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safe-t PRODUCTS

Targeting Safety

SAFE-T-TILT



Tested to IP66/69K
CE Conformity

IP RATED 66/69K

PROTECTIVE STOP CONTROL TILT DEVICE

ACTIVATES A PROTECTIVE STOP WHEN EXCESSIVE TILT IS DETECTED IN HARSH INDUSTRIAL APPLICATIONS

This all-in-one solution offers exceptional mechanical resilience, compliance with international safety standards, and field-proven reliability-making it the ideal choice for industrial environments that demand precise tilt detection and instantaneous protective shutdown in critical applications.

Unlike conventional tilt devices that rely on a single switching device, the Safe-T-Tilt integrates Dual IP67 Direct Opening Contacts with linked mechanical function using Safe-T-Products' proprietary technology. This design ensures full compliance as a certified protective stop control device, and offers flexibility with dual contacts in series or separate NO/NC signal outputs, depending on system requirements.

The switching action is activated at approximately 20–30 degrees of tilt. Extensive computer simulations have shown that, in typical chute applications, the device experiences tilt in the range of 70–90 degrees, meaning the direct opening action is engaged well before full tilt occurs—ensuring reliable and timely response.

BUILT FOR HARSH ENVIRONMENTS

The Safe-T-Tilt is specifically designed to withstand the harsh rigours of chute environments, where physical impact and environmental exposure are constant challenges. It is enclosed in a super heavy-duty, electropolished 316 stainless steel tube, featuring a custom-designed protective cap that shields the Ex-rated cable gland. This ensures maximum protection against rogue rock impacts, environmental ingress, and mechanical wear-preserving the functionality and integrity of the device in the field.

PROVEN PERFORMANCE IN REAL-WORLD CONDITIONS

To validate its performance, the Safe-T-Tilt has undergone extensive simulation testing under conditions involving lump iron ore, fines iron ore, and sugar pulp. These simulations have confirmed both the operational effectiveness and optimal mounting positions for the device in real-world material flow scenarios, ensuring consistent and dependable operation.

WHY SAFE-T-TILT STANDS APART

Most traditional tilt switches rely on outdated or non-compliant mechanisms, such as:

- Mercury-style switches, which operate by shifting a pool of liquid mercury to close contacts. These are not direct opening and present a toxic hazard on-site.
- Conventional mechanical tilt switches, which keep a micro switch engaged until tilted, allowing the actuator to move away and break contact. This approach is the opposite of direct opening with linked mechanical function and does not meet protective stop standards.

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TRUE DIRECT OPENING SAFETY WITH LINKED MECHANICAL IP97 DIRECT OPENING MICRO SWITCH FUNCTION

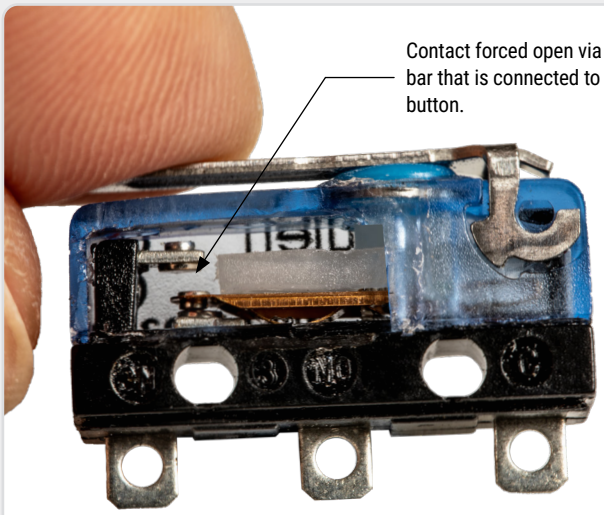
The Safe-T-Tilt features a precision-engineered plunger system that actively forces open the contacts of its direct opening micro switches when tilted. This creates a mechanically linked, fail-safe disconnection, guaranteeing that a true protective stop control function is triggered in the event of hazardous tilt or machine displacement.

COMPLETE KIT FOR EASY INTEGRATION

Each Safe-T-Tilt unit is delivered fully assembled and ready for immediate installation, including:

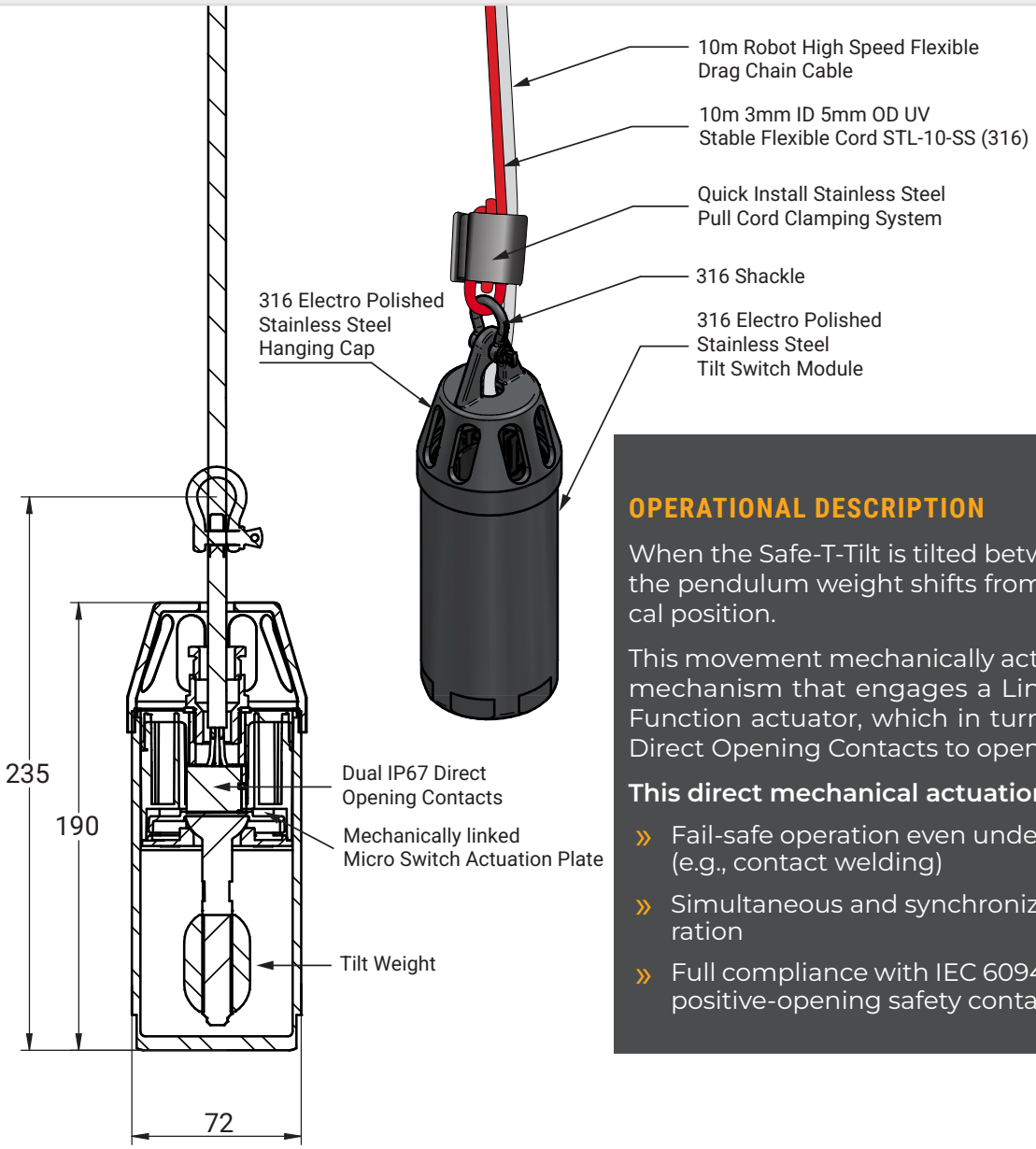
- 1 x Safe-T-Tilt device
- 10 metres of Stainless Steel attachment cable with clamping system
- 10 metres of robot high speed flexible drag chain cable.

DIRECT OPENING MICRO SWITCH



All Safe-T-Products switches use TUV-tested contacts (IEC 60947-5-1) with direct opening action, optimised for low-current control circuits. Shown here is our Mini Micro Switch.

PRODUCT DETAILS



OPERATIONAL DESCRIPTION

When the Safe-T-Tilt is tilted between 20° and 30°, the pendulum weight shifts from its neutral vertical position.

This movement mechanically actuates an internal mechanism that engages a Linked Mechanical Function actuator, which in turn forces the Dual Direct Opening Contacts to open.

This direct mechanical actuation ensures:

- Fail-safe operation even under fault conditions (e.g., contact welding)
- Simultaneous and synchronized contact separation
- Full compliance with IEC 60947-5-1 Annex K for positive-opening safety contacts.

FEATURE: IP 67 DUAL DIRECT OPENING CONTACT WITH LINKED MECHANICAL FUNCTION

Description:

The device is equipped with dual direct opening contacts, ensuring reliable ad fail-safe operation in safety-critical applications. Each contact is mechanically driven to open under actuator force, in full compliance with IEC 60947-5-1 Annex K, ensuring positive mechanical separation-even in the event of contact welding or spring failure.

Key Characteristics:

PARAMETER	SPECIFICATION
Contact Type	Dual NC (Normally Closed) Direct Opening
Standard Compliance	IEC 60947-5-1 Annex K, GS-ET-15, ISO 13850
Mechanical Linkage	Mechanically linked contacts for synchronised operation
Safety Function Category	Suitable for use in Category 1-4 systems (ISO 13849-1)
Performance Level (PL)	PL d/PL e capable depending on system integration
Function	Ensures consistent and complete contact opening on actuation
Redundancy	Dual- channel contact paths for fault tolerance
Application	Emergency stop switches, pull -cord devices, guard interlocks and Protective Stop Controls

Operational Benefits:

- Mechanically enforced contact separation, even under harsh conditions or component failure
- Enhances redundancy and diagnostic capability in safety circuits
- Prevents partial activation due to contact failure
- Fully compliant with international safety standards for machine safety protective stop controls and emergency stops.

Mounting Note:

These contact are pre-fitted within the safety switch mechanism and require no additional configuration during installation.

ELECTRICAL SPECIFICATIONS

IP 67 Safety Micro Switch with Direct Opening Action Specifications

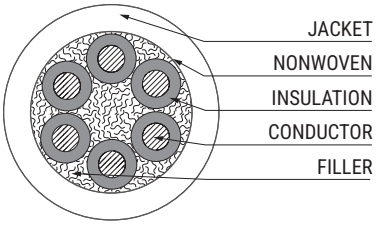
IEC 60947-5-1 Annex K classification	☐ Type 1	☒ Type 2 Direct Opening	
Change-over contact element	☒ C	☐ Za	☐ Zb
Contact material	Ag-Ni		
Utilization category	AC-15	DC-13	
Operational voltage	250 V	60 V	
Operational current	1,5 A	0.5 A	
Frequency	50/60 Hz	---------	
Number of electrical cycles	6050 (6 min-1)		
Number of mechanical cycles	6050 (6 min-1)		
Conventional free air thermal current	10 A		
Conventional enclosed thermal current	---------		
Operating Temperature	-35° C No Icing	+80° C	

Specifications (short-circuit with standability)

Rated conditional short-circuit current	1 000 A
Short circuit protective device	Fuse 6 A gG (IEC 60269-2)

WIRE SPECIFICATION

ROBOT HIGH SPEED FLEXIBLE DRAG CHAIN CABLE TESTED FOR 10 MILLION BENDS

TYPE	6 X 0.75mm2			
TEMP	-40°C~105°C	ENVIRONMENT	ROHS	
RATE	VOLTAGE	300/500V CURRENT 4.5A		
CONDUCTOR	MATERIAL	BARE COPPER		
INSULATION	MATERIAL	NITRILE POLYVINYL CHLORIDE		
	AVERAGE THICKNESS	0.40mm		
	DIAMETER	2.2±0.2mm		
	COLOUR	RED, BLUE, BLACK, GREY, BROWN, ORANGE		
JACKET	MATERIAL	BLACK NITRILE POLYVINYL CHLORIDE		
	AVERAGE THICKNESS	1.2mm		
	DIAMETER	9.3±0.5mm		
SECTION VIEW				
TEST	VOLTAGE	1500V/5MIN	CONDUCTOR RESISTANCE	≤26Ω/Km at 20° C

SAFE-T-TILT SIMULATION REQUIREMENTS

VISUALISING RELIABLE ACTIVATION IN ACTION

This computer simulation demonstrates the Safe-T-Tilt in operation, clearly showing how the device activates during the early stages of a chute blockage when mounted low within the chute and out of the main ore flow.

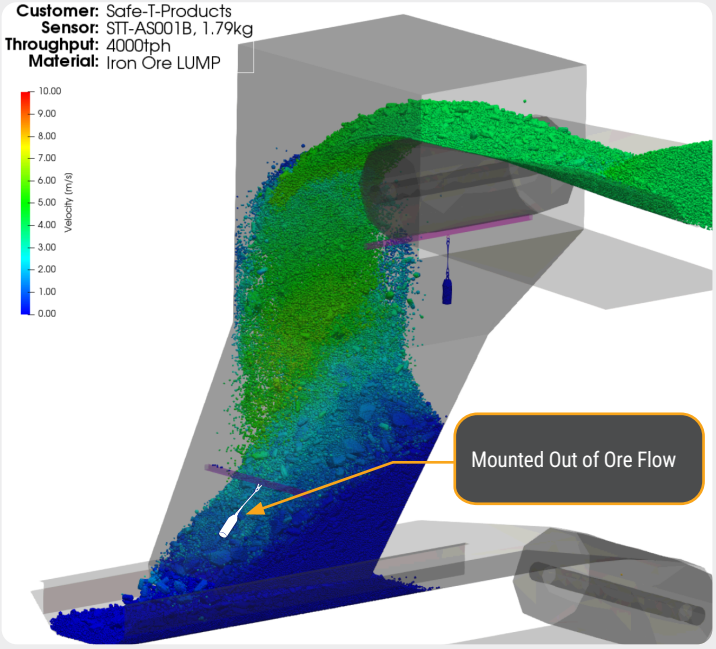
As the simulation illustrates, the Safe-T-Tilt is triggered at a tilt angle of approximately 20–30 degrees—well before the blockage becomes critical. This pre-emptive activation is enabled by Safe-T-Products' proprietary dual direct-opening contact system, which is mechanically linked to deliver a positive, fail-safe response.

In real-world chute conditions, tilt angles can exceed 70–90 degrees during a blockage event. The Safe-T-Tilt responds early, issuing a timely stop signal to help prevent chute overflow and system damage.

This visual confirmation reinforces the Safe-T-Tilt's role as a certified protective stop control device, delivering reliable, early-warning performance exactly when it's needed most.

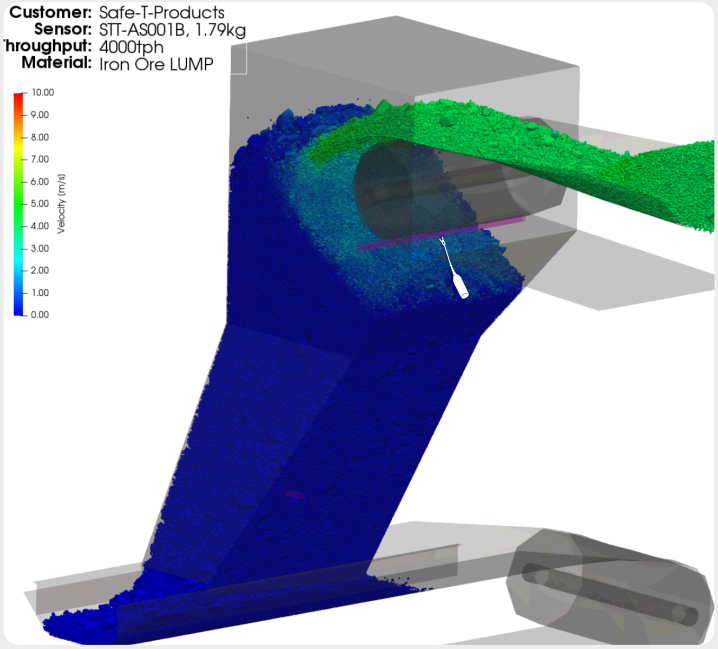
OPTIMAL MOUNTING POSITION-EARLY DETECTION

IRON ORE LUMP

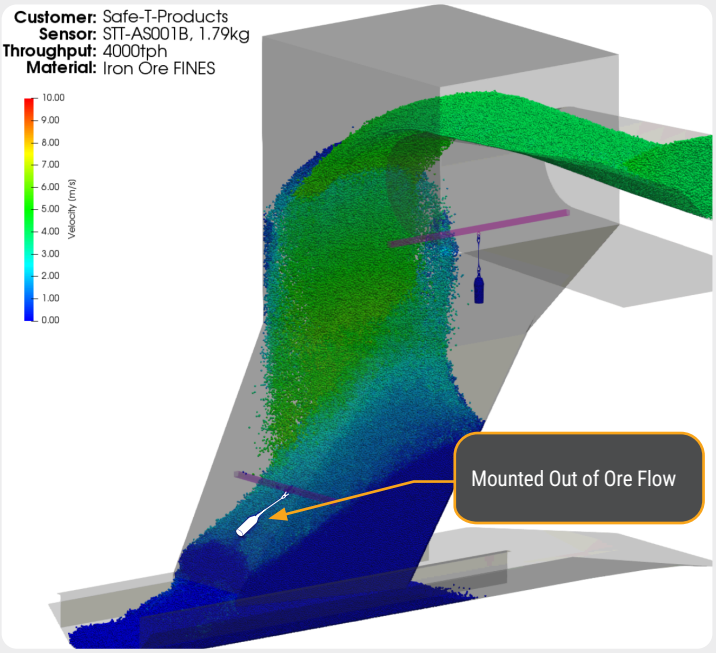


LATE DETECTION POSITION-OVERFLOW MAY OCCUR

IRON ORE LUMP



IRON ORE FINES



IRON ORE FINES

