

Braking Solutions for Nuclear Applications

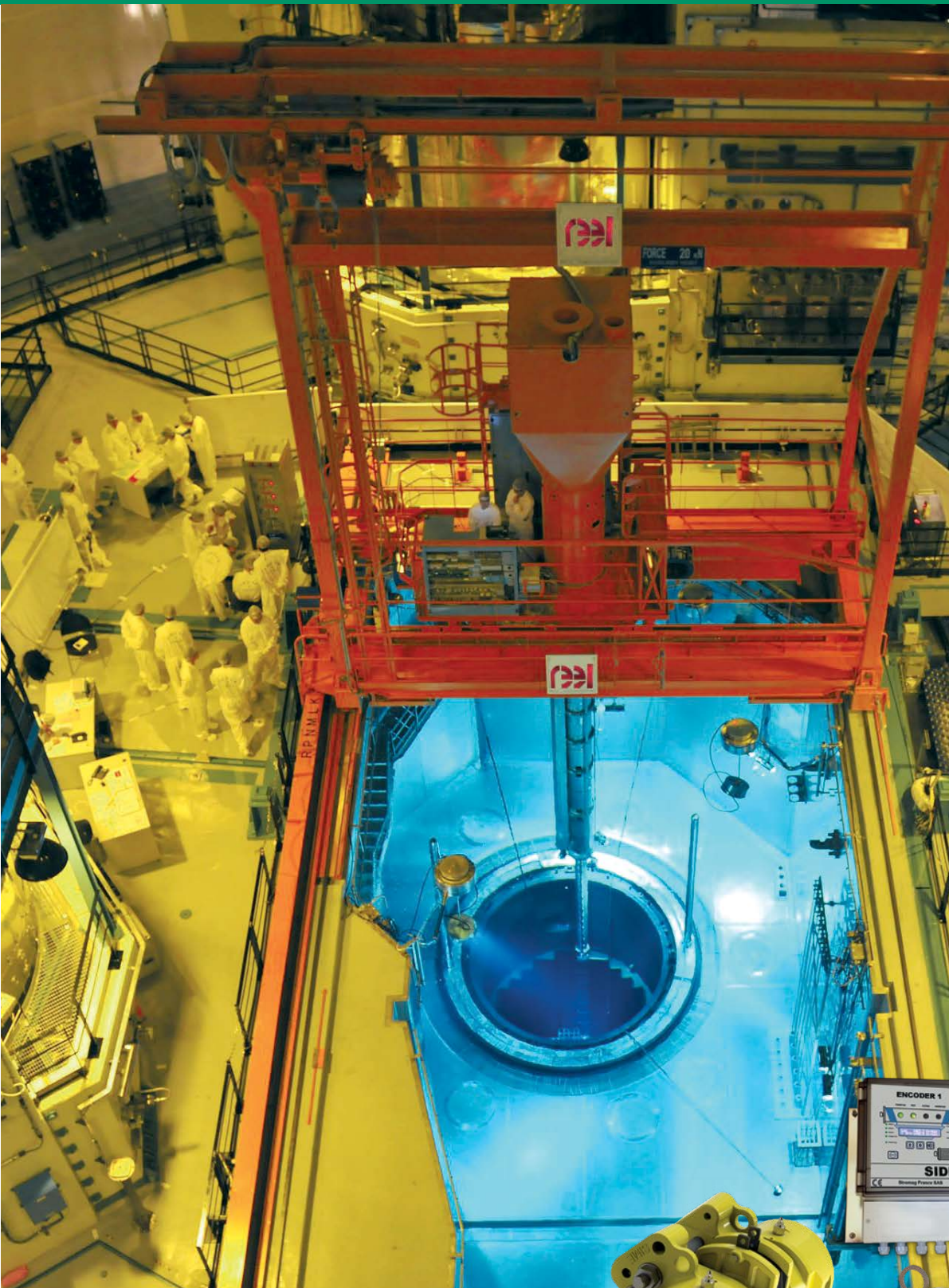


Photo courtesy of REEL

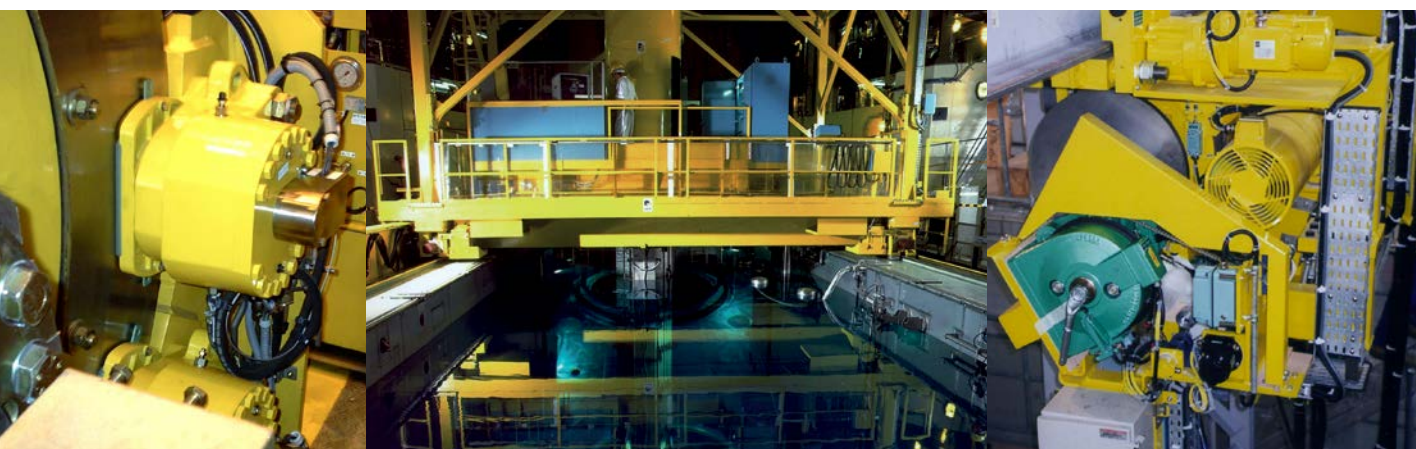


Stromag[®]
Altra Industrial Motion

STROMAG PROVIDES BRAKING SOLUTIONS FOR REACTOR BUILDING CRANES, FUEL STORAGE CRANES, HEAVY LIFTING CRANES AND LOWERING DEVICES

As the main supplier of disc brakes for the French Nuclear Industry for more than 40 years, Stromag provides worldwide (Europe, China, Brazil and South Korea) braking solutions meeting all safety and quality requirements.

All Stromag products are designed and manufactured to meet the stringent and specific needs of the nuclear environment, validated by the availability of a Quality Plan, reinforced controls and conformity certifications.



The SIME-Brakes braking systems equip today:

- Multiple Civil Installations such as nuclear power plants (cooling pool cranes, external gantries, lowering devices, fuel manipulative equipment), sites of waste reprocessing, EPR (Taicang, UK), experiment research center (CEA),
- Military Installations such as the DCNS (Naval Group) of Toulon and Brest, the Charles de Gaulle aircraft carrier cranes.

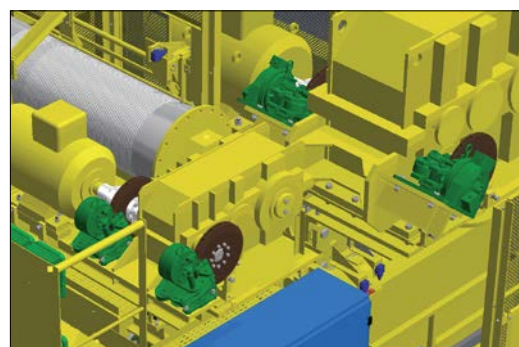
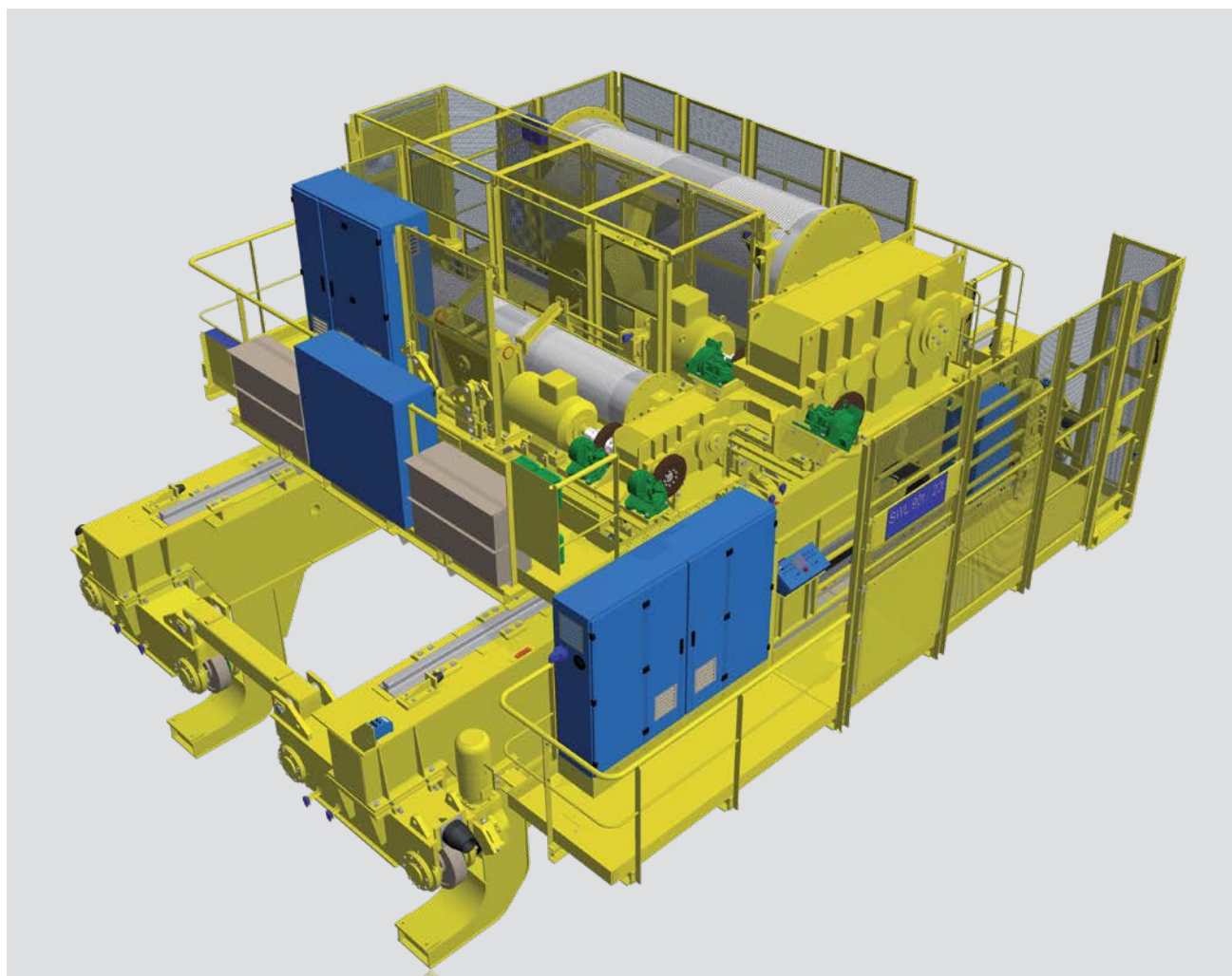
Stromag skills are world-renowned, validated by the certification ISO 9001-2015 and EDF qualification.

To ensure the best reliable performance in safety, Stromag can supply complete braking solutions including:

- Service Brakes for intensive use at "high speed"
- Emergency Brakes for safety use at "low speed"
- Electrical Power units allowing controlled and manual load lowering
- Hydraulic Power Packs with a large range of options
- Configurable Monitoring Systems of the kinematic chain (SSCC), designed accordingly to the CRT EDF rules
- Elastic Disc Couplings for the transmission of the torque with damping of the operation vibrations and shocks.

www.stromag.com

NUCLEAR APPLICATION EXAMPLE EQUIPPED WITH A STROMAG BRAKING SYSTEM



**90 T/20 T Overhead Cranes realized by REEL SAS,
to equip the Taishan EPR Fuel Buildings,
fitted with Stromag SIME-Brakes**

SERVICE BRAKES

SIME-Brakes electromagnetic disc brakes ensure a high performance of braking that meet the quality requirements of the nuclear applications.


The 5, 45 and CA2 ranges are used in dynamic braking applications.

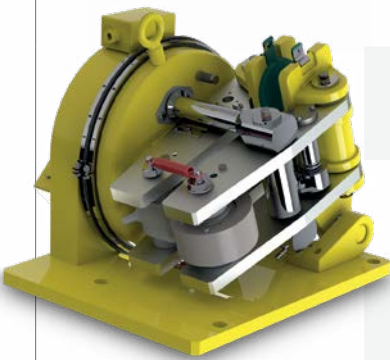
The power supplies AC64 and AC32 are designed to give optimum performance to the electromagnetic calipers.

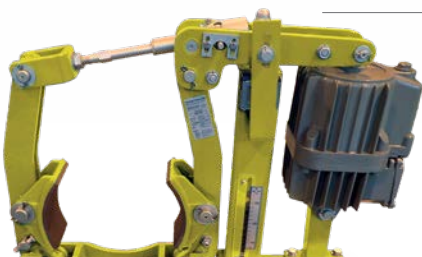
The brakes can be fitted with specific options in order to meet requirements and specifications of the installation.

As a complement to our brakes, Stromag can offer a full range of drum brakes equipped with electro-hydraulic thruster.



	CALIPERS	BRAKING TORQUES (N.m)	
		Ø Disc (mm)	
	5K 5D	48 Ø315	555 Ø625
	45K 45D	285 Ø315	1190 Ø625

	4CA2	665 Ø445	2400 Ø795
	3CA2	1120 Ø445	4020 Ø795
	2CA2	2660 Ø625	8040 Ø995
	1CA2	3860 Ø625	11660 Ø995

SDB BRAKES	BRAKING TORQUES (N.m)	
	Ø Drum (mm)	
	80	9600
	Ø160	Ø710

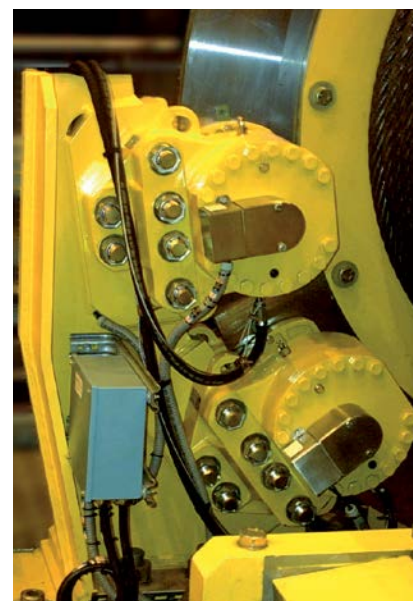
EMERGENCY BRAKES

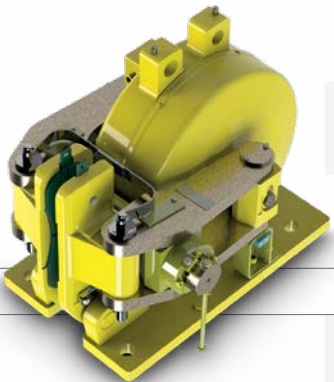
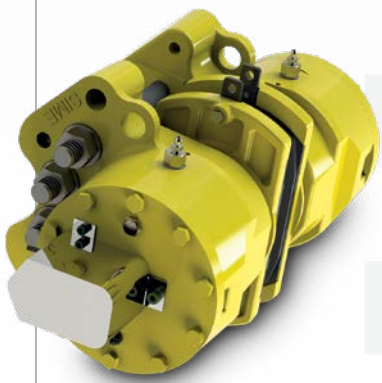
The SA range includes the electromagnetic disc brakes OSA, OOSA and 2SA. Those brakes are particularly renowned for their braking power, they are a reference in terms of safety.

This range has low maintenance requirements and offers an incomparable performance of braking. The electromagnetic brakes type SA can be associated with the electrical power unit type C4205, which allows the manual and controlled lowering of the load.

The brakes type SH are powerful hydraulic emergency brakes with a symmetrical design. Their robustness and simplicity of operation make them essential for emergency braking.

The SH calipers are supplied by hydraulic power packs type CE8L or CE12L. Mounted on the same support, two calipers type SH can be connected to a single hydraulic power pack. The SHC version integrates the hydraulic power pack, the caliper, on the same support with all the connection piping.



	CALIPERS	BRAKING TORQUES (N.m)	
		Ø Disc (mm)	
	OSA	10 000 Ø750	44 000 Ø3000
	OOSA	18 000 Ø750	86 000 Ø3000
	2SA	32 000 Ø750	145 000 Ø3000
	SH5	15 000 Ø750	74 000 Ø3000
	SH9A	28 000 Ø750	141 000 Ø3000
	SH15	43 000 Ø750	212 000 Ø3000
	SH18B	51 000 Ø750	254 000 Ø3000
	SH25	62 000 Ø750	343 000 Ø3000
	SH32	82 000 Ø750	455 000 Ø3000

OPTIONS AND OPERATION MODES

Electromagnetic or hydraulic, the Stromag SIME-Brakes calipers are adapted to the specific requirements of the nuclear environment.

A large range of options is available: decontaminated paint, special safety switches, specific surface treatments, secured systems for load lowering.

The electrical power supply C4205 allows the controlled lowering of the load on the electromagnetic brakes by regulating the braking torque from 100% to 50%.

The hydraulic power packs CE8L and CE12L allow a perfect control of the opening and closing times of the hydraulic brakes. Depending on their configuration, they offer different operation modes such as the manual load lowering or the controlled application of the braking force.

ELECTRICAL POWER UNITS



- A large range of power supplies: **AC64**, **AC32**, **AS100** and **C4205**
- Opening and closing of the brakes
- High "call" voltage to reduce opening response time
- Economical mode after caliper opening
- Short and constant closing times
- Available in steel or polycarbonate enclosure
- **C4205** unit associated to the calipers **4CA2**, **3CA2**, **OSA**, **OOSA** and **2SA**, allows the progressive release from 100 to 50% of the braking torque for load lowering by manual control or regulated control through a speed information feedback.

HYDRAULIC POWER PACKS CE8L AND CE12L



- Association with the calipers type **SH**
- A large range of options is available:
 - **MS**: Motor Special
 - **EVS**: Solenoid valves coils different from the standard
 - **OP1**: Enhanced security return circuit by 2 solenoid valves
 - **SPUM**: Monitoring system of the HPP operation
 - **OP1-OP2**: Manual lowering with dead man safety device
 - **OP1-OP3**: Manual lowering with overspeed safety by solenoid valves
 - **OP10**: Drip tray
 - **Y5**: Regulated braking
 - Indicators of clogging, oil level and oil temperature

SIDEOS V4 MONITORING SYSTEM

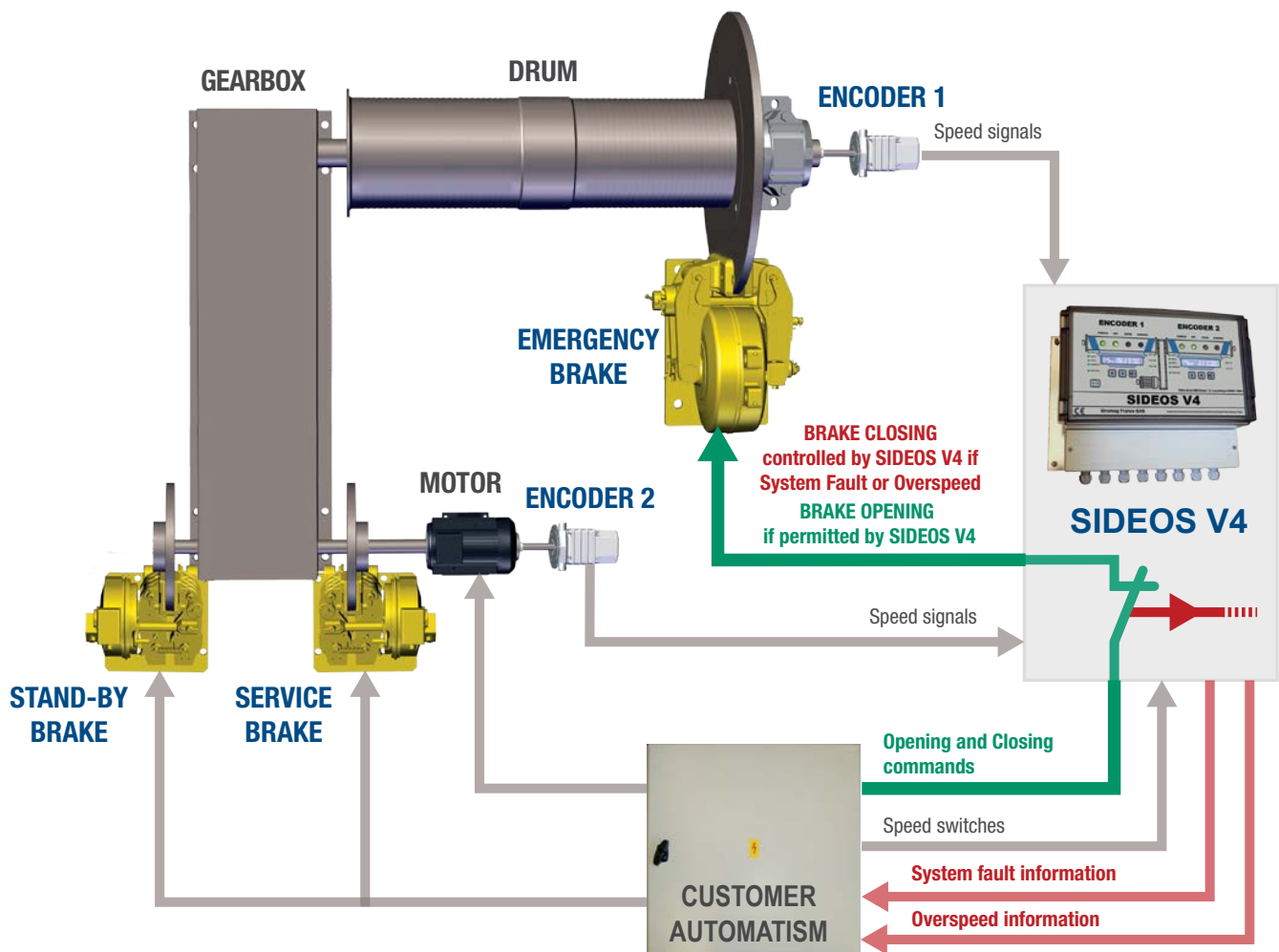
The SIDEOS V4 unit is a configurable monitoring system of the kinematic chain: it is designed to secure the kinematic chain of a lifting and handling equipment.

- It pilots the opening of the braking control circuit downstream of the control-command circuits from which it is independent.
- It prevents or stops the use of the lifting movement of the handling equipment, if it is unable to perform its function.
- It allows to obtain a secured monitoring system of the speed of:

Category 4, Performance Level PL= e according to the standard ISO/IEC 13849-1.

- It is designed according to the **CRT16 60.C.016 EDF**

NEW



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