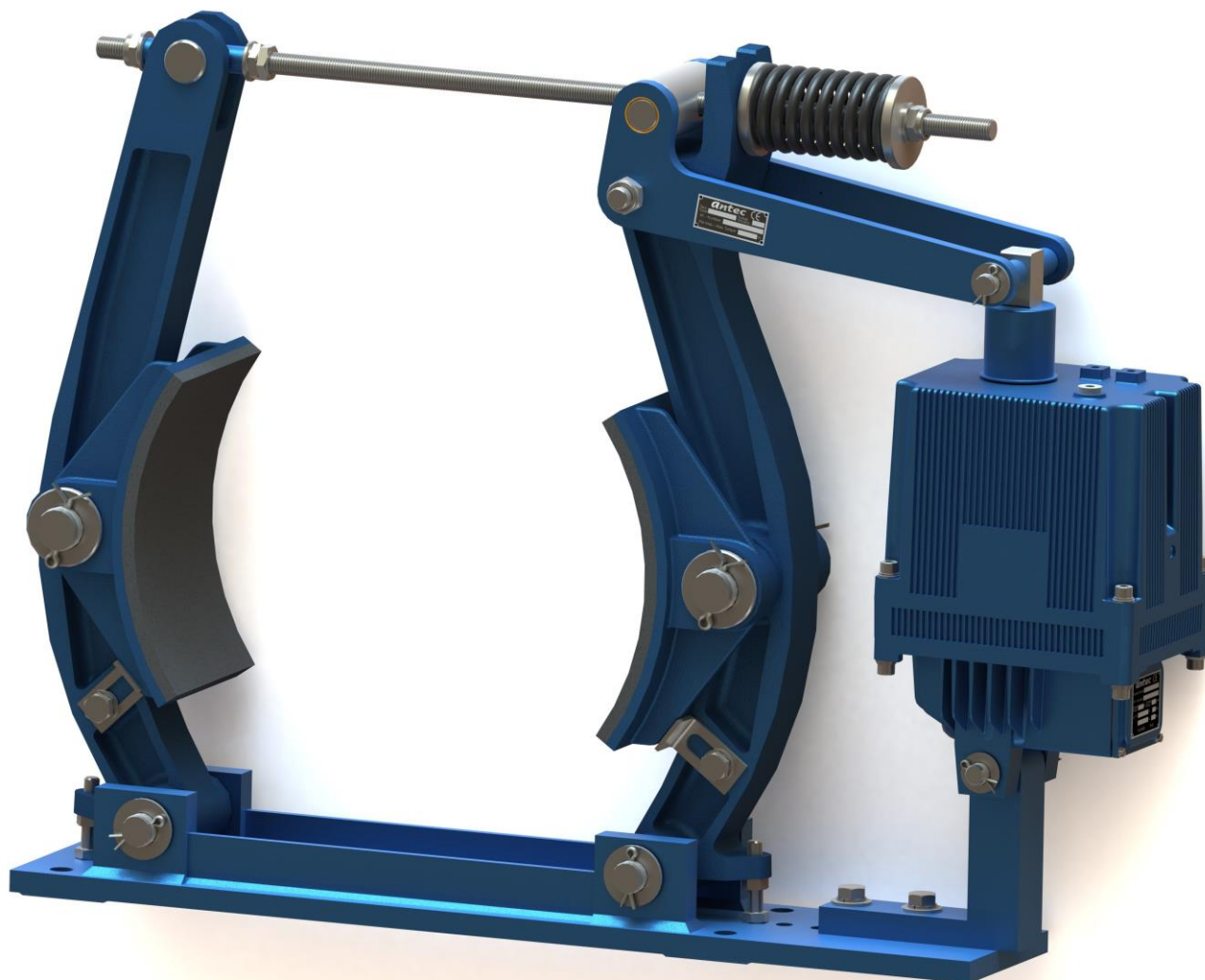


ELECTROHYDRAULIC BRAKES NDT-NFT-NAT

Instructions for assembly, adjustment and maintenance



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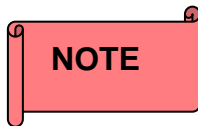
Instructions for assembly, adjustment and maintenance

1. INTRODUCTION.

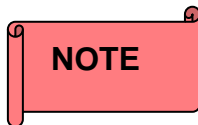
1.1. WHO IS THE TARGET AUDIENCE?

This manual has been written to aid with the installation, start-up, operation and maintenance of the brake. It is designed to help workers who are going to manipulate the brake and service technicians. It should therefore be made available to **everyone** who is going to work with these brakes and it must be ensured that the instructions given are followed.

This manual is intended to clarify any constructive doubts and the basic functions of the brake. We are sure that it will be an extremely useful information and reference tool for operators and technicians.



In the event of any problems or if you have any questions regarding the brake, please do not hesitate to contact the ANTEC After-Sales Service, specifying the brake model and the Antec order number, data that can be found on the label that each unit has.



Due to ongoing improvements to our brake designs, your brake may differ slightly from the one described in this manual. ANTEC reserves the right to make any changes deemed necessary.

1.2. SAFETY INSTRUCTIONS.

Various symbols appear throughout this manual which highlight the importance of the section in question. They are usually related to safety, and therefore require special attention.



Warning: This symbol will be included at points or in paragraphs that need special attention. It usually refers to an operation in which special care must be taken.



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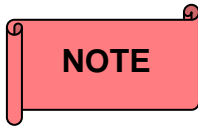
Instructions for assembly, adjustment and maintenance



Danger of death: This symbol will be included at points or in paragraphs that need special attention. It usually refers to an operation that might involve a death hazard.



High temperatures: This symbol will be included at points or in paragraphs that need special attention. It usually refers to an operation that might involve danger of high temperatures.



This symbol will be used to highlight an important comment or piece of information.

A number of general safety rules must be followed when handling Antec brakes:

1. All workers and technicians must wear appropriate gear when handling the brake (safety clothes, boots, helmet, goggles, etc.).
2. Always keep warning signs (if any) in good condition and adhere to them. During repairs or maintenance, place a card to inform other workers that an Antec brake is being repaired in that machine and that the power supply has been disconnected, if applicable.
3. Find out the exact specifications of the liquids used to ensure health and safety.
4. Make sure electrical apparatus (if any) is properly earthed to prevent electric shocks.
5. Respect the limits established for each brake element and for the brake itself.
6. Before switching on any machine fitted with Antec brakes ensure that the brake is properly fitted.

These are the general safety rules to be followed with any Antec product.



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1.3. RISK ASSESSMENT.

1.3.1. IDENTIFICATION OF THE BRAKE'S POTENTIAL RISKS.

In this section we will list the risks derived from the brakes made by Antec, S.A. in the event of malfunction (disassembly and assembly) and during their use by the end customer.

Risks when assembling and disassembling brakes:

Description of the risk identified	Measurement of the risk	Indication	Preventive solution adopted
Fall to a different level	Step ladder: 2m slant		Inform the operator. Basic training. Preventive inspection of stepladders.
Fallen material	Maximum weight: 10-45 Kg.		Operator training. Use of safety footwear. Use of gloves for a better grip on parts.
Cuts and blows	Use of tools for portable or manual assemblies.		Operator training. Use of protective gloves for certain assembly operations.
Projection of solid or liquid particles	Oil leaks through the drum/casing joint, maximum interior pressure: 5 bar.		Operator training. Setting of maximum filling levels Use of protective goggles.
Trapping	Manipulation of parts during assembly. Thrustor in operation, movement of the shank.		Operator training. Use of protective gloves.
Burns	Preheating stove, Ext. temp. 60 °C Thrustor in operation, Ext. temp. 100 °C		Operator training. Sticker indicating the risk of burns at the heat source. Use of protective gloves.
Electrocution	Use of test voltages. 185-910 V.		Operator training. Indicative sticker.






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Hazardous substances	Use of chemical products (oils, solvents, contact glue, etc.)		Operator training. Use of protective gloves.
Physical fatigue, back disorders.	Inadequate postures adopted during assembly and test. Lifting of weights. Maximum weight: 15-20 Kg.		Operator training. Use of support belts.
Physical comfort agents	Poor lighting (330/390 lux). High level of noise (LAeq = 93 dB(A)).		Use of ear protection.

Risks of brakes use:

Description of the risk identified	Measurement of the risk	Indication	Preventive solution adopted
Burns	Thrustor in operation, Ext. temp.: 100 °C		Hazard warning in the operation and maintenance instructions. Hazard warning on the unit.
Trapping	Thrustor in operation, vertical movement of the shank. Brake opening and closing. Brake operating, trapping by shoes-drum.		Indication in instructions. Placement of a protective cap on large models.
Electrocution	Voltages of AC operation (185-910 V.)		Indication in instructions. Waterproof terminal box, IP 65.



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1.3.2. ANALYSIS AND ASSESSMENT OF THE RISKS IDENTIFIED.

Assessment of the risks identified, for this a value from 0-3 is assigned to each risk, where 0 is the lowest risk (none) and 3 the maximum (high).

Description of the risk	Risk during assembly / test Risk of use	Assessment
Fall to a different level	Assembly	1 – low
Fallen material	Assembly	1 – low
Cuts and blows	Assembly	1 – low
Projection of solid or liquid particles	Assembly - Test	2 – medium
Trapping	Assembly - Test - Use	1 – low
Burns	Assembly - Test - Use	3 – high
Electrocution	Test - Use	2 – medium
Hazardous substances	Assembly	1 - low
Physical fatigue	Assembly - Test	1 – low
Physical comfort agents	Assembly	2 - medium

1.3.3. MEASURES ADOPTED TO MINIMISE THE RISKS ANALYSED.

Once the risks derived from the assembly and use of the brakes have been identified, analysed and assessed, a series of measures are taken to eliminate the risks that are possible to eliminate or to minimise them as much as possible.

To do so two, different paths are taken, varying the design or pointing out the risk if it cannot be eliminated.

- Design variations.

The thrustors do not allow for significant design modifications, they are machines with an aluminium shell that conveys heat in a fairly linear manner. Therefore, the most significant risk of those identified refers to the high operating temperatures, which is not easy to eliminate. The motor shells have therefore been fitted with a series of fins that allow for a greater cooling surface and the turbines have been fixed so that their movement does not have an incidence in increasing the temperature.



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- Special markings.

Faced with the impossibility of operating the devices at temperatures lower than 35 °C, the need is established to provide high temperature warnings in the operation and maintenance instructions, and on the devices themselves, accompanied by a legend (the client will mark it if they deem it appropriate).



CAUTION: High temperature. Do not touch.

Similarly, the electrocution risk will be indicated with a warning sign, this indication will be in the operation and maintenance instructions and not in the actual unit, as access to voltage areas (terminal box) is protected by an IP 65 cover.



The existing risk of trapping will be pointed out in the operation and maintenance instructions, indicating the risk area (the thruster's shank and the brake shoes).



As for the risks derived from the products necessary for the manufacture and testing of the units, in addition to the personal protection equipment necessary to carry out the work, the following series of rules are established:

- To minimise the risk of falls to different levels, the ladders must be inspected before carrying out any work, rejecting those that are not in adequate conditions and providing training and specific information to the workers.



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- To avoid the falling of materials during manipulation, adequate information will be provided to staff on the correct manipulation of loads. Tools with a comfortable grip must be used and they must be kept clean and in good condition. CE marked safety footwear will also be used to minimise injuries in the event of materials falling on lower extremities. Gloves with the CE marking will be used to increase adherence and reduce the risk of dropping tools.

- To avoid the risk of blows and cuts caused by objects, portable or manual tools, or projections of solid or liquid particles, or the risk of trapping, safety gloves will be used to increase adherence (their use during drilling operations or others with a possible risk of trapping/tangling is not prudent), and safety footwear, which will have a reinforced toecap, a rubber sole with a well-marked pattern and without fittings, to avoid slipping and electrical contacts. Safety goggles will also be used whenever there is work where solid or liquid particles could be projected. Training and information will be provided to workers concerning the correct use of the tools. The machines must only be operated by experienced operators that have perfect knowledge of the work to be carried out, the characteristics of the equipment used, the risks entailed and the ways to prevent them.

- For the use of pneumatic tools: For the operation of pneumatic tools: always purge the air conduits and verify the state of the flexible tubes and the connection hoses. A moving machine will not be manipulated without having checked its total safety, including the protection of moving parts. Never use hands or feet to slow down the machine.

- To avoid the risk of electrocution, before using a device or electrical installation make sure it is in a perfect state. To use a device or electrical installation, only move the control devices planned for this purpose by the builder or designer. In the event of damage or accident, cut off the electrical supply as a first measure. Any anomaly observed in the electrical installations must be immediately communicated to the electrical service.

- The risk of contact with hazardous substances and chemical products will be avoided by using appropriate protection gloves for chemical risks during their manipulation. The safety data sheets of all chemical products will be requested from suppliers. The instructions contained in the Safety Data Sheets of the products will be followed regarding the hazards, precautions, fires, accidents, intoxication etc. Chemical products will be kept in the original container. In the event of transferring to a container with different labelling. Training and information will be provided to workers.



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- To reduce the risks of physical fatigue caused by inadequate postures and back disorders, raising arms above shoulder level will be avoided. Tasks that involve different groups of muscles will be alternated. Maintaining the same posture during extended periods of time will also be avoided. If possible the standing-seated posture will be allowed. Training and information will be provided for the correct handling of loads (straight back, bent knees, etc.).

Recommendations are included to protect the back when manually handling loads. Whenever possible, to move or transport loads the auxiliary means available will be used. Tasks that require handling very heavy loads will be carried out with the aid of another worker. There will be periodic rests when these activities are lengthy or staff rotation among those who carry out these tasks. Back protection belts will be used at the moment when this activity will be carried out and information concerning its use will be provided.

- The risks created by physical comfort agents such as lighting will be avoided in the event of requests by the workers, if they consider the lighting to be poor, by increasing the number of lamps of their location.

- To avoid the risks created by chemical agents, the indications of the installation manufacturer and the chemical product suppliers will be followed when handling them. With the aim of assessing the risk, it would be necessary to carry out measurements and see the need for localised suction. Protective breathing equipment will be used that offers protection against organic vapours. The protection equipment must have the corresponding EC marking. Training and information will be provided concerning the correct use and maintenance of the breathing protection equipment. Containers with lids will also be provided to workers to collect the waste impregnated with residues and thus reduce the emission of vapours. Recipients or containers must not be left open after use.

- Physical agents as well as the noise level shall be avoided at this work position as required by R.D. 1316/1989, depending on the levels that could affect the workers. WORK POSITION WITH LEVELS GREATER THAN 90 dB. It will be obligatory to provide each worker with adequate information and training regarding the assessment of their exposure to noise and the potential risks to their hearing, in addition to the preventive measures adopted, the use of hearing protection and information on the results of the medical examination of their hearing. Workers exposed to these levels must undergo periodic medical checkups, at least once per year, and all workers must use hearing protection. The risk areas must be indicated and access to them limited, in addition to developing a program of technical measures destined to reducing such effects.



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1.4. GENERAL ASPECTS.



The use of Antec brakes for unplanned operations or the negligent use thereof could seriously damage them or severely injure people standing nearby.

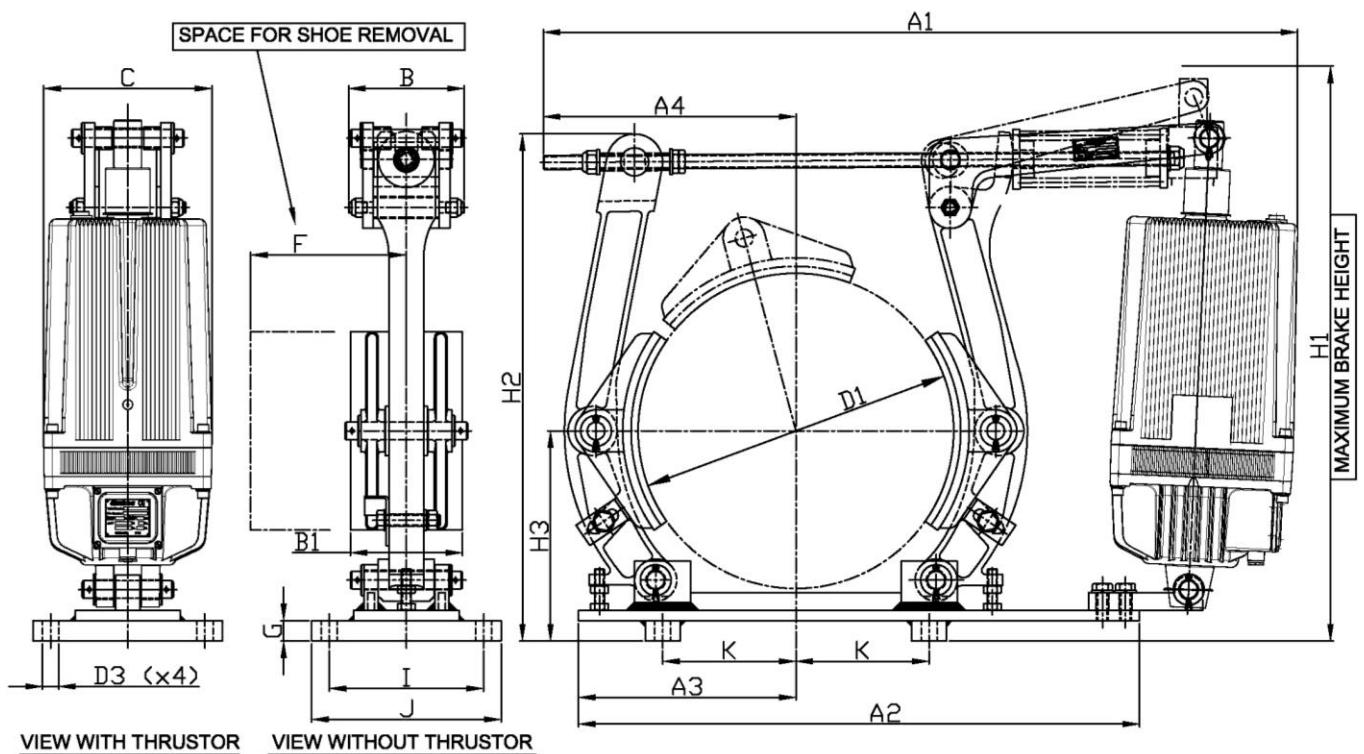
Both in the manufacturing of the brake as in that of all its components, the required standards of the related standard are complied with.

The NDT-NFT-NAT electrohydraulic brakes are brakes that brake mechanically by means of the action of a spring, when electric power is lacking for the electrohydraulic TURBEL brake lifter used.

This electrohydraulic brake lifter is powered by three-phase AC current.

The braking torque of these brakes can be adjusted by varying the spring's length values.

Relationship between technical and dimensional parameters of the NDT-NFT-NAT brakes based on the figure below:





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NDT (values in mm)

BRAKE TYPE	THRUSTOR TYPE	TORQUE (Nm)		WEIGHT Kgr.	DRUM WIDTH	SHOE WIDTH	DIMENSIONS																
		min.	max.				B2	B1	D1	D3	H3	I	K	A1	A2	A3	A4	B	C	F	G	H1	H2
160	I-256	70	140	23	80	65	160	11	125	55	108	574	410	130	203	62	160	70	20	405	295	80	
200	I-256	138	275	29	75	70	200	14	160	55	145	674	510	185	197	116	160	125	19	404	355	90	
	I-356	178	355	34								685			202					497			
250	I-256	165	330	35	95	90	250	18	190	65	180	760	580	220	210	107	160	130	13	423	413	100	
	I-356	243	485	40																500			500
315	I-356	320	640	59	118	110	315	18	230	80	220	770	690	260	226	159	160	180	18	593	588	120	
	II-506	475	950	62								805			216		195			619			
	II-806	725	1450	63								846			229		195			633			
400	II-506	575	1150	85	150	140	400	22	280	100	270	976	800	310	295	165	195	210	18	708	704	150	
	II-806	750	1500	87								976			295		195			708			
	III-1306	1225	2450	107								1017			329		240			779			
500	II-806	850	1700	125	190	180	500	22	340	130	325	1065	940	365	337	190	195	250	23	816	803	180	
	III-1306	1350	2700	145								1070			334		240			816			
	III-2006	2150	4300	147								1070			334		240			824			
630	III-1306	1600	3200	240	236	225	630	27	420	170	400	1214	1150	460	410	230	240	305	23	955	940	220	
	III-2006	2500	5000	242								1254			450					955			
	III-3006	3350	6700	244								1198			394					960			
	III-3012	4400	8800	258								1367			440					970			
	III-2006	2900	5800	323								1353											
710	III-3006	3850	7700	324	265	255	710	27	470	190	450	1353	1280	510	468	250	240	340	27	1082	1061	250	
	III-3012	5250	10500	338								1491											

NFT (values in mm)

BRAKE TYPE	THRUSTOR TYPE	TORQUE (Nm)		WEIGHT Kgr.	DRUM WIDTH	SHOE WIDTH	DIMENSIONS															
		min.	max.				B2	B1	D1	D3	H3	I	K	A1	A2	A3	A4	B	C	F	G	H1
150	I-256	65	130	24	80	65	150	11	125	135	90	580	400	120	201	73	160	70	10	400	295	160
200	I-256	135	270	30	80	70	200	15	161	130	75	675	510	185	197	116	160	125	9	404	355	160
	I-356	175	350	35								687			202					497		
250	I-256	165	330	36	90	90	250	18	181	130	94	690	580	220	201	107	160	130	9	423	413	160
	I-356	250	500	41								745			205					505		
350	I-356	325	650	61	130	110	350	20,5	250	180	145	855	690	260	263	160	160	180	28	615	613	230
	II-506	500	1000	64								920			278		195			644		
	II-806	800	1600	65								960			291		195			659		
450	II-506	625	1250	88	170	160	450	23	300	220	190	1045	800	310	326	165	195	190	29	728	724	270
	II-806	850	1700	90								1055			336		195			728		
	III-1306	1375	2750	110								1080			360		240			803		
530	II-806	925	1850	131	195	180	530	25	355	240	235	1145	940	365	383	190	195	240	23	833	823	290
	III-1306	1475	2950	151								1145			396		240			833		
	III-2006	2325	4650	153								1150			381		240			838		
600	III-1306	1575	3150	242	210	190	600	28	400	254	272	1175	1150	460	394	230	240	290	22	947	929	310
	III-2006	2450	4900	244								1207			424					947		
	III-3006	3275	6550	246								1207			424					949		
	III-3012	4400	8800	260								1330			424					957		
750	III-2006	3025	6050	328	230	210	750	31	475	290	338	1375	1280	510	470	250	240	330	34	1084	1071	350
	III-3006	4000	8000	329								1375			470					1084		
	III-3012	5475	10950	343								1545			504					1084		



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NAT (values in mm)

BRAKE TYPE	THRUSTOR TYPE	TORQUE (Nm)		WEIGHT Kgr.	DRUM WIDTH B2	SHOE WIDTH B1	DIMENSIONS																
		min.	max.				D1	D3	H3	I	K	A1	A2	A3	A4	B	C	F	G	H1	H2	J	
8" 203,2	I-256	140	280	32	83	77	203,2	17,5	178	146	83	675	510	185	197	107	160	125	19	411	373	190	
	I-356	183	365	37								686								507			
10" 254	I-256	168	335	38	95	90	254	17,5	213	159	102	710	580	220	221	107	160	130	19	446	436	200	
	I-356	245	490	43								772								515			
13" 330,2	I-356	345	690	63	146	140	330,2	20,5	251	228	146	815	690	260	244	159	160	180	28	616	614	280	
	II-506	500	1000	66								865			253		195			644			
	II-806	775	1550	67								890			253		195			660			
16" 406,4	II-506	550	1100	90	171	165	406,4	27	308	273	190,5	1002	800	310	315	165	195	210	34	735	730	330	
	II-806	750	1500	93								980			295		195			812			
	III-1306	1225	2450	114								1010			320		240			825			
19" 482,6	II-806	850	1700	134	222	216	482,6	27	336	330	235	1090	940	365	333	190	195	240	240	30	817	805	390
	III-1306	1350	2700	155								1075			355		240				825		
	III-2006	2125	4250	157								1143			404		240				825		
23" 584,2	III-1306	1525	3050	245	286	279	584,2	33,5	403	406	298	1217	1150	460	430	230	240	290	25	950	934	480	
	III-2006	2400	4800	247								1257			470					950			
	III-3006	3200	6400	250								1201			415					955			
	III-3012	4300	8600	265								1380			461					960			
	III-2006	3125	6250	332								1430			520								
30" 762	III-3006	4150	8300	333	362	356	762	39,5	527	482	381	1400	1280	510	489	250	240	330	48	1145	1121	560	
	III-3012	5700	11400	347								1540			489								

The technical data sheet that shows the technical and dimensional parameters of the Turbel brake lifter is BC.TDS.00007I.



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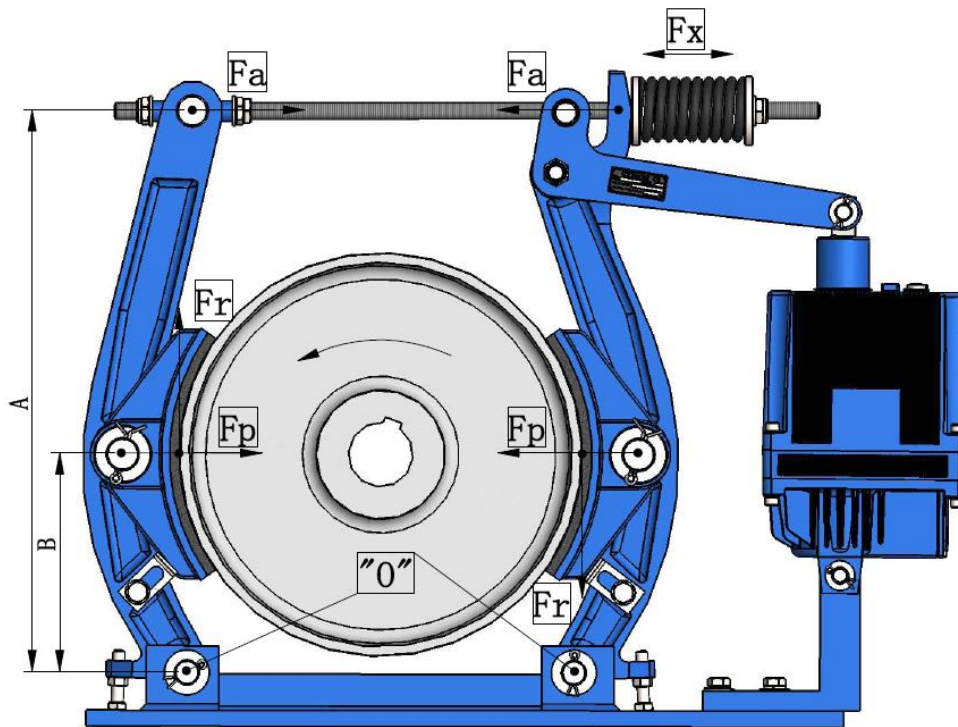
2. BRAKE OPERATION.

The electrohydraulic drum brakes brake using the force exercised by a spring.

The mounted compressed spring tends to extend itself, this extension force (F_x) is conveyed to the arms creating a force (F_a) that is equal but in the opposite direction in each arm.

Due to the relationship of the distances (A and B) that there is in arm with respect to the rotation axis (O) a force (F_p) is created that is equal in both brake shoes in the opposite direction that makes the brake operate. We shall call this force (F_p), the clamping force.

Each of the forces created in the brake shoe (F_p) generates a friction force (F_r) at a tangent to the drum in one direction or the other depending on the rotation direction of the drum. The result of adding the two friction forces of brake shoes will be what is known as braking force.



$$F_a(N) \quad F_x \text{ (Extension force of the spring)}(N) = K \text{ (Spring gradient)}(N/mm) \times (L_0 \text{ (initial spring length)}(mm) - L_1 \text{ (compressed spring length)}(mm)).$$

$$F_p(N) = F_a(N) \times A(mm) / B(mm).$$

$$F_r(N) = \mu \text{ (friction coefficient of lining } \mu=0.4) \times F_p(N).$$

$$\text{Braking force (N)} = 2 \times F_r(N).$$

$$\text{Brake torque (Nm)} = F_r(N) \times \varnothing \text{ (Drum diameter)}(m)$$



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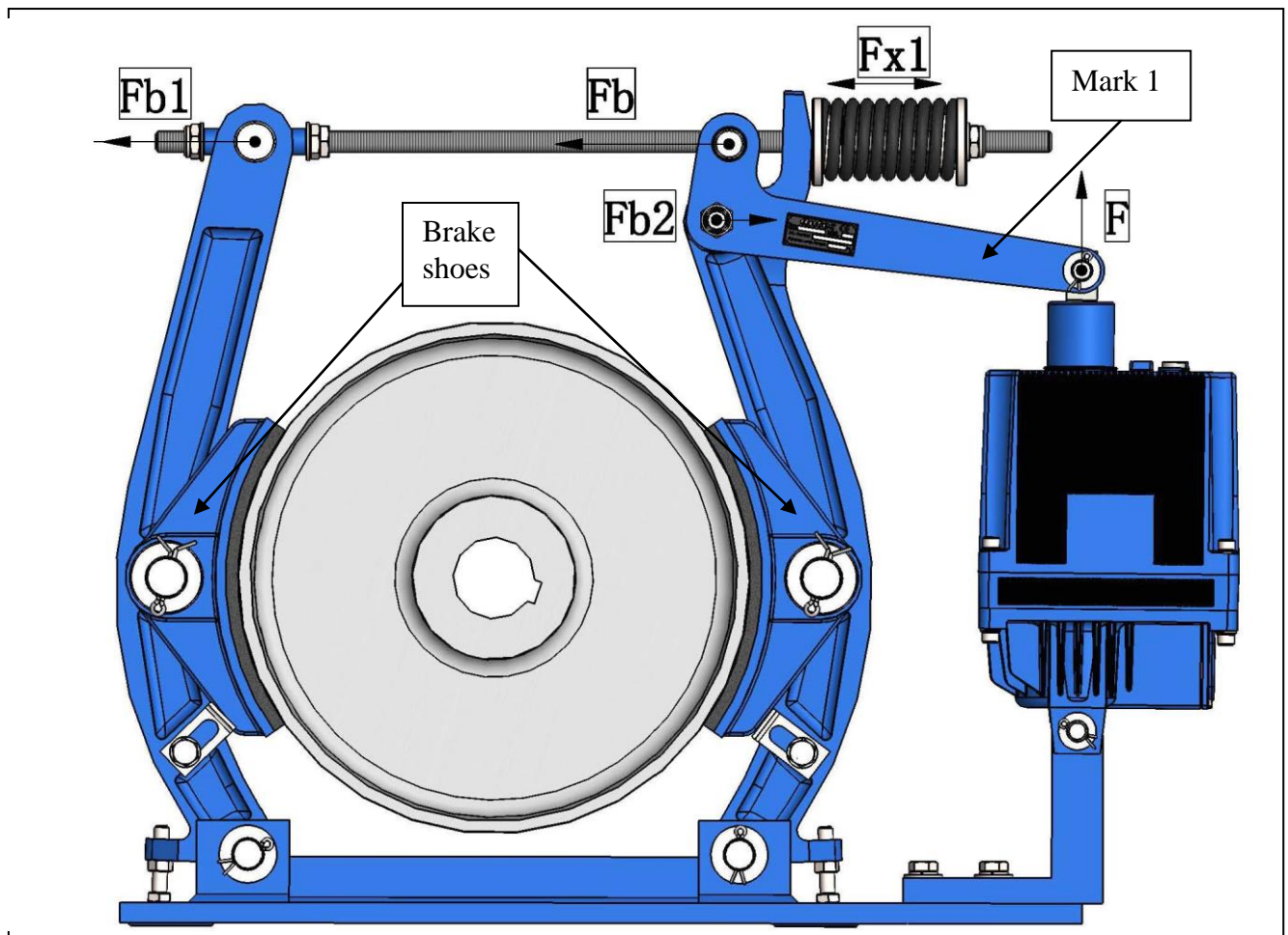
Instructions for assembly, adjustment and maintenance

The electrohydraulic drum brakes release the brake or open when the thruster brake lifter is electrically connected.

The thruster brake lifter assembly, adjustment and maintenance instruction is 01.165I.

When the thruster is connected it generates a force (F) capable of overcoming the force F_{x1} , the force generated by the spring when the brake is open, bear in mind that $F_{x1} > F_x$ where F_x is the force of the spring when the brake is closed.

When the force (F) is generated in the thruster, the thruster's piston pushes the brake lever (Mark 1) up with which force F_b is generated, which transmitted to the brake arms, generates forces F_{b1} and F_{b2} making the brake arms open, unlocking the drum's brake shoes.





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3. BRAKE ASSEMBLY.

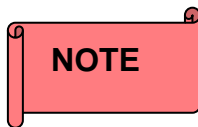
To assemble an electrohydraulic brake onto the related drum, proceed as follows:

3.1. The first thing an operator must do when he is going to assemble an Antec brake is unpack it.

When the brakes leave the factory, they are always packaged to ensure maximum safety during transportation.

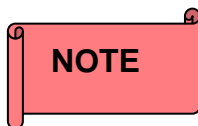
The brakes are supplied fully assembled and with their respective TURBEL brake lifters filled with the appropriate oil for their proper operation.

ANTEC certifies that the brakes have been tested on the company's test benches at its facilities using the appropriate operating oil.



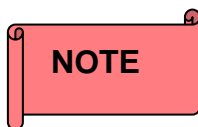
The customer will receive the documentation of the tests carried out on the brakes on the test benches, along with the documentation sent by Antec's quality department.

3.2. Before starting with the assembly of the brake, verify that both the drum and the base onto which the brake is to be mounted are clean and dry. Any residue, whether grease, oil or particles due to drum corrosion could prevent the brake and lining from working properly.



When you clean the base and the drum you can use oil or diesel the first time (insofar as the client allows it), but after that (most important) the drum must be cleaned using a solvent. Take care when using solvents. To finish carefully dry the drum.

During transportation and storage, residue may build up on the brake's contact surfaces with a future bracket and on contact faces of the linings and the drum. We therefore recommend cleaning them thoroughly.

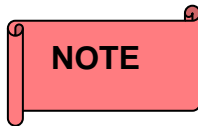


IMPORTANT Do not use liquid to clean the linings. Clean them using a dry paper towel or cloth.



NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



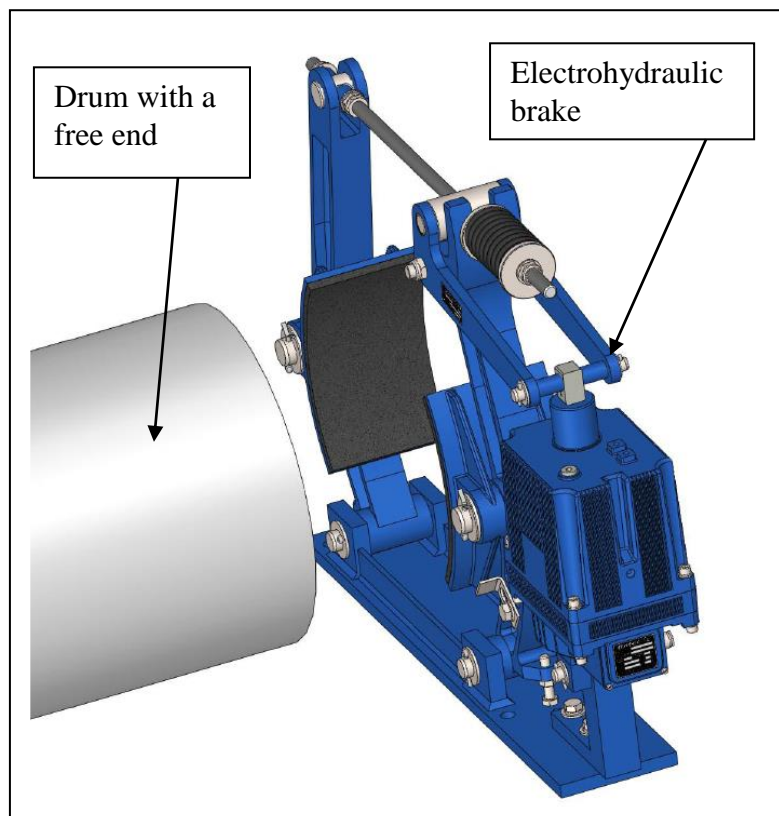
NOTE

The brakes have been designed in accordance with the customer's specifications. Therefore, possible drum and brake bracket machining defects have in no event been taken into account.

ANTEC thinks it is worth mentioning that possible flaws regarding parallelism and flatness in the brake's disc and securing bracket could reduce the contact surface area between the lining and disc.

3.3. There may be two possible cases of drum with which the electrohydraulic brake can be mounted.

3.3.1. If the electrohydraulic brake acts on a drum with a free end, the assembly must be done in the following manner:



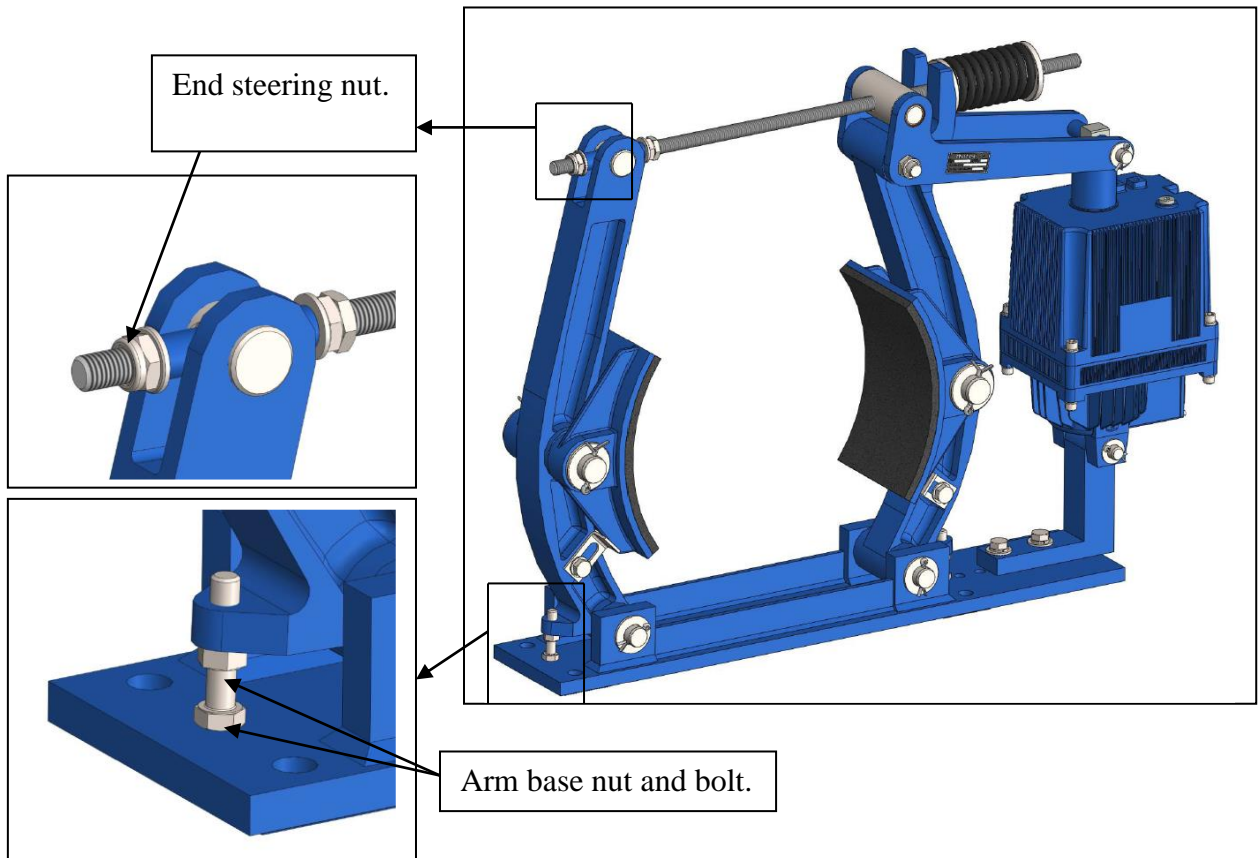
- Loosen the nuts and bolts shown in the following diagram:

- Arm base nut and bolt.
- End steering nut.



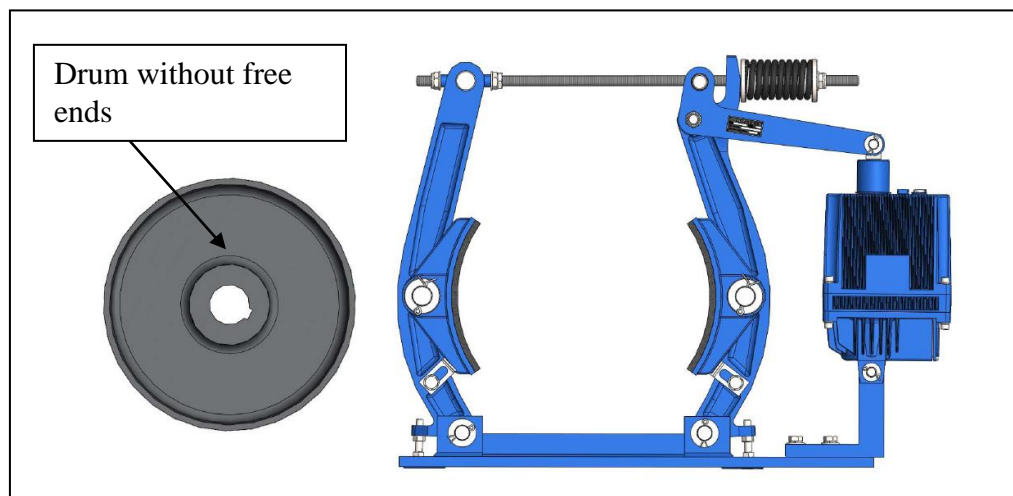
NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



- Insert the brake through the free end of the drum.

3.3.2. If the electrohydraulic brake acts on a drum without free ends, the assembly must be done in the following manner:



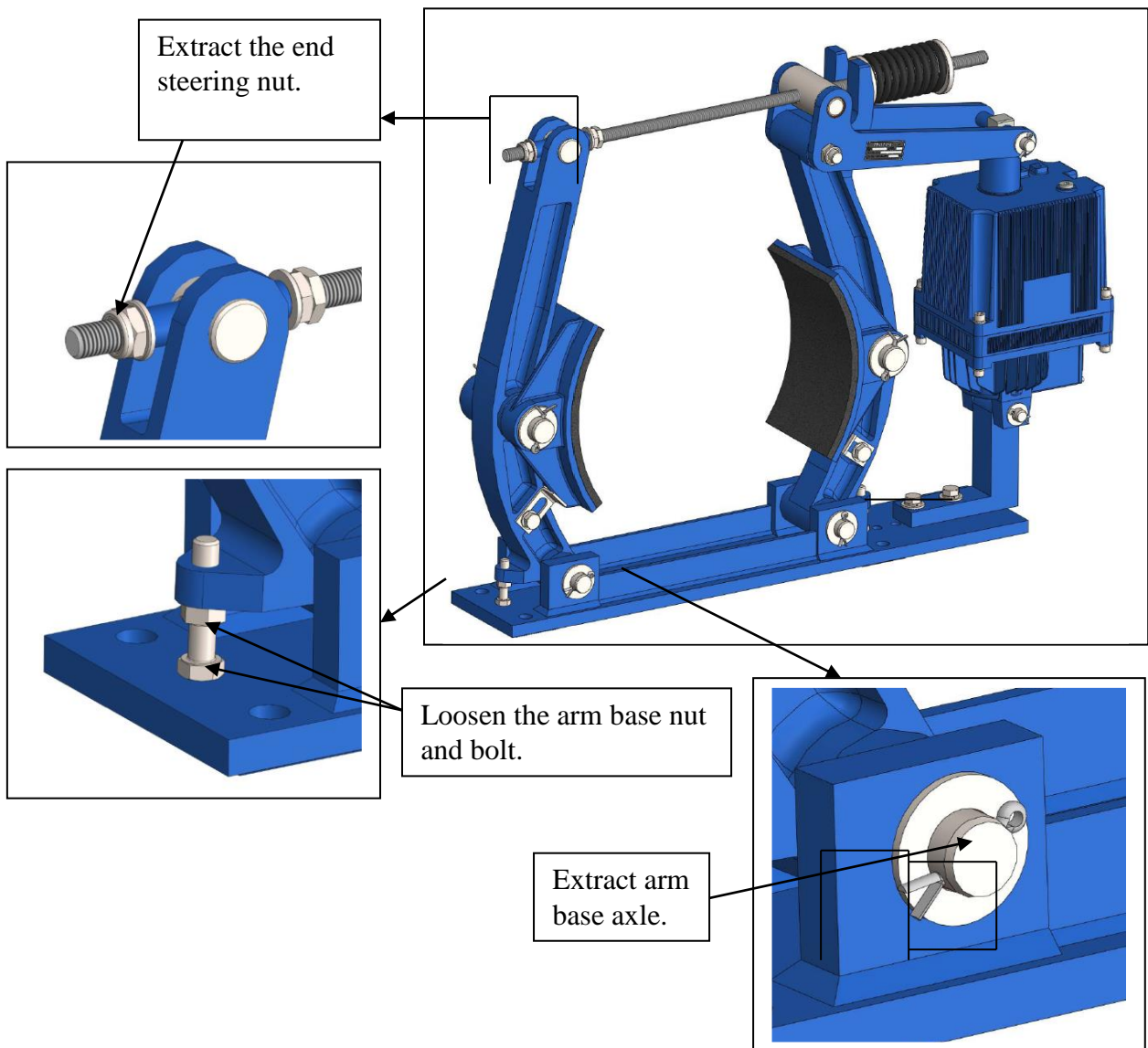


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

- Loosen or extract the nuts, bolts and axle shown in the following diagram:

- Loosen the arm base nut and bolt.
- Extract the end steering nut.
- Extract arm base axle.



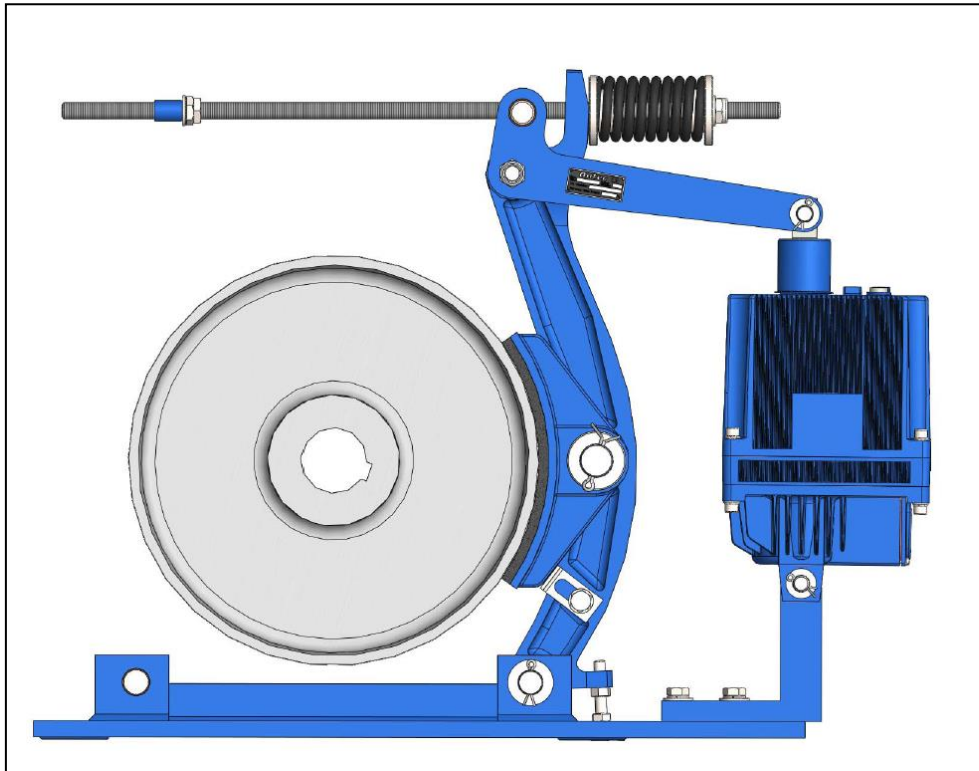
The purpose of loosening and extracting these parts is to dismantle the arm in order to facilitate the subsequent sideways assembly of the drum without free ends.

- Insert the brake through a side of the drum.

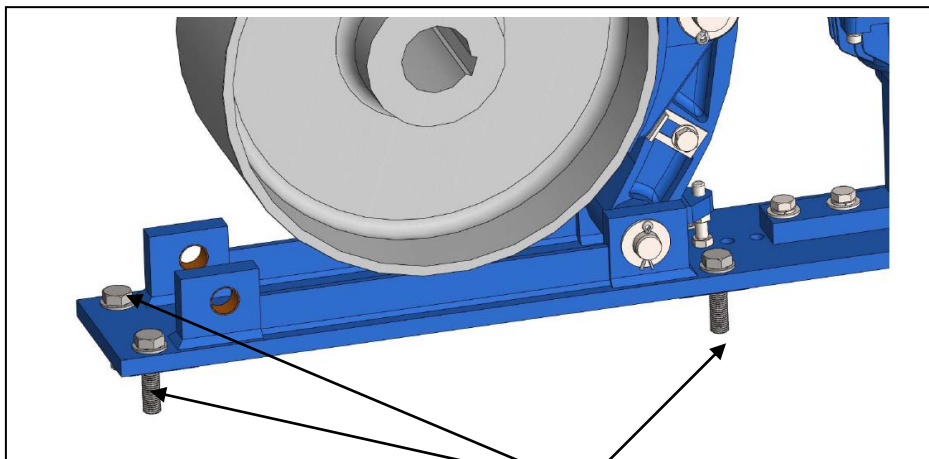


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



3.4. Whether case 3.3.1 or 3.3.2 of point 3.3, after this point, anchor the brake to the bracket with the four appropriate bolts.



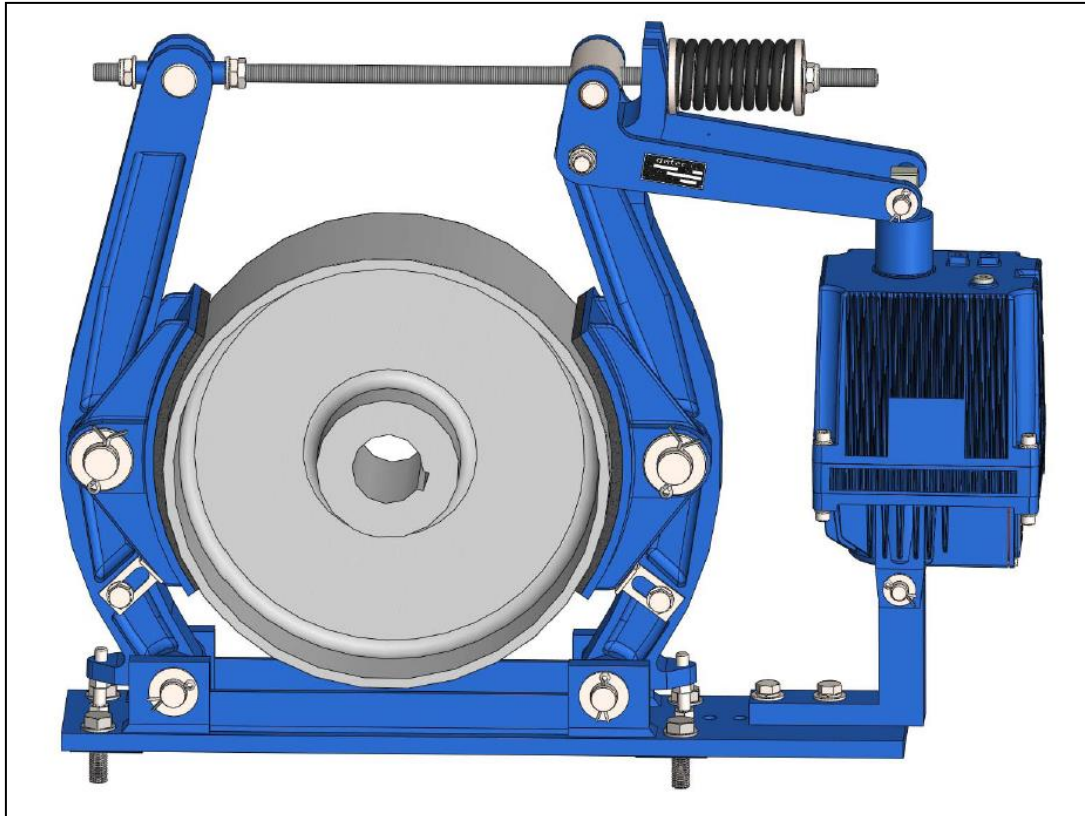
Anchor four bolts.



NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

3.5. In case 3.3.2 of point 3.3, reassemble the parts that have been dismantled.



3.6. Once the brake has been fitted onto the drum proceed to adjust it and set it.

NOTE

The client must foresee whether variable thickness gauges and wedges will be required to rectify the parallel alignment and height of the axle.

When the brake is properly assembled the shoes must be properly axially centred with the drum.



NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

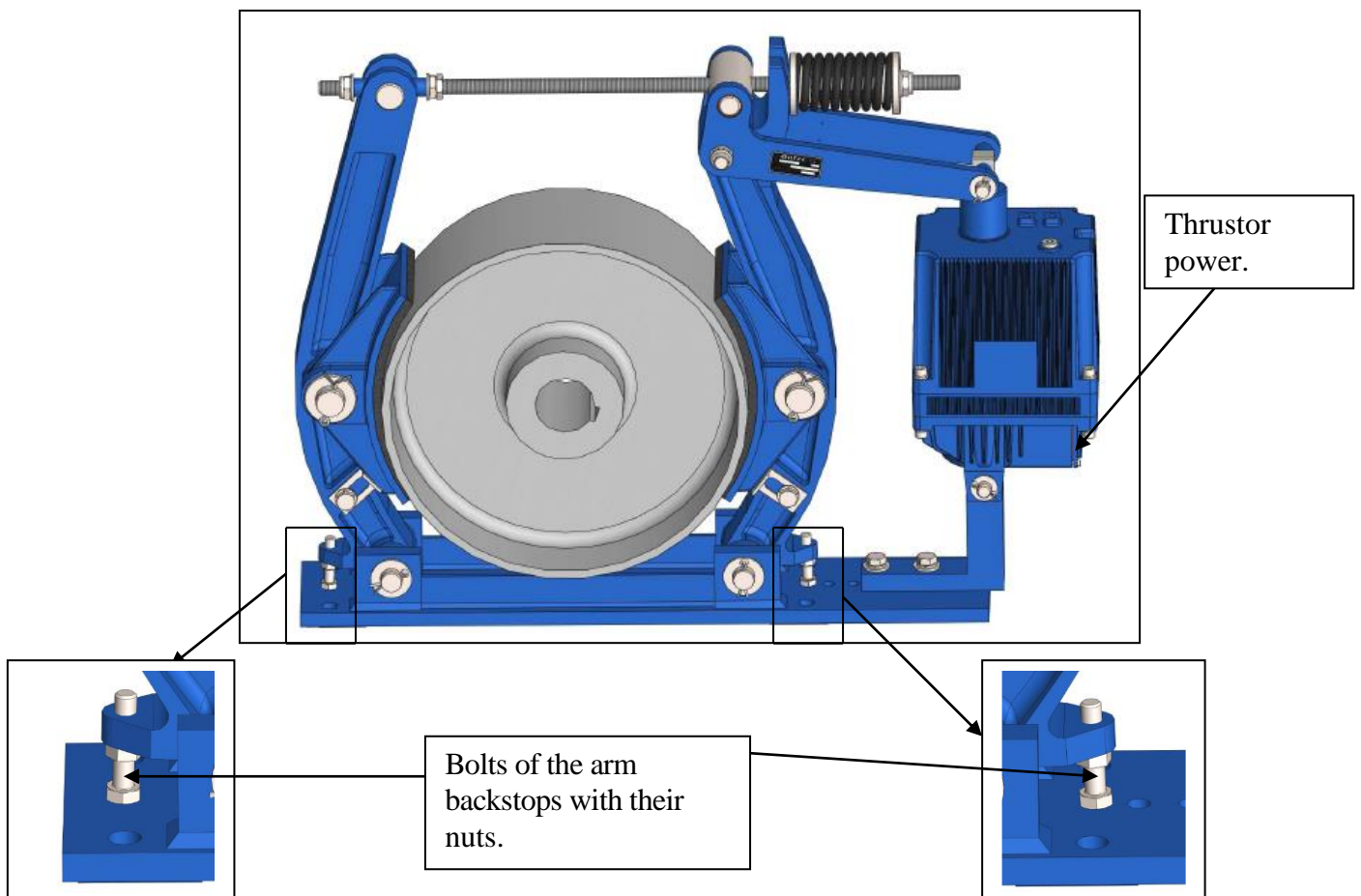
4. BRAKE ADJUSTMENT AND SETTING.

The brake has four points that must be adjusted in the following order.

4.1. Adjustment of the ARMS CENTRING.

This is done by means of the backstops of the arms with the base.

- Loosen the nuts and bolts of both arms. The assembly of both nut and bolt parts is referred to as the arm backstop.
- Activate the TURBEL brake lifter.
- Adjust the bolts, the arm backstops, so that the shoes are equally separated from the drum. In this position one of the bolts slightly touches the base and the other is close to it without touching.
- Secure the bolts of the arm backstops with the nuts.



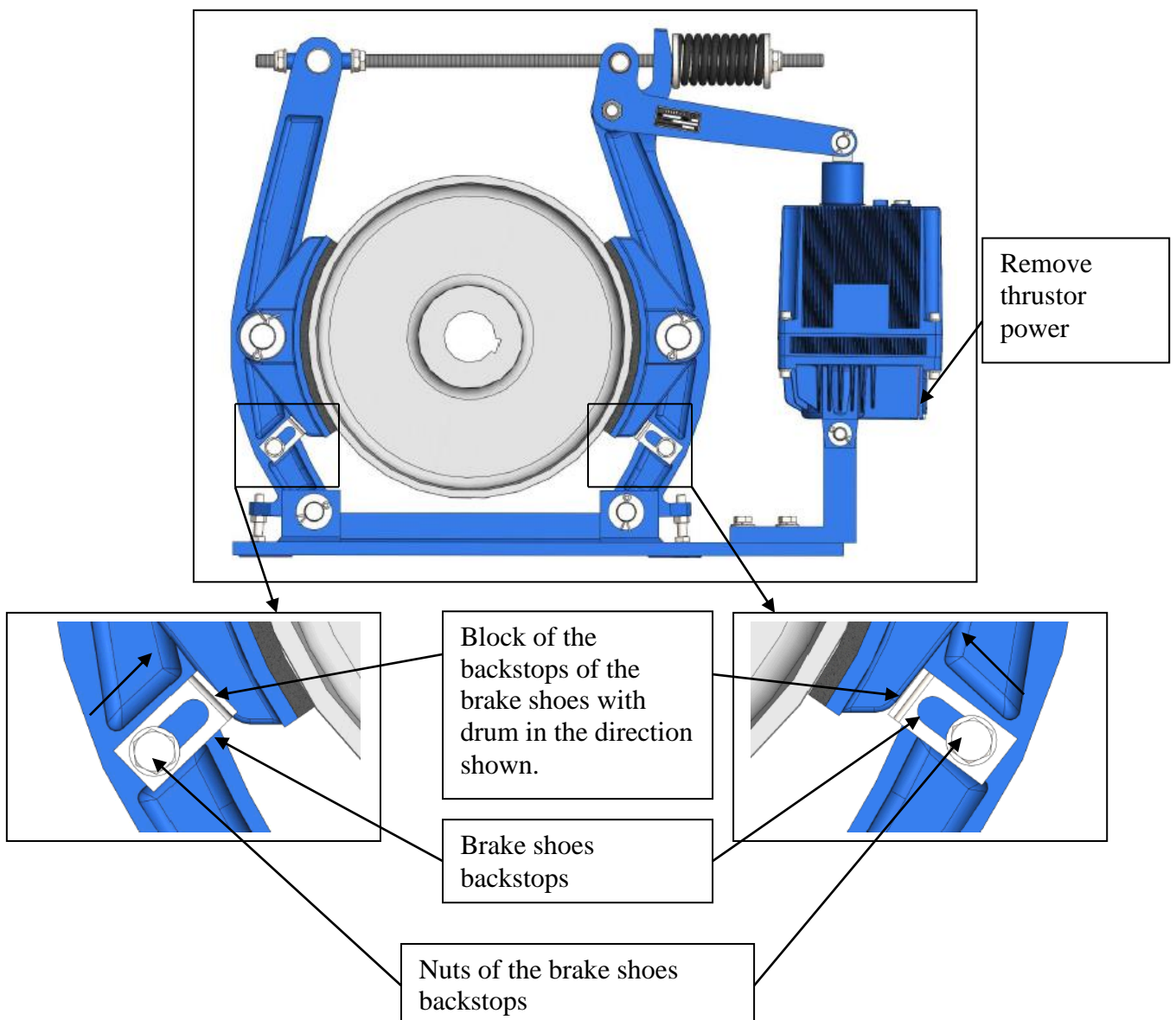


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

4.2. BRAKE SHOES POSITION adjustment.

- Loosen the backstop bolts of the shoes.
- Remove electric power from the brake lifter; the shoes press on the drum.
- Move the backstops forward until they make contact with the shoes, but without pressing excessively. Tighten and lock the shoe backstop bolts.



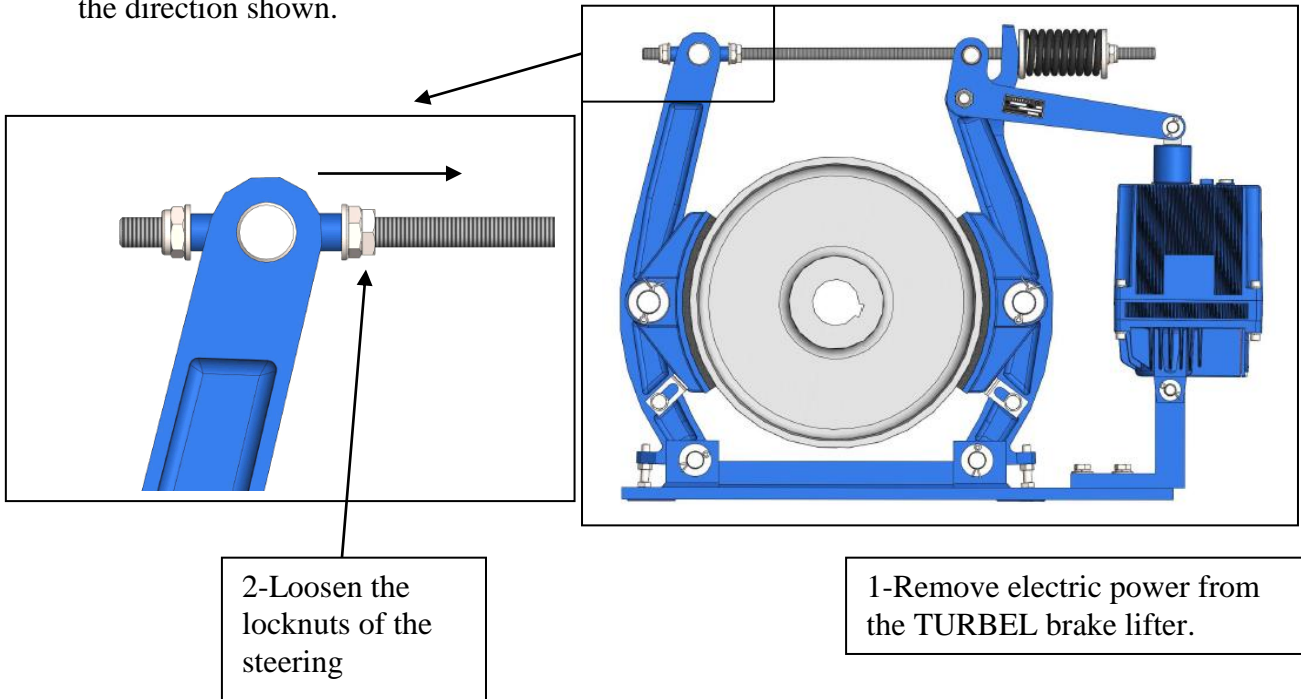


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

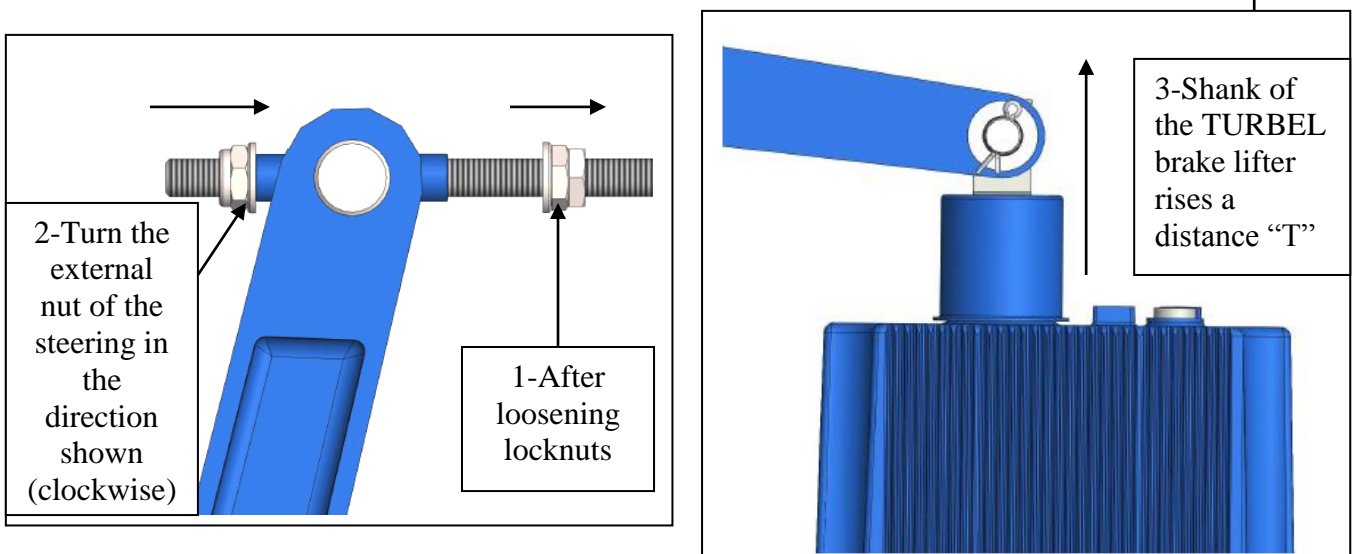
Instructions for assembly, adjustment and maintenance

4.3. RESERVE path adjustment.

- With the TURBEL brake lifter without electric power, loosen the locknuts of the steering in the direction shown.



- After loosening the locknuts, turn the external nut of the steering in the direction shown (clockwise) in the follow diagram so that the shank of the TURBEL brake lifter rises a distance "T" that corresponds to the value of the RESERVE PATH for the wear of the linings.



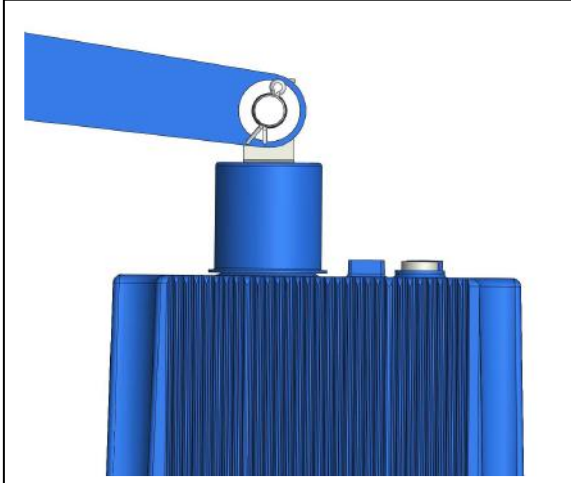


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

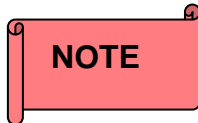
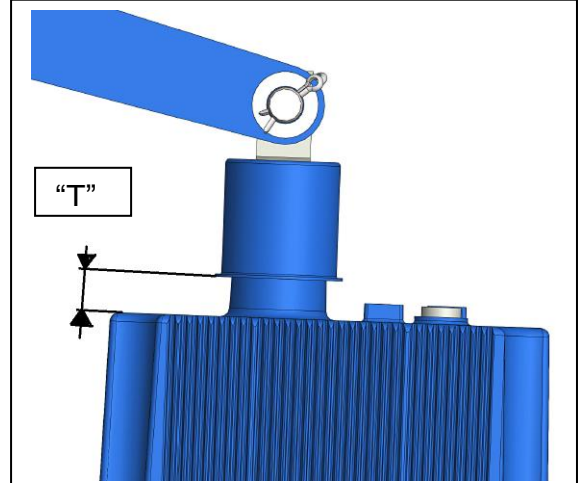
Instructions for assembly, adjustment and maintenance

- Repeatedly action the TURBEL brake lifter and adjust the external steering nut as required until the TURBEL's shank has gone up by the value 'T' shown in tables (Page 28) as from its starting position.

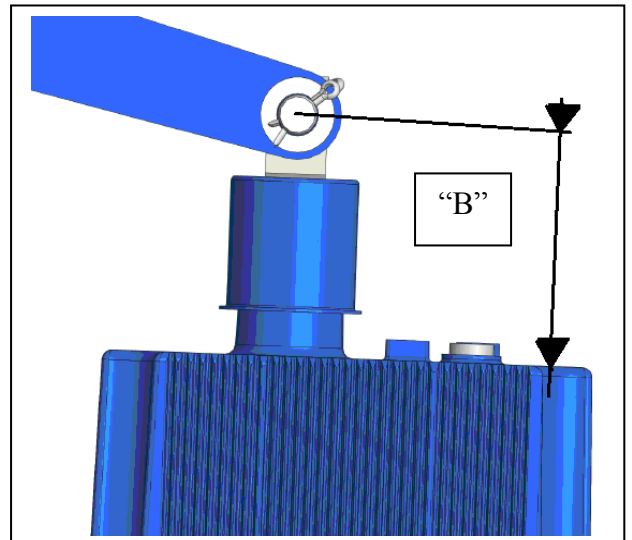
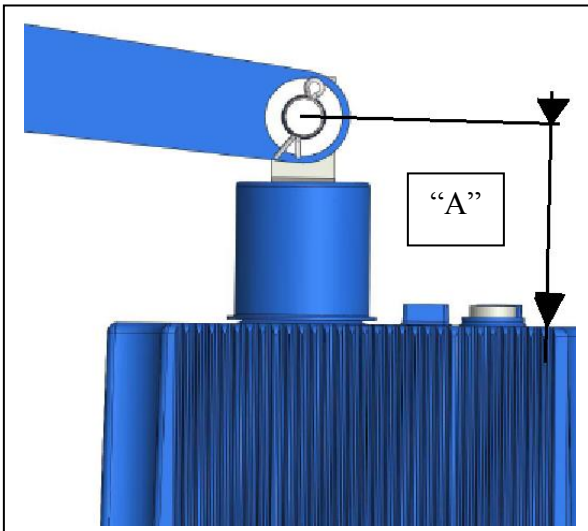
Initial position



End position



Some thruster brakes may not have dust guards. Height "T" can be measured at the thruster's lug.

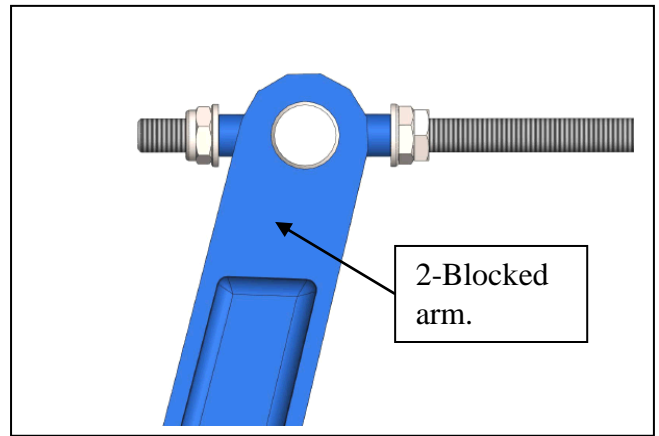
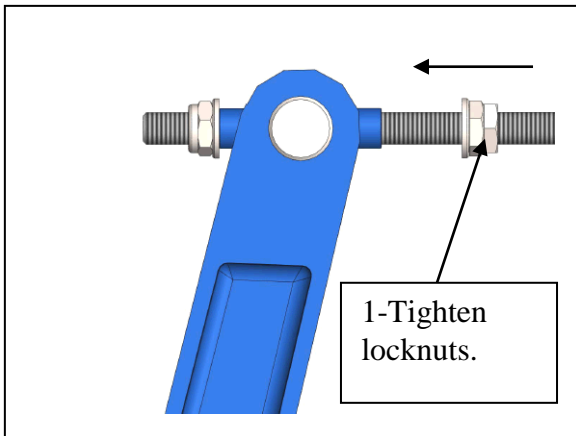


$$"T" = "B" - "A"$$

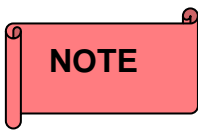


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

- Lock the arm's position as shown in the following diagram by tightening the locknuts.



Remember that wear of between 1 and 2 mm in both shoes implied loss of virtually entire reserve and brake must be readjusted.

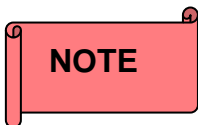


The brake does not need adjustment of the setting of the reserve if the automatic recovery option is fitted, which Antec brakes have. The automatic recovery of the brakes will be explained in point 7.1 of the instructions.

4.4. BRAKING TORQUE adjustment. (Except for brakes with TH with inside spring).

Ensure that the brake is without electric power and after having adjusted the position of the arms (point 4.1), position of the shoes (point 4.2) and the reserve path (point 4.3) proceed to adjust the braking torque.

As shown in the following diagram, the braking torque of the NDT, NFT and NAT brakes is adjusted by compressing the spring to a length "A", by means of the nut shown in the diagram, in accordance with the data set out in the following attached tables for this point on page 28.



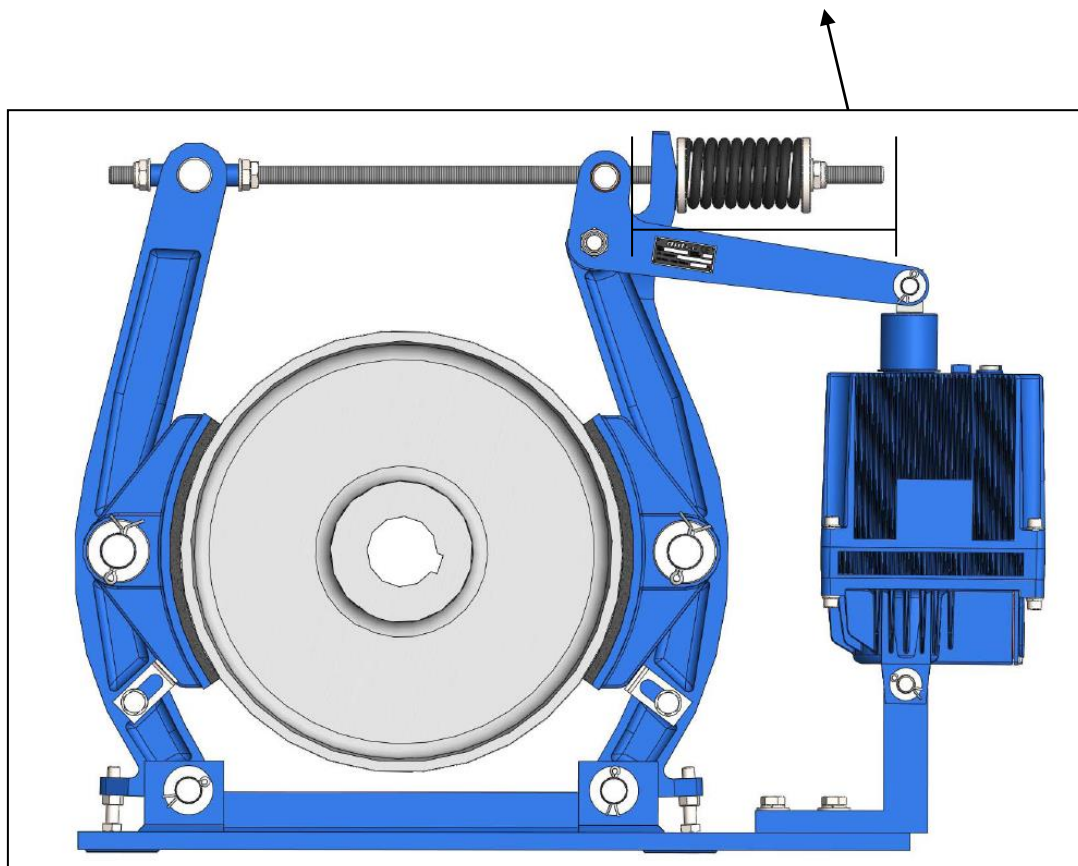
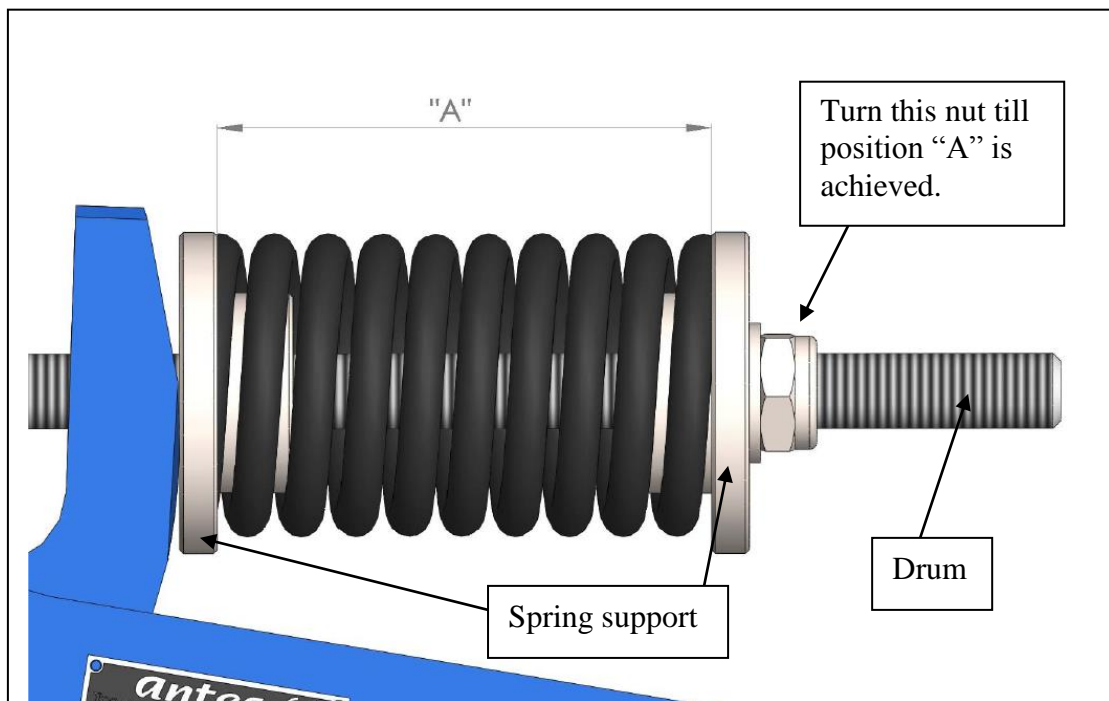
Try to keep the centring of the spring support with regards to the drum and the levers.

Verify and if needed redo that explained in points 4.1-4.2 and 4.3. It may be that on adjusting the braking torque the position of the arms and the "T" reserve become unadjusted.



NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance





NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

TABLE (I) OF BRAKING TORQUES & BRAKING LENGTH & RESERVE

MODEL	LENGTH "A" / TORQUE				
	Length (mm)	Torque (Nm)	Length (mm)	Torque (Nm)	Res. T (mm)
NDT-160/I-256	78	70	61	140	30
NDT-200/I-256	109	138	87	275	25
NDT-200/I-356	113	178	95	355	20
NDT-250/I-256	108	165	87	330	25
NDT-250/I-356	116	243	96	485	20
NDT-315/I-356	114	320	96	640	20
NDT-315/II-506	139	475	114	950	20
NDT-315/II-806	171	725	142	1450	20
NDT-400/II-506	139	575	115	1150	20
NDT-400/II-806	155	750	126	1500	20
NDT-400/III-1306	175	1225	151	2450	20
NDT-500/II-806	154	850	126	1700	20
NDT-500/III-1306	176	1350	152	2700	20
NDT-500/III-2006	218	2150	186	4300	20
NDT-630/III-1306	176	1600	152	3200	20
NDT-630/III-2006	218	2500	186	5000	20
NDT-630/III-3006	181	3350	155	6700	20
NDT-630/III-3012	292	4400	259	8800	20
NDT-710/III-2006	218	2900	185	5800	25
NDT-710/III-3006	180	3850	154	7700	25
NDT-710/III-3012	290	5250	256	10500	30

MODEL	LENGTH "A" / TORQUE				
	Length (mm)	Torque (Nm)	Length (mm)	Torque (Nm)	Res. T (mm)
NFT-150/I-256	78	65	61	130	30
NFT-200/I-256	109	135	87	270	25
NFT-200/I-356	113	175	95	350	20
NFT-250/I-256	108	165	87	330	25
NFT-250/I-356	117	250	96	500	20
NFT-350/I-356	114	325	96	650	20
NFT-350/II-506	139	500	114	1000	20
NFT-350/II-806	171	800	142	1600	20
NFT-450/II-506	139	625	115	1250	20
NFT-450/II-806	154	850	126	1700	20
NFT-450/III-1306	176	1375	151	2750	20
NFT-530/II-806	154	925	126	1850	20
NFT-530/III-1306	176	1475	152	2950	20
NFT-530/III-2006	218	2325	186	4650	20
NFT-600/III-1306	176	1575	152	3150	20
NFT-600/III-2006	218	2450	186	4900	20
NFT-600/III-3006	181	3275	155	6550	20
NFT-600/III-3012	291	4400	258	8800	25
NFT-750/III-2006	218	3025	186	6050	20
NFT-750/III-3006	180	4000	155	8000	20
NFT-750/III-3012	290	5475	257	10950	25

MODEL	LENGTH "A" / TORQUE				
	Length (mm)	Torque (Nm)	Length (mm)	Torque (Nm)	Res. T (mm)
NAT-8"/I-256	108	140	87	280	25
NAT-8"/I-356	113	183	94	365	20
NAT-10"/I-256	109	168	87	335	25
NAT-10"/I-356	116	245	96	490	20
NAT-13"/I-356	114	345	96	690	25
NAT-13"/II-506	139	500	114	1000	25
NAT-13"/II-806	171	775	142	1550	25
NAT-16"/II-506	139	550	115	1100	20
NAT-16"/II-806	154	750	126	1500	20
NAT-16"/III-1306	175	1225	151	2450	20
NAT-19"/II-806	155	850	126	1700	20
NAT-19"/III-1306	176	1350	152	2700	20
NAT-19"/III-2006	218	2125	186	4250	20
NAT-23"/III-1306	176	1525	152	3050	20
NAT-23"/III-2006	218	2400	186	4800	20
NAT-23"/III-3006	180	3200	155	6400	20
NAT-23"/III-3012	291	4300	258	8600	25
NAT-30"/III-2006	218	3125	185	6250	20
NAT-30"/III-3006	180	4150	155	8300	20
NAT-30"/III-3012	290	5700	256	11400	25

NOTE: Braking torques shown are 100% and 50%





NDT-NFT-NAT ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

4.5. Make the connections to the TURBEL brake lifter to connect it to the electric power supply specified by the client.

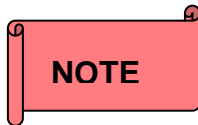
5. BRAKE MAINTENANCE.



The use of Antec brakes for unplanned operations or the negligent use thereof could seriously damage them or severely injure people standing nearby.

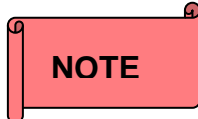
In order to obtain satisfactory long-lasting operation of the brake, it is necessary to pay regular attention to the following points:

5.1. Monitor the value of RESERVE "T". It is essential to verify the value of 'T' with the pulley cold. When it is at half way of the value shown in the tables on page 28, one must proceed to RECOVER THE RESERVE following the instructions given in point 4.3. Maintain the CENTRING OF THE ARMS according to point 4.1.



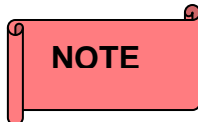
Antec deems it necessary to recommend the automatic recovery (RA) assembly option for the brake. This option is explained in point 7.1 of the instructions.

5.2. Verify that the dimension "A" of the spring shown in point 4.4 is maintained.



Any change in the "A" value may affect the torque generated by this brake.

5.3. When the thickness of the brake linings is less than 3 mm at the lowest point, proceed to change the shoes. For brake lining change go to point 6 of the instructions.



Antec deems it necessary to recommend the automatic lining wear detection (DD) option for the brake. This option is explained in point 7.3 of the instructions.

5.4. Monitor the condition of the surface of the drum, which should be polished, without scratches and completely clean.

If necessary, clean the drum on which the brake is installed. Any particle may damage the brake and impair its proper operation.



NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

5.5. All articulations of Antec brakes are mounted on self-lubricating bearings. In the event that a client were to order a brake without these self-lubricating bearings, we recommend that the brake's articulations should be lightly greased, avoiding oil spilling onto the linings or the pulley.

5.6. Change the oil of the TURBEL brake lifter on an annual basis, or otherwise when it can be seen that the oil has lost its original colour or performance features.

For the oil change, refer to the TURBEL brake lifter assembly and maintenance instructions in technical data sheet 01.165I.



Antec deems it necessary to always recommend that the maintenance tasks to be carried out on the brake must always be done in accordance with a safety protocol as explained in points 1.2 and 1.3 of the instructions.

Another recommendation worth mentioning is that during these maintenance tasks the electric current should be disconnected from the TURBEL brake lifter.

6. CHANGING THE BRAKE SHOES.

When the lining of any of the shoes has been worn down to the minimum recommended thickness, 3 mm at the lowest point, one must proceed to change both shoes in accordance with the following steps:

6.1.- Remove electric power from the TURBEL brake lifter.



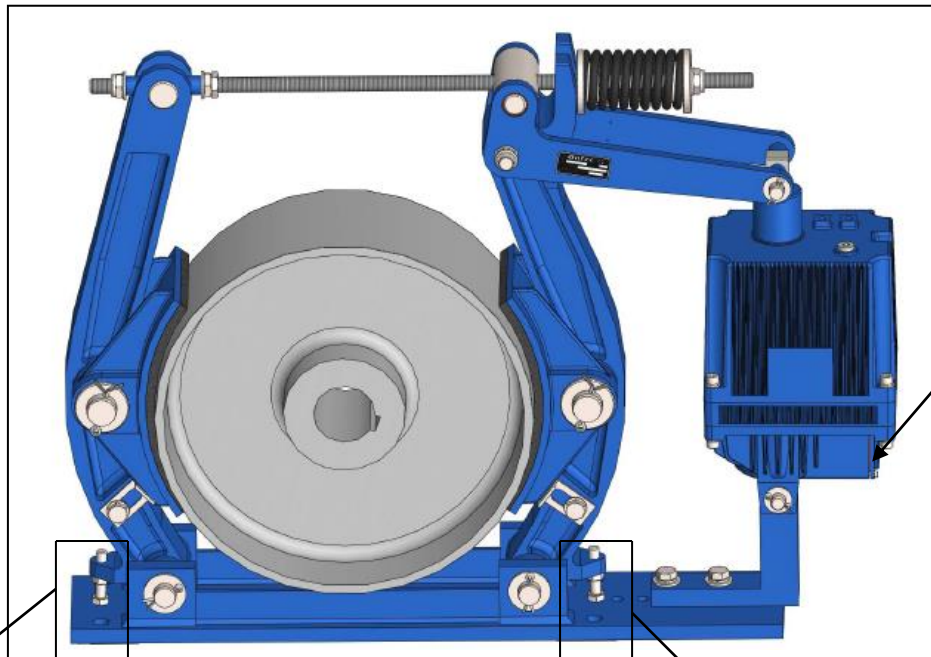
Antec recommends you to remove electric current from the TURBEL brake lifter. Non-compliance with this recommendation may cause serious damage to the brake as well as serious injury to people around it.

6.2.- Without powering the TURBEL brake lifter, loosen the bolts at the base of the arms as shown in the following diagram.

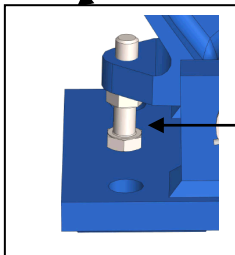


NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

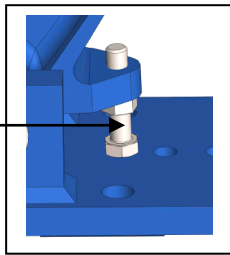
Instructions for assembly, adjustment and maintenance



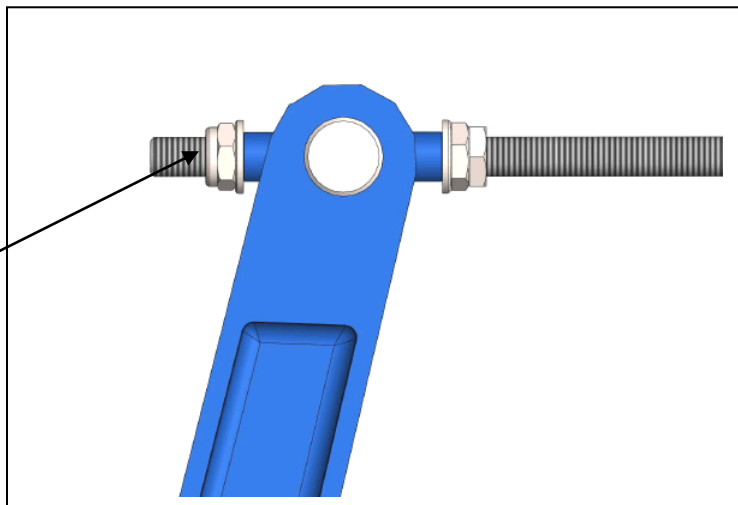
Without power in thruster



Loosen the bolts of the arm backstops with the nuts.



6.3.- Open the brake by loosening, counter-clockwise, the nut shown in the following diagram.



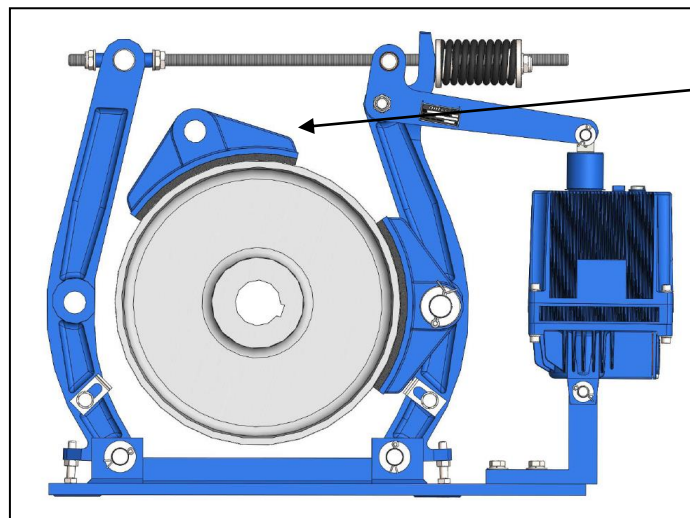
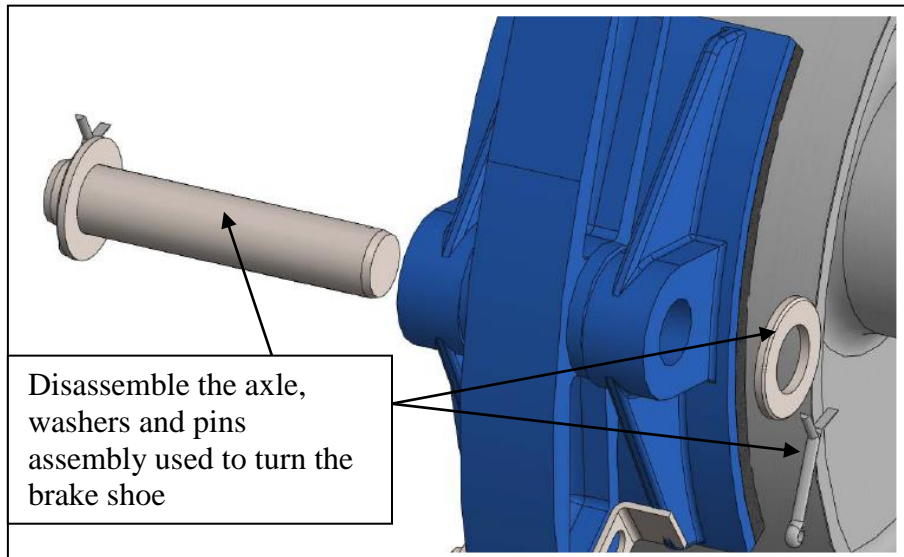
Loosen thenut to open the brake.
Counterclockwise



NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

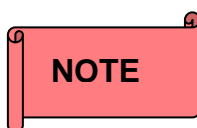
Instructions for assembly, adjustment and maintenance

6.4.- For both brake shoes the disassembly process is the same for which the axle of the brake shoe must be dismantled with all its components and after this the shoe must be rotated around the drum, up until the position shown in the following diagram, so that it can be removed.



6.5.- Mount the new brake shoe by performing the disassembly operations in reverse order as explained in point 6.4.

6.6.- Adjust and set the brake following that shown in point 4 of the instructions. This operation must be performed with the drum cold.



When new shoes are fitted , the contact between the liner and the pulley may not be perfect. This lightest adjustment error will correct itself after the first braking actions.



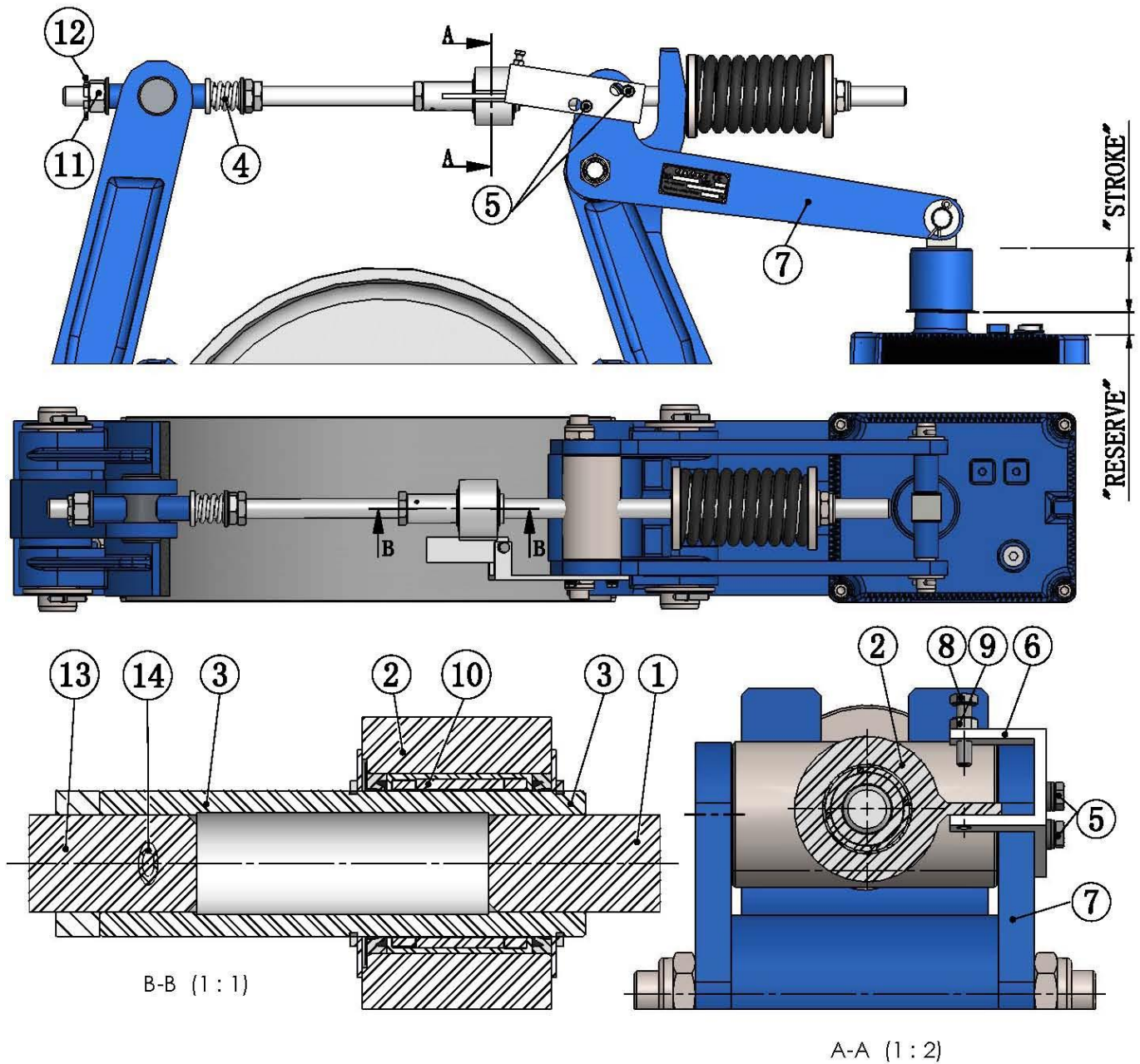
NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

7. BRAKE OPTIONS.

7.1. AUTOMATIC RECOVERY (RA).

For any explanation on automatic recovery, we shall base this on the following diagram with its related markings.





NDT-NFT-NAT ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

7.1.1. AUTOMATIC RECOVERY OPERATION DESCRIPTION.

The electrohydraulic brake system without automatic recovery is based on the fact that a short part of the TURBEL brake lifting path is allocated to the reserve for lining wear, the remaining part of the path being used for opening the brake shoes.

For brakes with manual recovery of brake lining wear, this is achieved with two nuts that bring the arms closer by means of the brace (refer to point 4.3 if necessary).

For brakes with automatic recovery, a tensor (3), performs as the nuts do and it is threaded to the brace (1). In turn the rod (13) is fastened to the tensor (3) by means of a pin (14).

The tensor (3) has a free wheel (10) with an outside crown (2) that holds the activation pusher that is dragged by the actuator (6) between the upper and lower positions. This actuator is joined to the lever (7) and placed so that the pusher remains stationary, when the brake has the proper reserve for the wear of linings.

When wear has occurred the value of the reserve path of the brake lifter decreases, increasing the opening path and the pusher ascends dragged by the lower backstop of the actuator (6): the tensor (3) does not move as the wheel (10) is in its free-wheeling direction. The next time the brake opens, the pusher that is above its correct point, is dragged downwards by the bolt (8) until it reaches the said point: now the tensor (3) is able to turn dragged by the free wheel (10), screwing onto the stay (1) and drawing in the arms in order to recover the wear that has occurred in the linings.

In addition to the tensor (3) and the free wheel (10), the brake steering device includes other components to ensure proper operation of the system: thus, a spring (4) causes friction on the tensor (3), which is required so that the said tensor does not slide back, but stays still and it is the wheel that rotates in its free direction: the spring's tension is set by the position of the crenellated nut (11) with a pin.

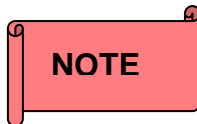
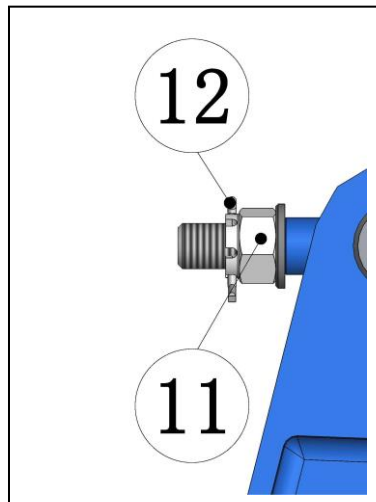
7.1.2. ASSEMBLY OF BRAKE WITH AUTOMATIC RECOVERY.

To assemble a brake with automatic recovery proceed in the following manner:

- Follow all the steps described in point 3.1 of the instructions although in these cases the upper nut to be removed is a crenellated nut (11) with a pin (12).



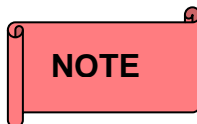
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To facilitate the assembly and disassembly of the arm opposite the thruster as shown in point 3 if necessary to facilitate the work we recommend dismantling the actuator (6) to the lever by loosening the bolts (5).

Remember to fit the pin (12) into its place after mounting the arm in its position.

7.1.3.- ADJUSTMENT AND SETTING OF A BRAKE WITH AUTOMATIC RECOVERY



All brakes leave Antec adjusted so that the client does not need to adjust them, but we do deem advisable that the latter should know how to perform possible future adjustments and settings.

Following the same steps shown in point 4 of these instructions we shall proceed to summarise the adjustments to be made on these brakes.

The brake has four points that must be adjusted in the following order.

7.1.3.1. The adjustment of the centring of the arms must be done as described in point 4 of the instructions.

7.1.3.2. The adjustment of the position of the shoes must be done as described in point 4 of the instructions.

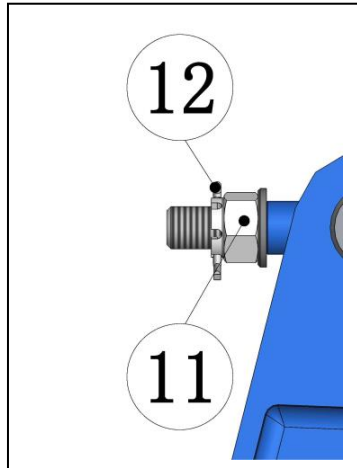
7.1.3.3. RESERVE PATH adjustment.

To adjust the reserve path perform the following steps:

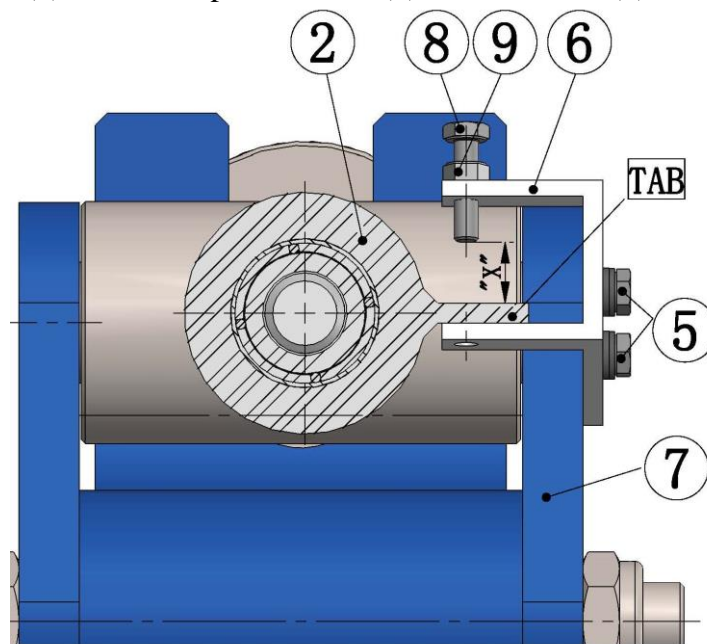


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- After having dismantled the actuator (6) and bolts (5) of the lever (7), turn the crenellated nut (11) with its pin (12) clockwise, until the shoes rest on the drum, which you will recognise on noticing a significant resistance to rotation and until the "T" reserve values are attained in the TURBEL brake lifter as shown in the tables on page 28.



- Mount the actuator (6) with its respective bolts (5) onto the lever (7) in its original position.



How to adjust the bolt (8):

By turning the crenellated nut (11) as explained above in this point one attains reserve "T" on the TURBEL brake lifter, in this position the tab of the outside crown (2) is in contact with the inside tab of the actuator (6).



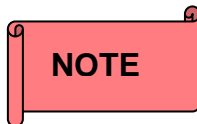
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In the position shown previously activate the TURBEL brake lifter with electric power and with the brake with the shank of the TURBEL in its open position tighten the bolt (8) until it makes contact with the tab of the outside crown (2).

Activate the brake lifter several times in order to ascertain that distance "X" shown in the previous diagram is maintained and then lock the bolt with the nut (9).

7.1.3.4. Finally adjust the setting of the braking torque as described in point 4.4.



Do not use the brake with a load until this final working position is reached, to ensure that the entire braking effort is applied to the drum.

7.1.4.- CHANGE OF BRAKE SHOES WITH AUTOMATIC RECOVERY.

The automatic recovery device avoids the need for the regular adjustments in order to compensate for the wear in the linings, although it is necessary to proceed to replace them before they are completely worn out: it is a good practice to replace them when the thickness of the lining in their most worn part is less than 3 mm.

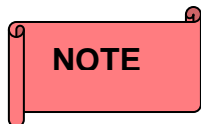
To replace either of the two brake shoes proceed in the following manner:

7.1.4.1. Extract the actuator (6) from its lodging by loosening the bolts (5).

7.1.4.2. Remove the pin (12) and rotate counter-clockwise, using a crenellated nut wrench (11), until the distance between the shoes and the pulley allows for the shoes to be removed.

7.1.4.3. Dismantle the brake shoes following the instructions in point 6.4.

7.1.4.4. Assemble the new brake shoe and the removed components, performing the tasks in the reverse order to that described in points 7.1.4.1-7.1.4.2 and 7.1.4.3.



All these operations must be performed with the drum cold.

7.1.5.- MAINTENANCE OF THE BRAKE WITH AUTOMATIC RECOVERY.

The maintenance of these brakes is performed by inspecting the same points as described in point 5.

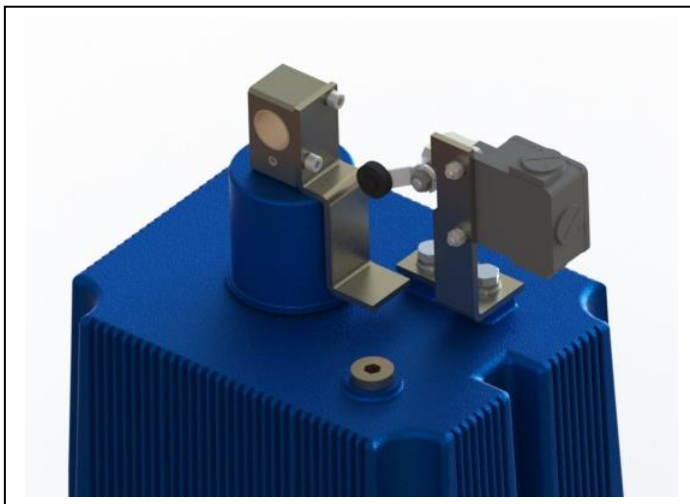


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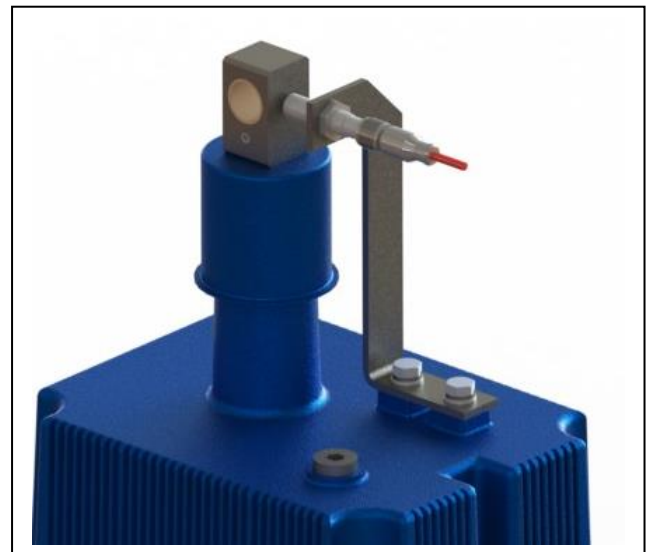
7.2. BRAKE OPEN SIGNALLING CONTACT (CSA).

The open signalling contact is used to electrically signal the end position of the path of an open TURBEL brake lifter and it therefore serves the purpose of signalling the time at which the brake is open and its arms separate the shoes from the drum.

There is the possibility of mounting two types of path end stops, mechanical or inductive.



Mechanical stroke limit.
(CSA-Mechanical limit)



Inductive stroke limit.
(CSA-Inductive limit)

NOTE

In the event that Antec's Sales Department does not receive any specification on the type of detector to be mounted on the brake, the standard detector mounted shall be of the mechanical type.

The reference of the standard mechanical detector mounted is:

XCKM115.

We attach the following technical data sheet for the detector.



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XCKM115

Main

Range of product	OsiSense XC
Series name	Standard format
Product or component type	Limit switch
Device short name	XCKM
Sensor design	-
Body type	Fixed
Head type	Rotary head
Material	Metal
Fixing mode	By the body
Movement of operating head	Rotary
Type of operator	Thermoplastic spring return roller lever
Type of approach	2 directions lateral approach
Electrical connection	Screw-clamp terminals , clamping capacity: 1 x 0.34...2 x 1.5 mm ²
Cable entry	3 entries tapped for Pg 11 cable gland
Number of poles	2
Contacts type and composition	1 NO + 1 NC
Contacts operation	Snap action
Positive opening	With

Complementary

Body material	Zamak
Switch actuation	By 30° cam
Contacts insulation form	Zb
Number of steps	1
Positive opening minimum torque	0.25 N.m
Minimum torque for tripping	0.1 N.m
Minimum actuation speed	0.01 m/min
Maximum actuation speed	1.5 m/s
Contact code designation	A300 , AC-15 (U _e = 240 V , I _e = 3 A) conforming to EN/IEC 60947-5-1 appendix A Q300 , DC-13 (U _e = 250 V , I _e = 0.27 A) conforming to EN/IEC 60947-5-1 appendix A
[I _{th} e] conventional enclosed thermal current	10 A AC
[U] rated insulation voltage	300 V conforming to UL 508 300 V conforming to CSA C22-2 No 14 500 V degree of pollution 3 conforming to IEC 60947-1
Resistance across terminals	≤ 25 mOhm conforming to IEC 60265-7 category 3
[U _{imp}] rated impulse withstand voltage	6 kV conforming to IEC 60947-1 6 kV conforming to IEC 60664
Short circuit protection	10 A by gG cartridge fuse
Electrical durability	5000000 cycles , DC-13 inductive load type, 48 V , 7 W , load factor: 0.5 , operating rate: ≤ 60 cyc/min 5000000 cycles , DC-13 inductive load type, 120 V , 4 W , load factor: 0.5 , operating rate: ≤ 60 cyc/min 5000000 cycles , DC-13 inductive load type, 24 V , 10 W , load factor: 0.5 , operating rate: ≤ 60 cyc/min
Mechanical durability	15000000 cycles
Width	63 mm





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Height	64 mm
Depth	30 mm
Product weight	0.28 kg

Environment

Shock resistance	50 gn (duration = 11 ms) conforming to IEC 60068-2-27
Vibration resistance	25 gn (f = 10...500 Hz) conforming to IEC 60068-2-6
IP degree of protection	IP66 conforming to IEC 60529
IK degree of protection	IK05 conforming to EN 50102
Class of protection against electric shock	Class I conforming to IEC 61140 Class I conforming to NF C 20-030
Ambient air temperature for operation	-25...70 °C
Ambient air temperature for storage	-40...70 °C
Protective treatment	TC
Product certifications	CCC CSA UL
Standards	CSA C22-2 No 14 EN 60204-1 EN 60947-5-1 IEC 60204-1 IEC 60947-5-1 UL 508
RoHS EUR conformity date	4Q2009
RoHS EUR status	Will be compliant



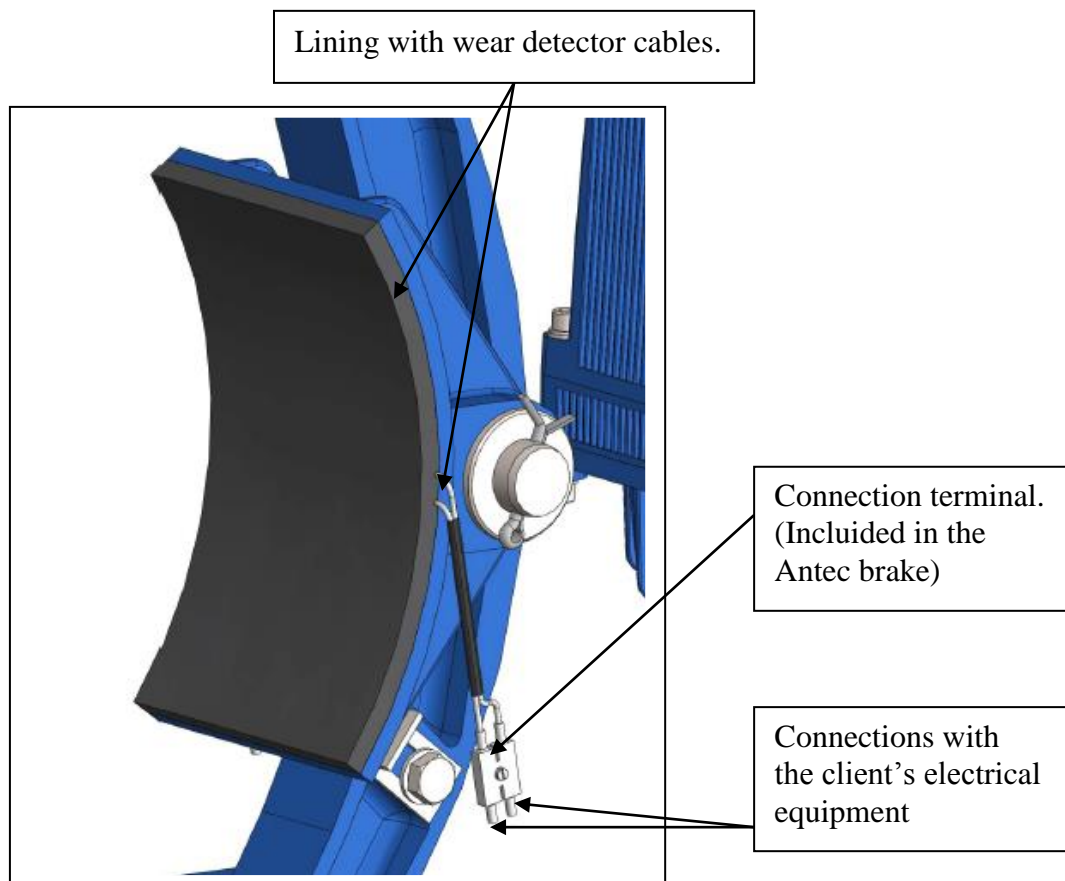
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7.3. BRAKE SHOE LINING WEAR DETECTOR (DD).

Antec brakes have an option for mounting the shoe lining wear detector by inserting two cables into the lining as shown in the following diagram.

The cables are connected to a connection terminal that is prepared so that the client can make the required connections to his electrical power equipment.

One must proceed to replace the shoes as explained in point 6 of the instructions, when these have been worn down to the minimum recommended thickness of 3 mm at the lowest point. In the event that the brake is fitted with a lining wear detector, the shoes must be replaced when the lining wear detector (DD) triggers a signal on the client's electronic control panel.



The brake's electrical connection with the client electrical equipment must be done by the client.



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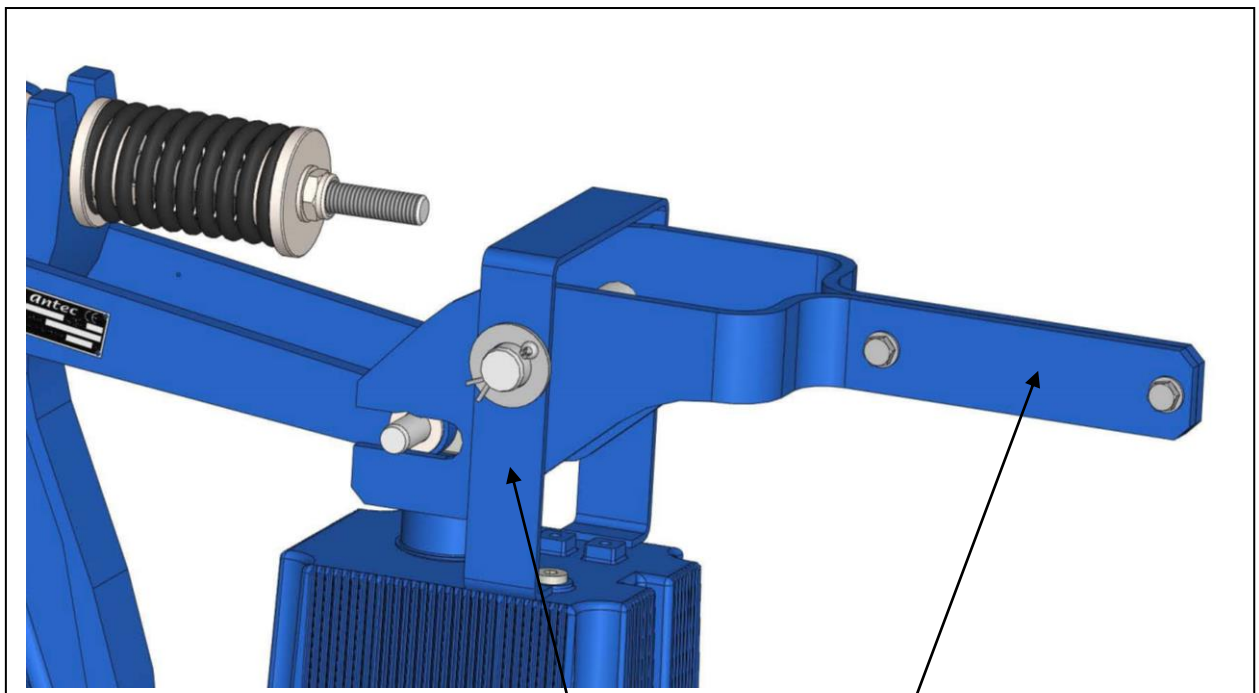
7.4. BRAKE MANUAL UNLOCK (DM).

The manual unlocking function in Antec brakes is intended to replace the activation of the opening of the brake by means of the TURBEL brake lifter, by manually activating the opening of the brake by means of a lever.

By means of a minimal manual unlocking effort by the operator, sufficient force is exercised to open the brake without having to recur to powering the TURBEL brake lifter with electric power.

The solutions available for manually unlocking the brakes vary depending on the brake model design, some may use a support fitted to the TURBEL brake lifter and others not.

The following diagram represents one of the designs conceived of a brake model and it is intended to serve as an example of how manual unlocking is approached for Antec brakes.



Thrustor manual
unlocking lever
support.

Manual
unlocking
lever.



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7.5. DESCENT VALVE IN TURBEL BRAKE LIFTER (VD).

Antec brakes activated by the TURBEL brake lifter may be fitted with the option of a descent valve (VD) for TURBEL brake lifters.

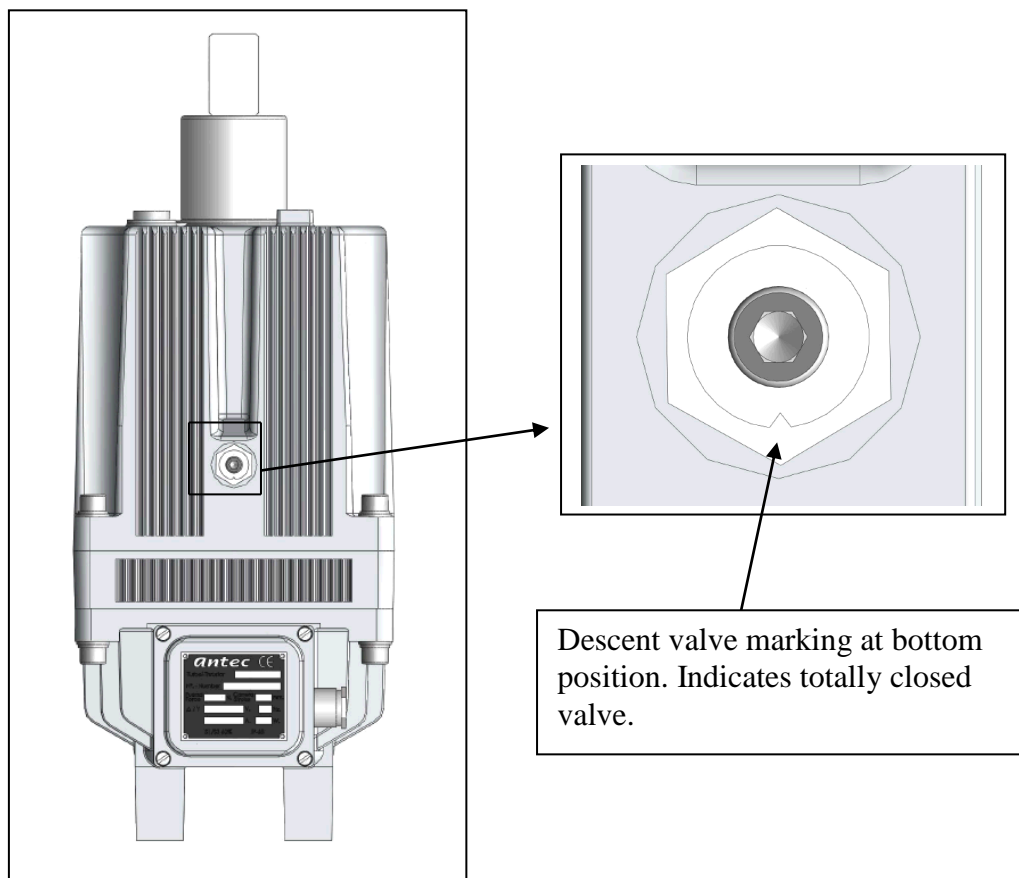
The function of mounting a TURBEL brake lifter fitted with a descent valve (VD) is to control the closing time of these brakes by means of this valve, an option that may benefit the operation of these brakes under certain working conditions.

The descent valve (VD), regulation and operation:

The set of parts integrated in the thruster used to control the descent of the shank is called the descent valve (VD).

By manipulating this valve, reducing or increasing the internal circulation and oil flow, the descent time of the thruster's shank can be controlled.

The oil flow is totally closed and the movement of the shank is minimal when the marking on the descent valve is as indicated in the following diagram.

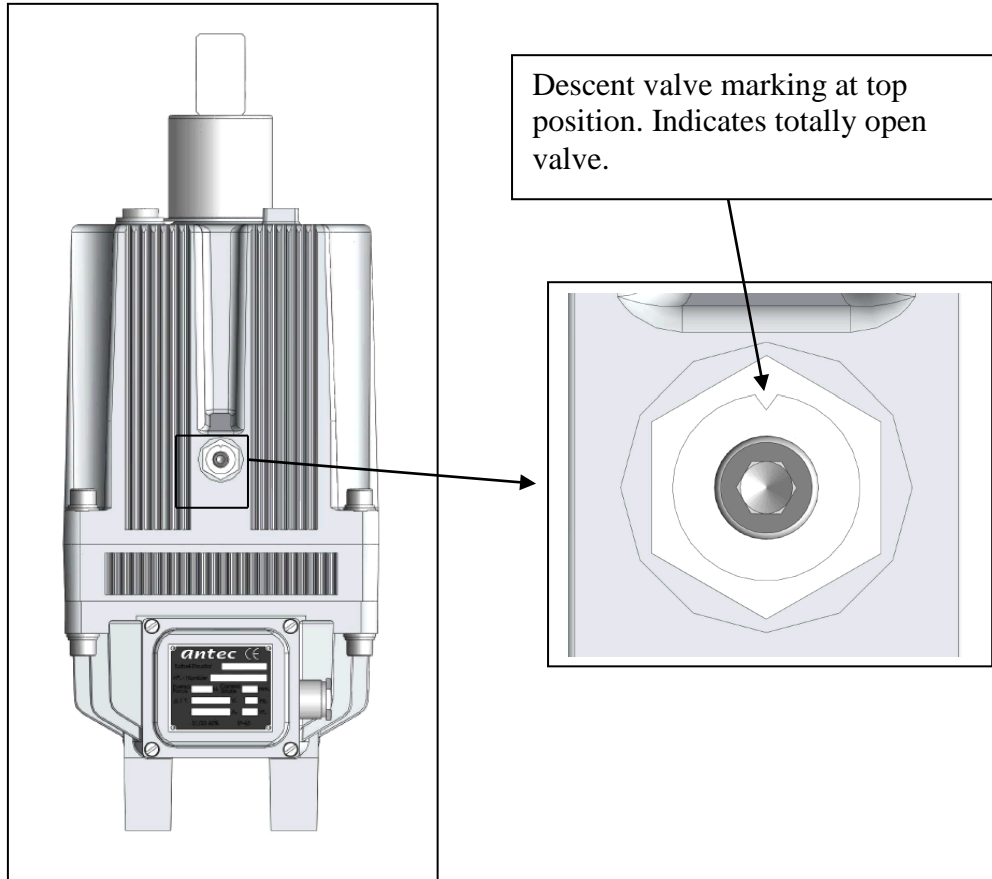




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The oil flow is fully open and the movement of the shank is at the maximum (it moves as if there was no valve) when the marking on the descent valve is as indicated in the following diagram.



The intermediate positions of the valve vary the descent time depending on what the customer wants.



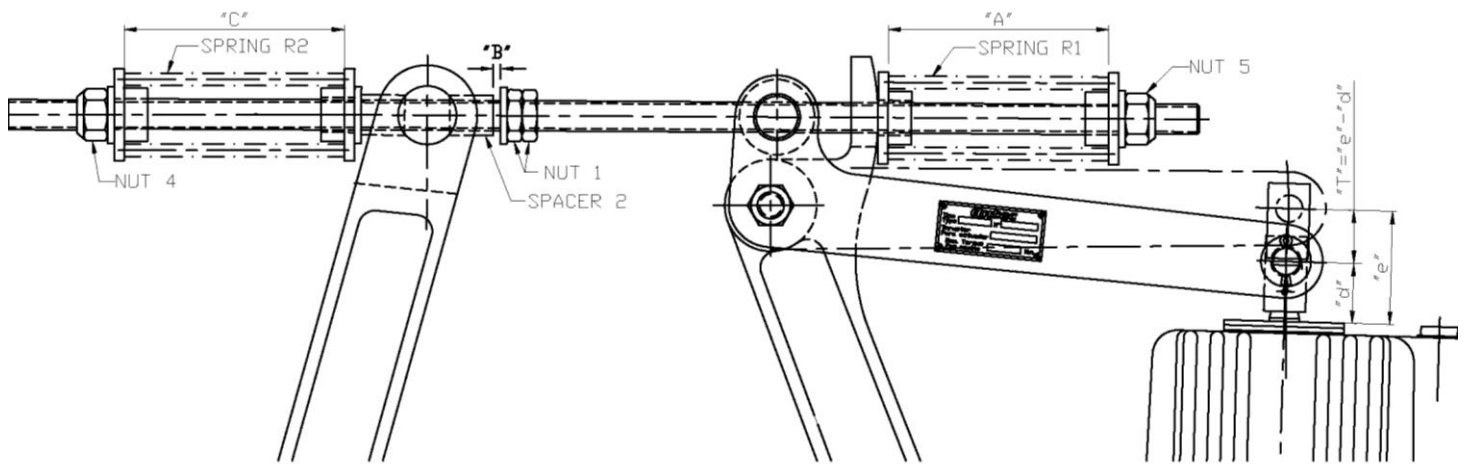
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7.6. REDUCED TORQUE BRAKES (PR).

When for whatever reason it is desired that a brake should provide a braking torque that is lower than that set as the minimum in accordance with the application tables shown in point 1.4 of the instructions, it will be necessary to fit the brake with a "reduced torque" mechanism.

To understand the operation of the "reduced torque" system and follow the explanations on its operation, the following diagram must be taken into account.



7.6.1 Operation of reduced torque brakes.

The operation of these brakes differs substantially from that of brakes with a normal drum.

In these brakes the spring of "reduced torque" mechanism R2 is what provides the braking torque and normal spring R1 is used so that the brake maintains its response times performance.

In the braking process, when the electric power is removed from the TURBEL brake lifter, spring R1 makes the brake close. All the force of this spring is absorbed by the inside backstop of the TURBEL brake lifter and the braking torque is therefore conveyed by spring R2. The lining wear reserve is provided by the gap left between the bolts (1) and the "B" measuring spacer (2).



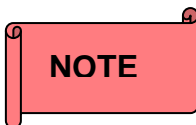
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7.6.2 Adjustment of the reduced torque brake.

To adjust the brake proceed as follows:

- With the brake without electric power in the TURBEL brake lifter, loosen the backstop (up until the free length of spring R1) of spring R1, by loosening the nut (5) counter-clockwise.
- Tighten the nuts (1) up against the bushing (2).
- Turn the nut (4) clockwise until spring R2 is blocked.
- Perform the same steps to adjust the brake as shown in point 4 of the instructions that explain how to adjust the opening of the arms and how to adjust the backstops of the brake shoes.
- Adjust the reserve of the TH by setting nuts (1) and (4). Loosen nut (1) two or three centimetres and then thread on nut (4) clockwise until reserve "T" is attained in the TURBEL brake lifter, as shown in the table on page 28.
- Activate the brake several times to ensure that the reserve is correct.
- Adjust spring R1 to its nominal torque (the torque shown in the table on page 28, by compressing the spring to length "A" that is also shown in the same table on page 28), if necessary for safety purposes, previously retighten spring R2.
- Loosen spring R2. When the force of spring R2 is less than that of spring R1, the reserve of the TH is lost, and at this time the torque is being provided by spring R2. Adjust the length of spring R2 to the required torque to spring length "C", which will be shown in the diagram of the brake assembly.



The diagram of the assembly of the reduced torque brake will be sent within the documentation prepared by our quality department.

For any clarification regarding brake spare parts, please contact the ANTEC After Sales Service, specifying the brake model and serial number.

- On performing the previous operation the nuts (1) will have been separated from the bushing (2) by measure "B". This distance is the reserve for brake lining wear. Take care of this distance and before the bushing (2) touches the nuts (1) the brake will have to be adjusted once again.



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7.7. SPECIAL PAINT (PE).

Antec supplies the brakes painted in accordance with the client's specifications. The special paint option makes it possible for the client to choose or advise on the coating and the RAL required for his brakes.

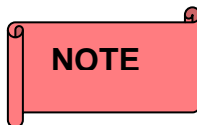
In such a case, through its sales department, Antec will study the possibility of supplying the brake following the client's specifications.

7.8. PNEUMATIC OR HYDRAULIC OPENING OF THE BRAKE.

The opening of Antec brakes is activated by means of the TURBEL brake lifter, although within this product range this activation mechanism can be varied by installing a hydraulic or a pneumatic cylinder that performs the action of the TURBEL brake lifter, taking into account and following the hydraulic and pneumatic specifications given by the client.

7.9. BRAKE WITH TURBEL ATEX CERTIFICATION.

The location of a brake may present problems with regards to the environment in which the brakes are installed, for such cases Antec has certified as ATEX, the brake component that operates by means of electric power, the TURBEL brake lifter.



The ATEX certification solely refers to the TURBEL brake lifter and not to the electrohydraulic brake product.

The work areas for which the TRUBEL brake lifter are ATEX certified are limited by the certificate obtained.

ANTEC S.A. would be grateful for the client to contact the sales department for clarification on any areas for which we have the ATEX certificate for the TURBEL brake lifter.

This CE Type Exam Certificate only refers to the design and construction of a specified protection equipment or system, in compliance with the 94/9/CE Directive.

The marking of the protection equipment or system includes on its specification plate the indication that refers to the Atex certification of the product.

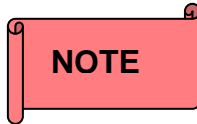


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8. SPARE PARTS.

ANTEC recommends keeping a number of spare parts on hand for any necessary repairs or when certain components come to the end of their service life.



If you have any questions regarding brake spare parts, please contact the ANTEC After Sales Service, specifying the brake model and serial number.

9. ONGOING IMPROVEMENT PLAN.

As part of its ongoing improvement process, ANTEC S.A. welcomes any customer suggestions or requests, which can be sent to the Sales Department at sales@antecsa.com.

ANTEC S.A. wishes to express its gratitude for the trust that you have placed in our product and we would like to invite you to visit our internet webpage to get to know our wide range of products.

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