SHAKTI
PUMPING LIFE

IMMERSIBLE PUMPS

SMTR 50/60 Hz

SHAKTI

THE POWER OF INNOVATION, EFFICIENCY & TECHNOLOGY.

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CONTENT

INTRODUCTION

SMTR

Shakti SMTR pumps are vertical multistage centrifugal pumps designed for pumping of cooling lubricants for machine tools, condensate transfer and similar applications.
The pumps are designed to be mounted on top of tanks with the chamber stack immersed in the pumped liquid.
The pumps come in various pump sizes and have various numbers of stages to provide the flow, the pressure and the installation length required. To meet specific depths of tanks or containers, the immersible length of the pump can be varied using empty chambers.
The pumps consist of two main components:
The motor and the pump unit. The motor is a Shakti standard SMG motor designed to EN standards. The pump unit consists of optimised hydraulics, various types of connections, a motor stool, a given number of chambers and various other parts.
The mounting flange dimensions are according to DIN 5440. The mechanical shaft seal is according to EN 12 756.

APPLICATION

Shakti range of high-pressure pumps offers unsurpassed accuracy and stability to make sure that nothing interferes with the delicate machining process. Equally important, high efficiency ensures a remarkably low heat input into the cooling lubricant.
Pumps suitable for machine tool applications are the immersible SMTR, offering a tank mounted design.

MACHINE TOOL APPLICATIONS

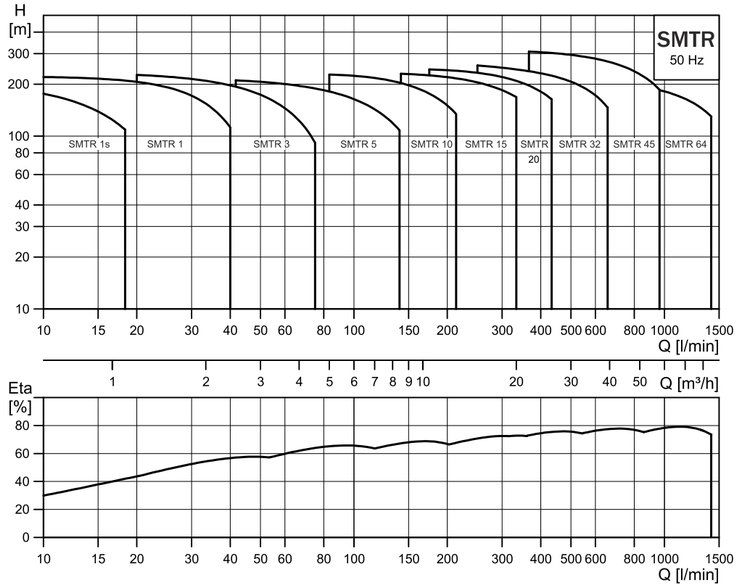
- Boring
- Milling/turning
- Wire cutting
- Filtration
- Part washing
- Chilling
- Condensate systems
- Wash & clean

Fig. 1 SMTR

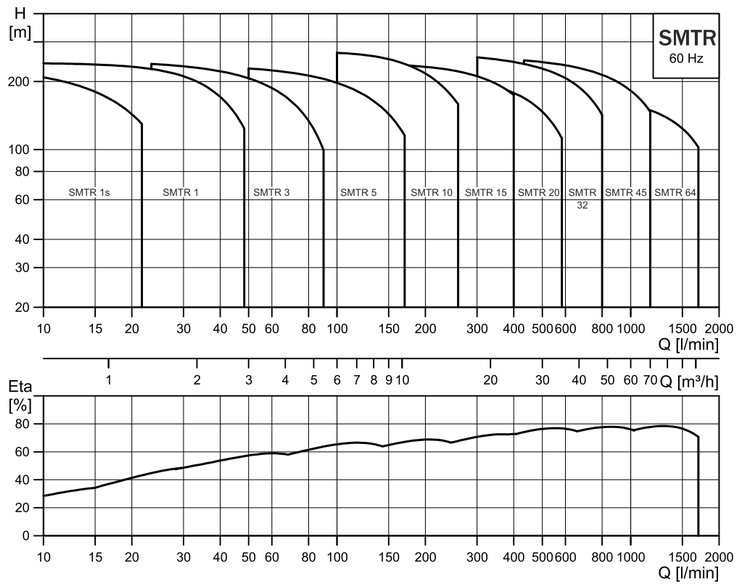
SHAKTI PUMPING LIFE

HYDRAULIC RANGE

SMTR, 50 Hz



SMTR, 60 Hz



MINIMUM EFFICIENCY INDEX

Minimum efficiency index (MEI) means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point (BEP), part load (PL) and overload (OL). The Commission regulation (EU) sets efficiency requirements to MEI ≥ 0.10 as from 1 January 2013 and MEI ≥ 0.40 as from 1 January 2015. An indicative benchmark for best-performing water pump available on the market as from 1 January 2013 is determined in the regulation.

- The benchmark for most efficient water pumps is MEI ≥ 0.70.
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, thus leading to reduced energy consumption. MEI is based on the full impeller diameter.

Minimum efficiency index (MEI)

Pump type	MEI
SMTR 1s-3/3	0.67
SMTR 1-3/3	> 0.70
SMTR 3-3/3	> 0.70
SMTR 5-3/3	0.57
SMTR 10-3/3	> 0.70
SMTR 15-3/3	> 0.70
SMTR 20-3/3	> 0.70
SMTR 32 3/3	> 0.70
SMTR 45 3/3	> 0.70
SMTR 64 3/3	> 0.70

PERFORMANCE RANGE

PUMP	SMTR 1s	SMTR 1	SMTR 3	SMTR 5	SMTR 10	SMTR 15	SMTR 20	SMTR 32	SMTR 45	SMTR 64
50 Hz										
Rated flow rate [m^3/h]	0.8	1	3	5	10	15	20	32	45	64
Rated flow rate [l/min]	13	17	50	83	167	250	333	533	750	1067
Temperature range [°C]	-10 - +90									
Maximum efficiency [%]	35	48	58	66	70	72	72	76	78	80
SMTR pumps										
Flow range [m^3/h]	0.3-1.3	0.7-2.4	1.2-4.5	2.5-8.5	5-13	8.5-23.5	10.5-29	15-40	22-58	30-85
Flow ratnge [l/min]	5-22	12-40	20-75	42-142	83-217	142-392	175-483	250-667	367-967	500-1417
Maximum head [bar]	20	22	23	21	22	23	24	27	32	22
Motor power [kW]	0.37-1.1	0.37-2.2	0.37-3.0	0.37-5.5	0.37-7.5	1.1-15.0	1.1-18.5	1.5-30	3.0-45	4.0-45
60 Hz										
Rated flow rate [m^3/h]	1	1.2	3.6	6	12	18	24	38	54	77
Rated flow rate [l/min]	17	20	60	100	200	300	400	633	900	1283
Temperature range [°C]	-10 - +90									
Maximum efficiency [%]	35	49	59	67	70	72	72	76	78	79
SMTR pumps										
Flow range [m^3/h]	0.4-1.6	0.8-2.9	1.4-5.4	3-10	6-15.5	10-28.5	13-35	18-48	26-70	36-102
Flow range [l/min]	7-27	13-23	48-90	50-167	100-258	167-475	217-583	300-800	433-1167	600-1700
Maximum head [bar]	22	24	23	23	26	23	21	27	26	18
Motor power [kW]	0.37-1.5	0.37-2.2	0.37-4.0	0.55-7.5	0.75-11	1.5-11	2.2-18.5	2.2-30	5.5-45	7.5-45
Material variants										
Pump head (A-version): cast iron,	•	•	•	•	•	•	•	•	•	•
Pipe connection										
Internal thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 2	G 2	G 2	-	-	-
	-	-	-	-	Rp 2	Rp 2	Rp 2	-	-	-
Square flange with internal thread	Rp 1 1/4	Rp 1 1/4	Rp 1 1/4	Rp 1 1/4	-	-	-	-	-	-
Flange	-	-	-	-	-	-	-	DN 65	DN 80	DN 80
Installation length [mm]										
Range	160-1006	160-1006	160-1006	169-1006	148-1018	178-1033	178-1033	223-1343	244-1444	249-1487
Shaft seal*										
HUUV	•	•	•	•	•	•	•	•	•	•

• Other shaft seal on request

MOTORS FOR SMTR PUMPS

SMTR pumps are fitted with a totally enclosed, fan-cooled, 2-pole Shakti standard SMG motor with principal dimensions according to IEC, DIN and British standards.

Electrical tolerances according to EN 60034.

Mounting designation	Up to 4 kW	V 18/B 14
	From 5.5 kW	V 1/B 5
Efficiency class	0.06 - 0.55 kW	-
	0.75 - 45 kW	IE2
Enclosure class		IP55
Insulation class		F
Supply voltage, 50 Hz (- 10 %/+ 10 %)	0.06 - 45 kW:	3 x 220-240/380-415 V
	0.37 - 5.5 kW	3 x 380-415 V
	7.5 - 45 kW	3 x 380-415/660-690 V
Supply voltage, 60 Hz (- 10 %/+ 10 %)	0.06 - 0.18 kW	3 x 220-277/380-480 V
	0.25 - 1.1 kW	3 x 220-255/380-440 V
	1.5 - 45 kW	3 x 220-277/380-480 V
	0.37 - 5.5 kW	3 x 380-440 V
	7.5 - 45 kW	3 x 380-480/660-690 V
SMTR **pumps are also available for these supply voltages**		
Supply voltage, 50 Hz	0.06 - 45 kW	3 x 200-220/346-380 V
Supply voltage, 60 Hz	0.06 - 45 kW	3 x 200-230/346-400 V
	0.25 - 45 kW	3 x 208-230/460-480 V

SHAKTI STANDARD MOTORS

Motor Protection

Single-phase Shakti motors have a built-in thermal overload switch (IEC 34-11:TP 211). Three-phase motors must be connected to a motor protective circuit breaker in accordance with local regulations.
Three-phase Shakti motors from 3 kW and upwards have a built-in thermistor (PTC) according to DIN 44082 (IEC 34-11:TP 211).

MAXIMUM NUMBER OF STARTS

Pump	Motor [kW]	Recommended maximum number of starts per hour
SMTR	0.06 - 0.18	100
	0.25 - 2.2	250
	3 - 4	100
	5.5 - 11	50
	15 - 22	40
	30 - 45	8

SOUND PRESSURE LEVEL

Pump	Motor [kW]	$\bar{L}_{pA}$ [dB(A)]	
		50 Hz	60 Hz
SMTR	0.06	41	41
	0.12	41	41
	0.18	41	41
	0.25	56	62
	0.37	53	58
	0.55	53	56
	0.75	53	57
	1.1	60	65
	1.5	59	65
	2.2	61	66
	3.0	59	64
	4.0	65	69
	5.5	63	68
	7.5	60	65
	11	60	65
	15	60	65
	18.5	60	65
	22	64	69
	30	70	84
	37	71	75
	45	71	75

The values have been measured according to EN ISO 4871.

VISCOSITY AND DENSITY

The pumping of liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption. In such situations, the pump should be fitted with a larger motor. If in doubt, contact Shakti.

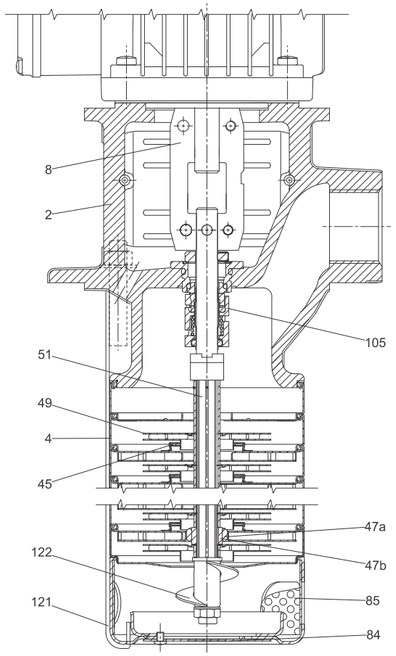
AMBIENT TEMPERATURE
SMTR

Motor power [kW]	Motor make	Motor efficiency class	Maximum ambient temperature at full load [°C]	Maximum altitude above sea level [m]
0.25-0.55	SMG	-	40	1000
0.75-22	SMG	IE2	60	3500

If the ambient temperature exceeds the above temperature values, or the pump is installed at an altitude exceeding the above altitude values, the motor must not be fully loaded due to the risk of overheating. Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air. In such cases, it may be necessary to use a motor with a higher rated output.

CONSTRUCTION

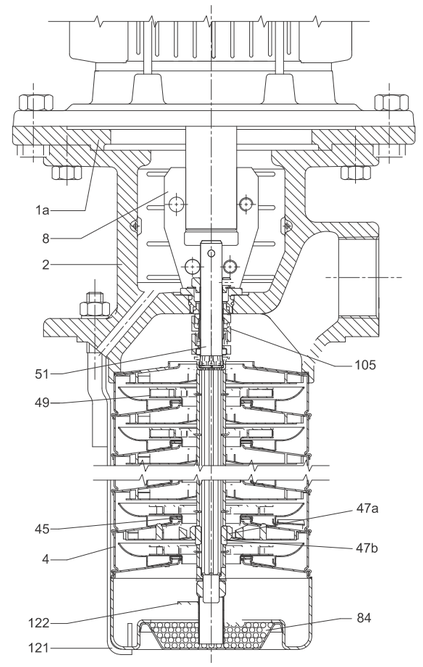
SMTR 1S, 1, 3 AND 5
SECTIONAL DRAWING



MATERIALS

Pos.	Description	Materials	EN/DIN
2	Pump head	cast iron	CI-FG 260
4	Chamber	Stainless steel	SS304
8	Coupling	Sintered metal	
45	Neck ring	PTFE	
47a	Bearing ring, stationary	Silicium carbide	
47b	Bearing ring, rotating	Silicium carbide	
49	Impeller	Stainless steel	SS304
51	Pump shaft	Stainless steel	SS304
84	Suction strainer	Stainless steel	SS304
85	Strainer internal	Stainless steel	SS304
105	Shaft seal	HUUV/HUUE	
121	Strap	Stainless steel	SS304
122	Priming screw	Stainless steel	SS304

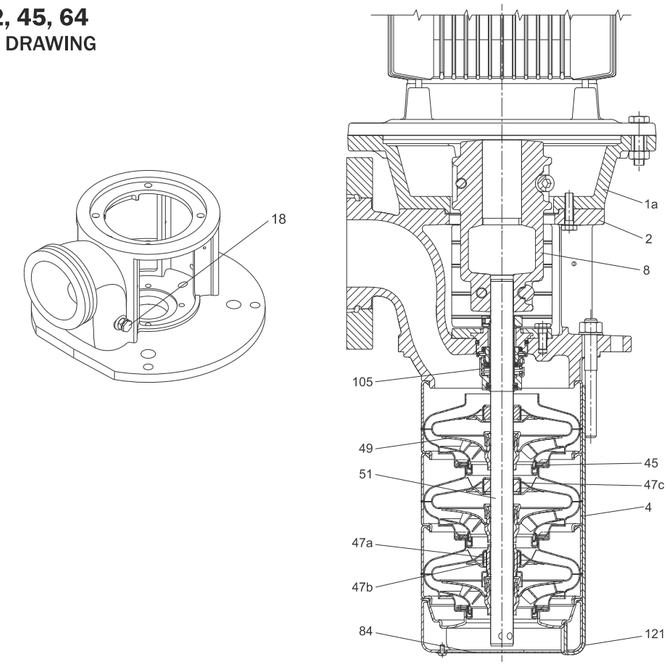
SMTR 10, 15 AND 20
SECTIONAL DRAWING



MATERIALS

Pos.	Description	Materials	EN/DIN
1a	Motor stool	Cast iron	CI-FG 260
2	Pump head	Cast iron	CI-FG 260
4	Chamber	Stainless steel	SS304
8	Coupling	Sintered metal	
45	Neck ring	PTFE	
47a	Bearing ring, stationary	Silicium carbide	
47b	Bearing ring, rotating	Silicium carbide	
49	Impeller	Stainless steel	SS304
51	Pump shaft	Stainless steel	SS304
84	Suction strainer	Stainless steel	SS304
105	Shaft seal	HUUV/HUUE	
121	Strap	Stainless steel	SS304
122	Priming screw	Stainless steel	SS304

SMTR 32, 45, 64
SECTIONAL DRAWING

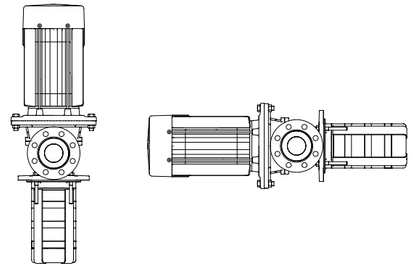


MATERIALS

Pos.	Description	Materials	EN/DIN
1a	Motor stool	Cast iron	CI-FG 260
2	Pump head	Cast iron	CI-FG 260
4	Chamber	Stainless steel	SS304
8	Coupling	Cast iron	CI-FG 260
18	Air vent screw	Stainless steel	SS304
45	Neck ring	PTFE	
47a	Bearing ring, stationary	Silicium carbide	
47b	Bearing ring, rotating	Stainless steel	SS304
47c	Bush		
49	Impeller	Stainless steel	SS304
51	Pump shaft	Stainless steel	SS304
	O-ring*	NBR	
84	Suction strainer	Stainless steel	SS304
105	Shaft seal	HUUV/HUUE	
121	Strap	Stainless steel	SS304

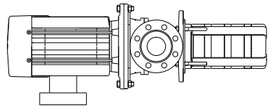
INSTALLATION OF SMTR PUMPS

SMTR 1s, 1, 3, 5, 10, 15 and 20 pumps can be installed both vertically and horizontally.
SMTR 32 pumps must be installed in a vertical position.



Vertical Horizontal

Installation of a SMTR pump



On horizontally installed SMTR pumps with motors from 5.5 kW and up, the motors have feet and must be supported.

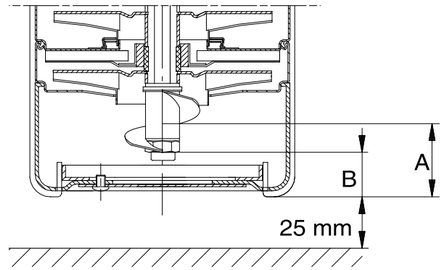
The pumps are designed to provide full performance down to a level of A mm above the bottom of the suction strainer.

At a liquid level between A and B mm above the bottom of the suction strainer, the built-in priming screw will protect the pump against dry running.

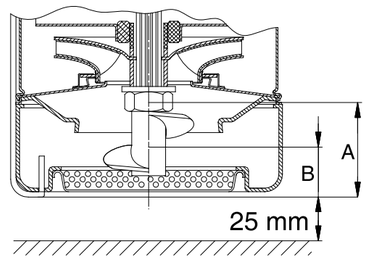
Note: SMTR 32 pumps have no priming screw.

Pump type	A [mm]	B [mm]
SMTR 1s, 1, 3, 5	41	28
SMTR 10, 15, 20	50	25
SMTR 32, 45, 64	70	-

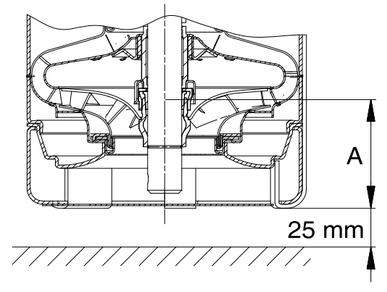
The distance between the pump and the tank bottom must be minimum 25 mm



SMTR 1s, 1, 3 and 5



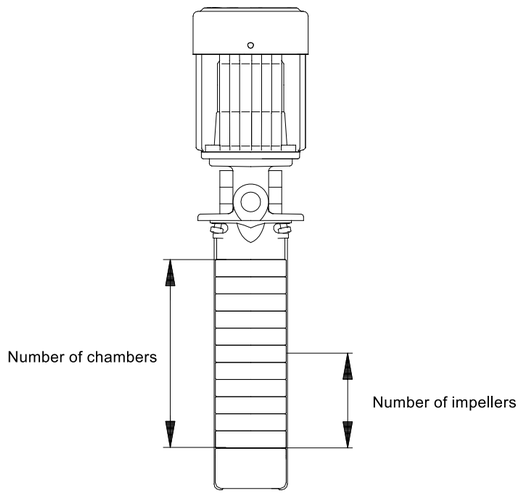
SMTR 10, 15 and 20



SMTR 32, 45 & 64

SMTR TYPE KEY

Example	SMTR	32	(s)	-2	/1	-1	-F	-A	-H	UU	V
Pump type											
Rated flow rate [m^3/h]											
All impellers with reduced diameter (only SMTR 1s)											
Number of chambers, see fig. 26											
Number of impellers, see fig. 26											
Number of impellers with reduced diameter											
Pipe connection											
F DIN flange											
Materials											
A Basic version											
Shaft seal											
H Balanced cartridge seal											
Q Silicon carbide											
U Tungsten carbide											
B Carbon											
E EPDM											
F FXM											
K FFKM											
V FKM											



SMTR pump

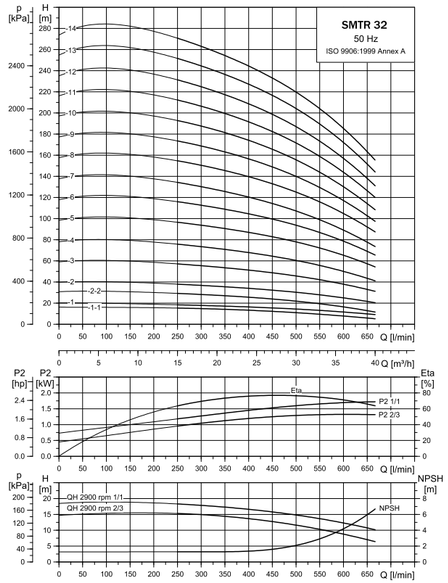
SELECTION OF PUMPS

Selection of pumps should be based on the following parameters:

- the duty point of the pump
- dimensional data such as pressure loss as a result of height differences, friction loss in the pipework, pump efficiency etc.
- minimum inlet pressure - NPSH.

DUTY POINT OF THE PUMP

From a duty point it is possible to select a pump on the basis of the curve charts shown.



Example of a curve chart

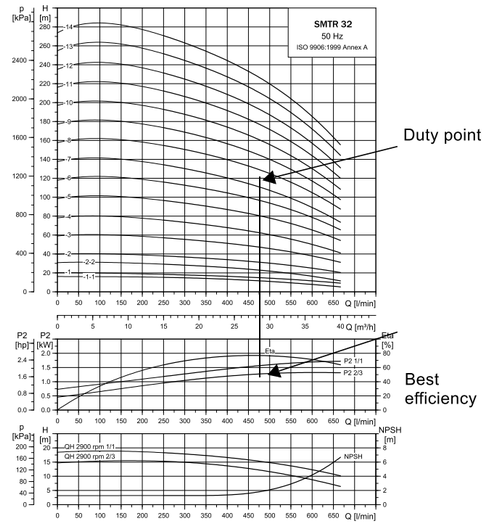
DIMENSIONAL DATA

When sizing a pump the following aspects must be taken into account:

- required flow rate and pressure at the draw-off point
- pressure loss as a result of height differences (H_{geo})
- friction loss in the pipework (H_f). It may be necessary to account for pressure loss in connection with long pipes, bends or valves, etc.
- best efficiency at the estimated duty point
- NPSH value
  for calculation of the NPSH value, see "Minimum inlet pressure - NPSH".

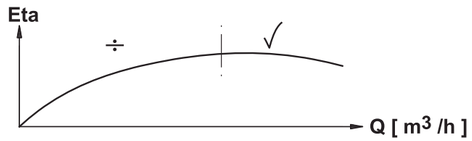
EFFICIENCY

Before determining the point of best efficiency, the operating pattern of the pump needs to be identified. Is the pump expected always to operate in the same duty point, select an SMTR pump which is operating at a duty point corresponding to the best efficiency of the pump.

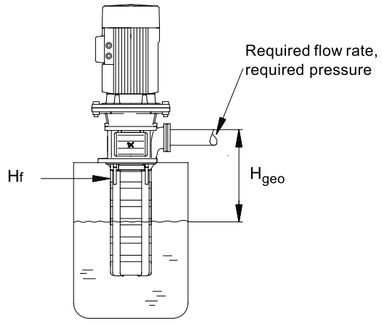


Example of an SMTR pump's duty point

As the pump is sized on the basis of the highest possible flow, it is important always to have the duty point to the right on the efficiency curve (eta) in order to keep efficiency high when the flow drops



Best Efficiency

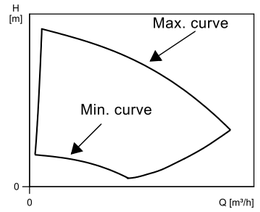


Dimensional data

In order to achieve optimum operating economy, the pump should be selected on the basis of the following criteria:

- The maximum duty point should be as close as possible to the QH curve of the pump.
- The required duty point should be positioned so that P2 is close to the max. point of the QH curve.

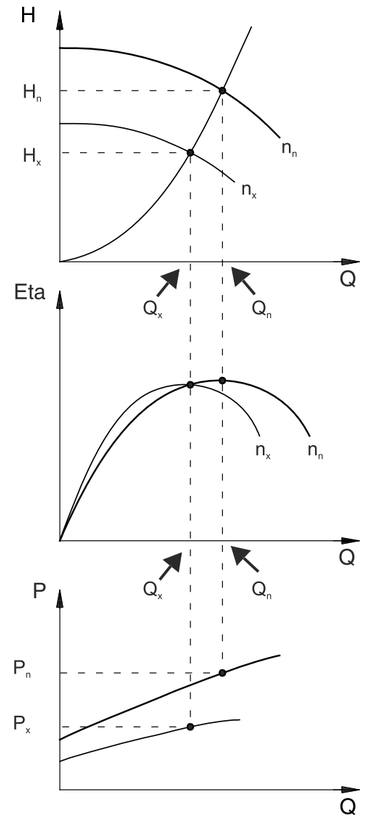
Between the minimum and maximum performance curves, VFD driven pumps have an infinite number of performance curves each representing a specific speed. Therefore it may not be possible to select a duty point close to the max. curve



Min. and max. performance curves

In situations where it is not possible to select a duty point close to the max. curve, the affinity equations below can be used. The head (H), the flow rate (Q) and the input power (P) are all the appropriate variables you need to be able to calculate the motor speed (n).

Note:
The approximated formulas apply on condition that the system characteristic remains unchanged for nn and nx and that it is based on the formula
H = k x Q2 where k is a constant.
The power equation implies that the pump efficiency is unchanged at the two speeds. In practice this is not quite correct.
Finally, it is worth noting that the efficiencies of the frequency converter and the motor must be taken into account if a precise calculation of the power saving resulting from a reduction of the pump speed is wanted.



Affinity equations

$$\frac{Q_n}{Q_x} = \frac{n_n}{n_x}$$

$$\frac{H_n}{H_x} = \left(\frac{n_n}{n_x}\right)^2$$

$$\frac{\eta_n}{\eta_x} = 1$$

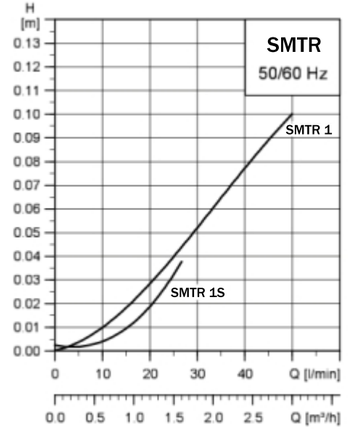
$$\frac{P_n}{P_x} = \left(\frac{n_n}{n_x}\right)^3$$

Legend

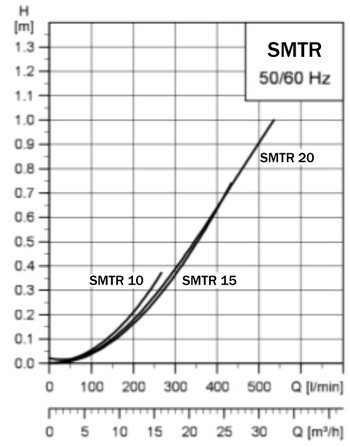
H_n	:	Rated head [m]
H_x	:	Current head [m]
Q_n	:	Flow rate [m^3/h]
Q_x	:	Current flow rate [m^3/h]
n_n	:	Rated motor speed [min^{-1}]
n_x	:	Current motor speed [min^{-1}]
η_n	:	Rated efficiency [%]
η_x	:	Current efficiency [%]

Pressure loss

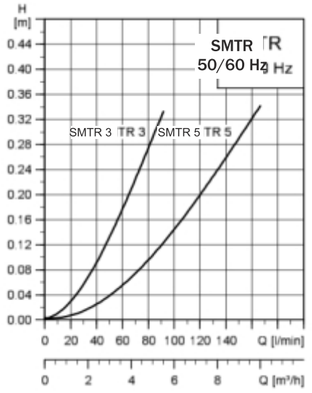
During operation pressure losses occur in all centri- fugal pumps.
The below curves illustrate the pressure losses for pumped liquid passing through one empty chamber. An empty chamber is a chamber without an impeller



Pressure losses of pumped liquid passing through an empty chamber for SMTR 1s and SMTR 1 pumps



Pressure losses of pumped liquid passing through an empty chamber for SMTR 3 and SMTR 5 Pumps



Pressure losses of pumped liquid passing through an empty chamber for SMTR 10, SMTR 15 and SMTR 20 pumps

As SMTR 32 pump have holes in the guide vanes, no pressure losses occur in the empty chambers of these pumps

Calculation of the Reduced Head of A Pump With Empty Chambers

Calculation of pressure loss in empty chambers

From the above curves and the curve charts of each pump type, it is possible to calculate the reduced head of a pump with empty chambers. The calculation can be made as shown below.

Example :

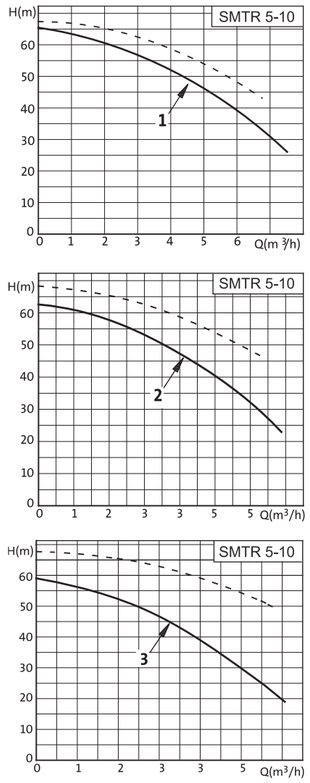
Pump type	SMTR 5-18/7
Flow Q (duty point)	6 [m³/h]
Head (duty point)	90 [m]

The selected pump is an SMTR 5-18/18 with 11 empty chambers.
From the above pressure loss curve of SMTR 5, it appears that the pressure loss of each empty chamber at 6 m³/h is 0.14 [m]. This results in a total pressure
loss of:
(Total pressure loss) = 0.14 × 11 = 1.54 [m]
The reduced head of the SMTR 5-18/7 pump including pressure losses caused by empty chambers is: Head = 33 - 1.54 = 31.46 [m] The head 33 metres is read from the performance curve for an SMTR 5-18/7.

Viscosity

Pump	Maximum kinematic viscosity of pumped liquid [cSt] = [mm²/s]
SMTR 1s, 1, 3, 5	50
SMTR 10, 15, 20, 32, 45 & 64	100

The pumping of liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption. In such situations the pump should be equipped with a larger motor.
The following examples show the drop in the hydraulic performance of SMTR pumps pumping oil with a density of 872 kg/m³ but with three different kinematic viscosities.

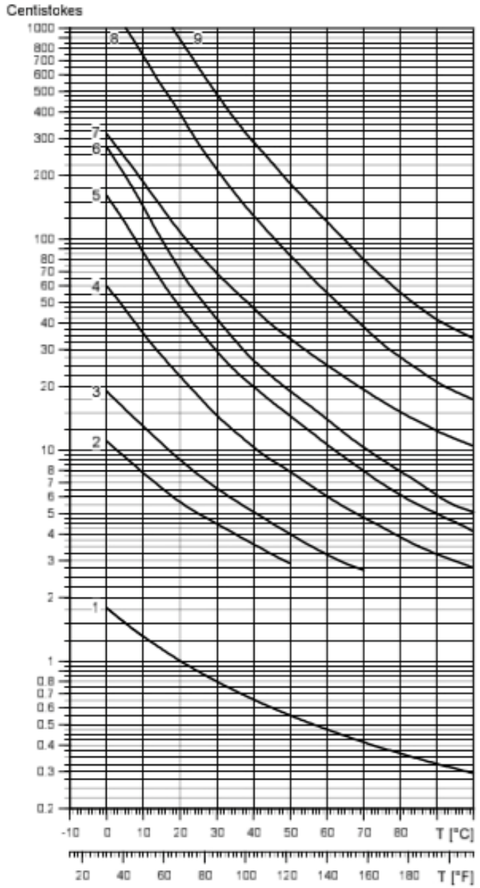


Key

Position	Density [kg/m]	Kinematic viscosity [cSt] = [mm²/s]
1	872	16
2	872	32
3	872	75

KINEMATIC VISCOSITY OF DIFFERENT OILS

The curves below show the kinematic viscosity of different oils in relation to oil temperature



Kinematic viscosity of different oils in relation to oil temperature

Key to kinematic viscosities of different oils

Curve number	Liquid
1	Water
2	Honing oil
3	Grinding oil
4	Hydraulic oil (ISO Vg10)
5	Thermal oil
6	Cutting oil
7	Hydraulic oil (ISO Vg46)
8	Motor oil (20W-50)
9	Gear oil

MINIMUM INLET PRESSURE - NPSH

We recommend calculating the inlet pressure "H" when the following aspects apply:

- the liquid temperature is high
- the flow is significantly higher than the flow rate
- water is drawn from depths
- water is drawn through long pipes
- inlet conditions are poor.

To avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump. The maximum suction lift "H" in metres head can be calculated as follows:

H = pb x 10.2 - NPSH - Hf - Hv - Hs

pb = Barometric pressure in bar. Barometric pressure can be set to 1 bar). In closed systems, pb indicates the system pressure in bar.

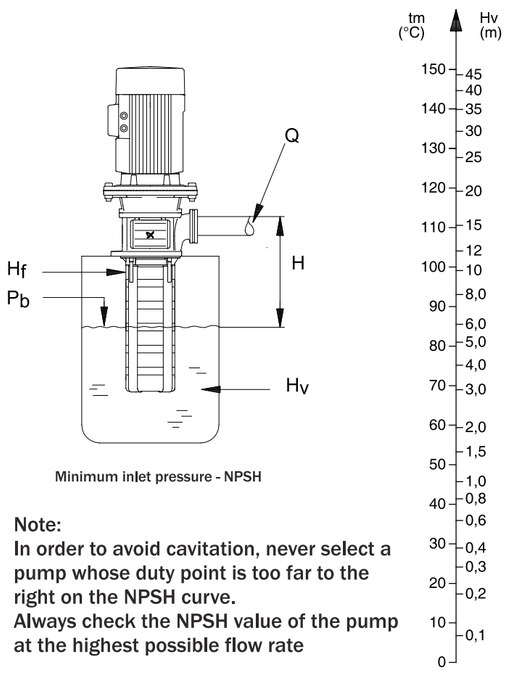
NPSH = Net Positive Suction Head in metres head. (To be read from the NPSH curve at the highest flow rate the pump will be delivering).

Hf = Friction loss in suction pipe in metres head. (At the highest flow rate the pump will be delivering).

Hv = Vapour pressure in metres head.

Hs = Safety margin = minimum 0.5 metre head.

If the "H" calculated is positive, the pump can operate at a suction lift of maximum "H" metres head.
If the "H" calculated is negative, an inlet pressure of minimum "H" metres head is required.

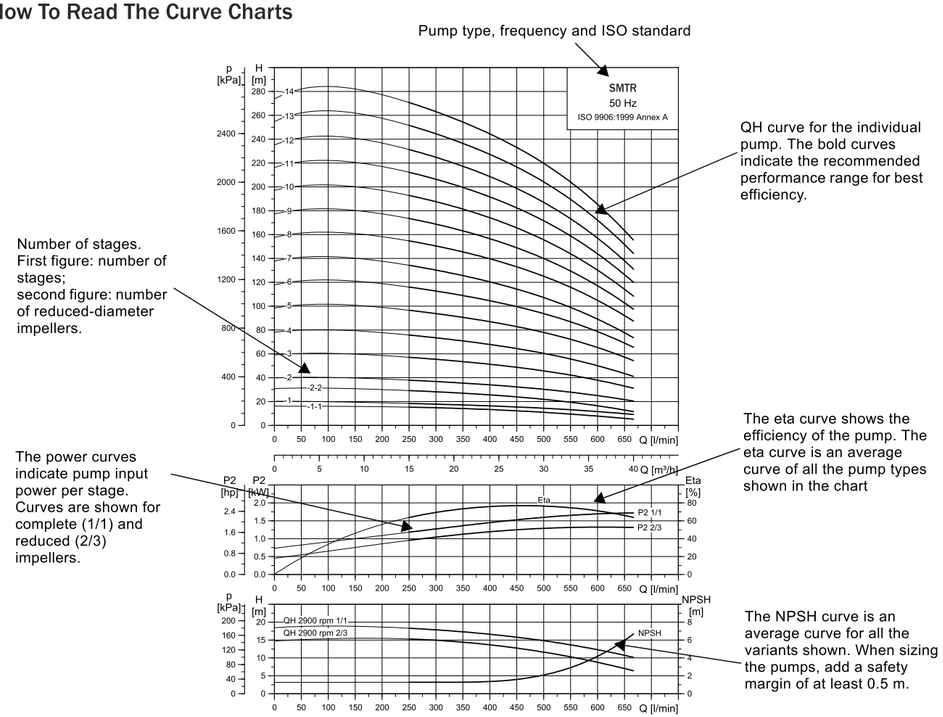


Minimum inlet pressure - NPSH

Note:
In order to avoid cavitation, never select a pump whose duty point is too far to the right on the NPSH curve.
Always check the NPSH value of the pump at the highest possible flow rate

INTRODUCTION TO PERFORMANCE CURVES

How To Read The Curve Charts

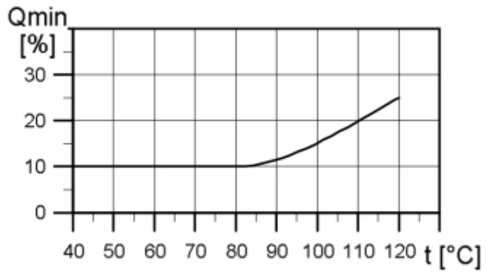


Example of an SMTR curve chart

GUIDELINES TO PERFORMANCE CURVES

The guidelines below apply to the curves shown on the following pages:

1. Tolerances to ISO 9906, Annex A, if indicated.
2. The motors used for the measurements are standard Shakti motors (SMG or SMGE).
3. Measurements have been made with airless water at a temperature of 20 °C.
4. The curves apply to a kinematic viscosity of = 1 mm^2/s (1 cSt).
5. Due to the risk of overheating, the pumps should not be used at a flow below the minimum flow rate.
6. QH curves of the individual pumps are based on current motor speeds.

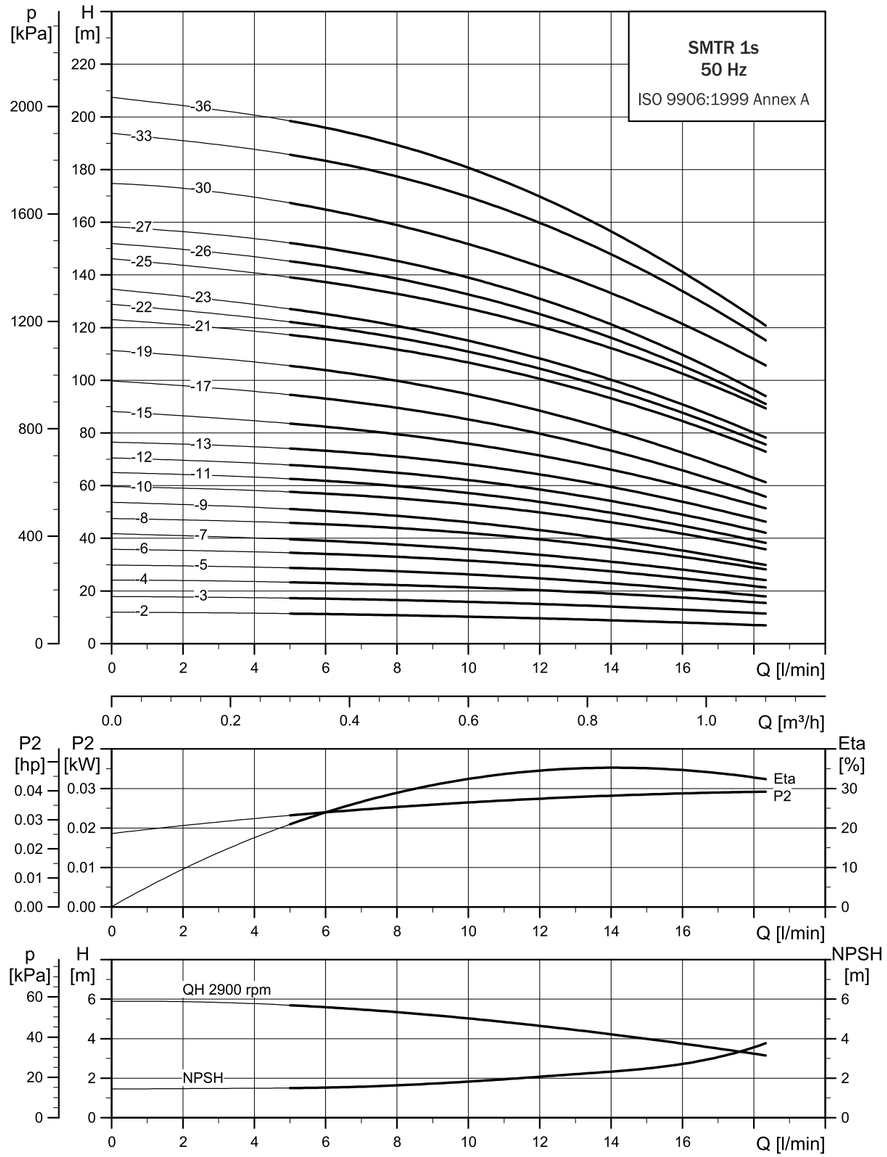


MINIMUM FLOW RATE

The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature

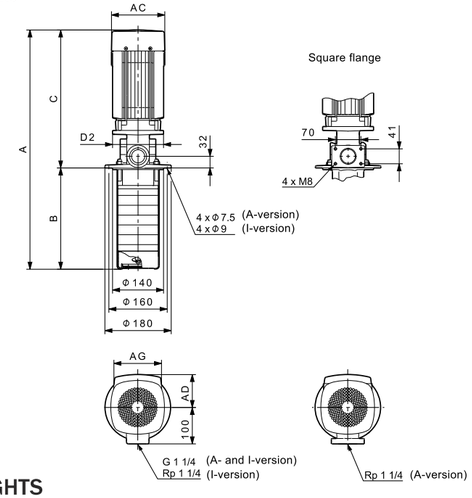
SMTR, 50 Hz

SMTR 1s, 50 Hz



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

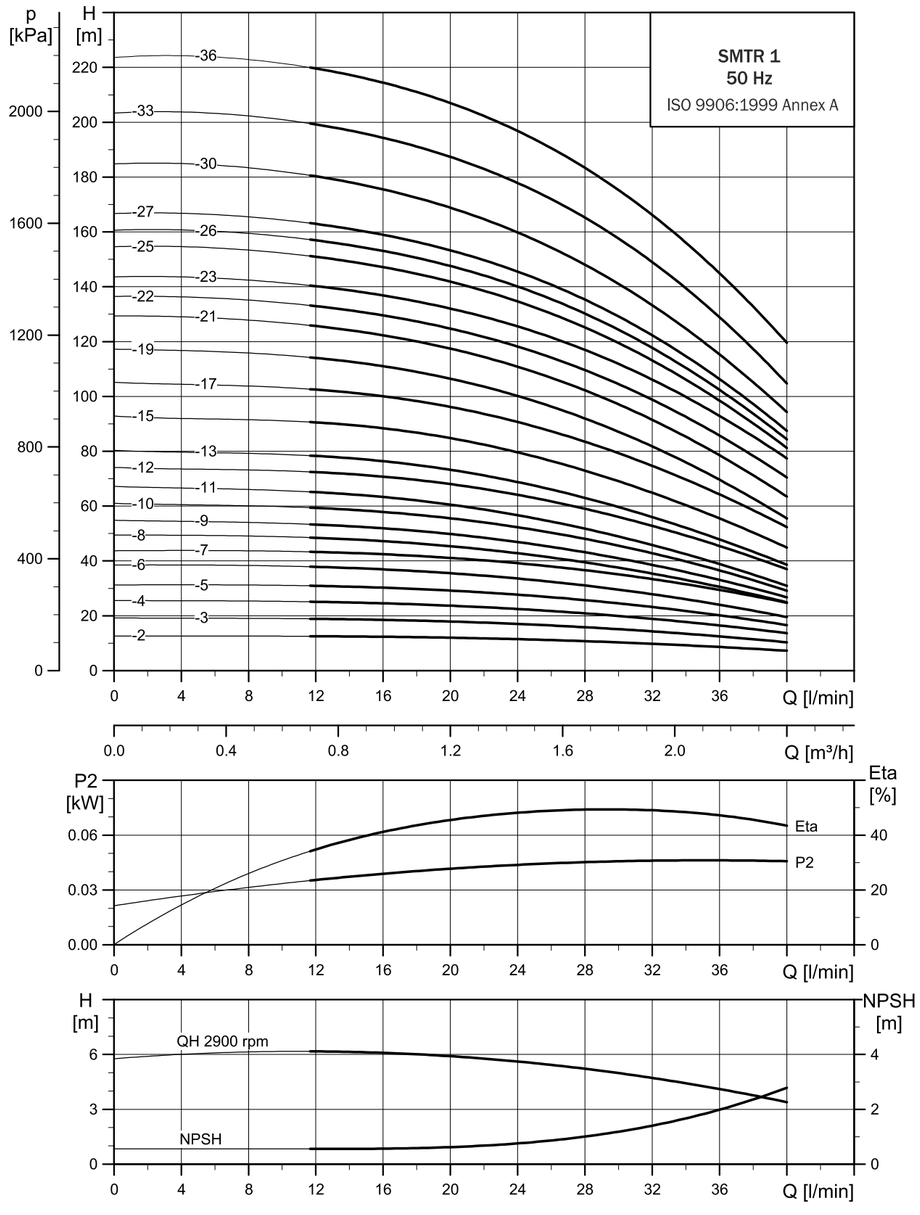


DIMENSIONS AND WEIGHTS

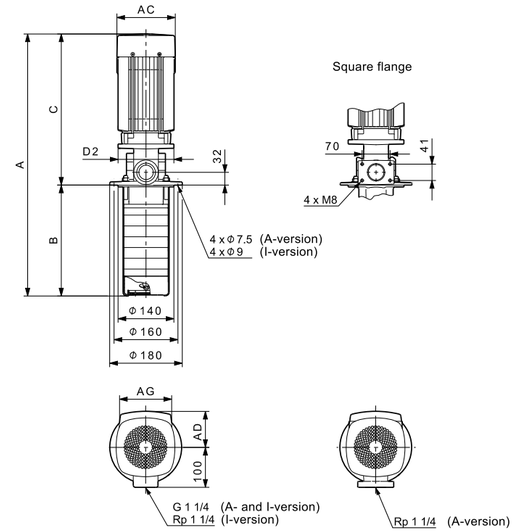
Pump type	P2 [kW]	SMTR Dimensions [mm]							Net weight [kg]
		A	B	C	AC	D2	AD	AG	
SMTR 1s-2/2	0.37	464	160	304	140	140	109	82	12.2
SMTR 1s-3/3	0.37	482	178	304	140	140	109	82	12.5
SMTR 1s-4/4	0.37	500	196	304	140	140	109	82	12.8
SMTR 1s-5/5	0.37	518	214	304	140	140	109	82	13.1
SMTR 1s-6/6	0.37	536	232	304	140	140	109	82	13.4
SMTR 1s-7/7	0.37	554	250	304	140	140	109	82	13.7
SMTR 1s-8/8	0.37	572	268	304	140	140	109	82	14.0
SMTR 1s-9/9	0.37	590	286	304	140	140	109	82	14.3
SMTR 1s-10/10	0.37	608	304	304	140	140	109	82	14.6
SMTR 1s-11/11	0.37	626	322	304	140	140	109	82	14.9
SMTR 1s-12/12	0.37	644	340	304	140	140	109	82	15.2
SMTR 1s-13/13	0.37	662	358	304	140	140	109	82	16.0
SMTR 1s-15/15	0.55	698	394	304	140	140	109	82	16.6
SMTR 1s-17/17	0.55	734	430	304	140	140	109	82	17.2
SMTR 1s-19/19	0.55	770	466	304	140	140	109	82	17.8
SMTR 1s-21/21	0.75	846	502	344	140	140	109	82	19.2
SMTR 1s-22/22	0.75	864	520	344	140	140	109	82	19.8
SMTR 1s-23/23	0.75	882	538	344	140	140	109	82	20.1
SMTR 1s-25/25	0.75	918	574	344	140	140	109	82	20.4
SMTR 1s-26/26	0.75	936	592	344	140	140	109	82	22.1
SMTR 1s-27/27	1.1	954	610	344	140	140	109	82	22.4
SMTR 1s-30/30	1.1	1008	664	344	140	140	109	82	23.3
SMTR 1s-33/33	1.1	1062	718	344	140	140	109	82	24.2
SMTR 1s-36/36	1.1	1116	772	344	140	140	109	82	25.1

*The Maximum immersion depth 1006 mm

SMTR 1, 50 Hz



DIMENSIONAL SKETCHES

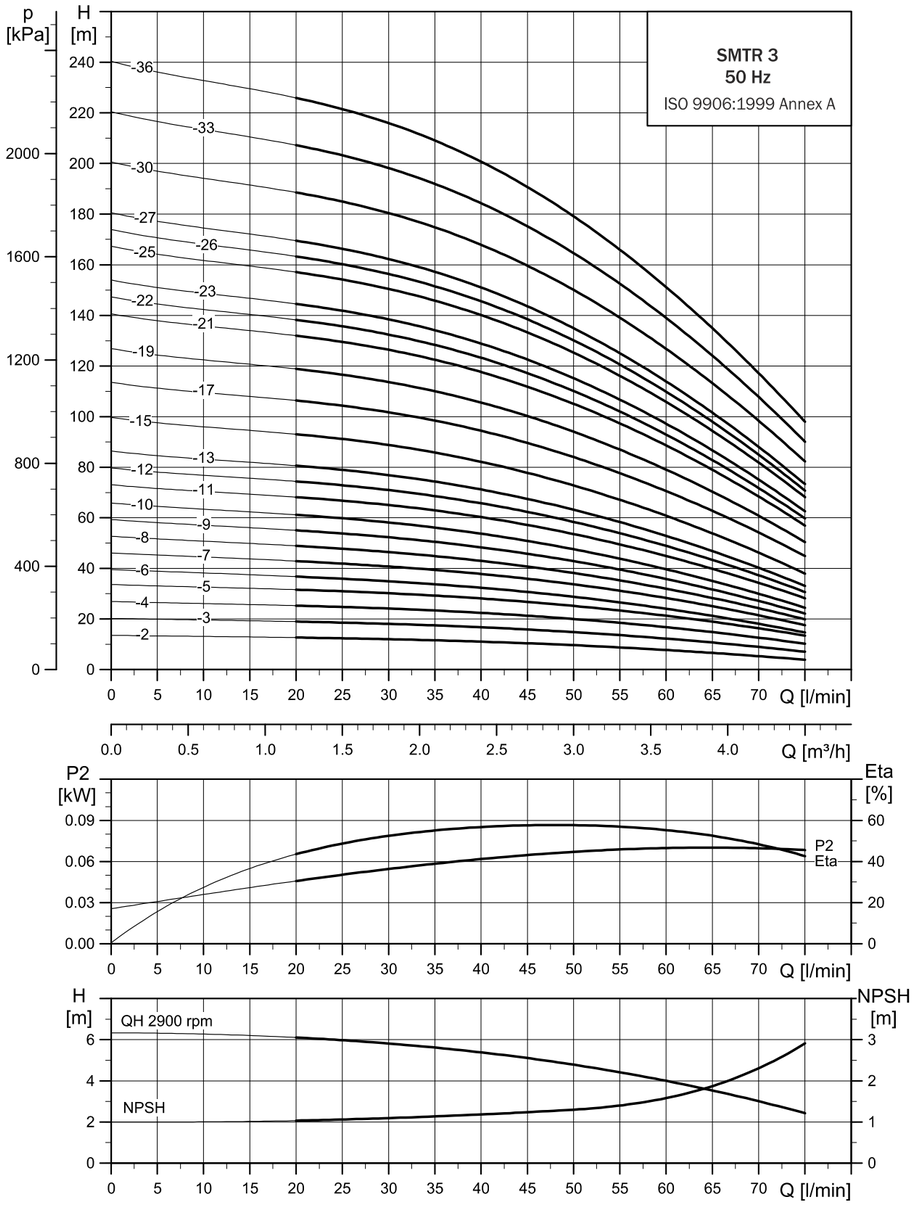


DIMENSIONS AND WEIGHTS

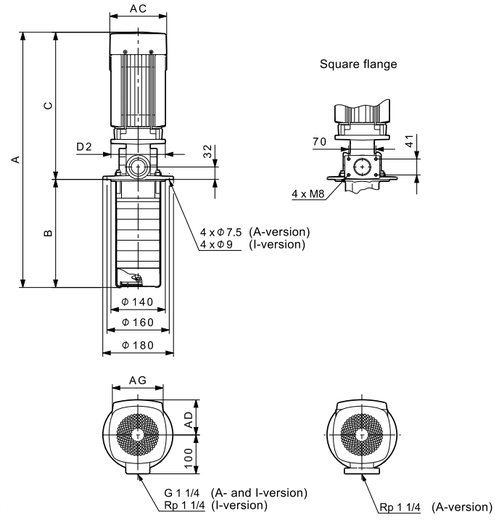
Pump type	P2 [kW]	SMTR Dimensions [mm]							Net weight [kg]
		A	B	C	AC	D2	AD	AG	
SMTR 1-2/2	0.37	464	160	304	140	140	109	82	12.2
SMTR 1-3/3	0.37	482	178	304	140	140	109	82	12.5
SMTR 1-4/4	0.37	500	196	304	140	140	109	82	12.8
SMTR 1-5/5	0.37	518	214	304	140	140	109	82	13.1
SMTR 1-6/6	0.37	536	232	304	140	140	109	82	13.4
SMTR 1-7/7	0.37	554	250	304	140	140	109	82	13.7
SMTR 1-8/8	0.55	572	268	304	140	140	109	82	14.0
SMTR 1-9/9	0.55	590	286	304	140	140	109	82	14.8
SMTR 1-10/10	0.55	608	304	304	140	140	109	82	15.1
SMTR 1-11/11	0.55	626	322	304	140	140	109	82	15.4
SMTR 1-12/12	0.75	684	340	344	140	140	109	82	16.5
SMTR 1-13/13	0.75	702	358	344	140	140	109	82	16.8
SMTR 1-15/15	0.75	738	394	344	140	140	109	82	17.1
SMTR 1-17/17	1.1	774	430	344	140	140	109	82	19.4
SMTR 1-19/19	1.1	810	466	344	140	140	109	82	20.0
SMTR 1-21/21	1.1	846	502	344	140	140	109	82	20.6
SMTR 1-22/22	1.1	864	520	344	140	140	109	82	20.9
SMTR 1-23/23	1.1	882	538	344	140	140	109	82	21.2
SMTR 1-25/25	1.5	968	574	394	178	140	110	162	28.3
SMTR 1-26/26	1.5	986	592	394	178	140	110	162	28.6
SMTR 1-27/27	1.5	1004	610	394	178	140	110	162	28.9
SMTR 1-30/30	1.5	1058	664	394	178	140	110	162	29.8
SMTR 1-33/33	2.2	1152	718	434	178	140	110	162	34.9
SMTR 1-36/36	2.2	1206	772	434	178	140	110	162	35.8

*The Maximum immersion depth 1006 mm

SMTR 3, 50 HZ



DIMENSIONAL SKETCHES

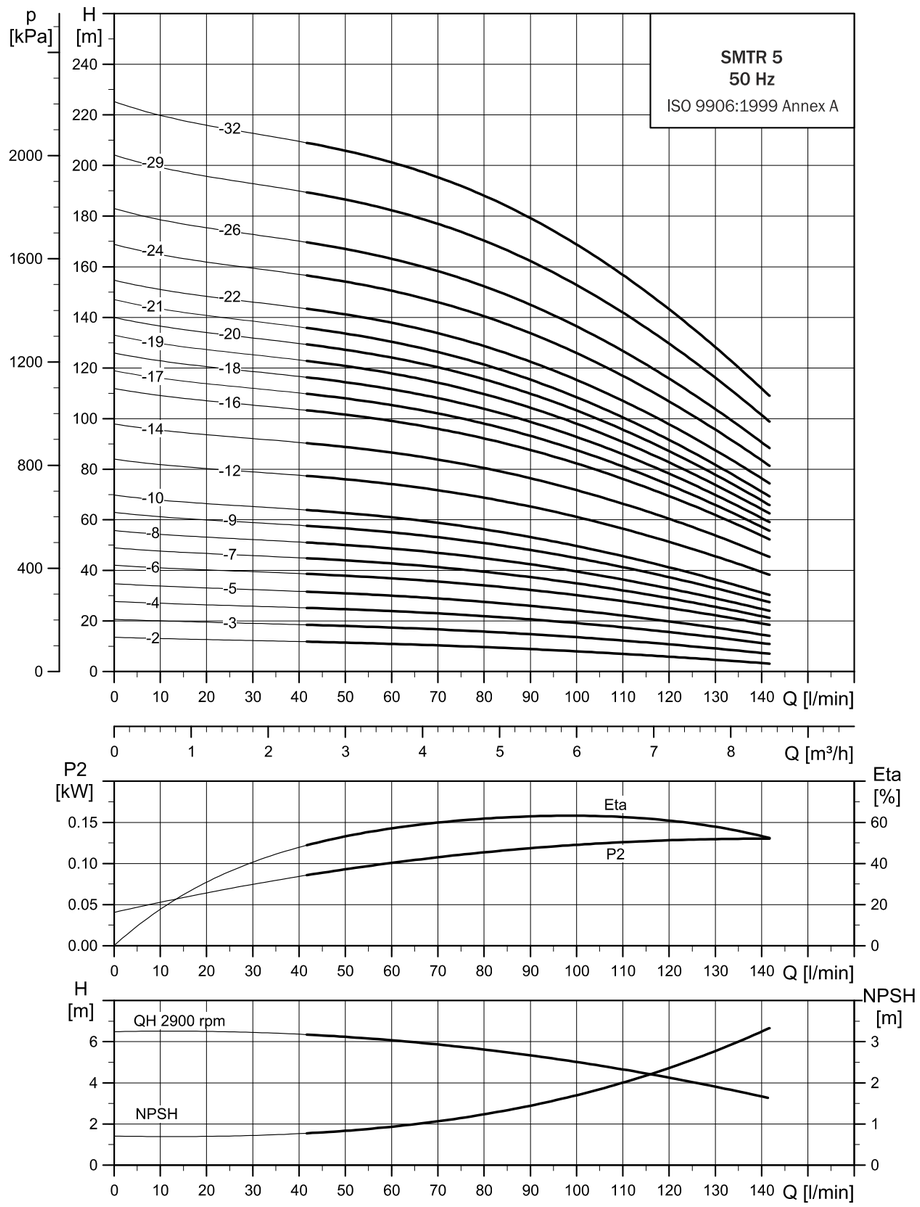


DIMENSIONS AND WEIGHTS

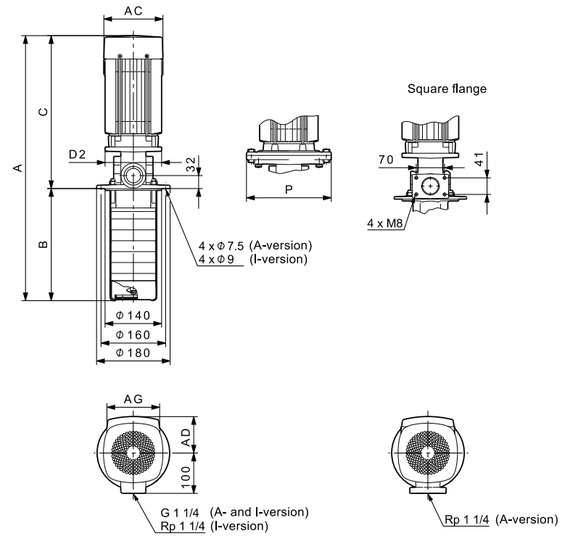
Pump type	P2 [kW]	SMTR Dimensions [mm]							Net weight [kg]
		A	B	C	AC	D2	AD	AG	
SMTR 3-2/2	0.37	464	160	304	140	140	109	82	12.2
SMTR 3-3/3	0.37	482	178	304	140	140	109	82	12.5
SMTR 3-4/4	0.37	500	196	304	140	140	109	82	12.8
SMTR 3-5/5	0.37	518	214	304	140	140	109	82	13.1
SMTR 3-6/6	0.55	536	232	304	140	140	109	82	13.9
SMTR 3-7/7	0.55	554	250	304	140	140	109	82	14.2
SMTR 3-8/8	0.75	612	268	344	140	140	109	82	15.2
SMTR 3-9/9	0.75	630	286	344	140	140	109	82	15.6
SMTR 3-10/10	0.75	648	304	344	140	140	109	82	15.9
SMTR 3-11/11	0.75	666	322	344	140	140	109	82	16.2
SMTR 3-12/12	1.1	684	340	344	140	140	109	82	17.9
SMTR 3-13/13	1.1	702	358	344	140	140	109	82	18.2
SMTR 3-15/15	1.1	738	394	344	140	140	109	82	18.5
SMTR 3-17/17	1.5	824	430	394	178	140	110	162	25.9
SMTR 3-19/19	1.5	860	466	394	178	140	110	162	26.5
SMTR 3-21/21	2.2	936	502	434	178	140	110	162	31.3
SMTR 3-22/22	2.2	954	520	434	178	140	110	162	31.6
SMTR 3-23/23	2.2	972	538	434	178	140	110	162	31.9
SMTR 3-25/25	2.2	1008	574	434	178	140	110	162	32.5
SMTR 3-26/26	2.2	1026	592	434	178	140	110	162	32.8
SMTR 3-27/27	2.2	1044	610	434	178	140	110	162	33.1
SMTR 3-30/30	3	1112	664	448	198	140	110	162	38.2
SMTR 3-33/33	3	1166	718	448	198	160	110	162	39.1
SMTR 3-36/36	3	1220	772	448	198	160	110	162	40.0

*The Maximum immersion depth 1006 mm

SMTR 5, 50 HZ



DIMENSIONAL SKETCHES

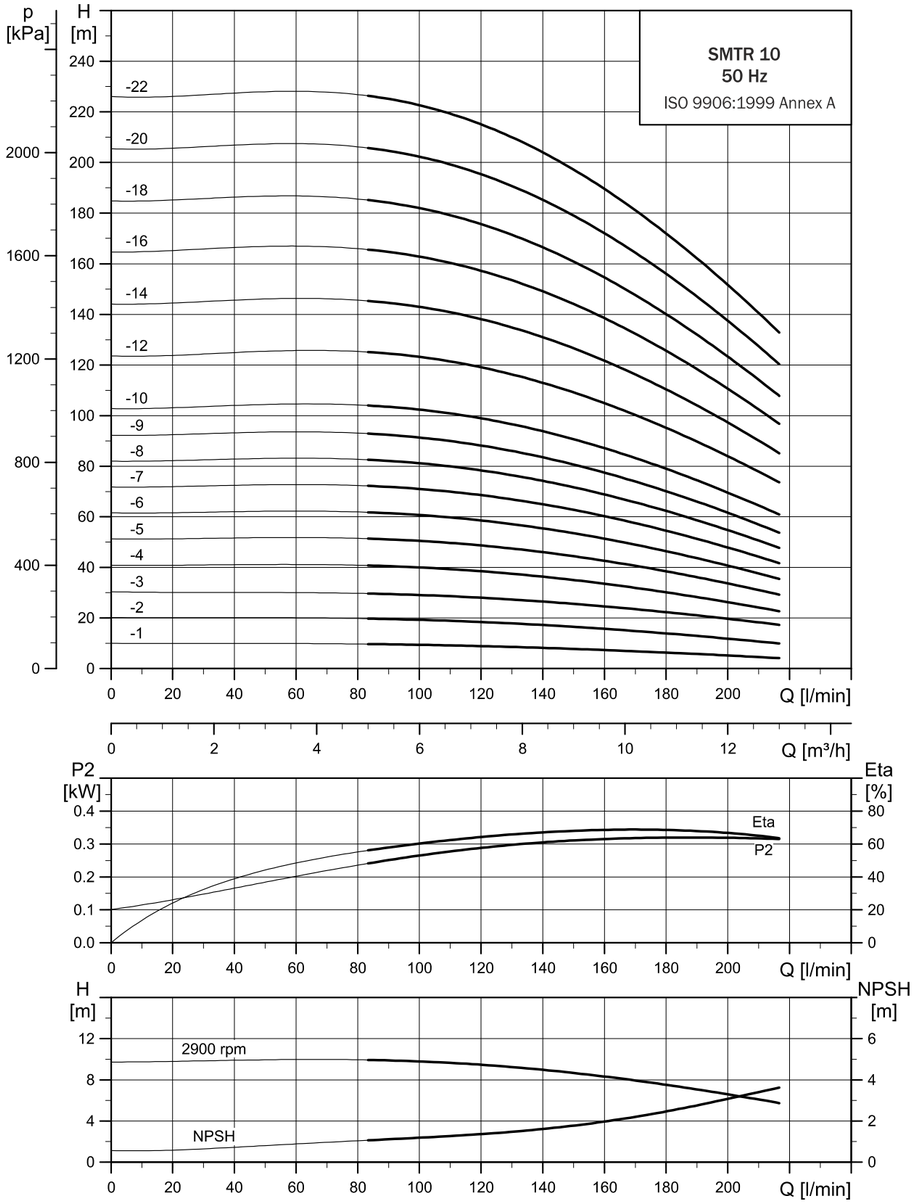


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 5-2/2	0.37	473	169	304	140	140	-	109	82	12.2
SMTR 5-3/3	0.55	500	196	304	140	140	-	109	82	13.0
SMTR 5-4/4	0.55	527	223	304	140	140	-	109	82	13.4
SMTR 5-5/5	0.75	594	250	344	140	140	-	109	82	14.7
SMTR 5-6/6	1.1	621	277	344	140	140	-	109	82	16.5
SMTR 5-7/7	1.1	648	304	344	140	140	-	109	82	16.9
SMTR 5-8/8	1.1	675	331	344	140	140	-	109	82	17.3
SMTR 5-9/9	1.5	752	358	394	178	140	-	110	162	26.6
SMTR 5-10/10	1.5	779	385	394	178	140	-	110	162	27.0
SMTR 5-12/12	2.2	873	439	434	178	140	-	110	162	32.0
SMTR 5-14/14	2.2	927	493	434	178	140	-	110	162	32.8
SMTR 5-16/16	2.2	981	547	434	178	140	-	110	162	33.6
SMTR 5-17/17	3	1031	583	448	198	160	-	110	162	35.7
SMTR 5-18/18	3	1049	601	448	198	160	-	110	162	36.1
SMTR 5-19/19	3	1076	628	448	198	160	-	110	162	36.5
SMTR 5-20/20	3	1103	655	448	198	160	-	110	162	36.9
SMTR 5-21/21	3	1130	682	448	198	160	-	110	162	37.3
SMTR 5-22/22	4	1194	709	485	220	160	-	134	202	39.5
SMTR 5-24/24	4	1248	763	485	220	160	-	134	202	39.9
SMTR 5-26/26	4	1302	817	485	220	160	-	134	202	40.3
SMTR 5-29/29	4	1383	898	485	220	160	-	134	202	40.7
SMTR 5-32/32	5.5	1464	979	485	220	-	300	134	202	49.3

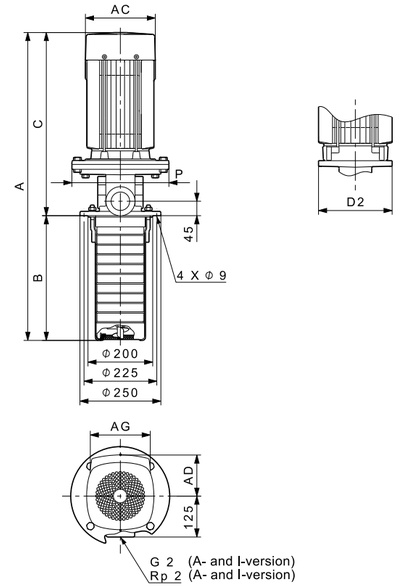
*The Maximum immersion depth 1006 mm

SMTR 10, 50 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

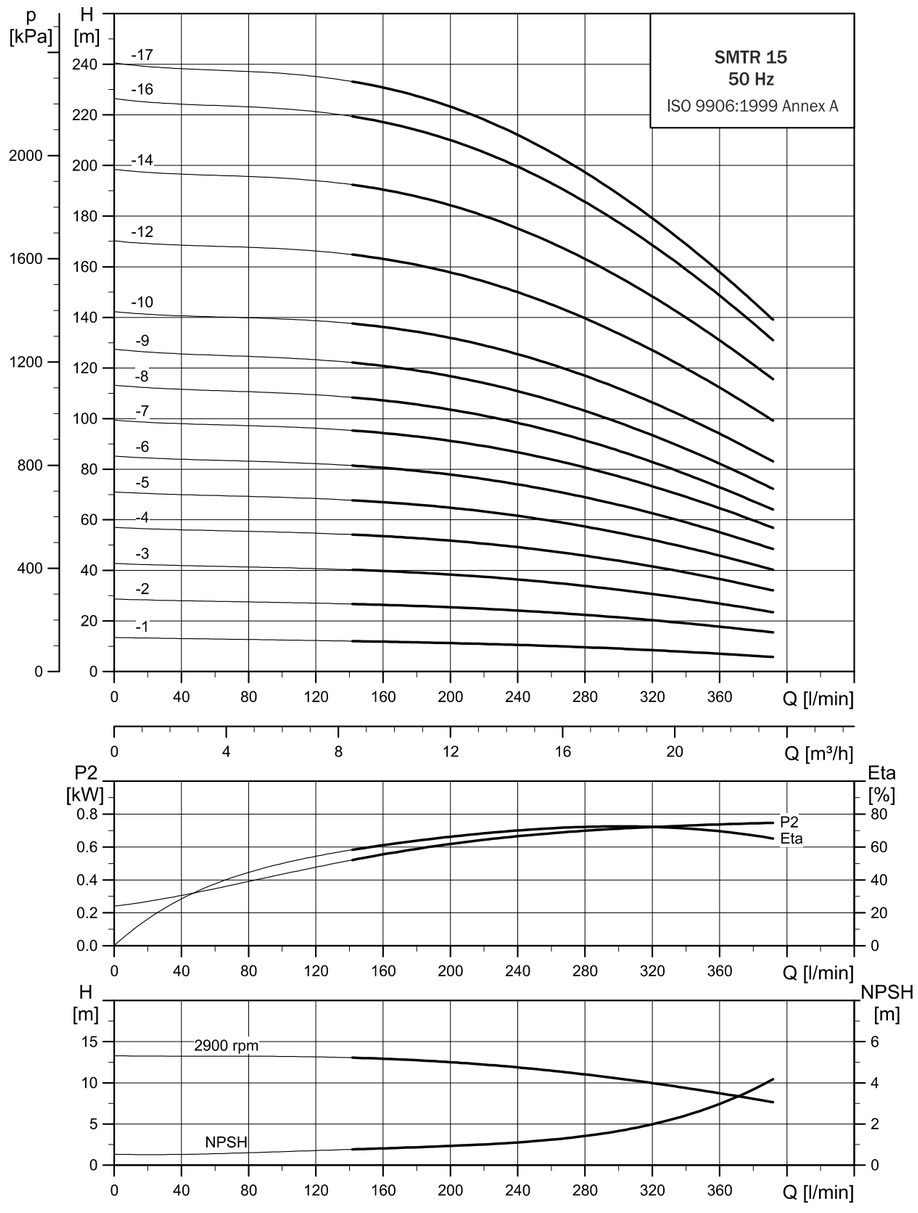


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR								
		Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 10-2/1	0.75	523	148	375	140	140	-	109	82	21
SMTR 10-2/2	0.75	523	148	375	140	140	-	109	82	22
SMTR 10-3/3	1.1	553	178	375	140	140	-	109	82	24
SMTR 10-4/4	1.5	633	208	425	178	140	-	110	162	31
SMTR 10-5/5	2.2	703	238	465	178	140	-	110	162	37
SMTR 10-6/6	2.2	733	268	465	178	140	-	110	162	38
SMTR 10-7/7	3	777	298	479	198	160	-	110	162	39
SMTR 10-8/8	3	807	328	479	198	160	-	110	162	40
SMTR 10-9/9	3	837	358	479	198	160	-	110	162	41
SMTR 10-10/10	4	904	388	516	220	160	-	134	202	43
SMTR 10-12/12	4	964	448	516	220	160	-	134	202	44
SMTR 10-14/14	5.5	1063	508	555	220	-	300	134	202	68
SMTR 10-16/16	5.5	1123	568	555	220	-	300	134	202	69
SMTR 10-18/18	7.5	1171	628	543	260	-	300	159	203	87
SMTR 10-20/20	7.5	1231	688	543	260	-	300	159	203	88
SMTR 10-22/22	7.5	1291	748	543	260	-	300	159	203	89

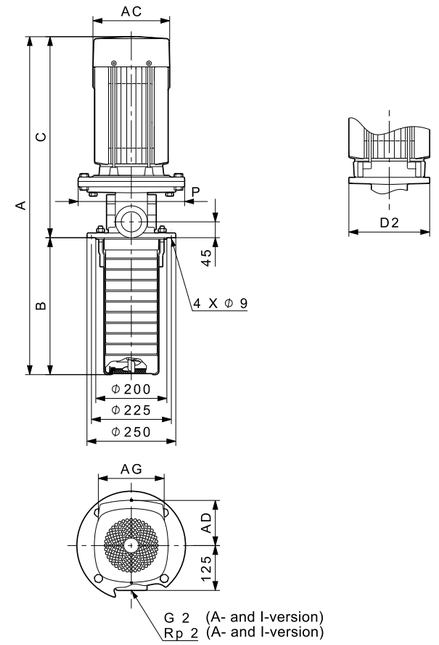
*The Maximum immersion depth 1018 mm

SMTR 15, 50 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

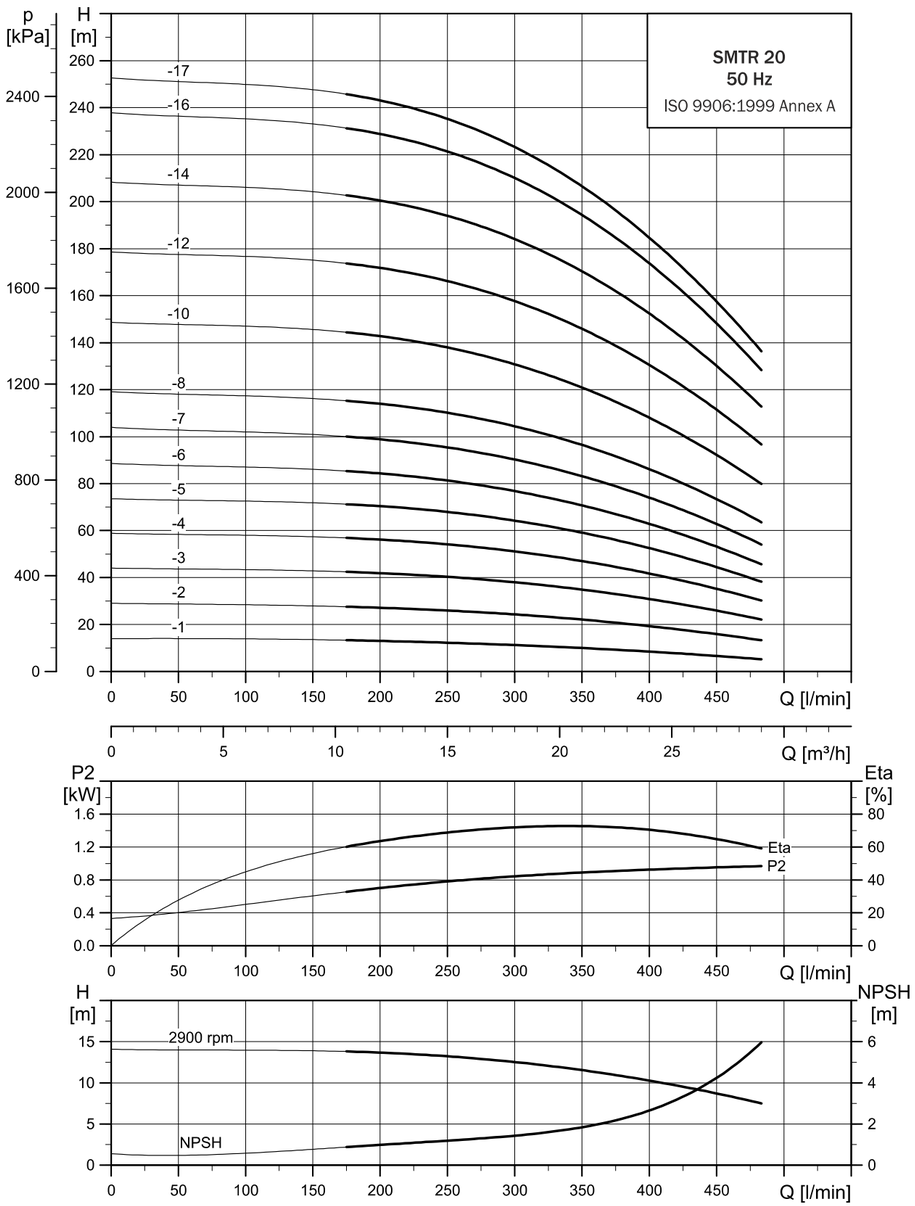


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 15-2/1	1.1	553	178	375	178	140	-	110	82	23
SMTR 15-2/2	2.2	643	178	465	178	140	-	110	162	34
SMTR 15-3/3	3	702	223	479	198	160	-	110	162	38
SMTR 15-4/4	4	784	268	516	220	160	-	134	202	40
SMTR 15-5/5	4	829	313	516	220	160	-	134	202	41
SMTR 15-6/6	5.5	913	358	555	220	-	300	134	202	64
SMTR 15-7/7	5.5	958	403	555	220	-	300	134	202	65
SMTR 15-8/8	7.5	991	448	543	260	-	300	159	203	83
SMTR 15-9/9	7.5	1036	493	543	260	-	300	159	203	84
SMTR 15-10/10	11	1203	538	665	315	-	350	204	243	123
SMTR 15-12/12	11	1293	628	665	315	-	350	204	243	125
SMTR 15-14/14	11	1383	718	665	315	-	350	204	243	127
SMTR 15-16/16	15	1473	808	665	314	-	350	204	243	141
SMTR 15-17/17	15	1518	853	665	314	-	350	204	243	142

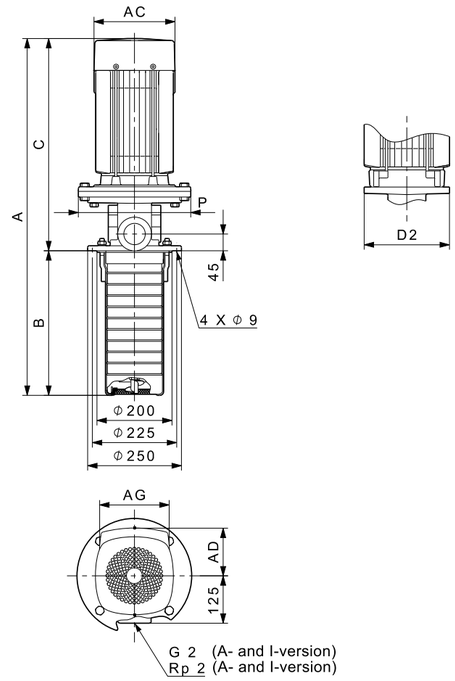
*The Maximum immersion depth 1033 mm

SMTR 20, 50 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

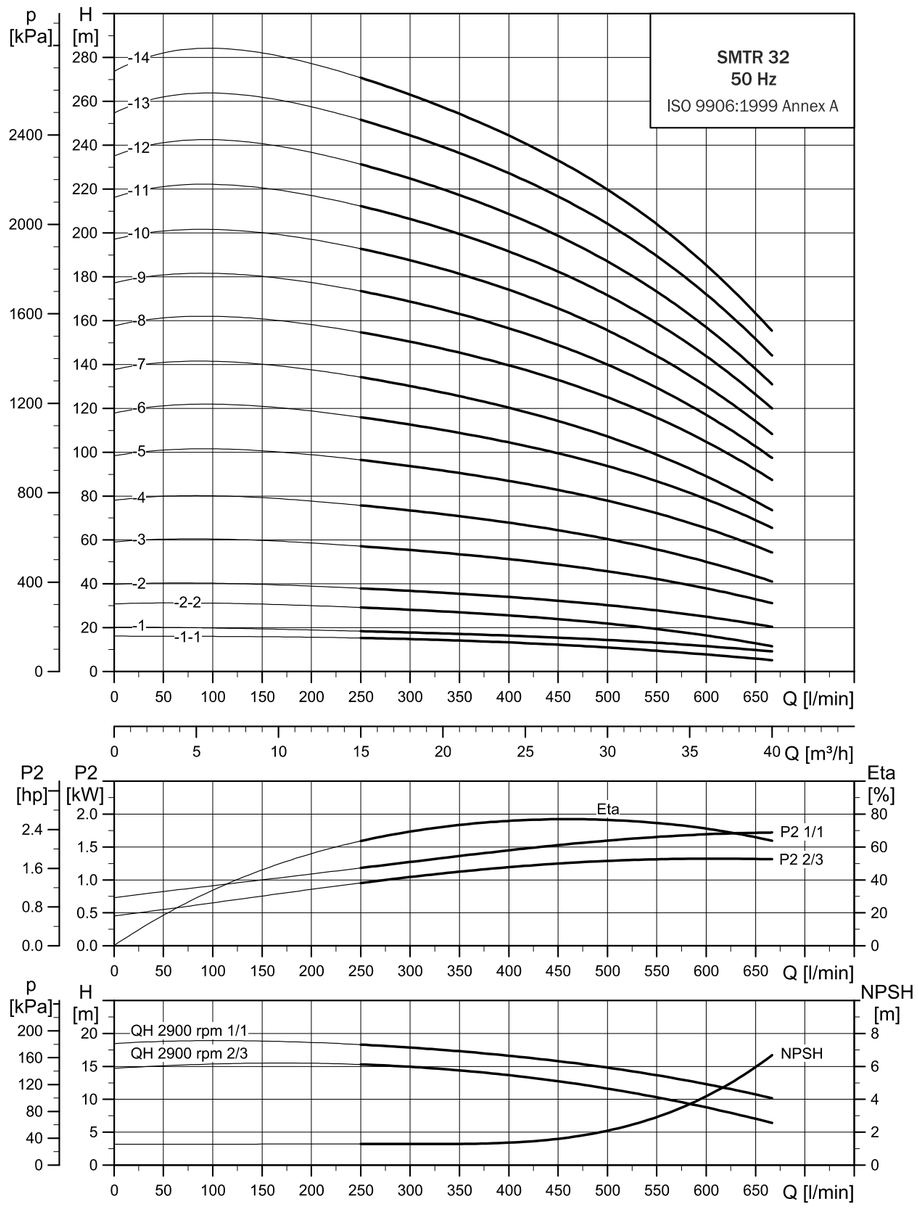


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 20-2/1	1.1	553	178	375	140	140	-	109	82	23
SMTR 20-2/2	2.2	643	178	465	178	140	-	110	162	34
SMTR 20-3/3	4	739	223	516	220	160	-	134	202	39
SMTR 20-4/4	5.5	823	268	555	220	-	300	134	202	62
SMTR 20-5/5	5.5	868	313	555	220	-	300	134	202	63
SMTR 20-6/6	7.5	901	358	543	260	-	300	159	203	81
SMTR 20-7/7	7.5	946	403	543	260	-	300	159	203	82
SMTR 20-8/8	11	1113	448	665	315	-	350	204	243	121
SMTR 20-10/10	11	1203	538	665	315	-	350	204	243	123
SMTR 20-12/12	15	1293	628	665	314	-	350	204	243	137
SMTR 20-14/14	15	1383	718	665	314	-	350	204	243	139
SMTR 20-16/16	18.5	1517	808	709	314	-	350	204	243	153
SMTR 20-17/17	18.5	1562	853	709	314	-	350	204	243	154

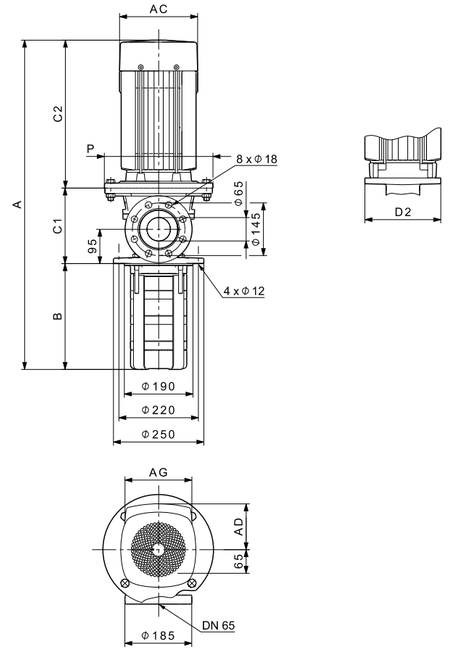
*The Maximum immersion depth 1033 mm

SMTR 32, 50 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

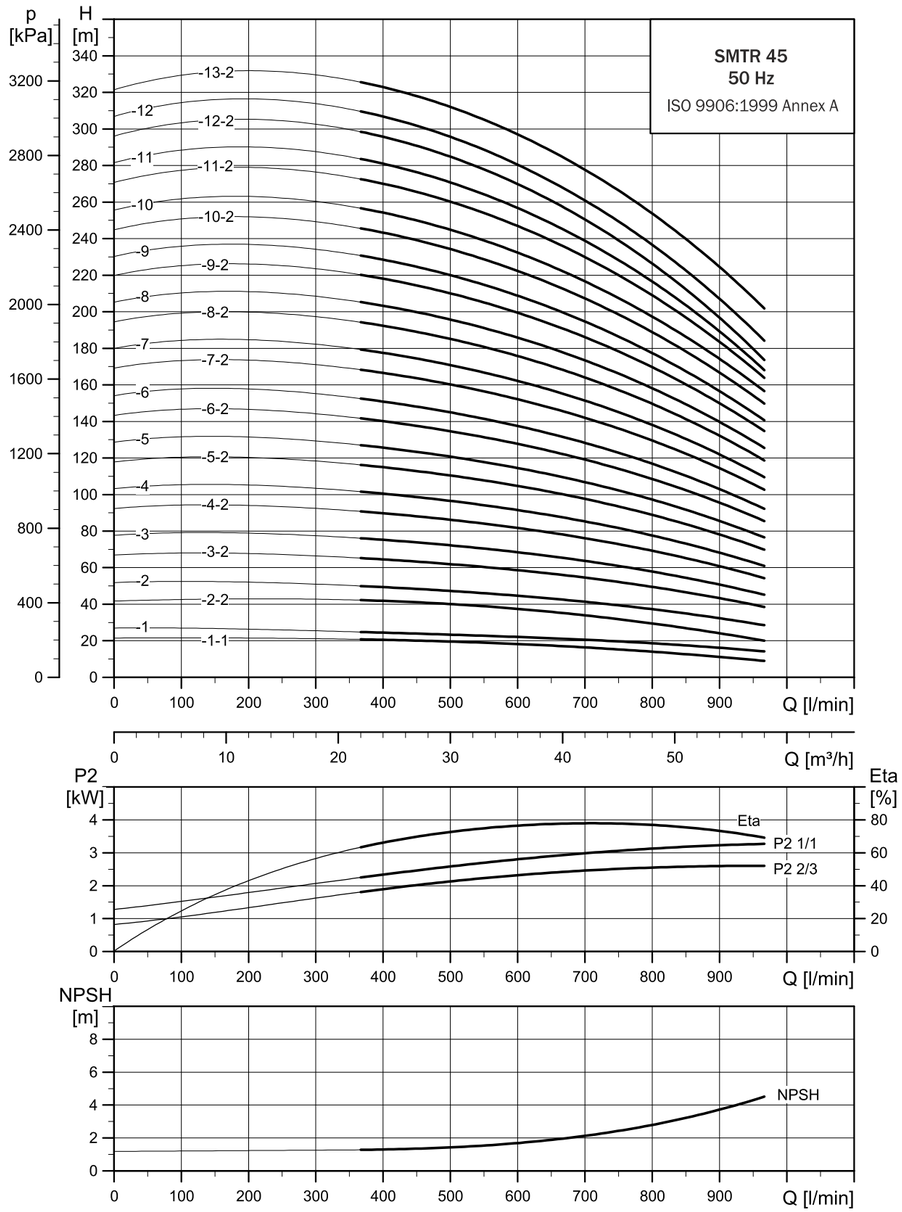


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]									Net weight [kg]
		A	B	C1	C2	AC	D2	P	AD	AG	
SMTR 32-2/1-1	1.5	642	223	138	281	178	-	200	110	162	64
SMTR 32-2/1	2.2	682	223	138	321	178	-	200	110	162	70
SMTR 32-2/2-2	3	696	223	138	335	198	198	-	120	162	71
SMTR 32-2/2	4	733	223	138	372	220	198	-	134	202	83
SMTR 32-3/3	5.5	893	293	209	391	220	-	300	134	202	110
SMTR 32-4/4	7.5	951	363	209	379	260	-	300	159	203	121
SMTR 32-5/5	11	1113	433	209	471	314	-	350	204	243	162
SMTR 32-6/6	11	1183	503	209	471	314	-	350	204	243	163
SMTR 32-7/7	15	1253	573	209	471	314	-	350	204	243	175
SMTR 32-8/8	15	1323	643	209	471	314	-	350	204	243	175
SMTR 32-9/9	18.5	1437	713	209	515	314	-	350	204	243	188
SMTR 32-10/10	18.5	1507	783	209	515	314	-	350	204	243	189
SMTR 32-11/11	22	1603	853	209	541	314	-	350	204	243	208
SMTR 32-12/12	22	1673	923	209	541	314	-	350	204	243	209
SMTR 32-13/13	30	1812	993	209	610	402	-	400	300	260	325
SMTR 32-14/14	30	1882	1063	209	610	402	-	400	300	260	325

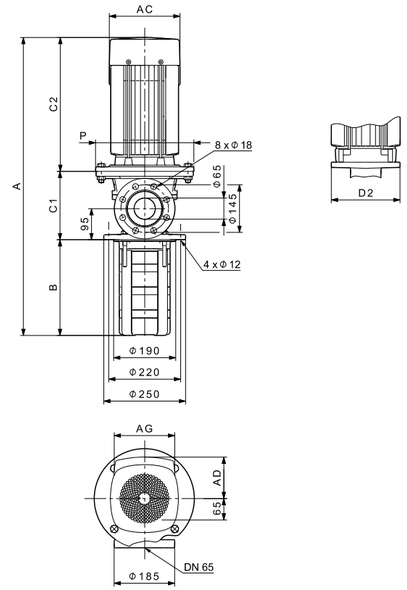
*The Maximum immersion depth 1343 mm

SMTR 45, 50 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

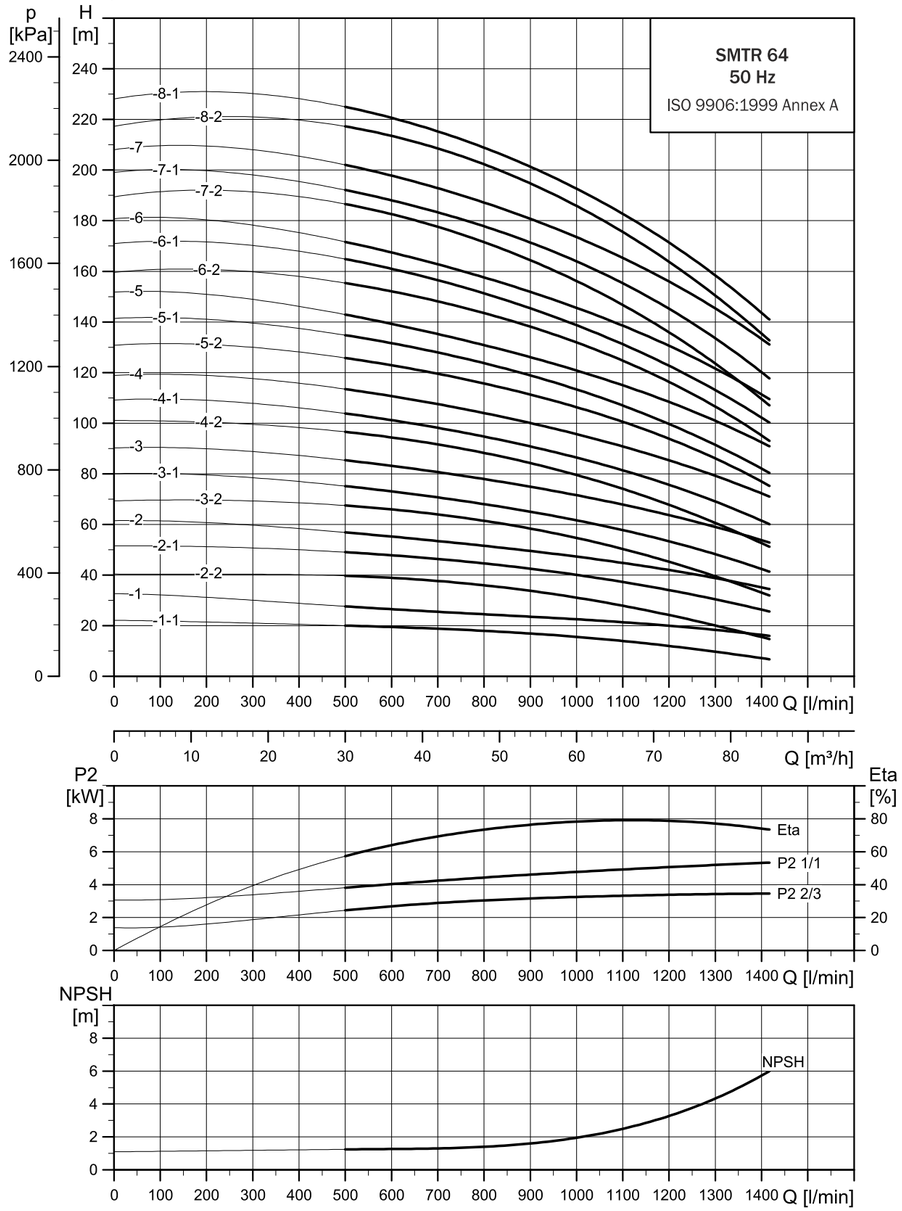


DIMENSIONS AND WEIGHTS

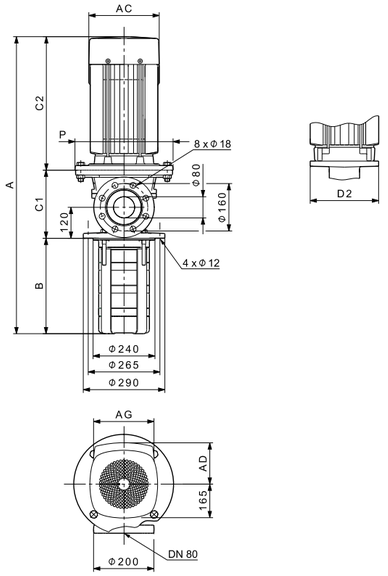
Pump type	P2 [kW]	SMTR									
		Dimensions [mm]									Net weight [kg]
		A	B	C1	C2	AC	D2	P	AD	AG	
SMTR 45-2/1-1	3	748	244	169	335	198	198	-	120	162	80
SMTR 45-2/1	4	785	244	169	372	220	198	-	134	202	102
SMTR 45-2/2-2	5.5	875	244	240	391	220	-	300	134	202	118
SMTR 45-2/2	7.5	863	244	240	379	260	-	300	159	203	128
SMTR 45-3/3-2	11	1035	324	240	471	314	-	350	204	243	171
SMTR 45-3/3	11	1035	324	240	471	314	-	350	204	243	171
SMTR 45-4/4-2	15	1115	404	240	471	314	-	350	204	243	183
SMTR 45-4/4	15	1115	404	240	471	314	-	350	204	243	183
SMTR 45-5/5-2	18.5	1239	484	240	515	314	-	350	204	243	196
SMTR 45-5/5	18.5	1239	484	240	515	314	-	350	204	243	196
SMTR 45-6/6-2	22	1345	564	240	541	314	-	350	204	243	211
SMTR 45-6/6	22	1345	564	240	541	314	-	350	204	243	211
SMTR 45-7/7-2	30	1494	644	240	610	402	-	400	300	260	332
SMTR 45-7/7	30	1494	644	240	610	402	-	400	300	260	332
SMTR 45-8/8-2	30	1574	724	240	610	402	-	400	300	260	332
SMTR 45-8/8	30	1574	724	240	610	402	-	400	300	260	332
SMTR 45-9/9-2	30	1654	804	240	610	402	-	400	300	260	333
SMTR 45-9/9	37	1711	804	240	667	402	-	400	300	260	355
SMTR 45-10/10-2	37	1791	884	240	667	402	-	400	300	260	355
SMTR 45-10/10	37	1791	884	240	667	402	-	400	300	260	355
SMTR 45-11/11-2	45	1932	964	259	709	442	-	450	325	260	507
SMTR 45-11/11	45	1932	964	259	709	442	-	450	325	260	507
SMTR 45-12/12-2	45	2012	1044	259	709	442	-	450	325	260	507
SMTR 45-12/12	45	2012	1044	259	709	442	-	450	325	260	507
SMTR 45-13/13-2	45	2092	1124	259	709	442	-	450	325	260	507

*The Maximum immersion depth 1006 mm

SMTR 64, 50 HZ



DIMENSIONAL SKETCHES



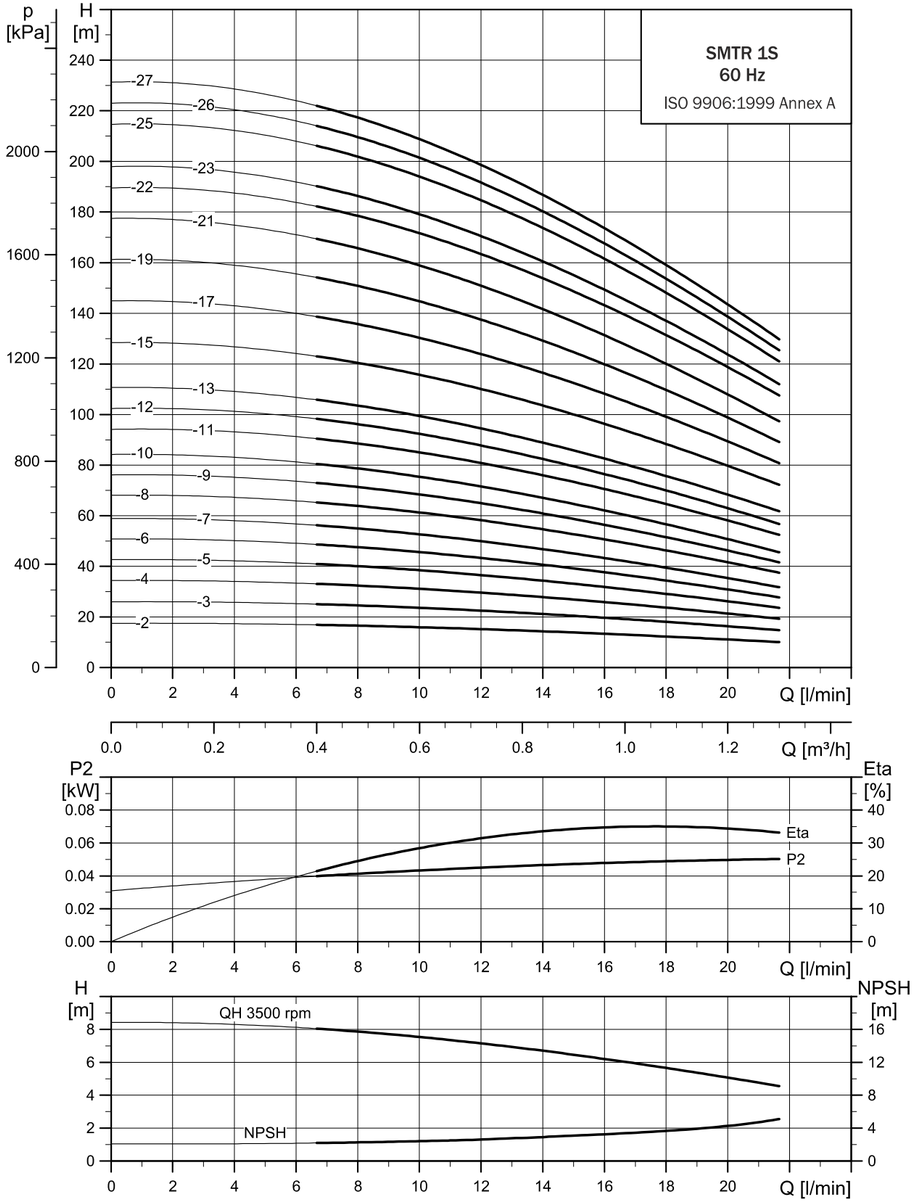
DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR									
		Dimensions [mm]									Net weight [kg]
		A	B	C1	C2	AC	D2	P	AD	AG	
SMTR 64-2/1-1	4	790	249	169	372	220	198	-	134	202	105
SMTR 64-2/1	5.5	880	249	240	391	220	-	300	134	202	120
SMTR 64-2/2-2	7.5	868	249	240	379	260	-	300	159	203	131
SMTR 64-2/2-1	11	960	249	240	471	314	-	350	204	243	173
SMTR 64-2/2	11	960	249	240	471	314	-	350	204	243	173
SMTR 64-3/3-2	15	1043	332	240	471	314	-	350	204	243	185
SMTR 64-3/3-1	15	1043	332	240	471	314	-	350	204	243	185
SMTR 64-3/3	18.5	1087	332	240	515	314	-	350	204	243	198
SMTR 64-4/4-2	18.5	1169	414	240	515	314	-	350	204	243	199
SMTR 64-4/4-1	22	1195	414	240	541	314	-	350	204	243	213
SMTR 64-4/4	22	1195	414	240	541	314	-	350	204	243	213
SMTR 64-5/5-2	30	1347	497	240	610	402	-	400	300	260	334
SMTR 64-5/5-1	30	1347	497	240	610	402	-	400	300	260	334
SMTR 64-5/5	30	1347	497	240	610	402	-	400	300	260	334
SMTR 64-6/6-2	30	1429	579	240	610	402	-	400	300	260	334
SMTR 64-6/6-1	37	1486	579	240	667	402	-	400	300	260	356
SMTR 64-6/6	37	1486	579	240	667	402	-	400	300	260	356
SMTR 64-7/7-2	37	1569	662	240	667	402	-	400	300	260	357
SMTR 64-7/7-1	37	1569	662	240	667	402	-	400	300	260	357
SMTR 64-7/7	45	1630	662	259	709	442	-	450	325	260	446
SMTR 64-8/8-2	45	1712	744	259	709	442	-	450	325	260	446
SMTR 64-8/8-1	45	1712	744	259	709	442	-	450	325	260	446

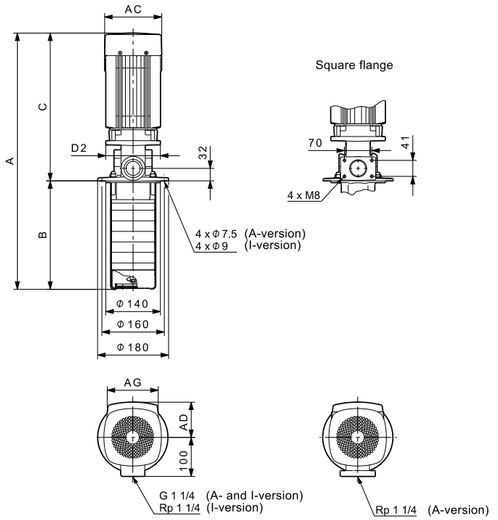
*The Maximum immersion depth 1006 mm

SMTR, 60 HZ

SMTR 1S, 60 HZ



DIMENSIONAL SKETCHES

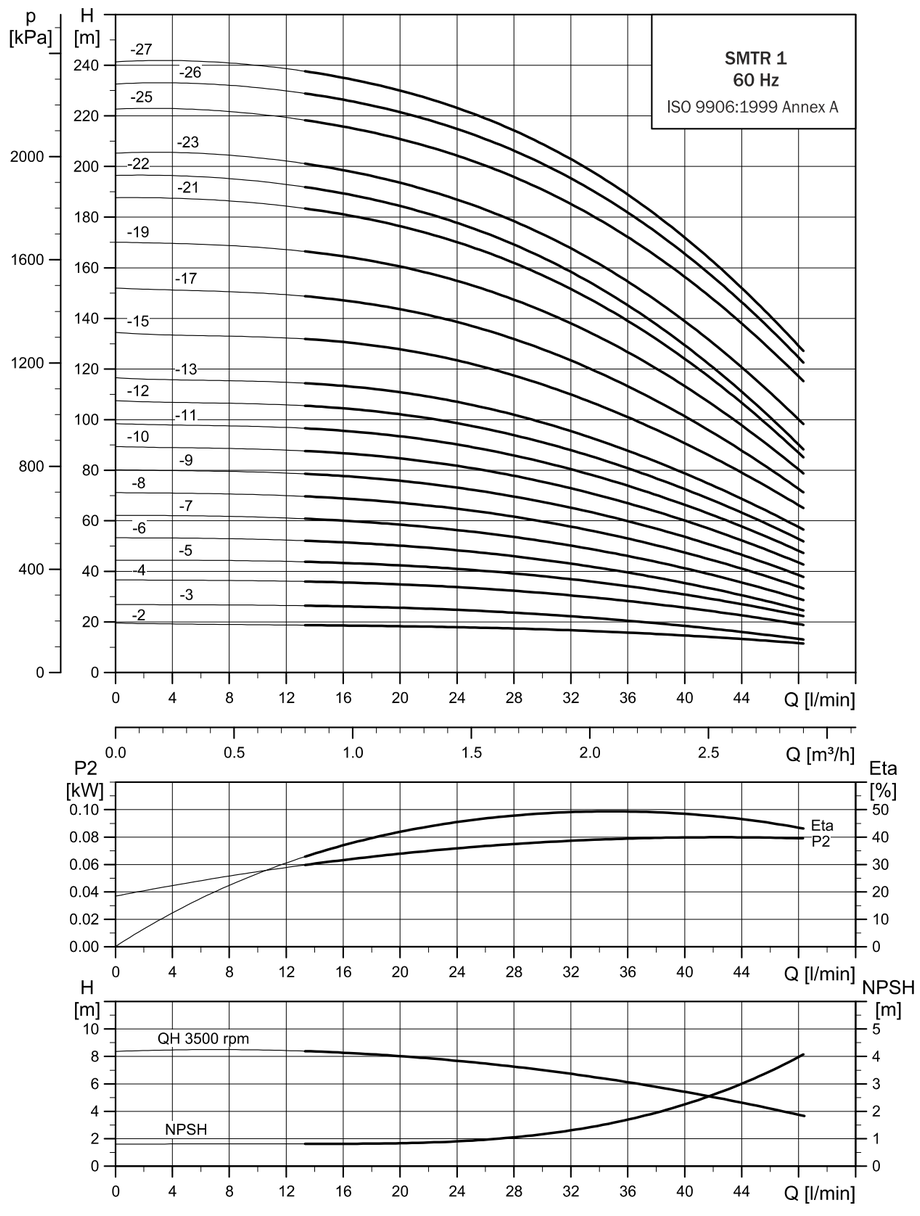


DIMENSIONS AND WEIGHTS

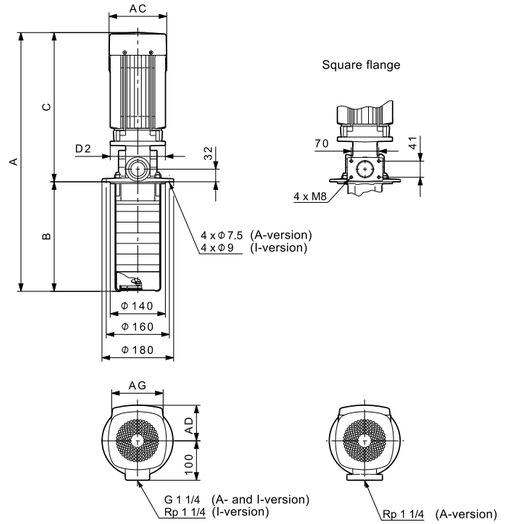
Pump type	P2 [kW]	SMTR Dimensions [mm]							Net weight [kg]
		A	B	C	AC	D2	AD	AG	
SMTR 1s-2/2	0.37	464	160	304	140	140	109	82	12.2
SMTR 1s-3/3	0.37	482	178	304	140	140	109	82	12.5
SMTR 1s-4/4	0.37	500	196	304	140	140	109	82	12.8
SMTR 1s-5/5	0.37	518	214	304	140	140	109	82	13.1
SMTR 1s-6/6	0.37	536	232	304	140	140	109	82	13.4
SMTR 1s-7/7	0.37	554	250	304	140	140	109	82	13.7
SMTR 1s-8/8	0.55	572	268	304	140	140	109	82	14.5
SMTR 1s-9/9	0.55	590	286	304	140	140	109	82	14.8
SMTR 1s-10/10	0.55	608	304	304	140	140	109	82	15.1
SMTR 1s-11/11	0.75	666	322	344	140	140	109	82	16.2
SMTR 1s-12/12	0.75	684	340	344	140	140	109	82	16.5
SMTR 1s-13/13	0.75	702	358	344	140	140	109	82	16.0
SMTR 1s-15/15	1.1	738	394	344	140	140	109	82	18.8
SMTR 1s-17/17	1.1	774	430	344	140	140	109	82	19.4
SMTR 1s-19/19	1.1	810	466	344	140	140	109	82	20.0
SMTR 1s-21/21	1.1	846	502	344	140	140	109	82	20.6
SMTR 1s-22/22	1.5	914	520	394	178	140	110	162	27.4
SMTR 1s-23/23	1.5	932	538	394	178	140	110	162	27.7
SMTR 1s-25/25	1.5	968	574	394	178	140	110	162	28.3
SMTR 1s-26/26	1.5	986	592	394	178	140	110	162	28.6
SMTR 1s-27/27	1.5	1004	610	394	178	140	110	162	28.9

*The Maximum immersion depth 1006 mm

SMTR 1, 60 HZ



DIMENSIONAL SKETCHES

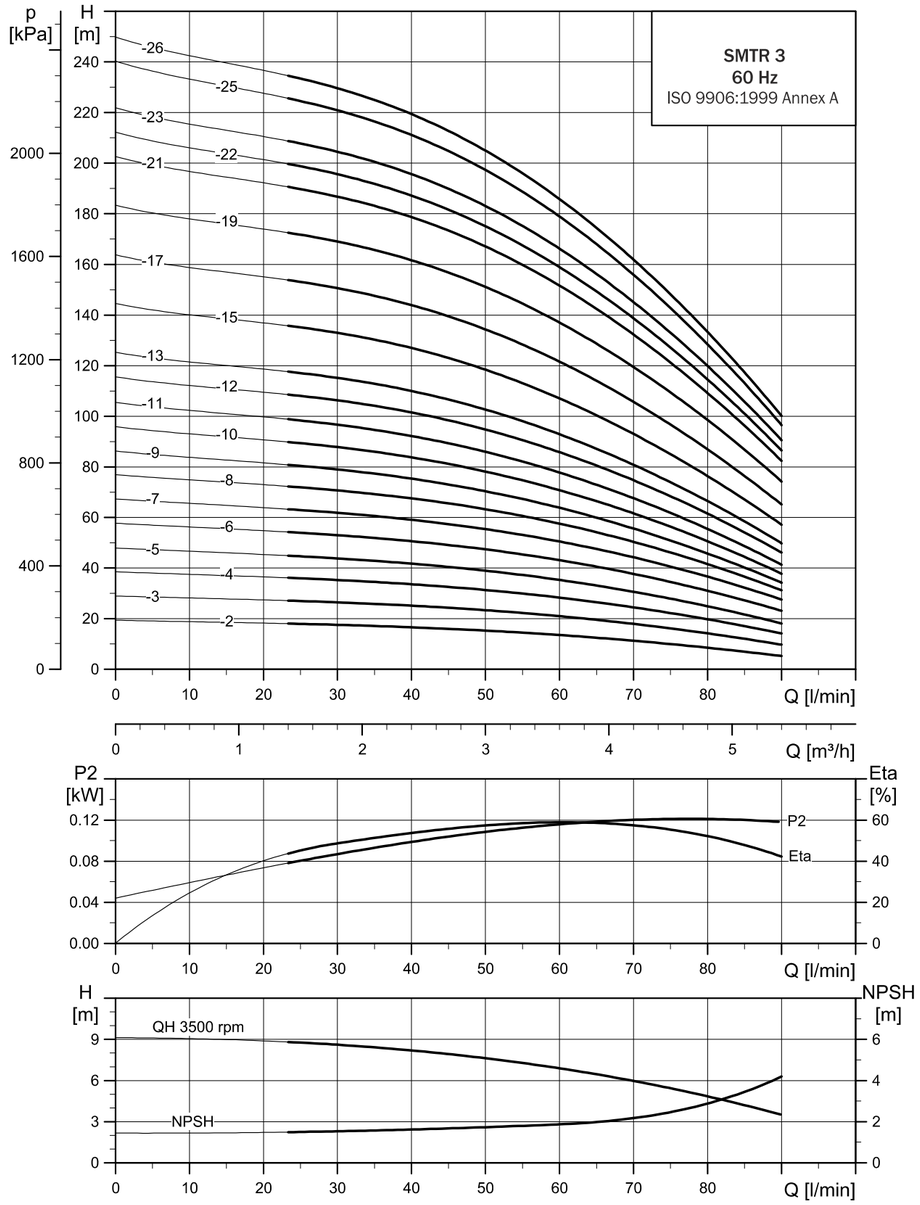


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]							Net weight [kg]
		A	B	C	AC	D2	AD	AG	
SMTR 1-2/2	0.37	464	160	304	140	140	109	82	12.2
SMTR 1-3/3	0.37	482	178	304	140	140	109	82	12.5
SMTR 1-4/4	0.37	500	196	304	140	140	109	82	12.8
SMTR 1-5/5	0.55	518	214	304	140	140	109	82	13.6
SMTR 1-6/6	0.55	536	232	304	140	140	109	82	13.9
SMTR 1-7/7	0.75	594	250	344	140	140	109	82	15.0
SMTR 1-8/8	0.75	612	268	344	140	140	109	82	15.3
SMTR 1-9/9	0.75	630	286	344	140	140	109	82	15.6
SMTR 1-10/10	1.1	648	304	344	140	140	109	82	17.3
SMTR 1-11/11	1.1	666	322	344	140	140	109	82	17.6
SMTR 1-12/12	1.1	684	340	344	140	140	109	82	17.9
SMTR 1-13/13	1.1	702	358	344	140	140	109	82	18.2
SMTR 1-15/15	1.5	788	394	394	178	140	110	162	25.3
SMTR 1-17/17	1.5	824	430	394	178	140	110	162	25.9
SMTR 1-19/19	2.2	900	466	434	178	140	110	162	29.7
SMTR 1-21/21	2.2	936	502	434	178	140	110	162	30.3
SMTR 1-22/22	2.2	954	520	434	178	140	110	162	30.6
SMTR 1-23/23	2.2	972	538	434	178	140	110	162	30.9
SMTR 1-25/25	2.2	1008	574	434	178	140	110	162	31.5
SMTR 1-26/26	3	1040	592	448	198	160	110	162	34.8
SMTR 1-27/27	3	1058	610	448	198	160	110	162	35.1

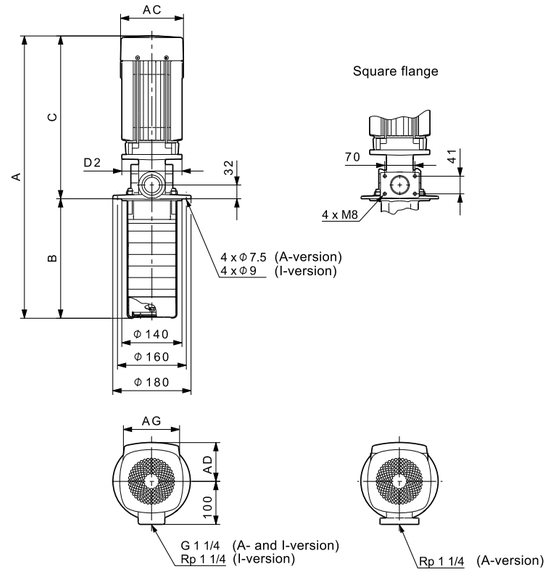
*The Maximum immersion depth 1006 mm

SMTR 3, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

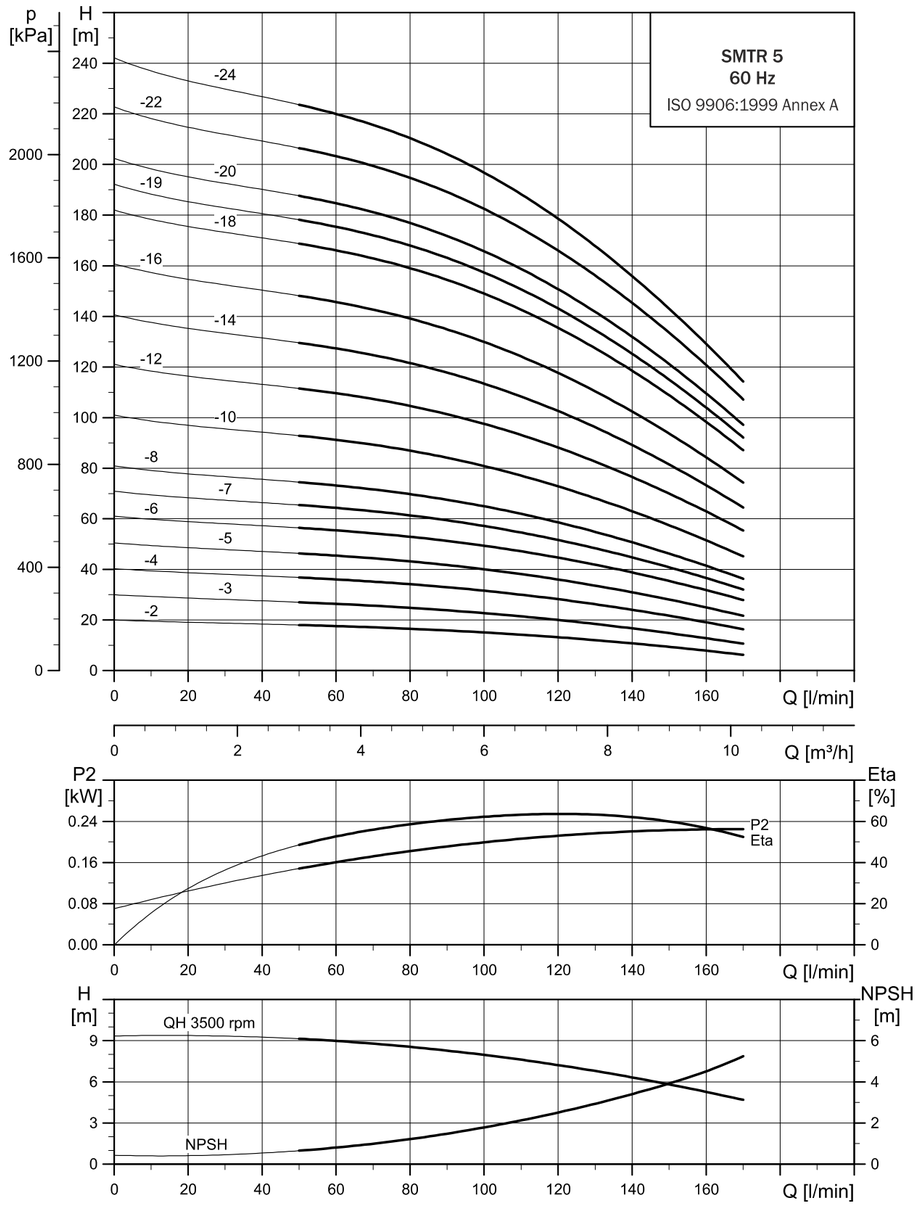


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR							
		Dimensions [mm]							Net weight [kg]
		A	B	C	AC	D2	AD	AG	
SMTR 3-2/2	0.37	464	160	304	140	140	109	82	12.2
SMTR 3-3/3	0.55	482	178	304	140	140	109	82	13.0
SMTR 3-4/4	0.55	500	196	304	140	140	109	82	13.3
SMTR 3-5/5	0.75	558	214	344	140	140	109	82	14.4
SMTR 3-6/6	1.1	576	232	344	140	140	109	82	16.1
SMTR 3-7/7	1.1	594	250	344	140	140	109	82	16.4
SMTR 3-8/8	1.1	612	268	344	140	140	109	82	16.7
SMTR 3-9/9	1.5	680	286	394	140	140	109	162	24.1
SMTR 3-10/10	1.5	698	304	394	140	140	109	162	24.4
SMTR 3-11/11	1.5	716	322	394	140	140	109	162	24.7
SMTR 3-12/12	2.2	774	340	434	178	140	110	162	27.6
SMTR 3-13/13	2.2	792	358	434	178	140	110	162	27.9
SMTR 3-15/15	2.2	828	394	434	178	140	110	162	28.5
SMTR 3-17/17	2.2	864	430	434	178	140	110	162	29.1
SMTR 3-19/19	3	914	466	448	198	160	110	162	36.4
SMTR 3-21/21	3	950	502	448	198	160	110	162	37.0
SMTR 3-22/22	3	968	520	448	198	160	110	162	37.3
SMTR 3-23/23	3	986	538	448	198	160	110	162	37.6
SMTR 3-25/25	4	1059	574	485	220	160	134	202	40.9
SMTR 3-26/26	4	1077	592	485	220	160	134	202	41.2

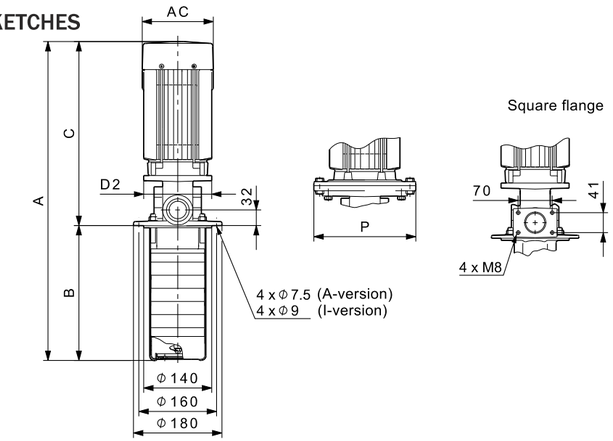
*The Maximum immersion depth 1006 mm

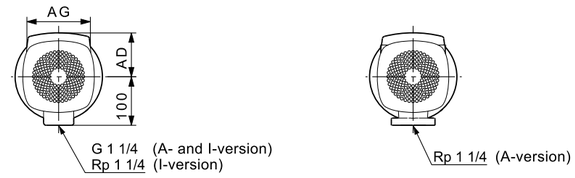
SMTR 5, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES



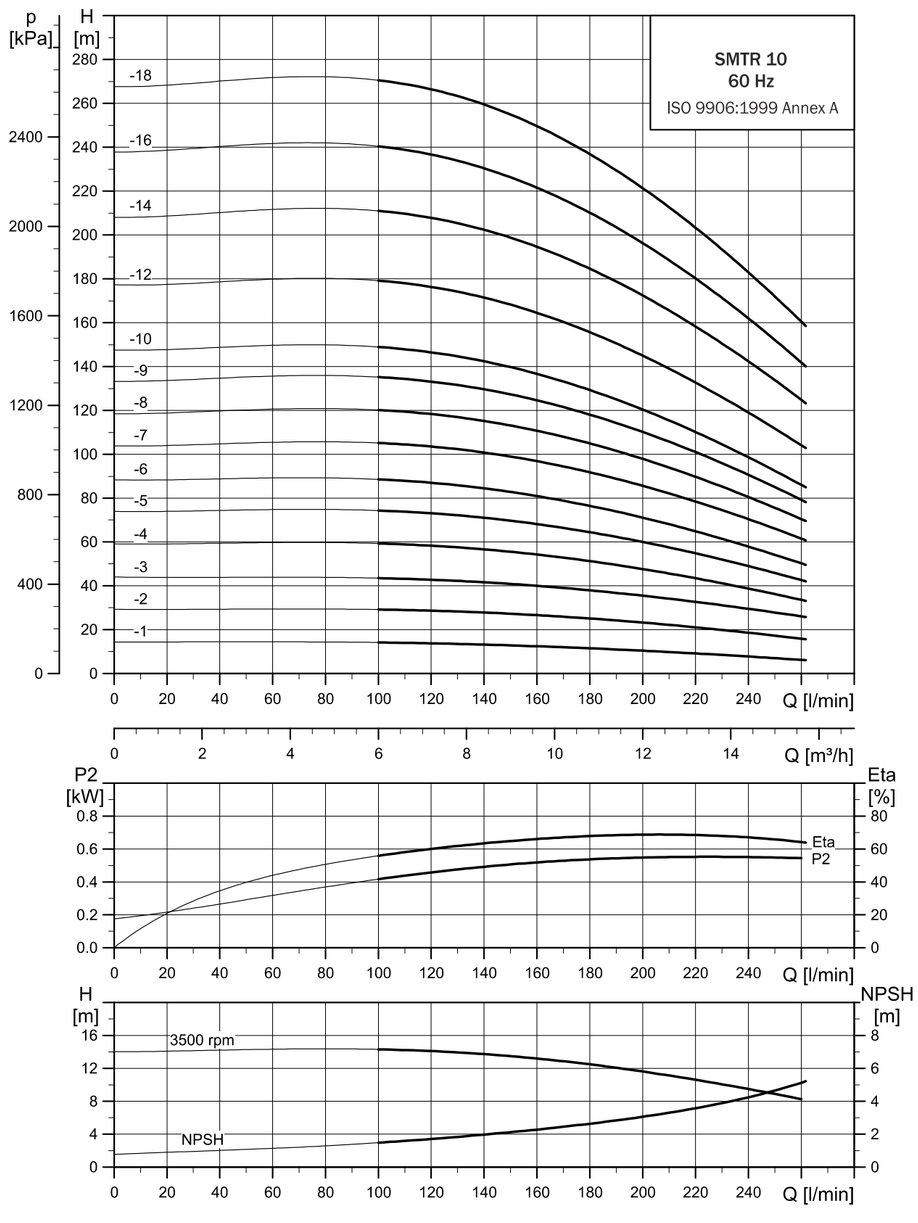


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 5-2/2	0.55	473	169	304	140	140	-	109	82	12.7
SMTR 5-3/3	1.1	540	196	344	140	140	-	109	82	15.6
SMTR 5-4/4	1.1	567	223	344	140	140	-	109	82	16.0
SMTR 5-5/5	1.5	644	250	394	178	140	-	110	162	25.0
SMTR 5-6/6	2.2	711	277	434	178	140	-	110	162	27.9
SMTR 5-7/7	2.2	738	304	434	178	140	-	110	162	28.3
SMTR 5-8/8	2.2	765	331	434	178	140	-	110	162	28.7
SMTR 5-10/10	3	833	385	448	198	160	-	110	162	32.9
SMTR 5-12/12	3	887	439	448	198	160	-	110	162	33.7
SMTR 5-14/14	4	978	493	485	220	160	-	134	202	36.3
SMTR 5-16/16	4	1032	547	485	220	160	-	134	202	37.1
SMTR 5-18/18	5.5	1130	601	529	220	-	300	134	202	43.7
SMTR 5-19/19	5.5	1157	628	529	220	-	300	134	202	44.1
SMTR 5-20/20	5.5	1184	655	529	220	-	300	134	202	44.5
SMTR 5-22/22	5.5	1238	709	529	220	-	300	134	202	45.3
SMTR 5-24/24	7.5	1280	763	517	260	-	300	159	203	58.1

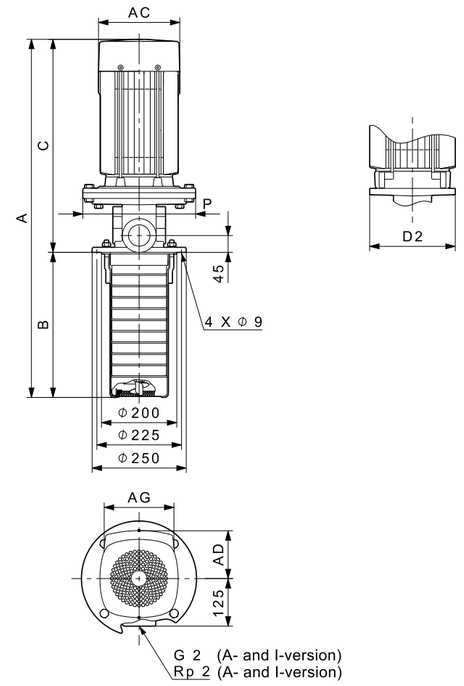
*The Maximum immersion depth 1006 mm

SMTR 10, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

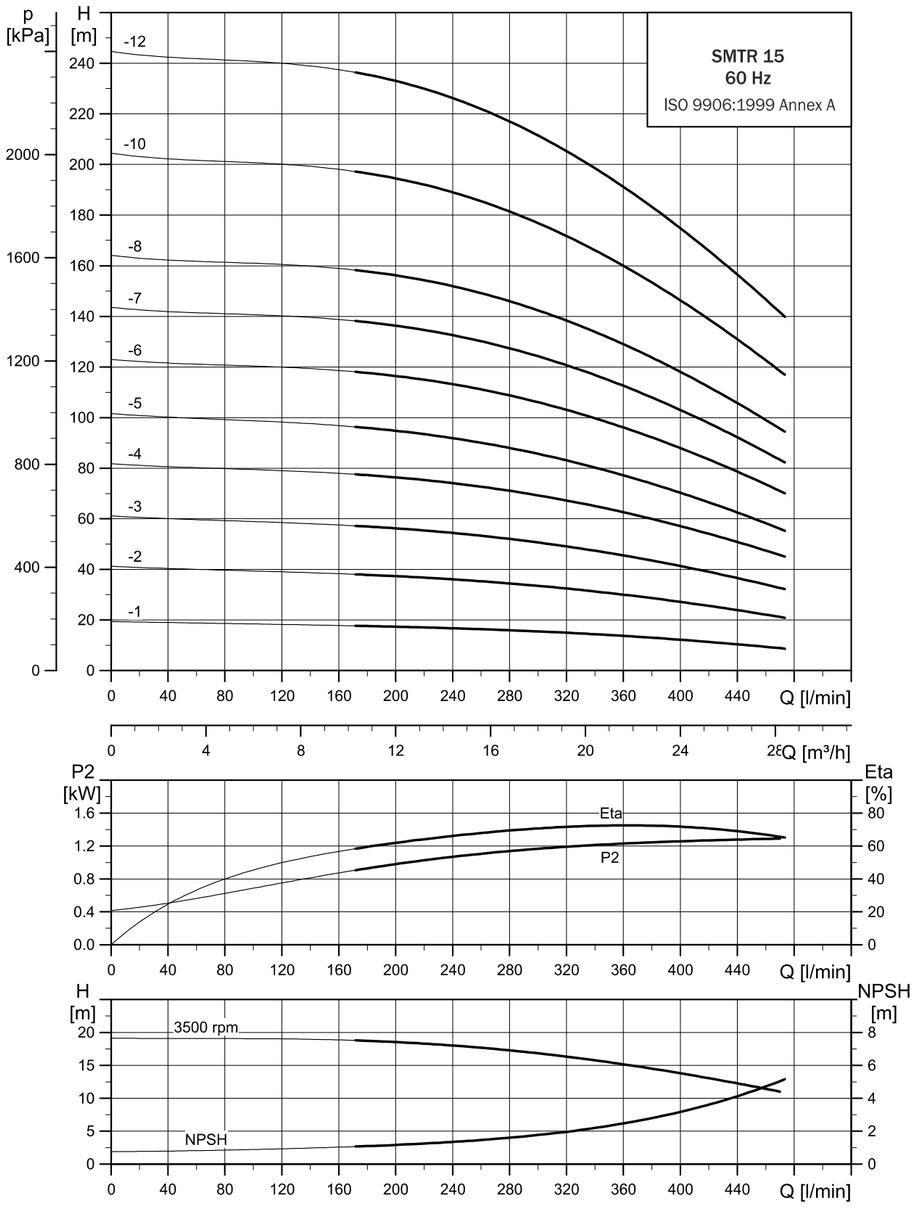


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR								
		Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 10-2/1	0.75	523	148	375	178	140	-	110	82	28
SMTR 10-2/2	1.5	573	148	425	178	140	-	110	162	31
SMTR 10-3/3	2.2	643	178	465	178	140	-	110	162	34
SMTR 10-4/4	3	687	208	479	198	160	-	110	162	38
SMTR 10-5/5	3	717	238	479	198	160	-	110	162	39
SMTR 10-6/6	4	784	268	516	220	160	-	134	202	40
SMTR 10-7/7	5.5	853	298	555	220	-	300	134	202	63
SMTR 10-8/8	5.5	883	328	555	220	-	300	134	202	64
SMTR 10-9/9	5.5	913	358	555	220	-	300	134	202	69
SMTR 10-10/10	7.5	931	388	543	260	-	300	159	203	82
SMTR 10-12/12	7.5	991	448	543	260	-	300	159	203	84
SMTR 10-14/14	11	1173	508	665	315	-	350	204	243	124
SMTR 10-16/16	11	1233	568	665	315	-	350	204	243	126
SMTR 10-18/18	11	1293	628	665	315	-	350	204	243	128
SMTR 10-20/18	11	1353	688	665	315	-	350	204	243	130
SMTR 10-22/18	11	1413	748	665	315	-	350	204	243	132

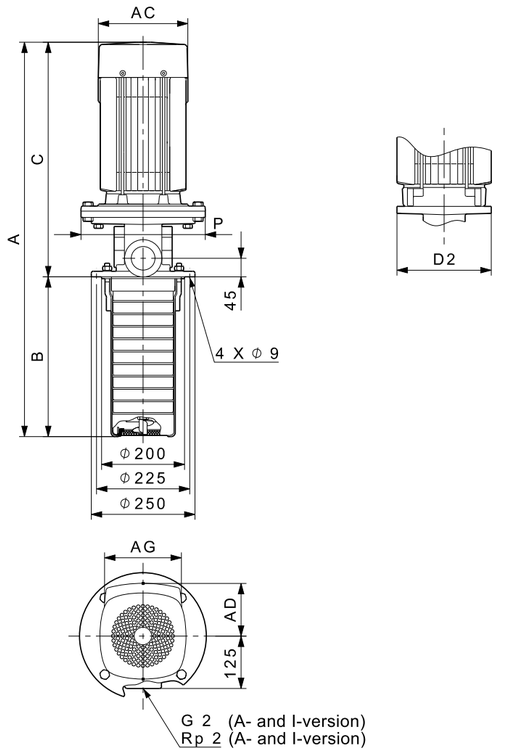
*The Maximum immersion depth 1018 mm

SMTR 15, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

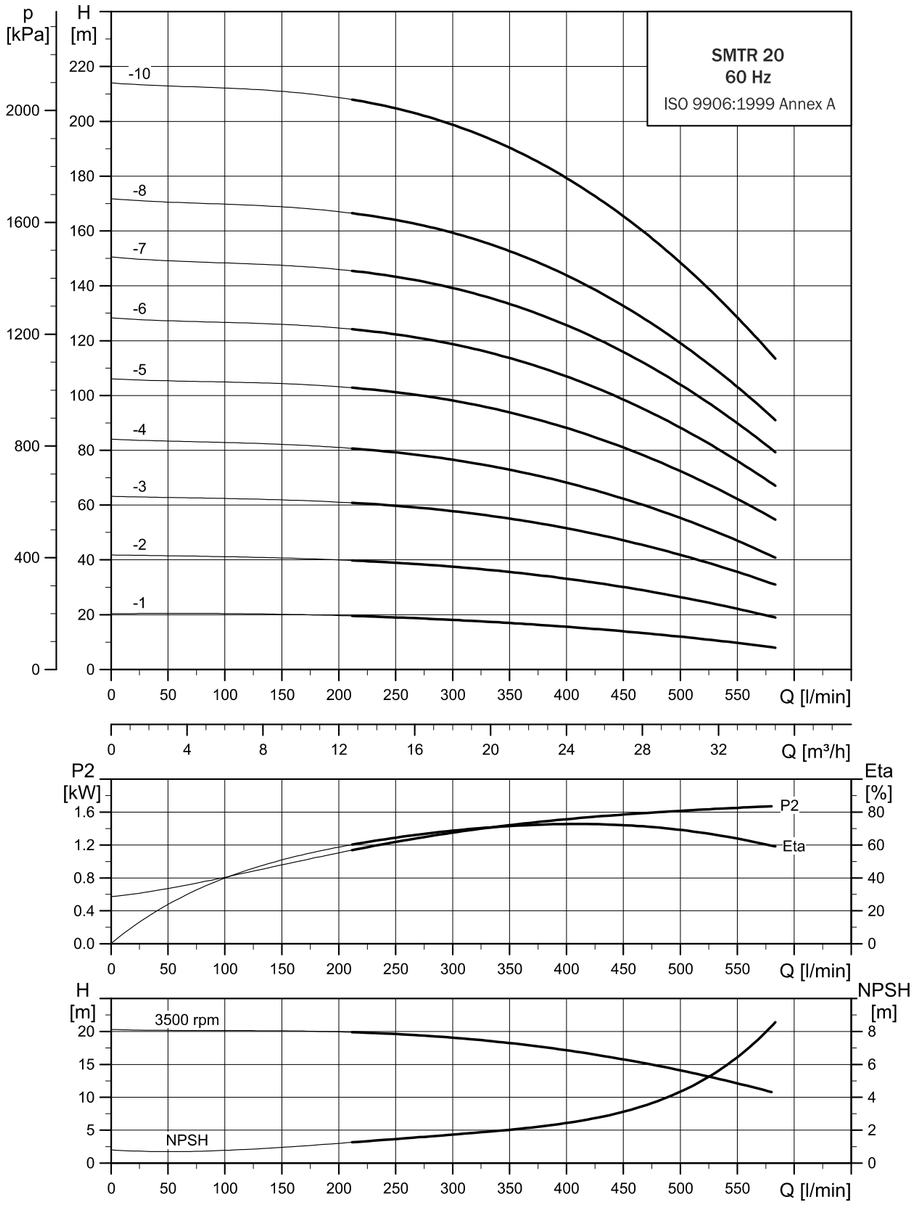


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 15-2/1	1.5	603	178	425	178	140	-	110	162	28
SMTR 15-2/2	3	657	178	479	198	160	-	110	162	45
SMTR 15-3/3	4	739	223	516	220	160	-	134	202	47
SMTR 15-4/4	5.5	823	268	555	220	-	300	134	202	63
SMTR 15-5/5	7.5	856	313	543	260	-	300	159	203	80
SMTR 15-6/6	11	1023	358	665	315	-	350	204	243	119
SMTR 15-7/7	11	1068	403	665	315	-	350	204	243	120
SMTR 15-8/8	11	1113	448	665	315	-	350	204	243	121
SMTR 15-10/10	15	1203	538	665	314	-	350	204	243	135
SMTR 15-12/12	18.5	1337	628	709	314	-	350	204	243	149
SMTR 15-14/12	18.5	1427	718	709	314	-	350	204	243	151
SMTR 15-16/12	18.5	1517	808	709	314	-	350	204	243	153
SMTR 15-17/12	18.5	1562	853	709	314	-	350	204	243	154

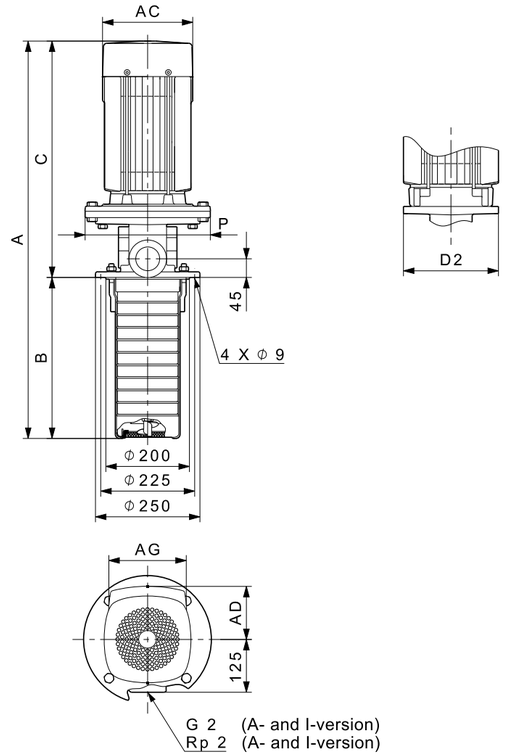
*The Maximum immersion depth 1033 mm

SMTR 20, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

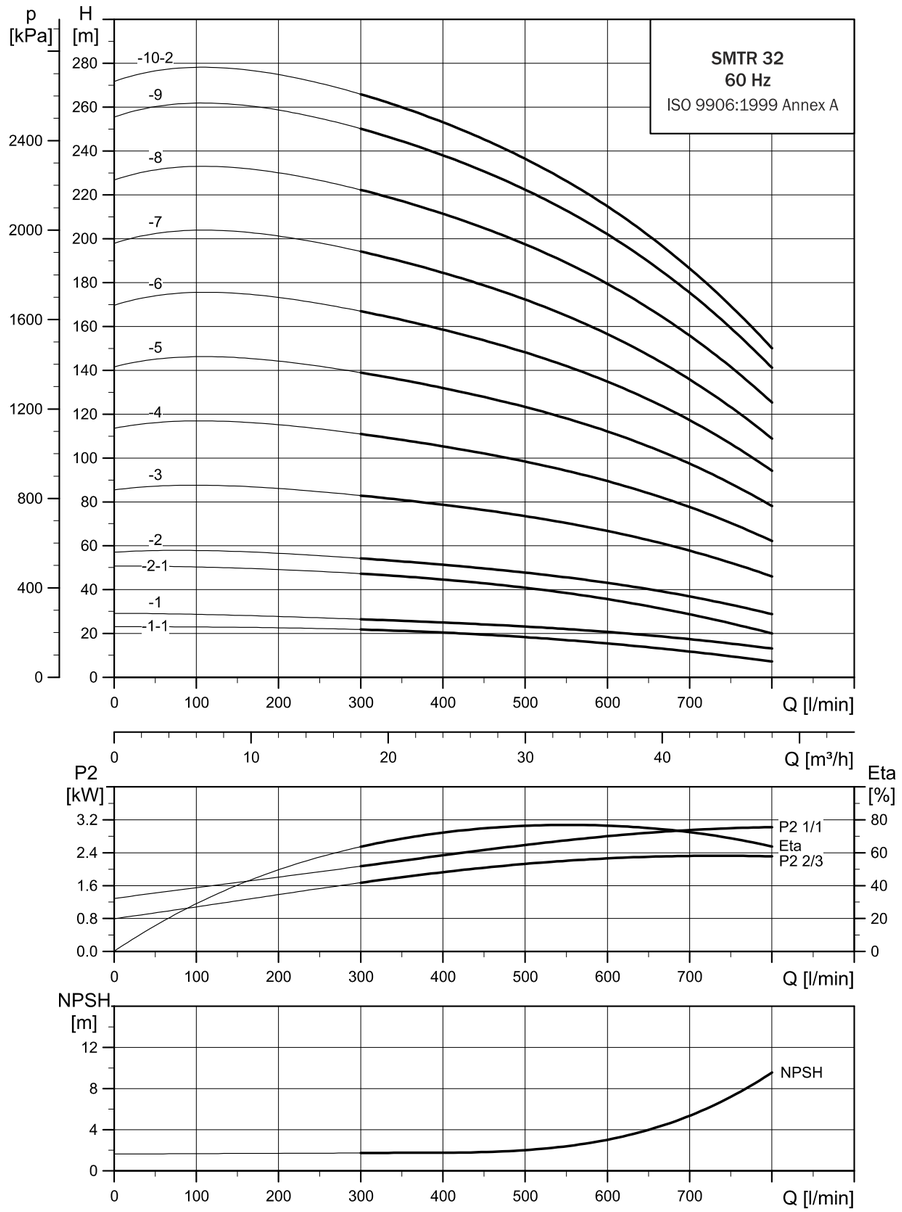


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR								
		Dimensions [mm]								Net weight [kg]
		A	B	C	AC	D2	P	AD	AG	
SMTR 20-2/1	2.2	643	178	465	178	160	-	110	162	44
SMTR 20-2/2	4	694	178	516	220	160	-	134	202	46
SMTR 20-3/3	5.5	778	223	555	220	-	300	134	202	62
SMTR 20-4/4	7.5	811	268	543	260	-	300	159	203	79
SMTR 20-5/5	11	978	313	665	315	-	350	204	243	117
SMTR 20-6/6	11	1023	358	665	315	-	350	204	243	118
SMTR 20-7/7	15	1068	403	665	314	-	350	204	243	131
SMTR 20-8/8	15	1113	448	665	314	-	350	204	243	132
SMTR 20-10/10	18.5	1247	538	709	314	-	350	204	243	146
SMTR 20-12/10	18.5	1337	628	709	314	-	350	204	243	148
SMTR 20-14/10	18.5	1427	718	709	314	-	350	204	243	150
SMTR 20-16/10	18.5	1517	808	709	314	-	350	204	243	152
SMTR 20-17/10	18.5	1562	853	709	314	-	350	204	243	153

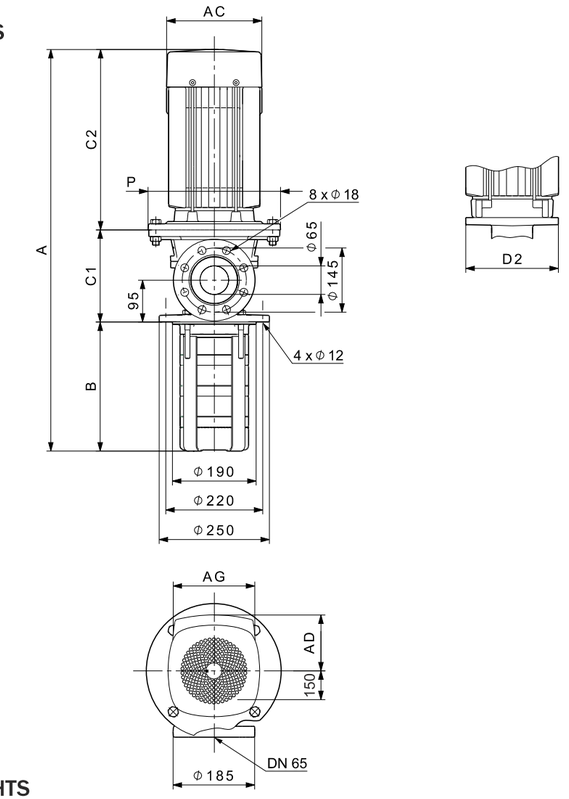
*The Maximum immersion depth 1033 mm

SMTR 32, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

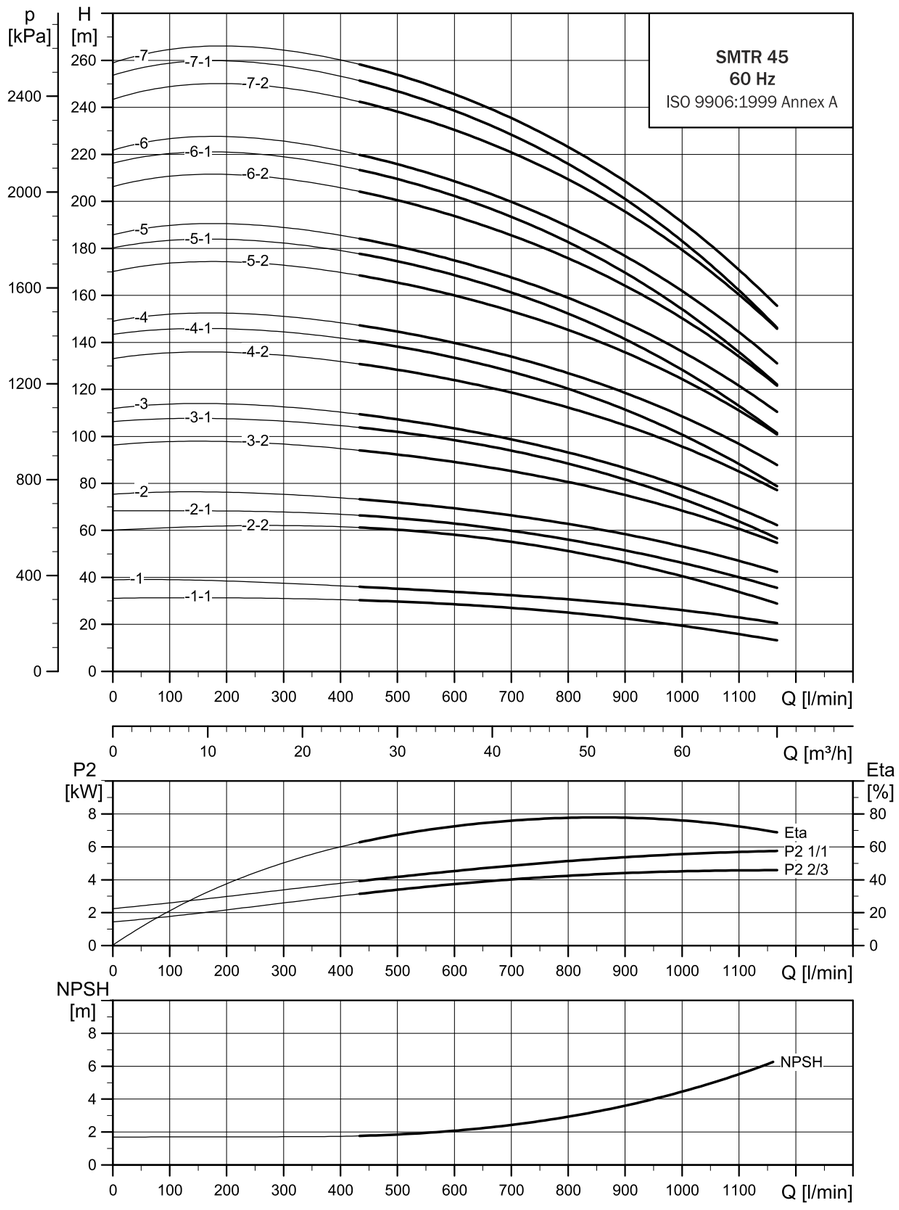


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]									Net weight [kg]
		A	B	C1	C2	AC	D2	P	AD	AG	
SMTR 32-2/1-1	2.2	682	223	138	321	178	-	200	110	162	70
SMTR 32-2/1	3	696	223	138	335	198	198	-	120	162	71
SMTR 32-2/2-1	5.5	823	223	209	391	220	-	300	134	202	110
SMTR 32-2/2	7.5	811	223	209	379	260	-	300	159	203	121
SMTR 32-3/3	11	973	293	209	471	314	-	350	204	243	162
SMTR 32-4/4	15	1043	363	209	471	314	-	350	204	243	174
SMTR 32-5/5	18.5	1157	433	209	515	314	-	350	204	243	187
SMTR 32-6/6	18.5	1227	503	209	515	314	-	350	204	243	188
SMTR 32-7/7	22	1323	573	209	541	314	-	350	204	243	202
SMTR 32-8/8	30	1462	643	209	610	402	-	400	300	260	307
SMTR 32-9/9	30	1532	713	209	610	402	-	400	300	260	307
SMTR 32-10/10-2	30	1602	783	209	610	402	-	400	300	260	308

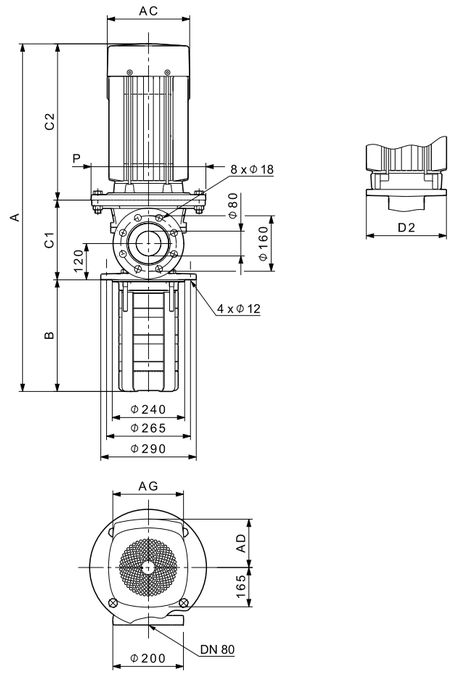
*The Maximum immersion depth 1343 mm

SMTR 45, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES

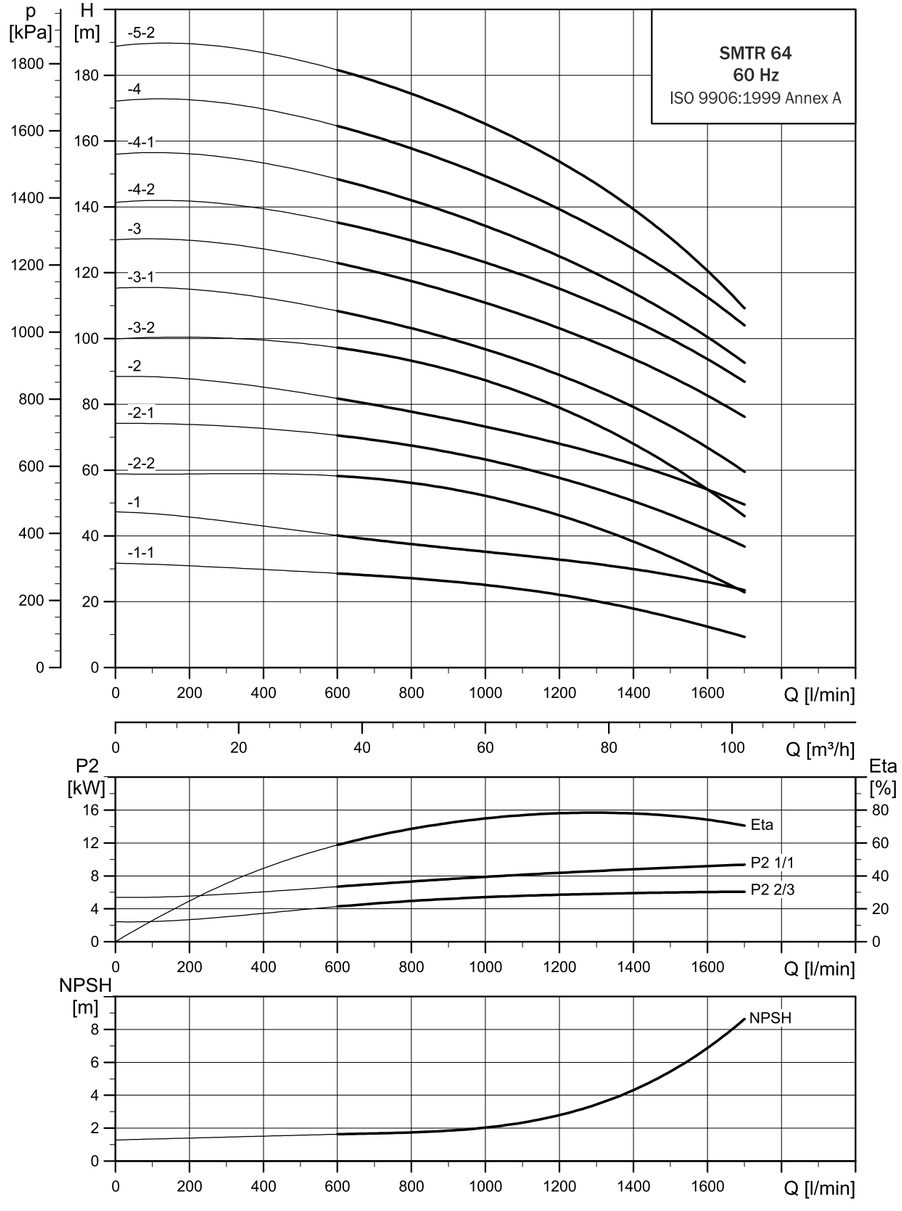


DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR								
		Dimensions [mm]								Net weight [kg]
		A	B	C1	C2	AC	P	AD	AG	
SMTR, 45-2/1-1	5.5	875	244	240	391	220	300	134	202	118
SMTR, 45-2/1	7.5	863	244	240	379	260	300	159	203	128
SMTR 45-2/2-2	11	955	244	240	471	314	350	204	243	170
SMTR, 45-2/2-1	11	955	244	240	471	314	350	204	243	170
SMTR, 45-2/2	15	955	244	240	471	314	350	204	243	182
SMTR 45-3/3-2	18.5	1079	324	240	515	314	350	204	243	196
SMTR 45-3/3-1	18.5	1079	324	240	515	314	350	204	243	196
SMTR, 45-3/3	18.5	1079	324	240	515	314	350	204	243	196
SMTR, 45-4/4-2	22	1185	404	240	541	314	350	204	243	210
SMTR 45-4/4-1	30	1254	404	240	610	402	400	300	260	331
SMTR 45-4/4	30	1254	404	240	610	402	400	300	260	331
SMTR 45-5/5-2	30	1334	484	240	610	402	400	300	260	331
SMTR 45-5/5-1	30	1334	484	240	610	402	400	300	260	331
SMTR 45-5/5	30	1334	484	240	610	402	400	300	260	331
SMTR 45-6/6-2	37	1471	564	240	667	402	400	300	260	354
SMTR 45-6/6-1	37	1471	564	240	667	402	400	300	260	354
SMTR 45-6/6	37	1471	564	240	667	402	400	300	260	354
SMTR 45-7/7-2	45	1612	644	259	709	442	450	325	260	444
SMTR 45-7/7-1	45	1612	644	259	709	442	450	325	260	444
SMTR 45-7/7	45	1612	644	259	709	442	450	325	260	444

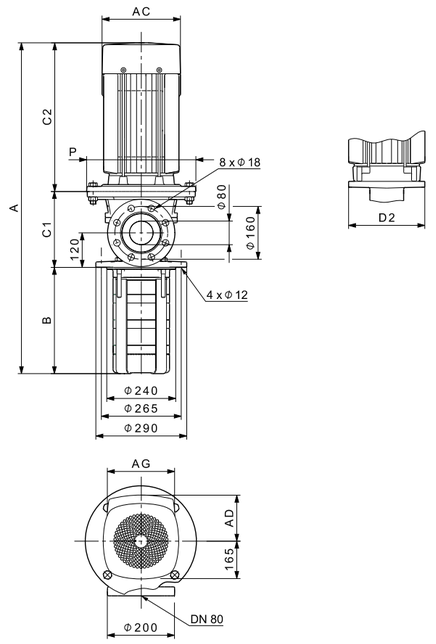
*The Maximum immersion depth 1006 mm

SMTR 64, 60 HZ



SHAKTI PUMPING LIFE

DIMENSIONAL SKETCHES



DIMENSIONS AND WEIGHTS

Pump type	P2 [kW]	SMTR Dimensions [mm]									Net weight [kg]
		A	B	C1	C2	AC	D2	P	AD	AG	
SMTR, 64-2/1-1	4	790	249	169	372	220	198	-	134	202	105
SMTR, 64-2/1	5.5	880	249	240	391	220	-	300	134	202	120
SMTR, 64-2/2-2	7.5	868	249	240	379	260	-	300	159	203	131
SMTR 64-2/2-1	11	960	249	240	471	314	-	350	204	243	173
SMTR, 64-2/2	11	960	249	240	471	314	-	350	204	243	173
SMTR 64-3/3-2	15	1043	332	240	471	314	-	350	204	243	185
SMTR, 64-3/3-1	15	1043	332	240	471	314	-	350	204	243	185
SMTR, 64-3/3	18.5	1087	332	240	515	314	-	350	204	243	198
SMTR 64-4/4-2	18.5	1169	414	240	515	314	-	350	204	243	199
SMTR 64-4/4-1	22	1195	414	240	541	314	-	350	204	243	213
SMTR, 64-4/4	22	1195	414	240	541	314	-	350	204	243	213
SMTR 64-5/5-2	30	1347	497	240	610	402	-	400	300	260	334
SMTR 64-5/5-1	30	1347	497	240	610	402	-	400	300	260	334
SMTR 64-5/5	30	1347	497	240	610	402	-	400	300	260	334
SMTR 64-6/6-2	30	1429	579	240	610	402	-	400	300	260	334
SMTR 64-6/6-1	37	1486	579	240	667	402	-	400	300	260	356
SMTR 64-6/6	37	1486	579	240	667	402	-	400	300	260	356
SMTR 64-7/7-2	37	1569	662	240	667	402	-	400	300	260	357
SMTR 64-7/7-1	37	1569	662	240	667	402	-	400	300	260	357
SMTR 64-7/7	45	1630	662	259	709	442	-	450	325	260	446
SMTR 64-8/8-2	45	1712	744	259	709	442	-	450	325	260	446
SMTR 64-8/8-1	45	1712	744	259	709	442	-	450	325	260	446

*The Maximum immersion depth 1006 mm

SMTR pumps are designed to pump non-explosive liquids that do not chemically attack the pump materials.
When pumping liquids with a density and/or viscosity higher than that of water, oversized motors may be required.
Whether a pump is suitable for a particular liquid depends on a number of factors of which the most important are the chloride content, pH-value, temperature and content of chemicals, oils, etc.
Please note that aggressive liquids may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

PUMPING OF SOLID PARTICLES

SMTR Pumps

These pumps are fitted with a suction strainer. The strainer prevents large solid particles from entering and damaging the pump. The table below describes the size of the passage in the strainer and the impeller.

Pump	Strainer passage [mm]	Free strainer passage [cm^2]	Impeller passage [mm]
SMTR 1s	∅2	23	2.5
SMTR 1	∅2	23	2.5
SMTR 3	∅2	23	3.1
SMTR 5	∅4	28	5.5
SMTR 10	∅4	43	5.5
SMTR 15	∅4	43	6.0
SMTR 20	∅4	43	8.0
SMTR 32	∅4	56	8.0
SMTR 45	∅4	56	9.5
SMTR 64	∅4	56	13.0

If the pumped liquid contains solid particles larger than the size of the holes in the strainer, the passage of the strainer may be blocked. In such situations the performance will drop as a result of a reduced flow through the pump.

Note:
If the strainer is removed from the suction port, solid particles may enter the pump and cause a seizure or even damage the pump.
In grinding applications Shakti recommends that the pumped liquid is screened for abrasive particles before entering the pump. When pumped, abrasive particles reduce the life of the pump components.
Wear of the pump components caused by abrasive particles starts when the concentration exceeds 20 ppm.

LIST OF PUMPED LIQUIDS

A number of typical liquids are listed below.
Other pump versions / shaft seals may be applicable, but those stated in the list are considered to be the best choices.
The table is intended as a general guide only, and it cannot replace actual testing of the pumped liquids and pump materials under specific working conditions.
The list should, however, be applied with some caution as factors such as concentration of the pumped liquid, liquid temperature or pressure may affect the chemical resistance of a specific pump version.
Safety precautions must be taken when pumping hazardous / flammable liquids.

List Of Notes

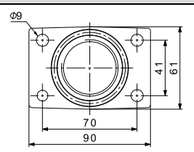
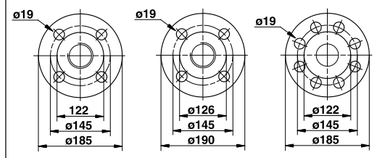
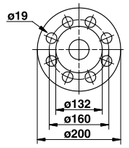
D	Often with additives.
E	Density and/or viscosity differ from that of water. Allow for this when calculating motor output and pump performance.
F	Pump selection depends on many factors. Contact Shakti.
H	Risk of chrystallisation /precipitation in shaft seal.
1	The pumped liquid is easily ignited.
2	The pumped liquid highly inflammable.
3	Insoluble in water.
4	Low self-ignition point.

LIST OF PUMPED LIQUIDS

Pumped liquid	Note	Liquid concentration, liquid temperature	Recommended pump version / shaft seal
			SMTR A-version (standard range, all wetted parts of cast iron and stainless steel)
Acetic acid, CH_3COOH	-	5 %, 20 °C	-
Alkaline degreasing agent	D, F	-	HUUE
Ammonium bicarbonate, NH_4HCO_3	E	20 %, 30 °C	-
Ammonium hydroxide, NH_4OH	-	20 %, 40 °C	HUUE
Benzoic acid, C_6H_5COOH	H	0.5 %, 20 °C	-
Boiler water	-	< 90 °C	HUUE
Calcareous water	-	< 90 °C	HUUE
Calcium acetate (as coolant with inhibitor) $Ca(CH_3COO)_2$	D, E	30 %, 50 °C	HUUE
Calcium hydroxide, $Ca(OH)_2$	E	Saturated solution, 50 °C	HUUE
Chloride-containing water	F	< 30 °C, max. 500 ppm	-
Citric acid, $HOC(CH_2CO_2H)_2COOH$	H	5 %, 40 °C	-
Completely desalinated water (demineralized water)	-	< 90 °C	-
Condensate	-	< 90 °C	HUUE
Copper sulfate, $CuSO_4$	E	10 %, 30 °C	-
Corn oil	D, E, 3	100 %, 80 °C	HUUV
Domestic hot water (potable water)	-	< 120 °C	HUUE
Ethylene glycol, $HOCH_2CH_2OH$	D, E	50 %, 50 °C	HUUE
Formic acid, HCOOH	-	2 %, 20 °C	-
Glycerine (glycerol), $OHCH_2CH(OH)CH_2OH$	D, E	50 %, 50 °C	HUUE
Hydraulic oil (mineral)	E, 2, 3	100 %, 100 °C	HUUV
Hydraulic oil (synthetic)	E, 2, 3	100 %, 100 °C	HUUV
Lactic acid, $CH_3CH(OH)COOH$	E, H	10 %, 20 °C	-
Linoleic acid, $C_{17}H_{31}COOH$	E, 3	100 %, 20 °C	HUUV
Motor oil	E, 2, 3	100 %, 80 °C	HUUV
Cutting oil	E	90 °C	HUUV
Water-based cooling lubricant	E	90 °C	HUUV
Naphthalene, $C_{10}H_8$	E, H	100 %, 80 °C	HUUV
Nitric acid, HNO_3	F	1 %, 20 °C	-
Oil-containing water	-	< 90 °C	HUUV
Olive oil	D, E, 3	100 %, 80 °C	HUUV
Oxalic acid, $(COOH)_2$	H	1 %, 20 °C	-
Peanut oil	D, E, 3	100 %, 80 °C	HUUV
Phosphoric acid, H_3PO_4	E	20 %, 20 °C	-
Propylene glycol, $CH_3CH(OH)CH_2OH$	D, E	50 %, 90 °C	HUUE
Potassium carbonate, K_2CO_3	E	20 %, 50 °C	HUUE
Potassium formate (as coolant with inhibitor), KOOCH	D, E	30 %, 50 °C	HUUE
Potassium hydroxide, KOH	E	20 %, 50 °C	-
Potassium permanganate, $KMnO_4$	-	1 %, 20 °C	-
Rape seed oil	D, E, 3	100 %, 80 °C	HUUV
Salicylic acid, $C_6H_4(OH)COOH$	H	0.1 %, 20 °C	-
Silicone oil	E, 3	100 %	HUUV
Sodium bicarbonate, $NaHCO_3$	E	10 %, 60 °C	-
Sodium chloride (as coolant), NaCl	D, E	30 %, < 5 °C, pH > 8	HUUE
Sodium hydroxide, NaOH	E	20 %, 50 °C	-
Sodium nitrate, $NaNO_3$	E	10 %, 60 °C	-
Sodium phosphate, Na_3PO_4	E, H	10 %, 60 °C	-
Sodium sulfate, Na_2SO_4	E, H	10 %, 60 °C	-
Softened water	-	< 120 °C	-
Soya oil	D, E, 3	100 %, 80 °C	HUUV
Unsalted swimming pool water	-	Approx. 2 ppm free chlorine (Cl_2)	HUUE

COUNTER-FLANGES FOR SMTR

A counter-flange set consists of one counter-flange, one gasket, bolts and nuts.

Counter-flange	Pump type	Description	Rated pressure	Pipe connection
	SMTR 1S SMTR 1 SMTR 3 SMTR 5	Threaded	16 bar	Rp 1 1/4
 Rp 2 1/2 / 16 bar Rp 3 / 16 bar 40 bar	SMTR 32	Threaded	16 bar, EN 1092-2	Rp 2 1/2
		Threaded	16 bar, special flange	Rp 3
		For welding	16 bar, EN 1092-2	65 mm, nominal
		For welding	40 bar, DIN 2635	65 mm, nominal
		For welding	16 bar, special flange	80 mm, nominal
	SMTR,45 SMTR,64	Threaded	16 bar	Rp 3
		For welding	16 bar	80 mm, nominal
		For welding	40 bar	80 mm, nominal

PIPE CONNECTION

Various sets of counter-flanges and couplings are available for pipe connection.

VARIANTS

LIST OF VARIANTS - ON REQUEST

Below please find the range of options available for SMTR pumps to meet special requirements. Contact Shakti for further information or for requests other than the ones mentioned below.

PUMPS

Variant	Applies to	Description
Suction pipe	SMTR	See page 59
Horizontally mounted pump	SMTR	See page 60
120° solution	SMTR	See page 60
Immersion depth	SMTR	See page 61

Shaft seals

Variant	Applies to	Description
Shaft seal with FFKM, FXM or EDPM O-ring material	SMTR	We recommend shaft seals with FFKM, FXM or EPDM O-ring material for applications where the pumped liquid may damage the standard O-ring material.

SUCTION PIPE

For compact coolant applications the filter is mounted inside the tank, and the pump sucks directly through this filter.

Pump	A [mm]	B [mm]	C [mm]	D [mm]
SMTR 1s, 1, 3, 5	48.5	15	∅64.8	∅60 x 3
SMTR 10, 15, 20	48	15	∅88.8	∅84 x 3
SMTR 32	48	15	∅104.8	∅100 x 3
SMTR 45	48	15	∅124.8	∅119.5 x 3
SMTR 64	48	15	∅133.7	∅128 x 3

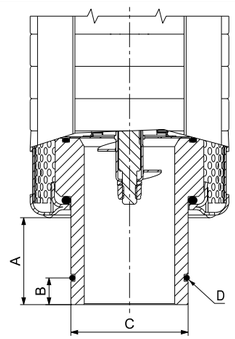


Fig. 77 Suction pipe

HORIZONTAL MOUNTING

For safety or height reasons, certain applications, for instance on ships, require the pump to be mounted in horizontal position.

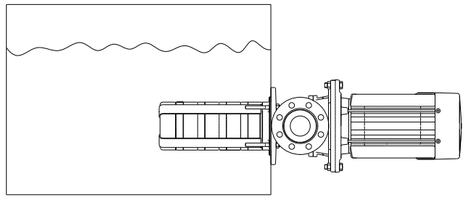


Fig. 75 Horizontal mounting of an SMTR pump

Note: If the SMTR pump is to be installed horizontally, the drain hole in the pump head must be fitted with a plug, and four closed nuts with O-rings must be fitted to the straps.
For SMTR pumps horizontal mounting is only available with stainless steel pump heads.
For motors from 5.5 kW and up, motor support is required.

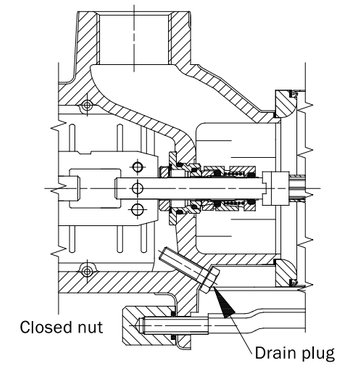


Fig. 76 Horizontal installation

120 °C solution

For applications with liquid temperature above 90 °C and up to 120 °C, Shakti offers a solution for SMTR

SMTR SERIES

IMMERSION DEPTHS, SMTR

To meet specific depths of tanks and containers, the immersion depth of the pump can be varied using empty chambers. For the SMTR range the following immersion depths are available

NUMBER OF CHAMBERS	IMMERSION DEPTH (MM)									
	SMTR1s	SMTR1	SMTR3	SMTR5	SMTR10	SMTR15	SMTR20	SMTR32	SMTR45	SMTR64
2	160	160	160	169	148	178	178	223	244	249
3	178	178	178	196	178	223	223	293	324	332
4	196	196	196	223	208	268	268	363	404	414
5	214	214	214	250	238	313	313	433	484	497
6	232	232	232	277	268	358	358	503	564	579
7	250	250	250	304	298	403	403	573	644	662
8	268	268	268	331	328	448	448	643	724	744
9	286	286	286	358	358	493	493	713	804	827
10	304	304	304	385	388	538	538	783	884	909
11	322	322	322	412	-	583	583	853	964	992
12	340	340	340	439	448	628	628	923	1044	1074
13	358	358	358	466	-	673	673	993	1124	1157
14	376	376	376	493	508	718	718	1063	1204	1239
15	394	394	394	520	-	763	763	1133	1284	1322
16	412	412	412	547	568	808	808	1203	1364	1404
17	430	430	430	574	-	853	853	1273	1444	1487
18	448	448	448	601	628	898	898	1343	-	-
19	466	466	466	628	-	943	943	-	-	-
20	484	484	484	655	688	988	988	-	-	-
21	502	502	502	682	-	1033	1033	-	-	-
22	520	520	520	709	748	-	-	-	-	-
23	538	538	538	736	778	-	-	-	-	-
24	556	556	556	763	808	-	-	-	-	-
25	574	574	574	790	838	-	-	-	-	-
26	592	592	592	817	868	-	-	-	-	-
27	610	610	610	844	898	-	-	-	-	-
28	628	628	628	871	928	-	-	-	-	-
29	646	646	646	898	958	-	-	-	-	-
30	664	664	664	925	988	-	-	-	-	-
31	682	682	682	952	1018	-	-	-	-	-
32	700	700	700	979	-	-	-	-	-	-
33	718	718	718	1006	-	-	-	-	-	-
34	736	736	736	-	-	-	-	-	-	-
35	754	754	754	-	-	-	-	-	-	-
36	772	772	772	-	-	-	-	-	-	-
37	790	790	790	-	-	-	-	-	-	-
38	808	808	808	-	-	-	-	-	-	-
39	826	826	826	-	-	-	-	-	-	-
40	844	844	844	-	-	-	-	-	-	-
41	862	862	862	-	-	-	-	-	-	-
42	880	880	880	-	-	-	-	-	-	-
43	898	898	898	-	-	-	-	-	-	-
44	916	916	916	-	-	-	-	-	-	-
45	934	934	934	-	-	-	-	-	-	-
46	952	952	952	-	-	-	-	-	-	-
47	970	970	970	-	-	-	-	-	-	-
48	988	988	988	-	-	-	-	-	-	-
49	1006	1006	1006	-	-	-	-	-	-	-