Operating and Assembly Instructions

for the electromagnetically released

Spring-Applied Brakes FDW / BRE 5…400

— Protection Class IP66 —

Table of contents

1. Preliminary Remarks

1.1 Introduction to the operating and assembly instructions

For validity, purpose and use, as well as terms and labels, see Chapter 1 "Information on the Operating and Assembly Instructions" in the current issue of the *General Introduction (...) PRECIMA Spring-Applied Brakes.* As noted there, please consult PRECIMA in case of doubt. Technical questions, notes and suggestions for improvement can also be sent to the following address:

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1.2 Conditions for assembly and operation

For personnel and product-related conditions, proper application, legal aspects and delivery scope and state, see Chapter 2 "Conditions for Assembly and Operation" in the current issue of the *General Introduction (...) PRECIMA Spring-Applied Brakes*

In addition, the following **general conditions of operation** apply to the FDW brakes:

Humidity: 0…100%

Duty cycle
*(valid for installation on a **self-ventilated motor** with a **speed** of **at least 750 min^{-1}** **or** on a **force-ventilated motor**)*:

S1-100% at an ambient temperature of -20…+40°C
S1-100% at -20**…+60°C** and power reduction through a fast-acting rectifier
S3-60% at -20**...+60°C** generally
S3-60% at -20**…+80°C** and power reduction through a fast-acting rectifier

Heating at ambient temperatures < -20°C (possible from FDW 10 / BRE 10)

Consultation with PRECIMA is required:

- with a PWM (pulse width modulation) control

Special conditions of operation of the ATEX version:

These dust-protected spring-applied brakes are suitable for use in **Zone 22** areas (non-conductive dust) and comply with the building regulations of **equipment group II, category 3D according to DIN EN 60079-31: 2014-12**. **Dust deposits must not exceed 5 mm.**

The spring-applied brakes are suitable for application on three-phase motors with fan. For **three-phase motors controlled by a frequency converter**, ventilation must be ensured by the operator. External measures must also be taken to ensure that the brake command is executed at the same time as the motor is switched off. Grounding must carried out on the machine of which the brake is a component.

If the ambient temperature according to 2.2.4 is maintained, the **surface temperature of the spring-applied brake** does **not** exceed **125 °C.** In order to maintain the max. permissible surface temperature, the brake is equipped with a PTC thermistor (100 °C). In the event of a failure, the motor and the brake must be disconnected from the mains by means of a standard trigger unit.

Technical data of the PTC thermistor:

Operating temperature:	-25°C … 120°C
Tolerance range:	± 5°C
Cold resistance:	< 100Ω
Max. operating voltage:	30 V
Max. measurement voltage:	7.5 V
Pill size:	Ø < 4mm
Pill insulation:	Kynar heat shrink tubing
Response time:	< 3s
Insulation:	PTFE
Nominal response temperature // colour code:	100°C // red/red
Test voltage:	2.5 kV

➔Attention!

The operator is responsible for testing and effectiveness of the protective device. Proof of the effectiveness of the installed protective device is required before commissioning.

In addition to the proper use according to 2.3 in the current issue of the *General Introduction (...) PRECIMA Spring-Applied Brakes*, the following also applies to the ATEX version**: When ignited by hot or sparking objects, explosive dust concentrations can cause explosions, which can result in serious or fatal injuries to people and considerable property damage!**

The ATEX version may only be used as a holding brake and not as a working brake!

1.3 Structure and functionality

For structure and functionality of a spring-applied brake in general, see the corresponding section (Chapter 3) in the current issue of the *General Introduction (…) PRECIMA Spring-Applied Brakes*

2. Product description

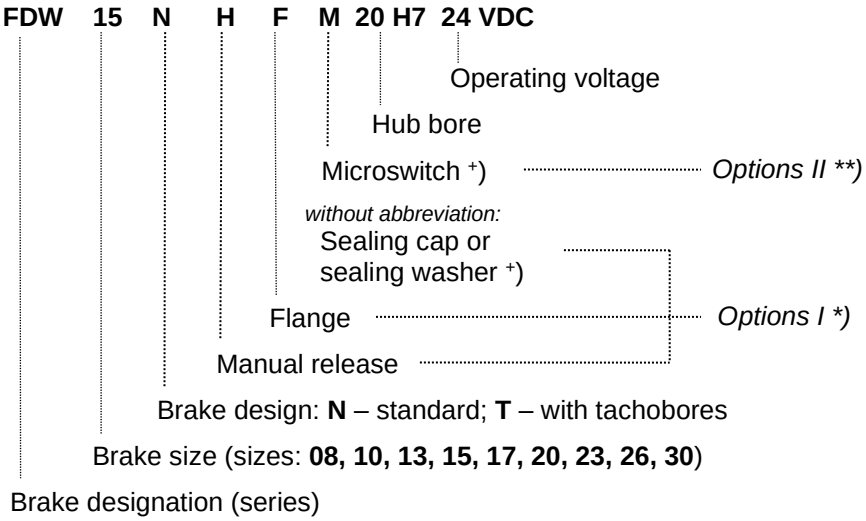
2.1 Marking

2.1.1 Type label

The type label of the spring-applied brake contains all its important data. These data and the contractual agreements for the brakes define the limits of their use.

2.1.2 Type code for FDW brakes (PRECIMA)

Example:



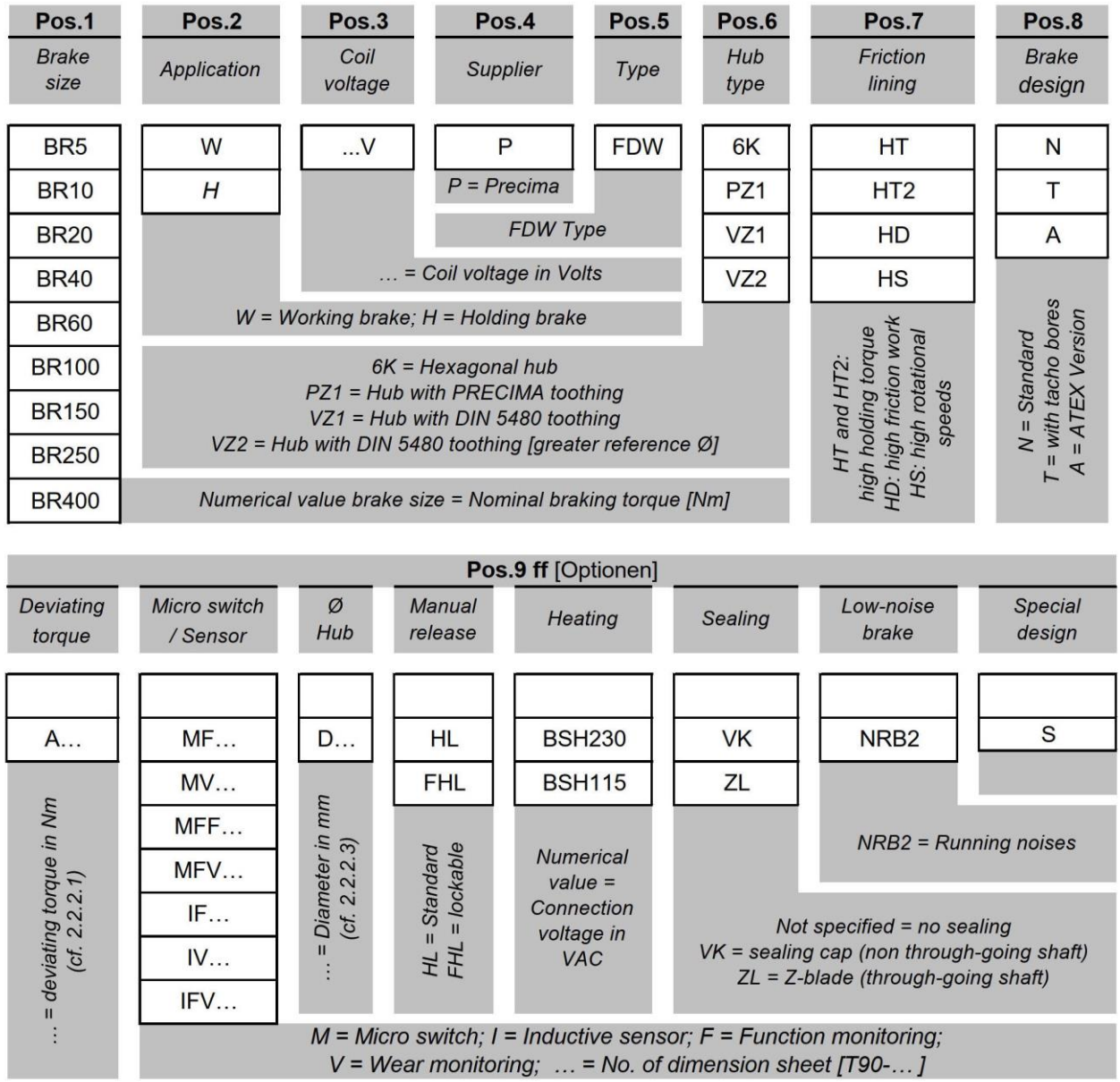
*) *Options I* are taken into account in these operating and assembly instructions, but, if desired, must be specified when placing the order (➔ abbreviation, if applicable).

) *Options II* must also be specified when placing the order and *cannot* be retrofitted. Furthermore, they are *not* taken into account in these instructions. There are **separate setting instructions for option M (= **microswitch**), the only one included, which must also be observed.

+) The microswitch and the sealing washer are not standard options for the ATEX version

2.1.3 FDW brake nomenclature (Getriebebau NORD)

The following two diagrams show how an FDB brake is designated by Getriebebau Nord. Pos.1 to Pos.8 must be listed in any case, Positions 9 ff only when the corresponding option is used, but then always in the sequence shown



Example: **BR400 W 180V P FDW VZ2 HD N A300 MFV322 D50 HL BSH230**

= Working brake FDW of size 400 (torque reduced to 300 Nm) in standard version with manual release, a 180 VDC coil, a rotor with HD friction lining and toothing according to DIN 5480 (VZ2), a hub Ø50, one microswitch each according to T90-322 for function and wear monitoring and a heater for a supply voltage of 230 VAC, supplied by PRECIMA

2.1.4 ATEX version marking

The ATEX version is identified by a special adhesive label.

Lettering on the adhesive label: **CE Ⓔx II 3D Ex tc IIIB T 125 °C Dc**

2.2 Technical information

2.2.1 Special features of the brake

In addition to the general description of the function of the brake (see *General Introduction (...) PRECIMA Spring-Applied Brakes* / Chapter 3 "Structure and Functionality"; cf. 1.3), the **higher protection class** is essential for FDW spring-applied brakes. **Due to their closed housing and their dustproof and waterproof cable gland, these brakes comply with protection class IP66. However, with a continuous shaft (with sealing washer option) and when using a flange, the sealing must be carried out by the customer** (cf. also 3.1 Mechanical installation).

For the **ATEX version** (dust-protected - Zone 22; temperature monitoring by PTC thermistor), the special conditions or certain restrictions must be taken into account compared to the normal BRE IP66 or FDW (cf. 1.2; 2.1.2; 2.1.3; 2.1.4)

2.2.2 Technical data

2.2.2.1 Nominal braking torques and number of springs

➔ Nominal braking torque / **working brake** = **dynamic braking torque** at 1 m/s friction speed
➔ Nominal braking torque / **holding brake** = **static holding torque** (= tearing off torque)
➔ For explanation see: *General introduction (...) PRECIMA spring-applied brakes* / Chapter 5

Size	**BR5** *FDW 08*	**BR10** *FDW 10*	**BR20** *FDW 13*	**BR40** *FDW 15*	**BR60** *FDW 17*	**BR100** *FDW 20*	**BR150** *FDW 23*	**BR250** *FDW 26*	**BR400** *FDW 30*
Nominal braking torques M_{bN} [Nm]	**5**	**10**	**20**	**40**	**60**	**100**	**150**	**250**	**400**
	3.5	7	14	28	43	70	107	187	300
	3	6	12	23	34	57	85	125	200
	2	4	8	17	26	42	65		

— Permissible deviations of the actual braking torque:
Working brake up to BR40 (dynamic torque)**: -20/+30%** (new and run-in*)
Working brake from BR60 (dynamic torque)**: -20/+30%** (new) **or ±20%** (run-in*)
Holding brake (static holding torque)**: -10/+50%** (new) **or -10/+40%** (conditioned*) **—**

***** For explanation see: *General introduction (...) PRECIMA spring-applied brakes* / Chapter 5

Size	**BR5** *FDW 08*	**BR10** *FDW 10*	**BR20** *FDW 13*	**BR40** *FDW 15*	**BR60** *FDW 17*	**BR100** *FDW 20*	**BR150** *FDW 23*	**BR250** *FDW 26*	**BR400** *FDW 30*
Number of springs for the above M_{bN}	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**8**	**8**
	5	5	5	5	5	5	5	6	6
	4	4	4	4	4	4	4	4	4
	3	3	3	3	3	3	3		

2.2.2.2 Dimensions, masses, fastening (Figure 2.1)

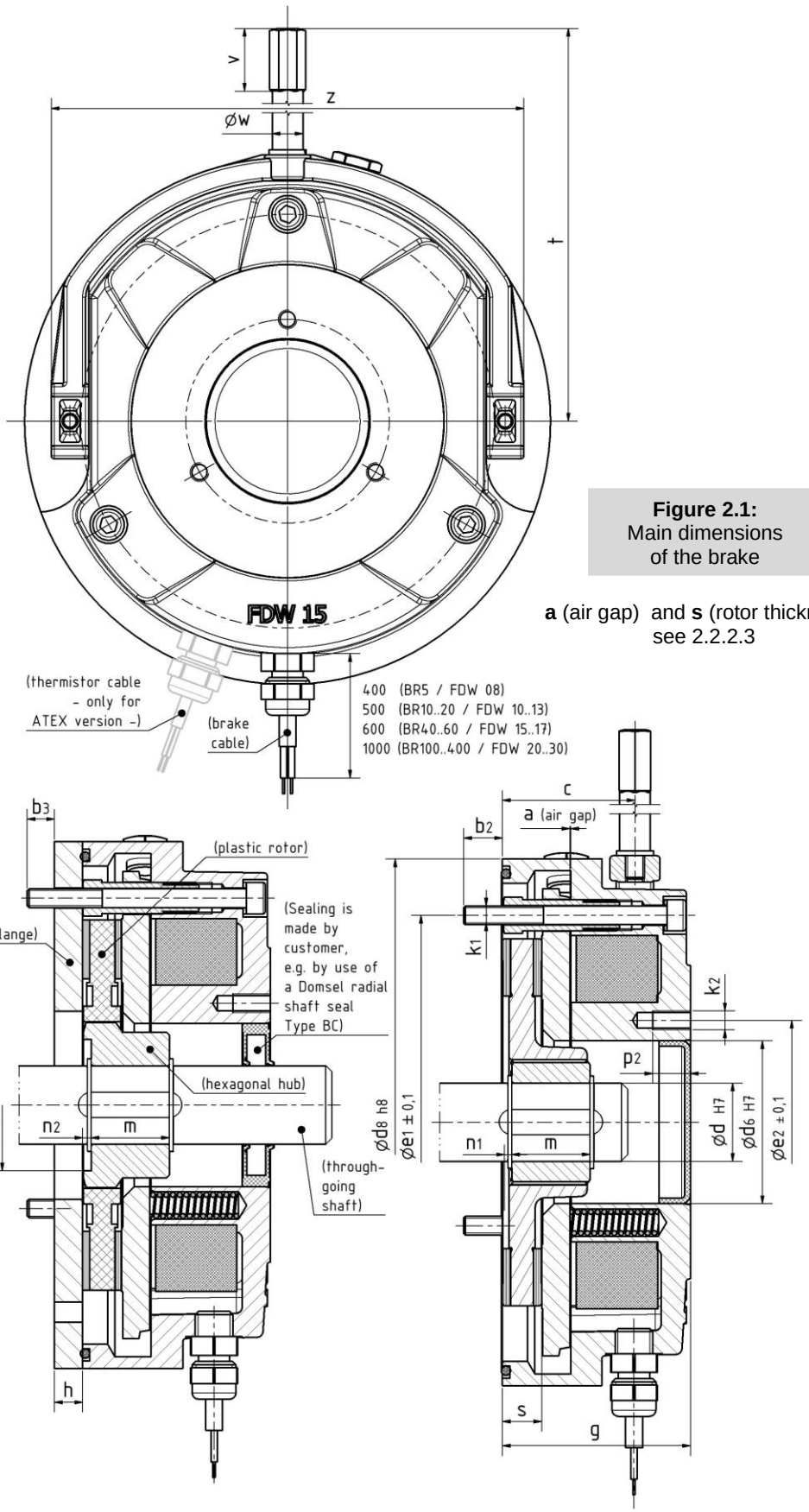


Figure 2.1:
Main dimensions
of the brake

a (air gap) and **s** (rotor thickness):
see 2.2.2.3

Size	Hub dimensions [mm]						General brake dimensions [mm]					Tachometer bores dimensions [mm]		
	Hex hub Ød H7	Toothed hub Ød H7	Mounting dimensions				Brake Ø inside / outside	Brake / flange	Brakes with manual release			Bolt circle Øe2 ±0.1	(Number of holes) x thread nominal Ø	Thread depth
	d	***d***	***d1***	***m***	***n1***	***n2***	***d6 / d8***	***g / h***	***c***	***v / w***	***t / z***	***e2***	***k2***	***p2***
BR5 *FDW 08*	11/14/15	11/14*/15*	20	18	1.5	0.5	26** / 98	40 / 6	30	15 / 8	100 / 89	34	(3 x) M4	8
BR10 *FDW 10*	15/19/20*	14/15	25	20	2.5	1	32 / 120	48 / 7	43.5	15 / 8	110 / 111	40	(3 x) M5	12
BR20 *FDW 13*	15/20/25	15/20	33	20	3.5	1.5	42 / 145	54 / 9	39	20 / 10	130 / 132	54	(3 x) M6	12
BR40 *FDW 15*	20/25/30	20/25	42	25	3	2	52 / 168	60 / 9	42	20 / 10	140 / 151	65	(3 x) M6	12
BR60 *FDW 17*	-	25/30/35*	-	30	3	-	62 / 188	70 / 8	46	25 / 12	165 / 172	75	(3 x) M8	15
BR100 *FDW 20*	-	30/35/40	-	30	3	-	72 / 213	80 / 11	51.5	25 / 12	220 / 196	85	(3 x) M8	15
BR150 *FDW 23*	-	35/40/45	-	35	4	-	80 / 245	90 / 8	58	25 / 12	250 / 224	95	(3 x) M8	15
BR250 *FDW 26*	-	40/45/ 50/55*	-	40	4	-	90 / 276	99 *** / 12,5	62	35 / 19	330 / 258	110	(6 x) M10	25
BR400 *FDW 30*	-	50/55/ 60/65*	-	50	4	-	115 / 324	105 / 12.5	64	35 / 19	357 / 304	138	(6 x) M10	25

Standard keyway of the hub as per DIN 6885/1-JS9
* deviating keyway as per DIN 6885/**3**-JS9 // ** can be obtained with Ø30 (7 mm deep) //
*** screw heads protrude for 2.5 mm (overall dimension = 101.5)

Size	Masses [kg]			Mounting dimensions [mm]			Tightening torque [Nm]
	Brake without manual release and flange	Manual release	Flange	Bolt circle Øe1 ±0.1	(Number of holes) x thread nominal Ø	Screw-in depth without / with flange	Fixing screws
				e1	***k1***	***b2 / b3***	***MA***
BR5 *FDW 08*	1.60	0.05	0.28	72	(3 x) M4	6 / 10	**3**
BR10 *FDW 10*	2.00	0.08	0.49	90	(3 x) M5	8.5 / 6.5	**6**
BR20 *FDW 13*	3.60	0.10	0.92	112	(3 x) M6	12 / 8	**10**
BR40 *FDW 15*	5.20	0.13	1.22	132	(3 x) M6	13 / 12	**10**
BR60 *FDW 17*	7.20	0.17	1.34	145	(3 x) M8	14 / 13	**25**
BR100 *FDW 20*	11.00	0.24	2.35	170	(3 x) M8	24 / 13	**25**
BR150 *FDW 23*	16.30	0.29	2.30	196	(3 x) M8	15 / 14	**25**
BR250 *FDW 26*	25.00	0.80	4.10	230	(3 x) M10	23.5 / 16	**50**
BR400 *FDW 30*	37.50	0.90	6.20	278	(6 x) M10	17 / 14	**50**

2.2.2.3 Air gaps, rotor values

Size	Nominal braking torques [Nm]	Min. air gap [mm]	Rotor thickness (new) [mm]	Max. air gap [mm]	Min. rotor thickness [mm]	Rotor moment of inertia [kgm²]	Max. rotor speed [min⁻¹] *- permissible speeds higher than indicated may be applicable through special measures on request -*	
	M_{bN}	a_{min}	s_{new}	a_{max}	s_{min}	J	n_{max} **Working brake**	n_{max} **Holding brake**$^{++}$
BR5 *FDW 08*	**5**	0,2	7,5 $^{-0,1}$	0.6	7.1	0,015 x 10^{-3}	**6000**	
	3.5							
	3							
	2							
BR10 *FDW 10*	**10**	0,2	8,5 $^{-0,1}$	0.7	8.0	0,045 x 10^{-3}	**6000**	
	7							
	6							
	4							
BR20 *FDW 13*	**20**	0,3	10,3 $^{-0,1}$	0.8	9.8	0,173 x 10^{-3}	**6000**	
	14							
	12							
	8							
BR40 *FDW 15*	**40**	0,3	12,5 $^{-0,1}$	0.9	11.9	0,45 x 10^{-3}	**6000**	
	28							
	23							
	17							
BR60 *FDW 17*	**60**	0,3	14,5 $^{-0,1}$	1.0	13.8	0,86 x 10^{-3}	**3600**	4500 (6000^{+})
	43							
	34							
	26							
BR100 *FDW 20*	**100**	0,4	16 $^{-0,1}$	1.1	15.3	1,22 x 10^{-3}	**3600**	4500 (6000^{+})
	70							
	57							
	42							
BR150 *FDW 23*	**150**	0,4	18 $^{-0,1}$	1.1	17.3	2,85 x 10^{-3}	**3600**	4500 (6000^{+})
	107							
	85							
	65							
BR250 *FDW 26*	**250**	0,5	20 $^{-0,1}$	1.2	19.3	6,65 x 10^{-3}	**1800**	3000 (4500^{+})
	187							
	125							
BR400 *FDW 30*	**400**	0,5	20 $^{-0,1}$	1.2	19.3	19,5 x 10^{-3}	**1800**	3000 (4500^{+})
	300							
	200							

$^{+}$ for max. 5 seconds $^{++}$ on request ➔ at high speeds a damping should be provided between rotor and hub (version NRB2, see 2.1.3)

2.2.2.4 Friction work, friction power

Size	Max. permissible friction power** [J/h]	Max. permissible friction work / braking [J]	Max. permissible friction power** [J/h]	Max. permissible friction work / braking [J]	Friction work / 0.1 mm wear [J]
	Working brake lining		Holding brake lining		
	P_{Rmax}	W_{Rmax}	P_{Rmax}	W_{Rmax}	$Qr\ 0.1$
BR5 / *FDW 08*	288 x 10^3	3 x 10^3	144 x 10^3	1.5 x 10^3	16 x 10^6
BR10 / *FDW 10*	360 x 10^3	6 x 10^3	180 x 10^3	3 x 10^3	30 x 10^6
BR20 / *FDW 13*	468 x 10^3	12 x 10^3	234 x 10^3	6 x 10^3	42 x 10^6
BR40 / *FDW 15*	576 x 10^3	25 x 10^3	288 x 10^3	12 x 10^3	70 x 10^6
BR60 / *FDW 17*	720 x 10^3	35 x 10^3	360 x 10^3	17 x 10^3	85 x 10^6
BR100 / *FDW 20*	900 x 10^3	50 x 10^3	450 x 10^3	25 x 10^3	140 x 10^6
BR150 / *FDW 23*	1080 x 10^3	75 x 10^3	540 x 10^3	37 x 10^3	170 x 10^6
BR250 / *FDW 26*	1260 x 10^3	105 x 10^3	630 x 10^3	52 x 10^3	230 x 10^6
BR400 / *FDW 30*	1440 x 10^3	150 x 10^3	720 x 10^3	75 x 10^3	310 x 10^6

** with a uniform timely distribution of the braking

2.2.2.5 Electrical parameters

Size	Electrical power (*average value*) [W]	Voltage [VDC]	Rated current (*benchmark*) [A]	**Size**	Electrical power (*average value*) [W]	Voltage [VDC]	Rated current (*benchmark*) [A]
	$P_{20°C}$ =	U =	I_N =		$P_{20°C}$ =	U =	I_N =
BR5 *FDW 08*	29	24	1.14	**BR100** *FDW 20*	110	24	4.30
		103	0.30			103	1.05
		180	0.16			180	0.59
		205	0.14			205	0.59
BR10 *FDW 10*	40	24	1.67	**BR150** *FDW 23*	101	24	4.00
		103	0.39			103	0.94
		180	0.22			180	0.58
		205	0.20			205	0.53
BR20 *FDW 13*	49	24	1.78	**BR250** *FDW 26*	140	24	5.70
		103	0.56			103	1.40
		180	0.26			180	0.78
		205	0.23			205	0.68
BR40 *FDW 15*	59	24	2.67	**BR400** *FDW 30*	189	24	7.27
		103	0.55			103	1.77
		180	0.33			180	1.16
		205	0.28			205	0.89
BR60 *FDW 17*	87	24	3.69				
		103	0.82				
		180	0.46				
		205	0.44				

2.2.2.6 Switching times

Size	Nominal braking torque [Nm]	Disconnection time [ms]	Response delay [ms]	Connection time [ms]	Response delay [ms]	Connection time [ms]
			*switched on the **DC side***		*switched on the **AC side***	
	M_{bN} =	t_2 =	t_{11DC} =	t_{1DC} =	t_{11AC} =	t_{1AC} =
BR5 *FDW 08*	**5**	35	18	38	60	90
BR10 *FDW 10*	**10**	60	20	50	100	145
BR20 *FDW 13*	**20**	85	25	65	220	280
BR40 *FDW 15*	**40**	100	20	70	150	225
BR60 *FDW 17*	**60**	120	22	82	200	290
BR100 *FDW 20*	**100**	150	35	115	300	420
BR150 *FDW 23*	**150**	270	45	145	320	570
BR250 *FDW 26*	**250**	300	58	178	400	600
BR400 *FDW 30*	**400**	400	65	195	550	900

**switched with fast-acting rectifier (overexcitation)

— The indicated switching times are to be understood as benchmarks with tolerances for the nominal air gap —

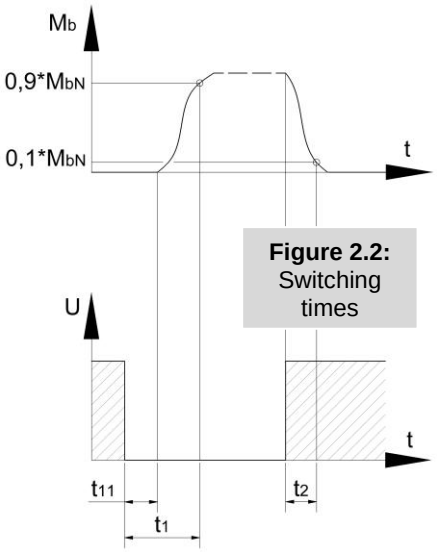


Figure 2.2: Switching times

t_2 = disconnection time = time between the switching on of the current and the ceasing of the braking torque ($M_b \leq 0{,}1*M_{bN}$)

– Overexcitation by a fast-acting rectifier results in approx. half as long disconnection times –

$t_{1\ DC}$ = connection time = response time during braking with interruption on the DC side by mechanical switches = time between the switching off of the current and the reaching of the full braking torque ($M_b \geq 0.9*M_{bN}$)

$t_{1\ AC}$ = connection time = response time during braking with disconnection on the AC side, i.e. by interruption of a *separately* powered rectifier

$t_{11\,DC}$ / $t_{11\,AC}$ = response delay = time between the switching off of the current and the increase in the braking torque (included in the respective connection time)

– Depending on the operating temperature and the wear status of the brake discs, the actual response delays (t_2, t_1 DC, t_1 AC) can deviate from the benchmarks indicated here. When the voltage is reduced by a fast-acting rectifier, connection times are shortened –

3. Assembly

3.1 Mechanical installation

3.1.1 Requirements and preparation

- Check the unpacked spring-applied brake as to being undamaged and complete of all parts (according to the delivery note). Complaints regarding recognizable transport damage must be made immediately to the deliverer, while claims for recognizable defects and incompleteness must be made to PRECIMA (cf. also 2.5 in the *General Introduction (…) PRECIMA Spring-Applied Brakes*).
- Compare the nameplate of the brake with the agreed characteristics and the actual conditions

➔Attention!
Should any ambiguities or contradictions be revealed during the inspection, the brake must not be installed and put into operation without consulting PRECIMA.

3.1.2 Counter friction surface

3.1.2.1 Motor end shield etc. as a counter friction surface

- Check whether the provided counter friction surface meets the requirements (material: steel, cast steel, cast iron - *no aluminium / stainless steel with limitations* -; surface quality **Rz 6.3**) and whether it is free of grease and oil. In addition, an even contact and sealing surface in the area of the surrounding O-ring (in the magnet housing groove) must be available.

3.1.2.2 Flange

- If the counter friction surface is supplied in the form of a flange (item **7**, **Figure 3.1**), this component — which lies directly on the motor end shield — is fixed there together with the brake (see also 3.1.3, 3.1.4 and Figure 3.1). The brake is sealed against the flange by means of an O-ring (item **13**) (analogous to the motor end shield for brakes without flange). **However, the flange itself contains no further sealing element and must be sealed with respect to its mounting surface.**

➔Attention!
If the counter friction surface does not meet the requirements, the brake must not be installed and put into operation without consulting PRECIMA. Grease and oil on the counter friction surface must be removed completely before continuing!

3.1.3 Hub and rotor (Figure 3.1)

➔Stop!
Before the assembly, check the thickness of the rotor according to the information in 2.2.2.3**. S_{new} is the value for a new rotor** (tolerance = 0/-0.1 mm)**, s_{min} is the lowest permissible rotor thickness. When installing a new rotor, the values must be s = s_{new}; in case of a reassembly (e.g. after a maintenance-related dismantling) the values must be s > s_{min}, otherwise the rotor must be replaced.**

The rotor, as a rotating component of the motor to be braked, is fixed onto the shaft via the hub.

- Insert the first circlip (item **14**) into the rear radial groove of the shaft
- Insert the feather key (item **15**) into the axial groove of the shaft
- Push the toothed hub (item **6.1**) or the hex hub (item **6.2**) onto the shaft and over the feather key
- Fix the hub axially by inserting the second circlip (item **16**) into the front radial groove of the shaft
- If necessary, mount the counter friction surface (= flange; item **7**)
- Push the rotor (item **3.1** or **3.2**) onto the hub, the rotor should still be axially displaceable

➔**Attention!** **Make sure that the rotor/hub pair runs smoothly!**

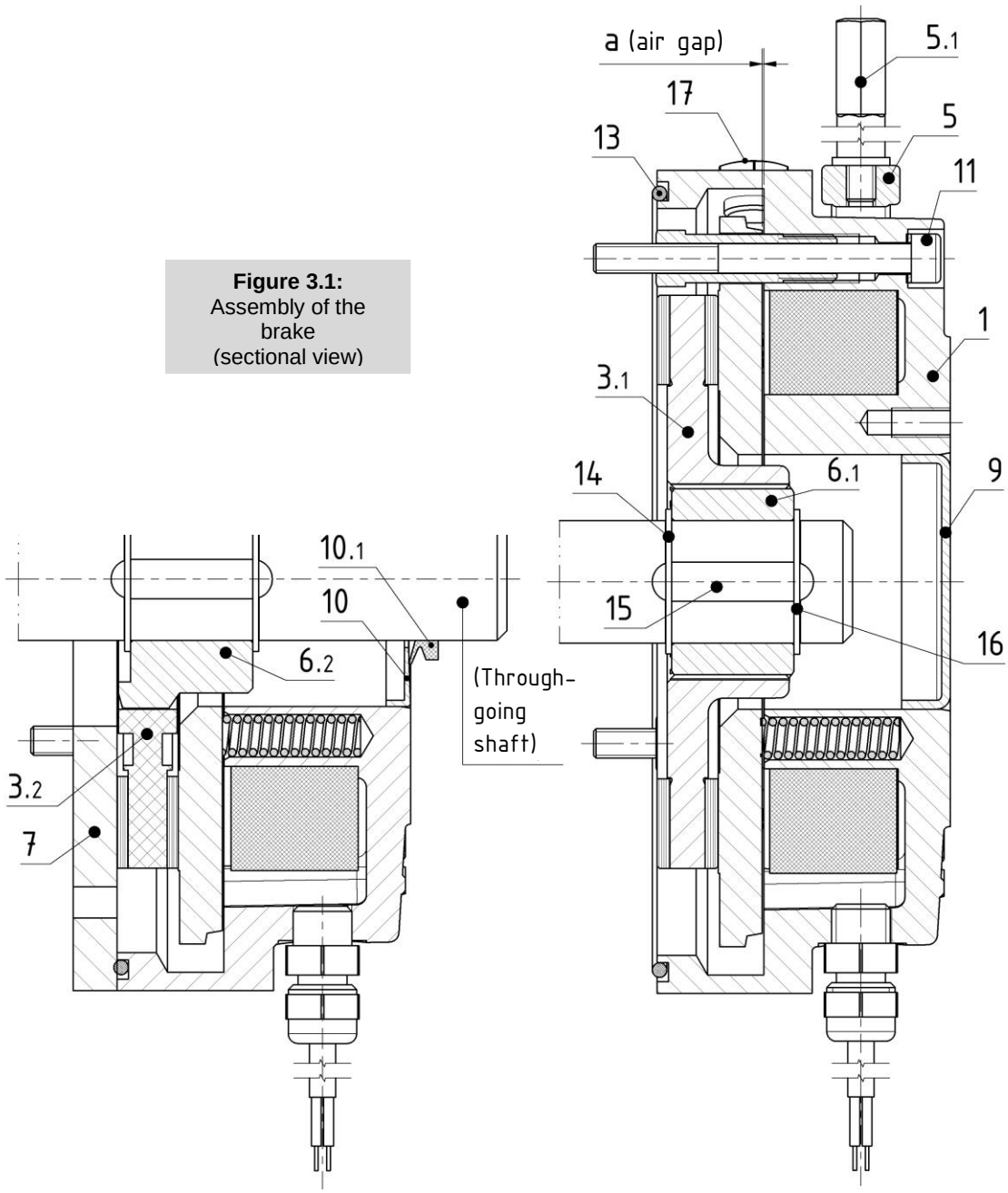


Figure 3.1:
Assembly of the brake
(sectional view)

3.1.4 Brake (Figure 3.1) ➔ ***for self-installation of the manual release, see 3.1.6 first***

The brake is attached to the motor (possibly through the holes in the intermediate flange) and, if required, can be also supplemented with additional components:

- Place the brake on the rotor, insert and screw in the fixing screws **with the underlying Cu washers** (item **11**) until the magnet housing rests on the counter friction surface
- Tighten the fixing screws with the tightening torque according to **2.2.2.2**
- Screw the manual release lever (item **5.1**) into the manual release bracket (item **5**) with the attached washer and tighten it on the hexagonal surfaces (*only for brakes with manual release = H option*) ➔ **screw-in torque:**

Size	Thread lever	Screw-in torque [benchmark in Nm]
BR5/10 // FDW 08/10	M5	**5**
BR20/40 // FDW 13/15	M6	**8**
BR60…150 // FDW 17…23	M8	**18**
BR250…400 // FDW 26…30	M10	**25**

➔Attention!

The Cu washers under the fixing screws may only be used once for sealing and must be replaced with new ones for each reassembly!
The setting of the manual release (option H) adjusted at the factory or by the customer (➔ 3.1.6.3**) must not be changed!**

3.1.5 Sealing (Figure 3.1)

Depending on whether the brake is mounted over a continuous shaft or not, sealing measures must still be taken:

- With a not continuous shaft, the pre-mounted sealing cap (item **9**) will close the central opening of the brake and no further measure is required
- With a continuous shaft, the pre-mounted sealing washer (item **10**) only forms the first part of the shaft seal. It must always be completed with a V-ring (item **10.1**) to be installed on the shaft

3.1.6 Manual release (Figure 3.2)

— only when assembly or disassembly is carried out by the customer —

The magnet housing has the **necessary holes** for assembly only if the brake was purchased with the **manual release option**. A brake purchased without that option cannot be retrofitted with a manual release!

3.1.6.1 Requirements for assembly or disassembly

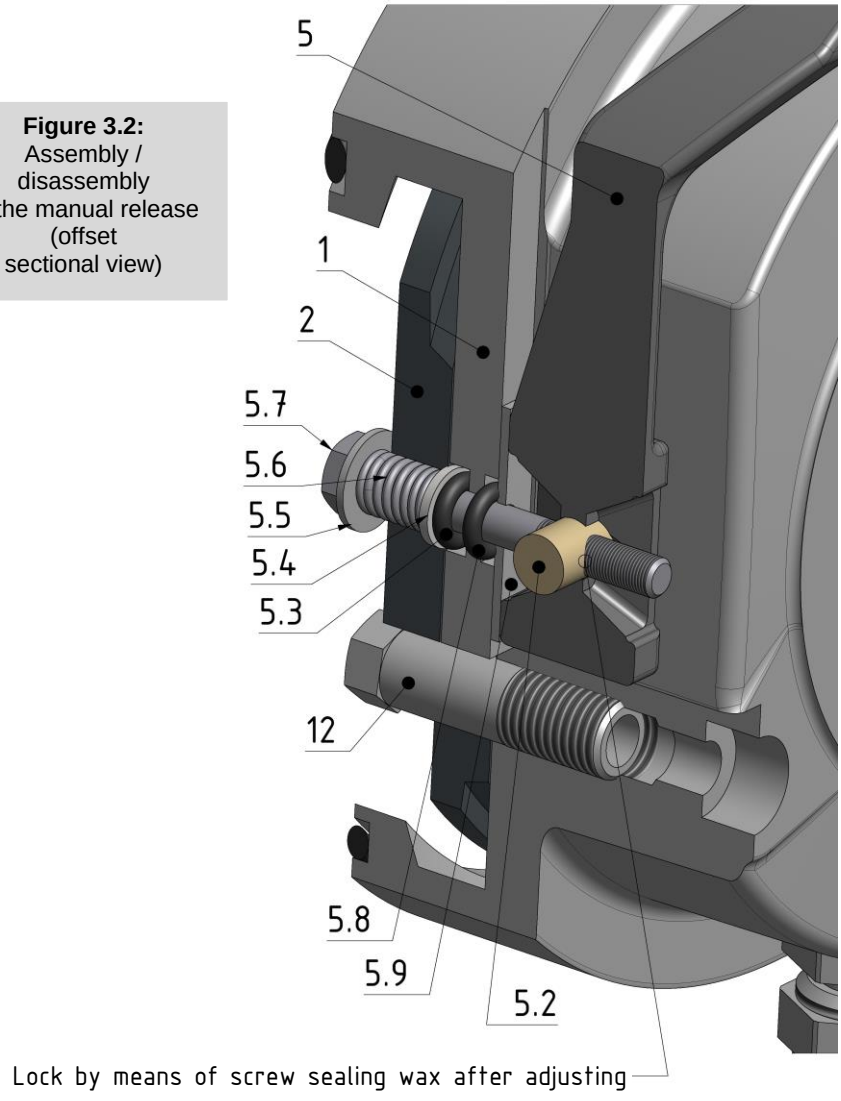
- The brake must be **dismantled and de-energized** in order to assemble or disassemble the manual release. For brake dismantling, see also **5.1**
- The **armature plate** (item **2**, **Figure 3.2**) must also be **removed**. To do so, unscrew all hollow screws (item **12**) so that the armature plate can be dismounted from the magnet housing (item **1**) and its inside with the spring holes and the inserted springs becomes visible

3.1.6.2 Carrying out the assembly or disassembly

The assembly is described below, the disassembly is to be carried out accordingly in reverse order:

- Insert the **rear O-ring** (item **5.3**, **Figure 3.2**) on both sides and the **washer** (item **5.4**) above it into the indentations of the magnet housing
- **Position the armature plate** (item **2**) so that the two lateral holes come to rest over the inserted O-rings and washers
- Fasten the armature plate by **screwing all hollow screws** (item **12**) into the magnet housing until the visible rear surfaces are slightly **below the sealing surface** of the magnet housing (the hollow screws have no axial supporting function when the brakes are closed)
- **Push** the **washer** (item **5.5**) and the **spring** (item **5.6**) onto the two **fixing screws** (item **5.7**) of the manual release and insert the screws so equipped into the holes of the magnet housing
- On the opposite side, **push** the **O-ring** (item **5.8**) and the **sealing plate** (item **5.9**) onto the inserted screws, pressing the O-rings into the corresponding indentations of the magnet housing
- Position the **manual release bracket** (item **5**) with the inserted **bolts** (item **5.2**) and **screw** the two actuating screws into the bolts

Figure 3.2:
Assembly / disassembly of the manual release (offset sectional view)



3.1.6.3 Adjustment of the manual release

After the actual assembly, the manual release must still be adjusted in order to fulfil the intended function:

- **Tighten** the two **actuating screws** (item **5.7**, **Figure 3.2**) until the armature plate lies on both sides of the magnet housing
- **Turn back** the two **actuating screws** by dimension **Y** or by **X** rotations according to **3.1.6.4**
- The two screws **must be locked by means of screw sealing wax** in the correct setting position.

3.1.6.4 Manual release setting values

Type	Setting dimension **Y**	Thread	Thread pitch	Number of rotations **X**
	[mm]		[mm]	
BRE 10 / *FDW 10*	1	M4	0.7	1.5
BRE 20 / *FDW 13*	1	M4	0.7	1.5
BRE 40 / *FDW 15*	1	M5	0.8	1.3
BRE 60 / *FDW 17*	1	M6	1	1
BRE 100 / *FDW 20*	1.2	M6	1	1.2
BRE 150 / *FDW 23*	1.2	M6	1	1.2
BRE 250 / *FDW 26*	1.5	M8	1.25	1.2
BRE 400 / *FDW 30*	1.5	M8	1.25	1.2

3.2 Electrical installation

The electrical connection is only to be carried out in a de-energized state.
The operating voltage (DC) of the brake is indicated on the magnet housing (cf. 3.1.1 and Figure 3.2).

3.3 Modifications and additions

3.3.1 Change of the braking torque

The braking torque can be adjusted by modifying the spring configuration in accordance with **2.2.2.1**. Make sure that at least the springs arranged on the outside are evenly distributed.

Should the braking torque be changed on a **brake with manual release**, it is also necessary to first **disassemble** and then **reassemble** the manual release. See **3.1.6**.

4. Operation

4.1 Brake in operation

4.1.1 Commissioning

Before commissioning the brake, a **functional test** must be carried out first. This can normally and readily be done together with the motor to which the brake is attached. For possible malfunctions, see: 4.2.

➔Stop!
The full braking torque is only effective after the brake pads on the rotor have run in! ➔ Deviation values to M_{bN}: see 2.2.2.1

4.1.2 Ongoing operation

Ongoing operation requires no special measures without malfunctions. Only the **size of the air gap** (increasing because of the wear of the friction lining on the rotor) must be checked according to the following arrangement (see also: 4.1.3), unless a special sensor for wear monitoring has been installed on the brake. In order to do this, temporarily remove the screw plug (item **17**, Figure 3.1) in the inspection hole. In case of malfunctions, proceed according to 4.2. For **ATEX version** (= Holding brake) the **function of the PTC thermistor** has to be controlled: The resistance at 20°C must be **lower than 100 Ω** (Thermistor cable Ø3.7 mm; Configuration: see Figure 2.1).

Control intervals:

Working brake:
+ according to tool life calculation
+ as per specification to be given by the customer

Holding brake:
+ at least once every two years
+ as per specification to be given by the customer
+ provide shorter intervals in case of frequent emergency stops

➔Danger!
De-energise motor and brake and protect them from an accidental reclosure. The brake must not be opened for inspection in an explosive atmosphere

4.1.3 Maintenance

4.1.3.1 Replacing the rotor

It is not possible to adjust the air gap for the closed brakes of the FDW series. When the minimum rotor thickness s_{min} according to **2.2.2.3** is reached, the rotor must then be replaced. Functionality of the brake that falls below the minimum rotor thickness just in individual cases does not change the above statement; **proper use is then no longer available**.

➔Stop!

Even after the rotor has been replaced, the full braking torque is only effective again after the brake linings on the rotor have run in!
➔ Deviation values to M_{bN}: see 2.2.2.1

➔Attention!

When replacing the rotor, the mechanical components involved in the build-up and transmission of the braking torque must be checked for excessive wear (armature plate, hollow screws) or integrity (springs) and replaced if necessary!

4.2 Brake out of operation (malfunctions)

The table below shows typical malfunctions during ongoing operation (in some cases also during commissioning), their possible causes and instructions for their correction.

Malfunction	Possible cause	Remedy
Brake does not release	Air gap too large	Replace the rotor
	Brake is not supplied with voltage	Check electrical connection
	Voltage at the magnetic coil too low	Check magnetic coil supplied voltage
	Armature plate mechanically blocked	Remove mechanical blockage
Brake releases with delay	Air gap too large	Rotor must be replaced
	Voltage at the magnetic coil too low	Check magnetic coil supplied voltage
Brake is not applied	Voltage at the magnetic coil too high	Check supply voltage of the magnetic coil
	Armature plate mechanically blocked	Remove mechanical blockages
Brake is applied with delay	Voltage at the magnetic coil too high	Check supply voltage of the magnetic coil

5. Disassembly / Replacement

5.1 Dismantling of the brake

Dismantling of the brake shall be carried out analogous to the assembly, but in reverse order, and only when the brake and the motor are **switched off, de-energized and torque-free**.

➔Danger!

The disassembly of the brake will result in a suspension of its passive braking function. There are no risks associated with this suspension!

5.2 Component replacement

The only component that can be regularly replaced on site is the **rotor** when it reaches the wear limit (see 4.1.3.1); when the **hub** shows signs of noticeable wear, it can be replaced if necessary. Furthermore, all other components listed in ***5.4 Spare parts*** can also be generally replaced.

➔Attention!

Before reassembling a brake, the fastening elements must be checked for proper functionality and replaced if necessary! It is fundamental to replace the Cu washers arranged under the screws, since their sealing function is no longer guaranteed if they are used multiple times!

5.3 Brake replacement / disposal

The components of our spring-applied brakes have to be recycled separately due to the presence of different materials. The official regulations must also be observed.
Important code numbers of the Waste Catalogue Ordinance (German designation: AAV) are given below. Depending on the material composition and the type of disassembling process, other key numbers may also apply to the components made from these materials.

- Ferrous metals (key no.160117)
- Non-ferrous metals (key no.160118)
- Brake pads (key no.160112)
- Plastics (key no. 160119)

5.4 Spare parts

Figure 5.1 shows all the spare parts that can be ordered for the FDW spring-applied brakes, which are listed below.

When ordering spare parts, please provide the brake lettering data (see 2.1.1)!

➔Attention!

PRECIMA Magnettechnik GmbH excludes any liability and warranty for damage resulting from the use of non-original spare parts and accessories (cf. 2.2.3 in the *General Introduction (…) PRECIMA Spring-Applied Brakes*).

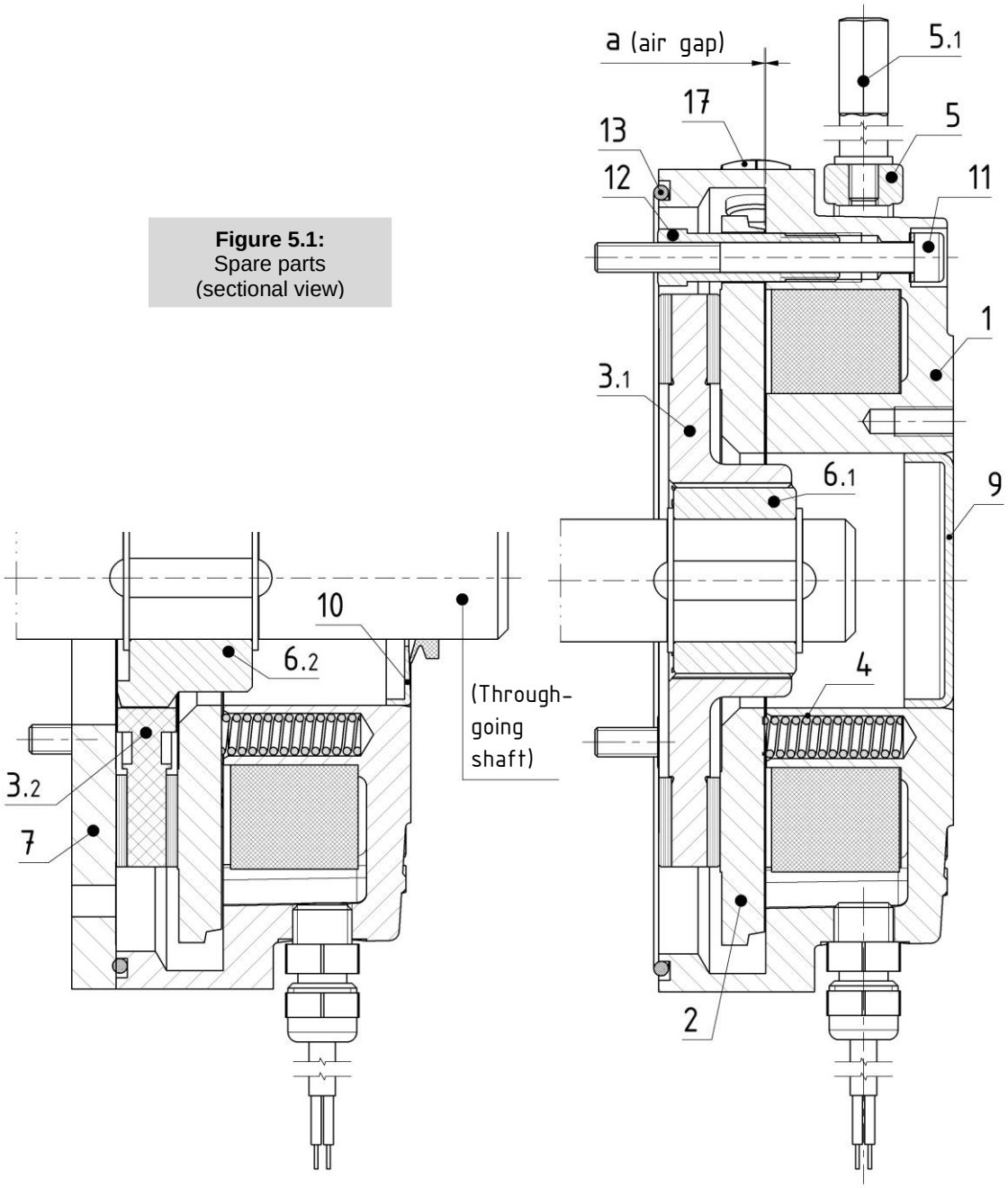


Figure 5.1:
Spare parts
(sectional view)

Position	Designation	Position	Designation
1	Magnetic body	6.2	Hub for rotor 3.2
2	Armature plate	7	Flange
3.1	Rotor complete (aluminium version)	9	Sealing cap
3.2	Rotor complete (plastic version)	10	Sealing washer
4	Spring	11	Fixing screw including Cu washer
5	Manual release complete	12	Hollow screw
5.1	Manual release lever	13	O-ring (magnet housing)
6.1	Hub for rotor 3.1	17	Screw plug with O-ring

Document history

Issue	Version	Description
05.2020	*0.0*	*Created*
10.2021	*1.0*	General: FDW as general brake **type** designation, BR5..BR400 as NORD-specific brake **size** designation (instead of BRE...) 2.1.3: Adaptation of Getriebebau NORD nomenclature 2.2.2: Table values for holding brakes/high braking torques omitted 2.2.2.1: Definition of nominal braking torques added; tolerance values revised. 4.1.2: Supplements for ATEX version