xylem
Let's Solve Water

50 Hz

GHV10-GHV20-GHV30-GHV40 Series

VARIABLE SPEED BOOSTER SETS WITH HYDROVAR® (HVL SERIES)
VERTICAL MULTISTAGE ELECTRIC PUMPS SERIES e-SV™

Central and Nordic European market

LOWARA
a xylem brand

Cod. 191020571 Rev. D Ed.07/2025

Directive 2009/125/EC of the European Union

The **Directive 2005/32/EC** on energy-using products (**EuP**) and the subsequent **Directive 2009/125/EC** on energy-related products (**ErP**) established the ecodesign requirements for products to reduce their energy consumption and consequently their environmental impact.

These requirements apply to products placed and used in the European Economic Area (European Union plus Iceland, Liechtenstein and Norway) as a stand-alone unit or as integrated parts in other products.

The following tables show the Regulations that define the requirements applicable to Lowara products.

- Some types of **pump**, used for pumping clean water:

Regulations	From	Target
(EU) N. 547/2012 and subsequent updates	1 January 2015	**MEI** ≥ 0,4

- **Circulators** with a rated hydraulic output power of between 1 and 2500 W, designed for use in heating systems or in secondary circuits of cooling distribution systems:

Regulations	From	Target
(EC) N. 641/2009 and subsequent updates	1 August 2015	**EEI** < 0,23

- **Three-phase motors** with frequency 50 or 60 or 50/60 Hz and voltages between 50 and 1000 V (S1 and D.O.L.):

Regulations	From	Target
(EU) 2019/1781 and subsequent updates	1 July 2023	**IE2**: motors with a rated output ≥ 0,12 and < 0,749 kW **IE3**: motors with a rated output ≥ 0,75 and < 74,9 kW **IE4**: motors with a rated output ≥ 75 and < 200 kW **IE3**: motors with a rated output ≥ 201 and < 1000 kW

- **Single-phase motors** with frequency 50 or 60 or 50/60 Hz and voltages between 50 and 1000 V (S1 and D.O.L.):

Regulations	From	Target
(EU) 2019/1781 and 2021/341	1 July 2023	**IE2**: motors with a rated output ≥ 0,12 kW

- **Variable speed drives** with three-phase input and rated output power from 0,12 kW up to 1000 kW, rated for operating with motor included in the same regulations:

Regulations	From	Target
(EU) 2019/1781 and 2021/341	1 July 2021	**IE2**

LOWARA
a xylem brand

CONTENTS

GHV BOOSTER SETS 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 variable speed pumping stations with one to four e-SV series multistage vertical pumps. Each pump is equipped with an HYDROVAR frequency converter. This means that all the pumps are capable of variable speed operation. Special sets with up to 8 pumps are also available on request.

These types of systems improve the comfort of the end user, reducing noise emissions. Thanks to the gradual switching off of the pumps, "water hammer" is also reduced.

GHV10: The e-SV pump is connected to the manifolds by means of on-off valves non-return valve.
GHV10 are available as kit.
GHV20, GHV30, GHV40: The pumps are installed on a single base and connected to each other by means of suction and delivery pipes.
The pumps are connected to the manifolds by means of on-off valves and non-return valves.
The control panel is secured to the same base by means of a bracket.

Materials in contact with water are either certified or approved according to KTW

GHV series booster sets have been defined with a wide range of pumps to satisfy the different needs of every system. However, Lowara can also offer the GHV series with customization to satisfy particular working requirements.

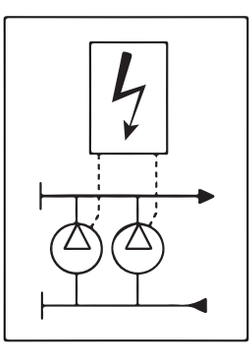
Systems for regulating the speed of the electric motors, as in GHV series booster sets, are used in the following cases:

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

GHV BOOSTER SETS SERIES
DESCRIPTION OF OPERATION

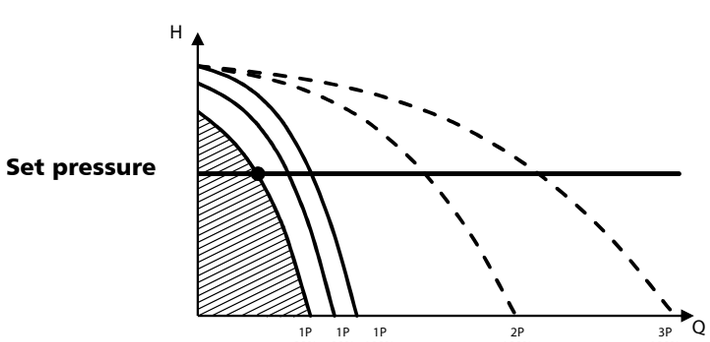
In Lowara GHV series booster sets, all the pumps are controlled by a HYDROVAR frequency converter, and operate at variable speeds.
Special sets with up to eight pumps are also available on request. Start-up is automatic, depending on system requirements. Each pump has a pressure transmitter that provides a pressure reading, which is recorded and sent to the frequency converter.
The pump speed is modulated based on system requirements.
Pump start alternation is automatic, following a preset time (parameter available in the frequency converter).
Pump starts and stops are determined based on the pressures entered as set values in the menu of the frequency converter.

Example of operation of a GHV set with three pumps.

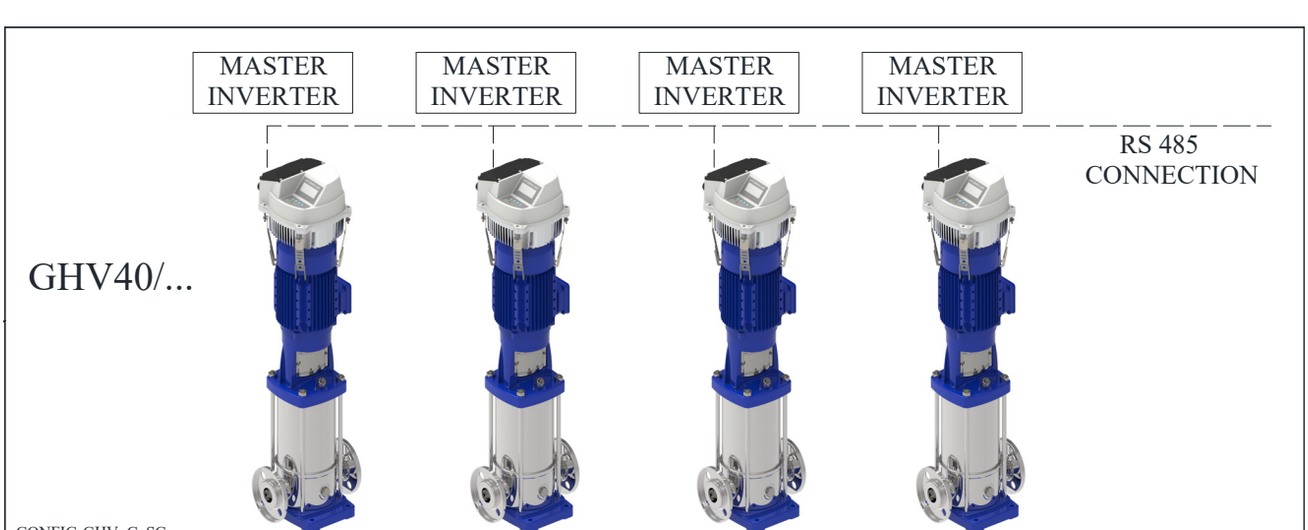


Each pump is controlled by a frequency converter, directly connected to the pump electric motor. The starting priority is changed in accordance with the time set in the relevant HYDROVAR parameter field. The speed adjustment will apply to all the pumps installed. When the water request decreases, the pumps stop in succession.
The pumps connected to the frequency converter keep the pressure constant by modulating the number of motor revs.
The acceleration and deceleration of the pump, both at start-up and switch off, is of the soft type.
This helps to reduce water hammer and ensures a quiet operation of the booster set.

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

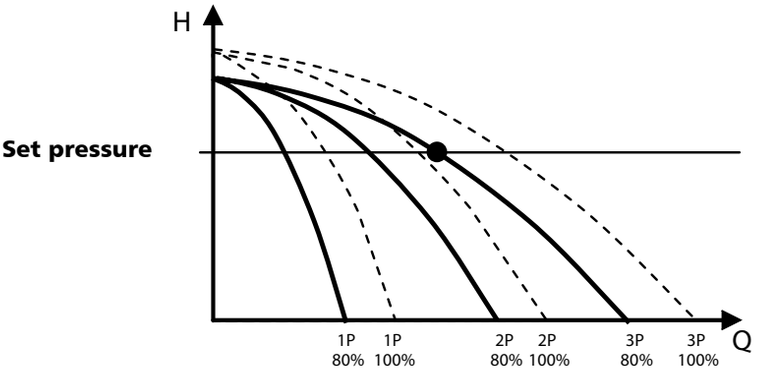


HYDROVAR fitted on 0,55 to 22 kW 2 and 4 pole motors (8 units maximum)



GHV BOOSTER SETS SERIES
DESCRIPTION OF OPERATION

When the pressure decreases, an electric pump starts, adjusting the motor speed so that the set pressure value can be guaranteed. When the demand for water increases, the other pumps also start in sequence, at variable speed, to keep the pressure at a constant level.



When the demand for water decreases, the pumps switch off in succession. The number of revolutions of the first pump switched on decreases to a set minimum before switching off.

Regulating the constant pressure value

GHV series booster sets guarantee constant pressure of the system even during frequent variations in water consumption.
The system pressure value is measured by the pressure transducers connected to the delivery manifold.
The value found is compared with the set value. The comparison between the measured pressure and the set pressure is performed through the HYDROVAR internal "controller", which manages the motor speed acceleration and deceleration ramps (frequency), changing the performance of the pump during the time.
In case of fault of one of the frequency converters, the others will remain active and will continue to guarantee the control of the other pumps and the constant pressure.

Type of control

GHV series booster sets use one or more sensors as a standard device to control pressure.
For each booster set, there are as many sensors as the number of pumps installed. In case of fault of one of the transducer, the converter connected to the pump stops working. It is also possible to change the unit of measure into bar, psi, m^3/h, °C, °F, l/sec, l/min, %. In this case, different transducers may be used, depending on the selected measure, such as flow or temperature transducers.

Setpoint

It is possible to set up to two setpoints of different values. In this way, the same booster set can be used for systems that require different pressure values at the utility. 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 setpoints can be changed through an external consensus.

GHV BOOSTER SETS SERIES
DESCRIPTION OF OPERATION

Cyclical exchange of pumps

In the GHV series with more than one pump, the pump's start is alternated according to a time set for each pump through a clock in the frequency converter menu.

Additional protection against dry running

Protection against dry running activates when the water reserve falls below the minimum level guaranteed for suction. The level can be checked using a float switch, a minimum pressure switch, an external contact, or level probes. For the latter, the probes must be connected to the adjustable sensitivity electronic module. In GHV series booster sets, the control panel includes the electronic module to connect the lack of water's control.
The minimum pressure switch is installed as standard.

Minimum delivery pressure protection

The minimum delivery pressure function can be managed by entering the pressure value in the menu of the HYDROVAR control card, which will receive the signal through the pressure transducer at the delivery.

GHV BOOSTER SETS SERIES
ENERGY SAVING

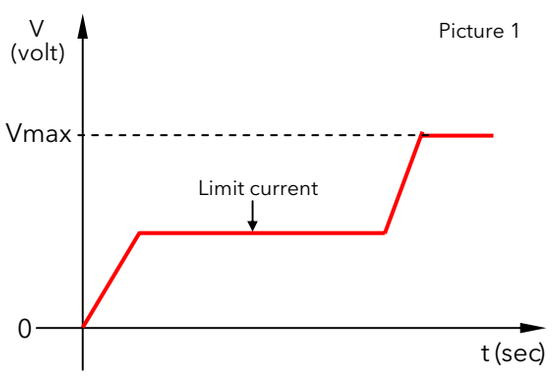
The worldwide demand for energy is growing all the time and, while the demand is increasing, production is coming up against serious problems of an environmental nature and related to the supply of raw materials. In other words, energy is an asset that is becoming more precious every day, imposing choices to optimize consumption, especially with a view to safeguarding the environment.
A very important improvement is provided by new technologies, which together with technical performance, include the safeguard for the environment and energy functionality among the important parameters.
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":



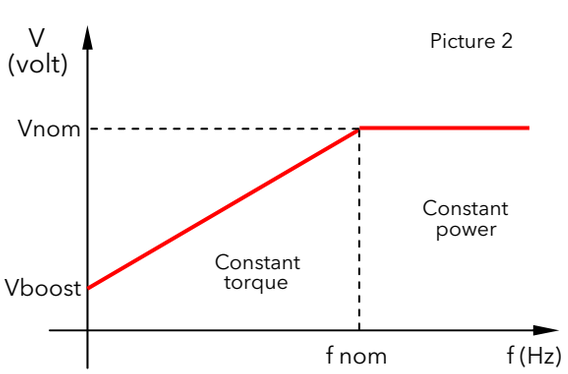
Picture 1

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 application advantages of the two categories of drives will be described below.

Soft start

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:



Picture 2

- 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.

GHV BOOSTER SETS SERIES
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, saving can apply to:
- 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 reliability and efficiency of the pump speed control systems means optimizing 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 realization 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.

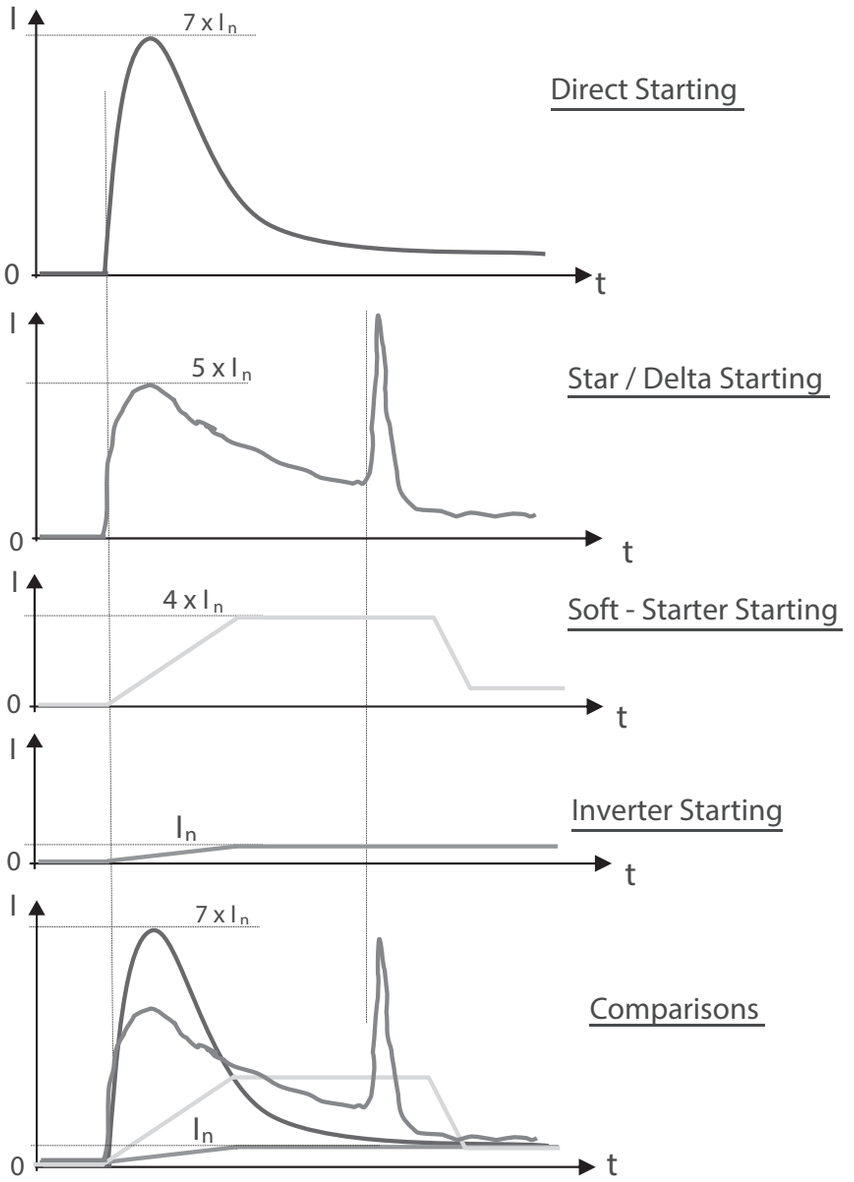
GHV BOOSTER SETS SERIES
ENERGY SAVING

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:

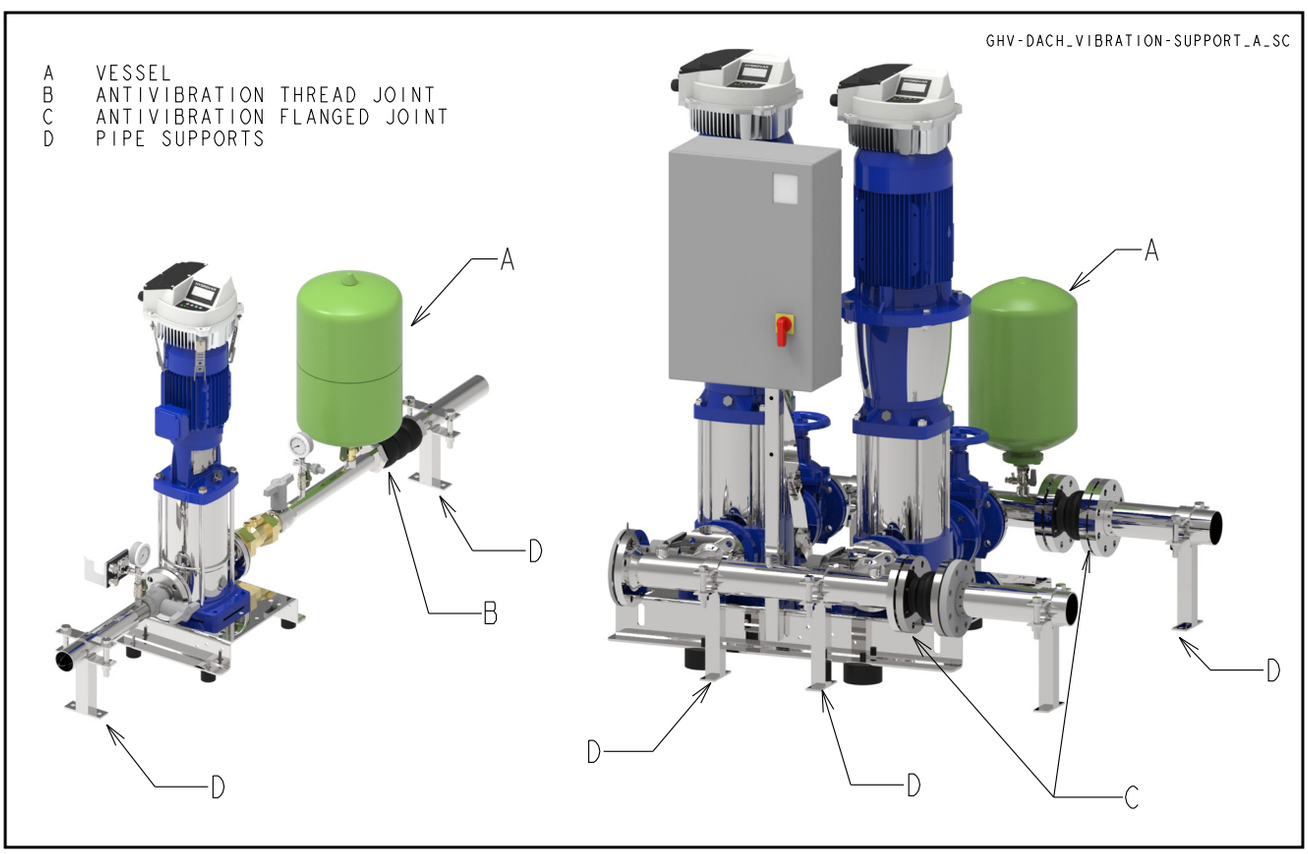
- ✓ Saving energy
- ✓ Optimizing resources and processes
- ✓ Having the possibility of complete integration of the management, control and supervision systems
- ✓ Prolonging the life of the installations
- ✓ Reducing maintenance costs
- ✓ Increasing the productivity and yield of an installation

Below is a comparison of the different starting systems:
having examined the various starting systems that can be realized for electric motors, direct start, star/delta, soft starter and inverter, they can be compared, analyzing the absorbed currents (In) and therefore the energy consumed (current = energy = kWh = MONEY)



GHV BOOSTER SETS SERIES
INSTALLATION

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



The booster sets must be connected to pressurized tanks with an adequate capacity for the system to operate correctly. 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, it is possible to use diaphragm tanks (hydro tube) that when installed in the delivery piping perform a pressure dampening function, as they are not intended to store water like autoclave systems. Due to their design, variable-speed booster sets can satisfy users' demands by moderating the pump speed.

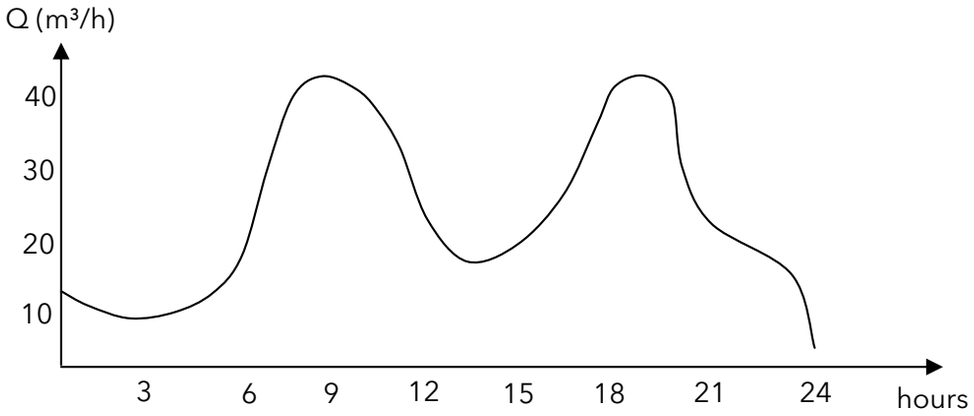
Considering also that variable-pressure sets are very sensitive to swings of pressure in the system, the use of diaphragm tanks allows the pressure to stabilize when requests are low or inexistent, and avoids the pumps remaining in operation at minimum speed without stopping.

GHV BOOSTER SETS SERIES
CHOICE AND SELECTION

The following conditions should be considered when choosing a variable pressure set:

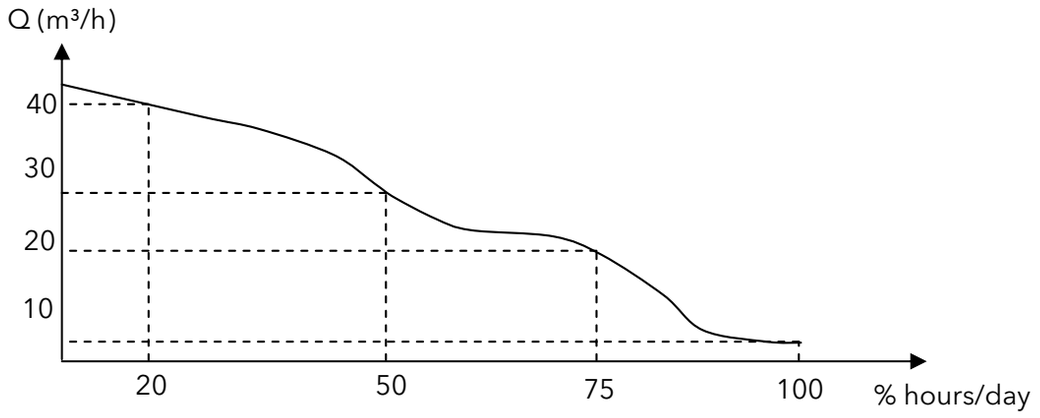
- The system's requirements should be met regarding flow rate and pressure.
- The unit must not be oversized, avoiding unnecessary installation and running costs.

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 unit 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 24h

The operating time of the unit 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

GHV BOOSTER SETS 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 control panel.
This allows checking of the system yield, 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.

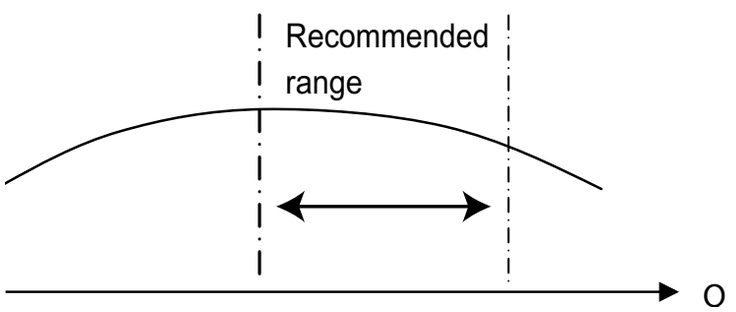
GHV series booster sets are equipped with a diaphragm tank. For the size of the tank, see the specific chapter in this catalogue.
The capacity of the tanks are: 25lt PN10, 12lt PN16.
Diaphragm tanks avoid the risk of water hammer, which is harmful for both the system and the pumps.

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.

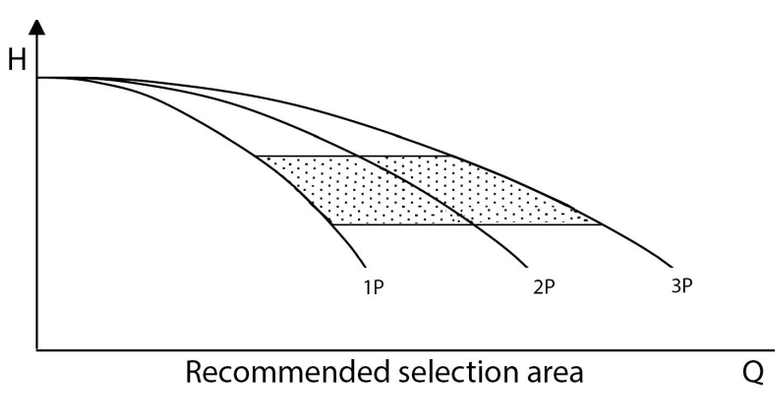
GHV BOOSTER SETS SERIES
SELECTING THE PUMPS

What type of pump to choose?
Generally, the selection of pump is based on the maximum duty 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.

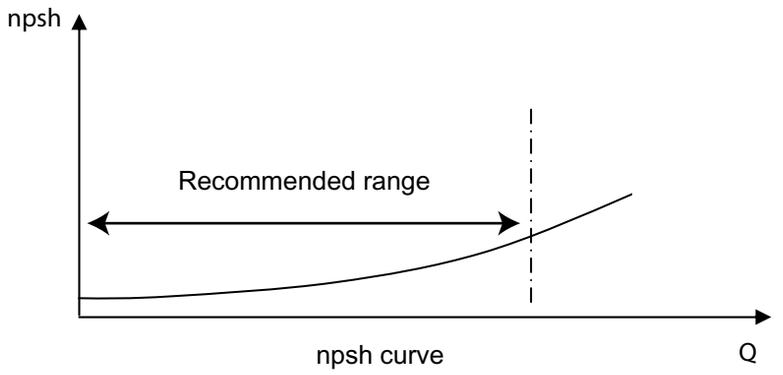
Generally the choice of the pump, based on the performance curve, should fall around the maximum efficiency point. The pump must ensure operation within its rated performance. Since the unit is sized according to the maximum possible consumption, the maximum duty point of the pumps must be in the area 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:

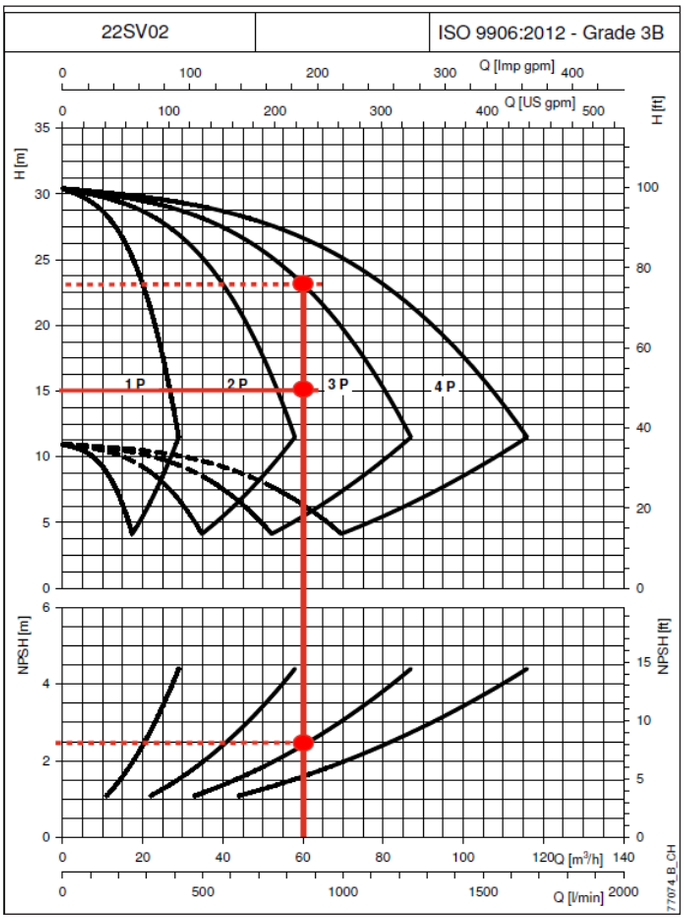


Another factor to be considered when choosing the pumps is its NPSH value. Never choose a pump where the maximum duty point is too far to the right of the NPSH curve. This risks not having good pump suction, which may be aggravated by the type of installation (where negative suction is possible).
In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



GHV BOOSTER SETS 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 15 m water column.

As shown in the operating curves on page 68, the selection requires three 22SV02 pumps.

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.
The example considers all pumps in operation. For the selection of booster it is recommended that one pump is in stand by.

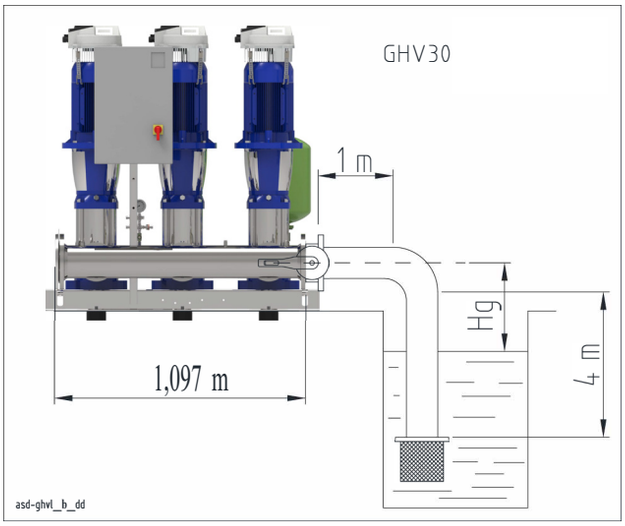
The inlet pressure of the booster or pump plus the pressure supply by pump must always be lower than the maximum operating pressure (PN) of the booster.

NPSH

The minimum operating values that can be reached by the pump suction are limited by the appearance of cavitation. Cavitation consists in the formation of steam pockets in the liquid when the local pressure reaches a critical value. A critical value is when the local pressure is equal or just below the pressure of the liquid steam.
Steam cavitation flows with the current. When it reaches a higher pressure area, condensation of the contained steam occurs. The pockets collide, causing pressure waves that are transmitted to the walls, which are therefore subjected to stress cycles that can cause deformation and then breaks due to fatigue.
This phenomena, characterized by a metallic noise due to the hammering of the walls, is called incipient cavitation. Cavitation damage can be made worse by electrochemical corrosion, and by local temperature increases due to the plastic deformation of the walls. The materials with the highest resistance to heat and corrosion are alloyed steels, and particularly austenitic steels. The conditions that cause cavitation can be predicted by calculating the total suction height, indicated in the technical literature with the acronym NPSH (Net Positive Suction Head).
The NPSH represents the total energy (in m) of the flow measured at the suction in incipient cavitation conditions, net of the steam pressure (in m) of the fluid at the input of the pump.

GHV BOOSTER SETS SERIES
SUCTION CONDITIONS

Once the type and the number of pumps of the set have been identified, the suction conditions must also be assessment. Below is an example of the assessment of the suction lift installation conditions, in relation to the previously described case:



in suction lift installation, it is necessary to calculate the maximum Hg height - which must not be exceeded due to safety reasons -, to avoid cavitation, and therefore the unpriming of the pump itself.
The relation that must assessed, and which connects this value, is the following:

NPSH $_{available}$ ≥ NPSH $_{required}$, when the equality condition represents the limit condition.

NPSH $_{available}$ = Patm + Hg – ∑t – ∑a

Where:
Patm is the atmospheric pressure, equal to 10,33 m
Hg is the geodetic level difference
∑t are the pressure drops for suction components such as foot check valve, suction piping, curve, gate valve.
∑a are the pressure drops for suction set branch.

The NPSH $_{requested}$ is a parameter obtained from the performance curve; in our case, at the flow of each pump equal to 20 m³/h, it corresponds to 2.5 m (page 68). Before calculating the NPSH $_{available}$, it is necessary to calculate the pressure drops at the suction, using the tables on page 70-74, and taking into account the material, such as the type of stainless steel for the piping and cast iron for the valves.
The total sum of the pressure drops ∑t for suction components is made in the following way, considering that the diameter of the suction piping is DN100, equal to the diameter of the suction manifold of the set (page 52).

Calculation of suction drops ∑c for cast iron components
Equivalent piping length for DN100 foot check valve = 4,7 m
Equivalent piping length for DN100 gate valve = 0,4 m
Total equivalent length = 4,7 + 0,4 = 5,1 m
Pressure drops in the suction piping (cast iron) ∑c = 5,1 x 7,79 /100 = 0,39 m

Calculation of suction drops ∑s for stainless steel components
Equivalent piping length for DN100 90° curve = 2,1 m
Total equivalent length = 2,1 m
Horizontal suction pipe length = 1 m
Vertical suction pipe length = 4 m
Pressure drops in the suction piping (stainless steel) ∑s = (2,1 + 4 + 1) x 7,79 x 0,54 / 100 = 0,29 m

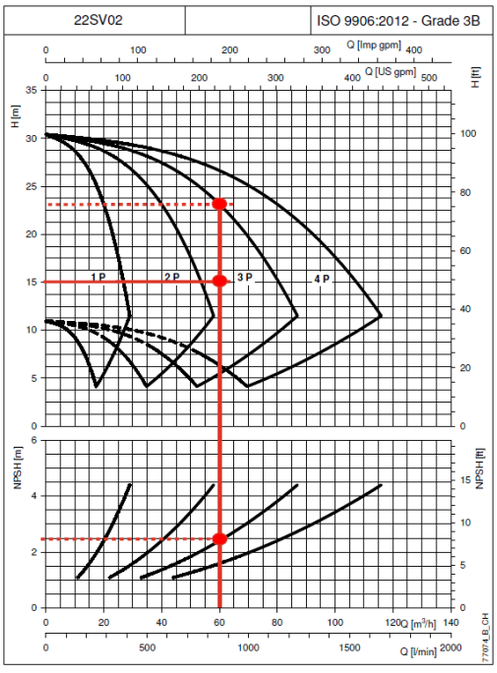
Pressure drops for suction components ∑t = ∑c + ∑s = 0,39 + 0,29 = 0,68 m
The total sum of the pressure drops ∑t for suction components is made in the following way, considering that the diameter of the suction piping is DN100, equal to the diameter of the suction manifold of the set (page 52).
Hc pressure drops for suction set branch must be assessed on the B curve, CB material version (page 71 scheme A0655_A_CH); at the flow value of each pump equal to 20 m³/h, a value of Hc = 0,0035 m is obtained.
Calculation of suction drops ∑s for stainless steel components
Equivalent piping length for DN100 manifold T fitting = 4,3 m
Suction manifold length = 1,097 m
Pressure drops in the suction manifold (steel) ∑t = (4.3 + 1,097) x 7,79 x 0,54 / 100 = 0,23 m
Pressure drops ∑a = Hc + ∑s = 0,0035 + 0,23 = 0,24 m

Remembering that NPSH $_{available}$ = Patm + Hg - ∑t – ∑a and that NPSH $_{available}$ ≥ NPSH $_{requested}$ we have that Patm + Hg - ∑t - ∑a must be ≥ NPSH $_{requested}$.
Substituting the values we get that 10,33 + Hg - 0,68 – 0,24 ≥ 2,5 m (NPSH $_{requested}$),
Hg = 2,5 + 0,68 + 0,24 – 10,33 = - 6,91 m, it represents the limit condition for which
NPSH $_{available}$ = NPSH $_{requested}$

Therefore, in order to guarantee the conditions for the correct operation of the system as far as cavitation risks, it will be necessary to position the pump above the water level, so that the Hg height is below the limit value of 6,91 m

GHV BOOSTER SETS SERIES
NET PRESSURE CALCULATION

When selecting GHV booster sets, the performance levels of the pump must be taken into account.
Performance levels are obtained from the characteristic curves of the pumps, and do not take into account any pressure drops due to system piping and valves. The following example helps the customer to obtain the correct delivery manifold pressure value: by knowing the system operating point Q = 60 m³/h and H = 15 mca (P requested),and the installation height Hg (estimated to 5 m), in order to make the calculations easier we use the pressure drop curves for each single pump on pages 70-74 of this catalogue. Assuming that a booster set GHV30/22SV with non-return valves on the delivery has been selected, we proceed as follows:



P net available ≥ P requested, when the equality condition represents the limit condition.

P net available = H – (Hg + ∑t + ∑a + ∑m)
Where:
H head value of booster set
Hg is the geodetic level difference (estimated to 5 m)
∑t are the pressure drops for suction components such as foot check valve, suction piping, curve and gate valve.
∑a are the pressure drops for suction set branch
∑m are the pressure drops for delivery set branch

The total sum of the pressure drops ∑t for suction components is made in the following way, considering that the diameter of the suction piping is DN100, equal to the diameter of the suction manifold of the set (page.59).

Calculation of suction drops ∑c for cast iron components
Equivalent piping length for DN100 foot check valve = 4,7 m
Equivalent piping length for DN100 gate valve = 0,4 m
Total equivalent length = 4,7 + 0,4 = 5,1 m
Pressure drops in the suction piping (cast iron)
∑c = 5,1 x 7,79 /100 = 0,39 m

Calculation of suction drops ∑s for stainless steel components
Equivalent piping length for DN100 90° curve = 2,1 m
Total equivalent length = 2,1 m
Horizontal suction pipe length = 1 m
Vertical suction pipe length = 4 m
Pressure drops in the suction piping (stainless steel) ∑s = (2,1 + 4 + 1) x 7,79 x 0,54 / 100 = 0,29 m

Pressure drops for suction components ∑t = ∑c + ∑s = 0,39 + 0,29 = 0,68 m
The total sum of the pressure drops ∑t for suction components is made in the following way, considering that the diameter of the suction piping is DN100, equal to the diameter of the suction manifold of the set (page 52).
Hc pressure drops for suction set branch must be assessed on the B curve, CB material version (page 71, scheme A0655_A_CH); at the flow value of each pump equal to 20 m³/h, a value of Hc = 0,0035 m is obtained.

Calculation of suction drops ∑s for stainless steel components
Equivalent piping length for DN100 manifold T fitting = 4,3 m
Suction manifold length = 1,097 m
Pressure drops in the suction manifold (steel) ∑t = (4,3 + 1,097) x 7,79 x 0,54 / 100 = 0,23 m
Pressure drops ∑a = Hc + ∑s = 0,0035 + 0,23 = 0,24
The total sum of the pressure drops ∑m for delivery branch is made in the following way, considering that the diameter of the delivery manifold is DN100, equal to the diameter of the delivery manifold of the set (page 52).
Hc pressure drops for delivery set branch must be assessed on the A curve , CB material version (page 71, scheme A0655_A_CH); at the flow value of each pump equal to 20 m³/h, a value of Hc = 1,14 m is obtained.

Calculation of delivery drops ∑s for stainless steel components
Equivalent piping length for DN100 manifold TEE fitting = 4,3 m
Delivery manifold length = 1,097 m
Pressure drops in the delivery manifold (steel) ∑s = (4,3 + 1,097) x 7,79 x 0,54 / 100 = 0,23 m

Pressure drops in delivery manifold ∑m = Hc + ∑s = 1,14 + 0,23 = 1,37 m
If we analyze the performance of the set at the flow value of 60 m³/h, the head value H is 23 m.
The net pressure at the delivery manifold will be P net available= H – (Hg + ∑t + ∑a + ∑m)
Substituting the values we get that P net available = 23 – (5 + 0,68 + 0,24 + 1,37) = 15,7m
When comparing this value with the design value (not taking into account the dynamic energy)
we see that 15,7 m > 15 m [P net available > P Required]

The set is therefore capable of meeting system requirements.

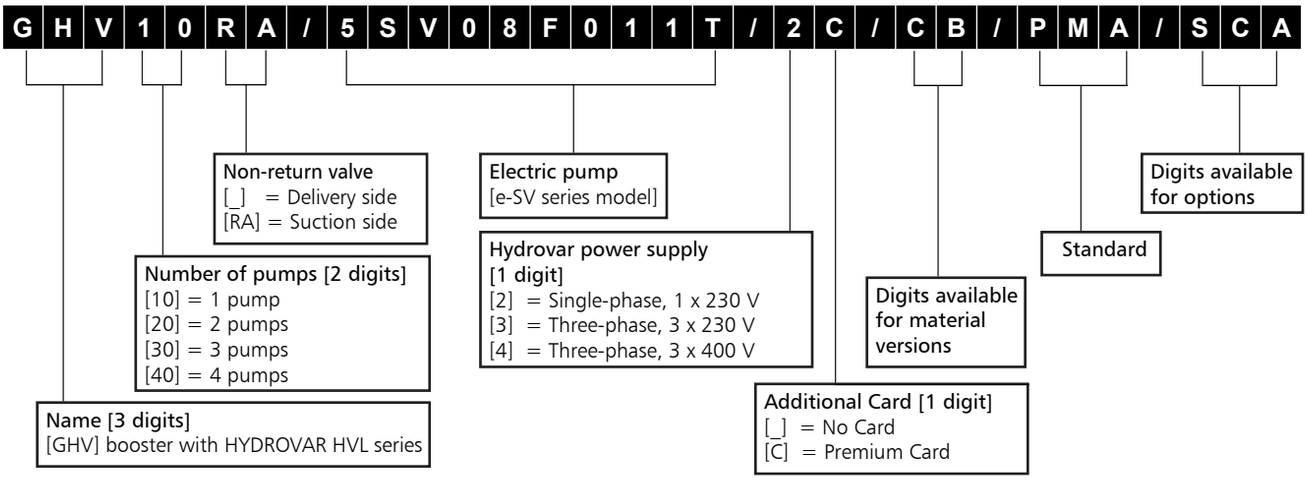
LOWARA
a xylem brand

GHV.../SV Series

Variable speed booster sets
with HYDROVAR® (HVL series)
e-SV™ series multistage vertical electric pumps
with high efficiency motors
Flow rate up to 160 m^3/h and pressure up to 16 bar

50 Hz

GHV BOOSTER SETS SERIES
IDENTIFICATION CODE



MATERIAL VERSIONS

Available CB, CX, for detail see table on page 33.

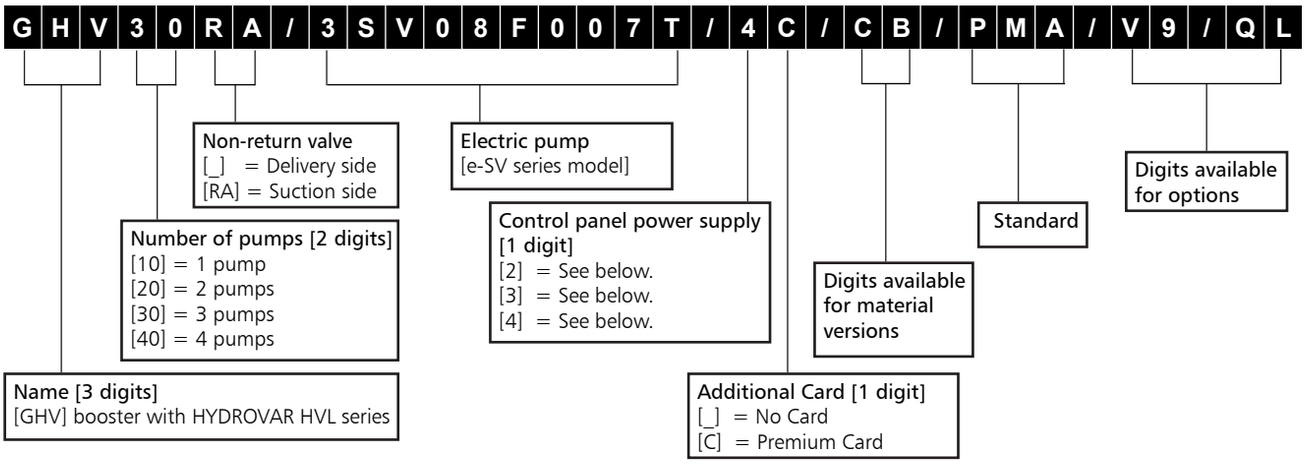
OPTIONS

BAP High pressure switch on the delivery manifold.
SCA Without suction manifold (suction valves are mounted).

GHV10 are available as kit.

Some options are not available together. Please contact the your usual Sales and Technical Assistance Service for further information.

GHV BOOSTER SETS SERIES
IDENTIFICATION CODE



MATERIAL VERSIONS

Available CB, CX, for detail see tables on page 33.

OPTIONS

BAP High pressure switch on the delivery manifold.
QL Control panel mounted on the left side of short side of base (option available for 33-125SV only)
SCA Without suction manifold (suction valves are mounted).
SQ Set without control panel and without panel frame; for inverter sets, transmitters and inverter are present.
V9 Delivery side turned upwards by 90° using elbow. It's possible to install expansion vessels directly on the manifold.
XA Control panel ready for a cloud connect device CCD401 (not included).

Some options are not available together. Please contact the your usual Sales and Technical Assistance Service for further information.

CONTROL PANEL POWER SUPPLY

/2 On request: up to 2,2kW, control panel 3x400 V+ neutral. HYDROVAR® 1x208-240 V (HVL2..).
/3 Control panel 3x230 V, HYDROVAR® 3x208-240 V (HVL3..).
/4 Control panel 3x400 V, HYDROVAR® 3x380-460 V (HVL4..).

e-SV SERIES
GENERAL DESCRIPTION

The **e-SV** pump is a multistage vertical pump, not self-priming, combined with a normalized standard motor. The liquid end, located between the upper cover end the pump casing, is held in place by tie rods. The pump casing is available with different configurations and connection types.

Technical Information:

Flow rates: up to 160 m^3/h.
Heads: up to 160 m.
(referred to the pump range used in this catalogue).

Temperature of pumped liquid:
from -30°C to +120°C (standard version).

Tested to ISO 9906:2012 - Grade 3B
(ex ISO 9906:1999 - annex A).
Direction of rotation: clockwise looking at the pump from the top down (indicated with an arrow on the bracket and joint).

Mechanical seal: Silicon carbide/Carbon/EPDM.
e-SV pumps (only for 10, 15, 22SV ≥ 5,5 kW and 33, 46, 66, 92, 125SV) are fitted standard with a balanced mechanical seal that can be replaced without having to remove the motor from the pump.

Elastomers: EPDM.

Motor

Supplied IE3 three-phase surface motors ≥ 0,75 kW as standard.

Electrical performances according to EN 60034-1.
Insulation class 155 (F).
IP55 protection.
Condensate drain plugs on standard version.
Cooling by fan according to EN 60034-6.
Cable gland metric size according to EN 50262.
Standard supplied e-SV electric pumps are equipped with Standard motors.

Standard voltage:
- **Single-phase version**: 220-240 V 50 Hz.
- **Three-phase version**: 220-240/380-415 V 50 Hz.

For electrical data of the motors used see page 24

Materials

The pumps for F, T, R, N, G versions are certified for drinking water use **(WRAS, ACS and D.M.174)**.

For complete information see dedicated e-SV technical catalogue.

GENERAL CHARACTERISTICS
3, 5, 10, 15, 22SV SERIES

- Multistage centrifugal vertical electric pumps. All metal parts in contact with pumped liquid are made of stainless steel.
- **F** version: round flanges, in-line delivery and suction ports, AISI 304 stainless steel.
- Further choice possibilities among the following versions:
  - **T**: oval flanges, in-line delivery and suction ports, AISI 304 stainless steel.
  - **R**: round flanges, delivery port above the suction port and adjustable in four positions, AISI 304 stainless steel.
  - **N**: round flanges, in-line delivery and suction ports, AISI 316 stainless steel.
- Reduced axial thrusts enable the use of **standard motors** that are easily found on the market.
- Standard mechanical seal according to EN 12756 (formerly DIN 24960) and ISO 3069 for series 1, 3, 5SV and 10, 15, 22SV (≤ of 4 kW).
- **Balanced mechanical** seal according to EN 12756 (formerly DIN 24960) and ISO 3069, easy to replace **without removing the pump motor**, for series 10, 15 and 22SV (≥ of 5,5 kW).
- Seal housing designed to avoid air accumulation inside the critical area adjoining the mechanical seal.
- Second loading plug available for series 10, 15, 22SV.
- Easy maintenance. No special tools required for assembly or disassembly.

F, T, R and N pumps are certified for use with drinking water (WRAS, ACS and D.M.174).

33, 46, 66, 92, 125SV SERIES

- Version **G**: Multistage vertical centrifugal electric pump with impellers, diffusers and outer jacket fully made of stainless steel; superior cast iron pump body and head. Round flanges, in-line delivery and suction ports.
- Further choice possibilities among the following versions:
  - **N**, **P**: fully made of AISI 316 stainless steel.
- In pumps with higher heads, the axial load compensation system allows a reduction of axial thrusts, and therefore the use of **normalized standard motors**, easy to find on the market.
- **Balanced mechanical seal** according to EN 12756 (formerly DIN 24960) and ISO 3069, **easy to replace without removing the pump motor**.
- Seal housing designed to avoid air accumulation inside the critical area adjoining the mechanical seal.
- Pump body supplied with the necessary attachments for a pressure gauge on the flanges, both on the suction and the delivery side.
- Mechanical strength and easy maintenance. No special tools required for assembly or disassembly.

G and N pumps are certified for use with drinking water (WRAS, ACS and D.M.174).

LOWARA
a xylem brand

e-SV SERIES
THREE-PHASE MOTORS AT 50 Hz, 2-POLE (up to 22 kW)

P_N kW	Manufacturer: Xylem Service Italia Srl, Reg. No. 07520560967, Montecchio Maggiore Vicenza - Italia Model	IEC SIZE*	Construction Design	N. of Poles	f_N Hz	Data for 400 V / 50 Hz Voltage: cosφ	Is / I_N	T_N Nm	Ts/T_N	Tm/Tn
0,37	SM71RB14/304	71R	V18/B14	2	50	0,64	4,35	1,37	4,14	4,10
0,55	SM71B14/305	71				0,71	6,25	1,84	3,96	3,97
0,75	SM80B14/307 PE	80				0,78	7,38	2,48	3,57	3,75
1,1	SM80B14/311 PE	80				0,79	8,31	3,63	3,95	3,95
1,5	SM90RB14/315 PE	90R				0,80	8,80	4,96	4,31	4,10
2,2	PLM90B14/322 E3	90				0,80	8,77	7,28	3,72	3,70
3	PLM100RB14/330 E3	100R				0,79	7,81	9,93	4,26	3,94
4	PLM112RB14S6/340 E3	112R				0,85	9,13	13,2	3,82	4,32
5,5	PLM132RB5/355 E3	132R	V1/B5			0,85	10,5	18,1	4,74	5,11
11	PLM160RB5/3110 E3	160R				0,86	9,89	35,9	3,46	4,59
22	PLM180RB5/3220 E3	180R				0,85	10,9	71,1	3,26	5,12

P_N kW	Manufacturer: OMEGA MOTOR SANAYI A.S., Dudullu Organize Sanayi Bölgesi, 2. Cadde No: 10 34775 Ümraniye ISTANBUL/TURKEY Reg. No. 913733 Model	IEC SIZE*	Construction Design	N. of Poles	f_N Hz	Data for 400 V / 50 Hz Voltage: cosφ	Is / I_N	T_N Nm	Ts/T_N	Tm/Tn
7,5	3MAS 132SB2 B5 7,5KW E3	132	V1/B5	2	50	0,86	6,42	24,6	2,60	3,00
15	3MAS 160MB2 B5 15KW E3	160				0,89	6,50	48,9	2,50	3,00
18,5	3MAS 160LA2 B5 18,5KW E3	160				0,89	6,50	60,1	2,50	3,10

P_N kW	Voltage U_N (V): Δ 220 V	Δ 230 V	Δ 240 V	Y 380 V	Y 400 V	Y 415 V	Δ 380 V	Δ 400 V	Δ 415 V	Y 660 V	Y 690 V	n_N min^{-1}	Operating conditions **: Altitude Above Sea Level (m)	T. amb min/max °C	ATEX
	I_N (A)														
0,37	2,03	2,18	2,32	1,17	1,26	1,34	-	-	-	-	-	2745 ÷ 2800	≤ 1000	-15 / 40	No
0,55	2,46	2,49	2,56	1,42	1,44	1,48	-	-	-	-	-	2835 ÷ 2865		-15 / 50	
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	7,97	7,90	7,98	4,60	4,56	4,61	4,57	4,54	4,57	2,64	2,62	2880 ÷ 2900			
3	11,0	11,0	11,2	6,35	6,33	6,44	6,29	6,27	6,34	3,63	3,62	2865 ÷ 2895			
4	13,6	13,4	13,4	7,87	7,75	7,74	7,80	7,62	7,61	4,50	4,40	2885 ÷ 2910			
5,5	18,1	17,9	18,1	10,4	10,4	10,4	10,6	10,5	10,7	6,10	6,05	2880 ÷ 2910			
7,5	25,1	24,2	23,9	14,5	14,0	13,8	14,5	14,0	13,8	8,38	8,08	2915		-20 / 50	
11	35,7	35,0	34,9	20,6	20,2	20,2	20,6	20,2	20,2	11,9	11,7	2910 ÷ 2930		-15 / 50	
15	48,1	46,1	44,7	27,8	26,6	25,8	27,8	26,6	25,8	16,0	15,4	2930		-20 / 50	
18,5	59,0	56,3	54,5	34,1	32,5	31,5	34,1	32,5	31,5	19,7	18,8	2940			
22	72,9	73,1	73,7	42,1	42,2	42,6	40,9	40,4	40,6	23,6	23,3	2950 ÷ 2960		-15 / 50	

P_N kW	Efficiency η_N (%): Δ 220 V Y 380 V 4/4	3/4	2/4	Δ 230 V Y 400 V 4/4	3/4	2/4	Δ 240 V Y 415 V 4/4	3/4	2/4	Δ 380 V Y 660 V 4/4	3/4	2/4	Δ 400 V Y 690 V 4/4	3/4	2/4	Δ 415 V 4/4	3/4	2/4	IE
0,37	70,4	73,2	68,9	70,4	70,3	64,5	70,4	67,2	60,2	-	-	-	-	-	-	-	-	-	2
0,55	74,1	74,2	70,4	74,1	73,6	68,8	74,1	72,7	67,1	-	-	-	-	-	-	-	-	-	
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	3
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	86,5	87,4	86,8	86,4	86,9	85,7	86,6	86,7	85,0	86,4	86,7	85,0	86,4	86,7	85,0	86,4	86,7	85,0	
3	87,2	88,5	88,3	87,5	88,2	87,5	87,5	87,8	86,4	87,2	87,8	86,4	87,2	87,8	86,4	87,2	87,8	86,4	
4	89,1	90,1	89,2	89,1	90,1	89,2	89,1	90,1	89,2	89,1	90,3	90,4	89,6	90,4	89,9	89,6	90,1	89,2	
5,5	89,5	89,6	88,0	89,5	89,6	88,0	89,5	89,6	88,0	89,5	90,3	89,9	89,7	90,0	89,0	89,6	89,6	88,0	
7,5	90,1	90,8	90,6	90,1	91,1	91,0	90,1	90,9	90,8	90,1	90,8	90,6	90,1	91,1	91,0	90,1	90,9	90,8	
11	91,3	92,0	91,1	91,3	92,0	91,1	91,3	92,0	91,1	91,3	92,2	92,2	91,6	92,2	91,7	91,7	92,0	91,1	
15	91,9	92,4	92,0	91,9	92,8	92,7	91,9	92,3	92,1	91,9	92,4	92,0	91,9	92,8	92,7	91,9	92,3	92,1	
18,5	92,4	92,8	92,6	92,4	93,3	93,4	92,4	93,3	93,4	92,4	92,8	92,6	92,4	93,3	93,4	92,4	93,3	93,4	
22	93,0	92,7	91,3	93,0	92,7	91,3	93,0	92,7	91,3	93,0	93,2	92,4	93,1	93,0	91,9	93,0	92,7	91,3	

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

sv-IE3-mott22-2p50-en_d_te

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

HYDROVAR HVL
GENERAL DESCRIPTION

GHV booster sets use the **HYDROVAR** frequency converter, an automatic device that gives the possibility of changing the **number of electric pump revolutions**, and maintain the system **pressure constant**.

Power converters up to 22 kW are **installed directly on the motor fan cover**. Using the additional **fan kit**, they can also be installed on the wall, or on a bracket attached to the set. 30 or 45 kW models are only suitable for wall or bracket installation.

The basic function of HYDROVAR, is to control the pump based on system requirements.

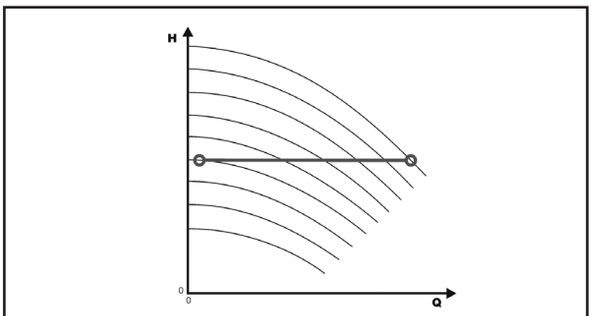
The basic function of the HYDROVAR device is to control the pump to meet the system demands.

HYDROVAR performs these functions by:

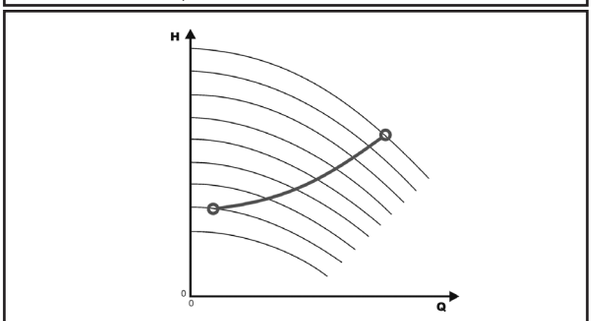
1) Measuring the system pressure or flow via a transmitter mounted on the pump's delivery side.
2) Calculating the motor speed to maintain the correct flow or pressure.
3) Sending out a signal to the pump to start the motor, increase speed, decrease speed or stop.
4) In the case of multiple pump installations, HYDROVAR will automatically provide for the cyclic changeover of the pumps' starting sequence.

In addition to these basic functions, HYDROVAR can perform controls only manageable by the most advanced computerized control systems. Some examples are:

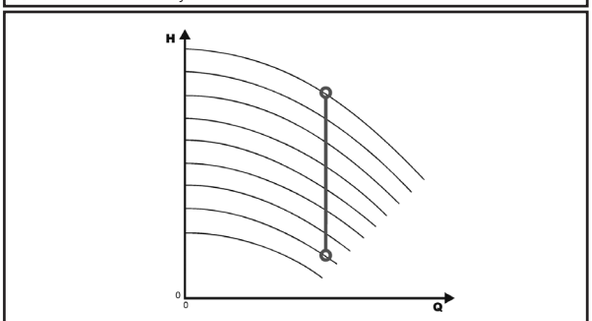
- Stop the pump(s) at zero demand.
- Stop the pump(s) in case of water failure on the suction side (protection against dry running).
- Stop the pump if the required delivery exceeds the pump's capacity (protection against cavitation caused by excessive demand), or automatically switch on the next pump in a multiple series.
- Protect the pump and motor from over-voltage, under-voltage, overload, and earth fault.
- Vary the pump speed: acceleration and deceleration time.
- Compensate for increased flow resistance at high flow rates.
- Conduct automatic tests at set intervals.
- Monitor the converter and motor operating hours.
- Monitor the energy consumption (kWh).
- Display all functions on an LCD in different languages (Italian, English, French, German, Spanish, Portuguese, Dutch, etc...).
- Send a signal to a remote control system which is proportional to the pressure and frequency.
- Communicate with external control system via Modbus (RS 485 interface) and Bacnet as standard.



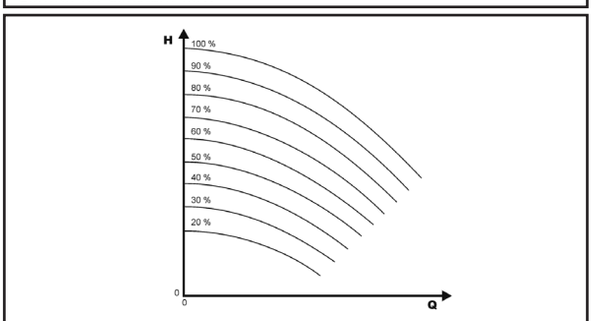
Control for constant pressure



Control to match a system curve



Control for constant flow



Control according to an external signal

LOWARA
a xylem brand

HYDROVAR HVL
ErP 2009/125/EC

From 1 July 2021 in accordance with the new **Regulations (EU) 2019/1781** and **2021/341** the **variance speed drives** with **three-phase input/output current**, rated voltage between **100 V** and **1000 V**, rated for operating with motors included in the same regulation (**0,12- 1000 kW**), must have efficiency level **IE2**.
The tables below also contain the mandatory information pursuant to Annex I, section 4, of the Regulations.

PN	Phase	UNin	Pa	Power losses (PL) with 10 KHz frequency % Pa (% rated speed; % rated torque)									
kW		V	kVA	stand-by	0;25	0;50	0;100	50;25	50;50	50;100	90;50	90;100	IE
1,5	~1	208-240	not included in regulation										
2,2													
3													
4													
1,5	~3	208-240	2,45	0,4%	1,3%	1,6%	1,9%	1,4%	1,7%	2,5%	2,0%	3,1%	2
2,2			3,46	0,3%	1,3%	1,6%	2,4%	1,4%	1,8%	2,7%	2,0%	3,3%	
3			5,15	0,2%	1,1%	1,4%	2,2%	1,3%	1,7%	2,6%	1,9%	3,2%	
4			6,00	0,2%	1,1%	1,3%	2,1%	1,3%	1,6%	2,5%	1,9%	3,1%	
5,5			7,90	0,1%	0,9%	1,1%	1,8%	1,0%	1,4%	2,4%	1,7%	3,2%	
7,5			10,1	0,1%	0,7%	0,9%	1,5%	0,8%	1,1%	2,1%	1,4%	3,1%	
11			15,1	0,1%	0,7%	0,9%	1,7%	0,8%	1,2%	2,3%	1,4%	3,0%	
1,5		380-460	2,56	0,4%	1,2%	1,5%	1,8%	1,3%	1,6%	2,1%	1,6%	2,3%	
2,2			3,67	0,3%	1,2%	1,3%	1,7%	1,3%	1,5%	2,1%	1,6%	2,3%	
3			5,00	0,2%	1,1%	1,1%	1,5%	1,2%	1,4%	2,1%	1,5%	2,2%	
4			6,20	0,2%	1,0%	0,9%	1,4%	1,1%	1,4%	2,0%	1,4%	2,2%	
5,5			8,30	0,2%	0,8%	0,8%	1,3%	0,9%	1,2%	1,9%	1,3%	2,2%	
7,5			10,7	0,1%	0,7%	0,6%	1,2%	0,7%	1,0%	1,8%	1,2%	2,3%	
11			15,9	0,1%	0,6%	0,6%	1,2%	0,7%	1,0%	1,8%	1,2%	2,2%	
15			21,5	0,1%	0,5%	0,6%	1,2%	0,6%	0,9%	1,6%	1,1%	2,0%	
18,5			25,6	0,1%	0,5%	0,6%	1,2%	0,6%	0,8%	1,6%	1,0%	1,9%	
22			29,4	0,0%	0,5%	0,7%	1,3%	0,6%	0,9%	1,6%	1,0%	2,1%	

hvl-pl-en_a_te

P_N	~	U_{Nin}	Manufacturer: Xylem Service Italia Srl Reg. No. 07520560967 Montecchio Maggiore (VI) - Italia	f_{Nin}	I_{Nin}	U_{nout}	f_{Nout}	I_{nout}	Operating conditions*		
									Altitude	T.amb	ATEX
kW		V	Model	Hz	A	V	Hz	A	m	°C	
1,5	1	208-240	HVL 2.015-..	50/60	11,6	0-100% U_{Nin}	15-70	7,5	≤1000	-15/40	No
2,2			HVL 2.022-..		1			15,1			
3			HVL 2.030-..		22,3			14,3			
4			HVL 2.040-..		27,6			16,7			
1,5	3	208-240	HVL 3.015-..		7			7,5			
2,2			HVL 3.022-..		9,1			10			
3			HVL 3.030-..		13,3			14,3			
4			HVL 3.040-..		16,5			16,7			
5,5			HVL 3.055-..		23,5			24,2			
7,5			HVL 3.075-..		29,6			31			
11			HVL 3.110-..		3			43,9			
1,5		380-460	HVL 4.015-..		3,9			4,1			
2,2			HVL 4.022-..		5,3			5,7			
3			HVL 4.030-..		7,2			7,3			
4			HVL 4.040-..		10,1			10			
5,5			HVL 4.055-..		12,8			13,5			
7,5			HVL 4.075-..		16,9			17			
11			HVL 4.110-..		24,2			24			
15			HVL 4.150-..		33,3			32			
18,5			HVL 4.185-..		38,1			38			
22			HVL 4.220-..		44,7			44			

*up to 2000 meters or maximum 55°C reducing the supplied power

hvl-en_b_te

LOWARA
a xylem brand

HYDROVAR HVL
IDENTIFICATION CODE

H V L 4 . 0 2 2 - A 0 0 1 0

Name [3 digits]
[HVL] = HYDROVAR generation L

Power supply [2 digits]
[2.] = 1~ 208-240 V (50/60 Hz)
[3.] = 3~ 208-240 V (50/60 Hz)
[4.] = 3~ 380-460 V (50/60 Hz)

Rated output power
[3 digits]
kW x 10

EXAMPLE: **HVL4.022-A0010**

HVL=HYDROVAR generation L, **4.**=3~ 380-460 V power supply, **022**=2,2kW rated output power, **A**=IP55 (Type1) enclosure class, **0**=Standard Bus communication, **0**=no optional card, **1**=internal display installed, **0**=no other options installed.
NOTE: HYDROVAR output voltage is three phase.

Enclosure class (IP class) [1 digit]
[A] = IP55 (Type1)
[B] = reserved for future use

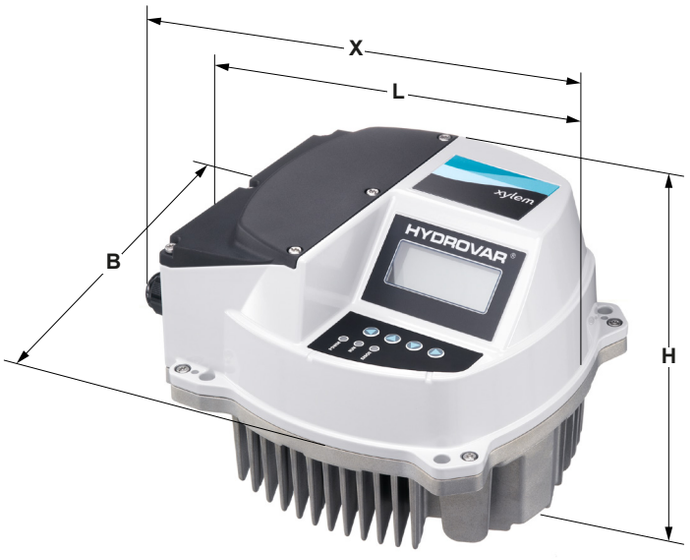
Bus communication [1 digit]
0 = Standard Communication (Modbus, Bacnet)
1 = reserved for future use
2 = reserved for future use
3 = reserved for future use
4 = reserved for future use
5 = reserved for future use
6 = reserved for future use

Optional cards [1 digit]
[0] = no optional cards (as standard)
[1] = Premium Card (option supplied loose)

Display [1 digit]
[0] = reserved for future use
[1] = Internal display installed as standard

Other options [1 digit]
[0] = reserved for future use

DIMENSIONS AND WEIGHTS

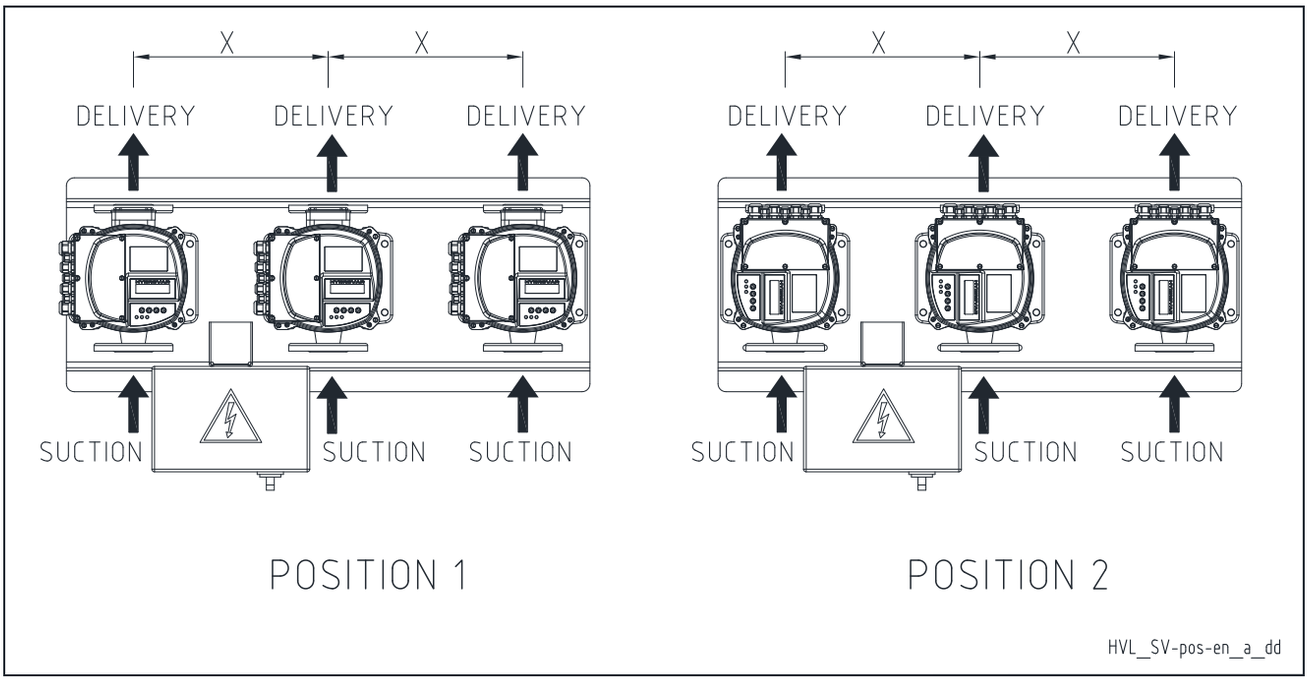


TYPE	MODELS			DIMENSIONS (mm)				WEIGHT
	/2	/3	/4	L	B	H	X	Kg
SIZE A	HVL2.015 ÷ 2.022	HVL3.015 ÷ 3.022	HVL4.015 ÷ 4.040	216	205	170	243	5,6
SIZE B	HVL2.030 ÷ 2.040	HVL3.030 ÷ 3.055	HVL4.055 ÷ 4.110	276	265	185	305	10,5
SIZE C	-	HVL3.075 ÷ 3.110	HVL4.150 ÷ 4.220	366	337	200	407	15,6

HVL_dim-en_b_td

LOWARA
a xylem brand

HYDROVAR HVL
DISPLAY POSITION



HVL SIZE A	
X (mm)	HVL STD position
300	1
370	1
440	1
490	1

HVL SIZE B	
X (mm)	HVL STD position
300	2
370	2
440	1
490	1
570	1

HVL SIZE C	
X (mm)	HVL STD position
370	2
440	2
490	1
	2 (only 22 kW)
570	1

*GHV10 position 1 as standard

HVL_SV-pos-en_a_td

TECHNICAL DATA

Inverter				Motor	
Model (*)	Power supply (V)	IP Degree	Installation	Power supply (V)	Power (kW)
HVL 2.015	1x230	IP 55	Motor	3x230	0,55-1,5
HVL 2.022	1x230	IP 55	Motor	3x230	2,2
HVL 2.030	1x230	IP 55	Motor	3x230	3
HVL 2.040	1x230	IP 55	Motor	3x230	4
HVL 4.015	3x400	IP 55	Motor	3x400	0,55-1,5
HVL 4.022	3x400	IP 55	Motor	3x400	2,2
HVL 4.030	3x400	IP 55	Motor	3x400	3
HVL 4.040	3x400	IP 55	Motor	3x400	4
HVL 4.055	3x400	IP 55	Motor	3x400	5,5
HVL 4.075	3x400	IP 55	Motor	3x400	7,5
HVL 4.110	3x400	IP 55	Motor	3x400	11
HVL 4.150	3x400	IP 55	Motor	3x400	15
HVL 4.185	3x400	IP 55	Motor	3x400	18,5
HVL 4.220	3x400	IP 55	Motor	3x400	22
HVL 3.015	3x230	IP 55	Motor	3x230	0,55-1,5
HVL 3.022	3x230	IP 55	Motor	3x230	2,2
HVL 3.030	3x230	IP 55	Motor	3x230	3
HVL 3.040	3x230	IP 55	Motor	3x230	4
HVL 3.055	3x230	IP 55	Motor	3x230	5,5
HVL 3.075	3x230	IP 55	Motor	3x230	7,5
HVL 3.110	3x230	IP 55	Motor	3x230	11

GHV with Hydrovar HVL 3 available on request

ghvl-2p-en_a_te

HYDROVAR HVL
EMC COMPATIBILITY

EMC requirements

HYDROVAR fulfills the product standard EN61800-3:2004 + A1:2012, which defines categories (C1 to C4) for device application areas.
Depending on the motor cable length, a classification of HYDROVAR by category (based on EN61800-3) is reported in the following tables:

HVL	HYDROVAR classification by categories based on EN61800-3
2.015 ÷ 2.040	C1 (*)
3.015 ÷ 3.110	C2 (*)
4.015 ÷ 4.220	C2 (*)

(*) 0,75 motor cable length; contact Xylem for further information

En-Rev_A

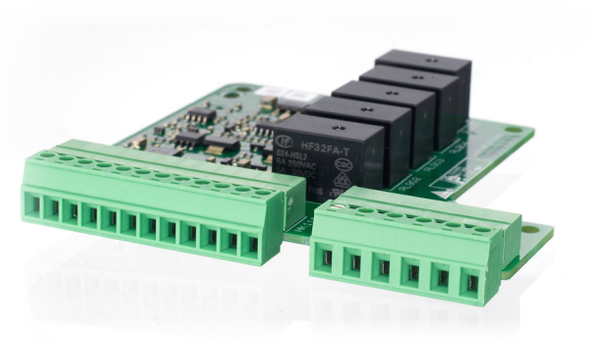
CARD

Premium Card HYDROVAR (optional)

For the e-SVH series, the Premium Card comes fitted as option on the standalone HYDROVAR.
This allows to control up to five fix speed pumps via an external panel.
The Premium Card will allow additional features listed below:

- 2 additional Analog Inputs
- 2 Analog Outputs
- 1 additional digital input
- 5 relays.

Booster set GHV...SV...C
(See identification code page 20 and 21).



OPTIONAL COMPONENTS

Sensors

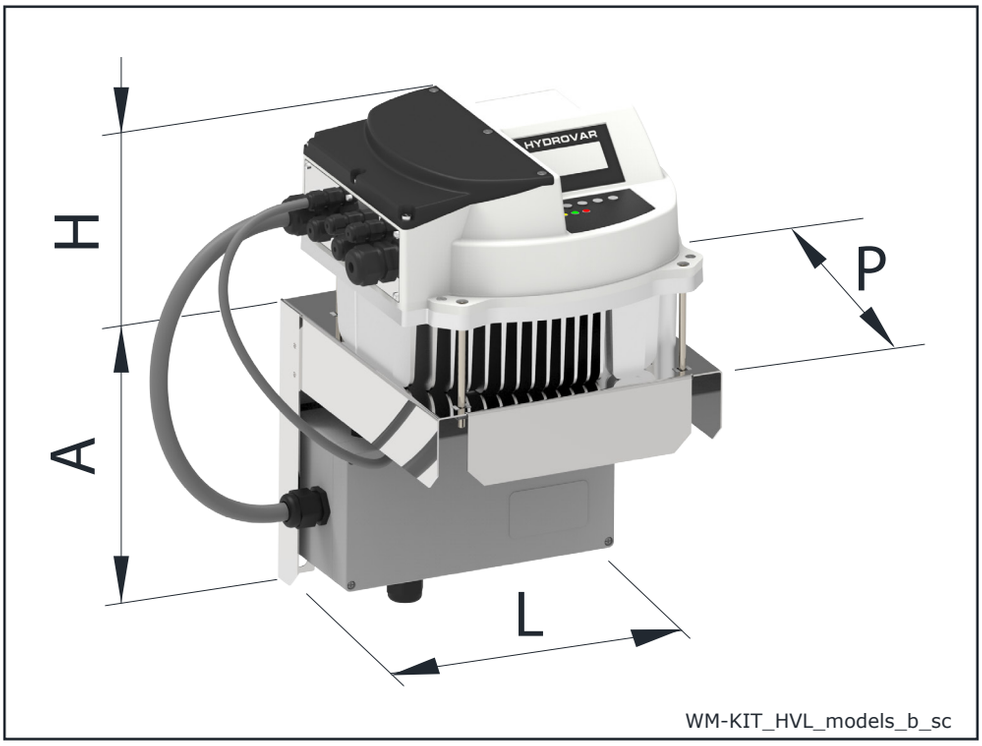
The following sensors are available for HYDROVAR:

a. Pressure-transducer
b. Differential pressure-transducer
c. Temperature-sensor
d. Flow indicator (orifice plate, inductive flow meter)
e. Level-sensor.

LOWARA
a xylem brand

HYDROVAR HVL (WALL MOUNTING KIT)
DIMENSIONS AND WEIGHTS

As an option a HYDROVAR wall mounting kit is also available, this is used where mounting on the pump unit is impossible or where you would like the controls in another location, these are available for the new generation HYDROVAR HVL 2.015-4.220 (22 kW). The speed of the cooling fan modulates with the HYDROVAR usage which optimizes energy consumption and also reduces noise.



WM KIT TIPE	kW	WM KIT POWER SUPPLY	HVL SIZE	DIMENSIONS (mm)				WEIGHT (kg)	
				A	H	L	P	HVL	WM KIT
WM KIT HVL 2.015	1,5	1~ 230V	A	220	170	202	232	5,6	2,6
WM KIT HVL 2.022	2,2			220	170	202	232	5,6	2,6
WM KIT HVL 2.030	3		B	240	175	258	290	10,5	8,2
WM KIT HVL 2.040	4			320	175	288	305	10,5	5,4
WM KIT HVL 3.015	1,5	3~ 230V	A	220	170	202	232	5,6	2,6
WM KIT HVL 3.022	2,2			220	170	202	232	5,6	2,6
WM KIT HVL 3.030	3		B	240	175	258	290	10,5	8,2
WM KIT HVL 3.040	4			240	175	258	290	10,5	8,2
WM KIT HVL 3.055	5,5			240	175	258	290	10,5	8,2
WM KIT HVL 3.075	7,5		C	400	200	325	365	15,6	11,6
WM KIT HVL 3.110	11			400	200	325	365	15,6	11,6
WM KIT HVL 4.015	1,5	3~ 400V	A	240	170	258	290	5,6	8,2
WM KIT HVL 4.022	2,2			240	170	258	290	5,6	8,2
WM KIT HVL 4.030	3			240	170	258	290	5,6	8,2
WM KIT HVL 4.040	4			240	170	258	290	5,6	8,2
WM KIT HVL 4.055	5,5		B	240	175	258	290	10,5	8,2
WM KIT HVL 4.075	7,5			240	175	258	290	10,5	8,2
WM KIT HVL 4.110	11			320	175	288	305	10,5	5,4
WM KIT HVL 4.150	15		C	400	200	325	365	15,6	11,6
WM KIT HVL 4.185	18,5			400	200	325	365	15,6	11,6
WM KIT HVL 4.220	22			400	200	325	365	15,6	11,6

WM-KIT_HVL_models-EN_b_td

GHV BOOSTER SETS SERIES
CONTROL PANEL

Standard control panel for protecting up to four electric pumps with HYDROVAR HVL frequency converter:

- power supply **voltage three-phase 3x400 V** +/-10%, 50/60Hz (GHV.../4)
- power supply **voltage three-phase 3x230 V** +/-10%, 50/60Hz (GHV.../3)
- **On request** power supply **voltage three-phase and neutral 3x400 V+N** +/-10%, 50/60Hz (GHV20../2, GHV30../2, GHV40../2)

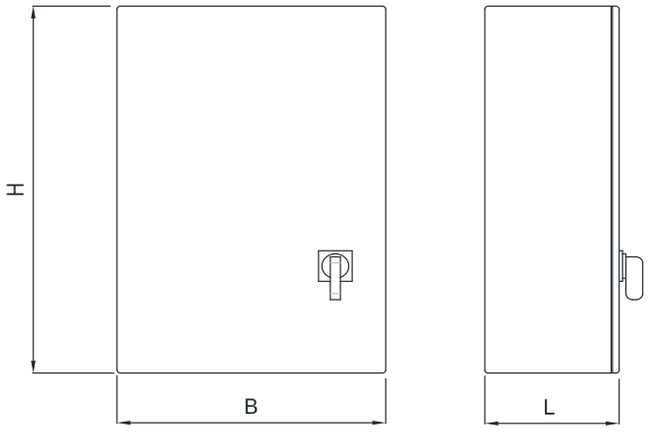
Cabinet of panel is made by metal and protected to **IP55**

Main characteristics:

- Automatic switch with thermal magnetic protection for each HYDROVAR frequency converter.
- Standard with "clean" potential-free contacts for signaling: pump running, frequency converter faulty. Configured for enable from external contact
- Protection against dry running: protection against dry running activates when the water reserve falls below the minimum level guaranteed for suction.

The level can be checked using a float switch, a minimum pressure switch, an external contact, or level probes.
For the latter, the probes must be connected to the adjustable sensitivity electronic module optional as standard, the control panel has inside the electronic module to connect the lack water's control.
The execution of lack of water, external ON/OFF, BAP configuration (pages 20 and 21) is done by an additional relaise inside of the control panel. The signals are connected in the panel and not to HYDROVAR directly.
For booster sets requiring a wall mounted control panel (GHV.../WM), the panel is supplied with 7 meter cables.

GHV10 booster series: the control panel is available as accessory.



TYPE	POWER (KW)	SUPPLY	IP	DIMENSIONS (mm) B	L	H
QHV10	1 x (0,55 ÷ 2,2)	1x230	55	300	400	200
QHV10	1 x (0,55 ÷ 22)	3x400	55	300	400	200
QHV20	2 x (0,55 ÷ 22)	3x400	55	400	600	200
QHV30	3 x (0,55 ÷ 22)	3x400	55	400	600	200
QHV40	4 x (0,55 ÷ 11)	3x400	55	400	600	200
QHV40	4 x (15 ÷ 22)	3x400	55	500	700	200
QHV10	1 x (0,55 ÷ 11)	3x230	55	300	400	200
QHV20	2 x (0,55 ÷ 11)	3x230	55	400	600	200
QHV30	3 x (0,55 ÷ 11)	3x230	55	400	600	200
QHV40	4 x (0,55 ÷ 5,5)	3x230	55	400	600	200
QHV40	4 x (7,5 ÷ 11)	3x230	55	500	700	200

qhv_cn-en_a_td

GHV10 BOOSTER SETS SERIES MAIN COMPONENTS

- **Main on-off valves** at the suction and delivery of each pump; ball type up to 2" included. For higher diameters, butterfly valves flanged lug type in suction and gate valve flanged in delivery
- **Non return valve** on the delivery of each pump; threaded spring type up to 2" included. Axial guided type for larger sizes, from DN65 to DN125
- **Suction manifolds** with threaded or flanged ends, depending on set type (see drawings)
  As standard minimum pressure switch, pressure gauge in suction
- **Delivery manifold** with threaded or flanged ends, depending on set type (see drawings). it has Rp3/4" threaded fittings for connection of diaphragm expansion vessels and hydraulic connector
- **Pressure gauge and transmitters** for control, installed on the delivery side of the set.
- **Pressure tank** 25lt PN10 or 12lt PN16 depending on the pump model, including a special isolation device that avoids water stagnation and allows servicing.
- **Various fittings** for the connections.
- **Support base** for the pump set.
- **Anti-vibration feet** sized depending on the set. For some sets, the assembling is the responsibility of the customer.

For the material of components see table at page 33.

Optional components:

Sensors

The following sensors are available:

- Pressure-transducer
- Level-sensor

Versions available

As standard, available two version of materials, CB basic version and CX premium version. See table at page 33 for details.

Accessories on request:

- Devices **for protection against dry running** in one of the following versions:
  - float switch
  - level probes (electrodes) kit

- **QHV10 control panel**

GHV20, GHV30, GHV40 BOOSTER SETS SERIES MAIN COMPONENTS

- **Main on-off valves** at the suction and delivery of each pump; ball type up to 2" included. For higher diameters, butterfly valves flanged lug type in suction and gate valve flanged in delivery.
- **Non return valve** on the delivery of each pump; threaded spring type up to 2" included. Axial guided type for larger sizes from DN65 to DN125
- **Suction manifold** with threaded or fixed flanged ends, depending on set type (see drawings). Threaded fitting for water loading priming of booster. As standard minimum pressure switch, pressure gauge in suction.
- **Delivery manifold** with threaded or fixed flanged ends, depending on set type (see drawings). It has Rp3/4" threaded fittings for connection of diaphragm expansion vessels and hydraulic connector.
- **Pressure gauge and transmitters** for control, installed on the delivery manifold of the set.
- **Pressure tank** 25lt PN10 or 12lt PN16 depending on the pump model, including a special isolation device that avoids water stagnation and allows servicing.
- **Control** panel.
- **Various fittings** for the connections.
- **Support base** for the pump set and control panel bracket.
- **Anti-vibration feet** sized depending on the set. For some sets, the assembling is the responsibility of the customer.

Versions available

As standard, available two version of materials, CB basic version and CX premium version. See tables at page 33 for details.

Accessories on request:

- Devices **for protection against dry running** in one of the following versions:
  - float switch
  - pack of electronic module and probe electrodes
- **Diaphragm expansion vessel kit**
  Hydrotube with on-off valve, depending on the maximum head of the pump:
  - 25 lt, 10 bar hydro tube kit
  - 12 lt, 16 bar hydro tube kit

SPECIAL EQUIPMENT ON REQUEST (Contact the Sales and Technical Assistance Service)

- Sets with special valves.
- Sets with 5 to 8 electric pumps.
- Sets with jockey pump.

Materials in contact with water are either certified or approved according to KTW

GHV BOOSTER SETS SERIES
MATERIAL TABLE FOR SETS PUMPS, 3-5-10-15-22SV,

DENOMINATION	G…/CB	G…/CX
Manifolds	AISI 304	AISI 304
Flanges of manifold	AISI 304	AISI 304
On-off valves, threaded	Nickel-plated brass	AISI 316
Non-return valves, threaded	Brass	AISI 316
Pressure switches	Steel nickel plated	Steel nickel plated
Pressure transmitters	AISI 304	AISI 304
Caps/plugs	AISI 304 / 316	AISI 304 / 316
Blind Flanges	AISI 304	AISI 304
Fittings	AISI 316	AISI 316
Bracket	AISI 304	AISI 304
Base	AISI 304	AISI 304
Antivibration dampers	Metallic part: AISI 304	Metallic part: AISI 304
Pressure gauge -Water connection -Cover -Fluid	- Brass - AISI 304 - Glycole	- AISI 316 - AISI 304 - Glycole
Screws, nuts, washers	AISI 304 / 316	AISI 304 / 316

Other materials on request

g_cn_3-22sv-en_b_tm

MATERIAL TABLE FOR SETS WITH PUMPS, 33SV

DENOMINATION	G…/CB
Manifolds	AISI 304
Flanges of manifold	AISI 304
On-off valves, threaded	AISI 316
On-off valves, flanged	Body: ductile iron Wedge: ductile iron, EPDM encapsulated
Non-return valves, axial guide	Body: cast iron Closing system: bronze (DN65), cast iron / epoxy (DN80÷DN125)
Pressure switches	Steel nickel plated
Pressure transmitters	AISI 304
Caps/plugs	AISI 304 / 316
Blind Flanges	AISI 304
Fittings	AISI 316
Bracket	AISI 304
Base	AISI 304
Antivibration dampers	Metallic part: AISI 304
Pressure gauge -Water connection -Cover -Fluid	- Brass - AISI 304 - Glycole
Screws, nuts, washers	AISI 304 / 316

Other materials on request

g_cn_33-125sv-en_b_tm

WORKING LIMITS

The input pressure of the pump, added to the pressure with the port shut off, must not exceed the maximum permitted operating pressure (PN) of the set.

Permitted liquids	Water without gases and corrosive and/or aggressive substances.
Fluid temperature	5°C to + 60 °C, CB version
	5°C to + 65 °C, CX version
Ambient temperature	0°C to + 40 °C
Maximum operating pressure*	Max 16 bar
Minimum input pressure	In line with the NPSH curve and the losses, with a margin of at least 0,5 m
Maximum input pressure	The input pressure added to the pump pressure without flow must be lower than the maximum operating pressure of the set.
Installation	Internal environment protected from atmospheric agents. Away from heat sources. Max altitude 1000 a.s.l. Max humidity 50%, without condensation.

* Higher PN available on request depending on pump type

ghv_nex_2p_cn-en_a_ti

LOWARA
a xylem brand

TABLE OF HYDRAULIC PERFORMANCE AT 50 Hz
GHV10/3-5SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	12	20	25	30	35	40	45	50	60	73	100	120	141
			m^3/h 0	0,7	1,2	1,5	1,8	2,1	2,4	2,7	3,0	3,6	4,4	6,0	7,2	8,5
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
3SV06	1 x 0,55	0,70	44,4		43,4	42,6	41,6	40,2	38,6	36,6	34,3	28,5	18,5			
3SV08	1 x 0,75	0,70	60,0		59,1	58,2	57,0	55,4	53,4	51,0	48,1	40,7	27,5			
3SV12	1 x 1,1	0,70	89,6		87,8	86,4	84,5	82,1	79,1	75,5	71,1	59,9	40,1			
3SV13	1 x 1,5	0,70	98,1		96,7	95,4	93,5	91,0	87,8	83,9	79,2	67,2	45,6			
3SV16	1 x 1,5	0,70	119,9		117,8	116,1	113,6	110,5	106,5	101,6	95,8	80,9	54,2			
3SV21	1 x 2,2	0,70	159,3		156,9	154,6	151,4	147,3	142,1	135,7	128,0	108,5	73,6			
5SV04	1 x 0,55	0,70	30,0						28,2	27,9	27,5	26,6	25,2	21,2	17,3	12,2
5SV05	1 x 0,75	0,70	38,0						36,4	36,0	35,5	34,5	32,9	28,2	23,5	17,1
5SV08	1 x 1,1	0,70	60,1						57,6	57,0	56,2	54,6	51,8	44,1	36,2	25,8
5SV11	1 x 1,5	0,70	82,8						79,3	78,4	77,5	75,2	71,4	60,7	49,9	35,6
5SV13	1 x 2,2	0,70	98,3						95,0	94,0	92,8	90,0	85,5	72,6	59,9	43,5
5SV16	1 x 2,2	0,70	120,5						115,9	114,6	113,1	109,6	103,9	87,8	72,1	51,8

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

1p_3-5sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 1 pump running.

GHV10/10-15-22SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	83,34	100	133	170	183,34	233	270	330	350	400	430	460	483,33
			m^3/h 0	5,0	6,0	8,0	10,2	11,0	14,0	16,2	19,8	21,0	24,0	25,8	27,6	29,0
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
10SV02	1 x 0,75	0,70	23,6	21,9	21,3	19,6	17,0	15,8	10,0							
10SV03	1 x 1,1	0,70	35,7	33,0	32,1	29,6	25,8	24,1	16,0							
10SV04	1 x 1,5	0,70	47,7	44,2	43,0	39,9	34,8	32,6	21,7							
10SV06	1 x 2,2	0,70	71,8	66,8	65,0	60,4	53,1	49,8	33,9							
15SV01	1 x 1,1	0,70	14,0			12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02	1 x 2,2	0,70	28,7			26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
22SV01	1 x 1,1	0,70	14,7					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02	1 x 2,2	0,70	30,4					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

1p_10-22sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 1 pump running.

GHV10/33SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY										
			l/min 0	250	300	367	417	500	583	667	750	900	1000
			m^3/h 0	15	18	22	25	30	35	40	45	54	60
	kW	(1)	H = TOTAL HEAD METRES COLUMN OF WATER										
33SV1/1A	1 x 2,2	0,70	17,4	16,2	15,7	15	14	12,2	9,8	6,7			

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

1p_33-46sv-2p50_cn-en_b_th

(1) Value referred to the G e N with PN □ 6 bar (1600 kPa). P version excluded.

The table refers to performance with 1 pump running.

LOWARA
a xylem brand

TABLE OF HYDRAULIC PERFORMANCE AT 50 Hz
GHV20/3-5SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	24	40	50	60	70	80	90	100	120	146	200	240	282
			m^3/h 0	1,4	2,4	3,0	3,6	4,2	4,8	5,4	6,0	7,2	8,8	12,0	14,4	16,9
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
3SV06	2 x 0,55	0,70	44,4		43,4	42,6	41,6	40,2	38,6	36,6	34,3	28,5	18,5			
3SV08	2 x 0,75	0,70	60,0		59,1	58,2	57,0	55,4	53,4	51,0	48,1	40,7	27,5			
3SV12	2 x 1,1	0,70	89,6		87,8	86,4	84,5	82,1	79,1	75,5	71,1	59,9	40,1			
3SV13	2 x 1,5	0,70	98,1		96,7	95,4	93,5	91,0	87,8	83,9	79,2	67,2	45,6			
3SV16	2 x 1,5	0,70	119,9		117,8	116,1	113,6	110,5	106,5	101,6	95,8	80,9	54,2			
3SV21	2 x 2,2	0,70	159,3		156,9	154,6	151,4	147,3	142,1	135,7	128,0	108,5	73,6			
5SV04	2 x 0,55	0,70	30,0						28,2	27,9	27,5	26,6	25,2	21,2	17,3	12,2
5SV05	2 x 0,75	0,70	38,0						36,4	36,0	35,5	34,5	32,9	28,2	23,5	17,1
5SV08	2 x 1,1	0,70	60,1						57,6	57,0	56,2	54,6	51,8	44,1	36,2	25,8
5SV11	2 x 1,5	0,70	82,8						79,3	78,4	77,5	75,2	71,4	60,7	49,9	35,6
5SV13	2 x 2,2	0,70	98,3						95,0	94,0	92,8	90,0	85,5	72,6	59,9	43,5
5SV16	2 x 2,2	0,70	120,5						115,9	114,6	113,1	109,6	103,9	87,8	72,1	51,8

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

2p_3-5sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 2 pumps running.

GHV20/10-15-22SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	166,7	200,0	266,0	340,0	366,7	466,0	540,0	660,0	700,0	800,0	860,0	920,0	966,7
			m^3/h 0	10,0	12,0	16,0	20,4	22,0	28,0	32,4	39,6	42,0	48,0	51,6	55,2	58,0
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
10SV02	2 x 0,75	0,70	23,6	21,9	21,3	19,6	17,0	15,8	10,0							
10SV03	2 x 1,1	0,70	35,7	33,0	32,1	29,6	25,8	24,1	16,0							
10SV04	2 x 1,5	0,70	47,7	44,2	43,0	39,9	34,8	32,6	21,7							
10SV06	2 x 2,2	0,70	71,8	66,8	65,0	60,4	53,1	49,8	33,9							
15SV01	2 x 1,1	0,70	14,0			12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02	2 x 2,2	0,70	28,7			26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
22SV01	2 x 1,1	0,70	14,7					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02	2 x 2,2	0,70	30,4					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

2p_10-22sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 2 pumps running.

GHV20/33SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY									
			l/min 0	500	600	733,333	833,333	1000	1166,67	1333,33	1500	1800	2000
			m^3/h 0	30	36	44	50	60	70	80	90	108	120
	kW	(1)	H = TOTAL HEAD METRES COLUMN OF WATER										
33SV1/1A	2 x 2,2	0,70	17,4	16,2	15,7	15	14	12,2	9,8	6,7			

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

2p_33-46sv-2p50_cn-en_b_th

(1) Value referred to the G e N with PN □ 6 bar (1600 kPa). P version excluded.

The table refers to performance with 2 pumps running.

LOWARA
a xylem brand

TABLE OF HYDRAULIC PERFORMANCE AT 50 Hz
GHV30/3-5SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	36	60	75	90	105	120	135	150	180	219	300	360	423
			m^3/h 0	2,2	3,6	4,5	5,4	6,3	7,2	8,1	9,0	10,8	13,1	18,0	21,6	25,4
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
3SV06	3 x 0,55	0,70	44,4		43,4	42,6	41,6	40,2	38,6	36,6	34,3	28,5	18,5			
3SV08	3 x 0,75	0,70	60,0		59,1	58,2	57,0	55,4	53,4	51,0	48,1	40,7	27,5			
3SV12	3 x 1,1	0,70	89,6		87,8	86,4	84,5	82,1	79,1	75,5	71,1	59,9	40,1			
3SV13	3 x 1,5	0,70	98,1		96,7	95,4	93,5	91,0	87,8	83,9	79,2	67,2	45,6			
3SV16	3 x 1,5	0,70	119,9		117,8	116,1	113,6	110,5	106,5	101,6	95,8	80,9	54,2			
3SV21	3 x 2,2	0,70	159,3		156,9	154,6	151,4	147,3	142,1	135,7	128,0	108,5	73,6			
5SV04	3 x 0,55	0,70	30,0						28,2	27,9	27,5	26,6	25,2	21,2	17,3	12,2
5SV05	3 x 0,75	0,70	38,0						36,4	36,0	35,5	34,5	32,9	28,2	23,5	17,1
5SV08	3 x 1,1	0,70	60,1						57,6	57,0	56,2	54,6	51,8	44,1	36,2	25,8
5SV11	3 x 1,5	0,70	82,8						79,3	78,4	77,5	75,2	71,4	60,7	49,9	35,6
5SV13	3 x 2,2	0,70	98,3						95,0	94,0	92,8	90,0	85,5	72,6	59,9	43,5
5SV16	3 x 2,2	0,70	120,5						115,9	114,6	113,1	109,6	103,9	87,8	72,1	51,8

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

3p_3-5sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 3 pumps running.

GHV30/10-15-22SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	250,02	300	399	510	550,02	699	810	990	1050	1200	1290	1380	1450
			m^3/h 0	15,0	18,0	23,9	30,6	33,0	41,9	48,6	59,4	63,0	72,0	77,4	82,8	87,0
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
10SV02	3 x 0,75	0,70	23,6	21,9	21,3	19,6	17,0	15,8	10,0							
10SV03	3 x 1,1	0,70	35,7	33,0	32,1	29,6	25,8	24,1	16,0							
10SV04	3 x 1,5	0,70	47,7	44,2	43,0	39,9	34,8	32,6	21,7							
10SV06	3 x 2,2	0,70	71,8	66,8	65,0	60,4	53,1	49,8	33,9							
15SV01	3 x 1,1	0,70	14,0			12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02	3 x 2,2	0,70	28,7			26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
22SV01	3 x 1,1	0,70	14,7					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02	3 x 2,2	0,70	30,4					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

3p_10-22sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 3 pumps running.

GHV30/33SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY										
			l/min 0	750	900	1100	1250	1500	1750	2000	2250	2700	3000
			m^3/h 0	45	54	66	75	90	105	120	135	162	180
	kW	(1)	H = TOTAL HEAD METRES COLUMN OF WATER										
33SV1/1A	3 x 2,2	0,70	17,4	16,2	15,7	15	14	12,2	9,8	6,7			

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

3p_33-46sv-2p50_cn-en_b_th

(1) Value referred to the G e N with PN □ 6 bar (1600 kPa). P version excluded.

The table refers to performance with 3 pumps running.

LOWARA
a xylem brand

TABLE OF HYDRAULIC PERFORMANCE AT 50 Hz
GHV40/3-5SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	48	80	100	120	140	160	180	200	240	292	400	480	564
			m^3/h 0	2,9	4,8	6,0	7,2	8,4	9,6	10,8	12,0	14,4	17,5	24,0	28,8	33,8
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
3SV06	4 x 0,55	0,70	44,4		43,4	42,6	41,6	40,2	38,6	36,6	34,3	28,5	18,5			
3SV08	4 x 0,75	0,70	60,0		59,1	58,2	57,0	55,4	53,4	51,0	48,1	40,7	27,5			
3SV12	4 x 1,1	0,70	89,6		87,8	86,4	84,5	82,1	79,1	75,5	71,1	59,9	40,1			
3SV13	4 x 1,5	0,70	98,1		96,7	95,4	93,5	91,0	87,8	83,9	79,2	67,2	45,6			
3SV16	4 x 1,5	0,70	119,9		117,8	116,1	113,6	110,5	106,5	101,6	95,8	80,9	54,2			
3SV21	4 x 2,2	0,70	159,3		156,9	154,6	151,4	147,3	142,1	135,7	128,0	108,5	73,6			
5SV04	4 x 0,55	0,70	30,0						28,2	27,9	27,5	26,6	25,2	21,2	17,3	12,2
5SV05	4 x 0,75	0,70	38,0						36,4	36,0	35,5	34,5	32,9	28,2	23,5	17,1
5SV08	4 x 1,1	0,70	60,1						57,6	57,0	56,2	54,6	51,8	44,1	36,2	25,8
5SV11	4 x 1,5	0,70	82,8						79,3	78,4	77,5	75,2	71,4	60,7	49,9	35,6
5SV13	4 x 2,2	0,70	98,3						95,0	94,0	92,8	90,0	85,5	72,6	59,9	43,5
5SV16	4 x 2,2	0,70	120,5						115,9	114,6	113,1	109,6	103,9	87,8	72,1	51,8

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

4p_3-5sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 4 pumps running.

GHV40/10-15-22SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY													
			l/min 0	333,36	400	532	680	733,36	932	1080	1320	1400	1600	1720	1840	1933,3
			m^3/h 0	20,0	24,0	31,9	40,8	44,0	55,9	64,8	79,2	84,0	96,0	103,2	110,4	116,0
	kW	(1)	H = TOTAL HEAD IN METRES OF COLUMN OF WATER													
10SV02	4 x 0,75	0,70	23,6	21,9	21,3	19,6	17,0	15,8	10,0							
10SV03	4 x 1,1	0,70	35,7	33,0	32,1	29,6	25,8	24,1	16,0							
10SV04	4 x 1,5	0,70	47,7	44,2	43,0	39,9	34,8	32,6	21,7							
10SV06	4 x 2,2	0,70	71,8	66,8	65,0	60,4	53,1	49,8	33,9							
15SV01	4 x 1,1	0,70	14,0			12,9	12,4	12,2	11,3	10,4	8,4	7,6	5,1			
15SV02	4 x 2,2	0,70	28,7			26,7	25,9	25,5	23,9	22,4	18,9	17,4	13,1			
22SV01	4 x 1,1	0,70	14,7					13,5	12,7	12,0	10,4	9,7	7,7	6,3	4,7	3,4
22SV02	4 x 2,2	0,70	30,4					28,4	27,2	26,0	23,3	22,2	18,9	16,6	13,8	11,5

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

4p_10-22sv-2p50_cn-en_b_th

(1) Value referred to the F, T, R, N, V, C, K versions. P version excluded.

The table refers to performance with 4 pumps running.

GHV40/33SV BOOSTER SETS SERIES

PUMP TYPE	RATED POWER	MEI ≥	Q = DELIVERY										
			l/min 0	1000	1200	1466,67	1666,67	2000	2333,33	2666,67	3000	3600	4000
			m^3/h 0	60	72	88	100	120	140	160	180	216	240
	kW	(1)	H = TOTAL HEAD METRES COLUMN OF WATER										
33SV1/1A	4 x 2,2	0,70	17,4	16,2	15,7	15	14	12,2	9,8	6,7			

Hydraulic performances in compliance with ISO 9906:2012 - Grade 3B (ex ISO 9906:1999 - Annex A)

4p_33-46sv-2p50_cn-en_b_th

(1) Value referred to the G e N with PN □ 6 bar (1600 kPa). P version excluded.

The table refers to performance with 4 pumps running.

GHV BOOSTER SETS SERIES
e-SV AVAILABLE VERSIONS AT 50 Hz, 2 POLES

PUMP		BOOSTER SET							
		GHV10		GHV20		GHV30		GHV40	
		PUMP VERSION							
TYPE	kW	F	R	F	R	F	R	F	R
3SV06	0,55	●	-	●	-	●	-	●	-
3SV08	0,75	●	-	●	●	●	●	●	●
3SV12	1,1	●	-	●	●	●	●	●	●
3SV13	1,5	●	-	●	●	●	●	●	●
3SV16	1,5	●	-	●	●	●	●	●	●
3SV21	2,2	●	-	●	●	●	●	●	●
5SV04	0,55	●	-	●	-	-	-	-	-
5SV05	0,75	●	-	●	-	-	-	-	-
5SV08	1,1	●	-	●	●	●	●	●	●
5SV11	1,5	●	-	●	●	●	●	●	●
5SV13	2,2	●	-	●	●	●	●	●	●
5SV16	2,2	●	-	●	●	●	●	●	●
10SV02	0,75	●	-	●	-	-	-	-	-
10SV03	1,1	●	-	●	-	-	-	-	-
10SV04	1,5	●	-	●	-	-	-	-	-
10SV06	2,2	●	-	●	●	●	●	●	●
15SV01	1,1	●	-	●	-	●	-	●	-
15SV02	2,2	●	-	●	-	●	-	●	-
22SV01	1,1	●	-	●	-	●	-	●	-
22SV02	2,2	●	-	●	-	●	-	●	-

GHV-3_22SV-HVL-2p50-en_cn_b_tm

PUMP (*)		BOOSTER SET							
		GHV10		GHV20		GHV30		GHV40	
TIPO	kW	STANDARD	../V9/QL	STANDARD	../V9/QL	STANDARD	../V9/QL	STANDARD	../V9/QL
33SV1/1A	2,2	●	-	●	●	●	●	●	●

* G, Standard pump version

GHV-33_125SV-HVL-2p50-en_cn_c_tm

LOWARA
a xylem brand

GHV BOOSTER SETS SERIES
ELECTRICAL DATA AT 50 Hz, 2 POLES

PUMP		CURRENT ABSORBED BY SET (A)								
		GHV10			GHV20		GHV30		GHV40	
		/2 HVL 2.	/3 HVL 3.	/4 HVL 4.	/3 HVL 3.	/4 HVL 4.	/3 HVL 3.	/4 HVL 4.	/3 HVL 3.	/4 HVL 4.
		INPUT SUPPLY								
TYPE	kW	1~ 230V	3~ 230V	3~ 400V	3~ 230V	3~ 400V	3~ 230V	3~ 400V	3~ 230V	3~ 400V
3SV06	0,55	3,1	1,7	1,0	3,5	2,0	5,2	3,0	6,9	4,0
3SV08	0,75	4,2	2,4	1,4	4,7	2,7	7,1	4,1	9,5	5,4
3SV12	1,1	6,0	3,4	2,0	6,8	3,9	10,2	5,9	13,6	7,8
3SV13	1,5	8,0	4,5	2,6	9,1	5,2	13,6	7,8	18,2	10,3
3SV16	1,5	8,1	4,6	2,6	9,1	5,2	13,7	7,8	18,3	10,4
3SV21	2,2	11,7	6,6	3,8	13,2	7,5	19,9	11,3	26,5	15,1
5SV04	0,55	3,1	1,7	1,0	3,5	2,0	5,2	3,0	6,9	4,0
5SV05	0,75	4,2	2,4	1,4	4,7	2,7	7,1	4,1	9,5	5,4
5SV08	1,1	6,0	3,4	2,0	6,8	3,9	10,2	5,9	13,6	7,8
5SV11	1,5	8,1	4,6	2,6	9,1	5,2	13,7	7,8	18,3	10,4
5SV13	2,2	11,7	6,6	3,8	13,2	7,5	19,9	11,3	26,5	15,1
5SV16	2,2	11,8	6,7	3,8	13,3	7,6	20,0	11,4	26,6	15,2
10SV02	0,75	4,2	2,4	1,4	4,7	2,7	7,1	4,1	9,5	5,4
10SV03	1,1	6,0	3,4	2,0	6,8	3,9	10,2	5,9	13,6	7,8
10SV04	1,5	8,1	4,6	2,6	9,1	5,2	13,7	7,8	18,3	10,4
10SV06	2,2	11,8	6,7	3,8	13,3	7,6	20,0	11,4	26,6	15,2
15SV01	1,1	6,0	3,4	2,0	6,8	3,9	10,2	5,9	13,6	7,8
15SV02	2	11,9	6,7	3,8	13,4	7,6	20,1	11,5	26,8	15,3
22SV01	1,1	6,0	3,4	2,0	6,8	3,9	10,2	5,9	13,6	7,8
22SV02	2,2	11,7	6,6	3,8	13,2	7,5	19,9	11,3	26,5	15,1

The current shown is the nominal current of the set.

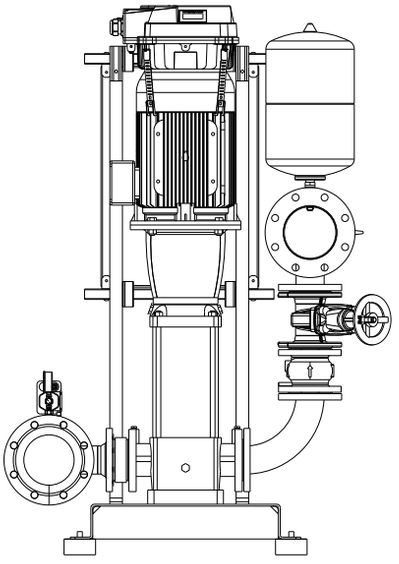
GHV-3_22SV-HVL-2p50_cn-en_c_te

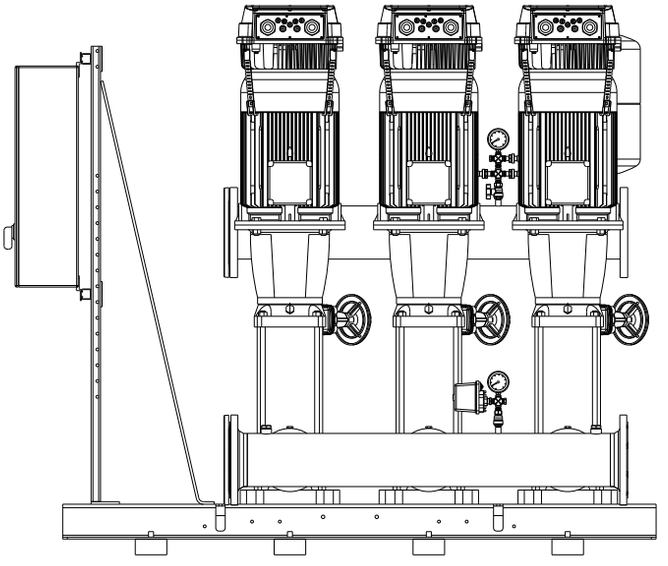
PUMP		CURRENT ABSORBED BY SET (A)							
		GHV10		GHV20		GHV30		GHV40	
		/3 HVL 3.	/4 HVL 4.	/3 HVL 3.	/4 HVL 4.	/3 HVL 3.	/4 HVL 4.	/3 HVL 3.	/4 HVL 4.
		INPUT SUPPLY							
TYPE	kW	3~ 230V	3~ 400V	3~ 230V	3~ 400V	3~ 230V	3~ 400V	3~ 230V	3~ 400V
33SV1/1A	2,2	6,7	3,8	13,4	7,6	20,1	11,5	26,8	15,3

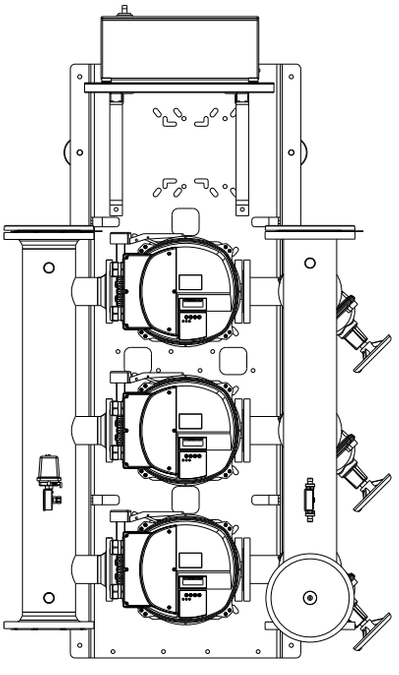
The current shown is the nominal current of the set.

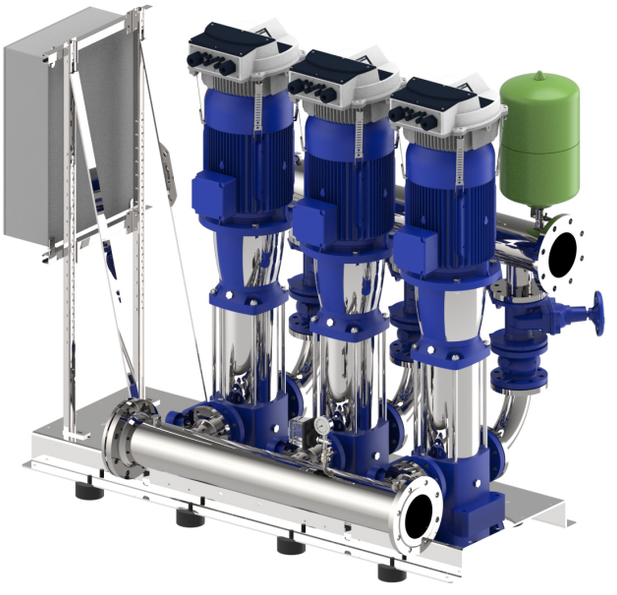
GHV-33_125SV-HVL-2p50_cn-en_c_te

GHV BOOSTER SETS SERIES
SPECIAL SET









GHV30/33SV../4/V9/QL

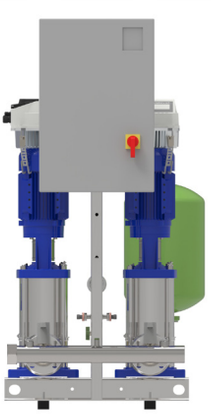
LOWARA
a xylem brand

GHV BOOSTER SETS SERIES
ELECTRIC PUMP RANGE AND CHARACTERISTICS

The standard range of GHV series variable-speed booster sets includes models with 1 to 4 e-SV pumps in different configurations, to adapt to the specific needs of each application.
For other models refer to your usual sales representative.

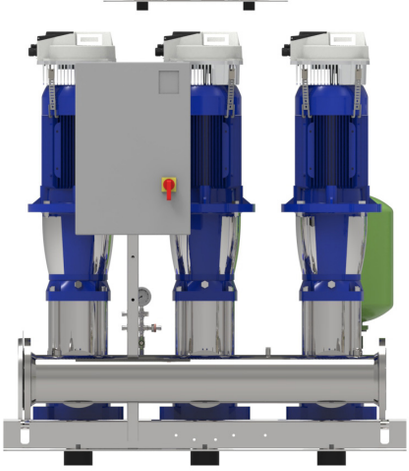
GHV10 SERIES
- Variable speed sets with HYDROVAR frequency converter and one multistage vertical pump with power up to 2,2 kW.

Head up to 160 m.
Flow rate up to 40 m³/h.



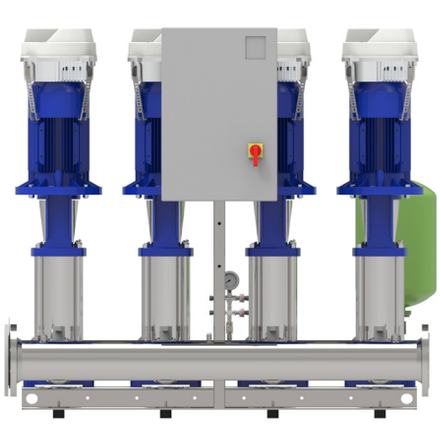
GHV20 SERIES
- Variable speed sets with HYDROVAR frequency converter and two multistage vertical pumps with power up to 2,2 kW.

Head up to 160 m.
Flow rate up to 80 m³/h.



GHV30 SERIES
- Variable speed sets with HYDROVAR frequency converter and three multistage vertical pumps with power up to 2,2 kW.

Head up to 160 m.
Flow rate up to 120 m³/h.



GHV40 SERIES
- Variable speed sets with HYDROVAR frequency converter and four multistage vertical pumps with power up to 2,2 kW.

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

Booster sets

GHV10 SERIES

MARKET SECTORS
RESIDENTIAL-CIVIL, INDUSTRIAL

APPLICATIONS
- Water network supply in housing complexes, offices, hotels, shopping centers, industrial plants.
- Supply of water networks for agricultural applications (e.g. irrigation).

SPECIFICATIONS

- **Flow rate**
  up to 40 m³/h.
- **Head**
  up to 160 m.
- **Frequency** 50Hz
- **e-SV** vertical axis electric pump
- **HVL** series HYDROVAR
- **Material**
  GHV10/ 3 to 22SV pump
  available CB and CX version

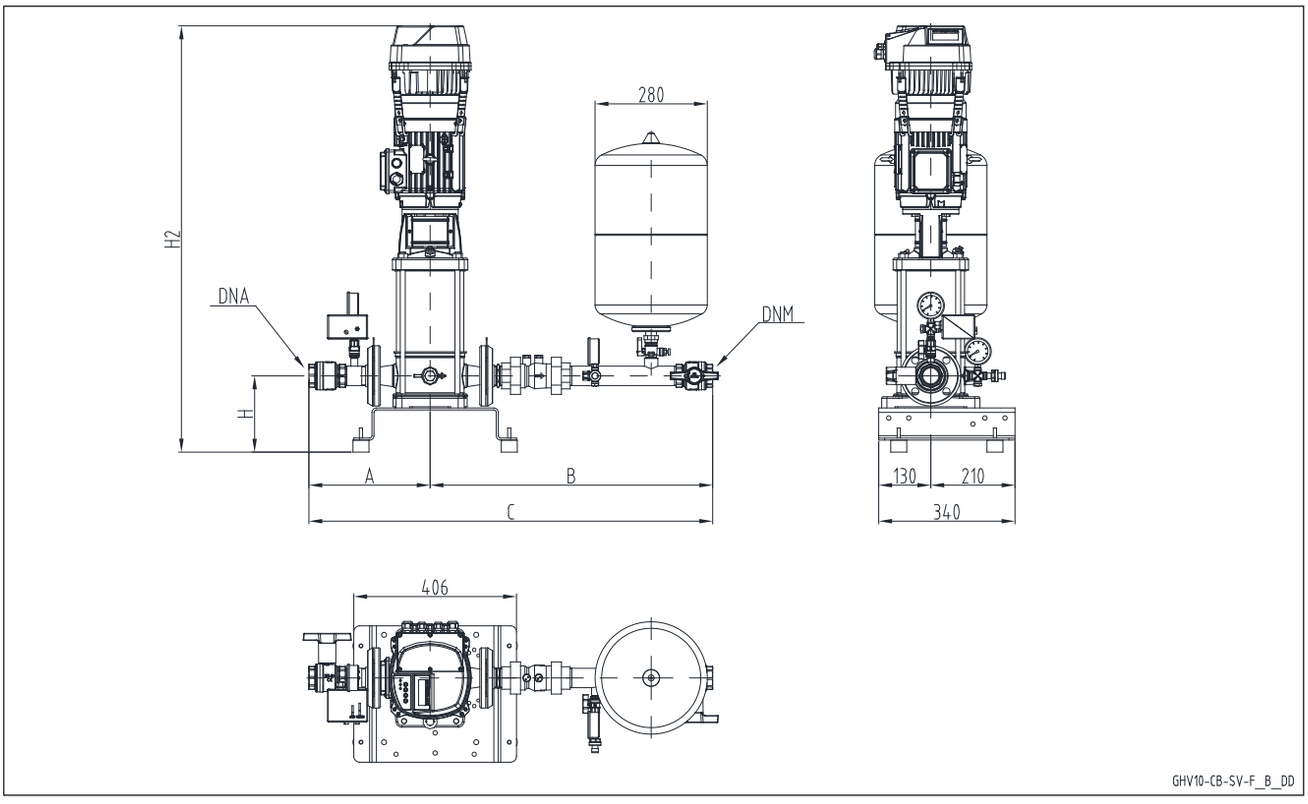
  GHV10/ 33SV pump
  available CB version
- **Protection class IP55** for:
  - electrical pump motor
  - HVL converter
- Maximum operating **pressure**:
  16 bar.
- Maximum liquid **temperature**:
  max 60°C, CB version
  max 65°C, CX version
- Maximum electric pump **power**:
  1 x 2,2 kW.
- **Progressive** motor start.

Hydraulics components of single pump booster set are also available as a kit.

Materials in contact with water are either certified or approved according to KTW

LOWARA
a xylem brand

SET OF 1 PUMP SV..F SERIES
SINGLE-PHASE POWER SUPPLY (GHV10.../2)
THREE-PHASE POWER SUPPLY (GHV10.../3, GHV10.../4)



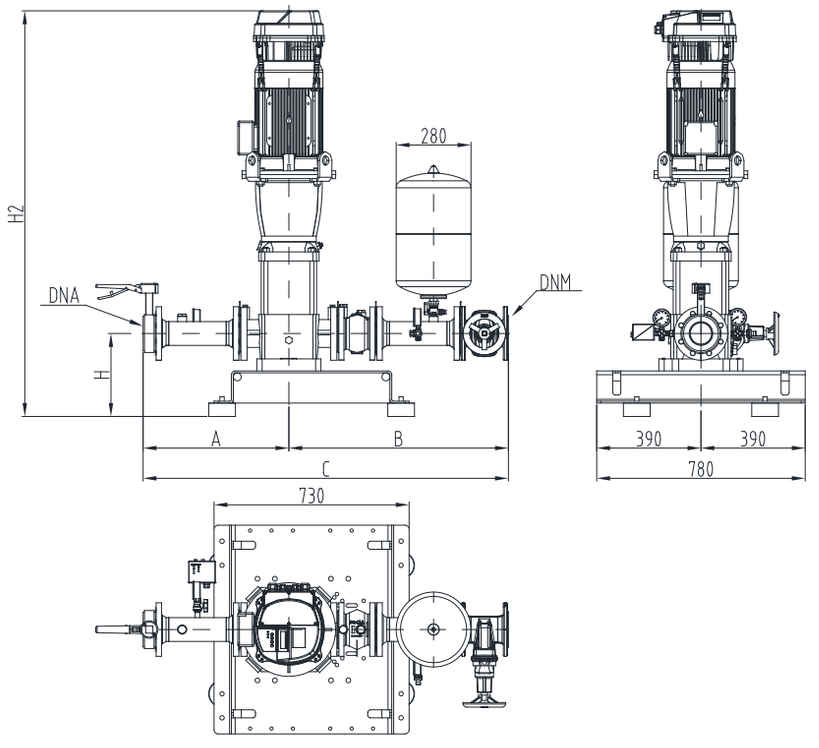
GHV 10	DNA	DNM	A		B		C		H	H2	
			CB	CX	CB	CX	CB	CX		/2 /3	/4
3SV06F005T	R1"	R1"	268	284	665	634	933	918	185	849	849
3SV08F007T	R1"	R1"	268	284	665	634	933	918	185	931	931
3SV12F011T	R1"	R1"	268	284	665	634	933	918	185	1011	1011
3SV13F015T	R1"	R1"	268	284	665	634	933	918	185	1041	1041
3SV16F015T	R1"	R1"	268	284	665	634	933	918	185	1101	1101
3SV21F022T	R1"	R1"	268	284	665	634	933	918	185	1236	1236
5SV04F005T	R1"1/4	R1"1/4	276	289	691	658	967	947	185	829	829
5SV05F007T	R1"1/4	R1"1/4	276	289	691	658	967	947	185	896	896
5SV08F011T	R1"1/4	R1"1/4	276	289	691	658	967	947	185	971	971
5SV11F015T	R1"1/4	R1"1/4	276	289	691	658	967	947	185	1056	1056
5SV13F022T	R1"1/4	R1"1/4	276	289	691	658	967	947	185	1141	1141
5SV16F022T	R1"1/4	R1"1/4	276	289	691	658	967	947	185	1216	1216
10SV02F007T	R1"1/2	R1"1/2	302	316	705	667	1007	983	190	900	900
10SV03F011T	R1"1/2	R1"1/2	302	316	705	667	1007	983	190	932	932
10SV04F015T	R1"1/2	R1"1/2	302	316	705	667	1007	983	190	974	974
10SV06F022T	R1"1/2	R1"1/2	302	316	705	667	1007	983	190	1073	1073
15SV01F011T	R 2"	R 2"	339	349	800	740	1138	1089	200	942	942
15SV02F022T	R 2"	R 2"	339	349	800	740	1138	1089	200	987	987
22SV01F011T	R 2"	R 2"	339	349	800	740	1138	1089	200	942	942
22SV02F022T	R 2"	R 2"	339	349	800	740	1138	1089	200	987	987

Dimensions in mm. Tolerance ± 10 mm.

ghv10_sv-f_c_td

LOWARA
a xylem brand

SET OF 1 PUMP SV..G SERIES
THREE-PHASE POWER SUPPLY (GHV10.../3, GHV10.../4)



GHV10-CB-46SV_B_DD

GHV 10	DNA	DNM	A	B	C	H	H2	
							/3	/4
33SV1/1AG022T	DN65	DN65	558	804	1362	265	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

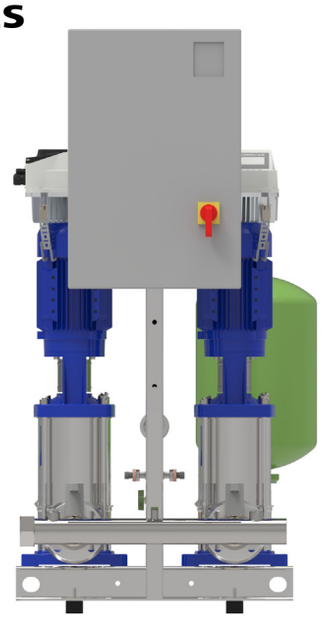
ghv10_46sv-dach_e_td

Booster sets

MARKET SECTORS
RESIDENTIAL-CIVIL, INDUSTRIAL

APPLICATIONS
- Water network supply in housing complexes, offices, hotels, shopping centers, industrial plants.
- Supply of water networks for agricultural applications (e.g. irrigation).

GHV20 SERIES



SPECIFICATIONS

- **Flow rate**
  up to 80 m³/h.

- **Head**
  up to 160 m.

- Electrical panel **supply voltage**:
  - three-phase 3 x 230V ± 10% 50/60Hz (GHV…/3)
  - three-phase 3 x 400V ± 10% 50/60Hz (GHV…/4)

- **Frequency** 50Hz

- **e-SV** vertical axis electric pump

- **HVL** series HYDROVAR

- **Material**
  GHV20/ 3 to 22SV pump
  available CB and CX version

  GHV20/ 33SV pump
  available CB version

- **Protection class IP55** for:
  - electrical control panel
  - electrical pump motor
  - HVL converter

- Maximum operating **pressure**:
  16 bar.

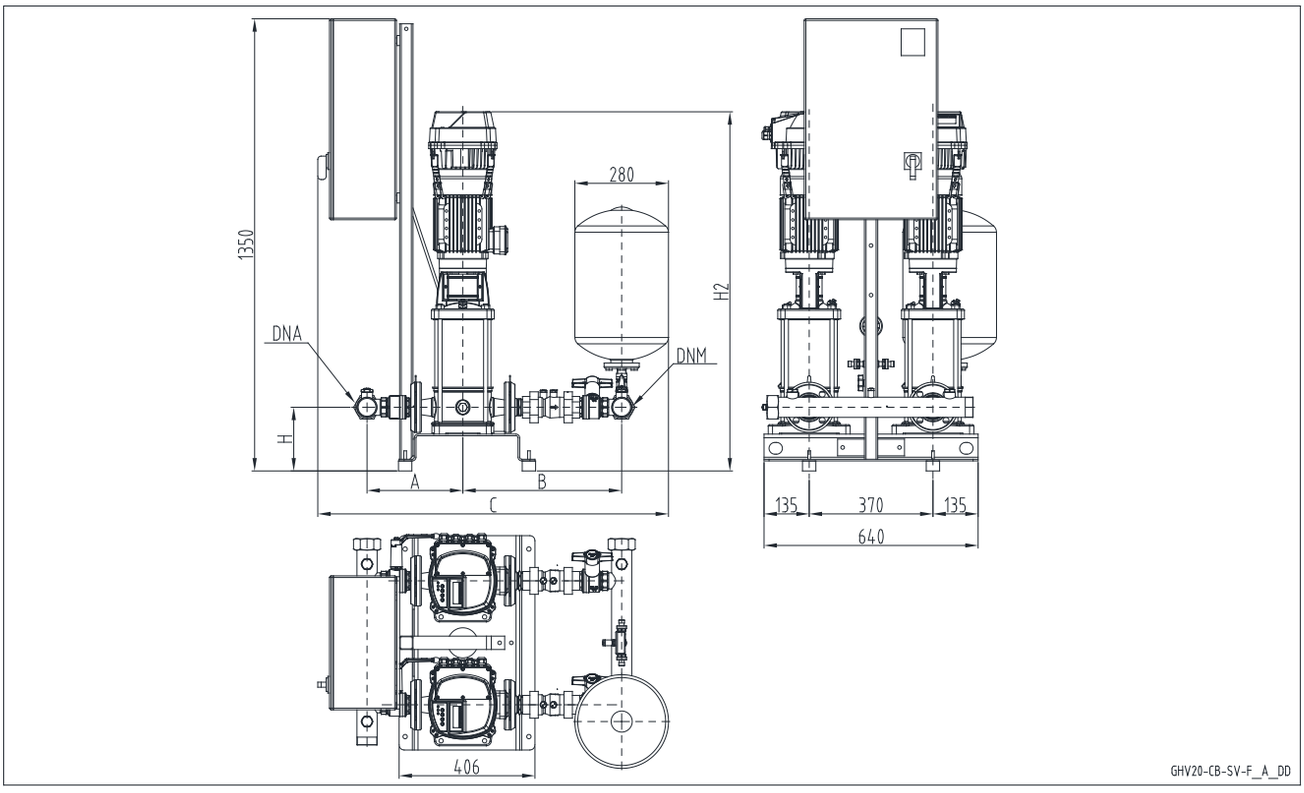
- Maximum liquid **temperature**:
  max 60°C, CB version
  max 65°C, CX version

- Maximum electric pump **power**:
  2 x 2,2 kW.

- **Progressive** motor start.

Materials in contact with water are either certified or approved according to KTW

SET OF 2 PUMPS SV..F SERIES
THREE-PHASE POWER SUPPLY (GHV20.../3, GHV20.../4)



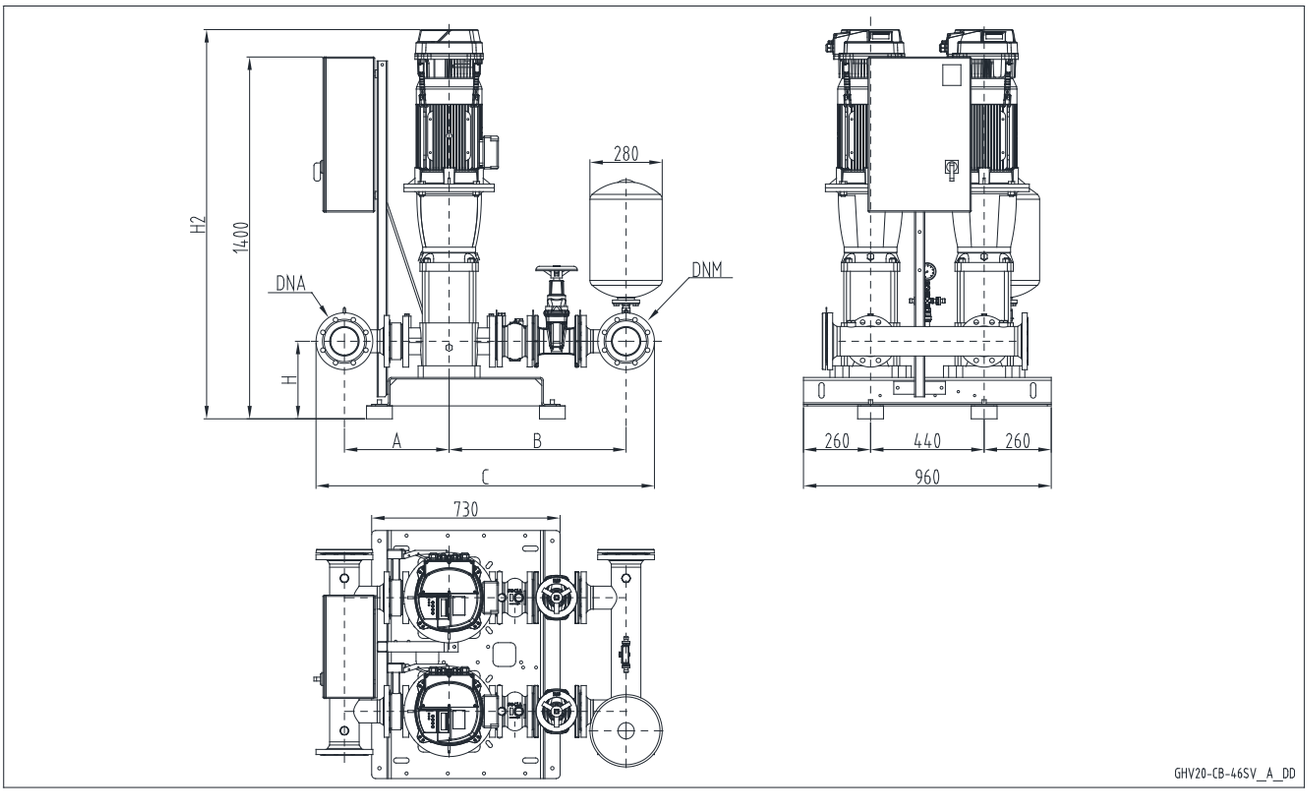
GHV 20	DNA	DNM	A		B		C		H	H2	
			CB	CX	CB	CX	CB	CX		/3	/4
3SV06F005T	R 2"	R 2"	256	281	413	391	972	950	185	849	849
3SV08F007T	R 2"	R 2"	256	281	413	391	972	950	185	931	931
3SV12F011T	R 2"	R 2"	256	281	413	391	972	950	185	1011	1011
3SV13F015T	R 2"	R 2"	256	281	413	391	972	950	185	1041	1041
3SV16F015T	R 2"	R 2"	256	281	413	391	972	950	185	1101	1101
3SV21F022T	R 2"	R 2"	256	281	413	391	972	950	185	1236	1236
5SV04F005T	R 2"	R 2"	262	283	441	417	1000	976	185	829	829
5SV05F007T	R 2"	R 2"	262	283	441	417	1000	976	185	896	896
5SV08F011T	R 2"	R 2"	262	283	441	417	1000	976	185	971	971
5SV11F015T	R 2"	R 2"	262	283	441	417	1000	976	185	1056	1056
5SV13F022T	R 2"	R 2"	262	283	441	417	1000	976	185	1141	1141
5SV16F022T	R 2"	R 2"	262	283	441	417	1000	976	185	1216	1216
10SV02F007T	R 2"	R 2"	286	306	475	445	1049	1019	190	900	900
10SV03F011T	R 2"	R 2"	286	306	475	445	1049	1019	190	932	932
10SV04F015T	R 2"	R 2"	286	306	475	445	1049	1019	190	974	974
10SV06F022T	R 2"	R 2"	286	306	475	445	1049	1019	190	1073	1073
15SV01F011T	R 2"1/2	R 2"1/2	338	361	560	510	1134	1084	200	942	942
15SV02F022T	R 2"1/2	R 2"1/2	338	361	560	510	1134	1084	200	987	987
22SV01F011T	R 2"1/2	R 2"1/2	338	361	560	510	1134	1084	200	942	942
22SV02F022T	R 2"1/2	R 2"1/2	338	361	560	510	1134	1084	200	987	987

Dimensions in mm. Tolerance ± 10 mm.

ghv20_sv-f_b_td

LOWARA
a xylem brand

SET OF 2 PUMPS SV..G SERIES
THREE-PHASE POWER SUPPLY (GHV20.../3, GHV20.../4)



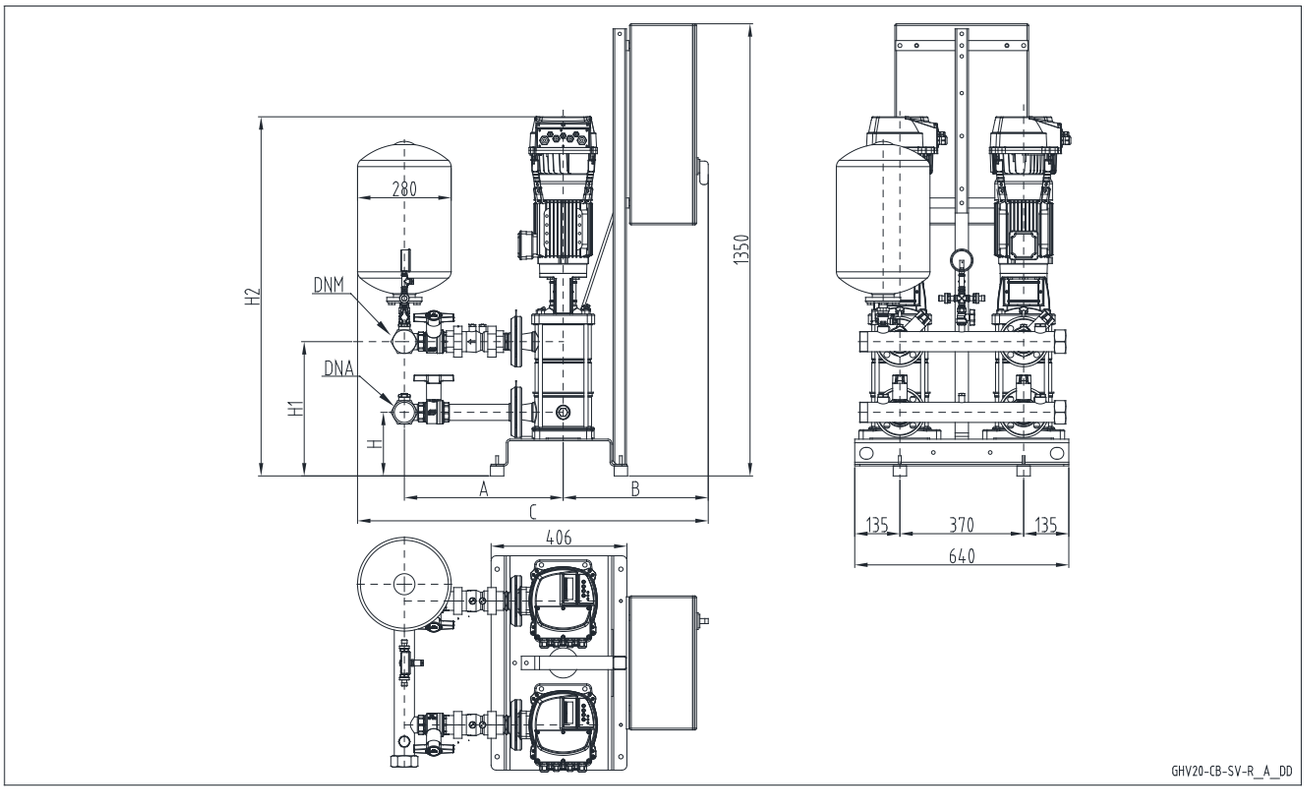
GHV 20	DNA	DNM	A	B	C	H	H2	
							/3	/4
33SV1/1AG022T	DN80	DN80	371	621	1245	265	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

ghv20_46sv-dach_d_td

LOWARA
a xylem brand

SET OF 2 PUMPS SV..R SERIES
THREE-PHASE POWER SUPPLY (GHV20.../3, GHV20.../4)

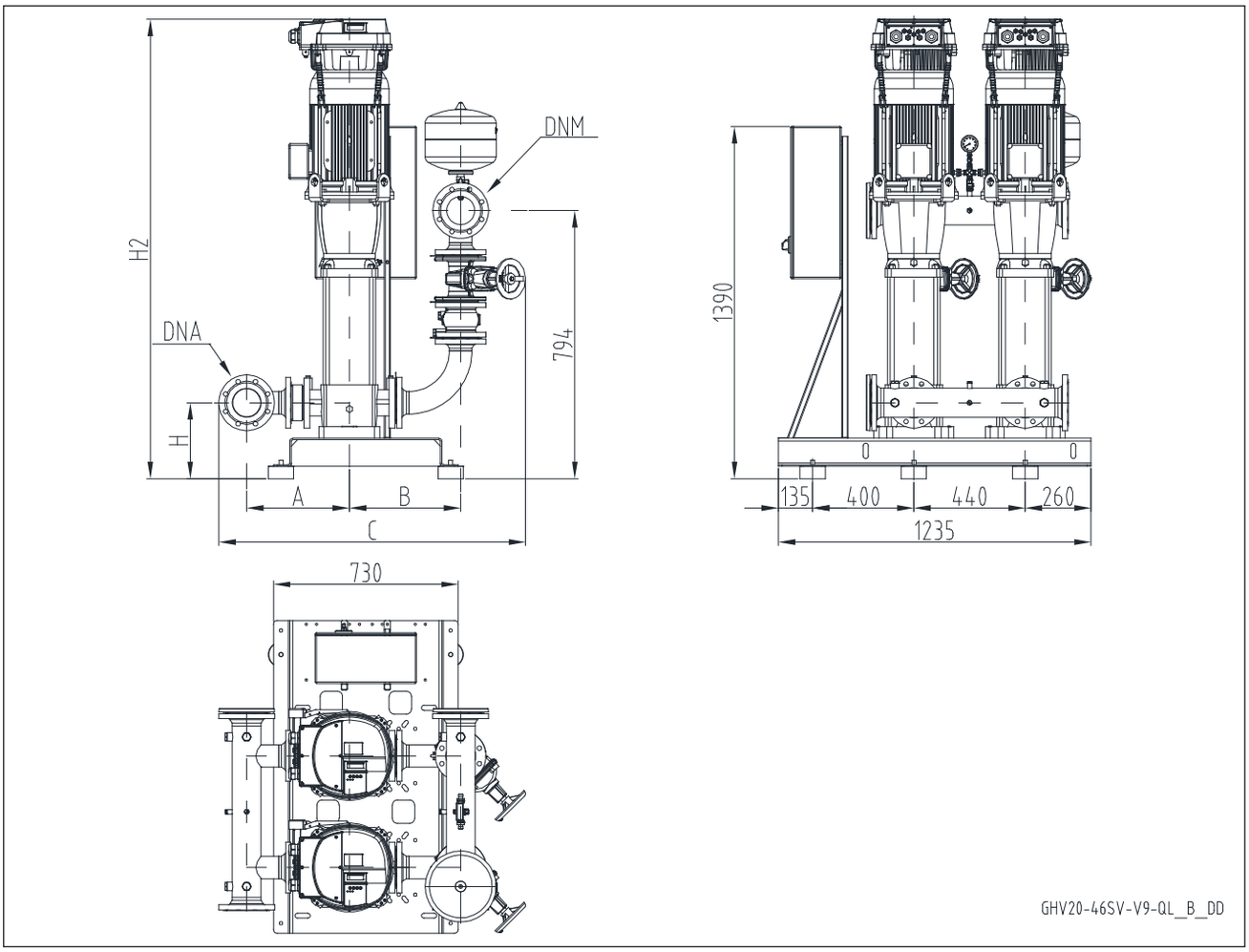


GHV 20	DNA	DNM	A		B	C		H	H1	H2	
			CB	CX		CB	CX			/3	/4
3SV08R007T	R 2"	R 2"	413	391	419	972	950	185	337	931	931
3SV12R011T	R 2"	R 2"	413	391	419	972	950	185	417	1011	1011
3SV13R015T	R 2"	R 2"	413	391	419	972	950	185	437	1041	1041
3SV16R015T	R 2"	R 2"	413	391	419	972	950	185	497	1101	1101
3SV21R022T	R 2"	R 2"	413	391	419	972	950	185	597	1236	1236
5SV08R011T	R 2"	R 2"	441	417	419	1000	976	185	377	971	971
5SV11R015T	R 2"	R 2"	441	417	419	1000	976	185	452	1056	1056
5SV13R022T	R 2"	R 2"	441	417	419	1000	976	185	502	1141	1141
5SV16R022T	R 2"	R 2"	441	417	419	1000	976	185	577	1216	1216
10SV06R022T	R 2"	R 2"	475	445	434	1049	1019	190	401	1073	1073

Dimensions in mm. Tolerance ± 10 mm.

ghv20_sv-r_b_td

SET OF 2 PUMPS SV..G SERIES - V9/QL OPTION
THREE-PHASE POWER SUPPLY (GHV20.../3, GHV20.../4)



GHV 20	DNA	DNM	A	B	C	H	H1	H2	
								/3	/4
33SV1/1AG022T	DN80	DN80	371	382	1105	265	945	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

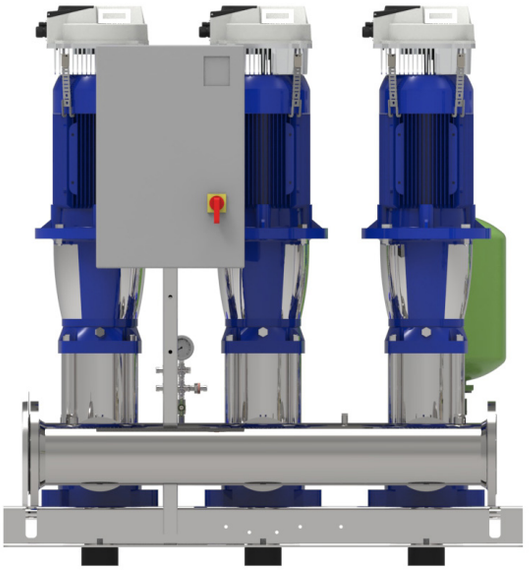
ghv20_46sv-v9-ql_b_td

Booster sets

GHV30 SERIES

MARKET SECTORS
RESIDENTIAL-CIVIL, INDUSTRIAL

APPLICATIONS
- Water network supply in housing complexes, offices, hotels, shopping centers, industrial plants.
- Supply of water networks for agricultural applications (e.g. irrigation)



SPECIFICATIONS

- **Flow rate**
  up to 120 m³/h.

- **Head**
  up to 160 m.

- Electrical panel **supply voltage**:
  - three-phase 3 x 230V ± 10% 50/60Hz (GHV…/3)
  - three-phase 3 x 400V ± 10% 50/60Hz (GHV…/4)

- **Frequency** 50Hz

- **e-SV** vertical axis electric pump

- **HVL** series HYDROVAR

- **Material**
  GHV30/ 3 to 22SV pump
  available CB and CX version

  GHV30/ 33SV pump
  available CB version

- **Protection class IP55** for:
  - electrical control panel
  - electrical pump motor
  - HVL converter

- Maximum operating **pressure**:
  16 bar.

- Maximum liquid **temperature**:
  max 60°C, CB version
  max 65°C, CX version

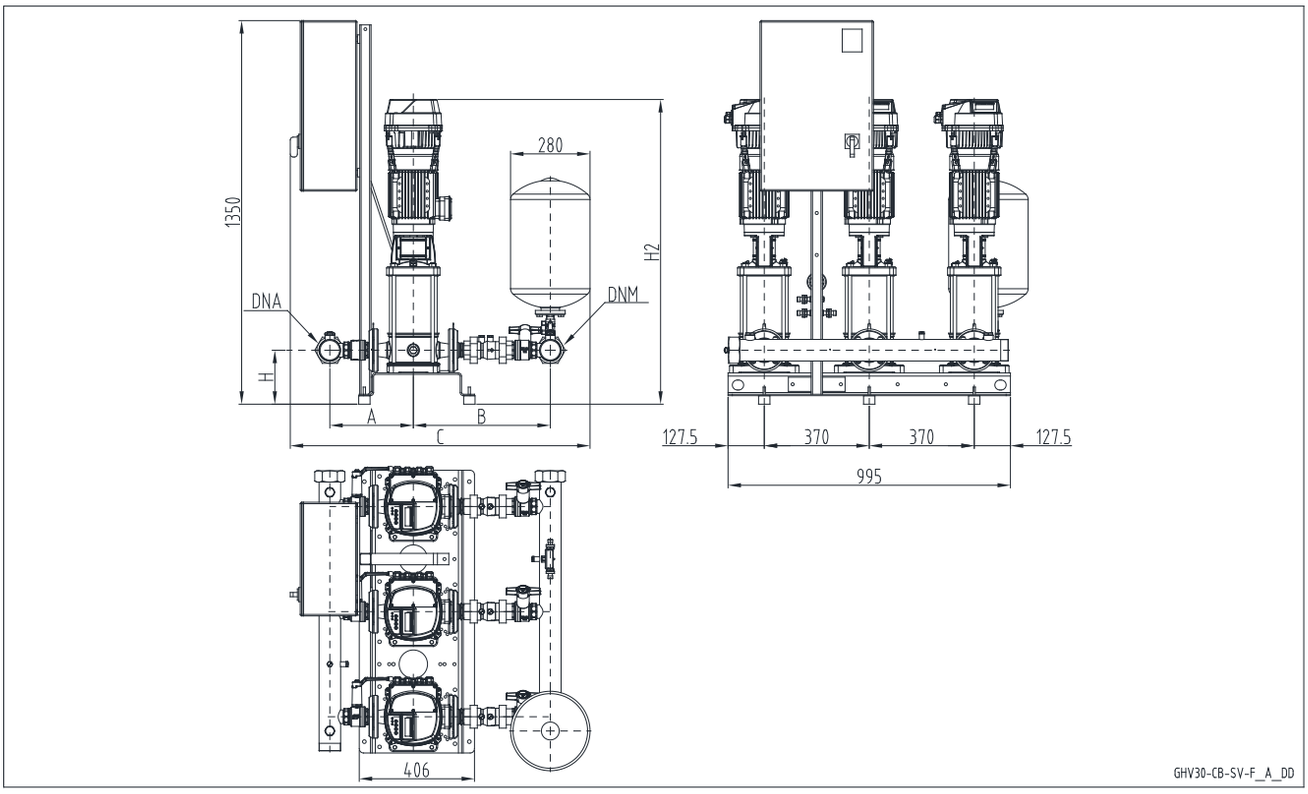
- Maximum electric pump **power**:
  3 x 2,2 kW.

- **Progressive** motor start.

Materials in contact with water are either certified or approved according to KTW

LOWARA
a xylem brand

SET OF 3 PUMPS SV..F SERIES
THREE-PHASE POWER SUPPLY (GHV30.../3, GHV30.../4)



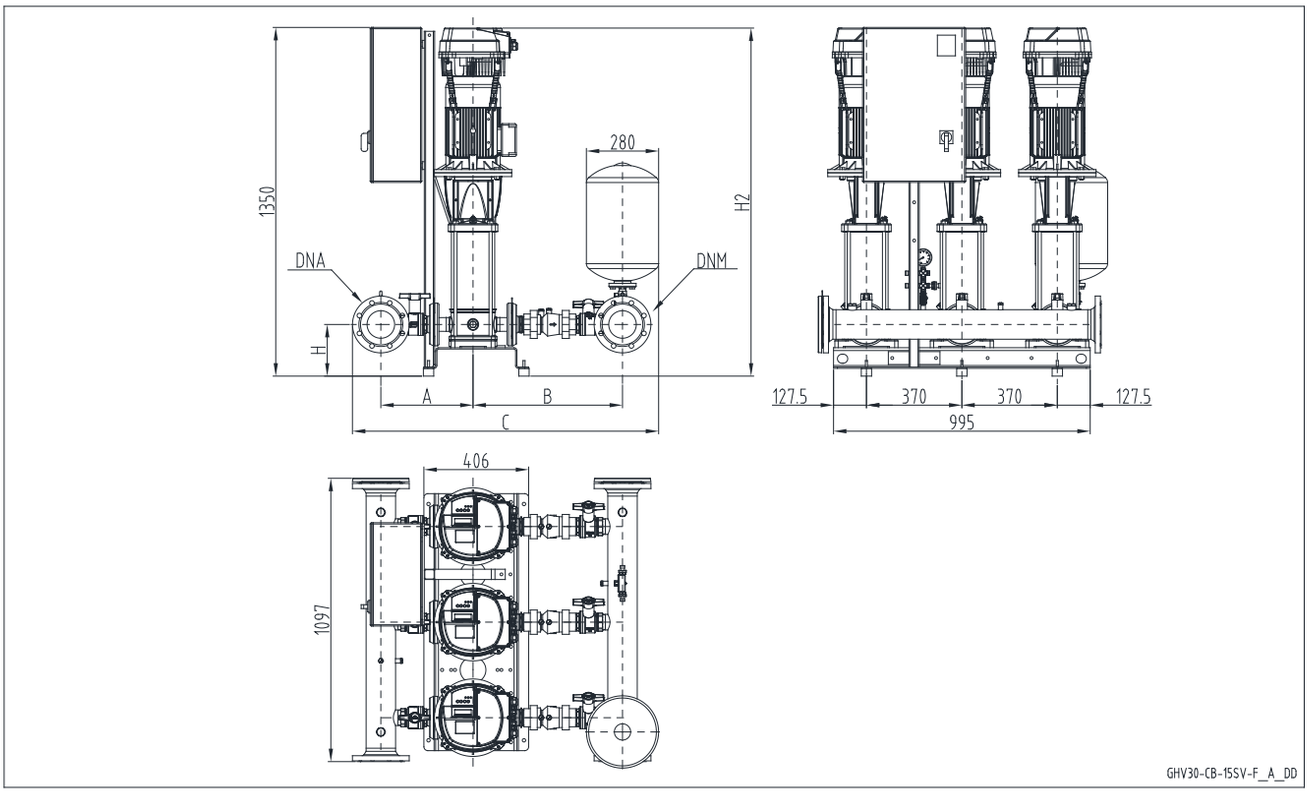
GHV 30	DNA	DNM	A		B		C		H	H2	
			CB	CX	CB	CX	CB	CX		/3	/4
3SV06F005T	R 2"	R 2"	256	281	413	391	972	950	185	849	849
3SV08F007T	R 2"	R 2"	256	281	413	391	972	950	185	931	931
3SV12F011T	R 2"	R 2"	256	281	413	391	972	950	185	1011	1011
3SV13F015T	R 2"	R 2"	256	281	413	391	972	950	185	1041	1041
3SV16F015T	R 2"	R 2"	256	281	413	391	972	950	185	1101	1101
3SV21F022T	R 2"	R 2"	256	281	413	391	972	950	185	1236	1236
5SV04F005T	R 2"	R 2"	262	283	441	417	1000	976	185	829	829
5SV05F007T	R 2"	R 2"	262	283	441	417	1000	976	185	896	896
5SV08F011T	R 2"	R 2"	262	283	441	417	1000	976	185	971	971
5SV11F015T	R 2"	R 2"	262	283	441	417	1000	976	185	1056	1056
5SV13F022T	R 2"	R 2"	262	283	441	417	1000	976	185	1141	1141
5SV16F022T	R 2"	R 2"	262	283	441	417	1000	976	185	1216	1216
10SV02F007T	R 2"1/2	R 2"1/2	294	314	483	453	1057	1027	190	900	900
10SV03F011T	R 2"1/2	R 2"1/2	294	314	483	453	1057	1027	190	932	932
10SV04F015T	R 2"1/2	R 2"1/2	294	314	483	453	1057	1027	190	974	974
10SV06F022T	R 2"1/2	R 2"1/2	294	314	483	453	1057	1027	190	1073	1073

Dimensions in mm. Tolerance ± 10 mm.

ghv30_sv-f_b_td

LOWARA
a xylem brand

SET OF 3 PUMPS SV..F SERIES
THREE-PHASE POWER SUPPLY (GHV30.../3, GHV30.../4)



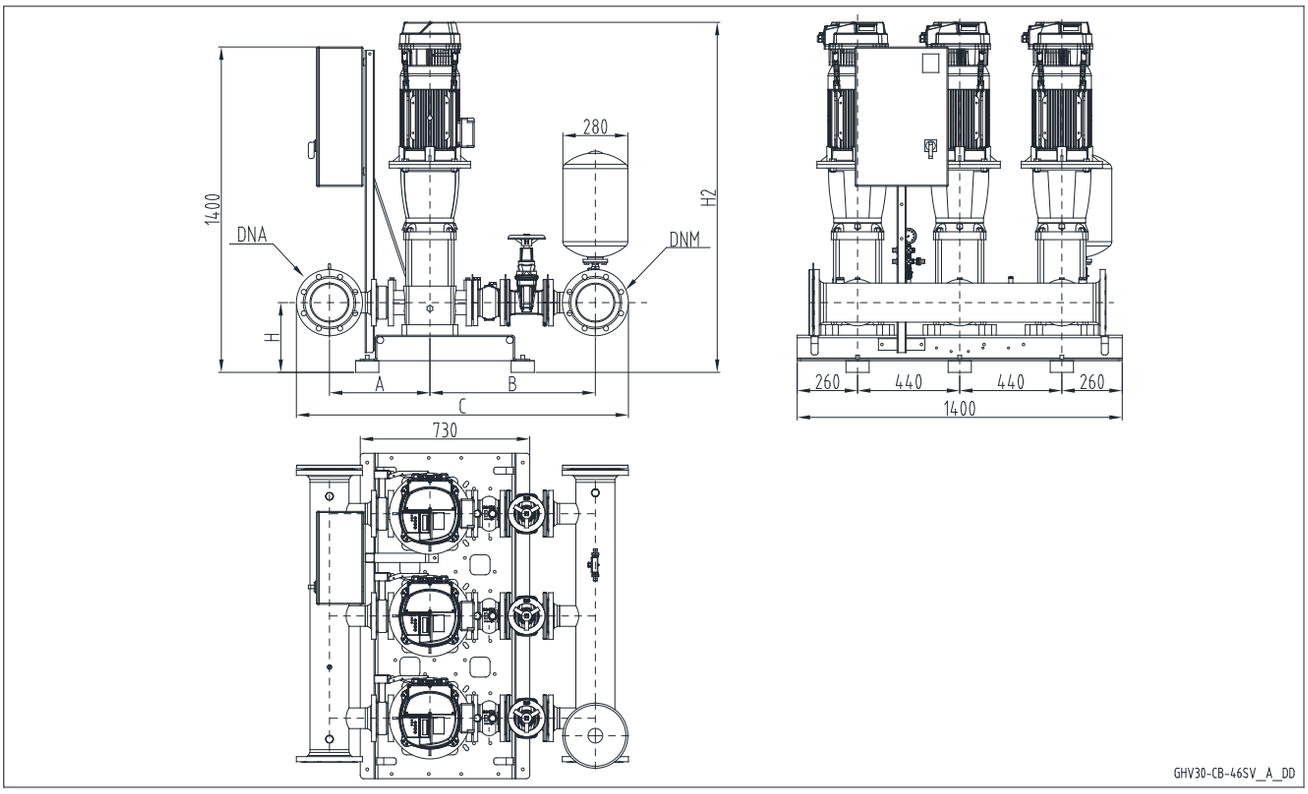
GHV 30	DNA	DNM	A		B		C		H	H2	
			CB	CX	CB	CX	CB	CX		/3	/4
15SV01F011T	DN100	DN100	357	380	579	529	1186	1159	200	942	942
15SV02F022T	DN100	DN100	357	380	579	529	1186	1159	200	987	987
22SV01F011T	DN100	DN100	357	380	579	529	1186	1159	200	942	942
22SV02F022T	DN100	DN100	357	380	579	529	1186	1159	200	987	987

Dimensions in mm. Tolerance ± 10 mm.

ghv30_15sv-f_b_td

LOWARA
a xylem brand

SET OF 3 PUMPS SV..G SERIES
THREE-PHASE POWER SUPPLY (GHV30.../3, GHV30.../4)



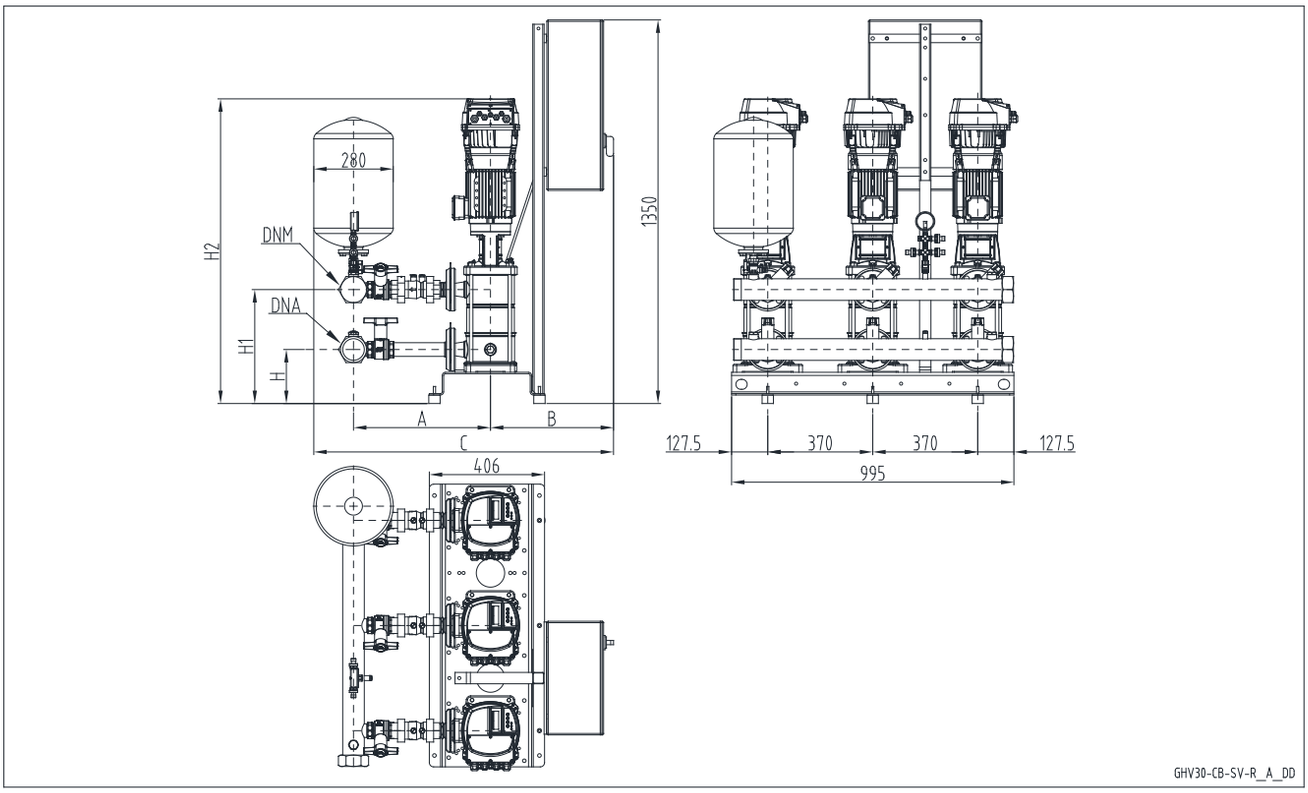
GHV 30	DNA	DNM	A	B	C	H	H2	
							/3	/4
33SV1/1AG022T	DN125	DN125	396	646	1292	265	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

ghv30_46sv-dach_d_td

LOWARA
a xylem brand

SET OF 3 PUMPS SV..R SERIES
THREE-PHASE POWER SUPPLY (GHV30.../3, GHV30.../4)

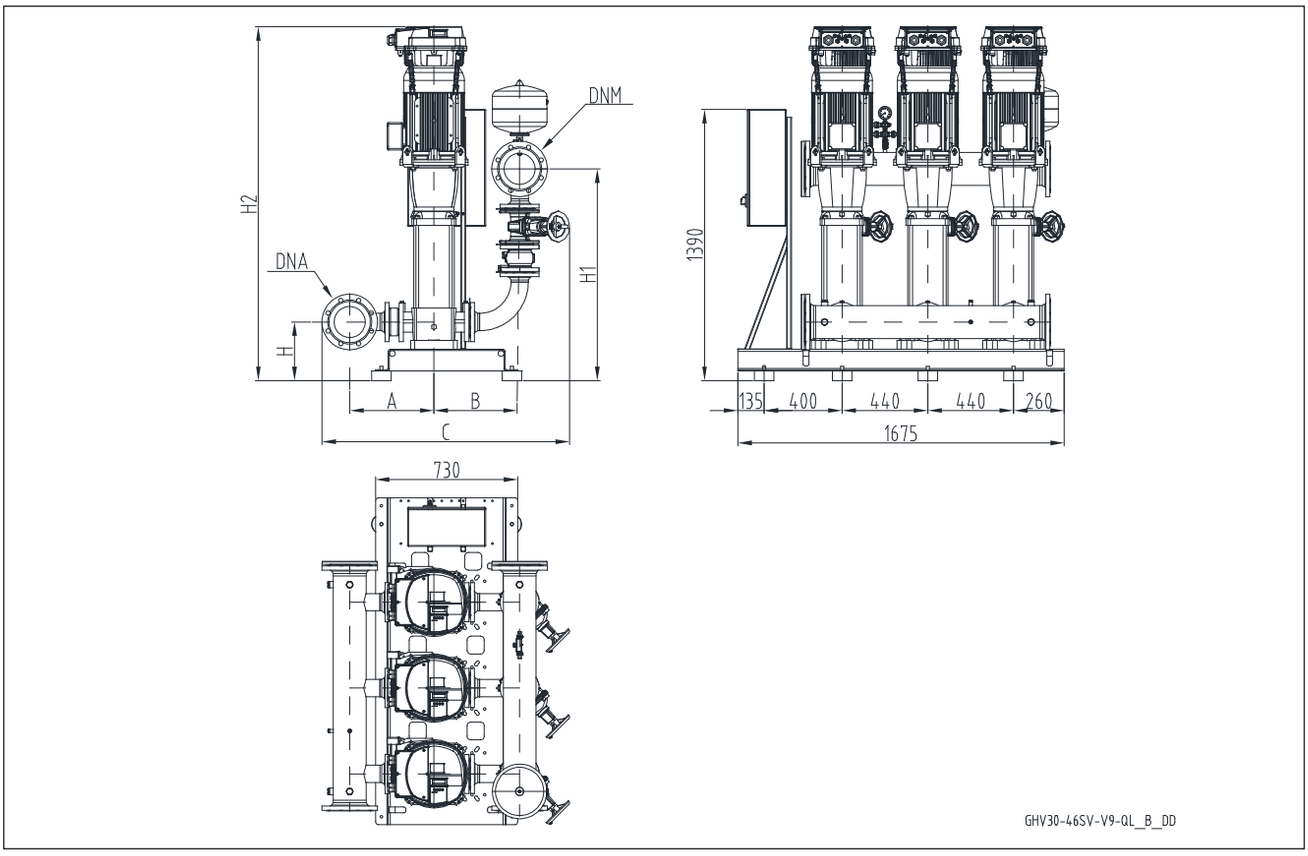


GHV 30	DNA	DNM	A		B	C		H	H1	H2	
			CB	CX		CB	CX			/3	/4
3SV08R007T	R 2"	R 2"	413	391	419	972	950	185	337	931	931
3SV12R011T	R 2"	R 2"	413	391	419	972	950	185	417	1011	1011
3SV13R015T	R 2"	R 2"	413	391	419	972	950	185	437	1041	1041
3SV16R015T	R 2"	R 2"	413	391	419	972	950	185	497	1101	1101
3SV21R022T	R 2"	R 2"	413	391	419	972	950	185	597	1236	1236
5SV08R011T	R 2"	R 2"	441	417	419	1000	976	185	377	971	971
5SV11R015T	R 2"	R 2"	441	417	419	1000	976	185	452	1056	1056
5SV13R022T	R 2"	R 2"	441	417	419	1000	976	185	502	1141	1141
5SV16R022T	R 2"	R 2"	441	417	419	1000	976	185	577	1216	1216
10SV06R022T	R 2"1/2	R 2"1/2	483	453	434	1057	1027	190	401	1073	1073

Dimensions in mm. Tolerance ± 10 mm.

ghv30_sv-r_b_td

SET OF 3 PUMPS SV..G SERIES - V9/QL OPTION
THREE-PHASE POWER SUPPLY (GHV30.../3, GHV30.../4)



GHV 30	DNA	DNM	A	B	C	H	H1	H2	
								/3	/4
33SV1/1AG022T	DN125	DN125	396	382	1155	265	971	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

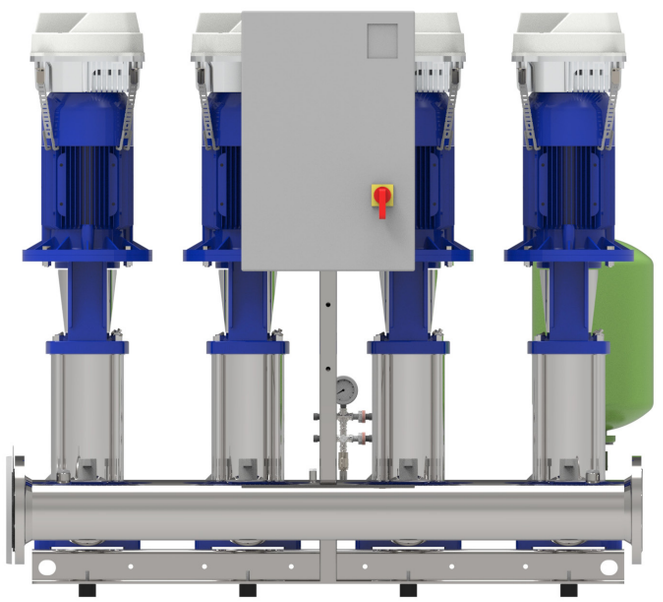
ghv30_46sv-v9-ql_b_td

Booster sets

MARKET SECTORS
RESIDENTIAL-CIVIL, INDUSTRIAL

APPLICATIONS
- Water network supply in housing complexes, offices, hotels, shopping centers, industrial plants.
- Supply of water networks for agricultural applications (e.g. irrigation)

GHV40 SERIES



SPECIFICATIONS

- **Flow rate**
  up to 160 m³/h.

- **Head**
  up to 160 m.

- Electrical panel **supply voltage**:
  - three-phase 3 x 230V ± 10% 50/60Hz (GHV…/3)
  - three-phase 3 x 400V ± 10% 50/60Hz (GHV…/4)

- **Frequency** 50Hz

- **e-SV** vertical axis electric pump

- **HVL** series HYDROVAR

- **Material**
  GHV40/ 3 to 22SV pump
  available CB and CX version

  GHV40/ 33SV pump
  available CB version

- **Protection class IP55** for:
  - electrical control panel
  - electrical pump motor
  - HVL converter

- Maximum operating **pressure**:
  16 bar.

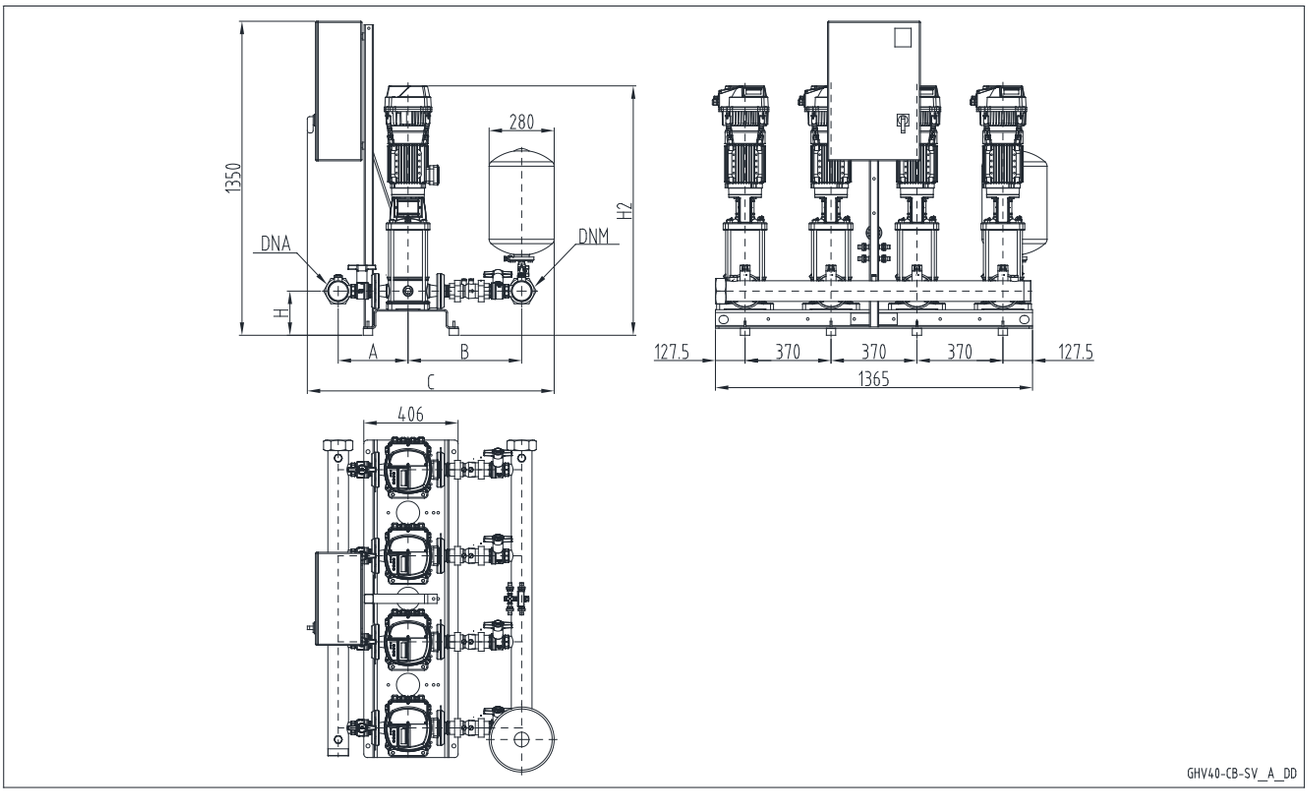
- Maximum liquid **temperature**:
  max 60°C, CB version
  max 65°C, CX version

- Maximum electric pump **power**:
  4 x 2,2 kW.

- **Progressive** motor start.

Materials in contact with water are either certified or approved according to KTW

SET OF 4 PUMPS SV..F SERIES
THREE-PHASE POWER SUPPLY (GHV40.../3, GHV40.../4)

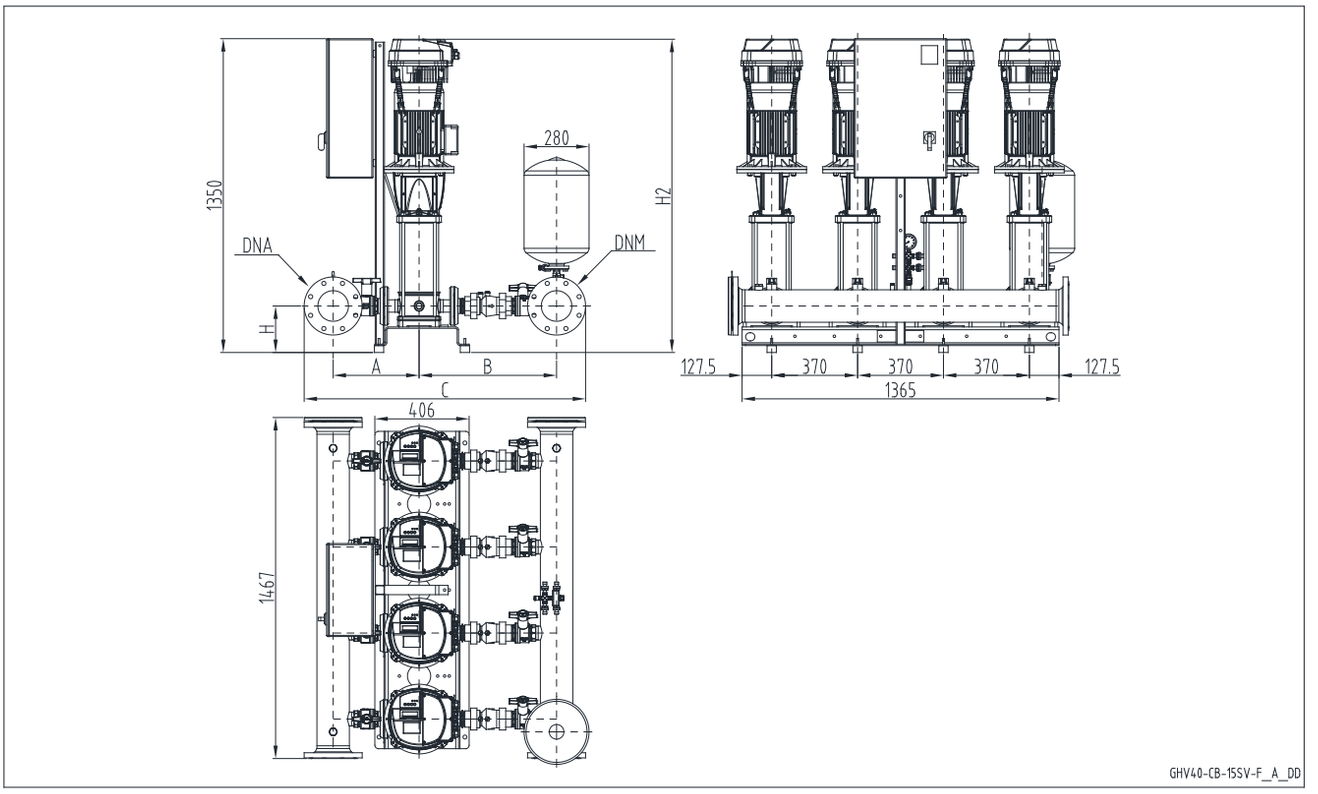


GHV 40	DNA	DNM	A		B		C		H	H2	
			CB	CX	CB	CX	CB	CX		/3	/4
3SV06F005T	R 2"	R 2"	256	281	413	391	972	950	185	849	849
3SV08F007T	R 2"	R 2"	256	281	413	391	972	950	185	931	931
3SV12F011T	R 2"	R 2"	256	281	413	391	972	950	185	1011	1011
3SV13F015T	R 2"	R 2"	256	281	413	391	972	950	185	1041	1041
3SV16F015T	R 2"	R 2"	256	281	413	391	972	950	185	1101	1101
3SV21F022T	R 2"	R 2"	256	281	413	391	972	950	185	1236	1236
5SV04F005T	R 2"1/2	R 2"1/2	270	291	449	425	1008	984	185	829	829
5SV05F007T	R 2"1/2	R 2"1/2	270	291	449	425	1008	984	185	896	896
5SV08F011T	R 2"1/2	R 2"1/2	270	291	449	425	1008	984	185	971	971
5SV11F015T	R 2"1/2	R 2"1/2	270	291	449	425	1008	984	185	1056	1056
5SV13F022T	R 2"1/2	R 2"1/2	270	291	449	425	1008	984	185	1141	1141
5SV16F022T	R 2"1/2	R 2"1/2	270	291	449	425	1008	984	185	1216	1216
10SV02F007T	R 3"	R 3"	301	321	490	460	1064	1034	190	900	900
10SV03F011T	R 3"	R 3"	301	321	490	460	1064	1034	190	932	932
10SV04F015T	R 3"	R 3"	301	321	490	460	1064	1034	190	974	974
10SV06F022T	R 3"	R 3"	301	321	490	460	1064	1034	190	1073	1073

Dimensions in mm. Tolerance ± 10 mm.

ghv40_sv-f_b_td

SET OF 4 PUMPS SV..F SERIES
THREE-PHASE POWER SUPPLY (GHV40.../3, GHV40.../4)

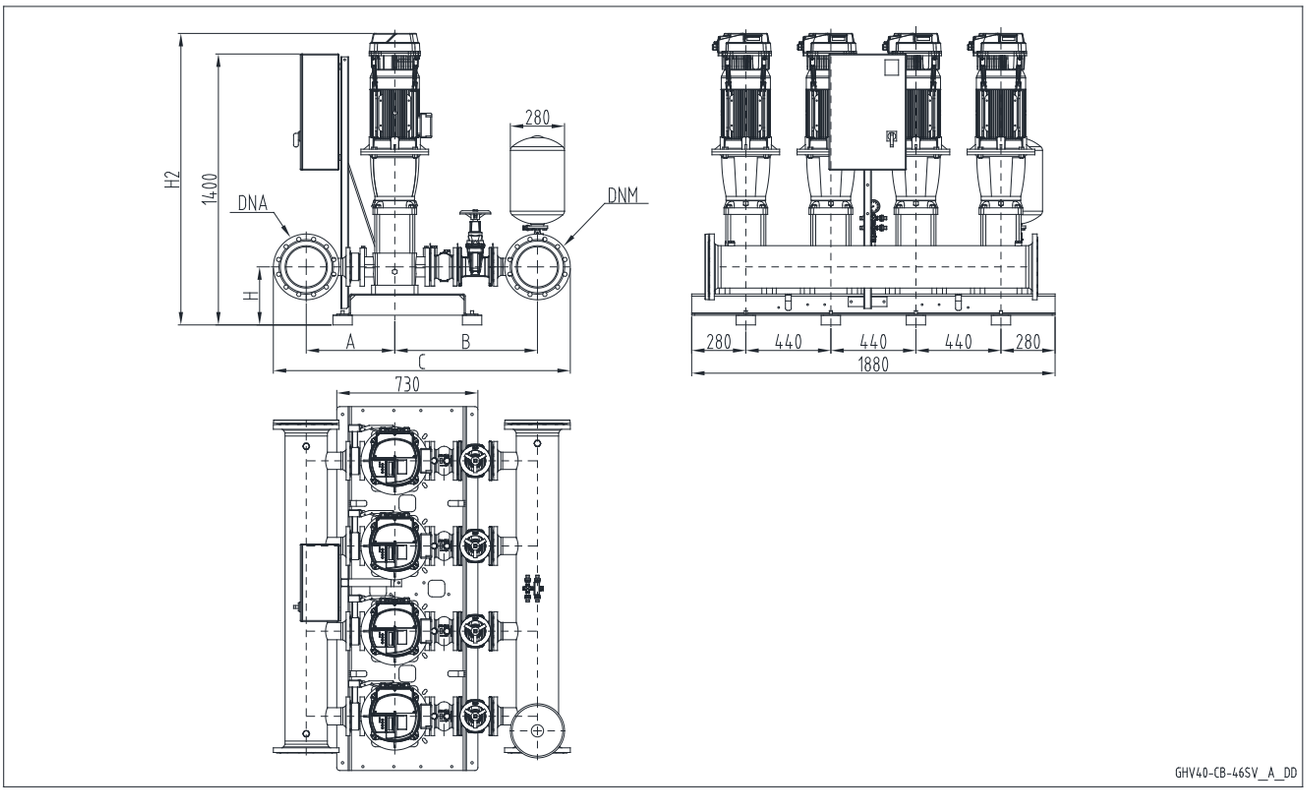


GHV 40	DNA	DNM	A		B		C		H	H2	
			CB	CX	CB	CX	CB	CX		/3	/4
15SV01F011T	DN125	DN125	370	393	592	542	1227	1200	200	942	942
15SV02F022T	DN125	DN125	370	393	592	542	1227	1200	200	987	987
22SV01F011T	DN125	DN125	370	393	592	542	1227	1200	200	942	942
22SV02F022T	DN125	DN125	370	393	592	542	1227	1200	200	987	987

Dimensions in mm. Tolerance ± 10 mm.

ghv40_15sv-f_b_td

SET OF 4 PUMPS SV..G SERIES
THREE-PHASE POWER SUPPLY (GHV40.../3, GHV40.../4)



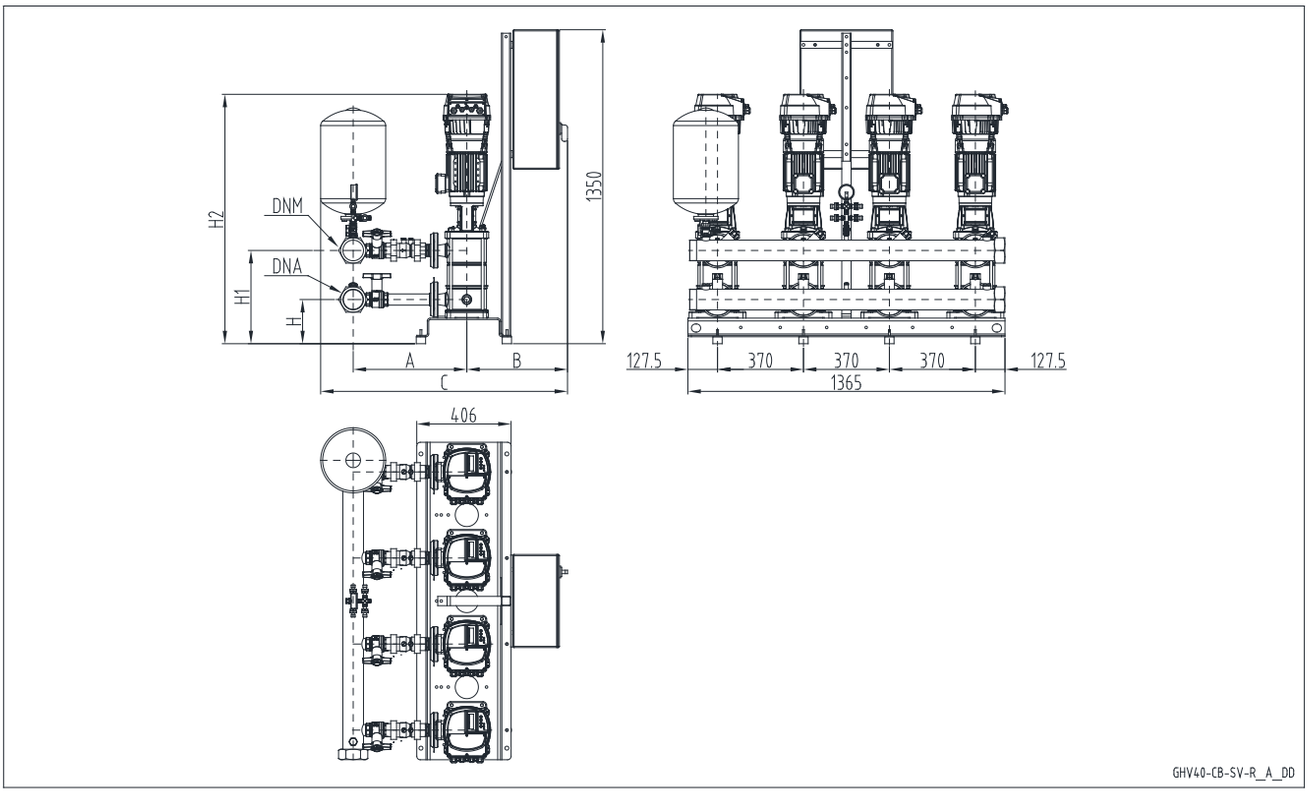
GHV 40	DNA	DNM	A	B	C	H	H2	
							/3	/4
33SV1/1AG022T	DN150	DN150	410	660	1355	265	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

ghv40_46sv-dach_c_td

LOWARA
a xylem brand

SET OF 4 PUMPS SV..R SERIES
THREE-PHASE POWER SUPPLY (GHV40.../3, GHV40.../4)



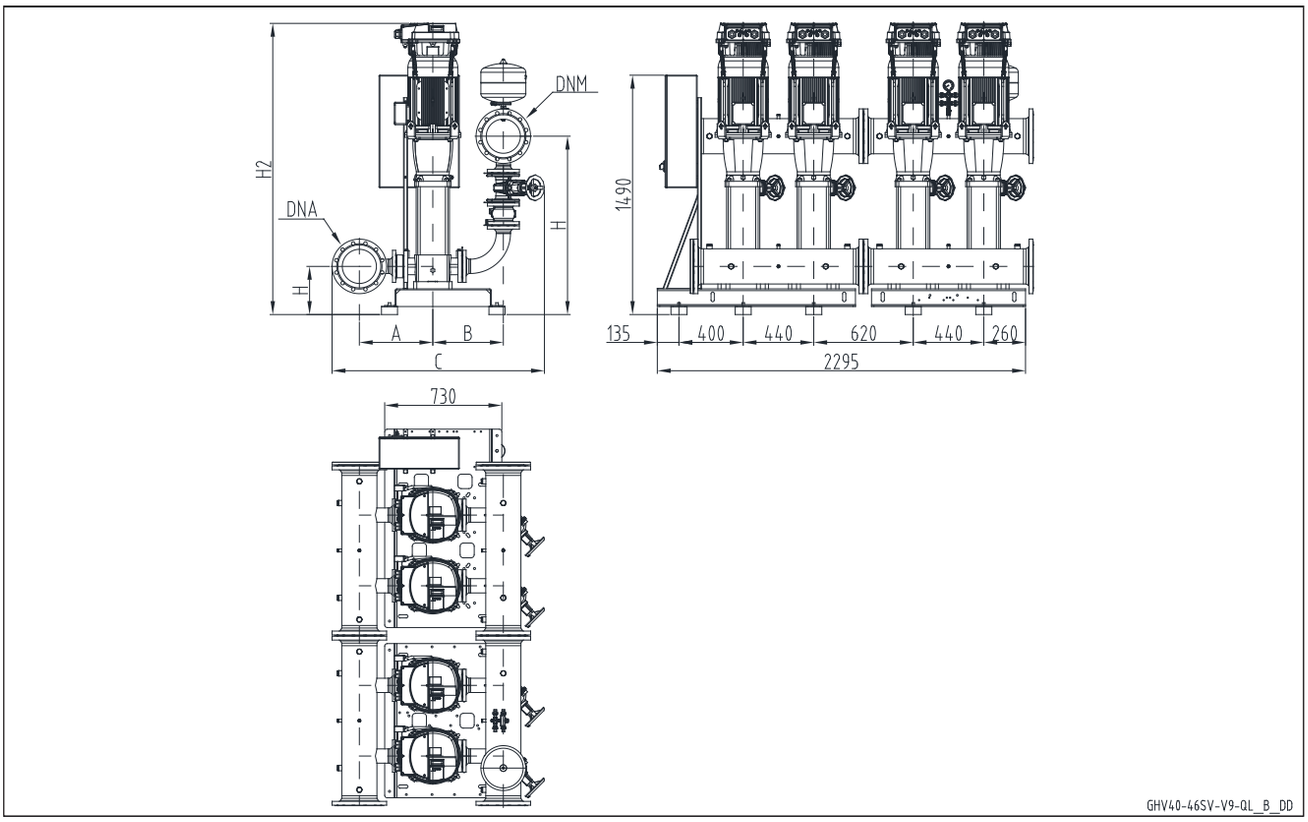
GHV 40	DNA	DNM	A		B	C		H	H1	H2	
			CB	CX		CB	CX			/3	/4
3SV08R007T	R 2"	R 2"	413	391	419	972	950	185	337	931	931
3SV12R011T	R 2"	R 2"	413	391	419	972	950	185	417	1011	1011
3SV13R015T	R 2"	R 2"	413	391	419	972	950	185	437	1041	1041
3SV16R015T	R 2"	R 2"	413	391	419	972	950	185	497	1101	1101
3SV21R022T	R 2"	R 2"	413	391	419	972	950	185	597	1236	1236
5SV08R011T	R 2"1/2	R 2"1/2	449	425	419	1008	984	185	377	971	971
5SV11R015T	R 2"1/2	R 2"1/2	449	425	419	1008	984	185	452	1056	1056
5SV13R022T	R 2"1/2	R 2"1/2	449	425	419	1008	984	185	502	1141	1141
5SV16R022T	R 2"1/2	R 2"1/2	449	425	419	1008	984	185	577	1216	1216
10SV06R022T	R 3"	R 3"	490	460	434	1064	1034	190	401	1073	1073

Dimensions in mm. Tolerance ± 10 mm.

ghv40_sv-r_b_td

LOWARA
a xylem brand

SET OF 4 PUMPS SV..G SERIES - V9/QL OPTION
THREE-PHASE POWER SUPPLY (GHV40.../3, GHV40.../4)



GHV 40	DNA	DNM	A	B	C	H	H1	H2	
								/3	/4
33SV1/1AG022T	DN150	DN150	410	382	1187	265	985	1117	1117

Dimensions in mm. Tolerance ± 10 mm.

ghv40_46sv-v9-ql_b_td

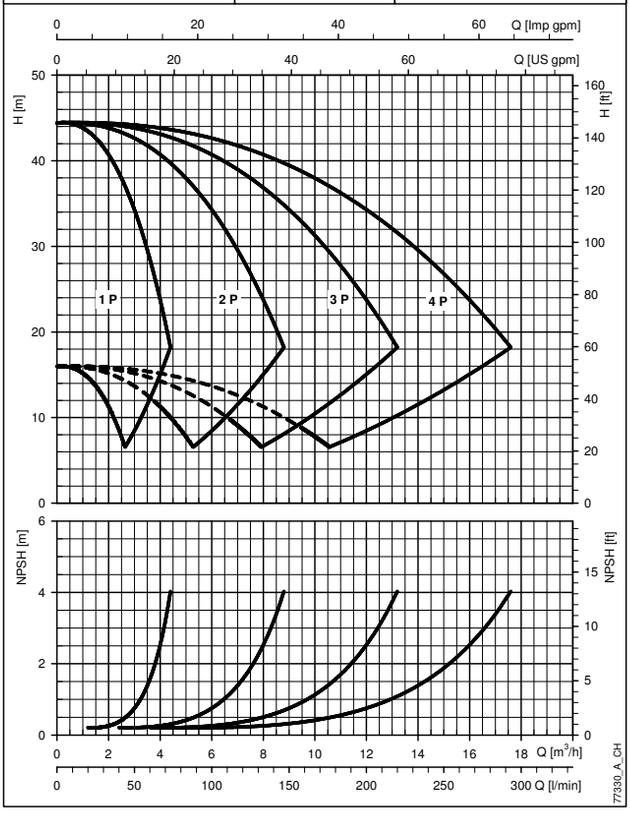
LOWARA
a xylem brand

PERFORMANCE CURVES

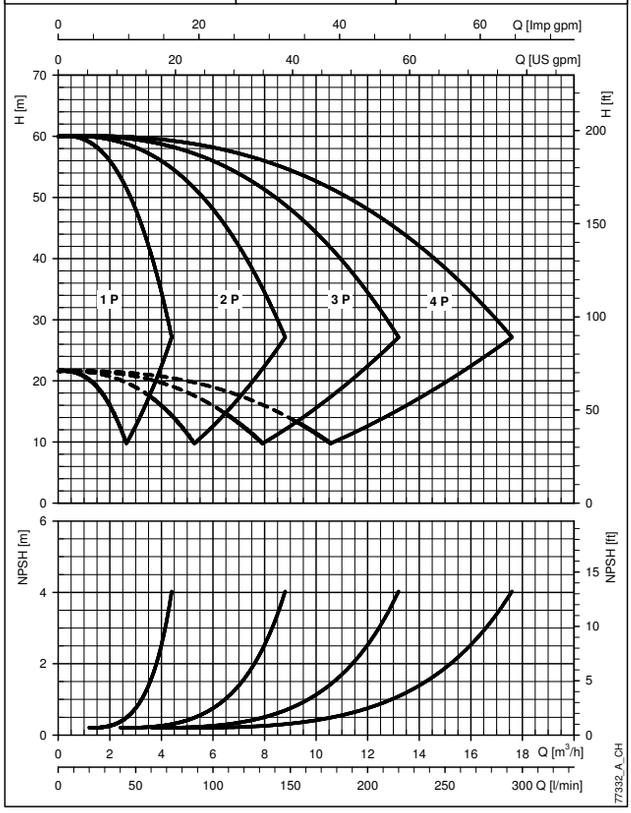
LOWARA
a xylem brand

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

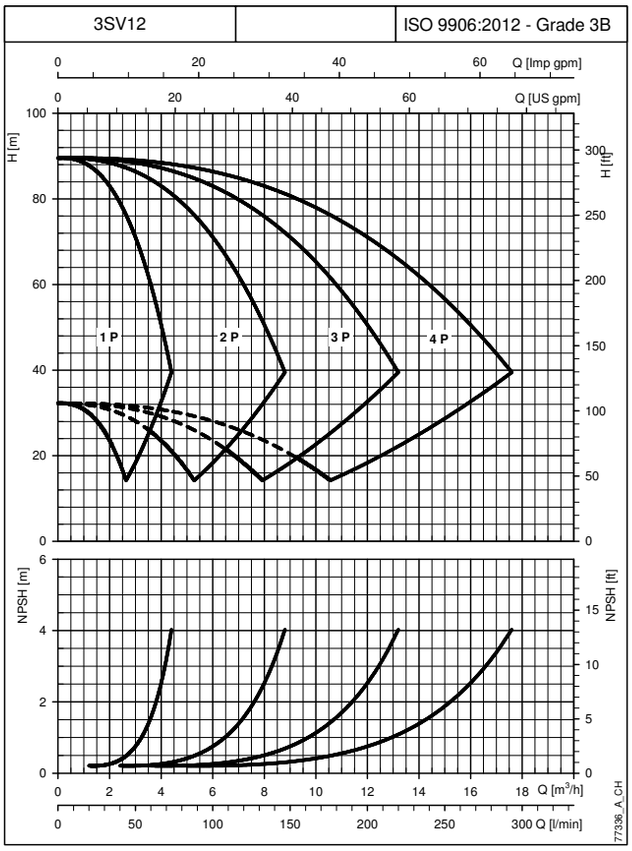
3SV06 | ISO 9906:2012 - Grade 3B



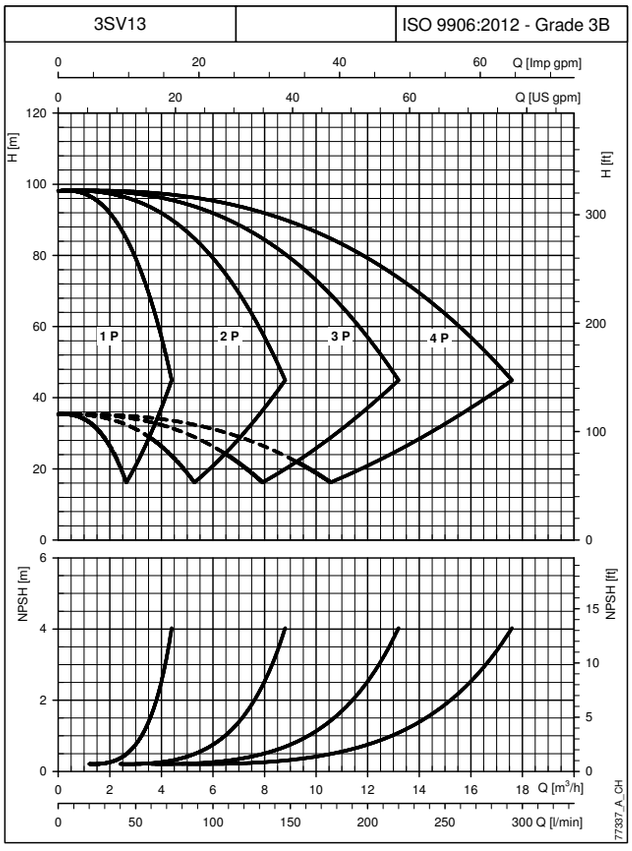
3SV08 | ISO 9906:2012 - Grade 3B



3SV12 | ISO 9906:2012 - Grade 3B



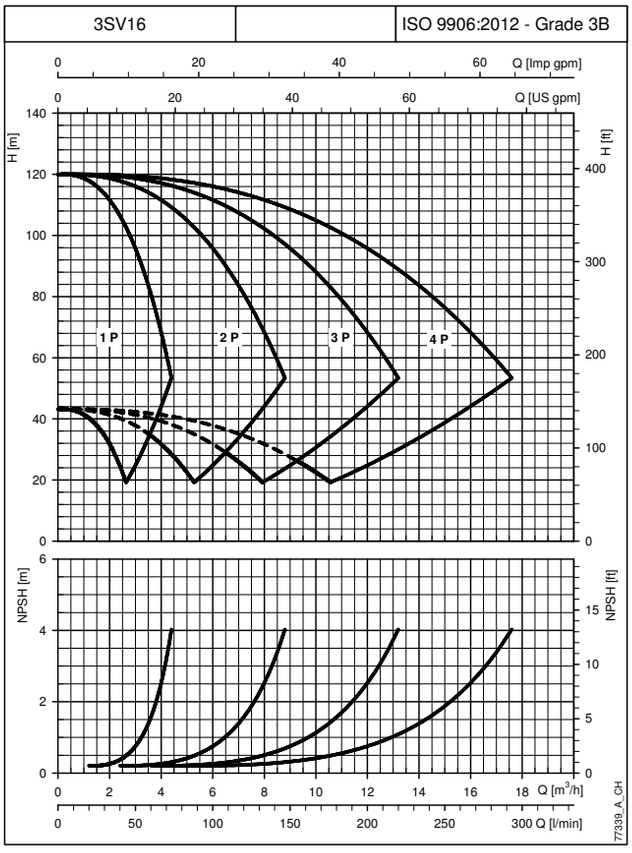
3SV13 | ISO 9906:2012 - Grade 3B

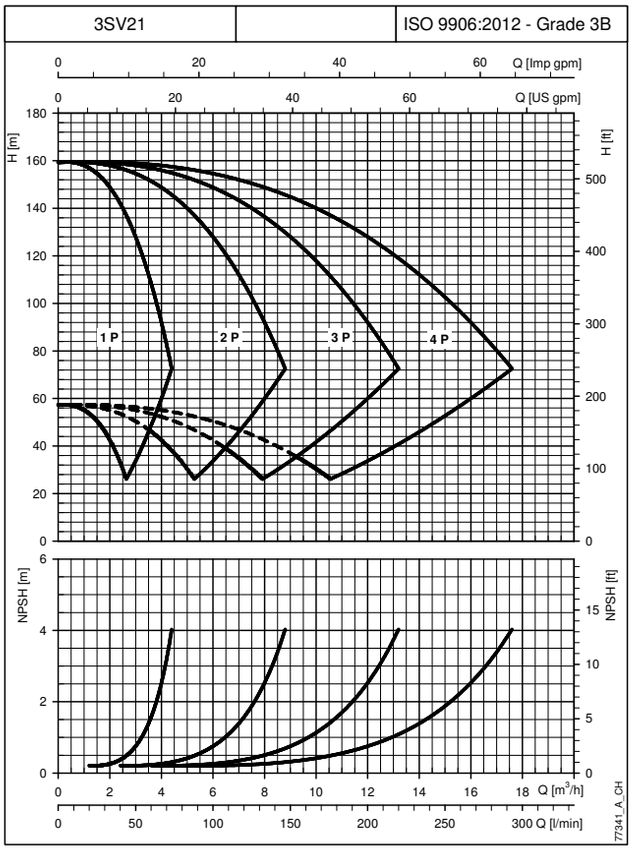


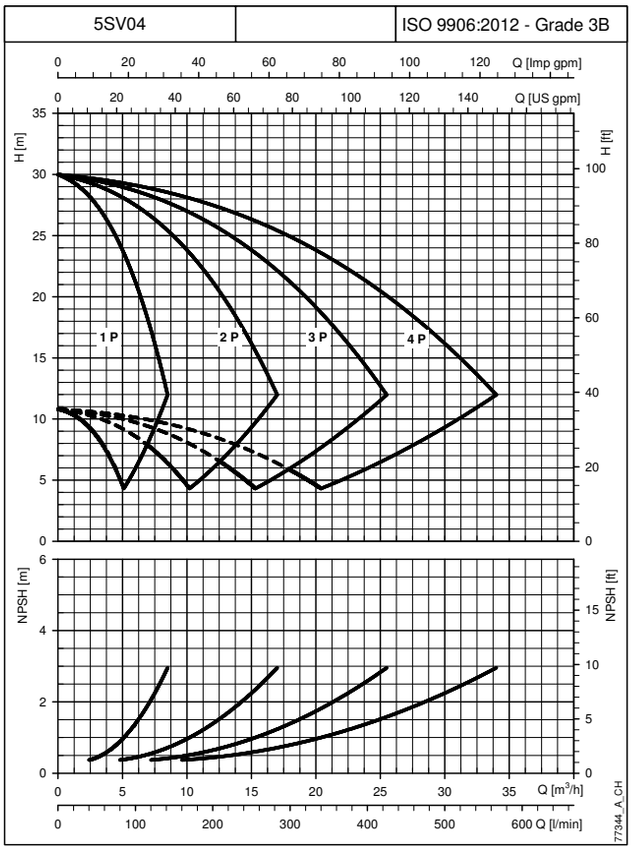
The performance curves do not take into account flow resistance in the valves and piping. The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0$ Kg/dm³ and kinematic viscosity $\nu = 1$ mm²/sec.
The declared NPSH values are laboratory values; for practical use we recommend increasing these values by 0,5 m.

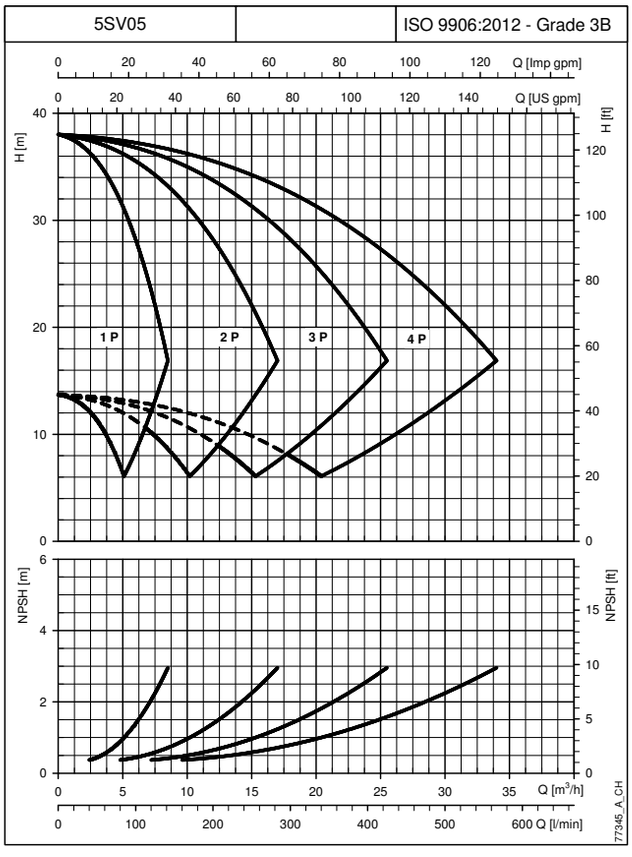
LOWARA
a xylem brand

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





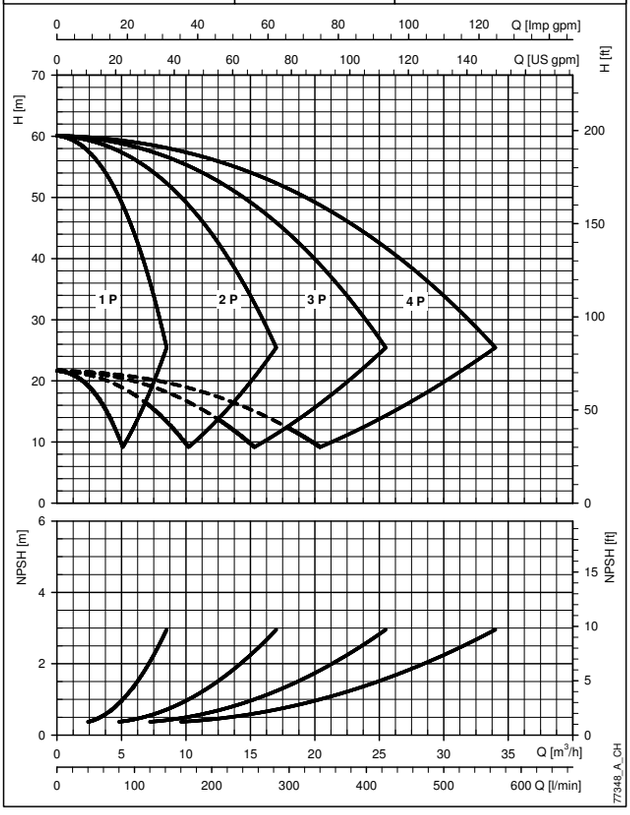




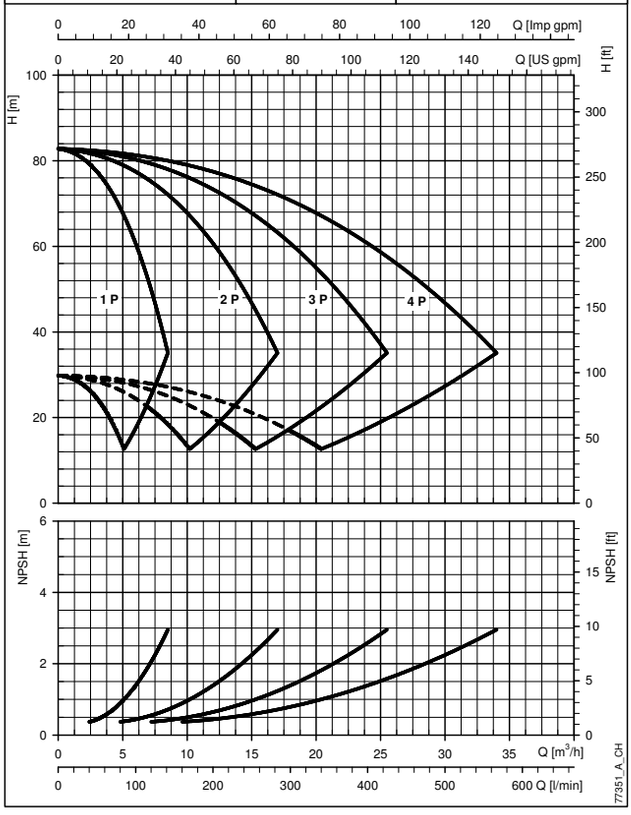
The performance curves do not take into account flow resistance in the valves and piping. The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0$ Kg/dm³ and kinematic viscosity $\nu = 1$ mm²/sec.
The declared NPSH values are laboratory values; for practical use we recommend increasing these values by 0,5 m.

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

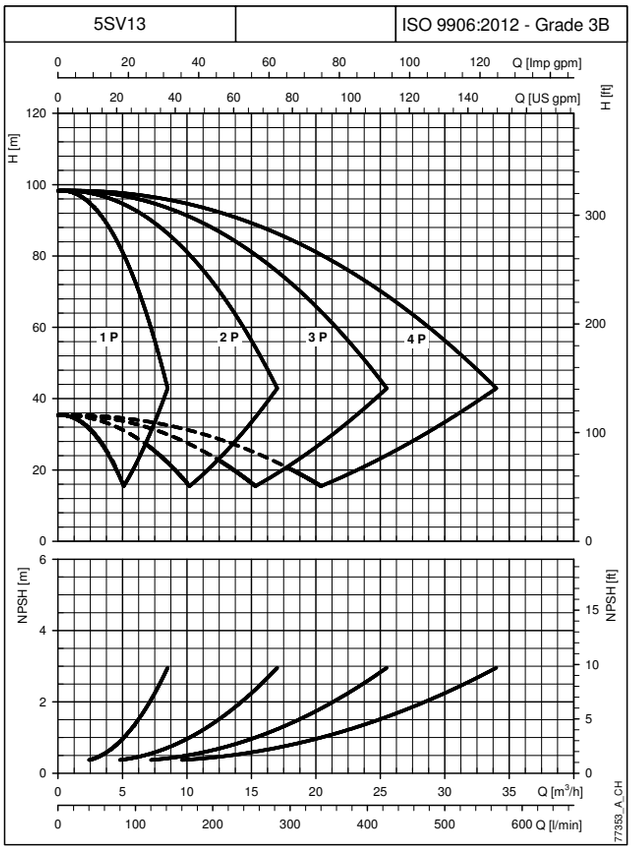
5SV08 | ISO 9906:2012 - Grade 3B



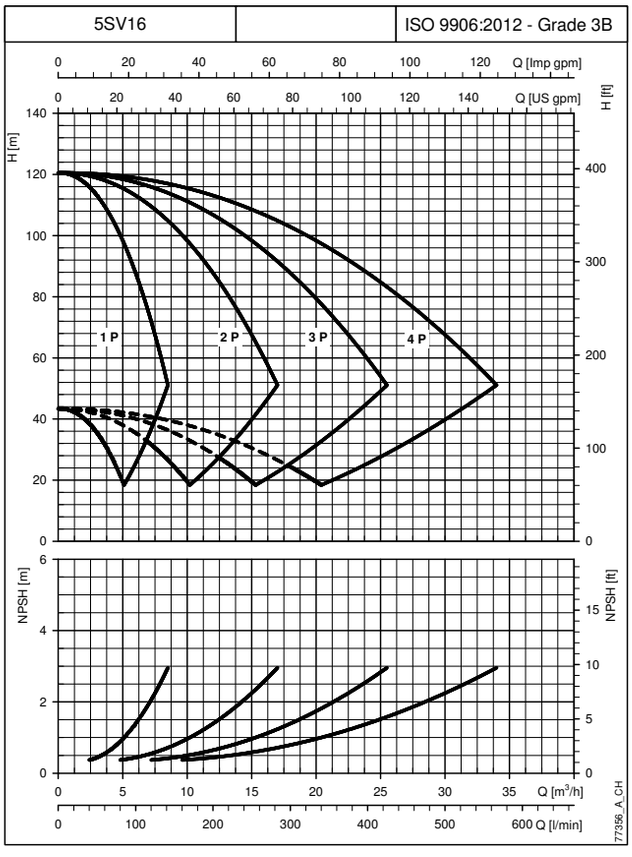
5SV11 | ISO 9906:2012 - Grade 3B



5SV13 | ISO 9906:2012 - Grade 3B



5SV16 | ISO 9906:2012 - Grade 3B

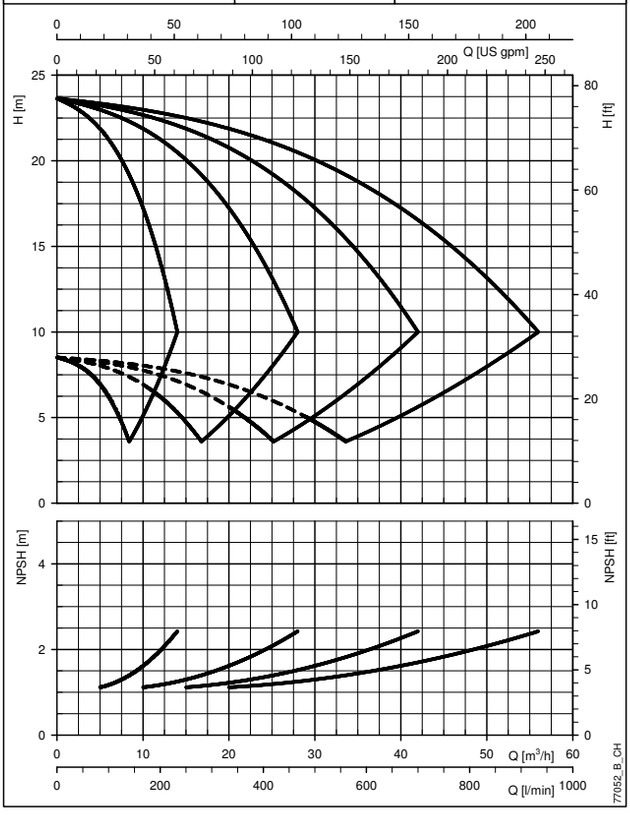


The performance curves do not take into account flow resistance in the valves and piping. The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0$ Kg/dm³ and kinematic viscosity $\nu = 1$ mm²/sec.
The declared NPSH values are laboratory values; for practical use we recommend increasing these values by 0,5 m.

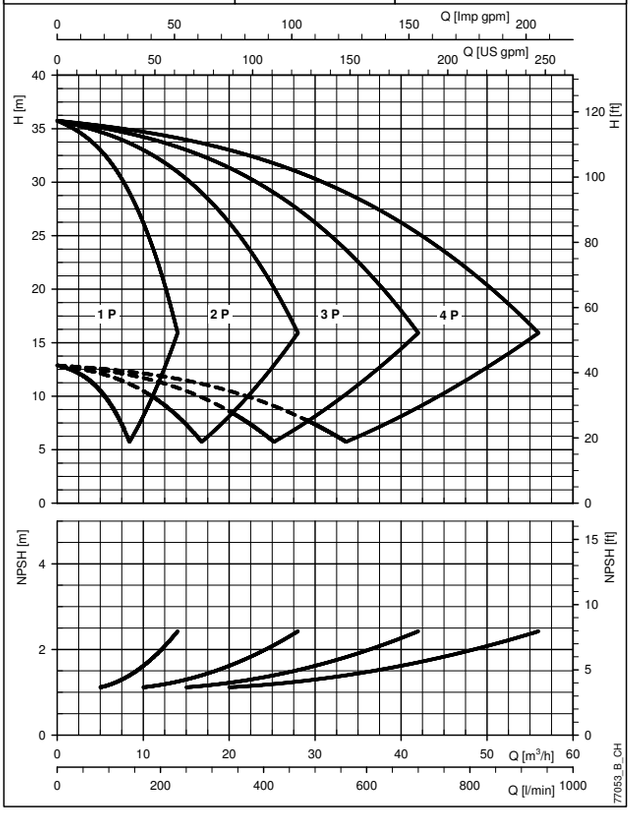
LOWARA
a xylem brand

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

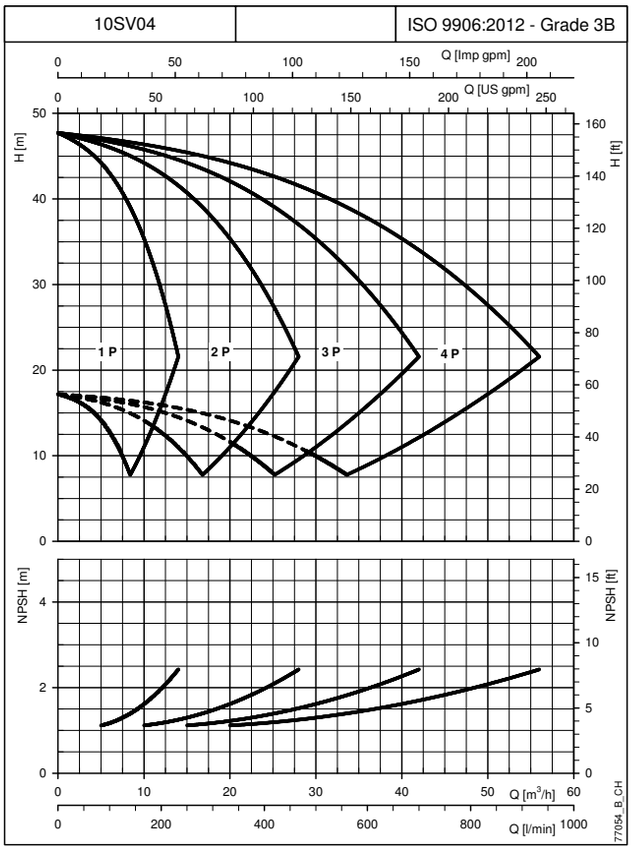
10SV02 | ISO 9906:2012 - Grade 3B



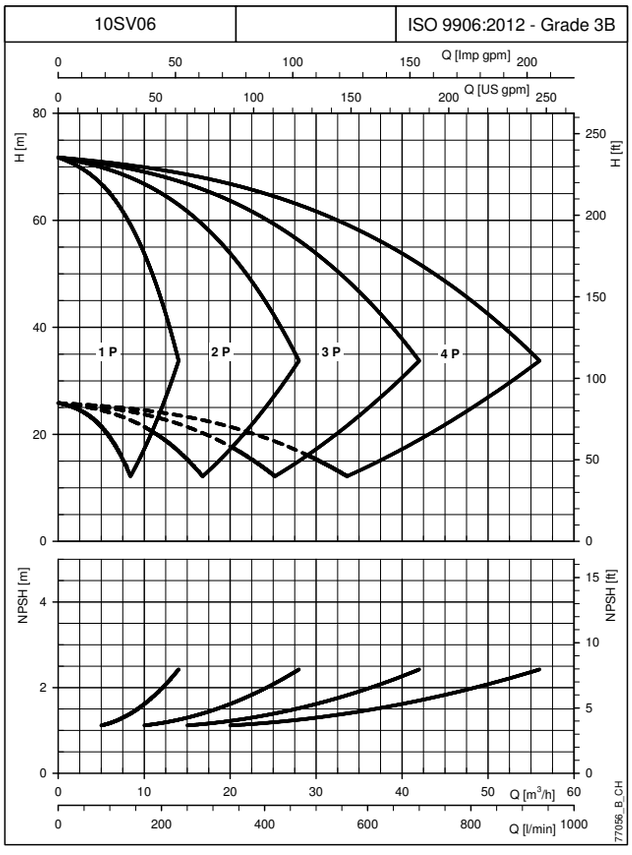
10SV03 | ISO 9906:2012 - Grade 3B



10SV04 | ISO 9906:2012 - Grade 3B



10SV06 | ISO 9906:2012 - Grade 3B

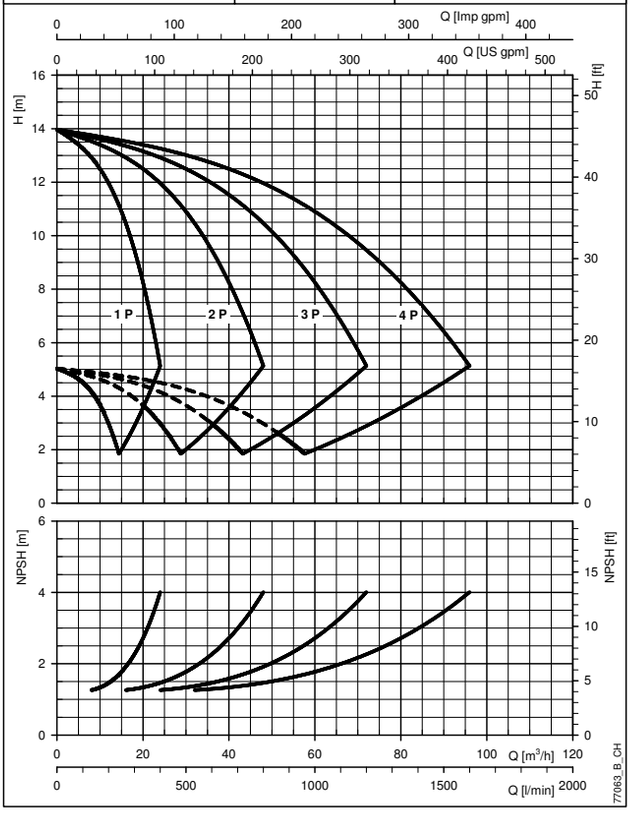


The performance curves do not take into account flow resistance in the valves and piping. The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0$ Kg/dm³ and kinematic viscosity $\nu = 1$ mm²/sec.
The declared NPSH values are laboratory values; for practical use we recommend increasing these values by 0,5 m.

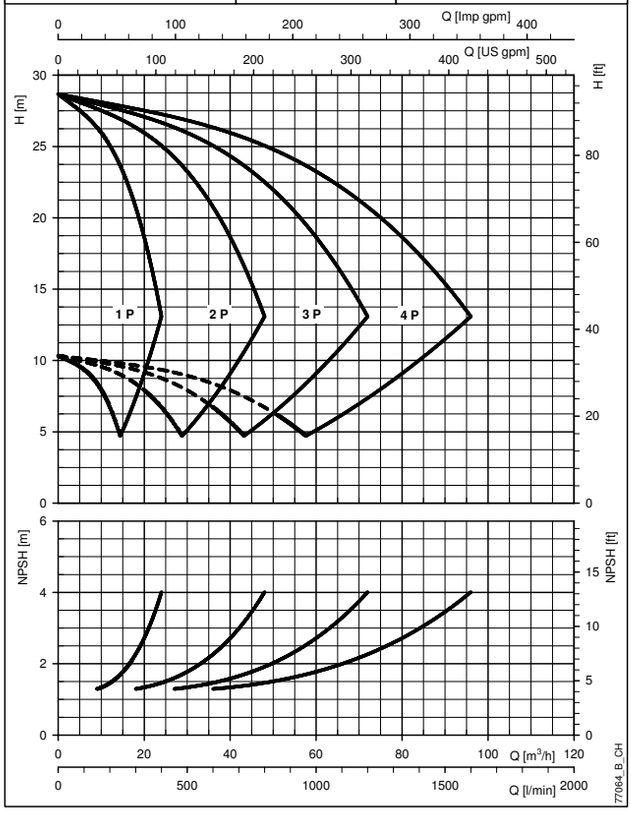
LOWARA
a xylem brand

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

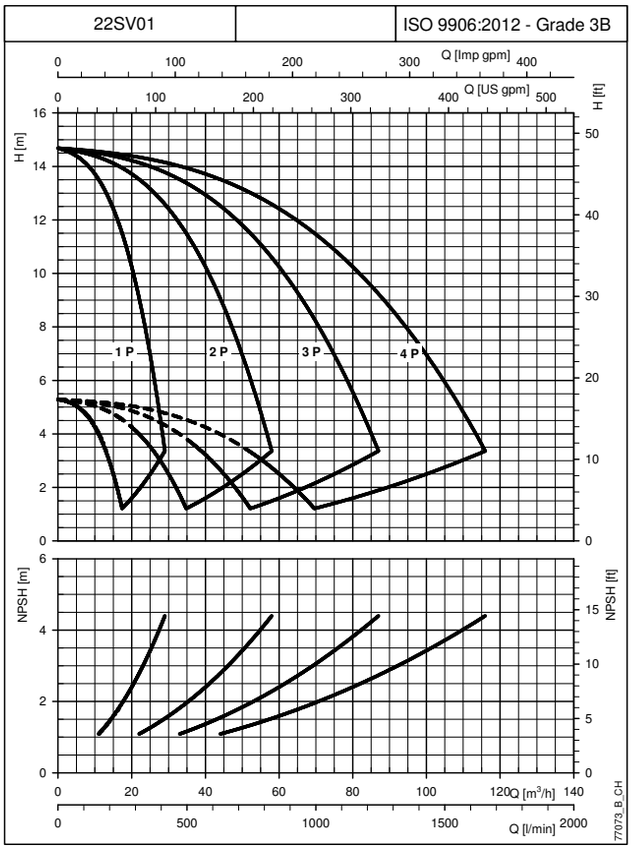
15SV01 | ISO 9906:2012 - Grade 3B



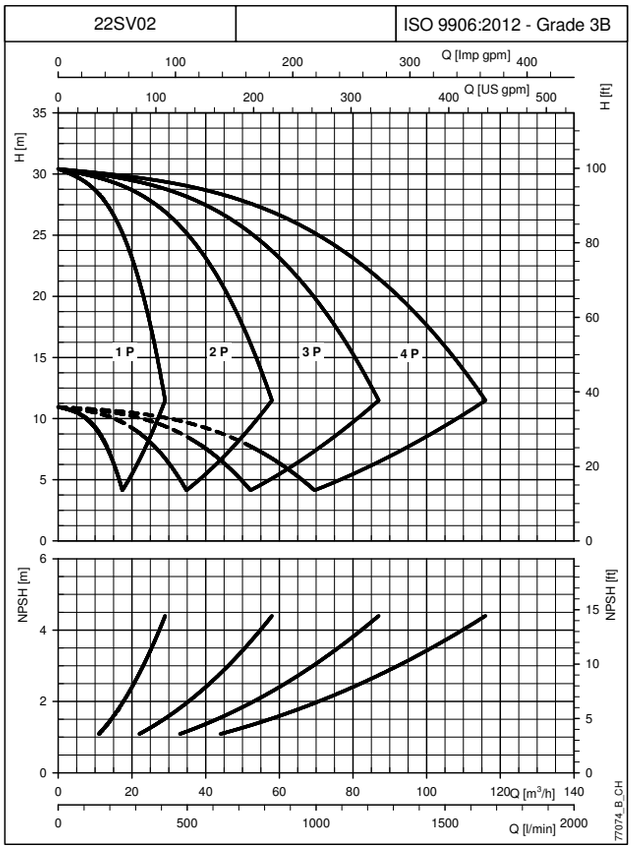
15SV02 | ISO 9906:2012 - Grade 3B



22SV01 | ISO 9906:2012 - Grade 3B

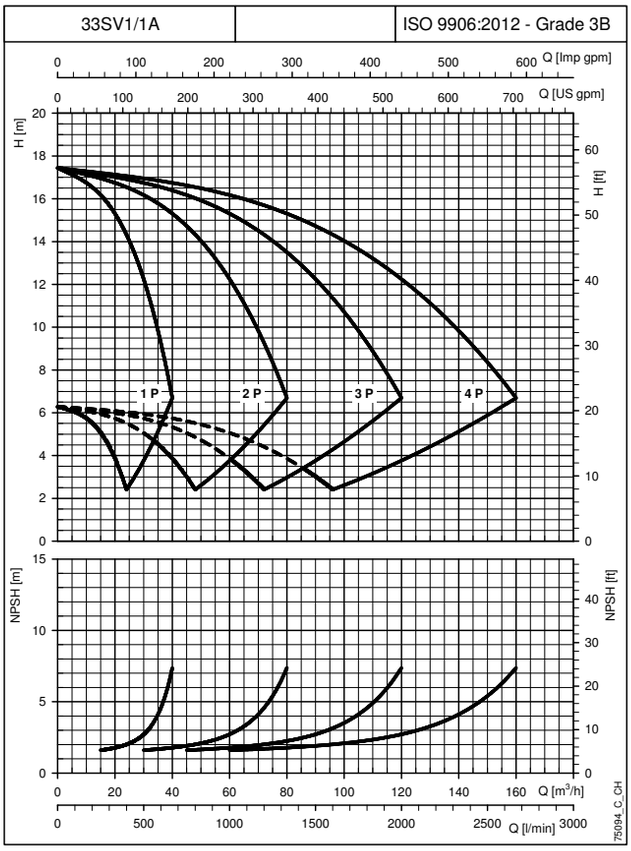


22SV02 | ISO 9906:2012 - Grade 3B



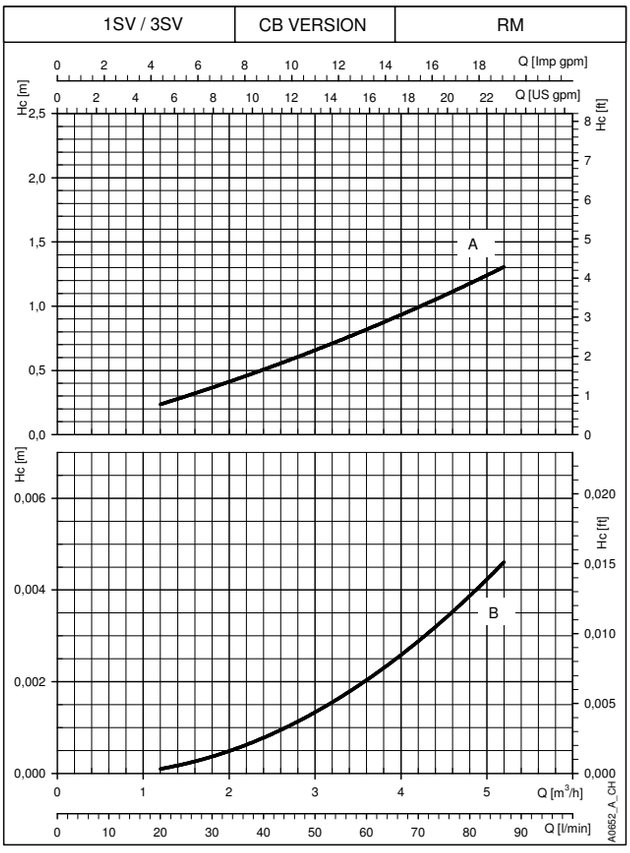
The performance curves do not take into account flow resistance in the valves and piping. The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0$ Kg/dm^3 and kinematic viscosity $\nu = 1$ mm^2/sec.
The declared NPSH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

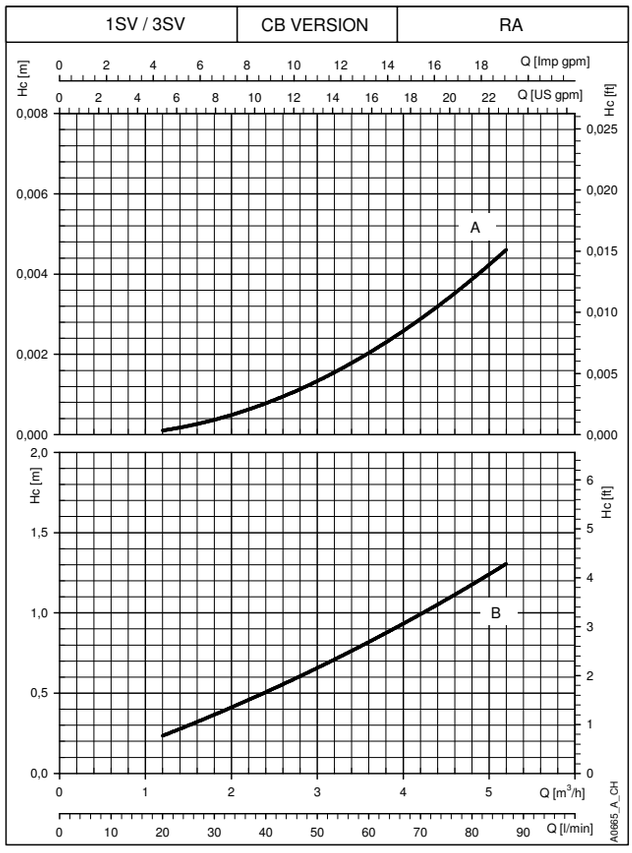
GHV.../SV BOOSTER SETS SERIES
OPERATING CHARACTERISTICS AT 30..50 Hz

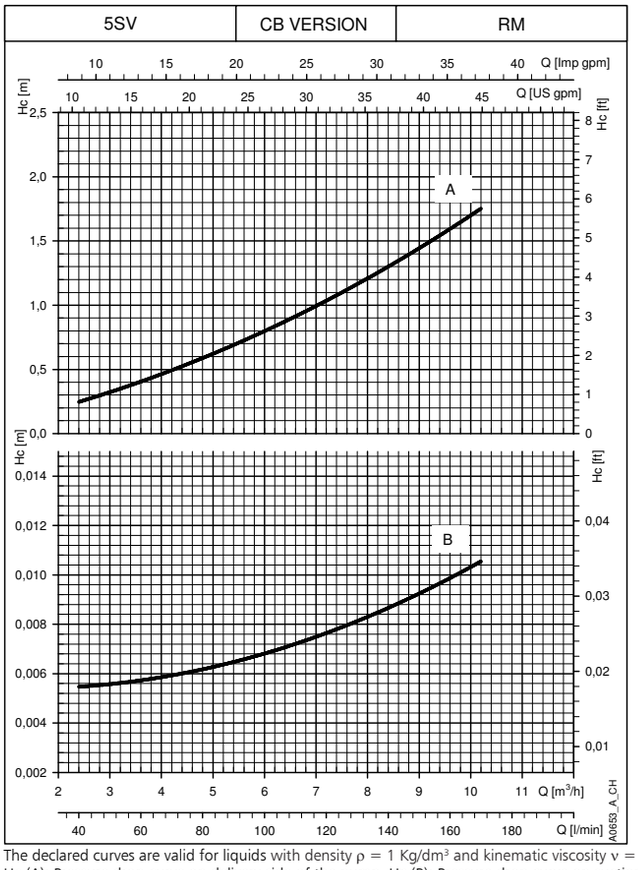


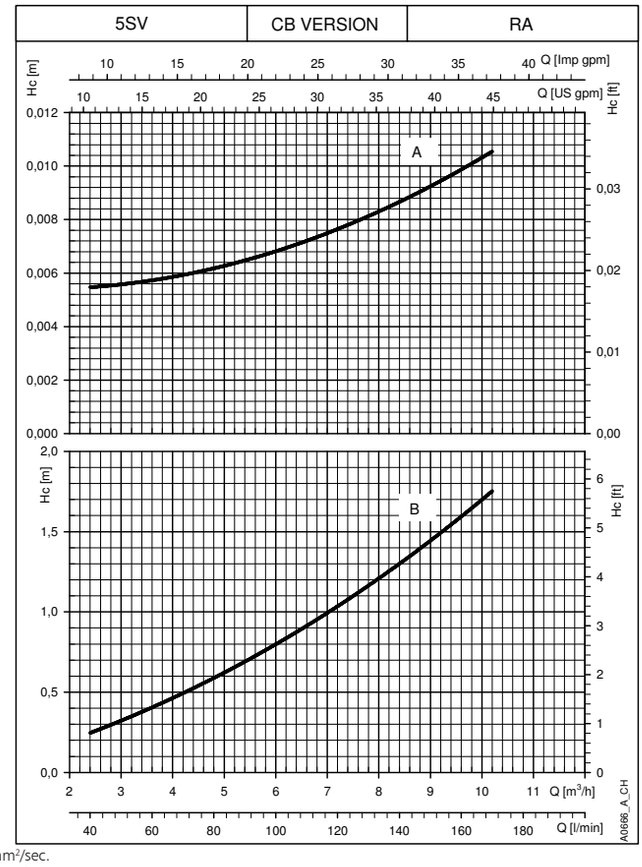
The performance curves do not take into account flow resistance in the valves and piping. The curves show the performance with one, two, three and four pumps running.
These performances are valid for liquids with density $\rho = 1.0$ Kg/dm^3 and kinematic viscosity $\nu = 1$ mm^2/sec.
The declared NPSH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

GHV../SV BOOSTER SETS SERIES
Hc PRESSURE DROP CURVES



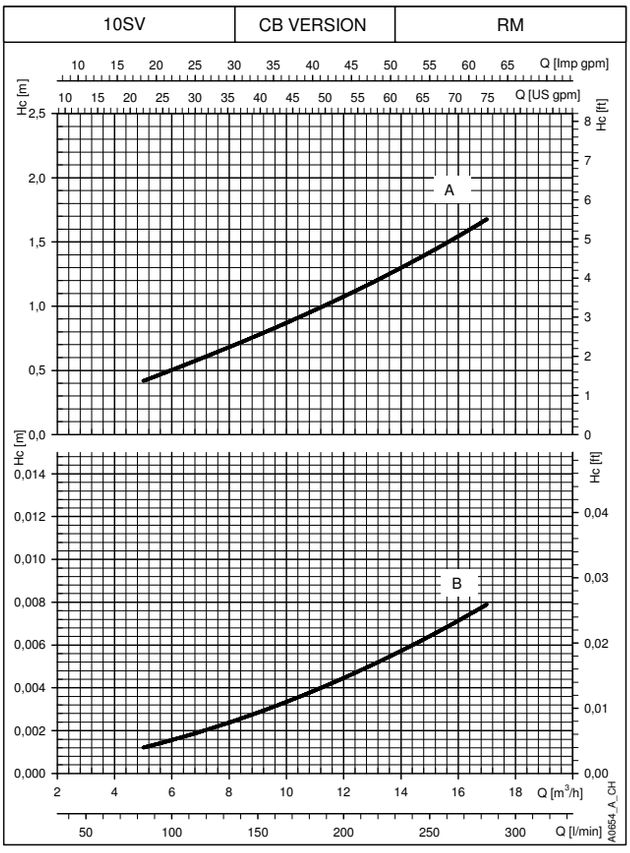


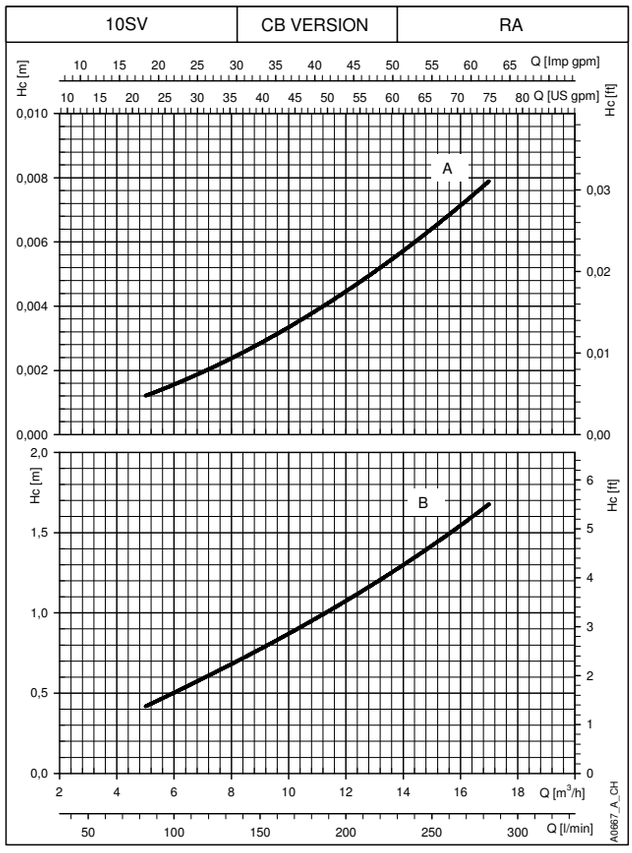


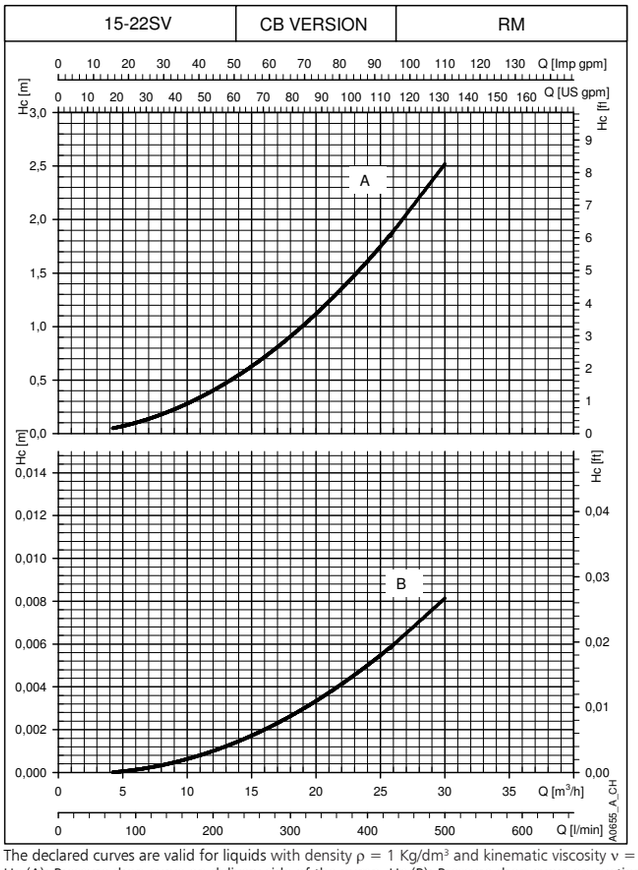


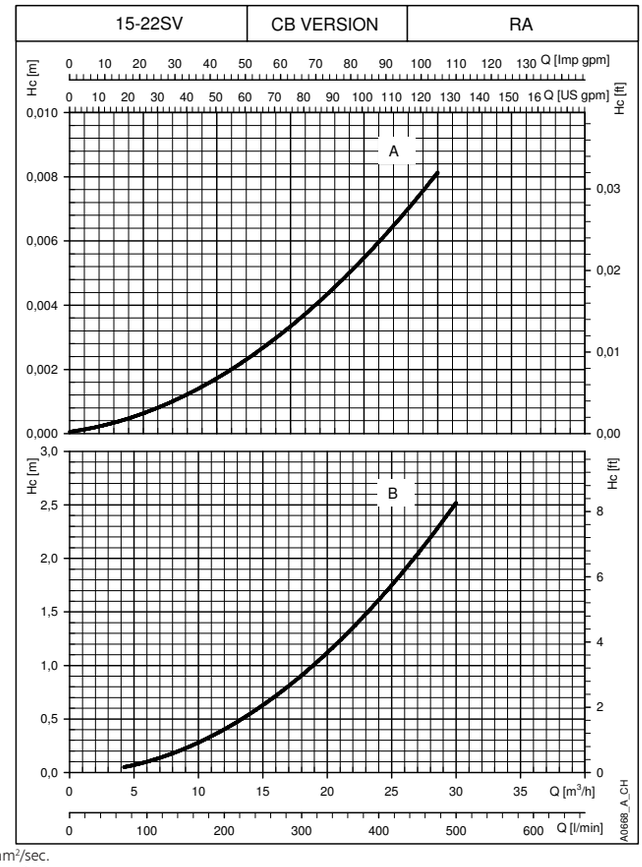
The declared curves are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.
Hc (A): Pressure drop curve on delivery side of the pump. Hc (B): Pressure drop curve on suction side of the pump.
RA: check valve on suction side. RM: check valve on delivery side.
The pressure drops do not consider the distributed pressure drops on the manifold.

GHV../SV BOOSTER SETS SERIES
Hc PRESSURE DROP CURVES



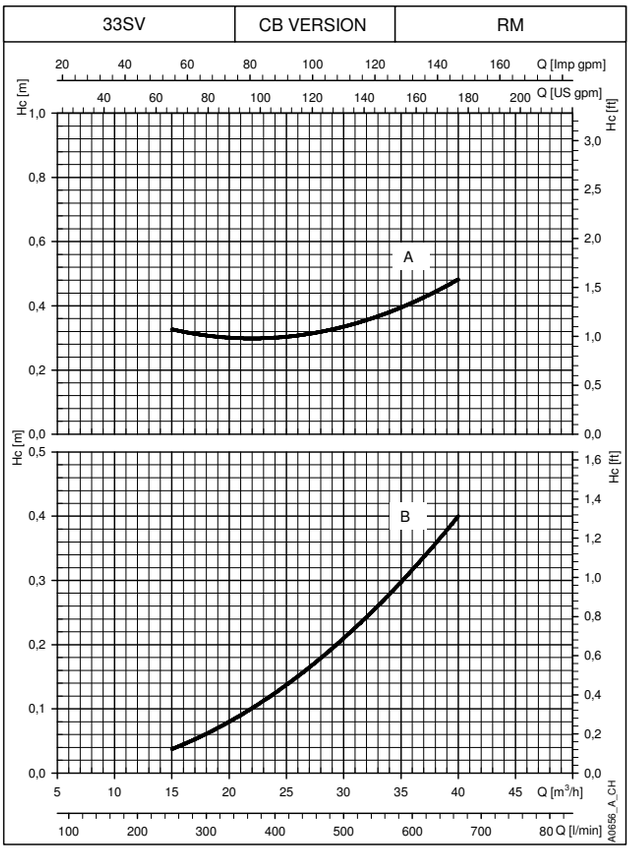


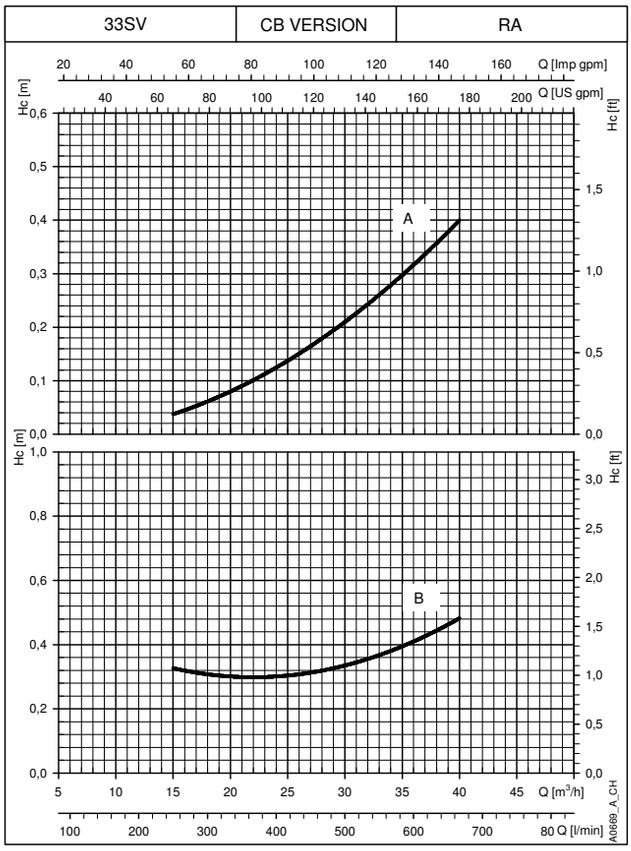


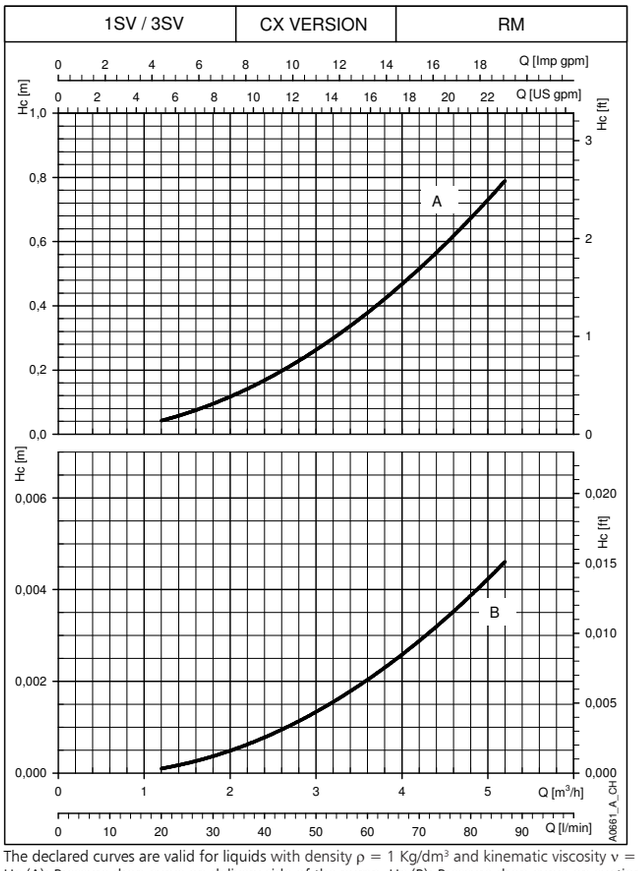


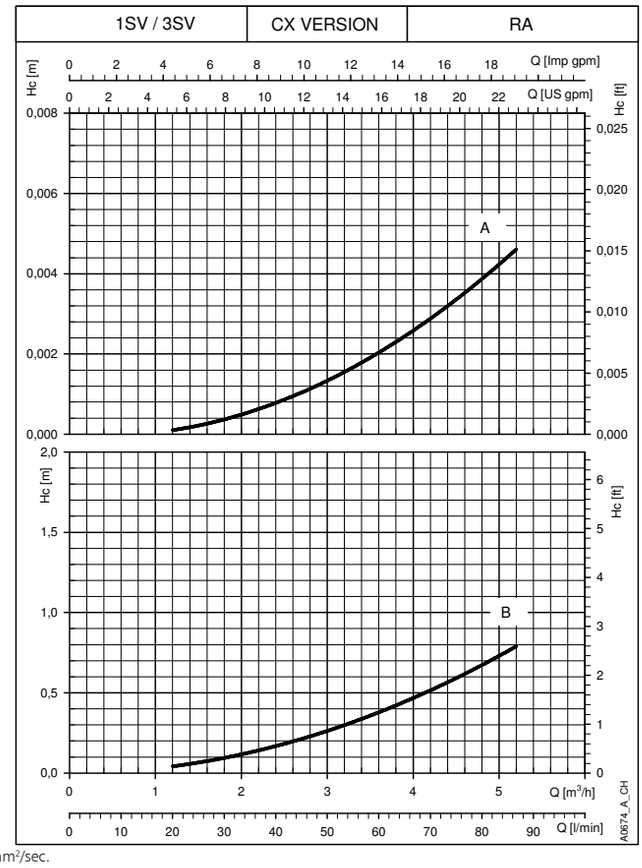
The declared curves are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.
Hc (A): Pressure drop curve on delivery side of the pump. Hc (B): Pressure drop curve on suction side of the pump.
RA: check valve on suction side. RM: check valve on delivery side.
The pressure drops do not consider the distributed pressure drops on the manifold.

GHV../SV BOOSTER SETS SERIES
Hc PRESSURE DROP CURVES



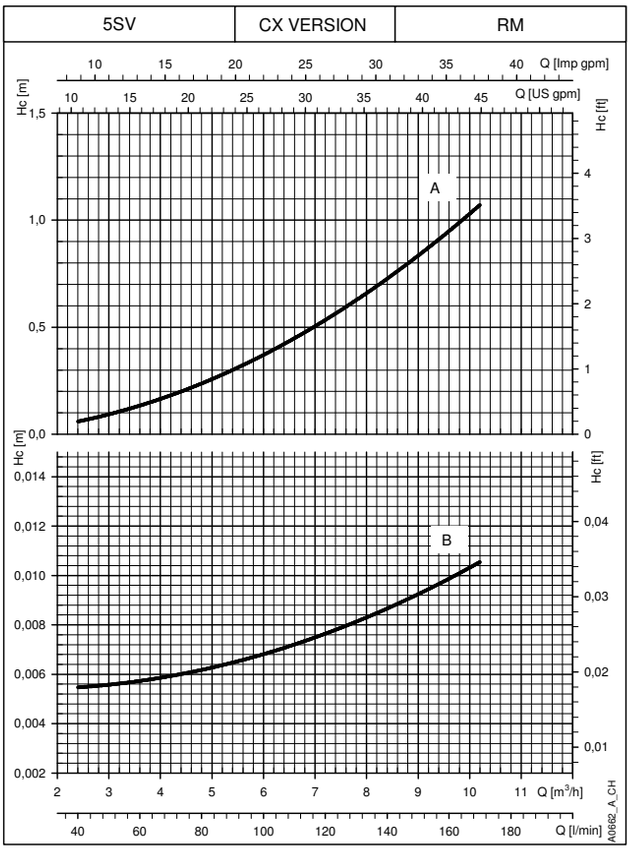


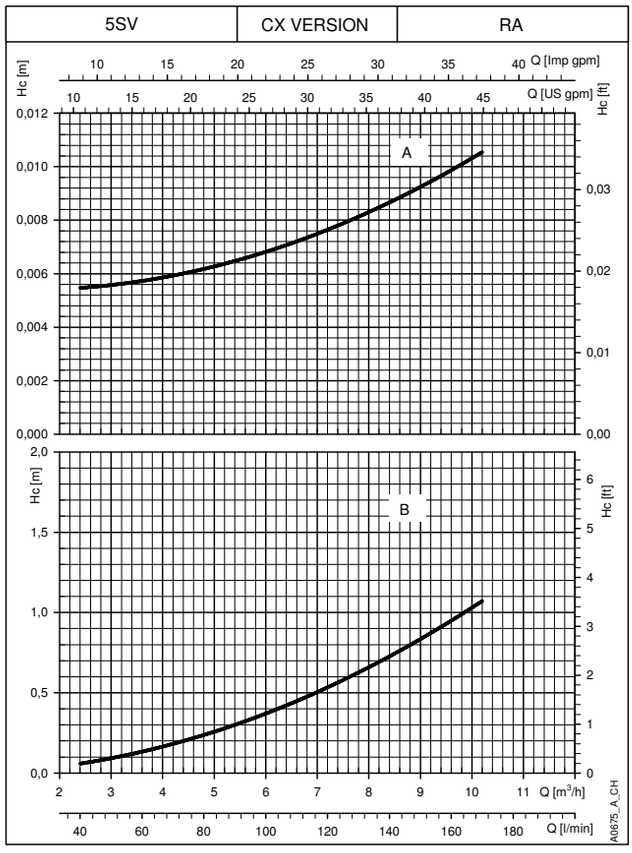


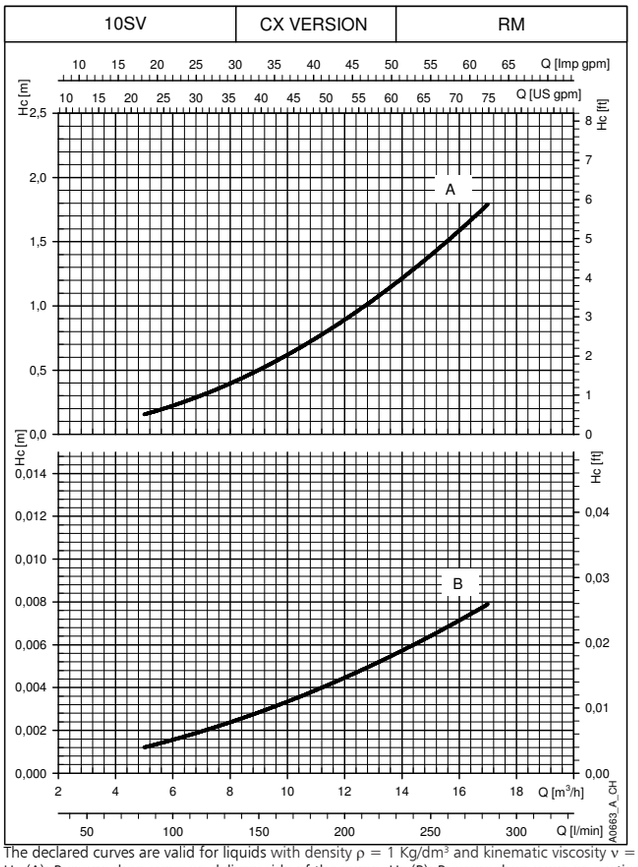


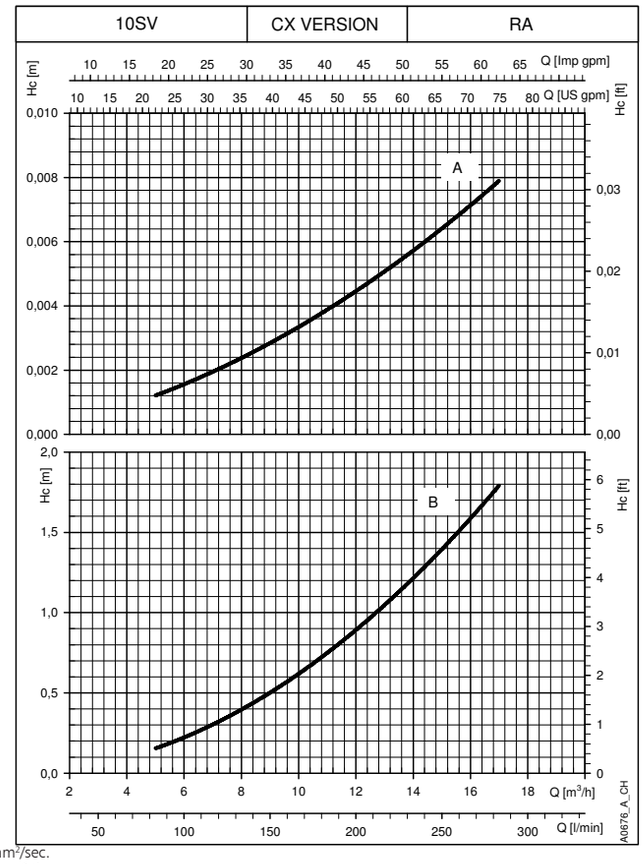
The declared curves are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.
Hc (A): Pressure drop curve on delivery side of the pump. Hc (B): Pressure drop curve on suction side of the pump.
RA: check valve on suction side. RM: check valve on delivery side.
The pressure drops do not consider the distributed pressure drops on the manifold.

GHV../SV BOOSTER SETS SERIES
Hc PRESSURE DROP CURVES





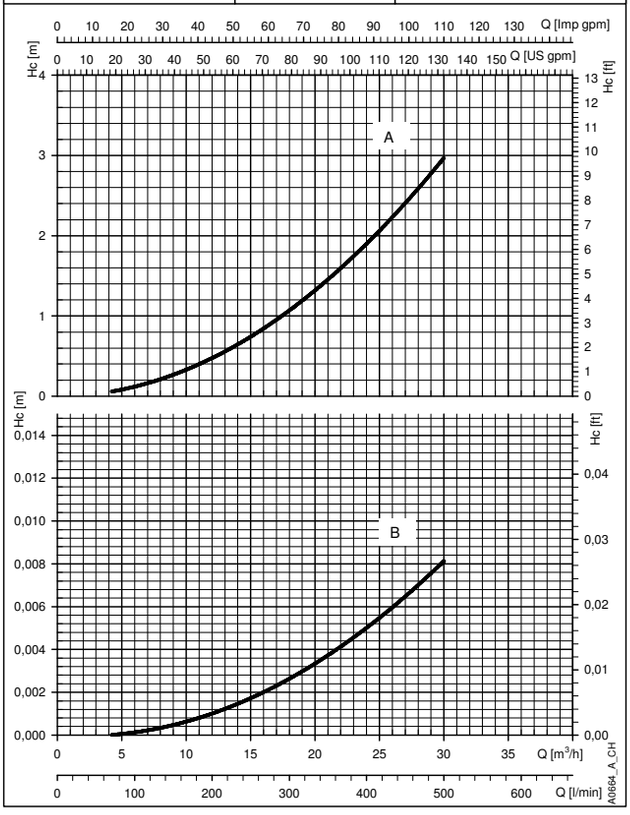




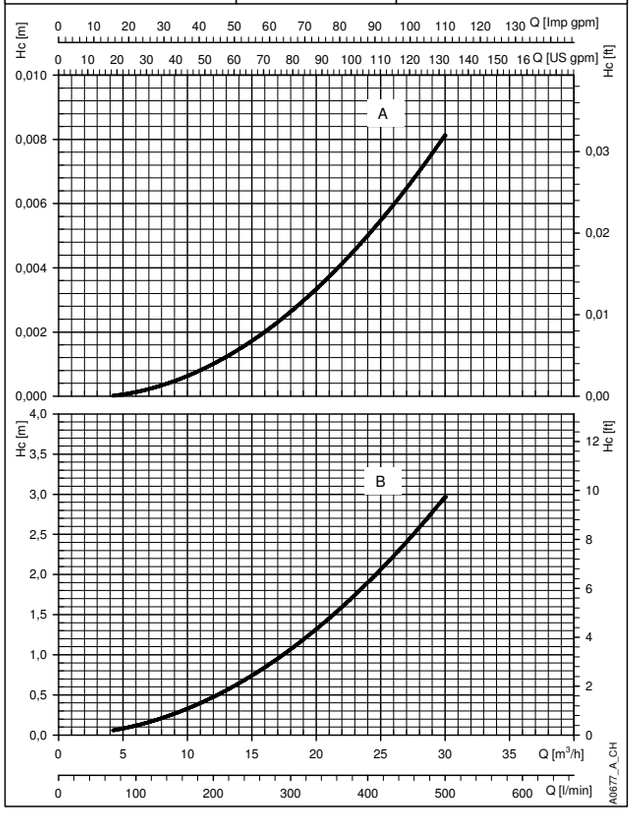
The declared curves are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.
Hc (A): Pressure drop curve on delivery side of the pump. Hc (B): Pressure drop curve on suction side of the pump.
RA: check valve on suction side. RM: check valve on delivery side.
The pressure drops do not consider the distributed pressure drops on the manifold.

GHV../SV BOOSTER SETS SERIES
Hc PRESSURE DROP CURVES

15-22SV	CX VERSION	RM



15-22SV	CX VERSION	RA



The declared curves are valid for liquids with density ρ = 1 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.
Hc (A): Pressure drop curve on delivery side of the pump. Hc (B): Pressure drop curve on suction side of the pump.
RA: check valve on suction side. RM: check valve on delivery side.
The pressure drops do not consider the distributed pressure drops on the manifold.

LOWARA
a xylem brand

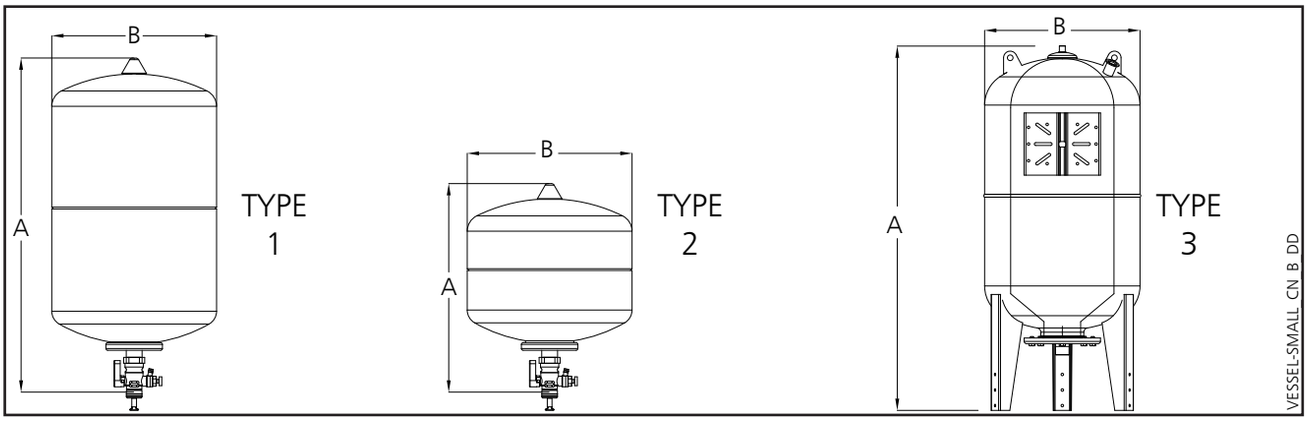
ACCESSORIES

ACCESSORIES FOR BOOSTER SETS
DIAPHRAGM TANK KITS

Any large size tanks can be connected to the unused end of the delivery manifold.
For proper sizing of the tank, please refer to the technical appendix.
Kits including the following accessories **are available on request:**
- Diaphragm tank
- Instructions sheet
- Packaging

Volume	Type	PN	DIMENSIONS (mm)			Vessel material			Device material
Liters		bar	A	ø B	Connection	Bladder	Body	Connection	Connection
25	1	10	280	567	G 3/4"	BUTYL	Painted steel	AISI 304	Brass
12	2	16	280	354	G 3/4"	BUTYL	Painted steel	AISI 304	Brass
100	3	10	910	450	G 1"	BUTYL	Painted steel	AISI 304	-
100	3	16	910	450	G 1"	BUTYL	Painted steel	AISI 304	-
200	3	10	1235	550	G 1" 1/2	BUTYL	Painted steel	AISI 304	-
200	3	16	1235	550	G 1" 1/2	BUTYL	Painted steel	AISI 304	-
300	3	10	1365	630	G 1" 1/2	BUTYL	Painted steel	AISI 304	-
300	3	26	1365	630	G 1" 1/2	BUTYL	Painted steel	AISI 304	-

vessel-small-en_cn_b_td



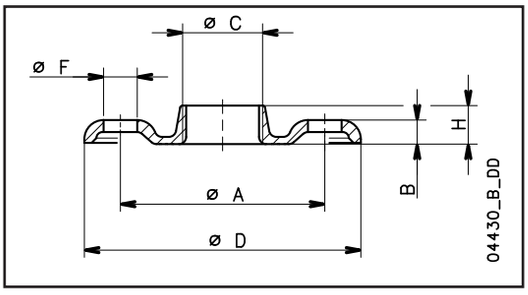
FLANGE KIT

Manifolds up to 3" are supplied with threaded attachments and caps for sealing the unused ends.
For these manifolds, stainless steel AISI 304 or 316 flanges for connection to the system are available on request.

THREADED COUNTERFLANGES

KIT			DIMENSIONS (mm)				HOLES		
TYPE	DN	ø C	ø A	B	ø D	H	ø F	N°	PN
2"	50	Rp 2	125	16	165	24	18	4	25
2" ½	65	Rp 2 ½	145	16	185	23	18	4	16
3"	80	Rp 3	160	17	200	27	18	8	16

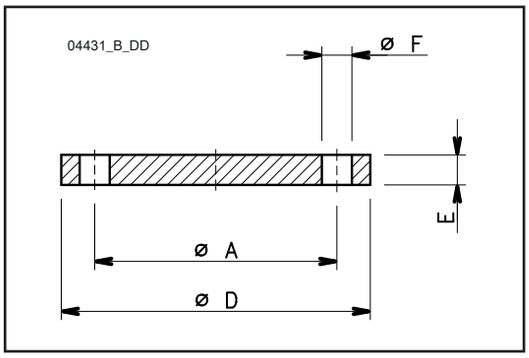
Gcom-ctf-tonde-f-en_a_td



WELD-ON COUNTERFLANGES

KIT			DIMENSIONS (mm)			HOLES		
TYPE	DN	ø C	ø A	B	ø D	ø F	N°	PN
2"	50	61,5	125	20	165	18	4	16
2"1/2	65	77,5	145	20	185	18	4	16
3"	80	90,5	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

Gcom-ctf-tonde-s-en_d_td

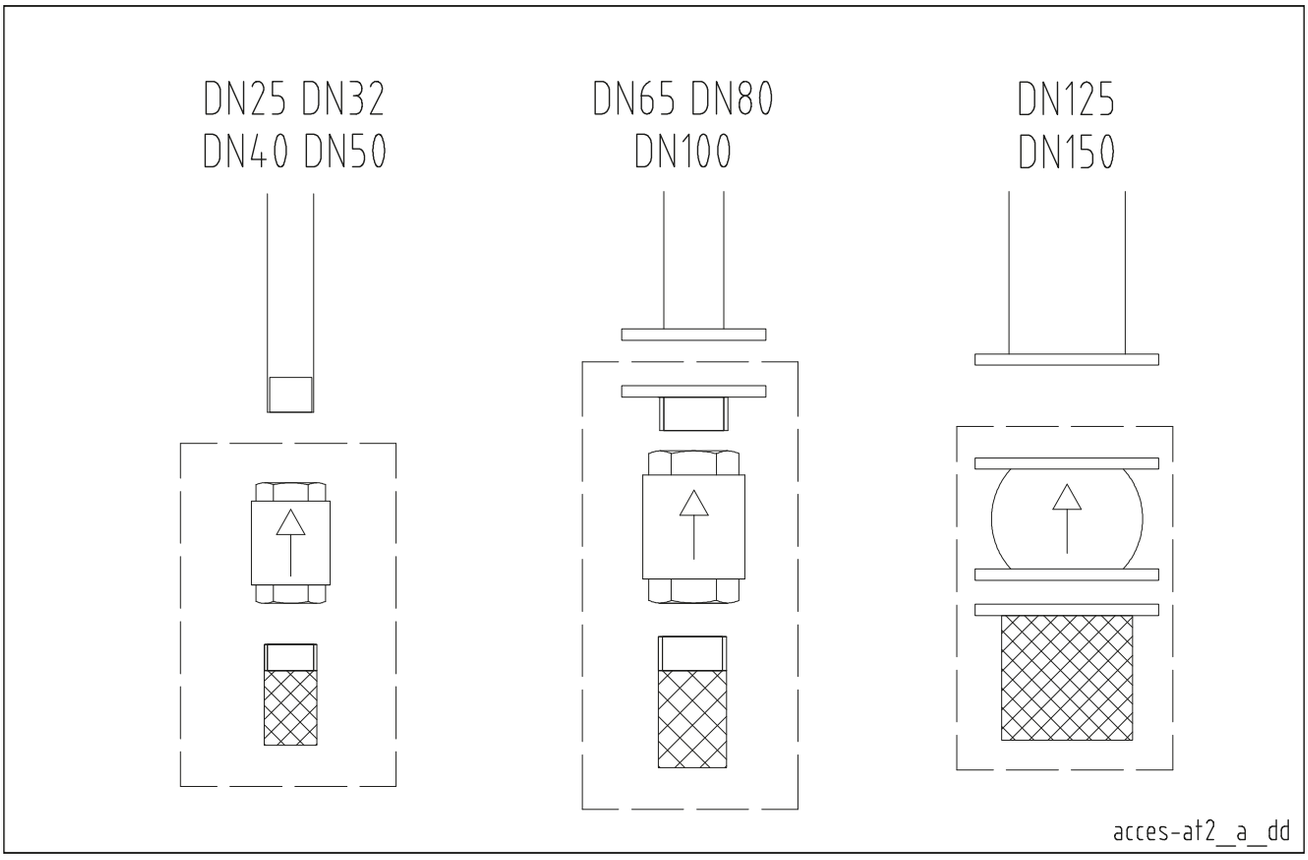


ACCESSORIES FOR BOOSTER SETS

SUCTION SIDE KIT

The GHV..SA booster sets are supplied without components on the suction side of the pumps and can be completed with piping, strainers and foot valves.

The following table summarizes the pump type and the components of the kit, such as strainer and foot valve.
The pipe connection from foot valve and pump must be provided by the customers.



PUMP NAME	FOOT VALVE & STRAINER SIZE	FOOT VALVE & STRAINER MATERIAL
1SV	DN32	Aisi 304
3SV	DN32	Aisi 304
5SV	DN40	Aisi 304
10SV	DN50	Aisi 304
15SV	DN65	Aisi 304
22SV	DN65	Aisi 304
33SV	DN80	Aisi 304
46SV	DN100	Aisi 304
66SV	DN125	Aisi 304
92SV	DN125	Aisi 304
125SV	DN150	Aisi 304

acces-strainer_at2_mat-en_a_tm

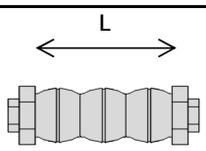
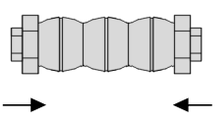
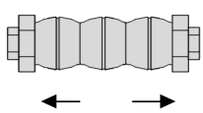
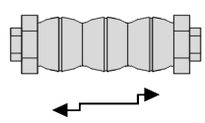
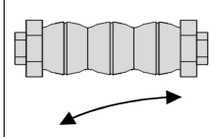
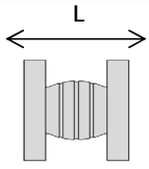
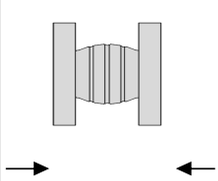
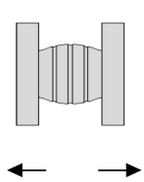
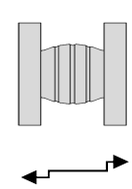
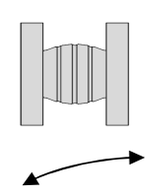
ANTI-VIBRATION JOINT KIT

Anti-vibration joints, or compensation joints, can be used to absorb deformations, expansions, pipe noise and reduce water hammering. They can also withstand a high level of vacuum, which enables the absorption of negative expansions due to depression.

Due to its elasticity, the material can deform or expand as necessary, making installation easier, simpler and quicker, even when the piping is not aligned.

The drinking water certificates are valid for the standard booster configuration. Please check with your Sales representative the drinking water certifications applicable for boosters equipped with fitted joints.
For more information, please contact the sales network.

RUBBER EXPANSION JOINT

EPDM RUBBER (*) DN	Pmax bar (**)	L  (mm)	A  (mm)	B  (mm)	C  (mm)	D  (°)
1"	10	203	22	6	22	25
1"1/4	10	203	22	6	22	25
1"1/2	10	203	22	6	22	20
2"	10	203	22	6	22	15
2"1/2	10	203	22	6	22	12
3	10	203	22	6	22	10
EPDM RUBBER (*) DN	Pmax bar (**)	L  (mm)	A  (mm)	B  (mm)	C  (mm)	D  (°)
32	16	152	13	9	13	15
40	16	152	13	9	13	15
50	16	152	13	9	13	15
65	16	152	13	9	13	15
80	16	152	13	9	13	15
100	16	152	19	13	13	15
125	16	152	19	13	13	15
150	16	152	19	13	13	15
200	16	152	19	13	19	15
250	16	203	25	16	19	15
300	10	203	25	16	19	15
350	10	203	25	16	19	15
400	9	203	25	16	19	15
450	9	203	25	16	19	15
500	9	203	25	16	19	15

* Metallic part in SS316

GD-316_JOINT_A_TD

** Maximum pressure permitted up to 80°C water

LEGEND

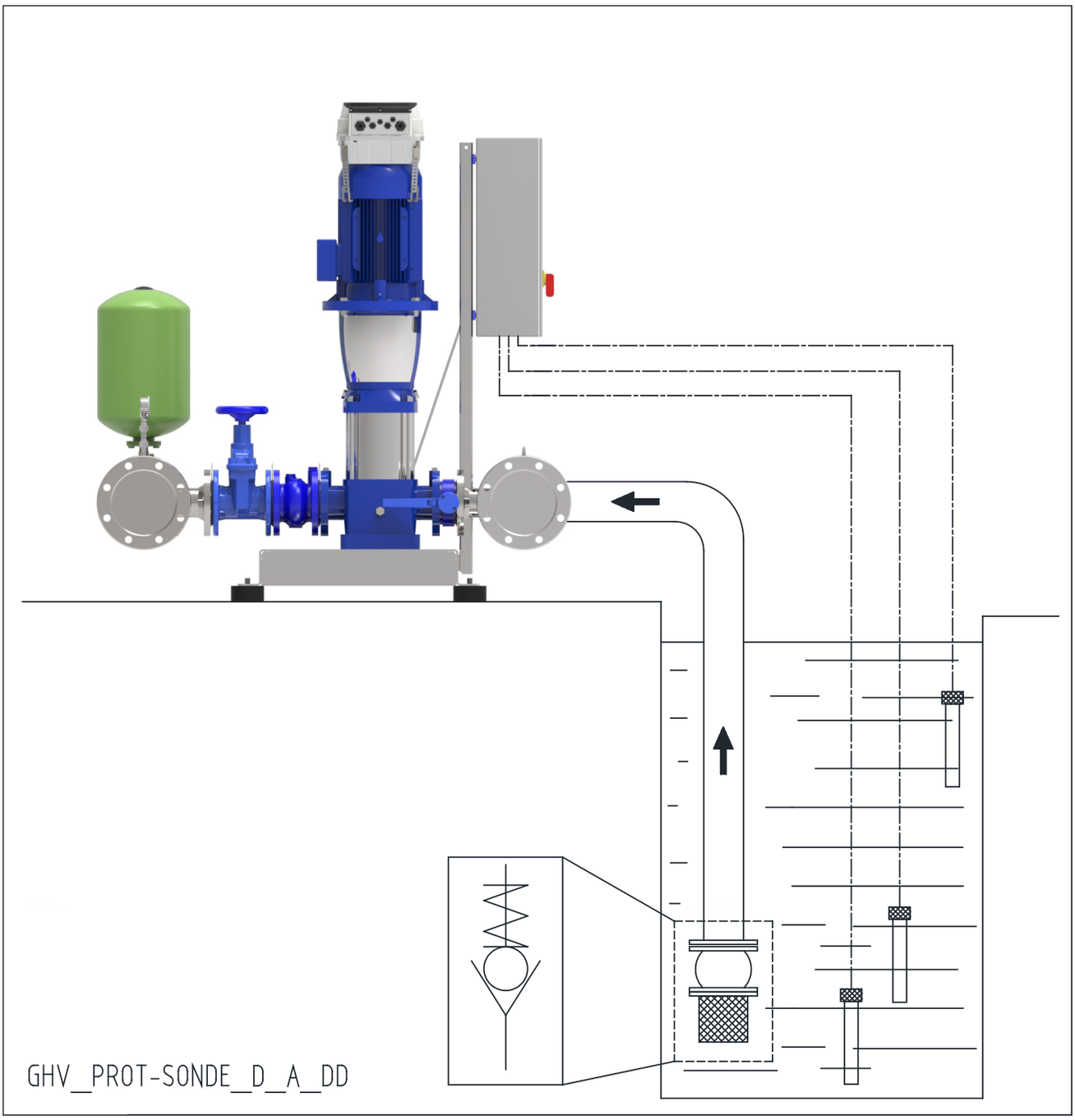
A = compression
B = extension
C = transverse
D = angular movement
NOTE. **A** - **B** - **C** - **D** can not be cumulative

PROTECTION SYSTEMS AGAINST DRY RUNNING

To avoid damaging the pumps, protection systems must be used to prevent it from dry running.

ELECTRODE PROBE PROTECTION

The system with electrode probes is used for supplies from open tanks or wells.
Three probes are directly connected to the electric module with adjustable sensitivity that can be installed in the control panel. If there is no water, the control circuit opens the electrical contact and the electric pumps stop.

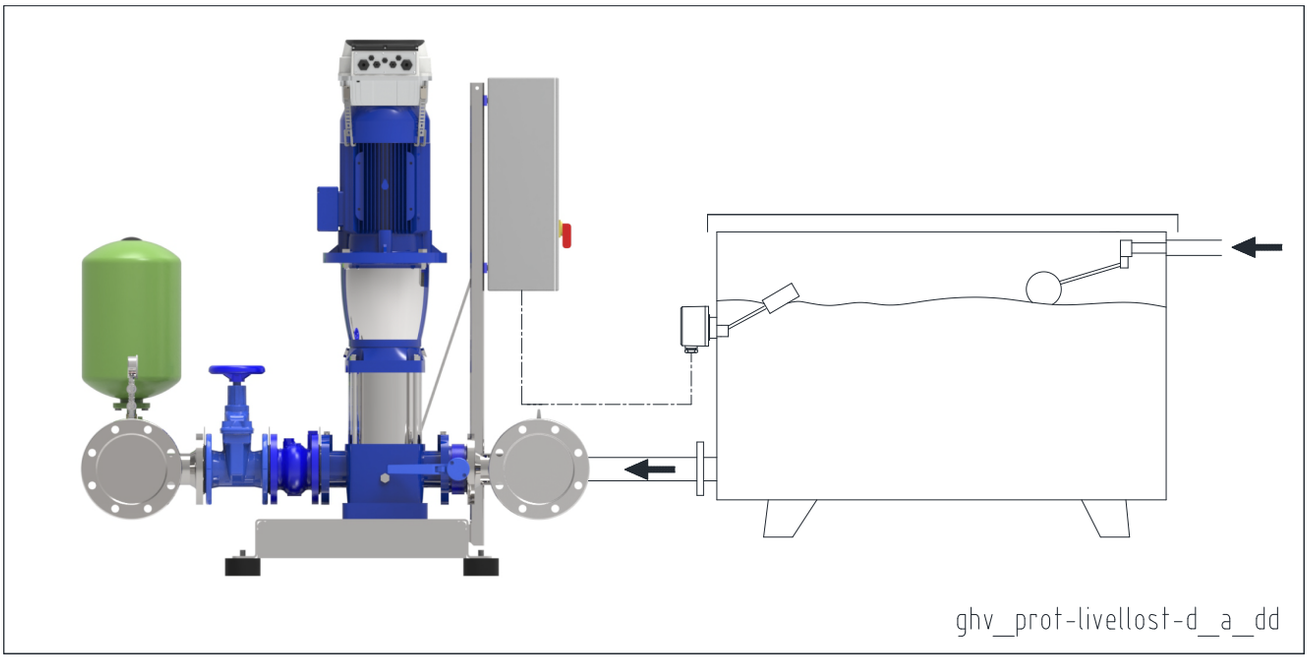


PROTECTION SYSTEMS AGAINST DRY RUNNING

To avoid damaging the pumps, protection systems must be used to prevent it from dry running.

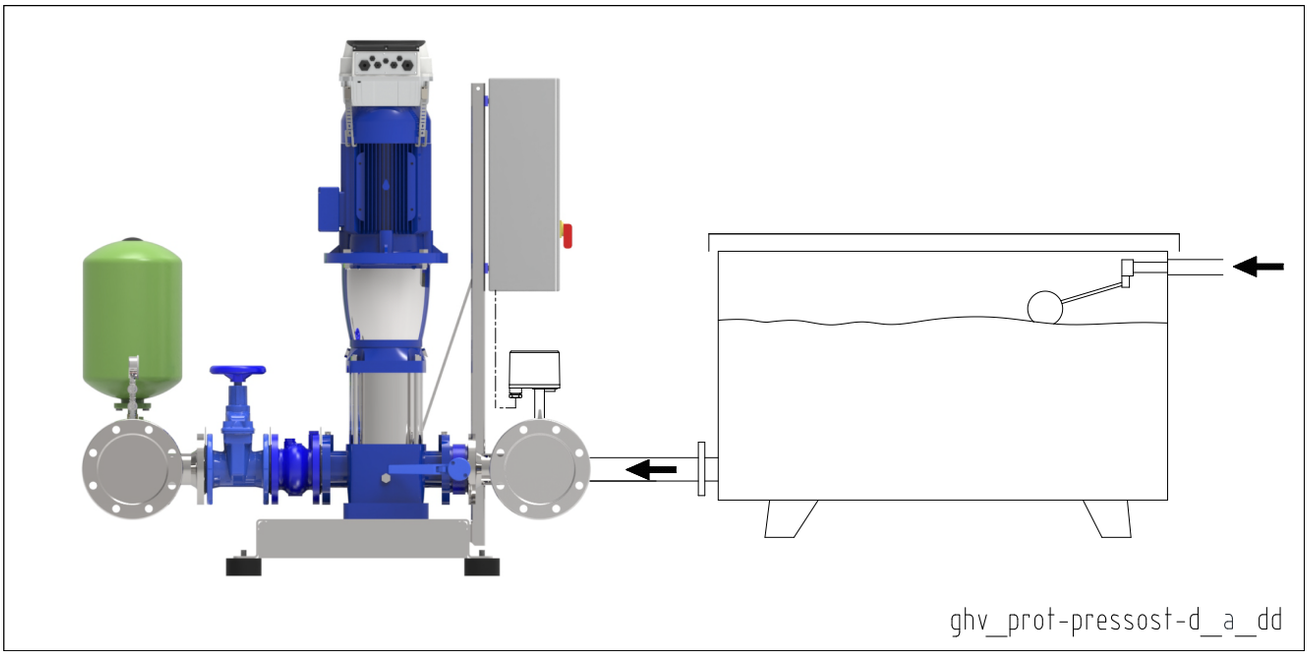
FLOAT SWITCH PROTECTION

The float switch system is used for supplies from open tanks. The float switch immersed in the tank must be connected to the control panel. If there is no water, the float switch opens the electrical contact and the pumps stop.



MINIMUM PRESSURE SWITCH PROTECTION

The system with minimum pressure switch is used for water supplies from pressurized networks or tanks. The pressure switch is connected to the control panel. In case of water shortage, it opens the electric contact, causing the stop of the pumps.



PROTECTION SENSOR AGAINST DRY RUNNING

Sensor for detecting the presence of water based on the optoelectronic principle, therefore non-invasive and with no moving parts. The sensor features an electronic contact (on/off) which stops the pump if there is no water in the seal area.
The sensor opens the electric contact if there is no water after they factory-set delay (10 seconds) elapses. The sensor is supplied as a kit complete with 2 meters of cable, an EPDM O-ring gasket and a stainless steel adapter.

General operating features

- The sensor can be fitted directly on the filling cap of the e-SV series of pumps.
- Operation is independent of the hardness and conductivity of the water. The sensor cannot detect frozen liquids.

Available in two power versions depending on foreseen use:

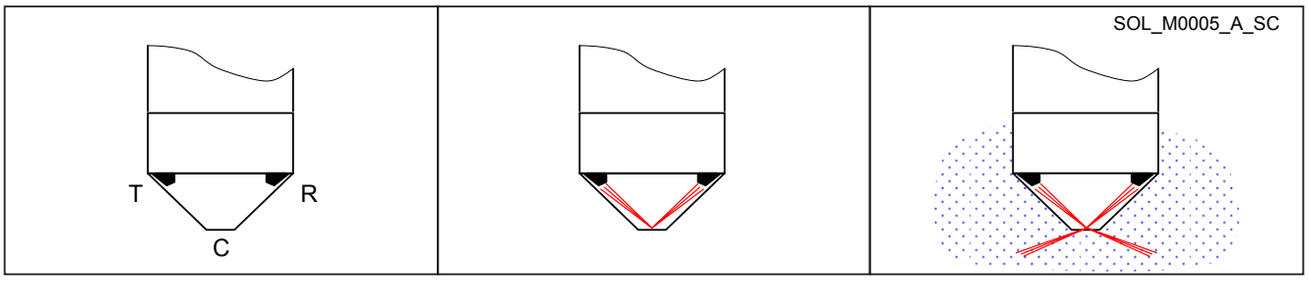
- 21÷27 Vac, universal solid state output for external relay at 24 Vac (21÷27 Vac, 50 mA).
- 15÷25 Vdc, NPN output at 25 V (10 mA) for HYDROVAR inverter.

Operating principle

Operation is based on the change in the refractive index on the surfaces. The optic sensor comprises a glass cap (C) containing a transmitter (T) and an infrared receiver (R).

If there is no liquid, all the infrared light emitted by the transmitter is internally reflected by the surface of the glass cap of the receiver.
The electronic contact will be open.

If liquid is present, the refractive index of the surface changes. Most of the infrared light emitted by the transmitter is dispersed in the liquid. The receiver receives less light and the electronic contact is closed.



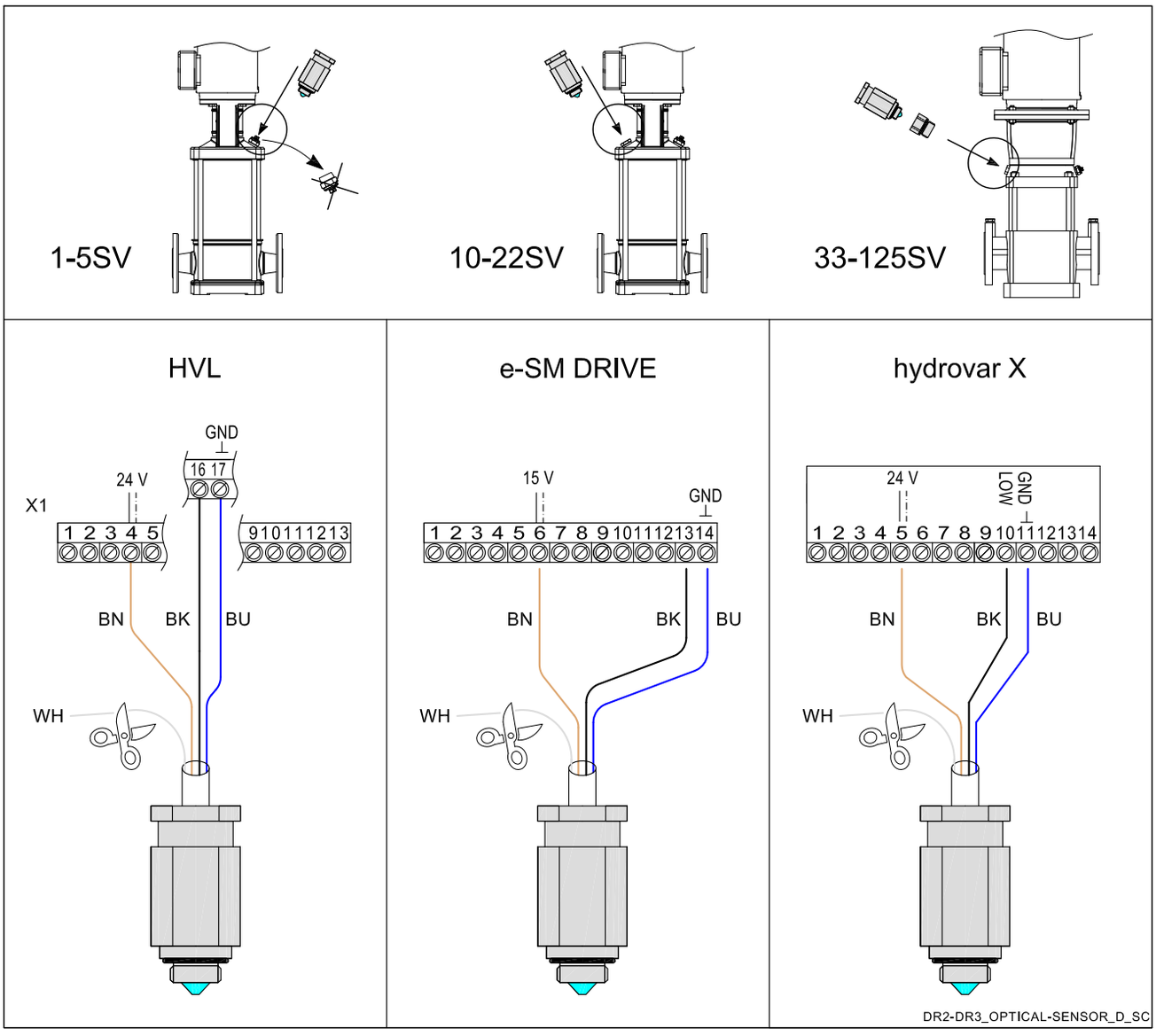
SPECIFICATIONS

- Materials:
  - Body in AISI 316L stainless steel
  - Glass optic cap
  - EPDM gasket
- Liquids: clean water, demi water. Operation is not affected by the hardness and conductivity of the liquid.
  To check the suitably of other liquids, contact the Lowara technical assistance service providing the characteristics of the liquid.
- Temperature of liquid: -20°C÷+120°C (cannot be used to detect frozen liquids).
- Ambient temperature: -5°C ÷+50°C
- Maximum pressure (PN): 25 bar
- Connector: 3/8 " (3/8" x 1/2" adapter plug included in the Kit)
- Dimensions: 27x 60 mm
- IP55 protection
- Electrical characteristics:
  - Input voltage SENSOR KIT DRP-GP: 21÷27 Vac
    SENSOR KIT DRP-HV: 15÷25 Vdc
  - Output SENSOR KIT DRP-GP: universal solid state 21÷27 Vac (50 mA) for 24 Vac external relay
    SENSOR KIT DRP-HV: NPN 25 V (10 mA) for HYDROVAR inverter
  - Alarm delay: 10 seconds (factory setting)
  - FROR cable 4 x 0,34 mm^2 (PVC-CEI 20-22) 2 meters long.

PROTECTION SENSOR AGAINST DRY RUNNING
WIRING DIAGRAM

The sensor can be directly mounted on the filling plug of the e-SV pumps.
For the 33, 46, 66, 92, 125SV series, the 3/8" x 1/2" adapter ring included in the Kit must also be mounted.

KIT SENSOR DRP-HV (code 109394600)
GHV10../DR1, GHV20../DR2, GHV30../DR3



LOWARA
a xylem brand

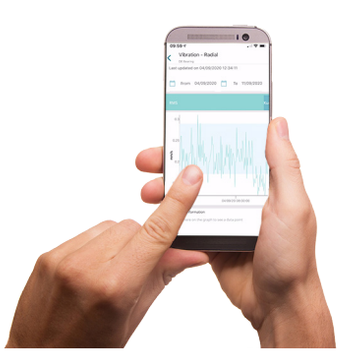
OPTIMYZE™
CONDITION MONITORING TO OPTIMIZE YOUR BOTTOM LINE

The optimyze™ modular condition monitoring solution provides health guidance and predictive maintenance advice for rotating and fixed assets such as pumps, motors, heat exchangers and steam traps. It periodically monitors system vibration and temperature and allows everyday users
to access simple-to-use monitoring tools from iOS or Android mobile devices.

Using predictive analysis, optimyze identifies potential problems with your equipment before they occur, to help you manage system reliability and maintenance. Information is monitored, collected, stored and analyzed in the optimyze sensor. This allows you to understand the current health and historical trends of your assets, create maintenance reminders and generate detailed reports. As a result, you can perform preventative maintenance before issues become critical to uptime.

BENEFITS:

- Predictive maintenance to monitor the health of mechanical and electrical assets
- Asset management including asset location, size and manufacturing date
- System transparency to optimize reliability
- Optimized reporting that helps to simplify documentation, manage system maintenance and inform purchasing
- The ability to automatically share data with multiple local users
- Conveniently monitor system conditions on our simple-to-use mobile application



INDUSTRIES:

- Commercial Building Services
- Manufacturing
- Agriculture
- Water Utilities

APPLICATIONS:

- Monitoring the vibration of pumps and motors
- Monitoring the temperature of pump bearings
- Monitoring the temperature of motors to prevent overheating and winding damage
- Monitoring the performance of heat exchangers
- And more

LOWARA
a xylem brand

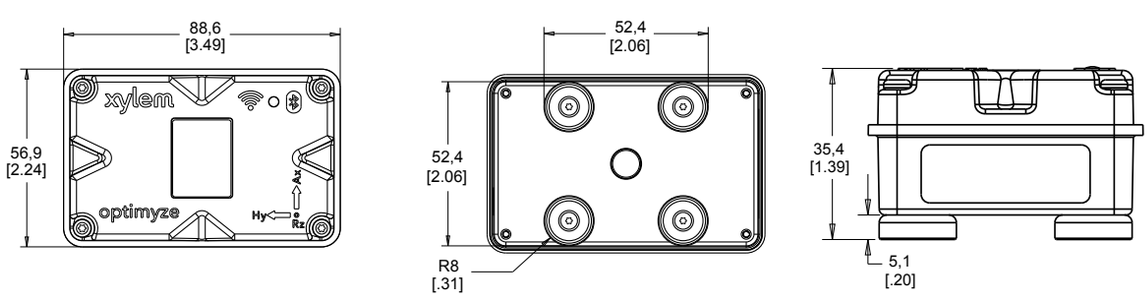
OPTIMYZE™
CONDITION MONITORING AND OPTIMIZATION SPECIFICATIONS

Surface Temperature Measurement	
Measurement range	-20°C to +135°C (-4°F to +275°F)
Measurement method	Non-contact infrared laser
Minor gradient accuracy (0°C to 25°C gradient)	+/- 1°C
Moderate gradient accuracy (25°C to 50°C gradient)	+/- 2°C
Large gradient accuracy (50°C to 100°C gradient)	+/- 4°C
Vibration Measurement	
Frequency range	5Hz to 1,100Hz
Measurement method	Independent 3-axis
Primary output (per axis)	Single value RMS
Other outputs	Kurtosis and FFT
Vibration limit (max acceleration)	16g
Threshold standard (Global)	ISO 10816-7
Threshold standard (North America)	ANSI/HI 9.6.4
Power	
Batteries (replaceable)	(2) 3.6V AA, 2400mAh, Lithium
Battery life (using default sampling rate at 25°C)	3 to 5 years
Default sampling rate	1 sample per 30 minutes
Available sampling rates (one sample per unit of time)	10 seconds to 12 hours
Wireless Communication	
Network type	Bluetooth® Low Energy 5.01
Connection range (without interference)	30 meters (100 feet)
Environmental	
Ambient operating range	-20°C to +50°C (-4°F to +122°F)
Storage temperature (5 to 95% humidity non-condensing)	-25°C to +65°C (-13°F to +149°F)
Protection rating	IP56, NEMA 4
Physical Properties	
Weight	145g (0.32 lbs.)
Status	LED
Mounting method (standard)	Magnetic (16mm potted magnets)
Mounting method (optional)	Drill and tap with plate
Certifications	
Certifications	CE, FCC, UL
Intended use (environments)	Non-hazardous, non-corrosive
Part Numbers	
optimyze (standard sensor)	P2007000
optimyze battery replacement kit	P2007030
optimyze optional flat plate mounting kit	P2007031

[1]Backwards compatible up to Bluetooth® Low Energy 4.2

opt-en_a_sc

DIMENSIONS: mm [in]



LOWARA
a xylem brand

TECHNICAL APPENDIX

LOWARA
a xylem brand

VAPOUR PRESSURE
VAPOUR PRESSURE ps AND ρ DENSITY OF WATER TABLE

t	T	ps	ρ
°C	K	bar	kg/dm³
0	273,15	0,00611	0,9998
1	274,15	0,00657	0,9999
2	275,15	0,00706	0,9999
3	276,15	0,00758	0,9999
4	277,15	0,00813	1,0000
5	278,15	0,00872	1,0000
6	279,15	0,00935	1,0000
7	280,15	0,01001	0,9999
8	281,15	0,01072	0,9999
9	282,15	0,01147	0,9998
10	283,15	0,01227	0,9997
11	284,15	0,01312	0,9997
12	285,15	0,01401	0,9996
13	286,15	0,01497	0,9994
14	287,15	0,01597	0,9993
15	288,15	0,01704	0,9992
16	289,15	0,01817	0,9990
17	290,15	0,01936	0,9988
18	291,15	0,02062	0,9987
19	292,15	0,02196	0,9985
20	293,15	0,02337	0,9983
21	294,15	0,24850	0,9981
22	295,15	0,02642	0,9978
23	296,15	0,02808	0,9976
24	297,15	0,02982	0,9974
25	298,15	0,03166	0,9971
26	299,15	0,03360	0,9968
27	300,15	0,03564	0,9966
28	301,15	0,03778	0,9963
29	302,15	0,04004	0,9960
30	303,15	0,04241	0,9957
31	304,15	0,04491	0,9954
32	305,15	0,04753	0,9951
33	306,15	0,05029	0,9947
34	307,15	0,05318	0,9944
35	308,15	0,05622	0,9940
36	309,15	0,05940	0,9937
37	310,15	0,06274	0,9933
38	311,15	0,06624	0,9930
39	312,15	0,06991	0,9927
40	313,15	0,07375	0,9923
41	314,15	0,07777	0,9919
42	315,15	0,08198	0,9915
43	316,15	0,09639	0,9911
44	317,15	0,09100	0,9907
45	318,15	0,09582	0,9902
46	319,15	0,10086	0,9898
47	320,15	0,10612	0,9894
48	321,15	0,11162	0,9889
49	322,15	0,11736	0,9884
50	323,15	0,12335	0,9880
51	324,15	0,12961	0,9876
52	325,15	0,13613	0,9871
53	326,15	0,14293	0,9862
54	327,15	0,15002	0,9862

t	T	ps	ρ
°C	K	bar	kg/dm³
55	328,15	0,15741	0,9857
56	329,15	0,16511	0,9852
57	330,15	0,17313	0,9846
58	331,15	0,18147	0,9842
59	332,15	0,19016	0,9837
60	333,15	0,1992	0,9832
61	334,15	0,2086	0,9826
62	335,15	0,2184	0,9821
63	336,15	0,2286	0,9816
64	337,15	0,2391	0,9811
65	338,15	0,2501	0,9805
66	339,15	0,2615	0,9799
67	340,15	0,2733	0,9793
68	341,15	0,2856	0,9788
69	342,15	0,2984	0,9782
70	343,15	0,3116	0,9777
71	344,15	0,3253	0,9770
72	345,15	0,3396	0,9765
73	346,15	0,3543	0,9760
74	347,15	0,3696	0,9753
75	348,15	0,3855	0,9748
76	349,15	0,4019	0,9741
77	350,15	0,4189	0,9735
78	351,15	0,4365	0,9729
79	352,15	0,4547	0,9723
80	353,15	0,4736	0,9716
81	354,15	0,4931	0,9710
82	355,15	0,5133	0,9704
83	356,15	0,5342	0,9697
84	357,15	0,5557	0,9691
85	358,15	0,5780	0,9684
86	359,15	0,6011	0,9678
87	360,15	0,6249	0,9671
88	361,15	0,6495	0,9665
89	362,15	0,6749	0,9658
90	363,15	0,7011	0,9652
91	364,15	0,7281	0,9644
92	365,15	0,7561	0,9638
93	366,15	0,7849	0,9630
94	367,15	0,8146	0,9624
95	368,15	0,8453	0,9616
96	369,15	0,8769	0,9610
97	370,15	0,9094	0,9602
98	371,15	0,9430	0,9596
99	372,15	0,9776	0,9586
100	373,15	1,0133	0,9581
102	375,15	1,0878	0,9567
104	377,15	1,1668	0,9552
106	379,15	1,2504	0,9537
108	381,15	1,3390	0,9522
110	383,15	1,4327	0,9507
112	385,15	1,5316	0,9491
114	387,15	1,6362	0,9476
116	389,15	1,7465	0,9460
118	391,15	1,8628	0,9445

t	T	ps	ρ
°C	K	bar	kg/dm³
120	393,15	1,9854	0,9429
122	395,15	2,1145	0,9412
124	397,15	2,2504	0,9396
126	399,15	2,3933	0,9379
128	401,15	2,5435	0,9362
130	403,15	2,7013	0,9346
132	405,15	2,867	0,9328
134	407,15	3,041	0,9311
136	409,15	3,223	0,9294
138	411,15	3,414	0,9276
140	413,15	3,614	0,9258
145	418,15	4,155	0,9214
155	428,15	5,433	0,9121
160	433,15	6,181	0,9073
165	438,15	7,008	0,9024
170	433,15	7,920	0,8973
175	448,15	8,924	0,8921
180	453,15	10,027	0,8869
185	458,15	11,233	0,8815
190	463,15	12,551	0,8760
195	468,15	13,987	0,8704
200	473,15	15,550	0,8647
205	478,15	17,243	0,8588
210	483,15	19,077	0,8528
215	488,15	21,060	0,8467
220	493,15	23,198	0,8403
225	498,15	25,501	0,8339
230	503,15	27,976	0,8273
235	508,15	30,632	0,8205
240	513,15	33,478	0,8136
245	518,15	36,523	0,8065
250	523,15	39,776	0,7992
255	528,15	43,246	0,7916
260	533,15	46,943	0,7839
265	538,15	50,877	0,7759
270	543,15	55,058	0,7678
275	548,15	59,496	0,7593
280	553,15	64,202	0,7505
285	558,15	69,186	0,7415
290	563,15	74,461	0,7321
295	568,15	80,037	0,7223
300	573,15	85,927	0,7122
305	578,15	92,144	0,7017
310	583,15	98,70	0,6906
315	588,15	105,61	0,6791
320	593,15	112,89	0,6669
325	598,15	120,56	0,6541
330	603,15	128,63	0,6404
340	613,15	146,05	0,6102
350	623,15	165,35	0,5743
360	633,15	186,75	0,5275
370	643,15	210,54	0,4518
374,15	647,30	221,20	0,3154

G-at_npsh_b_sc

TANK
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:

$$V_m = \frac{Qp}{4 \times Z} \times \frac{1}{1 - \frac{(Pmin - 2)}{Pmax}}$$

where:
Vm = Total volume of the air-cushion surge tank in m^3
Qp = Average pump flow rate in m^3/h
Pmax = Maximum pressure setting (wcm)
Pmin = Minimum pressure setting (wcm)
Z = Maximum number of starts per hour allowed by the motor
Example:
22SV10F110T electric pump
Pmax = 23 wcm
Pmin = 15 wcm
Qp = 20 m^3/h
Z =25

$$V_m = \frac{Qp}{4 \times Z} \times \frac{1}{1 - \frac{(Pmin - 2)}{Pmax}} = 0{,}46\ m^3$$

A 500-litre surge tank is therefore required.

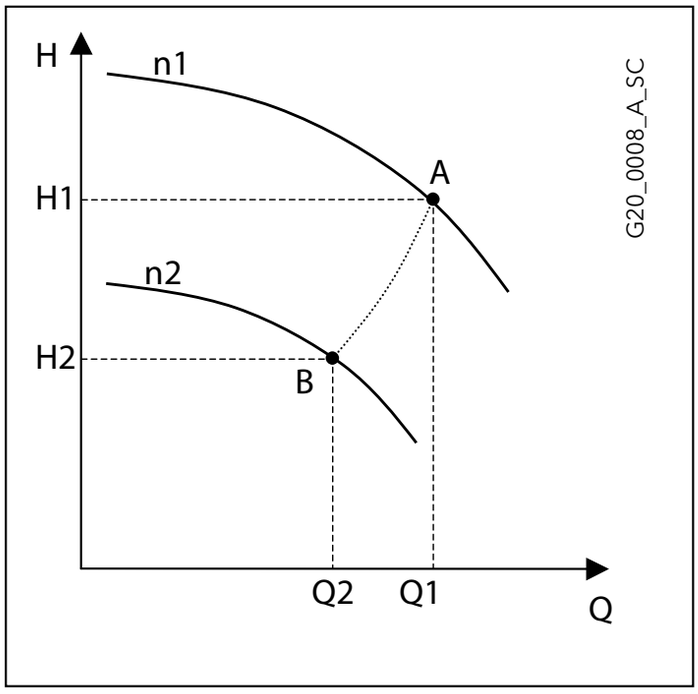
TANK
PERFORMANCE WITH VARYING SPEED: EQUIVALENCE RELATIONS

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.

Flow rate $\frac{Q1}{Q2} = \left[\frac{n1}{n2}\right]$

Head $\frac{H1}{H2} = \left[\frac{n1}{n2}\right]^2$

Power $\frac{P1}{P2} = \left[\frac{n1}{n2}\right]^3$



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 rpm (point A)
Flow rate (A) = 100 l/min; Head (A) = 50 m
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 liter capacity of just 10% of the nominal capacity of a single pump, expressed in liters 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 liters. 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.

LOWARA
a xylem brand

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 1/2"	20 3/4"	25 1"	32 1 1/4"	40 1 1/2"	50 2	65 2 1/2"	80 3"	100 4"	125 5"	150 6"	175 7"	200 8"	250 10"	300 12"	350 14"	400 16"
0,6	10	v	0,94	0,53	0,34	0,21	0,13												
		hr	16	3,94	1,33	0,40	0,13												
0,9	15	v	1,42	0,80	0,51	0,31	0,20												
		hr	33,9	8,35	2,82	0,85	0,29												
1,2	20	v	1,89	1,06	0,68	0,41	0,27	0,17											
		hr	57,7	14,21	4,79	1,44	0,49	0,16											
1,5	25	v	2,36	1,33	0,85	0,52	0,33	0,21											
		hr	87,2	21,5	7,24	2,18	0,73	0,25											
1,8	30	v	2,83	1,59	1,02	0,62	0,40	0,25											
		hr	122	30,1	10,1	3,05	1,03	0,35											
2,1	35	v	3,30	1,86	1,19	0,73	0,46	0,30											
		hr	162	40,0	13,5	4,06	1,37	0,46											
2,4	40	v		2,12	1,36	0,83	0,53	0,34	0,20										
		hr		51,2	17,3	5,19	1,75	0,59	0,16										
3	50	v		2,65	1,70	1,04	0,66	0,42	0,25										
		hr		77,4	26,1	7,85	2,65	0,89	0,25										
3,6	60	v		3,18	2,04	1,24	0,80	0,51	0,30										
		hr		108	36,6	11,0	3,71	1,25	0,35										
4,2	70	v		3,72	2,38	1,45	0,93	0,59	0,35										
		hr		144	48,7	14,6	4,93	1,66	0,46										
4,8	80	v		4,25	2,72	1,66	1,06	0,68	0,40										
		hr		185	62,3	18,7	6,32	2,13	0,59										
5,4	90	v			3,06	1,87	1,19	0,76	0,45	0,30									
		hr			77,5	23,3	7,85	2,65	0,74	0,27									
6	100	v			3,40	2,07	1,33	0,85	0,50	0,33									
		hr			94,1	28,3	9,54	3,22	0,90	0,33									
7,5	125	v			4,25	2,59	1,66	1,06	0,63	0,41									
		hr			142	42,8	14,4	4,86	1,36	0,49									
9	150	v				3,11	1,99	1,27	0,75	0,50	0,32								
		hr				59,9	20,2	6,82	1,90	0,69	0,23								
10,5	175	v				3,63	2,32	1,49	0,88	0,58	0,37								
		hr				79,7	26,9	9,07	2,53	0,92	0,31								
12	200	v				4,15	2,65	1,70	1,01	0,66	0,42								
		hr				102	34,4	11,6	3,23	1,18	0,40								
15	250	v				5,18	3,32	2,12	1,26	0,83	0,53	0,34							
		hr				154	52,0	17,5	4,89	1,78	0,60	0,20							
18	300	v					3,98	2,55	1,51	1,00	0,64	0,41							
		hr					72,8	24,6	6,85	2,49	0,84	0,28							
24	400	v					5,31	3,40	2,01	1,33	0,85	0,54	0,38						
		hr					124	41,8	11,66	4,24	1,43	0,48	0,20						
30	500	v					6,63	4,25	2,51	1,66	1,06	0,68	0,47						
		hr					187	63,2	17,6	6,41	2,16	0,73	0,30						
36	600	v						5,10	3,02	1,99	1,27	0,82	0,57	0,42					
		hr						88,6	24,7	8,98	3,03	1,02	0,42	0,20					
42	700	v						5,94	3,52	2,32	1,49	0,95	0,66	0,49					
		hr						118	32,8	11,9	4,03	1,36	0,56	0,26					
48	800	v						6,79	4,02	2,65	1,70	1,09	0,75	0,55					
		hr						151	42,0	15,3	5,16	1,74	0,72	0,34					
54	900	v						7,64	4,52	2,99	1,91	1,22	0,85	0,62					
		hr						188	52,3	19,0	6,41	2,16	0,89	0,42					
60	1000	v							5,03	3,32	2,12	1,36	0,94	0,69	0,53				
		hr							63,5	23,1	7,79	2,63	1,08	0,51	0,27				
75	1250	v							6,28	4,15	2,65	1,70	1,18	0,87	0,66				
		hr							96,0	34,9	11,8	3,97	1,63	0,77	0,40				
90	1500	v							7,54	4,98	3,18	2,04	1,42	1,04	0,80				
		hr							134	48,9	16,5	5,57	2,29	1,08	0,56				
105	1750	v							8,79	5,81	3,72	2,38	1,65	1,21	0,93				
		hr							179	65,1	21,9	7,40	3,05	1,44	0,75				
120	2000	v								6,63	4,25	2,72	1,89	1,39	1,06	0,68			
		hr								83,3	28,1	9,48	3,90	1,84	0,96	0,32			
150	2500	v								8,29	5,31	3,40	2,36	1,73	1,33	0,85			
		hr								126	42,5	14,3	5,89	2,78	1,45	0,49			
180	3000	v									6,37	4,08	2,83	2,08	1,59	1,02	0,71		
		hr									59,5	20,1	8,26	3,90	2,03	0,69	0,28		
210	3500	v									7,43	4,76	3,30	2,43	1,86	1,19	0,83		
		hr									79,1	26,7	11,0	5,18	2,71	0,91	0,38		
240	4000	v									8,49	5,44	3,77	2,77	2,12	1,36	0,94		
		hr									101	34,2	14,1	6,64	3,46	1,17	0,48		
300	5000	v										6,79	4,72	3,47	2,65	1,70	1,18		
		hr										51,6	21,2	10,0	5,23	1,77	0,73		
360	6000	v										8,15	5,66	4,16	3,18	2,04	1,42		
		hr										72,3	29,8	14,1	7,33	2,47	1,02		
420	7000	v											6,61	4,85	3,72	2,38	1,65	1,21	
		hr											39,6	18,7	9,75	3,29	1,35	0,64	
480	8000	v											7,55	5,55	4,25	2,72	1,89	1,39	
		hr											50,7	23,9	12,49	4,21	1,73	0,82	
540	9000	v											8,49	6,24	4,78	3,06	2,12	1,56	1,19
		hr											63,0	29,8	15,5	5,24	2,16	1,02	0,53
600	10000	v												6,93	5,31	3,40	2,36	1,73	1,33
		hr												36,2	18,9	6,36	2,62	1,24	0,65

The hr values must be multiplied by:

0,71 for galvanized or painted steel pipes

0,54 for stainless steel or copper pipes

0,47 for PVC or PE pipes

hr = flow resistance for 100 m of straight pipeline (m)

V = water speed (m/s)

G-at-pct-en_b_th

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 valve	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Foot check 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
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

G-a-pcv-en_b_th

The table is valid for the Hazen Williams coefficient C=100 (cast iron pipework)
for galvanized steel or painted steel multiply the values by 0,71;
for stainless steel and copper multiply the values by 0,54;
for Pvc and PE multiply the values by 0,47.

When the **equivalent pipeline length** has been determined, the flow resistance is obtained from the table in the previous page.
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 manufacturers.

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	Imperial gallon per minute Imp. gal/min	U.S. gallon per minute US gal/min
1,0000	0,0600	2,1189	0,0353	0,2200	0,2642
16,6667	**1,0000**	35,3147	0,5886	3,6662	4,4029
0,4719	0,0283	**1,0000**	0,0167	0,1038	0,1247
28,3168	1,6990	60,0000	**1,0000**	6,2288	7,4805
4,5461	0,2728	9,6326	0,1605	**1,0000**	1,2009
3,7854	0,2271	8,0208	0,1337	0,8327	**1,0000**

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_2O	Millimetre of mercury mm Hg
1,0000	0,0010	1×10^{-5}	$1{,}45 \times 10^{-4}$	$1{,}02 \times 10^{-4}$	0,0075
1 000,0000	**1,0000**	0,0100	0,1450	0,1020	7,5006
1×10^5	100,0000	**1,0000**	14,5038	10,1972	750,0638
6 894,7570	6,8948	0,0689	**1,0000**	0,7031	51,7151
9 806,6500	9,8067	0,0981	1,4223	**1,0000**	73,5561
133,3220	0,1333	0,0013	0,0193	0,0136	**1,0000**

LENGTH

Millimetre mm	Centimetre cm	Metre m	Inch in	Foot ft	Yard yd
1,0000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	**1,0000**	0,0100	0,3937	0,0328	0,0109
1 000,0000	100,0000	**1,0000**	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	**1,0000**	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	**1,0000**	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	**1,0000**

VOLUME

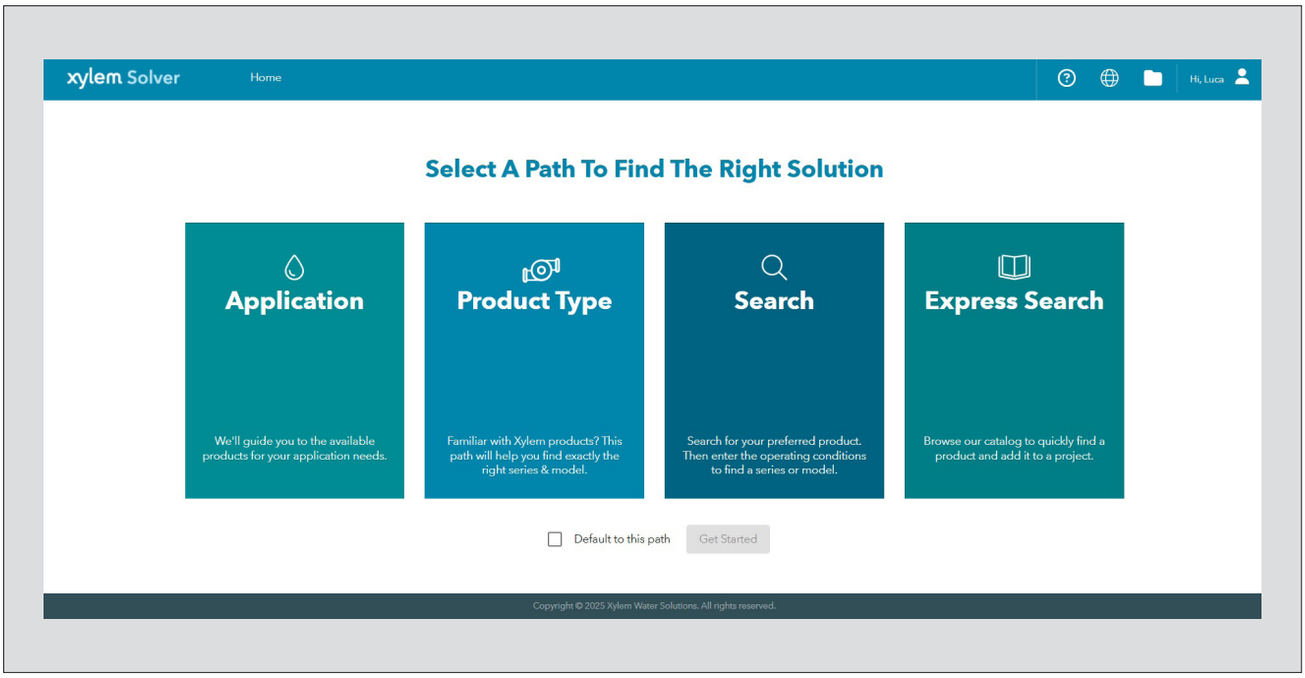
Cubic metre m^3	Litre L	Millilitre ml	Imperial gallon imp. gal.	U.S. gallon US gal.	Cubic foot ft^3
1,0000	1 000,0000	1×10^6	219,9694	264,1720	35,3147
0,0010	**1,0000**	1 000,0000	0,2200	0,2642	0,0353
1×10^{-6}	0,0010	**1,0000**	$2{,}2 \times 10^{-4}$	$2{,}642 \times 10^{-4}$	$3{,}53 \times 10^{-5}$
0,0045	4,5461	4 546,0870	**1,0000**	1,2009	0,1605
0,0038	3,7854	3 785,4120	0,8327	**1,0000**	0,1337
0,0283	28,3168	28 316,8466	6,2288	7,4805	**1,0000**

TEMPERATURE

Water	Kelvin K	Celsius °C	Fahrenheit °F	$°F = °C \times \frac{9}{5} + 32$ $°C = (°F - 32) \times \frac{5}{9}$
icing	273,1500	0,0000	32,0000	
boiling	373,1500	100,0000	212,0000	

G-at_pp-en_b_sc

FURTHER PRODUCT SELECTION AND DOCUMENTATION
Xylem Solver



Xylem Solver is pump solution selection software with an extensive online database of product information across the entire Xylem 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.

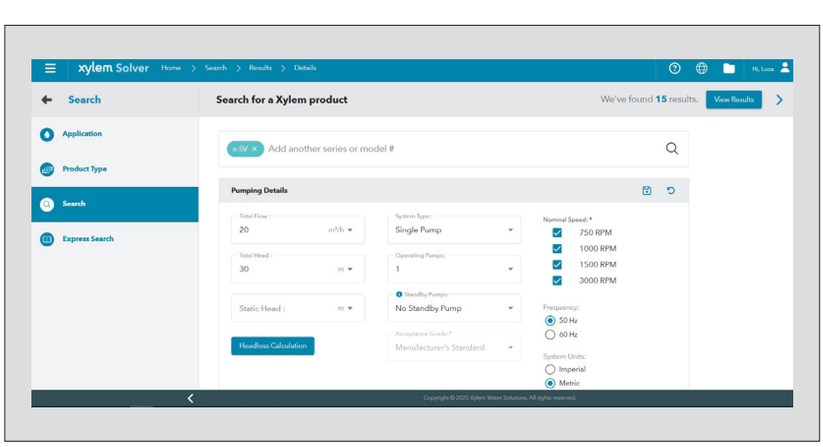
The possibility to search by applications and the detailed information output given makes it easy to make the optimal selection without having detailed knowledge about the Xylem products.

The search can be made by:

- Application
- Product type
- Duty point

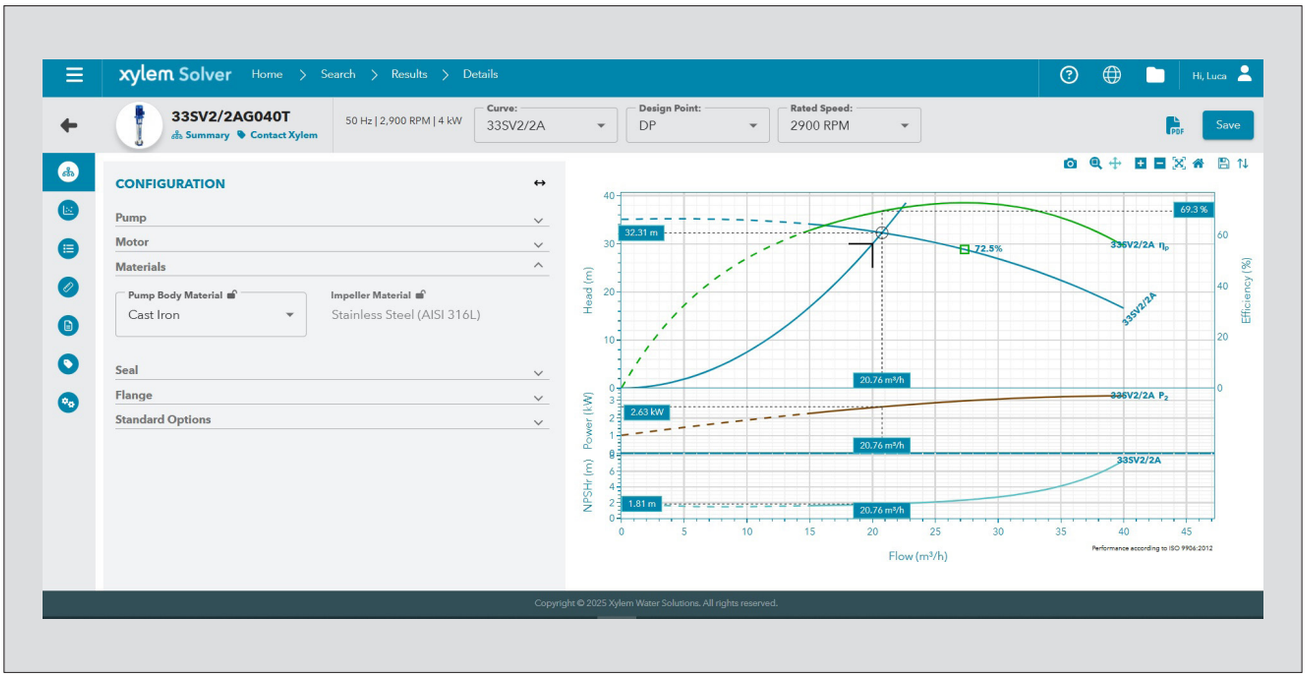
Xylem Solver gives a detailed output:

- List with search results in which you can compare up to four products
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Options
- Data sheet printouts
- Document downloads incl dxf, stp and BIM files



Once a product series has been selected, input design criteria to select pumps that meet the design requirements.

FURTHER PRODUCT SELECTION AND DOCUMENTATION
Xylem Solver



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

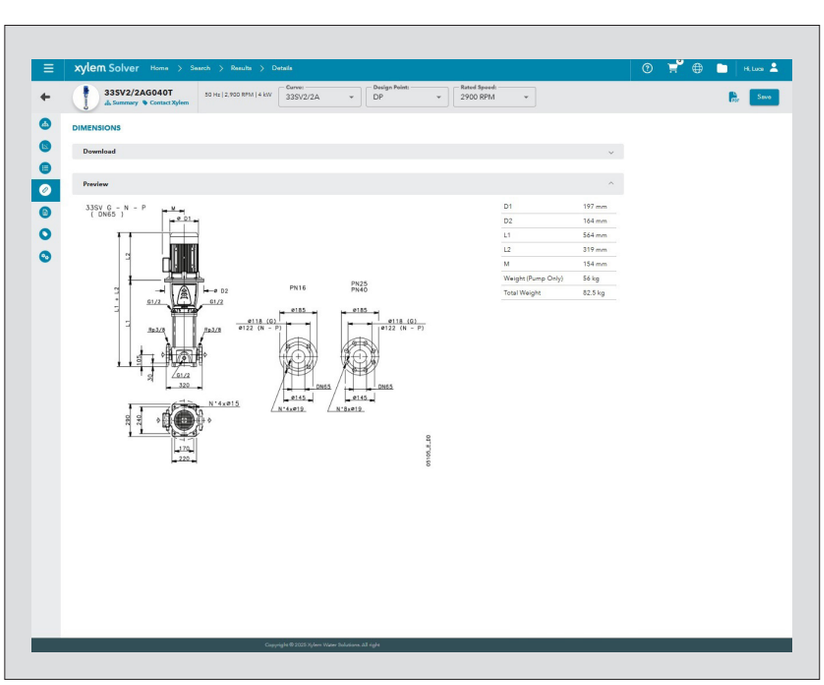
The best way to work with Xylem Solver is to create a personal account.

This makes it possible to:

- Set own standard units
- Create and save projects

Every registered user has a proper space, where all projects are saved.

For more information about Xylem Solver please contact our sales network or visit **https://solver.xylem.com.**



The dimensions tab shows technical drawings, dimensions, and CAD files when available.

Xylem |'zīləm|

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

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. 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 with a strong focus on developing comprehensive, sustainable solutions.

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

LOWARA®

xylem
Let's Solve Water

For information and technical support
Xylem Service Italia Srl

Via Dottor Vittorio Lombardi 14
36075 - Montecchio Maggiore (VI) - Italy
Tel. (+39) 0444 707111
Fax (+39) 0444 491043
xylem.com/lowara