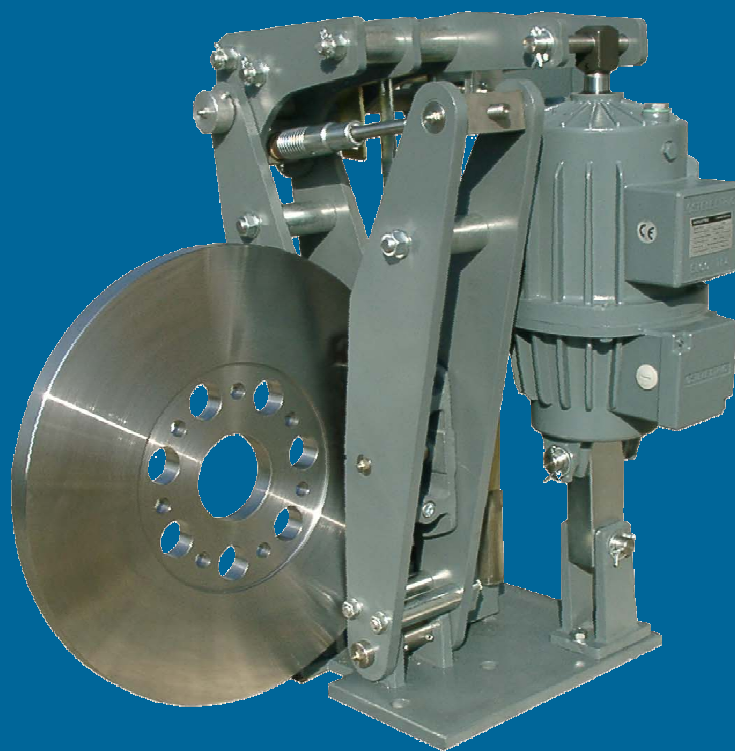


# NEW TURBOSTART INDUSTRIAL BRAKE



**CHAIN & DRIVES**<sup>®</sup>  
COMPLETE POWER  
TRANSMISSION

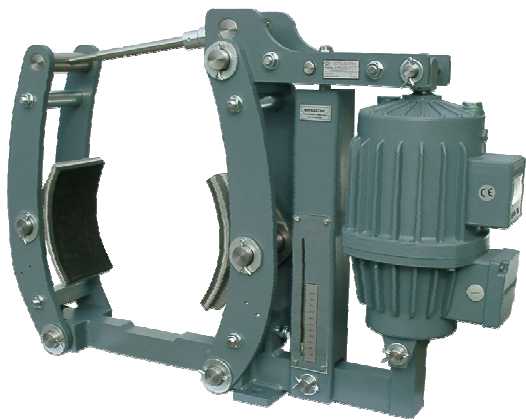
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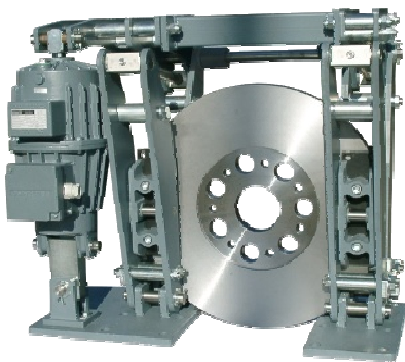
# TECHNICAL CATALOGUE

## INDUSTRIAL BRAKE



**New Turbostart s.r.l.** was born in 1958, its corporate purpose is the production and sale of mechanical and hydraulic drives; the company has always been renowned for their new products reliability and professional service offered to clientele. It is a compact structure, efficient and always ready to solve the most varied problems of customers, succeeding in realizing even personalized products, guaranteeing, at the same time, rapidity and prompt deliveries. Over the years, it has always followed quality objectives, **officially recognized on several occasions all over the world.**

New Turbostart is in **continual development, both in Italy and abroad** (all continents) where it is selling hydrodynamic and hydromechanic couplings without slip at continuous running and 100% efficiency, couplings in cast iron for mines applications for powers ranging from 0,37 to 2.200 Kw, both for in line and pulley assembly, and also disk brake, drum brake, and all metal flexible couplings.



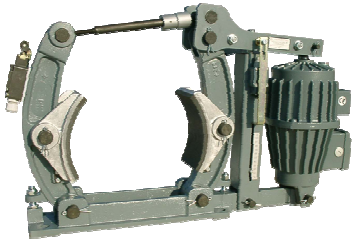
The administration and commercial offices are placed in Milan – Segrate, while production factory is located in Borgo Ticino – Novara, which is owned by New Turbostart and it covers 7.000 sq.m.

The factory is equipped with numerically controlled operating machines; processing of all particulars are carried out inside, as well as assembly and testing, whereas castings are made by skilled foundries in primary aluminium alloy

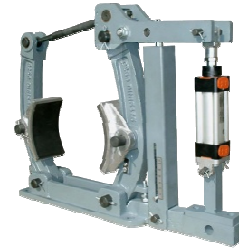
New Turbostart is certified, according to **UNI EN ISO 9001 – 2008** regulation, and it can supply couplings in according ATEX Certification.



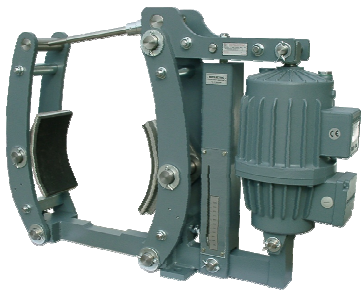
1. Index
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4. Drum brake Type NC - Dimensions
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**Drum brakes type NC to standard DIN 15435**



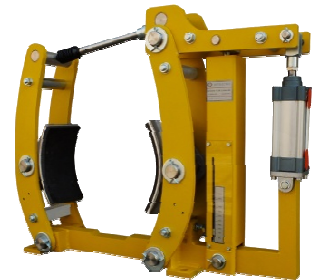
**NC Brake released by pneumatic cylinder**



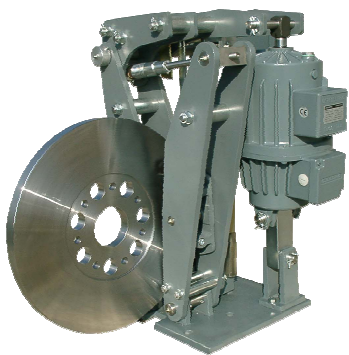
**Drum Brakes type St**



**Type Sth**



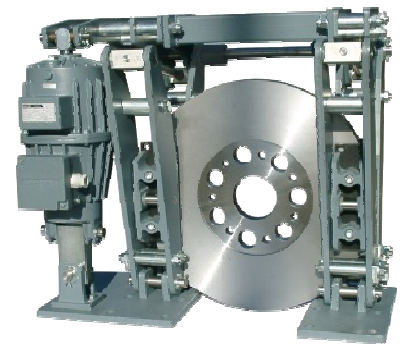
**St brake released by pneumatic cylinder**



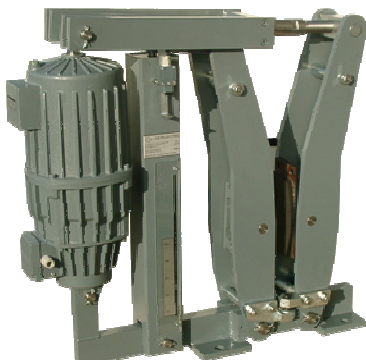
**Disc Brakes type ODB**



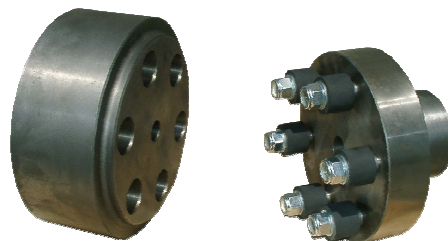
**Disc Brakes type ODB 0**



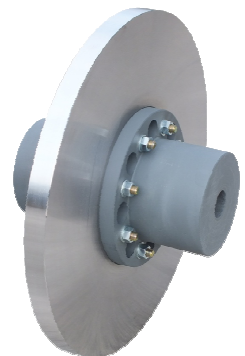
**Disc Brakes type ODB Double**



**Safety Brakes FDE**



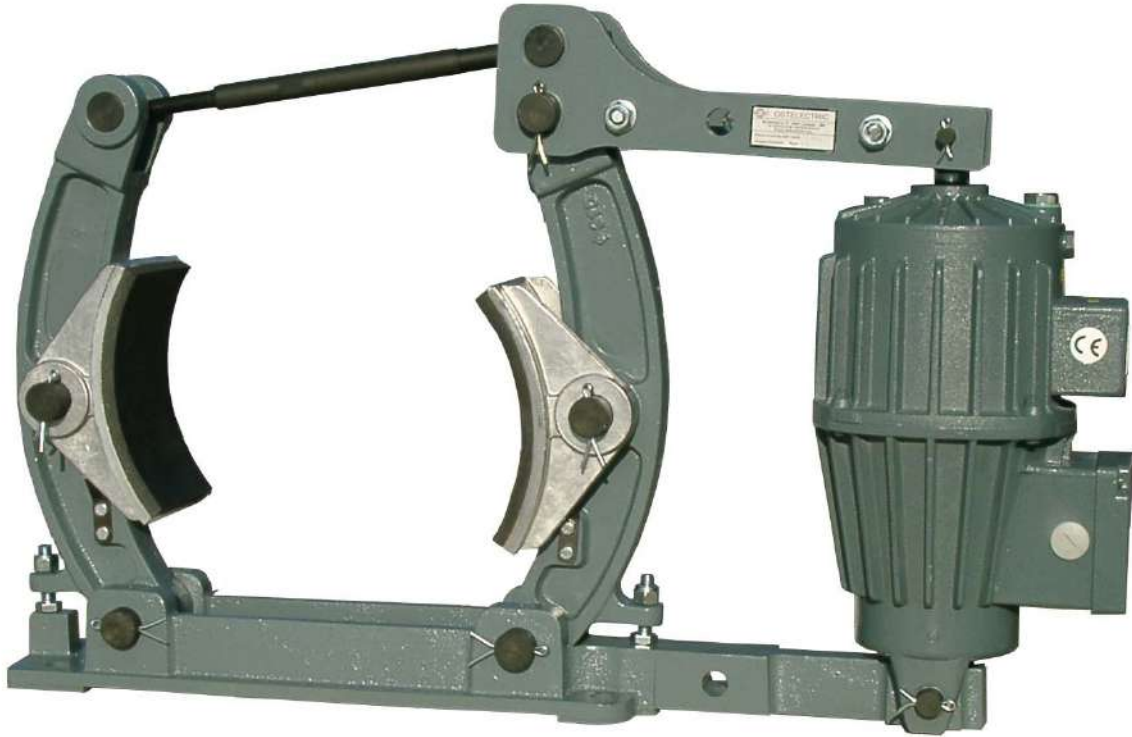
**Braking Drums with Coupling**



**Braking Discs with Coupling**

## Applications

Lifting installations, cranes, winches, conveyors, elevators, movable bridges, rolling-mill drives, ski lift.



## Working principle

The braking occurs by cutting power to thruster motor. Thanks to the action of a spiral spring, housed inside the thruster and pushing the piston rod along with the brake lever downwards, the two arms, holding the jaws, approach to each other, thus setting the brake. Electric power at thruster motor let overcome the spring action, thereby releasing the brake. On demand, the brake may be provided with external spring rather than the internal one.

## Materials

Base and brake arms in ductile cast iron. Levers in steel Fe510. Pins and rod in galvanized or phosphorized steel C40. Jaws in aluminium league, provided with clamping springs.

## Friction linings

Linings in asbestos free material with friction coefficient about 0,42 bonded to the shoes.

## Surface protection

Epoxy primer coat and final tint colour RAL 7031

## Design

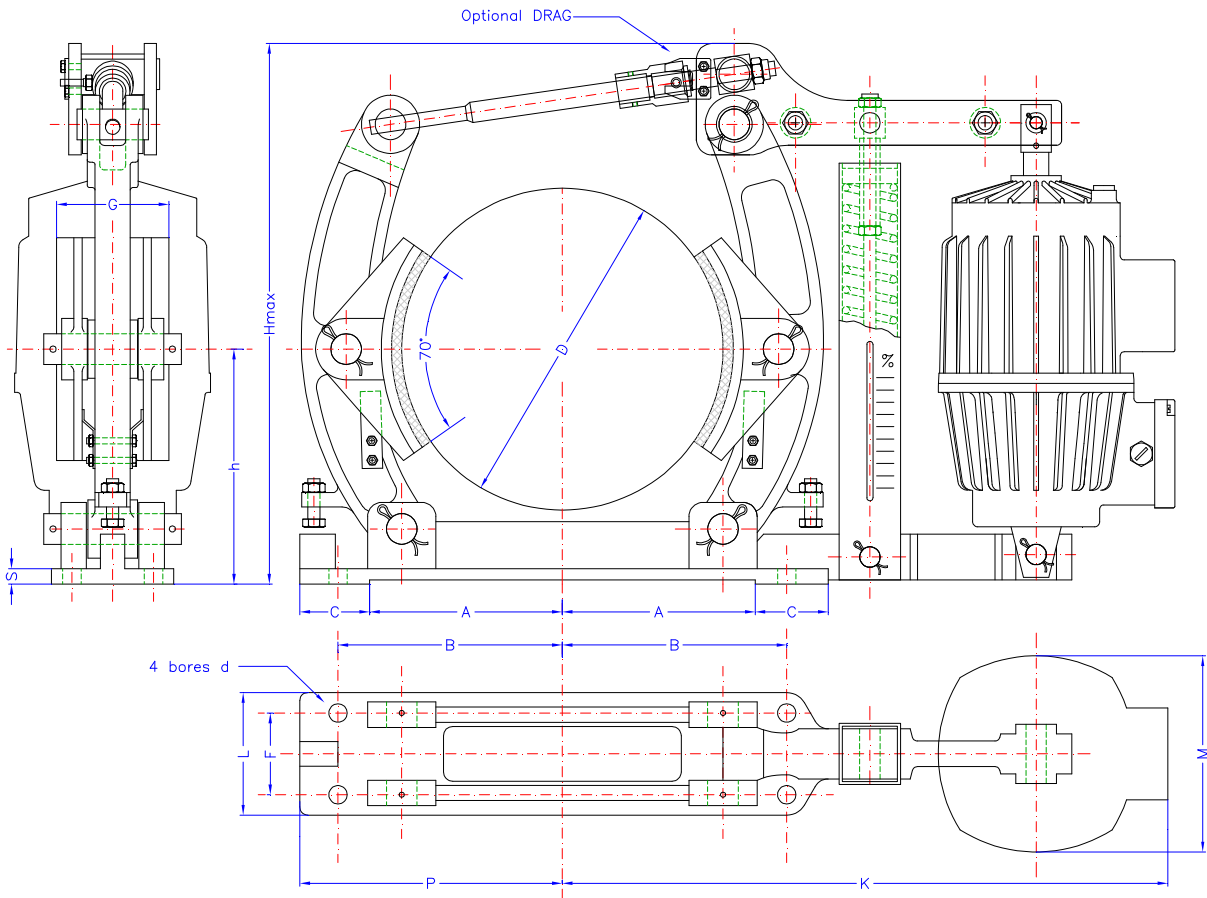
The over-sized base and arms bestow stability and reliability to the brake. Thanks to large pins, acting into self lubricated pins, frictions are reduced at lowest, although maintaining high precision in arm and lever swinging.

## Braking torque and braking spring

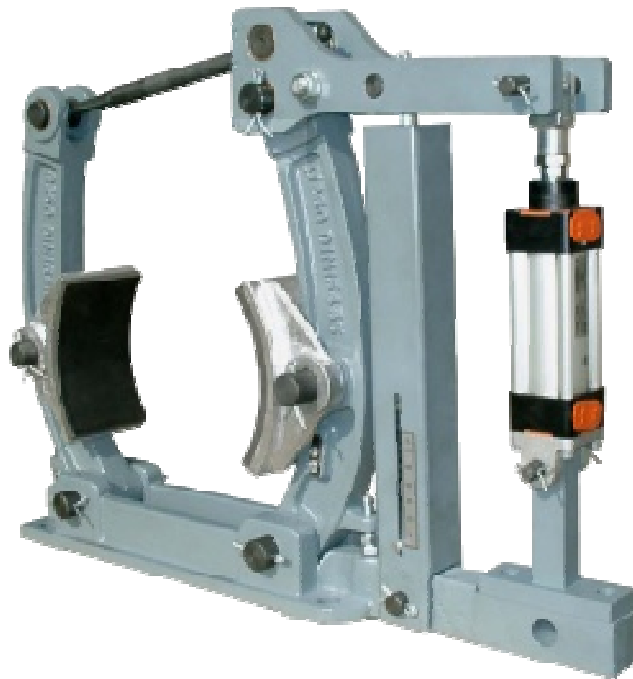
Braking spring is housed inside the thruster and is designed to develop the highest braking torque. If reduction and adjusting of braking torque is needed – as in horizontal drives of bridge cranes without inverter controlling – it is worthwhile to utilize the optional external braking spring, rather than the internal one.

## Electro-hydraulic thrusters

Casing in aluminium league, enclosure IP 56, rated for continuous as well as intermittent duty up to 2000 switching/hour. Standard tension is 3-phase 220/380 V, 50 Hz, but voltage variation up to  $\pm 10\%$  doesn't affect performance. Special tensions are available on demand. Thrusters require an easy maintenance and are delivered with complete oil filling.



Brake type	Braking torque Nm	Dimensions in mm														Weight Kg.
		D	A	B	C	d	F	G	h	Hmax.	L	K	M	P	S	
NC200-Th1	230	200	115	145	55	14	55	70	160	430	90	422	142	165	12	25
NC200-Th2	310	200	115	145	55	14	55	70	160	470	90	450	168	165	12	30
NC250-Th1	260	200	144	180	62	18	65	90	190	485	100	476	142	208	14	38
NC250-Th2	350	250	144	180	62	18	65	90	190	485	100	501	168	208	14	43
NC250-Th3	700	250	144	180	62	18	65	90	190	500	100	510	192	208	14	45
NC315-Th1	285	315	189	220	68,5	18	80	110	230	532	120	536	174	257,5	15	48
NC315-Th2	425	315	189	220	68,5	18	80	110	230	532	120	593	168	257,5	15	53
NC315-Th3	850	315	189	220	68,5	18	80	110	230	532	120	601	192	257,5	15	55
NC315-Th3.75	1050	315	189	220	68,5	18	80	110	230	532	120	601	192	257,5	15	55
NC315-Th4	1700	315	189	220	68,5	18	80	110	230	565	120	618	234	257,5	15	62
NC400-Th2	525	400	240	270	74	22	100	140	280	668	150	687	168	314	17	79
NC400-Th3	1040	400	240	270	74	22	100	140	280	668	150	695	192	314	17	81
NC400-Th3.75	1300	400	240	270	74	22	100	140	280	668	150	695	192	314	17	81
NC400-Th4	2075	400	240	270	74	22	100	140	280	668	150	715	234	314	17	88
NC500-Th4	2500	500	295	325	85	22	130	180	340	760	170	812	234	380	20	130
NC500-Th5	4170	500	295	325	85	22	130	180	340	785	170	823	274	380	20	153



#### Materials

Base and brake arms in ductile cast iron. Levers in steel Fe510. Pins and rod in galvanized or phosphorized steel C40. Jaws in aluminium league, provided with clamping springs.

#### Friction linings

Linings in asbestos free material with friction coefficient about 0,42 bonded to the shoes.

#### Surface protection

Epoxy primer coat and final tint colour RAL 7031

#### Design

The over-sized base and arms bestow stability and reliability to the brake. Thanks to large pins, acting into self lubricated pins, frictions are reduced at lowest, although maintaining high precision in arm and lever swinging.

#### Braking torque

The pressure is provided by a spiral spring inside of a square tube with scale to ease torque setting. The braking torque can be reduced downward to nearly 20% of rating, to suit characteristics of load by adjusting the spring tension.

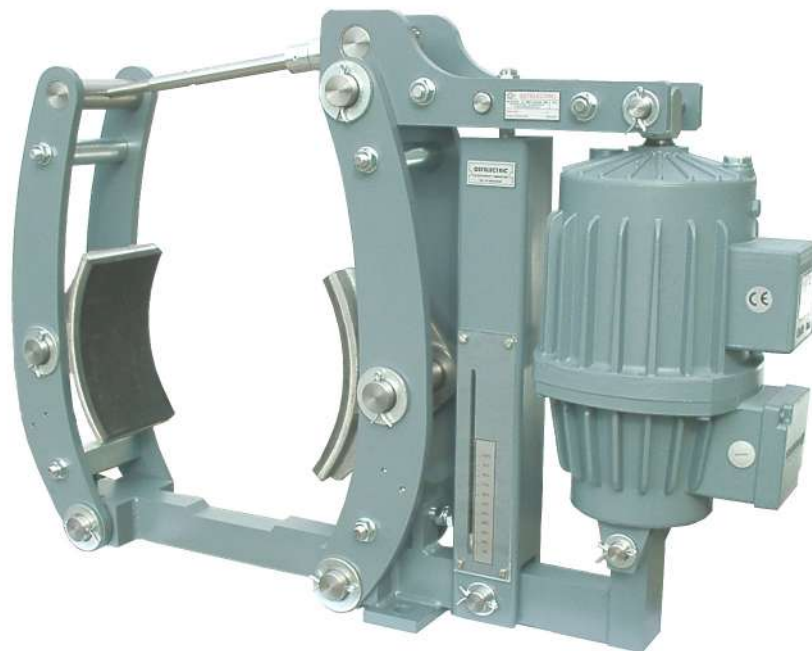
#### Pneumatic cylinder

Structure in anodised aluminium with chromium plated rod. The cylinder acts with double effect and is provided with end stroke shock absorbers. It is designed to operate at 5 atm air pressure.

## Drum brake type St to standard DIN 15435

### Features

- Compact design
- Easy installation and maintenance
- Asbestos-free linings bonded to easily replaceable shoes
- Large diameter stainless steel pins working in self-lubricated bushings
- Throughout galvanised frame work
- Standard self-adjusting lining wear mechanism
- Supply 3-phase 220/380 V, 50 Hz



St315 Th3

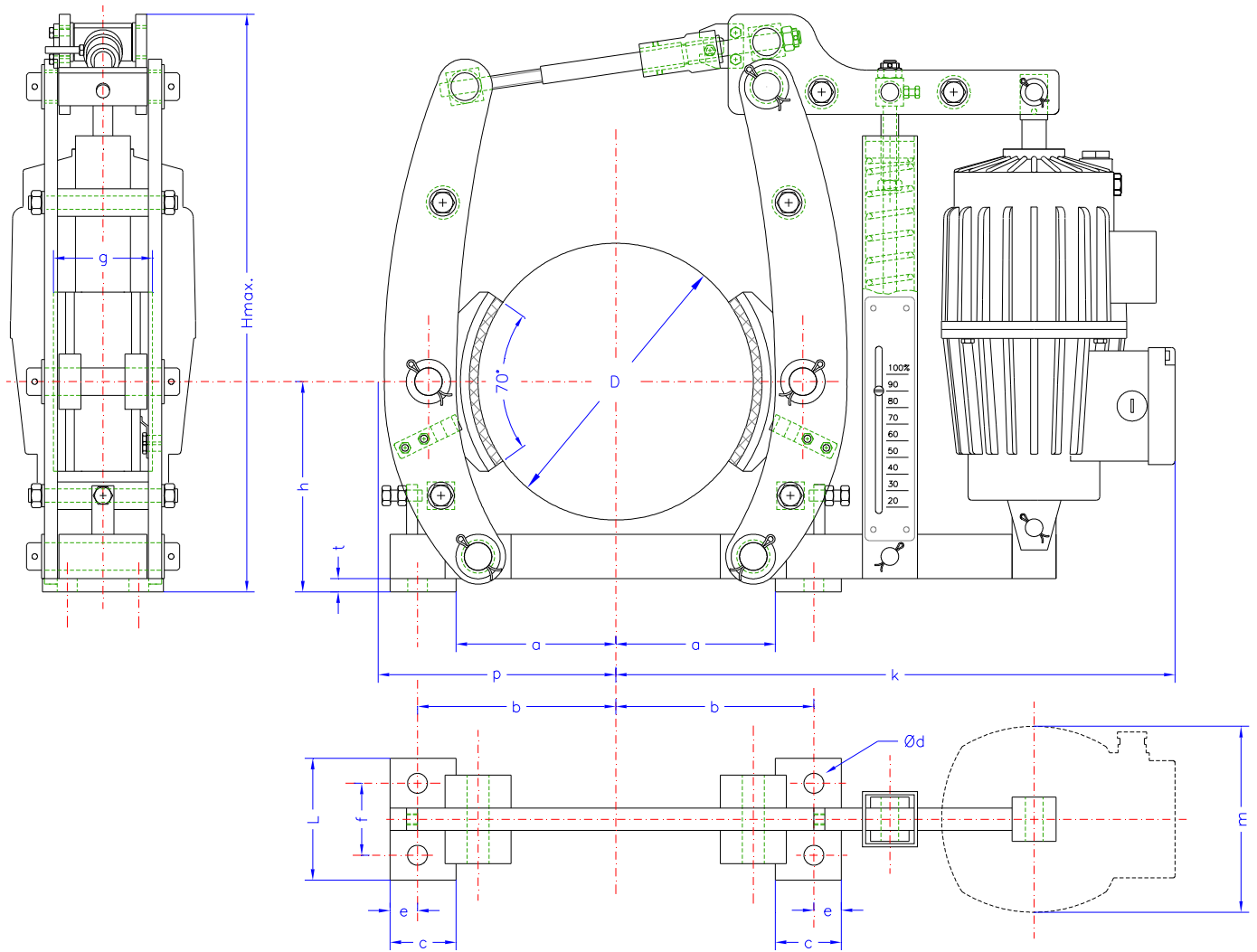
### Options

- Hand release
- Brake release limit switch
- Lining wear limit switch
- Shoes with increased width
- Special voltage/frequencies
- Thrustor in HR design for high temperature
- Thrustor with time delay valve
- Pneumatic or hydraulic actuator



St250 Th 2 with optional limit switches





Brake type	Thrustor type ELCO	Max torque in Nm $\mu=0,4$	Dimensions (mm)														Weight without thrustor Kg		
			D	a	b	c	d	e	f	g	h	H <sub>max</sub>	k	L	m	p		t	
St 200	Th 1	250	200	115	145	50	14	20	55	70	160	405	417	92	142	170	10	24	
St 200	Th 2	330																	168
St 250	Th 1	300	250	145	180	60	18	25	65	90	190	525	483	110	142	212	12	32	
St 250	Th 2	400																	168
St 250	Th 3	750																	192
St 315	Th 1	350	315	180	220	70	18	30	80	110	230	586	553	120	142	263	12	48	
St 315	Th 2	480																	168
St 315	Th 3	950																	192
St 315	Th 4	1800																	234
St 400	Th 2	680	400	230	270	70	22	30	100	140	280	702	665	150	168	314	15	85	
St 400	Th 3	1300																	192
St 400	Th 4	2500																	234
St 500	Th 3	1600	500	285	325	80	22	40	130	180	340	833	803	180	192	395	15	150	
St 500	Th 4	3100																	234
St 500	Th 5	5120																	274
St 630	Th 4	3100	630	340	400	95	27	40	170	225	420	1010	898	250	234	468	20	210	
St 630	Th 5	5000																	274
St 630	Th 6	7200																	274

St-brakes are spring-set drum brakes released by electro-hydraulic thrustors. Removal or loss of power causes the brake to set and stop the motor or driven load. They work fail-safe and their easiness to apply and remove braking pressure smoothly make them highly suitable for applications on lifting plants such as cranes, conveyors and elevators, as well as on movable bridges and rolling-mill drives.

### Material

Framework in welded steel protected through galvanisation, epoxy primer coat and final tint RAL 7031 painting. Brake shoes are in aluminium league. Rod and large-diameter pins are made of stainless steel and turn in self-lubricating, close-tolerance, bronze bushings. Friction linings in asbestos free high temperature resistant materials are bonded to the shoes.

### Installation

Since all brake are provided with lining compensator only two simple adjustments are required:

- A- Shoe clearance
- B- Brake torque



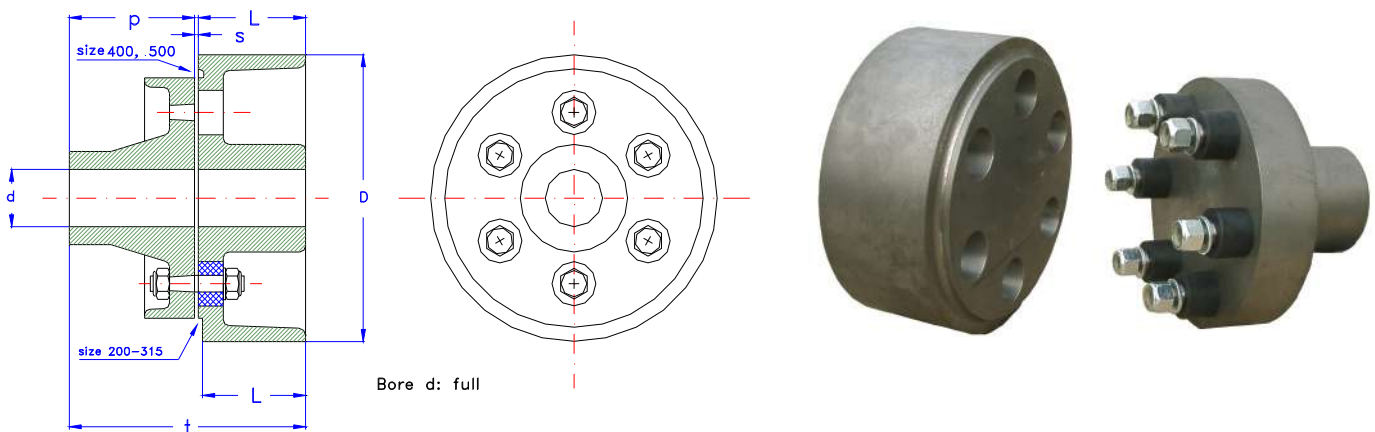
### Self-adjusting mechanism

It provides for automatic readjusting of shoe clearance. It acts progressively with lining wear through a free wheel device.

### Braking torque

The pressure is provided by a spiral spring inside of a square tube with scale to ease torque setting. The braking torque can be reduced downward to 20% of rating, to suit characteristics of load, by adjusting the spring tension.

### Brake drum with coupling to standard DIN 15431 with radial mounted rubber elements



Cast iron G25	D	d max	L	p	t	s	n° rubber elements	Weight Kg	J Kgm <sup>2</sup>
GEF 200	200	42	75	110	199	4	4	18	0,075
GEF 250	250	60	95	145	254	4	6	33	0,200
GEF 315	315	70	118	145	283	5	6	58	0,550
GEF 400	400	80	150	175	330	5	6	101	1,625
GEF 500	500	90	190	180	376	6	6	177	5,000
GEF 630	630	110	236	225	468	7	8	310	13,750

## Optional

**Brake release limit switch** It is fitted on the spring housing and might be either electro-mechanic or contact-free. It features one NO- and one NC-contact for signalling that the brake has been released.

**Lining wear limit switch** It is fitted in the brake rod and might be either electromechanical or contact-free. It features one NO-and one NC-contact for signalling that the lining has been worn out and needs replacement.

**Hand release lever** Enables removal of wheel or replacing brake shoes without adjustment of torque setting. Thanks to a lever of suitable length and an elliptical moulding the brake can be easily released with little human effort and left in released position.

**Wider shoes** Shoes with extended width (+50%) are employed in some crane motions, where a bigger brake energy dissipation rating is needed.

**Thrustor with time delay valve** The piston lowering and/or lifting time can be adjusted through a proper valve. This option is very useful when the brake has to be utilised only for emergency purpose. Thanks this device the lowering and/or lifting time can be extended up to 5-6 sec.

**Thrustor in HR- design** The “Heat Resistant” design is particularly utilised in very hot environment such as casting steelwork cranes, where temperature might achieve 212°F (100°C).

## Special design

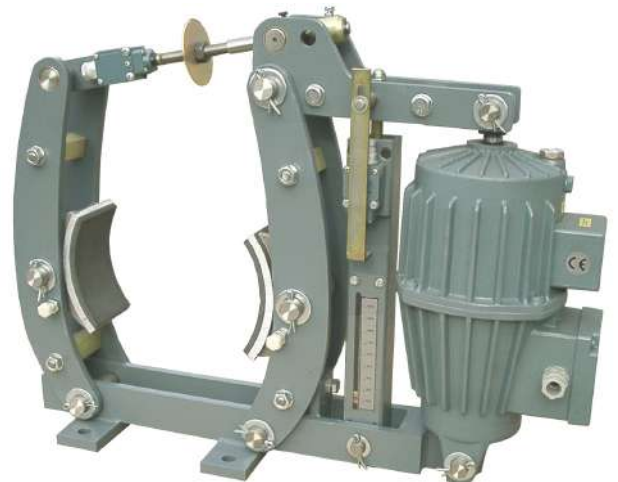


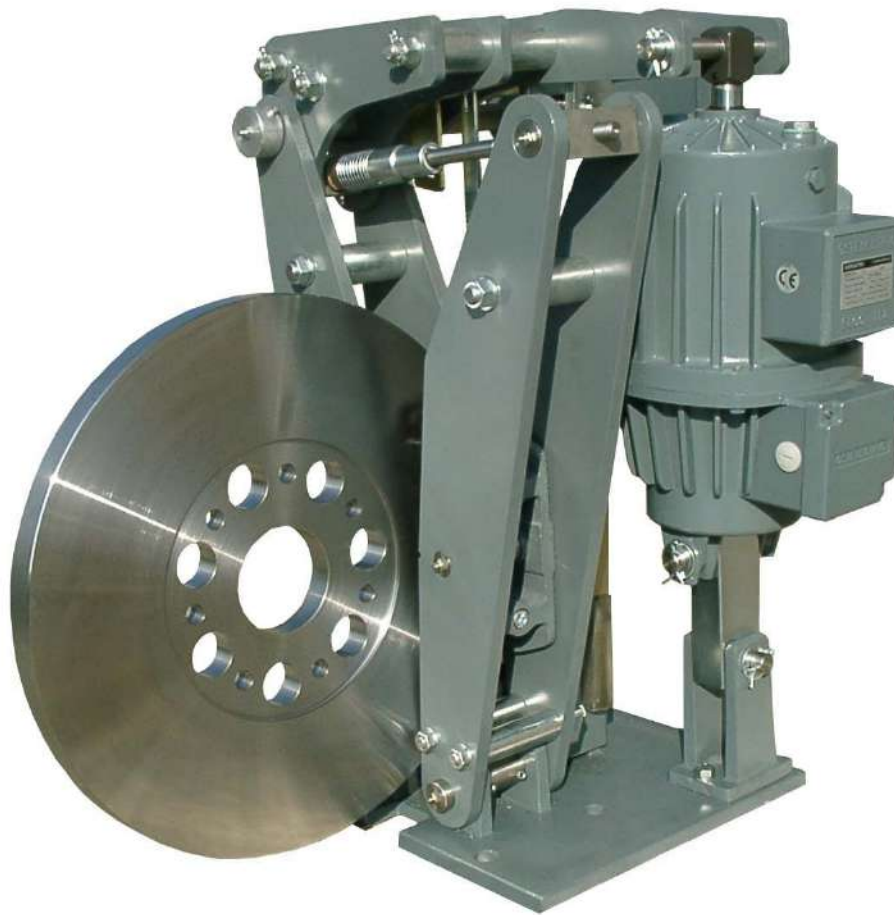
Sth-brake with thrustor in horizontal layout

St-brake with Pneumatic or hydraulic actuator



St-AISE brake to American Standard AISE





## Applications

- Heavy duty cranes
- Container cranes
- Conveyors
- Process lines
- Bucket wheel excavators

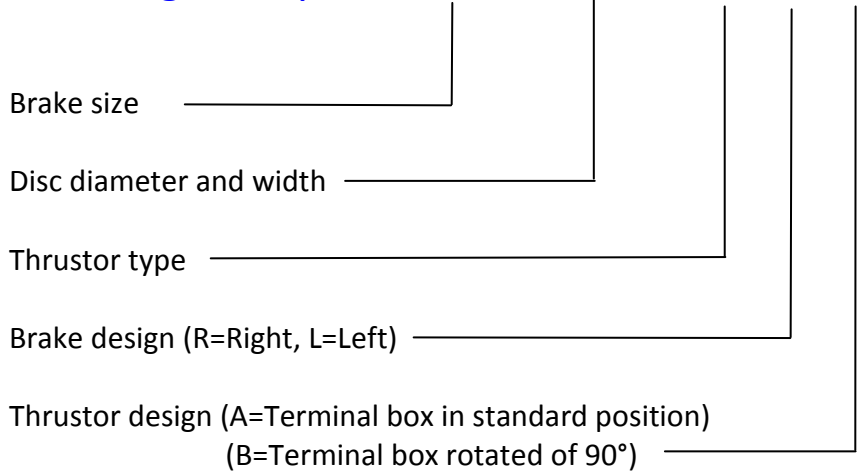
## Features

- All steel production.
- All pivot pins in **stainless steel** working on self lubricated bushings.
- Surface protection through **zinc plating**, epoxidic primer and finish paint RAL 7031. Other finish colour possible without surcharge.
- Easy removable low cost asbestos-free brake pads which can be quickly replaced without having to remove pivot pins.
- Adjustable brake torque with square spring tube provided with graduated scale.
- Symmetric opening of the brake's arms through a proper device

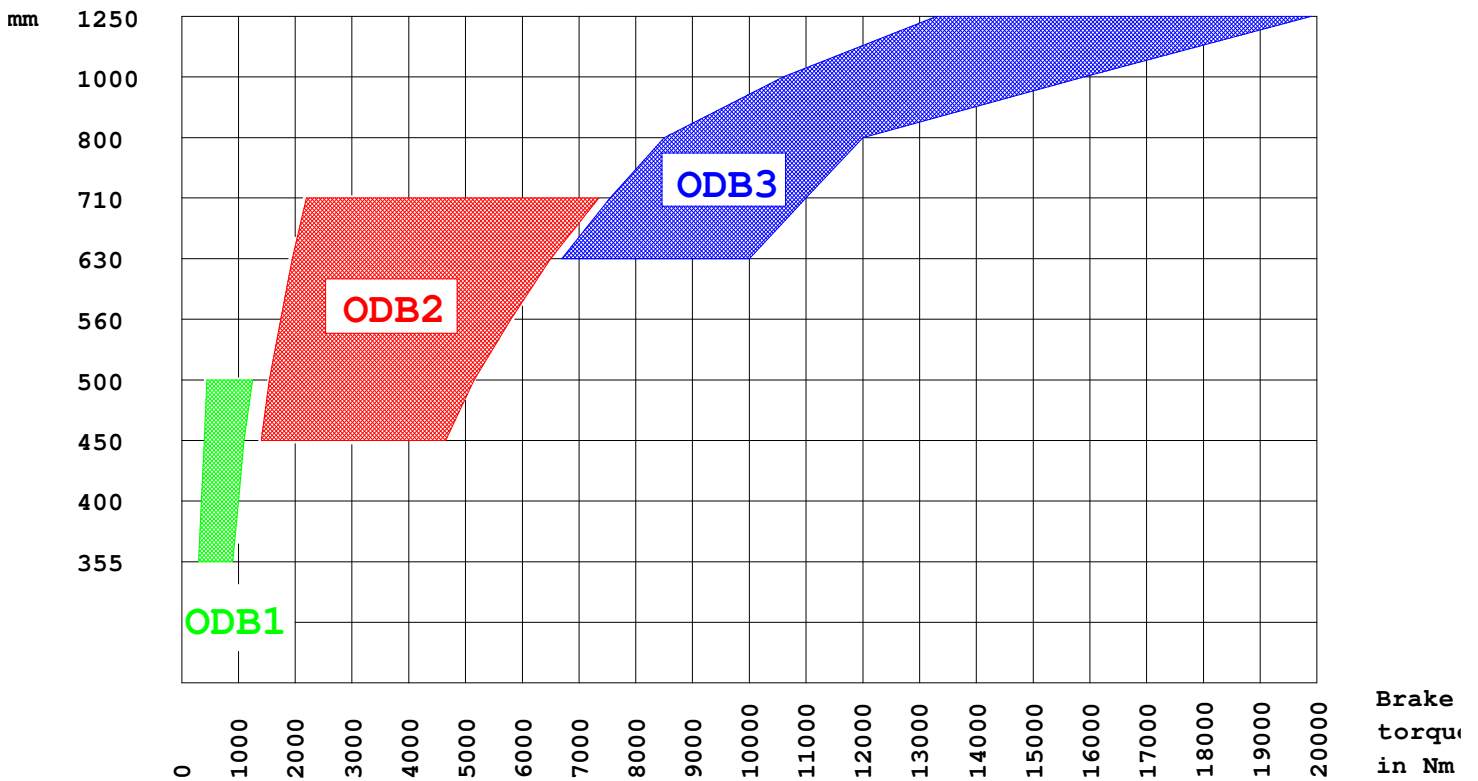
## Options

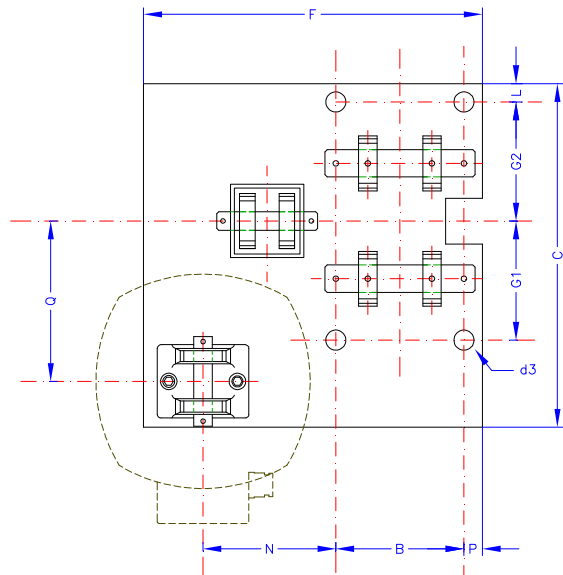
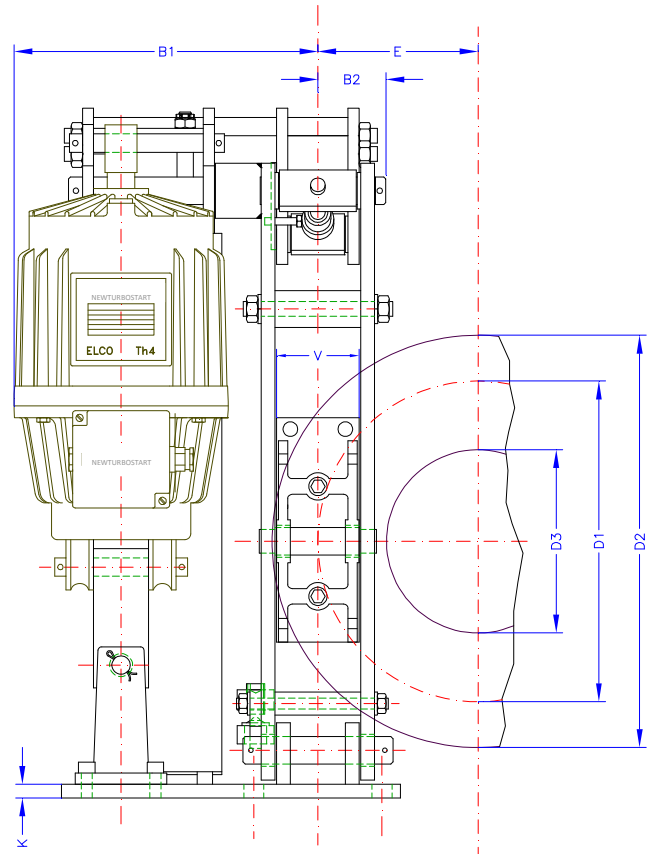
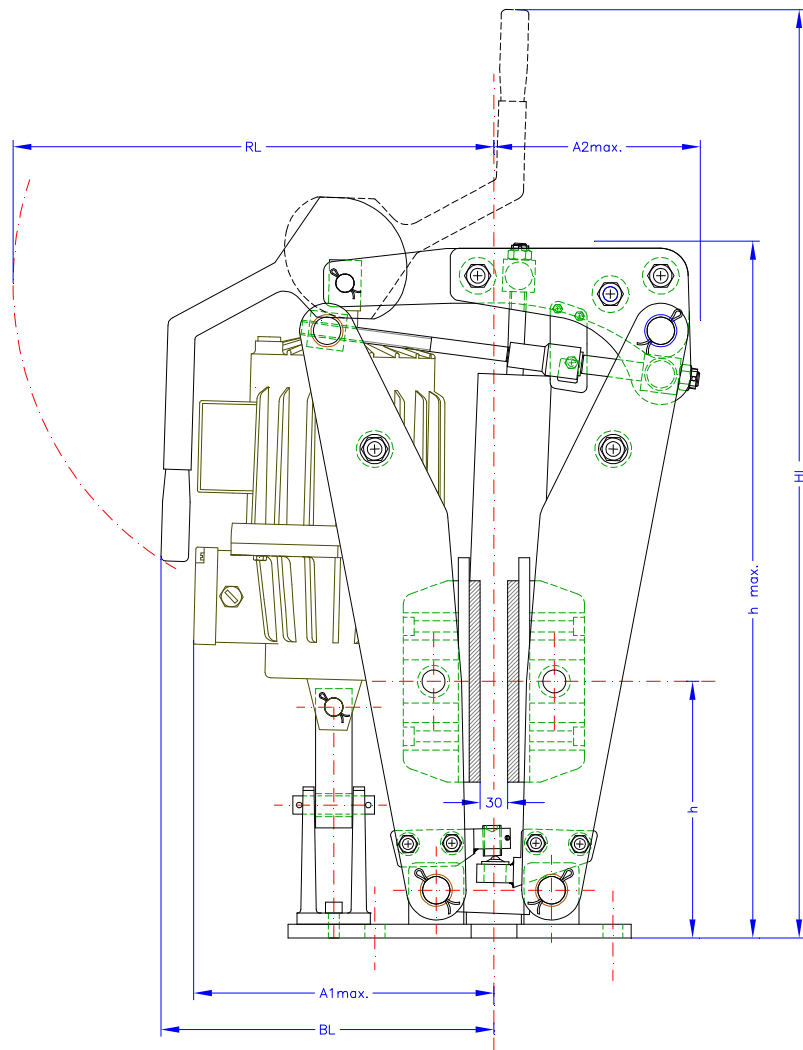
- Self adjusting device for lining wear with symmetric arms opening device
- "Released brake" limit-switch
- "Brake pad wear" limit-switch
- "Brake pad in sintered bronze"
- Hand release lever
- Brake disc with hubs and couplings

Ordering example: ODB2 500x30 Th4 R A



Diameter  
brake disc





Representation in right hand design  
with optional automatic lining wear  
compensator and hand release

All data subject to change  
without notice.

## ODB 1

A <sub>2</sub>	B	B <sub>2</sub>	C	d <sub>3</sub>	F	G <sub>1</sub>	G <sub>2</sub>	h	h <sub>max</sub>	k	L	N	P	Q	S	V
199	120	62	300	18	300	80	80	230	650	15	20	90	20	140	1,1	70

Brake disc			
D <sub>2</sub>	D <sub>1</sub>	D <sub>3</sub>	E
355	275	160	138
400	320	205	160
450	370	255	185
500	420	305	210

Weight brake without thrustor Kg.62

Thrustor ELCO Type		
Th1	Th2	Th3
Braking torque in Nm at $\mu = 0,4$		
300	450	900
350	500	1000
400	550	1100
450	600	1250

Dimensions depending on thrustor size		
A <sub>1</sub> max	253	274
B <sub>1</sub>	221	234
HL	880	961
RL	414	506
BL	277	324

## ODB 2

A <sub>2</sub>	B	B <sub>2</sub>	C	d <sub>3</sub>	F	G <sub>1</sub>	G <sub>2</sub>	h	h <sub>max</sub>	k	L	N	P	S	V
225	140	75	375	22	370	130	130	280	800	15	20	145	20	1,1	90

Brake disc			
D <sub>2</sub>	D <sub>1</sub>	D <sub>3</sub>	E
450	350	200	175
500	400	250	200
560	460	310	230
630	530	380	265
710	610	460	305

Weight brake without thrustor Kg.111

Thrustor ELCO Type		
Th3	Th4	Th5
Braking torque in Nm at $\mu = 0,4$		
1400	2800	4650
1550	3100	5150
1750	3450	5800
1950	3900	6500
2200	4400	7350

Dimensions depending on thrustor size		
A <sub>1</sub> max	327	348
B <sub>1</sub>	311	332
HL	1088	1020
RL	540	542
BL	358	371
Q	175	175

## ODB 3

A <sub>2</sub>	B	B <sub>2</sub>	C	d <sub>3</sub>	F	G <sub>1</sub>	G <sub>2</sub>	h	h <sub>max</sub>	k	L	N	P	Q	S	V
235	160	95	460	27	410	180	180	370	1050	20	50	155	30	195	1	120

Brake disc			
D <sub>2</sub>	D <sub>1</sub>	D <sub>3</sub>	E
630	500	310	250
710	580	390	290
800	670	480	335
1000	870	680	435
1250	1120	930	560

Weight brake without thrustor Kg.220

Thrustor ELCO Type	
Th 5	Th 6
Braking torque in Nm at $\mu = 0,4$	
6700	10000
7550	11300
8500	12750
10600	15900
13300	19900

Further dimensions	
A <sub>1</sub> max	395
B <sub>1</sub>	372
HL	1525
RL	745
BL	418

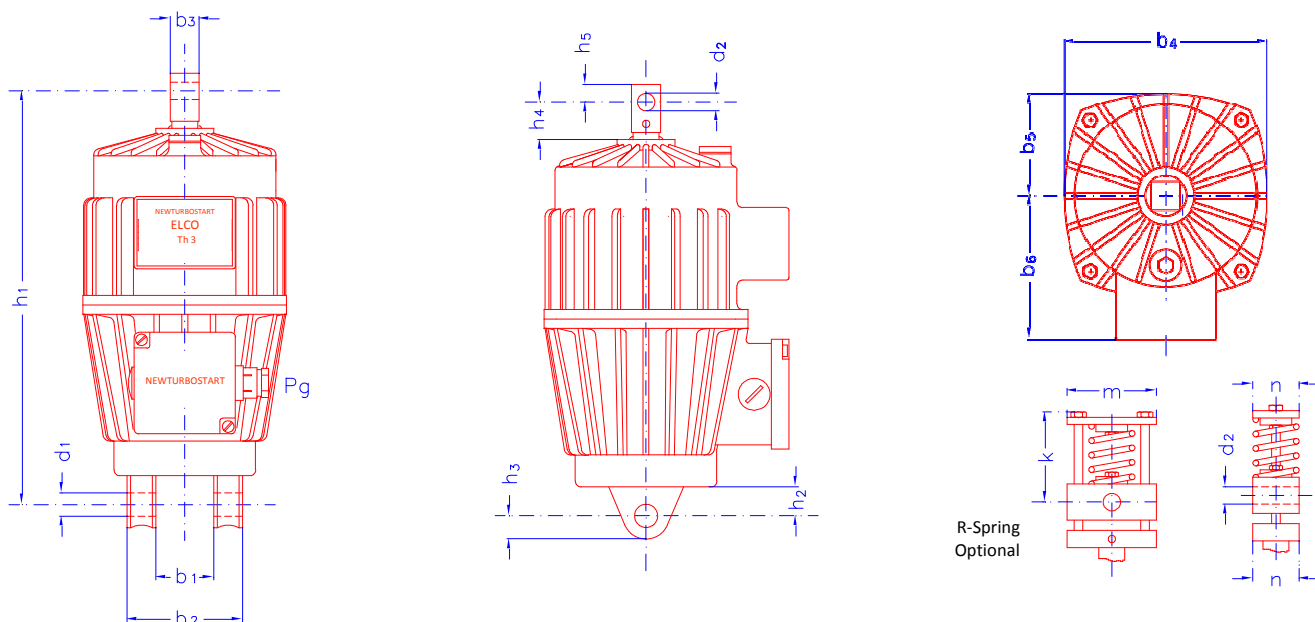
Dimensions in millimeters

D<sub>1</sub> theoretic friction diameter

S air gap

### Function:

Electro-hydraulic thruster ELCO combines in a coaxial unit all the basic elements of a hydraulic system: electric drive motor, hydraulic pump, cylinder with piston. So it is designed to exert outwards a straight-line, smooth, constant force for a specific stroke.



	b1	b2	b3	b4	b5	b6	d1	d2	h1	h2	h3	h4	h5	k	m	n	Pg
Th 1	40	80	20	142	71	106	16	12	286	20	16	26	12	64	62	32	11
Th 2	40	90	25	168	84	128	16	16	380	25	20	37	15	70	84	65	16
Th 3	60	110	30	192	96	136	20	20	406	30	25	39	18	70	84	65	16

	Th 1	Th 2	Th 3
Lifting force	220 N	300 N	600 N
Stroke	50 mm	50 mm	50 mm
Power input	130 W	180 W	250 W
Rated current at 380 V, 50 Hz	0,3 A	0,4 A	0,5 A
Standard voltage	Three-phase 220/380 V, 50 Hz		
Service continuous or intermittent up to 2000 switching/h			
Filling weight	1,3 Kg	2,5 Kg	3,5 Kg
Weight with filling	7 Kg	12 Kg	14 Kg
In equipment "C" spring force at 1/3 of the stroke	180 N	250 N	500 N

### Construction and principle of operation

The centrifugal pump impeller coupled to the motor shaft sets up a hydraulic pressure under the piston causing its movement upwards against the external load or against the built-in brake springs.

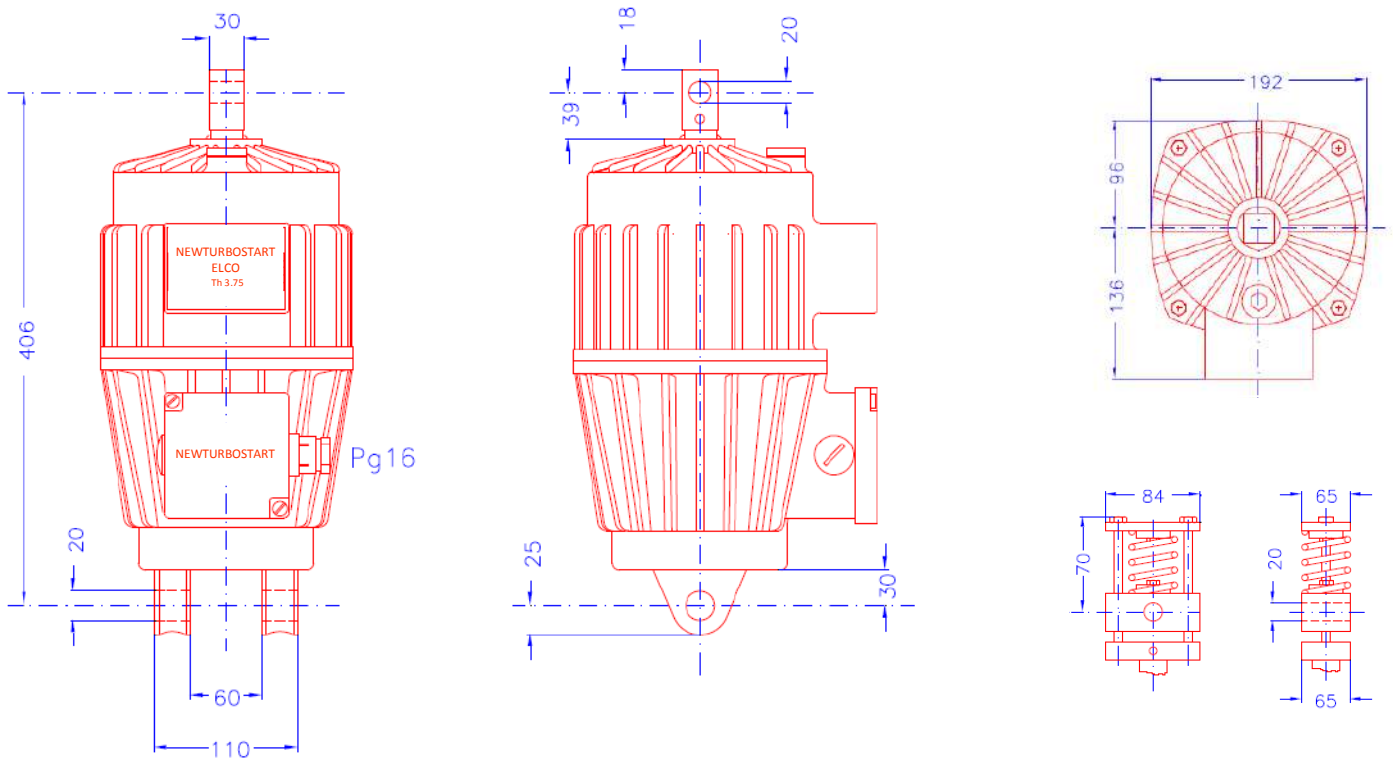
The oil above the piston is pressed again to the impeller inlet hole through the bypass port. When the motor is switched off, the piston will travel back by effect of external load or inside brake springs. The hydraulic force is nearly independent of piston position into cylinder. The outer load doesn't affect the strain of the motor. If the lifting load overcomes the hydraulic force the piston will not move up, but the electric motor will not suffer any damages. That is a considerable advantage in comparison with magnetic brake thruster. At lower load the lifting movement becomes quicker and the downward movement becomes slower. The time-load curves are related to rated lifting force.

### Applications

ELCO are mainly employed to operate drum and disc brakes. Nevertheless, they might be used in whatever application requiring a straight-line movement.



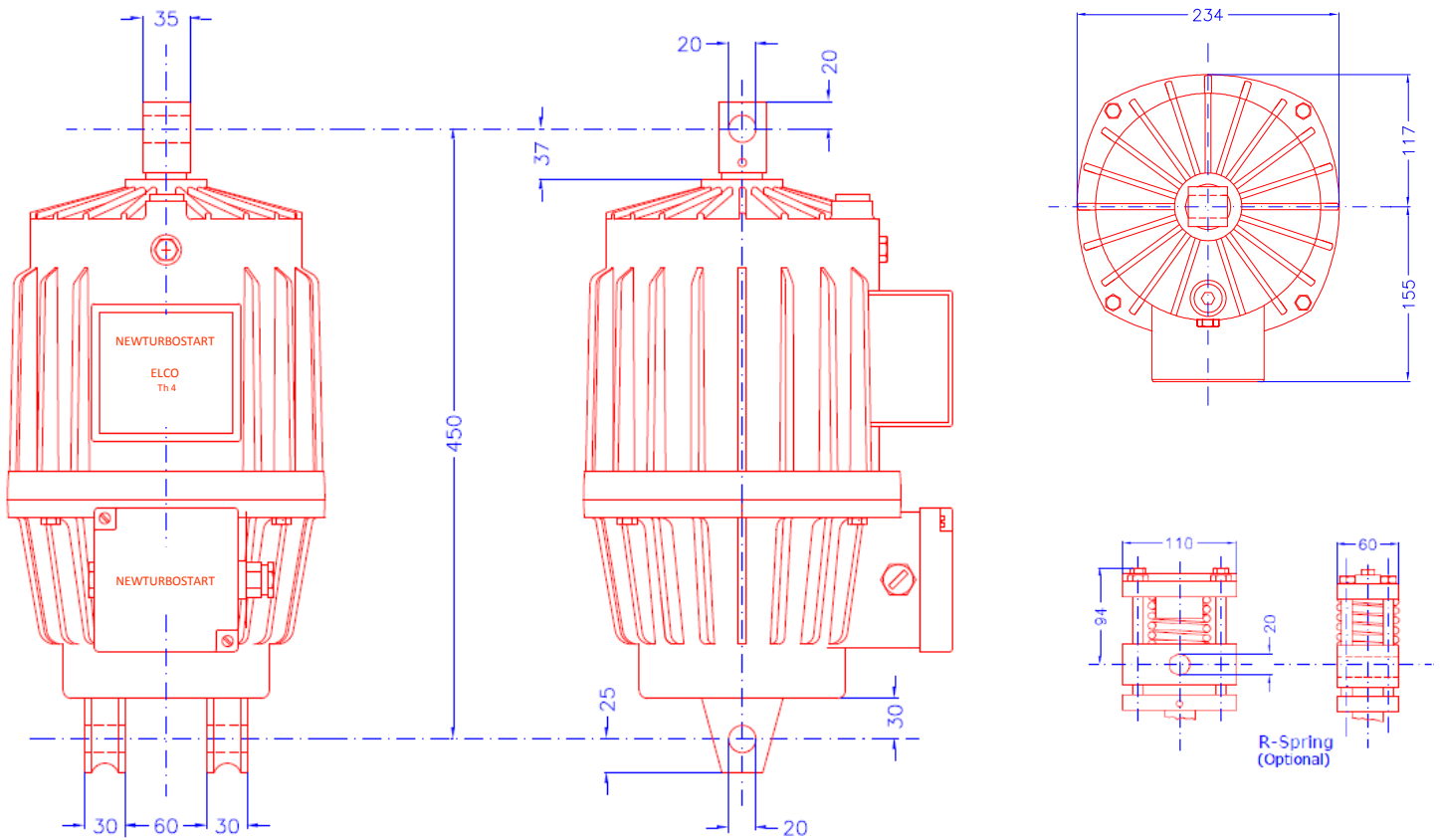
## MAIN DIMENSIONS ELCO Th. 3.75



## TECHNICAL RATINGS ELCO Th. 3.75

Lifting force	750 N
Stroke	50 mm
Power input	280 W
Rated current at 380 V, 50 Hz	0,6 A
Standard voltage	Three-phase 220/380 V, 50 Hz
Service continuous or intermittent up to 500 switching/h, R.I. 60%	
Filling weight	3,5 Kg
Weight with filling	14 Kg
In equipment "C" spring force at 1/3 of the stroke	700 N

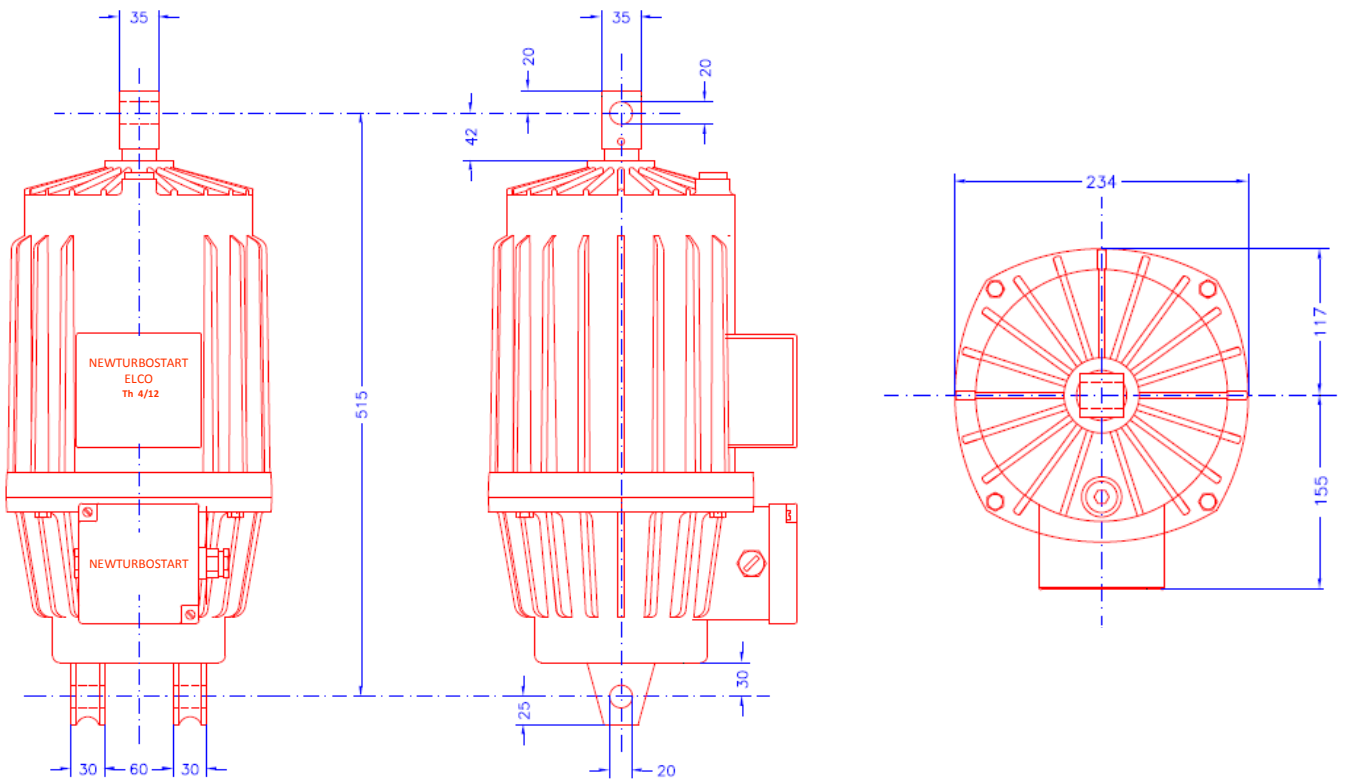
## MAIN DIMENSIONS ELCO Th. 4



## TECHNICAL RATINGS ELCO Th. 4

Lifting force	1200 N
Stroke	60 mm
Power input	350 W
Rated current at 380 v, 50 Hz	0,7 A
Standard voltage	Three-phase 220/380 V, 50 Hz
Service continuous or intermittent up to 2000 switching/h	
Filling weight	4,5 Kg
Weight with filling	21 Kg
In equipment Th 4 C, spring compression at 1/3 of thruster's stroke	1200 N

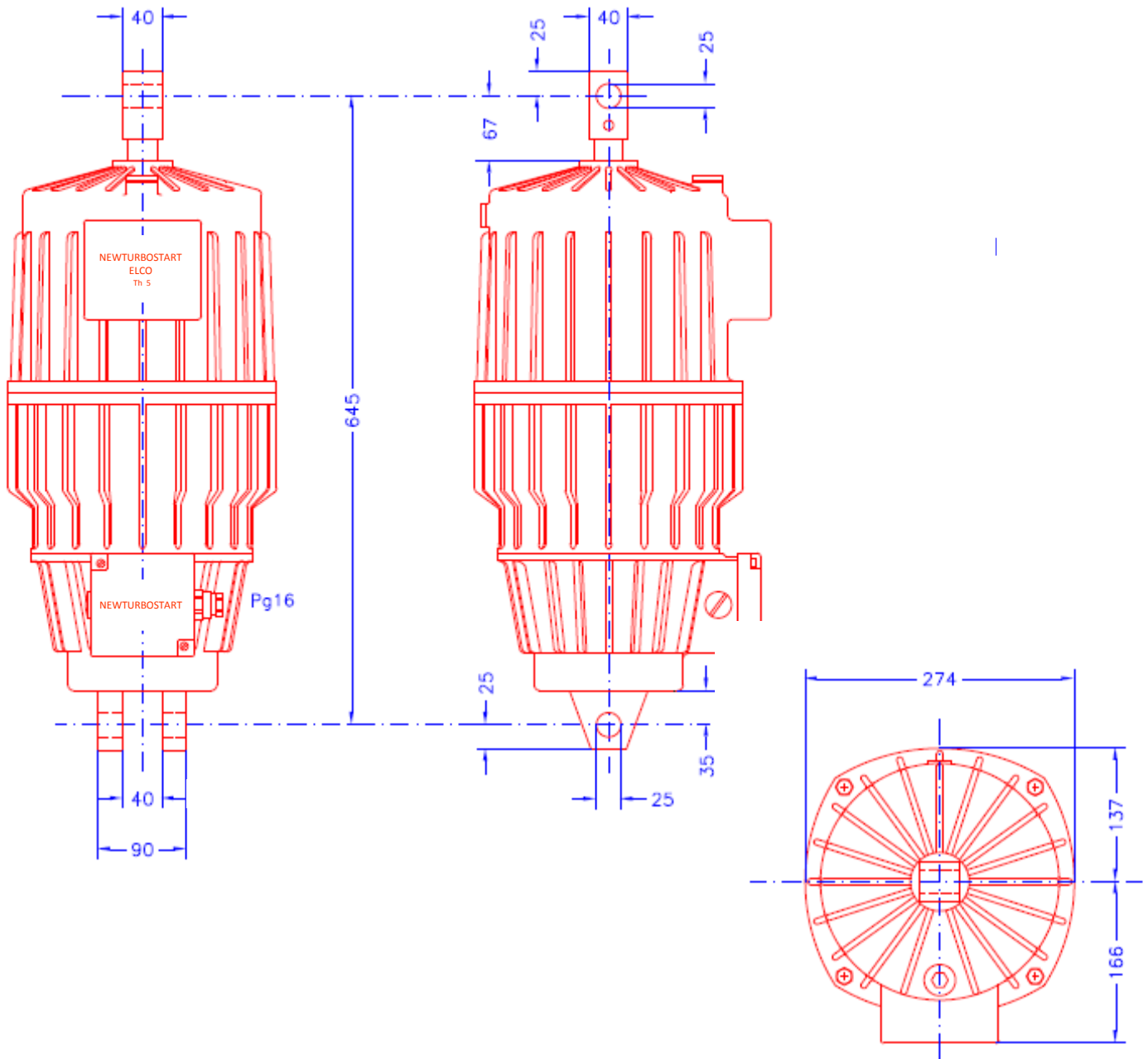
## MAIN DIMENSIONS ELCO Th. 4/12



## TECHNICAL RATINGS ELCO Th. 4/12

Lifting force	1200 N
Stroke	120 mm
Power input	350 W
Rated current at 380 v, 50 Hz	0,7 A
Standard voltage	Three-phase 220/380 V, 50 Hz
Service continuous or intermittent up to 2000 switching/h	
Filling weight	6 Kg
Weight with filling	23 Kg

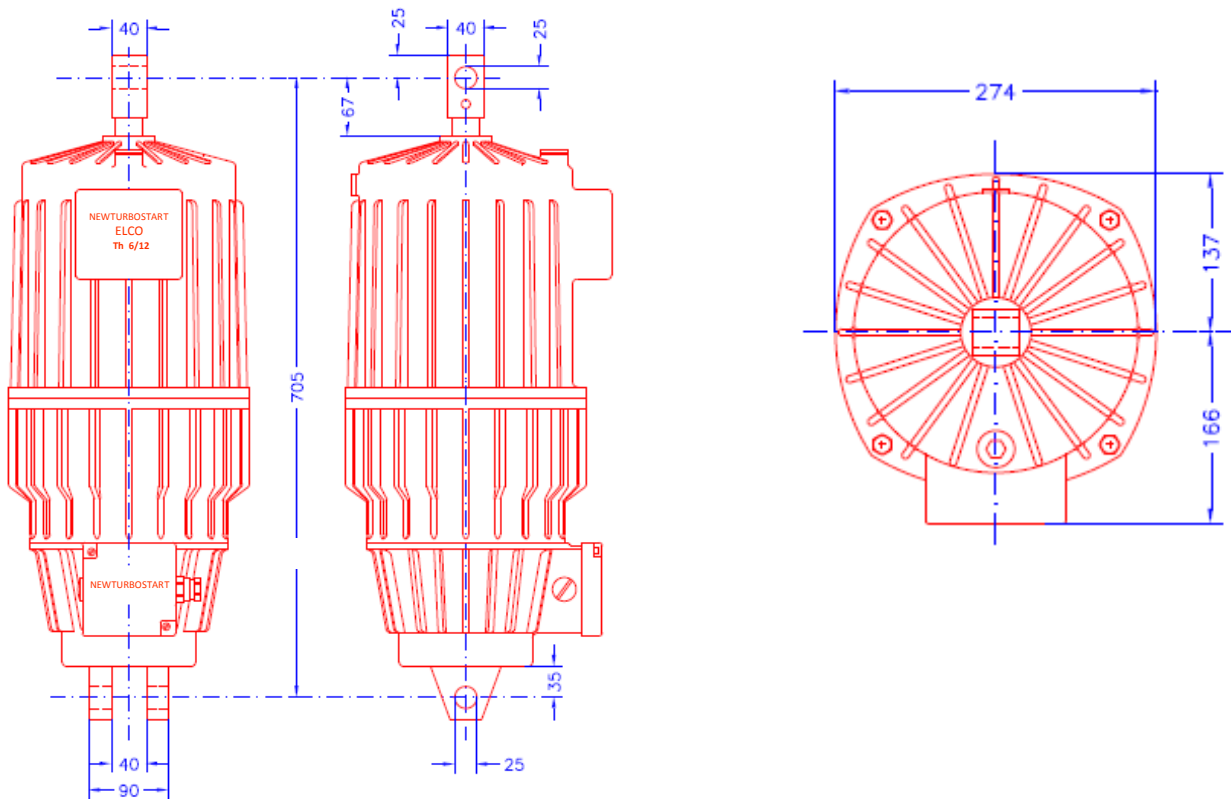
## MAIN DIMENSIONS ELCO Th. 5 - 6



## TECHNICAL RATINGS ELCO Th. 5 - 6

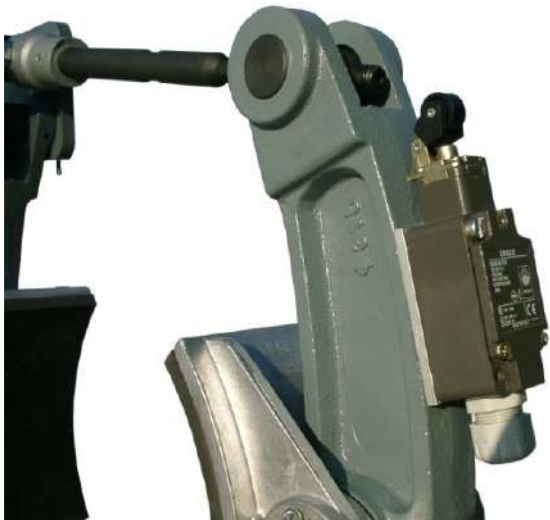
	Th 5	Th 6
Lifting force	2000 N	3000 N
Stroke	60 mm	60 mm
Power input	750 W	850 W
Rated current at 380 v, 50 Hz	1,2 A	1,4 A
Standard voltage	Three-phase 220/380 V, 50 Hz	
Service continuous or intermittent up to 2000 switching/h		
Filling weight	11 Kg	11 Kg
Weight with filling	44 Kg	44 Kg
In equipment with C spring force at 1/3 of the stroke	2000 N	3000 N

## MAIN DIMENSIONS ELCO Th. 5-6/12



## TECHNICAL RATINGS ELCO Th. 5-6/12

	Th 5/12	Th 6/12
Lifting force	2000 N	3000 N
Stroke	120 mm	120 mm
Power input	750 W	850 W
Rated current at 380 v, 50 Hz	1,2 A	1,4 A
Standard voltage	Three-phase 220/380 V, 50 Hz	
Service continuous or intermittent up to 2000 switching/h		
Filling weight	12 Kg	12 Kg
Weight with filling	46 Kg	46 Kg



### Micro-switch signaling "LINING WORN"

It issues an electric signal as the 2 brake's arm approach too much to each other on account of worn linings. It is very useful as it advises, whenever the linings have to be replaced, thus preventing the jaws to damage the drum surface. It is mostly employed along with the automatic lining wear compensator.

### Hand release lever

It enables the manual release the brake in power blackout. It is mainly employed to speed up lining replacement or maintenance operations. The symmetric layout of the lever makes easy the release of the brake, without inducing any deflection in the frame work.



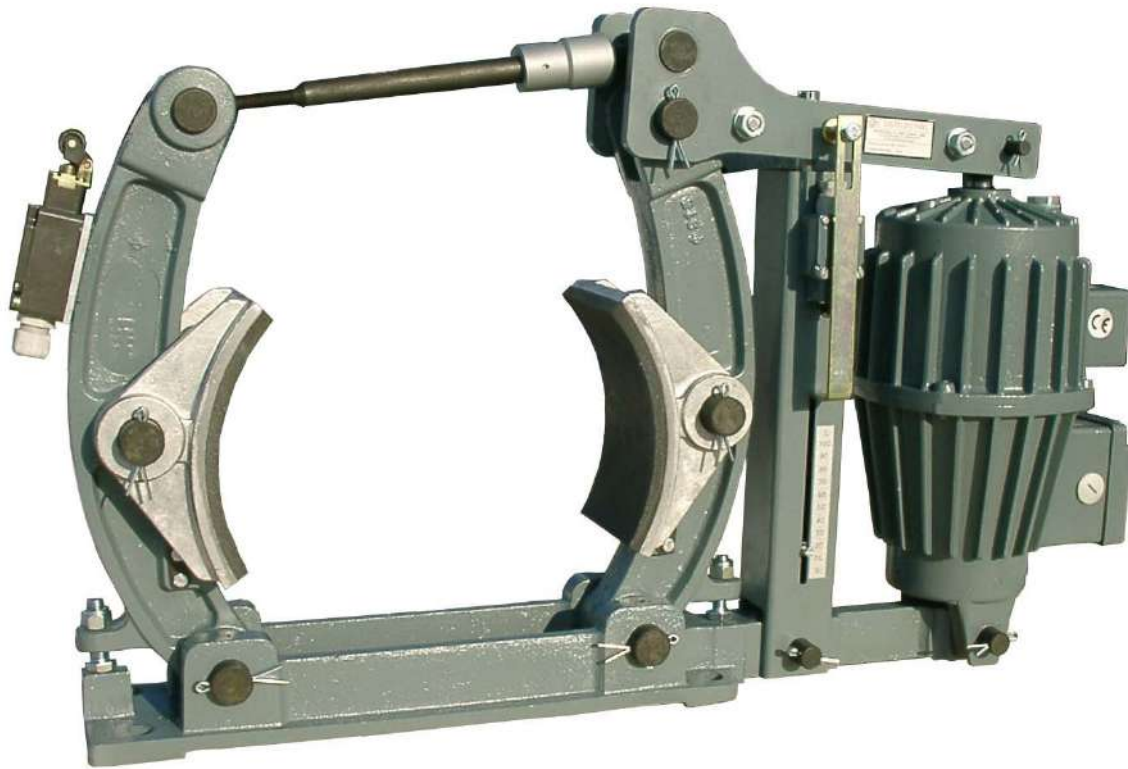
### Thruster rotated of 90°

In this layout the thruster is rotated of 90° versus its bottom hinge. This arrangement may be useful to save space in length direction and is standard in the brake NC315-Th1



### Further option:

- Shoes with extended width (1,5 times the standard value) to increase heat dissipation
- Pins and rod in stainless steel for aggressive environments
- Pins provided with grease nipple and grease reserve to enhance lubrication in extremely aggressive environment
- Copper wire fabric linings to prevent sticking of lining at drum surface in particular environment
- Thrusters in HR design (Heat Resistant) for hot metal cranes and rolling mills
- Special hydraulic fill for very hot or frosty environment
- Special tensions and frequencies on demand



### External braking spring

It is housed into a square tube provided with graduated scale to ease torque setting. External braking spring is an option to the one inside the thruster and it is utilized in applications requiring braking torque reduction and adjusting, such as horizontal drives without inverter controlling.

### Micro-switch signaling "BRAKE RELEASED"

It advises that the brake is duly released. The signal usually lights a led on the operator's push-button panel. Its role is preventing damage caused by using the crane with set brake. Whenever the brake isn't provided with external braking spring, this micro-switch is mounted on the top of the thruster.



### (DRAG)

### Automatic lining wear compensator

It provides for automatic re-adjusting of shoe clearance. It acts progressively with lining wear through a free wheel device. It is very useful in heavy braking application to reduce maintenance rate. It also maintains the brake at its proper operating torque.