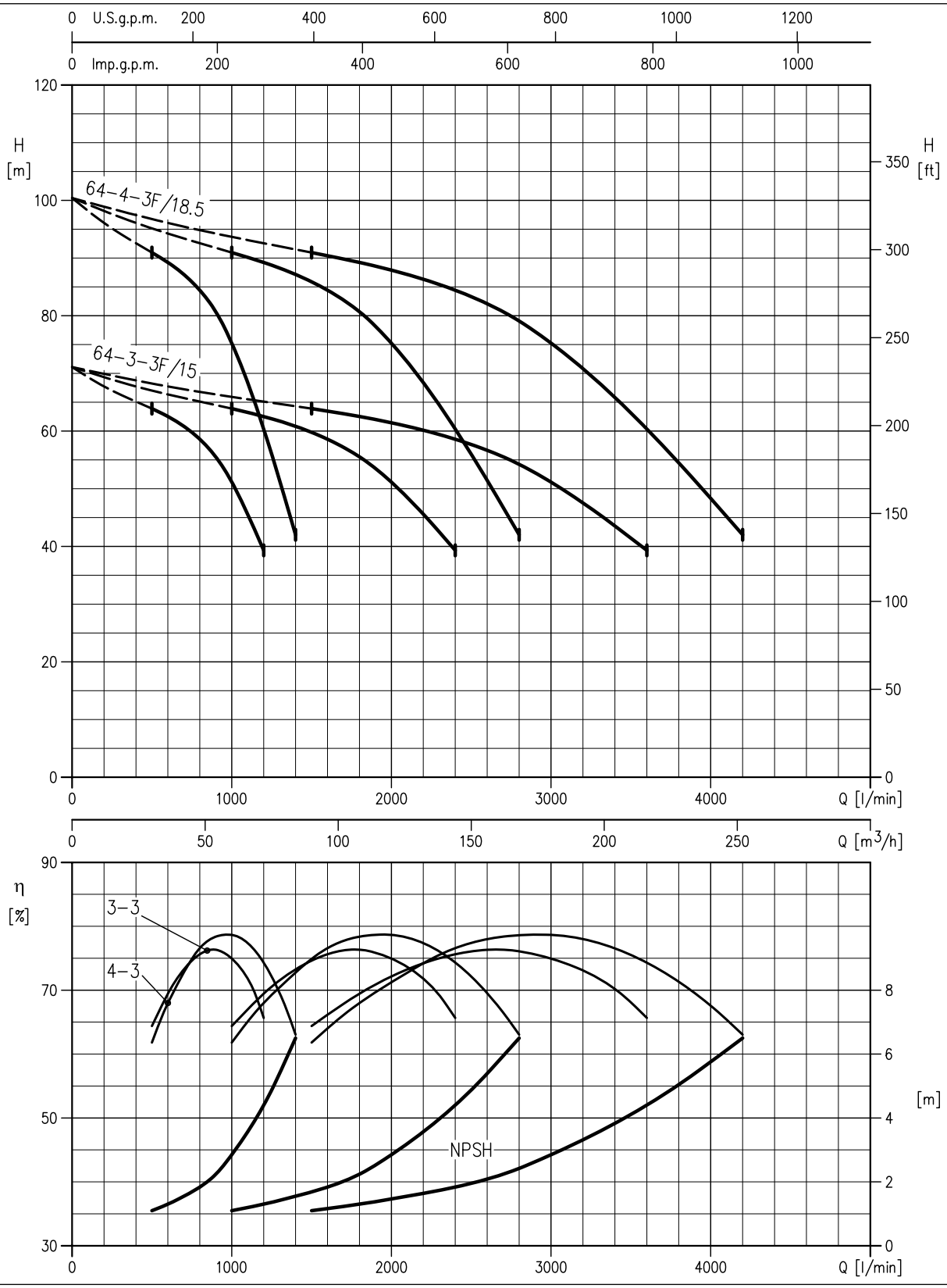
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GP EVMG 64 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 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

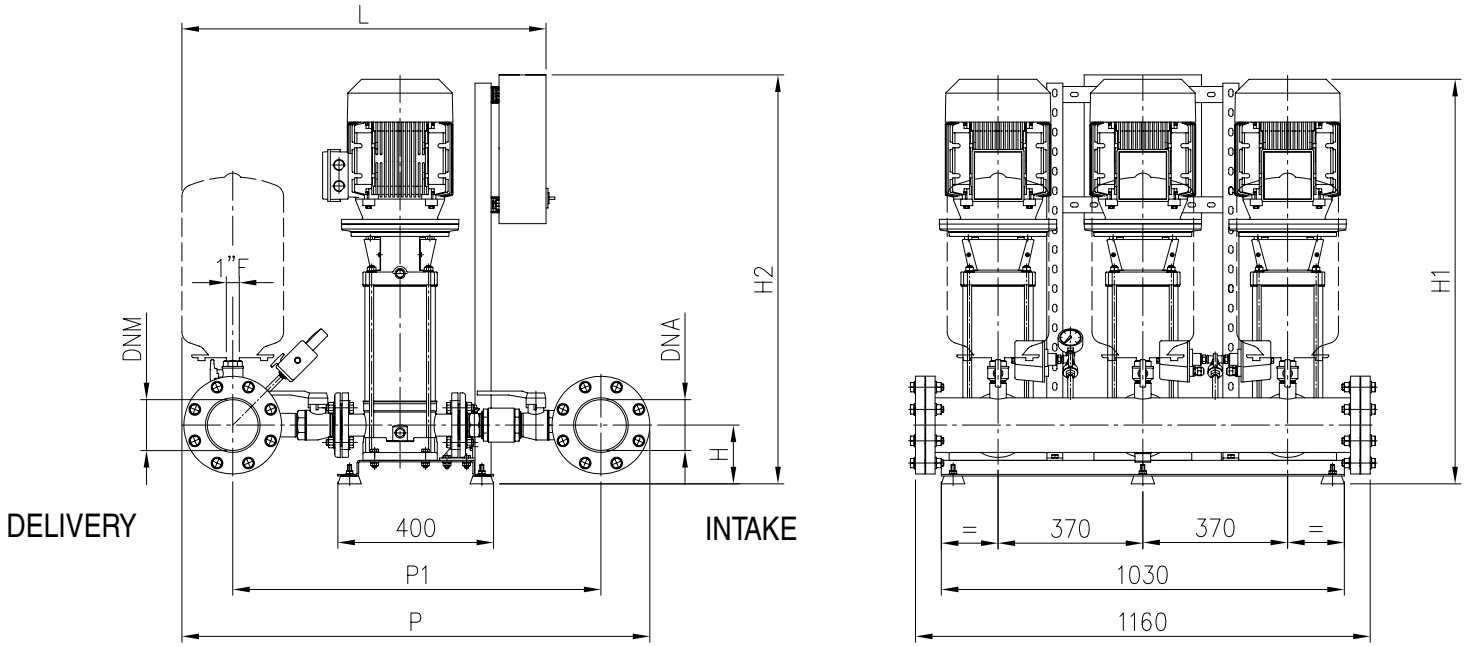
Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	225	300	390	450	600	750	900	1050	1200
			m³/h	13.5	18	23.4	27	36	45	54	63	72
			H = Head [m]									
3GP EVMG 10 10N/4.0	4+4+4	23.4		105.0	102.0	94.5	88.0	66.0	39.0	-	-	-
3GP EVMG 10 11N/4.0	4+4+4	23.4		116.0	112.0	104.0	97.0	72.5	43.0	-	-	-
3GP EVMG 18 4F/4.0	4+4+4	23.4		-	-	61.5	60.5	57.0	51.5	44.0	34.3	23.2
3GP EVMG 18 5F/5.5	5.5+5.5+5.5	31.2		-	-	77.0	75.5	71.5	64.5	54.5	43.0	29.0
3GP EVMG 18 6F/5.5	5.5+5.5+5.5	31.2		-	-	92.0	91.0	85.5	77.0	65.5	51.5	34.8
3GP EVMG 18 7F/7.5	7.5+7.5+7.5	42.6		-	-	108.0	106.0	100.0	90.0	76.5	60.0	40.5

Model Three-phase 400V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	600	1050	1500	1800	2100	2700	3000	3600	4200
			m³/h	36	63	90	108	126	162	180	216	252
			H = Head [m]									
3GP EVMG 32 3-3F/5.5	5.5+5.5+5.5	31.2		55.5	47.5	35.2	26.1	-	-	-	-	-
3GP EVMG 32 3-1F/5.5	5.5+5.5+5.5	31.2		62.0	55.0	44.5	35.2	24.5	-	-	-	-
3GP EVMG 32 4-3F/7.5	7.5+7.5+7.5	42.6		77.0	67.0	51.5	39.4	-	-	-	-	-
3GP EVMG 32 4-1F/7.5	7.5+7.5+7.5	42.6		83.5	74.5	61.0	48.5	34.2	-	-	-	-
3GP EVMG 32 5-3F/11	11+11+11	59.4		106.0	100.0	89.0	70.0	37.5	-	-	-	-
3GP EVMG 45 2-0F/7.5	7.5+7.5+7.5	42.6		-	51.5	50.0	48.0	45.0	35.4	29.1	-	-
3GP EVMG 45 3-2F/11	11+11+11	59.4		-	64.0	61.0	58.0	53.0	37.3	-	-	-
3GP EVMG 45 3-0F/11	11+11+11	59.4		-	77.5	75.0	72.5	68.0	54.0	45.0	-	-
3GP EVMG 45 4-2F/15	15+15+15	81.6		-	90.0	86.0	82.0	76.0	56.0	43.0	-	-
3GP EVMG 45 4-0F/15	15+15+15	81.6		-	103.0	100.0	96.5	91.0	73.0	60.5	-	-
3GP EVMG 64 2-0F/11	11+11+11	59.4		-	-	53.5	53.0	52.0	49.0	46.5	39.5	30.6
3GP EVMG 64 3-3F/15	15+15+15	81.6		-	-	64.0	62.5	61.0	55.5	51.0	39.3	-
3GP EVMG 64 3-1F/15	15+15+15	81.6		-	-	75.0	74.0	72.5	68.0	64.0	53.5	40.0
3GP EVMG 64 3-0F/18.5	18.5+18.5+18.5	99.9		-	-	80.5	79.5	78.0	74.0	70.5	60.5	47.5
3GP EVMG 64 4-3F/18.5	18.5+18.5+18.5	99.9		-	-	91.0	89.0	87.0	80.5	75.5	60.5	42.0
3GP EVMG 64 4-1F/22	22+22+22	117.0		-	-	102.0	101.0	98.5	93.0	88.0	74.5	57.0
3GP EVMG 64 4-0F/22	22+22+22	117.0		-	-	108.0	106.0	104.0	99.0	94.5	81.5	64.5

3GP EVMG

INDUSTRIAL PRESSURISATION

DIMENSIONS 3GP EVMG 10-18



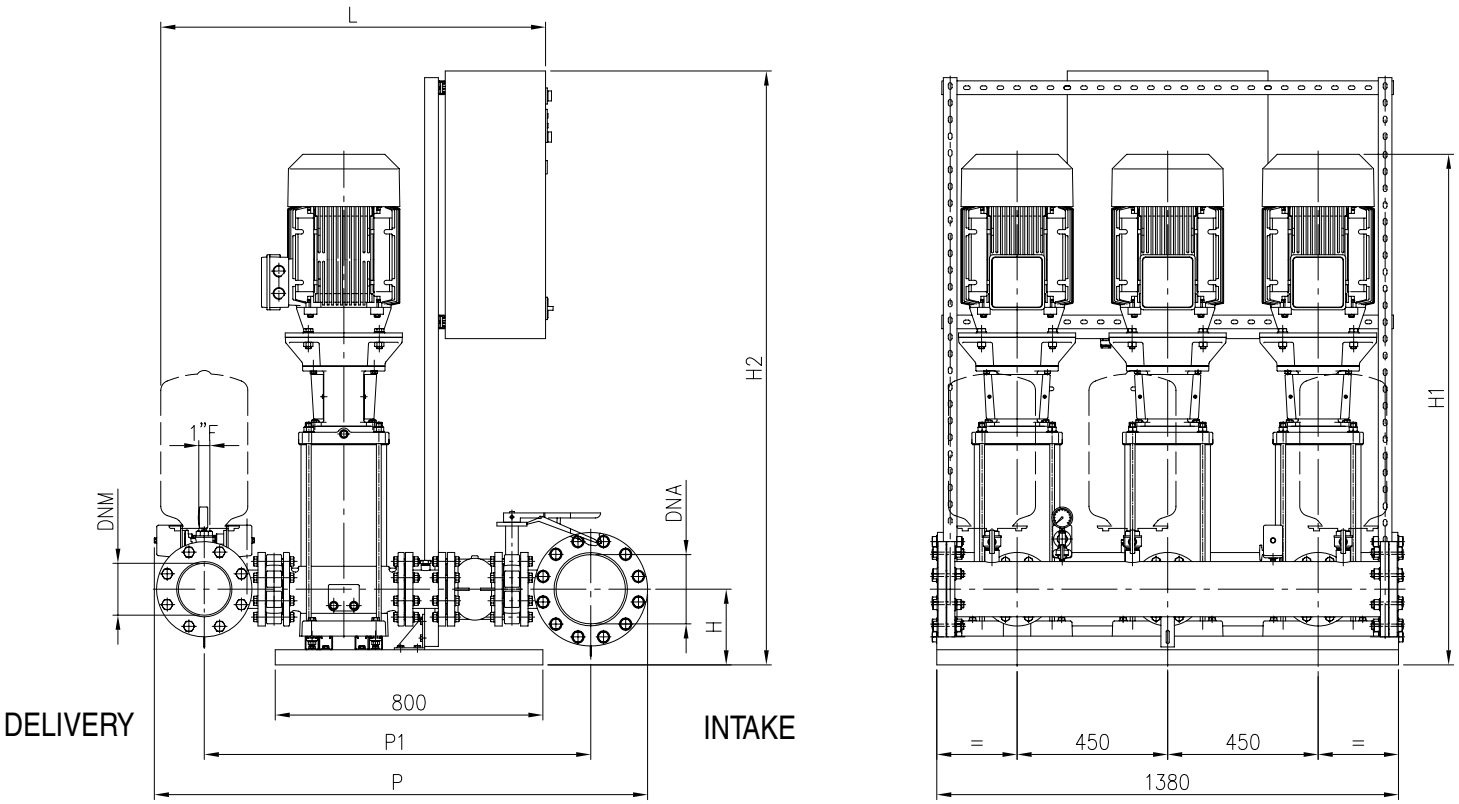
DIMENSION CHART

Model	Dimensions [mm]									Weight [kg]
	L	H	H1	H2	P	P1	L1	DNA	DNM	
3GP EVMG10 10N/4.0	855	140	970	1045	1005	765	1160	DN100	DN100	213.0
3GP EVMG10 11N/4.0	855	140	1000	1045	1005	765	1160	DN100	DN100	222.0
3GP EVMG18 4F/4.0	930	150	840	1045	1195	940	1160	DN125	DN125	250.0
3GP EVMG18 5F/5.5	930	150	910	1045	1195	940	1160	DN125	DN125	343.0
3GP EVMG18 6F/5.5	930	150	950	1045	1195	940	1160	DN125	DN125	352.0
3GP EVMG18 7F/7.5	930	150	990	1045	1195	940	1160	DN125	DN125	361.0

3GP EVMG

INDUSTRIAL PRESSURISATION

DIMENSIONS 3GP EVMG 32-45-64



DIMENSION CHART

Model	Dimensions [mm]								Weight [kg]
	L	H	H1	H2	P	P1	DNA	DNM	
3GP EVMG32 3-3F/5.5	1085	190	985	1175	1420	1130	DN150	DN125	547.0
3GP EVMG32 3-1F/5.5	1085	190	985	1175	1420	1130	DN150	DN125	547.0
3GP EVMG32 4-3F/7.5	1085	190	1035	1175	1420	1130	DN150	DN125	561.0
3GP EVMG32 4-1F/7.5	1085	190	1035	1175	1420	1130	DN150	DN125	561.0
3GP EVMG32 5-3F/11	1105	190	1290	1475	1420	1130	DN150	DN125	750.0
3GP EVMG45 2-0 F/7.5	1175	225	1030	1275	1420	1235	DN200	DN150	609.0
3GP EVMG45 3-2 F/11	1200	225	1310	1575	1550	1235	DN200	DN150	795.0
3GP EVMG45 3-0 F/11	1200	225	1310	1575	1550	1235	DN200	DN150	795.0
3GP EVMG45 4-2 F/15	1200	225	1475	1575	1550	1235	DN200	DN150	829.0
3GP EVMG45 4-0 F/15	1200	225	1475	1575	1550	1235	DN200	DN150	829.0
3GP EVMG64 2-0F/11	1050	225	1240	1575	1475	1155	DN200	DN150	778.0
3GP EVMG64 3-3F/15	1050	225	1405	1575	1475	1155	DN200	DN150	802.0
3GP EVMG64 3-1F/15	1050	225	1405	1575	1475	1155	DN200	DN150	802.0
3GP EVMG64 3-0F/18.5	1050	225	1450	1775	1475	1155	DN200	DN150	833.0
3GP EVMG64 4-3F/18.5	1050	225	1520	1775	1475	1155	DN200	DN150	891.0
3GP EVMG64 4-1F/22	1100	225	1555	1775	1475	1155	DN200	DN150	1081.0
3GP EVMG64 4-0F/22	1100	225	1555	1775	1475	1155	DN200	DN150	1081.0

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

2GPE COMPACT E-power

DOMESTIC PRESSURISATION

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

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

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

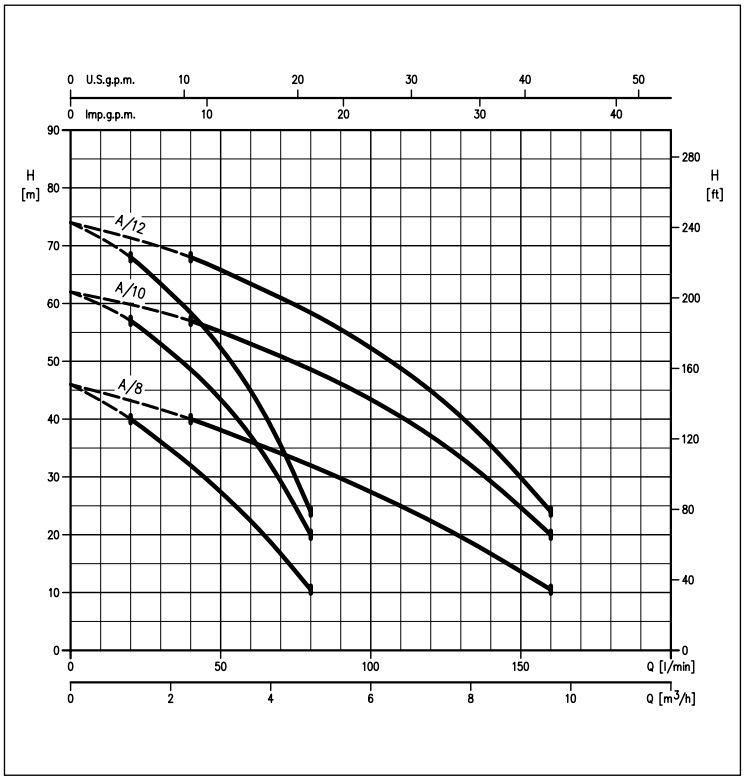
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

2GPE COMPACT E-power

DOMESTIC PRESSURISATION

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



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

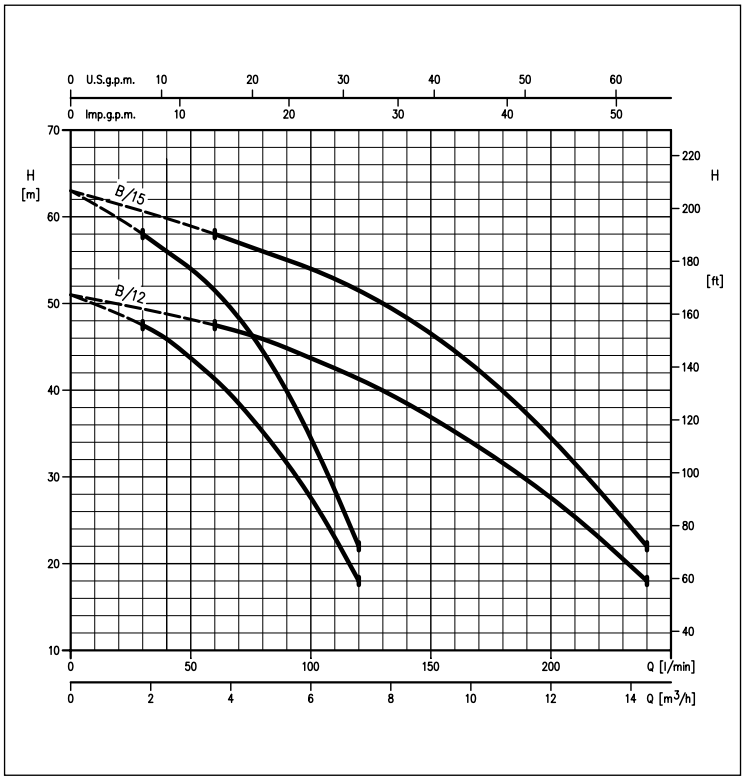


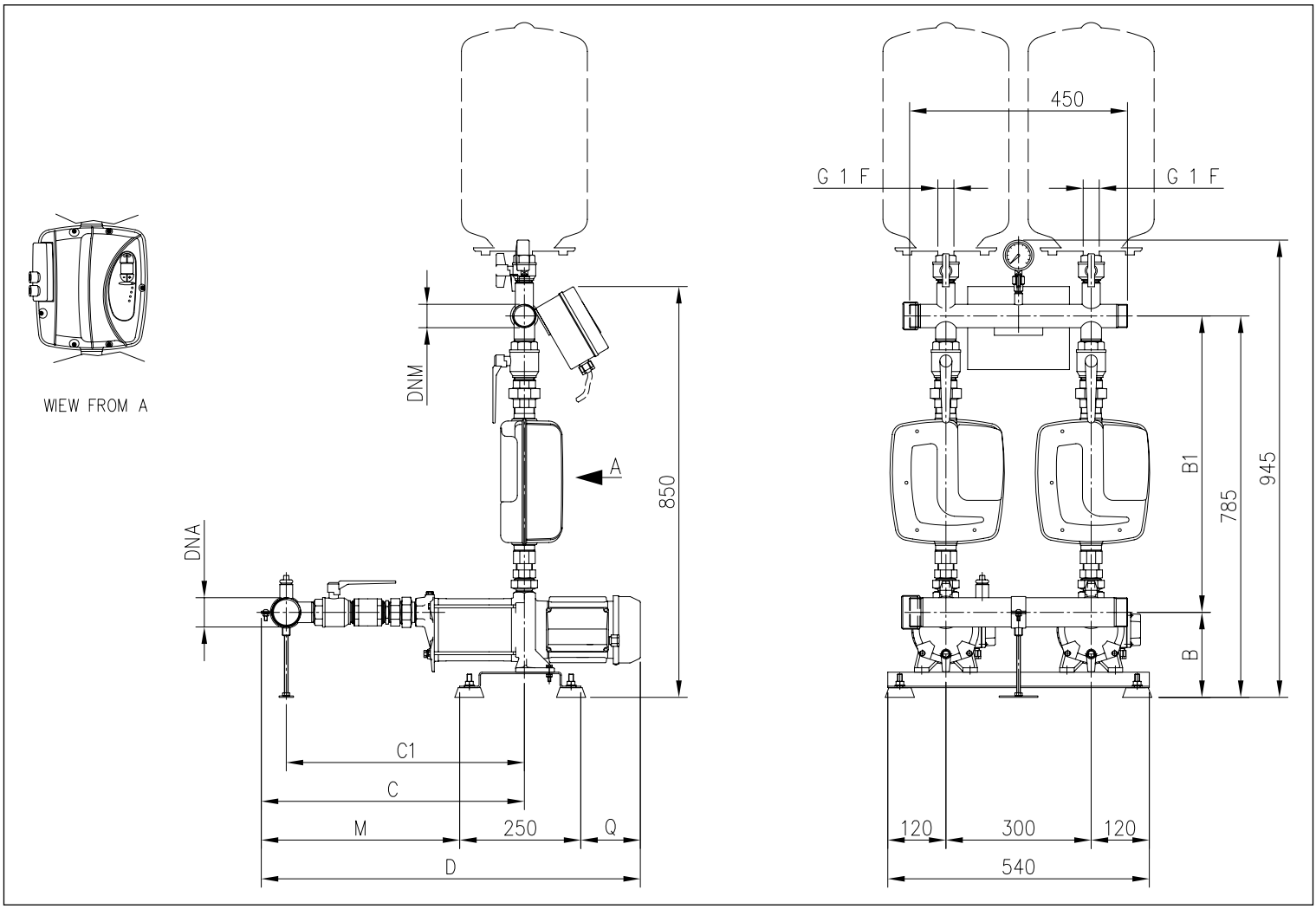
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 230V	Q = Flow rate l/min	40	60	80	100	120	160	200	240
			m³/h	2.4	3.6	4.8	6	7.2	9.6	12	14.4
			H = Head [m]								
2GPE COMPACT A 8 E-PW	0.6+0.6	5.2		39.7	36.1	32.0	27.4	22.4	10.5	-	-
2GPE COMPACT A 10 E-PW	0.75+0.75	6.6		56.5	53.0	48.5	43.5	37.1	20.0	-	-
2GPE COMPACT A 12 E-PW	0.9+0.9	8.6		67.5	63.5	58.5	52.5	45.0	24.0	-	-
2GPE COMPACT B 12 E-PW	0.9+0.9	8.6		-	47.5	46.0	43.5	41.5	35.2	27.6	18.0
2GPE COMPACT B 15 E-PW	1.1+1.1	9.0		-	58.0	56.0	54.0	51.5	44.5	34.5	22.0

2GPE COMPACT E-power

DOMESTIC PRESSURISATION

DIMENSIONS



DIMENSION CHART

Model	Dimensions [mm]									Weight [kg]
	B	B1	C	C1	DNA	DNM	D	M	Q	
2GPE COMPACT A/8 E-PW	180	620	430	380	G 2"	G1"½	615	295	70	39
2GPE COMPACT A/10 E-PW	175	625	455	405	G 2"	G1"½	680	320	110	48
2GPE COMPACT A/12 E-PW	175	625	485	430	G 2"	G1"½	725	350	125	51
2GPE COMPACT B/12 E-PW	175	625	385	335	G 2"	G1"½	625	255	125	50
2GPE COMPACT B15 E-PW	175	625	410	360	G 2"	G1"½	650	275	125	50

2GPE MATRIX E-power

DOMESTIC PRESSURISATION

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 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
- 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

2GPE MATRIX E-power

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-AlSi11Cu2(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

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

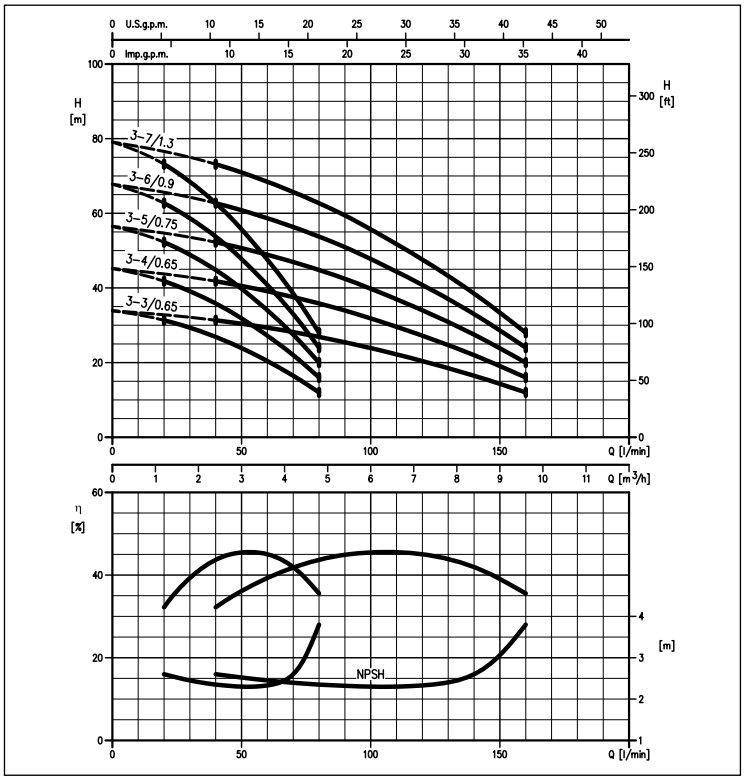
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

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

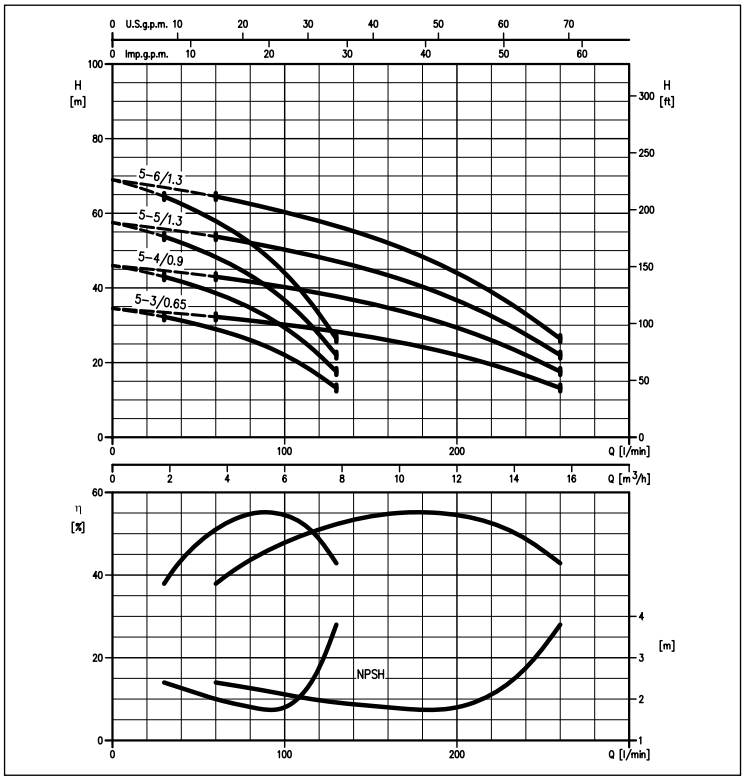
2GPE MATRIX E-power

DOMESTIC PRESSURISATION

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 drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

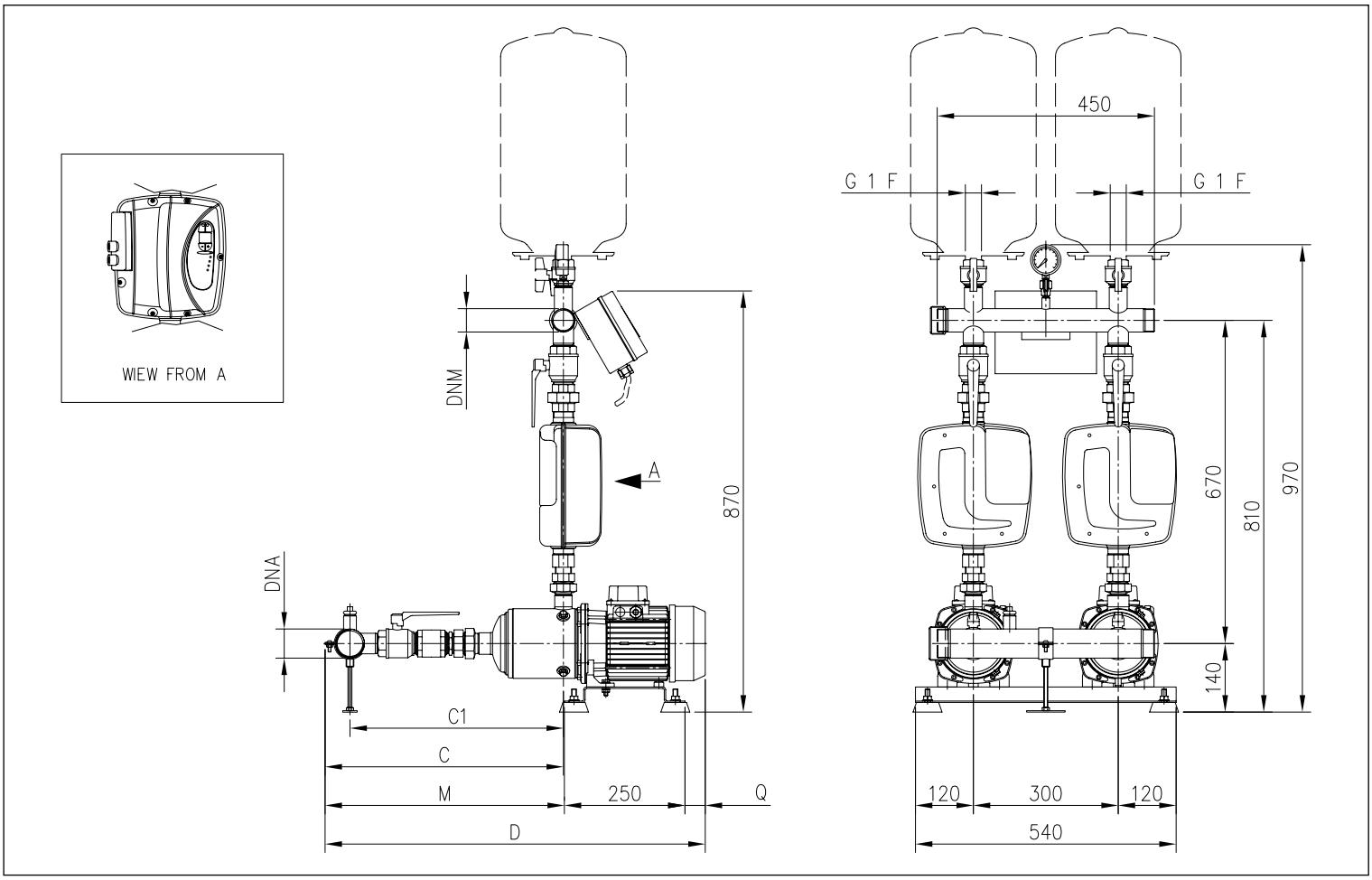
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 230V	Q = Flow rate l/min	40	60	120	160	200	260
			m³/h	2.4	3.6	7.2	9.6	12	15.6
			H = Head [m]						
2GPE MATRIX 3-3T/0.65 E-PW	0.65	5.6		31.4	29.3	20.4	12.0	-	-
2GPE MATRIX 3-4T/0.65 E-PW	0.65+0.65	5.6		42.0	39.1	27.2	16.0	-	-
2GPE MATRIX 3-5T/0.75 E-PW	0.75	5.8		52.5	49.0	34.0	20.0	-	-
2GPE MATRIX 3-6T/0.9 E-PW	0.9+0.9	8.6		62.5	58.5	41.0	24.0	-	-
2GPE MATRIX 3-7T/1.3 E-PW	1.3+1.3	11.0		73.0	68.5	47.5	28.0	-	-
2GPE MATRIX 5-3T/0.65 E-PW	0.9+0.9	5.6		-	43.0	38.6	34.7	24.9	17.6
2GPE MATRIX 5-4T/0.9 E-PW	1.3+1.3	8.6		-	54.0	48.5	43.5	36.7	22.0
2GPE MATRIX 5-5T/1.3 E-PW	1.3+1.3	11.0		-	64.5	58.0	52.0	44.0	26.4
2GPE MATRIX 5-6T/1.3 E-PW	1.5+1.5	11.0		-	75.5	67.5	61.0	51.5	30.8

2GPE MATRIX E-power

DOMESTIC PRESSURISATION

DIMENSIONS



DIMENSION CHART

Model	Dimensions [mm]							Weight [kg]
	C	C1	DNA	DNM	D	M	Q	
2GPE MATRIX 3-3T/0.65 E-PW	360	310	G 2"	G 1"½	615	360	5	38
2GPE MATRIX 3-4T/0.65 E-PW	385	335	G 2"	G 1"½	640	385	5	39
2GPE MATRIX 3-5T/0.75 E-PW	410	360	G 2"	G 1"½	665	410	5	43
2GPE MATRIX 3-6T/0.9 E-PW	435	380	G 2"	G 1"½	700	435	15	46
2GPE MATRIX 3-7T/1.3 E-PW	460	405	G 2"	G 1"½	750	460	40	52
2GPE MATRIX 5-3T/0.65 E-PW	315	265	G 2"	G 1"½	570	315	5	38
2GPE MATRIX 5-4T/0.9 E-PW	340	290	G 2"	G 1"½	605	340	15	43
2GPE MATRIX 5-5T/1.3 E-PW	365	315	G 2"	G 1"½	665	365	40	50
2GPE MATRIX 5-6T/1.3 E-PW	390	335	G 2"	G 1"½	680	390	40	51

2GPE CVM E-power

DOMESTIC PRESSURISATION

Inverter controlled units with two vertical 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 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 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

2GPE CVM E-power

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 0.75 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

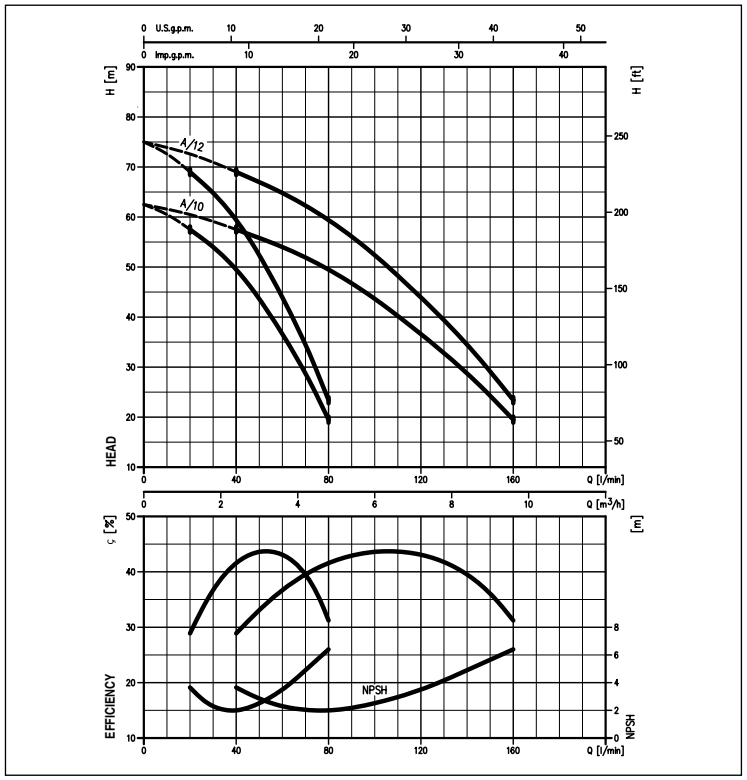
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

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

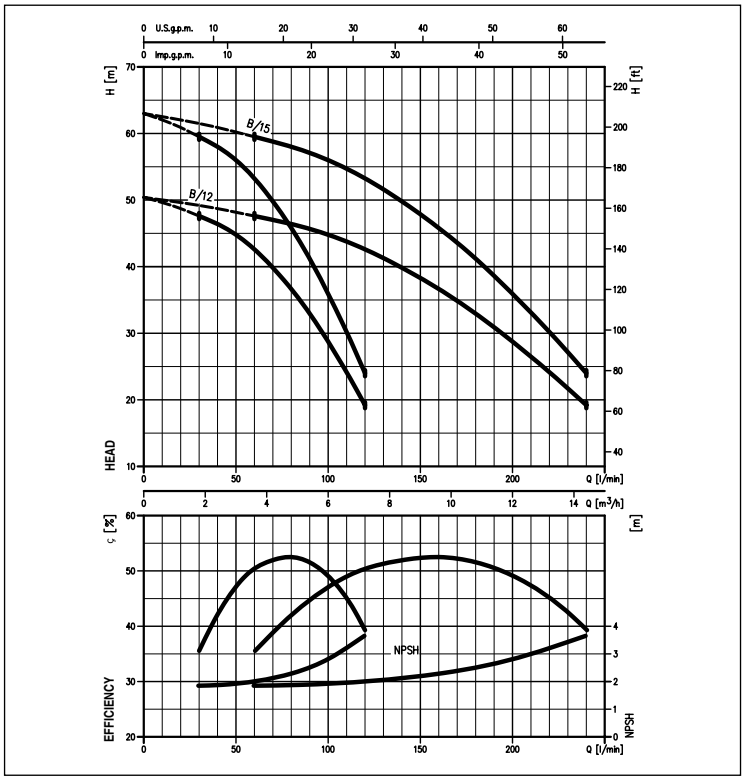
2GPE CVM E-power

DOMESTIC PRESSURISATION

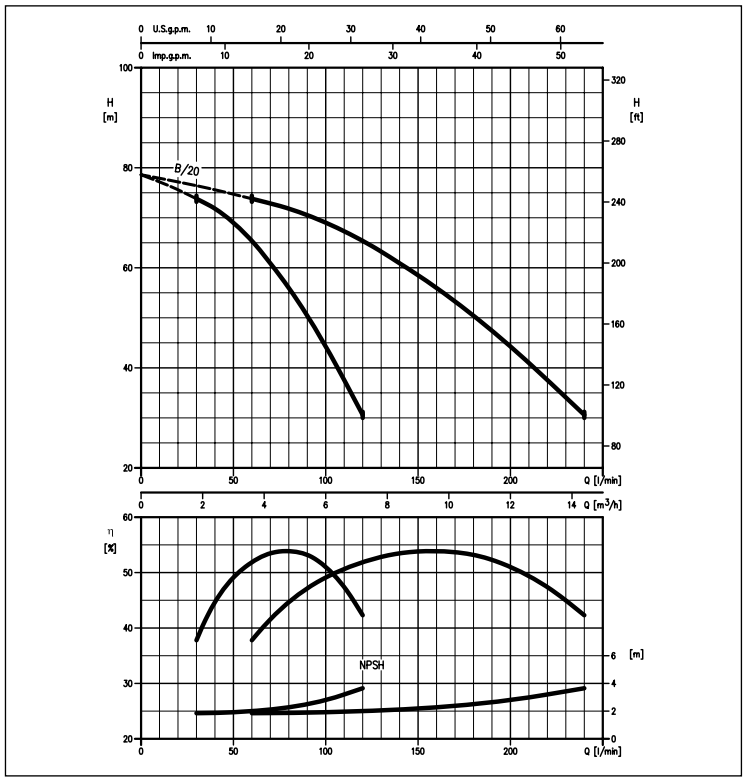
PERFORMANCE CURVES for 2GPE CVM A 10 - A 12 - A 15 series
(ISO 9906 Annex A)



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



PERFORMANCE CURVES for 2GPE CVM B 20 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-power

DOMESTIC PRESSURISATION

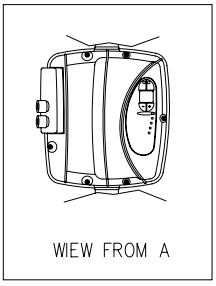
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

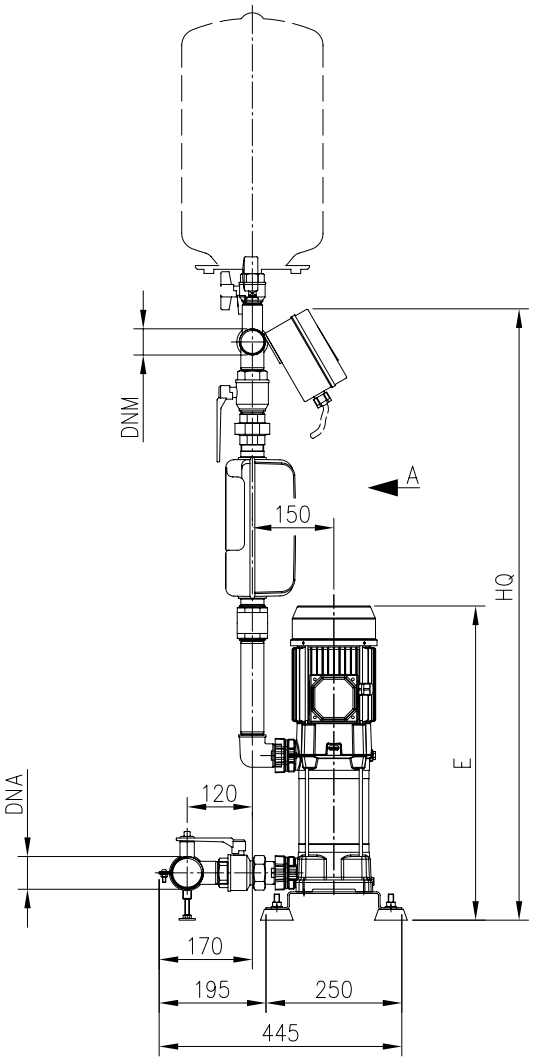
Model	[kW]	Max absorption [A] Three-phase 230V	Q = Flow rate l/min	40	60	80	100	120	160	200	240
			m^3/h	2.4	3.6	4.8	6	7.2	9.6	12	14.4
			H = Head [m]								
2GPE CVM A/10 E -PW	0.75+0.75	5.8		57.5	54.0	49.5	43.5	36.6	19.5	-	-
2GPE CVM A/12 E -PW	0.9+0.9	8.6		69.0	65.0	59.5	52.5	44.0	23.4	-	-
2GPE CVM B/12 E-PW	0.9+0.9	8.6		-	48.0	46.8	45.0	42.6	36.6	28.8	19.6
2GPE CVM B/15 E-PW	1.1+1.1	8.6		-	60.5	58.5	56.2	53.3	45.8	36.0	24.5
2GPE CVM B/20 E-PW	1.5+1.5	12.6		-	74.0	72.0	69.0	65.5	56.0	44.5	30.6

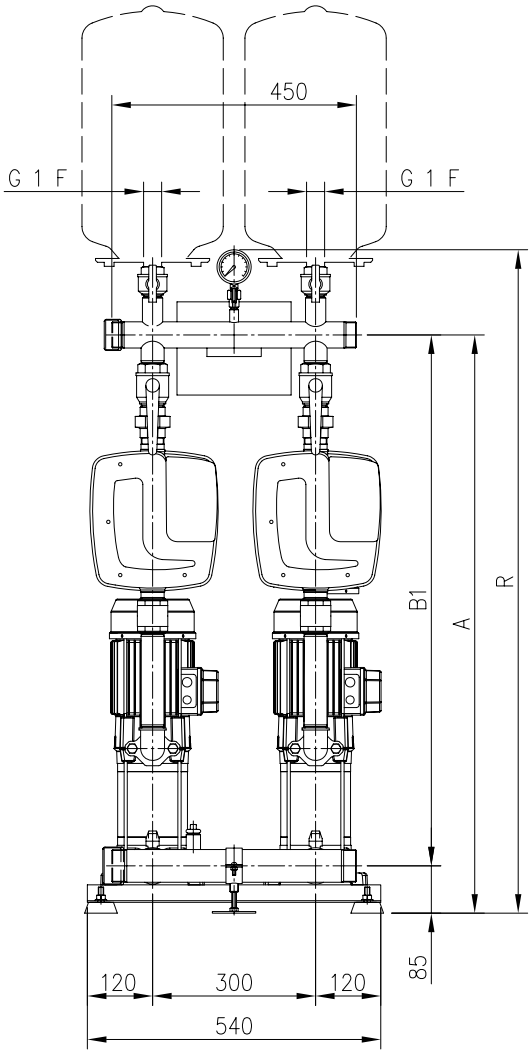
2GPE CVM E-power

DOMESTIC PRESSURISATION

DIMENSIONS







DIMENSION CHART

Model	Dimensions [mm]							Weight [kg]
	A	B1	DNA	DNM	E	HQ	R	
2GPE CVM A/1 0 E -PW	960	875	G 2"	G 1"½	505	1025	1140	52
2GPE CVM A/12 E -PW	985	900	G 2"	G 1"½	540	1050	1165	55
2GPE CVM B/12 E-PW	935	850	G 2"	G 1"½	490	1000	1115	53
2GPE CVM B/15 E-PW	960	875	G 2"	G 1"½	515	1025	1140	54
2GPE CVM B/20 E-PW	985	900	G 2"	G 1"½	580	1050	1165	64

2GPE MATRIX HYDROCONTROLLER

DOMESTIC PRESSURISATION

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

INVERTER CONTROL UNIT

- 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

2GPE MATRIX HYDROCONTROLLER

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-AlSi11Cu2(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

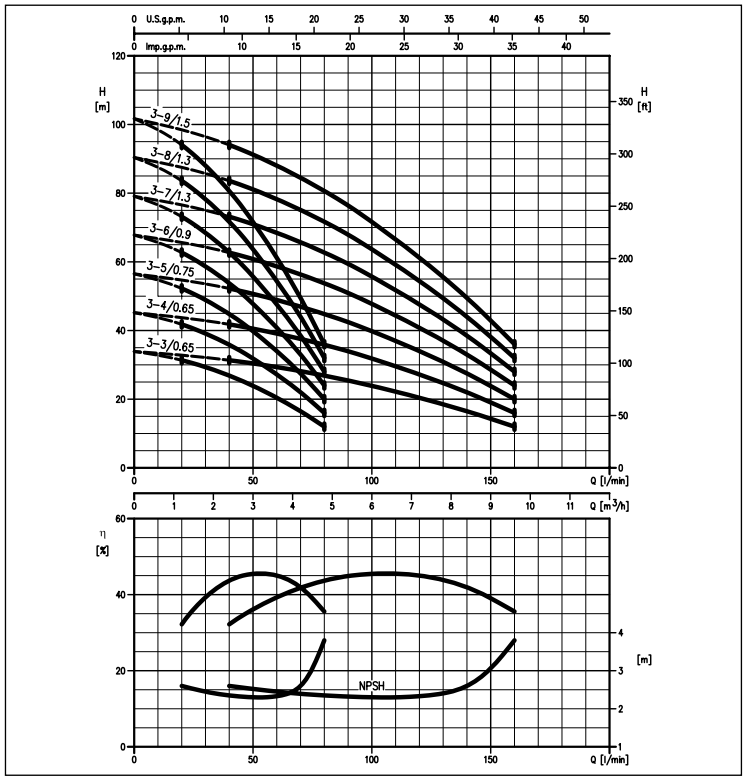
ADVANTAGES
- Energy saving: the controller modulates the pump rate in relation to system demand, better than direct in-line connection to the mains supply
- Better, faster response regulation
- Reduced hammering due to gradual startup and shutdown
- Improved heating, A/C and pressurisation system comfort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

ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

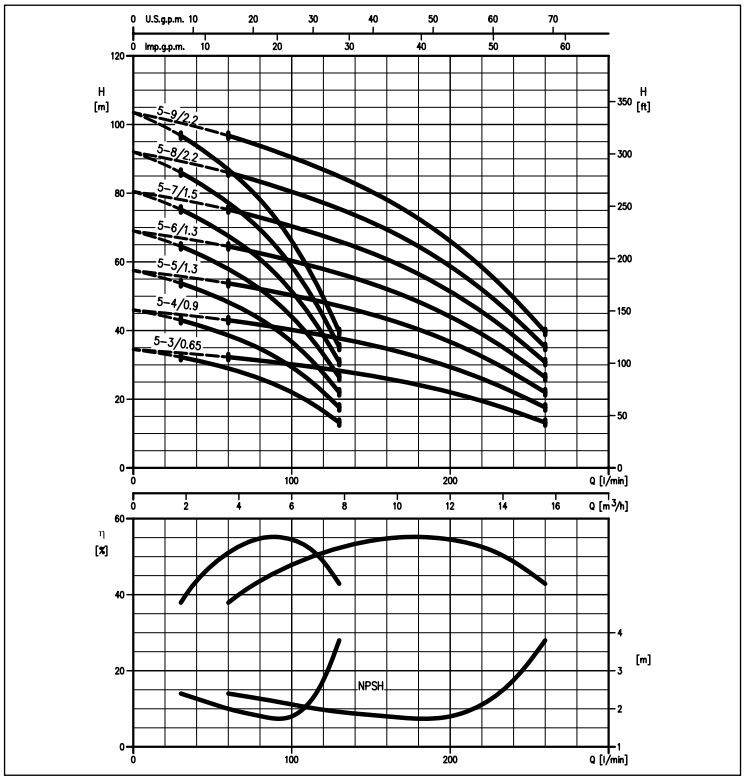
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

DOMESTIC PRESSURISATION

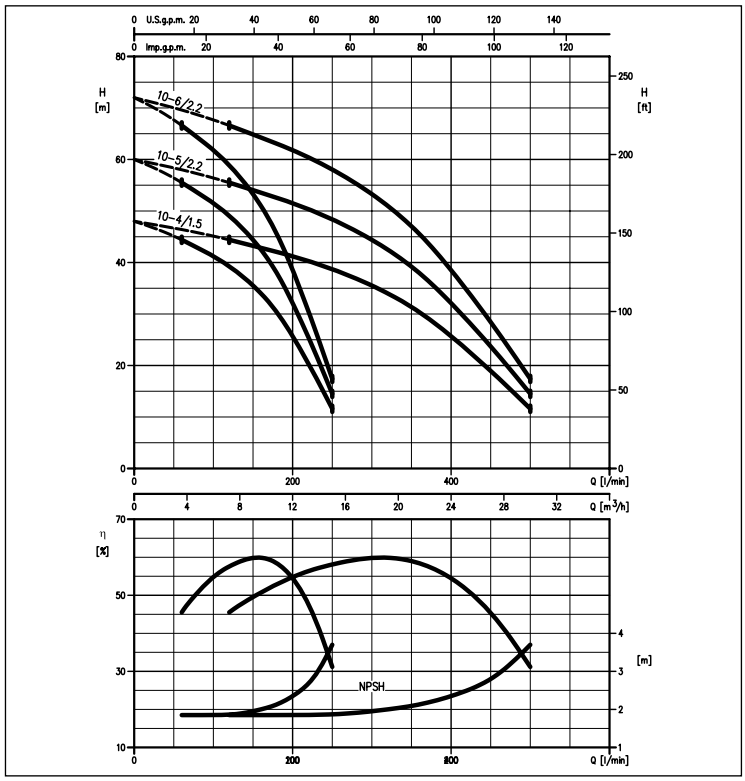
PERFORMANCE CURVES for 2GPE MATRIX 3 series
(ISO 9906 Annex A)



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



PERFORMANCE CURVES for 2GPE MATRIX 3 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

DOMESTIC PRESSURISATION

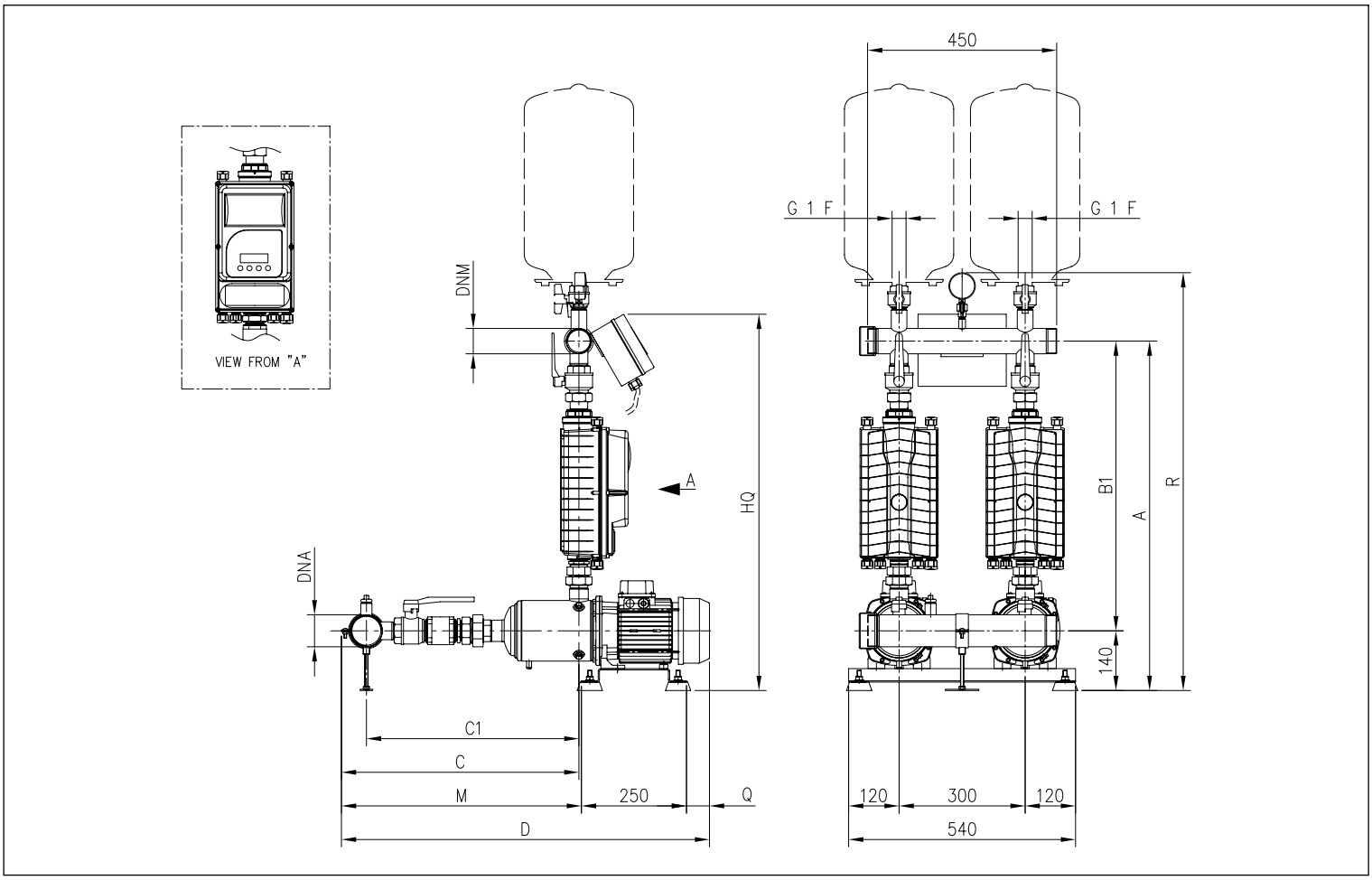
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model Single-phase 230V	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	40	60	120	160	200	260	320	400	500
			m^3/h	2.4	3.6	7.2	9.6	12	15.6	19.2	24	30
			H = Head [m]									
2GPE MATRIX 3-3T/0.65 HYD	0.65+0.65	3.2		31.4	29.3	20.4	12.0	-	-	-	-	-
2GPE MATRIX 3-4T/0.65 HYD	0.65+0.65	3.2		42.0	39.1	27.2	16.0	-	-	-	-	-
2GPE MATRIX 3-5T/0.75 HYD	0.75+0.75	3.4		52.5	49.0	34.0	20.0	-	-	-	-	-
2GPE MATRIX 3-6T/0.9 HYD	0.9+0.9	5.0		62.5	58.5	41.0	24.0	-	-	-	-	-
2GPE MATRIX 3-7T/1.3 HYD	1.3+1.3	6.4		73.0	68.5	47.5	28.0	-	-	-	-	-
2GPE MATRIX 3-8T/1.5 HYD	1.3+1.3	6.4		83.5	78.0	54.5	32.0	-	-	-	-	-
2GPE MATRIX 3-9T/1.5 HYD	1.5+1.5	7.4		94.0	88.0	61.0	36.0	-	-	-	-	-
2GPE MATRIX 5-3T/0.65 HYD	0.65+0.65	3.2		-	43.0	38.6	34.7	24.9	17.6	-	-	-
2GPE MATRIX 5-4T/0.9 HYD	0.9+0.9	5.0		-	43.0	38.6	34.7	24.9	17.6	-	-	-
2GPE MATRIX 5-5T/1.3 HYD	1.3+1.3	6.4		-	54.0	48.5	43.5	36.7	22.0	-	-	-
2GPE MATRIX 5-6T/1.3 HYD	1.3+1.3	6.4		-	64.5	58.0	52.0	44.0	26.4	-	-	-
2GPE MATRIX 5-7T/15 HYD	1.5+1.5	7.4		-	75.5	67.5	61.0	51.5	30.8	-	-	-
2GPE MATRIX 5-8T/2.2 HYD	2.2+2.2	9.4		-	86.0	77.0	69.5	58.5	35.2	-	-	-
2GPE MATRIX 5-9T/2.2 HYD	2.2+2.2	9.4		-	97.0	87.0	78.0	66.0	39.6	-	-	-
2GPE MATRIX 10-4T/1.5 HYD	1.5+1.5	7.4		-	-	44.5	43.0	41.0	38.1	34.0	25.7	11.6
2GPE MATRIX 10-5T/2.2 HYD	2.2+2.2	9.4		-	-	55.5	53.5	51.5	47.5	42.5	32.1	14.5
2GPE MATRIX 10-6T/2.2 HYD	2.2+2.2	9.4		-	-	66.5	64.5	62.0	57.0	51.0	38.5	17.4

2GPE MATRIX HYDROCONTROLLER

DOMESTIC PRESSURISATION

DIMENSIONS

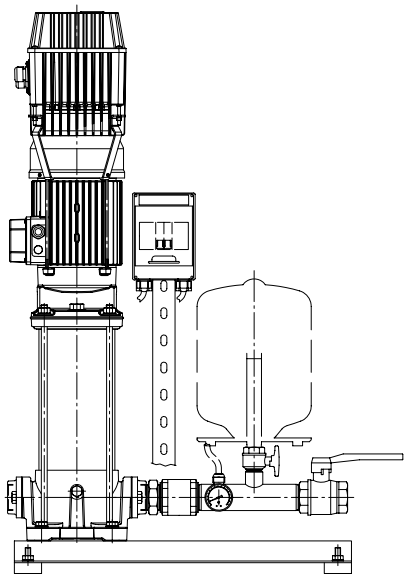


DIMENSION CHART

Model	Dimensions [mm]											Weight [kg]
	A	B1	C	C1	DNA	DNM	D	M	Q	HQ	R	
2GPE MATRIX 3-3T/0.65 HYD	865	725	360	310	G 2"	G 1"½	615	360	5	930	1025	42
2GPE MATRIX 3-4T/0.65 HYD	865	725	385	335	G 2"	G 1"½	640	385	5	930	1025	43
2GPE MATRIX 3-5T/0.75 HYD	865	725	410	360	G 2"	G 1"½	665	410	5	930	1025	47
2GPE MATRIX 3-6T/0.9 HYD	865	725	435	380	G 2"	G 1"½	700	435	15	930	1025	50
2GPE MATRIX 3-7T/1.3 HYD	865	725	460	405	G 2"	G 1"½	750	460	40	930	1025	56
2GPE MATRIX 3-8T/1.5 HYD	865	725	480	430	G 2"	G 1"½	770	480	40	930	1025	58
2GPE MATRIX 3-9T/1.5 HYD	865	725	505	455	G 2"	G 1"½	810	505	55	930	1025	62
2GPE MATRIX 5-3T/0.65 HYD	865	725	315	265	G 2"	G 1"½	570	315	5	930	1025	42
2GPE MATRIX 5-4T/0.9 HYD	865	725	340	290	G 2"	G 1"½	605	340	15	930	1025	47
2GPE MATRIX 5-5T/1.3 HYD	865	725	365	315	G 2"	G 1"½	655	365	40	930	1025	54
2GPE MATRIX 5-6T/1.3 HYD	865	725	390	335	G 2"	G 1"½	680	390	40	930	1025	55
2GPE MATRIX 5-7T/15 HYD	865	725	410	360	G 2"	G 1"½	715	410	55	930	1025	60
2GPE MATRIX 5-8T/2.2 HYD	865	725	435	385	G 2"	G 1"½	740	435	55	930	1025	60
2GPE MATRIX 5-9T/2.2 HYD	865	725	460	410	G 2"	G 1"½	765	460	55	930	1025	60
2GPE MATRIX 10-4T/1.5 HYD	870	730	425	365	G 2"½	G 2"	735	430	55	935	1035	61
2GPE MATRIX 10-5T/2.2 HYD	870	730	455	395	G 2"½	G 2"	765	460	55	935	1035	62
2GPE MATRIX 10-6T/2.2 HYD	870	730	485	425	G 2"½	G 2"	795	490	55	935	1035	63

1GPE HVM E-drive

DOMESTIC PRESSURISATION



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 HVM series pump with 2-pole self-ventilating asynchronous motor, efficiency class IE2 for three-phase motors starting from 0.9 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

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

1GPE HVM E-drive

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
- 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

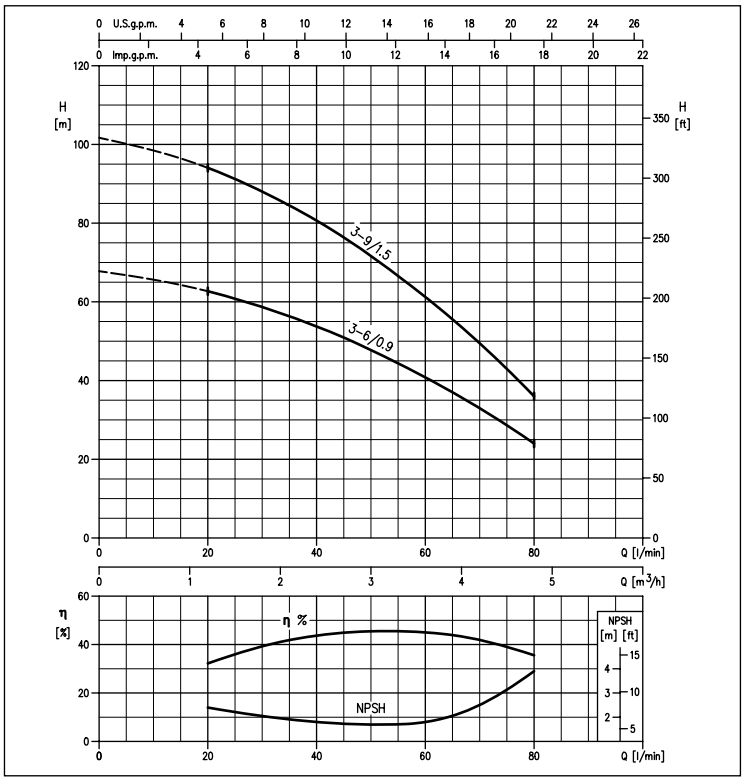
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

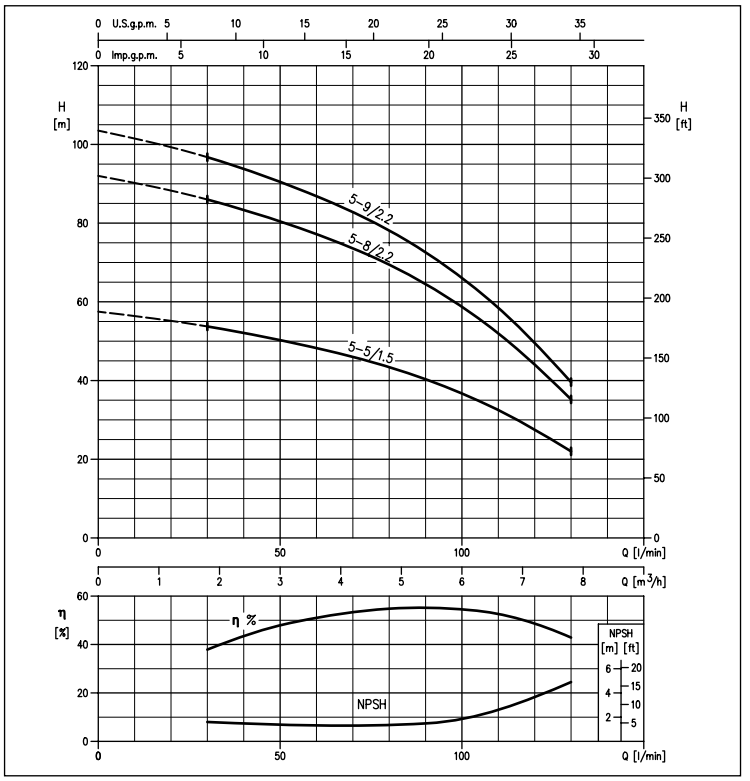
1GPE HVM E-drive

DOMESTIC PRESSURISATION

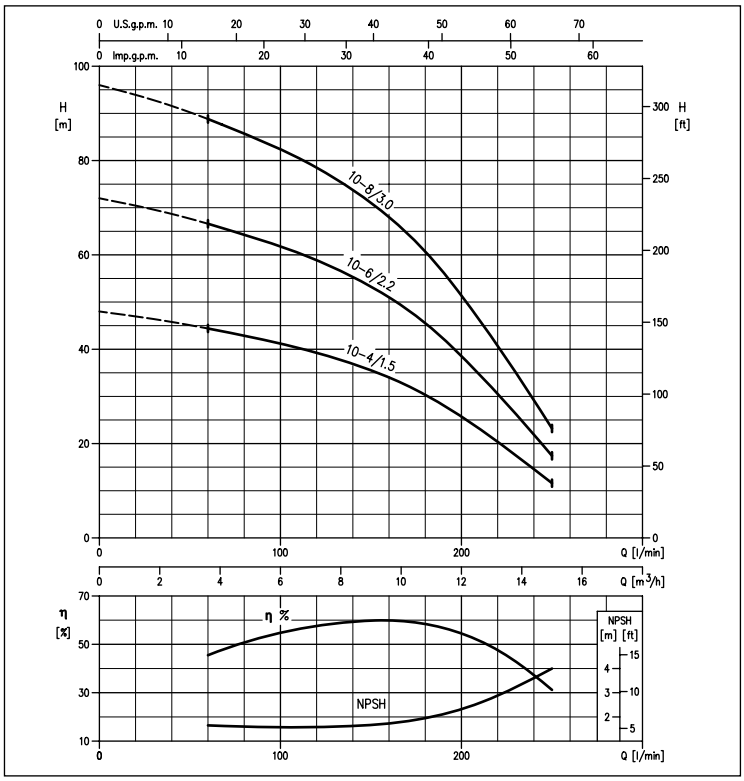
PERFORMANCE CURVES for serie HVM 3 series (0.65 kW to 1.5 kW)
(ISO 9906 Annex A)



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

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.

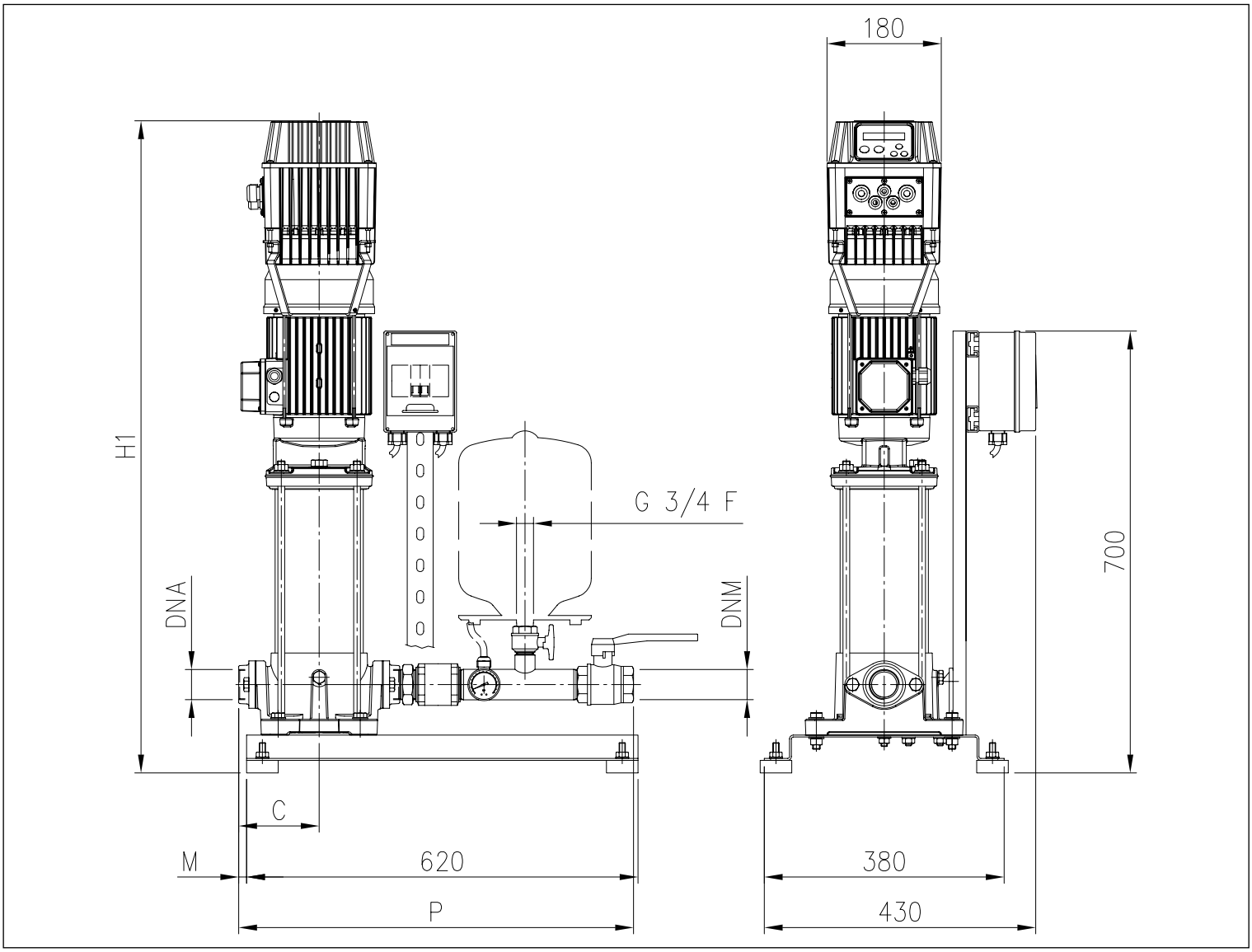
1GPE HVM E-drive

DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA

Model	[kW]	Max absorption [A] Three-phase 230V	Three-phase 400V	Q = Flow rate l/min	20	30	45	60	80	100	130	160	200	250
				m³/h	1.2	1.8	2.7	3.6	4.8	6	7.8	9.6	12	15
				H = Head [m]										
1GPE HVM 3-6N/0.9 Edr-1500 MT	0.9	4.3	-		62.5	58.5	51.0	41.0	24.0	-	-	-	-	-
1GPE HVM 3-6N/0.9 Edr-2200 TT	0.9	-	2.5		62.5	58.5	51.0	41.0	24.0	-	-	-	-	-
1GPE HVM 3-9N/1.5 Edr-1500 MT	1.5	6.3	-		94.0	88.0	76.5	61.0	36.0	-	-	-	-	-
1GPE HVM 3-9N/1.5 Edr-2200 TT	1.5	-	3.7		94.0	88.0	76.5	61.0	36.0	-	-	-	-	-
1GPE HVM 5-5N/1.5 Edr-1500 MT	1.5	6.3	-		-	54.0	51.0	48.5	43.5	36.7	22	-	-	-
1GPE HVM 5-8N/2.2 Edr-2200 TT	2.2	-	4.7		-	86.0	82.0	77.0	69.5	58.5	35.2	-	-	-
1GPE HVM 5-9N/2.2 Edr-2200 TT	2.2	-	4.7		-	97.0	92.0	87.0	78.0	66.0	39.6			
1GPE HVM 10-4N/1.5 Edr-1500 MT	1.5	6.3	-		-	-	-	44.5	43.0	41.0	38.1	34.0	25.7	11.6
1GPE HVM 10-4N/1.5 Edr-2200 TT	1.5	-	3.7		-	-	-	44.5	43.0	41.0	38.1	34.0	25.7	11.6
1GPE HVM 10-6N/2.2 Edr-2200 TT	2.2	-	4.7		-	-	-	66.5	64.5	62.0	57.0	51.0	38.5	17.4
1GPE HVM 10-8N/3 Edr-4000 TT	3	-	6.1		-	-	-	89.0	85.5	82.5	76.0	68.0	51.5	23.2

DIMENSIONS



1GPE HVM E-drive

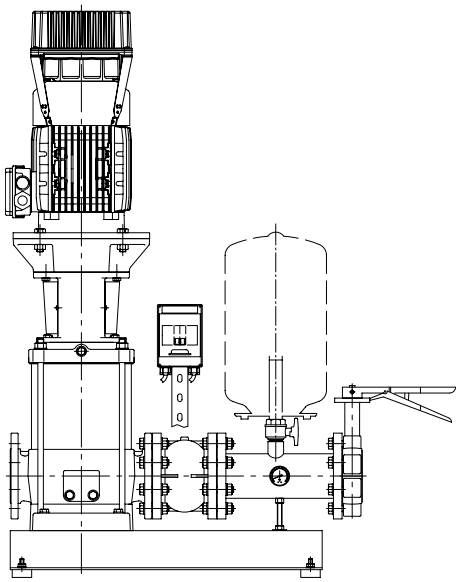
DOMESTIC PRESSURISATION

DIMENSION CHART

Model	Dimensions [mm]							Weight [kg]
	C	DNA	DNM	H	H1	M	P	
1GPE HVM 3-6N/0.9 Edr-1500 MT	105	G 1"	G 1"	110	840	-	545	23
1GPE HVM 3-6N/0.9 Edr-2200 TT	105	G 1"	G 1"	110	440	-	545	23
1GPE HVM 3-9N/1.5 Edr-1500 MT	105	G 1"	G 1"	110	945	-	545	29
1GPE HVM 3-9N/1.5 Edr-2200 TT	105	G 1"	G 1"	110	945	-	545	29
1GPE HVM 5-5N/1.5 Edr-1500 MT	105	G 1"¼	G 1"¼	110	850	-	570	26
1GPE HVM 5-8N/2.2 Edr-2200 TT	105	G 1"¼	G 1"¼	110	925	-	570	28
1GPE HVM 5-9N/2.2 Edr-2200 TT	105	G 1"¼	G 1"¼	110	950	-	570	28
1GPE HVM 10-4N/1.5 Edr-1500 MT	130	G 1"½	G 1"½	140	880	15	625	30
1GPE HVM 10-4N/1.5 Edr-2200 TT	130	G 1"½	G 1"½	140	880	15	625	30
1GPE HVM 10-6N/2.2 Edr-2200 TT	130	G 1"½	G 1"½	140	940	15	625	31
1GPE HVM 10-8N/3 Edr-4000 TT	130	G 1"½	G 1"½	140	1080	15	625	39

1GPE EVMG E-drive

DOMESTIC PRESSURISATION



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

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

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

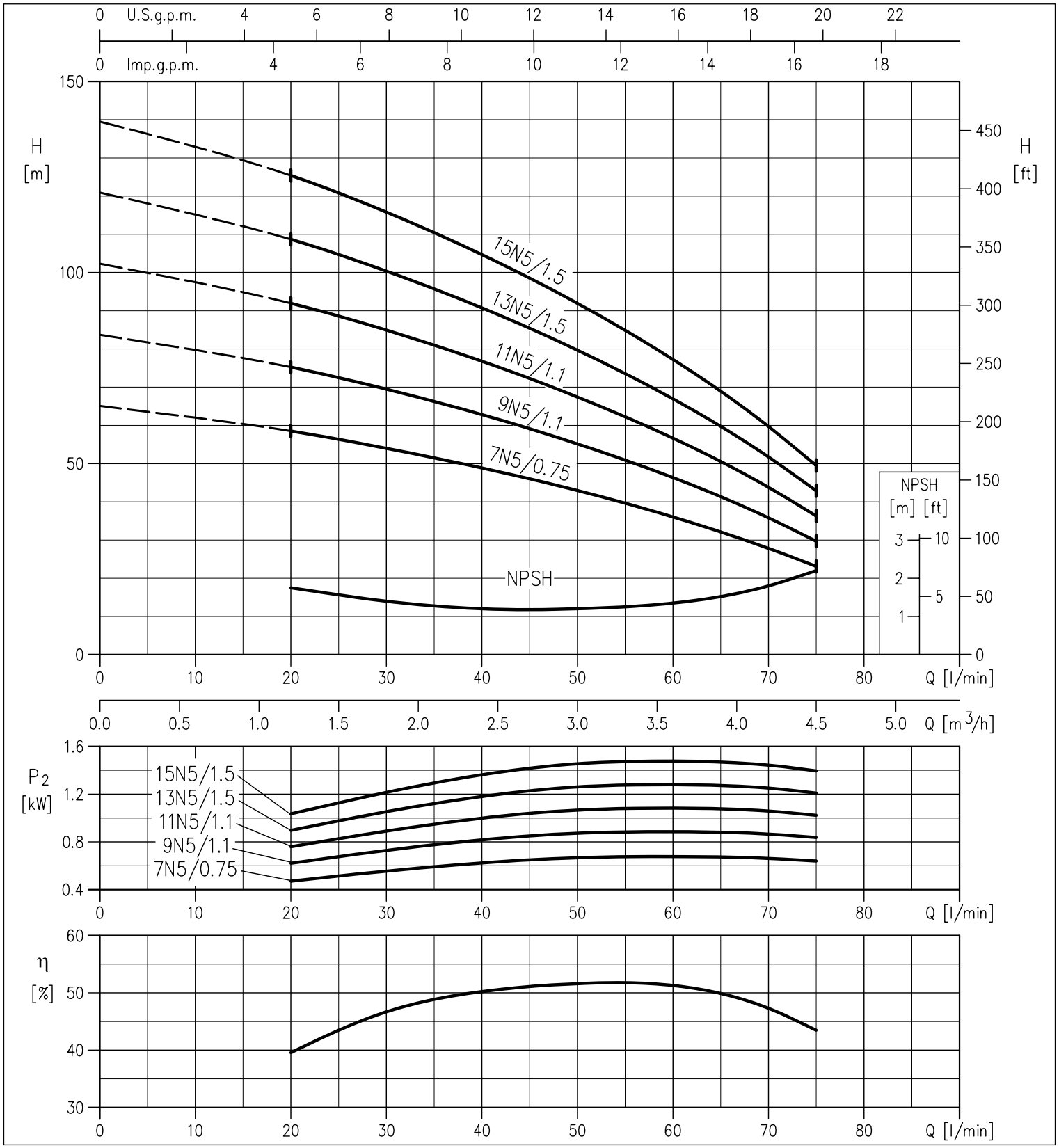
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions.

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

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

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

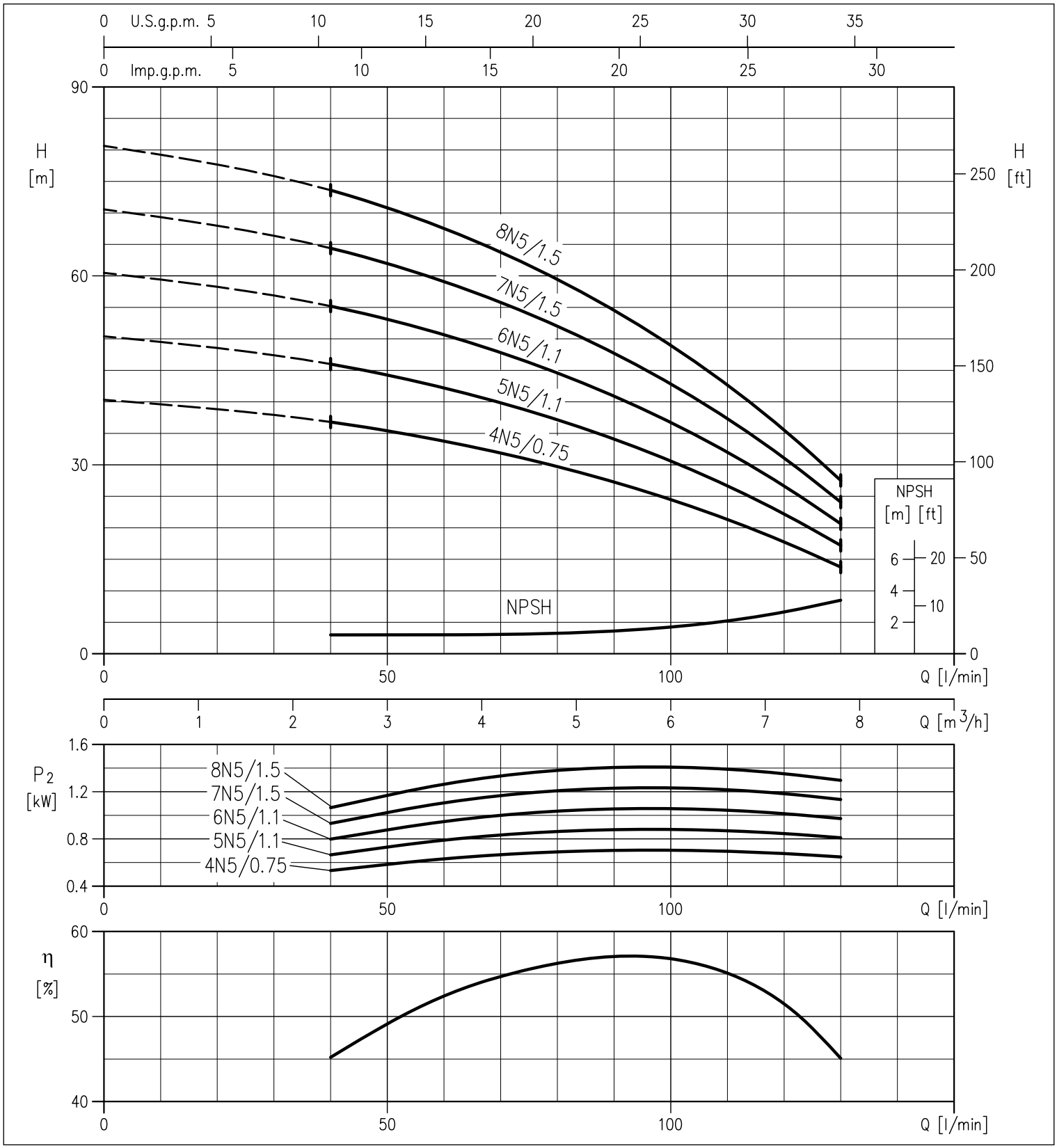


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 5 E-*drive* (1/2) series (ISO 9906 Annex A)

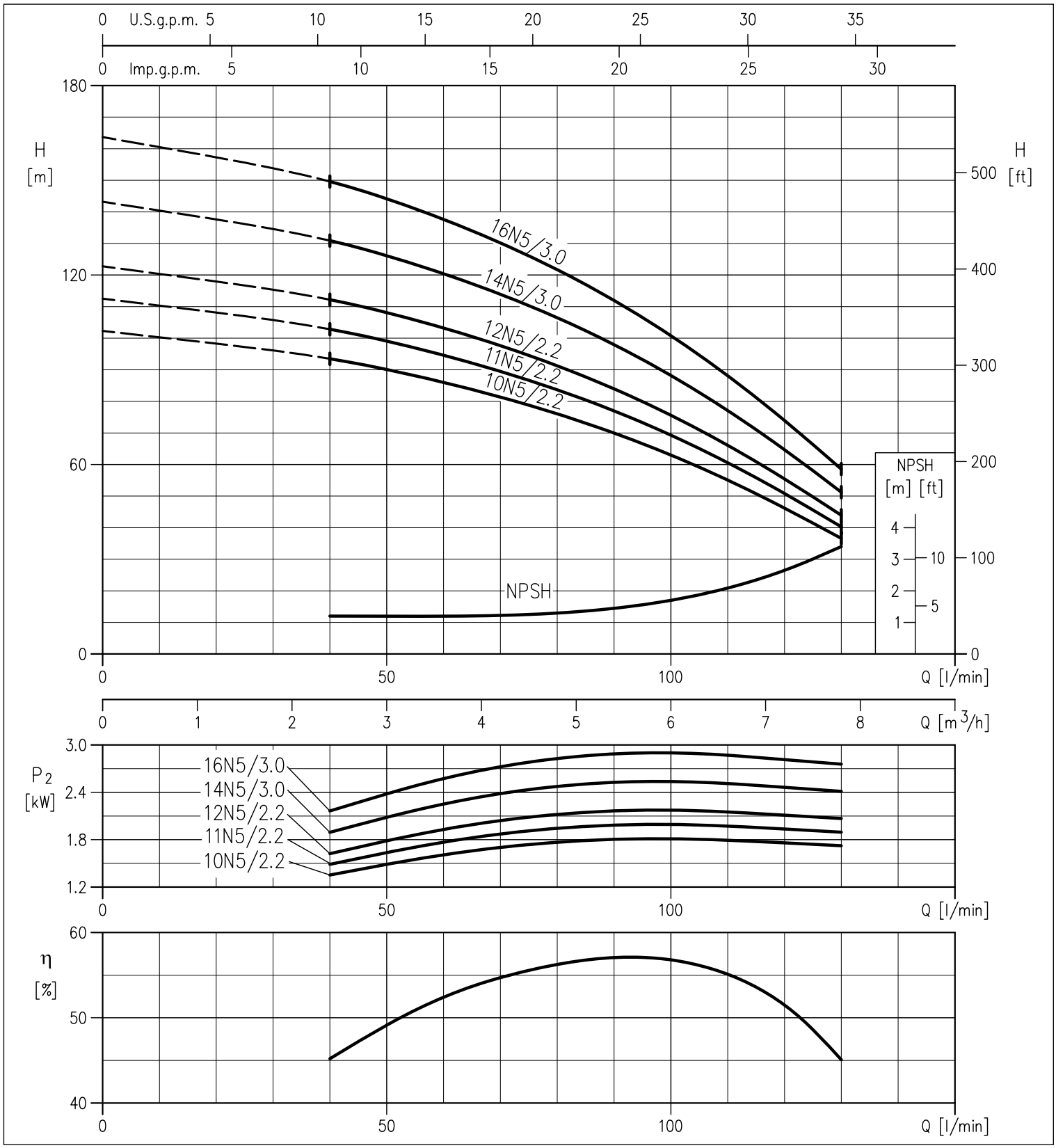


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 5 E-*drive* (2/2) series (ISO 9906 Annex A)

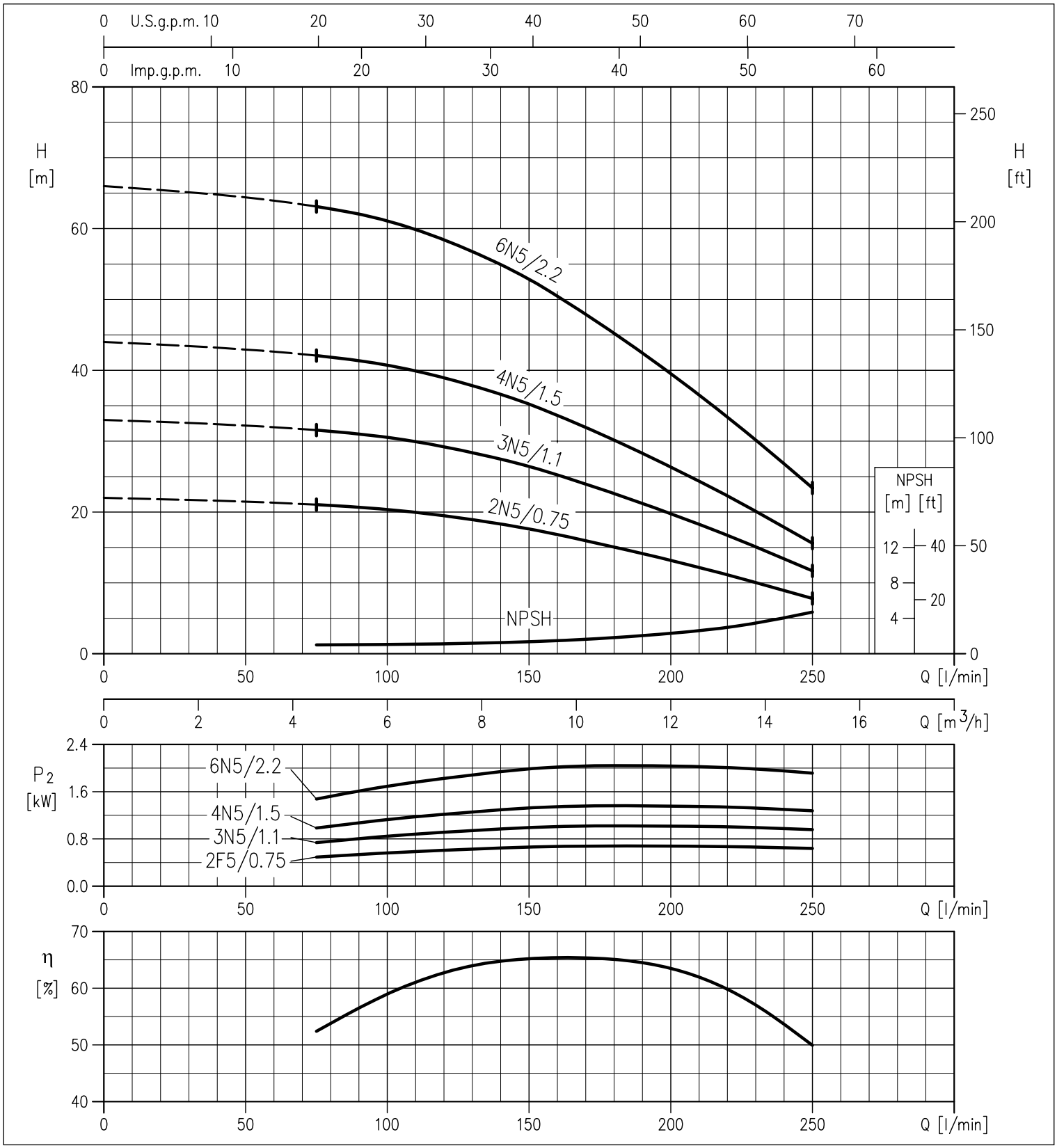


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 10 E-*drive* (1/2) series (ISO 9906 Annex A)

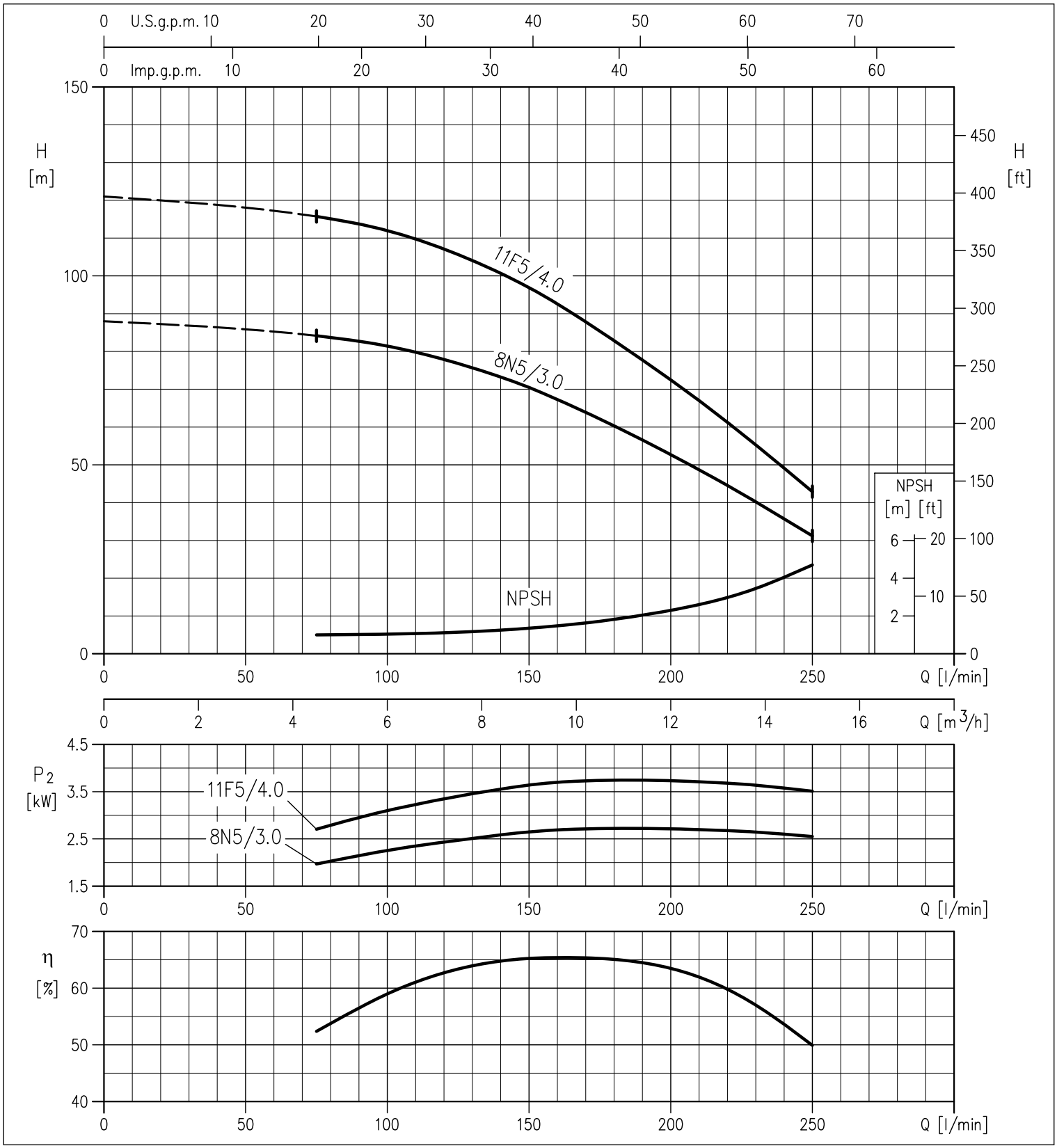


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 10 E-*drive* (2/2) series (ISO 9906 Annex A)

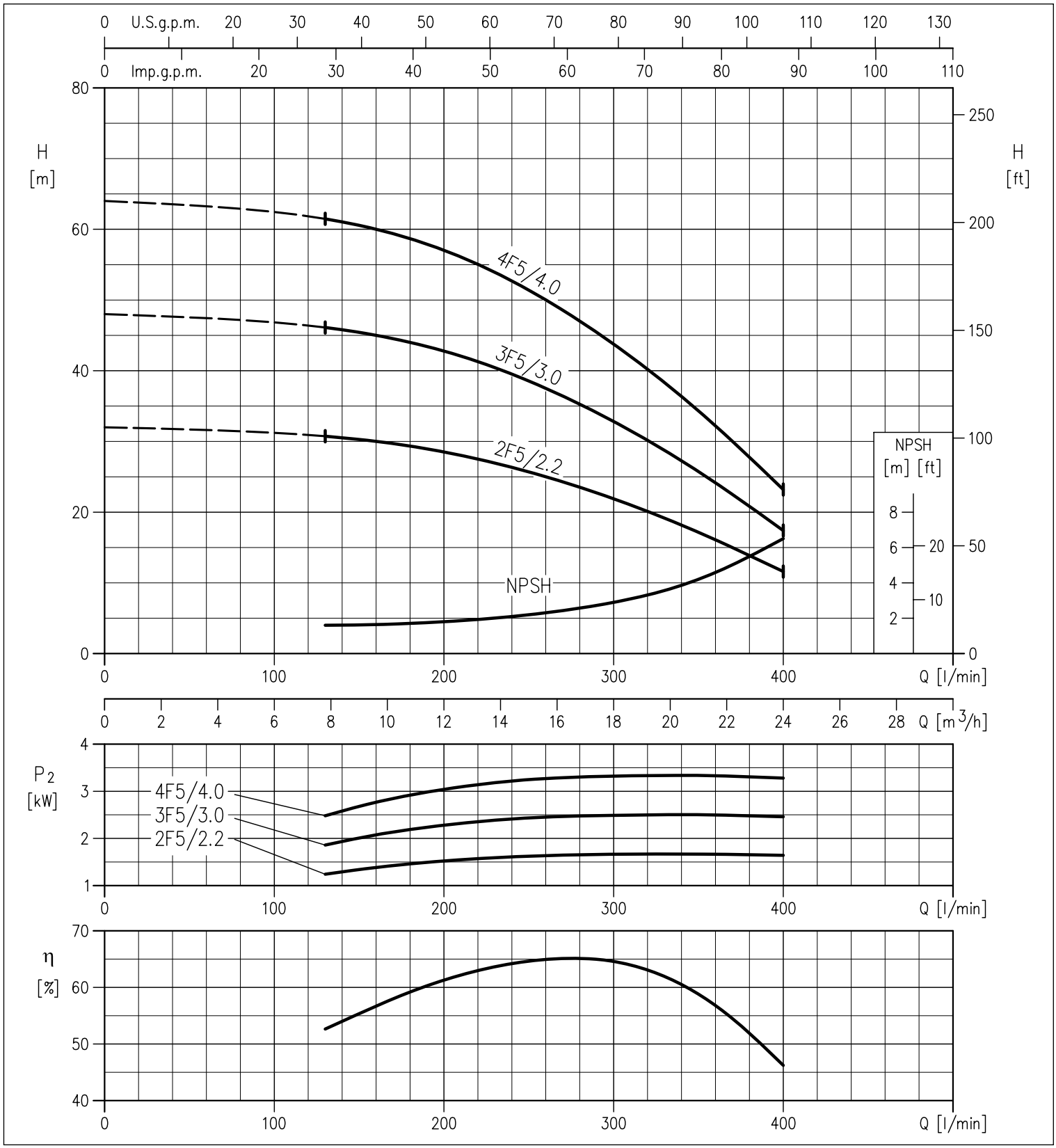


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

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

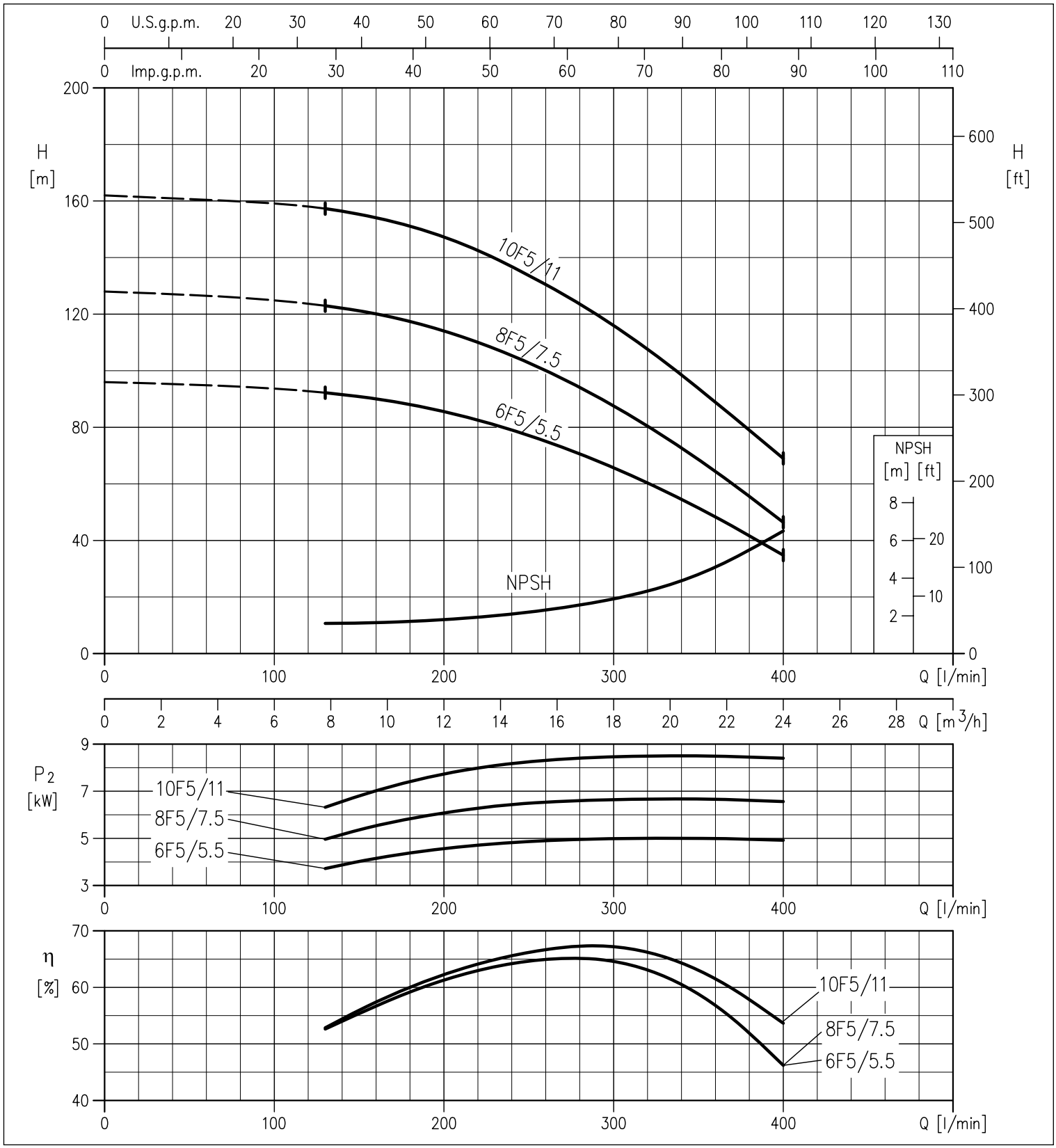


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

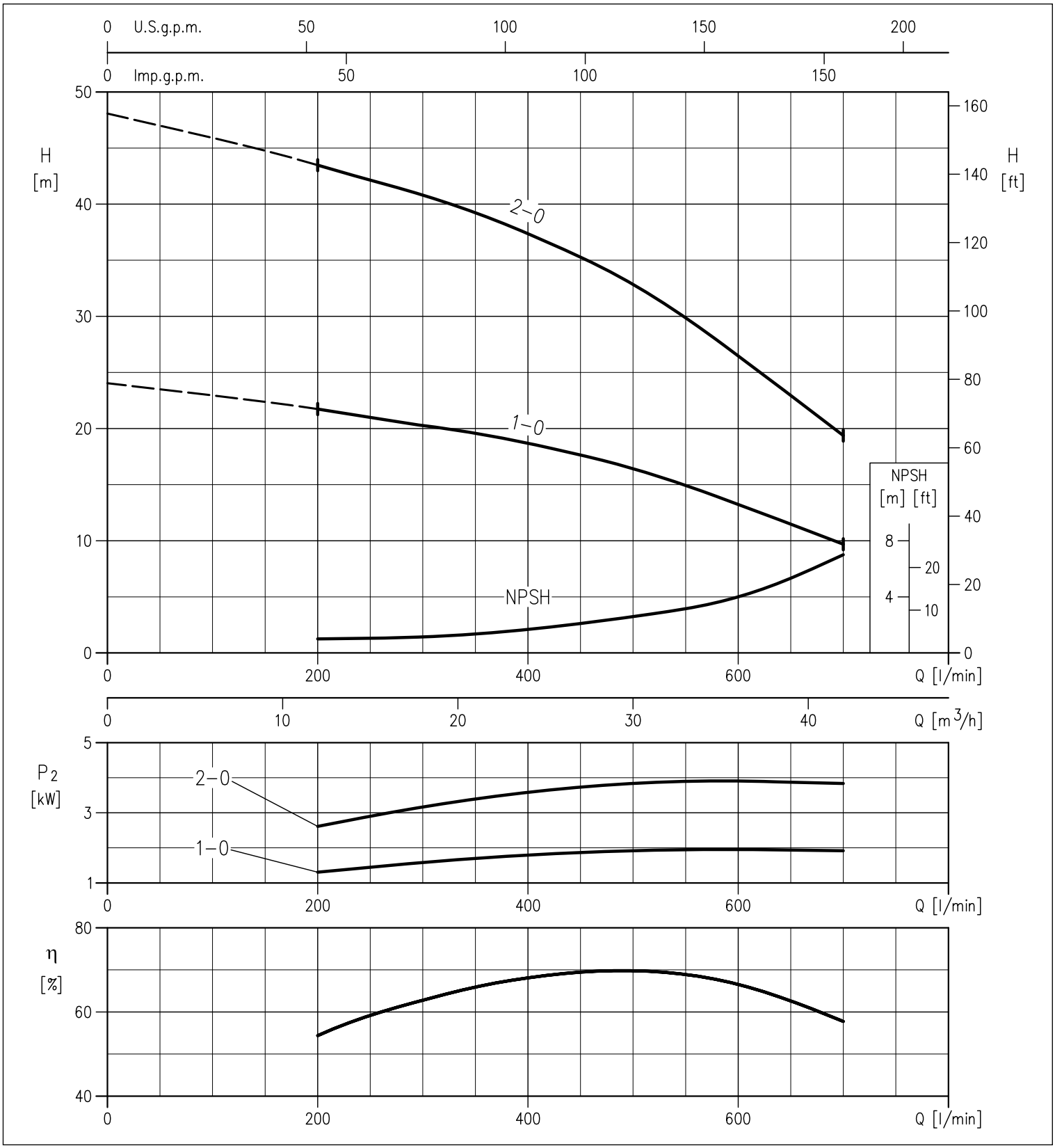
DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 18 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 32 E-*drive* (1/3) series (ISO 9906 Annex A)

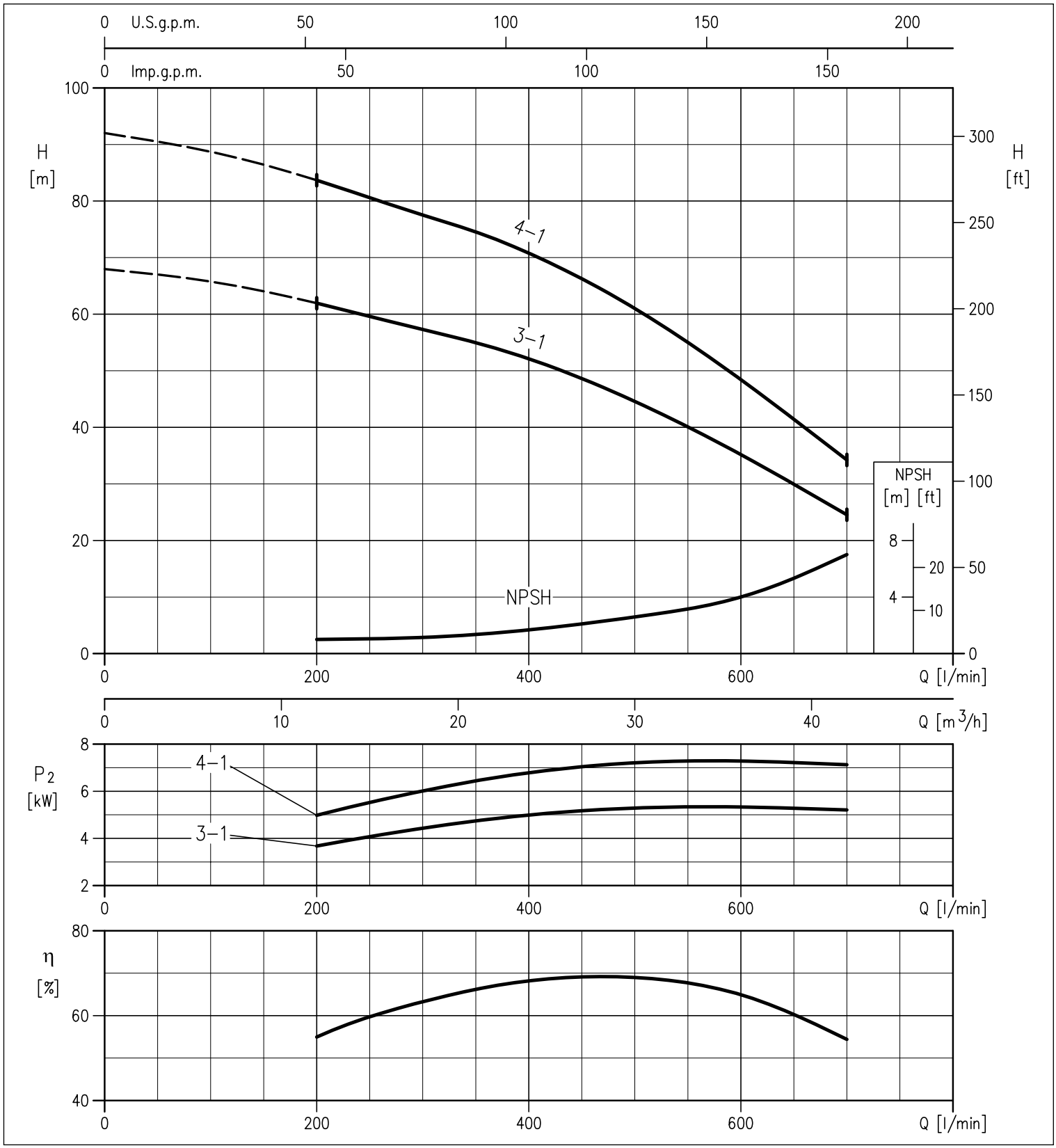


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

PERFORMANCE CURVES for 1GPE EVMG 32 E-*drive* (2/3) series (ISO 9906 Annex A)

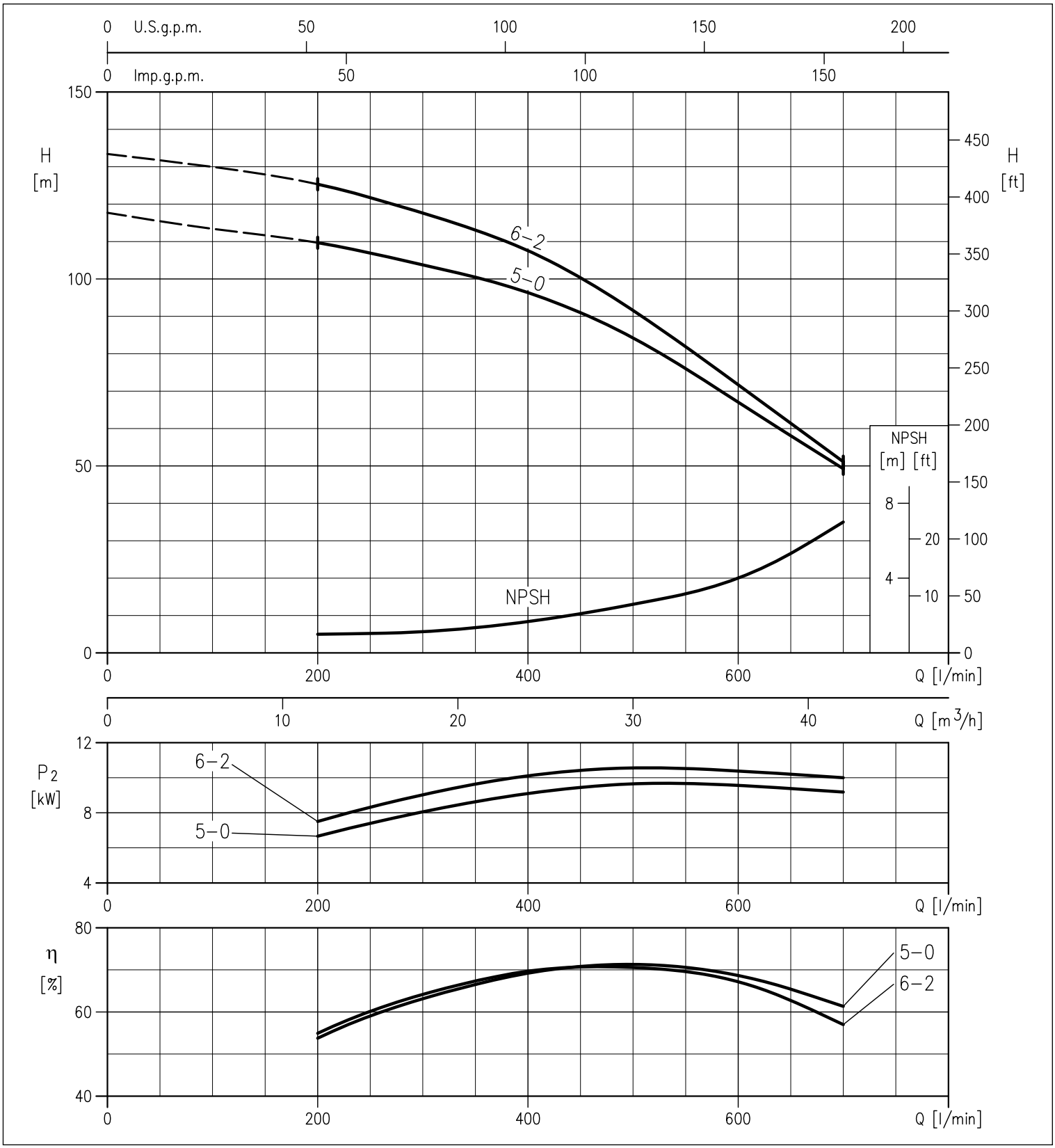


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

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

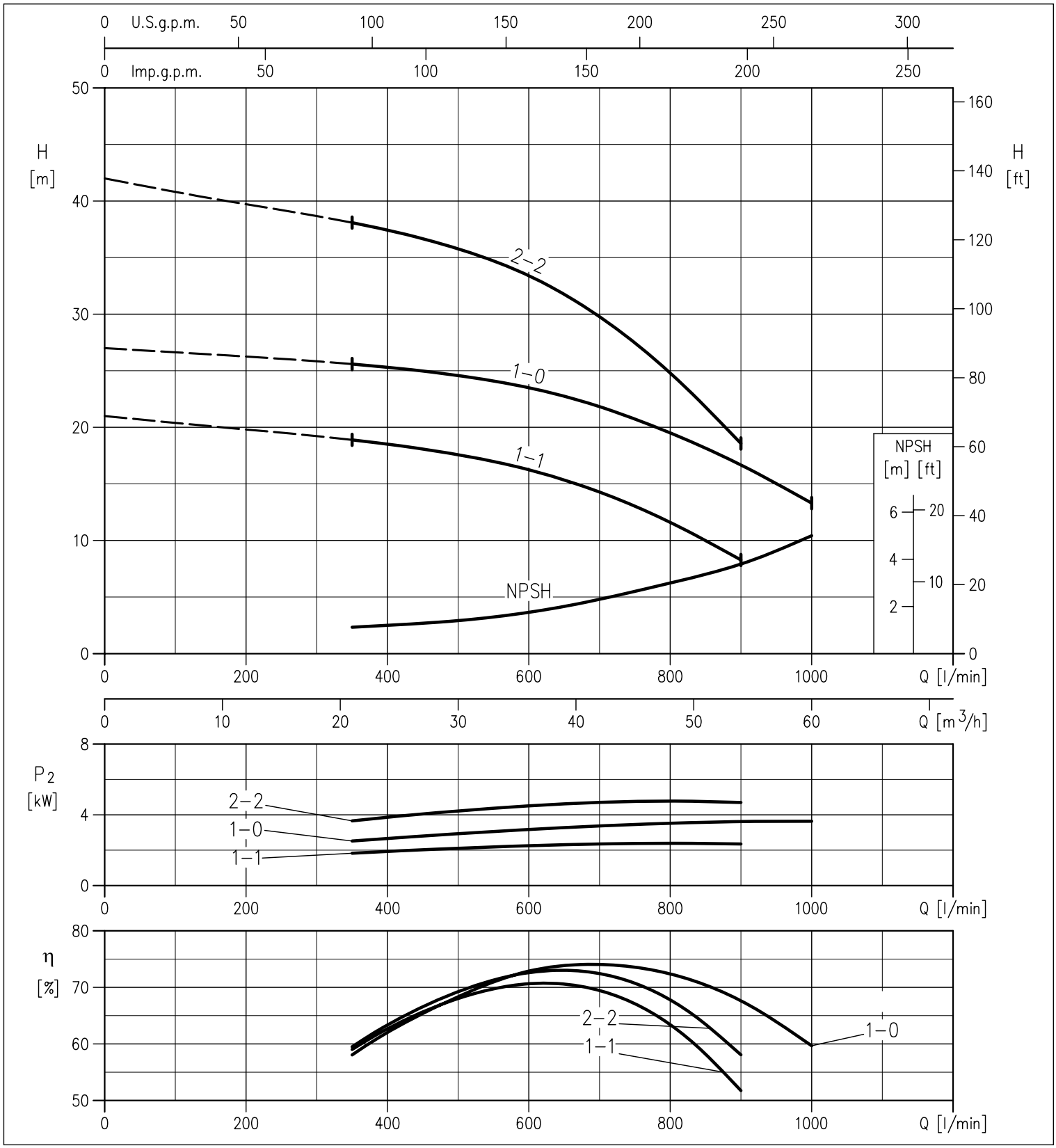


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

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

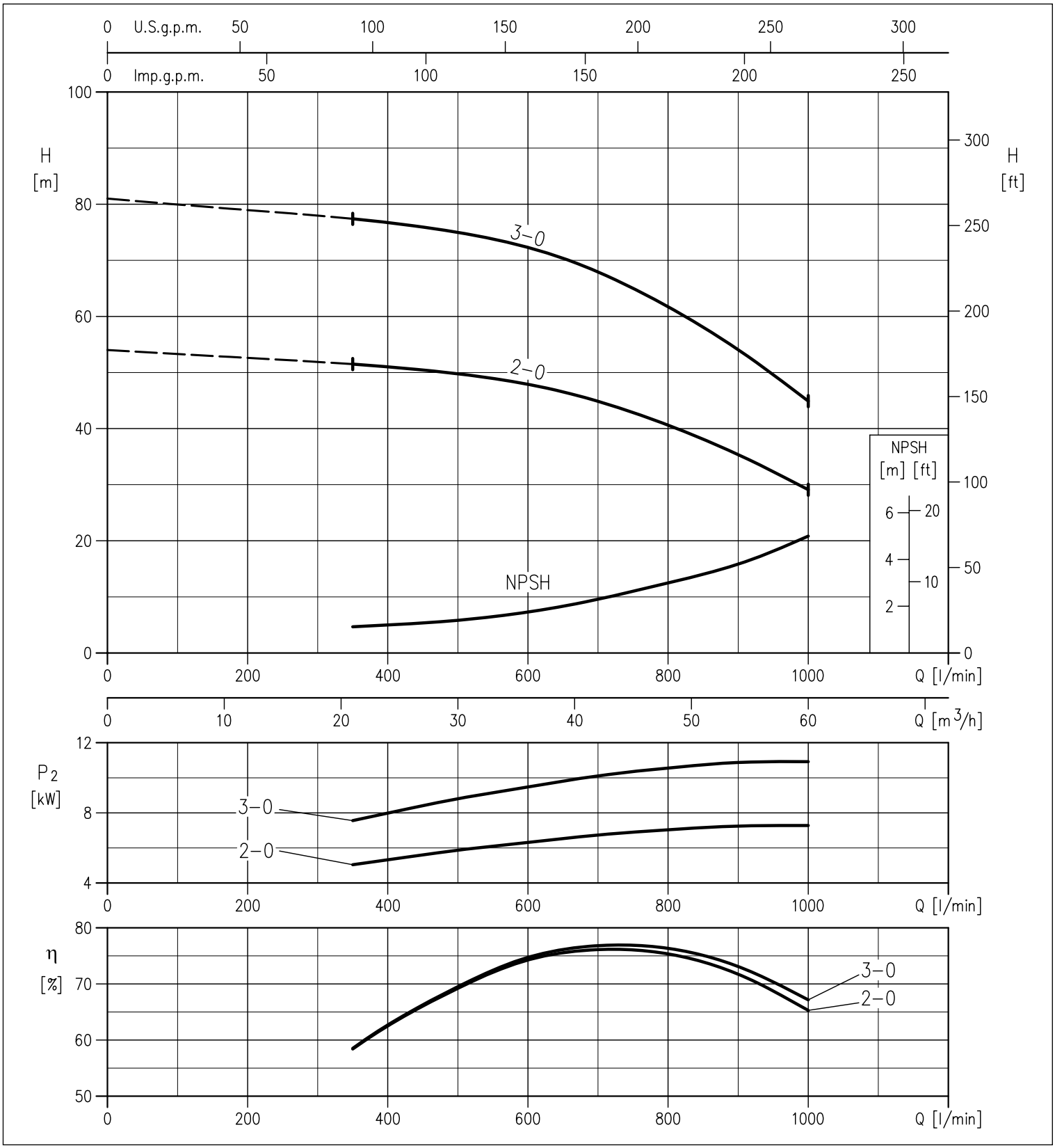


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

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

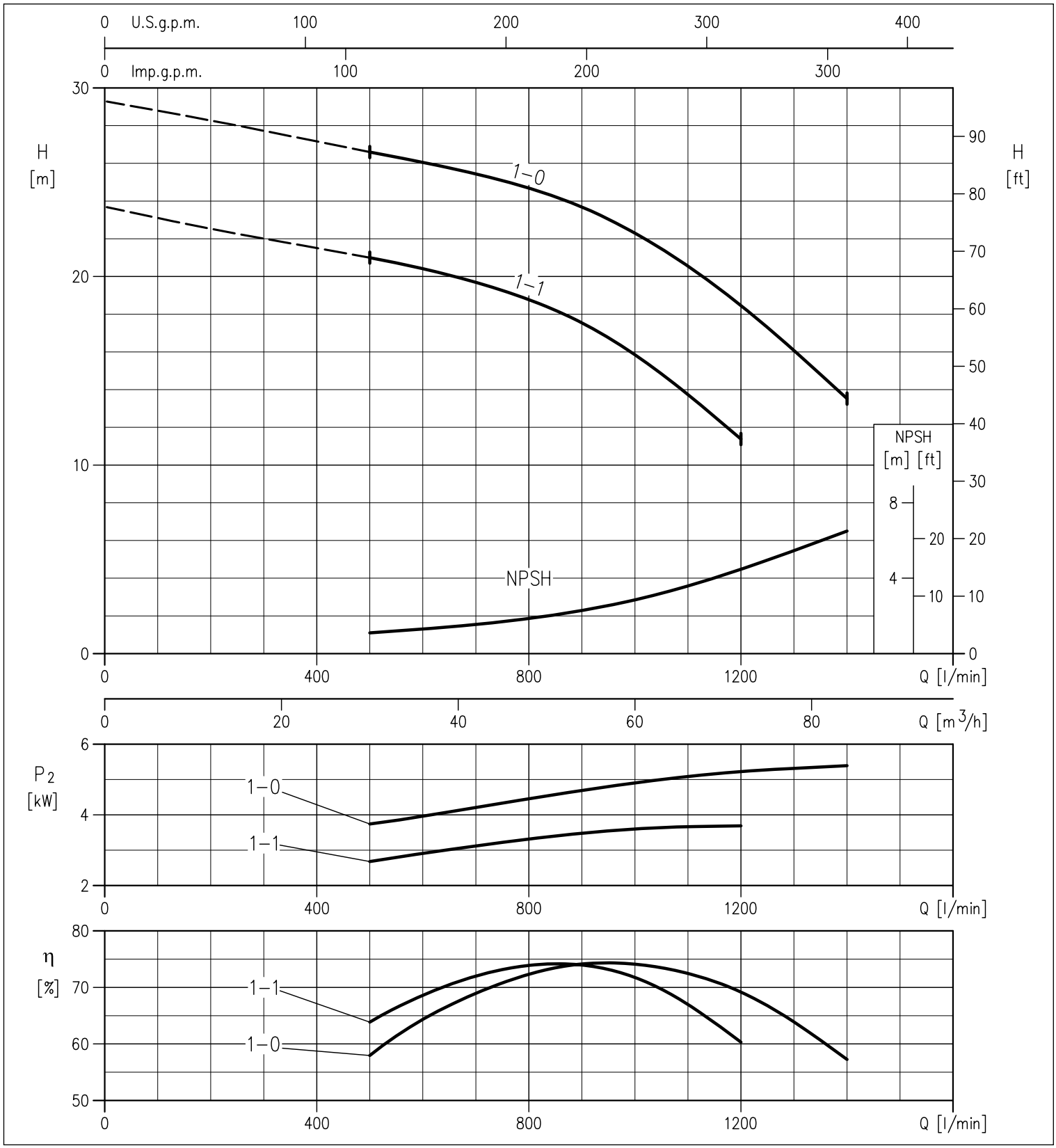


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

1GPE EVMG E-drive

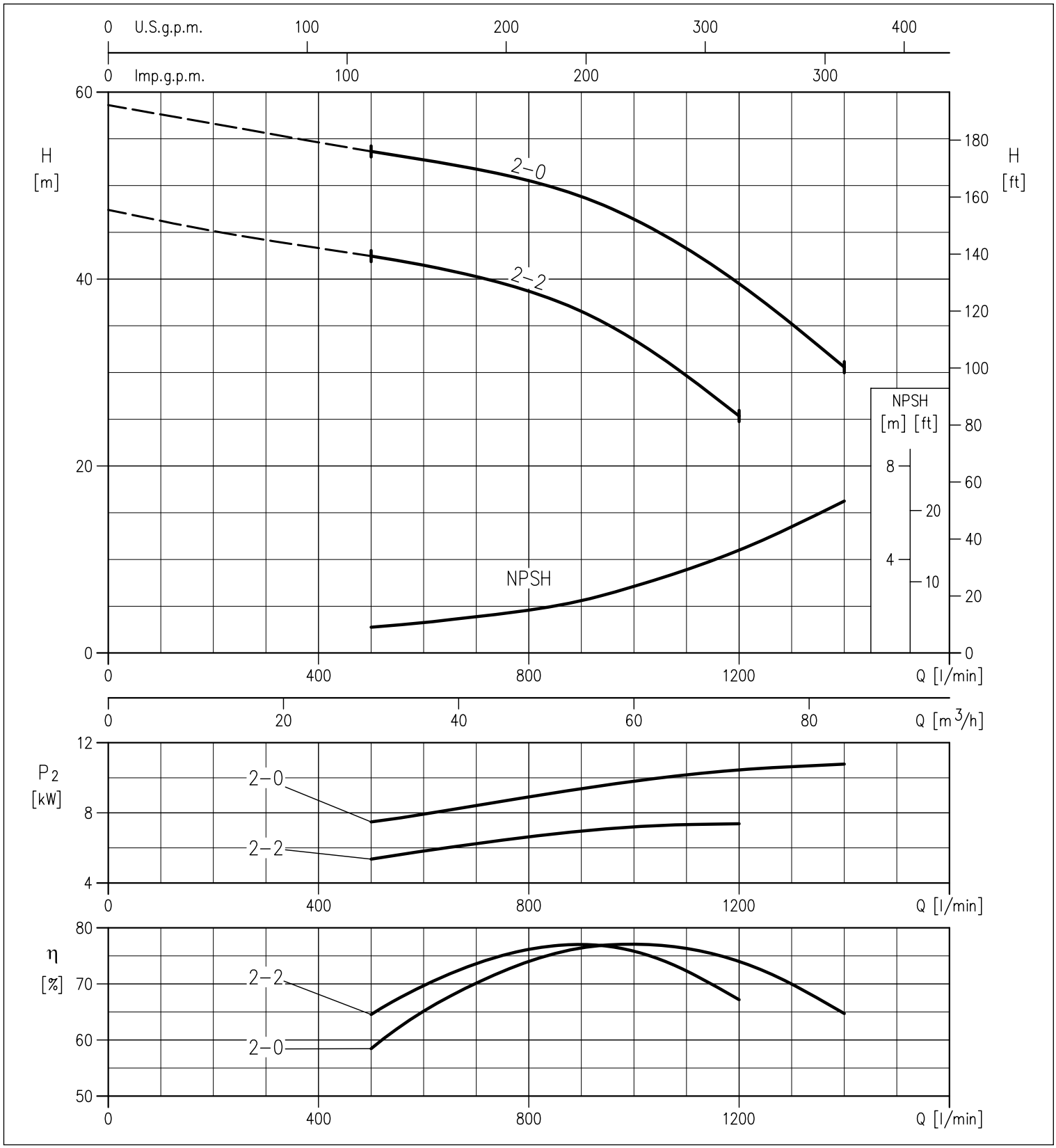
DOMESTIC PRESSURISATION

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

PERFORMANCE CURVES for 1GPE EVMG 64 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

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA

Model	[kW]	Max absorption [A] Three-phase 230V	400V	Q = Flow rate l/min	20	40	60	75	100	130	150	200	250	300	350	400
				m³/h	1.2	2.4	3.6	4.5	6.0	7.8	9	12	15	18	21	24
				H = Head [m]												
1GPE EVMG/B3 7N5/0.75 Edr1500 MT	0.75	2.9	-	58.5	49.0	36.1	23.1	-	-	-	-	-	-	-	-
1GPE EVMG/B3 7N5/0.75 Edr2200 TT	0.75	-	1.7	58.5	49.0	36.1	23.1	-	-	-	-	-	-	-	-
1GPE EVMG/B3 9N5/1.1 Edr1500 MT	1.1	4.3	-	75.0	63.0	46.5	29.7	-	-	-	-	-	-	-	-
1GPE EVMG/B3 9N5/1.1 Edr2200 TT	1.1	-	2.5	75.0	63.0	46.5	29.7	-	-	-	-	-	-	-	-
1GPE EVMG/B3 11N5/1.1 Edr1500 MT	1.1	4.3	-	92.0	77.0	56.5	36.3	-	-	-	-	-	-	-	-
1GPE EVMG/B3 11N5/1.1 Edr2200 TT	1.1	-	2.5	92.0	77.0	56.5	36.3	-	-	-	-	-	-	-	-
1GPE EVMG/B3 13N5/1.5 Edr1500 MT	1.5	5.5	-	109.0	90.5	67.0	43.0	-	-	-	-	-	-	-	-
1GPE EVMG/B3 13N5/1.5 Edr2200 TT	1.5	-	3.2	109.0	90.5	67.0	43.0	-	-	-	-	-	-	-	-
1GPE EVMG/B3 15N5/1.5 Edr1500 MT	1.5	5.5	-	125.0	105.0	77.5	49.5	-	-	-	-	-	-	-	-
1GPE EVMG/B3 15N5/1.5 Edr2200 TT	1.5	-	3.2	125.0	105.0	77.5	49.5	-	-	-	-	-	-	-	-
1GPE EVMG/B5 4N5/0.75 Edr1500 MT	0.75	2.9	-	-	36.8	33.8	30.8	24.5	13.8	-	-	-	-	-	-
1GPE EVMG/B5 4N5/0.75 Edr2200 TT	0.75	-	1.7	-	36.8	33.8	30.8	24.5	13.8	-	-	-	-	-	-
1GPE EVMG/B5 6N5/1.1 Edr1500 MT	1.1	4.3	-	-	55.0	50.5	46.5	36.7	20.6	-	-	-	-	-	-
1GPE EVMG/B5 6N5/1.1 Edr2200 TT	1.1	-	2.5	-	55.0	50.5	46.5	36.7	20.6	-	-	-	-	-	-
1GPE EVMG/B5 8N5/1.5 Edr1500 MT	1.5	5.5	-	-	73.5	67.5	61.5	49.0	27.5	-	-	-	-	-	-
1GPE EVMG/B5 8N5/1.5 Edr2200 TT	1.5	-	3.2	-	73.5	67.5	61.5	49.0	27.5	-	-	-	-	-	-
1GPE EVMG/B5 10N5/2.2 Edr2200 TT	2.2	-	4.4	-	93.5	86.0	79.0	63.0	36.6	-	-	-	-	-	-
1GPE EVMG/B5 12N5/2.2 Edr2200 TT	2.2	-	4.4	-	112.0	103.0	94.5	75.5	44.0	-	-	-	-	-	-
1GPE EVMG/B5 14N5/3 Edr4000 TT	3	-	5.9	-	131.0	120.0	110.0	88.0	51.0	-	-	-	-	-	-
1GPE EVMG/B5 16N5/3 Edr4000 TT	3	-	5.9	-	150.0	138.0	126.0	101.0	58.5	-	-	-	-	-	-
1GPE EVMG/B10 2N5/0.75 Edr1500 MT	0.75	2.9	-	-	-	-	21.0	20.4	18.9	17.6	13.2	7.8	-	-	-
1GPE EVMG/B10 2N5/0.75 Edr2200 TT	0.75	-	1.7	-	-	-	21.0	20.4	18.9	17.6	13.2	7.8	-	-	-
1GPE EVMG/B10 3N5/1.1 Edr1500 MT	1.1	4.3	-	-	-	-	31.6	30.5	28.4	26.4	19.8	11.7	-	-	-
1GPE EVMG/B10 3N5/1.1 Edr2200 TT	1.1	-	2.5	-	-	-	31.6	30.5	28.4	26.4	19.8	11.7	-	-	-
1GPE EVMG/B10 4N5/1.5 Edr1500 MT	1.5	5.5	-	-	-	-	42.0	40.5	37.8	35.2	26.4	15.6	-	-	-
1GPE EVMG/B10 4N5/1.5 Edr2200 TT	1.5	-	3.2	-	-	-	52.5	51.0	47.5	44.0	33.0	19.5	-	-	-
1GPE EVMG/B10 6N5/2.2 Edr2200 TT	2.2	-	4.4	-	-	-	63.0	61.0	57.0	53.0	39.5	23.4	-	-	-
1GPE EVMG/B10 8N5/3 Edr4000 TT	3	-	5.9	-	-	-	84.0	81.5	75.5	70.5	52.5	31.2	-	-	-
1GPE EVMG/B10 11N5/4 Edr4000 TT	4	-	7.8	-	-	-	116.0	112.0	104.0	97.0	72.5	43.0	-	-	-
1GPE EVMG/B18 2F5/2.2 Edr2200 TT	2.2	-	4.4	-	-	-	-	-	31.0	30.3	28.5	25.7	21.9	17.2	11.6
1GPE EVMG/B18 3F5/3 Edr4000 TT	3	-	5.9	-	-	-	-	-	46.0	45.5	43.0	38.6	32.8	25.7	17.4
1GPE EVMG/B18 4F5/4 Edr4000 TT	4	-	7.8	-	-	-	-	-	61.5	60.5	57.0	51.5	44.0	34.3	23.2
1GPE EVMG/B18 6F5/5.5 Edr5500 TT	5.5	-	10.4	-	-	-	-	-	92.0	91.0	85.5	77.0	65.5	51.5	34.8
1GPE EVMG/B18 8F5/7.5 Edr7500 TT	7.5	-	14.2	-	-	-	-	-	123.0	121.0	114.0	103.0	87.5	68.5	46.5
1GPE EVMG/B18 10F5/11 Edr11000 TT	11	-	19.8	-	-	-	-	-	157.0	155.0	147.0	134.0	116.0	93.5	69.0

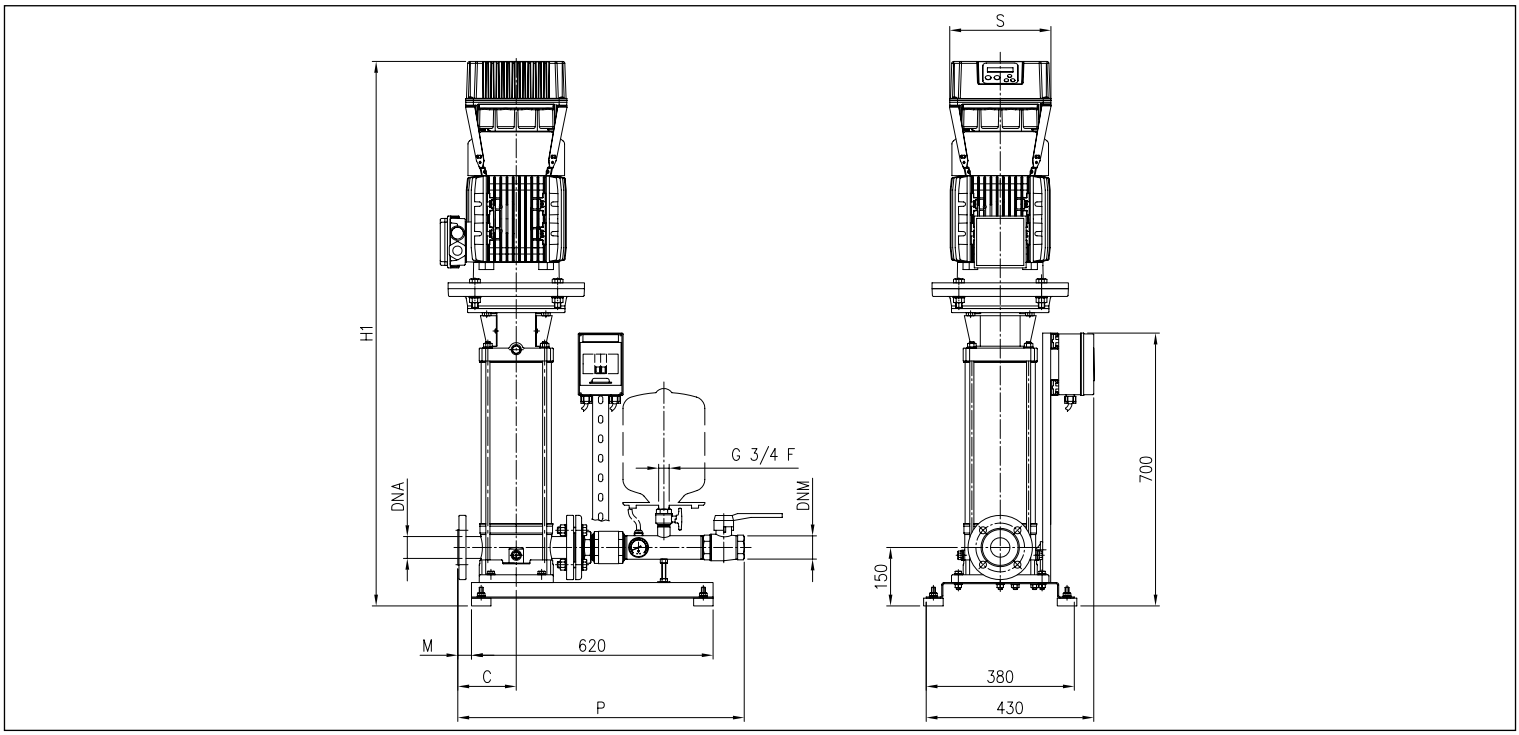
TABLE OF PERFORMANCE AND ELECTRICAL DATA

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	200	350	500	600	700	900	1000	1200	1400
			m³/h	12	21	30	36	42	54	60	72	84
			H = Head [m]									
1GPE EVMG/B32 1-0F5/2.2 Edr2200 TT	2.2	4.4	21.7	19.6	16.4	13.2	9.7	-	-	-	-
1GPE EVMG/B32 2-0F5/4 Edr4000 TT	4	7.8	43.5	39.2	32.8	26.5	19.4	-	-	-	-
1GPE EVMG/B32 3-1F5/5.5 Edr5500 TT	5.5	10.4	62	55	44.5	35.2	24.5	-	-	-	-
1GPE EVMG/B32 4-1F5/7.5 Edr7500 TT	7.5	14.2	83.5	74.5	61	48.5	34.2	-	-	-	-
1GPE EVMG/B32 5-0F5/11 Edr11000 TT	11	19.8	110	100	84	67	49	-	-	-	-
1GPE EVMG/B32 6-2F5/11 Edr11000 TT	11	19.8	125	113	91.5	71.5	51	-	-	-	-
1GPE EVMG/B45 1-1F5/3 Edr4000 TT	3	5.9	-	18.9	17.6	16.3	14.3	8.3	-	-	-
1GPE EVMG/B45 1-0F5/4 Edr4000 TT	4	7.8	-	25.6	24.6	23.5	21.8	16.7	13.3	-	-
1GPE EVMG/B45 2-2F5/5.5 Edr5500 TT	5.5	10.4	-	38.1	35.8	33.4	29.8	18.6	-	-	-
1GPE EVMG/B45 2-0F5/7.5 Edr7500 TT	7.5	14.2	-	51.5	50	48	45	35.4	29.1	-	-
1GPE EVMG/B45 3-0F5/11 Edr11000 TT	11	19.8	-	77.5	75	72.5	68	54	45	-	-
1GPE EVMG/B64 1-1F5/4 Edr4000 TT	4	7.8	-	-	21	20.4	19.7	17.5	15.9	11.4	-
1GPE EVMG/B64 1-0F5/5.5 Edr5500 TT	5.5	10.4	-	-	26.6	26.1	25.4	23.7	22.3	18.5	13.5
1GPE EVMG/B64 2-2F5/7.5 Edr7500 TT	7.5	14.2	-	-	42.5	41.5	40.5	36.5	33.5	25.3	-
1GPE EVMG/B64 2-0F5/11 Edr11000 TT	11	19.8	-	-	53.5	53	52	49	46.5	39.5	30.6

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

DIMENSIONS 1GPE EVMG E-*drive* 3 - 5 - 10 - 18



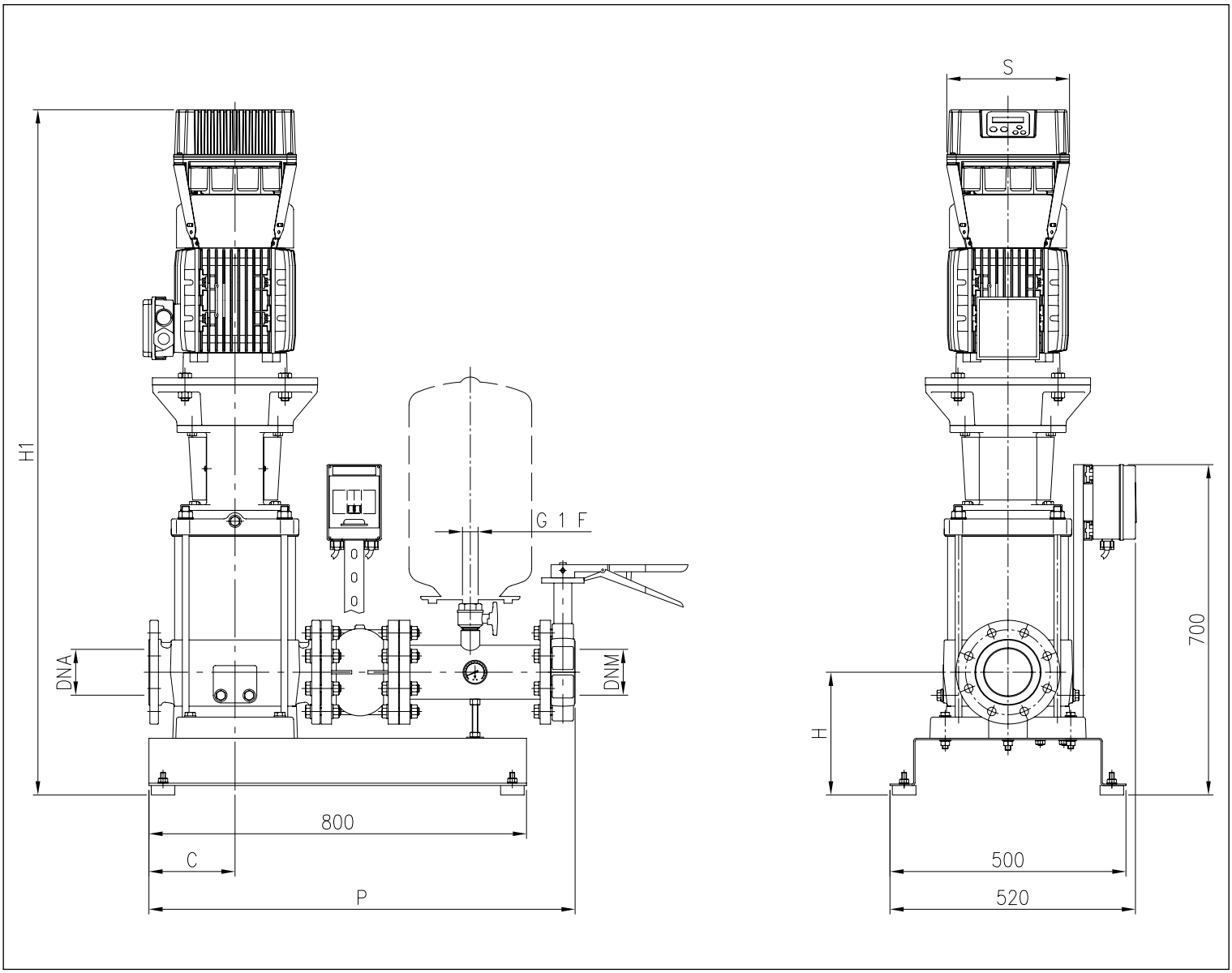
DIMENSION CHART

Model	Dimensions [mm]								Weight [kg]
	C	DNA	DNM	H	H1	M	P	S	
1GPE EVMG/B3 7N5/0.75 Edr1500 MT	105	G 1"	G 1"	110	880	-	700	180	23
1GPE EVMG/B3 7N5/0.75 Edr2200 TT	105	G 1"	G 1"	110	880	-	700	180	23
1GPE EVMG/B3 9N5/1.1 Edr1500 MT	105	G 1"	G 1"	110	915	-	700	180	26
1GPE EVMG/B3 9N5/1.1 Edr2200 TT	105	G 1"	G 1"	110	915	-	700	180	26
1GPE EVMG/B3 11N5/1.1 Edr1500 MT	105	G 1"	G 1"	110	960	-	700	180	28
1GPE EVMG/B3 11N5/1.1 Edr2200 TT	105	G 1"	G 1"	110	960	-	700	180	28
1GPE EVMG/B3 13N5/1.5 Edr1500 MT	105	G 1"	G 1"	110	1050	-	700	180	32
1GPE EVMG/B3 13N5/1.5 Edr2200 TT	105	G 1"	G 1"	110	1050	-	700	180	32
1GPE EVMG/B3 15N5/1.5 Edr1500 MT	105	G 1"	G 1"	110	1090	-	700	180	34
1GPE EVMG/B3 15N5/1.5 Edr2200 TT	105	G 1"	G 1"	110	1090	-	700	180	34
1GPE EVMG/B5 4N5/0.75 Edr1500 MT	105	G 1"¼	G 1"¼	110	845	-	565	180	22
1GPE EVMG/B5 4N5/0.75 Edr2200 TT	105	G 1"¼	G 1"¼	110	845	-	565	180	22
1GPE EVMG/B5 6N5/1.1 Edr1500 MT	105	G 1"¼	G 1"¼	110	900	-	565	180	26
1GPE EVMG/B5 6N5/1.1 Edr2200 TT	105	G 1"¼	G 1"¼	110	900	-	565	180	26
1GPE EVMG/B5 8N5/1.5 Edr1500 MT	105	G 1"¼	G 1"¼	110	1000	-	565	180	30
1GPE EVMG/B5 8N5/1.5 Edr2200 TT	105	G 1"¼	G 1"¼	110	1000	-	565	180	30
1GPE EVMG/B5 10N5/2.2 Edr2200 TT	105	G 1"¼	G 1"¼	110	1065	-	565	180	34
1GPE EVMG/B5 12N5/2.2 Edr2200 TT	105	G 1"¼	G 1"¼	110	1120	-	565	180	36
1GPE EVMG/B5 14N5/3 Edr4000 TT	105	G 1"¼	G 1"¼	110	1225	-	565	180	45
1GPE EVMG/B5 16N5/3 Edr4000 TT	105	G 1"¼	G 1"¼	110	1285	-	565	180	47
1GPE EVMG/B10 2N5/0.75 Edr1500 MT	125	G 1"½	G 1"½	140	855	10	620	180	27
1GPE EVMG/B10 2N5/0.75 Edr2200 TT	125	G 1"½	G 1"½	140	855	10	620	180	27
1GPE EVMG/B10 3N5/1.1 Edr1500 MT	125	G 1"½	G 1"½	140	885	10	620	180	31
1GPE EVMG/B10 3N5/1.1 Edr2200 TT	125	G 1"½	G 1"½	140	885	10	620	180	31
1GPE EVMG/B10 4N5/1.5 Edr1500 MT	125	G 1"½	G 1"½	140	960	10	620	180	36
1GPE EVMG/B10 4N5/1.5 Edr2200 TT	125	G 1"½	G 1"½	140	960	10	620	180	36
1GPE EVMG/B10 6N5/2.2 Edr2200 TT	125	G 1"½	G 1"½	140	1030	10	620	180	40
1GPE EVMG/B10 8N5/3 Edr4000 TT	125	G 1"½	G 1"½	140	1140	10	620	180	54
1GPE EVMG/B10 11N5/4 Edr4000 TT	125	G 1"½	G 1"½	140	1230	10	620	180	57
1GPE EVMG/B18 2F5/2.2 Edr2200 TT	150	DN 50	DN 50	150	930	35	735	180	44
1GPE EVMG/B18 3F5/3 Edr4000 TT	150	DN 50	DN 50	150	1020	35	735	180	52
1GPE EVMG/B18 4F5/4 Edr4000 TT	150	DN 50	DN 50	150	1070	35	735	180	55
1GPE EVMG/B18 6F5/5.5 Edr5500 TT	150	DN 50	DN 50	150	1130	35	735	260	80
1GPE EVMG/B18 8F5/7.5 Edr7500 TT	150	DN 50	DN 50	150	1210	35	735	260	85
1GPE EVMG/B18 10F5/11 Edr11000 TT	150	DN 50	DN 50	150	1395	35	735	260	117

1GPE EVMG E-drive

DOMESTIC PRESSURISATION

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

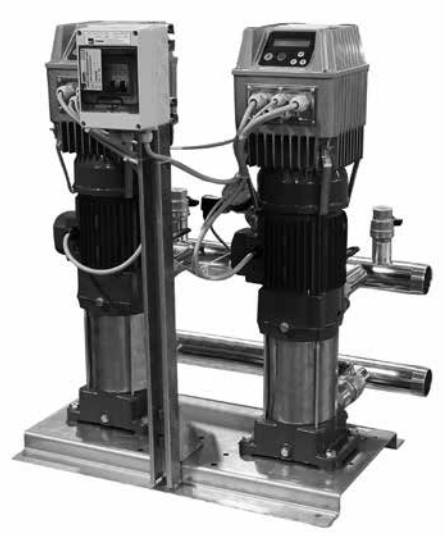


DIMENSION CHART

Model	Dimensions [mm]							Weight [kg]
	C	DNA	DNM	H	H1	P	S	
1GPE EVMG/B32 1-0F5/2.2 Edr2200 TT	160	DN 65	DN 65	225	1110	790	180	72
1GPE EVMG/B32 2-0F5/4 Edr4000 TT	160	DN 65	DN 65	225	1160	790	180	81
1GPE EVMG/B32 3-1F5/5.5 Edr5500 TT	160	DN 65	DN 65	225	1210	790	260	113
1GPE EVMG/B32 4-1F5/7.5 Edr7500 TT	160	DN 65	DN 65	225	1250	790	260	118
1GPE EVMG/B32 5-0F5/11 Edr11000 TT	160	DN 65	DN 65	225	1500	790	260	159
1GPE EVMG/B32 6-2F5/11 Edr11000 TT	160	DN 65	DN 65	225	1550	790	260	162
1GPE EVMG/B45 1-1F5/3 Edr4000 TT	185	DN 80	DN 80	260	1180	870	180	94
1GPE EVMG/B45 1-0F5/4 Edr4000 TT	185	DN 80	DN 80	260	1180	870	180	96
1GPE EVMG/B45 2-2F5/5.5 Edr5500 TT	185	DN 80	DN 80	260	1250	870	260	120
1GPE EVMG/B45 2-0F5/7.5 Edr7500 TT	185	DN 80	DN 80	260	1250	870	260	122
1GPE EVMG/B45 3-0F5/11 Edr11000 TT	185	DN 80	DN 80	260	1525	870	260	162
1GPE EVMG/B64 1-1F5/4 Edr4000 TT	185	DN 100	DN 100	260	1180	900	180	94
1GPE EVMG/B64 1-0F5/5.5 Edr5500 TT	185	DN 100	DN 100	260	1175	900	260	116
1GPE EVMG/B64 2-2F5/7.5 Edr7500 TT	185	DN 100	DN 100	260	1245	900	260	122
1GPE EVMG/B64 2-0F5/11 Edr11000 TT	185	DN 100	DN 100	260	1450	900	260	156

2GPE CVM E-drive

DOMESTIC PRESSURISATION



Inverter controlled units with two vertical multi-stage pumps.

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 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

2GPE CVM E-drive

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

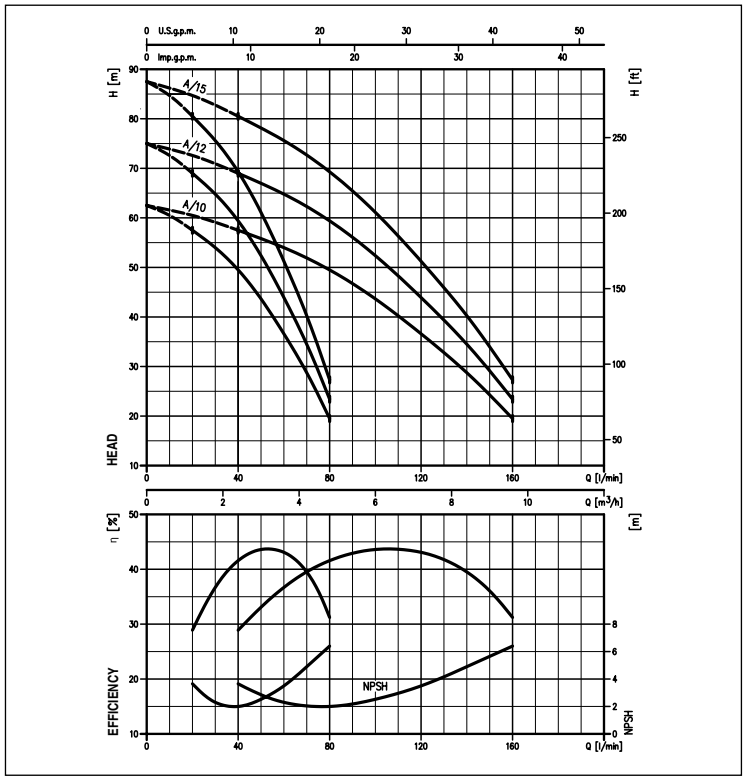
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

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

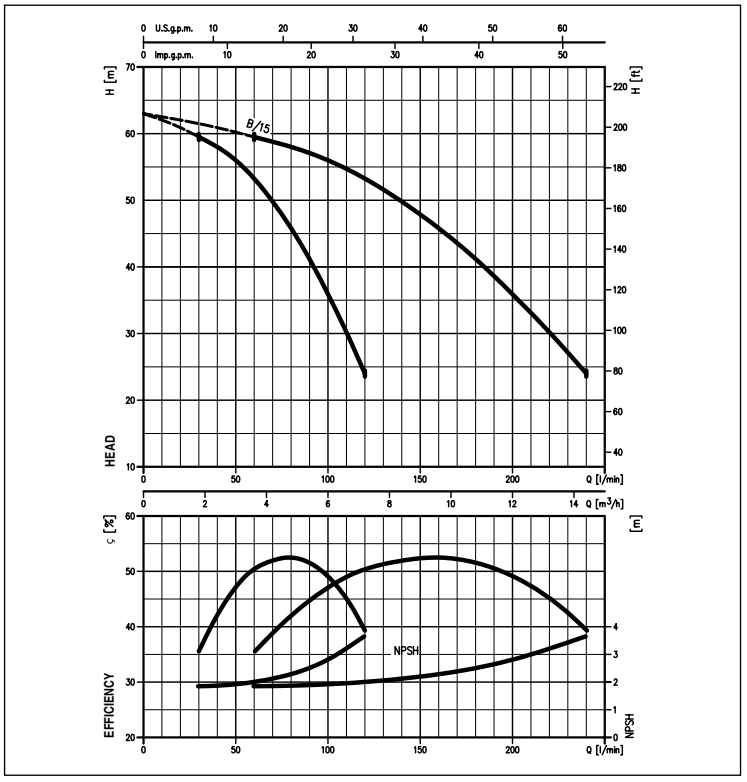
2GPE CVM E-drive

DOMESTIC PRESSURISATION

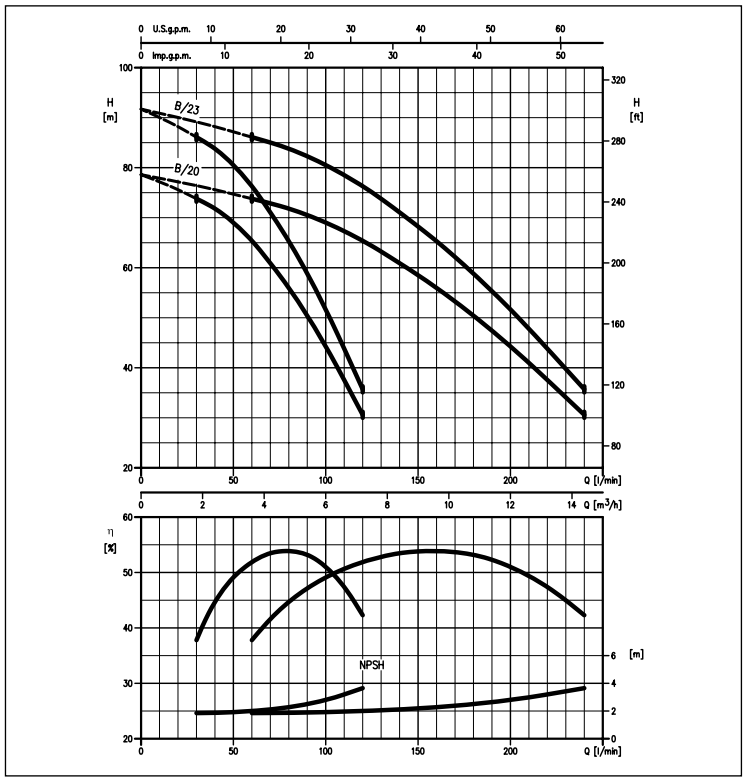
PERFORMANCE CURVES for 2GP CVM A 10 - A 12 - A 15 series
(ISO 9906 Annex A)



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)



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

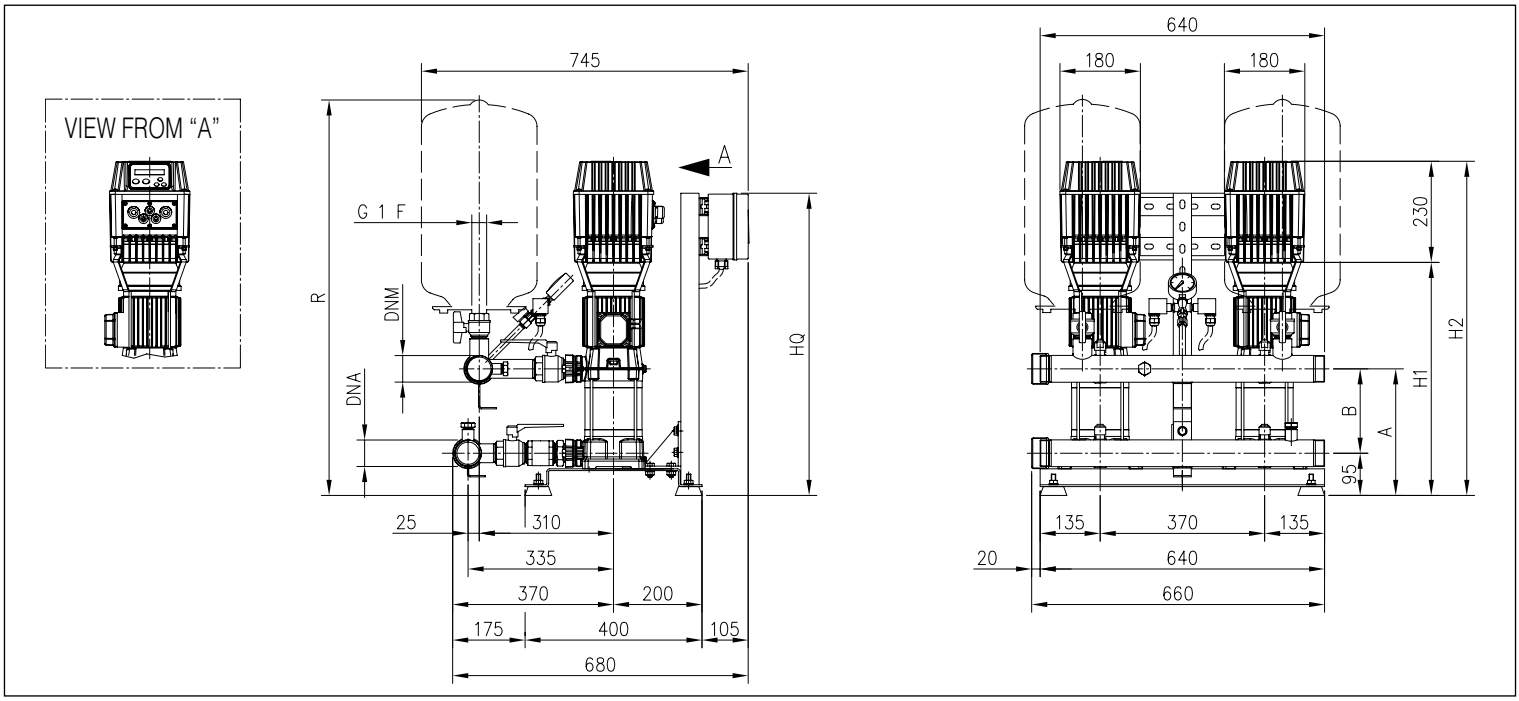
2GPE CVM E-drive

DOMESTIC PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model MT	Model TT	[kW]	Max absorption [A] Three-phase 230V	400V	Q = Flow rate l/min 40	60	80	100	120	160	200	240
					m^3/h 2.4	3.6	4.8	6	7.2	9.6	12	14.4
					H = Head [m]							
2GPE CVM A/10 E-DRIVE 1500 MT	2GPE CVM A/1 0 E -DRIVE 2200 TT	0.75+0.75	5.8	3.4	57.5	54.0	49.5	43.5	36.6	19.5	-	-
2GPE CVM A/12 E-DRIVE 1500 MT	2GPE CVM A/12 E -DRIVE 1500 TT	0.9+0.9	8.6	5.0	69.0	65.0	59.5	52.5	44.0	23.4	-	-
2GPE CVM A/15 E-DRIVE 1500 MT	2GPE CVM A/15 E -DRIVE 1500 TT	1.1+1.1	8.6	5.0	80.5	75.5	69.5	61.0	51.0	27.3	-	-
2GPE CVM B/15 E-DRIVE 1500 MT	2GPE CVM B/15 E-DRIVE 1500 TT	1.1+1.1	8.6	5.0	-	60.5	58.5	56.2	53.3	45.8	36.0	24.5
2GPE CVM B/20 E-DRIVE 1500 MT	2GPE CVM B/20 E-DRIVE 1500 TT	1.5+1.5	12.6	7.4	-	74.0	72.0	69.0	65.5	56.0	44.5	30.6
-	2GPE CVM B/23 E-DRIVE 2200 TT	1.7+1.7	-	8.0	-	86.0	84.0	80.5	76.5	65.5	51.5	35.7

DIMENSIONS

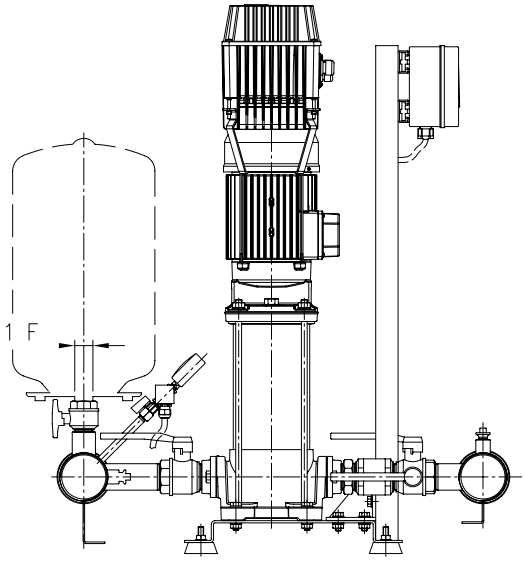


DIMENSION CHART

Model MT	Model TT	Dimensions [mm] A	B	R	DNA	DNM	H1	H2	HQ	Weight [kg]
2GPE CVM A/10 E-DRIVE 1500 MT	2GPE CVM A/1 0 E -DRIVE 2200 TT	285	190	890	G 2	G 2	510	740	665	72
2GPE CVM A/12 E-DRIVE 1500 MT	2GPE CVM A/12 E -DRIVE 1500 TT	310	215	915	G 2	G 2	550	780	690	76
2GPE CVM A/15 E-DRIVE 1500 MT	2GPE CVM A/15 E -DRIVE 1500 TT	335	240	940	G 2	G 2	575	805	730	76
2GPE CVM B/15 E-DRIVE 1500 MT	2GPE CVM B/15 E-DRIVE 1500 TT	285	190	890	G 2	G 2	525	755	680	75
2GPE CVM B/20 E-DRIVE 1500 MT	2GPE CVM B/20 E-DRIVE 1500 TT	310	215	915	G 2	G 2	585	815	725	85
-	2GPE CVM B/23 E-DRIVE 2200 TT	335	240	940	G 2	G 2	610	840	765	85

2GPE HVM E-drive

DOMESTIC PRESSURISATION



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

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

2GPE HVM E-drive

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
- 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

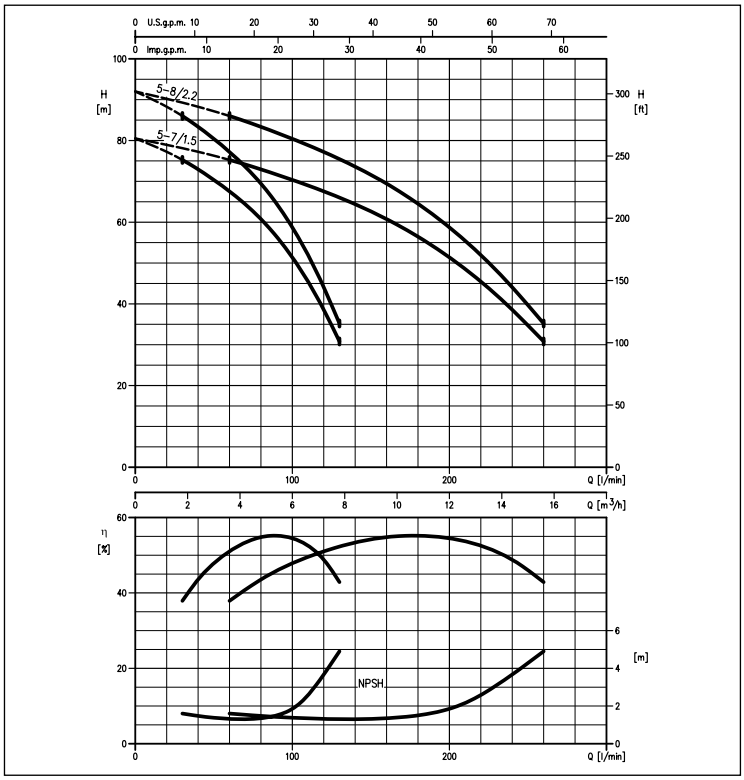
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

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

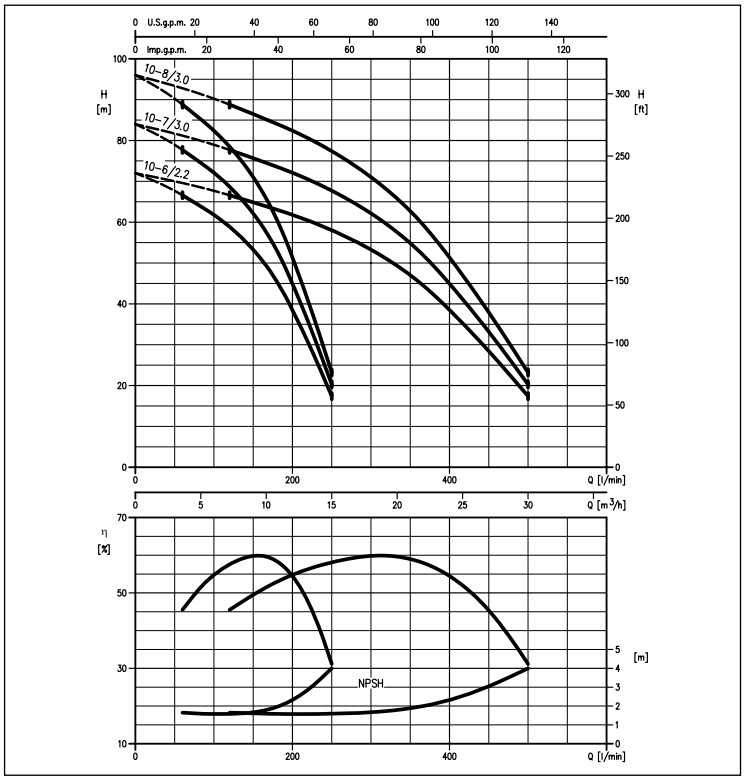
2GPE HVM E-drive

DOMESTIC PRESSURISATION

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

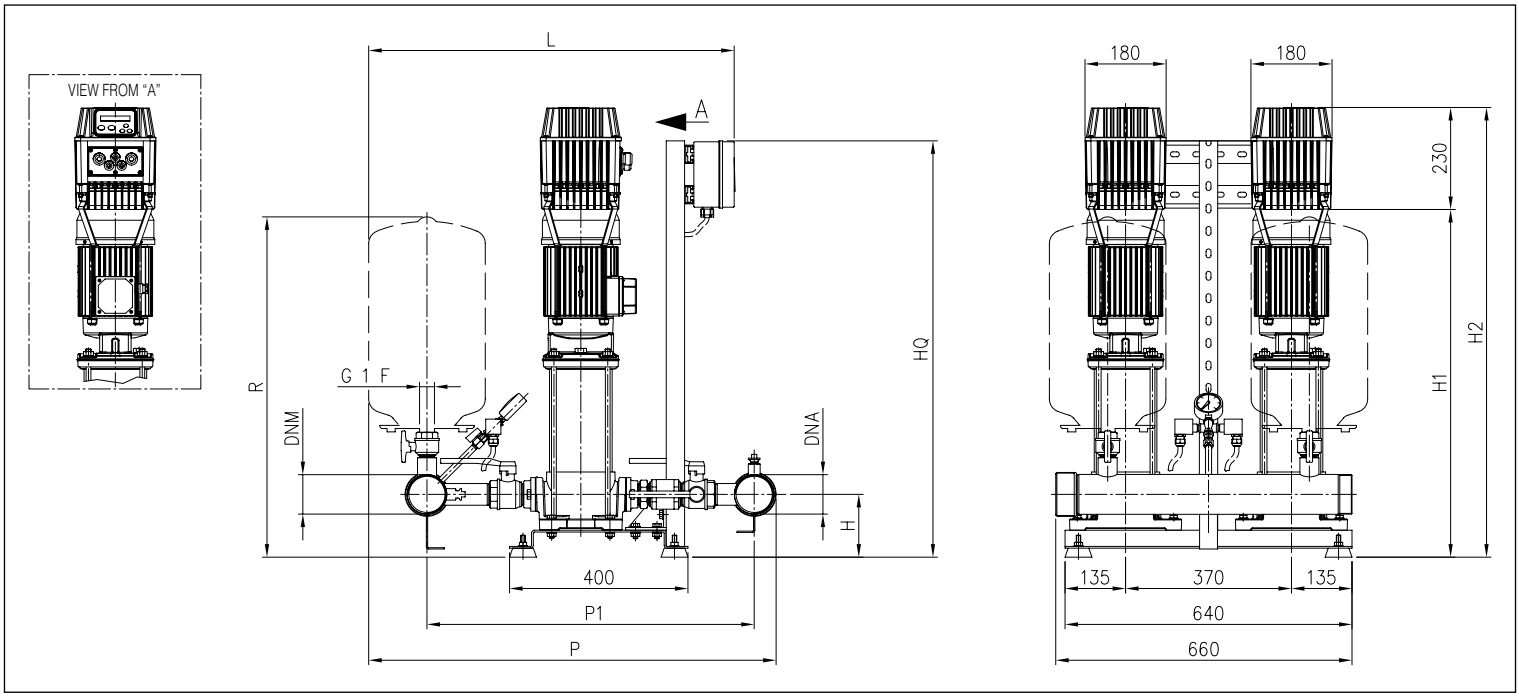
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model			Max absorption [A]		Q = Flow rate								
					60	90	120	160	200	260	320	400	500
MT	TT	[kW]	Three-phase 230V	Three-phase 400V	3.6	5.4	7.2	9.6	12	15.6	19.2	24	30
					H = Head [m]								
2GPE HVM 5-7N/1.5 E-DRIVE 1500 MT	2GPE HVM 5-7N/1.5 E-D RIVE 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	69.5	58.5	35.2	-	-	-
2GPE HVM 10-6N/2.2 E-DRIVE 3000 MT	2GPE HVM 10-6N/2.2 E-DRIVE 2200 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

2GPE HVM E-drive

DOMESTIC PRESSURISATION

DIMENSIONS 2GPE HVM E-*drive*

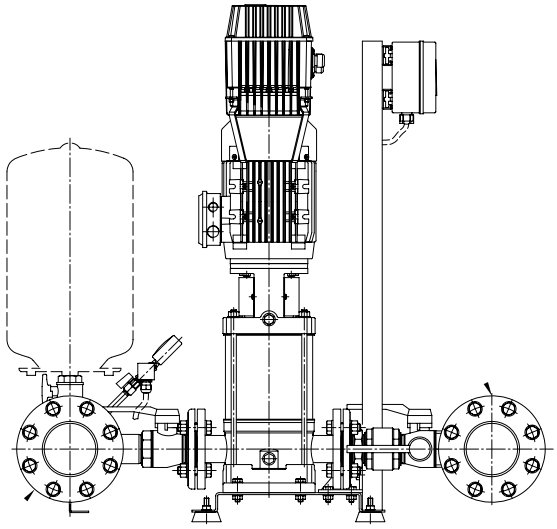


DIMENSION CHART

Model		Dimensions [mm]										Weight
MT	TT	L	R	P	P1	DNA	DNM	H	H1	H2	HQ	[kg]
2GPE HVM 5-7N/1.5 E-DRIVE 1500 MT	2GPE HVM 5-7N/1.5 E-D RIVE 2200 TT	785	715	805	640	G 2	G 2	110	670	900	825	106
-	2GPE HVM 5-8N/2.2 E-DRIVE 2200 TT	785	715	805	640	G 2	G 2	110	670	900	825	106
2GPE HVM 10-6N/2.2 E-DRIVE 3000 MT	2GPE HVM 10-6N/2.2 E-DRIVE 2200 TT	830	760	940	760	G 3	G 3	140	710	940	865	116
	2GPE HVM 10-7N/3.0 E-DRIVE 4000 TT	830	760	940	760	G 3	G 3	140	820	1050	1205	129
-	2GPE HVM 10-8N/3.0 E-DRIVE 4000 TT	830	760	940	760	G 3	G 3	140	850	1080	1235	131

2GPE EVMG E-drive

INDUSTRIAL PRESSURISATION



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 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

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

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

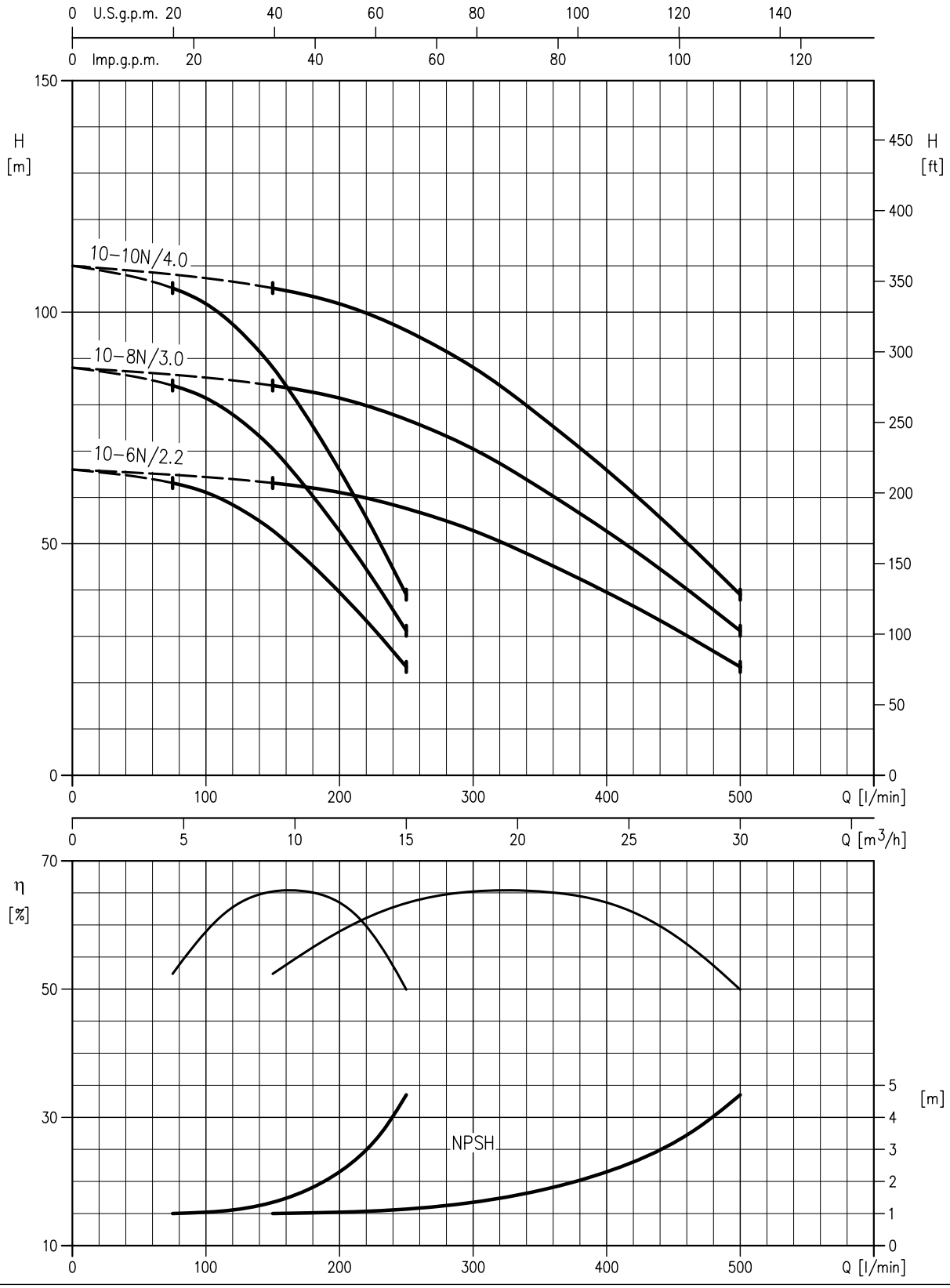
MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400V ±10% 50Hz (up to/incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)

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.

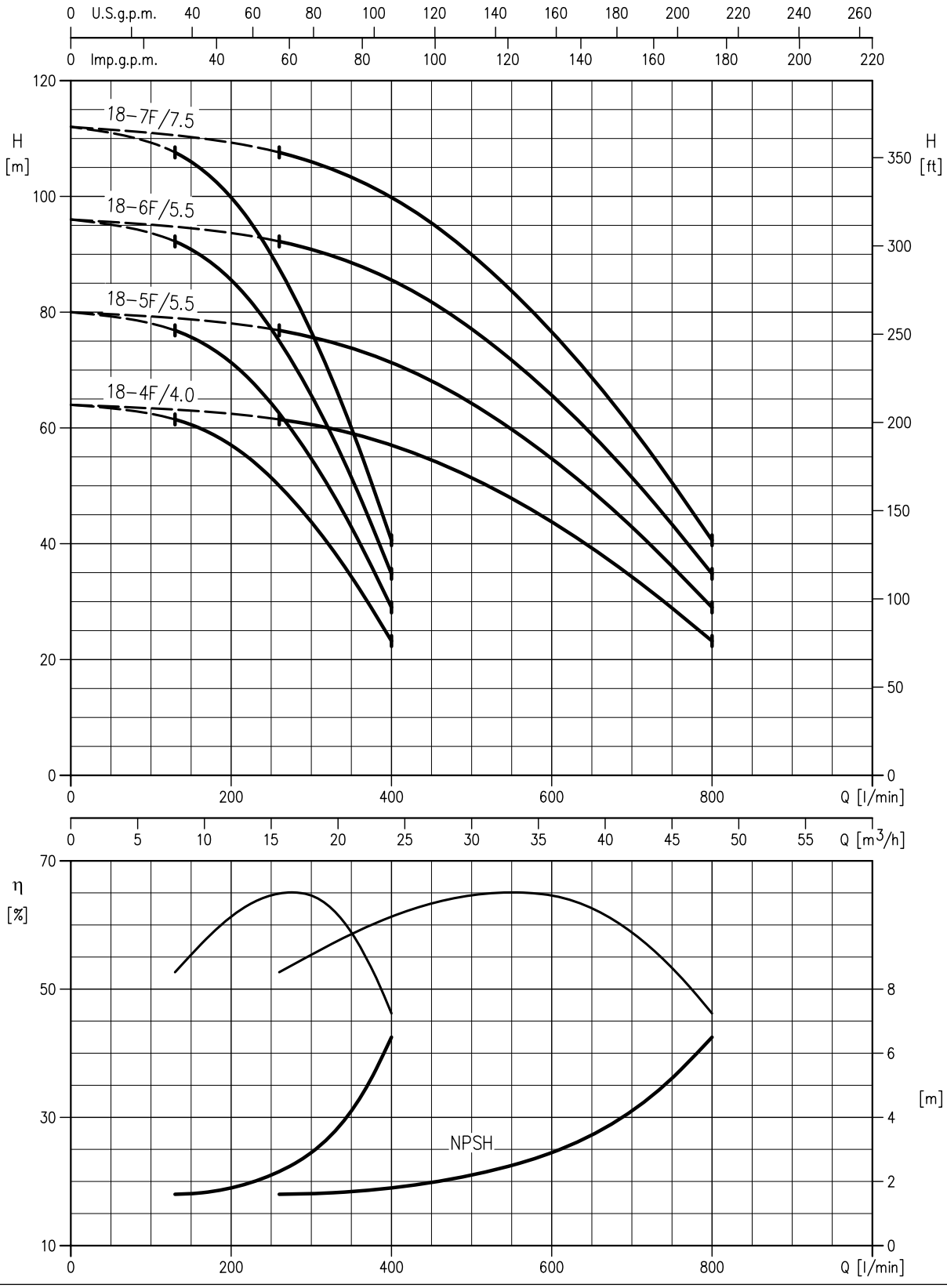
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

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



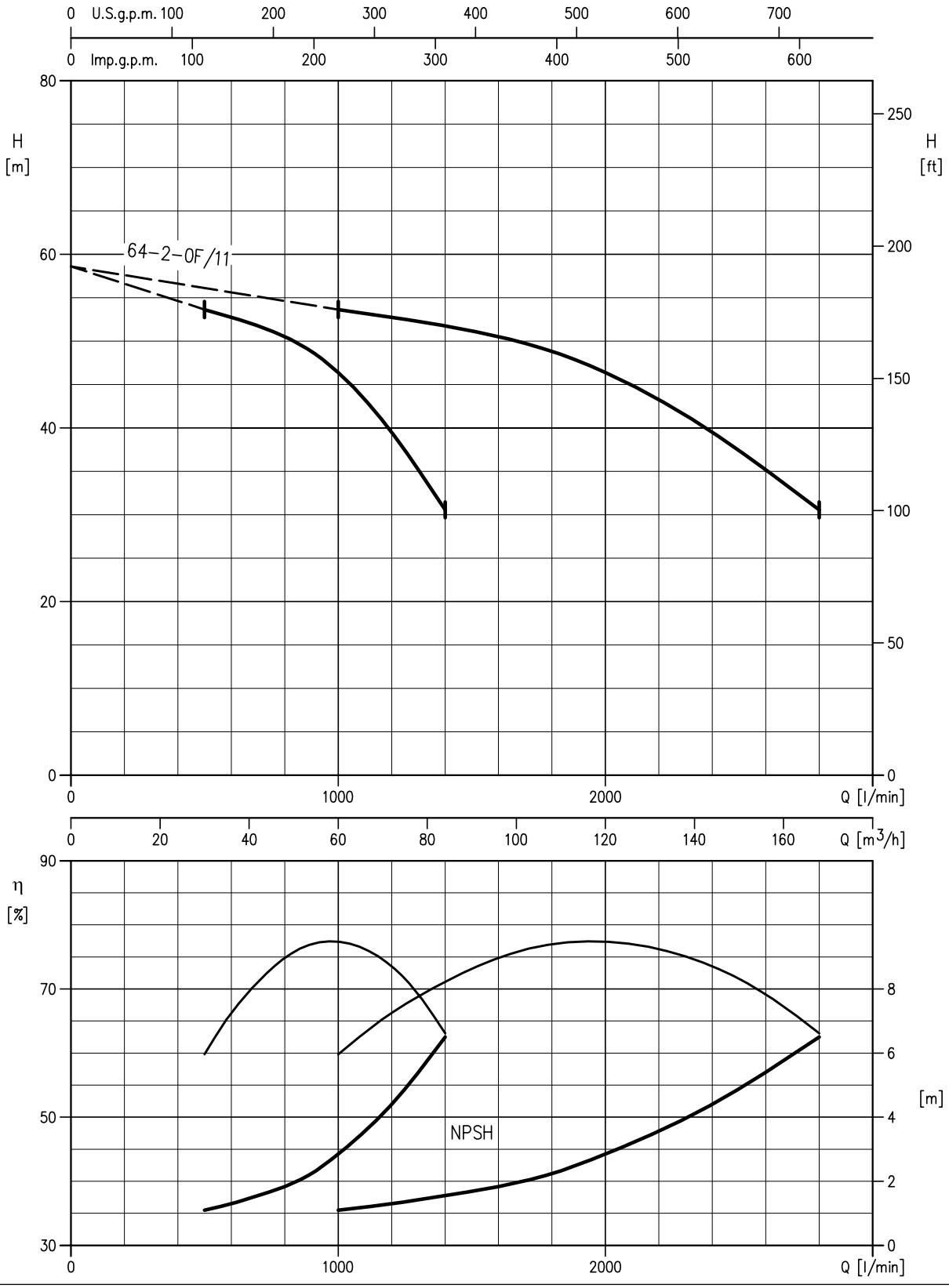
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GPE EVMG 18 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

PERFORMANCE CURVES for 2GPE EVMG 64 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

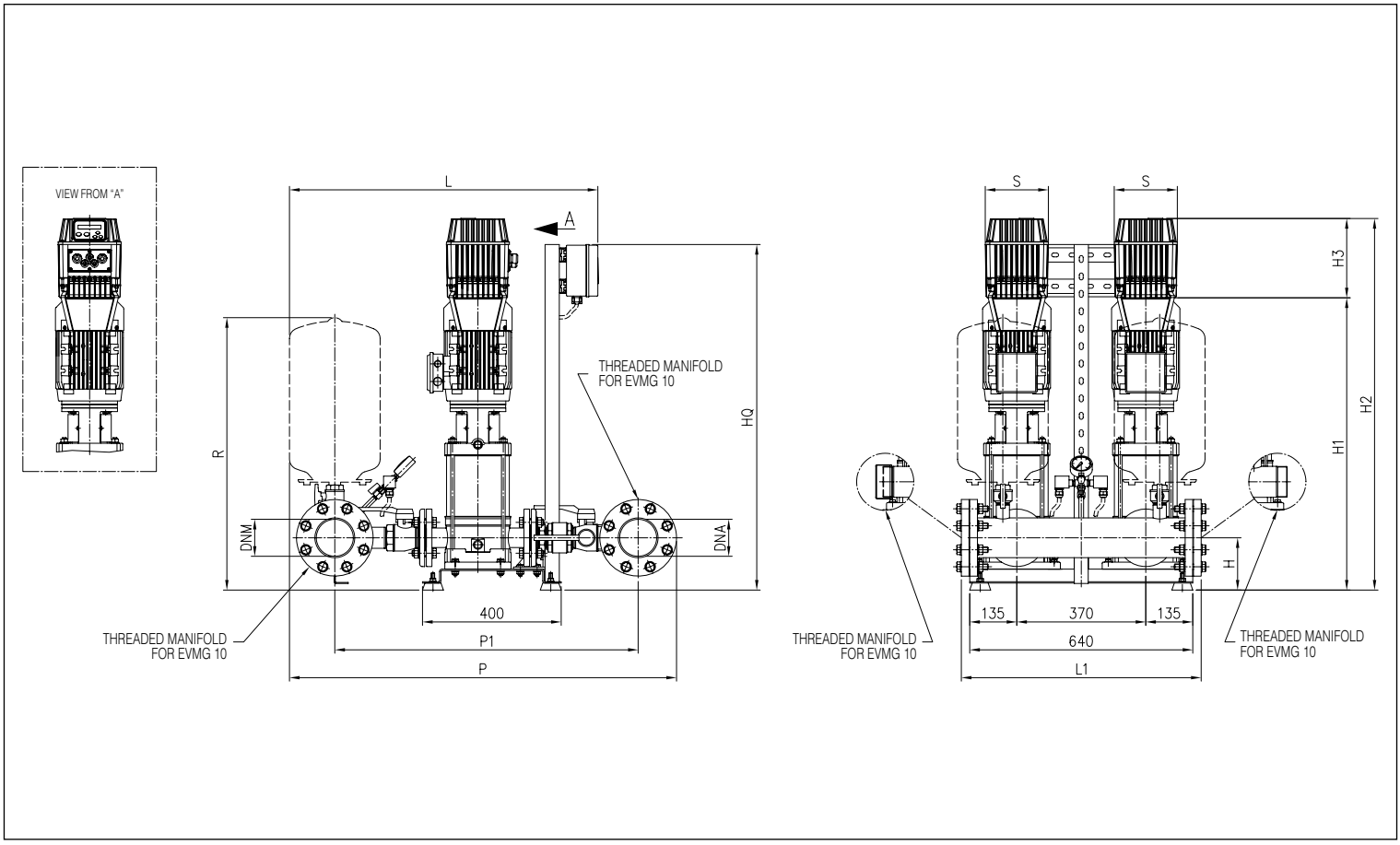
2GPE EVMG E-drive

INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	150	200	260	300	400	500	600	700	800
			m³/h	9	12	15.6	18	24	30	36	42	48
			H = Head [m]									
2GPE EVMG 10 6N5/2.2 E-DRIVE 2200 TT	2.2+2.2	8.8		63.0	61.0	57.0	53.0	39.5	23.4	-	-	-
2GPE EVMG 10 8N5/3 E-DRIVE 4000 TT	3+3	11.8		84.0	81.5	75.5	70.5	52.5	31.2	-	-	-
2GPE EVMG 10 10N5/4 E-DRIVE 4000 TT	4+4	15.6		105.0	102.0	94.5	88.0	66.0	39.0	-	-	-
2GPE EVMG 18 4F5/4 E-DRIVE 4000 TT	4+4	15.6		-	-	61.5	60.5	57.0	51.5	44.0	34.3	23.2
2GPE EVMG 18 5F5/5.5 E-DRIVE 5500 TT	5.5+5.5	20.8		-	-	77.0	75.5	71.5	64.5	54.5	43.0	29.0
2GPE EVMG 18 6F5/5.5 E-DRIVE 5500 TT	5.5+5.5	20.8		-	-	92.0	91.0	85.5	77.0	65.5	51.5	34.8
2GPE EVMG 18 7F5/7.5 E-DRIVE 7500 TT	7.5+7.5	28.4		-	-	108.0	106.0	100.0	90.0	76.5	60.0	40.5
2GPE EVMG 64 2-0F5/11 E-DR11000 TT	11+11	39.6		-	-	-	-	-	107.0	106.0	104.0	100.0

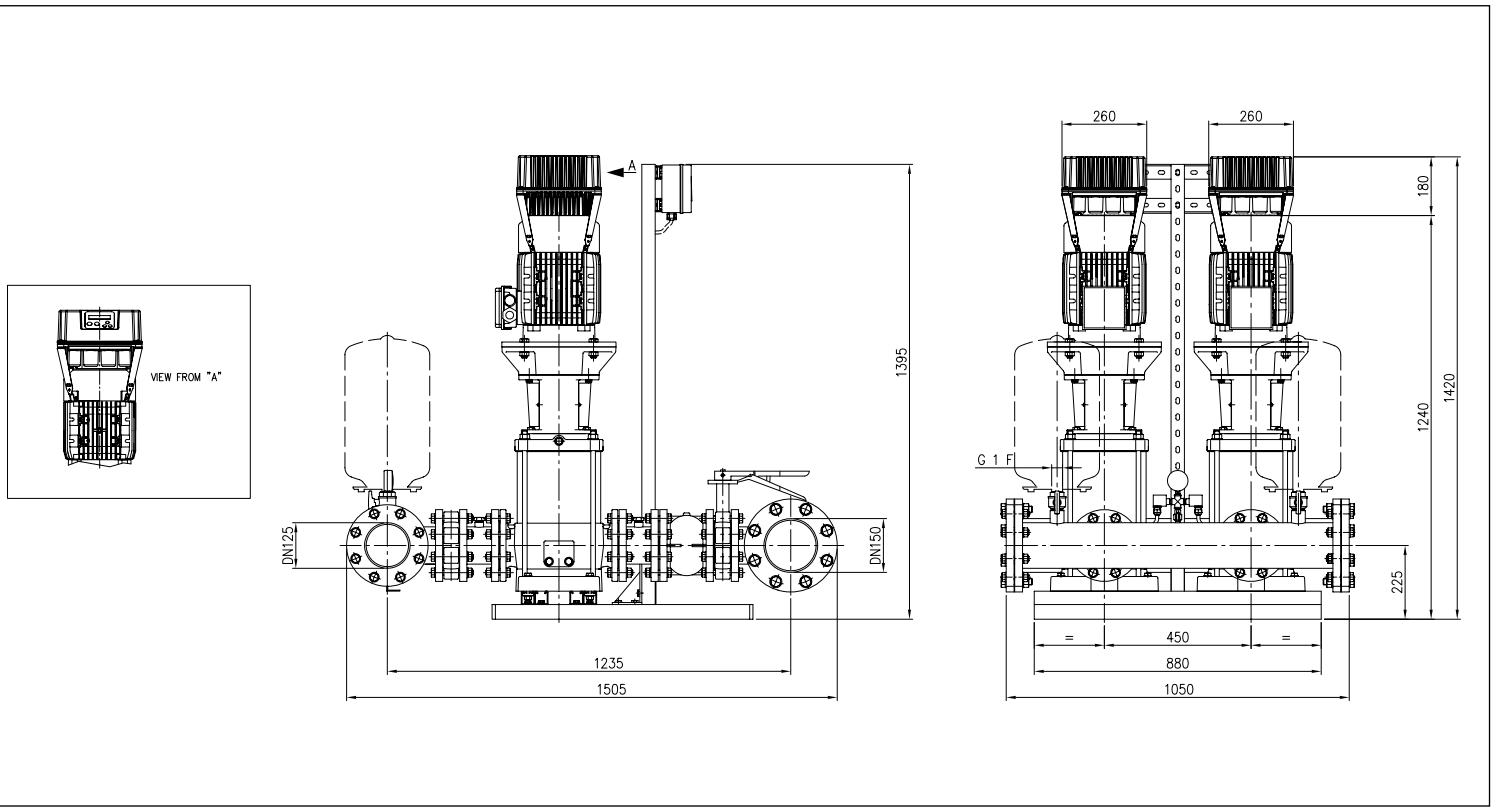
DIMENSIONS 2GPE EVMG 10-18 E-*drive*



DIMENSION CHART

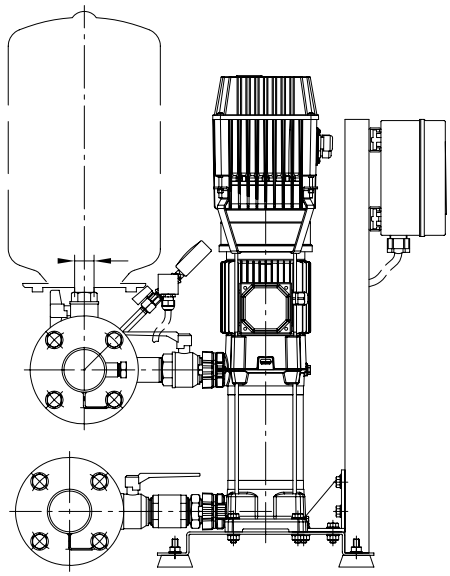
Model	Dimensions [mm] L	L1	R	p	P1	DNA	DNM	H	H1	H2	H3	HQ	S	Weight [kg]
2GPE EVMG 10 6N5/2.2 E-DRIVE 2200 TT	830	660	760	935	755	G3"	G3"	140	800	1030	230	955	180	131.0
2GPE EVMG 10 8N5/3 E-DRIVE 4000 TT	830	660	760	935	755	G3"	G3"	140	910	1140	230	1060	180	157.0
2GPE EVMG 10 10N5/4 E-DRIVE 4000 TT	830	660	760	935	755	G3"	G3"	140	970	1200	230	1020	180	159.0
2GPE EVMG 18 4F5/4 E-DRIVE 4000 TT	885	690	780	1110	870	DN100	DN100	150	840	1070	230	990	180	194.0
2GPE EVMG 18 5F5/5.5 E-DRIVE 5500 TT	885	690	780	1110	870	DN100	DN100	150	890	1070	180	990	260	240.0
2GPE EVMG 18 6F5/5.5 E-DRIVE 5500 TT	885	690	780	1110	870	DN100	DN100	150	950	1130	180	1025	260	275.0
2GPE EVMG 18 7F5/7.5 E-DRIVE 7500 TT	885	690	780	1110	870	DN100	DN100	150	990	1170	180	1065	260	284.0

DIMENSIONS 2GPE EVMG 64 2-0F5/11 E-*drive* 11000



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

3GPE CVM E-drive

INDUSTRIAL 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
- 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

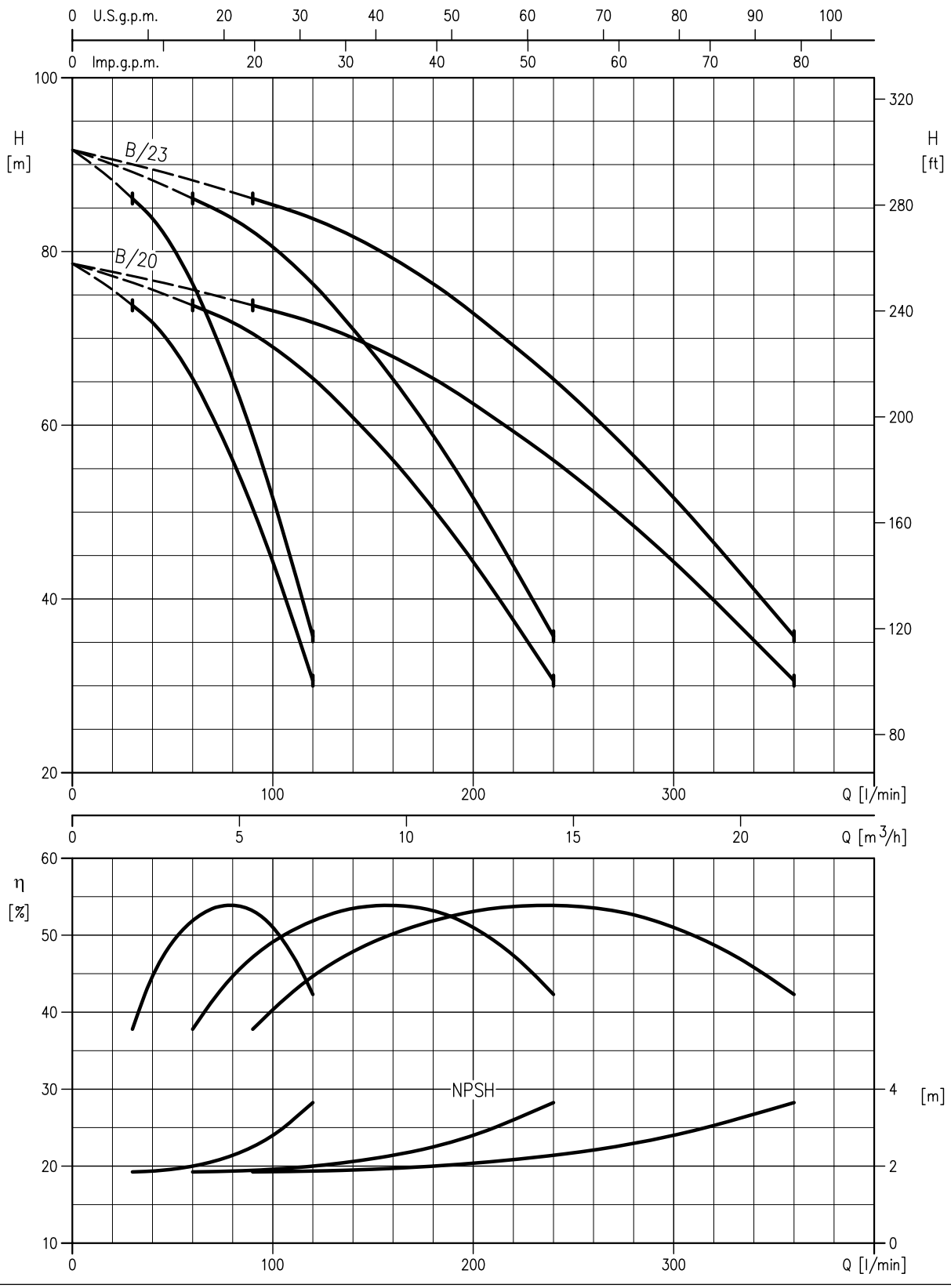
MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP44
- Three-phase voltage 230/400V ±10% 50Hz
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase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

PERFORMANCE CURVES for 3GPE CVM B/20 B/23 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

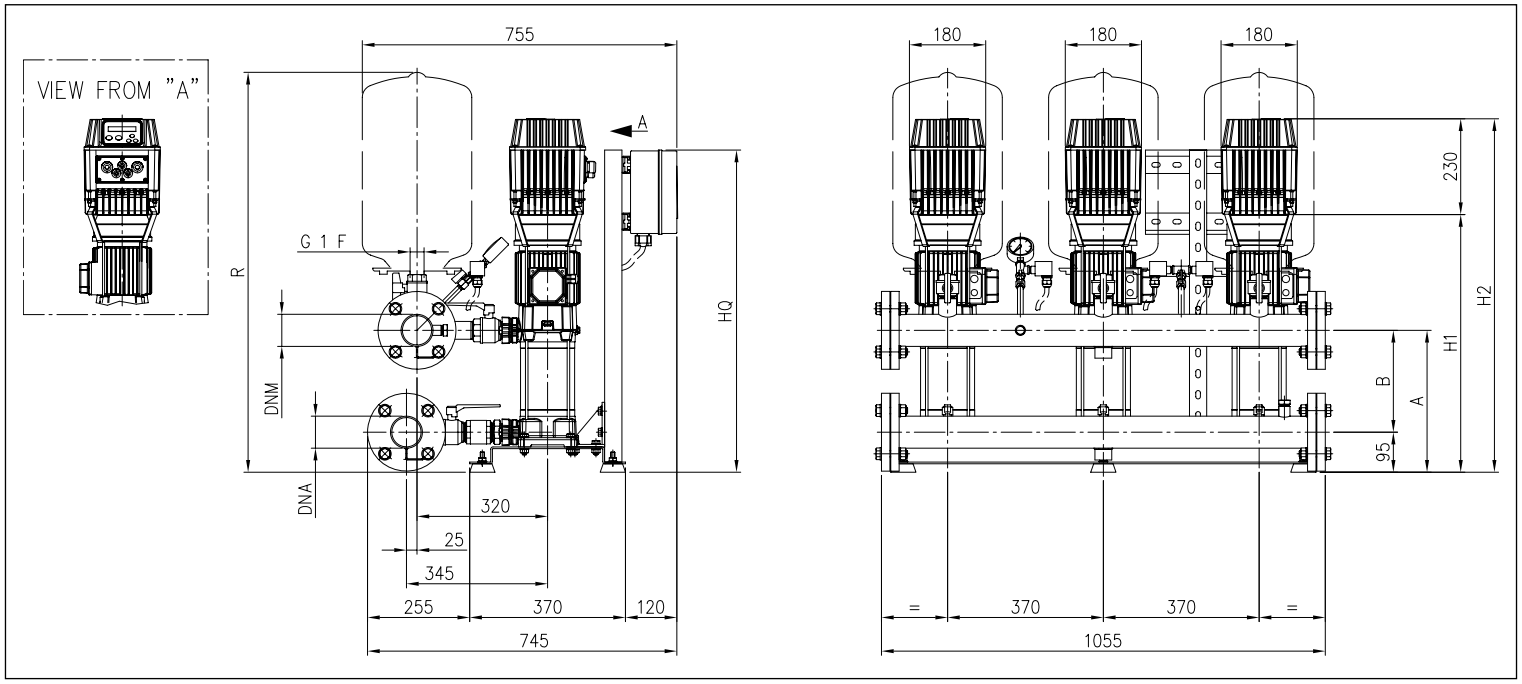
3GPE CVM E-drive

INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	60	90	120	150	180	240	300	360
			m³/h	3.6	5.4	7.2	9	10.8	14.4	18	21.6
			H = Head [m]								
3GPE CVM B/20 E-DRIVE 2200 TT	1.5+1.5+1.5	11.1		-	74.0	72.0	69.0	65.5	56.0	44.5	30.6
3GPE CVM B/23 E-DRIVE 2200 TT	1.7+1.7+1.7	12.0		-	86.0	84.0	80.5	76.5	65.5	51.5	35.7

DIMENSIONS 3GPE 3M

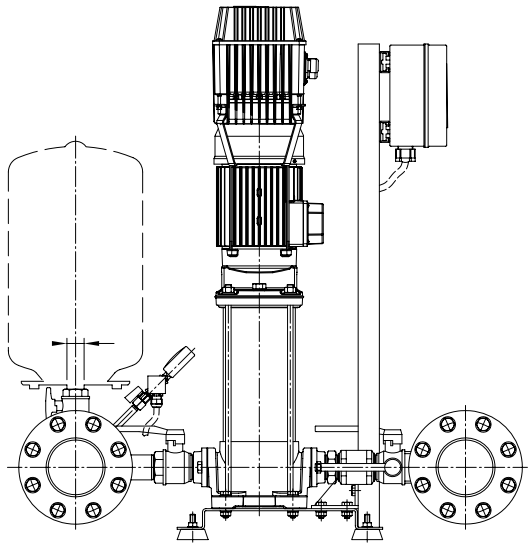


DIMENSION CHART

Model	Dimensions [mm] A	B	R	DNA	DNM	H1	H2	HQ	Weight [kg]
3GPE CVM B/20 E-DRIVE 2200 TT	310	215	925	DN 65	DN 65	585	815	725	148.0
3GPE CVM B/23 E-DRIVE 2200 TT	335	240	950	DN 65	DN 65	610	840	765	149.0

3GPE HVM 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 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

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

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

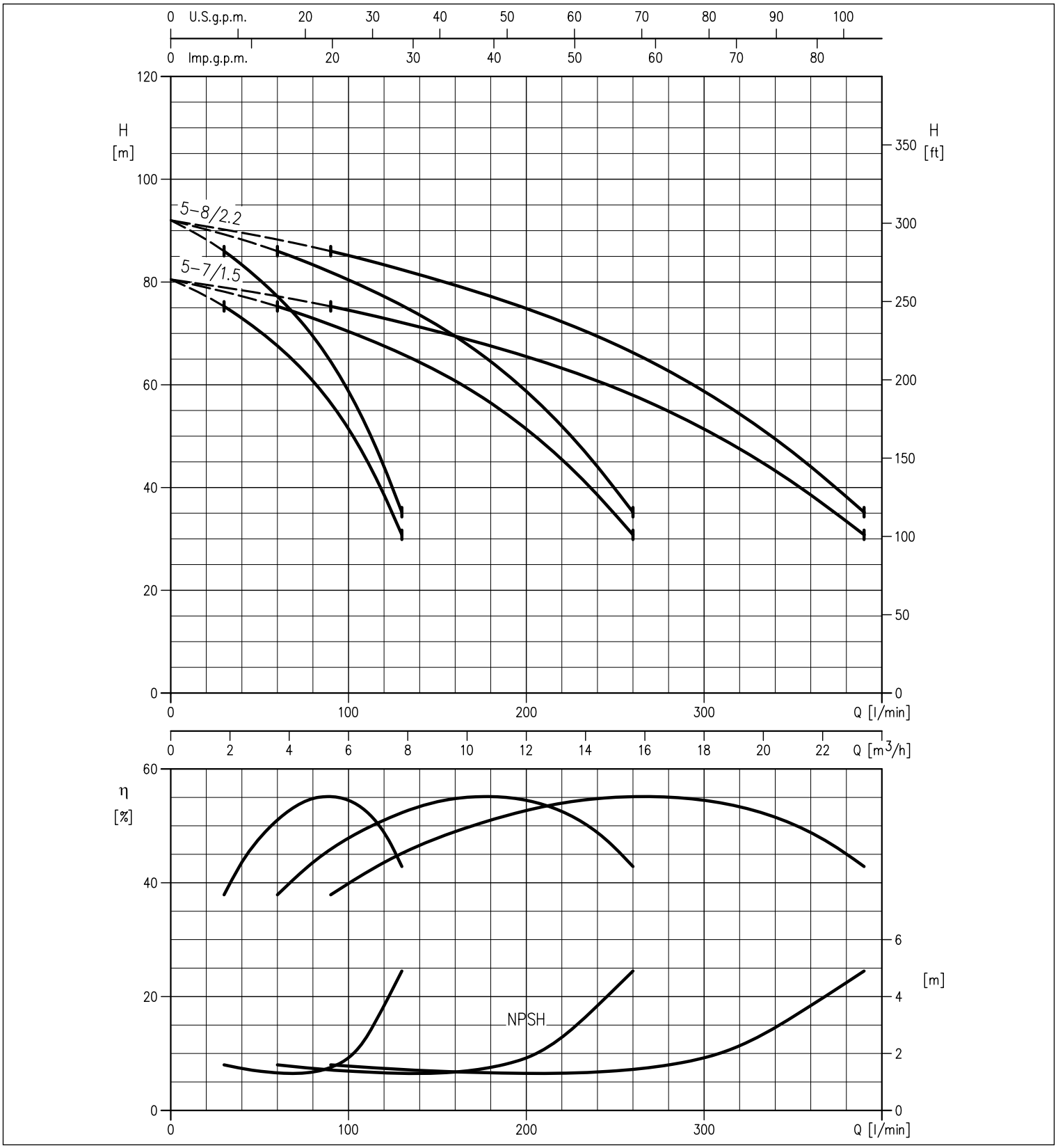
MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400V ±10% 50Hz,
- Permanently inserted capacitor and incorporated thermo-amperometric protection device with automatic rearm for single-phase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

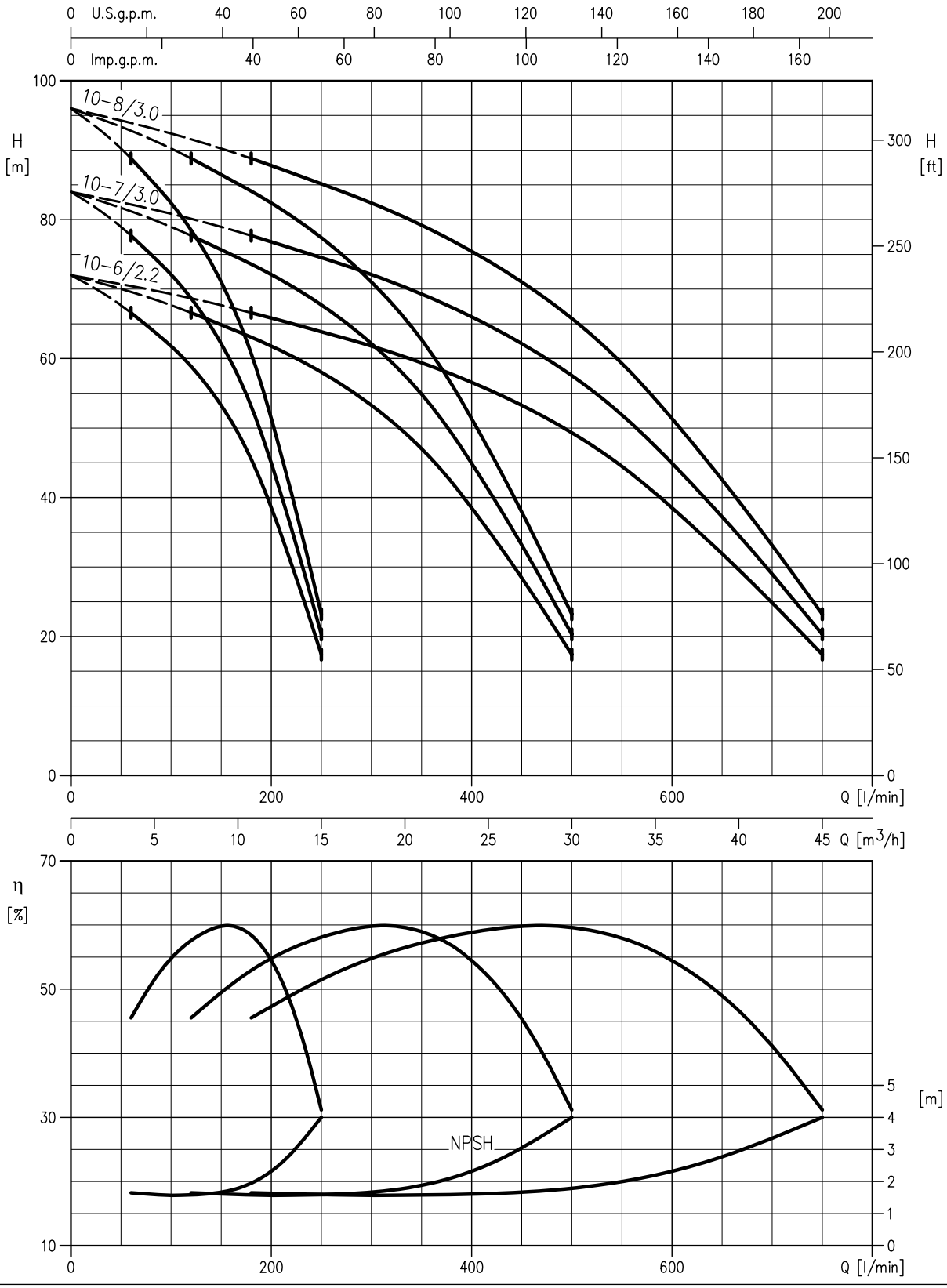
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

PERFORMANCE CURVES for 3GPE HVM 5 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 HVM 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

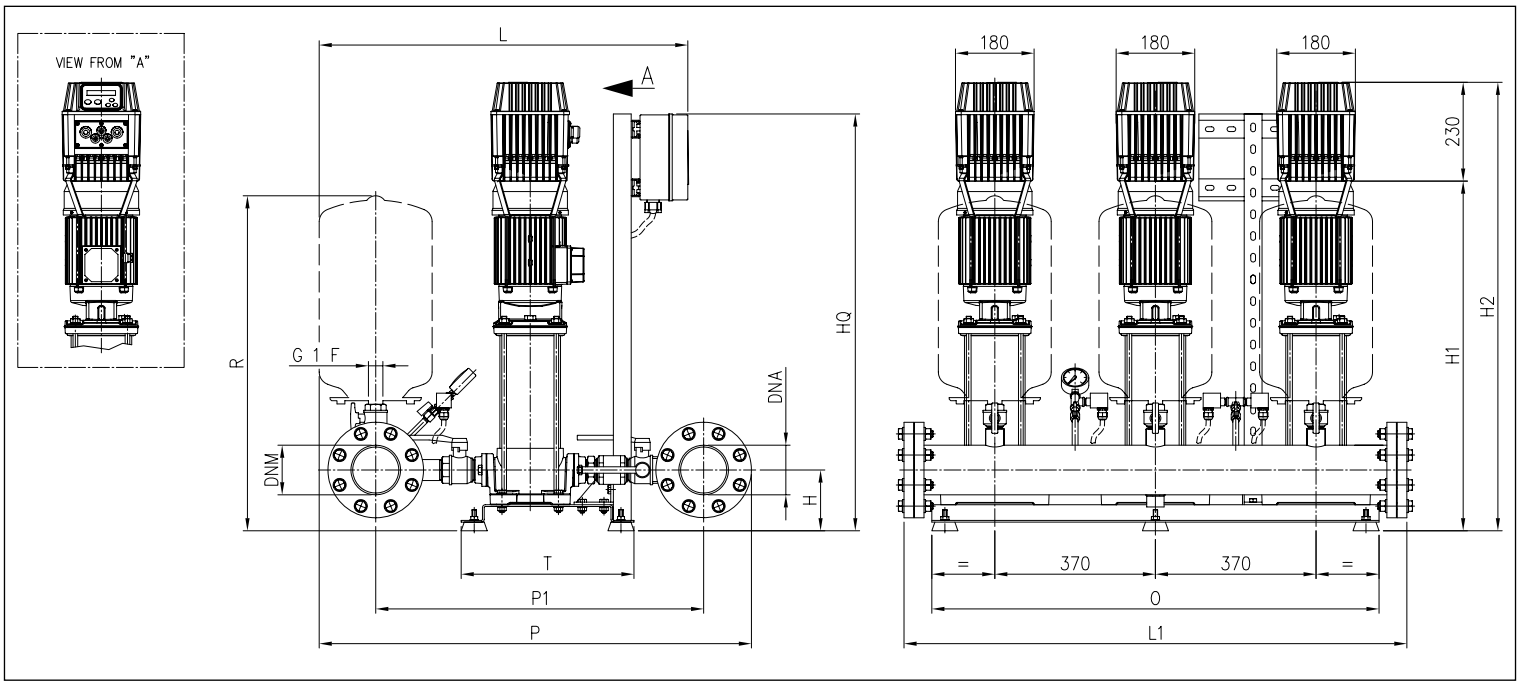
3GPE HVM E-drive

INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	90	135	180	240	300	390	480	600	750
			m³/h	5.4	8.1	10.8	14.4	18	23.4	28.8	36	45
			H = Head [m]									
3GPE HVM 5-7N/1.5 E -DRIVE 2200 TT	1.5+1.5+1.5	11.1		75.5	71.5	67.5	61.0	51.5	30.8	-	-	-
3GPE HVM 5-8N/2.2 E-DRIVE 2200 TT	2.2+2.2+2.2	14.1		86.0	82.0	77.0	69.5	58.5	35.2	-	-	-
3GPE HVM 10-6N/2.2 E-DRIVE 2200 TT	2.2+2.2+2.2	14.1		-	-	66.5	64.5	62.0	57.0	51.0	38.5	17.4
3GPE HVM 10-7N/3.0 E-DRIVE 4000 TT	3.0+3.0+3.0	18.3		-	-	77.5	75.0	72.0	66.5	59.5	45.0	20.3
3GPE HVM 10-8N/3.0 E-DRIVE 4000 TT	3.0+3.0+3.0	18.3		-	-	89.0	85.5	82.5	76.0	68.0	51.5	23.2

DIMENSIONS 3GPE HVM

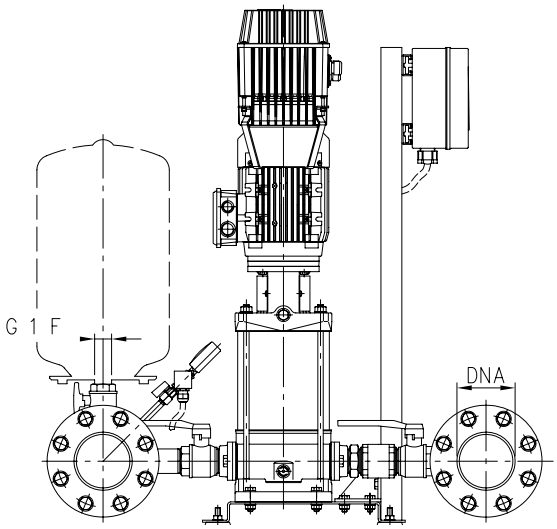


DIMENSION CHART

Model	Dimensions [mm] L	L1	0	R	p	P1	T	DNA	DNM	H	H1	H2	HQ	Weight [kg]
3GPE HVM 5-7N/1.5 E -DRIVE 2200 TT	795	1050	1010	725	880	680	370	DN 65	DN 65	110	670	900	810	164.0
3GPE HVM 5-8N/2.2 E-DRIVE 2200 TT	795	1050	1010	725	880	680	370	DN 65	DN 65	110	695	920	845	166.0
3GPE HVM 10-6N/2.2 E-DRIVE 2200 TT	865	1160	1030	770	1025	785	400	DN 100	DN 100	140	710	940	880	202.0
3GPE HVM 10-7N/3.0 E-DRIVE 4000 TT	865	1160	1030	770	1025	785	400	DN 100	DN 100	140	820	1050	930	223.0
3GPE HVM 10-8N/3.0 E-DRIVE 4000 TT	865	1160	1030	770	1025	785	400	DN 100	DN 100	140	850	1080	960	226.0

3GPE EVMG 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 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

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

3GPE 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 (models 32-45-64)
  (F= round counterflanges; N= oval counterflanges)
- PTFE wear rings

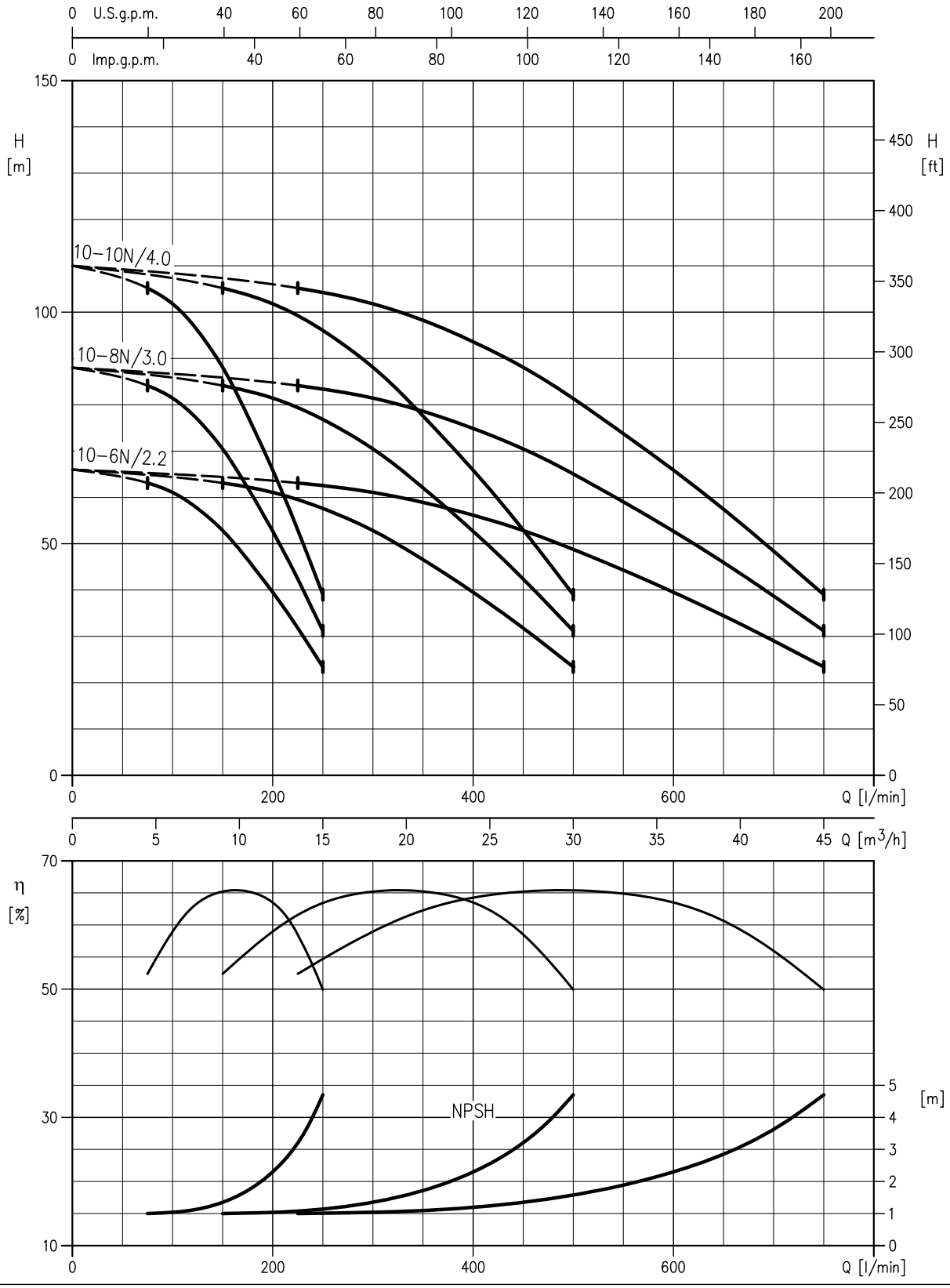
MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400V ±10% 50Hz (up to/incl. 4 kW), three-phase voltage 400/690V ±10% 50Hz (5.5 kW and over)

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.

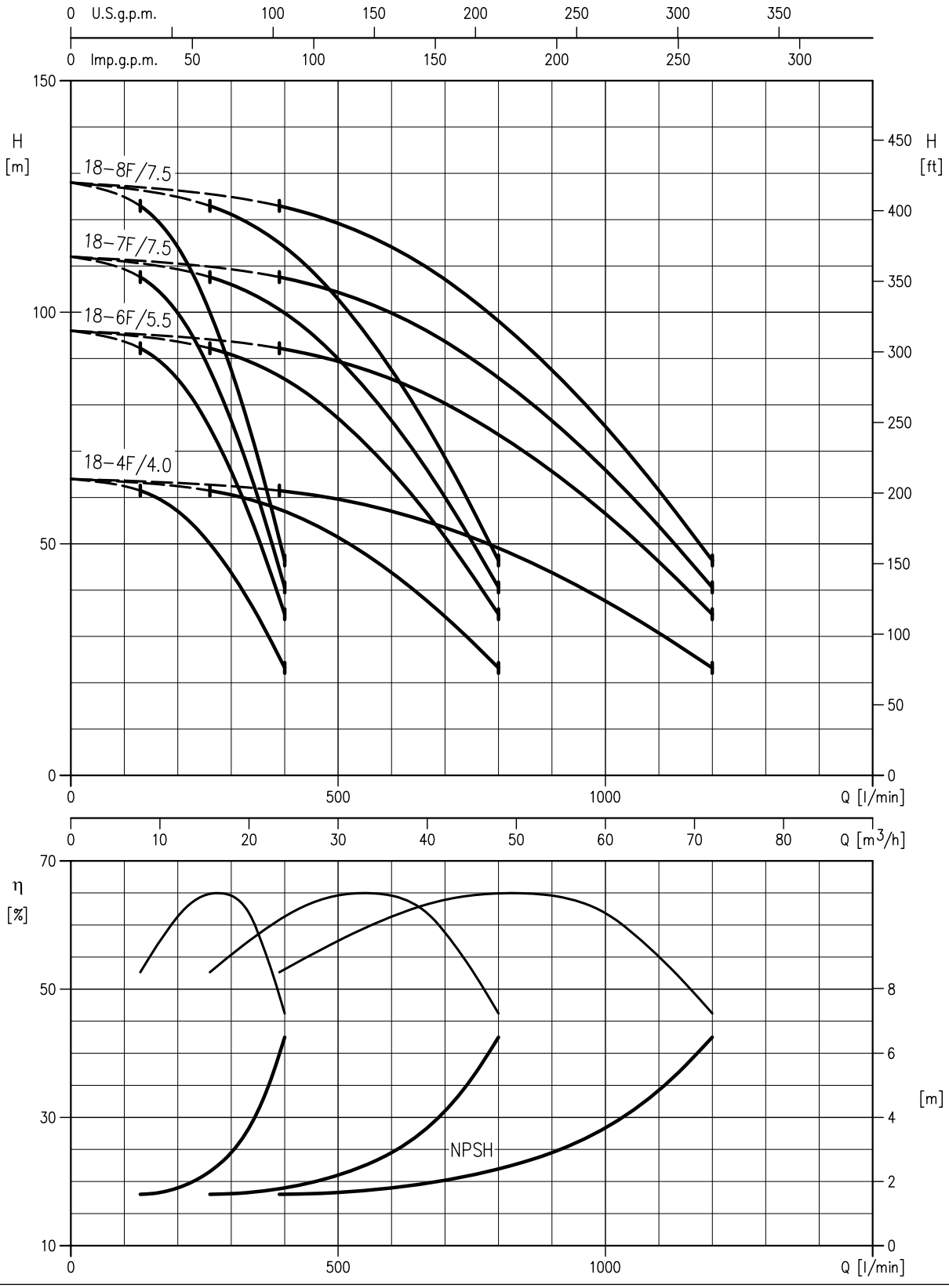
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

PERFORMANCE CURVES for 3GPE EVMG 10 E-*drive* (ISO 9906 Annex A)



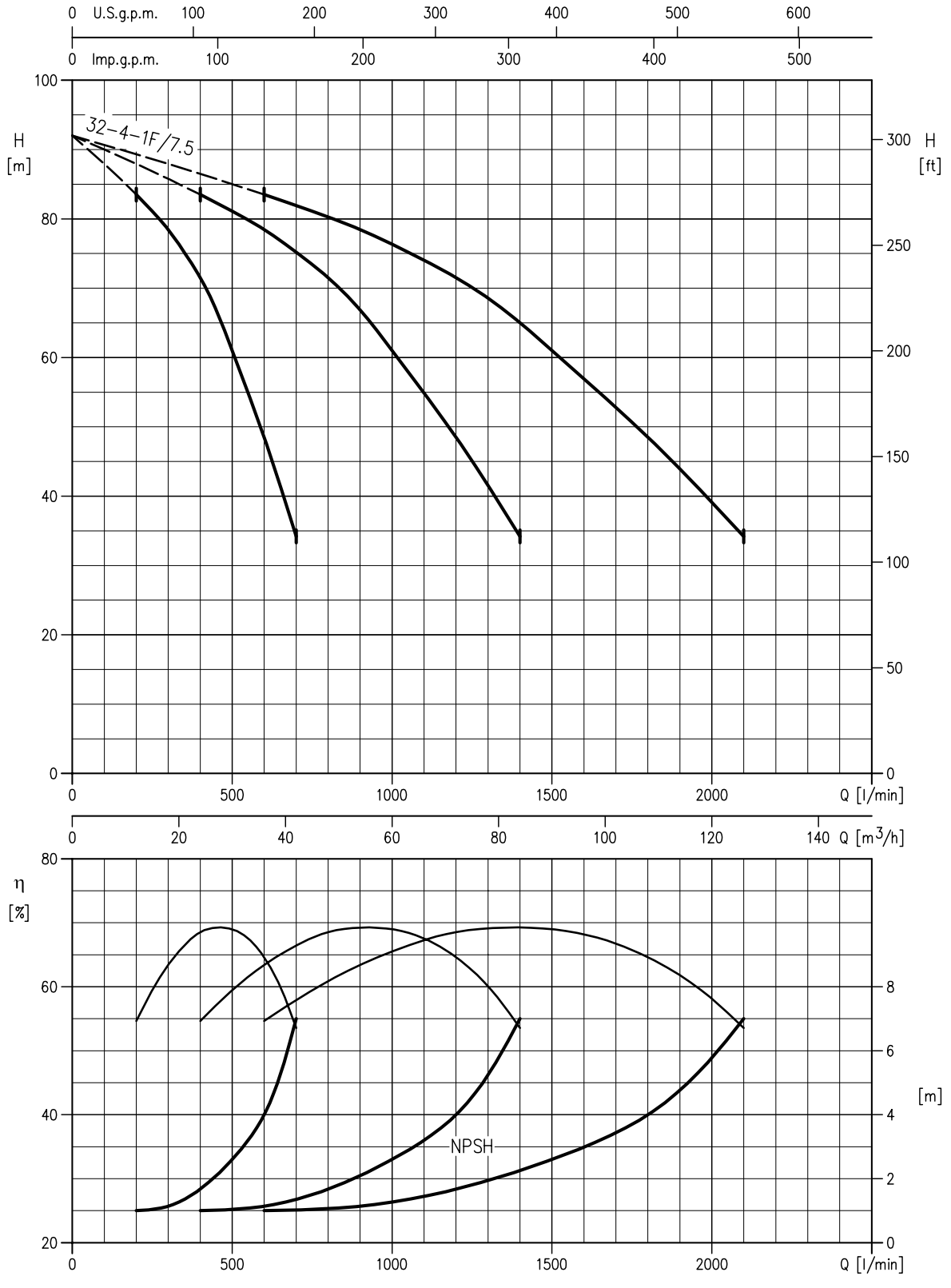
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GPE EVMG 18 E-*drive* (ISO 9906 Annex A)



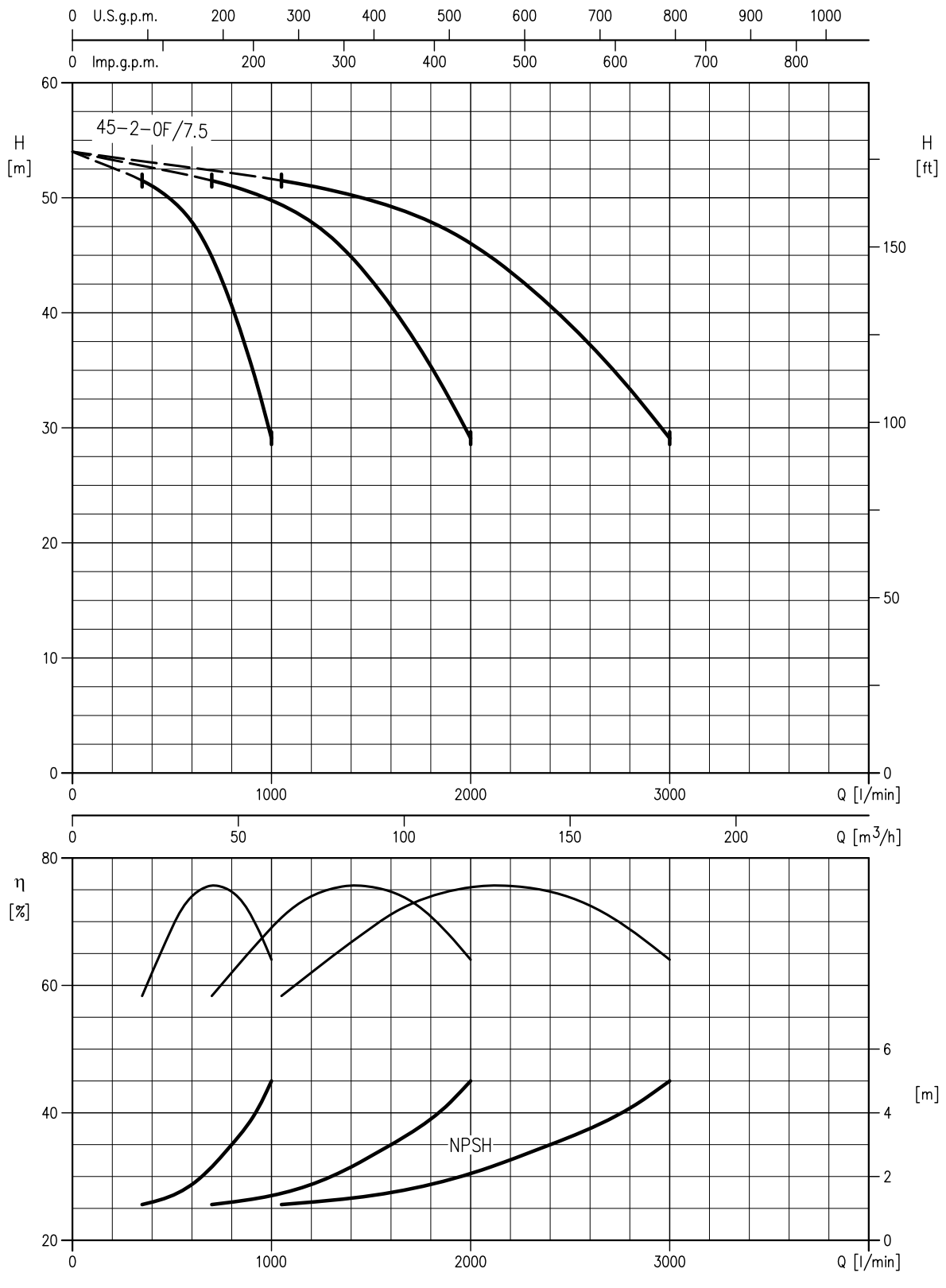
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

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

PERFORMANCE CURVES for 3GPE EVMG 45 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

3GPE EVMG E-drive

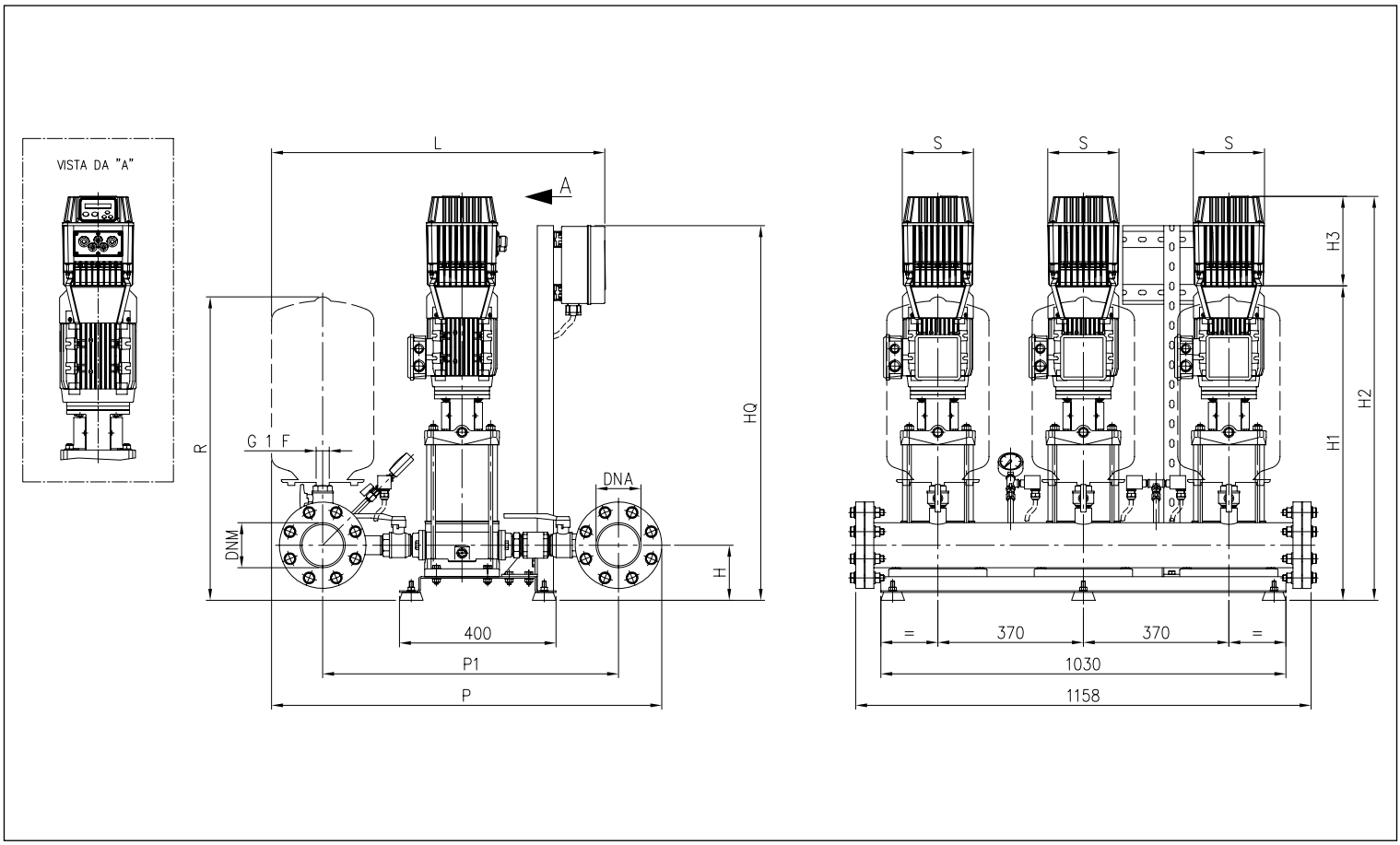
INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	225	300	390	450	600	750	900	1050	1200
			m³/h	13.5	18	23.4	27	36	45	54	63	72
			H = Head [m]									
3GPE EVMG 10 6N5/2.2 E-DRIVE 2200 TT	2.2+2.2+2.2	13.2		63.0	61.0	57.0	53.0	39.5	23.4	-	-	-
3GPE EVMG 10 8N5/3 E-DRIVE 4000 TT	3+3+3	17.7		84.0	81.5	75.5	70.5	52.5	31.2	-	-	-
3GPE EVMG 10 10N5/4 E-DRIVE 4000 TT	4+4+4	23.4		105.0	102.0	94.5	88.0	66.0	39.0	-	-	-
3GPE EVMG 18 4F5/4 E-DRIVE 4000 TT	4+4+4	23.4		-	-	61.5	60.5	57.0	51.5	44.0	34.3	23.2
3GPE EVMG 18 6F5/5.5 E-DRIVE 5500 TT	5.5+5.5+5.5	31.2		-	-	92.0	91.0	85.5	77.0	65.5	51.5	34.8
3GPE EVMG 18 7F5/7.5 E-DRIVE 7500 TT	7.5+7.5+7.5	42.6		-	-	108.0	106.0	100.0	90.0	76.5	60.0	40.5

Model	[kW]	Max absorption [A] Three-phase 400V	Q = Flow rate l/min	600	1050	1500	1800	2100	2700	3000
			m³/h	36	63	90	108	126	162	180
			H = Head [m]							
3GPE EVMG 32 4-1F/7.5 E-DRIVE 7500 TT	7.5+7.5+7.5	40.5		83.5	74.5	61.0	48.5	34.2	-	-
3GPE EVMG 45 2-0F/7.5 E-DRIVE 7500 TT	7.5+7.5+7.5	42.6		-	51.5	50.0	48.0	45.0	35.4	29.1

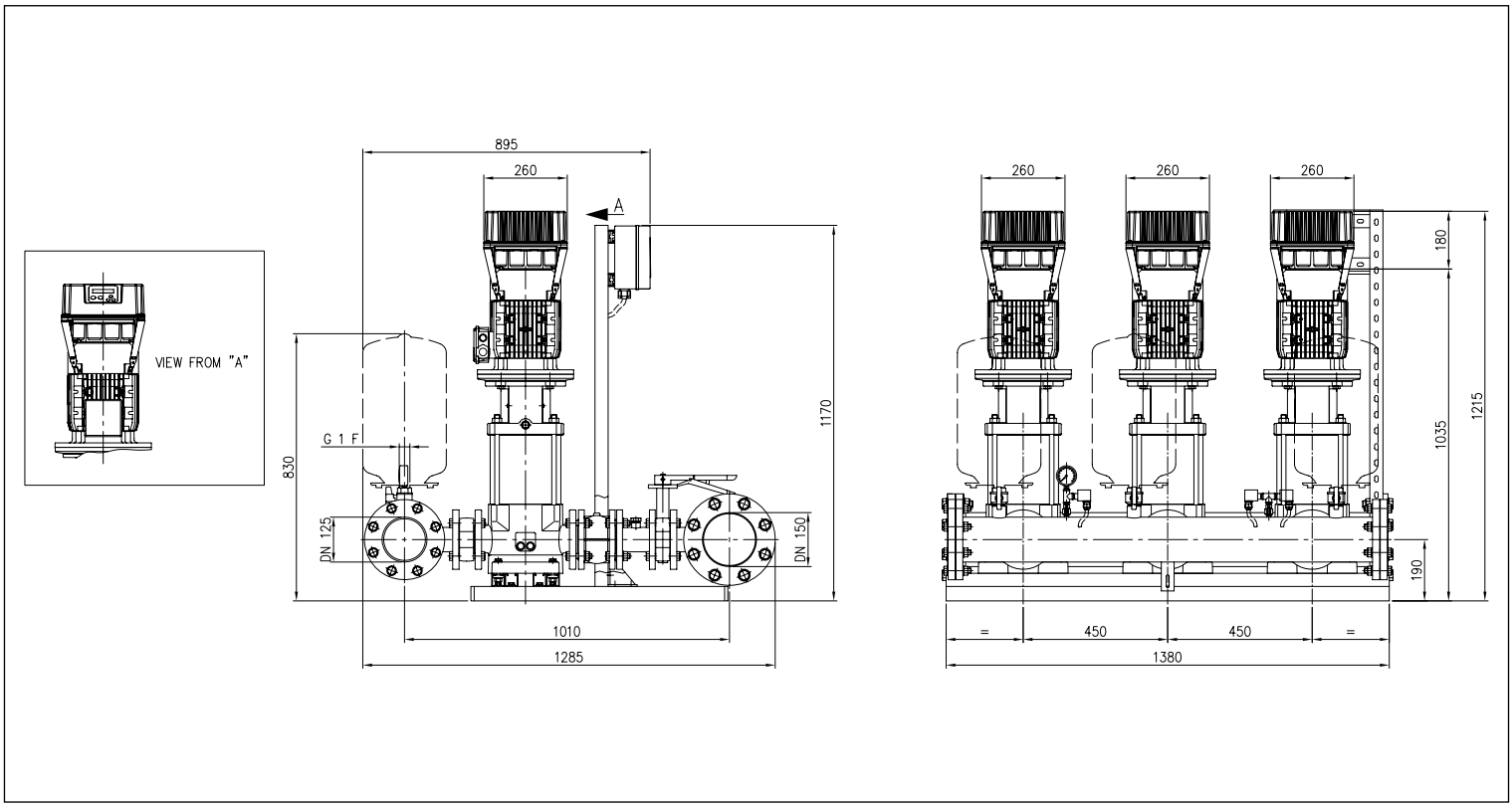
DIMENSIONS 3GPE EVMG 10-18 E-*drive*



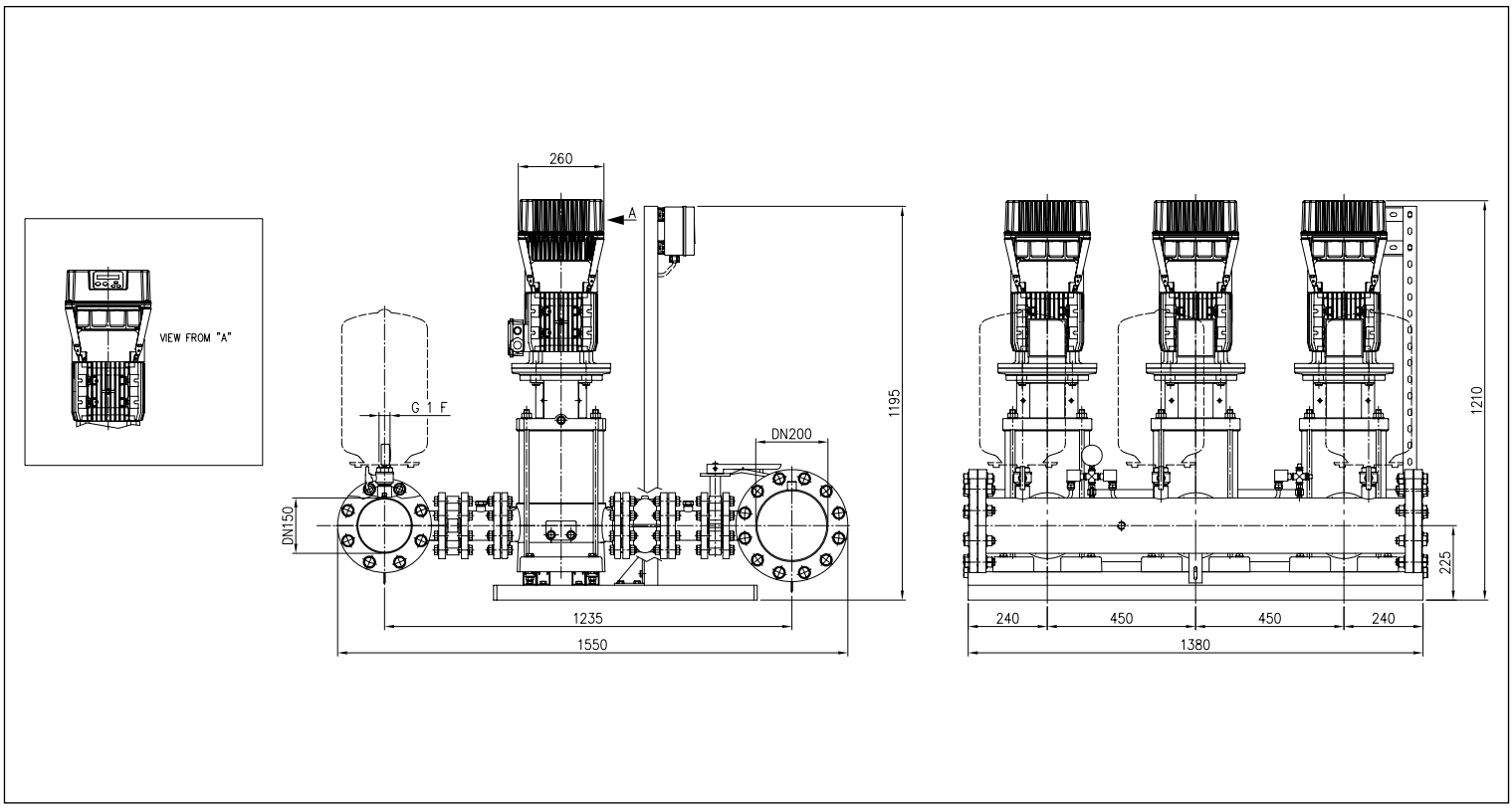
DIMENSION CHART

Model	Dimensions [mm] L	R	P	P1	DNA	DNM	H	H1	H2	H3	HQ	S	Weight [KG]
3GPE EVMG 10 6N5/2.2 E-DRIVE 2200 TT	860	770	1020	780	DN 100	DN 100	140	800	1030	230	955	180	171.0
3GPE EVMG 10 8N5/3 E-DRIVE 4000 TT	860	770	1020	780	DN 100	DN 100	140	910	1140	230	1060	180	212.0
3GPE EVMG 10 10N5/4 E-DRIVE 4000 TT	860	770	1020	780	DN 100	DN 100	140	970	1200	230	1050	180	215.0
3GPE EVMG 18 4F5/4 E-DRIVE 4000 TT	930	795	1205	950	DN 125	DN 125	150	840	1070	230	995	180	288.0
3GPE EVMG 18 6F5/5.5 E-DRIVE 5500 TT	930	795	1205	950	DN 125	DN 125	150	950	1130	180	1025	260	366.0
3GPE EVMG 18 7F5/7.5 E-DRIVE 7500 TT	930	795	1205	950	DN 125	DN 125	150	990	1170	180	1065	260	379.0
3GPE EVMG 18 8F5/7.5 E-DRIVE 7500 TT	930	795	1205	950	DN 125	DN 125	150	1030	1210	180	1105	260	379.0

DIMENSIONS 3GPE EVMG 32 E-*drive*

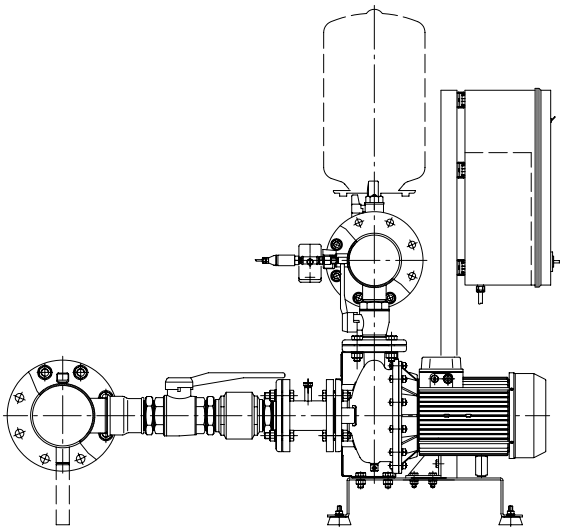


DIMENSIONS 3GPE EVMG 45 E-*drive*



2GPE 3M EFC

INDUSTRIAL PRESSURISATION



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

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

2GPE 3M EFC

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 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

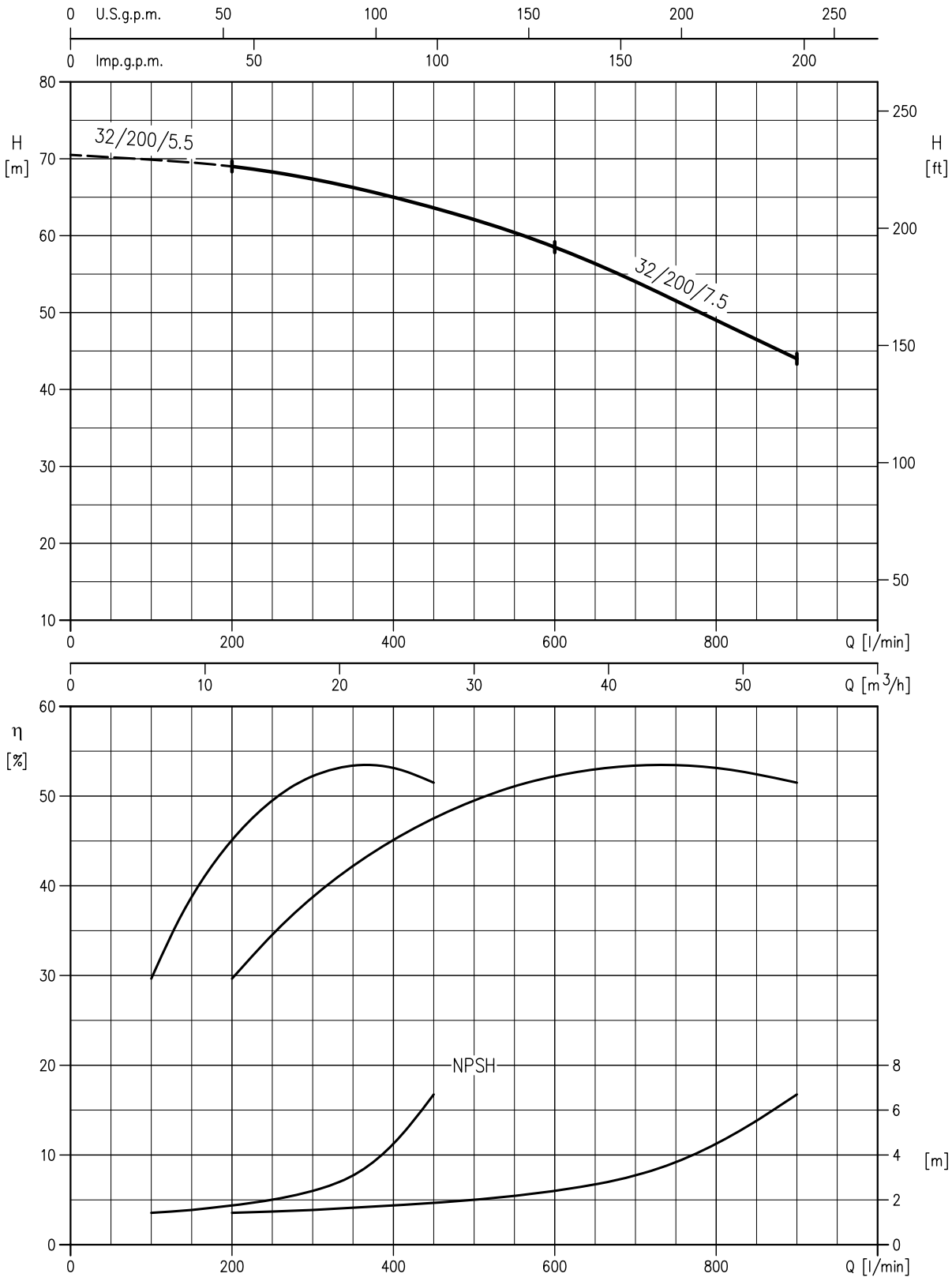
ACCESSORIES
- Membrane accumulation tank: depending on installation conditions

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

2GPE 3M EFC

INDUSTRIAL PRESSURISATION

PERFORMANCE CURVES for 2GPE 3M 32 EFC (ISO 9906 Annex A)

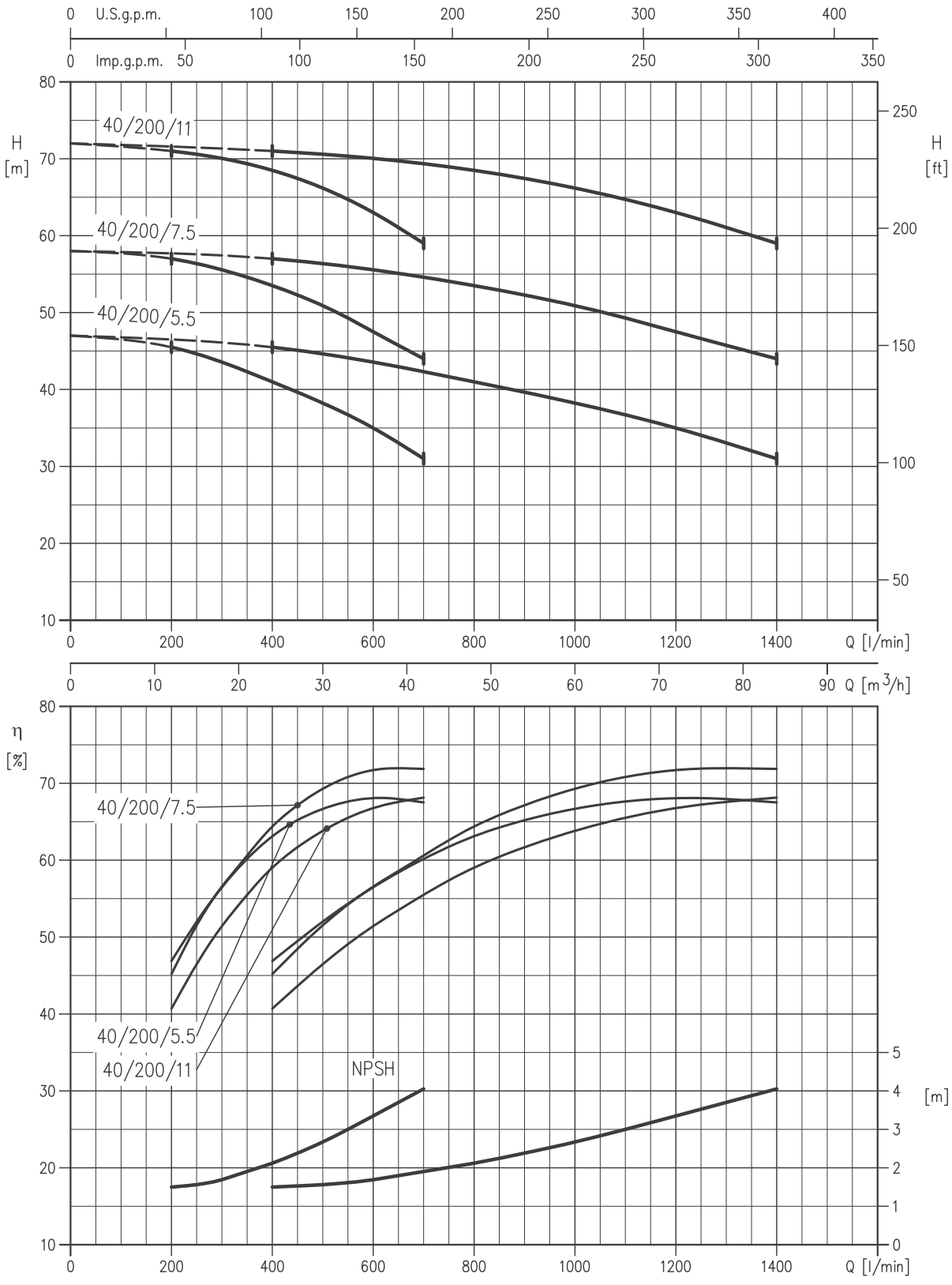


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

2GPE 3M EFC

INDUSTRIAL PRESSURISATION

PERFORMANCE CURVES for 2GPE 3M 40 EFC (ISO 9906 Annex A)

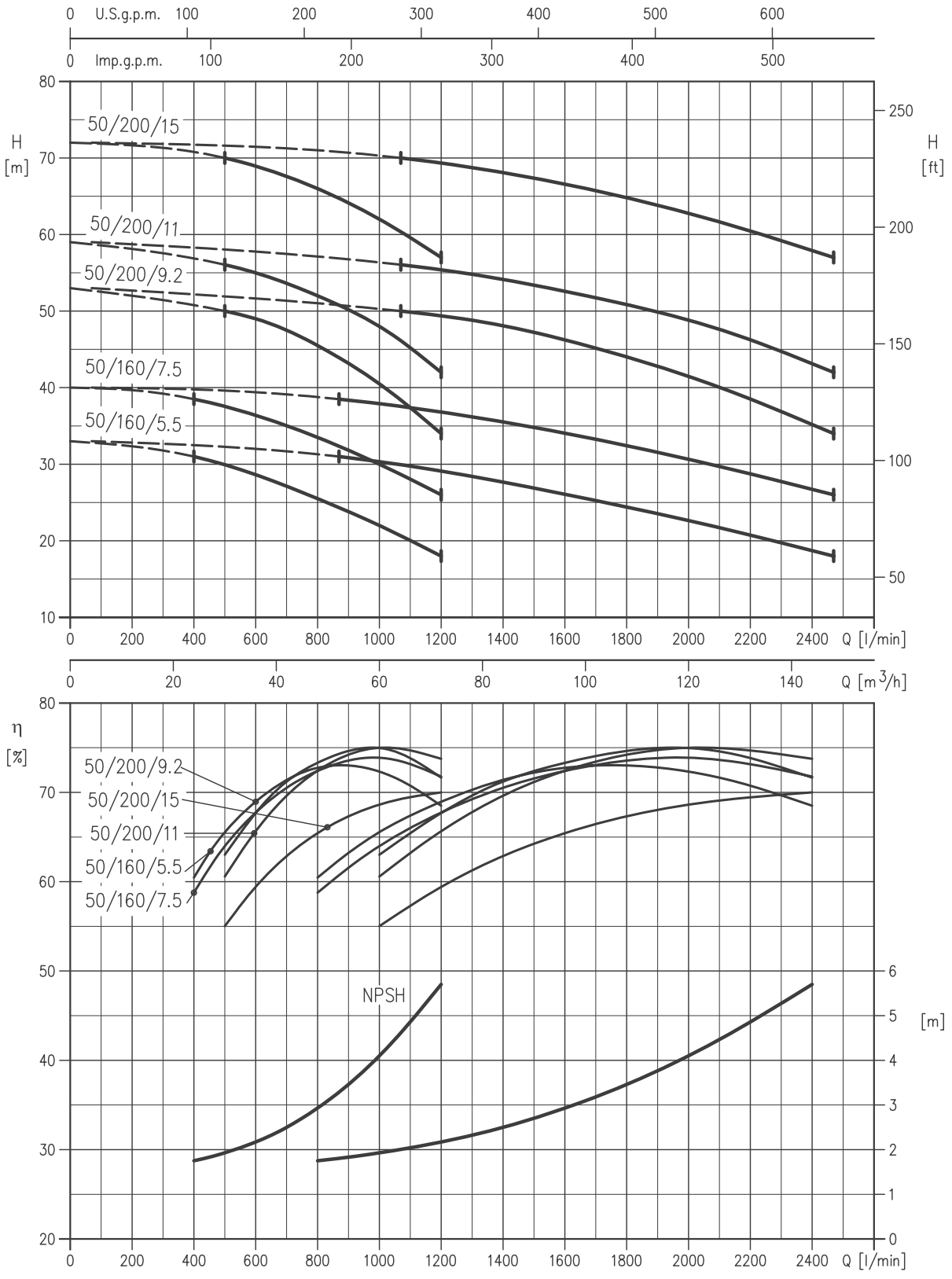


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

2GPE 3M EFC

INDUSTRIAL PRESSURISATION

PERFORMANCE CURVES for 2GPE 3M 50 EFC (ISO 9906 Annex A)

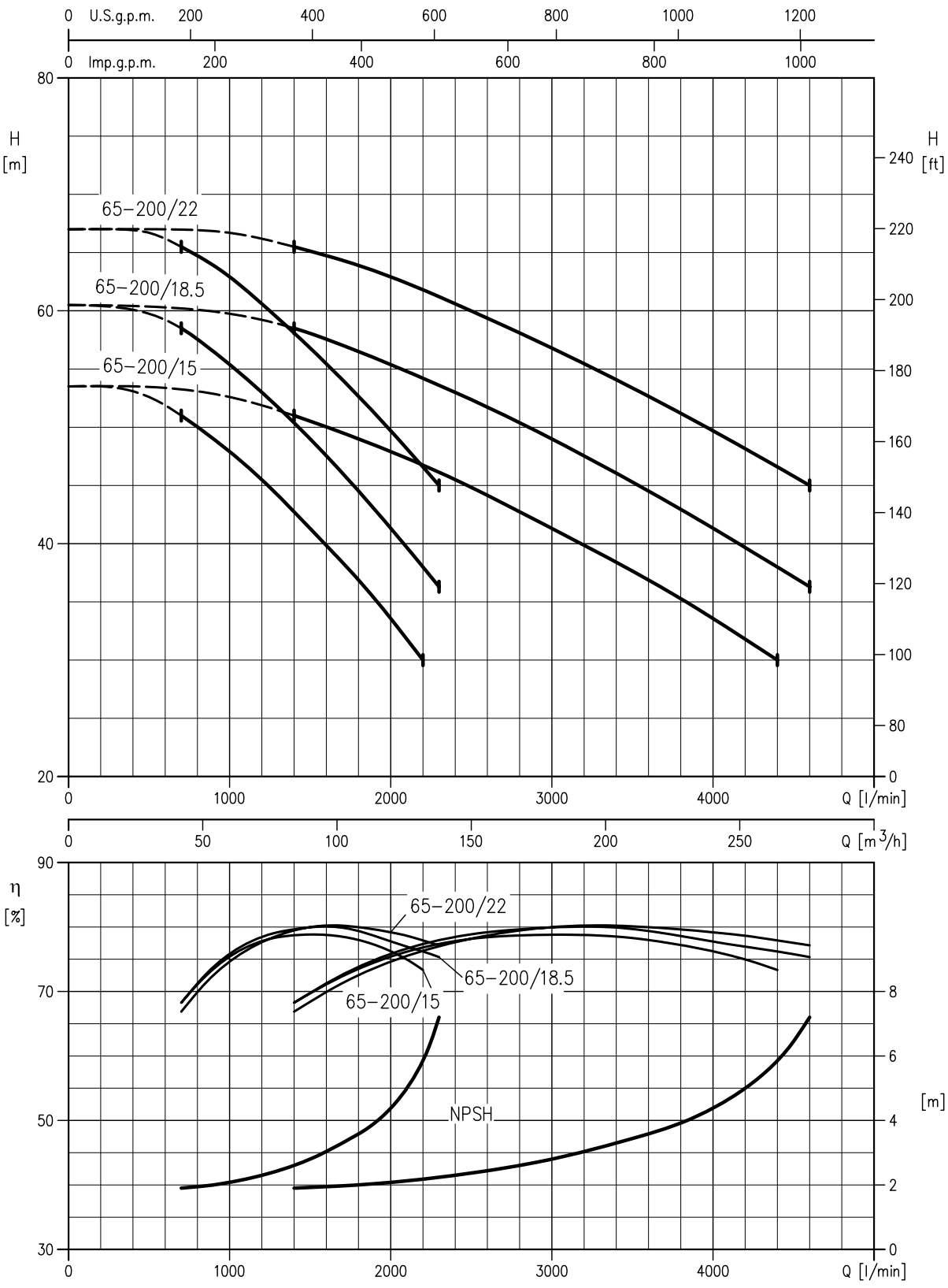


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

2GPE 3M EFC

INDUSTRIAL PRESSURISATION

PERFORMANCE CURVES for 2GPE 3M 65 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

2GPE 3M EFC

INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

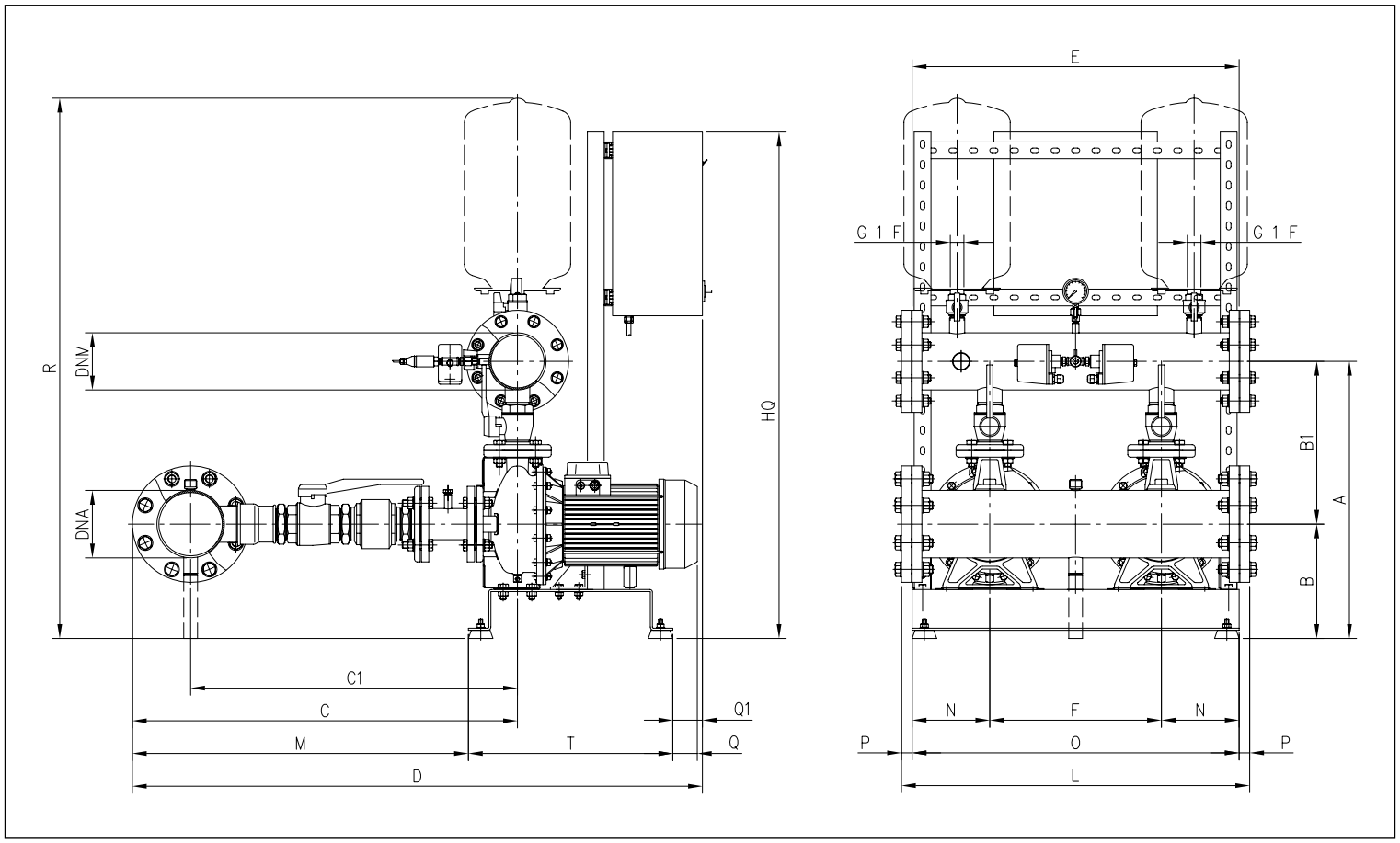
Model	[kW]	Q = Flow rate l/min	200	300	400	600	666	720	800	900	1000	1200	1400	1600	2000	2400
		m³/h	12	18	24	36	40	43.2	48	54	60	72	84	96	120	144
		H = Head [m]														
2GPE 3M 32-200/3.0	3+3		42.0	40.0	37.5	31.0	28.0	-	-	-	-	-	-	-	-	-
2GPE 3M 32-200/4.0	4+4		53.5	52.0	49.5	43.5	40.5	38.0	-	-	-	-	-	-	-	-
2GPE 3M 32-200/5.5	5.5+5.5		69.0	67.5	65.0	58.5	-	-	-	-	-	-	-	-	-	-
2GPE 3M 32-200/7.5	7.5+7.5		69.0	67.5	65.0	58.5	55.5	53.0	49.0	44.0	-	-	-	-	-	-
2GPE 3M 40-160/4.0	4+4		-	-	38.5	37.0	36.0	35.5	34.5	33.0	32.0	29.0	25.5	-	-	-
2GPE 3M 40-200/5.5	5.5+5.5		-	-	45.5	44.0	43.0	42.5	41.0	39.5	38.0	35.0	31.0	-	-	-
2GPE 3M 40-200/7.5	7.5+7.5		-	-	57.0	55.5	55.0	54.5	53.5	52.5	51.0	47.5	44.0	-	-	-
2GPE 3M 40-200/11	11+11		-	-	71.0	70.0	70.0	69.5	68.5	67.5	66.0	63.0	59.0	-	-	-
2GPE 3M 50-160/5.5	5.5+5.5		-	-	-	-	-	-	31.0	30.5	30.0	28.5	27.0	25.5	22.0	18.0
2GPE 3M 50-160/7.5	7.5+7.5		-	-	-	-	-	-	38.5	38.0	37.5	36.0	35.0	33.5	30.0	26.0
2GPE 3M 50-200/9.2	9.2+9.2		-	-	-	-	-	-	-	-	50.0	49.0	47.5	45.5	40.5	34.0
2GPE 3M 50-200/11	11+11		-	-	-	-	-	-	-	-	56.0	55.0	54.0	52.0	48.0	42.0
2GPE 3M 50-200/15	15+15		-	-	-	-	-	-	-	-	70.0	69.0	68.0	66.0	62.0	57.0

Model	[kW]	Q = Flow rate l/min	1400	1800	2600	3000	3400	3800	4200	4400	4600
		m³/h	84	108	156	180	204	228	252	264	276
		H = Head [m]									
2GPE 3M 65-200/15	15+15		51.0	49.0	44.0	41.5	38.4	35.3	31.8	30.0	-
2GPE 3M 65-200/18.5	18.5+18.5		58.5	56.5	51.5	49.0	46.0	43.0	39.7	38.0	36.3
2GPE 3M 65-200/22	22+22		65.5	64.0	59.5	57.0	54.0	51.0	48.0	46.5	45.0

2GPE 3M EFC

INDUSTRIAL PRESSURISATION

DIMENSIONS 2GPE 3M EFC

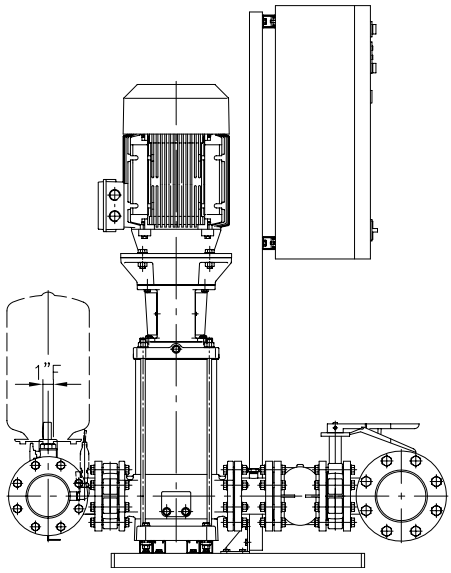


DIMENSION CHART

Model	Dimensions [mm]																				Weight [kg]
	A	B	B1	C	C1	D	DNA	DNM	E	F	HQ	L	M	N	O	P	Q	Q1	R	T	
2GPE 3M 32-200/5.5	705	280	425	415	370	925	G3"	G2"½	520	370	1180	800	295	215	800	-	60	130	1330	500	191.0
2GPE 3M 32-200/7.5	705	280	425	415	370	925	G3"	G2"½	520	370	1180	800	295	215	800	-	60	130	1330	500	202.0
2GPE 3M 40-200/5.5	655	280	375	805	680	1280	125	100	800	420	1240	850	685	190	800	25	60	95	1285	500	256.0
2GPE 3M 40-200/7.5	655	280	375	805	680	1320	125	100	800	420	1240	850	685	190	800	25	60	135	1285	500	263.0
2GPE 3M 40-200/11	620	245	375	805	680	1370	125	100	800	420	1330	880	570	230	880	-	-	-	1250	800	348.0
2GPE 3M 50-160/5.5	680	280	400	940	800	1415	150	125	800	420	1240	850	820	190	800	25	60	95	1325	500	257.0
2GPE 3M 50-160/7.5	680	280	400	940	800	1425	150	125	800	420	1240	850	820	190	800	25	60	105	1325	500	276.0
2GPE 3M 50-200/9.2	665	245	420	940	800	1525	150	125	800	420	1330	880	700	230	880	-	-	25	1310	800	328.0
2GPE 3M 50-200/11	665	245	420	940	800	1525	150	125	800	420	1330	880	700	230	880	-	-	25	1310	800	360.0
2GPE 3M 50-200/15	665	245	420	940	800	1655	150	125	800	420	1360	880	855	230	880	-	-	-	1310	800	426.0
2GPE 3M 65-200/15	950	265	685	1080	885	1780	250	200	800	400	1370	880	980	230	880	-	-	-	1635	800	436.0
2GPE 3M 65-200/18.5	950	265	685	1080	885	1780	250	200	800	400	1370	880	980	230	880	-	-	-	1635	800	559.0
2GPE 3M 65-200/22	950	265	685	1080	885	1780	250	200	800	400	1770	880	980	230	880	-	-	-	1635	800	610.0

2GPE EVMG EFC

INDUSTRIAL PRESSURISATION



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

- 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

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

2GPE EVMG EFC

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

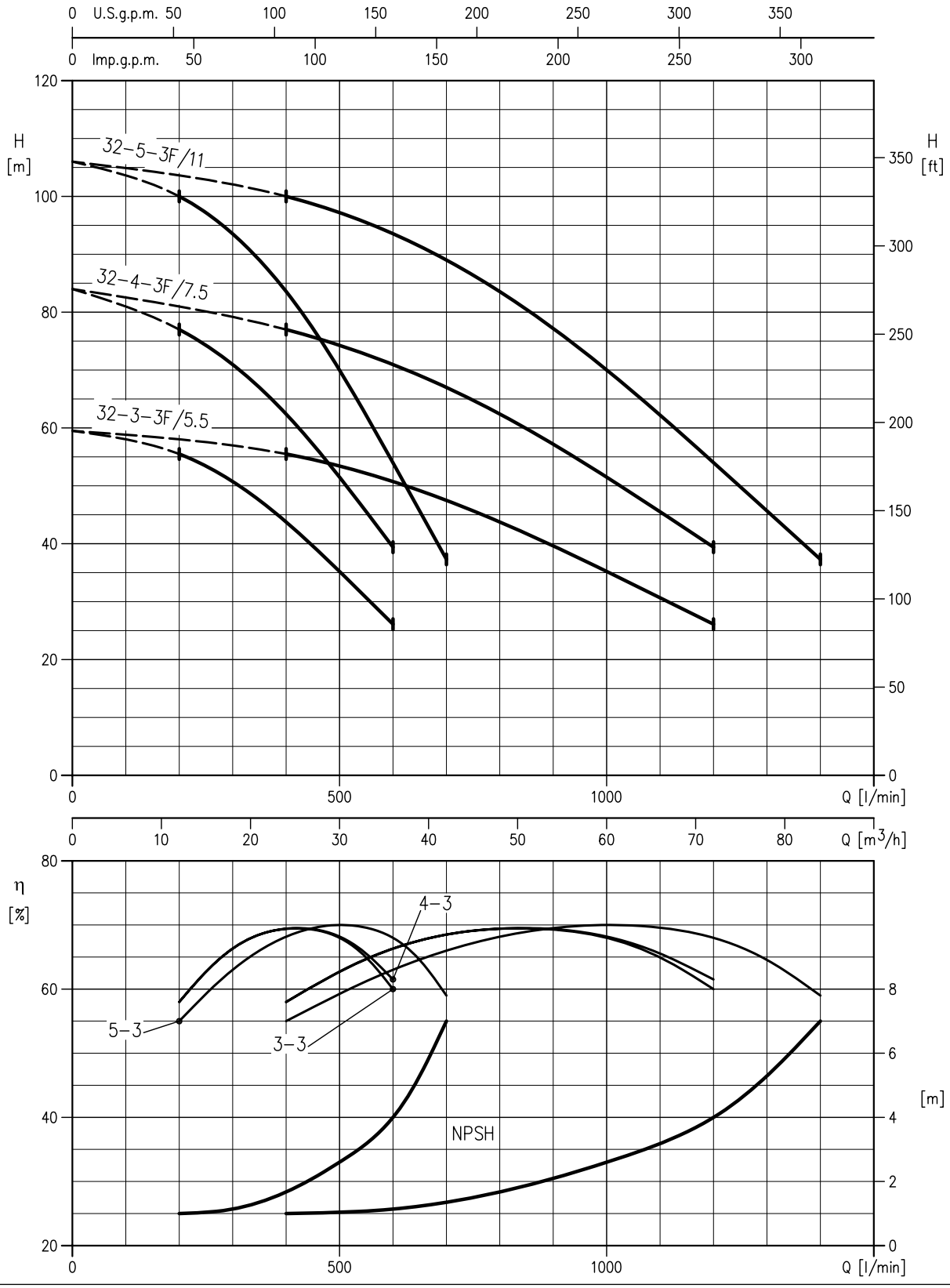
MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Single-phase voltage 230V ±10%, 50Hz,
  three-phase voltage 230/400 ±10% (up to 4 kW included) 50Hz,
  three-phase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

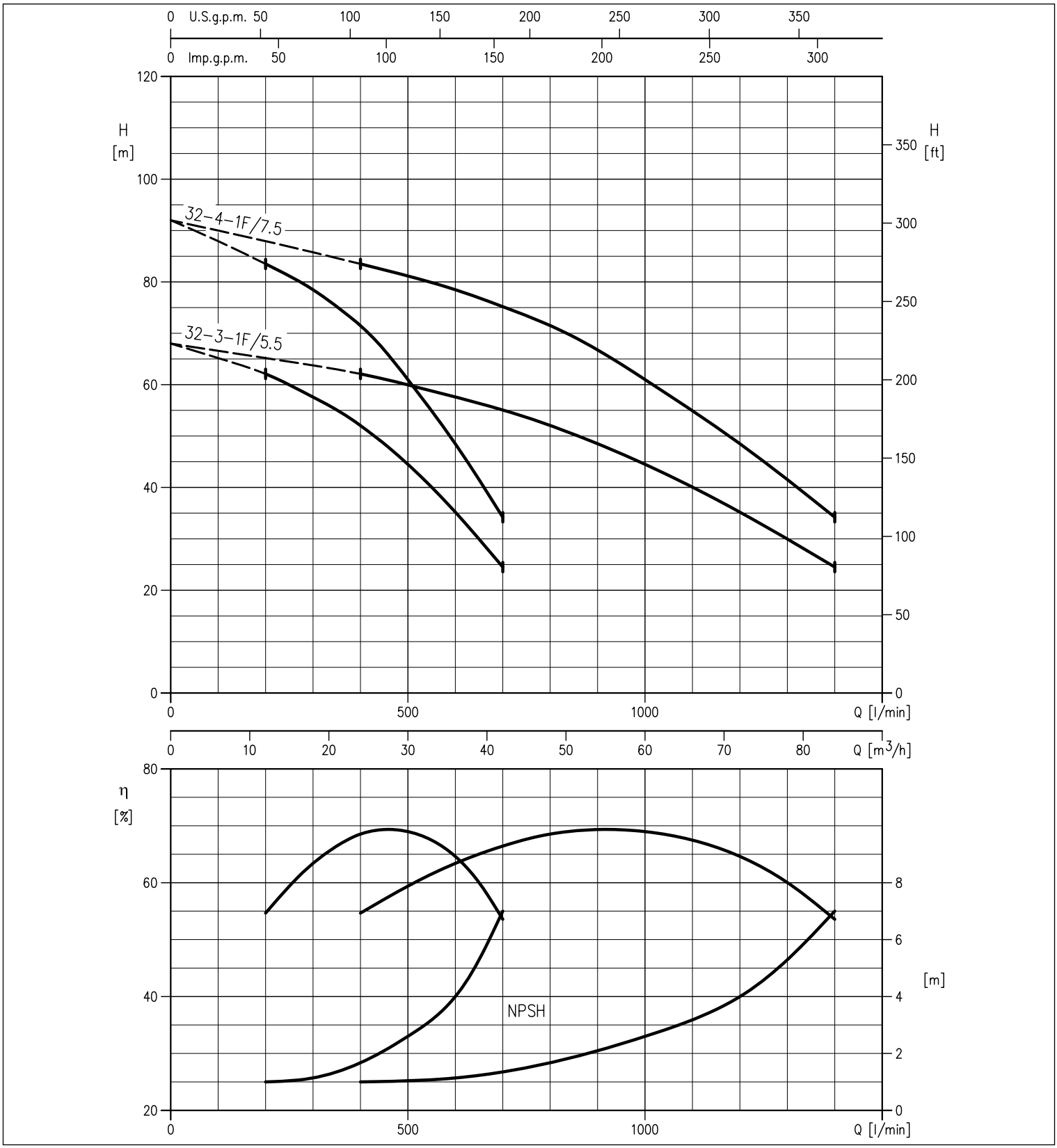
CONSIGNMENT
- Pressurisation system ready for hookup, factory assembled and tested for operation and hermetic seal
- Packaging
- Installation, user and maintenance instructions

PERFORMANCE CURVES for 2GPE EVMG 32 EFC (1/2) (ISO 9906 Annex A)



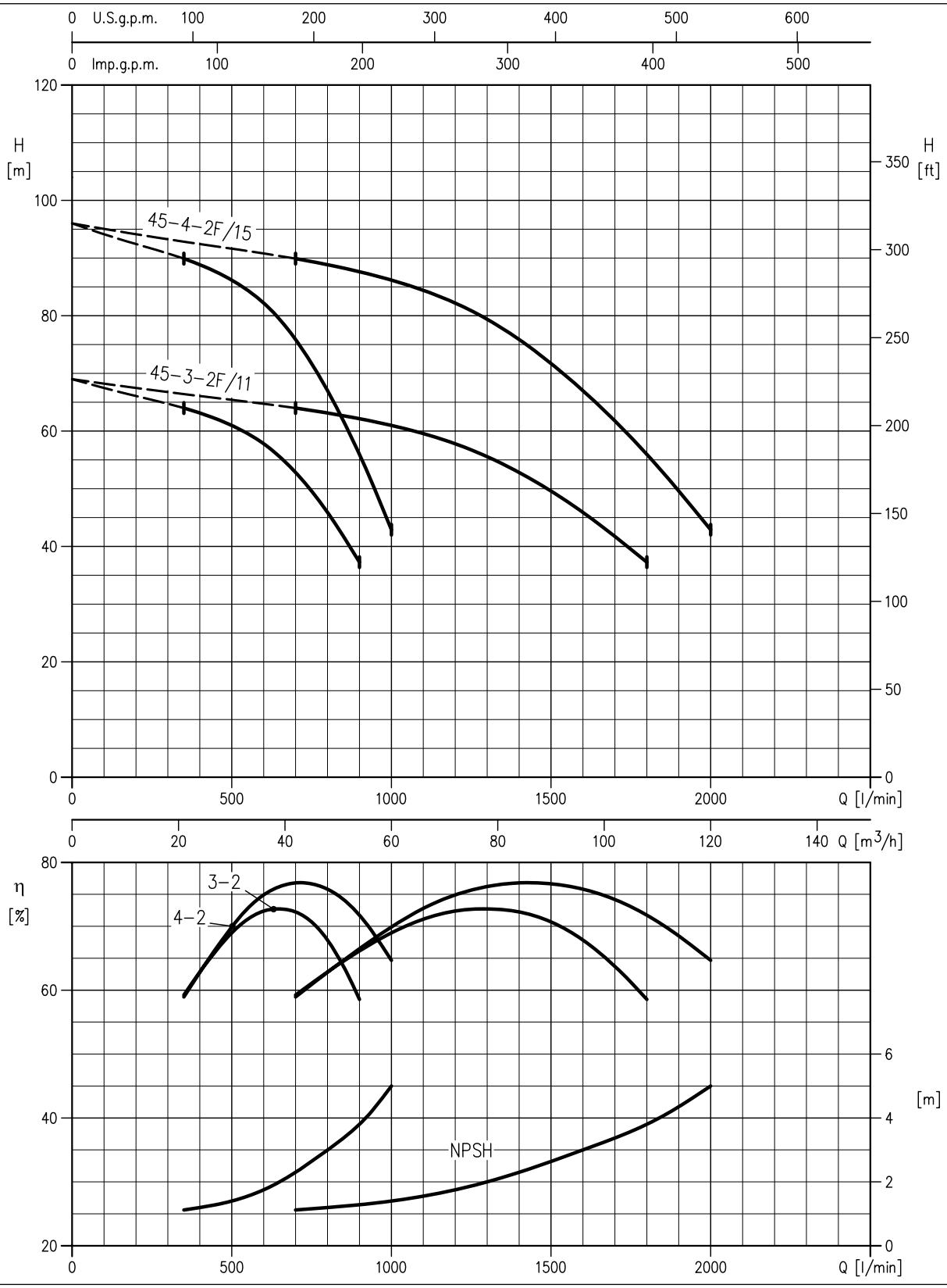
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GPE EVMG 32 EFC (2/2) (ISO 9906 Annex A)



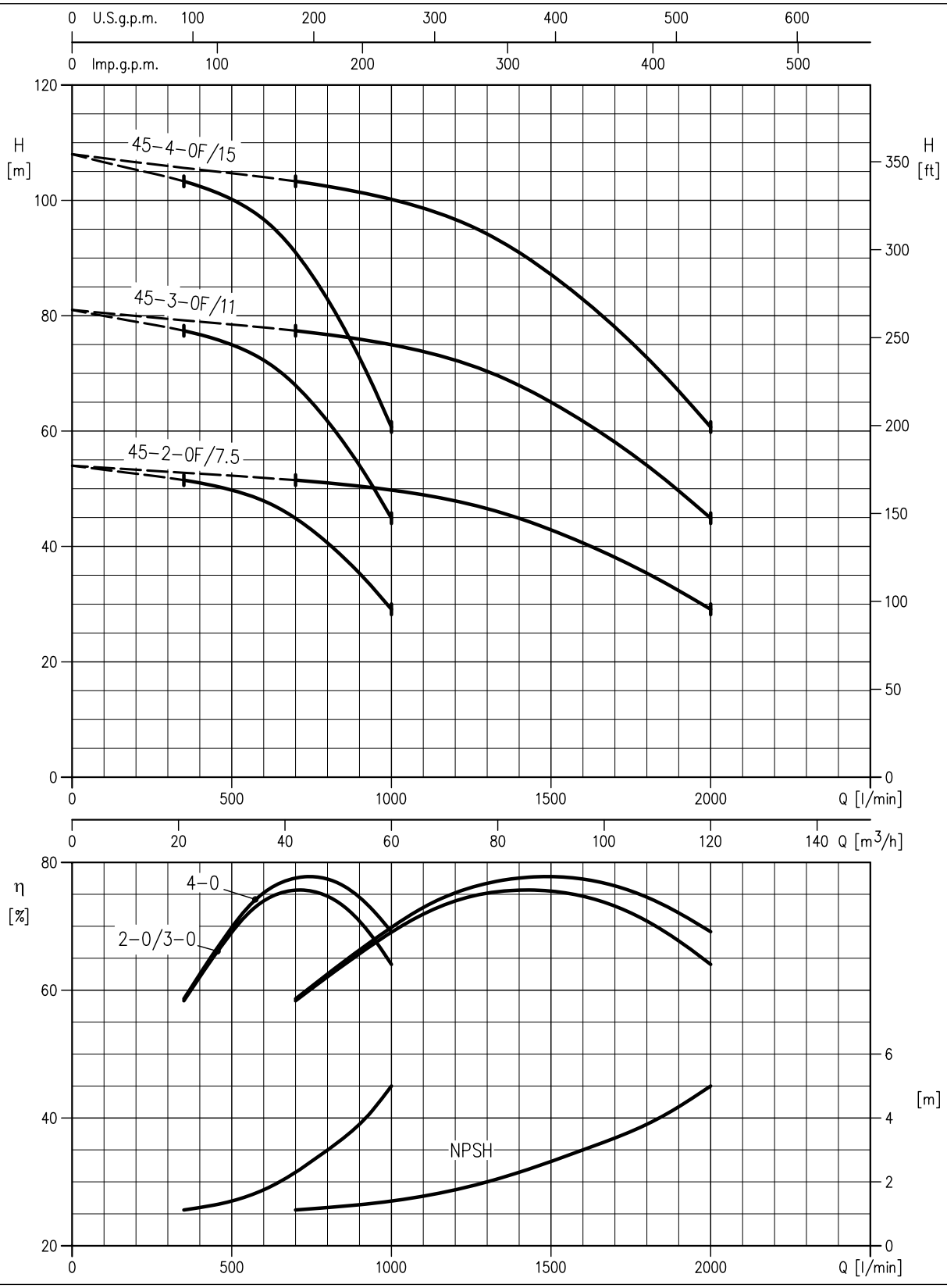
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GPE EVMG 45 EFC (1/2) (ISO 9906 Annex A)



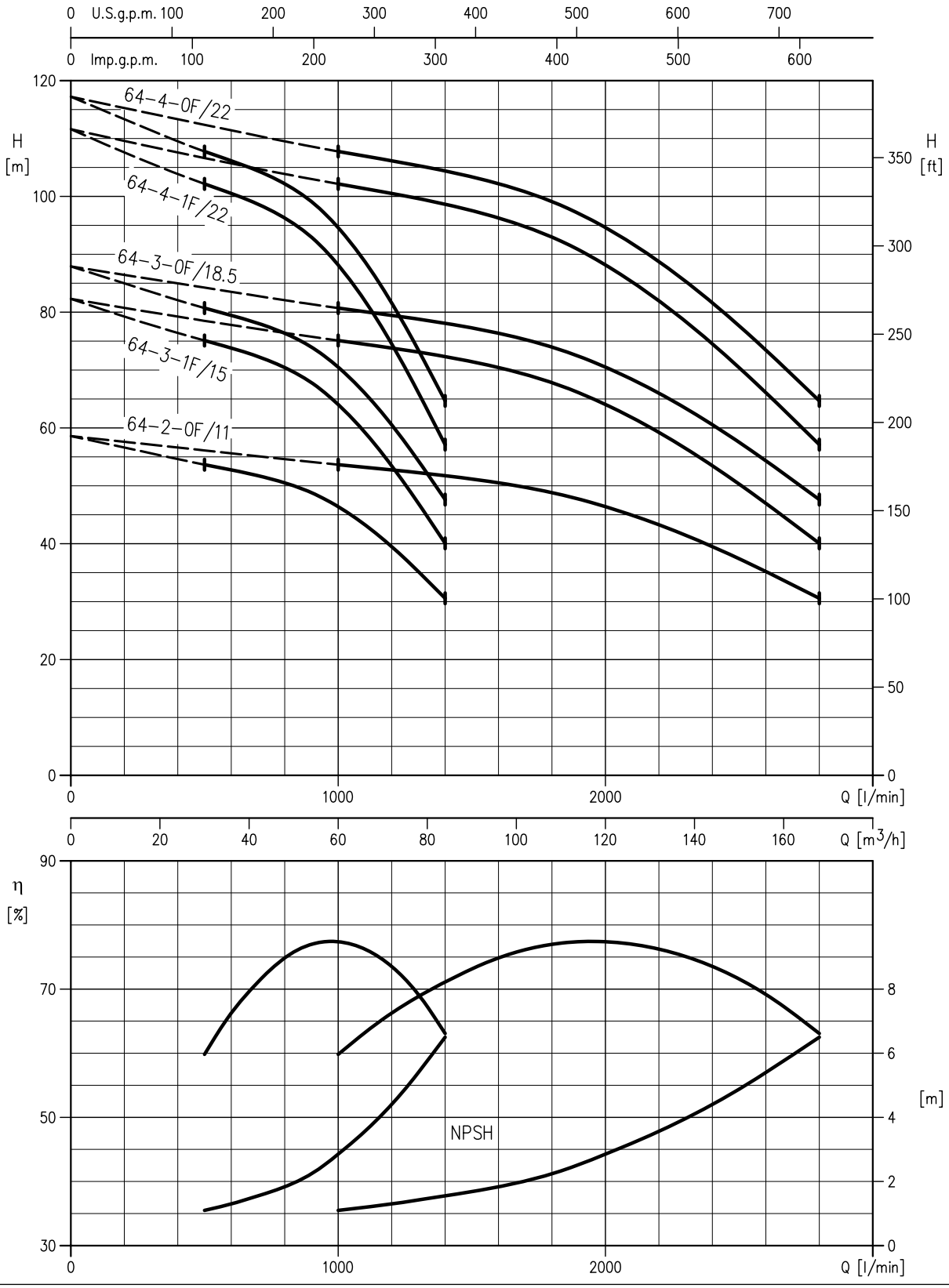
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GPE EVMG 45 EFC (2/2) (ISO 9906 Annex A)



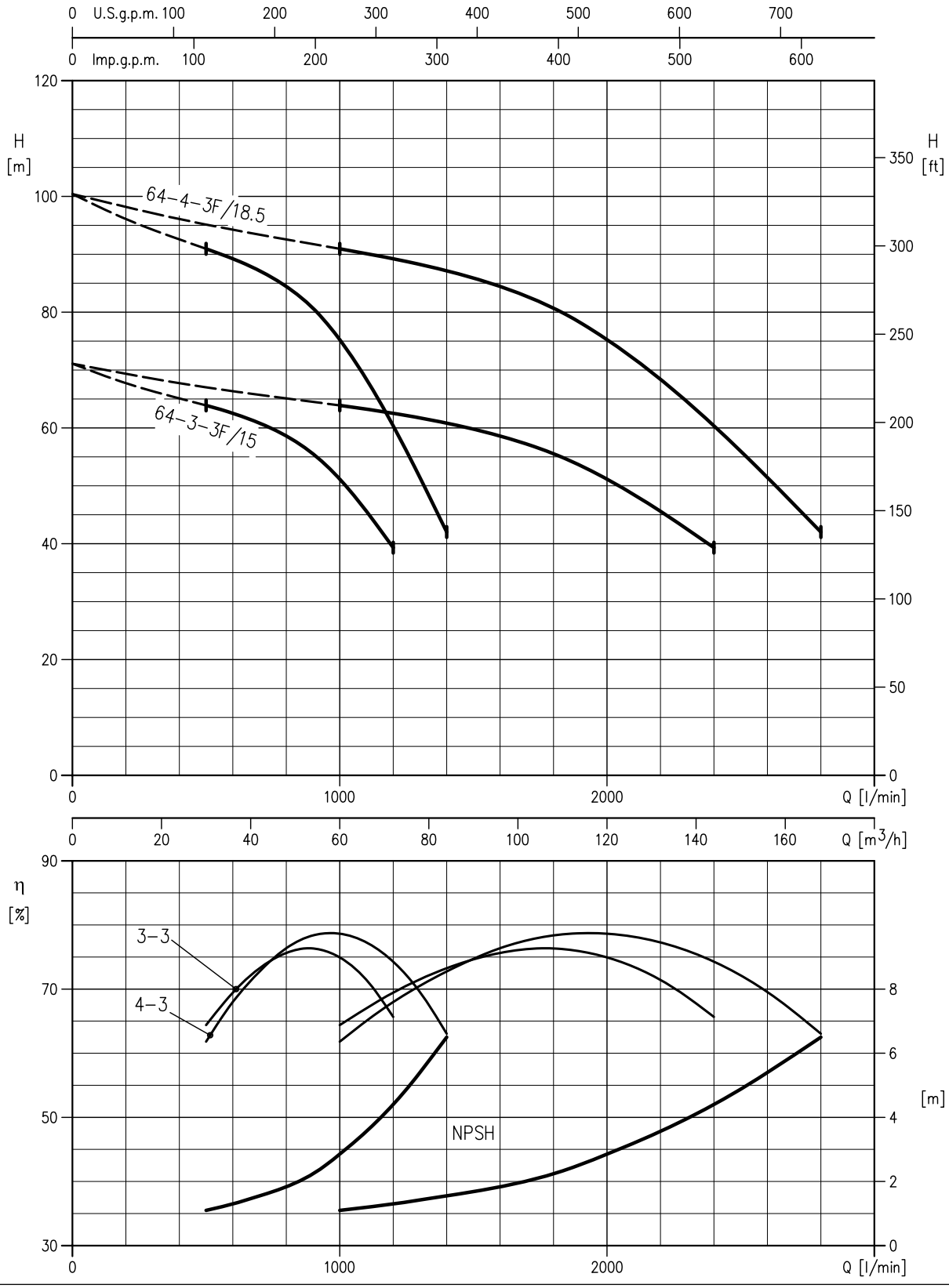
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 2GPE EVMG 64 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

PERFORMANCE CURVES for 2GPE EVMG 64 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

2GPE EVMG EFC

INDUSTRIAL PRESSURISATION

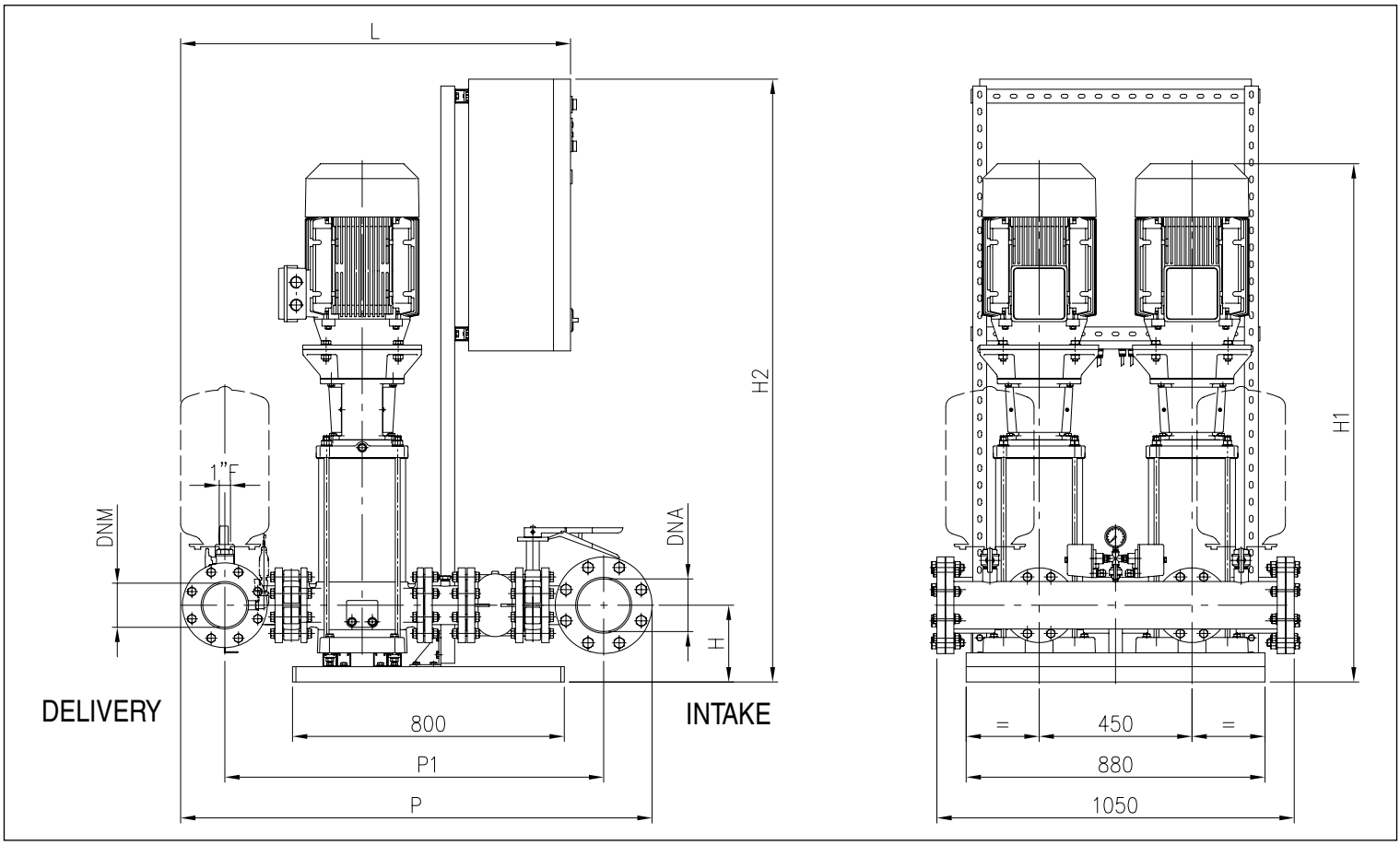
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR TWO PUMPS RUNNING SIMULTANEOUSLY

Model		Q = Flow rate								
		l/min	400	700	1000	1200	1400	1800	2000	2400	2800
	[kW]	m^3/h	24	42	60	72	84	108	120	144	168
		H = Head [m]									
2GPE EVMG 32 3-3F/5.5	5.5+5.5		55.5	47.5	35.2	26.1	-	-	-	-	-
2GPE EVMG 32 3-1F/5.5	5.5+5.5		62.0	55.0	44.5	35.2	24.5	-	-	-	-
2GPE EVMG 32 4-3F/7.5	7.5+7.5		77.0	67.0	51.5	39.4	-	-	-	-	-
2GPE EVMG 32 4-1F/7.5	7.5+7.5		83.5	74.5	61.0	48.5	34.2	-	-	-	-
2GPE EVMG 32 5-3F/11	11+11		106.0	100.0	89.0	70.0	37.5	-	-	-	-
2GPE EVMG 45 2-0F/7.5	7.5+7.5		-	51.5	50.0	48.0	45.0	35.4	29.1	-	-
2GPE EVMG 45 3-2F/11	11+11		-	64.0	61.0	58.0	53.0	37.3	-	-	-
2GPE EVMG 45 3-0F/11	11+11		-	77.5	75.0	72.5	68.0	54.0	45.0	-	-
2GPE EVMG 45 4-2F/15	15+15		-	90.0	86.0	82.0	76.0	56.0	43.0	-	-
2GPE EVMG 45 4-0F/15	15+15		-	103.0	100.0	96.5	91.0	73.0	60.5	-	-
2GPE EVMG 64 2-0F/11	11+11		-	-	53.5	53.0	52.0	49.0	46.5	39.5	30.6
2GPE EVMG 64 3-3F/15	15+15		-	-	64.0	62.5	61.0	55.5	51.0	39.3	-
2GPE EVMG 64 3-2F/15	15+15		-	-	69.5	68.0	66.5	61.5	57.5	46.5	32.5
2GPE EVMG 64 3-1F/15	15+15		-	-	75.0	74.0	72.5	68.0	64.0	53.5	40.0
2GPE EVMG 64 3-0F/18.5	18.5+18.5		-	-	80.5	79.5	78.0	74.0	70.5	60.5	47.5
2GPE EVMG 64 4-3F/18.5	18.5+18.5		-	-	91.0	89.0	87.0	80.5	75.5	60.5	42.0
2GPE EVMG 64 4-1F/22	22+22		-	-	102.0	101.0	98.5	93.0	88.0	74.5	57.0
2GPE EVMG 64 4-0F/22	22+22		-	-	108.0	106.0	104.0	99.0	94.5	81.5	64.5

2GPE EVMG EFC

INDUSTRIAL PRESSURISATION

DIMENSIONS 2GPE EVMG 32-45-64 EFC

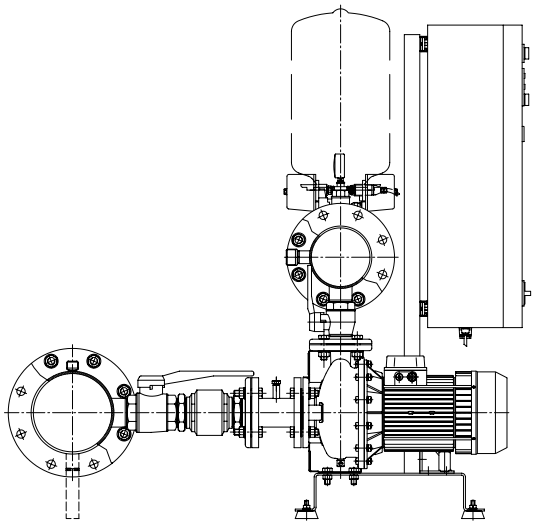


DIMENSION CHART

Model	Dimensions [mm]								Weight [kg]
	L	H	H1	H2	P	P1	DNA	DNM	
2GPE EVMG32 3-3F/5.5	1165	190	985	1275	1360	1105	DN125	DN100	453
2GPE EVMG32 3-1F/5.5	1165	190	985	1275	1360	1105	DN125	DN100	453
2GPE EVMG32 4-3F/7.5	1165	190	1035	1275	1360	1105	DN125	DN100	462
2GPE EVMG32 4-1F/7.5	1165	190	1035	1275	1360	1105	DN125	DN100	462
2GPE EVMG32 5-3F/11	1215	190	1290	1475	1360	1105	DN125	DN100	607
2GPE EVMG45 2-0F/7.5	1215	225	1030	1375	1470	1195	DN150	DN125	505
2GPE EVMG45 3-2F/11	1265	225	1310	1575	1470	1195	DN150	DN125	649
2GPE EVMG45 3-0F/11	1265	225	1310	1575	1470	1195	DN150	DN125	649
2GPE EVMG45 4-2F/15	1265	225	1475	1575	1470	1195	DN150	DN125	668
2GPE EVMG45 4-0F/15	1265	225	1475	1575	1470	1195	DN150	DN125	668
2GPE EVMG64 2-0F/11	1150	225	1240	1575	1390	1115	DN150	DN125	638
2GPE EVMG64 3-3F/15	1150	225	1405	1575	1390	1115	DN150	DN125	650
2GPE EVMG64 3-2F/15	1150	225	1405	1575	1390	1115	DN150	DN125	650
2GPE EVMG64 3-1F/15	1150	225	1405	1575	1390	1115	DN150	DN125	650
2GPE EVMG64 3-0F/18.5	1150	225	1450	1775	1390	1115	DN150	DN125	671
2GPE EVMG64 4-3F/18.5	1150	225	1520	1775	1390	1115	DN150	DN125	709
2GPE EVMG64 4-1F/22	1150	225	1555	1775	1390	1115	DN150	DN125	836
2GPE EVMG64 4-0F/22	1150	225	1555	1775	1390	1115	DN150	DN125	836

3GPE 3M EFC

INDUSTRIAL PRESSURISATION



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

3GPE 3M EFC

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

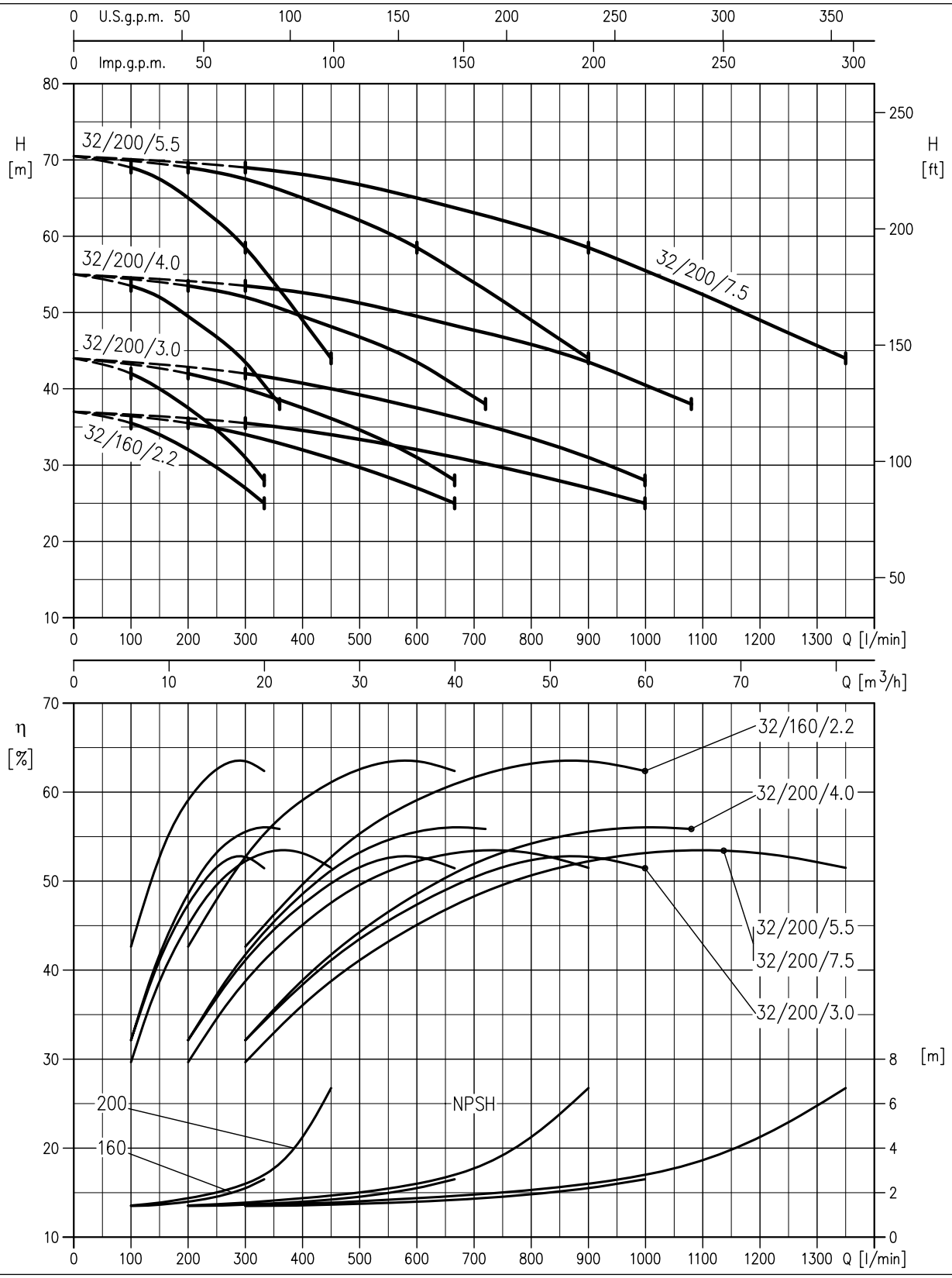
MOTOR SPECIFICATIONS
- Motors IE2 from 0.75kW
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Self-ventilated 2-pole and 4-pole asynchronous motors
- Isolation class F (B for high temperatures)
- Protection rating IP 55
- Three-phase voltage 230/400 ±10% (up to 4kW included) 50Hz, three-phase voltage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

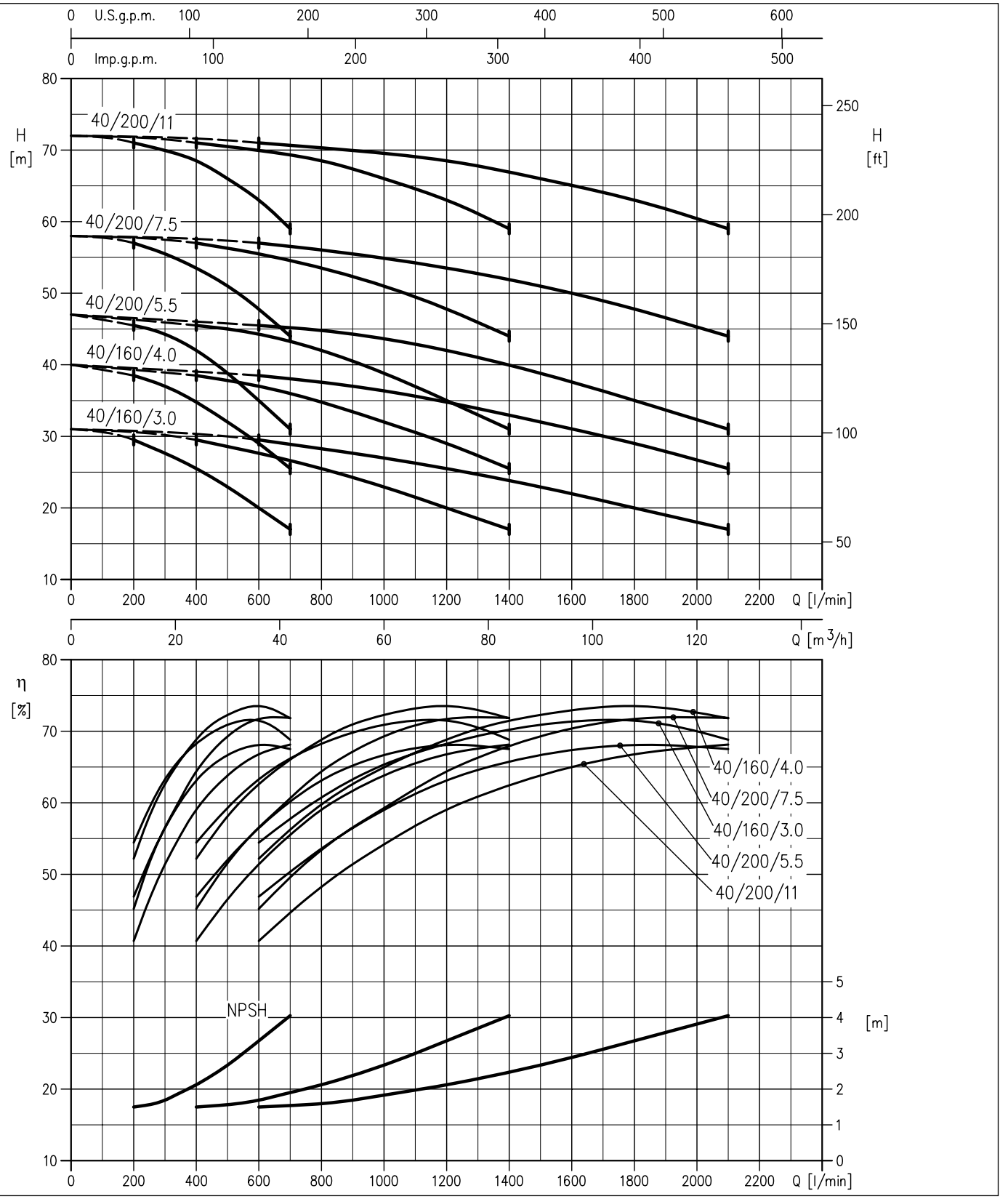


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

3GPE 3M EFC

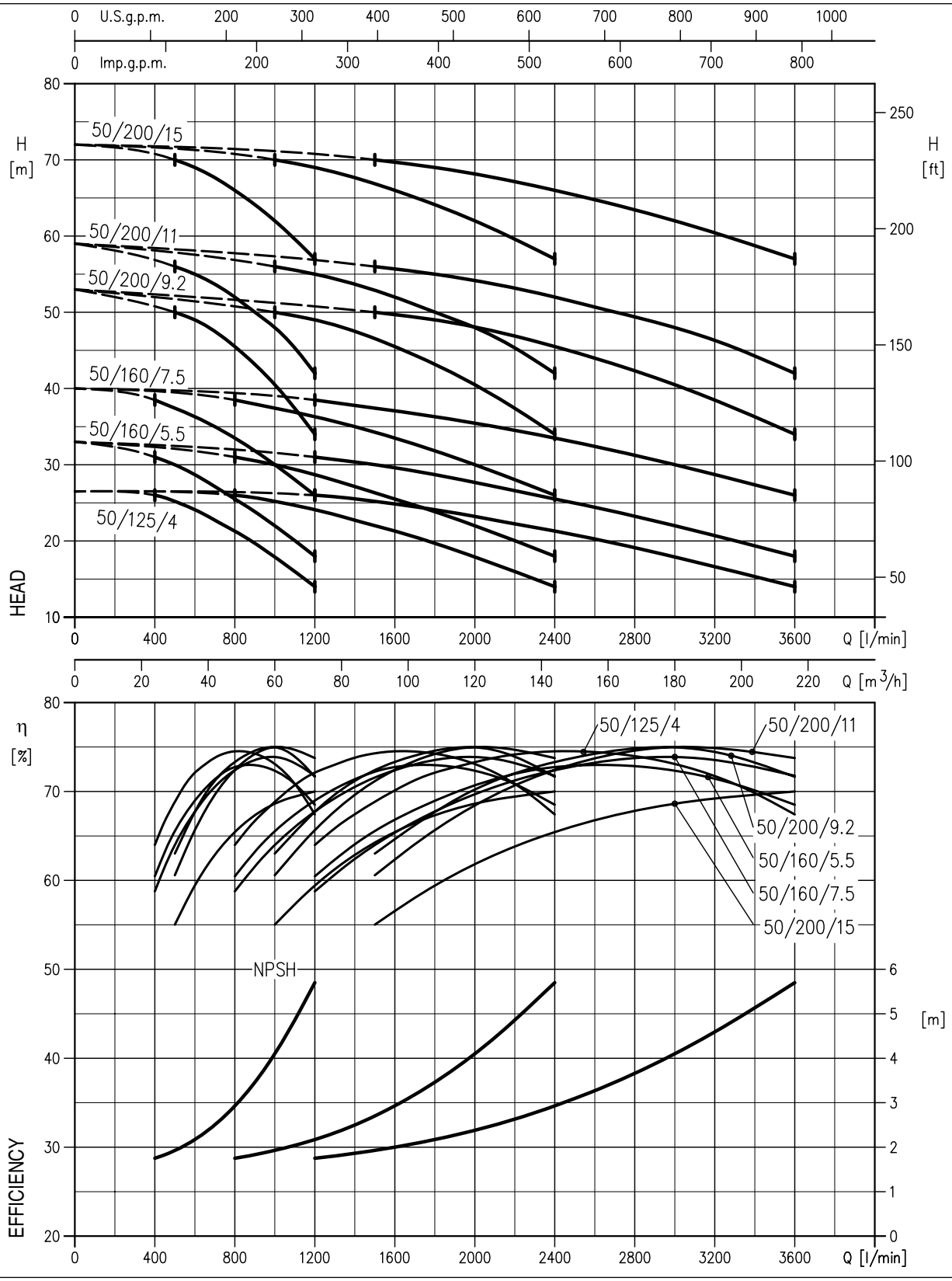
INDUSTRIAL PRESSURISATION

PERFORMANCE CURVES for 3GPE 3M 40 EFC (ISO 9906 Annex A)



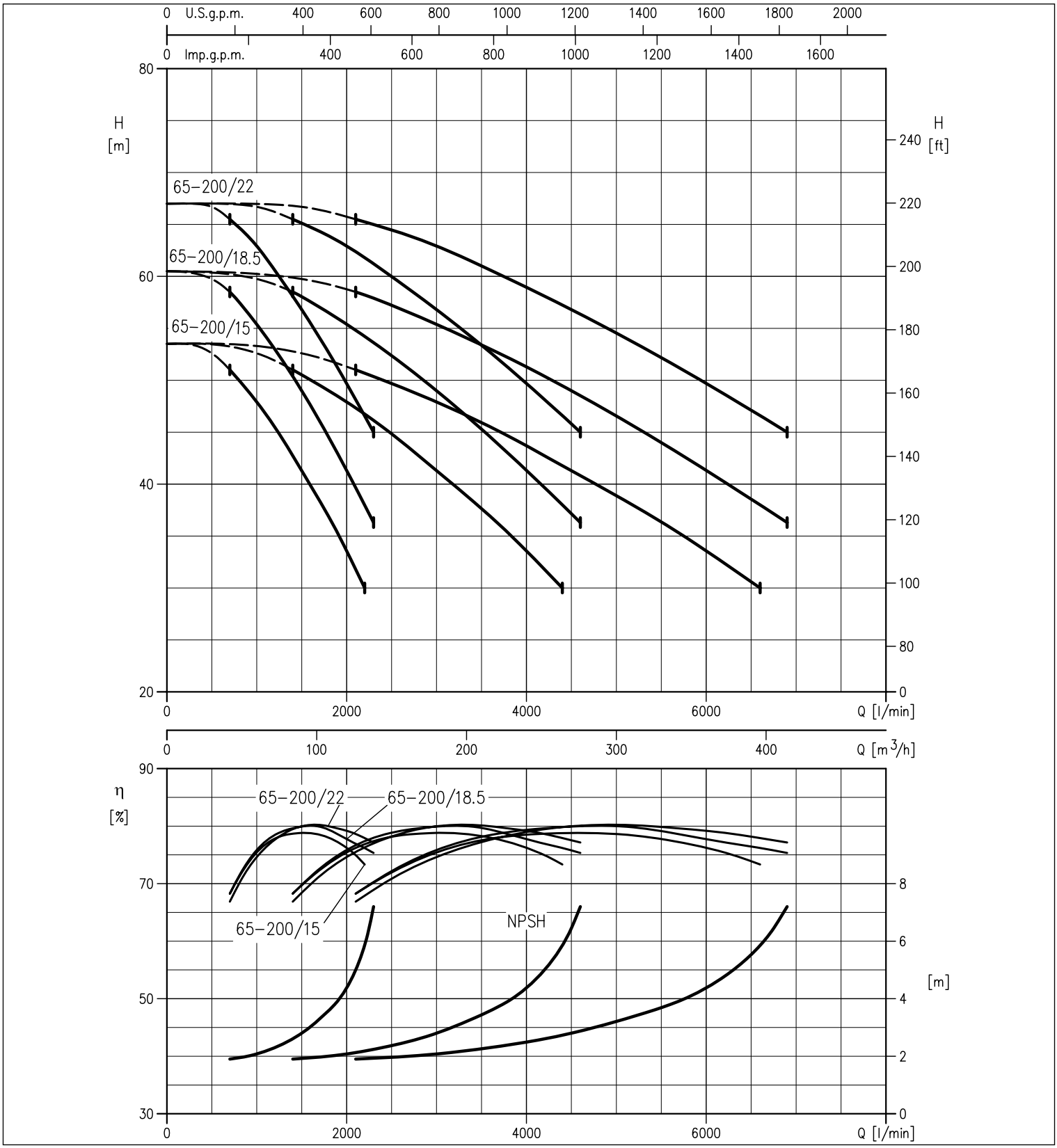
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

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

PERFORMANCE CURVES for 3GPE 3M 65 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

3GPE 3M EFC

INDUSTRIAL PRESSURISATION

TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

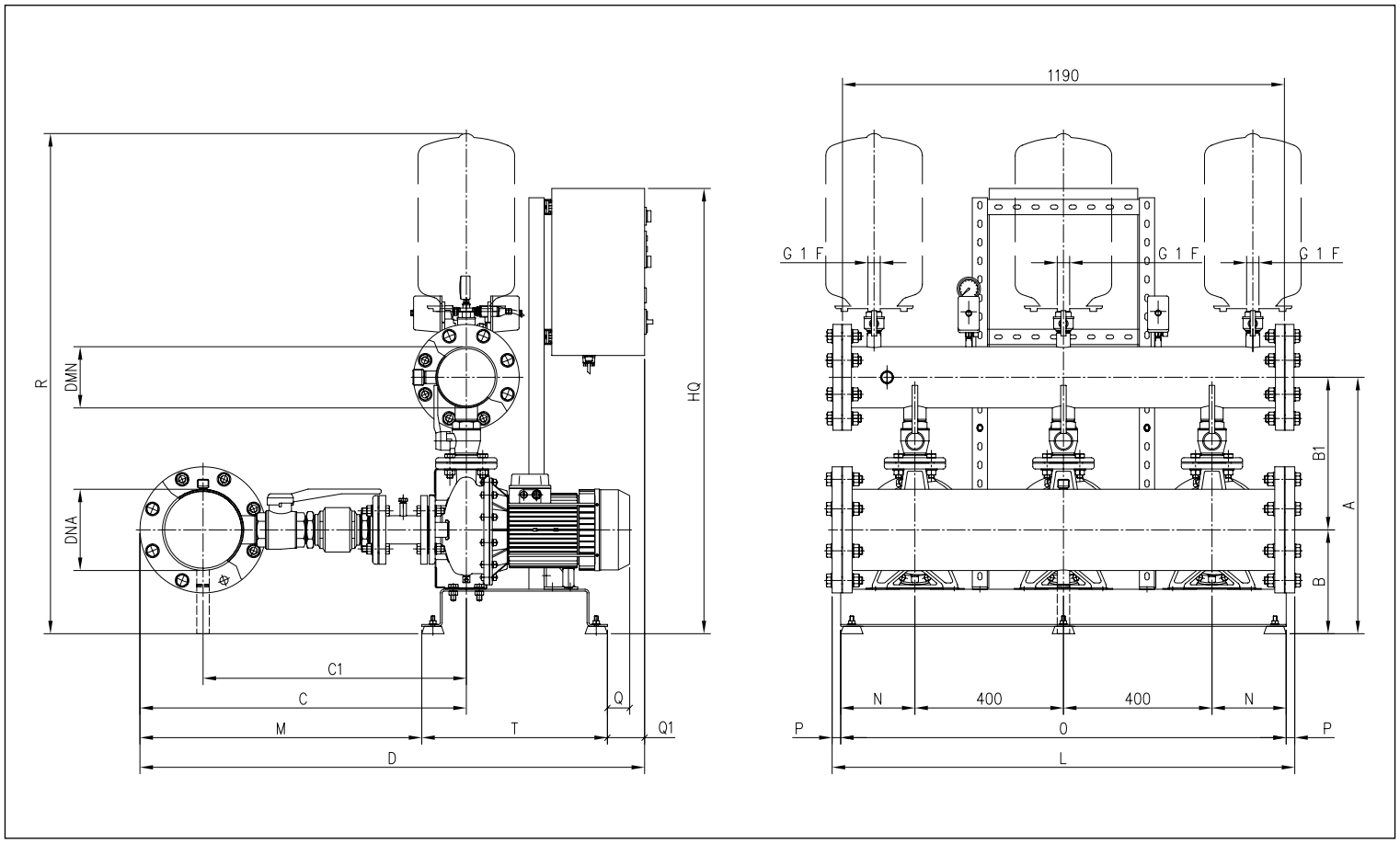
Model Three-phase 400V	[kW]	Q = Flow rate l/min	300	450	600	900	1000	1080	1200	1350	1500	1800	2100	2400	3000	3600
		m³/h	9	27	36	54	60	65	72	81	90	108	126	144	180	216
		H = Head [m]														
3GPE 3M 32-160/2.2	2.2+2.2+2.2		35.5	34.0	32.0	27.0	25.0	-	-	-	-	-	-	-	-	-
3GPE 3M 32-200/3.0	3+3+3		42.0	40.0	37.5	31.0	28.0	-	-	-	-	-	-	-	-	-
3GPE 3M 32-200/4.0	4+4+4		53.5	52.0	49.5	43.5	40.5	38.0	-	-	-	-	-	-	-	-
3GPE 3M 32-200/5.5	5.5+5.5+5.5		69.0	67.5	65.0	58.5	-	-	-	-	-	-	-	-	-	-
3GPE 3M 32-200/7.5	7.5+7.5		69.0	67.5	65.0	58.5	55.5	53.0	49.0	44.0	-	-	-	-	-	-
3GPE 3M 40-160/3.0	3+3+3		-	-	29.5	27.5	27.0	26.5	25.5	24.0	22.5	20.0	17.0	-	-	-
3GPE 3M 40-160/4.0	4+4+4		-	-	38.5	37.0	36.0	35.5	34.5	33.0	32.0	29.0	25.5	-	-	-
3GPE 3M 40-200/5.5	5.5+5.5+5.5		-	-	45.5	44.0	43.0	42.5	41.0	39.5	38.0	35.0	31.0	-	-	-
3GPE 3M 40-200/7.5	7.5+7.5+7.5		-	-	57.0	55.5	55.0	54.5	53.5	52.5	51.0	47.5	44.0	-	-	-
3GPE 3M 40-200/11	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	4+4+4		-	-	-	-	-	-	26.0	25.5	25.0	24.0	22.5	21.5	17.9	14.0
3GPE 3M 50-160/5.5	5.5+5.5+5.5		-	-	-	-	-	-	31.0	30.5	30.0	28.5	27.0	25.5	22.0	18.0
3GPE 3M 50-160/7.5	7.5+7.5+7.5		-	-	-	-	-	-	38.5	38.0	37.5	36.0	35.0	33.5	30.0	26.0
3GPE 3M 50-200/9.2	9.2+9.2+9.2		-	-	-	-	-	-	-	-	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

Model Three-phase 400V	[kW]	Q = Flow rate l/min	1200	2700	3900	4500	5100	5700	6300	6600	6900
		m³/h	126	162	234	270	306	342	378	396	414
		H = Head [m]									
3GPE 3M 65-200/15	15+15+15		51.0	49.0	44.0	41.5	38.4	35.3	31.8	30.0	-
3GPE 3M 65-200/18.5	18.5+18.5+18.5		58.5	56.5	51.5	49.0	46.0	43.0	39.7	38.0	36.3
3GPE 3M 65-200/22	22+22+22		65.5	64.0	59.5	57.0	54.0	51.0	48.0	46.5	45.0

3GPE 3M EFC

INDUSTRIAL PRESSURISATION

DIMENSIONS 3GPE 3M EFC



DIMENSION CHART

Model	Dimensions [mm]																		Weight [kg]
	A	B	B1	C	C1	D	DNA	DNM	HQ	L	M	N	O	P	Q	Q1	R	T	
3GPE 3M 32-160/2.2	570	250	320	445	380	890	100	80	1200	1230	330	200	1200	15	-	60	1190	500	193.0
3GPE 3M 32-200/3	620	280	340	445	380	940	100	80	1200	1230	330	200	1200	15	10	110	1240	500	212.0
3GPE 3M 32-200/4	620	280	340	445	380	940	100	80	1200	1230	330	200	1200	15	35	110	1240	500	224.0
3GPE 3M 32-200/5.5	620	280	340	445	380	940	100	80	1200	1230	330	200	1200	15	60	110	1240	500	256.0
3GPE 3M 32-200/7.5	620	280	340	445	380	940	100	80	1200	1230	330	200	1200	15	60	110	1240	500	270.0
3GPE 3M 40-160/3	615	250	365	920	780	1420	150	125	1200	1240	810	200	1200	20	10	110	1260	500	277.0
3GPE 3M 40-160/4	615	250	365	920	780	1420	150	125	1200	1240	810	200	1200	20	35	110	1260	500	320.0
3GPE 3M 40-200/5.5	665	280	385	940	800	1430	150	125	1200	1240	820	200	1200	20	60	110	1310	500	408.0
3GPE 3M 40-200/7.5	665	280	385	940	800	1430	150	125	1200	1240	820	200	1200	20	60	110	1310	500	419.0
3GPE 3M 40-200/11	630	245	385	940	800	1505	150	125	1580	1380	705	290	1380	-	-	-	1275	500	468.0
3GPE 3M 50-125/4	645	250	390	880	710	1370	200	150	1200	1250	760	200	1200	25	35	110	1300	500	414.0
3GPE 3M 50-160/5.5	690	280	410	880	710	1400	200	150	1200	1250	760	200	1200	25	60	110	1350	500	421.0
3GPE 3M 50-160/7.5	690	280	410	880	710	1400	200	150	1200	1250	760	200	1200	25	60	110	1350	500	448.0
3GPE 3M 50-200/9.2	675	245	430	880	710	1595	200	150	1580	1380	795	290	1380	-	-	-	1335	800	483.0
3GPE 3M 50-200/11	675	245	430	880	710	1595	200	150	1580	1380	795	290	1380	-	-	-	1335	800	493.0
3GPE 3M 50-200/15	675	245	430	880	710	1595	200	150	1650	1380	795	290	1380	-	-	-	1335	800	599.0
3GPE 3M 65-200/15	950	265	685	1055	855	1755	250	200	1650	1380	955	290	1380	-	-	-	1335	800	602.0
3GPE 3M 65-200/18.5	950	265	685	1055	855	1755	250	200	1650	1380	955	290	1380	-	-	-	1635	800	631.0
3GPE 3M 65-200/22	950	265	685	1055	855	1755	250	200	2000	1380	955	290	1380	-	-	-	1635	800	679.0

3GPE EVMG EFC

INDUSTRIAL PRESSURISATION

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

3GPE EVMG EFC

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

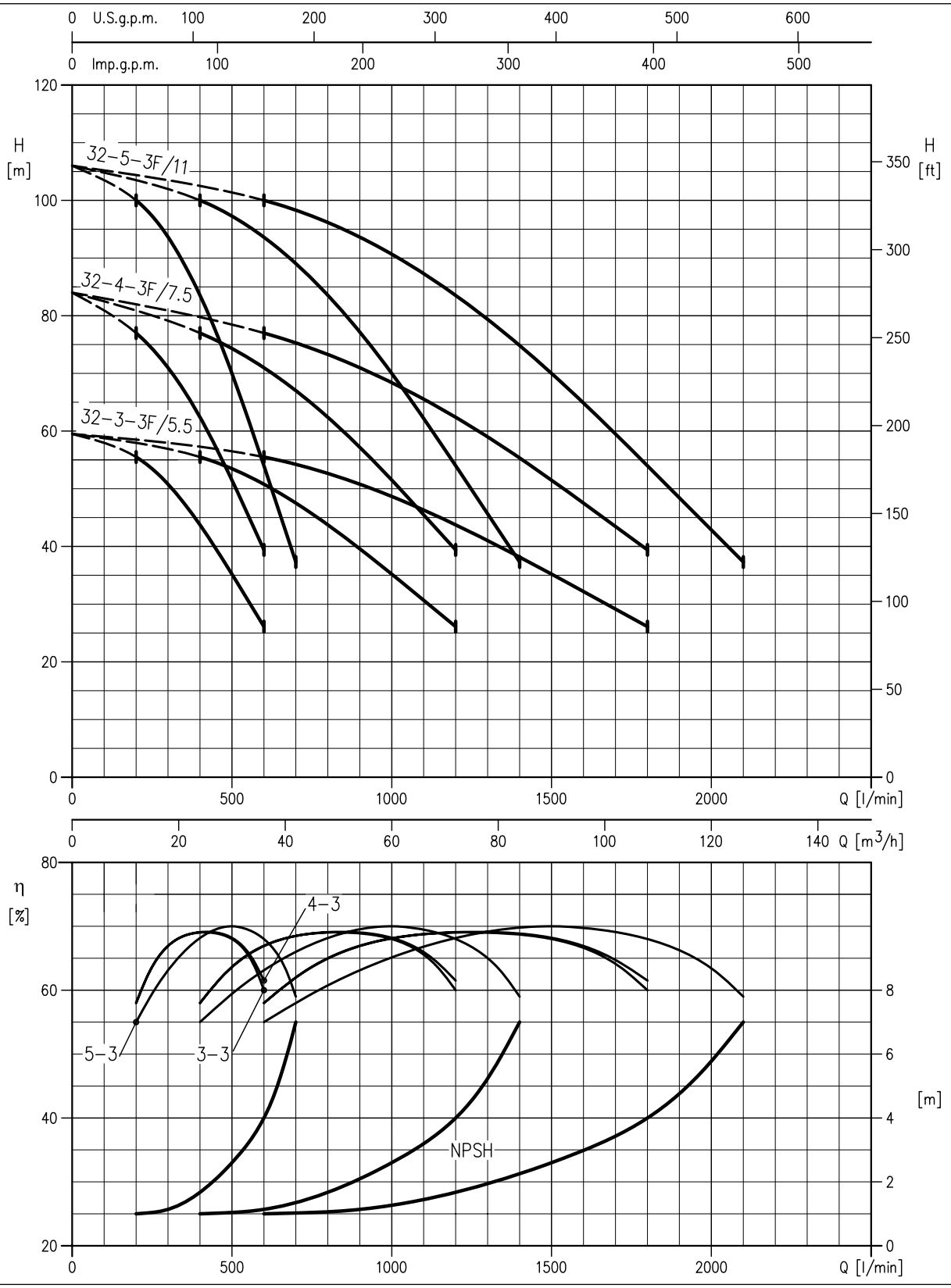
MOTOR SPECIFICATIONS
- High efficiency IE3 motors from 7.5 kW to 22 kW
- Motors IE2 from 0.75kW
- Self-ventilated asynchronous 2-pole motor
- Insulation Class F
- Protection rating IP55
- Three-phase voltage 230/400 ±10% (up to 4 kW included) 50Hz, three-phase voltage 400/690V ±10% (from 5.5 kW and above) 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 3GPE EVMG 32 EFC (ISO 9906 Annex A)

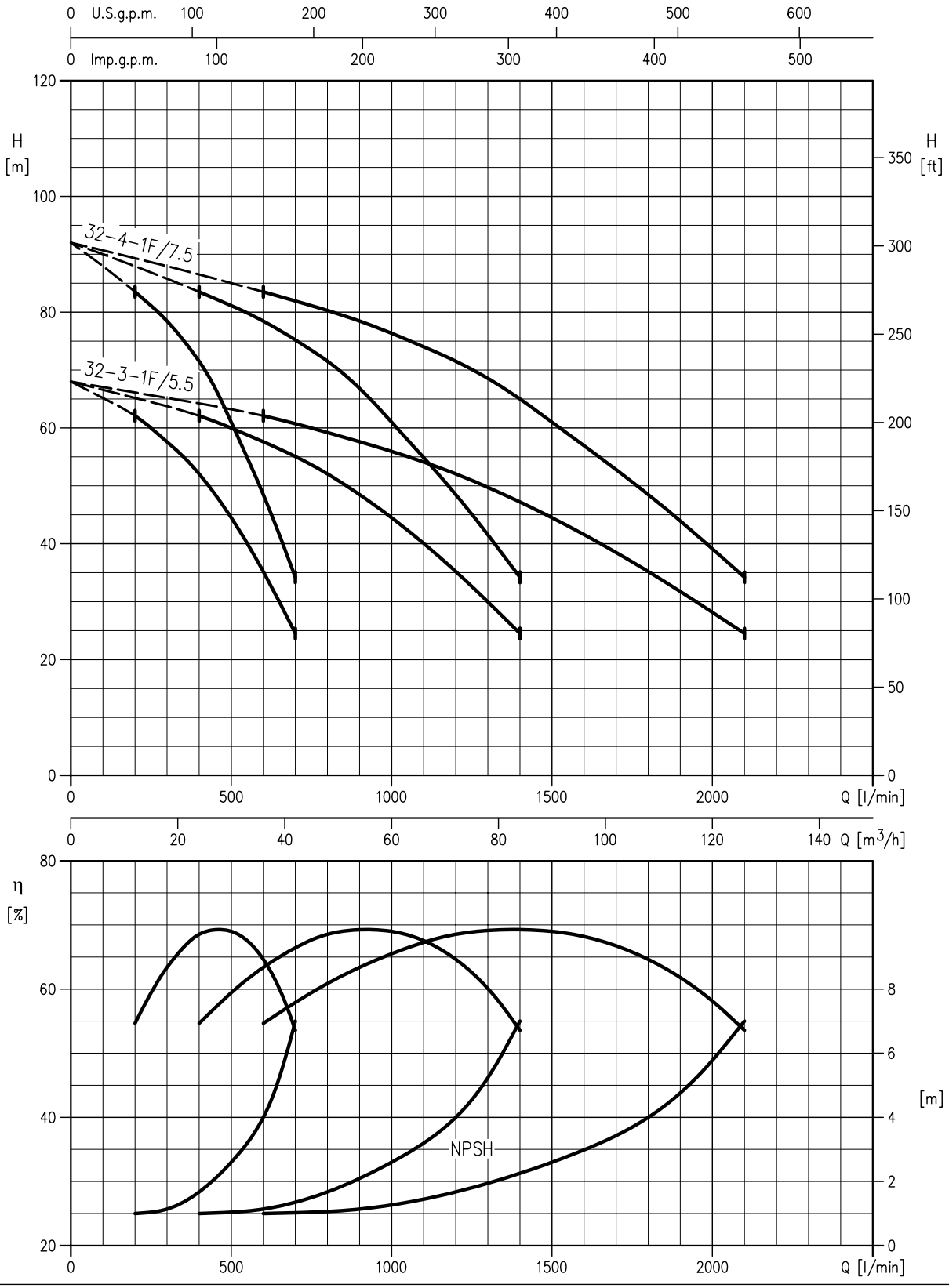


The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

3GPE EVMG EFC

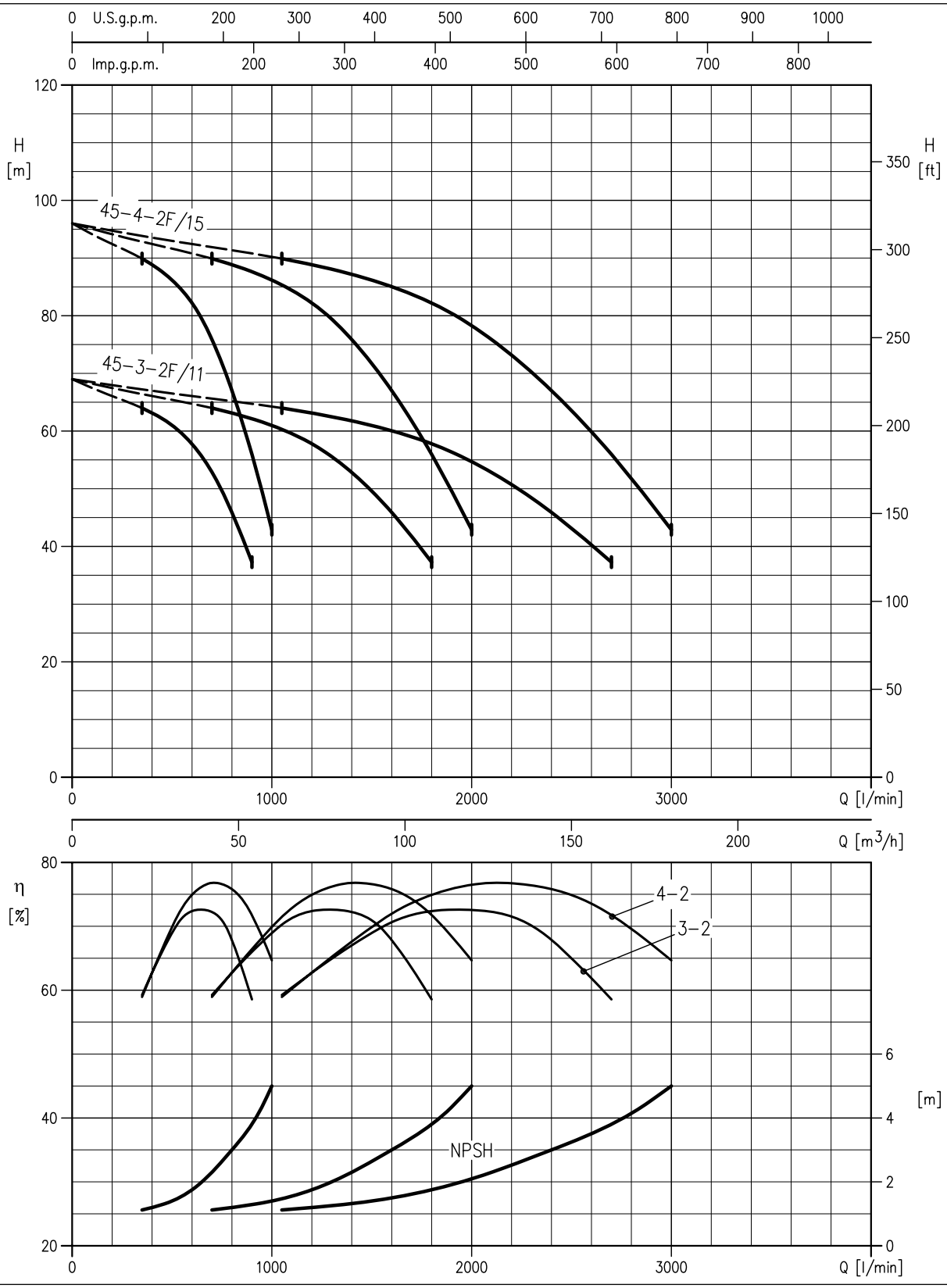
INDUSTRIAL PRESSURISATION

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



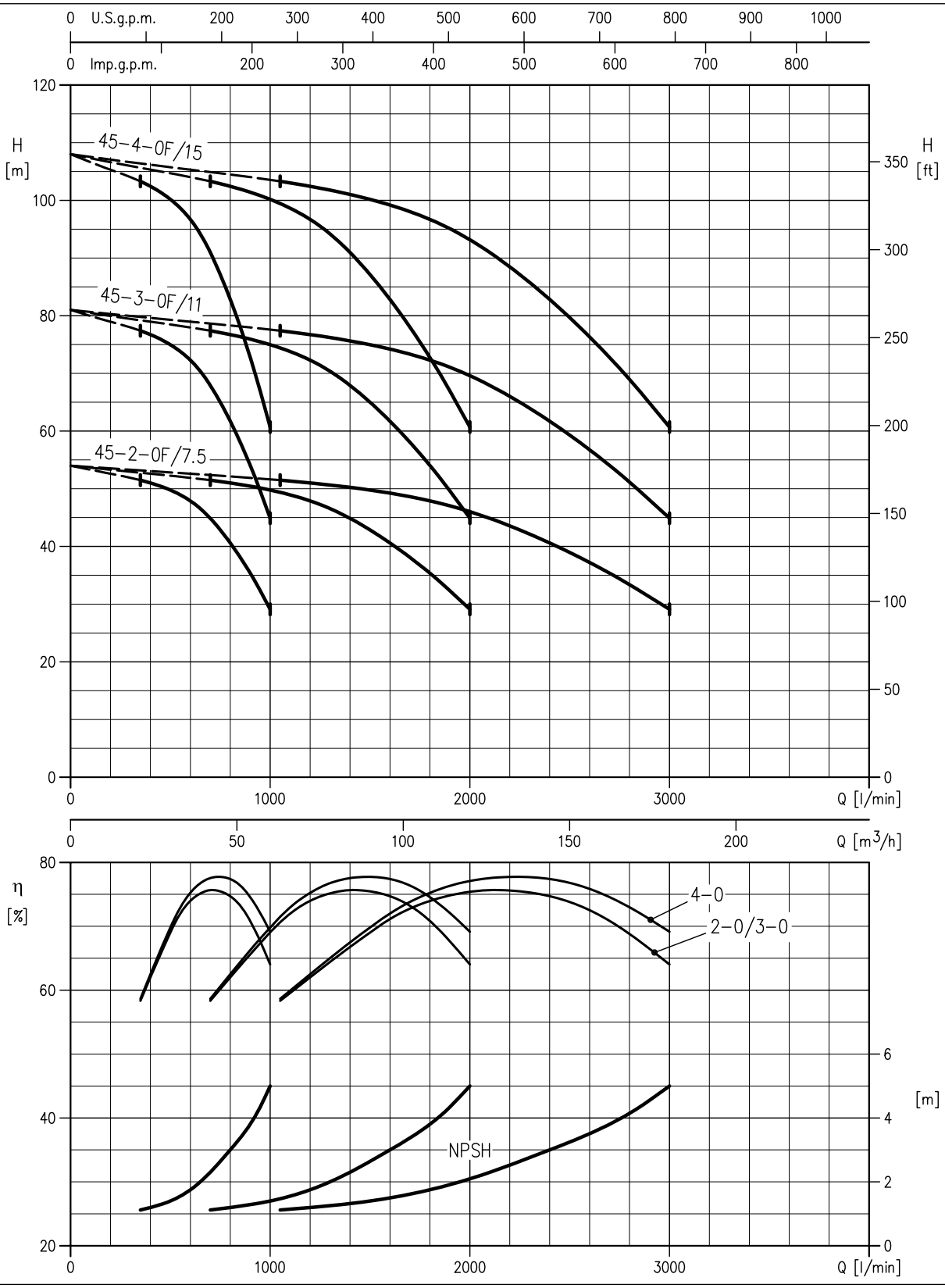
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GPE EVMG 45 EFC (1/2) (ISO 9906 Annex A)



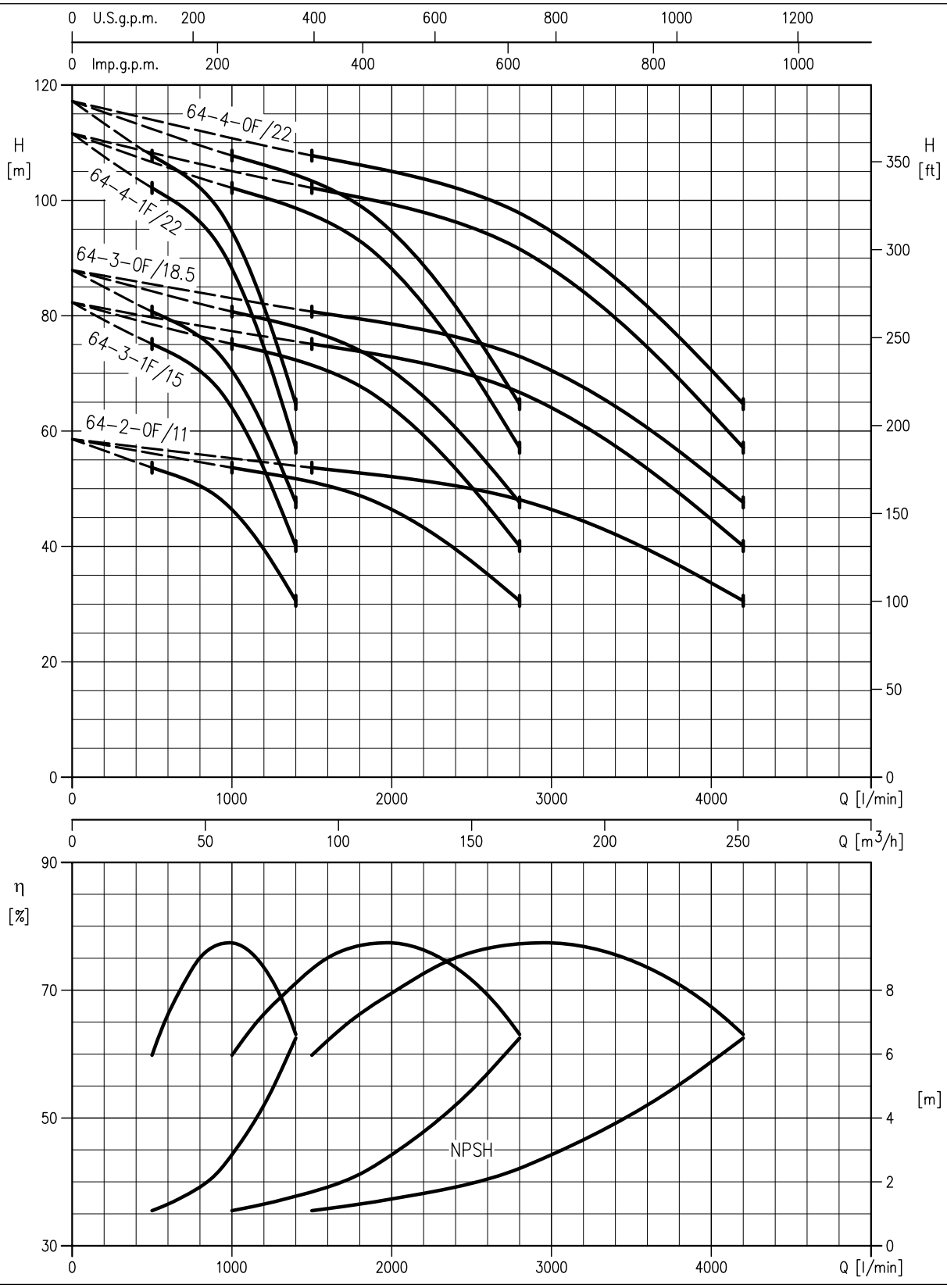
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GPE EVMG 45 EFC (2/2) (ISO 9906 Annex A)



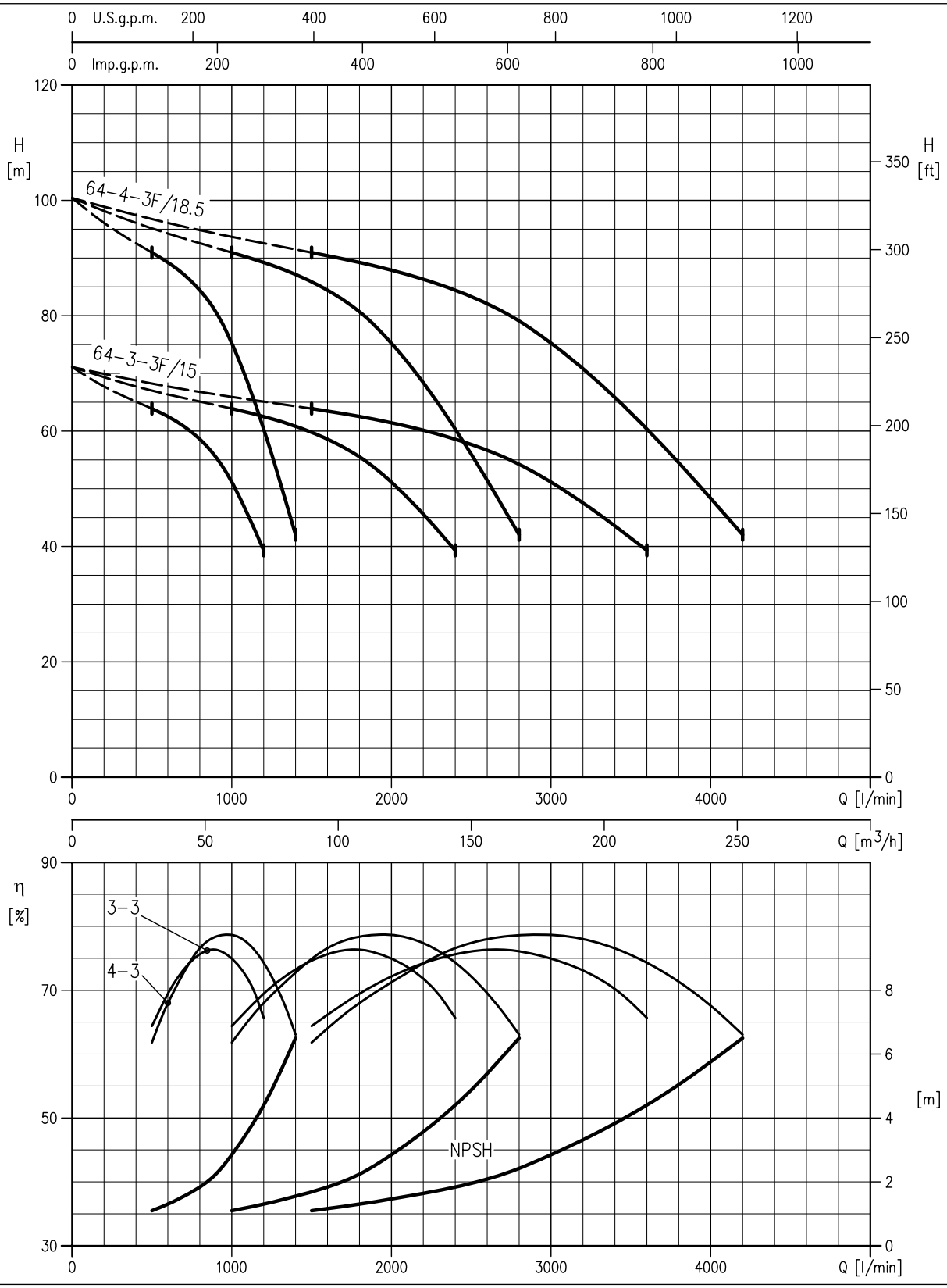
The indicated characteristics do not include the pressure drop in the valves and lines; the indicated NPSH is a laboratory value for the pump alone

PERFORMANCE CURVES for 3GPE EVMG 64 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

PERFORMANCE CURVES for 3GPE EVMG 64 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

3GPE EVMG EFC

INDUSTRIAL PRESSURISATION

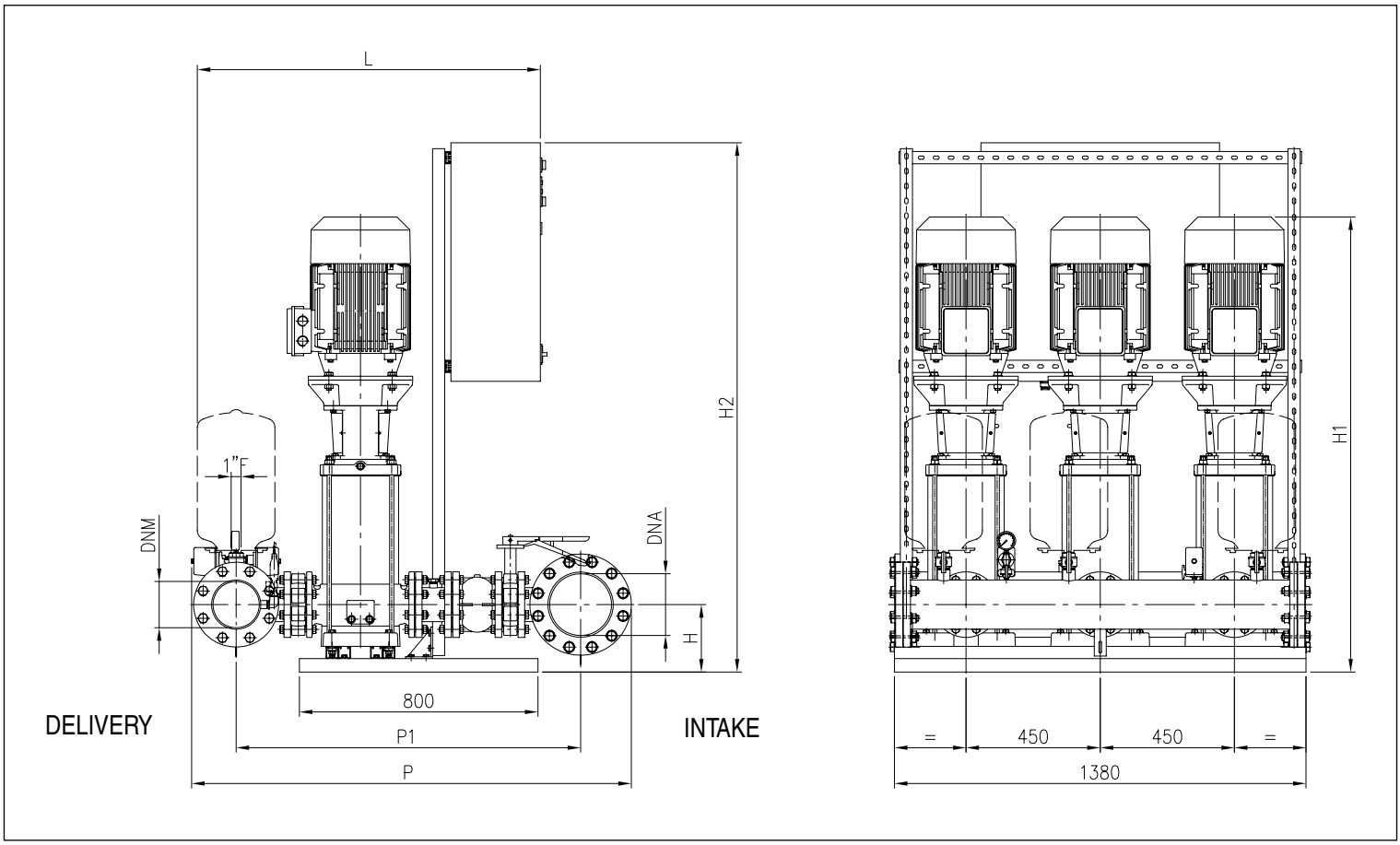
TABLE OF PERFORMANCE AND ELECTRICAL DATA FOR THREE PUMPS RUNNING SIMULTANEOUSLY

Model	[kW]	Q = Flow rate l/min	600	1050	1500	1800	2100	2700	3000	3600	4200
		m³/h	36	63	90	108	126	162	180	216	252
		H = Head [m]									
3GPE EVMG 32 3-3F/5.5	5.5+5.5+5.5		55.5	47.5	35.2	26.1	-	-	-	-	-
3GPE EVMG 32 3-1F/5.5	5.5+5.5+5.5		62.0	55.0	44.5	35.2	24.5	-	-	-	-
3GPE EVMG 32 4-3F/7.5	7.5+7.5+7.5		77.0	67.0	51.5	39.4	-	-	-	-	-
3GPE EVMG 32 4-1F/7.5	7.5+7.5+7.5		83.5	74.5	61.0	48.5	34.2	-	-	-	-
3GPE EVMG 32 5-3F/11	11+11+11		106.0	100.0	89.0	70.0	37.5	-	-	-	-
3GPE EVMG 45 2-0F/7.5	7.5+7.5+7.5		-	51.5	50.0	48.0	45.0	35.4	29.1	-	-
3GPE EVMG 45 3-2F/11	11+11+11		-	64.0	61.0	58.0	53.0	37.3	-	-	-
3GPE EVMG 45 3-0F/11	11+11+11		-	77.5	75.0	72.5	68.0	54.0	45.0	-	-
3GPE EVMG 45 4-2F/15	15+15+15		-	90.0	86.0	82.0	76.0	56.0	43.0	-	-
3GPE EVMG 45 4-0F/15	15+15+15		-	103.0	100.0	96.5	91.0	73.0	60.5	-	-
3GPE EVMG 64 2-0F/11	11+11+11		-	-	53.5	53.0	52.0	49.0	46.5	39.5	30.6
3GPE EVMG 64 3-3F/15	15+15+15		-	-	64.0	62.5	61.0	55.5	51.0	39.3	-
3GPE EVMG 64 3-2F/15	15+15+15		-	-	69.5	68.0	66.5	61.5	57.5	46.5	32.5
3GPE EVMG 64 3-1F/15	15+15+15		-	-	75.0	74.0	72.5	68.0	64.0	53.5	40.0
3GPE EVMG 64 3-0F/18.5	18.5+18.5+18.5		-	-	80.5	79.5	78.0	74.0	70.5	60.5	47.5
3GPE EVMG 64 4-3F/18.5	18.5+18.5+18.5		-	-	91.0	89.0	87.0	80.5	75.5	60.5	42.0
3GPE EVMG 64 4-1F/22	22+22+22		-	-	102.0	101.0	98.5	93.0	88.0	74.5	57.0
3GPE EVMG 64 4-0F/22	22+22+22		-	-	108.0	106.0	104.0	99.0	94.5	81.5	64.5

3GPE EVMG EFC

INDUSTRIAL PRESSURISATION

DIMENSIONS 3GPE EVMG 32-45-64 EFC



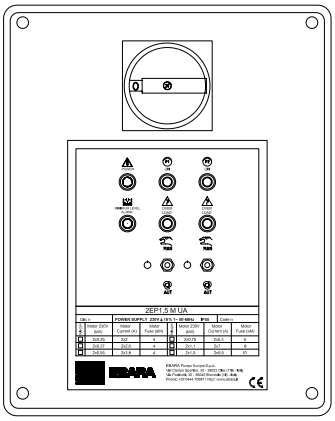
DIMENSION CHART

Model	Dimensions [mm]								Weight [kg]
	L	H	H1	H2	P	P1	DNA	DNM	
3GPE EVMG32 3-3F/5.5	1175	190	985	1475	1420	1130	DN150	DN125	573.0
3GPE EVMG32 3-1F/5.5	1175	190	985	1475	1420	1130	DN150	DN125	573.0
3GPE EVMG32 4-3F/7.5	1175	190	1035	1475	1420	1130	DN150	DN125	587.0
3GPE EVMG32 4-1F/7.5	1175	190	1035	1475	1420	1130	DN150	DN125	587.0
3GPE EVMG32 5-3F/11	1225	190	1290	1475	1420	1130	DN150	DN125	791.0
3GPE EVMG45 2-0F/7.5	1250	225	1030	1575	1550	1235	DN200	DN150	635.0
3GPE EVMG45 3-2F/11	1300	225	1310	1575	1550	1235	DN200	DN150	836.0
3GPE EVMG45 3-0F/11	1300	225	1310	1575	1550	1235	DN200	DN150	836.0
3GPE EVMG45 4-2F/15	1300	225	1475	1575	1550	1235	DN200	DN150	872.0
3GPE EVMG45 4-0F/15	1300	225	1475	1575	1550	1235	DN200	DN150	872.0
3GPE EVMG64 2-0F/11	1170	225	1240	1575	1475	1155	DN200	DN150	819.0
3GPE EVMG64 3-3F/15	1170	225	1405	1575	1475	1155	DN200	DN150	845.0
3GPE EVMG 64 3-2F/15	1170	225	1410	1575	1475	1155	DN200	DN150	863.0
3GPE EVMG64 3-1F/15	1170	225	1405	1575	1475	1155	DN200	DN150	845.0
3GPE EVMG64 3-0F/18.5	1170	225	1450	1775	1475	1155	DN200	DN150	876.0
3GPE EVMG64 4-3F/18.5	1170	225	1520	1775	1475	1155	DN200	DN150	934.0
3GPE EVMG64 4-1F/22	1170	225	1555	1775	1475	1155	DN200	DN150	1124.0
3GPE EVMG64 4-0F/22	1170	225	1555	1775	1475	1155	DN200	DN150	1124.0

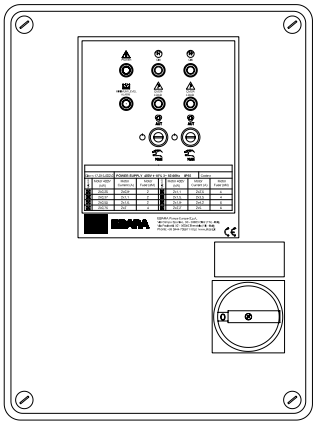
SERIES 2EP

ELECTRICAL ENCLOSURES FOR GP FIXED SPEED UNITS

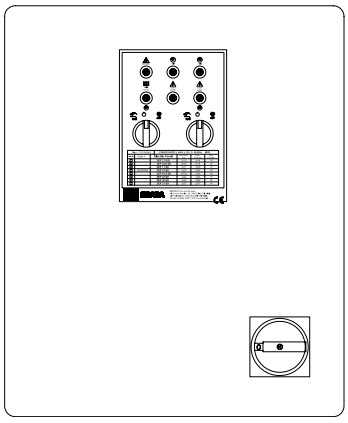
2EP M UA



2EP T UA



2EP SD UA



- **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

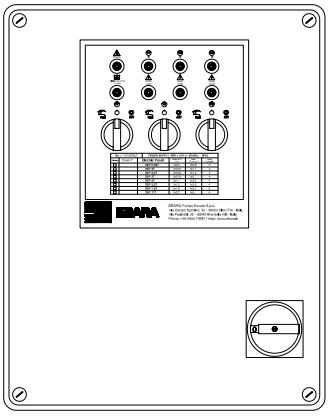
SPECIFICATIONS

- 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)

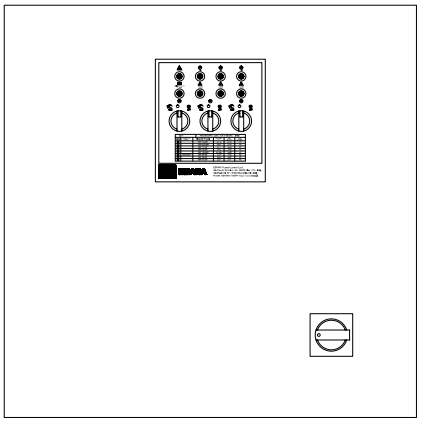
SERIE 3EP

ELECTRICAL ENCLOSURES FOR GP FIXED SPEED UNITS

3EP T UA



3EP SD UA



- **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

METAL PIPE, NO VALVES

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

VARIABLE SPEED CONTROL SYSTEM

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)

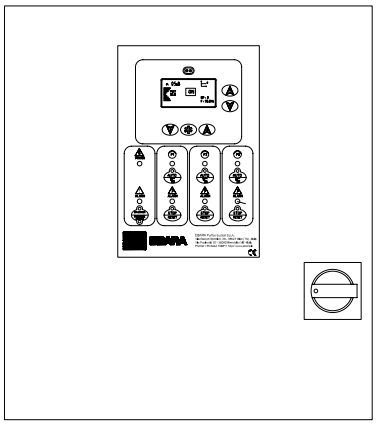
SPECIFICATIONS

- 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
- Standards:
  - Machinery Directive 2006/42/EC
  - EMC Directive 2004/108/EC
  - EN 55011 Class A
  - EN 61000
  - EN 60146
  - EN 50178
  - EN 60204-1
- 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)

SERIES EFC / MFC

ELECTRICAL ENCLOSURES FOR GPE VARIABLE SPEED UNITS

EFC / MF



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

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:

$$NPSH = z_i + \frac{P_o}{\gamma} - H_{ri} + \frac{P_b - P_v}{\gamma\gamma}$$

Where:
z_i = 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_o = 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, $p_o = 0$
γ = specific weight of fluid (in N/m^3) at the pumping temperature
H_{ri} = 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

Diminution of the suction level difference with varying fluid temperature

Temperature [°C]	Intake pressure drops in m [K_γ]
25	0
30	0.4
40	0.8
50	1.3
60	2.0
70	3.2
80	4.8
90	7.1

Diminution of the suction level difference with height above sea level

Heights [m]	Intake pressure drops in m [K_H]
0	0
500	0.55
1000	1.1
1500	1.65
2000	2.2
2500	2.75
3000	3.3

FLOW RATE

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).

Flow rate

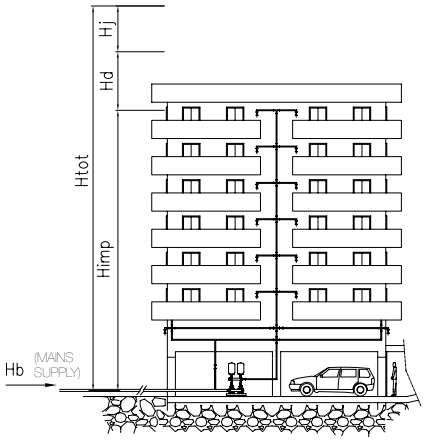
N.	WC (cistern)		WC (direct flush)	
apartments	1	2	1	2
	Flow rate [l/min]	Flow rate [l/min]	Flow rate [l/min]	Flow rate [l/min]
1	30	40	60	80
2	40	55	85	110
3	52	65	100	135
4	60	75	120	155
5	70	85	140	175
6	75	90	150	190
7	80	100	160	205
8	85	110	170	220
9	90	115	180	235
10	95	120	190	250
11	100	130	200	260
12	105	135	210	273
13	110	140	220	285
14	115	145	230	295
15	120	150	240	305
16	125	155	250	315
17	130	160	260	325
18	135	165	270	335
19	140	170	280	340
20	145	175	290	350
22	150	180	300	370
24	155	185	310	390
26	160	190	320	400
28	165	195	330	420
30	170	200	340	430
32	175	205	350	440
34	180	210	360	450
36	185	220	370	460
38	190	230	380	480
40	195	240	390	500
45	205	260	400	530
50	215	270	415	555
55	225	280	430	580
60	235	290	440	610
65	245	300	460	635
70	255	310	480	660
75	265	320	500	680
80	275	330	520	700
85	280	340	540	730
90	285	350	560	750
95	290	360	580	770
100	300	380	600	790
110	315	400	620	820
120	330	420	640	860
130	345	440	660	895
140	360	460	685	930
150	375	480	710	965
160	390	500	735	1000
170	405	520	765	1040
180	420	540	795	1085
190	435	560	825	1130
200	450	580	855	1150
220	465	600	890	1170
240	480	620	925	1225
260	495	640	960	1280
280	510	660	995	1320
300	525	680	1030	1365
320	540	700	1065	1410
340	555	720	1100	1450
360	570	740	1135	1490
380	585	760	1170	1535
400	600	780	1200	1575

CAUTION: for seaside areas, one must augment the flow rate by a factor of 20%

HEAD

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.



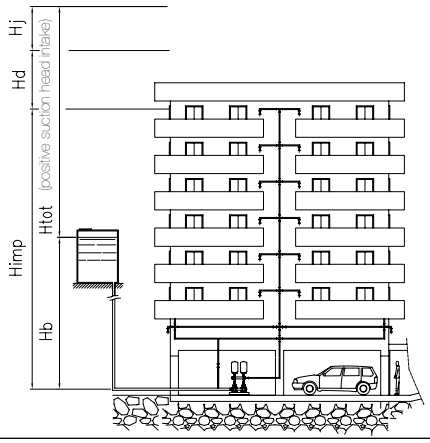
$H_{tot}=H_{imp}+H_d+H_j$

Example: $H_{imp}=20$
$H_d=15$
$H_j=2$
$H_{tot}=20+15+2=37$

H_{imp}= geodetic height of pump suction axis at most elevated service;

H_d= geodetic height at minimum pressure demand on most elevated service;

H_j= sum of continuous and local pressure drops



$H_{tot}=H_{imp}-H_b+H_d+H_j$

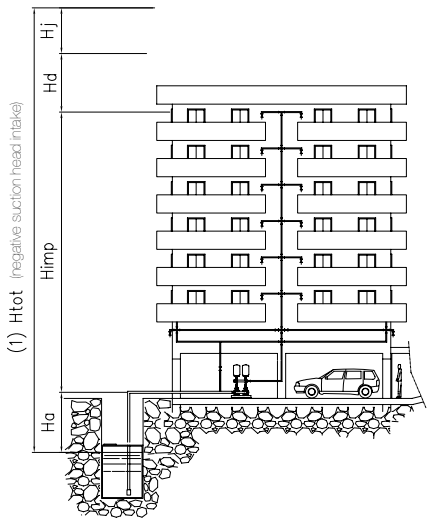
Example: $H_{imp}=20$
$H_d=15$
$H_d=15$
$H_j=2$
$H_{tot}=20-15+15+2=22$

H_b= positive suction head geodetic height or height corresponding to minimum mains supply pressure

H_{imp}= geodetic height of pump suction axis at most elevated service;

H_d= height corresponding to minimum pressure demand on most elevated service;

H_j= sum of continuous and local pressure drops



$H_{tot}=H_{imp}+H_a+H_d+H_j$

Example: $H_{imp}=20$
$H_a=5$
$H_d=15$
$H_j=2$
$H_{tot}=20+5+15+2=42$

H_a= positive suction head geodetic height

Himp= geodetic height of pump suction axis at most elevated service;

Hd= height corresponding to minimum pressure demand on most elevated service;

Hj= sum of continuous and local pressure drops

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.

Pc= Pressure drop in water column metres per 100 m of new cast iron pipe.
V= Speed of fluid in pipe, m/s.

Flow rate		Internal diameter [mm]																										
[m³/h]		25	32	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400	450	500	600	700	800	900	1000
3	Pc %	17	6	1.6	0.54	0.25	0.13	0.06	0.03	0.02																	
	Vm/s	1.70	1.03	0.67	0.43	0.29	0.22	0.16	0.13	0.10																	
6	Pc %		24	6	2	0.9	0.43	0.21	0.13	0.08	0.026																
	Vm/s		2.06	1.34	0.85	0.58	0.44	0.32	0.26	0.20	0.13																
9	Pc %			12.5	4.3	1.8	0.9	0.46	0.25	0.15	0.06																
	Vm/s			2.08	1.32	0.89	0.65	0.5	0.39	0.32	0.20																
12	Pc %			20	7	3.2	1.5	0.75	0.44	0.25	0.09	0.03															
	Vm/s			2.76	1.76	1.19	0.88	0.67	0.53	0.43	0.27	0.18															
15	Pc %				12	5.2	2.4	1.25	0.7	0.42	0.15	0.06															
	Vm/s				2.2	1.49	1.1	0.87	0.66	0.54	0.34	0.24															
18	Pc %				17	7	3.5	1.7	1	0.6	0.2	0.08															
	Vm/s				2.64	1.78	1.3	1	0.78	0.64	0.4	0.28															
21	Pc %				22	8.8	4.2	2.2	1.3	0.75	0.26	0.1	0.05														
	Vm/s				3.35	2.08	1.54	1.17	0.93	0.75	0.48	0.32	0.24														
24	Pc %					12	5.7	3	1.7	1	0.36	0.14	0.07														
	Vm/s					2.38	1.76	1.34	1.06	0.86	0.54	0.36	0.28														
27	Pc %					14	7	3.5	2	1.25	0.42	0.17	0.08														
	Vm/s					2.7	1.97	1.45	1.17	0.96	0.6	0.42	0.31														
30	Pc %					17	8.2	4.2	2.5	1.5	0.5	0.2	0.09														
	Vm/s					2.98	2.2	1.74	1.32	1.08	0.68	0.48	0.34														
36	Pc %					25	12	6.3	3.5	2	0.75	0.3	0.14	0.07													
	Vm/s					3.58	2.63	2	1.58	1.28	0.82	0.57	0.42	0.32													
42	Pc %						16	8.5	4.5	2.7	0.85	0.33	0.18	0.08													
	Vm/s						3.07	2.34	1.85	1.5	0.96	0.66	0.48	0.37													
48	Pc %						21	10	6	3.6	1.2	0.45	0.22	0.12	0.06												
	Vm/s						3.51	2.68	2.12	1.72	1.08	0.72	0.56	0.43	0.34												
54	Pc %						25	13.5	7.6	4.5	1.5	0.55	0.28	0.14	0.08												
	Vm/s						3.94	3	2.34	1.92	1.2	0.84	0.63	0.48	0.38												
60	Pc %							16	9	5.5	1.8	0.7	0.33	0.17	0.1												
	Vm/s							3.32	2.64	2.16	1.36	0.96	0.68	0.53	0.42												
75	Pc %							24	14	8	2.76	1	0.49	0.24	0.14	0.08											
	Vm/s							4.17	3.31	2.68	1.72	1.18	0.87	0.67	0.53	0.43											
90	Pc %								20	12.5	3.8	1.45	0.74	0.36	0.2	0.14	0.08										
	Vm/s								3.97	3.24	2.04	1.44	1.02	0.8	0.63	0.51	0.42										
105	Pc %								26	16.5	5.3	1.95	0.9	0.47	0.27	0.16	0.1										
	Vm/s								4.6	3.74	2.41	1.66	1.22	0.93	0.74	0.59	0.49										
120	Pc %									21.5	6.9	2.6	1.2	0.61	0.36	0.2	0.14	0.08									
	Vm/s									4.31	2.72	1.93	1.35	1.06	0.84	0.68	0.56	0.47									
135	Pc %									26	9	3.3	1.5	0.76	0.45	0.25	0.17	0.1									
	Vm/s									4.81	1.07	2.13	1.56	1.19	0.95	0.76	0.63	0.53									
150	Pc %										11	4	1.9	0.95	0.55	0.3	0.21	0.12	0.06								
	Vm/s										3.44	2.36	1.74	1.34	1.05	0.86	0.70	0.59	0.43								
165	Pc %										13	4.7	2.2	1.13	0.65	0.37	0.24	0.15	0.08								
	Vm/s										3.75	2.61	1.91	1.46	1.15	0.94	0.77	0.65	0.48								
180	Pc %										15.2	5.5	2.6	1.3	0.76	0.43	0.29	0.18	0.09								
	Vm/s										4.09	2.83	2.08	1.59	1.26	1.02	0.84	0.71	0.52								
210	Pc %										21	7.4	3.5	1.8	1.1	0.6	0.37	0.24	0.12	0.06							
	Vm/s										4.70	3.32	2.43	1.86	1.49	1.19	0.98	0.82	0.61	0.47							
240	Pc %											9.4	4.3	2.3	1.3	0.75	0.48	0.3	0.15	0.08							
	Vm/s											3.78	2.77	2.12	1.68	1.36	1.12	0.95	0.69	0.53							
270	Pc %											12	5.5	2.8	1.62	0.9	0.58	0.35	0.18	0.09							
	Vm/s											4.26	3.13	2.39	1.90	1.53	1.26	1.07	0.78	0.59							
300	Pc %											14	7.5	3.4	2	1.1	0.74	0.46	0.22	0.11	0.07						
	Vm/s											4.75	3.47	2.66	2.10	1.71	1.40	1.18	0.86	0.67	0.53						
360	Pc %												9	4.7	2.8	1.6	1	0.65	0.32	0.16	0.09	0.05					
	Vm/s												4.15	3.17	2.53	2.04	1.68	1.41	1.04	0.79	0.63	0.51					
420	Pc %												11.6	6.2	3.5	2	1.3	0.82	0.41	0.21	0.12	0.07	0.03				
	Vm/s												4.86	3.72	2.94	2.37	1.96	1.64	1.22	0.94	0.76	0.59	0.41				
480	Pc %													8.5	4.9	2.9	1.9	1.2	0.6	0.3	0.17	0.09	0.04				
	Vm/s													4.24	3.36	2.72	2.24	1.90	1.38	1.06	0.84	0.69	0.47				
540	Pc %													11	6.5	3.7	2.35	1.52	0.75	0.38	0.22	0.12	0.05				
	Vm/s													4.78	3.80	3.06	2.52	2.13	1.56	1.19	0.94	0.76	0.53				
600	Pc %													12.2	7.4	4.3	2.7	1.7	0.9	0.45	0.25	0.13	0.055	0.024			
	Vm/s													5.30	4.20	3.40	2.81	2.36	1.73	1.34	1.06	0.86	0.61	0.44			
660	Pc %														9	5.2	3.3	2.1	1.1	0.54	0.3	0.16	0.06	0.03			
	Vm/s														4.61	3.76	3.07	2.59	1.89	1.46	0.15	0.93	0.65	0.48			
720	Pc %														10	6	3.8	2.5	1.3	0.52	0.35	0.19	0.075	0.035			
	Vm/s														5.05	4.08	3.37	2.84	2.08	1.65	1.26	1.02	0.71	0.52			
780	Pc %															7.3	4.5	3	1.5	0.75	0.42	0.23	0.08	0.04			
	Vm/s															4.43	3.65	3.08	2.26	1.73	1.36	1.11	0.77	0.56			
840	Pc %															8	5.4	3.4	1.7	0.85	0.48	0.26	0.1	0.047			
	Vm/s															4.76	3.95	3.31	2.43	1.86	1.47	1.19	0.83	0.61			
900	Pc %															9	5.8	3.75	1.9	0.96	0.53	0.29	0.11	0.053			
	Vm/s															5.1	4.22	3.54	2.60	2.00	1.57	1.27	0.88	0.65			
960	Pc %																6.5	4.3	2.1	1.1	0.6	0.32	0.12	0.06			
	Vm/s																4.49	3.78	2.77	2.13	1.68	1.36	0.95	0.70			
1020	Pc %																7.2	4.6	2.45	1.2	0.67	0.35	0.14	0.065	0.033		
	Vm/s																4.76	4.01	2.94	2.26	1.78	1.44	1.00	0.77	0.54		
1080	Pc %																	5.4	2.8	1.4	0.78	0.43	0.16	0.073	0.037		
	Vm/s																	4.26	3.12	2.38	1.86	1.53	1.06	0.78	0.57		
1140	Pc %																	6	3.2	1.53	0.86	0.46	0.175	0.08	0.043	0.037	
	Vm/s																	4.49	3.29	2.53	1.99	1.65	1.12	0.84	0.61	0.52	
1200	Pc %																	6.5	3.4	1.7	0.93	0.5	0.19	0.09	0.046	0.04	0.025
	Vm/s																	4.72	3.45	2.68	2.12	1.72	1.23	0.88	0.63	0.54	0.4

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

- Foot valve: 15 m of pipe
- Check valve: 10 m of pipe
- Shutter: 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:

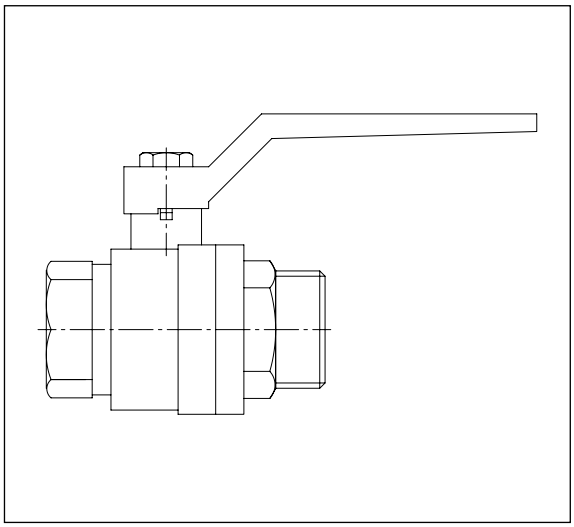
- stainless steel 0.8
- PVC 0.7
- porcelain 1.17
- laminated steel 0.8
- galvanised steel 0.8
- lightly rusted pipe 1.25
- rusted and very encrusted pipe 2.1

Recommended delivery dia.

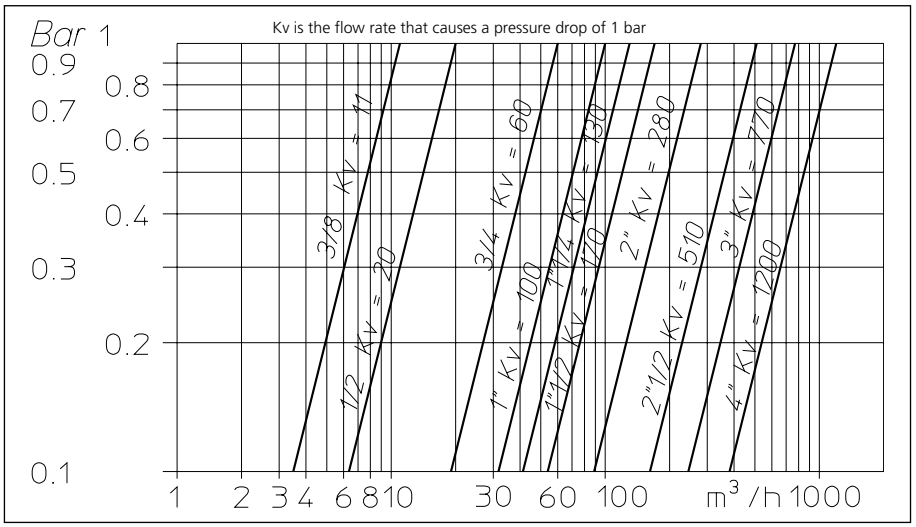
Recommended intake dia.

ACCIDENTAL PRESSURE DROPS

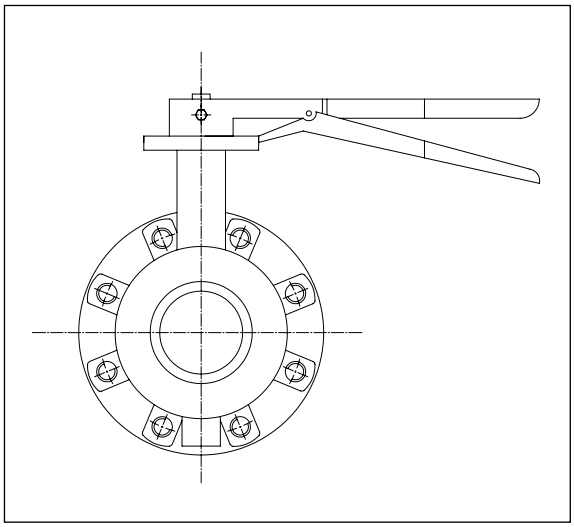
BALL VALVE



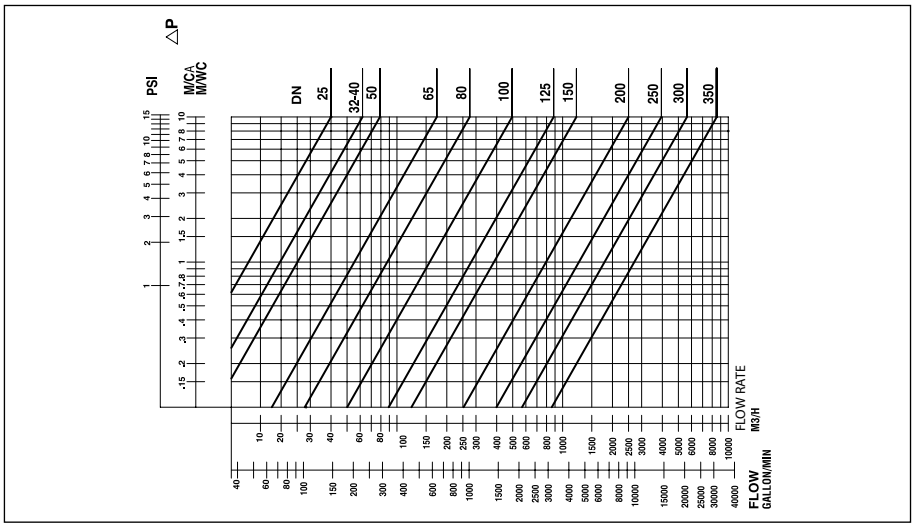
PRESSURE DROP/FLOW RATE DIAGRAM



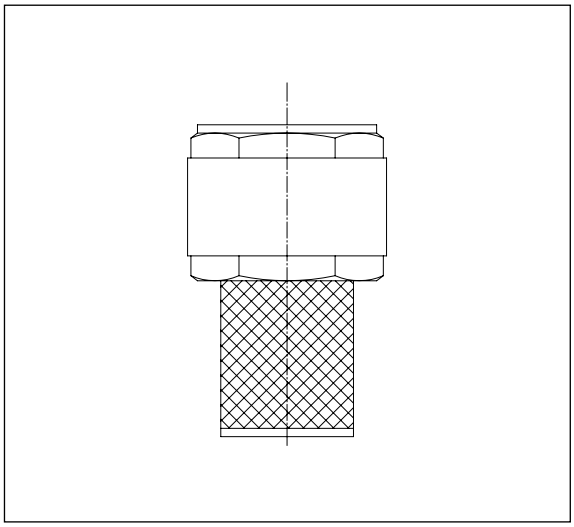
CHOKE VALVE

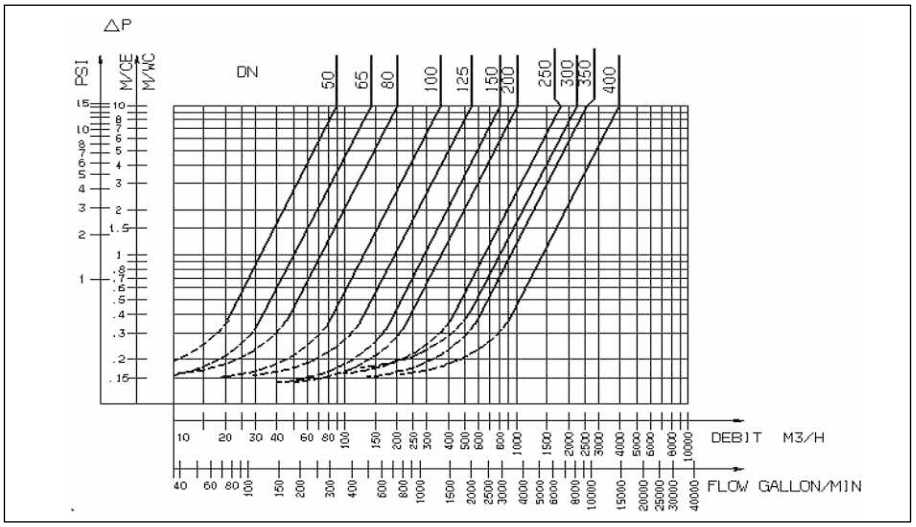


PRESSURE DROP ΔP DIAGRAM



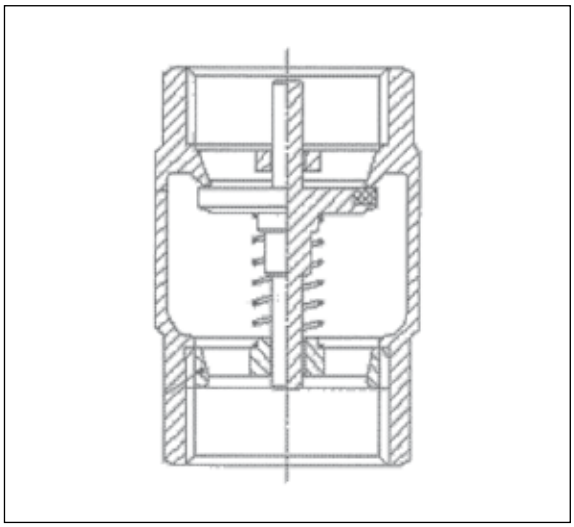
FOOT VALVE

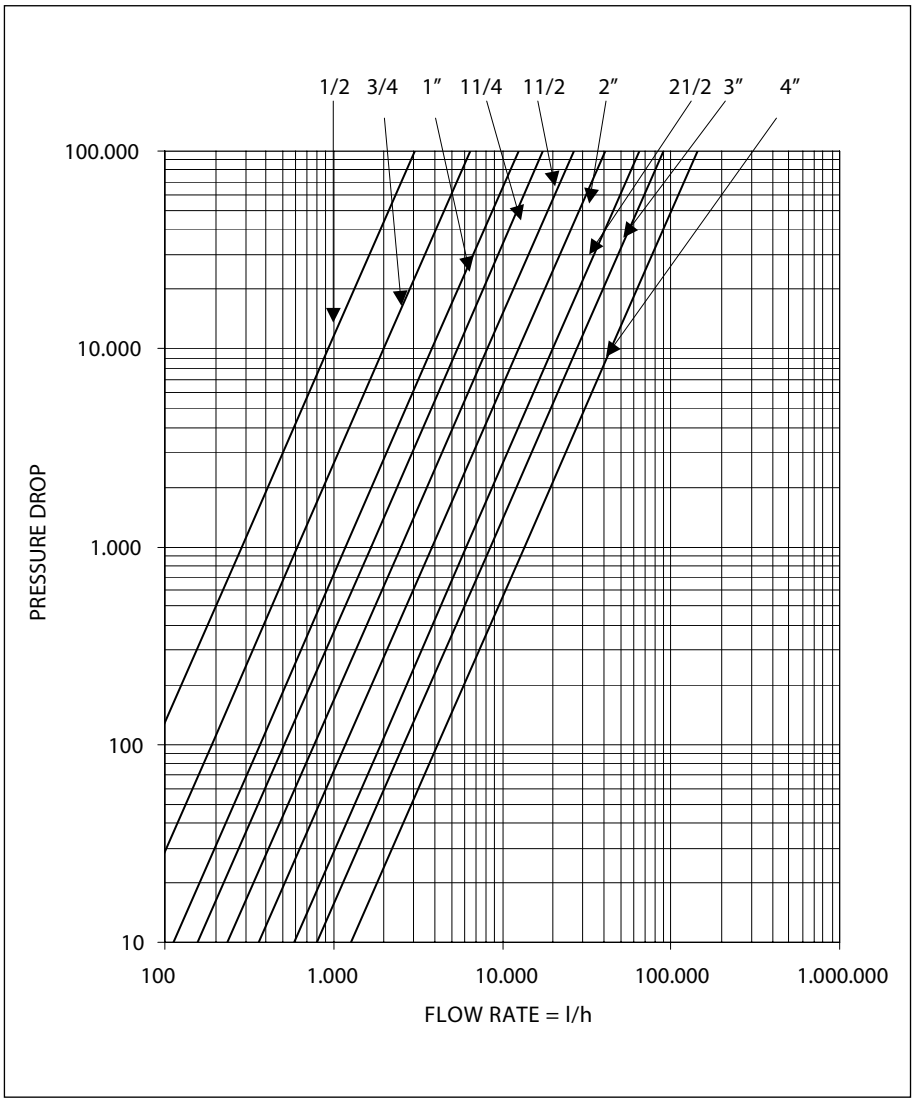




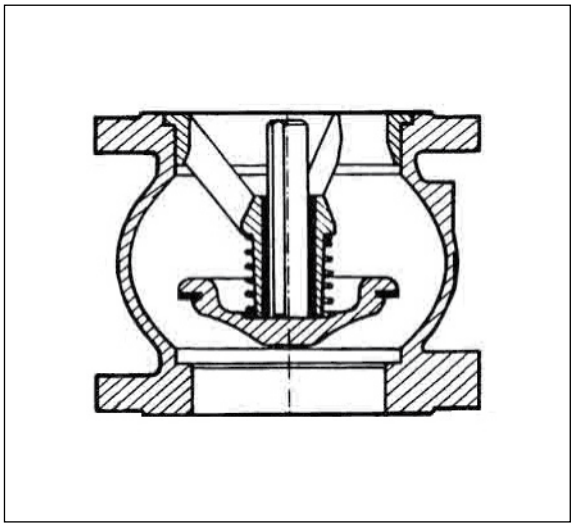
ACCIDENTAL PRESSURE DROPS

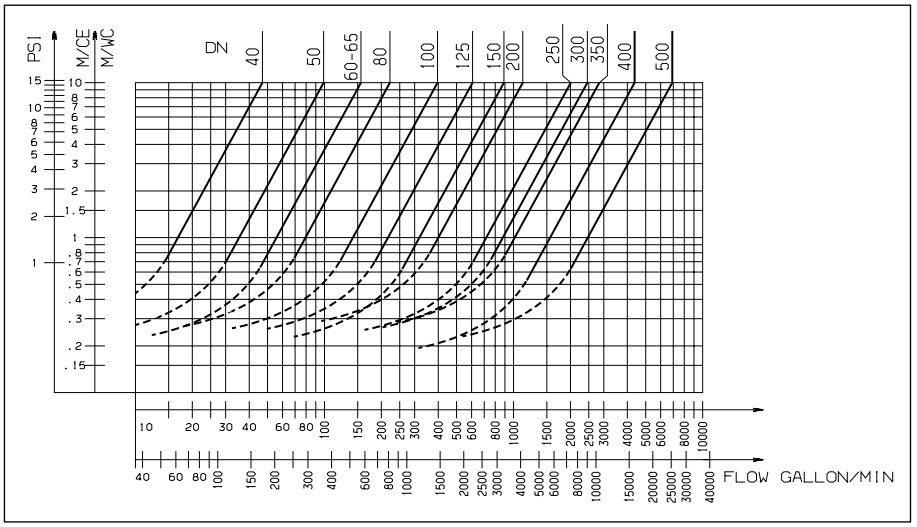
BRASS CHECK VALVE





FLANGED CHECK VALVE IN CAST IRON



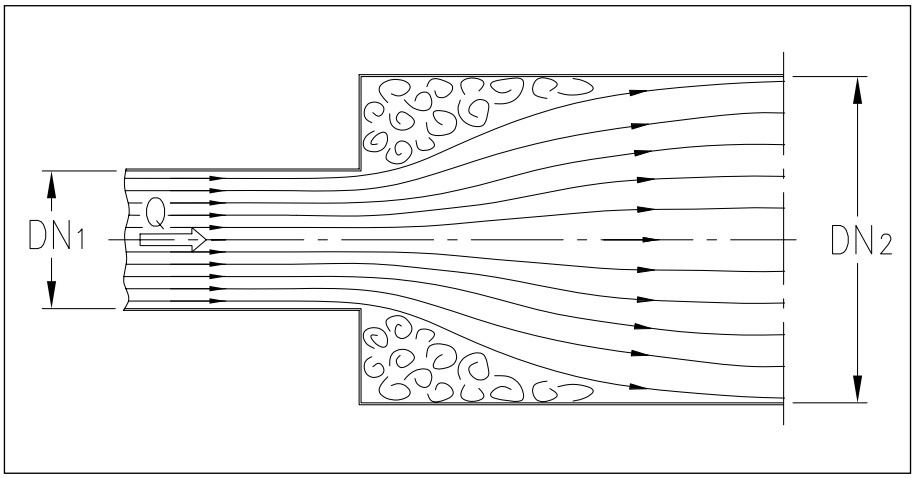


ACCIDENTAL PRESSURE DROPS

PRESSURE DROP IN EQUIVALENT LENGTH OF PIPE IN METRES OF GALVANISED STEEL PIPE

Diameter (nominal)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
	0.23	0.35	0.47	0.7	0.94	1.17	1.41	1.88	2.35	2.82	3.76	4.7	5.64
	0.22	0.33	0.44	0.67	0.86	1.11	1.33	1.78	2.23	2.68	-	-	-
	-	0.16	0.22	0.32	0.43	0.54	0.65	0.86	1.08	1.30	1.73	2.16	2.59
	-	0.61	0.81	1.22	1.63	2.03	2.44	3.25	-	-	-	-	-
	-	-	0.27	0.41	0.55	0.68	0.82	1.04	1.37	1.64	2.18	-	-
	0.16	0.24	0.32	0.48	0.64	0.79	0.95	1.27	1.59	1.91	2.54	-	-
	-	0.28	0.34	0.5	0.67	0.84	1.01	1.35	1.68	2.02	2.96	-	4.04
	0.1	0.15	0.2	0.3	0.41	0.51	0.61	0.81	1.02	1.22	-	-	-
	-	-	0.43	0.65	0.86	1.08	1.3	1.73	-	-	-	-	-
	0.04	0.06	0.08	0.12	0.17	0.21	0.25	0.33	0.41	0.5	0.66	0.83	0.99
	0.34	0.51	0.69	1.03	1.37	1.71	2.06	2.74	3.43	4.11	5.49	6.86	8.23
	0.42	0.62	0.83	1.25	1.66	2.08	2.5	3.33	4.16	4.99	6.65	8.32	9.98
	-	-	0.09	0.13	0.18	0.22	0.27	0.36	0.44	0.55	0.73	-	-
	-	-	0.44	0.66	0.88	1.1	1.31	1.75	2.19	2.7	3.51	-	-
	0.05	0.08	0.1	0.15	0.2	0.25	0.3	0.41	0.49	0.59	-	-	-
	0.34	0.5	0.67	1.01	1.35	1.68	2.02	2.69	3.36	4.02	-	-	-
	-	-	0.28	-	-	-	-	-	-	-	-	-	-
	-	-	0.30	-	-	-	-	-	-	-	-	-	-
	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03
	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-

LOCAL PRESSURE DROPS



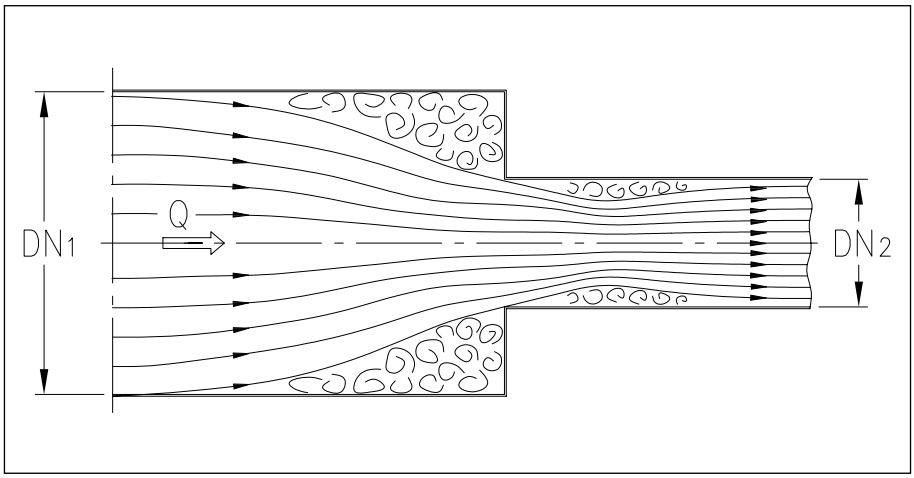
DN = Nominal pipe diameter
D_i = Effective internal diameter of pipe

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN_1 = L

PRESSURE DROPS DUE TO SUDDEN ENLARGEMENT IN WATER COLUMN METRES

Flow rate Q m³/h	DN_1	25			32			40			50			65			80			100			125			150		200
	D_{i1}	27.4	27.4	27.4	36.1	36.1	36.1	42.0	42.0	42.0	53.1	53.1	53.1	68.8	68.8	68.8	80.8	80.8	80.8	105.1	105.1	105.1	129.7	129.7	129.7	155.2	155.2	206.5
	DN_2	32	40	50	40	50	65	50	65	80	65	80	100	80	100	125	100	125	150	125	150	200	150	200	250	200	250	250
	D_{i2}	36.1	42.0	53.1	42.0	53.1	68.8	53.1	68.8	80.8	68.8	80.8	105.1	80.8	105.1	129.7	80.8	129.7	155.2	129.7	155.2	206.5	155.2	206.5	260.4	206.5	260.4	260.4
3		0.02	0.03	0.05	-	0.01	0.02	-	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6		0.07	0.13	0.22	0.01	0.04	0.07	0.01	0.03	0.04	-	0.01	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		0.16	0.30	0.49	0.02	0.09	0.16	0.02	0.07	0.09	0.01	0.02	0.04	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-
12		0.29	0.54	0.88	0.04	0.16	0.28	0.04	0.12	0.16	0.02	0.04	0.06	-	0.01	0.02	-	-	0.01	-	-	-	-	-	-	-	-	-
15		0.46	0.84	1.37	0.06	0.24	0.44	0.06	0.18	0.25	0.03	0.06	0.10	-	0.02	0.03	-	0.01	0.02	-	-	-	-	-	-	-	-	-
18		0.66	1.21	1.97	0.08	0.35	0.64	0.09	0.26	0.35	0.04	0.08	0.14	0.01	0.03	0.05	0.01	0.02	0.03	-	-	0.01	-	-	-	-	-	-
21		0.90	1.65	2.69	0.11	0.48	0.87	0.13	0.36	0.48	0.06	0.11	0.20	0.01	0.04	0.06	0.01	0.02	0.04	-	0.01	0.01	-	-	-	-	-	-
24		1.17	2.15	3.51	0.15	0.63	1.14	0.17	0.46	0.63	0.08	0.15	0.26	0.01	0.05	0.08	0.01	0.03	0.05	-	0.01	0.02	-	-	-	-	-	-
27		-	-	-	0.19	0.79	1.44	0.21	0.59	0.80	0.10	0.19	0.32	0.02	0.07	0.11	0.02	0.04	0.06	-	0.01	0.02	-	-	0.01	-	-	-
30		-	-	-	0.23	0.98	1.77	0.26	0.73	0.98	0.12	0.23	0.40	0.02	0.08	0.13	0.02	0.05	0.07	0.01	0.01	0.03	-	0.01	0.01	-	-	-
36		-	-	-	0.33	1.41	2.56	0.37	1.05	1.41	0.17	0.34	0.58	0.03	0.12	0.19	0.03	0.07	0.10	0.01	0.02	0.04	-	0.01	0.02	-	-	-
42		-	-	-	0.45	1.92	3.48	0.51	1.42	1.93	0.23	0.46	0.78	0.04	0.16	0.26	0.04	0.10	0.14	0.01	0.03	0.05	-	0.01	0.02	-	0.01	-
48		-	-	-	-	-	-	0.66	1.86	2.52	0.30	0.60	1.03	0.05	0.21	0.34	0.06	0.13	0.18	0.01	0.04	0.07	-	0.02	0.03	-	0.01	-
54		-	-	-	-	-	-	0.84	2.35	3.18	0.38	0.75	1.30	0.06	0.27	0.43	0.07	0.16	0.23	0.02	0.04	0.08	0.01	0.02	0.04	0.01	0.01	-
60		-	-	-	-	-	-	1.03	2.90	3.93	0.47	0.93	1.60	0.08	0.33	0.53	0.09	0.20	0.29	0.02	0.06	0.10	0.01	0.03	0.05	0.01	0.02	-
75		-	-	-	-	-	-	-	-	-	0.74	1.46	2.50	0.12	0.52	0.83	0.14	0.32	0.45	0.03	0.09	0.16	0.01	0.05	0.07	0.01	0.03	-
90		-	-	-	-	-	-	-	-	-	1.06	2.10	3.60	0.17	0.75	1.19	0.20	0.45	0.64	0.05	0.12	0.23	0.02	0.07	0.10	0.02	0.04	-
105		-	-	-	-	-	-	-	-	-	1.45	2.85	4.91	0.24	1.02	1.62	0.28	0.62	0.88	0.07	0.17	0.32	0.02	0.09	0.14	0.02	0.05	-
120		-	-	-	-	-	-	-	-	-	-	-	-	0.31	1.34	2.12	0.36	0.81	1.14	0.09	0.22	0.41	0.03	0.12	0.18	0.03	0.07	0.01
135		-	-	-	-	-	-	-	-	-	-	-	-	0.39	1.69	2.68	0.46	1.02	1.45	0.11	0.28	0.52	0.04	0.15	0.23	0.04	0.08	0.01
150		-	-	-	-	-	-	-	-	-	-	-	-	0.48	2.09	3.31	0.56	1.26	1.79	0.14	0.34	0.65	0.05	0.19	0.29	0.05	0.10	0.01
180		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.81	1.82	2.58	0.20	0.50	0.93	0.07	0.27	0.41	0.07	0.15	0.02
210		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	2.47	3.51	0.27	0.68	1.27	0.09	0.36	0.56	0.09	0.20	0.02
240		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	3.23	4.58	0.35	0.88	1.65	0.12	0.48	0.73	0.12	0.26	0.03
270		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.45	1.12	2.09	0.15	0.60	0.93	0.15	0.33	0.04
300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.55	1.38	2.58	0.18	0.74	1.15	0.19	0.41	0.04
360		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	1.99	3.72	0.27	1.07	1.65	0.27	0.59	0.06
420		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.36	1.46	2.25	0.37	0.81	0.09
480		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.47	1.90	2.94	0.48	1.05	0.11
540		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60	2.41	3.72	0.61	1.33	0.14
600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.74	2.97	4.59	0.75	1.65	0.17
660		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.91	1.99	0.21
720		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.08	2.37	0.25
780		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.27	2.78	0.29
840		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.47	3.22	0.34
900		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.39
1000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48
1100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.58
1200		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.70
1300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.82
1400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.95
1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.09

LOCAL PRESSURE DROPS



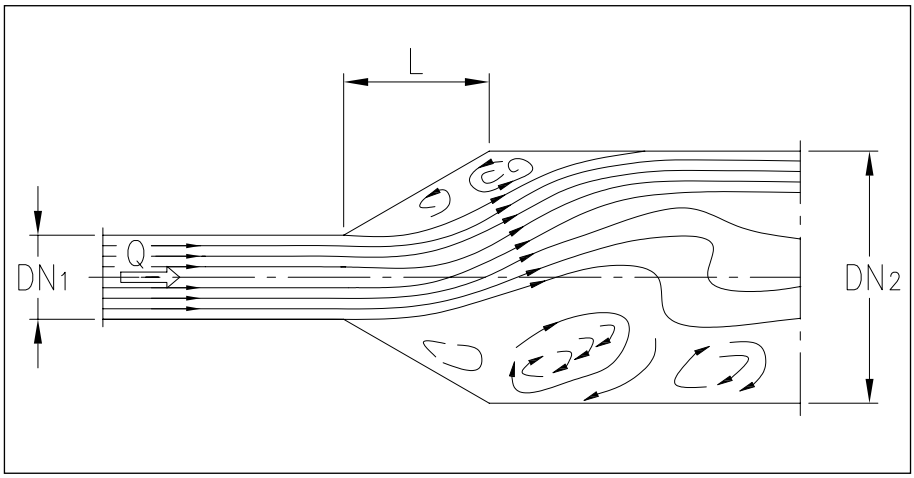
DN = Nominal pipe diameter
D_i = Effective internal diameter of pipe

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN_1 = L

PRESSURE DROPS DUE TO SUDDEN RESTRICTION IN WATER COLUMN METRES

Flow rate Q m³/h	DN1	32	40		50			65			80			100			125			150			200			250		
	Di1	36.1	42.0	42.0	53.1	53.1	53.1	68.8	68.8	68.8	80.8	80.8	80.8	105.1	105.1	105.1	129.7	129.7	129.7	155.2	155.2	155.2	206.5	206.5	206.5	260.4	260.4	260.4
	DN2	25	25	32	25	32	40	32	40	50	40	50	65	50	65	80	65	80	100	80	100	125	100	125	150	125	150	200
	Di2	27.4	27.4	36.1	27.4	36.1	42.0	36.1	42.0	53.1	42.0	53.1	68.8	53.1	68.8	80.8	68.8	80.8	105.1	80.8	105.1	129.7	80.8	129.7	155.2	129.7	155.2	206.5
3		0.02	0.03	-	0.04	0.01	-	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6		0.09	0.12	0.02	0.15	0.04	0.01	0.05	0.02	0.01	0.03	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		0.19	0.26	0.04	0.34	0.08	0.03	0.11	0.05	0.01	0.06	0.02	-	0.02	0.01	-	0.01	0.00	-	-	-	-	-	-	-	-	-	-
12		0.35	0.47	0.07	0.60	0.15	0.06	0.20	0.09	0.02	0.11	0.03	0.01	0.04	0.01	-	0.01	0.01	-	-	-	-	-	-	-	-	-	-
15		0.54	0.73	0.11	0.93	0.23	0.09	0.31	0.14	0.04	0.17	0.05	0.01	0.07	0.02	0.01	0.02	0.01	-	0.01	-	-	-	-	-	-	-	-
18		0.78	1.05	0.16	1.34	0.33	0.12	0.44	0.21	0.05	0.24	0.07	0.01	0.10	0.03	0.01	0.03	0.01	-	0.02	-	-	-	-	-	-	-	-
21		-	1.43	0.22	1.83	0.45	0.17	0.60	0.28	0.07	0.33	0.10	0.02	0.13	0.04	0.01	0.05	0.02	-	0.02	0.01	-	-	-	-	-	-	-
24		-	1.87	0.28	2.39	0.58	0.22	0.78	0.37	0.09	0.43	0.13	0.02	0.17	0.05	0.02	0.06	0.03	0.01	0.03	0.01	-	0.01	-	-	-	-	-
27		-	-	0.36	3.03	0.74	0.28	0.99	0.47	0.12	0.55	0.17	0.03	0.22	0.06	0.02	0.07	0.03	0.01	0.04	0.01	-	0.01	-	-	-	-	-
30		-	-	-	3.74	0.91	0.35	1.22	0.58	0.15	0.67	0.21	0.04	0.27	0.07	0.03	0.09	0.04	0.01	0.05	0.01	-	0.02	0.01	-	-	-	-
36		-	-	-	-	1.31	0.50	1.76	0.83	0.21	0.97	0.30	0.05	0.39	0.11	0.04	0.13	0.06	0.01	0.07	0.02	-	0.03	0.01	-	-	-	-
42		-	-	-	-	-	0.68	2.40	1.13	0.29	1.32	0.40	0.07	0.53	0.14	0.05	0.18	0.08	0.02	0.10	0.02	0.01	0.03	0.01	-	0.01	-	-
48		-	-	-	-	-	-	3.13	1.48	0.37	1.72	0.53	0.09	0.69	0.19	0.07	0.24	0.11	0.02	0.13	0.03	0.01	0.04	0.02	0.01	0.02	0.01	-
54		-	-	-	-	-	-	3.97	1.87	0.47	2.18	0.66	0.11	0.87	0.24	0.09	0.30	0.13	0.03	0.16	0.04	0.01	0.06	0.02	0.01	0.02	0.01	-
60		-	-	-	-	-	-	-	2.31	0.58	2.69	0.82	0.14	1.08	0.29	0.11	0.37	0.16	0.03	0.20	0.05	0.01	0.07	0.02	0.01	0.03	0.01	-
70		-	-	-	-	-	-	-	-	0.79	3.66	1.12	0.19	1.46	0.40	0.15	0.50	0.22	0.04	0.27	0.07	0.02	0.09	0.03	0.01	0.04	0.02	-
80		-	-	-	-	-	-	-	-	-	4.79	1.46	0.25	1.91	0.52	0.20	0.65	0.29	0.06	0.35	0.09	0.02	0.12	0.04	0.02	0.05	0.02	-
90		-	-	-	-	-	-	-	-	-	-	1.85	0.32	2.42	0.66	0.25	0.83	0.37	0.07	0.44	0.11	0.03	0.16	0.06	0.02	0.07	0.03	0.01
105		-	-	-	-	-	-	-	-	-	-	-	0.43	3.29	0.90	0.34	1.13	0.50	0.10	0.60	0.16	0.04	0.21	0.08	0.03	0.09	0.04	0.01
120		-	-	-	-	-	-	-	-	-	-	-	-	4.30	1.17	0.44	1.47	0.66	0.13	0.79	0.20	0.05	0.28	0.10	0.03	0.12	0.05	0.01
135		-	-	-	-	-	-	-	-	-	-	-	-	5.44	1.48	0.56	1.86	0.83	0.16	0.99	0.26	0.06	0.35	0.12	0.04	0.15	0.06	0.01
150		-	-	-	-	-	-	-	-	-	-	-	-	-	1.83	0.69	2.30	1.03	0.20	1.23	0.32	0.08	0.44	0.15	0.05	0.19	0.08	0.01
165		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.83	2.78	1.25	0.24	1.48	0.39	0.09	0.53	0.19	0.07	0.23	0.10	0.02
180		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.31	1.48	0.29	1.77	0.46	0.11	0.63	0.22	0.08	0.27	0.11	0.02
200		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.09	1.83	0.36	2.18	0.57	0.14	0.77	0.27	0.10	0.34	0.14	0.03
220		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.22	0.43	2.64	0.68	0.16	0.94	0.33	0.12	0.41	0.17	0.03
240		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.52	3.14	0.82	0.20	1.12	0.39	0.14	0.49	0.20	0.04
260		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.69	0.96	0.23	1.31	0.46	0.16	0.57	0.24	0.04
280		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.28	1.11	0.27	1.52	0.53	0.19	0.66	0.28	0.05
300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.27	0.31	1.74	0.61	0.22	0.76	0.32	0.06
330		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.37	2.11	0.74	0.26	0.92	0.39	0.07
370		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.65	0.93	0.33	1.16	0.49	0.09
410		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.26	1.15	0.40	1.42	0.60	0.11
450		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.92	1.38	0.48	1.72	0.72	0.13
500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.71	0.60	2.12	0.89	0.16
550		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.06	0.72	2.56	1.07	0.20
600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.86	3.05	1.28	0.23
660		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.04	3.69	1.54	0.28
720		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.39	1.84	0.34
780		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.15	2.16	0.40
840		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	0.46
900		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.87	0.53
960		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60
1020		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.68

LOCAL PRESSURE DROPS



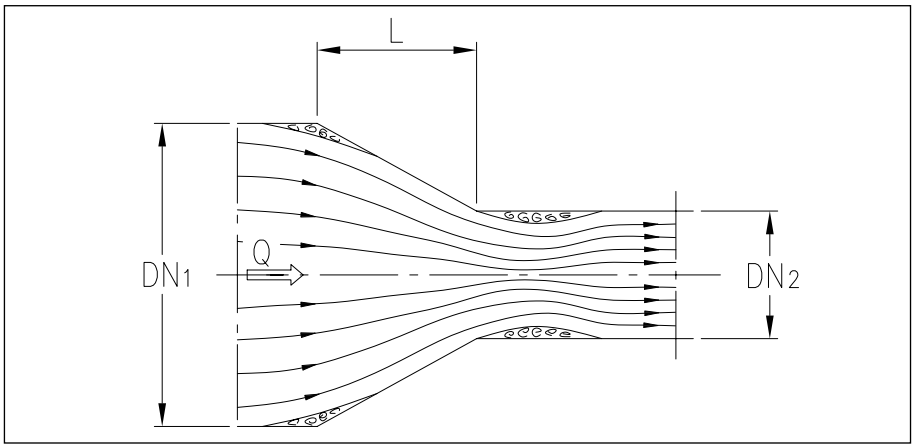
DN = Nominal pipe diameter
D_i = Effective internal diameter of pipe

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

PRESSURE DROPS LOCALISED TO DIVERGENT ISO CONES IN WATER COLUMN METRES

Flow rate Q m³/h	DN_1	25			32			40			50			65			80			100			125			150		200
	D_{i1}	28.5	28.5	28.5	37.2	37.2	37.2	43.1	43.1	43.1	54.5	54.5	54.5	70.3	70.3	70.3	82.5	82.5	82.5	107.1	107.1	107.1	131.7	131.7	131.7	159.3	159.3	206.5
	DN_2	32	40	50	40	50	65	50	65	80	65	80	100	80	100	125	100	125	150	125	150	200	150	200	250	200	250	250
	D_{i2}	37.2	43.1	54.5	43.1	54.5	70.3	54.5	70.3	82.5	70.3	82.5	107.1	82.5	107.1	131.7	107.1	131.7	159.3	131.7	159.3	206.5	159.3	206.5	260.4	206.5	260.4	260.4
	L	50	64	76	64	76	90	76	90	90	90	90	100	90	100	127	100	127	140	127	140	152	140	152	178	152	178	178
3		-	0.01	0.02	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6		0.01	0.03	0.07	-	0.01	0.03	-	0.01	0.02	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		0.02	0.06	0.17	-	0.02	0.06	-	0.02	0.04	-	0.01	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12		0.04	0.11	0.30	-	0.03	0.11	0.01	0.04	0.08	-	0.01	0.04	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-
15		0.06	0.17	0.46	-	0.05	0.17	0.01	0.06	0.12	-	0.02	0.06	-	0.01	0.02	-	-	0.01	-	-	-	-	-	-	-	-	-
18		0.09	0.24	0.66	0.01	0.07	0.25	0.01	0.08	0.17	0.01	0.03	0.09	-	0.01	0.03	-	0.01	0.02	-	-	0.01	-	-	-	-	-	-
21		0.13	0.33	0.90	0.01	0.10	0.33	0.02	0.11	0.24	0.01	0.04	0.12	-	0.02	0.04	-	0.01	0.02	-	-	0.01	-	-	-	-	-	-
24		0.16	0.43	1.18	0.01	0.13	0.44	0.02	0.14	0.31	0.01	0.05	0.16	-	0.02	0.05	-	0.01	0.03	-	-	0.01	-	-	0.01	-	-	-
27		0.21	0.54	1.49	0.01	0.17	0.55	0.03	0.18	0.39	0.01	0.06	0.20	-	0.03	0.06	-	0.02	0.04	-	-	0.02	-	-	0.01	-	-	-
30		-	-	-	0.02	0.21	0.68	0.03	0.22	0.48	0.02	0.07	0.25	-	0.03	0.07	0.01	0.02	0.05	-	0.01	0.02	-	-	0.01	-	-	-
36		-	-	-	0.02	0.30	0.98	0.05	0.32	0.69	0.03	0.11	0.35	-	0.05	0.11	0.01	0.03	0.07	-	0.01	0.03	-	-	0.02	-	-	-
42		-	-	-	0.03	0.40	1.34	0.07	0.44	0.94	0.04	0.14	0.48	-	0.07	0.15	0.01	0.04	0.09	-	0.01	0.04	-	0.01	0.02	-	-	-
48		-	-	-	0.04	0.53	1.75	0.09	0.57	1.23	0.05	0.19	0.63	0.01	0.09	0.19	0.01	0.05	0.12	-	0.01	0.05	-	0.01	0.03	-	0.01	-
54		-	-	-	-	-	-	0.11	0.72	1.56	0.06	0.24	0.80	0.01	0.11	0.24	0.02	0.07	0.16	-	0.02	0.07	-	0.01	0.04	-	0.01	-
60		-	-	-	-	-	-	0.13	0.89	1.92	0.07	0.29	0.98	0.01	0.13	0.30	0.02	0.09	0.19	-	0.02	0.08	-	0.02	0.04	-	0.01	-
75		-	-	-	-	-	-	0.21	1.39	3.00	0.11	0.46	1.54	0.01	0.21	0.46	0.03	0.13	0.30	0.01	0.04	0.13	-	0.03	0.07	-	0.02	-
90		-	-	-	-	-	-	-	-	-	0.16	0.66	2.21	0.02	0.30	0.67	0.05	0.19	0.43	0.01	0.05	0.19	-	0.04	0.10	-	0.02	-
105		-	-	-	-	-	-	-	-	-	0.22	0.90	3.01	0.03	0.41	0.91	0.07	0.26	0.59	0.01	0.07	0.26	-	0.05	0.13	0.01	0.03	-
120		-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.54	1.19	0.09	0.34	0.77	0.02	0.09	0.34	0.01	0.07	0.17	0.01	0.04	-
135		-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.68	1.51	0.11	0.43	0.97	0.02	0.12	0.43	0.01	0.09	0.22	0.01	0.05	-
150		-	-	-	-	-	-	-	-	-	-	-	-	0.06	0.84	1.86	0.14	0.54	1.20	0.02	0.15	0.53	0.01	0.11	0.27	0.01	0.07	-
180		-	-	-	-	-	-	-	-	-	-	-	-	0.08	1.21	2.68	0.20	0.77	1.73	0.04	0.21	0.76	0.01	0.15	0.39	0.02	0.10	-
210		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	1.05	2.36	0.05	0.29	1.03	0.02	0.21	0.53	0.03	0.13	0.01
240		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	1.37	3.08	0.06	0.37	1.35	0.02	0.27	0.69	0.03	0.17	0.01
270		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	0.47	1.70	0.03	0.34	0.88	0.04	0.21	0.01
300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	0.59	2.10	0.04	0.42	1.08	0.05	0.26	0.01
360		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14	0.84	3.03	0.06	0.61	1.56	0.07	0.38	0.02
420		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	1.15	4.12	0.08	0.83	2.12	0.10	0.52	0.03
480		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	1.09	2.77	0.13	0.68	0.04
540		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	1.38	3.50	0.17	0.86	0.05
600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	1.70	4.33	0.21	1.06	0.06
660		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	1.28	0.07
720		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	1.52	0.09
780		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	1.79	0.10
840		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.41	2.07	0.12
900		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.47	2.38	0.13
1000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.17
1100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20
1200		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24
1300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28
1400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.33
1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.37

LOCAL PRESSURE DROPS



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

For the continuous pressure drop in the cone, consider an equivalent length of pipe of diameter DN1 = L

PRESSURE DROPS LOCALISED TO CONVERGENT ISO CONES IN WATER COLUMN METRES

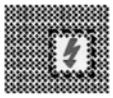
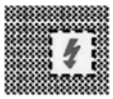
Flow rate Q m³/h	DN1	32	40		50			65			80			100			125			150			200			250		
	Di1	37.2	43.1	43.1	54.5	54.5	54.5	70.3	70.3	70.3	82.5	82.5	82.5	107.1	107.1	107.1	131.7	131.7	131.7	159.3	159.3	159.3	206.5	206.5	206.5	260.4	260.4	260.4
	DN2	25	25	32	25	32	40	32	40	50	40	50	65	50	65	80	65	80	100	80	100	125	100	125	150	125	150	200
	Di2	28.5	28.5	37.2	28.5	37.2	43.1	37.2	43.1	54.5	43.1	54.5	70.3	54.5	70.3	82.5	70.3	82.5	107.1	82.5	107.1	131.7	107.1	131.7	159.3	131.7	159.3	206.5
	L	50	64	64	76	76	76	90	90	90	90	90	90	100	100	100	127	127	127	140	140	140	152	152	152	178	178	178
3		-	0.01	-	0.02	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6		0.01	0.02	-	0.06	0.01	-	0.02	0.01	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		0.02	0.05	-	0.14	0.02	-	0.05	0.02	-	0.03	0.01	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12		0.03	0.08	-	0.24	0.03	-	0.08	0.03	-	0.05	0.01	-	0.02	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-
15		0.05	0.13	0.01	0.38	0.04	0.01	0.13	0.05	-	0.08	0.02	-	0.04	-	-	0.01	-	-	0.01	-	-	-	-	-	-	-	-
18		0.08	0.19	0.01	0.55	0.06	0.01	0.18	0.07	-	0.12	0.03	-	0.05	0.01	-	0.02	0.01	-	0.01	-	-	-	-	-	-	-	-
21		0.11	0.26	0.01	0.75	0.09	0.02	0.25	0.10	0.01	0.16	0.04	-	0.07	0.01	-	0.03	0.01	-	0.01	-	-	-	-	-	-	-	-
24		-	0.33	0.02	0.97	0.12	0.02	0.33	0.13	0.01	0.21	0.05	-	0.09	0.02	-	0.03	0.01	-	0.02	-	-	0.01	-	-	-	-	-
27		-	0.42	0.02	1.23	0.15	0.03	0.41	0.16	0.01	0.27	0.06	-	0.12	0.02	-	0.04	0.02	-	0.02	-	-	0.01	-	-	-	-	-
30		-	-	0.03	1.52	0.18	0.03	0.51	0.20	0.01	0.33	0.07	-	0.15	0.03	-	0.05	0.02	-	0.03	0.01	-	0.01	-	-	-	-	-
36		-	-	-	2.19	0.26	0.05	0.73	0.29	0.02	0.48	0.10	0.01	0.21	0.04	0.01	0.07	0.03	-	0.04	0.01	0.01	0.01	-	-	-	-	-
42		-	-	-	-	0.35	0.07	1.00	0.39	0.03	0.65	0.14	0.01	0.29	0.06	0.01	0.10	0.04	-	0.05	0.01	0.01	0.02	0.01	-	0.01	-	-
48		-	-	-	-	-	0.09	1.30	0.51	0.03	0.85	0.18	0.01	0.37	0.07	0.01	0.13	0.05	-	0.07	0.01	0.01	0.03	0.01	-	0.01	-	-
54		-	-	-	-	-	-	1.65	0.65	0.04	1.08	0.23	0.01	0.47	0.09	0.02	0.17	0.06	-	0.09	0.02	0.01	0.03	0.01	-	0.01	0.01	-
60		-	-	-	-	-	-	2.04	0.80	0.05	1.33	0.29	0.01	0.59	0.11	0.02	0.21	0.07	0.01	0.11	0.02	0.02	0.04	0.01	-	0.02	0.01	-
70		-	-	-	-	-	-	-	1.09	0.07	1.81	0.39	0.02	0.80	0.15	0.03	0.28	0.10	0.01	0.15	0.03	0.02	0.05	0.02	-	0.02	0.01	-
80		-	-	-	-	-	-	-	-	0.09	2.37	0.51	0.03	1.04	0.20	0.04	0.37	0.13	0.01	0.19	0.04	0.03	0.07	0.02	-	0.03	0.01	-
90		-	-	-	-	-	-	-	-	-	2.99	0.64	0.03	1.32	0.25	0.04	0.47	0.17	0.01	0.25	0.05	0.03	0.09	0.03	-	0.04	0.01	-
105		-	-	-	-	-	-	-	-	-	-	0.88	0.04	1.79	0.35	0.06	0.63	0.23	0.02	0.33	0.06	0.05	0.12	0.04	0.01	0.06	0.02	-
120		-	-	-	-	-	-	-	-	-	-	-	0.06	2.34	0.45	0.08	0.83	0.30	0.02	0.44	0.08	0.06	0.16	0.05	0.01	0.07	0.02	-
135		-	-	-	-	-	-	-	-	-	-	-	-	2.96	0.57	0.10	1.05	0.38	0.03	0.55	0.11	0.08	0.20	0.06	0.01	0.09	0.03	0.01
150		-	-	-	-	-	-	-	-	-	-	-	-	-	0.71	0.12	1.29	0.46	0.03	0.68	0.13	0.10	0.25	0.08	0.01	0.11	0.04	0.01
165		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	1.56	0.56	0.04	0.82	0.16	0.12	0.30	0.09	0.02	0.14	0.05	0.01
180		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.86	0.67	0.05	0.98	0.19	0.14	0.36	0.11	0.02	0.16	0.06	0.01
200		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.30	0.83	0.06	1.21	0.23	0.17	0.45	0.14	0.02	0.20	0.07	0.01
220		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.78	1.00	0.07	1.47	0.28	0.21	0.54	0.16	0.03	0.25	0.08	0.01
240		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.19	0.08	1.74	0.34	0.24	0.64	0.20	0.03	0.29	0.10	0.02
260		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	2.05	0.39	0.29	0.75	0.23	0.04	0.34	0.12	0.02
280		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.37	0.46	0.33	0.87	0.27	0.05	0.40	0.14	0.02
300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.73	0.52	0.38	1.00	0.31	0.05	0.46	0.16	0.03
330		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.63	0.46	1.21	0.37	0.06	0.55	0.19	0.03
370		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.58	1.53	0.46	0.08	0.70	0.24	0.04
410		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.87	0.57	0.10	0.86	0.29	0.05
450		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.26	0.69	0.12	1.03	0.35	0.06
500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.85	0.15	1.27	0.43	0.07
550		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.03	0.18	1.54	0.52	0.08
600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	1.83	0.62	0.10
660		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.26	2.22	0.75	0.12
720		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.64	0.90	0.15
780		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.10	1.05	0.17
840		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.22	0.20
900		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	0.23
960		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.26
1020		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.29

PROTECTION RATING

PROTECTION RATING

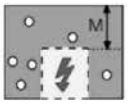
This is identified as IP (Ingress Protection - the degree of protection against the ingress of foreign materials and agents).
CEI EN 60529 (protection rating of housings - IP code) establishes the IP rating to indicate the protection of electrical equipment against access to live components and against 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

Digit	Test	Description	Comment
0		No protection	
1		Protected against solid bodies of size greater than **50 mm**	No parts of the human body, such as a hand, nor solid bodies of diameter greater than 50 mm, may penetrate
2		Protected against solid bodies of size greater than **12 mm**	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
3		Protected against solid bodies of size greater than **2.5 mm**	Wires of diameter or thickness greater than 2.5 mm, and solid bodies of diameter greater than 2.5 mm, may not penetrate
4		Protected against solid bodies of size greater than **1.0 mm**	Wires or plates of diameter or thickness greater than 1mm, and solid bodies of diameter greater than 1 mm, may not penetrate
5		Protected against dust	Penetration by dust is not totally excluded, but the amount is such as not to compromise the operation of the material
6		Totally protected against dust	No penetration of dust is permitted

PROTECTION RATING

SECOND CHARACTERISTIC DIGIT - PROTECTION AGAINST PENETRATION BY WATER

Digit	Test	Description	Comment
0		No protection	
1		Protected against water drops falling vertically	Water drops falling vertically must not cause damage
2		Protected against water falling at an angle of no more than 15°	Water drops falling vertically must not cause damage when the housing is tilted up to 15° away from its original position
3		Protected against **rain**	Water falling as rain at an angel form the vertical of up to 60° must not cause damage
4		Protected against **sprays** of water	Water sprayed onto the housing from all directions must not cause damage
5		Protected against **jets** of water	Water sprayed onto the housing with a nozzle from all directions must not cause damage
6		Protected against **powerful jets** of water	Waves or powerful jets of water may not penetrate the housing to a damaging extent
7		Protected against **temporary immersion**	Water may not penetrate to a damaging extent when the housing is immersed at a given pressure and for a given time
8		Protected against **continuous immersion**	The material is suited for immersion in water under the conditions specified by the manufacturer

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

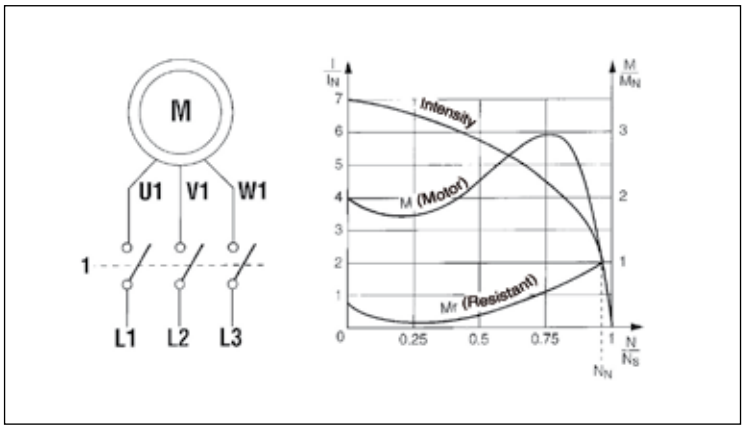
Direct start

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.

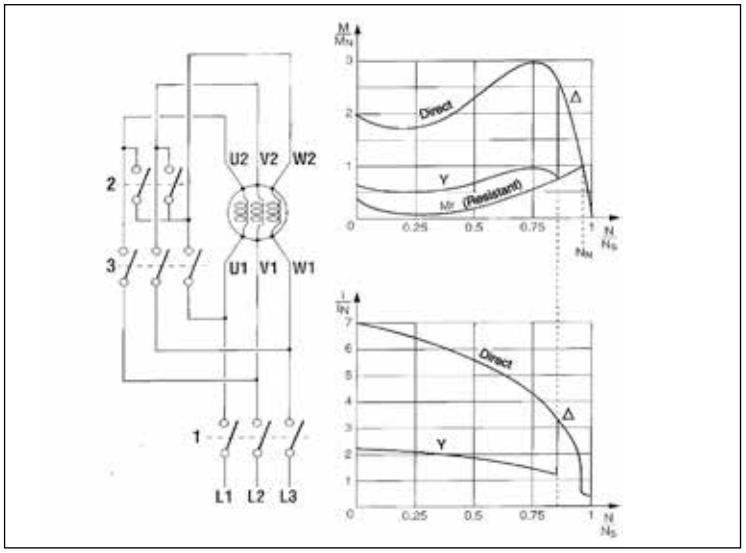
Fig. 1



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 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.

Fig. 2



SELECTION AND SIZING OF THE AUTOCLAVE

SELECTION AND SIZING OF THE AUTOCLAVE

The supply tank, or autoclave, is used to limit the number of pump starts per hour by supply part of its water reserve to the circuit, which is kept pressurised 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_{max}) and the maximum number of pump starts permitted per hour (N_{max}), the table allows us to calculate the necessary size of vessel.

MEMBRANE AUTOCLAVE

A_{max} (l/min)	Vessel / volume of vessel V (l)											
P_{prec} P_{min} P_{max}	0.8 1 2	0.8 1 2.5	1.8 2 3	1.3 1.5 2.5	1.3 1.5 3	1.8 2 2.5	1.8 2 4	2.3 2.5 4	2.3 2.5 4.5	2.3 2.5 5	2.8 3 5	3.8 4 8
10	45.8	35.6	58.9	52.3	39.9	103.1	36.8	48.6	40.1	35.0	43.4	32.2
15	68.8	53.5	88.4	78.5	59.8	154.7	55.2	72.9	60.2	52.5	65.1	48.3
20	91.7	71.3	117.9	104.6	79.7	206.3	73.7	97.2	80.2	70.0	86.8	64.5
30	137.5	106.9	176.8	156.9	119.6	309.4	110.5	145.8	120.3	105.0	130.3	96.7
50	229.2	178.2	294.6	261.5	199.3	515.6	184.2	243.1	200.5	175.0	217.1	161.1
75	343.8	267.4	442.0	392.3	298.9	773.4	276.2	364.6	300.8	262.5	325.7	241.7
100	458.3	356.5	589.3	523.1	398.6	1031.3	368.3	486.1	401.0	350.0	434.2	322.3
150	687.5	534.7	883.9	784.6	597.8	1546.9	552.5	729.2	601.6	525.0	651.3	483.4
200	916.7	713.0	1178.6	1046.2	797.1	2062.5	736.6	972.2	802.1	700.0	868.4	644.5

The formula

$$\Delta Vt = [M A_{max} (P_{max}+1) (P_{min}+1)] / [N_{max} (P_{max} - P_{min}) (P_{prec}+1)]$$

V = vessel / volume of vessel (l)
A_{max}= Maximum circuit absorption (l/min)
M= Multiplier (= 16.5 for this calculation model)
P_{min}= Minimum setting of pressure switch at which the pump starts
P_{max}= Maximum setting of pressure switch at which the pump stops
N_{max}= Maximum number of pump starts per hour
P_{prec}= Preload pressure
All pressures are in bar (relative pressure)

To calculate the volume of the vessel V_t the following parameters may be modified: N_{max}, P_{min}, P_{max}, A_{max}

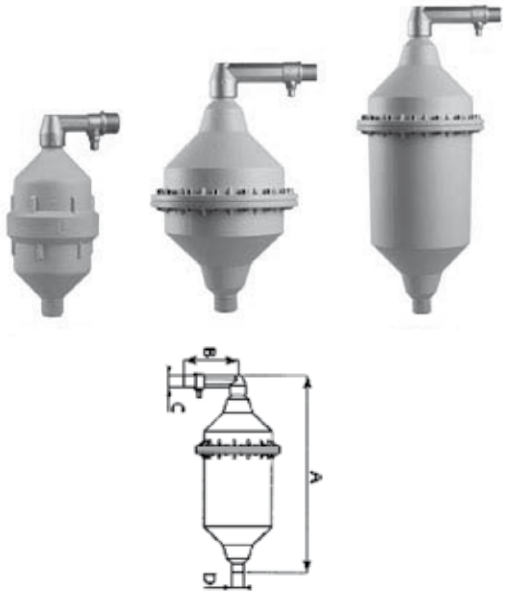
CAUTION: adjust the vessel preload pressure to 0.2 - 0.3 bar relative to the pump starting pressure

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

Type	Autoclave [l]	A	B	C	D
mini	25 - 500	210	66	G½	G½
midi	500 - 2000	286	108	G½	G¾
maxi	2000 - 4000	406	108	G½	G¾



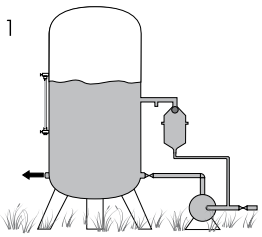
$$V_m = \frac{Q_p}{4 \times Z} \times \frac{1}{1 - \frac{(P_{min} - 2)}{P_{max}}}$$

where:

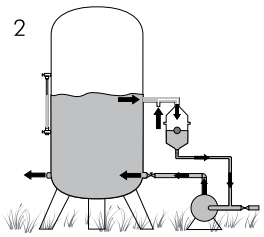
V^m = Total volume of air cushion autoclave, m^3
Q^p = Mean pump flow rate, m^3/h
P_{max} = Maximum pressure setpoint (mca)
P_{min} = Minimum pressure setpoint (mca)
Z = Maximum number of motor starts permitted per hour

Mean pressure setpoint [bar]	Autoclave tank capacity, litres										
	100	200	300	500	700	1000	1500	2000	2500	3000	4000
2.5	MINI				MIDI				MAXI		
3.5	MINI			MIDI				MAXI			
4.5	MINI		MIDI					MAXI			
5.5	MINI		MIDI				MAXI				
6.5	MINI	MIDI					MAXI				
7.5	MINI	MIDI				MAXI					

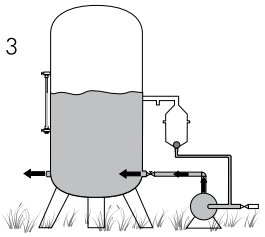
SUPPLY OPERATION SCHEME



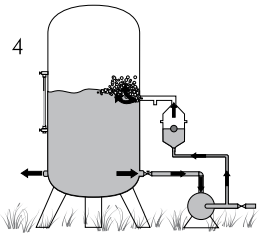
The pump is stopped. The air supply is full of water



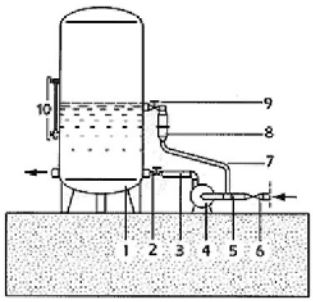
When the pump starts, it creates an underpressure which allows the water to be drawn from the supply, in turn drawing water from the autoclave. This, passing through the Venturi nozzle, takes air in through the valve



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]
- P_1 = Power draw from power line
- P_2 = 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.

DNV

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

Certificato No. / Certificate No. ***CERT-17819-2006-AQ-VEN-SINCERT***

Si attesta che / This is to certify that

EBARA PUMPS EUROPE S.p.A.

Sede e Stabilimento di Brendola: Via Pacinotti, 32 - 36040 Brendola (VI) - Italy
Stabilimento di Cles: Via Campo Sportivo, 30 - 38023 Cles (TN) - Italy
Filiale di Palermo: Via Don Luigi Sturzo, 181/183 - Z. I. - 90040 Carini (PA) - Italy
Filiale di Cagliari: Via del Fangario, 29 - 09122 Cagliari (CA) - Italy

è conforme ai requisiti della norma per i sistemi di gestione:
has been found to conform to the management system standard:

UNI EN ISO 9001:2008 (ISO 9001:2008)

Questa Certificazione è valida per il seguente campo applicativo:
This Certificate is valid for the following product or service ranges:

Progettazione, produzione, vendita e commercializzazione di pompe e sistemi di pompaggio
(Settore EA : 18 - 17)

Design, manufacture, sales and trade of pumps and pumping systems
(Sector EA : 18 - 17)

Data Prima Emissione/Initial Certification Date:
2006-10-13
Il Certificato è valido fino al:
This Certificate is valid until:
2015-10-10
L'audit è stato eseguito sotto la supervisione di/
The audit has been performed under the supervision of
Michele Gaiba
Lead Auditor

ACCREDIA

Luogo e Data/Place and Date:
Agrate Brianza (MB), 2012-10-02
Per l'Organismo di Certificazione:
For the Accredited Unit:
Zeno Beltrami
Management Representative

La validità del presente Certificato è subordinata al rispetto delle condizioni contenute nel Contratto di Certificazione.
Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.