Installation and maintenance
M10054-02

SIDEOS Box 2

SPEED MONITORING UNIT

**Adapted to
interfaces up to**

PL=e / CATEGORY 4

according to ISO/IEC 13849-1

SUMMARY

Non contractual photographs.
Instructions of this manual must be adhered to, to obtain the performance and the safety of operation of the equipment.

Encoder and limit switch 51 questionnaire	No. Q01390-01	Limit switch 51 - Stromag		13/05/16	1/17
Dimensions limit switch 51	No. T10003-01	Catalog	No. D142		
		Installation and maintenance	No. 151-00004	**M10054-02-A**	
Installation and maintenance SIDEOS One	No. M10054-01	EMC	No. 900-00001		

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NOTES AND SYMBOLS

According to EC regulations, we use, facing some paragraphs, symbols defining hazards and informing the user about the consequences of not following the instructions of this installation and maintenance leaflet.

DANGER!

This symbol concerns people's safety. It points out situations which could lead to death or serious injuries.

ATTENTION!

This symbol concerns the use of the equipment. It points out situations which could lead to a dysfunctioning of the equipment.

NOTE!

This symbol concerns information which can ease the installation and the use of the equipment.

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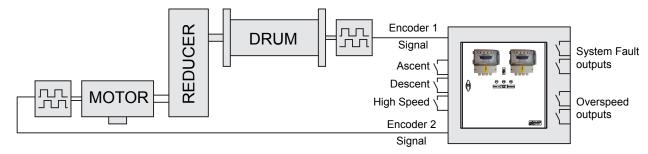|					
Encoder and limit switch 51 questionnaire	No. Q01390-01	Limit switch 51 - Stromag		13/05/16	2/17
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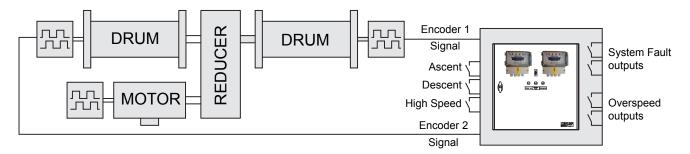# SIDEOS Box 2 — Installation and maintenance

1 - PRESENTATION

The **SIDEOS Box 2** unit is a secure **monitoring system of the speed**. It includes 2 SIDEOS One to comply with the diagram below.

Configuration 1 : Drum / Motor

Configuration 2 : Drum / Drum

The **SIDEOS Box 2** unit monitors :

> the speed,
> the stop,
> the rotation direction,
> the kinematic linkage,
> the signals of the incremental encoder,
> the external speed signal 0-20mA ,
> the contacts of Ascent / Descent / HS-LS (High Speed - Low Speed) control,
> the system fault and overspeed outputs and the taking into account by the customer PLC.

It allows to obtain, when installation is correct, a speed monitoring system secured up to the **category 4 with the performance level of PL= e according to the standard ISO/IEC 13849-1**. (see diagram examples in ch.4)

It provides :

> 2 secured outputs : System Fault
> 2 secured outputs : Overspeed
> 1 information output : System Fault
> 1 information output : Overspeed

It receives :

> 2 speed information (incremental encoders).
> Hoisting control information : Ascent - Descent - High Speed - Low speed
> 2 loop feedback of the secured outputs : System Fault
> 2 loop feedback of the secured outputs : Overspeed
> 2 selection inputs of the functions : Dynamic Slipping or Kinematic Linkage breaking

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2 - OUTPUTS CONTACTS USE

2-1 Use of overspeed outputs

Triggering of the secured contacts outputs : Overspeed C4 (terminals : 25-26) and C5 (terminals : 27-28), indicates an emergency situation and must drive, directly or via a safety relay, the redundant contactors of the safety brakes supply (mechanical stop of type 0).

See diagram examples on chapter : 4.

The information output : Overspeed C6 (terminals : 29-30) can be used to give triggering information signal to the customer PLC, the stop control being processed otherwise via the secured Overspeed contacts.

2-2 Use of System Fault outputs

Triggering of the secured outputs : System fault C1 (terminals: 19-20) and C2 (terminals : 21-22), indicates an operation fault of the monitoring system :

Those signals must be processed in order to maintain the machinery in a safe state.

> Mechanical stop (stop of type 0): the secured contacts outputs must drive directly or via a safety relay the redundant contactors of the service brakes supply.

> Electrical stop (stop of type 1) : the secured contacts outputs must drive the electrical stop of the hoidting motion, the customer PLC giving back the signal that the System Fault information is taken into account by 2 loops feedbacks.

See diagram examples on chapter : 4.

The information output System Fault C3 (terminals : 23-24) can be used to give the triggering information signal to the customer PLC, the stop control being processed otherwise via the secured Overspeed contacts.

Restart :

As indicated in the diagram examples in ch.4, restart of SIDEOS Box 2 (reset) must not restart the installation, but only allows the restart of the machinery from a control position with good visibility of the hazardous area.

Periodical checking :

When activation of **SIDEOS Box 2** outputs is not frequent (hoisting normal application), a procedure of switching off / switching on of the **SIDEOS Box 2** must be defined by the integrator of the SIDEOS One system, to carry out periodically the automatic and global TEST of the **SIDEOS box 2** unit.

3 - INPUTS CONTACTS CHARACTERISTICS

> **Ascent order** (terminals 13-14)
Ascent contact is closed during a hoisting Ascent working order.

> **Descent order** (terminals 15-16)
Descent contact is closed during a hoisting Descent working order.

> **High Speed order** (terminals 17-18)
High Speed contact is closed during a hoisting High Speed working order.

ATTENTION !

The High Speed connection cable is imperatively shielded to avoid the risk of short-circuit in the connection cable.

Otherwise, connect the High Speed contact between terminals 15 and 18, and this contact must imperatively be open (Low Speed order) when a Hoisting Stop order is present (Ascent and Descent order absent).

> **Loop feedback : System Fault** (terminals 31-32 + 33-34)

- Output contacts C1 and C2 are used to drive directly 2 internal relays of the customer PLC, which contacts drive a mechanical stop through the service brakes or an electrical stop through the controller.

- A NC contact of each of these relays is inserted in the respective System Fault feedback loop. Those contacts must imperatively close, when the contacts C1 and C2 open, to indicate a System Fault. This allows to the **SIDEOS Box 2** to check the opening of the associated relays and the customer PLC taking into account.

- **Reminder of EN ISO 13849-2 standard** :
Short-circuits between conductors are excluded in an electrical enclosure (enclosure and connection must comply with the requirements of CEI/EN 60204-1standard).

- If this exclusion is not possible, it will then be necessary to include a contact indicating the service brakes closing or the electrical stop in each feedback loop.

- In case of C1 and C2 contacts use in an input loop of a safety relay, those loop feedbacks can be shunted.

ATTENTION !

In this case, taking into account of the System Fault triggering by the customer PLC and possible short-circuits in the connection cables of C1 and C2 contacts are no more controlled by the **SIDEOS box 2** unit.

The customer will make sure that all these faults will be detected by its system (for example : safety relay with input loops control).

The achieved performance level will then depend on the performance level achieved by the safety relay.

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> **Overspeed loop feedback terminals 35-36 and 37-38**

- C4 and C5 contacts are used to drive directly 2 contactors inserted on the feed line of the safety brakes.

- The NC contact of each contactor is inserted into the respective overspeed feedback loop. This contact must imperatively close when the C4 et C5 contacts open to indicate an Overspeed, this allowing the **SIDEOS Box 2** to check the opening of the associated contactors.

- In case of a direct use of C4 and C5 contacts in an input loop of a safety relay, these loop feedbacks can be shunted. (see diagram ch. 4-2).

ATTENTION !   🛑 **STOP**

In this case, taking into account of KFS1 and KFS2 contactors triggering and possible short-circuits in the connection cables of C4 and C5 contacts are no more controlled by the **SIDEOS box 2** unit.

The customer will make sure that all these faults will be detected by its system (for example : safety relay with input loops control).

The achieved performance level will then depend on the performance level achieved by the safety relay

> **Dynamic Slipping selection on SIDEOS One N°1 terminals 39-40**

- Terminals 39-40 are dircetly linked to the terminal box to select the Dynamic Slipping on the SIDEOS One N°1.

- TS parameter on the SIDEOS N°1 will be put on CW or CCW according to the rotation direction of the encoder 1 during a Descent order.

- CW = clockwise, watching the encoder axis in front view.

- CCW = counter-clockwise, watching the encoder axis in front view.

> **Dynamic Slipping selection on SIDEOS One N°1 terminals 41-42**

- Terminals 41-42 are dircetly linked to the terminal box to select the Dynamic Slipping on the SIDEOS One N°2

- TS parameter on the SIDEOS N°2 will be put on CW or CCW according to the rotation direction of the encoder 2 during a Descent order.

- CW = clockwise, watching the encoder axis in front view.

- CCW = counter-clockwise, watching the encoder axis in front view.

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4 - EXAMPLES OF APPLICATIONS

4-1 OVERSPEED (mechanical stop) SYSTEM FAULT (electrical stop)

WIRING DIAGRAM

AU = emergency stop
CED = external condition of start-up
CO = brake opening switch
FDC = hoisting limit switch stop
K1 = contactor 1 / System Fault
K2 = contactor 2 / System Fault
K3 = contactor 1 / Overspeed
K4 = contactor 2 / Overspeed
KFS = contactor of safety brake control
KL = contactor of hoisting control

K1 and K2 relays, and K3 and K4 contactors have force-guided contacts according to IEC 609947-5-1 standard. (NO and NC contacts cannot close in the same time).

OVERSPEED :

> Overspeed / secured contacts outputs (C4 and C5) drive directly two redundant contactors (K3 and K4) inserted on the feed line of the safety brakes (Mechanical stop of type 0).

> A NC contact of K3 and K4 contactors is inserted in the respective feedback loop to check the good operation of the contactors.

> If a feedback loop remains open during an overspeed triggering, **SIDEOS box 2** unit triggers a System Fault (Contactor 2 fault). **SIDEOS Box** restart will not be possible before the installation reconditioning.

SYSTEM FAULT :

> System Fault / secured contacts outputs (C1 and C2) drive directly two redundant relays (K1 and K2) of the customer PLC, they are inserted on the hoisting control line and control the hoisting electrical stop

> A NC contact of K1 and K2 relays is inserted in the respective feedback loop to check that the System Fault is taken into account by the customer PLC.

> If a feedback loop remains open during a System Fault triggering, **SIDEOS Box 2** unit triggers a mechanical stop by switching off the contactors K3 and K4. Restart is no allowed before the installation reconditioning.

CATEGORY AND PERFORMANCE LEVEL
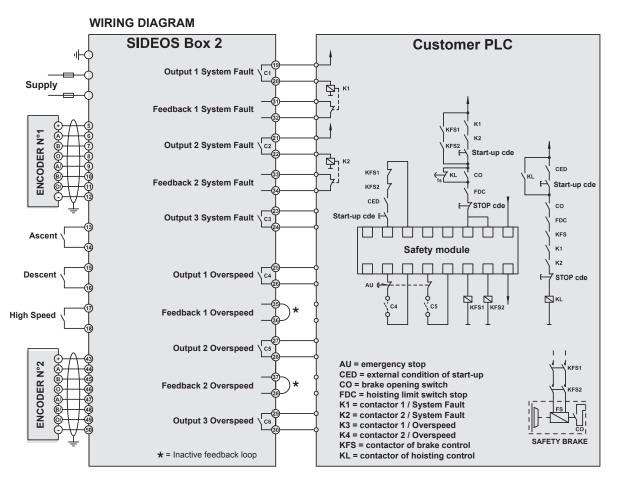**Category 4, and overall performance level obtained : PLe**

4-2 OVERSPEED (mechanical stop) via safety relay and SYSTEM FAULT (electrical stop)

WIRING DIAGRAM

AU = emergency stop
CED = external condition of start-up
CO = brake opening switch
FDC = hoisting limit switch stop
K1 = contactor 1 / System Fault
K2 = contactor 2 / System Fault
K3 = contactor 1 / Overspeed
K4 = contactor 2 / Overspeed
KFS = contactor of brake control
KL = contactor of hoisting control

★ = Inactive feedback loop

K1 and K2 relays, and KFS1 and KFS2 contactors have force-guided contacts according to IEC 609947-5-1 standard. (NO and NC contacts cannot close in the same time).

OVERSPEED :

> Overspeed / secured contacts outputs (C4 and C5) are inserted in the input loops of a safety relay, the contactors KFS1 and KFS2 are inserted on the feed line of the emergency brakes (Mechanical stop of type 0).

> The loops feedbacks are inactive (terminals 35-36 and 37-38 linked), the safety relay checking the input loops and monitoring the contactors KFS1 and KFS2.

SYSTEM FAULT :

> Secured contacts outputs of System Fault (C1 and C2) drive directly two redundant relays (K1 and K2) of the customer PLC, they are inserted on the hoisting control line and drive the hoisting electrical stop.

> A NC contact of K1 and K2 relays is inserted in the respective feedback loop to check that the System Fault is taken into account by the customer PLC.

> If a feedback loop remains open during a System Fault triggering, **SIDEOS Box 2** unit triggers a mechanical stop by switching off the contactors K3 and K4. Restart is no allowed before the installation reconditioning.

CATEGORY AND PERFORMANCE LEVEL

> **Category 3 or4, and overall performance level obtained: PLd or e.**

> Selection of the safety relay and its checkings will determine the achieved performance level.

As indicated in this diagram, connection in series of the emergency stop contacts and the contacts of the **SIDEOS Box 2** unit will limit the category to 3 and the maximal attainable level to PLd.

SIDEOS Box 2   Installation and maintenance

5 - TECHNICAL CHARACTERISTICS

5-1 Electrical connection terminal box   ∗ terminal linked to + 24VDC

Terminals	Function	Characteristics
1 2	Input 115/230VAC 50/60HZ +/-10%	Consumption maxi 60VA – internal protection by fuse - Micro-power cut : 250ms
3 ∗ 4	+ Input 24VDC +/-10% - Input 0VDC	Consumption 25W - internal protection by fuse Micro-power cut : 20ms
5	UB	
6	A+	
7	B+	Type push-pull HTL with inverted signal, no-load consumption maxi = 160mA
8	O+	Supply voltage delivered by SIDEOS One UB/GND = 12V
9	A-	Encoder input 1 Maxi. input frequency et nominal speed = 1000Hz
10	B-	Linkage by standard shielded cable (Length maxi : 250m)
11	O-	Input voltage maxi = 12.5V / mini = 7V
12	GND	
13 ∗ 14	Ascent contact input	Potential-free contact / voltage and breaking current : 24V/120mA
15 ∗ 16	Descent contact input	Potential-free contact / voltage and breaking current : 24V/150mA
17 18	High Speed contact input	Potential-free contact / voltage and breaking current : 24V/60mA
19 20	C1 : Output 1 secured System Fault	Fail-safe NO contact output, the NO contact is maintained closed and opens in case of fault or absence of supply voltage.
21 22	C2 : Output 2 secured System Fault	Breaking capacity Maxi : AC15 : 500VA (230VAC)
23 24	C3 : Output 3 System Fault	DC13 : 50W
25 26	C4 : Output 1 secured Overspeed	Breaking capacity Mini : 50mW (5V/2mA)
27 28	C5 : Output 2 secured Overspeed	The maximum current flowing in the contacts will be limited by a fuse : 2A Using an arc suppressing device at the coil terminals of the output contactor allows
29 30	C6 : Output 3 Overspeed	to ensure the specified lifespan.
31 ∗ 32	Loop feedback 1 System Fault	
33 ∗ 34	Loop feedback 2 System Fault	NC potential-free contact / voltage and breaking current : 24V/30mA
35 ∗ 36	Loop feedback 1 Overspeed	
37 ∗ 38	Loop feedback 2 Overspeed	
39 40	SIDEOS One N°1 Input of dynamic slipping selection	To select the function, link terminals 39-40 and set SIDEOS ONE N°1 parameter TS = CW or CCW
41 42	SIDEOS One N°2 Input of dynamic slipping selection	To select the function, link terminals 41-42 and set SIDEOS ONE N°2 parameter TS = CW or CCW
43	UB	
44	A+	Type push-pull HTL with inverted signal, no-load consumption maxi = 160mA
45	B+	Supply voltage delivered by SIDEOS One UB/GND = 12V
46	O+	Maxi. input frequency et nominal speed = 1000Hz
47	A-	Encoder input 2 Linkage by standard shielded cable (Length maxi : 250m)
48	B-	Input voltage maxi = 12.5V / mini = 7V
49	O-	
50	GND	

We recommend to connect the inputs and outputs contacts of the **SIDEOS Box 2** to the customer PLC with one or several shielded cable(s) to prevent any short-circuits in the connection cables.

Connection on terminals	Wire
Maxi.	6mm² without end ferrule 4mm² with end ferrule.
Mini.	0.5mm² without end ferrule 0.25mm² with end ferrule.
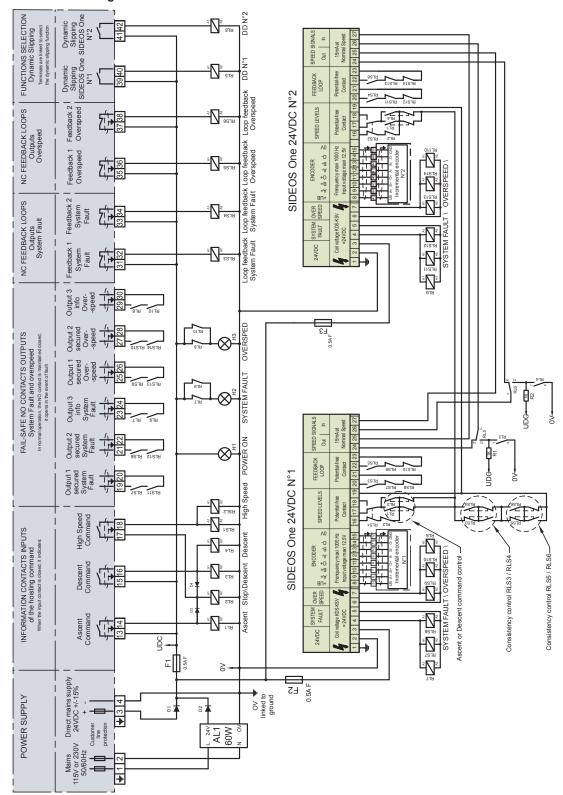
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Encoder and limit switch 51 questionnaire	No. Q01390-01	Limit switch 51 - Stromag	13/05/16 8/17
Dimensions limit switch 51	No. T10003-01	Catalog No. D142	
Installation and maintenance SIDEOS One	No. M10054-01	Installation and maintenance No. 151-00004 EMC No. 900-00001	**M10054-02-A**

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SIDEOS Box 2 — Installation and maintenance

5-2 Electrical diagram

POWER SUPPLY

INFORMATION CONTACTS INPUTS of the hoisting command
When the input contact is closed, it indicates:

FAIL-SAFE NO CONTACTS OUTPUTS System Fault and overspeed
In normal operation, the NO contact is maintained closed, it opens in the event of fault

NC FEEDBACK LOOPS Outputs System Fault

NC FEEDBACK LOOPS Outputs Overspeed

FUNCTIONS SELECTION Dynamic Slipping
Terminals are linked to select the dynamic slipping function

SIDEOS One 24VDC N°1

SIDEOS One 24VDC N°2

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5-3 Encoders selection

a) Electrical characteristics

Supply voltage range = 10…. 30V
Push-pull output with inverted signals
Maxi no-load consumption = 160mA
Standard shielded cable : 0.25 to 0.5mm²
The cable ways and connection should respect the safety
EMC-regulations.

b) SIDEOS One encoder resolution

Encoder	NS = Nominal speed maxi (NC < 60000 / NS) rpm	Rotation control threshold Encoder : RC = On rpm
20	3000	0,6
40	1500	0,3
360	166	0,04
600	100	0,02
1024	58	0,012
1500	40	0,008
3600	16	0,004

c) Option : Encoder frequency divider

If the motor encoder delivers a frequency > 1000Hz without
the possibility to install an other encoder on the motor shaft,
the option of an encoder frequency divider can be selected.

Non contractual photographs.
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SIDEOS Box 2

Installation and maintenance

5-4 Dimensions
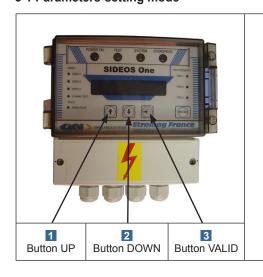
General characteristics

Temperature range	-20°C to + 60°C
Casing material	Steel
Protection rating of the casing	IP66
Impact resistance	IK10
Weight	25Kg
Dimension	600x600x200
Fastening	555x555

6 - INSTALLATION PARAMETERS SETTING

6-1 Parameters-setting mode

1	2	3
Button UP	Button DOWN	Button VALID

1. Unlock the access to the parameters (function Loc) : press simultaneously on 1 and 2 during 3 seconds
2. Briefly press on 3 to access to the parameter-setting mode
3. By means of the buttons 1 and 2 select the parameter to modify
4. Briefly press on 3 to switch to the modification mode
5. By means of the buttons 1 and 2 adjust the parameter as required
6. Press and hold 3 to validate the parameter
7. Repeat steps 3 to 6 to adjust an other parameter
8. To leave the parameter-setting mode and return to the display mode press and hold 3 or wait 5s
9. To leave the modification mode and return to the parameter-setting mode, briefly press on 3 or wait 5s
10. From the display mode to lock the access to the parameters (Loc): press simultaneously on 1 and 2 during 3 seconds

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SIDEOS Box 2   Installation and maintenance

6-2 Parameter-setting according to the selected function (Dynamic Slipping or Kinematic Linkage Breaking) and mounting configuration :

SIDEOS N°1	SIDEOS N°2	Configuration	
		Encoder N°1	**Encoder N°2**
Kinematic linkage breaking	Kinematic linkage breaking	Drum	Drum
		Drum	Motor
Kinematic linkage breaking	Dynamic Slipping	Drum	Motor
Dynamic Slipping	Dynamic Slipping	Drum	Drum

PARAMETERS	KINEMATIC LINKAGE BREAKING Setting	DYNAMIC SLIPPING Setting
VER	N/A	
CL	French / English	
NC	Pulses number / encoder N°1	Pulses number / encoder N°2
NS	Nominal speed detected by encoder N°1 in rpm	Nominal speed detected by encoder N°2 in rpm
DT	Deceleration time of the installation to pass from the nominal speed to the stop	
VS	Necessary number of encoder pulses to confirm the overspeed output triggering	
SP1	0	
SP2	Hoisting Low Speed detected by encoder N°1 +10% (rpm)	Hoisting Low Speed detected by encoder N°2 +10% (rpm)
SP3	Hoisting High Speed detected by encoder N°1 +10% (rpm)	Hoisting High Speed detected by encoder N°2 +10% (rpm)
RC	Off : Inactive	Off : Inactive
DS	10 %	0%
TS	Speed : Input of a speed signal.	CW : Encoder rotation = clockwise CCW : Encoder rotation = counter-clockwise

PARAMETERS	DETAILS FOR SETTING
NC	The selected encoder will deliver a frequency < 1000Hz at nominal speed otherwise the option of encoder frequency divider will be selected.
VS	The corresponding angle of the configured pulses number will be > mechanical clearance The validation angle will be = VS x (360/NC) (Slipping). The validation time will be = (60xVS) / (NC x Triggering speed)
SP2	Will be = SP3 if no hoisting Low Speed, KGV input will not be wired
RC	Will be set on ON if the 2 SIDEOS One monitor the Dynamic Slipping The minimum speed allowed during a Start order will be > 0.2Hz at the encoder
DS	Setting of the maximum speed difference in % of the nominal speed (NS) for the Kinematic Linkage Breaking function
CW/CCW	Rotation direction by watching the encoder axis from the front during the hoisting descent

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SIDEOS Box 2   Installation and maintenance

7 - START-UP PROCEDURE

> Switch on the **SIDEOS Box 2**.
> The 2 internal **SIDEOS One** launch automatically an AUTOTEST or actuate the RESTART button (Actuated during 1s).
> Check the autotest result on each **SIDEOS One** :

TEST FAULT
- Light : Test (red)
- LCD display :
  Autotest Fault ➜ Feedback loop open
                   (31-32 / 33-34 / 35-36 / 37-38).
- Correct the fault and launch again the test with the RESTART button (Actuated during 1s).

TEST OK and System Fault
- Light : Test (Green) and System Fault (Orange).
- LCD display :
  Encoder fault 1 ➜ encoder supply short-circuit
  Encoder fault 2 ➜ encoder not connected or encoder wiring fault
  Speed contact fault ➜ wiring fault or wrong speed contacts information (ch. 2-2).
- Correct the fault and launch again the test with the RESTART button (Actuated during 1s).

TEST OK
- Light : Test (green).
- LCD display : Parameter SPx active
  ➜ Connections are correct
  ➜ Set the **SIDEOS One** parameters - see ch.6
  ➜ Check the command operation and the setting by following the instructions below :

HOISTING WITH MONITORING OF 3 SPEED THRESHOLDS				
Step	**Point to check**	**Command**	**Possible fault**	**Causes**
1	Normal operation and accordance of the speed read on the LCD display with the required speed	HS (High Speed) speed active : make lifting operate at nominal and minimum speed in ascent then if the dynamic slipping function is active make lifting operate in descent.	Different speed	Customer data mistake or parameter-setting mistake : NC
			zero speed	Coupling not mounted or untighten (encoder 3 fault if function RC=On)
			Overspeed	Parameter-setting mistake NC Parameter-setting mistake : SPx Speed control mistake Wrong alignment of the encoder coupling Wrong parameter-setting of the variable speed drive
			Diff speed	Parameter-setting mistake, NS, DS Parameter-setting mistake of the external speed signal
			Dynamic Slipping	Parameter-setting mistake, CW, CCW External signal mistake
			Speed contact fault	Command mistake : See speed contact input
			Encoder 3 fault	Parameter-setting mistake of the variable speed drive : F mini motor too low
2		LS (Low Speed) speed active : make the lifting operate at nominal and minimum speed	Different speed	Customer data mistake
			Overspeed	Parameter-setting mistake : DT too short relatively to the real deceleration ramp Parameter-setting mistake : SPx Speed control mistake Wrong alignment of the encoder coupling
			Speed contact fault	Command mistake : See speed contact input
3		Stop the lifting	Static Slipping	Parameter-setting mistake : DT too short relatively to the real deceleration ramp Parameter-setting mistake : VS too low relatively to the mechanical slacks

➔ Check of triggering and reaction mode of the PLC for each SIDEOS One :

SIDEOS function	SIDEOS modification	Hoisting control	Action expected from the customer
System Fault	Disconnect a wire on the encoder input		
Overspeed	Decrease the active parameter SPx		
Differential speed if parameter setting	Disconnect the wire A on the encoder input of the other SIDEOS One	Make hoisting operate to the nominal speed	Check that the customer PLC reaction is in conformity for ex : closing of the emergency brakes.
Static slipping	Disconnect the Descent command and make hoisting operate in Descent mode.		
Dynamic slipping if parameter setting	Reverse the parameter-setting CW / CCW		

After each test restore the **SIDEOS One** in its previous configuration, make a RESTART and proceed with the following test.

8 - DIAGNOSIS

The following indicators provide access to diagnosis information
for a quick troubleshooting of your application :
LED lights and LCD display are placed on the front of the **SIDEOS One**

When the correct voltage is applied, the LEDs POWER ON light up.

When a **SIDEOS One** makes an Autotest :
- The LED TEST flashes Orange.
- Contacts C1-C2-C3-C4-C5-C6 are open.
- The LCD display indicates Autotest.

When a **SIDEOS One** validated its Autotest :
- The LED TEST lights up in green.
- Contacts C1-C2-C3-C4-C5-C6 are closed.
- The LCD display indicates the active speed parameter and its value.

When a Test Fault occurs :
- The LED TEST lights up in red.
- Contacts C1-C2-C3-C4-C5-C6 remain open.
- The LCD display indicates a Autotest Fault

When a System Fault occurs :
- The LED SYSTEM FAULT lights up.
- Contacts C1-C2-C3 open
- The LCD display indicates the Fault which caused the triggering.

When an Overspeed occurs :
- The LED OVERSPEED lights up.
- Contacts C4-C5-C6 open
- The LCD display indicates the Overspeed type which caused the triggering.

Encoder and limit switch 51 questionnaire	No. Q01390-01	Limit switch 51 - Stromag		13/05/16	14/17
Dimensions limit switch 51	No. T10003-01	Catalog	No. D142		
		Installation and maintenance	No. 151-00004	**M10054-02-A**	
Installation and maintenance SIDEOS One	No. M10054-01	EMC	No. 900-00001		

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For each SIDEOS One :

MISTAKES OF INSTALLATION OR APPLICATION					○ : Light off	🟢🟠🔴 : Light on	
LCD display	POWER ON	TEST	SYSTEM	OVER-SPEED	Mistake types	Possible causes	Solutions
	○	○	○	○	no 24VDC supply on terminals 2 and 3 of the SIDEOS One	Lack of mains voltage	Check the wiring, the mains voltage and correct the fault. Restart the **SIDEOS One**.
						Mains Protection Triggering : Fuse F2- F3 out of order	
						Internal supply failure	Return the **SIDEOS One** for repair
Encoder 1 Fault	🟢	○/🟢	🟠	○	Encoder supply short-circuit	External fault of wiring : Short-circuit 1of terminal UB to ground (OV)	Check the wiring and correct the fault. Restart the **SIDEOS One**.
						Encoder internal fault	Replace the encoder
Encoder 2 Fault	🟢	○/🟢	🟠	○	Encoder signals fault	External fault of wiring : Short-circuit - cut wire - wire wrongly connected on terminals 9 to 14	Check the wiring and correct the fault. Restart the **SIDEOS One.**
						Encoder internal fault	Replace the encoder
Encoder 3 Fault	🟢	○/🟢	🟠	○	Encoder rotation fault	Encoder coupling fault	Check the encoder coupling
						mini speed during operation at speed 2 or speed 3 < 0.2Hz (encoder)	Modification of the parameter-setting of the variable speed drive
Speed contact fault	🟢	○/🟢	🟠	○	Wrong speed information	Control fault. Ascent and Descent information overlap. High Speed order in stop position. Discrepancy of relays RLS3/RLS4 or RLS5/RLS6. Relays RL1-RL2-RL3 or RL4 stuck	Check the wiring. Check the relays operation. Correct the fault. Restart the **SIDEOS One**.
Contactor fault	🟢	○/🟢	🟠	○/🔴	Mistake in a feedback loop	During a triggering System Fault or Overspeed, the feedback loop remains open	Check the feedback loops wiring. Check the wiring of KDS (4-5). Check the relays : RLS7-8-9-10-11-12-13-14. Restart the **SIDEOS One**.
Autotest fault	🟢	🔴	🟠	🔴		During the test or a reset demand, the feedback loop remains open	
Overspeed 2 (Low Speed) Overspeed 3 (High Speed) Diff speed Static Slipping Dynamic slipping	🟢	○/🟢	○	🔴	Overspeed	Real Overspeed, see procedure of start-up to know the causes of wrong detection.	Check the parameter-setting. Check the encoder mounting. Check the variable speed drive

After carrying out all the indicated checkings, restart the SIDEOS One, if the fault persists consult us.

SIDEOS One INTERNAL FAULT							
Internal fault	🟢	○/🟢	🟠	○	Internal signals fault	Overspeed function internal fault	Restart and check the programming of the **SIDEOS One.** If the fault comes back, return the **SIDEOS One** for repair
Autotest fault	🟢	🔴	🟠	🔴	Internal signals fault	Welding, short-circuit, faulty internal component.	

Non contractual photographs.
Instructions of this manual must be adhered to, to obtain the performance and the safety of operation of the equipment.

Encoder and limit switch 51 questionnaire	No. Q01390-01	Limit switch 51 - Stromag		13/05/16	15/17
Dimensions limit switch 51	No. T10003-01	Catalog	No. D142		
		Installation and maintenance	No. 151-00004	**M10054-02-A**	
Installation and maintenance SIDEOS One	No. M10054-01	EMC	No. 900-00001		

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SIDEOS Box 2

Installation and maintenance

9 - STARTING-UP REPORT

APPLICATION……………………….............. CRANE N° ……………………......…. Place :……………...................

SIDEOS Box 2   N° …………….   LIMIT SWITCH 51   Type :...………….................................... N° ……………

SIDEOS One PARAMETERS SETTING see ch.8					
Customer data			**SIDEOS One parameters**		
Number of encoder pulses		pulses	NC =		pulses
Nominal speed		rpm	NS =		rpm
Deceleration time		s	DT =		s
Mechanical slacks		°	VS =		pulses
Speed 1		rpm	SP1 =		rpm
Speed 2		rpm	SP2 =		rpm
Speed 3		rpm	SP3 =		rpm
Encoder rotation checking		Y/N	RC =		
% Differential speed		%	DS =		%
Differential speed		Y/N	TS =		
Dynamic slipping		Y/N			

Reminder :
The frequency provided by the encoder at nominal speed of the machinery must be lower than 1000Hz.

ELECTRICAL CONNECTION	OK
Protection and connection of mains input	
Mounting and connection of the encoder	
Speed contact	
Connection of the feedback loop : NC contact	
Periodic test	

ACTION OF THE OUTPUT CONTACTS TOWARDS ➔					
	Alarm	**Electrical Stop**	**Service brakes**	**Emergency brakes**	**Connection**
System Fault					**Required**
Overspeed	**Forbidden**	**Forbidden**			**Required**

STARTING UP	OK
Autotest	
Lifting operation without fault	
System fault triggering : Encoder fault	
System fault triggering : Speed contact fault	
System Fault triggering : Contactor 1 and 2 fault	
Overspeed triggering	
Differential Speed triggering	
Static Slipping triggering	
Dynamic Slipping triggering	

TEST made by : …………………………………...……………., on …………………… Signature :

⚠

13/05/16   16/17

M10054-02-A

10 - GUARANTEE, LIABILITY, TECHNICAL ASSISTANCE

Obtaining the installation safety level targeted by the designer, is conditioned by a correct integration of the **SIDEOS One** in the control system.

For this, it is necessary to take into account the operating characteristics of the **SIDEOS One**, described in this leaflet and in the leaflets quoted below, at the design stage in order to ensure the compatibility of the characteristics, connections, parameters of the others components of the control chain such as the frequency converter, the controller, …

It is important to check that the assumptions used for the selection stated in the commercial offer match the real operating conditions of the crane.

Installation, start-up and maintenance will imperatively be carried out by skilled personnel, reading and understanding the recommendations of the GKN Stromag leaflets and documentation.

GKN Stromag France remains at the disposal of their customers for assistance provision during start-up. Contact your GKN Stromag sales representative.

Although we provide assistance for the applications, in an individual way or in our literature, it is the responsability of the customer to determine the suitability of the product for the application.

Specifications can change at any time and without previous notice. Information we provide is presumed to be accurate and reliable at the time of publication. However, we decline all responsability for its use.

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Dimensions limit switch 51	No. T10003-01	Catalog	No. D142		
		Installation and maintenance	No. 151-00004	**M10054-02-A**	
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