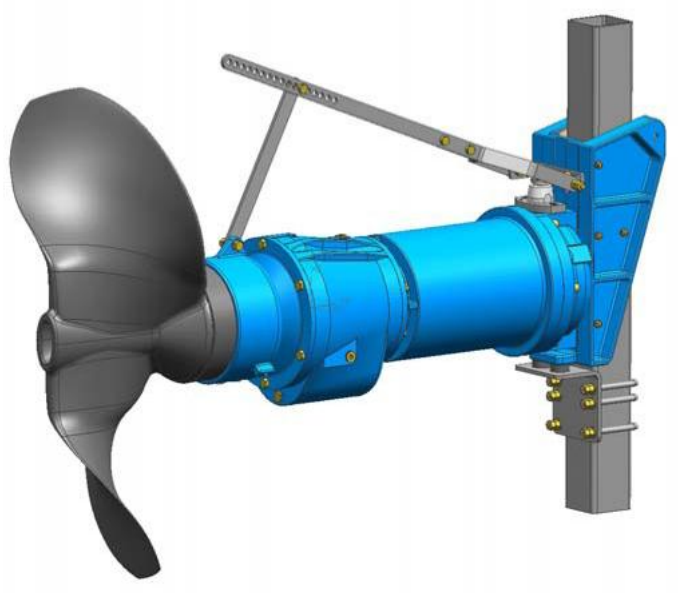
Amaprop®



Submersible mixer

Amaprop 1000

- Mixer
- Accessories (standard)

50 Hz
Standard programme

Applications

In environmental engineering, particulary for circulating, keeping in suspension and inducing flow in municipal and industrial waste water and sludges.

- In nitrification and denitrification tanks
- In activated sludge tanks
- In mixing tanks
- In final storage tanks
- In biological phosphate elimination tanks
- In flocculation tanks
- In biogas applications

Operating data

Nominal propeller diameter	D = 1000 mm
Power range	P = 10 kW to 20 kW
Fluid temperature	t up to 45 °C
Installation depth	H up to 12 m (Larger installation depths on request)

Design

Horizontal submersible mixer with self-cleaning two-blade ECB propeller in close-coupled design, with coaxial spur gear drive.
Also available as explosion-proof unit in acc. with ATEX II 2G T4.

Drive

Three-phase asynchronous motor 400 V/50 Hz, *(var. 500 V, 690 V)*.

On explosion-proof mixers in Ex d IIB type of protection.

Bearings

Motor: grease-packed, maintenance-free rolling element bearings sealed for life

Gear unit: oil-lubricated rolling element bearings

Shaft seal

Two bi-directional mechanical seals with oil reservoir filled with environmentally friendly oil.

Materials

Propeller made of carbon fibre reinforced epoxy resin with metal hub insert.

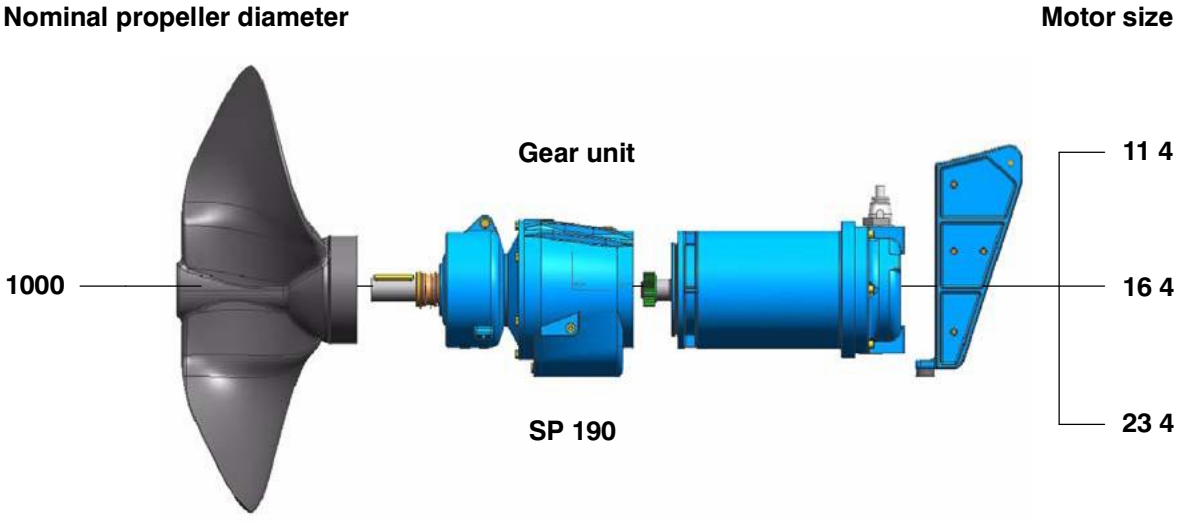
Designation

Amaprop V 184 - 1000 / 16 4 UR G

- Type series
- Propeller made of composite material
- Nominal propeller speed
- Nominal propeller diameter [mm]
- Motor size
- Number of motor poles
- Motor version
- Material variant

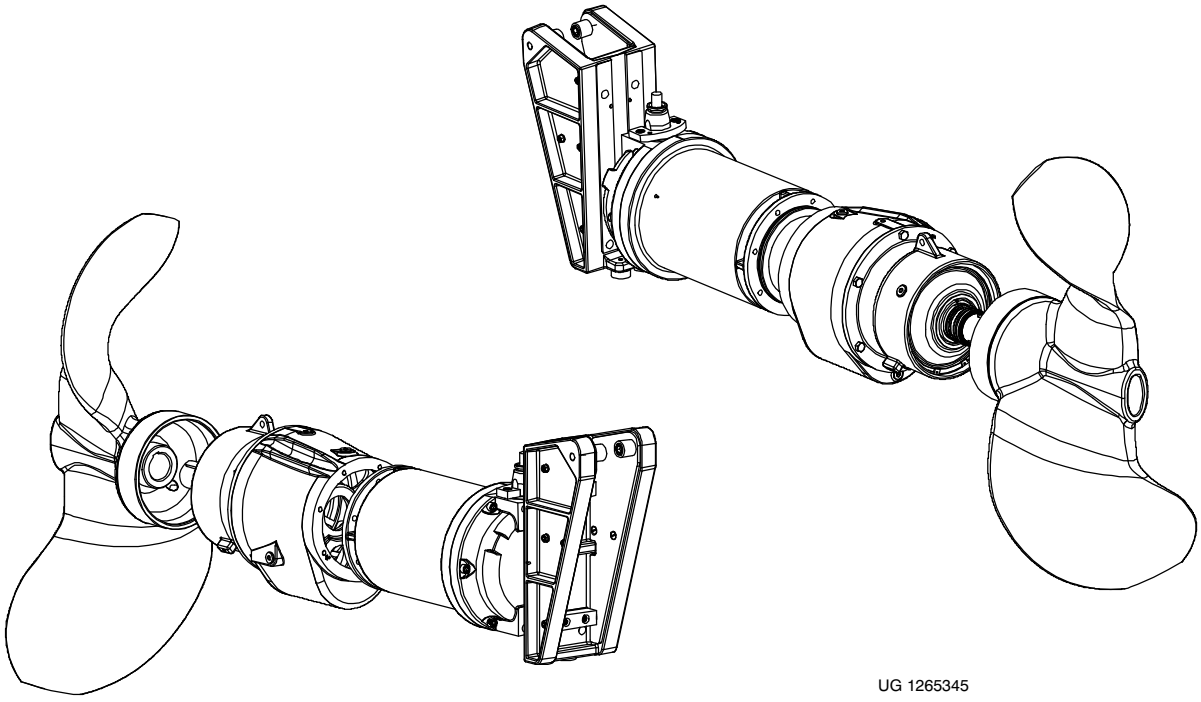
KSB

Modular design system of Amaprop 1000



UG 1265345

Motor/hydraulics combinations
see page 12/13



UG 1265345

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Product fenefits

Amaprop 1000

Propeller blades completely made of carbon fibre reinforced epoxy resin

Your benefit:
Easy installation thanks to low-weight propellers made of carbon fibre reinforced epoxy resin with metal hub insert and protective gel coating.
Absolutely unbreakable.
Little wear, compared to cast iron or stainless steel.

Optimum hydraulic selection

Your benefit:
Energy is efficiently converted into thrust.
A strong bulk flow is generated.

Two bi-rotational mechanical seals with silicon carbide faces and common liquid reservoir.

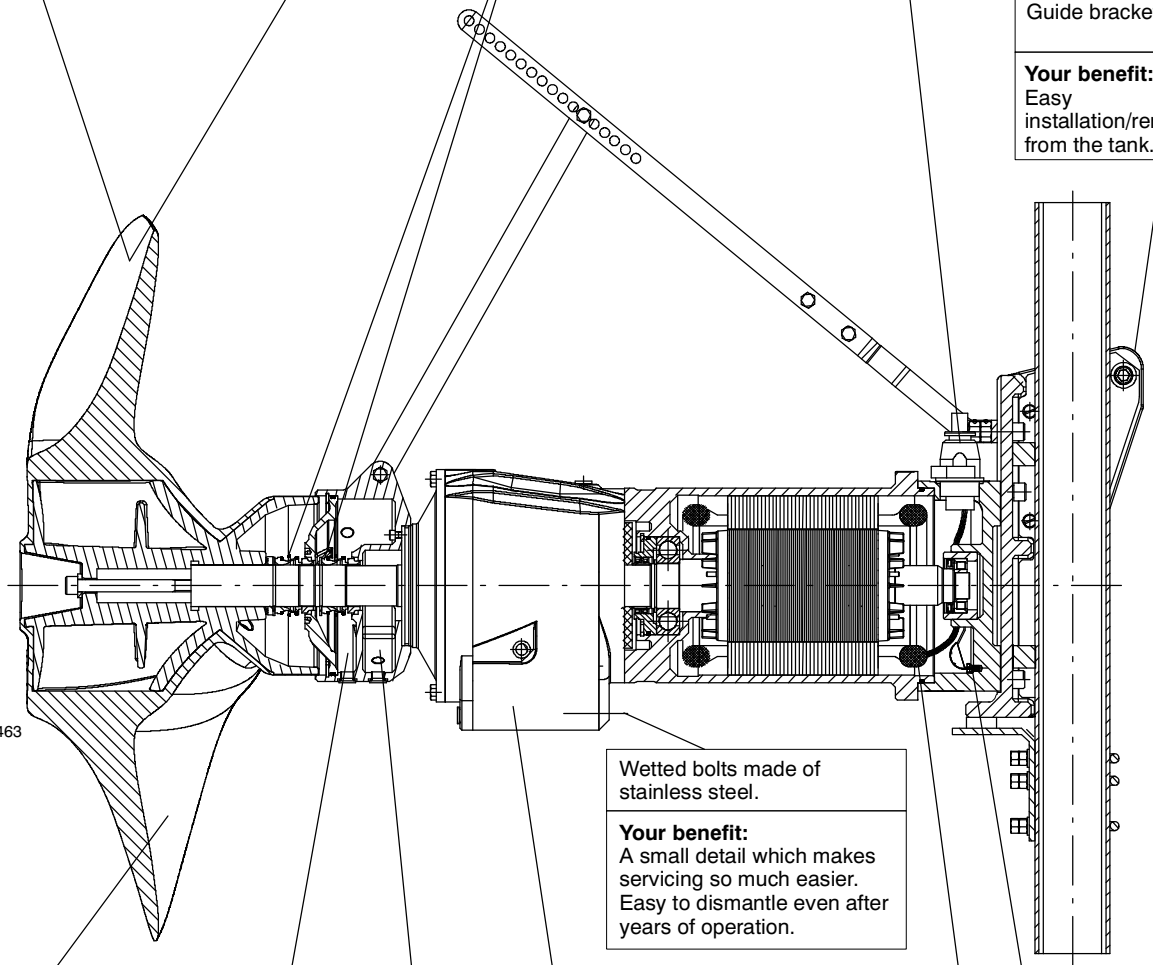
Your benefit:
Long service life, double safety.
Should one mechanical seal fail, the second one will continue to provide complete unit protection.

Absolutely watertight sealed cable gland

Your benefit:
Quick connection of motor and cable, easy to dismantle. Cable or motor can be replaced with minimum down time. Even if the cable sheath and core insulation are damaged, no moisture can penetrate into the motor space along the strands as a result of capillary action.

Guide bracket

Your benefit:
Easy installation/removal from the tank.



UG 1152463

Wetted bolts made of stainless steel.

Your benefit:
A small detail which makes servicing so much easier. Easy to dismantle even after years of operation.

Single-piece propeller

Your benefit:
Force is evenly transmitted to the propeller blades, and excessive stresses are avoided.
Straightforward propeller installation.

Robust high-efficiency spur gear with helical gearing makes for low-noise operation and reliable service, with a calculated service life of more than 100,000 operating hours.

Your benefit:
Reliability, smooth running and a complete assembly unit consisting of gear unit with motor and axial propeller.

Leakage monitor inside the motor

Your benefit:
The leakage monitor protects the motor against water damage.

Oil chamber filled with environmentally friendly oil.

Your benefit:
Any oil leaking into the environment is ecologically harmless.

Leakage chamber between oil chamber and gear unit

Your benefit:
Additional possibility to check mechanical seal performance; protection of gear unit.

Temperature sensors prevent excessive temperatures in the motor winding.

Your benefit:
The motor cannot be damaged by overheating.

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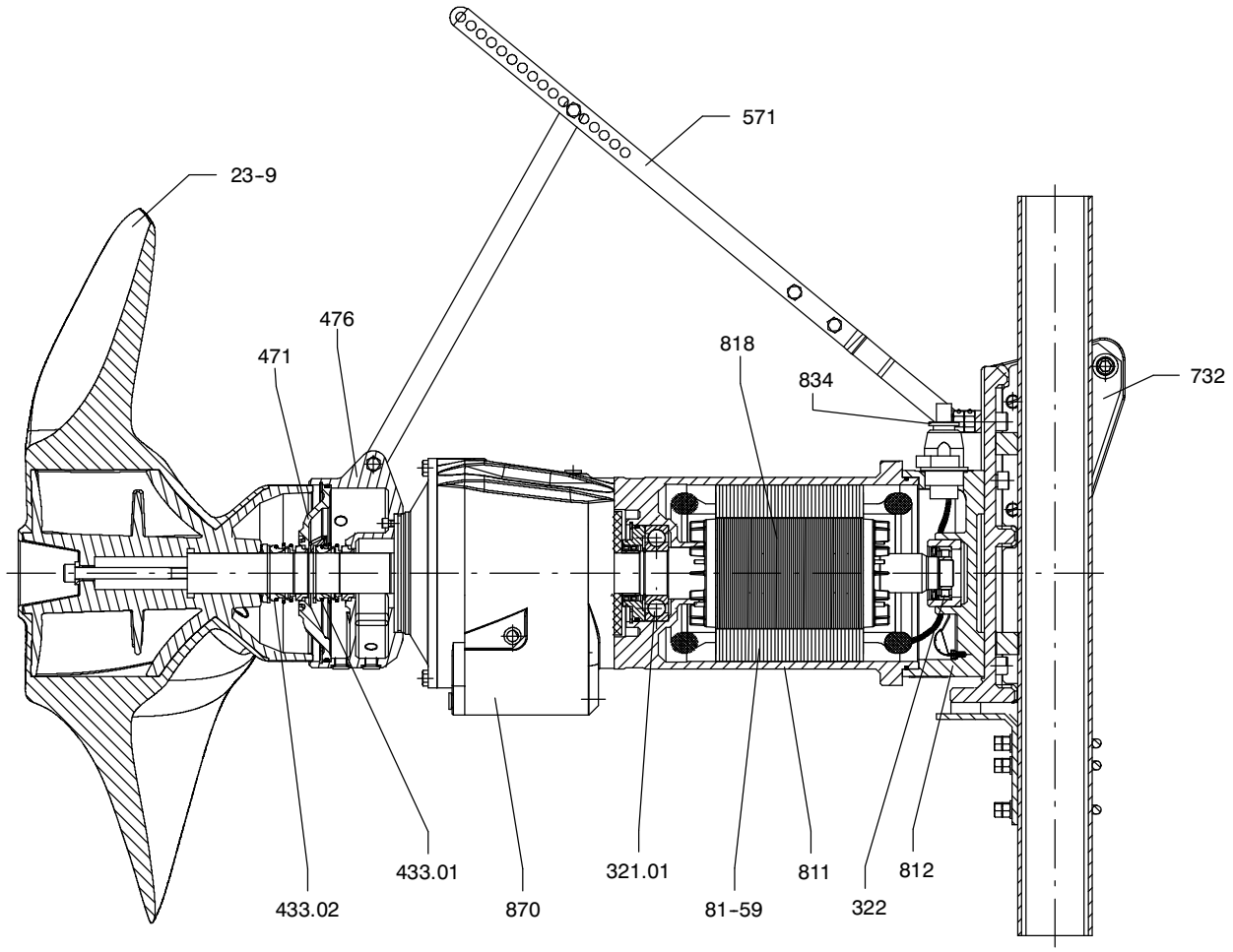
General assembly drawing with list of components

Amaprop 1000



UG 1152463

Part No.	Description	Part No.	Description
23-9	Axial propeller	732	Guide bracket
321	Radial ball bearing	81-59	Stator
322	Radial roller bearing	811	Motor housing
433	Mechanical seal	812	Motor housing cover
471	Seal cover	818	Rotor
476	Seat ring holder	834	Sealed cable gland
571	Lifting bail	870	Gear unit

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Material variant
Amaprop 1000

Part No.	Component		Material variant **G**
811	Motor housing		JL 1040
812	Motor housing cover		JL 1040
870	Gear housing		JL 1040
476	Seat ring holder		JL 1040
23-9	Propeller		Carbon fibre reinforced epoxy resin
433.02	Mechani-cal seal	propeller side	SiC/SiC
433.01		gear unit side	SiC/SiC
	Propeller shaft		1.4122
	Elastomer seals		FPM/NBR
	Screws/bolts		A4 (corresponds to 1.4571)
732	Guide bracket		JL 1040 plastic-lined

Comparison of materials
Amaprop 1000

EN	DIN	Similar to ASTM material
JL 1040	GG-25	A 48 Class 35 B
1.4122	1.4122	Sim. A 276 Type 440
NBR	NBR	NBR
FPM	FPM	FKM

Materials used

Grey cast iron JL 1040 (GG-25)
Lamellar graphite cast iron

This lamellar graphite cast iron to EN 10 204 is the most widely used cast material for handling municipal sewage, waste water and sludges as well as stormwater and surface water.
It is suitable for neutral and slightly aggressive fluids.

Carbon fibre reinforced epoxy resin

High-performance composite material consisting of carbon fibre reinforced epoxy resin, a metal hub insert and a protective gel coating resistant to abrasion and chemical substances.

Recommended oil quantity for gear unit
Amaprop 1000

Gear type	Oil quantity	Oil quality
SP 190	approx. 2.6 l	Oil in acc. with ISO VG 320

Recommended oil quantity for mechanical seals

Oil quantity	Oil quality
1.9 l	Environmentally friendly paraffin oil or white oil, non-toxic, suitable for use with foodstuffs

TECHNICAL FEATURES – STANDARD PROGRAMME/*(Standard variants)*

Material variant: G

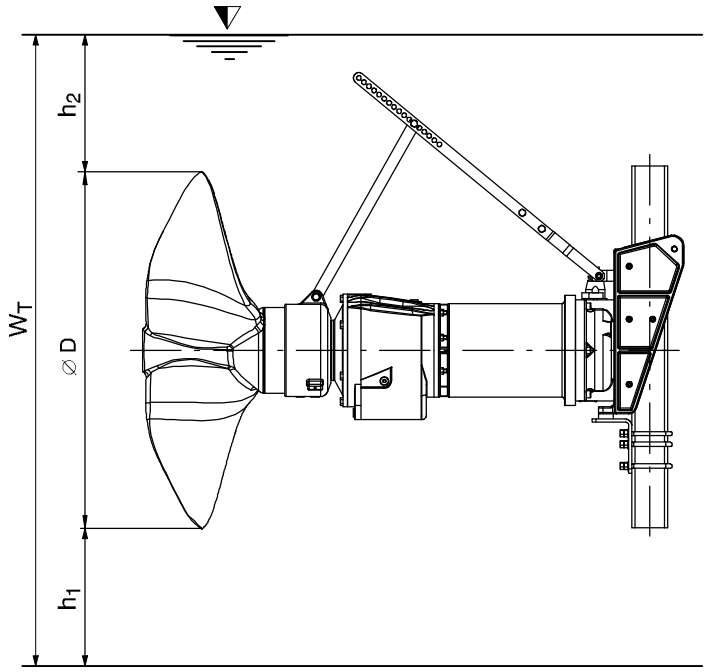
Amaprop 1000

Motor version	
UR	Standard
YR	ATEX II 2G T4
Motor	
Starting method	D.o.l. or star-delta
Voltage and frequency	400 V (500 V; 690 V on request) 50 Hz, suitable for frequency inverter operation
Cooling	By surrounding fluid handled
Submergence	Up to 12 m (deeper submergence on request)
Power cable	
Length	10 m *(Variant: 15 m and 20 m, >20 m on request)*
Cable entry	Totally watertight sealed cable gland
Type	Rubber-sheathed cable S1BN8-F
Bearings	
Motor	Grease-packed rolling element bearings sealed for life
Gear unit	Oil-lubricated rolling element bearings
Gear unit	Spur gear
Seals	
Elastomer seals	Viton (fluorocarbon rubber FPM)
Shaft seal	Bellows-type mechanical seal *(variant: mechanical seal with covered spring)*
Monitoring	
Winding temperature	PTC resistors
Motor leakage, mechanical seal leakage	Leakage monitor inside the motor *(variant: additional leakage monitor in the leakage chamber; for UR version only)*
Coating	
	2-comp. epoxy resin coating
Permissible fluid temperature	45 °C
Acceptance tests	
	To ISO 9001 *(variant: with test report EN 10 204-2.2)*
Installation	
Stationary	Installation depth up to 12 m (deeper installation on request)

Minimum level of fluid handled

Amaprop 1000

The submersible mixer is operational when the fluid level is not lower than dimension W_T. This minimum level must also be ensured during automatic operation.



Ø D [mm]	h_1 2) [m]
1000	0.30

2) Minimum

Formula for calculating the minimum fluid level

$h_2 = (n_{mixer} / n_{max.})^2 \times h_{2*}$

h_{2*} for sewage treatment plants/water = 0.75 m
h_{2*} for biogas installations/substrate = 0.5 m

$W_T = Ø\ D + h_1 + h_2$

Calculation example

Given:

- Amaprop V 184-1000/16 4
- Biogas application
- n_{mixer} = 184 rotations/minute
- $n_{max.}$ = 208 rotations/minute
  (see pages 12 and 13)

Solution:

$h_2 = (n_{mixer} / n_{max.})^2 \times h_{2*}$

$h_2 = (184 / 208)^2 \times 0.50\ m = 0.39\ m$

$W_T = Ø\ D + h_1 + h_2$

$W_T = 1.000\ m + 0.3\ m + 0.39\ m = 1.69\ m$

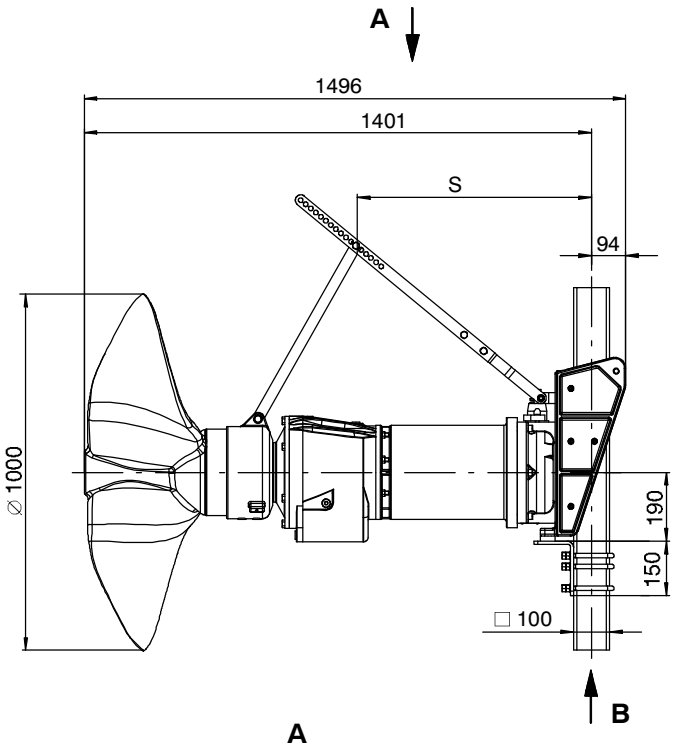
During mixer operation, the distance between the propeller tip and the fluid surface must not be less than dimension h_2. Any smaller distance must be approved by KSB in writing.

Please note that, even with a submergence of 0.20 m, air-entraining vortices may still form, depending on the flow behaviour of the fluid handled. Rough running of the mixer resulting from the formation of air-entraining vortices is not covered by our warranty.

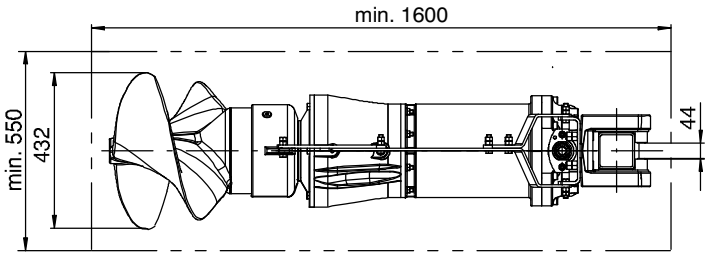
Amaprop 1000

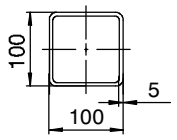
Version for standard accessories set 22

Dimensions



A
Minimum dimensions for installation through access opening





UG 1152463

Performance data – 400 V, 50 Hz – material variant G

Applications up to 45 °C

No.	Size Amaprop V ...	Propeller speed n_2 [min^{-1}]	Motor rating P_2 [kW]	Gear unit size	S [mm]	Weight incl. guide bracket [kg]
01	166-1000/11 4 URG / YRG	166	10	SP 190	540	260
02	175-1000/16 4 URG / YRG	175	15		520	273
03	184-1000/16 4 URG / YRG	184				
04	192-1000/16 4 URG / YRG	192				
05	185-1000/23 4 URG / YRG	185	20		500	284
06	208-1000/23 4 URG / YRG	208				

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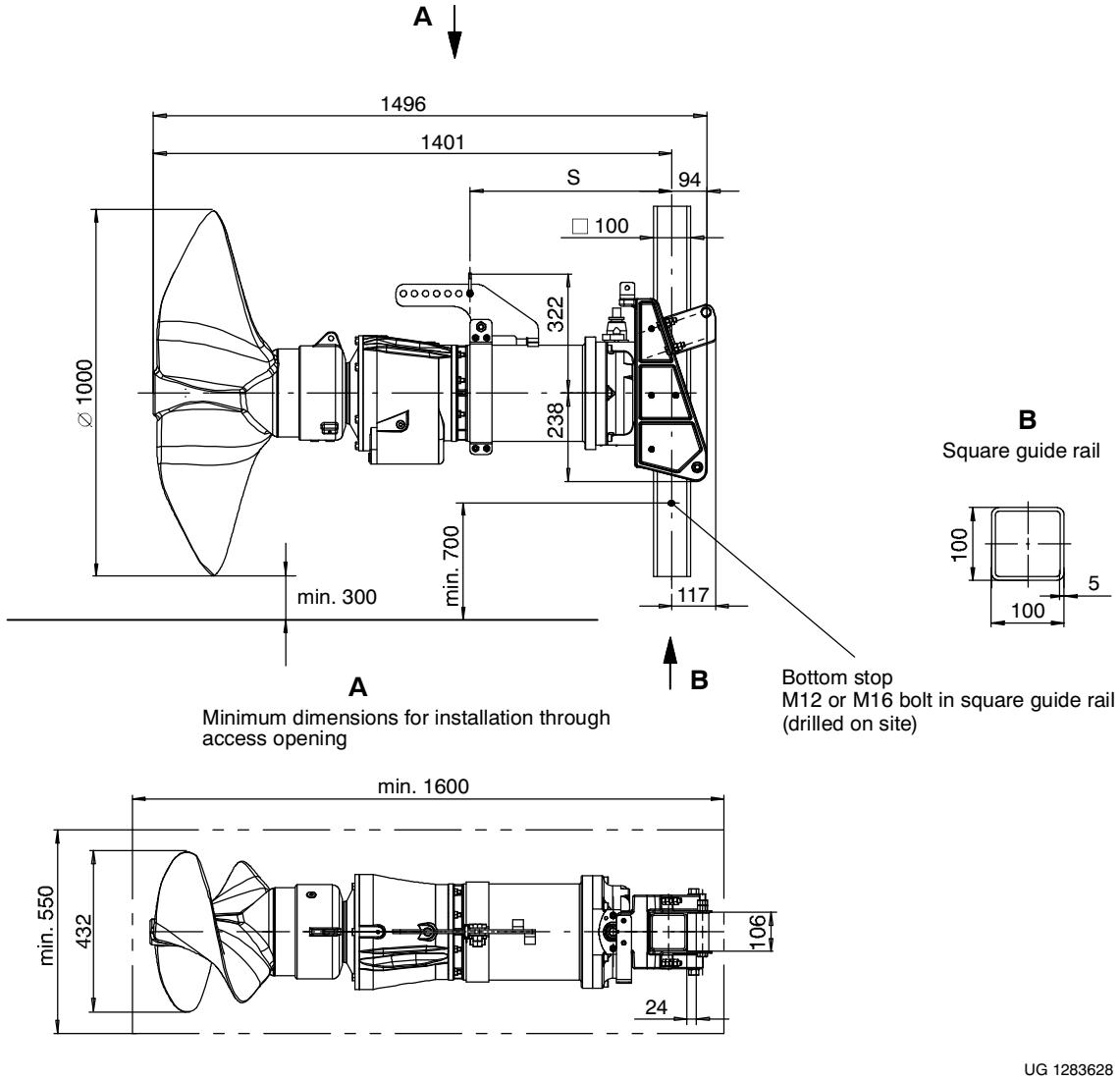
Amaprop 1000

Version for level-adjustable accessories with swivelling option, installation in gas-tight tank (crane-suspended operation)

Dimensions



Performance data - 400 V, 50 Hz - material variant G

Applications up to 45 °C

No.	Size Amaprop V ...	Propeller speed n_2 [min^{-1}]	Motor rating P_2 [kW]	Gear unit size	S [mm]	Weight incl. guide bracket [kg]
01	166-1000/11 4 URG / YRG	166	10	SP 190	570	260
02	175-1000/16 4 URG / YRG	175	15		550	273
03	184-1000/16 4 URG / YRG	184				
04	192-1000/16 4 URG / YRG	192				
05	185-1000/23 4 URG / YRG	185	20		530	284
06	208-1000/23 4 URG / YRG	208				

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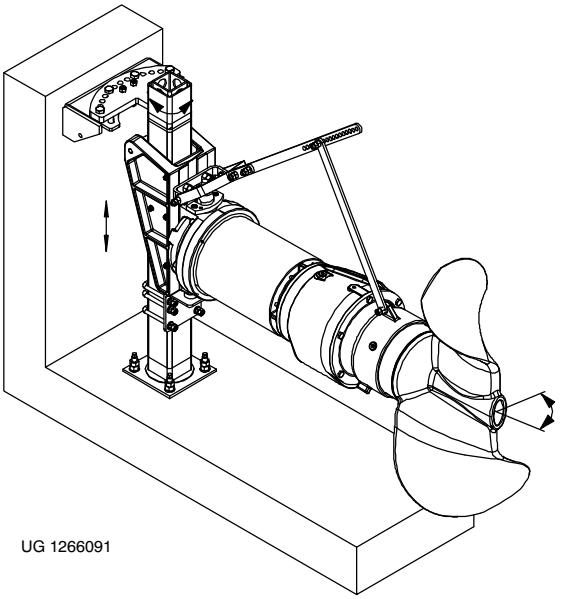
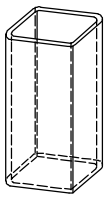
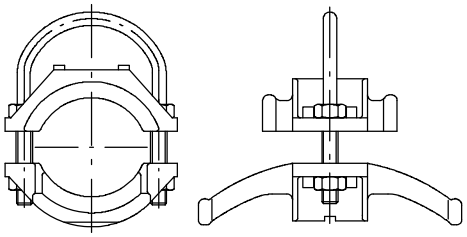
Overview of accessories

Amaprop 1000

Accessories	Installation example	
Accessories for gas-tight tanks, adjustment from outside the tank	**not shown**	– level-adjustable – with optional pitch adapter for vertical pitch adjustment – horizontal swivelling option together with guide rail
Standard accessories set 22 **Accessories set 22 – Options** Universal accessories Pages 16-22	 UG 1266091	– level-adjustable – with optional pitch adapter for vertical pitch adjustment – horizontal swivelling option together with guide rail
Guide rails **for accessories set 22** Page 23		
Other accessories Page 23		
Cranes	See type series booklet ”KSB Lifting Equipment” 1596.5/...	

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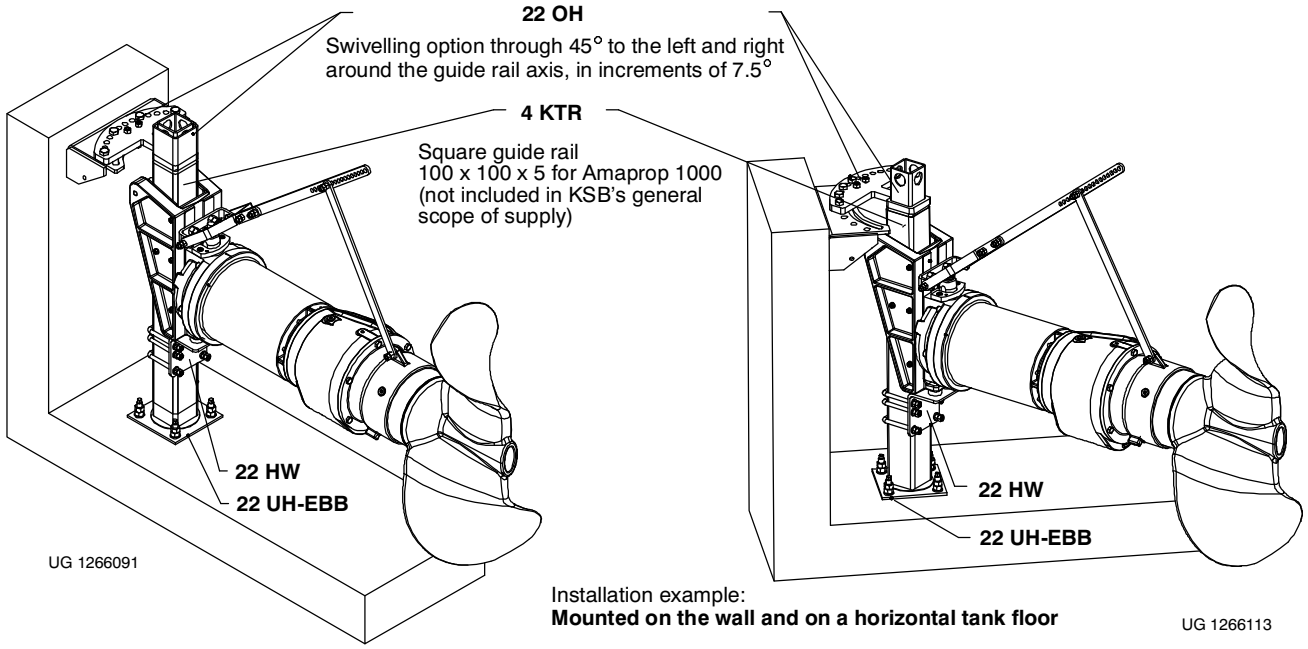
Standard accessories set 22

For mounting on the wall and horizontal tank floor, with horizontal swivelling option, level-adjustable Amaprop 1000



Installation example:
Mounted on the wall and on a horizontal tank floor

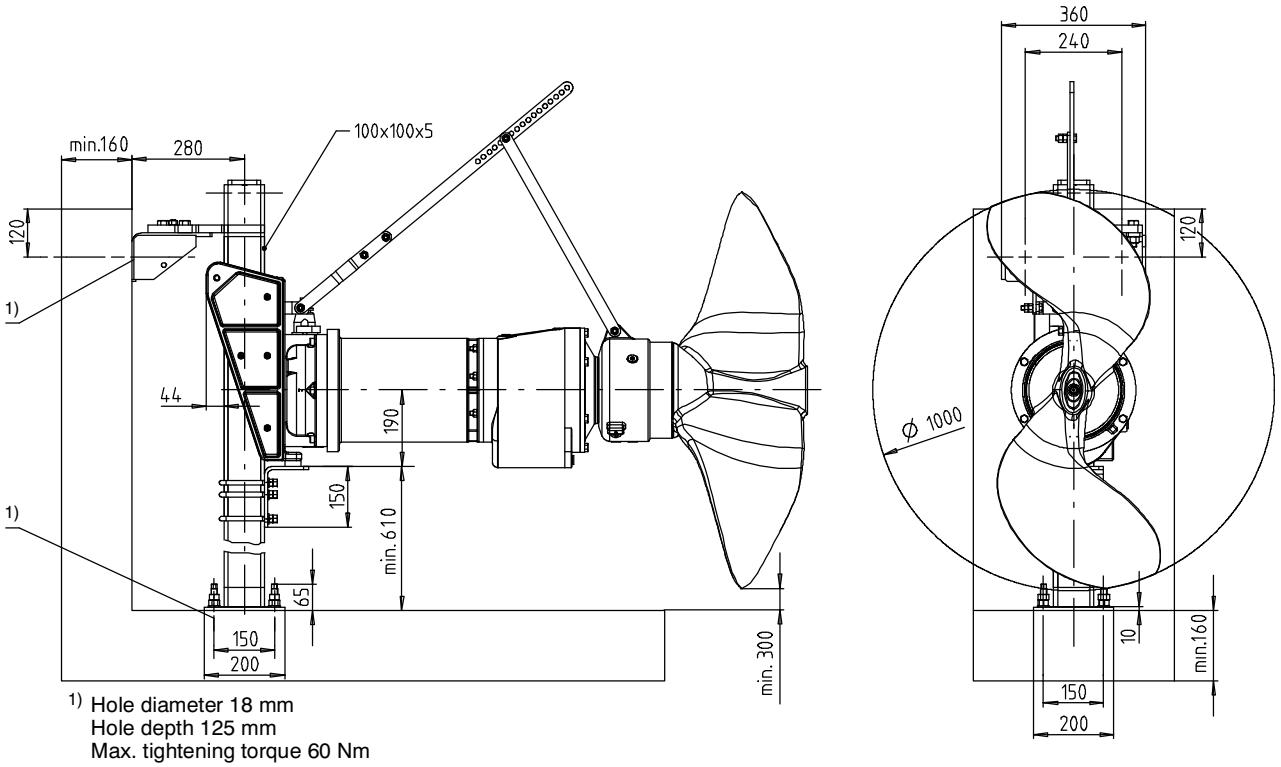
UG 1266113

Item No.	Accessories	Description
22 HW	Retaining bracket	Infinitely adjustable to mixer installation level; mixer rests on the retaining bracket via the guide bracket
4 KTR	Square guide rail 100 x 100 x 5	Guide rail cross-section: 100 x 100 x 5 Installation depths up to 6 m: without middle support (optional) >6 m: middle support required **See page 23!**
22 OH	Upper holder for square guide rail 100 x 100 x 5	Upper holder for mounting on the tank wall
	incl. 2 chemical anchors	Chemical anchors for mounting the upper holder on the tank wall Min. concrete quality: B25
22 UH-EBB	Lower holder for square guide rail 100 x 100 x 5	For mounting the lower holder of the 100 x 100 x 5 guide rail on a horizontal tank floor (inclined by 0° ... 0.5°)
	incl. 4 chemical anchors	Chemical anchors for mounting the lower holder on the tank floor Min. concrete quality: B25

Item No.	Description	Material	Material No.	Weight [kg]
22 HW	Retaining bracket for square guide rail 100 x 100 x 5	1.4301	01 129 810	3.5
		1.4571	19 202 370	3.5
4 KTR	Square guide rail 100 x 100 x 5	1.4301	See accessory 4 KTR, page 23!	14.4 kg/m
		1.4571		14.4 kg/m
22 OH	Upper holder for square guide rail 100 x 100 x 5	1.4301	01 118 904	20.33
		1.4571	01 118 905	20.33
	incl. 2 chemical anchors			
22 UH-EBB	Lower holder for horizontal tank floor for square guide rail 100 x 100 x 5	1.4301	01 118 892	5.68
		1.4571	01 118 903	5.68
	incl. 2 chemical anchors			

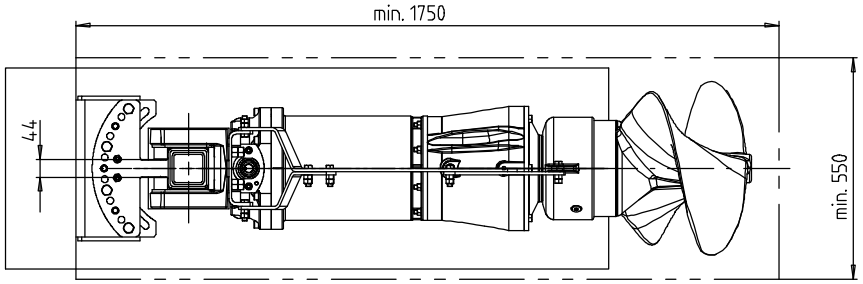
Standard accessories set 22

For mounting on the wall and horizontal tank floor, with horizontal swivelling option, level-adjustable
Amaprop 1000



1) Hole diameter 18 mm
Hole depth 125 mm
Max. tightening torque 60 Nm

Minimum dimensions for installation
through access opening



Other dimensions see page 12/13

UG 1266091

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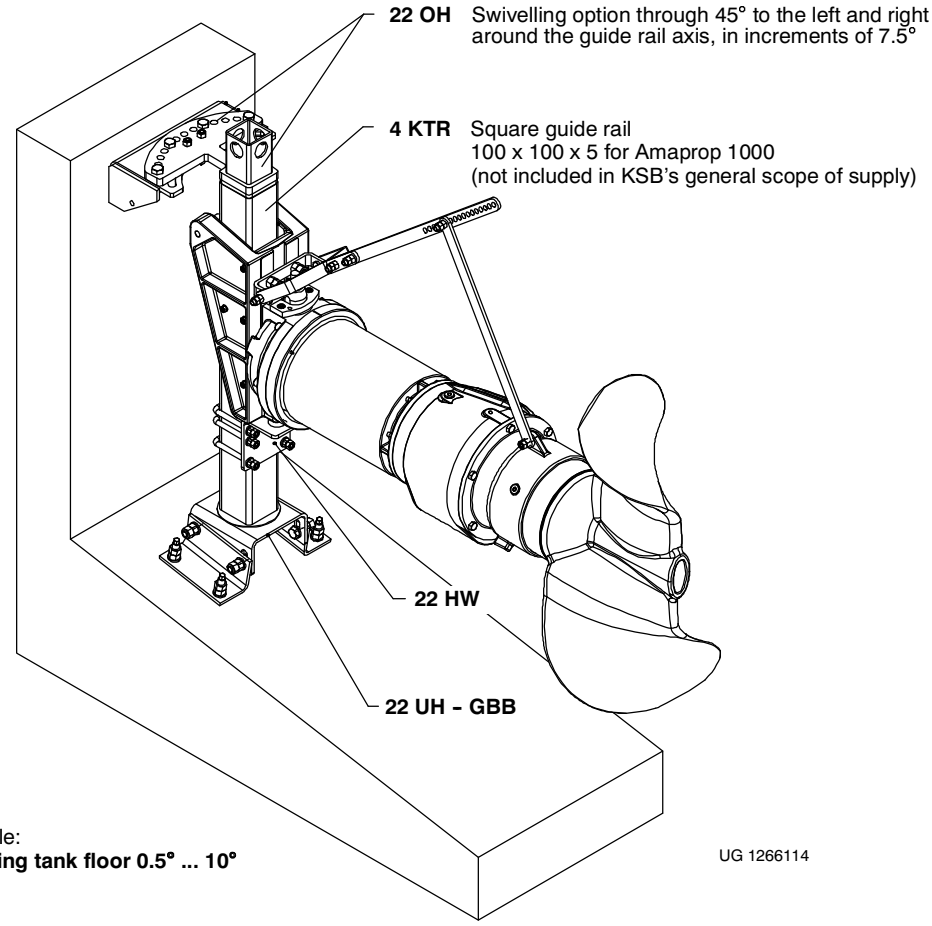
Standard accessories set 22 - Options

For mounting on the wall and sloping floor of the tank (0.5° ... 10°), with horizontal swivelling option, level-adjustable

Amaprop 1000



Installation example:
Mounted on sloping tank floor 0.5° ... 10°

UG 1266114

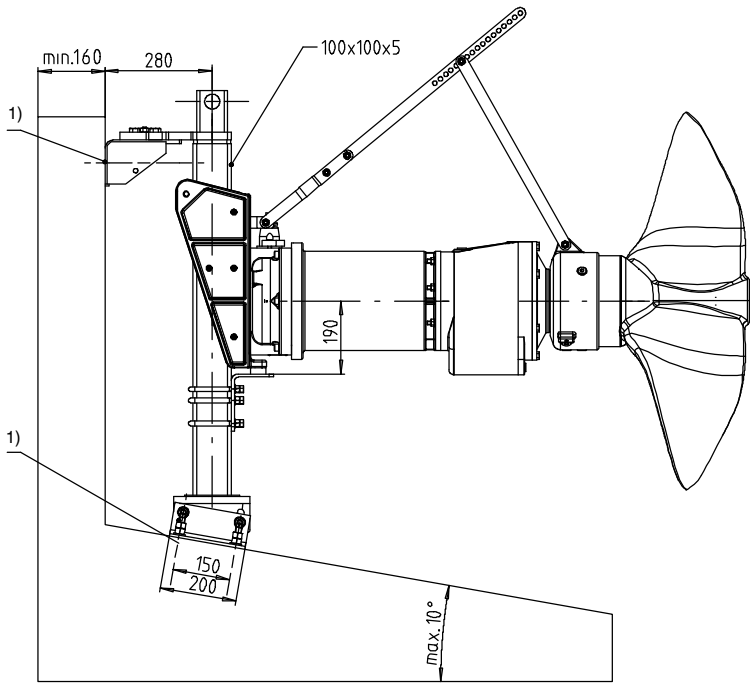
Item No.	Accessories	Description
22 UH-GBB	Lower holder for square guide rail 100 x 100 x 5	For mounting the lower holder of the 100 x 100 x 5 guide rail on a sloping tank floor (inclined by 0.5° ... 10°, continuously adjustable)
	incl. 4 chemical anchors	Chemical anchors for mounting the lower holder on the sloping tank floor Min. concrete quality: B25

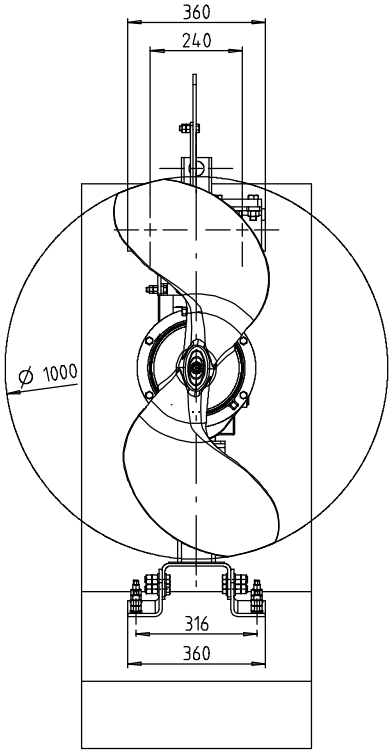
Item No.	Description	Material	Material No.	Weight [kg]
22 UH-GBB	Lower holder for square guide rail 100 x 100 x 5 on sloping tank floor	1.4301	01 118 906	11.92
		1.4571	01 118 907	11.92
	incl. 4 chemical anchors			

Standard accessories set 22 – Options

For mounting on the wall and sloping floor of the tank (0.5° ... 10°), with horizontal swivelling option, level-adjustable

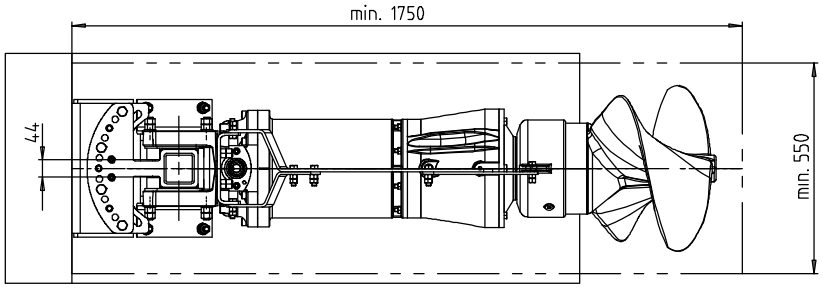
Amaprop 1000





1) Hole diameter 18 mm
Hole depth 125 mm
Max. tightening torque 60 Nm

Minimum dimensions for installation through access opening



Other dimensions see page 12/13

UG 1266114

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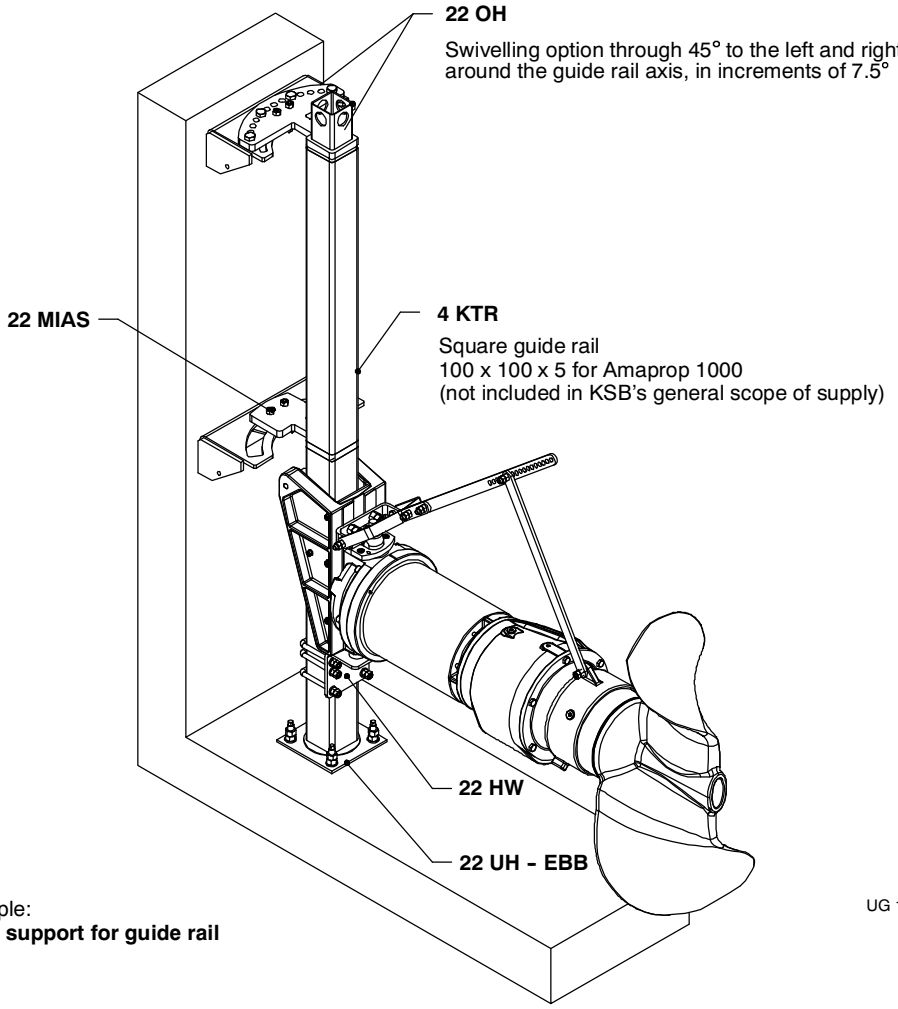
Standard accessories set 22 - Options

Middle support for 100 x 100 x 5 guide rail for installation depths >6 m
Amaprop 1000



Installation example:
Mounted middle support for guide rail

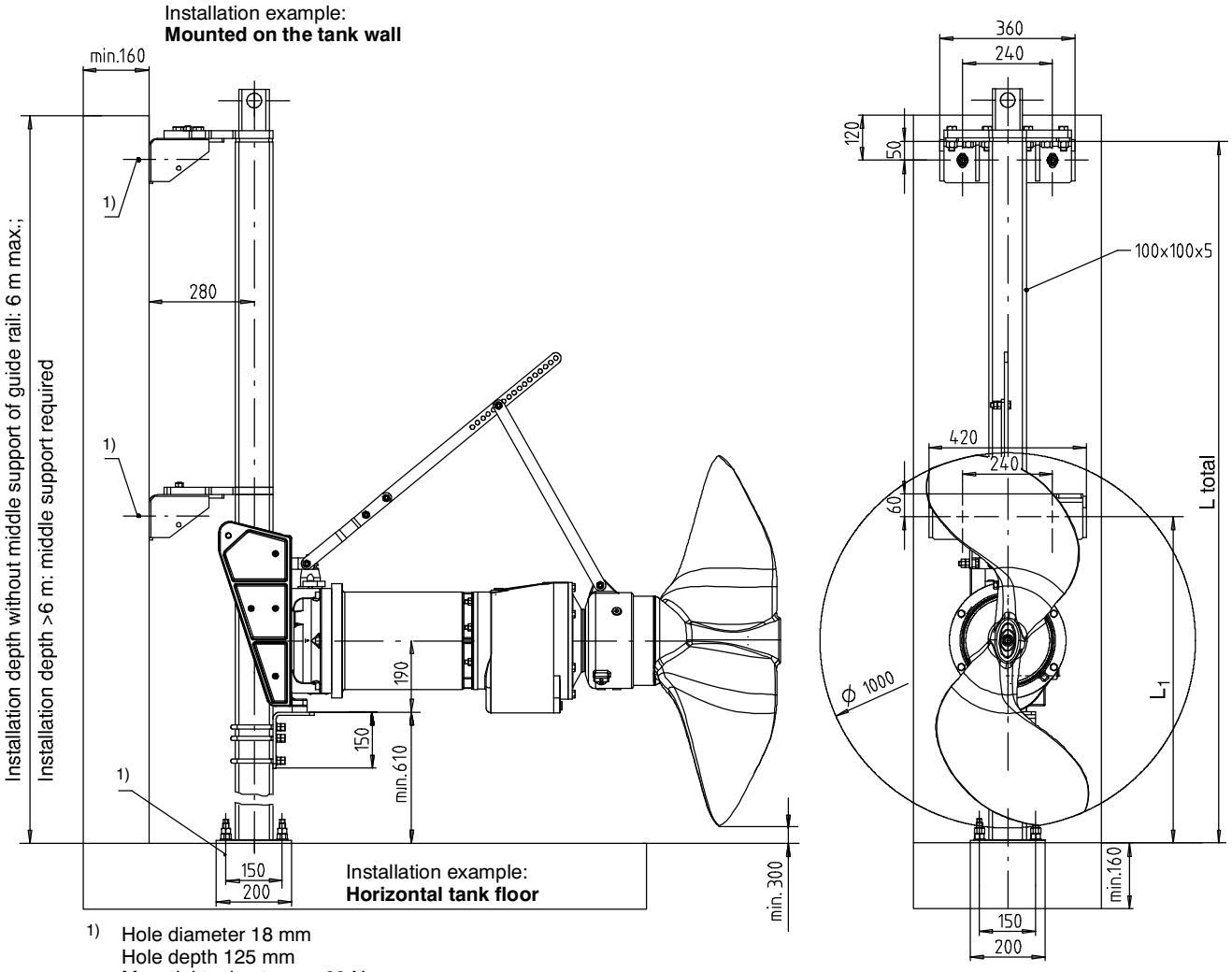
UG 1266106

Item No.	Accessories	Description
22 MIAS	Middle support for square guide rail 100 x 100 x 5	For supporting the square guide rail 100 x 100 x 5 on the tank wall for installation depths greater than 6 m, with flexible fittings
	incl. 2 chemical anchors	Chemical anchors for mounting the middle support on the tank wall Min. concrete quality: B25

Item No.	Description	Material	Material No.	Weight [kg]
22 MIAS	Middle support for square guide rail 100 x 100 x 5	1.4301	01 129 811	18.45
		1.4571	01 129 812	18.45
	incl. 2 chemical anchors			

Standard accessories set 22 – Options

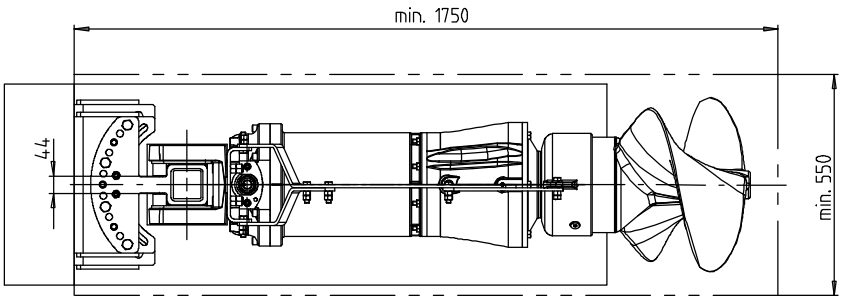
Middle support for 100 x 100 x 5 guide rail for installation depths >6 m
Amaprop 1000



1) Hole diameter 18 mm
Hole depth 125 mm
Max. tightening torque 60 Nm

L_1 should be located as closely above the mixer as possible to ensure that the forces generated are safely transferred from the guide rail to the wall!

Minimum dimensions for installation through access opening



Other dimensions see page 12/13

UG 1266106

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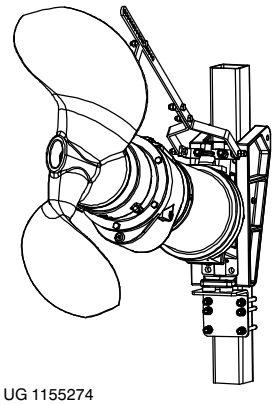
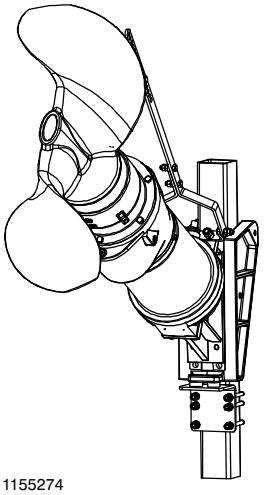
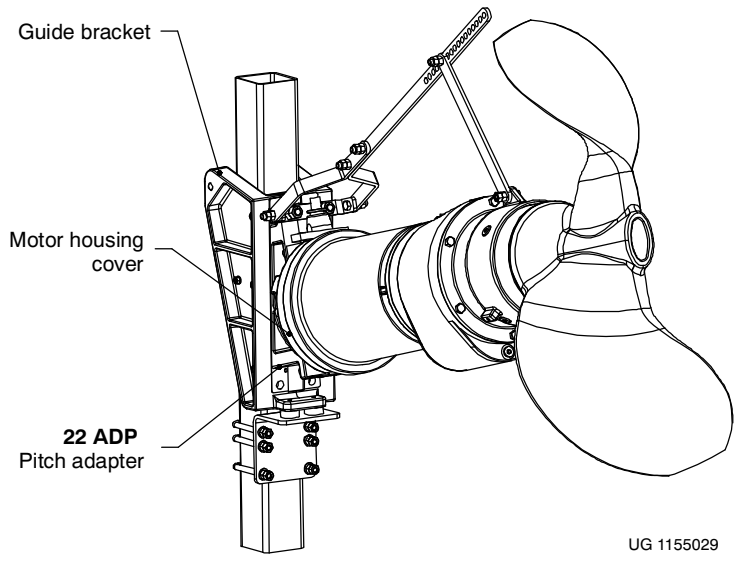
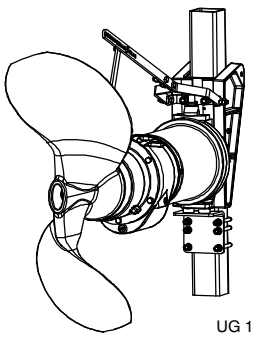
Accessories set 22 - Options

Pitch adapter for Amaprop 1000

Installation with pitch adapter

	Upward pitch of 15°	Upward pitch of 30°
- Mixer installation with upward pitch by means of adapter (item **22 ADP**)	 UG 1155274	 UG 1155274
	Pitch adapter as wedge-shaped cast component	Pitch adapter as welded component
- Adapter (item **22 ADP**) mounted between motor housing cover and guide bracket - Installation at the a.m. pitch angles will change the attachment point for raising and lowering the mixer, compared to horizontal mixer installation. The lifting bail is mounted at the factory so as to provide the correct attachment point.	 UG 1155029	

Installation with standard guide bracket (without pitch adapter)

	Horizontal installation
- The submersible mixer cannot be mounted in an inclined position relative to the guide rail axis - Attachment point for raising and lowering see pages 12/13	 UG 1155274

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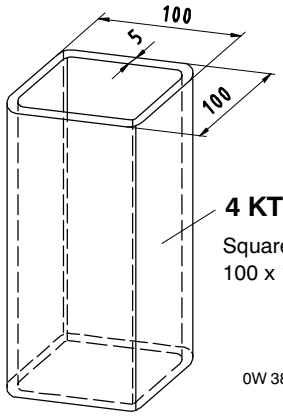
Guide rails (4 KTR)

Included in KSB's scope of supply, or supplied by customer for accessories set 22

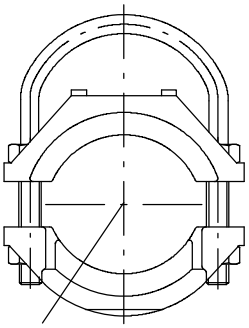


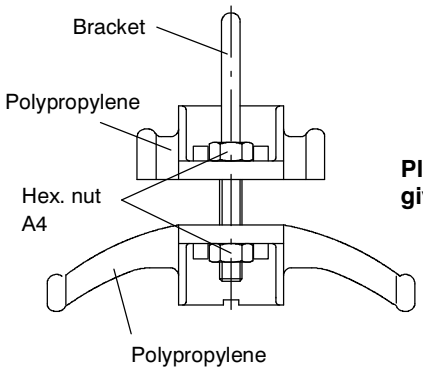
- Guide rails to DIN 59 411, wrapped in tubular film
- Lengths >6 m can be achieved by adding guide rail extensions (3 metres or 6 metres long) at the site.
  (Welding and subsequent treatment to be performed at the site in accordance with the relevant regulations)

Item No.	Description	Material	Material No.	Weight [kg]
4 KTR	Guide rail 100 x 100 x 5	1.4301	11 304 598	43.2
	Length: 3 m	1.4571	11 304 599	43.2
	Guide rail 100 x 100 x 5	1.4301	11 304 600	86.4
	Length: 6 m	1.4571	11 304 601	86.4

Other accessories

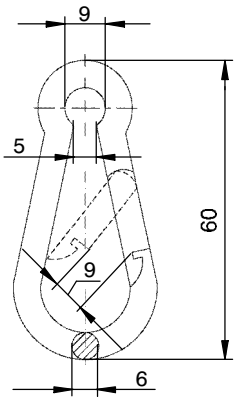
Cable support (KH)
For supporting the power cable at the lifting rope or tank edge





Please refer to the power cable data given in the motor catalogue!

Carabine hook



Load-carrying capacity: 150 kg

Item No.	Description	for size	Material	Material No.	Weight [kg]
KH	Cable support/cable bracket incl. carabine hook	for power cables 12 x 1.5 12 x 2.5 7 x 4 + 5 x 1.5 7 x 6 + 5 x 1.5	Plastic / A4 Carabine hook A4	19 555 523	0.20