

## 1. Function and Configuration

Roller or Lift gates are frequently installed in safety fences. They allow a regular or individual access to production plants, which may be necessary for the inserting or removal of work pieces. If the roller gate is not completely closed, it has to be guaranteed that the plant operator cannot be endangered.

Safety switches, which are integrated into the safety chain of the plant control, serve for recognising the safe position (gate closed). Independently of it further position switches are used, which control the movement of the gate and detect its position.

The advantages of non-contact transponder-based safety switches (insensitivity to dirt, mechanical adjustment, manipulation etc.) can also be used for recognising and controlling the gate position. This special type of SIDENT/IV does not only monitor the "safe" position of the gate; it is further able to detect and to report a total of fife positions (end positions, switching the speed from slow to fast and from fast to slow).
The SIDENT/IV is mounted at a suitable place of the gate (e.g. laterally the gate) so that it can detect the actuating element which is mounted at the gate or integrated into the gate itself. A specific code is assigned to each of the five actuating elements ("safe" end position, two or three changeover positions and one not safety-related end position).
On basis of this specific code SIDENT/IV is able to recognise which actuating element is in the reading range at the moment.

All electronic components of the safety switch are fitted in just one sensor housing. Connectors are used for the connection. Three LEDs indicate the present status of the "safe" part (red for "no transponder recognised" and/or "error" and $2 \times$ green for "transponder recognised"), four further LEDs indicate the present position.
The (two-channel) evaluation electronics of the safety-related part is electrically isolated from that part of the switch, which only controls the movement, so that no reaction is possible. Only the reading head, which is turned towards the actuating elements, is common to both systems.

## 2. Versions

### 2.1 SIDENT/IV for 4 Positions

(Ref. no. 13.14-47)
The safety-related position (gate closed) as well as position 1 of the not safety-related part are identical. This means, that the safety-related outputs and one not safety-related output respond to one and the same actuating element.

### 2.2 SIDENT/IV for 5 Positions

(Ref. no. 13.14-47-100)
The safety-related position (gate closed) is not identical to any of the not safety-related positions. The switch-off and switching points are independent of the safe position (gate closed).

### 2.3 SIDENT/IV for 4 Positions with Storage Behaviour (Ref. no. 13.14-47-201)

The safety-related position (gate closed) and position 1 of the not safety-related part are identical. In order to activate the frequency converters directly the positions 2 and 3 are equipped with storage behaviour. When passing position 2 the output A3.2 obtains the status "High" and maintains it until position 1 has been reached. When opening the gate and passing position 3 the output A3.3 obtains the status "High". When position 4 has been reached (upper end position) the output is reset to status "Low" and A3.4 is activated.

### 2.4 SIDENT/IV for 4 Positions with 2 Safe Positions and Storage Behaviour (alternating gate) (Ref. no. 13.14-47-202)

Both safety-related positions (gate closed in front and/or in the back) and position 1 of the not safety-related part are identical. For the direct activation of the frequency converters the switchover position 2 and 3 are equipped with storage behaviour. When passing position 2 the output A3.2 obtains the status "High" and maintains it until position 1 has been reached (gate closed in front). When opening the gate and passing position 3 the output A3.3 obtains the status "High". When reaching position 4 (door closed in back) the output is reset on status "Low" and A3.1 is activated.

## Example of Application with 4 positions:



Conventional Roller Gate Monitoring


Innovative Roller Gate Monitoring


Block diagram of the basic configuration

## 3. System Description

### 3.1 Principle of the SIDENT/IV Safety Switch

The SIDENT/IV safety switch works together with its actuating element SIDENT/B using the identification principle with a 6 -digit safety code which is issued only once. Only one "key", namely the matching SIDENT/B actuating element with its imprinted code, actually fits each "lock" of the SIDENT/IV safety switch.
The safety switch and actuating element work on a noncontact basis. Release is given only when the actuating element is within the response range of the switch and the code number of the actuating element matches that of the switch. At this point, the two green safety-switch indicators (CH1 + CH2) light up. The hysteresis zone is identified by the blinking of the red display (ERR), while the green indicators continue to flash (both outputs remain either connected or disconnected, depending on the direction of the movement, and show the typical hysteresis behaviour). After exit from the hysteresis zone, both green indicators extinguish and a red indicator lights up.

The code numbers in the safety switch undergo a twochannel analysis procedure. The two channels monitor each other on a reciprocal basis. Each channel is provided with one output which features two output transistors. The output is continuously monitored also in a switched condition.
By the monitoring of the outputs a short circuit between output and supply is recognised and a switching-on is prevented. In the event of a ground fault or low voltage at one output, both outputs are switched-off. The presence of such disturbance is verified cyclically. This results in short pulses on the non-faulty channel and, at the same time, constitutes a short-circuit protection during normal operation. A resetting of short-circuit monitoring is not necessary due to the intermittent operation mode.
The evaluation device is typically a safety PLC (programmable logic controller) or an emergency stop relay (e.g. Klaschka type ZSY). It supplies the operating voltage for the safety switch and its two outputs. The supply of the outputs can give short timing signals which allow the PLC to check the connecting lines for circuit breaks and cross circuits (for further details, refer to the technical data of the respective safety PLC). These are tolerated by SIDENT/IV to a large extent and do not impair its safety function. However, we recommend comparing with our compatibility list, which is continuously updated and can be requested on demand.


### 3.2 Response range

In case of parallel and centric alignment of the sensing faces of safety switch and actuating element, the following values apply. If the sensing faces are inclined at an angle of up to $30^{\circ}$ to each other, deviations by $\pm 10 \%$ from the standard values occur.

### 3.3 LEDs

The status of the SIDENT/IV (actuated/non-actuated) and possible error situations can be derived from the LED indication.
Some possibilities are represented below (version with 4 positions):

| Situation | LED CH 1 | LED CH 2 | LED Error | LED A3.1 | LED A3.2 | LED A3.3 | LED A3.4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Normal operation |  |  |  |  |  |  |  |
| Sensor actuated with safe position | on | on | off | on | off | off | off |
| position 2 | off | off | on | off | on | off | off |
| position 3 | off | off | on | off | off | on | off |
| position 4 | off | off | on | off | off | off | on |
| Sensor non-actuated | off | off | on | off | off | off | off |
| Hysteresis zone of the correspon. actuator | on | on | is flashing | on | on | on | on |
| Error situation (corresponding actuator in the response range) |  |  |  |  |  |  |  |
| Channel 1 defective | off | on | on | off | off | off | off |
| Channel 2 defective | on | off | on | off | off | off | off |
| Short circuit Ch. 1* | is flashing | is flashing | on | off | off | off | off |
| Short circuit Ch. $2^{*}$ | is flashing | is flashing | on | off | off | off | off |
| Short circuit A3.1* | on | on | off | is flashing | off | off | off |
| Short circuit A3.2* | off | off | off | off | is flashing | off | off |
| Short circuit A3.3* | off | off | off | off | off | is flashing | off |
| Short circuit A3.4* | off | off | off | off | off | off | is flashing |

* against power supply (L-)

Signal sequence SIDENT/IV, Ref. no. 13.14-47
for 4 positions without storage behaviour


Signal sequence SIDENT/IV, Ref. no. 13.14-47-201
for 4 positions with storage behaviour


Signal sequence SIDENT/IV, Ref. no. 13.14-47-100
for 5 positions without storage behaviour


Signal sequence SIDENT/IV, Ref. no. 13.14-47-202
for 2 safe positions and storage behaviour


## 4. Technical data

| General Technical Data |  |
| :---: | :---: |
| Switching distance, hysteresis | 20 mm*, < 15\% |
| Assured switching off distance | 35 mm |
| Design, housing material | cube $40 \times 40 \times 114 \mathrm{~mm}, \mathrm{KS}$ |
| Installation | non-flush |
| Wiring | plug, 12-poles |
| Max. permitted lead length | 300 m , with/without shield |
| Ambient temperature range | $-30 \ldots+70^{\circ} \mathrm{C}$ |
| Protection rating, weight | IP 67, 300 g |
| Protective insulation 回 | Prot. class II conform IEC 947 |
| Technical Data of Safety-Related Part |  |
| Wiring diagram |  |
| Identification | by a 6-digit numeric code |
| Control category | 4 conform to EN 13849-1 |
| Configuration | 2-channel, reciprocal monitoring |
| Operating voltage range L+ | 15... $24 \ldots 30$ VDC |
| Current consumption | < 90 mA |
| Operating mode | 2 NO |
| Input voltage L1, L2 | 12 ... 24 ... 30 VDC, clockable |
| Output voltage A1, A2 | $\begin{aligned} & \min . \mathrm{U}_{\mathrm{L} 1,2}-3 \mathrm{~V}(400 \mathrm{~mA}) ; \\ & \text { typ. } \mathrm{U}_{\mathrm{L}, 2}-1.75 \mathrm{~V}(100 \mathrm{~mA}) \end{aligned}$ |
| Output current | $<400 \mathrm{~mA}$ per output |
| Actuating time | $>150 \mathrm{~ms}$, typ. 185 ms |
| Drop-out time | $>75 \mathrm{~ms}$, typ. 100 ms |
| Switch-on delay | approx. 2 s |
| Max. operating frequency | 1 Hz |
| Indicators | $2 \times$ identification (green), $1 \times$ fault (red) |
| Rev. polarity, short circuit prot. | installed |


| Technical Data for Position Recognition |  |
| :---: | :---: |
| Ref. no. | 13.14-47-201, 13.14-47-202 |
| Wiring diagram |  |
| Operating voltage range L3+ | $15 . . .24$.. 30 VDC |
| Current consumption | < 45 mA |
| Operating mode | 4 NO |
| Output voltage A3.1 ... A3.4 | typ. U $\mathrm{U}_{\text {L3 }}-1.75 \mathrm{~V}$ (100 mA) |
| Output current | < 400 mA per output |
| Actuating time | typ. 10 ms |
| Drop-out time (pulse prolong.) | typ. 200 ms |
| Storage behaviour | when A3.2 + A3.3 |
| Switch-on delay | approx. 1 s |
| Moving speed | max. $1 \mathrm{~m} / \mathrm{s}$ |
| Indicators | $4 \times$ position (green) |
| Rev. polarity, short circuit prot. | installed |

Table: pinning diagram

|  |  |  |
| :---: | :---: | :---: |
| Pin number | Function | Wire colour |
| 3 | L+ | green |
| 2 | L1 | brown |
| 1 | A1 | white |
| 4 | L2 | yellow |
| 5 | L- | grey |
| 7 | L3+ | pink |
| 8 | A3.1 | blue |
| 9 | A3.2 | red |
| 10 | A3.3 | black |
| 12 | A3.4 | violet |
|  | L3- | grey/pink |

## * Note

- When mounting actuating elements in metallic environment, switching distances may change. Therefore it is strongly recommended to contact the producer.

| Designation | Actuating Element | Actuating Element |
| :---: | :---: | :---: |
| Type | SIDENT/B-22fv20-401 | SIDENT/B-11fs14-401 |
| Ref. no. | 13.14-30 | 13.14-40 |
| Index no. safety position and pos. 1 | -001, yellow | -001, yellow |
| Index no. safety position (spare part) | -002, yellow | -002, yellow |
| Index no. position 1(for 13.14-47-100 only) | -012, grey | -012, grey |
| Index no. position 2 | -022, blue | -022, blue |
| Index no. position 3 | -032, green | -032, green |
| Index no. position 4 | -042, red | -042, red |
| Design, housing material | Cube $22 \times 22 \times 20 \mathrm{~mm}$, KS | Cylinder $\varnothing 10.8 \mathrm{~mm}$, Crastin |
| Installation | non-flush; mounting preferably with one-way screws or by gluing |  |
| Protection rating, weight | IP 67, 13 g | IP 67, 2 g |
| Protective insulation $\square^{\text {a }}$ | Prot. class II conform IEC 947 |  |
| Dimensions |  |  |
| Identification | by a 6-digit numeric code |  |
| Control category | 4 conform to EN 13849-1 |  |
| Configuration | Transponder |  |
| Ambient temperature range | $-30 \ldots+70{ }^{\circ} \mathrm{C}$ |  |


| Designation | Actuating Element | Actuating Element |
| :---: | :---: | :---: |
| Type | SIDENT/B-10fs25-401 | SIDENT/B-6fs12-401 |
| Ref. no. | 13.14-64 | 13.14-66 |
| Index no. safety position and pos. 1 | -001, yellow | -001 |
| Index no. safety position (spare part) | -002, yellow | -002 |
| Index no. position1 (for 13.14-47-100 only) | -012, grey | -012 |
| Index no. position 2 | -022, blue | -022 |
| Index no. position 3 | -032, green | -032 |
| Index no. position 4 | -042, red | -042 |
| Design, housing material | $25 \times 10 \times 3 \mathrm{~mm}, \mathrm{KS}$ | $12.1 \times 5.9 \times 3 \mathrm{~mm}, \mathrm{KS}$ |
| Installation | non-flush; undoable fastening by screws or by glue in order to guarantee manipulation safety |  |
| Protection rating, weight | IP 67, 1 g | IP 67, 0.8 g |
| Protective insulation ${ }^{\text {a }}$ | Prot. class II conform IEC 947 |  |
| Dimensions | thickness 3 mm | thickness 3 mm |
| Identification | by a 6-digit numeric code |  |
| Control category | 4 conform to EN 13849-1 |  |
| Configuration | Transponder |  |
| Ambient temperature range | $-30 \ldots+70^{\circ} \mathrm{C}$ |  |

## Installation Instructions

When the actuating elements are installed in a metallic environment, e.g. in lamellas of roller gates, the switching distance may be reduced. Metal lamellas must therefore be slit within the transponder range. When the actuating elements SIDENT/B-10fs25-4O1 are used, the lamellas must be treated as shown in the diagram. Doing this, the metal-free range has to be observed. The same applies to the actuating elements SIDENT/B-6fs12-4O1.

The mounting in the lamella should take place with a flush rivet or similar device. For this, the holder of the transponder in the rear part can be perforated (see diagram).


## Mounting example:

SIDENT/B-10fs25-4O1

## 5. Accessories

| Designation | Connecting lead |  | Connecting lead |
| :---: | :---: | :---: | :---: |
| Type | VLG 12E/12/X-2 |  | VLG 12E/12/X-3 |
| Ref. no. | 20.18-52 |  | 20.18-55 |
| Housing material | Metal |  |  |
| Protection rating | IP 67 |  |  |
| Protective insulation ${ }^{\text {a }}$ | Prot. class II conform to IEC 947 |  |  |
| Dimensions |  |  |  |
| Connector diagram |  |  |  |
| Connection | 1: white 7: blue <br> 2: brown 8: red <br> 3: green 9: black <br> 4: yellow 10: violet <br> 5: grey 11: grey/pink <br> 6: pink 12: red/blue |  |  |
| Ambient temperature range | $-30 \ldots+70^{\circ} \mathrm{C}$ |  |  |
| Cross section | $12 \times 0.5 \mathrm{~mm}^{2}$ |  |  |
| Wiring | Socket, 12-pole |  |  |
| Contact connection | Solder contacts |  |  |


| Designation | Connector | Connector |
| :---: | :---: | :---: |
| Type | JKYIrZ-O-1 | JKYlaZ-0-2 |
| Ref. no. | 13.99-46 | 13.99-48 |
| Housing material | Metal |  |
| Protection rating | IP 67 |  |
| Protective insulation 回 | Prot. class II conform to IEC 947 |  |
| Dimensions |  |  |
| Connector diagram |  |  |
| Ambient temperature range | $-30 \ldots+70{ }^{\circ} \mathrm{C}$ |  |
| Wiring | Socket, 12-pole |  |
| Contact connection | Crimp contacts |  |

## 6. Proper Use

The purpose of the SIDENT/IV safety switch is to monitor mobile, separating safety devices. These are intended to ensure that dangerous work carried out on or with a machine or plant can only be executed when the safety device is closed.

The SIDENT/IV safety switch can accomplish its task only if it is employed, wired and installed according to the instructions of the manufacturer. In all other respects the relevant requirements and regulations must be kept.

These are inter alia:

- EN 13849-1 - safety-related parts of control devices,
- EN 1088 - locking devices in connection with separating safety devices,
- EN 60204-1 - electrical equipment of machines,
- EN 60947-5-3 - requirements for proximity switches with a defined action under fault conditions.

It is required to carry out a risk evaluation for the machine or plant itself based on the following standards:

- EN 13849-1 - safety-related parts of control devices,
- EN 14121 - safety of machines, risk evaluation.

The described product was developed, produced, inspected and documented under consideration of the relevant safety standards. If you observe the handling regulations and safety instructions concerning projecting, installation, proper use, and maintenance as described in this manual, the SIDENT, in the normal case, neither cause personal injury nor damage to property.

## 7. Dimensions



## 8. Order Data

8.1 Safety Switches for multiple positions

SIDENT/IV-40fv-1111ZI1D
Ref. no. 13.14-47 for four positions,

SIDENT/IV-4Ofv-1111ZI1D
Ref. no. 13.14-47-100
for five independent positions
SIDENT/IV-40fv-1111ZI1D
Ref. no. 13.14-47-201
for four positions,
with storage behaviour
SIDENT/IV-4Ofv-1111ZI1D
Ref. no. 13.14-47-202
for four positions,
with 2 safe positions
and storage behaviour

### 8.2 Actuating Elements

### 8.2.1 Actuating Elements in cubic housing

SIDENT/B-22fv20-401
Ref. no. 13.14-30-001
for safety-related position
and position 1
SIDENT/B-22fv20-4O1
Ref. no. 13.14-30-002
for safety-related position (spare part)

SIDENT/B-22fv20-401
Ref. no. 13.14-30-012
for position 1 (for 13.14-47-100 only)
(grey)
SIDENT/B-22fv20-4O1
Ref. no. 13.14-30-022
for position 2
(blue)
SIDENT/B-22fv20-4O1
Ref. no. 13.14-30-032
(green)
Ref. no. 13.14-30-042
SIDENT/B-22fv20-401
(red)

### 8.2.2 Actuating Elements of minimal size in cylindrical housing

SIDENT/B-11fs14-401
Ref. no. 13.14-40-001
for safety-related position (yellow)

## and position 1

SIDENT/B-11fs14-401
Ref. no. 13.14-40-002
for safety-related position (spare part)
(yellow)

SIDENT/B-11fs14-401
Ref. no. 13.14-40-012
for position 1 (for 13.14-47-100 only)
(grey)
SIDENT/B-11fs14-401
Ref. no. 13.14-40-022
for position 2
(blue)
SIDENT/B-11fs14-401
for position 3
SIDENT/B-11fs14-401
(green)
Ref. no. 13.14-40-042
for position 4

SIDENT/IV
Ref. no. 13.14-47

Safety Switch for the Inquiry of Multiple Positions
(e.g. for Roller/Lift Gates and Windows)

### 8.2.3. Actuating Elements in fork holder

SIDENT/B-10fs25-401
for safety-related position and position 1

SIDENT/B-10fs25-4O1
for safety-related position (spare part)
SIDENT/B-10fs25-401
for position 1 (for 13.14-47-100 only)
Ref. no. 13.14-64-012
(grey)
SIDENT/B-10fs25-401
Ref. no. 13.14-64-022
(blue)
SIDENT/B-10fs25-401
for position 3
Ref. no. 13.14-64-032
(green)
SIDENT/B-10fs25-401
for position 4
Ref. no. 13.14-64-001

Ref. no. 13.14-64-002
(yellow)

### 8.2.4. Actuating Elements without housing

SIDENT/B-6fs12-401
Ref. no. 13.14-66-001
for safety-related position
and position 1
SIDENT/B-6fs12-4O1
Ref. no. 13.14-66-002
for safety-related position
(spare part)
SIDENT/B-6fs12-401
Ref. no. 13.14-66-012
for position 1 (for 13.14-47-100 only)
SIDENT/B-6fs12-4O1
Ref. no. 13.14-66-022
for position 2
SIDENT/B-6fs12-401
Ref. no. 13.14-66-032
for position 3
SIDENT/B-6fs12-4O1
Ref. no. 13.14-66-042
for position 4

### 8.3 Connecting Leads for SIDENT

Please indicate lead length X when placing the order
(standard length $\mathrm{X}=5 \mathrm{~m}$ ).
VLG 12E/12/X-2
Ref. no. 20.18-52
with angled outlet, 12-lines, ( $12 \times 0.5 \mathrm{~mm}^{2}$ ), with Coninvers connector

VLG 12E/12/X-3
Ref. no. 20.18-55
with straight outlet, 12-lines, ( $12 \times 0.5 \mathrm{~mm}^{2}$ ),
with Coninvers connector

### 8.4 Connector

## JKYIrZ-O-1

Ref. no. 13.99-46
Coninvers connector,
coupling, series RC, angled outlet, 12-pole, crimp contacts

JKYIaZ-O-2
Ref. no. 13.99-48

Coninvers connector, coupling, series RC, straight outlet, 12-pole, crimp contacts

### 8.5 Accessories for Increasing the Manipulation Safety

Self-cutting one-way screw
Ref. no. 92.18-20
Flat head tapping screw, $3.5 \times 32 \mathrm{~mm}$,
one-way slot, stainless steel, for fixing the actuating element SIDENT/B-22fv20-4O1

## Self-cutting one way screw

Ref. no. 92.18-21
Flat head tapping screw, $4.8 \times 50 \mathrm{~mm}$, one-way slot, stainless steel, for fixing the safety switch SIDENT on a sheet metal base

One way screw with metrical thread
Ref. no. 92.18-22

Semi-circular head screw, M5 x 35 mm , one-way slot, stainless steel, for fixing the safety switch SIDENT

We are certified according to DIN EN ISO 9001
Subject to changes!

