renova
WE NEVER LOSE CONTROL

powder brake PWX

Assembly and maintenance manual

ITA

english - index

introduction

The following manual is intended for installers and users of the product and provides descriptions and explanations on the PWX powder brakes (installation and maintenance) and on all its parts and / or options that can be supplied by Renova.

Inside you will find:

- Instructions for the correct installation of the PWX brake, and relative maintenance
- Description of the possible versions of the PWX brake with relative dimensions and dimensions
- Technical data and related tables

Since the product and Renova itself are constantly evolving in order to improve the quality and performance of its products, Renova reserves the right to update the manuals to new versions, without the obligation to update products already marketed and / or any previous manuals.

warnings

CAREFULLY READ THE INSTRUCTIONS AND WARNINGS IN THIS MANUAL AND KEEP THEM FOR FURTHER REFERENCE FOR THE ENTIRE LIFE OF THE PRODUCT. IN THIS MANUAL ARE IMPORTANT INSTRUCTIONS RELATING TO OPERATIONS AND SAFETY FOR THE INSTALLATION, USE AND MAINTENANCE OF THE PRODUCT.

WE STRONGLY RECOMMEND ASSEMBLY OF THE DEVICE BY QUALIFIED TECHNICAL PERSONNEL IN ORDER TO AVOID ANY RISK OF DAMAGE TO PEOPLE, THINGS OR THE PRODUCT ITSELF.

IN THE EVENT OF ANY BREAKAGE OF THE PRODUCT, THE OPERATOR SHOULD BE AWARE OF THIS MANUAL AND THE INFORMATION INSIDE IT, KNOWING AND KNOWING TO AVOID ANY RISKS AND / OR DANGERS, BEFORE ANY INTERVENTION BY OUR TECHNICIAN.

assistance

Renova is present all over the world with its agents and distributors.

To contact the Renova support service write to:

support@renova-srl.it

description

The PWX series electromagnetic powder brakes guarantee perfect torque adjustment and stability over a wide speed range. The torque is produced by a special magnetic powder whose viscosity varies according to the magnetic field generated by modulating the coil supply current. This functional feature allows to design transmissions in which it is possible to easily adjust and program the braking (brake) or drag (clutch) torque according to the user's needs and in a wide range of use, from the minimum residual torque value: **Mr (residual torque Mr <= 1% Mn)**, up to the rated torque Mn of the brake/clutch (see Table). These clutches (brakes) can work with continuous slip at precise defined and stable torque values, determined by the level of electromagnetic excitation, provided that the heat dissipation is acceptable within the range specified in the table divided by size and version.

In order to transfer the torque, therefore, a slipping condition is not necessary between the brake/clutch input and output elements and, if the required torque does not exceed the maximum torque for which the brake is powered, a torque transmission with rotation will occur. synchronous between the brake / clutch input and output elements. Conversely, if the torque load exceeds the excitation torque level, the slip will occur in an absolutely regular way, transmitting only the set torque value. For all working modes, the static and dynamic torque coefficients are practically identical. The output torque is independent of the speed or slip speed. The characteristics of the powder are not sensitive to the increase in temperature in the workplace and the clutch always has the characteristic that the torque transferred is directly proportional to the supply current.

To adjust the braking torque Renova recommends using the ALPWX-5A module. The set torque is maintained with an accuracy of 5%, regardless of the number of revolutions or slippage between the brake body and the rotor. The operating rpm range is as follows:

50 - 3.000 [min-1] for brakes,

50 - 1.500 [min-1] for clutches.

ATTENTION: For clutches and brakes to work properly, their axis of rotation must be horizontal.

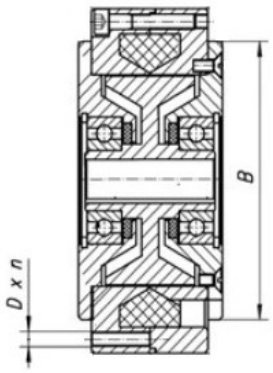
ALPWX-5A: power module

Technical specifications	
Power supply	From 12V to 27V AC or from 12V to 36V DC
Set power output	Adjustable from 1A to 5A, current-stabilized output, regulated through the reference analog inputs Reference nominal tension 24V DC
Power outputs	24VDC 200mA for sensors power supply (ex.: ultrasonic)
Set point auxiliary output	10VDC 50mA (control through potentiometer 5KOhm)
Digital inputs	3 dedicated digital inputs with configurable activation level through JP2 (0V or 24VDC) **FREE/BRAKE/DEMAG** functions
Digital outputs	2 Set-point analog inputs 0-10VDC and 4-20mA
Analog outputs	2 configurable analog outputs (supplied power or set point)
Comm Interface	RS485
Jumper	JP1: RS485 termination JP2: set up digital input activation mode
LEDs	2 for functioning and programming check 2 for activated pre-programmed functions check
Function	PSW protection - Automatic Demag function – Display value setting - **Smart Dancer**
Operating temperature	+0°C / +70°C
Available versions	DIP-SWITCHES user interface (mod. **ALPWX-5A-DSW**)
	LED DISPLAY user interface (mod. **ALPWX-5A-LED**)

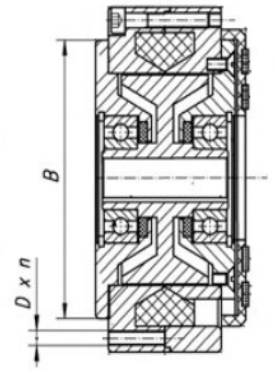
assembly procedures

PWX powder brakes and clutches require a few tricks to perform a correct assembly. Rather, it is recommended that you follow each step and check for correct execution.

Mount the brake or clutch on the shaft with the key in the appropriate seat.



Brake PWX



Clutch PWX

Assembly will be performed near the centering dimension B as per drawing. In case of flanged mounting it is important to check that the machining on the machine shoulder complies with the centering dimensions and tolerances for the flange dimension B **. In case of assembly with anti-rotation arm, the coupling flange of the arm to the brake must be suitably machined and fixed.

IMPORTANT: Since the brake (clutch) is symmetrical, dimension B in the drawing can be found in both parts of the product. However, one of these faces has the coil terminals which **must NEVER be mounted towards the machine shoulder** or otherwise they could short-circuit making the brake unusable. It is therefore very important to mount the coil terminals from the outside.

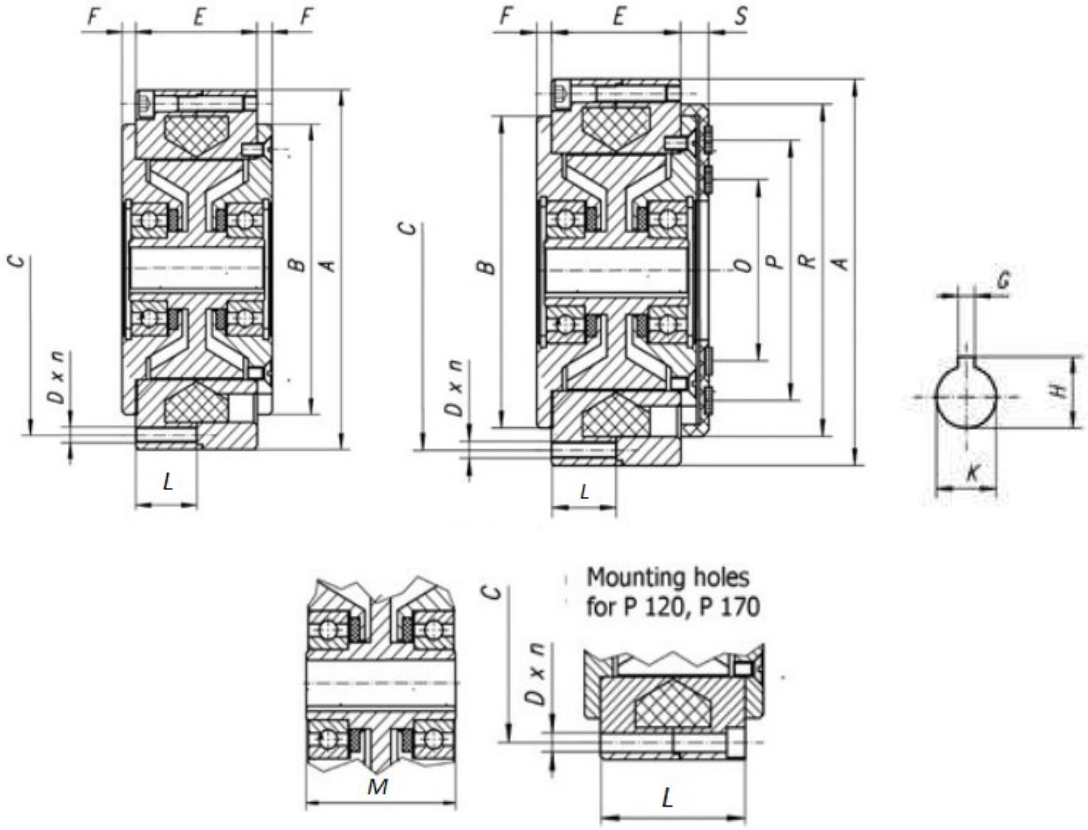
ATTENTION: In case of assembly of a clutch it will be necessary to fit a support for the clutch brushes which must work in contact with the manifold.

** If the assembly foresees a flanging through centering, it will be necessary to verify that the mechanical workings are carried out in tolerance so as not to axially or radially stress the brake / clutch bearings. Even in a possible case of assembly with belt or chain transmission (reduction or multiplication ratio), it will be necessary to avoid stressing the brake/clutch bearings. As a last step, tighten the mounting screws indicated in the drawing.

NOTE: as regards the part relating to the electronics of the brakes (clutches), we recommend, as mentioned above, the use of our ALPWX-5A power supply which provides greater stable electrical control.

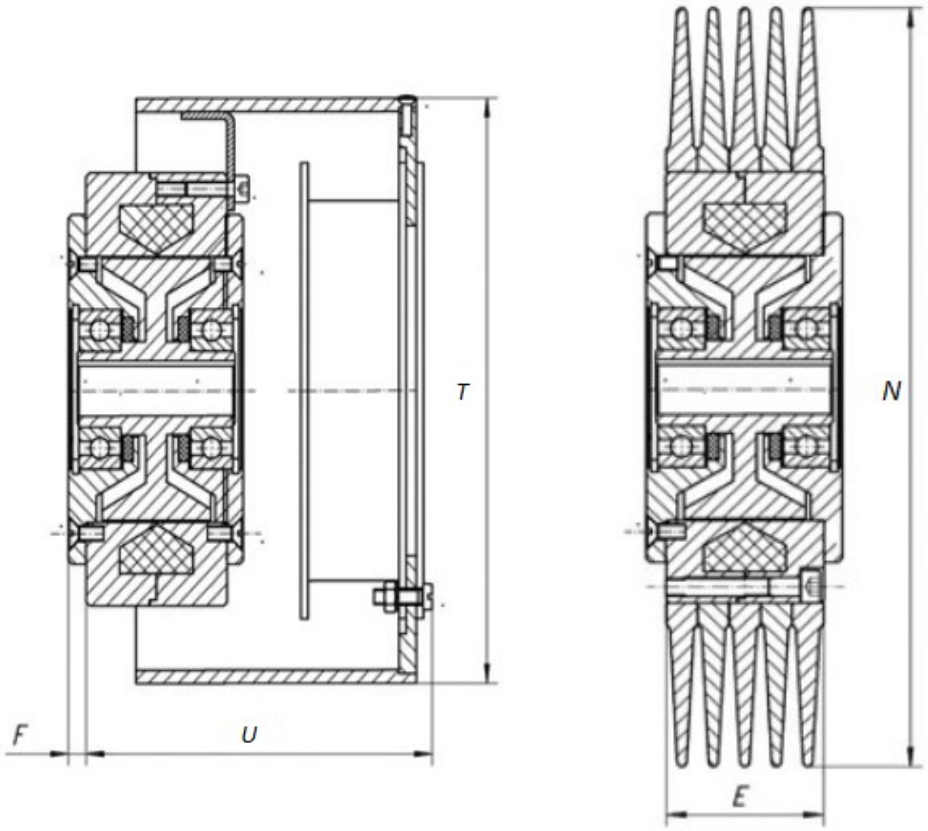
brake (clutch) assembly and dimension table

standard dimensions:



dimension	PWX 003	PWX 006	PWX 012	PWX 035	PWX 065	PWX 080	PWX 120	PWX 170
A [h8]	75	91	114	156	188	205	254	254
B	62	78	92	125	146	149	214	214
C	69	85	105	146	174	188	233	233
Dxn	M3x3	M3x3	M5x3	M5x6	M6x6	M6x6	Ø 8,5x8	Ø 8,5x8
E	25	32	40	48	56	64	70	86
F	5,5	5,5	5	5	5	6	6	6
G	3P9	4P9	4P9	5P9	8P9	8P9	10P9	10P9
H	$11^{+0,1}$	$19,3^{+0,1}$	$16^{+0,1}$	$19,7^{+0,1}$	$22,8^{+0,1}$	$31,3^{+0,2}$	$31,3^{+0,2}$	$31,3^{+0,2}$
K	10	17	15	17	20	28	28	28
(K max)	(15)	(22)	(25)	(35)	(38)	(38)	(42)	(42)
L	12,5	16	20	24	28	32	70	86
M	31	37	45	50	58	66	74	90
O (clutch)	42	52	54	64	70	90	108	108
P (clutch)	60	70	74	84	90	110	132	132
P-O / 2 (clutch)	9	9	10	10	10	10	12	12
R (clutch)	74,5	90,5	114	132	154	184	222	222
S (clutch)	10	10	10	10	10	10	10	10

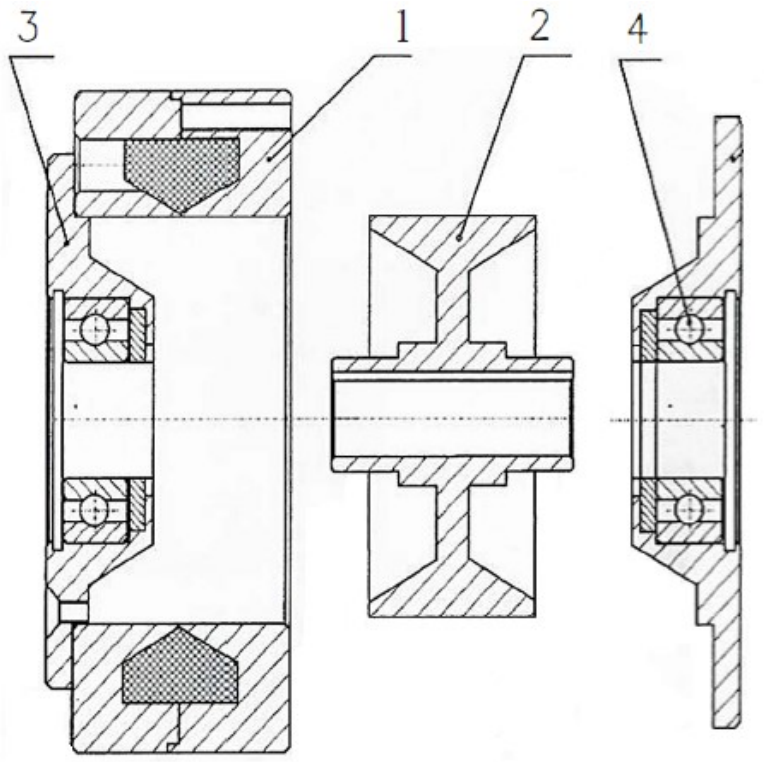
dimensions with optional:



dimension	PWX 003	PWX 006	PWX 012	PWX 035	PWX 065	PWX 080	PWX 120	PWX 170
N (with radiator)	110	140	200	260	330	350	390	390
T (with fan)	100	120	154	203	236	255	284	284
U (with fan)	86	93	99	125	137	145	202	218

costructiveness and functioning

The PWX series of powder brakes and clutches consists of the following parts:



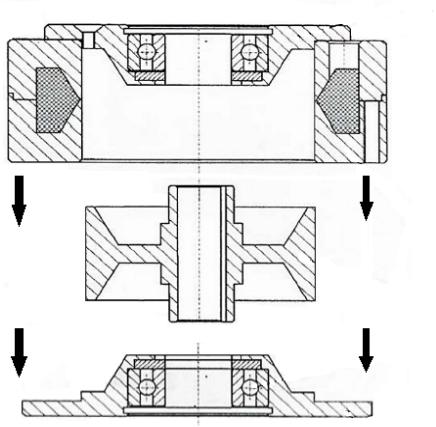
1. Electromagnet
2. Rotor
3. Flange
4. Ball bearings

The PWX brake (clutch) is composed of two coaxial rotors: the coil for the generation of the variable and controlled magnetic field is inserted in the external rotor and supports the internal rotor through two bearings. In the air gap (distance between the internal surfaces of the two rotors) the magnetic powder is distributed which has the property of varying its viscosity in proportion to the variation of the magnetic field generated by the coil. The change in viscosity translates into a change in the coefficient of friction between the two rotors, thus allowing you to adjust the amount of resistant torque in the brake (braking force), or of the transmission torque in the clutch (drag force). The torque transferred by the brake or powder clutch is therefore proportional to the intensity of the coil excitation current and is easily modulated from zero to the nominal value of the deliverable torque, this occurs for all models.

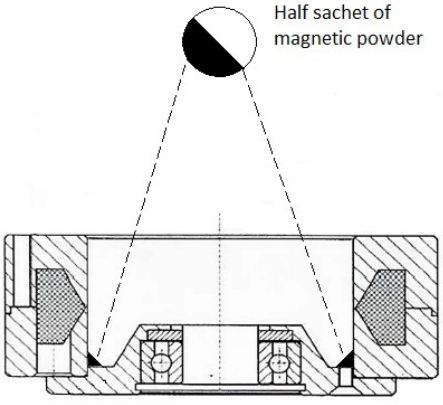
replacement of electromagnetic powder

The powder brake (clutch) does not require any particular maintenance other than a periodic replacement of the magnetic powder which allows the brake to operate correctly.

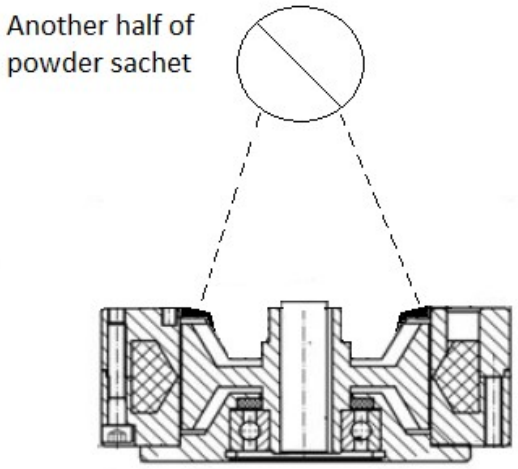
The replacement of the powder must be performed in a few steps:



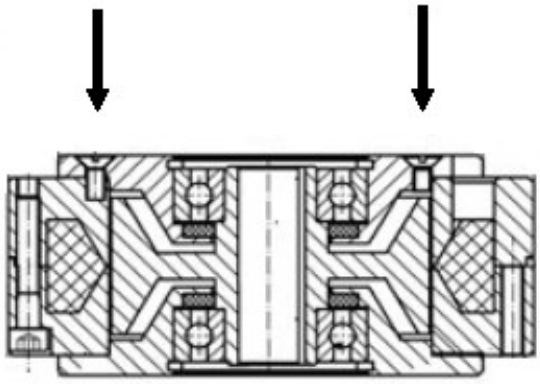
1) Remove the screws from the flange of the side opposite the coil terminals. Turn the brake upside down and place it on two spacers of 50 mm located outside the centering flange. Using a manual press, apply the force necessary to disassemble the internal rotor from the support bearing on the axis of the internal rotor. Alternatively, use a rubber mallet. However, the use of an aluminum pin / shaft is recommended. Remove the flange from the rotor. Then remove all traces of residual dust from the flange, rotor and internal brake body. It is recommended to carefully degrease and dry each internal part of the brake with alcohol or dry solvent using rubber gloves. Reposition the brake on the shims with the open side facing upwards, avoiding any interference with the coil terminals so as not to damage them.



2) Pour half of the magnetic powder inside the brake, trying to distribute it evenly as close as possible to the walls along the entire internal diameter. Then insert the rotor into the bearing in its seat by applying the necessary force by means of a manual press or by means of a hammer with rubber stops, taking care to interpose on an aluminum pin to avoid damaging the rotor hole.



3) Pour the residual magnetic powder into the rotor trying to distribute it evenly in the external area along the entire diameter



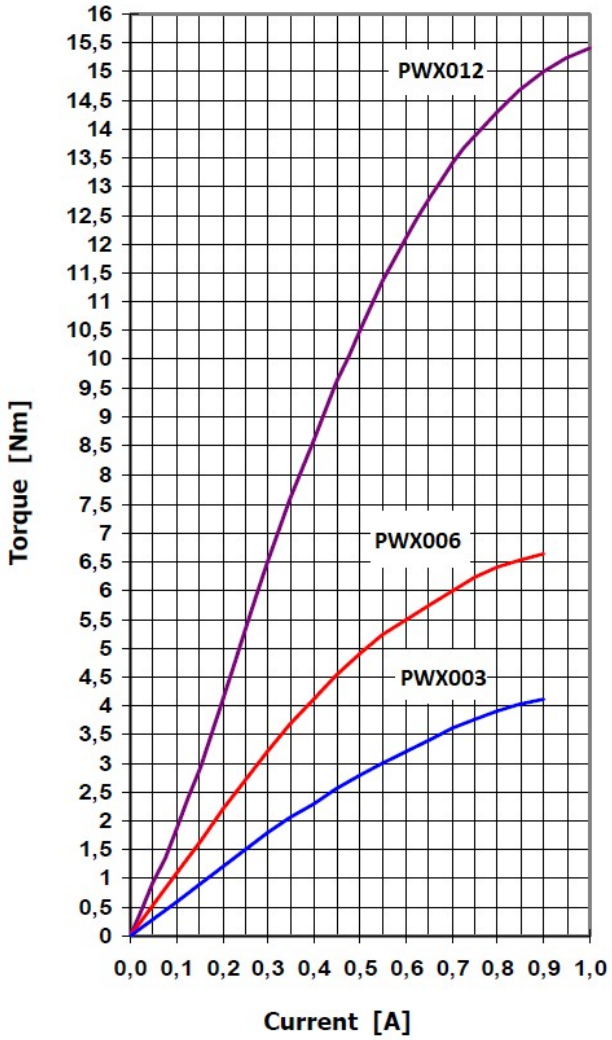
4) Reassemble the flange on the rotor by acting with a force directly on the bearing and then on the flange as soon as the bearing reaches the outer edge of the rotor. Check the correspondence of the holes of the closing screws on the flange with the threaded holes on the brake body, place the flange on the brake, then fix the flange to the body with the screws previously removed.

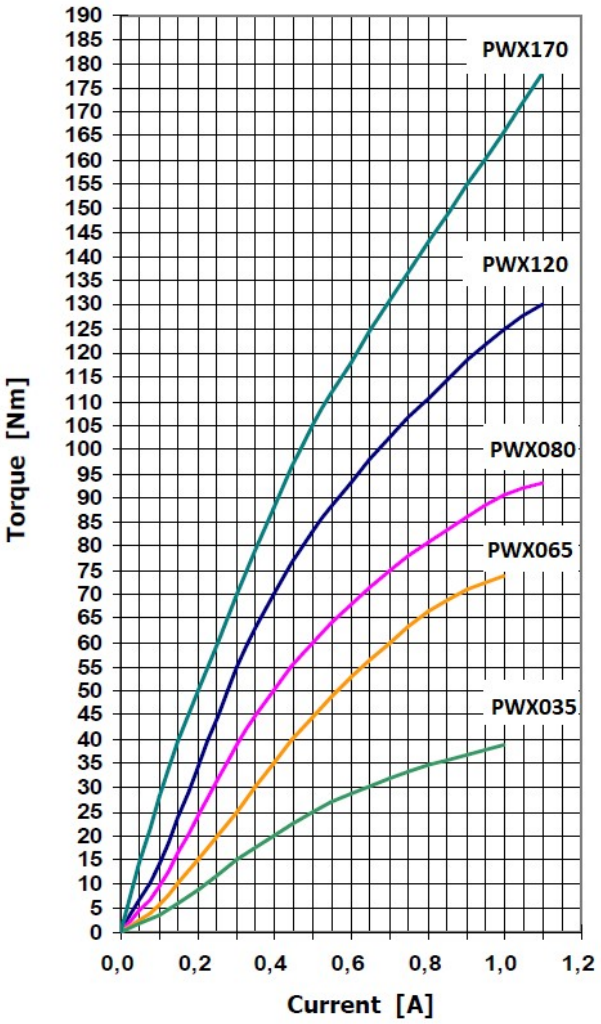
Below is a table with the PWX models available in Renova with indications on the quantities of electromagnetic powder to be used

Type of brake	PWX003	PWX006	PWX012	PWX035	PWX065	PWX080	PWX120	PWX170	PWX006HP
Electromagnetic powder	3 g.	5 g.	12 g.	35 g.	40 g.	44 g.	80 g.	115 g.	14 g.

technical datas and graphics

Technical data	PWX 003	PWX 006	PWX 012	PWX 035	PWX 065	PWX 080	PWX 120	PWX 170
Nom. Torque Nm	3	6	12	35	65	80	120	170
Residual Torque Nm	0,04	0,06	0,15	0,25	0,4	0,4	0,6	1,5
Supply voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Current intesity	0,8 A	0,96 A	0,92 A	1A	1A	1,1 A	1,2 A	1,2 A
Resistance	30 Ohm	25 Ohm	26 Ohm	24 Ohm	24 Ohm	22 Ohm	21 Ohm	21 Ohm
Engaging time ms t 9	100	110	130	280	360	350	530	800
Disengaging time ms t 01	50	60	70	100	140	170	200	270
Brake	PWX 003 B	PWX 006 B	PWX 012 B	PWX 035 B	PWX 065 B	PWX 080 B	PWX 120 B	PWR 170 B
Continuous heat dissipation	50 W	80 W	100 W	150 W	200 W	250 W	400 W	500 W
Weight	0,75 kg	1,4 kg	2.6 kg	5.0 kg	9.0 kg	12.7 kg	18 kg	24 kg
Brake with radiator	PWX 003 BR	PWX 006 BR	PWX 012 BR	PWX 035 BR	PWX 065 BR	PWX 080 BR	PWX 120 BR	PWX003BR
Continuous heat dissipation	100 W	160 W	200 W	280 W	400 W	500 W	800 W	1000 W
Weight	1,1 kg	1,9 kg	3.8 kg	7.5 kg	13.0 kg	18.5 kg	23 kg	30 kg
Brake with fan (the fan voltage: 24, or 115, or 230 VAC)	PWX 003 BV	PWX 006 BV	PWX 012 BV	PWX 035 BV	PWX 065 BV	PWX 080 BV	PWX 120 BV	PWX 170 BV
Continuous heat dissipation	150 W	300 W	400 W	600 W	800 W	1050 W	1600 W	2000 W
Weight	1,4 kg	2,2 kg	4.5 kg	8.0 kg	13.0 kg	17.0 kg	24 kg	28kg
Clutch	PWX 003 C	PWX 006 C	PWX 012 C	PWX 035 C	PWX 065 C	PWX 080 C	PWX 120 C	PWX 170 C
Continuous heat dissipation (500 rpm)	80 W	100 W	120 W	250 W	280 W	350 W	800 W	1000 W
Continuous heat dissipation (1000 rpm)	100 W	120 W	150 W	250 W	350 W	550 W	1000 W	1250 W
Weight	0,8 kg	1,5 kg	2.8 kg	5.2 kg	9.4 kg	13.3 kg	18,9 kg	24,8 kg
Clutch with radiator	PWX 003 CR	PWX 006 CR	PWX 012 CR	PWX 035 CR	PWX 065 CR	PWX 080 CR	PWX 120 CR	PWX 170 CR
Continuous heat dissipation (500 rpm)	250 W	350 W	440 W	640 W	960 W	1200 W	1600 W	2200 W
Continuous heat dissipation (1000 rpm)	300 W	400 W	500 W	800 W	1200 W	1550 W	2000 W	2750 W
Weight	1,2 kg	2,0 kg	4.0 kg	7.7 kg	13.4 kg	19.0 kg	23,7 kg	28,8 kg


Torque [Nm]
Current [A]
PWX012
PWX006
PWX003
0,0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1,0


Torque [Nm]
Current [A]
PWX170
PWX120
PWX080
PWX065
PWX035
0,0 0,2 0,4 0,6 0,8 1,0 1,2

warranty

Renova srl guarantees this device against any defects relating to materials and manufacturing for a period of 12 months from the date of delivery of the brake itself.

In the event that, during the period covered by the guarantee, the device exhibits malfunctions, please contact the representative of the Company in the country of origin, or, in the absence of these, Renova srl directly.

The warranty includes spare parts and labor, but the shipping costs for delivery or collection of the device are exempt.

The warranty becomes invalid in the following cases:

• Improper use of the product

• Incorrect installation

• Lack of maintenance

• Modifications or interventions with non-original components or with personnel not authorized by Renova srl

• Total or partial non-compliance with the instructions

• Exceptional events

Once the warranty period has expired, technical support will be carried out by the assistance network which will carry out repairs according to the rates in force.

Index of manual revision

Rev. n.	Revision date	Description of the chenges made

note

note

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