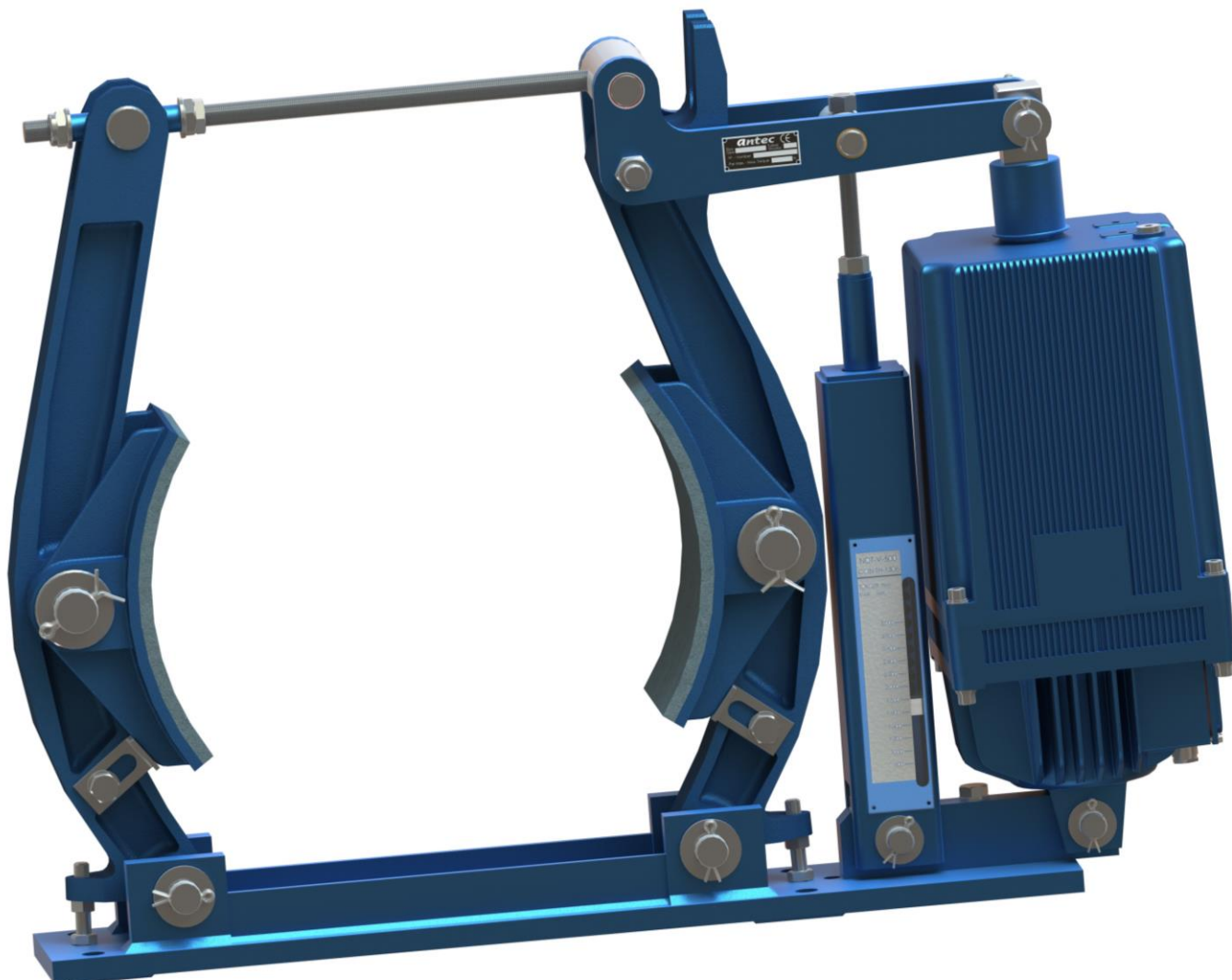


ELECTROHYDRAULIC BRAKES NDTV

Instructions for assembly, adjustment and maintenance



Technical data sheet number:	BC.TDS.00020I
Author:	Unitzer Bilbao
Reviewed by:	Sales department.
Date registered:	02-02-2012
Rev.2. date	04-11-2013
Rev.3. date	11-09-2014



Aplicación Nuevas Tecnologías, ANTEC S.A.
Ramón y Cajal, 74 – 48.920 Portugalete (Bizkaia)-Spain.

Tel.: 0034.94.496.50.11 Fax: 0034.94.496.53.37

After Sales Service: sales@antecsa.com

www.antecsa.com

Page 1-48



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

1. INTRODUCTION.	Page 3.
1.1. WHO IS THE TARGET AUDIENCE?	Page 3.
1.2. SAFETY INSTRUCTIONS.	Page 3.
1.3. RISK ASSESSMENT.	Page 5.
1.3.1. IDENTIFICATION OF THE BRAKE'S POTENTIAL RISKS.	Page 5.
1.3.2. ANALYSIS AND ASSESSMENT OF THE RISKS IDENTIFIED.	Page 7.
1.3.3. MEASURES ADOPTED TO MINIMISE THE RISKS ANALYSED.	Page 7.
1.4. GENERAL ASPECTS.	Page 11.
2. BRAKE OPERATION.	Page 13.
3. BRAKE ASSEMBLY.	Page 15.
4. BRAKE ADJUSTMENT AND SETTING.	Page 21.
5. BRAKE MAINTENANCE.	Page 29.
6. CHANGING THE BRAKE SHOES.	Page 30.
7. BRAKE OPTIONS.	Page 33.
7.1. AUTOMATIC RECOVERY (RA).	Page 33.
7.2. BRAKE OPEN SIGNALLING CONTACT (CSA).	Page 38.
7.3. BRAKE SHOE LINING WEAR DETECTOR (DD).	Page 41.
7.4. BRAKE MANUAL UNLOCK (DM).	Page 42.
7.5. DESCENT VALVE IN TURBEL BRAKE LIFTER (VD).	Page 43.
7.6. REDUCED TORQUE BRAKES (PR)	Page 45.
7.7. SPECIAL PAINT (PE).	Page 46.
7.8. PNEUMATIC OR HYDRAULIC OPENING OF THE BRAKE.	Page 47.
7.9. BRAKE WITH TURBEL ATEX CERTIFICATION.	Page 47.
8. SPARE PARTS.	Page 48.
9. ONGOING IMPROVEMENT PLAN.	Page 48.



NDTV ELECTROHYDRAULIC BRAKES

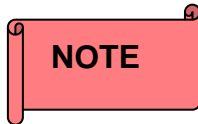
Instructions for assembly, adjustment and maintenance

1. INTRODUCTION.

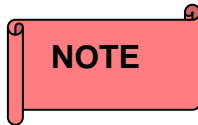
1.1. WHO IS THE TARGET AUDIENCE?

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.



NDTV ELECTROHYDRAULIC BRAKES

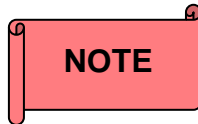
Instructions for assembly, adjustment and maintenance



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.



NDTV ELECTROHYDRAULIC BRAKES





Instructions for assembly, adjustment and maintenance

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.






NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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.



NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

- 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.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

- 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.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

- 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.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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.

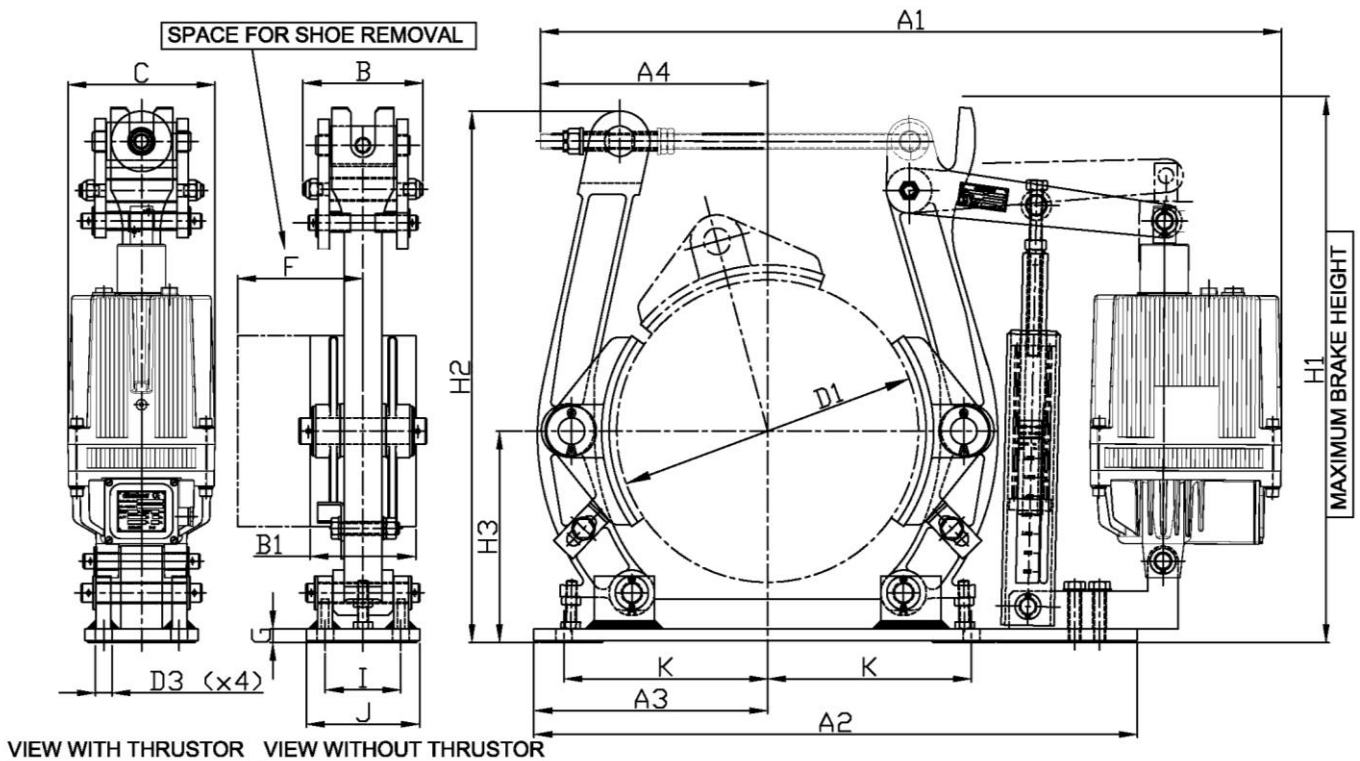
Both in the manufacturing of the brake as in that of all its components, the required standards of the related standard are complied with.

The NDTV 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 NDTV brakes based on the figure below:





NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

NDTV (values in mm)

BRAKE TYPE	THRUST OR TYPE	TORQUE (Nm)		WEIG HT 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
200	I-256	125	250	29	75	70	200	14	160	55	145	664	510	185	178	116	160	125	19	405	355	90
	I-356	188	375	34								674								497		
250	I-256	128	255	35	95	90	250	18	190	65	180	710	580	220	210	116	160	130	13	425	413	100
	I-356	235	470	40								760								499		
315	I-356	275	550	59	118	110	315	18	230	80	220	769	690	260	223	159	195	180	18	595	588	120
	II-506	438	875	62								820								620		
	II-806	700	1400	63								820								635		
400	II-506	450	900	85	150	140	400	22	280	100	270	980	800	310	307	159	195	210	18	710	704	150
	II-806	760	1520	87								990								710		
	III-1306	1350	2700	107								975								775		
500	II-806	800	1600	125	190	180	500	22	340	130	325	1039	940	365	312	190	240	250	23	820	803	180
	III-1306	1325	2650	145								1060								240		
	III-2006	2125	4250	147								1060								240		
630	III-1306	1450	2900	240	236	225	630	27	420	170	400	1240	1150	460	435	230	240	305	23	955	940	220
	III-2006	2325	4650	242								1240										
	III-3006	3725	7450	244								1240										
	III-3012	3875	7750	258								1325										
710	III-2006	2875	5750	323	265	255	710	27	470	190	450	1405	1280	510	470	250	240	340	29	1085	1067	250
	III-3006	4300	8600	324								1405										
	III-3012	4950	9900	338								1570										
800	III-3006	4900	9800	350	300	290	800	33	520	210	505	1420	1375	575	495	250	240	370	59	1135	1095	290
	III-3012	5575	11150	364								1540										

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



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

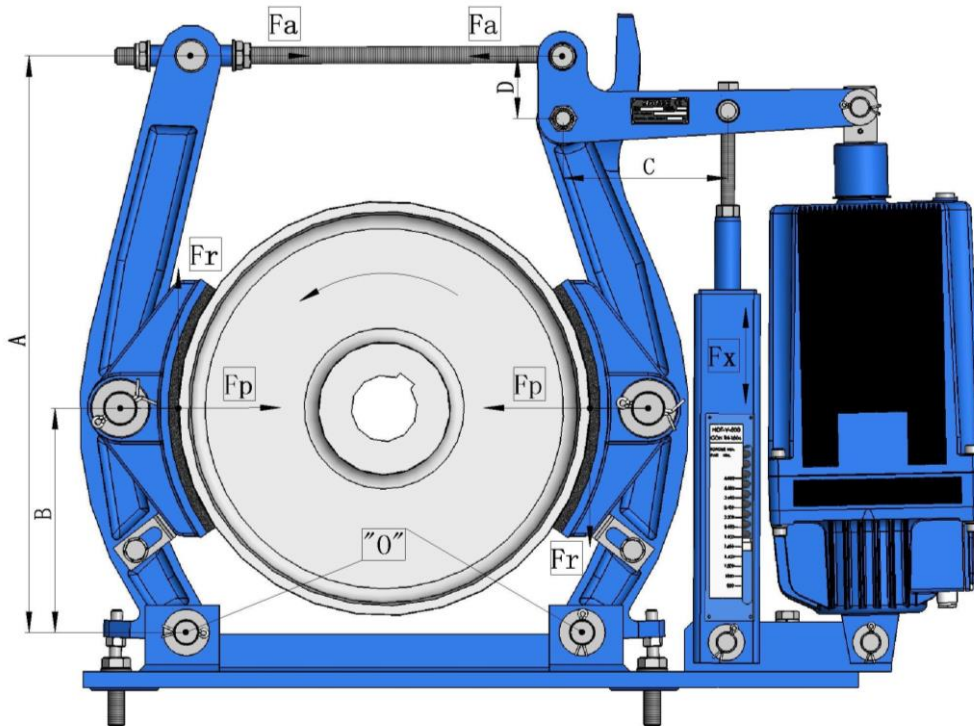
2. BRAKE OPERATION.

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.



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

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

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

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

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



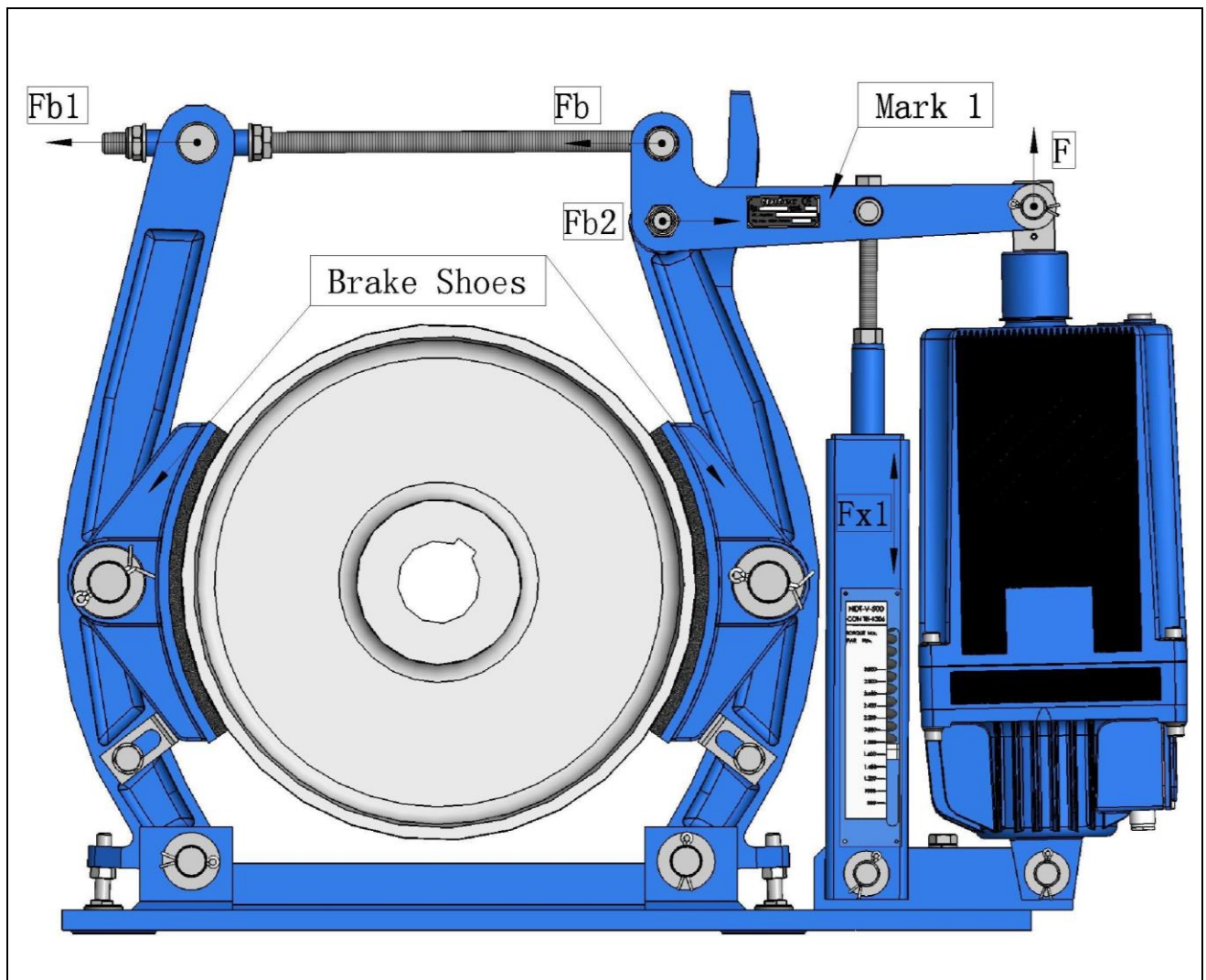
NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

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.





NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

3. BRAKE ASSEMBLY.

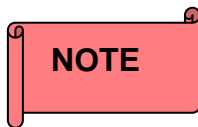
To assemble an electrohydraulic brake onto the related drum, proceed as follows:

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.

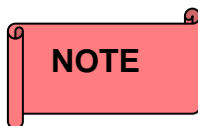
The brakes are supplied fully assembled and with their respective TURBEL brake lifters filled with the appropriate oil for their proper operation.

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



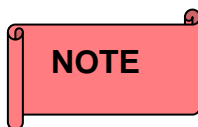
The customer will receive the documentation of the tests carried out on the brakes on the test benches, along with the documentation sent by Antec's quality department.

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.

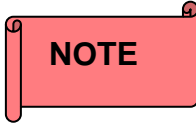


IMPORTANT Do not use liquid to clean the linings. Clean them using a dry paper towel or cloth.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



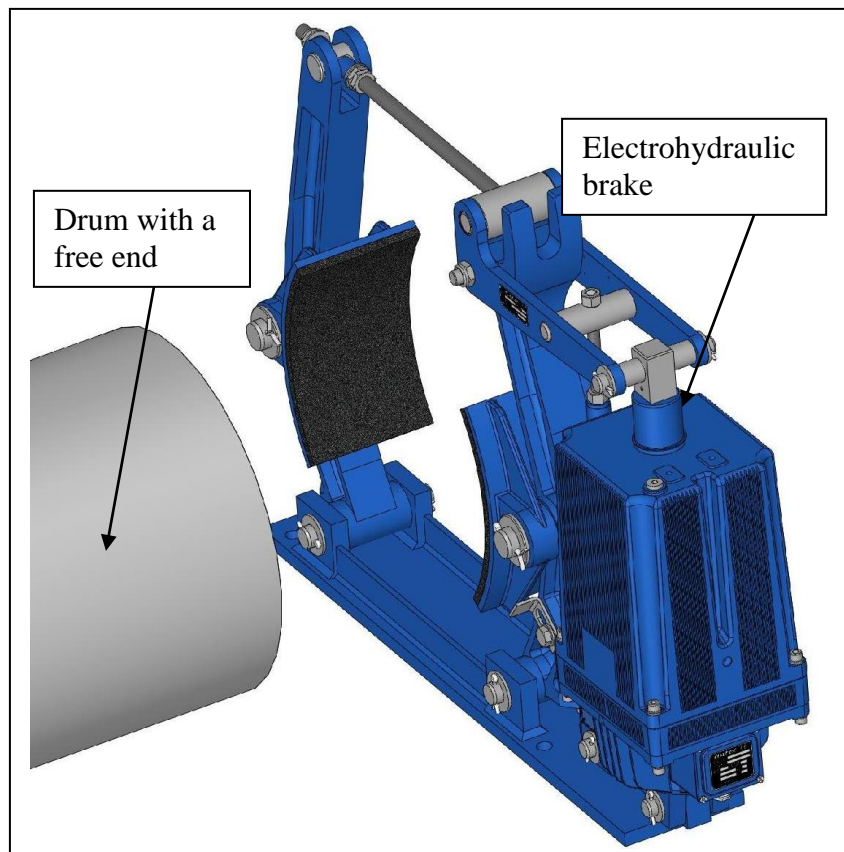
NOTE

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:



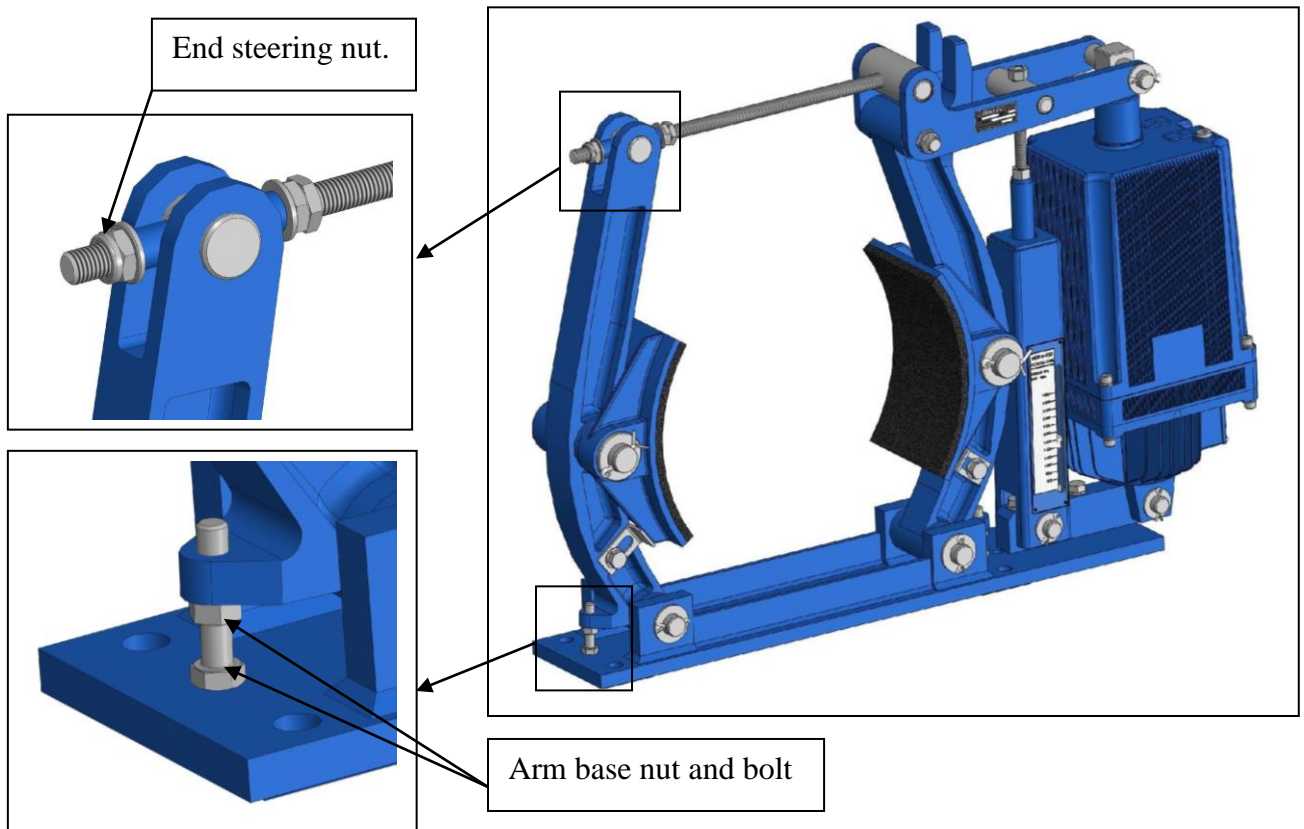
- Loosen the nuts and bolts shown in the following diagram:

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



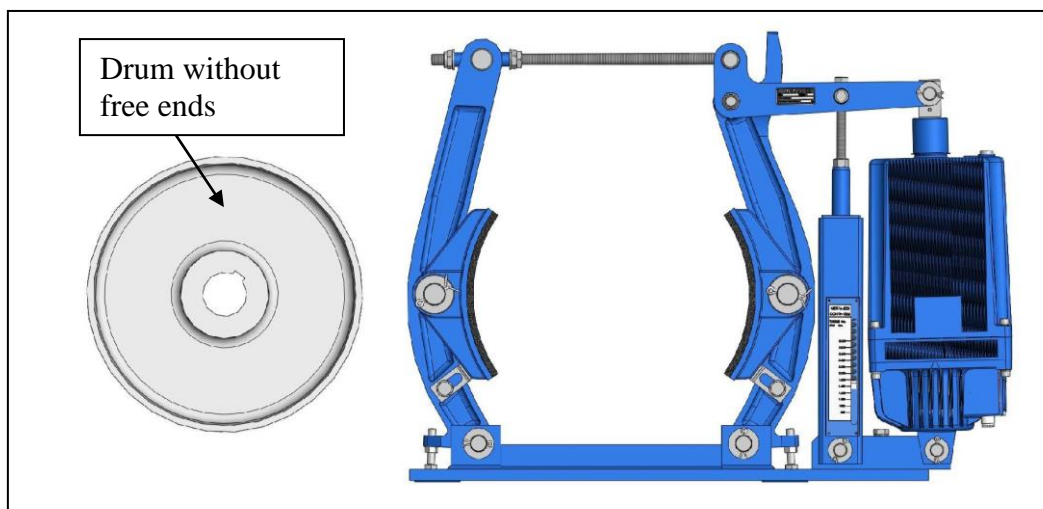
NDTV ELECTROHYDRAULIC BRAKES

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:

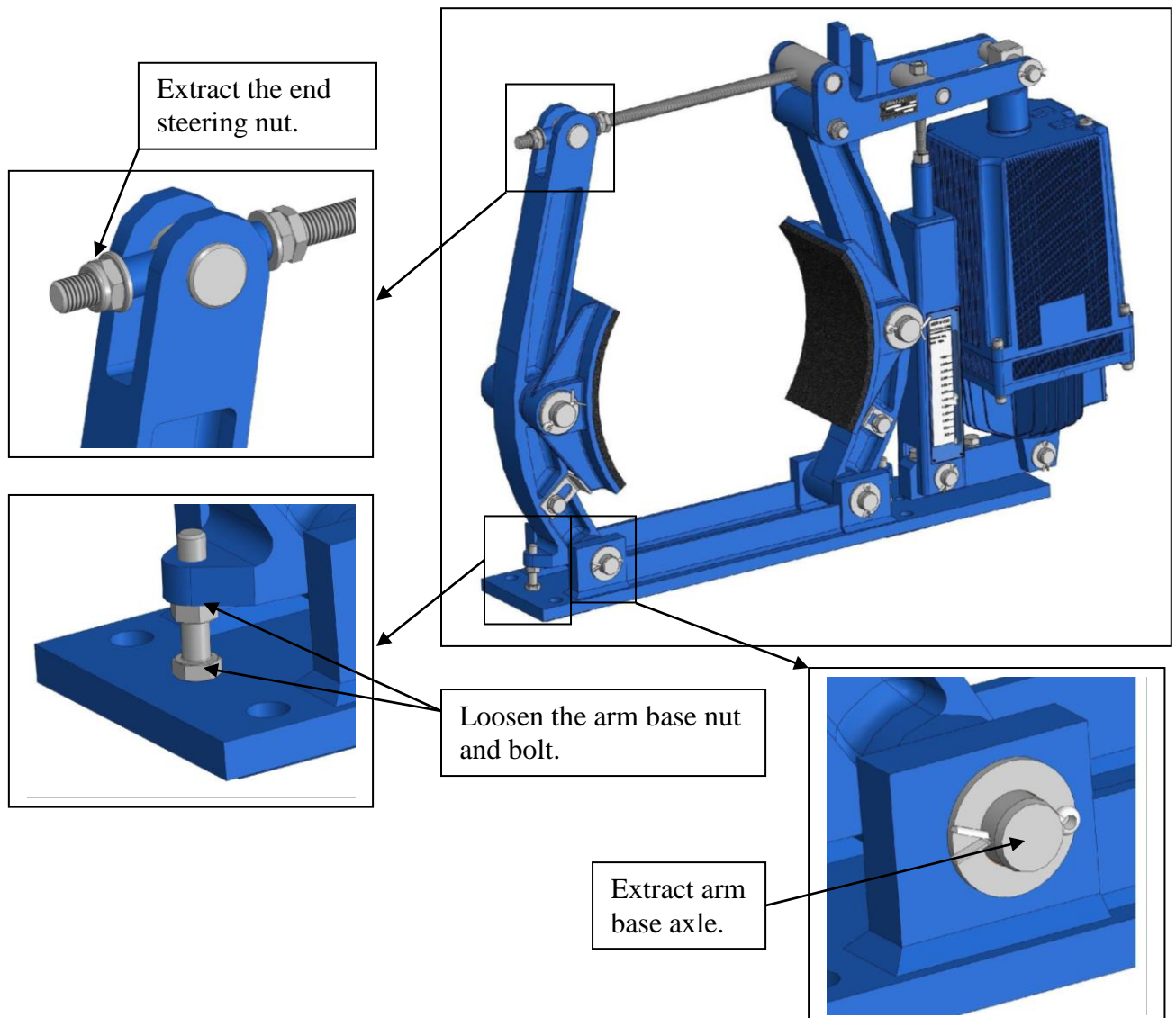




NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

- 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 (if necessary, see note below).
- Extract arm base axle (if necessary, see note below).



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.

NOTE

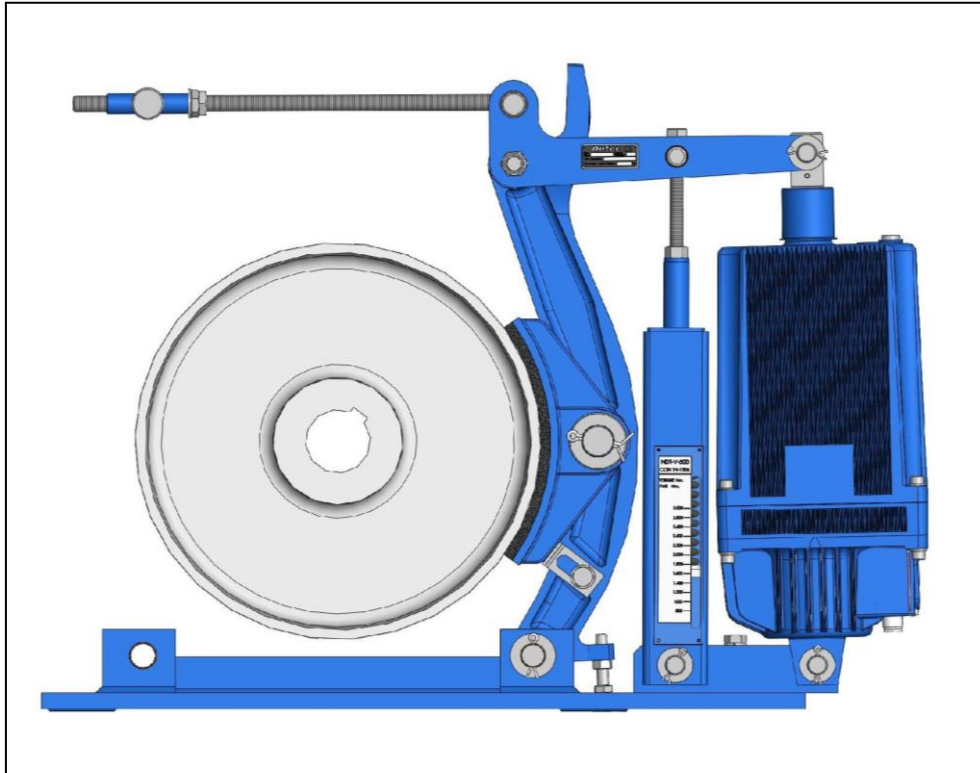
Depending on the space around the drum, the operator must consider whether or not removing the whole arm or just part of it.



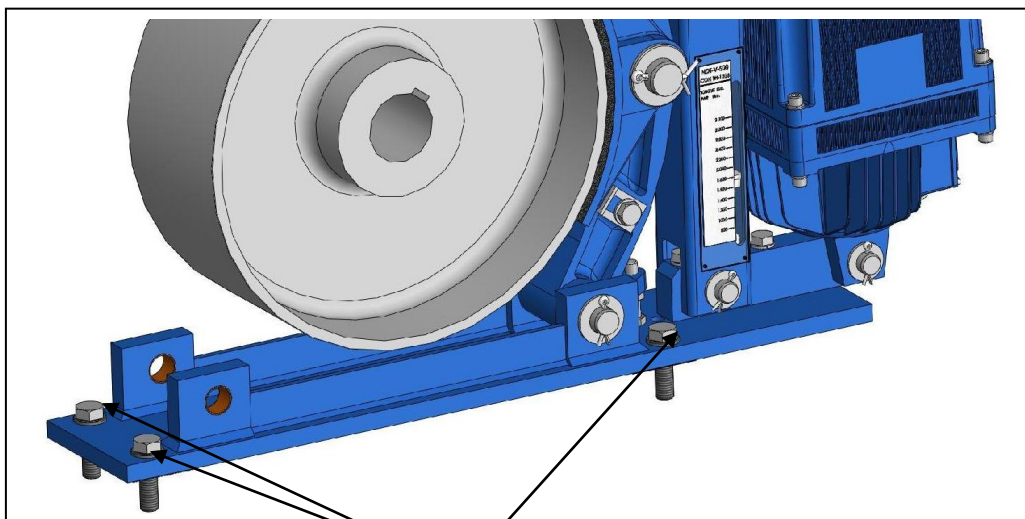
NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

- Insert the brake through a side of the drum.



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.



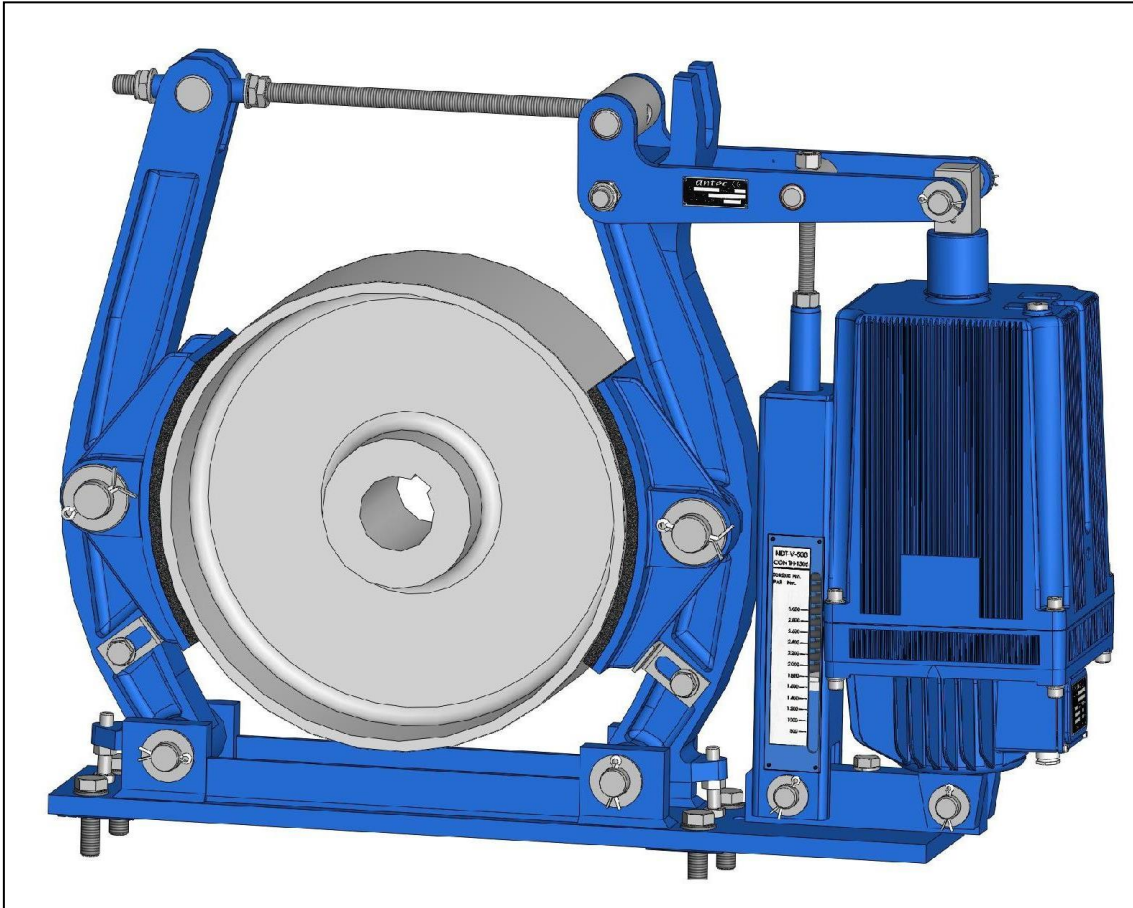
Anchor four bolts



NDTV 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.



NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

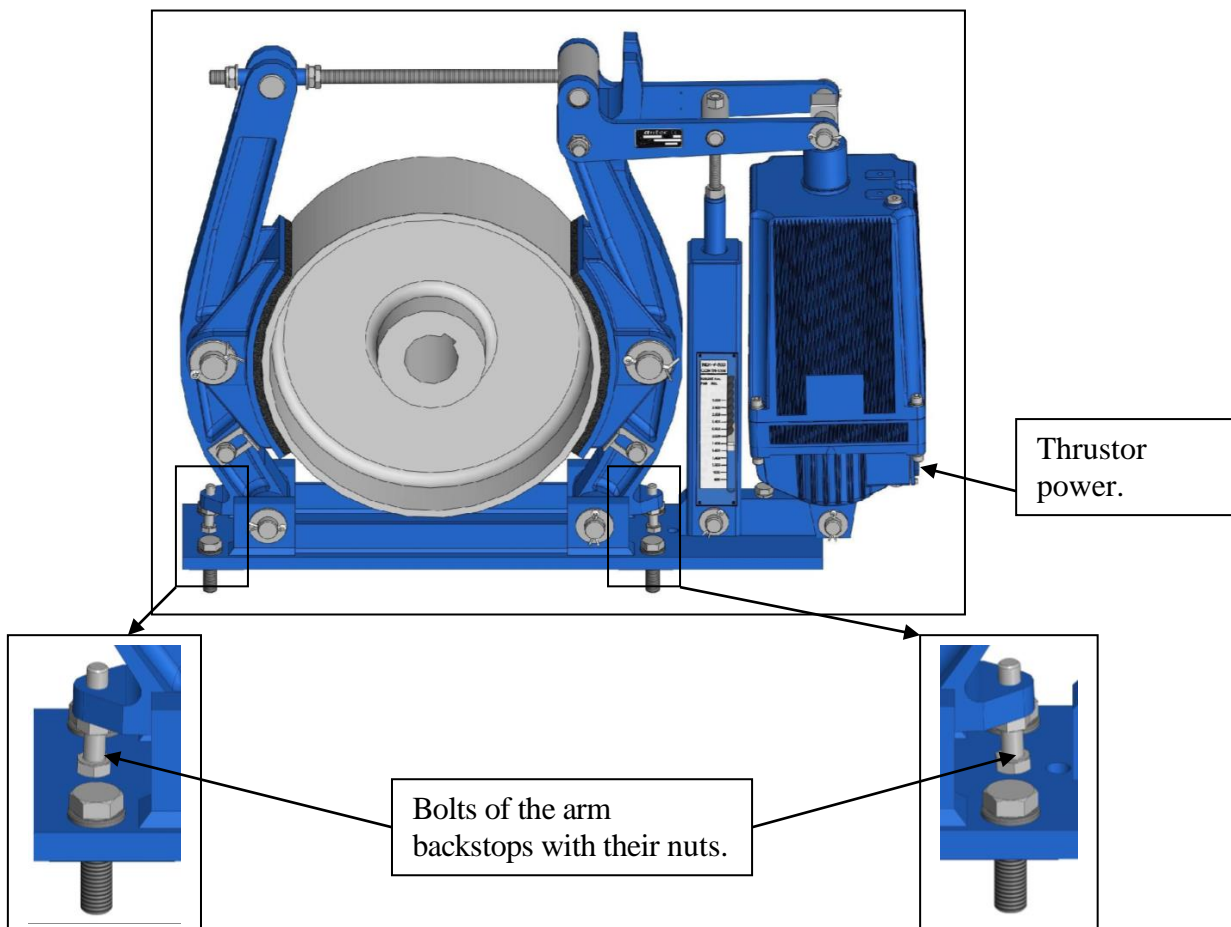
4. BRAKE ADJUSTMENT AND SETTING.

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.

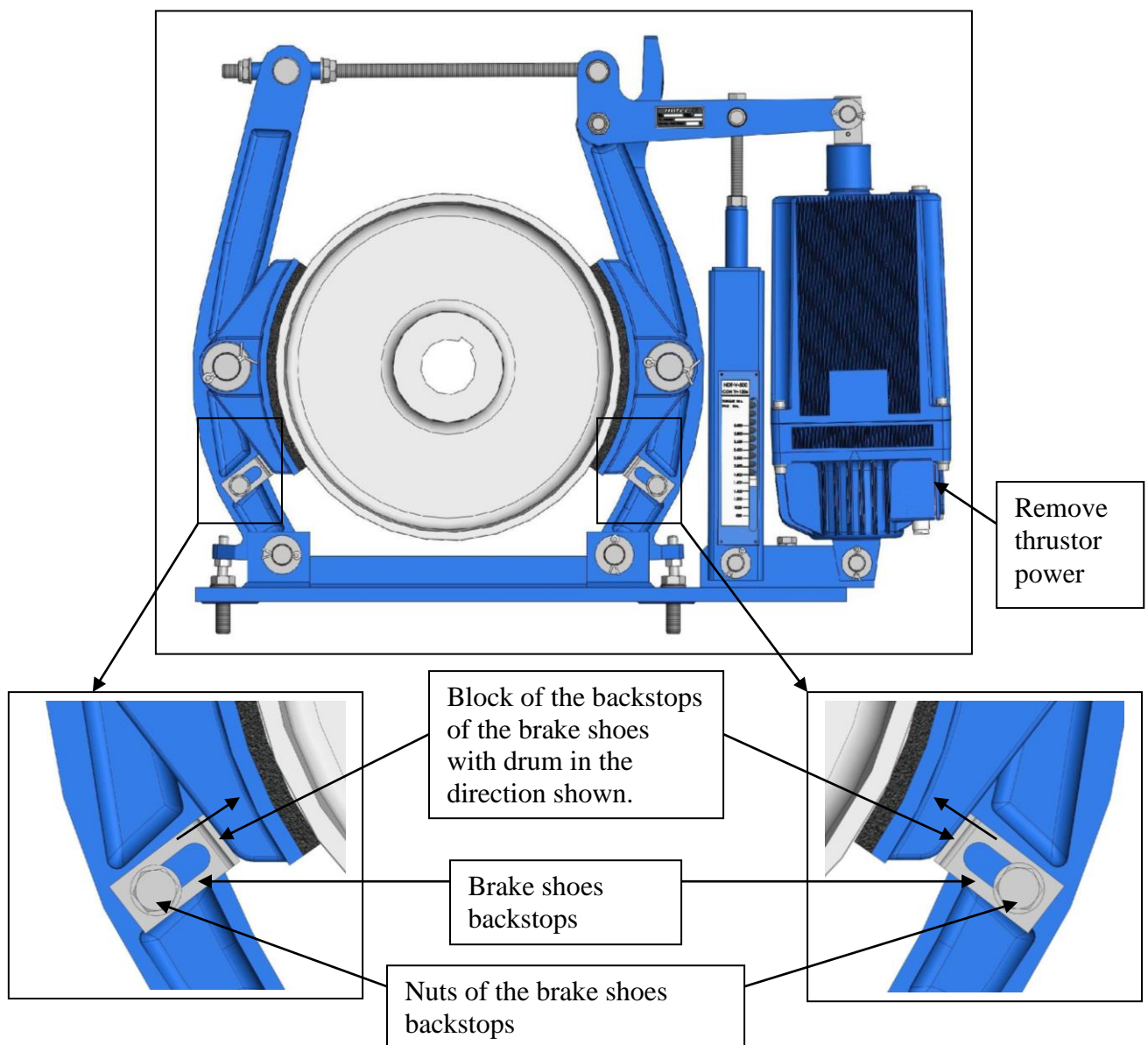




NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

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.

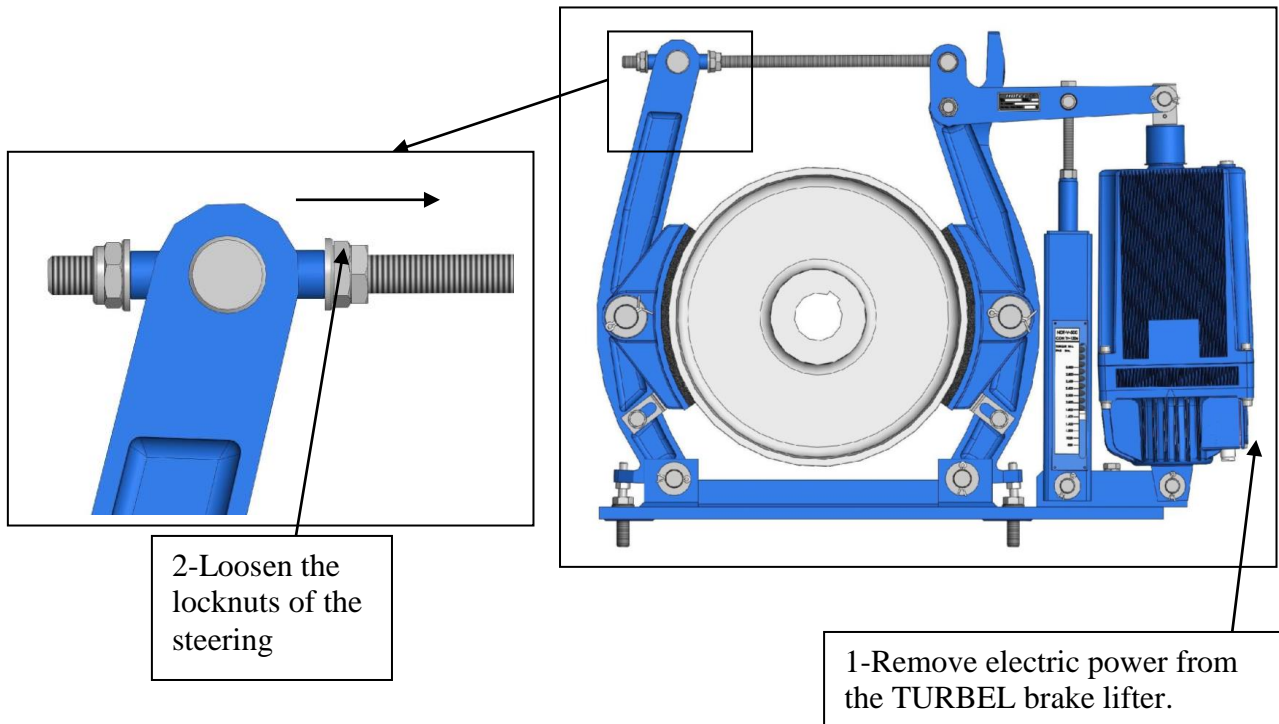




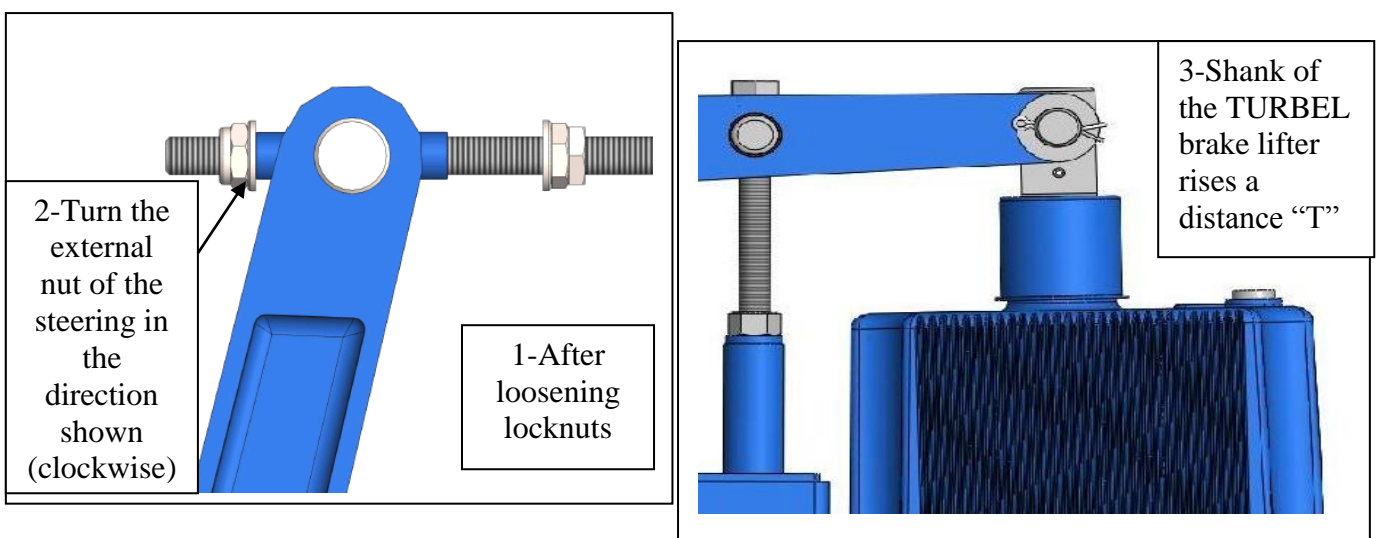
NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

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.

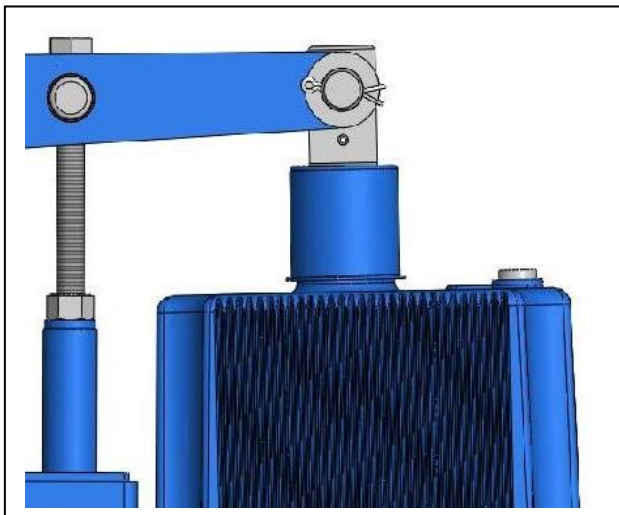




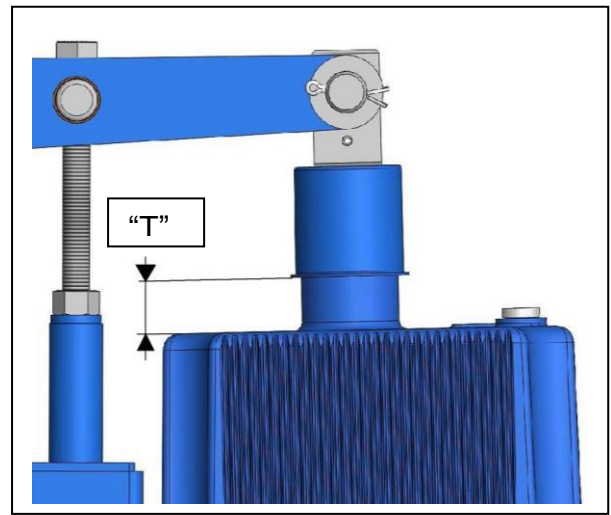
NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

- 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 27) as from its starting position.

Initial position

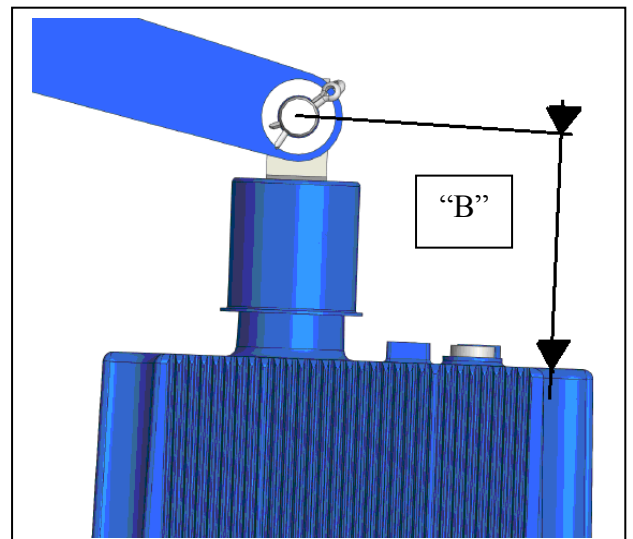
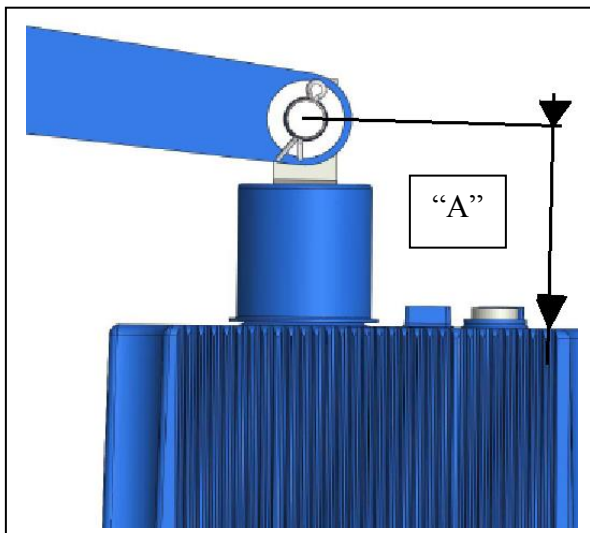


End position



NOTE

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

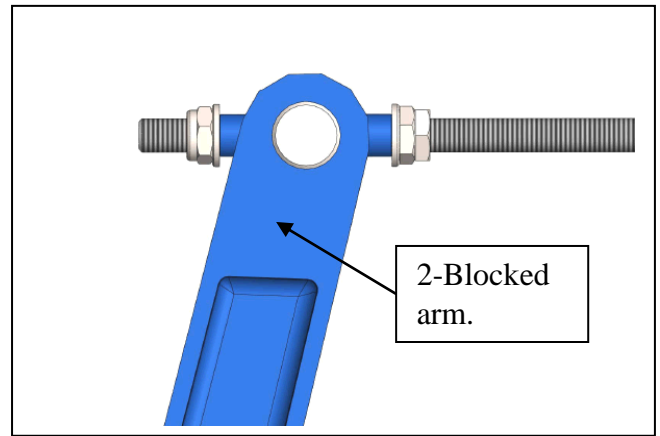
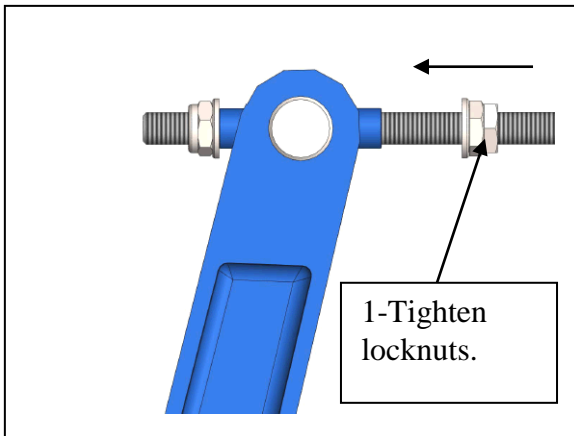


$$"T" = "B" - "A"$$

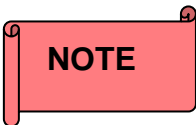


NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

- 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.



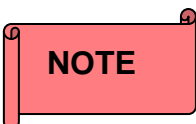
The adjustment of the brake with automatic recovery will be explained in point 7.1.3 of the instructions.

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 is shown in the following picture, NDTV brakes braking torque regulation will take place by manipulating the screw indicated until obtaining the desired torque marked on the scale of torque of the brake. The torque which you can adjust the brake has a maximum and minimum, these values are indicated in the table of page 12.

After screw regulation, lock position with the nut indicated in the following figure.

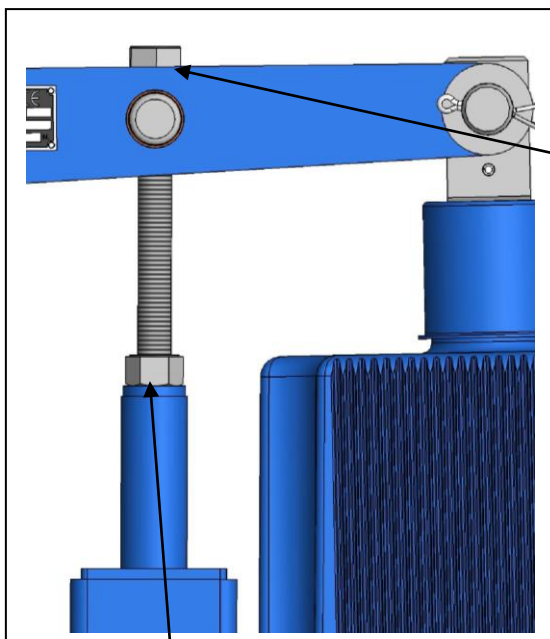
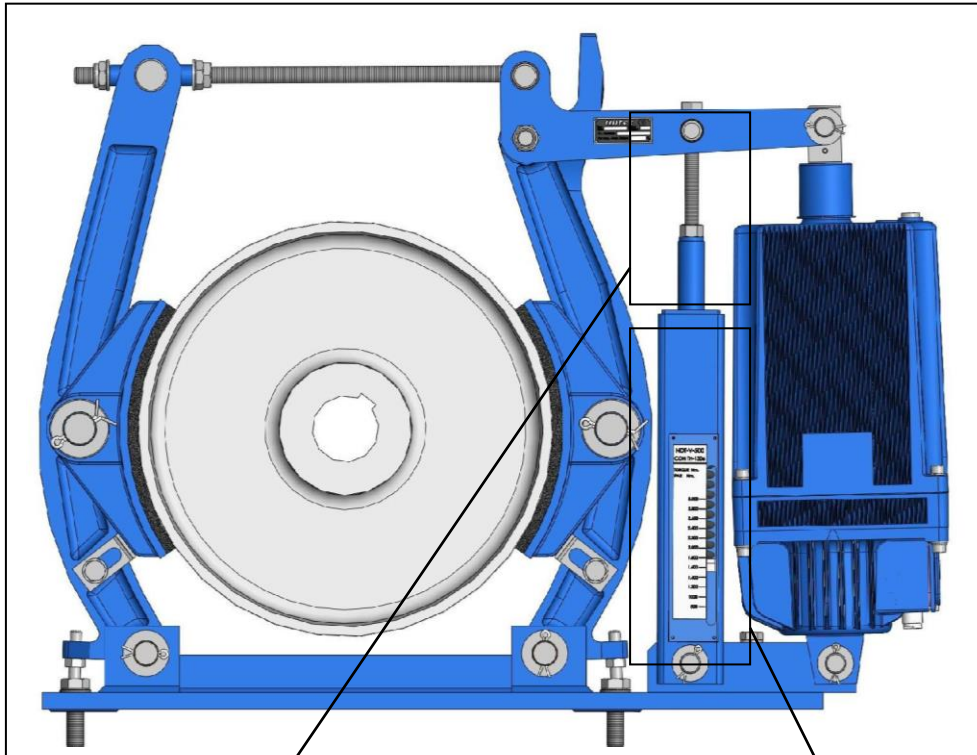


Verify and if needed redo that explained in points 4.1-4.2 and 4.3. It may be that on adjusting the braking torque the position of the arms and the "T" reserve become unadjusted.



NDTV ELECTROHYDRAULIC BRAKES

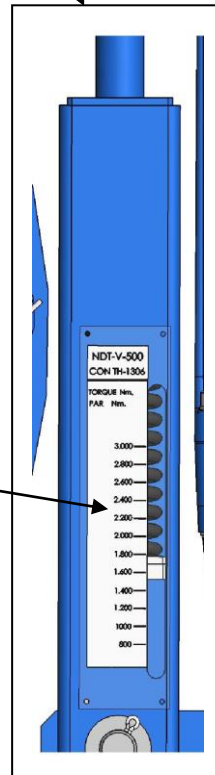
Instructions for assembly, adjustment and maintenance



1- Handle screw to get the torque wanted in the scale of torque.

2- After torque regulation, block position with nut.

Scale of torque





NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

THRUSTORS STROKES.

NDT-V BRAKE	STROKE		
	Total	OPENING	RESERVE "T"
	(mm)	(mm)	(mm)
NDT-V-200 / TH-I (256)	60	35	25
NDT-V-200 / TH-I (356)	60	40	20
NDT-V-250 / TH-I (256)	60	35	25
NDT-V-250 / TH-I (356)	60	40	20
NDT-V-315 / TH-I (356)	60	40	20
NDT-V-315 / TH-II (506)	60	40	20
NDT-V-315 / TH-II (806)	60	40	20
NDT-V-400 / TH-II (506)	60	40	20
NDT-V-400 / TH-II (806)	60	40	20
NDT-V-400 / TH-III (1306)	60	40	20
NDT-V-500 / TH-II (806)	60	40	20
NDT-V-500 / TH-III (1306)	60	40	20
NDT-V-500 / TH-III (2006)	60	40	20
NDT-V-630 / TH-III (1306)	60	40	20
NDT-V-630 / TH-III (2006)	60	40	20
NDT-V-630 / TH-III (3006)	60	40	20
NDT-V-630 / TH-III (3012)	120	100	20
NDT-V-710 / TH-III (2006)	60	40	20
NDT-V-710 / TH-III (3006)	60	40	20
NDT-V-710 / TH-III (3012)	120	90	30
NDT-V-800 / TH-III (3006)	60	40	20
NDT-V-800 / TH-III (3012)	120	95	25

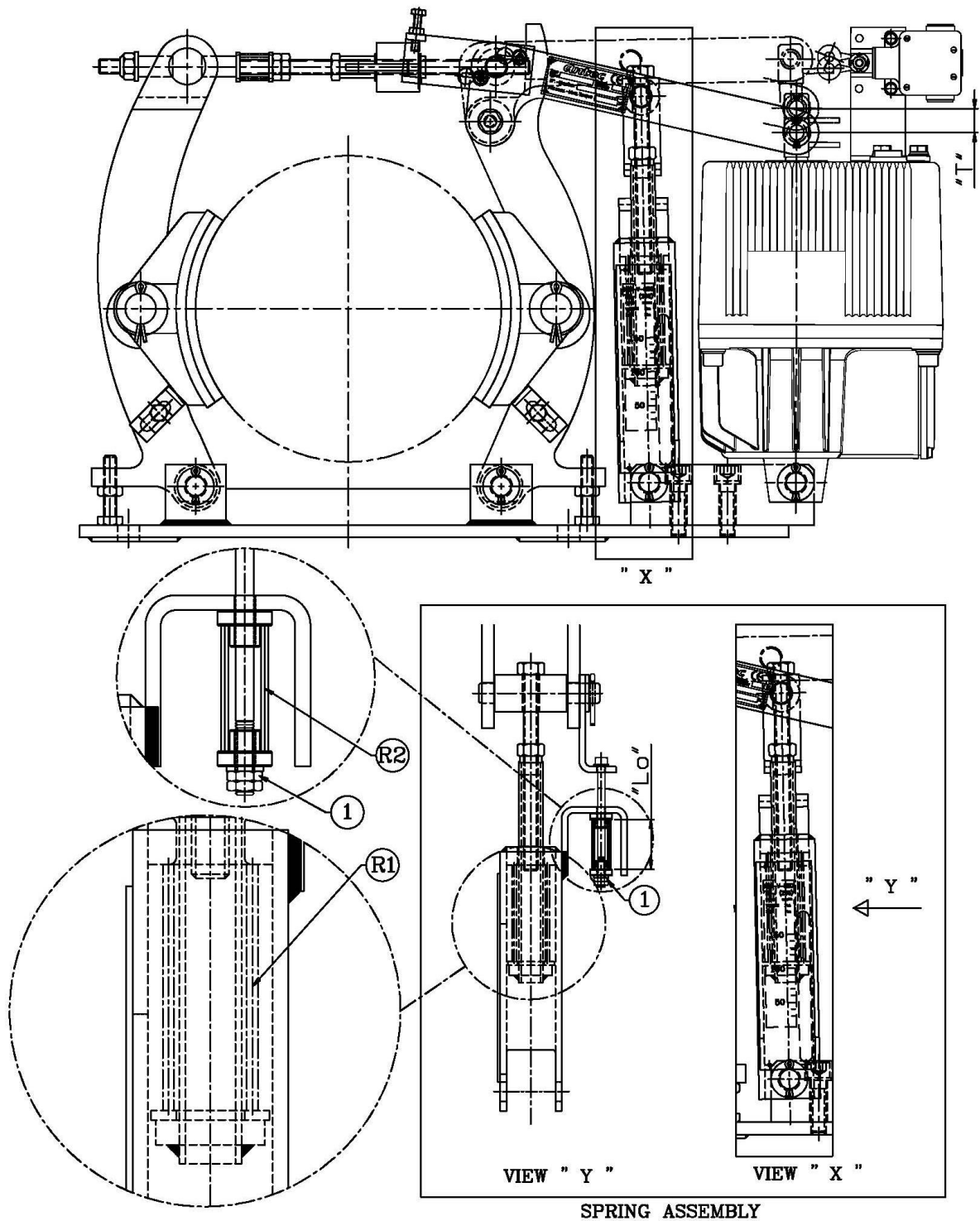
4.5. Secondary spring adjustment (only for brakes with reduced torque "RT", according to point 7.6).

After completing point 4.4, regulating the braking torque by compressing or extending the spring R1, and **after ensuring** as indicated in point 4.3 **the TURBEL reserve "T" for each corresponding brake**, tighten the nuts (Mark 1), as indicated in the following figure, to lock the spring until spring R2 is adjusted with the free length "L0", the length without compression.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



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



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

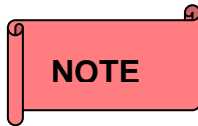
5. BRAKE MAINTENANCE.



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

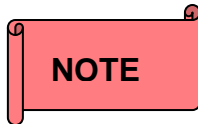
In order to obtain satisfactory long-lasting operation of the brake, it is necessary to pay regular attention to the following points:

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 27, 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.



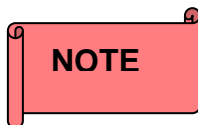
Antec deems it necessary to recommend the automatic recovery (RA) assembly option for the brake. This option is explained in point 7.1 of the instructions.

5.2.- Verify that the torque to which this brake is regulated is necessary for the proper functioning of this.



Any change in the value of the scale of torque could affect the proper functioning of the brake and cause problems.

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.



NDTV 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.



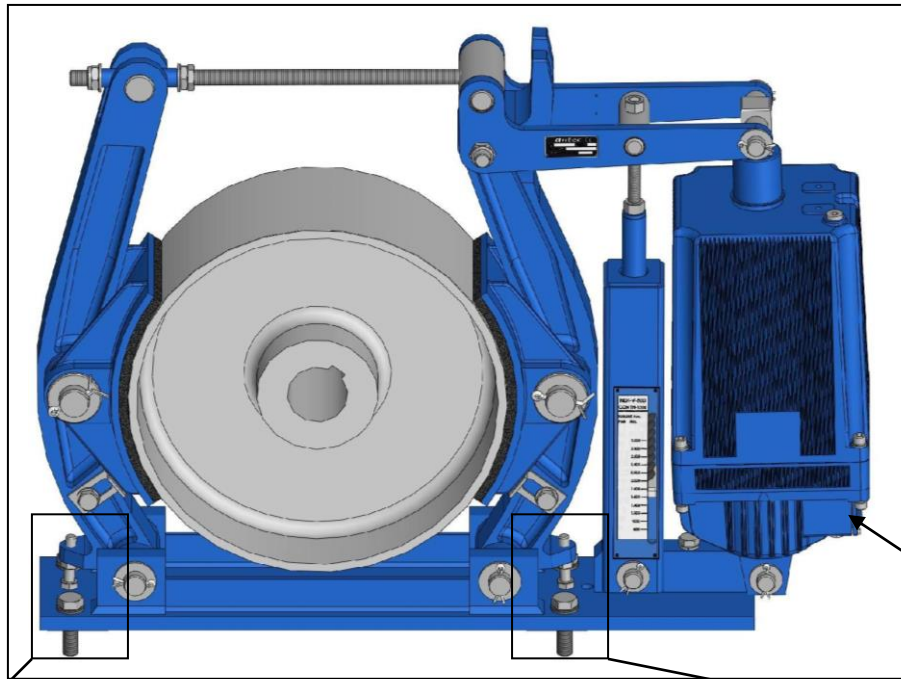
Antec recommends you to remove electric current from the TURBEL brake lifter. Non-compliance with this recommendation may cause serious damage to the brake as well as serious injury to people around it.

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

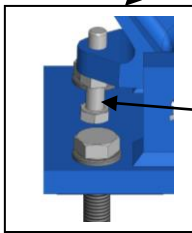


NDTV ELECTROHYDRAULIC BRAKES

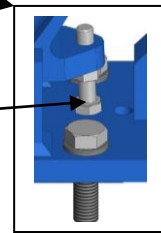
Instructions for assembly, adjustment and maintenance



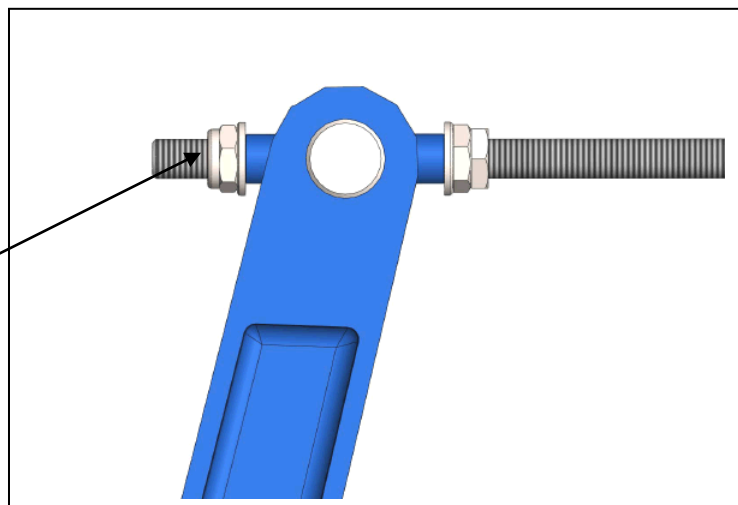
Without power
in thruster



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.



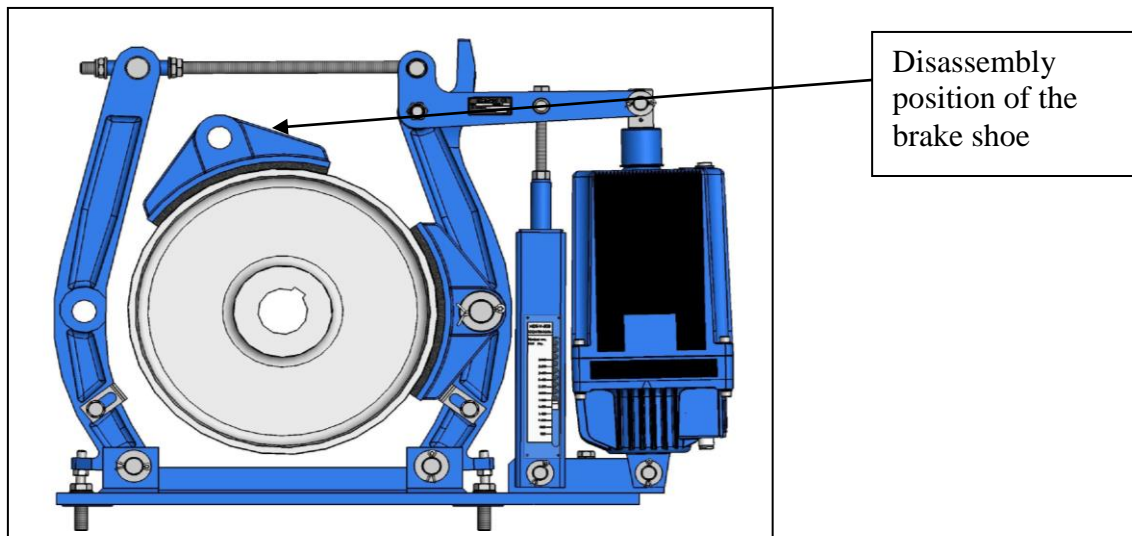
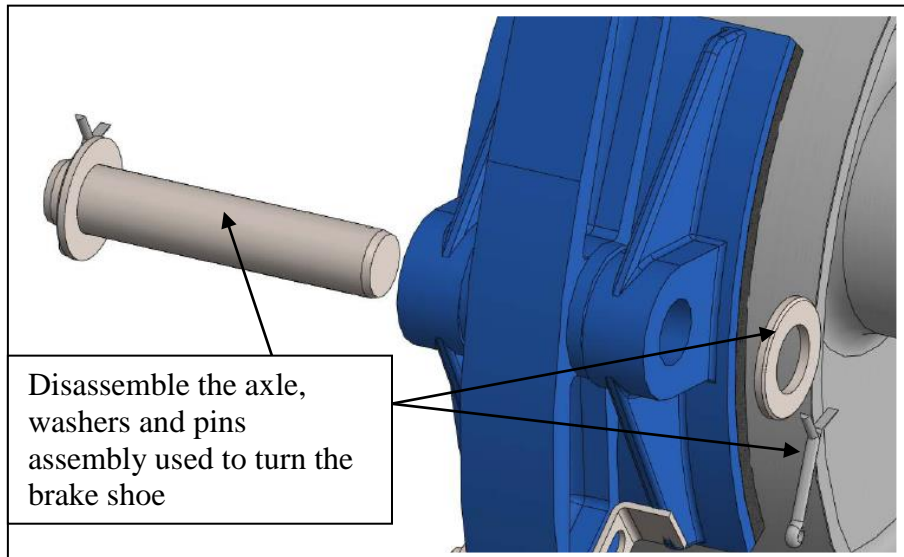
Loosen thenut to
open the brake.
Counterclockwise



NDTV ELECTROHYDRAULIC BRAKES

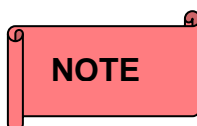
Instructions for assembly, adjustment and maintenance

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.



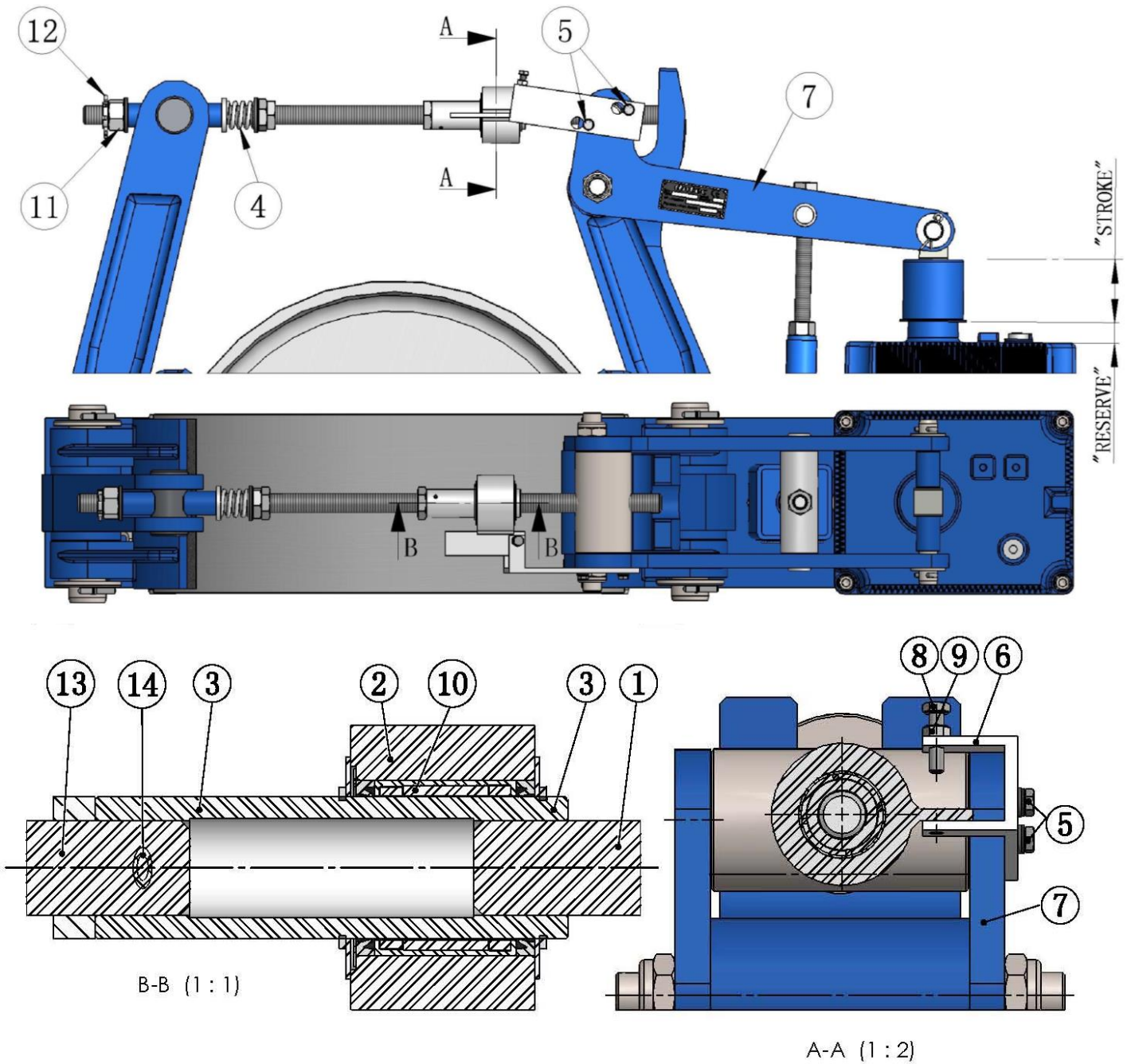
NDTV ELECTROHYDRAULIC BRAKES

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.





NDTV 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:

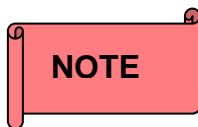
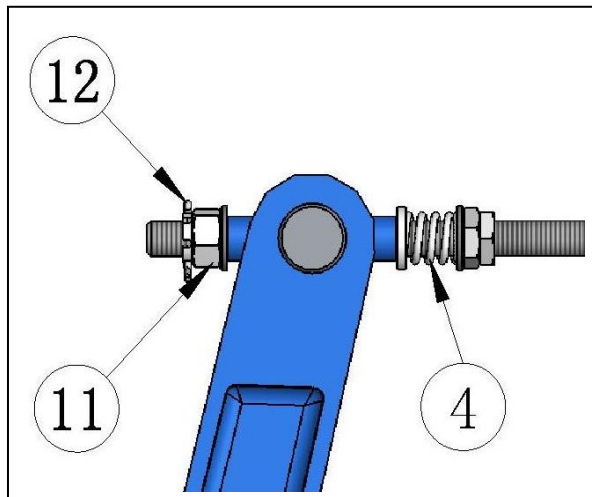
- Remove actuator mark (6) with its screws mark (5). See pictured below page 36.
- Follow all steps indicated in point 3 of the instructions. For point 3.3 take into account the following:
 - 3.3.1. With a spanner, screw the nut mark 11 in the direction of clockwise or counterclockwise to open or close the brake. See next picture.



NDTV ELECTROHYDRAULIC BRAKES

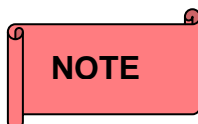
Instructions for assembly, adjustment and maintenance

• 3.3.2. Depending on the space around the drum, the operator should consider whether it is necessary or not to remove the entire or part of the arm. In the case of having to remove the whole arm must be removed pin mark (12) and then unscrew the nut mark (11). See next picture.



If necessary remove the pin mark (12), remember to place the pin mark (12) and nut mark (11) on the initial position before disassembly. In any case it is necessary to touch nuts compressing the spring mark (4).

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.



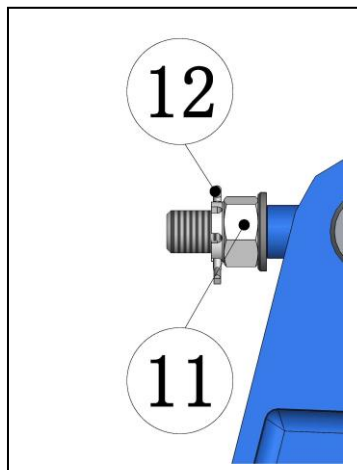
NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

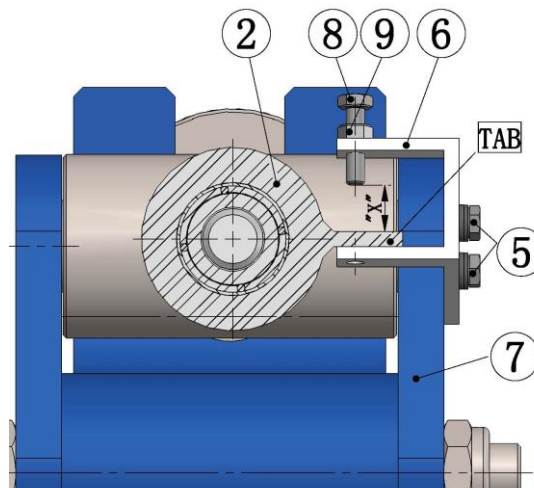
To adjust the reserve path perform the following steps:

- Remove the actuator (6) and bolts (5) of the lever (7).

- Turn the 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 27.



- 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).



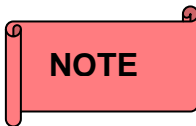
NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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.

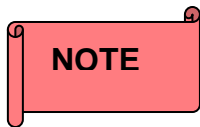
To replace either of the two brake shoes proceed in the following manner:

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

7.1.4.2. Turn, with a spanner, the crenellated nut mark (11) to counter-clockwise until the distance between the shoes and the drum 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.

7.1.4.5. Adjust brake according to point 7.1.3.

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.

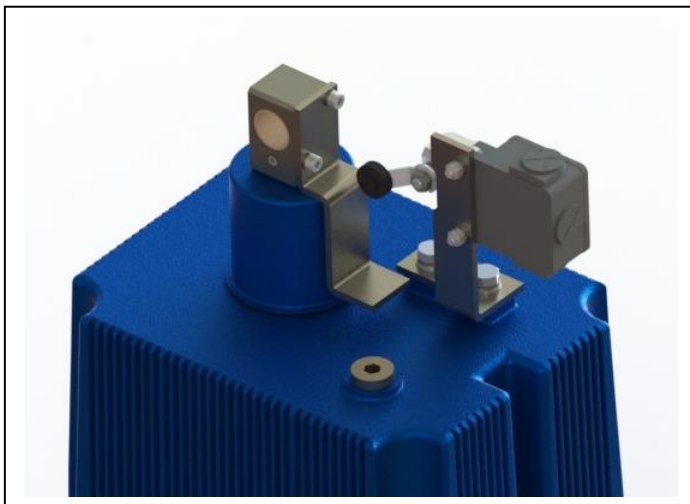


NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

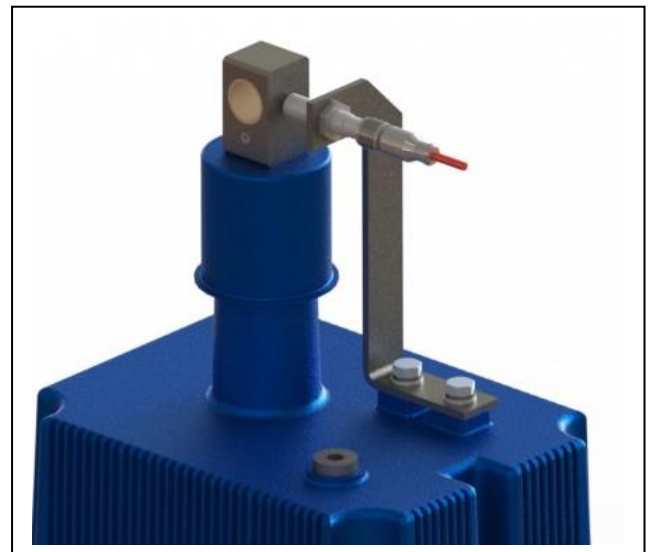
7.2. BRAKE OPEN SIGNALLING CONTACT (CSA).

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.



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



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





NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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



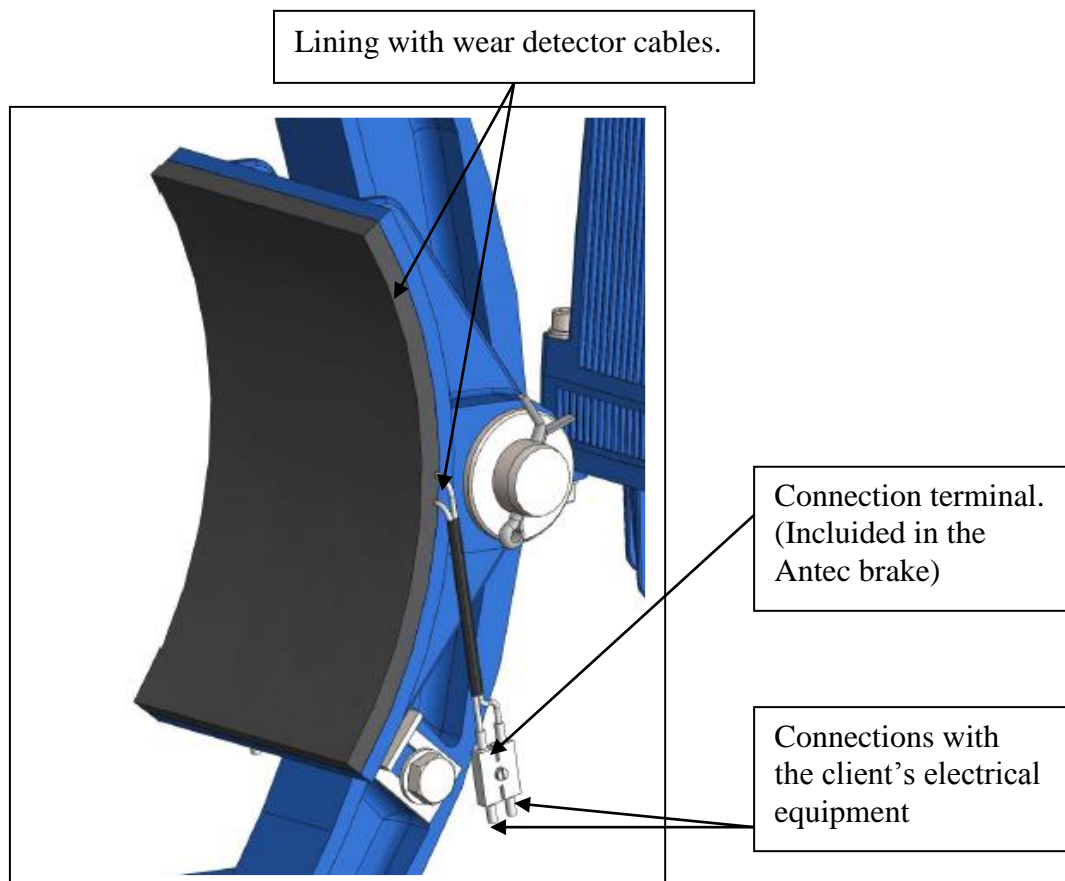
NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

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.



NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

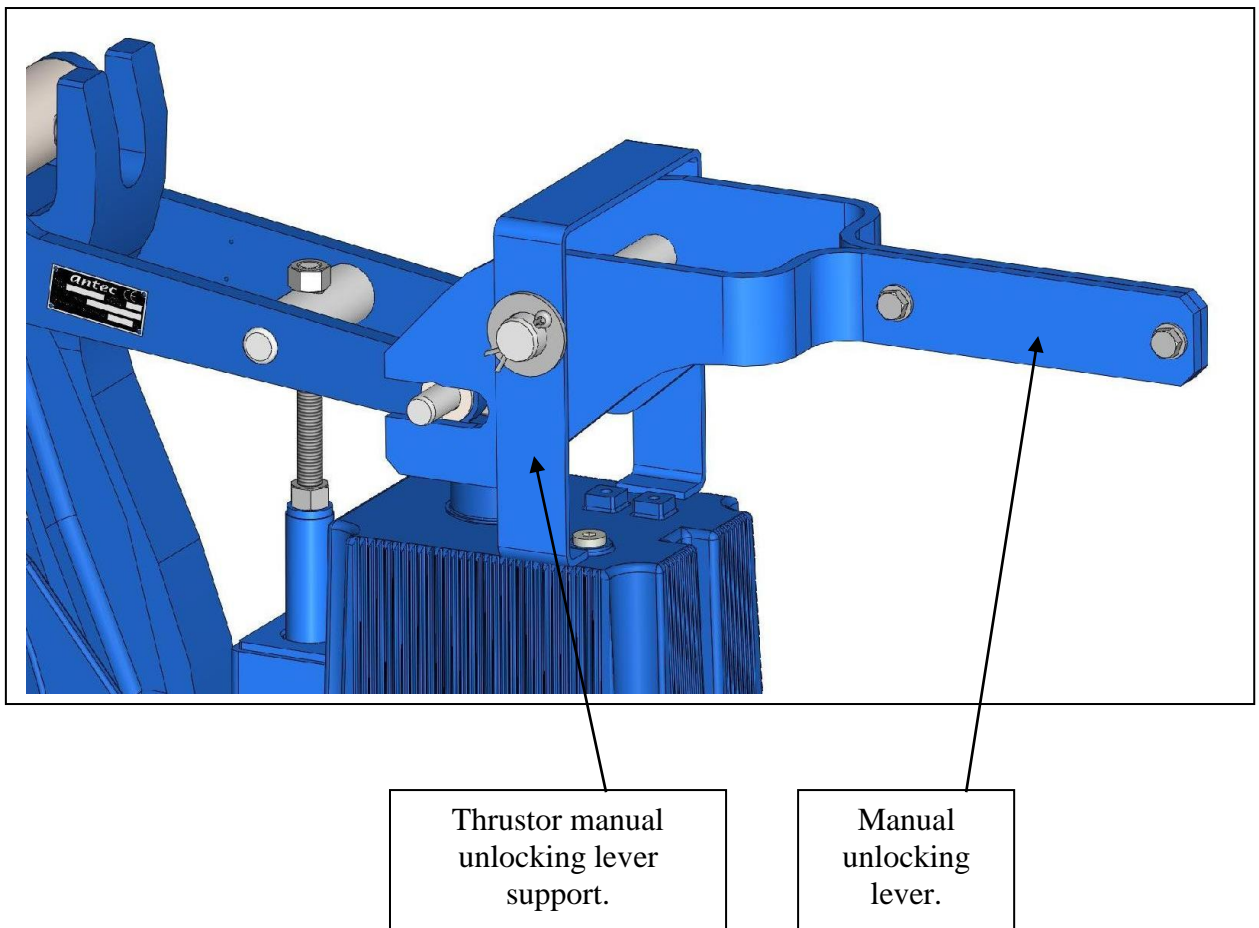
7.4. BRAKE MANUAL UNLOCK (DM).

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.





NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

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.

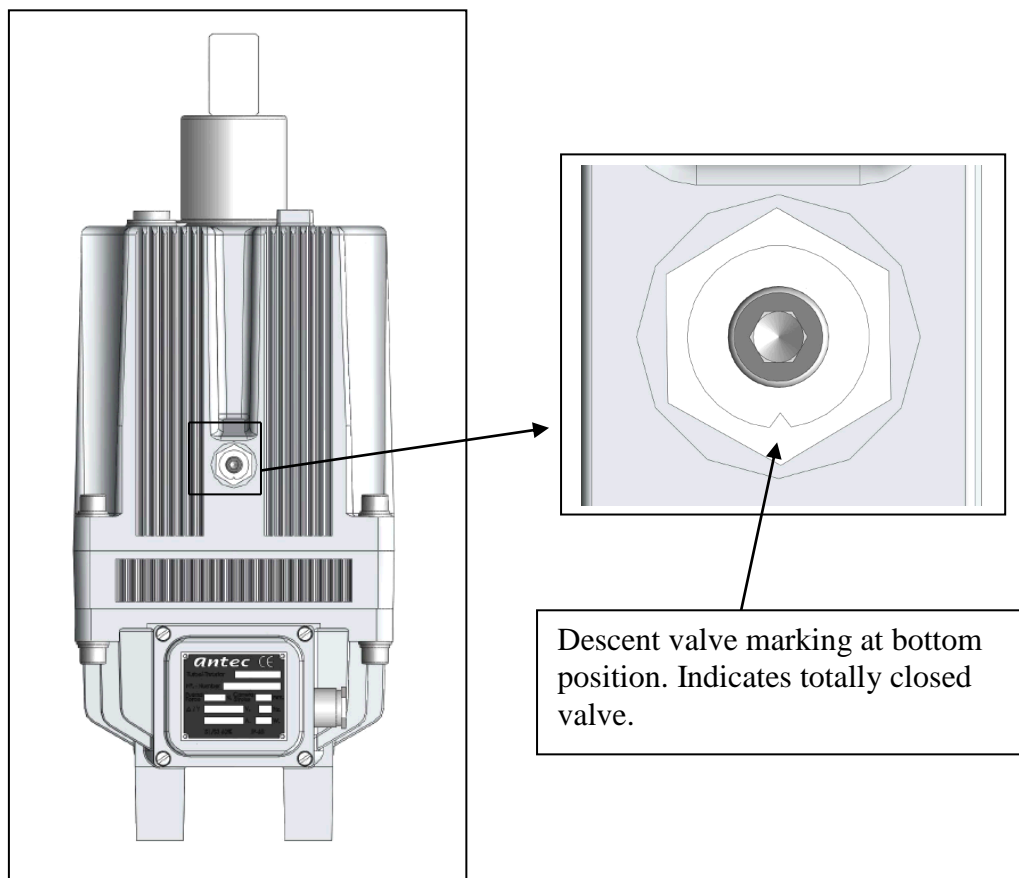
The function of mounting a TURBEL brake lifter fitted with a descent valve (VD) is to control the closing time of these brakes by means of this valve, an option that may benefit the operation of these brakes under certain working conditions.

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.

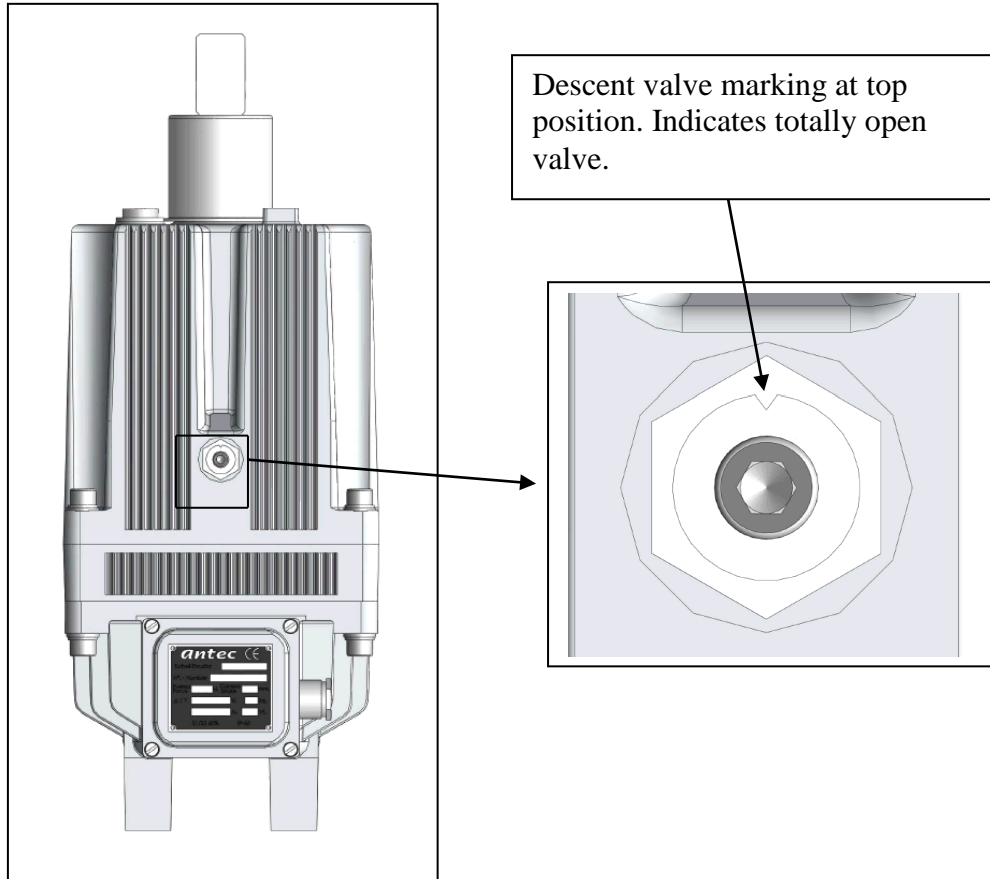




NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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.



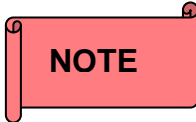
The intermediate positions of the valve vary the descent time depending on what the customer wants.



NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

7.6. REDUCED TORQUE BRAKES (PR).

When, for whatever reason, you would like the brake to provide a lower braking torque than that established as the minimum in the table in point 1.4 of the instructions, it is necessary to fit the brake with a “reduced torque” mechanism.



If a client requests the installation of the reduced torque in the brake, Antec's Technical Department shall study its feasibility.

This reduced torque mechanism is explained in the following drawing:

By adjusting the standard spring (R1) of the spring lock, we obtain the reduced torque requested by The Client. The spring lock, in the case of reduced torque brakes, indicates a special scale that is different from the one indicated in the brakes with the torque indicated in the table in point 1.4.

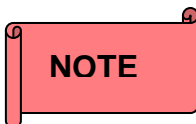
For the brake to maintain its braking response conditions, the spring lock includes a secondary spring (R2) that makes the TURBEL return to the load application position to carry out the braking.

When the electric power to the TURBEL is connected, the brake opens. At that time the TURBEL generates a greater force than the sum of the forces generated by the spring R1 when compressed and the force generated by spring R2 when compressed.

When the power supply to the TURBEL is disconnected, the brake returns to its initial position in which the spring R1 generates the force necessary for the brake to generate the reduced torque required. At the same time, spring R2 is fully decompressed until it reaches its free length (length without compression) and no longer generates any force.

This reduced torque brake adjustment is explained in the following drawing:

The reduced torque brake adjustment is indicated in point 4 of the instructions.



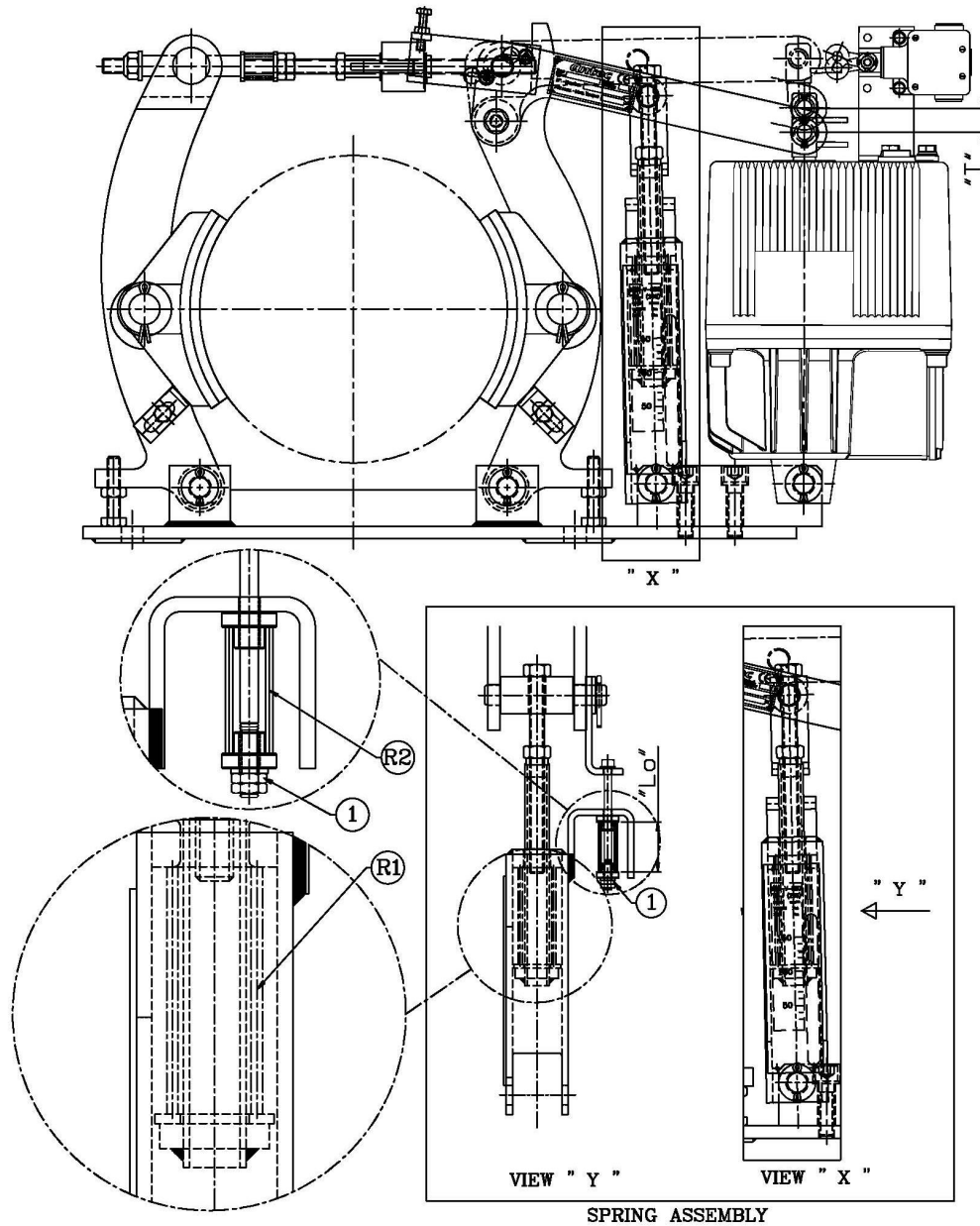
The diagram of the assembly of the reduced torque brake will be sent within the documentation prepared by our quality department.

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



NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance



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.





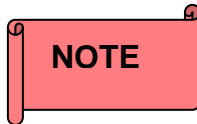
NDTV ELECTROHYDRAULIC BRAKES Instructions for assembly, adjustment and maintenance

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.

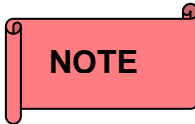


NDTV ELECTROHYDRAULIC BRAKES

Instructions for assembly, adjustment and maintenance

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.

Factory in Spain:

Aplicación Nuevas Tecnologías Antec, S.A.

Ramón y Cajal, 74

48920 Portugalete

Vizcaya – Spain

Tel.: +34 944 965 011

Fax.: +34 944 965 337

sales@antecsa.com

www.antecsa.com

Factory in China:

Antec Braking System (Tianjin) Co., Ltd

No.4, Longhuai Road, Shuangjiang Dao South

Beichen Business Development Area

300400 Tianjin, CHINA

Tel.: +86 22 26983272

Fax.: +86 22 26983273

info@antec-bs.com

www.antec-bs.com

