



SIME Brakes Braking Systems Overview

 **Stromag**[®]
Altra Industrial Motion



OUR KNOW-OUT AT YOUR DISPOSAL

Stromag is a world leading manufacturer of industrial brakes. Constant attention to evolving needs and its effort to focus its product development on quality and innovation allow our company to meet global supply requirements with standard or fully customised braking systems solutions.

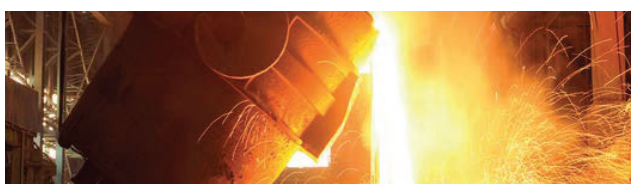


At Stromag, the accent is placed firmly upon research and innovation. That is why every year, the company invests heavily into Research and Development to provide leading edge products. With in-depth knowledge and experience in all key applications and markets, the company keeps constantly abreast of the every changing needs and market development. The R&D department uses unique test facilities like the braking simulation tower and many dynamic benches allowing to test the brakes under real operating conditions. In a mutually beneficial way, Stromag creates a strong relationship with its customers in order to understand their needs and provide them the best solution. Stromag engineers and technicians are developing with its customers the brakes of tomorrow.

With more than 60 years of experience in the supply of high efficiency braking systems, Stromag provides disc brakes certified by recognised authorities such as DNV, ABS, TUV, Lloyd's Register and EDF. The certification ISO9001 of our Quality management system was renewed under the version ISO 9001 - V2015 in 2018, combined with OHSAS 18001 - V2007 certification.

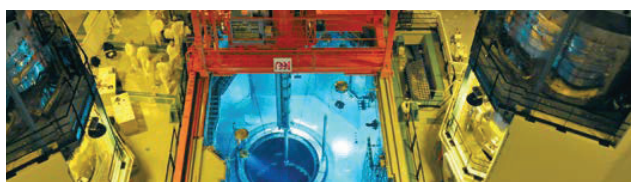
SOLUTIONS FOR YOUR APPLICATION

Stromag is particularly active in traditional areas such as steel industry, nuclear plants, port applications and mass transport as well as on fast-growing markets such as offshore applications. Stromag provides complete braking solutions to ensure the safety of many applications, such as:



STEEL INDUSTRIES

- Service and emergency brakes
- Electromagnetic, hydraulic and thruster brakes
- Control and safety systems



NUCLEAR INDUSTRIES

- Braking systems meeting all safety requirements
- Electromagnetic and hydraulic brakes
- Specific monitoring systems

CONSTRUCTION INDUSTRIES

- Disc brakes and drum brakes
- Soft braking
- Manual Overload Protection System MOPS



Photo : courtesy of RECOM

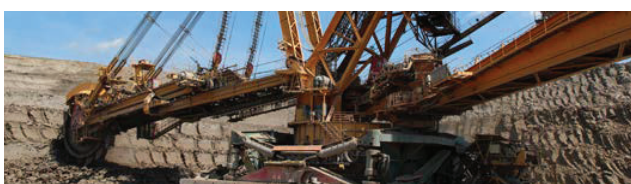
MARINE & OFFSHORE

- Electromagnetic and hydraulic brakes
- Reinforced anti-corrosion protection
- Modular braking systems for high power motors



PORTS

- High performance braking
- Disc brakes - Drum brakes - Storm brakes
- Speed monitoring systems



MINING

- Regulated braking system in all conditions of load
- Hydraulic brakes and thruster brakes
- Deceleration control and speed regulation

OUR KNOW-HOW AT YOUR DISPOSAL

Reactivity, availability and listening of the customer are values which define our teams. We put all our experience and knowledge at your disposal:



RESEARCH & DEVELOPMENT - TESTS

Stromag invests into increasingly sophisticated resources.

Unique test facilities like our braking simulation tower and our dynamic test benches enable to:

- test all the brakes in real conditions of operation, in environments that can be extreme (low and high temperatures),
- carry out pads wearing tests as part of our research into friction materials.



TRAINING

Our after-sale service team provides customers training sessions: upgrade operations on-site or trainings in our production center in France.

Our courses are designed for a wide audience: from the designer to the user with real-use conditions. Recognized as a training organization, the Stromag training team is at your disposal to examine all your specific needs.



RENOVATION

A real renovation is carried out on the brakes to be repaired:

After a complete disassembly of the brake, all the constituent parts are checked. The brake is upgraded according to the last technical developments. So the customer receives brakes having the same performances as the new brakes with a new warranty period of 12 months.



DIAGNOSIS

For installations including an important fleet of brakes, the diagnosis on-site allows to obtain an accurate picture of the state of the installation and to know the urgency order of the different maintenance operations to be carried out.

To achieve a maximal reliability in compliance with the safety regulations, our teams help the customer to realise a self-diagnosis of its braking systems.




INTERVENTION

Stromag After Sales Service Department operates quickly and efficiently on all installations worldwide for:

- the commissioning of the braking systems,
- all troubleshooting operations.

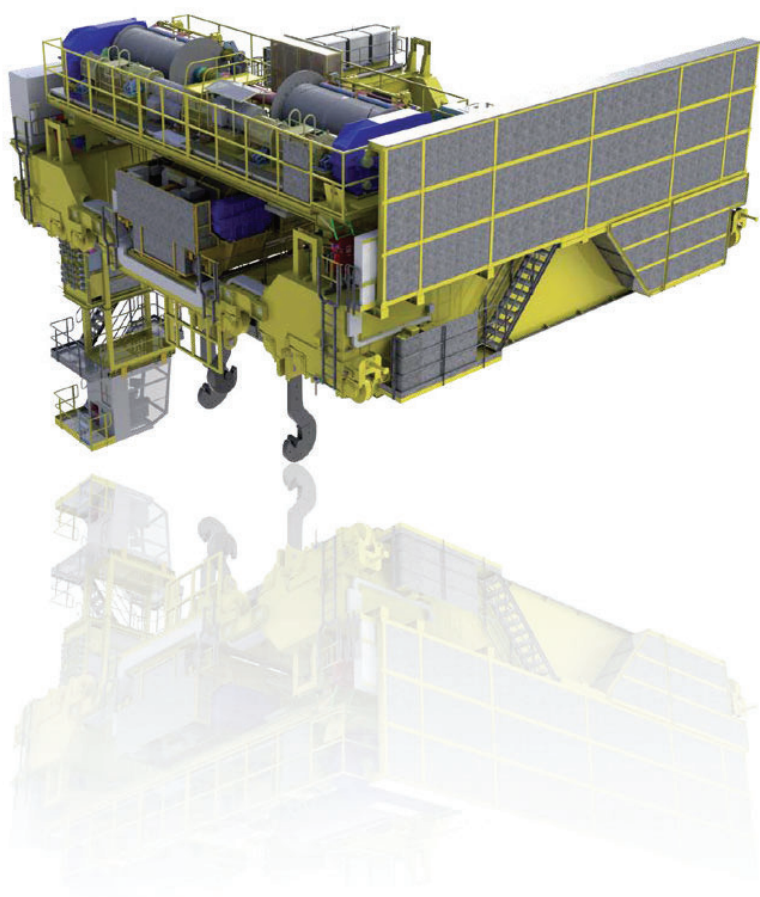
Our team consists of experts and technicians who work on all applications (steel industry, port cranes, nuclear cranes, cable-way, conveyors...)

Advantages	
<ul style="list-style-type: none"> • A team of experts at your disposal • Reactivity of the interventions • Study of the specific requirements • Secured installation 	<ul style="list-style-type: none"> • Optimal operation of the braking systems • Preventive maintenance • Expertise sustainability
For any information or intervention needs, please contact us.	 Simebrakes.service@stromag.com

OUR PRODUCTS

Stromag offers an extensive range of products to secure all lifting and transmission equipments:

- service brakes and emergency stop brakes,
- modules to monitor the over-speed, the kinematic chain or the hydraulic systems operation,
- and also peripheral products such as the cardan shafts or the buffers.



COUPLINGS

Discs



Drums



MONITORING MODULES

SIDEOS



SIMAN



STORM BRAKES

BUFFERS - CARDAN SHAFTS

EMERGENCY BRAKES

electromagnetic



hydraulic

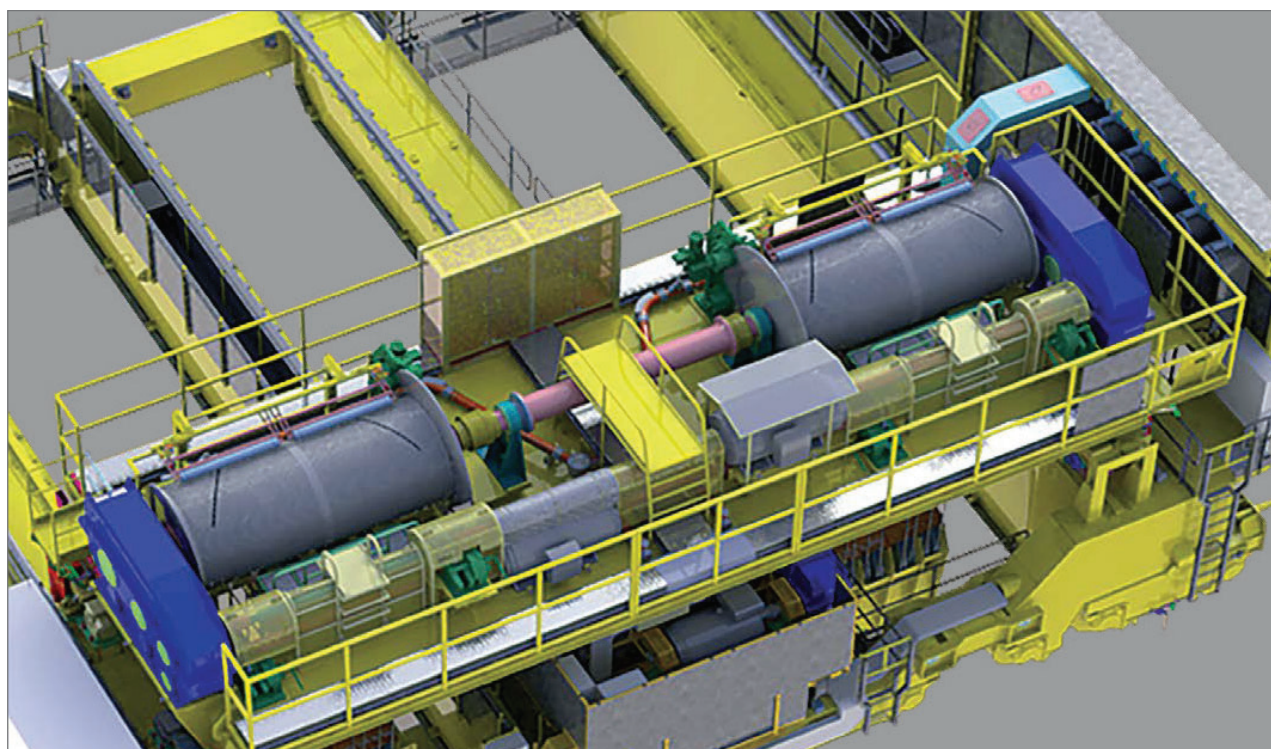


POWER SUPPLIES

electrical



hydraulic



SERVICE BRAKES

electromagnetic



hydraulic



with thruster



drum brakes



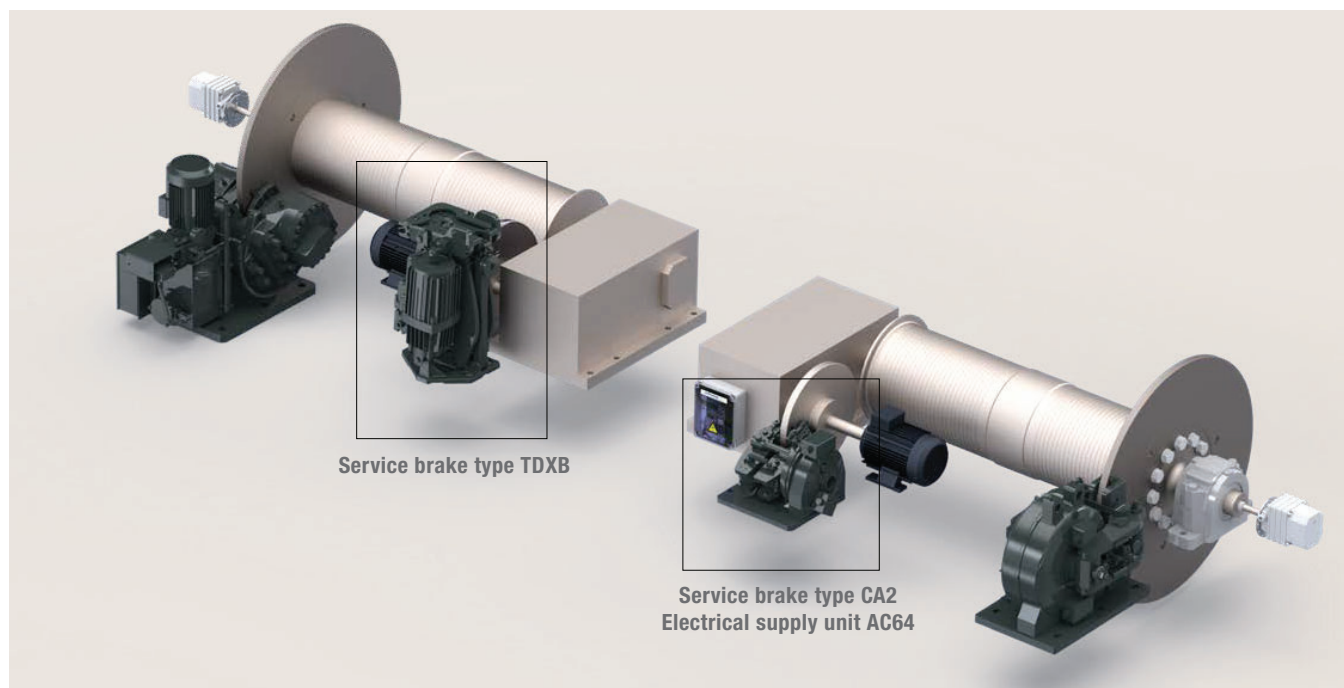
SERVICE BRAKES

Service brakes are installed on the high speed line of the gearbox.

These brakes follow motor ratings and can be equipped with an automatic wear compensation, ensuring a constant torque whatever the wear of the lining pads.

These brakes can be equipped with several options.

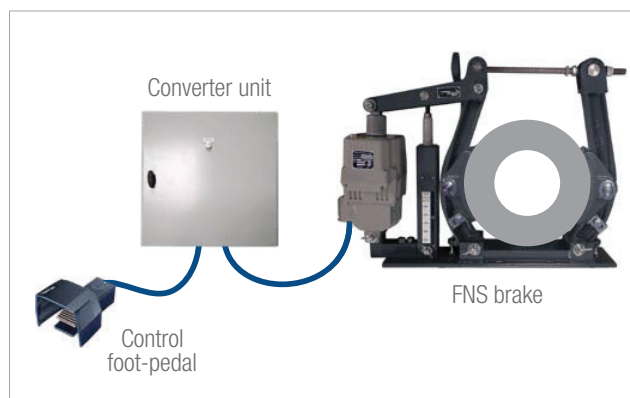
- **Electromagnetic brakes** are associated to the electrical power units AC64-FB or AC32. They are mainly used in nuclear and steelworks applications.
- **Hydraulic brakes** offer an incomparable braking torque stability.
- **Thruster brakes** are designed for high braking torque applications such as ports, iron and steel or mining.
- **Drum brakes** are used when the mechanical constraints are not an overriding factor.



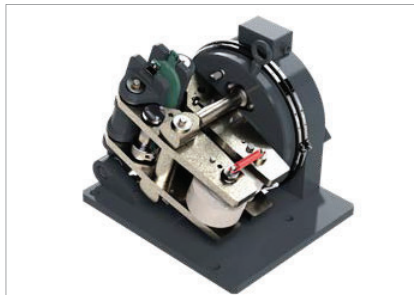
CONTROLLED BRAKING WITH THRUSTER BRAKES

For installations requiring the smooth and progressive application of the braking force, for example port cranes with drivers cabin, Stromag provide braking solutions allowing the proportional application of the braking torque by one (or two) thruster brake (drum brake or disc brake) through a converter unit:

- by action on a potentiometric control foot-pedal, or
- by control from the customer PLC: the required rate of deceleration is set on the **CRD®** system and the speed is monitored by the **SIDEOS One** module supplied by Stromag, consult us.



ELECTROMAGNETIC BRAKES

**CA2 RANGE**

Braking torque 665 - 8040 N.m

Disc Ø445 to 995

- High performance braking
- All applications
- Vertical mounting in option

**600 RANGE**

Braking torque 33 - 1104 N.m

Disc Ø175 to 625

- Economical
- Manual wear compensation

**K/D RANGE**

5K Braking torque 48 - 552 N.m

45K Braking torque 287 - 1188 N.m

Disc Ø445 to 995

- Compact, simplicity of setting
- Vertical mounting in option

THRUSTER BRAKES

**TDXB THRUSTER BRAKES**

Braking torque 901 - 21 240 N.m

Disc Ø315 to 995

- Symmetrical design
- Weight: TDXB-I: 85 kg / TDXB-II: 190 kg

**FAV THRUSTER BRAKES**

Braking torque 155 - 21 270 N.m

Disc Ø220 to 995

- Electro-Hydraulic Thruster
- Weight: 40 to 224 kg

HYDRAULIC BRAKES

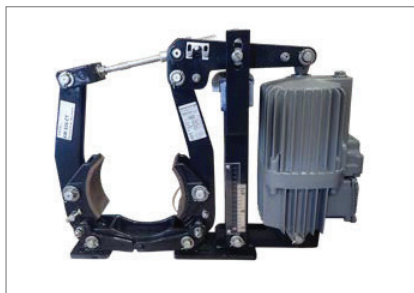
**T RANGE**

Braking torque 775 - 17 300 N.m

Disc Ø445 to 995

- Braking by HYDROSPRING®
- Weight: 160 kg

DRUM BRAKES

**SDB - FNS DRUM BRAKES**

Braking torque 60 - 11 000 N.m

Drum Ø150 to 750

- Standard DIN 15435
- Weight: 28 to 441 kg

**SAB DRUM BRAKES**

Braking torque 55 - 8800 lb.-ft.

Drum Ø6" to 30"

- Standard AISE N.11
- Weight: 70 to 980 lb

**SEMB DRUM BRAKES**

Braking torque 50 - 9000 lb.-ft.

Drum Ø6" to 30"

- Standard AISE N.11
- Weight: 112 to 1650 lb

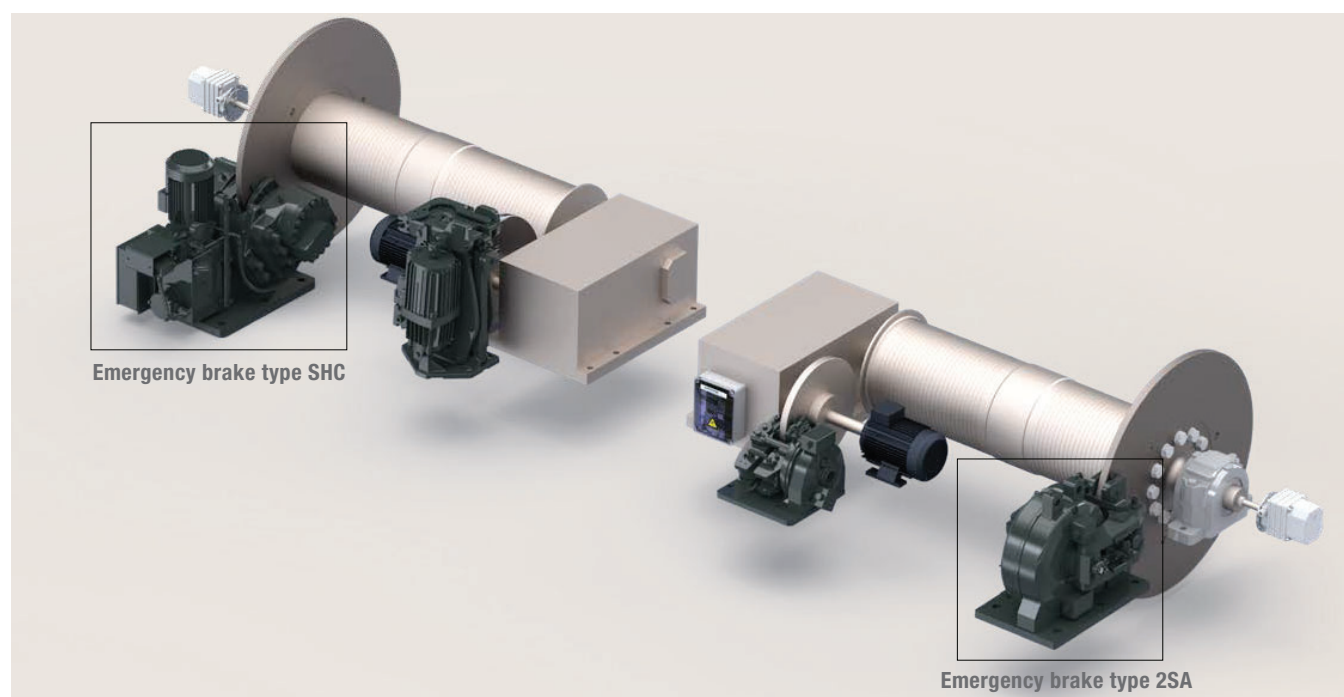
EMERGENCY BRAKES

Emergency brakes are installed directly on the flange of the drums, and they are the last safety device in the event of a falling load.

These brakes are applied in case of overspeed detection, power failure, mechanical transmission breakage or emergency stop controlled by operator.

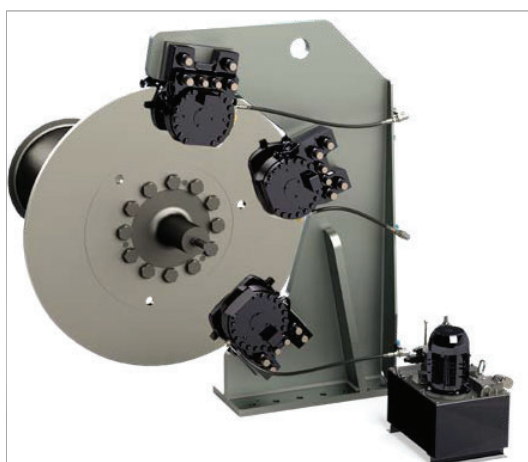
Many options are available: breather pot, special painting, protective cover, etc...

- **Electromagnetic brakes type SA** are references in the steel and nuclear applications. This range requires little maintenance.
- Stromag offers a large range of safety **hydraulic brakes**. Brakes type **SH** are designed to operate in the most severe environmental conditions of steel industry. Brakes type **SHD** can be mounted in restricted space.



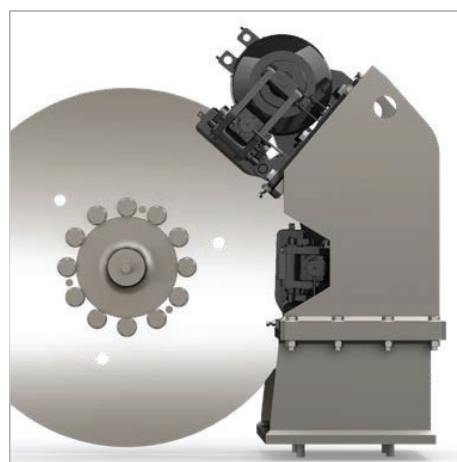
SHC RANGE

Integrated Hydraulic Power Pack with hydraulic connections



Adaptation example for hoisting crane

3 calipers **SH25** on a bracket with HPP, disc Ø1600 mm



Adaptation ex. for travelling crane

2 calipers **2SA** on a bracket for restricted space - disc Ø1600 mm

ELECTROMAGNETIC BRAKES

**2SA**

Braking force 100 kN

- The most powerful electromagn. brake
- Lifting applications of Steel Industry

**OOSA**

Braking force 60 kN

- Low maintenance level
- Association with **4205** electrical power unit for lowering operations

**OSA**

Braking force 31 kN

- Options: Hydraulic release - Breather pot - Special Painting - Steel cover for air gap seal...

HYDRAULIC BRAKES TYPE SH



SH1

Type	Weight	Braking force
SH32	600 kg	333 kN
SH25	440 kg	134 to 250 kN
SH18B	270 kg	73 to 180 kN
SH9	140 kg	55 to 105 kN
SH5	110 kg	7.3 to 70 kN
SH1	35 kg	2 to 11 kN



SH32

SH RANGE

- Symmetrical design
- Spring application - Hydraulic release
- Opening monitoring switch
- Full lining wear detection
- **Options:** Progressive braking system - Offshore protection
High temperatures, steel industry conditions
- **SHS:** caliper mounted on a bracket
- **SHC:** caliper and HPP mounted on the same bracket

HYDRAULIC BRAKES TYPE SHD



SHD1

Type	Weight	Braking force
SHD18	395 kg	120 to 180 kN
SHD9	148 kg	43 to 100 kN
SHD5A	108 kg	15 to 56 kN
SHD2	60 kg	10 to 23 kN
SHD1	24 kg	3 to 11 kN



SHD18

SHD RANGE

- Compact and modular design
- Spring application - Hydraulic release
- Opening monitoring switch
- Full lining wear detection
- Marine protection and low temperature materials
- Short response time
- Association with discs of different thicknesses
- **Options:** Opening, wear and temperature indication

ELECTRICAL POWER UNITS

Stromag electrical power units ensure a fast opening and closing time of the fail safe electromagnetic brakes. They have an “economic” mode which decreases the electric consumption and the heating of the brakes to provide an efficient and long lasting solution. Protected against overload and overcurrent, this range of power units ensures safe, reliable and high performance of your braking system.

Advantages

- Simplicity of adjustment and use
- Weight and size reduced
- Quick diagnosis of faults by means of leds indications

The switch-mode power supply units, type **AC64**, **AC32** and **AS100**, offer high quality and braking performance. These electrical power units are available in Polycarbonate or Steel enclosure.

4200 unit is proposed in panel mounted version or in casing protected version. It can supply several calipers.

4205 unit allows a progressive release of electromagnetic calipers to perform lowering operations.



AC64-FB & AC32

For calipers 600, K, CA2



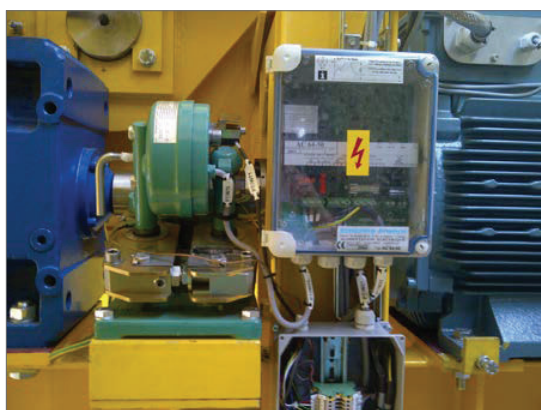
AS100

For calipers OSA, OOSA



4200 & 4205

For calipers 4CA2, 3CA2, OSA, OOSA, 2SA



HYDRAULIC POWER PACKS

Use of emergency brakes implies a perfect control of opening and closing times.
This is why we designed and developed special Hydraulic Power Packs adapted to these critical industrial constraints.
Whatever the type or the number of brakes necessary for your installation, whatever the distance that separates the braking system from the power unit, Stromag is able to provide a fitted solution to meet your needs.

OPTIONS	
<ul style="list-style-type: none">• Manual lowering• Delayed closing• Controlled braking torque• Enhanced security return circuit• CS2EV unit : monitoring of the EV good operation	<ul style="list-style-type: none">• Electrical box• Soft braking (CSH)• MOPS (Manual Overload Protection System) (CSH)• Indicators (clogging indicator, oil temperature indicator, oil level)



C3BSH
Tank 4 L
Max. pressure 180 bars
Weight without oil: 27 kg



CSH
Tank 6 L
Max. pressure 200 bars
Weight without oil: 28 to 62 kg



CE8L - CE12L
Tank 8/12 L
Max. pressure 225 bars
Weight without oil: 54 to 90 kg



ST210
Tank 63 L
Max. pressure 225 bars
Weight without oil: 125 kg



SPEED MONITORING MODULES SIDEOS and LIMIT SWITCHES SERIES 51

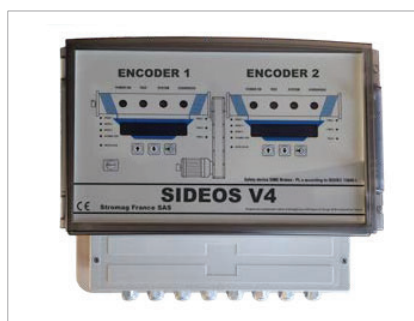
The modules **SIDEOS** are configurable and secure devices for speed monitoring, fitted with an efficient auto control system which secures the overall operation of the overspeed detection system.

They allow to obtain, when installation is correct a speed monitoring system secure up to category 4 with the performance level of PL = e according to the standard ISO/IEC 13849-1.



SIDEOS One - SIDEOS SC

- **SIDEOS One** monitors 3 speed thresholds, the stop and the rotation direction of the installation
- **SIDEOS Sc** monitors the speed according to a variable speed threshold (for ex. in case of joystick control)



SIDEOS V4

- **SIDEOS V4** monitors the kinematic chain of the installation, it receives the speed signals from 2 incremental encoders
- It pilots the opening of the braking command circuit



Limit switches series 51

- Geared cam limit switches fitted with an encoder
- Provide information on the position (angular of the drum, hoisting height) and the speed
- Accuracy and simplicity of adjustment



HYDRAULIC POWER PACKS MONITORING MODULE SIMAN

SIMAN is an intelligent system for monitoring and management of the good operation of Hydraulic Power Packs whatever their functionalities.

SIMAN is a reliable solution for safety with:

- according to standard NF EN ISO 13849, a performance level PLd, category 2 system, MTBF = high, DC = high
- a service life of 1 million of ON/OFF cycles

It drives the HPP motor pump and the solenoidvalves.

To ensure safety, it controls the good operation of the solenoidvalves and the oil return to the tank.

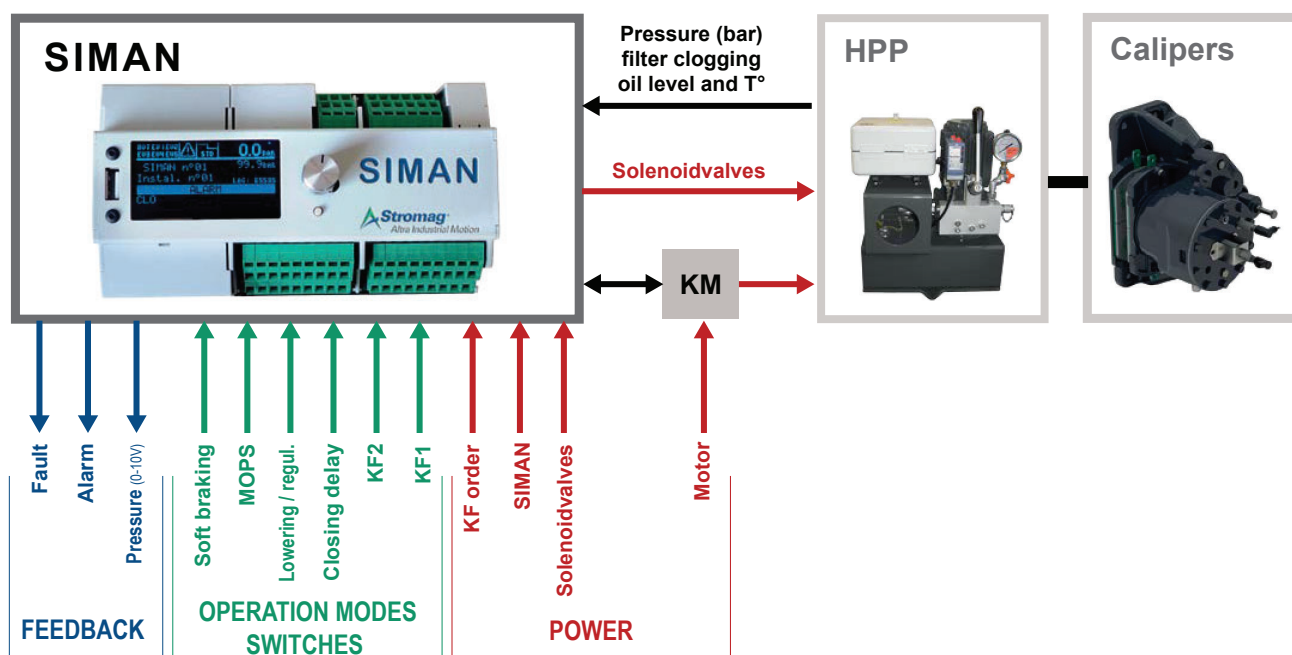
For optimal operation, it monitors the HPP parameters (the pressure, the number of starting-up, the internal faults, the state of the motor contactor,...).

Its LCD screen displays the current operation, the parameters-settings and the detected faults.

Options: Inter-product communication module - ModBus TCP communication - Multiple solenoidvalves voltages.



Diagram of the SIMAN inputs and outputs



BRAKE DISCS AND COUPLINGS

As a complement to its disc brakes, Stromag proposes three types of disc couplings to offer a complete braking system solution.

Stromag provides solid and ventilated discs with an external diameter from 175 to 995 mm, and a thickness of 15 mm (monobloc disc), 30 mm (solid and ventilated) or 42 mm (ventilated disc).



Stromag PERIFLEX® RANGE

Highly-Flexible couplings

- Rubber-fabric tyre, mounted and removed without moving the machines
- compensate extreme offsets, absorb torque peaks and damp vibrations



SDF RANGE

Double Engagement Gear Couplings

- 2 flanged sleeves with internal spur gear teeth, linked with steel bolts
- 2 crown toothed hubs allowing the best possible alignment



SDKL - SVKL RANGE

Highly-Flexible couplings

- Cam rings and flexible element, mounted and removed without moving the machines
- Damping of shocks & torsional vibrations

DRUM COUPLINGS

Stromag provides drums and drum couplings associated to drum brakes.

Drum couplings **PB-C** are made of two cast iron hubs onto which pins fitted with rubber bushes are mounted. Drum couplings **SVT** are flexible couplings with cam rings and flexible element, they allow simple mounting/dismounting, and damping of shocks and torsional vibrations.



SVT RANGE

- Drums diameters: Ø200 to 630 mm



PB-C RANGE

- Drums diameters: Ø200 to 710 mm

STORM BRAKES

Stromag provides a large range of storm brakes to secure outdoor cranes such as ship to shore cranes, automated stacking cranes and rail-mounted gantry cranes.

Storm brakes are parking and safety devices which prevent a crane from uncontrolled movement along the rail in case of sudden bursts of wind.



Rail clamps RBS & RRBS

RBS - Holding capacity 50 - 1000 kN
RRBS - Holding capacity 50 - 1200 kN

- Braking by spring (rail clamping)
- Hydraulic release (integrated HPP)
- RRBS: Retractable rail clamp



Rail press brakes RPS & RPS-SA

RPS - Braking force 120 - 300 kN
RPS-SA - Braking force 120 - 220 kN

- Braking by spring on the top of the rail
- Hydraulic release
- RPS-SA: automatical compensation of the rail height variations



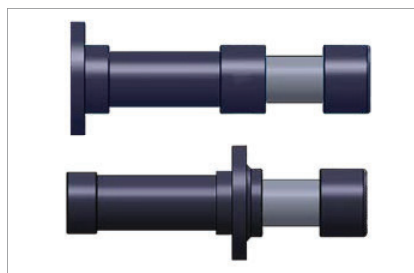
Wheel brakes WBES

Braking force 30 - 120 kN

- Braking by spring
- Electric release
- Can be used as dynamic brakes in case of emergency situation

HYDRAULIC BUFFERS

Deceleration of moving masses along the shortest possible stroke considering the installation requirements



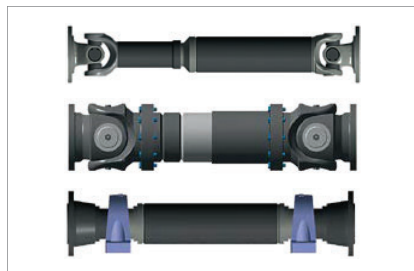
Hydraulic Buffers PHS

Damping force 70 - 670 kN

- 2 types: rear or front mounting
- 4 sizes: 063, 080, 100 and 125
- 15 strokes (that makes 120 different models)
- Strokes: 100 to 800 mm
- Total length max.: 456 to 2114 mm

CARDAN SHAFTS

Transmission of an angular rotation
 Coupling of two rotating non-aligned shafts



Cardan shafts ACS

Torque 600 - 3 900 000 Nm

- 7 types: with or without length compensation, with or without flanges
- 24 sizes
- Useful diameter: 76 to 840 mm
- Length max.: 190 to 4500 mm

TAILOR-MADE SOLUTIONS

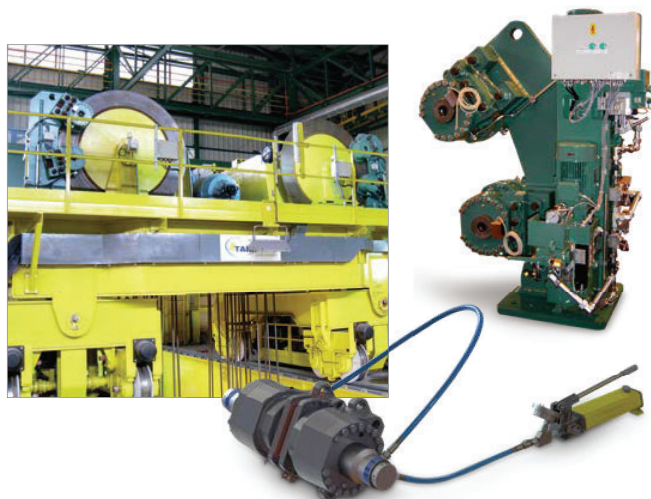
Stromag offers tailor-made solutions for the more specific requests of the customers. From design to conception of the product, our research and development team focuses all efforts to find the best technical solution to suit the customers requirements.

CRANES OF STEEL INDUSTRY

Since 1966, Stromag has been supplying braking solutions adapted to the requirements of the iron and steel industry all over the world.

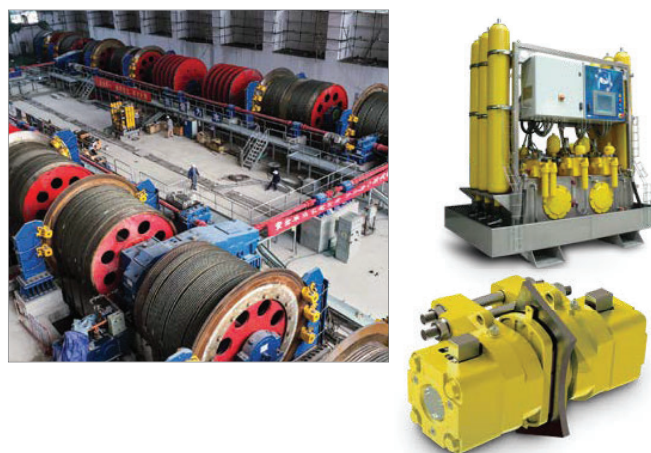
Our tailor-made solutions enable:

- several braking modes: on/off braking, regulated braking, load lowering, with Human Machine Interface
- an easy maintenance: holding tools and hydraulic release tools adapted to all the calipers of the installation.



OUTSTANDING SHIP LIFTS

Stromag was chosen to supply accurate braking systems for the ship lifts of the hydroelectric stations of Silin, Shatuo and Goupitan on the busy Wujang River in China. For each project, a huge braking system secures the lifting of the boat-reservoir (weight up to 3300 tons), to a maximum height of 79 meters. It is composed of hydraulic brakes types SH32 and SHD5, and specific Hydraulic Power Packs with electrical command and monitoring.



WAGON TIPPERS

Stromag has provided complete customised solutions for the transmission chain of wagon tippers.

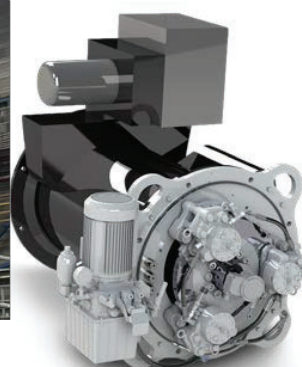
Each solution includes a set of extensions, couplings and gears for a total length of almost 16 meters. This device ensures the transmission of the rotational movement to the tippler and thus allows the wagon unloading.



HEAVY LIFT OFFSHORE CRANES

Modular Stromag SHD1 braking systems have been selected by several leading global OEM to equip large mass cranes installed on offshore construction vessels which provide heavy lifting capability to support surface or sub-sea asset installations (as for ex.: wind turbines, pipelines).

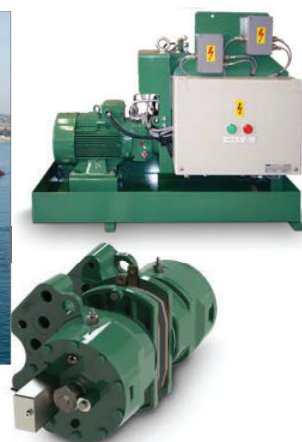
These braking systems offer an economical braking solution: they are factory-tested and designed to be mounted directly on the rear of the motors (400 kW and up).



PORT CRANE 10B in TOULON

SIME Brakes braking systems ensure the safety of the port crane 10B of the naval base of Toulon. This boom crane has a lifting capacity of 120 tons at 47 meters.

The braking systems, tested on seismic bench, include electromagnetic calipers 3CA2, electrical power units AC32-50, hydraulic calipers SH5 and SH25 and hydraulic power packs CE8L and CE12L especially designed for delayed or full braking, and manual lowering of the load with overspeed safety.



PIONEERING SPIRIT VESSEL

MCH120 type brakes have been specifically developed and manufactured by Stromag to equip the Pioneering Spirit vessel. This huge vessel is the world's largest construction vessel, designed to install and remove offshore oil and gas platforms.

More than 550 MCH120 type brakes ensure a firm holding of the topsides horizontal lifting beams in their transverse motion along the vessel deck under the most adverse weather conditions.



Stromag Facilities

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860-238-4783

Electromagnetic Clutches & Brakes

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Michigan City, IN 46360 - USA
219-874-5248

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2800 Fisher Rd.
Wichita Falls, TX 76302 - USA
940-723-3400

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Isolators, and Coupling Guards*

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Caliper & Drum Brakes, Discs, Geared
Cam Limit Switches, Wind Brakes*

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Clutches & Brakes, Couplings, Industrial
Caliper & Drum Brakes, Discs, Geared
Cam Limit Switches, Wind Brakes*

The Brands of Altra Motion

Couplings

Ameridrives
www.ameridrives.com

Bibby Turboflex
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Guardian Couplings
www.guardiancouplings.com

Huco
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Lamiflex Couplings
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Stromag
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TB Wood's
www.tbwoods.com

Linear Systems

Thomson
www.thomsonlinear.com

Geared Cam Limit Switches

Stromag
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Engineered Bearing Assemblies

Kilian
www.kilianbearings.com

Electric Clutches & Brakes

Matrix
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Stromag
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Warner Electric
www.warnerelectric.com

Deltran
www.thomsonlinear.com

Belted Drives

TB Wood's
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Heavy Duty Clutches & Brakes

Twiflex
www.twiflex.com

Stromag
www.stromag.com

Svendborg Brakes
www.svendborg-brakes.com

Wichita Clutch
www.wichitaclutch.com

Gearing & Specialty Components

Bauer Gear Motor
www.bauergears.com

Boston Gear
www.bostongear.com

Delevan
www.delevan.com

Delroyd Worm Gear
www.delroyd.com

Nuttall Gear
www.nuttallgear.com

Engine Braking Systems

Jacobs Vehicle Systems
www.jacobsvehiclesystems.com

Precision Motors & Automation

Kollmorgen
www.kollmorgen.com

Miniature Motors

Portescap
www.portescap.com

Overrunning Clutches

Formsprag Clutch
www.formsprag.com

Marland Clutch
www.marland.com

Stieber
www.stieberclutch.com

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