

SMD, SMG, SFG-Mixers and flowmakers

50/60 Hz

Installation and operating instructions



SMD, SMG, SFG
Installation and operating instructions
(all available languages)
<http://net.grundfos.com/qr/i/98826058>

SMD, SMG, SFG-Mixers and flowmakers

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English (GB) Installation and operating instructions

Original installation and operating instructions

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1. General information



Read this document before you install the product. Installation and operation must comply with local regulations and accepted codes of good practice.

1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:



SIGNAL WORD

Description of the hazard

Consequence of ignoring the warning

- Action to avoid the hazard.

1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

1.3 Target group

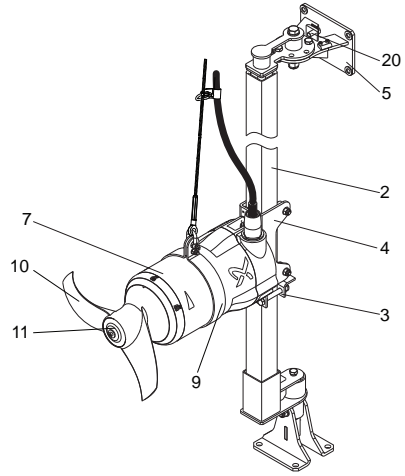
These installation and operating instructions are intended for professional installers.

2. Product introduction

2.1 Product description

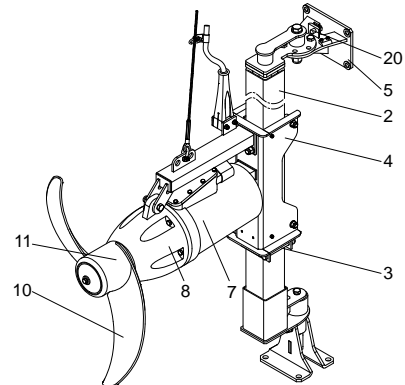
The mixers are fitted with 0.9 to 18.5 kW motors.

The 50 Hz flowmakers are fitted with 0.7 to 11.0 kW, and the 60 Hz versions are fitted with 0.85 to 12.1 kW motors.



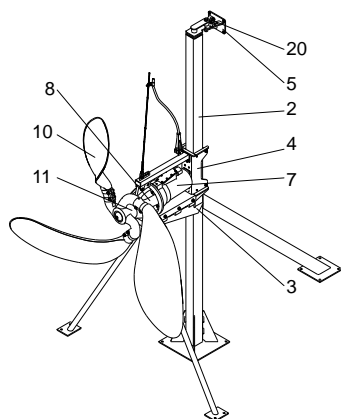
SMD mixer

TM066347



SMG mixer

TM042710



TM042755

SFG flowmaker

Pos.	Description
2	Column profile
3	Depth blocker
4	Motor bracket
5	Top fixation bracket including safety wire
7	Motor housing
8	Gearbox
9	Clamping ring
10	Propeller
11	Hub
20	Wire clamp

2.2 Intended use

These mixers and flowmakers are designed for mixing in industrial applications.

These products are designed for applications involving the mixing, that is the homogenisation and suspension of liquids of low to medium viscosity (≤ 500 mPas).

2.2.1 Applications

These mixers and flowmakers are intended to be used in the following areas:

- municipal and industrial wastewater treatment
- industrial processes
- sludge treatment
- agriculture
- biogas plants.

2.3 Mixed liquids

Observe the following liquid limitations to avoid overloading and exposing the mixers and flowmakers to corrosion.

	SMD, SMG, SFG	SMG.H, SFG.H
pH value	4-10	
Liquid temperature *	5-40 °C	5-60 °C
Maximum density	1060 kg/m ³	1100 kg/m ³
Maximum dynamic viscosity	250 mPas** 500 mPas	500-5000 mPas
Chloride content	Stainless steel DIN 1.4301: ≤ 200 mg/l	
Chloride content	Stainless steel DIN 1.4404: ≤ 1000 mg/l	

* The liquid temperature range is stated on the nameplate. See section Nameplate

** For SMD.

For mixing liquids exceeding the values stated above, contact Grundfos.

2.3.1 Mixers

Mixers are suitable for applications involving sludge with a typical dry solids content as stated in the table below. Mixers are also suitable for a wide range of other applications involving similar liquids, such as slurry and paper pulp.

	SMD	SMG, SFG
Activated sludge	0.5 % DS	
Sludge in selector zones	0.5 % DS	
Sludge in anoxic zones	0.5 % DS	
Sludge in bivalent zones	0.5 % DS	
Sludge in anaerobic zones	0.5 % DS	
Primary sludge	≤ 3 % DS	
Secondary sludge	Max. 4 %	≤ 6 % DS
Digested sludge	Max. 4 %	≤ 8 % DS
Sludge in wastewater tank without screen	≤ 2 % DS	
Sludge in wastewater tank with sand	≤ 2 % DS	

For SMG.H, the maximum dry solids content is 10 % DS and for SMG.A, the is 8 % DS.

2.3.2 Flowmakers

Flowmakers are suitable for activated sludge with a typical dry solids content of 0.5 to 1.0 % and for other liquids with a dry solids content of maximum 1.5 %. For SFG.H, the maximum dry solids content is 10 % DS.

2.3.3 Special versions

Mixers and flowmakers with "A", "M" or "H" in the type designation are designed for other applications. For more information about those products and their particular liquid limitations, contact Grundfos.

2.3.4 Technical data

Voltage tolerance		
	400-415 V	-10 % +6 %
SMD, SMG and SFG	380 V	-5 % +10 %
	440-480 V	-10 % +10 %
Enclosure class	IP68	
Insulation class	SMG, SFG	H
	SMD.09-18	F, H *
	SMD.19-35	H
Maximum installation depth	20 m below liquid surface	
Maximum number of starts per hour	SMG, SFG	20
	SMD	60
Power cable length	10 m **	
Wire length on all winches	10 m (standard)	

* The standard insulation class is F. Class H is optional.

** The standard cable length is 10 m. Other cable lengths are available on request.

The mixers and flowmakers are designed for continuous operation.

2.3.5 Potentially explosive environments

Use explosion-proof Grundfos mixers in potentially explosive environments.



The explosion protection classifications of the SMD mixer are II 2G Ex db h IIB T4 Gb and II 2G Ex db h ib IIB T4 Gb. The classification of the installation must be approved by the local authorities.

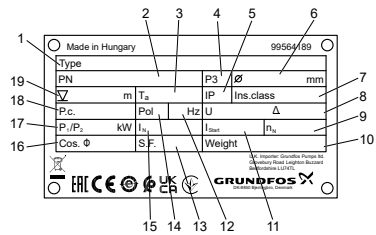
2.4 Identification

2.4.1 Type key

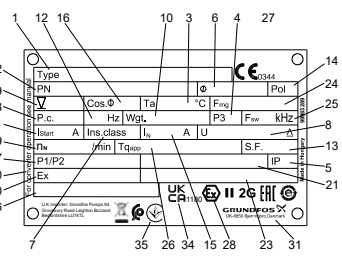
Example: SMG.30.45.325.5.0B

Code	Explanation	Designation
S	SMD, SMG, SFG	Type range
M	Mixer	Version
F	Flowmaker	
G	Gear-driven	Drive
D	Direct-driven	
30	Code from type designation / 10 kW 30 = 3.0 kW	Motor output power P2
45	45 cm	Propeller diameter [cm]
[]	Standard	Application
A	Agriculture	
M	Mud, for high density	
H	Heavy duty, biogas plants	
325	325 RPM	Propeller speed [min ⁻¹]
[]	Standard	Installation method
T	2" thread connection	
[]	Non-explosion proof	Explosion protection
Ex	Explosion-proof	
5	50 Hz	Frequency [Hz]
6	60 Hz	
0B	3 x 400-415 V, Y	
1B	3 x 400-415 V, D	
0K	3 x 380 V, Y	
1K	3 x 380 V, D	
0P	3 x 440-480 V, Y	
1P	3 x 440-480 V, D	
[]	First generation	Generation
A	Second generation	
B	Third generation	
Z	Custom-built product	Customisation

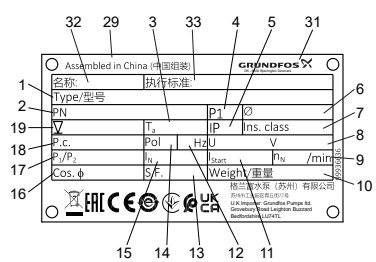
2.4.2 Nameplate



Nameplate for non-explosion proof products



Nameplate for explosion-proof SMD mixers



Nameplate for non-explosion proof products in China

Pos.	Description
1	Type designation
2	Product number and serial number
3	Liquid temperature range
4	Production site
5	Enclosure class according to IEC
6	Propeller diameter
7	Insulation class
8	Rated voltage
9	Rated speed (propeller)

TM062588

TM080050

TM081636

Pos.	Description
10	Weight
11	Starting current
12	Frequency
13	Safety factor
14	Number of poles
15	Rated current
16	Power factor
17	Motor power P1/P2
18	Production code
19	Maximum installation depth
20	Ex marking
21	Certificate number ATEX
23	Certificate number IEC Ex
24	Frequency range *
25	Switching frequency *
26	Torque application
27	Approval mark - CE with ATEX notified body number of production location
28	Approval mark - ATEX with ATEX equipment category
29	Place of production
30	Reference to requirement of electric machines operated with converter
31	Manufacturer name and address
	Type:
32	<ul style="list-style-type: none"> • SMG or SMD: Submersible mixer • SFG: Submersible flowmaker
33	Company standard
34	Approval mark - UKCA approved body number of production location
35	Approval mark - UA
36	Certificate number UKEX

* If a frequency converter is used.


Fix the extra nameplate that is supplied with the product at the installation site or production location, so the data can be checked when necessary. Make sure that the nameplate is visible.

2.4.3 Approvals

The SMD mixers designed for applications in potentially explosive environments (Ex versions) are supplied with a nameplate containing certification details.

SMD mixer IECEX certificate number: IECEX SEV 17.0004X.

Key to certification details

Directive or standard	Code	Description
ATEX/UKEX		The equipment conforms to harmonized EU and UK standards.
	II	Non-mining equipment group, according to the ATEX directive/UKEX regulation, defining the requirements applicable to the equipment in this group.
	2	High protection equipment group, according to the ATEX directive/UKEX regulation, defining the requirements applicable to the equipment in this category.
	G	Explosive atmospheres caused by gases, vapours or mists.
Harmonized European EN and IECEX standard	Ex	Marking of explosion protection.
	db	Flame-proof enclosure according to EN/IEC 60079-1.
	h	Non-electrical equipment for explosive atmosphere, according to EN ISO 80079-36 and EN ISO 80079-37.
	ib	Intrinsically safe according to EN 60079-11.
	IIB	Classification of gases, see EN/IEC 60079-0, Annex A. Gas group B includes gas group A.
	T4	Maximum surface temperature of the motor is 135 °C according to EN/IEC 60079-0.
	Gb	Equipment for explosive gas with "high" level of protection.

3. Safety instructions

3.1 General safety instructions



DANGER

Electric shock

Death or serious personal injury

- Before working on mixers or flowmakers, make sure that the fuses are removed or the main switch is switched off. Make sure that the power supply cannot be switched on unintentionally.



WARNING

Minor or moderate personal injury

- Wear the appropriate safety shoes, gloves, goggles and other protective equipment when handling the product.

Follow these instructions when transporting, storing, handling, operating or dismantling the mixer or flowmaker.



The mixer or flowmaker must be installed, connected, started up and serviced by qualified persons.

Make sure that persons cannot fall into the tank.



WARNING

Electric shock

Death or serious personal injury

- The power cable must be fixed in such a way, that it cannot get in contact with the propeller during operation.

3.2 Explosion-proof versions

The Ex instructions must be followed for the explosion-proof SMD. We recommend that you also follow these instructions for non-explosion proof mixers and flowmakers.



When using explosion-proof mixers, observe the following safety regulations.

Ex marking of the SMD Ex mixers: Ex db h IIB T4 Gb.

Ex marking of the SMD Ex mixer variant with leakage sensor: Ex db h ib IIB T4 Gb. For more information on leakage sensors, see [6.4 Gearbox or shaft seal housing protection](#).

Temperature monitoring

The motor temperature must always be monitored through the built-in PTC or PTO (Klixon) sensors. The associated relay must be certified for this use with the safety level, SIL 1. If the relay is built in as part of a frequency converter, the converter must also fulfil SIL 1.

Power cable

The factory-fitted power cable must not be shortened.



DANGER

Explosive environment

Death or serious personal injury

- Do not dismantle mixers and flowmakers in an explosive atmosphere.

Soft starter and frequency converter

Use soft starters and frequency converters only if their Ex classification is higher than the one applying to the mixer, and they are installed in accordance with the Ex regulations.

Accessories

Use only Grundfos-approved accessories.

Maintenance, service and repair

Only Grundfos or authorised service workshops are allowed to dismantle mixers. This applies to the cable entry as well.

For repair purposes, use only Grundfos-produced components.

For inspection and maintenance, the standard EN 60079-17 must be complied with.

Service log

Spare parts must be registered in a service log to have a 100 % traceability during the product lifecycle.

4. Receiving the product

4.1 Transporting the product

The individual components of the mixer or flowmaker must be packed carefully to prevent any damage to the surface protection during transportation.



Make sure that the mixer, flowmaker and accessories cannot roll or fall over.



Before lifting the components, make sure to comply with any local regulations that set limits for the weights to be lifted manually by individuals.



All lifting equipment must be rated for the purpose and checked for damage before lifting the components. The lifting equipment rating must under no circumstances be exceeded.

4.2 Inspecting the product



Do not install a damaged mixer or flowmaker.

Check the product and the accessories for any visible damage upon delivery.

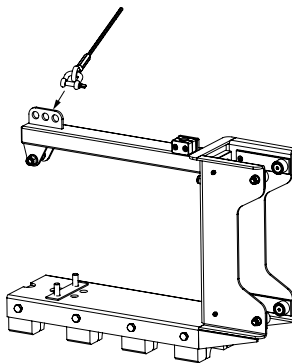
If the product or the accessories are damaged, contact Grundfos immediately. Do not remove a damaged component, unless instructed otherwise by Grundfos.

Make sure to comply with local regulations when disposing of the package.

5. Mechanical installation

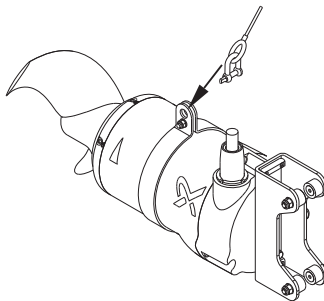
5.1 Foundation

Lift the mixer or flowmaker by the suspension point. See figs Mounting the lifting wire on the motor bracket and Mounting the lifting wire on SMD.



TM0042720

Mounting the lifting wire on the motor bracket



TM066306

Mounting the lifting wire on SMD



Do not use the lifting equipment supplied with the unit nor the wire used for lifting and lowering the mixer or flowmaker into the tank as universal lifting equipment.



Never hang the mixer or flowmaker by the power cable. Never let the mixer or flowmaker run while hanging from the lifting equipment.



Use the lifting equipment supplied with the unit only for lifting the mixer or flowmaker.

For dimensions and weights, see [A.1. Dimensions and weights](#).

5.2 Mounting the product

Make sure to use stainless steel nuts and bolts for installation.

Use grease or alu-paste with a locking nut for lubrication and locking or, alternatively, use Loctite or a similar product.

Tighten all nuts and bolts to the following torques:

	Bolts F-class 70 [Nm]	Bolts F-class 80 [Nm]
M6	8.8	11.8
M8	21.4	28.7
M10	44	58
M12	74	100
M16	183	245
M20	370	494

5.2.1 Anchor bolts

Anchor bolts used for mounting components in concrete must have the following pull-out strength:

Size	Pull-out strength [kN]
M12	6
M16	14

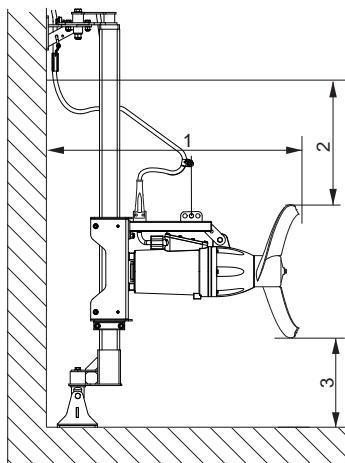
5.3 Positioning of mixers and flowmakers

Correct positioning of mixers and flowmakers is essential to ensure proper operation and long life.

5.3.1 Mixers

Submerge the mixer as deeply as possible.

- If more mixers are installed in the same tank, the mixers must not generate opposite flows.
- The distance between the propeller tip and the bottom of the tank, H_{MIN} in fig. Positioning sketch for mixers, must be half of the propeller diameter.
- **SMG**: The distance from the propeller tip to the liquid surface must be at least equal to the propeller diameter. See H_{ABOVE} in fig. Positioning sketch for mixers.
- **SMD**: The distance from the propeller tip to the liquid surface must be at least 1.5 times the propeller diameter. See H_{ABOVE} in fig. Positioning sketch for mixers.
- The distance between the propeller tip and the wall behind the mixer must be at least 1.5 times the propeller diameter. See L_{MIN} in fig. Positioning sketch for mixers



Positioning sketch for mixers

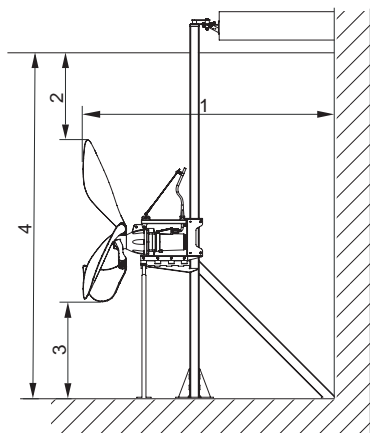
Pos.	Description
1	L_{MIN}
2	H_{ABOVE}
3	H_{MIN}

TM025917

5.3.2 Flowmakers

Submerge the flowmaker as deeply as possible.

- The distance between the propeller tip and the bottom of the tank must be 50 cm. See H_{MIN} in fig. Positioning sketch for flowmakers
- The distance from the propeller tip to the liquid surface must be at least 0.75 times the propeller diameter. See H_{ABOVE} in fig. Positioning sketch for flowmakers.
- The distance between the propeller tip and the wall behind the flowmaker must be at least twice the propeller diameter. See L_{MIN} in fig. Positioning sketch for flowmakers.
- The sideways distance between the propeller tip and the tank wall must be at least 0.5 metres.
- If more flowmakers are to be installed in parallel, the distance between their propellers must be larger than half the propeller diameter.
- The distance from a channel bend to the propeller and from the propeller to aeration areas must be at least the largest value of the channel width and the liquid level.



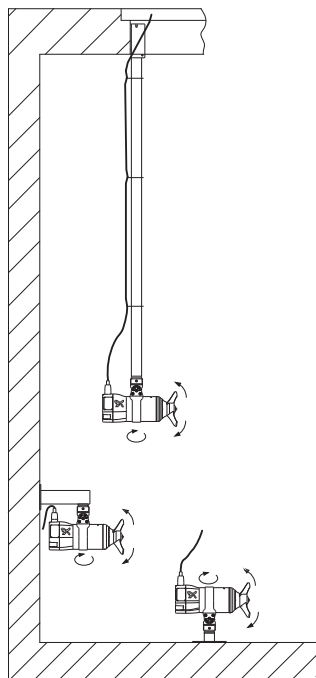
Positioning sketch for flowmakers

Pos.	Description
1	L_{MIN}
2	H_{ABOVE}
3	H_{MIN}
4	H_{LIQUID}

5.3.3 Installing a mixer

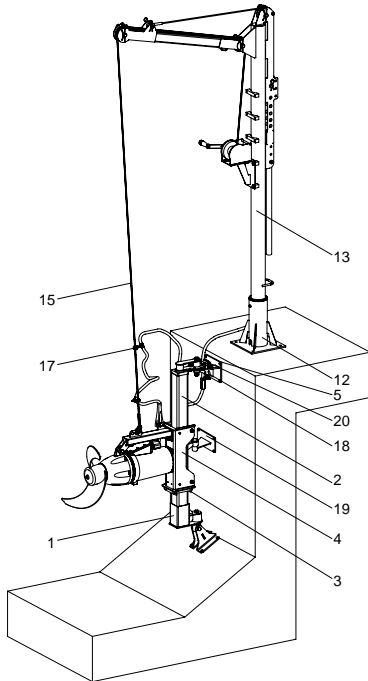
The mixer can be mounted in different ways depending on the accessories:

- fixation bracket and tube for suspended mounting. See fig. SMD.09 - 18.xx.xxxx.T.
- fixation bracket for wall mounting. See fig. SMD.09 - 18.xx.xxxx.T.
- fixation base for floor mounting. See fig. SMD.09 - 18.xx.xxxx.T.
- motor bracket for mounting on column profile. See fig. SMD and SMG mixers.



SMD.09 - 18.xx.xxxx.T

TM065286



TM042711

Procedure

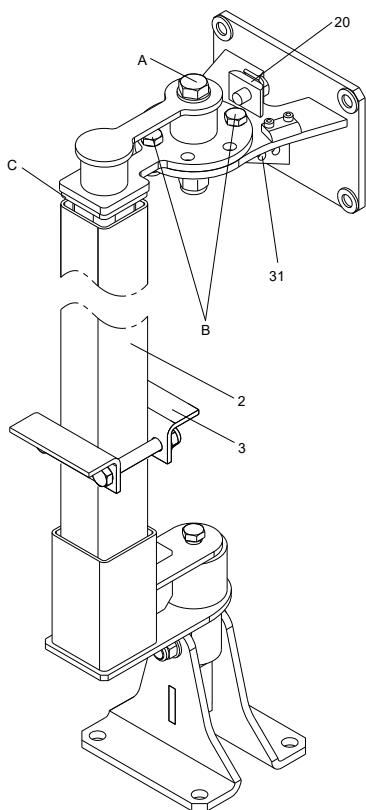
See fig. SMD and SMG mixers.

For torques, see section Mounting the product.

1. Drill the holes for the anchor bolts of the top fixation bracket.
2. Mount the anchor bolts and fit the top fixation bracket.
3. Place the bottom fixation bracket in the right position, vertically below the top fixation. The bottom fixation bracket can be mounted in any angle, from vertical to horizontal position.
4. Drill the holes for the anchor bolts of the bottom fixation bracket.
5. Mount the anchor bolts and fit the bottom fixation bracket.
6. Depending on the length of the column profile, weld the turnable part of an intermediate fixation bracket (19 in fig. SMD and SMG mixers) to the column profile.
7. Position and align the column profile in the bottom fixation bracket. Shorten the column profile (2) to the correct length to match the position of the insulator (C) at the top fixation bracket. A gap of 5 to 10 mm between the collar of the insulator and the column profile is optimal. See fig. Fixation.

SMD and SMG mixers

Pos.	Description
1	Bottom fixation bracket
2	Column profile
3	Depth blocker
4	Motor bracket
5	Top fixation bracket including safety wire
12	Crane foot
13	Crane with winch
15	Lifting wire including shackle and wire clamp
17	Cable clamp
18	Cable sock including shackle
19	Intermediate fixation bracket
20	Wire clamp
31	Hole for fastening the safety wire



Fixation

Pos.	Description
A, B	Bolts
C	Insulator
2	Column profile
3	Depth blocker
31	Hole for fastening a safety wire

8. Remove the insulator and the turnable metal part by removing the centre bolt (A) and the two fixation bolts (B).
9. Adapt the outside of the square insulator to the inside of the column profile. The insulator must fit tightly inside the column profile.
10. Insert the column profile into the bottom fixation bracket, and mount the top end with the insulator and the turnable metal part on the already installed top fixation bracket. Tighten the bolts (A and B) in the desired position. You can adjust the angle in steps of 7.5° .

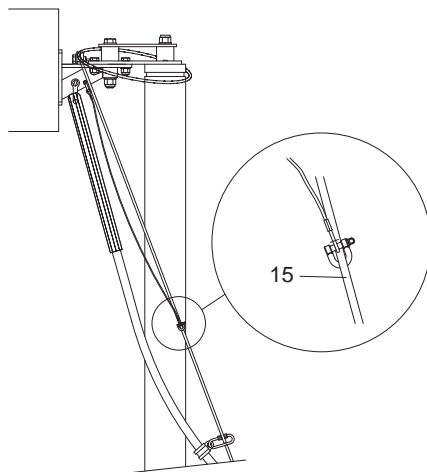
11. If an intermediate fixation bracket is used (19), fit it to the turnable part welded on to the column profile in step 6. Drill holes in the tank wall, fit anchor bolts in the bracket and tighten them.



Make sure that the mixer cannot be turned so much that the propeller touches the tank wall. See section Positioning of mixers and flowmakers.

12. Fasten the depth blocker (3) in the right position. See section Positioning of mixers and flowmakers and dimensions and weights in the appendix.
13. Drill the holes for the anchor bolts for the crane foot (12 in fig. SMD and SMG mixers).
14. Mount the crane foot, fit and tighten the bolts.
15. Mount the lifting wire (15 in fig. Safety wire) on the motor bracket using the shackle. See fig. Mounting the lifting wire on the motor bracket and Mounting the lifting wire on SMD.
16. Mount the top end of the safety wire to the hole (31 in fig. Fixation) of the top fixation bracket using a shackle. See fig. Fixation and Mounting the lifting wire in the drum. The other end of the safety wire ends in a shackle through which the lifting wire must run.

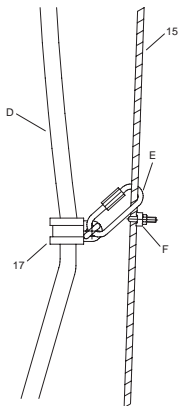
TM042712



TM043532

Safety wire

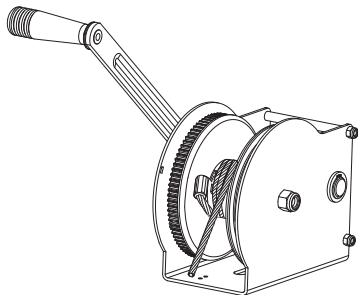
17. Fix the power cable to the lifting wire by a cable clamp approximately 0.8 m above the mixer. This prevents the cable from falling down and becoming entangled in the propeller during operation. Connect the cable clamp to the lifting wire above the wire clamp by a snap hook. See fig. Attaching the power cable to the lifting wire. Attach the power cable to the lifting wire by cable clamps placed at 1 m intervals.



Attaching the power cable to the lifting wire

Pos.	Description
D	Power cable
E	Snap hook
F	Wire clamp
15	Lifting wire
17	Cable clamp

18. Position the crane in the foot, and mount the lifting wire in the drum of the winch. See fig. Mounting the lifting wire in the drum.



Mounting the lifting wire in the drum

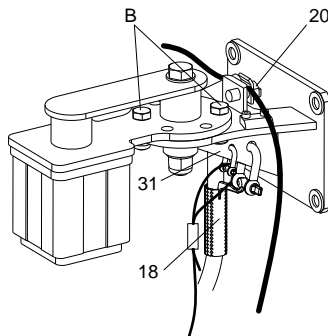


At least three turns of wire must always remain on the drum. Otherwise, the wire may break loose from the drum fixation.



Follow the separate installation and operating instructions for cranes.

19. Lift the complete mixer, motor bracket with motor, using the crane and slide it over the column profile.
20. Slowly lower the mixer into the tank and down to its position on the depth blocker.
21. Mount the cable sock (18) to the top fixation bracket using the shackle and pull the power cable through it to the desired position. See fig. Top fixation bracket with lifting and safety wires and cable sock. The power cable must be slightly tightened.



Top fixation bracket with lifting and safety wires and cable sock

Pos.	Description
B	Bolts
18	Cable sock
20	Fixation bracket
31	Hole for fastening a safety wire



Remove the lifting wire from the crane before starting the mixer.

22. Remove the lifting wire from the winch and fit it to the wire clamp (20 in fig. Top fixation bracket with lifting and safety wires and cable sock) on the top fixation bracket. Coil up additional lifting wire and fasten it by a strap. Use the lifting wire as a relief for the power cable. Always tighten the lifting wire.
23. Check the distance between the propeller and the wall, and the propeller and the bottom of the tank when the motor bracket is resting on the depth blocker. The mixer must under no circumstances

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touch other installations, bottom or wall. This also applies when the mixer is turned. See section Positioning of mixers and flowmakers.

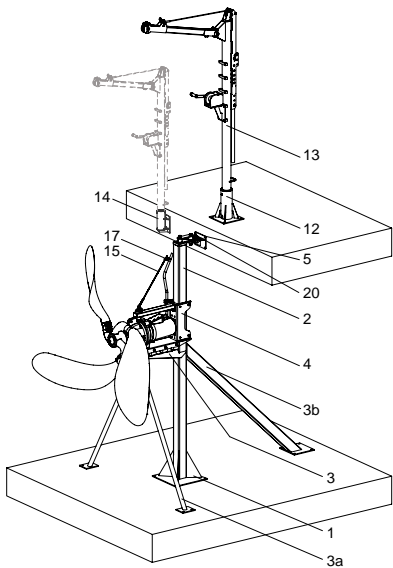
DANGER
Electric shock



- Death or serious personal injury
- Before making any electrical connections, make sure to remove the fuses or switch off the main switch. Make sure that the power supply cannot be switched on unintentionally.

24. Connect the power cable to the terminals in the control cabinet.

5.3.4 Installing a flowmaker



TMD042714

SFG flowmaker

Pos.	Description
1	Bottom fixation plate
2	Column profile
3	Depth blocker
3a	Front support leg

Pos.	Description
3b	Back support leg
4	Motor bracket
5	Top fixation bracket including safety wire
12	Crane foot
13	Crane with winch
14	Crane foot for vertical installation
15	Lifting wire including shackle and wire clamp
17	Cable clamp
20	Wire clamp
31	Hole for fastening a safety wire

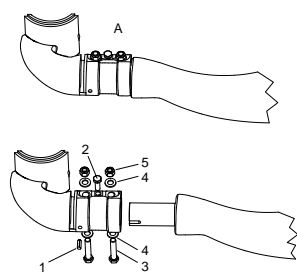
Procedure

For torques, see section Mounting the product.



The propeller blades can be mounted before installing SFG.xx.180/230/260 or after the crane is installed.

5.3.5 Mounting the propeller blades of SFG.xx.180/230



TMD042715

SFG.xx.180/230

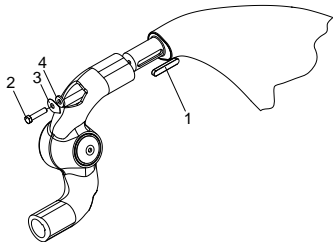
Pos.	Description
A	Blade position
1	Pin
2	Screw
3	Bolt
4	Washer
5	Nut



The fixation of the propeller blades is ensured by the pressure of the clamping jaws which are tightened by the bolts (3) and the nuts (5). The function of the pin (1) is to position the blades in the right angle before tightening the clamping jaws.

1. Check the premounted pins (1). They are used only for positioning.
2. Tighten the screw (2) to widen the opening of the clamping jaws.
3. Insert the blade from above. Turn it slightly and let it rest on the pin. Turn the blade back until the blade slides down and is flush with the hub.
4. Remove the screw (2).
5. Put Loctite 243 on the thread of the bolts (3).
6. Mount bolts, washers and nuts (3, 4 and 5) in both holes and tighten by hand.
7. Tighten the two nuts (5) with a torque wrench to 100 Nm (A4-80).
8. Make sure that the blade corresponds to position A in fig. SFG.xx.180/230.
9. Apply silicone to the joint between the blade and the hub.

5.3.6 Mounting the propeller blades of SFG.xx.260



SFG.xx.260

Pos.	Description
1	Key
2	Screw
3	Cover plate
4	Washer

1. Drive the key (1) into the keyway for correct positioning of the blades.
2. Apply a little oil to the blade shaft and the hole in the hub.
3. First put the cover plate (3) and then the washer (4) on the screw (2).
4. Put Loctite 243 on the thread of the screw (2).
5. Turn the hub, and insert the blade from above.
6. Turn the blade to the correct position and let it slide into the hub.
7. Screw in the screw (2) by hand and tighten it with a torque wrench to 183 Nm (A2-70).
8. Carry out a visual check.
9. Apply silicone to the joint between the blade and the hub and between the cover plate (3) and the hub.

5.3.7 Mounting the propeller blades of SFG.xx.150

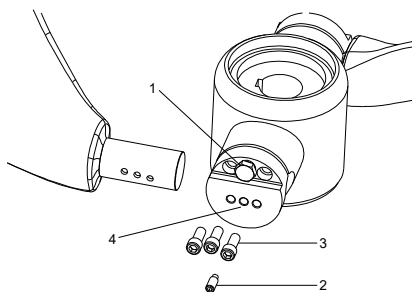


The fixation of the propeller blades is ensured by the pressure of the clamping jaws which are tightened by the screws (3). The function of the set screw (2) is to position the blade in the right angle before tightening the clamping jaws.

The blade can be placed in three different angles. Choose the right angle depending on the stirring power and liquid density. When in doubt, use the middle position.



The propeller blades must be mounted in the same position to avoid the propeller as well as the installation to be loaded unevenly.



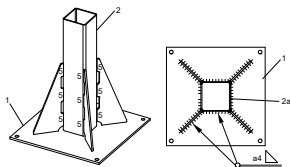
SFG.xx.150

Pos.	Description
1	Screw
2	Set screw
3	Three screws
4	Three different positions for the set screw

1. Tighten the screw (1) to open the clamp.
2. Fit the propeller blade into the hub.
3. Choose the right angle for the propeller blade and place the set screw (2) into the proper position.
4. Remove the screw (1).
5. Add Loctite to the screws (3).
6. Fit and tighten the screws (3). Tighten the screws with a torque wrench to 74 Nm.
7. Loosen the set screw (2) if necessary.
8. Tighten the screws (3).
9. Tighten the set screw (2) slightly to prevent it from falling out during operation.

5.3.8 All flowmakers

1. Weld the bottom fixation plate to the end of the column profile in a workshop.



Welding the column profile on to the bottom fixation plate

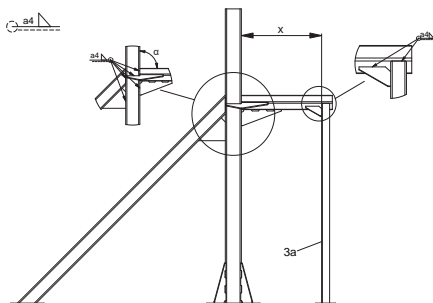
Pos.	Description
1	Fixation plate
2	Column profile
5	Ribs
2a	End of the column profile



The SFG.xx.130 bottom fixation plate does not have ribs.

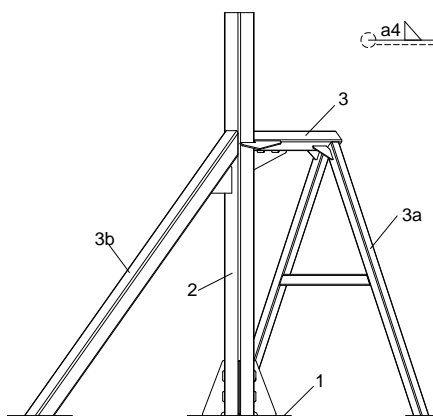
2. SFG.xx.150/260

Place the depth blocker (3), the back support leg (3b) and the front support legs (3a) in the right position, and weld them to the column profile (2). See position numbers in fig. SFG.xx.150/260, profile and support legs, back view.



SFG.xx.150/260, column profile and support legs, side view

Pos.	Description
α	min. 89.7° - max. 90°
x	600 mm
3a	front support legs



SFG.xx.150/260, profile and support legs, back view

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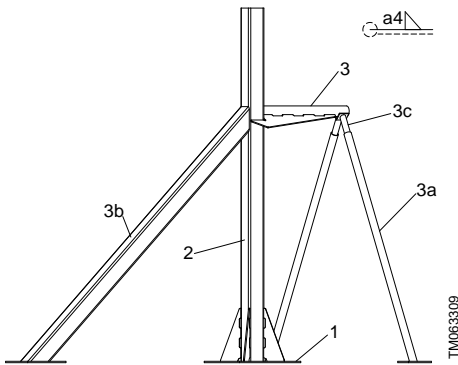
TM063310

Pos. Description

- 1 Fixation plate
- 2 Column profile
- 3 Depth blocker
- 3a, 3c Front support leg
- 3b Back support leg

3. SFG.xx.180 and SFG.xx.230

Place the depth blocker (3), the back support leg (3b) and the front support legs (3a and 3c) in the right position, and weld them to the column profile (2) in a workshop. See position numbers in fig. SFG.xx.180-230, profile and support legs. Calculate the required height (H) of the SFG depth blocker according to the positioning rules for flowmakers. See section Flowmakers.



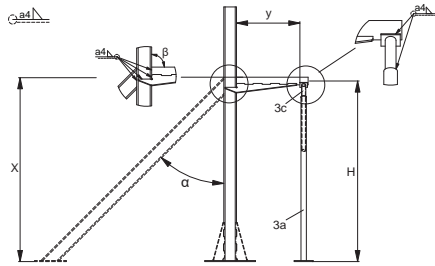
SFG.xx.180-230, profile and support legs

Pos. Description

- 1 Fixation plate
- 2 Column profile
- 3 Depth blocker
- 3a, 3c Front support leg
- 3b Back support leg



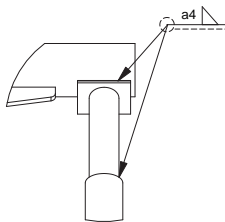
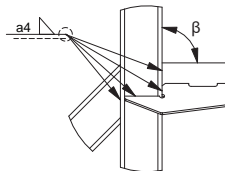
There must be a minimum overlap of 150 mm between the front support legs (3a and 3c). See fig. SFG.xx.130-230, profile and support legs.



SFG.xx.130	$960 \text{ mm} \leq H \leq 1700 \text{ mm}$
SFG.xx.180	$1170 \text{ mm} \leq H \leq 1700 \text{ mm}$
SFG.xx.230	$1420 \text{ mm} \leq H \leq 1700 \text{ mm}$

Pos. Description

- x 1450 mm
- α 45°
- β min. 89.7° - max. 90°
- 3a, 3c front support leg
- y 500 mm
- H height



SFG.xx.130-230, profile and support legs

4. SFG.xx.130

Place the depth blocker (3) and the front support legs (3a and 3c) in the right position, and weld them to the column profile (2) in a workshop. See position numbers in fig. SFG.xx.180-230, profile and support legs. Calculate the required height

(H) of the SFG depth blocker according to the positioning rules for flowmakers. See section Flowmakers.

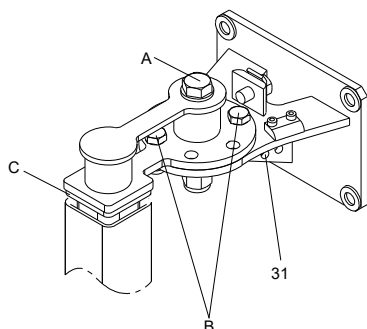


The back support leg (3b) is not supplied for SFG.xx.130.



There must be a minimum overlap of 150 mm between the front support legs (3a and 3c). See fig. SFG.xx.130-230, profile and support legs.

5. Drill the holes for the anchor bolts for the top fixation bracket.
6. Mount the anchor bolts, and fit the top fixation bracket.



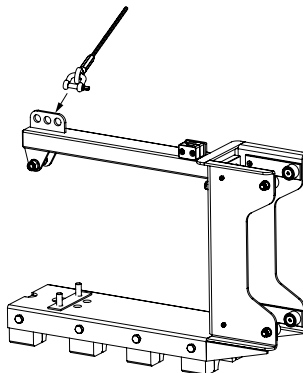
TM042719

Top fixation

Pos.	Description
A, B	Bolts
C	Insulator
31	Hole for fastening a safety wire

7. Shorten the column profile (2 in fig. SFG.xx.150/260, profile and support legs, back view and SFG.xx.180-230, profile and support legs) to the correct length to match the position of the insulator (C in fig. Top fixation) at the top fixation bracket. A gap of 5 to 10 mm between the collar of the insulator and the column profile is optimal. See fig. Top fixation.
8. Remove the insulator and the turnable metal part from the top fixation bracket by removing the centre bolt (A) and the two fixation bolts (B). See fig. Top fixation.
9. Adapt the outside of the square insulator to the inside of the column profile. The insulator must fit tightly inside the column profile.

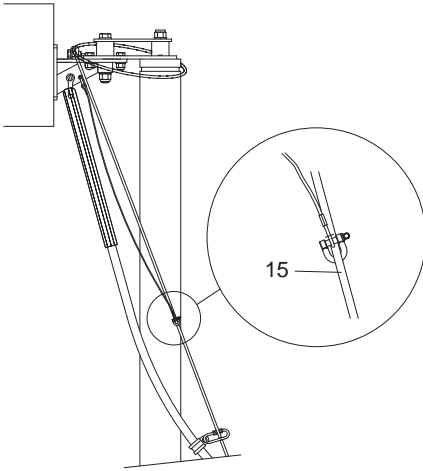
10. Fit the turnable metal part, now fitted on top of the column profile, to the already mounted top fixation bracket. Tighten the bolts (A and B in fig. Top fixation) in the desired position. Adjust the angle in steps of 7.5°.
11. Drill the holes for the anchor bolts for the bottom fixation plate in the bottom of the tank, and insert the bolts. See fig. SFG.xx.150/260, profile and support legs, back view.
12. Tighten the anchor bolts in the bottom fixation plate.
13. Drill holes, mount and tighten the anchor bolts of the front and back support legs as well.
14. Drill the holes for the anchor bolts for the crane foot in the concrete.
15. Mount the crane foot, and fit and tighten the bolts.
16. Mount the lifting wire (15) on the motor bracket using the shackle. See fig. Mounting of the lifting wire on the motor bracket.



TM042720

Mounting of the lifting wire on the motor bracket

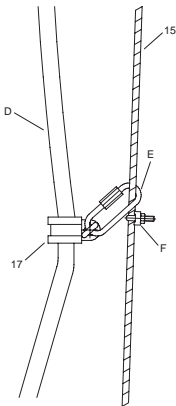
17. Mount the top end of the safety wire to the hole (31 in fig. Top fixation) of the top fixation bracket using a shackle. The other end of the safety wire ends in a shackle through which the lifting wire must run.



TM045932

Safety wire

18. Fix the power cable to the lifting wire by a cable clamp approximately 0.8 m above the flowmaker. This prevents the cable from falling down and becoming entangled in the propeller during operation. Connect the cable clamp to the lifting wire above the wire clamp by a snap hook. See fig. Attaching the power cable to the lifting wire. Attach the power cable to the lifting wire by cable clamps placed at 1 m intervals.

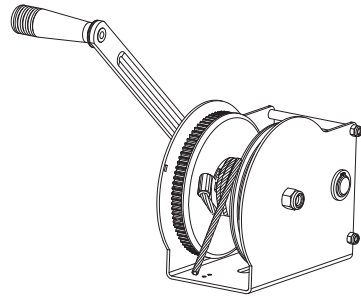


Attaching the power cable to the lifting wire

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Pos.	Description
D	Power cable
E	Snap hook
F	Wire clamp
15	Lifting wire
17	Cable clamp

19. Position the crane in the foot, and mount the lifting wire in the drum of the winch. See fig. Mounting the lifting wire in the drum.



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Mounting the lifting wire in the drum



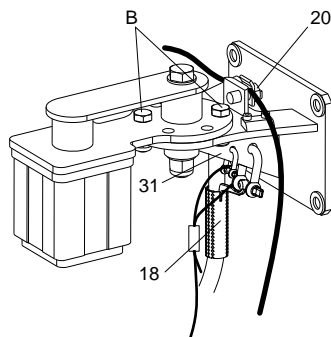
At least three turns of wire must always remain on the drum. Otherwise, the wire may break loose from the drum fixation.

Follow the separate installation and operating instructions for cranes.



<http://net.grundfos.com/qr/i/>
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20. Lift the complete flowmaker, motor bracket with motor, using the crane and slide it over the column profile.
21. Slowly lower the flowmaker into the tank and down to its position on the depth blocker.
22. Mount the cable sock (18 in fig. Top fixation bracket with lifting and safety wires and cable sock) to the top fixation bracket using the shackle, and pull the power cable through it to the desired position. See fig. Top fixation bracket with lifting and safety wires and cable sock. The power cable must be slightly tightened.



TM049929

Top fixation bracket with lifting and safety wires and cable sock

Pos.	Description
B	Bolts
18	Cable sock
20	Fixation bracket
31	Hole for fastening a safety wire



Remove the lifting wire from the crane before starting the flowmaker.

23. Remove the lifting wire from the winch and fit it to the wire clamp (20 in fig. Top fixation bracket with lifting and safety wires and cable sock) on the top fixation bracket. Coil up additional lifting wire and fasten it by a strap.
24. Use the lifting wire as a relief for the power cable. Always tighten the lifting wire. See fig. Attaching the power cable to the lifting wire.
25. Check the distance between the propeller and the wall, and the propeller and the bottom of the tank when the motor bracket is resting on the depth blocker. The flowmaker must under no circumstances touch other installations, the bottom or the wall.

DANGER **Electric shock**

Death or serious personal injury



- Before making any electrical connections, make sure to remove the fuses or switch off the main switch. Make sure that the power supply cannot be switched on unintentionally.

26. Connect the power cable to the terminals in the control cabinet.

6. Electrical connection



Electrical connections must be carried out by a qualified electrician in accordance with local regulations.

Observe all national and local regulations relating to safety and accident prevention.

Observe the safety instructions in section Explosion-proof versions.

WARNING

Sharp element

Death or serious personal injury

- Mixers and flowmakers must be installed with an external "supply disconnecting device", manufactured according to EN 60204-1 §5.3.2, that permits the mixer or flowmaker to be locked in the OFF (isolated) position. This device must be installed in a position that conforms with EN 60204-1 §5.3.4.



DANGER

Electric shock

Death or serious personal injury

- Before making any electrical connections, make sure to remove the fuses or switch off the main switch. Make sure that the power supply cannot be switched on unintentionally.



The explosion-protection classifications of the SMD mixer are II 2G Ex db h IIB T4 Gb and II 2G Ex db h ib IIB T4 Gb. The classification of the installation site must be approved by the local authorities.

For the electrical installation, the standard EN 60079-14 must be complied with.

The supply voltage and frequency are marked on the nameplate. Make sure that the mixer or flowmaker is suitable for the power supply available at the installation site.

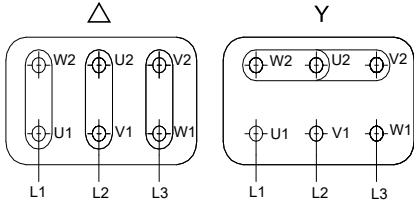
The mixer or flowmaker is supplied with a power cable. Standard cable length is 10 m, longer cables are available on request. See section Technical data.

The motor is marked either with a star (Y) or a delta (Δ). For 10- and 11-wire cables, this connection must be made in an external control panel using conductors 1 to 6 of the power cable.

Figure Schematic drawing of delta and star connection shows a schematic drawing of these star and delta connections. See also section Wiring diagrams for SMG and SFG.

If the mixer or flowmaker is connected in delta during operation, it can be started in a star-delta connection.

Three-phase motors

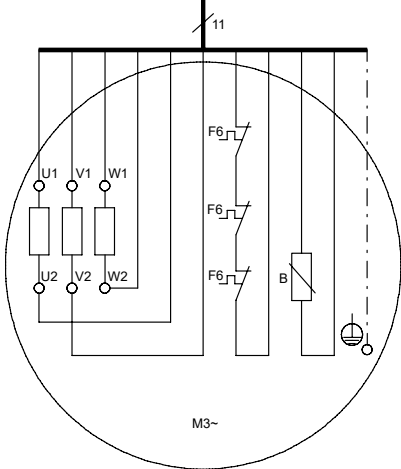
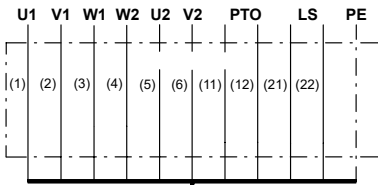


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Schematic drawing of delta and star connection

Pos.	Description
Δ	Delta
Y	Star

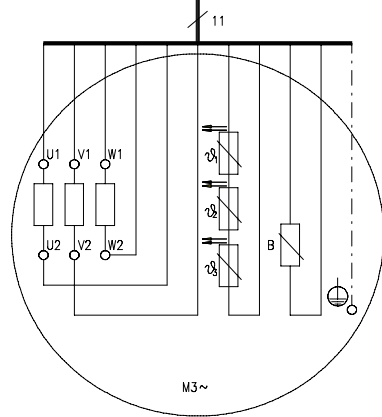
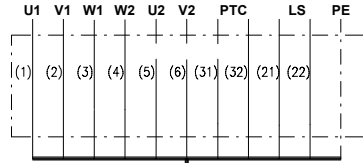
6.1 Wiring diagrams for SMG and SFG



TM024940

Three thermal switches

Terminals	Description
1, 2, 3, 4, 5, 6	Ends of the three stator windings, (U1, V1, W1, W2, U2, V2)
11, 12	Thermal switches (F6)
21, 22	Leakage sensor in gearbox (B)



TM024932

Three PTC sensors

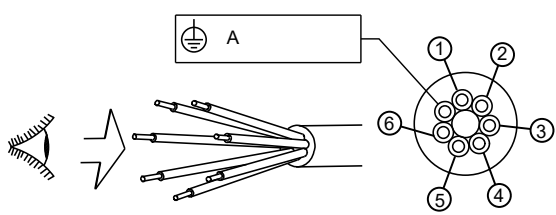
Terminals	Description
1, 2, 3, 4, 5, 6	Ends of the three stator windings, (U1, V1, W1, W2, U2, V2)
31, 32	PTC sensors according to DIN 44081 (ϑ1, ϑ2, ϑ3)
21, 22	Leakage sensor in gearbox (B)

6.2 Wiring diagrams, SMD

Marking		Switch and sensor			Maximum load	Connection
Wire 4 (7*)	Wire 6 (9*)	Thermal switch	Moisture switch (M)	Leakage sensor (LS)		Relay
11	12	PTO	No	No	2.5 A (250 V)	-
31	32	PTC	No	No	2.5 V	Thermistor
11	13	PTO	Yes	No	2.5 A (250 V)	-
31	33	PTC	Yes	No	2.5 V	Thermistor
11	23	PTO	Yes	Yes	12 V - 11 mA	ALR 20/A

* 10-wire cables.

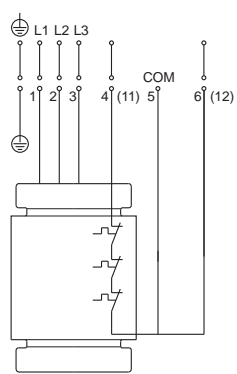
7-wire connections



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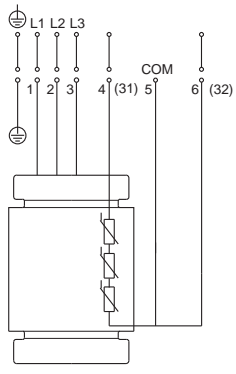
Pos.	Description
A	Yellow and green

3 x PTO (standard)



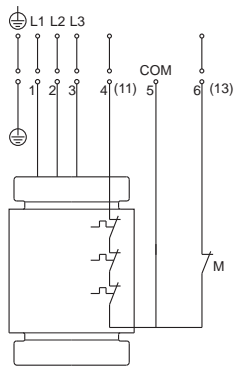
TM065362

3 x PTC



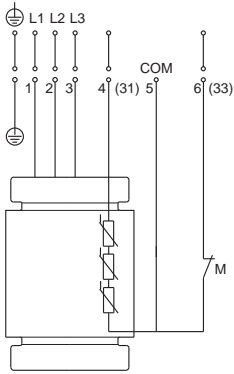
TM065363

3 x PTO + M



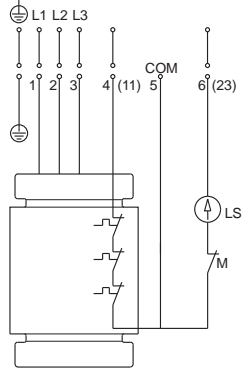
TM065364

3 x PTC + M



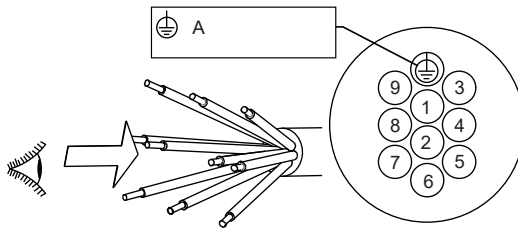
TM065365

3 x PTO + M + LS



TM065366

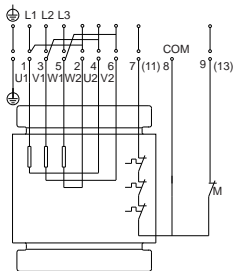
10-wire connections



TM065371

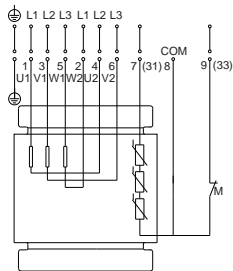
Pos.	Description
A	Yellow and green

3 x PTO (standard)



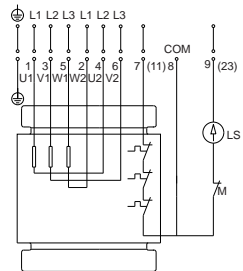
TM065368

3 x PTC



TM065369

3 x PTO + M



TM065370

6.3 Motor protection

Mixers and flowmakers are provided with the following types of motor protection:

- Standard mixers incorporate three bimetallic PTO thermal switches. See fig. Three thermal switches.
- Standard flowmakers incorporate three PTC sensors according to DIN 44081/44082. See fig. Three PTC sensors.

Function of PTO thermal switches

The motor is protected against overheating by three thermal switches connected in series, one switch in each winding.

When the maximum winding temperature is reached, the switch opens the circuit and stops the motor.

When the windings are cooled to normal temperature, the switch closes the circuit and the motor can be restarted manually.

See fig. Three thermal switches, section Wiring diagrams for SMG and SFG.

Thermal switches (F6):

- two conductors, terminals 11 and 12
- maximum operating voltage: 250 V
- maximum switching current: 2.5 A at $\cos \varphi = 1$
- cut-out temperature: 150 °C.

Function of PTC sensors

When overheated, the motor stops. Automatic restarting is not permitted. This requires a thermistor trigger unit with a reconnection suppressor in the control circuit of the motor contactor.

See wiring diagram in fig. Three PTC sensors, section Wiring diagrams for SMG and SFG.

Ø1, Ø2, Ø3: PTC sensors:

- two conductors, terminals 31 and 32
- maximum voltage at the terminals: $U_{\max.} = 2.5 \text{ V}$ (AC/DC)
- resistance between terminals 31 and 32:
 - at room temperature $R = 150$ to $750 \ \Omega$
 - at cut-out temperature (130 °C) $R \geq 4000 \ \Omega$.



The voltage at terminals 31 and 32 must not exceed 2.5 V (AC/DC). Considered this when conducting tests with an ohmmeter.



Explosion-proof SMD mixers must be protected against too high temperature by PTC or PTO (Klixon) sensors. The sensors must be connected to a certified signal converter with the safety level, SIL 1. If the relay is built in as part of a frequency converter, the converter must also fulfil SIL 1.

6.4 Gearbox or shaft seal housing protection

The gearbox or shaft seal housing is monitored for leakage by an incorporated leakage sensor.

The leakage sensor must be connected to a Grundfos ALR-20/A-Ex relay

The ALR-20/A-Ex relay must be ordered separately. Part number: 99794613 or 96489569.

If the gearbox or shaft seal housing is not monitored for leakage, inspect it every 6 months. If the oil contains water, replace the shaft seal.



<http://net.grundfos.com/qr/i/99421246>

For details on SMD cable Ex, see the *SE cable Ex Installation and operating instructions*



<http://net.grundfos.com/qr/i/99897875>

6.5 Overload relays

Adjust the relay to the rated current stated on the nameplate.



Connect the pumps to a controller with a motor protection relay with IEC trip class 10 or 15 or NEMA-equivalent.

Incorporate electro-thermal all-pole triggers in all six mains conductors (U1, V1, W1 and U2, V2, W2).

6.6 Starting method

6.6.1 SMD

Continuous operation

Direct start is possible throughout the entire power range.

Intermittent operation

For 1.9 kW and larger motors use a soft starter or a frequency converter. See section Frequency converter operation.

6.6.2 SMG

Continuous operation

Motors up to 1.6 kW can be started by direct starting.

Use star-delta starting, soft starter or frequency converter for 2 kW and larger motors. See section Frequency converter operation.

Intermittent operation

Use star-delta starting, soft starter or frequency converter throughout the entire power range.

6.6.3 SFG

Continuous operation

Start the flowmakers by star-delta starting, soft starter or frequency converter. See section Frequency converter operation.

Intermittent operation



It is mandatory to start the flowmakers by soft starter or frequency converter.

6.7 Direction of rotation

Once the electrical connections are set, check that the propeller is rotating in the correct direction. When viewed from the motor the propeller must rotate clockwise.

An arrow on the motor housing shows the correct direction of rotation.

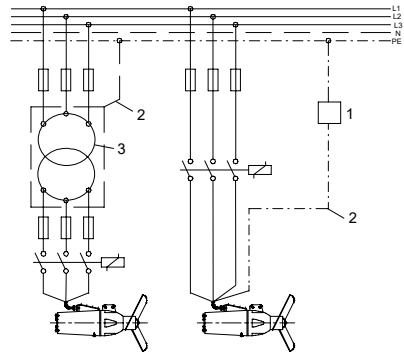
If the propeller rotates in the wrong direction, interchange two phases of the mains supply.

6.8 Protection against electro-chemical corrosion

Two different metals or alloys cause electro-chemical corrosion if they are connected by an electrolyte. This applies if more than one mixer or flowmaker are installed in the same tank. Use one of the following additional protection methods:

- galvanic separation of the earth conductor from the neutral conductor
- galvanic separation of the main supply by isolation transformer
- anode kit.

Separate the earth conductor, so direct current cannot flow through it. It must still function as a protective conductor. This can be achieved with a limiting unit, polarisation cell, anti-parallel diode or an isolation transformer.



TM024943

Protection against electro-chemical corrosion

Pos.	Description
1	Limiting unit
2	Earth conductor
3	Isolation transformer



When using an isolation transformer, do not alter the ratio between starting current and rated current.

6.9 Frequency converter operation

All mixers and flowmakers are designed for frequency converter operation for energy saving and for soft start. However, frequency converter operation often exposes the motor insulation system to a heavier load and causes the motor to be more noisy.

In this product range, only negligible amounts of bearing currents occur during frequency converter operation.

For frequency converter operation, observe the following:

- The thermal protection of the motor must be connected.
- Peak voltage and dU/dt must be in accordance with the table below. The values stated are maximum values supplied to the motor terminals. The cable influence is not taken into account. See the frequency converter data sheet regarding the actual values and the cable influence on the peak voltage and dU/dt .
- Set the frequency converter U/f ratio according to the motor data.

Product type	Maximum repetitive peak voltage [V]	Maximum dU/dt [V/ μ s]
SMD		
SMG.09-45	1500	15000
SFG.xx.130/180/230		
SMG.48-185	1000	3000
SFG.xx.150/260		

- In case the above values are too high, a dU/dt filter could prevent the voltage peaks.
- The thermal protection of the motor must be connected.
- Local regulations or standards must be complied with.
- Do not reduce the motor speed to less than 30 %.
- Do not set any slip compensation, as it may lead to an overspeed and therefore to motor overload.
- Set the frequency converter U/f ratio to a linear relation, and use the data from the motor nameplate to set the rated current, power, voltage and frequency.
- Do not exceed the frequency indicated on the nameplate as this may cause motor overload.
- Keep the power cable as short as possible. The peak voltage increases with the length of the power cable.
- Use input and output filters on the frequency converter.
- Use a screened power cable if there is a risk that electrical noise may disturb other electrical equipment.

- Ramp-up and ramp-down time must be at least 5-10 seconds.

When operating the pump by a frequency converter, consider the following:

- The locked-rotor torque can be lower depending on the frequency converter.
- The noise level may increase. See the installation and operating instructions for the selected frequency converter type.



Frequency converter use may reduce the lifespan of the bearings and the shaft seal, depending on operating mode and other circumstances.



For explosion-proof products, the PTC sensors placed in the windings must be connected to a suitable relay with the appropriate safety level (SIL 1).



If the motor is operated by a frequency converter, the temperature class of the explosion-proof SMD mixer must be T3.



For more information about frequency converter operated mixer or flowmaker speed and torque curves, visit the Grundfos Product Center at <https://product-selection.grundfos.com>.

For more information about the frequency converter operation, see the data sheet and the installation and operating instructions for the selected frequency converter.

7. Startup

7.1 Priming the product

Check the oil level in the gearbox or shaft seal housing. The oil must fill up between 50 and 75 % of the gearbox or shaft seal housing.

CAUTION

Pressurised system

Minor or moderate personal injury



- As pressure may have built up in the oil chamber, do not remove the oil level screw until the pressure is relieved.

If required, fill oil into the gearbox or shaft seal housing through the oil-filling hole (2). See figs Position of the oil drain and the oil filling screws on SMG and SFG and Position of the oil drain and the oil filling screws on SMD.

For oil quality and quantity, see section Oil quality, gearbox or shaft seal housing.

If the mixer or flowmaker is stored and not used for a long period before startup, see section Service chart.

Checks before startup:

1. Check that the propeller is rotating in the correct direction. See section Direction of rotation.
2. Make sure that the mixer or flowmaker is completely submerged in the liquid.



The mixer or flowmaker must always be submerged during operation.

3. Make sure that there are no solid objects in the tank.



Make sure that persons cannot fall into the tank.

8. Service

8.1 Maintenance

Before starting work on the mixer or flowmaker make sure that:



- the fuses are removed or the main switch is switched off
- the power supply cannot be switched on unintentionally
- all rotating parts have stopped moving.

Observe all regulations applying to mixers installed in potentially explosive environments.



Make sure that no work is carried out in potentially explosive environment.

CAUTION

Sharp element

Minor or moderate personal injury



- Wear safety gloves when handling the product.



Make sure that the mixer, flowmaker and accessories cannot roll or fall over.



All lifting equipment must be rated for the purpose and checked for damage before lifting the components. The lifting equipment rating must under no circumstances be exceeded.

8.2 Repairing the product

Before starting work on mixers or flowmakers used in contagious/toxic liquids, carry out thorough cleaning and venting according to local regulations.

8.2.1 Explosion-proof mixers

Explosion-proof mixers must be serviced and repaired by Grundfos or by an approved service partner.

Service work must be carried out according to EN 60079-19.

Spare parts

Damaged mixer parts must always be replaced by new, approved parts. Motor parts must not be reconditioned.

8.2.2 Contaminated mixer or flowmaker

WARNING

Biological hazard

Death or serious personal injury



- The product is classified as contaminated, if it is used for contagious or toxic liquid.

Before returning the product for service, contact Grundfos with details about the liquid. Otherwise, Grundfos can deny to service the product.

Any application for service must include details about the liquid.

Clean the product the best possible way before returning it. Possible costs of returning the mixer or flowmaker are paid by the customer.

8.3 Service chart



Electrical connections must be carried out by a qualified electrician in accordance with local regulations.

	Type	Service instructions	Lubrication	Inspection
Electric motor	All	Keep the motor housing clean. Otherwise, cooling may be affected. The motor housing must only be dismantled by Grundfos.	The roller bearings are maintenance-free. They must be replaced if they get noisy.	
Power cable	All			Check the power cable twice a year for surface damage. If damaged, the cable must be replaced by Grundfos.
Shaft seal housing	SMD	Replace the lip seal and wear ring if they are worn. If the oil contains water, replace the shaft seal.	If the oil contains water or is contaminated, change the oil. Change the oil at least every two years.	If the shaft seal housing is not monitored for leakage, inspect it every 6 months.
Gearbox	SMG, SFG	Replace the lip seal and wear ring if they are worn. If the oil contains water, replace the shaft seal.	If the oil contains water or is contaminated, change the oil. Change the oil at least every two years. If refilling is required, see section Oil.	If the shaft seal housing is not monitored for leakage, inspect it every 6 months.
Propeller	All			Check the propeller blades regularly for wear and tear. Remove any material wound around the blades, such as ropes and threads, which may cause uneven running and oscillation of the installation. In case of strong turbulence, a cleaning is necessary.
Winch	All	Spray the winch with a protective coating of oil at regular intervals to prevent corrosion.	Lubricate the gear teeth and the bearing bushes twice a year with an all-purpose grease.	
Lifting wire	All	Regular oiling or greasing increases the lifespan of the wire.		Check the wire regularly before using the winch. Replace the wire, if required.
Screws and bolts	All	Always check that all bolts in the motor bracket are properly tightened. Check the anchor bolts in the bottom fixation bracket or bottom fixation plate every time the tank is empty.	When tightening the screws and bolts, renew the threadlocker, if necessary.	

8.4 Oil

8.4.1 Oil quality, gearbox or shaft seal housing

The gear oil quality and designation for mixers (SMD, SMG) is according to DIN 51502, ISO VG 68. The gear oil quality and designation for flowmakers (SFG) is according to ISO VG 220.

8.4.2 Oil quantity

Type	Gearbox or shaft seal housing
	[l]
SMD.09 - 18.xx	0.13
SMD.19 - 35.xx	0.26
SMG.09 - 45.xx	1.2
SMG.48 - 130.xx	2.5
SMG.120.78.H	4.0
SMG.140 - 185.xx	4.0
SFG.xx.130.xx	1.3
SFG.xx.180.xx	3.2
SFG.xx.230.xx	3.2
SFG.xx.260.xx	4.6
SFG.xx.150.H.xx	4.6



SMD, SMG and SFG models do not have oil in the motor compartment.

8.5 Oil change

Proceed as follows:

1. Place the mixer or flowmaker in a horizontal position, and put a pan underneath to collect oil.

CAUTION Pressurised system

Minor or moderate personal injury

- As pressure may have built up in the oil chamber, do not remove the oil level screw until the pressure is fully relieved.

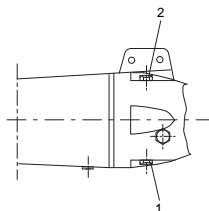


2. Remove the screw (2 in fig. Position of the oil drain and the oil filling screws on SMG and SFG).
3. Remove the oil drain screw (1), and let an oil sample drain from the chamber into a glass. Leave the oil in the glass for approximately 10 minutes, and check if it contains water. If the oil contains water, replace the shaft seal.



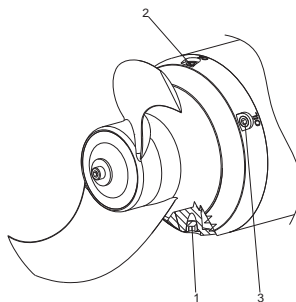
Dispose of used oil in accordance with local regulations.

4. Clean and refit the oil drain screw (1).
5. Fill oil into the oil chamber through the filling hole (2). For the oil quantity, see Oil quantity and for the quality, see Oil quality, gearbox or shaft seal housing.
6. Refit the screw (2).



Position of the oil drain and the oil filling screws on SMG and SFG

Pos.	Description
1	Oil drain screw
2	Filling hole



Position of the oil drain and the oil filling screws on SMD

TM029479

TM065327

9. Storing the product

Store mixers or flowmakers in a dry location in which the temperature is not exposed to major fluctuations.

Do not expose the flowmaker propeller blades to direct sunlight for more than a month.

If the mixer or flowmaker is stored for more than one year, change the gearbox oil. Change the oil even if the unit has never been in use. This is necessary due to natural aging of mineral oil lubricants.

After a long period of storage, inspect the mixer or flowmaker before putting it into operation. Make sure that the blades can rotate freely. Pay attention to the condition of the shaft seals, cable entry and sensors.

10. Fault finding

WARNING

Electric shock

Death or serious personal injury



- Before starting any work on mixers or flowmakers, disconnect the motor from the power supply or make sure that the fuses are removed or the main switch is switched off. Make sure that the power supply cannot be switched on unintentionally. Make sure that all rotating parts have stopped moving.



All regulations applying to mixers or flowmakers installed in potentially explosive environments must be observed.

Make sure that no work is carried out in potentially explosive environment.

Keep a service log.

Fault	Cause	Remedy
Mixer or flowmaker does not start.	No power supply, or supply failure.	<ul style="list-style-type: none"> • Re-establish the power supply. Start the mixer or flowmaker manually. • Contact an authorised service workshop.
	Power supply cable is damaged.	Contact an authorised service workshop.
	Control system is damaged.	Contact an authorised service workshop.
	Propeller cannot rotate freely.	Clean the propeller blades and make sure that the propeller can rotate freely.
	Stator windings are damaged.	Contact Grundfos.
	Motor has cut out due to overheating.	Wait until the motor is cooled, and try to restart the mixer or flowmaker.
	Different phase voltages.	Contact an authorised service workshop.
	Overload relay is set too low or is damaged.	Check the overload relay. Set the relay to the rated current.
	Leakage sensor cut out mixer or flowmaker.	Contact Grundfos.
	Humidity in the motor.	Contact Grundfos.
Mixer or flowmaker starts, but stops immediately.	Stator windings are damaged.	Contact Grundfos.
	Different phase voltages.	Contact an authorised service workshop.
	Overload relay is set too low or is damaged.	Check the overload relay. Set the relay to the rated current.
	Leakage sensor has cut out mixer or flowmaker.	Contact Grundfos.
No or inadequate circulation produced even if the motor is running.	Humidity in the motor.	Contact Grundfos.
	Propeller rotates in the wrong direction.	Interchange two phases of the main supply.
	Mixer or flowmaker runs on two phases.	<ul style="list-style-type: none"> • Check the electrical connections. • Replace damaged fuses. • Call an electrician.
Mixer or flowmaker runs unevenly and is	Internal parts are worn.	Contact Grundfos.
	Propeller blades are dirty or damaged.	Clean the blades and inspect them for any wear. In case the propeller blades are worn or damaged, contact Grundfos.
Mixer or flowmaker runs unevenly and is	Internal parts are worn.	Contact Grundfos.

Fault	Cause	Remedy
noisy.	Propeller blades are dirty or damaged.	Clean the blades and inspect them for any wear. In case the propeller blades are worn or damaged, contact Grundfos.
	Damaged motor or gearbox roller bearings.	Contact Grundfos.
	Oscillations caused by the installation (resonance).	Check the installation design.
High current and power consumption.	Wrong voltage supply or supply failure.	<ul style="list-style-type: none"> • Re-establish the correct voltage supply. • Contact an authorised service workshop.
	Power supply cable is damaged.	Contact an authorised service workshop.
	Control system is damaged.	Contact an authorised service workshop.
	Propeller cannot rotate freely.	Clean the propeller blades and make sure that the propeller can rotate freely.
	Stator windings are damaged.	Contact Grundfos.
	Mixer or flowmaker runs on two phases.	<ul style="list-style-type: none"> • Check the electrical connections. • Replace damaged fuses. • Call an electrician.
	Internal parts are worn.	Contact Grundfos.
	Damaged motor or gearbox roller bearings.	Contact Grundfos.

11. Technical data

11.1 Motor

Seal	Mechanical shaft seal
Material, motor housing	
SMG, SFG	Cast iron, grade 25 (EN-GJL-250)
SMD	Cast stainless steel 1.4408

11.2 Gearbox, SMG, SFG only

Type	Planetary gearbox
Gears	Hardened and ground steel
Seal monitoring	Leakage sensor incorporated in gearbox
Drive-end bearings	Two tapered roller bearings
Material, gear casing	Cast iron, grade 25 (EN-GJL-250)

11.5 Propeller

	SMD	SMG	SFG.xx.130	SFG.xx.150-260.xx
Number of blades	2	2	2	2 or 3
Propeller diameter	180-370 mm	400-1000 mm	1300 mm	1500, 1800, 2300, 2600 mm
Material, hub	Stainless steel	Stainless steel	Polyurethane with stainless-steel hub	Stainless steel or cast iron (EN-GJS-400-15)
Material, propeller				Polyurethane with cast-iron reinforcement

11.6 Sound pressure level

The sound pressure level of the mixer or flowmaker is lower than 70 dB(A).

11.3 Shaft seals

Sealing against leakage

Two lip seals and one mechanical shaft seal made of tungsten carbide/tungsten carbide or SiC/SiC

11.4 Operating conditions

Continuous operation

The mixers and flowmakers are designed for continuous operation.

Intermittent operation



It is mandatory to start the flowmakers by a soft starter or a frequency converter.

The mixer or flowmaker must always be submerged during operation.

12. Disposing of the product

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

See also end-of-life information at www.grundfos.com/product-recycling.



The crossed-out wheellie bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local waste disposal authorities. The separate collection and recycling of such products will help protect the environment and human health.



Make sure that the mixer, flowmaker and accessories cannot roll or fall over.



Electrical connections must be carried out by a qualified electrician in accordance with local regulations.

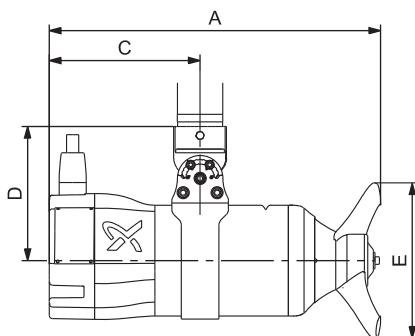


Dispose of used oil in accordance with local regulations.

Appendix A

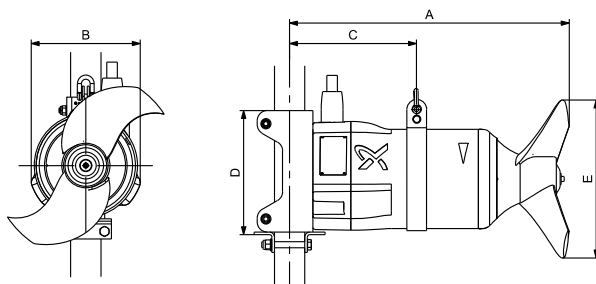
A.1. Dimensions and weights

A.1.1. SMD



TM065319

SMD - Version T



TM065320

SMD mounted on slide

50 Hz

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMD.09.21.1478.T	0.9	440	180	195	180	210	36
SMD.11.25.1470.T	1.1	440	180	195	180	250	36
SMD.14.25.1460.T	1.4	440	180	195	180	250	36
SMD.18.25.1440.T	1.8	440	180	195	180	250	36
SMD.09.21.1478	0.9	490	180	225	240	210	35

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMD.11.25.1470	1.1	490	180	225	240	250	35
SMD.14.25.1460	1.4	490	180	225	240	250	35
SMD.18.25.1440	1.8	490	180	225	240	250	35
SMD.19.32.985	1.9	550	230	240	240	320	64
SMD.23.37.980	2.3	550	230	240	240	370	64
SMD.28.37.975	2.8	550	230	240	240	370	64
SMD.35.37.967	3.5	550	230	240	240	370	65

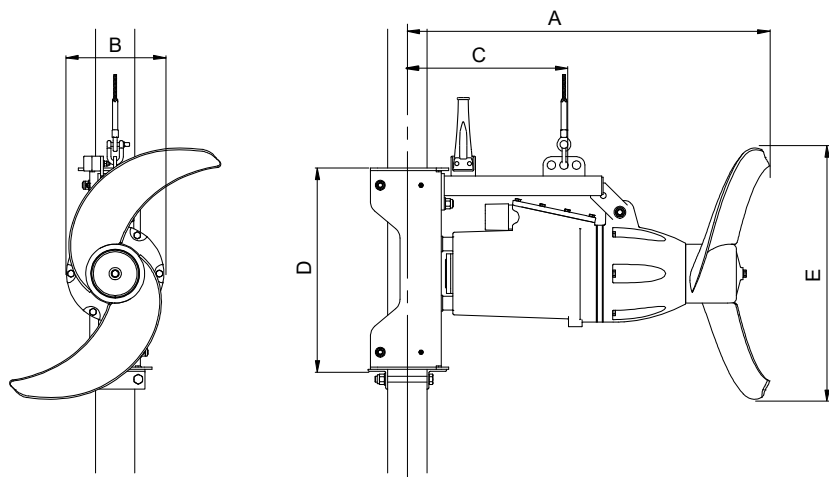
* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

60 Hz

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMD.10.18.1765.T.6.0K	1.15	440	180	195	180	180	36
SMD.13.21.1750.T.6.0K	1.5	440	180	195	180	210	36
SMD.17.25.1725.T.6.0K	2.0	440	180	195	180	250	36
SMD.10.18.1765.6.0K	1.15	490	180	225	240	180	38
SMD.13.21.1750.6.0K	1.5	490	180	225	240	210	38
SMD.17.25.1725.6.0K	2.0	490	180	225	240	250	38
SMD.22.29.1174.6.1K	2.6	550	230	240	240	290	67
SMD.26.32.1165.6.1K	3.1	550	230	240	240	320	67
SMD.32.37.1152.6.1K	3.9	550	230	240	240	370	67
SMD.10.18.1775T.6.0P	1.15	440	180	195	180	180	36
SMD.13.21.1765T.6.0P	1.5	440	180	195	180	210	36
SMD.17.25.1750T.6.0P	2.0	440	180	195	180	250	36
SMD.10.18.1775.6.0P	1.15	490	180	225	240	180	38
SMD.13.21.1765.6.0P	1.5	490	180	225	240	210	38
SMD.17.25.1750.6.0P	2.0	490	180	225	240	250	38
SMD.22.29.1182.6.1P	2.6	550	230	240	240	290	67
SMD.28.32.1178.6.1P	3.2	550	230	240	240	320	67
SMD.35.37.1170.6.1P	4.1	550	230	240	240	370	67

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

A.1.2. SMG



TM024944

50 Hz

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight [*] [kg]
SMG.09.55.277.5.0B	0.9	780	200	320	410	550	79
SMG.12.63.275.5.0B	1.2	790	200	320	410	630	79
SMG.16.63.272.5.0B	1.6	790	200	320	410	630	79
SMG.20.71.264.5.1B	2.0	800	200	320	410	710	86
SMG.25.71.263.5.1B	2.5	800	200	320	410	710	86
SMG.30.71.303.5.1B	3.0	800	200	320	410	710	86
SMG.36.71.301.5.1B	3.6	800	200	320	410	710	86
SMG.48.73.306.5.1B	4.8	1000	260	430	460	730	172
SMG.56.86.264.5.1B	5.6	1050	260	430	460	860	174
SMG.70.86.263.5.1B	7.0	1050	260	430	460	860	174
SMG.85.86.306.5.1B	8.5	1050	260	430	460	860	190
SMG.110.86.305.5.1B	11.0	1050	260	430	460	860	190
SMG.140.90.325.5.1B	14.0	1100	315	460	460	900	280
SMG.180.90.359.5.1B	18.0	1100	315	460	460	900	280

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

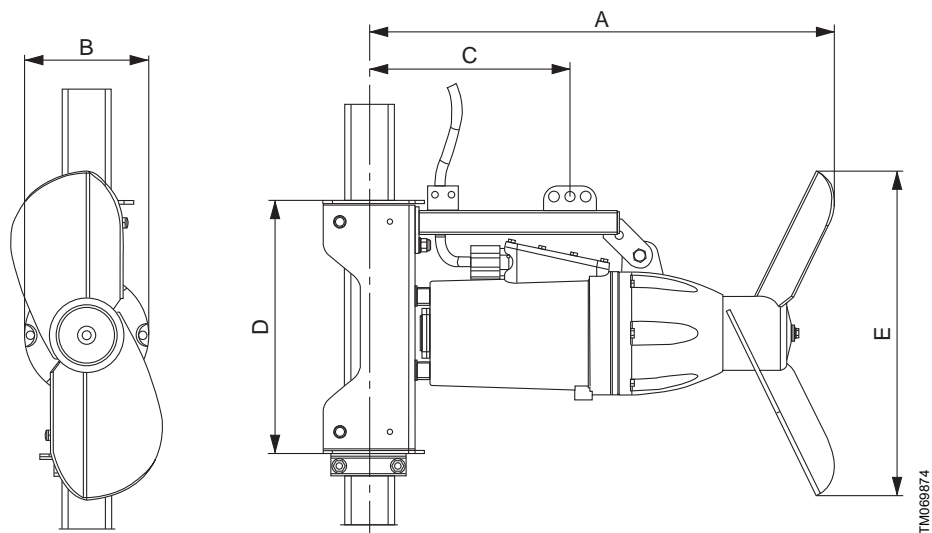
60 Hz

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMG.09.55.275.6.0K	1.1	780	200	320	410	550	79
SMG.12.63.273.6.0K	1.4	790	200	320	410	630	79
SMG.16.63.270.6.0K	1.9	790	200	320	410	630	79
SMG.20.71.262.6.1K	2.3	800	200	320	410	710	86
SMG.25.71.261.6.1K	2.9	800	200	320	410	710	86
SMG.33.71.311.6.1K	3.9	800	200	320	410	710	86
SMG.38.71.309.6.1K	4.5	800	200	320	410	710	86
SMG.56.86.263.6.1K	6.2	1050	260	430	460	860	174
SMG.70.86.262.6.1K	7.9	1050	260	430	460	860	174
SMG.95.86.316.6.1K	10.4	1050	260	430	460	860	190
SMG.120.86.315.6.1K	13.2	1050	260	430	460	860	190
SMG.160.90.344.6.1K	17.6	1100	315	460	460	900	280
SMG.09.55.276.6.0P	1.1	780	200	320	410	550	79
SMG.12.63.275.6.0P	1.4	790	200	320	410	630	79
SMG.16.63.273.6.0P	1.9	790	200	320	410	630	79
SMG.20.71.264.6.1P	2.3	800	200	320	410	710	86
SMG.25.71.263.6.1P	2.8	800	200	320	410	710	86
SMG.33.71.315.6.1P	3.7	800	200	320	410	710	86
SMG.40.71.314.6.1P	4.6	800	200	320	410	710	86
SMG.56.86.264.6.1P	6.2	1050	260	430	460	860	174
SMG.70.86.263.6.1P	7.8	1050	260	430	460	860	174
SMG.95.86.318.6.1P	10.3	1050	260	430	460	860	190
SMG.120.86.317.6.1P	13.1	1050	260	430	460	860	190
SMG.160.90.345.6.1P	17.3	1100	315	460	460	900	280

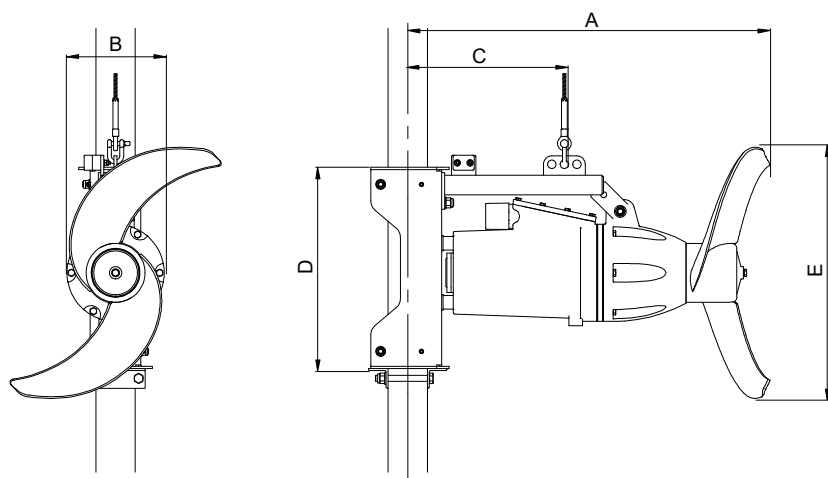
* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

A.1.3. SMG.A - Agriculture

SMG.A mixers are only available as 50 Hz variants.



H -propeller design

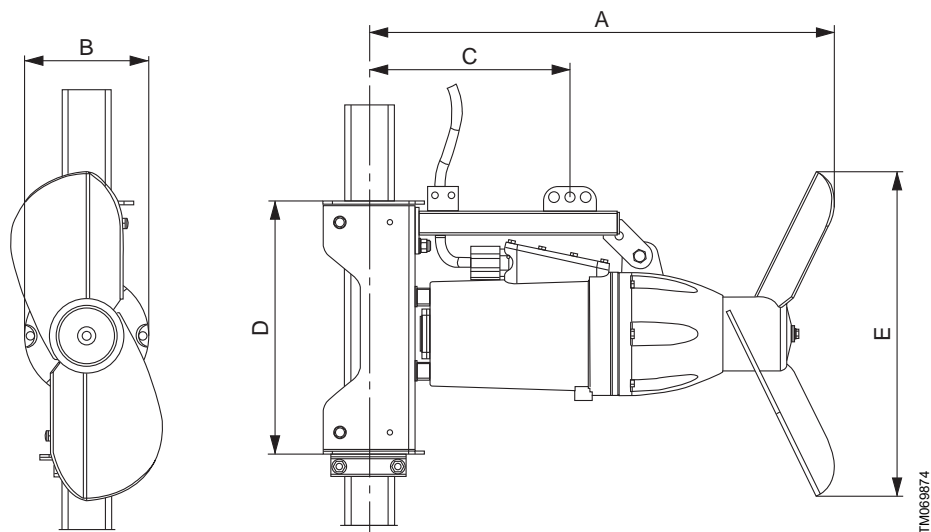


S - propeller design

Type	Rated power [kW]	Propeller design	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMG.45.71.A.338.5.1B	4.8	S	800	200	320	410	710	86
SMG.75.58.A.343.5.1B	7.5	H	990	260	430	460	580	175
SMG.80.73.A.343.5.1B	8.0	S	1000	260	430	460	730	172
SMG.110.65.A.344.5.1B	11.0	H	1010	260	430	460	650	193
SMG.130.86.A.343.5.1B	13.0	S	1050	260	430	460	860	190

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.
Maximum operating hours per year 250.

A.1.4. SMG.H - Heavy duty



50 Hz

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMG.50.65.H.265.5.1B	5.0	1050	260	430	460	650	180
SMG.80.65.H.306.5.1B	8.0	1050	260	430	460	650	196
SMG.110.65.H.344.5.1B	11.0	1050	260	430	460	650	196
SMG.150.78.H.325.5.1B	15.0	1100	315	315	460	780	288
SMG.185.78.H.358.5.1B	18.5	1100	315	315	460	780	288

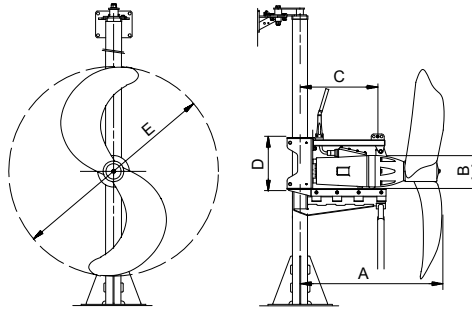
* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

60 Hz

Type	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SMG.50.65.H.263.6.1K	5.6	1050	260	430	460	650	180
SMG.50.65.H.264.6.1P	5.6	1050	260	430	460	650	180
SMG.90.65.H.317.6.1K	9.8	1050	260	430	460	650	196
SMG.90.65.H.319.6.1P	9.8	1050	260	430	460	650	196
SMG.120.78.H.297.6.1K	13.2	1100	315	460	460	780	288
SMG.120.78.H.298.6.1P	13.1	1100	315	460	460	780	288
SMG.180.78.H.345.6.1P	19.4	1100	315	460	460	780	288

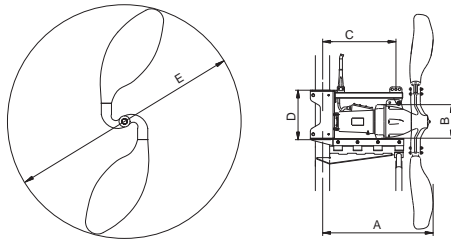
* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

A.1.5. SFG.xx.130/180/230.xx



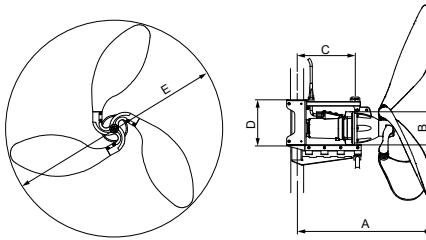
TM026346

SFG.xx.130.xx



TM043959

SFG.xx.180.xx - 2 blade and SFG.xx.230.xx - 2 blade



TM081534

SFG.xx.180.xx - 3 blade and SFG.xx.230.xx - 3 blade

50 Hz

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]		
SFG.07.130.50.5.0B	2-blade	0.7	900	200	353	400	1300	113		
SFG.10.130.57.5.0B		1.0	900	200	353	400	1300	113		
SFG.14.130.64.5.0B		1.4	900	200	353	400	1300	113		
SFG.17.130.68.5.1B		1.7	900	200	353	400	1300	118		
SFG.22.130.74.5.1B		2.2	900	200	353	400	1300	118		
SFG.27.130.80.5.1B		2.7	900	200	353	400	1300	118		
SFG.33.130.85.5.1B		3.3	900	200	353	400	1300	118		
SFG.36.130.88.5.1B		3.6	900	200	353	400	1300	118		
SFG.07.180.32.5.0B		2-blade	0.7	1200	302	570	400	1800	195	
SFG.10.180.36.5.0B			1.0	1200	302	570	400	1800	195	
SFG.14.180.41.5.0B			1.4	1200	302	570	400	1800	195	
SFG.17.180.44.5.1B			1.7	1200	302	570	400	1800	200	
SFG.22.180.48.5.1B			2.2	1200	302	570	400	1800	200	
SFG.26.180.51.5.1B			2.6	1200	302	570	400	1800	200	
SFG.32.180.51.5.1B			3-blade	3.2	1200	302	570	400	1800	223
SFG.36.180.54.5.1B				3.6	1200	302	570	400	1800	223
SFG.07.230.26.5.0B	2-blade		0.7	1200	302	570	400	2300	200	
SFG.10.230.29.5.0B			1.0	1200	302	570	400	2300	200	
SFG.12.230.31.5.0B		1.2	1200	302	570	400	2300	200		
SFG.15.230.33.5.0B		1.5	1200	302	570	400	2300	200		
SFG.17.230.35.5.1B		1.7	1200	302	570	400	2300	205		
SFG.22.230.39.5.1B		2.2	1200	302	570	400	2300	205		
SFG.26.230.40.5.1B		3-blade	2.6	1200	302	570	400	2300	230	
SFG.33.230.43.5.1B			3.3	1200	302	570	400	2300	230	
SFG.36.230.45.5.1B			3.6	1200	302	570	400	2300	230	

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

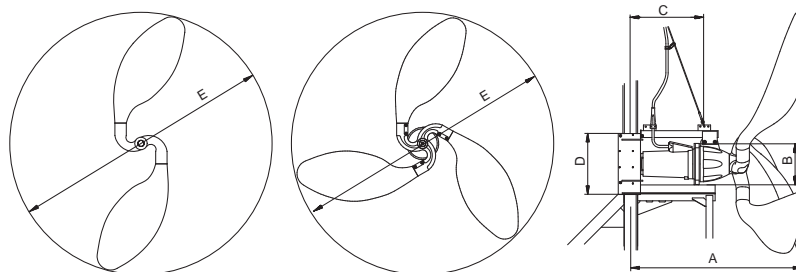
60 Hz

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.07.130.50.6.0K		0.85	900	200	353	400	1300	113
SFG.10.130.57.6.0K		1.2	900	200	353	400	1300	113
SFG.14.130.64.6.0K		1.7	900	200	353	400	1300	113
SFG.17.130.68.6.1K		1.9	900	200	353	400	1300	118
SFG.22.130.74.6.1K		2.5	900	200	353	400	1300	118
SFG.29.130.82.6.1K		3.3	900	200	353	400	1300	118
SFG.33.130.85.6.1K		3.9	900	200	353	400	1300	118
SFG.36.130.88.6.1K		4.3	900	200	353	400	1300	118
SFG.07.130.50.6.0P		0.85	900	200	353	400	1300	113
SFG.10.130.57.6.0P		1.2	900	200	353	400	1300	113
SFG.14.130.64.6.0P		1.7	900	200	353	400	1300	113
SFG.17.130.68.6.1P	2-blade	1.9	900	200	353	400	1300	118
SFG.22.130.74.6.1P		2.5	900	200	353	400	1300	118
SFG.29.130.82.6.1P		3.3	900	200	353	400	1300	118
SFG.33.130.85.6.1P		3.7	900	200	353	400	1300	118
SFG.36.130.88.6.1P		4.1	900	200	353	400	1300	118
SFG.07.180.32.6.0K		0.85	1200	302	570	400	1800	195
SFG.10.180.36.6.0K		1.2	1200	302	570	400	1800	195
SFG.14.180.41.6.0K		1.7	1200	302	570	400	1800	195
SFG.17.180.43.6.1K		1.9	1200	302	570	400	1800	200
SFG.22.180.48.6.1K		2.5	1200	302	570	400	1800	200
SFG.29.180.53.6.1K		3.3	1200	302	570	400	1800	200
SFG.35.180.53.6.1K	3-blade	4.2	1200	302	570	400	1800	223
SFG.38.180.54.6.1K		4.5	1200	302	570	400	1800	223
SFG.07.180.32.6.0P		0.85	1200	302	570	400	1800	195
SFG.10.180.36.6.0P		1.2	1200	302	570	400	1800	195
SFG.14.180.41.6.0P		1.7	1200	302	570	400	1800	195
SFG.17.180.43.6.1P	2-blade	1.9	1200	302	570	400	1800	200
SFG.22.180.48.6.1P		2.5	1200	302	570	400	1800	200
SFG.29.180.53.6.1P		3.3	1200	302	570	400	1800	200
SFG.35.180.53.6.1P		4.0	1200	302	570	400	1800	223
SFG.40.180.54.6.1P	3-blade	4.6	1200	302	570	400	1800	223

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.07.230.26.6.0K	2-blade	0.85	1200	302	570	400	2300	200
SFG.09.230.28.6.0K		1.1	1200	302	570	400	2300	200
SFG.12.230.31.6.0K		1.4	1200	302	570	400	2300	200
SFG.16.230.35.6.0K		1.9	1200	302	570	400	2300	200
SFG.19.230.37.6.1K		2.1	1200	302	570	400	2300	205
SFG.22.230.39.6.1K		2.5	1200	302	570	400	2300	205
SFG.25.230.39.6.1K	3-blade	2.9	1200	302	570	400	2300	230
SFG.32.230.42.6.1K		3.8	1200	302	570	400	2300	230
SFG.38.230.46.6.1K		4.5	1200	302	570	400	2300	230
SFG.07.230.26.6.0P	2-blade	0.85	1200	302	570	400	2300	200
SFG.09.230.28.6.0P		1.1	1200	302	570	400	2300	200
SFG.12.230.31.6.0P		1.4	1200	302	570	400	2300	200
SFG.16.230.35.6.0P		1.9	1200	302	570	400	2300	200
SFG.19.230.37.6.1P		2.2	1200	302	570	400	2300	205
SFG.22.230.39.6.1P		2.5	1200	302	570	400	2300	205
SFG.25.230.39.6.1P	3-blade	2.8	1200	302	570	400	2300	230
SFG.32.230.42.6.1P		3.6	1200	302	570	400	2300	230
SFG.40.230.46.6.1P		4.6	1200	302	570	400	2300	230

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

A.1.6. SFG.xx.260.xx



TM04-3957

SFG.xx.260.xx - 2 blades and 3 blades

50 Hz

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.22.260.30.5.1B		2.2	1500	360	650	585	2600	360
SFG.27.260.32.5.1B		2.7	1500	360	650	585	2600	360
SFG.32.260.34.5.1B		3.2	1500	360	650	585	2600	360
SFG.36.260.35.5.1B		3.6	1500	360	650	585	2600	360
SFG.44.260.39.5.1B	2-blade	4.4	1500	360	650	585	2600	360
SFG.48.260.39.5.1B		4.8	1500	360	650	585	2600	360
SFG.50.260.35.5.1B		5.0	1500	360	680	585	2660	415
SFG.60.260.38.5.1B		6.0	1500	360	680	585	2660	415
SFG.66.260.39.5.1B		6.6	1500	360	680	585	2660	415
SFG.74.260.41.5.1B	3-blade	7.4	1500	360	680	585	2660	415
SFG.80.260.42.5.1B		8.0	1500	360	680	585	2660	415

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

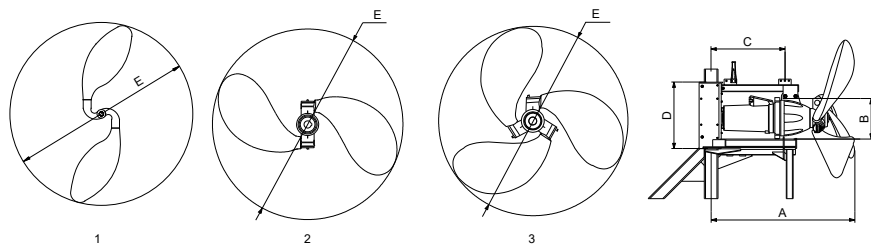
60 Hz

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.22.260.29.6.1K		2.6	1500	360	650	585	2600	360
SFG.32.260.34.6.1K	2-blade	3.7	1500	360	650	585	2600	360
SFG.36.260.35.6.1K		4.1	1500	360	650	585	2600	360
SFG.44.260.38.6.1K		5.0	1500	360	650	585	2600	360

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.50.260.35.6.1K	3-blade	5.7	1500	360	680	585	2660	415
SFG.60.260.38.6.1K		6.9	1500	360	680	585	2660	415
SFG.72.260.40.6.1K		8.3	1500	360	680	585	2660	415
SFG.80.260.42.6.1K		9.2	1500	360	680	585	2660	415
SFG.22.260.29.6.1P	2-blade	2.6	1500	360	650	585	2600	360
SFG.32.260.34.6.1P		3.7	1500	360	650	585	2600	360
SFG.36.260.35.6.1P		4.1	1500	360	650	585	2600	360
SFG.44.260.38.6.1P		5.0	1500	360	650	585	2600	360
SFG.50.260.35.6.1P	3-blade	5.7	1500	360	680	585	2660	415
SFG.60.260.38.6.1P		6.8	1500	360	680	585	2660	415
SFG.72.260.40.6.1P		8.1	1500	360	680	585	2660	415
SFG.80.260.42.6.1P		9.0	1500	360	680	585	2660	415

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

A.1.7. SFG.H - Heavy duty



TM079284

SFG.xx.260, SFG.xx.150 - 2 blades and SFG.xx.150 - 3 blades

Pos.	Description
1	SFG.xx.260
2	SFG.xx.150 - 2 blades
3	SFG.xx.150 - 3 blades

SFG.xx.150 propeller angle

There are three possible propeller angles:

- 18°
- 22°
- 26°

Thrust values vary for each angle.

50 Hz

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.110.150.H.91.5.1B	2	11.0	1300	360	650	585	1500	333
SFG.110.150.H.83.5.1B	3	11.0	1300	360	650	585	1500	358
SFG.70.260.H.44.5.1B	2	7.0	1500	360	650	585	2600	363
SFG.100.260.H.51.5.1B		10.0	1500	360	650	585	2600	378

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

60 Hz

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.110.150.H.91.6.1K	2-blade	12.1	1300	360	650	585	1500	288
SFG.110.150.H.91.6.1P		12.0	1300	360	650	585	1500	288
SFG.110.150.H.83.6.1K	3-blade	12.1	1300	360	650	585	1500	313
SFG.110.150.H.83.6.1P		12.0	1300	360	650	585	1500	313

Type	Propeller version	Rated power [kW]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Net weight* [kg]
SFG.70.260.H.44.6.1K	2-blade	7.9	1500	360	650	585	2600	318
SFG.70.260.H.44.6.1P		7.8	1500	360	650	585	2600	318
SFG.110.260.H.51.6.1K		12.1	1500	360	650	585	2600	333
SFG.110.260.H.51.6.1P		12.0	1500	360	650	585	2600	333

* With motor bracket and 10 m cable. Cable weight: 0.5 kg/m.

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