

Submersible Motor

DN 100

50 Hz, 60 Hz

Type Series Booklet



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Type Series Booklet DN 100

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Contents

Drives	4
Submersible Motor.....	4
DN 100.....	4
Main applications.....	4
Operating data.....	4
Designation.....	4
Design details.....	4
Materials.....	5
Starting method.....	5
Product benefits.....	5
Certifications.....	5
Technical data.....	6
Selection tables.....	6
1~ motor, DN 100 with run capacitor.....	6
1~ motor, DN 100, incl. motor lead and starting device.....	6
1~ motor, DN 100, without motor lead.....	6
1~ starting device.....	6
3~ motor, DN 100.....	7
3~ motor, DN 100, incl. motor lead.....	7
3~ motor, DN 100, without motor lead.....	8
Power cable, accessories.....	8
Dimensions.....	10
Dimensions.....	10
Mating dimensions.....	11
Technical data of the control unit.....	12
1~ starting device.....	12
General drawings with list of components.....	13
DN 100, up to 3 kW.....	13
DN 100 from 3 kW.....	15

Drives

Submersible Motor

DN 100



Main applications

- Driving submersible borehole pumps

Used for:

- General irrigation systems
- Spray irrigation systems
- Water extraction / water withdrawal

Operating data

Table 1: Operating properties

Characteristic		Value		
Frequency	f_N [Hz]	50		60
Type of current		1 ~	3 ~	3 ~
Power	P_N [kW]	0,37 - 2,2	0,37 - 7,5	0,56 - 8,4
Fluid temperature	T [°C]	≤ 30		
Voltage	U [V]	220, 230	220, 230, 380, 400, 415, 500	230, 380, 460
Number of poles		2		
Speed	n [rpm]	≈ 2850		≈ 3450

Designation

Example: DN 100 - 0.37

Table 2: Designation key

Code	Description
DN 100	Type series, size
0,37	Maximum rated power

Design details

- Design and function as per DIN EN 60034-1

Design

- Single-phase asynchronous motor for operation with a run capacitor (PSC motor) / three-phase asynchronous motor
- Stator with hermetically sealed winding
- Rubber expansion diaphragm for pressure equalisation
- Water-tight plug-type connection between power cable and motor
- Motor fill: drinking water / antifreeze mixture
- Thermal class B
- Shaft seal
 - Material variant E: shaft seal ring
 - Material variant C: mechanical seal

Installation types

- Vertical installation
- Horizontal installation¹⁾
- Angled installation²⁾

Bearings

- Radial bearings and thrust bearings lubricated by the motor fill
- Thrust bearing with self-adjusting tilting pads for absorbing the axial thrust

Connections

- To NEMA

¹ With cooling hood

² On request

Materials

1~ motor, DN 100, 0.37 kW - 2.2 kW, 50 Hz
 3~ motor, DN 100, 0.37 kW - 3.0 kW, 50 Hz
 3~ motor, DN 100, 0.56 kW - 3.4 kW, 60 Hz

Table 3: Materials

Part No.	Description	Material variant	
		E	C
		1~ / 3~	3~
160.51	Cover (diaphragm)	1.4301	1.4571
160.52	Cover (adapter)	1.4301	1.4401
270	Deflector	BUNA N	
412.51/.52	O-ring	BUNA N	
421	Shaft seal ring	BUNA N	-
433	Mechanical seal	-	SiC / SiC
59-12	Membrane	BUNA N	
81-59	Stator	1.4571	
818	Rotor (shaft or shaft end)	1.4305	1.4462
900.51/.52	Bolt/screw	A2	A4
902	Grub screw	1.4305	1.4401
920	Nut	1.4305	1.4401
-	Motor connector (flat) incl. motor lead	1.4301 + neoprene	1.4401 + neoprene

3~ motor, DN 100, 3.7 kW - 7.5 kW, 50 Hz
 3~ motor, DN 100, 4.2 kW - 8.5 kW, 60 Hz

Table 4: Materials

Part No.	Description	Material variant	
		E	C
		1~ / 3~	3~
145	Adapter	-	1.4404
160.51	Cover (diaphragm)	1.4301	1.4404
160.52	Cover (adapter)	1.4301	-
270	Deflector	BUNA N	
271	Sand guard	-	BUNA N
354	Thrust bearing housing (sheet metal on the outside)	1.4301	1.4404
412.51/.52	O-ring	BUNA N / NBR 70	
421	Shaft seal ring	BUNA N	-
433	Mechanical seal	-	SiC / SiC
59-12	Membrane	NBR 60	
550.52	Disc	Delrin 500	-
81-59	Stator	1.4301	1.4571
818	Rotor (shaft or shaft end)	1.4548	
900.51/.52	Bolt/screw	A2	A4
902	Grub screw	1.4305	1.4401
920	Nut	1.4305	1.4401
950	Spring	1.4310	
-	Motor connector (flat) incl. motor lead	1.4301 + neoprene	1.4401 + neoprene

Starting method

- DOL starting

Product benefits

- High efficiency reduces operating costs.
- Reliable pressure equalisation system for largest possible immersion depths
- Long service life ensured by proven shaft seal system

Certifications
Table 5: Overview

Label	Effective in:	Comment
	All countries	Certified quality management to ISO 9001
	France	Approved in accordance with the French drinking water regulation

Technical data
Selection tables
1~ motor, DN 100 with run capacitor
Table 6: 230 V, 50 Hz, $n \approx 2850$ rpm, $v_{\min} = 0.08$ m/s, $T_{\text{amb}} \leq 30$ °C, with run capacitor

Size	P		n	η			$\cos \varphi$			I_N	Power cable	I_A/I_N	M_A/M_N	Run capacitor ³⁾
	[kW]	[hp]		[rpm]	4/4	3/4	2/4	4/4	3/4		2/4			
				[%]	[%]	[%]	[-]	[-]	[-]	[A]	[mm ²]	[-]	[-]	[μ F]
0,37	0,37	0,50	2860	35	46	54	0,78	0,85	0,91	3,3	F4 x 1,5	3,8	0,9	16
0,55	0,55	0,75	2850	45	57	63	0,86	0,91	0,94	4,3	F4 x 1,5	4,2	0,9	20
0,75	0,75	1,00	2845	41	52	59	0,92	0,96	0,98	5,7	F4 x 1,5	4,0	1,0	35
1,1	1,10	1,50	2845	43	56	63	0,77	0,86	0,92	8,4	F4 x 1,5	4,0	0,8	40
1,5	1,50	2,00	2830	48	59	66	0,82	0,90	0,95	10,7	F4 x 1,5	3,9	0,8	50
2,2	2,20	3,00	2840	51	62	68	0,86	0,93	0,97	14,7	F4 x 1,5	4,2	0,7	70

1~ motor, DN 100, incl. motor lead and starting device
Table 7: 230 V, 50 Hz (also 220 V, 50 Hz)

Size	Description	Material variant	Motor assembly ⁴⁾	Power cable
			Mat. No.	
0,37	DN100 0,37-230-50-1	E	39020382	F4 x 1,5 x 1,5 m
0,55	DN100 0,55-230-50-1	E	39020383	F4 x 1,5 x 1,5 m
0,75	DN100 0,75-230-50-1	E	39020384	F4 x 1,5 x 1,5 m
1,1	DN100 1,1-230-50-1	E	39020385	F4 x 1,5 x 1,5 m
1,5	DN100 1,5-230-50-1	E	39020386	F4 x 1,5 x 1,5 m
2,2	DN100 2,2-230-50-1	E	39020387	F4 x 1,5 x 2,5 m

1~ motor, DN 100, without motor lead
Table 8: 230 V, 50 Hz (also 220 V, 50 Hz)

Size	Description	Material variant	Motor
			Mat. No.
0,37	DN 100 0,37-230-50-1	E	05095520
0,55	DN 100 0,55-230-50-1	E	05095521
0,75	DN 100 0,75-230-50-1	E	05095522
1,1	DN 100 1,1-230-50-1	E	05095523
1,5	DN 100 1,5-230-50-1	E	05095524
2,2	DN 100 2,2-230-50-1	E	05095525

1~ starting device
Table 9: 230 V, 50 Hz (also 220 V, 50 Hz)

Size	Run capacitor ⁵⁾	Starting device
	[μ F]	Mat. No.
0,37	16	05061525
0,55	20	05061526
0,75	35	05061527
1,1	40	05061553
1,5	50	05061572
2,2	70	05061573

 Technical data (\Rightarrow Page 12)

³ $V_c = 450$ V

⁴ Incl. motor, motor lead, starting device

⁵ $V_c = 450$ V

3~ motor, DN 100
Table 10: 400 V, 50 Hz, $n \approx 2850$ rpm, $v_{\min} = 0.08$ m/s, $T_{\text{amb}} \leq 30$ °C

Size	P		n	η			$\cos \varphi$			I_N	Power cable DOL	I_A/I_N	M_A/M_N
	[kW]	[hp]		[rpm]	4/4	3/4	2/4	4/4	3/4				
	[%]	[%]	[%]	[-]	[-]	[-]	[A]	[mm ²]	[-]	[-]			
0,37	0,37	0,50	2870	66	63	54	0,74	0,66	0,55	1,1	F4 × 1,5	4,9	2,4
0,55	0,55	0,75	2870	68	63	55	0,74	0,65	0,53	1,6	F4 × 1,5	4,6	2,3
0,75	0,75	1,00	2865	70	68	61	0,77	0,68	0,55	2,0	F4 × 1,5	5,2	2,7
1,1	1,10	1,50	2850	74	72	66	0,78	0,69	0,57	2,8	F4 × 1,5	5,7	3,1
1,5	1,50	2,00	2855	73	71	65	0,78	0,68	0,55	3,9	F4 × 1,5	5,3	2,8
2,2	2,20	3,00	2845	75	74	69	0,77	0,66	0,52	5,5	F4 × 1,5	5,4	3,0
3	3,00	4,00	2845	76	76	70	0,77	0,67	0,53	7,5	F4 × 1,5	5,6	3,2
3,7	3,70	5,00	2840	78	77	73	0,78	0,69	0,54	9,0	F4 × 1,5	5,8	3,3
4	4,00	5,45	2840	78	77	72	0,77	0,67	0,52	9,9	F4 × 1,5	5,7	3,3
5,5	5,50	7,50	2865	79	79	75	0,81	0,73	0,59	12,6	F4 × 1,5	6,1	3,1
7,5	7,50	10,20	2855	79	79	75	0,81	0,72	0,58	17,1	F4 × 1,5	5,8	2,9

Table 11: 460 V, 60 Hz, $n \approx 3450$ rpm, $v_{\min} = 0.08$ m/s, $T_{\text{amb}} \leq 30$ °C

Size	P		n	η			$\cos \varphi$			I_N	Power cable DOL	I_A/I_N	M_A/M_N
	[kW]	[hp]		[rpm]	4/4	3/4	2/4	4/4	3/4				
	[%]	[%]	[%]	[-]	[-]	[-]	[A]	[mm ²]	[-]	[-]			
0,59	0,59	0,80	3455	73	71	65	0,77	0,68	0,56	1,4	F4 × 1,5	5,0	2,5
0,83	0,83	1,12	3445	66	65	60	0,79	0,71	0,59	1,9	F4 × 1,5	5,2	2,4
1	1,00	1,40	3410	70	67	61	0,82	0,75	0,64	2,3	F4 × 1,5	4,9	2,3
1,4	1,40	1,95	3415	74	72	66	0,82	0,75	0,64	3,0	F4 × 1,5	5,4	2,6
1,8	1,80	2,50	3430	75	73	67	0,80	0,72	0,60	3,9	F4 × 1,5	5,2	2,3
2,5	2,50	3,45	3425	76	74	69	0,78	0,70	0,57	5,4	F4 × 1,5	5,3	2,6
3,4	3,40	4,60	3425	77	76	71	0,79	0,70	0,57	7,2	F4 × 1,5	5,5	2,5
4,2	4,20	5,60	3425	79	78	74	0,80	0,72	0,59	8,6	F4 × 1,5	6,0	2,8
4,7	4,70	6,20	3420	79	78	73	0,79	0,71	0,58	9,7	F4 × 1,5	5,9	2,9
6,4	6,40	8,50	3440	81	80	76	0,83	0,75	0,64	12,4	F4 × 1,5	5,7	2,4
8,6	8,60	11,40	3435	80	79	75	0,83	0,75	0,63	16,8	F4 × 1,5	5,9	2,6

3~ motor, DN 100, incl. motor lead
Table 12: 400 V, 50 Hz (also 380 V, 50 Hz; 415 V, 50 Hz and 460 V, 60 Hz)

Size	Description	Material variant	Motor assembly ⁶⁾	Power cable
			Mat. No.	
0,37	DN100 0,37-400-50-3	E	90051513	F4 × 1,5 × 1,5 m
0,55	DN100 0,55-400-50-3	E	90051514	F4 × 1,5 × 1,5 m
0,75	DN100 0,75-400-50-3	E	90051515	F4 × 1,5 × 1,5 m
1,1	DN100 1,1-400-50-3	E	90051516	F4 × 1,5 × 1,5 m
1,5	DN100 1,5-400-50-3	E	90051517	F4 × 1,5 × 1,5 m
2,2	DN100 2,2-400-50-3	E	90011139	F4 × 1,5 × 2,5 m
3	DN100 3,0-400-50-3	E	90050058	F4 × 1,5 × 2,5 m
3,7	DN100 3,7-400-50-3	E	90011140	F4 × 1,5 × 2,5 m
4	DN100 4,0-400-50-3	E	39300028	F4 × 1,5 × 2,5 m
5,5	DN100 5,5-400-50-3	E	90041906	F4 × 1,5 × 2,5 m
7,5	DN100 7,5-400-50-3	E	39300029	F4 × 1,5 × 2,5 m
0,37	DN100 0,37-400-50-3	C	01807606	F4 × 1,5 × 2,5 m
0,55	DN100 0,55-400-50-3	C	01807608	F4 × 1,5 × 2,5 m
0,75	DN100 0,75-400-50-3	C	01132567	F4 × 1,5 × 2,5 m
1,1	DN100 1,1-400-50-3	C	90051521	F4 × 1,5 × 2,5 m
1,5	DN100 1,5-400-50-3	C	90051522	F4 × 1,5 × 2,5 m

⁶⁾ Incl. motor, motor lead, starting device

Size	Description	Material variant	Motor assembly ⁶⁾	Power cable
			Mat. No.	
2,2	DN100 2,2-400-50-3	C	90039244	F4 × 1,5 × 2,5 m
3	DN100 3,0-400-50-3	C	90051395	F4 × 1,5 × 2,5 m
3,7	DN100 3,7-400-50-3	C	90039245	F4 × 1,5 × 2,5 m
4	DN100 4,0-400-50-3	C	01132934	F4 × 1,5 × 2,5 m
5,5	DN100 5,5-400-50-3	C	90044604	F4 × 1,5 × 2,5 m
7,5	DN100 7,5-400-50-3	C	01132935	F4 × 1,5 × 2,5 m

3~ motor, DN 100, without motor lead
Table 13: 400 V, 50 Hz (also 380 V, 50 Hz; 415 V, 50 Hz and 460 V, 60 Hz)

Size	Description	Material variant	Motor
			Mat. No.
0,37	DN 100 0,37-400-50-3	E	05095526
0,55	DN 100 0,55-400-50-3	E	05095527
0,75	DN 100 0,75-400-50-3	E	05095528
1,1	DN 100 1,1-400-50-3	E	05095529
1,5	DN 100 1,5-400-50-3	E	05095530
2,2	DN 100 2,2-400-50-3	E	05095531
3	DN 100 3,0-400-50-3	E	05095532
3,7	DN 100 3,7-400-50-3	E	01191784
4	DN 100 4,0-400-50-3	E	01191785
5,5	DN 100 5,5-400-50-3	E	01191786
7,5	DN 100 7,5-400-50-3	E	01191787
0,37	DN 100 0,37-400-50-3	C	05095533
0,55	DN 100 0,55-400-50-3	C	05095534
0,75	DN 100 0,75-400-50-3	C	05095535
1,1	DN 100 1,1-400-50-3	C	05095536
1,5	DN 100 1,5-400-50-3	C	05095537
2,2	DN 100 2,2-400-50-3	C	05095538
3	DN 100 3,0-400-50-3	C	05095539
3,7	DN 100 3,7-400-50-3	C	01191793
4	DN 100 4,0-400-50-3	C	01191794
5,5	DN 100 5,5-400-50-3	C	01191795
7,5	DN 100 7,5-400-50-3	C	01191796

Power cable, accessories
Table 14: Selection table

Description ⁷⁾	Mat. No.	Connector design	Material variant	Length
				[m]
F4 × 1,5	1045631	Round	E	1,5
F4 × 1,5	1045632	Round	E	2,5
F4 × 1,5	1431841	Round	E	5,0
F4 × 1,5	1435407	Round	E	10
F4 × 1,5	1435408	Round	E	15
F4 × 1,5	1435409	Round	E	20
F4 × 1,5	1435410	Round	E	25
F4 × 1,5	1435411	Round	E	30
F4 × 1,5	1435412	Round	E	35
F4 × 1,5	1435413	Round	E	40
F4 × 1,5	1025741	Round	C	2,5

⁷⁾ 4-core flat cable × cross-section × length

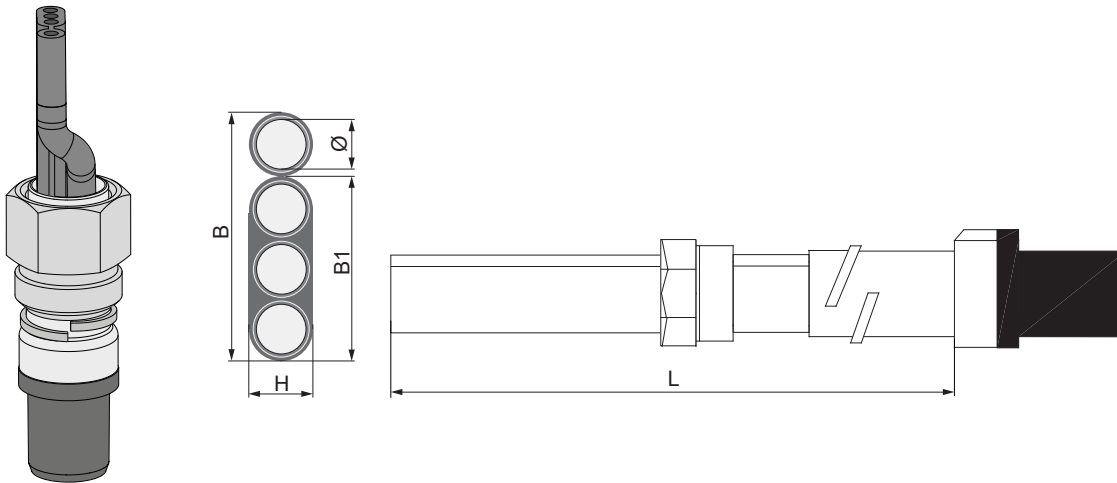


Fig. 1: Design: round connector with (3 + 1)-core flat cable

Table 15: Connector design [mm]

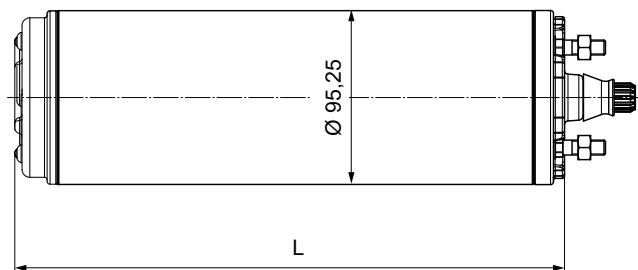
Design	Ø	B	B1	H
Round	3 × 1,5 + 1G1,5	16,8 +/-0,3	10,7 +/-0,3	5,0 +/-0,3

Set of removable cable connectors for 3~ motor, DN 100

Table 16: Removable cable connector

Size	Type	Set Mat. No.	Motor power cable with two-way plug			Coupling	
			Design of motor-end connector	Size	Mat. No.	Mat. No.	
25	MVB ⁸⁾	90039543	Round	F4 × 1,5 × 2,5 m	01025739	00117792	
25	OVB ⁸⁾	90033494	Round	F4 × 1,5 × 2,5 m	01025739	00117792	

⁸ Not connected and sealed at the factory

Dimensions
Dimensions

Fig. 2: Motor dimensions, DN 100, dimensions in [mm]

1~ motor, DN 100, 0.37 kW - 2.2 kW, 50 Hz
Table 17: Dimensions, weight, permissible axial thrust, moment of inertia

Size	Material variant	L _M [mm]	Weight [kg]	Permissible axial thrust	Moment of inertia
				F _{AX} [N]	J [kg/cm ²]
0,37	E, C	251,1	7,20	4000	3,8
0,55	E, C	276,2	8,35	4000	4,6
0,75	E, C	297,2	9,30	4000	5,6
1,1	E, C	321,2	10,45	4000	7,7
1,5	E, C	353,0	11,90	4000	8,1
2,2	E, C	451,2	16,65	4000	11,5

3~ motor, DN 100, 0.37 kW - 3.0 kW, 50 Hz
3~ motor, DN 100, 0.56 kW - 3.4 kW, 60 Hz
Table 18: Dimensions, weight, permissible axial thrust, moment of inertia

Size	Material variant	L _M [mm]	Weight [kg]	Permissible axial thrust	Moment of inertia
				F _{AX} [N]	J [kg/cm ²]
0,37	E, C	237,2	5,58	4000	3,2
0,55	E, C	251,1	6,40	4000	3,8
0,75	E, C	271,2	7,25	4000	4,6
1,1	E, C	297,2	8,55	4000	5,6
1,5	E, C	321,2	9,55	4000	6,5
2,2	E, C	353,2	11,05	4000	7,7
3,0	E, C	408,2	13,55	4000	9,8

3~ motor, DN 100, 3.7 kW - 7.5 kW, 50 Hz
3~ motor, DN 100, 4.2 kW - 8.5 kW, 60 Hz
Table 19: Dimensions, weight, permissible axial thrust, moment of inertia

Size	Material variant	L _M [mm]	Weight [kg]	Permissible axial thrust	Moment of inertia
				F _{AX} [N]	J [kg/cm ²]
3,7	E	520,2	19,1	6500	11,5
4,0	E	543,2	20,0	6500	12,0
5,5	E	652,5	26,6	6500	22,4
7,5	E	730,5	30,6	6500	26,5
3,7	C	529,4	19,6	6500	11,5
4,0	C	552,4	20,5	6500	12,0
5,5	C	661,7	27,1	6500	22,4
7,5	C	739,7	31,1	6500	26,5

Mating dimensions

1 ~ motor, DN 100, 0.37 kW – 2.2 kW

3 ~ motor, DN 100, 0.37 kW – 3.0 kW (60 Hz: 0.59 kW - 3.4 kW)

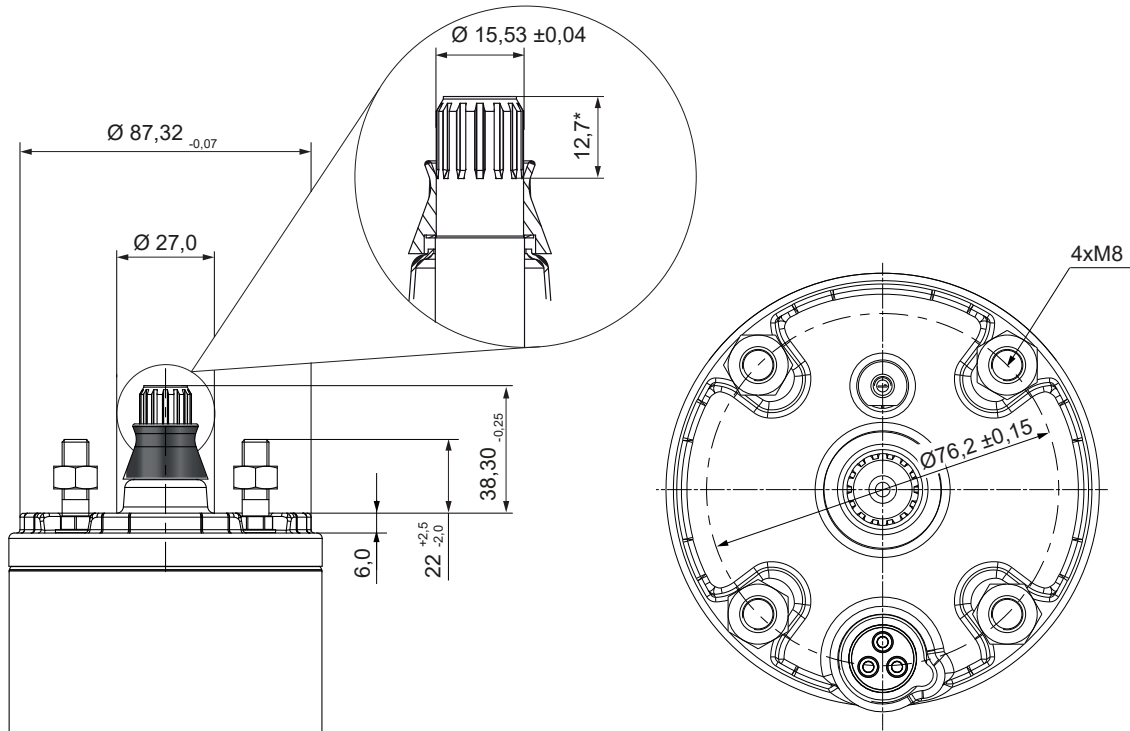


Fig. 3: Mating dimensions in [mm], * = minimum value

3 ~ motor, DN 100, 3.7 kW – 7.5 kW (60 Hz: 4.2 kW - 8.6 kW)

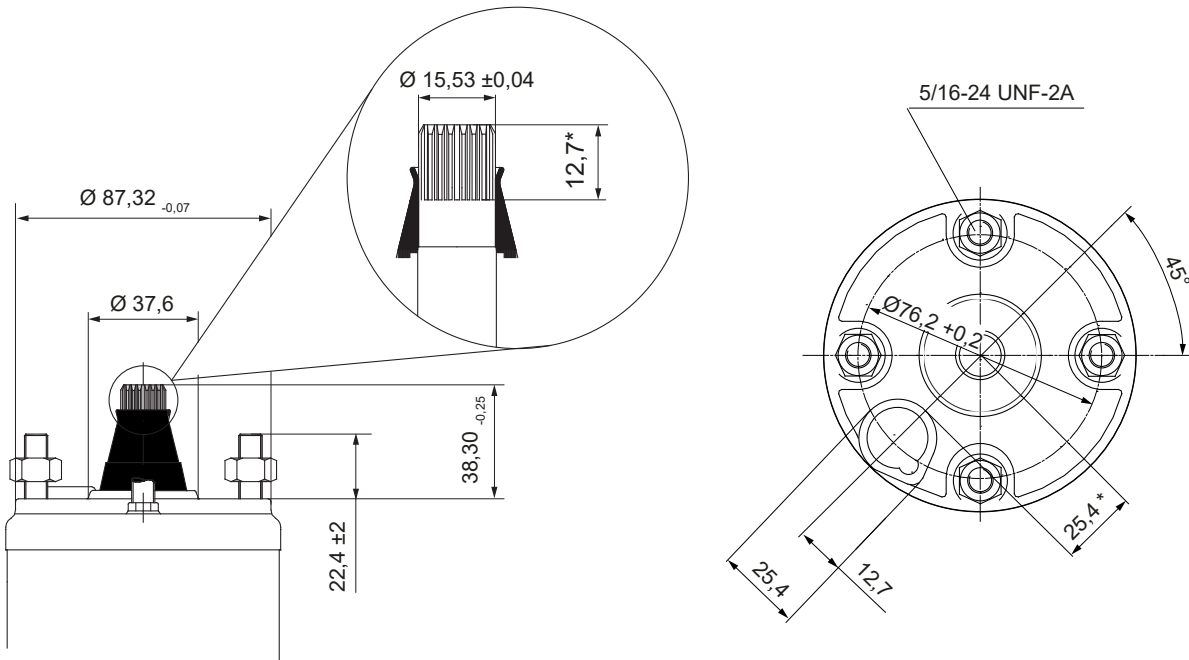


Fig. 4: Mating dimensions in [mm], * = minimum value

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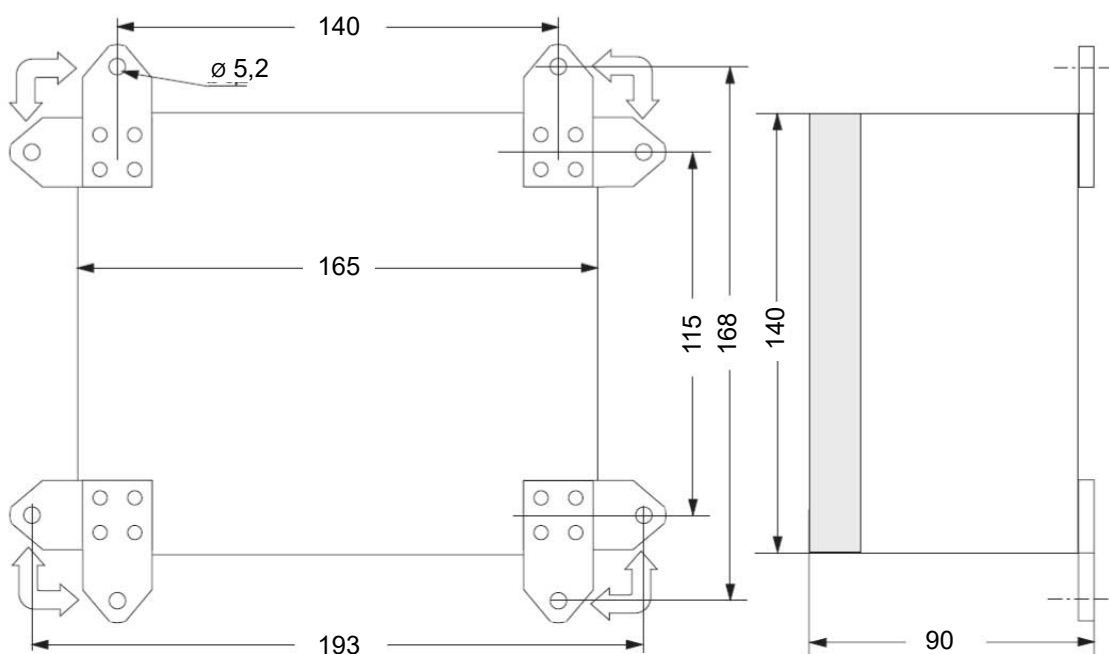
Technical data of the control unit
1~ starting device

Starting device for DN 100 submersible motor, with run capacitor

- Enclosure: IP54
- Suitable for environment B to IEC / EN 60439-1
- Supply voltage: 1~, 50 Hz, 220 V to 240 V ± 10 %
- Operating temperature: -5 °C to +55 °C
- Storage temperature: -25 °C to +55 °C
- Rated insulation voltage: 400 VAC
- Rated short-time withstand current: 1.5 kA
- Rated conditional short-circuit current: 1 kA
- Current: up to 16 A
- Power: 0.37 to 2.2 kW
- Humidity: 50 % at +55 °C (non-condensing)
- Weight: 0.6 to 1.0 kg

Table 20: Technical data

Power	Current	Maximum starting current ⁹⁾	Maximum current	Switch position
[kW]	[A]	[A]	[A]	
0,37	3,3	12,6	5	Rocker switch, bottom
0,55	4,3	17,7	6	Rocker switch, bottom
0,75	5,7	22,7	8	Rocker switch, bottom
1,1	8,4	33,9	10	Rocker switch, bottom
1,5	10,7	41,7	13	Turn dial, side
2,2	14,7	61,8	18	Turn dial, side

Dimensions

Fig. 5: Dimensions [mm]

⁹ Expected motor starting current under normal operating conditions

General drawings with list of components

DN 100, up to 3 kW

DN 100, 0.37 kW - 3.0 kW, 50 Hz
DN 100, 0.56 kW - 3.4 kW, 60 Hz

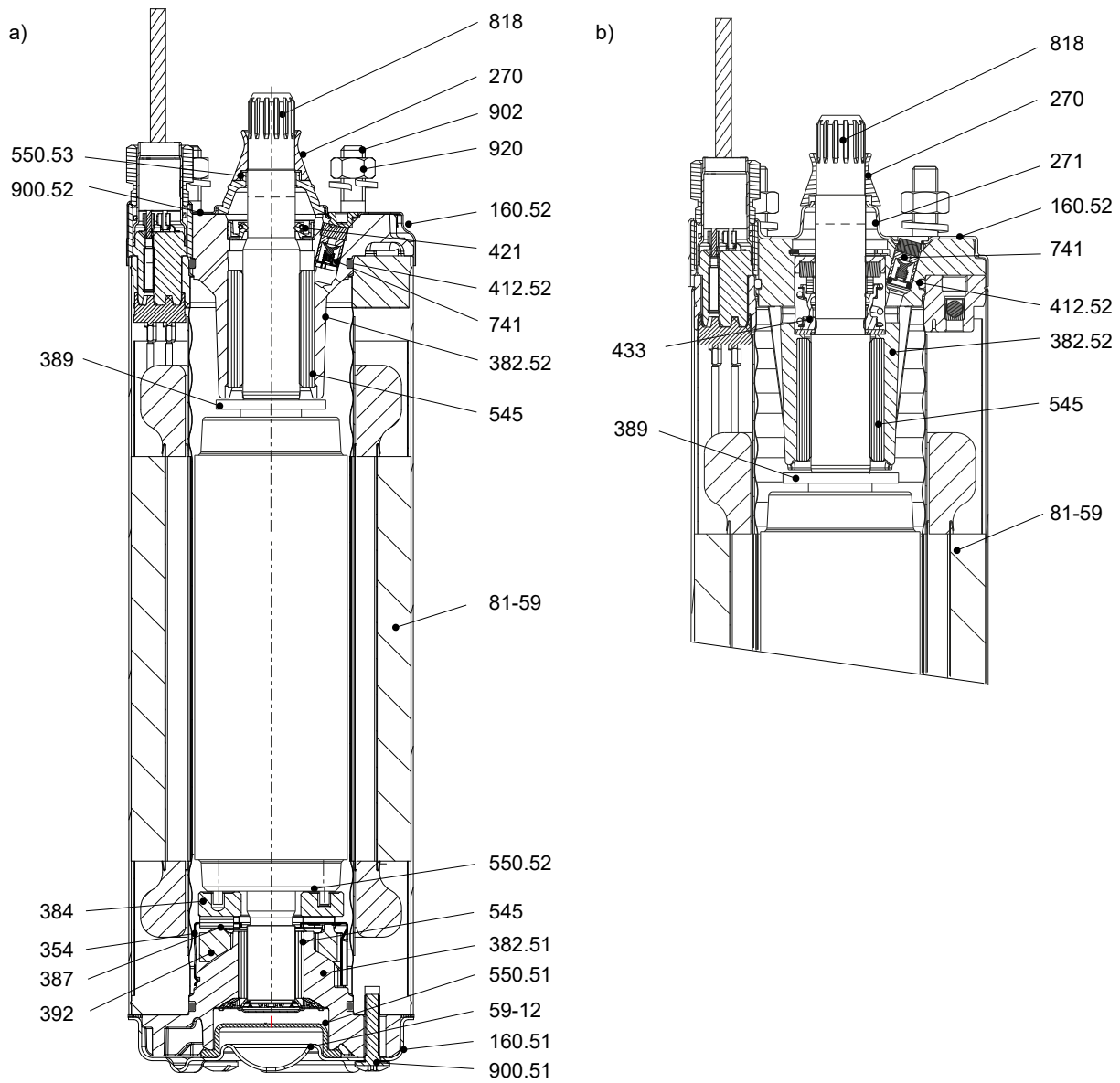


Fig. 6: General assembly drawing of motor DN 100, up to 3 kW, a) Material variant E, b) Material variant C

Table 21: List of components

Part No.	Description	Part No.	Description
160.51/.52	Cover	433	Mechanical seal
270	Deflector	59-12	Membrane
271	Sand guard	545	Bearing bush
354	Thrust bearing housing	550.51/.52/.53	Disc
382.51/.52	Bearing carrier	741	Valve
384	Thrust collar	81-59	Stator
387	Thrust bearing segment	818	Rotor
389	Counter thrust bearing ring	900.51/.52	Bolt/screw
392	Bearing segment carrier	902	Stud
412.52	O-ring	920	Nut
421	Lip seal		

DN 100 from 3 kW

DN 100, 3.7 kW - 7.5 kW, 50 Hz
DN 100, 4.2 kW - 8.5 kW, 60 Hz

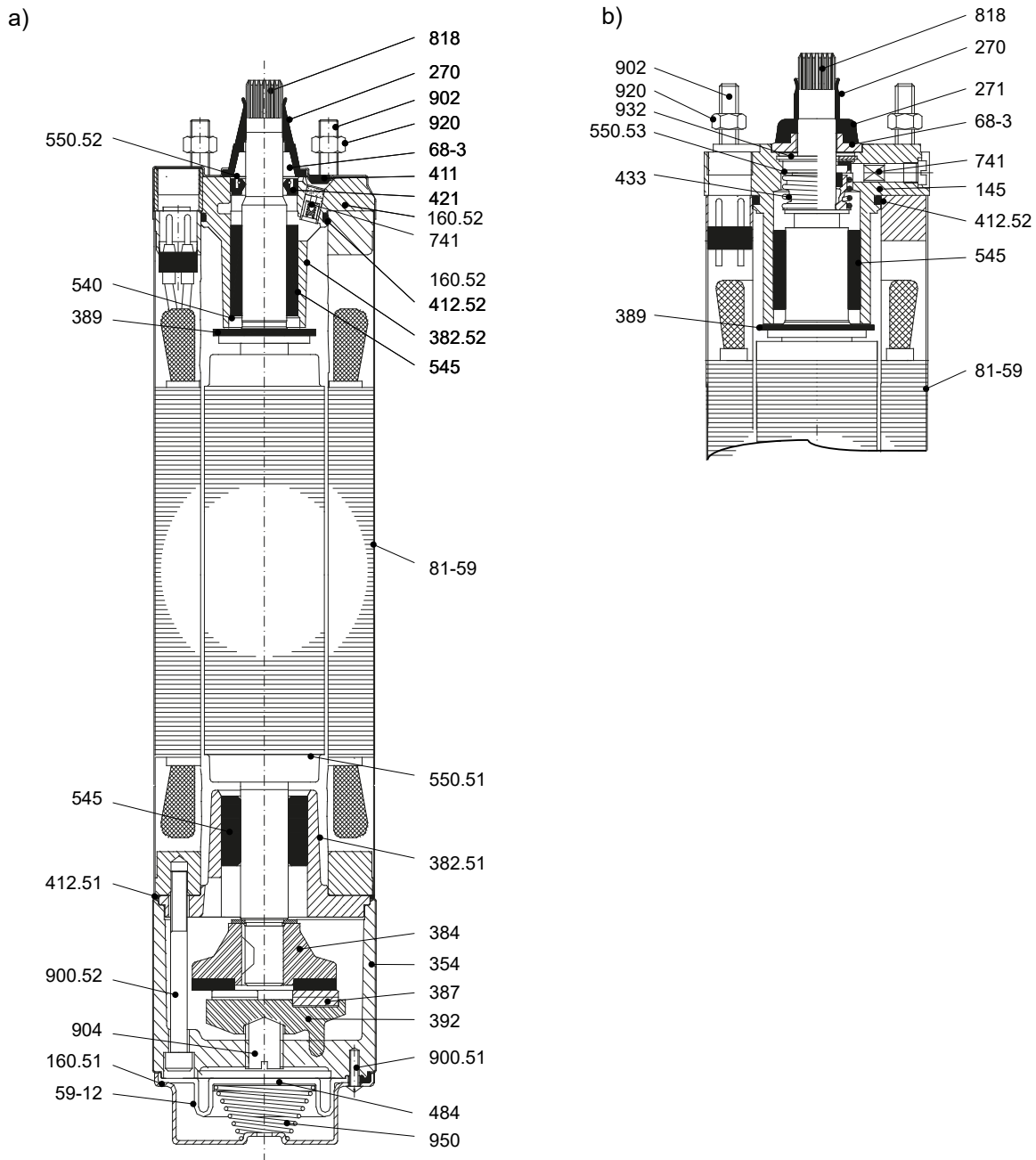


Fig. 7: General assembly drawing of motor DN 100, from 3 kW, a) Material variant E, b) Material variant C

Table 22: List of components

Part No.	Description	Part No.	Description
160.51/.52	Cover	59-12	Membrane
270	Deflector	540	Bush
271	Sand guard	545	Bearing bush
354	Thrust bearing housing	550.51/.52/.53	Disc
382.51/.52	Bearing carrier	68-3	Cover plate
384	Thrust collar	741	Valve
387	Thrust bearing segment	81-59	Stator
389	Counter thrust bearing ring	818	Rotor
392	Bearing segment carrier	900.51/.52	Bolt/screw
411	Joint ring	902	Stud
412.51/.52	O-ring	904	Grub screw
421	Lip seal	920	Nut
433	Mechanical seal	950	Spring
484	Spring plate		



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