Safe-System | **LES03 / SGT02 / PSU02** | **Safety functions with electronic overspeed governor**

SIL3 Functional Safety EN 81

RoHS

CANopen LIFT

Digitization of elevator systems

With the combination of the LES03 sensor ants with the SGT02 safety gear trigger and the PSU02 evaluation unit, numerous elevator and safety functions can be implemented in accordance with EN 81-20/21/50 and classic mechanical solutions with all the relevant components can be replaced. This reduces both the complexity in the assembly process and the number of components in the safety circuit of the elevator system.

The state of the safety gear is constantly monitored by the SGT02 and can also be safely and easily reset after safe tripping. The safe system not only provides a high level of safety for passengers, but also realizes refuge space during installation and maintenance of the elevator systems (shield mode).

Features and benefits

- **Digitization of elevator systems**
  Safe determination, transmission and processing of position and speed information of the elevator car.
- **Reduced number of components**
  Numerous mechanical components such as magnetic switches, ramps, and roller limit switches can be eliminated thanks to the digitally available shaft information. This also reduces installation and maintenance times. Even the mounting kit for installing the code band and sensor is designed according to the „plug-and-play“ principle.
- **Elevator and safety functions according to EN 81-20/21/50**
  The 100% slip-free position and speed data detected by the LES03 sensor are processed by the SIL3-certified PSU02 evaluation unit (Position Supervisor Unit) for the implementation of numerous elevator and safety functions.
- **Electronic overspeed governor**
  The SGT02 Safety Gear Trigger analyzes the data with regard to overspeed and, in an emergency, triggers the electromechanical safety gear independently of the control system.
- **Condition monitoring and reset**
  The SGT02 also takes over the monitoring and resetting of the respective safety gear. In addition to direct evaluation, the status information can also be processed by a control system if required.
- **Establishment of refuge spaces (Shield-Mode)**
  In addition to safety for assembly personnel in accordance with the requirements of EN 81-21, the Shield mode of the SGT02 sets new standards for the safety of installation, service and maintenance personnel.
  Even during scaffold-free assembly, the system independently forms position- and speed-dependent refuge spaces.
- **Self learning system**
  Due to the respective highest and lowest approached position in the elevator shaft, refuge spaces are automatically produced.
- **Easiest validation**
  From plant approval to annual inspection - the reduced complexity simplifies validation processes and guarantees the highest safety standards.

Required components for the use of the LES03 / SGT02 / PSU02 Safe-System

Sensor LES03

Configuration strip

Coded band

Mounting kit LES.MK

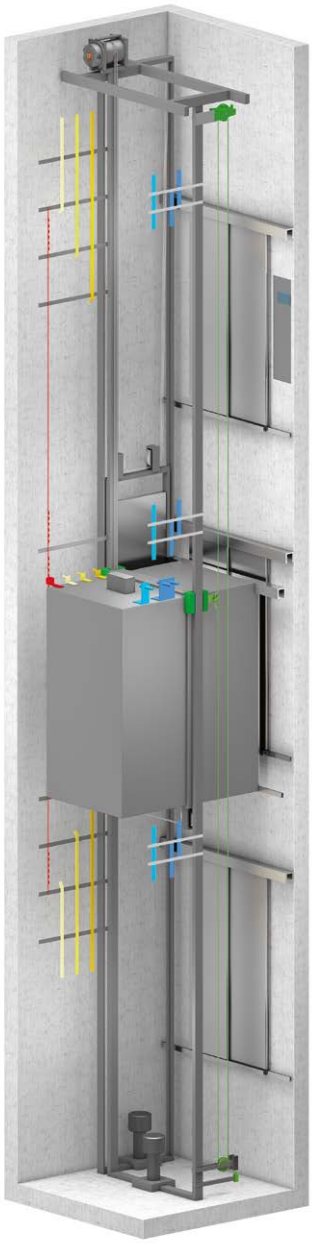
Safety Gear Trigger SGT02

Evaluation unit PSU02

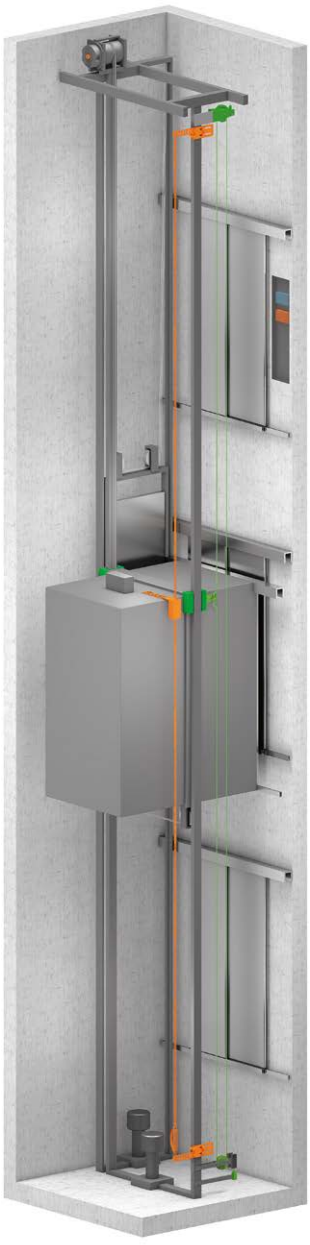
Safe-System | **LES03 / SGT02 / PSU02** | **Safety functions with electronic overspeed governor**

Kübler Safe-System

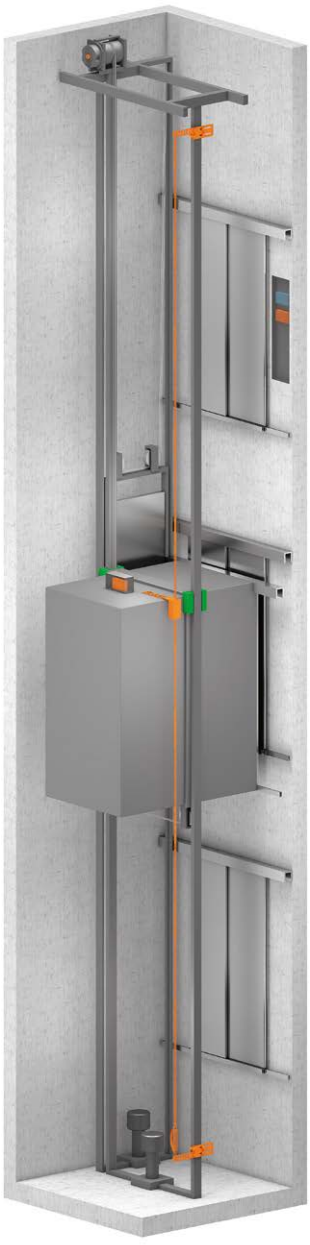
Conventional elevator system



Modern elevator system with Kübler Safe system LES02 / PSU02
Safety functions without triggering of safety gear



Modern elevator system with Kübler Safe system LES03 / SGT02 / PSU02
Safety functions with triggering of safety gear



Safe-System	LES03 / SGT02 / PSU02	Safety functions with electronic overspeed governor

Kübler Safe-System						
			LES02 PSU02	LES03 SGT02	LES03 SGT02 PSU02	LES03 PSU03
Realizable elevator and Safety functions	**Standard references**	**SIL**	to the Safe System > LES02/PSU02	to the Safe System > LES03/SGT02		in development LES03/PSU03
Absolute position feedback	no standard reference	–	✓	✓	✓	✓
Final limit switch	EN 81-20: 5.12.2.3.1 b)	1	✓	–	✓	✓
Retardation control (in case of reduced stroke buffers)	EN 81-20: 5.12.1.3	3	✓	–	✓	✓
UCM (Unintended Car Movement)	EN 81-20: 5.6.7.7	2	✓	–	✓	✓
Door bridging	EN 81-20: 5.12.1.4 a), b), c), 2), d)	2	✓	–	✓	✓
Two redundant signals for the door zone (door zone magnet emulation)	no standard reference	–	✓	–	✓	✓
Door zone signalization in case of evacuation with 12 V emergency power supply	no standard reference	–	–	–	✓	✓
Overspeed pretripping 115 %	EN 81-20: 5.6.2.2.1.6	2	(✓) functional	✓	✓	✓
Triggering electromech. safety gear in case overspeed	EN 81-20: 5.6.2.2.1	3	–	✓	✓	✓
Status control of electromechanical safety gear	EN 81-20: 5.6.2.1.5	1	–	✓	✓	✓
Reset control of electromech. safety gear	no standard reference	3	–	✓	✓	✓
Triggering electromechanical safety gear in case of upwards movement	EN 81-20: 5.6.6.5	2	–	✓	✓	✓
Triggering electromechanical safety gear in case of activating emergency braking switch	no standard reference	3	–	✓	✓	✓
Inspection limit switch within reduced shaft head / pit	EN 81-21: 5.5.3.4, 5.7.3.4	2	✓	✓	✓	✓
Shield Mode: triggering of electromechanical safety gear for ensuring refuge space	EN 81-21: 5.5.2.3, 5.7.2.3	2	–	✓	✓	✓
Triggering switch for opening safety circuit (within reduced shaft head / pit)	EN 81-21: 5.5.2.3.3 f)	2	–	✓	✓	✓
Reset device control	EN 81-21: 5.5.3.3 c)	2	–	✓	✓	✓
Shield Mode: refuge space during scaffoldless installation	no standard reference	3	–	✓	✓	✓
Functional safety already from wiring (without presetting)	no standard reference	3	✓	–	✓	✓
Overspeed during inspection (0.63 m/s)	EN 81-20: 5.12.1.5.1 e)	–	✓	✓	✓	✓
Safe configuration management for accelerated approval process	no standard reference	–	–	✓	✓	✓

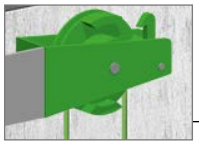
Safe-System | **LES03 / SGT02 / PSU02** | **Safety functions with electronic overspeed governor**

Technology in detail

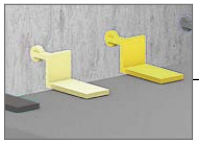
Conventional elevator system – mechanical components

In conventional elevator systems, detecting the position of the elevator car and the resulting triggering of safety functions involves a great deal of effort. Numerous mechanical components from magnetic flags to limit switches and ramps are used for this purpose. This leads to high installation, maintenance and cost efforts. In the event of a malfunction, troubleshooting can be correspondingly time-consuming.

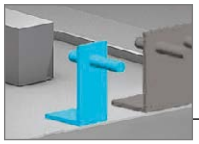
In this design, the high safety requirements for elevator systems are mainly met by redundant components. With the entry into force of EN 81-20/21/50, the safety requirements for passenger and freight elevators have increased even further. The design of conventional elevator systems is therefore becoming even more complex.


Mechanical overspeed governor


Inspection switch

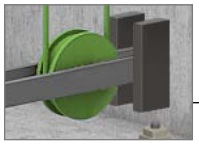

Emergency limit switch

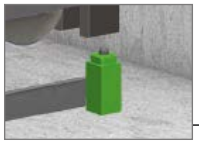

Delay control

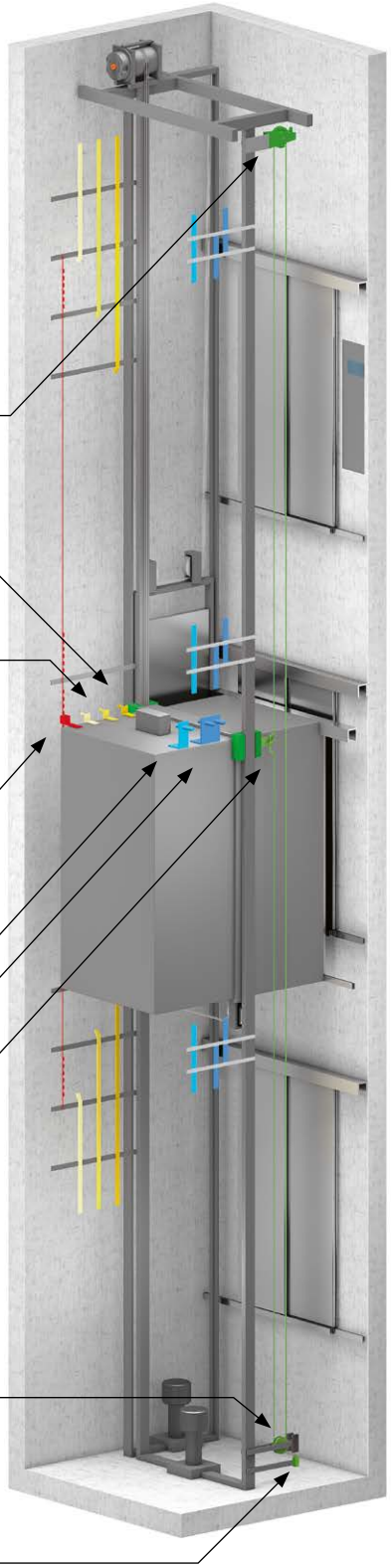

Door zone monitoring


Flush door position


Mechanical trigger of the safety gear


Tensioning device for overspeed governor


Switch for slack rope monitoring (governor rope)



Safe-System | **LES03 / SGT02 / PSU02** | **Safety functions with electronic overspeed governor**

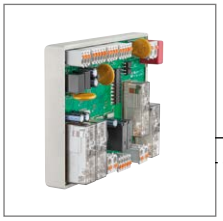
Technology in detail

Modern elevator installation with Kübler Safe-System LES03 / SGT02 / PSU02 - digital components

With the digital Shaft copying system Safe-System LES03 / SGT02 / PSU02 from Kübler these mechanical components are replaced. This saves time and costs.

The SIL3-certified LES03 sensor detects the position and speed of the elevator car and transmits this data for evaluation. With this safe data, the Safe Gear Trigger SGT02 takes over the traditional functions of an overspeed governor. The Safe system triggers the release of the electromechanical safety gear. In addition to the triggering, this is also monitored and can be reset.

The SIL3-certified evaluation unit (Position Supervisor Unit) PSU02 processes the sensor data for the implementation of numerous elevator and safety functions according to EN 81-20/21/50.

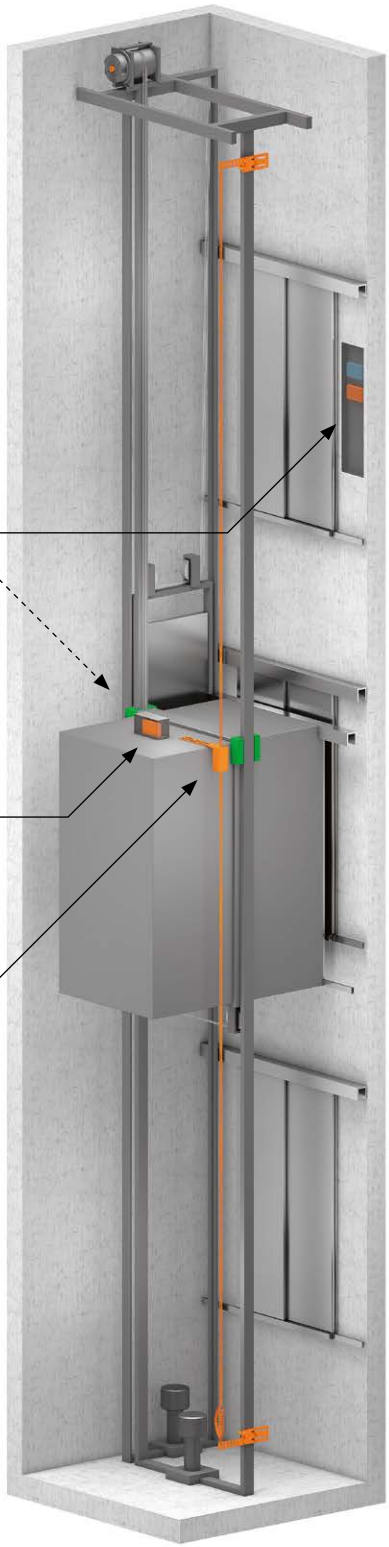


Kübler evaluation unit PSU02
(in the switch cabinet)

(alternatively at the elevator car)

Kübler Safety Gear Trigger SGT02

Kübler sensor LES03

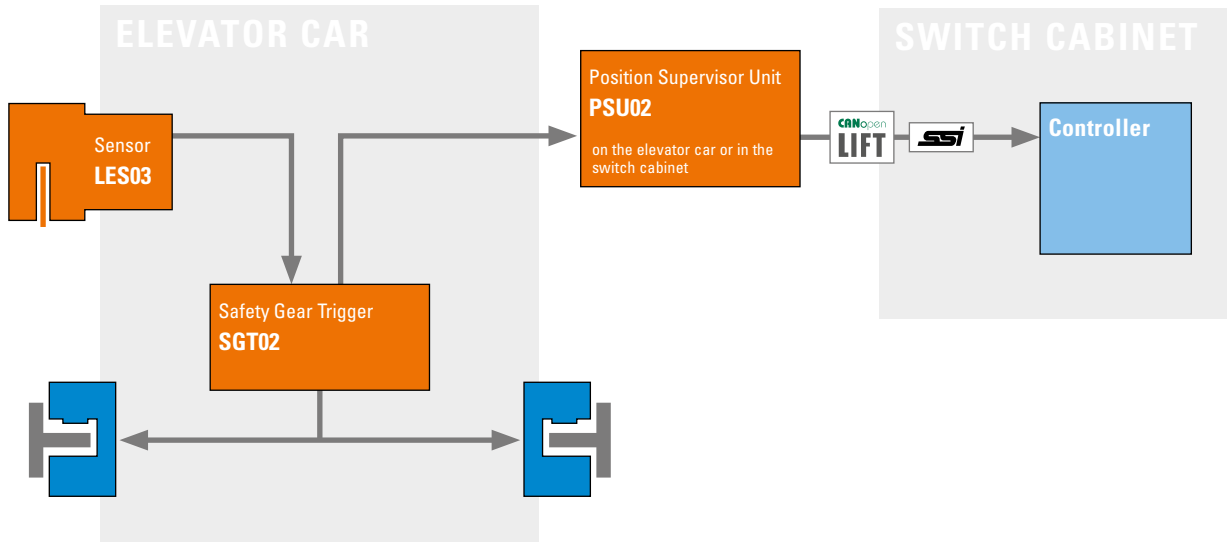


This allows functions such as emergency limit switches, delay control, door override or inspection switches to be implemented in the case of a shortened shaft head or shaft pit in accordance with EN 81-21.
The avoidance of unintentional car movements (UCM) as well as the installation of refuge spaces for assembly and maintenance are also possible.

Safe-System | **LES03 / SGT02 / PSU02** | **Safety functions with electronic overspeed governor**

Technology in detail

Safe-System LES03 / SGT02 / PSU02 – Integration in the elevator system

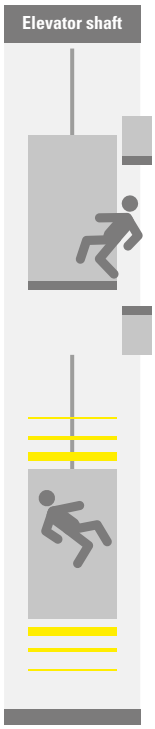


Use cases triggering electromechanical safety gear

Refuge space installation (Shield Mode)

Shield Mode Installation ensures a refuge space for the employees even before the elevator is put into operation.
During scaffoldless installation, such as rail fastening, a refuge space is created sequentially according to the progress of the installation. Depending on the position, the car is secured with a tolerance of ± 5 cm.

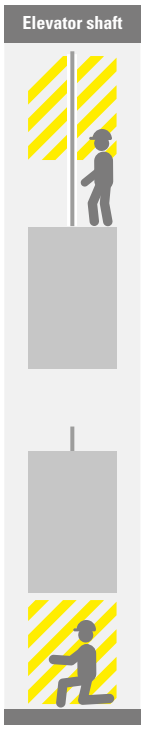
Safety functions operation



UCM (Unintended Car Movement)
If the car leaves unintended a defined door zone with open doors the safety circuit will be open respectively the electromechanical safety gear will be triggered.

Overspeed
Elimination of the mechanical overspeed governor: In case of overspeed the safety circuit will be open respectively the electromechanical safety gear will be triggered by the Kübler Safe System.

Refuge space maintenance (Shield Mode)



Before entering the shaft with reduced shaft head / pit acc. to EN 81-21, the **Shield Mode Maintenance** will be activated via the door release. A refuge space that enables safe working for the maintenance employees is created.

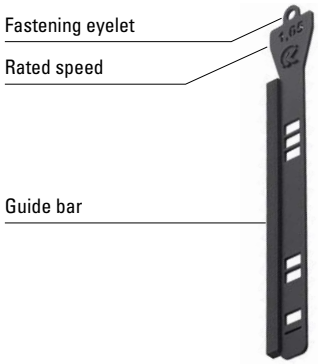
A protective space that enables safe working for maintenance personnel is automatically established based on the highest or lowest position approached.
- Acoustic warning signal from 1.9 m
- Pre-triggering at 1.4 m (safety circuit opens for 3 s)
- Triggering at 1.3 m (catch)

Safe-System | **LES03 / SGT02 / PSU02** | **Safety functions with electronic overspeed governor**

Technology in detail

Teach-in of the rated speed via configuration strips

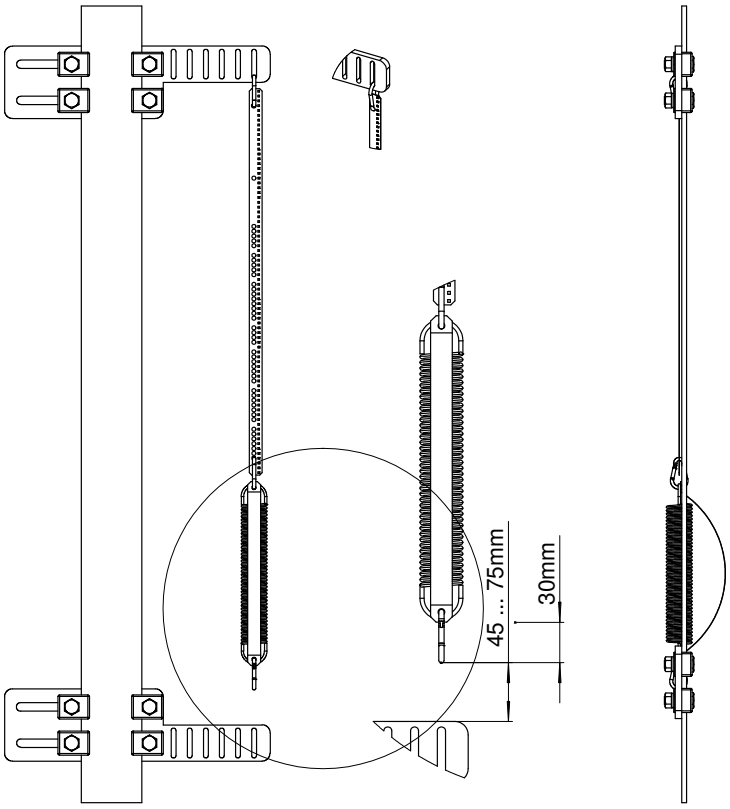
The configuration strip for the respective rated speed is inserted into the LES03 sensor during commissioning. An LED visualizes the respective taught-in rated speed with a flashing pattern. In this way, the certifying agency can also validate the configuration at any time.



Corresponding configuration strips are available for different rated speeds.

Can be assembled into sets by means of fastening eyelet

Coded band fastening with Mounting Kit LES.MK



Safe-System	LES03 / SGT02 / PSU02	Safety functions with electronic overspeed governor

Order code Sensor

8.LES03 . X 1 1 X . 11 1 1 . 0000
Type (a) (b)(c) (d) (e)

To the data sheet >

a *Type of mounting*
1 = with mounting plate
2 = without mounting plate (T-slot mounting)

b *Interface / supply voltage*
1 = CAN / 10 ... 30 V

c *Type of connection*
1 = cable, 3 m [9.84'], open cable end
A = cable, special lengths, shielded, open cable end *)

*) Special lengths on request: 5 m, 7 m, 10 m
order code expansion .XXXX = length in dm
ex.: 8.LES03.111A.1111.**0050** (for cable length 5 m)

d *Interface profile*
11 = CAN (1-channel), proprietary

e *Rated speed of the elevator system*
1 = not preset
The rated speed must be taught in once with the „Configuration strip“.
The speed for the installation mode is preset with 0.3 m/s.

Order code Configuration strip

8.CS . 1111 . XXXX
Type (a)

To the data sheet >

a *Rated speed*
XXXX = cm/s

Ex.: 8.CS.1111.0160 (for 1.6 m/s)

Order code Coded band, absolute

8.LEX.BA . XXXX
Type (a)

a *Measuring lengths*
XXXX = lengths in meters
(max. length = 392 m)

Standard lengths

0010 = 10 m	0030 = 30 m	0070 = 70 m	0392 = 392 m
0015 = 15 m	0040 = 40 m	0080 = 80 m	Intermediate lengths < 100 m
0020 = 20 m	0050 = 50 m	0090 = 90 m	as from 5 pieces,
0025 = 25 m	0060 = 60 m	0100 = 100 m	> 100 m on request

Stock types

0010 = 10 m	0030 = 30 m
0015 = 15 m	0040 = 40 m
0020 = 20 m	0392 = 392 m
0025 = 25 m	

Mounting kit LES.MK

8.LES.MK.0001

To the data sheet >

Mounting kit for sensor Ants LES03

Order code SGT02

8.SGT02 . 1 X 1 X . 11 1 X
Type (b) (d) (g)

To the data sheet >

b *Version electromechanical safety gear*
1 = with electrical reset
2 = without electrical reset

d *Combination* *(Dependence on the internal CAN bus termination of the SGT02)*
1 = Combinable with LES03
2 = Combinable with LES03 and PSU02

g *Electromechanical brake (see table)*
1 = Type 1
2 = Type 2
3 = Type 3

Manufacturer	Product	Order code
Dynatech	eASG - 65 UD	**8.SGT02.111X.1111**
	eASG - 100 UD	
	eASG - 120 UD	
	eASG - 121 UD	
	eASG - 221 UD	
Wittur	ESG-17BS	**8.SGT02.121X.1112**
	ESG-25BS	
	ESG-25U	
Cobianchi	PC13GALEA	**8.SGT02.111X.1113**
	PC24GALEA	
	PC13GAREA	
	PC24GAREA	

Order code PSU02

8.PSU02 . 1121 . 2211
Typ

To the data sheet >

Evaluation unit for DIN rail mounting

Supply voltage 24 V / CANopen Lift, DS417 V2.2.8

Accessories		Order no.
EMC - Shield terminal	For an EMC-compliant installation of the cable	**8.0000.4G06.0312**