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# 3" WPS® Constant Pressure Pumping System

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3" WPS-CP 50/60Hz

WP/JVG/1.0/01.06.09



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### 3" WPS®-CP submersible pumps

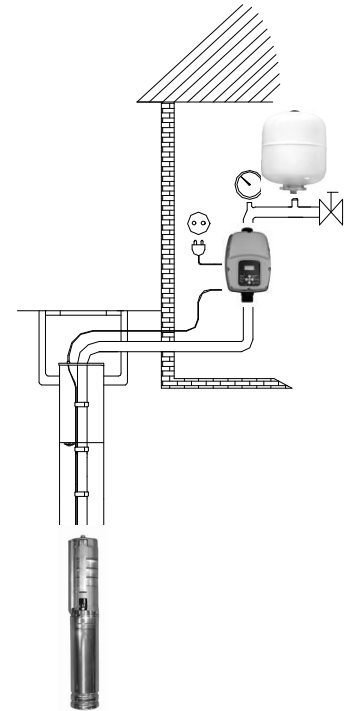
3" WPS®-CP pumps are suitable for both continuous and intermittent operation for a variety of applications:

- Domestic water supply
- Small waterworks
- Irrigation
- Tank applications
- Pressure boosting
- Heating pumps

Note: For other applications, please contact Well Pumps.

3" WPS®-CP pumps offer the following features:

- Pump entirely made out of stainless steel and fits in 3" drilled wells
- Constant pressure with two set pressures possible
- Capacity from 0.2 to 7m<sup>3</sup>/h and a maximum head of 190m
- Motor rating up to 1,5kW, 140Hz
- Single phase supply to the controller
- Incorporated jam free check valve
- Dry-running protection
- High efficiency of pump and motor
- Excellent resistance to wear
- Soft start
- Overvoltage and undervoltage protection
- Overload protection
- Overtemperature protection.
- Variable speed



The 3" WPS®-CP pump is fitted with a three phase 230V Well Pumps motor. The 3" WPS®-CP controller needs a single-phase supply and transforms it to a three-phase current to the motor. The controller is fitted with a frequency drive and performs a constant pressure of the flow through a variable speed of the pump. As a consequence, the pump can be set to operate in any duty point in the range between the pump min. and max. performance curves.

In case of a pump fault, an alarm will be indicated on the front of the 3" WPS® controller.

### The kit

The 3" WPS®-CP pump is sold as a kit and consists of the following elements:

- A 3" submersible pump WPS® entirely made of stainless steel.
- A WPS® high speed submersible motor able to run at variable frequencies up to 140Hz.
- A WPS®-CP constant pressure controller including a variable speed drive, a flow detection and a pressure sensor.
- A pressure vessel of 8 liter, a valve and a pressure gauge.

### Pump and motor range

3" WPS®-CP pump (1, 2, 3, and 5 m<sup>3</sup>/h) Stainless steel DIN 1.4301, AISI 304

3" WPS®-CP motor Three-phase maximum 1,5 kW Stainless steel DIN 1.4301, AISI 304, top bracket nickel plated.

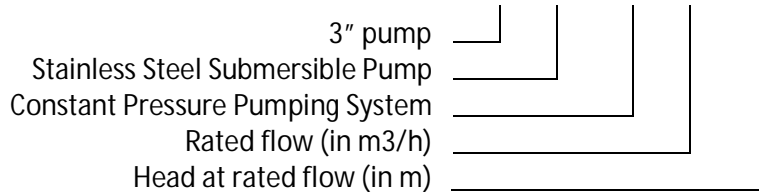
### Pipe connection

All pump types have a treaded pipe connection Rp1 ¼"

### Pump identification code

Example

3" WPS - CP 2 - 75



### Pumped liquids

3"WPS®-CP pumps are designed for pumping thin, clean, non-aggressive and non-explosive liquids, not containing solid particles.

3"WPS®-CP pumps are suitable for pumping liquids with a content of sand up to 50 g/m<sup>3</sup>. A higher content of sand will shorten pump life.

The maximum fluid temperature is 30°C. For higher temperatures, please contact Well Pumps.

### Features and benefits

#### Dry-running protection

3"WPS®-CP pumps are protected against dry running. The WPS®-CP controller is equipped with a flow sensor that at all times measures the pumped flow. As soon as this flow drops under a minimum value ( $Q_{min}$  is about 0,1m<sup>3</sup>/h), the pump will be stopped.

Simultaneously, also the absorbed power of the motor is measured. A minimum value of this power ensures cut-out of the pump.

Both these measurements ensure in case of lack of water in the borehole, a shutdown of the pump and thus preventing a burnout of the motor.

#### High pump efficiency and Wear resistance

The WPS® pump is entirely made of stainless steel and ensures a high efficiency meaning low energy consumption and therefore low energy costs.

Due to its stainless steel construction in combination with the high performance NBR seals and bearings, the 3"WPS®-CP pumps ensure high wear resistance to sand for long product life.

#### Excellent starting capabilities

The integrated electronic unit of the WPS®-CP controller features soft starting. Soft start reduces the starting current and thus gives the pump a smooth and steady acceleration.

A soft starter minimizes the risk of wear of the pump and prevents overloading of the supply during start-up.

The high starting reliability also applies in case of low voltage supply.

#### Overvoltage and undervoltage protection

Overvoltage and undervoltage may occur in case of unstable voltage supply.

The integrated protection of all three motor versions prevents damage to the motor in case the voltage moves outside the permissible voltage range.

The pump will be cut out if voltage falls below 185V or rises above 260V. The motor is automatically started again when the voltage is again within the permissible voltage range. Therefore no extra protection relay is needed.

#### Overload protection

Exposure of the pump to heavy load causes the current consumption to rise. When the maximum allowed current is exceeded, the pump will be stopped.

Also a locked rotor will automatically be detected and the power supply cut out. Consequently, no extra motor protection is needed.

#### Overtemperature protection

The electronic unit of the WPS®-CP controller has a built-in temperature sensor. When the temperature rises over its limit, the motor is cut out. When the temperature has dropped again, the motor is automatically started again.

#### Reliability

The motors have been constructed with a view to high reliability and have the following features:

- Top quality high speed ball bearings.
- An efficient internal oil circulation in the motor transfers the heat away from the rotor, stator and ball bearings and ensures an optimum operating condition for the motor.

#### Variable speed

The 3" WPS®-CP controller enables continuously variable speed control within the 5740 and 8200 rpm. The pump can operate in any duty point in the range between the 5740 and 8200 rpm performance curves of the pump. Consequently, the pump performance can be adapted to any specific requirement.

On the basis of a required head the speed of the motor is calculated.

#### Installation

The 3" WPS®-CP pump may be installed vertically, horizontally or in any position in between.

Note: The pump must not fall below the horizontal level in relation to the motor.

The following features ensure simple and easy installation of 3" WPS®-CP pumps:

- Discharge 1 ¼" F.
- Built-in non-return valve,
- The 3" WPS®-CP controller has a flow through design. The pumped water ensures the cooling of the electronics. The connections on the controller are 1 ¼" M.
- Low weight ensuring user-friendly handling,
- Installation in 3" or larger boreholes,
- No extra on/off switch or motor starter is necessary.
- 3" WPS®-CP pumps are available with one length cable with a motor plug (from 1,75m up to 60m).

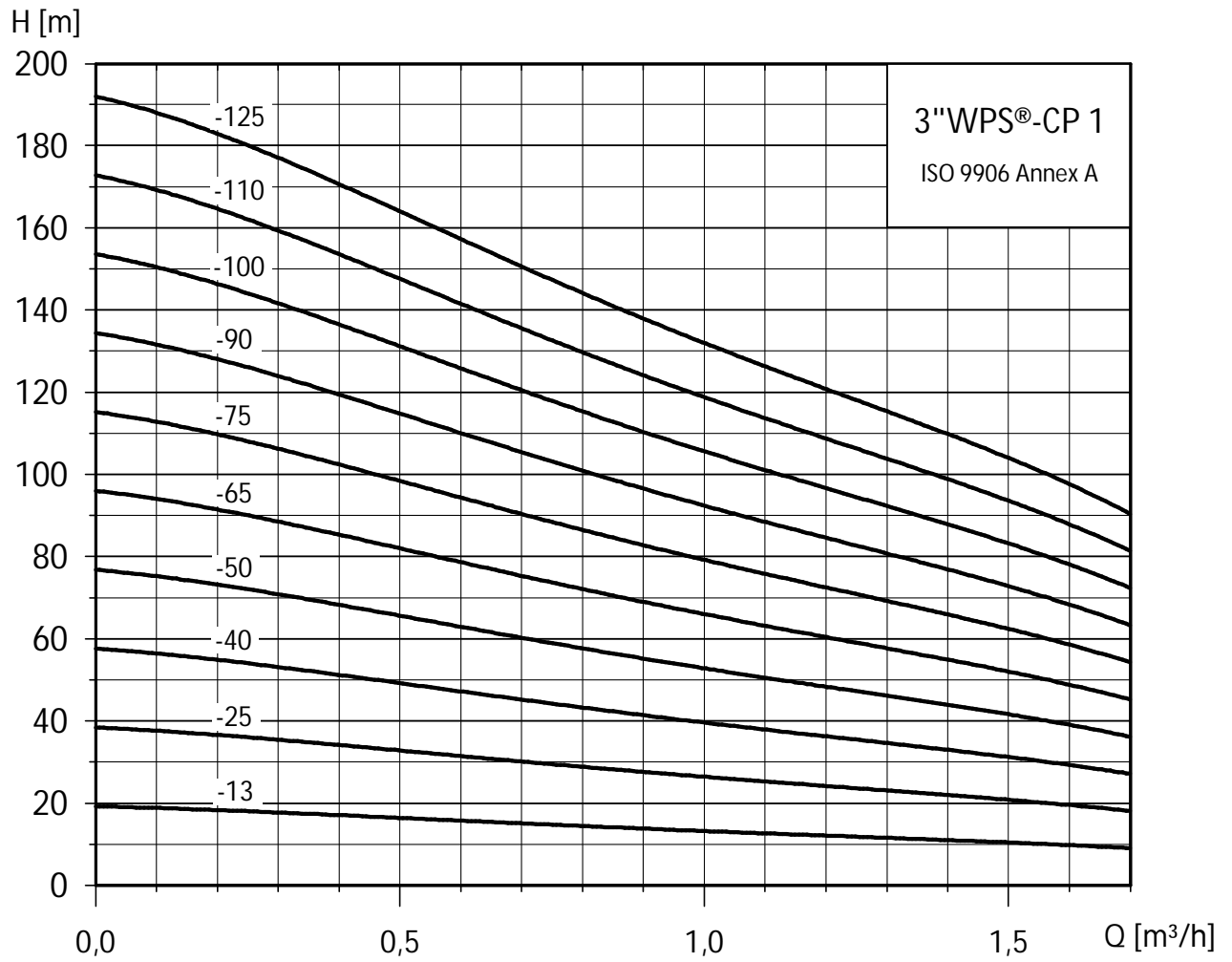
For horizontal installation a flow sleeve is recommended in order to

- Ensure sufficient flow velocity past the motor and thus provide sufficient cooling,
- Prevent motor and electronic unit from being buried in sand or mud.

#### Service

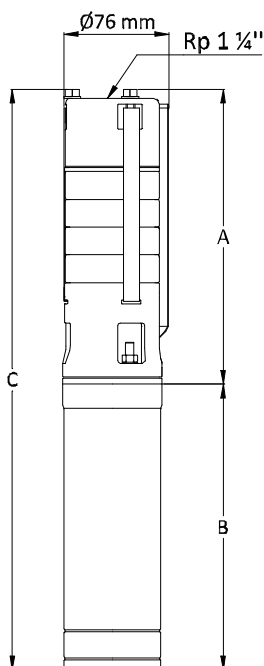
The pump and motor are very easy to maintain and repair. The modular pump and motor design facilitates installation and service. The cable and the plug are fitted to the pump with screws which enables replacement.

Performance Curves 3"WPS®-CP 1



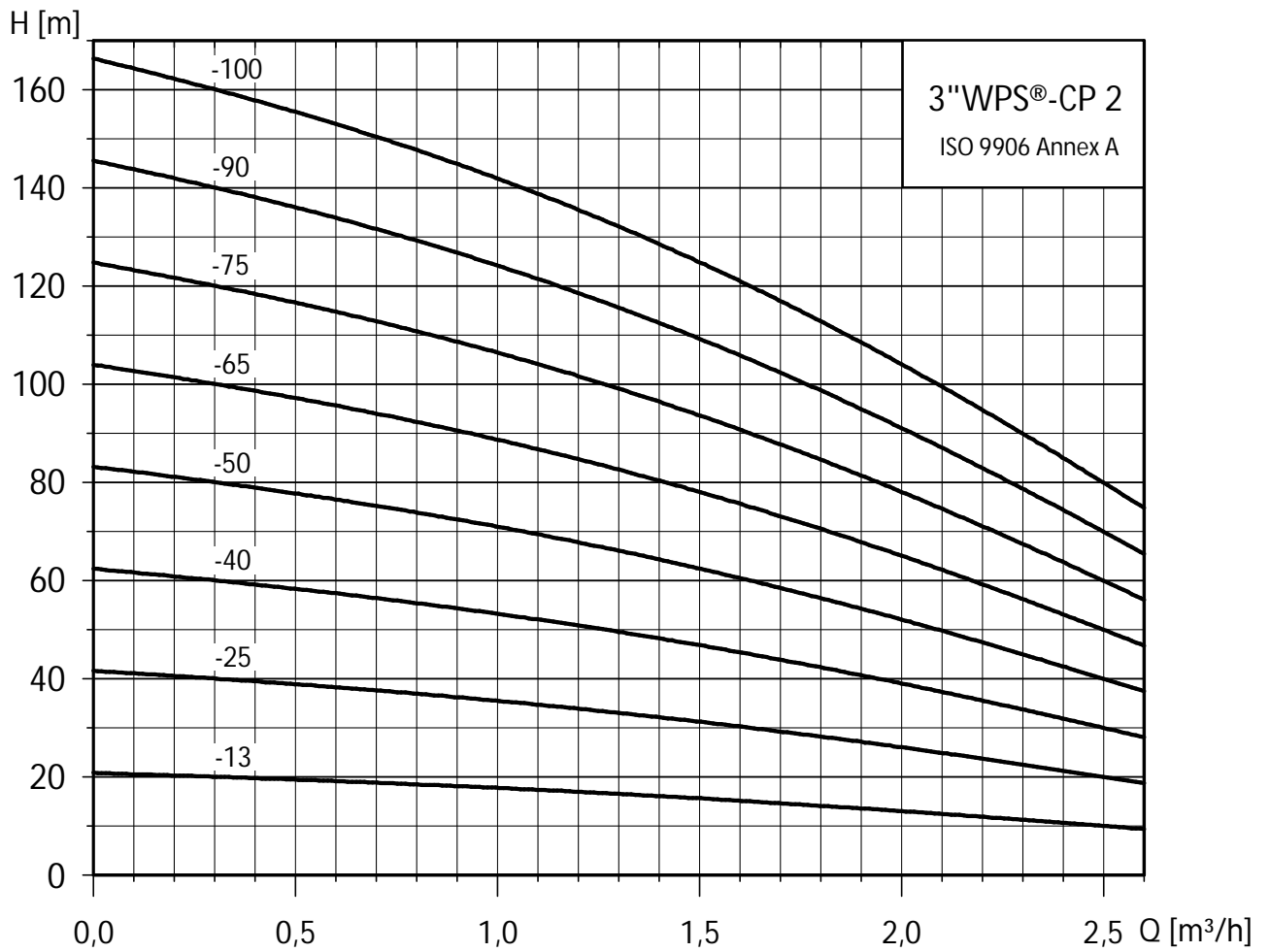
**Selection Chart 3"WPS®-CP 1**

Pump Type	Max. Pump Power [kW]	Flow [m <sup>3</sup> /h]				Max. Head [m] at 0 m <sup>3</sup> /h	Full load current	
		0,5	1	1,5	2		Motor [A]	Supply [A]
3"WPS®-CP 1-13	0,15	17	13	10	6	20	1,9	3,3
3"WPS®-CP 1-25	0,29	33	26	21	12	39	2,3	3,8
3"WPS®-CP 1-40	0,44	50	40	31	18	59	2,7	4,7
3"WPS®-CP 1-50	0,58	66	53	42	24	78	3,1	5,4
3"WPS®-CP 1-65	0,73	83	66	52	30	98	4,1	7,1
3"WPS®-CP 1-75	0,87	100	79	62	36	117	4,6	8,0
3"WPS®-CP 1-90	1,02	116	92	73	42	137	6,1	10,6
3"WPS®-CP 1-100	1,16	133	106	83	48	156	6,5	11,3
3"WPS®-CP 1-110	1,31	149	119	94	54	176	6,9	12,0
3"WPS®-CP 1-125	1,45	166	132	104	60	195	7,2	12,5

**Dimensions and weights 3"WPS®-CP 1**


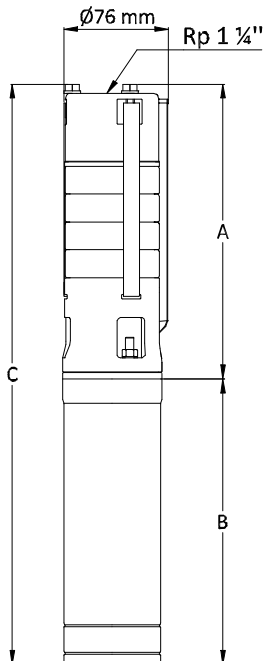
Pump Type	Num. of stages	Max Pump Power P <sub>2</sub> [kW]	Pump data			Kit		
			A [mm]	B [mm]	C [mm]	Weight [kg]	Dim. [cm]	Weight [kg]
3"WPS®-CP 1-13	1	0,15	160	210	370	5,1	65x32x22	11,2
3"WPS®-CP 1-25	2	0,29	180	210	390	4,3	65x32x22	10,4
3"WPS®-CP 1-40	3	0,44	200	210	410	5,5	65x32x22	11,6
3"WPS®-CP 1-50	4	0,58	220	210	430	5,7	65x32x22	11,8
3"WPS®-CP 1-65	5	0,73	240	240	480	6,6	65x32x22	12,7
3"WPS®-CP 1-75	6	0,87	260	240	500	6,8	65x32x22	12,9
3"WPS®-CP 1-90	7	1,02	280	270	550	7,6	65x32x22	13,7
3"WPS®-CP 1-100	8	1,16	300	270	570	7,8	65x32x22	13,9
3"WPS®-CP 1-110	9	1,31	320	270	590	8,0	65x32x22	14,1
3"WPS®-CP 1-125	10	1,45	340	270	610	8,2	65x32x22	14,3

## Performance Curves 3"WPS®-CP 2



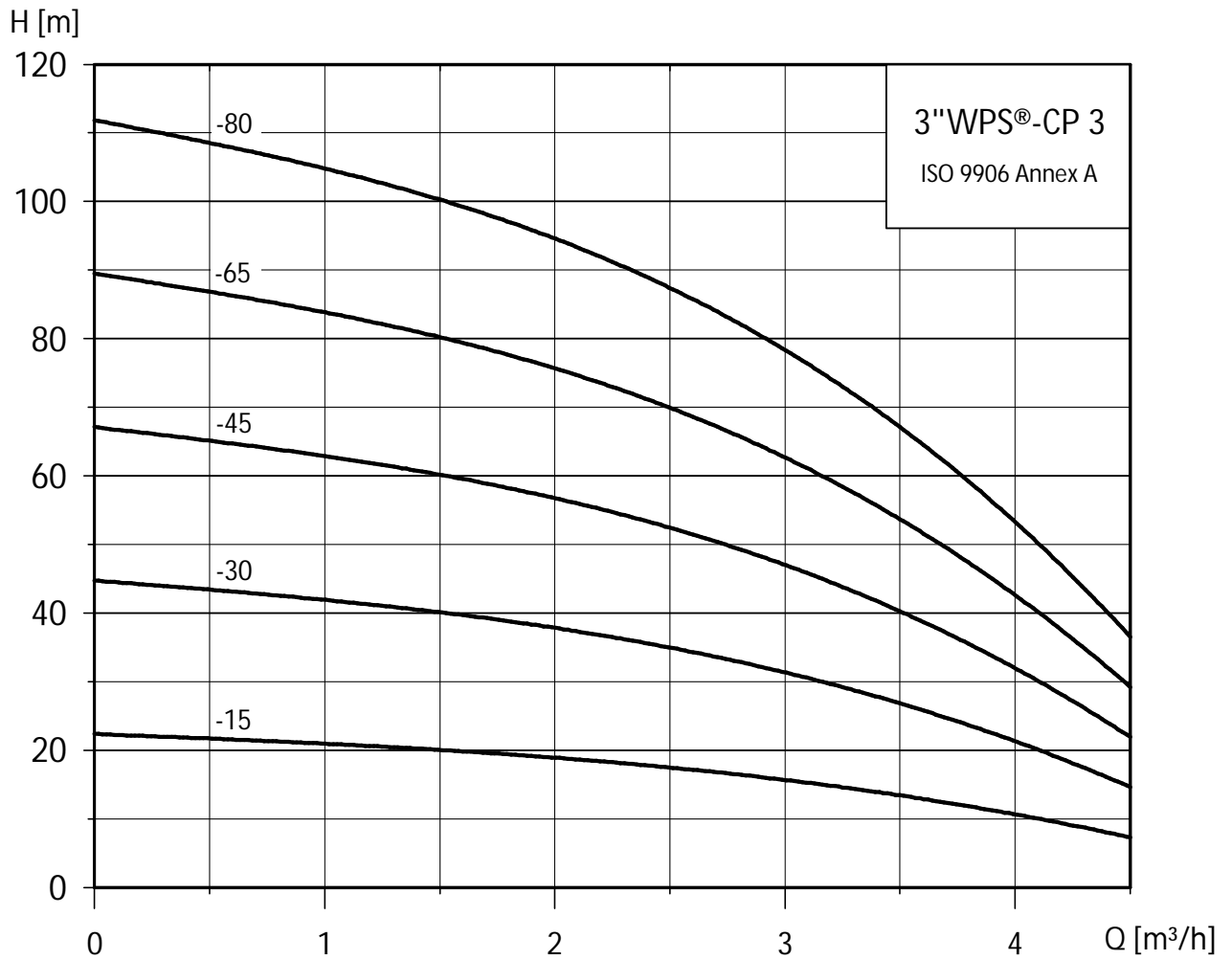
**Selection Chart 3"WPS®-CP 2**

Pump Type	Max. Pump Power [kW]	Flow [m³/h]					Max. Head [m] at 0 m³/h	Full load current	
		0,5	1	1,5	2	2,5		Motor [A]	Supply [A]
3"WPS®-CP 2-13	0,19	20	18	16	13	10	21	2,0	3,5
3"WPS®-CP 2-25	0,37	39	36	31	26	20	42	2,5	4,4
3"WPS®-CP 2-40	0,56	59	53	47	39	30	62	3,1	5,4
3"WPS®-CP 2-50	0,74	78	71	62	52	40	83	4,1	7,1
3"WPS®-CP 2-65	0,90	98	89	78	65	50	104	4,7	8,2
3"WPS®-CP 2-75	1,11	117	107	93	78	60	125	6,1	10,6
3"WPS®-CP 2-90	1,29	137	124	109	91	70	145	6,8	11,8
3"WPS®-CP 2-100	1,48	156	142	124	104	80	166	7,2	12,5

**Dimensions and weights 3"WPS®-CP 2**


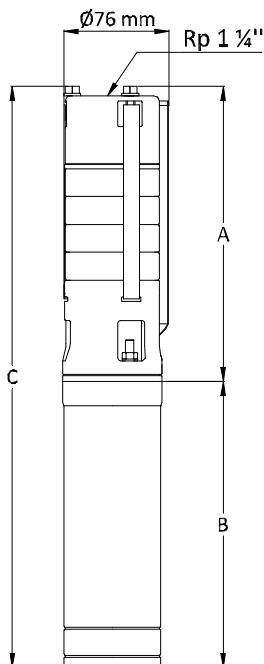
Pump Type	Num. of stages	Max Pump Power P <sub>2</sub> [kW]	Pump data			Weight [kg]	Kit	
			A [mm]	B [mm]	C [mm]		Dim. [cm]	Weight [kg]
3"WPS®-CP 2-13	1	0,19	160	210	370	5,1	65x32x22	11,2
3"WPS®-CP 2-25	2	0,37	180	210	390	4,3	65x32x22	10,4
3"WPS®-CP 2-40	3	0,56	200	210	410	5,5	65x32x22	11,6
3"WPS®-CP 2-50	4	0,74	220	240	460	6,5	65x32x22	12,6
3"WPS®-CP 2-65	5	0,93	240	240	480	6,7	65x32x22	12,8
3"WPS®-CP 2-75	6	1,11	260	270	530	7,6	65x32x22	13,7
3"WPS®-CP 2-90	7	1,29	280	270	550	7,8	65x32x22	13,9
3"WPS®-CP 2-100	8	1,48	300	270	570	8,0	65x32x22	14,1

Performance Curves 3"WPS®-CP 3



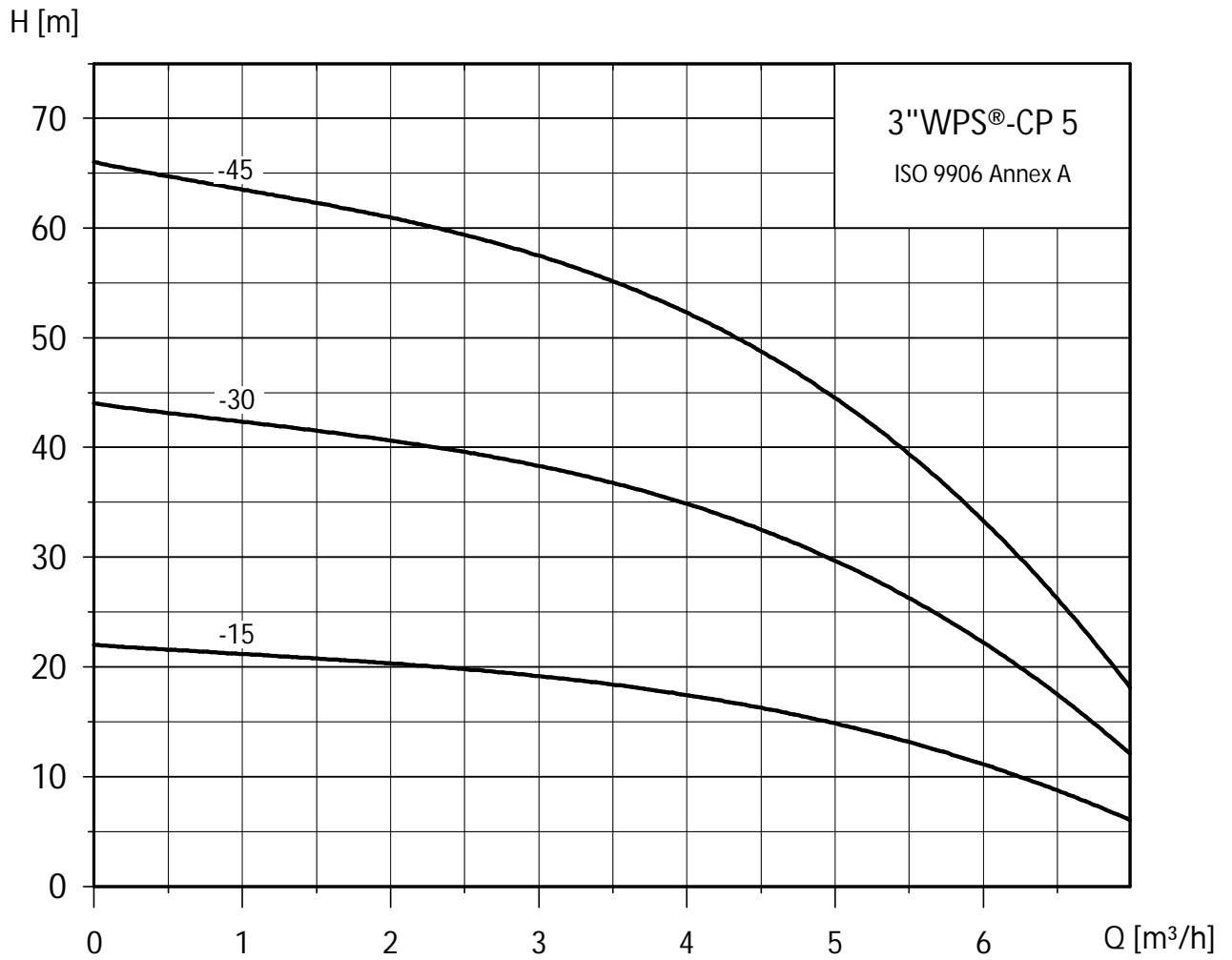
**Selection Chart 3"WPS®-CP 3**

Pump Type	Max. Pump Power [kW]	Flow [m³/h]						Max. Head [m] at 0 m³/h	Full load current	
		1	2	2,5	3	3,5	4		Motor [A]	Supply [A]
3"WPS®-CP 3-15	0,29	21	19	17	16	13	10	22	2,8	4,9
3"WPS®-CP 3-30	0,58	42	37	34	31	26	21	45	3,1	5,4
3"WPS®-CP 3-45	0,87	62	56	52	47	40	31	67	4,6	8,0
3"WPS®-CP 3-65	1,16	83	74	69	62	53	42	90	6,3	10,9
3"WPS®-CP 3-80	1,45	104	93	86	78	66	52	112	7,1	12,3

**Dimensions and weights 3"WPS®-CP 3**


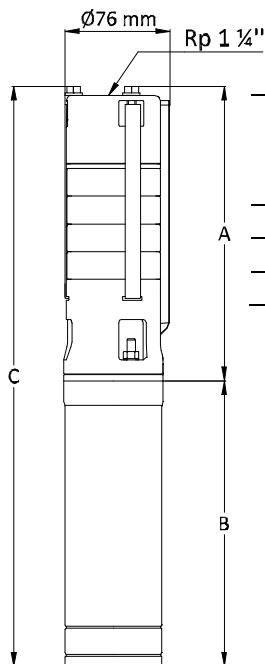
Pump Type	Num. of stages	Max Pump Power P <sub>2</sub> [kW]	Pump data			Kit		
			A [mm]	B [mm]	C [mm]	Weight [kg]	Dim. [cm]	Weight [kg]
3"WPS®-CP 3-15	1	0,29	160	210	370	5,1	65x32x22	11,2
3"WPS®-CP 3-30	2	0,58	180	210	390	4,3	65x32x22	10,4
3"WPS®-CP 3-45	3	0,87	200	240	440	6,3	65x32x22	12,4
3"WPS®-CP 3-65	4	1,16	220	270	490	7,3	65x32x22	13,4
3"WPS®-CP 3-80	5	1,45	240	270	510	7,5	65x32x22	13,6

Performance Curves 3"WPS®-CP 5

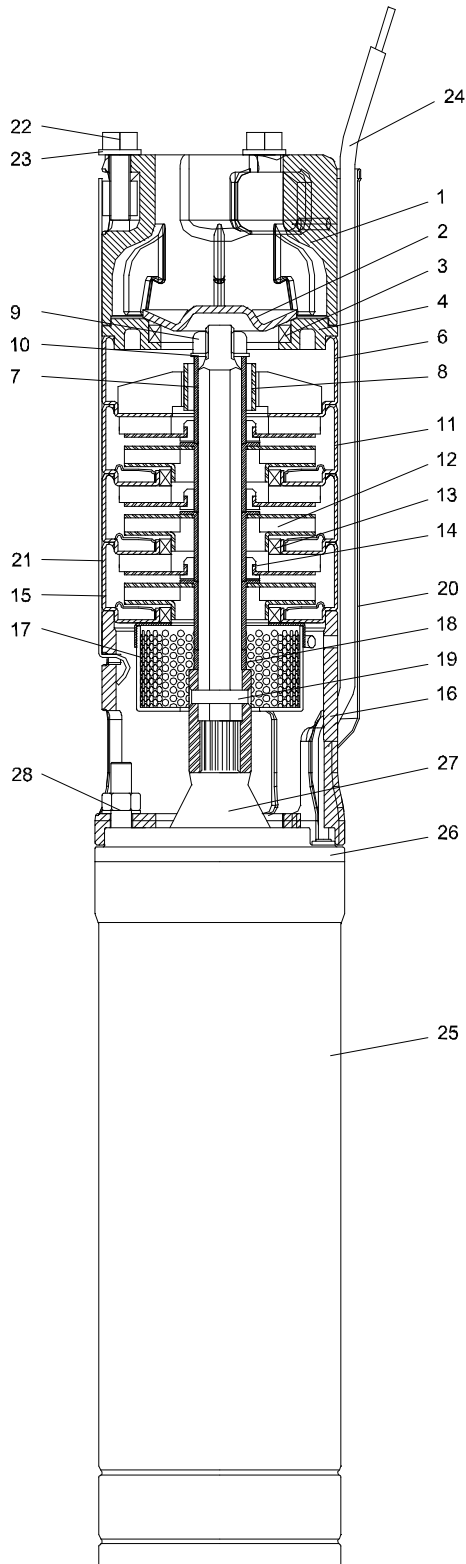


**Selection Chart 3"WPS®-CP 5**

Pump Type	Max. Pump Power [kW]	Flow [m³/h]						Max. Head [m] at 0 m³/h	Full load current	
		1	2	3	4	5	6		Motor [A]	Supply [A]
3"WPS®-CP 5-15	0,45	21	20	19	17	15	11	22	3,2	5,6
3"WPS®-CP 5-30	0,90	43	41	38	35	29	22	45	4,7	8,2
3"WPS®-CP 5-45	1,35	64	61	57	52	44	33	67	7,2	12,5

**Dimensions and weights 3"WPS®-CP 5**


Pump Type	Num. of stages	Max Pump Power P <sub>2</sub> [kW]	Pump data			Kit		
			A [mm]	B [mm]	C [mm]	Weight [kg]	Dim. [cm]	Weight [kg]
3"WPS®-CP 5-15	1	0,45	160	210	370	5,1	65x32x22	11,2
3"WPS®-CP 5-30	2	0,90	180	240	420	6,1	65x32x22	12,2
3"WPS®-CP 5-45	3	1,35	200	270	470	7,1	65x32x22	13,2

**Material specification**


Pos.	Component	Material	Material code
1	Discharge Chamber	Stainless Steel	AISI 304 - 1.4301
2	Valve Cone	Stainless Steel	AISI 304 - 1.4301
3	Valve Seat	Stainless Steel/NBR	AISI 316 - 1.4401
4	Retainer for Valve Seat	Stainless Steel	AISI 304 - 1.4301
6	Top Diffusor	Stainless Steel	AISI 304 - 1.4301
7	Top Spacer	Stainless Steel	AISI 304 - 1.4301
8	Top Bearing	Stainless Steel/NBR	AISI 316 - 1.4401
9	Nut M8	Stainless Steel	AISI 304 - 1.4301
10	Washer M8	Stainless Steel	AISI 304 - 1.4301
11	Diffusor	Stainless Steel	AISI 304 - 1.4301
12	Impeller	Stainless Steel	AISI 304 - 1.4301
13	Neck Ring	Stainless Steel/NBR	AISI 304 - 1.4301
14	Intermediate Bearing	NBR	
15	Bottom Diffusor	Stainless Steel	AISI 304 - 1.4301
16	Suction interconnector	Stainless Steel	AISI 304 - 1.4301
17	Strainer	Stainless Steel	AISI 304 - 1.4301
18	First Spacer	Stainless Steel	AISI 304 - 1.4301
19	Shaft with coupling	Stainless Steel	AISI 304 - 1.4301
20	Cable Guard	Stainless Steel	AISI 304 - 1.4301
21	Strap	Stainless Steel	AISI 304 - 1.4301
22	Bolt M6	Stainless Steel	AISI 304 - 1.4301
23	Washer M6	Stainless Steel	AISI 304 - 1.4301
24	Motor Lead with plug		
25	Motor Stator	Stainless Steel	AISI 304 - 1.4301
26	Motor Top Cover	Nickel plated	
27	Shaft Seal	NBR	
28	Nut and Washer M6	Stainless Steel	AISI 304 - 1.4301

## Cable selection

### Submersible drop cable to the motor

The table below shows the maximum length of the submersible drop cable between the controller and the motor for the different cable sizes and motor powers.

The cross-sections of the cable are calculated according to a 3% voltage drop (IEC 60364:2001) or follow the regulations set by the local authorities.

The pump will be cut out if voltage falls below 185 V.

Motor size	4G1,5 mm <sup>2</sup>	4G2,5 mm <sup>2</sup>	4G4 mm <sup>2</sup>	4G6 mm <sup>2</sup>
600 W	100 m	150 m*	-	-
900W	70 m	115 m	175m*	-
1500W	45 m	75 m	120 m*	170 m*

\*extra filter required

In case the total length of the electrical power cable between controller and motor exceeds 120m, an extra filter to protect the motor from burning is required. See accessories.

### Supply cable to the controller

In case you want a longer electrical cable, you must check the cable section following the table below. Maximal cable length for specific cable sections:

Motor Power	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	6 mm <sup>2</sup>	10 mm <sup>2</sup>
600 W	50 m	80 m	120 m	200 m
900W	40 m	60 m	90 m	150 m
1500W	30 m	45 m	70 m	110 m

## Accessories

### Submersible drop cable to the motor (drinking water quality)

4-core submersible cable including earth conductor. This blue cable is approved for drinking water applications (KTW approval). When ordering please state length [m]



Description	Cross Section of leads	Reference
Submersible cable 4G2.5	2.5 mm <sup>2</sup>	003505
Submersible cable 4G4	4 mm <sup>2</sup>	003509
Submersible cable 4G6	6 mm <sup>2</sup>	003507

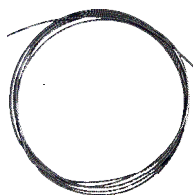
### Submersible cable joint kit

For watertight shrink-joining of motor cable and submersible drop cable (round or flat cable). The joint is ready for use after a few minutes and requires no long hardening time as do resin joints.



Description	Cross Section of leads	Reference
Submersible cable joint kit 1,5-2,5	1.5 – 2.5 mm <sup>2</sup>	001042
Cable joint 4x 1,5–2,5mm <sup>2</sup> fitted to the drop cable	1.5 – 2.5 mm <sup>2</sup>	001059
Submersible cable joint kit 4-6	4 – 6 mm <sup>2</sup>	001043
Cable joint 4x 1,5–2,5mm <sup>2</sup> fitted to the drop cable	4 – 6 mm <sup>2</sup>	001060

## Straining Wire



The stainless steel wire retains the submersible pump. Special openings are made in the discharge chamber to fix the wire to the pump. When ordering please state the requested length [m].

Material	Diameter	Reference
Stainless steel DIN W.-Nr. 1.4401, AISI 316	Ø 3mm	001098

## Wire clamps



Two units are needed per loop. This means per installation 4 wire clamps are recommended.

Material	Diameter	Reference
Stainless steel DIN W.-Nr. 1.4401, AISI 316	Ø 3mm	001099

## Filters



1. Motor side: When the drop cable between the controller and the pump exceeds more than 120m, an extra filter to protect the motor from burning is required.

Description	Max. Cable length	Reference
WPS® 200MF Filter	200 m	001007
WPS® 400MF Filter	400 m	001008

2. Supply side: Radio frequency interference is the radiation or conduction of radio frequency energy (or electronic noise) produced by electrical and electronic devices at levels that interfere with the operation of adjacent equipment. In case you experience phenomena, please install the WPS® RFI Power Line Filter.

Description	Reference
WPS® RFI Power Line Filter	001009

**Cooling Shrouds**

The cooling shrouds are designed to ensure a sufficient flow velocity past the motor in order to provide sufficient cooling. For the following cases a cooling shroud is recommended:

- horizontal or vertical installation in a tank
- installation of the pump in the screen from the well
- installation in big sized well not ensuring enough cooling velocity. See table.

Minimum flow required for motor cooling in water up to 30°C.	
Casing or sleeve I.D. [mm (inches)]	3" motor, cooling flow 8 cm/sec [m <sup>3</sup> /h]
78 (3")	0,2
102 (4")	1,1
127 (5")	2,4
152 (6")	4,0

To the shroud itself, a screen can be added. In case of horizontal installation a set of supports are available. The screen can be changed by an adaptor with floating screen ensuring water intake about 20cm under the water level and prevent clogging of the pump due to sand or other sediments on the bottom of the tank, lake, ...

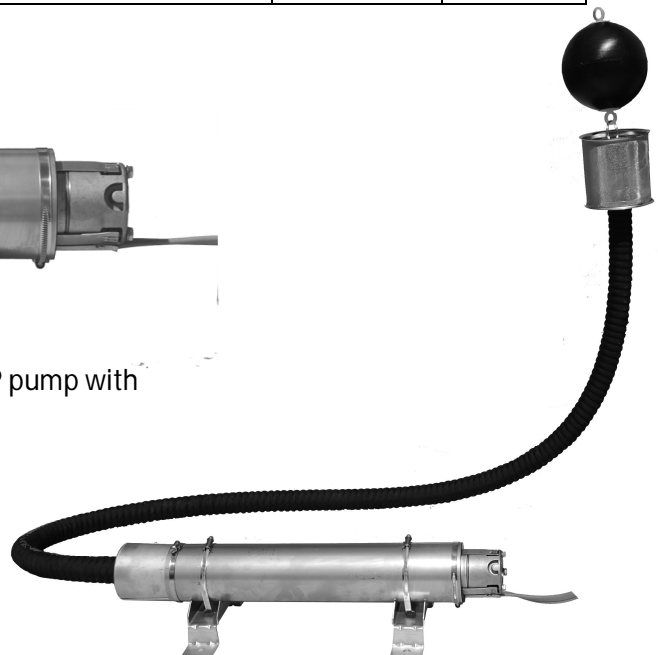
Description	Material	Pump with motor	Reference
Shroud Ø88x350mm	1.4301 AISI304	600W	001104
Shroud Ø88x450mm	1.4301 AISI304	900W – 1500W	001105

Description	Material	Pump with motor	Reference
Screen Ø88x90mm	1.4301 AISI304	All types	001106
Floating Screen	1.4301 AISI304	All types	001107

Description	Material	Reference
Set of supports for horizontal installation	1.4301 AISI 304	001108



complete horizontal installation of 3" WPS®-CP pump with shroud, screen and set of supports



Complete horizontal installation of 3" WPS®-CP pump with floating screen

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