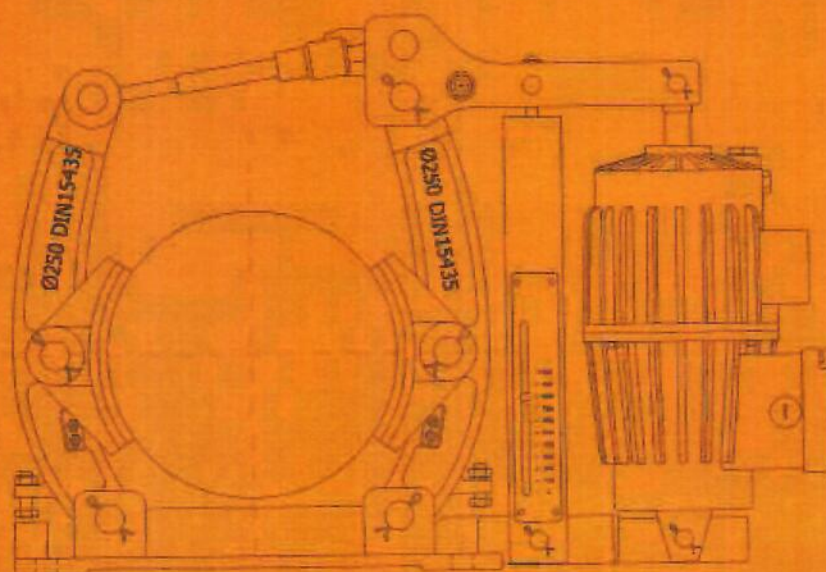


Original instructions

OSTELECTRIC

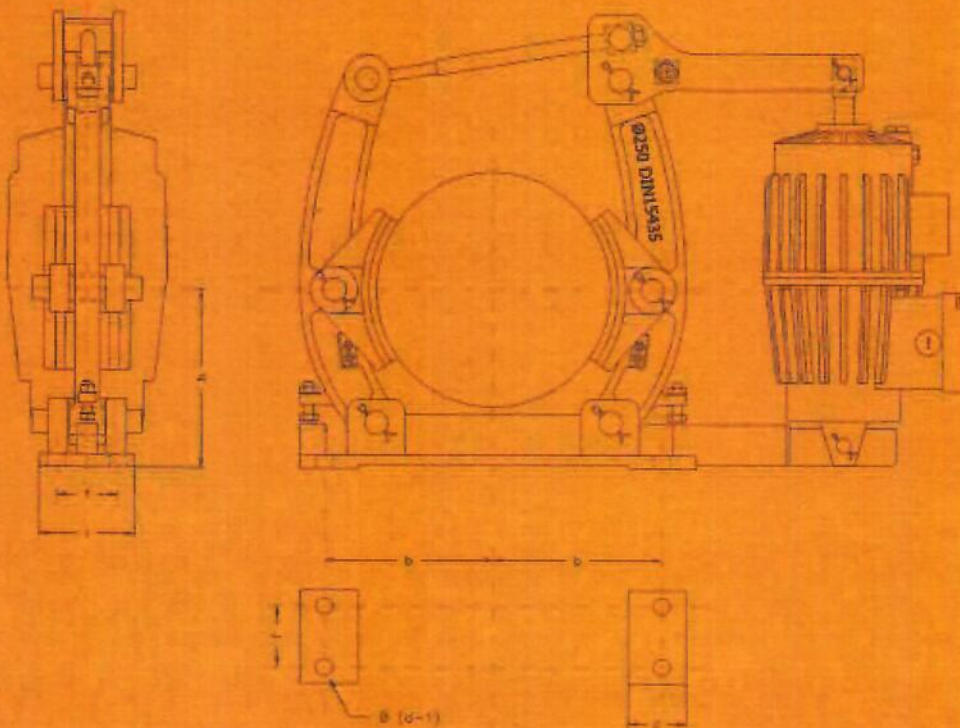
**Installation and maintenance
of drum brakes type NC
with electro-hydraulic thrustors**



Preparing supporting plane

The brake must lie on a plane surface provided with 4 fixing bores diameter $(d - 1)$ at distance b from drum axle and at mutual distance f on transverse axis. As the brake structure is self-holding the machining of the whole supporting plane is not required, but just the contact surface $l \times c$ around the brake feet. The supporting plane must lie at exact distance h from drum axle.

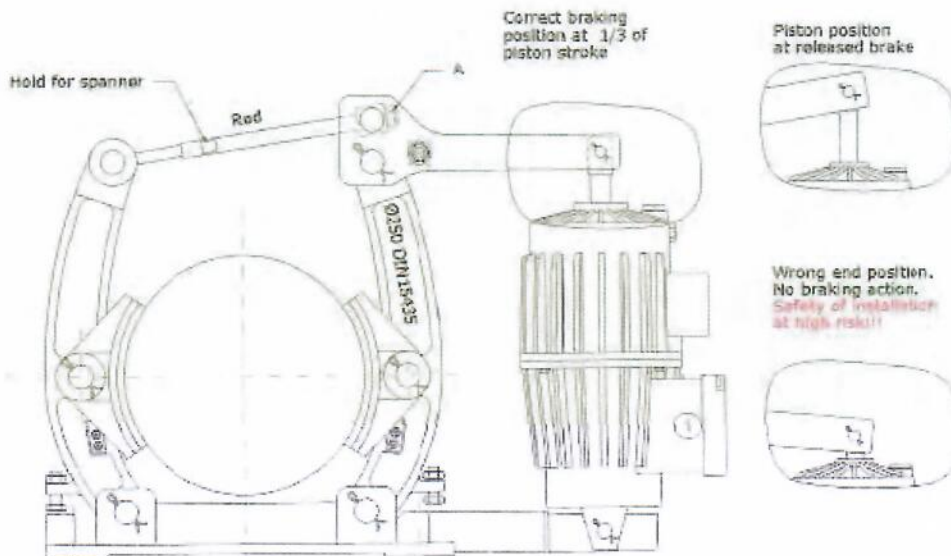
The 4 fixing screws must be strongly tightened.



Drum brakes type NC OSTELECTRIC

Thrustor's stroke setting

The purpose of this adjusting is to make sure that the thrustor releases the brake by utilizing about 2/3 of its stroke, thereby preserving the remaining 1/3 for the following and progressive lining wear. To meet this condition proceed as follows: After having loosened the self-locking nut A at rod end, screw (or unscrew) the rod into its pin. By screwing, the jaws get closer and closer to the drum until they tighten it. Keeping on screwing, the thrustor piston begins rising up. Carry on this operation until the piston rod is out for 16-20mm of its stroke. Subsequently, lock the rod through its nut by utilizing a spanner, gripped on its hold at one side and a second spanner gripped onto the nut A. Beware from using pipe-wrench and improper tools that could damage the rod. Keep in mind that the integrity of the rod is fundamental for the safety of the lifting installation and the personnel care. Time-by-time the linings wear, the stop position of thrustor piston at applied brake will lower more and more until extreme position will be reached where the spring will not be able to transmit his force to the drum. **In this condition the safety of the lifting installation is exposed at high risk**. Hence, a periodical checking of the brake is important eventually to re-establish the thrustor-rod-braking position at 1/3 of its stroke as upon described.



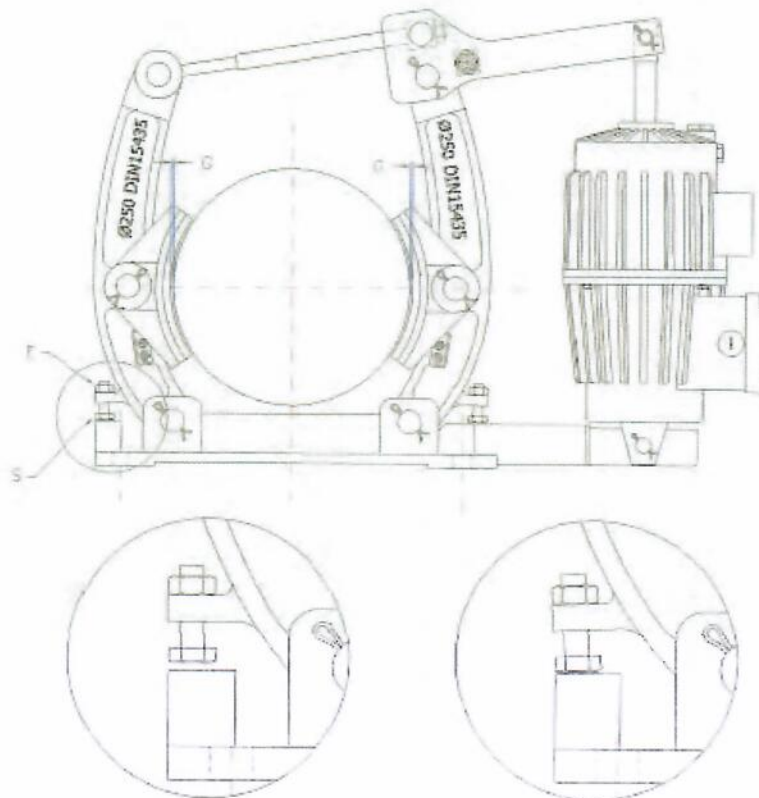
Drum brakes type NC OSTELECTRIC

Jaws gaping adjustment

The thruster opening stroke results in 3-3,5mm jaws gaping that must be equally shared between the 2 brake arms. As the stop screws S limit the arm swinging, by adjusting them the condition of equality can be met without hindering the thruster in the performance of its whole stroke.

The best way to carry out this adjusting consists in smoothly tightening the 2 screws S until their stop while the thruster is on and accordingly the brake is released.

During this operation the 2 brake arms must be kept in symmetric position versus the brake drum. After adjusting, the 2 screws have to be locked by means of their lock nuts E.



Stop arm swinging
at applied brake

Stop arm swinging
at released brake

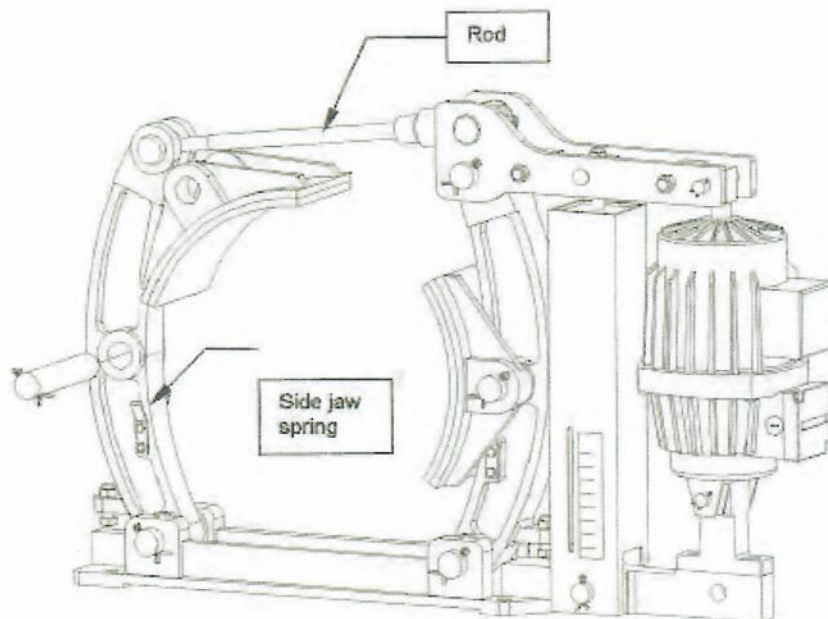
Drum brakes type NC OSTELECTRIC

Jaws replacement

Jaws replacement has to be carried out before the linings get throughout worn, in order to prevent the jaw's bare metal from rubbing against the braking drum and thereby damaging the drum surface.

Loosen the rod in order to move away at maximum the jaws from the drum. Remove the split pin at one side of the pin and extract it pin from the jaw. To get the jaw free from the brake, rotate it to a comfortable position, as showed in the picture below, and take away both jaws, before replacing them with the new ones.

After inserting the new jaws, make sure the 2 side spring have a good grip at the jaws. Bend again the 2 tines of the split pin at the end of this operation, keeping in mind that otherwise the split pin could come out from its seat. If so, the pin could come out as well, due to vibration on the installation and as a result the brake would fail with great danger for the personnel safety.

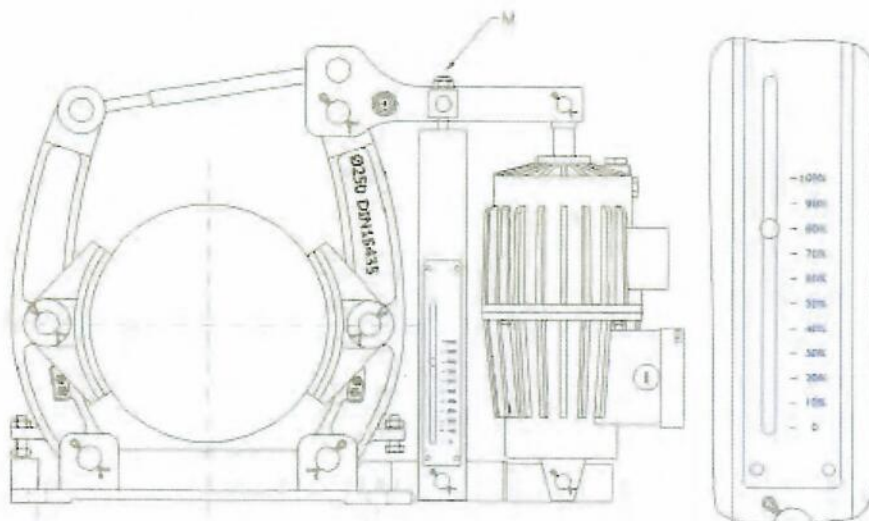


Drum brakes type NC OSTELECTRIC

Braking torque setting at brakes with external spring

The braking force is supplied by a spiral spring that is housed inside of a square pipe. The thruster hydraulic force serves just to compress this spring and doesn't affect at all the braking torque.

The braking torque may be reduced from its highest value downwards up to 20-25% by lessening the spring compression by means of the screw **M**. The spring compression rate can be read on a graduated scale provided on the spring square tube. Take into account that the more the spring gets compressed, the higher is the braking torque, the quicker is the brake action, yet the slower is the brake release. Keep in mind that after loosening too much the compression rate, the reduced braking torque could not be enough to hold the load hanging at the lifting installation with great danger for the personnel safety.



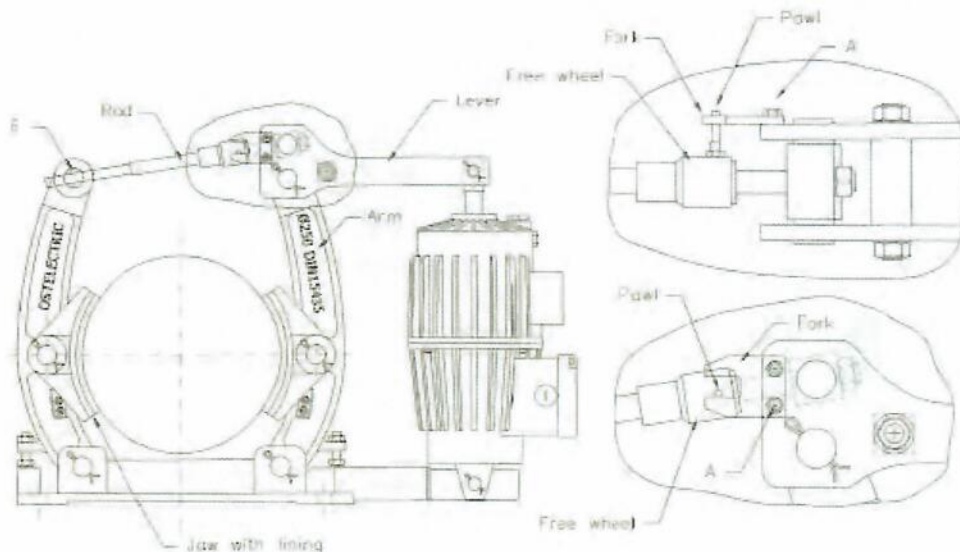
Optional self adjusting device for lining wear compensation

The device acts time by time the linings wear and provides for automatic restoring of the thrustor opening-stroke and thus of the right opening gap between brake drum and linings. Basically, the device is made up of a free wheel housed inside a cylindrical casing keyed on the brake rod. The fork fixed to the brake lever moves a pawl stretching out from the casing.

Acting principle. By setting and releasing the brake the free wheel pawl swings within the fork. As linings wear the lever swing tends to increase and the pawl gets in touch with the fork's lips and is prompted to rotate as a whole with the rod. As a result the rod screws into its arm pin F, thereby approaching each other the brake arms and restoring the right opening gap between brake drum and linings.

Replacing lining shoes. With new linings the two arms have to be moved off and re-adjusted, because of the mayor lining thickness. Yet, before unscrewing the rod, to make possible the rotation of the free wheel with its stretching pawl, the fork has to be taken off by removing its screws A.

After replacing the lining shoes, the rod has to be screwed again into its pin F until the thrustor rod rises from its lowest position up to about 8-10mm. Set again the fork at its place with the pawl inside its lips and finally the brake is ready to service again.



Drum brakes type NC OSTELECTRIC

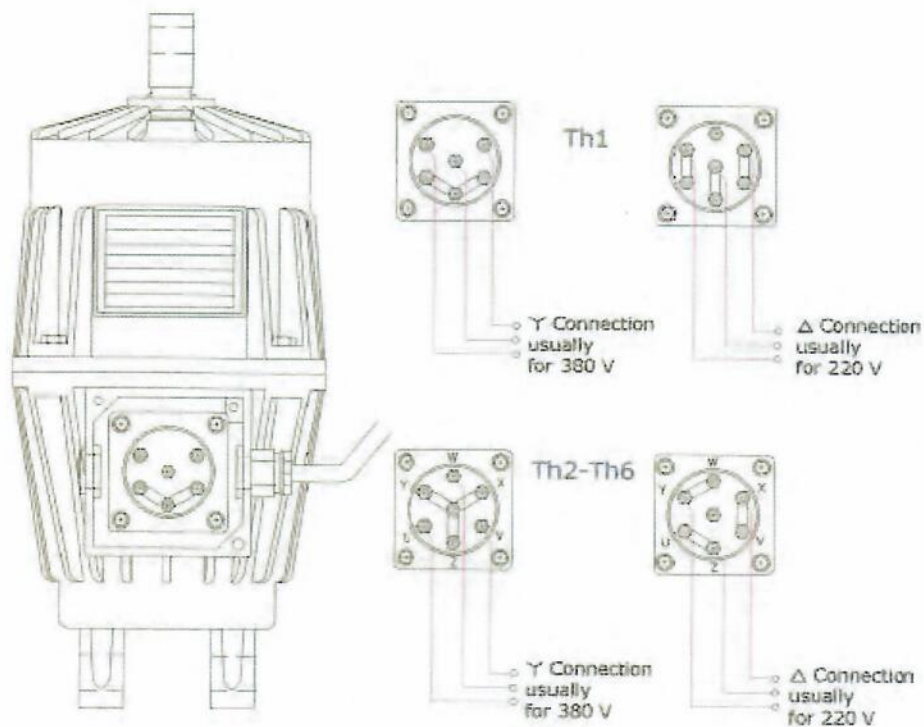
Electric connection

The cable may entry from both sides of terminal box. The gland size is Pg11 for Th1 and Pg16 for Th2 to Th6. Since the sense of rotation doesn't affect the thruster's function you don't need to respect any sequence by connecting the 3 phases.

Elco-thrusters can bear tension swings of $\pm 10\%$, whereas even small changes in frequency affect the lifting force.

Direct parallel connection with crane motor should be avoided, whereby it may bring forth delay in lowering stroke and therefore in braking action.

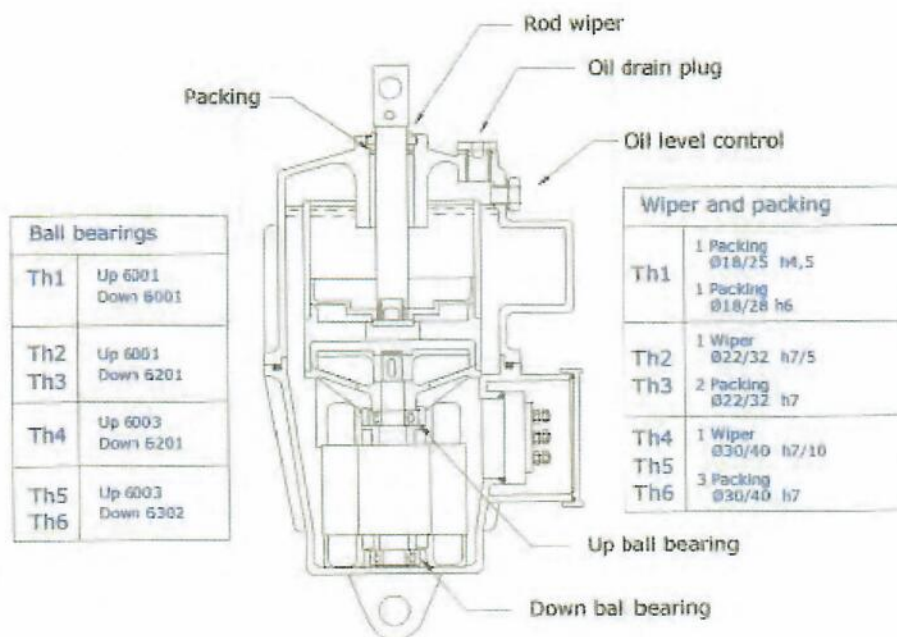
Don't switch on before having closed the terminal box cover and having connected the earth wire.



Drum brakes type NC OSTELECTRIC

Hydraulic filling

Thrustors are always supplied complete with their oil filling HL10 to standard DIN 51524. The most employed oil mark is AGIP ACER MV10. Time by time, check out the oil level through the oil level control plug and eventually add it through the oil drain plug. For HR design, utilize the oil indicated on the name plate.



Maintenance

Every 6 months

Check up the thrustor conditions making sure any oil leakage has not occurred. Verify the oil level and finally restore it.

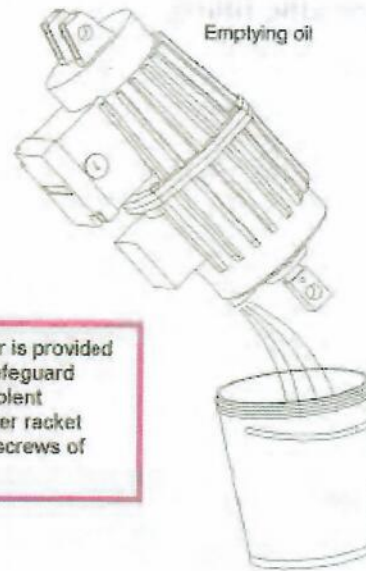
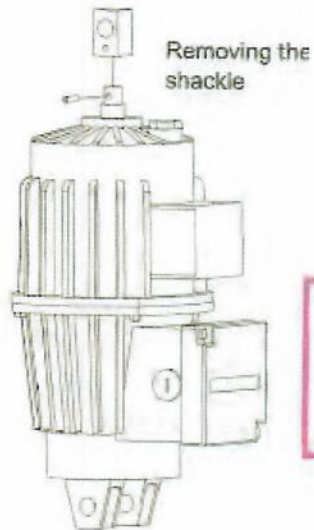
Every 5 years

To grant the perfect function of the thrustor following components should be replaced:

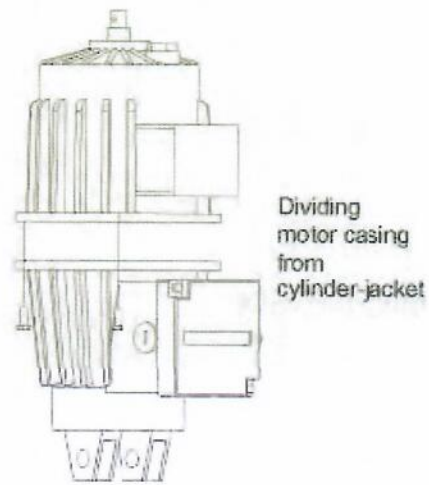
- Packing
- Wiper
- Bearings
- Hydraulic filling

Drum brakes type NC OSTELECTRIC

Replacing rod packing



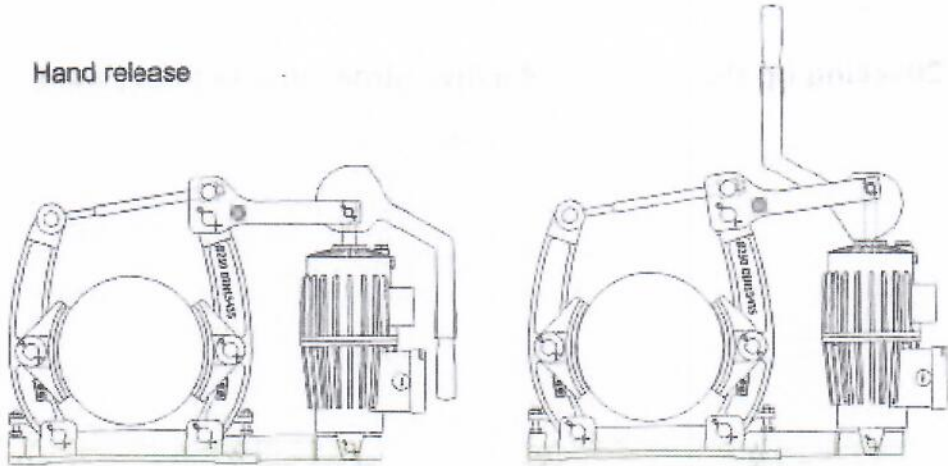
Beware: If the thruster is provided with internal spring, safeguard yourself against the violent expulsion of the cylinder racket after loosening the 4 screws of the casing.



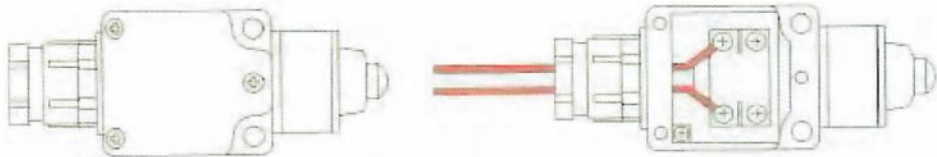
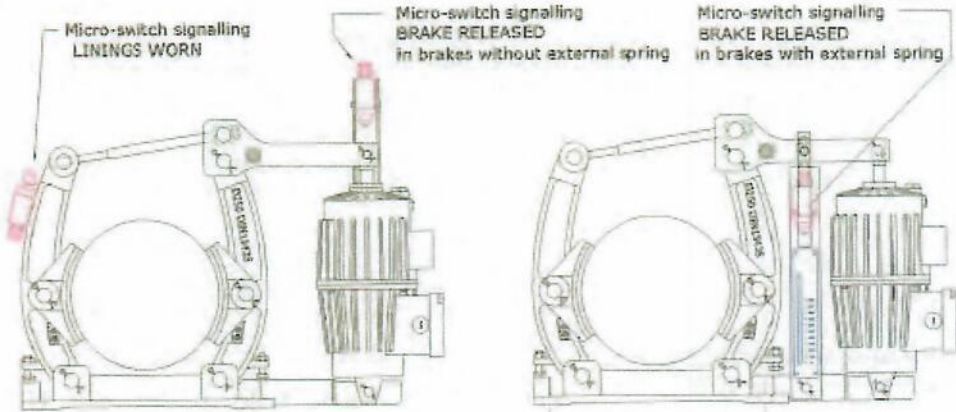
Re-insert the new packing and wiper and set again the thruster following the other way around

Drum brakes type NC OSTELECTRIC

Hand release



Micro switch

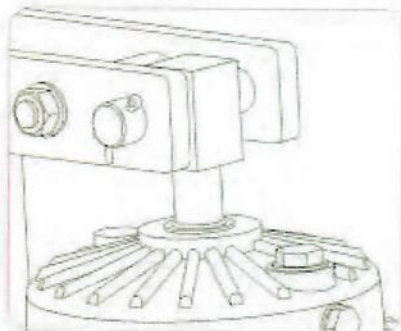


Micro-switch connection

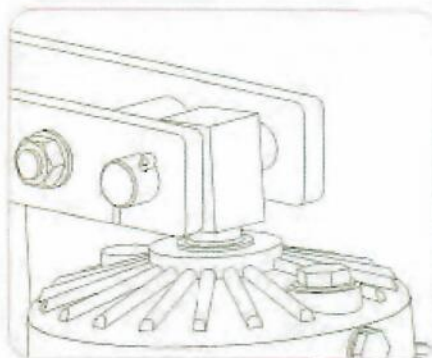
Drum brakes type NC OSTELECTRIC

Inspection and maintenance

Checking up the increase of active stroke due to lining wear



Correct piston stop-position at applied brake



Wrong piston stop-position at applied brake. Danger!!!

At brakes without automatic lining wear compensator

Verify the piston position. Take into account that gradually the linings wear, the piston stop-position will be lower and lower until the end position is reached, where the braking effect will miss with great danger for the personnel safety.

As the wear rate depends upon the utilization rate of the brake, as well as on different

factors related to the lifting installation, it isn't possible to establish beforehand the right frequency of these inspections.

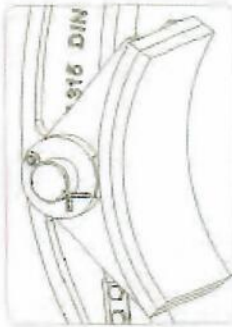
Thus it is recommended to perform this inspection fairly often (every week) at the beginning of the installation activity. Yet, if after repeated intensive inspections, it is apparent that the piston stop-position remains quite unchanged and no new adjustment is needed, you can prolong the inspection frequency in order to find the right interval, where the restoring of the piston stroke doesn't exceed 5-6mm.

It is worthwhile to proceed with caution in the research of the right inspection frequency.

At brakes equipped with automatic lining wear compensator

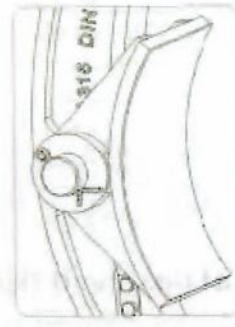
As the device provides the self-adjustment, no intervention is required for this function. Yet, by beginning it is valuable making sure that the device works correctly, as it could have been damaged during transportation or installation. The proper function of the automatic compensator can be easily assessed by observing the piston stop-position across the times. It must remain constant!

Checking up lining conditions

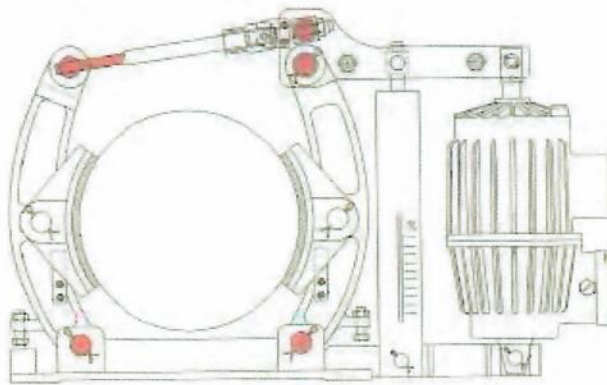


Lining in good Condition

The purpose of this control is to verify whether the jaws are still provided with enough lining thickness or the linings are worn and their replacement is required. It is quite normal that by dint of braking the linings wear and after a time they have to be replaced. Anyway it is worth avoiding that the linings wear completely to end, as in this conditions the brake performance drop dramatically and it may even not be able to hold the load hanging from lifting installation with high risk for personnel safety.



Worn lining. Replacement required



Greasing

Every three months the brake has to be greased. Grease is better than oil as the latter rapidly leaks and ends up make onto the linings, thereby reducing the braking performance. It is worth using a dense product to grease al pins and joints and avoiding the

drum braking surface. A good periodical greasing not only is essential for the brake function but makes last it longer.

All pins have to be greased, but particular care must be devoted to the ones marked in red color in the above picture. If the brake is equipped with automatic lining wear compensator the portion of threaded bar of the rod – just close to left pin – has to be greased as well.

Drum brakes type NC OSTELECTRIC

Checking up the state of the brake

Due to particular environmental conditions or progressive aging, the brake could not be safe any longer. Hence, it is worthwhile carrying out at least a time a year an inspection to brake structure making sure that:

- The brake is still strongly fixed on its supporting plane.
- Rustiness and oxidation don't appear
- Joints and pivots are not locked and can freely swing
- Any oil leakage appear on and around the thruster
- Any leakage or grease, coming from whatever hydraulic device (thruster gear box) flow onto the braking drum surface

List of unsolved risks

Risk of missed brake adjustment by maintenance staff to restore the thruster opening stroke. As a result, the hanging load can fall to ground with high risk for personnel safety.

Advices for maintenance-staff training

It is fundamental to explain how drum brakes work. Make sure that maintenance operator has basically understood the difference between entirely worn lining - which requires to be replaced - and just partially worn lining - which requires a brake adjustment. If the guy hasn't taken a grip on these concepts chance are that he find satisfying the brake conditions just because a plentiful reserve of lining thickness appear on the jaws - even if the thruster's piston is at the end of its downwards stroke and the braking capability is at highest risk.

The maintenance staff must be told that after thruster's stroke adjusting, the rod has to be locked again, yet by utilizing proper tools that preserve the rod from breaking due to excessive torsion.



Certificato di conformità
Declaration of conformity
Certificat de conformité
Konformitätserklärung

Dichiariamo con ciò che il seguente prodotto
We hereby declare that following product
Nous certifions ci-dessous
Hiermit erklären wir, dass folgendes Produkt

Freno a ceppi tipo NC-Th n.
Drum brake type NC-Th no.
Frein à mâchoires type NC-Th n.
Backenbremse Typ NC-Th Nr.

è conforme alle seguenti norme:
complies with following standard:
est en conformité avec les normes ci-dessous :
folgenden einschlägigen Bestimmungen entspricht :

Direttiva macchine 2006/42/CE
Direttiva per bassa tensione 2006/95/CE

EC recommendation for machines 2006/42/EEC
EC low voltage recommendation 2006/95/CE

Normes européennes pour machines CE 2006/42
Normes européennes pour basse tension 2006/95/CE

EG-Maschinenrichtlinien 2006/42/EG
EG-Niederspannungsrichtlinien 2006/95/CE

Norme armonizzate applicate: EN ISO 12100 sicurezza delle macchine
EN 60204 Parte 1 Esecuzione elettrica delle macchine

Applied harmonized standards: EN ISO 12100 Safety of machines
EN 60204 Part 1 Electric equipment of machines

Normes harmonisées appliquées: EN ISO 12100 Sécurité des machines
EN 60204 Equipement électrique des machines

Angewendete harmonisierte Normen: EN ISO 12100 Sicherheit von Maschinen
EN 60204 Teil1 Elektrische Ausführung von Maschinen

Limbiato, 3 Dicembre 2009

Casini Roberto

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