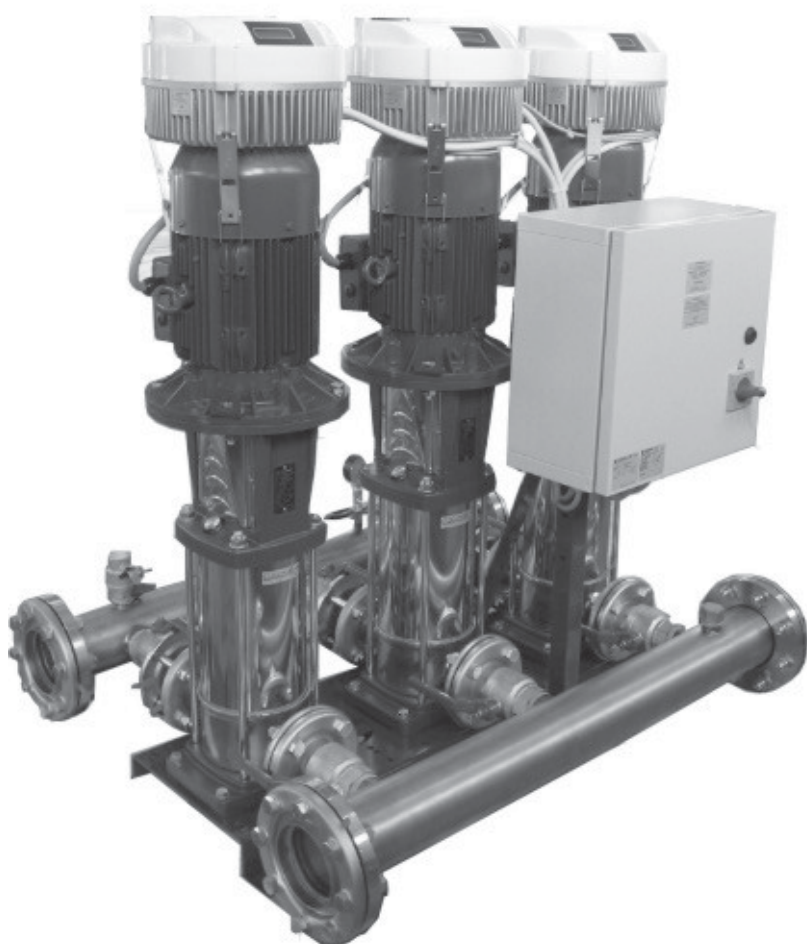


50 Hz



GHV20-GHV30-GHV40 Series

VARIABLE-SPEED BOOSTER SETS WITH
VERTICAL MULTISTAGE ELECTRIC PUMPS e-SV™ SERIES

Cod. 191000771 Rev.C Ed.06/2012

 **LOWARA**
a xylem brand

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BOOSTER SETS GHV SERIES

GENERAL INTRODUCTION - PRODUCT DESCRIPTION

Lowara GHV series booster sets are designed to transfer and increase the pressure of water, in the following applications:

- Hospitals
- Schools
- Public buildings
- Industries
- Hotels
- Condominiums
- Sports facilities
- Mains water systems

GHV series booster sets are pumping stations assembled with two up to a maximum of four vertical multistage pumps from the e-SV series.

The pumps are connected to one another by suction and delivery pipes, and fixed onto a single base. The pumps are connected to the manifolds by means of stop valves and check valves.

An electric protection and control panel is installed using a bracket on the base of the set.

GHV series booster sets offer different regulating possibilities and are divided into the following versions:

GHV Multi - Master series

Pressure boosting sets with 2 to 4 e-SV series pumps, with Hydrovar® Master-type frequency converters for each pump located on the booster set. Variable speed operation is possible on all pumps turning at the same speed.

GHV Master + Basic series

Pressure boosting sets with 2 to 4 e-SV series pumps, with Hydrovar® Master-type or Basic-type frequency converters for each pump located on the booster set. Further details on page 15. Variable speed operation is possible on all pumps turning at the same speed.

GHC Cascade control series

Pressure boosting sets with 2 to 4 e-SV series pumps, one single pump equipped with a Hydrovar® frequency converter. Further details on page 16. All the other pumps kick-in depending on system requirements and run at fixed speed.

The constant pressure is maintained by adjusting the speed on the Hydrovar® pump.

Systems for regulating the speed of the electric motors, as in GHV series booster sets, are used in the following cases:

- In the case of systems with a lot of users where the daily consumption varies frequently and in different periods.
- When it is necessary to obtain constant pressure.
- In the case of systems with supervision it is possible to monitor and check the performances of the pump stations.

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- When it is necessary to obtain constant pressure.
- In the case of systems with supervision it is possible to monitor and check the performances of the pump stations.

These types of systems improve comfort for the final user, reducing noise output and guarantee the reduction of the so-called "water hammer", thanks to the gradual switching off of the pumps.

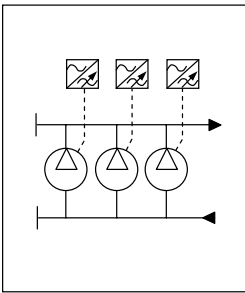
BOOSTER SETS GHV SERIES DESCRIPTION OF OPERATION

In Lowara GHV series booster sets all pumps operate at variable speed. The pumps are connected to a frequency converter assembled directly on the motor fan cover.

All pumps, to a maximum of four, engage by means of their own frequency converter. The pumps start automatically depending on the system requirements. Each pump is fitted with a pressure transmitter that is required to detect the pressure variation. The recorded figure is transmitted to the frequency converter. The pump driven by the inverter modulates its speed according to the system demand. The alternating pump start takes place automatically whenever the system is started and at pre-set timings.

Starting and stopping of the pumps is determined according to the set value of pressure in the frequency converter menu.

Example of operation of a set of three GHV series pumps.



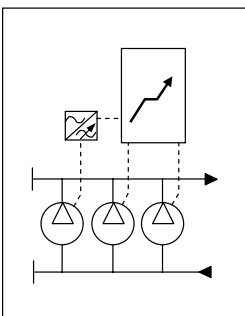
The pumps are controlled by each frequency converter connected directly to the pump electric motor; at every new starting cycle of the pumps, the starting priority of the pumps changes. The speed adjustment will be for all installed pumps. All the pumps will turn at the same speed.

When the demand for water decreases, the pumps will stop in cascade.

The pumps connected to the frequency converters keep the pressure constant by modulating the number of motor revs.

At start and stop all pumps have a soft acceleration and deceleration. This allows to reduce water hammers and provide low booster set noise output.

Example of operation of a set of three GHC series pumps.



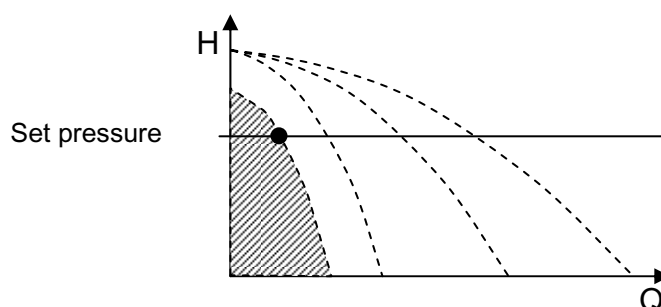
One pump is controlled by a Master-type frequency converter connected directly to the pump electric motor. The other pumps are controlled by an external ON/OFF signal and run at fixed speed. Speed adjustment happens only for the pump connected to the frequency converter. The other starting pumps use the contactors in the electric panel.

The pump connected to the frequency converter will start first, while the other pumps will follow. For the latter it is possible to have the automatic alternating start in order to distribute the working load evenly.

When the demand for water decreases, the pumps will stop in cascade. The last to stop will be the inverter pump.

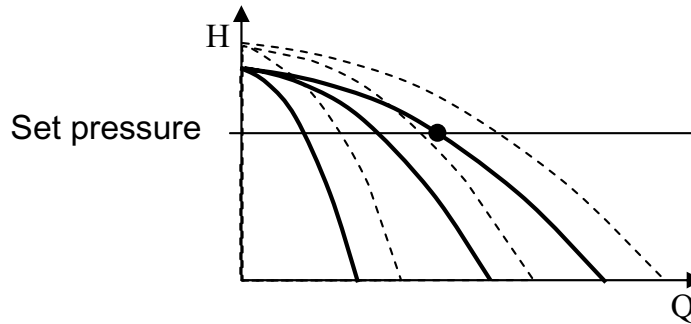
The constant pressure is maintained by adjusting the speed of the first pump.

Lowara GHV series booster sets guarantee constant pressure of the system as in the following example:



BOOSTER SETS GHV SERIES DESCRIPTION OF OPERATION

When there is a demand for water, the pump controlled by the converter will start, positioning its speed to guarantee the set pressure value. When the demand for water increases, the other pumps will start operating at variable speed and with the same speed value in order to maintain a constant pressure.



When the demand for water decreases, the pumps switch off in cascade and the first pump decreases the number of revs to a set minimum before switching off definitively.

Regulating the constant pressure value

GHV series booster sets guarantee constant pressure of the system even during frequent variations in water consumption.

When the booster set is connected to the system, the pressure value is read through the pressure transducers fitted on the delivery manifold. The value found is compared with the set value. The check between the pressure value found and the set value is made by means of the Hydrovar® internal "controller" that manages the motor acceleration and deceleration ramps (frequency), modifying the pump performance over time.

In case of malfunction of one of the frequency converters, the other will continue to stay active and guarantee the control of the other pumps as well as maintain a constant pressure.

Type of control

GHV series booster sets use a sensor as a standard device to control pressure.

For each booster set the sensor number is the same as the number of installed pumps. In case of fault in the transducer the converter connected to the pump stops operating. It is possible to change the measuring unit as bar, psi, m³/h, °C, °F, l/sec, l/min, %. In this case it is possible to use different transducers depending of the selected measuring unit, such as flow and temperature transducers.

Setpoint

It is possible to select up to two setpoints of different values. Thus it is possible to use the booster set to serve systems that require different user pressure values. For example, different setpoints can be used for an irrigation system on a hillside, or one setpoint value can be used for domestic water supply during the day and a second setpoint for irrigation at night.

The setpoint changes can be made using an external device.

BOOSTER SETS GHV SERIES DESCRIPTION OF OPERATION

Cyclical exchange of pumps

Cyclical exchange of pumps is available for both the GHV and the GHC series. For the GHV series the pumps equipped each with its own drive alternate the start at every system restart or at a given time set for each pump by means of an internal clock in the drive menu.

For the GHC series, the cyclical exchange takes place only for fixed-speed pumps that are controlled by their dedicated electric panel. The pump connected to the drive always starts first.

Protection against dry running

The protection function against dry running intervenes if the water reserve to which the booster set is connected falls below the minimum level guaranteed for suction.

For GHV series booster sets the level may be controlled by a float, level probes or minimum pressure switch.

It is also possible to manage the function directly by imputing a minimum pressure value in the Hydrovar® control board menu, which will receive a signal from the pressure transducer.

BOOSTER SETS GHV SERIES CHOICE AND SELECTION

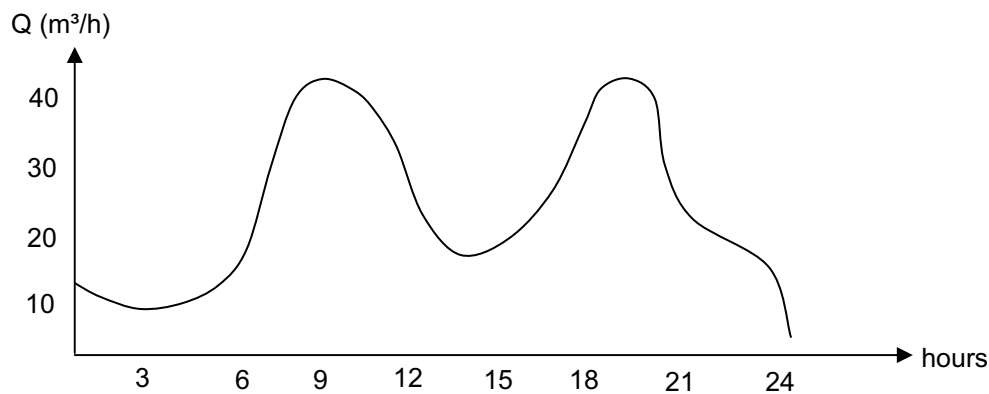
The following conditions should be considered when choosing a booster set:

- The system's requirements should be met regarding flow rate and pressure.
- The booster set must not be oversized, avoiding unnecessary installation and running costs.

Generally water distribution systems such as those for domestic water supply or for large agglomerates such as hospitals, hotels or similar, have "variable" water consumption i.e. in a 24-hour period there may be sudden variations in consumption that are difficult to foresee.

A pattern of consumption may occur in 24 hours, but the daily percentage of booster set operation may also occur at various flow rates.

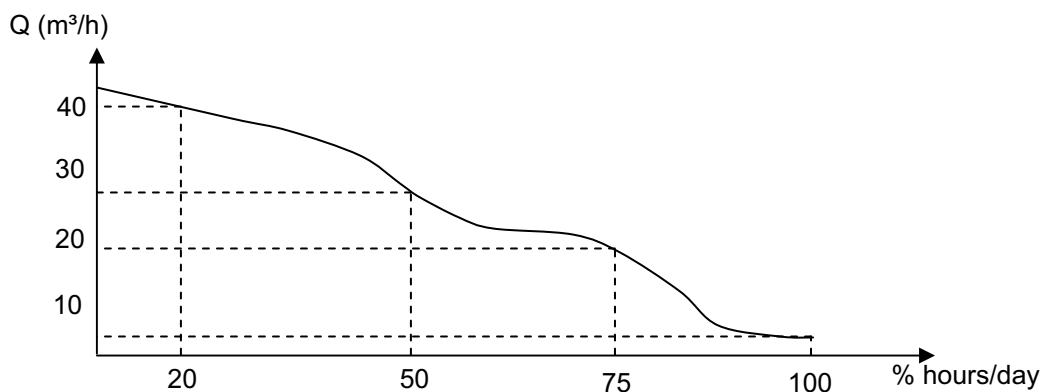
Generally the definition of flow rate for these types of systems is based on either the "probability calculation" which is a very complex system of calculation, or based on tables or diagrams in the national standards which provide guidelines for the sizing of the systems and therefore for calculating the maximum simultaneous flow rate.



Consumption over 24 h

The operating time of the booster set, still calculated over 24h, gives us a view of the daily percentage of operation at the various flow rates.

This means that there may be daily peaks where the maximum flow rate requested is concentrated in a short space of time. In the example given below, it can be seen that in 100% of the time there is a consumption of 4 m³/h, while in 20% of the operating time there is a consumption of 40 m³/h.



Operating time

BOOSTER SETS GHV SERIES CHOICE AND SELECTION

When selecting the booster set the consumption figure of the system must be considered, which is generally supplied by the person who designed the system.

For systems where consumption varies continuously and suddenly over time it is advisable to install GHV series booster sets with variable regulation of the pump speed.

The calculation of the size of the booster set (its performance and the number of pumps) is based on the take-off point and therefore on the consumption value which takes the following factors into account:

- The value of the peak in consumption
- Efficiency
- NPSH
- Standby pumps
- Jockey pumps
- Diaphragm tanks

By adjusting their operation over time, variable-speed booster sets give the end user energy savings which can be calculated directly on the control board with a metering module fitted in the electric panel.

This allows checking of the system efficiency, especially in complex systems with many users and many ranges of consumption.

It is possible to install a standby pump if it is necessary to have some kind of additional safety in the pump station. This is typical in systems of a certain importance, such as hospitals or factories, or in the field of crop irrigation.

If small users have to be served in the same system, it is preferable to install what is commonly called a jockey pump, where instead of running the main pump, which usually has higher power, the service is guaranteed with a smaller pump and therefore lower energy consumption.

GHV series booster sets must also be equipped with diaphragm tanks (for the size of the tank, see the specific chapter in this catalogue).

A single tank can be installed on the delivery side of the booster set, or smaller tanks, maintaining the same total volume.

Diaphragm tanks avoid the risk of water hammer, which is harmful for both the system and the pumps.

Generally for systems with highly variable or sudden variations in consumption, it is recommended to install a booster set with variable pump speed, such as the GHV series, to guarantee constant pressure.

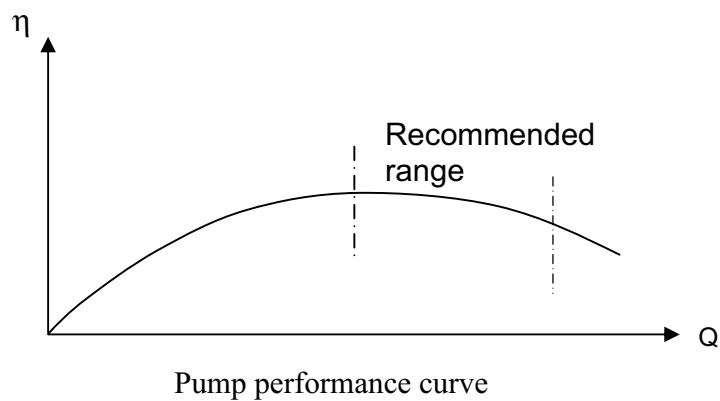
SELECTING THE PUMPS

What type of pump to choose?

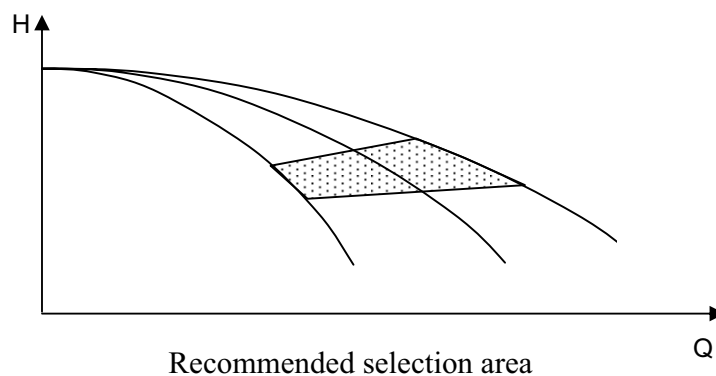
Generally, the choice of pump is based on the take-off point of the system, which is usually the highest possible. The maximum request value is normally for short periods, so the pump must also be able to satisfy variable requests throughout its time in service.

BOOSTER SETS GHV SERIES SELECTING THE PUMPS

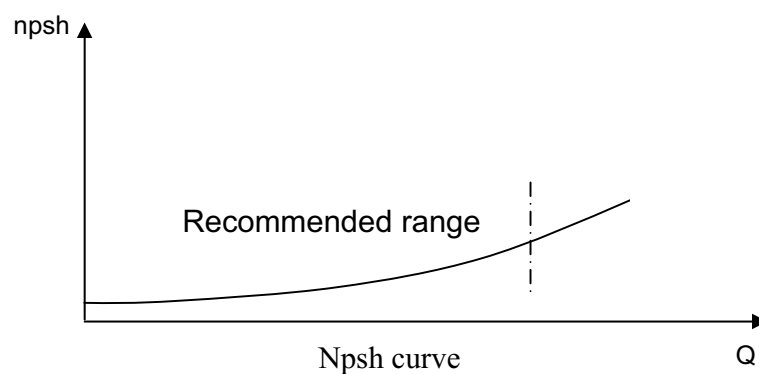
Generally the choice of the pump, based on the performance curve, should fall around the maximum efficiency point. The pump must ensure operation within its rated performance. Since the booster set is sized according to the maximum possible consumption, the take-off point of the pumps must be in the area on the right of the performance curve so that, if there is a fall in consumption, the efficiency remains high.



If we make a choice on the characteristic curve of the pump, we can see that the area where it is best to select the pump is represented by the following graph:

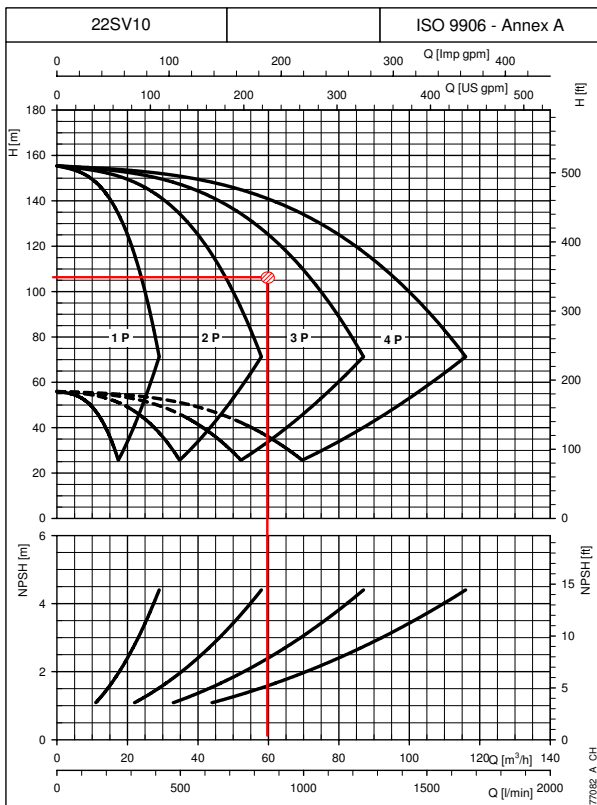


Another factor to be considered when choosing the pumps is its npsH value. Never choose a pump where the take-off point is too far to the right of the npsH curve. This risks not having good pump suction, which may be aggravated by the type of installation (where negative suction is possible). In these cases there is the risk of cavitation. The npsH of the pump must always be checked at the maximum flow rate requested.



BOOSTER SETS GHV SERIES SELECTING THE PUMPS

The choice of pump is therefore based on the characteristic curve of the pump depending on the flow rate and the pressure required for the system. Starting from the required flow rate, a vertical line is drawn until it meets the horizontal line of the required pressure. The point of intersection of the lines gives both the type and the number of pumps necessary for the system.



The example alongside refers to a required flow rate of 60 m³/h and a pressure of 110 water column.

As may be seen from the selection, the system requires three pumps of the type 22SV10 as indicated top left in the table.

Moreover the take-off point falls in the npsH area farthest to the left and therefore in an area with a low cavitation risk.

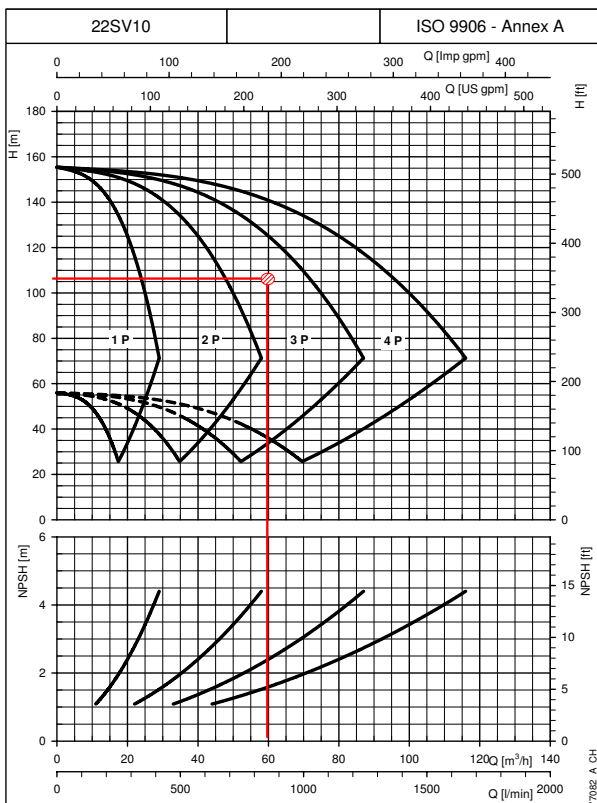
The values obtained are those for the performance of the pumps. A correct check of the net pressure value must be made due to the intrinsic load loss of the booster set and the conditions of installation.

For this reason it is recommended to see the specific chapter in this catalogue.

BOOSTER SETS GHV SERIES CALCULATING NET PRESSURE

When selecting the GHV series of pressure booster units, reference must be made to pump performance. Performance is calculated from the characteristic curves of the pumps and does not consider any pressure drops generated by pipes and valves as in the pressure booster units. To help choose the right pressure booster unit and calculate the correct pressure at the delivery manifold, the following example is shown:

given the duty point $Q = 42 \text{ m}^3/\text{h}$ $H = 105 \text{ mca}$ and with two pumps working, the pump with the most suitable characteristic curve is chosen, that is, the one with a curve that guarantees the required flow and head values.



From the example, we have chosen the 22SV10 series pump which guarantees system performance. The pump curve is slightly oversized, but this provides a safety margin to counter the pressure drops in the pressure booster unit pipes. To know the effective pressure at the delivery manifold outlet, the pressure drops in the suction and delivery lines of each pump are calculated.

To simplify calculations, the pressure drop curves for each pump, on page 113 of this catalogue, are used.

Assuming a pressure booster unit with check valves on the suction line (curve B of Hc pressure drops) has been selected, one proceeds as follows:

The Hc pressure drops on the pump suction line are to be evaluated on the "B" curve. At a flow rate of $21 \text{ m}^3/\text{h}$ the value of $H_c = 2,8 \text{ m}$.

Similarly, the Hc pressure drops on the delivery line of the pump, as evaluated on the "B" curve, are analysed. At a flow rate of $21 \text{ m}^3/\text{h}$, the value of Hc is $0,035 \text{ m}$.

The total pressure drop on the delivery and suction lines is therefore $2,84 \text{ m}$.

As regards the pressure drop in the suction and delivery manifolds, 5% with respect to the pressure drops in the pump suction and delivery can be considered.

In this case, therefore, the value is $0,142 \text{ m}$.

The total pressure drop is approximately: 3 m .

Analysing the performance of the unit at a flow rate of $42 \text{ m}^3/\text{h}$, the head H is 115 m .

The net pressure at the delivery manifold is $115 - 3 = 112 \text{ m}$.

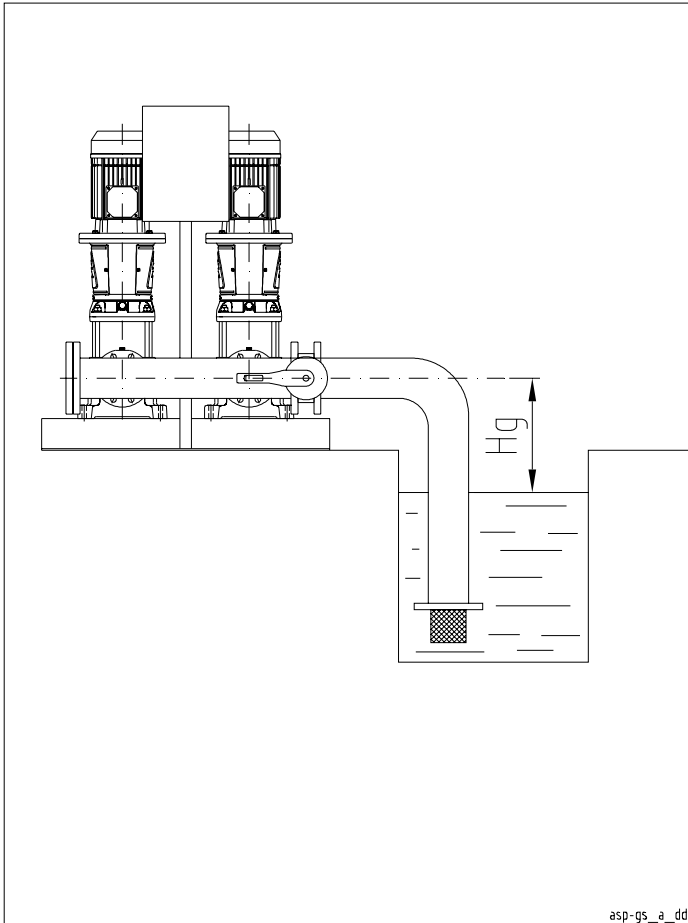
Comparing this value with the rated value, $112 \text{ m} > 105 \text{ m}$.

The unit can therefore satisfy the demand of the system.

BOOSTER SETS GHV SERIES SUCTION CONDITIONS

The above example does not consider the suction conditions of the pressure booster unit which, similarly, affect final performance. It is therefore always best to check the suction line for leaks, especially as regards positive head installations.

An example of positive head installation relative to the above case is shown below:



In the positive head installation, the designer must calculate the minimum installation height H_g of the pump in safety conditions in order to avoid cavitation and, therefore, de-priming of the pump.

The relationship that must be checked and which connects this measurement is the following:

$NPSH_{available} \geq NPSH_{requested}$ where equality is the limit condition.

$NPSH_{available} = P_{atm} + H_g - \sum \text{pressure drops}$.

Where:

P_{atm} is the atmospheric pressure, equal to 10,33 m

H_g is the geodetic difference in level

The pressure drops are connected with to the suction piping and relative valves (foot and cut-off valves)

$NPSH_{requested}$ is a pump parameter taken from the performance curve of the pump which in our case, at a flow rate of 21 m³/h corresponds to 2,5 m. Before calculating the $NPSH_{available}$, the suction pressure drops are calculated using the tables on pages 131-132 in this catalogue, considering a material such as steel.

The chosen diameter of the suction piping is DN80.

90° curve DN80 = 2,11 m

Damper DN80 = 0,28 m

Drain valve DN80 = 0,3 m (calculated from supplier data)

Piping DN80 = 0,61 m (assuming a length of 2,5 m)

Piping DN80, intake manifold = 0,04 m (length of manifold 0,61 m)

Pressure drops on pump suction side (curve B) = 2,8 m

$\sum \text{pressure drops} = 6,1 \text{ m}$

Remembering that: $NPSH_{available} = 10,33 + H_g - 6,1$

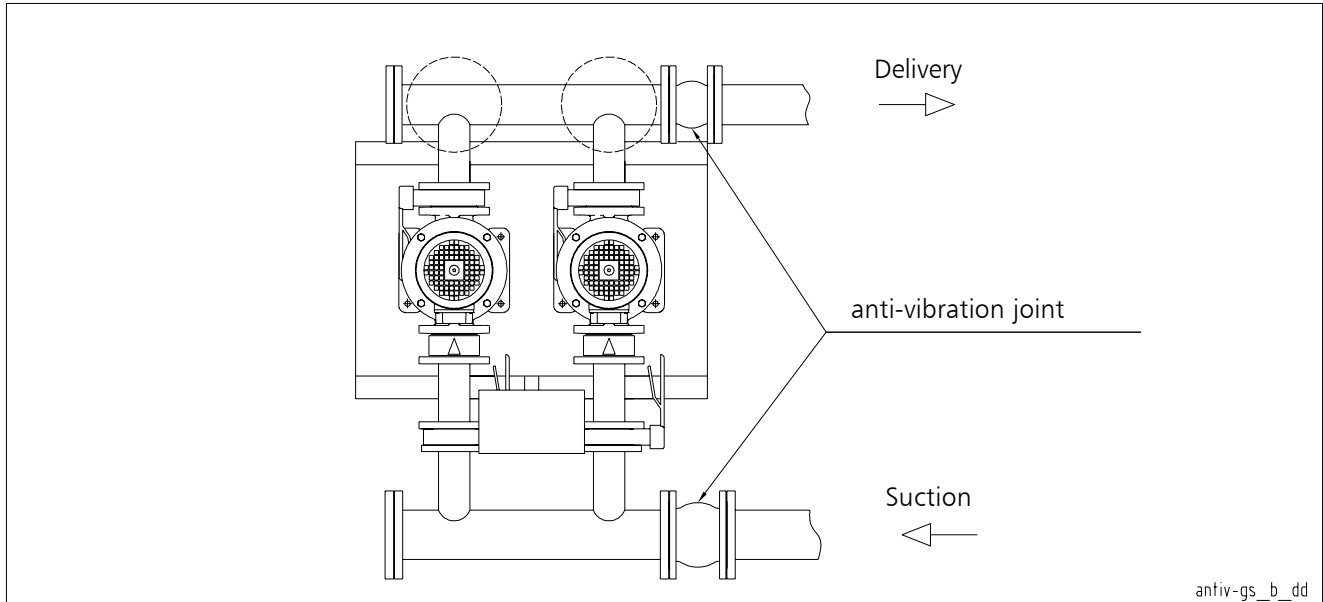
Replacing: $10,33 + H_g - 6,1 \geq 2,5$

$H_g = 2,5 + 6,1 - 10,33 = -1,73 \text{ m}$ representing the limit, for which reason: $NPSH_{available} = NPSH_{requested}$

Generally speaking, therefore, in order to assure correct operating conditions as regards the risk of cavitation, the pump must be positioned above the level of the tank so that the suction height is lower than the limit value of 1,73 m.

BOOSTER SETS GHV SERIES INSTALLATION

GHV series booster sets must be installed in areas protected against frost and with adequate ventilation to cool the motors. It is good practice to connect the suction and delivery pipes with vibration-damping joints to limit vibrations and resonance in the whole system.

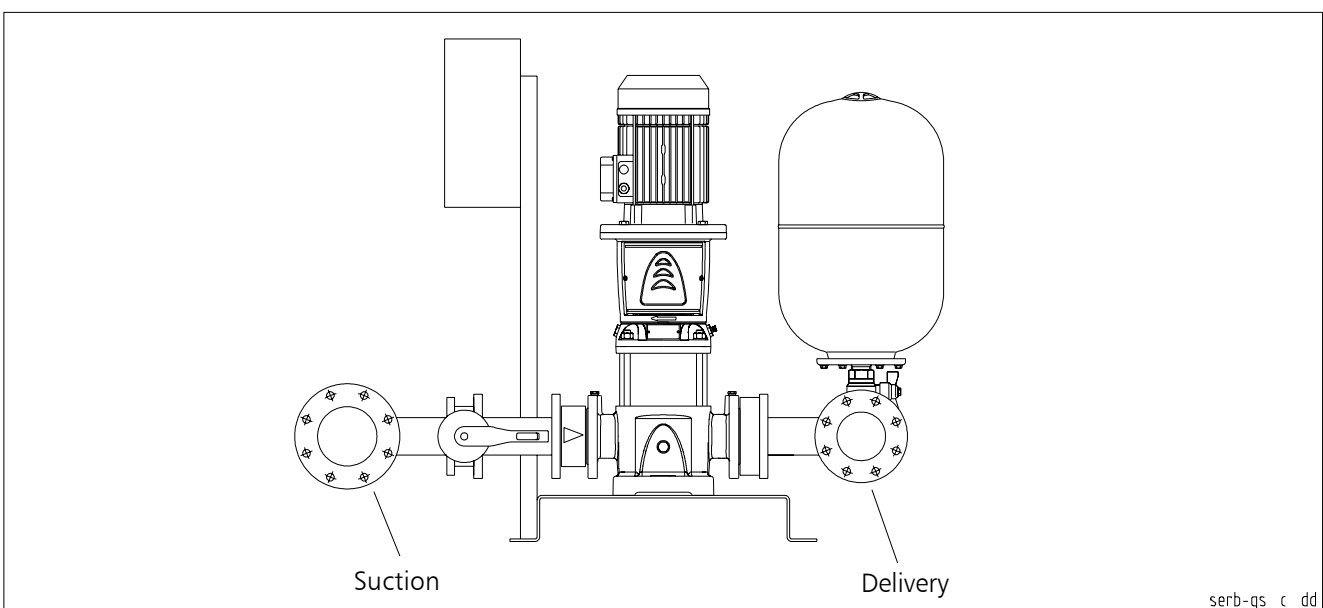


GHV series booster sets must be connected to pressurised tanks with an adequate capacity for the system. These tanks can avoid any problems due to water hammer that is created due to the sudden stopping of the pumps running at a fixed speed. For this type of system, 24-litre diaphragm tanks can be used that perform a pressure dampening function, since they do not have to provide water storage like ordinary autoclave systems. Due to their design, variable-speed booster sets can satisfy users' demands by moderating the pump speed. It is always recommended to check the type of system to be made and choose the correct capacity of the diaphragm tank accordingly.

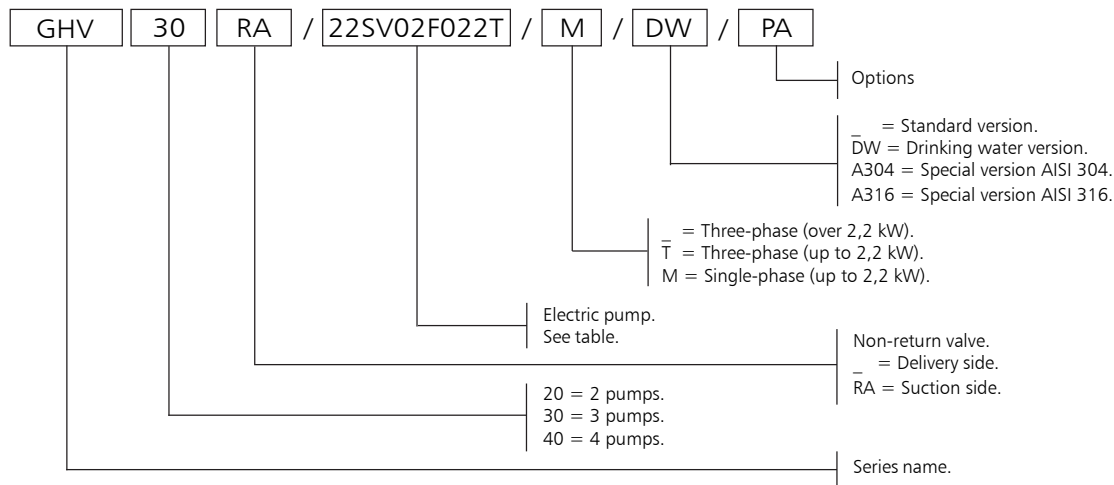
For the sizing of the diaphragm tanks, see the specific chapter in this catalogue.

Considering also that variable-pressure sets are very sensitive to swings of pressure in the system, the use of diaphragm tanks allows the pressure to stabilise when requests are low or inexistent, and avoids the pumps remaining in operation at minimum speed without stopping.

It is good practice to check the value of the maximum pump pressure to match the set with a tank suitable for the pressure value.



SET IDENTIFICATION CODE



OPTIONS (ON DEMAND)

2S	Hydrovar® equipped with double sensor.
3A	Booster set with electric pump certified 1A (Factory test reports issued by the end of assembly line; it includes QH curve).
3B	Booster set with electric pump certified 1B (Test report issued by Audit Test Lab; it includes QH curve, efficiency and power).
60	Booster set with 60Hz supply voltage.
BAP	High pressure switch installed on the delivery manifold.
BF	Hydrovar® equipped with "B" filter for for three-phase supply; domestic environment.
C9	Delivery manifold at 90° with bend. The expansion vessels cannot be installed directly on the manifold.
CM	Suction or delivery manifold larger than standard size.
CP	Clean contacts version: converter faulty, start/stop for each pump.
HFD	Hydrovar® and panel mounted delivery side (for wall mounted version Hydrovar®), available only up to 22kw power. Beyond this size, the control panel will be wall mounted WM and the Hydrovar® will be wall mounted HWM.
HFS	Hydrovar® and panel mounted suction side (for wall mounted version hydrovar).
HWM	Wall mounted hydrovar , cables lenght = 5 m.
IP65	IP65 version control panel.
KV	Kit voltmeter.
MA	Pressure gauge installed on suction manifold.
NL	Dutch market version.
PA	Minimum pressure gauge installed on the suction manifold for dry-running protection.
PQ	Booster set with higt suction pressure (pressure gauge/pressure switches/pressure transmitter increased of one range).
RA	Non return valves mounted on suction side (Es. GHV20RA/SV...).
RE	Heaters inside the control panel, with thermostat.
SA	No intake: no suction valves and suction manifold.
SC	Group with no control devices, such as pressure switches and transmitters; the pressure gauge is present.
SCA	No suction manifold (suction valves present).
SCM	Without delivery manifold (no pressure transmitters and pressure gauge, with delivery valves).
SM	Without delivery: without valves on delivery and without delivery manifold.
TS	Booster set with pumps equipped with special mechanical seals.
UK	UK market version.
VA	Electric control panel fitted with analogue voltmeter and ammeter.
WM	Wall-mounted electrical panel with fixing tabs. Cables L= 5m

AVAILABLE VERSIONS

A304	Main component in contact with liquid in stainless steel Aisi 304 or superior; gasket, sealing tape and thread sealing are suitable for drinking water. Bolts and screws galvanized. Flanges not in contact with the liquid in galvanized steel.
B304	Main component in contact with liquid in stainless steel Aisi 304 or superior; gasket, sealing tape and thread sealing are suitable for drinking water. Bolts and screws in Aisi 304 or superior. Flanges not in contact with the liquid in Aisi 304 or superior.
C304	Main component in contact with liquid in stainless steel Aisi 304 or superior; gasket, sealing tape and thread sealing are suitable for drinking water. Baseplate, frame, supports, bolts and screws in Aisi 304 or superior. Flanges not in contact with the liquid in Aisi 304 or superior. Valves and their components completely in Aisi 304 or superior (body, disc, plate).
A316	Main component in contact with liquid in stainless steel Aisi 316; gasket, sealing tape and thread sealing are suitable for drinking water. Pumps in Aisi 316 material. Bolts and screws galvanized. Flanges not in contact with the liquid in galvanized steel.
B316	Main component in contact with liquid in stainless steel Aisi 316; gasket, sealing tape and thread sealing are suitable for drinkingwater. Pumps in Aisi 316 material. Bolts and screws in Aisi 316. Flanges not in contact with the liquid in Aisi 316.
C316	Main component in contact with liquid in stainless steel Aisi 316; gasket, sealing tape and thread sealing are suitable for drinking water. Pumps in Aisi 316 material. Baseplate, frame, supports, bolts and screws in Aisi 316. Flanges not in contact with the liquid in Aisi 316. Valves and their components completely in Aisi 316 (body, disc, plate).
DW	Main component in contact with fluid suitable for drinking water or in stainless steel AISI 304 or superior quality.

AVAILABLE SERIES

- GHV Multi-Master series. One Hydrovar® Master-type frequency converter for each electric pump.
- GHV Master + Basic series. One Hydrovar® frequency converter for each electric pump. Hydrovar® Master and/or Basic type.
- GHC GHC Cascade control series. Single Hydrovar® Master type frequency converter per set; the other electric pumps run at fixed speed, without a converter.

VARIABLE-SPEED PUMP SYSTEMS

From a mechanical standpoint, the **Module concept** related to **HYDROVAR®** is divided in two parts, the **motor assembly** power unit (power unit) and the **control board**. In the basic configuration, that is with a single motor assembly, HYDROVAR® may be used as **“Basic Unit (BASIC)”** without having to use a control board. In this configuration HYDROVAR® may be used as a sequential pump in a multi-pump system with at least one master inverter.

By expanding the “Basic inverter” with the additional control board and the LCD screen, the HYDROVAR® **“Master Unit”** becomes suitable to operate in different modes and may be expanded by implementing several modules.

GHV VERSION, MASTER + BASIC SERIES

This mode provides several different combinations of different HYDROVAR® versions.

In general, each pump is equipped with a HYDROVAR® unit. Each pump in the system (which may count up to 8 pumps), is fitted with a HYDROVAR® unit (at least one as **“Master unit”** and the others as **“Basic units”**, to guarantee adequate system control); the units are connected one another by means of a serial interface.

Minimum requirements: one “Master unit” and the others equipped with “Basic unit”.

The entire control process takes always place by means of the “Master unit”, though it is also possible to alternate the standby pump sequence in order to distribute wear and allow for the same number of operating hours of the pumps controlled by basic inverters.

Following versions are available:

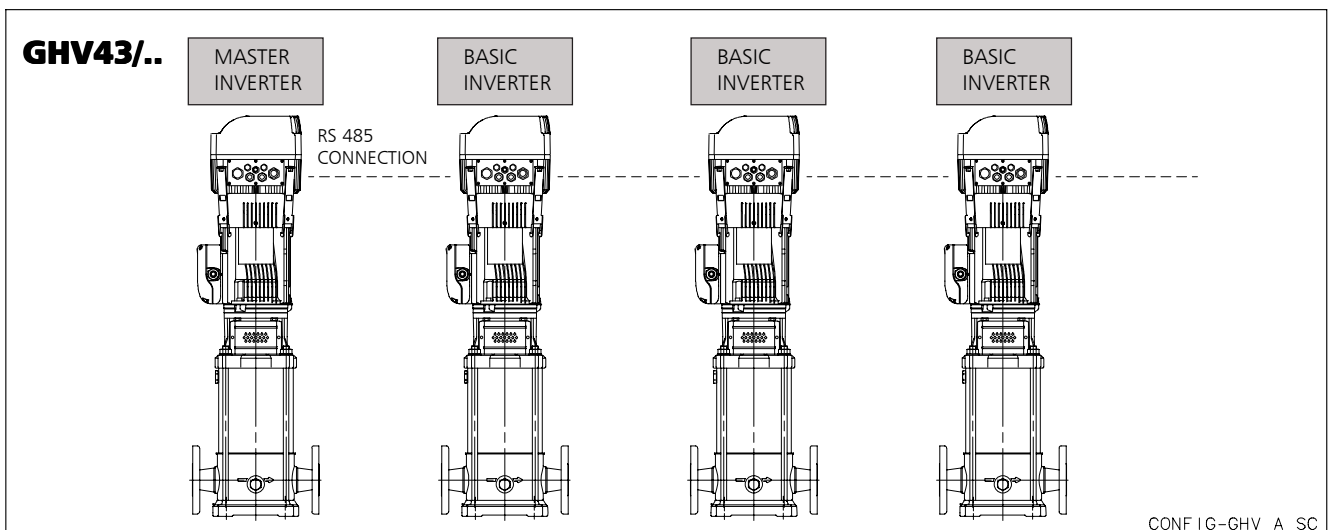
- **Power size above 2,2kW up to 11 kW motor mounted.**

General description of booster name:

GHV [][]: First digit: total number of pump, Second digit: number of Basic units.

Example:

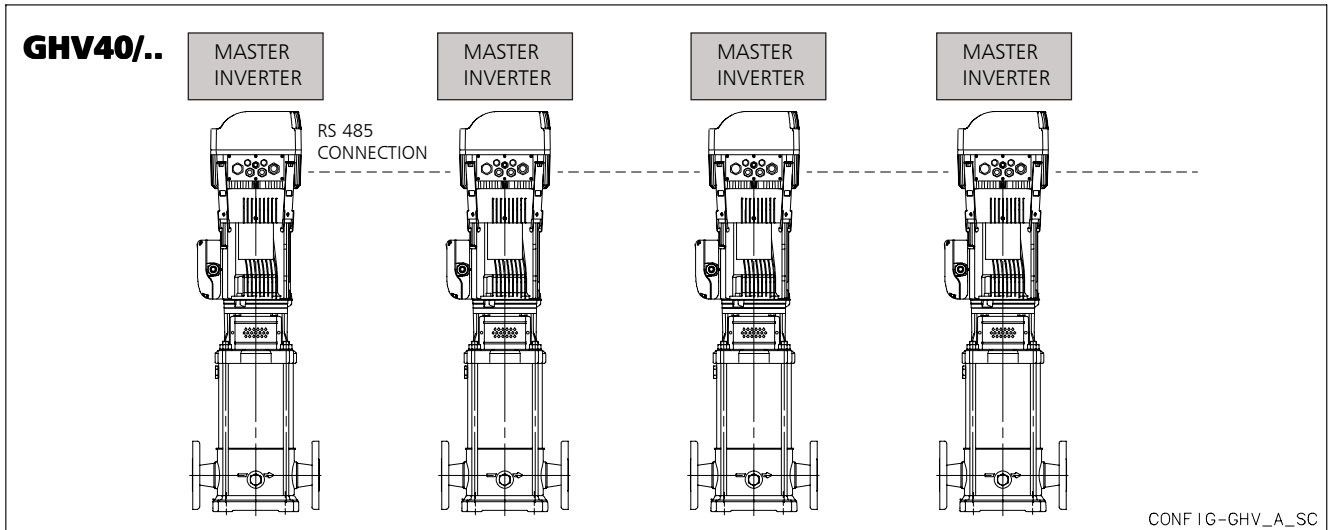
- **GHV21**: two pumps booster set, one “Master Inverter” and one “Basic Inverter” configuration.
- **GHV31**: three pumps booster set, two “Master Inverter” and one “Basic Inverter” configuration.
- **GHV32**: three pumps booster set, one “Master Inverter” and two “Basic Inverter” configuration.



GHV VERSION, MULTI MASTER SERIES

Each electric pump is fitted with a HYDROVAR® type “Master Unit”. Automatic alternation of the electric pumps is guaranteed in order to distribute wear and optimize the operating hours. The following power levels are available:

- Power from 2,2kW to 22 kW, motor assembly (maximum 8 units).



GHC VERSION, CASCADE CONTROL SERIES

One pump is equipped with a HYDROVAR® “Master unit”, while up to five fixed-speed pumps may be operated on request with the ON and OFF signal.

For this purpose an additional 5-relay board is fitted on to the “Master unit”. It is necessary to resort to an external electric panel, in that the HYDROVAR® relays are not capable of directly commutating the pumps, since they are used exclusively as signal terminals.

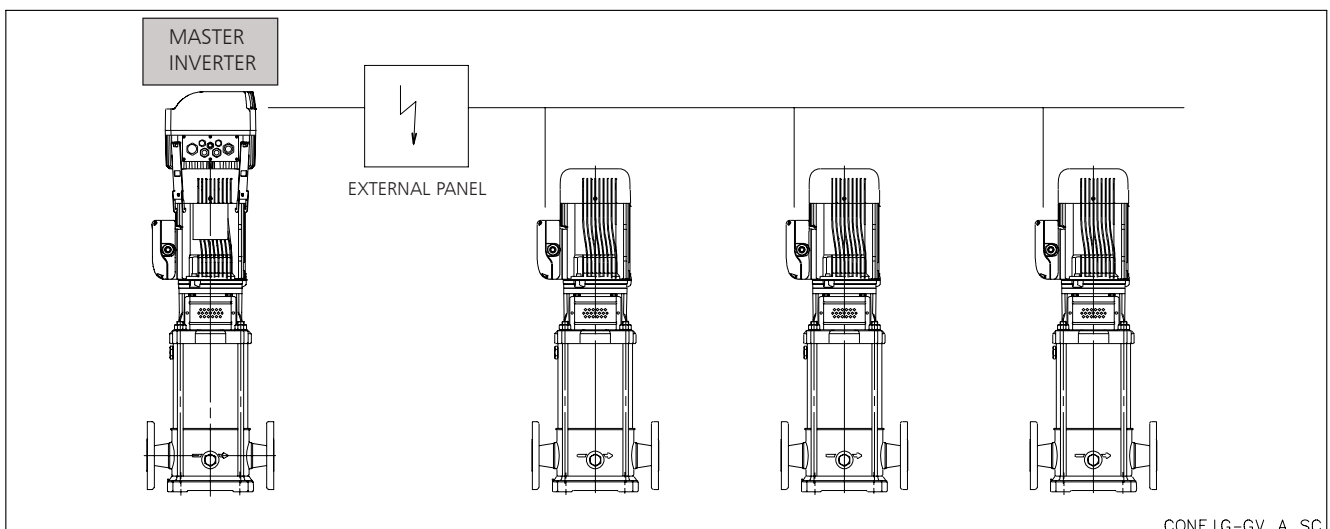
In this operating mode it is also possible to automatically alternate the fixed-speed pumps in order to distribute wear and allow the pumps to operate for the same number of hours. The inverter always feeds the same electric pump.

The following power levels are available:

- Power from 2,2kW to 22 kW, motor assembly (maximum 6 electric pumps)

Example:

- **GHC20**: pressure booster assembly made up of two pumps, a “Master inverter” and an electric pump running at fixed speed.
- **GHC30**: pressure booster assembly made up of three pumps, a “Master inverter” and two electric pumps running at fixed speed.



MAIN CHARACTERISTICS OF FREQUENCY CONVERTERS USED IN THE BOOSTER SETS GHV, GHC SERIES

The GHV, GHC series booster sets use a **Hydrovar®** frequency converter, an automatic device that adjusts the speed of the electric pump in order to maintain **constant pressure** in the system.

Converters with power up to 22 kW can be **mounted directly on to the motor**. Models up to 22 kW can be mounted alternatively on the wall if equipped with the optional **fan kit**. Models with over 22 kW power, up to 45 kW, are designed for wall mounting only. The pressure is measured by a **pressure transmitter** which uses a standard **4..20 mA** signal. The system pressure value can be read on the converter's display. A simple user interface allows you to set the desired pressure value for optimal adjustment, as well as to **view the operating data**, such as the hours of operation and any alarms triggered.

Included diagnostic menu to view temperature, current and voltage values of Hydrovar® facilitates diagnostics and failure analysis.

Indicator lights signal power status, pump running and malfunctions.

A **password** is required to access sensitive settings that allow you to **configure the converter** in order to adapt it to any control requirements, such as **flow resistance compensation, external control, periodic testing** and so on.

When more than one pump is used, the converters exchange information with each other through an **RS485 serial line** which can connect up to 8 Hydrovar® devices plus one external unit for remote control. The Pump-link and Pump-watcher dedicated systems, connected to Hydrovar®, allow remote control with a mobile or landline telephone system.

RS485 serial interface available as standard up to 22 kW, which allows to control the Hydrovar® converters from a Modbus® field serial bus line.

The converter is equipped with two **potential-free relays** which can be used for **remote signalling** of pump running and malfunction status, plus a programmable voltage **analogue output** for signalling the frequency or pressure.

Standard version with two sensors inputs for implementing of two actual values signals within one system (min/max, difference) or for a second sensor for safety reasons.

Specific digital **inputs** are used for protection against **water failure, motor overtemperature**, as well as for external enable signal and remote control.

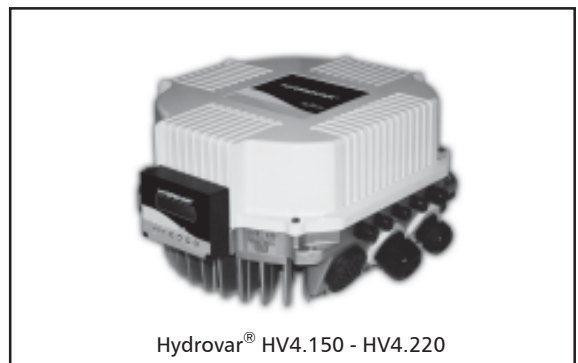
The converter also incorporates a dry running protection function via an adjustable **minimum pressure** threshold.



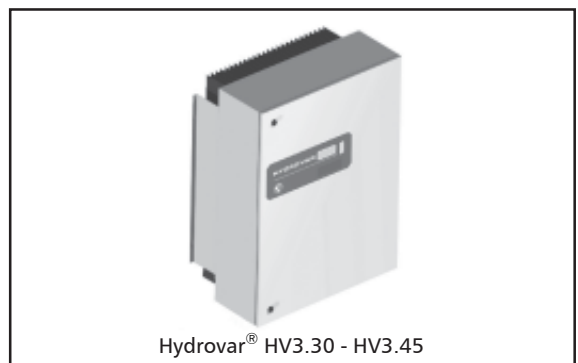
Hydrovar® HV2.015 - HV4.110



Hydrovar® Versione Wall mounted



Hydrovar® HV4.150 - HV4.220



Hydrovar® HV3.30 - HV3.45

Class A filter standard for Hydrovar® three-phase power supply. E.g. Industrial areas, technical areas of any building fed from a dedicated transformer are examples of environment locations.

Class B filter standard for Hydrovar® single-phase power supply. E.g. Houses, apartments, commercial premises or offices in a residential building are examples of environment locations.

Further information are available into Hydrovar® manual.

SPECIFICATIONS

Converter				Motor	
Model *	Power supply (V)	IP Class	Install.	Power supply (V)	Power (kW)
HV 2.015	1x230	IP 55	Motor	3x230	0,75-1,5
HV 2.022	1x230	IP 55	Motor	3x230	2,2
HV 4.022	3x400	IP 55	Motor	3x400	1,1-2,2
HV 4.030	3x400	IP 55	Motor	3x400	3
HV 4.040	3x400	IP 55	Motor	3x400	4
HV 4.055	3x400	IP 55	Motor	3x400	5,5
HV 4.075	3x400	IP 55	Motor	3x400	7,5
HV 4.110	3x400	IP 55	Motor	3x400	11
HV 4.150	3x400	IP 55	Motor	3x400	15
HV 4.185	3x400	IP 55	Motor	3x400	18,5
HV 4.220	3x400	IP 55	Motor	3x400	22
(HV 3.30)	3x400	IP 54	Wall	3x400	30
(HV 3.37)	3x400	IP 54	Wall	3x400	37
(HV 3.45)	3x400	IP 54	Wall	3x400	45

* The Hydrovar Modular is available single-phase up to 2,2kW and above 2,2kW up to 22kW three-phase power supply only.

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CONTROL PANELS

Single-phase (GHV../M) or three-phase (GHV../T) electrical power supply panel for protecting up to two three-phase electric pumps (3x230Vac or 3x400Vac), with Hydrovar® frequency converter, made from polycarbonate, featuring a transparent door and protected to IP55 for power ratings up to 4kW. Panel to control and protection of higher power and all power for three or four electric pumps (GHV..) made from metallic material.

Main characteristics:

- Automatic switch with overload protection for each Hydrovar® frequency converter.
- Standard supply voltage: 1x230Vac (GHV../M) or 3x400Vac (GHV../T) +/-10%, 50/60Hz.
- No-water protection system alternatives: float, minimum pressure switch, external contact or electrode probes via the electronic module with sensitivity adjustment.
- A special version with "clean" potential-free contacts for signalling: pump running, converter faulty. Configured for enable from external contact.

A Hydrovar® frequency converter, integrated to the motor of each pump, which controls the number of revs required to keep pressure constant and complete with: power-on, pump running and fault indicator LED's, control buttons. Complete with two relays for remote pump running and alarm signalling.

A serial line for transmitting information between the two units in order to assure cycle exchange, simultaneous operation in case of maximum demand and service continuity in case one of the two converters develops a fault. The standard external serial line can be used to connect a control system.



Control panel 2 pumps single-phase up to 2,2kW, or three-phase power supply up to 4kW



Control panel 2 pumps three-phase power supply with dry contacts up to 4kW



Control panel

ENERGY SAVING

The worldwide demand for energy is growing all the time and, while the demand is increasing, production is coming up against serious problems of an environmental nature and related to the supply of raw materials. In other words, energy is an asset that is becoming more precious every day, imposing choices to optimise consumption, especially with a view to safeguarding the environment.

A very important improvement role is played by new technologies which include, among the most desirable parameters, environmental protection and energy saving as well as best technical performance. Drives for electric motors fall into this category. As well as making a considerable contribution to the decrease in energy consumption and consequently to the improvement of the environment, in many applications they also produce a notable reduction in the overall costs of running the installations.

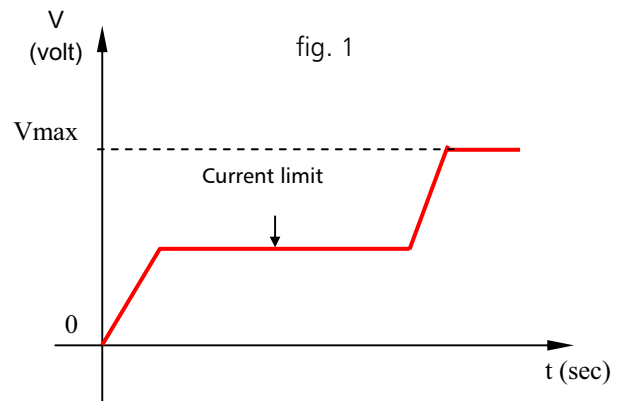
Drives for Electric Motors

The electronic drives that are most involved in the general improvement of the quality of systems and installations, are those for asynchronous alternating current motors, generally three-phase induction motors. They may be divided into two large categories:

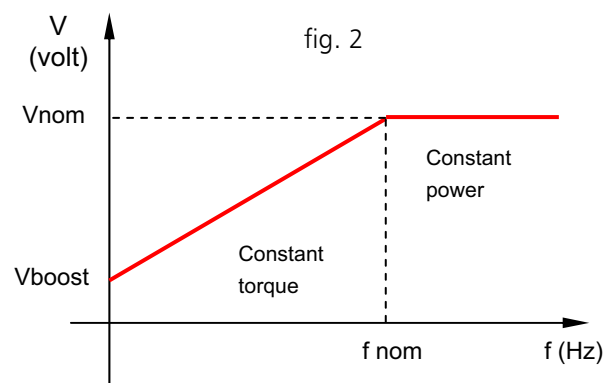
- Drives with variable voltage
- Drives with variable frequency

The first, called "starters" or "soft starters", are appliances that operate at constant frequency (that of the power mains), dose the voltage supplied to the load and have limited current.

The following figure illustrates the typical operation of the "soft starter":



The second, called "Inverters" or "frequency converters" are most important from the point of view of energy saving and are able to supply the motor with a practically sinusoidal current (PMW) at a frequency that may vary from a value of practically 0 Hz to a rated frequency and beyond, with a constant flow (torque) or constant power. Typical example, fig.2:



The applicatory advantages of the two categories of drives will be described below.

Softstart

The direct starting of an asynchronous motor presents considerable difficulties due to the peak current in the start phase. Typically the value of the starting current is about 7/8 times the rated current of the motor.

Direct start systems are therefore not generally convenient (except for small power); mainly because of the need to increase the size of the power supply mains (switches, fuses, etc. ...), and also problems of a mechanical nature, due to high stress in the start phase which in the medium/long term may prove to be destructive.

The electrical engineering industry has already found various practical solutions to the problems; the main ones are noted below:

- Special motors with double winding
- Starting with autotransformer
- Star/delta starting

These starting systems are certainly an improvement on direct starting, but they do not solve the problem. The advent of electronic starters ("soft starters") made a decisive contribution to solving the question.

ENERGY SAVING

This type of drive is able to supply performance advantages:

- Progressive start with a voltage ramp having a duration adjustable within wide time limits.
- Limited current start with a value that can be set from 100% to 500% of the rated value.
- Descending voltage ramp having a duration adjustable within wide time limits.
- Voltage ramps at starting and stopping adaptable to particular operations (pumps).
- Low-speed operation, with reversible running direction, for specific applications.
- "Energy Saving" function with automatic reduction of the voltage/current in the case of a prolonged underload.
- Safety devices that can be calibrated to prevent overheating of the motor, over/under currents and over/under voltages.
- Safety devices that can be calibrated to prevent prolonged or too frequent starts.
- Possibility of by-pass operation after starting, keeping all the safety devices active.

All these features make the electronic starter the ideal tool for solving the problems we have mentioned. With the recently designed starters, with both analog and digital control, it is possible to obtain considerable softer and more efficient starts than any other electromechanical system was able to achieve. Moreover, thanks to the intrinsic control and protection systems of the starter, it is generally possible to eliminate other protection equipment that would otherwise be necessary in the system.

In conclusion, in many applications, one can SAVE on:

- Structure and auxiliary equipment of the power supply system.
- Protection of the mechanical system against excessive stress.

Speed Adjustment

The speed adjustment systems allow energy consumption in proportion to the use of the system based on user demand. This allows considerable savings in systems working on a daily basis (24h).

Alongside applications that require operation of the electric motors at a constant speed, with steady voltage and frequency, there are many in which the electric motor must be able to vary its speed of rotation (frequency); moreover, in many applications the process control obtained by varying the speed (adjustment of flow rate, pressure, etc...) is much more convenient than any other method of adjustment.

For these applications the most suitable drives are certainly frequency converters, referred to below as "Inverters", which can supply the motor with the desired torque from a few rpm up to the rated speed beyond which they are still able to operate at constant power with a decreasing torque. The advantage of using the Inverter lies in the greater efficiency of the performance that it is able to give in comparison with electromechanical controls.

A useful application of frequency converters may simply be that of obtaining a soft start for a load that is particularly heavy to start (pump) and variable over time (flow rate). In any case the advantage of a soft start is present in all inverter-controlled systems for starting a motor, even in cases where speed adjustment is not needed.

The advantage is due to the fact that the inverter is able to supply the rated torque (with possibility of 150% overload with respect to the rated current), right from frequency zero. This is possible because the voltage to the motor, generated by the inverter, is in phase with the number of revolutions right from the start (unless the motor is running). In this way the losses in the motor are considerably reduced.

The starting torque that can be obtained using the inverter is greater than that obtained with a soft starter, and the demand for current in the whole starting phase is much lower.

The yearly saving, for a lost power of 40000 Kwh, with electromechanical start, may be as much as 2000 Euro.

The reliability and efficiency of the pump speed control systems means optimising consumption and processes as well as savings. In the specific case of pumping appliances, the immediate consequence of the use of these systems is the realisation of pumps with greater operative flexibility, with much larger and optimal performance curves. There are many advantages – above all, a pump that always works, irrespective of variations in the installation, in optimal conditions with less wear and less malfunctions. So there are less problems from downtime and the pumps require less frequent maintenance. Moreover, an installation where the pumps are controlled by an inverter is more efficient and less subject to stress:

- absence of water hammer (which occurs when switching off pumps driven in a traditional way);
- lower working pressures than systems with an autoclave or piezometric tank;
- pressure and flow rate conditions always adequate for the demands, because the inverter is able to adjust the pump gradually in real time according to the pressure trend in the installation.

ENERGY SAVING

All this results in less stress on all the components in the distribution network, and therefore in less maintenance of the network, greater reliability of supply and lower running costs.

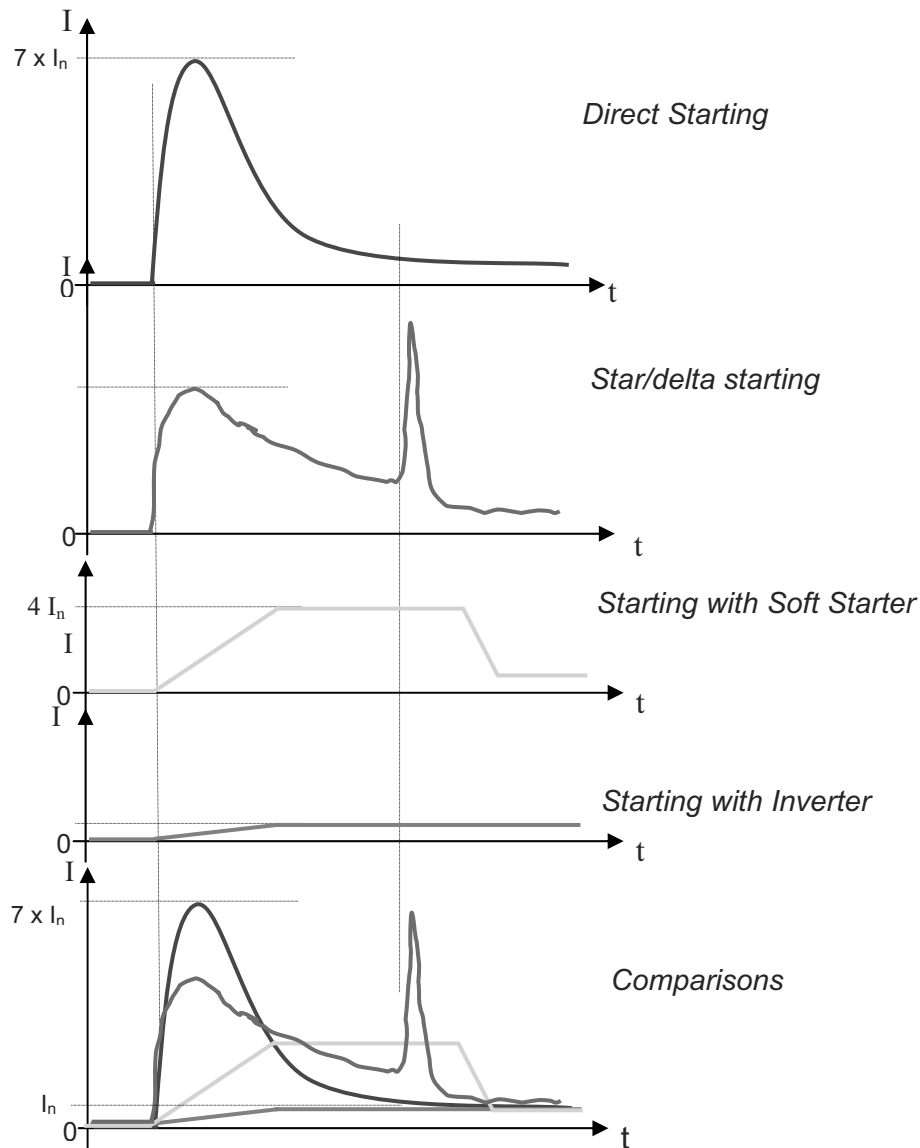
In short, using a pumping system with one or more variable-speed pumps means:

- ✓ Saving energy;
- ✓ Optimising resources and processes;
- ✓ Having the possibility of complete integration of the management, control and supervision systems;
- ✓ Prolonging the life of the installations;
- ✓ Reducing maintenance costs;

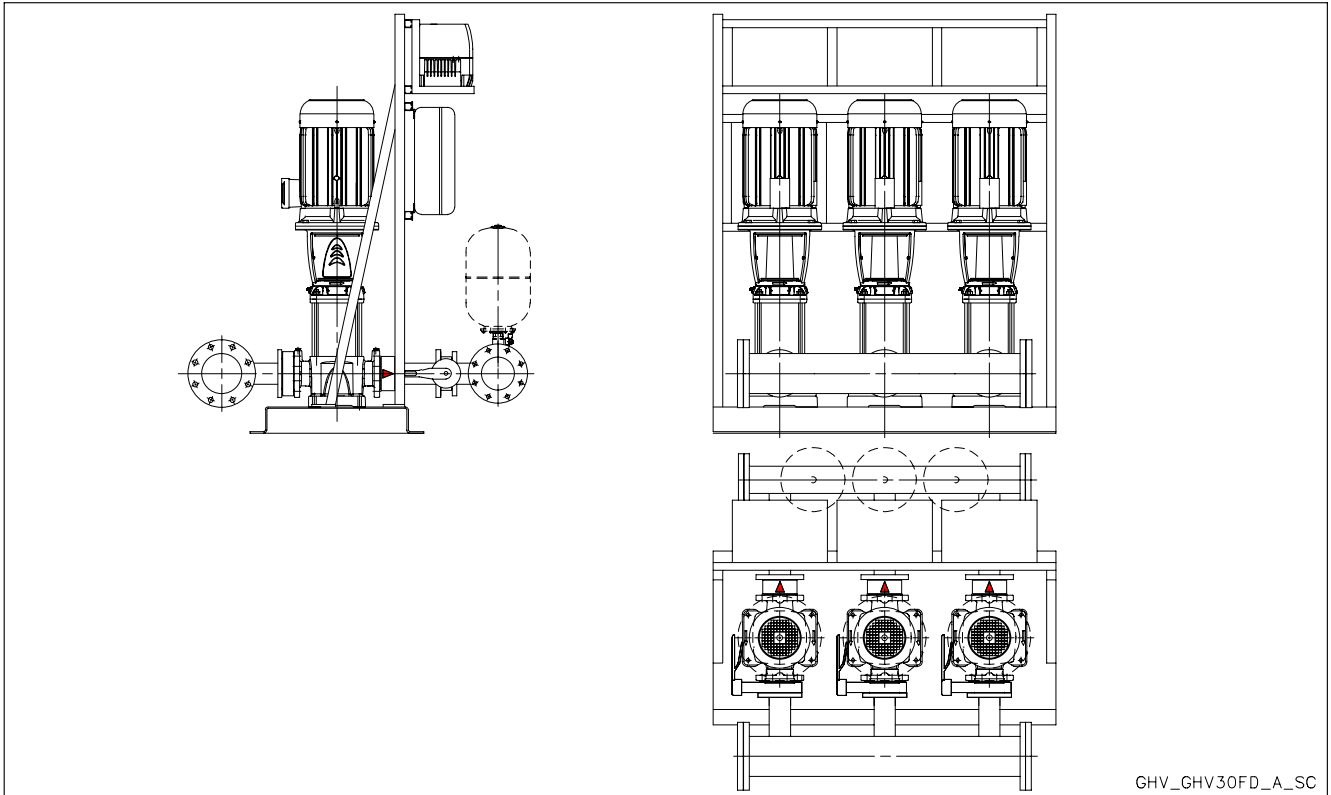
Increasing the productivity and efficiency of an installation.

Comparison of starting systems

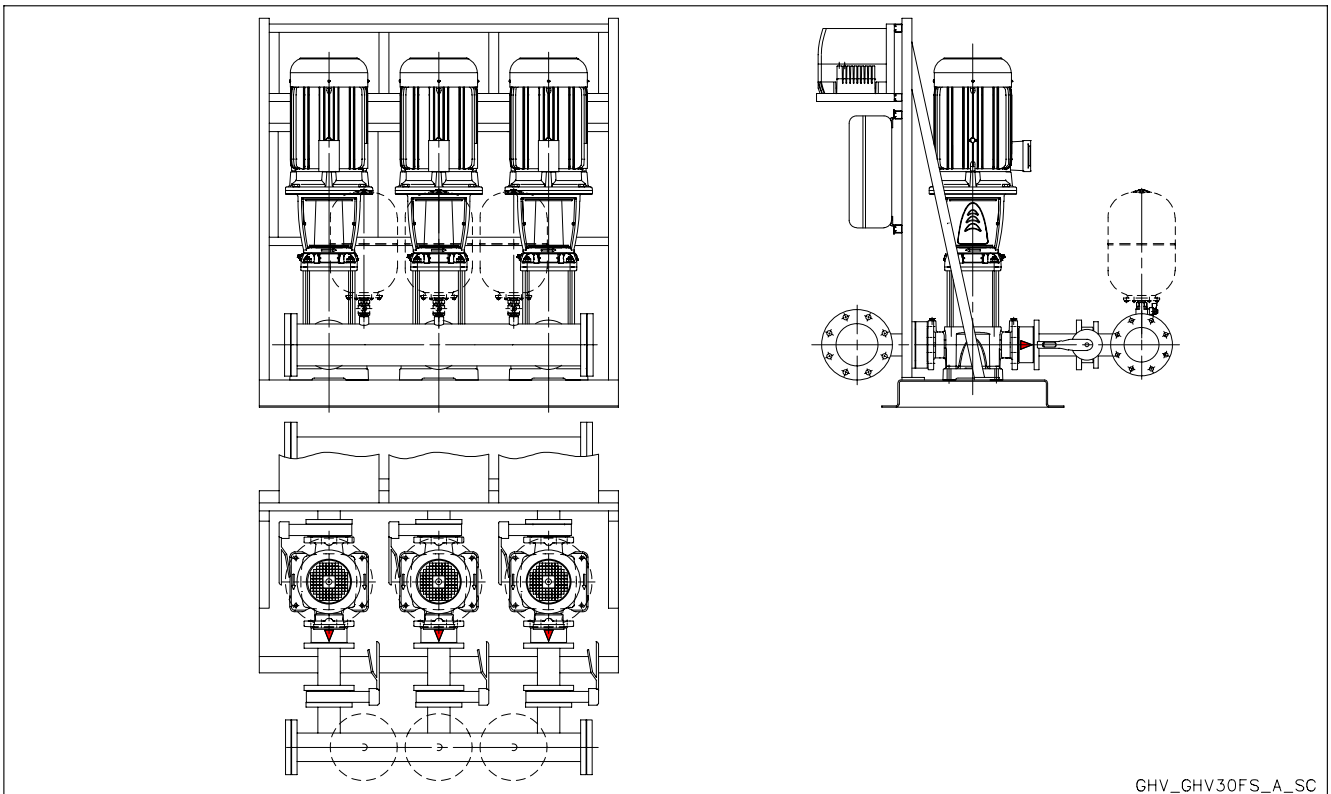
Having examined the various starting systems that can be realised for electric motors, direct start, star/delta, soft starter and inverter, they can be compared, analysing the absorbed currents and therefore the energy consumed (current = energy = kWh = MONEY)



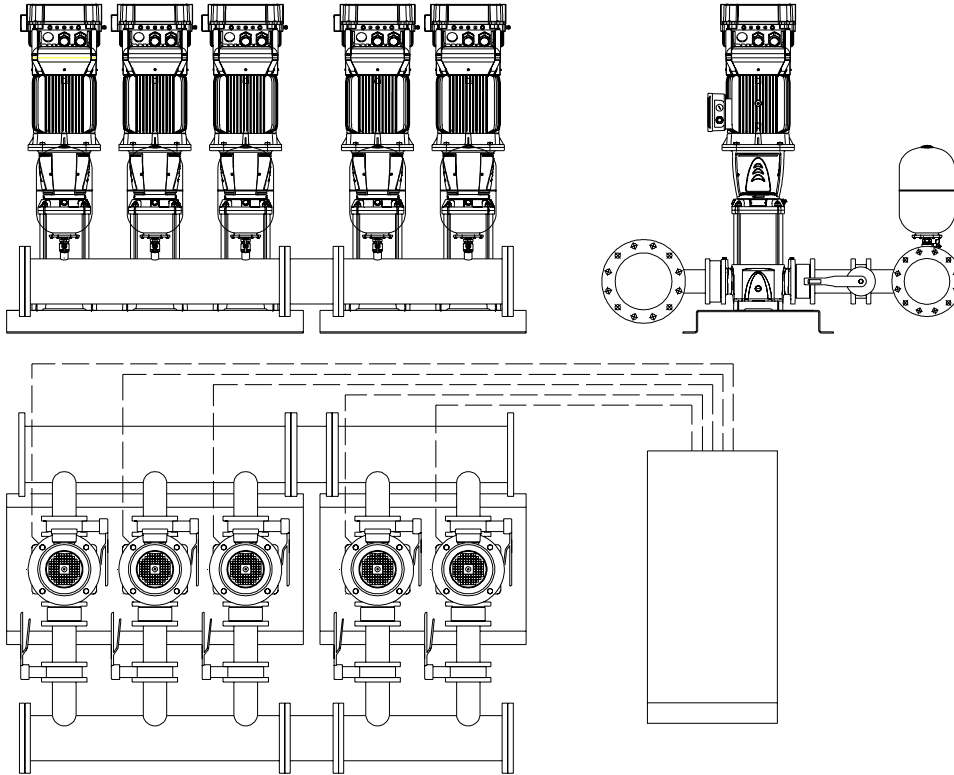
**GHV SERIES - EXAMPLE OF SPECIAL SETS
HYDROVAR CONVERTER MOUNTED ON A BRACKET
DELIVERY SIDE**



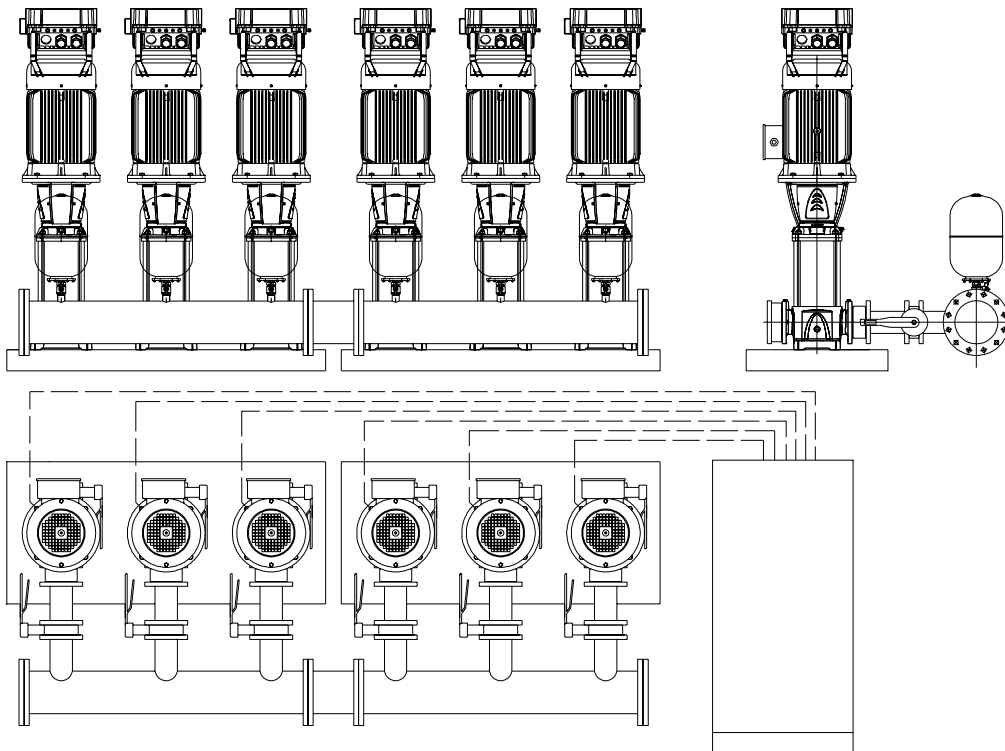
SUCTION SIDE



SPECIAL VERSIONS WITH 5/6 PUMPS



GHV50/92SV3G220T



GHV60/92SV5/2AG70T/SCA

GHV_SPEC-SV_A_DD

N.B.: Please request other special versions with regard to materials used, working temperatures, electric panels with additional functions.

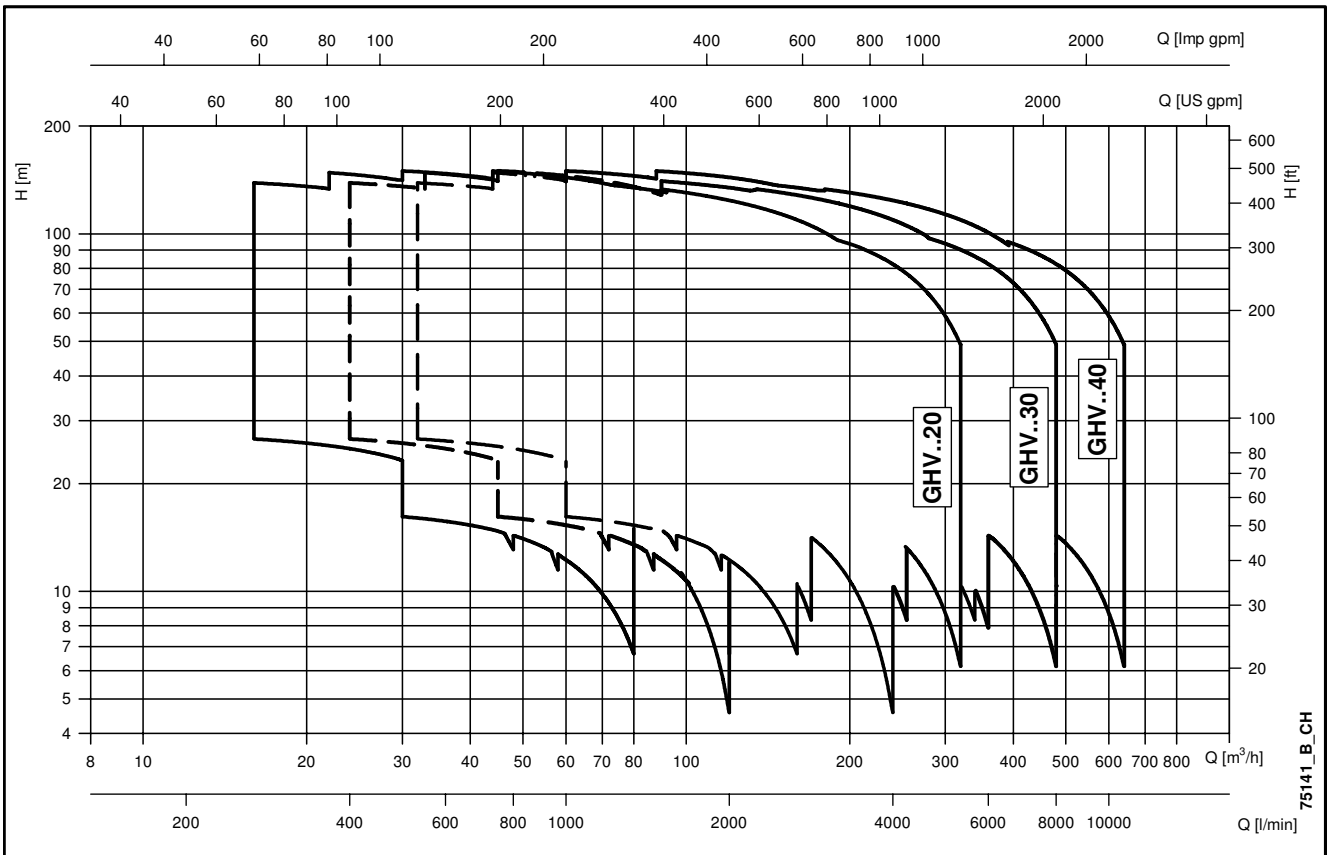
GHV.../SV Series

Variable-speed booster sets with e-SV™ series
Vertical Multistage Electric Pumps with
high-efficiency motors and
flow rates up to 640 m³/h

50 Hz

GHV.../SV SERIES
HYDRAULIC PERFORMANCE RANGE AT 50 Hz

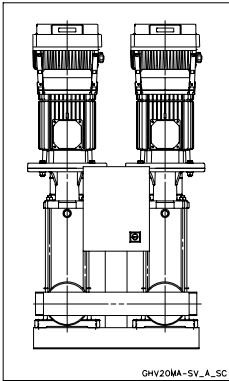
GHV.../SV



75141_B_CH

RANGE

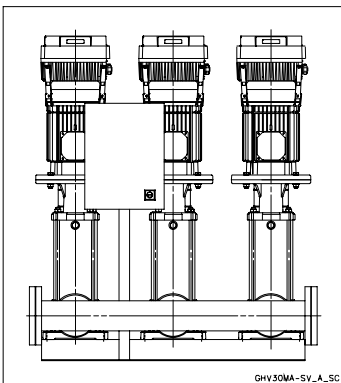
The range of GHV series variable-speed booster sets includes models with 2 to 4 electric duty pumps to adapt to the specific needs of each application.



GHV20 SETS

- Variable speed sets equipped with Hydrovar frequency converter and two multistage vertical pumps with up to 22 kW power.

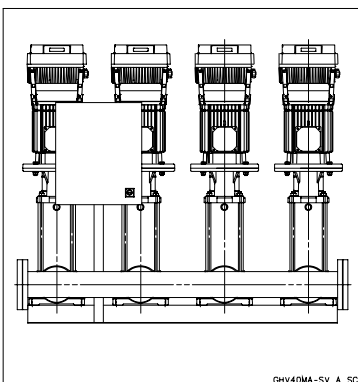
Head up to 160m.
Flow rate up to 320 m³/h.



GHV30 SETS

- Variable speed sets equipped with Hydrovar frequency converter and three multistage vertical pumps with up to 22 kW power.

Head up to 160m.
Flow rate up to 480 m³/h.



GHV40 SETS

- Variable speed sets equipped with Hydrovar frequency converter and four multistage vertical pumps with up to 22 kW power.

Head up to 160m.
Flow rate up to 640 m³/h.

REFERENCE STANDARDS

- The Lowara booster sets are CE-marked for conformity with the following directives:
 - Machinery Directive: 2006/42/EC.
 - Low Voltage Directive 2006/95/EC.
 - Electromagnetic Compatibility Directive 2004/108/EC
- Electric pump performance complies with the following standard: ISO 9906-A Rotodynamic pumps – hydraulic performance acceptance tests.

CHARACTERISTICS OF THE ELECTRIC PUMPS

The SV pump is a multistage vertical pump, not self-priming, combined with a normalised standard motor. The hydraulic part is kept in place between the upper cover and the pump body with tie-rods. The pump body is available in different configurations and connection typologies.

GHV.../SV



Technical Information:

Flow rates: up to 160 m³/h.
Heads: up to 160 m.

Temperature of pumped liquid:
- from -30°C to +120°C for 10, 15, 22, 33, 46, 66, 92, 125SV
standard version.

Tested to ISO 9906 annex A.
Clockwise direction of rotation looking
at the pump from above (indicated
with an arrow on the bracket and joint).

Motor

Short circuit squirrel cage motor, totally enclosed, fan-cooled. Standard supplied IE2/IE3 motors are compliant with Regulation (EC) no. 640/2009 and IEC 60034-30.

IP55 protection.

Class 155 (F) insulation.

Performance levels according to EN 60034-1.

Standard voltage:

Single-phase version: 220-240 V, 50 Hz.

Three-phase version: 220-240/380-415 V, 50 Hz for power up to 3 kW,

380-415/660-690 V, 50 Hz for power above 3 kW.

For electrical data of the motors used see Technical Appendix.

Materials

Suitable for pumping drinking water (WRAS certified).

CHARACTERISTICS OF THE ELECTRIC PUMPS USED IN GHV SERIES BOOSTER SETS

CHARACTERISTICS OF 10, 15, 22SV SERIES

- Vertical multistage centrifugal pump. All metal parts in contact with the pumped liquid are made of stainless steel.
- The following versions are available:
 - **F**: round flanges, in-line delivery and suction ports, AISI 304.
 - **T**: oval flanges, in-line delivery and suction ports, AISI 304.
 - **R**: round flanges, delivery port above the suction port, with four adjustable positions, AISI 304.
 - **N**: round flanges, in-line delivery and suction ports, AISI 316.
 - **V, P**: Victaulic® couplings, in-line delivery and suction ports, AISI 316.
 - **C**: Clamp couplings (DIN 32676), in-line delivery and suction ports, AISI 316.
 - **K**: threaded couplings, (DIN 11851), in-line delivery and suction ports, AISI 316.
- Reduced axial thrusts enable the use of **standard motors** that are easily found in the market. **Standard supplied IE2/IE3 three-phase surface motors $\geq 0,75$ kW are compliant with Regulation (EC) no. 640/2009.**
- Mechanical seal according to EN 12756 (ex DIN 24960) and ISO 3069 for 1, 3, 5SV and 10, 15, 22SV (\leq of 4 kW) series.
- **Balanced mechanical seal** according to EN 12756 (ex DIN 24960) and ISO 3069, which **can be replaced without removing the motor from the pump** for 10, 15 and 22SV (\geq of 5,5 kW) series.
- Seal housing chamber designed to prevent the accumulation of air in the critical area next to the mechanical seal.
- A second plug is available for 10, 15, 22SV series.
- Versions with round flanges that can be coupled to counter-flanges, according to EN 1092.
- Threaded, oval counter-flanges made of stainless steel are standard supply for the T versions.
- Round counter-flanges made of stainless steel are available on request for the F, R and N versions.
- Easy maintenance. No special tools required for assembly or disassembly.
- **The pumps for F, T, R, N versions are certified for drinking water use (WRAS and ACS certified).**
- Standard version for temperatures ranging from -30°C to $+120^{\circ}\text{C}$.

CHARACTERISTICS OF 33, 46, 66, 92, 125SV SERIES

- The following versions are available:
 - **G**: vertical multistage centrifugal pump with impellers, diffusers and outer sleeve made entirely of stainless steel, and with pump casing and motor adaptor made of cast iron.
 - **N, P**: version made entirely of AISI 316 stainless steel.
- Innovative axial load compensation system on pumps with higher head. This ensures reduced axial thrusts and enables the use of **standard motors** that are easily found in the market. **Standard supplied IE2/IE3 three-phase surface motors are compliant with Regulation (EC) no. 640/2009.**
- **Balanced mechanical seal** according to EN 12756 (ex DIN 24960) and ISO 3069, which **can be replaced without removing the motor from the pump.**
- Seal housing chamber designed to prevent the accumulation of air in the critical area next to the mechanical seal.
- **The pumps for G, N versions are certified for drinking water use (WRAS and ACS certified).**
- Standard version for temperatures ranging from -30°C to $+120^{\circ}\text{C}$.
- Pump body fitted with couplings for installing pressure gauges on both suction and delivery flanges.
- In-line ports with round flanges that can be coupled to counter-flanges, in compliance with EN 1092.
- Mechanical sturdiness and easy maintenance. No special tools required for assembly or disassembly.

OPERATING CHARACTERISTICS AND LIMITS

Liquids handled	Water containing no gas or corrosive and/or aggressive substances.
Fluid temperature	Above -10°C a + 80 °C
Ambient temperature	Above 0°C a + 40 °C
Maximum operating pressure	Max 8 bar, 10 bar, 16 bar in function of pump type
Minimum inlet pressure	According to NPSH curve and losses, with a minimum margin of 0.5 m
Maximum inlet pressure	The inlet pressure added to the pressure of the pump at zero flow must be lower than the maximum operating pressure of the set.
Installation	Indoors, protected from the weather. Away from heat sources. Max elevation 1000 m ASL. Max humidity 50% without condensation.
Hourly starts (single pump)	0,37 kW ≤ Pn ≤ 3 kW max 60 starts per hour. Direct motor start; 4 kW ≤ Pn ≤ kW max 40 starts per hour. Direct motor start; 11 kW ≤ Pn ≤ kW max 30 starts per hour. Direct motor start; 18,5 kW ≤ Pn ≤ 22 kW max 24 starts per hour. Direct motor start; 30 kW ≤ Pn ≤ 37 kW max 16 starts per hour. Start/delta start; Pn = 45 kW max 8 starts per hour. Start/delta start;
Sound emission	See table

* On request, PN above in function of the pump

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SOUND EMISSION LEVELS

50 Hz 2900 min -1		LpA (dB ±2)**		
P2 (kW)	IEC*	GHV20	GHV30	GHV40
1,1	80	< 70	< 70	< 70
1,5	90	< 70	< 70	< 70
2,2	90	< 70	< 70	< 70
3	100R	< 70	< 70	< 70
4	112R	< 70	< 70	< 70
5,5	132R	< 70	< 70	< 70
7,5	132	74	76	77
11	160R	76	78	79
15	160	74	76	77
18,5	160	76	78	79
22	180R	73	75	76
30	200	75	77	78
37	200	75	77	78

* R=Reduced motor casing size with respect to shaft extension and related flange.

GHVcom_2p-en_a_tr

** Noise value of the electric motor only.

MAIN COMPONENTS

- **Main On-off valves** on suction and discharge side of each pump, ball type with threaded coupling up to 2" size included. Butterfly type for installation between the flanges are used for larger diameters.
- **Check valve** on discharge side of each pump, spring-loaded type, with threaded coupling up to 1 1/2" size, as well as the double-swing type to fit between the flanges.
For applications with air-cushion surge tanks, they are mounted on the suction side and the set is equipped with a connector for G 1/2" threaded flexible air feeder pipe (GHV..RA series).
- **Suction manifold** made of galvanized or AISI 304 stainless steel with threaded or flanged ends depending on the type of pump (see drawings). Threaded coupling for water charging.
- **Delivery manifold** made of galvanized or AISI 304 stainless steel depending on the version, with threaded or flanged ends depending on the type of pump (see drawings). Fitted with two R1" threaded couplings with caps to allow connection of 24 or 20-litre diaphragm pressure vessels.
- **Pressure gauge and 2 control transmitters** located on the delivery side of the unit.
- **Various couplings** in nickel-plated brass, galvanized steel or stainless steel depending on the version.
- **Mounting base**, for pumpset and panel mounting brackets:
 - in painted steel for sets with electric pumps series 10-15-22-33-46-66-92-125SV;
- **Electric control panel**, IP55 protection class.

STANDARD VERSIONS AVAILABLE

See table of materials.

STANDARD VERSION

For general applications

Sets with 10SV pumps:

Nickel-plated brass valves, brass non-return valves.

Sets with 15-22SV pumps:

Nickel-plated brass valves, non-return valves with stainless steel flaps.

Sets with 33-46-66-92-125SV pumps:

Valves with polyamide butterfly, non-return valves with stainless steel flaps.

DW VERSION (GHV./DW)

For drinking water applications.

The main components in contact with the liquid are certified suitable for drinking water or are made of AISI 304 or higher grade of stainless steel.

Sets with 10SV pumps:

Nickel-plated brass valves, brass non-return valves.

Sets with 15-22SV pumps:

Nickel-plated brass valves, non-return valves with stainless steel flaps.

Sets with 33-46-66-92-125SV pumps:

Valves with epoxy butterfly, non-return valves with stainless steel flaps.

AISI304 Version (GHV./A304),

AISI 316 (GHV./A316)

For special applications

Manifolds, valves, non-return valves and main components with parts directly in contact with the pumped liquid are made of AISI 304 or AISI 316 stainless steel.

Accessories available on request:

- Devices **against dry running** in one of the following versions:
 - float switch, for positive suction head;
 - probe electrodes kit, for positive suction head;
 - minimum pressure switch, for positive suction head.
- **Surge tank** in the following versions:
 - Air-cushion surge tank with compressor and accessories for surge tank and compressor.
 - Diaphragm vessel as an alternative to the air-cushion tank.
- **Kit featuring** a 24 or 20-litre **diaphragm expansion vessel** with ball valve (one for each pump), in the following versions, depending on the maximum head of the pumps:
 - 24-litre 8 bar cylinder water vessel kit
 - 24-litre 10 bar cylinder water vessel kit
 - 24-litre 16 bar cylinder water vessel kit
 - 20-litre 25 bar cylinder water vessel kit
- **Alarm kit;**
- **Air feeder** for **RA** version;
- **Air compressor** for **RA** version.

SPECIAL VERSIONS AVAILABLE ON

REQUEST

(Contact the Sales and technical Assistance Service)

- Units with non-standard input voltages, such as three-phase 3x230V, 3x440V.
- Support base in AISI 304, AISI 316 stainless steel.
- Units with stainless steel expansion vessels.
- Units with special valves.
- Sets with 5 electric pumps.
- Sets with 6 electric pumps.
- Sets with jockey pump.

TABLE OF MATERIALS FOR SETS WITH 10SV PUMPS UP TO 4kW

NAME	MATERIAL			
	(STANDARD)	DW	A304	A316
Manifolds	AISI 304	AISI 304	AISI 304	AISI 316
On-off valves	Nickel-plated brass	Nickel-plated brass	AISI 316	AISI 316
Non-return valves	Brass	Brass	AISI 304	AISI 316
Pressure switches	Chrome plated zinc alloy	AISI 304	AISI 304	AISI 304
Pressure transmitters	AISI 316	AISI 316	AISI 316	AISI 316
Caps/plugs/flanges	Galvanized steel	AISI 304	AISI 304	AISI 316
Bracket	Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel
Base	Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel
Pump body	AISI 304	AISI 304	AISI 304	AISI 316
Outer sleeve	AISI 304	AISI 304	AISI 304	AISI 316

gfixvsv_2p-en_d_tm

TABLE OF MATERIALS FOR SETS WITH 10SV PUMPS ABOVE 4kW

NAME	MATERIAL			
	(STANDARD)	DW	A304	A316
Manifolds	AISI 304	AISI 304	AISI 304	AISI 316
On-off valves	Nickel-plated brass	Nickel-plated brass	AISI 316	AISI 316
Non-return valves	Brass	Brass	AISI 304	AISI 316
Pressure switches	Chrome plated zinc alloy	AISI 304	AISI 304	AISI 304
Pressure transmitters	AISI 316	AISI 316	AISI 316	AISI 316
Caps/plugs/flanges	Galvanized steel	AISI 304	AISI 304	AISI 316
Bracket	Painted steel	Painted steel	Painted steel	Painted steel
Base	Painted steel	Painted steel	Painted steel	Painted steel
Pump body	AISI 304	AISI 304	AISI 304	AISI 316
Outer sleeve	AISI 304	AISI 304	AISI 304	AISI 316

gfixvsv8_2p-en_c_tm

TABLE OF MATERIALS FOR SETS WITH 10-15-22SV PUMPS

DENOMINATION	MATERIAL			
	(STANDARD)	DW	A304	A316
Manifolds	AISI304	AISI 304	AISI 304	AISI 316
On-off valves	Nickel-plated brass	Nickel-plated brass	AISI 316	AISI 316
Non-return valves	Painted cast iron with stainless steel flaps	Painted cast iron with stainless steel flaps	AISI 304	AISI 316
Pressure switches	Chrome plated zinc alloy	AISI 304	AISI 304	AISI 304
Pressure transmitters	AISI 316	AISI 316	AISI 316	AISI 316
Caps/plugs/flanges	Galvanized steel	AISI 304	AISI 304	AISI 316
Bracket	Painted steel (*)	Painted steel (*)	Painted steel (*)	Painted steel (*)
Base	Painted steel	Painted steel	Painted steel	Painted steel
Pump body	AISI 304	AISI 304	AISI 304	AISI 316
Outer sleeve	AISI 304	AISI 304	AISI 304	AISI 316

(*) of galvanized steel for two-pump sets up to 4kW

gfixvsv16_2p-en_b_tm

TABLE OF MATERIALS FOR SETS WITH 33-46-66-92-125SV PUMPS

DENOMINATION	MATERIAL			
	(STANDARD)	DW	A304	A316
Manifolds	AISI 304	AISI 304	AISI 304	AISI 316
On-off valves	Poliamide	Epoxy	AISI 316	AISI 316
Non-return valves	Painted cast iron with stainless steel flaps	Painted cast iron with stainless steel flaps	AISI 304	AISI 316
Pressure switches	Chrome plated zinc alloy	AISI 304	AISI 304	AISI 304
Pressure transmitters	AISI 316	AISI 316	AISI 316	AISI 316
Caps/plugs/flanges	Galvanized steel	AISI 316	AISI 316	AISI 316
Bracket	Painted steel	Painted steel	Painted steel	Painted steel
Base	Painted steel	Painted steel	Painted steel	Painted steel
Pump body	Cast iron	Cast iron	Cast iron	AISI 316
Outer sleeve	AISI 304	AISI 304	AISI 304	AISI 316

gfixvsv33_2p-en_b_tm

GHV.../SV

GHV20/15SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

SET TYPE GHV20/..	NOMINAL POWER kW	Q = DELIVERY												
		l/min 0	167	267	340	367	467	540	660	700	800	860	920	967
		m ³ /h 0	10	16	20,4	22	28	32	39,6	42	48	52	55	58
H = TOTAL HEAD METRES COLUMN OF WATER														
15SV01F011T	2 x 1,1	14		12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02F022T	2 x 2,2	29		26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
15SV03F030T	2 x 3	43		40,4	39,1	38,6	36,2	33,8	28,7	26,5	20,1			
15SV04F040T	2 x 4	58		54,7	53,1	52,5	49,4	46,3	39,7	36,9	28,7			
15SV05F040T	2 x 4	73		67,8	65,8	65,0	61,0	57,1	48,7	45,2	34,9			
15SV06F055T	2 x 5,5	88		81,5	79,4	78,4	74,1	69,9	60,3	56,3	44,2			
15SV07F055T	2 x 5,5	102		94,5	91,9	90,8	85,7	80,6	69,4	64,7	50,5			
15SV08F075T	2 x 7,5	117		110,9	108,0	106,8	100,8	94,9	82,0	76,7	60,6			
15SV09F075T	2 x 7,5	132		124,4	121,0	119,6	112,8	106,1	91,5	85,5	67,4			
15SV10F110T	2 x 11	148		138,8	135,3	133,8	126,7	119,6	103,9	97,4	77,5			

The table refers to performance with 2 pumps running

gcomv2p15sv_2p50-en_a_th

GHV20/22SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY													
		l/min 0	167	200	267	340	367	467	540	660	700	800	860	920	967
		m ³ /h 0	10	12	16	20,4	22	28	32	39,6	42	48	52	55	58
H = TOTAL HEAD METRES COLUMN OF WATER															
22SV01F011T	2 x 1,1	15					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02F022T	2 x 2,2	30					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5
22SV03F030T	2 x 3	45					42,2	40,4	38,5	34,5	32,8	27,8	24,2	20,2	16,6
22SV04F040T	2 x 4	61					56,8	54,4	51,9	46,6	44,4	37,9	33,1	27,7	23,0
22SV05F055T	2 x 5,5	76					70,9	67,9	64,9	58,3	55,6	47,4	41,4	34,7	28,8
22SV06F075T	2 x 7,5	93					88,8	85,7	82,5	75,4	72,4	63,3	56,7	49,1	42,6
22SV07F075T	2 x 7,5	109					103,1	99,4	95,7	87,2	83,7	73,1	65,3	56,5	48,8
22SV08F110T	2 x 11	125					119,2	115,2	111,0	101,6	97,7	85,7	77,0	66,9	58,2
22SV09F110T	2 x 11	140					133,7	129,2	124,4	113,8	109,3	95,8	86,0	74,6	64,8
22SV10F110T	2 x 11	155					148,2	143,1	137,8	125,9	120,9	105,8	94,8	82,3	71,3

The table refers to performance with 2 pumps running

gms_2p22sv_2p50-en_b_th

GHV20/33-46SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

GHV.../SV

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY										
		l/min 0 m ³ /h 0	500 30	600 36	733 44	833 50	1000 60	1167 70	1333 80	1500 90	1800 108	2000 120
H = TOTAL HEAD METRES COLUMN OF WATER												
33SV1/1AG022T	2 x 2,2	17,4	16,2	15,7	15,0	14,0	12,2	9,8	6,7			
33SV1G030T	2 x 3	23,8	21,7	21,2	20,3	20,0	17,8	15,5	12,7			
33SV2/2AG40T	2 x 4	35,1	34,1	33,3	32,0	30,0	27,0	22,4	16,6			
33SV2/1AG40T	2 x 4	40,8	38,8	37,9	36,0	35,0	32,0	27,5	22,3			
33SV2G055T	2 x 5,5	47,8	45,0	44,1	43,0	41,0	39,0	35,0	29,9			
33SV3/2AG055T	2 x 5,5	57,7	55,2	53,8	51,0	49,0	44,0	38,0	29,6			
33SV3/1AG075T	2 x 7,5	64,5	61,3	60,0	58,0	56,0	51,0	45,0	37,0			
33SV3G075T	2 x 7,5	71,5	67,4	66,0	64,0	62,0	58,0	52,0	44,6			
33SV4/2AG075T	2 x 7,5	82,0	78,8	77,0	74,0	72,0	66,0	58,0	47,2			
33SV4/1AG110T	2 x 11	88,9	85,0	83,0	81,0	78,0	73,0	65,0	55,1			
33SV4G110T	2 x 11	95,9	91,1	90,0	87,0	85,0	80,0	73,0	63,1			
33SV5/2AG110T	2 x 11	106,0	101,6	100,0	96,0	93,0	85,0	76,0	63,0			
33SV5/1AG110T	2 x 11	112,7	107,2	105,0	102,0	99,0	92,0	82,0	70,0			
33SV5G150T	2 x 15	120,4	114,9	113,0	110,0	107,0	101,0	92,0	80,5			
33SV6/2AG150T	2 x 15	131,2	126,9	125,0	120,0	116,0	108,0	96,0	81,2			
33SV6/1AG150T	2 x 15	139,1	133,5	131,0	128,0	124,0	116,0	105,0	90,4			
33SV6G150T	2 x 15	145,6	139,0	137,0	133,0	129,0	121,0	110,0	96,1			
33SV7/2AG150T	2 x 15	156,0	149,9	147,0	143,0	138,0	128,0	115,0	98,2			
46SV1/1AG030T	2 x 3	19,5			19,2	18,8	17,9	16,7	15,1	13,1	8,5	4,6
46SV1G040T	2 x 4	27,2			24,0	23,5	22,5	21,4	19,9	18,2	14,3	10,8
46SV2/2AG055T	2 x 5,5	38,8			39,8	39,2	37,8	35,7	32,9	29,4	21,1	13,9
46SV2G075T	2 x 7,5	52,6			48,5	47,7	46,1	44,2	41,7	38,7	31,4	25,1
46SV3/2AG110T	2 x 11	64,7			65,1	64,0	62,0	60,0	56,0	52,0	40,4	30,8
46SV3G110T	2 x 11	80,8			74,3	73,0	71,0	68,0	65,0	60,0	50,0	40,7
46SV4/2AG150T	2 x 15	92,4			90,7	90,0	87,0	83,0	79,0	73,0	58,0	45,6
46SV4G150T	2 x 15	107,3			99,8	98,0	96,0	92,0	87,0	82,0	68,0	55,9
46SV5/2AG185T	2 x 18,5	117,2			114,8	113,0	110,0	106,0	100,0	93,0	75,0	60,2
46SV5G185T	2 x 18,5	134,5			125,1	123,0	120,0	116,0	110,0	103,0	86,0	71,5
46SV6/2AG220T	2 x 22	143,7			139,3	138,0	134,0	129,0	122,0	113,0	92,0	73,4
46SV6G220T	2 x 22	161,0			149,9	148,0	144,0	139,0	132,0	124,0	104,0	86,0

The table refers to performance with 2 pumps running.

gms_2psv33-46_2p50-en_b_th

GHV20/66-92SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY												
		l/min 0	1000	1200	1400	1500	1800	2000	2400	2600	2833,3	3200	3600	4000
		m ³ /h 0	60	72	84	90	108	120	144	156	170	192	216	240
H = TOTAL HEAD METRES COLUMN OF WATER														
66SV1/1AG040T	2 x 4	23,8	21,4	20,7	19,9	19,4	17,8	16,6	13,3	11,2	8,3			
66SV1G055T	2 x 5,5	29,2	25,8	24,8	23,8	23,3	21,8	20,7	17,9	16,1	13,5			
66SV2/2AG075T	2 x 7,5	47,5	42,6	41,2	39,5	38,6	35,5	32,9	26,4	22,2	16,4			
66SV2/1AG110T	2 x 11	54,2	49,6	48,2	46,7	45,8	42,9	40,6	34,8	31,2	26,2			
66SV2G110T	2 x 11	60,4	55,7	54,4	52,8	52,0	49,3	47,1	42,0	38,9	34,7			
66SV3/2AG150T	2 x 15	78,4	71,6	69,6	67,2	65,9	61,5	57,9	49,0	43,3	35,3			
66SV3/1AG150T	2 x 15	84,7	77,8	75,8	73,5	72,2	68,0	64,6	56,3	51,1	44,0			
66SV3G185T	2 x 18,5	91,4	84,7	82,7	80,5	79,3	75,2	72,0	64,4	59,8	53,5			
66SV4/2AG185T	2 x 18,5	108,9	99,6	96,9	93,8	92,1	86,3	81,6	70,1	62,8	52,8			
66SV4/1AG220T	2 x 22	115,2	105,9	103,1	100,1	98,5	92,9	88,6	77,8	71,1	61,8			
66SV4G220T	2 x 22	121,6	112,5	109,8	106,9	105,3	99,8	95,7	85,5	79,2	70,8			
66SV5/2AG300T	2 x 30	139,1	127,5	124,1	120,2	118,2	111,1	105,5	91,5	82,7	70,4			
66SV5/1AG300T	2 x 30	145,6	134,0	130,5	126,8	124,7	117,8	112,4	99,2	90,9	79,5			
66SV5G300T	2 x 30	152,0	140,4	137,0	133,3	131,3	124,6	119,4	106,8	99,1	88,5			
92SV1/1AG055T	2 x 5,5	24,5				22,2	21,5	20,9	19,4	18,5	17,3	15,0	11,8	7,9
92SV1G075T	2 x 7,5	33,5				28,7	27,2	26,2	24,3	23,3	22,2	20,2	17,6	14,3
92SV2/2AG110T	2 x 11	49,4				45,1	43,7	42,5	39,6	37,9	35,5	30,9	24,6	16,8
92SV2G150T	2 x 15	67,8				58,2	55,3	53,4	49,5	47,6	45,2	41,4	36,3	29,6
92SV3/2AG185T	2 x 18,5	82,4				74,4	71,6	69,6	64,8	62,1	58,6	52,2	43,6	32,9
92SV3G220T	2 x 22	102,2				88,2	84,0	81,2	75,5	72,6	69,2	63,4	55,9	46,3
92SV4/2AG300T	2 x 30	115,7				104,0	99,9	97,0	90,4	86,8	82,1	73,8	62,8	49,0
92SV4G300T	2 x 30	133,1				117,0	111,7	108,0	100,6	96,8	92,3	84,6	74,8	62,5
92SV5/2AG370T	2 x 37	149,0				133,2	127,8	124,0	115,6	111,0	105,2	94,9	81,4	64,6

The table refers to performance with 2 pumps running.

gms_2psv66-92_2p50-en_b_th

GHV20/125SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY									
		l/min 0	2000	2400	2833	3400	3800	4000	4300	4600	5333
		m ³ /h 0	120	144	170	204	228	240	258	276	320
H = TOTAL HEAD METRES COLUMN OF WATER											
125SV1G075T	2 x 7,5	27,6	20,8	19,8	18,6	16,8	15,3	14,4	12,9	11,3	6,2
125SV2G150T	2 x 15	53,8	44,4	42,5	40,4	37,1	34,4	32,9	30,4	27,7	19,6
125SV3G220T	2 x 22	80,7	66,5	63,8	60,6	55,7	51,6	49,4	45,7	41,5	29,4
125SV4G300T	2 x 30	107,6	88,7	85,0	80,7	74,2	68,8	65,8	60,9	55,4	39,2
125SV5G370T	2 x 37	134,5	110,9	106,3	100,9	92,8	86,0	82,3	76,1	69,2	49,0

The table refers to performance with 2 pumps running.

gv_2p125sv_2p50-en_b_th

GHV30/15SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

GHV.../SV

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY													
		l/min 0	167	200	267	340	367	467	540	660	700	800	600	700	800
		m ³ /h 0	10	12	16	20,4	22	28	32	39,6	42	48	36	42	48
H = TOTAL HEAD METRES COLUMN OF WATER															
10SV03F011T	3 x 1,1	36	33,0	32,1	29,6	25,8	24,1	16,0							
10SV04F015T	3 x 1,5	48	44,2	43,0	39,9	34,8	32,6	21,7							
10SV05F022T	3 x 2,2	60	56,1	54,7	50,9	44,9	42,2	29,0							
10SV06F022T	3 x 2,2	72	66,8	65,0	60,4	53,1	49,8	33,9							
10SV07F030T	3 x 3	84	78,3	76,2	70,8	62,1	58,3	39,8							
10SV08F030T	3 x 3	95	88,9	86,5	80,1	70,2	65,7	44,5							
10SV09F040T	3 x 4	106	100,1	97,5	90,8	80,0	75,1	52,1							
10SV10F040T	3 x 4	118	110,8	107,9	100,3	88,2	82,8	57,2							
10SV11F040T	3 x 4	130	121,3	118,1	109,6	96,3	90,3	62,1							
10SV13F055T	3 x 5,5	156	146,5	142,7	132,6	116,4	109,2	74,3							
15SV01F011T	3 x 1,1	14			12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02F022T	3 x 2,2	29			26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
15SV03F030T	3 x 3	43			40,4	39,1	38,6	36,2	33,8	28,7	26,5	20,1			
15SV04F040T	3 x 4	58			54,7	53,1	52,5	49,4	46,3	39,7	36,9	28,7			
15SV05F040T	3 x 4	73			67,8	65,8	65,0	61,0	57,1	48,7	45,2	34,9			
15SV06F055T	3 x 5,5	88			81,5	79,4	78,4	74,1	69,9	60,3	56,3	44,2			
15SV07F055T	3 x 5,5	102			94,5	91,9	90,8	85,7	80,6	69,4	64,7	50,5			
15SV08F075T	3 x 7,5	117			110,9	108,0	106,8	100,8	94,9	82,0	76,7	60,6			
15SV09F075T	3 x 7,5	132			124,4	121,0	119,6	112,8	106,1	91,5	85,5	67,4			
15SV10F110T	3 x 11	148			138,8	135,3	133,8	126,7	119,6	103,9	97,4	77,5			

The table refers to performance with 3 pumps running.

gms_3p10-15sv_2p50-en_c_th

GHV30/22SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY													
		l/min 0	250	300	400	510	550	700	810	990	1050	1200	1290	1380	1450
		m ³ /h 0	15	18	24	30,6	33	42	49	59,4	63	72	77	83	87
H = TOTAL HEAD METRES COLUMN OF WATER															
22SV01F011T	3 x 1,1	15					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02F022T	3 x 2,2	30					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5
22SV03F030T	3 x 3	45					42,2	40,4	38,5	34,5	32,8	27,8	24,2	20,2	16,6
22SV04F040T	3 x 4	61					56,8	54,4	51,9	46,6	44,4	37,9	33,1	27,7	23,0
22SV05F055T	3 x 5,5	76					70,9	67,9	64,9	58,3	55,6	47,4	41,4	34,7	28,8
22SV06F075T	3 x 7,5	93					88,8	85,7	82,5	75,4	72,4	63,3	56,7	49,1	42,6
22SV07F075T	3 x 7,5	109					103,1	99,4	95,7	87,2	83,7	73,1	65,3	56,5	48,8
22SV08F110T	3 x 11	125					119,2	115,2	111,0	101,6	97,7	85,7	77,0	66,9	58,2
22SV09F110T	3 x 11	140					133,7	129,2	124,4	113,8	109,3	95,8	86,0	74,6	64,8
22SV10F110T	3 x 11	155					148,2	143,1	137,8	125,9	120,9	105,8	94,8	82,3	71,3

The table refers to performance with 3 pumps running.

gms_3p22sv_2p50-en_b_th

GHV30/33-46SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY										
		l/min 0 m ³ /h 0	750 45	900 54	1100 66	1250 75	1500 90	1750 105	2000 120	2250 135	2700 162	3000 180
H = TOTAL HEAD METRES COLUMN OF WATER												
33SV1/1AG022T	3 x 2,2	17,4	16,2	15,7	15	14	12,2	9,8	6,7			
33SV1G030T	3 x 3	23,8	21,7	21,2	20	20	17,8	15,5	12,7			
33SV2/2AG40T	3 x 4	35,1	34,1	33,3	32	30	27	22,4	16,6			
33SV2/1AG40T	3 x 4	40,8	38,8	37,9	36	35	32	27,5	22,3			
33SV2G055T	3 x 5,5	47,8	45	44,1	43	41	39	35	29,9			
33SV3/2AG055T	3 x 5,5	57,7	55,2	53,8	51	49	44	38	29,6			
33SV3/1AG075T	3 x 7,5	64,5	61,3	60	58	56	51	45	37			
33SV3G075T	3 x 7,5	71,5	67,4	66,0	64	62	58	52,0	44,6			
33SV4/2AG075T	3 x 7,5	82	78,8	77	74	72	66	58	47,2			
33SV4/1AG110T	3 x 11	88,9	85	83	81	78	73	65	55,1			
33SV4G110T	3 x 11	95,9	91,1	90	87	85	80	73	63,1			
33SV5/2AG110T	3 x 11	106	101,6	100	96	93	85	76	63			
33SV5/1AG110T	3 x 11	112,7	107,2	105	102	99	92	82	70			
33SV5G150T	3 x 15	120,4	114,9	113	110	107	101	92	80,5			
33SV6/2AG150T	3 x 15	131,2	126,9	125	120	116	108	96	81,2			
33SV6/1AG150T	3 x 15	139,1	133,5	131	128	124	116	105	90,4			
33SV6G150T	3 x 15	145,6	139	137	133	129	121	110	96,1			
33SV7/2AG150T	3 x 15	156	149,9	147	143	138	128	115	98,2			
46SV1/1AG030T	3 x 3	19,5			19,2	18,8	17,9	16,7	15,1	13,1	8,5	4,6
46SV1G040T	3 x 4	27,2			24	23,5	22,5	21,4	19,9	18,2	14,3	10,8
46SV2/2AG055T	3 x 5,5	38,8			39,8	39,2	37,8	35,7	32,9	29,4	21,1	13,9
46SV2G075T	3 x 7,5	52,6			48,5	47,7	46,1	44,2	41,7	38,7	31,4	25,1
46SV3/2AG110T	3 x 11	64,7			65,1	64	62	60	56	52	40,4	30,8
46SV3G110T	3 x 11	80,8			74,3	73	71	68	65	60	50	40,7
46SV4/2AG150T	3 x 15	92,4			90,7	90	87	83	79	73	58	45,6
46SV4G150T	3 x 15	107,3			99,8	98	96	92	87	82	68	55,9
46SV5/2AG185T	3 x 18,5	117,2			114,8	113	110	106	100	93	75	60,2
46SV5G185T	3 x 18,5	134,5			125,1	123	120	116	110	103	86	71,5
46SV6/2AG220T	3 x 22	143,7			139,3	138	134	129	122	113	92	73,4
46SV6G220T	3 x 22	161			149,9	148	144	139	132	124	104	86

The table refers to performance with 3 pumps running.

gms_3psv33-46_2p50-en_b_th

GHV30/66-92SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

GHV.../SV

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY												
		l/min 0	1500	1800	2100	2250	2700	3000	3600	3900	4250	4800	5400	6000
		m ³ /h 0	90	108	126	135	162	180	216	234	255	288	324	360
H = TOTAL HEAD METRES COLUMN OF WATER														
66SV1/1AG040T	3 x 4	23,8	21,4	20,7	19,9	19,4	17,8	16,6	13,3	11,2	8,3			
66SV1G055T	3 x 5,5	29,2	25,8	24,8	23,8	23,3	21,8	20,7	17,9	16,1	13,5			
66SV2/2AG075T	3 x 7,5	47,5	42,6	41,2	39,5	38,6	36	32,9	26,4	22,2	16,4			
66SV2/1AG110T	3 x 11	54,2	49,6	48,2	46,7	45,8	42,9	40,6	34,8	31,2	26,2			
66SV2G110T	3 x 11	60,4	55,7	54,4	52,8	52	49,3	47,1	42	38,9	34,7			
66SV3/2AG150T	3 x 15	78,4	71,6	70	67	66	62	58	49	43,3	35,3			
66SV3/1AG150T	3 x 15	84,7	77,8	76	74	72	68	65	56	51	44,0			
66SV3G185T	3 x 18,5	91,4	84,7	83	81	79	75	72	64	60	53,5			
66SV4/2AG185T	3 x 18,5	108,9	99,6	97	94	92	86	82	70	63	52,8			
66SV4/1AG220T	3 x 22	115,2	105,9	103	100	99	93	89	78	71	61,8			
66SV4G220T	3 x 22	121,6	112,5	110	107	105	100	96	86	79	70,8			
66SV5/2AG300T	3 x 30	139,1	127,5	124	120	118	111	106	92	83	70,4			
66SV5/1AG300T	3 x 30	145,6	134	131	127	125	118	112	99	91	79,5			
66SV5G300T	3 x 30	152	140,4	137	133	131	125	119	107	99	88,5			
92SV1/1AG055T	3 x 5,5	24,5				22,2	21,5	20,9	19,4	18,5	17,3	15	11,8	7,9
92SV1G075T	3 x 7,5	33,5				28,7	27,2	26,2	24,3	23,3	22,2	20,2	17,6	14,3
92SV2/2AG110T	3 x 11	49,4				45,1	43,7	42,5	39,6	37,9	35,5	30,9	24,6	16,8
92SV2G150T	3 x 15	67,8				58,2	55	53	49,5	47,6	45,2	41,4	36,3	29,6
92SV3/2AG185T	3 x 18,5	82,4				74,4	72	70	65	62	59	52	43,6	32,9
92SV3G220T	3 x 22	102,2				88,2	84	81	76	73	69	63	56	46,3
92SV4/2AG300T	3 x 30	115,7				104	100	97	90	87	82	74	63	49
92SV4G300T	3 x 30	133,1				117	112	108	101	97	92	85	75	62,5
92SV5/2AG370T	3 x 37	149				133,2	128	124	116	111	105	95	81	64,6

The table refers to performance with 3 pumps running.

gms_3psv66-92_2p50-en_b_th

GHV30/125SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY									
		l/min 0	3000	3600	4250	5100	5700	6000	6450	6900	8000
		m ³ /h 0	180	216	255	306	342	360	387	414	480
H = TOTAL HEAD METRES COLUMN OF WATER											
125SV1G075T	3 x 7,5	27,6	20,8	19,8	18,6	16,8	15,3	14,4	12,9	11,3	6,2
125SV2G150T	3 x 15	53,8	44,4	42,5	40,4	37,1	34,4	32,9	30,4	27,7	19,6
125SV3G220T	3 x 22	80,7	66,5	63,8	60,6	55,7	51,6	49,4	45,7	41,5	29,4
125SV4G300T	3 x 30	107,6	88,7	85,0	80,7	74,2	68,8	65,8	60,9	55,4	39,2
125SV5G370T	3 x 37	134,5	110,9	106,3	100,9	92,8	86,0	82,3	76,1	69,2	49,0

The table refers to performance with 3 pumps running.

gv_3p125sv_2p50-en_b_th

GHV40/15SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY													
		l/min 0	333	400	533	680	733	933	1080	1320	1400	1600	1200	1400	1600
		m ³ /h 0	20	24	32	40,8	44	56	65	79,2	84	96	72	84	96
H = TOTAL HEAD METRES COLUMN OF WATER															
10SV03F011T	4 x 1,1	36	33,0	32,1	29,6	25,8	24,1	16,0							
10SV04F015T	4 x 1,5	48	44,2	43,0	39,9	34,8	32,6	21,7							
10SV05F022T	4 x 2,2	60	56,1	54,7	50,9	44,9	42,2	29,0							
10SV06F022T	4 x 2,2	72	66,8	65,0	60,4	53,1	49,8	33,9							
10SV07F030T	4 x 3	84	78,3	76,2	70,8	62,1	58,3	39,8							
10SV08F030T	4 x 3	95	88,9	86,5	80,1	70,2	65,7	44,5							
10SV09F040T	4 x 4	106	100,1	97,5	90,8	80,0	75,1	52,1							
10SV10F040T	4 x 4	118	110,8	107,9	100,3	88,2	82,8	57,2							
10SV11F040T	4 x 4	130	121,3	118,1	109,6	96,3	90,3	62,1							
10SV13F055T	4 x 5,5	156	146,5	142,7	132,6	116,4	109,2	74,3							
15SV01F011T	4 x 1,1	14			12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02F022T	4 x 2,2	29			26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
15SV03F030T	4 x 3	43			40,4	39,1	38,6	36,2	33,8	28,7	26,5	20,1			
15SV04F040T	4 x 4	58			54,7	53,1	52,5	49,4	46,3	39,7	36,9	28,7			
15SV05F040T	4 x 4	73			67,8	65,8	65,0	61,0	57,1	48,7	45,2	34,9			
15SV06F055T	4 x 5,5	88			81,5	79,4	78,4	74,1	69,9	60,3	56,3	44,2			
15SV07F055T	4 x 5,5	102			94,5	91,9	90,8	85,7	80,6	69,4	64,7	50,5			
15SV08F075T	4 x 7,5	117			110,9	108,0	106,8	100,8	94,9	82,0	76,7	60,6			
15SV09F075T	4 x 7,5	132			124,4	121,0	119,6	112,8	106,1	91,5	85,5	67,4			
15SV10F110T	4 x 11	148			138,8	135,3	133,8	126,7	119,6	103,9	97,4	77,5			

The table refers to performance with 4 pumps running.

gms4p10-15sv_2p50-en_b_th

GHV40/22SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY													
		l/min 0	333	400	533	680	733	933	1080	1320	1400	1600	1720	1840	1933
		m ³ /h 0	20	24	32	40,8	44	56	65	79,2	84	96	103	110	116
H = TOTAL HEAD METRES COLUMN OF WATER															
22SV01F011T	4 x 1,1	15					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02F022T	4 x 2,2	30					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5
22SV03F030T	4 x 3	45					42,2	40,4	38,5	34,5	32,8	27,8	24,2	20,2	16,6
22SV04F040T	4 x 4	61					56,8	54,4	51,9	46,6	44,4	37,9	33,1	27,7	23,0
22SV05F055T	4 x 5,5	76					70,9	67,9	64,9	58,3	55,6	47,4	41,4	34,7	28,8
22SV06F075T	4 x 7,5	93					88,8	85,7	82,5	75,4	72,4	63,3	56,7	49,1	42,6
22SV07F075T	4 x 7,5	109					103,1	99,4	95,7	87,2	83,7	73,1	65,3	56,5	48,8
22SV08F110T	4 x 11	125					119,2	115,2	111,0	101,6	97,7	85,7	77,0	66,9	58,2
22SV09F110T	4 x 11	140					133,7	129,2	124,4	113,8	109,3	95,8	86,0	74,6	64,8
22SV10F110T	4 x 11	155					148,2	143,1	137,8	125,9	120,9	105,8	94,8	82,3	71,3

The table refers to performance with 4 pumps running.

gms_4p22sv_2p50-en_a_th

GHV40/33-46SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

GHV.../SV

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY										
		l/min 0 m ³ /h 0	1000 60	1200 72	1466,67 88	1666,67 100	2000 120	2333,33 140	2666,67 160	3000 180	3600 216	4000 240
H = TOTAL HEAD METRES COLUMN OF WATER												
33SV1/1AG022T	4 x 2,2	17,4	16,2	15,7	15	14	12,2	9,8	6,7			
33SV1G030T	4 x 3	23,8	21,7	21,2	20	20	17,8	15,5	12,7			
33SV2/2AG40T	4 x 4	35,1	34,1	33,3	32	30	27	22,4	16,6			
33SV2/1AG40T	4 x 4	40,8	38,8	37,9	36	35	32	27,5	22,3			
33SV2G055T	4 x 5,5	47,8	45	44,1	43	41	39	35	29,9			
33SV3/2AG055T	4 x 5,5	57,7	55,2	53,8	51	49	44	38	29,6			
33SV3/1AG075T	4 x 7,5	64,5	61,3	60	58	56	51	45	37			
33SV3G075T	4 x 7,5	71,5	67,4	66,0	64	62	58	52,0	44,6			
33SV4/2AG075T	4 x 7,5	82	78,8	77	74	72	66	58	47,2			
33SV4/1AG110T	4 x 11	88,9	85	83	81	78	73	65	55,1			
33SV4G110T	4 x 11	95,9	91,1	90	87	85	80	73	63,1			
33SV5/2AG110T	4 x 11	106	101,6	100	96	93	85	76	63			
33SV5/1AG110T	4 x 11	112,7	107,2	105	102	99	92	82	70			
33SV5G150T	4 x 15	120,4	114,9	113	110	107	101	92	80,5			
33SV6/2AG150T	4 x 15	131,2	126,9	125	120	116	108	96	81,2			
33SV6/1AG150T	4 x 15	139,1	133,5	131	128	124	116	105	90,4			
33SV6G150T	4 x 15	145,6	139	137	133	129	121	110	96,1			
33SV7/2AG150T	4 x 15	156	149,9	147	143	138	128	115	98,2			
46SV1/1AG030T	4 x 3	19,5			19,2	18,8	17,9	16,7	15,1	13,1	8,5	4,6
46SV1G040T	4 x 4	27,2			24	23,5	22,5	21,4	19,9	18,2	14,3	10,8
46SV2/2AG055T	4 x 5,5	38,8			39,8	39,2	37,8	35,7	32,9	29,4	21,1	13,9
46SV2G075T	4 x 7,5	52,6			48,5	47,7	46,1	44,2	41,7	38,7	31,4	25,1
46SV3/2AG110T	4 x 11	64,7			65,1	64	62	60	56	52	40,4	30,8
46SV3G110T	4 x 11	80,8			74,3	73	71	68	65	60	50	40,7
46SV4/2AG150T	4 x 15	92,4			90,7	90	87	83	79	73	58	45,6
46SV4G150T	4 x 15	107,3			99,8	98	96	92	87	82	68	55,9
46SV5/2AG185T	4 x 18,5	117,2			114,8	113	110	106	100	93	75	60,2
46SV5G185T	4 x 18,5	134,5			125,1	123	120	116	110	103	86	71,5
46SV6/2AG220T	4 x 22	143,7			139,3	138	134	129	122	113	92	73,4
46SV6G220T	4 x 22	161			149,9	148	144	139	132	124	104	86

The table refers to performance with 4 pumps running.

gms_4psv33-46_2p50-en_a_th

GHV40/66-92SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY												
		l/min 0	2000	2400	2800	3000	3600	4000	4800	5200	5666,7	6400	7200	8000
		m ³ /h 0	120	144	168	180	216	240	288	312	340	384	432	480
H = TOTAL HEAD METRES COLUMN OF WATER														
66SV1/1AG040T	4 x 4	23,8	21,4	20,7	19,9	19,4	17,8	16,6	13,3	11,2	8,3			
66SV1G055T	4 x 5,5	29,2	25,8	24,8	23,8	23,3	21,8	20,7	17,9	16,1	13,5			
66SV2/2AG075T	4 x 7,5	47,5	42,6	41,2	39,5	38,6	36	32,9	26,4	22,2	16,4			
66SV2/1AG110T	4 x 11	54,2	49,6	48,2	46,7	45,8	42,9	40,6	34,8	31,2	26,2			
66SV2G110T	4 x 11	60,4	55,7	54,4	52,8	52	49,3	47,1	42	38,9	34,7			
66SV3/2AG150T	4 x 15	78,4	71,6	70	67	66	62	58	49	43,3	35,3			
66SV3/1AG150T	4 x 15	84,7	77,8	76	74	72	68	65	56	51	44,0			
66SV3G185T	4 x 18,5	91,4	84,7	83	81	79	75	72	64	60	53,5			
66SV4/2AG185T	4 x 18,5	108,9	99,6	97	94	92	86	82	70	63	52,8			
66SV4/1AG220T	4 x 22	115,2	105,9	103	100	99	93	89	78	71	61,8			
66SV4G220T	4 x 22	121,6	112,5	110	107	105	100	96	86	79	70,8			
66SV5/2AG300T	4 x 30	139,1	127,5	124	120	118	111	106	92	83	70,4			
66SV5/1AG300T	4 x 30	145,6	134	131	127	125	118	112	99	91	79,5			
66SV5G300T	4 x 30	152	140,4	137	133	131	125	119	107	99	88,5			
92SV1/1AG055T	4 x 5,5	24,5				22,2	21,5	20,9	19,4	18,5	17,3	15	11,8	7,9
92SV1G075T	4 x 7,5	33,5				28,7	27,2	26,2	24,3	23,3	22,2	20,2	17,6	14,3
92SV2/2AG110T	4 x 11	49,4				45,1	43,7	42,5	39,6	37,9	35,5	30,9	24,6	16,8
92SV2G150T	4 x 15	67,8				58,2	55	53	49,5	47,6	45,2	41,4	36,3	29,6
92SV3/2AG185T	4 x 18,5	82,4				74,4	72	70	65	62	59	52	43,6	32,9
92SV3G220T	4 x 22	102,2				88,2	84	81	76	73	69	63	56	46,3
92SV4/2AG300T	4 x 30	115,7				104	100	97	90	87	82	74	63	49
92SV4G300T	4 x 30	133,1				117	112	108	101	97	92	85	75	62,5
92SV5/2AG370T	4 x 37	149				133,2	128	124	116	111	105	95	81	64,6

The table refers to performance with 4 pumps running.

gms_4psv66-92_2p50-en_a_th

GHV40/125SV SERIES BOOSTER SETS HYDRAULIC PERFORMANCE TABLE AT 50 HZ (SERVICE PUMP)

PUMP TYPE	NOMINAL POWER kW	Q = DELIVERY									
		l/min 0	4000	4800	5667	6800	7600	8000	8600	9200	10667
		m ³ /h 0	240	288	340	408	456	480	516	552	640
H = TOTAL HEAD METRES COLUMN OF WATER											
125SV1G075T	4 x 7,5	27,6	20,8	19,8	18,6	16,8	15,3	14,4	12,9	11,3	6,2
125SV2G150T	4 x 15	53,8	44,4	42,5	40,4	37,1	34,4	32,9	30,4	27,7	19,6
125SV3G220T	4 x 22	80,7	66,5	63,8	60,6	55,7	51,6	49,4	45,7	41,5	29,4
125SV4G300T	4 x 30	107,6	88,7	85,0	80,7	74,2	68,8	65,8	60,9	55,4	39,2
125SV5G370T	4 x 37	134,5	110,9	106,3	100,9	92,8	86,0	82,3	76,1	69,2	49,0

The table refers to performance with 4 pumps running.

gv_4p125sv_2p50-en_b_th

GHV20, GHV30, GHV40/10-15-22-33SV SERIES BOOSTER SETS ELECTRICAL DATA TABLE AT 50 Hz

GHV.../SV

SERVICE PUMP 3 X 400 V			CURRENT ABSORBED BY SET 3 X 400V		
TYPE	NOMINAL POWER P _n	NOMINAL CURRENT I _n	GHV20 CURRENT ABSORBED 3 x 400V	GHV30 CURRENT ABSORBED 3 x 400V	GHV40 CURRENT ABSORBED 3 x 400V
	kW	A	A	A	A
10SV03	1,1	2,39	-	7,5	10,0
10SV04	1,5	3,17	-	10,0	13,3
10SV05	2,2	4,64	-	14,6	19,5
10SV06	2,2	4,64	-	14,6	19,5
10SV07	3	6,17	-	19,4	25,9
10SV08	3	6,14	-	19,3	25,8
10SV09	4	7,63	-	24,0	32,0
10SV10	4	7,63	-	24,0	32,0
10SV11	4	7,63	-	24,0	32,0
10SV13	5,5	10,40	-	32,8	43,7
15SV01	1,1	2,39	5,0	7,5	10,0
15SV02	2,2	4,64	9,7	14,6	19,5
15SV03	3	6,14	12,9	19,3	25,8
15SV04	4	7,63	16,0	24,0	32,0
15SV05	4	7,63	16,0	24,0	32,0
15SV06	5,5	10,40	21,8	32,8	43,7
15SV07	5,5	10,40	21,8	32,8	43,7
15SV08	7,5	14,00	29,4	44,1	58,8
15SV09	7,5	14,00	29,4	44,1	58,8
15SV10	11	20,30	42,6	63,9	85,3
22SV01	1,1	2,39	5,0	7,5	10,0
22SV02	2,2	4,64	9,7	14,6	19,5
22SV03	3	6,14	12,9	19,3	25,8
22SV04	4	7,63	16,0	24,0	32,0
22SV05	5,5	10,40	21,8	32,8	43,7
22SV06	7,5	14,00	29,4	44,1	58,8
22SV07	7,5	14,00	29,4	44,1	58,8
22SV08	11	20,30	42,6	63,9	85,3
22SV09	11	20,30	42,6	63,9	85,3
22SV10	11	20,30	42,6	63,9	85,3
33SV1/1A	2,2	4,64	9,7	14,6	19,5
33SV1	3	6,14	12,9	19,3	25,8
33SV2/2A	4	7,63	16,0	24,0	32,0
33SV2/1A	4	7,63	16,0	24,0	32,0
33SV2	5,5	10,40	21,8	32,8	43,7
33SV3/2A	5,5	10,40	21,8	32,8	43,7
33SV3/1A	7,5	14,00	29,4	44,1	58,8
33SV3	7,5	14,00	29,4	44,1	58,8
33SV4/2A	7,5	14,00	29,4	44,1	58,8
33SV4/1A	11	20,30	42,6	63,9	85,3
33SV4	11	20,30	42,6	63,9	85,3
33SV5/2A	11	20,30	42,6	63,9	85,3
33SV5/1A	11	20,30	42,6	63,9	85,3
33SV5	15	26,00	54,6	81,9	109,2
33SV6/2A	15	26,00	54,6	81,9	109,2
33SV6/1A	15	26,00	54,6	81,9	109,2
33SV6	15	26,00	54,6	81,9	109,2
33SV7/2A	15	26,00	54,6	81,9	109,2

The current shown is the nominal current of the set.

gcom1_2p50-en_e_te

GHV20, GHV30, GHV40/46-66-92-125SV SERIES BOOSTER SETS ELECTRICAL DATA TABLE AT 50 Hz

SERVICE PUMP 3 X 400 V			CURRENT ABSORBED BY SET 3 X 400V		
TYPE	NOMINAL POWER P _n	NOMINAL CURRENT I _n	GHV20 CURRENT ABSORBED 3 x 400V	GHV30 CURRENT ABSORBED 3 x 400V	GHV40 CURRENT ABSORBED 3 x 400V
	kW	A	A	A	A
46SV1/1A	3	6,14	12,9	19,3	25,8
46SV1	4	7,63	16,0	24,0	32,0
46SV2/2A	5,5	10,40	21,8	32,8	43,7
46SV2	7,5	14,00	29,4	44,1	58,8
46SV3/2A	11	20,30	42,6	63,9	85,3
46SV3	11	20,30	42,6	63,9	85,3
46SV4/2A	15	26,00	54,6	81,9	109,2
46SV4	15	26,00	54,6	81,9	109,2
46SV5/2A	18,5	33,20	69,7	104,6	139,4
46SV5	18,5	33,20	69,7	104,6	139,4
46SV6/2A	22	38,60	81,1	121,6	162,1
46SV6	22	38,60	81,1	121,6	162,1
66SV1/1A	4	7,63	16,0	24,0	32,0
66SV1	5,5	10,40	21,8	32,8	43,7
66SV2/2A	7,5	14,00	29,4	44,1	58,8
66SV2/1A	11	20,30	42,6	63,9	85,3
66SV2	11	20,30	42,6	63,9	85,3
66SV3/2A	15	26,00	54,6	81,9	109,2
66SV3/1A	15	26,00	54,6	81,9	109,2
66SV3	18,5	33,20	69,7	104,6	139,4
66SV4/2A	18,5	33,20	69,7	104,6	139,4
66SV4/1A	22	38,60	81,1	121,6	162,1
66SV4	22	38,60	81,1	121,6	162,1
66SV5/2A	30	53,60	112,6	168,8	225,1
66SV5/1A	30	53,60	112,6	168,8	225,1
66SV5	30	53,60	112,6	168,8	225,1
92SV1/1A	5,5	10,40	21,8	32,8	43,7
92SV1	7,5	14,00	29,4	44,1	58,8
92SV2/2A	11	20,30	42,6	63,9	85,3
92SV2	15	26,00	54,6	81,9	109,2
92SV3/2A	18,5	33,20	69,7	104,6	139,4
92SV3	22	38,60	81,1	121,6	162,1
92SV4/2A	30	53,60	112,6	168,8	225,1
92SV4	30	53,60	112,6	168,8	225,1
92SV5/2A	37	65,80	138,2	207,3	276,3
125SV1	7,5	14,00	29,4	44,1	58,8
125SV2	15	26,00	54,6	81,9	109,2
125SV3	22	38,60	81,1	121,6	162,1
125SV4	30	53,60	112,6	168,8	225,1
125SV5	37	65,80	138,2	207,3	276,3

The current shown is the nominal current of the set.

gcom2_2p50-en_c_te

Booster sets

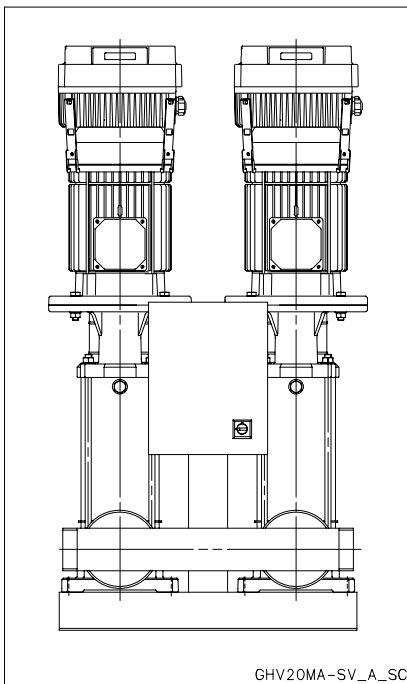
MARKET SECTORS

CIVIL, INDUSTRIAL

APPLICATIONS

- Water network supply in condominiums, offices, hotels, shopping centres, factories.
- Water supply to agricultural water networks (e.g. irrigation).

GHV20 Series



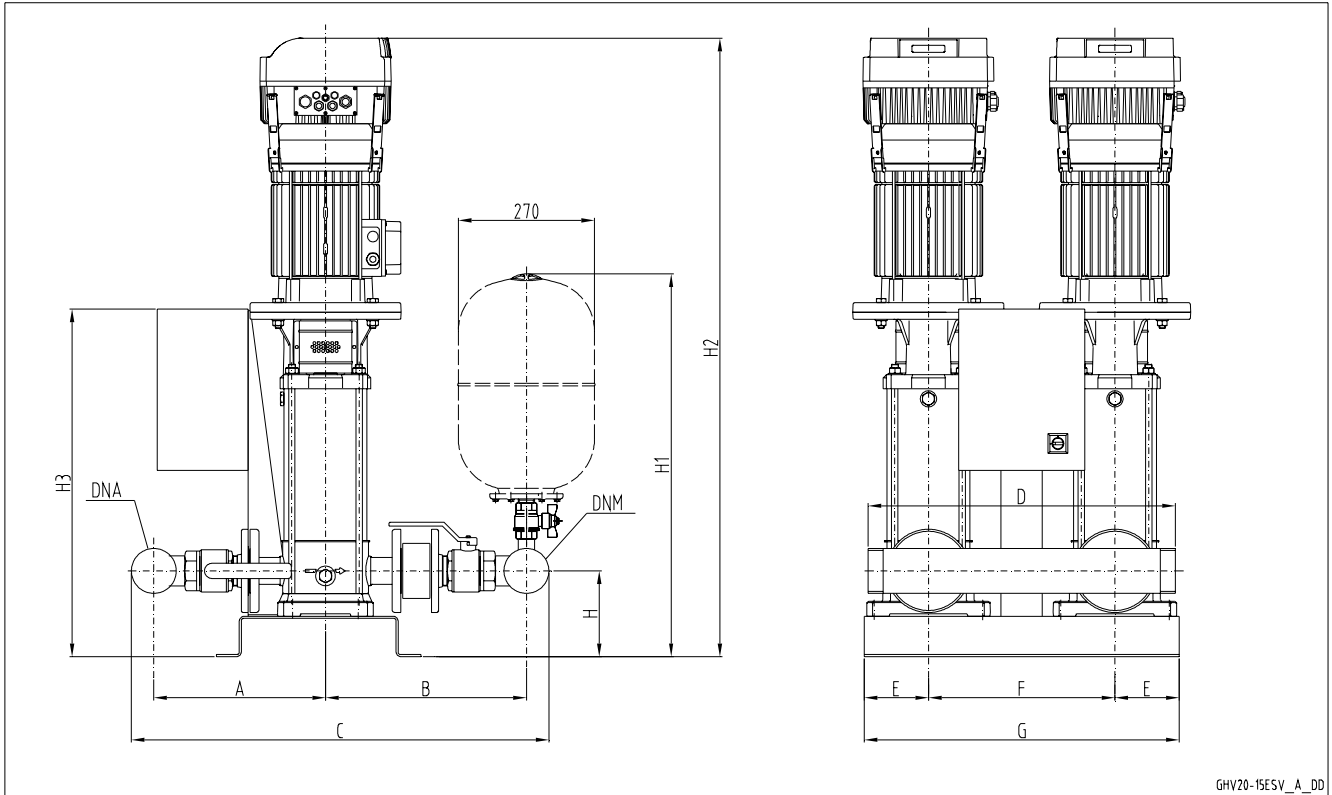
GHV20

SPECIFICATIONS

- **Flow rate** up to 320 m³/h.
- **Head** up to 160 m.
- Electrical panel supply voltage:
 - 1 x 230V ± 10% up to 2,2 kW.
 - 3 x 400V ± 10% for 1,1 kW and up.
- Frequency: 50 Hz.
- External control voltage: 5 ÷ 10 V.
- Protection class:
 - electrical panel: IP55.
 - converter: IP55 up to 22 kW.
 - IP54 above 22 kW.
- Maximum electric pump power 2 x 37 kW.
- Progressive motor start.
- **Vertical design pump:**
 - SV..T series (motor protection class IP55).
- Maximum operating pressure: 16 bar for sets with SV..T electric pumps.
- Maximum temperature of pumped liquid : +80°C.

TWO-PUMP BOOSTER SETS, GHV20 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE

GHV20



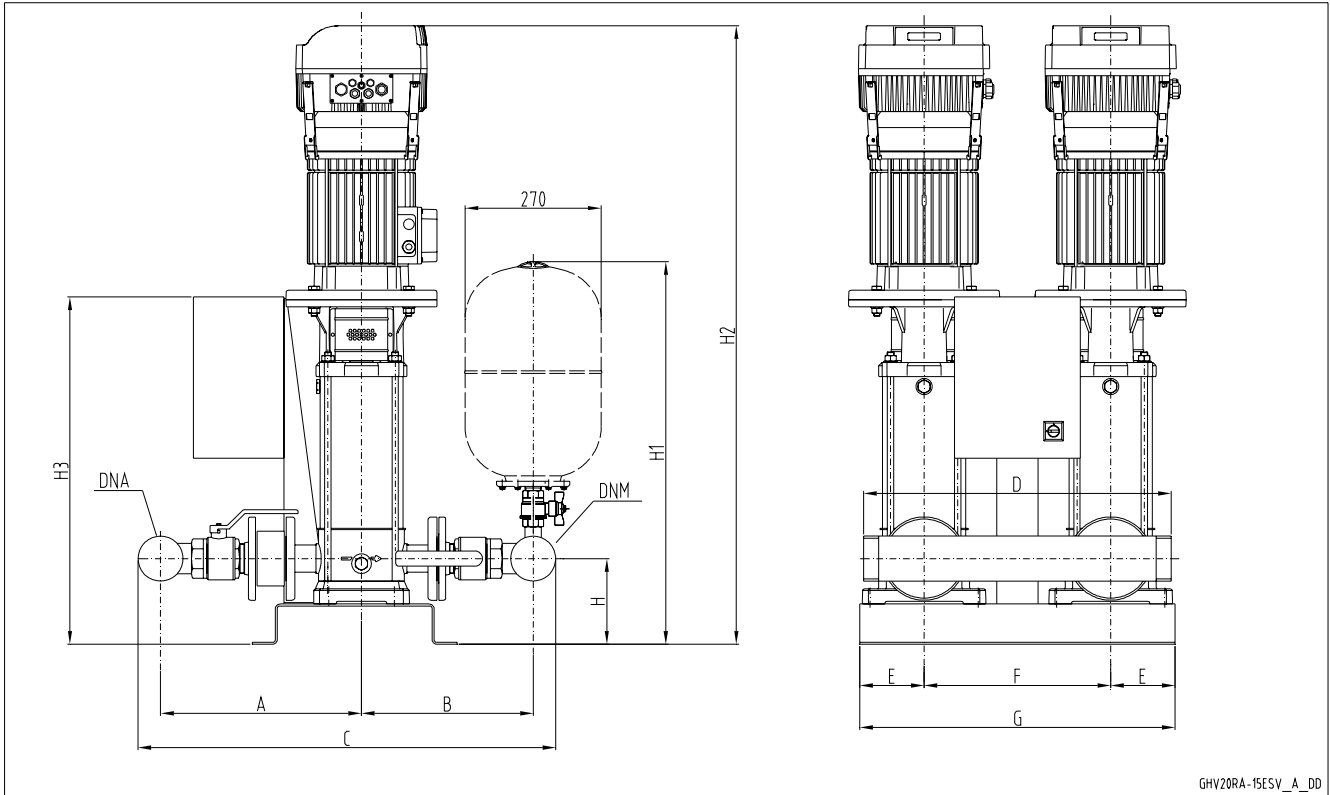
GHV20-15ESV_A_DD

GHV 20	DNA	DNM	A		B		C		D	E	F	G	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI								
15SV01F011T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	912	746
15SV02F022T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	957	746
15SV03F030T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1015	746
15SV04F040T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1084	746
15SV05F040T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1132	746
15SV06F055T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1303	689
15SV07F055T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1351	689
15SV08F075T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1391	689
15SV09F075T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1439	689
15SV10F110T	R 3"	R 3"	342	382	399	437	829	907	680	260	440	960	200	795	1608	797
22SV01F011T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	912	746
22SV02F022T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	957	746
22SV03F030T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1015	746
22SV04F040T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1084	746
22SV05F055T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1255	689
22SV06F075T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1295	689
22SV07F075T	R 3"	R 3"	342	382	399	437	829	907	610	135	370	640	170	765	1343	689
22SV08F110T	R 3"	R 3"	342	382	399	437	829	907	680	260	440	960	200	795	1512	797
22SV09F110T	R 3"	R 3"	342	382	399	437	829	907	680	260	440	960	200	795	1560	797
22SV10F110T	R 3"	R 3"	342	382	399	437	829	907	680	260	440	960	200	795	1608	797

Dimensions in mm. Tolerance ± 10 mm.

ghv20_15esv-en_c_td

**TWO-PUMP BOOSTER SETS, GHV20 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV20RA-15ESV_A_DD

GHV20

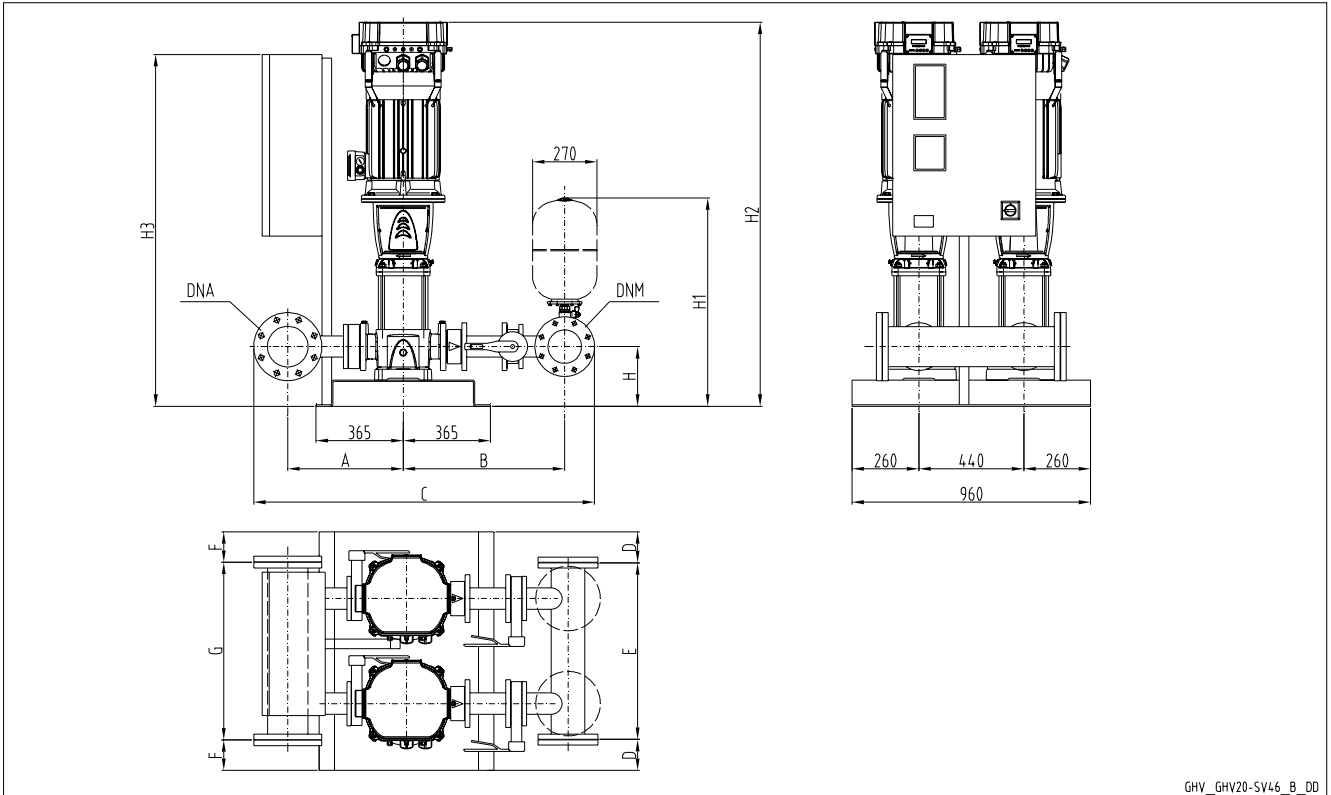
GHV 20 RA	DNA	DNM	A		B		C		D	E	F	G	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI								
15SV01F011T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	912	746
15SV02F022T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	957	746
15SV03F030T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1015	746
15SV04F040T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1084	746
15SV05F040T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1132	746
15SV06F055T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1303	689
15SV07F055T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1351	689
15SV08F075T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1391	689
15SV09F075T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1439	689
15SV10F110T	R 3"	R 3"	399	437	342	380	829	905	680	260	440	960	200	795	1608	797
22SV01F011T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	912	746
22SV02F022T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	957	746
22SV03F030T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1015	746
22SV04F040T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1084	746
22SV05F055T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1255	689
22SV06F075T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1295	689
22SV07F075T	R 3"	R 3"	399	437	342	380	829	905	610	135	370	640	170	765	1343	689
22SV08F110T	R 3"	R 3"	399	437	342	380	829	905	680	260	440	960	200	795	1512	797
22SV09F110T	R 3"	R 3"	399	437	342	380	829	905	680	260	440	960	200	795	1560	797
22SV10F110T	R 3"	R 3"	399	437	342	380	829	905	680	260	440	960	200	795	1608	797

Dimensions in mm. Tolerance ± 10 mm.

ghv20ra_15esv-en_c_td

**TWO-PUMP BOOSTER SETS, GHV20 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**

GHV20



GHV_GHV20-SV46_B_DD

TWO-PUMP BOOSTER SETS, GHV20 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE

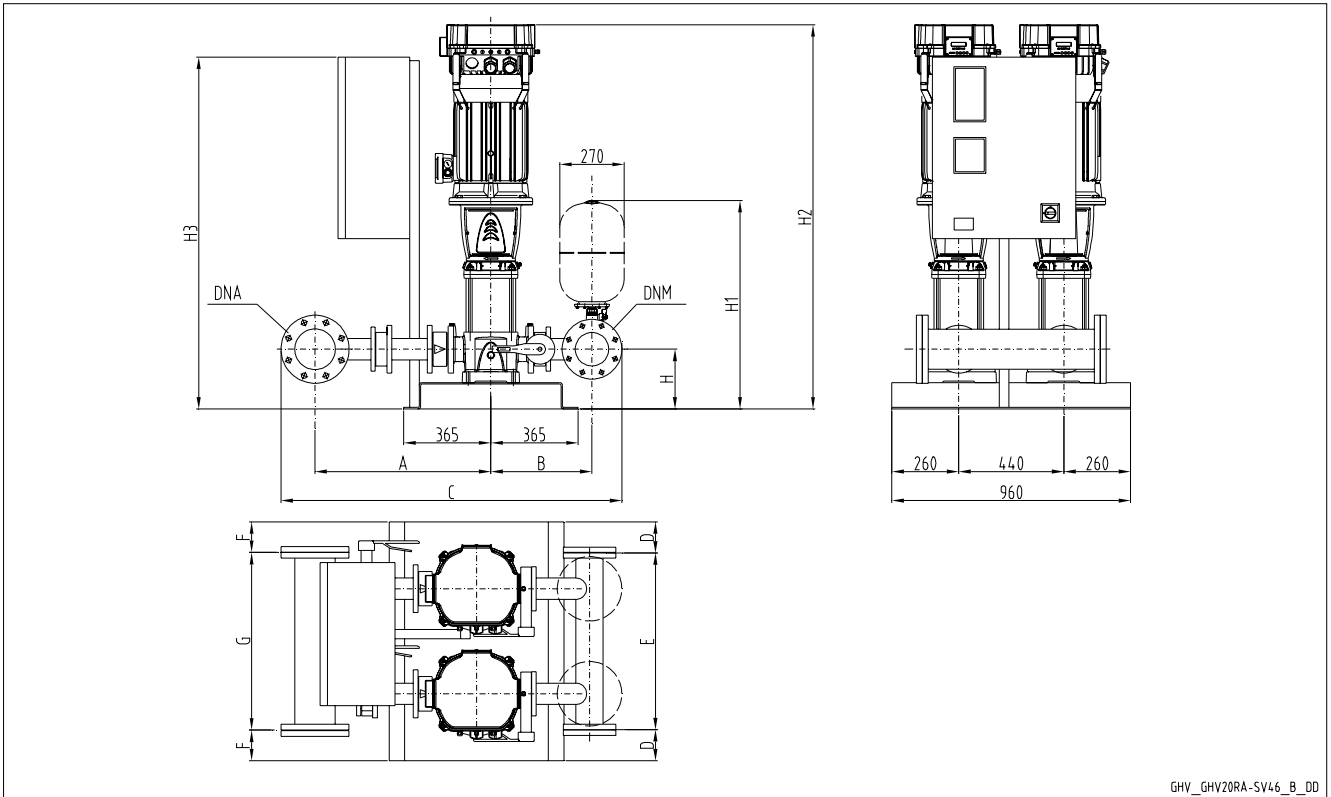
GHV 20	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
33SV1/1AG022T	100	80	448	701	1359	90	780	90	780	215	810	1067	886
33SV1G030T	100	80	448	701	1359	90	780	90	780	215	810	1067	886
33SV2/2AG040T	100	80	448	701	1359	90	780	90	780	215	810	1163	886
33SV2/1AG040T	100	80	448	701	1359	90	780	90	780	215	810	1163	886
33SV2G055T	100	80	448	701	1359	90	780	90	780	215	810	1239	1017
33SV3/2AG055T	100	80	448	701	1359	90	780	90	780	215	810	1314	1017
33SV3/1AG075T	100	80	448	701	1359	90	780	90	780	215	810	1306	1017
33SV3G075T	100	80	448	701	1359	90	780	90	780	215	810	1306	1017
33SV4/2AG075T	100	80	448	701	1359	90	780	90	780	215	810	1381	1017
33SV4/1AG110T	100	80	448	701	1359	90	780	90	780	215	810	1477	1017
33SV4G110T	100	80	448	701	1359	90	780	90	780	215	810	1477	1017
33SV5/2AG110T	100	80	448	701	1359	90	780	90	780	215	810	1552	1017
33SV5/1AG110T	100	80	448	701	1359	90	780	90	780	215	810	1552	1017
33SV5G150T	100	80	448	701	1359	90	780	90	780	215	810	1656	1017
33SV6/2AG150T	100	80	448	701	1359	90	780	90	780	215	810	1731	1017
33SV6/1AG150T	100	80	448	701	1359	90	780	90	780	215	810	1731	1017
33SV6G150T	100	80	448	701	1359	90	780	90	780	215	810	1731	1017
33SV7/2AG150T	100	80	448	701	1359	90	780	90	780	215	810	1806	1017
46SV1/1AG030T	125	100	484	739	1457	90	780	90	780	250	857	1107	886
46SV1G040T	125	100	484	739	1457	90	780	90	780	250	857	1128	886
46SV2/2AG055T	125	100	484	739	1457	90	780	90	780	250	857	1279	1017
46SV2G075T	125	100	484	739	1457	90	780	90	780	250	857	1271	1017
46SV3/2AG110T	125	100	484	739	1457	90	780	90	780	250	857	1442	1017
46SV3G110T	125	100	484	739	1457	90	780	90	780	250	857	1442	1017
46SV4/2AG150T	125	100	484	739	1457	90	780	90	780	250	857	1621	1017
46SV4G150T	125	100	484	739	1457	90	780	90	780	250	857	1621	1017
46SV5/2AG185T	125	100	484	739	1457	90	780	90	780	250	857	1696	1097
46SV5G185T	125	100	484	739	1457	90	780	90	780	250	857	1696	1097
46SV6/2AG220T	125	100	484	739	1457	90	780	90	780	250	857	1771	1097
46SV6G220T	125	100	484	739	1457	90	780	90	780	250	857	1771	1097
66SV1/1AG040T	150	125	504	780	1551	90	780	70	820	250	870	1153	886
66SV1G055T	150	125	504	780	1551	90	780	70	820	250	870	1229	1017
66SV2/2AG075T	150	125	504	780	1551	90	780	70	820	250	870	1311	1017
66SV2/1AG110T	150	125	504	780	1551	90	780	70	820	250	870	1407	1017
66SV2G110T	150	125	504	780	1551	90	780	70	820	250	870	1407	1017
66SV3/2AG150T	150	125	504	780	1551	90	780	70	820	250	870	1601	1017
66SV3/1AG150T	150	125	504	780	1551	90	780	70	820	250	870	1601	1017
66SV3G185T	150	125	504	780	1551	90	780	70	820	250	870	1601	1097
66SV4/2AG185T	150	125	504	780	1551	90	780	70	820	250	870	1691	1097
66SV4/1AG220T	150	125	504	780	1551	90	780	70	820	250	870	1691	1097
66SV4G220T	150	125	504	780	1551	90	780	70	820	250	870	1691	1097
92SV1/1AG055T	200	150	529	794	1635	70	820	70	820	250	884	1229	1017
92SV1G075T	200	150	529	794	1635	70	820	70	820	250	884	1221	1017
92SV2/2AG110T	200	150	529	794	1635	70	820	70	820	250	884	1407	1017
92SV2G150T	200	150	529	794	1635	70	820	70	820	250	884	1511	1017
92SV3/2AG185T	200	150	529	794	1635	70	820	70	820	250	884	1601	1097
92SV3G220T	200	150	529	794	1635	70	820	70	820	250	884	1601	1097

Dimensions in mm. Tolerance ± 10 mm.

ghv20_sv46-en_d_td

**TWO-PUMP BOOSTER SETS, GHV20 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**

GHV20



GHV_GHV20RA-SV46_B_DD

TWO-PUMP BOOSTER SETS, GHV20 RA SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON SUCTION SIDE

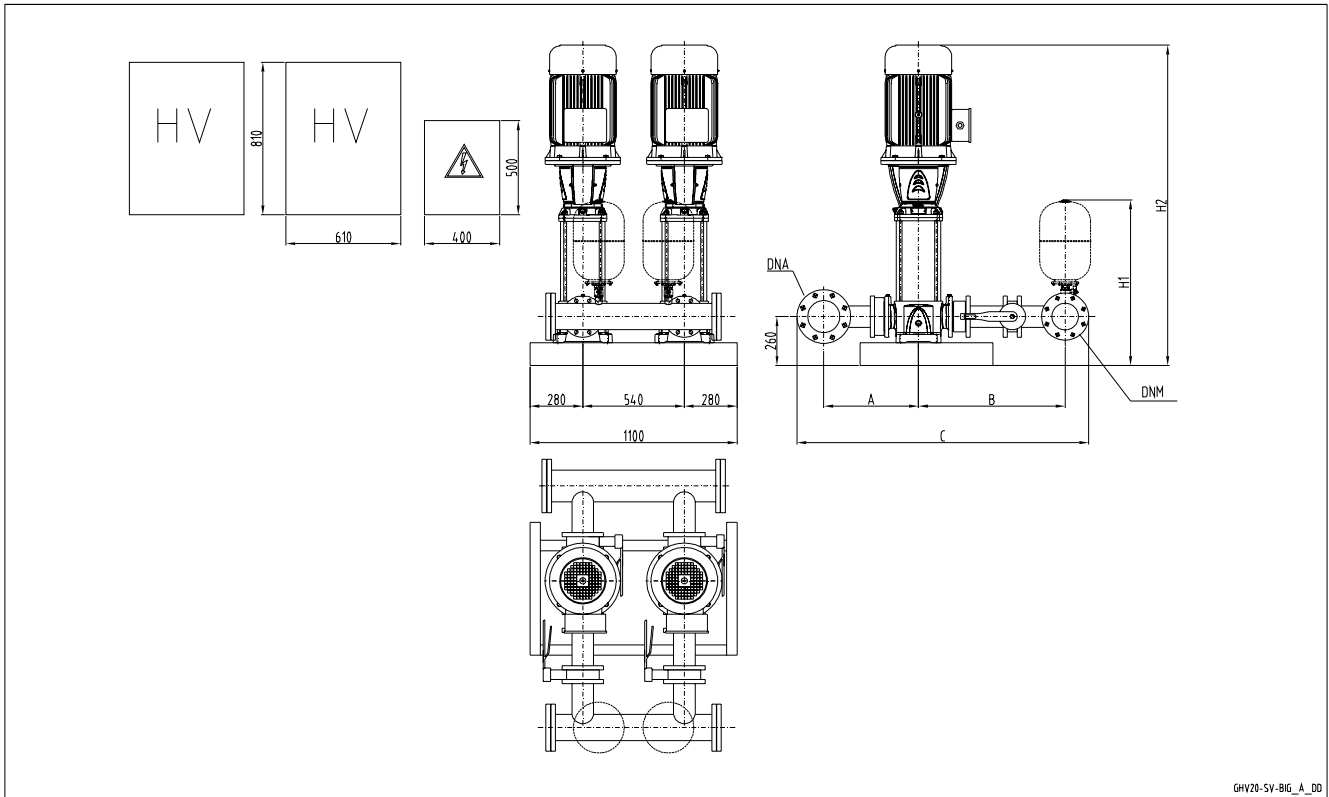
GHV 20RA	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
33SV1/1AG022T	100	80	713	436	1359	90	780	90	780	215	810	1067	886
33SV1G030T	100	80	713	436	1359	90	780	90	780	215	810	1067	886
33SV2/2AG040T	100	80	713	436	1359	90	780	90	780	215	810	1163	886
33SV2/1AG040T	100	80	713	436	1359	90	780	90	780	215	810	1163	886
33SV2G055T	100	80	713	436	1359	90	780	90	780	215	810	1239	1017
33SV3/2AG055T	100	80	713	436	1359	90	780	90	780	215	810	1314	1017
33SV3/1AG075T	100	80	713	436	1359	90	780	90	780	215	810	1306	1017
33SV3G075T	100	80	713	436	1359	90	780	90	780	215	810	1306	1017
33SV4/2AG075T	100	80	713	436	1359	90	780	90	780	215	810	1381	1017
33SV4/1AG110T	100	80	713	436	1359	90	780	90	780	215	810	1477	1017
33SV4G110T	100	80	713	436	1359	90	780	90	780	215	810	1477	1017
33SV5/2AG110T	100	80	713	436	1359	90	780	90	780	215	810	1552	1017
33SV5/1AG110T	100	80	713	436	1359	90	780	90	780	215	810	1552	1017
33SV5G150T	100	80	713	436	1359	90	780	90	780	215	810	1656	1017
33SV6/2AG150T	100	80	713	436	1359	90	780	90	780	215	810	1731	1017
33SV6/1AG150T	100	80	713	436	1359	90	780	90	780	215	810	1731	1017
33SV6G150T	100	80	713	436	1359	90	780	90	780	215	810	1731	1017
33SV7/2AG150T	100	80	713	436	1359	90	780	90	780	215	810	1806	1017
46SV1/1AG030T	125	100	752	471	1457	90	780	90	780	250	857	1107	886
46SV1G040T	125	100	752	471	1457	90	780	90	780	250	857	1128	886
46SV2/2AG055T	125	100	752	471	1457	90	780	90	780	250	857	1279	1017
46SV2G075T	125	100	752	471	1457	90	780	90	780	250	857	1271	1017
46SV3/2AG110T	125	100	752	471	1457	90	780	90	780	250	857	1442	1017
46SV3G110T	125	100	752	471	1457	90	780	90	780	250	857	1442	1017
46SV4/2AG150T	125	100	752	471	1457	90	780	90	780	250	857	1621	1017
46SV4G150T	125	100	752	471	1457	90	780	90	780	250	857	1621	1017
46SV5/2AG185T	125	100	752	471	1457	90	780	90	780	250	857	1696	1097
46SV5G185T	125	100	752	471	1457	90	780	90	780	250	857	1696	1097
46SV6/2AG220T	125	100	752	471	1457	90	780	90	780	250	857	1771	1097
46SV6G220T	125	100	752	471	1457	90	780	90	780	250	857	1771	1097
66SV1/1AG040T	150	125	794	490	1551	90	780	70	820	250	870	1153	886
66SV1G055T	150	125	794	490	1551	90	780	70	820	250	870	1229	1017
66SV2/2AG075T	150	125	794	490	1551	90	780	70	820	250	870	1311	1017
66SV2/1AG110T	150	125	794	490	1551	90	780	70	820	250	870	1407	1017
66SV2G110T	150	125	794	490	1551	90	780	70	820	250	870	1407	1017
66SV3/2AG150T	150	125	794	490	1551	90	780	70	820	250	870	1601	1017
66SV3/1AG150T	150	125	794	490	1551	90	780	70	820	250	870	1601	1017
66SV3G185T	150	125	794	490	1551	90	780	70	820	250	870	1601	1097
66SV4/2AG185T	150	125	794	490	1551	90	780	70	820	250	870	1691	1097
66SV4/1AG220T	150	125	794	490	1551	90	780	70	820	250	870	1691	1097
66SV4G220T	150	125	794	490	1551	90	780	70	820	250	870	1691	1097
92SV1/1AG055T	200	150	819	504	1635	70	820	70	820	250	884	1229	1017
92SV1G075T	200	150	819	504	1635	70	820	70	820	250	884	1221	1017
92SV2/2AG110T	200	150	819	504	1635	70	820	70	820	250	884	1407	1017
92SV2G150T	200	150	819	504	1635	70	820	70	820	250	884	1511	1017
92SV3/2AG185T	200	150	819	504	1635	70	820	70	820	250	884	1601	1097
92SV3G220T	200	150	819	504	1635	70	820	70	820	250	884	1601	1097

Dimensions in mm. Tolerance ± 10 mm.

ghv20ra_sv46-en_d_td

**TWO-PUMP BOOSTER SETS, GHV20 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**

GHV20



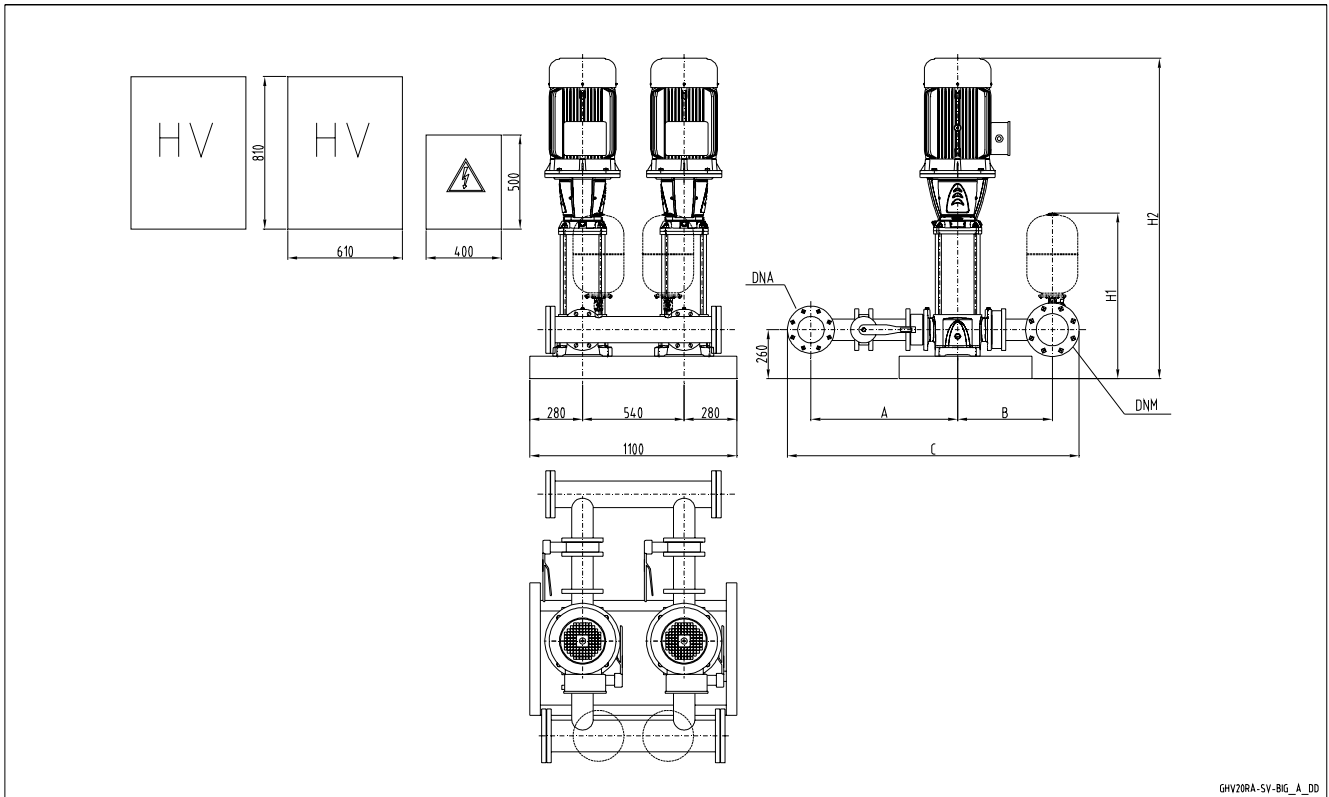
GHV20-SV-BIG_A_DD

GHV20	DNA	DNM	A	B	C	H1	H2
66SV5/2AG300T	150	125	504	780	1552	880	1766
66SV5/1AG300T	150	125	504	780	1552	880	1766
66SV5G300T	150	125	504	780	1552	880	1766
92SV4/2AG300T	200	150	529	794	1635	894	1676
92SV4G300T	200	150	529	794	1635	894	1676
92SV5/2AG370T	200	150	529	794	1635	894	1766

Note: for versions with vibration damping fir increase height by 50 mm.

ghv20_sv-big-en_b_td

**TWO-PUMP BOOSTER SETS, GHV20 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV20RA-SV-BIG_A_DD

GHV20

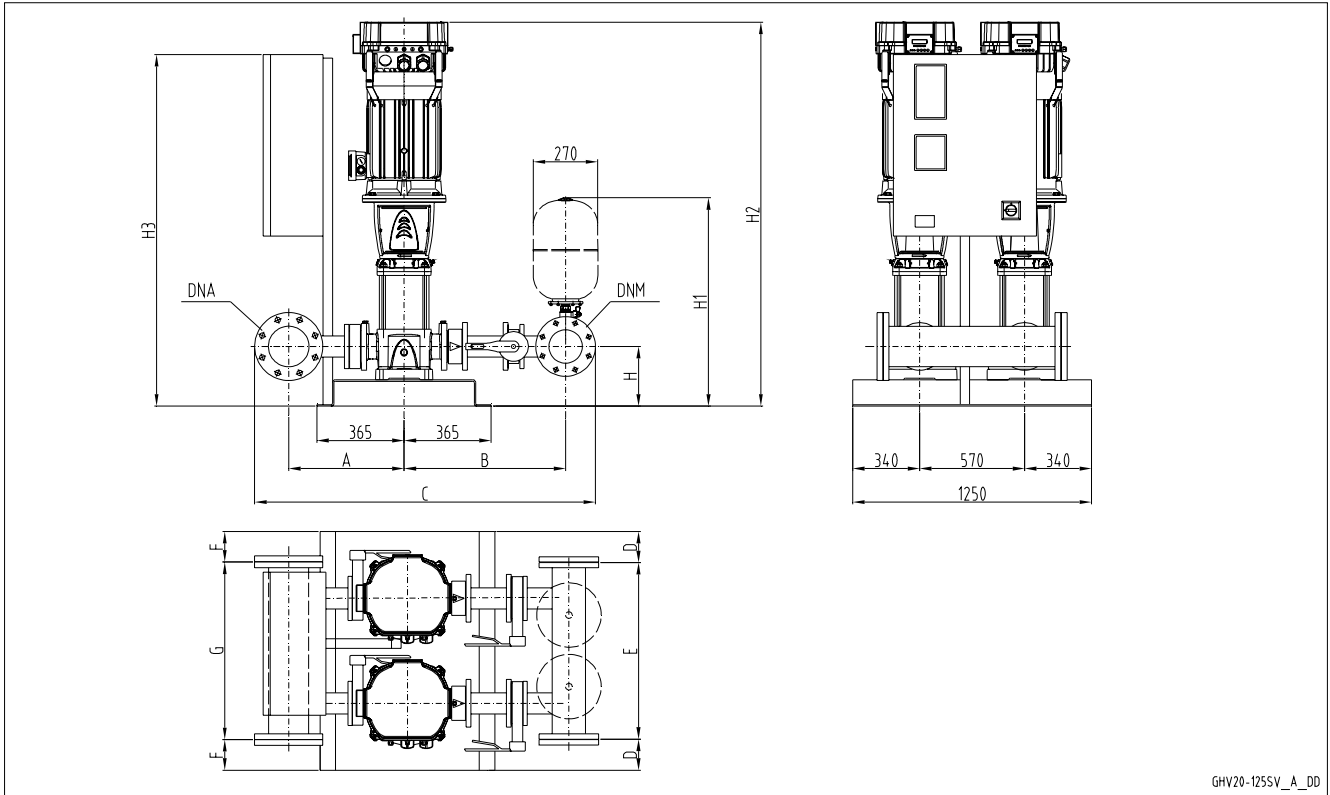
GHV20RA	DNA	DNM	A	B	C	H1	H2
66SV5/2AG300T	150	125	794	490	1552	880	1766
66SV5/1AG300T	150	125	794	490	1552	880	1766
66SV5G300T	150	125	794	490	1552	880	1766
92SV4/2AG300T	200	150	819	504	1635	894	1676
92SV4G300T	200	150	819	504	1635	894	1676
92SV5/2AG370T	200	150	819	504	1635	894	1766

Note: for versions with vibration damping fir increase height by 50 mm.

ghv20ra_sv-big-en_b_td

**TWO-PUMP BOOSTER SETS, GHV20 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**

GHV20



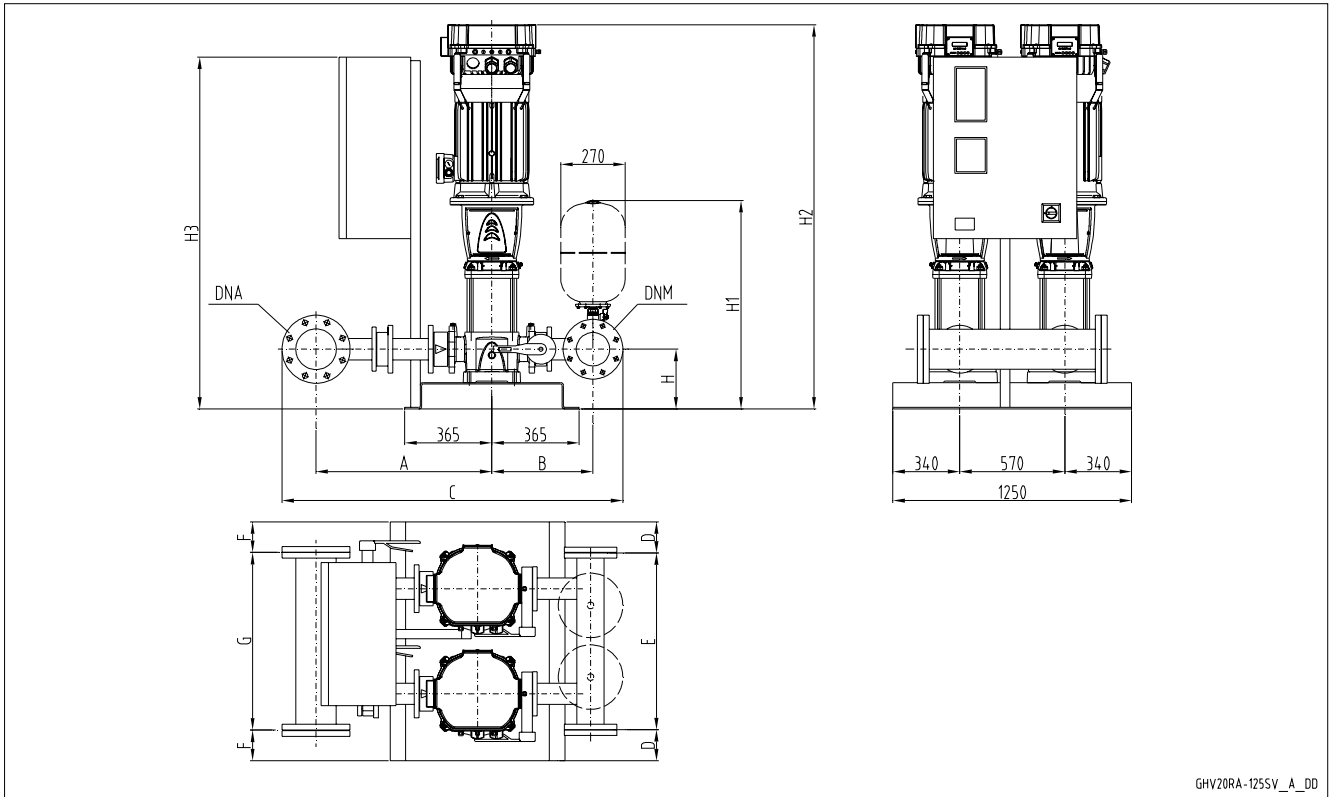
GHV20-125SV_A_DD

GHV 20	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
125SV1G075T	200	200	591	927	1857	150	950	150	950	280	940	1350	1018
125SV2G150T	200	200	591	927	1857	150	950	150	950	280	940	1700	1018
125SV3G220T	200	200	591	927	1857	150	950	150	950	280	940	1850	1098

Dimensions in mm. Tolerance ± 10 mm.

ghv20_125sv-en_a_td

**TWO-PUMP BOOSTER SETS, GHV20 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV20

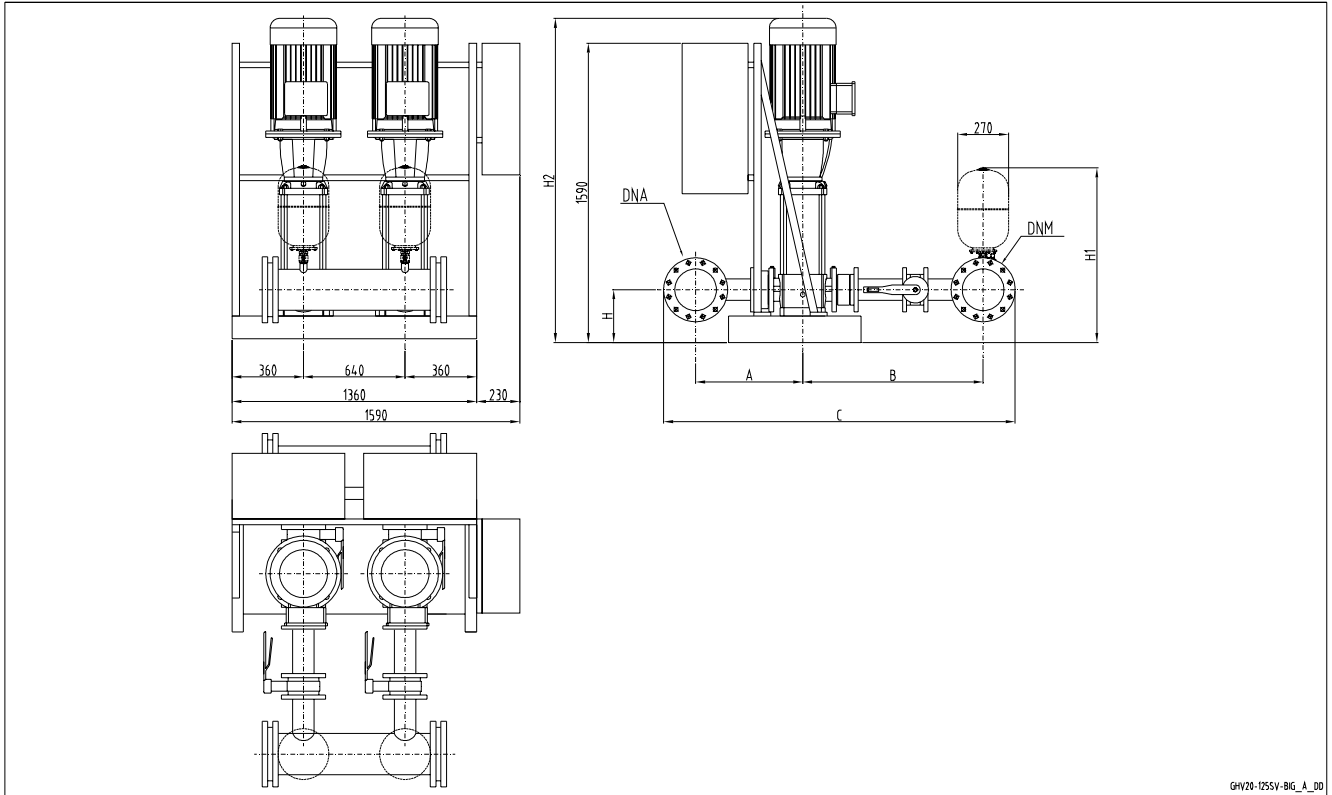
GHV 20RA	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
125SV1G075T	200	200	927	591	1857	150	950	150	950	280	940	1350	1018
125SV2G150T	200	200	927	591	1857	150	950	150	950	280	940	1700	1018
125SV3G220T	200	200	927	591	1857	150	950	150	950	280	940	1850	1098

Dimensions in mm. Tolerance ± 10 mm.

ghv20ra_125sv-en_a_td

**TWO-PUMP BOOSTER SETS, GHV20 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**

GHV20



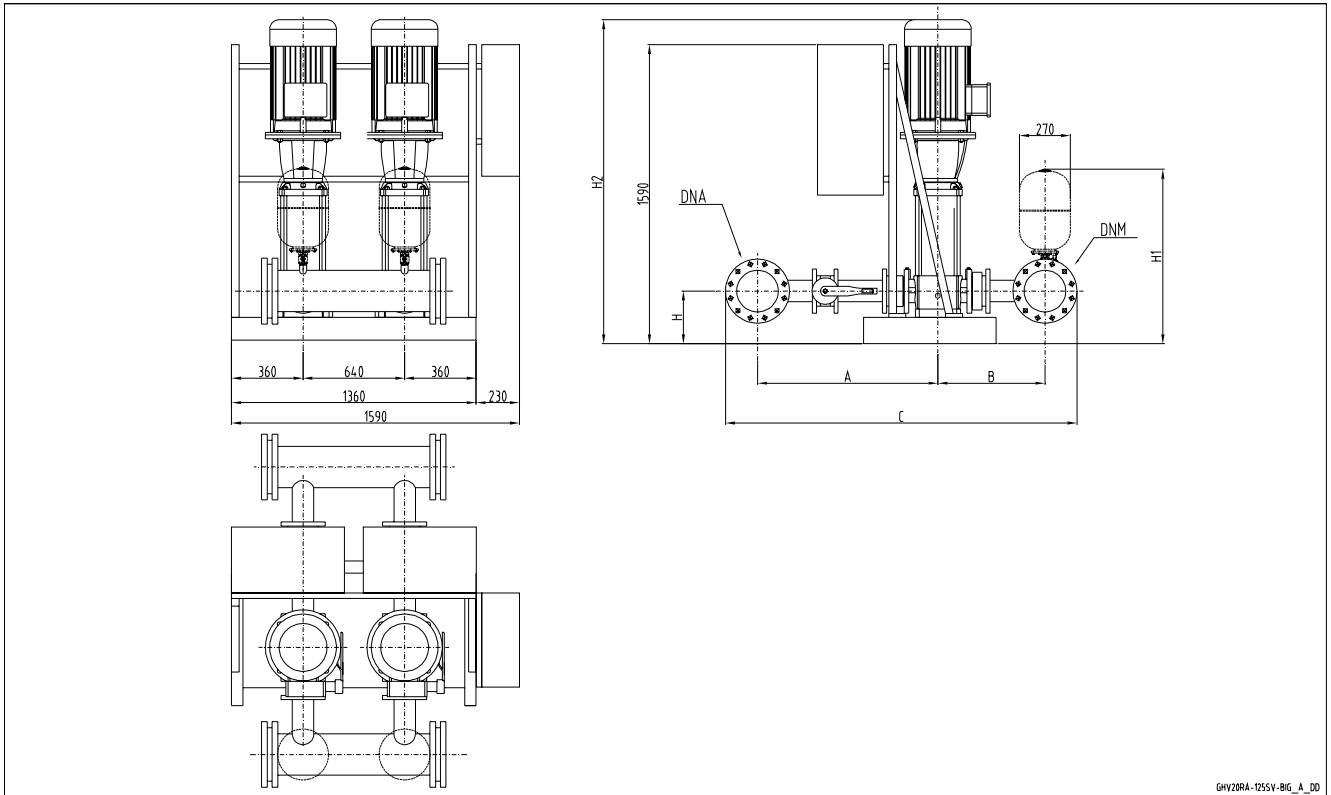
GHV20-125SV-8IG_A_00

GHV 20	DNA	DNM	A	B	C	H	H1	H2
125SV4G300T	200	200	591	927	1857	300	960	1975
125SV5G370T	200	200	591	927	1857	300	960	2125

Dimensions in mm. Tolerance ± 10 mm.

ghv20_125sv-big-en_a_td

**TWO-PUMP BOOSTER SETS, GHV20 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV20

GHV20RA-125SV-BIG_A_DD

GHV 20RA	DNA	DNM	A	B	C	H	H1	H2
125SV4G300T	200	200	927	591	1857	300	960	1975
125SV5G370T	200	200	927	591	1857	300	960	2125

Dimensions in mm. Tolerance ± 10 mm.

ghv20ra_125sv-big-en_a_td

Booster sets

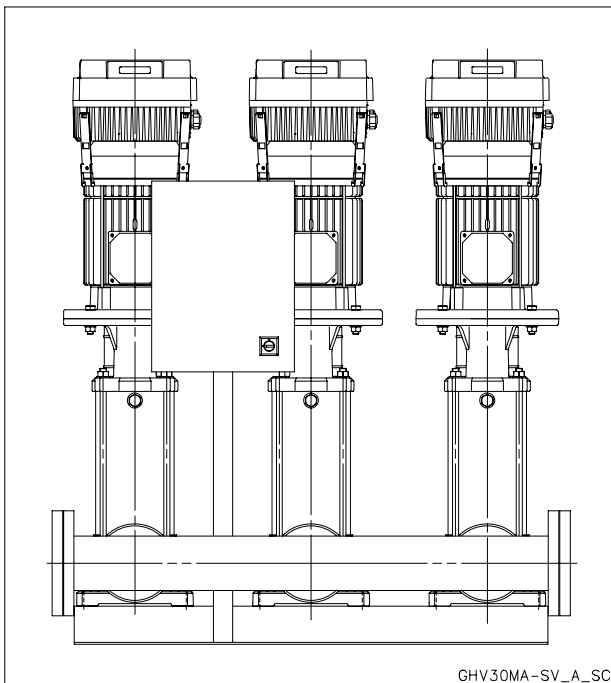
MARKET SECTORS

CIVIL, INDUSTRIAL

APPLICATIONS

- Water network supply in condominiums, offices, hotels, shopping centres, factories.
- Water supply to agricultural water networks (e.g. irrigation).

GHV30 Series

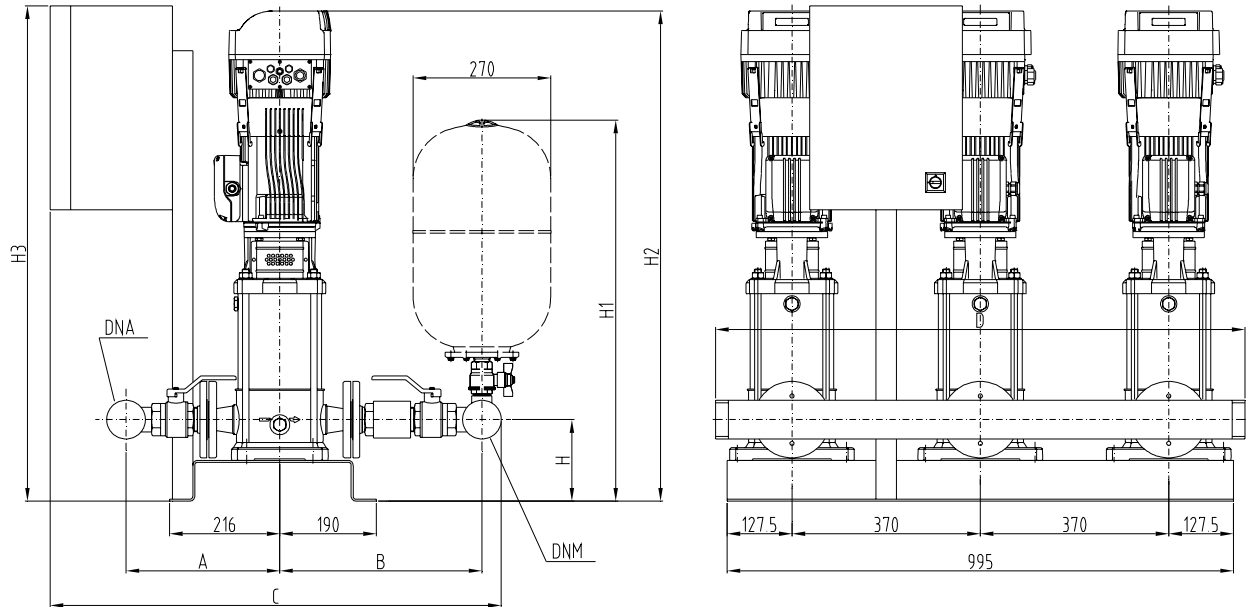


GHV30

SPECIFICATIONS

- **Flow rate** up to 480 m³/h.
- **Head** up to 160 m.
- Electrical panel supply voltage: 3 x 400V ± 10%.
- Frequency: 50 Hz.
- External control voltage: 5 ÷ 10 V.
- Protection class:
 - electrical panel: IP55.
 - converter: IP55 up to 22 kW.
 - IP54 above 22 kW.
- Maximum electric pump power 3 x 37 kW.
- Progressive motor start.
- **Vertical design pump:**
 - SV..T series (motor protection class IP55).
- Maximum operating pressure: 16 bar for sets with SV..T electric pumps.
- Maximum temperature of pumped liquid : +80°C.

THREE-PUMP BOOSTER SETS, GHV30 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE



GHV30MA-SV8_A_DD

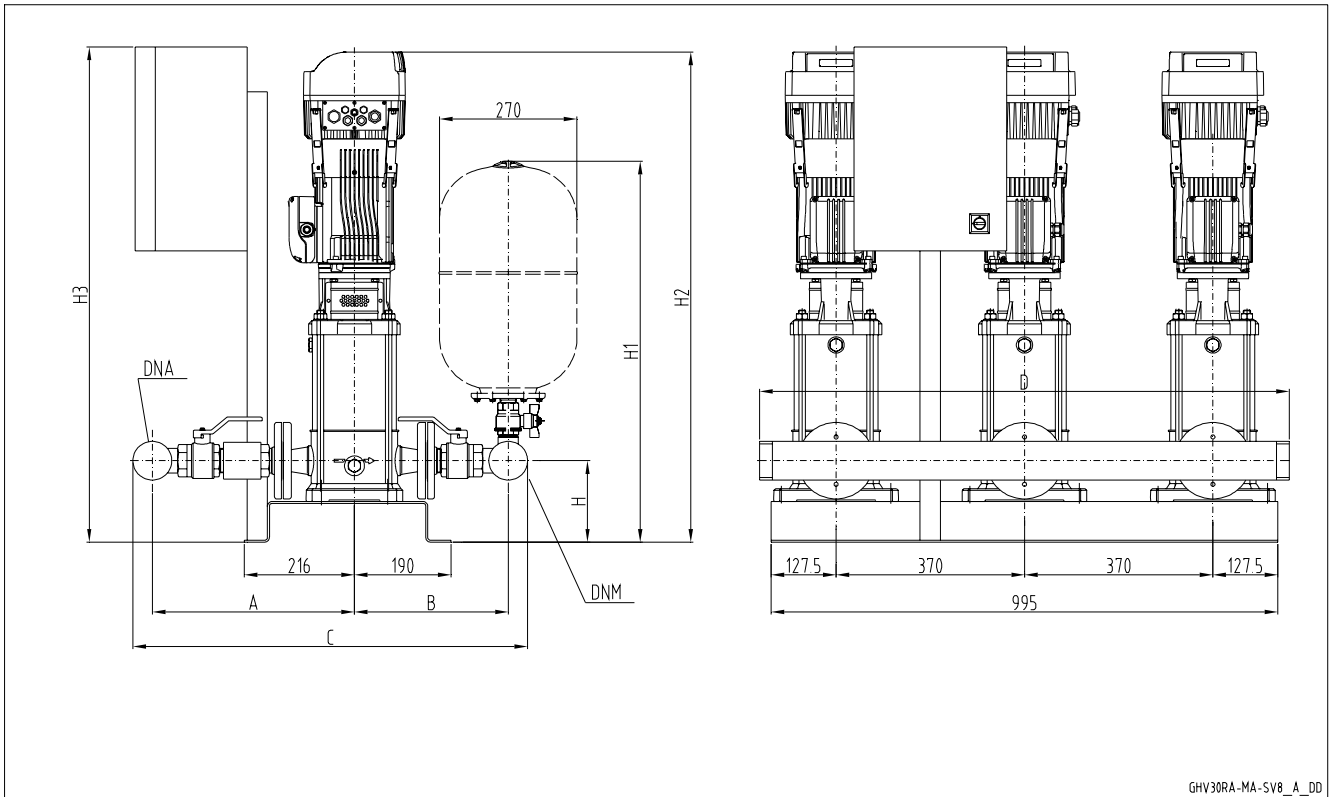
GHV30

GHV 30	DNA	DNM	A		B		C		D	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI					
10SV03F011T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	902	846
10SV04F015T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	944	846
10SV05F022T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1011	846
10SV06F022T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1043	846
10SV07F030T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1085	846
10SV08F030T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1117	846
10SV09F040T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1170	846
10SV10F040T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1202	846
10SV11F040T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1234	846
10SV13F055T	R 2"1/2	R 2"1/2	297	356	362	497	735	929	1040	160	748	1421	846

Dimensions in mm. Tolerance ± 10 mm.

ghv30_10esv-en_b_td

THREE-PUMP BOOSTER SETS, GHV30 RA SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON SUCTION SIDE



GHV30

GHV30RA-MA-SV8_A_DD

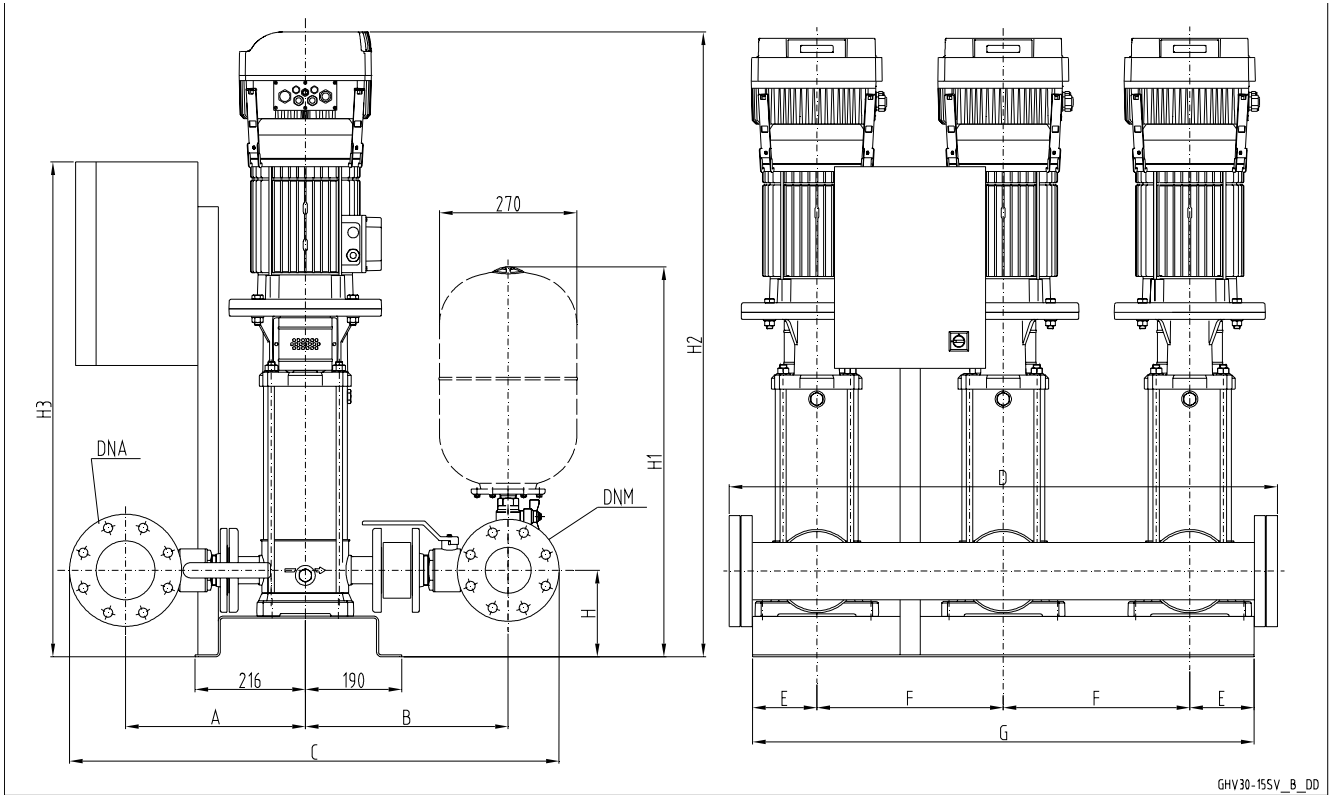
GHV 30 RA	DNA	DNM	A		B		C		D	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI					
10SV03F011T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	902	846
10SV04F015T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	944	846
10SV05F022T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1011	846
10SV06F022T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1043	846
10SV07F030T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1085	846
10SV08F030T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1117	846
10SV09F040T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1170	846
10SV10F040T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1202	846
10SV11F040T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1234	846
10SV13F055T	R 2"1/2	R 2"1/2	367	497	345	356	788	929	1040	160	748	1421	846

Dimensions in mm. Tolerance ± 10 mm.

ghv30ra_10esv-en_b_td

THREE-PUMP BOOSTER SETS, GHV30 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE

GHV30



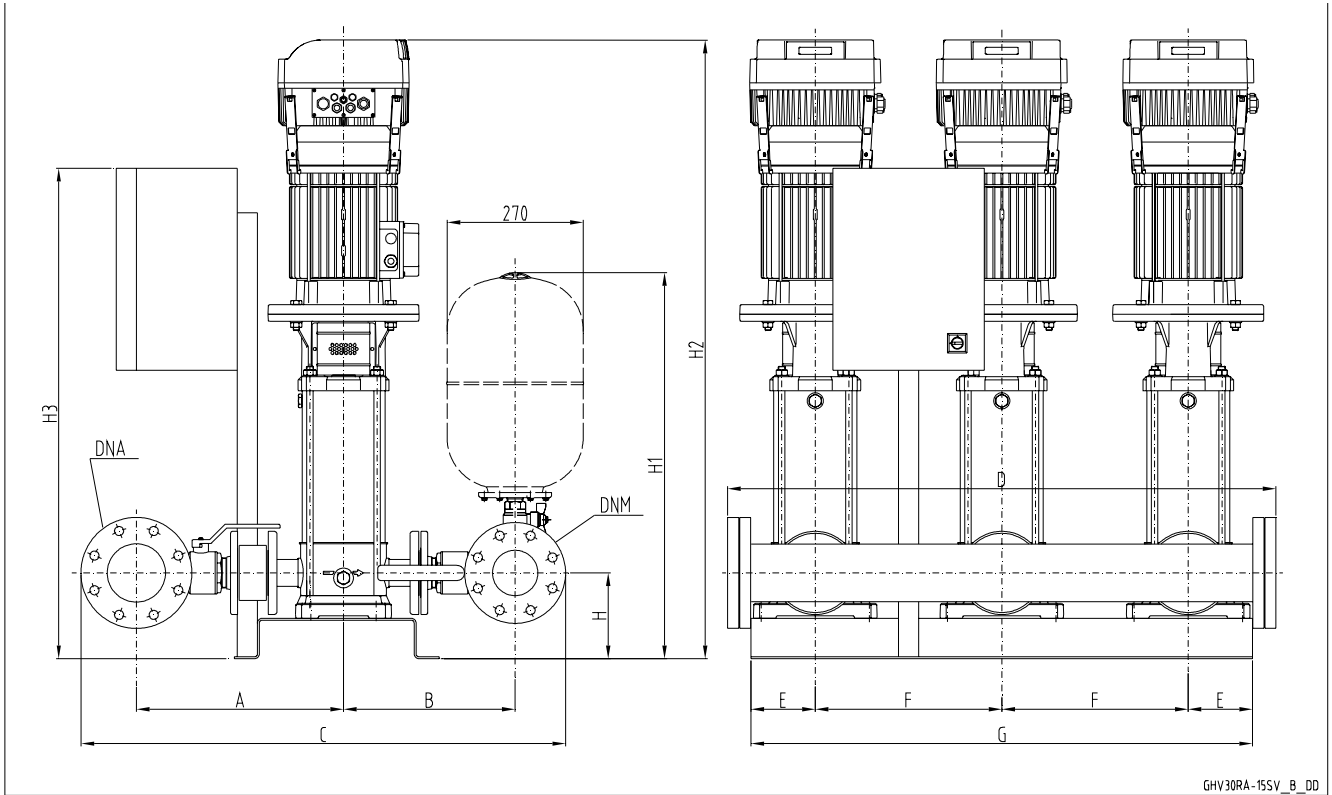
GHV30-15SV_B_DD

GHV 30	DNA	DNM	A		B		C		D	E	F	G	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI								
15SV01F011T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	912	846
15SV02F022T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	957	846
15SV03F030T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1015	846
15SV04F040T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1084	846
15SV05F040T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1132	846
15SV06F055T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1303	846
15SV07F055T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1351	846
15SV08F075T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1391	846
15SV09F075T	100	80	354	394	399	437	963	1041	1084	128	370	995	170	765	1439	846
15SV10F110T	100	80	354	394	399	437	963	1041	1224	260	440	1400	200	795	1608	973
22SV01F011T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	912	846
22SV02F022T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	957	846
22SV03F030T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	1015	846
22SV04F040T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	1084	846
22SV05F055T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	1255	846
22SV06F075T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	1295	846
22SV07F075T	100	100	354	394	411	449	985	1063	1084	128	370	995	170	777	1343	846
22SV08F110T	100	100	354	394	411	449	985	1063	1224	260	440	1400	200	807	1512	973
22SV09F110T	100	100	354	394	411	449	985	1063	1224	260	440	1400	200	807	1560	973
22SV10F110T	100	100	354	394	411	449	985	1063	1224	260	440	1400	200	807	1608	973

Dimensions in mm. Tolerance ± 10 mm.

ghv30_15sev-en_c_td

**THREE-PUMP BOOSTER SETS, GHV30 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV30RA-15SV_B_DD

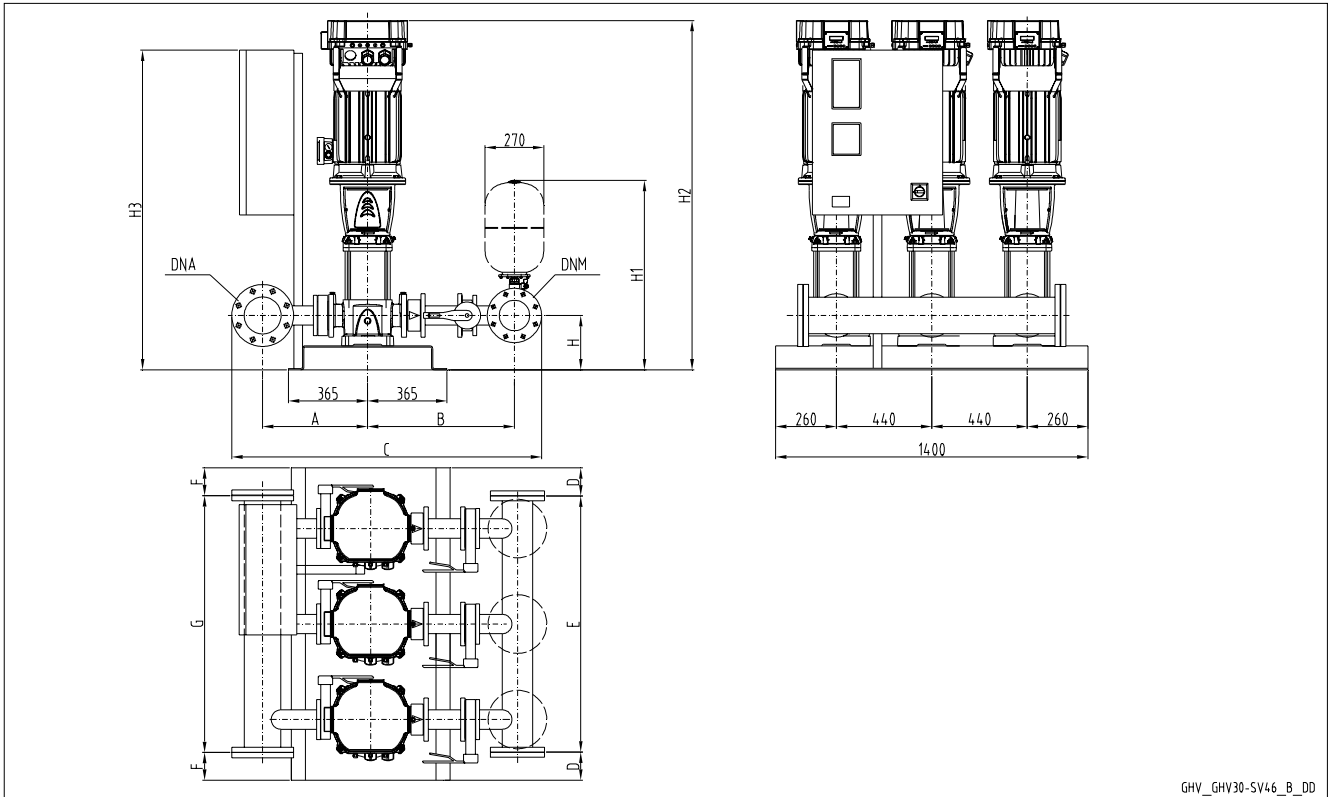
GHV30

GHV 30 RA	DNA	DNM	A		B		C		D	E	F	G	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI								
15SV01F011T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	912	846
15SV02F022T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	957	846
15SV03F030T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1015	846
15SV04F040T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1084	846
15SV05F040T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1132	846
15SV06F055T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1303	846
15SV07F055T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1351	846
15SV08F075T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1391	846
15SV09F075T	100	80	411	449	342	380	963	1039	1084	128	370	995	170	765	1439	846
15SV10F110T	100	80	411	449	342	380	963	1039	1224	260	440	1400	200	795	1608	973
22SV01F011T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	912	846
22SV02F022T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	957	846
22SV03F030T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	1015	846
22SV04F040T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	1084	846
22SV05F055T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	1255	846
22SV06F075T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	1295	846
22SV07F075T	100	100	411	449	354	392	985	1061	1084	128	370	995	170	777	1343	846
22SV08F110T	100	100	411	449	354	392	985	1061	1224	260	440	1400	200	807	1512	973
22SV09F110T	100	100	411	449	354	392	985	1061	1224	260	440	1400	200	807	1560	973
22SV10F110T	100	100	411	449	354	392	985	1061	1224	260	440	1400	200	807	1608	973

Dimensions in mm. Tolerance ± 10 mm.

ghv30ra_15sv-en_c_td

**THREE-PUMP BOOSTER SETS, GHV30 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**



GHV_GHV30-SV46_B_DD

GHV30

THREE-PUMP BOOSTER SETS, GHV30 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE

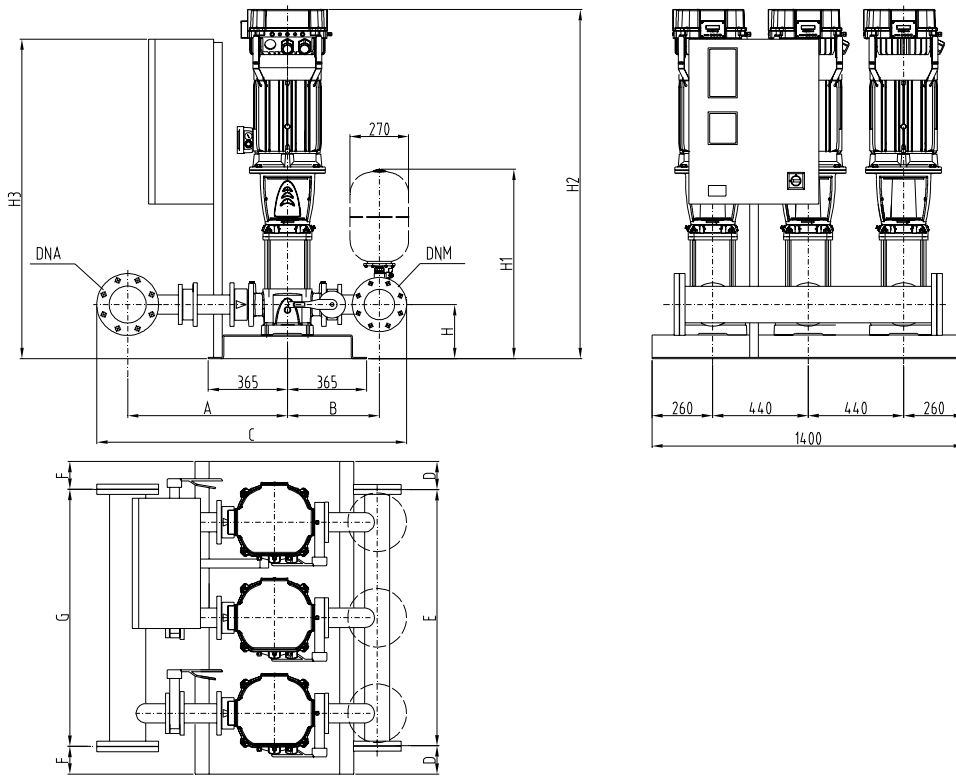
GHV 30	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
33SV1/1AG022T	125	100	461	713	1409	90	1220	90	1220	215	822	1067	1097
33SV1G030T	125	100	461	713	1409	90	1220	90	1220	215	822	1067	1097
33SV2/2AG040T	125	100	461	713	1409	90	1220	90	1220	215	822	1163	1097
33SV2/1AG040T	125	100	461	713	1409	90	1220	90	1220	215	822	1163	1097
33SV2G055T	125	100	461	713	1409	90	1220	90	1220	215	822	1239	1097
33SV3/2AG055T	125	100	461	713	1409	90	1220	90	1220	215	822	1314	1097
33SV3/1AG075T	125	100	461	713	1409	90	1220	90	1220	215	822	1306	1097
33SV3G075T	125	100	461	713	1409	90	1220	90	1220	215	822	1306	1097
33SV4/2AG075T	125	100	461	713	1409	90	1220	90	1220	215	822	1381	1097
33SV4/1AG110T	125	100	461	713	1423	90	1220	90	1220	215	822	1477	974
33SV4G110T	125	100	461	713	1423	90	1220	90	1220	215	822	1477	974
33SV5/2AG110T	125	100	461	713	1423	90	1220	90	1220	215	822	1552	974
33SV5/1AG110T	125	100	461	713	1423	90	1220	90	1220	215	822	1552	974
33SV5G150T	125	100	461	713	1423	90	1220	90	1220	215	822	1656	974
33SV6/2AG150T	125	100	461	713	1423	90	1220	90	1220	215	822	1731	974
33SV6/1AG150T	125	100	461	713	1423	90	1220	90	1220	215	822	1731	974
33SV6G150T	125	100	461	713	1423	90	1220	90	1220	215	822	1731	974
33SV7/2AG150T	125	100	461	713	1423	90	1220	90	1220	215	822	1806	974
46SV1/1AG030T	150	125	498	752	1517	90	1220	70	1260	250	870	1107	1097
46SV1G040T	150	125	498	752	1517	90	1220	70	1260	250	870	1128	1097
46SV2/2AG055T	150	125	498	752	1517	90	1220	70	1260	250	870	1279	1097
46SV2G075T	150	125	498	752	1517	90	1220	70	1260	250	870	1271	1097
46SV3/2AG110T	150	125	498	752	1517	90	1220	70	1260	250	870	1442	974
46SV3G110T	150	125	498	752	1517	90	1220	70	1260	250	870	1442	974
46SV4/2AG150T	150	125	498	752	1517	90	1220	70	1260	250	870	1621	974
46SV4G150T	150	125	498	752	1517	90	1220	70	1260	250	870	1621	974
46SV5/2AG185T	150	125	498	752	1517	90	1220	70	1260	250	870	1696	974
46SV5G185T	150	125	498	752	1517	90	1220	70	1260	250	870	1696	974
46SV6/2AG220T	150	125	498	752	1517	90	1220	70	1260	250	870	1771	974
46SV6G220T	150	125	498	752	1517	90	1220	70	1260	250	870	1771	974
66SV1/1AG040T	200	150	529	794	1635	70	1260	70	1260	250	884	1153	1097
66SV1G055T	200	150	529	794	1635	70	1260	70	1260	250	884	1229	1097
66SV2/2AG075T	200	150	529	794	1635	70	1260	70	1260	250	884	1311	1097
66SV2/1AG110T	200	150	529	794	1635	70	1260	70	1260	250	884	1407	1194
66SV2G110T	200	150	529	794	1635	70	1260	70	1260	250	884	1407	1194
66SV3/2AG150T	200	150	529	794	1635	70	1260	70	1260	250	884	1601	1194
66SV3/1AG150T	200	150	529	794	1635	70	1260	70	1260	250	884	1601	1194
66SV3G185T	200	150	529	794	1635	70	1260	70	1260	250	884	1601	1194
66SV4/2AG185T	200	150	529	794	1635	70	1260	70	1260	250	884	1691	1194
66SV4/1AG220T	200	150	529	794	1635	70	1260	70	1260	250	884	1691	1194
66SV4G220T	200	150	529	794	1635	70	1260	70	1260	250	884	1691	1194
92SV1/1AG055T	200	200	529	819	1688	70	1260	70	1260	250	910	1229	1097
92SV1G075T	200	200	529	819	1688	70	1260	70	1260	250	910	1221	1097
92SV2/2AG110T	200	200	529	819	1688	70	1260	70	1260	250	910	1407	1194
92SV2G150T	200	200	529	819	1688	70	1260	70	1260	250	910	1511	1194
92SV3/2AG185T	200	200	529	819	1688	70	1260	70	1260	250	910	1601	1194
92SV3G220T	200	200	529	819	1688	70	1260	70	1260	250	910	1601	1194

Dimensions in mm. Tolerance ± 10 mm.

ghv30_sv46-en_d_td

GHV30

**THREE-PUMP BOOSTER SETS, GHV30 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV_GHV30RA-SV46_B_DD

GHV30

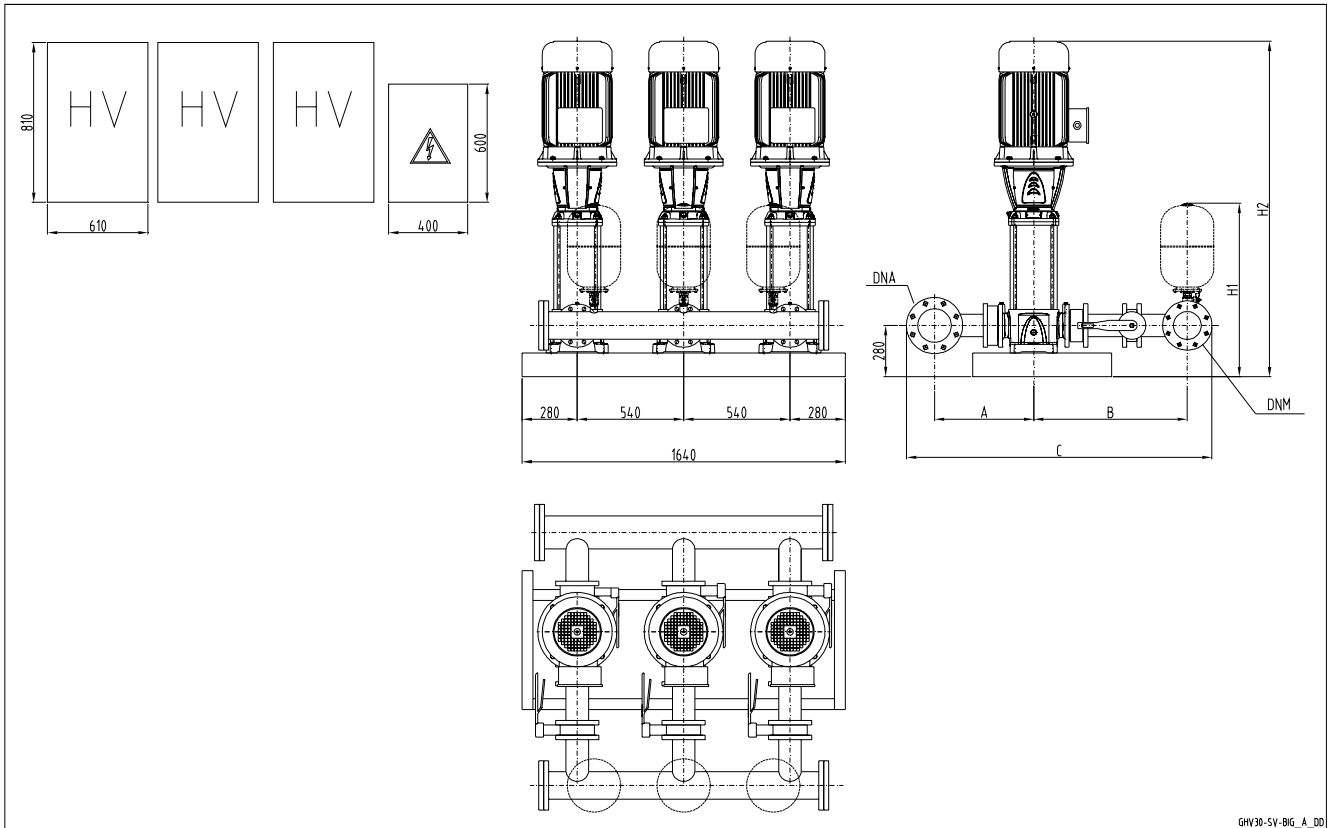
THREE-PUMP BOOSTER SETS, GHV30 RA SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON SUCTION SIDE

GHV 30RA	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
33SV1/1AG022T	125	100	726	448	1409	90	1220	90	1220	215	822	1067	1097
33SV1G030T	125	100	726	448	1409	90	1220	90	1220	215	822	1067	1097
33SV2/2AG040T	125	100	726	448	1409	90	1220	90	1220	215	822	1163	1097
33SV2/1AG040T	125	100	726	448	1409	90	1220	90	1220	215	822	1163	1097
33SV2G055T	125	100	726	448	1409	90	1220	90	1220	215	822	1239	1097
33SV3/2AG055T	125	100	726	448	1409	90	1220	90	1220	215	822	1314	1097
33SV3/1AG075T	125	100	726	448	1409	90	1220	90	1220	215	822	1306	1097
33SV3G075T	125	100	726	448	1409	90	1220	90	1220	215	822	1306	1097
33SV4/2AG075T	125	100	726	448	1409	90	1220	90	1220	215	822	1381	1097
33SV4/1AG110T	125	100	726	448	1409	90	1220	90	1220	215	822	1477	974
33SV4G110T	125	100	726	448	1409	90	1220	90	1220	215	822	1477	974
33SV5/2AG110T	125	100	726	448	1409	90	1220	90	1220	215	822	1552	974
33SV5/1AG110T	125	100	726	448	1409	90	1220	90	1220	215	822	1552	974
33SV5G150T	125	100	726	448	1409	90	1220	90	1220	215	822	1656	974
33SV6/2AG150T	125	100	726	448	1409	90	1220	90	1220	215	822	1731	974
33SV6/1AG150T	125	100	726	448	1409	90	1220	90	1220	215	822	1731	974
33SV6G150T	125	100	726	448	1409	90	1220	90	1220	215	822	1731	974
33SV7/2AG150T	125	100	726	448	1409	90	1220	90	1220	215	822	1806	974
46SV1/1AG030T	150	125	766	484	1517	90	1220	70	1260	250	870	1107	1097
46SV1G040T	150	125	766	484	1517	90	1220	70	1260	250	870	1128	1097
46SV2/2AG055T	150	125	766	484	1517	90	1220	70	1260	250	870	1279	1097
46SV2G075T	150	125	766	484	1517	90	1220	70	1260	250	870	1271	1097
46SV3/2AG110T	150	125	766	484	1517	90	1220	70	1260	250	870	1442	974
46SV3G110T	150	125	766	484	1517	90	1220	70	1260	250	870	1442	974
46SV4/2AG150T	150	125	766	484	1517	90	1220	70	1260	250	870	1621	974
46SV4G150T	150	125	766	484	1517	90	1220	70	1260	250	870	1621	974
46SV5/2AG185T	150	125	766	484	1517	90	1220	70	1260	250	870	1696	974
46SV5G185T	150	125	766	484	1517	90	1220	70	1260	250	870	1696	974
46SV6/2AG220T	150	125	766	484	1517	90	1220	70	1260	250	870	1771	974
46SV6G220T	150	125	766	484	1517	90	1220	70	1260	250	870	1771	974
66SV1/1AG040T	200	150	819	504	1635	70	1260	70	1260	250	884	1153	1097
66SV1G055T	200	150	819	504	1635	70	1260	70	1260	250	884	1229	1097
66SV2/2AG075T	200	150	819	504	1635	70	1260	70	1260	250	884	1311	1097
66SV2/1AG110T	200	150	819	504	1635	70	1260	70	1260	250	884	1407	1194
66SV2G110T	200	150	819	504	1635	70	1260	70	1260	250	884	1407	1194
66SV3/2AG150T	200	150	819	504	1635	70	1260	70	1260	250	884	1601	1194
66SV3/1AG150T	200	150	819	504	1635	70	1260	70	1260	250	884	1601	1194
66SV3G185T	200	150	819	504	1635	70	1260	70	1260	250	884	1601	1194
66SV4/2AG185T	200	150	819	504	1635	70	1260	70	1260	250	884	1691	1194
66SV4/1AG220T	200	150	819	504	1635	70	1260	70	1260	250	884	1691	1194
66SV4G220T	200	150	819	504	1635	70	1260	70	1260	250	884	1691	1194
92SV1/1AG055T	200	200	819	529	1688	70	1260	70	1260	250	910	1229	1097
92SV1G075T	200	200	819	529	1688	70	1260	70	1260	250	910	1221	1097
92SV2/2AG110T	200	200	819	529	1688	70	1260	70	1260	250	910	1407	1194
92SV2G150T	200	200	819	529	1688	70	1260	70	1260	250	910	1511	1194
92SV3/2AG185T	200	200	819	529	1688	70	1260	70	1260	250	910	1601	1194
92SV3G220T	200	200	819	529	1688	70	1260	70	1260	250	910	1601	1194

Dimensions in mm. Tolerance \pm 10 mm.

ghv30ra_sv46-en_d_td

THREE-PUMP BOOSTER SETS, GHV30 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE

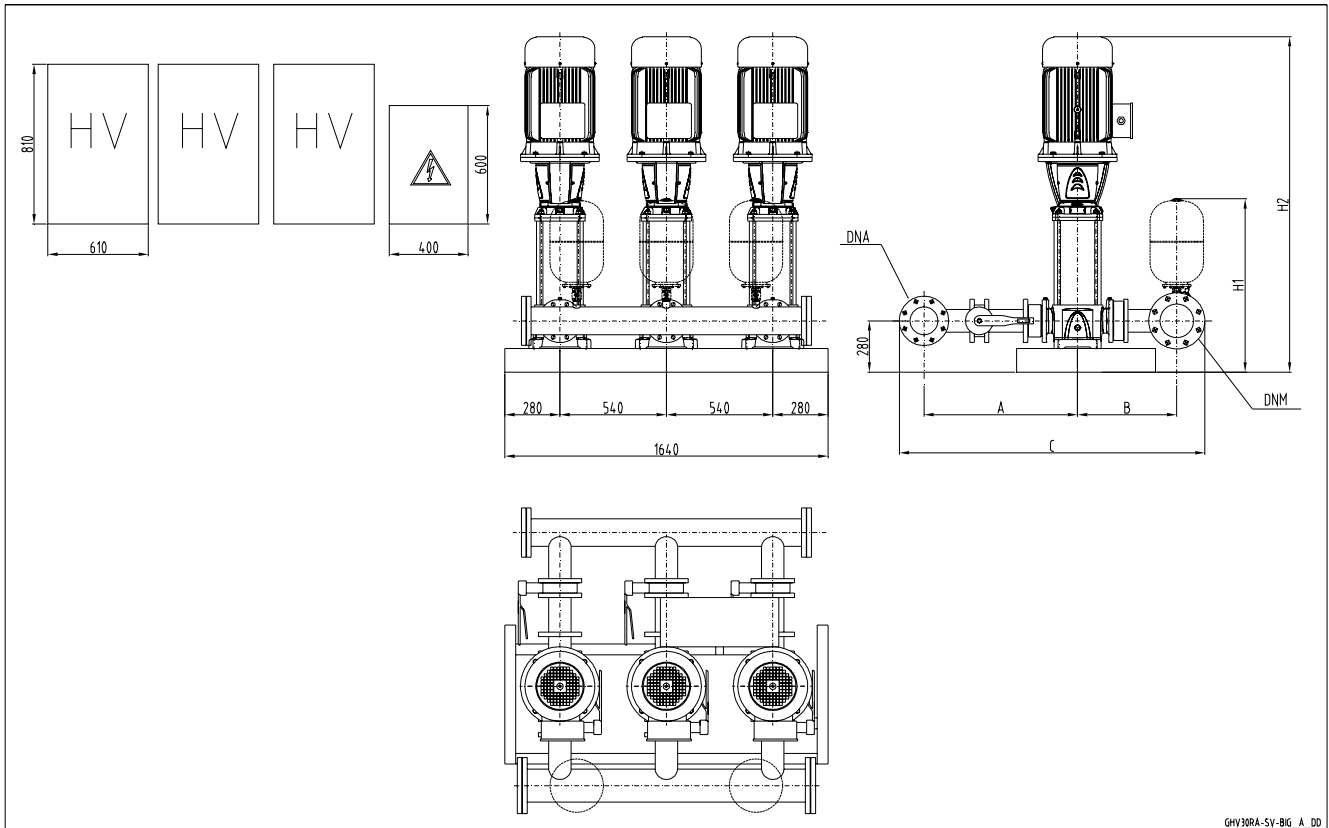


GHV30	DNA	DNM	A	B	C	H1	H2
66SV5/2AG300T	200	150	529	794	1635	914	1766
66SV5/1AG300T	200	150	529	794	1635	914	1766
66SV5G300T	200	150	529	794	1635	914	1766
92SV4/2AG300T	200	200	529	819	1688	940	1676
92SV4G300T	200	200	529	819	1688	940	1676
92SV5/2AG370T	200	200	529	819	1688	940	1766

Note: for versions with vibration damping fir increase height by 50 mm.

ghv30_sv-big-en_b_td

**THREE-PUMP BOOSTER SETS, GHV30 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV30

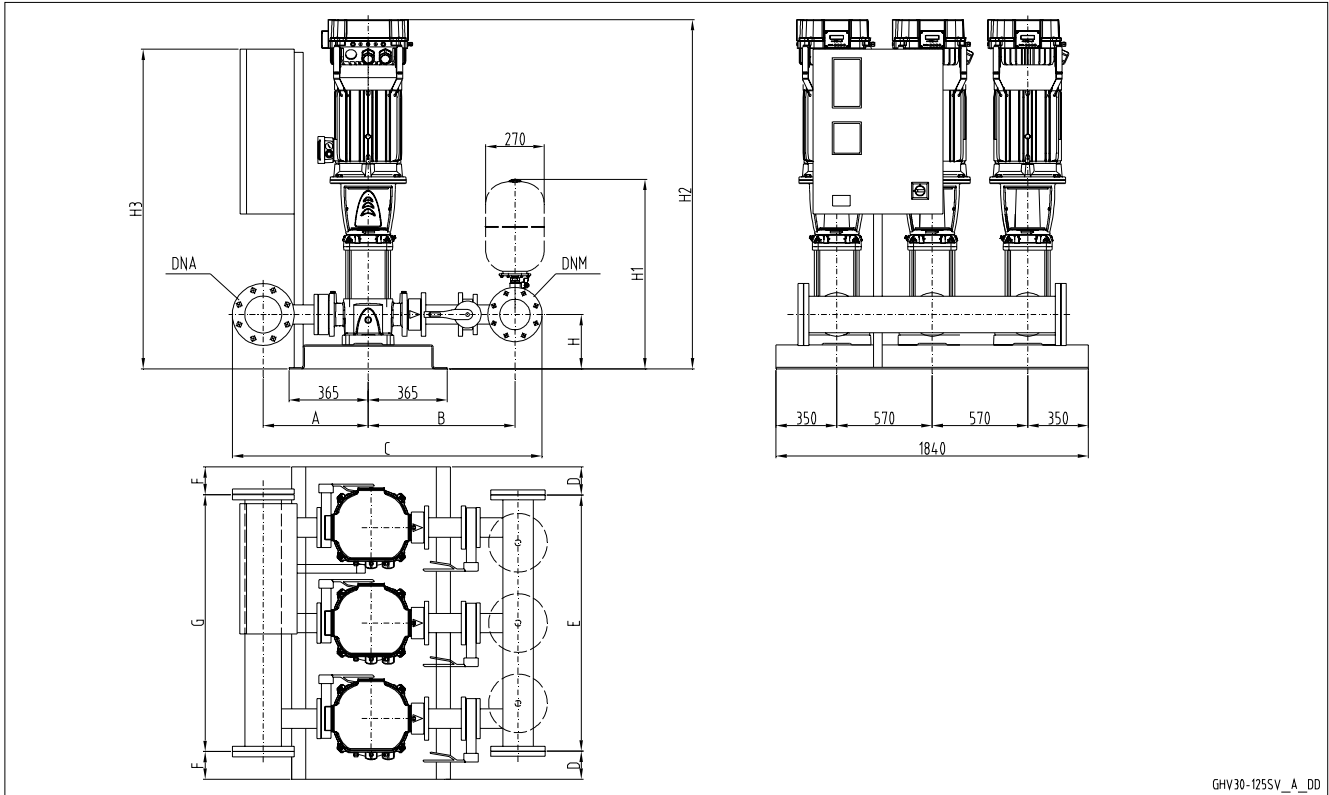
GHV30RA	DNA	DNM	A	B	C	H1	H2
66SV5/2AG300T	200	150	819	504	1635	914	1766
66SV5/1AG300T	200	150	819	504	1635	914	1766
66SV5G300T	200	150	819	504	1635	914	1766
92SV4/2AG300T	200	200	819	529	1688	940	1676
92SV4G300T	200	200	819	529	1688	940	1676
92SV5/2AG370T	200	200	819	529	1688	940	1766

Note: for versions with vibration damping fir increase height by 50 mm.

ghv30ra_sv-big-en_b_td

**THREE-PUMP BOOSTER SETS, GHV30 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**

GHV30

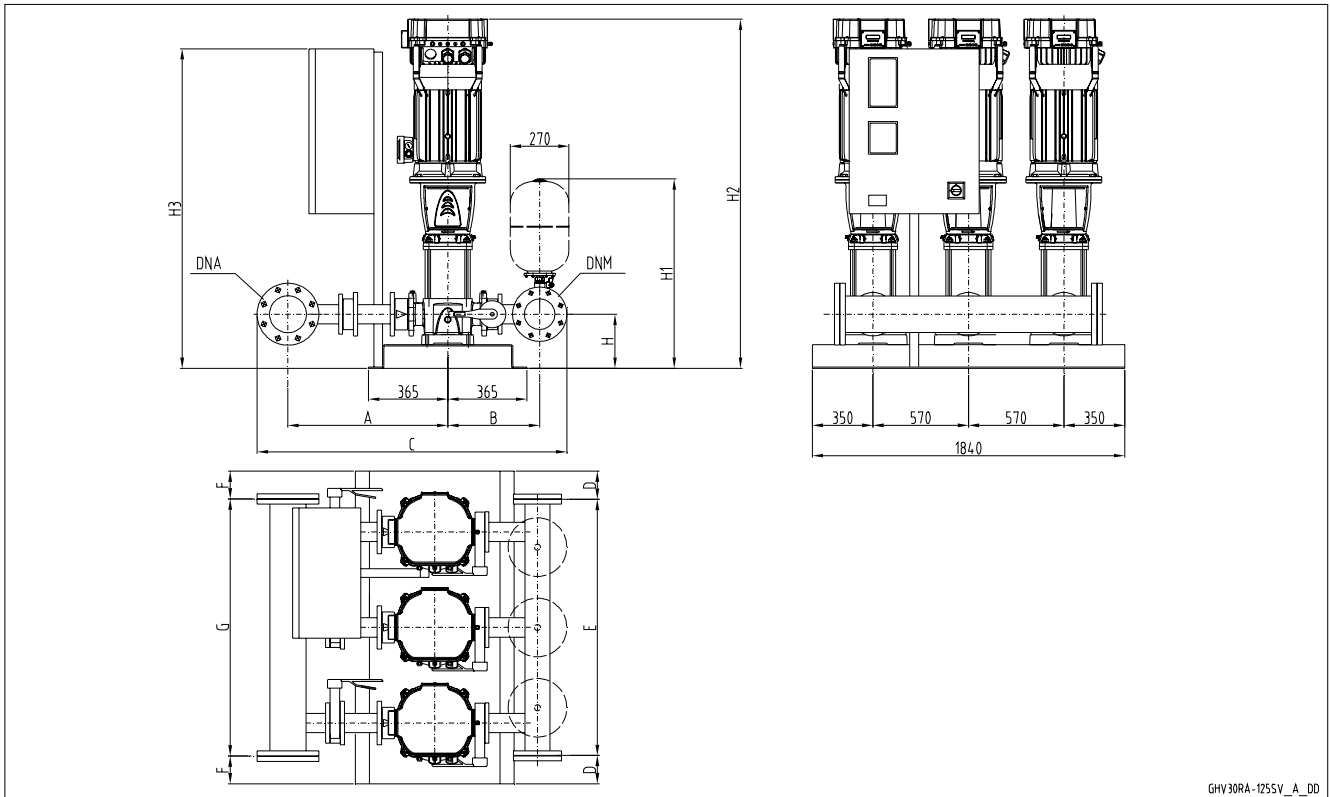


GHV 30	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
125SV1G075T	250	200	618	927	1917	160	1520	130	1580	280	940	1350	1098
125SV2G150T	250	200	618	927	1917	160	1520	130	1580	280	940	1700	1195
125SV3G220T	250	200	618	927	1917	160	1520	130	1580	280	940	1850	1195

Dimensions in mm. Tolerance ± 10 mm.

ghv30_125sv-en_a_td

**THREE-PUMP BOOSTER SETS, GHV30 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV30RA-125SV_A_DD

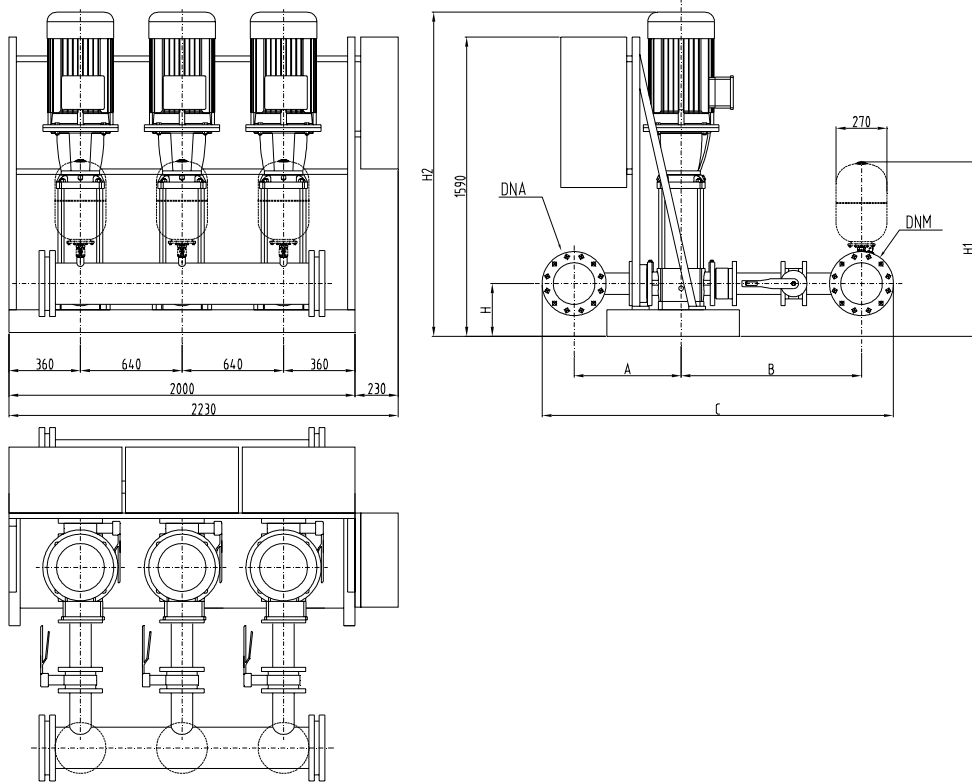
GHV30

GHV 30RA	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
125SV1G075T	250	200	954	591	1917	160	1520	130	1580	280	940	1350	1098
125SV2G150T	250	200	954	591	1917	160	1520	130	1580	280	940	1700	1195
125SV3G220T	250	200	954	591	1917	160	1520	130	1580	280	940	1850	1195

Dimensions in mm. Tolerance ± 10 mm.

ghv30ra_125sv-en_a_td

**THREE-PUMP BOOSTER SETS, GHV30 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**



GHV30-125SV-BIG_A_00

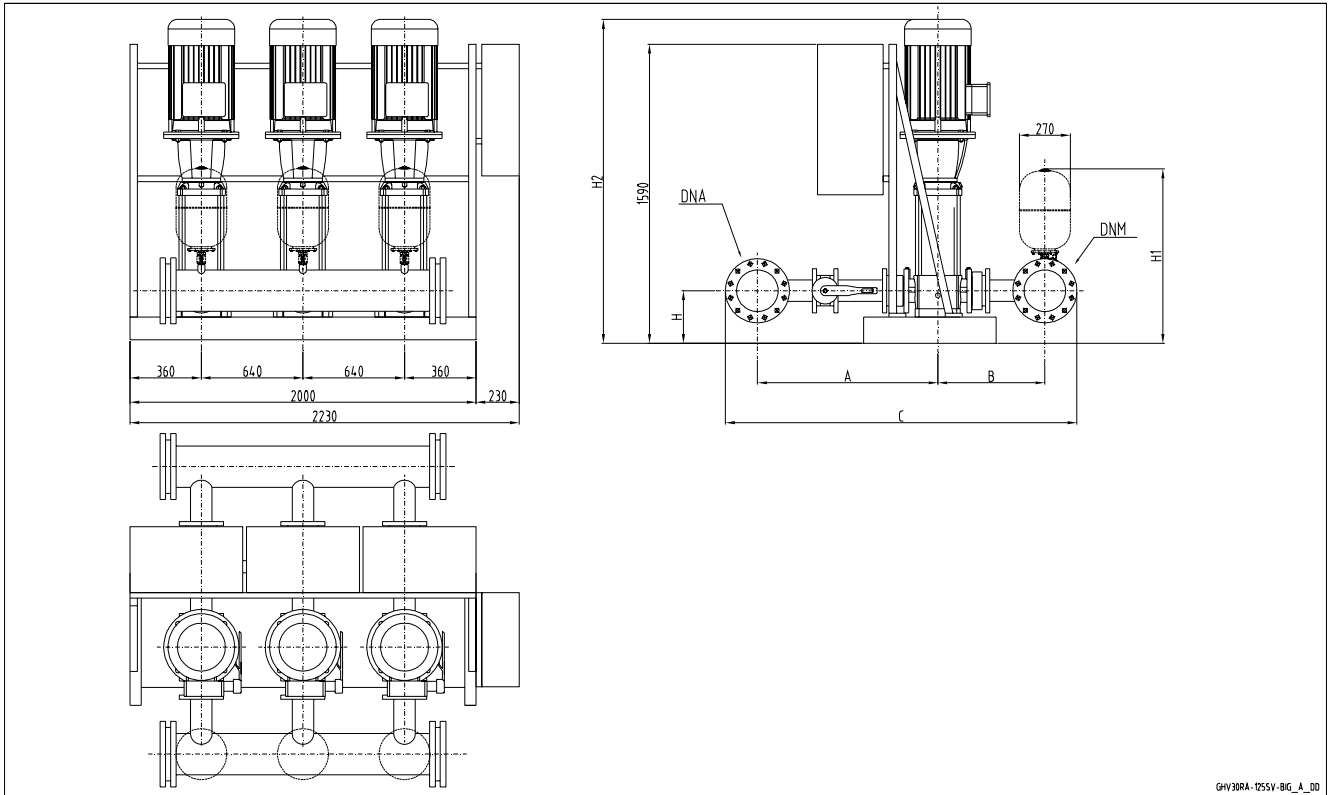
GHV30

GHV 30	DNA	DNM	A	B	C	H	H1	H2
125SV4G300T	250	200	618	927	1917	300	960	1975
125SV5G370T	250	200	618	927	1917	300	960	2125

Dimensions in mm. Tolerance ± 10 mm.

ghv30_125sv-big-en_a_td

**THREE-PUMP BOOSTER SETS, GHV30 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV30RA-125SV-BIG_A_DD

GHV30

GHV 30RA	DNA	DNM	A	B	C	H	H1	H2
125SV4G300T	250	200	954	591	1917	300	960	1975
125SV5G370T	250	200	954	591	1917	300	960	2125

Dimensions in mm. Tolerance ± 10 mm.

ghv30ra_125sv-big-en_a_td

Booster sets

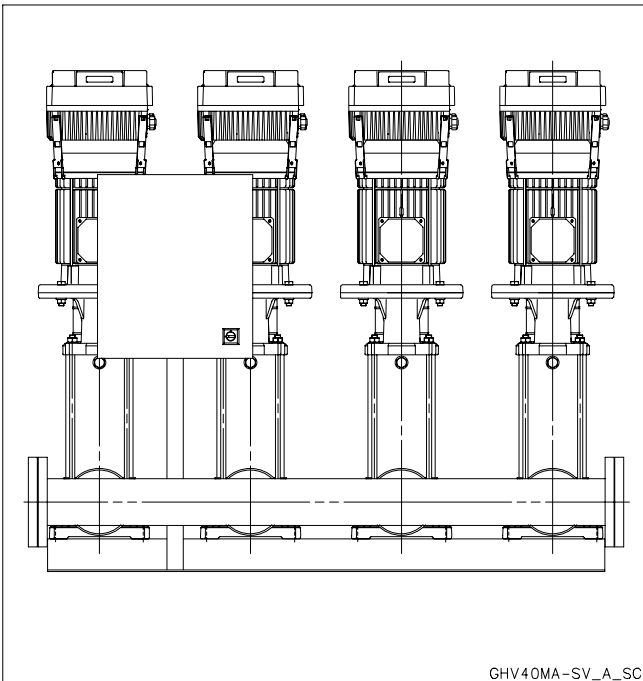
MARKET SECTORS

CIVIL, INDUSTRIAL

APPLICATIONS

- Water network supply in condominiums, offices, hotels, shopping centres, factories.
- Water supply to agricultural water networks (e.g. irrigation).

GHV40 Series

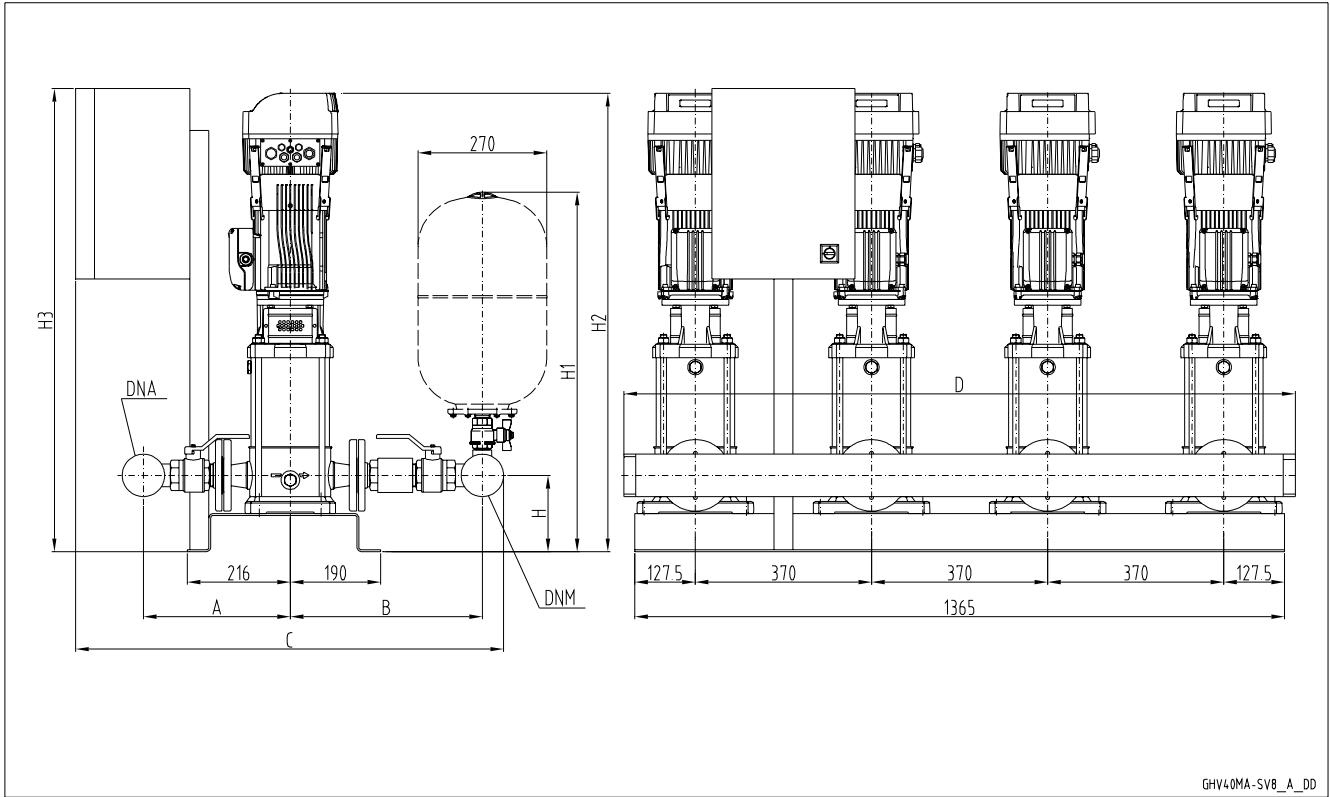


GHV40

SPECIFICATIONS

- **Flow rate** up to 640 m³/h.
- **Head** up to 160 m.
- Electrical panel supply voltage: 3 x 400V ± 10%.
- Frequency: 50 Hz.
- External control voltage: 5 ÷ 10 V.
- Protection class:
 - electrical panel: IP55.
 - converter: IP55 up to 22 kW.
 - IP54 above 22 kW.
- Maximum electric pump power 4 x 37 kW.
- Progressive motor start.
- **Vertical design pump:**
 - SV..T series (motor protection class IP55).
- Maximum operating pressure: 16 bar for sets with SV..T electric pumps.
- Maximum temperature of pumped liquid : +80°C.

FOUR-PUMP BOOSTER SETS, GHV40 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE



GHV40MA-SV8_A_DD

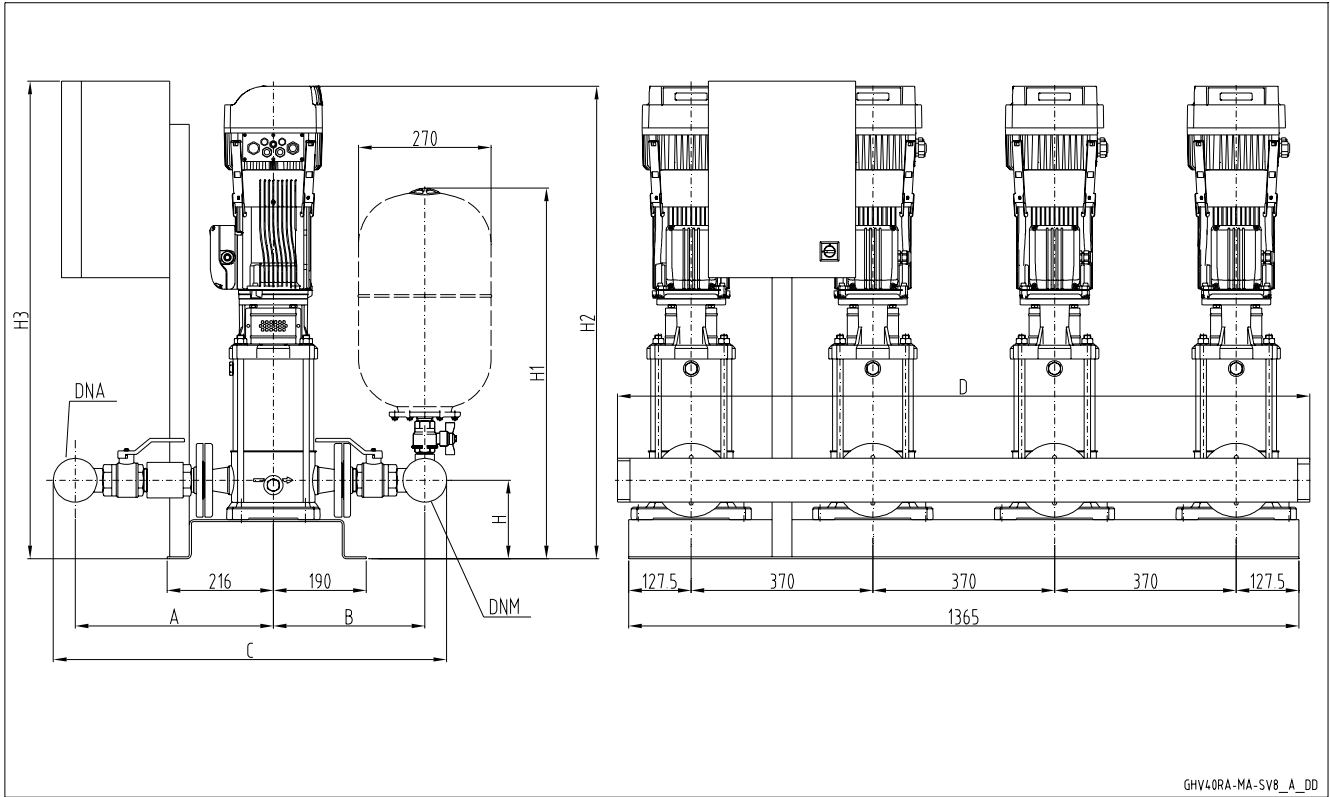
GHV40

GHV 40	DNA	DNM	A		B		C		D	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI					
10SV03F011T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	902	846
10SV04F015T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	944	846
10SV05F022T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1011	846
10SV06F022T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1043	846
10SV07F030T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1085	846
10SV08F030T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1117	846
10SV09F040T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1170	846
10SV10F040T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1202	846
10SV11F040T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1234	846
10SV13F055T	R 3"	R 3"	304	363	369	504	761	955	1410	160	755	1421	846

Dimensions in mm. Tolerance ± 10 mm.

ghv40_10esv-en_b_td

**FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV40RA-MA-SV8_A_DD

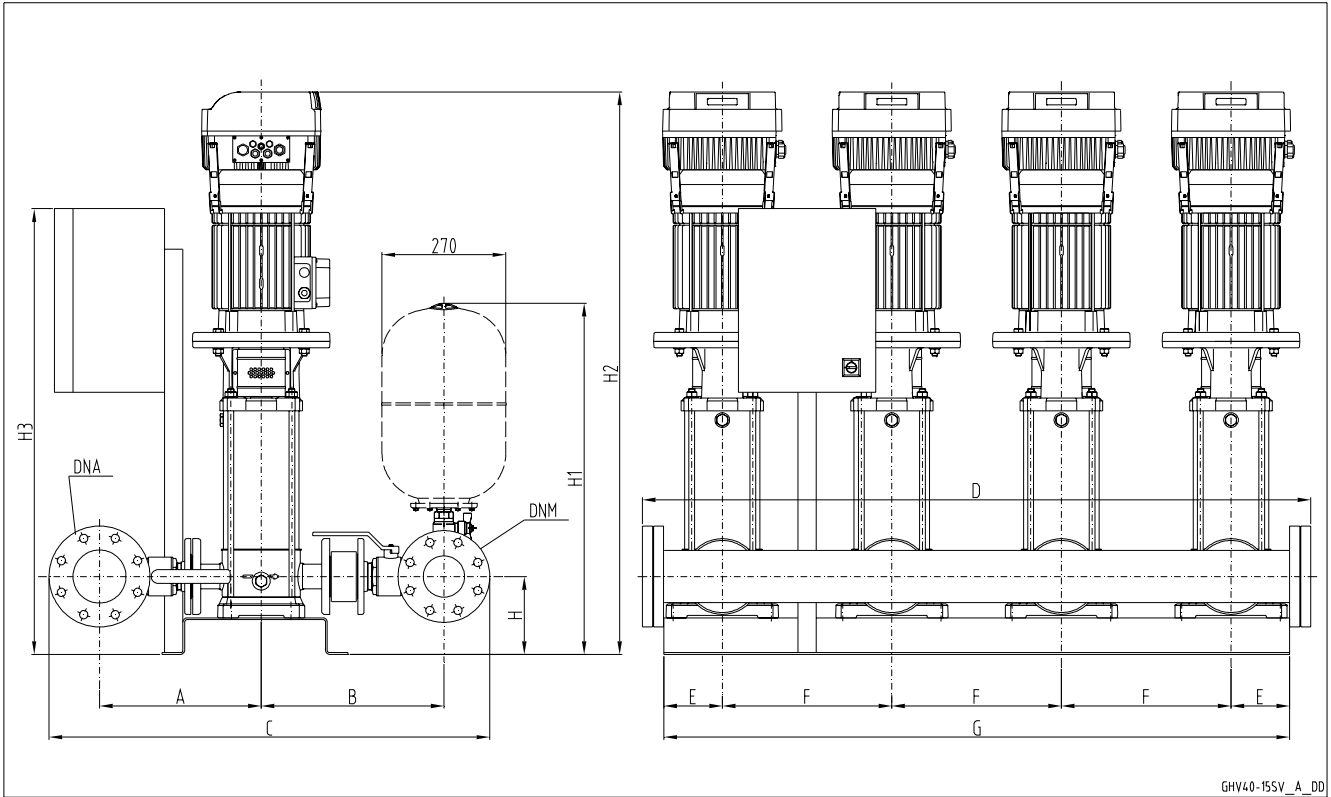
GHV40

GHV 40 RA	DNA	DNM	A		B		C		D	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI					
10SV03F011T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	902	846
10SV04F015T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	944	846
10SV05F022T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1011	846
10SV06F022T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1043	846
10SV07F030T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1085	846
10SV08F030T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1117	846
10SV09F040T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1170	846
10SV10F040T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1202	846
10SV11F040T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1234	846
10SV13F055T	R 3"	R 3"	374	504	352	363	814	955	1410	160	755	1421	846

Dimensions in mm. Tolerance ± 10 mm.

ghv40ra_10esv-en_b_td

FOUR-PUMP BOOSTER SETS, GHV40 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE



GHV40-15SV_A_DD

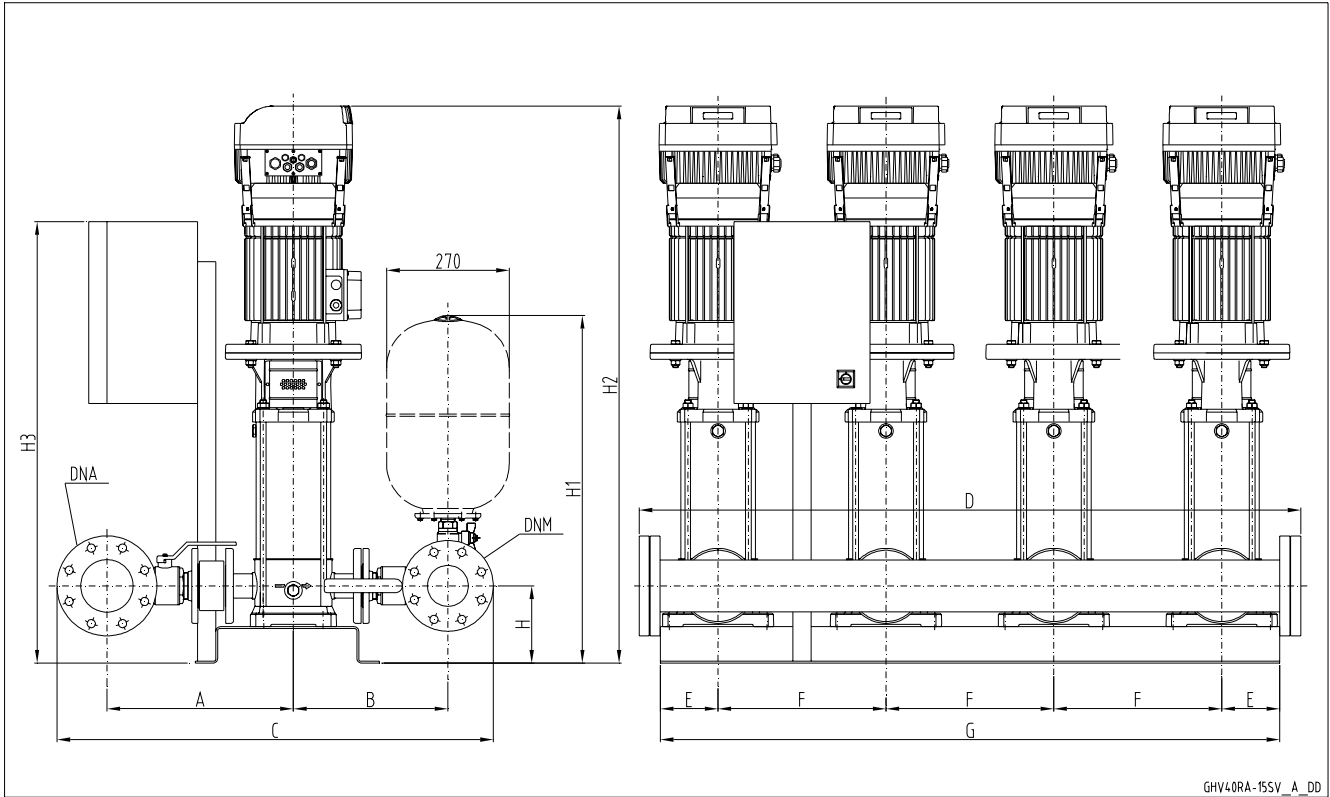
GHV40

GHV 40	DNA	DNM	A		B		C		D	E	F	G	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI								
15SV01F011T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	912	846
15SV02F022T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	957	846
15SV03F030T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1015	846
15SV04F040T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1084	846
15SV05F040T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1132	846
15SV06F055T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1303	846
15SV07F055T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1351	846
15SV08F075T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1391	1193
15SV09F075T	100	100	354	394	411	449	985	1063	1454	128	370	1365	170	777	1439	1193
15SV10F110T	100	100	354	394	411	449	985	1063	1664	280	440	1880	200	807	1608	1193
22SV01F011T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	912	846
22SV02F022T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	957	846
22SV03F030T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	1015	846
22SV04F040T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	1084	846
22SV05F055T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	1255	846
22SV06F075T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	1295	1193
22SV07F075T	125	100	367	407	411	449	1013	1091	1454	128	370	1365	170	777	1343	1193
22SV08F110T	125	100	367	407	411	449	1013	1091	1664	280	440	1880	200	807	1512	1193
22SV09F110T	125	100	367	407	411	449	1013	1091	1664	280	440	1880	200	807	1560	1193
22SV10F110T	125	100	367	407	411	449	1013	1091	1664	280	440	1880	200	807	1608	1193

Dimensions in mm. Tolerance ± 10 mm.

ghv40_15sv-en_c_td

FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON SUCTION SIDE



GHV40RA-15SV_A_DD

GHV40

GHV 40 RA	DNA	DNM	A		B		C		D	E	F	G	H	H1	H2	H3
			STD/DW	AISI	STD/DW	AISI	STD/DW	AISI								
15SV01F011T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	912	846
15SV02F022T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	957	846
15SV03F030T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1015	846
15SV04F040T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1084	846
15SV05F040T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1132	846
15SV06F055T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1303	846
15SV07F055T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1351	846
15SV08F075T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1391	1193
15SV09F075T	100	100	411	449	354	392	985	1061	1454	128	370	1365	170	777	1439	1193
15SV10F110T	100	100	411	449	354	392	985	1061	1664	280	440	1880	200	807	1608	1193
22SV01F011T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	912	846
22SV02F022T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	957	846
22SV03F030T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	1015	846
22SV04F040T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	1084	846
22SV05F055T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	1255	846
22SV06F075T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	1295	1193
22SV07F075T	125	100	424	462	354	392	1013	1089	1454	128	370	1365	170	777	1343	1193
22SV08F110T	125	100	424	462	354	392	1013	1089	1664	280	440	1880	200	807	1512	1193
22SV09F110T	125	100	424	462	354	392	1013	1089	1664	280	440	1880	200	807	1560	1193
22SV10F110T	125	100	424	462	354	392	1013	1089	1664	280	440	1880	200	807	1608	1193

Dimensions in mm. Tolerance ± 10 mm.

ghv40ra_15sv-en_c_td

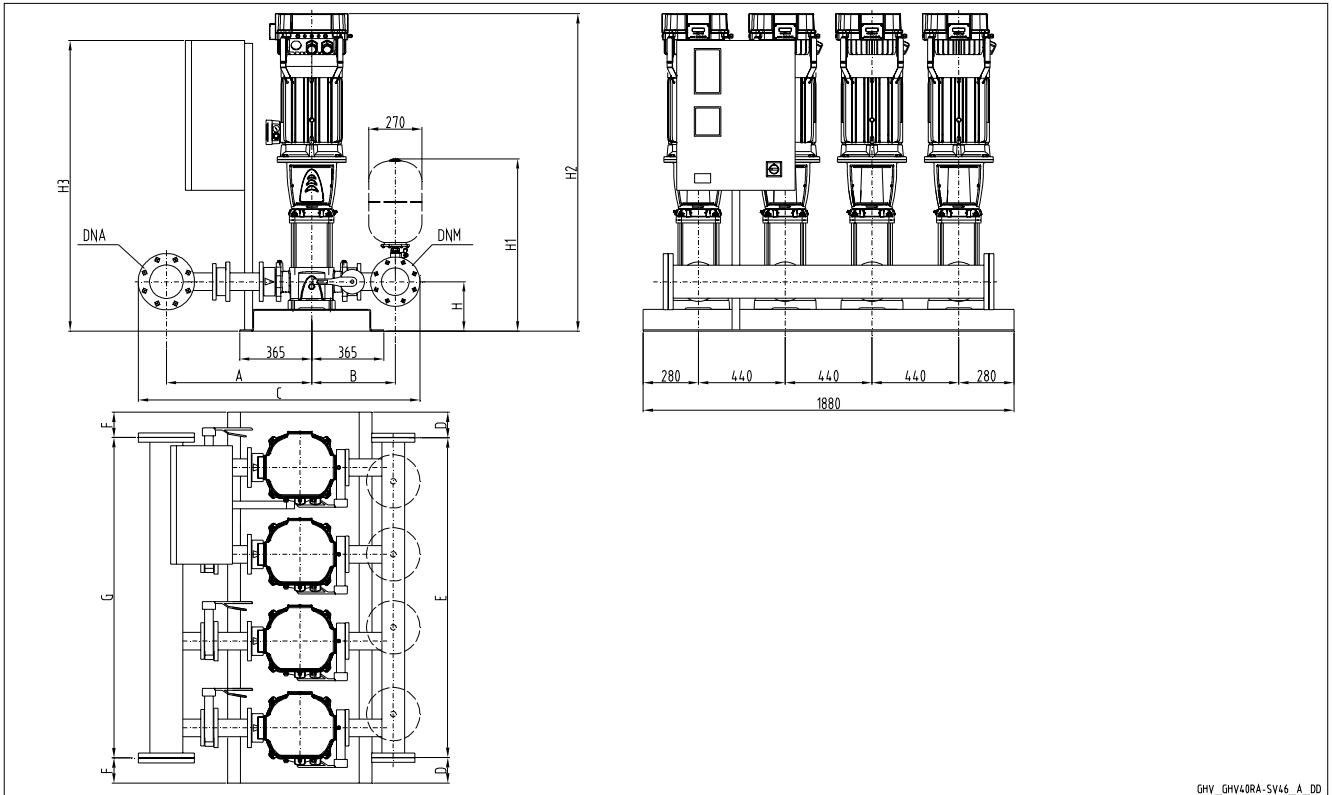
FOUR-PUMP BOOSTER SETS, GHV40 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE

GHV40	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
33SV1/1AG022T	125	125	461	726	1437	110	1660	110	1660	215	835	1067	1097
33SV1G030T	125	125	461	726	1437	110	1660	110	1660	215	835	1067	1097
33SV2/2AG040T	125	125	461	726	1437	110	1660	110	1660	215	835	1163	1097
33SV2/1AG040T	125	125	461	726	1437	110	1660	110	1660	215	835	1163	1097
33SV2G055T	125	125	461	726	1437	110	1660	110	1660	215	835	1239	1097
33SV3/2AG055T	125	125	461	726	1437	110	1660	110	1660	215	835	1314	1097
33SV3/1AG075T	125	125	461	726	1451	110	1660	110	1660	215	835	1306	974
33SV3G075T	125	125	461	726	1451	110	1660	110	1660	215	835	1306	974
33SV4/2AG075T	125	125	461	726	1451	110	1660	110	1660	215	835	1381	974
33SV4/1AG110T	125	125	461	726	1451	110	1660	110	1660	215	835	1477	974
33SV4G110T	125	125	461	726	1451	110	1660	110	1660	215	835	1477	974
33SV5/2AG110T	125	125	461	726	1451	110	1660	110	1660	215	835	1552	974
33SV5/1AG110T	125	125	461	726	1451	110	1660	110	1660	215	835	1552	974
33SV5G150T	125	125	461	726	1451	110	1660	110	1660	215	835	1656	974
33SV6/2AG150T	125	125	461	726	1451	110	1660	110	1660	215	835	1731	974
33SV6/1AG150T	125	125	461	726	1451	110	1660	110	1660	215	835	1731	974
33SV6G150T	125	125	461	726	1451	110	1660	110	1660	215	835	1731	974
33SV7/2AG150T	125	125	461	726	1451	110	1660	110	1660	215	835	1806	974
46SV1/1AG030T	150	150	498	766	1548	90	1700	90	1700	250	884	1107	1097
46SV1G040T	150	150	498	766	1548	90	1700	90	1700	250	884	1128	1097
46SV2/2AG055T	150	150	498	766	1548	90	1700	90	1700	250	884	1279	1097
46SV2G075T	150	150	498	766	1548	90	1700	90	1700	250	884	1271	974
46SV3/2AG110T	150	150	498	766	1548	90	1700	90	1700	250	884	1442	974
46SV3G110T	150	150	498	766	1548	90	1700	90	1700	250	884	1442	974
46SV4/2AG150T	150	150	498	766	1548	90	1700	90	1700	250	884	1621	974
46SV4G150T	150	150	498	766	1548	90	1700	90	1700	250	884	1621	974
46SV5/2AG185T	150	150	498	766	1548	90	1700	90	1700	250	884	1696	1121
46SV5G185T	150	150	498	766	1548	90	1700	90	1700	250	884	1696	1121
46SV6/2AG220T	150	150	498	766	1548	90	1700	90	1700	250	884	1771	1121
46SV6G220T	150	150	498	766	1548	90	1700	90	1700	250	884	1771	1121
66SV1/1AG040T	200	200	529	819	1688	90	1700	90	1700	250	910	1153	1097
66SV1G055T	200	200	529	819	1688	90	1700	90	1700	250	910	1229	1097
66SV2/2AG075T	200	200	529	819	1688	90	1700	90	1700	250	910	1311	1194
66SV2/1AG110T	200	200	529	819	1688	90	1700	90	1700	250	910	1407	1194
66SV2G110T	200	200	529	819	1688	90	1700	90	1700	250	910	1407	1194
66SV3/2AG150T	200	200	529	819	1688	90	1700	90	1700	250	910	1601	1194
66SV3/1AG150T	200	200	529	819	1688	90	1700	90	1700	250	910	1601	1194
66SV3G185T	200	200	529	819	1688	90	1700	90	1700	250	910	1601	1121
66SV4/2AG185T	200	200	529	819	1688	90	1700	90	1700	250	910	1691	1121
66SV4/1AG220T	200	200	529	819	1688	90	1700	90	1700	250	910	1691	1121
66SV4G220T	200	200	529	819	1688	90	1700	90	1700	250	910	1691	1121
92SV1/1AG055T	250	200	556	819	1748	90	1700	60	1760	250	910	1229	1097
92SV1G075T	250	200	556	819	1748	90	1700	60	1760	250	910	1221	1194
92SV2/2AG110T	250	200	556	819	1748	90	1700	60	1760	250	910	1407	1194
92SV2G150T	250	200	556	819	1748	90	1700	60	1760	250	910	1511	1194
92SV3/2AG185T	250	200	556	819	1748	90	1700	60	1760	250	910	1601	1121
92SV3G220T	250	200	556	819	1748	90	1700	60	1760	250	910	1601	1121

 Dimensions in mm. Tolerance ± 10 mm.

ghv40_sv46-en_d_td

**FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV_GHV40RA-SV46_A_DD

GHV40

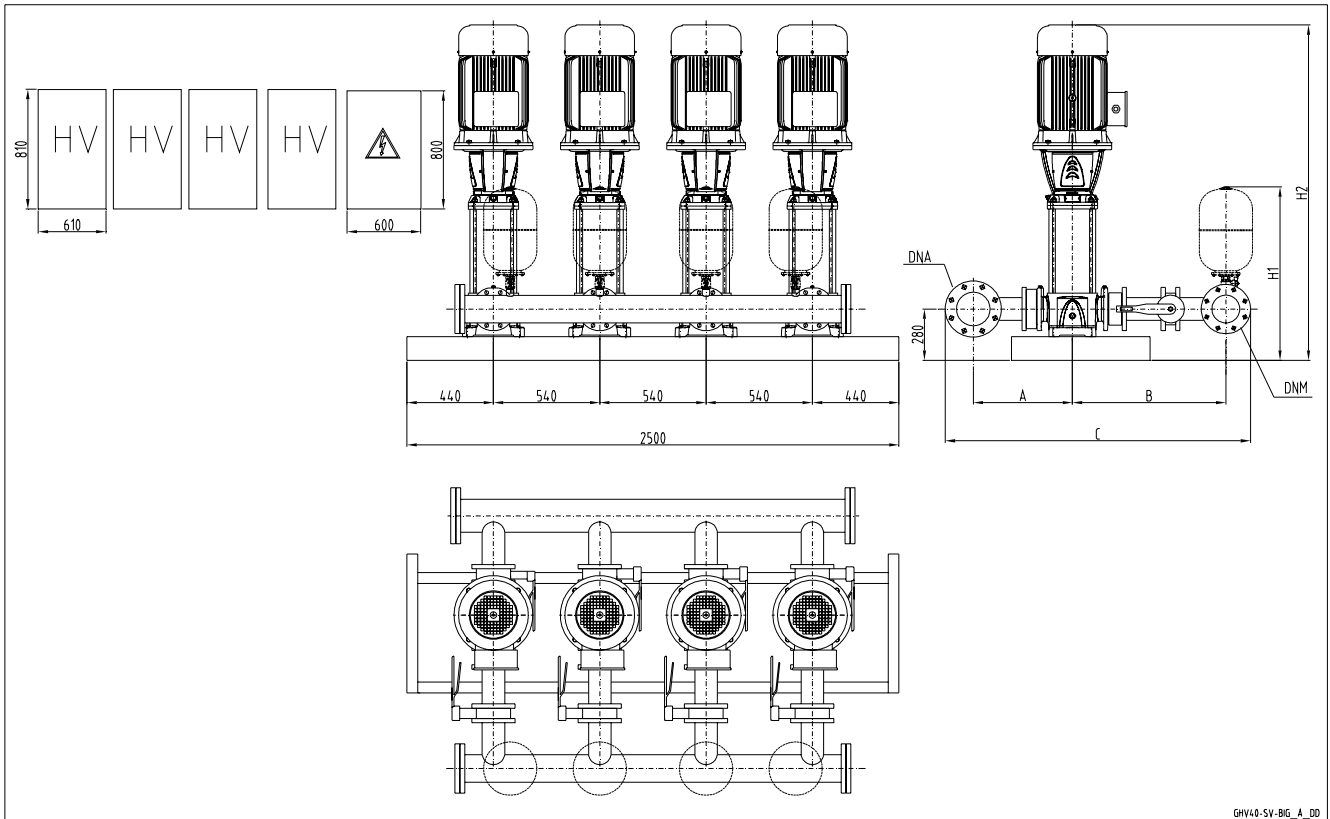
FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON SUCTION SIDE

GHV40RA	DNA	DNM	A	B	C	D	E	F	G	H	H1	H2	H3
33SV1/1AG022T	125	125	726	461	1437	110	1660	110	1660	215	835	1067	1097
33SV1G030T	125	125	726	461	1437	110	1660	110	1660	215	835	1067	1097
33SV2/2AG040T	125	125	726	461	1437	110	1660	110	1660	215	835	1163	1097
33SV2/1AG040T	125	125	726	461	1437	110	1660	110	1660	215	835	1163	1097
33SV2G055T	125	125	726	461	1437	110	1660	110	1660	215	835	1239	1097
33SV3/2AG055T	125	125	726	461	1437	110	1660	110	1660	215	835	1314	1097
33SV3/1AG075T	125	125	726	461	1437	110	1660	110	1660	215	835	1306	974
33SV3G075T	125	125	726	461	1437	110	1660	110	1660	215	835	1306	974
33SV4/2AG075T	125	125	726	461	1437	110	1660	110	1660	215	835	1381	974
33SV4/1AG110T	125	125	726	461	1437	110	1660	110	1660	215	835	1477	974
33SV4G110T	125	125	726	461	1437	110	1660	110	1660	215	835	1477	974
33SV5/2AG110T	125	125	726	461	1437	110	1660	110	1660	215	835	1552	974
33SV5/1AG110T	125	125	726	461	1437	110	1660	110	1660	215	835	1552	974
33SV5G150T	125	125	726	461	1437	110	1660	110	1660	215	835	1656	974
33SV6/2AG150T	125	125	726	461	1437	110	1660	110	1660	215	835	1731	974
33SV6/1AG150T	125	125	726	461	1437	110	1660	110	1660	215	835	1731	974
33SV6G150T	125	125	726	461	1437	110	1660	110	1660	215	835	1731	974
33SV7/2AG150T	125	125	726	461	1437	110	1660	110	1660	215	835	1806	974
46SV1/1AG030T	150	150	766	498	1548	90	1700	90	1700	250	884	1107	1097
46SV1G040T	150	150	766	498	1548	90	1700	90	1700	250	884	1128	1097
46SV2/2AG055T	150	150	766	498	1548	90	1700	90	1700	250	884	1279	1097
46SV2G075T	150	150	766	498	1548	90	1700	90	1700	250	884	1271	974
46SV3/2AG110T	150	150	766	498	1548	90	1700	90	1700	250	884	1442	974
46SV3G110T	150	150	766	498	1548	90	1700	90	1700	250	884	1442	974
46SV4/2AG150T	150	150	766	498	1548	90	1700	90	1700	250	884	1621	974
46SV4G150T	150	150	766	498	1548	90	1700	90	1700	250	884	1621	974
46SV5/2AG185T	150	150	766	498	1548	90	1700	90	1700	250	884	1696	1121
46SV5G185T	150	150	766	498	1548	90	1700	90	1700	250	884	1696	1121
46SV6/2AG220T	150	150	766	498	1548	90	1700	90	1700	250	884	1771	1121
46SV6G220T	150	150	766	498	1548	90	1700	90	1700	250	884	1771	1121
66SV1/1AG040T	200	200	819	529	1688	90	1700	90	1700	250	910	1153	1097
66SV1G055T	200	200	819	529	1688	90	1700	90	1700	250	910	1229	1097
66SV2/2AG075T	200	200	819	529	1688	90	1700	90	1700	250	910	1311	1194
66SV2/1AG110T	200	200	819	529	1688	90	1700	90	1700	250	910	1407	1194
66SV2G110T	200	200	819	529	1688	90	1700	90	1700	250	910	1407	1194
66SV3/2AG150T	200	200	819	529	1688	90	1700	90	1700	250	910	1601	1194
66SV3/1AG150T	200	200	819	529	1688	90	1700	90	1700	250	910	1601	1194
66SV3G185T	200	200	819	529	1688	90	1700	90	1700	250	910	1601	1121
66SV4/2AG185T	200	200	819	529	1688	90	1700	90	1700	250	910	1691	1121
66SV4/1AG220T	200	200	819	529	1688	90	1700	90	1700	250	910	1691	1121
66SV4G220T	200	200	819	529	1688	90	1700	90	1700	250	910	1691	1121
92SV1/1AG055T	250	200	846	529	1748	90	1700	60	1760	250	910	1229	1097
92SV1G075T	250	200	846	529	1748	90	1700	60	1760	250	910	1221	1194
92SV2/2AG110T	250	200	846	529	1748	90	1700	60	1760	250	910	1407	1194
92SV2G150T	250	200	846	529	1748	90	1700	60	1760	250	910	1511	1194
92SV3/2AG185T	250	200	846	529	1748	90	1700	60	1760	250	910	1601	1121
92SV3G220T	250	200	846	529	1748	90	1700	60	1760	250	910	1601	1121

Dimensions in mm. Tolerance ± 10 mm.

ghv40ra_sv46-en_d_td

FOUR-PUMP BOOSTER SETS, GHV40 SERIES VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE ON DISCHARGE SIDE



GHV40-SV-BIG_A_DD

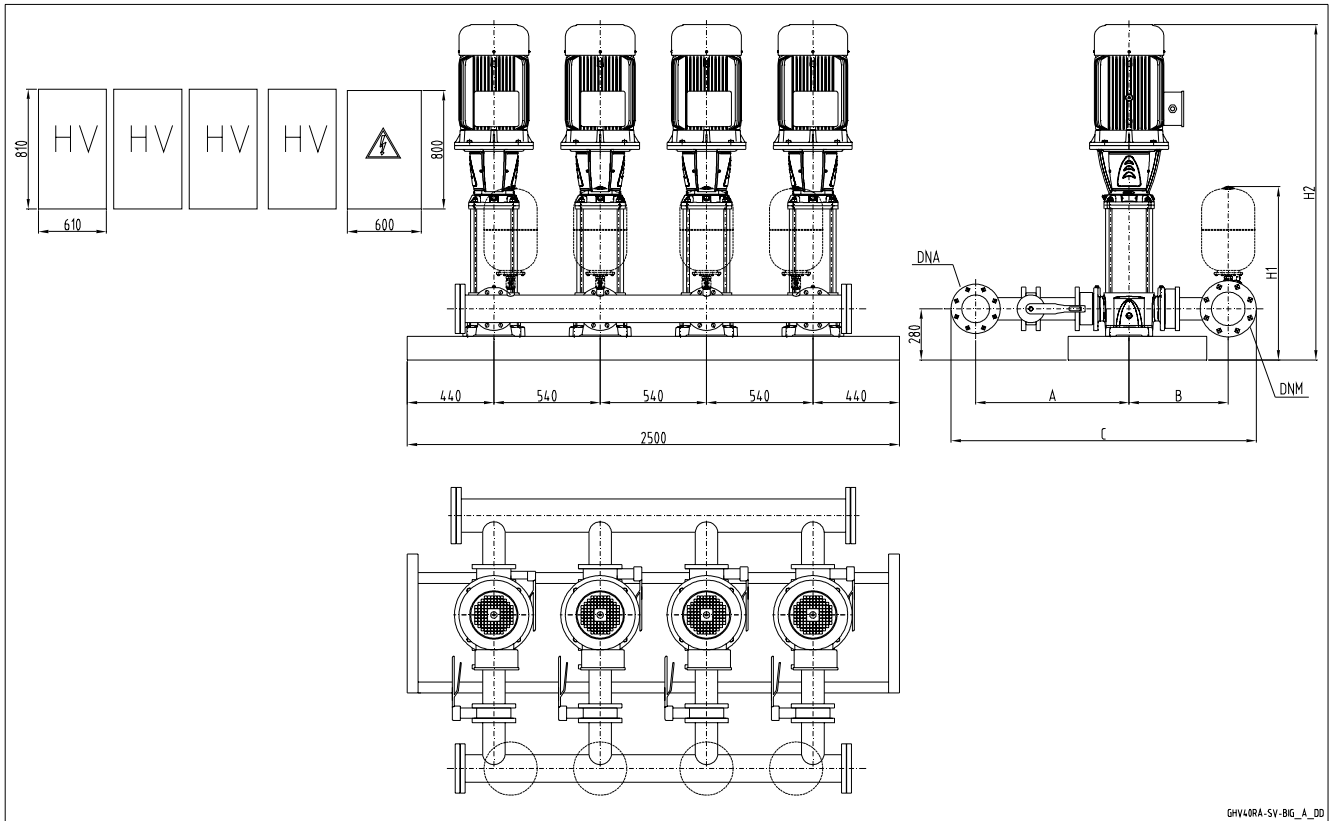
GHV40

GHV40	DNA	DNM	A	B	C	H1	H2
66SV5/2AG300T	200	200	529	819	1635	914	1766
66SV5/1AG300T	200	200	529	819	1635	914	1766
66SV5G300T	200	200	529	819	1635	914	1766
92SV4/2AG300T	250	200	556	819	1688	940	1676
92SV4G300T	250	200	556	819	1688	940	1676
92SV5/2AG370T	250	200	556	819	1688	940	1766

Note: for versions with vibration damping fir increase height by 50 mm.

ghv40_sv-big-en_b_td

**FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV40RA-SV-BIG_A_DD

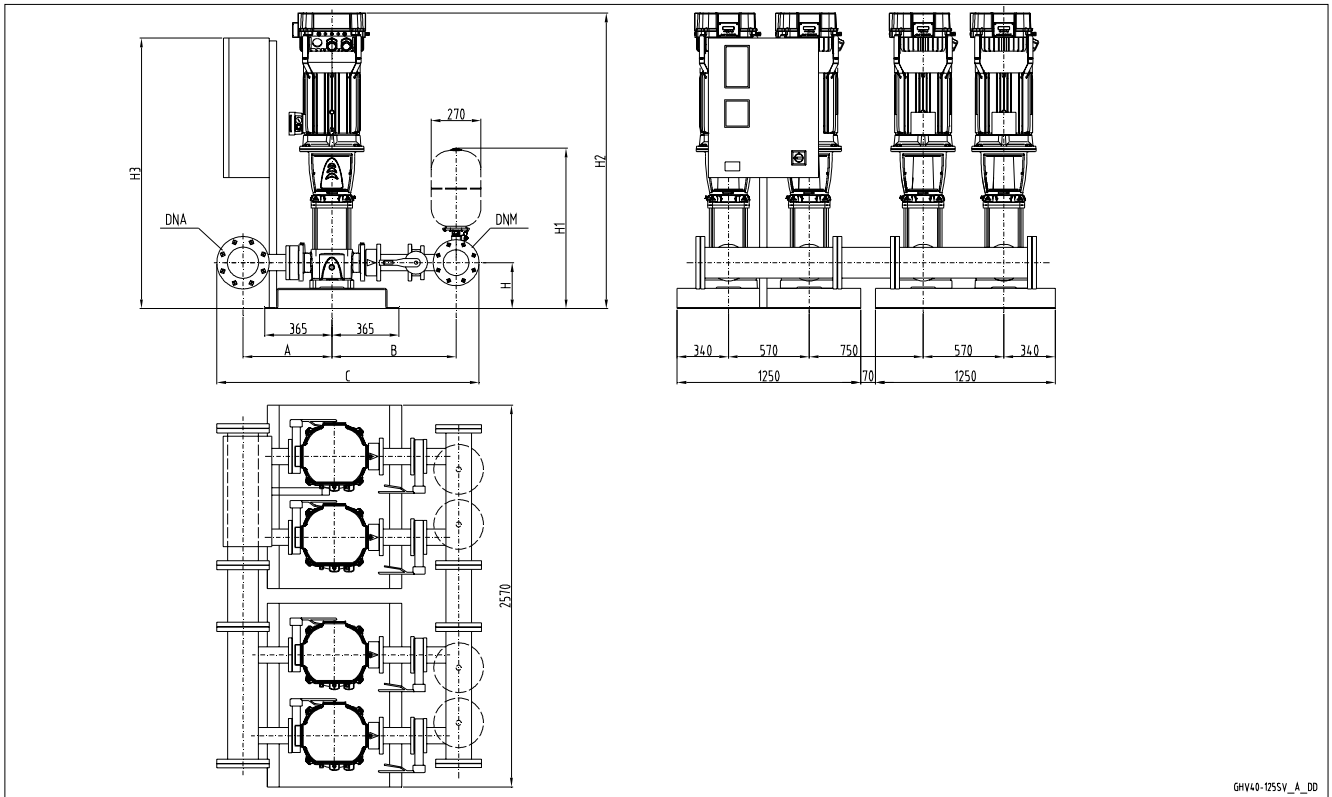
GHV40

GHV40RA	DNA	DNM	A	B	C	H1	H2
66SV5/2AG300T	200	200	819	529	1688	914	1766
66SV5/1AG300T	200	200	819	529	1688	914	1766
66SV5G300T	200	200	819	529	1688	914	1766
92SV4/2AG300T	250	200	846	529	1748	940	1676
92SV4G300T	250	200	846	529	1748	940	1676
92SV5/2AG370T	250	200	846	529	1748	940	1766

Note: for versions with vibration damping fir increase height by 50 mm.

ghv40ra_sv-big-en_b_td

**FOUR-PUMP BOOSTER SETS, GHV40 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**



GHV40-125SV_A_DD

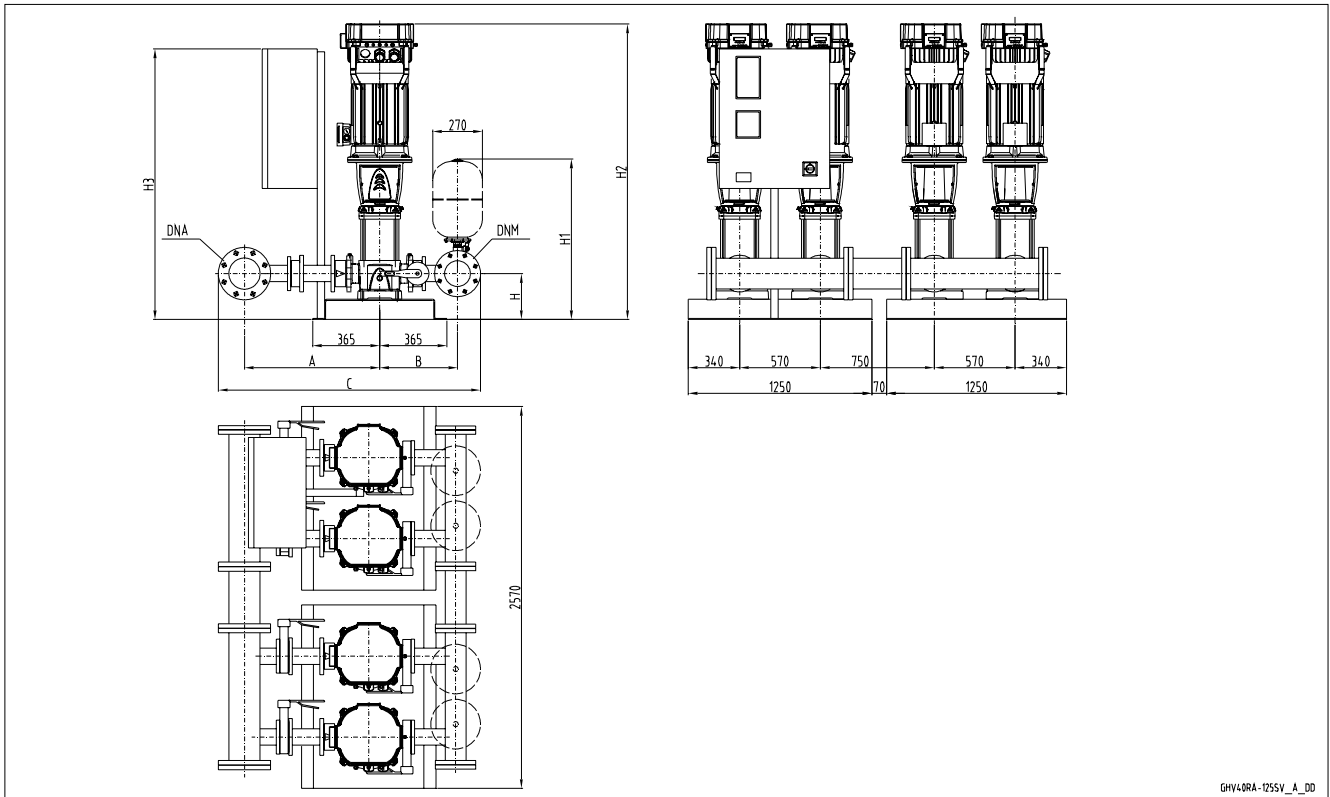
GHV40

GHV40	DNA	DNM	A	B	C	H	H1	H2	H3
125SV1G075T	300	250	643	954	2029	280	967	1350	1195
125SV2G150T	300	250	643	954	2029	280	967	1700	1195
125SV3G220T	300	250	643	954	2029	280	967	1850	1122

Dimensions in mm. Tolerance ± 10 mm.

ghv40_125sv-en_a_td

**FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV40RA-125SV_A_DD

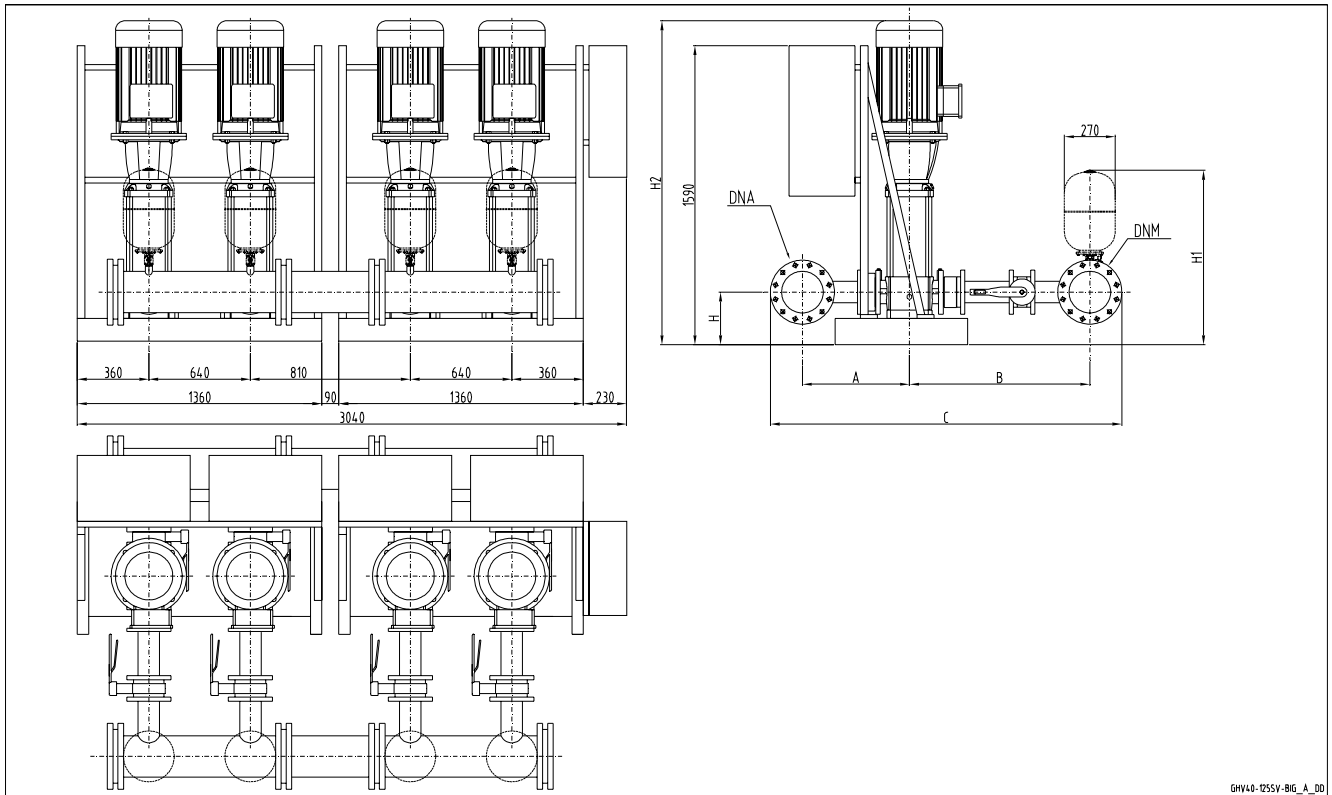
GHV40

GHV40RA	DNA	DNM	A	B	C	H	H1	H2	H3
125SV1G075T	300	250	979	618	2029	280	967	1350	1195
125SV2G150T	300	250	979	618	2029	280	967	1700	1195
125SV3G220T	300	250	979	618	2029	280	967	1850	1122

Dimensions in mm. Tolerance ± 10 mm.

ghv40ra_125sv-en_a_td

**FOUR-PUMP BOOSTER SETS, GHV40 SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON DISCHARGE SIDE**



GHV40-125SV-BIG_A_00

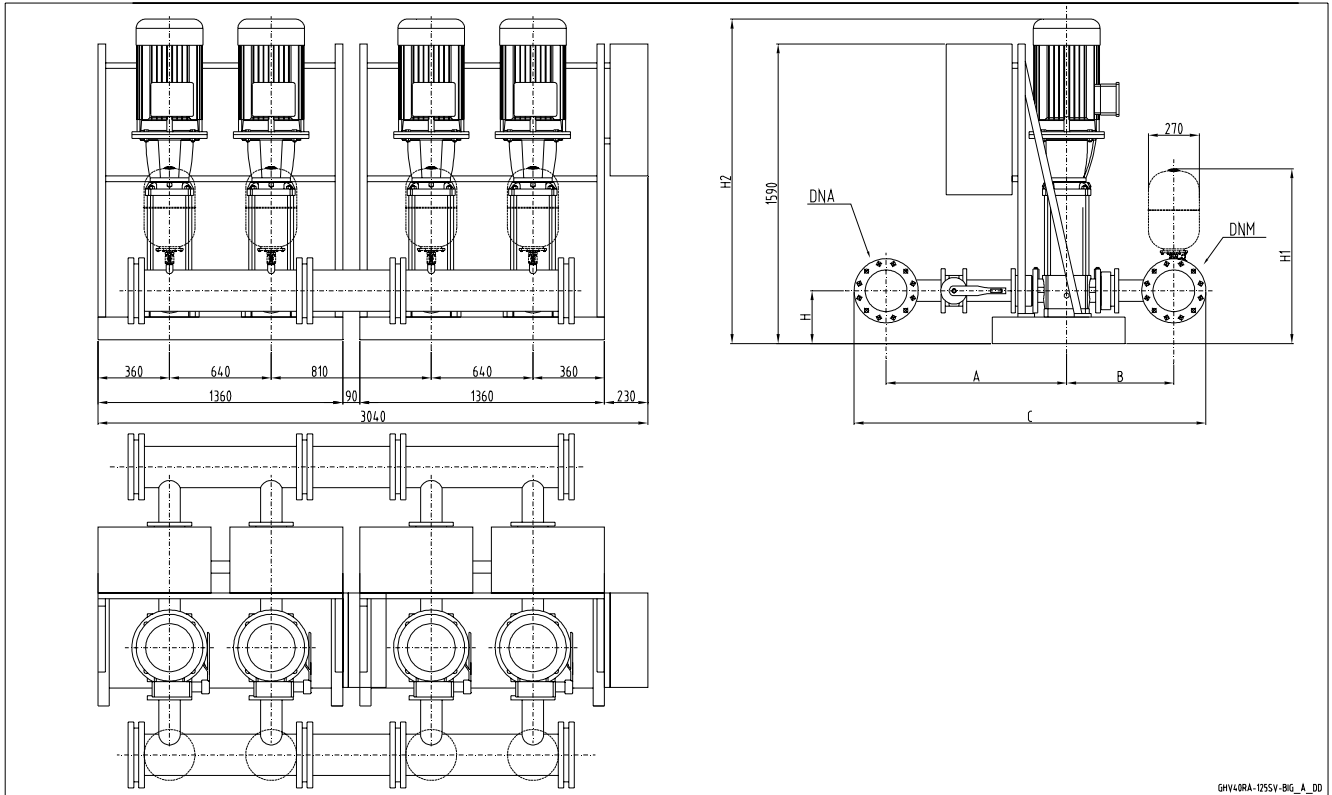
GHV40

GHV40	DNA	DNM	A	B	C	H	H1	H2
125SV4G300T	300	250	643	954	2029	300	987	1975
125SV5G370T	300	250	643	954	2029	300	987	2125

Dimensions in mm. Tolerance ± 10 mm.

ghv40_125sv-big-en_a_td

**FOUR-PUMP BOOSTER SETS, GHV40 RA SERIES
VERTICAL ELECTRIC PUMPS WITH NON-RETURN VALVE
ON SUCTION SIDE**



GHV40RA-125SV-BIG_A_DD

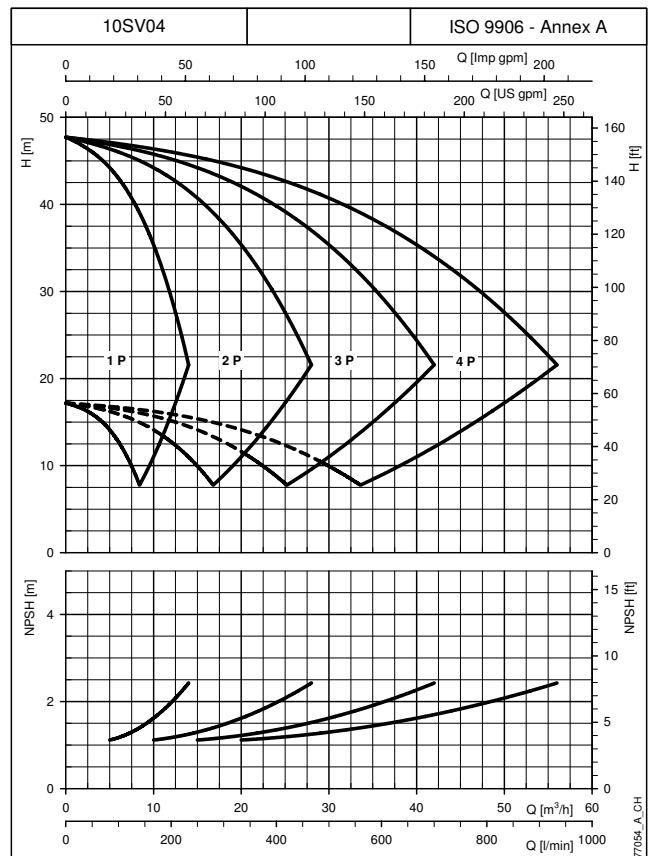
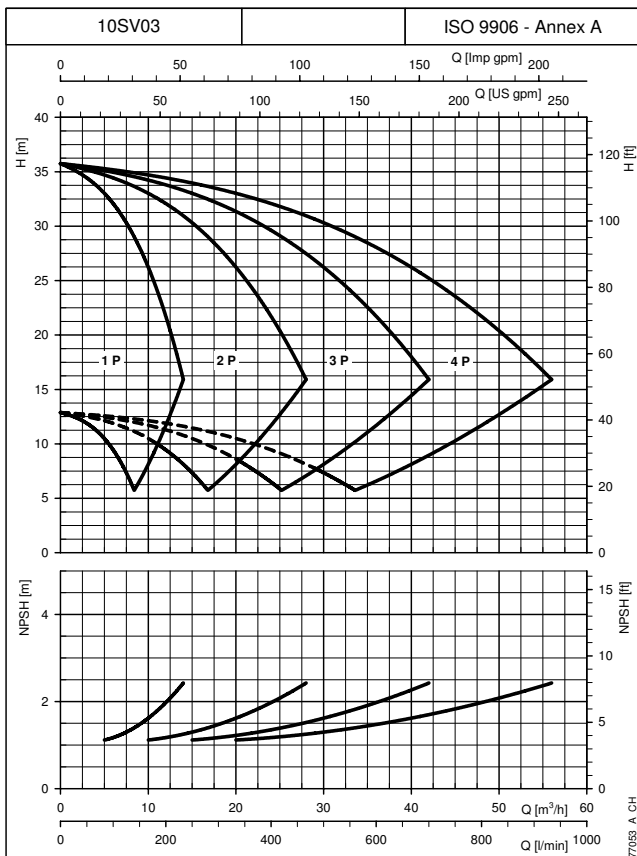
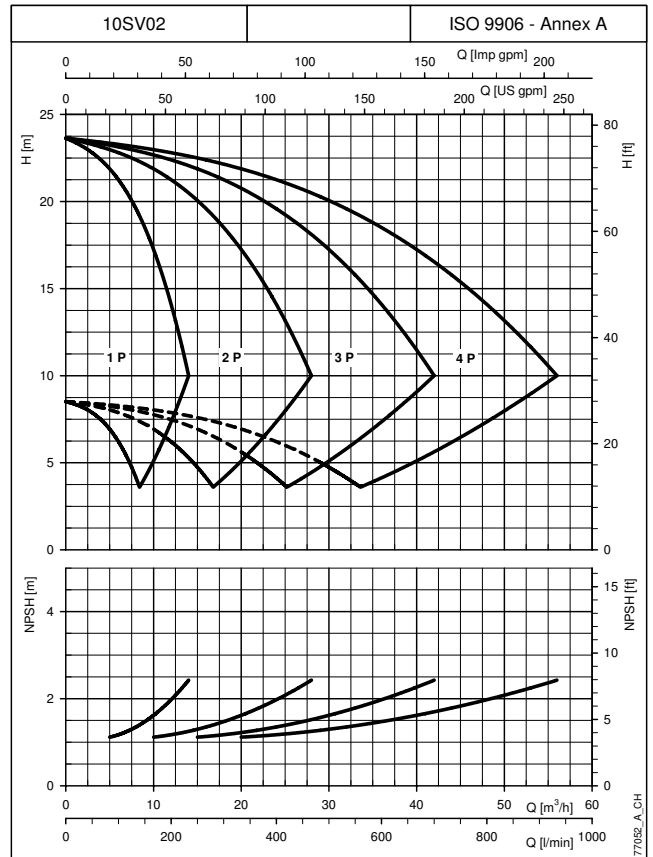
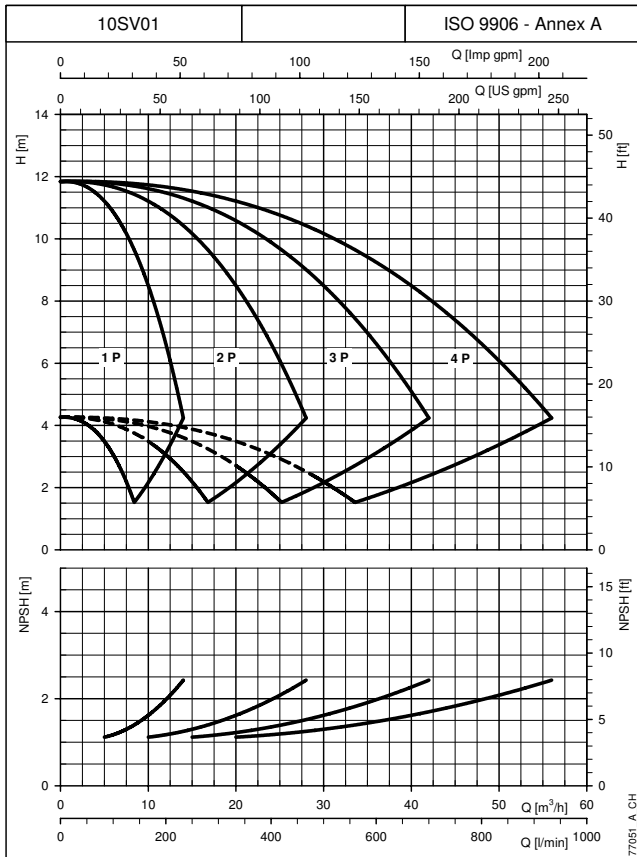
GHV40

GHV40RA	DNA	DNM	A	B	C	H	H1	H2
125SV4G300T	300	250	979	618	2029	300	987	1975
125SV5G370T	300	250	979	618	2029	300	987	2125

Dimensions in mm. Tolerance ± 10 mm.

ghv40ra_125sv-big-en_a_td

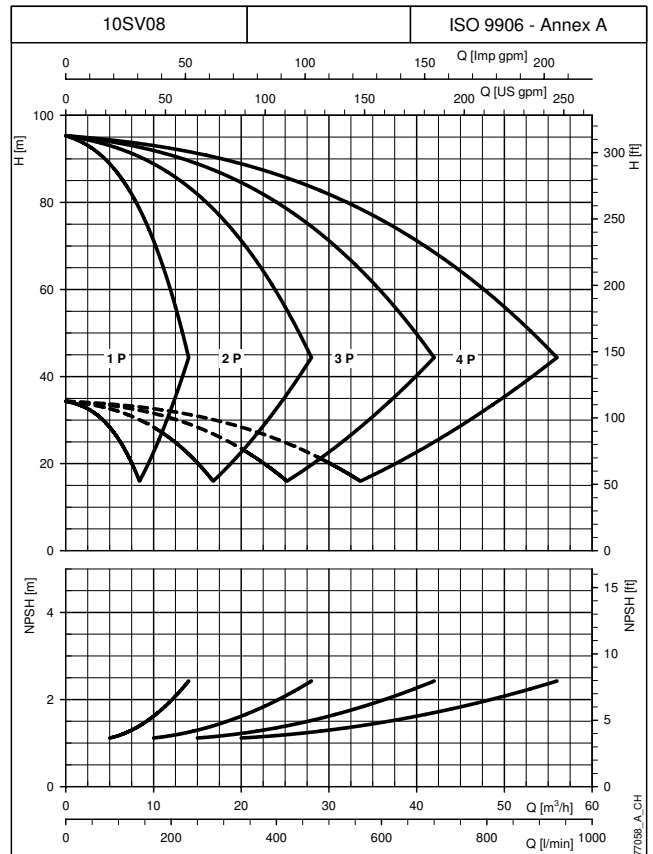
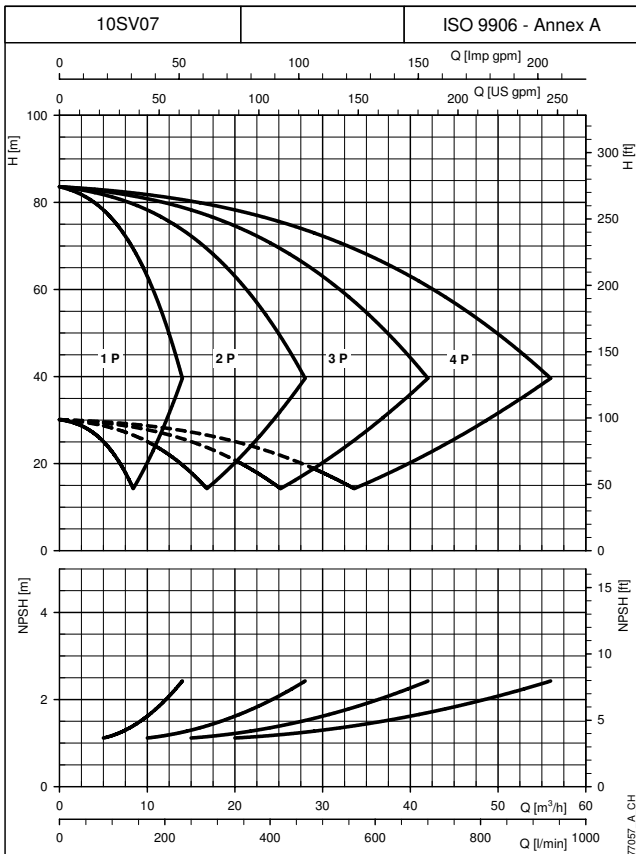
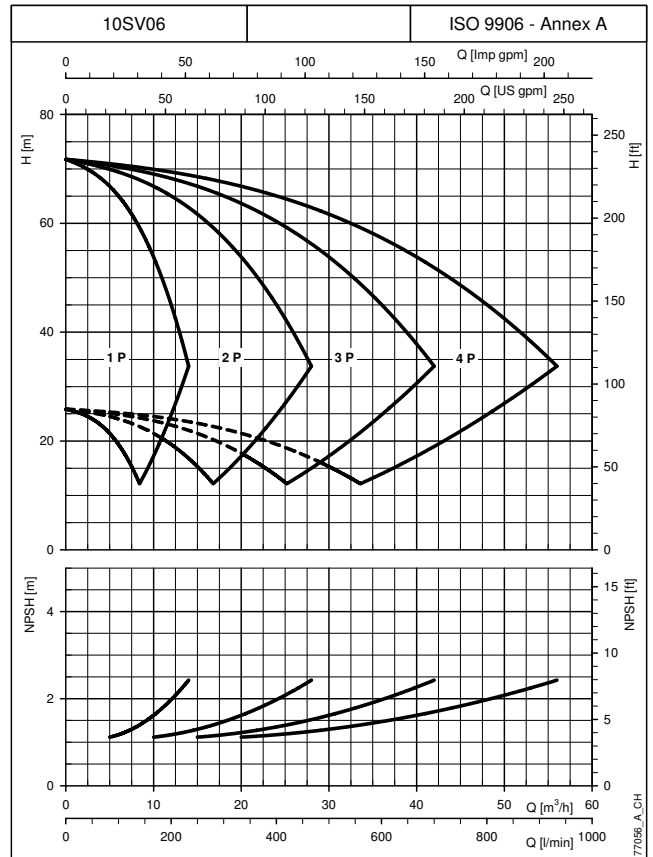
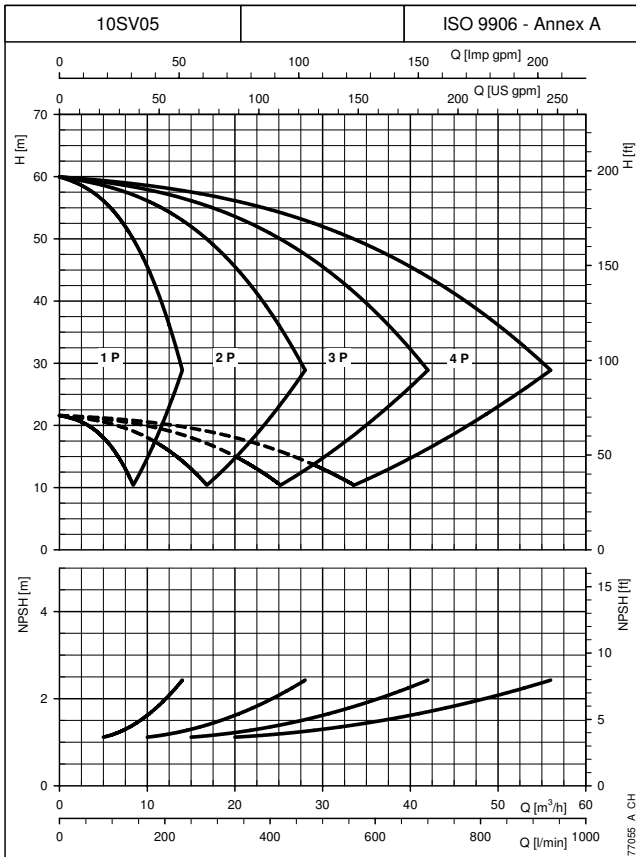
BOOSTER SETS, GHV.../SV SERIES OPERATING CHARACTERISTICS AT 30..50 Hz



CURVES

The performance curves do not take into account flow resistance in the valves and piping.
 The curves show the performance with one, two, three and four pumps running.
 These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{s}$.
 The declared NPSH values are laboratory values: for practical use we recommend increasing these values by 0,5 m.

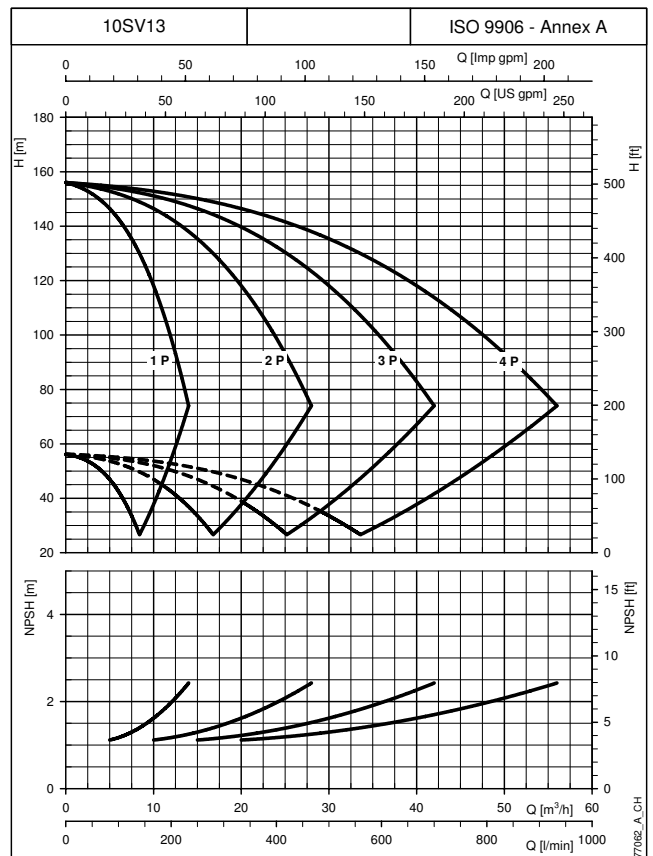
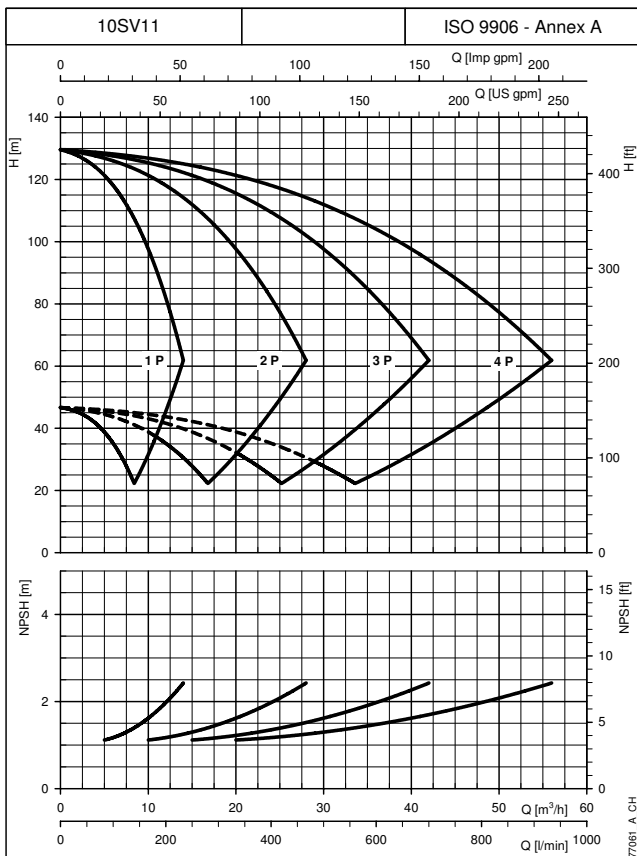
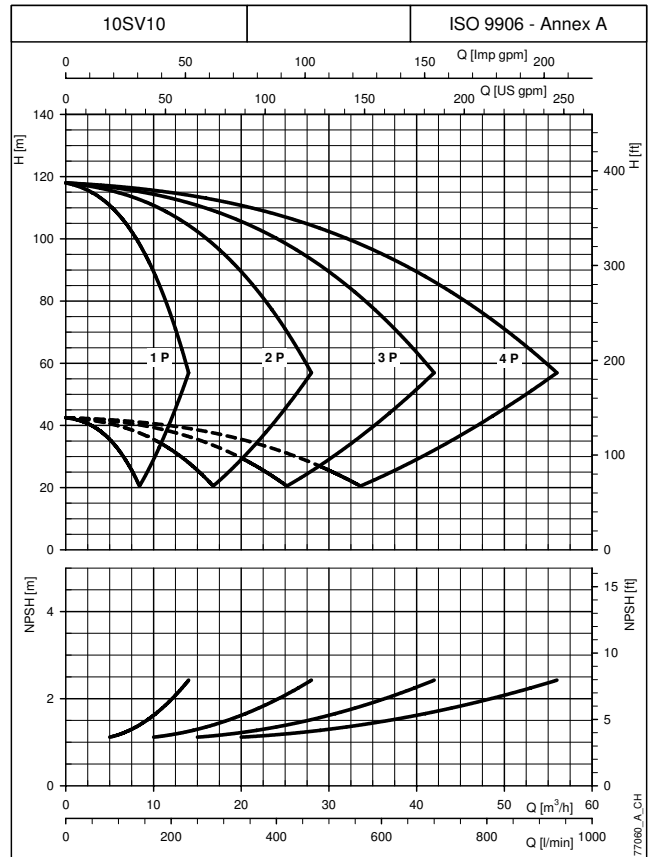
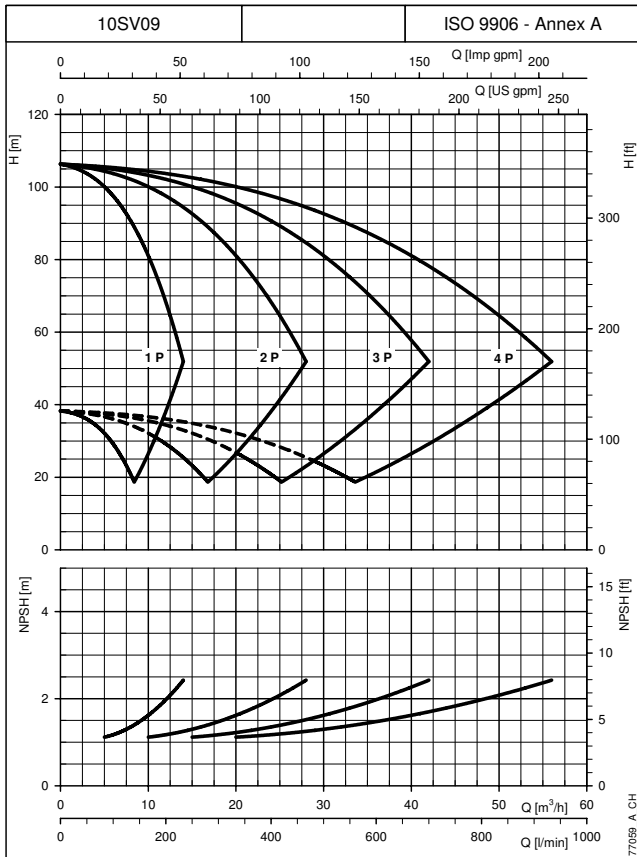
**BOOSTER SETS, GHV.../SV SERIES
OPERATING CHARACTERISTICS AT 30..50 Hz**



The performance curves do not take into account flow resistance in the valves and piping.
The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{s}$.
The declared NPSH values are laboratory values: for practical use we recommend increasing these values by 0,5 m.

CURVES

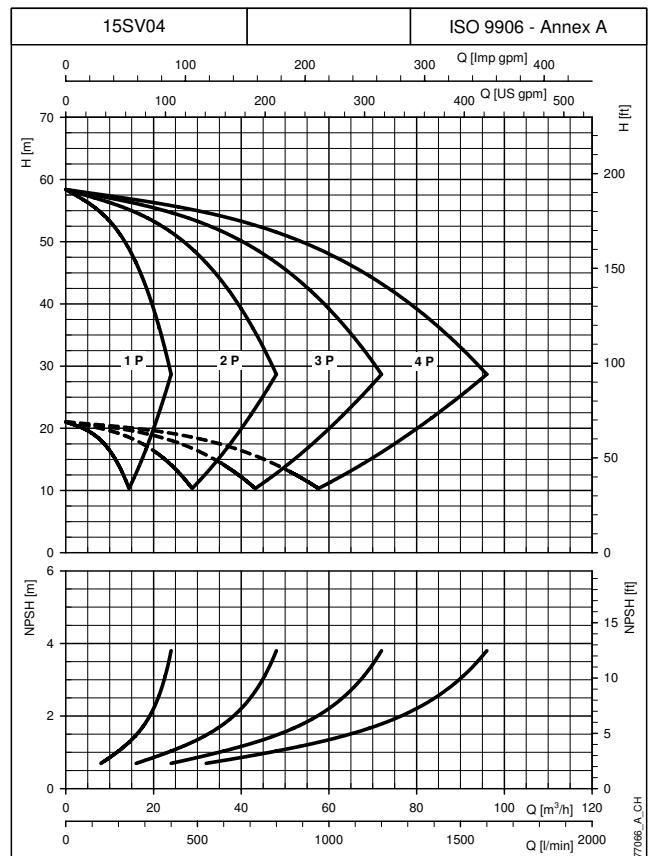
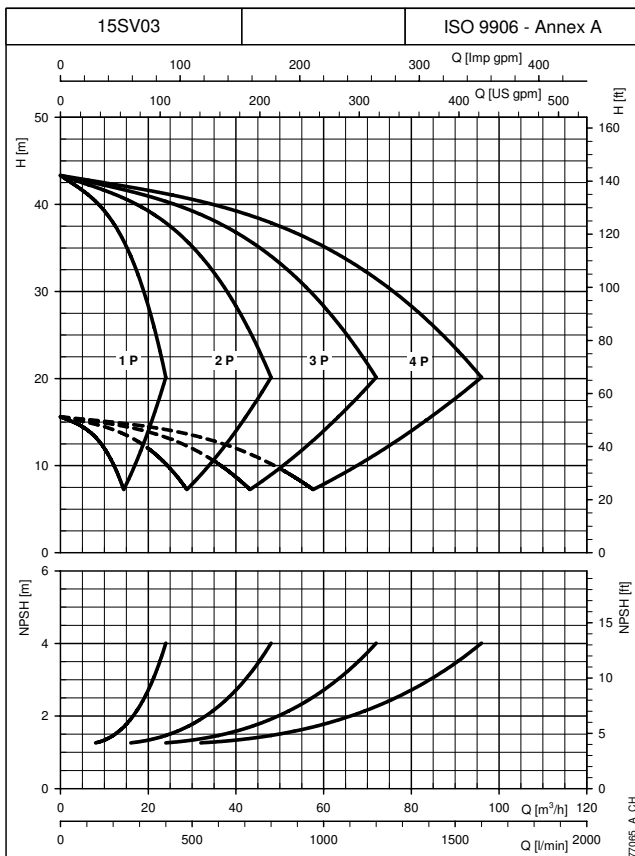
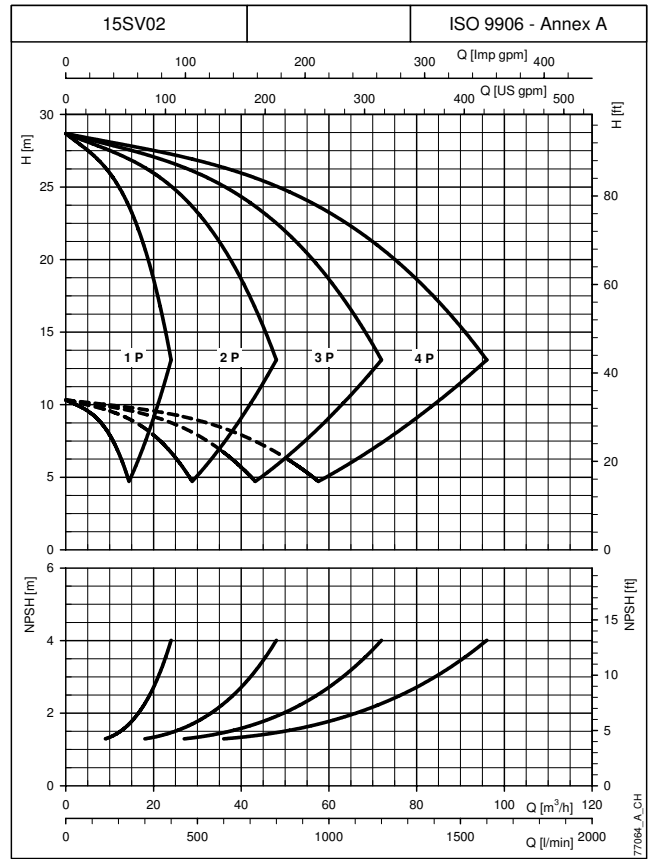
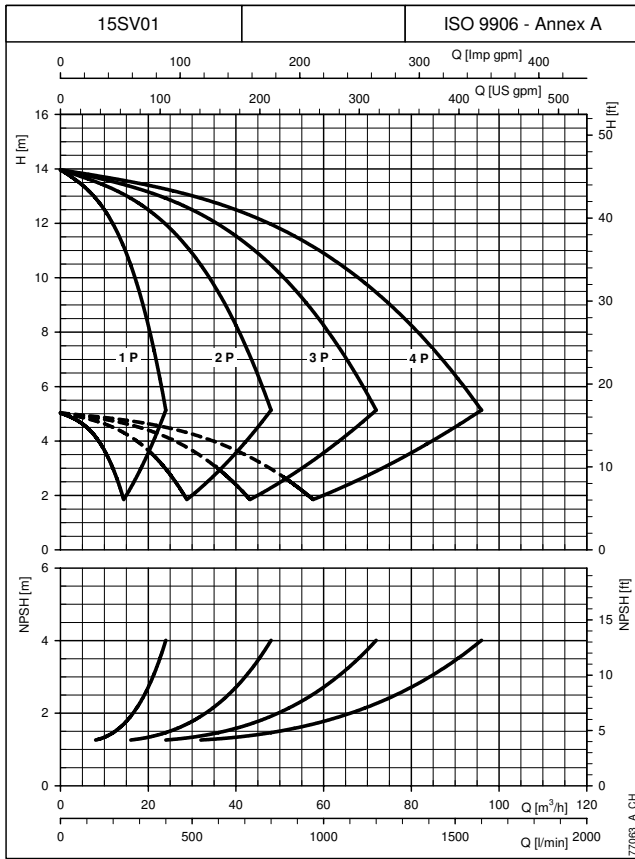
**BOOSTER SETS, GHV.../SV SERIES
OPERATING CHARACTERISTICS AT 30..50 Hz**



The performance curves do not take into account flow resistance in the valves and piping.
The curves show the performance with one, two, three and four pumps running.
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CURVES

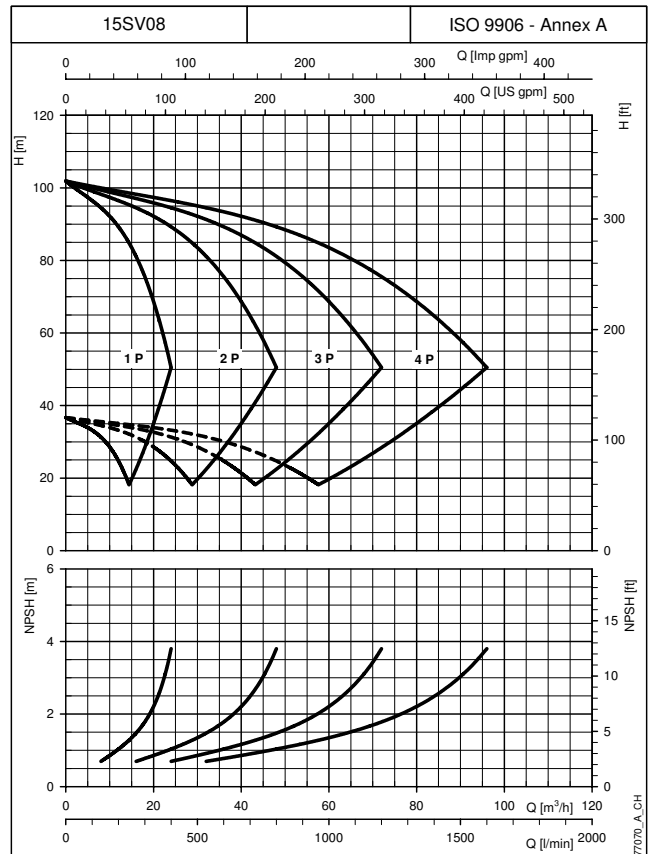
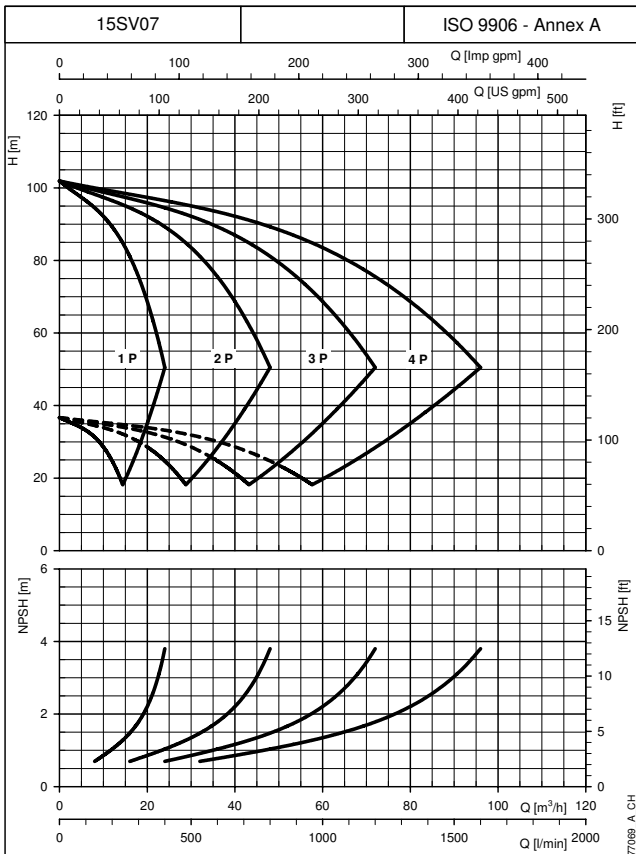
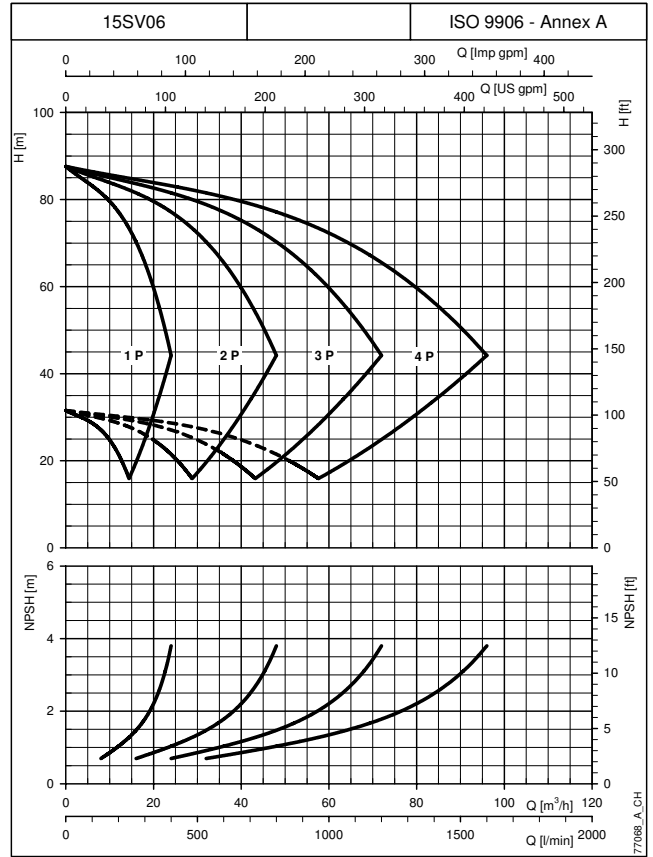
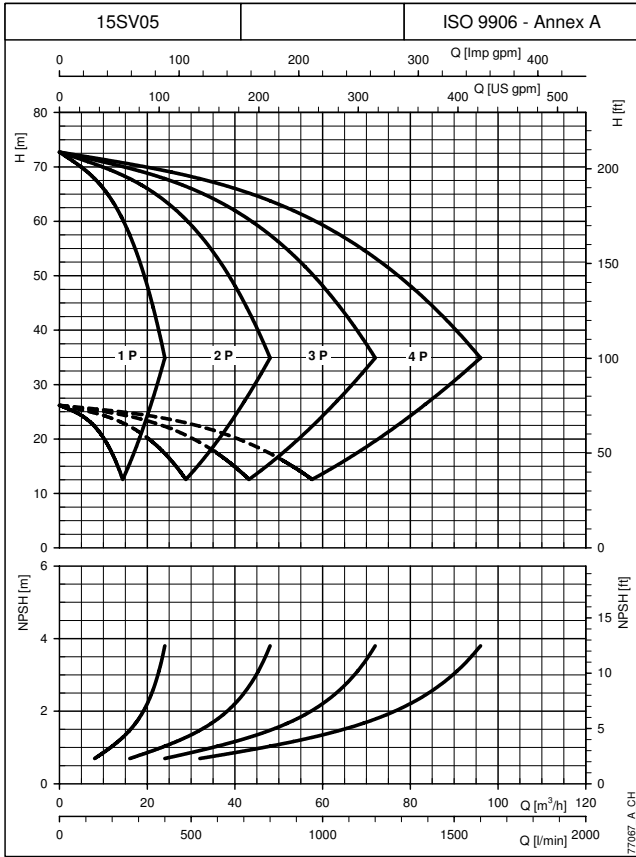
BOOSTER SETS, GHV.../SV SERIES OPERATING CHARACTERISTICS AT 30..50 Hz



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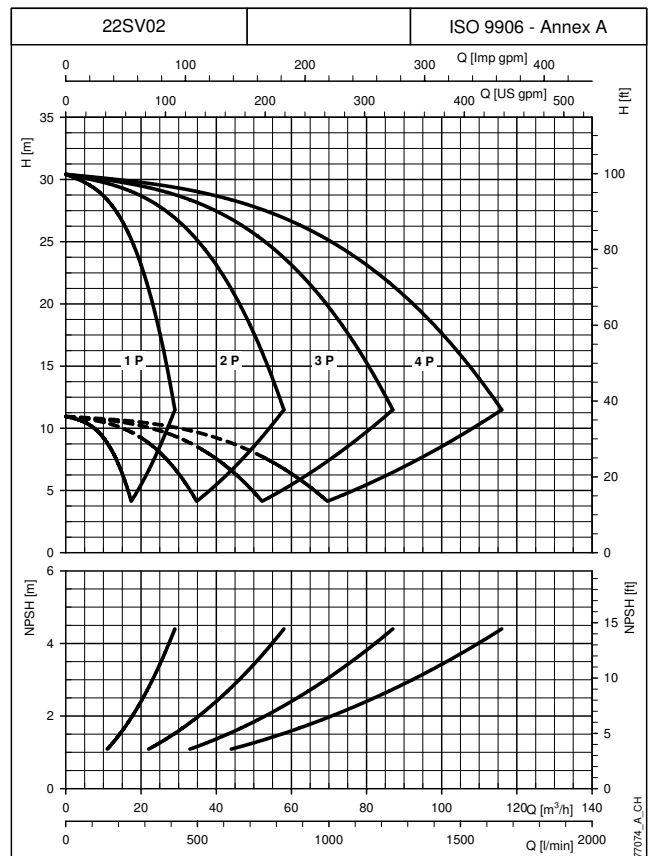
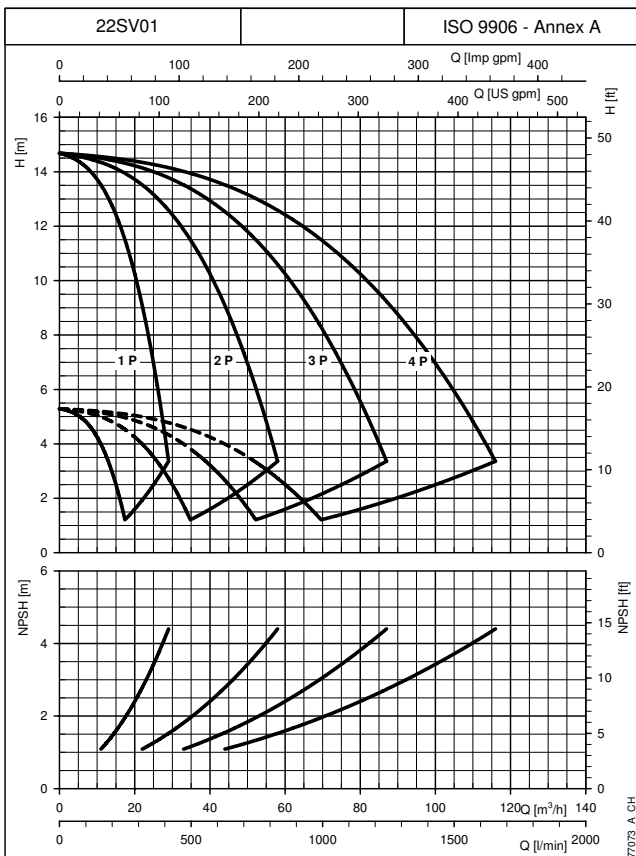
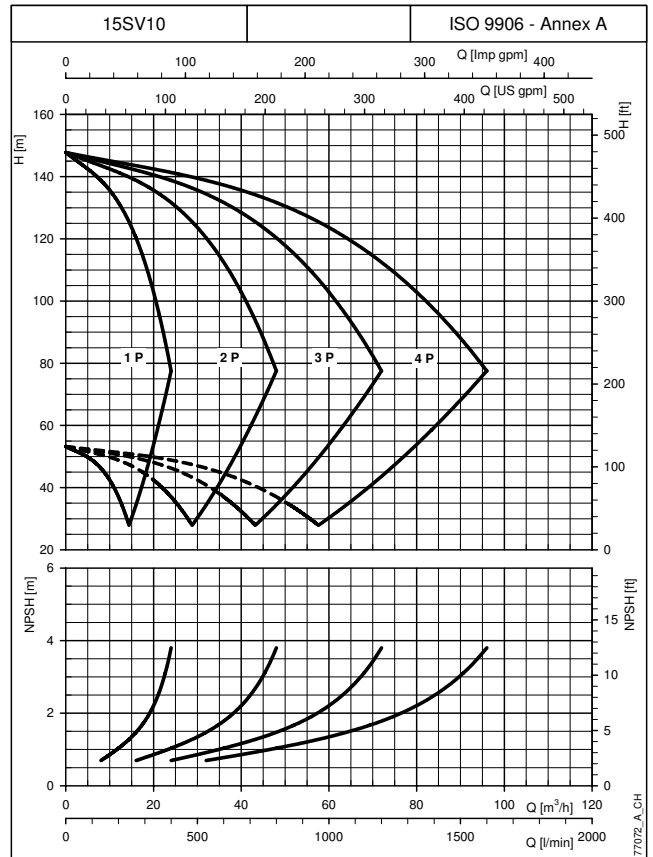
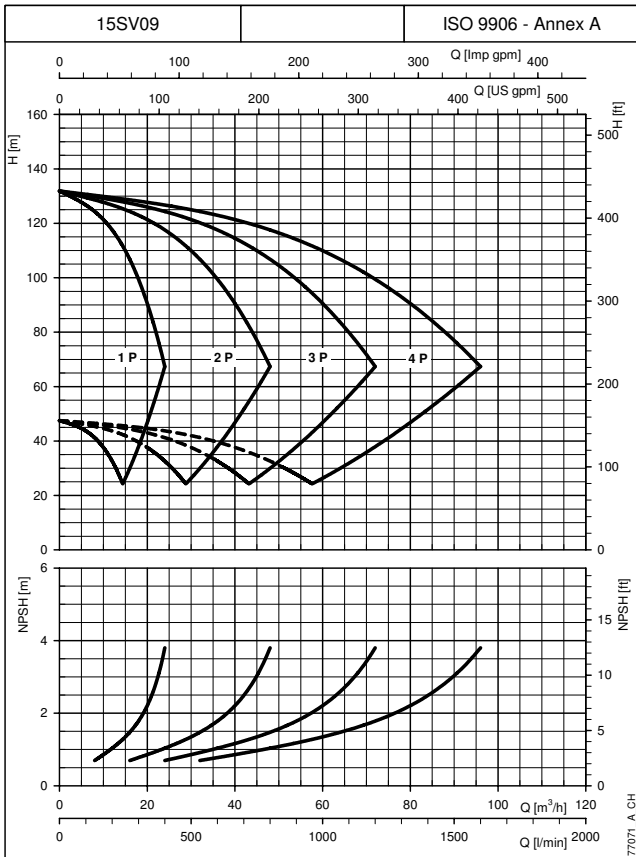
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OPERATING CHARACTERISTICS AT 30..50 Hz**



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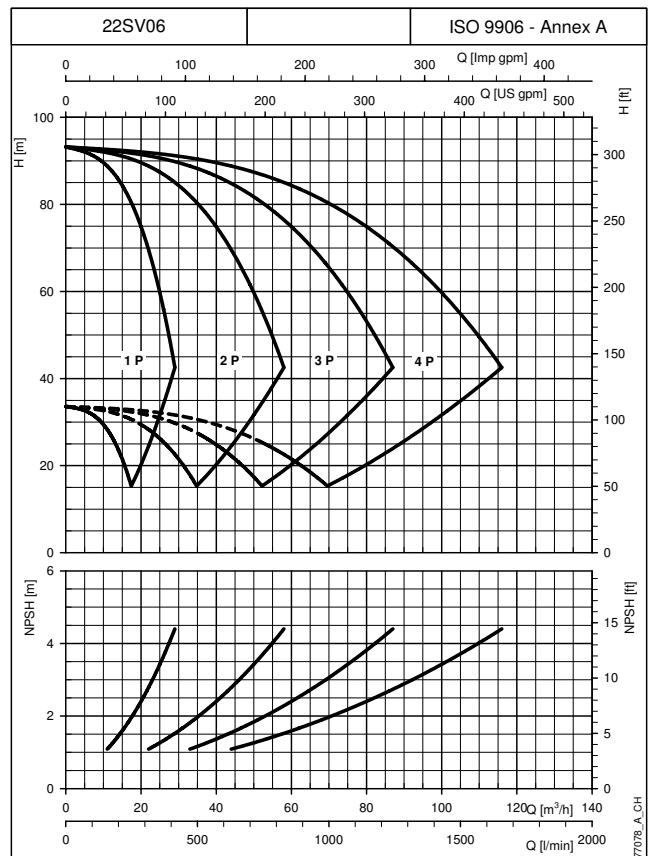
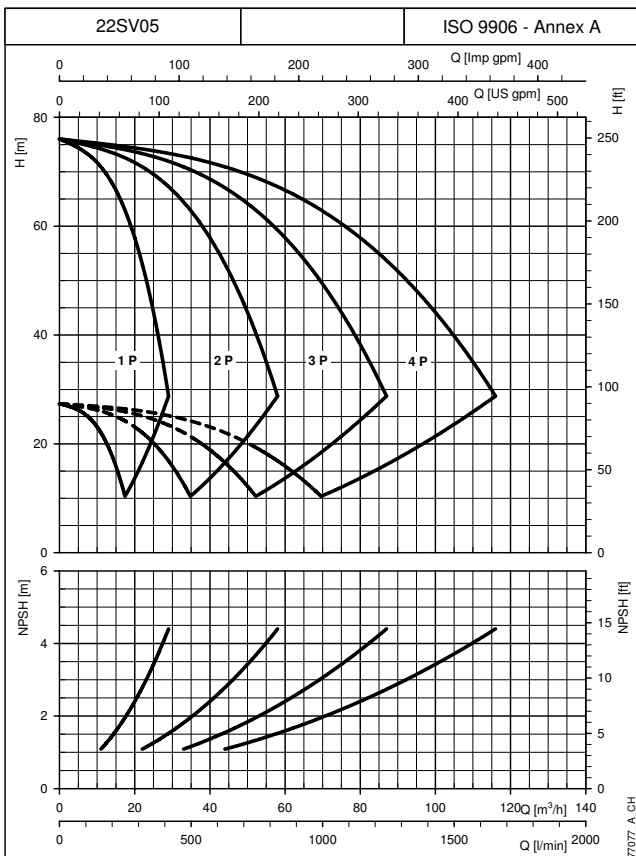
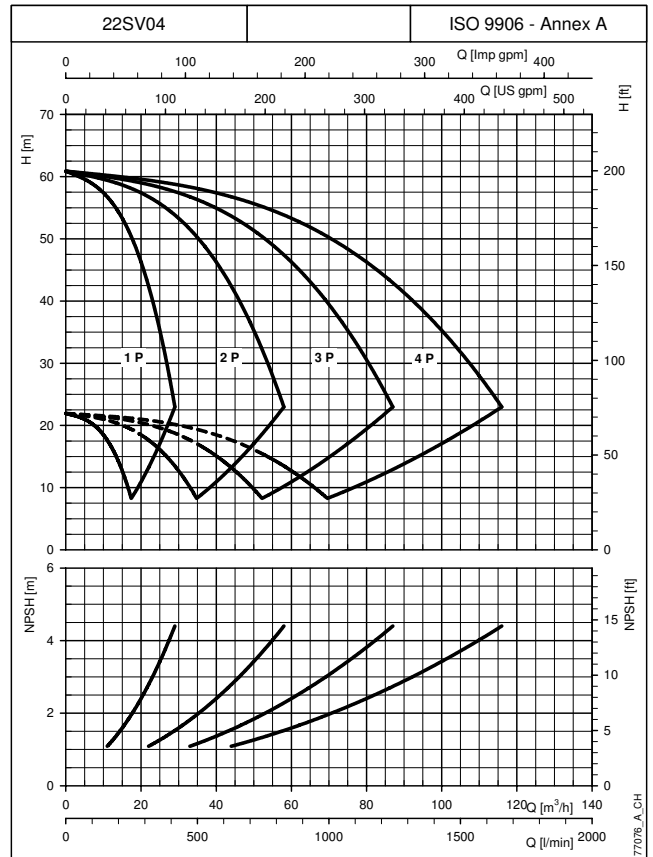
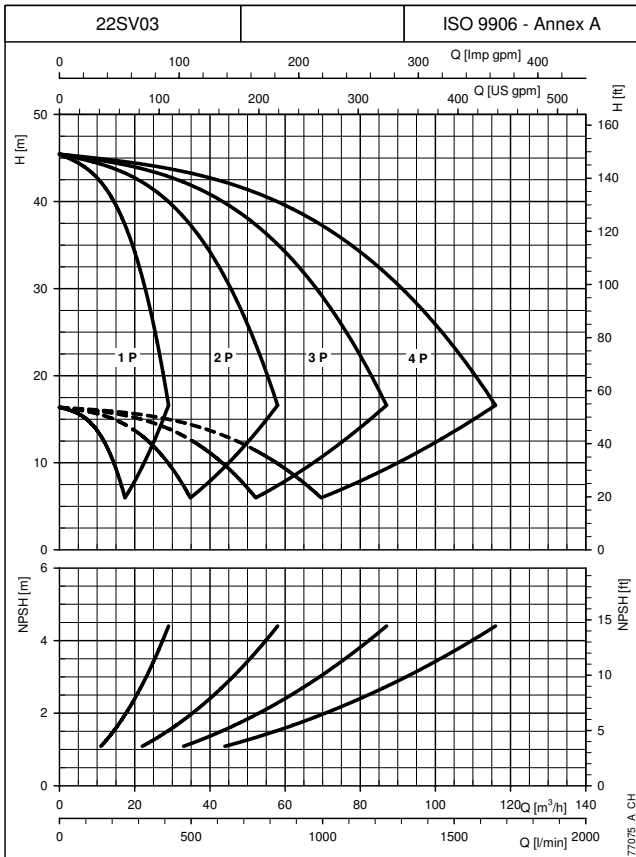
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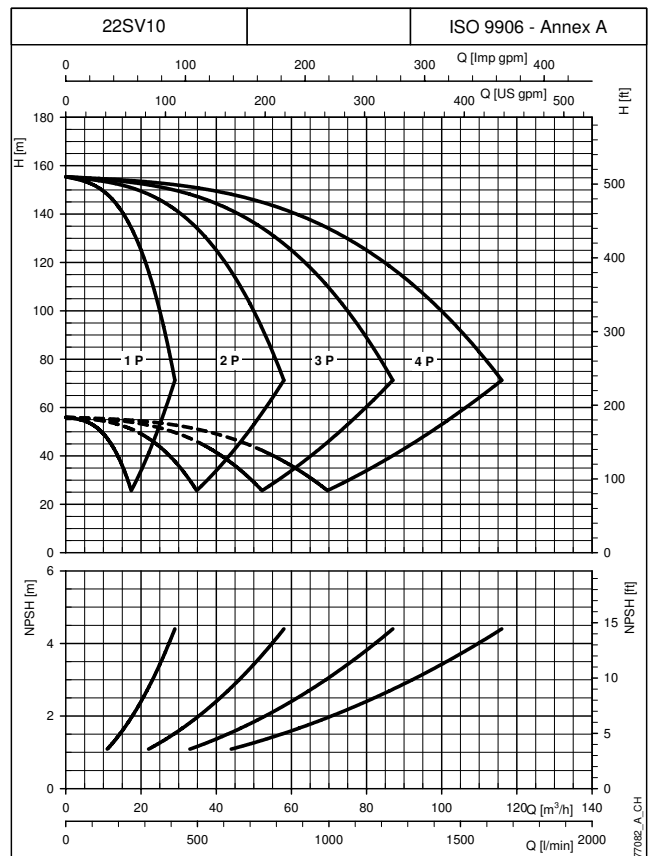
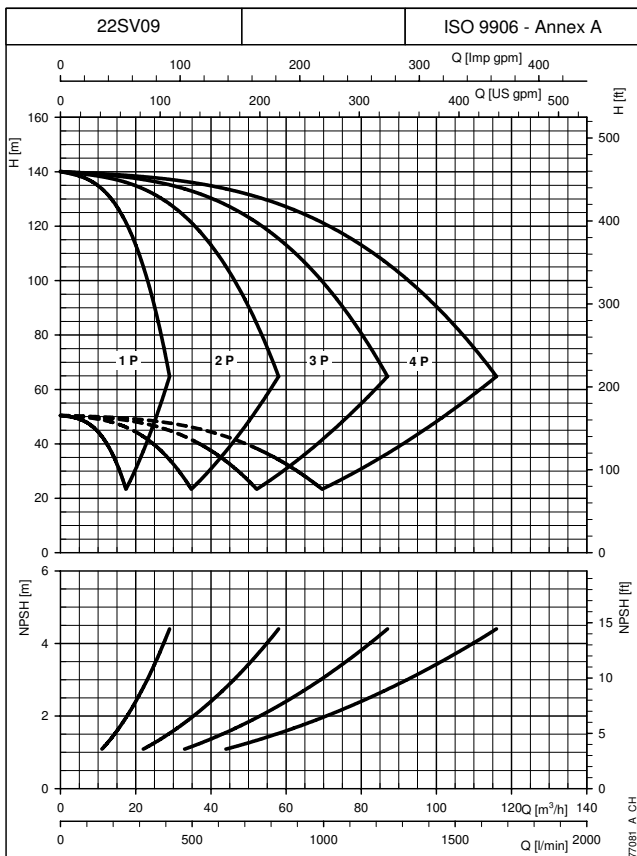
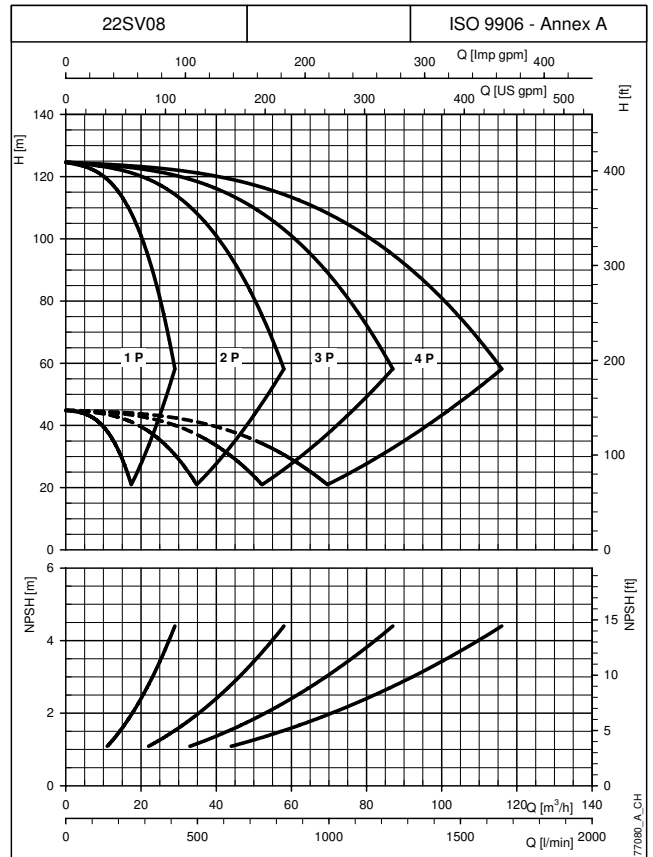
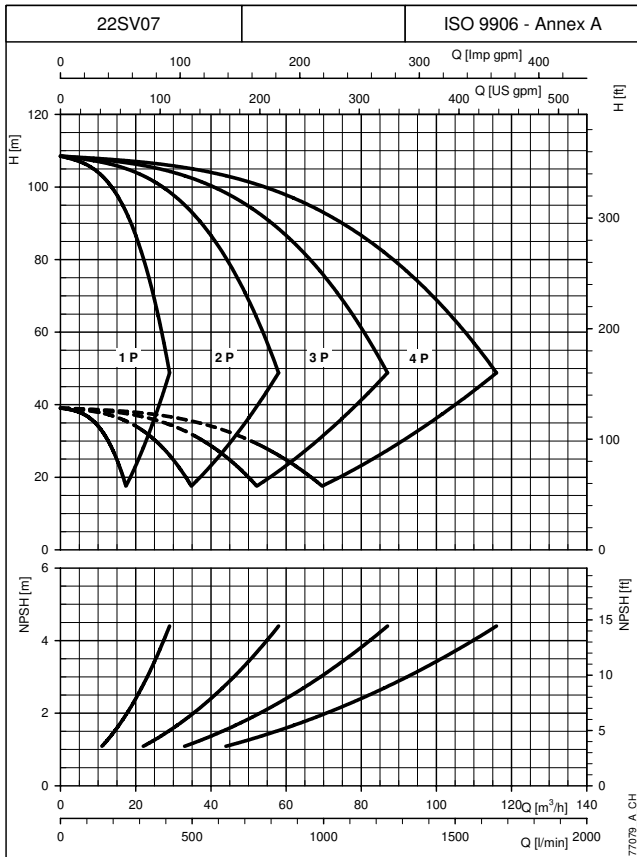
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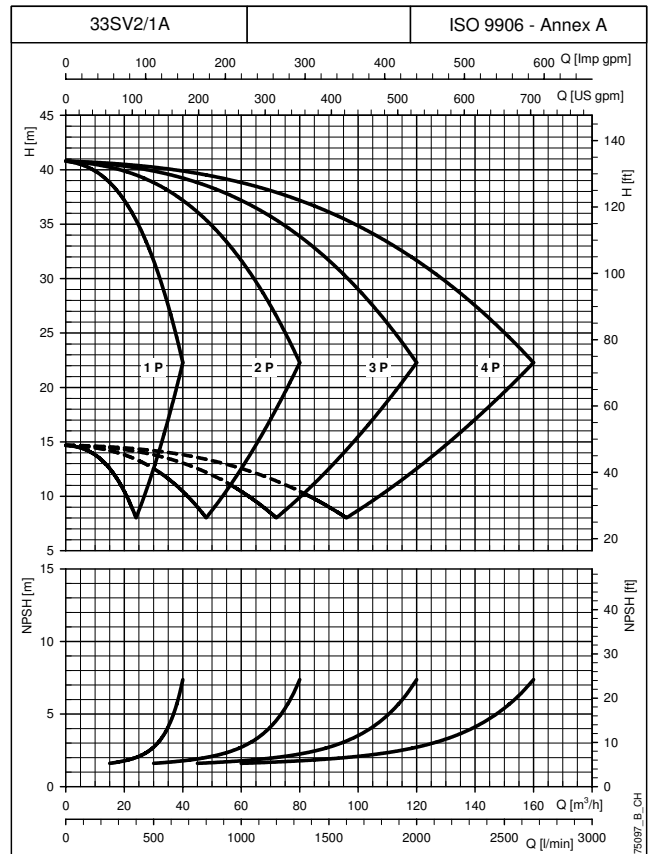
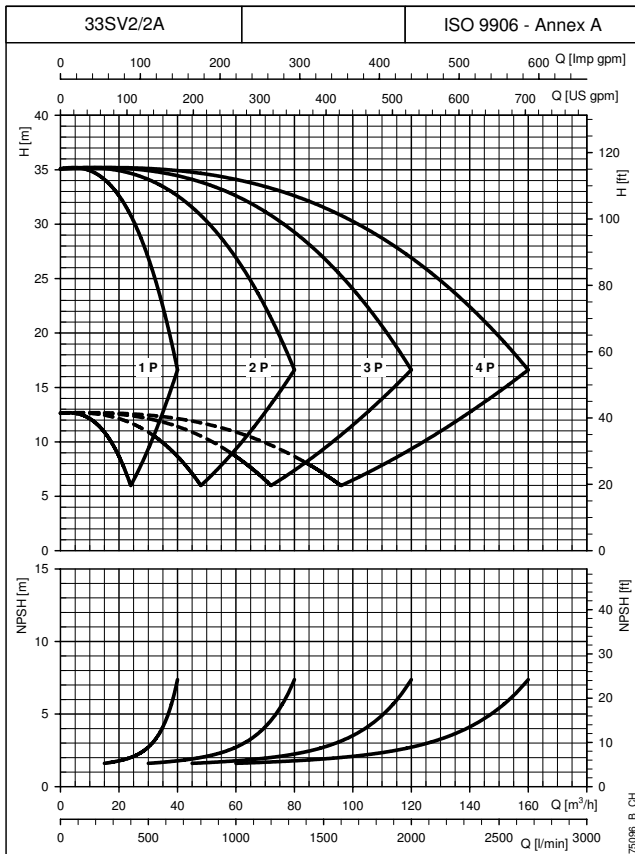
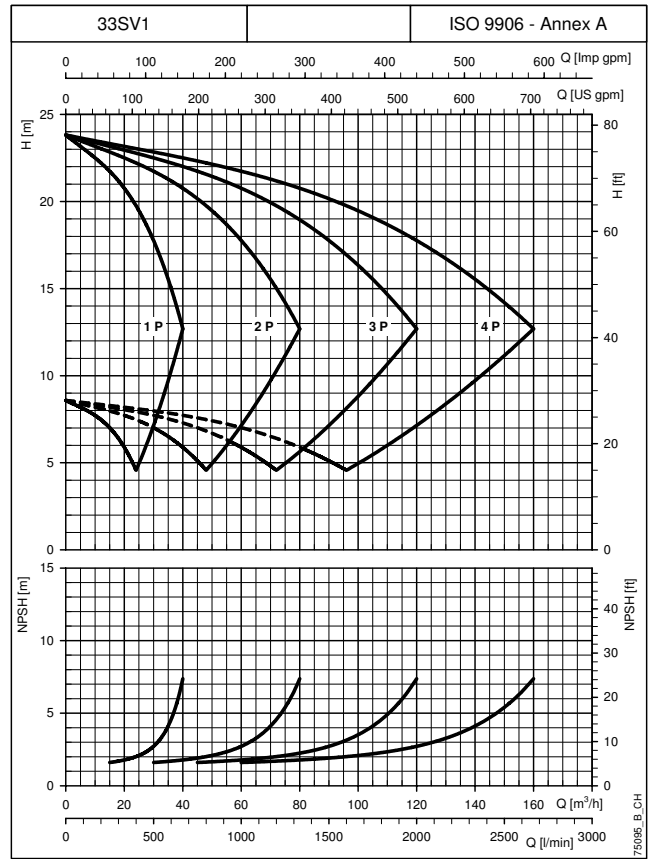
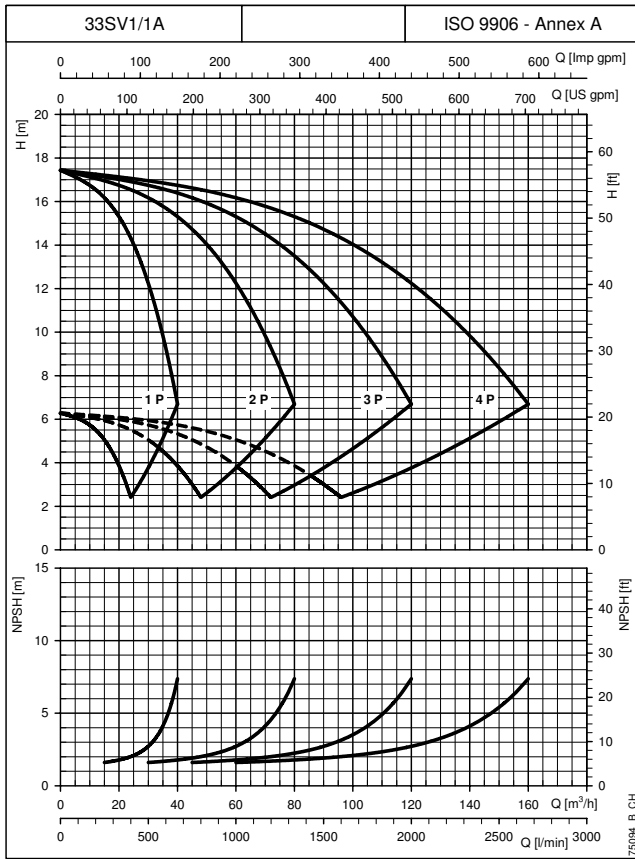
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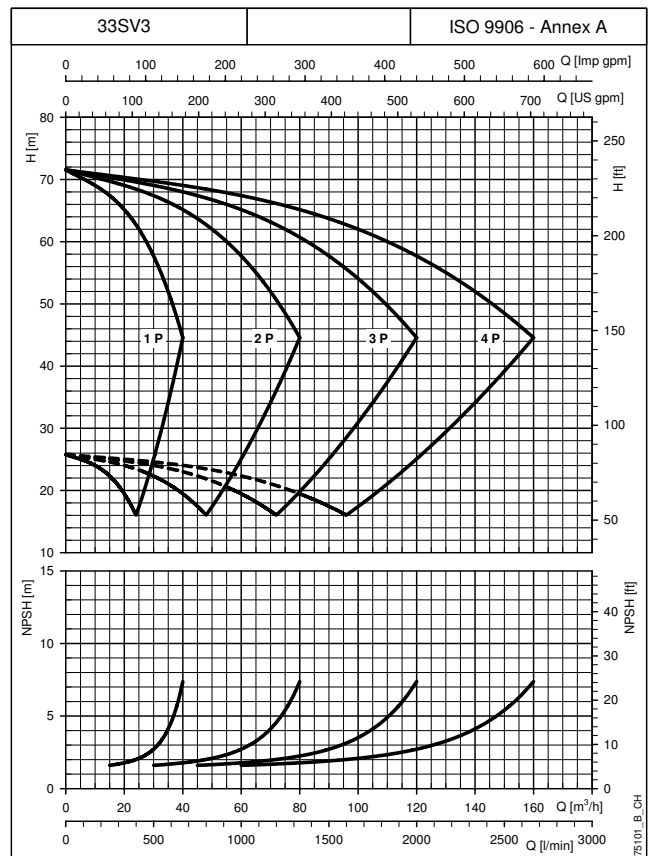
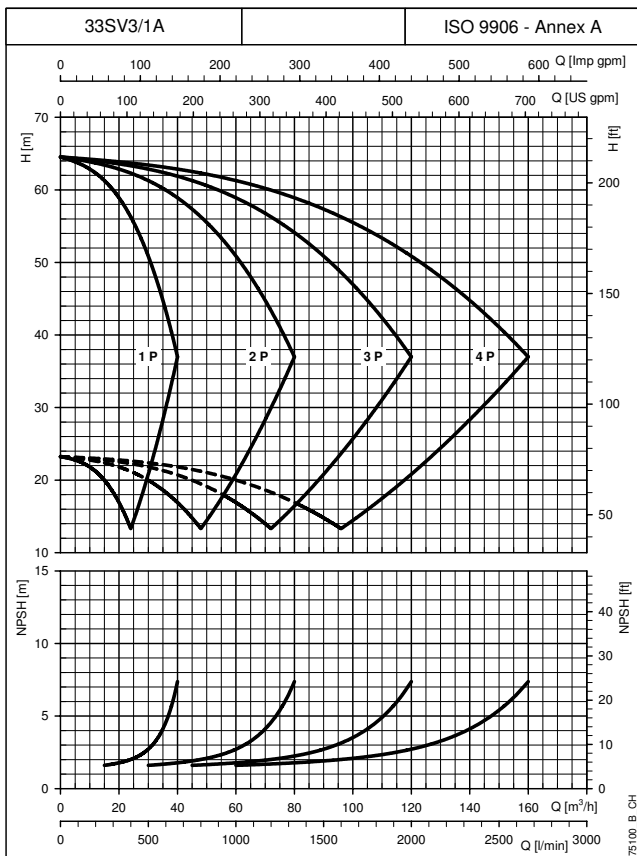
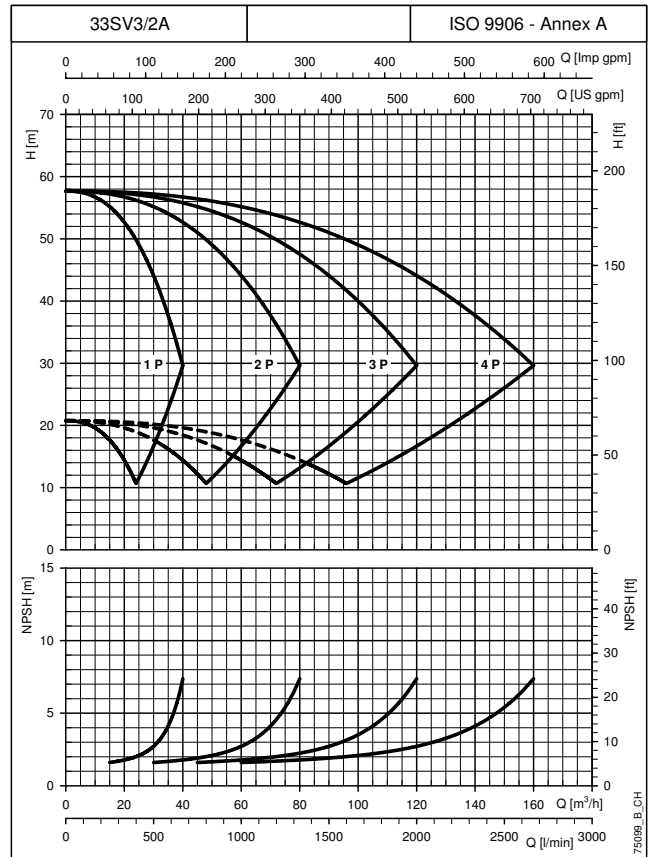
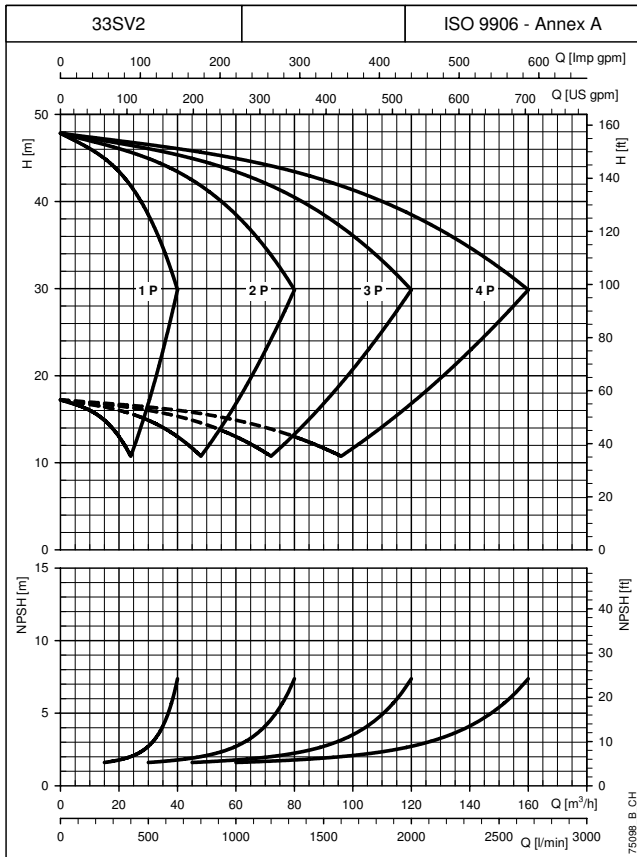
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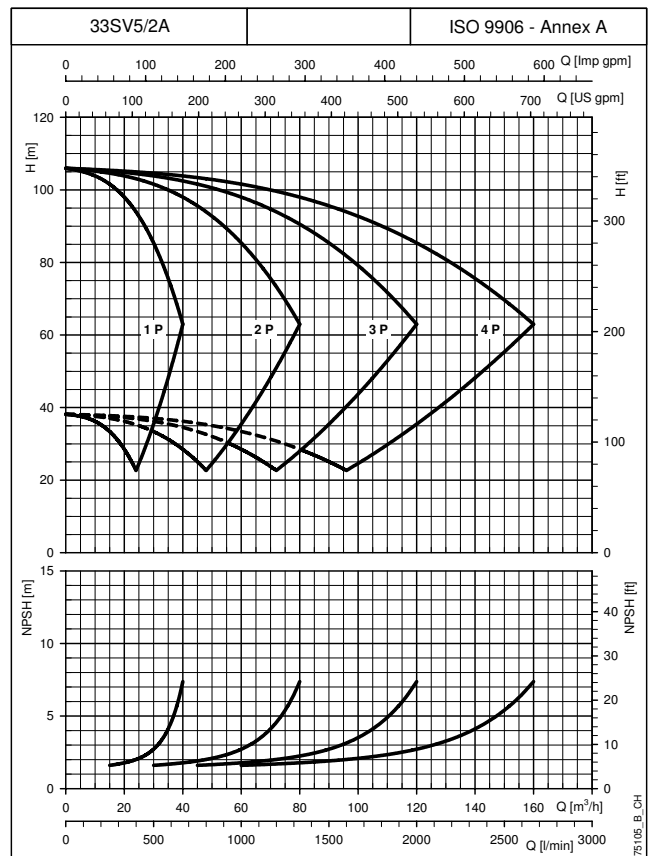
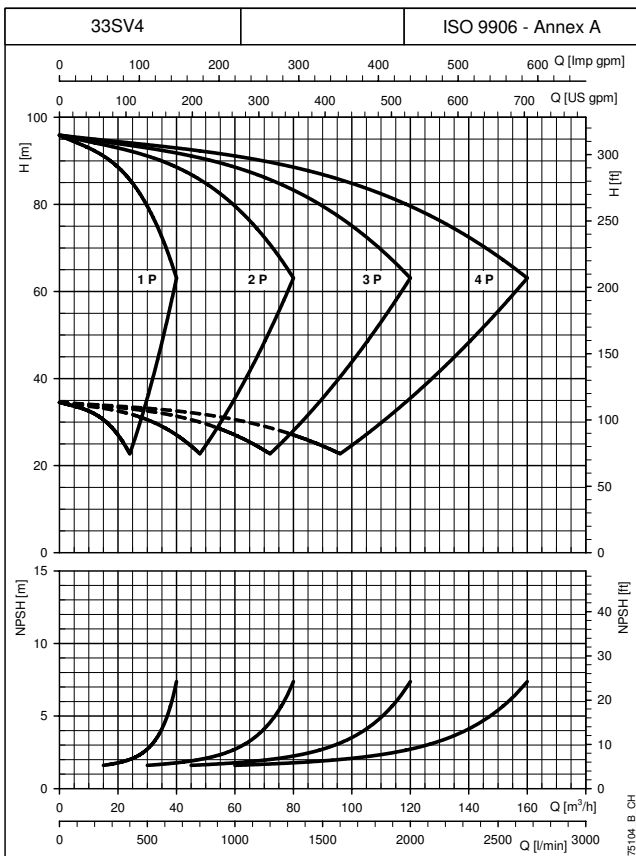
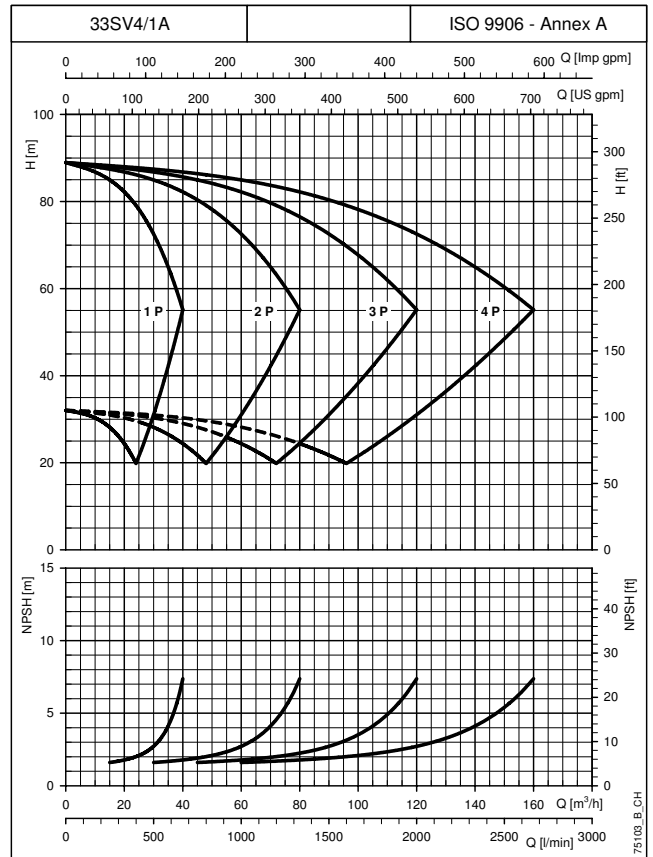
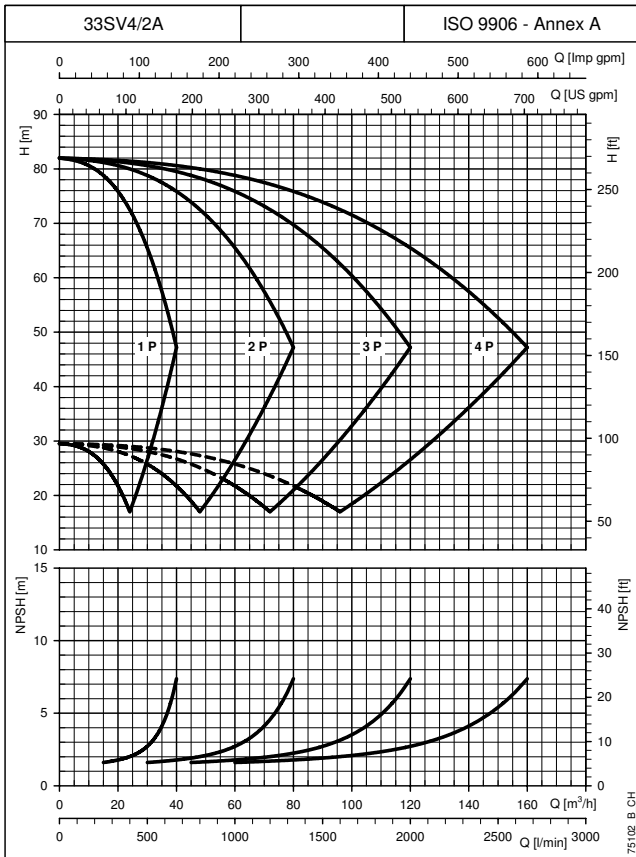
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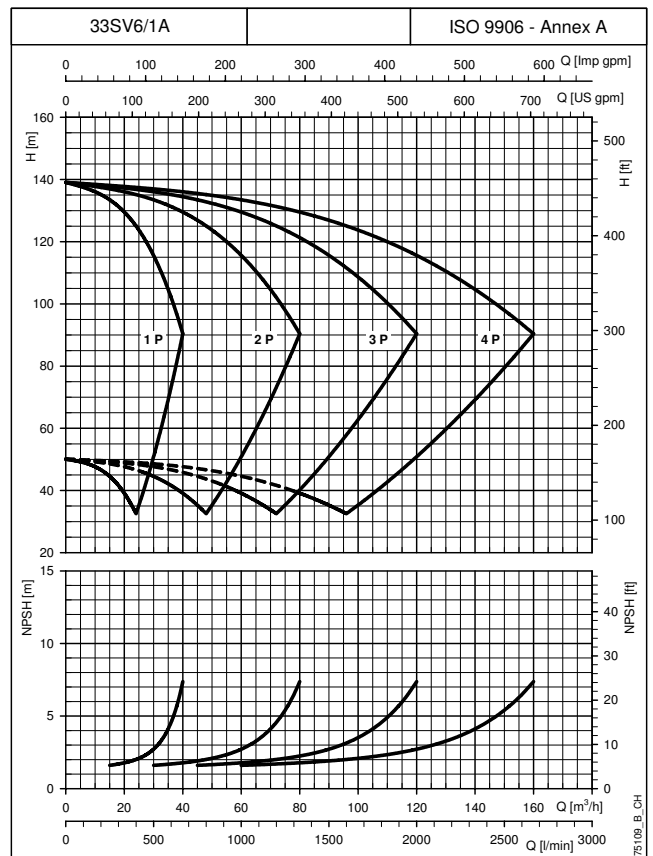
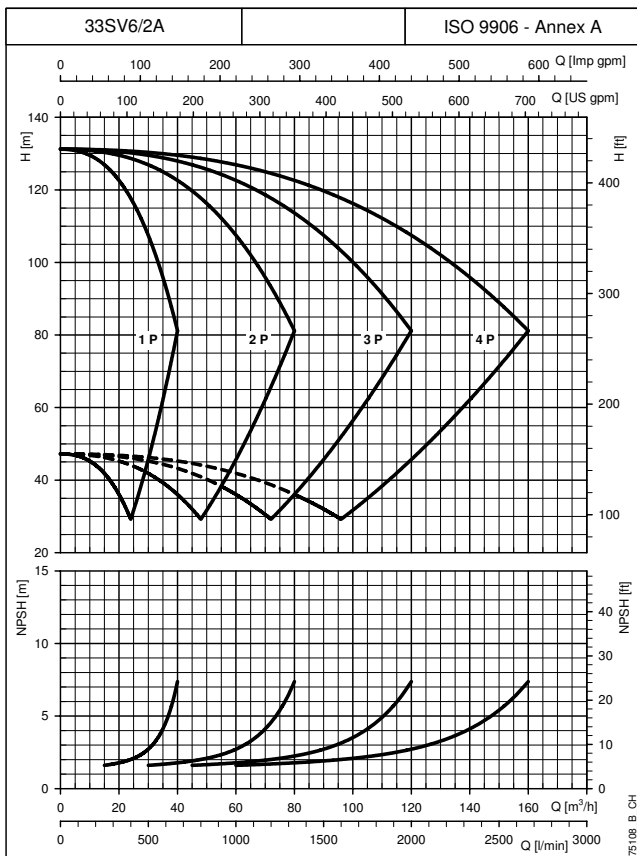
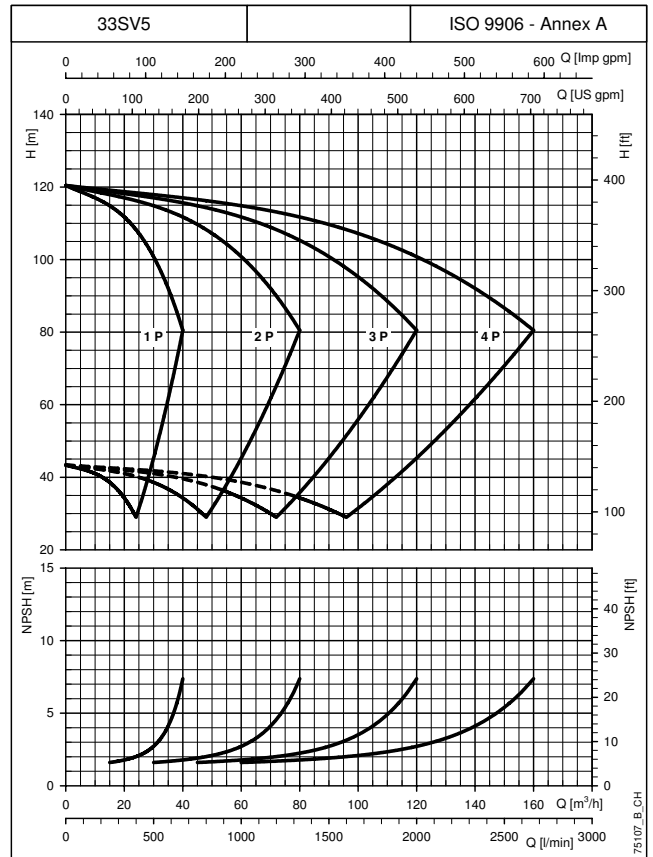
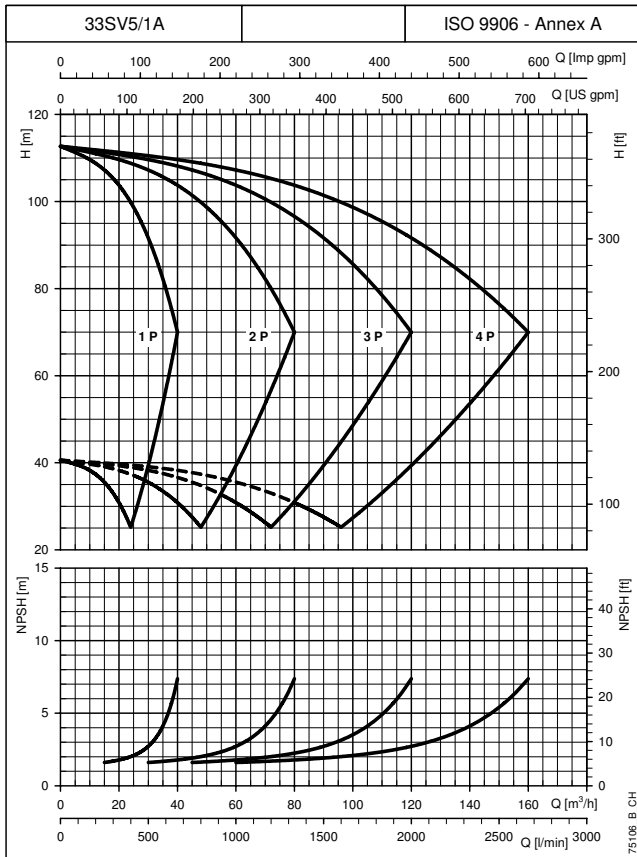
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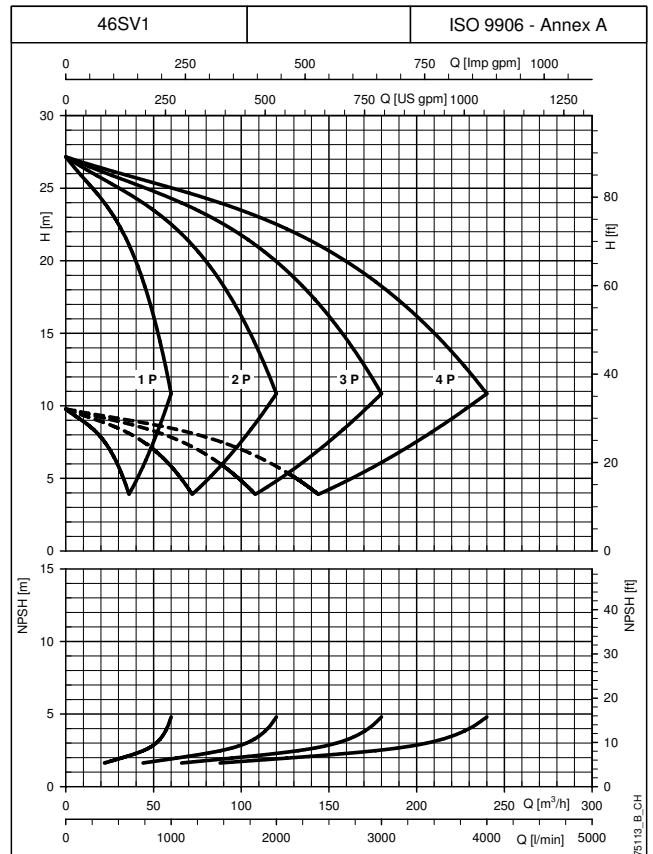
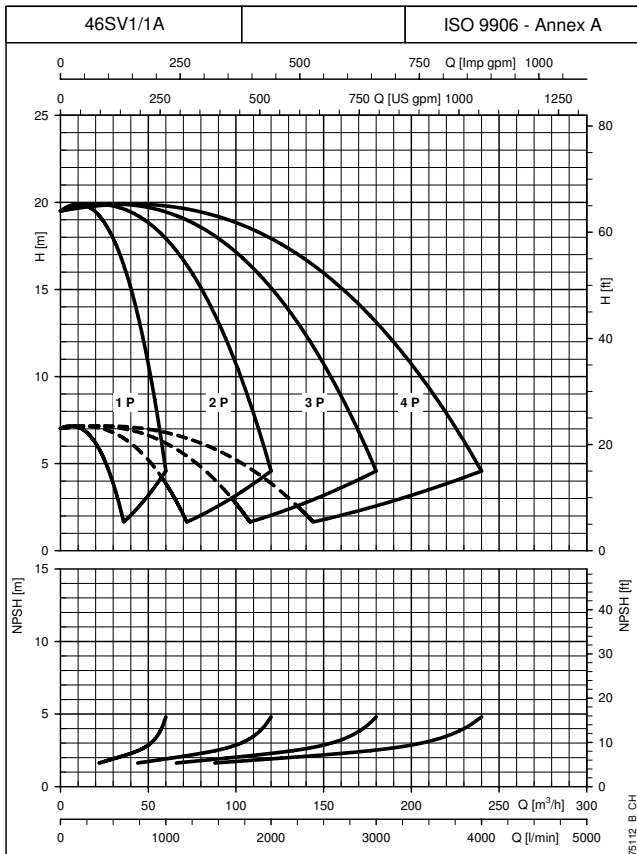
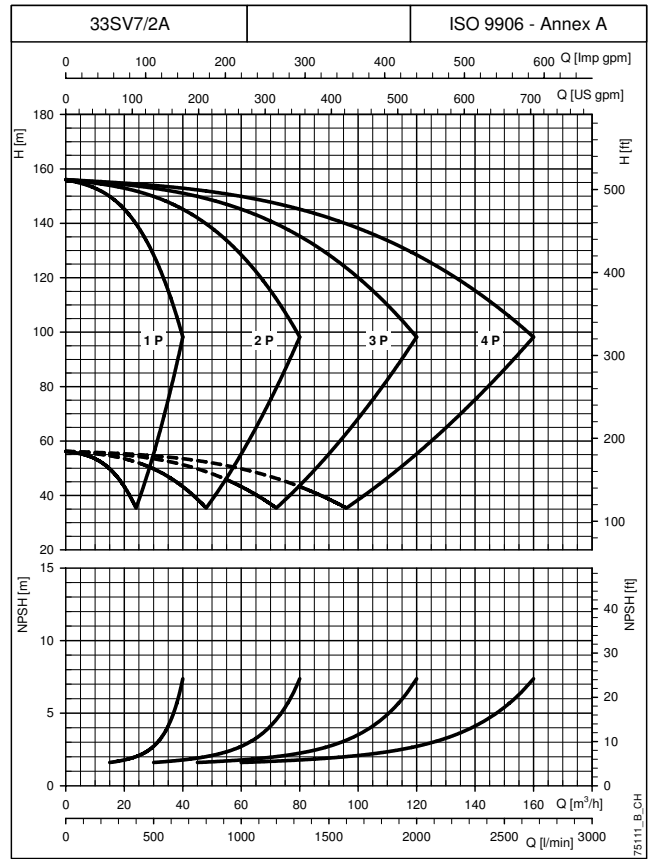
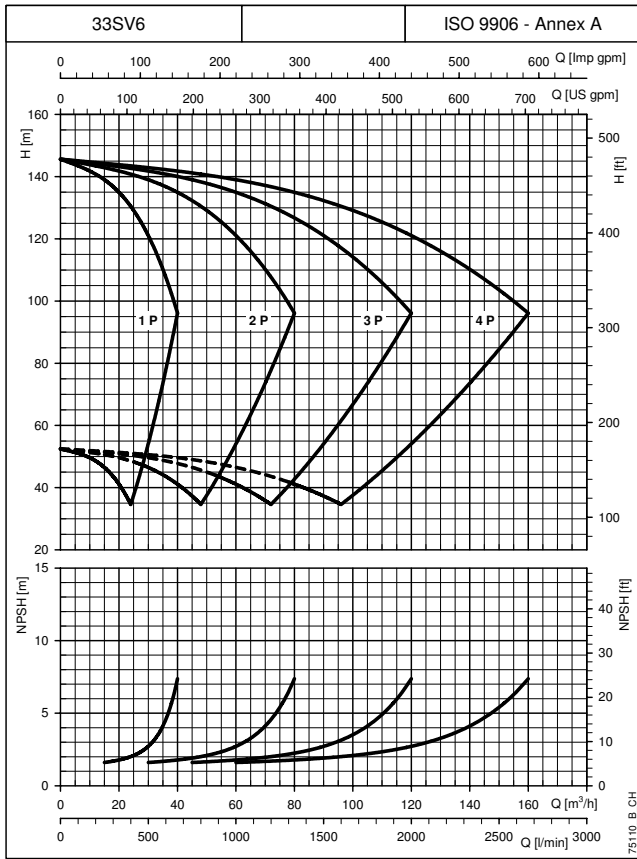
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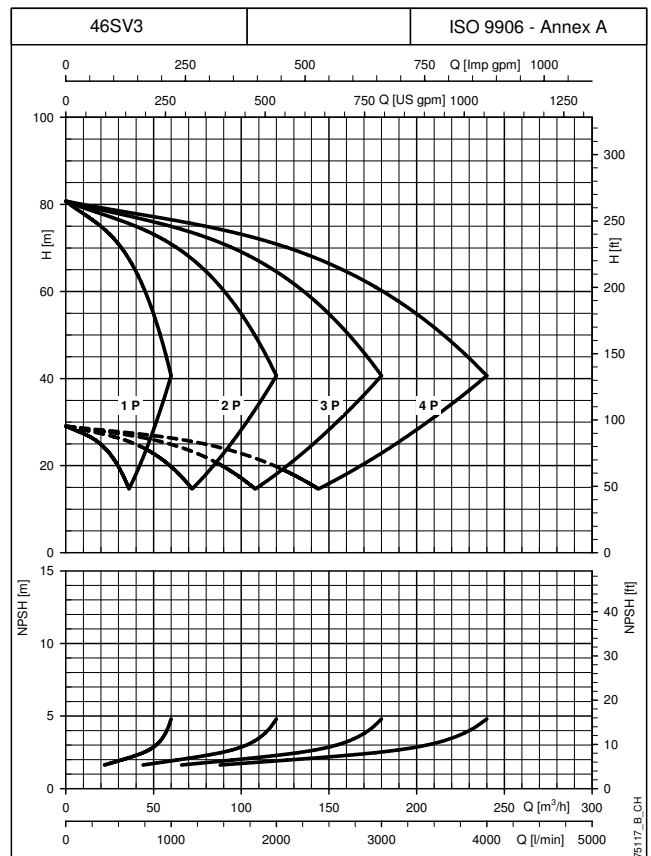
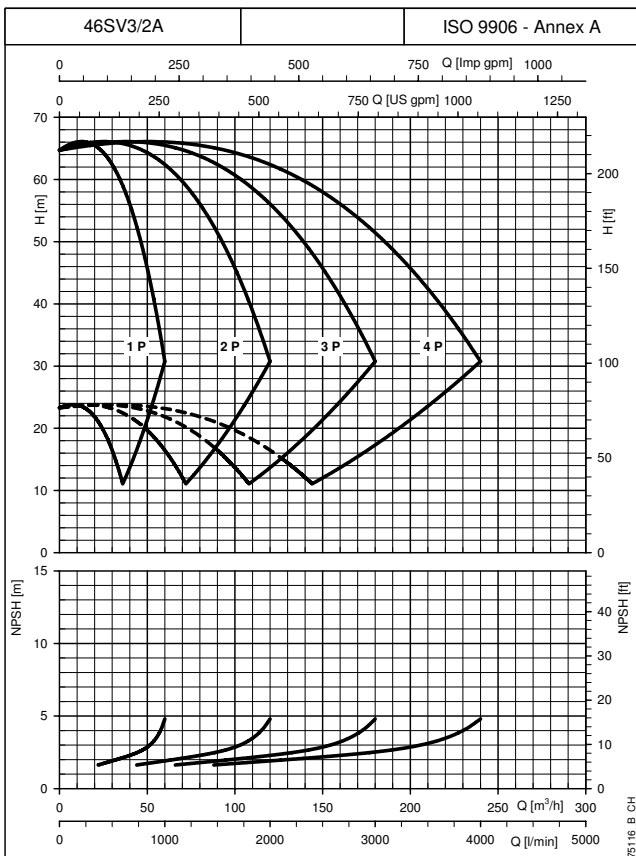
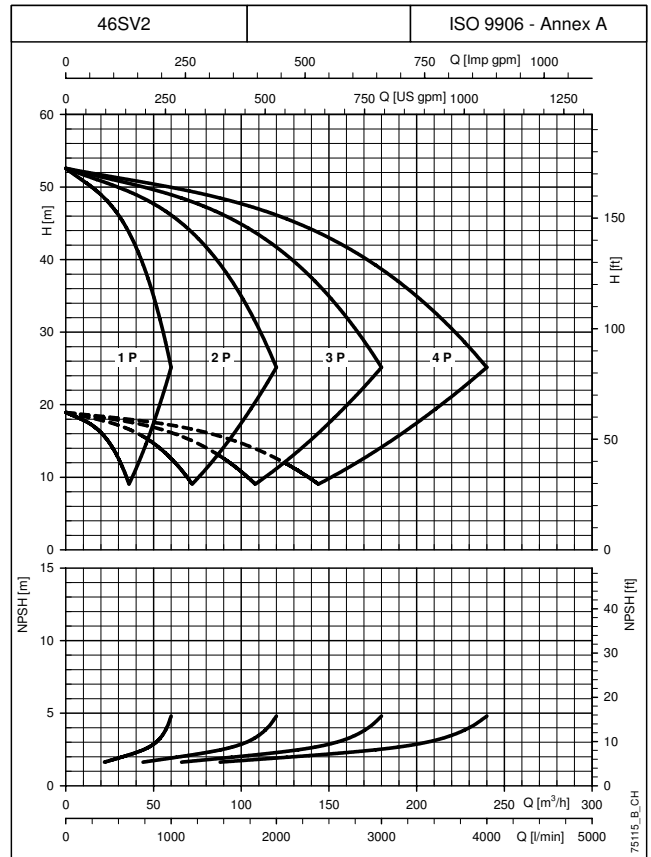
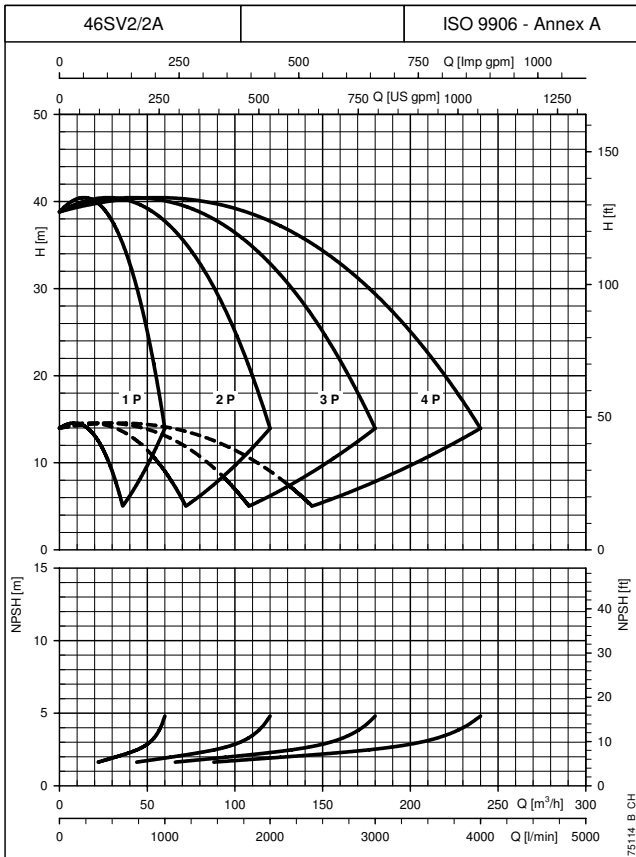
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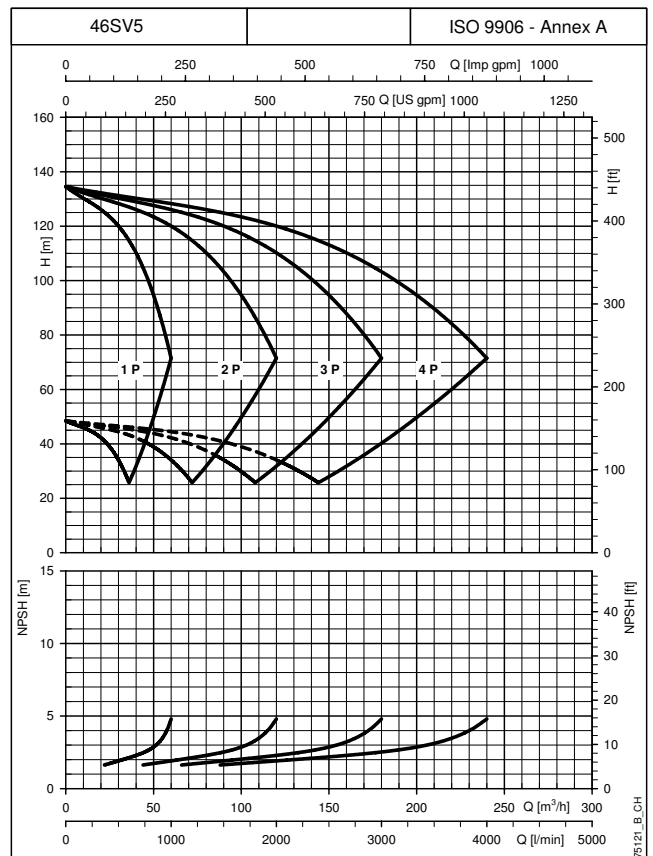
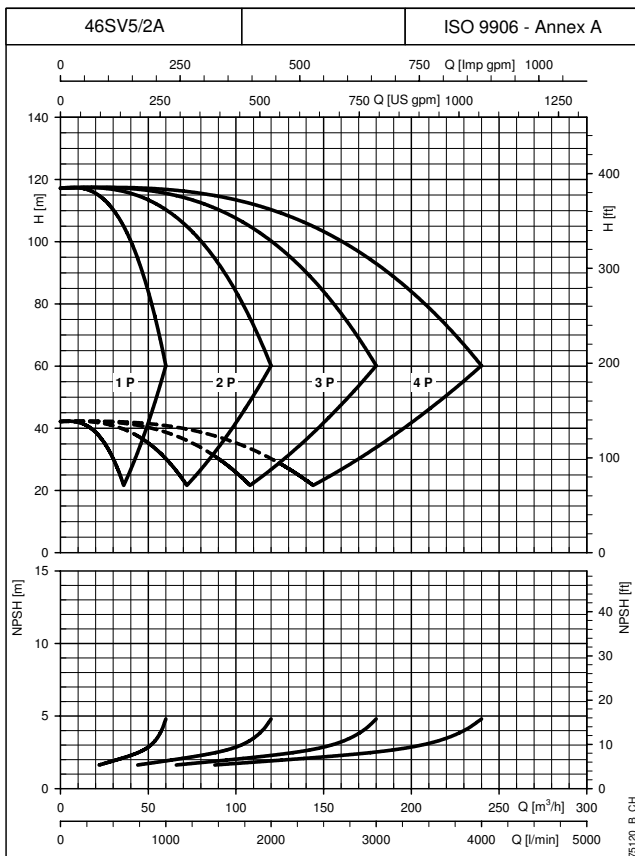
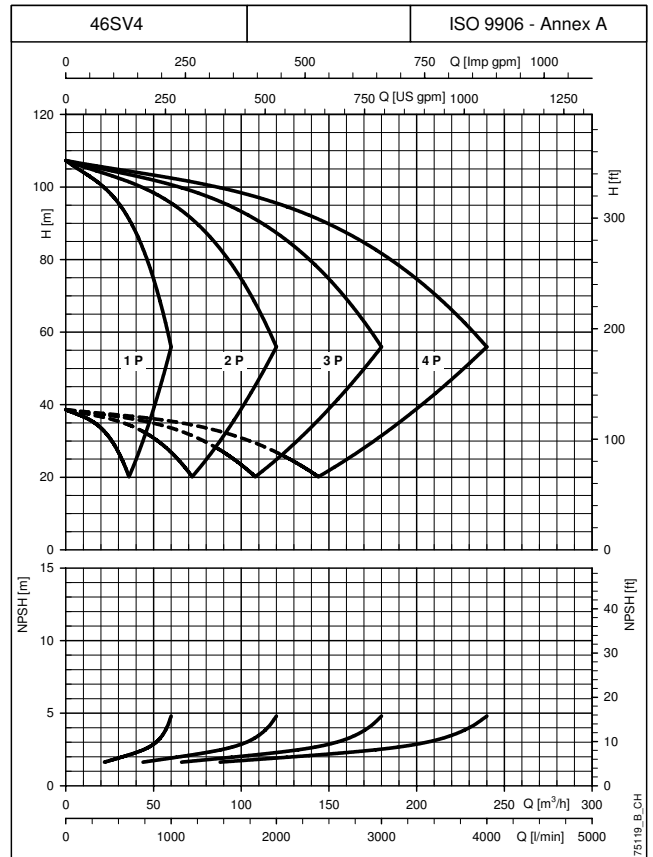
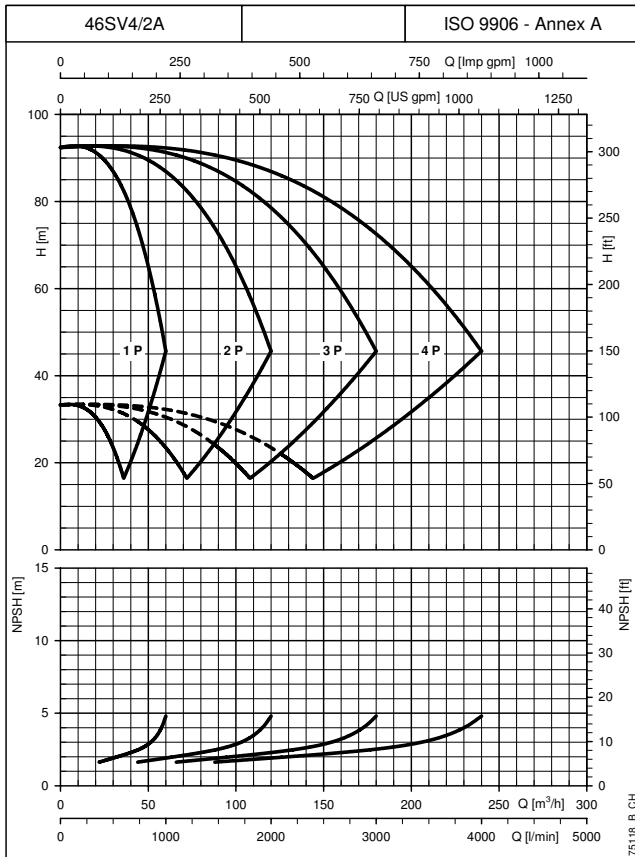
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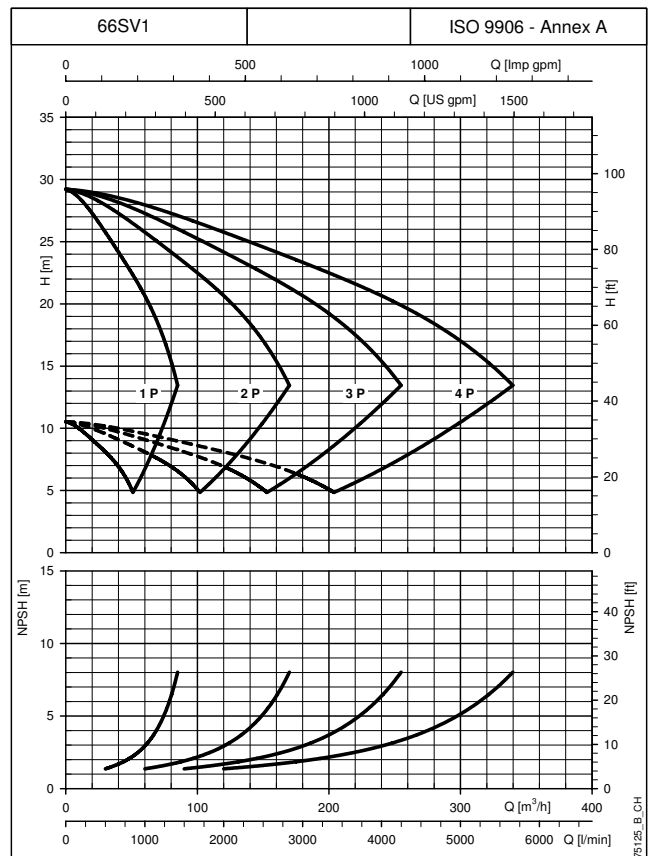
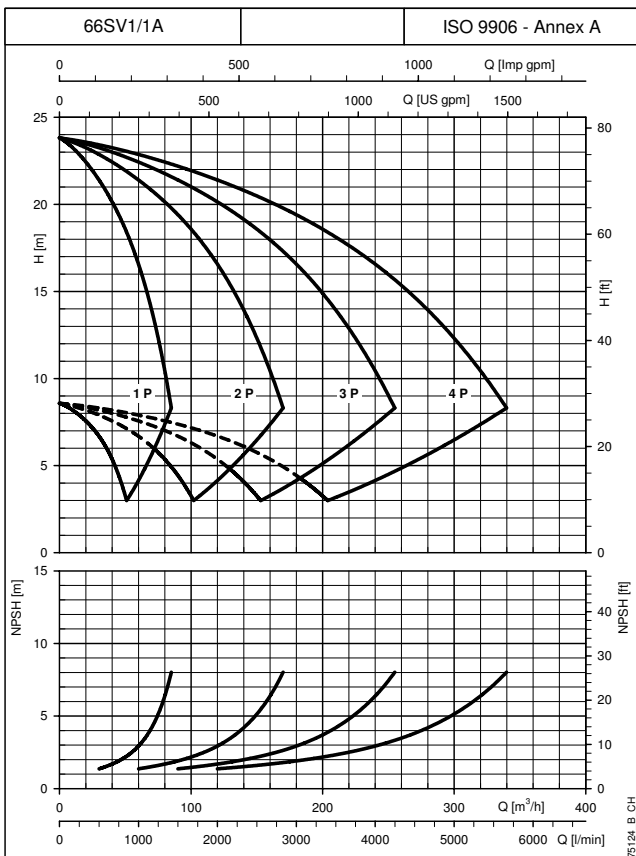
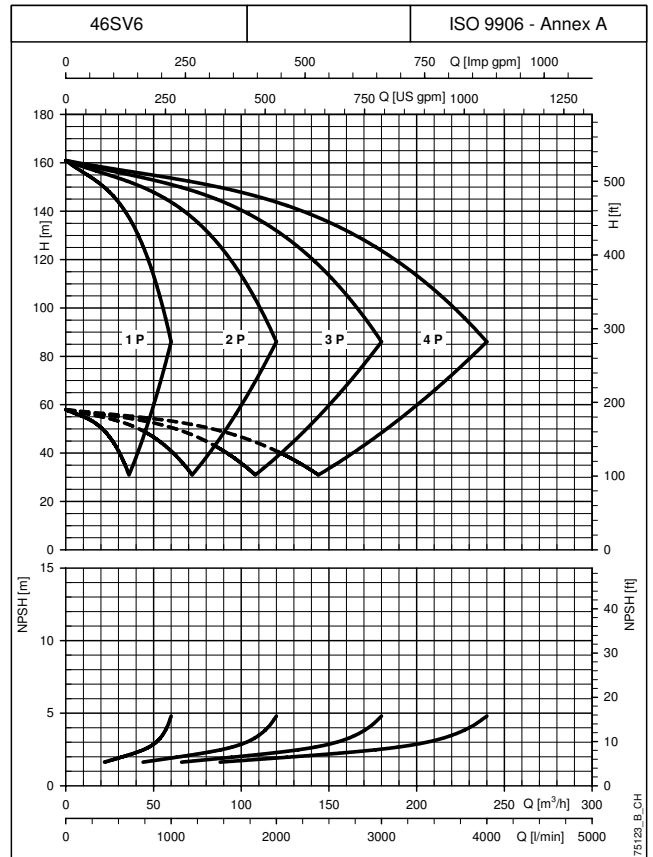
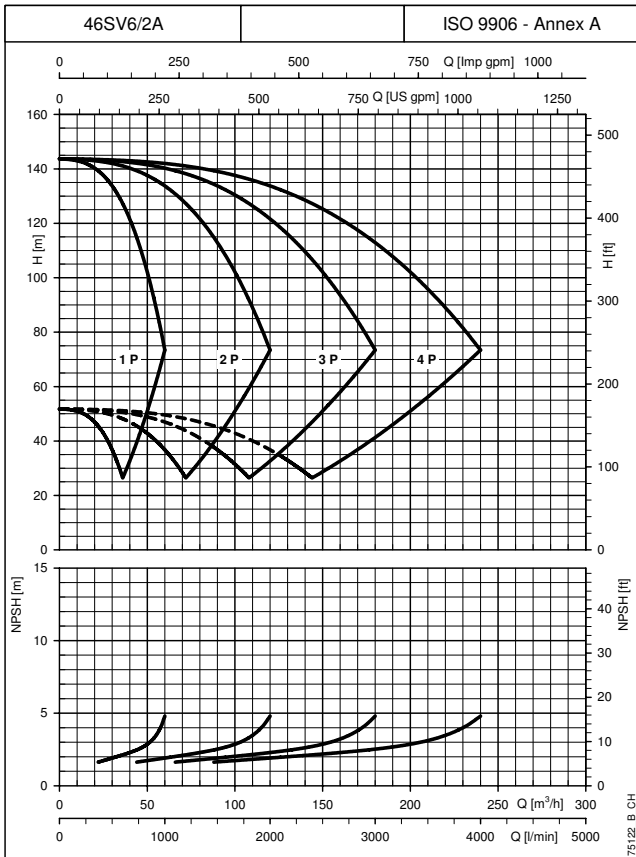
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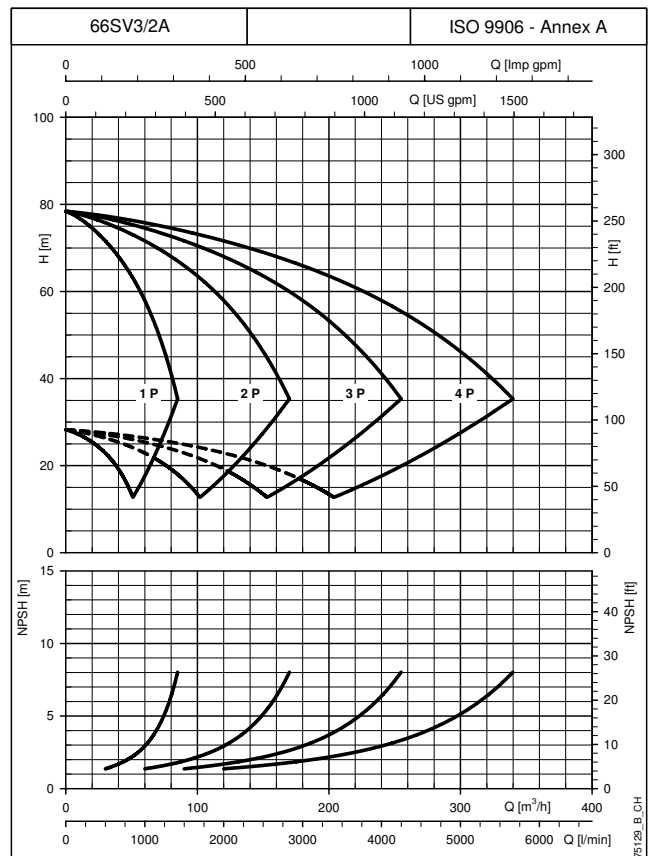
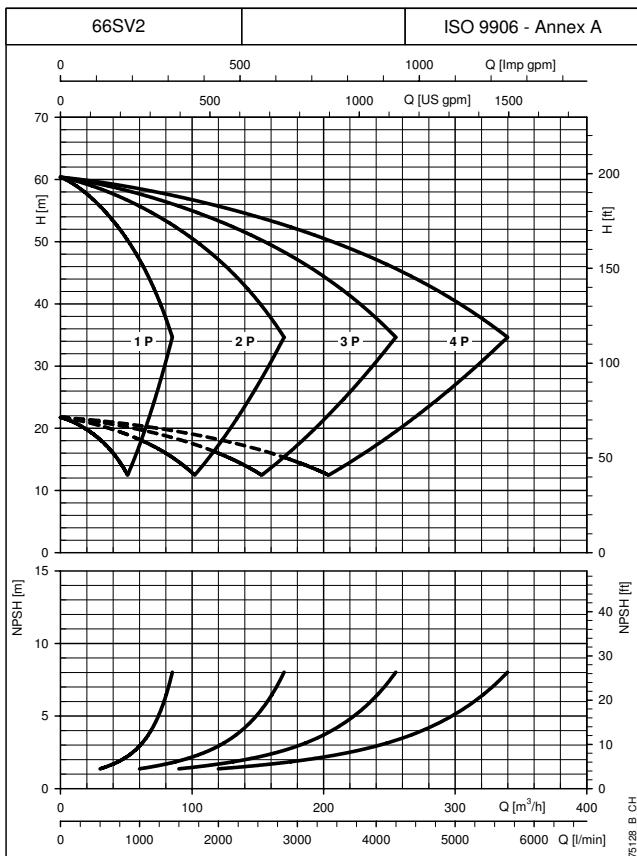
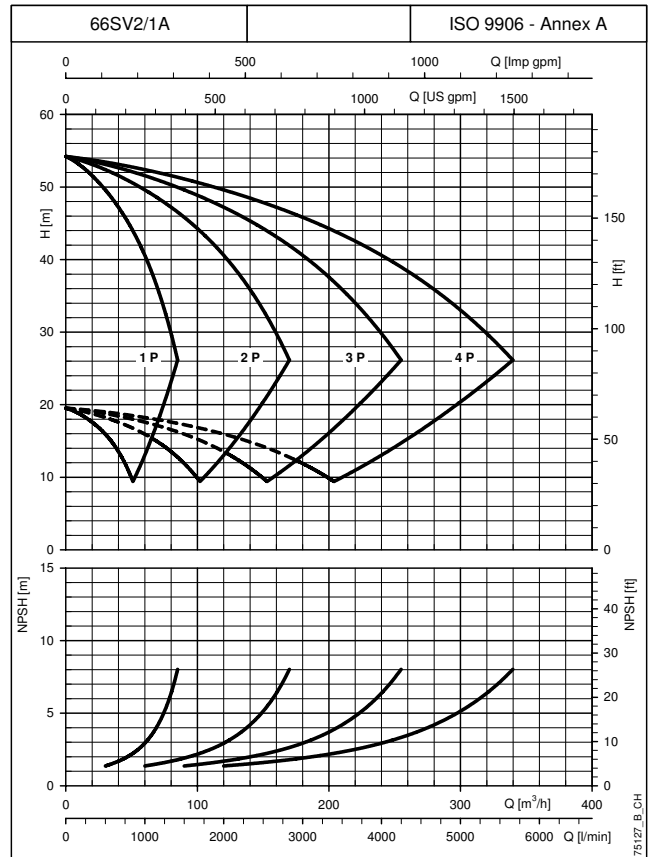
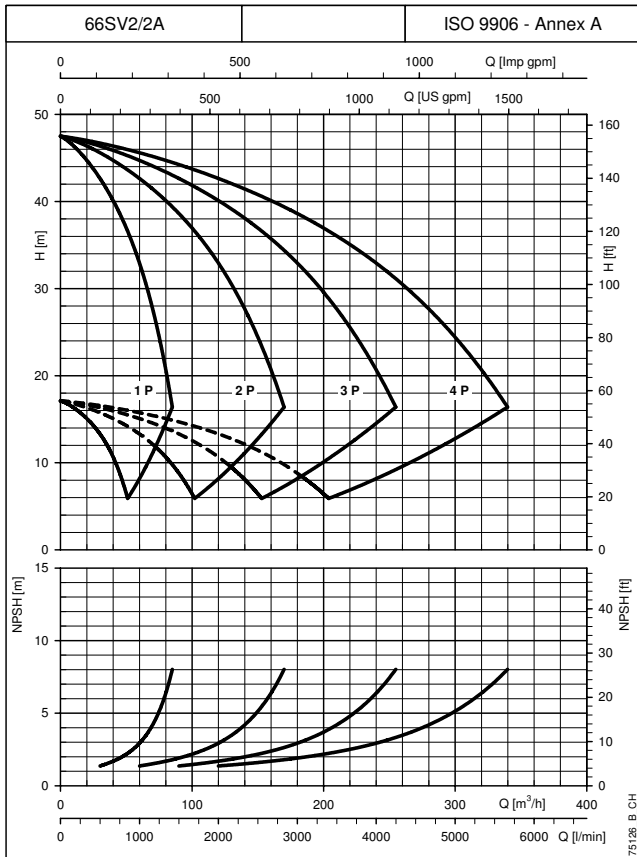
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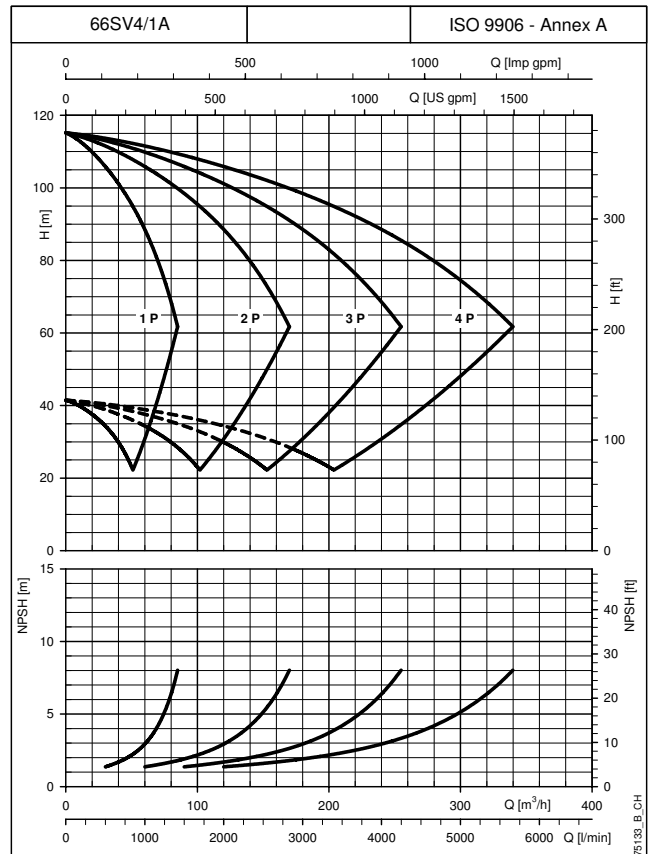
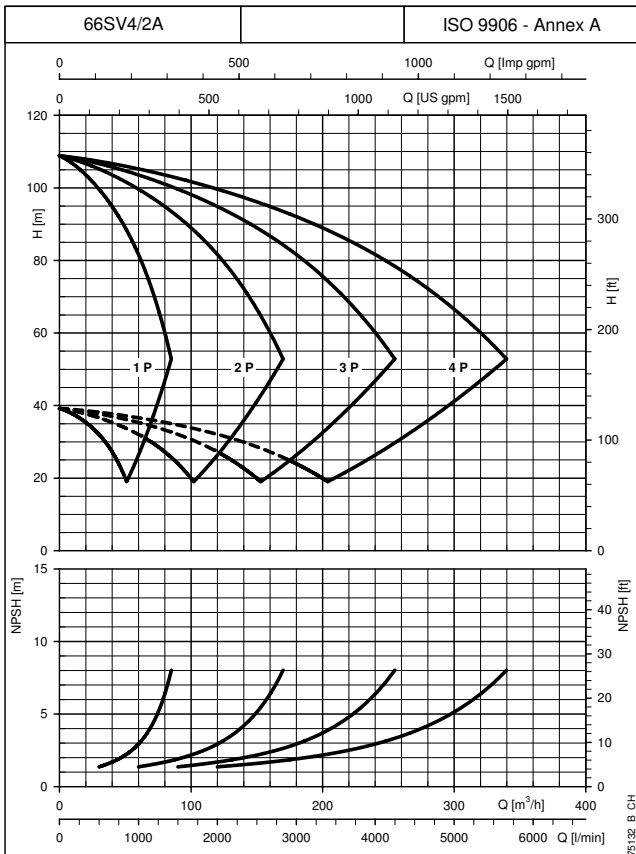
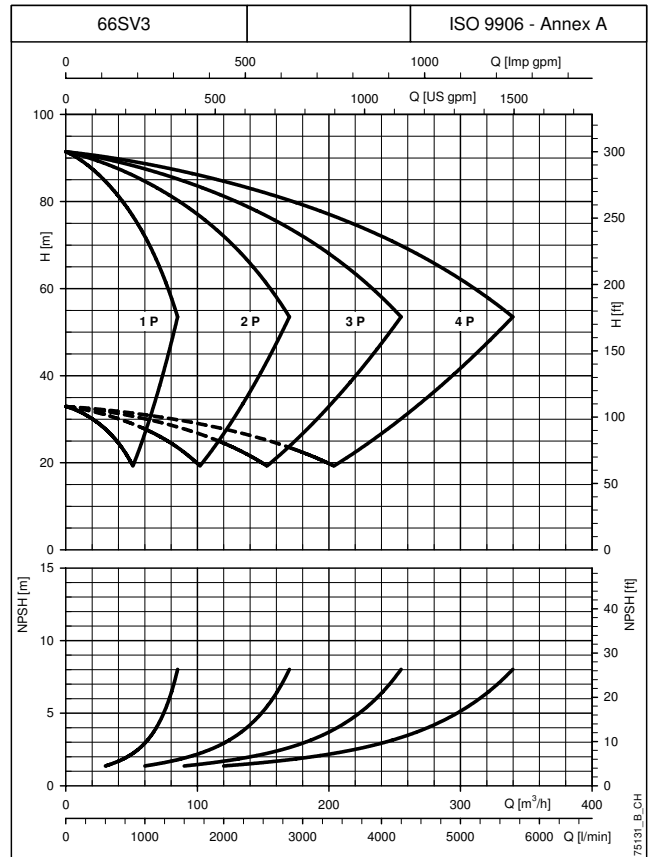
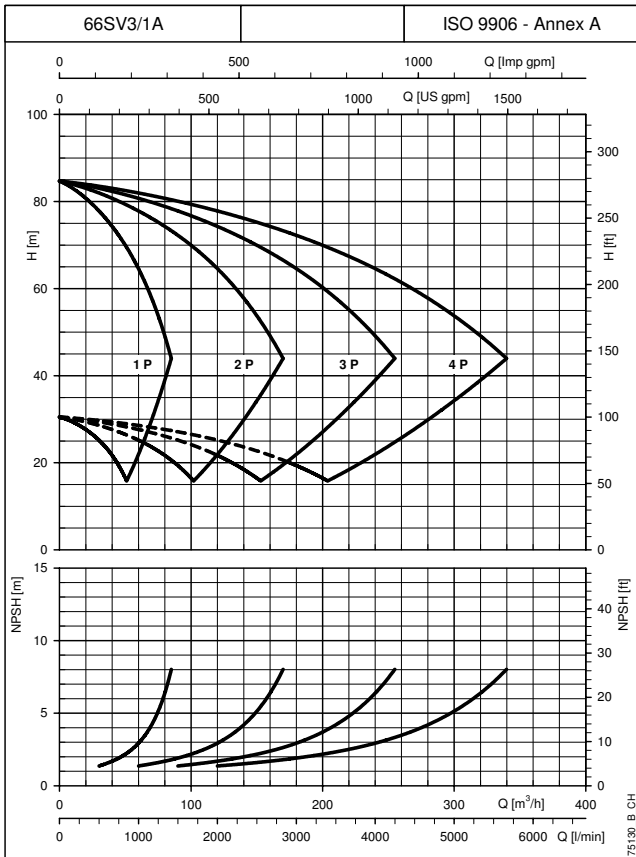
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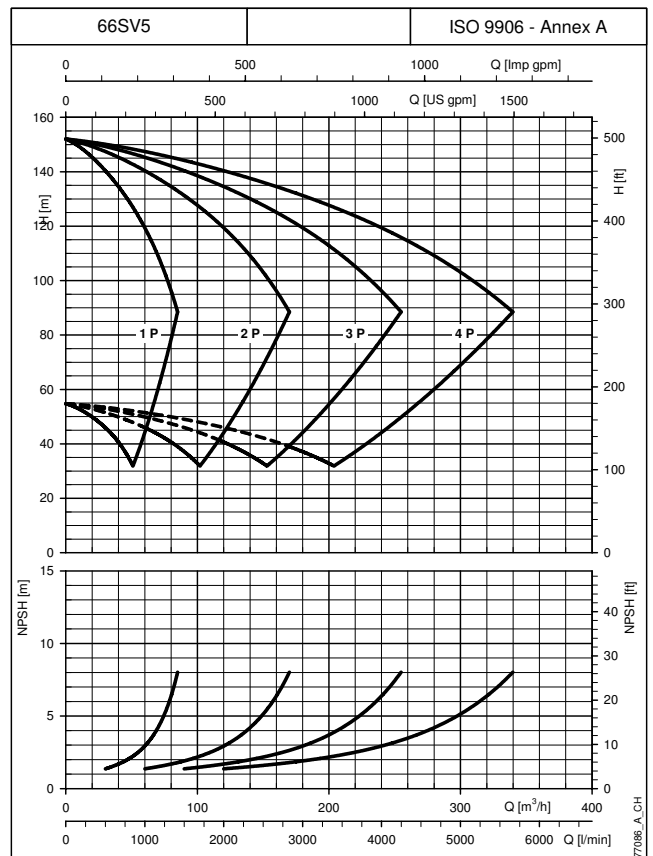
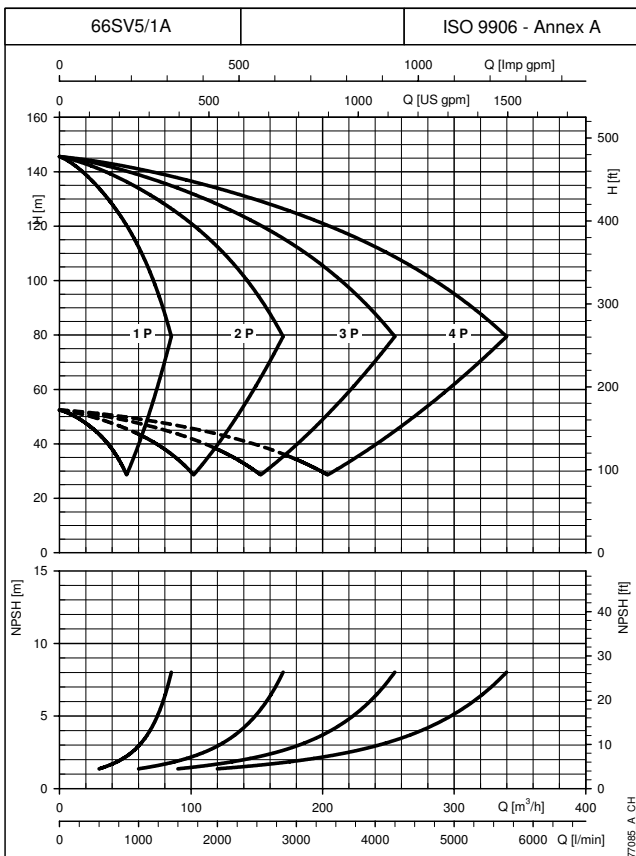
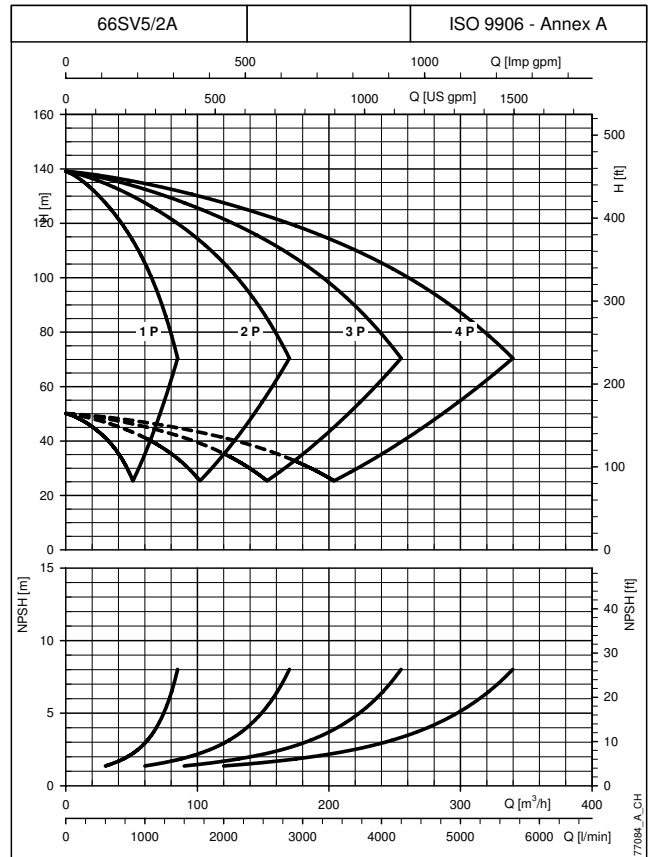
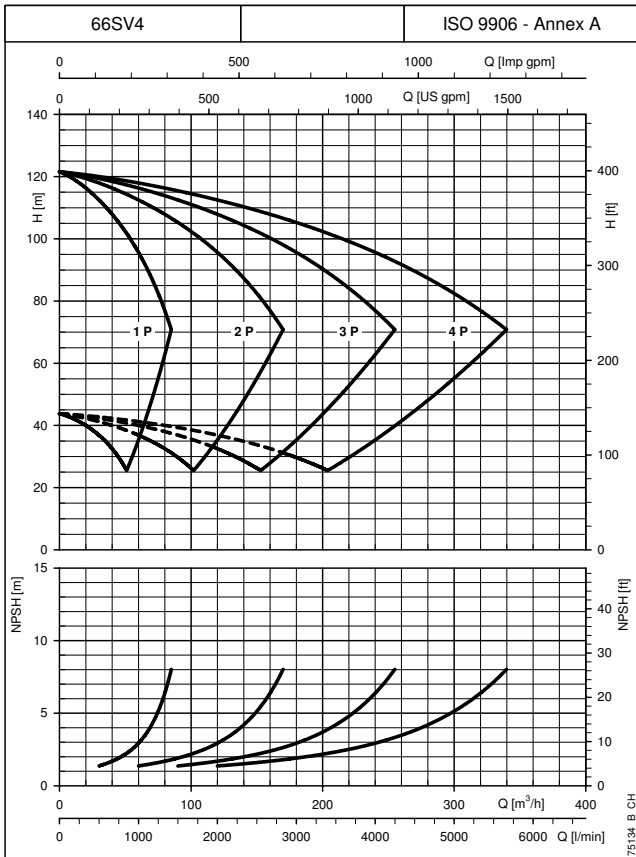
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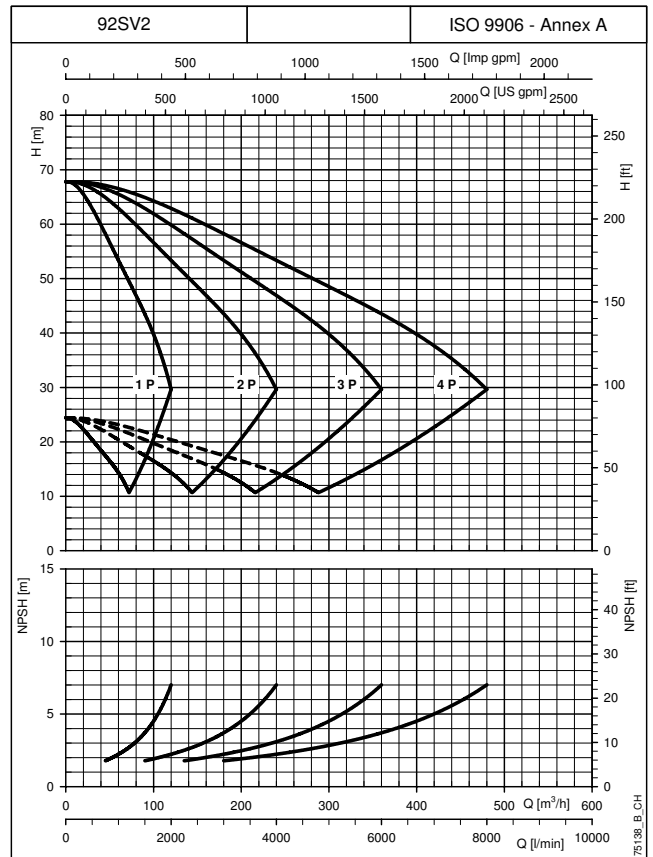
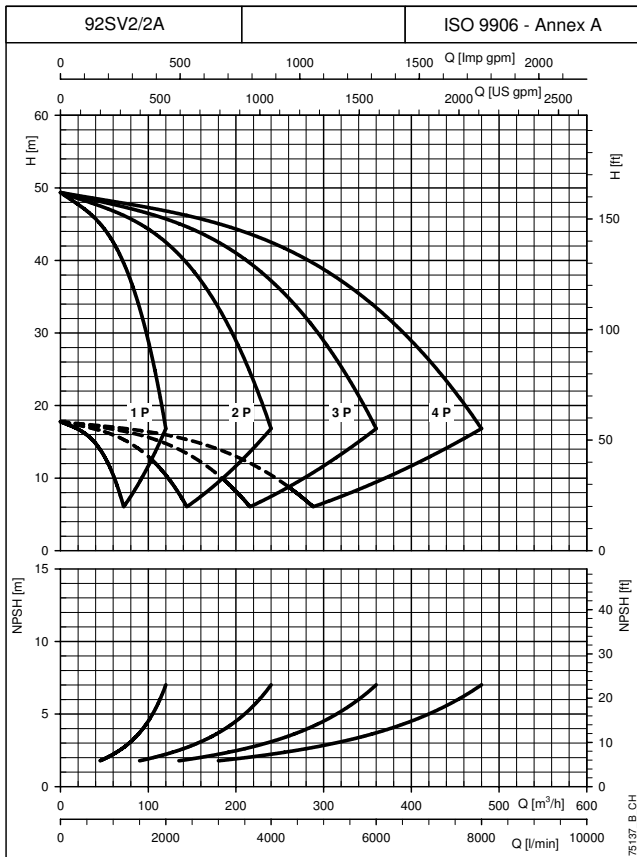
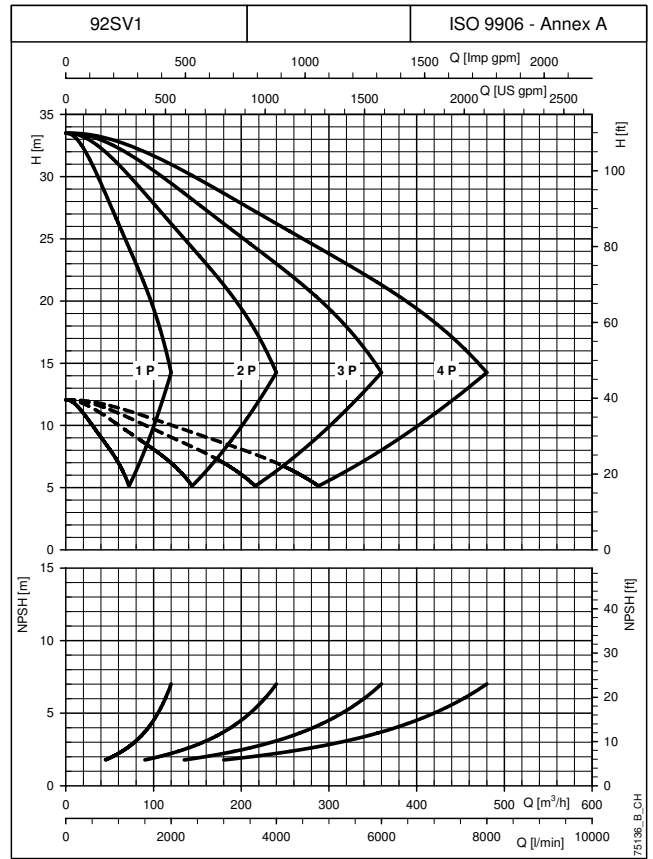
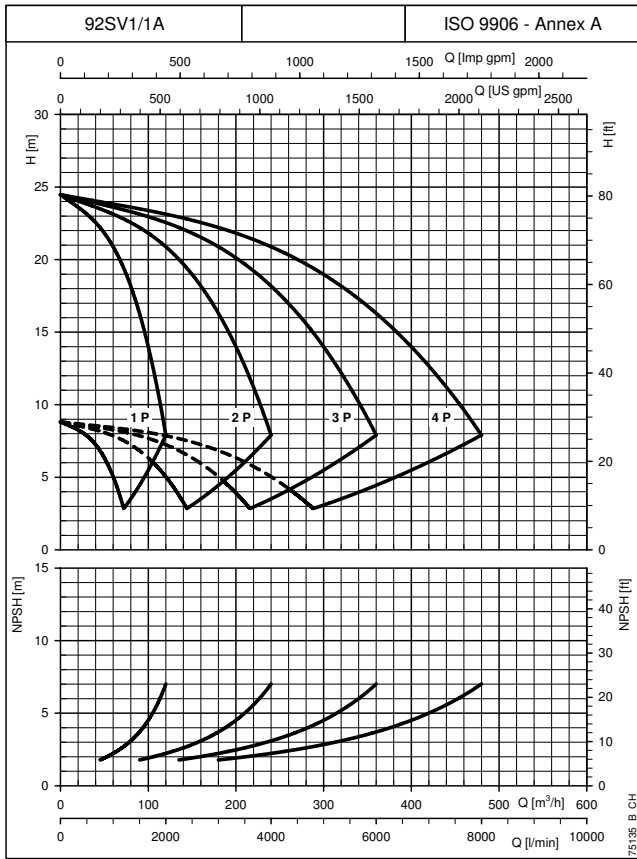
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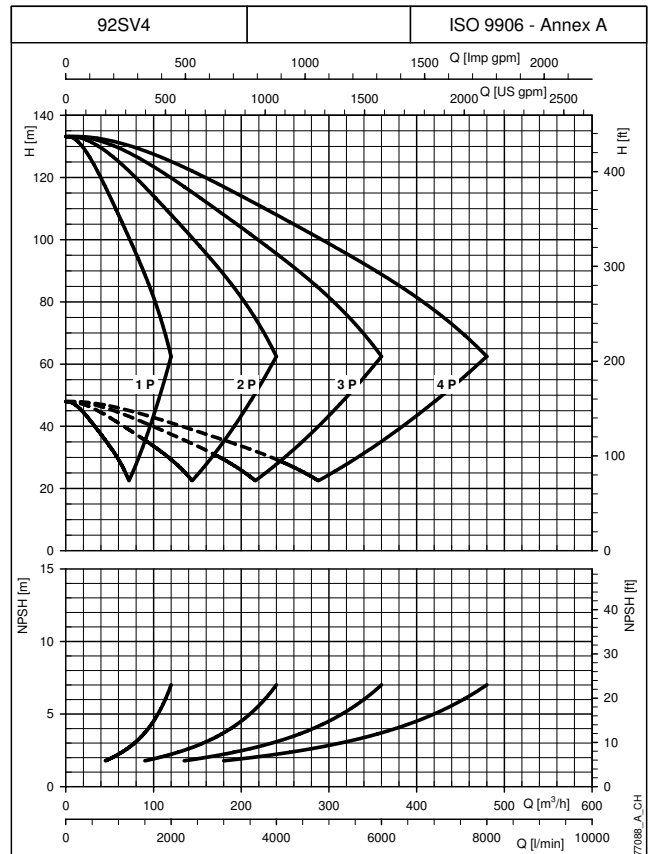
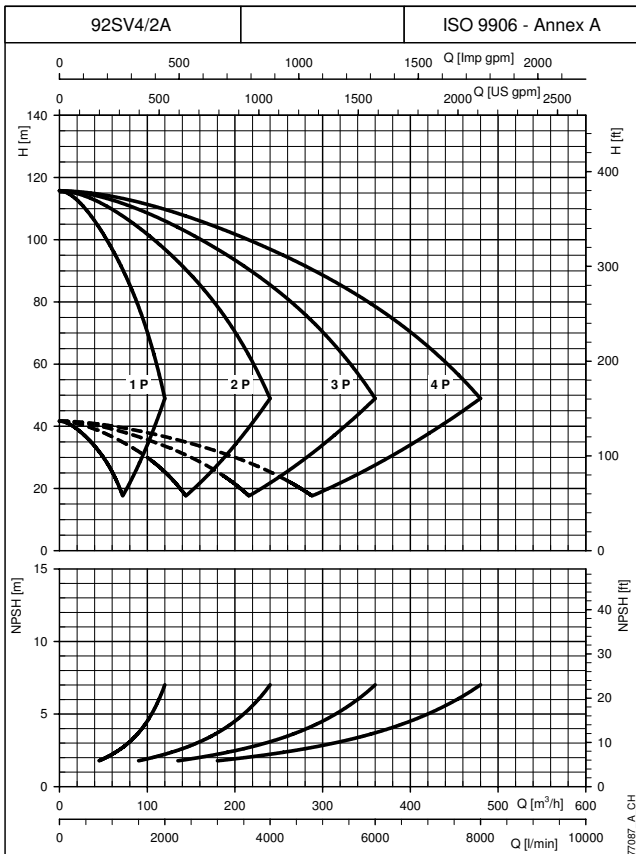
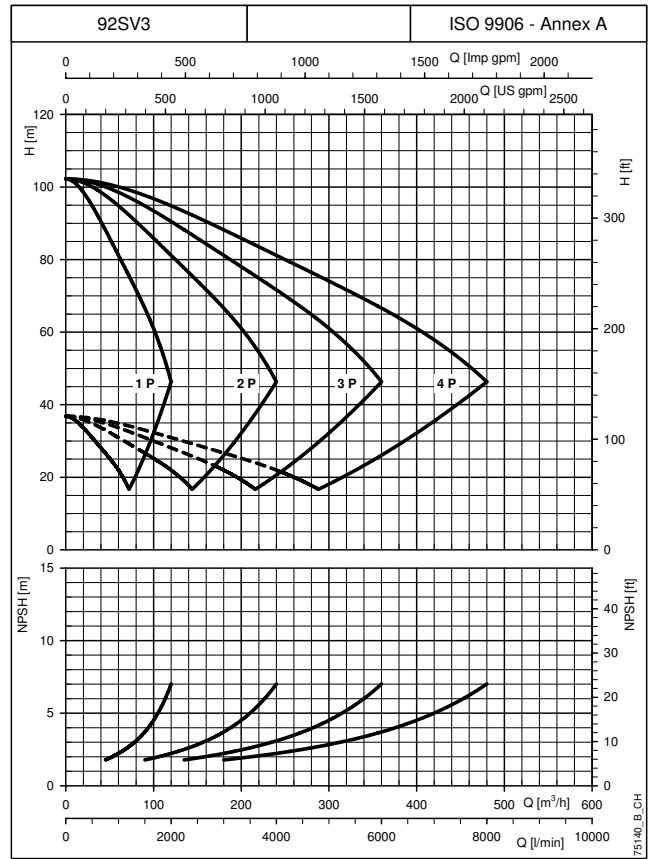
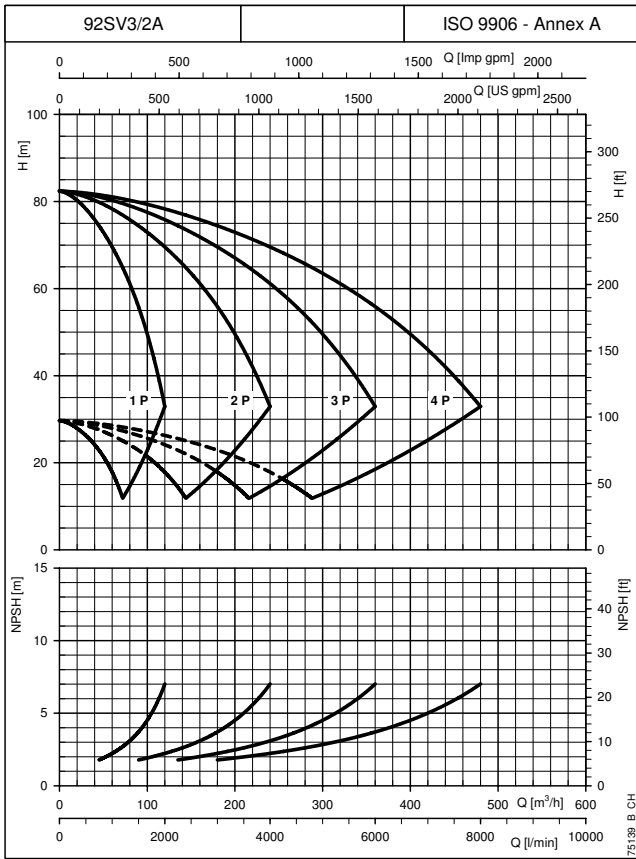
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These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{s}$.
The declared NPSH values are laboratory values: for practical use we recommend increasing these values by 0,5 m.

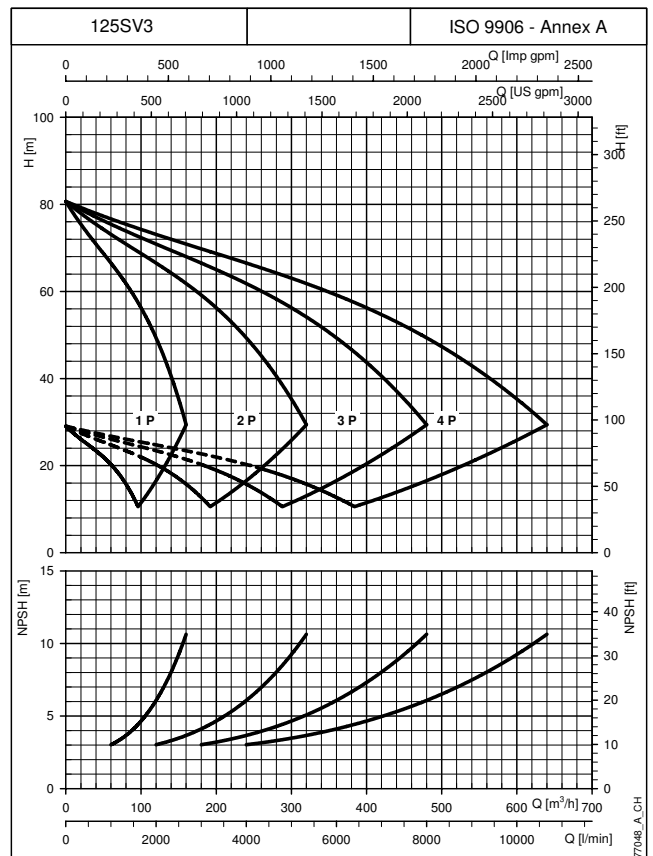
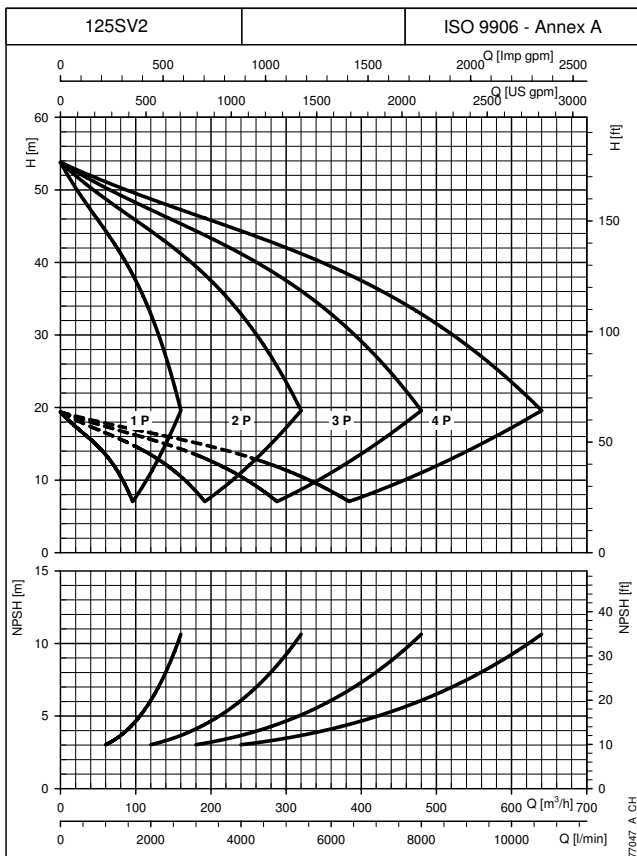
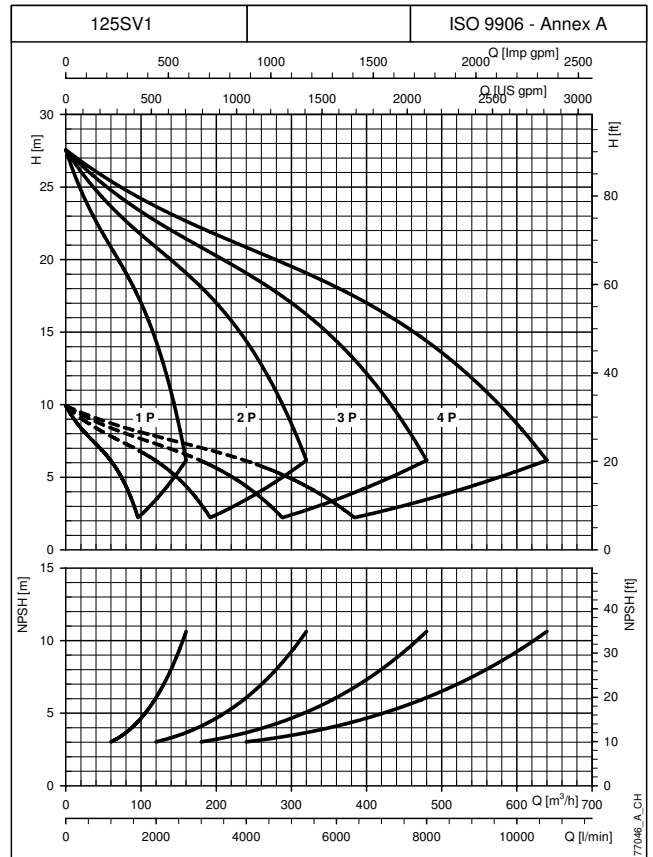
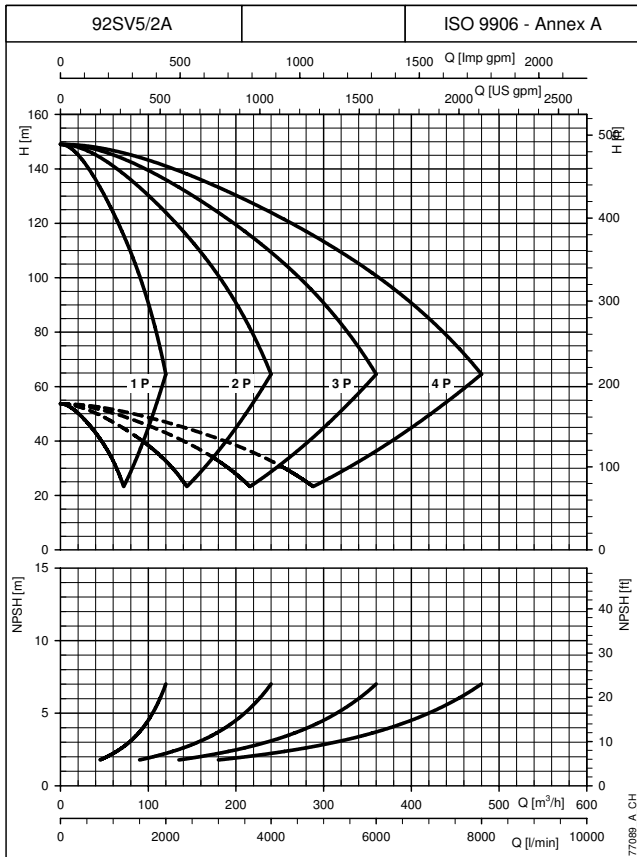
BOOSTER SETS, GHV.../SV SERIES OPERATING CHARACTERISTICS AT 30..50 Hz



CURVES

The performance curves do not take into account flow resistance in the valves and piping.
 The curves show the performance with one, two, three and four pumps running.
 These performances are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{s}$.
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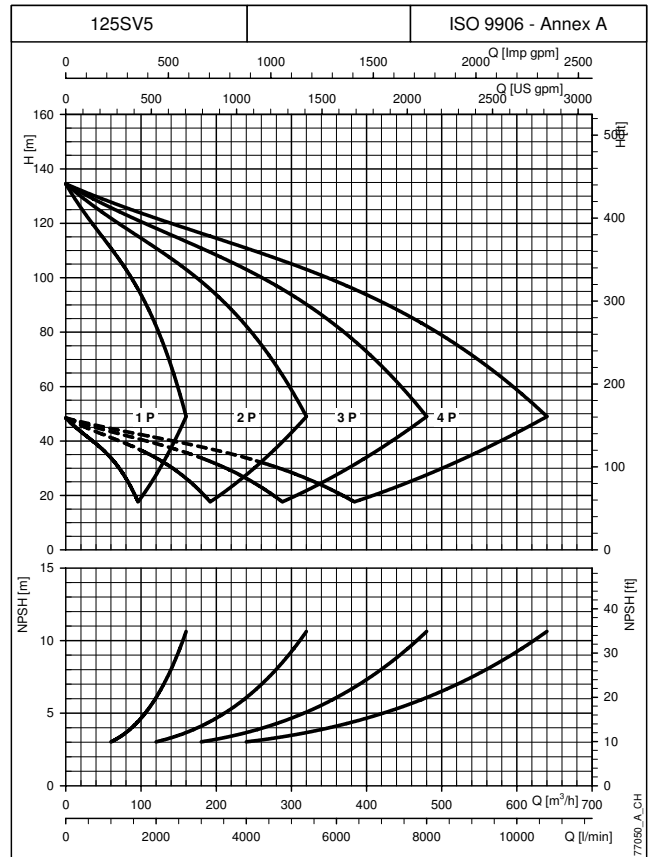
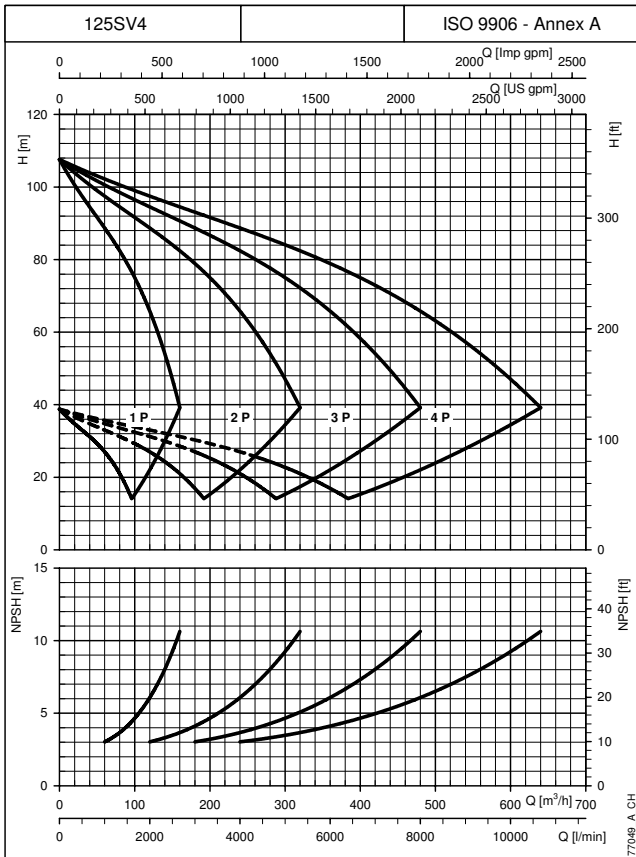
**BOOSTER SETS, GHV.../SV SERIES
OPERATING CHARACTERISTICS AT 30..50 Hz**



The performance curves do not take into account flow resistance in the valves and piping.
The curves show the performance with one, two, three and four pumps running.
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The declared NPSH values are laboratory values: for practical use we recommend increasing these values by 0,5 m.

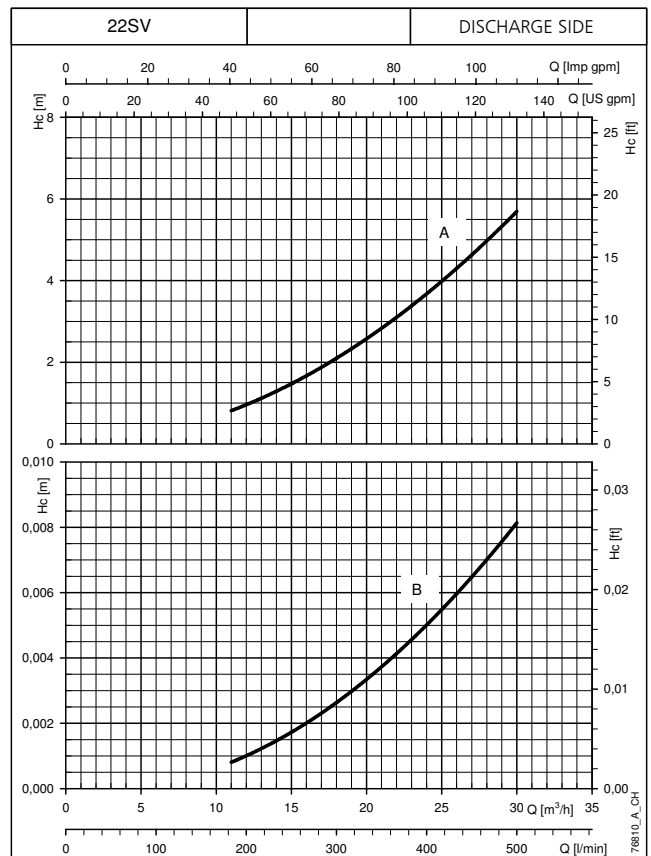
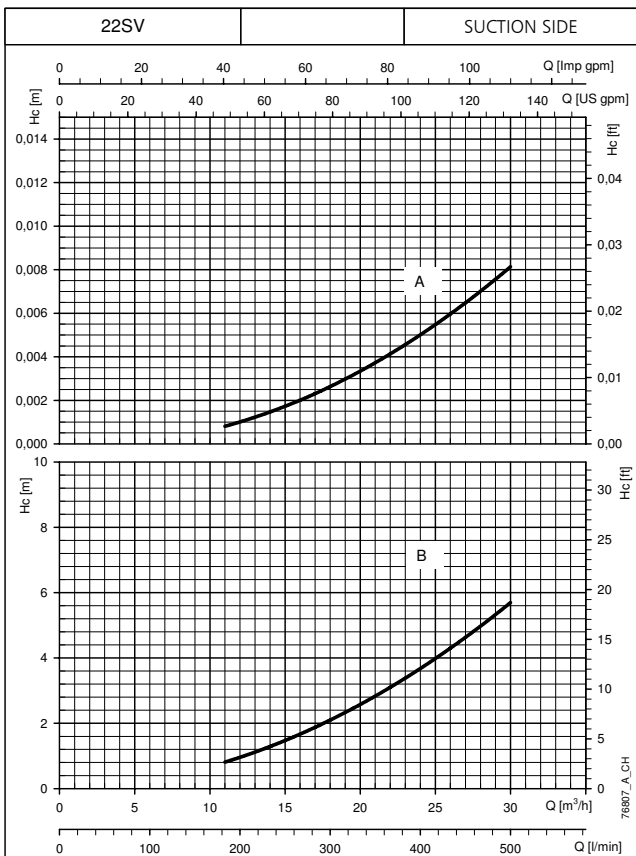
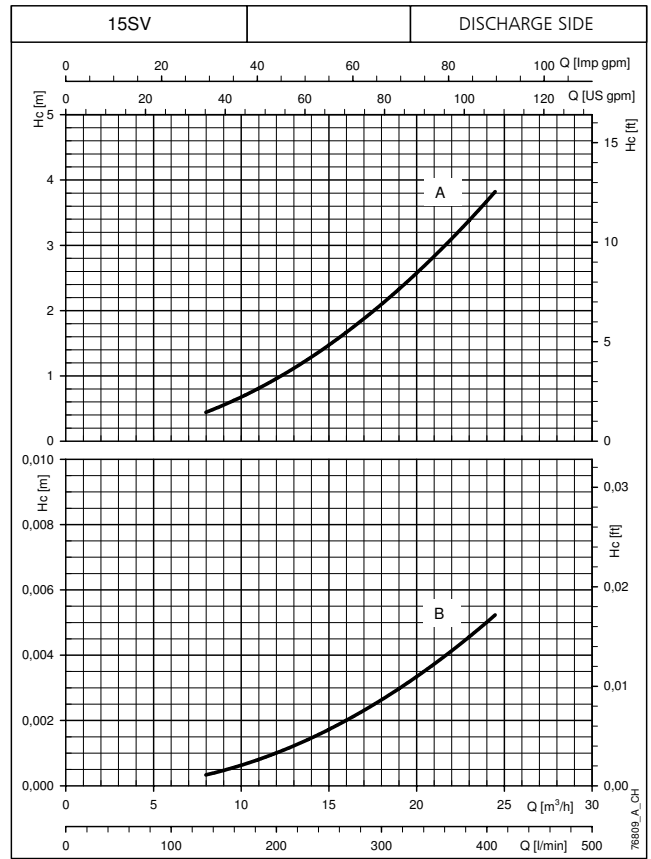
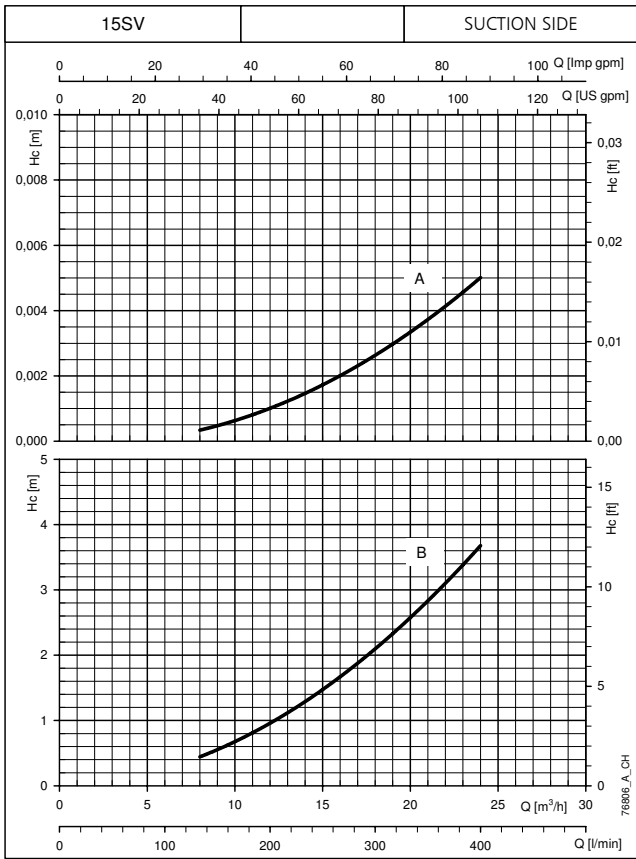
CURVES

**BOOSTER SETS, GHV.../SV SERIES
OPERATING CHARACTERISTICS AT 30..50 Hz**



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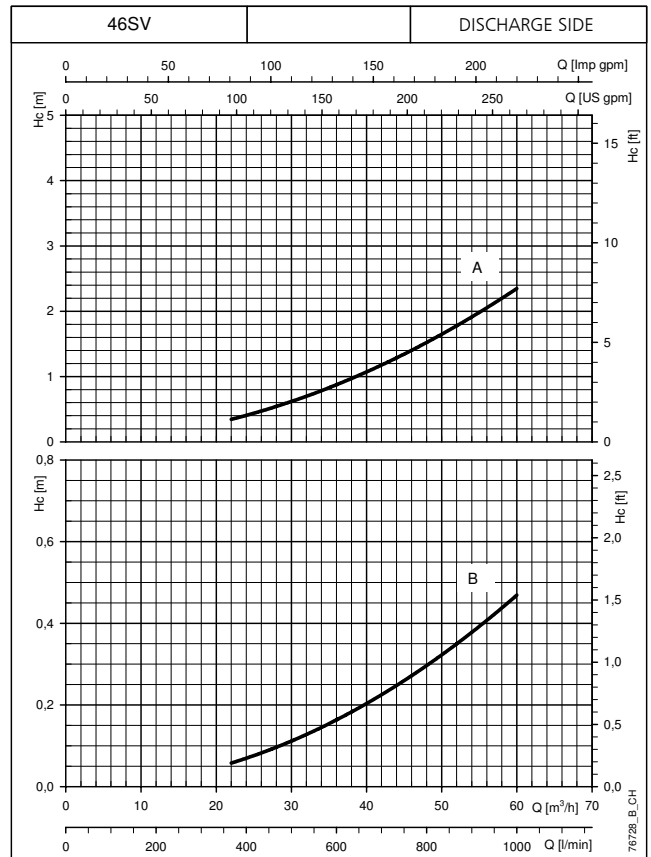
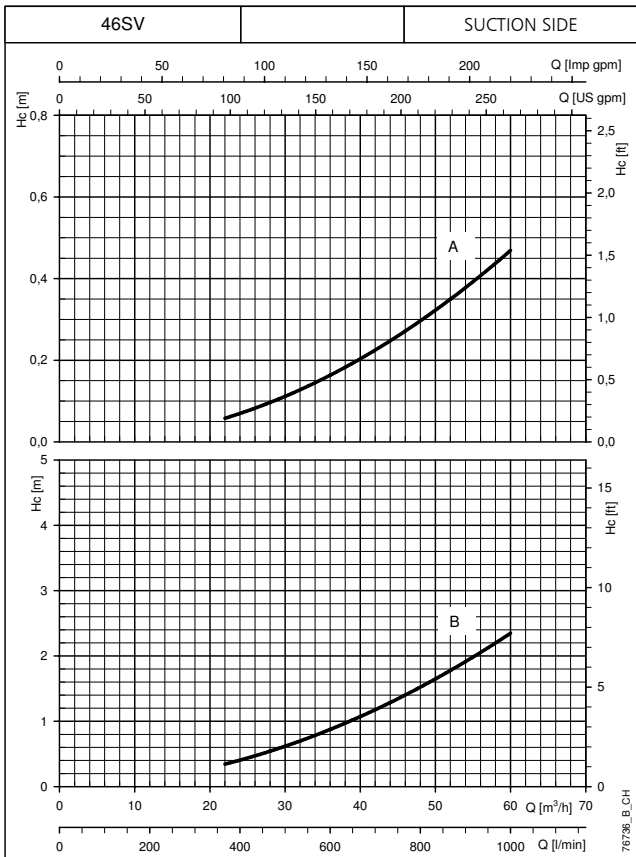
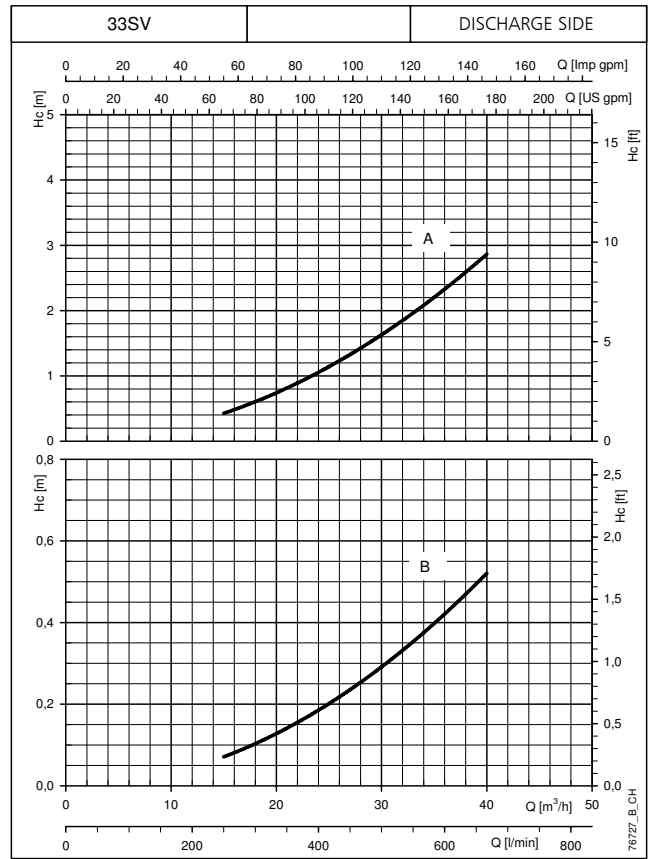
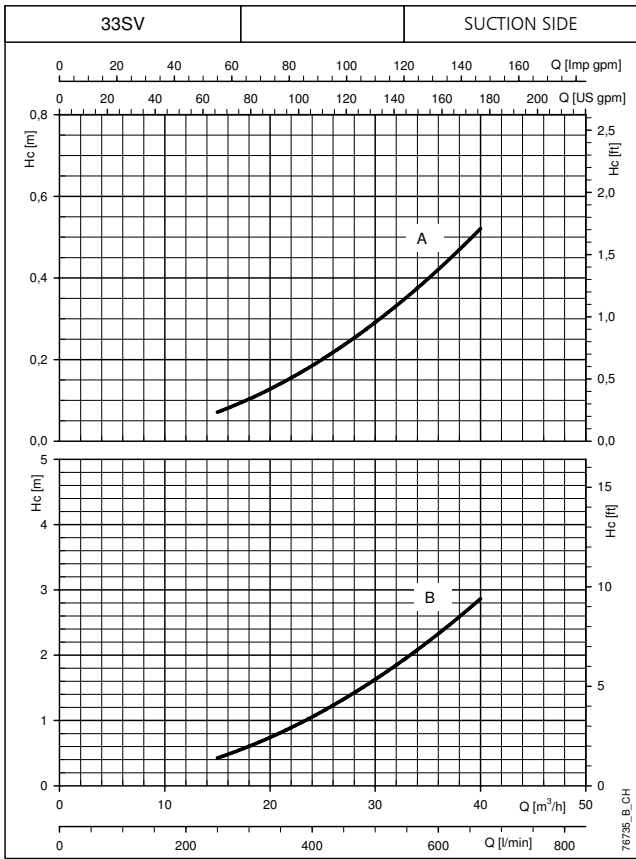
BOOSTER SETS, GHV.../SV SERIES
H_c PRESSURE DROP CURVE



The declared curves are valid for liquids with density $\rho = 1.0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.
 Hc (A): Pressure drop curve with check valve installed on the delivery side of the pump.
 Hc (B): Pressure drop curve with check valve installed on the suction side of the pump.
 The pressure drops do not consider the pressure drops distributed in the manifold.

CURVES

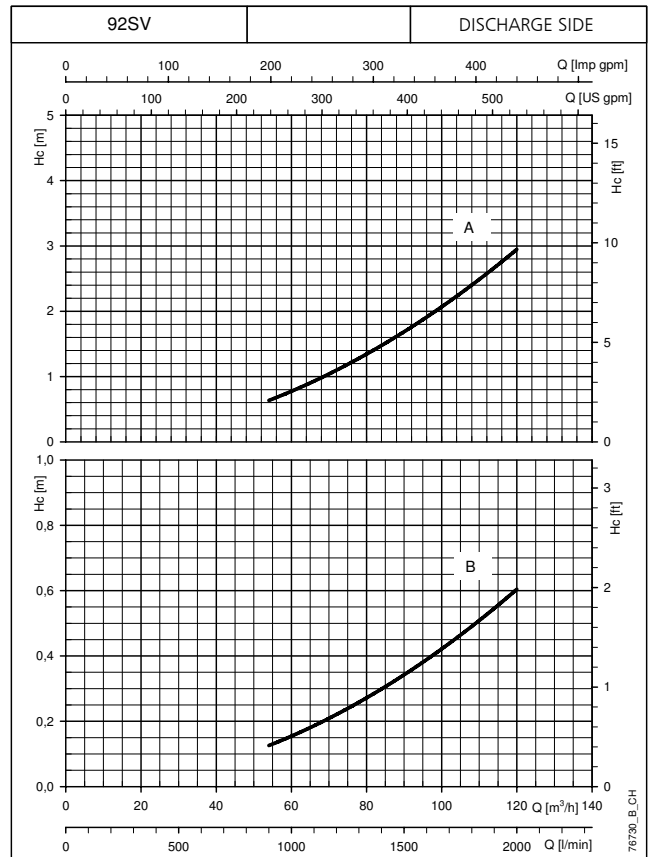
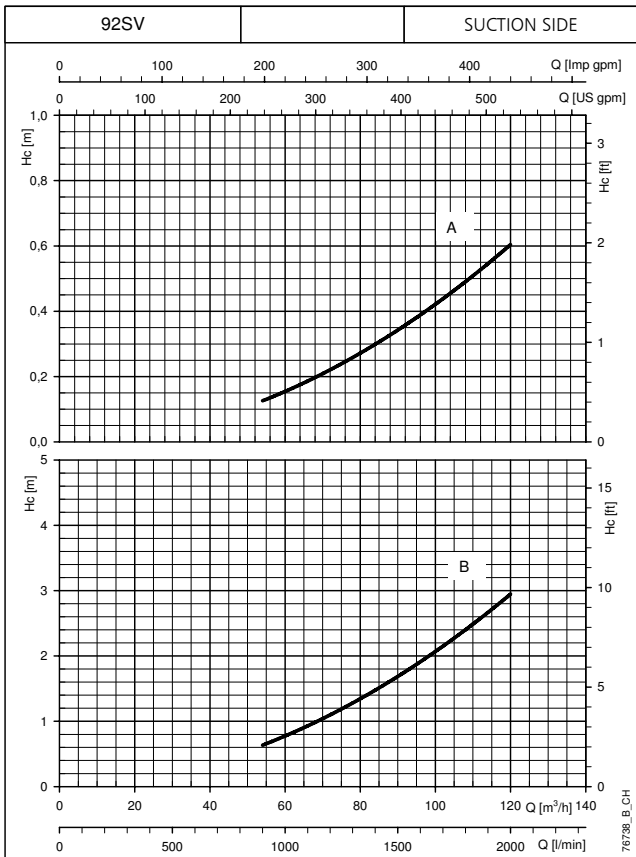
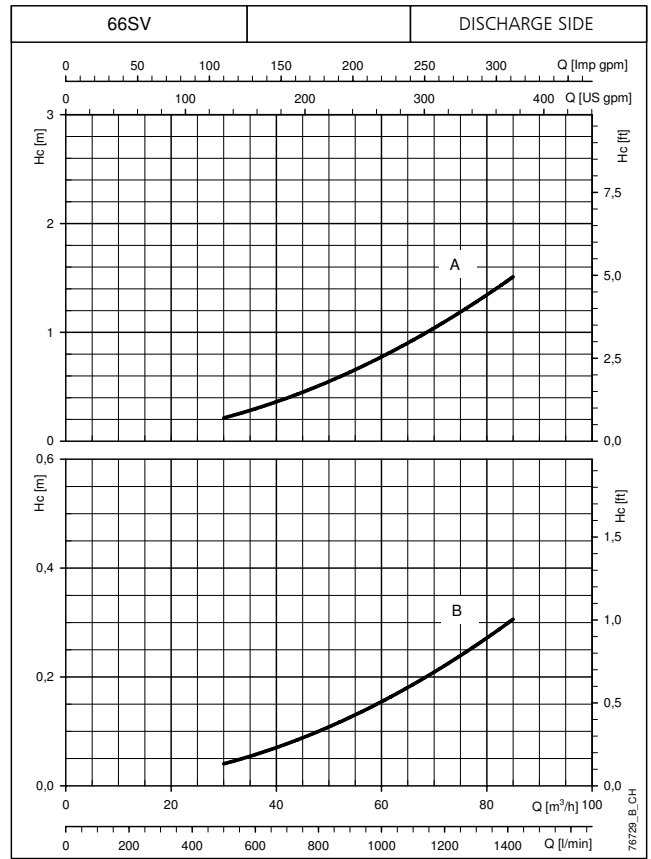
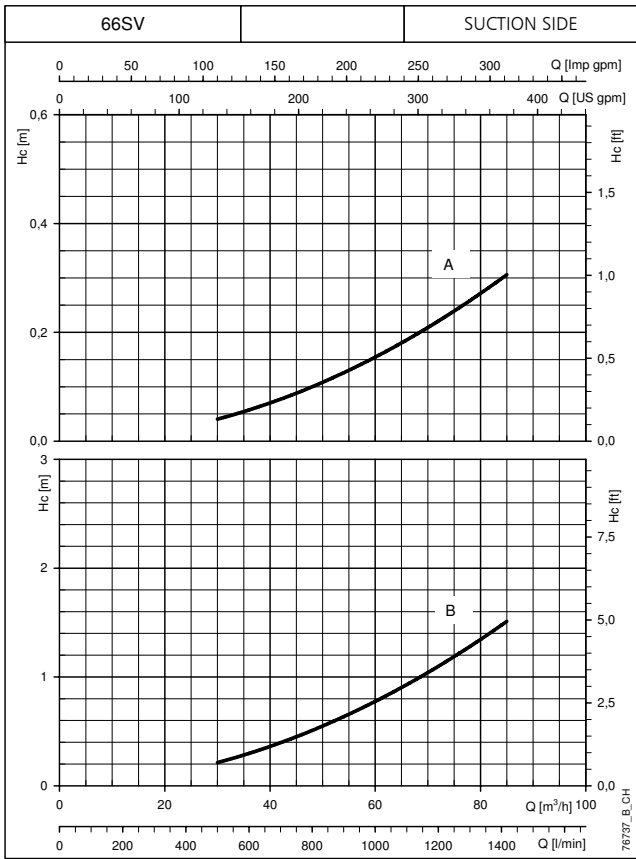
BOOSTER SETS, GHV.../SV SERIES
H_c PRESSURE DROP CURVE



CURVES

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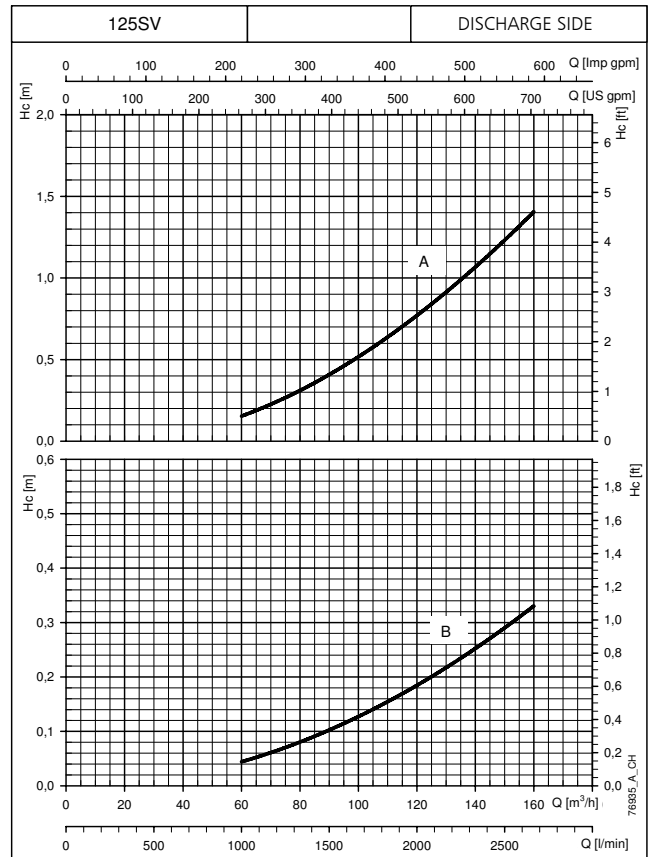
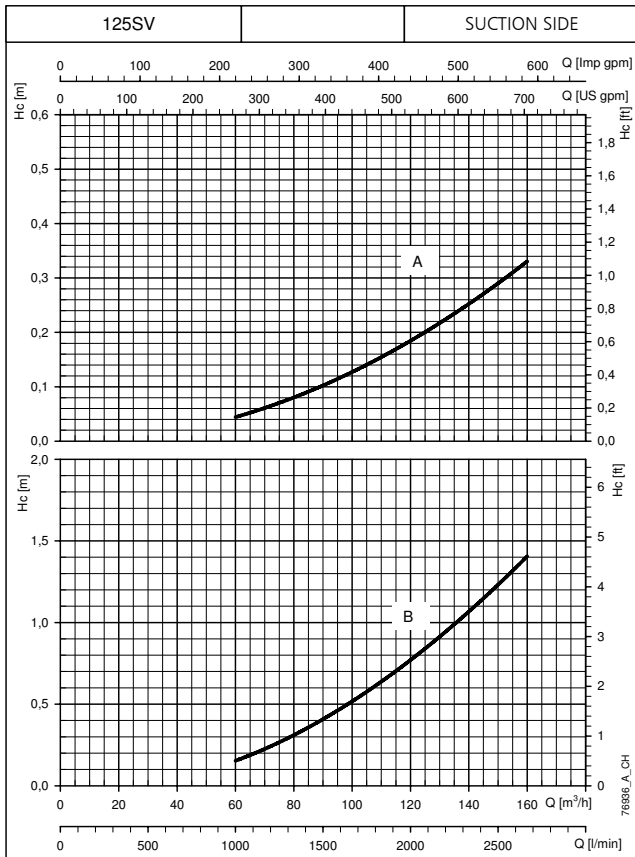
BOOSTER SETS, GHV.../SV SERIES
H_c PRESSURE DROP CURVE



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CURVES

BOOSTER SETS, GHV.../SV SERIES
H_c PRESSURE DROP CURVE



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Hc (A): Pressure drop curve with check valve installed on the delivery side of the pump.
Hc (B): Pressure drop curve with check valve installed on the suction side of the pump.
The pressure drops do not consider the pressure drops distributed in the manifold.

ACCESSORIES

DIAPHRAGM TANKS

The booster sets are ready for installation, directly on the manifold, of 24-litre diaphragm tanks, one for each pump. The sets are also equipped with caps to close off the unused couplings. Larger tanks can also be connected to the unused end of the discharge manifold. For proper sizing of the tank please refer to the technical appendix.

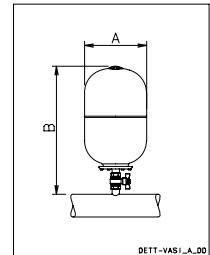
Kits featuring the following accessories are **available on request**:

- diaphragm tank;
- on-off ball valve;
- operating instructions;
- packaging.

DIAPHRAGM TANK KIT

Volume Litres	PN bar	DIMENSIONS (mm)			Materials		
		ø A	B	Valve	Diaphragm	Vessel	Valve
8	8	205	390	1" FF	EPDM	Painted steel	Nickel-plated brass
24	8	270	555	1" FF	EPDM	Painted steel	Nickel-plated brass
24	10	270	555	1" FF	EPDM	Painted steel	Nickel-plated brass
24	16	270	555	1" FF	EPDM	Painted steel	Nickel-plated brass
24	10	270	575	1" FF	Butyl	Stainless steel	AISI 316 Stainless steel

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COUNTERFLANGE KIT

Manifolds up to 3" in diameter are usually supplied with threaded couplings and caps on unused end.

Counterflange coupling kits made of zinc-plated or stainless steel are available on request.

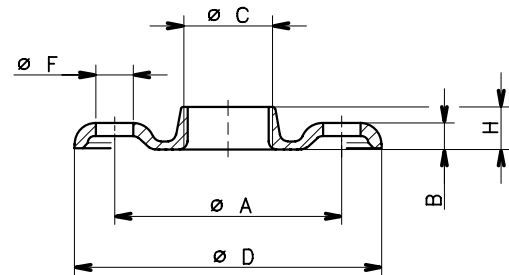
The counterflange kits are equipped with:

- threaded flange.
- gasket and bolts/screws.
- threaded counterflange (weld-on type for 3" diameter).

THREADED COUNTERFLANGES

KIT TYPE	DN	ø C	DIMENSIONS (mm)				HOLES		PN
			ø A	B	ø D	H	ø F	N°	
2"	50	Rp 2	125	16	165	24	18	4	25
2" 1/2	65	Rp 2 1/2	145	16	185	23	18	4	16
3"	80	Rp 3	160	17	200	27	18	8	16

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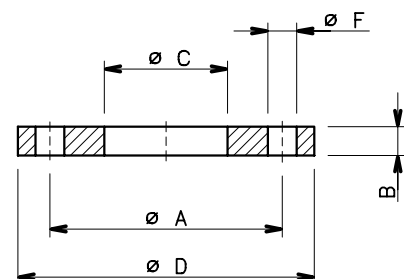


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WELD-ON COUNTERFLANGES

KIT TYPE	DN	ø C	DIMENSIONS (mm)				HOLES		PN
			ø A	B	ø D	ø F	N°		
2"	50	61	125	19	165	18	4	16	
2"1/2	65	77	145	20	185	18	4	16	
3"	80	90	160	20	200	18	8	16	
4"	100	116	180	22	220	18	8	16	
5"	125	141,5	210	22	250	18	8	16	
6"	150	170,5	240	24	285	22	8	16	
8"	200	221,5	295	26	340	22	12	16	
10"	250	276,5	355	29	405	26	12	16	
12"	300	327,5	410	32	460	26	12	16	

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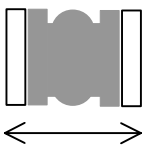


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RUBBER EXPANSION JOINT KIT

The anti-vibrating joints or compensation joints can be used in order to absorb deformations, expansions, noises in the piping and to reduced ram blows. Moreover they can resist a high degree of empty that allows the absorption of negative expansions for depression.

Being of elastic material it can be become deformed and be dilated facilitating therefore the installation, that it becomes simpler and fast, also in which the piping they are not aligned. It does not need assembly joints.

TABELLA 1 TABLE 1		L 	A-B-C-D non possono essere sommati			A-B-C-D can not be cumulative
GIUNTI ELASTICI RUBBER EXPANSION JOINT			A COMPRESSIONE COMPRESSION	B ESTENSIONE EXTENSION	C SPOSTAMENTO TRANSVERSE	D FLESSIONE ANGOLARE ANGULAR MOVEMENT
DN		mm	mm	mm	mm	(°)
32	1"1/4	95	8	4	8	15
40	1"1/2	95	8	4	8	15
50	2"	105	8	5	8	15
65	2"1/2	115	12	6	10	15
80	3"	130	12	6	10	15
100	4"	135	18	10	12	15
125	5"	170	18	10	12	15
150	6"	180	18	10	12	15
200	8"	205	25	14	22	15
250	10"	240	25	14	22	15
300	12"	260	25	14	22	15
350	14"	265	25	16	22	15
400	16"	265	25	16	22	15
450	18"	265	25	16	22	15
500	20"	265	25	16	22	15

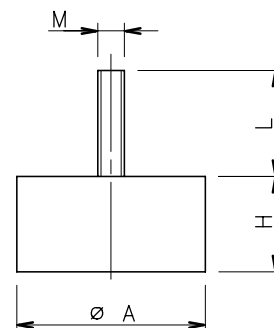
GD_JOINT_A_TD

VIBRATION DAMPERS

TYPE	SHORE	DIMENSIONS (mm)			
		∅ A	H	L	M
VIBRATION DAMPER P20X20	60	20	20	18	6
VIBRATION DAMPER P40X30	60	40	30	23	8
VIBRATION DAMPER P100X50	60	100	50	50	16

Note: Available versions M/F and F/F

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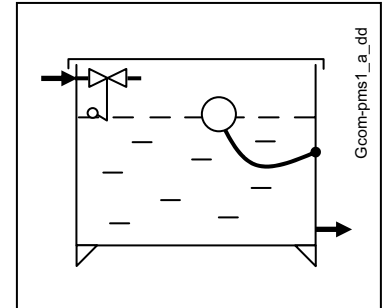
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DRY RUNNING PROTECTION SYSTEMS

Dry run shutdown systems should be installed to protect the pumps in case of insufficient water supply.

FLOAT SWITCH PROTECTION METHOD

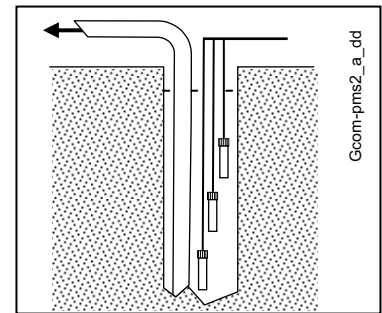
The float switch protection system is used when the water supply comes from open tanks. A float switch immersed in the tank can be connected directly to the frequency converter (GHV10 sets) or to the electrical panel for the GHV20, 30 and 40 sets. If the water supply is insufficient, the float switch opens the electric contact and the pumps stop running.



ELECTRODE PROBE PROTECTION METHOD

The electrode probe protection system is used when the water supply comes from open tanks or wells. A set of three probes is connected directly to the electrical panel with control circuit (for GHV20, 30 and 40 sets). For single-pump sets (GHV10), an additional level control must be installed (probe module) which supplies an electric contact to be connected to the frequency converter.

If the water supply is insufficient, the control circuit opens the electric contact and the pumps stop running.

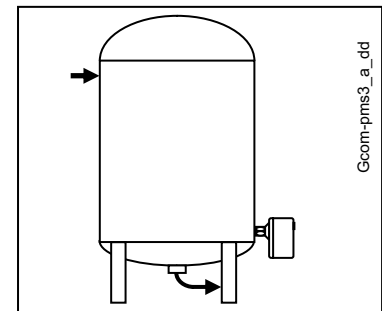


MINIMUM PRESSURE SWITCH PROTECTION METHOD

The minimum pressure switch protection system is used when the water supply comes from water networks or pressurized tanks. The pressure switch is connected to the electrical panel equipped with control circuit (for GHV20, 30 and 40 sets).

For single-pump sets (GHV10) the pressure switch is connected directly to the frequency converter.

If the water supply is insufficient, the pressure switch opens the electric contact and the pumps stop running.

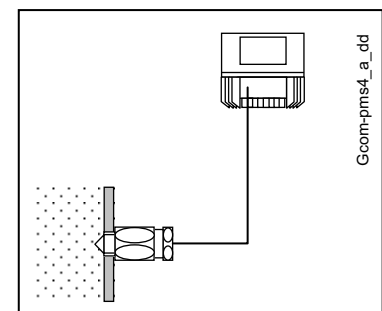


OPTOELECTRONIC SENSOR PROTECTION METHOD (ONLY GHV)

The optoelectronic sensor protection system is used to protect the pump by installing a sensor directly on the body of each pump. The device is mounted onto the fill plug using an adapter, if needed.

The sensor is electrically connected to the frequency converter which powers it.

The sensor cuts in if the water supply is insufficient or if there is air in the area of the pump body where it is positioned. For installations where lack of water is a normal condition when the pump is off, the control system must be equipped with a "pump running" electric contact.



TECHNICAL APPENDIX

WATER REQUIREMENTS IN CIVIL USERS

Determination of the water requirement depends on the type of users and contemporaneity factor. The calculation may be subject to regulations, standards or customs that may vary from country to country. The calculation method shown below is an example based on practical experience, designed to provide a reference value and not a substitute for detailed analytical calculation.

Water requirements in condominiums

The **consumption table** shows the maximum values for each delivery point, depending on the plumbing amenities.

MAXIMUM CONSUMPTION FOR EACH DELIVERY POINT

TYPE	CONSUMPTION (l/min)
Sink	9
Dishwasher	10
Washing machine	12
Shower	12
Bathtub	15
Washbasin	6
Bidet	6
Flush tank WC	6
Controlled flushing system WC	90

G-at-cm_a_th

The **sum of the water consumption values** of each delivery point determines the maximum theoretical requirement, which must be reduced according to the **contemporaneity coefficient**, because in actual fact the delivery points are never used all together.

$f = \frac{1}{\sqrt{(0,857 \times Nr \times Na)}}$	Coefficient for apartments with one bathroom and flush tank WC
$f = \frac{1}{\sqrt{(0,857 \times Nr \times Na)}}$	Coefficient for apartments with one bathroom and controlled flushing system WC
$f = \frac{1,03}{\sqrt{(0,545 \times Nr \times Na)}}$	Coefficient for apartments with two bathrooms and flush tank WC
$f = \frac{0,8}{\sqrt{(0,727 \times Nr \times Na)}}$	Coefficient for apartments with two bathrooms and controlled flushing system WC
f = coefficient; Nr = number of delivery points; Na = number of apartments	

The **table of water requirements in civil users** shows the maximum contemporaneity flow-rate values based on the **number of apartments** and the type of WC for apartments with one bathroom and two bathrooms. As regards apartments with one bathroom, 7 drawing points have been taken into consideration, while 11 points have been considered for apartments with two bathrooms. If the number of drawing points or apartments is different, use the formulas to **calculate** the requirement.

TABLE OF WATER REQUIREMENTS IN CIVIL USERS

NUMBER OF APARTMENTS	WITH FLUSH TANK WC		WITH CONTROLLED FLUSHING SYSTEM WC	
	1	2	1	2
	FLOW RATE (l/min)			
1	32	40	60	79
2	45	56	85	111
3	55	68	105	136
4	63	79	121	157
5	71	88	135	176
6	78	97	148	193
7	84	105	160	208
8	90	112	171	223
9	95	119	181	236
10	100	125	191	249
11	105	131	200	261
12	110	137	209	273
13	114	143	218	284
14	119	148	226	295
15	123	153	234	305
16	127	158	242	315
17	131	163	249	325
18	134	168	256	334
19	138	172	263	343
20	142	177	270	352
21	145	181	277	361
22	149	185	283	369
23	152	190	290	378
24	155	194	296	386
25	158	198	302	394
26	162	202	308	401
27	165	205	314	409
28	168	209	320	417
29	171	213	325	424
30	174	217	331	431
35	187	234	357	466
40	200	250	382	498
45	213	265	405	528
50	224	280	427	557
55	235	293	448	584
60	245	306	468	610
65	255	319	487	635
70	265	331	506	659
75	274	342	523	682
80	283	354	540	704
85	292	364	557	726
90	301	375	573	747
95	309	385	589	767
100	317	395	604	787
120	347	433	662	863
140	375	468	715	932
160	401	500	764	996
180	425	530	811	1056
200	448	559	854	1114

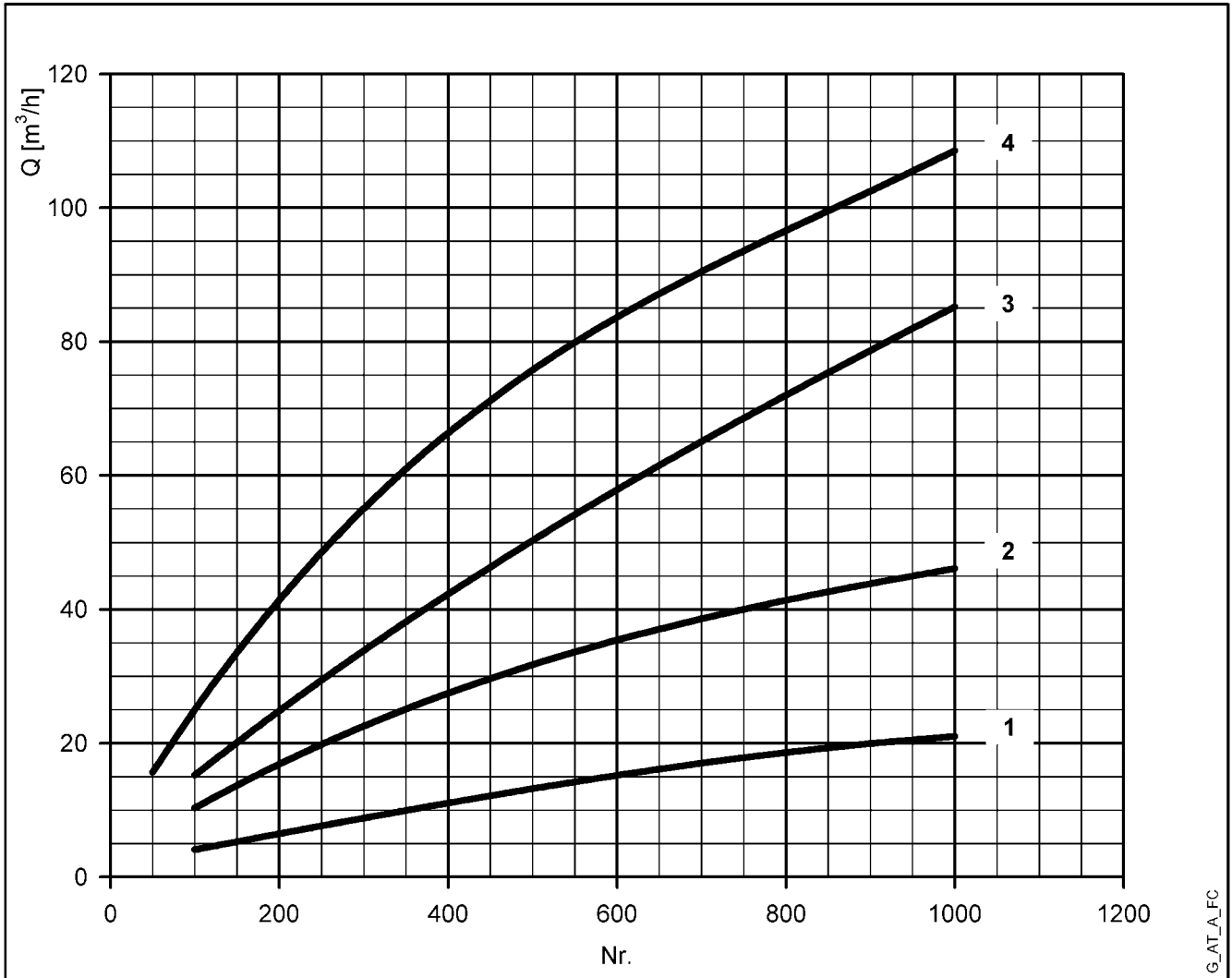
For seaside resorts, a flow rate increased by at least 20% must be considered.

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WATER REQUIREMENTS FOR COMMUNITY BUILDINGS

The requirements of buildings intended for specific uses, such as **offices, residential units, hotels, department stores, nursing homes** and so on, are different from those of condominiums, and both their global daily water consumption and the maximum contemporaneity flow rate are usually greater. The **diagram of water requirements for community buildings** shows the maximum contemporaneity flow rate of some types of communities, for guidance.

These requirements must be determined case by case with the utmost accuracy, using analytical calculation methods, according to particular needs and local provisions.



For seaside resorts, the flow rate must be increased by at least 20%.

- 1 = Offices (N. of people)
- 2 = Department stores (N. of people)
- 3 = Nursing homes (N. of beds)
- 4 = Hotels, residences (N. of beds)

USE OF BOOSTER SET

Water is usually delivered by public supply systems and the pressure is generally sufficient for the proper operation of the users' water and sanitary equipment.

When this pressure is not sufficient, booster sets are employed to increase water pressure and ensure an acceptable minimum value at the furthest points. Therefore, the water supply to a building, group of buildings or to a system in general can be considered satisfactory when all the user points can deliver the required quantity of water.

Set connection methods (intake side)

Water can be supplied to a booster set in two ways:

- 1 - By installing a water storage tank between the user's offtake and the booster set (indirect connection, fig. 7.1.1).
- 2 - By connecting the booster set directly between the user's offtake and the system (direct connection, fig. 7.1.1).

The indirect connection does not allow the water system pressure to be utilized. Therefore, it requires pumps with greater head.

The direct connection allows the water system pressure to be utilized, provided the pressure fluctuation (Δp) does not exceed 1 bar.

If it does, a pressure reducer must be installed for proper operation of the booster set.

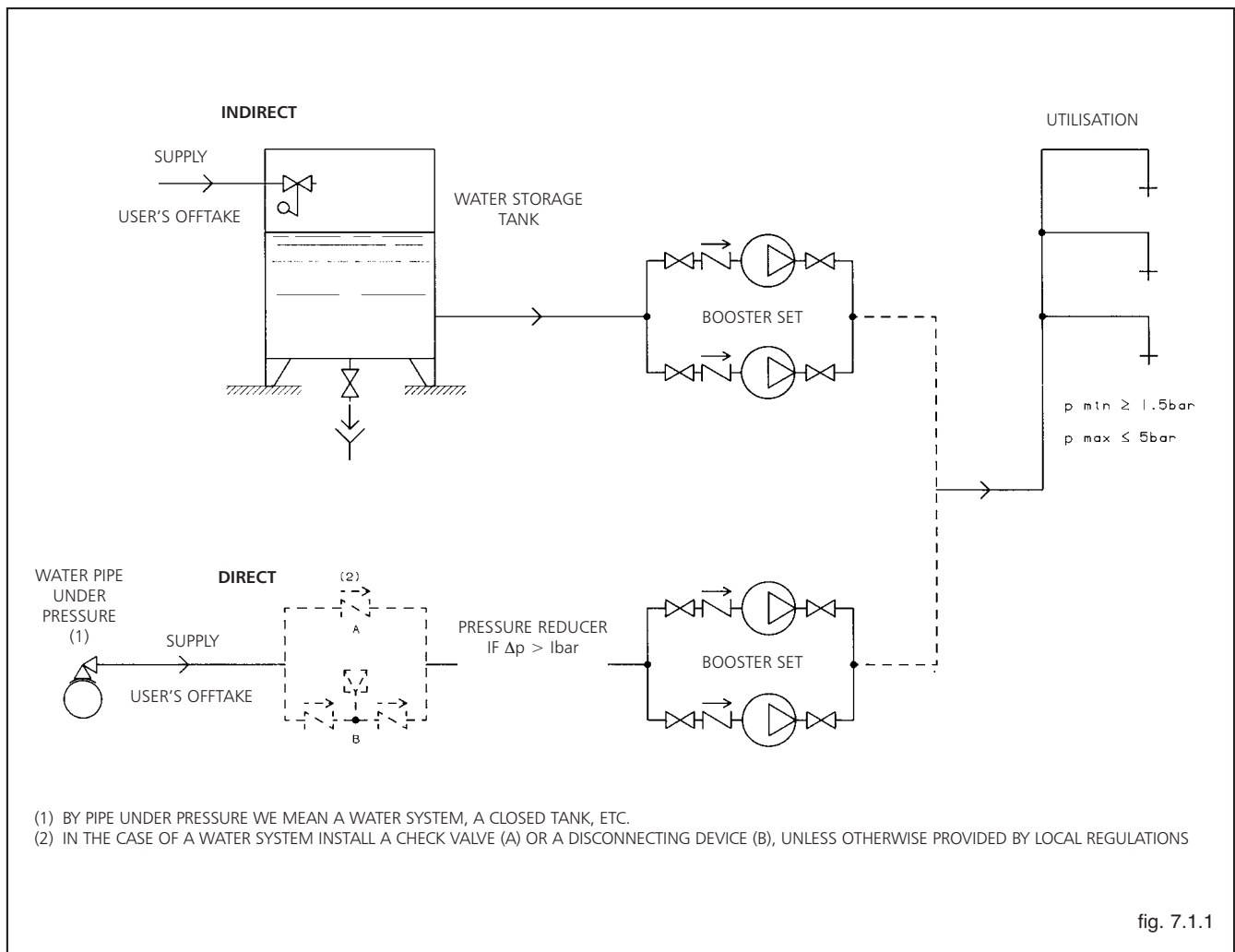


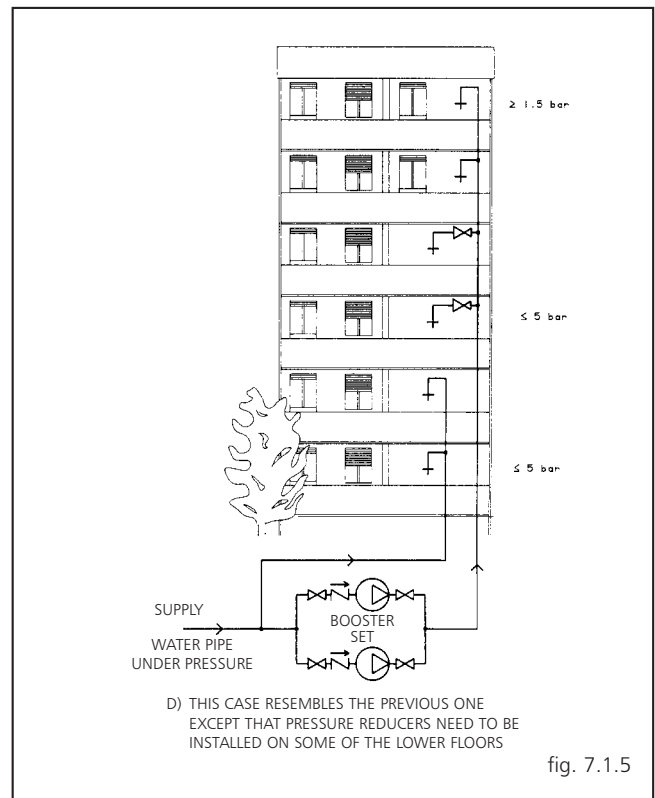
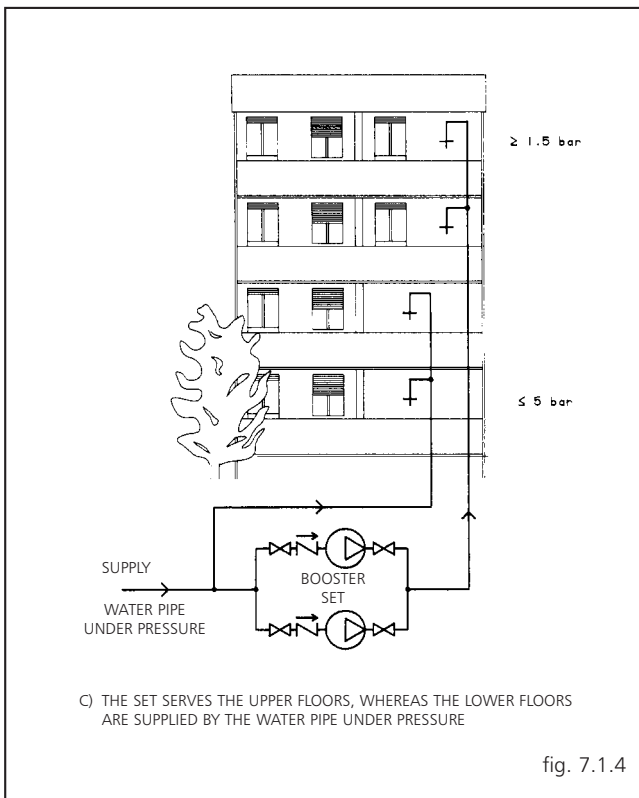
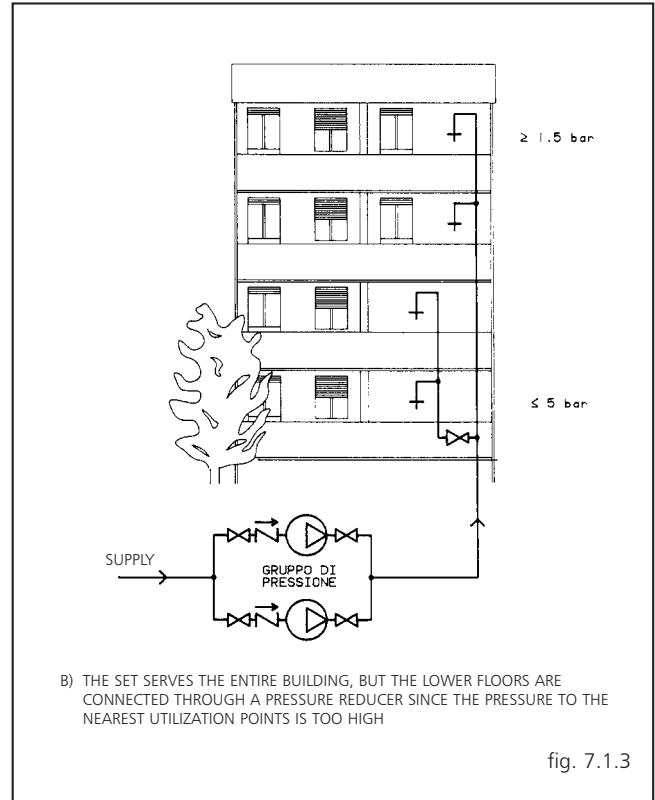
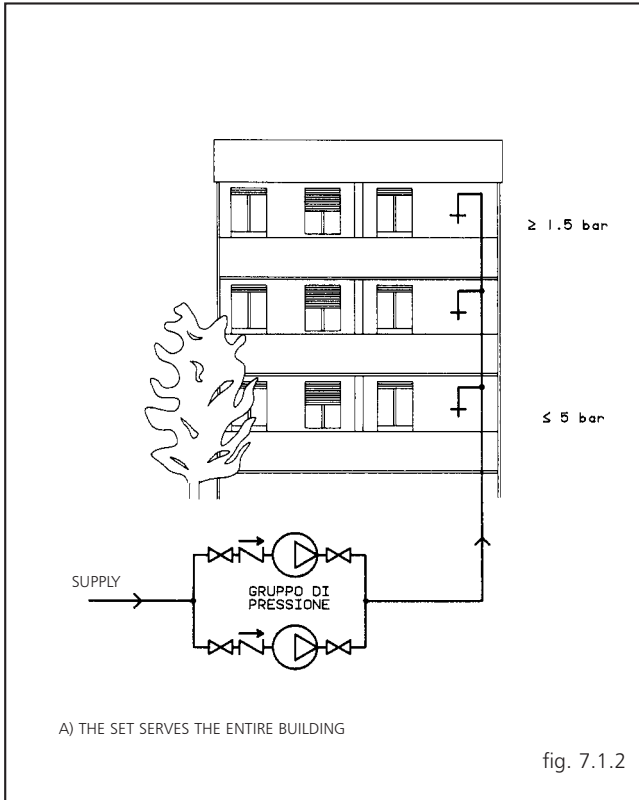
fig. 7.1.1

Water supply systems in civil buildings

The configuration of the supply system must comply with the following conditions:

- The minimum pressure ensuring the proper operation of the equipment must be guaranteed at the most unfavourable drawing point (1.5 bar for valves and flush tank WC, and 2 bar for controlled flushing system WC).
- At the most favourable drawing point, pressure must not exceed 5 bar.

Once these parameters have been satisfied, in relation to the height of the building and to the set intake conditions, the water supply system can have one of the following configurations:



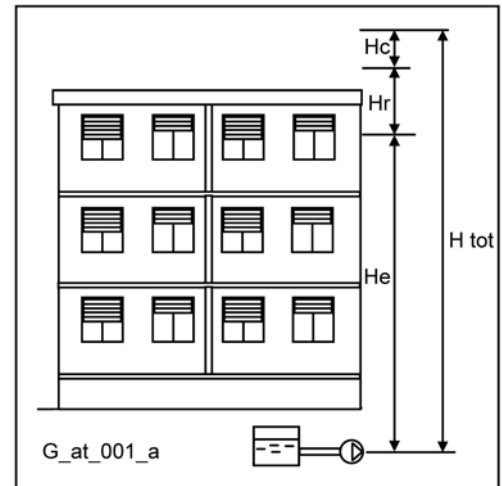
DETERMINING THE HEAD OF THE SET AND INTAKE CONDITIONS

Level intake

The delivery head of the set (H_{tot}) is the sum of:

- H_e : geodetic difference in level between the set and the furthest delivery point.
- H_c : flow resistance along all the pipes and through other system components, such as valves, filters, etc..
- H_r : pressure required at the most unfavourable point.

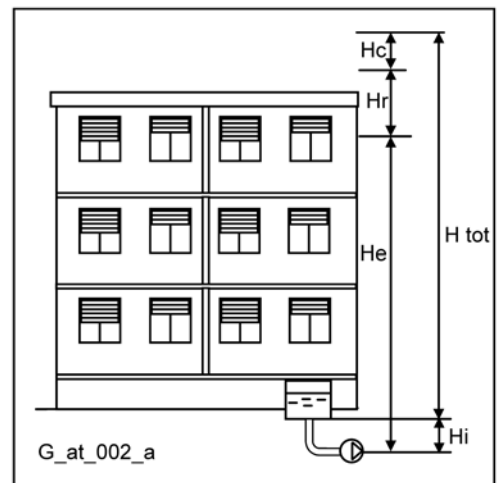
$$H_{tot} = H_e + H_c + H_r$$



Intake with positive head

In this case, the necessary delivery head (H_{tot}) will be reduced by the inlet pressure value (H_i).

$$H_{tot} = H_e + H_c + H_r - H_i$$

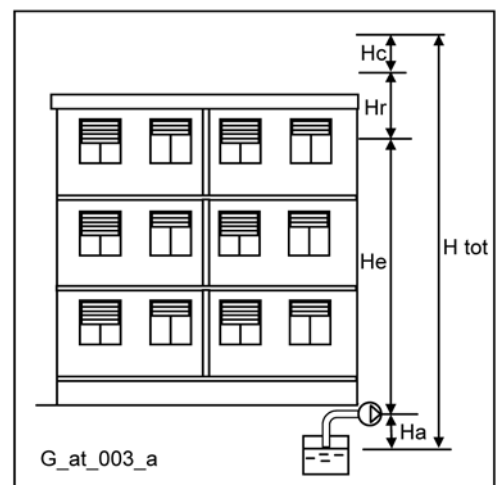


Intake with negative head

When the pumps suck from an underground tank or well, the necessary head will be increased by the value of the intake height (H_a):.

$$H_{tot} = H_e + H_c + H_r + H_a$$

In this case the intake height must be considered very carefully, bearing in mind that an excessive difference in level between the water storage tank and the set, or the wrong sizing of the intake pipe, can have adverse effects on pump operation, such as cavitation and unpriming.



NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapour-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapour pressure of the liquid.

The vapour-filled cavities flow with the current and when they reach a higher pressure area the vapour contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in m.) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapour pressure (expressed in m.) that the liquid has at the pump inlet.

To find the static height h_z at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (\text{NPSH}_r + 0.5) + h_f + h_{pv} \quad \textcircled{1}$$

where:

- h_p** is the absolute pressure applied to the free liquid surface in the suction tank, expressed in m. of liquid; h_p is the quotient between the barometric pressure and the specific weight of the liquid.
- h_z** is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in m.; h_z is negative when the liquid level is lower than the pump axis.
- h_f** is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.
- h_{pv}** is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid. h_{pv} is the quotient between the Pv vapour pressure and the liquid's specific weight.
- 0,5** is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (4° C) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

Water temperature (°C)	20	40	60	80	90	110	120
Suction loss (m)	0,2	0,7	2,0	5,0	7,4	15,4	21,5

Elevation above sea level (m)	500	1000	1500	2000	2500	3000
Suction loss (m)	0,55	1,1	1,65	2,2	2,75	3,3

Friction loss is shown in the tables at pages 131-132 of this catalogue. To reduce it to a minimum, especially in cases of high suction head (over 4-5 m.) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

Make the following calculation:

Liquid: water at ~15°C $\gamma = 1 \text{ kg/dm}^3$

Flow rate required: 30 m³/h

Head for required delivery: 43 m.

Suction lift: 3,5 m.

The selection is an FHE 40-200/75 pump whose NPSH required value is, at 30 m³/h, di 2,5 m.

For water at 15 °C

$$h_p = P_a / \gamma = 10,33\text{m}, h_{pv} = P_v / \gamma = 0,174\text{m} (0,01701 \text{ bar})$$

The H_f flow resistance in the suction line with foot valves is ~ 1,2 m.

By substituting the parameters in formula $\textcircled{1}$ with the numeric values above, we have:

$$10,33 + (-3,5) \geq (2,5 + 0,5) + 1,2 + 0,17$$

from which we have: 6,8 > 4,4

The relation is therefore verified.

TECHNICAL APPENDIX VAPOUR PRESSURE PS VAPOUR PRESSURE AND ρ DENSITY OF WATER TABLE

t °C	T K	ps bar	ρ kg/dm ³	t °C	T K	ps bar	ρ kg/dm ³	t °C	T K	ps bar	ρ kg/dm ³
0	273,15	0,00611	0,9998	55	328,15	0,15741	0,9857	120	393,15	1,9854	0,9429
1	274,15	0,00657	0,9999	56	329,15	0,16511	0,9852	122	395,15	2,1145	0,9412
2	275,15	0,00706	0,9999	57	330,15	0,17313	0,9846	124	397,15	2,2504	0,9396
3	276,15	0,00758	0,9999	58	331,15	0,18147	0,9842	126	399,15	2,3933	0,9379
4	277,15	0,00813	1,0000	59	332,15	0,19016	0,9837	128	401,15	2,5435	0,9362
5	278,15	0,00872	1,0000	60	333,15	0,1992	0,9832	130	403,15	2,7013	0,9346
6	279,15	0,00935	1,0000	61	334,15	0,2086	0,9826	132	405,15	2,867	0,9328
7	280,15	0,01001	0,9999	62	335,15	0,2184	0,9821	134	407,15	3,041	0,9311
8	281,15	0,01072	0,9999	63	336,15	0,2286	0,9816	136	409,15	3,223	0,9294
9	282,15	0,01147	0,9998	64	337,15	0,2391	0,9811	138	411,15	3,414	0,9276
10	283,15	0,01227	0,9997	65	338,15	0,2501	0,9805	140	413,15	3,614	0,9258
11	284,15	0,01312	0,9997	66	339,15	0,2615	0,9799	145	418,15	4,155	0,9214
12	285,15	0,01401	0,9996	67	340,15	0,2733	0,9793	155	428,15	5,433	0,9121
13	286,15	0,01497	0,9994	68	341,15	0,2856	0,9788	160	433,15	6,181	0,9073
14	287,15	0,01597	0,9993	69	342,15	0,2984	0,9782	165	438,15	7,008	0,9024
15	288,15	0,01704	0,9992	70	343,15	0,3116	0,9777	170	443,15	7,920	0,8973
16	289,15	0,01817	0,9990	71	344,15	0,3253	0,9770	175	448,15	8,924	0,8921
17	290,15	0,01936	0,9988	72	345,15	0,3396	0,9765	180	453,15	10,027	0,8869
18	291,15	0,02062	0,9987	73	346,15	0,3543	0,9760	185	458,15	11,233	0,8815
19	292,15	0,02196	0,9985	74	347,15	0,3696	0,9753	190	463,15	12,551	0,8760
20	293,15	0,02337	0,9983	75	348,15	0,3855	0,9748	195	468,15	13,987	0,8704
21	294,15	0,24850	0,9981	76	349,15	0,4019	0,9741	200	473,15	15,550	0,8647
22	295,15	0,02642	0,9978	77	350,15	0,4189	0,9735	205	478,15	17,243	0,8588
23	296,15	0,02808	0,9976	78	351,15	0,4365	0,9729	210	483,15	19,077	0,8528
24	297,15	0,02982	0,9974	79	352,15	0,4547	0,9723	215	488,15	21,060	0,8467
25	298,15	0,03166	0,9971	80	353,15	0,4736	0,9716	220	493,15	23,198	0,8403
26	299,15	0,03360	0,9968	81	354,15	0,4931	0,9710	225	498,15	25,501	0,8339
27	300,15	0,03564	0,9966	82	355,15	0,5133	0,9704	230	503,15	27,976	0,8273
28	301,15	0,03778	0,9963	83	356,15	0,5342	0,9697	235	508,15	30,632	0,8205
29	302,15	0,04004	0,9960	84	357,15	0,5557	0,9691	240	513,15	33,478	0,8136
30	303,15	0,04241	0,9957	85	358,15	0,5780	0,9684	245	518,15	36,523	0,8065
31	304,15	0,04491	0,9954	86	359,15	0,6011	0,9678	250	523,15	39,776	0,7992
32	305,15	0,04753	0,9951	87	360,15	0,6249	0,9671	255	528,15	43,246	0,7916
33	306,15	0,05029	0,9947	88	361,15	0,6495	0,9665	260	533,15	46,943	0,7839
34	307,15	0,05318	0,9944	89	362,15	0,6749	0,9658	265	538,15	50,877	0,7759
35	308,15	0,05622	0,9940	90	363,15	0,7011	0,9652	270	543,15	55,058	0,7678
36	309,15	0,05940	0,9937	91	364,15	0,7281	0,9644	275	548,15	59,496	0,7593
37	310,15	0,06274	0,9933	92	365,15	0,7561	0,9638	280	553,15	64,202	0,7505
38	311,15	0,06624	0,9930	93	366,15	0,7849	0,9630	285	558,15	69,186	0,7415
39	312,15	0,06991	0,9927	94	367,15	0,8146	0,9624	290	563,15	74,461	0,7321
40	313,15	0,07375	0,9923	95	368,15	0,8453	0,9616	295	568,15	80,037	0,7223
41	314,15	0,07777	0,9919	96	369,15	0,8769	0,9610	300	573,15	85,927	0,7122
42	315,15	0,08198	0,9915	97	370,15	0,9094	0,9602	305	578,15	92,144	0,7017
43	316,15	0,09639	0,9911	98	371,15	0,9430	0,9596	310	583,15	98,70	0,6906
44	317,15	0,09100	0,9907	99	372,15	0,9776	0,9586	315	588,15	105,61	0,6791
45	318,15	0,09582	0,9902	100	373,15	1,0133	0,9581	320	593,15	112,89	0,6669
46	319,15	0,10086	0,9898	102	375,15	1,0878	0,9567	325	598,15	120,56	0,6541
47	320,15	0,10612	0,9894	104	377,15	1,1668	0,9552	330	603,15	128,63	0,6404
48	321,15	0,11162	0,9889	106	379,15	1,2504	0,9537	340	613,15	146,05	0,6102
49	322,15	0,11736	0,9884	108	381,15	1,3390	0,9522	350	623,15	165,35	0,5743
50	323,15	0,12335	0,9880	110	383,15	1,4327	0,9507	360	633,15	186,75	0,5275
51	324,15	0,12961	0,9876	112	385,15	1,5316	0,9491	370	643,15	210,54	0,4518
52	325,15	0,13613	0,9871	114	387,15	1,6362	0,9476	374,15	647,30	221,20	0,3154
53	326,15	0,14293	0,9862	116	389,15	1,7465	0,9460				
54	327,15	0,15002	0,9862	118	391,15	1,8628	0,9445				

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CHOOSING AND SIZING THE SURGE TANK

The purpose of the surge tank is to limit the number of hourly starts of the pumps, placing part of its stock of water, which is maintained under pressure by the air above it, at the disposal of the system.

The surge tank can be of the air cushion or diaphragm type.

In the air cushion version there is no clear separation between air and water. Since part of the air tends to mix with water, it is necessary to restore it by means of air supply units or a compressor.

In the diaphragm version, neither air supply units nor compressor are needed, as contact between air and water is prevented by a flexible diaphragm inside the tank.

The following method, which is used to determine the volume of a surge tank, is valid both for horizontal and vertical surge tanks.

When calculating the volume of the surge tank, it is generally sufficient to consider the first pump only.

DIAPHRAGM TANK

If you decide to use a diaphragm tank, the volume will be lower than that of the air-cushion tank. It can be calculated with the following formula:

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

where:

- V_m = Total volume of the air-cushion surge tank in m^3
- Q_p = Average pump flow rate in m^3/h
- P_{max} = Maximum pressure setting (wcm)
- P_{min} = Minimum pressure setting (wcm)
- Z = Maximum number of starts per hour allowed by the motor

Example:

- CN 32 - 160/22 pump
- P_{max} = 32 mca
- P_{min} = 22 mca
- Q_p = 18 m^3/h
- Z = 30

$$V_m = \frac{Q_p}{4 \times Z} \times \frac{1}{1 - \frac{(P_{min} - 2)}{P_{max}}} = 0,4 \text{ m}^3$$

A 500-litre surge tank is therefore required.

TABLE OF FLOW RESISTANCE IN 100 m OF STRAIGHT CAST IRON PIPELINE (HAZEN-WILLIAMS FORMULA C=100)

FLOW RATE		NOMINAL DIAMETER in mm and INCHES																	
m ³ /h	l/min	15	20	25	32	40	50	65	80	100	125	150	175	200	250	300	350	400	
		1/2"	3/4"	1"	1 1/4"	1 1/2"	2	2 1/2"	3"	4"	5"	6"	7"	8"	10"	12"	14"	16"	
0,6	10	v 0,94	v 0,53	v 0,34	v 0,21	v 0,13													
		hr 16	hr 3,94	hr 1,33	hr 0,40	hr 0,13													
0,9	15	v 1,42	v 0,80	v 0,51	v 0,31	v 0,20													
		hr 33,9	hr 8,35	hr 2,82	hr 0,85	hr 0,29													
1,2	20	v 1,89	v 1,06	v 0,68	v 0,41	v 0,27	v 0,17												
		hr 57,7	hr 14,21	hr 4,79	hr 1,44	hr 0,49	hr 0,16												
1,5	25	v 2,36	v 1,33	v 0,85	v 0,52	v 0,33	v 0,21												
		hr 87,2	hr 21,5	hr 7,24	hr 2,18	hr 0,73	hr 0,25												
1,8	30	v 2,83	v 1,59	v 1,02	v 0,62	v 0,40	v 0,25												
		hr 122	hr 30,1	hr 10,1	hr 3,05	hr 1,03	hr 0,35												
2,1	35	v 3,30	v 1,86	v 1,19	v 0,73	v 0,46	v 0,30												
		hr 162	hr 40,0	hr 13,5	hr 4,06	hr 1,37	hr 0,46												
2,4	40	v 2,12	v 1,36	v 0,83	v 0,53	v 0,34	v 0,20												
		hr 51,2	hr 17,3	hr 5,19	hr 1,75	hr 0,59	hr 0,16												
3	50	v 2,65	v 1,70	v 1,04	v 0,66	v 0,42	v 0,25												
		hr 77,4	hr 26,1	hr 7,85	hr 2,65	hr 0,89	hr 0,25												
3,6	60	v 3,18	v 2,04	v 1,24	v 0,80	v 0,51	v 0,30												
		hr 108	hr 36,6	hr 11,0	hr 3,71	hr 1,25	hr 0,35												
4,2	70	v 3,72	v 2,38	v 1,45	v 0,93	v 0,59	v 0,35												
		hr 144	hr 48,7	hr 14,6	hr 4,93	hr 1,66	hr 0,46												
4,8	80	v 4,25	v 2,72	v 1,66	v 1,06	v 0,68	v 0,40												
		hr 185	hr 62,3	hr 18,7	hr 6,32	hr 2,13	hr 0,59												
5,4	90	v 3,06	v 1,87	v 1,19	v 0,76	v 0,45	v 0,30												
		hr 77,5	hr 23,3	hr 7,85	hr 2,65	hr 0,74	hr 0,27												
6	100	v 3,40	v 2,07	v 1,33	v 0,85	v 0,50	v 0,33												
		hr 94,1	hr 28,3	hr 9,54	hr 3,22	hr 0,90	hr 0,33												
7,5	125	v 4,25	v 2,59	v 1,66	v 1,06	v 0,63	v 0,41												
		hr 142	hr 42,8	hr 14,4	hr 4,86	hr 1,36	hr 0,49												
9	150	v 3,11	v 1,99	v 1,27	v 0,75	v 0,50	v 0,32												
		hr 59,9	hr 20,2	hr 6,82	hr 1,90	hr 0,69	hr 0,23												
10,5	175	v 3,63	v 2,32	v 1,49	v 0,88	v 0,58	v 0,37												
		hr 79,7	hr 26,9	hr 9,07	hr 2,53	hr 0,92	hr 0,31												
12	200	v 4,15	v 2,65	v 1,70	v 1,01	v 0,66	v 0,42												
		hr 102	hr 34,4	hr 11,6	hr 3,23	hr 1,18	hr 0,40												
15	250	v 5,18	v 3,32	v 2,12	v 1,26	v 0,83	v 0,53	v 0,34											
		hr 154	hr 52,0	hr 17,5	hr 4,89	hr 1,78	hr 0,60	hr 0,20											
18	300	v 3,98	v 2,55	v 1,51	v 1,00	v 0,64	v 0,41												
		hr 72,8	hr 24,6	hr 6,85	hr 2,49	hr 0,84	hr 0,28												
24	400	v 5,31	v 3,40	v 2,01	v 1,33	v 0,85	v 0,54	v 0,38											
		hr 124	hr 41,8	hr 11,66	hr 4,24	hr 1,43	hr 0,48	hr 0,20											
30	500	v 6,63	v 4,25	v 2,51	v 1,66	v 1,06	v 0,68	v 0,47											
		hr 187	hr 63,2	hr 17,6	hr 6,41	hr 2,16	hr 0,73	hr 0,30											
36	600	v 5,10	v 3,02	v 1,99	v 1,27	v 0,82	v 0,57	v 0,42											
		hr 88,6	hr 24,7	hr 8,98	hr 3,03	hr 1,02	hr 0,42	hr 0,20											
42	700	v 5,94	v 3,52	v 2,32	v 1,49	v 0,95	v 0,66	v 0,49											
		hr 118	hr 32,8	hr 11,9	hr 4,03	hr 1,36	hr 0,56	hr 0,26											
48	800	v 6,79	v 4,02	v 2,65	v 1,70	v 1,09	v 0,75	v 0,55											
		hr 151	hr 42,0	hr 15,3	hr 5,16	hr 1,74	hr 0,72	hr 0,34											
54	900	v 7,64	v 4,52	v 2,99	v 1,91	v 1,22	v 0,85	v 0,62											
		hr 188	hr 52,3	hr 19,0	hr 6,41	hr 2,16	hr 0,89	hr 0,42											
60	1000	v 5,03	v 3,32	v 2,12	v 1,36	v 0,94	v 0,69	v 0,53											
		hr 63,5	hr 23,1	hr 7,79	hr 2,63	hr 1,08	hr 0,51	hr 0,27											
75	1250	v 6,28	v 4,15	v 2,65	v 1,70	v 1,18	v 0,87	v 0,66											
		hr 96,0	hr 34,9	hr 11,8	hr 3,97	hr 1,63	hr 0,77	hr 0,40											
90	1500	v 7,54	v 4,98	v 3,18	v 2,04	v 1,42	v 1,04	v 0,80											
		hr 134	hr 48,9	hr 16,5	hr 5,57	hr 2,29	hr 1,08	hr 0,56											
105	1750	v 8,79	v 5,81	v 3,72	v 2,38	v 1,65	v 1,21	v 0,93											
		hr 179	hr 65,1	hr 21,9	hr 7,40	hr 3,05	hr 1,44	hr 0,75											
120	2000	v 6,63	v 4,25	v 2,72	v 1,89	v 1,39	v 1,06	v 0,68											
		hr 83,3	hr 28,1	hr 9,48	hr 3,90	hr 1,84	hr 0,96	hr 0,32											
150	2500	v 8,29	v 5,31	v 3,40	v 2,36	v 1,73	v 1,33	v 0,85											
		hr 126	hr 42,5	hr 14,3	hr 5,89	hr 2,78	hr 1,45	hr 0,49											
180	3000	v 6,37	v 4,08	v 2,83	v 2,08	v 1,59	v 1,02	v 0,71											
		hr 59,5	hr 20,1	hr 8,26	hr 3,90	hr 2,03	hr 0,69	hr 0,28											
210	3500	v 7,43	v 4,76	v 3,30	v 2,43	v 1,86	v 1,19	v 0,83											
		hr 79,1	hr 26,7	hr 11,0	hr 5,18	hr 2,71	hr 0,91	hr 0,38											
240	4000	v 8,49	v 5,44	v 3,77	v 2,77	v 2,12	v 1,36	v 0,94											
		hr 101	hr 34,2	hr 14,1	hr 6,64	hr 3,46	hr 1,17	hr 0,48											
300	5000	v 6,79	v 4,72	v 3,47	v 2,65	v 2,05	v 1,36	v 0,94											
		hr 51,6	hr 21,2	hr 10,0	hr 5,23	hr 2,77	hr 1,77	hr 0,73											
360	6000	v 8,15	v 5,66	v 4,16	v 3,18	v 2,47	v 1,82	v 1,42											
		hr 72,3	hr 29,8	hr 14,1	hr 7,33	hr 3,46	hr 2,47	hr 1,02											
420	7000	v 6,61	v 4,85	v 3,72	v 2,83	v 2,38	v 1,65	v 1,21											
		hr 39,6	hr 18,7	hr 9,75	hr 3,29	hr 1,35	hr 0,64	hr 0,26											
480	8000	v 7,55	v 5,55	v 4,25															

FLOW RESISTANCE

TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES

The flow resistance is calculated using the equivalent pipeline length method according to the table below:

ACCESSORY TYPE	DN											
	25	32	40	50	65	80	100	125	150	200	250	300
	Equivalent pipeline length (m)											
45° bend	0,2	0,2	0,4	0,4	0,6	0,6	0,9	1,1	1,5	1,9	2,4	2,8
90° bend	0,4	0,6	0,9	1,1	1,3	1,5	2,1	2,6	3,0	3,9	4,7	5,8
90° smooth bend	0,4	0,4	0,4	0,6	0,9	1,1	1,3	1,7	1,9	2,8	3,4	3,9
Union tee or cross	1,1	1,3	1,7	2,1	2,6	3,2	4,3	5,3	6,4	7,5	10,7	12,8
Gate	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Non return valve	1,1	1,5	1,9	2,4	3,0	3,4	4,7	5,9	7,4	9,6	11,8	13,9

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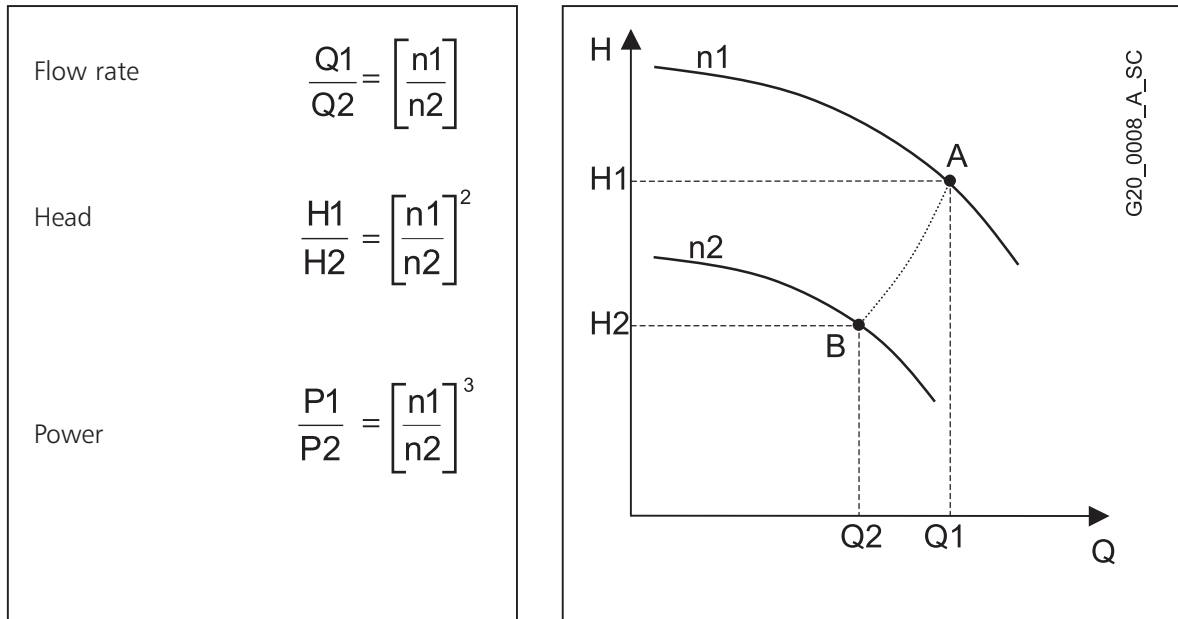
The table is valid for the Hazen Williams coefficient $C = 100$ (cast iron pipework). For steel pipework, multiply the values by 1.41. For stainless steel, copper and coated cast iron pipework, multiply the values by 1.85.

When the **equivalent pipeline length** has been determined, the flow resistance is obtained from the table of flow resistance.

The values given are guideline values which are bound to vary slightly according to the model, especially for gate valves and non-return valves, for which it is a good idea to check the values supplied by the manufacturers.

PERFORMANCE WITH VARYING SPEED EQUIVALENCE RELATIONS

Fitting the electric pump with a frequency converter makes it possible to vary the pump rotation speed, normally according to the system pressure parameter. **Variations in electric pump speed result in modified performances** according to the equivalence relations.



n1 = initial speed;	n2= speed required.
Q1 = initial flow rate;	Q2= flow rate required.
H1 = initial head;	H2= head required.
P1 = initial power;	P2= power required

Frequency ratios can be used instead of speed in practical applications, keeping 30 Hz as the bottom limit.

Example : 2-pole 50 Hz electric pump n1 =2900 (point A)
 Flow rate (A) = 100 l/min; Head (A) = 50m
 By reducing the frequency to 30 Hz the speed is reduced to approx. n2 = 1740 rpm (point B)
 Flow rate (B) = 60 l/min; Head (B) = 18 m
 The power of the new work point B is cut to about 22% of the initial power.

SIZING THE DIAPHRAGM TANK IN SYSTEMS WITH SPEED VARIATION

Variable speed booster sets need **smaller tanks** compared to traditional systems. Generally speaking, a tank with a litre capacity of just 10% of the nominal capacity of a single pump, expressed in litres per minute, is needed. The **gradual starting** of the pumps controlled by the frequency converters reduces the need to limit the number of hourly starts; the main purpose of the tank is to compensate for small system losses, stabilize the pressure and make up for pressure variations caused by sudden demand.

Make the following calculation:
 Set made up of three electric pumps, each with a maximum flow rate of 400 l/min, for a total capacity of 1200 l/min. The **volume** required for the tank is 40 litres. This size can be obtained by using two 24-litre tanks mounted directly onto the set's manifold.
 The calculation establishes the minimum value needed for proper operation.

ASSESSMENT OF PROBABLE DEMAND (VALID IN U.K. ONLY)

The method adopted is based on loading unit values as detailed in the Plumbing Engineering Design Guide published by the Institute of Plumbing.

When designing a hot or cold water supply system an assessment must be made to obtain the maximum probable simultaneous demand.

Depending on the type of services being provided it rarely occurs for all the appliances to be used at the same time therefore the design usually allows for a peak usage which is less than the maximum.

Probable demand will depend on the type of building and its use, type of appliances installed and frequency of use.

The simultaneous demand in most installations can be calculated with an adequate degree of accuracy using the loading unit concept.

The usage patterns and types of appliances in different installations will vary greatly.

Sports and Leisure centres for example are usually calculated directly by the flow rates of each appliance, without diversity factors. Each case will need to be looked at in its own right and assessed accordingly. Judgement of the designer must prevail.

Loading unit values vary for each type of appliance. A loading unit has no precise value in terms of litres per second.

See loading unit table below.

By multiplying the total number of each appliance by the appropriate loading unit number and adding the resultant totals together, the recommended flow can be read from the chart.

Loading unit table

APPLIANCE	Loading Unit	Recommended Flow L/s
WC	1,5	0,12
Wash basin (hot & cold)	3	0,3
Sink (hot & cold)	6	0,4
Bath (hot & cold)	20	0,6
Shower (hot & cold)	10	0,24
Washing machine	2	0,3

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Working Example

A block of standard flats containing a total of 70 dwellings

Each standard flat is assumed to have:

1 x Hand basin hot & cold = 3 L/U x 70 = 210

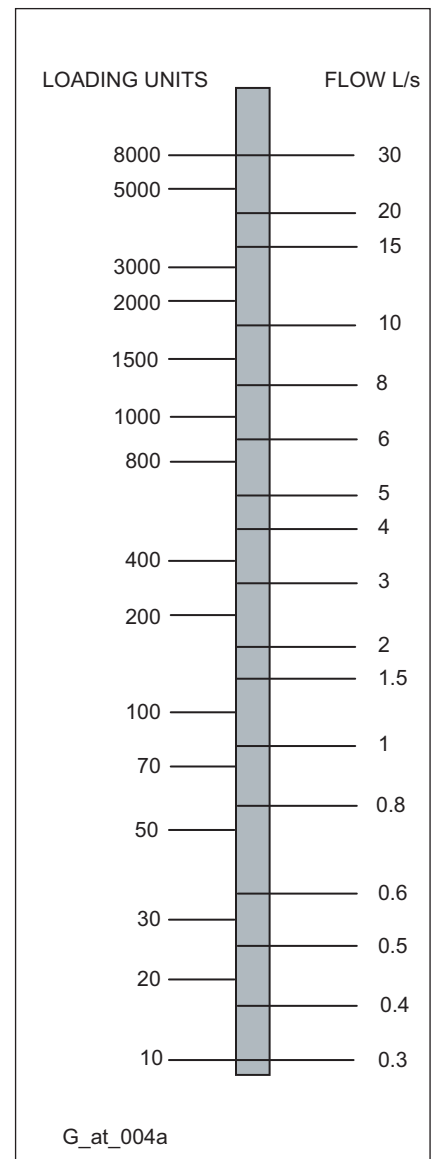
1 x WC cold only = 1.5 L/U x 70 = 105

1 x Shower hot & cold = 10 L/U x 70 = 700

1 x Sink hot & cold = 6 L/U x 70 = 420

Total Loading Unit = 1435

This figure can now be read from the chart opposite: total flow = 8.5 L/s



ASSESSING HEAD REQUIREMENT (VALID IN U.K. ONLY)

The **head** required in a boosted cold water system consists of three components, static head, residual pressure and system friction losses. The values of these three components are added together to give the total required head at the system flow rate.

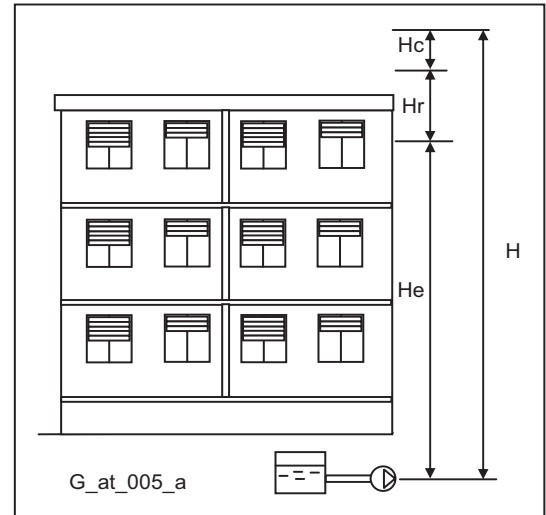
Static head (He): This is the difference between the break tank low water line and the highest discharge point in the building. If the height of the build is not known, then 2.8-3.0 metres per floor can be used to assess the building height.

Residual pressure (Hr): This is the pressure required at the highest outlet device, normally 20metres.

Note: some modern showers may require higher pressures.

System friction losses (Hc): The total losses through pipework, pipework fittings, valves, PRVs and all other equipment fed through the pumpset must be added to find the total system losses.

On conventional systems that do not include excessive runs of pipe or specialised components a rough guide would be to allow 0.05 metres friction loss for each metre of static head.



Example:

Static head (He): Building height four floors @ 2.8m each = 11.2m +
 Residual pressure (Hr): Pressure at highest outlet = 20m +
 Friction losses (Hc): 11.2 (static head) x 0.05 = 0.56m
 Total pump head required (H) = 31.76m (3.11 Bar)

Pressure limitations

The designer must ensure that adequate precautions are taken to ensure that the system is capable of withstanding the closed valve head produced by the pump set. In cases where closed valve pressures cannot be tolerated, pressure reducing valves should be fitted down stream of the booster set.

Velocity

Pipework within the system should be sized to limit the velocity to the figures stated in table below.

Higher velocities will lead to excessive noise, wear and higher running costs.

PIPE SIZE	SUCTION PIPE m/s	DELIVERY PIPE m/s
Less than 80mm	0,46	0,91 to 1,07
100-150mm	0,55	1,22 to 1,52
200mm	0,76	1,68
250 and above	0,91	1,82 to 2,13

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BOOSTER SIZING

What information do we require to size a booster set?

- As a minimum we need to know:
 - The total flow rate, or information to assess this.
 - The total head at flow rate, or the height of building.
 - If the pumps are to operate under positive head, or suction lift conditions.
 - Where the set is to be sited, I.E. basement or roof.
 - Preferred choice fixed or variable speed
- Additional information if available:
 - How to split the duty for particular applications I.E. duty/standby or duty/assist.
 - The size and material of the connecting pipework.
 - Is a Jockey pump required.

ACCESSORIES/SPARE PARTS



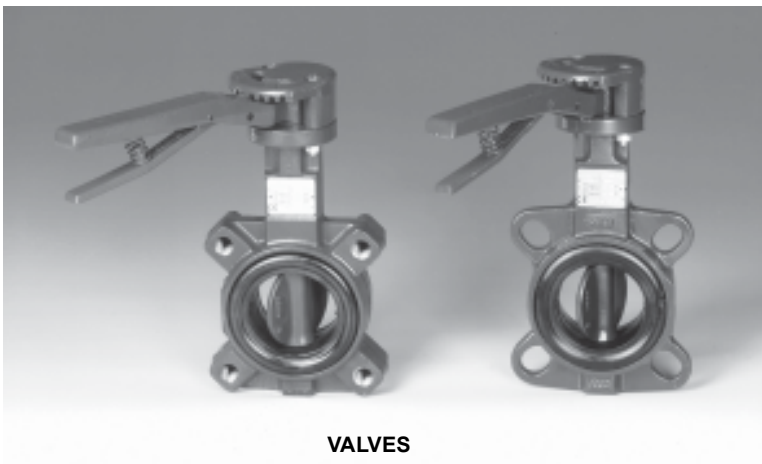
HYDRO TUBE



PRESSURE SWITCH



FLOAT SWITCHES



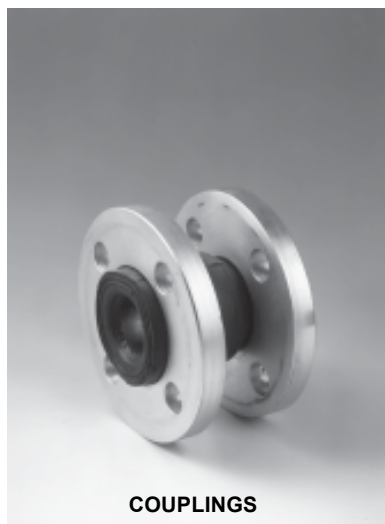
VALVES



OPTICAL SENSORS



NON-RETURN VALVES



COUPLINGS



PRESSURE TRANSMITTER

VOLUMETRIC CAPACITY

Litres per minute l/min	Cubic metres per hour m ³ /h	Cubic feet per hour ft ³ /h	Cubic feet per minute ft ³ /min	Imp. gal. per minute Imp. gal./min	US gal. per minute Us gal./min
1,000	0,0600	2,1189	0,0353	0,2200	0,2642
16,6667	1,000	35,3147	0,5886	3,6662	4,4029
0,4719	0,0283	1,000	0,0167	0,1038	0,1247
28,3168	1,6990	60,0000	1,000	6,2288	7,4805
4,5461	0,2728	9,6326	0,1605	1,000	1,2009
3,7854	0,2271	8,0208	0,1337	0,8327	1,000

PRESSURE AND HEAD

Newton per square metre N/m ²	kilo Pascal kPa	bar bar	Pound force per square inch psi	metre of water m H ₂ O	millimetre of mercury mm Hg
1,000	0,0010	1 x 10 ⁻⁵	1.45 x 10 ⁻⁴	1.02 x 10 ⁻⁴	0,0075
1000,0000	1,000	0,0100	0,1450	0,1020	7,5006
1 x 10 ⁵	100,0000	1,000	14,5038	10,1972	750,0638
6894,7570	6,8948	0,0689	1,000	0,7031	51,7151
9806,6500	9,8067	0,0981	1,4223	1,000	73,5561
133,3220	0,1333	0,0013	0,0193	0,0136	1,000

LENGTH

millimetre mm	centimetre cm	metre m	inch in	foot ft	yard yd
1,000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	1,000	0,0100	0,3937	0,0328	0,0109
1000,0000	100,0000	1,000	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	1,000	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	1,000	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	1,000

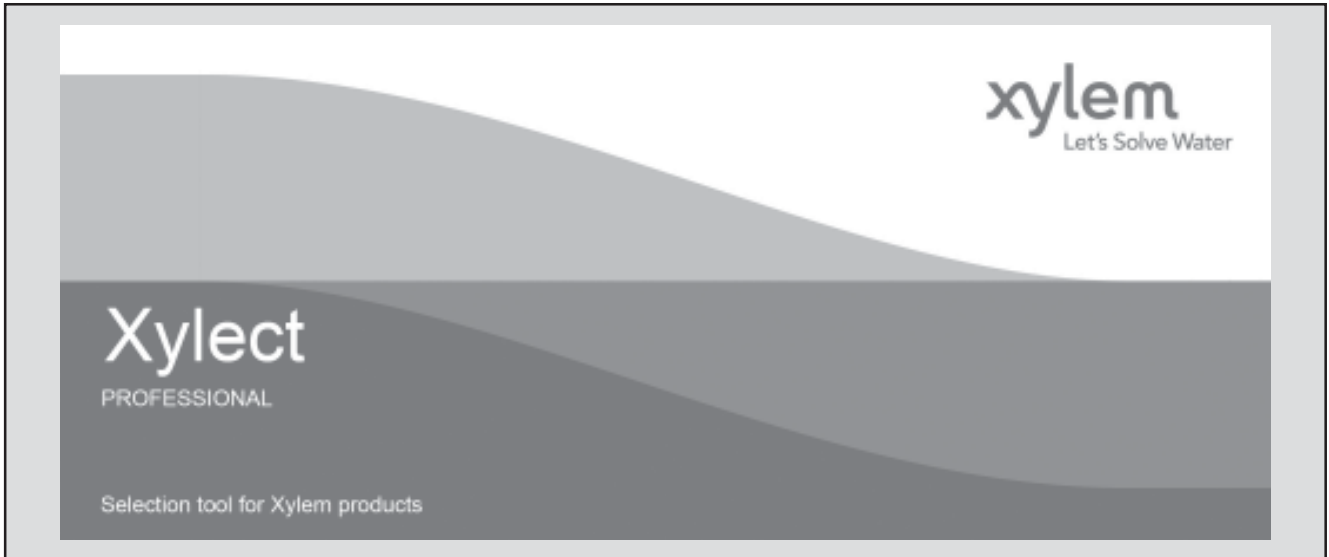
VOLUME

cubic metre m ³	litre litro	millilitre ml	imp. Gallon imp. gal.	US gallon US gal.	cubic foot ft ³
1,000	1000,0000	1 x 10 ⁶	219,9694	264,1720	35,3147
0,0010	1,000	1000,0000	0,2200	0,2642	0,0353
1 x 10 ⁻⁶	0,0010	1,000	2.2 x 10 ⁻⁴	2.642 x 10 ⁻⁴	3.53 x 10 ⁻⁵
0,0045	4,5461	4546,0870	1,000	1,2009	0,1605
0,0038	3,7854	3785,4120	0,8327	1,000	0,1337
0,0283	28,3168	28316,8466	6,2288	7,4805	1,000

G-at_pp-en_a_sc

FURTHER PRODUCT SELECTION AND DOCUMENTATION

Xylect



Xylect is pump solution selection software with an extensive online database of product information across the entire Lowara, and Vogel range of pumps and related products, with multiple search options and helpful project management facilities. The system holds up-to-date product information on thousands of products and accessories.

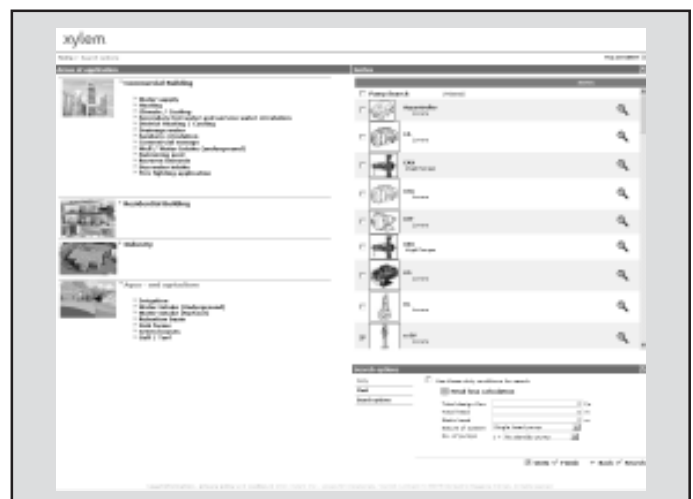
The possibility to search by applications and the detailed information output given makes it easy to make the optimal selection without having detailed knowledge about the Lowara and Vogel products.

The search can be made by:

- Application
- Product type
- Duty point

Xylect gives a detailed output:

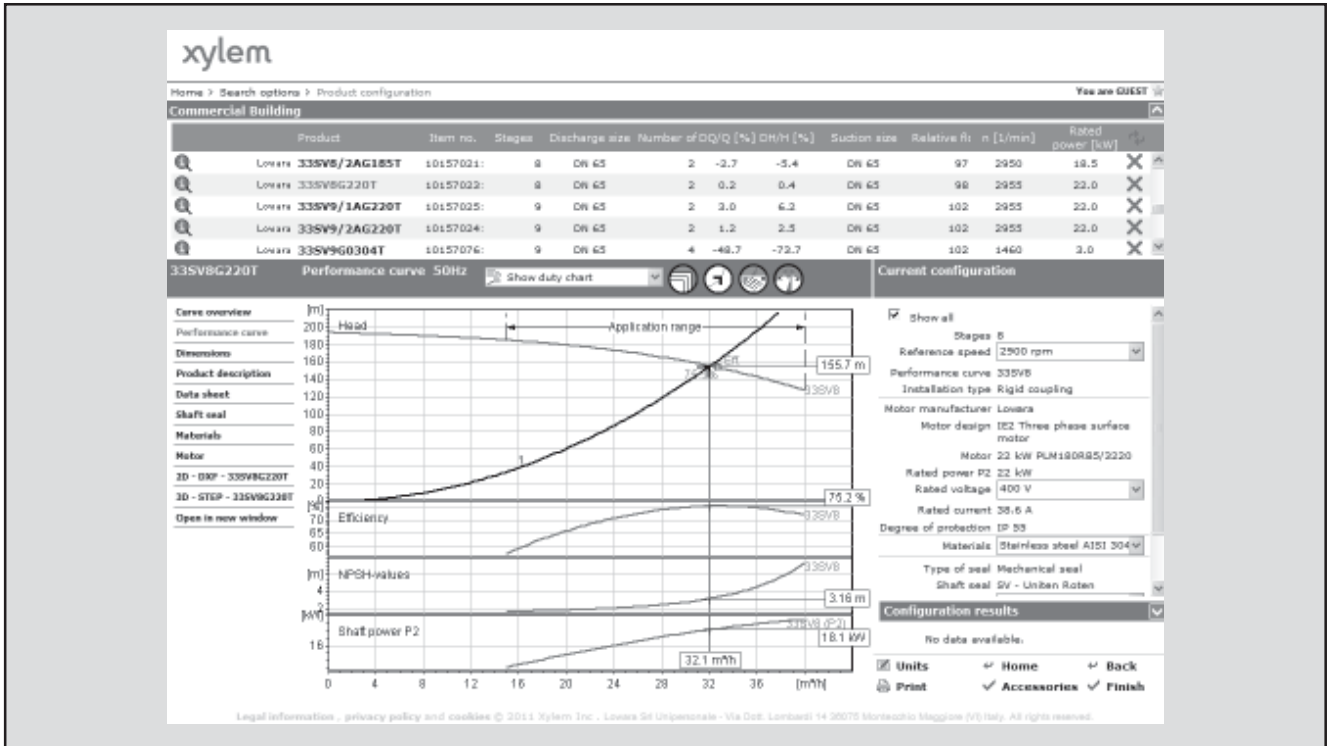
- List with search results
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Options
- Data sheet printouts
- Document downloads incl dxf files



The search by application guides users not familiar with the product range to the right choice.

FURTHER PRODUCT SELECTION AND DOCUMENTATION

Xylect



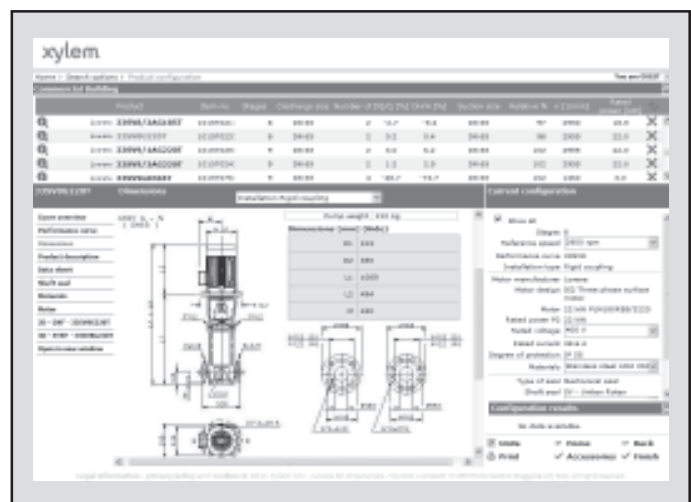
The detailed output makes it easy to select the optimal pump from the given alternatives.

The best way to work with Xylect is to create a personal account. This makes it possible to:

- Set own standard units
- Create and save projects
- Share projects with other Xylect users

Every user have a My Xylect space, where all projects are saved.

For more information about Xylect please contact our sales network or visit www.xylect.com.



Dimensional drawings appear on the screen and can be downloaded in dxf format.

BOOSTER SETS, GHV SERIES WITH ELECTRIC PUMPS e-SV™ THREE-PHASE MOTORS AT 50 Hz, 2-POLE (up to 22 kW)

P _N kW	Efficiency η _N %																		IE	Year of manufacture				
	Δ 220 V Y 380 V			Δ 230 V Y 400 V			Δ 240 V Y 415 V			Δ 380 V Y 660 V			Δ 400 V Y 690 V			Δ 415 V								
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4						
0,37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0,55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0,75	82,5	83,1	81,3	82,8	82,7	80,1	82,6	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	-	-	-	-	-	-
1,1	84,0	84,7	83,4	84,4	84,5	82,5	84,3	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	-	-	-	-	-	-
1,5	85,6	86,5	85,8	85,9	86,4	84,9	86,0	86,0	84,0	85,6	86,0	84,0	85,6	86,0	84,0	85,6	86,0	84,0	-	-	-	-	-	-
2,2	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	-	-	-	-	-	-
3	85,5	86,8	85,6	86,1	86,8	85,6	86,3	86,8	85,6	85,5	86,8	85,6	85,5	86,8	85,6	85,5	86,8	85,6	-	-	-	-	-	-
4	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	86,3	-	-	-	-	-	-
5,5	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	87,6	-	-	-	-	-	-
7,5	88,6	88,1	88,1	88,6	88,1	88,1	88,6	88,1	88,1	88,6	88,1	88,1	88,6	88,1	88,1	88,6	88,1	88,1	-	-	-	-	-	-
11	90,3	91,1	90,3	90,3	91,1	90,3	90,3	91,1	90,3	90,3	91,1	90,3	90,8	91,1	90,3	91,0	91,1	90,3	-	-	-	-	-	-
15	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	90,3	-	-	-	-	-	-
18,5	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	91,2	-	-	-	-	-	-
22	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	91,3	-	-	-	-	-	-

P _N kW	Manufacturer		IEC SIZE*	Construction Design	N. of Poles	f _N Hz	Data for 400 V / 50 Hz Voltage				
	Lowara srl Unipersonale Reg. No. 341820260 Montecchio Maggiore Vicenza - Italia						cosφ	I _s / I _N	T _N Nm	Ts/T _N	Tm/Tn
	Model										
0,37	SM71RB14/304		71R	V18/B14	2	50	0,66	4,32	1,38	4,14	3,13
0,55	SM71B14/305		71				0,74	5,97	1,85	3,74	3,56
0,75	SM80B14/307PE		80				0,78	7,38	2,48	3,57	3,75
1,1	SM80B14/311PE		80				0,79	8,31	3,63	3,95	3,95
1,5	SM90RB14/315PE		90R				0,80	8,80	4,96	4,31	4,10
2,2	PLM90B14/322		90				0,80	8,63	7,25	3,74	3,71
3	PLM100RB14/330		100R				0,82	8,39	9,96	3,50	3,32
4	PLM112RB14/340		112R				0,85	9,52	13,1	3,04	4,40
5,5	PLM132RB5/355		132R				0,87	10,3	18,1	4,43	5,80
7,5	PLM132B5/375		132				0,87	9,21	24,5	3,26	4,55
11	PLM160RB5/3110		160R				0,87	9,72	36,0	3,46	4,56
15	PLM160B5/3150		160				0,91	8,45	48,6	2,26	3,81
18,5	PLM160B5/3185		160				0,88	9,75	59,8	2,82	4,53
22	PLM180RB5/3220		180R				0,89	9,50	71,1	2,74	4,26

P _N kW	Voltage U _N V											η _N min ⁻¹	Observe the regulations and codes locally in force regarding sorted waste disposal.	Operating conditions **		
	Δ			Y			Δ			Y				Altitude Above Sea Level (m)	T. amb min/max °C	ATEX
	220 V	230 V	240 V	380 V	400 V	415 V	380 V	400 V	415 V	660 V	690 V					
0,37	2,20	2,34	2,51	1,27	1,35	1,45	-	-	-	-	-	2740 ÷ 2790	≤ 1000	-15 / 40	No	
0,55	2,56	2,56	2,62	1,48	1,48	1,51	-	-	-	-	-	2825 ÷ 2850				
0,75	2,96	2,94	2,96	1,71	1,70	1,71	1,70	1,69	1,70	0,98	0,98	2875 ÷ 2895				
1,1	4,19	4,14	4,16	2,42	2,39	2,40	2,41	2,38	2,38	1,39	1,37	2870 ÷ 2900				
1,5	5,56	5,49	5,51	3,21	3,17	3,18	3,21	3,18	3,19	1,85	1,84	2870 ÷ 2895				
2,2	8,05	8,04	8,09	4,65	4,64	4,67	4,62	4,61	4,63	2,67	2,66	2885 ÷ 2900				
3	10,8	10,6	10,6	6,23	6,14	6,12	6,18	6,10	6,06	3,57	3,52	2850 ÷ 2885				
4	13,6	13,5	13,5	7,88	7,77	7,79	7,80	7,63	7,65	4,51	4,41	2895 ÷ 2920				
5,5	18,3	18,0	17,9	10,6	10,4	10,3	10,6	10,4	10,5	6,14	6,02	2885 ÷ 2905				
7,5	25,4	24,8	24,4	14,7	14,3	14,1	14,5	14,0	13,9	8,35	8,11	2920 ÷ 2935				
11	36,0	35,1	34,7	20,8	20,3	20,0	20,8	20,3	20,1	12,0	11,7	2910 ÷ 2925				
15	47,2	45,3	44,0	27,2	26,2	25,4	27,2	26,0	25,3	15,7	15,0	2940 ÷ 2950				
18,5	58,3	56,9	55,9	33,7	32,9	32,3	34,1	33,2	32,8	19,7	19,1	2945 ÷ 2955				
22	68,3	66,2	64,3	39,4	38,2	37,1	40,0	38,6	37,8	23,1	22,3	2945 ÷ 2955				

* R = Reduced size of motor casing as compared to shaft extension and flange.

sv-ie2-mott22-2p50-en_c_tte

** Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

BOOSTER SETS, GHV SERIES WITH ELECTRIC PUMPS e-SV™ THREE-PHASE MOTORS AT 50 Hz, 2-POLE (from 30 to 55 kW)

P _N kW	Efficiency η_N %									IE	Year of manufacture
	Δ 380 V Y 660 V			Δ 400 V Y 690 V			Δ 415 V				
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4		
30	92,6	92,9	92,7	92,5	93,0	92,9	93,0	93,0	92,3	2	By June 2011
37	93,0	93,3	93,2	93,0	93,4	93,3	93,5	93,4	92,8		
45	93,2	93,5	93,4	93,3	93,6	93,6	93,8	93,6	93,1		
55	93,6	93,8	93,8	93,6	93,9	93,9	94,0	93,8	93,3		

P _N kW	Manufacturer	IEC SIZE	Construction Design	N. of Poles	f _N Hz	Data for 400 V / 50 Hz Voltage				
	WEG Equipamentos Eletricos S.A. Reg. No. 07.175.725/0010-50 Jaragua do Sul - SC (Brazil)					cos ϕ	I _s / I _N	T _N Nm	T _s /T _N	T _m /T _N
	Model									
30	W22 200L2-B5 30kW	200	V1/B5	2	50	0,87	6,50	97,00	2,40	2,70
37	W22 200L2-B5 37kW	200				0,87	6,80	120,0	2,40	2,60
45	W22 225S/M2-B5 45kW	225				0,89	7,00	145,0	2,20	2,80
55	W22 250S/M2-B5 55kW	250				0,89	7,00	178,0	2,20	2,80

P _N kW	Voltage U _N V					n _N min ⁻¹	See note:	Operating conditions **		
	Δ			Y				Altitude Above Sea Level (m)	T. amb min/max °C	ATEX
	380 V	400 V	415 V	660 V	690 V					
	I _N (A)									
30	55,90	53,60	52,20	32,18	31,07	2950 ÷ 2960	≤ 1000	-15 / 40	No	
37	68,70	65,80	64,00	39,55	38,14	2945 ÷ 2955				
45	81,50	78,00	75,80	46,92	45,22	2955 ÷ 2960				
55	99,20	95,00	92,50	57,12	55,07	2955 ÷ 2960				

** Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

sv-ie2-mott55-2p50-en_a_te

Note: Observe the regulations and codes locally in force regarding sorted waste disposal.

Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're 12,000 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to xylem.com.



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