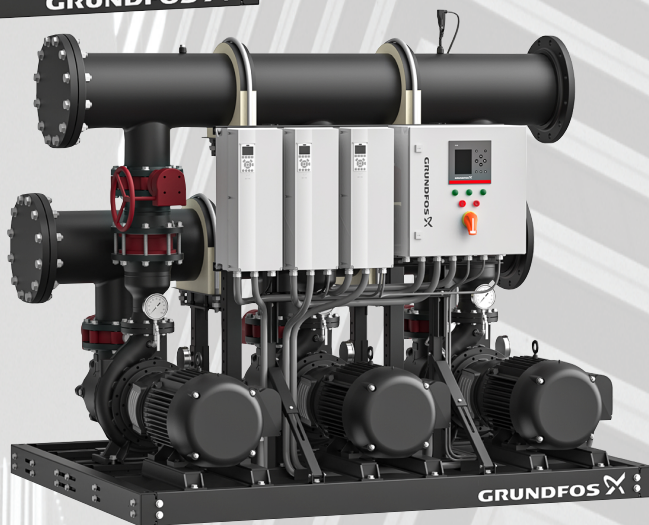


GRUNDFOS DELTA HCU

NBS, NBSE pumps

60 Hz



GRUNDFOS DELTA HCU

Data booklet

Other languages

<http://net.grundfos.com/qr/i/92705455>

GRUNDFOS DELTA HCU

English (US)

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1. Product introduction

Introduction of the product name

In the HVAC (Heating Ventilation and Air Conditioning) application, two variables determine pump system requirements: delta T and delta P. Delta T represents the flow rate, while Delta P the head. Grundfos strives to deliver best-in-class systems and solutions to delta T and delta P control and operation. It seems only fitting, that a product made to ensure these two deltas are met, shares their name.

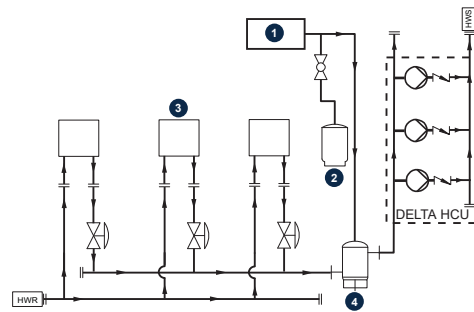
GRUNDFOS DELTA = $\Delta T + \Delta P$

GRUNDFOS DELTA is a product of the Water Handling Unit family. It is designed for heating and cooling loops. For this reason, the HCU is short for Heating and Cooling Units.

Applications

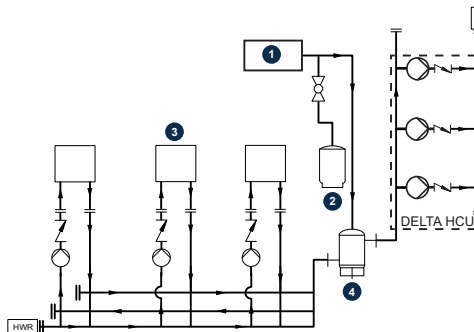
The GRUNDFOS DELTA HCU pump skid circulates water in heat transfer systems with or without glycol. The main applications include but are not limited to the following.

Variable primary or secondary hot water system



TM083703

Primary side

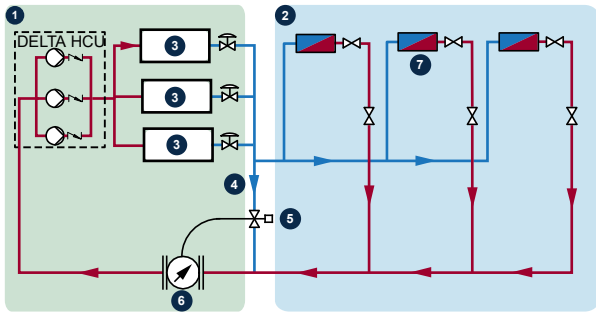


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Secondary side

Pos.	Description
1	Water supply
2	Expansion tank
3	Boiler
4	Air separator
HWR	Hot water return
HWS	Hot water supply

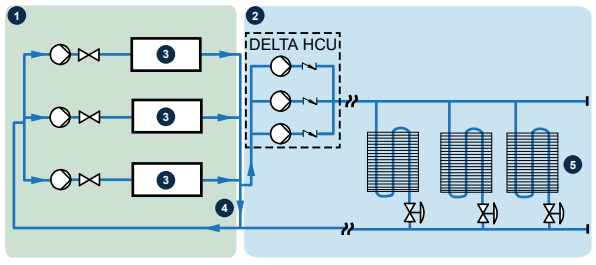
Variable primary or secondary chilled water system



TM083715

Primary side

Pos.	Description
1	Primary side
2	Secondary side
3	Chiller
4	Bypass pipe
5	Bypass valve
6	Flowmeter
7	Load

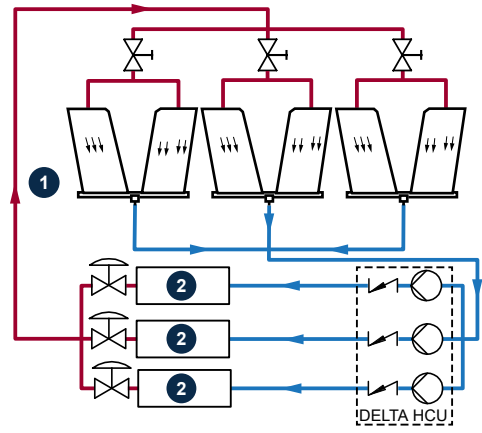


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Secondary side

Pos.	Description
1	Primary side
2	Secondary side
3	Chiller
4	Bypass pipe
5	Cooling coils with two-way valves

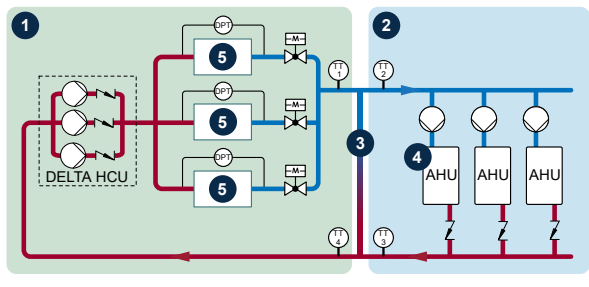
Condenser water system



TM083713

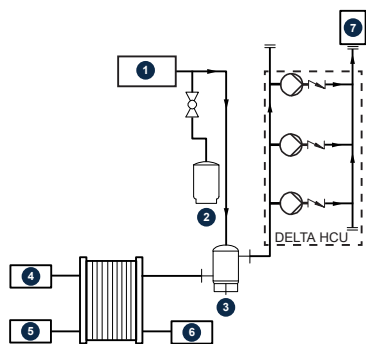
Pos.	Description
1	Cooling tower
2	Chiller

Primary distributed pumping system



TM083725

Pos.	Description
1	Primary side
2	Secondary side
3	Decoupler pipe
4	Terminal units with distributed pumps and non-return valves
5	Chiller

District energy system.

Pos.	Description
1	Water supply
2	Expansion tank
3	Air separator
4	District energy supply
5	District energy return
6	System return
7	System supply

The standard GRUNDFOS DELTA HCU pump skid consists of two to five identical NBS or NBSE pumps in parallel, installed on a common base with all necessary pipes and control equipment. The control cabinet and VFDs are also installed on the base frame.

The GRUNDFOS DELTA HCU pump skid supports the following combinations:

Combination type	Description
DELTA HCU-2	1 duty pump + 1 standby pump
DELTA HCU-3	2 duty pumps + 1 standby pump
DELTA HCU-4	3 duty pumps + 1 standby pump
DELTA HCU-5	4 duty pumps + 1 standby pump

The GRUNDFOS DELTA HCU pump skid can be equipped with either one of the following pumps:

- NBSE pumps with integrated frequency converters
- NBS pumps connected to Grundfos CUE frequency converters, one converter for each pump.

Pump Energy Index (PEI)

Pump Energy Index (PEI) was established by the U.S. Department of Energy (DOE) and adopted by Canada as the standard metric used for evaluating pump efficiency. The value is the ratio of the pump efficiency rating (PER) divided by the calculated minimally compliant PER (PERSTD) for the pump type. This shows the actual performance of a pump compared to the minimal standard performance required by regulation. The lower the PEI value is, the more efficient a pump is at the tested operating points.

PER is determined by defined testing parameters required by the DOE. This includes testing a particular pump model at its best efficiency point (BEP). For PEI values, there are two different versions:

- PEICL (constant load): applying to a bare-shaft pump, and a pump sold with a motor
- PEIVL (variable load): applying to pumps sold with a motor and controller (such as VFD and VSD).

The DOE sets the maximum PEI value to 1.00. Any pump, pump and motor, or pump, motor and controller that exceeds a PEI value of 1.00 can no longer be manufactured after January 26, 2020.

PEI is a generalized efficiency value. PEI cannot be used for determining the efficiency of a pump in a specific application.

Even though packaged systems with advanced control logic can deliver greater savings, the GRUNDFOS DELTA HCU pump skid will not have a PEI value. Instead, the individual pumps in the system will have a PEI value.

NBSE pumps with speed-controlled motors

Medium speed, 4000 RPM

Pump size	Impeller diameter [inch]	Power size [hp]	Voltage [V]	PEI value
012-070	4.69	3	3x200-240	0.43
	5.00	5		0.43
	5.47	7.5		0.43
	6.10	7.5		0.43
	4.69	3	3x440-480	0.41
	5.00	5		0.41
	5.47	7.5		0.41
	6.10	7.5		0.41
	6.97	10		0.41
	6.65	15		0.41
	6.97	15		0.41
	6.97	15		0.41
015-070	4.49	5	3x200-240	0.47
	6.73	7.5		0.47
	4.49	5	3x440-480	0.42
	6.73	7.5		0.42
	5.59	10		0.42
	6.93	15		0.42
025-070	4.57	7.5	3x200-240	0.48
	4.57	7.5	3x440-480	0.47
	4.96	10		0.47
	6.65	15		0.47
030-070	5.87	15		3x440-480

Low speed, 2200 RPM

Pump size	Impeller diameter [inch]	Power size [hp]	Voltage [V]	PEI value
015-070	6.93	3	3x440-480	0.44
015-090	9.84	3		0.43
	9.84	5	0.37	
015-095	8.82	5	3x440-480	0.40
	9.84	7.5		0.40
020-095	9.45	5	3x440-480	0.41
	9.45	7.5		0.39
020-110	9.92	10	3x440-480	0.40
	025-070	6.61		3
6.77		5	0.42	
025-095	5.98	3	3x440-480	0.42
	9.13	5		0.44
	9.53	7.5		0.42
	9.53	10		0.41
030-070	6.85	3	3x440-480	0.43
	6.85	5		0.41
030-095	8.27	7.5	3x440-480	0.44
	8.86	10		0.43
040-070	5.43	3	3x440-480	0.42
	6.30	5		0.42
	6.85	7.5		0.42
050-070	5.43	3	3x440-480	0.44
	6.85	5		0.43
	6.93	7.5		0.44
	6.93	10		0.44
050-095	7.67	10	3x440-480	0.46

NBS pumps with fixed-speed motors**4-pole**

Pump size	Max. Power [hp]	Max. impeller trim [inch]	PEI		
			Bare pump	Pump with motor	Pump with motor and CUE
012-070	1.5	6.97	0.87	0.87	0.53
015-070	3	6.93	0.87	0.87	0.45
015-090	5	9.84	0.83	0.83	0.44
015-095	7.5	9.84	0.83	0.83	0.42
020-095	7.5	9.45	0.87	0.88	0.44
020-110	15	10.31	0.89	0.89	0.45
020-135	25	13.39-13.23	0.87	0.87	0.43
025-070	5	6.77	0.88	0.88	0.48
025-095	10	9.53	0.93	0.93	0.45
025-110	15	11.02	0.90	0.90	0.46
030-070	5	6.85	0.90	0.90	0.47
030-095	15	8.86	0.92	0.92	0.46
030-110	20	10.94-10.63	0.90	0.90	0.44
030-135	40	12.91	0.91	0.91	0.46
040-070	7.5	6.85	0.93	0.93	0.47
040-095	20	9.37	0.94	0.94	0.46
040-110	30	10.08	0.93	0.93	0.46
040-135	50	12.83	0.94	0.94	0.51
040-150	150	16.77	0.97	0.97	0.59
050-070	10	6.93	0.93	0.93	0.47
050-095	30	9.13	0.93	0.93	0.46
050-110	40	10.63	0.95	0.95	0.47
050-135	75	13.11-12.95	0.94	0.94	0.58
050-150	150	14.96	0.95	0.95	0.56
060-095	40	9.53	0.93	0.93	0.45
060-110	60	10.75	0.93	0.93	0.56
060-135	125	12.91-12.76	0.94	0.94	0.58
060-150	250	15.83	Out of DOE scope		
080-135	150	12.6	0.94	0.94	0.54
080-150	250	15.59	Out of DOE scope		
100-150	250	14.76	Out of DOE scope		

2. Features and benefits

Advanced pump system control



GR-1014555

CU 352

The pumps of the GRUNDFOS DELTA HCU pump skid are controlled individually by the CU 352 multi-pump control unit which contains application-optimized software and pump-curve data. The CU 352 contains the exact hydraulic and electrical data of the pumps to be controlled.

Furthermore, a log function enables monitoring of the system performance over a period of time.

User-friendliness

The GRUNDFOS DELTA HCU pump skid features a built-in startup wizard in a wide range of languages that guides the installer through a series of steps until the system is correctly installed. The large user-friendly display makes it easy to read the information and change programs.

Low-energy consumption

The GRUNDFOS DELTA HCU pump skid with the newest MLE motors from 3 to 15 hp (2.2 to 11 kW) has a combined total VFD/motor efficiency higher than the NEMA Premium Efficiency motor alone.

The MLE motor is a permanent magnet motor with a built-in frequency converter and onboard controls. The onboard controls consist of an advanced application software that provides the user with an all-in-one solution pre-programmed for electronic speed control of variable volume applications.

Electronic speed control provides continuously variable control of motor speed and enables the automatic adaption of pump performance to a given requirement.

The Grundfos MLE motor utilizes a Permanent Magnet Synchronous Motor (PMSM) of IE5 rating based on European Commission standards. This IE5 rating exceeds the current NEMA Premium Efficiency standard. A comparison between IE and NEMA ratings is presented in the table below:

IEC	NEMA
IE5	Ultra Premium ¹⁾

IEC	NEMA
IE4	Super Premium or Enhanced-Premium ¹⁾
IE3	NEMA Premium

¹⁾ A common terminology, not officially established by NEMA.

System features and benefits

Strainer

GRUNDFOS DELTA HCU is equipped with a strainer on the inlet of each pump as standard. It helps trap debris, silt, sand, pollen, algae and other suspended solids brought into the loop from the water source, as well as scale and rust generated in the loop. These contaminants can be deposited on heat transfer surfaces, which could decrease their energy transfer abilities and increase the pressure drop across components.

Vibration damper

GRUNDFOS DELTA HCU offers holes in the base frame to install optional vibration dampers. Vibration dampers help isolate any vibration the system might produce from being transmitted to the building and/or piping. Isolating the vibration can help minimize the damage to the building structure and/or piping, as well as the discomfort felt by people in the building.

Pump curve shape

GRUNDFOS DELTA HCU mainly utilizes pump curve shapes that allow for large variations in flow rate with minimal change in pressure. The required flow to the heat transfer equipment can vary significantly with minor changes in the opening of the control valves. This means that the heat transfer can be adjusted with a minimal increase in pressure drop.

Power Optimal Pump Sequencing (POPS)

Power Optimal Pump Sequencing (POPS) brings energy optimization to all pumps. In lieu of speed-based pump cut-in or cut-out, after a short parameterization phase, pumps cut-in or cut-out based on the least power consumption required to meet the duty point. This feature can:

- Optimize energy consumption and lower OPEX (operating expenditure) with energy-saving pumps.
- Ensure the optimal sequence of operation without the need for on-site programming and save time on optimizing the system.
- Result in huge savings and automatic adjustments to ensure maximum performance and significant savings.
- Simplify setup to minimize the risk of setup errors.
- Act as a maintenance feature which ensures that when the pumps wear out or are over the life of the system, the controller is still able to capture the most current pump characteristics. This data is in turn used to ensure that the system continues to sequence pumps in the most efficient way even after years of operation.

Pump curve data

Pump curve data is loaded into the CU 352 controller on the GRUNDFOS DELTA HCU system at the factory. The controller uses pump curve data along with inlet and outlet pressure information to analyze and determine the operating point of each pump. This data is used to optimize the performance, minimize energy consumption, and provide protection for running pumps outside their duty range. This data allows users to estimate the flow which will display the approximate flow of the system without the need for an expensive flowmeter.

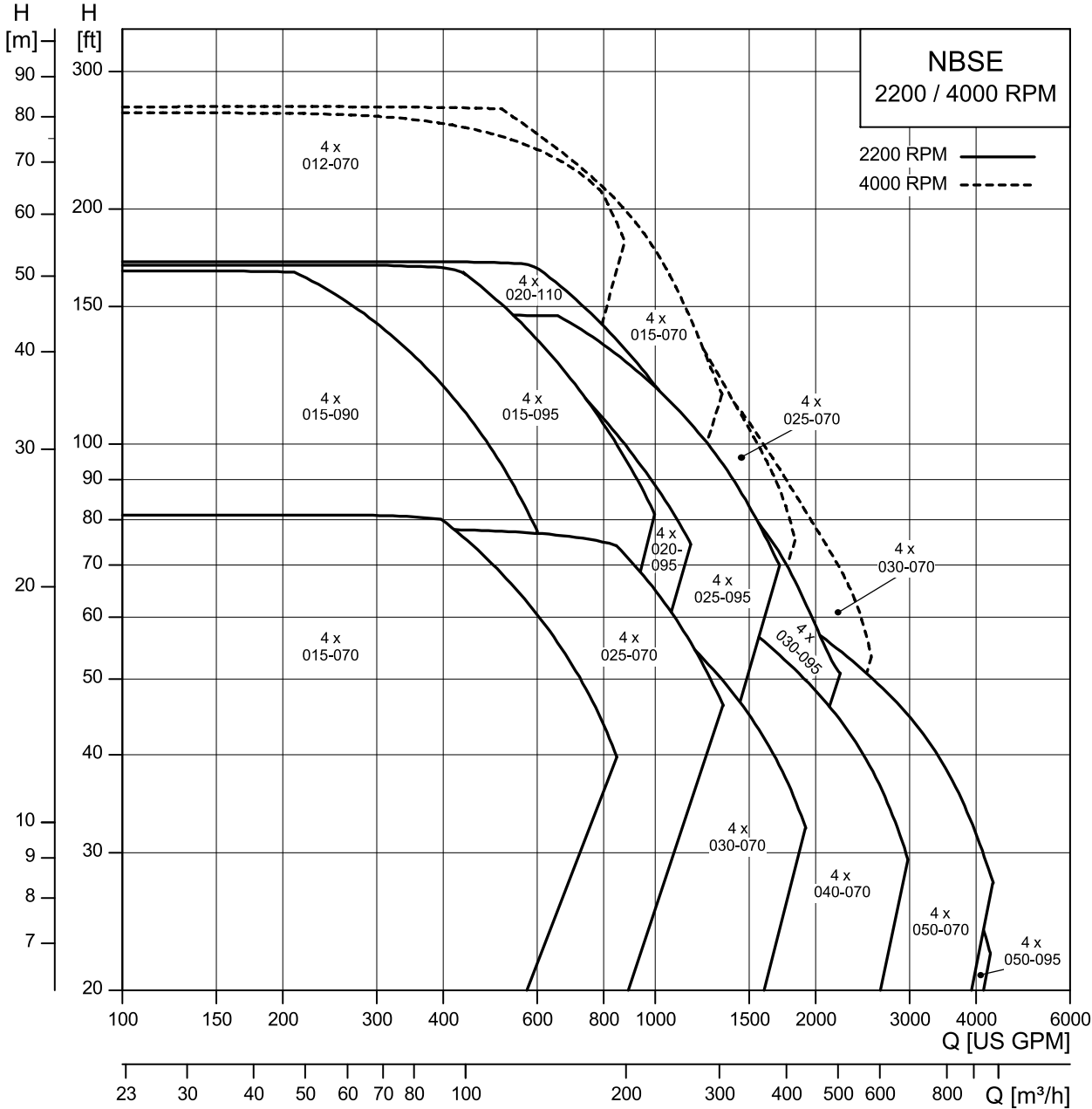
CIM 300

GRUNDFOS DELTA HCU includes a CIM 300 module installed inside the CU 352 controller. The CIM 300 module is a standard interface for data transmission between a BACnet MS/TP network and a Grundfos system. It makes data exchange possible between a pump system and a SCADA system or supervisory controller. The communication interface is based on standard BACnet object types, allowing for straightforward data access over the network. The BACnet functional profile has been optimized for exchanging data between pumping systems and building management systems.

3. Product data

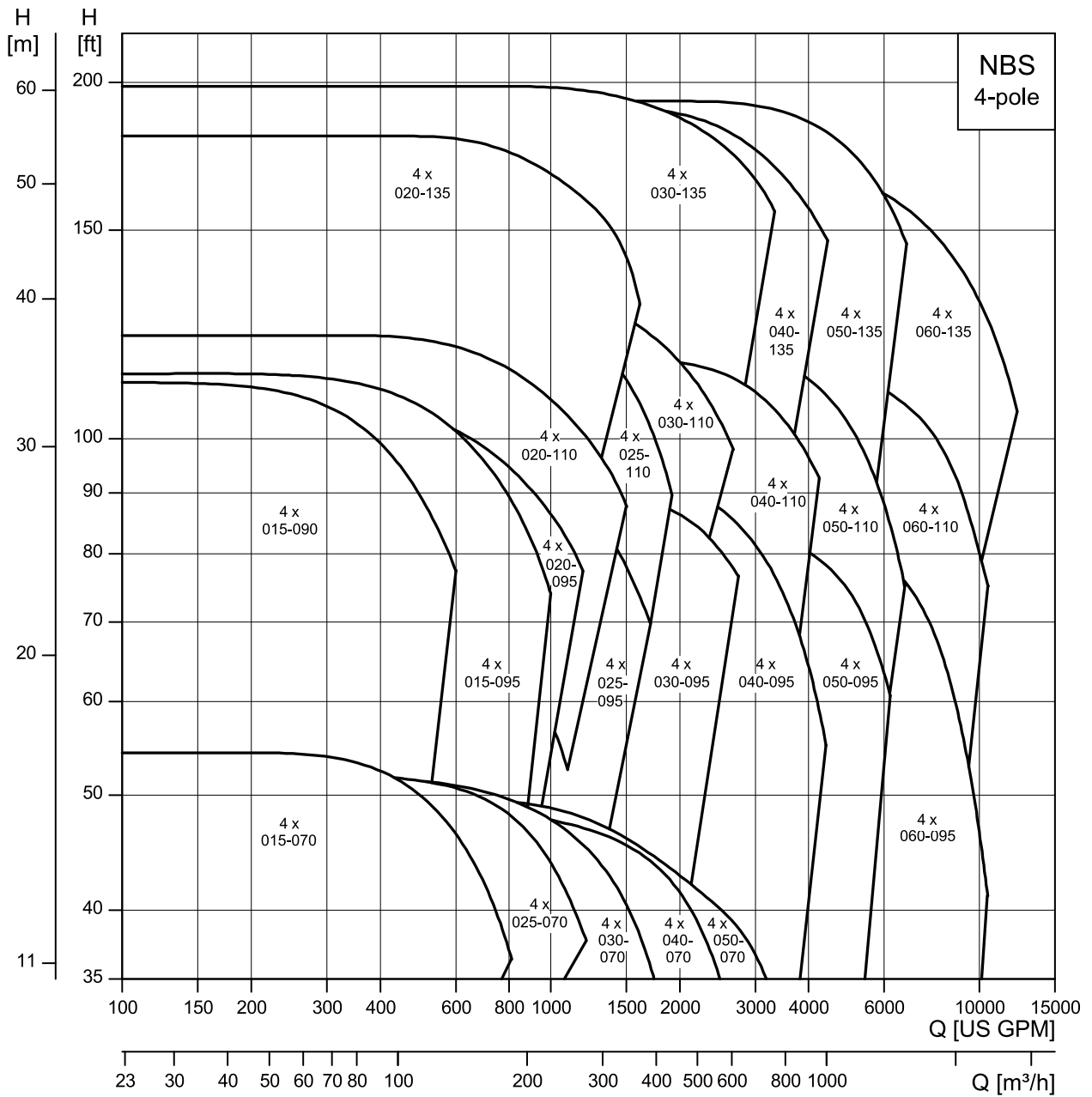
Performance range

NBSE



TM085663

NBS, 4-pole



TM083639

Product range

System design	Technical data	Parameter
Frequency		60 Hz
Hydraulic data	Maximum head [ft]	165
	Flow [gpm]	0-8000
	Liquid temperature [°F]	14-212 ²⁾
	Ambient temperature [°F]	32-104
	Maximum operating pressure [psi]	175
	Relative humidity	Maximum relative humidity: 95%
	Altitude	Up to 3280 ft ³⁾
Motor data	Number of main pumps [set]	2-5
	Motor power [hp]	2-100
	Motor voltage [V]	2-25 hp: 208-230 V 2-100 hp: 460 V
Shaft seal	BQQE	• ⁴⁾
	BAQE, BBQV, BQQV, DAQF, DQQE	o ⁵⁾
Material	Pump housing: ASTM Class 35 (gray cast iron)	•
	Impeller: ASTM A351 CF8	•
	Manifold: painted carbon steel ⁶⁾	•
Pipe connection	ANSI flange [inch]	3-18
	Alternative setpoints	•
	Automatic cascade control	•
	Clock program	•
	Controlled output	•
	Constant-pressure control	•
	Differential pressure, pump control	•
	Differential temperature control ⁷⁾	•
	Return pipe temperature control ⁷⁾	•
	DiPu control ⁷⁾	•
	Dry-running protection	•
	Emergency run	•
	Flow estimation	•
	Forced pump change-over	•
	Limit 1 and 2 exceeded	•
	Log function	•
	Minimum change-over time	•
	Monitoring of non-return valve ⁸⁾	•
	Multi-sensor	•
	Number of starts per hour	•
	Password	•
	Pilot pump ⁷⁾	•
	Proportional pressure	•
	Pump curve data	•
	Pumps outside duty range	•
	Pump test run	•
	Reduced operation	•
Redundant primary sensor ⁷⁾	•	
Secondary sensor	•	
Setpoint ramp	•	
Specific energy calculation	• ⁹⁾	
Functions via CU 352		

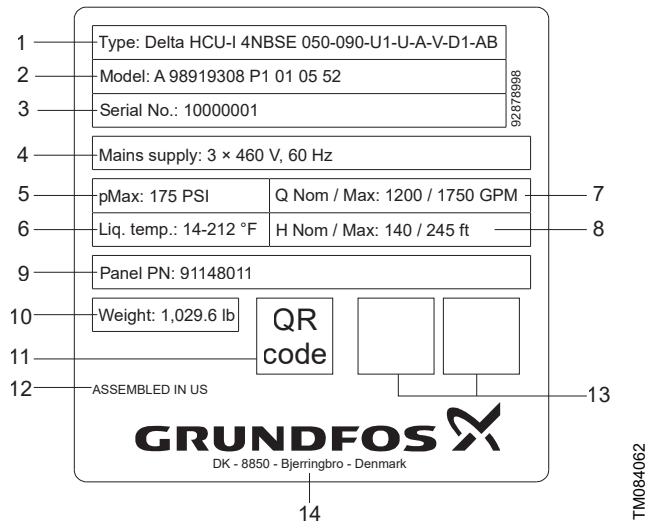
System design	Technical data	Parameter
	Soft pressure buildup	•
	Standby pumps	•
	Stop function	•
	Ethernet connection	•
	External GENIbus connection	o
	Other bus protocols: PROFIBUS, LonWorks, Modbus, GRM, GSM, BACnet MS/TP, Industrial Ethernet via CIM modules.	o
	For further information, see the section on Optional equipment.	

- 2) When the liquid temperature exceeds 212 °F, please contact Grundfos.
- 3) Customization should be considered if the altitude is higher than 3280 ft.
- 4) •: Available as standard.
- 5) o: Available on request.
- 6) For certain sizes, painted stainless steel is supplied.
- 7) Hardware is not supplied as standard, but the functionality is available in the controller.
- 8) Systems with MLE motors.
- 9) It requires a flowmeter to be installed and connected.

Related information

10. Optional equipment

Nameplate



Pos.	Description
12	Production site
13	Marks of approval
14	Address of manufacturer

Example of GRUNDFOS DELTA HCU nameplate

Pos.	Description
1	Product name
2	Factory code and production code (year and week)
3	Serial number
4	Mains supply
5	Maximum operating pressure [psi]
6	Temperature range of liquid
7	Max. flow rate
8	Max. head
9	Material number of the control panel
10	Net weight
11	QR code

Type key

Example: DELTA HCU-I 4NBSE 050-090-UL-J-A-A-I8-AB

Code	Description	Designation
DELTA HCU		Product name
-I	E: Multi-E control, with E-motor I: MPC, with E-motor or CUE X: Customized system type	System type
4	2, 3, 4 etc.	Number of main pumps
NBSE 050-090	TP, TPE, NB, NBE, CR, CRE etc.	Pump type
-UL-	UJ = 1 × 208-230 V, PE, 60 Hz UK = 3 × 208-230 V, PE, 60 Hz UL = 3 × 460-480 V, PE, 60 Hz UX = CSU variant (special voltage rating)	Voltage code
J-	B: Manifolds on the same side of the pump, stacked on top of each other with the manifold centerlines in the same vertical plane I: Manifolds on opposite sides of the pump, in a straight branch configuration, with the manifold centerlines in the same horizontal plane J: Manifolds at the top of the system with manifold centerlines in different horizontal and vertical planes L: Suction manifold and branch centerline in the same horizontal plane, discharge manifold and branch centerline in the same vertical plane U: Manifolds at the top of the system with the manifold centerlines in the same horizontal plane X: Other type of design	Design, manifold layout
A-	A: <ul style="list-style-type: none"> Suction: suction diffuser with isolation valve Discharge: non-return valve with isolation valve B: <ul style="list-style-type: none"> Suction: suction diffuser with isolation valve Discharge: combination valve C: <ul style="list-style-type: none"> Suction: suction diffuser with isolation valve Discharge: combination valve with isolation valve D: <ul style="list-style-type: none"> Suction: Y-strainer with isolation valve Discharge: non-return valve with isolation valve E: <ul style="list-style-type: none"> Suction: Y-strainer with isolation valve Discharge: combination valve F: <ul style="list-style-type: none"> Suction: Y-strainer with isolation valve Discharge: combination valve with isolation valve G: <ul style="list-style-type: none"> Suction: isolation valve only Discharge: non-return valve with isolation valve H: <ul style="list-style-type: none"> Suction: isolation valve only Discharge: combination valve I: <ul style="list-style-type: none"> Suction: isolation valve only Discharge: combination valve with isolation valve X: Other	Design, branch layout

Code	Description	Designation
A-	A: ANSI flange T: Thread connection V: Victaulic connections X: Other	Build type
I8-	I3: 3" I4: 4" I5: 5" I6: 6" I8: 8" IA: 10" IB: 12" IC: 14" ID: 16" IE: 18" IF: 20" IG: 24" X: Other	Manifold size
AB	A: Additional sensors, gauges and tapping points B: No standby pumps C: Bypass D: Pump electrical disconnect switches E: With expansion joints, bellows and compensators F: Alternative manifold connection points when built with Victaulic, flanged ends G: Without manifold blind flanges I: Insulation required O: Outdoor installation P: Pipework material other than mild steel S: One pressure & one temperature sensor on the inlet manifold, one pressure sensor on the outlet manifold T: Certificate for pumps U: Undersized motor V: Vibration dampers X: More than 2 options Y: Other Z: SWA Cabling (BS 5467) for Power Transfer	Options

4. Construction

Pumps



NBS, NBSE pumps

The standard GRUNDFOS DELTA HCU is equipped with two to five Grundfos NBS or NBSE pumps. These pumps are non-self priming, single-stage, centrifugal volute pumps with an axial inlet port, radial outlet port and horizontal shaft. The pumps are fitted with an asynchronous motor. The motor and the pump shaft are connected via an axially split, rigid coupling which enables rapid mechanical seal access without motor removal. Additionally, no alignment is required between the pump and motor, which eliminates laser alignment costs.

The difference between the NBS and the NBSE pump is in the motor. The NBSE pumps are NBS pumps equipped with a Grundfos MLE motor. The MLE motor is a permanent-magnet motor with a built-in frequency converter. The pump housing and motor stool are made of cast iron. Continuously variable speed control of the motor enables the adjustment of the performance to the specified requirements thus achieving the best efficiency.

For further information, see the data booklet for NBS and NBSE by using the QR code or the link below.

Part number	Book name	QR code	Book link
99932033	NBS, NBSE		https://api.grundfos.com/literature/Grundfosliterature-6820966.pdf

QR99932033

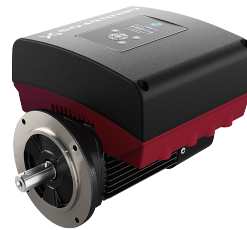
Shaft seal



Shaft seal

GRUNDFOS DELTA HCU utilizes NBS(E) pumps with a bellows mechanical shaft seal made of silicon carbide EPDM (BQQE). This type of seal is well-suited for a wide range of temperatures (-13 to +248 °F) and water-glycol mixtures to cover most HVAC applications.

Motors



MLE motor

NBS pumps are equipped with a totally enclosed fan-cooled standard motor with main dimensions according to IEC, NEMA and DIN standards. Electrical tolerances comply with IEC 60034 and NEC. Motors include shaft grounding rings.

NBSE pumps are equipped with motors and integrated frequency converters.

The Grundfos MLE motor utilizes a Permanent Magnet Synchronous Motor (PMSM) which carries an IE5 rating based on European Commission standards. This IE5 rating exceeds the current NEMA Premium Efficiency standard.

The MLE motor is a fully enclosed, fan-cooled, and frequency-controlled motor with dimensions according to IEC NEMA and DIN standards. Electrical tolerances comply with IEC 60034 and NEMA.

TM080291

TM075511

TM078031

Manifold

Depending on the size, a stainless-steel (AISI 316Ti/EN DIN 1.4571) or carbon-steel manifold is installed on the inlet and outlet sides of the pumps. An isolation valve and a non-return valve are installed between the outlet manifold and the individual pumps. An isolation valve and a suction diffuser are installed between the inlet manifold and the individual pumps.

Control cabinet

The control cabinet is equipped with all the necessary components.

The standard panel of the cabinet consists of a main disconnect switch, surge arrestor, pump service disconnect switches, individual pump run lights, system fault light, audible alarm, and the CU 352. Components are housed in a NEMA 12-panel enclosure featuring a 100kA SCCR and UL 508A approval. Customization is available upon request.

CU 352

The CU 352 multi-pump control unit is installed at the door of the control cabinet.



CU 352

The CU 352 features a color display, ten buttons and two indicator lights. The operating panel enables manual setting of parameters such as setpoint, start and stop of the whole system or the individual pumps.

The CU 352 has an application-optimized software for adapting the system to the application in question.

IO 351B



IO 351B

IO 351B is a module for the exchange of digital and analog signals between CU 352 and the other electrical system via GENIbus.

IO 351B is used for one to six mains-operated Grundfos pumps and/or pumps controlled by external Grundfos CUE frequency converters. The module can also be used as an input-output module for communication with monitoring equipment or other external equipment.

Base frame



The pumps in the GRUNDFOS DELTA HCU are installed on a common base frame. The base frame is made of carbon steel.

Suction diffuser



Suction diffuser

A suction diffuser is installed on the inlet side of each pump. It provides a uniform flow pattern to the inlet side of the pump, which ensures a stable NPSH. It incorporates a cylindrical strainer preventing impurities from entering the pump. The suction diffuser comes with a disposable, fine mesh, and stainless steel startup screen for the capture and removal of foreign particulates in the system piping.

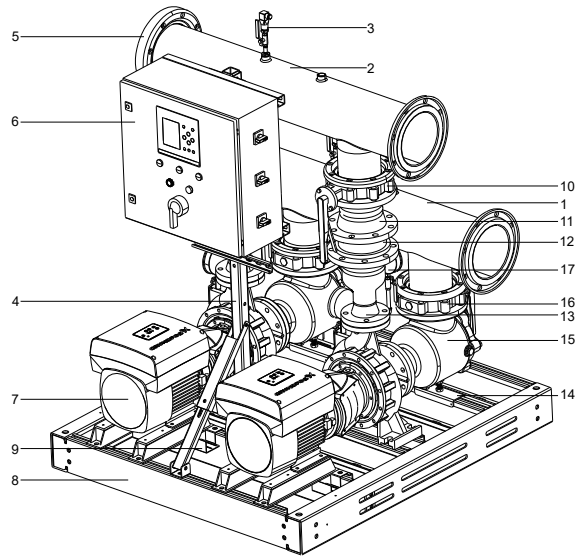
GR-1014555

GR1005375

TM084338

TM083712

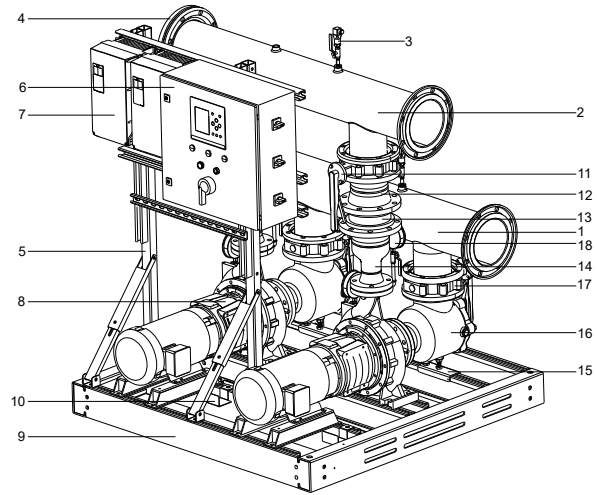
System components of GRUNDFOS DELTA HCU with E-pump



TM084336

Pos.	Description
1	Inlet manifold
2	Outlet manifold
3	Pressure transmitter
4	Support bracket for cabinet and VFD
5	Blind flange
6	Control panel
7	Pump
8	Base frame
9	Cable bracket
10	Butterfly valve
11	Spool spacer pipe
12	Check valve
13	Spool reducer pipe
14	Cover plate
15	Suction diffuser
16	Butterfly valve
17	Pressure gauge

System components of GRUNDFOS DELTA HCU with non-E pump



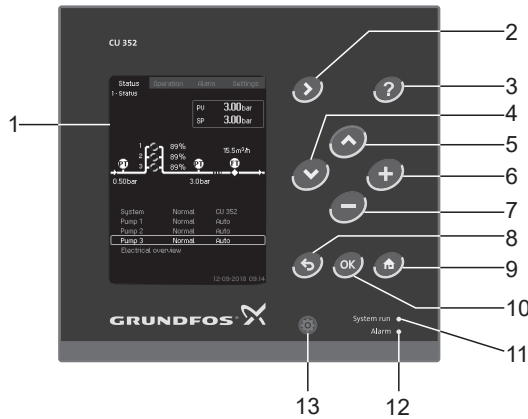
TM084337

Pos.	Description
1	Inlet manifold
2	Outlet manifold
3	Pressure transmitter
4	Blind flange
5	Support bracket for cabinet and VFD
6	Control panel
7	Grundfos CUE
8	Pump
9	Base frame
10	Cable bracket
11	Butterfly valve
12	Spool spacer pipe
13	Check valve
14	Spool reducer pipe
15	Cover plate
16	Suction diffuser
17	Butterfly valve
18	Pressure gauge

5. Control functions

CU 352 operating panel

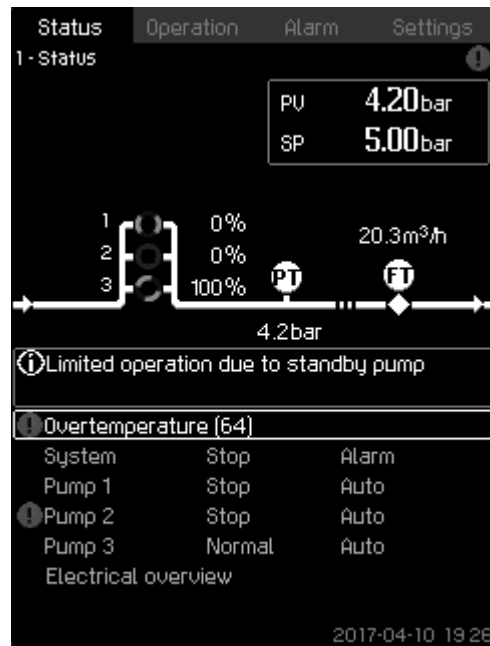
The operating panel on the front cover of the control cabinet features a display, a number of buttons and two indicator lights. The operating panel enables manual setting and monitoring of the performance of the system.



CU 352 operating panel

Pos.	Description
1	Display
2	Arrow to the right
3	Help
4	Down
5	Up
6	Plus
7	Minus
8	Esc.
9	Home
10	OK
11	Indicator light, operation (green)
12	Indicator light, fault (red)
13	Display brightness

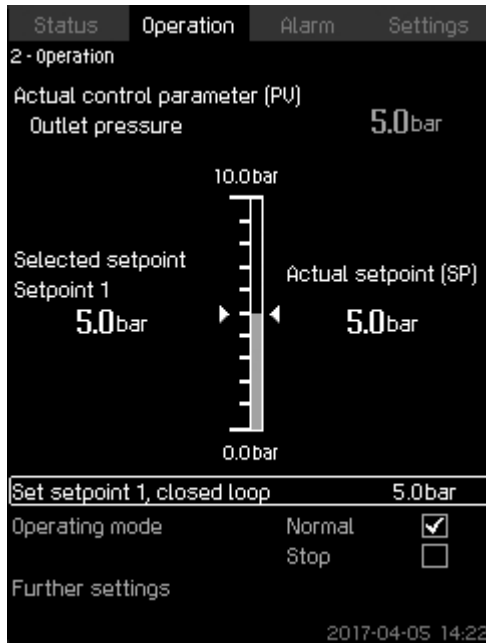
Status menu



Status menu

- Reading of process value (PV) of control parameter and selected setpoint (SP)
- graphical illustration of system (upper half of the display)
- indication if any incidents occurring during operation (middle of the display)
- reading of performance of system and individual pumps (lower half of the display)
- button for further information
- active buttons are on.

Operation menu

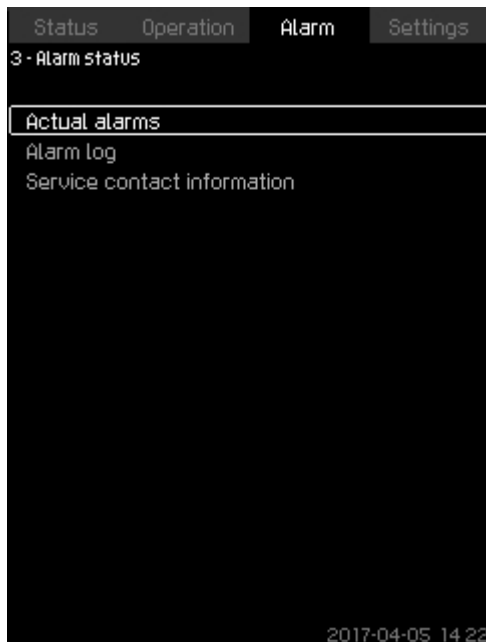


2_TMO38950_002

Operation menu

- Setting of basic parameters, for instance, setpoint or start/stop of system or individual pumps
- reading of selected setpoint and current setpoint
- button ⓘ for further information
- active buttons are on.

Alarm menu

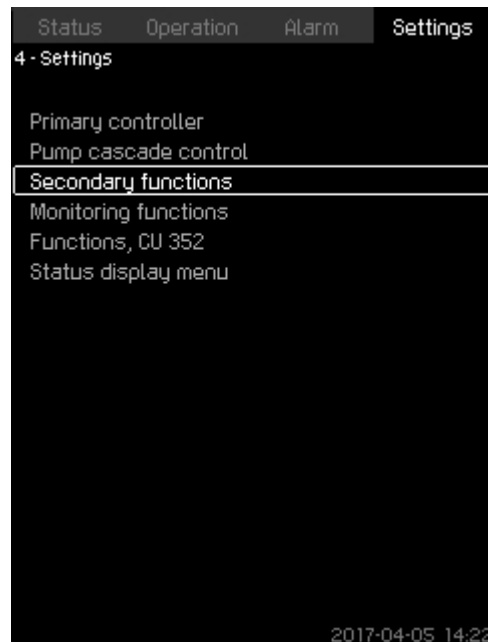


3_TMO32291_003

Alarm menu

- Overview of current warnings and alarms in clear text with detailed information:
 - Cause of the fault
 - remedy for the fault
 - where the fault occurred: system, pump no. 1, etc.
 - when the fault occurred (time and date)
 - when the fault disappeared (time and date)
 - whom to contact for service
- alarm log with up to 24 warnings and alarms
- button ⓘ for further information
- active buttons are on.

Settings menu



4_TMO32294_004

Settings menu

- Various settings:
 - **External setpoint influence**
 - **Redundant primary sensor**
 - **Standby pumps**
 - **Stop function**
 - **Proportional pressure**
 - **Display language**
 - **Ethernet**, etc.
- button ⓘ for further information
- active buttons are on.

Description of selected functions

Constant-pressure control of E-system

Constant-pressure control ensures that the system delivers constant pressure despite a change in consumption.

When taps are opened, water is drawn from the diaphragm tank, if installed. The pressure drops to a set cut-in pressure, and the first speed-controlled pump starts. The speed of the pump in operation is continuously increased to meet the demand. As the consumption rises, more pumps are cut in until the performance of the pumps in operation corresponds to the demand. During operation, CU 352 controls the speed of each pump individually according to the pump curve data downloaded into CU 352.

Furthermore, CU 352 regularly estimates whether pumps are to be cut in or out to ensure the best efficiency.

When the water consumption decreases, pumps are cut out one by one to maintain the set outlet pressure.

Display language



4-5-1_TM038987_116

Display language

You can select the language for the display via CU 352.

Options

- English
- Danish
- German
- French
- Italian
- Spanish
- Portuguese
- Greek
- Dutch
- Swedish
- Finnish
- Polish
- Russian
- Korean
- Chinese
- Japanese
- Czech
- Turkish
- Hungarian
- Bulgarian
- Croatian
- Latvian
- Lithuanian
- Romania
- Slovak
- Slovenian
- Serbian Latin
- US English
- Indonesian
- Malay
- Estonian

Pump curve data

Status	Operation	Alarm	Settings
4.3.19 - Pump curve data			
Pump data			
Rated flow rate Q _{nom}	0.0m ³ /h		
Rated head H _{nom}	0m		
Max. head H _{max}	0m		
Max. flow rate Q _{max}	0.0m ³ /h		
Motor data			
Power, Q0, 100 % speed	0.00kW		
Power, Q0, 50 % speed	0.00kW		
Rated power P _{nom}	0.00kW		
Flow estimation			
Demo mode active		2016-08-26 13:42	

Pump curve data

Pump curve data is loaded into the CU 352 control unit on the Hydro MPC system at the factory.

The control unit uses pump curve data along with inlet and outlet pressure information to analyze and determine the operating point of each pump. These data are used to optimize the performance, minimize energy consumption and provide protection from running pumps outside their duty range.

Redundant primary sensor

A redundant sensor can be installed as backup for the primary sensor to increase reliability and prevent stop of operation. The redundant primary sensor can also act as a reference point in the outlet manifold of the system.



The redundant primary sensor is available as a factory-fitted option.

Automatic cascade control

The cascade control ensures that the performance of the system is automatically adapted to consumption by switching pumps on or off. The system thus runs as energy-efficiently as possible with constant pressure and a limited number of pumps.

Alternative setpoints

This function makes it possible to determine up to six setpoints as alternatives to the primary setpoint. The setpoints can be determined for closed loop and open loop. The performance of the system can thereby be adapted to other consumption patterns.

Example

A system is used for irrigation of a hilly golf course.

Constant-pressure irrigation of golf course sections of different sizes and at different altitudes may require more than one setpoint.

For golf course sections at a higher altitude, a higher outlet pressure is required.

Log function

Status	Operation	Alarm	Settings
4.4.9 - Log values			
Samples per hour			
3600	<input type="checkbox"/>		
300	<input type="checkbox"/>		
150	<input type="checkbox"/>		
75	<input type="checkbox"/>		
20	<input type="checkbox"/>		
Resulting timespan	4h		
Select values to be logged			
Estimated flow rate	<input checked="" type="checkbox"/>		
Speed of pumps	<input checked="" type="checkbox"/>		
Process value	<input checked="" type="checkbox"/>		
Setpoint	<input checked="" type="checkbox"/>		
Power consumption	<input checked="" type="checkbox"/>		
2017-04-05 14:23			

4-4-9_TM052973_181

Log values

The log function can monitor selected parameters. The data can be presented on the display or exported as a csv file via the built-in Ethernet connection.

Specific energy calculation

For MPC-E systems with a flow meter connected, CU 352 can calculate and show the specific energy used. There are two values displayed: the actual value and the average value.

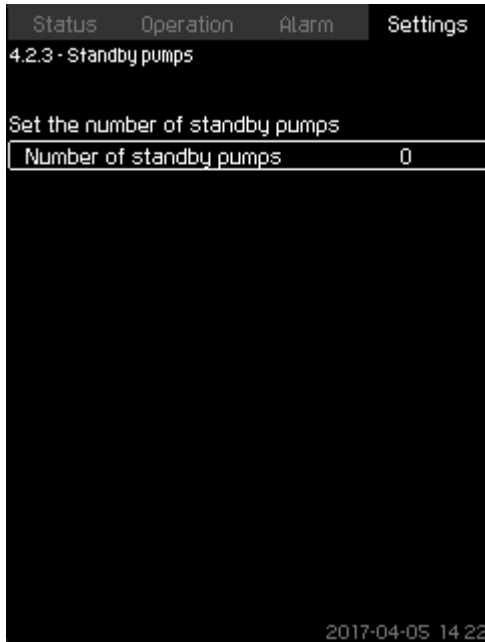
Number of starts per hour

This function limits the number of pump starts and stops per hour. It reduces noise emission and improves the comfort of systems with mains-operated pumps.

Each time when a pump starts or stops, CU 352 calculates when the next pump is allowed to start or stop in order not to exceed the permissible number of starts per hour.

This function always allows pumps to be started to meet the requirement. However, pump stops can be delayed to avoid exceeding the permissible number of starts/stops per hour.

Standby pumps



4-2-3_TM032366_075

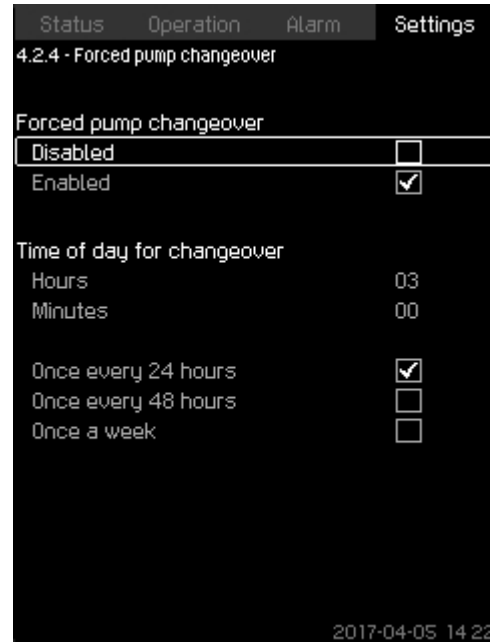
Standby pumps

You can let one or more pumps function as standby pumps. For example, a system of four pumps with one designated to be a standby pump runs as a three-pump system.

If a pump is stopped due to a fault, the standby pump is cut in. This function ensures that the system can maintain the rated performance even if one of the pumps is stopped due to a fault.

The status of the standby pump alternates between all pumps of the same type, for instance electronically speed-controlled pumps.

Forced pump changeover



4-2-4_TM032366_058

Forced pump changeover

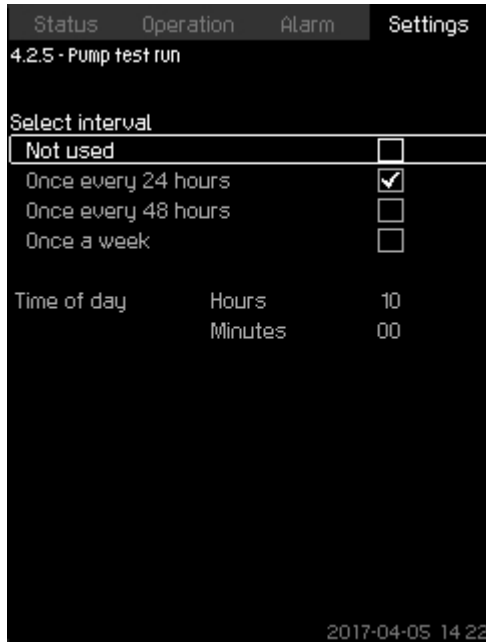
This function ensures that the pumps run for the same amount of operating hours over time.

In certain applications, the required flow remains constant for long periods and does not require all pumps to run. In such situations, pump changeover does not take place automatically, and forced pump changeover may be required.

Once every 24 hours, the control unit checks if any pump in operation has been running continuously for the preceding 24 hours.

If that is the case, the pump with the most number of operating hours stops and is replaced by the pump with the lowest number of operating hours.

Pump test run



4-2-5_TM032364_057

Pump test run

This function is primarily used for connecting pumps that do not run every day.

Benefits:

- Pumps do not seize up during a long standstill due to deposits from the pumped liquid.
- The pumped liquid does not decay in the pump.
- Trapped air is removed from the pump.
- The pump starts automatically and runs for a short time.

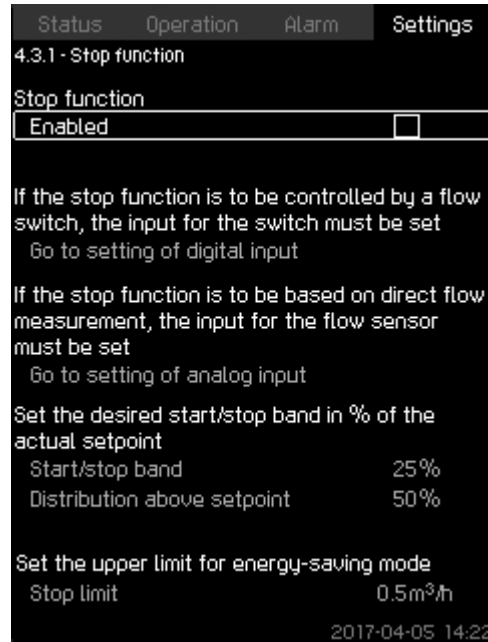
Dry-running protection

This function is one of the most important ones, as dry running may damage bearings and shaft seals.

The inlet pressure of the system or the water level in a tank, if any, on the inlet side is monitored. If the inlet pressure or the water level is too low, all pumps stop.

Level switches, pressure switches or analog sensors indicating water shortage at a set level can be used. The system can also be reset and restarted manually or automatically after water shortage.

Stop function



4-3-1_TM032365_102

Stop function

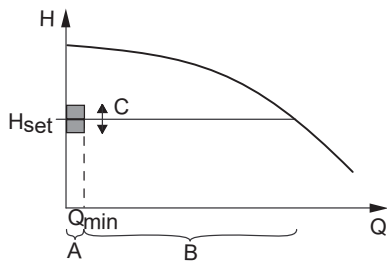
The stop function makes it possible to stop the last pump in operation if there is no or very small consumption.

Purposes are to:

- save energy
- prevent heating of shaft-seal faces due to increased mechanical friction as a result of reduced cooling by the pumped liquid
- prevent heating of the pumped liquid.

This function is only used in systems with variable-speed pumps.

When the stop function is enabled, the operation of the system is continuously monitored to detect a low flow rate. If CU 352 detects no or a low flow rate ($Q < Q_{\min}$), it changes from normal constant-pressure operation to on/off control of the last pump in operation.



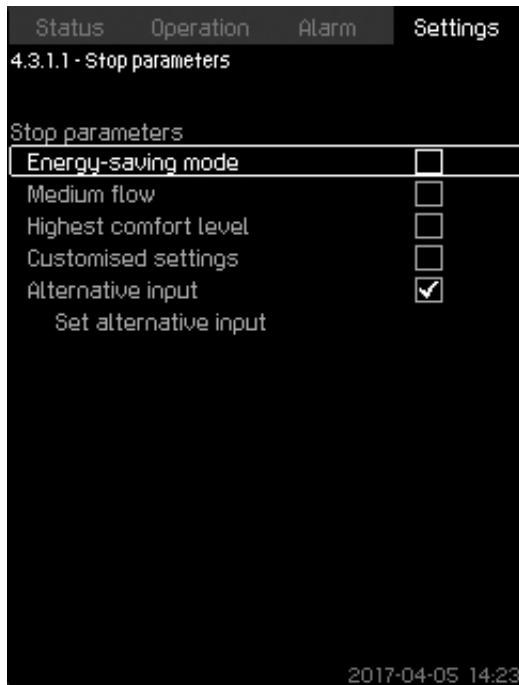
TM078147

On/off band

Pos.	Description
A	On/off control
B	Normal operation
C	Start/stop band

As long as the flow rate is lower than Q_{min} , the pump runs in on/off operation. If the flow rate rises above Q_{min} , the pumps return to normal constant-pressure operation.

Via CU 352, you can set the system to operate as energy-efficiently as possible or with the highest level of comfort.



4-3-1-1_STOP_PARAMETERS_171

Stop parameters

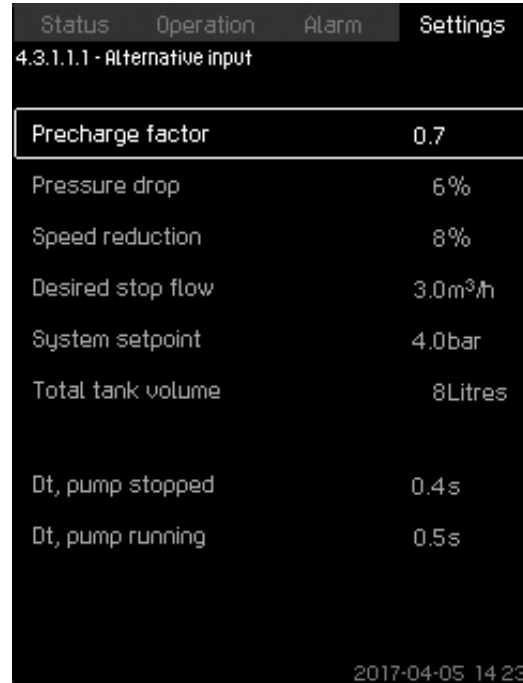
Five stop parameters can be selected:

- **Energy-saving mode (factory setting)**
It is the most energy-efficient mode possible.
- **Medium flow**
It combines energy efficiency with high comfort.
- **Highest comfort level**
It achieves the highest comfort level without too many pump starts or stops.
- **Customised settings**

It allows for customized setup.

• **Alternative input**

It allows for defining the stop flow on the basis of the system setpoint, total tank volume or pre-charge pressure.



4-3-1-1-1_ALTERNATIVE_INPUT_201

Alternative input

Setpoint ramp



4-1-9_TM052969_174

Setpoint ramp

If this function is enabled, any setpoint change made via the control unit or clock program, when changing between alternative setpoints or via a SCADA system, will be made gradually over time. In this way, smooth setpoint changes can be made, thus causing no discomfort to the consumer.

Password



4-5-4_TM032899_115

Password

Passwords make it possible to limit the access to the **Operation** and **Settings** menus of the control unit. If the access is limited, it is not possible to view or set any parameter in the menus.

Clock program

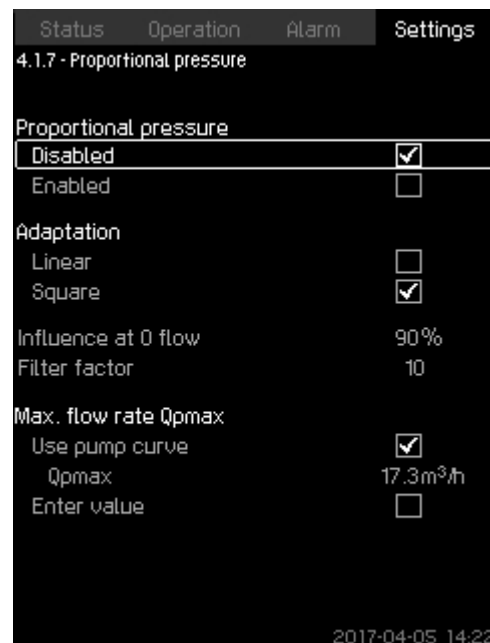


4-1-6_TM038990_129

Clock program

This function allows for specifying day and time for up to ten events, including activation or deactivation, for example, activating the sprinkling system of a golf course at fixed times for the individual greens.

Proportional pressure



4-1-7_TM038960_130

Proportional pressure

This function can be used in applications with a large pipe system, for instance a village supplied with water from a pumping station or waterworks.

Purposes are to:

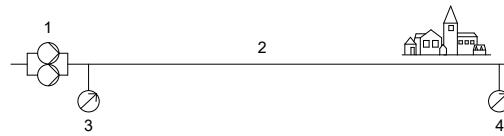
- deliver the required water at all times
- compensate for friction loss
- keep energy consumption at a minimum
- ensure the highest comfort level at tapping points, etc.
- minimise water loss from leaks
- minimize water loss from leaks
- reduce wear and tear on pipes.

With high flow rates, the pressure loss in the pipe system is relatively high. To deliver a system pressure of 5 bar in such a situation, the outlet pressure of the system must be set to 6 bar if the pressure loss in the pipe system is 1 bar.

In a low-flow situation, the pressure loss in the pipe system may only be 0.2 bar. Here the system pressure would be 5.8 bar if the setpoint was fixed to 6 bar. That 0.8 bar is too high compared with the peak situation above.

To compensate for excessive system pressure, the proportional pressure function of CU 352 automatically adapts the setpoint to the actual flow rate. The adaptation can be linear or square. Such an automatic adaptation results in large energy savings and optimum comfort at the tapping point.

Setpoint at Q_{min} with proportional-pressure control:
 $6 \text{ bar} - (6 \text{ bar} \times 0.1667) = 5 \text{ bar}$.

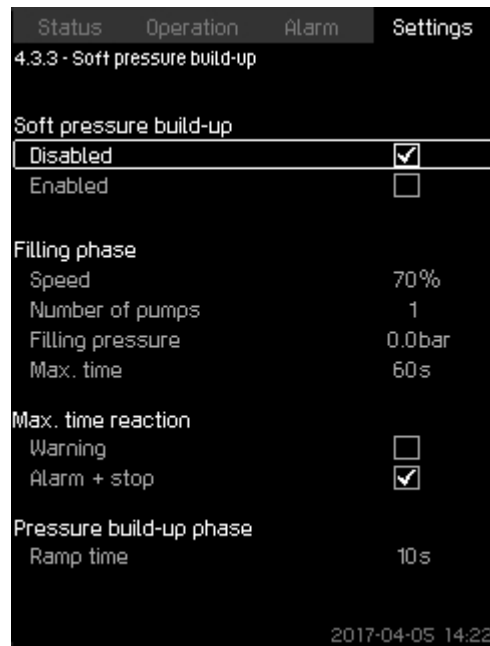


TM081526

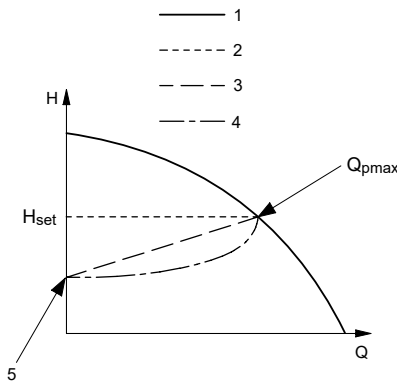
Without proportional-pressure control

Pos.	Description
1	Pumping station
2	Pressure loss Q_{max} : 1 bar Q_{min} : 0.2 bar
3	Setpoint: 6 bar
4	System pressure Q_{max} : 5 bar Q_{min} : 5.8 bar

Soft pressure build-up



4-3-3_TM038970_133



TM038524

Proportional-pressure control

Pos.	Description
1	Pump curve
2	Setpoint
3	Resultant setpoint, linear
4	Resultant setpoint, square
5	Starting point of proportional-pressure control (influence at 0 flow = x % of H_{set})

Q_{pmax} is the expected maximum flow rate. It can be set to either the maximum flow the system can deliver at a determined setpoint, or a value entered manually based on a known or assessed maximum flow rate.

Example

Influence at 0 flow (Q_0) = pressure loss in supply pipe x 100 / setpoint.

Influence at 0 flow (Q_0) = 1 bar x 100 / 6 bar = 16.67 %.

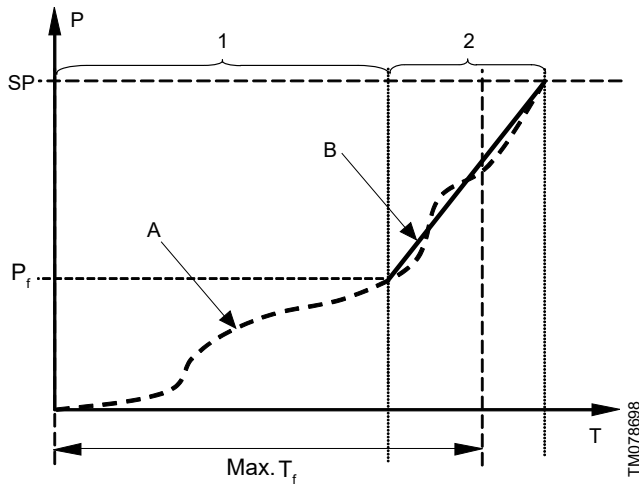
Soft pressure build-up

This function is typically used in pressure-boosting applications and ensures a smooth startup of systems with, for instance, empty pipes.

Startup takes place in two phases:

- **Filling phase (1):** The pipes are slowly filled with water. When the pressure sensor of the system detects that the pipes are filled, phase 2 begins.
- **Pressure build-up phase (2):** The system pressure is increased until the setpoint (SP) is reached. The pressure buildup takes place over a ramp time. If SP is

not reached within a given time, a warning or an alarm can be given, and the pumps can be stopped at the same time.



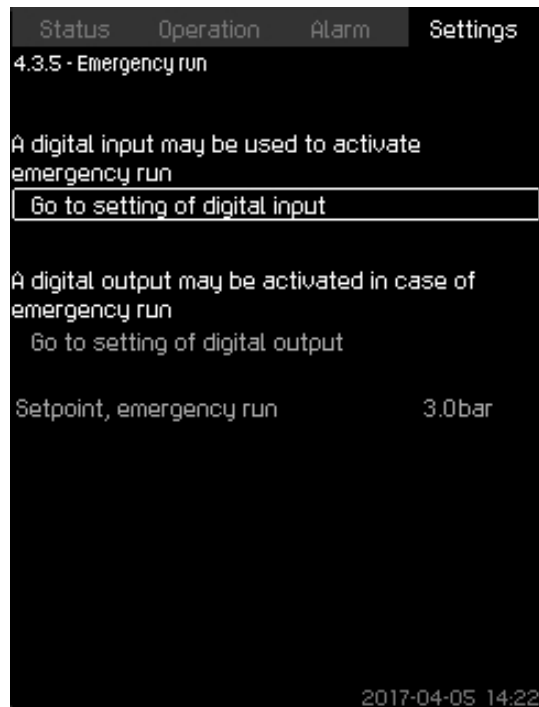
Filling and pressure buildup phases

P: Pressure T: Time [second]

P_f: Filling pressure T_f: Filling time

Pos.	Description
1	Filling phase: constant-curve operation
2	Pressure build-up phase: constant-pressure operation
A	Actual value
B	Setpoint ramp-up

Emergency run



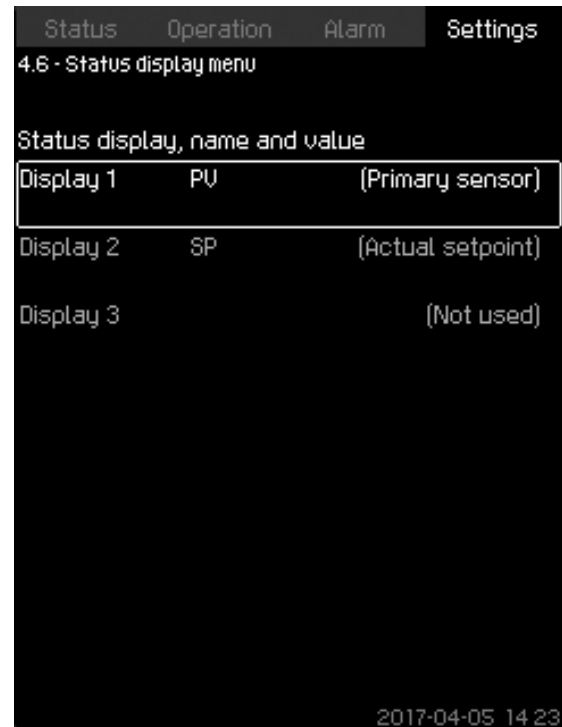
Emergency run

This function is for systems where the operation must not be interrupted. The function keeps all pumps running regardless of warnings or alarms. The pumps run according to a setpoint set specifically for this function.

Reduced operation

This function makes it possible to reduce the operation of the system via a digital input. The function is used in applications where the mains power is sometimes switched to generator power. To avoid using more power than the generator can deliver, the system can be derated via a digital input.

Status display menu



Status display menu

This main status menu can display up to three status values.

In this menu, you can define each status value and a name for the value.

Examples:

- PV: process value
- SP: setpoint
- Q: flow rate.

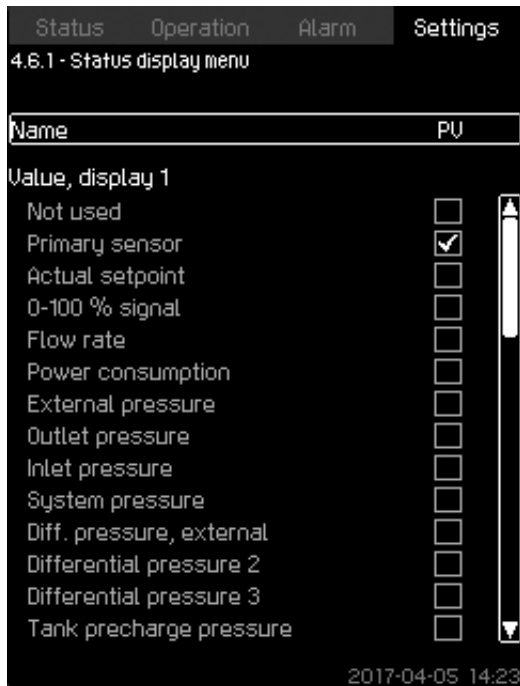
Setting range

1. Name of each display value.
2. Selection of displays 1 to 3.

Setting the display value

1. Go to the **Settings** menu.
2. Select **Status display menu**.
3. Mark the display and press **OK**.

4. Enter a name for display value.
5. Define the function of the display.

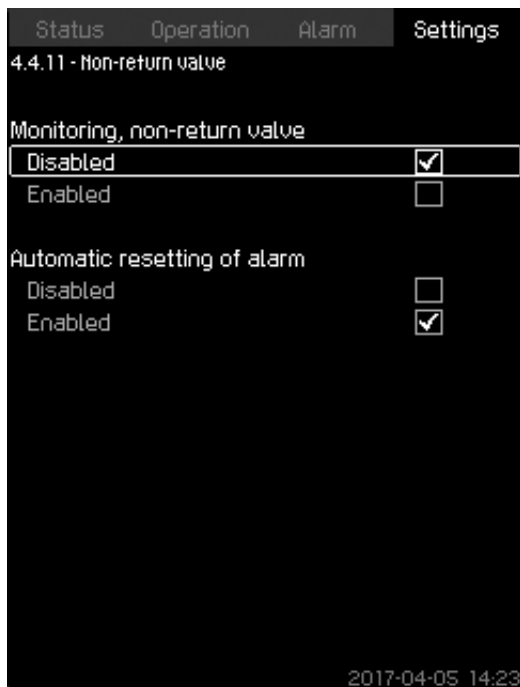


Status display menu

Factory settings

Display 1: PV, primary sensor.
 Display 2: SP, actual setpoint.

Non-return valve



Non-return valve

The function enables CU 352 to detect if a non-return valve is leaking or faulty. A small leakage after five accumulated incidents results in a warning. A faulty non-return valve will instantly result in an alarm and pump stop. In such case, the motor is not able to overcome the backflow through the pump with the faulty non-return valve.

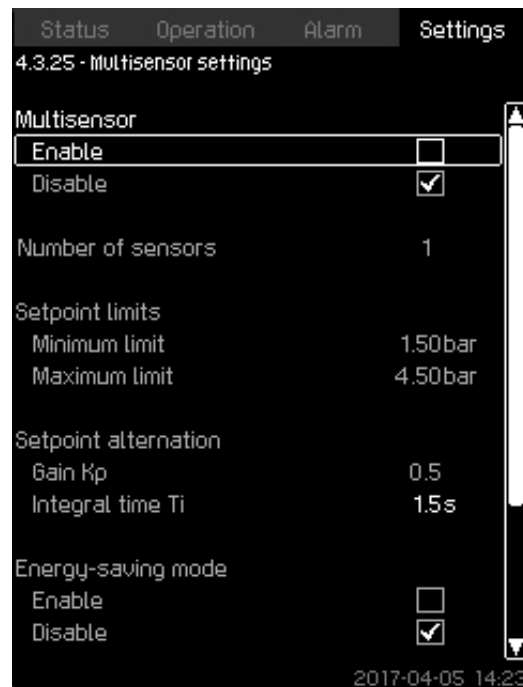


The function is only valid for an MPC-E system with MGE motors, model F, G, H, I, J or K.



The function is only valid for an MPC-E system with MLE motors, model F, G, H, I, J or K.

Multisensor settings



Multisensor settings

The function is designed for controlling up to six different zones in a HVAC system with a defined differential-pressure band. If one of the multi-sensor signals is outside the specific sensor limits (minimum or maximum), the function adjusts the setpoint (SP) up or down to ensure that the specific sensor or zone is kept within its pressure band.

You can adjust the reaction of the setpoint influence by the means of dedicated setpoint alternation, Kp and Ti values. If more sensors are below or above their limits, they can be prioritised. Through activating the energy-saving mode, the system can optimise the actual setpoint by lowering it to the minimum limit of one of the multisensors.

If more sensors are below or above their limits, they can be prioritized. Through activating the energy-saving mode, the system can optimize the actual setpoint by lowering it to the minimum limit of one of the multisensors.

4-6-1_STATUS_DISPLAY_MENU_197

4-3-25_MULTISENSOR_186

4-4-11_NON-RETURN_VALVE_202

If the multisensor function is enabled, it has higher priority and the following programs are overruled:



- **Clock program**
- **Proportional pressure**
- **Alternative setpoints**
- **External setpoint influence**
- **Setpoint ramp.**

Counter inputs

Status	Operation	Alarm	Settings
4.3.11.1 - Volume counter			
Select digital input for volume counter			
Not used			<input checked="" type="checkbox"/>
DI1 (IO 351-41), [10] (Not used)			<input type="checkbox"/>
DI2 (IO 351-41), [12] (Not used)			<input type="checkbox"/>
Select unit			
p/m3			<input checked="" type="checkbox"/>
p/l			<input type="checkbox"/>
p/gal			<input type="checkbox"/>
Set scaling			
Pulse per unit			0 p/m3
2017-04-05 14:23			

4-3-11-1_VOLUMIE_COUNTER_195

Volume counter

You can set CU 352 to accumulate a pumped volume from a digital water meter.



This menu only appears if an IO 351B module is connected to CU 352.

6. Installation

Mechanical installation

Location



The system is only designed for indoor installation. Do not expose the system to direct sunlight.

- Install the system in a well-ventilated room to ensure sufficient cooling of the control cabinet and pumps.
- Install the system with a one-meter (3 ft) clearance on all sides for inspection and removal.

Pipes

WARNING

Hot surface

Death or serious personal injury



- To avoid stress on pipes or joints inside the pumping system, do not apply any extra tension on the connection to the main pipeline.
- Make sure that the thermal expansion does not cause any damage to the joints.

WARNING

Hot surface

Death or serious personal injury



- Install the external pipe connections according to the guidelines of the pipe manufacturers to avoid excessive stress on the pipes.



The screws for connecting the pipe must be at least Grade 8, in case the deformation causes pipe leakage.

Arrows on the pump base show the direction of the flow through the pump.

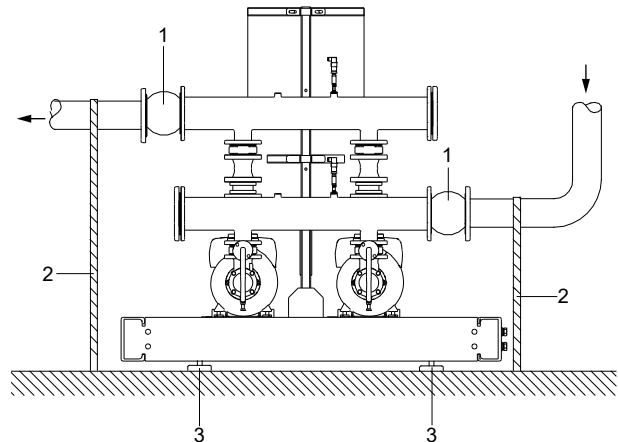
The pipes connected to the system must be of adequate size.

Connect the pipes to the manifolds of the system. Either end of the manifold can be used. Apply a blind flange to the unused end of the manifold. For the other side of the manifold, you need to remove the flange protector first before you connect the manifold to the pipes of the customer. For manifolds with flanges, install a blind flange with a gasket.

To optimize the operation and minimize the noise and vibration, it may be necessary to consider vibration damping of the system.

Noise and vibration are generated by the motor and pump rotations, and flow in the pipes and fittings. The effect on the environment is subjective and depends on the correct installation and the state of the other parts of the system.

If systems are installed in blocks of flats, or the first consumer on the line is close to the system, we recommend that you install expansion joints on the inlet and outlet pipes to prevent vibration from transmitting through the pipes.



TM084440

Example showing the position of expansion joints, pipe supports and machine shoes

Pos.	Description
1	Expansion joint
2	Pipe support (and good location for system isolation valve)
3	Vibration damper (machine shoe)



Expansion joints, pipe supports and machine shoes shown in the figure above are not included in a standard system.

Foundation

We recommend that you install the system on an even and solid surface, such as a concrete floor or foundation. If the system is not equipped with vibration dampers, bolt it to the floor or foundation.

The weight of a concrete foundation must be at least 1.5 times the weight of the system.

Vibration dampers

To prevent the transmission of vibration to buildings, we recommend that you isolate the system foundation from the building parts by vibration dampers.

A proper damper varies in different installation situations, and a wrong damper may increase the vibration level. Vibration dampers must therefore be sized by the supplier. If the system is installed on a base frame with vibration dampers, always install expansion joints on the manifolds. This is important to prevent the system from "hanging" on the pipes.

Expansion joints

Install expansion joints for the following reasons:

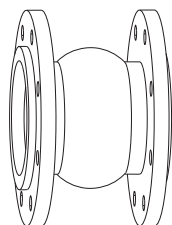
- to absorb expansions or contractions in the pipes caused by changes in liquid temperature
- to reduce mechanical strain caused by pressure surges in the pipes
- to isolate mechanical structure-borne noise in the pipes (only expansion joints like rubber bellows).



Do not install expansion joints to compensate for inaccuracies in the pipes, such as flange center displacement.

Proceed with the following steps when you install an expansion joint:

- Install expansion joints at a minimum distance of 1 to 1.5 times the nominal flange diameter from the manifold on the inlet and on the outlet side. This prevents the development of turbulence in the expansion joints, resulting in better inlet conditions and a minimum pressure loss on the pressure side.



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Example of an expansion joint

- Expansion joints with limiting rods can be used to minimize the forces caused by the expansion joints. We always recommend that you use expansion joints with limiting rods for flanges larger than four inches.
- Anchor the pipes so that they do not stress the expansion joints and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

Electrical installation

The electrical installation must be carried out by authorized personnel in accordance with local regulations.

- The electrical installation of the system must be carried out in accordance with UL type 12.
- Make sure that the supply voltage and frequency correspond to the values stated on the nameplate. Contact Grundfos if you have special voltage requirements.
- Make sure that the conductor cross-section meets the specifications in the wiring diagram.



The mains connection must be set up as shown in the wiring diagram.

7. Selection of product

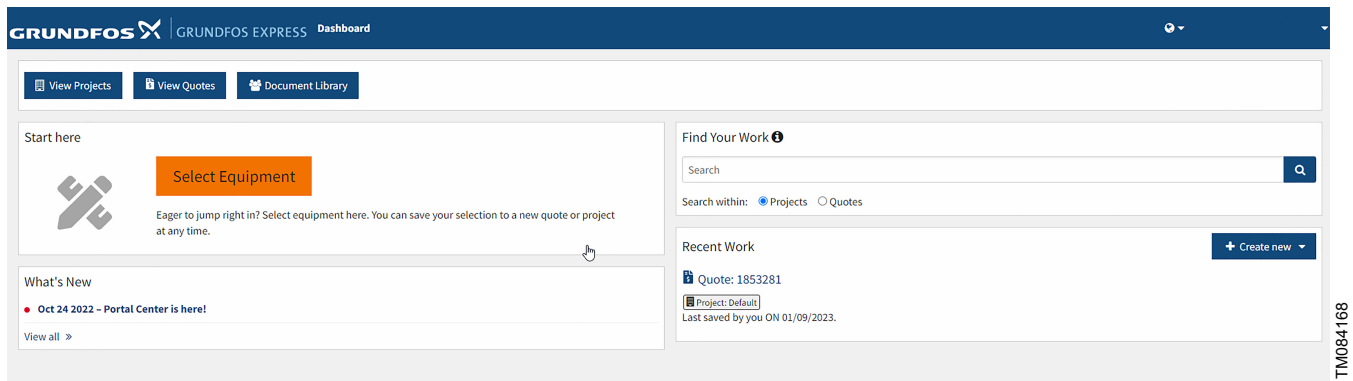
When sizing a system, you need to consider the following aspects:

- The performance of the system must meet the highest possible demand in terms of both flow rate and pressure.
- The system must not be oversized. This is important in relation to installation and operating costs.

You can size the systems via Grundfos Express or this data booklet.

Sizing in Grundfos Express

We recommend that you size your system in Grundfos Express (<https://grundfos.portal.intelliquip.com>), which is a selection program offered by Grundfos.



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Webpage of Express

Sizing via this data booklet

If you size the system by this data booklet, you need to consider the items below:

- heating and cooling load requirement
- differential temperature (ΔT) requirement
- flow requirement
- head loss
- static lift (if applicable)
- NPSH (if applicable)
- accessories.

For detailed information about how to consider these seven items, see the corresponding sections below.

Closed-loop systems

A closed-loop system, like chilled or hot water loops where all the pipes are filled with water, is not open to the atmosphere. The static pressure exerted by the vertical column of the pipe is equal on both sides of the pump. Circulator pumps only need to overcome the frictional losses in the piping and the associated components. It is not necessary for the pumps to lift the water from a lower level.

Here the circulation pumps just need to overcome the frictional resistance offered by the heat transfer equipment, pipes and valves. The vertical height of the pipes hardly affects the system resistance as it gets nullified by the static water column.

Heating and cooling load requirement

Heating and cooling load requirements need to be calculated based on the location, space, construction, occupancy, and heat-generating equipment that are present. Heating loads are typically determined in Btu/h, while cooling loads are typically determined in tons of cooling.

Differential temperature (ΔT) requirement

Boilers are typically designed for a differential temperature (ΔT) of 20 °F. However, this requirement depends on the boiler used. Refer to the manuals from the boiler manufacturer for details.

Chillers are typically designed for a differential temperature (ΔT) of 10 °F, which is commonly used. However, this requirement depends on the chiller used. Consult the chiller manufacturer for details.

Flow requirement

After determining the heating and cooling load and the differential temperature (ΔT) requirement, a flow can be calculated by using one of the following equations:

$$Flow = \frac{Btu/h}{Specific\ heat \times Density \times \Delta T}$$

$$Flow = \frac{12000 \times Tons\ of\ cooling}{Specific\ heat \times Density \times \Delta T}$$

Example: 6000 MBH heating load requirement

$$Flow = \frac{6000000 \frac{Btu}{h} \times \frac{1h}{60min}}{1 \frac{Btu}{lb^{\circ}F} \times 8.34 \frac{lb}{gal} \times 20^{\circ}F}$$

$$Flow = 600USGPM$$

Example: 1000 tons cooling load requirement

$$Flow = \frac{12000 \frac{Btu}{h\ tons} \times 1000\ tons \times \frac{1h}{60min}}{1 \frac{Btu}{lb^{\circ}F} \times 8.34 \frac{lb}{gal} \times 10^{\circ}F}$$

$$Flow = 2400USGPM$$

Both equations can be further simplified if the media is water at 68°F.

Equation A can be replaced with equation B.

The simplified heating load equation would be equation C.

Equation A

$$\frac{1\ h}{60\ min} \times \frac{12000\ Btu}{1\ lb^{\circ}F \times 8.34\ gal}$$

Equation B

$$\frac{1\ h}{500\ min} \times \frac{Btu}{gal^{\circ}F}$$

Equation C

$$Flow = \frac{6000000 \frac{Btu}{h\ min}}{500 \frac{Btu}{gal^{\circ}F} \times 20^{\circ}F}$$

Load profile

The water consumption pattern in the air-conditioning system of a commercial building depends on the thermal load inside the building. This is affected by factors such as the number of people at a given time, climate, building insulation, building orientation against solar radiation, building lighting, equipment, and chiller selection.

The load profile can be determined by estimating how many hours per day the system will demand a specific water flow. The most important thing to consider when selecting a pump

for variable flow is that the peak flow does not occur most of the time, so it is imperative to choose pumps that offer the best efficiency with lower frequent flows. This is counterintuitive as we have the tendency to select a pump with the best efficiency at the peak flow, which will lead to an application that uses much more energy than needed.

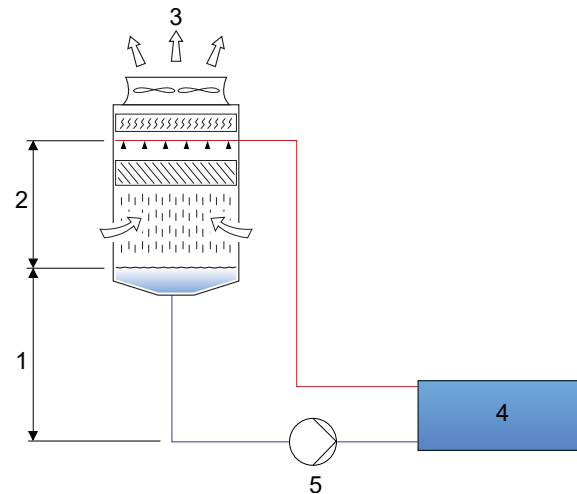
Head loss

Each source-to-load and load-to-source path must be evaluated for frictional losses through pipes, fittings, equipment, and the highest frictional losses added together. This combined value determines the required head of the pump.

Open-loop systems

Condenser water pumping systems in air-conditioning applications are open-loop systems since the media (water) is open to the atmosphere at the cooling tower.

It means that when the condenser water pump is stopped, water gets fills in the pipes up to the level maintained in the cooling tower pond. When the pump is restarted, it must work to lift the water from the pond to the cooling tower nozzles in addition to working against the frictional resistance in the pipes and associated fittings of the system.



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Pos.	Description
1	Static water column when the pump is stopped
2	Static lift
3	Cooling tower
4	Chiller
5	Condenser water pump

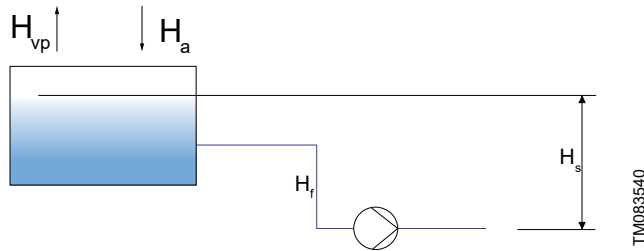
Static lift

For open-loop systems as described above, the static lift must be added to the head loss calculated earlier.

NPSH

For open-loop systems, NPSHa (Net Positive Suction Head available) at site must be kept sufficiently higher than that required for the pump duty. Typically, an NPSH margin ratio of 1.1 or 2.0 ft minimum is suggested. NPSHa is supplied by the system, and it is solely a function of the system design on the inlet side of the pump.

To avoid cavitation, the NPSHa of the system must be greater than the NPSH required by the pump at the largest flow requirement.



$$NPSHa = H_a + H_s - H_{vp} - H_f$$

H_a	the head on the surface of the liquid in the tank or sump, such as atmospheric pressure
H_s	the vertical distance of the free surface of the liquid above the center line of the impeller. If the liquid is below the pump center line, this value becomes negative.
H_{vp}	the vapour pressure of the liquid at the highest pumping temperature
H_f	the friction losses in the inlet piping

Accessories

GRUNDFOS DELTA HCU ACCPACK is an add-on package to our modular systems designed for circulating fluid in HVAC applications. GRUNDFOS DELTA HCU ACCPACK contains tanks, air handling equipment, glycol or water make-up, and water treatment options. These components can also be purchased as ship-loose components for field installation.

Air separator

Air separators are typically selected based on their flow rates. Refer to the manufacturer's recommended maximum flow rate to select the appropriate size.

Expansion tank

Expansion tanks can typically be sized on the manufacturer's website or by using the guide below. To size an expansion tank, the following information is required:

- total system water content (gallon)
- temperature of the water when the system is filled (°F)
- average maximum operating temperature (°F)
- minimum operating pressure (psig)
- maximum operating pressure (10 % below relief valve) (psig).

The size of the expansion tank is calculated by the steps below:

1. Enter the total system water content (the first item on the bullet list above).
2. Use the expansion factor table. Find and enter the expansion factor.
3. Multiply the value of step 1 by that of step 2. This gives you the expanded water volume in gallon.
4. Use the acceptance factor table. Find and enter the acceptance factor.
5. Divide the value of step 3 by that of step 4. This gives you the total tank volume in gallon required.

The volume of the diaphragm expansion tank must satisfy both the expanded water volume in step 3 and the total tank volume in step 5. Bladder tanks must satisfy the total tank volume in step 5.

Glycol make-up package

A general guideline for sizing the glycol make-up package reservoir is to ensure a 1 % leak load. This means that the container size should be equal to 1 % of the system volume.

Buffer tank (on request)

Chilled water buffer tanks are typically sized according to the following:

$$BT \text{ capacity} = TCC \times MRSV - ASV$$

BT capacity:	Buffer tank capacity
TCC:	Total chiller capacity
MRSV:	System volume suggested by the manufacturer. Chiller manufacturers recommend 3 to 6 gallons per ton for HVAC application and 6 to 10 gallons per ton for nominal cooling when temperature accuracy is critical.
ASV:	Actual System Volume

Hot water buffer tanks are typically sized according to the following:

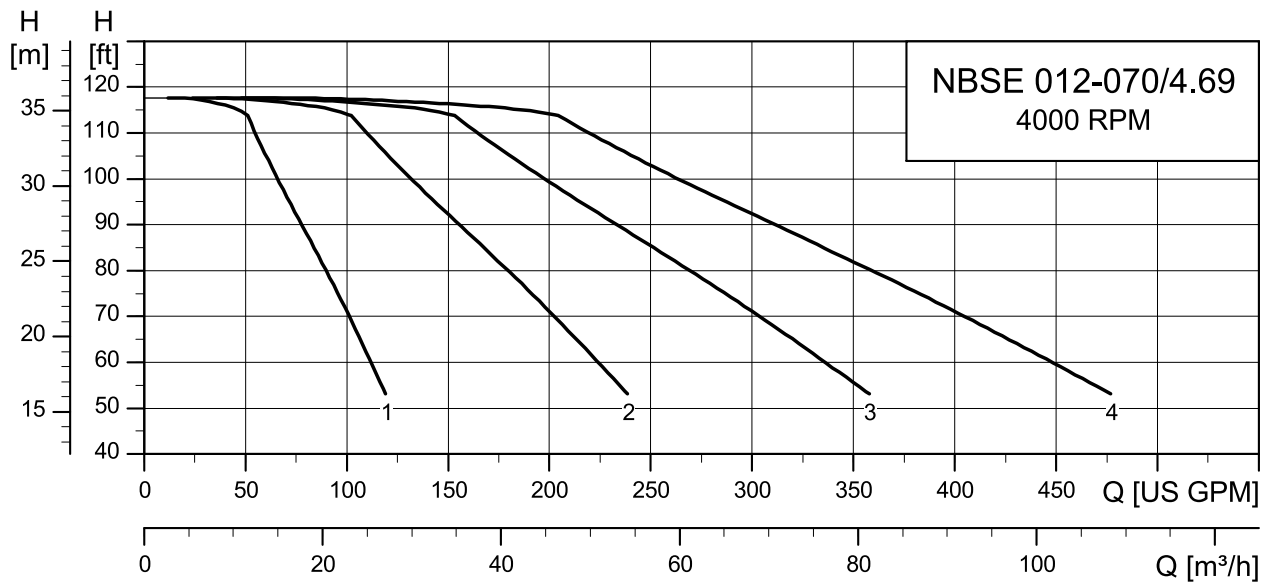
$$BT \text{ capacity} = \frac{MMBCT \times (MBO - MSL)}{\Delta T \times 500}$$

BT capacity:	Buffer tank capacity
MMBCT:	Minimum boiler cycle time suggested by the manufacturer. Typically, from 1 to 5 minutes.
MBO:	Minimum boiler output
MSL:	Minimum system load. It is assumed to be 0 if there is no system load or the rate is unknown.
ΔT :	Temperature differential within the tank. The temperature differential can vary between 5 and 25 °F, typically 10 °F.

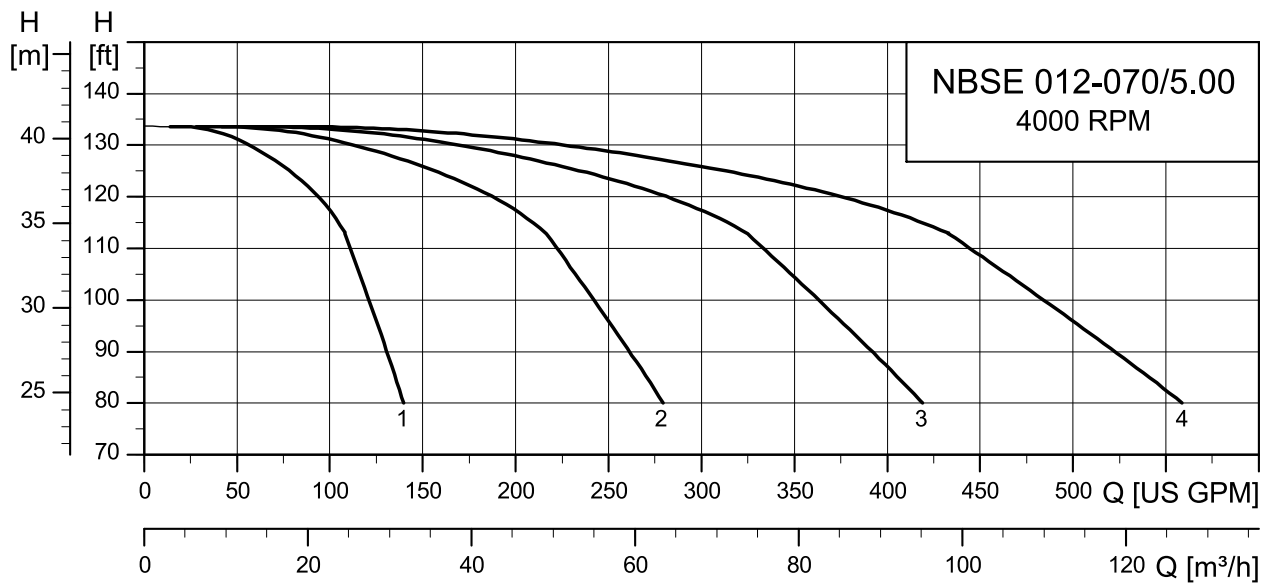
8. Performance curves

NBSE, 4000 rpm

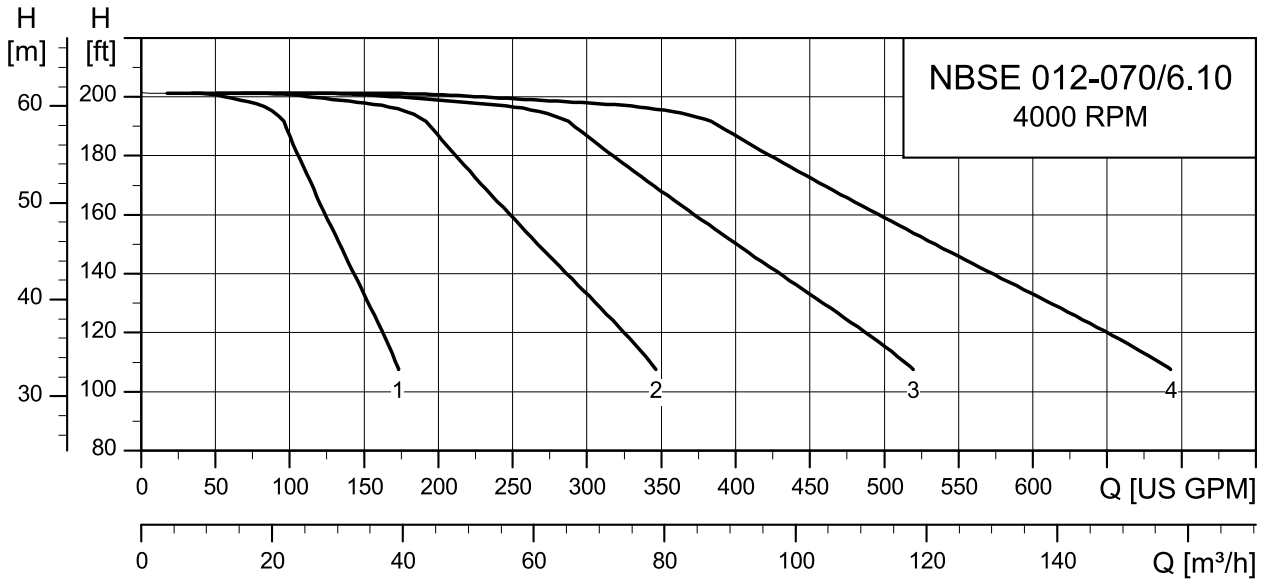
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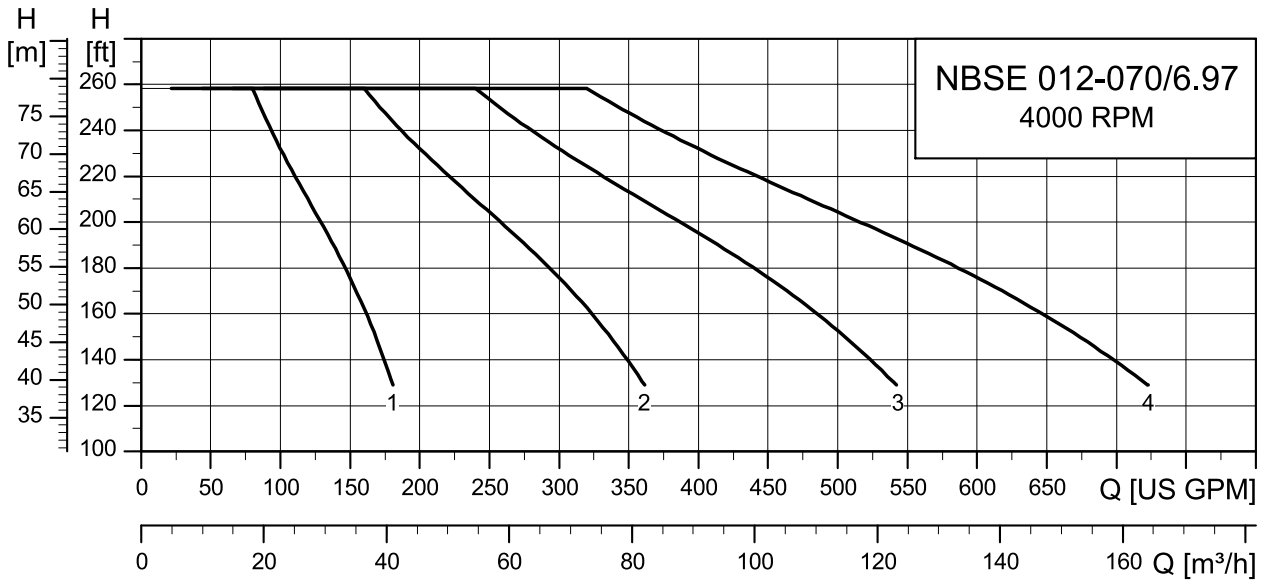
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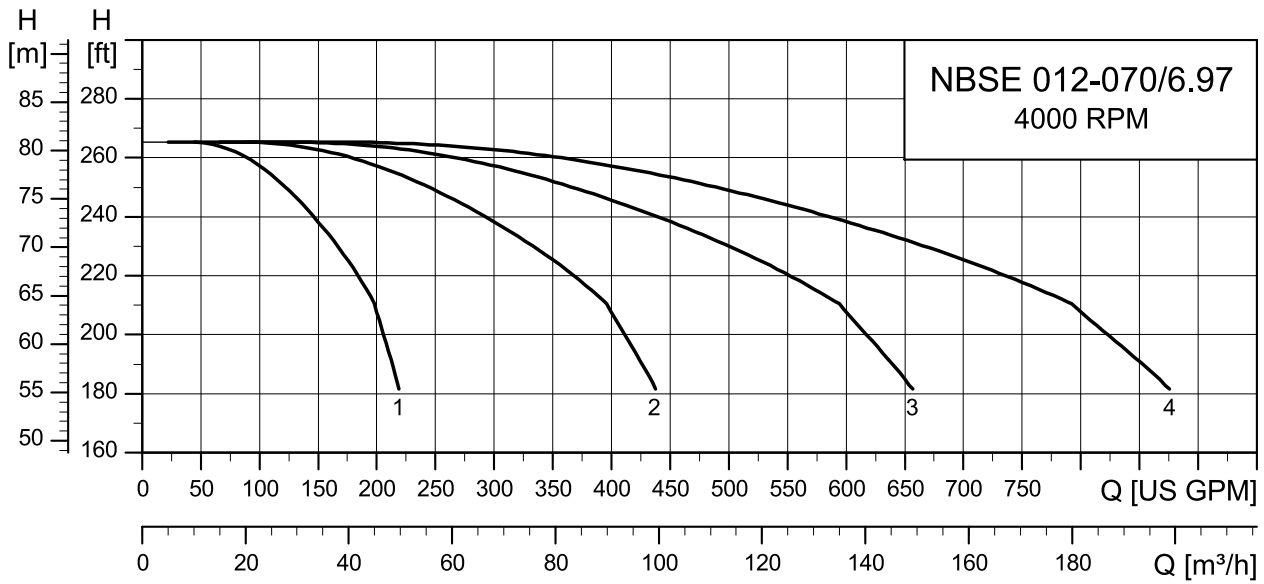


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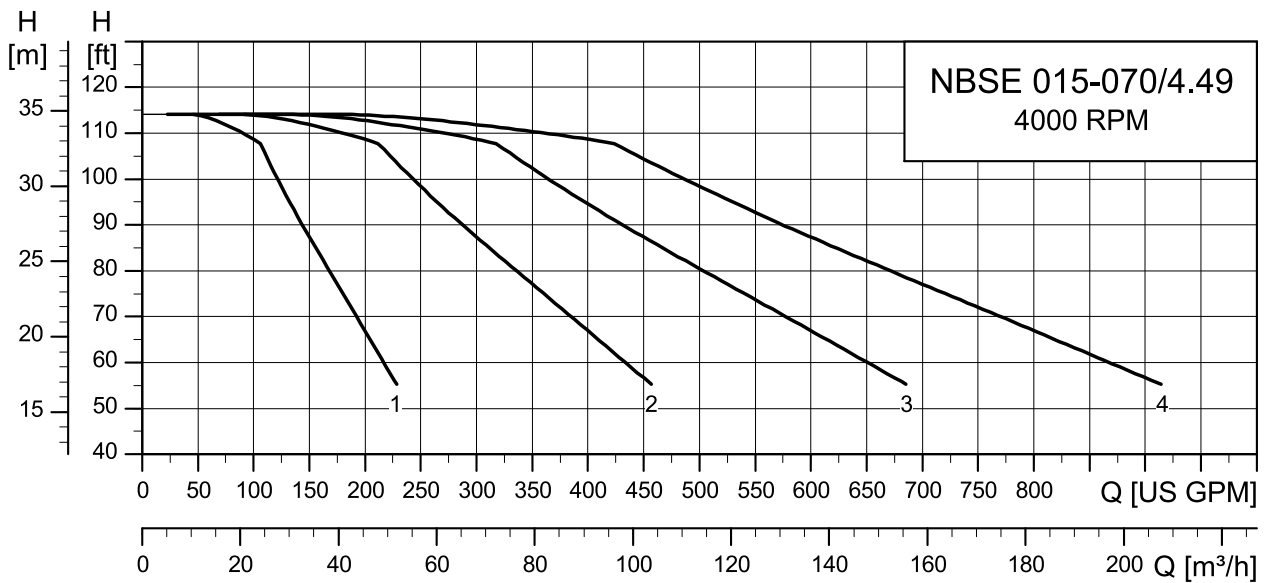
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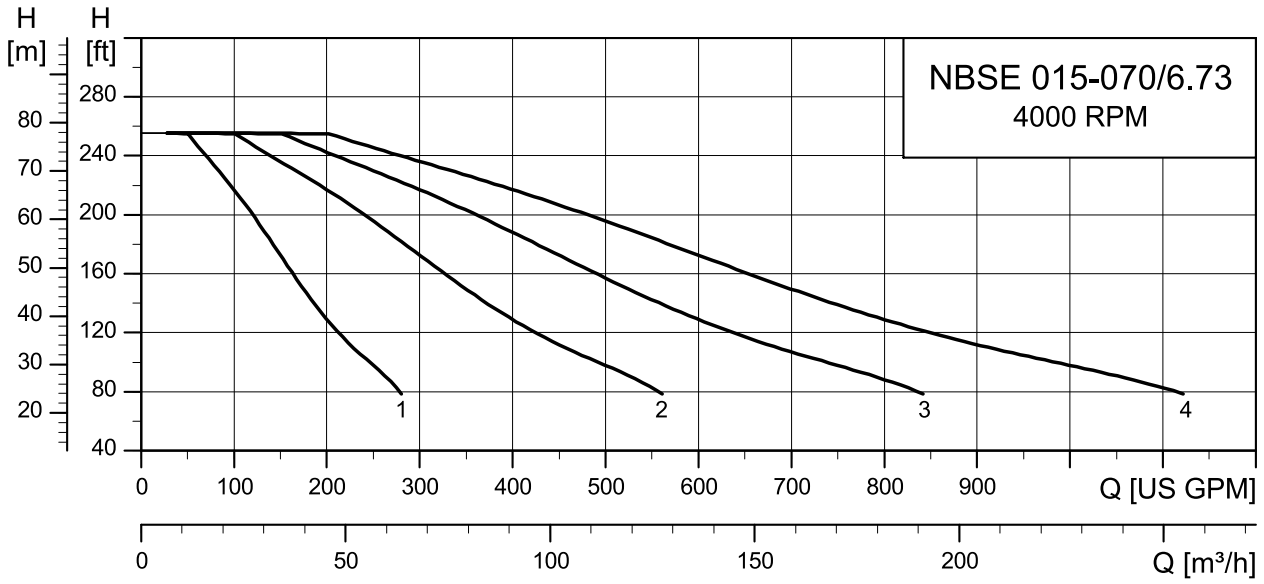


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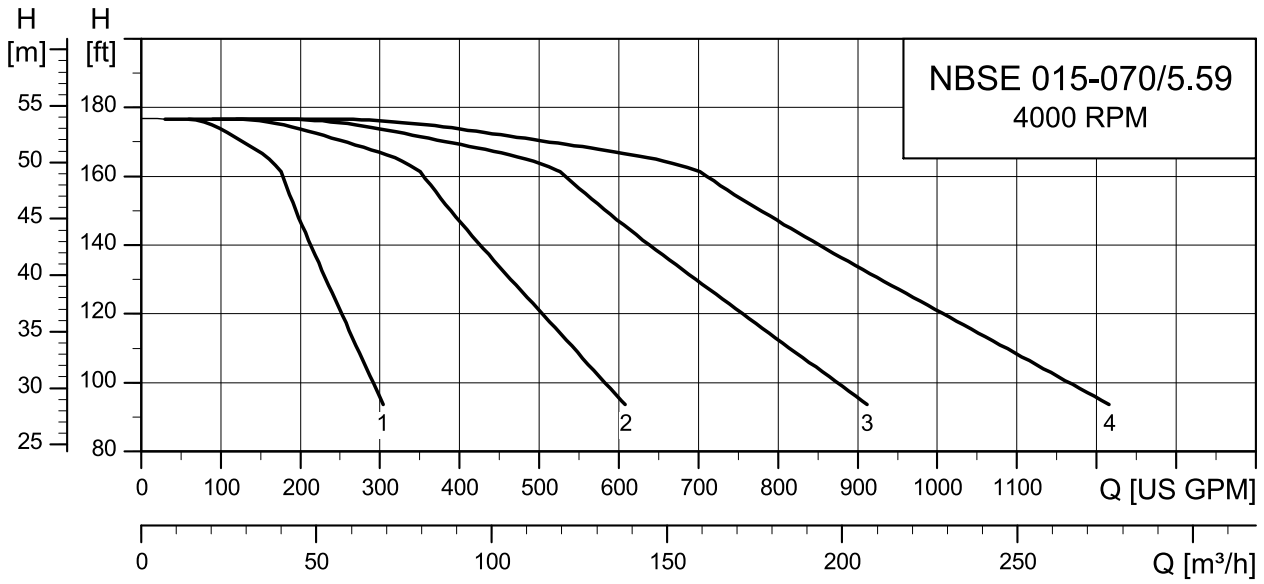
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NBSE 015-070

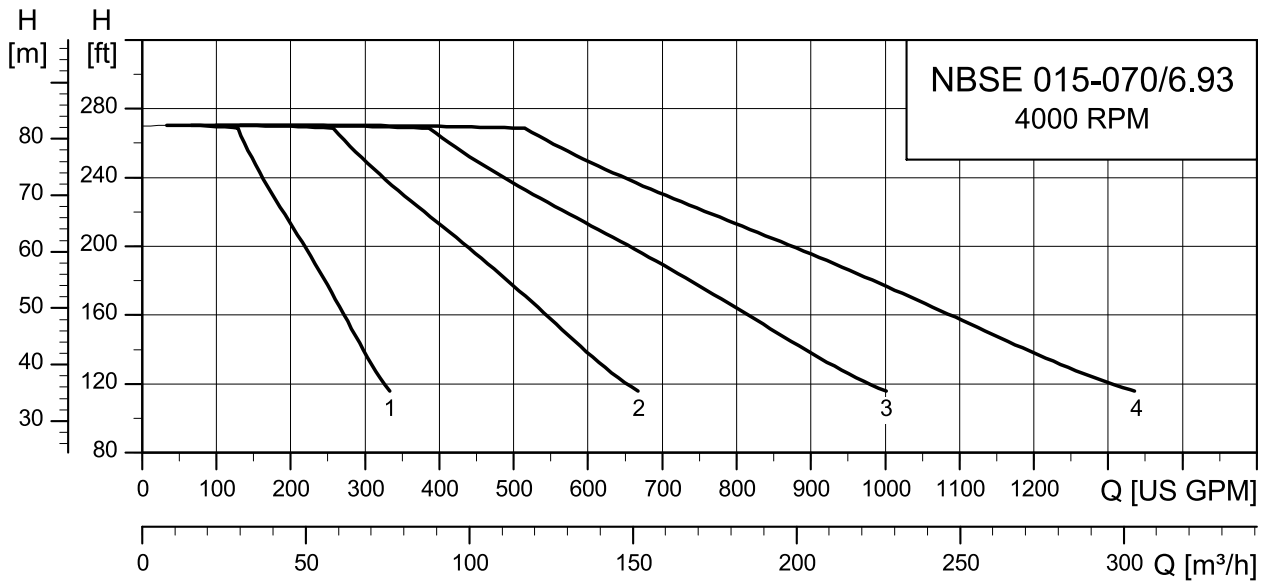
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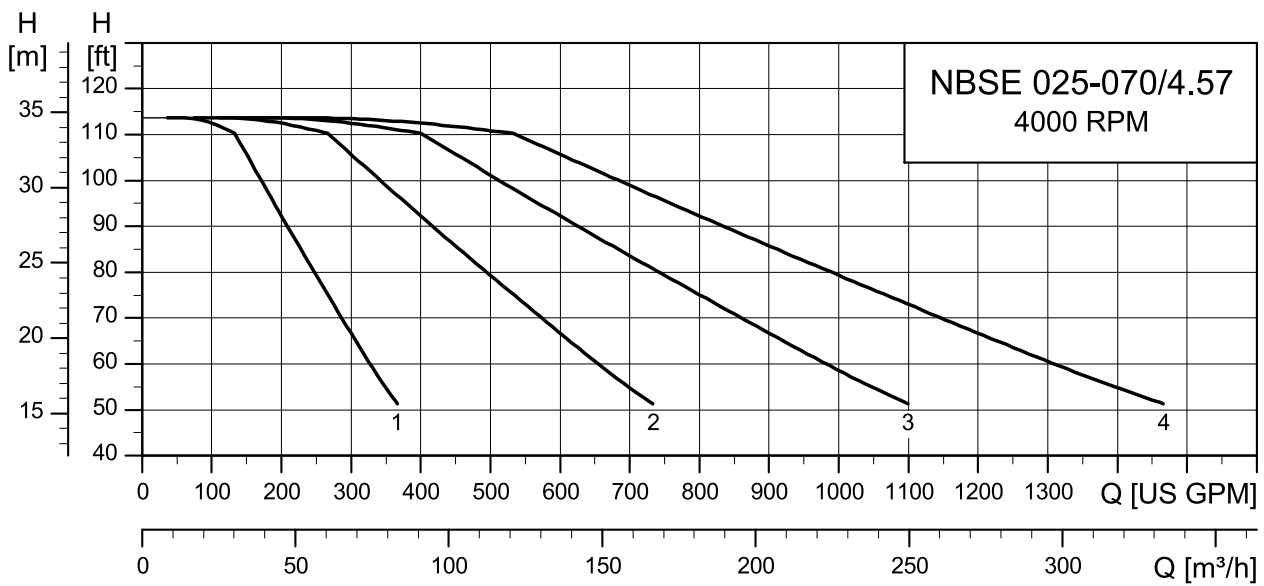
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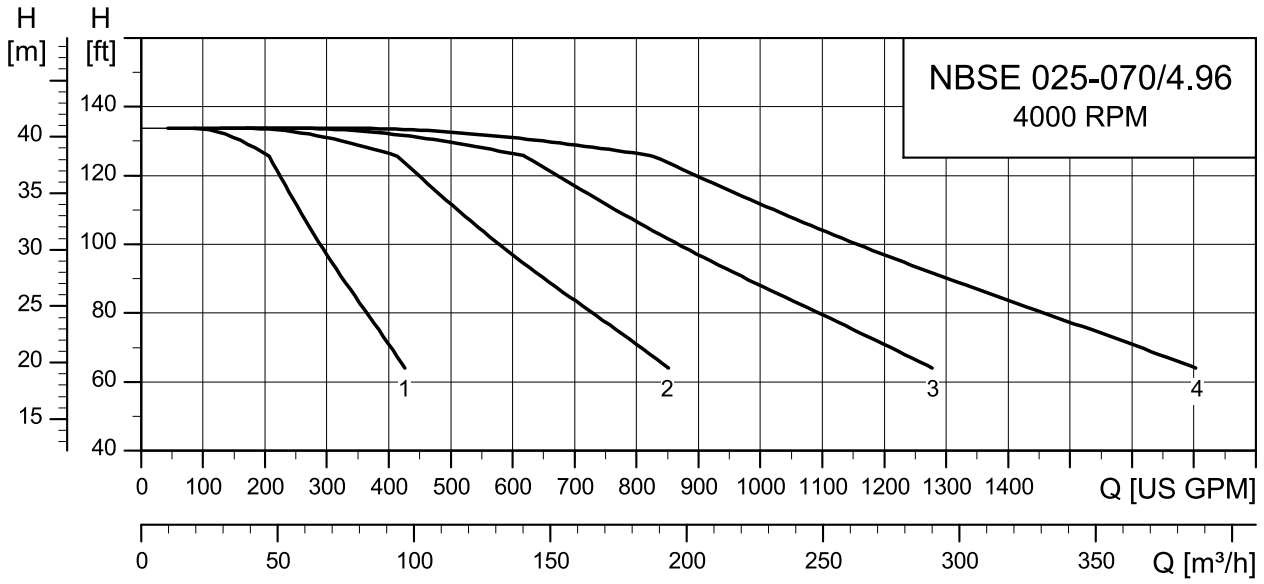
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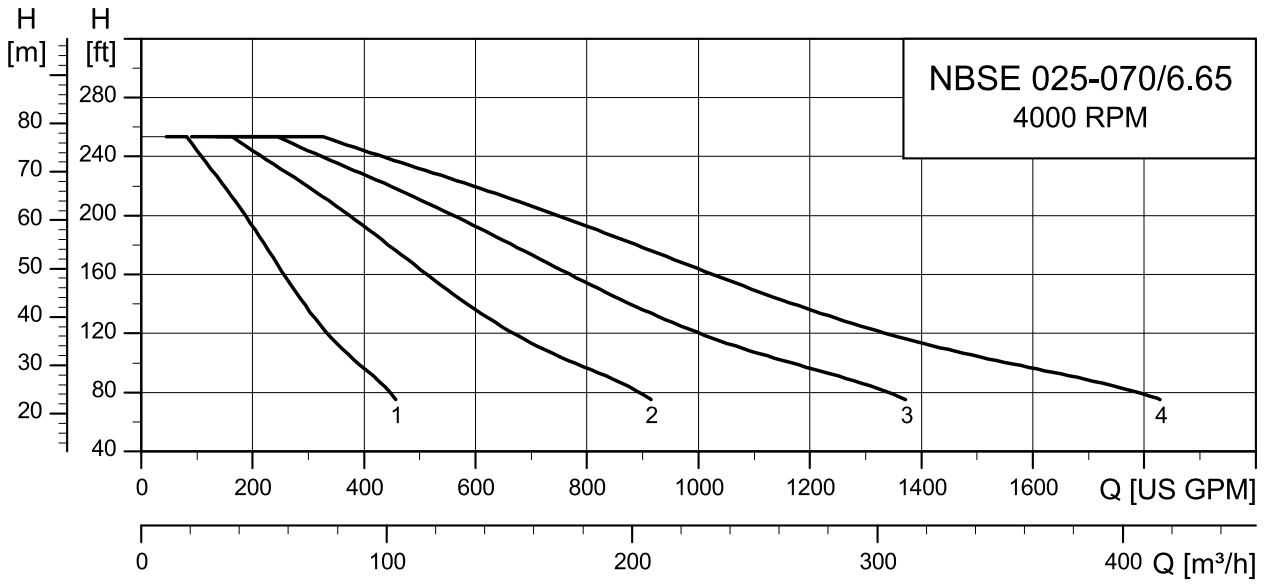
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NBSE 025-070

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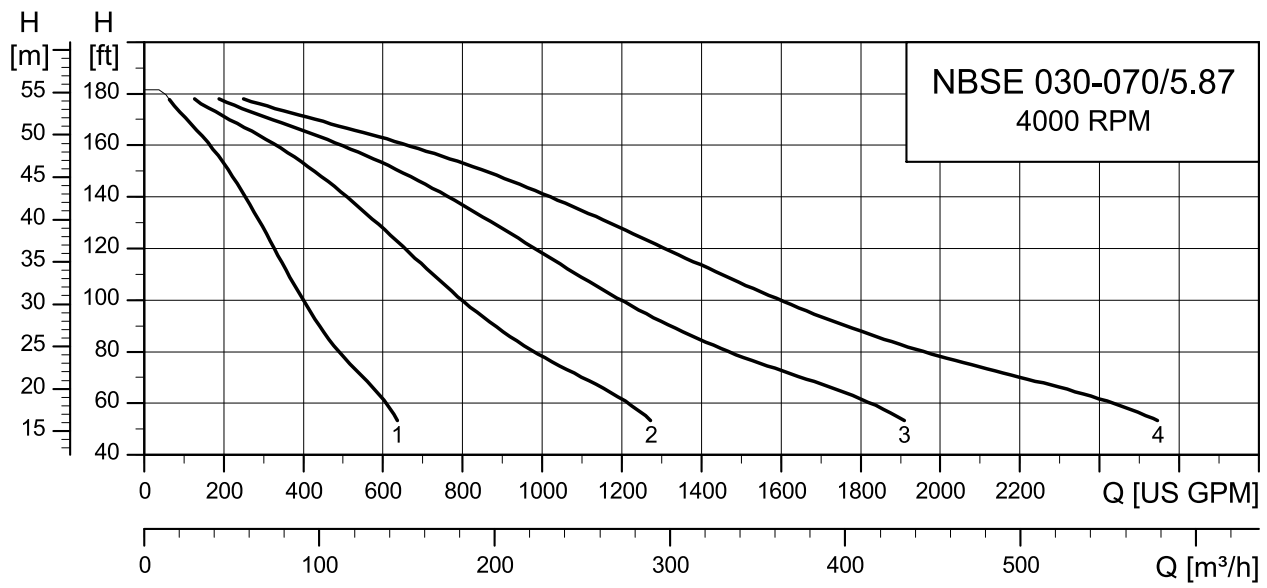


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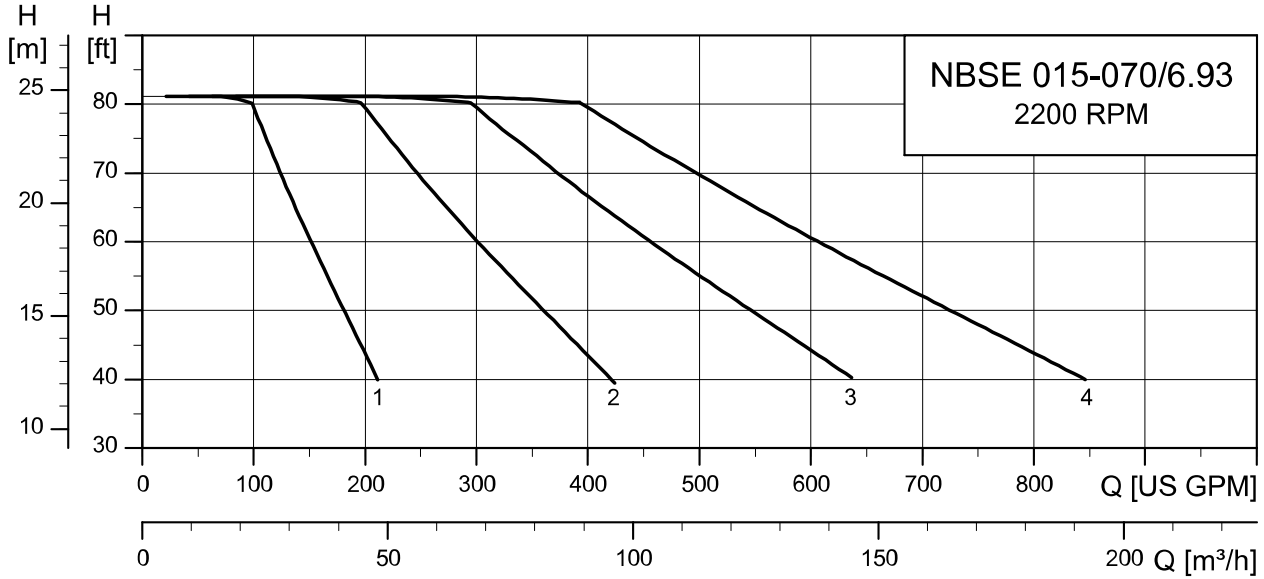
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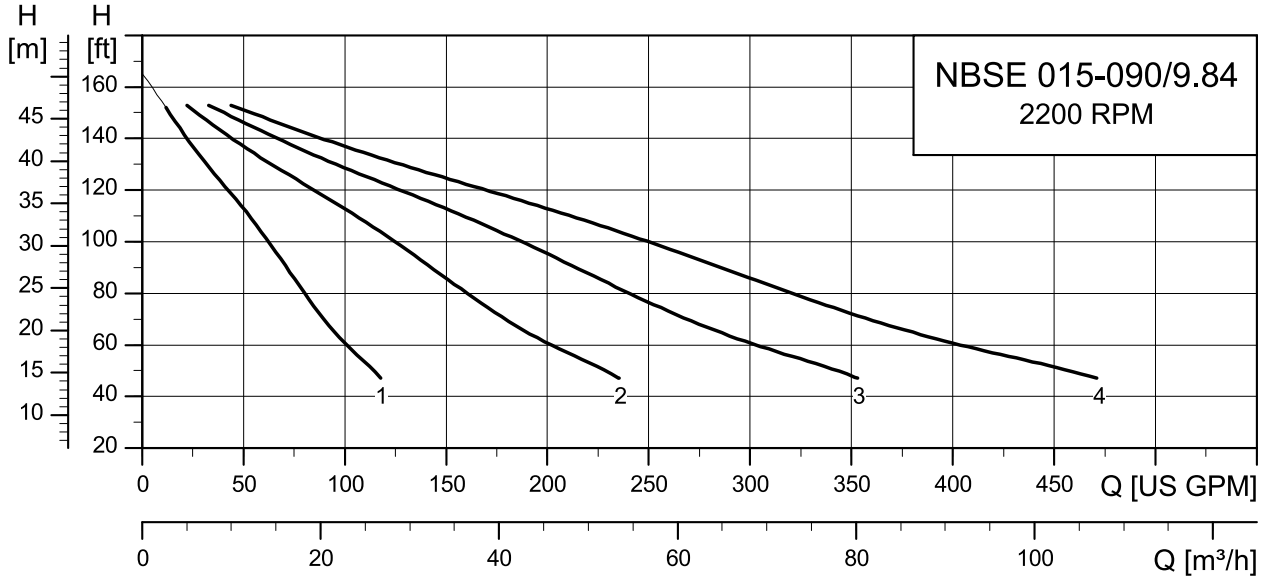
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NBSE 015-070



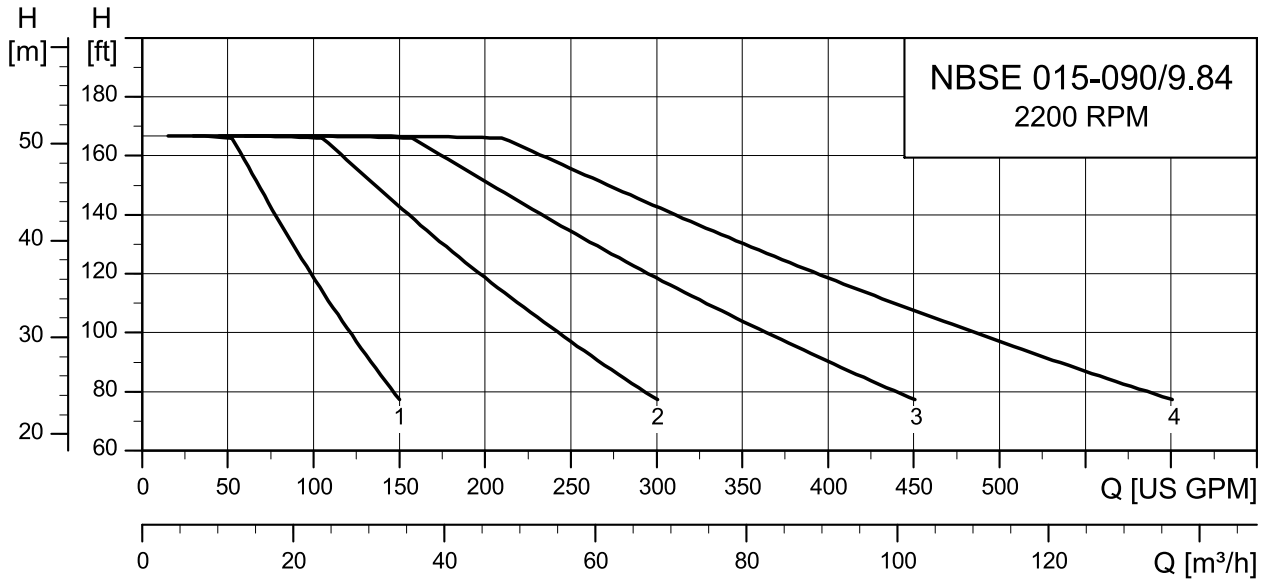
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NBSE 015-090



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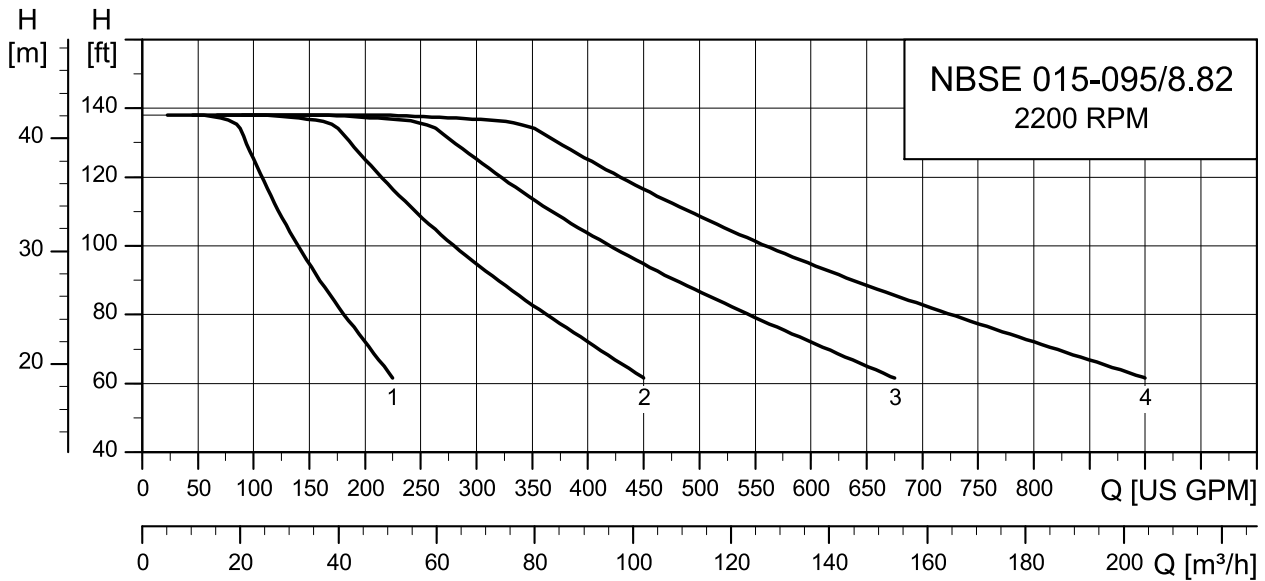
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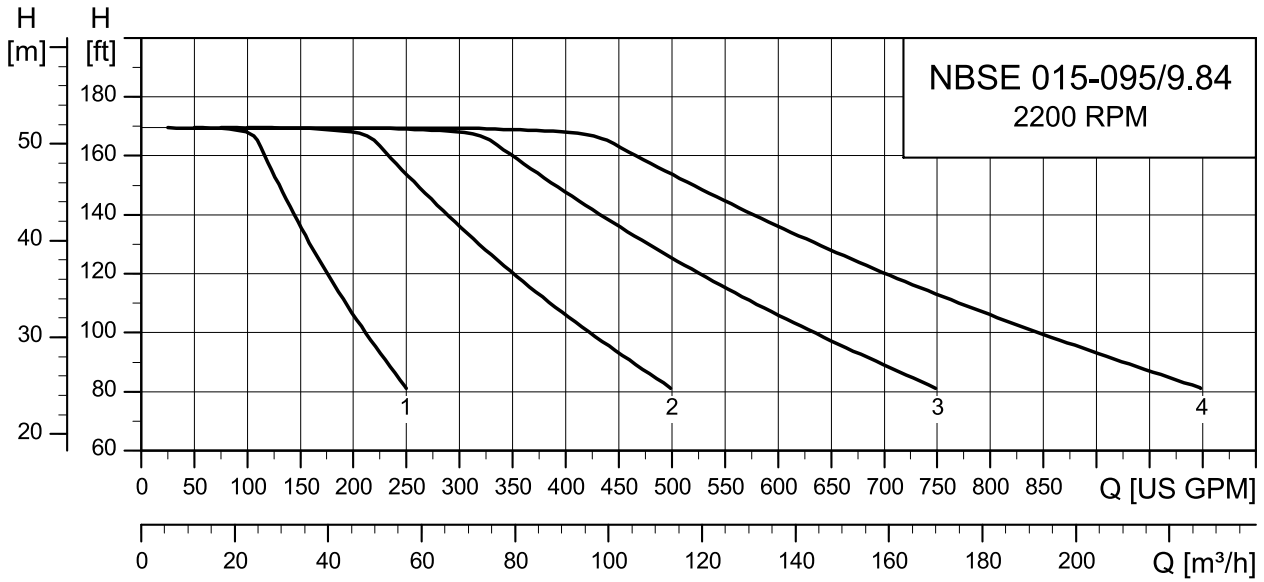
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NBSE 015-095

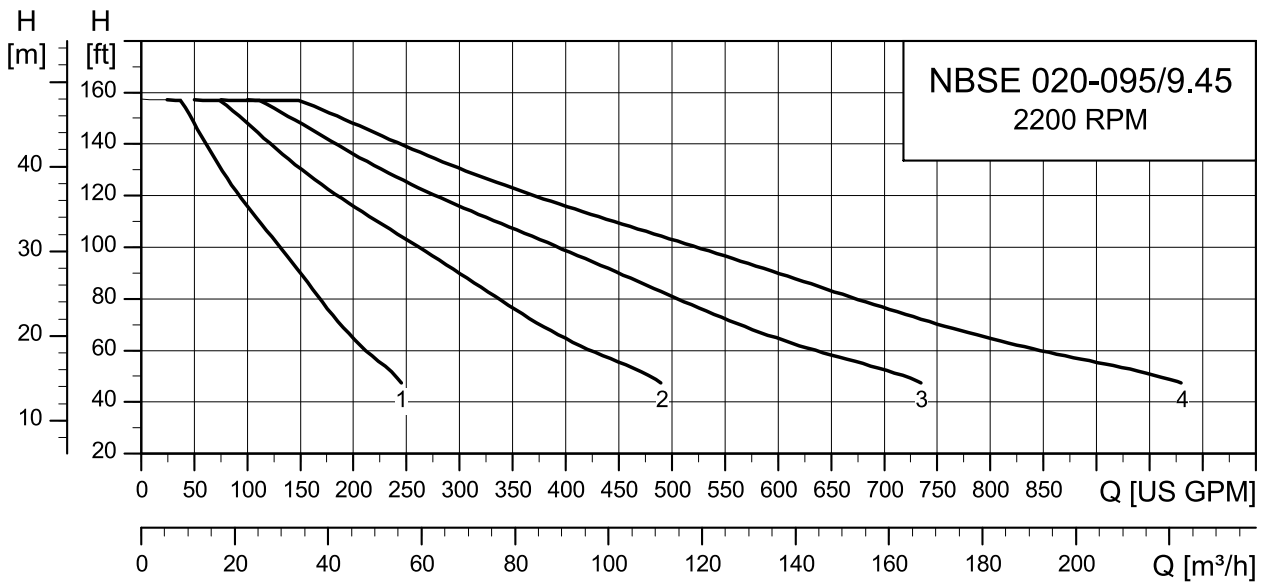


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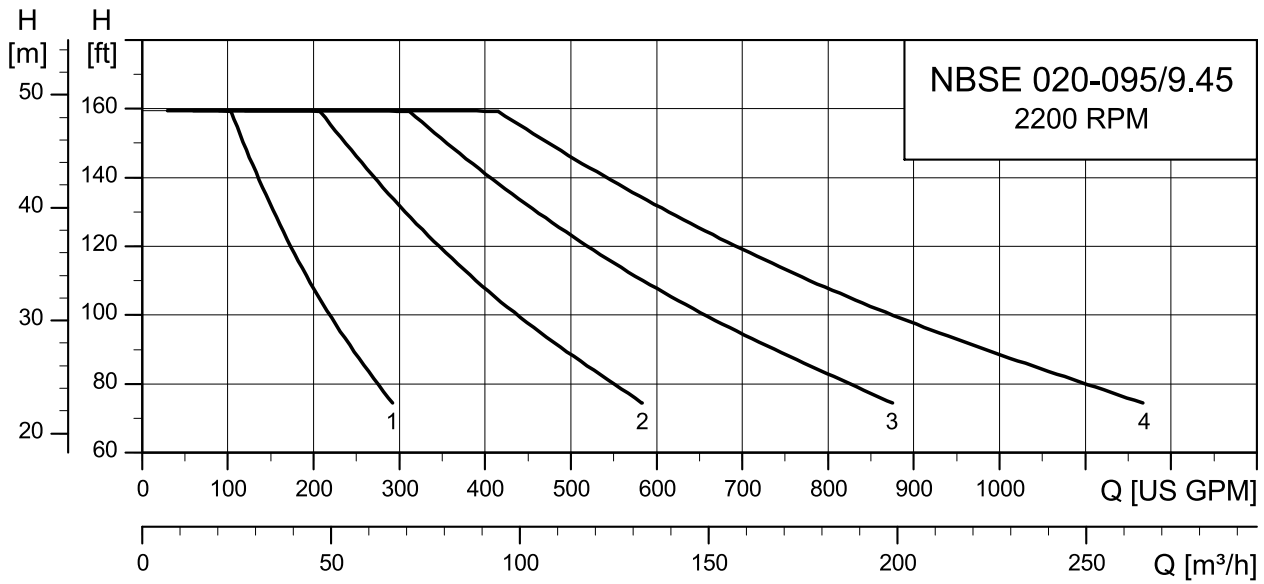
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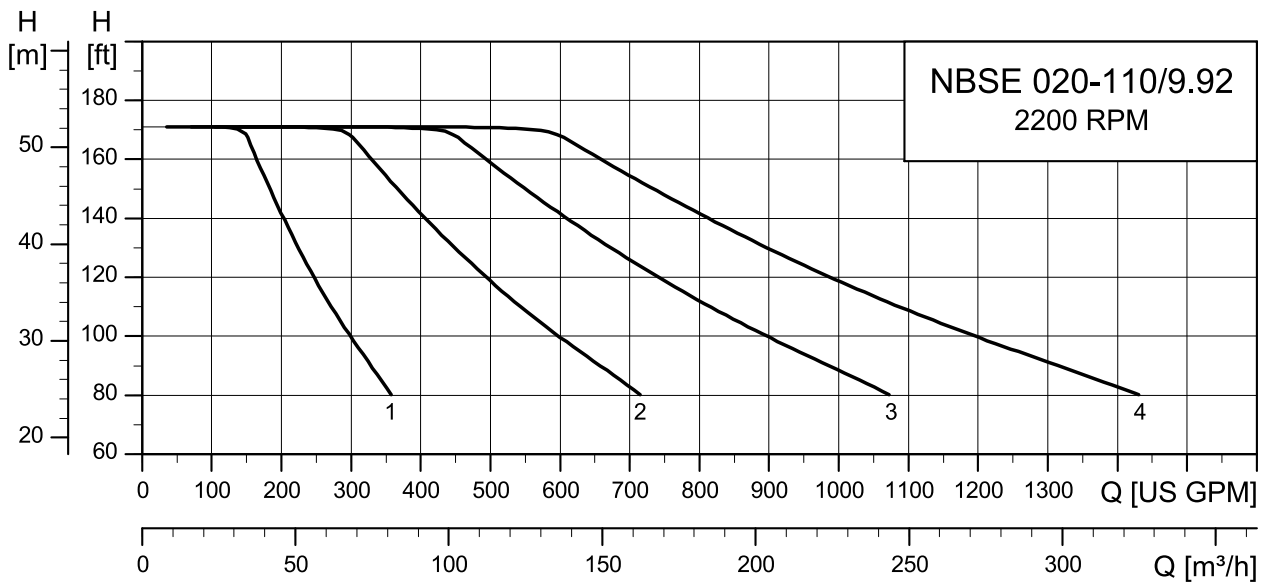
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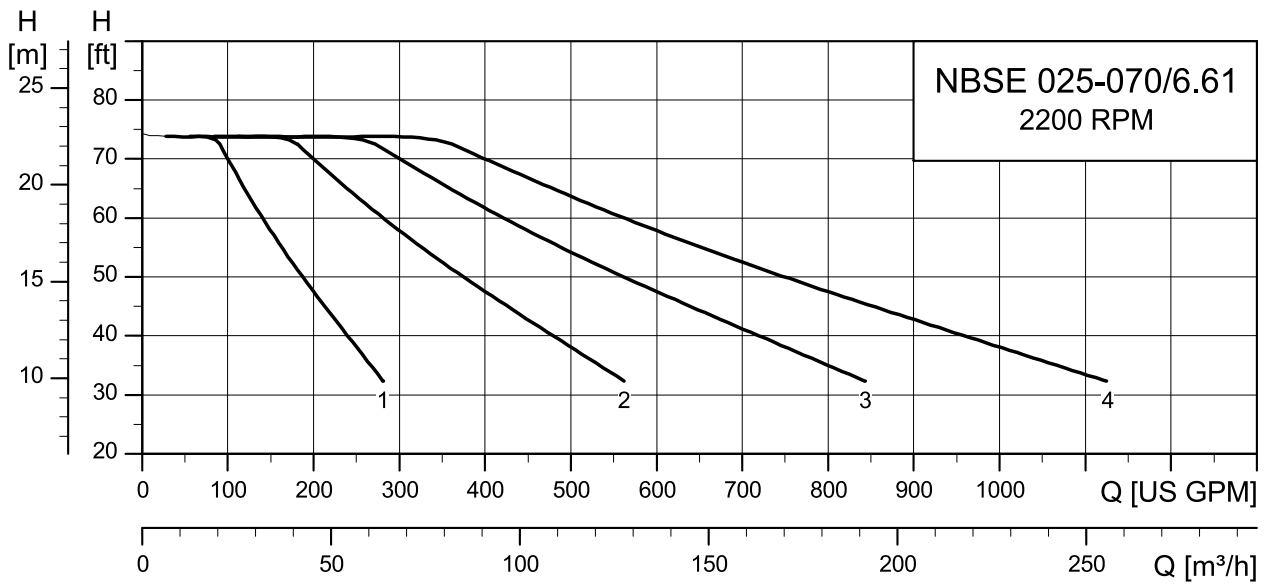
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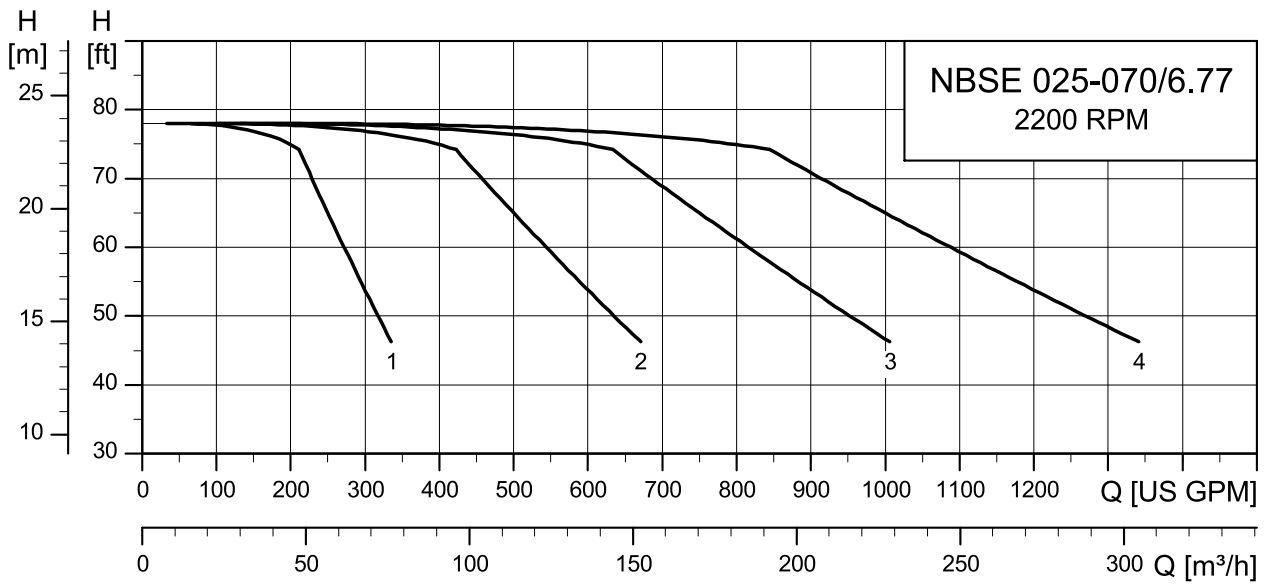
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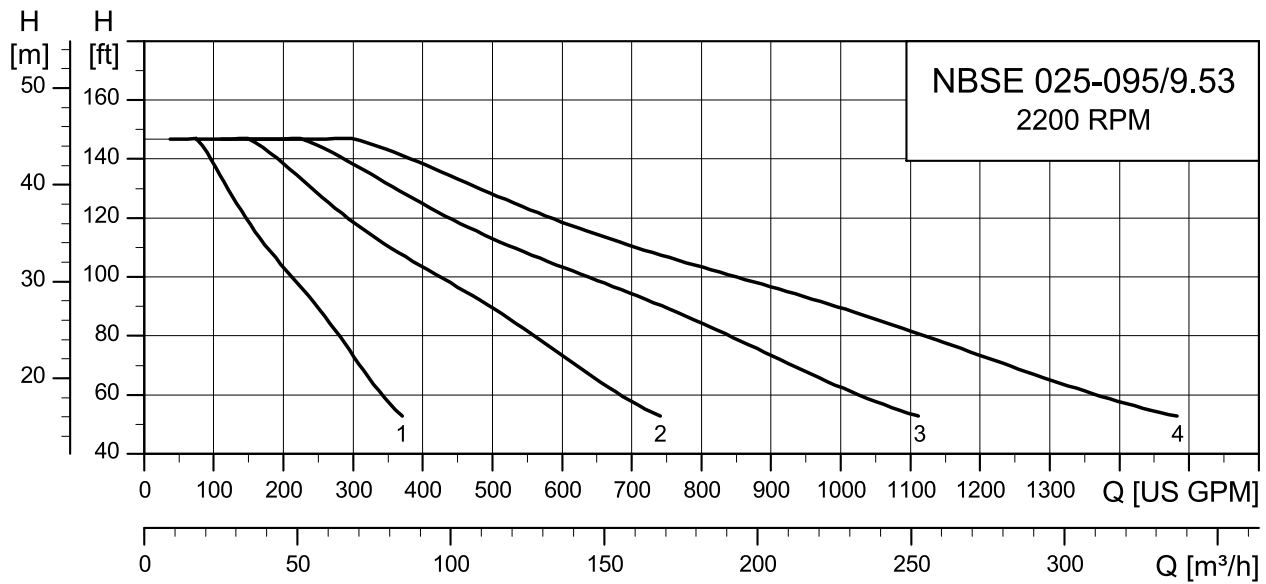
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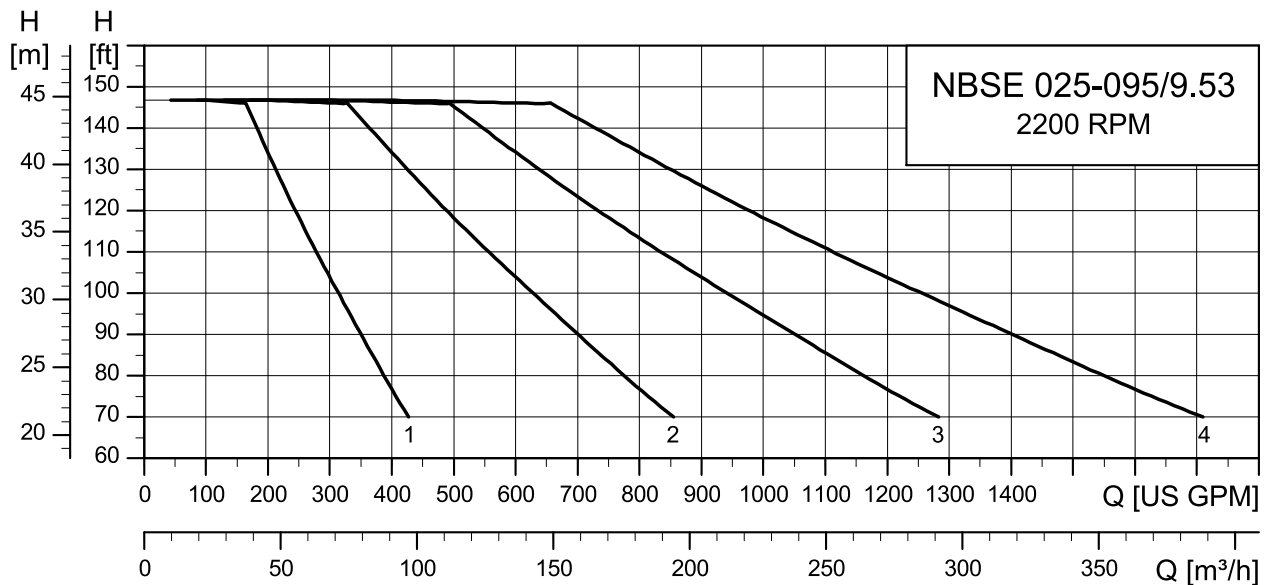
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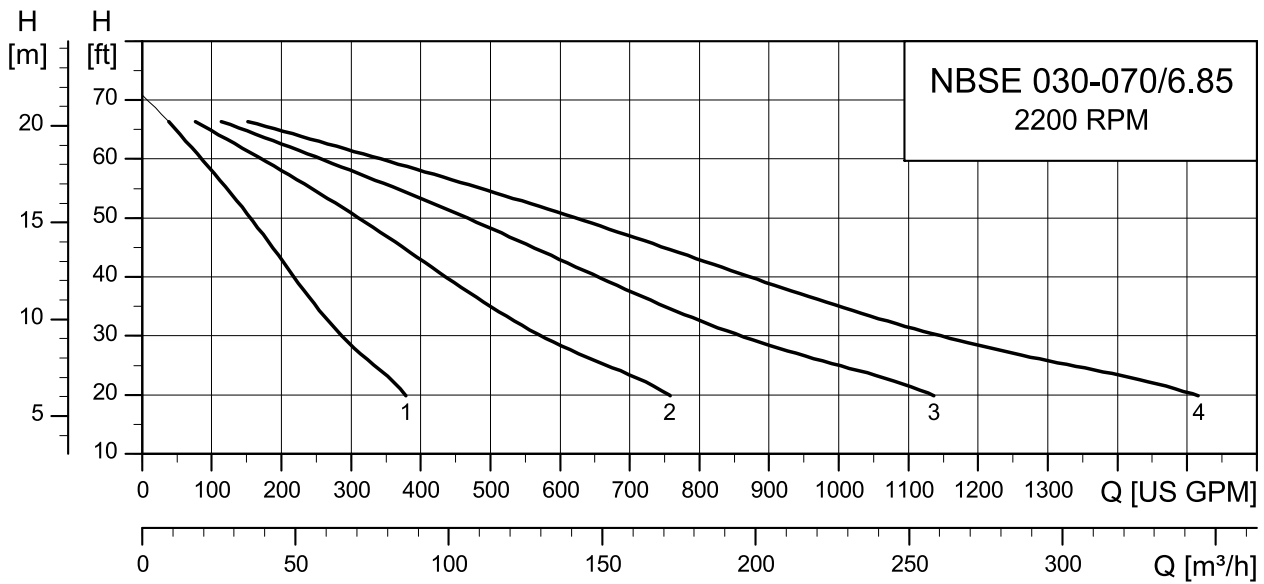
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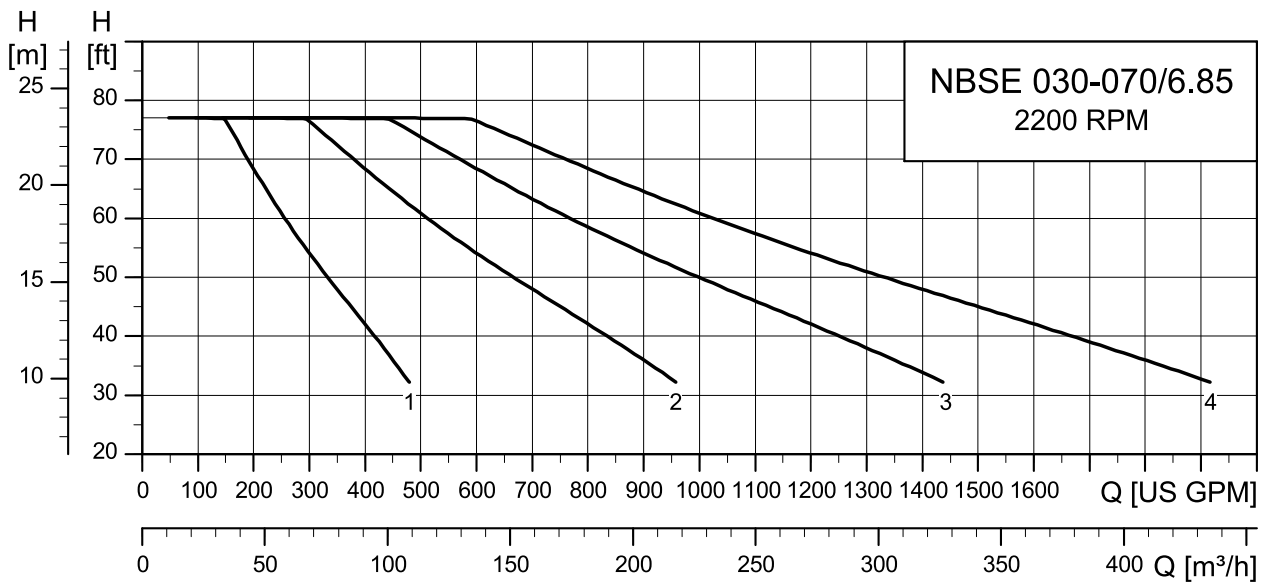
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NBSE 030-070



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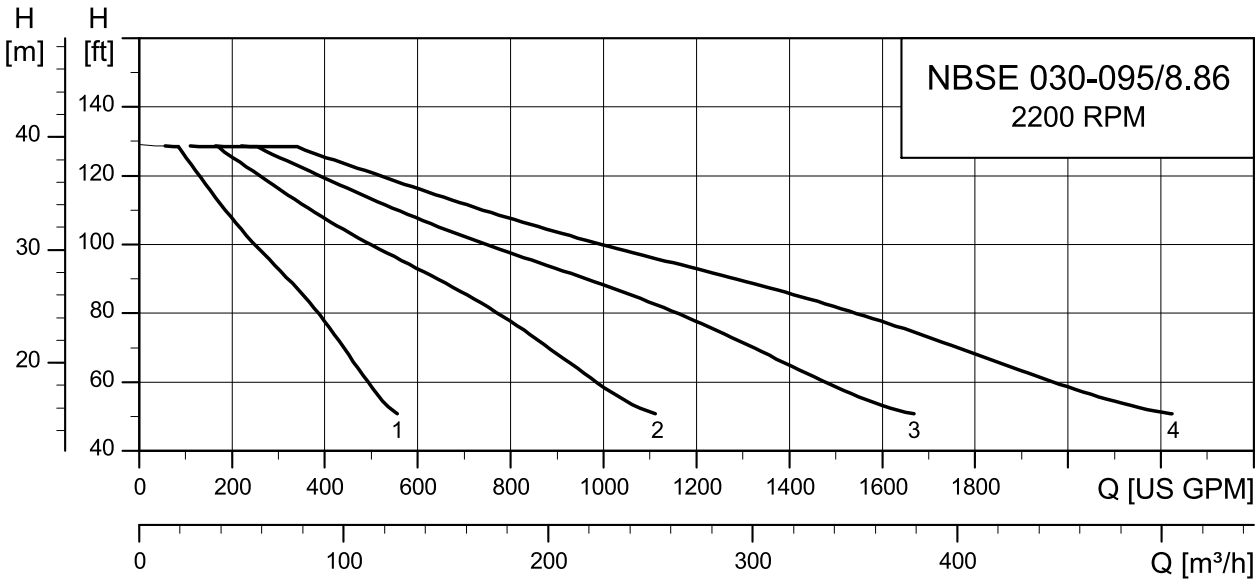
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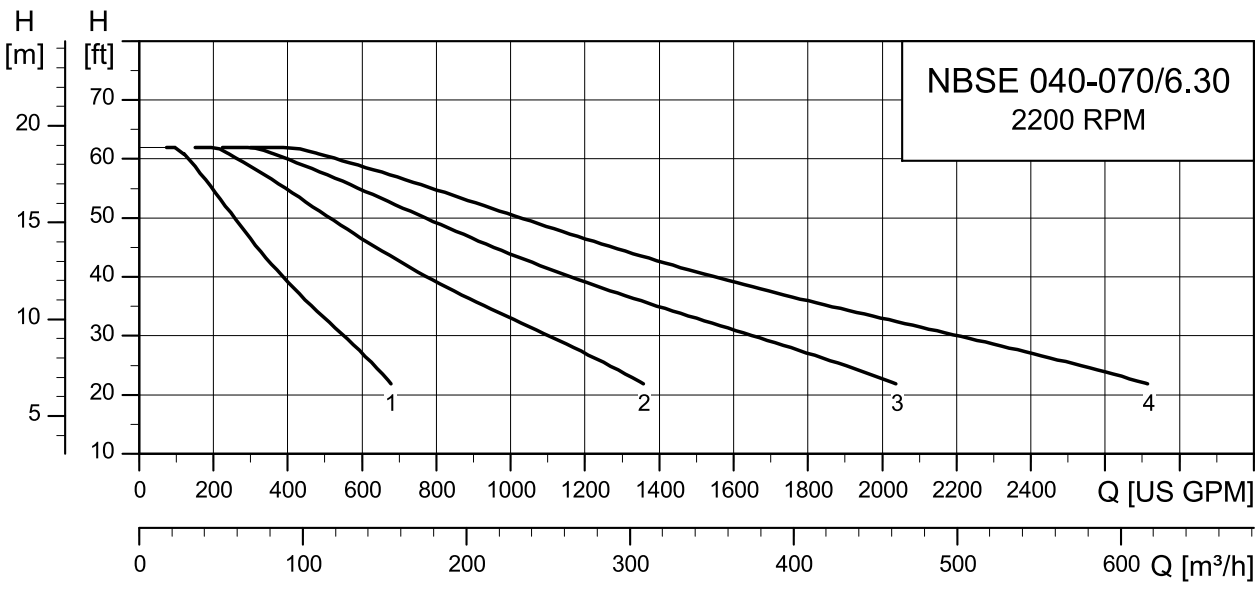
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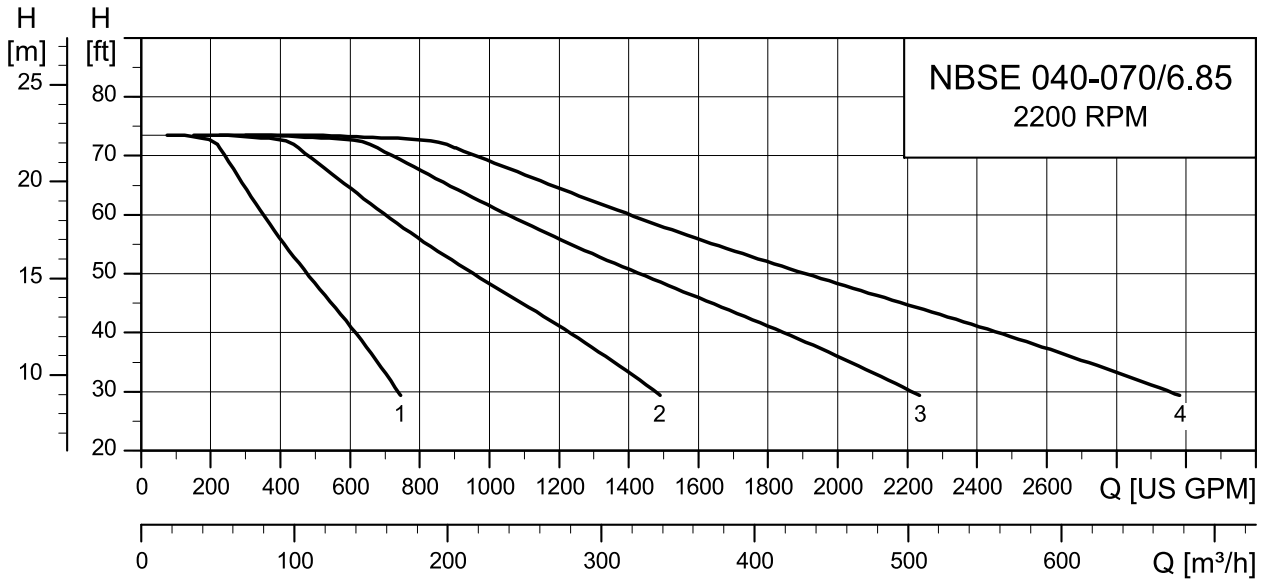


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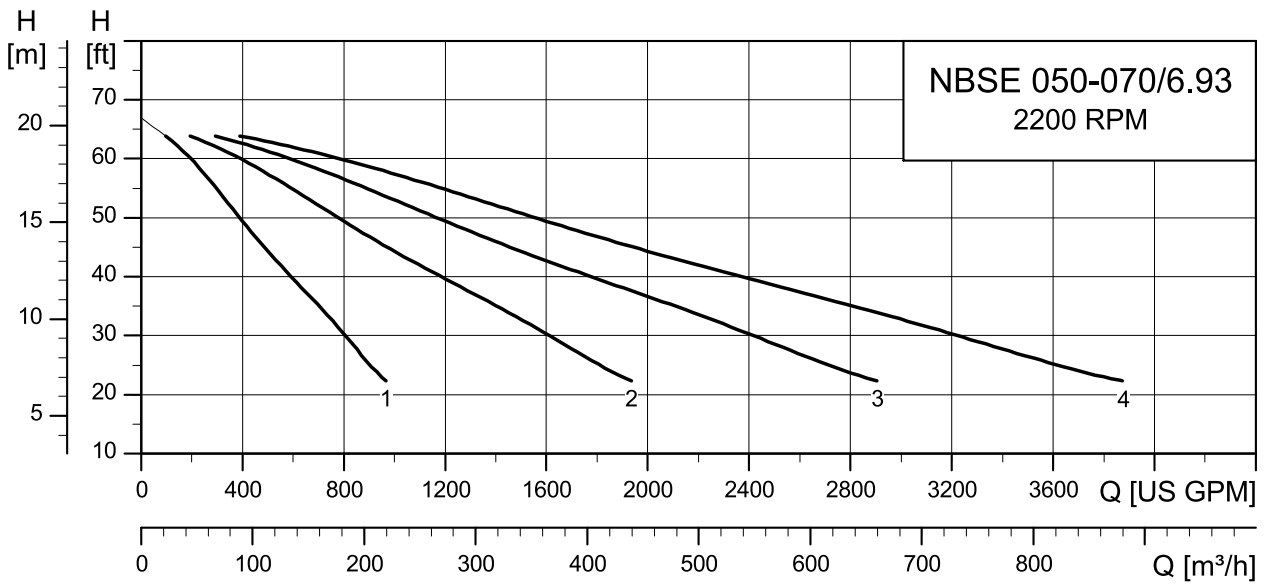


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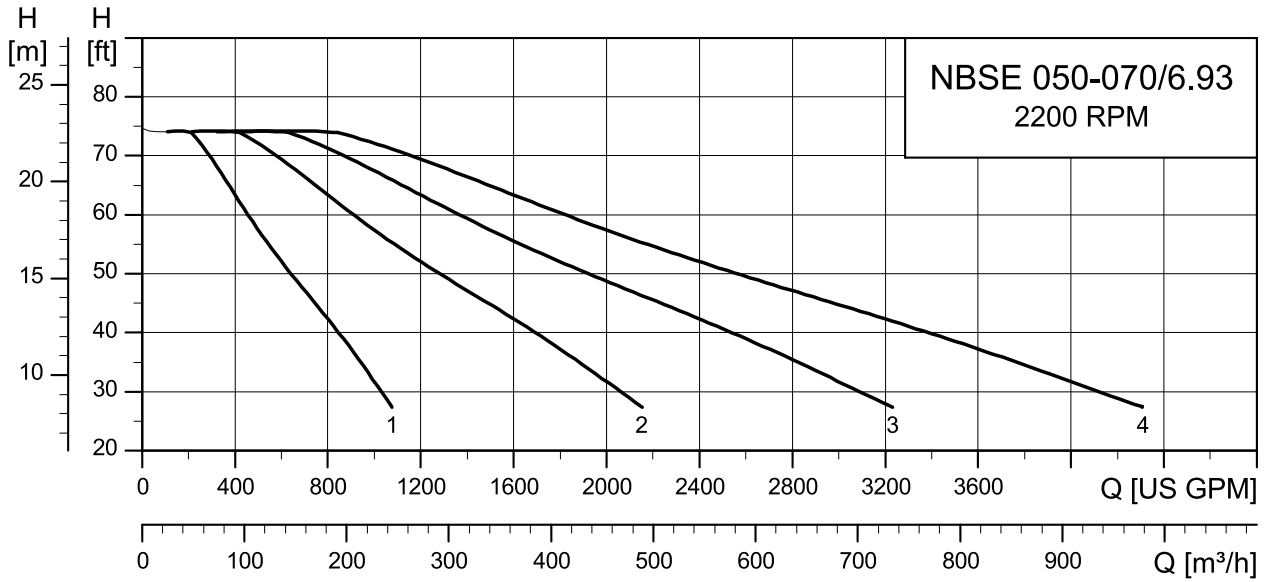
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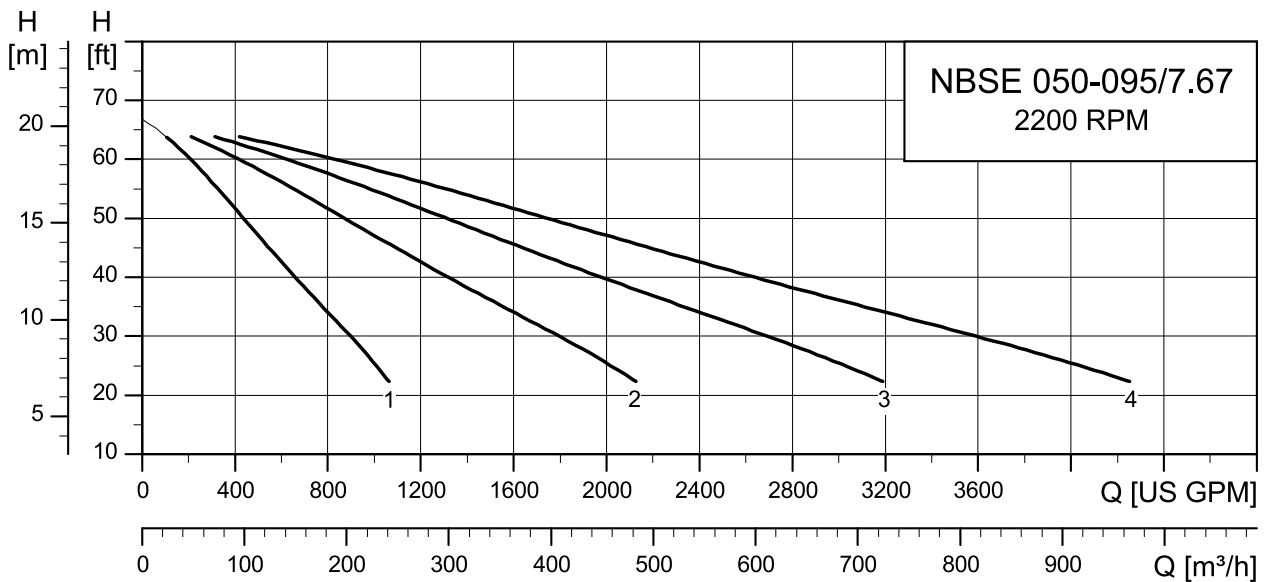
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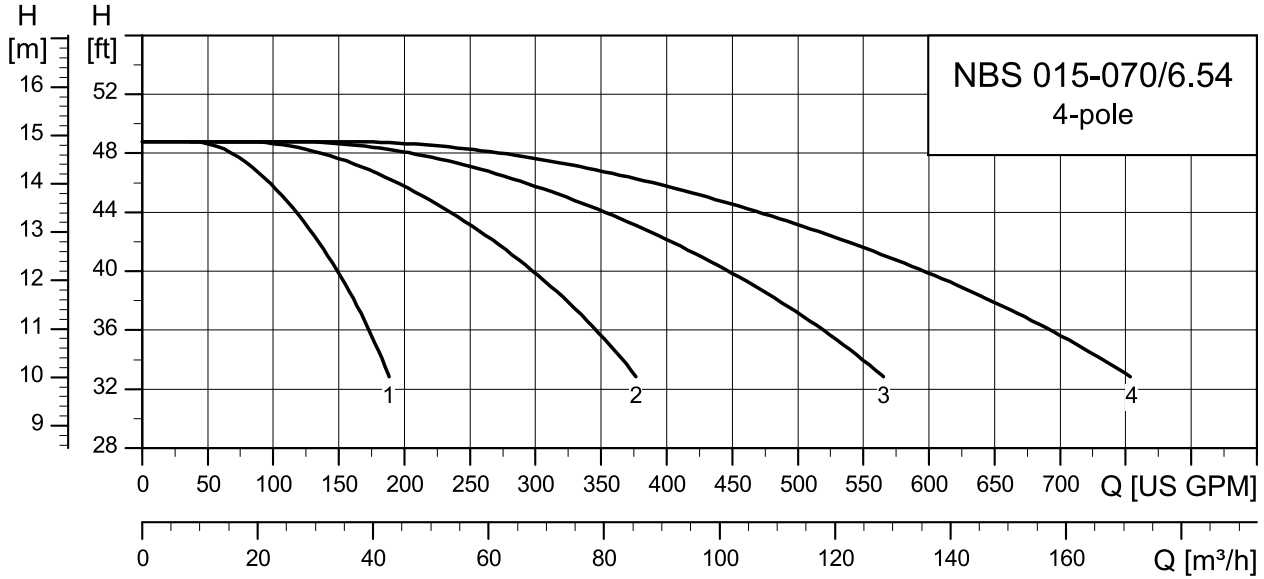
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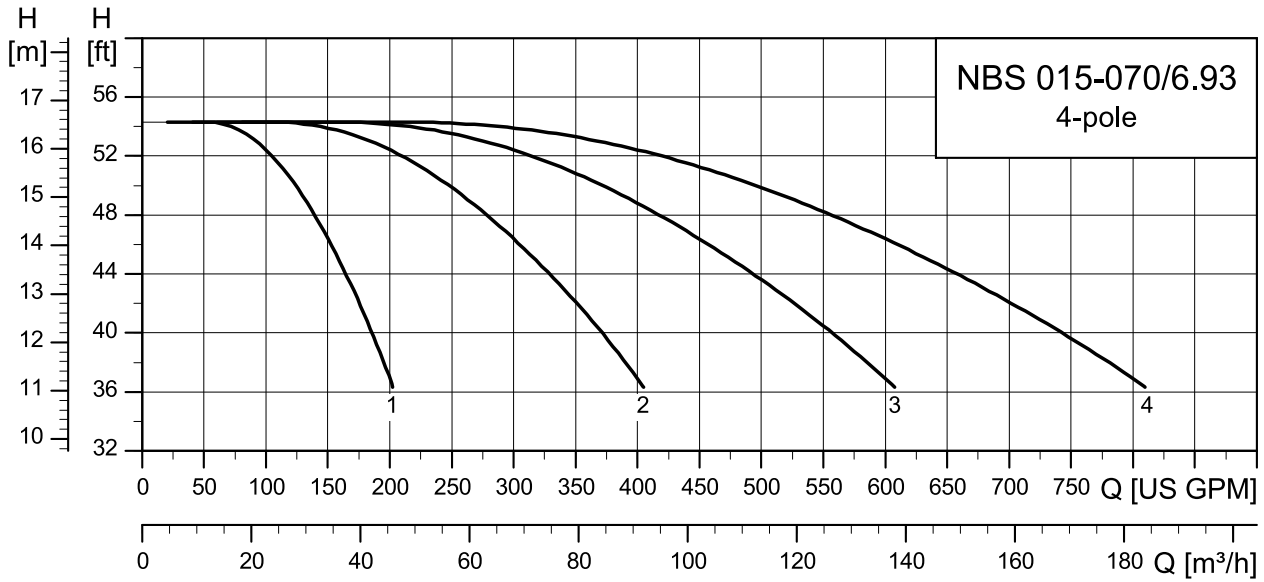
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NBS, 4-pole

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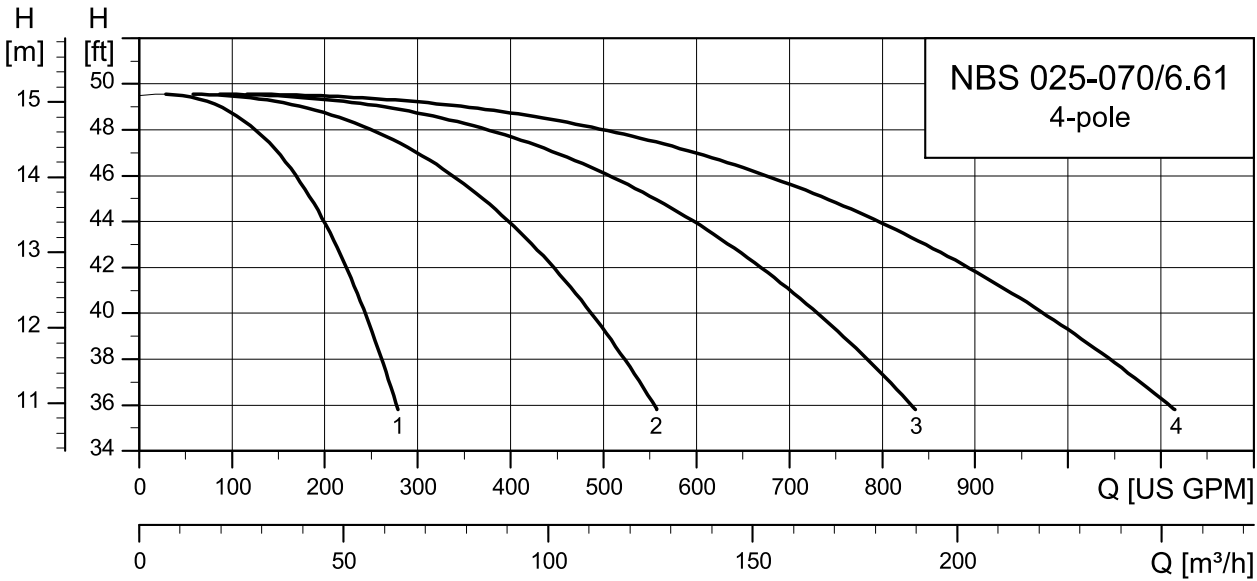


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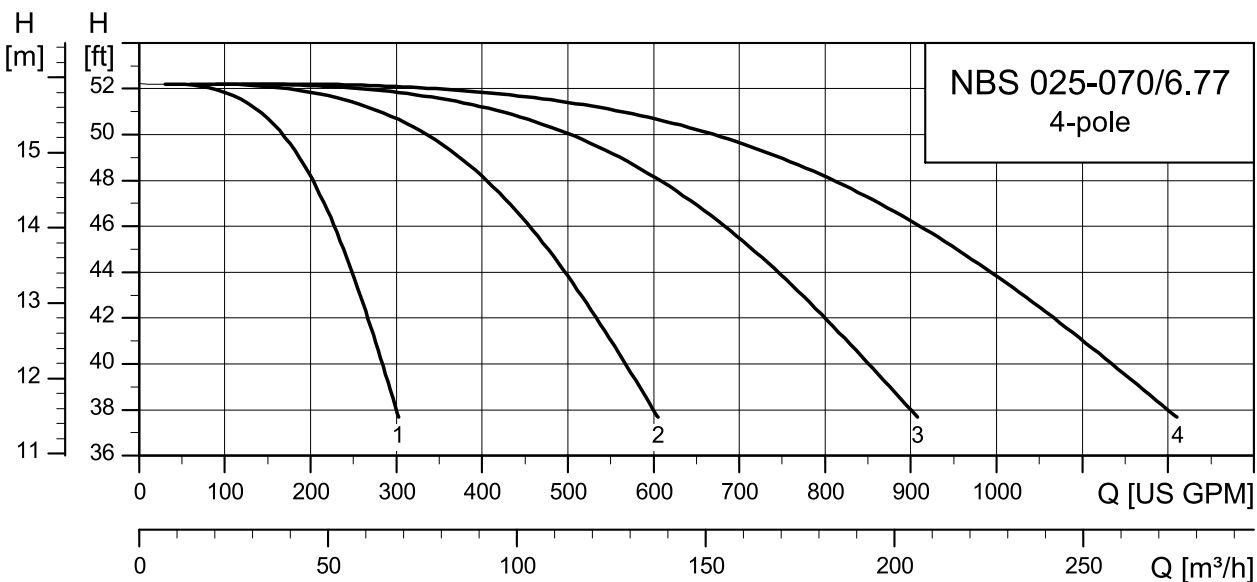


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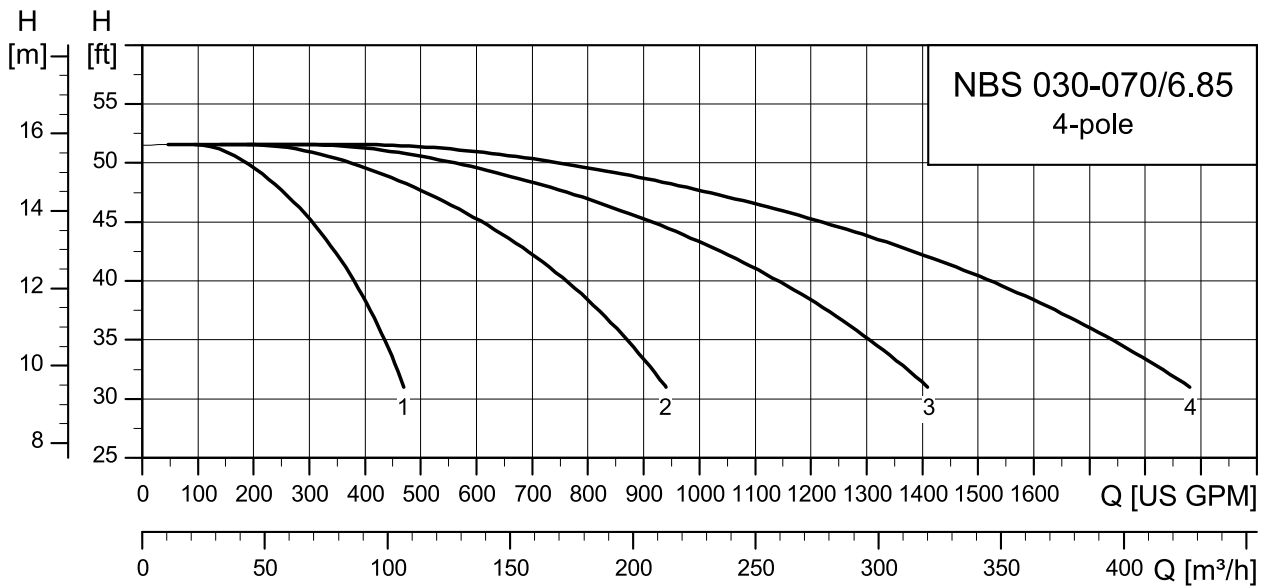


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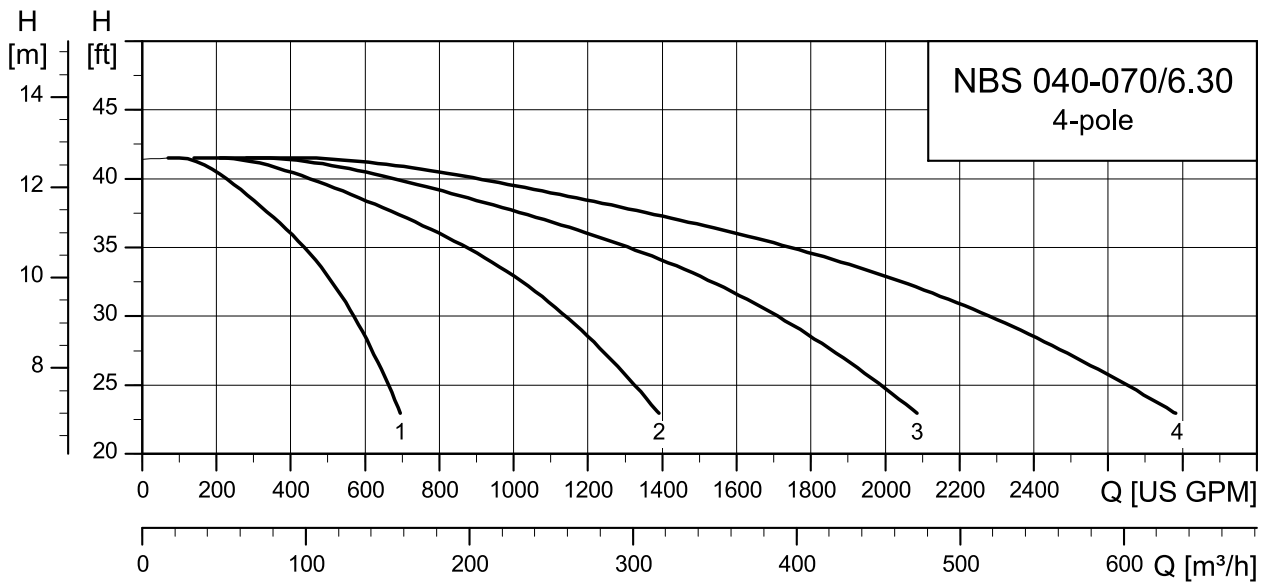
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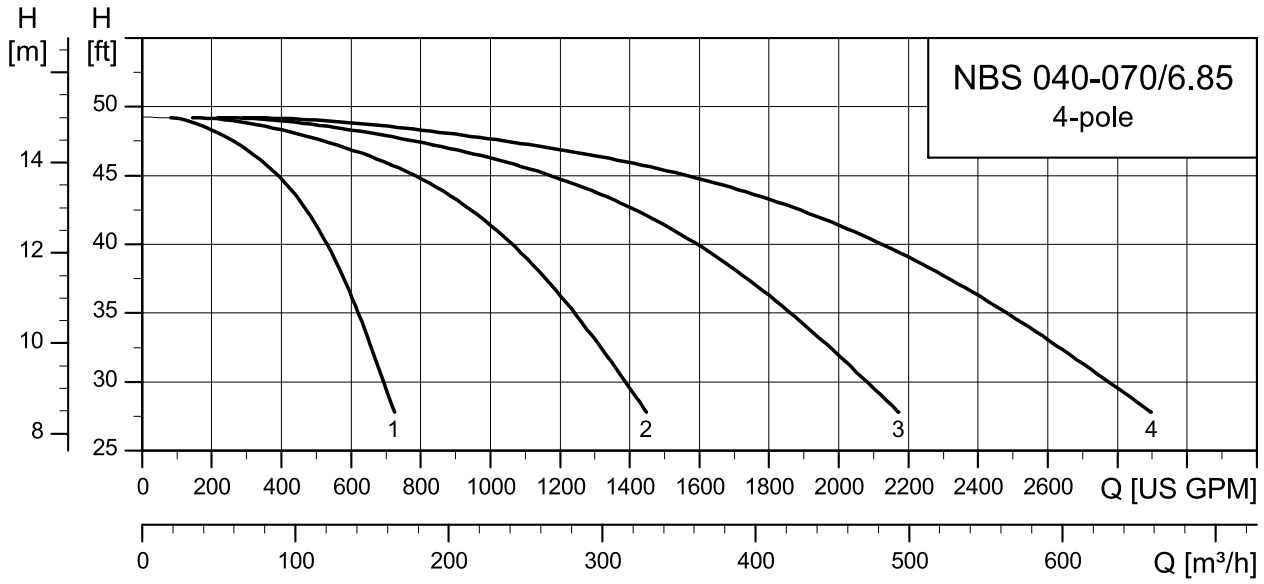


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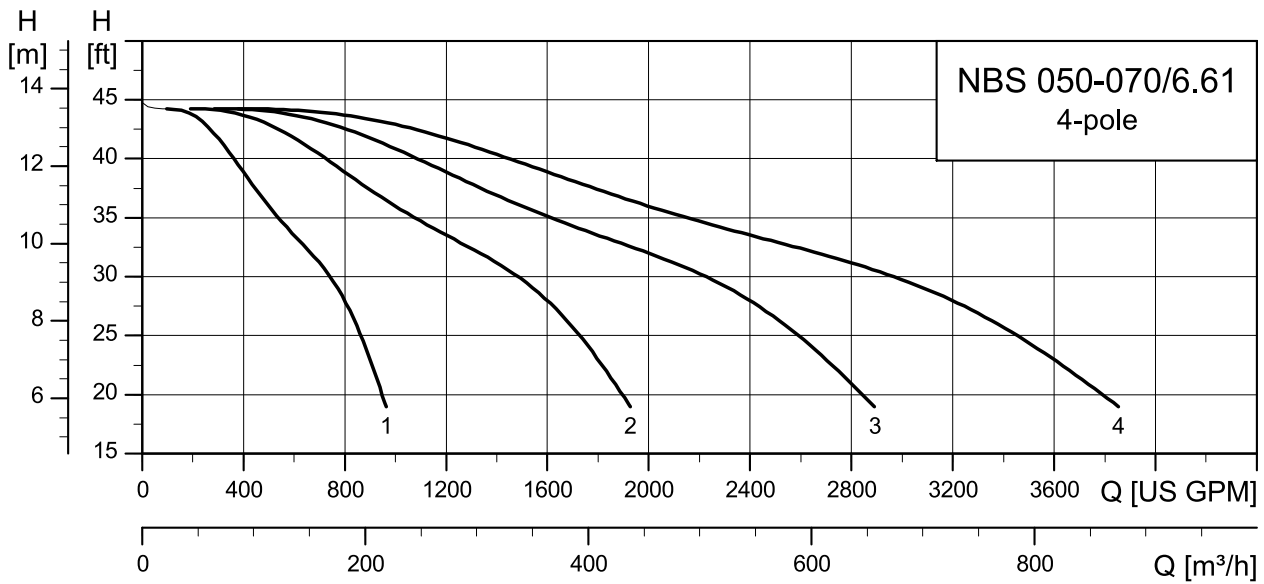


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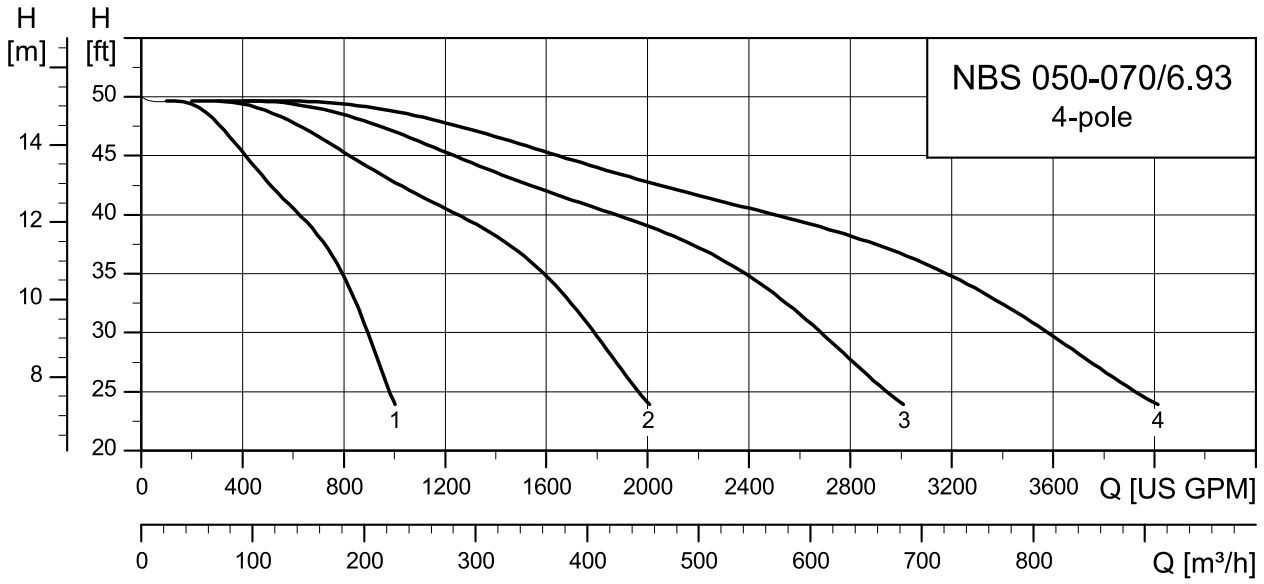


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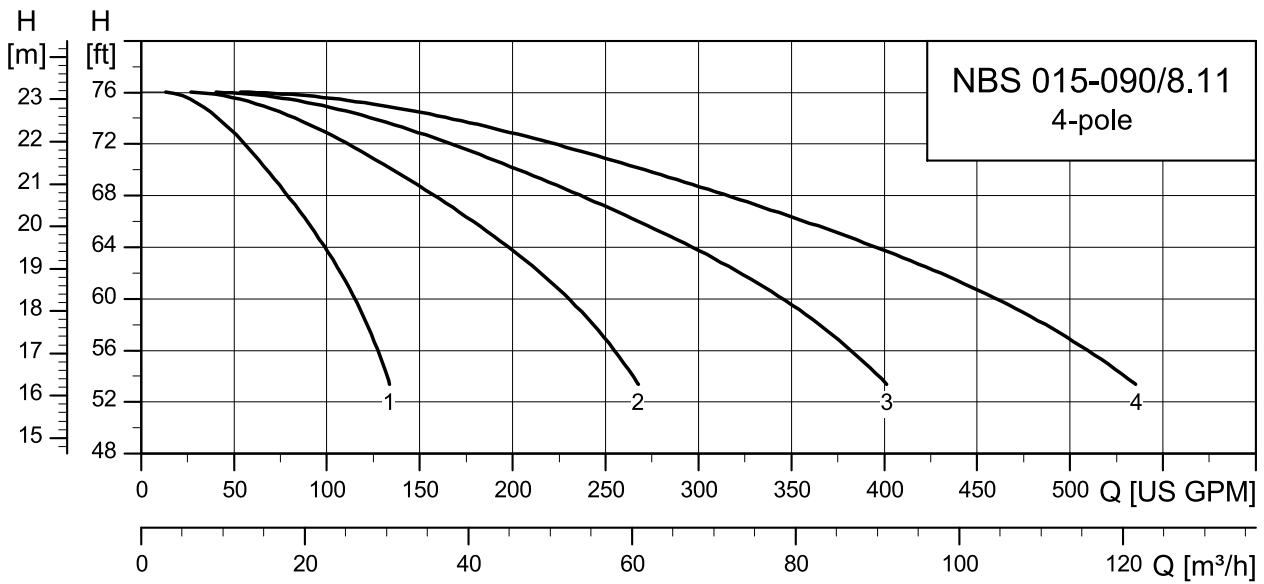


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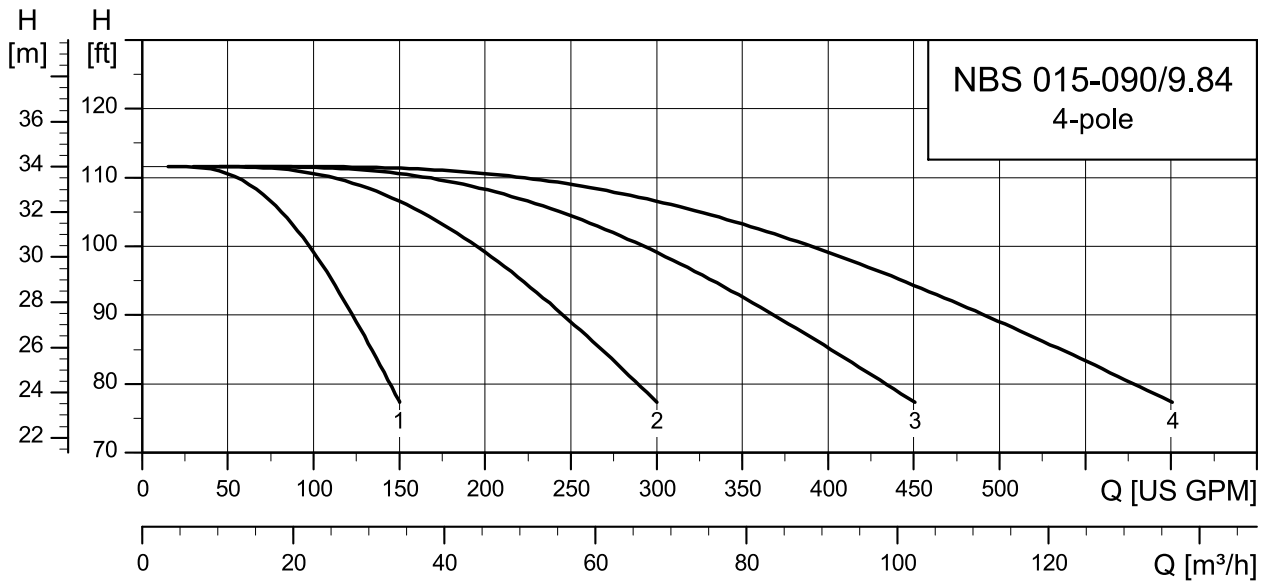


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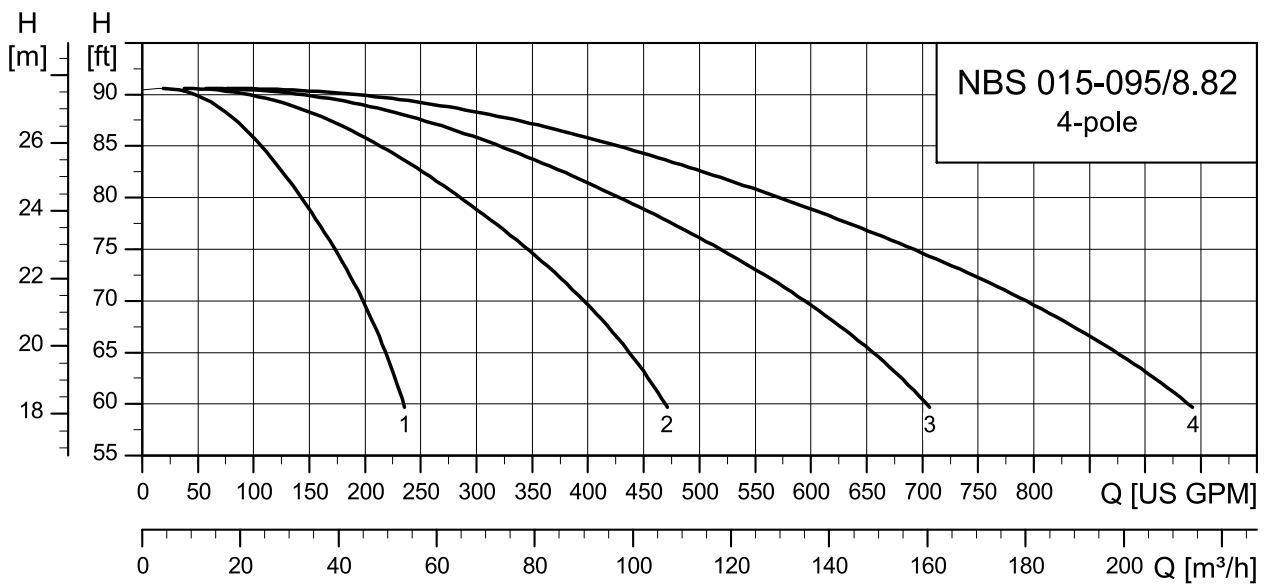


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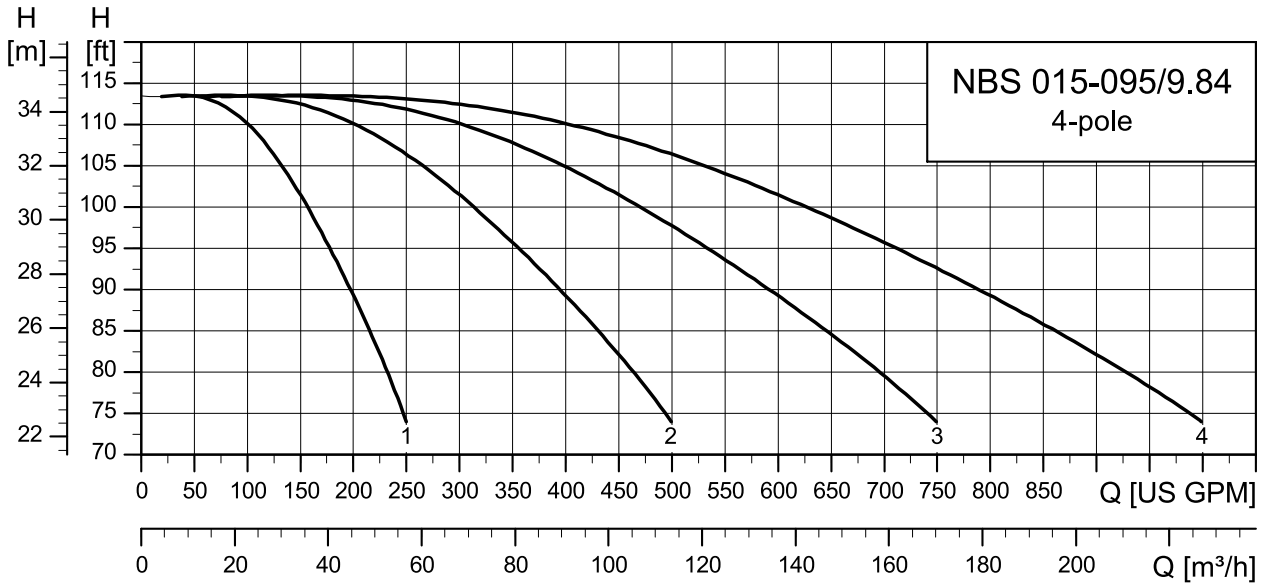


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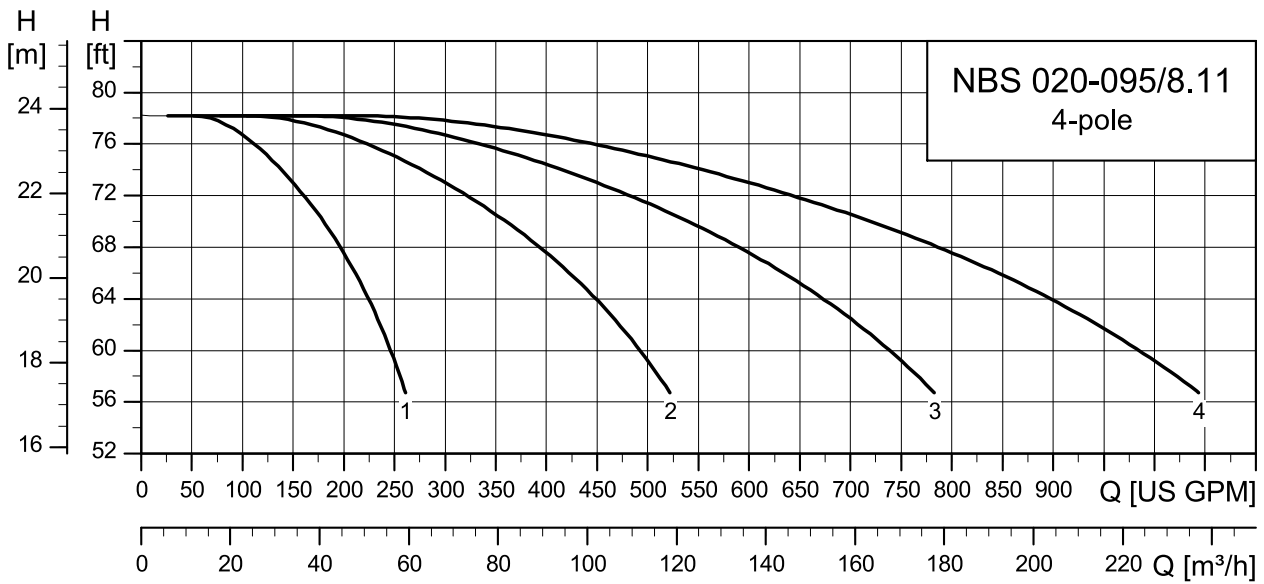


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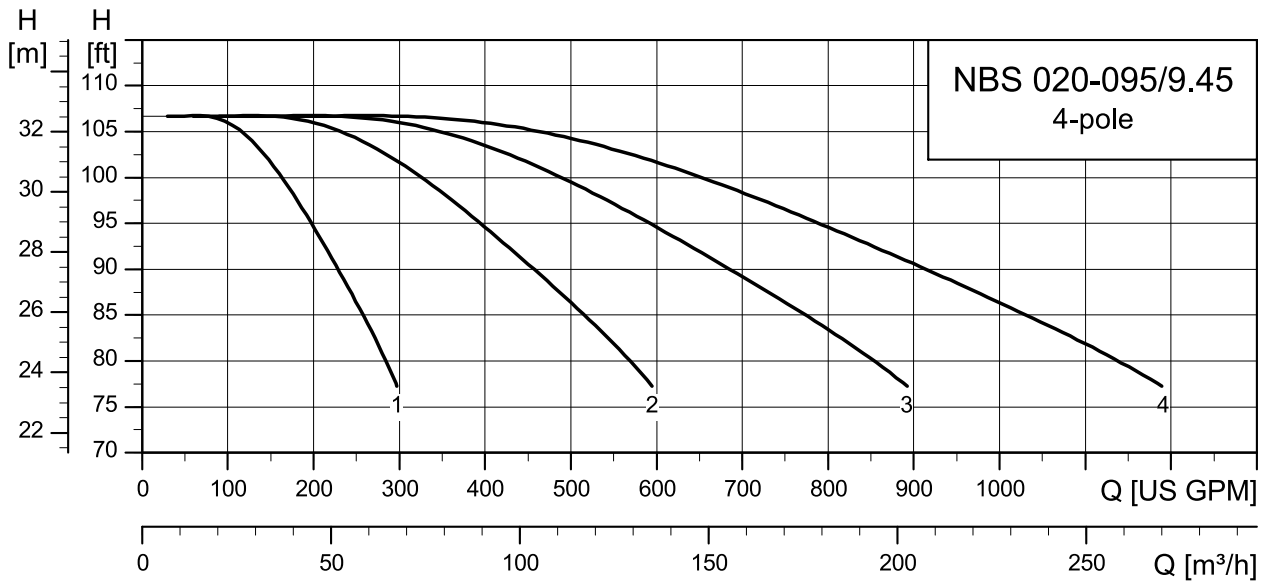


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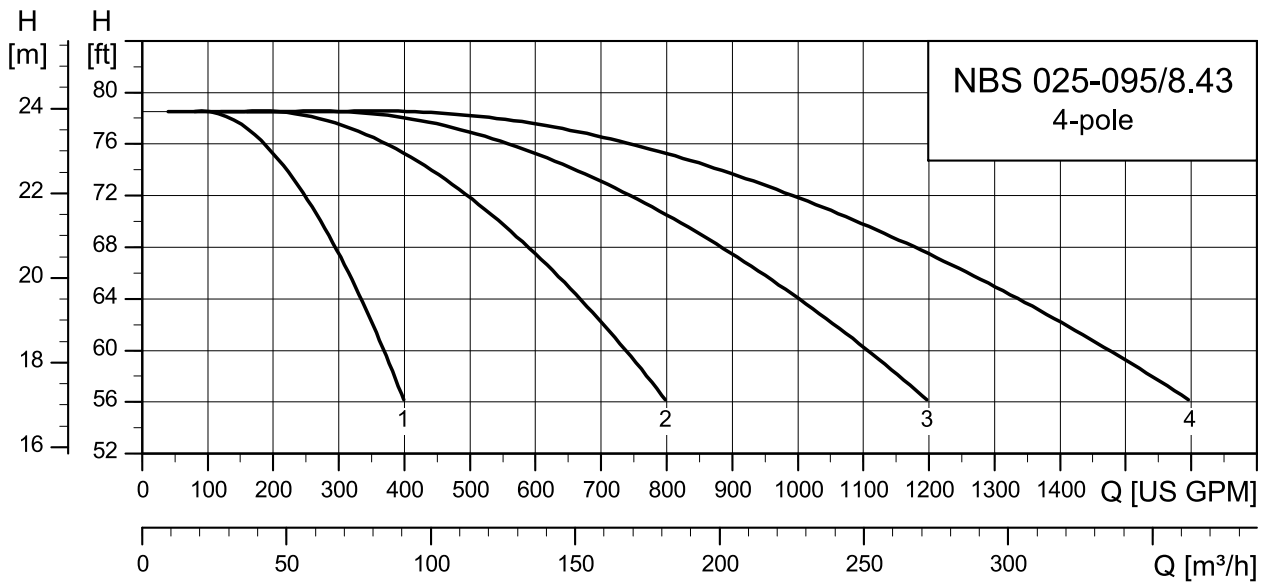


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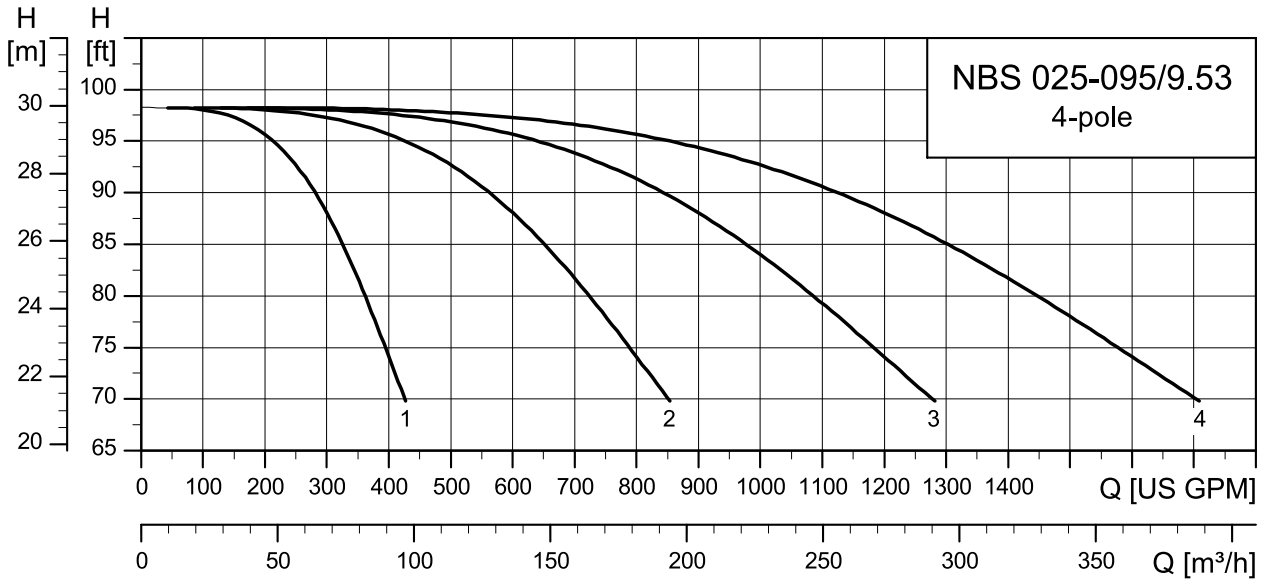


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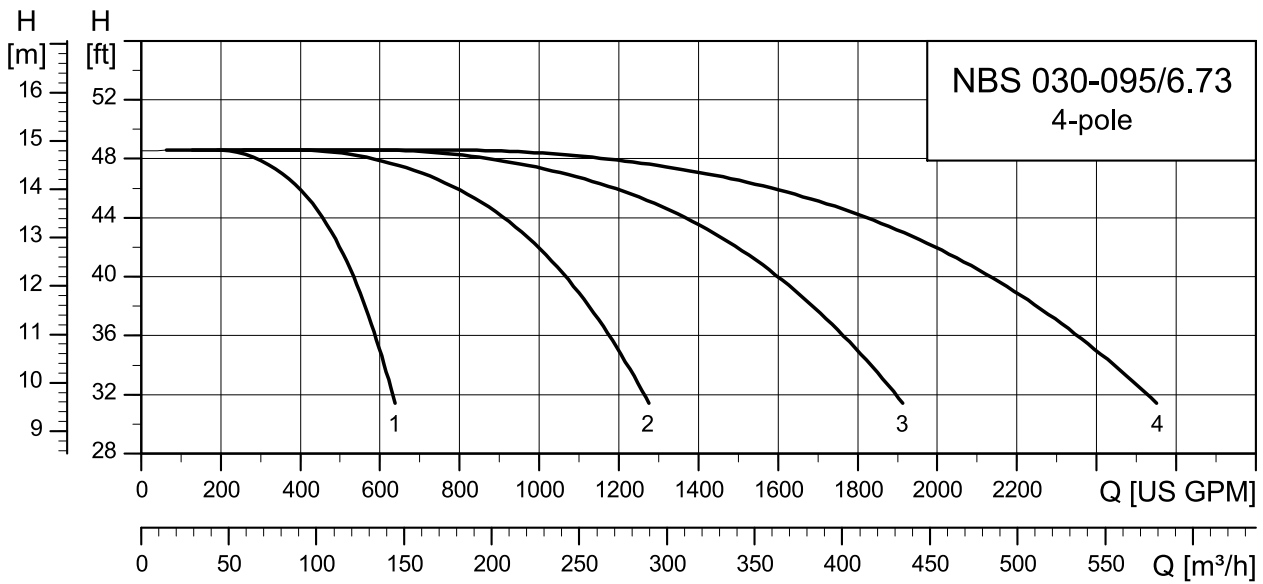


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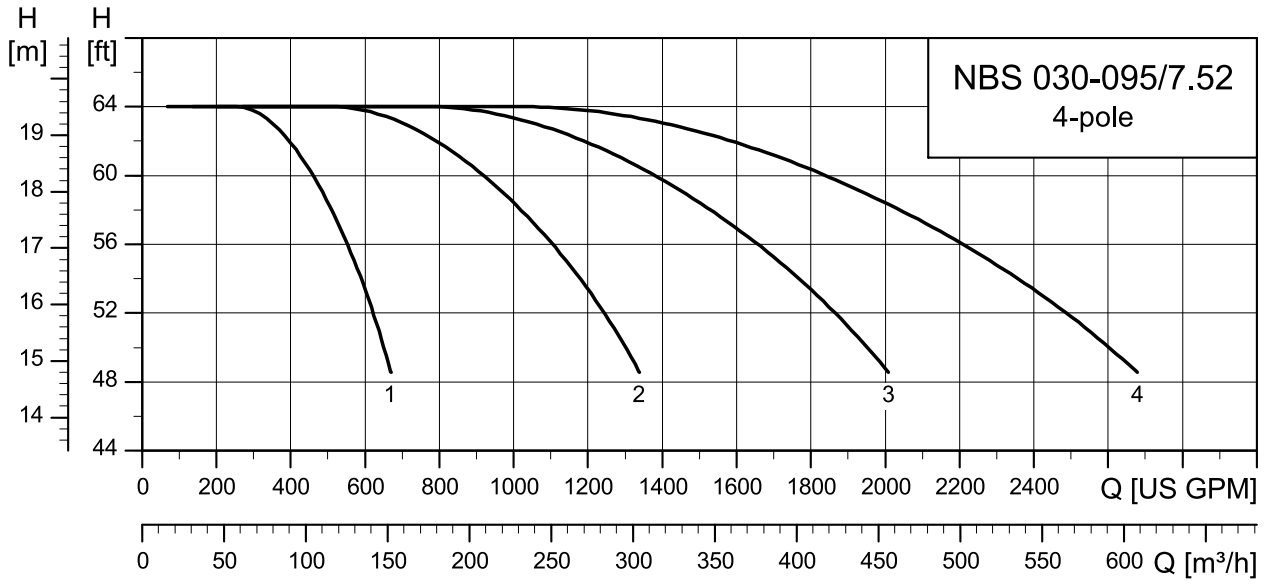


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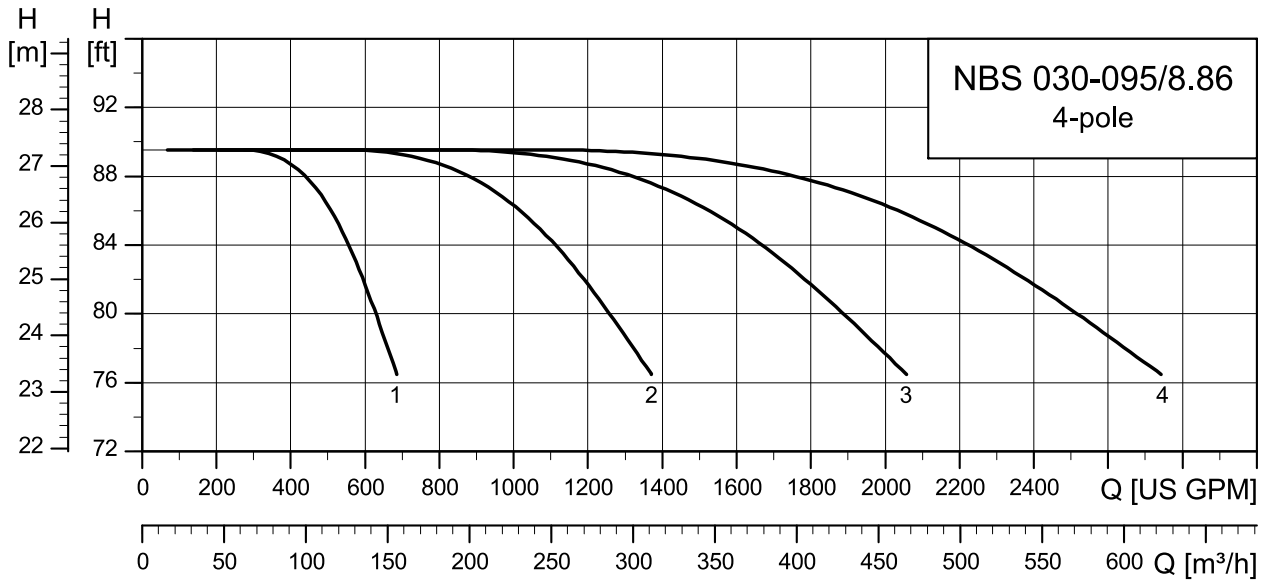
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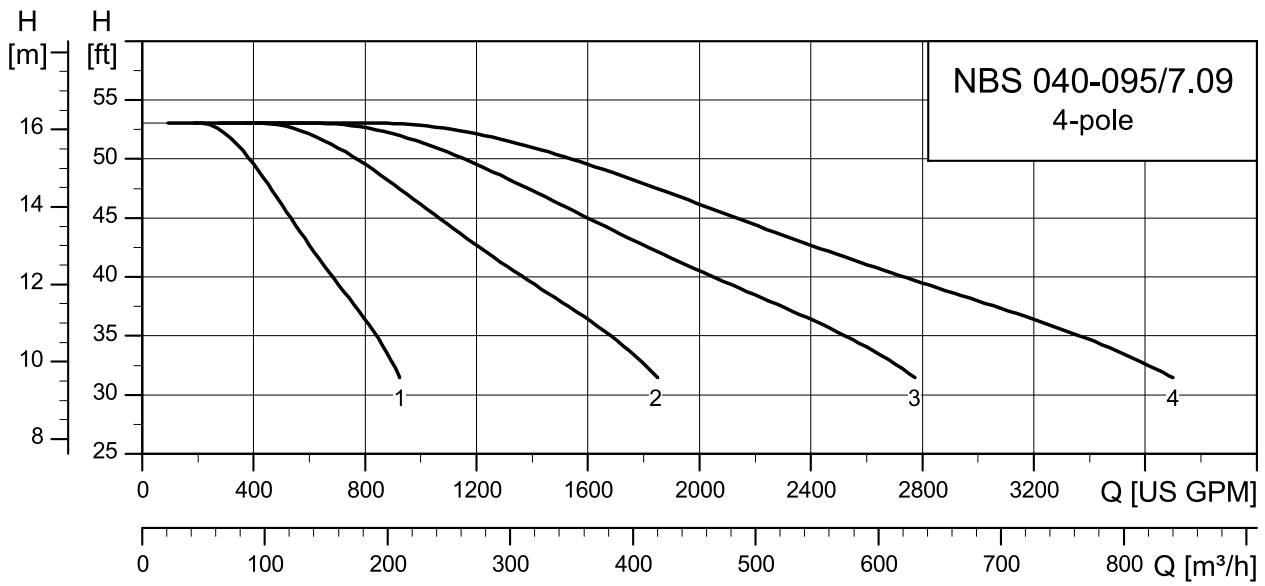


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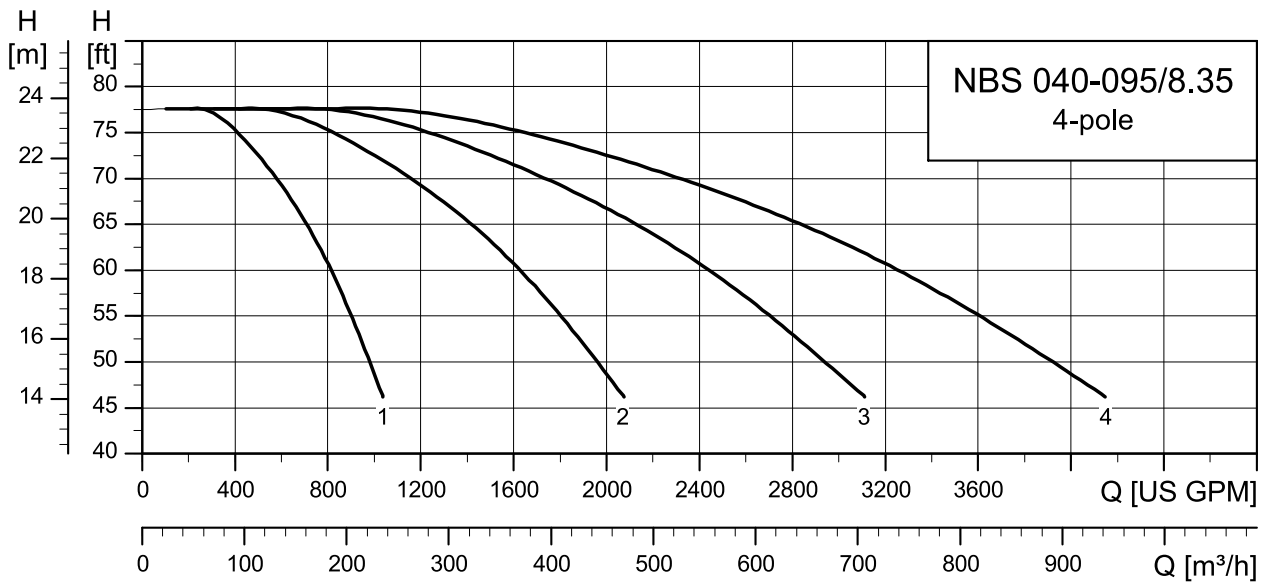


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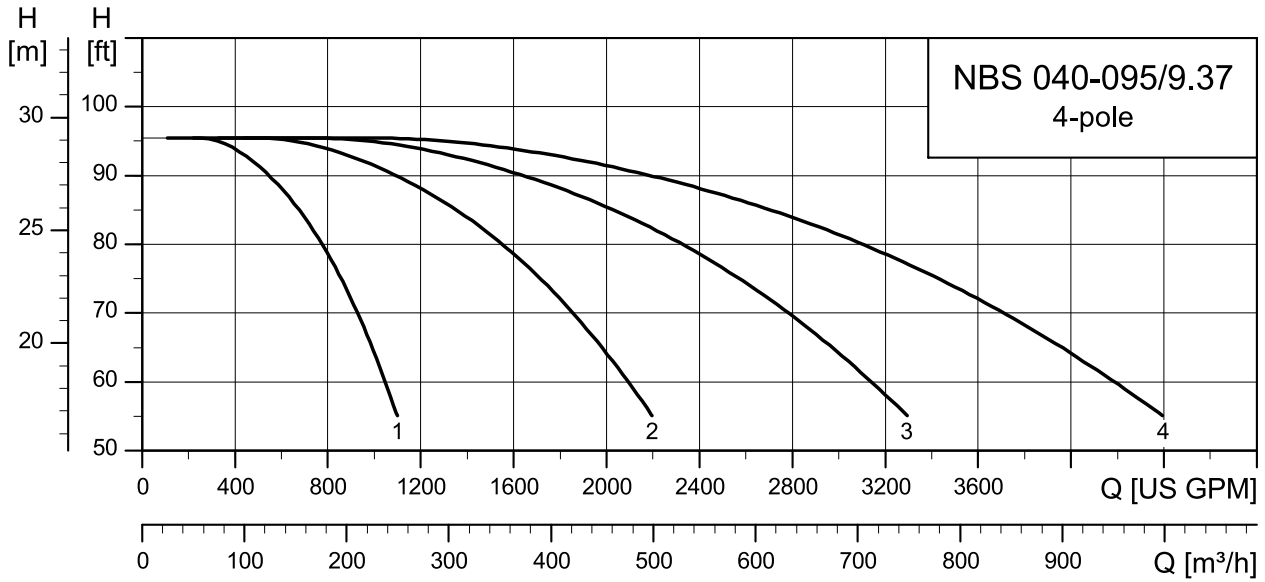
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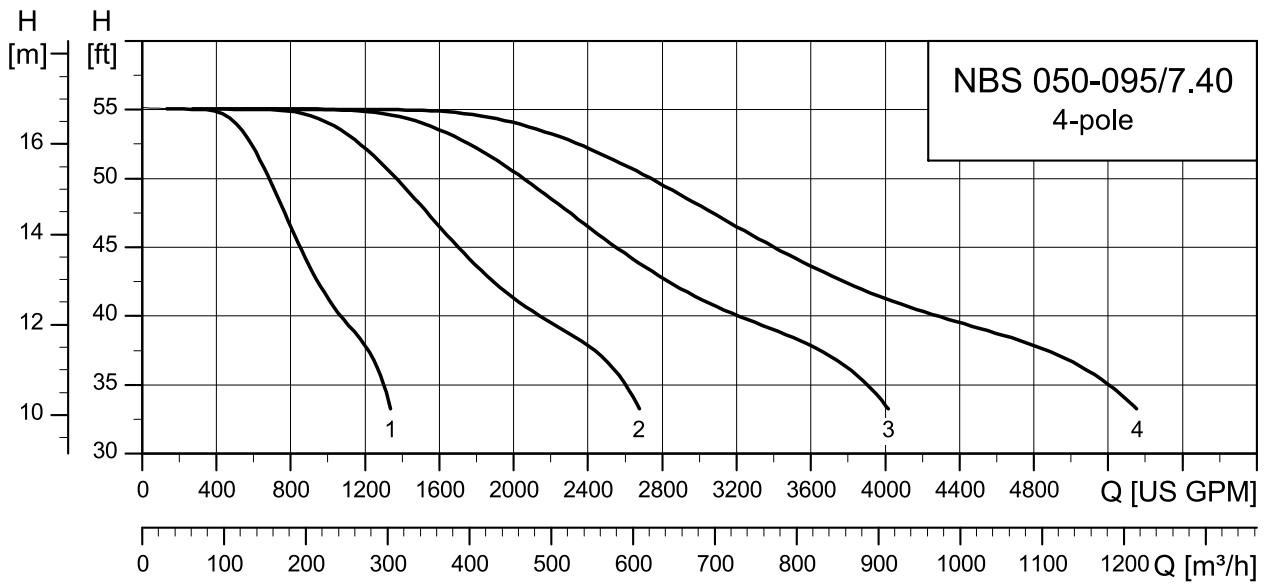


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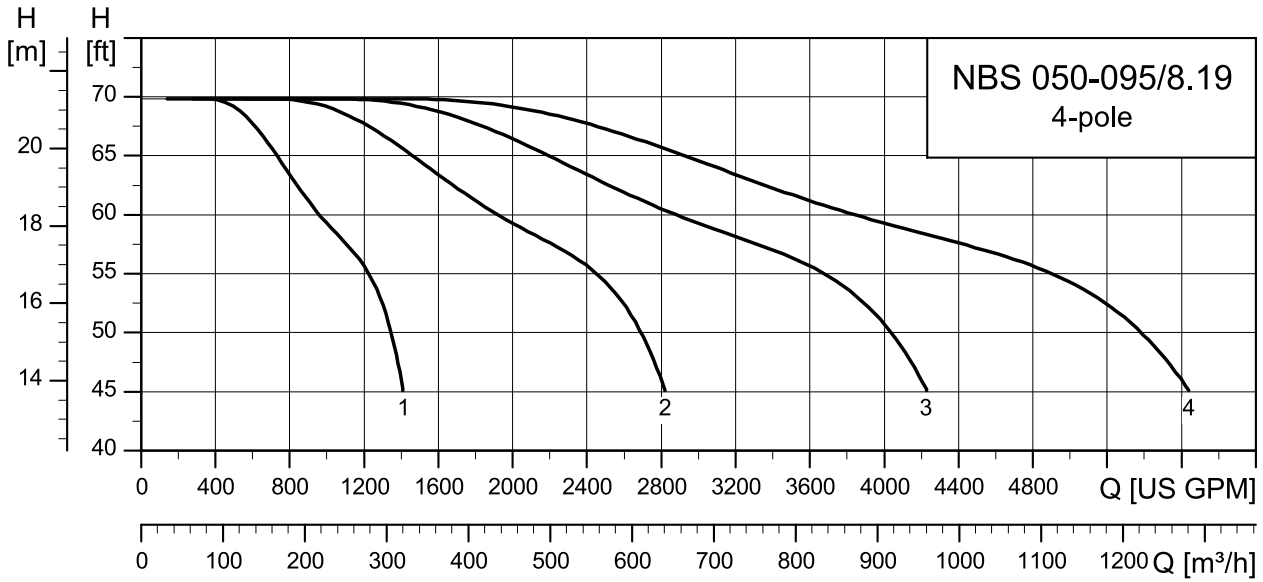


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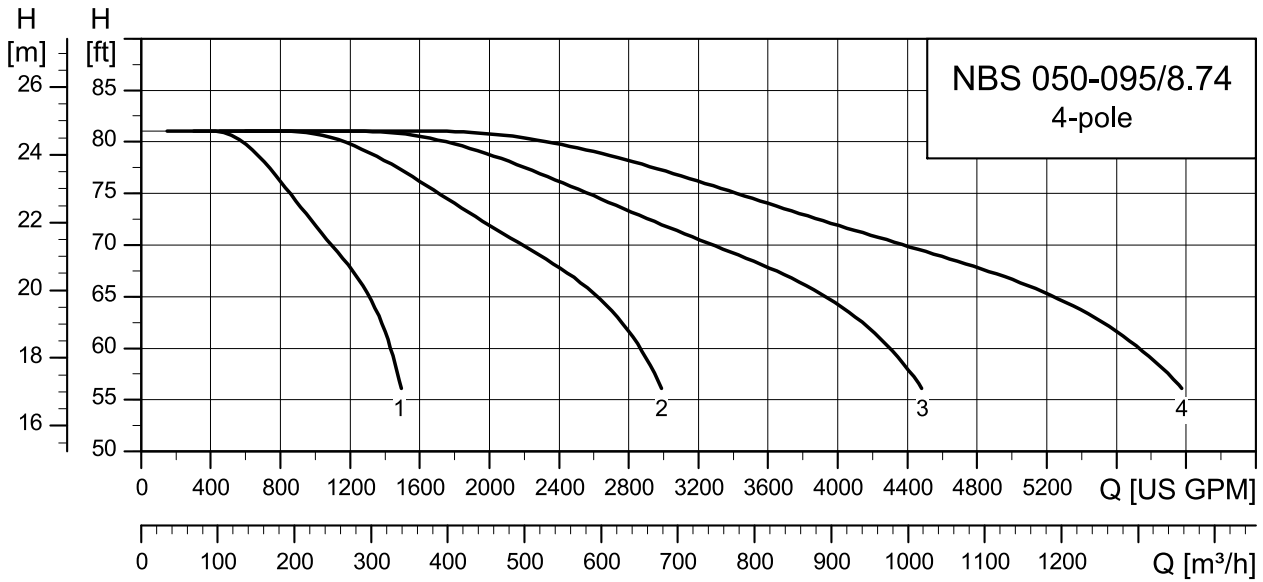
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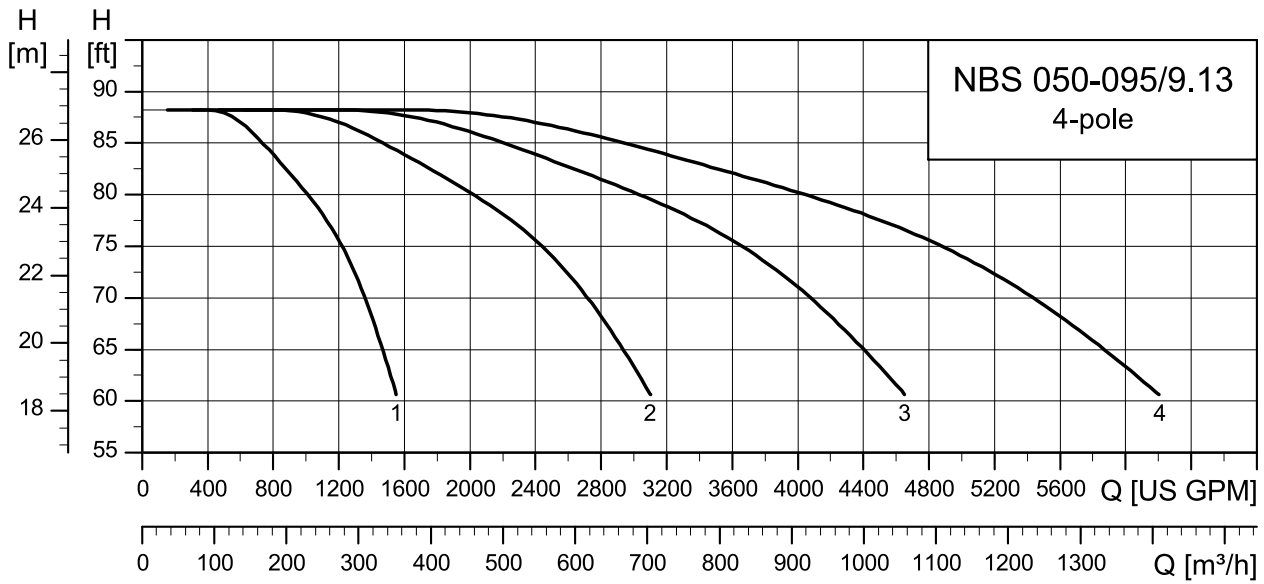
TM083613



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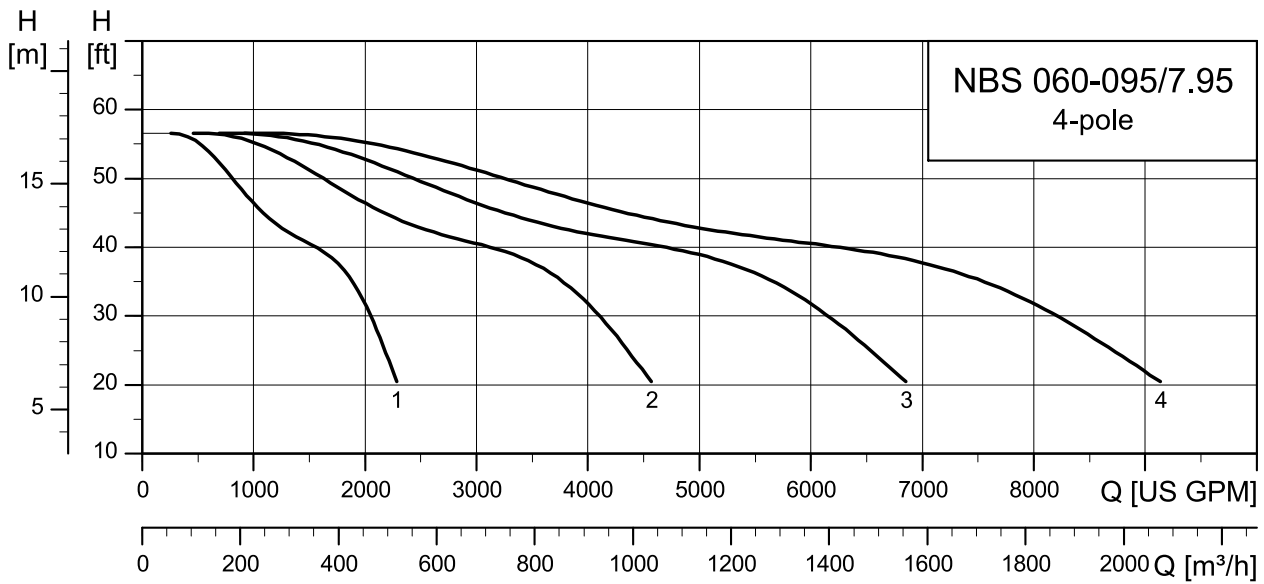


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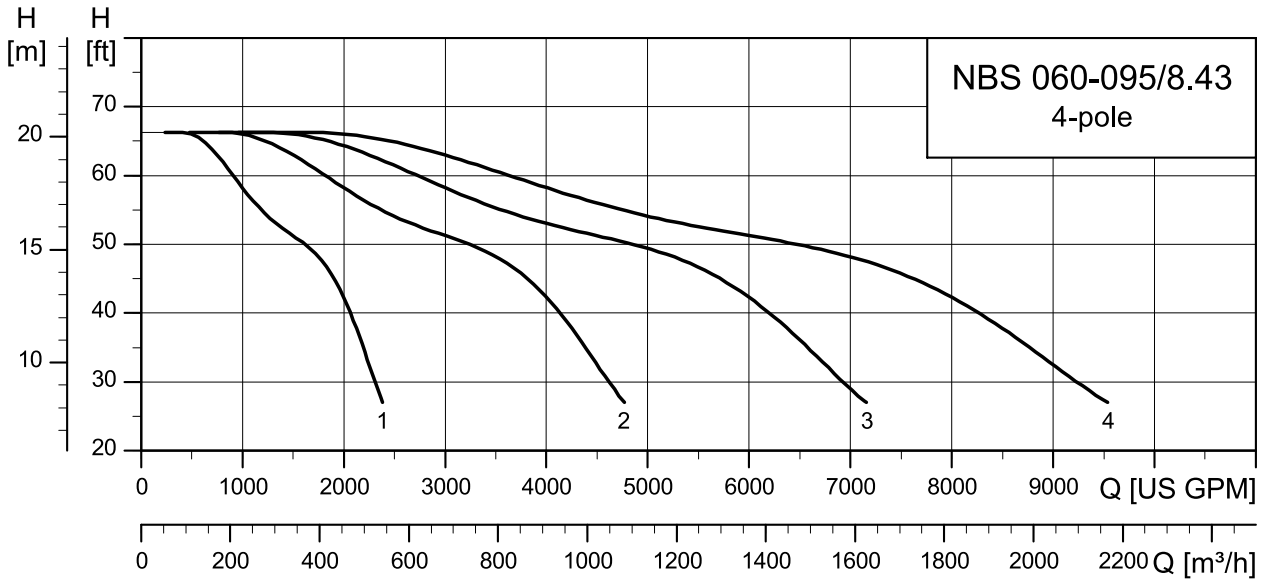


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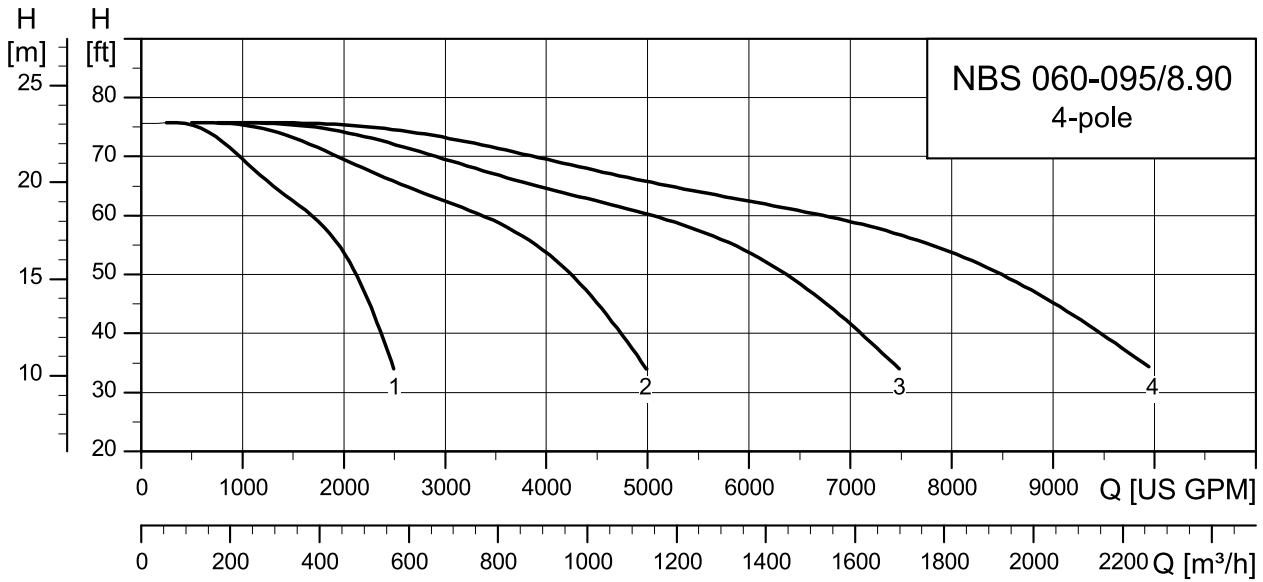
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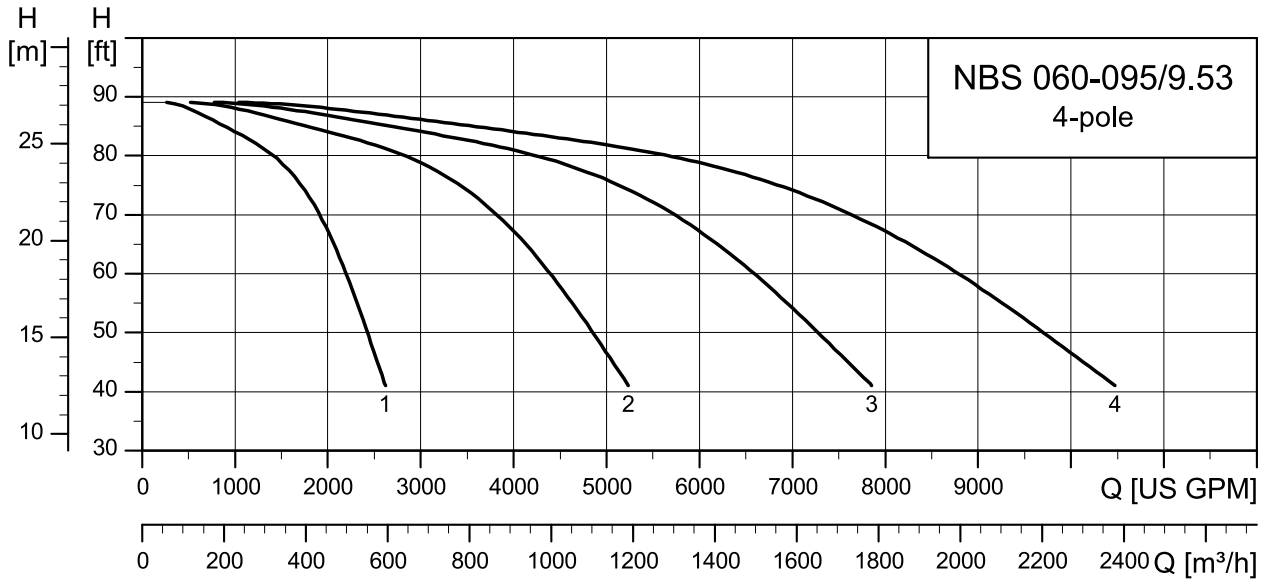
TM083626



TM083627

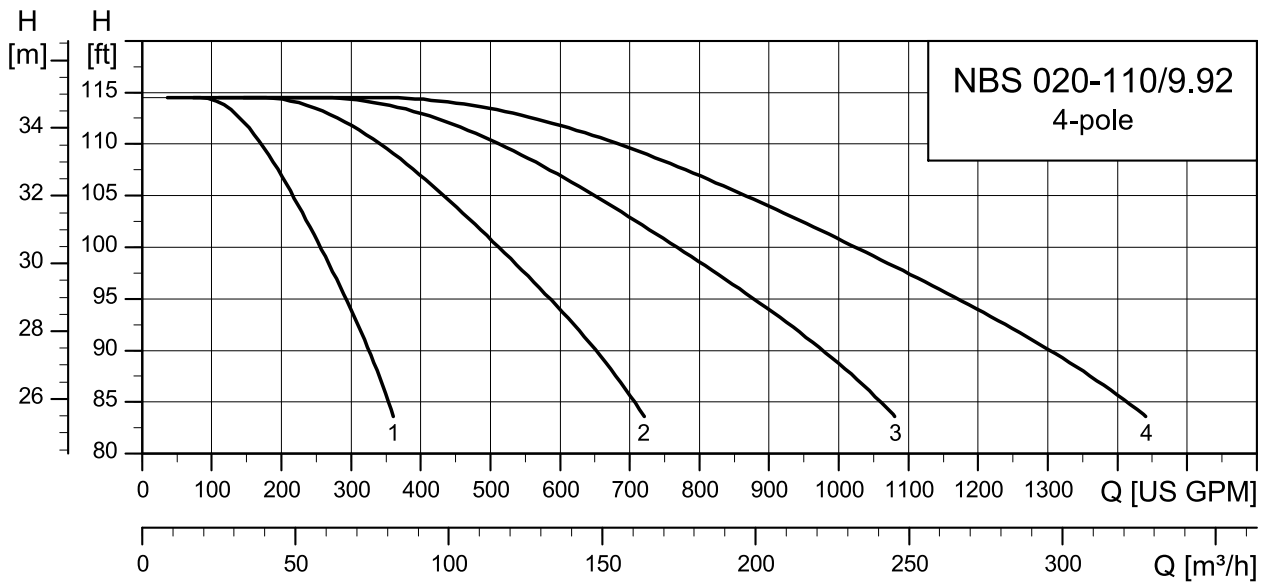


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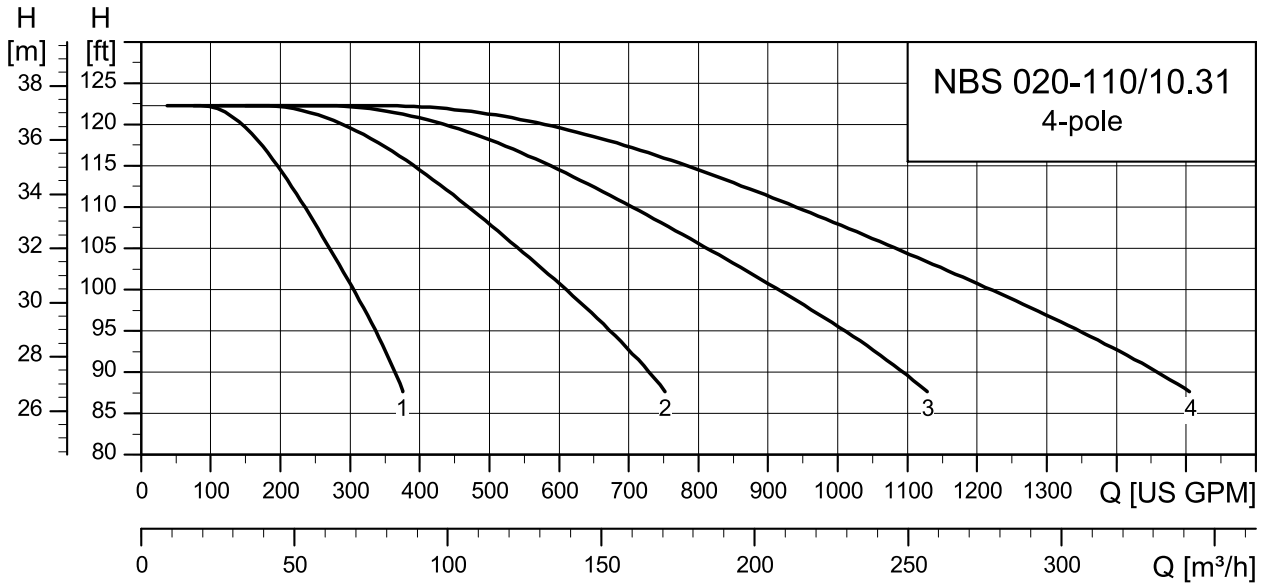


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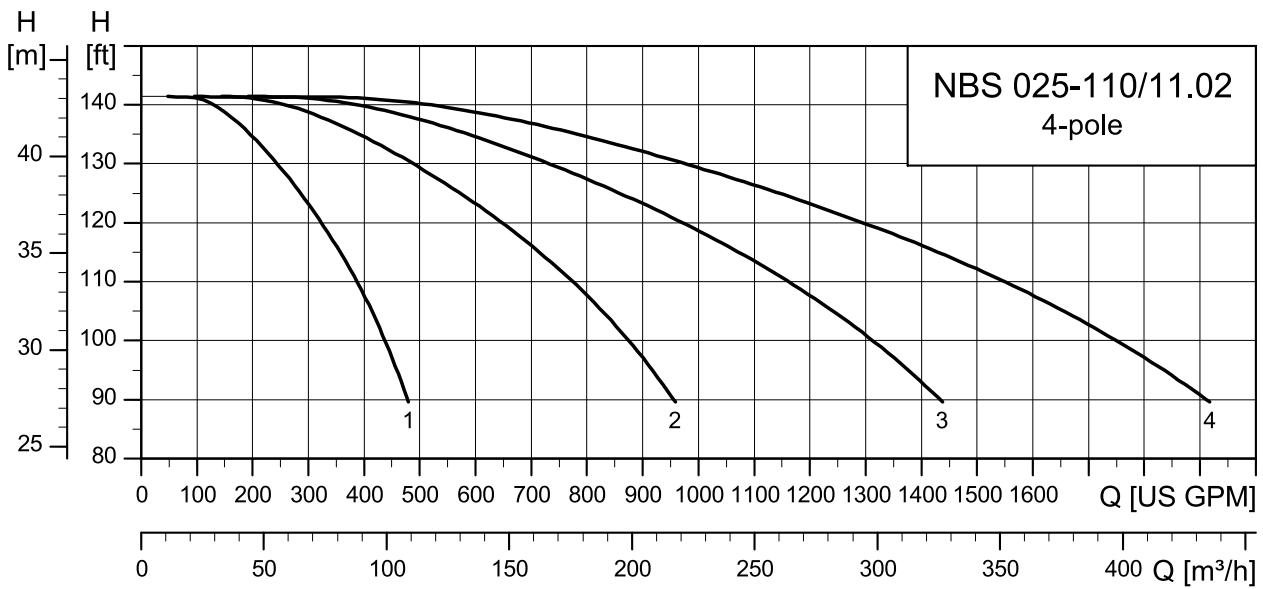


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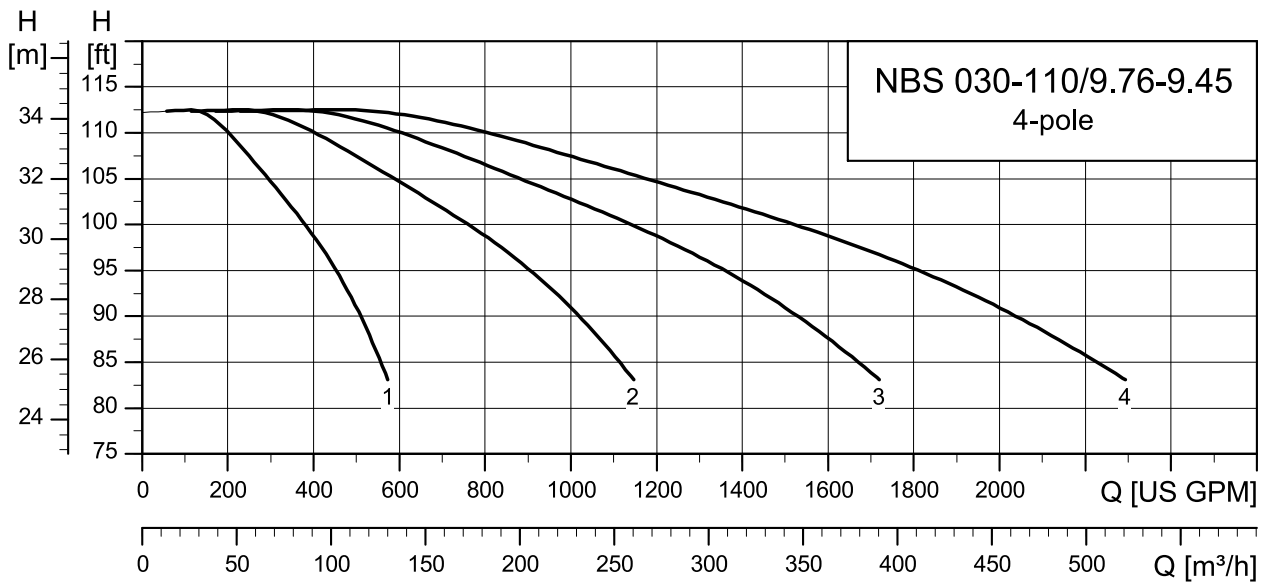
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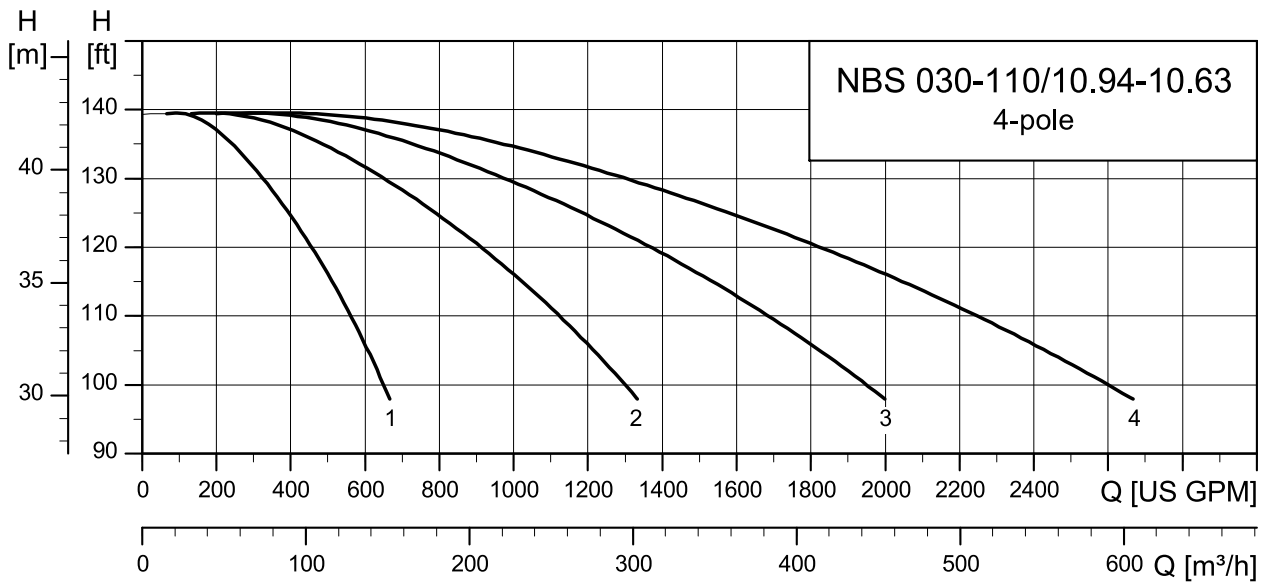


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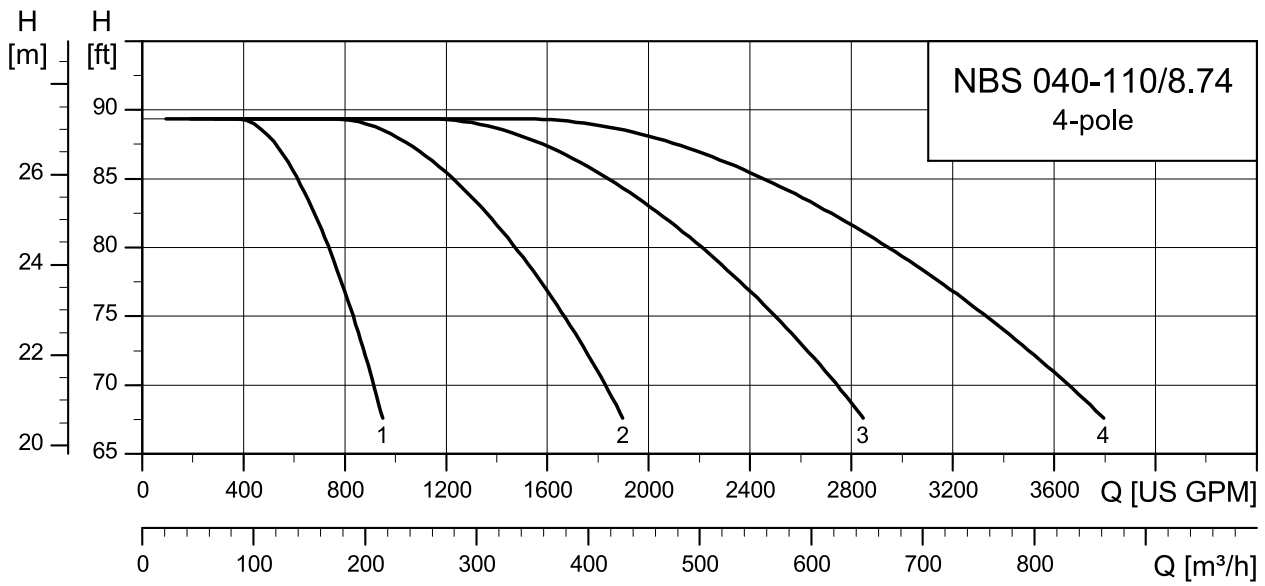


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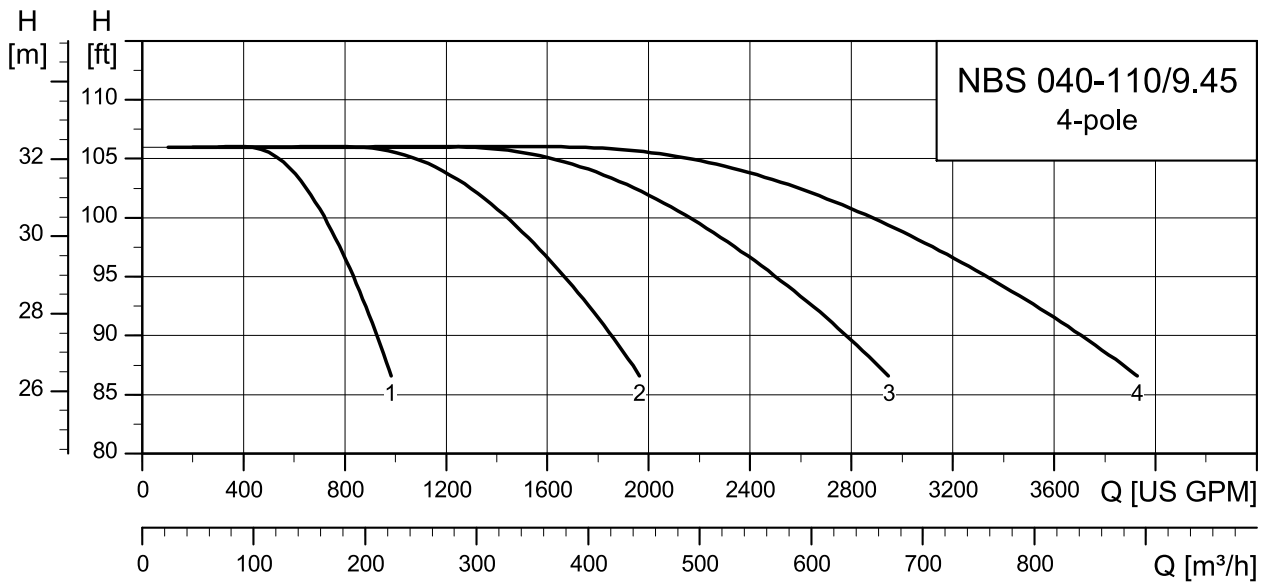


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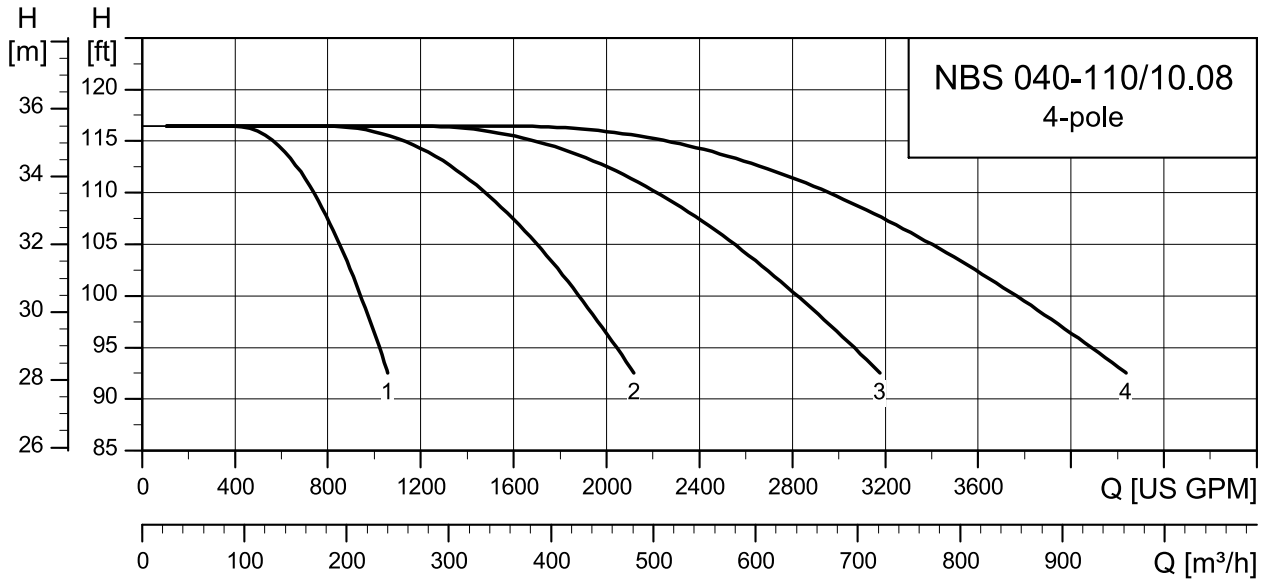
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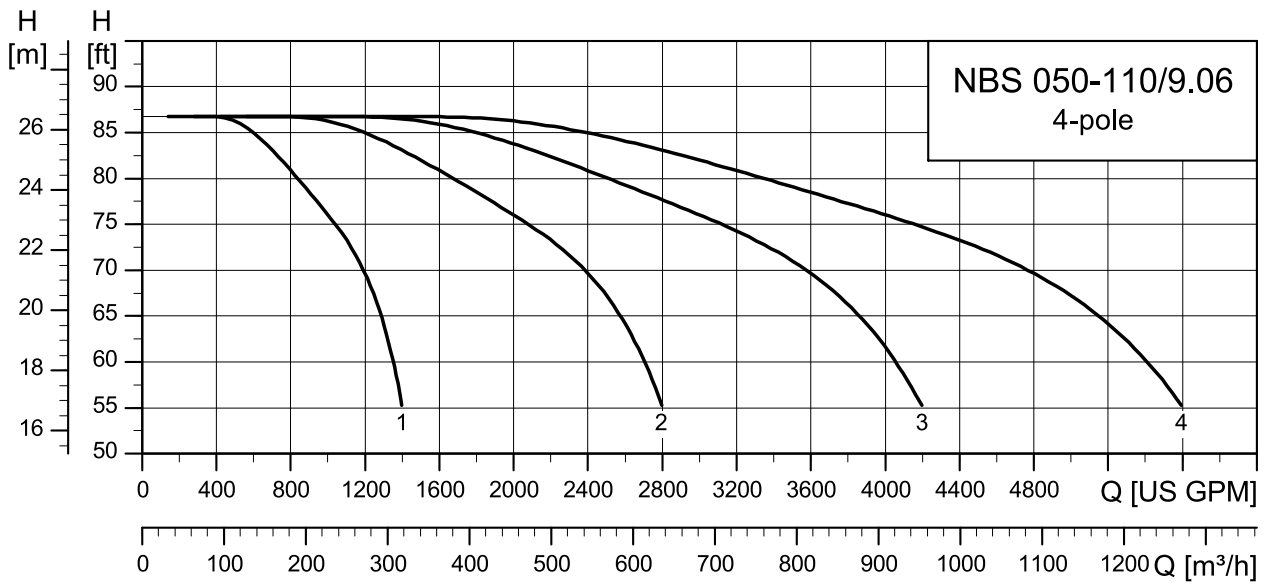


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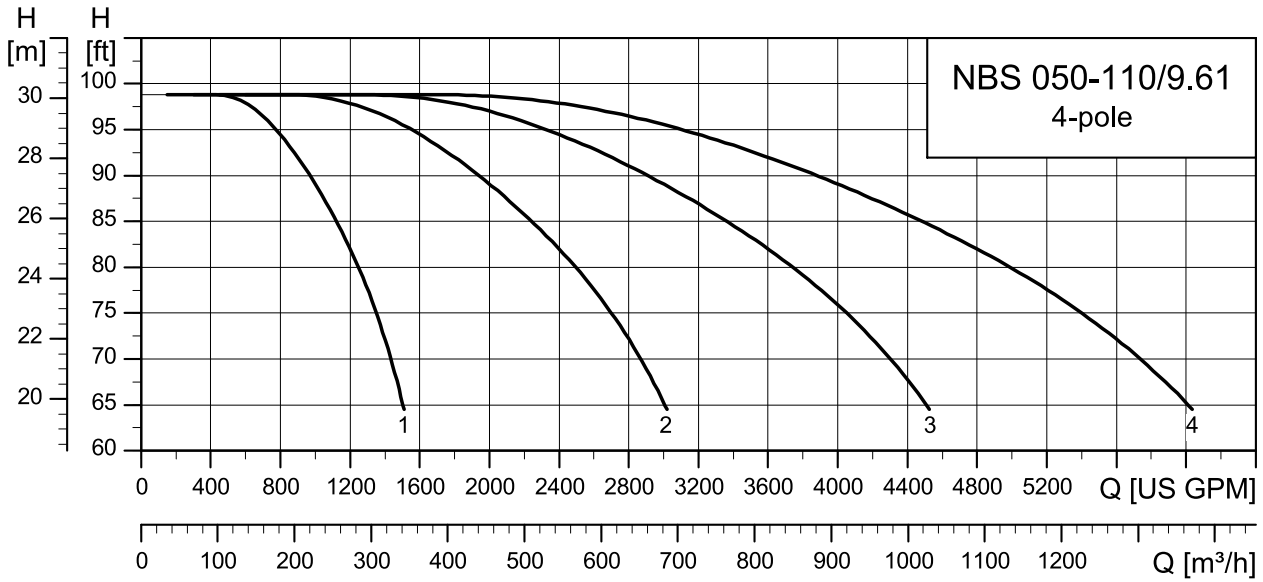


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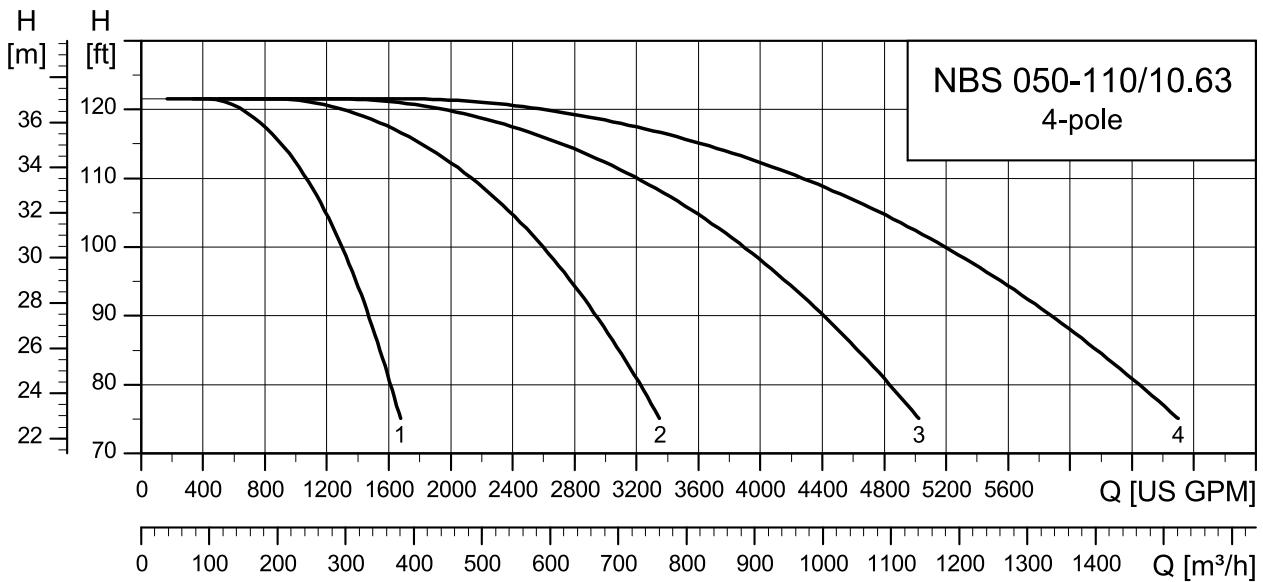
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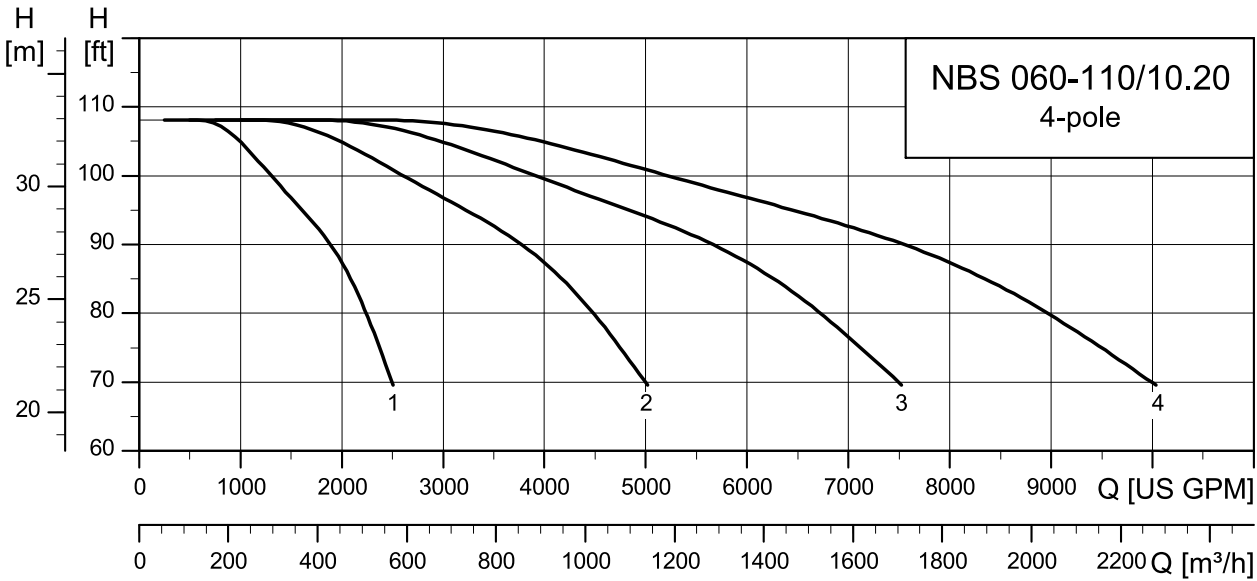


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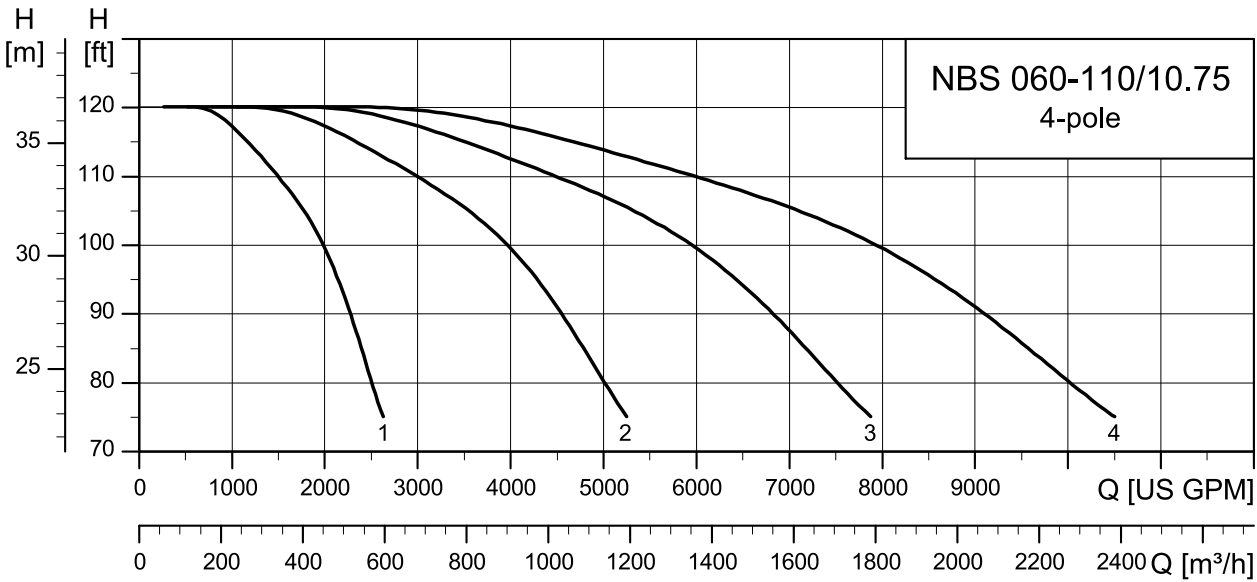


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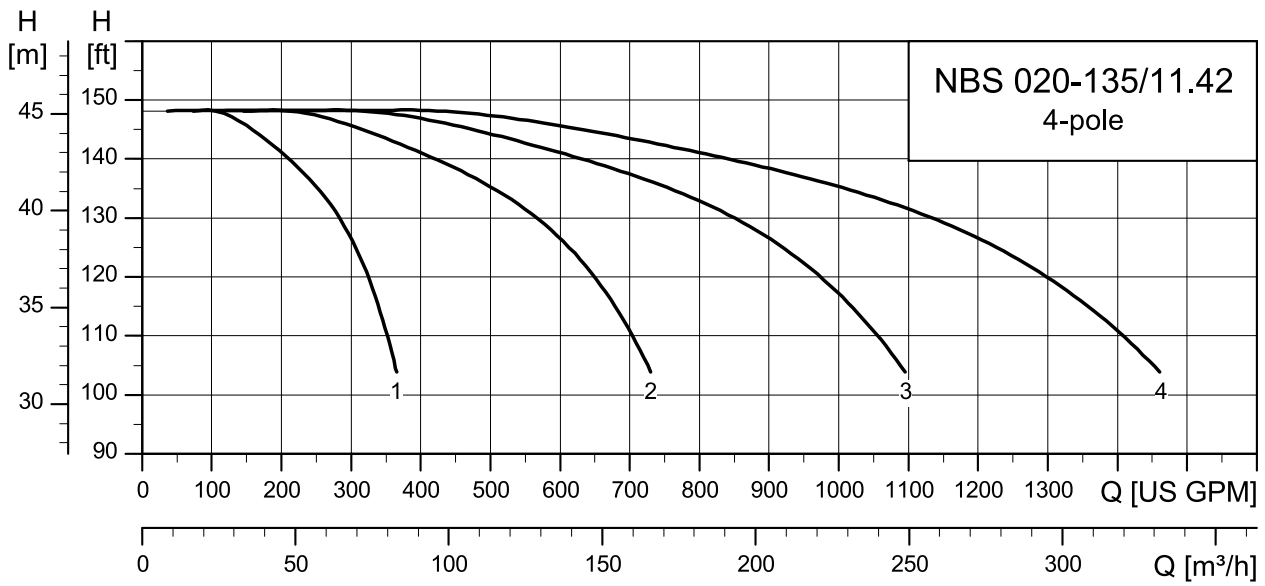


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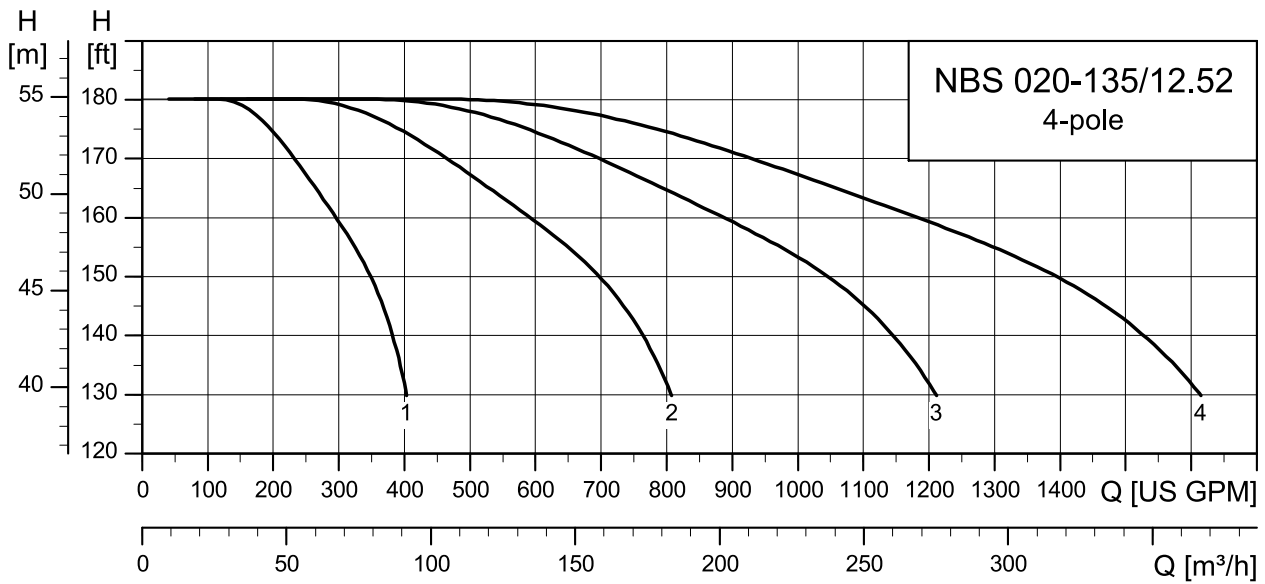


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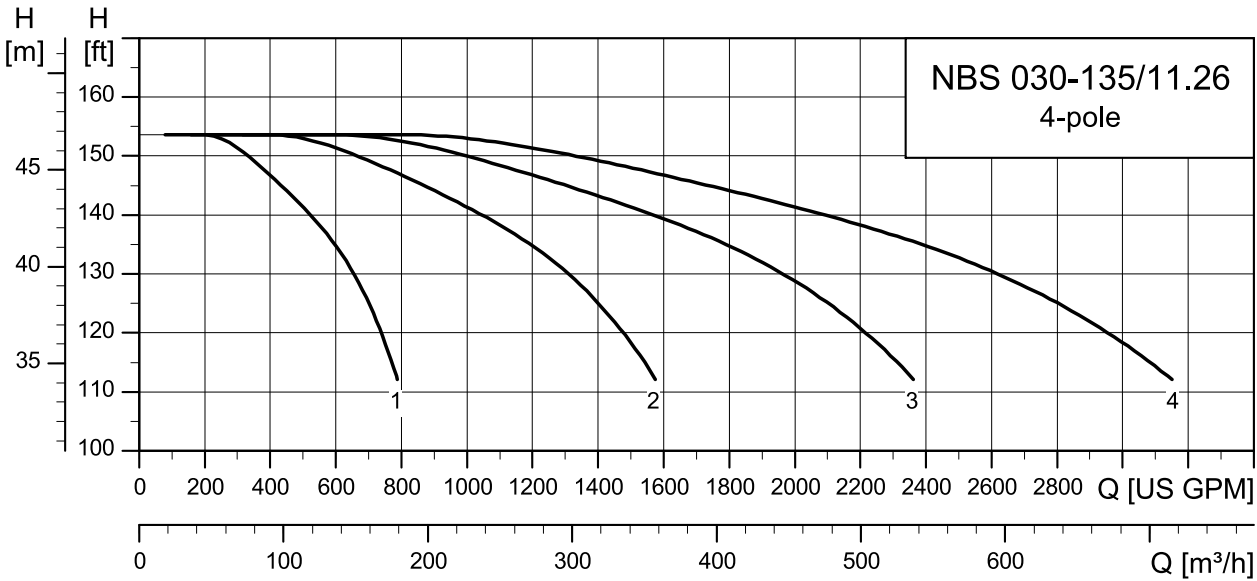


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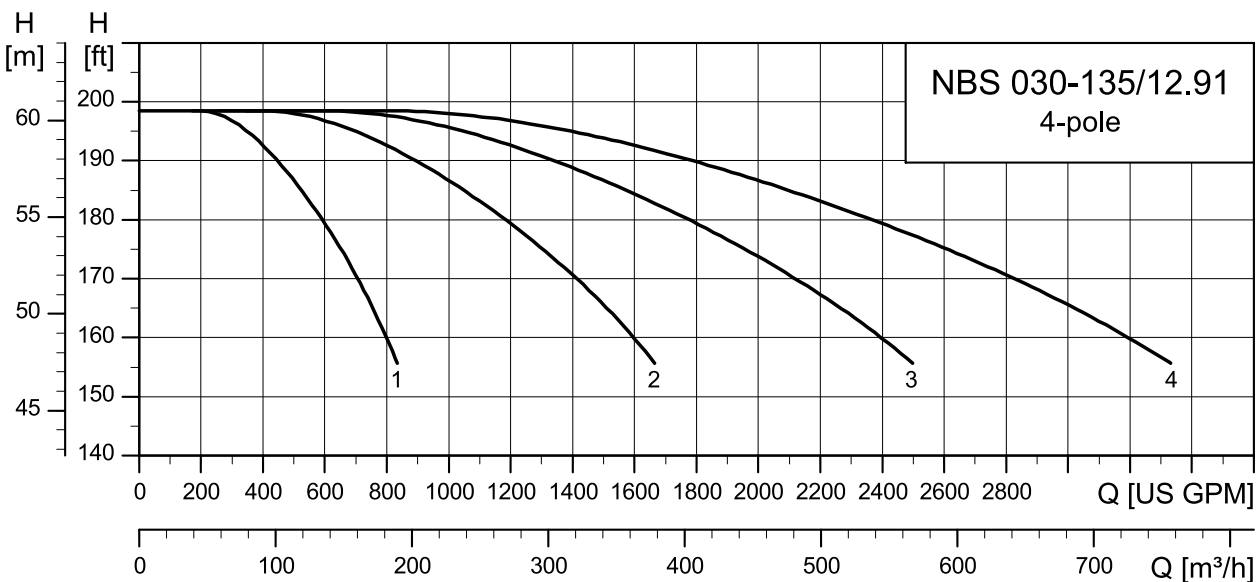


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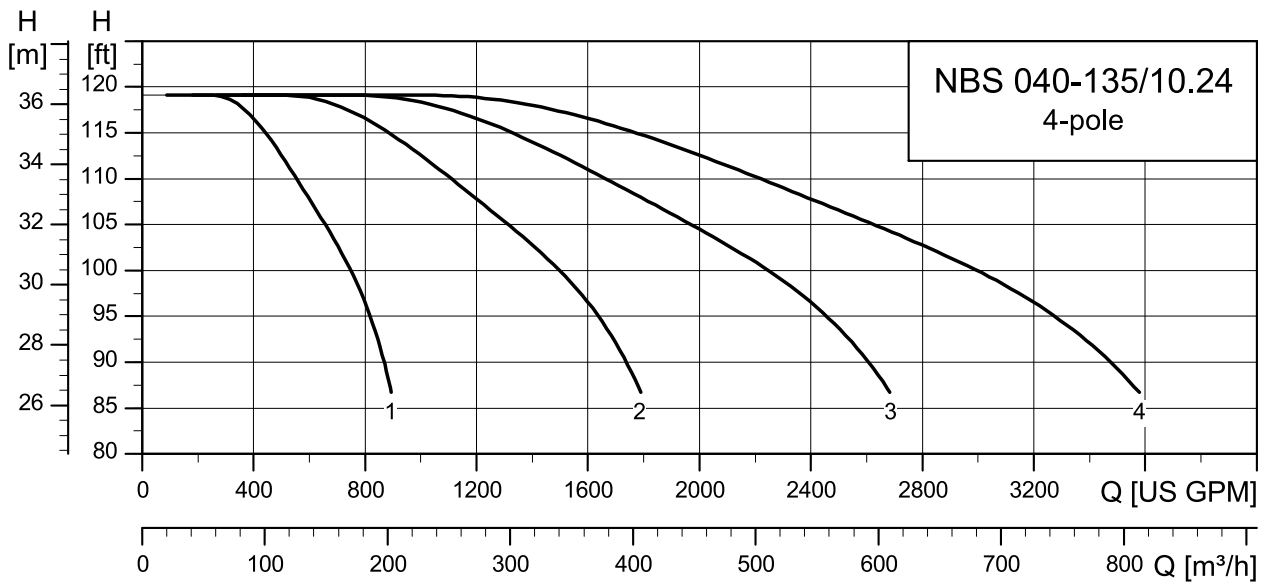


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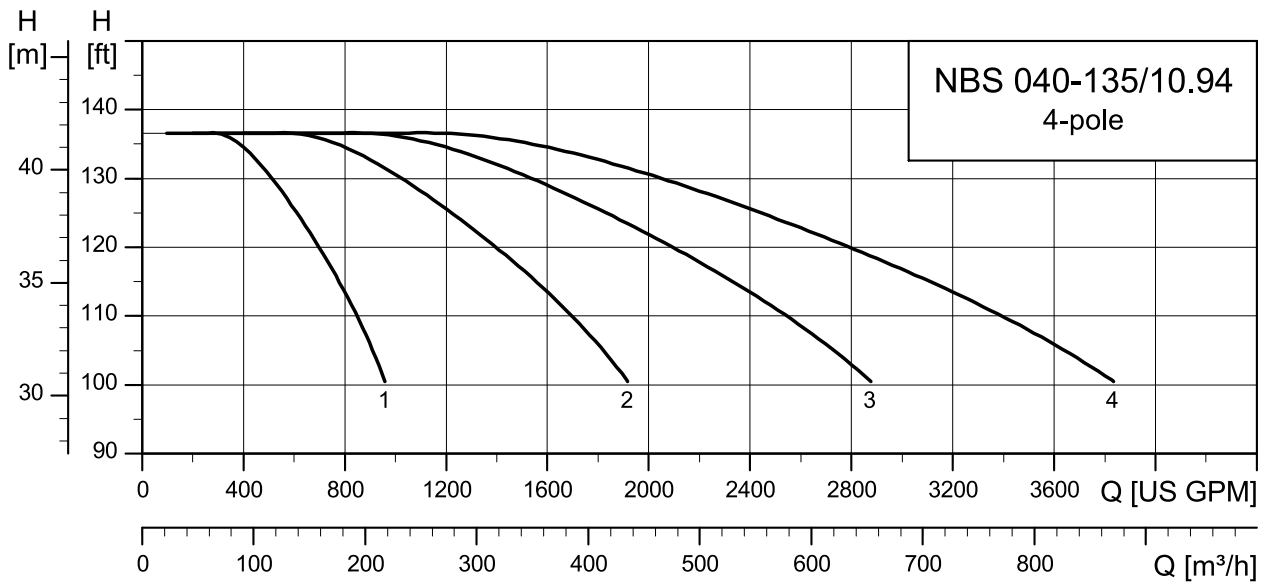


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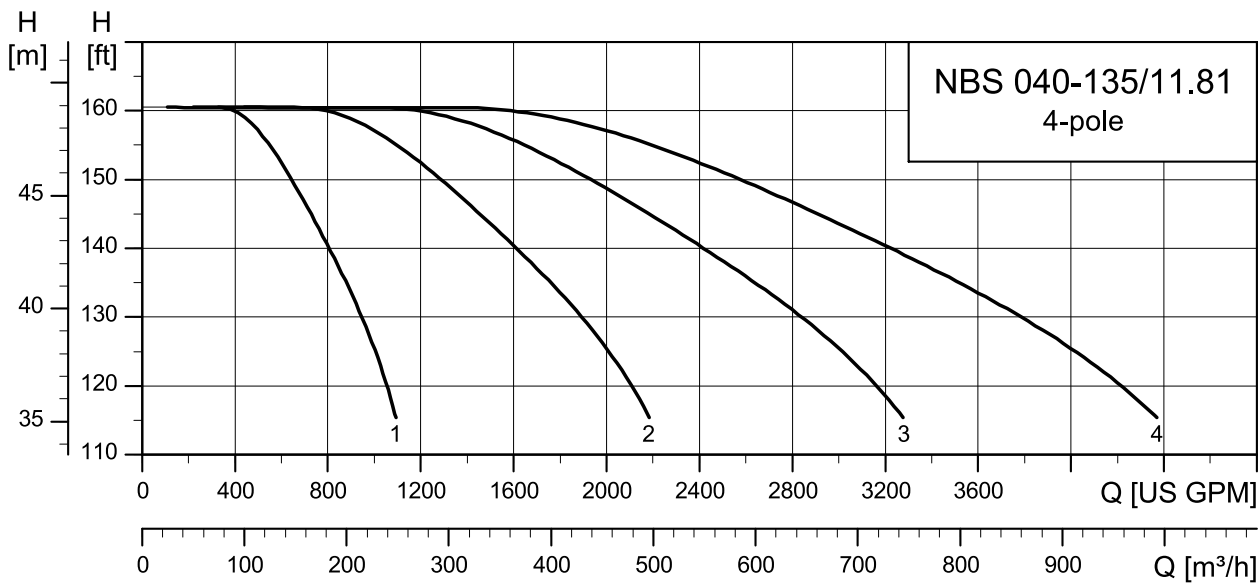
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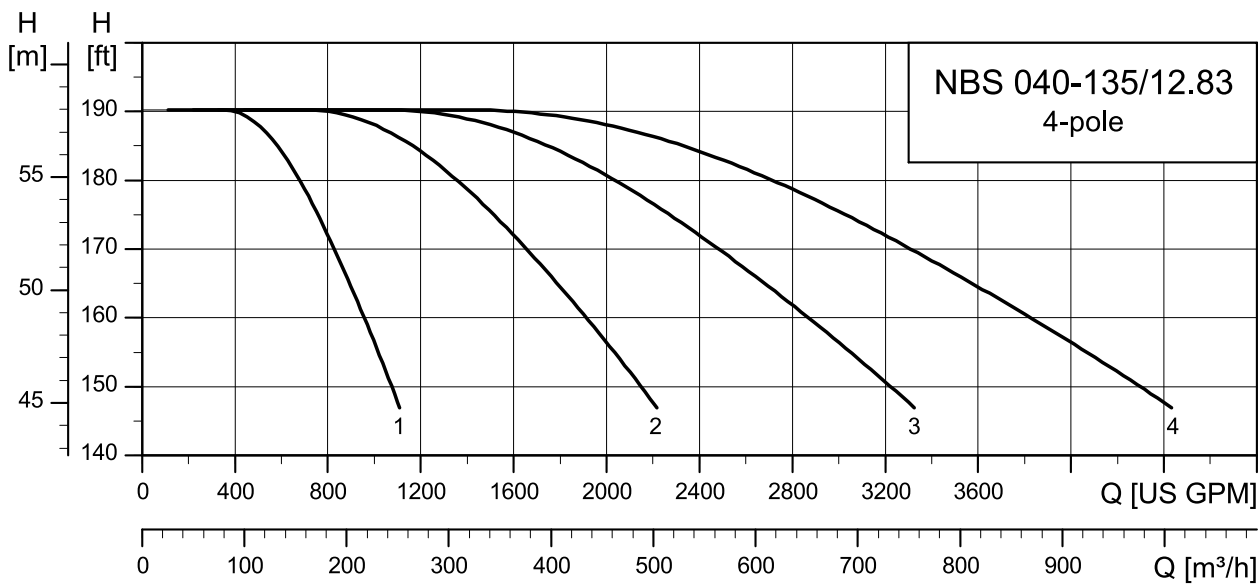
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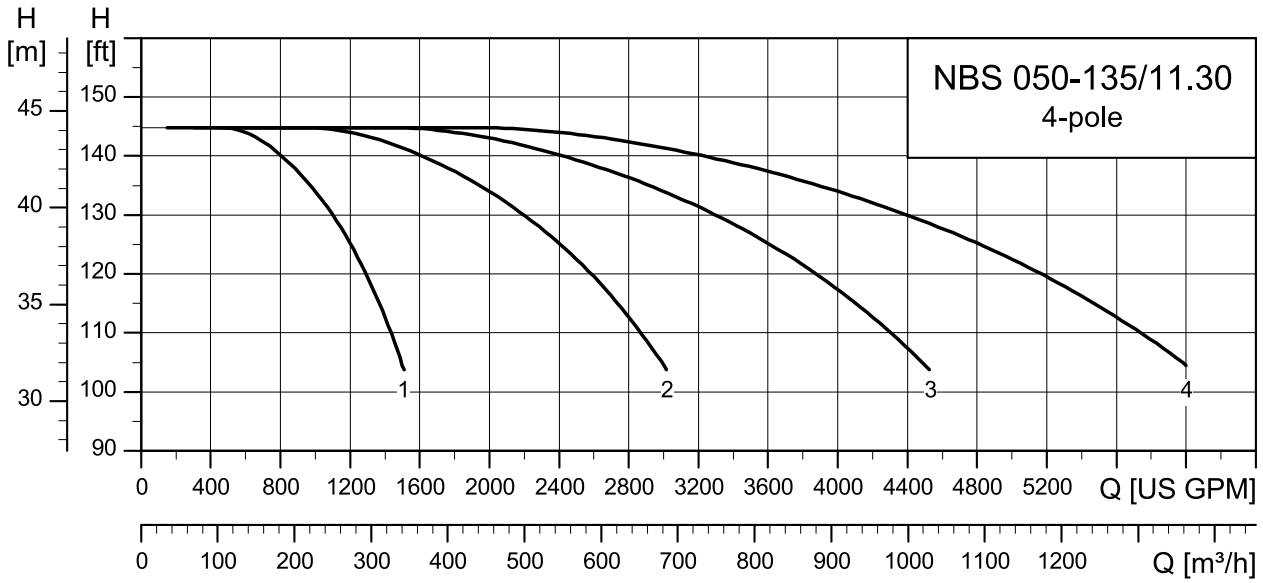


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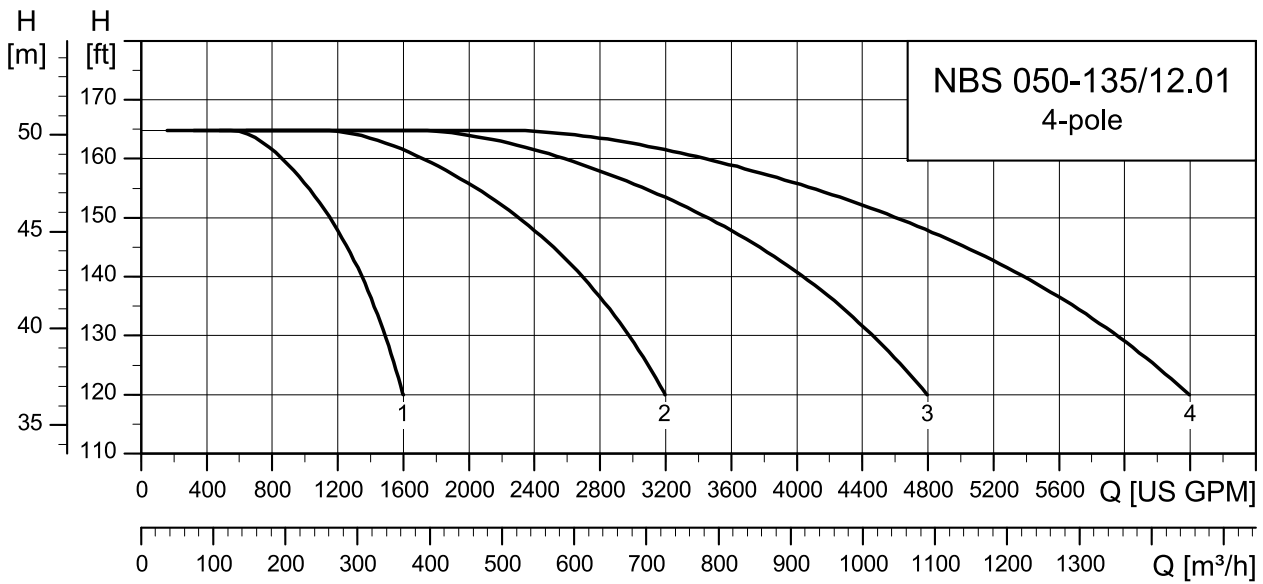


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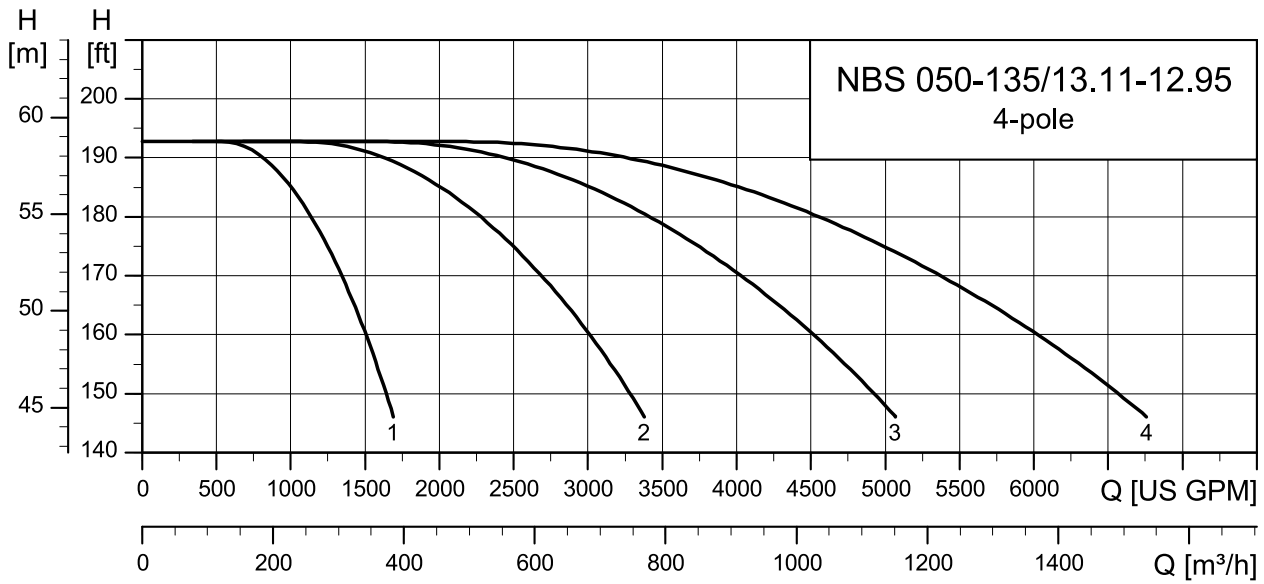
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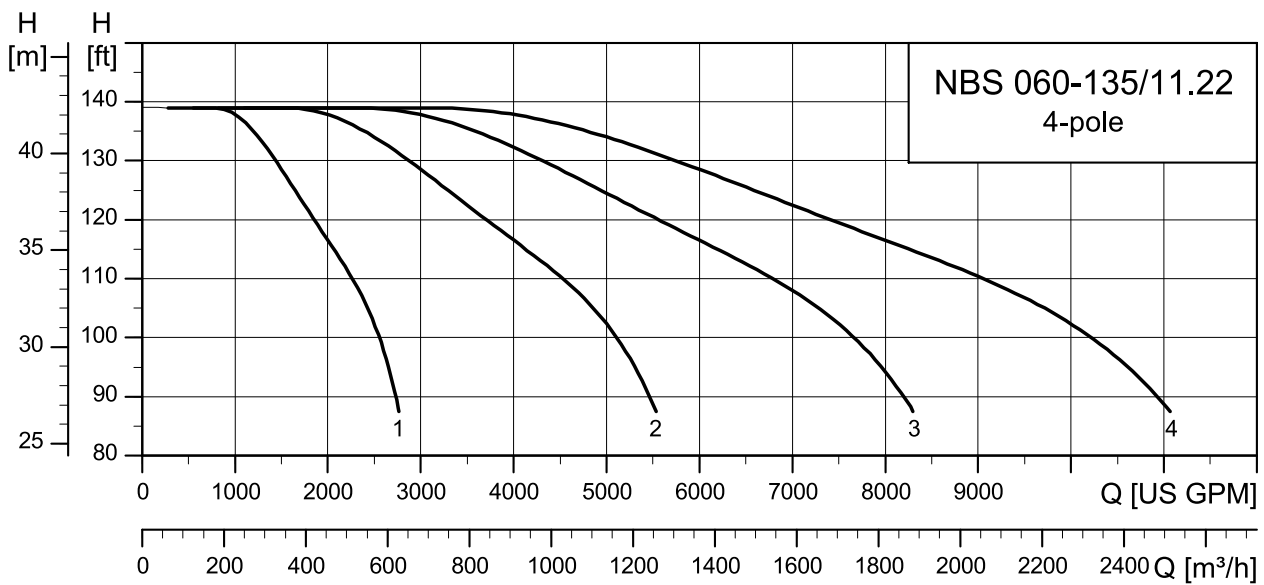
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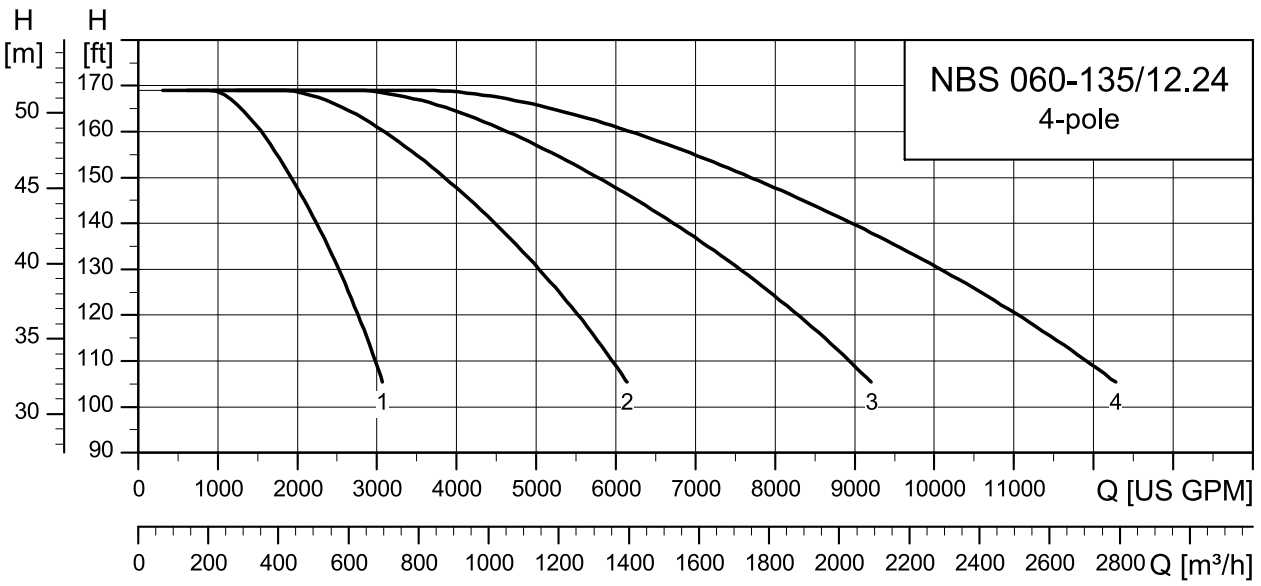
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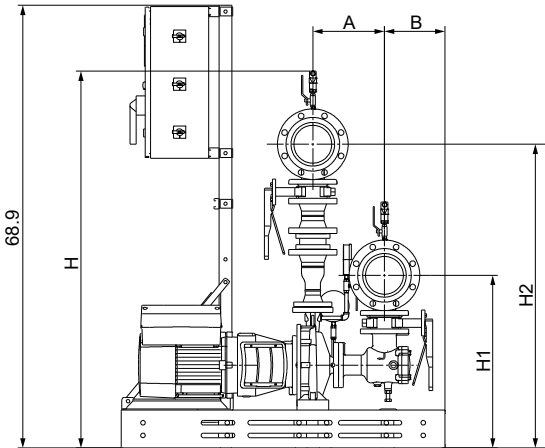
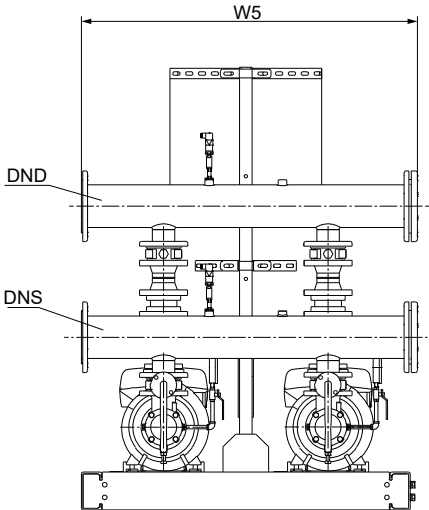
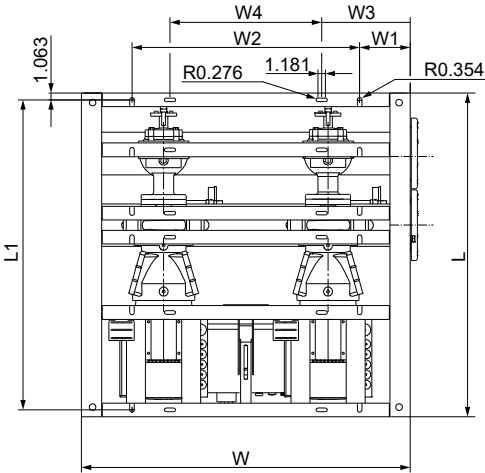


TM063638

9. Technical data

GRUNDFOS DELTA HCU with MLE motor

Two-pump system with the check valve

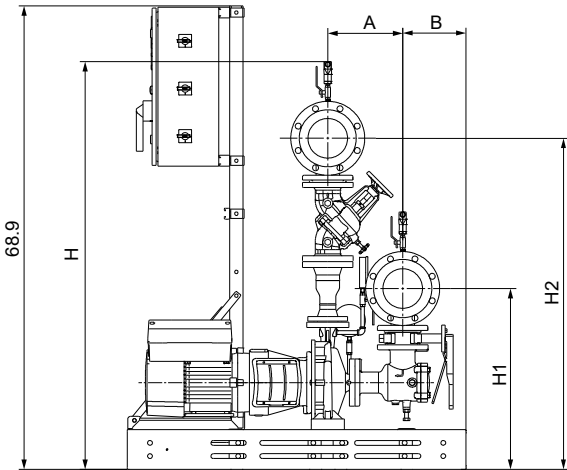
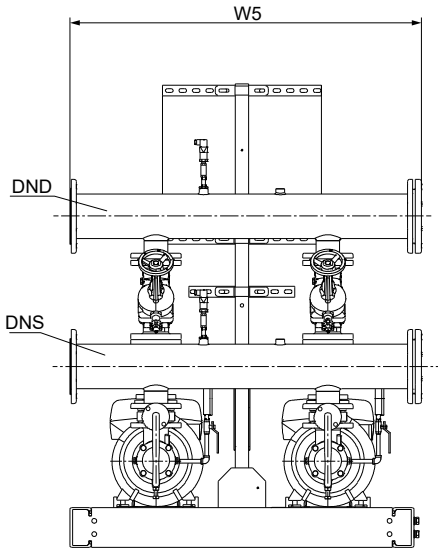
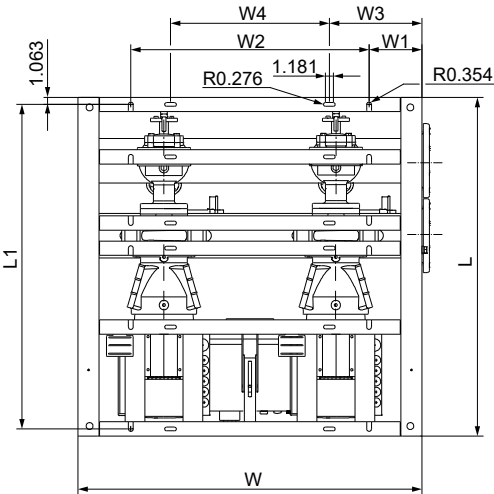


TM084809

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	55.5	26.9	45.1	10.3	6.9	4	4
NBSE-015-090-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-095-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	9.4	4	4
NBSE-020-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-025-070-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	28.9	49.2	12.4	10.9	6	6

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-025-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.6	29.9	52.2	12.4	8.2	6	6
NBSE-025-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.6	29.9	52.2	12.4	8.2	6	6
NBSE-030-070-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.5	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.5	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-095-4-60	10	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	71.6	33.9	59.2	15.2	12.4	8	8
NBSE-040-070-4-60	5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	69.9	32.9	57.5	15.4	15.8	8	8
NBSE-040-070-4-60	7.5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	69.9	32.9	57.5	15.4	13.0	8	8
NBSE-050-070-4-60	10	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	78.7	38.1	65.0	17.0	11.5	10	10
NBSE-050-070-4-60	7.5	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	78.7	38.1	65.0	17.0	11.5	10	10
NBSE-050-095-4-60	10	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	83.8	40.1	70.0	17.5	16.0	10	10
NBSE-012-070-2-60	3	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	51.6	23.6	41.8	8.3	9.1	3	3
NBSE-012-070-2-60	5	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	51.6	23.6	41.8	8.3	9	3	3
NBSE-012-070-2-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	52.7	24.2	42.4	8.3	13.3	4	4
NBSE-012-070-2-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	52.7	24.2	42.4	8.3	13	4	4
NBSE-012-070-2-60	15	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	52.7	24.2	42.4	8.3	8.9	4	4
NBSE-015-070-2-60	5	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	55.5	26.9	45.1	10.3	7	4	4
NBSE-015-070-2-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	55.5	26.9	45.1	10.3	11.3	4	4
NBSE-015-070-2-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	55.5	26.9	45.1	10.3	11.3	4	4
NBSE-015-070-2-60	15	58.3	56.1	51.2	7.874	35.433	13.8	25.6	52.3	56.5	26.9	45.1	10.3	14.8	6	6
NBSE-025-070-2-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	28.9	49.2	12.4	9	6	6
NBSE-025-070-2-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	28.9	49.2	12.4	9	6	6
NBSE-025-070-2-60	15	58.3	56.1	51.2	7.874	35.433	13.8	25.6	52.3	60.6	28.9	49.2	12.4	12.7	6	6
NBSE-030-070-2-60	15	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	68.6	32.9	56.2	14.2	10.9	8	8

Two-pump system with the combination valve

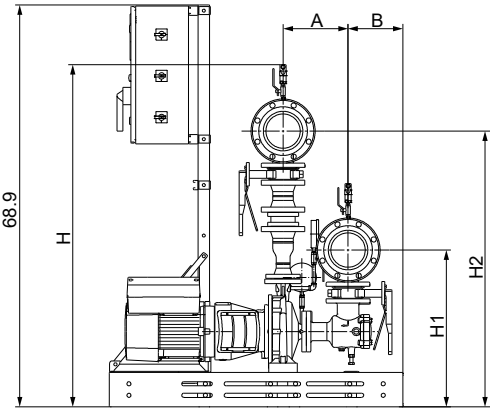
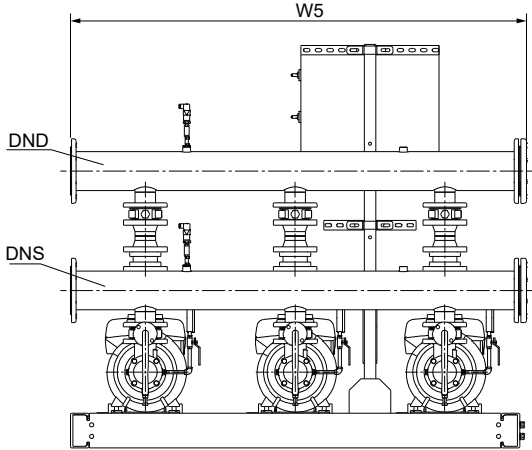
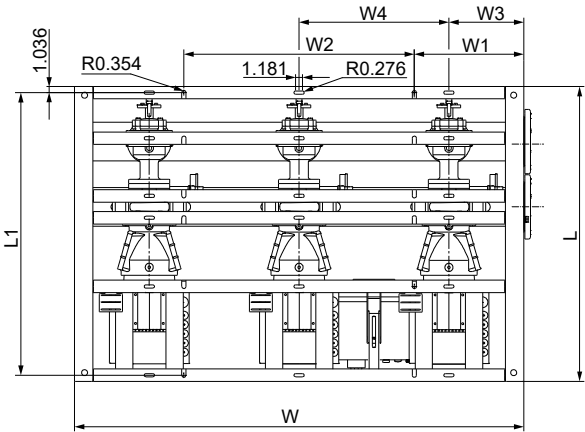


TM084810

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	57.4	26.9	47.1	10.3	6.9	4	4
NBSE-015-090-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-095-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	9.4	4	4
NBSE-020-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	26.9	49.2	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	26.9	49.2	11.1	9.4	6	6
NBSE-025-070-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	66.1	29.9	54.7	12.4	8.2	6	6
NBSE-025-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	66.1	29.9	54.7	12.4	8.2	6	6
NBSE-030-070-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.5	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.5	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-095-4-60	10	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	76.6	33.9	64.2	15.2	12.4	8	8
NBSE-040-070-4-60	5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	74.8	32.9	62.5	15.4	15.8	8	8

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-040-070-4-60	7.5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	74.8	32.9	62.5	15.4	13.0	8	8
NBSE-050-070-4-60	10	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	84.6	38.1	70.8	17.0	11.5	10	10
NBSE-050-070-4-60	7.5	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	84.6	38.1	70.8	17.0	11.5	10	10
NBSE-050-095-4-60	10	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	89.6	40.1	75.9	17.5	16.0	10	10
NBSE-012-070-2-60	3	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	52.1	23.6	42.3	8.3	9.1	3	3
NBSE-012-070-2-60	5	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	52.1	23.6	42.3	8.3	9	3	3
NBSE-012-070-2-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	53.2	24.2	42.9	8.3	13.3	4	4
NBSE-012-070-2-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	53.2	24.2	42.9	8.3	13	4	4
NBSE-012-070-2-60	15	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	53.2	24.2	42.9	8.3	8.9	4	4
NBSE-015-070-2-60	5	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	57.4	26.9	47.1	10.3	7	4	4
NBSE-015-070-2-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.4	26.9	47.1	10.3	11.3	4	4
NBSE-015-070-2-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.4	26.9	47.1	10.3	11.3	4	4
NBSE-015-070-2-60	15	58.3	56.1	51.2	7.874	35.433	13.8	25.6	52.3	58.5	26.9	47.1	10.3	14.8	6	6
NBSE-025-070-2-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63	28.9	51.6	12.4	9	6	6
NBSE-025-070-2-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63	28.9	51.6	12.4	9	6	6
NBSE-025-070-2-60	15	58.3	56.1	51.2	7.874	35.433	13.8	25.6	52.3	63	28.9	51.6	12.4	12.7	6	6
NBSE-030-070-2-60	15	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	73.5	32.9	61.1	14.2	10.9	8	8

Three-pump system with the check valve

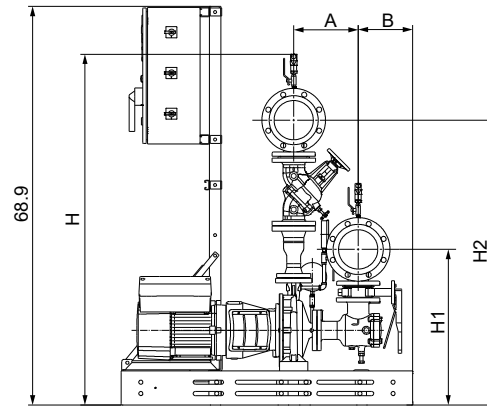
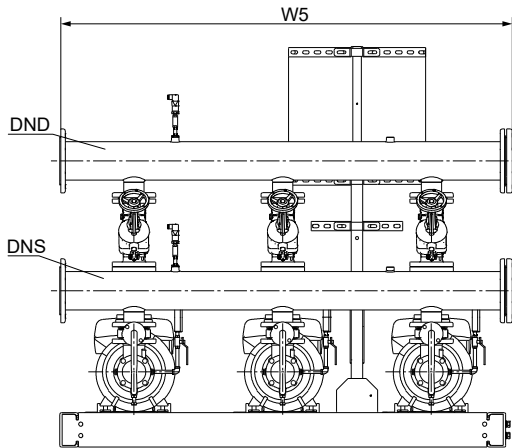
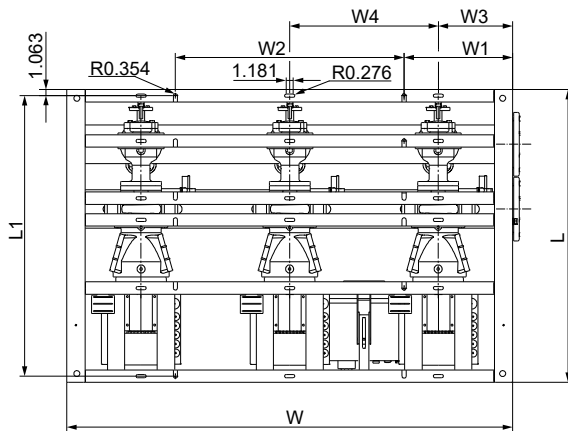


TM084811

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	55.5	26.9	45.1	10.3	6.9	4	4
NBSE-015-090-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-095-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	9.4	4	4
NBSE-020-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-025-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.6	29.9	52.2	12.4	8.2	6	6
NBSE-025-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.6	29.9	52.2	12.4	8.2	6	6
NBSE-030-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	78.1	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	78.1	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-095-4-60	10	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	71.6	33.9	59.2	15.2	12.4	8	8
NBSE-040-070-4-60	5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	69.9	32.9	57.5	15.4	15.8	8	8
NBSE-040-070-4-60	7.5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	69.9	32.9	57.5	15.4	13.0	8	8
NBSE-050-070-4-60	10	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	78.7	38.1	65.0	17.0	11.5	10	10
NBSE-050-070-4-60	7.5	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	78.7	38.1	65.0	17.0	11.5	10	10
NBSE-050-095-4-60	10	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	83.8	40.1	70.0	17.5	16.0	10	10
NBSE-012-070-2-60	3	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	51.6	23.6	41.8	8.3	9.1	3	3

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-012-070-2-60	5	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	51.6	23.6	41.8	8.3	9	3	3
NBSE-012-070-2-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	52.7	24.2	42.4	8.3	13.3	4	4
NBSE-012-070-2-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	52.7	24.2	42.4	8.3	13	4	4
NBSE-012-070-2-60	15	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	52.7	24.2	42.4	8.3	8.9	4	4
NBSE-015-070-2-60	5	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	55.5	26.9	45.1	10.3	7	4	4
NBSE-015-070-2-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	55.5	26.9	45.1	10.3	11.3	4	4
NBSE-015-070-2-60	10	50.4	48.3	76.8	18.701	39.37	12.8	25.6	77.7	55.5	26.9	45.1	10.3	11.3	4	4
NBSE-015-070-2-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	77.9	56.5	26.9	45.1	10.3	14.8	6	6
NBSE-025-070-2-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	9	6	6
NBSE-025-070-2-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	9	6	6
NBSE-025-070-2-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	12.7	6	6
NBSE-030-070-2-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	68.6	32.9	56.2	14.2	10.9	8	8

Three-pump system with the combination valve

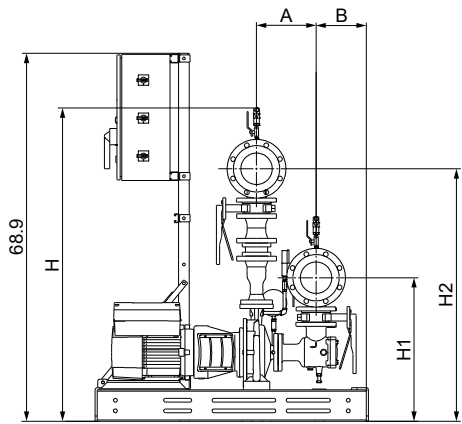
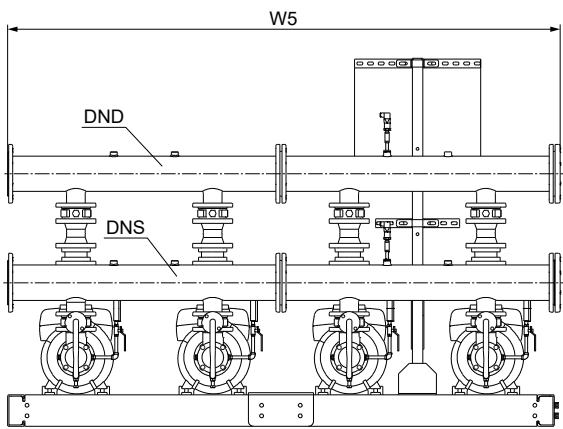
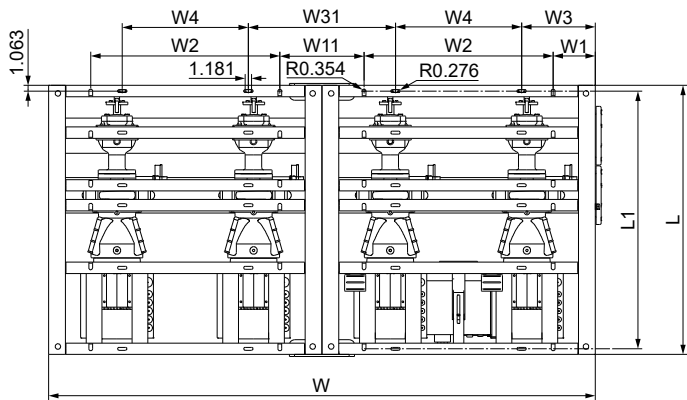


TM084814

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	57.4	26.9	47.1	10.3	6.9	4	4
NBSE-015-090-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-095-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	9.4	4	4
NBSE-020-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	26.9	49.3	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	26.9	49.3	11.1	9.4	6	6
NBSE-025-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	66.1	29.9	54.7	12.4	8.2	6	6
NBSE-025-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	66.1	29.9	54.7	12.4	8.2	6	6
NBSE-030-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	78.1	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	78.1	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-095-4-60	10	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	76.6	33.9	64.2	15.2	12.4	8	8
NBSE-040-070-4-60	5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	74.8	32.9	62.5	15.4	15.8	8	8
NBSE-040-070-4-60	7.5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	74.8	32.9	62.5	15.4	13.0	8	8
NBSE-050-070-4-60	10	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	84.6	38.1	70.8	17.0	11.5	10	10
NBSE-050-070-4-60	7.5	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	84.6	38.1	70.8	17.0	11.5	10	10
NBSE-050-095-4-60	10	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	89.6	40.1	75.9	17.5	16.0	10	10

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-012-070-2-60	3	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	52.1	23.6	42.3	8.3	9.1	3	3
NBSE-012-070-2-60	5	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	52.1	23.6	42.3	8.3	9	3	3
NBSE-012-070-2-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	53.2	24.2	42.9	8.3	13.3	4	4
NBSE-012-070-2-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	53.2	24.2	42.9	8.3	13	4	4
NBSE-012-070-2-60	15	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	53.2	24.2	42.9	8.3	8.9	4	4
NBSE-015-070-2-60	5	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	57.4	26.9	47.1	10.3	7	4	4
NBSE-015-070-2-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.4	26.9	47.1	10.3	11.3	4	4
NBSE-015-070-2-60	10	50.4	48.3	76.8	18.701	39.37	12.8	25.6	77.7	57.4	26.9	47.1	10.3	11.3	4	4
NBSE-015-070-2-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	77.9	58.5	26.9	47.1	10.3	14.8	6	6
NBSE-025-070-2-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63	28.9	51.6	12.4	9	6	6
NBSE-025-070-2-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63	28.9	51.6	12.4	9	6	6
NBSE-025-070-2-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	77.9	63	28.9	51.6	12.4	12.7	6	6
NBSE-030-070-2-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	73.5	32.9	61.1	14.2	10.9	8	8

Four-pump system with the check valve

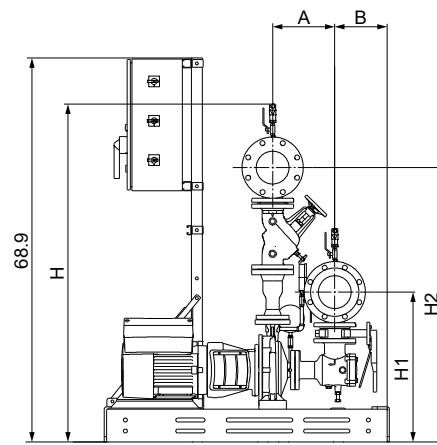
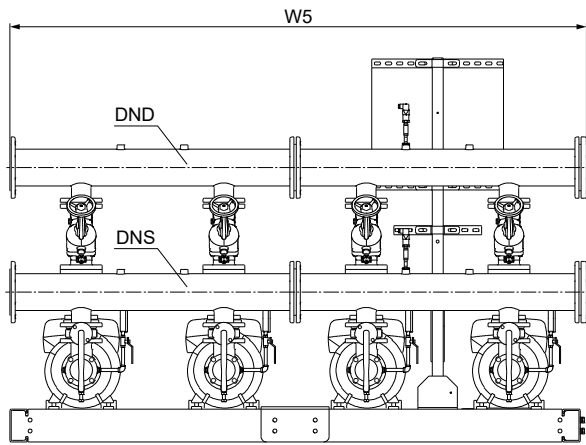
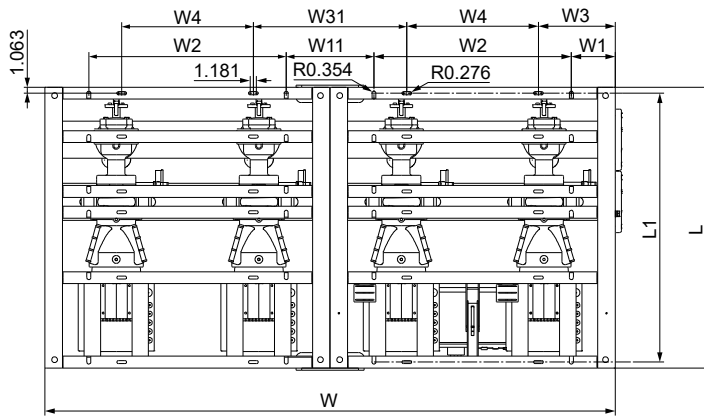


TM084817

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	56.5	26.9	45.1	10.3	6.9	6	6
NBSE-015-090-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	57.5	26.9	47.2	11.1	12.2	4	4
NBSE-015-095-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	58.6	26.9	47.2	11.1	12.2	6	6
NBSE-015-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	58.6	26.9	47.2	11.1	9.4	6	6
NBSE-020-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-025-070-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	64.4	29.7	52.1	12.4	8.2	8	8
NBSE-025-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	64.4	29.7	52.1	12.4	8.2	8	8
NBSE-030-070-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-095-4-60	10	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	71.6	33.9	59.2	15.2	12.4	8	8
NBSE-040-070-4-60	5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	71.3	33.0	57.5	15.4	15.8	10	10
NBSE-040-070-4-60	7.5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	71.3	33.0	57.5	15.4	13.0	10	10
NBSE-050-070-4-60	10	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	81.7	40.1	66.9	17.0	11.5	12	12
NBSE-050-070-4-60	7.5	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	78.7	38.1	65.0	17.0	11.5	10	10
NBSE-050-095-4-60	10	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	86.7	42.1	72.0	17.5	16.0	12	12
NBSE-012-070-2-60	3	43.3	41.2	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	52.7	24.2	42.4	8.3	9.1	4	4
NBSE-012-070-2-60	5	43.3	41.2	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	52.7	24.2	42.4	8.3	9	4	4
NBSE-012-070-2-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	52.7	24.2	42.4	8.3	13.3	4	4

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-012-070-2-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	52.7	24.2	42.4	8.3	13	4	4
NBSE-012-070-2-60	15	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	55	25.5	43.6	8.3	8.9	6	6
NBSE-015-070-2-60	5	43.3	41.2	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	56.5	26.9	45.1	10.3	7	6	6
NBSE-015-070-2-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	56.5	26.9	45.1	10.3	11.3	6	6
NBSE-015-070-2-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	56.5	26.9	45.1	10.3	11.3	6	6
NBSE-015-070-2-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	56.5	26.9	45.1	10.3	14.8	6	6
NBSE-025-070-2-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	28.9	49.2	12.4	9	6	6
NBSE-025-070-2-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	61.4	28.7	49	12.4	9	8	8
NBSE-025-070-2-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	61.4	28.7	49	12.4	12.7	8	8
NBSE-030-070-2-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	68.6	32.9	56.2	14.2	10.9	8	8

Four-pump system with the combination valve

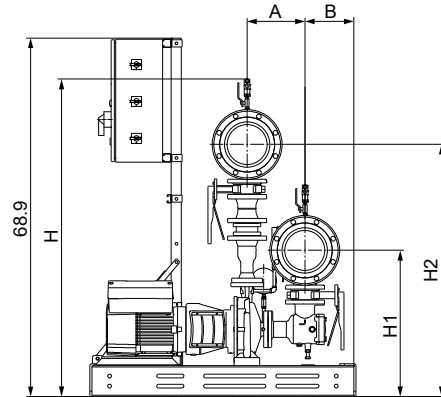
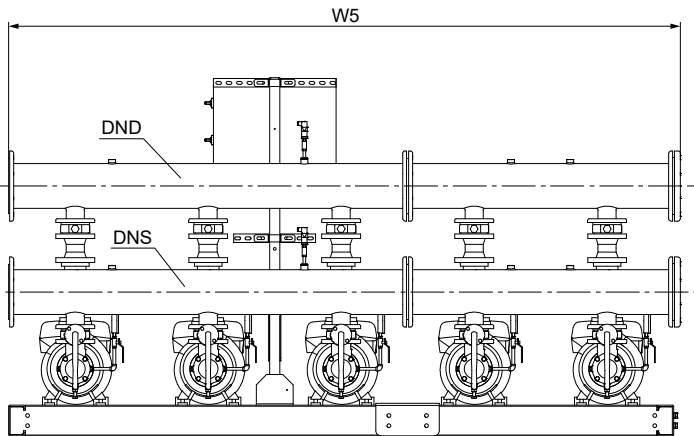
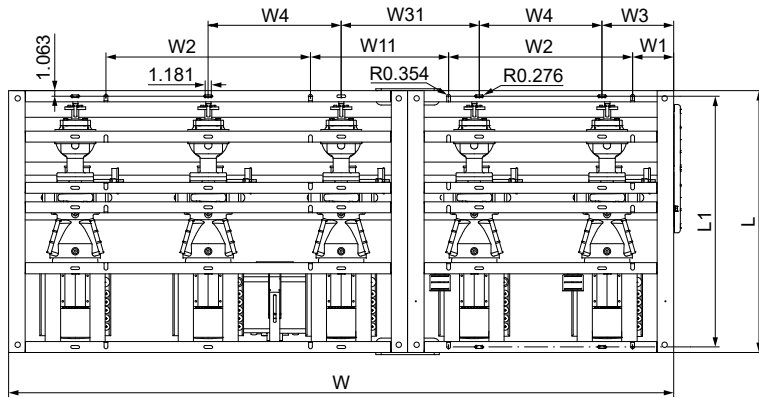


TM084818

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	58.5	26.9	47.1	10.3	6.9	6	6
NBSE-015-090-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	59.5	26.9	49.1	11.1	12.2	4	4
NBSE-015-095-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	12.2	6	6
NBSE-015-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	9.4	6	6
NBSE-020-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	9.4	6	6
NBSE-025-070-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	66.9	29.7	54.5	12.4	8.2	8	8
NBSE-025-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	66.9	29.7	54.5	12.4	8.2	8	8
NBSE-030-070-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-095-4-60	10	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.2	33.9	64.1	15.2	12.4	8	8
NBSE-040-070-4-60	5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.2	33.0	62.5	15.4	15.8	10	10
NBSE-040-070-4-60	7.5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.2	33.0	62.5	15.4	13.0	10	10
NBSE-050-070-4-60	10	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	87.6	40.1	72.8	17.0	11.5	12	12
NBSE-050-070-4-60	7.5	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	84.6	38.1	70.8	17.0	11.5	10	10
NBSE-050-095-4-60	10	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	92.6	42.1	77.8	17.5	16.0	12	12
NBSE-012-070-2-60	3	43.3	41.2	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.3	53.2	24.2	42.9	8.3	9.1	4	4
NBSE-012-070-2-60	5	43.3	41.2	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.3	53.2	24.2	42.9	8.3	9	4	4

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-012-070-2-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.3	53.2	24.2	42.9	8.3	13.3	4	4
NBSE-012-070-2-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.3	53.2	24.2	42.9	8.3	13	4	4
NBSE-012-070-2-60	15	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	55.5	25.5	44.1	8.3	8.9	6	6
NBSE-015-070-2-60	5	43.3	41.2	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.5	26.9	47.1	10.3	7	6	6
NBSE-015-070-2-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.5	26.9	47.1	10.3	11.3	6	6
NBSE-015-070-2-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.5	26.9	47.1	10.3	11.3	6	6
NBSE-015-070-2-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.5	26.9	47.1	10.3	14.8	6	6
NBSE-025-070-2-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	63	28.9	51.6	12.4	9	6	6
NBSE-025-070-2-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	63.8	28.7	51.5	12.4	9	8	8
NBSE-025-070-2-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	63.8	28.7	51.5	12.4	12.7	8	8
NBSE-030-070-2-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	73.5	32.9	59.9	14.2	10.9	8	8

Five-pump system with the check valve

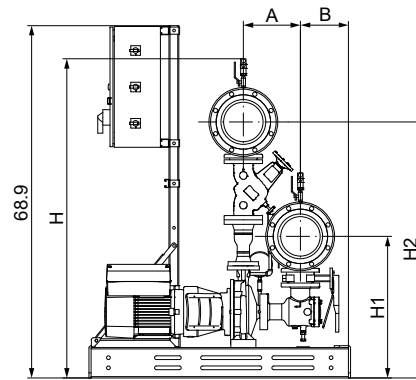
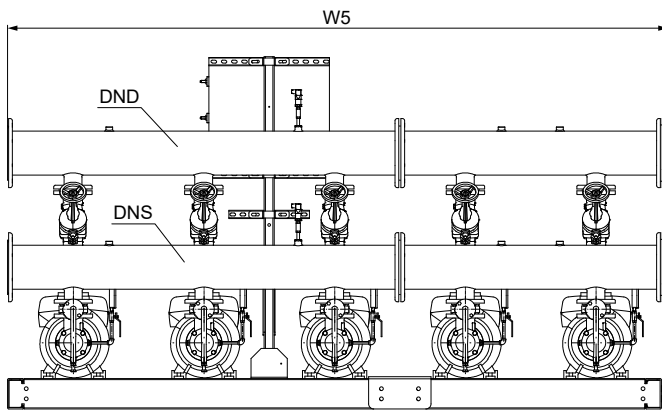
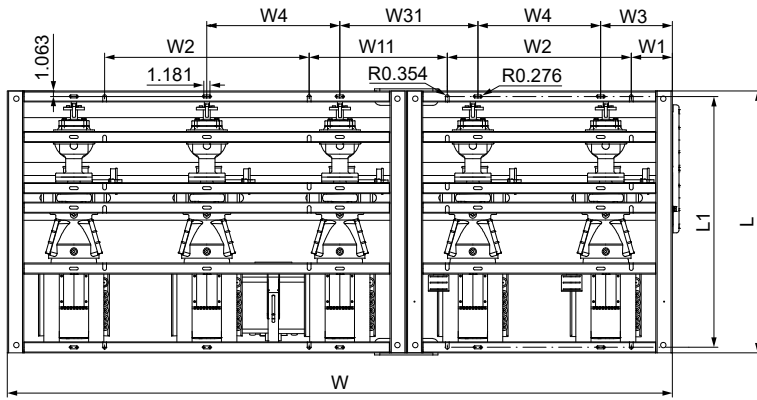


TM084821

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	56.5	26.9	45.1	10.3	6.9	6	6
NBSE-015-090-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	57.5	26.9	47.1	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.6	26.9	47.2	11.1	12.2	6	6
NBSE-015-095-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.6	26.9	47.2	11.1	12.2	6	6
NBSE-015-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.6	26.9	47.2	11.1	9.4	6	6
NBSE-020-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.7	26.9	47.3	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	60.5	27.7	48.1	11.1	9.4	8	8
NBSE-025-070-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	28.9	49.2	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	64.4	29.7	52.1	12.4	8.2	8	8
NBSE-025-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	64.4	29.7	52.1	12.4	8.2	8	8
NBSE-030-070-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	68.6	32.9	56.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	70.0	33.0	56.2	14.2	9.1	10	10
NBSE-030-095-4-60	10	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	73.0	34.0	59.2	15.2	12.4	10	10
NBSE-040-070-4-60	5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	71.3	33.0	57.5	15.4	15.8	10	10
NBSE-040-070-4-60	7.5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	74.3	34.9	59.5	15.4	13.0	10	10
NBSE-050-070-4-60	10	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	81.7	40.1	66.9	17	11.5	12	12
NBSE-050-070-4-60	7.5	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	81.7	40.1	66.9	17	11.5	12	12
NBSE-050-095-4-60	10	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	92.3	46.0	75.9	17.5	16.0	16	16
NBSE-012-070-2-60	3	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	52.7	24.2	42.4	8.3	9.1	4	4
NBSE-012-070-2-60	5	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	52.7	24.2	42.4	8.3	9	4	4

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-012-070-2-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55	25.5	43.6	8.3	13.3	6	6
NBSE-012-070-2-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55	25.5	43.6	8.3	13.3	6	6
NBSE-012-070-2-60	15	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55	25.5	43.6	8.3	8.9	6	6
NBSE-015-070-2-60	5	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	56.5	26.9	45.1	10.3	7	6	6
NBSE-015-070-2-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	56.5	26.9	45.1	10.3	11.3	6	6
NBSE-015-070-2-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	56.5	26.9	45.1	10.3	11.3	6	6
NBSE-015-070-2-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	58.3	27.7	46	10.3	14.8	8	8
NBSE-025-070-2-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	61.4	28.7	49	12.4	9	8	8
NBSE-025-070-2-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	61.4	28.7	49	12.4	9	8	8
NBSE-025-070-2-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	61.4	28.7	49	12.4	12.7	8	8
NBSE-030-070-2-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	70	33	56.2	14.2	10.9	10	10

Five-pump system with the combination valve



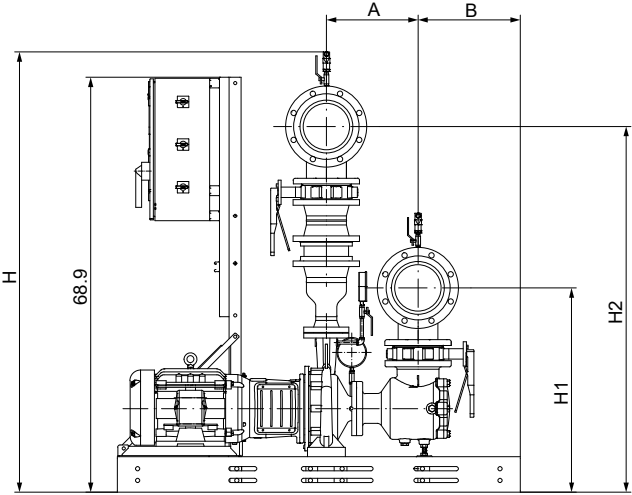
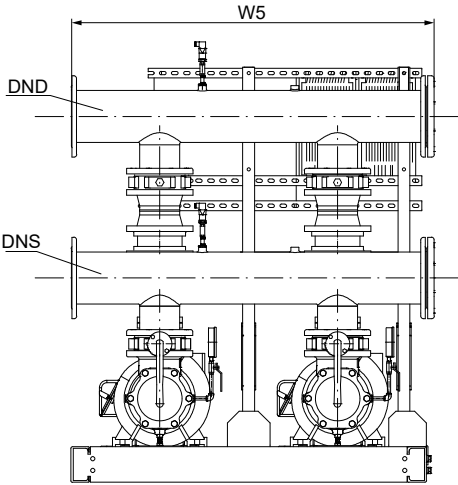
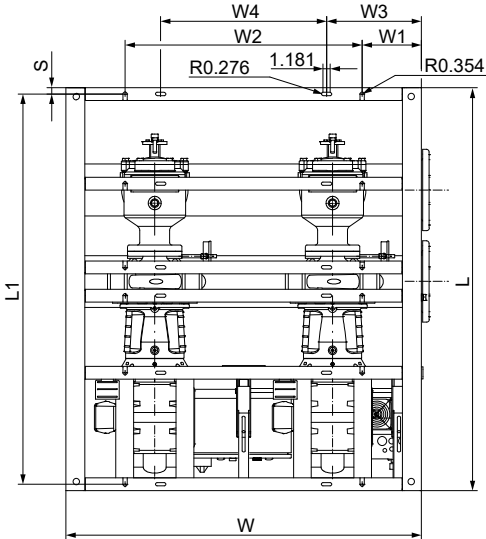
TM094822

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-015-070-4-60	3	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.5	26.9	47.1	10.3	6.9	6	6
NBSE-015-090-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	59.4	26.9	49.1	11.1	12.2	4	4
NBSE-015-090-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	12.2	6	6
NBSE-015-095-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	12.2	6	6
NBSE-015-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	9.4	6	6
NBSE-020-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.3	11.1	9.4	6	6
NBSE-020-110-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	62.4	27.7	50.1	11.1	9.4	8	8
NBSE-025-070-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	63.1	28.9	51.7	12.4	10.9	6	6
NBSE-025-095-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	66.9	29.7	54.5	12.4	8.2	8	8
NBSE-025-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	66.9	29.7	54.5	12.4	8.2	8	8
NBSE-030-070-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	73.6	32.9	61.2	14.2	9.1	8	8
NBSE-030-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	75.0	33.0	61.2	14.2	9.1	10	10
NBSE-030-095-4-60	10	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	78.0	34.0	64.2	15.2	12.4	10	10
NBSE-040-070-4-60	5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	76.2	33.0	62.5	15.4	15.8	10	10
NBSE-040-070-4-60	7.5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	79.2	34.9	64.4	15.4	13.0	10	10
NBSE-050-070-4-60	10	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	87.6	40.1	72.8	17	11.5	12	12
NBSE-050-070-4-60	7.5	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	87.6	40.1	72.8	17	11.5	12	12
NBSE-050-095-4-60	10	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	98.2	46.0	81.8	17.5	16.0	16	16
NBSE-012-070-2-60	3	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	53.2	24.2	42.9	8.3	9.1	4	4
NBSE-012-070-2-60	5	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	53.2	24.2	42.9	8.3	9	4	4
NBSE-012-070-2-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55.5	25.5	44.1	8.3	13.3	6	6

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	DNS [inch]	DND [inch]
NBSE-012-070-2-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55.5	25.5	44.1	8.3	13.3	6	6
NBSE-012-070-2-60	15	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55.5	25.5	44.1	8.3	8.9	6	6
NBSE-015-070-2-60	5	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.5	26.9	47.1	10.3	7	6	6
NBSE-015-070-2-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.5	26.9	47.1	10.3	11.3	6	6
NBSE-015-070-2-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.5	26.9	47.1	10.3	11.3	6	6
NBSE-015-070-2-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	60.3	27.7	47.9	10.3	14.8	8	8
NBSE-025-070-2-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	63.8	28.7	51.5	12.4	9	8	8
NBSE-025-070-2-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	63.8	28.7	51.5	12.4	9	8	8
NBSE-025-070-2-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	63.8	28.7	51.5	12.4	12.7	8	8
NBSE-030-070-2-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	74.9	33	61.1	14.2	10.9	10	10

GRUNDFOS DELTA HCU with CUE

Two-pump system with the check valve

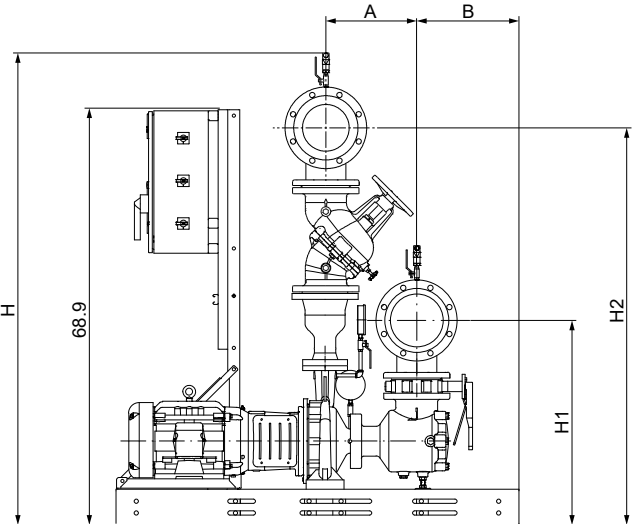
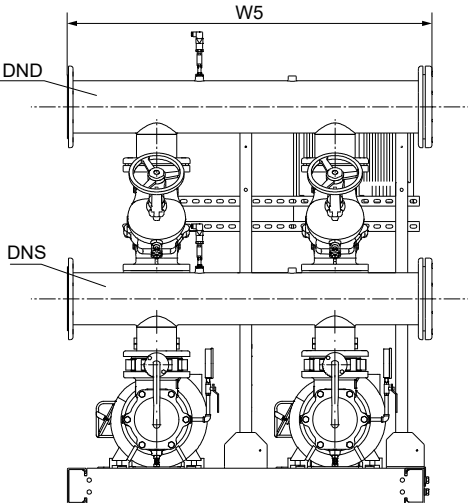
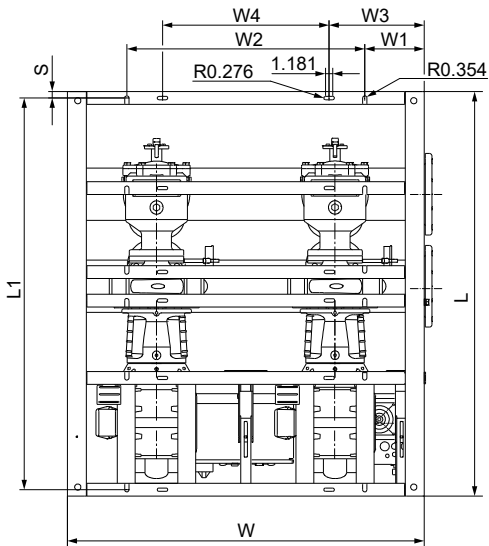


TM084807

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	54.7	26.1	44.4	10.3	9.4	1.063	4	4
NBS-015-070-4-60	3	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	55.5	26.9	45.1	10.3	7	1.063	4	4
NBS-015-090-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.4	1.063	4	4
NBS-015-095-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.3	1.063	4	4
NBS-015-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	9.4	1.063	4	4
NBS-020-095-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	57.5	26.9	47.2	11.1	12.3	1.063	4	4
NBS-020-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	15	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.3	58.7	26.9	47.3	11.1	13.9	1.063	6	6
NBS-020-135-4-60	15	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	65.4	30.9	54.0	13.4	9.6	1.063	6	6
NBS-020-135-4-60	20	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	65.4	30.9	54.0	13.4	9.6	1.063	6	6

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-025-070-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.6	29.9	52.2	12.4	8.2	1.063	6	6
NBS-025-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.6	29.9	52.2	12.4	8.2	1.063	6	6
NBS-025-110-4-60	15	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	64.6	29.9	53.2	13.4	10.1	1.063	6	6
NBS-030-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.5	68.6	32.9	56.2	14.2	9.3	1.063	8	8
NBS-030-095-4-60	10	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	71.6	33.9	59.2	15.2	12.4	1.063	8	8
NBS-030-095-4-60	15	66.9	64.8	51.2	7.874	35.433	13.8	23.6	52.5	71.6	33.9	59.2	15.2	17.2	1.063	8	8
NBS-030-095-4-60	7.5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	71.6	33.9	59.2	15.2	12.4	1.063	8	8
NBS-030-110-4-60	15	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	73.1	33.9	60.8	15.2	17.0	1.063	8	8
NBS-030-110-4-60	20	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	73.1	33.9	60.8	15.2	17.0	1.063	8	8
NBS-030-135-4-60	30	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	75.1	35.9	62.8	15.2	13.0	1.063	8	8
NBS-030-135-4-60	40	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.3	75.1	35.9	62.8	15.2	15.0	1.063	8	8
NBS-040-070-4-60	5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	69.9	32.9	57.5	15.4	15.9	1.063	8	8
NBS-040-070-4-60	7.5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	69.9	32.9	57.5	15.4	13.0	1.063	8	8
NBS-040-095-4-60	10	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	74.3	35.0	60.5	15.9	11.8	1.063	10	10
NBS-040-095-4-60	15	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	74.3	35.0	60.5	15.9	16.0	1.063	10	10
NBS-040-095-4-60	20	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	74.3	35.0	60.5	15.9	16.0	1.063	10	10
NBS-040-110-4-60	20	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	75.8	35.0	62.0	15.9	15.8	1.063	10	10
NBS-040-110-4-60	25	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	75.8	35.0	62.0	15.9	12.8	1.063	10	10
NBS-040-110-4-60	30	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	75.8	35.0	62.0	15.9	12.8	1.063	10	10
NBS-040-135-4-60	25	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	75.4	35.9	63.0	15.9	12.2	1.063	8	8
NBS-040-135-4-60	30	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	76.8	36.0	63.0	15.9	12.2	1.063	10	10
NBS-040-135-4-60	40	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	76.8	36.0	63.0	15.9	14.1	1.063	10	10
NBS-040-135-4-60	50	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	76.8	36.0	63.0	15.9	14.1	1.063	10	10
NBS-050-070-4-60	7.5	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	78.7	38.1	65.0	17.0	11.5	1.063	10	10
NBS-050-070-4-60	10	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	78.7	38.1	65.0	17.0	11.5	1.063	10	10
NBS-050-095-4-60	15	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	83.8	40.1	70.0	17.5	16.3	1.063	10	10
NBS-050-095-4-60	20	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	83.8	40.1	70.0	17.5	16.3	1.063	10	10
NBS-050-095-4-60	25	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.3	86.7	42.1	72.0	17.5	14.1	1.063	12	12
NBS-050-095-4-60	30	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.3	86.7	42.1	72.0	17.5	14.1	1.063	12	12
NBS-050-110-4-60	25	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.1	83.8	40.1	70.0	17.5	15.0	1.142	10	10
NBS-050-110-4-60	30	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.2	86.7	42.1	72.0	17.5	15.0	1.142	12	12
NBS-050-110-4-60	40	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.2	86.7	42.1	72.0	17.5	12.6	1.142	12	12
NBS-050-135-4-60	50	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.2	87.7	43.1	73.0	17.5	16.0	1.142	12	12
NBS-050-135-4-60	60	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.2	87.7	43.1	73.0	17.5	15.1	1.142	12	12
NBS-050-135-4-60	75	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.2	87.7	43.1	73.0	17.5	15.1	1.142	12	12
NBS-060-095-4-60	20	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.4	94.9	48.9	79.5	20.6	12.6	1.142	14	14
NBS-060-095-4-60	25	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	94.9	48.9	79.5	20.6	15.9	1.142	14	14
NBS-060-095-4-60	30	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	97.9	50.8	81.5	20.6	15.9	1.142	16	16
NBS-060-095-4-60	40	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	97.9	50.8	81.5	20.6	13.4	1.142	16	16
NBS-060-110-4-60	50	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	94.9	48.9	79.5	20.6	12.8	1.142	14	14
NBS-060-110-4-60	60	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	94.9	48.9	79.5	20.6	11.9	1.142	14	14
NBS-060-135-4-60	75	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	108.7	50.8	92.3	20.6	11.9	1.142	16	16
NBS-060-135-4-60	100	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	108.7	50.8	92.3	20.6	7.5	1.142	16	16

Two-pump system with the combination valve

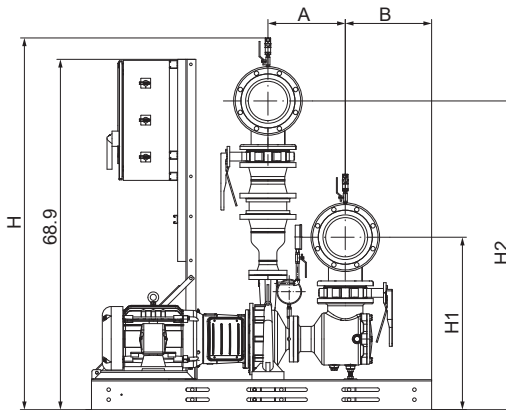
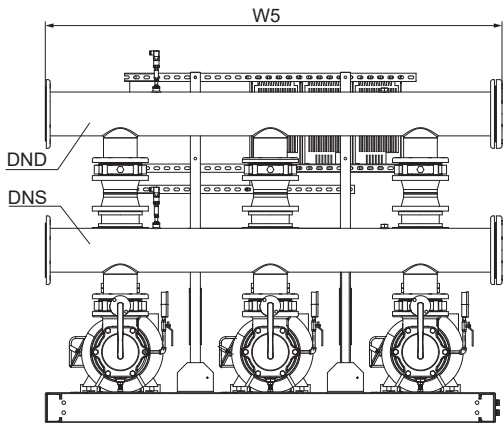
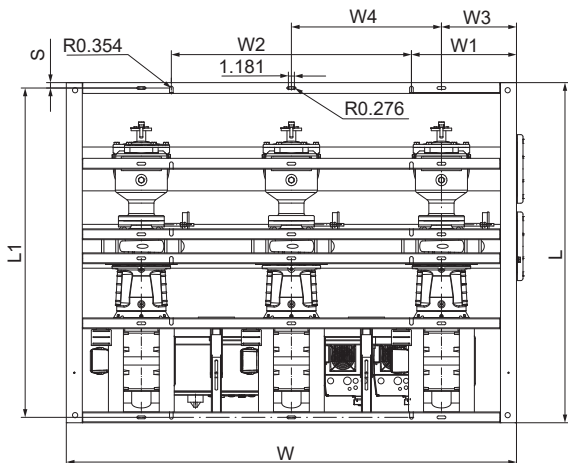


TM084808

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	56.7	26.1	46.3	10.3	9.4	1.063	4	4
NBS-015-070-4-60	3	43.3	41.2	51.2	7.874	35.433	13.8	23.6	52.1	57.4	26.9	47.1	10.3	7	1.063	4	4
NBS-015-090-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-095-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	12.3	1.063	4	4
NBS-015-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.1	11.1	9.4	1.063	4	4
NBS-020-095-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.1	59.5	26.9	49.2	11.1	12.3	1.063	4	4
NBS-020-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	15	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.3	60.6	26.9	49.2	11.1	13.9	1.063	6	6
NBS-020-135-4-60	15	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	67.8	30.9	56.5	13.4	9.6	1.063	6	6
NBS-020-135-4-60	20	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	67.8	30.9	56.5	13.4	9.6	1.063	6	6
NBS-025-070-4-60	3	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	66.1	29.9	54.7	12.4	8.2	1.063	6	6

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-025-095-4-60	7.5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.3	66.1	29.9	54.7	12.4	8.2	1.063	6	6
NBS-025-110-4-60	15	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	67.1	29.9	55.7	13.4	10.1	1.063	6	6
NBS-030-070-4-60	5	50.4	48.3	51.2	7.874	35.433	13.8	23.6	52.5	73.6	32.9	61.2	14.2	9.3	1.063	8	8
NBS-030-095-4-60	10	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	76.6	33.9	64.2	15.2	12.4	1.063	8	8
NBS-030-095-4-60	15	66.9	64.8	51.2	7.874	35.433	13.8	23.6	52.5	76.6	33.9	64.2	15.2	17.2	1.063	8	8
NBS-030-095-4-60	7.5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	76.6	33.9	64.2	15.2	12.4	1.063	8	8
NBS-030-110-4-60	15	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	78.1	33.9	65.7	15.2	17.0	1.063	8	8
NBS-030-110-4-60	20	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	78.1	33.9	65.7	15.2	17.0	1.063	8	8
NBS-030-135-4-60	30	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	80.1	35.9	67.7	15.2	13.0	1.063	8	8
NBS-030-135-4-60	40	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.3	80.1	35.9	67.7	15.2	15.0	1.063	8	8
NBS-040-070-4-60	5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	74.8	32.9	62.5	15.4	15.9	1.063	8	8
NBS-040-070-4-60	7.5	58.3	56.1	51.2	7.874	35.433	13.8	23.6	52.5	74.8	32.9	62.5	15.4	13.0	1.063	8	8
NBS-040-095-4-60	10	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	79.2	35.0	65.5	15.9	11.8	1.063	10	10
NBS-040-095-4-60	15	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	79.2	35.0	65.5	15.9	16.0	1.063	10	10
NBS-040-095-4-60	20	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	79.2	35.0	65.5	15.9	16.0	1.063	10	10
NBS-040-110-4-60	20	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	80.8	35.0	67.0	15.9	15.8	1.063	10	10
NBS-040-110-4-60	25	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	80.8	35.0	67.0	15.9	12.8	1.063	10	10
NBS-040-110-4-60	30	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	80.8	35.0	67.0	15.9	12.8	1.063	10	10
NBS-040-135-4-60	25	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.3	80.4	35.9	68.0	15.9	12.2	1.063	8	8
NBS-040-135-4-60	30	66.9	64.8	59.1	9.843	39.370	15.7	27.6	60.2	81.8	36.0	68.0	15.9	12.2	1.063	10	10
NBS-040-135-4-60	40	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	81.8	36.0	68.0	15.9	14.1	1.063	10	10
NBS-040-135-4-60	50	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	81.8	36.0	68.0	15.9	14.1	1.063	10	10
NBS-050-070-4-60	7.5	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	84.6	38.1	70.8	17.0	11.5	1.063	10	10
NBS-050-070-4-60	10	58.3	56.1	59.1	9.843	39.370	15.7	27.6	60.2	84.6	38.1	70.8	17.0	11.5	1.063	10	10
NBS-050-095-4-60	15	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	89.6	40.1	75.9	17.5	16.3	1.063	10	10
NBS-050-095-4-60	20	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.2	89.6	40.1	75.9	17.5	16.3	1.063	10	10
NBS-050-095-4-60	25	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.3	92.6	42.1	77.8	17.5	14.1	1.063	12	12
NBS-050-095-4-60	30	71.3	69.1	59.1	9.843	39.370	15.7	27.6	60.3	92.6	42.1	77.8	17.5	14.1	1.063	12	12
NBS-050-110-4-60	25	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.1	89.6	40.1	75.9	17.5	15.0	1.142	10	10
NBS-050-110-4-60	30	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.2	92.6	42.1	77.8	17.5	15.0	1.142	12	12
NBS-050-110-4-60	40	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.2	92.6	42.1	77.8	17.5	12.6	1.142	12	12
NBS-050-135-4-60	50	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.2	93.6	43.1	78.8	17.5	16.0	1.142	12	12
NBS-050-135-4-60	60	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.2	93.6	43.1	78.8	17.5	15.1	1.142	12	12
NBS-050-135-4-60	75	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.2	93.6	43.1	78.8	17.5	15.1	1.142	12	12
NBS-060-095-4-60	20	71.3	69.0	66.9	11.811	43.307	17.7	31.5	68.4	104.8	48.9	89.3	20.6	12.6	1.142	14	14
NBS-060-095-4-60	25	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	104.8	48.9	89.3	20.6	15.9	1.142	14	14
NBS-060-095-4-60	30	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	107.7	50.8	91.3	20.6	15.9	1.142	16	16
NBS-060-095-4-60	40	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	107.7	50.8	91.3	20.6	13.4	1.142	16	16
NBS-060-110-4-60	50	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	104.8	48.9	89.3	20.6	12.8	1.142	14	14
NBS-060-110-4-60	60	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	104.8	48.9	89.3	20.6	11.9	1.142	14	14
NBS-060-135-4-60	75	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	118.5	50.8	102.1	20.6	11.9	1.142	16	16
NBS-060-135-4-60	100	76.8	74.5	66.9	11.811	43.307	17.7	31.5	68.4	118.5	50.8	102.1	20.6	7.5	1.142	16	16

Three-pump system with the check valve

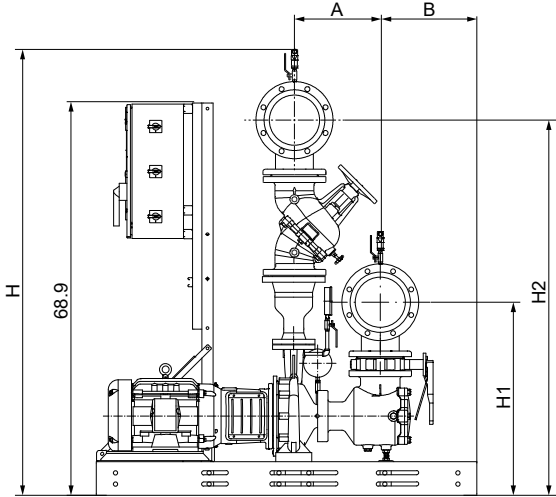
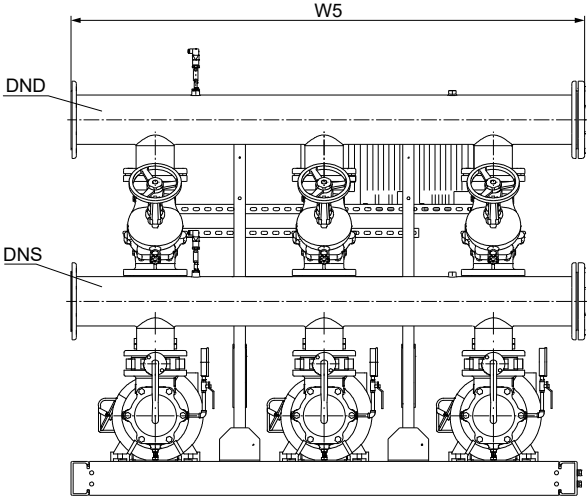
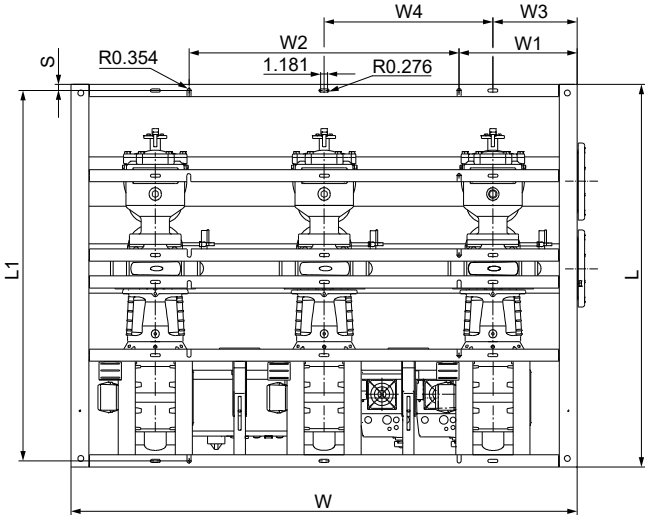


TM084842

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	56.7	26.1	46.3	10.3	9.4	1.063	4	4
NBS-015-070-4-60	3	43.3	41.2	76.8	18.701	39.370	12.8	25.6	77.7	57.4	26.9	47.1	10.3	7	1.063	4	4
NBS-015-090-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.4	1.063	4	4
NBS-015-095-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.3	1.063	4	4
NBS-015-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.2	11.1	9.4	1.063	4	4
NBS-020-095-4-60	5	50.4	48.3	76.8	18.701	39.37	12.8	25.6	77.7	57.5	26.9	47.2	11.1	12.3	1.063	4	4
NBS-020-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	77.9	58.7	26.9	47.3	11.1	13.9	1.063	6	6
NBS-020-135-4-60	15	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.7	65.4	30.9	54.0	13.4	9.6	1.063	6	6
NBS-020-135-4-60	20	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.7	65.4	30.9	54.0	13.4	9.6	1.063	6	6
NBS-025-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.6	29.9	52.2	12.4	8.2	1.063	6	6
NBS-025-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.6	29.9	52.2	12.4	8.2	1.063	6	6
NBS-025-110-4-60	15	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.7	64.6	29.9	53.2	13.4	10.1	1.063	6	6
NBS-030-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	78.1	68.6	32.9	56.2	14.2	9.3	1.063	8	8
NBS-030-095-4-60	10	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	71.6	33.9	59.2	15.2	12.4	1.063	8	8
NBS-030-095-4-60	15	66.9	64.8	76.8	18.701	39.370	12.8	25.6	78.1	71.6	33.9	59.2	15.2	17.2	1.063	8	8

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-030-095-4-60	7.5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	71.6	33.9	59.2	15.2	12.4	1.063	8	8
NBS-030-110-4-60	15	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	73.1	33.9	60.8	15.2	17.0	1.063	8	8
NBS-030-110-4-60	20	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	73.1	33.9	60.8	15.2	17.0	1.063	8	8
NBS-030-135-4-60	30	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	75.1	35.9	62.8	15.2	13.0	1.063	8	8
NBS-030-135-4-60	40	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.9	75.1	35.9	62.8	15.2	15.0	1.063	8	8
NBS-040-070-4-60	5	58.3	56.1	76.8	18.701	39.37	12.8	25.6	78.1	69.9	32.9	57.5	15.4	15.9	1.063	8	8
NBS-040-070-4-60	7.5	58.3	56.1	76.8	18.701	39.37	12.8	25.6	78.1	69.9	32.9	57.5	15.4	13.0	1.063	8	8
NBS-040-095-4-60	10	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	74.3	35.0	60.5	15.9	11.8	1.063	10	10
NBS-040-095-4-60	15	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	74.3	35.0	60.5	15.9	16.0	1.063	10	10
NBS-040-095-4-60	20	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	74.3	35.0	60.5	15.9	16.0	1.063	10	10
NBS-040-110-4-60	20	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	75.8	35.0	62.0	15.9	15.8	1.063	10	10
NBS-040-110-4-60	25	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	75.8	35.0	62.0	15.9	12.8	1.063	10	10
NBS-040-110-4-60	30	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	75.8	35.0	62.0	15.9	12.8	1.063	10	10
NBS-040-135-4-60	25	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	75.4	35.9	63.0	15.9	12.2	1.063	8	8
NBS-040-135-4-60	30	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	76.8	36.0	63.0	15.9	12.2	1.063	10	10
NBS-040-135-4-60	40	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	76.8	36.0	63.0	15.9	14.1	1.063	10	10
NBS-040-135-4-60	50	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	76.8	36.0	63.0	15.9	14.1	1.063	10	10
NBS-050-070-4-60	7.5	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	78.7	38.1	65.0	17.0	11.5	1.063	10	10
NBS-050-070-4-60	10	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	78.7	38.1	65.0	17.0	11.5	1.063	10	10
NBS-050-095-4-60	15	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	83.8	40.1	70.0	17.5	16.3	1.063	10	10
NBS-050-095-4-60	20	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	83.8	40.1	70.0	17.5	16.3	1.063	10	10
NBS-050-095-4-60	25	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	86.7	42.1	72.0	17.5	14.1	1.063	12	12
NBS-050-095-4-60	30	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	86.7	42.1	72.0	17.5	14.1	1.063	12	12
NBS-050-110-4-60	25	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.6	83.8	40.1	70.0	17.5	15.0	1.142	10	10
NBS-050-110-4-60	30	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.6	86.7	42.1	72.0	17.5	15.0	1.142	12	12
NBS-050-110-4-60	40	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.6	86.7	42.1	72.0	17.5	12.6	1.142	12	12
NBS-050-135-4-60	50	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.6	87.7	43.1	73.0	17.5	16.0	1.142	12	12
NBS-050-135-4-60	60	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.6	87.7	43.1	73.0	17.5	15.1	1.142	12	12
NBS-050-135-4-60	75	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.6	87.7	43.1	73.0	17.5	15.1	1.142	12	12
NBS-060-095-4-60	20	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.8	94.9	48.9	79.5	20.6	12.6	1.142	14	14
NBS-060-095-4-60	25	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.8	94.9	48.9	79.5	20.6	15.9	1.142	14	14
NBS-060-095-4-60	30	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	97.9	50.8	81.5	20.6	15.9	1.142	16	16
NBS-060-095-4-60	40	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	97.9	50.8	81.5	20.6	13.4	1.142	16	16
NBS-060-110-4-60	50	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.8	94.9	48.9	79.5	20.6	12.8	1.142	14	14
NBS-060-110-4-60	60	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.8	94.9	48.9	79.5	20.6	11.9	1.142	14	14
NBS-060-135-4-60	75	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	98.9	50.8	82.5	20.6	11.9	1.142	16	16
NBS-060-135-4-60	100	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	98.9	50.8	82.5	20.6	7.5	1.142	16	16

Three-pump system with the combination valve

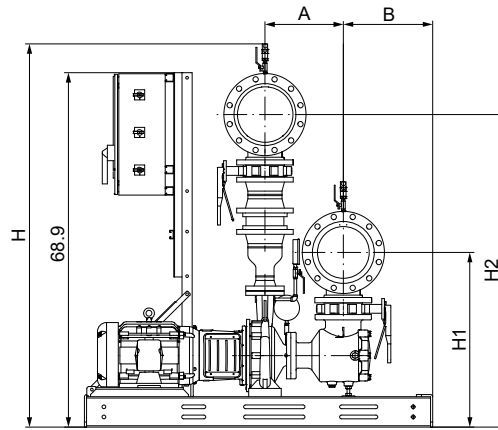
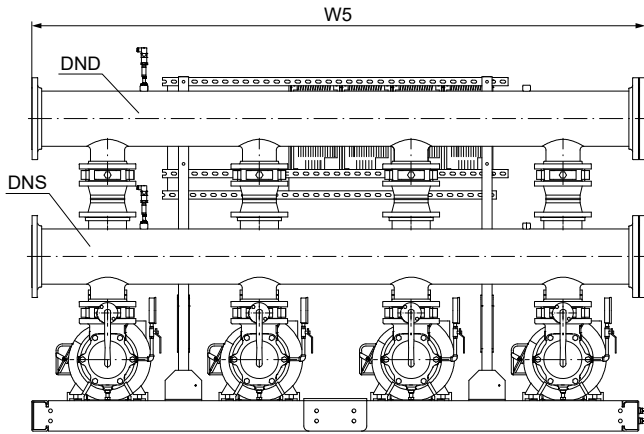
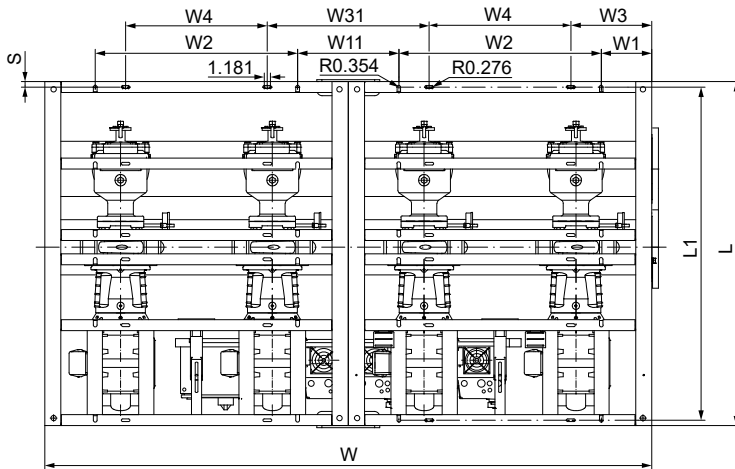


TM084812

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	56.7	26.1	46.4	10.3	16.4	1.063	4	4
NBS-015-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	57.5	26.9	47.1	10.3	14.1	1.063	4	4
NBS-015-090-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-095-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	12.3	1.063	4	4
NBS-015-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.7	59.5	26.9	49.1	11.1	9.4	1.063	4	4
NBS-020-095-4-60	5	50.4	48.3	76.8	18.701	39.37	12.8	25.6	77.7	59.5	26.9	49.2	11.1	12.3	1.063	4	4
NBS-020-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	15	58.3	56.1	76.8	18.701	39.370	12.8	25.6	77.9	60.6	26.9	49.2	11.1	13.9	1.063	6	6
NBS-020-135-4-60	15	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.7	67.8	30.9	56.5	13.4	9.6	1.063	6	6
NBS-020-135-4-60	20	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.7	67.8	30.9	56.5	13.4	9.6	1.063	6	6
NBS-025-070-4-60	3	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	66.1	29.9	54.7	12.4	8.2	1.063	6	6
NBS-025-095-4-60	7.5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	77.9	66.1	29.9	54.7	12.4	8.2	1.063	6	6
NBS-025-110-4-60	15	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.7	67.1	29.9	55.7	13.4	10.1	1.063	6	6

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W2 [inch]	W3 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-030-070-4-60	5	50.4	48.3	76.8	18.701	39.370	12.8	25.6	78.1	73.6	32.9	61.2	14.2	9.3	1.063	8	8
NBS-030-095-4-60	10	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	76.6	33.9	64.2	15.2	12.4	1.063	8	8
NBS-030-095-4-60	15	66.9	64.8	76.8	18.701	39.370	12.8	25.6	78.1	76.6	33.9	64.2	15.2	17.2	1.063	8	8
NBS-030-095-4-60	7.5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	76.6	33.9	64.2	15.2	12.4	1.063	8	8
NBS-030-110-4-60	15	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	78.1	33.9	65.7	15.2	17.0	1.063	8	8
NBS-030-110-4-60	20	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	78.1	33.9	65.7	15.2	17.0	1.063	8	8
NBS-030-135-4-60	30	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	80.1	35.9	67.7	15.2	13.0	1.063	8	8
NBS-030-135-4-60	40	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.9	80.1	35.9	67.7	15.2	15.0	1.063	8	8
NBS-040-070-4-60	5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	74.8	32.9	62.5	15.4	15.9	1.063	8	8
NBS-040-070-4-60	7.5	58.3	56.1	76.8	18.701	39.370	12.8	25.6	78.1	74.8	32.9	62.5	15.4	13.0	1.063	8	8
NBS-040-095-4-60	10	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	79.2	35.0	65.5	15.9	11.8	1.063	10	10
NBS-040-095-4-60	15	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	79.2	35.0	65.5	15.9	16.0	1.063	10	10
NBS-040-095-4-60	20	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	79.2	35.0	65.5	15.9	16.0	1.063	10	10
NBS-040-110-4-60	20	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	80.8	35.0	67.0	15.9	15.8	1.063	10	10
NBS-040-110-4-60	25	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	80.8	35.0	67.0	15.9	12.8	1.063	10	10
NBS-040-110-4-60	30	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	80.8	35.0	67.0	15.9	12.8	1.063	10	10
NBS-040-135-4-60	25	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.9	80.4	35.9	68.0	15.9	12.2	1.063	8	8
NBS-040-135-4-60	30	66.9	64.8	88.6	20.669	47.244	14.8	29.5	89.8	81.8	36.0	68.0	15.9	12.2	1.063	10	10
NBS-040-135-4-60	40	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	81.8	36.0	68.0	15.9	14.1	1.063	10	10
NBS-040-135-4-60	50	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	81.8	36.0	68.0	15.9	14.1	1.063	10	10
NBS-050-070-4-60	7.5	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	84.6	38.1	70.8	17.0	11.5	1.063	10	10
NBS-050-070-4-60	10	58.3	56.1	88.6	20.669	47.244	14.8	29.5	89.8	84.6	38.1	70.8	17.0	11.5	1.063	10	10
NBS-050-095-4-60	15	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	89.6	40.1	75.9	17.5	16.3	1.063	10	10
NBS-050-095-4-60	20	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	89.6	40.1	75.9	17.5	16.3	1.063	10	10
NBS-050-095-4-60	25	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	92.6	42.1	77.8	17.5	14.1	1.063	12	12
NBS-050-095-4-60	30	71.3	69.1	88.6	20.669	47.244	14.8	29.5	89.8	92.6	42.1	77.8	17.5	14.1	1.063	12	12
NBS-050-110-4-60	25	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.6	89.6	40.1	75.9	17.5	15.0	1.142	10	10
NBS-050-110-4-60	30	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.6	92.6	42.1	77.8	17.5	15.0	1.142	12	12
NBS-050-110-4-60	40	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.6	92.6	42.1	77.8	17.5	12.6	1.142	12	12
NBS-050-135-4-60	50	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.6	93.6	43.1	78.8	17.5	16.0	1.142	12	12
NBS-050-135-4-60	60	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.6	93.6	43.1	78.8	17.5	15.1	1.142	12	12
NBS-050-135-4-60	75	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.6	93.6	43.1	78.8	17.5	15.1	1.142	12	12
NBS-060-095-4-60	20	71.3	69.0	100.4	22.638	55.118	16.7	33.5	101.8	104.8	48.9	89.3	20.6	12.6	1.142	14	14
NBS-060-095-4-60	25	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.8	104.8	48.9	89.3	20.6	15.9	1.142	14	14
NBS-060-095-4-60	30	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	107.7	50.8	91.3	20.6	15.9	1.142	16	16
NBS-060-095-4-60	40	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	107.7	50.8	91.3	20.6	13.4	1.142	16	16
NBS-060-110-4-60	50	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.8	104.8	48.9	89.3	20.6	12.8	1.142	14	14
NBS-060-110-4-60	60	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.8	104.8	48.9	89.3	20.6	11.9	1.142	14	14
NBS-060-135-4-60	75	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	108.7	50.8	92.3	20.6	11.9	1.142	16	16
NBS-060-135-4-60	100	76.8	74.5	100.4	22.638	55.118	16.7	33.5	101.9	108.7	50.8	92.3	20.6	7.5	1.142	16	16

Four-pump system with the check valve

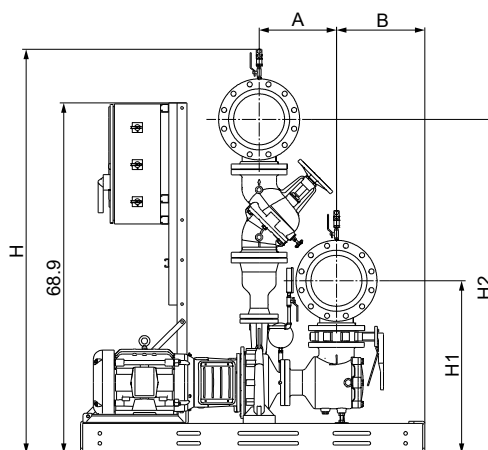
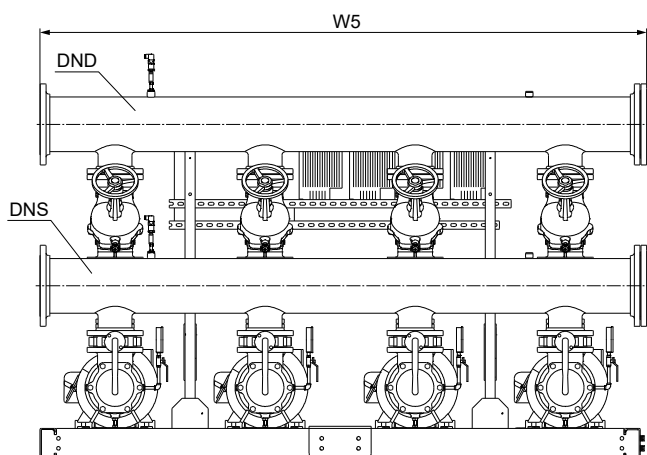
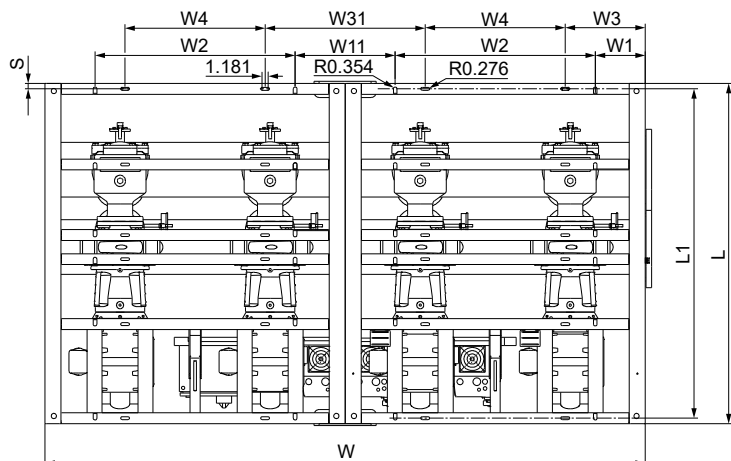


TM084815

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	102.4	7.874	15.7	35.4	13.8	27.6	23.6	103.5	55.8	26.1	44.4	10.3	9.4	1.063	6	6
NBS-015-070-4-60	3	43.3	41.2	102.4	7.874	15.7	35.4	13.8	27.6	23.6	103.5	56.5	26.9	45.1	10.3	7	1.063	6	6
NBS-015-090-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.3	57.5	26.9	47.2	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.3	57.5	26.9	47.2	11.1	12.4	1.063	4	4
NBS-015-095-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.6	26.9	47.2	11.1	12.3	1.063	6	6
NBS-015-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.6	26.9	47.2	11.1	9.4	1.063	6	6
NBS-020-095-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.7	26.9	47.3	11.1	12.3	1.063	6	6
NBS-020-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.7	26.9	47.3	11.1	13.9	1.063	6	6
NBS-020-135-4-60	15	58.3	56.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	66.2	30.7	53.8	13.4	9.6	1.063	8	8
NBS-020-135-4-60	20	58.3	56.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	66.2	30.7	53.8	13.4	9.6	1.063	8	8
NBS-025-070-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	64.4	29.7	52.1	12.4	8.2	1.063	8	8
NBS-025-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	64.4	29.7	52.1	12.4	8.2	1.063	8	8
NBS-025-110-4-60	15	58.3	56.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	65.4	29.7	53.0	13.4	10.1	1.063	8	8
NBS-030-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	68.6	32.9	56.2	14.2	9.3	1.063	8	8
NBS-030-095-4-60	10	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	71.6	33.9	59.2	15.2	12.4	1.063	8	8
NBS-030-095-4-60	15	66.9	64.8	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	73.0	34.0	59.2	15.2	17.2	1.063	10	10

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-030-095-4-60	7.5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	71.6	33.9	59.2	15.2	12.4	1.063	8	8
NBS-030-110-4-60	15	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	73.1	33.9	60.8	15.2	17.0	1.063	8	8
NBS-030-110-4-60	20	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	74.5	34.0	60.8	15.2	17.0	1.063	10	10
NBS-030-135-4-60	30	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	76.5	36.0	62.8	15.2	13.0	1.063	10	10
NBS-030-135-4-60	40	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	76.5	36.0	62.8	15.2	15.0	1.063	10	10
NBS-040-070-4-60	5	58.3	56.1	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	71.3	33.0	57.5	15.4	15.9	1.063	10	10
NBS-040-070-4-60	7.5	58.3	56.1	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.6	71.3	33.0	57.5	15.4	13.0	1.063	10	10
NBS-040-095-4-60	10	58.3	56.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	74.3	35.0	60.5	15.9	11.8	1.063	10	10
NBS-040-095-4-60	15	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	77.3	36.9	62.5	15.9	16.0	1.063	12	12
NBS-040-095-4-60	20	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	77.3	36.9	62.5	15.9	16.0	1.063	12	12
NBS-040-110-4-60	20	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	75.8	35.0	62.0	15.9	15.8	1.063	10	10
NBS-040-110-4-60	25	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	78.8	36.9	64.0	15.9	12.8	1.063	12	12
NBS-040-110-4-60	30	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	78.8	36.9	64.0	15.9	12.8	1.063	12	12
NBS-040-135-4-60	25	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	76.8	36.0	63.0	15.9	12.2	1.063	10	10
NBS-040-135-4-60	30	66.9	64.8	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	79.8	37.9	65.0	15.9	12.2	1.063	12	12
NBS-040-135-4-60	40	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	79.8	37.9	65.0	15.9	14.1	1.063	12	12
NBS-040-135-4-60	50	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	79.8	37.9	65.0	15.9	14.1	1.063	12	12
NBS-050-070-4-60	7.5	58.3	56.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.3	78.7	38.1	65.0	17.0	11.5	1.063	10	10
NBS-050-070-4-60	10	58.3	56.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	81.7	40.1	66.9	17.0	11.5	1.063	12	12
NBS-050-095-4-60	15	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.4	86.7	42.1	72.0	17.5	16.3	1.063	12	12
NBS-050-095-4-60	20	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.6	89.3	44.0	73.9	17.5	16.3	1.063	14	14
NBS-050-095-4-60	25	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.6	89.3	44.0	73.9	17.5	14.1	1.063	14	14
NBS-050-095-4-60	30	71.3	69.1	118.1	9.843	19.685	39.370	15.748	31.5	27.6	119.6	89.3	44.0	73.9	17.5	14.1	1.063	14	14
NBS-050-110-4-60	25	71.3	69.0	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.3	89.3	44.0	73.9	17.5	15.0	1.142	14	14
NBS-050-110-4-60	30	71.3	69.0	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.3	89.3	44.0	73.9	17.5	15.0	1.142	14	14
NBS-050-110-4-60	40	71.3	69.0	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.3	89.3	44.0	73.9	17.5	12.6	1.142	14	14
NBS-050-135-4-60	50	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.3	90.3	45.0	74.9	17.5	16.0	1.142	14	14
NBS-050-135-4-60	60	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.3	90.3	45.0	74.9	17.5	15.1	1.142	14	14
NBS-050-135-4-60	75	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.3	93.3	47.0	76.9	17.5	15.1	1.142	16	16
NBS-060-095-4-60	20	71.3	69.0	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	100.8	52.8	83.4	20.6	12.6	1.142	18	18
NBS-060-095-4-60	25	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	100.8	52.8	83.4	20.6	15.9	1.142	18	18
NBS-060-095-4-60	30	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	100.8	52.8	83.4	20.6	15.9	1.142	18	18
NBS-060-095-4-60	40	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	100.8	52.8	83.4	20.6	13.4	1.142	18	18
NBS-060-110-4-60	50	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	100.8	52.8	83.4	20.6	12.8	1.142	18	18
NBS-060-110-4-60	60	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	100.8	52.8	83.4	20.6	11.9	1.142	18	18
NBS-060-135-4-60	75	76.8	74.5	133.9	11.811	23.622	43.307	17.717	35.4	31.5	135.5	101.8	52.8	84.4	20.6	11.9	1.142	18	18

Four-pump system with the combination valve

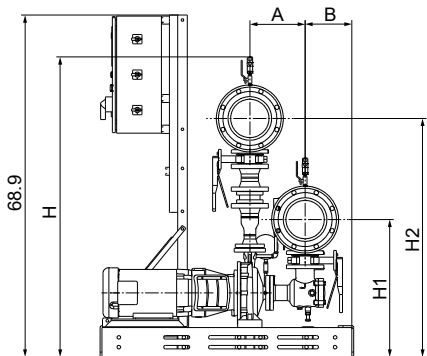
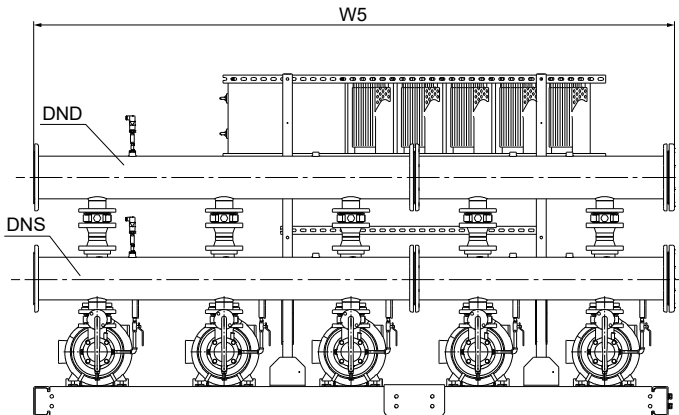
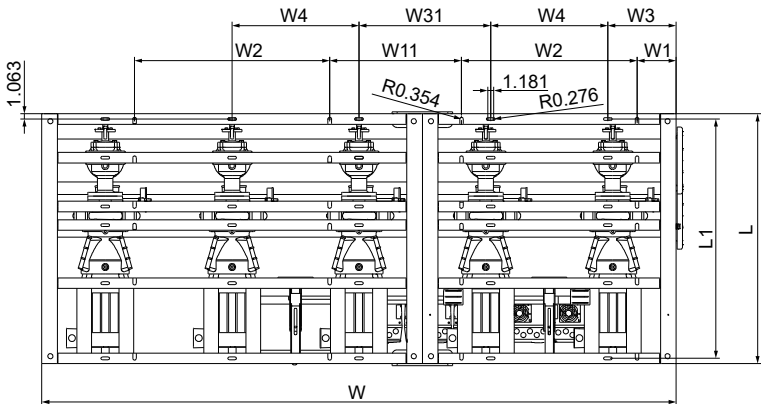


TM054816

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	57.7	26.1	46.4	10.3	9.4	1.063	6	6
NBS-015-070-4-60	3	43.3	41.2	102.4	7.874	15.748	35.433	13.78	27.6	23.6	103.5	58.5	26.9	47.1	10.3	7	1.063	6	6
NBS-015-090-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	59.5	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.3	59.5	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-095-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	12.3	1.063	6	6
NBS-015-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-095-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	12.3	1.063	6	6
NBS-020-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	15	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	60.6	26.9	49.2	11.1	13.9	1.063	6	6
NBS-020-135-4-60	15	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	68.7	30.7	56.3	13.4	9.6	1.063	8	8
NBS-020-135-4-60	20	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	68.7	30.7	56.3	13.4	9.6	1.063	8	8
NBS-025-070-4-60	3	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.5	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	66.9	29.7	54.5	12.4	8.2	1.063	8	8
NBS-025-095-4-60	7.5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	66.9	29.7	54.5	12.4	8.2	1.063	8	8
NBS-025-110-4-60	15	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	67.9	29.7	55.5	13.4	10.1	1.063	8	8
NBS-030-070-4-60	5	50.4	48.3	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	73.6	32.9	61.2	14.2	9.3	1.063	8	8
NBS-030-095-4-60	10	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.5	33.9	64.1	15.2	12.4	1.063	8	8
NBS-030-095-4-60	15	66.9	64.8	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	78.0	34.0	64.2	15.2	17.2	1.063	10	10

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-030-095-4-60	7.5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.5	33.9	64.1	15.2	12.4	1.063	8	8
NBS-030-110-4-60	15	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	78.1	33.9	65.7	15.2	17.0	1.063	8	8
NBS-030-110-4-60	20	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	79.5	34.0	65.7	15.2	17.0	1.063	10	10
NBS-030-135-4-60	30	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	81.5	36.0	67.7	15.2	13.0	1.063	10	10
NBS-030-135-4-60	40	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	81.5	36.0	67.7	15.2	15.0	1.063	10	10
NBS-040-070-4-60	5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.2	33.0	62.5	15.4	15.9	1.063	10	10
NBS-040-070-4-60	7.5	58.3	56.1	102.4	7.874	15.748	35.433	13.8	27.6	23.6	103.6	76.2	33.0	62.5	15.4	13.0	1.063	10	10
NBS-040-095-4-60	10	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	79.2	35.0	65.5	15.9	11.8	1.063	10	10
NBS-040-095-4-60	15	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	82.2	36.9	67.4	15.9	16.0	1.063	12	12
NBS-040-095-4-60	20	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	82.2	36.9	67.4	15.9	16.0	1.063	12	12
NBS-040-110-4-60	20	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	80.8	35.0	67.0	15.9	15.8	1.063	10	10
NBS-040-110-4-60	25	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	83.7	36.9	69.0	15.9	12.8	1.063	12	12
NBS-040-110-4-60	30	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	83.7	36.9	69.0	15.9	12.8	1.063	12	12
NBS-040-135-4-60	25	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	81.8	36.0	68.0	15.9	12.2	1.063	10	10
NBS-040-135-4-60	30	66.9	64.8	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	84.7	37.9	70.0	15.9	12.2	1.063	12	12
NBS-040-135-4-60	40	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	84.7	37.9	70.0	15.9	14.1	1.063	12	12
NBS-040-135-4-60	50	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	84.7	37.9	70.0	15.9	14.1	1.063	12	12
NBS-050-070-4-60	7.5	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.3	84.6	38.1	70.8	17.0	11.5	1.063	10	10
NBS-050-070-4-60	10	58.3	56.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	87.6	40.1	72.8	17.0	11.5	1.063	12	12
NBS-050-095-4-60	15	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.4	92.6	42.1	77.8	17.5	16.3	1.063	12	12
NBS-050-095-4-60	20	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.6	95.2	44.0	79.8	17.5	16.3	1.063	14	14
NBS-050-095-4-60	25	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.6	95.2	44.0	79.8	17.5	14.1	1.063	14	14
NBS-050-095-4-60	30	71.3	69.1	118.1	9.843	19.685	39.370	15.7	31.5	27.6	119.6	95.2	44.0	79.8	17.5	14.1	1.063	14	14
NBS-050-110-4-60	25	71.3	69.0	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.3	95.2	44.0	79.8	17.5	15.0	1.142	14	14
NBS-050-110-4-60	30	71.3	69.0	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.3	95.2	44.0	79.8	17.5	15.0	1.142	14	14
NBS-050-110-4-60	40	71.3	69.0	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.3	95.2	44.0	79.8	17.5	12.6	1.142	14	14
NBS-050-135-4-60	50	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.3	96.2	45.0	80.8	17.5	16.0	1.142	14	14
NBS-050-135-4-60	60	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.3	96.2	45.0	80.8	17.5	15.1	1.142	14	14
NBS-050-135-4-60	75	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.3	99.2	47.0	82.8	17.5	15.1	1.142	16	16
NBS-060-095-4-60	20	71.3	69.0	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	110.7	52.8	93.3	20.6	12.6	1.142	18	18
NBS-060-095-4-60	25	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	110.7	52.8	93.3	20.6	15.9	1.142	18	18
NBS-060-095-4-60	30	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	110.7	52.8	93.3	20.6	15.9	1.142	18	18
NBS-060-095-4-60	40	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	110.7	52.8	93.3	20.6	13.4	1.142	18	18
NBS-060-110-4-60	50	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	110.7	52.8	93.3	20.6	12.8	1.142	18	18
NBS-060-110-4-60	60	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	110.7	52.8	93.3	20.6	11.9	1.142	18	18
NBS-060-135-4-60	75	76.8	74.5	133.9	11.811	23.622	43.307	17.7	35.4	31.5	135.5	111.7	52.8	94.3	20.6	11.9	1.142	18	18

Five-pump system with the check valve

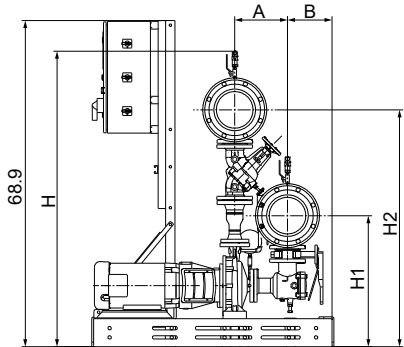
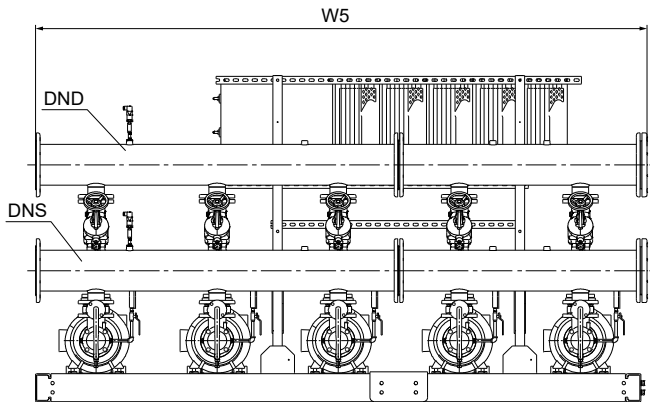
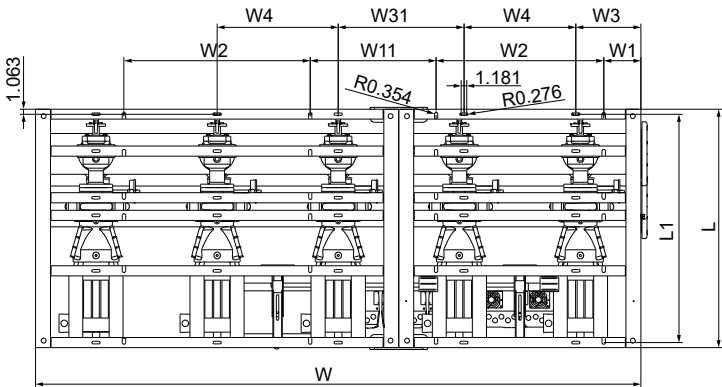


TM084819

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	55.8	26.1	44.4	10.3	9.4	1.063	6	6
NBS-015-070-4-60	3	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	56.5	26.9	45.1	10.3	7	1.063	6	6
NBS-015-090-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	57.5	26.9	47.1	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.6	26.9	47.2	11.1	12.4	1.063	6	6
NBS-015-095-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.6	26.9	47.2	11.1	12.3	1.063	6	6
NBS-015-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.6	26.9	47.2	11.1	9.4	1.063	6	6
NBS-020-095-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.7	26.9	47.3	11.1	12.3	1.063	6	6
NBS-020-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.7	26.9	47.3	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	60.5	27.7	48.1	11.1	9.4	1.063	8	8
NBS-020-110-4-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	60.5	27.7	48.1	11.1	13.9	1.063	8	8
NBS-020-135-4-60	15	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	66.2	30.7	53.8	13.4	9.6	1.063	8	8
NBS-020-135-4-60	20	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	66.2	30.7	53.8	13.4	9.6	1.063	8	8
NBS-025-070-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	28.9	49.2	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	64.4	29.7	52.1	12.4	8.2	1.063	8	8
NBS-025-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	64.4	29.7	52.1	12.4	8.2	1.063	8	8
NBS-025-110-4-60	15	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	65.4	29.7	53	13.4	10.1	1.063	8	8
NBS-030-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	70.0	33	56.3	14.2	9.3	1.063	10	10
NBS-030-095-4-60	10	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	73.0	34	59.2	15.2	12.4	1.063	10	10
NBS-030-095-4-60	15	66.9	64.8	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	73.0	34	59.2	15.2	17.2	1.063	10	10
NBS-030-095-4-60	7.5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	73.0	34	59.2	15.2	12.4	1.063	10	10

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-030-110-4-60	15	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.8	74.5	34	60.8	15.2	17	1.063	10	10
NBS-030-110-4-60	20	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.8	74.5	34	60.8	15.2	17	1.063	10	10
NBS-030-135-4-60	30	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	79.5	37.9	64.7	15.2	13.0	1.063	12	12
NBS-030-135-4-60	40	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	79.5	37.9	64.7	15.2	15.0	1.063	12	12
NBS-040-070-4-60	5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	74.3	34.9	57.5	15.4	15.8	1.063	10	10
NBS-040-070-4-60	7.5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	74.3	34.9	59.5	15.4	13.0	1.063	12	12
NBS-040-095-4-60	10	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	77.3	36.9	62.5	15.9	11.8	1.063	12	12
NBS-040-095-4-60	15	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	77.3	36.9	62.5	15.9	16.0	1.063	12	12
NBS-040-095-4-60	20	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	77.3	36.9	62.5	15.9	16.0	1.063	12	12
NBS-040-110-4-60	20	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	78.8	36.9	64	15.9	15.8	1.063	12	12
NBS-040-110-4-60	25	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	78.8	36.9	64	15.9	12.8	1.063	12	12
NBS-040-110-4-60	30	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	78.8	36.9	64	15.9	12.8	1.063	12	12
NBS-040-135-4-60	25	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	79.8	37.9	65	15.9	12.2	1.063	12	12
NBS-040-135-4-60	30	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	79.8	37.9	65	15.9	12.2	1.063	12	12
NBS-040-135-4-60	40	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	79.8	37.9	65	15.9	14.1	1.063	12	12
NBS-040-135-4-60	50	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	79.8	37.9	65	15.9	14.1	1.063	12	12
NBS-050-070-4-60	7.5	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	81.7	40.1	66.9	17	11.5	1.063	12	12
NBS-050-070-4-60	10	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	81.7	40.1	66.9	17	11.5	1.063	12	12
NBS-050-095-4-60	15	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	92.3	46	75.9	17.5	16.3	1.063	16	16
NBS-050-095-4-60	20	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	92.3	46	75.9	17.5	16.3	1.063	16	16
NBS-050-095-4-60	25	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	92.3	46	75.9	17.5	14.1	1.063	16	16
NBS-050-095-4-60	30	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	92.3	46	75.9	17.5	14.1	1.063	16	16
NBS-050-110-4-60	25	71.3	69	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	92.3	46	75.9	17.5	15	1.142	16	16
NBS-050-110-4-60	30	71.3	69	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	92.3	46	75.9	17.5	15	1.142	16	16
NBS-050-110-4-60	40	71.3	69	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	92.3	46	75.9	17.5	12.6	1.142	16	16
NBS-050-135-4-60	60	76.8	74.5	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	93.3	47	76.9	17.5	15.1	1.142	16	16
NBS-050-135-4-60	75	76.8	74.5	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	96.3	47	78.9	17.5	15.1	1.142	18	18

Five-pump system with the combination valve



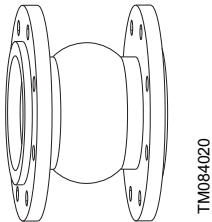

TM084820

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-015-070-4-60	2	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	57.7	26.1	46.4	10.3	9.4	1.063	6	6
NBS-015-070-4-60	3	43.3	41.2	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	58.5	26.9	47.1	10.3	7	1.063	6	6
NBS-015-090-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	128.9	59.4	26.9	49.1	11.1	12.4	1.063	4	4
NBS-015-090-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	12.4	1.063	6	6
NBS-015-095-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	12.3	1.063	6	6
NBS-015-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-095-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	12.3	1.063	6	6
NBS-020-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	60.6	26.9	49.2	11.1	9.4	1.063	6	6
NBS-020-110-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	62.4	27.7	50.1	11.1	9.4	1.063	8	8
NBS-020-110-4-60	15	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	62.4	27.7	50.1	11.1	13.9	1.063	8	8
NBS-020-135-4-60	15	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	68.7	30.7	56.3	13.4	9.6	1.063	8	8
NBS-020-135-4-60	20	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	68.7	30.7	56.3	13.4	9.6	1.063	8	8
NBS-025-070-4-60	3	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	63.1	28.9	51.7	12.4	11.1	1.063	6	6
NBS-025-095-4-60	10	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	66.9	29.7	54.5	12.4	8.2	1.063	8	8
NBS-025-095-4-60	7.5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	66.9	29.7	54.5	12.4	8.2	1.063	8	8
NBS-025-110-4-60	15	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	67.9	29.7	55.5	13.4	10.1	1.063	8	8
NBS-030-070-4-60	5	50.4	48.3	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	75.0	33.0	61.2	14.2	9.3	1.063	10	10
NBS-030-095-4-60	10	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	78.0	34.0	64.2	15.2	12.4	1.063	10	10
NBS-030-095-4-60	15	66.9	64.8	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	78.0	34.0	64.2	15.2	17.2	1.063	10	10
NBS-030-095-4-60	7.5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.1	78.0	34.0	64.2	15.2	12.4	1.063	10	10

Pump type	Power [hp]	L [inch]	L1 [inch]	W [inch]	W1 [inch]	W11 [inch]	W2 [inch]	W3 [inch]	W31 [inch]	W4 [inch]	W5 [inch]	H [inch]	H1 [inch]	H2 [inch]	A [inch]	B [inch]	S [inch]	DNS [inch]	DND [inch]
NBS-030-110-4-60	15	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.8	79.5	34.0	65.7	15.2	17	1.063	10	10
NBS-030-110-4-60	20	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.8	79.5	34.0	65.7	15.2	17	1.063	10	10
NBS-030-135-4-60	30	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	84.5	37.9	69.7	15.2	13.0	1.063	12	12
NBS-030-135-4-60	40	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	84.5	37.9	69.7	15.2	15.0	1.063	12	12
NBS-040-070-4-60	5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	79.2	34.9	62.5	15.4	15.8	1.063	10	10
NBS-040-070-4-60	7.5	58.3	56.1	128	7.874	26.575	35.433	13.8	26.6	23.6	129.2	79.2	34.9	64.4	15.4	13.0	1.063	12	12
NBS-040-095-4-60	10	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	82.2	36.9	67.4	15.9	11.8	1.063	12	12
NBS-040-095-4-60	15	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	82.2	36.9	67.4	15.9	16	1.063	12	12
NBS-040-095-4-60	20	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	82.2	36.9	67.4	15.9	16	1.063	12	12
NBS-040-110-4-60	20	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	83.7	36.9	69.0	15.9	15.8	1.063	12	12
NBS-040-110-4-60	25	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	83.7	36.9	69.0	15.9	12.8	1.063	12	12
NBS-040-110-4-60	30	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	83.7	36.9	69.0	15.9	12.8	1.063	12	12
NBS-040-135-4-60	25	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	84.7	37.9	70.0	15.9	12.2	1.063	12	12
NBS-040-135-4-60	30	66.9	64.8	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	84.7	37.9	70.0	15.9	12.2	1.063	12	12
NBS-040-135-4-60	40	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	84.7	37.9	70.0	15.9	14.1	1.063	12	12
NBS-040-135-4-60	50	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	84.7	37.9	70.0	15.9	14.1	1.063	12	12
NBS-050-070-4-60	7.5	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	87.6	40.1	72.8	17	11.5	1.063	12	12
NBS-050-070-4-60	10	58.3	56.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	148.9	87.6	40.1	72.8	17	11.5	1.063	12	12
NBS-050-095-4-60	15	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	98.2	46	81.8	17.5	16.3	1.063	16	16
NBS-050-095-4-60	20	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	98.2	46	81.8	17.5	16.3	1.063	16	16
NBS-050-095-4-60	25	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	98.2	46	81.8	17.5	14.1	1.063	16	16
NBS-050-095-4-60	30	71.3	69.1	147.6	9.843	30.512	39.370	15.7	30.5	27.6	149.1	98.2	46	81.8	17.5	14.1	1.063	16	16
NBS-050-110-4-60	25	71.3	69	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	98.2	46	81.8	17.5	15	1.142	16	16
NBS-050-110-4-60	30	71.3	69	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	98.2	46	81.8	17.5	15.0	1.142	16	16
NBS-050-110-4-60	40	71.3	69	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	98.2	46	81.8	17.5	12.6	1.142	16	16
NBS-050-135-4-60	60	76.8	74.5	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	99.2	47	82.8	17.5	15.1	1.142	16	16
NBS-050-135-4-60	75	76.8	74.5	167.3	11.811	34.449	43.307	17.7	34.4	31.5	168.8	102.2	49	84.8	17.5	15.1	1.142	18	18

10. Optional equipment

All optional equipment must be specified when ordering the pump system, as it must be installed in the factory prior to delivery. See options in the GRUNDFOS DELTA HCU type key.

Optional equipment	Image	Description	Location	Option code in the type key
Additional sensors, gauges, and tapping points	-	Additional sensors and gauges can be installed in the system piping and additional tapping points as needed if more instrumentation is required.	System	A
No standby pumps	-	The system can be modified and configured to accommodate all pumps running.	System	B
Expansion joints		It is used to absorb expansion or contractions in pipes caused by changes in liquid temperature, reduce mechanical strains in resulting from pressure surges and isolate mechanical structure-borne noise in the pipes.	Pump connection	E
Outdoor installation	-	The system can be modified to accommodate various types of outdoor installation applications.	-	O
Pipework material other than mild steel	-	Different system piping materials, other than the standard mild steel, are available.	-	P
Vibration dampers		Rubber vibration dampers can be installed in the system to help mitigate vibration from being transferred to the buildings.	System	V

Related information

[Type key](#)

11. Grundfos Product Center

Online search and sizing tool to help you make the right choice.

From the international view, you can select your specific country to view the product range available to you.

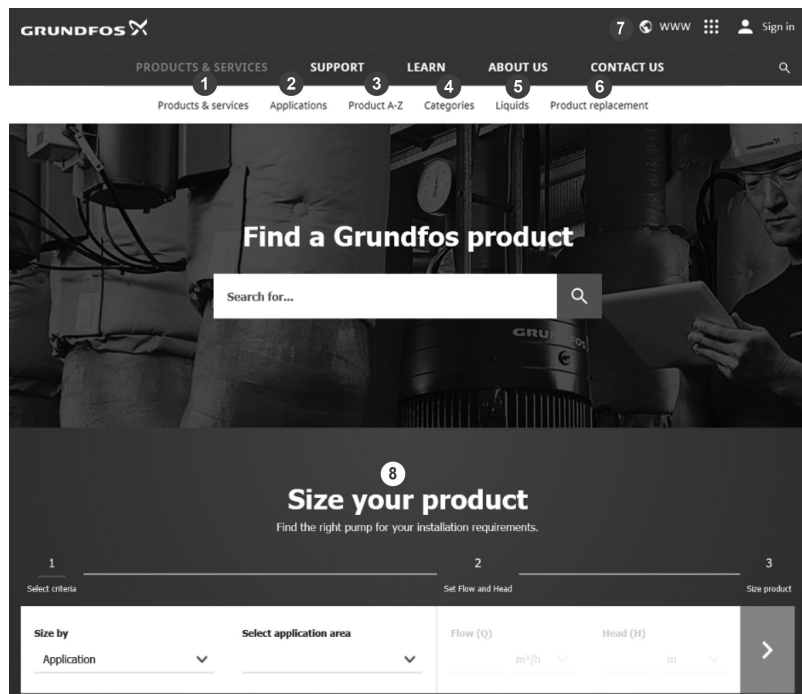
International view: <https://product-selection.grundfos.com>

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc., in PDF format.



When you select your country, you will see the menus below. Note that some menus may not be available depending on the country.

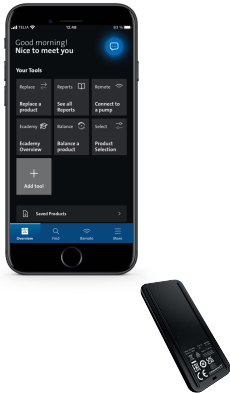
Example: <https://product-selection.grundfos.com/uk>

Pos.	Description
1	Products & services enables you to find products and documents by typing a product number or name into the search field.
2	Applications enables you to choose an application to see how Grundfos can help you design and optimise your system.
3	Products A-Z enables you to look through a list of all the Grundfos products.
4	Categories enables you to look for a product category.
5	Liquids enables you to find pumps designed for aggressive, flammable or other special liquids.
6	Product replacement enables you to find a suitable replacement.
7	WWW enables you to select the country, which changes the language, the available product range and the structure of the website.
8	Sizing enables you to size a product based on your application and operating conditions.

12. Grundfos GO

Mobile solution for professionals on the GO!

Grundfos GO is the mobile toolbox for professional users on the go. It is the most comprehensive platform for mobile pump control and pump selection, including sizing, replacement and documentation. It offers intuitive, handheld assistance and access to Grundfos online tools, and it saves valuable time for reporting and data collection.



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