

# SMD

50/60 Hz

Service instructions



**SMD 50 Hz - QR99018520**  
Service instructions  
Other languages  
<http://net.grundfos.com/qr/i/98826058>



**SMD 60 Hz - QR99018520**  
Service instructions  
Other languages  
<http://net.grundfos.com/qr/i/98826143>



# SMD

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## English (GB)

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## Original service instructions

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## 1. Symbols used in this document



Warning

If these safety instructions are not observed, it may result in personal injury.



Warning

If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.



Warning

These instructions must be observed for explosion-proof pumps. We recommend that you also follow these instructions for standard pumps.

Caution

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

Note

Notes or instructions that make the job easier and ensure safe operation.

## 2. Safety

WARNING



Mixer installation in pits must be carried out by specially trained persons.

Work in or near pits must be carried out according to local regulations.



WARNING

Persons must not enter the installation area when the atmosphere is explosive.



WARNING

It must be possible to lock the mains switch in position 0. Type and requirements as specified in local regulations.

For safety reasons, all work in pits must be supervised by a person outside the pit.

Note

We recommend that you make all maintenance and service work when the mixer is placed outside the pit.

Pits for submerged mixers may contain sewage or wastewater with toxic and/or disease-causing substances. Therefore, all persons involved must wear appropriate personal protective equipment and clothing, and all work on and near the mixer must be carried out under strict observance of hygienic regulations in force.



WARNING

Lift the mixer by its lifting bracket or by means of a forklift truck if the mixer is on a pallet. Do not lift the mixer by the power supply cable.

## 3. Receiving the product

## 3.1 Transporting the product

Transport the mixer in horizontal position. Make sure that the mixer cannot roll or fall over.

During long periods of storage, the mixer must be protected against moisture and heat.

See the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

## 3.2 Contaminated products

See the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

## 4. Storing and handling the product

### 4.1 Handling the product

The mixer weighs between 36 and 65 kg without accessories. It is therefore very important to use the correct lifting equipment. The mixer weight is stated on the nameplate.

Note

Make sure that all lifting equipment is rated for the purpose. Check the lifting equipment for damage before any attempts to lift the components are made.

#### WARNING

Always lift the mixer by the marked lifting points or by means of a forklift truck.



Do not lift the mixer by the power supply cable. It may result in electric short circuit and risk of shock when the mixer is connected to the mains. The cable and cable entry may be damaged, leading to loss of watertightness and consequent severe damage to the motor.

### 4.2 Storing the product

See the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

## 5. Identification

You can find an example of a nameplate and the explanation of the type key in the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

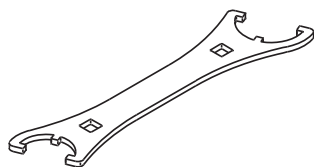
## 6. Special tools

Standard tools are not shown in the tables below, as it is expected to be a part of every service workshop.

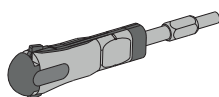
A



B



C



Pos.	Designation	Description	Part number
A	TMFT 36	Bearing fitting tool kit	97905585
B	Spanner	Spanner for cable union nut	95043464
C	Molex tool	Plug removal tool	SV2117

## 7. Torques and lubricants

Pos.	Description	Quantity	Dimensions	Torque		Lubricant
				[Nm]	[ft.lbs]	
1007	O-ring		-	-	-	Loctite MR 5923
1020	Motor flange	1	-	-	-	Oil
1021	Screw	3	M8	21.4	15.8	Loctite 243
1022	O-ring	1	-	-	-	Loctite MR 5923
1028	Screw		M6	8.8	6.5	Loctite 243
1041	Screw	1	M6	8.8	6.5	Loctite 511
			M8	21.4	15.8	
			M10	44	32.5	
			M12	74	54.6	
1082	Screw		M16	183	135	Loctite 243
			M4			
			M5	8.8	6.5	
			M6	21.4	15.8	
			M8	44	32.5	
1085	Locking nut	2	M10	74	54.6	Loctite 243
			M12	183	135	
			M16			
			M16			
1097	Wear ring	1	-	-	-	Loctite 648
1098	Shaft seal		-	-	-	Loctite MR 5923
1098a	O-ring	2	-	-	-	Loctite MR 5923
1100	O-ring		-	-	-	Loctite MR 5923
1102	Oil plug		-	By hand		PTFE tape
1111	Screw	1	M6	10	7.4	Loctite 243
1125	O-ring		-	-	-	Loctite MR 5923
1126	Screw		M10	49	36.1	Loctite 243
1140	Locking nut	1	M8	25	18.4	
1142	O-ring		-	-	-	Loctite MR 5923
1143	O-ring		-	-	-	Loctite MR 5923
1144	Screw	3	M8	25	18.4	Loctite 243
1147	Screw	3	M6	10	7.4	Loctite 243
1149	Screw	2	M6	10	7.4	Loctite 243
1174	Leakage switch		3/8"	-	-	PTFE tape

## 8. Oil types and quantity

DIN 50 Hz	Oil in gearbox/shaft seal housing ISO VG 68 [litre]
SMD.09.21.1478	
SMD.11.25.1470	
SMD.14.25.1460	0.13
SMD.18.25.1440	
SMD.19.32.985	
SMD.23.37.980	0.26
SMD.28.37.975	
SMD.35.37.967	

DIN 60 Hz	Oil in gearbox/shaft seal housing ISO VG 68 [litre]
SMD.10.18.1765	
SMD.13.21.1750	0.13
SMD.17.25.1725	
SMD.22.29.1182	
SMD.28.32.1178	0.26
SMD.35.37.1170	

ANSI 60 Hz	Oil in gearbox/shaft seal housing ISO VG 68 [fl oz]
SMD.13.7.1775	
SMD.17.8.1765	4.40
SMD.23.10.1750	
SMD.30.11.1182	
SMD.38.13.1178	8.80
SMD.47.15.1170	

## 9. Oil change

Positions numbers refer to fig. [Position of oil drain and oil filling screws](#).

### WARNING



Before starting any service work, remove the fuses or switch off the power supply. Make sure that the power supply cannot be accidentally switched on.

All rotating parts must have stopped moving.

1. Place the mixer in a horizontal position on supports with oil plug number 1 downwards, and place a pan underneath to collect oil.

### WARNING



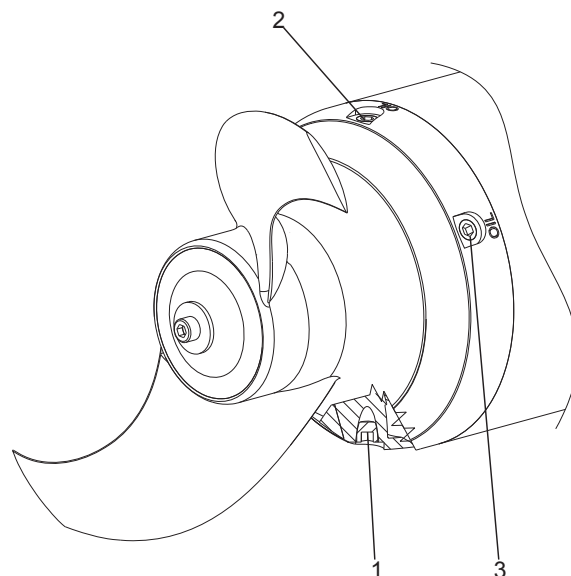
As pressure may have built up in the oil chamber, loosen the oil screw slowly. Do not remove the screw until the pressure has been fully relieved.

2. Remove the oil plug (2) to relieve the pressure.
3. Remove the oil drain plug (1), and allow the oil to drain from the chamber into a glass. Leave the oil in the glass for approximately 10 minutes, and check if the oil contains water. If the oil contains water, replace the shaft seal.

### Note

Used oil must be disposed of in accordance with local regulations.

4. Clean and fit the oil drain plug (1).
5. Remove the plug (3).
6. Fill oil into the oil chamber through the filling hole (2) until the oil level reaches the threads of hole number 3. See section [Oil types and quantity](#).
7. Fit the plugs (2, 3).



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Position of oil drain and oil filling screws

### Related information

- 8. [Oil types and quantity](#)

## 10. Service charts

See the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

## 11. Dismantling and assembly



### WARNING

Before starting any service work, remove the fuses or switch off the power supply. Make sure that the power supply cannot be accidentally switched on.

All rotating parts must have stopped moving.



### WARNING

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

Do not carry out work in potentially explosive environments.

Before starting any work on mixers used in liquids which could constitute a hazard to health, carry out thorough cleaning and venting of the mixer, pit, etc., according to local regulations.

### 11.1 Explosion-proof versions

Explosion-proof versions must be serviced and repaired by Grundfos or by a service partner appointed by Grundfos.

#### Spare parts

Replace defective parts. Motor parts must not be reconditioned by machining, retapping, welding, etc.

### 11.2 General information

Position numbers of parts (digits) refer to section [16. Exploded view](#).

#### Before dismantling

- Switch off the power supply.
- Disconnect the power supply cable in accordance with local regulations.

#### Before assembly

- Clean and check all parts.
- Replace defective parts by new parts.
- Order the necessary service kits.
- Always replace O-rings.

#### During assembly

- Lubricate and tighten screws and nuts according to section [Torques and lubricants](#).

#### Related information

[7. Torques and lubricants](#)

### 11.3 Dismantling the product

#### 11.3.1 Propeller

1. Support the mixer in such a way that the propeller can rotate freely.
2. Remove the screw (1111) and the hub cover (1109).
3. Gently tap on the back of the propeller (1103) with a plastic hammer to remove it from the shaft.
4. Remove the lip seal (1104) from the back of the propeller.

#### 11.3.2 Sealing system

Before removing the sealing system, make sure that the mixer have been drained of oil. See section [Oil change](#).

1. Remove the key (1105) from the shaft.
2. Remove the wear ring (1097) from the sealing flange (1141).
3. Remove the screws (1147).
4. Remove the wear ring (1146).
5. Remove the screw (1144) from the sealing flange (1141).
6. Remove the sealing flange (1141).
7. Remove the O-ring (1142 and 1143) from the sealing flange.
8. Remove the locking ring (1051).
9. Remove the screws (1149).

10. Remove the shaft seal (1098).

11. Remove the O-ring (1100) from the shaft.

#### Related information

[9. Oil change](#)

#### 11.3.3 Bearings and water-in-oil sensor

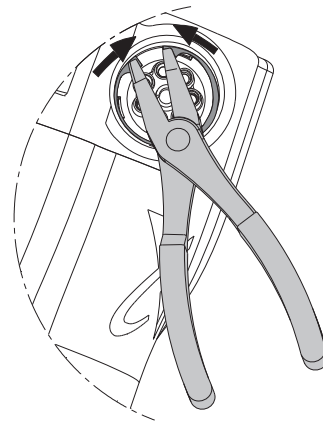
1. Fit an M6 eyebolt in the drive end of the shaft.
2. Remove the screws (1021).
3. Lift up the shaft with motor flange (1020) approximate 60 mm above the motor housing (1017).
4. Disconnect the plug of the water-in-oil sensor if fitted.
5. Lift away the shaft.
6. Remove the compensation disc (1038).
7. Place the motor flange with shaft in a vice, and replace the eyebolt used for lifting, with a screw to protect the threads of the shaft end.
8. Remove the motor flange (1020) from the shaft using a puller.
9. Remove the O-ring (1022) from the motor flange (1020).
10. Remove the locking ring (1058) from the motor flange.
11. Tap out the drive-end bearing (1047) from the motor flange (1020) using a hammer and a punch.
12. Remove the non-drive-end bearing (1039) from the shaft (1019) using a puller.

#### 11.3.4 Cable connection

1. Remove the union nut of the cable plug (181) using the spanner (B). See [Special tools](#).
2. Remove the cable plug (181).
3. Remove the screw (1041) and washer (1040).
4. Remove the screws (1126).
5. Gently tap on the end cover (1124) until it comes loose, and placed it closely to the motor housing (1017).
 

Caution

 Take care not to damage any wires.
6. Remove the locking ring (1016). See fig. [Locking ring inside cable plug](#).



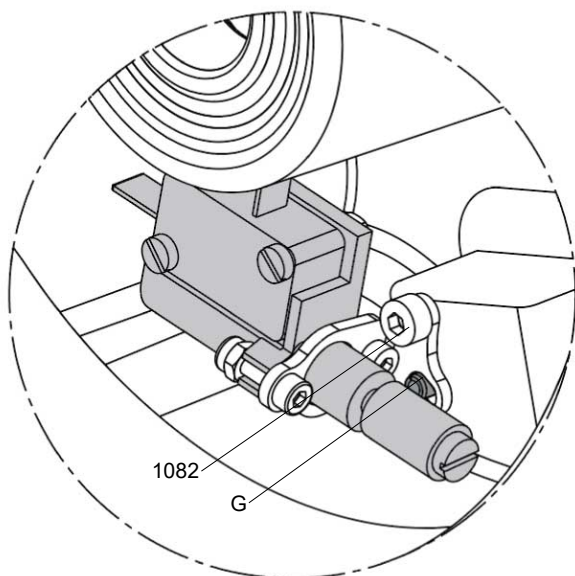
#### Locking ring inside cable plug

7. Pull out the male connector (1013).
8. Write down the numbers on the wires to ensure correct connection.
9. Disconnect the cable conductors from the male connector (1013) with the molex tool (C). See [Special tools](#)
10. Remove the O-ring (1125) from the end cover (1124).
11. Lift away the end cover (1124) from the motor housing (1017).



### 11.3.5 Moisture switch

1. Disconnect the wires of the moisture switch (1080).
2. Remove the screw (1082).
3. Remove the moisture switch (1080).



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Moisture switch, guide pin

Pos.	Description
1	1082
2	Guide pin

## 11.4 Assembling the product

### 11.4.1 End cover and moisture switch

1. Lubricate the O-ring (1125) and fit it on the end cover (1124). See section [Torques and lubricants](#).
2. Fit the moisture switch inside the end cover (1124).
 

**Caution** Fit the moisture switch bracket according to the guide pin. See fig. [Moisture switch, guide pin](#).
3. Lubricate the threads of the screw (1082) with Loctite 243.
4. Fit the screw. See section [Torques and lubricants](#).
5. Pull all wires through the end cover.
6. Connect the stator wires and the moisture switch, if any, and the leakage sensor, if any, to the male connector (1013).
7. Connect the earth conductor to the male connector (1013).
 

**Note** Connect the wires according to the notes you made during dismantling, or see section [Wiring diagrams](#).
8. Fit the male connector (1013) into the end cover.
9. Fit the locking ring (1016). See fig. [Locking ring inside cable plug](#).
10. Lubricate the threads of the screw (1041) with Loctite 243.
11. Fit the washer (1040) and the screw (1041). See section [Torques and lubricants](#).

#### Related information

[7. Torques and lubricants](#)

[11.3.4 Cable connection](#)

[11.3.5 Moisture switch](#)

### 11.4.2 Motor housing

1. Fit the end cover (1124) on the motor housing (1017).
2. Lubricate the threads of the screws (1126) with Loctite 243.

3. Fit the screws. See section [Torques and lubricants](#).
4. Fit and tighten the clamping ring (1138), if not fitted.

#### Related information

[7. Torques and lubricants](#)

### 11.4.3 Leakage sensor

1. Lubricate the threads of the sensor (1174) with Loctite 243.
2. Tighten the sensor on the motor flange (1020).

### 11.4.4 Motor flange and bearings

1. Lubricate the outer ring of the bearing (1047) with Loctite 641.
2. Place the bearing (1047) in the motor flange (1020).
3. Press the bearing home with the bearing fitting tool kit (A) by pressing on the outer ring of the bearing (1047). See [Special tools](#).
4. Insert the locking ring (1058) into the motor flange (1020).
5. Fit the motor flange (1020) on the rotor.
6. Press the motor home using the bearing fitting tool kit (A) by pressing on the inner ring of the bearing (1047). See [Special tools](#).
7. Fit the bearing (1039) in the non-drive end of the rotor using the bearing fitting tool kit (A). See [Special tools](#).
8. Lubricate the O-ring (1022) with Loctite MR 5923 and fit the O-ring.
9. Place the motor housing in vertical position and fit the compensation disc (1038).
10. Fit an M6 eyebolt in the drive end of the shaft.
11. Lower the rotor (1019) with motor flange (1020) towards the motor housing (1017) leaving a small gap.
12. Connect the cable plug to the leak sensor (1174), if fitted.
13. Lower the rotor (1019) with motor flange (1020) into place.
14. Lubricate the threads of the screws (1021) with Loctite 243.
15. Fit the screws. See section [Torques and lubricants](#).
16. Lubricate the O-ring (1143) with Loctite MR 5923 and fit the O-ring.

#### Related information

[7. Torques and lubricants](#)

### 11.4.5 Shaft seal

1. Lubricate the O-rings (1100 and 2 x 1098a) with Loctite MR 5923 and fit the O-rings on the shaft seal.
 

**Caution** Take care not to damage the seal face. Make sure that the surface of the shaft is clean.
2. Push the shaft seal (1098) home on the shaft.
3. Lubricate the threads of the screws (1149) with Loctite 243.
4. Fit the screws. See section [Torques and lubricants](#).
5. Fit the locking ring (1051) on the shaft.

#### Related information

[7. Torques and lubricants](#)

### 11.4.6 Sealing flange

1. Place the wear ring (1097) on the sealing flange (1141) and knock it home using the bearing fitting tool kit (A). See [Special tools](#).
2. Lubricate the O-ring (1142) with Loctite MR 5923 and fit the O-ring on the sealing flange (1141).
3. Fit the sealing flange (1141).
4. Fit the propeller wear ring (1146).
5. Lubricate the threads of the screws (1147) with Loctite 243.

6. Fit the screws. See section [Torques and lubricants](#).
7. Lubricate the lip seal (1104) with Loctite MR 5923 and knock it home on the propeller (1103) using the bearing fitting tool kit (A).
8. Fit the key (1105) and the propeller (1103) onto the shaft.
9. Fit the hub cover (1109).
10. Lubricate the threads of the screw (1111) with Loctite 243.
11. Fit the screw. See section [Torques and lubricants](#).
12. Add gear oil through the hole for plug (1102). See section [Oil change](#).

**Related information**

[7. Torques and lubricants](#)

[9. Oil change](#)

**11.4.7 Cable connection**

1. Fit the O-ring (198) on the cable plug (181).
2. Fit the cable plug (181) into the end cover (1124).
3. Fit the union nut of the cable plug (181) and tighten it firmly, using the spanner (B). See [Special tools](#).

## 12. Testing the AL05 Ex leakage sensor

### WARNING



If the sensor has been or is to be incorporated in an explosion-proof product, you must not carry out the tests described below. The intrinsically safe sensor (EN 60079-11) loses the explosions-proof aspect if it is connected to non-intrinsically safe devices.

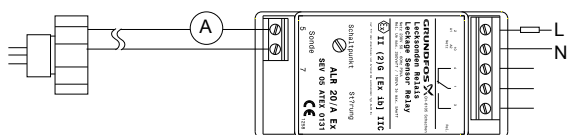
The AL05 Ex leakage sensor is integrated in a submerged agitator and connected to the ALR 20/A Ex leakage sensor relay via two wires. The relay supplies the sensor with power and receives a current signal from the sensor. The signal depends on the amount of water in the gear oil.

The current signal decreases as the amount of water in the oil increases and is compared to a manually adjustable switching point. If the switching point is exceeded, the relay switches to fault mode.

In case of a short circuit or a cable breakage the relay also automatically switches to fault mode.

### Leakage sensor with relay

In order to test the sensor and the relay, measure the current flowing through the sensor and compare it to the values in the table below.



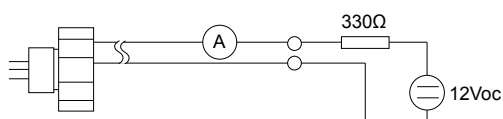
TM064366

Current measured [mA]	Cause	Status of relay
< 0.5	No current	Cable breakage
0.5 - 5	Low current	Fault
5-11	Normal value	Depends on the switching point of the relay.
> 11	Too high current	The power supply cable is short-circuited.

### Leakage sensor without relay

If no relay is available or the sensor is to be tested separately, you can replace the relay by a direct-current supply of 12 V. In this case a 330  $\Omega$  resistor must be added to the circuit.

Now, the measured current is comparable to the table above.



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## 13. Starting up the product

See the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

## 14. Fault finding the product

See the installation and operating instructions for SMD, SMG, SFG mixers and flowmakers. Use the QR code and link on the front page of this document.

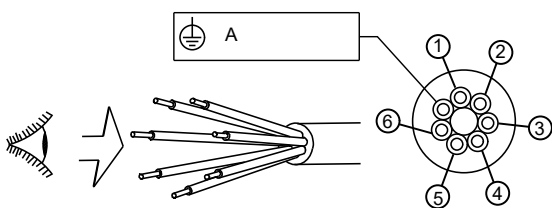
## 15. Wiring diagrams

### 15.1 SMD

Marking		Switch/sensor			Maximum load	Connection
Wire 4 / (7*)	Wire 6 / (9*)	Thermal switch	Moisture switch (M)	Leak 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	ALR20/A

\* 10-wire cables.

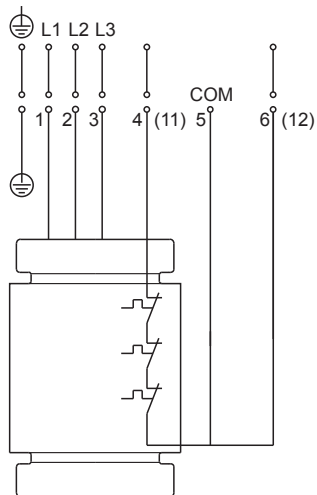
#### 7-wire cable



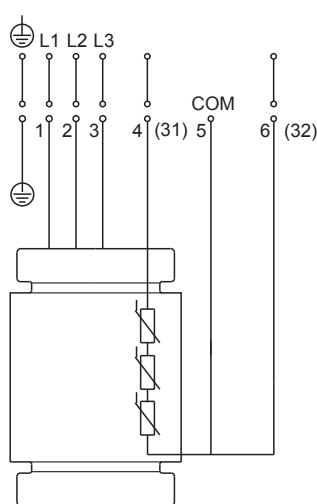
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Pos.	Description
A	Yellow and green

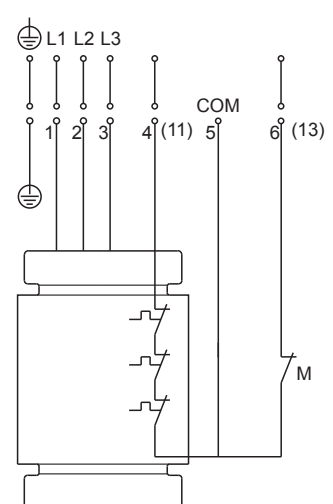
#### Wiring diagrams for 7-wire cable



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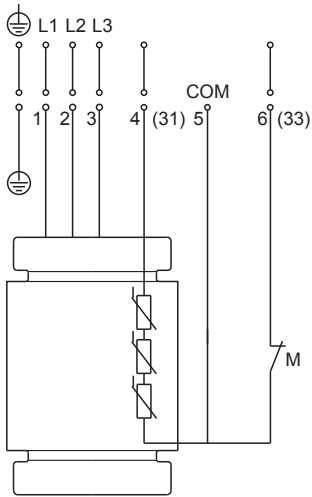


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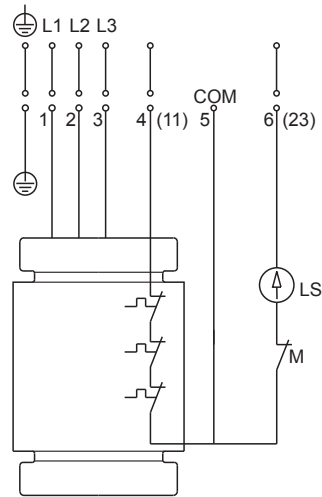
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3 x PTO



3 x PTC + M

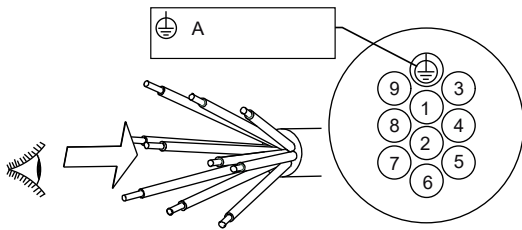
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3 x PTO + M + LS

TM065366

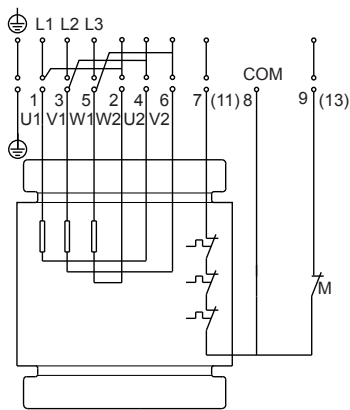
10-wire cable



TM065371

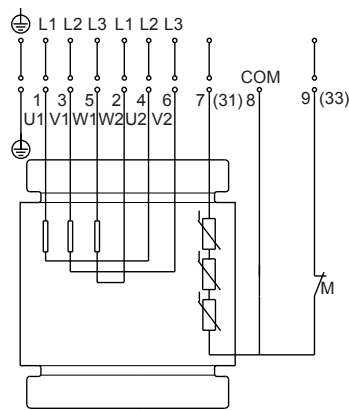
Pos.	Description
A	Yellow and green

Wiring diagrams for 10-wire cable



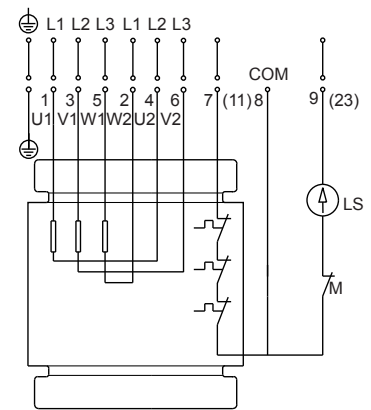
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3 x PTO + M



TM065369

3 x PTC + M

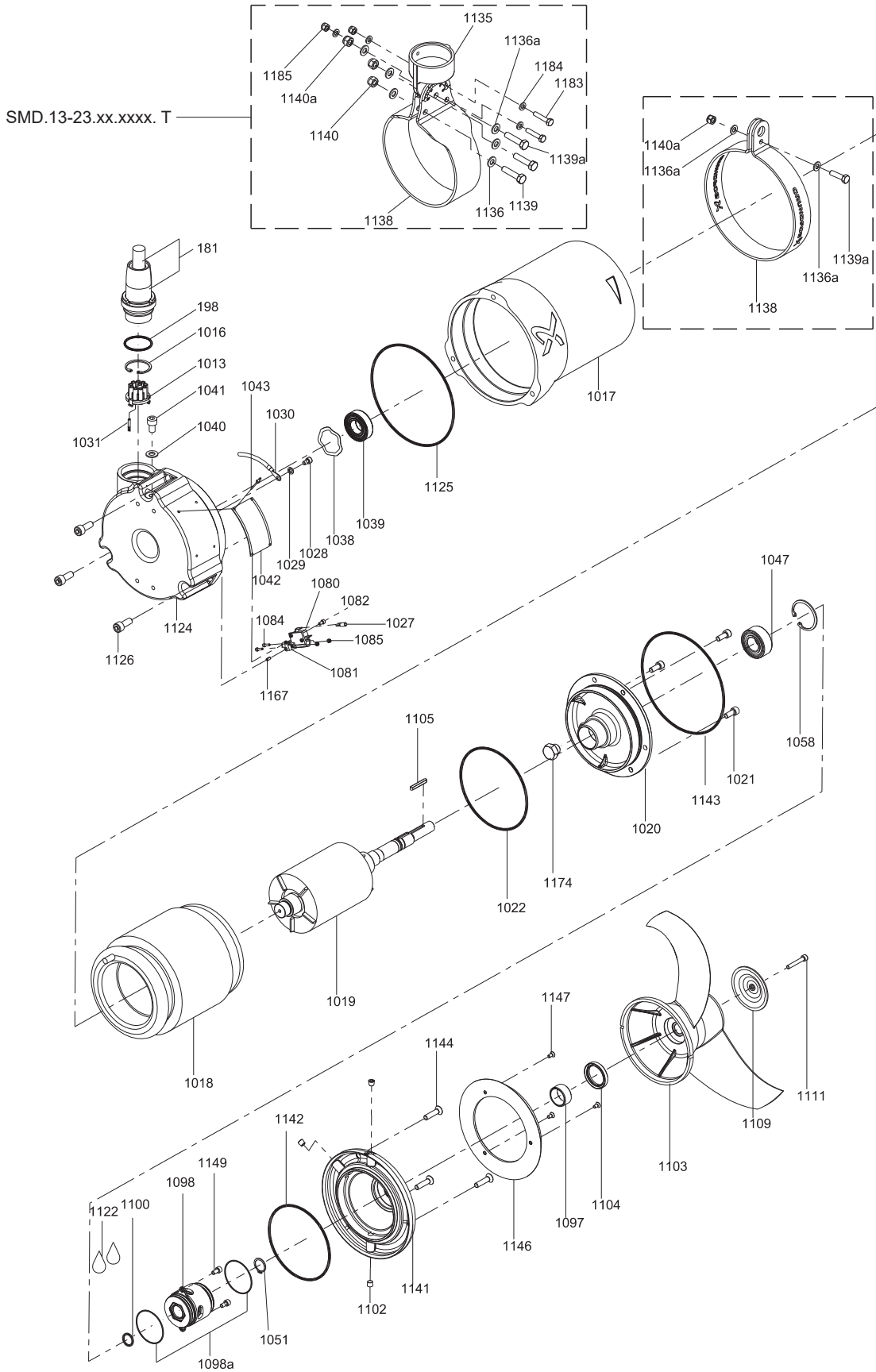


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3 x PTO + M + LS

## 16. Exploded view

### 16.1 SMD



## 17. Document quality feedback

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