

# S pumps, range 70

107 to 188 HP  
60 Hz ANSI



<b>1. Introduction</b>	<b>3</b>	<b>13. Weights</b>	<b>61</b>
Introduction	3		
Applications	3	<b>14. Flange forces</b>	<b>62</b>
Main constructional features	3		
<b>2. Performance range</b>	<b>4</b>	<b>15. Grundfos Product Center</b>	<b>63</b>
Performance range overview, S pumps	4	Grundfos GO	64
Performance range, S pumps, range 70	5		
List of pump curves	5		
<b>3. Identification</b>	<b>6</b>		
Type key	6		
Pump nameplate	6		
FM approval plate	7		
<b>4. Selection of product</b>	<b>8</b>		
Ordering the product	8		
<b>5. Product range</b>	<b>9</b>		
Explosion-proof pumps	9		
<b>6. Variants</b>	<b>11</b>		
List of variants	11		
<b>7. Construction</b>	<b>12</b>		
Sectional drawings, motors	12		
Components and material specification	20		
<b>8. Product description</b>	<b>22</b>		
Features	22		
Operating conditions	23		
Motor range	24		
Explosion-proof pumps	24		
Level controllers	24		
Wiring diagrams	28		
<b>9. Curve charts and technical data</b>	<b>29</b>		
How to read the curve charts	29		
Curve conditions	30		
Pump performance testing	30		
Performance-test types for end-suction pumps	31		
Specifying acceptance grades	34		
Certificates	35		
Witness test	35		
<b>10. Performance curves and technical data</b>	<b>36</b>		
Low pressure	36		
Medium pressure	38		
High pressure	42		
<b>11. Accessories</b>	<b>48</b>		
Accessories (for installation)	48		
Other accessories	49		
<b>12. Dimensions</b>	<b>50</b>		
Recommendation for pump foundations	50		
Basic pump	51		
Installation on auto-coupling system	53		
Dry, vertical installation on concrete foundation	57		
Dry, horizontal installation on base stand	59		

# 1. Introduction

## Introduction

This product guide deals with Grundfos heavy-duty sewage pumps, type S, range 70.



TM07 0831 0718

**Fig. 1** S pump, range 70

S pumps, range 70, are a range of free-flow channel impeller pumps specifically designed for pumping sewage and wastewater in a wide range of municipal, private and industrial applications.

The pumps are made of resistant materials, such as cast iron and stainless steel. These materials ensure a proper operation.

The pumps are fitted with motors from 107 to 188 HP (80 kW to 140 kW). The motors are either 4-, 6- or 8-pole motors, depending on the motor size.

The free passage in the pumps is 3.5" to 5.7" (90 to 145 mm).

The pumps are available for these types of installation:

- submerged installation on auto-coupling system
- submerged installation, free-standing
- dry installation, vertical
- dry installation, horizontal.

## Applications

S pumps are designed for applications such as:

- raw-water intake
- wastewater treatment plants
- municipal pumping stations
- public buildings
- residential housing
- blocks of apartments
- industries
- parking garages
- underground car parks
- car-wash areas
- restaurants and hotels.

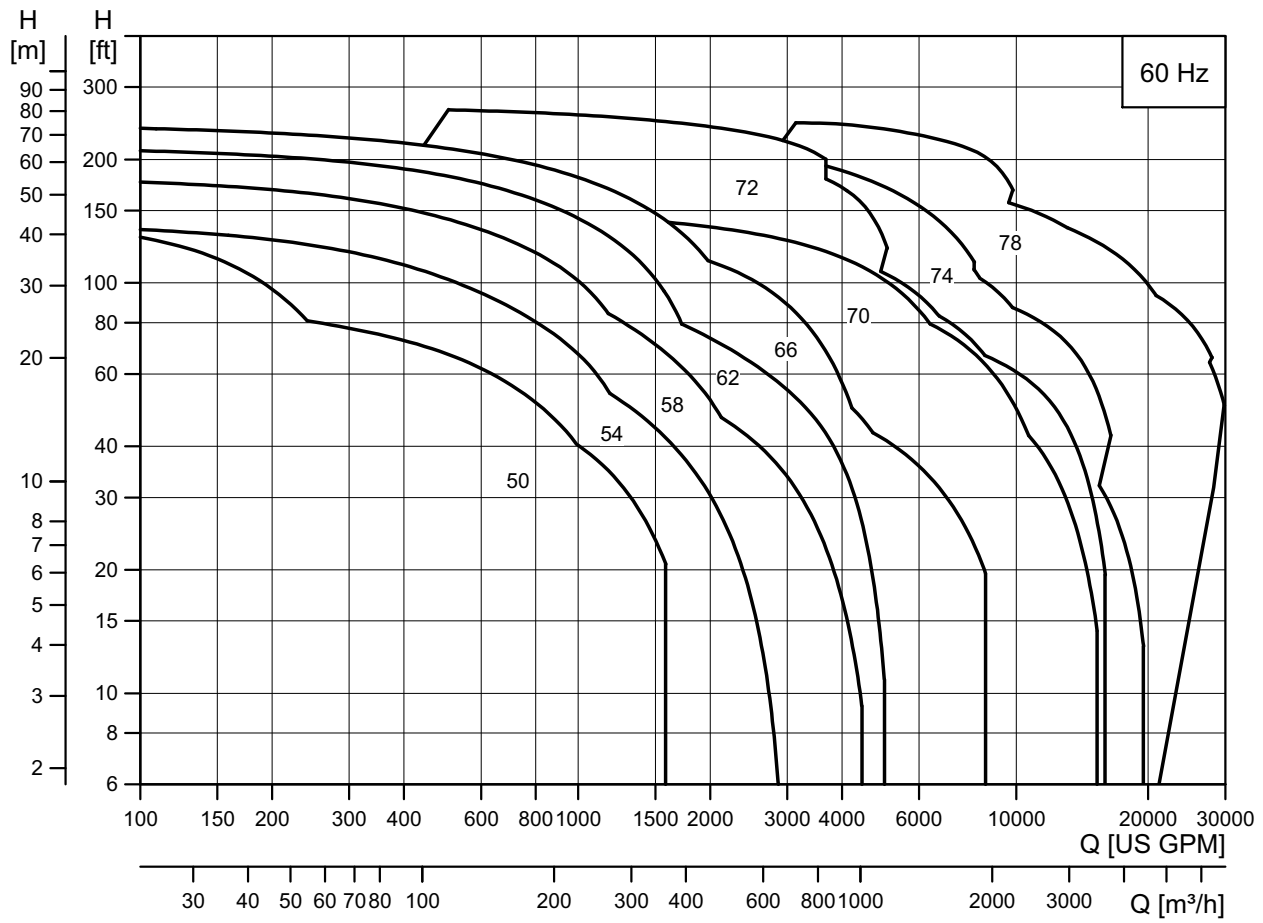
The pumps are suitable for both temporary and permanent installation. The lifting bracket fitted on the pumps facilitates easy transportation as well as installation at the installation site.

## Main constructional features

- Leak-proof connection via the Grundfos SmartSeal sealing system
- double mechanical shaft seal system for reliable sealing between pumped liquid and motor
- watertight cable entry
- moisture switch for continuous monitoring of motor housing and automatic cut-off power in case liquid penetrates into motor top area or into stator housing
- self-cleaning channel impeller with long vanes reducing the risk of jamming or clogging
- SmartTrim system allowing easy adjustment of impeller clearance and maintaining maximum pump efficiency over pump lifetime
- motor in insulation class H [356 °F (180 °C)] with class F [311 °F (155 °C)] temperature rise, enclosure class IP68 with three thermal sensors in stator windings
- shaft seal condition monitoring via water-in-oil sensor (optional)
- explosion-proof motors for applications involving potential risk of explosion
- stainless steel versions for use in corrosive or aggressive liquids:
  - stainless steel impeller, cast iron pump and motor housing
  - stainless steel pump housing, flange and impeller, cast iron motor housing made entirely of corrosion-resistant stainless steel.

## 2. Performance range

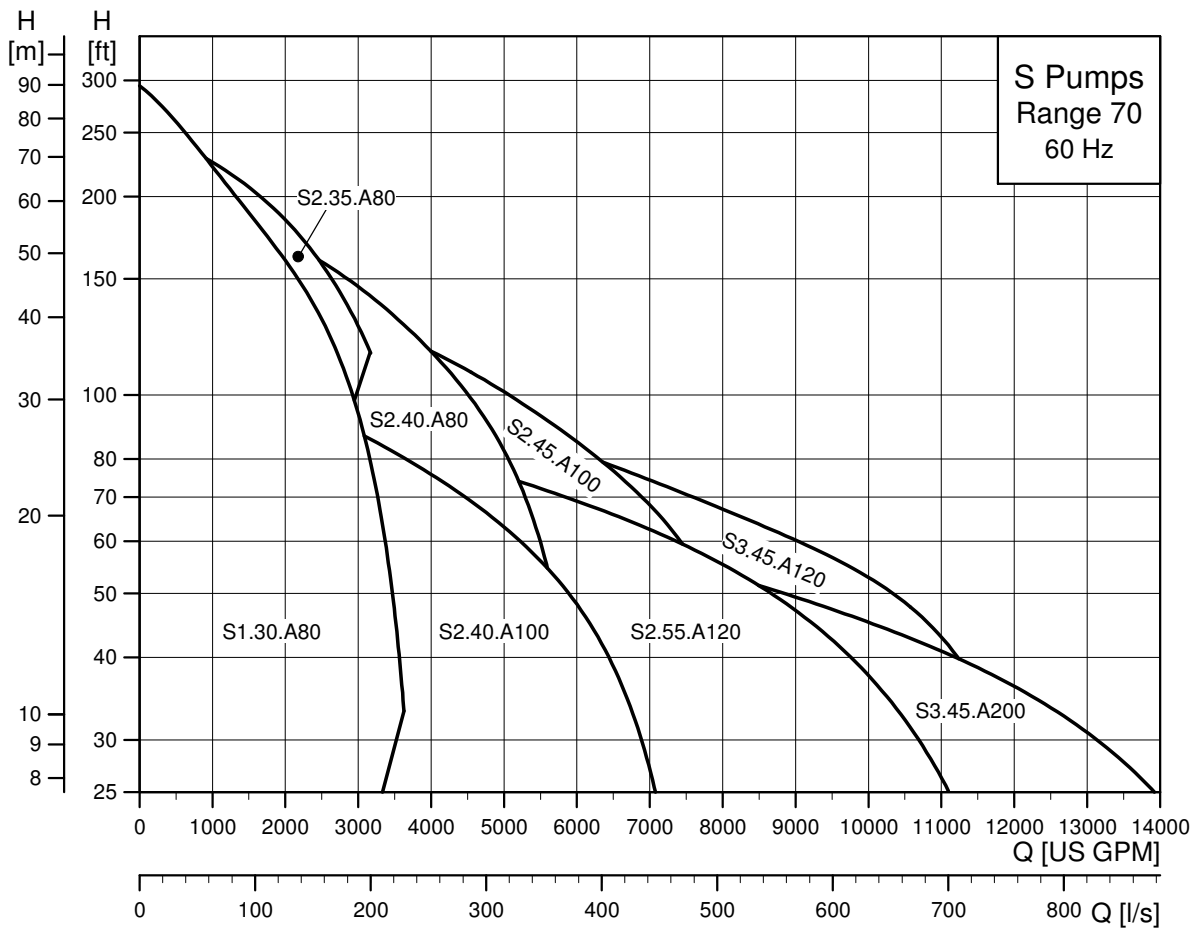
### Performance range overview, S pumps



TM06 4934 3215



Performance range, S pumps, range 70



TM04 6610 4818

List of pump curves

3 x 460 V

Pump type	Pressure range	Curve chart on page
S3.45.A200.1070.8.70L	Low	36
S3.45.A200.1880.6.70L		
S2.40.A80.1270/1610.4.70M	Medium	38
S2.40.A80.1470.6.70M		
S3.45.A120.1070/1880.8.70M	High	40
S1.30.A80.1200.4.70H		42
S2.35.A80.1270/1610.4.70H		44
S2.40.A100.1070.8.70H		46
S2.45.A100.1880.8.70H		
S2.45.A100.1470.6.70H		

## 3. Identification

### Type key

Please note that the pump type described in this booklet is not necessarily available in all variants.

Example: **S1.40.A80.980.4.66H.S.358.G.Ex.D.611.Z**

Code	Explanation	Designation
S	Grundfos sewage and wastewater pump	Pump type
ST	Multi-channel impeller pump installed in a column pipe	
1	Single-channel impeller	Impeller type
2	Two-channel impeller	
3	Three-channel impeller	
V	SuperVortex impeller	
40	Maximum solids size = code number from type designation / 10 [inch]	Pump passage
A80	Nominal diameter of pump outlet port = code number from type designation / 10 [inch]	Pump outlet, S-type
	Nominal diameter of column pipe = code number from type designation / 10 [inch]	Pump outlet, ST-type
980	P2 = code number from type designation / 10 [HP]	Power output [HP] <sup>1</sup>
2	2-pole motor	Number of poles
4	4-pole motor	
6	6-pole motor	
8	8-pole motor	
10	10-pole motor	
12	12-pole motor	
50	Range 50	Pump range
54	Range 54	
58	Range 58	
62	Range 62	
66	Range 66	
70	Range 70	
S	Super-high	Pressure version
H	High	
M	Medium	
L	Low	
E	Extra-low	
F	Super-low	
S	Submersible installation without cooling jacket	Installation type
C	Submersible installation with cooling jacket	
D	Dry installation, vertical	
H	Dry installation, horizontal	
358	Impeller diameter	Impeller diameter [mm]
G	Cast iron impeller, pump housing and stator housing	Material code for impeller, pump housing and stator housing
Q	Stainless steel impeller, DIN W.-Nr. 1.4408	
N	Non-explosion-proof pump	Pump version
Ex	Pump with explosion-proof motor	
B	Pump with built-in SM 113 <sup>2</sup>	
C	Not in use	Sensor version
D	Pump without built-in SM 113.	
6	60 Hz	Frequency [Hz]
11	3 x 460 V, Y/D	Voltage code and connection
Z	Custom-built products	Customization

<sup>1</sup> The power output (P2) indicated in the type key, which is used to indicate the motor size, can deviate from the actual power output.

Please refer to the nameplate or the chapter *Performance curves and technical data* for the exact power output.

<sup>2</sup> PTC sensors are connected directly to IO 113 or other PTC relay.

### Pump nameplate

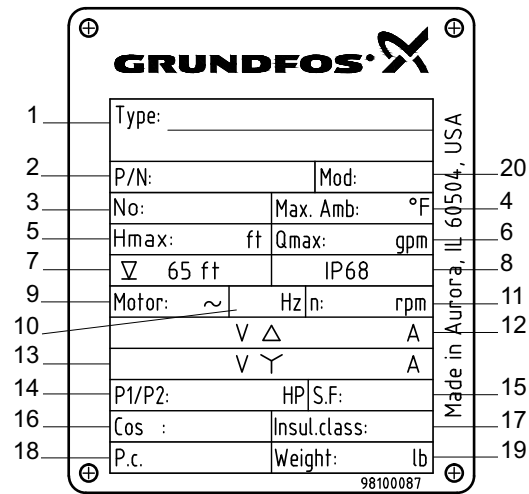


Fig. 2 Pump nameplate

Pos.	Description
1	Type designation
2	Product number
3	Serial number
4	Maximum liquid temperature
5	Maximum head
6	Maximum flow rate
7	Maximum installation depth
8	Enclosure class
9	Number of phases
10	Frequency
11	Rated speed [rpm]
12	Voltage/current, delta connection
13	Voltage/current, star connection
14	Power input/output (P1/P2)
15	Motor service factor
16	Cos $\phi$ , 1/1 load
17	Insulation class
18	Production code, year and week
19	Weight
20	Generation code

TM05 5094 3212

## FM approval plate

The certified pumps (FM pumps) are supplied with an approval plate fixed on motor top cover.



Fig. 3 FM approval plate

The approval plate gives the following details:

	FM approval symbol
Class I	Permitted for locations where flammable gases or vapors may be present.
Division 1	Permitted for locations where flammable or combustible gases can exist under normal operating conditions or because of repair, breakdown or faulty operation of equipment.
Group C and D	Permitted for specific gases or vapors of Group C and D that will be present.
T3C	Temperature class (T code) Surface temperature max. 320 °F (160 °C)
Type	FM listing code (e.g. S50X13.5/4.60)
yyww/no	Production year, week and serial number (e.g. 1052/123456)

## FM certification and classification

Pump	Approval
50-70	Class I Division 1 Group C and D Hazardous (Classified) Locations. Temperature class T3C.

## 4. Selection of product

### Ordering the product

When ordering the product, you need to take the following four aspects into consideration.

1. pump
2. custom-built variation (option)
3. accessories
4. controller.

### Pump

Use the online selection tool in Grundfos Product Center to find the best suited pump for your application or use *Product range*, page 9 and *Type key*, page 6 to identify the pump that best fulfils your needs. The list below is a detailed description of the product you get if you order the following pump:

Pump	Product no
S2.45.A100.1880.6.70H.H.465.G.Ex.D	97632349

- Pump as specified in the type key
- 50 ft (15 m) cable
- Paint: Black, NCS S9000-N/RAL 9005, gloss 30, thickness 150  $\mu$
- Water-in-oil sensor
- Three thermal switches (Klixon), one in each phase, or three thermal sensors (PTC)
- One moisture switch below the motor top cover and one in the stator housing in the bottom of the motor.
- ANSI-HI centrifugal pump test 11.6:2012, acceptance level 3B.

See *Performance curves and technical data*, page 36 for selection of a standard product range.

**Note:** Product-specific data for the pump can also be seen online in Grundfos Product Center using the product number 97632349.

### Custom-built variants

The S pumps can be customized to meet individual requirements. Many pump features and options are available for customization, e.g. explosion-proof versions, various cable lengths or special materials.

Variants can be seen in *List of variants*, page 11. For requirements or designs not included in the list, contact Grundfos.

### Accessories

Depending on the installation type, you may need to order accessories. See *Accessories*, page 48 for selection of the correct accessories.

**Note:** Ordered accessories are not fitted from factory.

### Controller

Grundfos Dedicated Controls (DC) is available.



**Fig. 4** Grundfos Dedicated Controls

Grundfos Dedicated Controls is a control system designed for installation in either commercial buildings or network pumping stations with one to six pumps. As standard, the system is supplied with application-optimized software and can be configured to meet your specific pumping needs.

For more information about *Level controllers*, see page 24.

TM06 6501 1515

## 5. Product range

### Explosion-proof pumps

All pumps given here can be delivered as non-explosion-proof pumps, if required.

**Note:** WIO sensor is standard for explosion-proof pumps.

#### Cast iron, 3 x 460 V

Pump type	Cable length [ft (m)]	Pump	Accessories		
			Horizontal base stand <sup>1</sup>	To be ordered separately	
				Vertical base plate	Auto-coupling system <sup>2</sup>
S2.35.A80.1270.4.70H.S.340.G.Ex.D...	50 (15)	97660727	-	-	97506541
S2.35.A80.1270.4.70H.C.340.G.Ex.D...	50 (15)	97660728	-	-	97506541
S2.35.A80.1270.4.70H.D.340.G.Ex.D...	50 (15)	97660729	-	96857815	-
S2.35.A80.1270.4.70H.H.340.G.Ex.D...	50 (15)	97660730	96308212	-	-
S2.40.A80.1270.4.70M.S.332.G.Ex.D...	50 (15)	97660771	-	-	97506541
S2.40.A80.1270.4.70M.C.332.G.Ex.D...	50 (15)	97660772	-	-	97506541
S2.40.A80.1270.4.70M.D.332.G.Ex.D...	50 (15)	97660773	-	96857815	-
S2.40.A80.1270.4.70M.H.332.G.Ex.D...	50 (15)	97660774	96308212	-	-
S2.45.A100.1470.6.70H.S.443.G.Ex.D...	50 (15)	97660775	-	-	97510048
S2.45.A100.1470.6.70H.C.443.G.Ex.D...	50 (15)	97660776	-	-	97510048
S2.45.A100.1470.6.70H.D.443.G.Ex.D...	50 (15)	97660777	-	96857816	-
S2.45.A100.1470.6.70H.H.443.G.Ex.D...	50 (15)	97660779	96308192	-	-
S2.55.A120.1470.6.70M.S.420.G.Ex.D...	50 (15)	97660780	-	-	97510049
S2.55.A120.1470.6.70M.C.420.G.Ex.D...	50 (15)	97660781	-	-	97510049
S2.55.A120.1470.6.70M.D.420.G.Ex.D...	50 (15)	97660782	-	96857816	-
S2.55.A120.1470.6.70M.H.420.G.Ex.D...	50 (15)	97660783	96308255	-	-
S2.35.A80.1610.4.70H.S.361.G.Ex.D...	50 (15)	97660784	-	-	97506541
S2.35.A80.1610.4.70H.C.361.G.Ex.D...	50 (15)	97660785	-	-	97506541
S2.35.A80.1610.4.70H.D.361.G.Ex.D...	50 (15)	97660786	-	96857815	-
S2.35.A80.1610.4.70H.H.361.G.Ex.D...	50 (15)	97660787	96308212	-	-
S2.40.A80.1610.4.70M.S.355.G.Ex.D...	50 (15)	97660788	-	-	97506541
S2.40.A80.1610.4.70M.C.355.G.Ex.D...	50 (15)	97660789	-	-	97506541
S2.40.A80.1610.4.70M.D.355.G.Ex.D...	50 (15)	97660790	-	96857815	-
S2.40.A80.1610.4.70M.H.355.G.Ex.D...	50 (15)	97660791	96308212	-	-
S2.45.A100.1880.6.70H.S.465.G.Ex.D...	50 (15)	97660792	-	-	97510048
S2.45.A100.1880.6.70H.C.465.G.Ex.D...	50 (15)	97660793	-	-	97510048
S2.45.A100.1880.6.70H.D.465.G.Ex.D...	50 (15)	97660794	-	96857816	-
S2.45.A100.1880.6.70H.H.465.G.Ex.D...	50 (15)	97660795	96308192	-	-
S2.40.A100.1070.8.70H.S.523.G.Ex.D...	50 (15)	99442998	-	-	97510048
S2.40.A100.1070.8.70H.C.523.G.Ex.D...	50 (15)	99442999	-	-	97510048
S2.40.A100.1070.8.70H.D.523.G.Ex.D...	50 (15)	99443000	-	96857816	-
S2.40.A100.1070.8.70H.H.523.G.Ex.D...	50 (15)	99443001	96308192	-	-
S3.45.A200.1880.6.70L.S.371.G.Ex.D...	50 (15)	97660800	-	-	97510050
S3.45.A200.1880.6.70L.C.371.G.Ex.D...	50 (15)	97660801	-	-	97510050
S3.45.A200.1880.6.70L.D.371.G.Ex.D...	50 (15)	97660802	-	96867808	-
S3.45.A200.1880.6.70L.H.371.G.Ex.D...	50 (15)	97660803	96308192	-	-
S3.45.A120.1880.6.70M.S.407.G.Ex.D...	50 (15)	97660804	-	-	97510049
S3.45.A120.1880.6.70M.C.407.G.Ex.D...	50 (15)	97660805	-	-	97510049
S3.45.A120.1880.6.70M.D.407.G.Ex.D...	50 (15)	97660806	-	96857816	-
S3.45.A120.1880.6.70M.H.407.G.Ex.D...	50 (15)	97660807	96308192	-	-
S3.45.A200.1070.8.70L.S.402.G.Ex.D...	50 (15)	97660808	-	-	97510050
S3.45.A200.1070.8.70L.C.402.G.Ex.D...	50 (15)	97660809	-	-	97510050
S3.45.A200.1070.8.70L.D.402.G.Ex.D...	50 (15)	97660810	-	96867808	-
S3.45.A200.1070.8.70L.H.402.G.Ex.D...	50 (15)	97660811	96308192	-	-
S3.45.A120.1070.8.70M.S.442.G.Ex.D...	50 (15)	97660812	-	-	97510049
S3.45.A120.1070.8.70M.C.442.G.Ex.D...	50 (15)	97660813	-	-	97510049
S3.45.A120.1070.8.70M.D.442.G.Ex.D...	50 (15)	97660814	-	96857816	-
S3.45.A120.1070.8.70M.H.442.G.Ex.D...	50 (15)	97660815	96308192	-	-

<sup>1</sup> Pumps of installation type H include the standard horizontal stand. Pumps with material code G or Q include a painted-steel stand. If another horizontal stand is required, order a pump of installation type D together with the required stand.

<sup>2</sup> Installation type S and C pumps with outlet flange size ANSI 10" (DN 250) and higher are supplied with guide claw mounted on the flange.



## Stainless steel, 3 x 460 V

Pump type	Cable length [ft (m)]	Pump	Accessories		
			Horizontal base stand <sup>1</sup>	To be ordered separately	
				Vertical base plate	Auto-coupling system <sup>2</sup>
S2.35.A80.1270.4.70H.S.340.G.Ex.D...	50 (15)	97663765	-	-	97506541
S2.35.A80.1270.4.70H.C.340.G.Ex.D...	50 (15)	97663766	-	-	97506541
S2.35.A80.1270.4.70H.D.340.G.Ex.D...	50 (15)	97663767	-	96857815	-
S2.35.A80.1270.4.70H.H.340.G.Ex.D...	50 (15)	97663768	96308212	-	-
S2.40.A80.1270.4.70M.S.332.G.Ex.D...	50 (15)	97663769	-	-	97506541
S2.40.A80.1270.4.70M.C.332.G.Ex.D...	50 (15)	97663770	-	-	97506541
S2.40.A80.1270.4.70M.D.332.G.Ex.D...	50 (15)	97663771	-	96857815	-
S2.40.A80.1270.4.70M.H.332.G.Ex.D...	50 (15)	97663772	96308212	-	-
S2.45.A100.1470.6.70H.S.443.G.Ex.D...	50 (15)	97663773	-	-	97510048
S2.45.A100.1470.6.70H.C.443.G.Ex.D...	50 (15)	97663774	-	-	97510048
S2.45.A100.1470.6.70H.D.443.G.Ex.D...	50 (15)	97663775	-	96857816	-
S2.45.A100.1470.6.70H.H.443.G.Ex.D...	50 (15)	97663776	96308192	-	-
S2.55.A120.1470.6.70M.S.420.G.Ex.D...	50 (15)	97663777	-	-	97510049
S2.55.A120.1470.6.70M.C.420.G.Ex.D...	50 (15)	97663778	-	-	97510049
S2.55.A120.1470.6.70M.D.420.G.Ex.D...	50 (15)	97663779	-	96857816	-
S2.55.A120.1470.6.70M.H.420.G.Ex.D...	50 (15)	97663780	96308255	-	-
S2.35.A80.1610.4.70H.S.361.G.Ex.D...	50 (15)	97663781	-	-	97506541
S2.35.A80.1610.4.70H.C.361.G.Ex.D...	50 (15)	97663782	-	-	97506541
S2.35.A80.1610.4.70H.D.361.G.Ex.D...	50 (15)	97663783	-	96857815	-
S2.35.A80.1610.4.70H.H.361.G.Ex.D...	50 (15)	97663784	96308212	-	-
S2.40.A80.1610.4.70M.S.355.G.Ex.D...	50 (15)	97663785	-	-	97506541
S2.40.A80.1610.4.70M.C.355.G.Ex.D...	50 (15)	97663786	-	-	97506541
S2.40.A80.1610.4.70M.D.355.G.Ex.D...	50 (15)	97663787	-	96857815	-
S2.40.A80.1610.4.70M.H.355.G.Ex.D...	50 (15)	97663788	96308212	-	-
S2.45.A100.1880.6.70H.S.465.G.Ex.D...	50 (15)	97663789	-	-	97510048
S2.45.A100.1880.6.70H.C.465.G.Ex.D...	50 (15)	97663790	-	-	97510048
S2.45.A100.1880.6.70H.D.465.G.Ex.D...	50 (15)	97663791	-	96857816	-
S2.45.A100.1880.6.70H.H.465.G.Ex.D...	50 (15)	97663792	96308192	-	-
S2.45.A100.1070.8.70H.S.520.G.Ex.D...	50 (15)	97663793	-	-	97510048
S2.45.A100.1070.8.70H.C.520.G.Ex.D...	50 (15)	97663794	-	-	97510048
S2.45.A100.1070.8.70H.D.520.G.Ex.D...	50 (15)	97663795	-	96857816	-
S2.45.A100.1070.8.70H.H.520.G.Ex.D...	50 (15)	97663796	96308192	-	-
S3.45.A200.1880.6.70L.S.371.G.Ex.D...	50 (15)	97663797	-	-	97510050
S3.45.A200.1880.6.70L.C.371.G.Ex.D...	50 (15)	97663798	-	-	97510050
S3.45.A200.1880.6.70L.D.371.G.Ex.D...	50 (15)	97663799	-	96867808	-
S3.45.A200.1880.6.70L.H.371.G.Ex.D...	50 (15)	97663800	96308192	-	-
S3.45.A120.1880.6.70M.S.407.G.Ex.D...	50 (15)	97663801	-	-	97510049
S3.45.A120.1880.6.70M.C.407.G.Ex.D...	50 (15)	97663802	-	-	97510049
S3.45.A120.1880.6.70M.D.407.G.Ex.D...	50 (15)	97663803	-	96857816	-
S3.45.A120.1880.6.70M.H.407.G.Ex.D...	50 (15)	97663804	96308192	-	-
S3.45.A200.1070.8.70L.S.402.G.Ex.D...	50 (15)	97663805	-	-	97510050
S3.45.A200.1070.8.70L.C.402.G.Ex.D...	50 (15)	97663806	-	-	97510050
S3.45.A200.1070.8.70L.D.402.G.Ex.D...	50 (15)	97663807	-	96867808	-
S3.45.A200.1070.8.70L.H.402.G.Ex.D...	50 (15)	97663808	96308192	-	-
S3.45.A120.1070.8.70M.S.442.G.Ex.D...	50 (15)	97663809	-	-	97510049
S3.45.A120.1070.8.70M.C.442.G.Ex.D...	50 (15)	97663810	-	-	97510049
S3.45.A120.1070.8.70M.D.442.G.Ex.D...	50 (15)	97663811	-	96857816	-
S3.45.A120.1070.8.70M.H.442.G.Ex.D...	50 (15)	97663812	96308192	-	-

<sup>1</sup> Pumps of installation type H include the standard horizontal stand. Pumps with material code G or Q include a painted-steel stand. If another horizontal stand is required, order a pump of installation type D together with the required stand.

<sup>2</sup> Installation type S and C pumps with outlet flange size ANSI 10" (DN 250) and higher are supplied with guide claw mounted on the flange.

## 6. Variants

### List of variants

<b>Motor</b>		
Various cable lengths		33 ft (10 m)
		50 ft (15 m)
		82 ft (25 m)
		165 ft (50 m)
EMC power cables	Screened power cables for variable-speed drives	33 ft (10 m)
		50 ft (15 m)
		82 ft (25 m)
		165 ft (50 m)
Special motor		Special voltage
PTC thermistors in windings		
Special oil	Non-toxic Shell Ondina X420 <sup>1</sup>	
<b>Motor protection</b>		
PTC + moisture switch		FPV1
Klixon + moisture switch + WIO <sup>2</sup>		FPV2a
PTC + moisture switch + WIO <sup>2</sup>		FPV2b
Klixon + moisture switch + WIO <sup>2</sup> + Pt100 at lower and upper bearing + PVS 3		FPV4a
PTC + moisture switch + WIO <sup>2</sup> + Pt100 at lower and upper bearing + PVS 3		FPV4b
<b>Materials</b>		
Stainless steel lifting bracket	AISI 316	
Stainless steel impeller	Duplex ASTM 890 grade 3A and 316 stainless steel	Variant Q
Stainless steel shaft	AISI 329 / 1.4462	
Ceramic coatings for pump housing, suction cover and impellers	Belzona 1321 and Chesterton ARC 855	
<b>Tests</b>		
Test at specified duty on standard impeller curve		
Trimmed impeller for specified duty test		
Additional test of entire QH curve (including report)	5-10 flows from pump performance curve	
Different test standard	Efficiency guaranteed by Grundfos	HI 11.6:2012 grade 1B/1U tolerance
		HI 11.6:2012 grade 2B/2U tolerance
Vibration test (including report)	According to Grundfos factory quality standard	
Performance test on dry test stand	Not yet available	
NPSHr test	Not yet available	
String test	Contact Grundfos	
Witness test	Contact Grundfos	
<b>Miscellaneous</b>		
Special packaging	Contact Grundfos	
Special nameplate	Contact Grundfos	
Other variants	Contact Grundfos	

<sup>1</sup> Shell Ondina should not be used for pumps with WIO sensor.

<sup>2</sup> WIO sensor is standard for explosion-proof pumps.

## 7. Construction

### Sectional drawings, motors

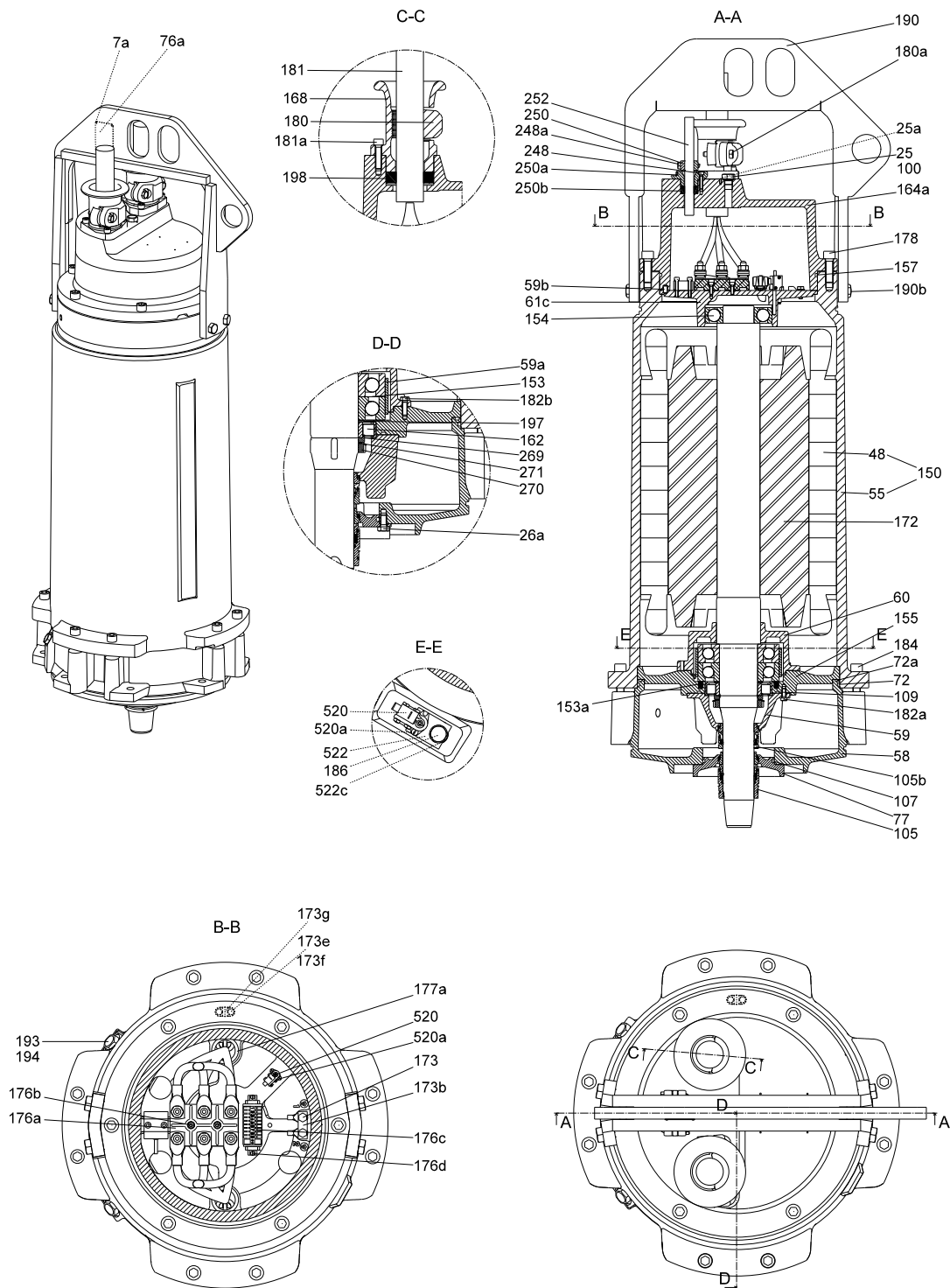


Fig. 5 Explosion-proof motor, without cooling jacket (installation type S)

TM06 3963 1315

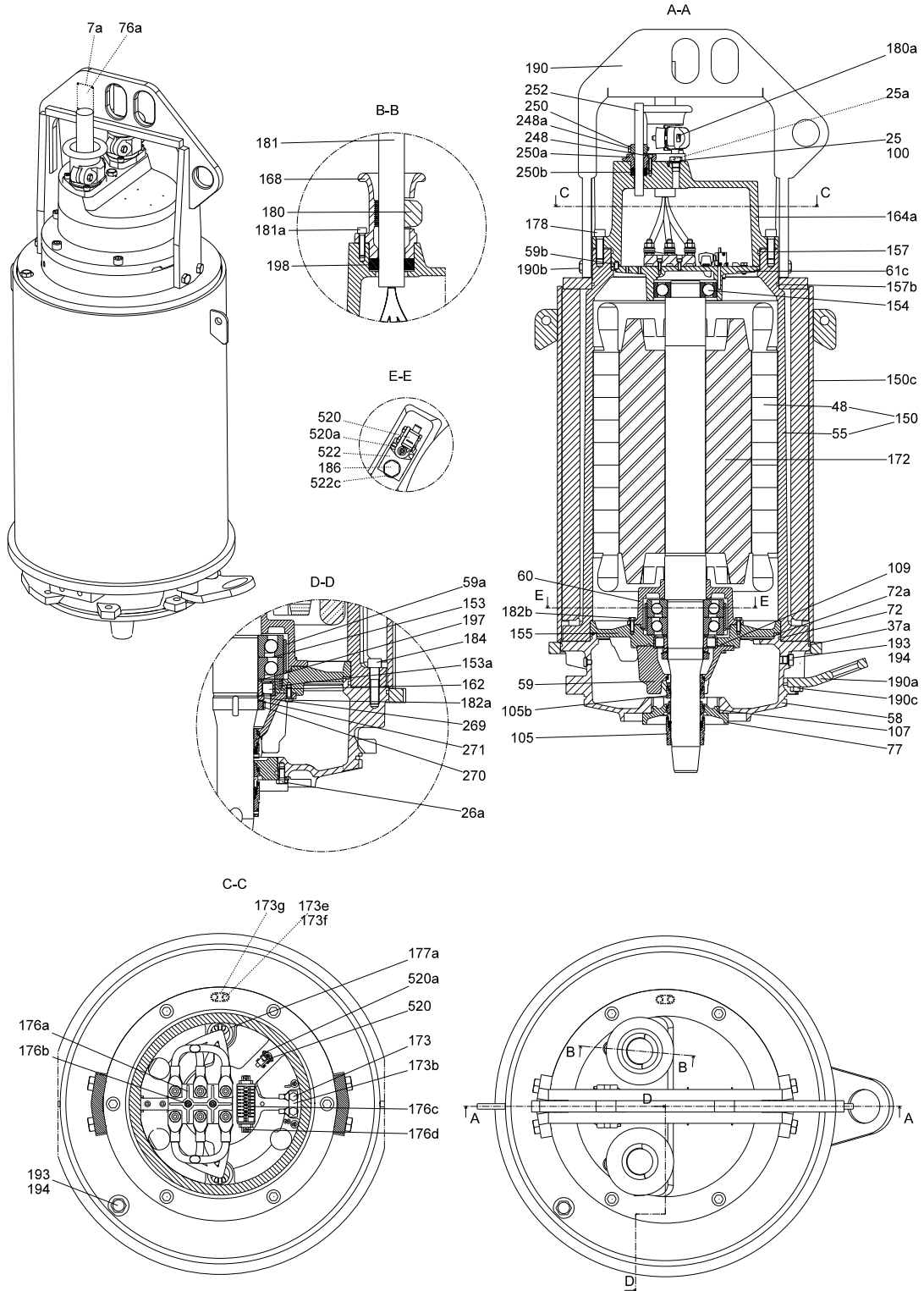


Fig. 6 Explosion-proof motor with cooling jacket (installation types C, D and H)

TMM06 3965 1315

## Pumps

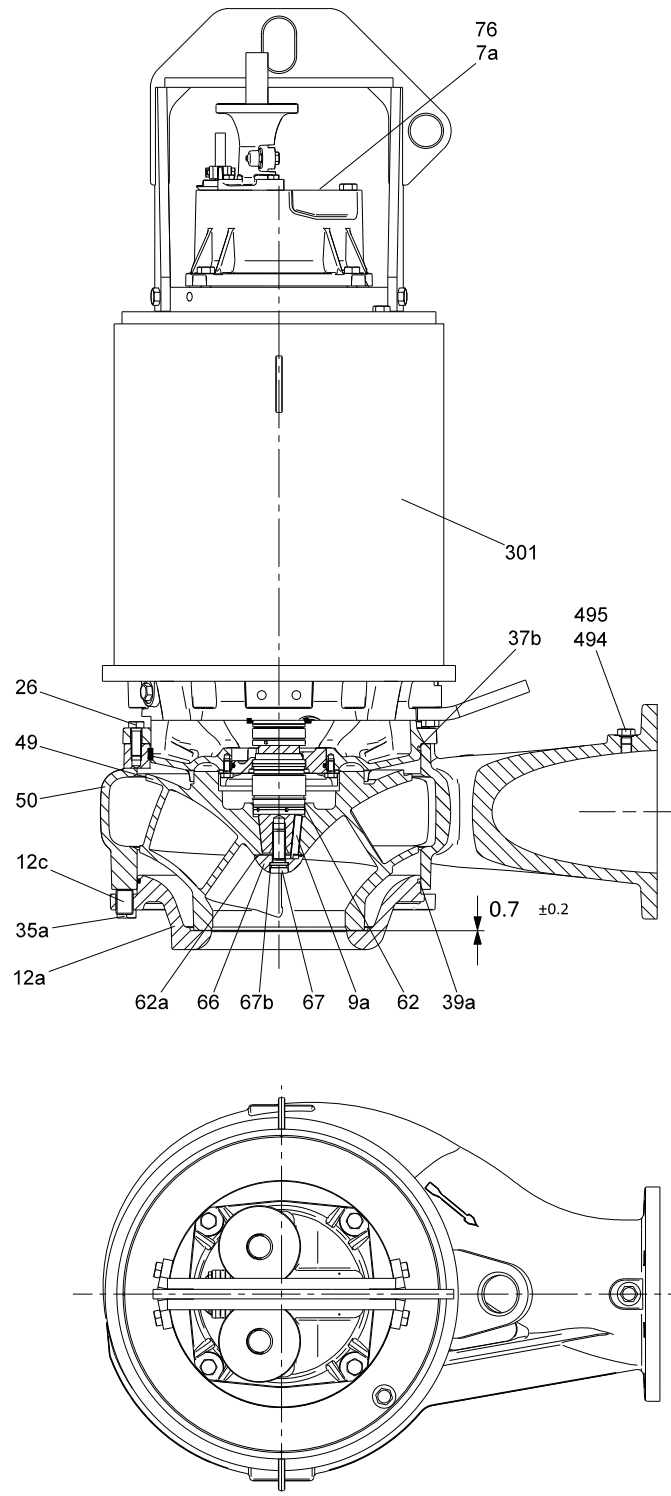


Fig. 7 Basic pump, installation types S and C

TM04 2589 2708



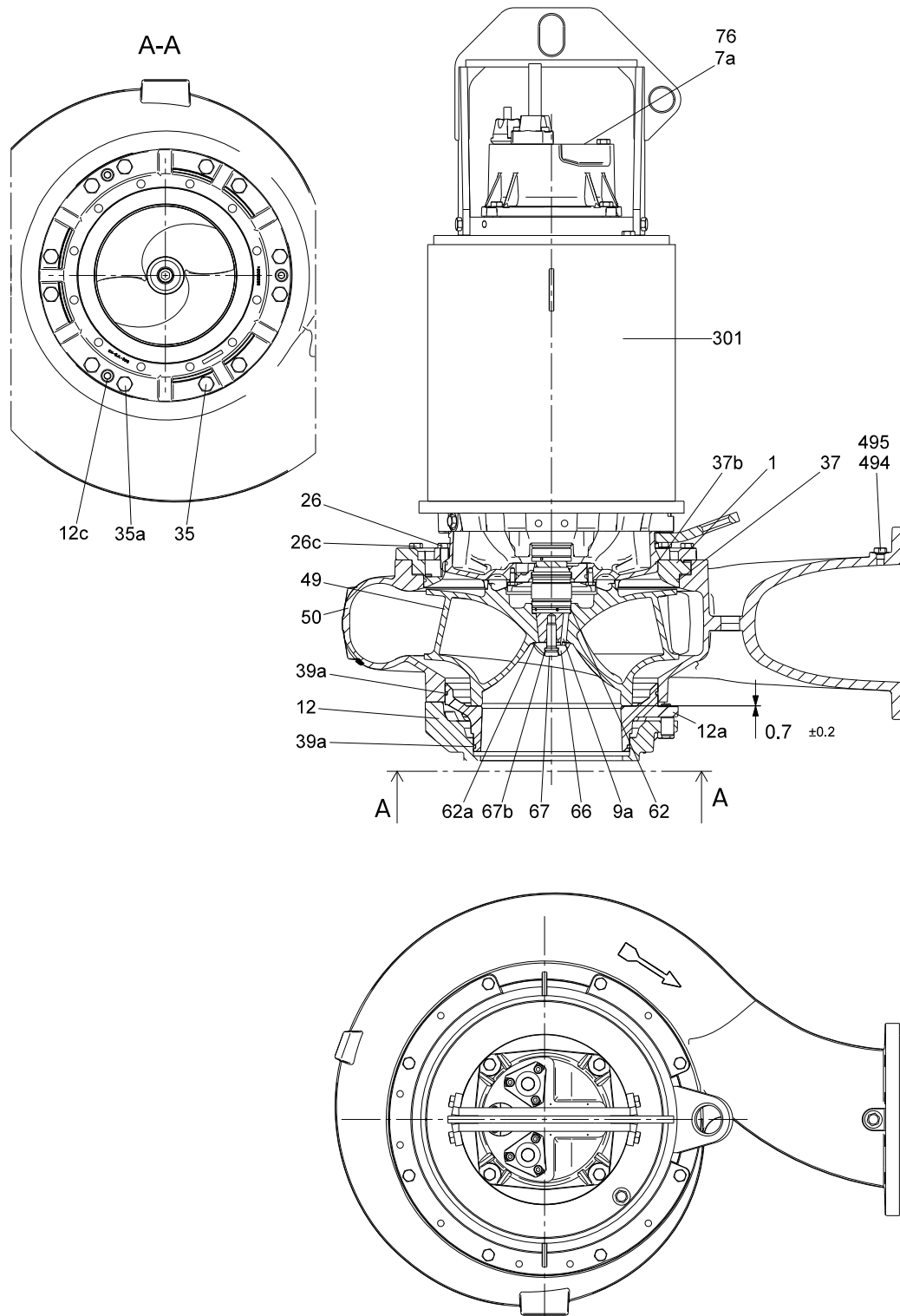
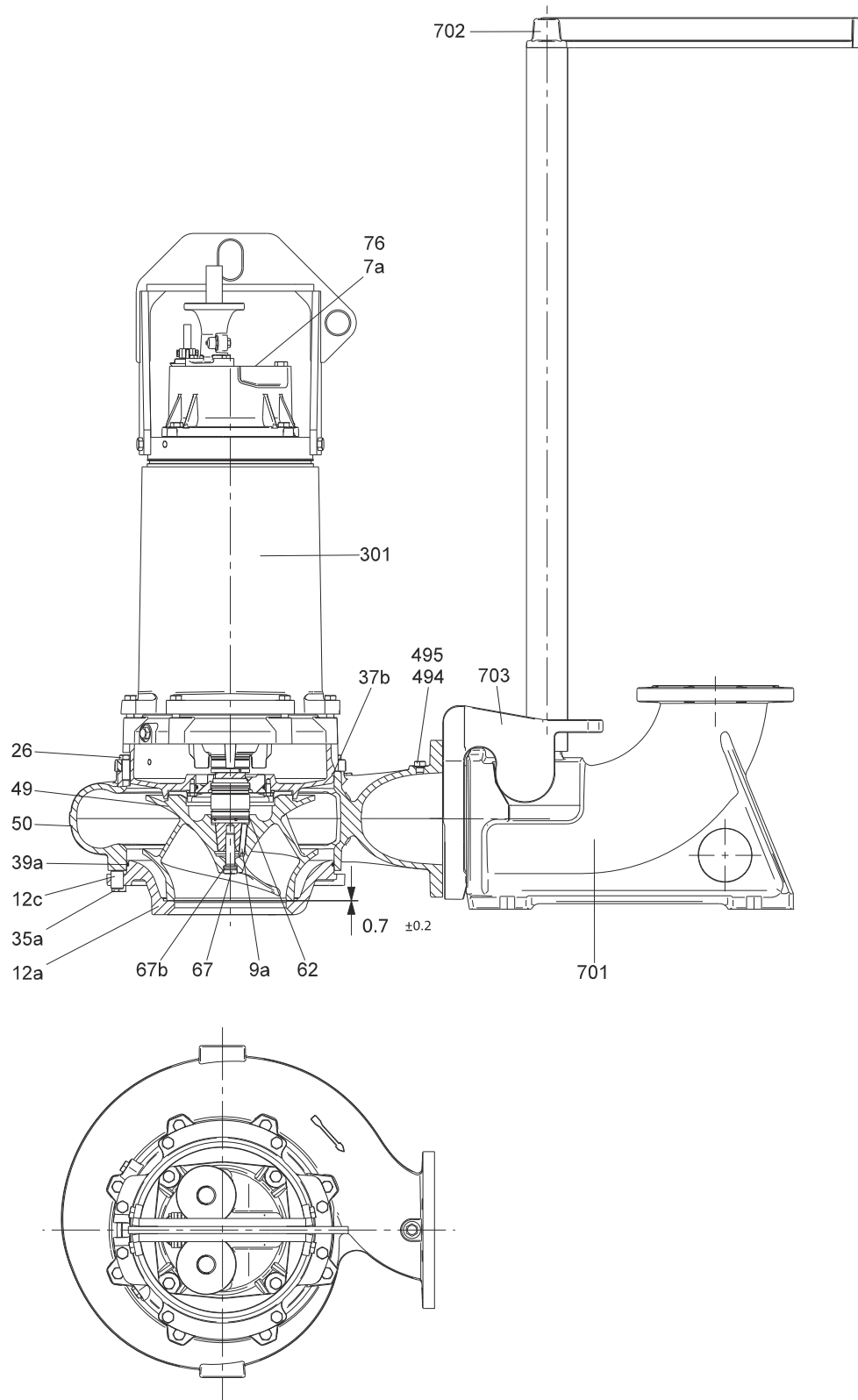


Fig. 8 Basic pump, installation types D and H

TM04 2707 2808



**Fig. 9** Installation types Sand C pump on auto coupling

TM04 2708 4116

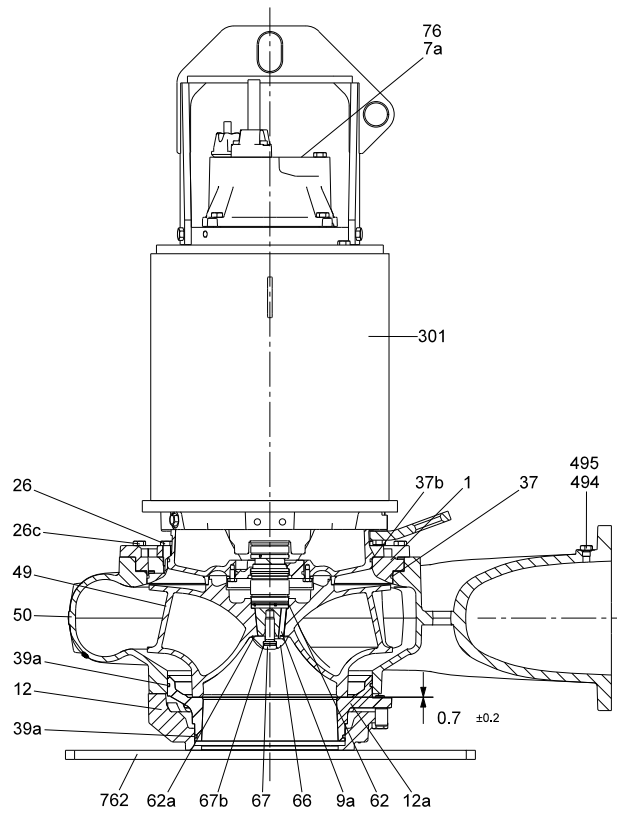


Fig. 10 Installation type D, dry, vertical pump on base plate - version 1

TM04 2585 2708

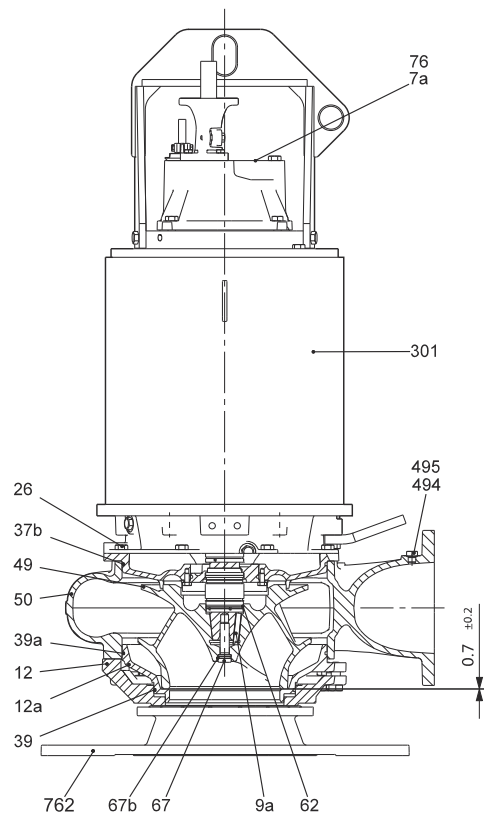
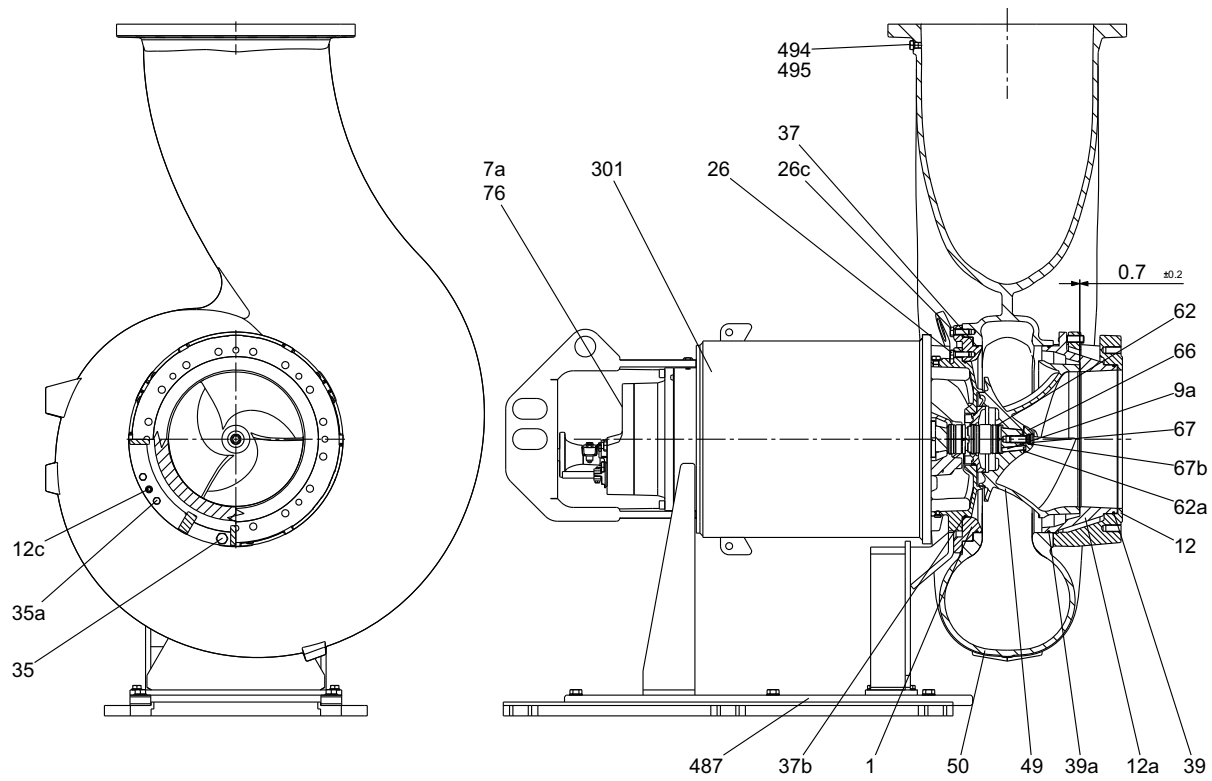


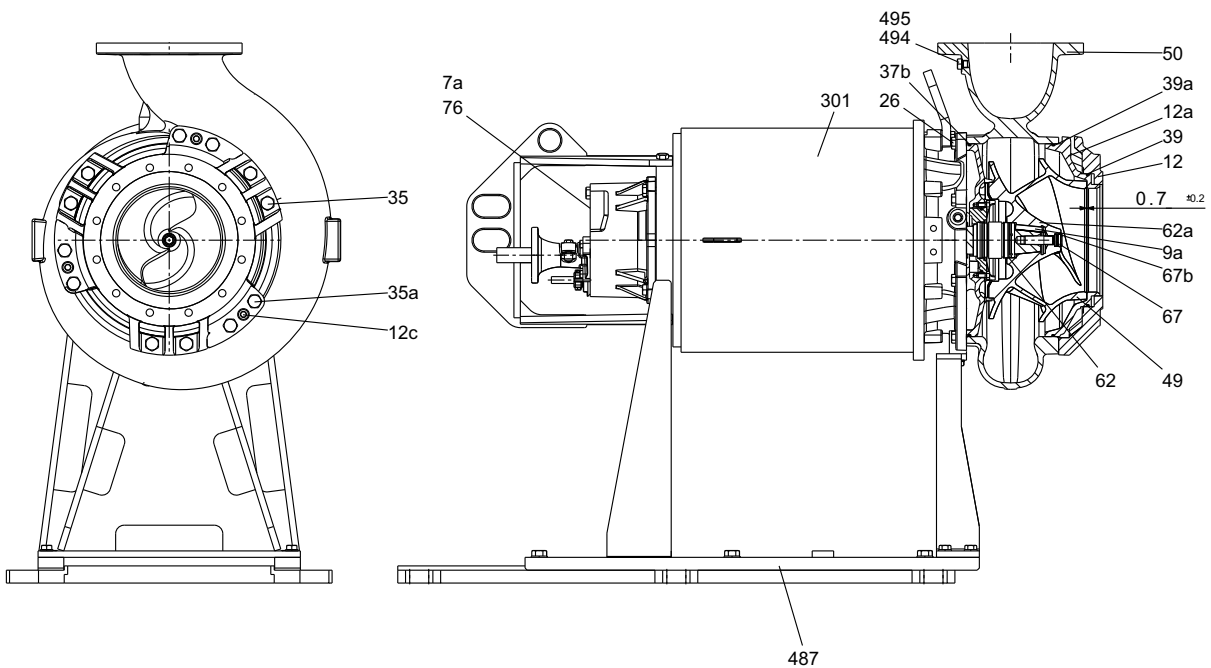
Fig. 11 Installation type D, dry, vertical pump on base plate - version 2

TM 04 2588 2708



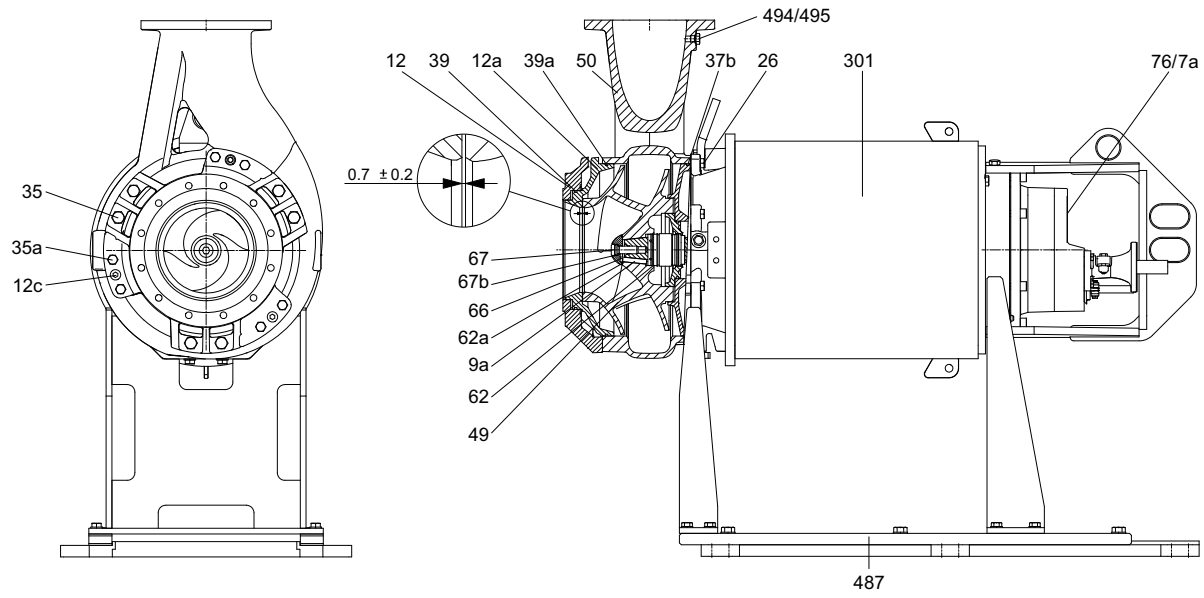
TM04 2590 0817

Fig. 12 Installation type H, dry, horizontal installation on base stand - version 1



TM04 2591 0817

Fig. 13 Installation type H, dry, horizontal installation on base stand - version 2



TM07 0974 0918

Fig. 14 Installation type H, dry, horizontal installation on base stand - version 3



## Components and material specification

### Motor

Pos.	Component	Material	DIN W.Nr./ EN standard	AISI/ ASTM
7a	Rivet	Stainless steel	1.4436	316
25	Pressure test plug	Stainless steel	1.4436	316
25a	Screw	Stainless steel	1.4436	316
26a	Screw	Stainless steel	1.4436	316
37a	O-ring	NBR rubber		
48	Stator			
55	Stator housing	Cast iron <sup>1</sup>	EN-JL 1040	A48 40B
58	Seal housing	Cast iron		
60	Lower bearing bracket cover	Cast iron		
61c	Upper bearing bracket	Cast iron		
72	O-ring	NBR rubber		
72a	O-ring	NBR rubber		
76a	Approval plate (pump)	Stainless steel		
76b	Approval plate (cable)	Stainless steel		
77	Seal housing cover	Cast iron		
100	O-ring	NBR rubber		
105	Primary shaft seal	SiC/SiC or SiC/carbon		
105b	Secondary shaft seal	SiC/SiC or SiC/carbon		
107	O-ring	NBR rubber		
109	O-ring	NBR rubber		
150	Stator housing complete			
150c	Cooling jacket	Galvanized steel		
153	Ball bearing	Stainless steel		
154	Ball bearing	Stainless steel		
155	Lower bearing bracket	Cast iron <sup>1</sup>		
157	O-ring	NBR rubber		
157b	O-ring	NBR rubber		
162	Roller bearing	Steel, brass or steel cage		
164a	Motor top cover	Cast iron <sup>1</sup>		
168	Cable entry	Cast iron		
172	Shaft with rotor	High tensile steel	1.7225	4140
173	Screw	Stainless steel	1.4436	316
173b	Earth terminal			
173c	Washer	Stainless steel	1.4436	316
173e	Screw	Stainless steel	1.4436	316
173f	Spring washer	Stainless steel	1.4436	316
173g	Earth connector			
176a	Terminal block			
176b	Screw	Stainless steel	1.4436	316
176c	Terminal block			
176d	Terminal block			
177a	Protection sleeve	Rubber or plastic		
178	Screw	Stainless steel	1.4436	316
180	Cable clamp	PA or cast iron		
181	Cable	ATON		
181a	Screw	Stainless steel	1.4436	316
182b	Screw	Stainless steel	1.4436	316
184	Screw	Stainless steel	1.4436	316
186	Screw	Stainless steel	1.4436	316
190	Lifting bracket	Stainless steel	1.4436	316
190a	Screw	Stainless steel		
190b	Screw	Stainless steel		
190c	Lifting bracket	Galvanized steel		
193	Plug	Stainless steel	1.4436	316
194	O-ring	NBR rubber		
197	Washer	Stainless steel	1.4436	316
198	Rubber seal			
248	Screw	Stainless steel	1.4436	316

Pos.	Component	Material	DIN W.Nr./ EN standard	AISI/ ASTM
250	Cable clamp	PA or cast iron		
250a	Cable entry	PA or cast iron		
250b	Rubber seal			
252	Cable	ATON		
520	Moisture switch <sup>2</sup>			
520a	Screw	Stainless steel	1.4436	316
522	Holder			
522c	Spring washer			

<sup>1</sup> Available in stainless steel (custom-built option).

<sup>2</sup> FM versions have two moisture switches.

## Pump

Pos.	Component	Material	DIN W.Nr./ EN standard	AISI/ ASTM
1	Intermediate ring	Cast iron		
7a	Rivet			
9a	Key (for keyway)	Stainless steel	1.4436	316
12	Flange	Cast iron		
12a	Inlet cover	Cast iron		
12c	Adjusting screw	Stainless steel	1.4436	316
26	Screw	Stainless steel	1.4436	316
26c	Screw	Stainless steel	1.4436	316
35	Screw	Stainless steel		
35a	Screw	Stainless steel		
37	O-ring	NBR rubber		
37b	O-ring	NBR rubber		
39	O-ring	NBR rubber		
39a	O-ring	NBR rubber		
49	Impeller	Cast iron <sup>1</sup>	EN-JL 1050	
50	Pump housing	Cast iron <sup>1</sup>	EN-JL 1050	
62	O-ring	NBR rubber		
62a	O-ring	NBR rubber		
66	Cap	Cast iron or stainless steel		
67	Impeller screw	Stainless steel	1.4436	316
67b	O-ring	NBR rubber		
76	Nameplate			
301	Motor housing			
487	Base stand, horizontal			
487a	Base plate			
494	Plug	Stainless steel	1.4436	316
495	O-ring	NBR rubber		
762	Stand			

<sup>1</sup> Available in stainless steel (custom-built option).

## Accessories

Pos.	Component	Material
487	Base stand, horizontal <sup>1</sup>	Cast iron or steel
701	Auto-coupling base unit	Cast iron <sup>2</sup>
702	Upper guide rail bracket	Cast iron <sup>2</sup>
703	Guide claw <sup>3</sup>	Cast iron <sup>2</sup>
762	Base plate, vertical	Cast iron or steel

<sup>1</sup> Pumps of installation type H include the standard horizontal stand. Pumps with material code G or Q include a painted-steel stand. If another horizontal stand is required, order a pump of installation type D together with the required stand.

<sup>2</sup> Available in stainless steel (custom-built option).

<sup>3</sup> Guide claws for ANSI 10" (DN 250) outlets or bigger are factory fitted.

## 8. Product description

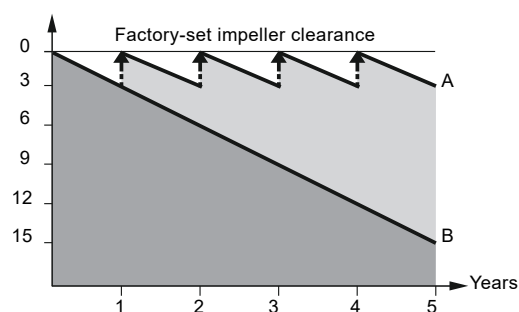
### Features

#### SmartTrim

On conventional pumps, maintaining factory-set impeller clearance is a time-consuming and costly task. The pumps need to be disconnected from the pipes and to be totally dismantled, and new parts need to be mounted in order to maintain full pumping efficiency. Not so with Grundfos SmartTrim!

All Grundfos heavy-duty channel-impeller pumps, whether for submerged or dry installation, are equipped with the unique SmartTrim impeller clearance adjustment system. This enables you to easily restore factory-set impeller clearance and maintain peak pumping efficiency. All you need to do is to tighten the adjustment screws on the exterior of the impeller housing. This can be done on site, quickly and easily, without dismantling the pump and without using special tools.

Efficiency drop in %



TM04 2391 2508

**A:** With Grundfos SmartTrim impeller clearance adjustment system

**B:** Without impeller clearance adjustment system

#### SmartSeal

For pumps with ANSI 10" (DN 250) outlet or larger, the Grundfos SmartSeal auto-coupling sealing mounted on the pump outlet flange provides a completely leak-proof connection between the pump and the base unit of the auto-coupling system. This optimizes the efficiency of the entire pumping system and keeps operating costs at a minimum.

#### Bearings

The bearings are greased for life.

**Main bearings:** Double-row angular contact ball bearing. Single or pair-mounted angular contact ball bearings for axial forces and cylindrical roller bearing for radial forces.

**Support bearings:** Single-row deep-groove ball bearing.

#### Shaft seals

The pumps have a primary and a secondary shaft seal. The material combination of the primary shaft seal of all pump types is silicon carbide/silicon carbide. For the secondary shaft seal, the material combination is silicon carbide/carbon.

The shaft seals are placed in the oil chamber of the pump. The oil chamber provides reliable sealing between the pumped liquid and the motor.

The shaft seals have no springs or other parts in direct contact with the pumped liquid. This prevents rags and fibers from getting caught. The shaft seals are bidirectional, meaning that they can operate in either direction, thus allowing for opposite rotation caused by back-flow of liquid through the pump.

#### Motor

The motor is a watertight, totally encapsulated motor.

- Insulation class H [356 °F (180 °C)]
- Temperature rise class F [189 °F (105 K)]
- Enclosure class IP68.

For motor protection and sensors, see *Sensors*, page 23.

#### Cables

The pumps have H07RN-F AT power cables as standard or screened ATON EMC VSCCB power cables on request.

The pumps have H07RN-F 450/750 V control cables as standard or screened ATON VSCB 450/750 V control cables on request.

The cables are 50 ft (15 m) long as standard. Other cable lengths are available on request. See *List of variants*, page 11.

The number and dimension of cables depend on the motor size and number of poles.

Motor power [HP (kW)]	Voltage	Cable size [power + control]
107 (80)	3 x 460 V	2 x 4 x 25 mm <sup>2</sup> + 1 x 10 x 1.5 mm <sup>2</sup>
127 (95)		2 x 4 x 35 mm <sup>2</sup> + 1 x 10 x 1.5 mm <sup>2</sup>
147 (110)		2 x 4 x 50 mm <sup>2</sup> + 1 x 10 x 1.5 mm <sup>2</sup>
161 (120)		2 x 4 x 70 mm <sup>2</sup> + 1 x 10 x 1.5 mm <sup>2</sup>
188 (140)		2 x 4 x 70 mm <sup>2</sup> + 1 x 10 x 1.5 mm <sup>2</sup>

**Power cable**

Cable type [mm <sup>2</sup> ]	Outer cable diameter [inch (mm)]	Weight [lb/ft (kg/m)]	Bending radius [inch (cm)]
4 x 25	1.14-1.23 (28.9-31.4)	1.26 (1.88)	7.5 (19)
4 x 35	1.28-1.37 (32.5-34.7)	1.63 (2.43)	8.7 (22)
4 x 50	1.48-1.59 (37.7-40.4)	2.18 (3.24)	9.8 (25)
4 x 70	1.68-1.79 (42.7-45.4)	2.89 (4.30)	11.0 (28)

**Control cable**

Cable type [mm <sup>2</sup> ]	Outer cable diameter [inch (mm)]	Weight [lb/ft (kg/m)]	Bending radius [inch (cm)]
10 x 1.5	0.71 - 0.79 (18.0 - 20.0)	0.41 (0.61)	4.7 (12)

**Cable entry**

Watertight cast iron cable entry with soft shape and sealing rings to prevent damage of the cable or leaks.

**Sensors**

As standard the pump is equipped with these switches and sensors:

- Three thermal switches (Klixon) or three thermal sensors in the stator housing.
- Two moisture switches;
  - one under motor top cover
  - one in the stator housing.

**Customized sensor options**

## 1. WIO (water-in-oil) sensor

The WIO sensor measures the water content in the oil and converts the value into an analog current signal. The two sensor conductors are for power supply as well as for carrying the signal to the measuring device or controller. The sensor measures the water content from 0 to 20 %. It also sends a signal if the water content is outside the normal range (warning), or if there is air in the oil chamber (alarm). The sensor is fitted in a stainless steel tube for mechanical protection.

The sensor is either built-in with the motor (FM) or installed as an accessory. If the sensor is installed externally, it is fitted in a plastic hose for mechanical protection. The WIO sensor is connected to the Grundfos IO 113 module.

## 2. PVS3 (pump vibration sensor)

The vibration sensor monitors the vibration level of the pump by using measurements of three axes and combining them into a single measurement outputted in an analog current signal. The sensor acts only as a general indicator of changes in the vibration levels. PVS3 is to be connected to Grundfos IO 113 and SM 113. A substantial increase in vibration will trigger a warning or an alarm.

An increase in vibrations can be caused by a clogged impeller, worn bearings, closed force main valves, etc. indicating that service inspection should be carried out quickly in order to protect the pump or the pipe system from being damaged.

## 3. Bearing temperature sensor

Pt100 bearing temperature sensor installed within the motor housing. Sensors to be connected using SM 113 and IO 113.

**Testing**

All pumps are tested before leaving the factory. The factory test report is based on ANSI-HI centrifugal pump test 11.6:2012, acceptance level 3B. Test reports can be ordered directly with the pump or can be ordered separately based on the pump serial number. Other tests or third-party inspection certificates are available on request. See *List of variants*, page 11.

**Operating conditions****Pumps without cooling jacket in submerged installation (type S):**

- Continuous operation when the pump is fully submerged to the top of the motor.
- Intermittent operation with maximum 20 starts per hour when the pump is submerged to the middle of the motor and with short periods of operation down to the top of the pump housing.

**Warning:** A motor protection device must be used to cut off power supply in case of overheating.

**Note:** Explosion proof pumps must always be fully submerged.

**Pumps with cooling jacket in submerged and dry installation (types C, D and H):**

- Continuous and intermittent operation with maximum 20 starts per hour with water level down to the top of the pump housing.

**Note:** Explosion proof pump without cooling jacket must always be fully submerged in a submersible application.

## Pumped liquids

**pH value:** 4-10

**Liquid temperature:** 32-104 °F (0-40 °C)

When pumping liquids with a density and/or a kinematic viscosity higher than that of water, use motors with correspondingly higher outputs.

### Sound pressure

The sound pressure level of the pump is lower than the limiting values stated in EC Council directive 2006/42/EC relating to machinery (the EC Machinery Directive).

## Motor range

Motor power [HP (kW)]	Number of poles
107 (80)	8
127 (95)	4
147 (110)	6
161 (120)	4
188 (140)	6

## Explosion-proof pumps

### Approval standards

Pumps are approved by FM according to FM3600, FM3615 and FM3615.80.

### Explanation to FM approval

Use explosion-proof pumps in potentially explosive environments.

**Note:** All installations must be approved by the local authorities.

### Relevant standards/regulations

- FM 3600
- FM 3615
- FM 3615.80
- ANSI/UL 1004-1
- ANSI/UL 1004-3

### Explosion protection classification (FMus)

Class I, Division 1, Groups C and D, T3 or T3C

### Operation with frequency converter

Only temperature class T3

### Notified body

FM Approvals

## Level controllers

Grundfos offers dedicated pump controllers for monitoring liquid levels in the wastewater collecting tanks to ensure correct operation and protection of the pumps.

Grundfos pump controllers are ideally suited to Grundfos S pumps, and include:

- Grundfos Dedicated Controls (DC)
- Grundfos LC controllers

### Grundfos DC Controllers



Fig. 15 Grundfos Dedicated Controls control cabinet

Grundfos Dedicated Controls (DC) is a control system designed for installation in municipal wastewater transportation, commercial buildings or network pumping stations with up to six wastewater pumps and an optional mixer or a flush valve.

Advanced control and data communication are also possible with the Grundfos Dedicated Controls system. The control cabinets are delivered with a built-in main switch and thermal magnetic circuit breaker.

Features and benefits:

- Advanced Flow Calculation
- Automatic energy optimization
- Easy installation and configuration
- Configuration wizard
- Electrical overview
- Advanced data communication
- Advanced alarm and warning priority
- Supports several languages
- Daily emptying
- Mixer control or flush valve
- User-defined functions
- Anti-blocking
- Start level variation
- Advanced pump alternation with pump groups
- SMS scheduling

GI-1016086



- Communication to SCADA, BMS, GRM or cell phone.

Dedicated Controls is ordered either with or without a built-in communication interface module (CIM).

The communication module enables the possibility for fieldbus protocol (e.g. PROFIBUS DP, Modbus RTU and PROFINET IO/Modbus TCP) and the communication line.

For further information about Grundfos Dedicated Controls, please see Grundfos Product Center:

- Grundfos Dedicated Controls, brochure <http://net.grundfos.com/qr/i/96925597>
- Grundfos iSolutions, brochure <http://net.grundfos.com/qr/i/99249771>
- Grundfos Controls Guide, product guide <http://net.grundfos.com/qr/i/97954965>

#### Additional features, CUE or VFD

The CUE/VFD (optional), which is either a Grundfos variable frequency drive or a general variable frequency drive, offers better pump protection and a more steady flow through the pipe system.

In addition, Grundfos CUE,VFD offers these features and benefits:

- Anti-blocking
  - Automatic energy optimization
  - Specific-energy test
  - Output frequency
  - Monitoring of:
    - voltage\*
    - current\*
    - phase sequence\*
    - power\*
    - energy\*
    - torque\*
  - Reverse start\*\*
  - Run flushing
  - Stop flushing
  - PID control.
- \* These functions are only available with a Grundfos CUE.
- \*\* We do not recommend reversing at full speed at any time. When reduced reverse operation settings are set, make sure constant torque is enabled in Variable Frequency Drive (VFD) (i.e. Grundfos CUE, Siemens Simatic, ABB, Schneider Electric etc.) to have maximum torque available when reversing.

#### Grundfos LC controllers

The LC 231 pump controller is designed for level control, monitoring and protection of Grundfos pumping stations featuring one pump or two pumps, starting direct-on-line. The LC 231 controller is integrated in a polymer cabinet.

The LC 241 is a modular pump controller that has a metal or polymer cabinet and can be customized according to your needs.

It is designed for level control, monitoring and protection of Grundfos pumping stations featuring one pump or two pumps, starting direct-on-line with 0-23 A, star-delta with 0-59 A or soft starter with 0-72 A.

#### IO 113

The IO 113 module is a protection module for Grundfos wastewater pumps.

IO 113 has inputs for digital and analog pump sensors and can stop the pump if a sensor indicates a pump fault.

IO 113 can be connected to the Grundfos Dedicated Controls system and allows advanced monitoring functions:

- motor temperature
- moisture in motor
- water in oil
- insulation resistance.

#### SM 113

The SM 113 module is used for collection and transfer of sensor data in pumps and includes a large number of sensors.

SM 113 can be placed either inside the pump (allowing fewer sensor conductors out of the pump) or in the control cabinet next to the pump installation.

SM 113 works together with IO 113 through a power-line communication using the Grundfos GENIbus protocol.

SM 113 can collect data from:

- 3 current sensors, 4-20 mA
- 3 Pt100 thermal sensors or 3 Pt1000 thermal sensors
- 1 PTC thermal sensor
- 1 digital input.

#### MP 204

The MP 204 control cabinet can be used as a stand-alone motor protector.

MP 204 may also be incorporated in a Grundfos Dedicated Controls system in which it functions as a motor protector. The pump is protected secondarily by measuring the temperature with a Pt100 sensor and a PTC sensor or thermal switch.

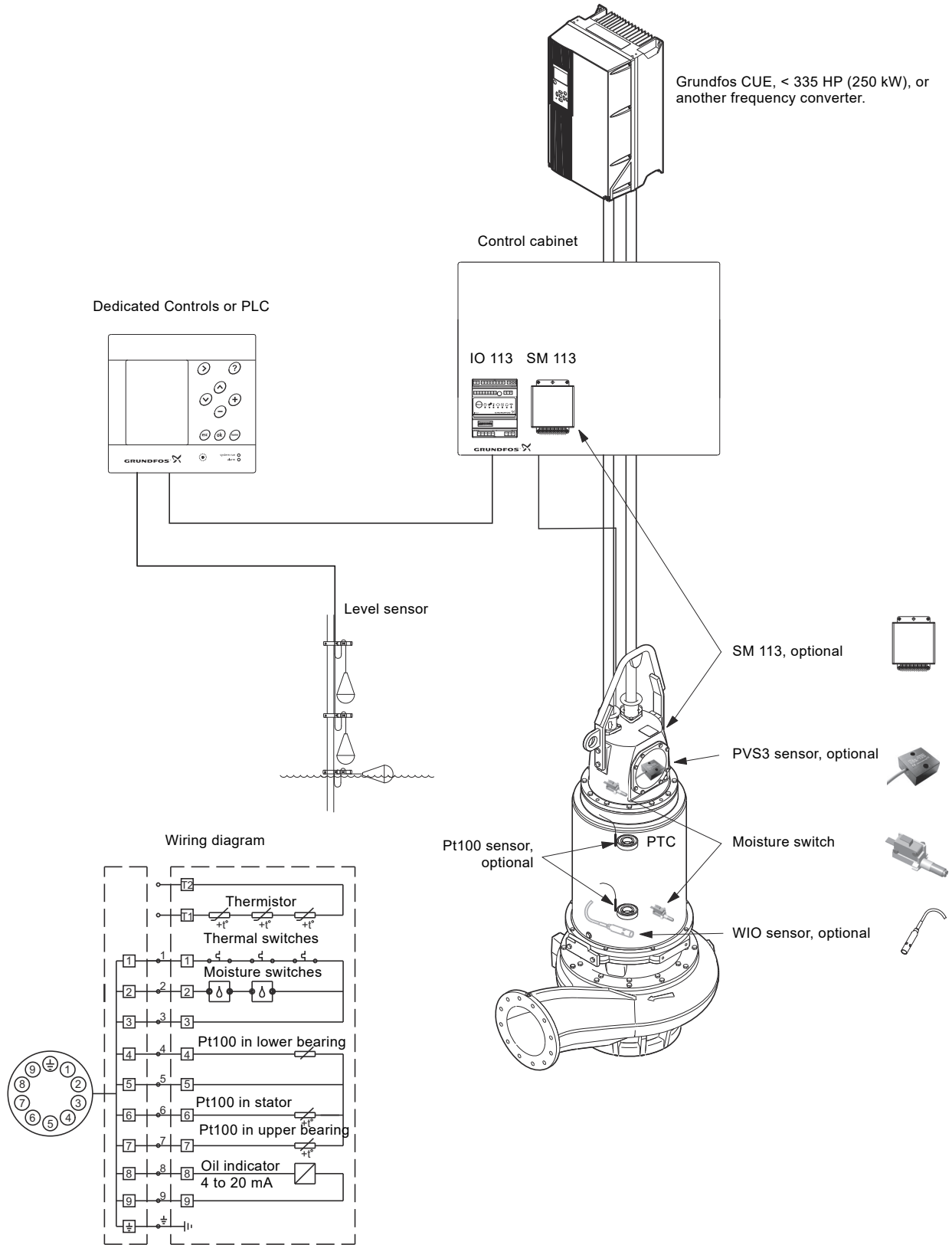


Fig. 16 Pumps with frequency converter operation

TM06 8753 1117

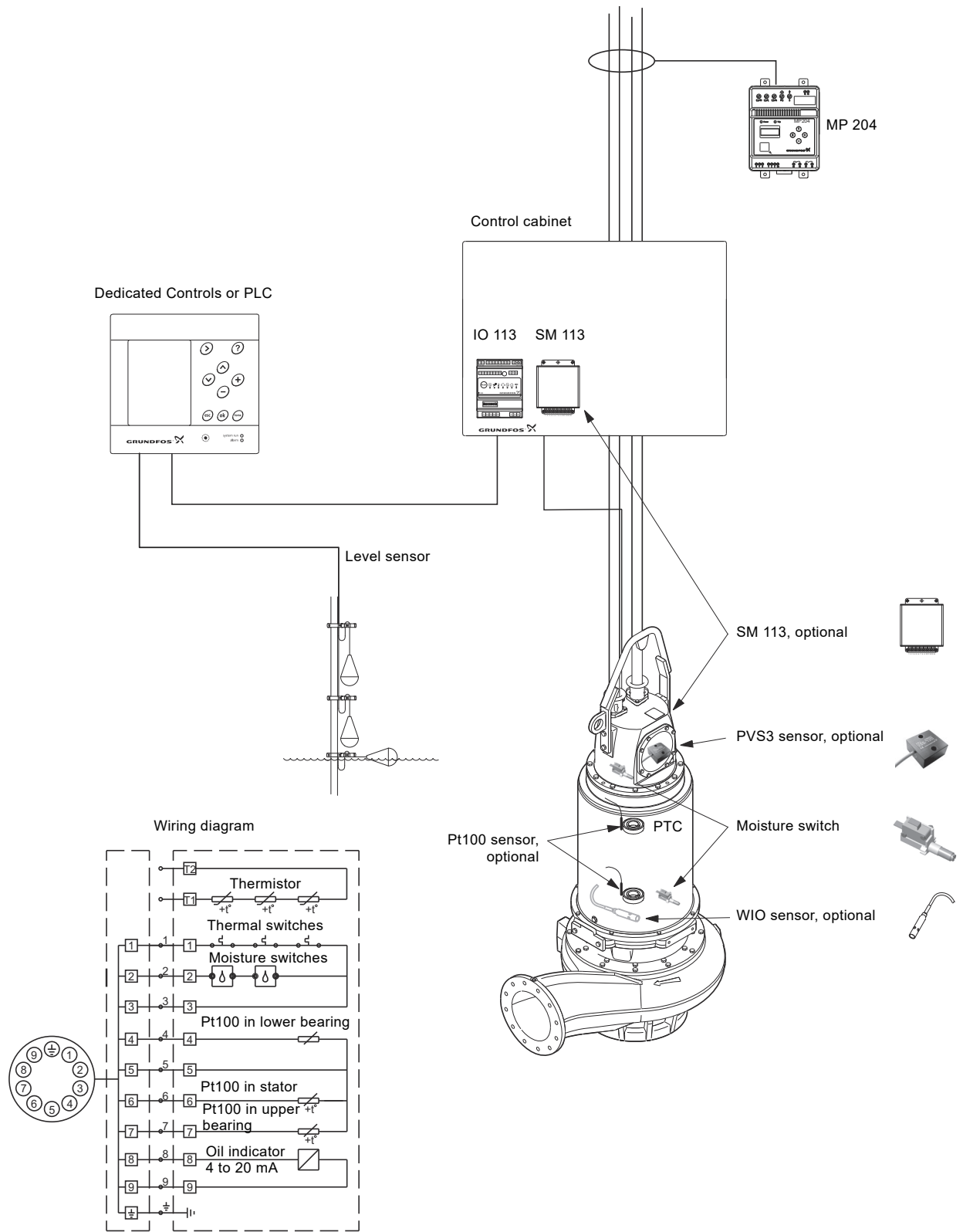


Fig. 17 Pump with MP 204 motor protector

TM06 8754 1117

## Wiring diagrams

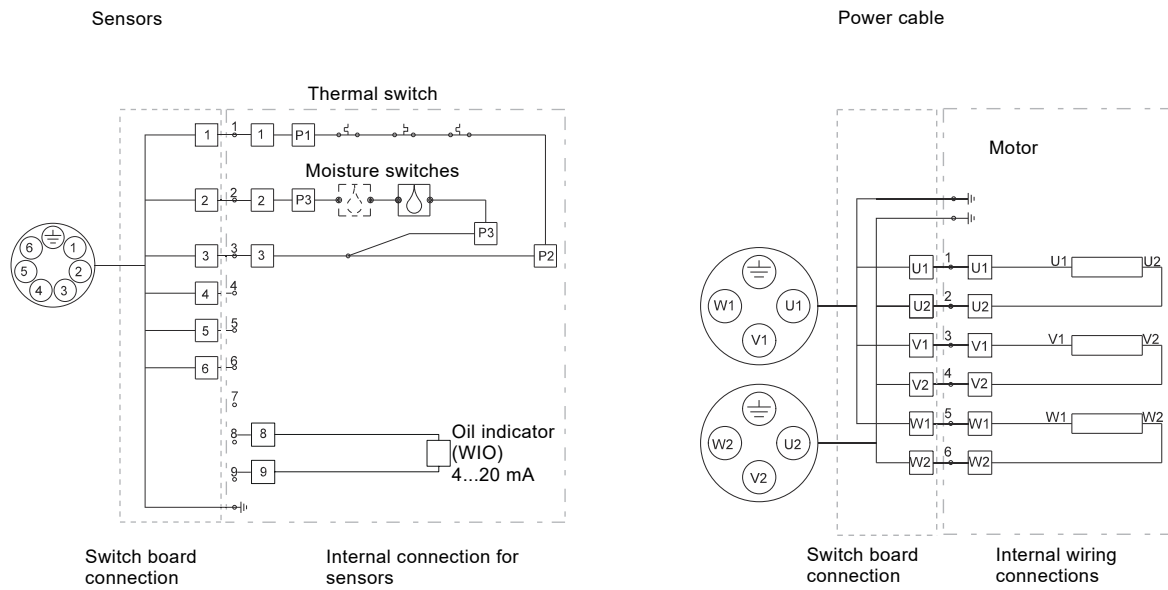


Fig. 18 Wiring diagrams, Y-connected (460 V) for standard sensors

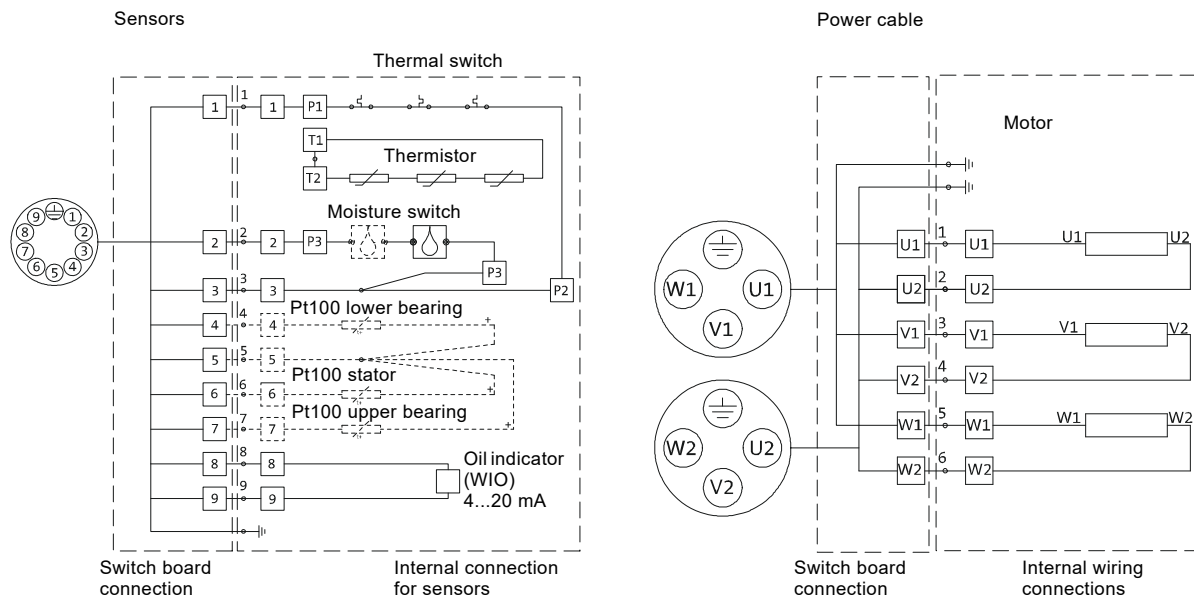


Fig. 19 Wiring diagram for sensors (with WIO sensor)

TM06 4937 3515 / TM05 1758 3611

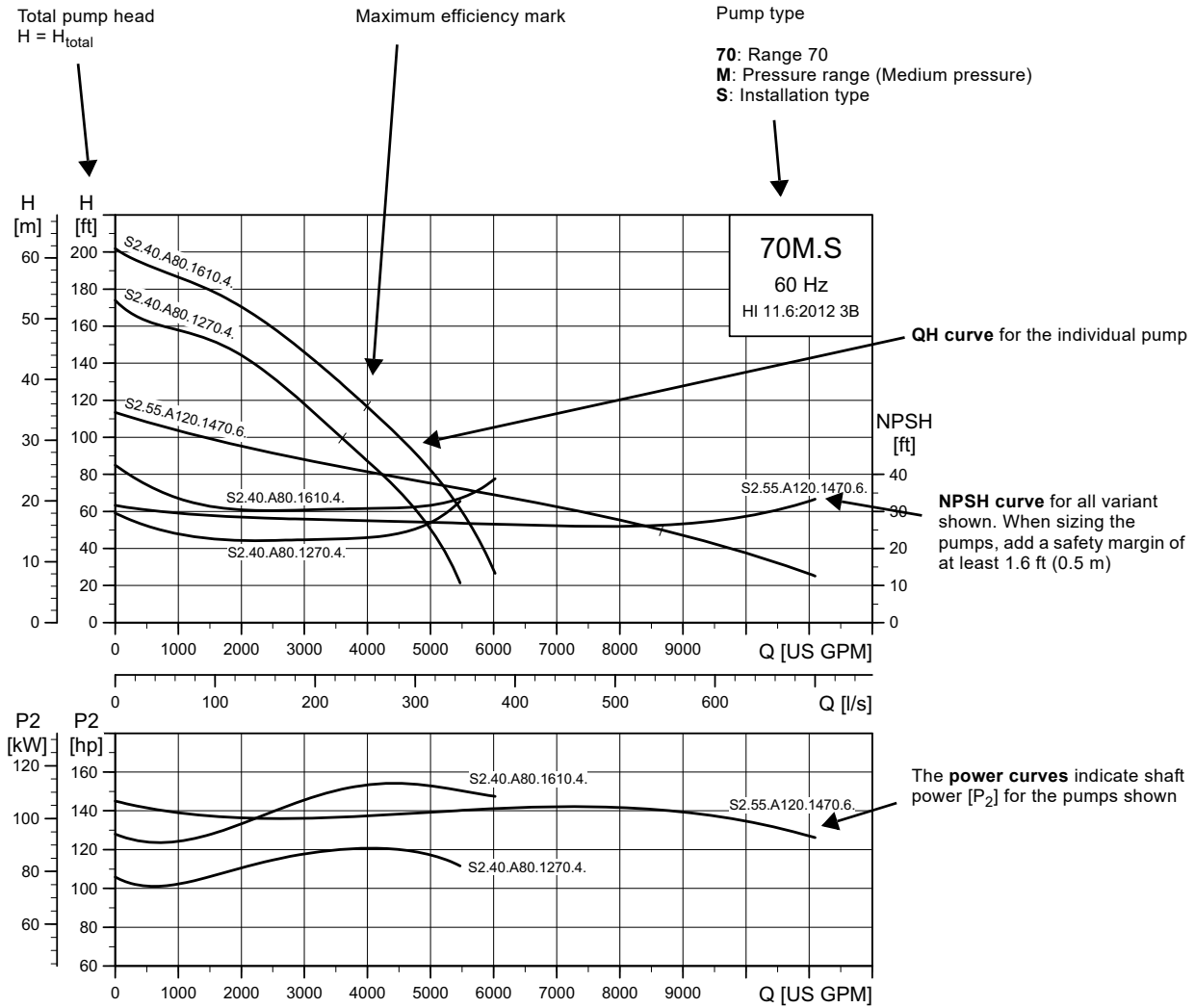
TM05 1758 3611

## 9. Curve charts and technical data

The following many pages are divided into sections.

On pages 29 to 35 you will find a brief explanation of how to read the curve charts, the curve conditions, etc.

### How to read the curve charts



TM04 6601 1914

**Note:** The pumps are tested according to ANSI HI 11.6:2012 grade 3B tolerance. Testing equipment and measuring instruments are designed and calibrated according to the standards mentioned. The pumps are approved according to tolerances for entire curves, specified in grade 3B.

## Curve conditions

The guidelines below apply to the curves shown in the performance charts on page 36.

- ANSI-HI centrifugal pump test 11.6:2012, acceptance level 3B.
- The curves show pump performance with different impeller diameters at rated speed.
- The curves apply to the pumping of airless water at a temperature of 68 °F (20 °C) and a kinematic viscosity of 1 cSt (1 mm<sup>2</sup>/s).
- **NPSH:** The curves show average values measured under the same conditions as the performance curves.  
When sizing the pump, add a safety margin of at least 1.6 ft (0.5 m).
- In case of densities other than 133.5 ounces/gallon (1000 kg/m<sup>3</sup>), the outlet pressure is proportional to the density.
- When pumping liquids with a density higher than 133.5 ounces/gallon (1000 kg/m<sup>3</sup>), motors with correspondingly higher outputs must be used.

### Calculation of total head

The total pump head consists of the height difference between the measuring points + the differential head + the dynamic head.

$$H_{\text{total}} = H_{\text{geo}} + H_{\text{stat}} + H_{\text{dyn}}$$

$H_{\text{geo}}$ : Height difference between measuring points.

$H_{\text{stat}}$ : Differential head between the inlet and outlet side of the pump.

$H_{\text{dyn}}$ : Calculated values based on the velocity of the pumped liquid on the inlet and outlet side of the pump.

## Pump performance testing

S pump testers are all capable of performing hydraulic performance tests according to ANSI HI 11.6:2012 requirements.

ANSI HI 11.6:2012 sets standards for "rotodynamic pumps, Hydraulic performance acceptance tests, Grades 1, 2 and 3".

## Performance acceptance grades

Six-pump-performance-test acceptance grades, 3B, 2B, 2U, 1B and 1U are defined in ANSI HI 11.6:2012.

Acceptance grade	Mandatory measurements		Optional measurements	
	Q	H	P1	Eta-tot
3B	± 9 %	± 7 %	+ 9 %	- 7 %
2B	± 8 %	± 5 %	+ 8 %	- 5 %
2U	+ 16 %	+ 10 %	+ 16 %	
1B	± 5 %	± 3 %	+ 4 %	- 3 %
1U	+ 10 %	+ 6 %	+ 10 %	≥ 0 %

These tolerance grades can be used in the contract between the pump manufacturer and the customer, or they can be used as part of a default tolerance factor for cases in which no specific tolerance grade has been agreed between the manufacturer and the customer.

The performance acceptance grades are explained in *Specifying acceptance grades*, page 35, showing the performance grades related to an ordinary pump curve.

### The guarantee point

According to ANSI HI 11.6:2012 the acceptance-grade tolerance applies to one guarantee point.

A guarantee point is defined by a guaranteed flow rate and a guaranteed head.

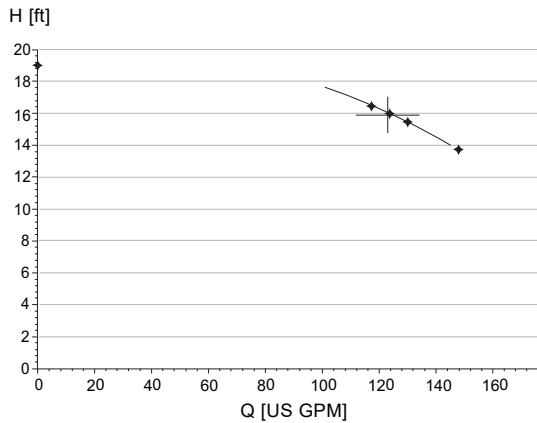
In addition, either minimum total efficiency or maximum total input power may be guaranteed at the specified conditions.

This means that the standard sets guidelines for a duty point guaranteed for the following:

- Q and H, or
- Q, H and total efficiency (Eta-total), or
- Q, H and total consumed power (P1).

The guarantee point is defined by a minimum of five measured test points.

Example of a duty point test living up to ANSI HI 11.6:2012 requirements



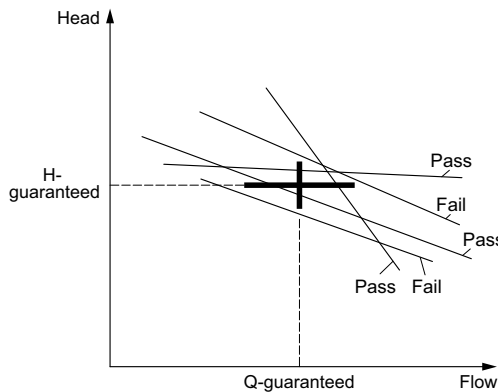
TM07 0448 5117

**Fig. 20** Five measured test points are used to verify one guarantee point

### Evaluation of performance

The test must show that the measured pump curve touches or passes through a tolerance surrounding the guarantee point, as defined by the selected acceptance grade.

Guarantee-point evaluation must be made at the rated speed, which for S pumps means 50 Hz or 60 Hz.



TM07 1544 1818

**Fig. 21** Pump curves that either pass or fail to cross the tolerance cross of the guarantee point

### Performance-test types for end-suction pumps

Two types of performance tests are available for S pumps:

- duty-point-verification test
- curve test.

#### Tests carried out on S pumps

- Tests are saved for at least five years and can be traced using the pump's unique serial number.
- It is not possible to change acceptance grade on an already tested and supplied pump; if required, a re-test of the pump is needed.
- Witness testing can be arranged.

#### Duty-point-verification test, Grades 3B, 2B, 2U, 1B and 1U

This test method offers the possibility to perform a duty-point verification of the following:

- Q and H, or
- Q, H and total efficiency (Eta-tot), or
- Q, H and total consumed power (P1).

Acceptance grade	Mandatory measurements		Optional measurements	
	Q	H	P1	Eta-tot
3B	Standard		On request	
2B	On request		On request	
2U	On request		On request	
1B	On request		On request	
1U	On request		On request	

What Grundfos is able to guarantee for the different acceptance grades will be evaluated on a case-by-case basis. Contact your local sales company on this.

Grundfos makes duty-point verification according to ANSI HI 11.6:2012 for one guarantee point at full speed, 50 or 60 Hz. The customer must tell Grundfos which duty point to verify.

The requested duty point is verified by five measured points.

**Grade 1U duty-point verification**

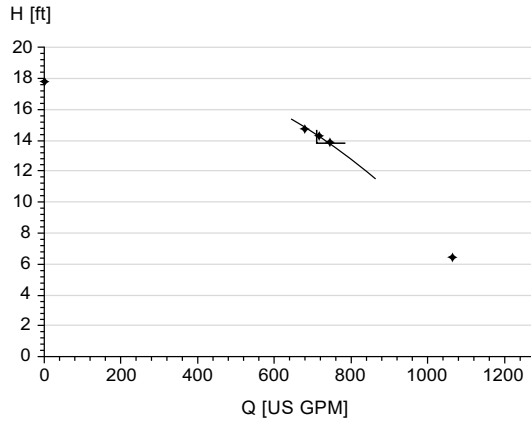
The following example illustrates performance testing according to Grade 1U.

Flow and head are mandatory, and efficiency or power consumption, P1, is optional.

Tolerances for a Grade 1U test are as follows:

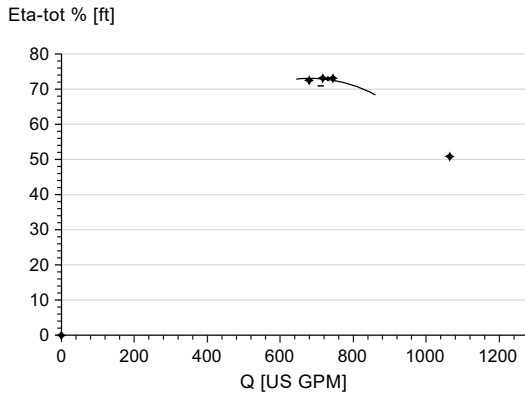
- Flow: 10 %
- Head: 6 %
- Efficiency: 0 %, only equal to or better than the guaranteed value
- P1: 10 %

1. Q, H and Eta-tot are tested and verified



**Fig. 22** Measured values for flow rate and head

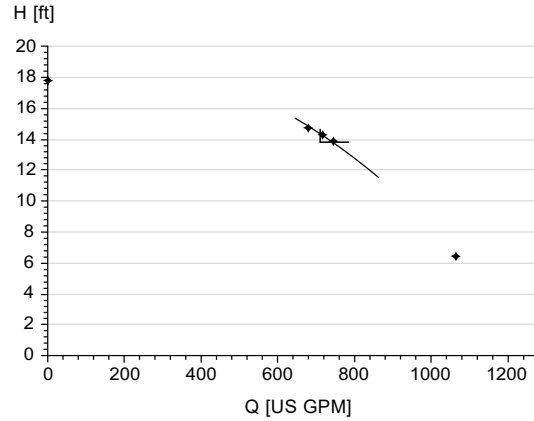
TM07 1542 1618



**Fig. 23** Measured values for total efficiency

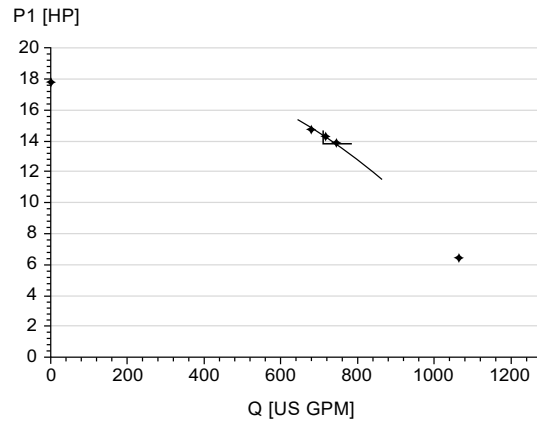
TM07 1543 1618

2. Q, H and P1 tested and verified



**Fig. 24** Measured values for flow rate and head

TM07 1542 1618



**Fig. 25** performance range

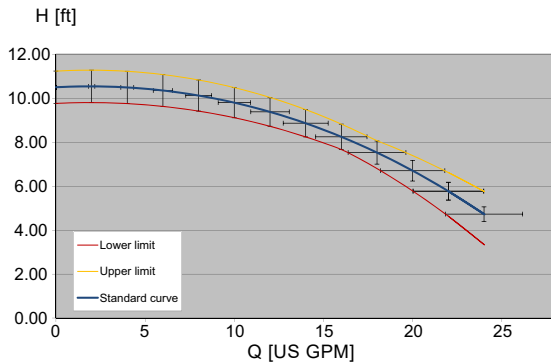
TM07 1545 1618

Note that other points than the guarantee point can be measured and displayed in a curve-test report according to Grade 3B tolerances.



## Curve test, Grade 3B

This test method is developed by Grundfos and is based on ANSI HI 11.6:2012 performance acceptance grade 3B tolerances:  $Q = \pm 9\%$ ,  $H = \pm 7\%$ .



**Fig. 26** Q-H curve with tolerance crosses on complete performance range

In fig. 26, tolerance crosses according to Grade 3B have been distributed across the complete performance range of a pump. We generate the upper and lower limit of the performance curve by drawing two curves at the outlines of these crosses.

When the pump is tested, and the measured point is located within the range between the upper and lower limit, it meets the ANSI HI 11.6:2012 Grade 3B tolerances. This way of qualifying the pump performance is stricter than a duty-point-verification test for Grade 3B.

## How does Grundfos perform curve testing for S pumps

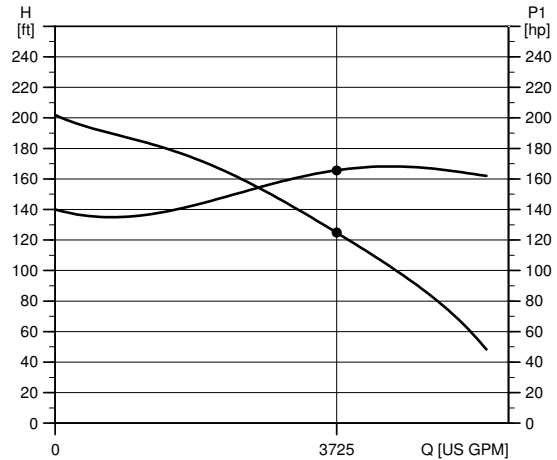
Grundfos applies two types of curve tests:

- a reference curve test
- a performance curve test.

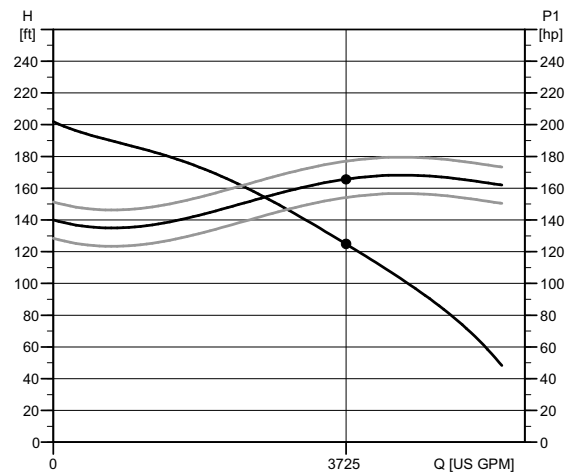
### Reference curve test, Grade 3B

A reference curve test is performed when no curve test report is specified with the order. Three or four test points are measured depending on production site, and no curve test report is supplied with the pump. Measurements are made to maintain and observe continuous quality and to ensure that the supplied pump is within test grade tolerances. Test grade tolerances are set as for Grade 3B but without certification.

## Example of a reference curve test



**Fig. 27** Measured values for tested pump



**Fig. 28** The values in fig. 27 calculated to reference speed for comparison to a reference performance curve

If a pump performance report is requested at a later stage, only reference test data are available.

### Performance curve test, grade 3B

A performance curve test is carried out when a curve test report is specified with the order.

The pump is tested at pre-specified flow rates, and test grade tolerances are set as for Grade 3B but without certification.

### Example of an S pump curve test

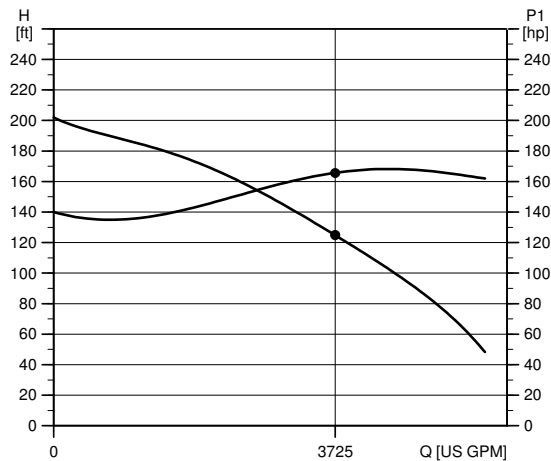


Fig. 29 Measured values for tested pump

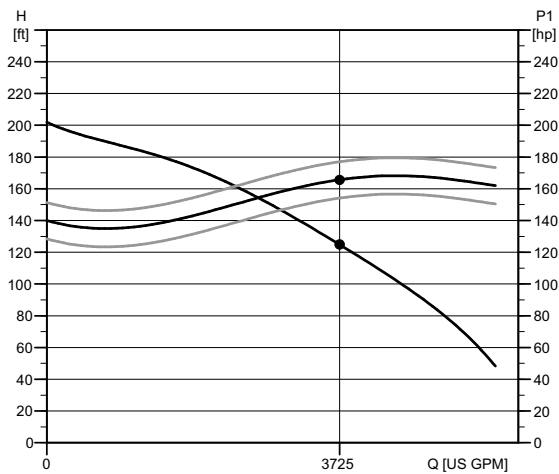


Fig. 30 The values in fig. 29 calculated to a reference speed for comparison to a reference performance

If the customer requires more points on the curve to be checked, individual measurements must be made, which is not part of the performance curve test.

### Static high pressure test

All produced pumps undergo a static high pressure test of  $1.5 \times PN$  (nominal pressure of the pump).

## Specifying acceptance grades

The graphs in the table on page 35 show the tolerances as stated in the standard, related to an ordinary pump curve. The graphs also show which pump performance to expect if the customer, having the same pump to start with, orders a pump with the same guarantee point for different tolerances (B or U) within the acceptance grades.

In some cases, it will not be possible to fulfil the same guarantee point for a unilateral tolerance as it will for a bilateral tolerance. This is indicated by the lower curve for "U" grades.

If the requested guarantee point is the same for a Grade U pump as for a Grade B pump, the consequence of the production tolerances could be that a larger pump is required to obtain the requested duty point.

What Grundfos is able to guarantee for the different acceptance grades will be evaluated on a case-by-case basis. Contact your local sales company on this.

## Acceptance grades and tolerances

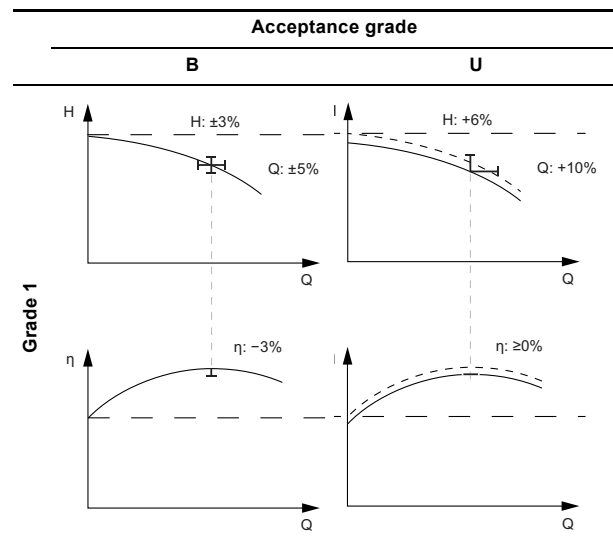
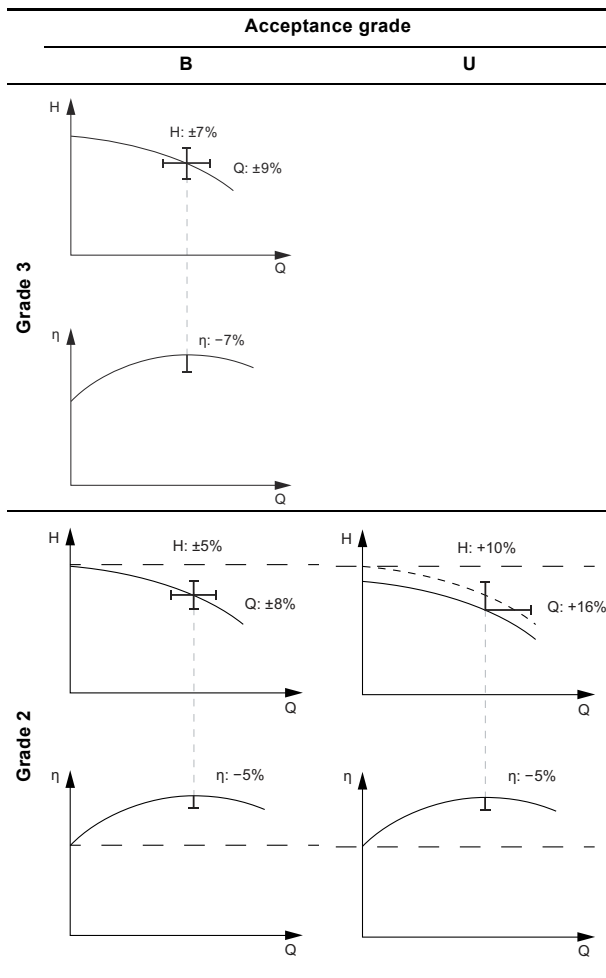
### Acceptance grade B

This acceptance grade refers to grades with a bilateral tolerance on flow rate and head and with a tolerance on efficiency.

### Acceptance grade U

This acceptance grade refers to a grade with a unilateral tolerance on flow rate and head. For the 2U grade, there is a tolerance on efficiency. For the 1U grade, there is no tolerance on efficiency.

Note that if the acceptance grade changes from Grade 1B to 1U, the customer does not necessarily get a better pump with a higher efficiency. More likely, he gets a pump where the performance is always to the positive side of the guarantee point.



## Certificates

Certificates have to be confirmed for every order and are available on request as follows:

- certificate of compliance with the order (EN 10204-2.1)
- pump test sheet.

## Witness test

When the pumps are being tested or are tested with a certification, it is possible for the customer to witness the testing procedure according to ANSI HI 11.6:2012.

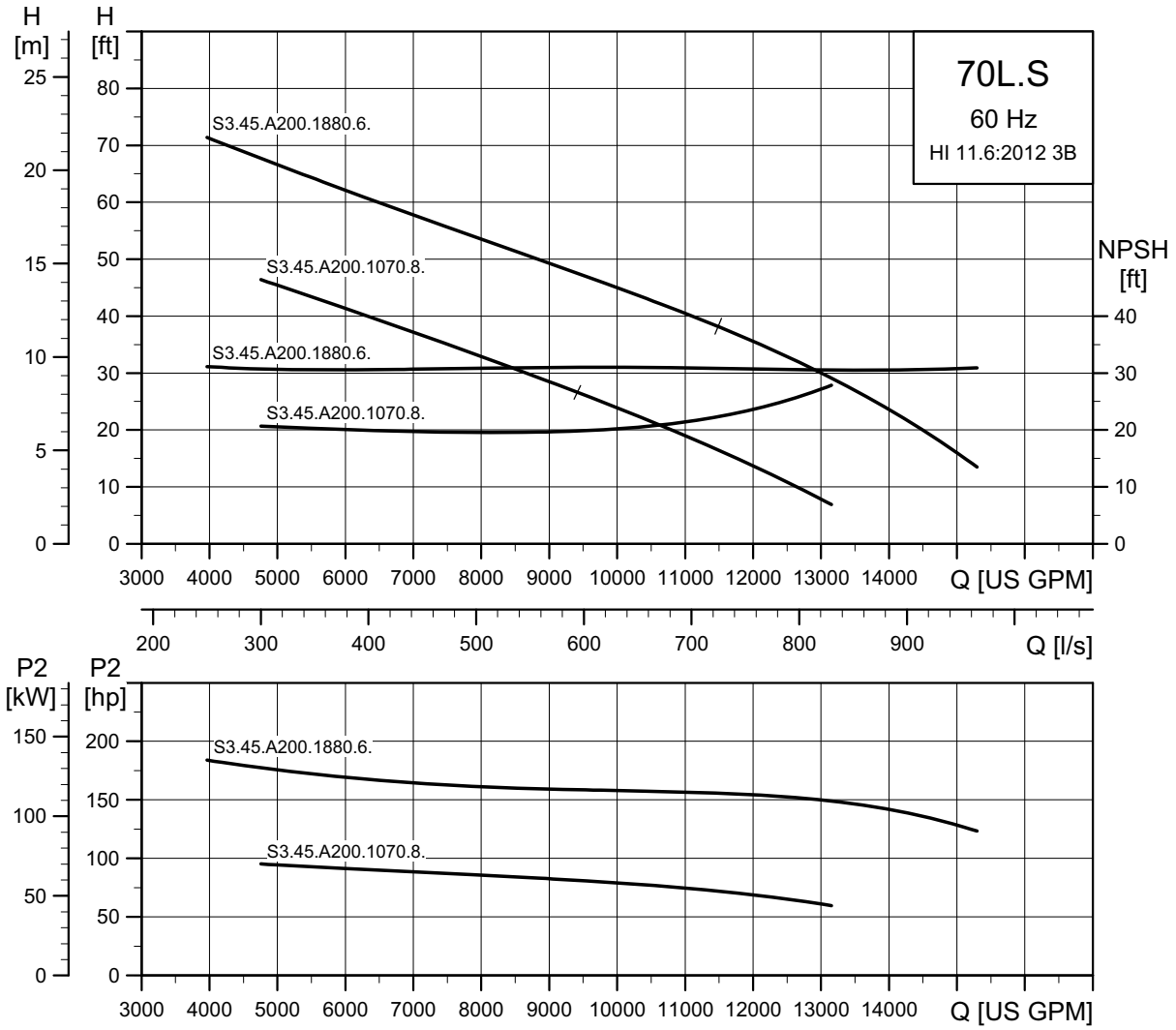
The witness test is not a certificate and will not result in a written statement from Grundfos. The witness itself is the only guarantee that everything is carried out as prescribed in the testing procedure.

If the customer wants to witness the test, place this request on the order.

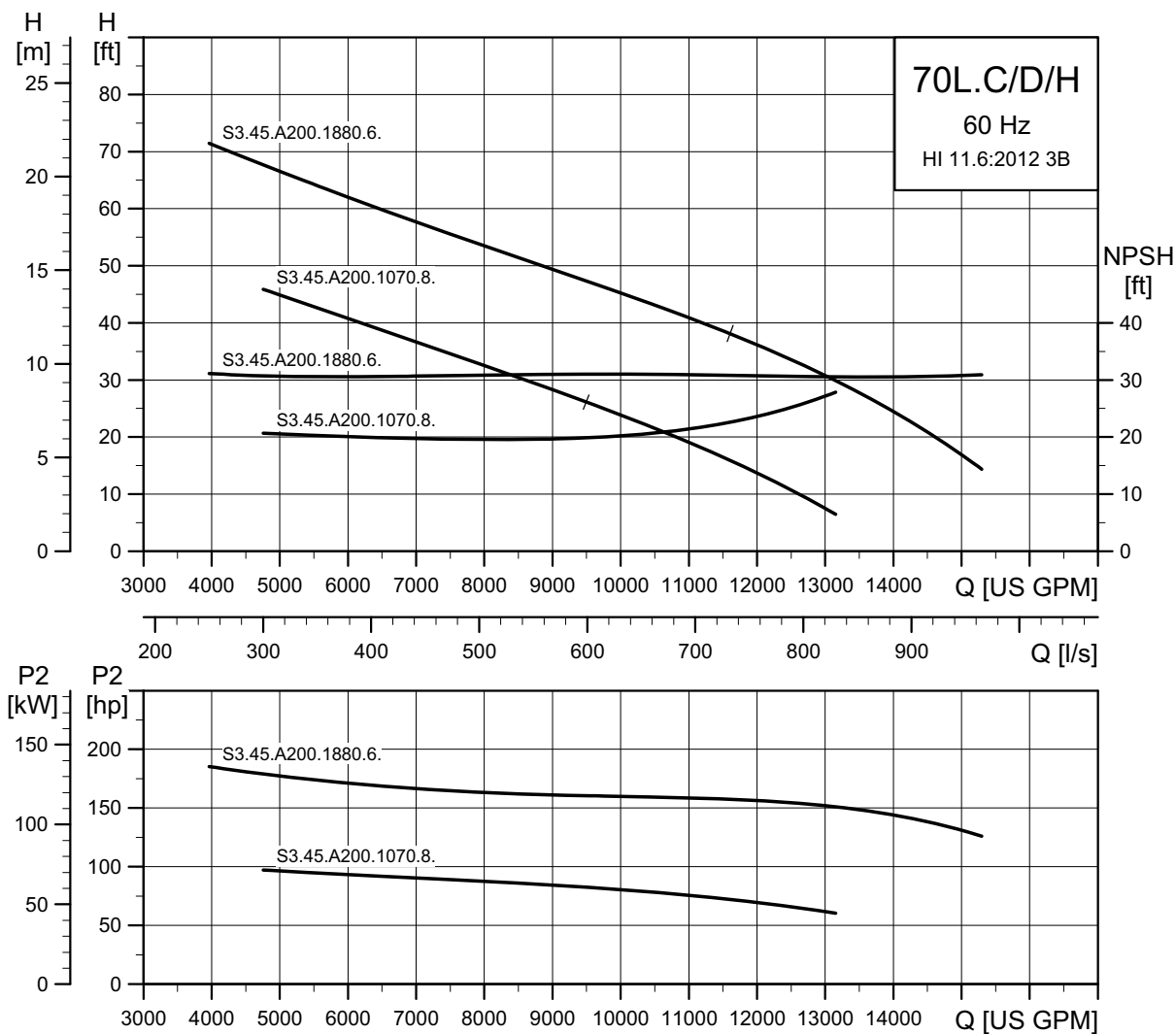
# 10. Performance curves and technical data

## Low pressure

S3.45.A200.1070.8 and S3.45.A200.1880.6



TM04 6599 1914



TM04 6600 1914

**Motor data**

Pump type	P1	P2	No. of poles	RPM	Starting method	I <sub>N</sub> [A]	I <sub>start</sub> [A]	η <sub>motor</sub> [%]			Cos φ			Moment of inertia [lbf <sup>2</sup> (kgm <sup>2</sup> )]	Breakdown torque M <sub>max</sub> [lbf <sup>2</sup> (Nm)]
	[HP (kW)]	[HP (kW)]						1/2	3/4	1/1	1/2	3/4	1/1		
S3.45.A200.1880.6.70L	206 (154)	188 (140)	6	1186	Y/D	246	1978	89	90	91	0.62	0.72	0.78	66.4 (2.80)	2161.0 (2930)
S3.45.A200.1070.8.70L	115 (86)	107 (80)	8	882	Y/D	129	861	93	94	93	0.77	0.83	0.84	49.8 (2.10)	1600.5 (2170)

Note: Enclosure class: IP68

**Pump data**

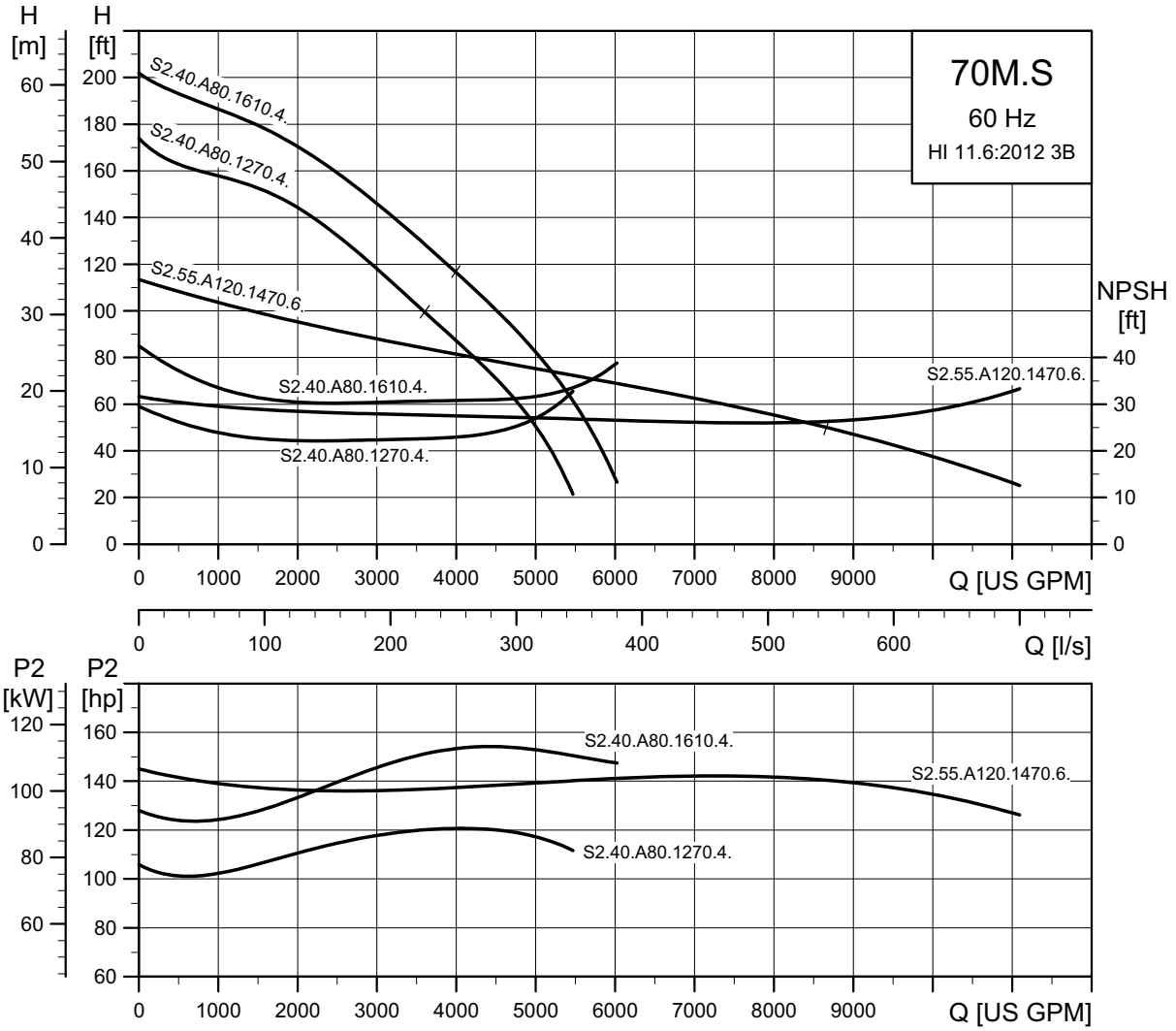
Pump type	Impeller diameter	Maximum solids size	Pump housing pressure	Maximum installation depth	Moment of inertia
	[inch (mm)]	[inch (mm)]	[PSI (PN)]	[ft (m)]	[lbf <sup>2</sup> (kgm <sup>2</sup> )]
S3.45.A200.1880.6.70L.S/C/D/H.371	14.6 (371)	4.5 (115)	145 (10)	66 (20)	33.86 (1.427)
S3.45.A200.1070.8.70L.S/C/D/H.404	15.9 (404)				

\* Applies to material code G (see Type key). For other material codes, please contact Grundfos.

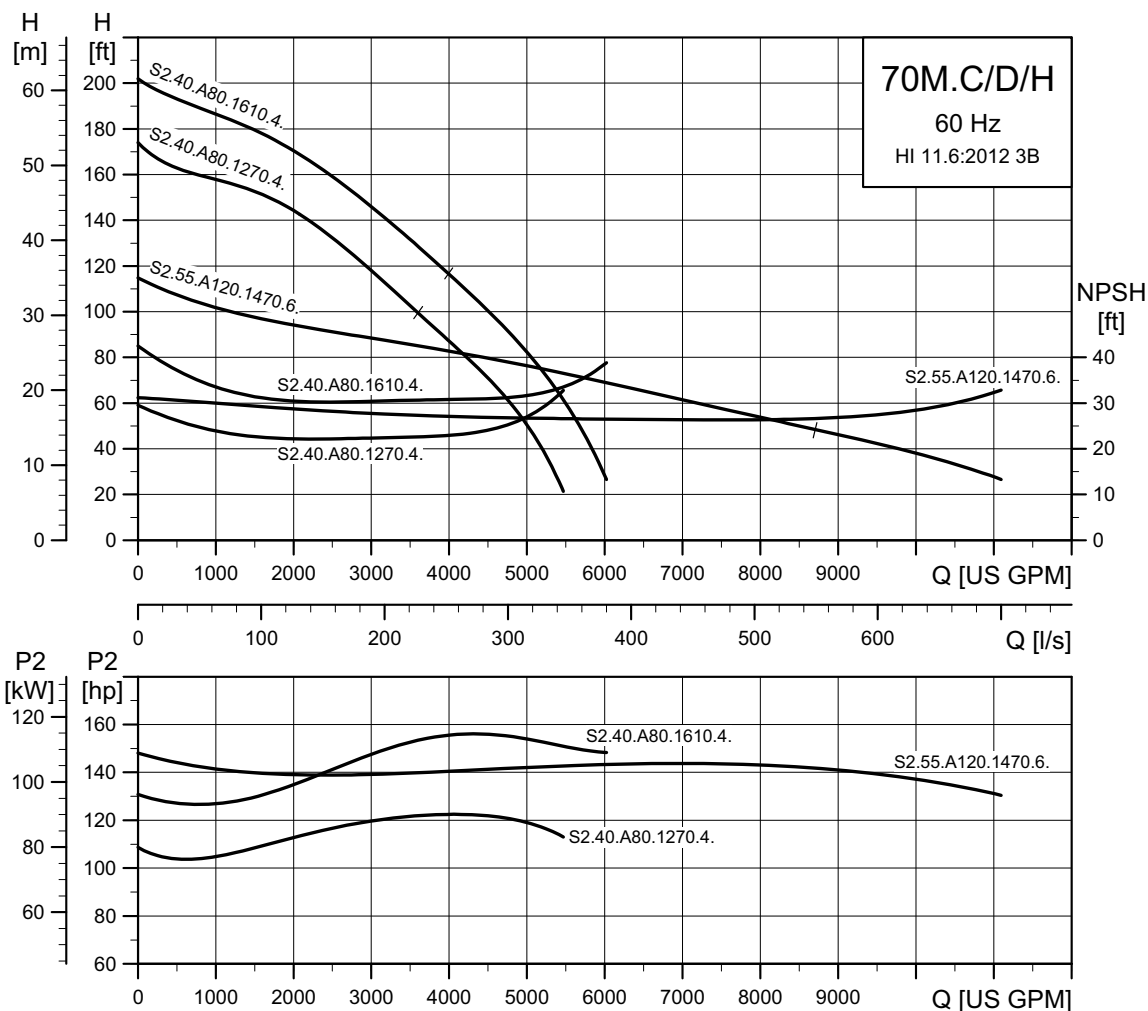
S

### Medium pressure

S2.40.A80.1270.4, S2.55.A120.1470.6 and S2.40.A80.1610.4



TM04 6601 1914



TM04 6602 1914

**Motor data**

Pump type	P1 P2		No. of poles	RPM	Starting method	I <sub>N</sub> [A]	I <sub>start</sub> [A]	η <sub>motor</sub> [%]			Cos φ			Moment of inertia [lbf <sup>2</sup> (kgm <sup>2</sup> )]	Breakdown torque M <sub>max</sub> [lbf <sup>2</sup> ft (Nm)]
	[HP (kW)]	[HP (kW)]						1/2	3/4	1/1	1/2	3/4	1/1		
S2.40.A80.1270.4.70M	138 (103)	127 (95)	4	1778	Y/D	148	1105	94	94	92	0.80	0.86	0.88	20.2 (0.85)	1090.9 (1479)
S2.40.A80.1610.4.70M	174 (130)	161 (120)	4	1778	Y/D	195	1380	94	94	92	0.77	0.84	0.84	26.1 (1.10)	1427.2 (1935)
S2.55.A120.1470.6.70M	158 (118)	147 (110)	6	1181	Y/D	175	1275	91	93	93	0.73	0.81	0.85	49.8 (2.10)	1639.6 (2223)

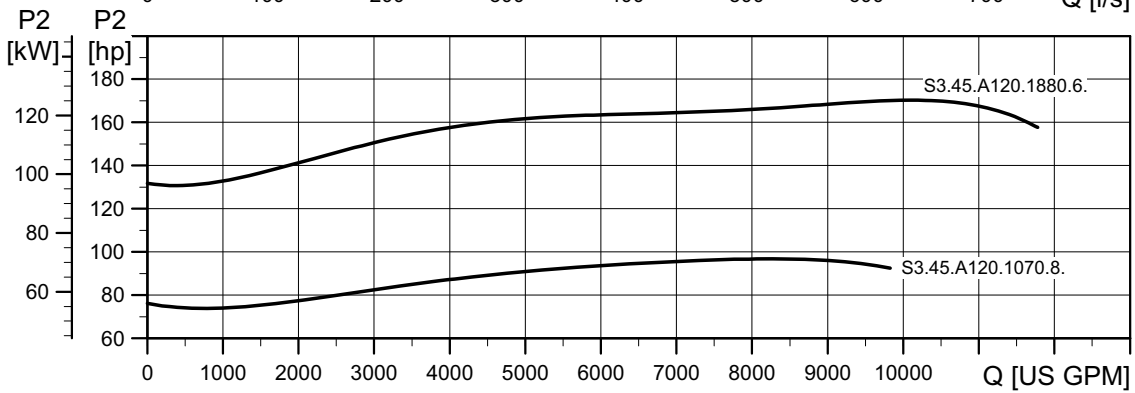
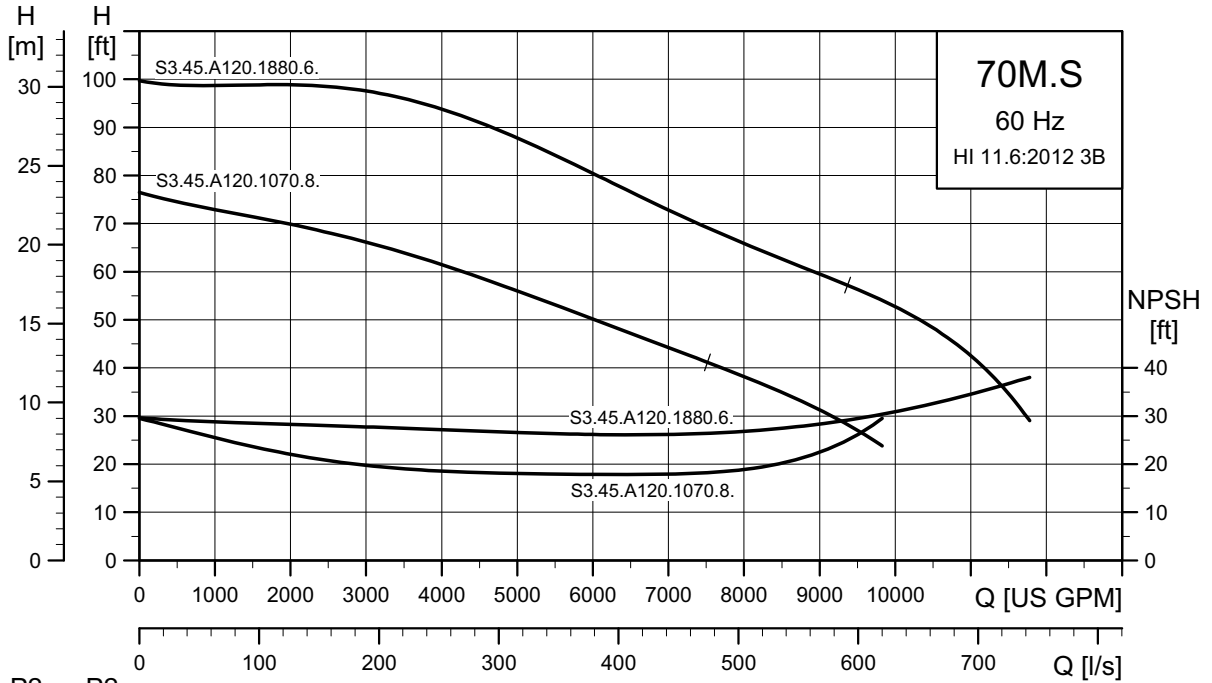
Note: Enclosure class: IP68

**Pump data**

Pump type	Impeller diameter	Maximum solids size	Pump housing pressure	Maximum installation depth	Moment of inertia *
	[inch (mm)]	[inch (mm)]	[PSI (PN)]	[ft (m)]	[lbf <sup>2</sup> (kgm <sup>2</sup> )]
S2.40.A80.1270.4.70M.S/C/D/H.332	13.1 (332)				13.24 (0.558)
S2.40.A80.1610.4.70M.S/C/D/H.355	14.0 (355)	4.0 (100)	145 (10)	66 (20)	15.87 (0.669)
S2.55.A120.1470.6.70M.S/C/D/H.420	16.5 (420)	5.5 (140)			28.56 (1.204)

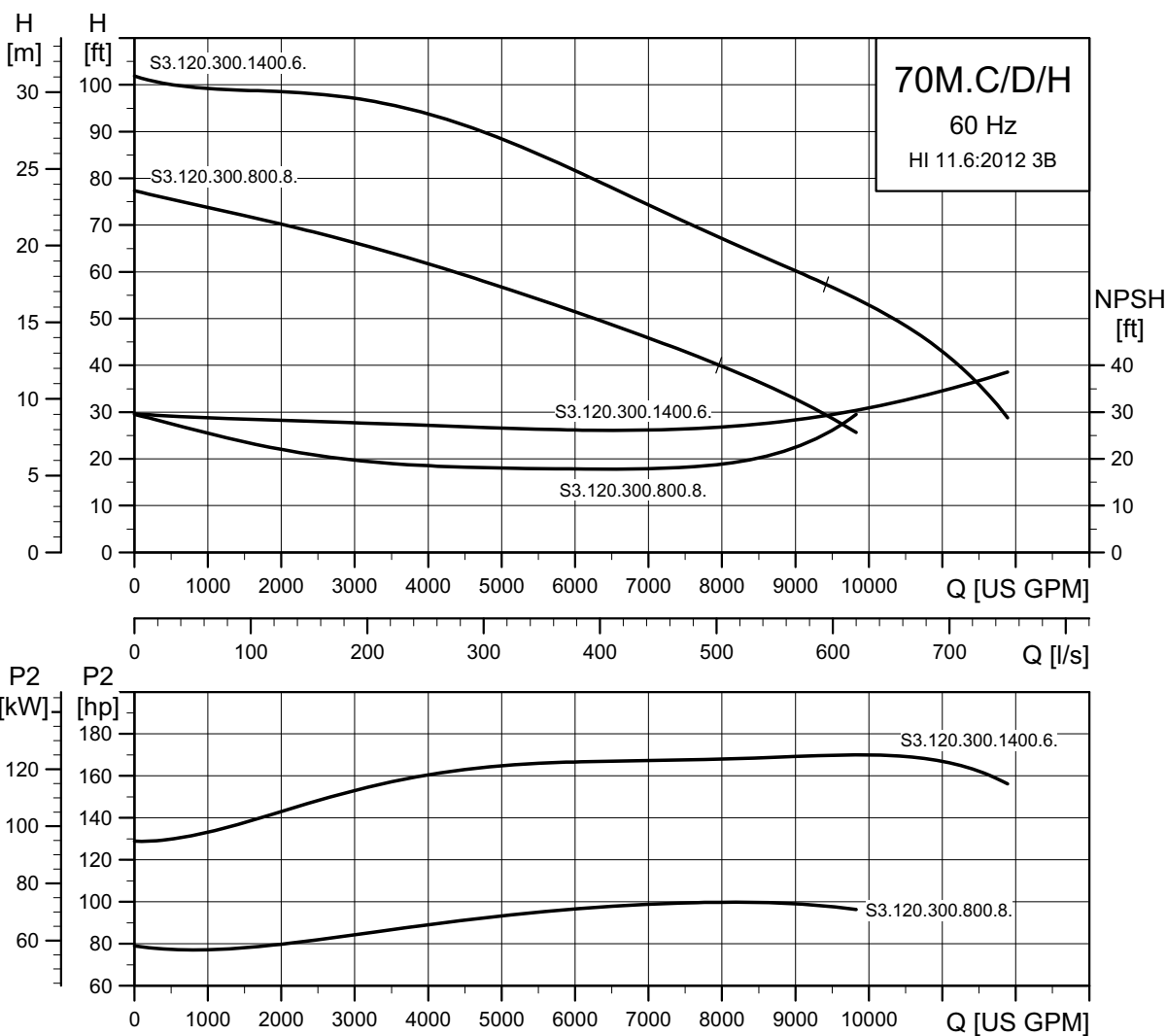
\* Applies to material code G (see Type key). For other material codes, please contact Grundfos.

S3.45.A120.1070.8 and S3.45.A120.1880.8



TM04 6603 1914





TM04 6604 19 14

**Motor data**

Pump type	P1 P2		No. of poles	RPM	Starting method	I <sub>N</sub> [A]	I <sub>start</sub> [A]	η <sub>motor</sub> [%]			Cos φ			Moment of inertia [lbf <sup>2</sup> (kgm <sup>2</sup> )]	Breakdown torque M <sub>max</sub> [lbf <sup>2</sup> ft (Nm)]
	[HP (kW)]	[HP (kW)]						1/2	3/4	1/1	1/2	3/4	1/1		
S3.45.A120.1880.6.70M	206 (154)	188 (140)	6	1186	Y/D	246	1978	89	90	91	0.62	0.72	0.78	66.4 (2.80)	2161.0 (2930)
S3.45.A120.1070.8.70M	115 (86)	107 (80)	8	882	Y/D	129	861	93	94	93	0.77	0.83	0.84	49.8 (2.10)	1600.5 (2170)

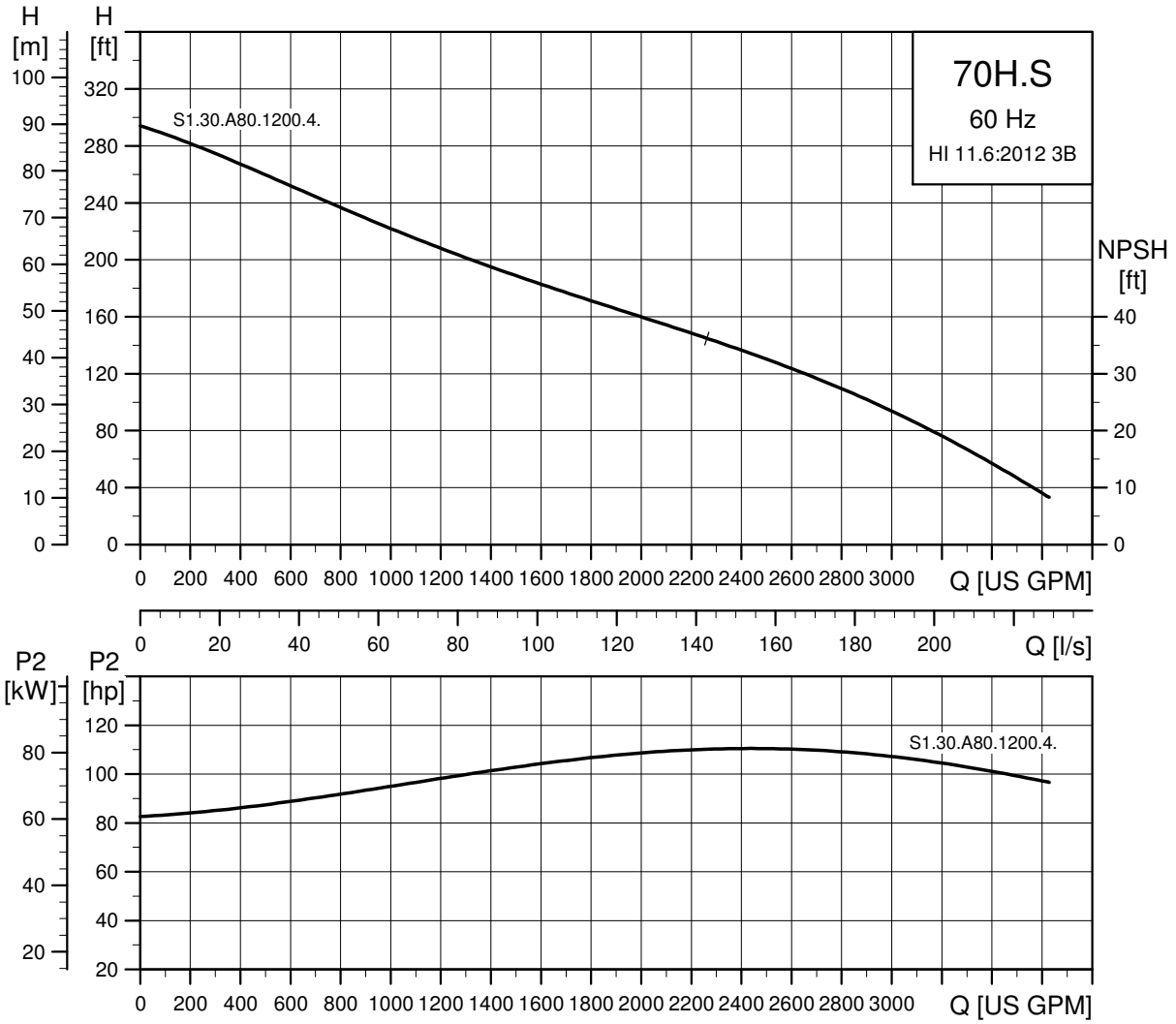
Note: Enclosure class: IP68

**Pump data**

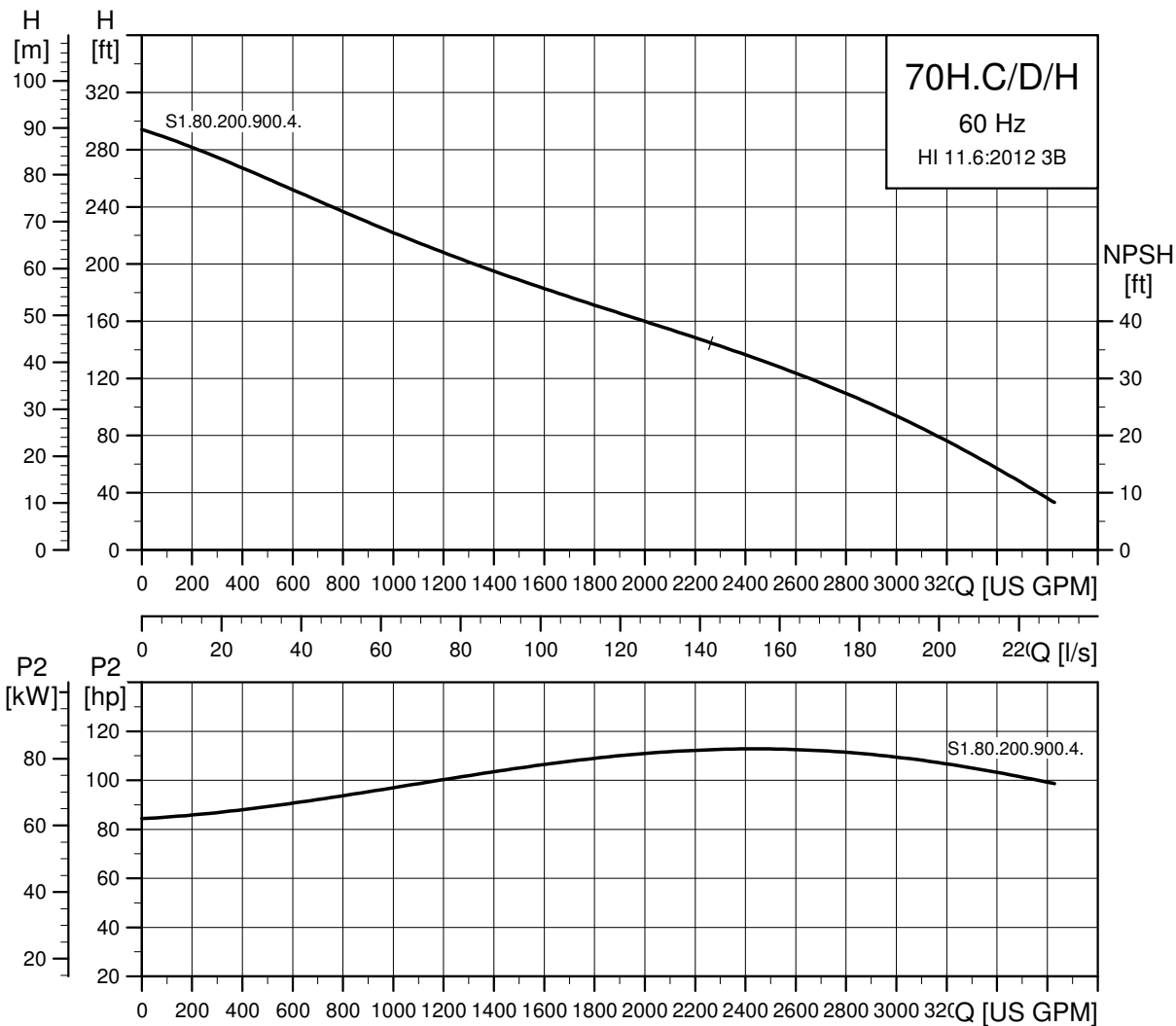
Pump type	Impeller diameter	Maximum solids size	Pump housing pressure	Maximum installation depth	Moment of inertia
	[inch (mm)]	[inch (mm)]	[PSI (PN)]	[ft (m)]	[lbf <sup>2</sup> (kgm <sup>2</sup> )]
S3.45.A120.1880.6.70M.S/C/D/H.407	16.0 (407)	4.5 (115)	145 (10)	66 (20)	27.88 (1.175)
S3.45.A120.1070.8.70M.S/C/D/H.442	17.4 (442)				34.77 (1.465)

\* Applies to material code G (see Type key). For other material codes, please contact Grundfos.

**High pressure**  
**S1.30.A80.1200.4**



TM07 3197 4818



TM07 3198 4818

**Motor data**

Pump type	P1	P2	No. of poles	RPM	Starting method	I <sub>N</sub>	I <sub>start</sub>	η <sub>motor</sub> [%]				Cos φ		Moment of inertia [lbf <sup>2</sup> (kgm <sup>2</sup> )]	Breakdown torque M <sub>max</sub> [lbf <sup>2</sup> ft (Nm)]
	[HP (kW)]	[HP (kW)]				[A]	[A]	1/2	3/4	1/1	1/2	3/4	1/1		
S1.30.A80.1200.4.70H			4		Y/D										

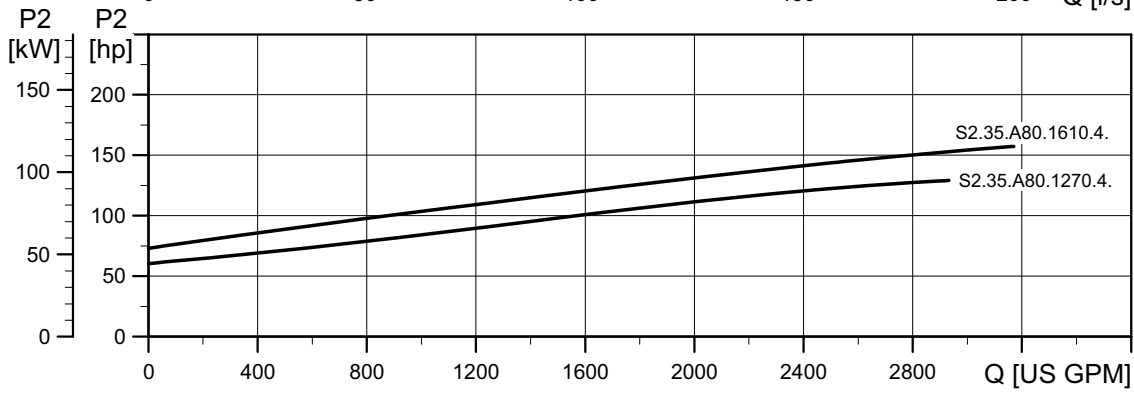
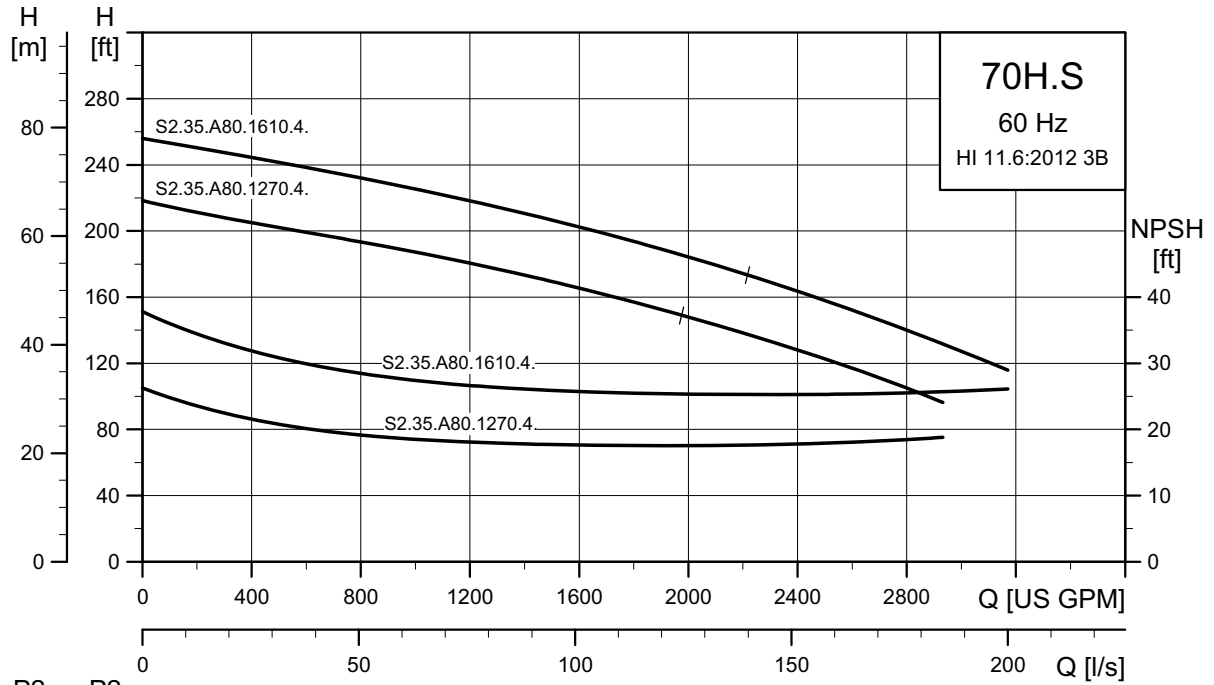
Note: Enclosure class: IP68

**Pump data**

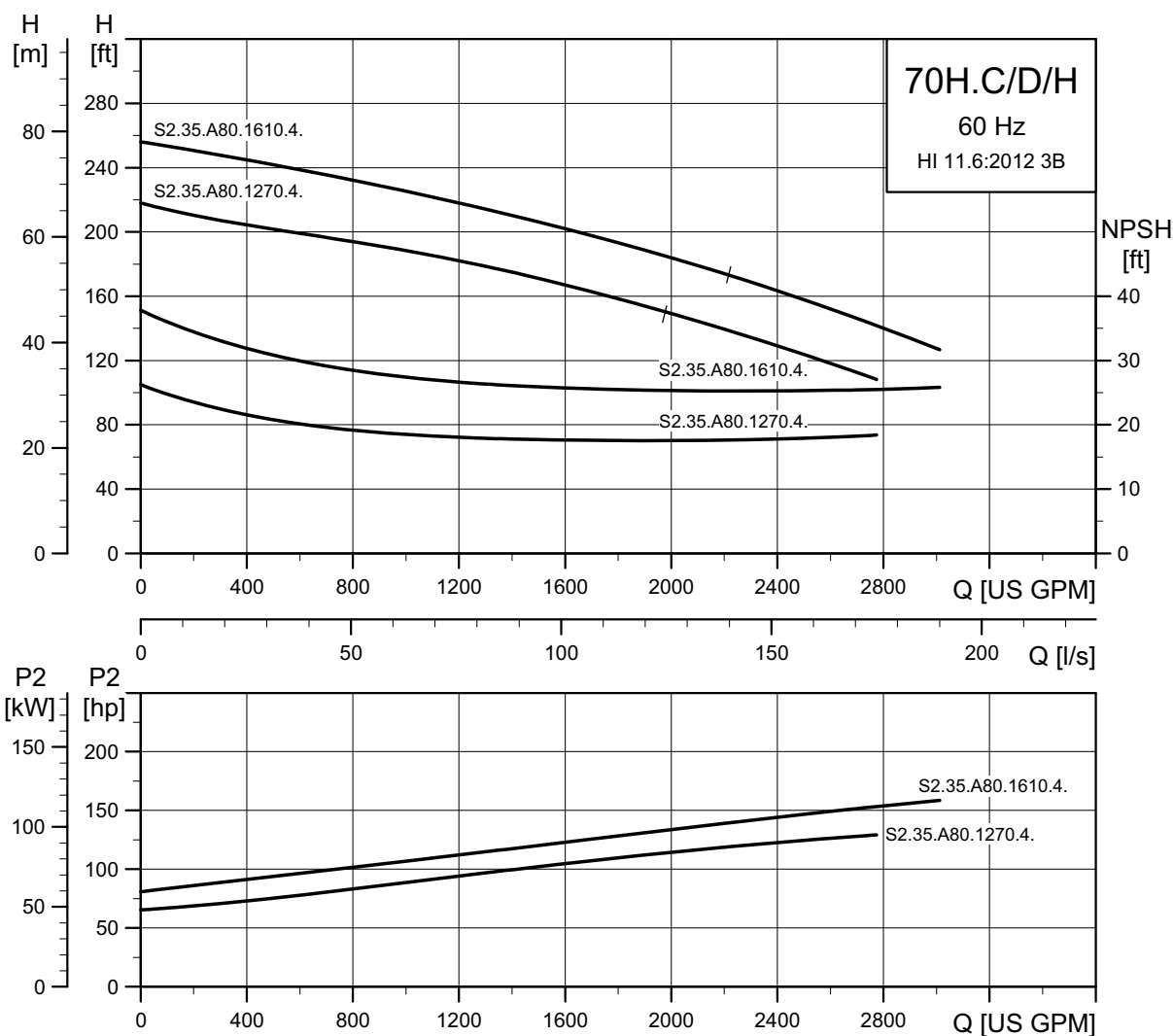
Pump type	Impeller diameter	Maximum solids size	Pump housing pressure	Maximum installation depth	Moment of inertia *
	[inch (mm)]	[inch (mm)]	[PSI (PN)]	[ft (m)]	[lbf <sup>2</sup> (kgm <sup>2</sup> )]
S1.30.A80.1200.4.70H.S/C/D/H.408	16.1 (408)	3 (80)	145 (10)	66 (20)	24.2 (1.02)

\* Applies to material code G (see Type key). For other material codes, please contact Grundfos.

**S2.35.A80.1270.4 and S2.35.A80.1610.4**



TM04 6595 01914



TM04 6596 1914

**Motor data**

Pump type	P1	P2	No. of poles	RPM	Starting method	$I_N$			$\eta_{motor}$ [%]			Cos $\phi$			Moment of inertia [lbf <sup>2</sup> (kgm <sup>2</sup> )]	Breakdown torque $M_{max}$ [lbf <sup>2</sup> ft (Nm)]
	[HP (kW)]	[HP (kW)]				$I_N$ [A]	$I_{start}$ [A]	1/2	3/4	1/1	1/2	3/4	1/1			
S2.35.A80.1270.4.70H	138 (103)	127 (95)	4	1778	Y/D	148	1105	94	94	92	0.80	0.86	0.88	20.2 (0.85)	1090.9 (1479)	
S2.35.A80.1610.4.70H	174 (130)	161 (120)	4	1777	Y/D	195	1380	94	94	92	0.77	0.84	0.84	26.1 (1.10)	1427.2 (1935)	

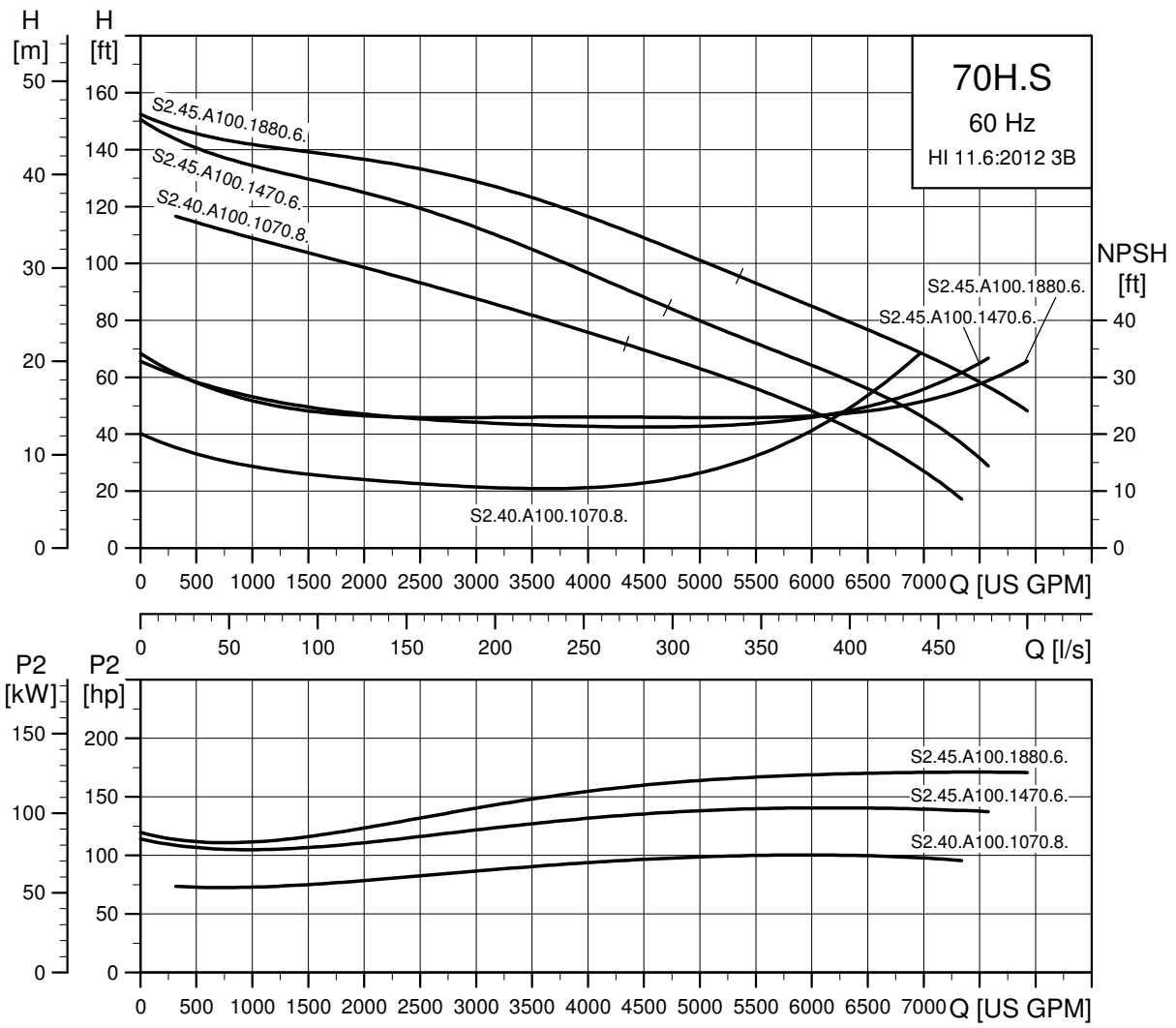
Note: Enclosure class: IP68

**Pump data**

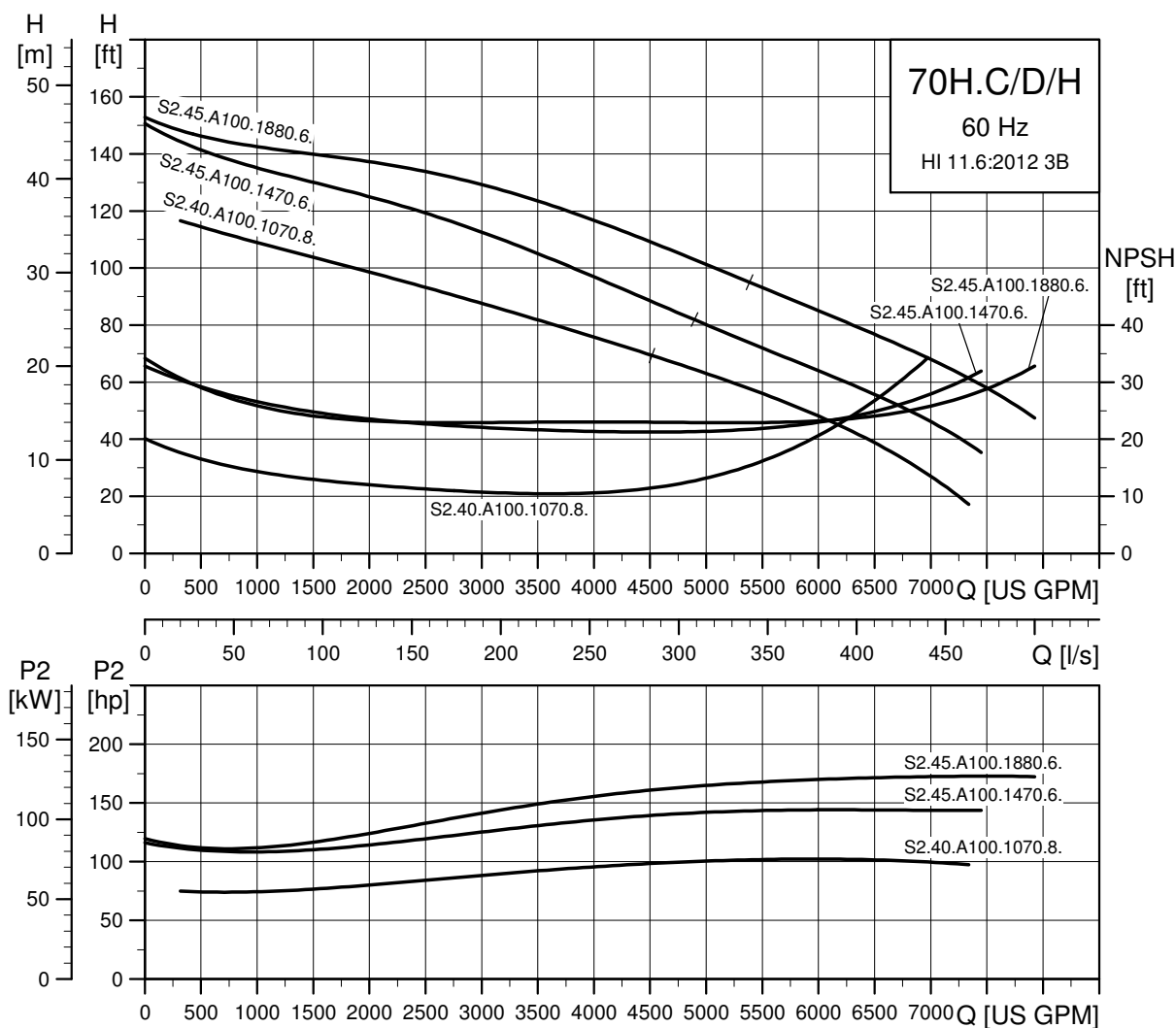
Pump type	Impeller diameter	Maximum solids size	Pump housing pressure	Moment of inertia*
	[inch (mm)]	[inch (mm)]	[PSI (PN)]	[lbf <sup>2</sup> (kgm <sup>2</sup> )]
S2.35.A80.1270.4.70H.S/C/D/H.340	13.4 (340)	3.5 (90)	145 (10)	13.31 (0.561)
S2.35.A80.1610.4.70H.S/C/D/H.361	14.2 (361)			14.26 (0.601)

\* Applies to material code G (see Type key). For other material codes, please contact Grundfos.

S2.40.A100.1070.8, S2.45.A100.1470.6 and S2.45.A100.1880.6



TM04 6597 4818



TM04 6598 4818

**Motor data**

Pump type	P1	P2	No. of poles	RPM	Starting method	I <sub>N</sub>	I <sub>start</sub>	η <sub>motor</sub> [%]			Cos φ			Moment of inertia [lbf <sup>2</sup> (kgm <sup>2</sup> )]	Breakdown torque M <sub>max</sub> [lbf·ft (Nm)]
	[HP (kW)]	[HP (kW)]				[A]	[A]	1/2	3/4	1/1	1/2	3/4	1/1		
S2.45.A100.1470.6.70H	158 (118)	147 (110)	6	1181	Y/D	175	1275	91	93	93	0.73	0.81	0.85	49.8 (2.10)	1639.6 (2223)
S2.45.A100.1880.6.70H	206 (154)	188 (140)	6	1186	Y/D	246	1978	89	90	91	0.62	0.72	0.78	66.4 (2.80)	2162.1 (2930)
S2.40.A100.1070.8.70H	115 (86)	107 (80)	8	882	Y/D	129	861	93	94	93	0.77	0.83	0.84	49.8 (2.10)	1600.5 (2170)

Note: Enclosure class: IP68

**Pump data**

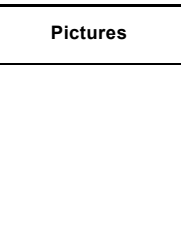
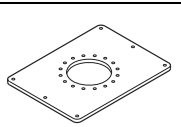
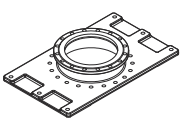
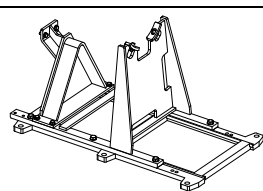
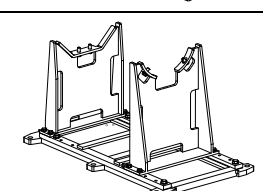
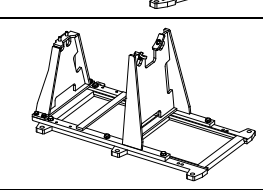
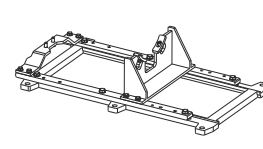
Pump type	Impeller diameter	Maximum solids size	Pump housing pressure	Maximum installation depth	Moment of inertia *
	[inch (mm)]	[inch (mm)]	[PSI (PN)]	[ft (m)]	[lbf <sup>2</sup> (kgm <sup>2</sup> )]
S2.45.A100.1470.6.70H.S/C/D/H.443	17.5 (443)	4.5 (115)	145 (10)	66 (20)	36.66 (1.545)
S2.45.A100.1880.6.70H.S/C/D/H.465	18.3 (465)	4.5 (115)			42.07 (1.773)
S2.40.A100.1070.8.70H.S/C/D/H.523	20.6 (523)	4.0 (100)			60.04 (2.53)

\* Applies to material code G (see Type key). For other material codes, please contact Grundfos.

# 11. Accessories


## Accessories (for installation)

Pump type	Installation accessories
Range 50-70 S and C	ANSI 3"-8" (DN 80-DN 200) without guide claw (guide claw included in auto-coupling kit)
Range 50-70 S and C	ANSI 10"-24" (DN 250-DN 600) with guide claw mounted on the pump
Range 50-70 D	Pump without installation accessories (accessories as separate kit)
Range 50-70 H	Base stand for horizontal, dry installation supplied together with the pump. Pumps of installation type H include the standard horizontal stand. Pumps with material code G or Q include a painted-steel stand. If another horizontal stand is required, order a pump of installation type D together with the required stand.

Pictures	Description	Size	Weight [lb (kg)]	NPS (PN)	Product number
	TM06 9868 3417 Cast-iron, epoxy-coated auto-coupling system complete with: • guide claw <sup>1</sup> • base unit • upper guide rail bracket • gaskets and bolts.	ANSI 8" (DN 200)	551 (250)	145 (10)	97506541
		ANSI 10" (DN 250)	491 (223)		97510048
		ANSI 12" (DN 300)	595 (270)		97510049
		ANSI 20" (DN 500)	1550 (703)		97510050
<sup>1</sup> Installation type S and C pumps with outlet flange size ANSI 10" (DN 250) and higher are supplied with guide claw mounted on the flange.					
Intermediate guide rail bracket	For guide rails longer than 19.5 ft (6 m)	ANSI 8"-ANSI 24" (DN 200-DN 600)	17.6 (8)		96255842
Guide rails	Standard pipes. Not supplied by Grundfos				
	TM03 2015 3505 Steel, epoxy-coated. Base plate for vertical, dry installation with: • gaskets • bolts.	ANSI 10" (DN 250)	199 (90)		96857815
		ANSI 12" (DN 300)	192 (87)		96857816
	TM04 3693 4908 Cast iron, epoxy-coated. Base plate for vertical, dry installation with: • gaskets • bolts.	ANSI 16"/ANSI 20" (DN 400/DN 500)	430 (195)		96867808
	TM04 4158 0909 Base stand for horizontal, dry installation: • S2.40.A100.1070.8.70H.H • S2.45.A100.1470.6.70H.H • S2.45.A100.1880.6.70H.H • S2.45.A120.1070.8.70M.H • S3.24.A120.1880.6.70M.H • S3.45.A200.1070.8.70L.H • S3.45.A200.1880.6.70L.H	Version 1	415 (188)		96308192
	TM04 4160 0909 Base stand for horizontal, dry installation: • S1.30.A80.1200.4.70H.H • S2.35.A80.1270.4.70H.H • S2.35.A80.1610.4.70H.H • S2.40.A80.1270.4.70M.H • S2.40.A80.1610.4.70M.H	Version 2	417 (189)		96308212
	TM04 4159 0909 Base stand for horizontal, dry installation: • S2.55.A120.1470.6.70M.H	Version 3	386 (175)		96308255
	TM06 4971 3415 Special base stand for horizontal, dry installation with customized height.				Contact Grundfos



## Other accessories

Picture	Description	Size	Product number	
	Galvanized lifting chain with lifting link and safety hook.	13 ft (4 m)	98425788	
		Certified.	20 ft (6 m)	98425789
		Maximum lifting capacity 7055 lb (3200 kg).	26 ft (8 m)	98425790
			33 ft (10 m)	98425791
		13 ft (4 m)	98425805	
	Stainless steel lifting chain with lifting link and safety hook.	20 ft (6 m)	98425806	
	Certified.	26 ft (8 m)	98425807	
	Maximum lifting capacity 7055 lb (3200 kg).	33 ft (10 m)	98425808	

TM02 6126 5102

## 12. Dimensions

### Recommendation for pump foundations

**Note:** This applies only to pumps above 20 HP (15 kW).

All rotating equipment generates vibrations as a mass, such as an impeller or rotor, is turning at high speeds. Proper installation and anchorage of Grundfos pumps and installation accessories is critical to limit vibrations and achieve reliable, trouble-free installation. It is important to note that all mechanically connected pipes, fittings and supports to the pump are part of a single system.

The rotating mass of the entire pump together with the forces from the motor and hydraulics will generate disturbances related to the speed of the motor.

Unbalance and impeller vane pass in hydraulics are the two most important frequencies affecting vibration.

When these frequencies coincide with the natural frequency of the entire mechanical system, the vibration level will increase substantially.

Pumps from Grundfos are designed and produced according to the highest quality standards. The method and grade of balancing is specified by the manufacturer in order to achieve acceptable vibration levels. Although the pump itself can withstand rather high vibration levels under operating conditions without considerable lifetime reduction, the pipes and supportive structure might suffer and crack if vibration levels are too high. Furthermore, noticeable noise levels might be generated.

The likelihood of high vibration levels occurring is increased in variable-speed applications where the pump is operated over a range of speeds rather than a single constant speed. Most variable-speed drives provide the possibility to exclude certain frequency ranges to avoid operating areas with high vibrations.

To ensure acceptable vibration levels in the field, all parts of the system must be sufficiently stiff and firmly anchored to minimize vibrations:

- The foundation and concrete must be of adequate strength to support the weight of the pump including accessories, the weight of the liquid passing through the pump, and the forces generated by the pump
- As a rule of thumb, the mass of the concrete foundation must be a minimum of three to five times the mass of the supported equipment and must have sufficient rigidity to withstand the axial, transverse, and torsional loadings generated by the equipment.
- The foundation must be 6" (15 cm) wider than the base plate for pumps up to 470 HP (350 kW) and 10" (25 cm) wider for larger pumps.

- The concrete used in the foundation must have a minimum tensile strength of 363 PSI (250 N/cm<sup>2</sup>). Epoxy grout must always be used to secure the pump base plate to the foundation.

#### Pull-out strengths for anchor bolts

#### Submerged installation on auto-coupling (type S and C):

Auto-coupling base unit	Anchor bolts	Pull-out strength [kip (kN)]
ANSI 4" (DN 100)	4 x 5/8" (4 x M16)	1.1 (5)
ANSI 5"/NPS 6" (DN 125/DN 150) <sup>1</sup>		1.8 (8)
ANSI 8" (DN 200)	4 x 1" (4 x M24)	3.6 (16)
ANSI 10" (DN 250)		6.8 (30)
ANSI 12" (DN 300)		
ANSI 20" (DN 500)	6 x 1 1/4" (6 x M30)	9.0 (40)
ANSI 24" (DN 600)		
ANSI 32" (DN 800)		4.5 (20)

<sup>1</sup> Pump outlet ANSI 5" (DN 125) and base plate outlet ANSI 6" (DN 150).

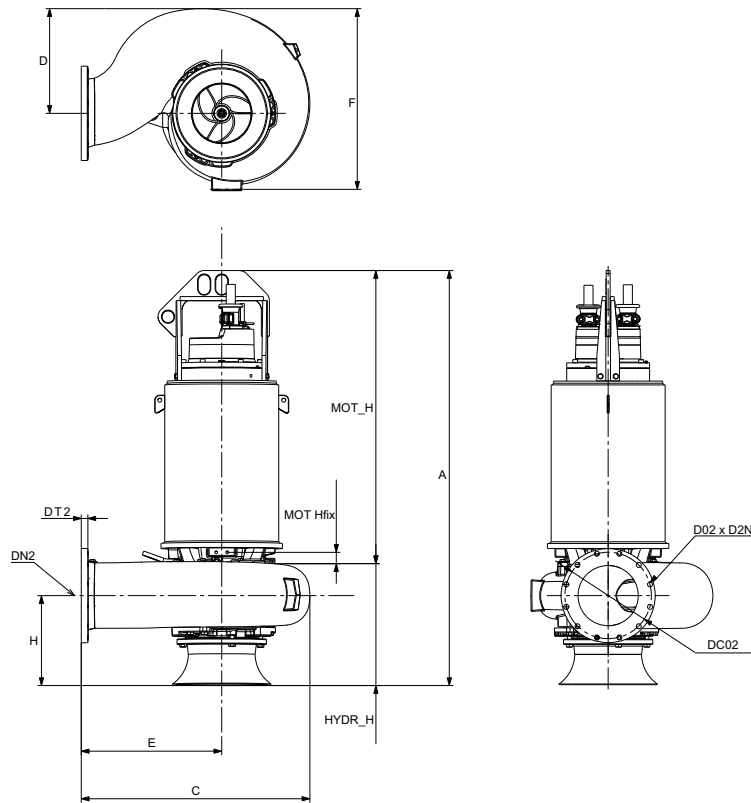
#### Dry installation (type H and D):

Dry installation	Anchor bolts	Pull-out strength [kip (kN)]
ANSI 4" (DN 100)	3 x 3/4" (3 x M20)	4.0 (18)
ANSI 6" (DN 150)		
ANSI 8" (DN 200)	6 x 3/4" (6 x M20)	5.6 (25)
ANSI 10" (DN 250)		
ANSI 12" (DN 300)		
ANSI 16" (DN 400)		
ANSI 20"/ANSI 16" (DN500/DN400) <sup>1</sup>		
ANSI 20" (DN 500)		
ANSI 24" (DN 600)		
ANSI 32" (DN 800)		

<sup>1</sup> Base plate inlet ANSI 20" (DN 500) and pump inlet ANSI 16" (DN 400).

# Basic pump

Installation types S and C



Installation types D and H

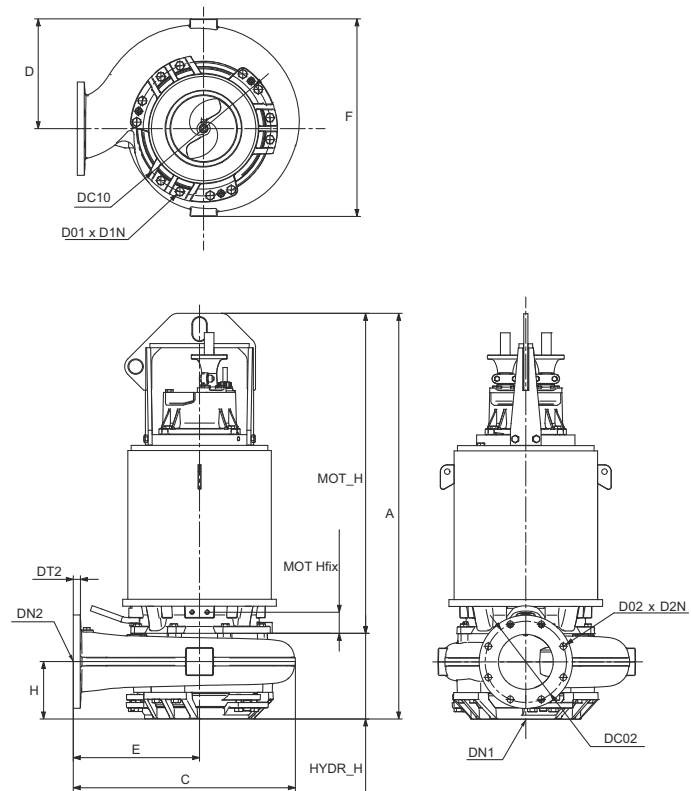


Fig. 31 Basic pumps

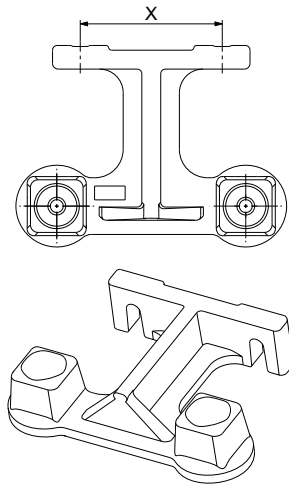
TM04 2412 2018 - TM07 1653 2018

**Note:** Dimensions D01, D1N, DC10 and DN1 are equal to zero for installation types C and S because the inlet type.

Pump type	[inch (mm)]			Pc.								[inch (mm)]							
	A	C	D	D01	D02	D1N	D2N	DC02	DC10	DN1	DN2	DT2	E	F	H	HYDR H	MOT H	MOT Hfix	
S1.30.A80.1200.4.70H.C/S	64.9 (1648)	42.6 (1083)	11.8 (300)	-	0.95 (24)	-	8	11.7 (298)	-	-	ANSI 8" (DN 200)	0.9 (24)	31.5 (800)	23.5 (596)	8.7 (220)	12.9 (328)	52.0 (1320)	0.79 (20)	
S1.30.A80.1200.4.70H.D/H	65.1 (1654)	34.8 (883)	11.8 (300)	3/4" (M20)	0.95 (24)	12	8	11.7 (298)	14.3 (362)	ANSI 10" (DN 250)	ANSI 8" (DN 200)	0.9 (24)	23.6 (600)	23.5 (596)	8.9 (226)	13.1 (334)	52.0 (1320)	0.79 (20)	
S2.35.A80.1270.4.70H.C/S	64.0 (1625)	30.0 (770)	11.2 (285)	-	0.95 (24)	-	8	11.7 (298)	-	-	ANSI 8" (DN 200)	1.02 (26)	19.7 (500)	22.4 (570)	8.0 (203)	12.0 (305)	53.1 (1350)	0.79 (20)	
S2.35.A80.1270.4.70H.D/H	64.5 (1638)	30.0 (770)	11.2 (285)	3/4" (M20)	0.95 (24)	12	8	11.7 (298)	14.3 (362)	ANSI 10" (DN 250)	ANSI 8" (DN 200)	1.02 (26)	19.7 (500)	22.4 (570)	8.9 (226)	12.5 (318)	53.1 (1350)	0.79 (20)	
S2.35.A80.1610.4.70H.C/S	64.0 (1625)	30.0 (770)	11.2 (285)	-	0.95 (24)	-	8	11.7 (298)	-	-	ANSI 8" (DN 200)	1.02 (26)	19.7 (500)	22.4 (570)	8.0 (203)	12.0 (305)	53.1 (1350)	0.79 (20)	
S2.35.A80.1610.4.70H.D/H	64.5 (1638)	30.0 (770)	11.2 (285)	3/4" (M20)	0.95 (24)	12	8	11.7 (298)	14.3 (362)	ANSI 10" (DN 250)	ANSI 8" (DN 200)	1.02 (26)	19.7 (500)	22.4 (570)	8.9 (226)	12.5 (318)	53.1 (1350)	0.79 (20)	
S2.40.A80.1270.4.70M.C/S	64.5 (1638)	31.9 (809)	15.7 (400)	-	0.95 (24)	-	8	11.7 (296)	-	-	ANSI 8" (DN 200)	1.02 (26)	18.1 (460)	28.4 (720)	8.5 (215)	12.5 (318)	53.1 (1350)	0.79 (20)	
S2.40.A80.1270.4.70M.D/H	64.5 (1638)	31.9 (809)	15.7 (400)	3/4" (M20)	0.95 (24)	12	8	11.7 (296)	14.3 (362)	ANSI 10" (DN 250)	ANSI 8" (DN 200)	1.02 (26)	18.1 (460)	28.4 (720)	8.5 (215)	12.5 (318)	53.1 (1350)	0.79 (20)	
S2.40.A80.1610.4.70M.C/S	64.5 (1638)	31.9 (809)	15.7 (400)	-	0.95 (24)	-	8	11.7 (296)	-	-	ANSI 8" (DN 200)	1.02 (26)	18.1 (460)	28.4 (720)	8.5 (215)	12.5 (318)	53.1 (1350)	0.79 (20)	
S2.40.A80.1610.4.70M.D/H	64.5 (1638)	31.9 (809)	15.7 (400)	3/4" (M20)	0.95 (24)	12	8	11.7 (296)	14.3 (362)	ANSI 10" (DN 250)	ANSI 8" (DN 200)	1.02 (26)	18.1 (460)	28.4 (720)	8.5 (215)	12.5 (318)	53.1 (1350)	0.79 (20)	
S2.40.A100.1070.8.70H.C/S	66.5 (1689)	47.0 (1193)	18.8 (478)	-	0.95 (24)	-	12	14.3 (362)	-	-	ANSI 10" (DN 250)	1.18 (30)	29.5 (750)	35.1 (891)	9.3 (235)	14.5 (369)	53.1 (1350)	0.79 (20)	
S2.40.A100.1070.8.70H.D/H	70.5 (1790)	47.0 (1193)	18.8 (478)	3/4" (M20)	0.95 (24)	6	12	14.3 (362)	17.0 (432)	ANSI 12" (DN 300)	ANSI 10" (DN 250)	1.18 (30)	29.5 (750)	35.1 (891)	13.2 (336)	18.5 (470)	53.1 (1350)	0.79 (20)	
S2.45.A100.1470.6.70H.C/S	66.5 (1689)	47.0 (1193)	18.8 (478)	-	0.95 (24)	-	12	14.3 (362)	-	-	ANSI 10" (DN 250)	1.18 (30)	29.5 (750)	35.1 (891)	9.3 (235)	14.5 (369)	53.1 (1350)	0.79 (20)	
S2.45.A100.1470.6.70H.D/H	70.5 (1790)	47.0 (1193)	18.8 (478)	3/4" (M20)	0.95 (24)	6	12	14.3 (362)	17.0 (432)	ANSI 12" (DN 300)	ANSI 10" (DN 250)	1.18 (30)	29.5 (750)	35.1 (891)	13.2 (336)	18.5 (470)	53.1 (1350)	0.79 (20)	
S2.45.A100.1880.6.70H.C/S	72.6 (1844)	47.0 (1193)	18.8 (478)	-	0.95 (24)	-	12	14.3 (362)	-	-	ANSI 10" (DN 250)	1.18 (30)	29.5 (750)	35.1 (891)	9.3 (235)	14.5 (369)	59.3 (1505)	0.79 (20)	
S2.45.A100.1880.6.70H.D/H	76.6 (1915)	47.0 (1193)	18.8 (478)	3/4" (M20)	0.95 (24)	6	12	14.3 (362)	17.0 (432)	ANSI 12" (DN 300)	ANSI 10" (DN 250)	1.18 (30)	29.5 (750)	35.1 (891)	13.2 (336)	18.5 (470)	59.3 (1505)	0.79 (20)	
S2.55.A120.1470.6.70M.C/S	76.6 (1915)	47.0 (1193)	20.6 (522)	-	1.0 (25)	-	12	17.0 (432)	-	-	ANSI 12" (DN 300)	1.30 (33)	27.6 (700)	35.7 (907)	17.7 (450)	23.4 (595)	53.1 (1350)	0.79 (20)	
S2.55.A120.1470.6.70M.D/H	70.5 (1790)	47.0 (1193)	20.6 (522)	3/4" (M20)	1.0 (25)	6	12	17.0 (432)	17.0 (432)	ANSI 12" (DN 300)	ANSI 12" (DN 300)	1.30 (33)	27.6 (700)	35.7 (907)	12.8 (325)	18.5 (470)	53.1 (1350)	0.79 (20)	
S3.45.A120.1070.8.70M.C/S	76.6 (1915)	47.0 (1193)	20.6 (522)	-	1.0 (25)	-	12	17.0 (432)	-	-	ANSI 12" (DN 300)	1.30 (33)	27.6 (700)	35.7 (907)	17.7 (450)	23.4 (595)	53.1 (1350)	0.79 (20)	
S3.45.A120.1070.8.70M.D/H	70.5 (1790)	47.0 (1193)	20.6 (522)	3/4" (M20)	1.0 (25)	6	12	17.0 (432)	17.0 (432)	ANSI 12" (DN 300)	ANSI 12" (DN 300)	1.30 (33)	27.6 (700)	35.7 (907)	12.8 (325)	18.5 (470)	53.1 (1350)	0.79 (20)	
S3.45.A120.1880.6.70M.C/S	81.5 (2070)	47.0 (1193)	20.6 (522)	-	1.0 (25)	-	12	17.0 (432)	-	-	ANSI 12" (DN 300)	1.30 (33)	27.6 (700)	35.7 (907)	17.7 (450)	23.4 (595)	59.3 (1505)	0.79 (20)	
S3.45.A120.1880.6.70M.D/H	76.6 (1945)	47.0 (1193)	20.6 (522)	3/4" (M20)	1.0 (25)	6	12	17.0 (432)	17.0 (432)	ANSI 12" (DN 300)	ANSI 12" (DN 300)	1.30 (33)	27.6 (700)	35.7 (907)	12.8 (325)	18.5 (470)	59.3 (1505)	0.79 (20)	
S3.45.A200.1070.8.70L.C/S	72.0 (1830)	72.6 (1843)	28.3 (719)	-	1.3 (32)	-	20	25.0 (635)	-	-	ANSI 20" (DN 500)	1.46 (37)	47.2 (1200)	50.0 (1269)	14.9 (380)	20.0 (510)	53.1 (1350)	0.79 (20)	
S3.45.A200.1070.8.70L.D/H	76.8 (1951)	72.6 (1843)	28.3 (719)	1" (M24)	1.3 (32)	8	20	25.0 (635)	21.3 (540)	ANSI 16" (DN 400)	ANSI 20" (DN 500)	1.46 (37)	47.2 (1200)	50.0 (1269)	18.2 (461)	24.8 (631)	53.1 (1350)	0.79 (20)	
S3.45.A200.1880.6.70L.C/S	78.1 (1985)	72.6 (1843)	28.3 (719)	-	1.3 (32)	-	20	25.0 (635)	-	-	ANSI 20" (DN 500)	1.46 (37)	47.2 (1200)	50.0 (1269)	14.9 (380)	20.0 (510)	59.3 (1505)	0.79 (20)	
S3.45.A200.1880.6.70L.D/H	82.9 (2106)	72.6 (1843)	28.3 (719)	1" (M24)	1.3 (32)	8	20	25.0 (635)	21.3 (540)	ANSI 16" (DN 400)	ANSI 20" (DN 500)	1.46 (37)	47.2 (1200)	50.0 (1269)	18.2 (461)	24.8 (631)	59.3 (1505)	0.79 (20)	

## Installation on auto-coupling system

### Upper guide rail bracket dimensions

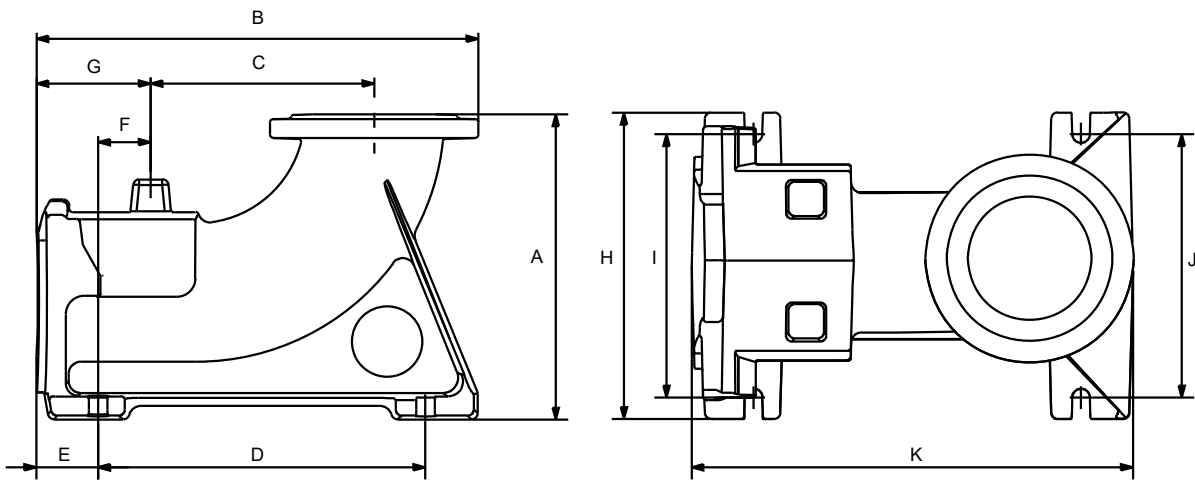


TM06 9915 3617

Fig. 32 Installation dimensions for upper guide rail bracket

Auto-coupling	Size	X
Product number		[inch (mm)]
97506541	ANSI 8" (DN 200)	6 (150)
97510048	ANSI 10" (DN 250)	
97510049	ANSI 12" (DN 300)	
97510050	ANSI 20" (DN 500)	

### Auto-coupling dimensions



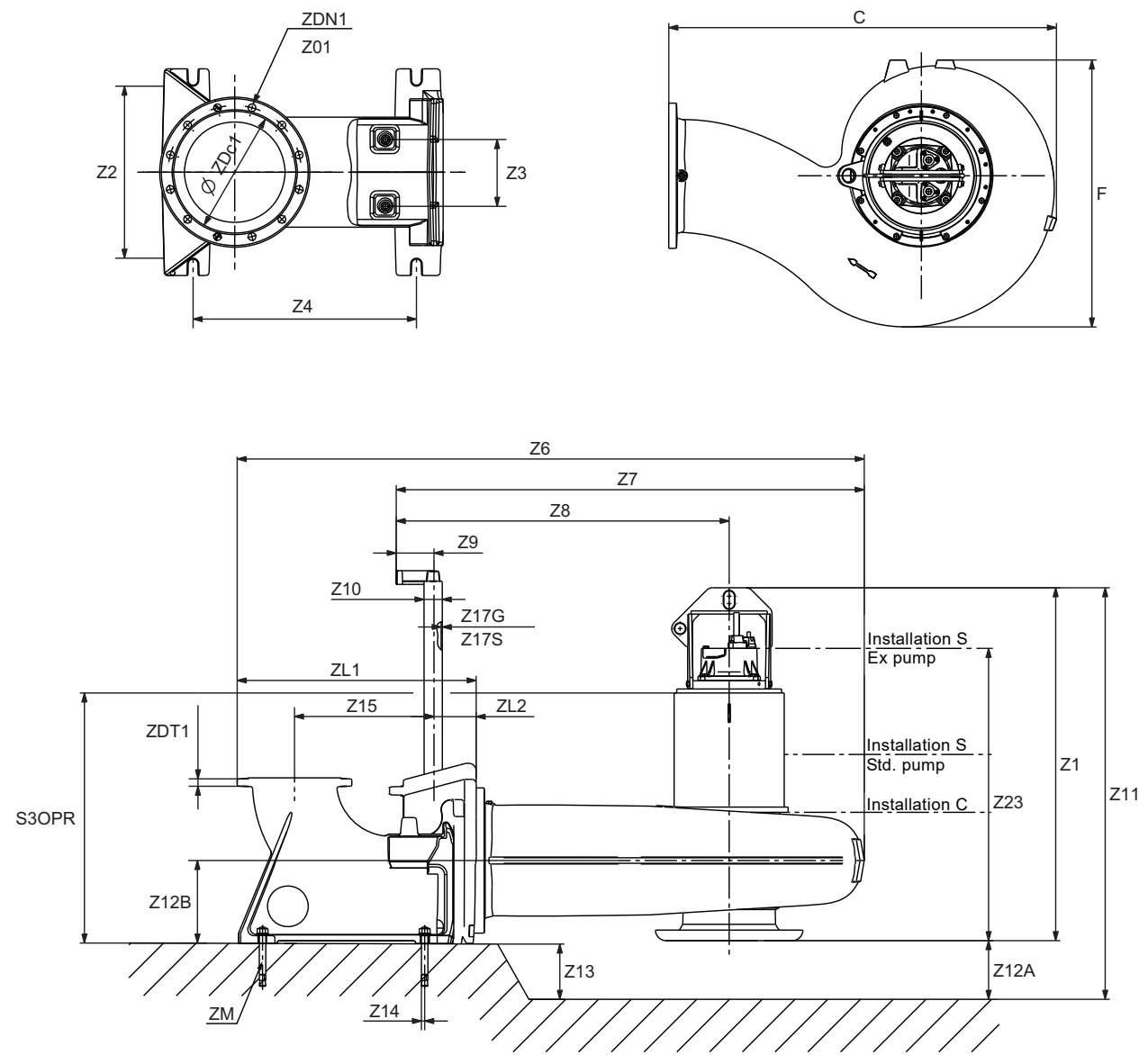
TM06 6497 1516

Fig. 33 Dimensions for base unit

Product number	Size	[inch (mm)]										
		A	B	C	D	E	F	G	H	I	J	K
97506541	ANSI 8" (DN 200)	19.0 (485)	28.0 (710)	14.4 (365)	21.0 (535)	3.5 (89)	3.4 (86)	6.9 (175)	19.7 (500)	16.9 (430)	16.9 (430)	27.9 (710)
97510048	ANSI 10" (DN 250)	21.4 (545)	29.6 (753)	14.8 (375)	22.2 (565)	3.5 (89)	3.4 (86)	6.9 (175)	21.3 (540)	18.5 (470)	18.5 (470)	29.3 (745)
97510049	ANSI 12" (DN 300)	25.6 (650)	33.9 (860)	17.7 (450)	26.4 (670)	3.1 (80)	3.7 (95)	6.9 (175)	24.4 (620)	21.7 (550)	21.7 (550)	33.3 (845)
97510050	ANSI 20" (DN 500)	35.0 (890)	45.2 (1148)	22.2 (564)	28.9/5.9 (735/150) <sup>1</sup>	5.0 (127)	3.9 (99)	8.9 (226)	28.3 (720)	26.0 (660)	26.0 (660)	44.1 (1120)

<sup>1</sup> Six bolt installation: distance between the front bolt hole and the middle bolt hole / distance between the middle bolt hole and the back bolt hole.

### Pump installation dimensions



TM06 8504 2518

**Fig. 34** Installation on auto-coupling system - version 1 (base unit with 4 anchor bolts)

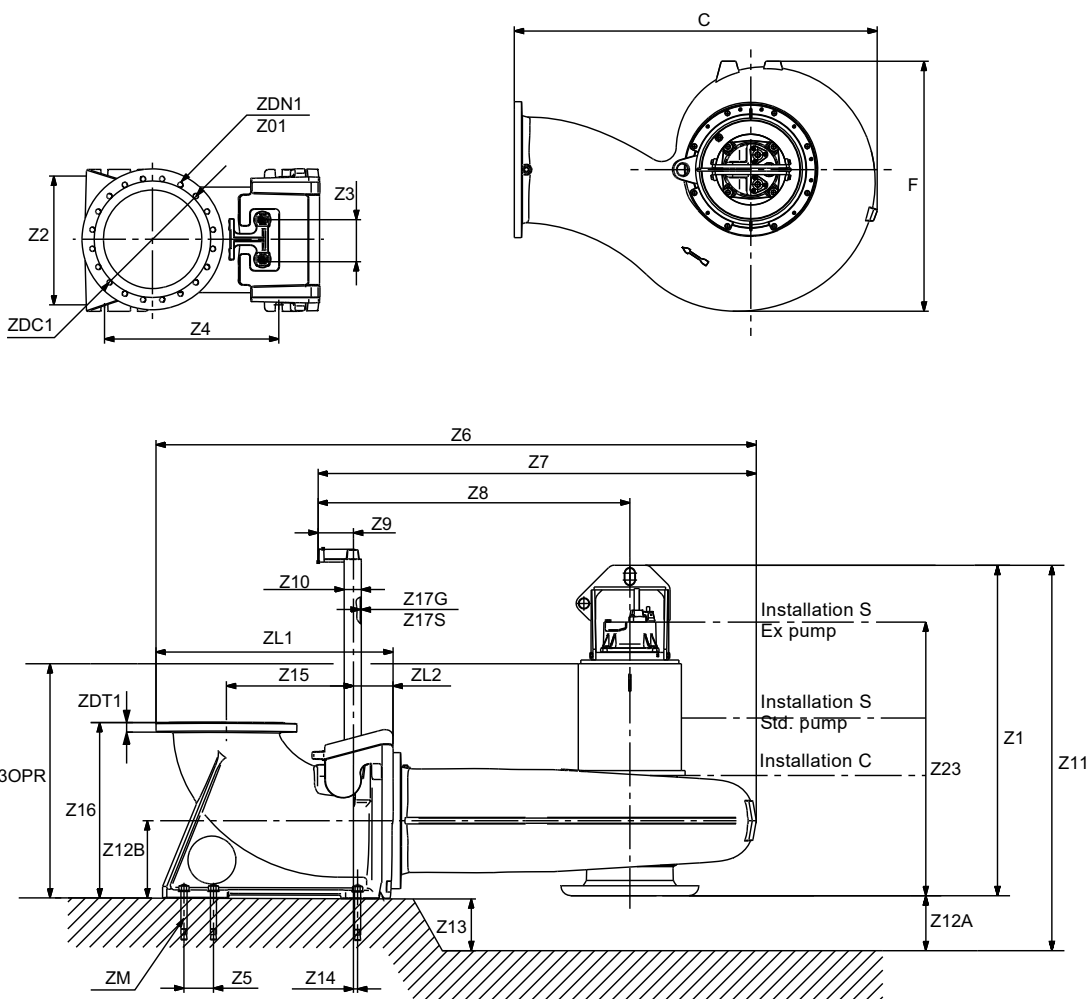
**Note:** Z12A is the minimum recommended distance from pit bottom to bottom of pump suction side.

**Note:** Z11 is the total height of pump installed on Grundfos installation accessory in the pit.

**Note:** This figure not equal Z12A + Z1.

Pump type	[inch (mm)]														
	C	F	Z01	Z1	Z2	Z3	Z4	Z6	Z7	Z8	Z9	Z10	Z11	Z12A	Z12B
S1.30.A80.1200.4.70H.C/S	42.6 (1083)	23.5 (296)	8 x 0.9 (8 x 23)	64.9 (1648)	16.9 (430)	7.9 (200)	21.1 (535)	72.6 (1844)	58.1 (1475)	46.9 (1192)	6.7 (170)	3.5 (88)	69.8 (1774)	5.0 (126)	7.7 (196)
S2.35.A80.1270.4.70H.C/S	30.3 (770)	22.4 (570)	8 x 0.9 (8 x 23)	64.0 (1625)	16.9 (430)	7.9 (200)	21.1 (535)	60.3 (1531)	45.7 (1162)	35.1 (892)	6.7 (170)	3.5 (88)	69.6 (1768)	5.6 (143)	7.7 (196)
S2.35.A80.1610.4.70H.C/S	38.2 (970)	22.4 (570)	8 x 0.9 (8 x 23)	64.0 (1625)	16.9 (430)	7.9 (200)	21.1 (535)	68.1 (1731)	53.6 (1362)	43.0 (1092)	6.7 (170)	3.5 (88)	69.6 (1768)	5.6 (143)	7.7 (196)
S2.40.A80.1270.4.70M.C/S	31.9 (809)	28.3 (720)	8 x 0.9 (8 x 23)	64.5 (1638)	16.9 (430)	7.9 (200)	21.1 (535)	61.8 (1570)	47.3 (1201)	33.5 (852)	6.7 (170)	3.5 (88)	69.6 (1768)	5.2 (131)	7.7 (196)
S2.40.A80.1610.4.70M.C/S	31.9 (809)	28.3 (720)	8 x 0.9 (8 x 23)	64.5 (1638)	16.9 (430)	7.9 (200)	21.1 (535)	61.8 (1570)	47.3 (1201)	33.5 (852)	6.7 (170)	3.5 (88)	69.6 (1768)	5.2 (131)	7.7 (196)
S2.40.A100.1070.8.70M.C/S	47.0 (1193)	35.1 (891)	12 x 0.9 (12 x 23)	66.5 (1689)	18.5 (471)	7.9 (200)	22.2 (565)	78.4 (1992)	62.4 (1585)	45.0 (1142)	6.7 (170)	3.5 (88)	73.9 (1878)	7.4 (189)	8.8 (224)
S2.45.A100.1470.6.70H.C/S	47.0 (1193)	35.1 (891)	12 x 0.9 (12 x 23)	66.5 (1689)	18.5 (471)	7.9 (200)	22.2 (565)	78.4 (1992)	62.4 (1585)	45.0 (1142)	6.7 (170)	3.5 (88)	73.9 (1878)	7.4 (189)	8.8 (224)
S2.45.A100.1880.6.70H.C/S	47.0 (1193)	35.1 (891)	12 x 0.9 (12 x 23)	72.6 (1844)	18.5 (471)	7.9 (200)	22.2 (565)	78.4 (1992)	62.4 (1585)	45.0 (1142)	6.7 (170)	3.5 (88)	80.0 (2033)	7.4 (189)	8.8 (224)
S2.55.A120.1470.6.70M.C/S	44.8 (1139)	35.7 (907)	12 x 0.9 (12 x 23)	75.4 (1915)	21.7 (551)	7.9 (200)	26.4 (670)	80.3 (2040)	60.3 (1531)	43.0 (1092)	6.7 (170)	3.5 (88)	83.5 (2121)	8.1 (206)	10.1 (256)
S3.45.A120.1070.8.70M.C/S	44.8 (1139)	35.7 (907)	12 x 0.9 (12 x 23)	75.4 (1915)	21.7 (551)	7.9 (200)	26.4 (670)	80.3 (2040)	60.3 (1531)	43.0 (1092)	6.7 (170)	3.5 (88)	83.5 (2121)	8.1 (206)	10.1 (256)
S3.45.A120.1880.6.70M.C/S	44.8 (1139)	35.7 (907)	12 x 0.9 (12 x 23)	81.5 (2070)	21.7 (551)	7.9 (200)	26.4 (670)	80.3 (2040)	60.3 (1531)	43.0 (1092)	6.7 (170)	3.5 (88)	89.6 (2276)	8.1 (206)	10.1 (256)

Pump type	[inch (mm)]													
	Z13	Z14	Z15	Z16	Z17		Z23		S3OPR		ZDC1	DN1	ZDT1	ZM
					G	S	Std.	Ex.	Std.	Ex.				
S1.30.A80.1200.4.70H.S	5.9 (150)	3.4 (86)	14.4 (365)	19.1 (485)	0.1 (3)	0.1 (3)	31.8 (808)	53.4 (1357)	30.9 (784)	52.5 (1333)	11.6 (295)	ANSI 8" (DN 200)	1.2 (31)	4 x 1" (4 x M24)
17.7 (450)							17.7 (450)	16.8 (426)	16.8 (426)					
S2.35.A80.1270.4.70H.S	5.9 (150)	3.4 (86)	14.4 (365)	19.1 (485)	0.1 (3)	0.1 (3)	30.7 (780)	52.3 (1329)	30.4 (773)	52.0 (1322)	11.6 (295)	ANSI 8" (DN 200)	1.2 (31)	4 x 1" (4 x M24)
16.6 (422)							16.6 (422)	16.3 (415)	16.3 (415)					
S2.35.A80.1610.4.70H.S	5.9 (150)	3.4 (86)	14.4 (365)	19.1 (485)	0.1 (3)	0.1 (3)	30.7 (780)	52.3 (1329)	30.4 (773)	52.0 (1322)	11.6 (295)	ANSI 8" (DN 200)	1.2 (31)	4 x 1" (4 x M24)
16.6 (422)							16.6 (422)	16.3 (415)	16.3 (415)					
S2.40.A80.1270.4.70M.S	5.9 (150)	3.4 (86)	14.4 (365)	19.1 (485)	0.1 (3)	0.1 (3)	31.2 (793)	52.8 (1342)	30.5 (774)	52.1 (1323)	11.6 (295)	ANSI 8" (DN 200)	1.2 (31)	4 x 1" (4 x M24)
17.2 (435)							17.2 (435)	16.3 (416)	16.3 (416)					
S2.40.A80.1610.4.70M.S	5.9 (150)	3.4 (86)	14.4 (365)	19.1 (485)	0.1 (3)	0.1 (3)	31.2 (793)	52.8 (1342)	30.5 (774)	52.1 (1323)	11.6 (295)	ANSI 8" (DN 200)	1.2 (31)	4 x 1" (4 x M24)
17.2 (435)							17.2 (435)	16.3 (416)	16.3 (416)					
S2.40.A100.1070.8.70M.S	7.9 (200)	3.4 (86)	14.8 (375)	21.5 (545)	0.1 (3)	0.1 (3)	33.2 (844)	54.8 (1393)	32.8 (833)	54.4 (1382)	13.8 (350)	ANSI 10" (DN 250)	1.3 (32)	4 x 1" (4 x M24)
19.1 (486)							19.1 (486)	18.7 (475)	18.7 (475)					
S2.45.A100.1470.6.70H.S	7.9 (200)	3.4 (86)	14.8 (375)	21.5 (545)	0.1 (3)	0.1 (3)	33.2 (844)	54.8 (1393)	32.8 (833)	54.4 (1382)	13.8 (350)	ANSI 10" (DN 250)	1.3 (32)	4 x 1" (4 x M24)
19.1 (486)							19.1 (486)	18.7 (475)	18.7 (475)					
S2.45.A100.1880.6.70H.S	7.9 (200)	3.4 (86)	14.8 (375)	21.5 (545)	0.1 (3)	0.1 (3)	36.6 (921)	60.9 (1548)	35.8 (910)	60.5 (1537)	13.8 (350)	ANSI 10" (DN 250)	1.3 (32)	4 x 1" (4 x M24)
19.1 (486)							19.1 (486)	18.7 (475)	18.7 (475)					
S2.55.A120.1470.6.70M.S	15.7 (400)	3.7 (95)	17.7 (450)	25.6 (650)	0.1 (3)	0.1 (3)	42.1 (1070)	63.7 (1619)	34.5 (876)	56.1 (1425)	15.7 (400)	ANSI 12" (DN 300)	1.3 (32)	4 x 1" (4 x M24)
28.0 (712)							28.0 (712)	20.4 (518)	20.4 (518)					
S3.45.A120.1070.8.70M.S	15.7 (400)	3.7 (95)	17.7 (450)	25.6 (650)	0.1 (3)	0.1 (3)	42.1 (1070)	63.7 (1619)	34.5 (876)	56.1 (1425)	15.7 (400)	ANSI 12" (DN 300)	1.3 (32)	4 x 1" (4 x M24)
28.0 (712)							28.0 (712)	20.4 (518)	20.4 (518)					
S3.45.A120.1880.6.70M.S	15.7 (400)	3.7 (95)	17.7 (450)	25.6 (650)	0.1 (3)	0.1 (3)	45.2 (1147)	69.8 (1774)	37.5 (953)	62.2 (1580)	15.7 (400)	ANSI 12" (DN 300)	1.3 (32)	4 x 1" (4 x M24)
28.0 (712)							28.0 (712)	20.4 (518)	20.4 (518)					



TM04 2418 2018

Fig. 35 Installation on auto-coupling system - version 2 (base unit with 6 anchor bolts)

**Note:** Z12A is minimum recommended distance from pit bottom to bottom of pump suction side.

**Note:** Z11 is total heights of pump installed on Grundfos installation accessory in the pit.

**Note:** The pump in this figure not equal Z12A + Z1.

Pump type	[inch (mm)]															
	C	F	Z01	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	Z11	Z12A	Z12B
S3.45.A200.1070.8.70L.C/S	72.6 (1843)	50.0 (1269)	20 x 27	72.0 (1830)	25.9 (657)	7.9 (200)	34.8 (885)	5.9 (150)	119.2 (3028)	90.4 (2297)	65.1 (1654)	6.7 (170)	3.5 (88)	81.9 (2080)	9.8 (250)	15.0 (380)
S3.45.A200.1880.6.70L.C/S	72.6 (1843)	50.0 (1269)	20 x 27	78.1 (1985)	25.9 (657)	7.9 (200)	34.8 (885)	5.9 (150)	119.2 (3028)	90.4 (2297)	65.1 (1654)	6.7 (170)	3.5 (88)	88.0 (2235)	9.8 (250)	15.0 (380)

Pump type	[inch (mm)]													
	Z13	Z14	Z15	Z16	Z17		Z23		S3OPR		ZDC1	DN1	ZDT1	ZM
					G	S	Stand.	Ex.	Stand.	Ex.				
S2.35.A80.1270.4.70H.S	5.9 (150)	3.4 (86)	14.4 (365)	19.1 (485)	0.1 (3)	0.1 (3)	30.7 (780)	52.3 (1329)	30.4 (773)	52.0 (1322)	11.6 (295)	ANSI 8" (DN 200)	1.2 (31)	4 x 1" (4 x M24)
S3.45.A200.1070.8.70L.S	9.8 (250)	3.9 (98)	22.2 (565)	35.0 (890)	0.1 (3)	0.1 (3)	38.8 (985)	60.4 (1534)	38.8 (985)	60.4 (1534)	24.4 (620)	ANSI 20" (DN 500)	1.7 (42)	6 x 1 1/4" (6 x M30)
S3.45.A200.1070.8.70L.C							34.7 (627)	34.7 (627)	24.7 (627)	24.7 (627)				
S3.45.A200.1880.6.70L.S	9.8 (250)	3.9 (98)	22.2 (565)	35.0 (890)	0.1 (3)	0.1 (3)	41.8 (1062)	66.5 (1689)	41.8 (1062)	66.5 (1689)	24.4 (620)	ANSI 20" (DN 500)	1.7 (42)	6 x 1 1/4" (6 x M30)
S3.45.A200.1880.6.70L.C							34.7 (627)	34.7 (627)	24.7 (627)	24.7 (627)				



Dry, vertical installation on concrete foundation

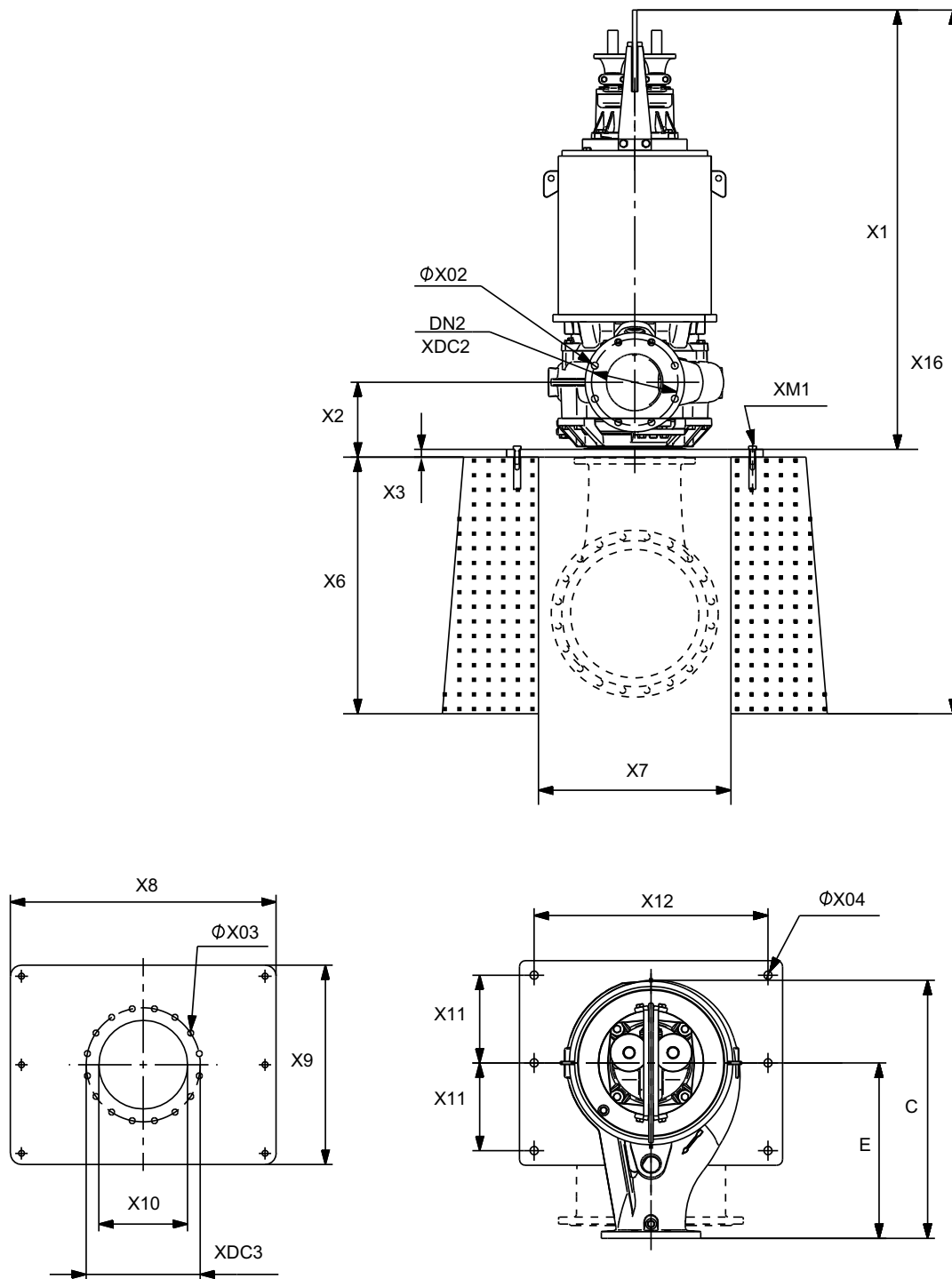


Fig. 36 Dry, vertical installation on concrete foundation

TM04 2424 2018

Pump type	[inch (mm)]										
	C	E	Ø X02	Ø X03	Ø X04	X1	X2	X3	X6	X7	X8
S1.30.A80.1200.4.70H.D	34.8 (883)	23.6 (600)	0.9 (24)	1.0 (25)	1.1 (28)	65.1 (1654)	9.8 (249)	0.9 (23)	27.6 (700)	19.7 (500)	35.4 (900)
S2.35.A80.1270.4.70H.D	30.3 (770)	19.7 (500)	0.9 (24)	1.0 (25)	1.1 (28)	64.5 (1638)	9.8 (249)	0.9 (23)	27.6 (700)	19.7 (500)	35.4 (900)
S2.35.A80.1610.4.70H.D	30.3 (770)	19.7 (500)	0.9 (24)	1.0 (25)	1.1 (28)	64.5 (1638)	9.8 (249)	0.9 (23)	27.6 (700)	19.7 (500)	35.4 (900)
S2.40.A80.1270.4.70M.D	31.9 (809)	18.1 (460)	0.9 (24)	1.0 (25)	1.1 (28)	64.5 (1638)	9.4 (238)	0.9 (23)	27.6 (700)	19.7 (500)	35.4 (900)
S2.40.A80.1610.4.70M.D	31.9 (809)	18.1 (460)	0.9 (24)	1.0 (25)	1.1 (28)	64.5 (1638)	9.4 (238)	0.9 (23)	27.6 (700)	19.7 (500)	35.4 (900)
S2.40.A100.1070.8.70H.D	47.0 (1193)	29.5 (750)	0.9 (24)	1.0 (25)	1.1 (28)	70.2 (1783)	12.3 (312)	0.9 (23)	31.5 (800)	23.6 (600)	35.4 (900)
S2.45.A100.1470.6.70H.D	47.0 (1193)	29.5 (750)	0.9 (24)	1.0 (25)	1.1 (28)	70.2 (1783)	12.3 (312)	0.9 (23)	31.5 (800)	23.6 (600)	35.4 (900)
S2.45.A100.1880.6.70H.D	47.0 (1193)	29.5 (750)	0.9 (24)	1.0 (25)	1.1 (28)	76.3 (1938)	12.3 (312)	0.9 (23)	31.5 (800)	23.6 (600)	35.4 (900)
S2.55.A120.1470.6.70M.D	47.0 (1193)	27.6 (700)	0.9 (24)	1.0 (25)	1.1 (28)	70.2 (1783)	11.9 (301)	0.9 (23)	31.5 (800)	23.6 (600)	35.4 (900)
S3.45.A120.1070.8.70M.D	47.0 (1193)	27.6 (700)	0.9 (24)	1.0 (25)	1.1 (28)	68.6 (1743)	11.9 (301)	0.9 (23)	31.5 (800)	23.6 (600)	35.4 (900)
S3.45.A120.1880.6.70M.D	47.0 (1193)	27.6 (700)	0.9 (24)	1.0 (25)	1.1 (28)	76.3 (1938)	11.9 (301)	0.9 (23)	31.5 (800)	23.6 (600)	35.4 (900)
S3.45.A200.1070.8.70L.D	72.6 (1843)	47.2 (1200)	1.3 (32)	1.3 (32)	1.1 (28)	76.8 (1951)	18.1 (461)	6.3 (160)	57.1 (1450)	37.4 (950)	46.5 (1180)
S3.45.A200.1880.6.70L.D	72.6 (1843)	47.2 (1200)	1.3 (32)	1.3 (32)	1.1 (28)	82.9 (2106)	18.1 (461)	6.3 (160)	57.1 (1450)	37.4 (950)	46.5 (1180)

Pump type	[inch (mm)]									
	X9	X10	X11	X12	X16	DT2	XDC2	XDC3	D2N	XM1
S1.30.A80.1200.4.70H.D	27.6 (700)	ANSI 10" (DN 250)	11.8 (300)	31.5 (800)	93.6 (2377)	0.9 (24)	11.7 (298)	14.3 (362)	0.3 (8)	6 x 1" (6 x M24)
S2.35.A80.1270.4.70H.D	27.6 (700)	ANSI 10" (DN 250)	11.8 (300)	31.5 (800)	93.0 (2361)	1.0 (26)	11.7 (298)	14.3 (362)	0.3 (8)	6 x 1" (6 x M24)
S2.35.A80.1610.4.70H.D	27.6 (700)	ANSI 10" (DN 250)	11.8 (300)	31.5 (800)	93.0 (2361)	1.0 (26)	11.7 (298)	14.3 (362)	0.3 (8)	6 x 1" (6 x M24)
S2.40.A80.1270.4.70M.D	27.6 (700)	ANSI 10" (DN 250)	11.8 (300)	31.5 (800)	93.0 (2361)	1.0 (26)	11.7 (296)	14.3 (362)	0.3 (8)	6 x 1" (6 x M24)
S2.40.A80.1610.4.70M.D	27.6 (700)	ANSI 10" (DN 250)	11.8 (300)	31.5 (800)	93.0 (2361)	1.0 (26)	11.7 (296)	14.3 (362)	0.3 (8)	6 x 1" (6 x M24)
S2.40.A100.1070.8.70H.D	27.6 (700)	ANSI 12" (DN 300)	11.8 (300)	31.5 (800)	102.6 (2606)	1.2 (30)	14.3 (362)	17.0 (432)	0.5 (12)	6 x 1" (6 x M24)
S2.45.A100.1470.6.70H.D	27.6 (700)	ANSI 12" (DN 300)	11.8 (300)	31.5 (800)	102.6 (2606)	1.2 (30)	14.3 (362)	17.0 (432)	0.5 (12)	6 x 1" (6 x M24)
S2.45.A100.1880.6.70H.D	27.6 (700)	ANSI 12" (DN 300)	11.8 (300)	31.5 (800)	108.7 (2761)	1.2 (30)	14.3 (362)	17.0 (432)	0.5 (12)	6 x 1" (6 x M24)
S2.55.A120.1470.6.70M.D	27.6 (700)	ANSI 12" (DN 300)	11.8 (300)	31.5 (800)	102.6 (2606)	1.3 (33)	17.0 (432)	17.0 (432)	0.5 (12)	6 x 1" (6 x M24)
S3.45.A120.1070.8.70M.D	27.6 (700)	ANSI 12" (DN 300)	11.8 (300)	31.5 (800)	101.0 (2566)	1.3 (33)	17.0 (432)	17.0 (432)	0.5 (12)	6 x 1" (6 x M24)
S3.45.A120.1880.6.70M.D	27.6 (700)	ANSI 12" (DN 300)	11.8 (300)	31.5 (800)	108.7 (2761)	1.3 (33)	17.0 (432)	17.0 (432)	0.5 (12)	6 x 1" (6 x M24)
S3.45.A200.1070.8.70L.D	27.6 (700)	ANSI 16" (DN 400)	11.8 (300)	43.3 (1100)	76.8 (1951)	1.5 (37)	25.0 (635)	20.3 (515)	0.8 (20)	6 x 1" (6 x M24)
S3.45.A200.1880.6.70L.D	27.6 (700)	ANSI 16" (DN 400)	11.8 (300)	43.3 (1100)	82.9 (2106)	1.5 (37)	25.0 (635)	20.3 (515)	0.8 (20)	6 x 1" (6 x M24)

## Dry, horizontal installation on base stand

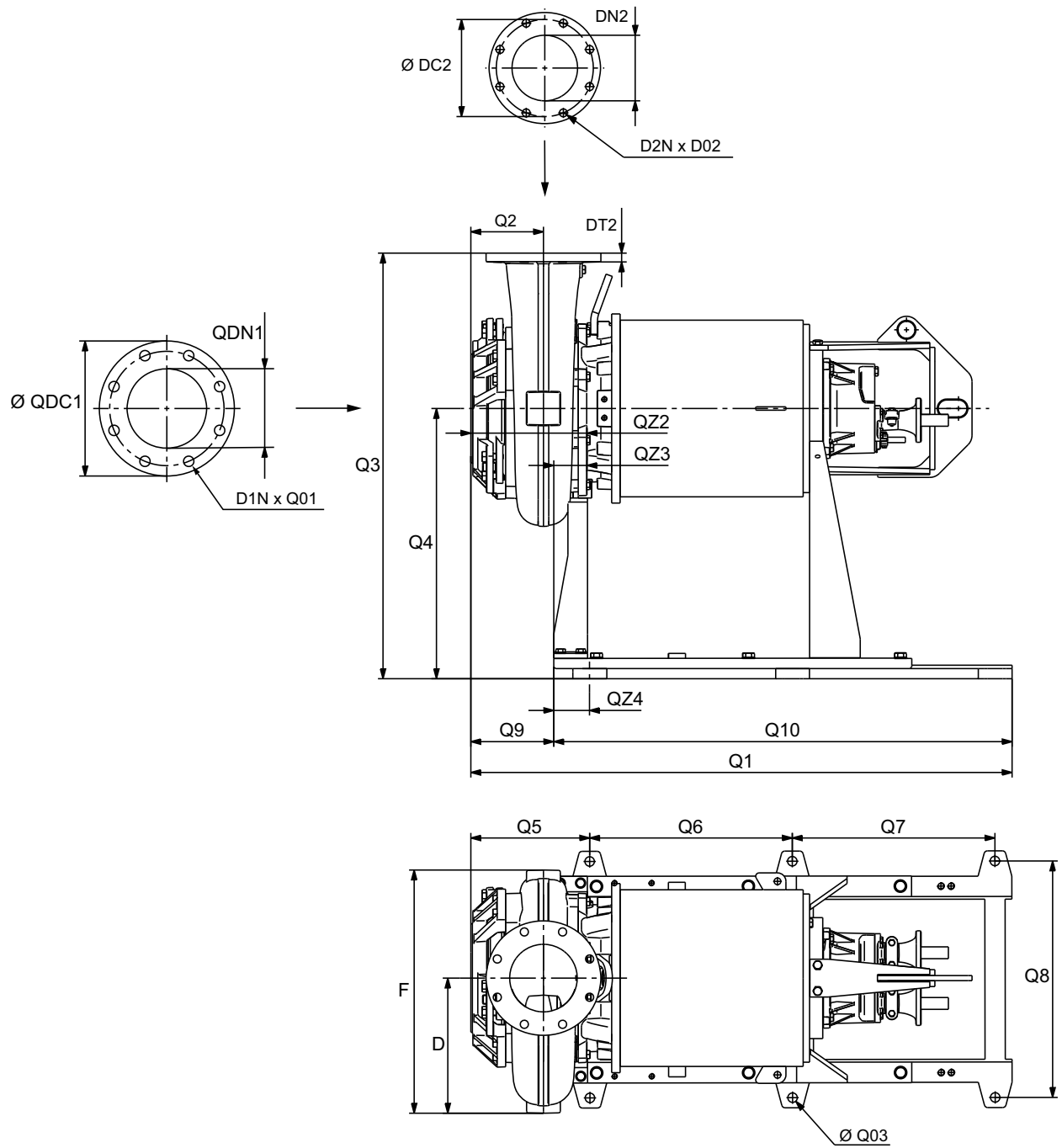


Fig. 37 Dry, horizontal installation on base stand

Pump type	[inch (mm)]											
	D	F	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
S1.30.A80.1200.4.70H.H	11.8 (300)	23.5 (596)	65.1 (1654)	8.9 (226)	55.1 (1400)	31.5 (800)	16.2 (411)	23.6 (600)	23.6 (600)	27.6 (700)	12.0 (304)	53.4 (1357)
S2.35.A80.1270.4.70H.H	10.2 (258)	22.4 (570)	64.5 (1638)	8.9 (226)	51.2 (1300)	31.5 (800)	15.6 (395)	23.6 (600)	23.6 (600)	27.6 (700)	11.3 (288)	53.4 (1357)
S2.35.A80.1610.4.70H.H	11.2 (285)	22.4 (570)	64.5 (1638)	8.9 (226)	51.2 (1300)	31.5 (800)	15.6 (395)	23.6 (600)	23.6 (600)	27.6 (700)	11.3 (288)	53.4 (1357)
S2.40.A80.1270.4.70M.H	15.7 (400)	28.3 (720)	64.5 (1638)	8.5 (215)	49.6 (1260)	31.5 (800)	15.6 (395)	23.6 (600)	23.6 (600)	27.6 (700)	11.3 (288)	53.4 (1357)
S2.40.A80.1610.4.70M.H	15.7 (400)	28.3 (720)	64.5 (1638)	8.5 (215)	49.6 (1260)	31.5 (800)	15.6 (395)	23.6 (600)	23.6 (600)	27.6 (700)	11.3 (288)	53.4 (1357)
S2.40.A100.1070.8.70H.H	18.8 (478)	35.1 (891)	70.2 (1783)	11.4 (289)	61.0 (1550)	31.5 (800)	21.3 (540)	23.6 (600)	23.6 (600)	27.6 (700)	17.0 (433)	53.4 (1357)
S2.45.A100.1470.6.70H.H	18.8 (478)	35.1 (891)	70.2 (1783)	11.4 (289)	61.0 (1550)	31.5 (800)	21.3 (540)	23.6 (600)	23.6 (600)	27.6 (700)	17.0 (433)	53.4 (1357)
S2.45.A100.1880.6.70H.H	18.8 (478)	35.1 (891)	76.3 (1938)	11.4 (289)	61.0 (1550)	31.5 (800)	21.3 (540)	23.6 (600)	23.6 (600)	27.6 (700)	17.0 (433)	53.4 (1357)
S2.55.A120.1470.6.70M.H	20.6 (522)	35.7 (907)	70.2 (1783)	10.9 (278)	59.1 (1500)	31.5 (800)	21.3 (540)	23.6 (600)	23.6 (600)	27.6 (700)	17.0 (433)	53.4 (1357)
S3.45.A120.1070.8.70M.H	20.6 (522)	35.7 (907)	68.6 (1743)	10.9 (278)	59.1 (1500)	31.5 (800)	19.7 (500)	23.6 (600)	23.6 (600)	27.6 (700)	15.5 (393)	53.4 (1357)
S3.45.A120.1880.6.70M.H	20.6 (522)	35.7 (907)	76.3 (1938)	10.9 (278)	59.1 (1500)	31.5 (800)	21.3 (540)	23.6 (600)	23.6 (600)	27.6 (700)	17.0 (433)	53.4 (1357)
S3.45.A200.1070.8.70L.H	28.3 (719)	50.0 (1269)	76.8 (1951)	18.1 (461)	78.7 (2000)	31.5 (800)	27.9 (708)	23.6 (600)	23.6 (600)	27.6 (700)	23.7 (601)	53.4 (1357)
S3.45.A200.1880.6.70L.H	28.3 (719)	50.0 (1269)	82.9 (2106)	18.1 (461)	78.7 (2000)	31.5 (800)	27.9 (708)	23.6 (600)	23.6 (600)	27.6 (700)	23.7 (601)	53.4 (1357)

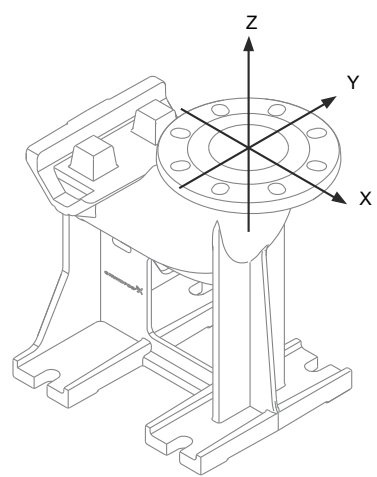
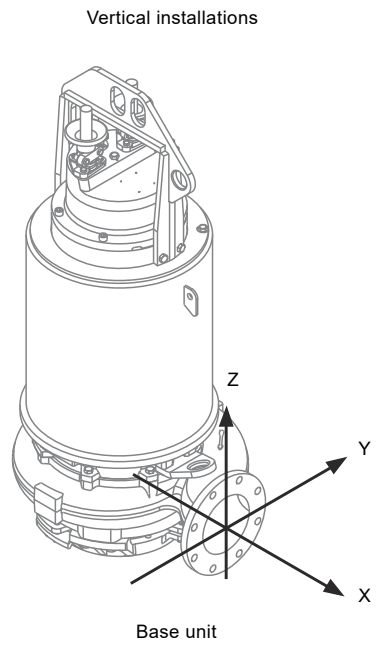
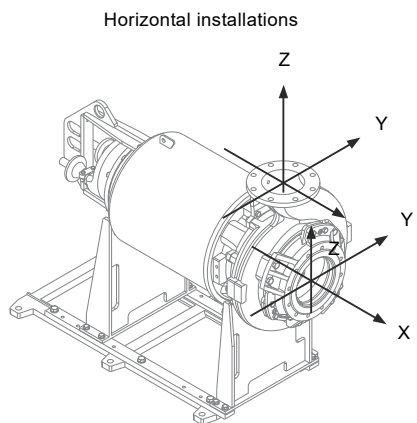
Pump type	[inch (mm)]		Pc.	[inch (mm)]		Pc.	[inch (mm)]						
	QDC1	QDN1		D1N	Q01		DN2	D2N	D02	DC02	DT2	Q03	QZ2
S1.30.A80.1200.4.70H.H	14.3 (362)	ANSI 10" (DN 200)	12	3/4" (M20)	ANSI 8" (DN 200)	8	0.9 (24)	11.7 (298)	0.9 (24)	1.1 (28)	13.9 (354)	-2.0 (-50)	4.2 (107)
S2.35.A80.1270.4.70H.H	14.3 (362)	ANSI 10" (DN 200)	12	3/4" (M20)	ANSI 8" (DN 200)	8	0.9 (24)	11.7 (298)	1.0 (26)	1.1 (28)	13.3 (338)	-2.0 (-50)	4.2 (107)
S2.35.A80.1610.4.70H.H	14.3 (362)	ANSI 10" (DN 200)	12	3/4" (M20)	ANSI 8" (DN 200)	8	0.9 (24)	11.7 (298)	1.0 (26)	1.1 (28)	13.3 (338)	-2.0 (-50)	4.2 (107)
S2.40.A80.1270.4.70M.H	14.3 (362)	ANSI 10" (DN 200)	12	3/4" (M20)	ANSI 8" (DN 200)	8	0.9 (24)	11.7 (298)	1.0 (26)	1.1 (28)	13.3 (338)	-2.0 (-50)	4.2 (107)
S2.40.A80.1610.4.70M.H	14.3 (362)	ANSI 10" (DN 200)	12	3/4" (M20)	ANSI 8" (DN 200)	8	0.9 (24)	11.7 (298)	1.0 (26)	1.1 (28)	13.3 (338)	-2.0 (-50)	4.2 (107)
S2.40.A100.1070.8.70H.H	17.0 (432)	ANSI 12" (DN 250)	6	3/4" (M20)	ANSI 12" (DN 250)	12	0.9 (24)	14.3 (362)	1.2 (30)	1.1 (28)	19.0 (483)	-2.0 (-50)	4.2 (107)
S2.45.A100.1470.6.70H.H	17.0 (432)	ANSI 12" (DN 250)	6	3/4" (M20)	ANSI 12" (DN 250)	12	0.9 (24)	14.3 (362)	1.2 (30)	1.1 (28)	19.0 (483)	-2.0 (-50)	4.2 (107)
S2.45.A100.1880.6.70H.H	17.0 (432)	ANSI 12" (DN 250)	6	3/4" (M20)	ANSI 12" (DN 250)	12	0.9 (24)	14.3 (362)	1.2 (30)	1.1 (28)	19.0 (483)	-2.0 (-50)	4.2 (107)
S2.55.A120.1470.6.70M.H	17.0 (432)	ANSI 12" (DN 250)	6	3/4" (M20)	ANSI 12" (DN 250)	12	1.0 (25)	17.0 (432)	1.3 (33)	1.1 (28)	19.0 (483)	-2.0 (-50)	4.2 (107)
S3.45.A120.1070.8.70M.H	17.0 (432)	ANSI 12" (DN 250)	6	3/4" (M20)	ANSI 12" (DN 250)	12	1.0 (25)	17.0 (432)	1.3 (33)	1.1 (28)	17.4 (443)	-2.0 (-50)	4.2 (107)
S3.45.A120.1880.6.70M.H	17.0 (432)	ANSI 12" (DN 250)	6	3/4" (M20)	ANSI 12" (DN 250)	12	1.0 (25)	17.0 (432)	1.3 (33)	1.1 (28)	19.0 (483)	-2.0 (-50)	4.2 (107)
S3.45.A200.1070.8.70L.H	21.3 (540)	ANSI 16" (DN 300)	8	3/4" (M20)	ANSI 20" (DN 500)	20	1.3 (32)	25.0 (635)	1.5 (37)	1.1 (28)	25.6 (651)	-2.0 (-50)	4.2 (107)
S3.45.A200.1880.6.70L.H	21.3 (540)	ANSI 16" (DN 300)	8	3/4" (M20)	ANSI 20" (DN 500)	20	1.3 (32)	25.0 (635)	1.5 (37)	1.1 (28)	25.6 (651)	-2.0 (-50)	4.2 (107)

## 13. Weights

Weights include 15 ft (15 m) cable.

Pump type	Weight [lbs (kg)]
S1.30.A80.1200.4.70H.S	2317 (1051)
S1.30.A80.1200.4.70H.C	2626 (1191)
S1.30.A80.1200.4.70H.D	2575 (1168)
S1.30.A80.1200.4.70H.H	2824 (1281)
S2.35.A80.1270.4.70H.S	2315 (1050)
S2.35.A80.1270.4.70H.C	2557 (1160)
S2.35.A80.1270.4.70H.D	2557 (1160)
S2.35.A80.1270.4.70H.H	2886 (1300)
S2.35.A80.1610.4.70H.S	2425 (1100)
S2.35.A80.1610.4.70H.C	2535 (1150)
S2.35.A80.1610.4.70H.D	2756 (1250)
S2.35.A80.1610.4.70H.H	3086 (1400)
S2.40.A80.1270.4.70M.S	2315 (1050)
S2.40.A80.1270.4.70M.C	2557 (1160)
S2.40.A80.1270.4.70M.D	2557 (1160)
S2.40.A80.1270.4.70M.H	2778 (1260)
S2.40.A80.1610.4.70M.S	2315 (1050)
S2.40.A80.1610.4.70M.C	2557 (1160)
S2.40.A80.1610.4.70M.D	2557 (1160)
S2.40.A80.1610.4.70M.H	2778 (1260)
S2.45.A100.1470.6.70H.S	2535 (1150)
S2.45.A100.1470.6.70H.C	2800 (1270)
S2.45.A100.1470.6.70H.D	2800 (1270)
S2.45.A100.1470.6.70H.H	3042 (1380)
S2.45.A100.1880.6.70H.S	2800 (1270)
S2.45.A100.1880.6.70H.C	3086 (1400)
S2.45.A100.1880.6.70H.D	3086 (1400)
S2.45.A100.1880.6.70H.H	3351 (1520)
S2.40.A100.1070.8.70H.S	2535 (1150)
S2.40.A100.1070.8.70H.C	2800 (1270)
S2.40.A100.1070.8.70H.D	2800 (1270)
S2.40.A100.1070.8.70H.H	3042 (1380)
S2.55.A120.1470.6.70M.S	2866 (1300)
S2.55.A120.1470.6.70M.C	3153 (1430)
S2.55.A120.1470.6.70M.D	3153 (1430)
S2.55.A120.1470.6.70M.H	3439 (1560)
S3.45.A120.1070.8.70M.S	2866 (1300)
S3.45.A120.1070.8.70M.C	3153 (1430)
S3.45.A120.1070.8.70M.D	2976 (1350)
S3.45.A120.1070.8.70M.H	3285 (1490)
S3.45.A120.1880.6.70M.S	3131 (1420)
S3.45.A120.1880.6.70M.C	3439 (1560)
S3.45.A120.1880.6.70M.D	3439 (1560)
S3.45.A120.1880.6.70M.H	3748 (1700)
S3.45.A200.1070.8.70L.S	3858 (1750)
S3.45.A200.1070.8.70L.C	3638 (1800)
S3.45.A200.1070.8.70L.D	3638 (1800)
S3.45.A200.1070.8.70L.H	4233 (1920)
S3.45.A200.1880.6.70L.S	4299 (1950)
S3.45.A200.1880.6.70L.C	4630 (2100)
S3.45.A200.1880.6.70L.D	4409 (2000)
S3.45.A200.1880.6.70L.H	4718 (2140)

# 14. Flange forces



The flange forces and moments are according to EN ISO 5199.

Forces can be found for both horizontal and vertical installations in table B.3 in EN ISO 5199, by selecting the correct flange dimension. Forces cannot be used directly for end-suction wastewater pumps without using a coefficient which can be found in table B.5 in EN ISO 5199 by selecting the correct pump family.

For Grundfos wastewater pumps, the pump families and coefficients are as stated below.

Horizontally installed pumps  
 Pump family A4 = Coefficient 0.35

Vertically installed pumps  
 Pump family 10A = Coefficient 0.30

TM06 4901 3115 - TM06 4903 3115 - TM06 4902 3115

Fig. 38 Pump characteristics

## 15. Grundfos Product Center

Online search and sizing tool to help you make the right choice.  
<http://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.



TM07 2384

TM07 2383

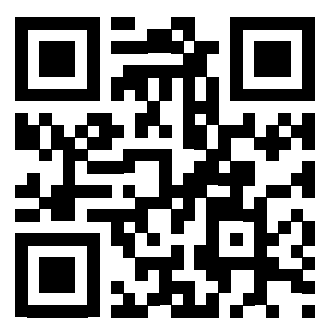
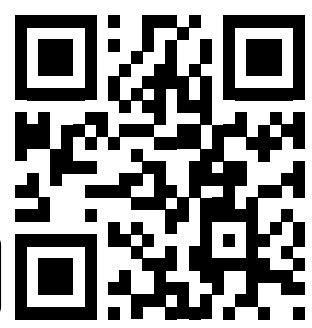
### Pos. Description

- |   |  |
|---|--|
| 1 | This drop-down menu enables you to set the search function to "Products" or "Literature".  |
| 2 | <b>SIZING</b> enables you to size a pump based on entered data and selection choices.  |
| 3 | <b>CATALOGUE</b> gives you access to the Grundfos product catalogue.<br><b>REPLACEMENT</b> enables you to find a replacement product. Search results will include information on |
| 4 | <ul style="list-style-type: none"> <li>the lowest purchase price</li> <li>the lowest energy consumption</li> <li>the lowest total life cycle cost.</li> </ul>                    |
| 5 | <b>LIQUIDS</b> enables you to find pumps designed for aggressive, flammable or other special liquids.  |

# Grundfos GO

## Mobile solution for professionals on the GO!

Grundfos GO is the mobile tool box 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.











97682353 01.2021

ECM: 1301833

**GRUNDFOS Chicago**

3905 Enterprise Court  
P.O. Box 6620  
Aurora, IL 60598-0620  
Phone: +1-630-236-5500  
Fax: +1-630-236-5511

**GRUNDFOS Kansas City**

9300 Loiret Boulevard  
Lenexa, Kansas 66219  
Phone: +1-913-227-3400  
Fax: +1-913-227-3500  
[www.grundfos.us](http://www.grundfos.us)

**GRUNDFOS Canada**

2941 Brighton Road  
Oakville, Ontario L6H 6C9 Canada  
Phone: +1-905 829 9533  
Fax: +1-905 829 9512  
[www.grundfos.ca](http://www.grundfos.ca)

**GRUNDFOS México**

Boulevard TLC No. 15  
Parque Industrial Stiva Aeropuerto  
C.P. 66600 Apodaca, N.L. Mexico  
Phone: +011-52-81-8144 4000  
Fax: +011-52-81-8144 4010  
[www.grundfos.mx](http://www.grundfos.mx)