Safety products
Machine safety – Jokab Safetys products
# Safety products catalog

**ABB Jokab Safety**

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<td>Fence</td>
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ABB Jokab Safety has been helping machine builders to create production-friendly and safe work environments for operators since 1988.

We develop products and solutions for machine safety

We make it simple to build safety systems. Developing products and solutions for machine safety has been our business idea since the company Jokab Safety, now a part of ABB, was founded in Sweden in 1988.

Many industries around the world have discovered how much easier it has become to build protection and safety systems with our components and guidance. Our extensive program of products, safety solutions and our long experience in machine safety makes us a safe partner.

Together we create a safe world!
Products and systems
We deliver machine safety solutions for single machines or entire production lines. Our long experience of helping customers making solutions for demanding environments has made us experts in combining production demands with safety demands for production-friendly solutions.

We market a wide range of safety products, which makes it easy to build safety systems. We develop these intelligent products continuously, in cooperation with our customers.

Our experience of safety requirements and standards
Directives and standards are very important to machine builders and safety component manufacturers. We represent Sweden in several international committees that develop standards, for e.g. industrial robots, safety distances and control system safety features. We work daily with the practical application of safety requirements in combination with production requirements. We are happy to share our knowledge of standards with our customers. You can use our experience for training and advice.

Markets and industries
Solutions from ABB Jokab Safety can be found in all types of industries across the globe. But we pride ourselves in having products and solutions that are especially well suited for e.g.:
- Robotics
- Food and beverage
- General machinery (OEM)
Our range of safety products

ABBB is the only supplier that can deliver complete safety solutions (including output devices such as contactors and frequency converters) together with automation solutions such as robotics, motors, drives and PLCs.
Pluto programmable safety controller, Vital safety controller and Sentry safety relays for flexible monitoring of safety devices

Smile emergency stop button to safely stop machinery in hazardous situations

Orion light guards for a production friendly detection

Magne magnetic lock to keep doors closed during a process

Knox safety lock for safe locking of doors

JSDH4 three-position device for safe and ergonomic inspection and troubleshooting
Standards and regulations

Directives and standards are of great importance for manufacturers of machines and safety components. International trade and global end customers makes it increasingly important to be aware of the requirements in each country. In Europe, the EU Directives are giving requirements for the minimum level of health and safety which are mandatory for manufacturers to fulfil. In each member state the Directives are implemented in the national legislation.

The European Machinery Directive
Machines which have been put on the European market since 2010 must comply with the new Machinery Directive 2006/42/EC. Before that, the old Machinery Directive 98/37/EC was valid. The objective of the Machinery Directive is to maintain, increase and equalize the safety level of machines within the members of the European Community. Based on this, the free movement of machines/products between the countries in this market can be achieved.

Harmonized standards
Standards are documents that try to give a common best solution to an issue. If a standard is harmonized, it means it gives support on how to fulfil the requirements of a specific Directive (in our case the Machinery Directive).

Examples of regularly used standards that are harmonized with the Machinery Directive

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN ISO 12100</td>
<td>Safety of machinery - General principles for design - Risk assessment and risk reduction. The primary purpose of this standard is to provide designers with an overall framework and guidance for decisions during the development of machinery to enable them to design machines that are safe for their intended use.</td>
</tr>
<tr>
<td>EN ISO 13849-1</td>
<td>Safety of machinery - Safety related parts of control systems - Part 1: General principles for design. This standard provides safety requirements and guidance on the principles for the design of safety-related parts of control systems. It specifies the term performance level (PL) and the requirements to fulfill different PL.</td>
</tr>
<tr>
<td>IEC/EN 62061</td>
<td>Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems. This standard defines the safety requirements and guiding principles for the design of safety-related electrical/electronic/programmable parts of a control system. It specifies the term safety integrity level (SIL) and the requirements to fulfill different SIL.</td>
</tr>
<tr>
<td>EN 60204-1</td>
<td>Safety of machinery - Electrical equipment of machines - Part 1: General requirements. This standard provides requirements and recommendations relating to the electrical equipment of machinery so as to promote - safety of persons and property - consistency of control response - ease of maintenance</td>
</tr>
</tbody>
</table>
Tools to simplify the process of safety function design

FSDT is an ABB software for determining PL and SIL of safety functions and generating technical documentation. The tool helps simplifying the process of safety function design, verification and documentation. It supports the compliance of the requirements of both EN ISO 13849-1 and IEC 62061 as well as the European Machinery Directive. Please turn to your local ABB contact in order to purchase FSDT.

Another commonly used software tool for the calculation of PL according to EN ISO 13849-1 is SISTEMA, developed by IFA (The Institute for Occupational Safety and Health) in Germany. With SISTEMA it is possible to “build” safety functions, verify them and generate the technical documentation required. The tool is freeware and can be downloaded from the IFA website.

To simplify the use of FSDT and SISTEMA with our products we have created a library containing all of our safety products.

2TLC172300D0201
Safety controllers

### Introduction and overview

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<td>Programmable safety controller - Pluto</td>
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<tr>
<td>Safety controller - Vital</td>
<td>2/18</td>
</tr>
<tr>
<td>Safety relay - Sentry</td>
<td>2/24</td>
</tr>
</tbody>
</table>
# Introduction and overview

## Selection guide

The safety controllers from ABB can monitor anything from a single safety function to complete manufacturing lines.

<table>
<thead>
<tr>
<th></th>
<th>Pluto</th>
<th>Vital</th>
<th>Sentry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image</strong></td>
<td><img src="image1.png" alt="Pluto" /></td>
<td><img src="image2.png" alt="Vital" /></td>
<td><img src="image3.png" alt="Sentry" /></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Programmable safety controller</td>
<td>Safety controller</td>
<td>Safety relay</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>A cost-effective, powerful and compact programmable safety controller for all types of safety applications.</td>
<td>A configurable safety controller that can monitor all safety devices on smaller machines.</td>
<td>Powerful and easy-to-install safety relays suitable for all common types of safety devices.</td>
</tr>
<tr>
<td><strong>Application(s)</strong></td>
<td>Monitoring of multiple safety devices and several safety functions, as well as control of machines and/or processes. Many I/Os and programmable logic.</td>
<td>Monitoring multiple safety devices with one or two safety functions, with all the advantages of the DYNlink system.</td>
<td>Monitoring safety devices with one safety function, as well as expansion of safety outputs, with or without time delay.</td>
</tr>
<tr>
<td><strong>Compatible safety devices</strong></td>
<td>All types of conventional safety devices and DYNlink devices</td>
<td>DYNlink devices</td>
<td>All types of conventional safety devices</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>- Easy-to-use while still allowing advanced programming</td>
<td>- Monitor up to 30 sensors in series maintaining Cat. 4/PL e</td>
<td>- Easy to install</td>
</tr>
<tr>
<td></td>
<td>- Free software</td>
<td>- No programming</td>
<td>- Universal models for all common applications</td>
</tr>
<tr>
<td></td>
<td>- Easy system modification</td>
<td></td>
<td>- Extensive status information</td>
</tr>
<tr>
<td></td>
<td>- Gateway communication with all main fieldbuses</td>
<td></td>
<td>- Advanced timer functions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Multireset of up to 10 safety relays</td>
</tr>
</tbody>
</table>
Overview

Selection orientation

Conventional safety devices
By conventional safety devices, we mean safety devices with one or two channels with contacts (e.g. key switches and emergency stop buttons), devices with OSSD outputs (e.g. light guards and Eden OSSD), safety devices with solid state outputs (e.g. safety magnetic sensors) and pressure sensitive devices (e.g. safety mats, safety edges and bumpers).

A safety controller compatible with conventional safety devices can be used with most safety devices on the market, independently of the brand.

The DYNlink solution
The DYNlink solution is a unique ABB Jokab Safety feature allowing to connect safety devices in series and still reach category 4/PL e/SIL 3 with only one channel (instead of two with conventional safety devices). This saves cabling and hardware.

For a small machine, the Vital safety controller can be a very cost effective solution since up to 30 DYNlink devices can be connected to one Vital and still reach category 4/PL e/SIL 3. With conventional safety devices this would require one safety relay per safety device.

When Pluto programmable safety controller is used, only one safety input is necessary for each DYNlink circuit instead of two inputs for a traditional safety device, which means that less I/Os are necessary.

Tina adapters allow to use conventional safety devices in a DYNlink solution and transform between DYNlink signals and conventional safety signals, while maintaining the highest level of safety. This means that most conventional safety devices can be used in a DYNlink solution when used together with a suitable Tina adapter.

Programmable logic
Quite often, there is a need for logic between the different safety functions. For instance:
IF ("door A" AND "door B" are open) OR ("door C" is open) THEN “Action 1”.

A logic like this can be hardwired without using programmable safety controllers, but the cabling becomes much more complicated, modifications are time consuming, errors happen more often and are difficult to find.

With a programmable safety controller, the safety devices are simply connected to the safe inputs of the controller and the logic is made in the program of the safety controller. The logic is then easy to modify without changing anything in the cabling. The Pluto Manager programming software allows to test the logic and see on the screen if there are any problems, which means much faster troubleshooting.

Pluto also offers many functions that enables it to do much more than supervising safety functions. It can e.g. control the complete manufacturing process of a smaller machine, thus saving the cost of a standard (non-safety) PLC.
Introduction and overview
Standards

Standards
Some of the more important safety standards to follow when designing safety solutions are:
EN ISO 12100 - Risk assessment
EN ISO 13849 - Performance Level
EN ISO 62061 - SIL
ISO/TR 23849 - Guidance on the use of the PL and SIL standards
EN 60204 - Electrical equipment
Pluto is a cost effective, powerful and compact programmable safety controller used in a variety of applications: in large and small systems, for process and functional safety, and even on trains.

Pluto can control most types safety devices on the market, as well as ABB Jokab Safety DYNlink safety devices, analog sensors, encoders, contactors, valves and many more. Programming is done easily in the complimentary software, Pluto Manager.

The models with safety bus communication simplify the design of safety systems, thanks to our All-Master concept. A wide range of gateways allows communication with other networks and also remote monitoring of a Pluto system. Some models also offer AS-i safety.

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**Speed up installation**

**Great flexibility**
Up to 32 Pluto units can exchange data on the same safety bus, and the unique All-Master system allows simple scaling, splitting and modification.

**Powerful yet compact**
Unexpected features for its size, like real programming and speed monitoring, enables replacement of more complex PLC systems in some applications.

**More sensors and less cabling**
The DYNlink solution allows series connection of up to 10 safety devices on each input. StatusBus and light button feature also reduces cabling to a minimum.

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**Optimum interface**

**Programming software free of charge**
Pluto Manager is an easy to use PC based programming software provided free of charge.

**Easy programming**
Ready-made TÜV approved function blocks for safety functions make it easy to reach PL e/SIL3. Ladder logic and text programming allow the design of more advanced functions and the control of complete machines.

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**Continuous operation**

**Easy modification**
Easy and quick replacement of units without any configuration.

**Flexible monitoring**
Online monitoring from any Pluto in the system and remote monitoring and control with an Ethernet gateway.

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**Safety controllers**

**Pluto**

Pluto gateways provide a two-way communication between the Pluto safety bus and other field buses.
Features

Pluto

I/Os

Failsafe inputs (I) are used to connect the safety devices to be monitored. Some of them can be used as analog inputs and counter inputs. The choice is made in the Pluto program when the I/Os are configured. Depending on the model, the analog inputs can be low resolution 0-27 V or high resolution 0-10 V/4-20 mA. The fast counter inputs can handle frequencies up to 14 kHz.

Failsafe inputs/non-failsafe outputs (IQ) are terminals that can be used as failsafe inputs or communication outputs (non-failsafe). The choice is made in the Pluto program when the I/Os are configured. A specific configuration is “light button” which means that both the contact and the LED indicator of an illuminated push-button are connected to only one IQ, thus saving one I/O.

Failsafe outputs (Q) are individually safe and independently programmable outputs. There are both relay and transistor outputs. The transistor outputs deliver a negative voltage (-24 VDC) that facilitates the detection of a short circuit with other voltage potentials and increases safety. The transistor outputs are primarily intended for electromechanical components such as contactors and valves.

DYNlink solution

The DYNlink circuit is a unique solution that allows up to 10 DYNlink devices to be connected in series to a Pluto input while still reaching up to Cat. 4/PL e/SIL3. This saves inputs and cabling, since to reach the same level with standard two-channel safety devices, two inputs are necessary and series connection is not possible.

The DYNlink solution checks the signal 200 times/second and a fault such as a short circuit will be detected before any safety device is used. Examples of DYNlink devices are Eden, Spot and Smile Tina. Most two-channel safety devices can be connected to the DYNlink solution using Tina adapters.

StatusBus functionality

The StatusBus functionality is available with some DYNlink devices and allows to collect the status of each individual safety device, even when connected in series. A single input on Pluto can collect the status of up to 30 safety devices. The devices are connected using standard cable and M12-5 connectors. No specific bus cable or extra communication module is necessary. All Pluto models offer the StatusBus functionality.

Safety bus with All-Master function

The unique All-Master system allows simple scaling, splitting and modification of the safety system. In a traditional safety PLC network, there is one Master and additional Slave units. But for Plutos connected to a safety bus, all units are Masters and make their own decisions, while still having the possibility to listen to what is happening to the other Plutos on the safety bus. This enables great flexibility when it comes to modification of the safety system. It also enables very simple replacement of a broken Pluto, since all Plutos have a copy of the application software of all other Plutos on the safety bus stored locally. If the replacement Pluto is given the same ID as the broken Pluto (using IDFIX), the software is downloaded from the safety bus with a simple button on the front of Pluto.

Up to 32 Pluto units can be connected to the Pluto safety bus. The Pluto S20 and S46 are stand-alone models and cannot be connected to the Pluto safety bus. All other models have bus functionality. The Safety bus functionality is necessary in order to use a Pluto gateway.

AS-i communication

AS-i reduces cabling and installation time and makes it almost impossible to connect incorrectly. Up to 62 devices/31 safety devices can be connected to a flat communication cable running around the cell. Connectors with piercing technology and self-healing cables are used (also called vampire connectors) and the sensors can easily be moved with minimum effort. AS-i Safe bus communication makes it easy to reach PL e/SIL3 and eliminates the risk of short circuit between signals in the same cable, which is not allowed for Category 4.

The ABB Jokab Safety AS-i products, including the Pluto AS-i models, are easy to use and Pluto Manager makes it easy to address the devices and read their status. Of course, ABB Jokab safety AS-i products are also compatible with AS-i products from other brands. Pluto AS-i and Pluto B42 AS-i can either be used as masters of an AS-i bus, slaves of an AS-i master or safety monitors on an AS-i bus with another AS-i master. Therefore, they can also operate as safe I/O modules for the AS-i bus. Besides controlling all devices connected to the AS-i bus, a number of non-AS-i devices can be connected to the standard I/Os of Pluto, and there is still the possibility to communicate with other Plutos using the Pluto safety bus. In all, this leads to huge possibilities when designing the safety system.
Pluto Manager
Pluto Manager is the programming software for Pluto, downloaded free of charge from our website http://new.abb.com/low-voltage/products/safety-products/programmable-safety-controllers/pluto. An update function in Pluto Manager helps you to always have the latest version installed as long as you have an Internet connection. Pluto Manager is a user-friendly PC software that allows a simple configuration of the Pluto I/Os and programming in ladder logic and with TÜV approved function blocks.

Examples of what the available function blocks can handle:
- Two-channel safety devices, with or without Reset and Monitoring.
- Single channel functions with Reset.
- Muting functions
- Encoders and counters
- Communication with Gateways, AS-i and StatusBus

Examples of ladder logic functions provided:
- Boolean instructions, Edge/inverted edge detection, Latch function, Toggle
- Timers
- Addition, Subtraction, Multiplication, Division
- Remanent memories
- Registers: 16 and 32 bit
- Sequence programming
- Option handling
- Online monitoring

In Pluto Manager there is a unique Option handling function suitable for series production of machines with different customer options. All versions of a machine type can have the same PLC program. To handle the different customer options, check boxes are used to set memories that activate the different functions of the code.

Current monitoring
Pluto A20 has a special current monitoring function. The function is mainly used to check if the connected muting lamps are working.

Harsh Environment
Pluto D20 and D45 are available in models that are suited for harsh environments and railway rolling stock in particular. These models have certificates for railway standards (e.g. EN 50126) and comply with standards for railway applications (EN 50155) that includes requirements on important electrical and mechanical aspects, as well as fire and smoke protection standard (EN 45545).

Remote monitoring and control
Remote monitoring allows the connection to a remote Pluto system via the Internet and an Ethernet gateway. Pluto Manager is used for the monitoring. This function can be used for:
- Support of local maintenance personnel during troubleshooting
- Regular monitoring of the status of the machine or process
- Follow-up of operational data like number of cycles/day or runtime.

Pluto Manager also offers remote control of a Pluto system using the Internet and an Ethernet gateway. With the remote control function it is possible to:
- Download a program from PC to the remote Pluto
- Configure addressing of AS-i and StatusBus slaves, write IDFIX code

The security of the remote control function is guaranteed by use of the K-button on Pluto. A change in a remote Pluto system cannot be made without a person at the remote Pluto confirming the action by pressing the K-button.

Configuration of the gateway itself, e.g. switching remote control on/off, can only be made via the programming port on the gateway and not via the Ethernet port.
Accessories
Pluto

Pluto gateways
Pluto gateways provide two-way communication between the Pluto safety bus, i.e. all the Pluto units connected to it, and other field buses. Several models are available for the most common field buses. Ready-made function blocks in Pluto Manager facilitate the communication. A gateway can be located anywhere on the Pluto safety bus.

Pluto safe encoders
Rotary absolute encoders can be used for safe position determination. Our safe encoders are intended to be connected to the Pluto safety bus. They are available in single and multi-turn versions, with shaft or hollow shaft. Up to 16 absolute encoders can be connected to a Pluto safety bus. In Pluto Manager, specific function blocks make it easy to read and evaluate the values of two encoders forming a PL e/SIL3 solution. Apart from position, the speed values are available which means that also zero speed and overspeed can be monitored.

Examples of applications are gantry robots, industrial robots, and also eccentric shaft presses, where the encoders can replace existing cam mechanisms.

Operator panels
An operator panel can be connected to the programming port of Pluto with a specific cable and communicate with Pluto in MODBUS ASCII. We recommend the ABB CP600 series operator panels that offer the appropriate communication driver. An operator panel can also communicate with Pluto via a GATE-MT gateway.
Pluto S20 v2

Pluto A20 v2

Pluto D45

Pluto AS-i

**Ordering information Pluto**

Pluto is available in different models depending on the needs of your application. Optional features includes bus communication, AS-i bus, high resolution analog inputs, current monitoring and adaption for harsh environments.

### Pluto ordering table

<table>
<thead>
<tr>
<th>AS-i</th>
<th>Safety bus</th>
<th>Failsafe outputs</th>
<th>Failsafe inputs (max)</th>
<th>Analog inputs (max)</th>
<th>Fast counter inputs (max)</th>
<th>StatusBus inputs (max)</th>
<th>Non failsafe outputs (max)</th>
<th>Width</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>4</td>
<td>16</td>
<td>4</td>
<td>8</td>
<td>45</td>
<td>Pluto S20</td>
<td>2TLA020070R4700</td>
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<td>Yes</td>
<td>6</td>
<td>40</td>
<td>3</td>
<td>4</td>
<td>16</td>
<td>90</td>
<td>Pluto S46</td>
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<td>-</td>
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<td>Pluto B22</td>
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<td>45</td>
<td>-</td>
<td>Pluto A20</td>
<td>2TLA020070R4500</td>
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<tr>
<td></td>
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<td>16</td>
<td>-</td>
<td>8</td>
<td>45</td>
<td>-</td>
<td>Pluto A25</td>
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<td>6</td>
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<td>4</td>
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<td>Pluto B46</td>
<td>2TLA020070R1700</td>
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<td>39</td>
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<td>Pluto D45</td>
<td>2TLA020070R8600</td>
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<td>Yes</td>
<td>4</td>
<td>8</td>
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<td>4</td>
<td>45</td>
<td>Pluto AS-i</td>
<td>2TLA020070R1100</td>
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<td>6</td>
<td>38</td>
<td>3</td>
<td>4</td>
<td>16</td>
<td>90</td>
<td>Pluto B42 AS-i</td>
<td>2TLA020070R1400</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) Failsafe outputs

- 2 failsafe outputs:
  - 2 independent individually safe potential free relay outputs (Q0 and Q1) with 3 contacts each
  - 2 independent individually safe potential free relay outputs (Q0 and Q1) with common supply (Q4 and Q5)
  - 2 independent individually safe transistor outputs (-24 VDC) (Q2 and Q3)

b) - The number of failsafe outputs available decreases with the number of used non-failsafe outputs, analog inputs, fast counter inputs and StatusBus inputs.
   - The number of analogue inputs available decreases with the number of used fast counter inputs.
   - The number of non-failsafe outputs available decreases with the number of StatusBus inputs used.
   - Check the Pluto hardware manual for more information.

c) 0-27 V analog inputs

d) 0-10 V/4-20 mA (high resolution) analog inputs

e) Expansion model with failsafe inputs and no failsafe outputs.

f) Expansion model with 2 failsafe outputs with 3 contacts each. Also possible to use as stand-alone unit.

g) Model with current monitoring

h) Pluto D20 (Harsh Env) and Pluto D45 (Harsh Env) have coated circuit boards and can be used in severe environments where cold and condensation can cause problems, like on trains and other vehicles and in the wind energy segment.

- They comply with railway standard EN 50155
- They can be used on all trains up to the highest hazard level (HL3) according to the fire and smoke protection standard EN 45545.
Ordering information
Pluto accessories

IDFIX identifiers
IDFIX is an identification circuit that is connected to Pluto. It must be used:
• when several Pluto are connected to the Pluto Safety bus (IDFIX-R or IDFIX-RW)
• with Pluto AS-I and Pluto B42 AS-I (IDFIX-DATA)
• to get the possibility to replace a stand-alone Pluto with a new one without the need of a PC (IDFIX-PROG stores the Pluto program)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-programmed unique identification number.</td>
<td>IDFIX-R</td>
<td>2TLA20070PR2000</td>
</tr>
<tr>
<td>Programmable identification number, i.e. the user can choose the identification number</td>
<td>IDFIX-RW</td>
<td>2TLA20070PR2100</td>
</tr>
<tr>
<td>Programmable identification number and storage of AS-I safety codes. Must be used with Pluto AS-I and Pluto B42-AS-I.</td>
<td>IDFIX-DATA</td>
<td>2TLA20070PR2300</td>
</tr>
<tr>
<td>Programmable identification number and storage of the Pluto program, 2.5 Kbyte. Especially useful for stand-alone Pluto.</td>
<td>IDFIX-PROG 2k5</td>
<td>2TLA20070PR2400</td>
</tr>
<tr>
<td>Programmable identification number and storage of the Pluto program, 10 Kbyte. Especially useful for stand-alone Pluto.</td>
<td>IDFIX-PROG 10k</td>
<td>2TLA20070PR2600</td>
</tr>
</tbody>
</table>

Pluto cables and connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pluto programming and on-line monitoring cable. For a PC serial port, 9-pole D-sub connector.</td>
<td>Pluto cable serial</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Pluto programming and on-line monitoring cable. For a PC USB port.</td>
<td>Pluto cable USB</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Cable for connecting a HMI-panel to the Pluto programming port. Connector on HMI-side: 15-pole D-sub. On Pluto side: 90 degrees angled Modbus contact.</td>
<td>Pluto cable HMI</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Cable for connecting HMI-panel ABB CP400 to Pluto programming port. Connector on HMI-side: 9-pole D-sub.</td>
<td>Pluto cable CP400</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Cable for connecting HMI-panel ABB CP600 to Pluto programming port. Connector on HMI-side: 9-pole D-sub.</td>
<td>Pluto cable CP600</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm². Ordered by meter, cut to size. Minimum order length 10 m.</td>
<td>PCABLE-000</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², 50-meter ring.</td>
<td>PCABLE-050</td>
<td>2TLA20070P9605</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², 100-meter ring.</td>
<td>PCABLE-100</td>
<td>2TLA20070P9610</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², 500-meter drum.</td>
<td>PCABLE-500</td>
<td>2TLA20070P9650</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², Halogen free. Ordered by meter, cut to size. Minimum order length 10 m.</td>
<td>PCABLE-000-HF</td>
<td>2TLA20070P9600</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², Halogen free, 50-meter ring.</td>
<td>PCABLE-050-HF</td>
<td>2TLA20070P9605</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², Halogen free, 100-meter ring.</td>
<td>PCABLE-100-HF</td>
<td>2TLA20070P9610</td>
</tr>
<tr>
<td>Bus cable for Pluto safety bus, 2 x 0.75 mm², Halogen free, 500-meter drum.</td>
<td>PCABLE-500-HF</td>
<td>2TLA20070P9650</td>
</tr>
<tr>
<td>Terminal block with capacitor, 12Hf, for connection between 0 V of Pluto supply and earth in order to reduce problems with conducted disturbances.</td>
<td>Pluto capacitor</td>
<td>2TLA20070P96200</td>
</tr>
</tbody>
</table>

Other accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set of function blocks for mechanical presses.</td>
<td>Pluto press block</td>
<td>2TLA20070PR4100</td>
</tr>
<tr>
<td>Smile reset button for light button function with M12-5 connector.</td>
<td>Smile 11 RB</td>
<td>2TLA20050PR1000</td>
</tr>
<tr>
<td>Handheld terminal AS-i/StatusBus. Used for e.g. addressing and test. Connection to PC via USB-micro cable.</td>
<td>FIXA</td>
<td>2TLA20070PR2000</td>
</tr>
<tr>
<td>Terminating resistor for Pluto safety bus. Necessary for each stand-alone Pluto and on the Pluto units at each end of the Pluto safety bus. Should be removed from the other Pluto units.</td>
<td>R120 Resistor</td>
<td>2TLA20070PR2200</td>
</tr>
</tbody>
</table>

Pluto spare parts (included when ordering a Pluto)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact block for safety relays and Pluto, 7 poles, Grey.</td>
<td>Contact block 7 grey</td>
<td>2TLA81200OR1500</td>
</tr>
</tbody>
</table>

ABB Safety products catalog | 2/11
Tina adaptation units to DYNlink

The Tina devices adapt the DYNlink signals from Pluto to safety components with mechanical contacts, such as E-stops, switches and light beams/curtains with dual outputs. Tina is available in several versions depending on the type of safety component that is connected to the DYNlink solution. Also available is connector blocks and a blind plug.

<table>
<thead>
<tr>
<th>Type of safety device</th>
<th>Type of connection to the DYNlink loop</th>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices with positively driven force-guided contacts like E-stop buttons and key switches</td>
<td>Via the device connection</td>
<td>Mounted directly on the device enclosure to a M20 cable entry.</td>
<td>Tina 2A</td>
<td>2TLA020054R0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Placed inside the safety device enclosure.</td>
<td>Tina 2B</td>
<td>2TLA020054R1100</td>
</tr>
<tr>
<td></td>
<td>M12-5 male connector</td>
<td>Mounted directly on the device enclosure to a M20 cable entry.</td>
<td>Tina 3A</td>
<td>2TLA020054R0200</td>
</tr>
<tr>
<td></td>
<td>M12-5 male connector with extra conductor for the supply of the safety device</td>
<td>Two circuits and with supply voltage for the safety sensor. Connects to a M20 cable entry.</td>
<td>Tina 3Aps</td>
<td>2TLA020054R1400</td>
</tr>
<tr>
<td></td>
<td>Removable terminal blocks</td>
<td>Mounted on a DIN rail in the electrical cabinet. Note that the connected safety device(s) must be mounted on the same cabinet.</td>
<td>Tina 7A</td>
<td>2TLA020054R0700</td>
</tr>
<tr>
<td>Devices with OSSD outputs like Orion light guards</td>
<td>M12-5 male connector</td>
<td>Adaptation of OSSD to DYNlink. Two M12 connectors.</td>
<td>Tina 10A</td>
<td>2TLA020054R1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adaptation of OSSD to DYNlink with possibility to connect a local reset button. Three M12 connectors.</td>
<td>Tina 10B</td>
<td>2TLA020054R1300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adaptation of OSSD to DYNlink with possibility to power the transmitter. Three M12 connectors.</td>
<td>Tina 10C</td>
<td>2TLA020054R1600</td>
</tr>
<tr>
<td>Safety mats, edges and bumpers with short-circuit detection</td>
<td>M12-5 male connector</td>
<td>Short-circuit detection and adaptation to DYNlink.</td>
<td>Tina 6A</td>
<td>2TLA020054R0600</td>
</tr>
</tbody>
</table>

Connection blocks for serial connection of DYNlink devices (or devices with Tina adapter)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection block for the serial connection of up to 4 DYNlink devices with M12-5 connectors</td>
<td>Tina 4A</td>
<td>2TLA020054R0300</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 8 DYNlink devices with M12-5 connectors</td>
<td>Tina 8A</td>
<td>2TLA020054R0500</td>
</tr>
<tr>
<td>Connection block for the serial connection of two DYNlink devices with M12-5 connectors</td>
<td>Tina 11A</td>
<td>2TLA020054R1700</td>
</tr>
<tr>
<td>Connection block for the serial connection of two DYNlink devices with M12-8 connectors, e.g. Dalton and Magne</td>
<td>Tina 12A</td>
<td>2TLA020054R1800</td>
</tr>
</tbody>
</table>

Blind plug to complete the serial connection on a connection block

All M12 connectors on Tina 4A or Tina 8A must be connected to a safety device or a Tina 1A. For example, if only 6 devices are connected to a Tina 8A, two Tina 1A are necessary.

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tina 1A is a blind plug connected to the unused M12 connectors of the connection blocks Tina 4A and Tina 8A.</td>
<td>Tina 1A</td>
<td>2TLA020054R0000</td>
</tr>
</tbody>
</table>
Pluto safe encoders

The safe encoders can be used together with Pluto to safely determine the position of machine movements.

<table>
<thead>
<tr>
<th>Function</th>
<th>Shaft</th>
<th>Shaft diameter (mm)</th>
<th>Type of connection</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-turn</td>
<td>Solid</td>
<td>10</td>
<td>Connector male 12 poles</td>
<td>RSA 597 connector</td>
<td>2TLA200071R8000</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1.5 m cable</td>
<td>RSA 597 1.5 m cable</td>
<td>GATE-C2</td>
<td>2TLA200071R8200</td>
</tr>
<tr>
<td></td>
<td>Hollow</td>
<td>12</td>
<td>2 m cable</td>
<td>RHA 597 2 m cable</td>
<td>2TLA200071R9000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m cable</td>
<td>RHA 597 10 m cable</td>
<td>GATE-EC</td>
<td>2TLA200071R9100</td>
</tr>
<tr>
<td>Multi-turn</td>
<td>Solid</td>
<td>6</td>
<td>M12 connector</td>
<td>RSA 698 6 mm solid</td>
<td>2TLA200071R9200</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>M12 connector</td>
<td>RSA 698 10 mm solid</td>
<td>GATE-MT</td>
<td>2TLA200071R9400</td>
</tr>
<tr>
<td></td>
<td>Hollow</td>
<td>12</td>
<td>M12 connector</td>
<td>RSA 698 hollow</td>
<td>2TLA200071R9500</td>
</tr>
</tbody>
</table>

For more information, see the manual:
Pluto safe encoders 2TLC172006M0206
Urax adaptation devices for AS-i

Urax are adaptation devices for the AS-i bus that enables the connection of safety sensors and non-safe products to AS-i safety.

<table>
<thead>
<tr>
<th>Type of safety device to connect</th>
<th>Non-failsafe outputs</th>
<th>Local reset</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DYNlink devices, e.g. Eden. Up to three devices in series.</td>
<td>1</td>
<td>No</td>
<td>URAX-A1</td>
<td>2TLC200720R0000</td>
</tr>
<tr>
<td>DYNlink devices with need for extra power, e.g. Magne, Knox and Button. Up to 10 devices in series. Black AS-i cable needed.</td>
<td>3</td>
<td>Yes</td>
<td>URAX-B1R</td>
<td>2TLC200720R0200</td>
</tr>
<tr>
<td>Devices with two potential free contacts, NO + NO or NO + NC, e.g. Smile and MKey.</td>
<td>-</td>
<td>No</td>
<td>URAX-C1</td>
<td>2TLC200720R0300</td>
</tr>
<tr>
<td>Devices with OSSD outputs, e.g. Orion light guards. Black AS-i cable needed.</td>
<td>3</td>
<td>Yes</td>
<td>URAX-D1R</td>
<td>2TLC200720R0500</td>
</tr>
<tr>
<td>Two-hand devices according to EN 574 type IC, e.g. two Safeball.</td>
<td>-</td>
<td>No</td>
<td>URAX-E1</td>
<td>2TLC200720R0600</td>
</tr>
</tbody>
</table>

1) Non-failsafe outputs can be used for e.g. indicators and locking signal.
2) Possibility to connect an illuminated push-button to Urax, to reset the safety devices connected to Urax. All models with local reset possibility can still be used with manual or automatic reset.

For more information, see the user manual: Urax 2TLC172008M0201

AS-i accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handheld terminal AS-i/StatusBus, used for e.g. addressing and test. Connection to PC via USB-micro cable. Connection to PC via USB-micro cable.</td>
<td>FIXA</td>
<td>2TLC200720R0000</td>
</tr>
<tr>
<td>Cable for addressing M12-5 devices like Adam AS-i with Fea. 1 m cable 5 x 0.34 mm² + screen with straight M12 female + male connectors. Screen connected to pin3 (0 V) on male connector.</td>
<td>M12-C112</td>
<td>2TLC200750R0200</td>
</tr>
<tr>
<td>Cable for addressing Urax adapters with Fea, M12-5 male connector on one side and jack socket on the other side.</td>
<td>AS-i addressing cable</td>
<td>2TLC200730R0000</td>
</tr>
</tbody>
</table>

Cables and connection accessories for AS-i

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable for AS-i, power and data, +30 VDC, yellow, EPDM</td>
<td>AS-i cable yellow</td>
<td>2TLC200740R0000</td>
</tr>
<tr>
<td>Cable for AS-i, additional power, +24 VDC, black, EPDM</td>
<td>AS-i cable black</td>
<td>2TLC200740R0100</td>
</tr>
<tr>
<td>M12-5 female connector with vampire connector for AS-i flat cable.</td>
<td>AS-i-T-connector M12</td>
<td>2TLC200730R0000</td>
</tr>
<tr>
<td>AS-i flat cable splitter used to make T-connections and to extend cables.</td>
<td>AS-i-splitter box</td>
<td>2TLC200730R0300</td>
</tr>
</tbody>
</table>

Accessories to Urax adapters

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket for mounting Urax on ABB Jokab Safety fence system. Includes fasteners.</td>
<td>JSM D25</td>
<td>2TLC200709R0000</td>
</tr>
<tr>
<td>Urax bottom plate</td>
<td>URAX Bottom</td>
<td>2TLC200720R0000</td>
</tr>
<tr>
<td>M12 plug needed when Urax with local reset possibility (URAX-x1R) is used in automatic reset.</td>
<td>JSAUR1</td>
<td>2TLC200730R0100</td>
</tr>
</tbody>
</table>
## Technical data

### Pluto

#### Approvals
- **Railway**: TÜV Rheinland InterTraffic

#### Conformity
<table>
<thead>
<tr>
<th>Standard</th>
<th>Sil 3</th>
<th>Sil Cl 3</th>
<th>Pl, e/Cat.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61508:2010</td>
<td>2.00 x 10⁻⁹</td>
<td>2.00 x 10⁻⁹</td>
<td>2.00 x 10⁻⁹</td>
</tr>
<tr>
<td>EN 62061:2005+A1:2013</td>
<td>1.5 x 10⁻⁹</td>
<td>1.5 x 10⁻⁹</td>
<td>1.5 x 10⁻⁹</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>2.00 x 10⁻⁹</td>
<td>2.00 x 10⁻⁹</td>
<td>2.00 x 10⁻⁹</td>
</tr>
</tbody>
</table>

#### Functional safety data
- **SIL3**
- **SIL CL3**
- **PL e/Cat.4**

#### Electrical data
- **Category II in accordance with IEC 61010-1**
- **Operating voltage**: +24 VDC ± 15%
- **Failsafe outputs Q**: Transistor, -24 VDC, 800 mA

#### Q2, Q3, Q0, Q1, (Q4, Q5)
<table>
<thead>
<tr>
<th>Relay outputs</th>
<th>Pluto Q2</th>
<th>Pluto Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-12: 250 V / 1.5 A</td>
<td>Relay outputs</td>
<td>Relay outputs (Q3-Q4)</td>
</tr>
<tr>
<td>AC-15: 250 V / 1.5 A</td>
<td>AC-12: 250 V / 5 A</td>
<td>AC-15: 24 V / 1.5 A</td>
</tr>
<tr>
<td>VDC-12: 50 V / 1.5 A</td>
<td>AC-15: 250 V / 3 A</td>
<td>AC-15: 24 V / 1.5 A</td>
</tr>
<tr>
<td>DC-13: 24 V / 1.5 A</td>
<td>DC-12: 60 V / 5 A</td>
<td>DC-12: 24 V / 1.5 A</td>
</tr>
<tr>
<td>DC-13: 24 V / 3 A</td>
<td>DC-13: 24 V / 3 A</td>
<td>DC-13: 24 V / 1.5 A</td>
</tr>
</tbody>
</table>

#### Installation
- **35 mm DIN rail**
- **Ambient temperature**: -10 °C to +50 °C

#### Pluto safety bus
- **Max. number of Pluto units**: 32
- **Cable length**: Up to 600 m

#### Pluto AS-i bus
- **Number of slave units**: 31 safe slaves, 62 non-safe slaves
- **Bus cable length**: Up to 500 m

### More information
For more information, e.g. the complete technical information, see product manual: Pluto hardware manual [2TLC172009M0210](#)
Dimension drawings
Pluto

Single size

Double size

All dimensions in mm
Safety controllers
Vital

Vital is a configurable safety controller that does not require programming. It uses the DYNlink system, which allows up to 30 safety devices to be connected in series to the same circuit, while achieving PL e.

This enables a single Vital to supervise all safety functions on many machines that otherwise would have required a programmable safety controller or multiple safety relays.

Vital is also commonly used to supervise all emergency stops for larger machine lines.

Speed up your projects

Easy connection
Reduced installation and engineering time thanks to simple installation with serial connection using M12 connectors.

No programming required
The use of only one safety module without any programming simplifies engineering, commissioning and replacement.

Less components
Significantly less components needed to achieve PL e/SIL 3.

Continuous operation

LED diagnostics
Integrated LED diagnostics reduces down time when troubleshooting.

Detachable connection blocks
Detachable connection blocks simplify replacement.

Exchange without configuration
The configuration is made with jumpers in the detachable connection blocks. In case of exchange, the new unit automatically gets the correct configuration.

Safety and protection

Easy to reach highest safety level
The DYNlink solution makes it possible to maintain the highest level of safety with up to 30 sensors connected in series.

Extensive fault detection
The DYNlink solution enables unique fault detection features and prevents 2-channel faults.
Applications and features

Vital

Applications

Vital safety controller excels at supervising multiple safety devices on the same machine, since up to 30 safety devices can be connected in series to the same input while achieving up to PL e. Typical applications are machines with multiple doors/hatches or emergency stop buttons.

Models

**Vital 1 Safety controller**
- One DYNlink circuit with up to 30 safety devices
- 2 safe outputs

**Vital 2 Safety controller**
- Two DYNlink circuits with up to 10 safety devices each
- 2 x 2 safe outputs
- A time delay of up to 1.5 s can be set for output group 2
- 3 different modes can be configured:
  1. DYNlink circuit 1 controls output group 1, DYNlink circuit 2 controls output group 2
  2. DYNlink circuit 1 controls both output groups, DYNlink circuit 2 controls output group 2
  3. Both circuits control both output groups in parallel

**Vital 3 Safety controller**
- One NC circuit for two-channel NC contact safety devices
- One DYNlink circuit with up to 10 safety devices
- 2 x 2 safe outputs
- A time delay of up to 1.5 s can be set for output group 2
- 3 different modes can be configured:
  1. NC circuit controls output group 1, DYNlink circuit controls output group 2
  2. NC circuit controls both output groups, DYNlink circuit controls output group 2
  3. Both circuits control both output groups in parallel

Features

**DYNlink**
The DYNlink circuit is a unique solution that uses one single channel to achieve up to Cat. 4/PL e. Vital sends out a square wave signal that is inverted by each safety device. A connection between B1 and S1 sets if Vital should receive a non-inverted signal, i.e. an even number of devices are connected (no shunt indicates an odd number). Vital checks the returning signal 200 times/second and a fault such as a short circuit will be detected before any safety device is used.

Vital can only be used with DYNlink safety device, such as Eden DYN, and devices with a Tina adapter.
Ordering information

Vital

### Tina adaptation units to DYNlink

The Tina devices adapt the DYNlink signals from Pluto to safety components with mechanical contacts, such as E-stops, switches and light beams/curtains with dual outputs. Tina is available in several versions depending on the type of safety component that is connected to the DYNlink solution. Also available is connector blocks and a blind plug.

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<th>Order code</th>
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<td>Via the device connection</td>
<td>Mounted directly on the device enclosure to a M20 cable entry.</td>
<td>Tina 2A</td>
<td>2TLA020054R0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Placed inside the safety device enclosure</td>
<td>Tina 2B</td>
<td>2TLA020054R1100</td>
</tr>
<tr>
<td>M12-5 male connector</td>
<td>Mounted directly on the device enclosure to a M20 cable entry.</td>
<td>Tina 3A</td>
<td>2TLA020054R0200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M12-5 male connector with extra conductor for the supply of the safety device</td>
<td>Two circuits and with supply voltage for the safety sensor. Connects to a M20 cable entry.</td>
<td>Tina 3Aps</td>
<td>2TLA020054R1400</td>
</tr>
<tr>
<td>Removable terminal blocks</td>
<td>Mounted on a DIN rail in the electrical cabinet.</td>
<td>Tina 7A</td>
<td>2TLA020054R0700</td>
<td></td>
</tr>
<tr>
<td>Devices with OSSD outputs like Orion light guards</td>
<td>M12-5 male connector</td>
<td>Adaptation of OSSD to DYNlink. Two M12 connectors.</td>
<td>Tina 10A</td>
<td>2TLA020054R1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adaptation of OSSD to DYNlink with possibility to connect a local reset button. Three M12 connectors.</td>
<td>Tina 10B</td>
<td>2TLA020054R1300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adaptation of OSSD to DYNlink with possibility to power the transmitter. Three M12 connectors.</td>
<td>Tina 10C</td>
<td>2TLA020054R1600</td>
</tr>
<tr>
<td>Safety mats, edges and bumpers with short-circuit detection</td>
<td>M12-5 male connector</td>
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<td>Tina 6A</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Connection blocks for serial connection of DYNlink devices (or devices with Tina adapter)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection block for the serial connection of up to 4 DYNlink devices with M12-5 connectors</td>
<td>Tina 4A</td>
<td>2TLA020054R0200</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 8 DYNlink devices with M12-5 connectors</td>
<td>Tina 8A</td>
<td>2TLA020054R0500</td>
</tr>
<tr>
<td>Connection block for the serial connection of two DYNlink devices with M12-5 connectors</td>
<td>Tina 11A</td>
<td>2TLA020054R1700</td>
</tr>
<tr>
<td>Connection block for the serial connection of two DYNlink devices with M12-8 connectors, e.g. Dalton and Magne.</td>
<td>Tina 12A</td>
<td>2TLA020054R1800</td>
</tr>
</tbody>
</table>

### Blind plug to complete the serial connection on a connection block

All M12 connectors on Tina 4A or Tina 8A must be connected to a safety device or a Tina 1A. For example, if only 6 devices are connected to a Tina 8A, two Tina 1A are necessary.

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tina 1A is a blind plug connected to the unused M12 connectors of the connection blocks Tina 4A and Tina 8A.</td>
<td>Tina 1A</td>
<td>2TLA020054R0000</td>
</tr>
</tbody>
</table>
## Technical data

### Vital

#### Technical data

<table>
<thead>
<tr>
<th>Approvals</th>
<th>Vital 1</th>
<th>Vital 2/Vital 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity</td>
<td>![CE]</td>
<td>![CE]</td>
</tr>
<tr>
<td>EN 2006/42/EC - Machinery</td>
<td>EN 2006/42/EC - Machinery</td>
<td></td>
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<tr>
<td>EN 2014/30/EU - EMC</td>
<td>EN 2014/30/EU - EMC</td>
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</tr>
<tr>
<td>EN 2011/65/EU - RoHS</td>
<td>EN 2011/65/EU - RoHS</td>
<td></td>
</tr>
</tbody>
</table>

#### Functional safety data

| EN 61508:2010 | Sil3 |
| EN ISO 13849-1:2008 | PL e, Cat. 4 |
| PFH<sub>T</sub> Relay output | 2.74 x 10<sup>-8</sup> |
| PFH<sub>D</sub> Transistor output | - |

#### Electrical data

| Power supply | +24 VDC ± 15% |
| Max. switching capacity | Relay output (Q1, Q11) |
| AC-1 | 250 VAC / 6 A / 1500 VA |
| AC-15 | 240 VAC / 2 A |
| DC-1 | 24 VDC / 6 A / 150 W |
| DC-13 | 24 VDC / 1 A |

#### Number of sensors

| Max. number of Eden DYN or Tina units per input | 30 |
| Total max. cable length (depending on the number of Eden/Tina units) | 1000 m |
| Max. number of Spot 10 per input | 6 |
| Total max. cable length (depending on the number of Spot 10) | 600 m |

| Operating temperature | -10 °C to +55 °C |

### More information

For more information, e.g. the complete technical information, see product manual for:

Vital 1: 2TLC172156M0201  
Vital 2/Vital 3: 2TLC172219M0201
Dimension drawings
Vital

Vital 1

Vital 2/Vital 3

All dimensions in mm
The Sentry safety relays are powerful and easy to use safety relays, suitable for all common types of safety applications.

The Sentry series contains basic models for simple applications and easy output expansion, as well as highly flexible models with extremely accurate timer functions.

Sentry safety relays are used in both simple and more advanced safety solutions when safety devices need to be monitored according to the requirements of functional safety standards.

Continuous operation

LEDs and display
3-color LEDs allow for more status messages and simplify troubleshooting. Models with display offer preset configurations and extensive fault information.

Advanced timer functions
Timer functions with an accuracy of ± 1% minimize unnecessary downtime.

Multi-reset
The multi-reset function enables reset of up to 10 Sentry safety relays using just one reset button.

Optimized logistics

Universal models
A single safety relay for all common safety applications reduces stock and saves warehouse space.

Multi-voltage
Multi-voltage models offer more flexibility and less stock.

Compact size
All models are only 22.5 mm wide, even models with 2 NO + 2 NO outputs.

Easy to install

Detachable terminal blocks
Detachable terminal blocks speed up connection and replacement.

Switch for reset selection
Manual or automatic reset easily selectable by switch.

Powerful outputs
Powerful outputs allow to drive larger contactors and simplify installation by saving the use of an intermediary contactor.
Applications

Sentry

Monitoring of safety devices
Sentry safety relays make it easy to reach the required level of safety when monitoring safety devices like emergency stop buttons, door switches, light guards, etc.

Expansion of safety outputs
Sentry expansion modules are used to increase the number of safety outputs of a safety control module in order to control more machinery.
Features

Sentry

Timer functions with an accuracy of ± 1%
Several timer functions are available: On/Off-delay, time bypass and time reset.

On/Off-delay are used to postpone the activation/deactivation of the safety outputs with a preset time delay. This is used in e.g. Category 1 stops.

Time bypass activates the safety outputs for a maximum predefined time when the safety inputs are closed. inching is an example of application.

Time reset activates the safety outputs for a maximum predefined time when the safety inputs are opened. Pre-reset is an example of application.

An accuracy of ± 1% allows a very precise time to be set in order to increase safety and minimize unnecessary downtime.

Configurable models with display
The models with display are configurable and the user can choose between preset configurations and a custom configuration that can be protected by password.

Faster troubleshooting with display
The display minimizes troubleshooting by giving extensive information about internal faults, I/O faults, system faults, function faults and a log of the last 10 errors.

Switch for selection of the reset function
All models can be used in automatic reset and some models allow to choose manual reset, either by switch or by configuration, which simplifies connection. In order to prevent mistakes, it is not possible to change reset function during operation by just flipping the switch.

Powerful outputs
The outputs have a switching capacity of up to 6A DC-13. This allows Sentry to drive larger contactors and saves the use of an intermediary contactor.

Delayed outputs
Some Sentry models have delayed outputs in order to e.g. give a machine time to apply breaking force before power is disconnected.
For models with 2 NO + 2 NO outputs, it is only the second pair of NO outputs that is delayed.
For models with 3 NO + 1 NC, all outputs are delayed.

Single function or universal models
Sentry SSR models are single function safety relays designed for a specific application such as 1 and 2 channel devices, OSSD devices or two-hand devices.
Sentry USR models are universal safety relays. They are capable of handling most types of applications and safety devices, i.e. 1 and 2 channel devices, OSSD-devices, two-hand devices and contact mats/bumpers/edges. This means that only one type of relay is necessary as a spare, which reduces stock and saves warehouse space.
## Ordering information

### Sentry

#### Ordering details

<table>
<thead>
<tr>
<th>Expansion of safety controller outputs</th>
<th>Safety devices</th>
<th>Test/Reset</th>
<th>Safety relay outputs</th>
<th>Timer function</th>
<th>Feature</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 channel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 channels with equivalent contacts</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSSD outputs / EAP outputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact mats, bumpers and safety edges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual reset (all models have auto reset)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start/Stop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3 NO + 1 NC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 NO + 2 delayed/delayable NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 NO + 1 NC</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Off-delay 0.5 s</td>
<td></td>
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<tr>
<td>Off-delay 1.5 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced timer functions 0 – 999 s</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configurable with delay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85-265 V AC / 120-375 VDC</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Order code</th>
</tr>
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<tbody>
<tr>
<td>x</td>
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<tr>
<td>x</td>
<td>BSR11</td>
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<td>x</td>
<td>BSR23</td>
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<tr>
<td>x</td>
<td>SSR10</td>
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<tr>
<td>x</td>
<td>SSR10M</td>
</tr>
<tr>
<td>x</td>
<td>SSR20</td>
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<tr>
<td>x</td>
<td>SSR20M</td>
</tr>
<tr>
<td>x</td>
<td>SSR22</td>
</tr>
<tr>
<td>x</td>
<td>SSR42</td>
</tr>
<tr>
<td>x</td>
<td>TSR10</td>
</tr>
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<td>x</td>
<td>TSR20</td>
</tr>
<tr>
<td>x</td>
<td>TSR20M</td>
</tr>
<tr>
<td>x</td>
<td>USR10</td>
</tr>
<tr>
<td>x</td>
<td>USR22</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal block for Sentry safety relays. One piece.</td>
<td>S30A</td>
<td>2TLA010099R0000</td>
</tr>
<tr>
<td>Coding kit for terminal blocks. One kit for one Sentry relay.</td>
<td>S30B</td>
<td>2TLA010099R0100</td>
</tr>
</tbody>
</table>

---

**Notes:**

- a) These models can also be used for expansion of Pluto safe transistor outputs (-24 VDC)
- b) No monitoring of two-channel fault, i.e. max Category 3 without fault exclusion.
- c) The safety relay detects a short-circuit, not a change in resistance.
- d) Off-delay, On-delay, Time bypass or Time reset.
- e) BSR23 must be monitored by another device in order to reach higher than Category 1/PL c according to EN ISO 13849-1, for example a safety relay, a safety PLC or an Orion light guard (EDM function).
# Technical data

## Sentry

### Technical data

#### Approvals (pending)

**Conformity**

- 2006/42/EC - Machinery
- 2014/30/EU - EMC
- 2011/65/EU - RoHS

#### Functional safety data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SIL3, PFH3 = 3.0 x 10⁻⁹</td>
<td>SIL3, PFH3 = 4.1 x 10⁻⁹</td>
<td>SIL3, PFH3 = 4.9 x 10⁻⁹</td>
<td>SIL3, PFH3 = 9.3 x 10⁻⁹</td>
<td></td>
</tr>
<tr>
<td>EN/IEC 62061:2005+A1:2013</td>
<td>SILCL3, PFH3 = 3.1 x 10⁻⁹</td>
<td>SILCL3, PFH3 = 4.1 x 10⁻⁹</td>
<td>SILCL3, PFH3 = 4.9 x 10⁻⁹</td>
<td>SILCL3, PFH3 = 3.9 x 10⁻⁹</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>Pl. e, Cat. 4, PFH3 = 3.1 x 10⁻⁹</td>
<td>Pl. e, Cat. 4, PFH3 = 4.1 x 10⁻⁹</td>
<td>Pl. e, Cat. 4, PFH3 = 4.9 x 10⁻⁹</td>
<td>Pl. e, Cat. 4, PFH3 = 3.9 x 10⁻⁹</td>
</tr>
</tbody>
</table>

**Note:** The relays must be cycled at least once a year.

#### Electrical data

**Operating voltage**

- +24 VDC (19.2-27.6 VDC) PELV / SELV
- Mains models: 85-265 VAC (50 / 60 Hz) or 120-375 VDC

**Response time at deactivation**

- 20 ms

**Maximum switching capacity**

- DC13, DC1: Up to 6 A (except relays with 2 NO + 2 NO outputs that switch 3 A)
- AC15, AC1: Up to 5 A (except relays with 2 NO + 2 NO outputs that switch 3 A)

#### Mechanical data

**Operating temperature**

- -10 °C – 55 °C

**Humidity range**

- 35% ... 90%

**Protection class**

- I20 (enclosure/electrical cabinet must have at least an IP54)

**Mounting**

- 35 mm DIN rail (DIN 50022)

**Minimum space between relays in the enclosure**

- 3 mm

### More information

For more information, e.g. the complete technical information, see product manual:

**Sentry 2TLC01002M0201**
Dimension drawing
Sentry

Dimension drawing

All dimensions in mm
Optical safety devices

Introduction and overview

Selection guide .................................................. 3/2
Light curtain - Orion1 Base .................................. 3/6
Light curtain - Orion1 Extended ......................... 3/14
Light grid - Orion2 Base ................................... 3/22
Light grid - Orion2 Extended ......................... 3/30
Light grid - Orion3 Base ................................... 3/38
Light grid - Orion3 Extended ......................... 3/46
Light beam - Spot ............................................. 3/54
Light curtains, light guards and light beams that cover most types of applications.

### Orion1

<table>
<thead>
<tr>
<th>Function</th>
<th>Light curtain, Transmitter + Receiver, Slim profile</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Orion1 Base</th>
<th>Orion1 Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of detection</td>
<td>Finger</td>
<td>Hand</td>
</tr>
<tr>
<td>Resolution</td>
<td>14 mm</td>
<td>30 mm</td>
</tr>
<tr>
<td>Protected height</td>
<td>15-180 cm</td>
<td>15-180 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Auto/Manual reset</td>
</tr>
<tr>
<td>EDM</td>
</tr>
<tr>
<td>Muting</td>
</tr>
<tr>
<td>Override</td>
</tr>
<tr>
<td>Integrated muting lamp</td>
</tr>
<tr>
<td>Blanking</td>
</tr>
<tr>
<td>No dead zone</td>
</tr>
<tr>
<td>Coding</td>
</tr>
<tr>
<td>Cascading</td>
</tr>
<tr>
<td>Function</td>
</tr>
<tr>
<td>---------------------------</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Image</th>
<th><img src="image1.png" alt="Orion1 Image" /></th>
<th><img src="image2.png" alt="Orion2 Image" /></th>
<th><img src="image3.png" alt="Orion3 Image" /></th>
<th><img src="image4.png" alt="Spot Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Orion2 Base</td>
<td>Orion2 Extended</td>
<td>Orion3 Base</td>
<td>Orion3 Extended</td>
</tr>
<tr>
<td>Type of detection</td>
<td>Body</td>
<td>Body</td>
<td>Body</td>
<td>Body</td>
</tr>
</tbody>
</table>

| Resolution     | 2, 3 or 4 beams            | Perimeter guarding over long distances | Perimeter guarding with one-sided connection | Perimeter guarding with one-sided connection and muting | 1 beam                      |
| Protected height | 50-120 cm                  | Perimeter guarding over long distances with muting | Perimeter guarding with one-sided connection and muting | Perimeter guarding with one-sided connection and muting | 50-120 cm                   |
| Applications   | Perimeter guarding over long distances | Perimeter guarding over long distances with muting | Perimeter guarding with one-sided connection | Perimeter guarding with one-sided connection and muting | Used in combination with other safeguards or in reduced spaces. Several spot light beams can also be combined to form a light grid. |

<table>
<thead>
<tr>
<th>Functions</th>
<th>Range</th>
<th>Auto/Manual reset</th>
<th>EDM</th>
<th>Muting</th>
<th>Override</th>
<th>Integrated muting lamp</th>
<th>Blanking</th>
<th>No dead zone</th>
<th>Coding</th>
<th>Cascading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 m</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 m</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 8 m</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 8 m</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 m</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

ABB Safety products catalog | 3/3
Introduction and overview

Selection orientation

Choose the right resolution for your application

Finger detection
Light curtains with 14 mm resolution are intended for finger detection when the light guard needs to be very close to the machine in order to give the operator a good view and easy accessibility to the machine.

Hand detection
Light curtains with 30 mm resolution are intended for hand detection and area protection and is often a good compromise between cost and accessibility to the machine. They offer a better sensing range than finger detection light curtains, but require a slightly greater safety distance.

Body detection
Light grids have a resolution adapted for detection of the whole body and are intended for perimeter guarding where there is a requirement for high accessibility. They offer a very good sensing range, but require a much greater safety distance than light guards for finger and hand detection.

Body detection with single beam
Since it is not suitable to use a single beam as the only means of protection for preventing whole body access, single beams are often used in combination with other safeguards. They can also be used in combination with fixed structures, which restrict the openings such that it is not possible to pass the protective device without being detected.

Several Spot light beams can also be connected in series to form a light grid according to Cat. 4/PL e. Spot belongs to the DYNlink system and must be connected to Pluto or Vital.
Introduction and overview

Standards

Resolution and safety distance
The optical safety device must be installed so that no-one can reach the hazardous area without first passing through the detection zone of the light guard. The distance from the hazardous area to the detection zone of the optical safety device must be large enough in order for the machine to have time to stop before someone can reach the hazardous area. This distance is called the safety distance, and it shall be calculated using the formula from EN ISO 13855.

The safety distance is influenced by the distance between each beam in the light guard. The closer the beams are together, the smaller the safety distance can be, which is why light curtains for finger detection can be placed much closer to the hazardous area than light grids for body detection.
Orion1 Base is an easy to use light curtain with compact dimensions and two resolutions for detection of fingers and hands.

Light curtains are usually used closed to the hazardous zone when repeated access to the machine is necessary, for example manually serviced machines.

Light curtains can also be used to limit work zones inside the hazardous area and be mounted horizontally for area protection.

Cost effective solution

Orion1 Base comes with a minimum of advanced functionalities to save cost.

Minimized cabling

A local reset button can be connected directly to the light curtain. In this way there is no need for a cable between the reset button and the electrical cabinet or for an extra control module.

External device monitoring

Each light curtain can monitor the actuators without any extra control module (EDM function).

Continuous operation

Visible alignment level

Since the alignment level is displayed, the alignment can be improved before the occurrence of an unwanted stop.

Extensive error indication

Extensive error indication reduces troubleshooting time.

Easy to install

Easy to align

Alignment help and a wide angle within the limits of a Type 4 device facilitate alignment. Rotation brackets also simplify alignment.

Easy to connect

M12 connectors speed up cabling.

Protection against harsh environment

Protective tubes and lens shields protect the devices in harsh environments.
Applications and features
Orion1 Base

Applications

Vertical mounting
When using standard vertical mounting the light guard can be placed close to the hazard zone. This is suitable for applications where repeated access to the machine is necessary, e.g. manually serviced machines.

Horizontal mounting
Horizontal mounting is mainly used for area protection and limitation of work zones.

Features

Finger detection
A 14 mm resolution is intended for finger detection when the light guard needs to be very close to the machine in order to give the operator a good view and easy accessibility to the machine. A 14 mm resolution enables a sensing range of 6 m.

Hand detection
A 30 mm resolution is intended for hand detection and area protection and is a good compromise between cost and accessibility to the machine. A 30 mm resolution enables a sensing range of 19 m.

Local reset
A local reset button is connected directly to the light guard instead of to the safety control module in the electrical cabinet. This saves safety relays/PLC inputs and minimizes cabling to the electrical cabinet. Clever accessories makes the connection easier.

EDM
External Device Monitoring is a feature allowing the light guard to supervise the actuators in simpler applications, eliminating the need for a safety relay or programmable safety controller.
## Ordering information
### Orion1 Base

### Ordering details

<table>
<thead>
<tr>
<th>Detection (Resolution mm)</th>
<th>Protected height mm</th>
<th>Type (Transmitter + receiver)</th>
<th>Order code</th>
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</thead>
<tbody>
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<td>Finger (14)</td>
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</tr>
<tr>
<td>150</td>
<td>Orion1-4-14-015-B</td>
<td>2TLA02235FR0000</td>
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<td>300</td>
<td>Orion1-4-14-030-B</td>
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<td>450</td>
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<td>750</td>
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<tr>
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<tr>
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<td>1650</td>
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<tr>
<td>1800</td>
<td>Orion1-4-14-180-B</td>
<td>2TLA02235FR1100</td>
<td></td>
</tr>
<tr>
<td>Hand (30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
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<td>Orion1-4-30-030-B</td>
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<td>450</td>
<td>Orion1-4-30-045-B</td>
<td>2TLA02056FR0200</td>
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<td>600</td>
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<td>2TLA02056FR0300</td>
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<td>750</td>
<td>Orion1-4-30-075-B</td>
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<tr>
<td>900</td>
<td>Orion1-4-30-090-B</td>
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<td>Orion1-4-30-120-B</td>
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<tr>
<td>1350</td>
<td>Orion1-4-30-135-B</td>
<td>2TLA02056FR0800</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>Orion1-4-30-150-B</td>
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<tr>
<td>1650</td>
<td>Orion1-4-30-165-B</td>
<td>2TLA02056FR1000</td>
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<tr>
<td>1800</td>
<td>Orion1-4-30-180-B</td>
<td>2TLA02056FR1100</td>
<td></td>
</tr>
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</table>

### Spare parts (included when ordering Orion)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 standard brackets for Orion1 &amp; Orion2</td>
<td>JSM Orion01</td>
<td>2TLA02235FR0000</td>
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</table>
### Accessories

#### Mounting accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion Test Piece 14 mm</td>
<td>Orion TP-14</td>
<td>2TLA022310PS000</td>
</tr>
<tr>
<td>Orion Test Piece 30 mm</td>
<td>Orion TP-30</td>
<td>2TLA022310PS000</td>
</tr>
<tr>
<td>Orion Laser pointer</td>
<td>Orion Laser</td>
<td>2TLA022310PS000</td>
</tr>
<tr>
<td>Screw MO6S M5x12 to be used with T-nut, JSM M5B for mounting Orion on Quick-Guard</td>
<td>Screw MO6S</td>
<td>2TLJ0101R0200</td>
</tr>
<tr>
<td>JSM M5B Special T-nut M5 to be used with screw MO6S for mounting Orion on Quick-Guard</td>
<td>T-nut, JSM M5B</td>
<td>2TLA04003FR0400</td>
</tr>
<tr>
<td>4 rotation brackets for Orion Base</td>
<td>JSM Orion03</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 &amp; Orion2 in Stand (4 pieces for lengths shorter than 1200 mm)</td>
<td>JSM Orion06</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 &amp; Orion2 in Stand (6 pieces for lengths of 1200 mm or more)</td>
<td>JSM Orion07</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 Mirror in Stand</td>
<td>JSM Orion11</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Orion Plate kit for adjustment of protective stand</td>
<td>Orion Stand-Plate</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Deviating mirror to be mounted in Orion Stand with one kit JSM Orion11</td>
<td>Orion1 Mirror*</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Protective stand</td>
<td>Orion Stand*</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Protective tube</td>
<td>Orion WET*</td>
<td>2TLA022310PR000</td>
</tr>
<tr>
<td>Lens shield</td>
<td>Orion Shield*</td>
<td>2TLA022310PR000</td>
</tr>
</tbody>
</table>

#### Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile reset button with NO contact</td>
<td>Smile 11 RA</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Pluto</td>
<td>Smile 11 RA</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Orion1 Base</td>
<td>Smile 11RO1</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Y-connector for series connection of DYNlink devices with M12-5 connectors, e.g. Eden</td>
<td>M12-3A</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Y-connector for connection of a Smile reset button to Orion</td>
<td>M12-3R</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Y-connector for easy connection of a transmitter</td>
<td>M12-3D</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNlink, Two M12-5 connectors.</td>
<td>Tina 10A</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNlink with possibility to connect a local reset button, Three M12-5 connectors.</td>
<td>Tina 10B</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNlink with possibility to power the transmitter, Three M12-5 connectors.</td>
<td>Tina 10C</td>
<td>2TLA02233PR000</td>
</tr>
<tr>
<td>Safe AS-i input slave for OSSD, 3 non safe inputs and 1 reset input</td>
<td>Ursa-DIR</td>
<td>2TLA02233PR000</td>
</tr>
</tbody>
</table>

*These accessories are available in different sizes.

For more information see:
- Orion1 Mirror 2TLC172058L0201
- Orion Stand 2TLC172059L0201
- Orion WET 2TLC172061L0201
- Orion Shield 2TLC172071L0201

### How to choose correct reset button

<table>
<thead>
<tr>
<th>Local or global reset</th>
<th>Adaption to DYNlink</th>
<th>Safety controle module</th>
<th>Type</th>
<th>Useful connection modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local reset button connected to the light guard (Orion in manual reset mode)</td>
<td>Yes</td>
<td>Vital or Pluto</td>
<td>Smile 11RO1</td>
<td>Tina 10B: OSSD to DYNlink + local reset button M12-3A: Serial connection of DYNlink</td>
</tr>
<tr>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11RO1</td>
<td>M12-3R: Easy connection of a local reset button</td>
<td></td>
</tr>
<tr>
<td>Global reset button connected to the control module (Orion in automatic reset mode)</td>
<td>Yes</td>
<td>Vital</td>
<td>Smile 11 RA</td>
<td>Tina 10A: OSSD to DYNlink Tina 10C: OSSD to DYNlink + supply to transmitter</td>
</tr>
<tr>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11 RA</td>
<td>Tina 10A: OSSD to DYNlink Tina 10C: OSSD to DYNlink + supply to transmitter</td>
<td></td>
</tr>
</tbody>
</table>

* The ABB Jokab Safety DYNlink solution offers the following advantages:
  - Serial connection of safety devices while maintaining PLe/cat. 4, up to 25 Tina 10 per Vital and up to 5 Tina 10 per Pluto input.
  - Only one safety input of the Pluto instead of two with the standard OSSD outputs.

** Smile 11 RA has one NO contact, which is the most common for reset buttons. Please check what is requested for the chosen safety control module.
### Cables and connectors

**Orion1 Base**

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>20 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C012</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>3 m</td>
<td></td>
<td>M12-C312</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>16 m</td>
<td></td>
<td>M12-C1612</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C083</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>20 m</td>
<td></td>
<td>M12-C203</td>
<td>2TLA020056R0000</td>
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<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C008341</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C314</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>3 m</td>
<td></td>
<td>M12-C334</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td>M12-8 male + female</td>
<td>Female + male</td>
<td>0.2</td>
<td></td>
<td>M12-CT01BA⁴</td>
<td>2TLA020319R0000</td>
</tr>
<tr>
<td>M12-8 male + female</td>
<td>Female + male</td>
<td>0.2</td>
<td></td>
<td>M12-CT01BM⁴</td>
<td>2TLA020319R0000</td>
</tr>
<tr>
<td>M12-8 female - M12-5 male</td>
<td>Female + male</td>
<td>1</td>
<td></td>
<td>M12-CTURAX-O1B³</td>
<td>2TLA022319R0000</td>
</tr>
</tbody>
</table>

1) M12-CT01BA can be used for: - connection of Orion1 Base to Tina 10A/C - replacement of Focus II in automatic reset with Orion in automatic reset. The EDM function should be deactivated in all cases.

2) M12-CT01BM can be used for: - connection of Orion1 Base to Tina 10B or M12-3R for use of a local reset button, for example Smile 11ROx - replacement of Focus II in manual reset with Orion in manual reset. The EDM function should be deactivated in all cases.

3) M12-CTURAX-01B is used for: - the connection of Orion1 Base to URAX-D1R. The light guard is automatically configured in automatic reset and the EDM function should be deactivated.

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>M12-8 pole male</td>
<td>M12-C04</td>
<td>2TLA020056R1000</td>
</tr>
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</table>

#### Cable with 5 conductors

<table>
<thead>
<tr>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 m</td>
<td>C5 cable</td>
<td>2TLA020056R0001</td>
</tr>
<tr>
<td>50 m</td>
<td>C5 cable</td>
<td>2TLA020056R0005</td>
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<tr>
<td>100 m</td>
<td>C5 cable</td>
<td>2TLA020056R0010</td>
</tr>
<tr>
<td>200 m</td>
<td>C5 cable</td>
<td>2TLA020056R0020</td>
</tr>
<tr>
<td>500 m</td>
<td>C5 cable</td>
<td>2TLA020056R0050</td>
</tr>
</tbody>
</table>

#### Cable with 8 conductors

<table>
<thead>
<tr>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 m</td>
<td>C8 cable</td>
<td>2TLA020056R0005</td>
</tr>
<tr>
<td>100 m</td>
<td>C8 cable</td>
<td>2TLA020056R0010</td>
</tr>
<tr>
<td>200 m</td>
<td>C8 cable</td>
<td>2TLA020056R0020</td>
</tr>
<tr>
<td>500 m</td>
<td>C8 cable</td>
<td>2TLA020056R0050</td>
</tr>
</tbody>
</table>
Connection examples
Orion1 Base

**Orion with Tina 10A/C**

Connection to the ABB Jokab Safety DYnlink signal via Tina 10 A/C. To be used with Vital safety control module or Pluto programmable safety controller.

**Reset to Orion with M12-3R**

Connection of a local reset button via M12-3R.

**Reset to Orion with Tina 10B**

Connection to the ABB Jokab Safety DYnlink signal via Tina 10B. To be used with Vital safety control module or Pluto programmable safety controller.
### Technical data

**Orion1 Base**

<table>
<thead>
<tr>
<th>Technical data</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Approvals</strong></td>
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</tr>
<tr>
<td>Conformity</td>
<td>![CE]</td>
</tr>
<tr>
<td>2006/42/EC - Machinery</td>
<td></td>
</tr>
<tr>
<td>2004/108/EC - EMC</td>
<td></td>
</tr>
<tr>
<td><strong>Functional safety data</strong></td>
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</tr>
<tr>
<td>EN 61508:2010</td>
<td>SIL3, PFH(_D) = 2.64 \times 10^{-9}</td>
</tr>
<tr>
<td>EN 62061:2005+A1:2013</td>
<td>SILCL3, PFH(_D) = 2.64 \times 10^{-9}</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>PL e, Cat. 4, PFH(_D) = 2.64 \times 10^{-9}</td>
</tr>
<tr>
<td><strong>Electrical data</strong></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>+24 VDC ± 20%</td>
</tr>
<tr>
<td>Power consumption, transmitter</td>
<td>1.5 W max</td>
</tr>
<tr>
<td>Power consumption, receiver</td>
<td>4 W max (without load)</td>
</tr>
<tr>
<td>Outputs</td>
<td>2 PNP</td>
</tr>
<tr>
<td>Short-circuit protection</td>
<td>1.4 A max</td>
</tr>
<tr>
<td>Output current</td>
<td>0.5 A max / output</td>
</tr>
<tr>
<td>Output voltage – ON</td>
<td>Vdd -1 V min</td>
</tr>
<tr>
<td>Output voltage – OFF</td>
<td>0.2 V max</td>
</tr>
<tr>
<td>Capacitive load</td>
<td>2.2 (\mu)F at +24 VDC max</td>
</tr>
<tr>
<td>Cable length (for power supply)</td>
<td>50 m max</td>
</tr>
<tr>
<td>Connectors</td>
<td>M12-4 pole male on transmitter (compatible with M12-5 pole female)</td>
</tr>
<tr>
<td></td>
<td>M12-8 pole male on receiver</td>
</tr>
<tr>
<td><strong>Optical data</strong></td>
<td></td>
</tr>
<tr>
<td>Light emission ((\lambda))</td>
<td>Infrared, LED (950 nm)</td>
</tr>
<tr>
<td>Resolution</td>
<td>14 or 30 mm</td>
</tr>
<tr>
<td>Operating distance</td>
<td>0.2...19 m for 30 mm</td>
</tr>
<tr>
<td></td>
<td>0.2...6 m for 14 mm</td>
</tr>
<tr>
<td>Ambient light rejection</td>
<td>According to IEC-61496-2:2013</td>
</tr>
<tr>
<td><strong>Mechanical data</strong></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0...+ 55 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25...+ 70 °C</td>
</tr>
<tr>
<td>Humidity range</td>
<td>15...95% (no condensation)</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65 (EN 60529:2000)</td>
</tr>
<tr>
<td>Weight</td>
<td>1.3 kg / meter for each single unit</td>
</tr>
<tr>
<td>Housing material</td>
<td>Painted aluminium (yellow RAL 1003)</td>
</tr>
<tr>
<td>Front glass material</td>
<td>PMMA</td>
</tr>
<tr>
<td>Cap material</td>
<td>PC MAKROLON</td>
</tr>
</tbody>
</table>

**More information**

For more information, e.g. the complete technical information, please see product manual for: Orion1 Base [2TLC172287M0201](#).
Dimension drawings
Orion1 Base

Orion1 Base

All dimensions in mm

<table>
<thead>
<tr>
<th>Protected height</th>
<th>L1 mm</th>
<th>L2 mm</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>233.3</td>
<td>153.3</td>
<td>Orion1-4-xx-015-B</td>
</tr>
<tr>
<td>300</td>
<td>383.2</td>
<td>303.2</td>
<td>Orion1-4-xx-045-B</td>
</tr>
<tr>
<td>450</td>
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<td>453.2</td>
<td>Orion1-4-xx-075-B</td>
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<td>683.3</td>
<td>603.2</td>
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<td>833.2</td>
<td>753.2</td>
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<td>983.2</td>
<td>903.2</td>
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<tr>
<td>1050</td>
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<tr>
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<td>1203.2</td>
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<td>Orion1-4-xx-180-B</td>
</tr>
</tbody>
</table>

xx = Resolution
Safety light curtain
Orion1 Extended

Orion1 Extended is an easy to use light curtain with compact dimensions. It has two resolutions for detection of fingers and hands, and comes with advanced features like cascading, muting and blanking.

Light curtains are usually placed closed to the hazardous zone when repeated access to the machine is necessary, for example manually serviced machines.

Cost effective solution

Easy to install

Integrated muting function
Muting sensors are connected directly to the light grid, with no need for a remote muting module.

No dead zones
The light beams cover all of the profile length, without the usual dead zones at the ends requiring extra mechanical guards.

Easy serial connection
Cascading with the standard units: no separate slave or master units.

Easy to align
Alignment help and a wide angle within the limits of a Type 4 device facilitate installation.

Easy to connect
Cables with M12 connectors speeds up connection.

Continuous operation

Reduced downtime
Extensive error indication reduces troubleshooting time.

Interference protection
Protection against mutual interference with coding.
Features
Orion1 Extended

Finger detection
A 14 mm resolution is intended for finger detection when the light guard needs to be very close to the machine in order to give the operator a good view and easy accessibility to the machine. A 14 mm resolution enables a sensing range of 7 m.

Hand detection
A 30 mm resolution is intended for hand detection and area protection and is a good compromise between cost and accessibility to the machine. A 30 mm resolution enables a sensing range of 20 m.

Blanking
The blanking function allows to define a number of beams that can be constantly interrupted without stopping the machine. In this way a fixed material or a cable is allowed in the protected field, but a hand interrupting an extra beam would stop the machine. With floating blanking, the object, for ex. the cable, can move within the protected field.

No dead zones
A special feature of Orion1 Extended is that the light beams cover all of the profile length, without any dead zones. This enables to place it inside openings, instead of having a larger light guard in front of an opening.

Cascading
All Orion1 Extended units can be connected in series (cascaded) to easily create a suitable light curtain setup with no special units needed.

Muting
By connecting muting sensors to the light guard, it can distinguish material from persons and allow the material to pass through an opening but not persons.

Local reset
A local reset button is connected directly to the light guard instead of to the safety control module in the electrical cabinet. This saves safety relays/programmable inputs and minimizes cabling to the electrical cabinet.

EDM
External Device Monitoring is a feature allowing the light guard to supervise the actuators in simpler applications, eliminating the need for a safety relay or programmable safety controller.
### Ordering information

#### Orion1 Extended

#### Ordering details

<table>
<thead>
<tr>
<th>Resolution mm</th>
<th>Protected height mm</th>
<th>Type (Transmitter + receiver)</th>
<th>Order code</th>
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<td>450</td>
<td>Orion1-4-14-045-E</td>
<td>2TLA222301R0200</td>
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<td>2TLA222301R0300</td>
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<td>750</td>
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<td>2TLA222301R0400</td>
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<td>Hand (30)</td>
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<td>Orion1-4-30-180-E</td>
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#### Spare parts (included when ordering Orion)

<table>
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<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
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<tbody>
<tr>
<td>4 standard brackets for Orion1 &amp; Orion2</td>
<td>JSM Orion01</td>
<td>2TLA222315R0000</td>
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## Accessories
### Orion1 Extended

#### Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection box for two or four muting sensors</td>
<td>OMC1</td>
<td>2TLA022316R2000</td>
</tr>
<tr>
<td>Retroreflex photoelectric sensor</td>
<td>Mute R2</td>
<td>2TLA022344R0500</td>
</tr>
<tr>
<td>Adjustable mounting bracket for M18 sensors (e.g. Mute R2 and Spot 10)</td>
<td>JSM 64</td>
<td>2TLA040000R0200</td>
</tr>
<tr>
<td>Reflector diameter 63 mm</td>
<td>Reflect 1</td>
<td>2TLA022344R0200</td>
</tr>
<tr>
<td>Reflector diameter 82 mm</td>
<td>Reflect 2</td>
<td>2TLA022344R0300</td>
</tr>
<tr>
<td>Smile reset button with NO contact</td>
<td>Smile 1 RA</td>
<td>2TLA020035R0000</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Pluto</td>
<td>Smile 1 RB</td>
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#### Mounting accessories

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Orion Test Piece 14 mm</td>
<td>Orion TP-14</td>
<td>2TLA022315R0200</td>
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<tr>
<td>Orion Test Piece 30 mm</td>
<td>Orion TP-30</td>
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<tr>
<td>Orion Laser pointer</td>
<td>Orion Laser</td>
<td>2TLA022315R0600</td>
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<tr>
<td>Screw M6x12 to be used with T-nut JSM M5B for mounting Orion on Quick-Guard</td>
<td>Screw M6x12</td>
<td>2TLA040101R0020</td>
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<tr>
<td>JSM M5B Special T-nut to be used with screw M6x6 for mounting Orion on Quick-Guard</td>
<td>T-nut JSM M5B</td>
<td>2TLA040035R0400</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 &amp; Orion2 in Stand (4 pieces for lengths shorter than 1200 mm)</td>
<td>JSM Orion06</td>
<td>2TLA022310R0400</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 &amp; Orion2 in Stand (6 pieces for lengths 1200 mm or more)</td>
<td>JSM Orion07</td>
<td>2TLA022310R0500</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 Mirror in Stand</td>
<td>Orion1 Mirror</td>
<td>2TLA022310R0900</td>
</tr>
<tr>
<td>Orion Plate kit for adjustment of protective stand</td>
<td>Orion Stand Plate</td>
<td>2TLA022312R0500</td>
</tr>
<tr>
<td>Deviating mirror to be mounted in Orion Stand with one kit JSM Orion11</td>
<td>Orion1 Mirror*</td>
<td>2TLA022312R0000</td>
</tr>
<tr>
<td>Protective stand</td>
<td>Orion Stand*</td>
<td>2TLA022312R0000</td>
</tr>
</tbody>
</table>

*These accessories are available in different sizes.

For more information see:
- Orion1 Mirror 2TLC172008L0201
- Orion Stand 2TLC172008L0201

For more information about the connection accessories, please see: Orion connection accessories 2TLC172101L0201
## Cables

### Orion1 Extended

#### Cables with connectors

<table>
<thead>
<tr>
<th>Muting to be used</th>
<th>Necessary transmitter/receiver cable</th>
<th>Suitable cable between transmitter/receiver cable and el-cabinet</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Transmitter M12-C02PT2T</td>
<td>M12-5 female single ended, to e.g. el-cabinet</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C101HE</td>
<td>2TLA020056R1000</td>
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<tr>
<td></td>
<td>Receiver M12-C02PT62RM</td>
<td>M12-5 male + female, to e.g. OMC1</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA020056R6000</td>
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<td>M12-C03312</td>
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<td>1 m</td>
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<td>M12-C1112</td>
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<td></td>
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<td></td>
<td>3 m</td>
<td></td>
<td>M12-C3312</td>
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<td>M12-C612</td>
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<td>M12-C1612</td>
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<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA020056R2400</td>
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<td>M12-12 female single ended, to e.g. el-cabinet</td>
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<td></td>
<td>M12-C65</td>
<td>2TLA020056R7200</td>
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<td>10 m</td>
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<td>M12-C105</td>
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<td>20 m</td>
<td></td>
<td>M12-C205</td>
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<td>No</td>
<td>Transmitter M12-C02PT2T</td>
<td>M12-5 female single ended, to e.g. el-cabinet</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
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<tr>
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<td>Receiver M12-C02PT6RB</td>
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#### Separate cables and connectors

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<td>Connectors</td>
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<tr>
<td>M12-5-pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020056R1000</td>
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<tr>
<td>M12-5-pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
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<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020057R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA020057R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA020057R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA020057R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA020057R0050</td>
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<tr>
<td>Special cables for Orion1 Extended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter cable for Orion1 Extended, M12-5 male connector.</td>
<td>0.2 m</td>
<td>M12-C02PT2T</td>
</tr>
<tr>
<td>Receiver cable for Orion1 Extended when no muting, M12-12 male connector.</td>
<td>0.2 m</td>
<td>M12-C02PT6RB</td>
</tr>
<tr>
<td>Receiver cable for Orion1 Extended when muting, M12-5 male connector (for muting sensors) and M12-12 male connector.</td>
<td>0.2 m</td>
<td>M12-C02PT62RM</td>
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<tr>
<td>Cascade cable for Orion1 Extended</td>
<td>1 m</td>
<td>PT-C1PT</td>
</tr>
<tr>
<td>Cascade cable for Orion1 Extended</td>
<td>0.5 m</td>
<td>PT-C05PT</td>
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<td>Cascade cable for Orion1 Extended</td>
<td>0.05 m</td>
<td>PT-C05SP</td>
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</table>
Connection example
Orion1 Extended

Connection of the muting sensors with M12-C02PT62RM and OMC1

NB: Cable with M12-5 male + female connectors shall be used between muting sensors and OMC1 inputs A1, B1, A2, B2.

1. +24 VDC
2. —
3. 0 V
4. Muting input
5. —
**Technical data**

**Orion1 Extended**

### Technical data

#### Approvals

<table>
<thead>
<tr>
<th>Conformity</th>
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<tbody>
<tr>
<td>2006/42/EC - Machinery</td>
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<tr>
<td>2004/108/EC - EMC</td>
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<tr>
<td>EN ISO 13849-1:2008,</td>
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<tr>
<td>EN 62061:2005/A1:2013,</td>
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<tr>
<td>EN 61496-1:2013,</td>
</tr>
</tbody>
</table>

#### Functional safety data

- **EN 61508:2010**
  - SIL3, PFH \(_D = 2.64 \times 10^{-9}\)
- **EN 62061:2005+A1:2013**
  - SILCL3, PFH \(_D = 2.64 \times 10^{-9}\)
- **EN ISO 13849-1:2008**
  - PLe, Cat. 4, PFH \(_D = 2.64 \times 10^{-9}\)

#### Electrical data

- **Power supply**
  - +24 VDC ± 20%
- **Power consumption, Transmitter**
  - 3 W max
- **Power consumption, Receiver**
  - 5 W max (without load)
- **Outputs**
  - 2 PNP
- **Short-circuit protection**
  - 1.4 A max
- **Output current**
  - 0.5 A max / output
- **Output voltage – ON**
  - Vdd - 1 V min
- **Output voltage – OFF**
  - 0.2 V max
- **Capacitive load**
  - 2.2 μF at +24 VDC max
- **Current for external lamp**
  - 20 mA min; 200 mA max
- **Cable length (for power supply)**
  - 50 m max
- **Connectors**
  - M12-4 pole male on transmitter (compatible with M12-5 pole female)
  - M12-8 pole male on receiver

#### Optical data

- **Light emission (\(\lambda\))**
  - Infrared, LED (950 nm)
- **Resolution**
  - 14 or 30 mm
- **Operating distance**
  - 0.2...20 m for 30 mm
  - 0.2...7 m for 14 mm
- **Ambient light rejection**
  - According to IEC-61496-2:2013

#### Mechanical data

- **Operating temperature**
  - 0...+50 °C
- **Storage temperature**
  - -25...+70 °C
- **Humidity range**
  - 15...95% (no condensation)
- **Protection class**
  - IP65 (EN 60529:2003)
- **Weight**
  - 1.35 kg / meter for each single unit
- **Housing material**
  - Painted aluminium (yellow RAL 1003)
- **Front glass material**
  - PMMA
- **Cap material**
  - PBT Valox 508

For more information, e.g. the complete technical information, see product manual for: Orion1 Extended [2TLC172280M0201](#)
Dimension drawings
Orion1 Extended

Orion1 Extended

All dimensions in mm

<table>
<thead>
<tr>
<th>Dimension</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>Type</th>
</tr>
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<tbody>
<tr>
<td>300</td>
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<tr>
<td>450</td>
<td>456.3</td>
<td></td>
<td>Orion1-4-xx-045-E</td>
</tr>
<tr>
<td>600</td>
<td>606.3</td>
<td></td>
<td>Orion1-4-xx-060-E</td>
</tr>
<tr>
<td>750</td>
<td>756.3</td>
<td></td>
<td>Orion1-4-xx-075-E</td>
</tr>
<tr>
<td>900</td>
<td>906.3</td>
<td></td>
<td>Orion1-4-xx-090-E</td>
</tr>
<tr>
<td>1050</td>
<td>1056.3</td>
<td></td>
<td>Orion1-4-xx-105-E</td>
</tr>
<tr>
<td>1200</td>
<td>1206.3</td>
<td></td>
<td>Orion1-4-xx-120-E</td>
</tr>
<tr>
<td>1350</td>
<td>1356.3</td>
<td></td>
<td>Orion1-4-xx-135-E</td>
</tr>
<tr>
<td>1500</td>
<td>1506.3</td>
<td></td>
<td>Orion1-4-xx-150-E</td>
</tr>
<tr>
<td>1650</td>
<td>1656.3</td>
<td></td>
<td>Orion1-4-xx-165-E</td>
</tr>
<tr>
<td>1800</td>
<td>1806.3</td>
<td></td>
<td>Orion1-4-xx-180-E</td>
</tr>
</tbody>
</table>

xx = Resolution (14 or 30 mm)
Safety Light Grid
Orion2 Base

Orion2 Base is a compact light grid for access protection.

The light grid has 2-4 beams and is intended for body detection.

With an operating distance of 50 m between transmitter and receiver the light grid is suitable for applications with deviating mirrors.

Cost effective solution

Minimized cabling
A local reset button can be connected directly to the light grid, eliminating the need for cable between the reset button and the electrical cabinet or for an extra control module.

External device monitoring
Each light grid can monitor the actuators without any extra control module (EDM function).

Easy to install

Alignment help
Alignment help and a wide angle within the limits of a Type 4 device facilitate installation.

Easy adjustment
Rotation brackets makes alignment easy.

Fast connection
M12 connectors speed up cabling.

Continuous operation

Protection in harsh environments
The housing is IP65 rated, and protective tubes and lens shields are available to provide further protection for the device in harsh environments.
Applications and features
Orion2 Base

Application

**Body detection over long distances**
With 2-4 beams and a maximum sensing range of 50 m between transmitter and receiver, the light grid is intended for body detection and can be used with deviating mirrors to form a protective perimeter around a dangerous area.

Features

**EDM**
External Device Monitoring is a feature allowing the light guard to supervise the actuators in simpler applications, eliminating the need for a safety relay or programmable safety controller.

**Local reset**
A local reset button is connected directly to the light guard instead of to the safety control module in the electrical cabinet. This saves safety relays/programmable inputs and minimizes cabling to the electrical cabinet. Clever accessories make the connection easier.
## Ordering information
### Orion2 Base

### Ordering details

<table>
<thead>
<tr>
<th>Detection</th>
<th>Protected height (mm)</th>
<th>Type (Transmitter + receiver)</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>500 (2 beams)</td>
<td>Orion2-4-K2-050-B</td>
<td>2TLA222304R0000</td>
</tr>
<tr>
<td></td>
<td>800 (3 beams)</td>
<td>Orion2-4-K3-080-B</td>
<td>2TLA222304R0100</td>
</tr>
<tr>
<td></td>
<td>900 (4 beams)</td>
<td>Orion2-4-K4-090-B</td>
<td>2TLA222304R0200</td>
</tr>
<tr>
<td></td>
<td>1200 (4 beams)</td>
<td>Orion2-4-K4-120-B</td>
<td>2TLA222304R0300</td>
</tr>
</tbody>
</table>

### Spare parts (included when ordering Orion)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 standard brackets for Orion1 &amp; Orion2</td>
<td>JSM Orion01</td>
<td>2TLA222319R0000</td>
</tr>
</tbody>
</table>
## Accessories

### Orion2 Base

### Mounting accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion Test Piece 14 mm</td>
<td>Orion TP-14</td>
<td>2TLA22310PR500</td>
</tr>
<tr>
<td>Orion Test Piece 30 mm</td>
<td>Orion TP-30</td>
<td>2TLA22310PR600</td>
</tr>
<tr>
<td>Orion Laser pointer</td>
<td>Orion Laser</td>
<td>2TLA22310PR5000</td>
</tr>
<tr>
<td>Screw MO65 M5x12 to be used with T-nut JSM M5B for mounting Orion on Quick-Guard</td>
<td>Screw MO65</td>
<td>2TLA041015R0200</td>
</tr>
<tr>
<td>JSM M5B Special T-nut M5 to be used with screw MO65 for mounting Orion on Quick-Guard</td>
<td>JSM M5B</td>
<td>2TLA040303R0400</td>
</tr>
<tr>
<td>4 rotation brackets for Orion</td>
<td>JSM Orion04</td>
<td>2TLA22310PR3000</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 &amp; Orion2 in Stand (4 pieces for lengths shorter than 1200 mm)</td>
<td>JSM Orion06</td>
<td>2TLA22310PR4000</td>
</tr>
<tr>
<td>Kit for mounting of Orion1 &amp; Orion2 in Stand (6 pieces for lengths of 1200 mm or more)</td>
<td>JSM Orion07</td>
<td>2TLA22310PR5000</td>
</tr>
<tr>
<td>Orion Plate kit for adjustment of protective stand</td>
<td>Orion Stand Plate</td>
<td>2TLA22312R5000</td>
</tr>
<tr>
<td>Deviating mirror in stand for Orion 2 and 3</td>
<td>Orion Mirror*</td>
<td>2TLA22312R5000</td>
</tr>
<tr>
<td>Protective stand</td>
<td>Orion Stand*</td>
<td>2TLA22312R5000</td>
</tr>
<tr>
<td>Protective tube</td>
<td>Orion WET*</td>
<td>2TLA22312R5000</td>
</tr>
<tr>
<td>Lens shield</td>
<td>Orion Shield*</td>
<td>2TLA22312R5000</td>
</tr>
</tbody>
</table>

### Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile reset button with NO contact</td>
<td>Smile 11 RA</td>
<td>2TLA03003R0000</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Pluto</td>
<td>Smile 11 RB</td>
<td>2TLA03003R0100</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Orion1 Base</td>
<td>Smile 11 RO1</td>
<td>2TLA22316R0300</td>
</tr>
<tr>
<td>Y-connector for series connection of Dynlink devices with M12-5 connectors, e.g. Eden</td>
<td>M12-3A</td>
<td>2TLA20055P0000</td>
</tr>
<tr>
<td>Y-connector for connection of a Smile reset button to Orion</td>
<td>M12-3R</td>
<td>2TLA22316R0000</td>
</tr>
<tr>
<td>Y-connector for easy connection of a transmitter</td>
<td>M12-3D</td>
<td>2TLA22055P0300</td>
</tr>
<tr>
<td>Adaptation of OSSD to Dynlink, Two M12-5 connectors.</td>
<td>Tina 10A</td>
<td>2TLA20054R1200</td>
</tr>
<tr>
<td>Adaptation of OSSD to Dynlink with possibility to connect a local reset button. Three M12-5 connectors.</td>
<td>Tina 10B</td>
<td>2TLA20054R1300</td>
</tr>
<tr>
<td>Adaptation of OSSD to Dynlink with possibility to power the transmitter. Three M12-5 connectors.</td>
<td>Tina 10C</td>
<td>2TLA20054R1600</td>
</tr>
<tr>
<td>Safe AS-i input slave for OSSD, 3 non safe inputs and 1 reset input</td>
<td>Tina-D1R</td>
<td>2TLA20072P0500</td>
</tr>
</tbody>
</table>

*These accessories are available in different sizes. For more information see: Orion Mirror 2TLC172060L0201, Orion Stand 2TLC172059L0201, Orion WET 2TLC172061L0201, Orion Shield 2TLC172071L0201.

For more information about the connection accessories, please see: Orion connection accessories 2TLC172101L0201

### How to choose correct reset button

<table>
<thead>
<tr>
<th>Local or global reset</th>
<th>Adaption to Dynlink</th>
<th>Safety controle module</th>
<th>Type</th>
<th>Useful connection accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local reset button connected to the light guard (Orion in manual reset mode)</td>
<td>Yes</td>
<td>Vital or Pluto</td>
<td>Smile 11 RO2</td>
<td>Tina 10B: OSSD to Dynlink + local reset button M12-3A: Serial connection of the Dynlink</td>
</tr>
<tr>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11 RO2</td>
<td>M12-3R: Easy connection of a local reset button</td>
<td></td>
</tr>
<tr>
<td>Global reset button connected to the control module (Orion in automatic reset mode)</td>
<td>Yes</td>
<td>Vital</td>
<td>Smile 11 RA</td>
<td>Tina 10A: OSSD to Dynlink Tina 10C: OSSD to Dynlink + supply to transmitter</td>
</tr>
<tr>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11 RB</td>
<td>Pluto</td>
<td>Tina 10A: OSSD to Dynlink Tina 10C: OSSD to Dynlink + supply to transmitter</td>
</tr>
</tbody>
</table>

* The ABB Jokab Safety Dynlink solution offers the following advantages:
  - Serial connection of safety devices while maintaining PLe/cat. 4, up to 25 Tina 10 per Vital and up to 5 Tina 10 per Pluto input.
  - Only one safety input of the Pluto instead of two with the standard OSSD outputs.

** Smile 11RA has one NO contact, which is the most common for reset buttons. Please check what is requested for the chosen safety control module.
## Cables

### Orion2 Base

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>M12-C61</td>
<td>2TLA020056R0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C610HE</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td>M12-C3012</td>
<td>2TLA020056R0800</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td>M12-C0012</td>
<td>2TLA020056R0800</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td>M12-C112</td>
<td>2TLA020056R0800</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td>M12-C312</td>
<td>2TLA020056R2100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td>M12-C612</td>
<td>2TLA020056R2200</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C1012</td>
<td>2TLA020056R2200</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>M12-C1612</td>
<td>2TLA020056R4500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C2012</td>
<td>2TLA020056R4400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td>M12-C0012</td>
<td>2TLA020056R0800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td>M12-C112</td>
<td>2TLA020056R4400</td>
<td></td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td>M12-C63</td>
<td>2TLA020056R0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C103</td>
<td>2TLA020056R4000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C203</td>
<td>2TLA020056R4100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td>M12-C0012</td>
<td>2TLA020056R0800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td>M12-C112</td>
<td>2TLA020056R4400</td>
<td></td>
</tr>
<tr>
<td>M12-8 female + M12-5 male</td>
<td>Female + male</td>
<td>1</td>
<td>M12-CT1322</td>
<td>2TLA020060R0600</td>
<td></td>
</tr>
</tbody>
</table>

1) Used for the connection to Tina 10, M12-3D and M12-3R. Tina 10 can be connected directly to the light guard without cable, but will form an angle (i.e. not be aligned) with the light guard, which might be a problem if the light guard is mounted close to a wall/aluminum profile.

2) M12-CT132 is used for the connection of Orion2 Base to URAX-D1R.

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020056R1100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA020056R1500</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA020056R1700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable with 5 conductors</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020057R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA020057R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA020057R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA020057R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA020057R0050</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable with 8 conductors</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA020057R1005</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 100 m</td>
<td>2TLA020057R1010</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA020057R1020</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA020057R1050</td>
</tr>
</tbody>
</table>
# Technical data
## Orion2 Base

### Technical data

#### Approvals

<table>
<thead>
<tr>
<th>Conformity</th>
<th>2006/42/EC - Machinery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2004/108/EC - EMC</td>
</tr>
</tbody>
</table>

#### Functional safety data

- **EN 61508:2010**: SIL3, PFH \( D = 2.64 \times 10^{-9} \)
- **EN 62061:2005+A1:2013**: SIL3, PFH \( D = 2.64 \times 10^{-9} \)
- **EN ISO 13849-1:2008**: PL e, Cat. 4, PFH \( D = 2.64 \times 10^{-9} \)

#### Electrical data

<table>
<thead>
<tr>
<th>Power supply</th>
<th>+24 VDC ± 20% (SELV/PELV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumtion, Transmitter</td>
<td>30 mA max / 0.9 W</td>
</tr>
<tr>
<td>Power consumption, Receiver</td>
<td>75 mA max (without load) / 2.2 W</td>
</tr>
<tr>
<td>Cable length (for power supply)</td>
<td>50 m max with 50 nF capacitive load and +24 VDC</td>
</tr>
<tr>
<td>Internal capacitance</td>
<td>23 nF (Transmitter) / 120 nF (Receiver)</td>
</tr>
</tbody>
</table>

#### Outputs

- **2 PNP**
- **Short-circuit protection**: Max 1.4 A at 55 °C, min. 1.1 A at -10 °C
- **Output current**: 0.5 A max / output
- **Leakage current**: < 1 mA
- **Capacitive load (pure)**: 65 nF max at 25 °C
- **Resitive load (pure)**: 56 Ω min at +24 VDC
- **Current for external lamp**: 20 mA min, 250 mA max

#### Connectors

- **M12-4 pole male on transmitter (compatible with M12-5 pole female)**
- **M12-8 pole male on receiver**

#### Optical data

<table>
<thead>
<tr>
<th>Light emission (λ)</th>
<th>Infrared, LED (880 nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>315 - 515 mm</td>
</tr>
<tr>
<td>Operating distance</td>
<td>0.5…50 m</td>
</tr>
<tr>
<td>Ambient light rejection</td>
<td>According to IEC-61496-2:2013</td>
</tr>
</tbody>
</table>

#### Mechanical data

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>10…+ 55 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>- 25…+ 70 °C</td>
</tr>
<tr>
<td>Humidity range</td>
<td>15…95% (no condensation)</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65 (EN 60529:2000)</td>
</tr>
<tr>
<td>Weight</td>
<td>1.2 kg max / meter for each single unit</td>
</tr>
<tr>
<td>Housing material</td>
<td>Painted aluminium (yellow RAL 1003)</td>
</tr>
<tr>
<td>Front glass material</td>
<td>PMMA</td>
</tr>
<tr>
<td>Cap material</td>
<td>PC Lexan 943A</td>
</tr>
</tbody>
</table>
Dimension drawings
Orion2 Base

All dimensions in mm

<table>
<thead>
<tr>
<th>Lr (mm)</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>617</td>
<td>664</td>
<td>538.4</td>
<td>Orion2-4-K2-060-B</td>
</tr>
<tr>
<td>917</td>
<td>964</td>
<td>838.4</td>
<td>Orion2-4-K3-080-B</td>
</tr>
<tr>
<td>1017</td>
<td>1064</td>
<td>938.4</td>
<td>Orion2-4-K4-090-B</td>
</tr>
<tr>
<td>1317</td>
<td>1364</td>
<td>1238.4</td>
<td>Orion2-4-K4-120-B</td>
</tr>
</tbody>
</table>

xx = Resolution
Orion2 Extended is a compact light grid for access protection in muting applications.

The light grid has 2-4 beams and is intended for body detection.

Cost effective solution

Integrated muting function
Muting sensors are connected directly to the light grid, with no need for a remote muting module.

Minimized cabling
A local reset button can be connected directly to the light grid, eliminating the need for cable between the reset button and the electrical cabinet.

External device monitoring (EDM)
Each light grid can monitor the actuators without any extra control module.

Easy to install

Alignment help
Alignment help and a wide angle within the limits of a Type 4 device facilitate installation.

Easy adjustment
Rotation brackets makes alignment easy.

Fast connection
M12 connectors speed up cabling.

Continuous operation

Protection in harsh environments
The housing is IP65 rated, and protective tubes and lens shields are available to provide further protection for the device in harsh environments.
Features
Orion2 Extended

**Muting**
Orion2 Extended is intended for muting applications. By connecting muting sensors to the light guard, it can distinguish material from persons and allow the material to pass through an opening but not persons. Muting sensors and a connection box for muting are available to simplify the muting application.

**EDM**
External Device Monitoring is a feature allowing the light guard to supervise the actuators in simpler applications, eliminating the need for a safety relay or programmable safety controller.

**Local reset**
A local reset button is connected directly to the light guard instead of to the safety control module in the electrical cabinet. This saves safety relays/PLC inputs and minimizes cabling to the electrical cabinet. Clever accessories makes the connection easier.
Ordering information
Orion2 Extended

Ordering details

<table>
<thead>
<tr>
<th>Resolution (Detection) mm</th>
<th>Protected height mm</th>
<th>Type (Transmitter + receiver)</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>500 (2 beams)</td>
<td>Orion2-4-K2-050-E</td>
<td>2TLA222306R0000</td>
</tr>
<tr>
<td></td>
<td>800 (3 beams)</td>
<td>Orion2-4-K3-080-E</td>
<td>2TLA222306R0100</td>
</tr>
<tr>
<td></td>
<td>900 (4 beams)</td>
<td>Orion2-4-K4-090-E</td>
<td>2TLA222306R0200</td>
</tr>
<tr>
<td></td>
<td>1200 (4 beams)</td>
<td>Orion2-4-K4-120-E</td>
<td>2TLA222306R0300</td>
</tr>
</tbody>
</table>

Spare parts (included when ordering Orion)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 standard brackets for Orion1 &amp; Orion2</td>
<td>JSM Orion01</td>
<td>2TLA222319R0000</td>
</tr>
</tbody>
</table>
## Accessories
### Orion2 Extended

### Connection accessories

**Description**
- Connection box for two or four muting sensors: OMC1
- Retroreflect photoelectric sensor: Mute R2
- Adjustable mounting bracket for M18 sensors (e.g., Mute R2 and Spot 10): JSM 64
- Reflector diameter 63 mm: Reflect 1
- Reflector diameter 82 mm: Reflect 2
- Smile reset button with NO contact for Pluto: Smile 11 RA
- Smile reset button with NC contact for Orion2 Base/Extended and Orion3 Extended: Smile 11 RO2
- Y-connector for series connection of DYNlink devices with M12-5 connectors, e.g., Eden: M12-3A
- Y-connector for connection of a Smile reset button to Orion M12-3R
- Y-connector for easy connection of a transmitter M12-3D
- Adaptation of OSSD to DYNlink, Two M12-5 connectors: Tina 10A
- Adaptation of OSSD to DYNlink with possibility to connect a local reset button, Three M12-5 connectors: Tina 10B
- Adaptation of OSSD to DYNlink with possibility to power the transmitter, Three M12-5 connectors: Tina 10C
- Safe AS+ input slave for OSSD, 3 non-safe inputs and one reset input: Unae D1R

**Order code**
- 2TLA022316R2000
- 2TLA022316R0000
- 2TLA022316R0100
- 2TLA022316R1300
- 2TLA022316R1600
- 2TLA022044R0500
- 2TLA022044R3000
- 2TLA020055R0000
- 2TLA020055R0300
- 2TLA020055R0400
- 2TLA020055R0600
- 2TLA020055R0900
- 2TLA022310R5200
- 2TLA022310R5300
- 2TLA020072R0500
- 2TLA022310R0000
- 2TLA022310R0200
- 2TLA022310R0400
- 2TLA022310R0500
- 2TLA022310R0600
- 2TLA022310R0800

### Mounting accessories

- Orion Test Piece 14 mm: Orion TP-14
- Orion Test Piece 30 mm: Orion TP-30
- Orion Laser pointer: Orion Laser
- Screw M6x12: JSM M5B
- 4 standard brackets for Orion1 & Orion2: JSM Orion01
- 4 rotation brackets for Orion2: JSM Orion04
- Kit for mounting of Orion 1 & Orion 2 in Stand (4 pieces for lengths shorter than 1200 mm): JSM Orion06
- Kit for mounting of Orion 1 & Orion 2 in Stand (6 pieces for lengths of 1200 mm or more): JSM Orion07
- Orion Plate kit for adjustment of protective stand: Orion Stand Plate
- Deviating mirror in stand for Orion 2 and 3: Orion Mirror*
- Protective stand: Orion Stand*
- Protective tube: Orion WET*
- Lens shield: Orion Shield*

**Order code**
- 2TLA022310R5200
- 2TLA022310R5300
- 2TLA022310R0000
- 2TLA022310R0200
- 2TLA022310R0400
- 2TLA022310R0500
- 2TLA022310R0600
- 2TLA022310R0800

*These accessories are available in different sizes. For more information see:
- Orion Mirror 2TLC172060L0201
- Orion Stand 2TLC172059L0201
- Orion WET 2TLC172061L0201
- Orion Shield 2TLC172071L0201

For more information about the connection accessories, please see:
- Orion connection accessories 2TLC172101L0201

### How to choose correct reset button

**Local or global reset**
- **Orion in manual reset mode**: No
- **Orion in automatic reset mode**: Yes

**Adaptation to DYNlink**
- Yes: Smile 11 RO2
- No: Smile 11 RC2

**Safety control module**
- Smile 11 RO2: Tina 10B: OSSD to DYNlink + local reset button
- Smile 11 RA: Tina 10A: OSSD to DYNlink
- Smile 11 RC2: Tina 10A: OSSD to DYNlink + supply to transmitter
- Smile 11 RB: Tina 10C: OSSD to DYNlink + supply to transmitter

**Type**
- Vital or Pluto: M12-3A: Serial connection of DYNlink
- Smile 11 RA: M12-3R: Easy connection of a local reset button
- Pluto: M12-3A: Serial connection of DYNlink

**Useful connection accessories**
- M12-3A: Serial connection of DYNlink
- M12-3R: Easy connection of a local reset button
- M12-3A: Serial connection of DYNlink
- M12-3A: Serial connection of DYNlink

**How to choose correct reset button**

* The ABB Jokab Safety DYNlink solution offers the following advantages:
  - Serial connection of safety devices while maintaining PLe/cat. 4, up to 25 Tina 10 per Vital and up to 5 Tina 10 per Pluto input.
  - Only one safety input of the Pluto instead of two with the standard OSSD outputs.
  - Smile 11 RA has one NO contact, which is the most common for reset buttons. Please check what is requested for the chosen safety control module.
### Cables

#### Orion2 Extended

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA20035FR8000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA20035FR6000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C112</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA20035FR2000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>16 m</td>
<td></td>
<td>M12-C1612</td>
<td>2TLA20035FR4000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA20035FR4000</td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C63</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C006341</td>
<td>2TLA20035FR6000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C1341</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>3 m</td>
<td></td>
<td>M12-C3341</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td>M12-8 male + female</td>
<td>Female + male</td>
<td>0.2</td>
<td></td>
<td>M12-CT1322</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td>M12-8 female - M12-5 male</td>
<td>Female + male</td>
<td>1</td>
<td></td>
<td>M12-CYMUTE2</td>
<td>2TLA20035FR0000</td>
</tr>
</tbody>
</table>

1) Used for the connection to Tina 10, M12 3D and M12-3R. Tina 10 can be connected directly to the light guard without cable, but will form an angle (i.e. not be aligned) with the light guard, which might be a problem if the light guard is mounted close to a wall/aluminum profile.

2) M12-CT132 is used for the connection of Orion2 Extended to URAX-D1R.

3) M12-CYMUTE is used to simplify the connection of 2 or 4 muting sensors with the help of the OMC1 connection box.

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5-pole female, straight</td>
<td>M12-C01</td>
<td>2TLA20035FR1000</td>
</tr>
<tr>
<td>M12-5-pole male, straight</td>
<td>M12-C02</td>
<td>2TLA20035FR1000</td>
</tr>
<tr>
<td>M12-8-pole female, straight</td>
<td>M12-C03</td>
<td>2TLA20035FR1000</td>
</tr>
<tr>
<td>M12-8-pole male, straight</td>
<td>M12-C04</td>
<td>2TLA20035FR1000</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA20035FR0000</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA20035FR0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA20035FR0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA20035FR0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA20035FR0050</td>
</tr>
<tr>
<td>Cable with 8 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA20035FR0005</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 100 m</td>
<td>2TLA20035FR0010</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA20035FR0020</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA20035FR0050</td>
</tr>
</tbody>
</table>
Connection examples
Orion2 Extended

Orion with Tina 10A/C

Connection to the ABB Jokab Safety DYnlink signal via Tina 10 A/C. To be used with Vital safety control module or Pluto programmable safety controller.

Reset to Orion with Tina 10B

Connection to the ABB Jokab Safety DYnlink signal via Tina 10B. To be used with Vital safety control module or Pluto programmable safety controller.

Reset to Orion with M12-3R

Connection of a local reset button via M12-3R.

Connection of muting sensors with M12-CYMUTE and OMC1

NB: Cable with M12-5 male + female connectors shall be used between muting sensors and OMC1 inputs A1, B1, A2, B2.
## Technical data

### Orion2 Extended

#### Approvals

- CE
- 2006/42/EC - Machinery
- 2004/108/EC - EMC

#### Functional safety data

- EN 61508:2010
- SIL3, PFH = 2.64 x 10^-9
- SILCL3, PFH = 2.64 x 10^-9
- EN ISO 13849-1:2008
- PL e, Cat. 4, PFH = 2.64 x 10^-9

#### Electrical data

- **Internal capacitance**
  - 23 nF (Transmitter) / 120 nF (Receiver)
- **Power supply**
  - +24 VDC ± 20% (SELV/PELV)
- **Power consumption, Transmitter**
  - 0.5 W during normal operation
- **Power consumption, Receiver**
  - 2 W during normal operation
- **Outputs**
  - 2 PNP
- **Short-circuit protection**
  - Max 1.4 A at 55 °C, min 1.1 A at -10 °C
- **Output current**
  - 0.5 A max / output
- **Leakage current**
  - < 1 mA
- **Capacitive load (pure)**
  - 65 nF max at 25 °C
- **Resistive load (pure)**
  - 56 Ω min at +24 VDC
- **Current for external lamp**
  - 20 mA min, 250 mA max
- **Response time**
  - 2 and 3 beams: 14 ms; 4 beams: 16 ms

#### Connectors

- M12-4 pole male on transmitter (compatible with M12-5 pole female)
- M12-8 pole male on receiver

#### Optical data

- **Light emission (λ)**
  - Infrared (880 nm)
- **Resolution**
  - 315 - 515 mm
- **Operating distance**
  - 0.5…50 m
- **Ambient light rejection**
  - According to IEC-61496-2:2013

#### Mechanical data

- **Operating temperature**
  - -10...+ 55 °C
- **Storage temperature**
  - -25...+ 70 °C
- **Humidity range**
  - 15...95% (no condensation)
- **Protection class**
  - IP65 (EN 60529:2000)
- **Weight**
  - 1.2 kg max / meter for each single unit
- **Housing material**
  - PC Lexan 943A
- **Lens material**
  - PMMA
- **Cap material**
  - PC MAKROLON

---

For more information, e.g. the complete technical information, see manual for: Orion2 Extended [2TLC172291M0201](#)
Dimension drawings
Orion2 Extended

Orion2 Extended

All dimensions in mm

<table>
<thead>
<tr>
<th>Lr (mm)</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>617</td>
<td>664</td>
<td>538.4</td>
<td>Orion2-4-K2-050-E</td>
</tr>
<tr>
<td>917</td>
<td>964</td>
<td>838.4</td>
<td>Orion2-4-K3-080-E</td>
</tr>
<tr>
<td>1017</td>
<td>1064</td>
<td>938.4</td>
<td>Orion2-4-K4-090-E</td>
</tr>
<tr>
<td>1317</td>
<td>1364</td>
<td>1238.4</td>
<td>Orion2-4-K4-120-E</td>
</tr>
</tbody>
</table>
Safety Light Grid
Orion3 Base

Orion3 Base is a light grid with a sturdy profile for access protection.

Only one of the parts needs power supply, since both transmitter and receiver are in the same active part. The other part is passive with mirrors to reflect the beams.

With 2-4 beams and an operating range of up to 8 m, it is intended for body detection.

Easy to install
Alignment help
Alignment help and a wide angle within the limits of a Type 4 device facilitate installation.

Easy adjustment
Rotation brackets makes alignment easy.

Fast connection
M12 connectors speed up cabling.

Less cabling
Only the active part needs connecting.

Cost effective solution
Minimized cabling
A local reset button can be connected directly to the light grid, eliminating the need for cable between the reset button and the electrical cabinet or for an extra control module.

External device monitoring
Each light grid can monitor the actuators without any extra control module (EDM function).

Continuous operation
Visible alignment level
Since the alignment level is displayed, the alignment can be improved before the occurrence of an unwanted stop.

Extensive error indication
Extensive error indication reduces troubleshooting time.
Sturdy profile for demanding applications
With its thicker and sturdier profile Orion3 is suitable for applications with tougher requirements.

Power on one side
Both transmitter and receiver is in one active part, and the other part is passive containing mirrors. This simplifies installation and saves cables, making it easier to place in applications where cables needs to be avoided.

EDM
External Device Monitoring is a feature allowing the light guard to supervise the actuators in simpler applications, eliminating the need for a safety relay or programmable safety controller.

Local reset
A local reset button is connected directly to the light guard instead of to the safety control module in the electrical cabinet. This saves safety relays/PLC inputs and minimizes cabling to the electrical cabinet. Clever accessories makes the connection easier.
## Ordering information
### Orion3 Base

### Ordering details

<table>
<thead>
<tr>
<th>Detection</th>
<th>Protected height</th>
<th>Active or passive part</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>500 (2 beams)</td>
<td>Active part</td>
<td>Orion3-4-K1C-050-B</td>
<td>2TLA02239FR0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M1C-050</td>
<td>2TLA02239FR1000</td>
</tr>
<tr>
<td></td>
<td>800 (3 beams)</td>
<td>Active part</td>
<td>Orion3-4-K2C-080-B</td>
<td>2TLA02239FR0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M2C-080</td>
<td>2TLA02239FR1100</td>
</tr>
<tr>
<td></td>
<td>900 (4 beams)</td>
<td>Active part</td>
<td>Orion3-4-K2C-090-B</td>
<td>2TLA02239FR0200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M2C-090</td>
<td>2TLA02239FR1300</td>
</tr>
<tr>
<td></td>
<td>1200 (4 beams)</td>
<td>Active part</td>
<td>Orion3-4-K2C-120-B</td>
<td>2TLA02239FR0300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M2C-120</td>
<td>2TLA02239FR1400</td>
</tr>
</tbody>
</table>

### Spare parts (included when ordering Orion)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 standard brackets for Orion3</td>
<td>JSM Orion02</td>
<td>2TLA022310R1000</td>
</tr>
</tbody>
</table>
### Accessories

#### Orion3 Base

**Mounting accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion Laser pointer</td>
<td>Orion Laser</td>
<td>2TLA022310R5000</td>
</tr>
<tr>
<td>Screw M6x12 to be used with T-nut JSM M5B for mounting Orion on Quick-Guard</td>
<td>Screw M6x12</td>
<td>2TLJ041012R0100</td>
</tr>
<tr>
<td>JSM M5B Special T-nut M5 to be used with screw M6x12 for mounting Orion on Quick-Guard</td>
<td>JSM Screw M5B</td>
<td>2TLA040035R0400</td>
</tr>
<tr>
<td>4 standard brackets for Orion3</td>
<td>JSM OrionG</td>
<td>2TLA022310R0300</td>
</tr>
<tr>
<td>Kit for mounting of Orion3 in Stand (4 pieces for lengths shorter than 1200 mm)</td>
<td>JSM Orion08</td>
<td>2TLA022310R0600</td>
</tr>
<tr>
<td>Kit for mounting of Orion3 in Stand (6 pieces for lengths of 1200 mm or more)</td>
<td>JSM Orion09</td>
<td>2TLA022310R7000</td>
</tr>
<tr>
<td>Orion Plate kit for adjustment of protective stand</td>
<td>Orion Stand Plate</td>
<td>2TLA022312R5000</td>
</tr>
</tbody>
</table>

**Deviating mirror in stand for Orion 2 and 3**

**Protective stand**

**Connection accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile reset button with NO contact</td>
<td>Smile 11 RA</td>
<td>2TLA00035R0000</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Pluto</td>
<td>Smile 11 RB</td>
<td>2TLA00035R0100</td>
</tr>
<tr>
<td>Smile reset button with NC contact for Orion3 Base</td>
<td>Smile 11 RO3</td>
<td>2TLA02316R0200</td>
</tr>
<tr>
<td>Y-connector for series connection of DYNlink devices with M12-5 connectors, e.g. Eden</td>
<td>M12-3A</td>
<td>2TLA02059R0300</td>
</tr>
<tr>
<td>Y-connector for connection of a Smile reset button to Orion</td>
<td>M12-3R</td>
<td>2TLA022316R0300</td>
</tr>
<tr>
<td>Y-connector for easy connection of a transmitter</td>
<td>M12-3D</td>
<td>2TLA02059R0300</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNlink, Two M12-5 connectors.</td>
<td>Tina 10A</td>
<td>2TLA02059R1200</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNlink with possibility to connect a local reset button, Three M12-5 connectors.</td>
<td>Tina 10B</td>
<td>2TLA02059R1300</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNlink with possibility to power the transmitter, Three M12-5 connectors.</td>
<td>Tina 10C</td>
<td>2TLA02059R1600</td>
</tr>
<tr>
<td>Safe AS-i input slave for OSSD, 3 non safe inputs and 1 reset input</td>
<td>Urax-D1R</td>
<td>2TLA02072R0500</td>
</tr>
</tbody>
</table>

*These accessories are available in different sizes.

For more information see:
- Orion Mirror: 2TLC172006L0201
- Orion Stand: 2TLC172006L0201

For more information about the connection accessories, please see: Orion connection accessories 2TLC172011L0201

### How to choose correct reset button

<table>
<thead>
<tr>
<th>Locally or globally reset</th>
<th>Adaption to DYNlink</th>
<th>Safety controller module</th>
<th>Type</th>
<th>Useful connection accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local reset button connected to the light guard (Orion in manual reset mode)</td>
<td>Yes</td>
<td>Vital or Pluto</td>
<td>Smile 11 RO3</td>
<td>Tina 10B: OSSD to DYNlink solution + local reset button M12-3A: Serial connection of the DYNlink solution</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11 RO3</td>
<td>M12-3R: Easy connection of a local reset button</td>
</tr>
<tr>
<td>Global reset button connected to the control module (Orion in automatic reset mode)</td>
<td>Yes</td>
<td>Vital</td>
<td>Smile 11 RA</td>
<td>Tina 10A: OSSD to DYNlink solution + supply to transmitter/active part</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11 RA</td>
<td>Tina 10C: OSSD to DYNlink solution + supply to transmitter/active part</td>
</tr>
</tbody>
</table>

* The ABB Jokab Safety DYNlink solution offers the following advantages:
  - Serial connection of safety devices while maintaining PLe/cat. 4, up to 25 Tina 10 per Vital and up to 5 Tina 10 per Pluto input.
  - Only one safety input of the Pluto instead of two with the standard OSSD outputs.

**Smile 11 RA** has one NO contact, which is the most common for reset buttons. Please check what is requested for the chosen safety control module.
### Cables

**Orion3 Base**

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10 m</td>
<td></td>
<td>M12-C101</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20 m</td>
<td></td>
<td>M12-C201</td>
<td>2TLA020056R2000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA020056R3000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.05 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA020056R4000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C0112</td>
<td>2TLA020056R5000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA020056R6000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
<td>2TLA020056R7000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>16 m</td>
<td></td>
<td>M12-C1612</td>
<td>2TLA020056R9000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA020056R0001</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.2 m</td>
<td></td>
<td>M12-C003B</td>
<td>2TLA022315R3200</td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C83</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>20 m</td>
<td></td>
<td>M12-C203</td>
<td>2TLA020056R2000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.05 m</td>
<td></td>
<td>M12-C00634</td>
<td>2TLA020056R3000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C0134</td>
<td>2TLA020056R4000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>3 m</td>
<td></td>
<td>M12-C0334</td>
<td>2TLA020056R5000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>6 m</td>
<td></td>
<td>M12-C634</td>
<td>2TLA020056R6000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C1034</td>
<td>2TLA020056R7000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-C0134</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>3 m</td>
<td></td>
<td>M12-C0334</td>
<td>2TLA020056R9000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>6 m</td>
<td></td>
<td>M12-C634</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>10 m</td>
<td></td>
<td>M12-C1034</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>M12-8 female + M12-5 male</td>
<td>Female + male</td>
<td>1 m</td>
<td></td>
<td>M12-CT03B</td>
<td>2TLA020056R2000</td>
</tr>
</tbody>
</table>

1) M12-CT03B can be used for:
- connection of Orion3 Base to Tina 10A/B/C.
- connection of Orion3 Base to M12-3R.

The EDM function is deactivated in all cases.

2) M12-CTURAX-03B is used for:
- connection of Orion3 Base to URAX-D1R.

The light guard is automatically configured in automatic reset and the EDM function is deactivated.

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C02</td>
<td>2TLA020056R1100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA020056R1200</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C04</td>
<td>2TLA020056R1300</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020057R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA020057R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA020057R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA020057R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA020057R0030</td>
</tr>
<tr>
<td>Cable with 8 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA020057R0040</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 100 m</td>
<td>2TLA020057R0050</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA020057R0060</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA020057R0070</td>
</tr>
</tbody>
</table>
Connection examples
Orion3 Base

Orion with Tina 10A/C

Connection to the ABB Jokab Safety DYNlink signal via Tina 10 A/C. To be used with Vital safety control module or Pluto programmable safety controller.

Reset to Orion with M12-3R

Connection of a local reset button via M12-3R.

Reset to Orion with Tina 10B

Connection to the ABB Jokab Safety DYNlink signal via Tina 10B. To be used with Vital safety control module or Pluto programmable safety controller.
## Technical data

### Orion3 Base

#### Technical data

<table>
<thead>
<tr>
<th>Approvals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity</td>
<td>CE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/42/EC - Machinery</td>
</tr>
<tr>
<td>2004/108/EC - EMC</td>
</tr>
</tbody>
</table>

#### Functional safety data

<table>
<thead>
<tr>
<th>Approvals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61508:2010</td>
<td>SIL3, PFH$_D$ = 9.28 x 10$^{-9}$</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>Pl e, Cat. 4, PFH$_D$ = 9.28 x 10$^{-9}$</td>
</tr>
</tbody>
</table>

#### Electrical data

<table>
<thead>
<tr>
<th>Power supply</th>
<th>+24 VDC ±20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption, Active unit</td>
<td>6.5 W max (without load)</td>
</tr>
<tr>
<td>Cable length (for power supply)</td>
<td>70 m max</td>
</tr>
<tr>
<td>Outputs</td>
<td>2 PNP</td>
</tr>
<tr>
<td>Short-circuit protection</td>
<td>1.4 A max</td>
</tr>
<tr>
<td>Output current</td>
<td>0.5 A max / output</td>
</tr>
<tr>
<td>Output voltage – ON</td>
<td>Power supply value less 1 V (min)</td>
</tr>
<tr>
<td>Output voltage – OFF</td>
<td>0.2 V max</td>
</tr>
<tr>
<td>Capacitive load</td>
<td>2.2 μF at +24 VDC max</td>
</tr>
<tr>
<td>Cable length (for power supply)</td>
<td>70 m max</td>
</tr>
<tr>
<td>Connectors</td>
<td>M12-8 pole male on receiver</td>
</tr>
</tbody>
</table>

#### Optical data

<table>
<thead>
<tr>
<th>Light emission (λ)</th>
<th>Infrared, LED (950 nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>319.75 - 519.75 mm</td>
</tr>
<tr>
<td>Operating distance</td>
<td>0.5...8 m except K2C-090: 0.5...6.5 m</td>
</tr>
<tr>
<td>Ambient light rejection</td>
<td>According to IEC-61496-2:2013</td>
</tr>
</tbody>
</table>

#### Mechanical data

| Operating temperature | 0...+ 55 °C |
| Storage temperature | - 25...+ 70 °C |
| Humidity range | 15...95% (no condensation) |
| Protection class | IP65 (EN 60529:2000) |

#### Weight

| Orion3-4-K1C-050-B | 1.3 kg |
| Orion3-4-K2C-080-B | 1.8 kg |
| Orion3-4-K2C-090-B | 2.1 kg |
| Orion3-4-K2C-120-B | 2.6 kg |
| Orion3-4-M1C-050 (passive) | 1.2 kg |
| Orion3-4-M2C-080 (passive) | 1.7 kg |
| Orion3-4-M2C-090 (passive) | 1.9 kg |
| Orion3-4-M2C-120 (passive) | 2.5 kg |

| Housing material | Painted aluminium (yellow RAL 1003) |
| Cap material | PBT Valox 508 |
| Lens material | PMMA |

For more information about the connection accessories, see manual for: Orion3 Base [2TLC172289M0201](#)
Dimension drawings
Orion3 Base

Orion3 Base

Active part – All dimensions in mm

Passive part – All dimensions in mm

Dimensions

<table>
<thead>
<tr>
<th>LT  mm</th>
<th>L2  mm</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>606.4</td>
<td>520.5</td>
<td>Orion3-4-K1C-050-B (active part)</td>
</tr>
<tr>
<td>906.4</td>
<td>820.5</td>
<td>Orion3-4-K2C-080-B (active part)</td>
</tr>
<tr>
<td>1006.4</td>
<td>920.5</td>
<td>Orion3-4-K2C-090-B (active part)</td>
</tr>
<tr>
<td>1306.4</td>
<td>1220.5</td>
<td>Orion3-4-K2C-120-B (active part)</td>
</tr>
<tr>
<td>580.5</td>
<td>520.5</td>
<td>Orion3-4-M1C-050 (passive part)</td>
</tr>
<tr>
<td>880.5</td>
<td>820.5</td>
<td>Orion3-4-M2C-080 (passive part)</td>
</tr>
<tr>
<td>980.5</td>
<td>920.5</td>
<td>Orion3-4-M2C-090 (passive part)</td>
</tr>
<tr>
<td>1280.5</td>
<td>1220.5</td>
<td>Orion3-4-M2C-090 (passive part)</td>
</tr>
</tbody>
</table>

xx = Resolution
Orion3 Extended is a sturdy light grid for access protection in muting applications.

Only one of the parts needs power supply, since both transmitter and receiver are in the same active part. The other part is passive and contains mirrors to reflect the beams.

With 2-4 beams and an operating range of up to 8 m, it is intended for body detection.

---

**Cost effective solution**

Integrated muting function
Muting sensors are connected directly to the light grid, with no need for a remote muting module.

Minimized cabling
A local reset button can be connected directly to the light grid, eliminating the need for cable between the reset button and the electrical cabinet.

External device monitoring (EDM)
Each light grid can monitor the actuators without any extra control module.

**Easy to install**

Alignment help
Alignment help and a wide angle within the limits of a Type 4 device facilitate installation.

Easy adjustment
Rotation brackets makes alignment easy.

Fast connection
M12 connectors speed up cabling.

Less cabling
Only the active part needs connecting.

**Continuous operation**

Visible alignment level
Since the alignment level is displayed, the alignment can be improved before the occurrence of an unwanted stop.

Extensive error indication
Extensive error indication reduces troubleshooting time.
Applications and features
Orion3 Extended

Application

Muting
Orion2 Extended is intended for muting applications. By connecting muting sensors to the light guard, it can distinguish material from persons and allow the material to pass through an opening but not persons. Muting sensors and a connection box for muting are available to simplify the muting application.

Features

Power on one side
Both transmitter and receiver are in one active part, and the other part is passive and contains mirrors. This simplifies installation and saves cables, making it easier to place in applications where cables need to be avoided.

EDM
External Device Monitoring is a feature allowing the light guard to supervise the actuators in simpler applications, eliminating the need for a safety relay or programmable safety controller.

Sturdy profile for demanding applications
With its thicker and sturdier profile Orion3 is suitable for applications with tougher requirements.

Local reset
A local reset button is connected directly to the light guard instead of to the safety control module in the electrical cabinet. This saves safety relays/PLC inputs and minimizes cabling to the electrical cabinet. Clever accessories make the connection easier.
Ordering information
Orion3 Extended

Ordering details

<table>
<thead>
<tr>
<th>Detection</th>
<th>Protected height</th>
<th>Active or passive part</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>500 (2 beams)</td>
<td>Active part</td>
<td>Orion3-4-K1C-050-E</td>
<td>2TLA022307R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M1C-050</td>
<td>2TLA022305R1000</td>
</tr>
<tr>
<td></td>
<td>800 (3 beams)</td>
<td>Active part</td>
<td>Orion3-4-K2C-080-E</td>
<td>2TLA022307R0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M2C-080</td>
<td>2TLA022305R1100</td>
</tr>
<tr>
<td></td>
<td>900 (4 beams)</td>
<td>Active part</td>
<td>Orion3-4-K2C-090-E</td>
<td>2TLA022307R0200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M2C-090</td>
<td>2TLA022305R1300</td>
</tr>
<tr>
<td></td>
<td>1200 (4 beams)</td>
<td>Active part</td>
<td>Orion3-4-K2C-120-E</td>
<td>2TLA022307R0300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive part</td>
<td>Orion3-4-M2C-120</td>
<td>2TLA022305R1400</td>
</tr>
</tbody>
</table>

Please note that active and passive parts are ordered separately and both are necessary for Orion3 Extended to function.

Spare parts (included when ordering Orion)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 standard brackets for Orion3</td>
<td>JSM Orion02</td>
<td>2TLA022310R1000</td>
</tr>
</tbody>
</table>

Orion3 Extended

JSM Orion02
### Accessories

#### Orion3 Extended

**Connection accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection box for two or four muting sensors</td>
<td>OMC1</td>
<td>2TLA022316R2000</td>
</tr>
<tr>
<td>Retroreflective photoelectric sensor</td>
<td>Mute R2</td>
<td>2TLA02244R0050</td>
</tr>
<tr>
<td>Adjustable mounting bracket for M18 sensors (e.g. Mute R2 and Spot 10)</td>
<td>JSM 64</td>
<td>2TLA040000R0200</td>
</tr>
<tr>
<td>Reflector diameter 63 mm</td>
<td>Reflect 1</td>
<td>2TLA222044R2000</td>
</tr>
<tr>
<td>Reflector diameter 82 mm</td>
<td>Reflect 2</td>
<td>2TLA222044R0050</td>
</tr>
<tr>
<td>Smile reset button with NO contact</td>
<td>Smile RA</td>
<td>2TLA0005FR0000</td>
</tr>
<tr>
<td>Smile reset button with NO contact for Pluto</td>
<td>Smile RB</td>
<td>2TLA0005FR1000</td>
</tr>
<tr>
<td>Smile reset button with NC contact for Orion2 Base/Extended and Orion3 Extended</td>
<td>Smile 11R2</td>
<td>2TLA22216R53100</td>
</tr>
<tr>
<td>Y-connector for series connection of DYNNlink devices with M12-5 connectors, e.g. Eden</td>
<td>M12-3A</td>
<td>2TLA02005FR0000</td>
</tr>
<tr>
<td>Y-connector for a Smile reset button to Orion</td>
<td>M12-3R</td>
<td>2TLA22216R0000</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNNlink. Two M12-5 connectors.</td>
<td>Tina 10A</td>
<td>2TLA02005FR1200</td>
</tr>
<tr>
<td>Adaptation of OSSD to DYNNlink with possibility to connect a local reset button, Three M12-5 connectors.</td>
<td>Tina 10B</td>
<td>2TLA02005FR1300</td>
</tr>
<tr>
<td>Safe AS-i input slave for OSSD, 3 non safe inputs and one reset input</td>
<td>Unas-D1R</td>
<td>2TLA02007FR0050</td>
</tr>
</tbody>
</table>

**Mounting accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion Laser pointer</td>
<td></td>
<td>2TLA022310R0000</td>
</tr>
<tr>
<td>Screw M06 M5x12 to be used with T-nut JSM M6B for mounting Orion on Quick-Guard</td>
<td>Screw M08S</td>
<td>2TLA041012R0200</td>
</tr>
<tr>
<td>JSM M6B Special T-nut M6B to be used with screw M08S for mounting Orion on Quick-Guard</td>
<td>T-nut JSM M6B</td>
<td>2TLA040000R0400</td>
</tr>
<tr>
<td>4 rotation brackets for Orion3</td>
<td></td>
<td>JSM Orion05</td>
</tr>
<tr>
<td>Kit for mounting of Orion3 in Stand (4 pieces)</td>
<td>JSM Orion08</td>
<td>2TLA222110R0000</td>
</tr>
<tr>
<td>For a pair Orion3 - 120 (Orion3-4-KZC-120 + Orion3-4-MZC-120)</td>
<td>JSM Orion09</td>
<td>2TLA022311R0700</td>
</tr>
<tr>
<td>Orion Plate kit for adjustment of protective stand</td>
<td>Orion Stand Plate</td>
<td>2TLA22212R6300</td>
</tr>
<tr>
<td>Deviating mirror in stand for Orion 2 and 3</td>
<td>Orion Mirror*</td>
<td></td>
</tr>
<tr>
<td>Protective stand</td>
<td>Orion Stand*</td>
<td></td>
</tr>
<tr>
<td>Protective tube</td>
<td>Orion WET*</td>
<td></td>
</tr>
<tr>
<td>Lens shield</td>
<td>Orion Shield*</td>
<td></td>
</tr>
</tbody>
</table>

*These accessories are available in different sizes.
For more information see:
- Orion Mirror 2TLC172060L0201, Orion Stand 2TLC172059L0201, Orion WET 2TLC172061L0201, Orion Shield 2TLC172071L0201

For more information about the connection accessories, please see:
- Orion connection accessories 2TLC172101L0201

#### How to choose correct reset button

<table>
<thead>
<tr>
<th>Local or global reset</th>
<th>Adaption to the DYNNlink solution*</th>
<th>Safety control module</th>
<th>Type</th>
<th>Suitable connection accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local reset button connected to the light guard</td>
<td>Yes</td>
<td>Vital or Pluto</td>
<td>Smile 11RD</td>
<td>Tina 10B: OSSD to DYNNlink + local reset button M12-3A: serial connection of DYNNlink</td>
</tr>
<tr>
<td>(Orion in manual reset mode)</td>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11RD</td>
<td>M12-3R: Easy connection of a local reset button</td>
</tr>
<tr>
<td>Global reset button connected to the control module</td>
<td>Yes</td>
<td>Vital</td>
<td>Smile 11 RA</td>
<td>Tina 10A: OSSD to DYNNlink Tina 10C: OSSD to DYNNlink + supply to transmitter</td>
</tr>
<tr>
<td>(Orion in automatic reset mode)</td>
<td>No</td>
<td>Any safety control module compatible with light guard</td>
<td>Smile 11 RA</td>
<td>Tina 10A: OSSD to DYNNlink Tina 10C: OSSD to DYNNlink + supply to transmitter</td>
</tr>
</tbody>
</table>

* The ABB Jokab safety DYNNlink solution offers the following advantages:
- Serial connection of safety devices while maintaining PLc/cat. 4, up to 25 T10 per Vital and up to 5 T10 per Pluto input.
- Only one safety input of the Pluto instead of two with the standard OSSD outputs.

** Smile 11 RA has one NO contact, which is the most common for reset buttons. Please check what is requested for the chosen safety control module.
# Cables
## Orion3 Extended

### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C101</td>
<td>2TLA020056R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA020056R6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C112</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C312</td>
<td>2TLA020056R2100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
<td>2TLA020056R2200</td>
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<td></td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA020056R2300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td></td>
<td>M12-C1612</td>
<td>2TLA020056R4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA020056R4200</td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C083</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA020056R0000</td>
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<td>20 m</td>
<td></td>
<td>M12-C203</td>
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</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00634</td>
<td>2TLA020056R6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C134</td>
<td>2TLA020056R8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C334</td>
<td>2TLA020056R1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2 m</td>
<td></td>
<td>M12-CT132</td>
<td>2TLA020060R6000</td>
</tr>
</tbody>
</table>

| M12-8 female + M12-5 male | Female + male | 1 | M12-CYMUTE | 2TLA020316R0100 |

1) Used for the connection to Tina 10, M12 3D and M12-3R. Tina 10 can be connected directly to the light guard without cable, but will form an angle (i.e. not be aligned) with the light guard, which might be a problem if the light guard is mounted close to a wall/ aluminum profile.

2) M12-CT132 is used for the connection of Orion3 Extended to URAX-D1R.

3) M12-CYMUTE is used to simplify the connection of 2 or 4 muting sensors with the help of the OMC1 connection box.

### Separate cables and connectors

#### Connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020055R1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020055R1100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA020055R1600</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA020055R1700</td>
</tr>
</tbody>
</table>

#### Cable with 5 conductors

<table>
<thead>
<tr>
<th>Description</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>2TLA020057R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>2TLA020057R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>2TLA020057R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>2TLA020057R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>2TLA020057R0050</td>
</tr>
</tbody>
</table>

#### Cable with 8 conductors

<table>
<thead>
<tr>
<th>Description</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>2TLA020057R1005</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>2TLA020057R1010</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>2TLA020057R1020</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>2TLA020057R1050</td>
</tr>
</tbody>
</table>
Connection examples
Orion3 Extended

Orion with Tina 10A/C

Connection to the ABB Jokab Safety DYNlink signal via Tina 10 A/C. To be used with Vital safety control module or Pluto programmable safety controller.

Reset to Orion with Tina 10B

Connection to the ABB Jokab Safety DYNlink signal via Tina 10B. To be used with Vital safety control module or Pluto programmable safety controller.

Reset to Orion with M12-3R

Connection of a local reset button via M12-3R.

Connection of muting sensors with M12-CYMUTE and OMC1

NB: Cable with M12-5 male + female connectors shall be used between muting sensors and OMC1 inputs A1, B1, A2, B2.
Technical data
Orion3 Extended

Approvals
Conformity
- 2006/42/EC - Machinery
- 2004/108/EC - EMC

Functional safety data
- EN 61508:2010
  - SIL3, PFH\(_D\) = 8.57 \times 10^{-9}
  - SILC\(_L3\), PFH\(_D\) = 8.57 \times 10^{-9}
- EN ISO 13849-1:2008
  - PL e, Cat. 4, PFH\(_D\) = 8.57 \times 10^{-9}

Electrical data
- Power supply +24 VDC ± 20%
- Power consumption, Active unit 2.5 W max (without load)
- Cable length (for power supply) 70 m max
- Outputs 2 PNP
- Short-circuit protection 1.4 A at 55 °C
- Output current 0.5 A max / output
- Output voltage – ON Power supply value less 1 V (min)
- Output voltage – OFF 0.2 V max
- Capacitive load 2.2 \(\mu\)F at +24 VDC max
- Current for external lamp 20 mA min, 250 mA max
- Response time K1C-050: 11 ms, others: 12 ms

Connectors
- M12-4 pole male on transmitter (compatible with M12-5 pole female)

Optical data
- Light emission (\(\lambda\)) Infrared (860 nm)
- Resolution 319.75 - 519.75 mm
- Operating distance 0.5...8 m except K2C-090: 0.5...6.5 m
- Ambient light rejection According to IEC-61496-2:2013

Mechanical data
- Operating temperature 0...+ 55 °C
- Storage temperature - 25...+ 70 °C
- Humidity range 15...95% (no condensation)
- Protection class IP65 (EN 60529:2000)
- Housing material Painted aluminium
- Lens material PMMA
- Cap material PBT Valox 508

Weight
- Orion3-4-K1C-050-E 1.3 kg
- Orion3-4-K2C-080-E 1.8 kg
- Orion3-4-K2C-090-E 2.1 kg
- Orion3-4-K2C-120-E 2.6 kg
- Orion3-4-M1C-050 (passive) 1.2 kg
- Orion3-4-M2C-080 (passive) 1.7 kg
- Orion3-4-M2C-090 (passive) 1.9 kg
- Orion3-4-M2C-120 (passive) 2.5 kg

For more information about the connection accessories, see manual for: Orion3 Extended 2TLC172292M0201
Dimension drawings
Orion3 Extended

Orion3 Extended

Active part - All dimensions in mm

Passive part - All dimensions in mm

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>L1 mm</th>
<th>L2 mm</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>606.4</td>
<td>520.5</td>
<td>Orion3-4-K1C-000-E (active part)</td>
<td></td>
</tr>
<tr>
<td>906.4</td>
<td>820.5</td>
<td>Orion3-4-K2C-000-E (active part)</td>
<td></td>
</tr>
<tr>
<td>1006.4</td>
<td>920.5</td>
<td>Orion3-4-K2C-000-E (active part)</td>
<td></td>
</tr>
<tr>
<td>1306.4</td>
<td>1220.5</td>
<td>Orion3-4-K2C-120-E (active part)</td>
<td></td>
</tr>
<tr>
<td>580.5</td>
<td>520.5</td>
<td>Orion3-4-M1C-000-E (passive part)</td>
<td></td>
</tr>
<tr>
<td>880.5</td>
<td>820.5</td>
<td>Orion3-4-M2C-000-E (passive part)</td>
<td></td>
</tr>
<tr>
<td>980.5</td>
<td>920.5</td>
<td>Orion3-4-M2C-000-E (passive part)</td>
<td></td>
</tr>
<tr>
<td>1280.5</td>
<td>1220.5</td>
<td>Orion3-4-M2C-000-E (passive part)</td>
<td></td>
</tr>
</tbody>
</table>
Spot is a light beam mainly used for body detection. It consists of a transmitter and a receiver. Infrared light is sent from the transmitter to the receiver and when the light beam is interrupted a stop signal is given to the dangerous machine.

Spot needs to be connected to Pluto safety PLC or Vital safety controller and can be used for distances up to 10 meter.

---

Speed up installation

**Easy to place**
Spot is very compact which makes it easy to place.

**Easy cabling**
M12 and Y connectors speed up the installation.

**Minimal cabling**
Up to 6 Spot light beams can be connected in series to Vital while maintaining PL e.

**Accessories simplifies mounting**
Brackets and mirrors simplify mounting and make it easy to create a suitable light beam setup.

Continuous operation

**LED indication**
LED indication shows if the units are in contact and simplifies alignment.

**Information output**
Information output reduces troubleshooting time.

Safety and protection

**Highest safety level**
Spot used together with Pluto or Vital achieves PL e according to EN ISO 13849.

**Safe series connection**
Easy to connect several Spot in series to make a multi-beam solution while still achieving PL e.
Applications and features

Spot

Applications

Perimeter guard
Spot can be used as a perimeter guard to detect if someone gets too close to the dangerous zone. Since spot only consists of one beam, the risk assessment has to decide if this is suitable for the safety function.

Complementary protective device
Spot is often used together with other protective devices, e.g. to detect someone standing on the wrong side (inside) of the protective device.

Features

Light beams
By using deflective mirrors, a suitable light beam setup can easily be created by just using one Spot transmitter and receiver pair. Spot has a sensing distance of 10 m, but each mirror used reduces the sensing distance by approximately 20%.
If longer distances or more beams are required, it is simple to connect up to 6 Spot light beams in series, while maintaining PL e.

Light beam adjustment
In environments with optical disturbances the power of the light beam can be adjusted using the trim potentiometer on the transmitter.

DYNlink solution
Spot uses the ABB Jokab Safety DYNlink signal that allows to connect several safety products in series while maintaining PL e using only one channel. DYNlink signals must be used with Vital safety controller or Pluto programmable safety controller. Up to 6 Spot can be connected in series to Vital and up to 2 Spot can be connected in series to one input of Pluto. All products using the DYNlink signal can easily be connected in series and mixed in the same loop with a maintained PL e. Tina adapters allow to use other products in a DYNlink loop, and a wide range of connection accessories simplify the cabling.

Info signal and extensive indication facilitate troubleshooting
Spot offers extensive LED indication to help troubleshooting and localizing which safety device has caused a stop. The LEDs on the Spot transmitter and receiver have the following functions:
- transmitter green - power supply OK
- receiver green - alignment OK, DYNlink circuit closed
- receiver flashing - alignment OK, earlier DYNlink circuit open
- receiver off - beam interrupted, DYNlink circuit open
## Ordering information

### Spot

#### Ordering details

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot 10 T/R safety light beam, transmitter and receiver</td>
<td>Spot 10 T/R</td>
<td>2TLA020009R0600</td>
</tr>
</tbody>
</table>

#### Mounting accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable mounting bracket with rotational knuckle for 18 mm barrel style sensors.</td>
<td>JSM64</td>
<td>2TLA040007R0200</td>
</tr>
<tr>
<td>Bracket for JSM9 for vertical angling. Includes screws for profile.</td>
<td>JSM60-L</td>
<td>2TLA040003R0000</td>
</tr>
<tr>
<td>Bracket for JSM9 for horizontal angling around a machine. Includes screws for profile.</td>
<td>JSM62-L</td>
<td>2TLA040004R0000</td>
</tr>
<tr>
<td>Mirror for 0-20 m, adjustable mirror plate. Dimensions: 115 x 80 x 30 mm. Screws for bracket included.</td>
<td>JSM7A</td>
<td>2TLA040008R0500</td>
</tr>
<tr>
<td>Bracket for mirror.</td>
<td>JSM9</td>
<td>2TLA040007R0000</td>
</tr>
<tr>
<td>Wrench for tightening of M12 connectors according to specified torque: 0.6 Nm.</td>
<td>M12 Torque wrench</td>
<td>2TLA020056SR0600</td>
</tr>
<tr>
<td>Aluminum post 44 x 44 x 1100 mm with 3 feet brackets and end caps.</td>
<td>JSM44A-L</td>
<td>2TLA040001R1100</td>
</tr>
</tbody>
</table>

#### Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y-connector for series connection of DYNlink devices with M12-5 connectors, e.g. Spot</td>
<td>M12-3A</td>
<td>2TLA020056SR0000</td>
</tr>
<tr>
<td>Y-connector for parallel connection of 2 DYNlink devices with M12-5 connectors, e.g. Spot</td>
<td>M12-3B</td>
<td>2TLA020056SR0100</td>
</tr>
</tbody>
</table>
Cables and connections

### Spot

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C01</td>
<td>2TLA20056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C101</td>
<td>2TLA20056R1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C201</td>
<td>2TLA20056R2000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA20056R3000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA20056R4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C112</td>
<td>2TLA20056R5000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C312</td>
<td>2TLA20056R6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
<td>2TLA20056R7000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA20056R8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>Angled female connector</td>
<td>M12-C1012V2</td>
<td>2TLA20056R9000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA20056R9100</td>
</tr>
</tbody>
</table>

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-01</td>
<td>2TLA20056R1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-02</td>
<td>2TLA20056R1100</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA20057R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA20057R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA20057R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA20057R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA20057R0050</td>
</tr>
</tbody>
</table>
Technical data
Spot

Technical data

Approvals (pending)
TÜV NORD

Conformity
2006/42/EC - Machinery
2004/108/EC - EMC

Functional safety data
EN/IEC 61508:2010
SIL3, PFH D= 1.14 x 10^-8

SILCL3, PFH D= 1.14 x 10^-8

EN ISO 13849-1:2008
PL e, Cat. 4, PFH D= 1.14 x 10^-8

EN/IEC 61496-1:2004
Type 4 with Vital/Pluto

Electrical data
Operating voltage
+17...+27 VDC, ripple ± 10% (SELV/PELV)

Mechanical data
Operating temperature
-25...+65 °C

Protection class
IP67

Range
0 - 10 m

Installation
2 x M18 nuts (provided)

Cable connection
M12-4 male connector on the transmitter and M12-5 male connector on the receiver

Serial connection
With Vital
Up to 6 Spot light beams can be connected in series while maintaining PL e.

With Pluto
2 Spot light beams can be connected in series on each Pluto input while maintaining PL e.

For more information about the connection accessories, see manual for:
Spot 2TLC172178M0201

Dimension drawing

All dimensions in mm
# Sensors and locks

## Introduction

<table>
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</tr>
</thead>
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<td>Non-contact safety sensor - Eden</td>
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<td>Safety Interlock switch - MKey</td>
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<td>Electromagnetic process lock - Magne</td>
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<td>4/28</td>
</tr>
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<td>Safety lock - Knox</td>
<td>4/34</td>
</tr>
</tbody>
</table>
Introduction and overview

Selection guide

ABB has a full range of switches for monitoring doors and hatches, both with and without locking function.

<table>
<thead>
<tr>
<th>Eden</th>
<th>MKey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td><strong>Interlock</strong> Interlock and process/safety lock</td>
</tr>
<tr>
<td><strong>Image</strong></td>
<td><strong>Image</strong></td>
</tr>
<tr>
<td></td>
<td><img src="image1" alt="Eden Image" /> <img src="image2" alt="MKey Image" /></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td><strong>Non-contact switch Mechanical switch</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The original non-contact sensor with unique fault-detection capabilities. A classic and well-tried solution.</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td>Monitoring doors and hatches. Ideal for use in harsh environments such as food and beverage. Also for monitoring of end positions of e.g. an overhead crane. Monitoring doors and hatches. Also available with safe locking.</td>
</tr>
</tbody>
</table>
| **Advantage**             | - Flexible mounting  
                            - M12 connectors  
                            - IP69K for harsh environments  
                            - One switch to reach Cat. 4  
                            - Unique coding to prevent defeat  
                            - Local reset minimizes cabling  
                            - Non-contact eliminates wear  
                            - Holds the door closed  
                            - Possible to lock |

3/2 | ABB Safety products catalog
<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
<th>Image</th>
<th>Type</th>
<th>Description</th>
<th>Applications</th>
<th>Advantage</th>
</tr>
</thead>
</table>
| Eden MKey    | Interlock and process lock         | ![Image](image1.png)           | Electromagnetic lock  | A robust magnetic lock with strong holding force.     | Locking doors and hatches to prevent interruption of machines with short stopping time e.g. robotics applications. | - Robust design for harsh environments  
- M12 connectors.                                                      |
| Magne Dalton | Interlock and process lock         | ![Image](image2.png)           | Electromechanical lock| A compact ball catch lock.                            | Locking small doors or hatches to prevent interruption of machines with short stopping time. | - Compact  
- M12 connectors                                                      |
| Knox         | Interlock and safety lock          | ![Image](image3.png)           | Electromechanical lock| A robust lock with integrated handle                  | Safe locking of doors for machines with long stopping time. | - Safe locking  
- Robust design  
- M12 connectors  
- Integrated door handle                                              |
The difference between locking and interlocking functions

**Interlocking function**
An interlocking function indicates if a door is open or closed. When the door is open the interlocking function also prevents dangerous machine functions, but it does not prevent the door from being opened.

**Locking function**
A locking function prevents the door from being opened until an unlocking signal has been sent.

When to use interlocking and locking functions
An interlocking function is required if the dangerous machine functions needs to be stopped when someone enters the dangerous area.

A locking function is required if a user can open a door/hatch and reach the dangerous machine parts before the dangerous machine functions have ceased. It is also required if the process needs to be protected from unwanted stops that would occur if a person could open a door in the middle of a critical stage of the process.

The difference between a process lock and a safety lock

All locks of the ABB Jokab Safety range can be used as process locks but only Knox and the models of MKey that uses power to unlock can be used as safety locks. Here is why:

A **process lock** protects the process. One example of an application is a lock on a door giving access to a machine with short stopping time, e.g. a welding machine. The door should not be unlocked before the end of the welding cycle. Should the door be unlocked before the end of the cycle (as a consequence of a fault in the installation like a loss of power or a short-circuit) the door could be opened, which would result in a process stop. It might take a long time to restart the process, but no person would have had time to come close to the danger or get injured. Since the lock only protects the process there is no need for a safe locking signal.

A **safety lock** protects people. One example of an application is a lock on a door giving access to a dangerous machine with a long stopping time, e.g. a circular saw. The door should never be unlocked before the dangerous movement has stopped, not even as a consequence of a fault in the installation like a loss of power or a short-circuit. Should the door be unlocked before the machine has stopped, a person could open the door and have time to get close to the dangerous movement and get injured. Since the lock is protecting the person, the unlocking signal should be safe.

Since a loss of power should not unlock a safety lock, only locks that require power to unlock (e.g. +24 VDC) can be used as safety locks.
Non-contact safety sensor
Eden

Eden is a non-contact safety sensor used as interlocking device for e.g. doors and safe position monitoring.

Eden consists of two parts: Adam and Eva. Adam senses the presence of Eva without mechanical contact and therefore without any wear. The compact size of Eden and its 360° mounting possibility make it easy to use in most applications.

Different models of Eden are available for different types of control modules. All Eden models make it very easy to reach PL e, often using fewer components than other solutions.

All Eden models have an IP67/IP69K sealing.

Continuous operation
Easier troubleshooting
Extensive LED indication and status information reduce downtime.

Suitable in harsh environments
IP67/IP69K and a temperature range of -40 to +70°C offer an excellent resistance in demanding environments.

No wear, no mechanical breakage
Non-contact sensing means no mechanical wear and the large sensing tolerance gives a better tolerance to vibrations, resulting in fewer unwanted process stops.

Affordable range
Local reset function
The integrated reset function reduces the number of cables and PLC inputs.

PL e with fewer components
Series connection with PL e, local reset and DYNlink signal allow to considerably reduce the number of components needed to reach PL e.

Easy to install
Large mounting tolerance
A 360° mounting possibility with generous tolerances facilitates mounting.

Fast connection
M12 connectors, local reset and accessories speed up installation.
Applications
Eden

Doors and hatches
Eden monitors whether the hatch is open or closed. The dangerous movement is stopped as soon as the hatch is opened.

Position control
Eden can be used to monitor the position of a machine when someone is in the work area. This can be useful when removing power to the machine causes problems like a long restart time.
As long as the machine remains in the safe position monitored by Eden, a person can be allowed to enter the hazardous area even though the machine is still powered. If the machine leaves the safe position while the person is still in the hazardous area, power is removed from the machine.
Features

Eden

Easy PL e with Eden safety sensor
- Eden sensors can be connected in series while maintaining Cat. 4.
- Only one Eden per guard is necessary to reach PL e (instead of two key switches).
- Eden reaches PL e without any need for periodic checks (see ISO/TR 24119).

Local reset button
A local reset button with integrated LED can be connected directly to Adam Reset instead of to the safety control module. In this way, each Eden can easily have its own reset button, which saves cable length and safety relays/PLC inputs. Adam Reset monitors the reset function and manages the LED in the reset button in the following way:

- **on** - Adam and Eva are not in contact
- **flashing** - Adam and Eva in contact, waiting for reset
- **off** - Adam and Eva in contact and reset

Info signal and extensive indication facilitate troubleshooting
All Eden models offer extensive LED indication to help troubleshooting and localizing which doors/hatches are opened. The LED on Adam lights in green or red depending on status:

- **green** - valid Eva within range
- **red** - valid Eva out of range
- **flashing red/green** - valid Eva within range, but no valid safety signal received (loop broken “upstream”)

The LED on Adam AS-i has slightly different default settings and can be programmed to light in any behaviour.

Simple status information with StatusBus
StatusBus is a simple and cost effective way to collect the status information of safety sensors. The StatusBus functionality is available with some DYnlink devices and allows to collect the status of each individual safety device, even when connected in series. A single input on Pluto safety PLC can collect the status of up to 30 safety devices. The devices are connected using standard cable and M12-5 connectors. No specific bus cable or extra communication module is necessary.

Low or high level coded sensor
Eva is available with General code or Unique code. If a new Adam is paired with an Eva general code at start up, Adam will accept all Eva with general code as a valid actuator. Eden will then classify as a low level coded sensor.
If a new Adam is paired with an Eva Unique code at startup (or Eva AS-i), Adam will only accept this specific Eva as a valid actuator. In this case Eden is classified as a high level coded sensor. A high level coded sensor should be used when the motivation to defeat a sensor cannot be eliminated (see EN ISO 14119:2013).

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All Eden models offer extensive LED indication to help troubleshooting and localizing which doors/hatches are opened. The LED on Adam lights in green or red depending on status:

- **green** - valid Eva within range
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360° mounting possibility
Eden offers 360° mounting possibility with generous tolerances.
Models

Eden DYN
Eden DYN consists of an Adam DYN and an Eva (general or unique code).
Adam DYN uses the ABB Jokab Safety DYNlink signal that allows to connect several safety products in series while maintaining PL e using only one channel. DYNlink signals must be used with Vital safety controller or Pluto safety PLC.
Up to 30 Adam DYN can be connected in series to Vital and up to 10 Adam DYN can be connected in series to one input of Pluto.
All products using the DYNlink signal can easily be connected in series and mixed in the same loop with a maintained PL e. Tina adapters allow to use other products in a DYNlink loop, and a wide range of connection accessories simplifies the cabling.

Eden OSSD
Eden OSSD consists of an Adam OSSD and an Eva (general or unique code).
Adam OSSD can be used with all safety relays and safety PLCs compatible with OSSD signals (commonly used for light guards). Up to 30 Adam OSSD can be connected in series, and since OSSD devices monitor their own outputs for short circuits, a Cat. 4/PL e can still be reached.

Eden AS-i
Eden AS-i consists of an Adam AS-i and an Eva AS-i (Eva AS-i has a unique code).
Eden AS-i can be used with any AS-i monitor. AS-i is a bus system that offers a very simple connection of up to 31 safety devices to one monitor according to PL e and makes it easy to move, remove and add safety devices.
When Eden AS-i is used with Pluto programmable safety controller, no other AS-i master or monitor is necessary, and no specific knowledge of AS-i is required.
## Ordering information

### Eden

<table>
<thead>
<tr>
<th>Adam</th>
<th>Type of safety controller</th>
<th>StatusBus</th>
<th>Info signal</th>
<th>Local reset</th>
<th>Series connection</th>
<th>Connector male</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pluto</td>
<td>Pluto or Vital</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-5</td>
<td>Adam DYN-Status M12-5</td>
<td>2TLA020061R6200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OSSD compatible (incl. Pluto and Sentry)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-5</td>
<td>Adam DYN-Info M12-5</td>
<td>2TLA020061R6100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-5</td>
<td>Adam DYN-Reset M12-5</td>
<td>2TLA020061R6300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-8</td>
<td>Adam OSSD-Info M12-8</td>
<td>2TLA020061R6500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-8</td>
<td>Adam OSSD-Reset M12-8</td>
<td>2TLA020061R6700</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-8</td>
<td>Adam OSSD-Info M12-8</td>
<td>2TLA020061R6400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Pluto M12-8</td>
<td>Adam OSSD-Reset M12-8</td>
<td>2TLA020061R6600</td>
<td></td>
</tr>
</tbody>
</table>

1) Pin 5 can be used as a standard info signal or StatusBus.
2) AS-i offers the same advantages using another technology.

### Eva

<table>
<thead>
<tr>
<th>Eva</th>
<th>Compatible Adam</th>
<th>Code description</th>
<th>Code level</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adam DYN and OSSD</td>
<td>General code. (Eva is interchangeable)</td>
<td>Low level</td>
<td>Eva General code</td>
<td>2TLA202046R0800</td>
</tr>
<tr>
<td></td>
<td>Adam DYN and OSSD</td>
<td>Unique code. (Prevents defeat/fraud)</td>
<td>High level</td>
<td>Eva Unique code</td>
<td>2TLA202046R0600</td>
</tr>
<tr>
<td></td>
<td>Adam AS-i</td>
<td>Unique code. (Prevents defeat/fraud)</td>
<td>High level</td>
<td>Eva AS-i</td>
<td>2TLA202051R6000</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting plate for conventional door/hatch and folding door. Two pieces are needed for a complete set.</td>
<td>JSM D4H</td>
<td>2TLA020033R3800</td>
</tr>
<tr>
<td>Mounting plate for folding doors. Used together with one piece of JSM D4H.</td>
<td>JSM D4J</td>
<td>2TLA020020R4000</td>
</tr>
<tr>
<td>Sliding lock for Eden on conventional doors. (Eden is not included.)</td>
<td>JSM D20</td>
<td>2TLA020203R1000</td>
</tr>
<tr>
<td>Mounting converting plate from Eden E to Eden OSSD or Eden DYN</td>
<td>DA 3A</td>
<td>2TLA020053R0600</td>
</tr>
<tr>
<td>Heat shrinking tubes for M12 connectors. Protects M12 connectors in harsh environments and provides extra protection against tampering.</td>
<td>M12 Safety seal</td>
<td>2TLA020053R0800</td>
</tr>
<tr>
<td>Safety screwdriver bit</td>
<td>SBiT Safety bit</td>
<td>2TLA020053R0500</td>
</tr>
<tr>
<td>Wrench for tightening of M12 connectors according to specified torque: 0.6 Nm.</td>
<td>M12 Torque wrench</td>
<td>2TLA020053R0900</td>
</tr>
<tr>
<td>Safety screw to eliminate the risk of manipulation/tampering. 1pc M4 x 20. Length adapted to Eden.</td>
<td>Safety screw SM4 x 20</td>
<td>2TLA020053R4200</td>
</tr>
<tr>
<td>Handheld terminal for addressing, configuration and testing of AS-i devices, StatusBus devices, DYNlink devices and conventional PNP devices.</td>
<td>FIXA</td>
<td>2TLA020072R2000</td>
</tr>
</tbody>
</table>

### Spare parts (included with main product on delivery)

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance plate in yellow PBT (4 pcs).</td>
<td>DA 1B</td>
<td>2TLA020053R0700</td>
</tr>
<tr>
<td>Black distance rings to be mounted in Adam and Eva mounting holes (4 pcs).</td>
<td>DA 2B</td>
<td>2TLA020053R0300</td>
</tr>
</tbody>
</table>

### Reset buttons for local reset

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset button for Adam with 5 pins</td>
<td>Smile 12RF</td>
<td>2TLA020030R0600</td>
</tr>
<tr>
<td>Reset button for Adam with 8 pins</td>
<td>Smile 12RG</td>
<td>2TLA020030R0700</td>
</tr>
</tbody>
</table>
### Cables and connectors

**Eden**

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5 *</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA020056F0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020056F8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C61A</td>
<td>2TLA020056F1000</td>
</tr>
<tr>
<td>Female + male</td>
<td>0.3 m</td>
<td>M12-C312</td>
<td></td>
<td>2TLA020056F9000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.06 m</td>
<td>M12-C0312</td>
<td></td>
<td>2TLA020056F3000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 m</td>
<td>M12-C103</td>
<td></td>
<td>2TLA020056F4000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 m</td>
<td>M12-C103</td>
<td></td>
<td>2TLA020056F2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 m</td>
<td>M12-C103</td>
<td></td>
<td>2TLA020056F2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 m</td>
<td>M12-C103</td>
<td></td>
<td>2TLA020056F2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 m</td>
<td>M12-C103</td>
<td></td>
<td>2TLA020056F4000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 m</td>
<td>M12-C103</td>
<td></td>
<td>2TLA020056F4000</td>
<td></td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C63</td>
<td>2TLA020056F5000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA020056F4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA020056F4000</td>
</tr>
<tr>
<td>Female + male</td>
<td>0.06 m</td>
<td>M12-C334</td>
<td></td>
<td>2TLA020056F6000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 m</td>
<td>M12-C134</td>
<td></td>
<td>2TLA020056F6000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 m</td>
<td>M12-C134</td>
<td></td>
<td>2TLA020056F6000</td>
<td></td>
</tr>
</tbody>
</table>

* Compatible with Adam AS-i

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020056F1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020056F1100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA020056F1600</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA020056F1700</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020056F70001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA020056F70005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA020056F70010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA020056F70020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA020056F70050</td>
</tr>
<tr>
<td>Cable with 8 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA020056F70100</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 100 m</td>
<td>2TLA020056F70100</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA020056F70100</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA020056F70100</td>
</tr>
</tbody>
</table>

#### Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y-connector for series connection of DrNLink devices with M12-5 connectors, e.g. Eden.</td>
<td>M12-3A</td>
<td>2TLA020056F0000</td>
</tr>
<tr>
<td>Y-connector for series connection of DrNLink devices with the StatusBus function.</td>
<td>M12-3S</td>
<td>2TLA020056F6000</td>
</tr>
<tr>
<td>Y-connector for series connection of Adam OSSD M12-6 with M12-8 cables</td>
<td>M12-3G</td>
<td>2TLA020056F7000</td>
</tr>
<tr>
<td>Y-connector for series connection of Adam OSSD M12-8 with M12-6 cables</td>
<td>M12-3H</td>
<td>2TLA020056F8000</td>
</tr>
<tr>
<td>Termination plug M12-5. For Adam OSSD with M12-3H. Connects pin 1 with pin 2 and 4.</td>
<td>JSOP-1 Terminator</td>
<td>2TLA020056F9000</td>
</tr>
<tr>
<td>Termination plug M12-8. For Adam OSSD with M12-3G. Connects pin 2 with pin 3 and 4.</td>
<td>JSOP-2 Terminator</td>
<td>2TLA020056F7100</td>
</tr>
<tr>
<td>M12-5 female connector with vampire connector for AS-i flat cable</td>
<td>AS-i T-connector M12</td>
<td>2TLA020056F3000</td>
</tr>
</tbody>
</table>
## Technical data

### Eden

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Eden DYN</th>
<th>Eden OSSD</th>
<th>Eden AS-i</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approvals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conformity</td>
<td>CE</td>
<td>CE</td>
<td>CE</td>
</tr>
<tr>
<td>Functional safety data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN/IEC 61508:2010</td>
<td>SIL3, PFH₃ = 4.5 x 10⁻⁹</td>
<td>SIL3, PFH₃ = 4.5 x 10⁻⁹</td>
<td>SIL3, PFH₃ = 6.0 x 10⁻⁹</td>
</tr>
<tr>
<td>EN/IEC 62061:2005+A1:2013</td>
<td>SILC₇, PFH₃ = 4.5 x 10⁻⁹</td>
<td>SILC₇, PFH₃ = 4.5 x 10⁻⁹</td>
<td>SILC₇, PFH₃ = 6.0 x 10⁻⁹</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>PL e, Cat. 4, PFH₃ = 4.5 x 10⁻⁹</td>
<td>PL e, Cat. 4, PFH₃ = 4.5 x 10⁻⁹</td>
<td>PL e, Cat. 4, PFH₃ = 6.0 x 10⁻⁹</td>
</tr>
<tr>
<td>Electrical data</td>
<td>+24 VDC</td>
<td>+24 VDC</td>
<td>+30 VDC (AS-i bus)</td>
</tr>
<tr>
<td></td>
<td>Tolerance: +14.4...+27.6 VDC</td>
<td>Tolerance: +14.4...+27.6 VDC</td>
<td>Tolerance: ±26.5...±31.6 VDC</td>
</tr>
<tr>
<td>Mechanical data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40 °C...+70 °C (storage/operation)</td>
<td>-40 °C...+70 °C (storage/operation)</td>
<td>-40 °C...+85 °C (storage), -25 °C...+55 °C (operation)</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67 and IP69K</td>
<td>IP67 and IP69K</td>
<td>IP67 and IP69K</td>
</tr>
<tr>
<td>Humidity range</td>
<td>35 to 85% (no icing, no condensation)</td>
<td>35 to 85% (no icing, no condensation)</td>
<td>35 to 85% (no icing, no condensation)</td>
</tr>
<tr>
<td>Material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>Polybutylene terephthalate (PBT)</td>
<td>Polybutylene terephthalate (PBT)</td>
<td>Polybutylene terephthalate (PBT)</td>
</tr>
<tr>
<td>Moulding</td>
<td>Epoxy</td>
<td>Epoxy</td>
<td>Epoxy</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eva</td>
<td>70 g</td>
<td>80 g</td>
<td>80 g</td>
</tr>
<tr>
<td>Adam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assured release distance (Sₐₐ)</td>
<td>25 mm</td>
<td>25 mm</td>
<td>45 mm</td>
</tr>
<tr>
<td>Assured operating distance (Sₐ₉)</td>
<td>10 mm</td>
<td>10 mm</td>
<td>7.5 mm</td>
</tr>
<tr>
<td>Rated operating distance (S₉)</td>
<td>15 ± 2mm</td>
<td>15 ± 2mm</td>
<td>15 ± 2mm</td>
</tr>
<tr>
<td>Recommended distance between Adam and Eva</td>
<td>7 mm</td>
<td>7 mm</td>
<td>7 mm</td>
</tr>
<tr>
<td>Min distance between two Eden</td>
<td>100 mm</td>
<td>100 mm</td>
<td>100 mm</td>
</tr>
</tbody>
</table>

### More information

For more information, e.g. the complete technical information, see product manual for:
- Eden DYN [2TLC172271M0201](#)
- Eden OSSD [2TLC172272M0201](#)
- Eden AS-i [2TLC172230M0201](#)
Dimension drawings

Eden

Adam M12-5 male connector.
(Note that some models have 4 or 8 pins instead.)

All dimensions in mm
MKey are mechanical safety switches used for monitoring doors and hatches. The switch is mounted on the frame and the actuator key on the moving part of the guard.

All MKey models have a safe interlocking function. Some MKey models can be locked and depending on the locking signal they can be used either as process locks or safety locks (with a safe unlocking function).

MKey switches are available in different material and sizes in order to meet the requirements of different applications.

Safety and protection

Highest level of safety
PL e/SIL3 can be reached when using two switches on a door.

Safety lock
Models that use power to unlock can be used as safety locks.

Emergency escape button
Using MKey8ER with an integrated emergency escape button, it is always possible to open the door from inside the dangerous zone.

Continous operation

Strong holding force
A holding force of up to 2000 N prevents unwanted process stops.

Robust design
Models are available with full stainless steel housing with IP69K, suitable for most applications in food processing and chemical industries.

Status information
Auxiliary contacts give status information.

Easy to install

Easy mounting with rotating head
The head of the switch can be mounted in up to 8 actuating positions to allow different mounting positions.

Flexible keys
Flexible keys are available to minimize mechanical wear and allow a smaller movement radius and use in reduced spaces.
Applications
MKey

Doors and hatches
MKey is used to monitor the position of doors and hatches. The models with locking function are usually used for:
– Processes which should not be interrupted, such as welding.
– Machinery with a long stopping procedure, such as paper machinery that requires a long braking operation.
– Prevention of unauthorized access to a particular area.

Please note that all safety key switches (including MKey) normally need two switches per door/hatch in order to reach PL e/SIL3. (See EN ISO 13849 and EN ISO 14119.)

Locking and interlocking
An interlocking function indicates if a door is open or closed and prevents movement when the door is open, but it does not prevent the door from being opened. A locking function makes sure the door is kept closed.

Process lock with safe interlocking
All MKey models offer a safe interlocking function that will stop the process if the door/hatch is opened. All lockable models of MKey can also be used as a process lock to prevent the process from being interrupted.
An example of an application where a process lock could be used is a welding robot where the stopping time is short, but the welding should not be interrupted once it has started.

Safety lock with safe interlocking and safe unlocking
The MKey models that uses power to unlock can be used as safety locks. They have a safe unlocking function, which means that the loss of power for these locks will not result in the release of the locking element, and the door will remain locked even during a power failure.
An example of an application where a safety lock should be used is a circular saw that would have a long stopping time after a power failure.
Different models
MKey5 are simple mechanical interlocks while MKey8 and MKey9 also have locking functions.
- MKey5: plastic body with plastic or stainless steel head, or full stainless steel body and head. Holding force 12 N or 40 N.
- MKey8: robust design in die cast metal or stainless steel body and head. Holding force of 2000 N.
- MKey9: plastic body with stainless steel head. Holding force of 1800 N.

Different materials and protection classes
The housing and head of the key switches are available in different material in order to meet the requirements of different applications. Metal heads are more resistant to mechanical wear. The choice between plastic, die cast or stainless steel depends on the environment and the chemicals used. Models ending with -Z are completely made of stainless steel 316 and offers an IP69K protection class. They can be high pressure hosed with detergent at high temperature and can be used in harsh applications, e.g. the food processing and chemical industries. All other models offer IP67.

Emergency escape button
MKey8ER has a manual release button at the rear of the housing. It is used for emergency exit by a person locked inside the dangerous zone by mistake. It is a non-latching manual escape, and can be used when the risk assessment requires it. The switch must be mounted so that the release button is reachable from inside the dangerous zone, but not reachable from outside. Pressing and holding the button will release the locking mechanism allowing to open the door/guard.

Power to lock or power to unlock
Two different types of locking function are available:
- Spring lock (power to unlock) models are automatically locked when closing the door. An active signal (+24 VDC) must be supplied to unlock the switch, which makes these models suitable as safe locks.
- Electro-magnetic lock (power to lock) models are locked when an active signal (+24 VDC) is supplied, which makes these models suitable only as process locks.

Rotatable head
Depending on model, the head of MKey can be set in two or four directions with two entrance holes each, thus providing four or eight different mounting positions. The leading edges of the actuator key are reinforced and beveled in order to guide it properly into the hole.

Constructed for safety
All MKey switches have double positively operated forced-guided contacts controlled by the actuator key. This means that the contacts that are closed when the actuator key is in the switch will be forced to open, and the ones that are opened will be forced to close, when the actuator key is removed. It also means that it is not possible to have, e.g. NO and NC contacts opened at the same time due to a fault like one welded contact. The actuator key is designed to prevent tampering with the safety switch using a tool, a magnet or any similar object. The lockable models also have forced-guided contacts controlled by the locking mechanism. MKey8 and MKey9 have auxiliary contacts giving status information (not MKey5, MKey8M or MKey9M).
### MKey ordering information

<table>
<thead>
<tr>
<th>Locking function</th>
<th>Material housing</th>
<th>Material head</th>
<th>Holding force</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>Plastic</td>
<td>Plastic</td>
<td>12 N</td>
<td>MKey5</td>
<td>2TLA050003F0201</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 N</td>
<td>MKey5+</td>
<td>2TLA050003F0202</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stainless steel</td>
<td>12 N</td>
<td>MKey5 SSH</td>
<td>2TLA050003F0203</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 N</td>
<td>MKey5+ SSH</td>
<td>2TLA050003F0204</td>
<td></td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>12 N</td>
<td>IP69K</td>
<td>MKey5Z</td>
<td>2TLA050003F0205</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 N</td>
<td>MKey5+ Z</td>
<td>2TLA050003F0206</td>
<td></td>
</tr>
<tr>
<td>Process lock</td>
<td>Plastic</td>
<td>Stainless steel</td>
<td>1800 N</td>
<td>MKey5M 24VDC</td>
<td>2TLA050003F0207</td>
<td></td>
</tr>
<tr>
<td>(power to lock)</td>
<td>Die cast</td>
<td>Die cast</td>
<td>2000 N</td>
<td>MKey5M 24VDC</td>
<td>2TLA050003F0208</td>
<td></td>
</tr>
<tr>
<td>Safety lock</td>
<td>Plastic</td>
<td>Stainless steel</td>
<td>1800 N</td>
<td>MKey5 24VDC</td>
<td>2TLA050003F0209</td>
<td></td>
</tr>
<tr>
<td>(power to unlock)</td>
<td>Die cast</td>
<td>Die cast</td>
<td>2000 N</td>
<td>MKey5 24VDC, No Key</td>
<td>2TLA050003F0210</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Die cast</td>
<td>Die cast</td>
<td>2000 N</td>
<td>MKey5ER 24VDC</td>
<td>2TLA050003F0211</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>2000 N</td>
<td>MKey5Z 24VDC</td>
<td>2TLA050003F0212</td>
<td></td>
</tr>
</tbody>
</table>

**MKey5**

**MKey5 SSH**

**MKey5Z**

**MKey9**

**MKey8ER**

**MKey8Z**
Accessories
MKey

Actuator keys
All MKey safety switches are supplied with the appropriate standard key, except MKey9 24VDC, No key. Choose standard key or flat key depending on suitable mounting direction, e.g. standard door or sliding door. Flexible keys are suitable for doors/hatches with a smaller opening radius (i.e. 100-175 mm).

<table>
<thead>
<tr>
<th>Type of key</th>
<th>Compatible MKey models</th>
<th>Key housing</th>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard key</td>
<td>MKey5, MKey5+</td>
<td>None</td>
<td>Standard key for MKey safety switches with plastic head. Stainless steel key.</td>
<td>MKey Key 1</td>
<td>2TLA050040R0201</td>
</tr>
<tr>
<td></td>
<td>MKey5 SSH, MKey5+ SSH, MKey5Z, All MKey8, All MKey9</td>
<td>None</td>
<td>Standard key for MKey safety switches with metal head. Stainless steel key.</td>
<td>MKey Key 2</td>
<td>2TLA050040R0202</td>
</tr>
<tr>
<td>Flat key</td>
<td>All</td>
<td>Plastic shroud</td>
<td>Flat key for MKey safety switches. Stainless steel key with plastic shroud.</td>
<td>MKey Key 3</td>
<td>2TLA050040R0220</td>
</tr>
<tr>
<td>Flexible key</td>
<td>All MKey5</td>
<td>Plastic</td>
<td>Flexible key for MKey5 safety switches. Stainless steel key with plastic housing.</td>
<td>MKey Key 4</td>
<td>2TLA050040R0221</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>Die cast</td>
<td>Flexible key for MKey safety switches. Stainless steel key with black die cast metal housing.</td>
<td>MKey Key 5</td>
<td>2TLA050040R0203</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>Stainless steel</td>
<td>Flexible key for MKey safety switches. Stainless steel key with stainless steel housing.</td>
<td>MKey Key 6</td>
<td>2TLA050040R0204</td>
</tr>
</tbody>
</table>

Other accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit for manual unlocking of MKey8Z. Stainless steel.</td>
<td>MKey8Z Manual release</td>
<td>2TLA050040R0400</td>
</tr>
<tr>
<td>Maintenance lockout actuator key. Compatible with all MKey switches.</td>
<td>MKey Lockout key</td>
<td>2TLA050040R0401</td>
</tr>
<tr>
<td>Slide Lock for MKey8 and MKey9, left.</td>
<td>MKey slide lock left</td>
<td>2TLA050040R0500</td>
</tr>
<tr>
<td>Slide Lock for MKey8 and MKey9, right.</td>
<td>MKey slide lock right</td>
<td>2TLA050040R0501</td>
</tr>
<tr>
<td>Rear handle for MKey Slide Lock, Required to open door from inside.</td>
<td>Slide lock rear handle</td>
<td>2TLA050040R0510</td>
</tr>
<tr>
<td>Spring catch for MKey Slide Lock. Prevents accidental movement of the Slide Lock.</td>
<td>Slide lock spring catch</td>
<td>2TLA050040R0511</td>
</tr>
<tr>
<td>Spacer in stainless steel for flexible keys. Required when using JSM D29A and JSM D29C.</td>
<td>JSM D29E</td>
<td>2TLA040033R6400</td>
</tr>
</tbody>
</table>
## Technical data

### MKey

### Approvals

2006/42/EC - Machinery  
2014/30/EU - EMC  
2011/65/EU - RoHS  

### Functional safety data

**B_{tot}**  
2,500,000 operations at 100 mA load  
Up to SIL CL3 (depending on system architecture)  
Up to PL e (depending on system architecture)

### Electrical data

**Contact block configuration with guard open and unlocked**

- For actuator key: 2 NO + 1 NC  
- For solenoid/locking: MKey8, Mkey8Z, MKey8ER: 2 NO + 1 NC  
- MKey8M: 1 NO + 1 NC  
- MKey9: 2 NO + 1 NC  
- MKey9M: 2 NO

**Solenoid voltage**

- +24 VDC ± 10%  
- +24 VDC ± 10%

### Mechanical data

**Travel for positive opening**

- 6 mm  
- 10 mm  
- 10 mm

**Actuator key entry minimum radius**

- 175 mm Standard Key, 100 mm Flexible Key

**Material**

- Body: Polyester or stainless steel 316  
- Head: Polyester or stainless steel 316  
- MKey8, MKey8M, MKey8ER: Die cast painted red  
- MKey8Z: Stainless steel 316  
- MKey9: Glass filled polyester  
- MKey9M: Stainless steel 316

**Condut entries**

- 3 x M20 x 1.5  
- 3 x M20 x 1.5  
- 1 x M20 x 1.5

**Operating temperature**

- -25...+80 °C  
- -25...+40 °C

**Protection class**

- MKey5, MKey5+, MKey5 SSH, MKey5+ SSH: IP67  
- MKey5Z, MKey5+Z, IP69K  
- MKey8, MKey8M, MKey8ER: IP67  
- MKey8Z, IP67, IP69K  
- MKey9, IP67

---

1) Please see EN/IEC 62061, EN ISO 13849, EN ISO 14119 and ISO/TR 24119 to see how fault exclusions and serial connection impacts the reliability of the safety related parts of control systems.  
2) For MKey9, the pair of contacts for the actuator key and the pair of contacts for the locking cannot be used independently of each other. See the manual for more information.

### More information

For more information, e.g. the complete technical information, see product manual:

- MKey5 2TLC172244M0201  
- MKey8 2TLC172245M0201  
- MKey9 2TLC172246M0201
Dimension drawings
MKey

MKey5

Fixing Holes for M5 Screws

MKey8 and MKey8M

MKey9 and MKey9M

Fixing Holes for M5 Screws (4 pieces)

All dimensions in mm
Electromagnetic process lock
Magne

Magne is an electromagnetic process lock intended for locking doors and hatches.

Magne is usually used to prevent unwanted process interruptions, e.g. during a welding operation.

Magne models with integrated Adam safety sensor make it easy to achieve the highest safety level for the interlocking function.

Sealed aluminium housing
IP67 sealing makes Magne suitable for harsh environments.

Robust design
The electromagnetic lock without mechanical moving parts is a robust design with fewer parts that are subject to wear.

Hygienic design
Flat surfaces without cavities or screws sticking out minimize the risk of accumulating dirt on the surface.

Reliable in extreme conditions

Easy to install

Continuous operation

M12 connectors
Quick and easy cabling with M12 connectors.

Magnets simplify installation
Electromagnets offer larger mounting tolerances than mechanical locks.

LED diagnostics
Integrated LED diagnostics reduce down time when troubleshooting.

Strong holding force
A holding force of up to 1500 N prevents unwanted process stops.
Applications and features
Magne

Applications

Protect the process
Magne 4 is a process lock, with a safe interlocking function. This means that the interlocking function reaches PL e/SIL3 but the unlocking signal is not a safe signal. A typical application is to prevent unintentional/unnecessary interruptions of a sensitive process when the dangerous movement has a very short stop time.

Magne 3 is a simple lock without any interlocking function/safety function.

Harsh environments
With a hygienic enclosure in anodized aluminum and IP67 protection class, Magne is well suited for harsh environments.

Features

PL e in a simple and cost effective way
Magne 4 has an integrated Adam sensor. Models are available with either Adam DYN or Adam OSSD. Eva General code or Eva Unique code is ordered separately. The use of the Eden safety sensor makes it easy to reach PL e/SIL3 for the interlocking function, and enables serial connection of several Magne 4 locks to the Pluto safety PLC using only one input for Eden DYN and two for Eden OSSD. Tina 12A can be used for the serial connection of two Magne 4 locks in order to simplify connection, reduce cabling and risk of connection errors.

M12 connectors
Since the Adam sensor is integrated in Magne 4, the amount of cables is reduced so that only one cable is necessary for both the locking of Magne and the interlocking with Eden. The M12 connectors speed up connection and reduce the risk of connection errors.

Status indication
Most models offer an info signal indicating whether the Magne is locked or not, which simplifies troubleshooting and improves user friendliness.

Optional permanent magnet
Anchor plates for Magne are ordered separately and are available with or without permanent magnet. A permanent magnet holds the door closed when Magne is unlocked, or if there is a power loss. Without the permanent magnet, Magne has no magnetic field when unlocked, which avoids the accumulation of metallic particles on the magnet.

Locking and interlocking
An interlocking function indicates if a door is open or closed and prevents movement when the door is open. But it does not prevent the door from being opened. A locking function makes sure the door is kept closed.
# Ordering information

## Magne

### Ordering details

For a complete Magne lock both door part and frame part is necessary. Magne 4 also requires a separate Eva sensor.

<table>
<thead>
<tr>
<th>Safe interlocking with integrated Adam</th>
<th>Safety signal</th>
<th>Extra function</th>
<th>Connector</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>M12-5 male</td>
<td>Magne 3X M12-5</td>
<td>2TLA02022R2700</td>
</tr>
<tr>
<td>Yes</td>
<td>Dynlink</td>
<td></td>
<td>M12-5 male</td>
<td>Magne 4X Dyn M12-5</td>
<td>2TLA02022R3000</td>
</tr>
<tr>
<td></td>
<td>&quot;Locked&quot; and &quot;Closed&quot; information outputs</td>
<td>M12-8 male</td>
<td>Magne 4 Dyn-info</td>
<td>2TLA02022R3400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local reset</td>
<td>M12-8 male</td>
<td>Magne 4 Dyn-Reset</td>
<td>2TLA02022R4000</td>
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</tr>
<tr>
<td>OSSD</td>
<td>&quot;Locked&quot; and &quot;Closed&quot; information outputs</td>
<td>M12-8 male</td>
<td>Magne 4 OSSD-info</td>
<td>2TLA02022R4600</td>
<td></td>
</tr>
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<td></td>
<td>Local reset</td>
<td>M12-8 male</td>
<td>Magne 4 OSSD-Reset</td>
<td>2TLA02022R5200</td>
<td></td>
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</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium profile for door handle that completely covers a Magne unit when the door is closed. For conventional door (5–15 mm door gap)</td>
<td>JSM D28</td>
<td>2TLA02023R0100</td>
</tr>
<tr>
<td>Mounting kit for Magne. For conventional door (5 - 15 mm door gap) *</td>
<td>JSM D21B</td>
<td>2TLA02022R0600</td>
</tr>
<tr>
<td>Mounting kit for Magne. For sliding door *</td>
<td>JSM D23</td>
<td>2TLA02022R0200</td>
</tr>
<tr>
<td>Mounting kit for Eva. For conventional door*</td>
<td>JSM D24</td>
<td>2TLA02022R0300</td>
</tr>
<tr>
<td>Door handle for JSM D21B</td>
<td>JSM D27</td>
<td>2TLA02022R1000</td>
</tr>
<tr>
<td>Y-connector for serial connection of Magne 3</td>
<td>M12-3A</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td>Connection block for serial connection of two Magne, Dalton or Knox (M12-8)</td>
<td>Tina 12A</td>
<td>2TLA020054R1800</td>
</tr>
<tr>
<td>Cellular rubber, 10 mm thick. Spare part for anchor plate.</td>
<td>Cellular rubber</td>
<td>2TLA02022R3800</td>
</tr>
</tbody>
</table>

* All mounting kits include the bolts and nuts necessary to mount Magne on ABB Quick-Guard® fencing system

### Door part

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor plate with permanent magnet. Delivered with cellular rubber</td>
<td>Magne Anchor 32B</td>
<td>2TLA02023R0400</td>
</tr>
<tr>
<td>Anchor plate without permanent magnet. Delivered with cellular rubber.</td>
<td>Magne Anchor 32A</td>
<td>2TLA02023R1300</td>
</tr>
</tbody>
</table>

### Eva sensor for Magne 4 models

<table>
<thead>
<tr>
<th>Compatible Adam</th>
<th>Code description</th>
<th>Code level</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam Dyn and OSSD</td>
<td>General code.* (Eva is interchangeable)</td>
<td>Low level</td>
<td>Eva General code</td>
<td>2TLA020048R0800</td>
</tr>
<tr>
<td></td>
<td>Unique code. (Prevents defeat/fraud)</td>
<td>High level</td>
<td>Eva Unique code</td>
<td>2TLA020048R0900</td>
</tr>
</tbody>
</table>
## Cables and Connectors

### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020069P01000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020069P01100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA020055P01800</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA020055P01700</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020055P01000</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA020055P01005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA020055P010010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA020055P010020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA020055P010050</td>
</tr>
<tr>
<td>Cable with 8 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA020055P011005</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 100 m</td>
<td>2TLA020055P011010</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA020055P011020</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA020055P011050</td>
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</tbody>
</table>

### Cable with Connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA020069P0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020069P0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA020069P0100</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C03</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C03</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C03</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C03</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>Angled female connector</td>
<td>M12-C1612</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C1612</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C63</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C203</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00634</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C134</td>
<td>2TLA020069P01005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C334</td>
<td>2TLA020069P01005</td>
</tr>
</tbody>
</table>
## Technical data

### Approvals

<table>
<thead>
<tr>
<th>2014/35/EU - Low voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/65/EU - RoHS</td>
</tr>
<tr>
<td>2006/42/EC - Machinery</td>
</tr>
<tr>
<td>2014/30/EU - EMC</td>
</tr>
<tr>
<td>2011/65/EU - RoHS</td>
</tr>
</tbody>
</table>

### Functional safety data

<table>
<thead>
<tr>
<th>EN 61508:2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 62061:2005</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
</tr>
</tbody>
</table>

- Interlocking function: SIL3, PFH\_D = 4.50 \times 10^{-9}
- Interlocking function: SIL\(_{CL3}, PFH\_D = 4.50 \times 10^{-9}
- Interlocking function: PL\_e, Cat. 4, PFH\_D = 4.50 \times 10^{-9}

### Electrical data

<table>
<thead>
<tr>
<th>Operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24 VDC ± 15%</td>
</tr>
</tbody>
</table>

**Holding force**

<table>
<thead>
<tr>
<th>+24 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min 1500 N</td>
</tr>
<tr>
<td>0 V, Anchor plate 32A</td>
</tr>
<tr>
<td>0 N</td>
</tr>
<tr>
<td>0 V, Anchor plate 32B</td>
</tr>
<tr>
<td>30 N</td>
</tr>
</tbody>
</table>

### Mechanical data

<table>
<thead>
<tr>
<th>Mechanical life</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;10(^7) switch operations</td>
</tr>
</tbody>
</table>

**Operating temperature**

-20...+50 °C

**Humidity range**

35 to 85% (with no icing or condensation)

**Protection class**

IP67

**Weight**

<table>
<thead>
<tr>
<th>Anchor plate 32A/B</th>
</tr>
</thead>
<tbody>
<tr>
<td>610 g</td>
</tr>
<tr>
<td>700 g</td>
</tr>
<tr>
<td>290 g</td>
</tr>
</tbody>
</table>

**Material**

- Anchor plate: Iron with nickel coating
- Electromagnet: Iron with zinc-nickel coating
- Housing: Anodized aluminum with parts in polycarbonate
- Potting: PUR, epoxy

---

**More information**

For more information, e.g. the complete technical information, see product manual for: Magne **2TLC172315M0201**
Dimension drawings
Magne

Anchor plate 32A

Anchor plate 32B

All dimensions in mm
Dalton is a compact electromechanical lock intended for locking doors and hatches. In the unlocked state the hatch is held closed by a ball catch, and in locked state the balls are mechanically blocked so the hatch cannot be opened.

Dalton is usually used to prevent unwanted process interruptions, e.g. during a welding operation.

Dalton can be used alone or with an Eden safety sensor that makes it easy to achieve PL e/SIL3 for the interlocking function. Dalton is available with an M12-connector for direct connection of Eden, to reduce cabling.

Easy to install

M12 connectors
Quick and easy cabling with M12 connectors.

Compact size
Dalton is easy to fit due to its low weight and compact size.

Modular structure
Dalton has a modular structure and can be combined in different ways depending on position, installation and function.

Continuous operation

LED diagnostics
Integrated LED diagnostics reduces downtime when troubleshooting.

Robust design
With an IP64 enclosure in anodized aluminum and a tongue in stainless steel, Dalton keeps your machine running in demanding environments.

Safety and protection

Safety interlocking
Easy connection to Eden sensor enables the highest level of safety for the interlocking function.
Applications and features
Dalton

Applications

Protection of the process
When used with Eden safety sensor, Dalton is a process lock, since the Eden sensor provides a safe interlocking function. This means that the interlocking function can reach PL e/SIL3 but the unlocking signal is not a safe signal. A typical application is on a hatch to prevent unintentional/unnecessary interruptions of a sensitive process when the dangerous movement has a very short stop time.

Dalton without Eden is a lock without any interlocking function/safety function.

Locking and interlocking
An interlocking function indicates if a door is open or closed and prevents the machine from running when the door is open. But it does not prevent the door from being opened. A locking function makes sure the door is kept closed.

Features

PL e in a simple and cost effective way
The use of an Eden safety sensor together with Dalton makes it easy to reach PL e/SIL3 for the interlocking function. Eden can be mounted separately on the door/hatch or directly on Dalton M12. Both Eden DYN and Eden OSSD can be used.

When Eden DYN is used, a Tina 12A can be used to simplify the serial connection of two Dalton M12 locks. This reduces cabling and minimizes the risk of connection errors.

M12 connectors
Dalton M12 is equipped with an extra M12 connector for direct connection of an Eden safety sensor. This reduces cabling so that only one cable is necessary for both the locking of Dalton and the interlocking with Eden. The M12 connectors speed up connection and reduce the risk of connection errors.

Status indication
All models offer an info signal indicating whether Dalton is locked or not, which simplifies troubleshooting and improves user friendliness.
Ordering details
Go through the three steps below in order to select the necessary parts of a complete Dalton lock.

1. Choose a lock housing

<table>
<thead>
<tr>
<th>Connector for Adam</th>
<th>Type of connector</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (only locking function)</td>
<td>M12-5 male⁵</td>
<td>Dalton M11</td>
<td>2TLA020038R0100</td>
</tr>
<tr>
<td></td>
<td>M12-6 male⁵</td>
<td>Dalton M12</td>
<td>2TLA020038R0200</td>
</tr>
<tr>
<td>Yes ¹)</td>
<td>M12-8 male (+ M12-5 female for Adam)</td>
<td>Dalton M12</td>
<td>2TLA020038R0200</td>
</tr>
</tbody>
</table>

¹) The compatible models are Adam DYN-Info M12-5, Adam DYN-Status M12-5, Adam OSSD-info M12-5 and Adam OSSD-Reset M12-5.

2) Dalton M11 and Dalton M31 offer the same function and the same number of signals. The choice between the two is mainly depending on the type of cable that is standard on site, with 5 or 8 leads.

2. Choose a lock tongue

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door closing to the front of Dalton</td>
<td>Lock tongue A</td>
<td>2TLA020039R0800</td>
</tr>
<tr>
<td>Door closing to the upper or lower side of Dalton</td>
<td>Lock tongue B</td>
<td>2TLA020039R1000</td>
</tr>
</tbody>
</table>

3. Choose a fixing kit

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Dalton and lock tongue.</td>
<td>Dalton fixing kit 1</td>
<td>2TLA020039R0000</td>
</tr>
<tr>
<td>For Dalton and lock tongue plus Eden sensor.</td>
<td>Dalton fixing kit 2</td>
<td>2TLA020039R0100</td>
</tr>
</tbody>
</table>

Fixing kit 1
For Dalton and lock tongue.
NOTE! Lock tongue is NOT included.

Fixing kit 2
For Dalton, lock tongue and Eden sensor.
NOTE! Eden and lock tongue are NOT included.
## Cables and connectors

### Dalton

#### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer cable M12-8 to M12-5, used e.g. for Dalton to Tina 4A or Tina 8A.</td>
<td>M12-CT0214</td>
<td>2TLA20056FR0100</td>
</tr>
<tr>
<td>Connection block for series connection of two locks. E.g. Knox(M12-8), Magne or Dalton M12 with Eden DYN.</td>
<td>Tina 12A</td>
<td>2TLA20054R1800</td>
</tr>
</tbody>
</table>

#### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-CB1</td>
<td>2TLA20056FR0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C61HE</td>
<td>2TLA20056FR8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C101HE</td>
<td>2TLA20056FR8100</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C3312</td>
<td>2TLA20056FS8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA20056FS6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C112</td>
<td>2TLA20056FR2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C312</td>
<td>2TLA20056FR2100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
<td>2TLA20056FR2200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA20056FR3000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>Angled female connector</td>
<td>M12-C1012V2</td>
<td>2TLA20056FR6100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA20056FR4000</td>
</tr>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-CB3</td>
<td>2TLA20056FR3000</td>
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<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA20056FR4000</td>
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<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C203</td>
<td>2TLA20056FR4100</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00634</td>
<td>2TLA20056FS6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C134</td>
<td>2TLA20056FS5000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C334</td>
<td>2TLA20056FS5100</td>
</tr>
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</table>

#### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td>Type</td>
<td>Order code</td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA20056FR1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA20056FR1100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA20056FR1600</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA20056FR1700</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA20057R0001</td>
</tr>
<tr>
<td>50 m cable 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA20057R0005</td>
</tr>
<tr>
<td>100 m cable 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA20057R0010</td>
</tr>
<tr>
<td>200 m cable 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA20057R0020</td>
</tr>
<tr>
<td>500 m cable 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA20057R0050</td>
</tr>
<tr>
<td>Cable with 8 conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA20057R0105</td>
</tr>
<tr>
<td>50 m cable 8 x 0.34 shielded conductors</td>
<td>C8 cable 130 m</td>
<td>2TLA20057R0105</td>
</tr>
<tr>
<td>100 m cable 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA20057R0120</td>
</tr>
<tr>
<td>200 m cable 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA20057R0150</td>
</tr>
</tbody>
</table>
## Technical data

### Dalton

#### Technical data

<table>
<thead>
<tr>
<th>Approvals</th>
<th></th>
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</thead>
</table>

#### Functional safety data

<table>
<thead>
<tr>
<th>IEC/EN 61508-1...7</th>
<th>Interlocking function (with Eden): SIL3, PFH = 4.50 x 10^-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 62061</td>
<td>Interlocking function (with Eden): SILCL3, PFH = 4.50 x 10^-9</td>
</tr>
<tr>
<td>EN ISO 13849-1</td>
<td>Interlocking function (with Eden): PL e, Cat. 4, PFH = 4.50 x 10^-9</td>
</tr>
</tbody>
</table>

#### Electrical data

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>+24 VDC +25 / -20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holding force</td>
<td></td>
</tr>
<tr>
<td>Unlocked</td>
<td>25-100 N</td>
</tr>
<tr>
<td>Locked</td>
<td>2000 N</td>
</tr>
</tbody>
</table>

#### Mechanical data

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>-10...+55 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP64</td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>Ball catch, securing plate</td>
<td>Anodized aluminum</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Anodized aluminum</td>
</tr>
<tr>
<td>Lock tongue, securing plate</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

### More information

For more information, e.g. the complete technical information, see product manual for: Dalton 2TLC172165M0201
Dimension drawings
Dalton

Fixing kit 1 with Dalton

Fixing kit 2 with Dalton and Eden

All dimensions in mm
Knox is a robust lock in stainless steel available in a variety of models: process locks and safety locks, and for most types of doors.

All Knox models offer an interlocking function reaching PL e/SIL3. Knox as safety lock also offers a locking/unlocking function reaching PL e/SIL3 while the locking/unlocking function of Knox as a process lock is not intended for safety functions.

Knox has a front handle and a red back handle. The handles on the lock operate as they would on a normal door, eliminating the needs of other handles for the door. But the front handle also offers a reset function, eliminating the need for a separate reset button, and the red back handle works as an emergency release/opening.

Safe lock with double locking function
Both the locking function and the interlocking functions of Knox reach PL e/SIL3. Moreover, the mechanical locking is guaranteed by two separate latch bolts.

Emergency release handle on the inside
It is always possible to open the door from inside the dangerous zone, using the emergency release handle.

LED diagnostics
Integrated LED diagnostics reduce down time when troubleshooting.

Strong holding force
A holding force of up to 5000 N prevents the door from being opened while the machine is running.

Robust design
Made of stainless steel and with a robust construction, Knox is ideal for use in mechanically demanding environments.
Applications and features

Knox

Process lock with safe interlocking
Knox 2X is a process lock, which means that the locking should not be used as a safety function. But it has a safe interlocking function that will stop the process if the door is opened.

Safety lock with safe interlocking and safe unlocking
Knox 2A is a safety lock, which means that the unlocking function is suitable for safety functions, since it cannot be unlocked as a result of e.g. a short-circuit or a power loss. It also has a safe interlocking function that makes sure the machine won’t start if the door is open.

Locking and interlocking
An interlocking function indicates if a door is open or closed and prevents movement when the door is open, but it does not prevent the door from being opened. A locking function makes sure the door is kept closed.

Several models
Several different models of Knox are available depending on if the door is left or right-hung, inward or outward opened, sliding door or with manual unlocking function.

Four different states
The front handle works as it would on a normal door with the addition that it offers a reset function when turned upwards, and the red back handle always offers an emergency release/opening. The following four combinations/states are possible.

Maintenance mode
There are holes in the two latch bolts for placing a padlock and preventing the door from closing/locking. This can be used e.g. by maintenance personnel to indicate the presence of a person inside the dangerous zone, and prevent unintended startup.

Manual unlocking/Auxiliary release
In case of power loss, Knox remains in its state (locked or unlocked). Models with manual unlocking function offer the possibility to mechanically unlock Knox with a hex key. For all other models, it is necessary to apply power to unlock.
**Ordering information**

**Knox**

### Door part

<table>
<thead>
<tr>
<th>Type of opening</th>
<th>Manual unlocking</th>
<th>Right/Left hung door</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outwards opening (away from the dangerous zone)</td>
<td>No</td>
<td>Right</td>
<td>Knox 1A-R v2</td>
<td>2TLA020105R5000</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Right</td>
<td>Knox 1AX-R v2</td>
<td>2TLA020105R5800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left</td>
<td>Knox 1A-L v2</td>
<td>2TLA020105R5100</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Right</td>
<td>Knox 1AX-L v2</td>
<td>2TLA020105R5900</td>
</tr>
<tr>
<td>Inwards opening (towards the dangerous zone)</td>
<td>No</td>
<td>Right</td>
<td>Knox 1B-R v2</td>
<td>2TLA020105R5200</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Right</td>
<td>Knox 1BX-R v2</td>
<td>2TLA020105R6000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left</td>
<td>Knox 1B-L v2</td>
<td>2TLA020105R5300</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Right</td>
<td>Knox 1BX-L v2</td>
<td>2TLA020105R6100</td>
</tr>
<tr>
<td>Sliding door</td>
<td>No</td>
<td>Slide right to open</td>
<td>Knox 1F-R v2</td>
<td>2TLA020105R6200</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Slide right to open</td>
<td>Knox 1FX-R v2</td>
<td>2TLA020105R6400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slide left to open</td>
<td>Knox 1F-L v2</td>
<td>2TLA020105R6300</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Slide left to open</td>
<td>Knox 1FX-L v2</td>
<td>2TLA020105R6500</td>
</tr>
</tbody>
</table>

### Frame part

**Description**

<table>
<thead>
<tr>
<th>Connector</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-8 pole</td>
<td>Knox 2A v2</td>
<td>2TLA020105R2200</td>
</tr>
<tr>
<td>M12-5 pole</td>
<td>Knox 2X v2</td>
<td>2TLA020105R2300</td>
</tr>
</tbody>
</table>

**Accessories**

**Description**

<table>
<thead>
<tr>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC plate for Knox on mesh door to prevent emergency opening from the outside through the mesh.</td>
<td>2TLA020105R2000</td>
</tr>
<tr>
<td>Cover plate to fit on the door part instead of the emergency release handle.</td>
<td>2TLA020105R6000</td>
</tr>
<tr>
<td>Connection block for serial connection of two Magne, Dalton or Knox (M12-8)</td>
<td>2TLA020105R1800</td>
</tr>
</tbody>
</table>

**Connectors**

| M12-8 female, straight | M12-C01 | 2TLA020059R1000 |
| M12-5 female, straight | M12-C03 | 2TLA020059R1600 |

**Cable with 5 conductors**

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10m cable with x 0.34 shielded conductors</td>
<td>CS 10m</td>
<td>2TLA020059R0001</td>
</tr>
<tr>
<td>50m cable with x 0.34 shielded conductors</td>
<td>CS 50m</td>
<td>2TLA020059R1000</td>
</tr>
<tr>
<td>100m cable with x 0.34 shielded conductors</td>
<td>CS 100m</td>
<td>2TLA020059R1400</td>
</tr>
<tr>
<td>200m cable with x 0.34 shielded conductors</td>
<td>CS 200m</td>
<td>2TLA020059R1600</td>
</tr>
<tr>
<td>500m cable with x 0.34 shielded conductors</td>
<td>CS 500m</td>
<td>2TLA020059R1800</td>
</tr>
<tr>
<td>6m cable with straight M12-5 female connector</td>
<td>M12-C61</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td>10m cable 5 with straight M12-5 female connector</td>
<td>M12-C101</td>
<td>2TLA020059R1000</td>
</tr>
<tr>
<td>20m cable 5 with straight M12-5 female connector</td>
<td>M12-C201</td>
<td>2TLA020059R1400</td>
</tr>
<tr>
<td>6m cable 5 with angled M12-5 female connector</td>
<td>M12-C61 V</td>
<td>2TLA020059R0100</td>
</tr>
<tr>
<td>10m cable 5 with angled M12-5 female connector</td>
<td>M12-C101 V</td>
<td>2TLA020059R1100</td>
</tr>
</tbody>
</table>

**Cable with 8 conductors**

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6m cable with straight M12-8 female connector</td>
<td>M12-C83</td>
<td>2TLA020059R3000</td>
</tr>
<tr>
<td>10m cable with straight M12-8 female connector</td>
<td>M12-C103</td>
<td>2TLA020059R4000</td>
</tr>
<tr>
<td>20m cable with straight M12-8 female connector</td>
<td>M12-C203</td>
<td>2TLA020059R4100</td>
</tr>
</tbody>
</table>

**Spare parts**

<table>
<thead>
<tr>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knox shear pin for handle</td>
<td>2TLA020105R8000</td>
</tr>
<tr>
<td>Extra seal labels for Knox with manual unlock, 10 pcs per package</td>
<td>2TLA020105R8000</td>
</tr>
<tr>
<td>Knox man. unlock seal-label</td>
<td>2TLA020105R8000</td>
</tr>
<tr>
<td>Knox silver handle</td>
<td>2TLA020105R8000</td>
</tr>
<tr>
<td>Extra back red handle</td>
<td>2TLA020105R8000</td>
</tr>
</tbody>
</table>
## Technical data

### Knox

### Approvals


### Functional safety data

<table>
<thead>
<tr>
<th>Standard</th>
<th>Interlocking function</th>
<th>PFH$_D$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61508:2010</td>
<td>SL3, PFH$_D$ = 4.50 x 10$^{-9}$</td>
<td></td>
</tr>
<tr>
<td>EN 62061:2005+A1:2013</td>
<td>SLCL3, PFH$_D$ = 4.50 x 10$^{-9}$</td>
<td></td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>PL e, Cat. 4, PFH$_D$ = 4.50 x 10$^{-9}$</td>
<td></td>
</tr>
</tbody>
</table>

### Locking function

- PL e, Cat. 4

### Electrical data

| Operating voltage | 24 VDC ± 10% |
| Holding force |         |
| Unlocked | 5000 N (10 000 N ultimate breaking strength) |
| Locked | 5000 N (10 000 N ultimate breaking strength) |

### Mechanical data

| Connection | Knox 2A: M12-8 pole male connector |
| Lock function | Knox 2X: M12-8 pole male connector |
| Operating temperature | -5°C...+55°C |
| Protection class | IP65 |

### More information

For more information, e.g. the complete technical information, see product manual: Knox 2TLC172250M0201
Dimension drawings
Knox

Knox 1A/B

Knox 1F

All dimensions in mm
Control devices

Introduction and overview

Selection guide

One- and two-hand device - Safeball™

Three-position device - JSHD4
ABB offers ergonomic control devices that allow operators to safely control dangerous machinery.

<table>
<thead>
<tr>
<th>Safeball</th>
<th>JSHD4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image</strong></td>
<td><img src="image1.png" alt="Image" /> <img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>One or two-hand control device</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Ergonomic and unique machine control</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Mainly used in pairs as a two-hand control in applications where it must be ensured that the operator has his hands outside the hazardous area, e.g. for starting a press cycle.</td>
</tr>
</tbody>
</table>
| **Advantages** | - Ergonomic design  
- Several grip possibilities  
- Flexible mounting  
- Two opposing buttons minimize the possibility to defeat | - Ergonomic shape and operation  
- Hand recognition prevents defeat  
- Easy connection with M12 connectors  
- Several models to suit multiple applications  
- Extra buttons for e.g. machine control |
Different types of control devices

When to use a two-hand or one-hand control device
A two-hand control device is often used for machines with manual loading or unloading. The operator uses the two-hand control device to safely start a machine cycle. A two-hand control must be used with a safety control device that supervises that both buttons are pressed simultaneously, i.e. both hands are on the control and therefore outside the dangerous zone, in order to start the dangerous movement. An one-hand control device can be used in applications when the operator cannot reach the hazardous area with his/her free hand, or on less dangerous machines.

When to use a three-position device
A three-position device (or hold-to-run device) is used to allow a limited movement of the machine when the operator needs to be in the dangerous area without stopping the dangerous machine, for example during troubleshooting, test running or programming.

The operator pushes the larger black button to a middle position in order to allow a movement. In case of danger, the operator will either release the button or squeeze it to its bottom position and the machine will stop.

Standards
The safety distance of two-hand control devices should be calculated using EN ISO 13855.

When constructing a two-hand station for a machine, the standard EN 574 about functional aspects and principles for design needs to be followed.
One- and two-hand devices

Safeball™ is an ergonomic control device used for safe start and stop of machine cycles. Usually two Safeball™ are used together to form a two-hand control.

Safeball™ consists of a spherical ball containing two embedded push button switches, one on each side of the ball. Both buttons must be pressed in order to start and operate the machine. The risk of unintentional activation is thereby minimized and the device is simple and ergonomic to use.

When two Safeball™ are used in a two-hand device application, the operator must press all four push buttons simultaneously in order to operate the machine. If one or more of the buttons are released, a stop signal is given to the machine.

Optimum interface

Ergonomic design
The design of Safeball™ allows for comfort of use for all hand sizes and a great variety in gripping positions. And there is no need for shrouding top covers to prevent defeat, as there is for two-hand devices with standard push buttons.

Flexible mounting
With the JSM C5 mounting bracket, Safeball™ can be orientated in the most ergonomic position for the operator.

Safety and protection

Unique design
The unique design of Safeball™ combines the highest level of safety with the best ergonomics.

Highest safety level
Safeball™ provides the operator with a dual switching function and short-circuit supervision in each hand.
Applications and features
Safeball™

Applications

One-hand control device
One Safeball™ can be used as an ergonomic “hold to run” button, i.e. the movement is allowed as long as both push buttons on Safeball™ are pressed, usually when the operator cannot reach the hazardous area with his/her free hand, or on less dangerous machines. Safeball™ is a very practical one-hand control device since it is very easy to locate and activate.

Two-hand control device
A two-hand control device is often used for machines with manual loading or unloading. The operator uses the two-hand control device to safely start a machine cycle. A two-hand control must be used with a safety control device that makes sure that both buttons are pressed simultaneously, i.e. both hands are on the control and therefore outside the dangerous zone, in order to start the dangerous movement. Using two Safeball™, it is easy to realize a custom two-hand device.

Features

Mounting methods
Safeball™ can be mounted in many different ways. It can be mounted on a table, on the machine, on a support or wherever suitable for ergonomic reasons. Safeball™ can be mounted in a fixed position or on a tilting and/or rotating support when used with a JSM C5. This flexibility in mounting enhances ergonomics and minimizes work-related musculoskeletal disorders.

When two Safeball™ are used as a two-hand device, no shrouding top cover is necessary to prevent defeat, as it is for two-hand devices with push buttons, since it is very difficult to push all 4 push buttons of the two Safeball™ with e.g. a hand and an elbow.

Highest level of safety
When used as a two-hand control device, a safety controller for two-hand devices must be used, like an appropriate Sentry safety relay or a Pluto programmable safety controller. The safety controller monitors that all four push buttons (i.e. on each side of both Safeball™) are pressed within 0.5 second, in order to detect e.g. a short circuit or fraud, like a rubber band around one device. Safeball™ is certified to comply with type III C according to EN 574+A1:2008.

JSTD25
The JSTD25 control stations are pre-built two-hand devices utilizing the good ergonomics of Safeball™. They can be used as fixed devices that are easy to install, or as mobile devices. All models are equipped with shields to protect the buttons from accidental operation, and also protect from damage if the device is dropped on the floor when used as mobile device. All versions meet EN 574 and EN ISO 13849-1.
### Ordering information

**Safeball™**

<table>
<thead>
<tr>
<th>Safeball™ JSTD1</th>
<th>Types of switches</th>
<th>Cable length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 NO + 1 NC</td>
<td>2 m</td>
<td>JSTD1-A</td>
<td>2TLA020007R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2 m</td>
<td>JSTD1-B</td>
<td>2TLA020007R0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>JSTD1-C</td>
<td>2TLA020007R0200</td>
</tr>
<tr>
<td></td>
<td>2 NO</td>
<td>0.2 m</td>
<td>JSTD1-E</td>
<td>2TLA020007R0300</td>
</tr>
</tbody>
</table>

### Two-hand control devices JSTD25

<table>
<thead>
<tr>
<th>Extra feature</th>
<th>Connector male</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>M12-5</td>
<td>JSTD25F</td>
<td>2TLA020007R6000</td>
</tr>
<tr>
<td></td>
<td>M12-8</td>
<td>JSTD25H</td>
<td>2TLA020007R6300</td>
</tr>
<tr>
<td>Pre-mounted Smile 10 EA emergency stop button</td>
<td>M12-8</td>
<td>JSTD25K</td>
<td>2TLA020007R6900</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bracket for JSTD1 with orientation possibility (ball joint)</td>
<td>JSM C5</td>
<td>2TLA020007R0900</td>
</tr>
<tr>
<td>Suspension shelf for JSTD25F/H/K</td>
<td>JSM C7</td>
<td>2TLA020007R1200</td>
</tr>
<tr>
<td>Protection coat for Safeball</td>
<td>Safeball coat</td>
<td>2TLA020007R1900</td>
</tr>
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</table>
### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA02006F00000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA02006F80000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C201</td>
<td>2TLA02006F14000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA02006F69020</td>
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<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA02006F63000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C112</td>
<td>2TLA02006F02000</td>
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<td>3 m</td>
<td></td>
<td>M12-C312</td>
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<td></td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
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<td></td>
<td>10 m</td>
<td></td>
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<td>M12-8</td>
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<td>M12-C63</td>
<td>2TLA02006F30000</td>
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<td></td>
<td>10 m</td>
<td></td>
<td>M12-C103</td>
<td>2TLA02006F40000</td>
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<td></td>
<td>20 m</td>
<td></td>
<td>M12-C203</td>
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<td>Female + male</td>
<td>0.06 m</td>
<td></td>
<td>M12-C00634</td>
<td>2TLA02006F64000</td>
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<tr>
<td></td>
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<td>1 m</td>
<td></td>
<td>M12-C134</td>
<td>2TLA02006F50000</td>
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<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C334</td>
<td>2TLA02006F51000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>Angled female connector</td>
<td>M12-C1012V2</td>
<td>2TLA02006F67000</td>
</tr>
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### Separate cables and connectors

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<td>10 m cable with 5 x 0.34 shielded conductors</td>
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## Technical data

### Safeball™

#### Technical data

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#### Functional safety data

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<th>EN/IEC 61508:2010</th>
<th>Up to SIL3, depending on system architecture</th>
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<td>EN/IEC 62061:2005+A1:2013</td>
<td>Up to SIL CL3, depending on system architecture</td>
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<tr>
<td>EN ISO 13849-1:2008</td>
<td>Up to Cat. 4, PL e, depending on system</td>
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</table>

#### Mechanical data

| Operating force | Approx. 2N |
| Life, mechanical | > 1 x 10⁶ operations at max 1 Hz |
| Connection cable |  |
| JSTD1-A | PVC-cable, 4 x 0.75 mm², L = 2 m |
| JSTD1-B, JSTD1-E | Wires, 4 x 0.75 mm², L = approx. 0.2 m |
| JSTD1-C | PVC-cable, 4 x 0.75 mm², L = 10 m |
| Protection class | IP67. Not intended for use under water |
| Ambient temperature | -25 °C to +50 °C (operating) |
| Material JSTD1 | Polypropylene |
| Weight JSTD1 |  |
| With 2 m cable | 0.2 kg |
| With 10 m cable | 0.7 kg |
| With 4 x 0.2 m wires | 0.1 kg |

### More information

For more information, e.g. the complete technical information, see product manual for: Safeball 2TLC172182M0201
Dimension drawings
Safeball™

Safeball™

JSTD25F

All dimensions in mm
JSHD4 is a three-position device used to allow a limited movement of the machine when the operator is in the dangerous area, for example during troubleshooting, test running and programming.

The operator pushes the larger black button to a middle position in order to allow a movement. In case of danger, the operator will either release the button or squeeze it to its bottom position and the machine will stop.

JSHD4 is available with different types of connectors for an optimal adaptation to the application. Some models offer additional top and front button to control a non-safe signal, for ex. move forward and/or backward.

Cheat-safe hand recognition
All JSHD4 models comply with PL e/Cat 4. Some models offer an “anti-tamper” function: an extra signal indicate if the JSHD4 is held in the middle position by a human hand. A machine movement will be authorized only in presence of this signal and not if the device is held in run position by any other (fraudulent) mean.

Ergonomic shape and operation
JSHD4 is ergonomic, both in respect of its shape, fitting to the hand, and the way the buttons are operated. JSHD4 is easy to operate using just the fingers (even with gloves), and the middle position provides a safe resting position.

Safety and protection

Optimum interface

Continuous operation

Safely inspect a running machine
JSHD4 allows the operators to safely inspect the manufacturing process without completely stopping the machine.
Safe troubleshooting, programming and testing

If the operator has to enter a risk area for troubleshooting or test running, it is extremely important that he/she is able to stop the machinery without having to rely on someone else pushing a stop button. In addition, no-one else should be able to start the machinery after it has been stopped by the operator. An operator who is under pressure must also be able to give a stop signal, whether in panic he/she pushes harder on the button or just releases it.

Applications

JSHD4 three-position control device can be used for troubleshooting, programming and test running in situations where no other protection is available or feasible. JSHD4 allows the operator to safely inspect the process without completely stopping the machine. The big black button has 3 distinct positions: released, pressed gently and pressed hard. The middle position allows the machine to run with limited speed or range, but when released or pressed hard the machine stops.

Applications and features

JSHD4

Applications

Safe troubleshooting, programming and testing

Hand recognition for protection against tampering
An optional “anti-tamper” function sends an extra signal to indicate if the JSHD4 is held by a human hand or not. By using this, the safety level is increased, and the risk of manipulation or bypass of the safety function is reduced. It is no longer possible to expose the operator to danger by trying to lock the three-position control device in run mode.

Ergonomic design
JSHD4 is ergonomic, both in respect of its shape, fitting to the hand and the way the buttons are operated. It is easy to operate the device by using just the fingers (even with gloves), and the middle position provides a secure resting position.

Features

Hand recognition for protection against tampering
An optional “anti-tamper” function sends an extra signal to indicate if the JSHD4 is held by a human hand or not. By using this, the safety level is increased, and the risk of manipulation or bypass of the safety function is reduced. It is no longer possible to expose the operator to danger by trying to lock the three-position control device in run mode.

Additional top and front buttons for non-safe signals
The two additional buttons can be used for e.g. start/stop, up/down or forward/back. Internally the device is duplicated. The three-position function itself is built up of two completely independent three-position buttons which feels as one button for the user.
## Ordering information

JSHD4

### Choose top part, bottom part and anti-tamper

<table>
<thead>
<tr>
<th>Top part Buttons and LEDs</th>
<th>Bottom part Feature</th>
<th>ID</th>
<th>Connection</th>
<th>Anti-tamper Type</th>
<th>Order code</th>
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</thead>
<tbody>
<tr>
<td><strong>JSHD4-1</strong></td>
<td>Use your own cable</td>
<td>AA</td>
<td>Cable gland and 5 screw connections</td>
<td></td>
<td>JSHD4-1-AA</td>
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<tr>
<td>No LEDs</td>
<td>No buttons</td>
<td>Cost effective and quick connection</td>
<td>AC</td>
<td>M12-5 male</td>
<td>JSHD4-1-AC</td>
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<tr>
<td></td>
<td></td>
<td>Holder for Eva (used with JSM54)</td>
<td>AL</td>
<td>Cable gland and 10 screw connections</td>
<td>JSHD4-1-AL</td>
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<tr>
<td><strong>JSHD4-2</strong></td>
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<td>AB</td>
<td>Cannon 12 male pins</td>
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<td>x</td>
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<td>LEDs</td>
<td>Front button</td>
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<td>Top button</td>
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<tr>
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* See document 2TLC010007L0201 for information about replacement.
**Cables and connectors JSHD4**

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### Separate cables and connectors

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<thead>
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<th>Description</th>
<th>Type</th>
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<tbody>
<tr>
<td>Connectors</td>
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<tr>
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<td>M12-5-pole female, straight</td>
<td>M12-C01</td>
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<td>M12-5-pole male, straight</td>
<td>M12-C02</td>
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<td>M12-8-pole female, straight</td>
<td>M12-C03</td>
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<td></td>
<td>M12-8-pole male, straight</td>
<td>M12-C04</td>
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<td>12-pole female cannon connector for JSHD4</td>
<td>JSHK0</td>
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<td>Cable with 5 conductors</td>
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<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020069R0001</td>
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<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
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<td>C5 cable 100 m</td>
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## Accessories

### JSHD4

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSM 55 Wall bracket for three position device</td>
<td>JSM 55</td>
<td>2TLA00000GR0500</td>
</tr>
<tr>
<td>JSM 5B Wall bracket for 2 pcs MKey5 interlock switches</td>
<td>JSM 5B</td>
<td>2TLA00000GR0700</td>
</tr>
<tr>
<td>JSM 54A Wall bracket for Adam. Used with AL bottom part that has a holder for Eva</td>
<td>JSM 54A</td>
<td>2TLA00000GR0800</td>
</tr>
<tr>
<td>JSM 50G Bracket for key switches</td>
<td>JSM 50G</td>
<td>2TLA00000GR0900</td>
</tr>
<tr>
<td>JSM 50H Bracket for Eden sensor</td>
<td>JSM 50H</td>
<td>2TLA00000GR1000</td>
</tr>
<tr>
<td>Others</td>
<td>JSHD4 Coat</td>
<td>2TLA00000GR0900</td>
</tr>
</tbody>
</table>

JSM 50G bracket for key switches and JSM 5B wall bracket for 2 pcs MKey5

JSM 54A wall bracket for Adam (and AL bottom part that has a holder for Eva)

JSHD4 protection coat
Electrical wiring diagrams
Examples with JSHD4-1 and JSHD4-2 models

JSHD4-1-AA, cable gland and 5 screw connections on JSHD4-1

JSHD4-2-AB-A, Cannon 12 pins

JSHD4-2-AK, Cannon 12 pins

JSHD4-2-AD-A, M12-8
Electrical wiring diagrams
Examples with JSHD4-2 models

JSHD4-2-AH-A, cable gland and 10 screw connection

JSHD4-2-AL-A, cable gland and 10 screw connection

JSHD4-2-AJ-A, cable gland and 16 screw connection
### Technical data

<table>
<thead>
<tr>
<th>Approval</th>
<th>Supplier</th>
<th>CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006/42/EC - Machinery</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Functional safety data
- **EN ISO 13849-1:2016**: Up to PL e (depending on number of operations per year)
- **B10d**: 2,000,000 to middle position, 968,000 to bottom position

#### Electrical data
- **Current allowed, three-position button**: Per channel: Maximum +30 VDC, 20 mA, Minimum +10 VDC, 8 mA
- **Current allowed, extra button**: Maximum 500 mA

#### Operation force
- **Approx. 15 N for three-position buttons (ON)**
- **Approx. 45 N for three-position buttons (OFF)**
- **Approx. 2.5 N for top/front push button**

#### Mechanical data
- **Operating temperature**: -10 ...+50 °C
- **Protection class**: IP65
- **Mechanical life**: 1,000,000 cycles to middle position
- **Weight**: Approx. 0.2 kg without cable

### More information
For more information, e.g. the complete technical information, see product manual for: JSHD4 2TLC172072M0201

### Dimension drawings

All dimensions in mm
## Introduction and overview

<table>
<thead>
<tr>
<th>Selection guide</th>
<th>6/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency stop - Smile, INCA, EStrong and Compact</td>
<td>6/6</td>
</tr>
<tr>
<td>Safety stop - Smile, INCA and Compact</td>
<td>6/14</td>
</tr>
<tr>
<td>Pull wire emergency stop switch - LineStrong</td>
<td>6/22</td>
</tr>
<tr>
<td>Push-button box - Smile 41</td>
<td>6/32</td>
</tr>
<tr>
<td>Reset button - Smile</td>
<td>6/38</td>
</tr>
</tbody>
</table>
ABB offers a full range of buttons and pull wires for emergency stop functions, as well as pilot devices for e.g. reset functions.

<table>
<thead>
<tr>
<th>Emergency stop buttons</th>
<th>Safety stop buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Smile, Inca, EStrong, Compact</td>
<td>Smile, Inca, Compact</td>
</tr>
<tr>
<td><strong>Image</strong></td>
<td><strong>Image</strong></td>
</tr>
<tr>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Emergency stop buttons for external mounting and panel mounting in different sizes and material.</td>
<td>Safety stop buttons for external mounting and panel mounting</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td><strong>Applications</strong></td>
</tr>
<tr>
<td>Safely stop dangerous machine functions</td>
<td>Safely stop a limited part of a dangerous machine</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>Models with:</td>
<td>Models with:</td>
</tr>
<tr>
<td>- Compact size</td>
<td>- Compact size</td>
</tr>
<tr>
<td>- Robust enclosure for harsh environments</td>
<td>- Robust enclosure for harsh environments</td>
</tr>
<tr>
<td>- Quick installation with M12 connectors</td>
<td>- Quick installation with M12 connectors</td>
</tr>
<tr>
<td>- LED indication</td>
<td>- LED indication</td>
</tr>
<tr>
<td></td>
<td>Pull wire emergency stop switches</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>LineStrong</td>
</tr>
<tr>
<td><strong>Image</strong></td>
<td><img src="image1.png" alt="Image of emergency stop switch" /></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Emergency stop switches in robust enclosures for pull wires of various lengths.</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td>Emergency stop line to safely stop conveyor belts and long transportation lines.</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>- Up to 200 m wire with one switch - Reliable mechanical connection - Robust construction</td>
</tr>
</tbody>
</table>
Why an emergency stop is necessary
If a machine breaks down or if someone is in danger, anyone should be able to stop the machine, regardless of their knowledge of the specific application.

When a safety stop could be used
A safety stop (also called machine stop) should be used to safely stop a part of the machine, e.g. as a stop for an individual hazardous motion. It should not be used as an emergency stop and stop the complete machine. Likewise, an emergency stop with red push button must not be used as a safety stop.

In order to separate the safety stop function from the emergency stop function, the safety stop buttons should be colored black.

When a pull wire emergency stop could be used
A pull wire emergency stop is easier to install than a system of several emergency stop buttons along a carriage path which makes it ideal for installations over long distances. LineStrong can handle wires up to 200 m on one single switch and the emergency command can be initiated from any point along the installed wire length.
Emergency stop buttons
Smile, INCA, EStrong and Compact

Emergency stop buttons are used to safely stop dangerous machine functions.

ABB offers a wide range of emergency stop buttons for external mounting or panel mounting, with plastic or metal housing and for different types of connections.

Easy to install
Compact size
Models with a compact and appealing housing saves space and makes it easy to place.

Quick installation
Quick and easy installation of models with features such as centered mounting holes, removable terminal blocks and M12 connectors.

Serial connection
Tina models save cable length and installation time with serial connection.

Optimum interface
Highly adaptable
Several models to choose between depending on position, installation and function.

Reliable in extreme conditions
Robust models and models in stainless steel for use in demanding environments.

Continuous operation
LED diagnostics
Models with integrated LED diagnostics reduce downtime when troubleshooting.

Smile, INCA, EStrong and Compact 6
ABB Safety products catalog
Models and application
Emergency stop buttons

Models for external mounting

**Smile**
Smile is a small and easy to install emergency stop button. Its size allows mounting in reduced spaces, and its centered mounting holes makes it especially easy to mount on aluminum extrusions (e.g. Quick-Guard fencing system). Smile is available with M12 connectors or cable. Smile has an integrated LED in the button that shows the status and simplifies error tracking. The standard models of Smile have 2 contacts and can be used with safety controllers from all brands. Smile Tina models belong to the ABB DYNlink solution, with the advantages of serial connection using only one channel and still reaching Cat. 4/PL e.

**Compact**
Compact emergency stop buttons offer a robust enclosure with a high IP rating that fulfill the demands in severe and humid environments, such as food and beverage industry. Compact can be fitted with a Tina adapter for use in a DYNlink solution (Tina 2A, Tina 2B or Tina 3A).

Models for panel mounting

**INCA**
INCA is an emergency stop button for panel mounting, designed for installation in 22.5 mm holes. Its removable terminal block facilitates connection and exchange. INCA has an integrated LED in the button that shows the status and simplifies error tracking. The standard model of INCA has 2 contacts and can be used with safety controllers from all brands. INCA Tina models belongs to the ABB DYNlink solution, with the advantages of serial connection using only one channel and still reaching Cat. 4/PL e.

**Smile Reverse**
Smile Reverse is identical to the regular Smile emergency stop button besides from being reversed in order to be mounted on the back side of a panel. Smile Reverse has an IP65 housing that makes it suitable in panels where moisture and dust may occur. Smile Reverse has an integrated LED in the button that shows the status and simplifies error tracking. The standard model of Smile Reverse has 2 contacts and can be used with safety controllers from all brands. The Smile Reverse Tina model belongs to the ABB DYNlink solution, with the advantages of serial connection using only one channel and still reaching Cat. 4/PL e.

Application
Emergency stop buttons are used to safely stop a dangerous machine function in order to prevent an accident, or minimize the consequences of an accident. An emergency stop should be a complement to other safety devices, and not a replacement for them.
Features
Emergency stop buttons

Communication features

DYNlink
Emergency stop buttons with Tina in their name belong to the DYNNlink solution, which enables serial connection using only one channel and still reaching Cat. 4/PL e. DYNNlink devices must be used with Vital safety controller or Pluto programmable safety controller. Up to 30 DYNNlink devices can be connected in series to Vital and up to 10 can be connected to each input on Pluto.

StatusBus
StatusBus is simple and cost effective way to collect the status information of emergency stops and safety sensors. The StatusBus functionality is available with some DYNNlink devices and allows to collect the status of each individual safety device, even when connected in series. A Pluto programmable safety controller must be used to read the StatusBus information, and a single input on Pluto can collect the status of up to 30 safety devices. The devices are connected using standard cable and M12-5 connectors. No specific bus cable or extra communication module is necessary.

AS-i
Smile is available in a model compatible with the AS-i safety bus. Smile AS-i can be used with any AS-i monitor. AS-i is a bus system that offers a very simple connection of up to 31 safety devices to one monitor according to PL e and makes it easy to move, remove and add safety devices. When Smile AS-i is used with Pluto programmable safety controller, no other AS-i master or monitor is necessary, and no specific knowledge of AS-i is required.
Ordering information

Emergency stop buttons

### External mounting

<table>
<thead>
<tr>
<th>Description</th>
<th>Type of safety signal</th>
<th>Connection type</th>
<th>Feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic housing</td>
<td>DYNLink</td>
<td>1 m cable from bottom</td>
<td>Status LED</td>
<td>Smile 10 EA Tina</td>
<td>2TLA030005R0400</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>DYNLink</td>
<td>1 x M12-5 male</td>
<td>Status LED, StatusBus</td>
<td>Smile 11 EA Tina</td>
<td>2TLA030005R0000</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>AS-i</td>
<td>1 x M12-4 male</td>
<td>Status LED, StatusBus</td>
<td>Smile 11 EA AS-i</td>
<td>2TLA030002R0000</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>2 NC</td>
<td>1 m cable from bottom</td>
<td>Status LED</td>
<td>Smile 10 EA</td>
<td>2TLA030005R0400</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>2 NC</td>
<td>1 m leads from bottom</td>
<td>Status LED</td>
<td>Smile 10 EK</td>
<td>2TLA030001R0600</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>2 NO + 2 NC</td>
<td>2 x M20 conduits</td>
<td>Status LED, StatusBus</td>
<td>Smile 11 EA</td>
<td>2TLA030005R0000</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>2 NO + 2 NC</td>
<td>2 x M20 conduits</td>
<td>Status LED, StatusBus</td>
<td>Smile 12 EA</td>
<td>2TLA030005R0200</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>2 NO + 2 NC</td>
<td>3 x M20 conduits</td>
<td>Status LED, StatusBus</td>
<td>EStrongZ LED</td>
<td>2TLA050000R0222</td>
</tr>
<tr>
<td>Metal housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal housing</td>
<td>2 NC</td>
<td>2 x M20 conduits</td>
<td>Status LED, StatusBus</td>
<td>EStrongZ</td>
<td>2TLA050000R0220</td>
</tr>
<tr>
<td>Metal housing</td>
<td>2 NC</td>
<td>2 x M20 conduits</td>
<td>Status LED, StatusBus</td>
<td>EStrongZ</td>
<td>2TLA050000R0220</td>
</tr>
</tbody>
</table>

* Can be adapted to DYNlink with Tina

### Panel mounting

<table>
<thead>
<tr>
<th>IP rating</th>
<th>Depth</th>
<th>Connection type</th>
<th>Type of safety signal</th>
<th>Feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP65</td>
<td>26 mm</td>
<td>1 x M12-5 male</td>
<td>DYNLink</td>
<td>Status LED</td>
<td>Smile 11 EA Tina</td>
<td>2TLA030005R0100</td>
</tr>
<tr>
<td>IP65</td>
<td>26 mm</td>
<td>2 NC</td>
<td>Status LED</td>
<td>StatusLED, StatusBus</td>
<td>Smile 11 EAR</td>
<td>2TLA030005R0100</td>
</tr>
<tr>
<td>Button IP65, connector IP20</td>
<td>53 mm</td>
<td>Removable terminal block</td>
<td>DYNLink</td>
<td>Status LED</td>
<td>INCA 1 Tira</td>
<td>2TLA030005R0000</td>
</tr>
<tr>
<td>Button IP65, connector IP20</td>
<td>53 mm</td>
<td>Removable terminal block</td>
<td>Status LED, StatusBus</td>
<td>StatusLED, StatusBus</td>
<td>INCA 1 EC Tira</td>
<td>2TLA030005R1400</td>
</tr>
<tr>
<td>Button IP65, connector IP20</td>
<td>53 mm</td>
<td>Removable terminal block</td>
<td>2 NC</td>
<td>Status LED</td>
<td>INCA 1</td>
<td>2TLA030005R0100</td>
</tr>
</tbody>
</table>
## Accessories

### Emergency stop buttons

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-3S Y-connector for serial connection of device with StatusBus functionality.</td>
<td>M12-3S</td>
<td>2TLA020059R0600</td>
</tr>
<tr>
<td>M12-3A Y-connector for serial connection of devices without StatusBus functionality.</td>
<td>M12-3A</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 8 Dynlink devices with 12-5 connectors.</td>
<td>Tina 8A</td>
<td>2TLA020059R0500</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 4 Dynlink devices with 12-5 connectors.</td>
<td>Tina 4A</td>
<td>2TLA020059R0300</td>
</tr>
<tr>
<td>Adaption unit for Dynlink solution with M20 fitting. For e.g. Compact.</td>
<td>Tina 2A*</td>
<td>2TLA020059R1100</td>
</tr>
<tr>
<td>Adaption unit for Dynlink solution, internal assembly. For e.g. Compact.</td>
<td>Tina 2B*</td>
<td>2TLA020059R1000</td>
</tr>
<tr>
<td>Termination for Smile 12</td>
<td>JST2</td>
<td>2TLA020059R1300</td>
</tr>
</tbody>
</table>

### Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 Y-connector for serial connection of device with StatusBus functionality.</td>
<td>M12-3S</td>
<td>2TLA020055R0600</td>
</tr>
<tr>
<td>M12 Y-connector for serial connection of devices without StatusBus functionality.</td>
<td>M12-3A</td>
<td>2TLA020055R0000</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 4 Dynlink devices with 12-5 connectors.</td>
<td>Tina 4A</td>
<td>2TLA020055R0300</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 8 Dynlink devices with 12-5 connectors.</td>
<td>Tina 8A</td>
<td>2TLA020055R0500</td>
</tr>
<tr>
<td>Adaption unit for Dynlink solution with M20 fitting. For e.g. Compact.</td>
<td>Tina 2A*</td>
<td>2TLA020055R1100</td>
</tr>
<tr>
<td>Adaption unit for Dynlink solution, internal assembly. For e.g. Compact.</td>
<td>Tina 2B*</td>
<td>2TLA020055R1000</td>
</tr>
<tr>
<td>Termination for Smile 12</td>
<td>JST2</td>
<td>2TLA020055R1300</td>
</tr>
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### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency stop sign, yellow, no text, for INCA (22.5mm)</td>
<td>E-Sign 22.5</td>
<td>2TLA030054R0900</td>
</tr>
<tr>
<td>Emergency stop sign, yellow, no text, for Smile (32.5mm)</td>
<td>E-Sign 32.5</td>
<td>2TLA030054R1000</td>
</tr>
<tr>
<td>Yellow surround for Inca</td>
<td>Surround for Inca</td>
<td>15F816900P5003</td>
</tr>
<tr>
<td>Stainless steel cable gland, for EStrong</td>
<td>Gland M20x1.5</td>
<td>2TLA050040R0002</td>
</tr>
<tr>
<td>Stainless steel conduit plug, for EStrong</td>
<td>Conduit Plug M20x1.5</td>
<td>2TLA050040R0004</td>
</tr>
<tr>
<td>LED Green/Red 230 VAC, for EStrong</td>
<td>LED 230</td>
<td>2TLA050021R0003</td>
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### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C01</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C01HE</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C112</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C312</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td></td>
<td>M12-C612</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C1012</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>Angled female connector</td>
<td>M12-C1012V2</td>
<td>2TLA020059R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C2012</td>
<td>2TLA020059R0000</td>
</tr>
</tbody>
</table>

### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA020059R1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA020059R1000</td>
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</tbody>
</table>

### Connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA020057R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA020057R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA020057R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA020057R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA020057R0050</td>
</tr>
</tbody>
</table>
Technical data
Emergency stop buttons

### Technical data

#### Approvals

<table>
<thead>
<tr>
<th>Product</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile, INCA</td>
<td>TÜV NORD, Inspecta</td>
</tr>
<tr>
<td>Smile Tina, INCA Tina</td>
<td>TÜV NORD</td>
</tr>
<tr>
<td>Smile AS-i</td>
<td>TÜV NORD, Inspecta</td>
</tr>
<tr>
<td>EStrong</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td></td>
</tr>
</tbody>
</table>

#### Conformity

<table>
<thead>
<tr>
<th>Product</th>
<th>Standards</th>
</tr>
</thead>
</table>

#### Functional safety data

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61508:2010</td>
<td>Up to SIL3, depending on system architecture</td>
</tr>
<tr>
<td>EN 62061:2005</td>
<td>Up to SIL3, depending on system architecture</td>
</tr>
<tr>
<td>EN ISO 13849-1:2008</td>
<td>Up to Cat. 4, PL e, depending on system architecture</td>
</tr>
<tr>
<td>Smile, INCA</td>
<td>B10d = 100,000</td>
</tr>
<tr>
<td>Smile Tina, INCA Tina</td>
<td>PFH0 = 4.66 x 10^-9</td>
</tr>
<tr>
<td>Smile AS-i</td>
<td>PFH0 = 1.69 x 10^-9</td>
</tr>
<tr>
<td>EStrong</td>
<td>B10d = 1,500,000</td>
</tr>
<tr>
<td>Compact</td>
<td>B10d = 50,000</td>
</tr>
</tbody>
</table>
## Technical data

### Emergency stop buttons

### Technical data

#### Electrical data

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smile, INCA</td>
<td>17-27 VDC ± 10%</td>
<td></td>
</tr>
<tr>
<td>Smile Tina, INCA Tina</td>
<td>+24 VDC +15%, -25%</td>
<td></td>
</tr>
<tr>
<td>Smile AS-i</td>
<td>+30 VDC from the AS-i bus. Tolerances 26.5 - 31.6 VDC</td>
<td></td>
</tr>
<tr>
<td>EStrong</td>
<td>230 VAC / +24 VDC (the LED is +24 VDC originally, but can be replaced with a 230 VAC accessory)</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td>230 VAC / +24 VDC</td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical data

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical life</strong></td>
<td>&gt;50 000 operations</td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smile, INCA</td>
<td>-10...+55 °C</td>
<td></td>
</tr>
<tr>
<td>EStrong</td>
<td>-25...+80 °C</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td>-25...+70 °C</td>
<td></td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>EStrong</td>
<td>IP67, IP69K</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td>IP66, IP67, IP69K</td>
<td></td>
</tr>
</tbody>
</table>

#### Weight

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile</td>
<td>65 g</td>
<td></td>
</tr>
<tr>
<td>INCA</td>
<td>45 g</td>
<td></td>
</tr>
<tr>
<td>EStrong</td>
<td>820 g</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td>108 g, 124 g (with shroud)</td>
<td></td>
</tr>
</tbody>
</table>

#### Material

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile</td>
<td>Polyamide PA66, Macromelt, polybutyleneterephthalate PBT, Polypropene PP, UL 94 V0</td>
<td></td>
</tr>
<tr>
<td>INCA</td>
<td>Polyamide PA66, Macromelt, polybutyleneterephthalate PBT, Polypropene PP, UL 94 V0</td>
<td></td>
</tr>
<tr>
<td>EStrong</td>
<td>Stainless steel 316 housing</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td>Polycarbonate</td>
<td></td>
</tr>
</tbody>
</table>

### More information

For more information, e.g. the complete technical information, see product manual for:
- Smile 2TLC172097M0201
- INCA 2TLC172163M0201
- EStrong 2TLC172247M0201
- Compact 1SFC151005C0201
Dimension drawings
Emergency stop buttons

Smile

INCA

<table>
<thead>
<tr>
<th>Type</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCA 1 EC Tina</td>
<td>75.5</td>
<td>49.5 ± 0.5</td>
</tr>
<tr>
<td>INCA 1</td>
<td>80</td>
<td>54 ± 0.5</td>
</tr>
<tr>
<td>INCA 1 Tina</td>
<td>80</td>
<td>54 ± 0.5</td>
</tr>
</tbody>
</table>

EStrong

Compact

All dimensions in mm
Safety stop buttons
Smile, INCA and Compact

Safety stop buttons are used to safely stop a certain part of a dangerous machine.

ABB offers safety stop buttons to suit different needs of connection and communication. Models are available for e.g. external mounting or panel mounting, in compact size or robust design, adapted for the DYNlink solution or with 2 NC contacts.

Easy to install
Compact size
Models with a compact and appealing housing saves space and makes it easy to place.

Quick installation
Quick and easy installation of models with features such as centered mounting holes, removable terminal blocks and M12 connectors.

Serial connection
Tina models save cable length and installation time with serial connection.

Optimum interface
Highly adaptable
Several models to choose between depending on position, installation and function.

Reliable in extreme conditions
Robust models for use in demanding environments.

Continuous operation
LED diagnostics
Models with integrated LED diagnostics reduce downtime when troubleshooting.
Applications and features

Safety stop buttons

Applications

A safety stop (also called machine stop) can be used to safely stop a part of the machine, e.g. as a stop for an individual hazardous machine function. It may not be used as an emergency stop and stop the complete machine or production line. Likewise, an emergency stop with red push button should not be used as a safety stop. In order to separate the safety stop function from the emergency stop function, the safety stop buttons should be colored black.

Features

**DYNlink**

Safety stop buttons with Tina in their name belong to the DYNlink solution, which enables serial connection using only one channel and still reaching Cat. 4/PL e. DYNlink devices must be used with Vital safety controller or Pluto programmable safety controller. Up to 30 DYNlink devices can be connected in series to Vital and up to 10 can be connected to each input on Pluto.
Models
Safety stop buttons

Safety stop buttons for external mounting

**Smile**
Smile is a small and easy to install safety stop button. Its size allows mounting in reduced spaces, and its centered mounting holes makes it especially easy to mount on aluminum extrusions (e.g. Quick-Guard fencing system).

Smile has an integrated LED in the button that shows the status and simplifies error tracking.

The standard model of Smile has 2 contacts and can be used with safety controllers from all brands. The Smile Tina model belongs to the ABB DYNlink solution, with the advantages of serial connection using only one channel and still reaching Cat. 4/PL e.

Smile safety stops are identical to the corresponding Smile emergency stops apart from the color of the button.

**Compact**
The Compact safety stop button offers a robust enclosure with a high IP rating that fulfills the demands in severe and humid environments, such as food and beverage industry. Compact can be fitted with a Tina adapter for use in a DYNlink solution (Tina 2A, Tina 2B or Tina 3A).

Compact safety stop is identical to Compact emergency stop apart from the color of the button.

Safety stops for panel mounting

**INCA**
INCA is a safety stop button for panel mounting, designed for installation in 22.5 mm holes. Its removable terminal block facilitates connection and exchange.

INCA has an integrated LED in the button that shows the status and simplifies error tracking.

The standard model of INCA has 2 contacts and can be used with safety controllers from all brands. INCA Tina belongs to the ABB DYNlink solution, with the advantages of serial connection using only one channel and still reaching Cat. 4/PL e.

INCA safety stop is identical to INCA emergency stop apart from the color of the button.
Ordering information
Safety stop buttons

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Type of safety signal</th>
<th>Connection type</th>
<th>Feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td>DYLink</td>
<td>1 m cable from bottom</td>
<td>Status LED</td>
<td>Smile 11 SA Tina</td>
<td>2TLA030050R6500</td>
</tr>
<tr>
<td></td>
<td>2 NC</td>
<td>1 x M12-5</td>
<td>Status LED</td>
<td>Smile 11 SA</td>
<td>2TLA030051R9000</td>
</tr>
<tr>
<td></td>
<td>2 NC*</td>
<td>2 x M20 conduits</td>
<td>-</td>
<td>CEP1-1002 (Compact)</td>
<td>1SF461981R1002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With shroud</td>
<td>CEP1-2002 (Compact)</td>
<td>1SF461981R2002</td>
</tr>
<tr>
<td>Panel</td>
<td>DYLink</td>
<td>5 pole terminal block</td>
<td>Status LED</td>
<td>INCA 1S Tina</td>
<td>2TLA030054R0200</td>
</tr>
<tr>
<td></td>
<td>2 NC</td>
<td>5 pole terminal block</td>
<td>Status LED</td>
<td>INCA 1S</td>
<td>2TLA030054R6300</td>
</tr>
</tbody>
</table>

* Can be adapted to DYLink with Tina

Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 Y-connector for serial connection of devices without StatusBus functionality.</td>
<td>M12-3A</td>
<td>2TLA020055R0000</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 4 DYLink devices with 12-5 connectors.</td>
<td>Tina 4A</td>
<td>2TLA020054R0300</td>
</tr>
<tr>
<td>Connection block for the serial connection of up to 8 DYLink devices with 12-5 connectors.</td>
<td>Tina 8A</td>
<td>2TLA020054R0500</td>
</tr>
<tr>
<td>Grey shroud for Compact</td>
<td>CA1-3054</td>
<td>1SF4619820R6054</td>
</tr>
<tr>
<td>Adaptation unit for DYLink solution with M20 fitting. For e.g. Compact.</td>
<td>Tina 2A *</td>
<td>2TLA020054R0100</td>
</tr>
<tr>
<td>Adaptation unit for DYLink solution, internal assembly. For e.g. Compact.</td>
<td>Tina 2B *</td>
<td>2TLA020054R1100</td>
</tr>
<tr>
<td>Adaptation unit for DYLink solution with M20 fitting and M12 connector. For e.g. connecting Compact to Pluto/Vital.</td>
<td>Tina 3A *</td>
<td>2TLA020054R0200</td>
</tr>
</tbody>
</table>

* For more information about Tina adapter units, please see Pluto and Vital chapters.
## Cable and connectors

### Safety stop buttons

### Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td></td>
<td>M12-C61</td>
<td>2TLA200056R0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA200056R8000</td>
</tr>
<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
<td></td>
<td>M12-C0312</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.06 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 m</td>
<td>Angled female connector</td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td></td>
<td>M12-C00612</td>
<td>2TLA200056R6800</td>
</tr>
</tbody>
</table>

### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA200056R1000</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA200056R1100</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 10 m</td>
<td>2TLA200056R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 50 m</td>
<td>2TLA200056R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 100 m</td>
<td>2TLA200056R0010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 200 m</td>
<td>2TLA200056R0020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable 500 m</td>
<td>2TLA200056R0030</td>
</tr>
</tbody>
</table>
## Technical data

### Approvals

<table>
<thead>
<tr>
<th>Device</th>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile, INCA</td>
<td><img src="http://example.com/ce.png" alt="CE" /></td>
</tr>
<tr>
<td>Smile Tina, INCA Tina</td>
<td><img src="http://example.com/tuv.png" alt="TÜV NORD" /></td>
</tr>
<tr>
<td>Compact</td>
<td><img src="http://example.com/ce.png" alt="CE" /> <img src="http://example.com/ul.png" alt="UL" /></td>
</tr>
</tbody>
</table>

### Conformity

<table>
<thead>
<tr>
<th>Device</th>
<th>Standard</th>
</tr>
</thead>
</table>

### Functional safety data

<table>
<thead>
<tr>
<th>Device</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile, INCA</td>
<td>EN 61508:2010 - Up to SIL3, depending on system architecture</td>
</tr>
<tr>
<td>EN 62061:2005 - Up to SILCL3, depending on system architecture</td>
<td></td>
</tr>
<tr>
<td>EN ISO 13849-1:2008 - Up to Cat. 4, PL e, depending on system architecture</td>
<td></td>
</tr>
<tr>
<td>Smile Tina, INCA Tina</td>
<td><img src="http://example.com/b10d.png" alt="B10d" /> = 100 000</td>
</tr>
<tr>
<td>ITU H = 4.66 x 10^-9</td>
<td></td>
</tr>
<tr>
<td>Compact</td>
<td><img src="http://example.com/b10d.png" alt="B10d" /> = 50 000</td>
</tr>
</tbody>
</table>

### Electrical data

<table>
<thead>
<tr>
<th>Device</th>
<th>Operating Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile, INCA</td>
<td>17-27 VDC ±10%</td>
</tr>
<tr>
<td>Smile Tina, INCA Tina</td>
<td>+24 VDC +15% -25%</td>
</tr>
<tr>
<td>Compact</td>
<td>230 VAC / +24 VDC</td>
</tr>
</tbody>
</table>

### Mechanical data

<table>
<thead>
<tr>
<th>Device</th>
<th>Mechanical Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile, INCA</td>
<td>&gt;50,000 operations</td>
</tr>
<tr>
<td>Compact</td>
<td>-10…+65 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td></td>
</tr>
<tr>
<td>Smile, INCA</td>
<td>IP65</td>
</tr>
<tr>
<td>Compact</td>
<td>IP66, IP67, IP69K</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>Smile</td>
<td>65 g</td>
</tr>
<tr>
<td>INCA</td>
<td>45 g</td>
</tr>
<tr>
<td>Compact</td>
<td>108 g, 124 g (with shroud)</td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>Smile</td>
<td>Polyamide PA66, Macromelt, polybutylenephthalate PBT, Polypropene PP, UL 94 V0</td>
</tr>
<tr>
<td>INCA</td>
<td>Polyamide PA66, Macromelt, polybutylenephthalate PBT, Polypropene PP, UL 94 V0</td>
</tr>
<tr>
<td>Compact</td>
<td>Polycarbonate</td>
</tr>
</tbody>
</table>

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**More information**

For more information, e.g. the complete technical information, see product manual for:

Smile [2TLC172097M0201](#)

INCA [2TLC172163M0201](#)

Compact [1SFC151005C0201](#)
Dimension drawings
Safety stop buttons

Smile

INCA

Compact

All dimensions in mm
Pull wire emergency stop switch
LineStrong

LineStrong is a pull wire emergency stop switch, used for easy reach of the emergency stop function along machines and sections of conveyors.

A pull wire emergency stop switch allows to initiate the emergency stop command from any point along the installed wire length by pulling the wire. It replaces a series of emergency stop buttons and is easier to install.

LineStrong is also available in different models for different lengths of wires, with different housing material as well as an explosion proof version.

Easy to install
Quick installation
A pull wire emergency stop switch is easier to install than a system of several emergency stop buttons along a carriage path.

Highly adaptable
Several models to choose between gives a variety of mounting possibilities and features.

Long wire length
Can handle wires up to 200 m on a single switch.

Safety and protection
Easily accessible
Easy reach of the emergency stop function along machines, conveyors and processes.

High level of safety
The positive forced disconnect contacts provide a high level of safety and are double switching, i.e. triggers emergency stop in both directions of the wire.

Continuous operation
Reliable in extreme conditions
Robust construction makes LineStrong ideal for use in demanding environments.

LED diagnostics
Integrated LED diagnostics ensures status can be seen easily from a distance.
Applications
LineStrong

Instead of multiple emergency stops
A pull wire emergency stop switch is often placed along conveyor belts or carriage paths where access to the stop function must be possible along the whole line. It is often easier to install a pull wire emergency stop switch than to place multiple emergency stop buttons if the distance is longer.

LineStrong can handle wires up to 200 m on one single switch and since the emergency stop command can be initiated from any point along the wire, this gives better access to the emergency stop function than using emergency stop buttons.

As protective device in low risk applications
LineStrong can be used as protection, for example along conveyors with low risks where the wire can be installed at waist height in front of the conveyor, which provides an emergency stop if someone walks or falls towards the conveyor, hence pulling the wire.

One, two or several switches
The maximum length of the wire attached to LineStrong depends on if there is a LineStrong unit attached to both ends of the wire or if one end is attached to a wall/fixed object. In the image below LineStrong2 is used as an example.
Features
LineStrong

Positive forced disconnected contacts
The contacts in LineStrong are positive force disconnected, which ensures that the contacts will not be held in a normally closed position due to a failure of the spring mechanism or the welding/sticking of the contacts.

Reset button
All models of LineStrong have an integrated reset button that needs to be pressed in order to reset the emergency stop if the emergency stop function has been triggered.

Emergency stop button
Most LineStrong models have an integrated emergency stop button on the housing of the switch. Since the first half meter of the wire is not intended to pull in order to trigger the emergency stop function, the integrated emergency stop button provides quick and simple access to the emergency stop function if you are standing right in front of LineStrong. The emergency stop button of LineStrong 2 can be moved to either side of LineStrong to enable best access depending on position and height of LineStrong.

Integrated LED
LineStrong2 and LineStrong3 have an integrated 2-color LED that shows if the emergency stop function has been triggered or not. The LED is also available as spare part.

Material
LineStrong is available with a housing in yellow die cast aluminum alloy or with a housing in stainless steel 316 which is recommended for severe applications in e.g. the food processing and the chemical industries.

Left hand, right hand or both sides
LineStrong1 and LineStrong2 can be mounted in any direction. LineStrong3 is available in different models depending on installation. L (left hand) should be used if the placement of the grab wire switch is to the left in the installation. R (right hand) should be used if the grab wire switch is to the right in the installation. D (double wire) has wire entries from both sides of the grab wire switch.

Wire breakage monitoring
The contacts are double switching which means that the emergency stop command is given both when someone pulls the wire and if the wire should break.

Indication of wire tension
All models are equipped with an indicator of the tension of the wire which simplifies installation and adjustment.

Explosion proof
LineStrong2 also exists in an X-model with certified explosion proof contact blocks. The X-model has a stainless steel body and can be used in ATEX zones 1, 2, 21 and 22 (gas and dust). The X-model is preassembled with a 3 m cable.
Features
LineStrong

Easier installation with tensioner/gripper
The tensioner/gripper accessory significantly reduces the installation time. Traditional grab wire systems normally need turnbuckle and clamps, which are difficult to tension and adjust, and normally require frequent re-tensioning. The tensioner gripper integrates an eyehook, a tensioner thimble and a wire strength gripper in one assembly which enables rapid connection to the switch eyebolts and fast and accurate tensioning of the wire.

Thanks to the switch tension indicator, it is easy to adjust the system accurately and quickly. The double clamp mechanism prevents wire slippage and significantly reduces machine downtime which can occur which traditional turnbuckle systems.

For systems longer than 50 m, the tensioner/gripper is necessary on both sides.

Quick-link termination
The quick link termination is provided for easy connection to the safety spring or the switch eyebolt for systems up to 50 m.

Mounting accessories
The wire pull kits contains the suitable accessories for the included wire length.
- When using one switch, the wire must be anchored at the other end using a safety spring.
- The first eyeball support must be placed no more than 500 mm from the switch eyebolt or safety spring.
- The part of the wire from the wire end to the first eyebolt support shall not be used as part of the active protection coverage.
- Wire support eyebolts must be fitted at 2.5 - 3 meters intervals along the complete wire length.
- The tensioner/gripper is used to adjust the correct tension

Corner pulley
A corner pulley can be used to navigate inside or outside corners without causing damage to the wire. They are in stainless steel and can be rigidly mounted.
When using a safety spring, a maximum of one corner pulley may be used, to ensure that the complete length of the wire is visible from either the switch or the spring anchorage.
## Ordering information

**LineStrong**

<table>
<thead>
<tr>
<th>IP rating</th>
<th>Material</th>
<th>E-stop button</th>
<th>Contacts</th>
<th>Max. wire length (m)</th>
<th>Feature</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P67</td>
<td>Yellow die cast aluminum alloy</td>
<td>No</td>
<td>2 NO + 2 NC</td>
<td>30</td>
<td>50</td>
<td>-</td>
<td>LineStrong1</td>
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<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>2 NO + 2 NC</td>
<td>60</td>
<td>80</td>
<td>-</td>
<td>LineStrong2</td>
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<td></td>
<td></td>
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<td>2 NO + 4 NC</td>
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<td>125</td>
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<td>LineStrong3L</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>200</td>
<td>325</td>
<td>Right hand</td>
<td>LineStrong3R</td>
</tr>
<tr>
<td>P67, P69K</td>
<td>Stainless steel 316</td>
<td>Yes</td>
<td>2 NO + 2 NC</td>
<td>60</td>
<td>80</td>
<td>-</td>
<td>LineStrong2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>80</td>
<td>100</td>
<td>Explosion proof</td>
<td>LineStrong2Z</td>
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<td></td>
<td></td>
<td>2 NO + 4 NC</td>
<td>100</td>
<td>125</td>
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<td>LineStrong3LZ</td>
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<td>325</td>
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</table>

Note: LineStrong1, LineStrong2, LineStrong2Z, LineStrong3L, LineStrong3R, LineStrong3D.
## Accessories

### LineStrong

#### Mounting accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire pull kit including wire, eyebolts, tensioner/gripper and Allen key in</td>
<td>Galvanized</td>
<td>10 m</td>
<td>10 m wire kit, gal</td>
<td>2TLA050210R0130</td>
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<tr>
<td>right quantity for the included wire length.</td>
<td></td>
<td>wire kit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>20 m wire kit, gal</td>
<td>2TLA050210R0230</td>
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<tr>
<td></td>
<td></td>
<td>80 m</td>
<td>80 m wire kit, gal</td>
<td>2TLA050210R0330</td>
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<tr>
<td></td>
<td></td>
<td>100 m</td>
<td>100 m wire kit, gal</td>
<td>2TLA050210R0730</td>
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<tr>
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<td>Stainless</td>
<td>50 m</td>
<td>50 m wire kit, SS</td>
<td>2TLA050210R0520</td>
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<tr>
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<td>steel</td>
<td>100 m</td>
<td>100 m wire kit, SS</td>
<td>2TLA050210R0720</td>
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<tr>
<td>Wire tensioner/gripper</td>
<td>Galvanized</td>
<td>Wire</td>
<td>Wire tensioner, gal</td>
<td>2TLA050210R0430</td>
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<td>Stainless</td>
<td>steel</td>
<td>Wire tensioner, SS</td>
<td>2TLA050210R0420</td>
</tr>
<tr>
<td>Corner pulley</td>
<td>Galvanized</td>
<td>Corner</td>
<td>Corner pulley, gal</td>
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<tr>
<td></td>
<td>Stainless</td>
<td>steel</td>
<td>Corner pulley, SS</td>
<td>2TLA050210R0620</td>
</tr>
<tr>
<td>Eyebolt M8 x 1.25</td>
<td>Galvanized</td>
<td>Eyebolt</td>
<td>Eyebolt M8x1.25, gal</td>
<td>2TLA050210R0430</td>
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<tr>
<td></td>
<td>Stainless</td>
<td>steel</td>
<td>Eyebolt M8x1.25, SS</td>
<td>2TLA050210R0420</td>
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<tr>
<td>Safety spring, 220 mm</td>
<td>Stainless</td>
<td>Steel</td>
<td>Spring 220 mm, SS</td>
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#### Other accessories

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<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
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</thead>
<tbody>
<tr>
<td>Screwdriver, anti-tamper, Torx T20</td>
<td>Screwdriver T20</td>
<td>2TLA050210R0006</td>
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<tr>
<td>Gland M20 x 1.5</td>
<td>Gland M20x1.5</td>
<td>2TLA050040R0002</td>
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<tr>
<td>Conduit plug M20 x 1.5</td>
<td>Condu.Plug M20x1.5</td>
<td>2TLA050040R0004</td>
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</table>

#### Spare parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
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<tbody>
<tr>
<td>LineStrong LED Green/Red +24 VDC</td>
<td>LineStrong LED 24</td>
<td>2TLA050210R0001</td>
</tr>
<tr>
<td>LineStrong LED Green/Red 230 VAC</td>
<td>LineStrong LED 230</td>
<td>2TLA050210R0003</td>
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<tr>
<td>LineStrong® and LineStrong® Emergency stop button</td>
<td>LineStrong E-Stop</td>
<td>2TLA050211R0005</td>
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</table>
## Cables LineStrong

### Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA2002058R1000</td>
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<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA2002058R1100</td>
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<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA2002058R1600</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA2002058R1700</td>
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<tr>
<td><strong>Cable with 5 conductors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable</td>
<td>2TLA2002007R0001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable</td>
<td>2TLA2002007R0005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable</td>
<td>2TLA2002007R0010</td>
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<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable</td>
<td>2TLA2002007R0020</td>
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<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>C5 cable</td>
<td>2TLA2002007R0050</td>
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<tr>
<td><strong>Cable with 8 conductors</strong></td>
<td></td>
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</tr>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable</td>
<td>2TLA2002007R1005</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable</td>
<td>2TLA2002007R1010</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable</td>
<td>2TLA2002007R1020</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable</td>
<td>2TLA2002007R1050</td>
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</table>
### Technical data

#### LineStrong

<table>
<thead>
<tr>
<th>Approvals</th>
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<tbody>
<tr>
<td>LineStrong</td>
<td>![CE] ![TUV]</td>
</tr>
<tr>
<td>LineStrong-X</td>
<td>![CE] ![TUV]</td>
</tr>
</tbody>
</table>

#### Conformity


#### Functional safety data

| EN ISO 13849-1:2008 | Up to Cat. 4, PL e, depending on system architecture. |
| EN/IEC 62061:2005 | Up to SIL CL3, depending on system architecture. |
| IEC 61508 | Up to SIL3, depending on system architecture. |
| B10 | 1 500 000 |

#### Electrical data

<table>
<thead>
<tr>
<th>Utilization category</th>
<th>240 VAC / 3 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED</td>
<td>+24 VDC / 2.5 A</td>
</tr>
</tbody>
</table>

#### Mechanical data

| Operating temperature | -25...+80 °C |
| Protection class | IP67, IP66, IP67, IP69K |
| LineStrong1, LineStrong2, LineStrong3 | IP67 |
| LineStrong2Z(X), LineStrong3Z | IP66, IP67, IP69K |

<table>
<thead>
<tr>
<th>Weight</th>
<th>LineStrong1</th>
<th>675 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>LineStrong2</td>
<td>880 g</td>
<td></td>
</tr>
<tr>
<td>LineStrong2Z(X)</td>
<td>1635 g</td>
<td></td>
</tr>
<tr>
<td>LineStrong3L/R</td>
<td>1100 g</td>
<td></td>
</tr>
<tr>
<td>LineStrong3LZ/RZ</td>
<td>2000 g</td>
<td></td>
</tr>
<tr>
<td>LineStrong3D</td>
<td>1320 g</td>
<td></td>
</tr>
<tr>
<td>LineStrong3DZ</td>
<td>2200 g</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Die cast painted yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>LineStrong1, LineStrong2, LineStrong3D/L/R</td>
<td>Stainless steel 316</td>
</tr>
<tr>
<td>LineStrong2Z(X), LineStrong3LZ/RZ/DZ</td>
<td>Stainless steel 316</td>
</tr>
</tbody>
</table>

| Wire type | PVC sheath steel wire 4.0 mm outside diameter |
| Conduit entries |  |
| LineStrong1/2 | 3 x M20 x 1.5 |
| LineStrong3 | 4 x M20 x 1.5 |

---

**More information**

For more information, e.g. the complete technical information, see product manual for: LineStrong 2TLC172248M0201
Dimension drawings
LineStrong

LineStrong1

LineStrong2

LineStrong3L-R

All dimensions in mm
Smile 41 is a push-button box that gathers push buttons, an emergency stop button and a safe key selector in a single compact device with only one M12 connector for all functions.

Smile 41 push-button box is available in models for use with Pluto programmable safety controller and models for all types of AS-i safety monitors.

A kit of colored filters is supplied and the color of each button can be chosen after delivery and changed later.

**Easy to install**

**Easy to attach to profiles**
The centered mounting holes make Smile 41 easy to attach to e.g. aluminum extrusions profiles like Quick-Guard.

**Quick installation**
The four buttons are connected with only one M12 connector which speeds up the connection. A maximum of 8 wires need to be connected for the complete push-button box with LEDs. The AS-i models also offer the flexibility of vampire connectors with piercing technology and self-healing cables.

**Compact housing**
A compact and appealing housing saves space and makes it easy to place.

**LED indication**
All push-buttons and emergency stop buttons are illuminated. The lighting of the push-buttons can easily be managed by the Pluto programmable safety controller, allowing a greater adaptation to the needs.

**Several button colors**
The color of each button can be chosen after delivery and changed later.
Applications and features
Smile 41

Applications

Smile 41 is a convenient way to gather several buttons at the same place while reducing cabling and installation. For example, an emergency stop button, a push button used to request the unlocking of the door, a push button used as reset button, and a push button used as start button.

Features

With Pluto programmable safety controller without AS-i function
The Smile 41 models without AS-i function have been developed for use with Pluto programmable safety controller and allow to get all the advantages of the Pluto “light-button function”: only one I/O (IQ) is necessary for both a push-button and its LEDs and the lighting of the reset buttons can be handled by Pluto without any extra programming.

The emergency stop button satisfies the highest level of safety, and although only one cable is used for the signals of the four buttons, a possible short-circuit can be detected by Pluto and the highest level of safety can be reached.

Kit of colored filters
A kit of colored filters is supplied with all models and the color of each push button can be chosen after delivery and changed later.

With AS-i safety monitor e.g. Pluto AS-i and Pluto B42 AS-i
All AS-i models of Smile 41 can be used with any AS-i safety monitor. The AS-i system significantly reduces the necessary cable lengths and the M12 connector speeds up the connection. The vampire connectors with piercing technology and self-healing cables facilitate changes.

Both the safe key selector and the emergency stop button satisfy the highest level of safety. Moreover, the use of AS-i Safety makes it easy to reach the highest level of safety while eliminating most risks of connection mistakes.

The push buttons and the emergency stop button are equipped with an easily programmed LED for a perfect adaptation to the needs of the application, a better user friendliness and easier troubleshooting.

Centered mounting holes
Centered mounting holes facilitate the mounting of Smile 41 on aluminum profiles like Quick-Guard.
## Ordering information

### Smile 41

### Smile 41 push button box

All Smile 41 push-button boxes are delivered with a kit of filters.

<table>
<thead>
<tr>
<th>Safety controller</th>
<th>Emergency stop button</th>
<th>Other buttons</th>
<th>Connector</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pluto programmable safety controller</td>
<td>0</td>
<td>4 push-buttons</td>
<td>M12-8 male</td>
<td>Smile 41 WWWWP</td>
<td>2TLA030057R0000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3 push-buttons</td>
<td>M12-8 male</td>
<td>Smile 41 EWWWP</td>
<td>2TLA030057R1000</td>
</tr>
<tr>
<td>AS-i monitor*</td>
<td>0</td>
<td>4 push-buttons</td>
<td>M12-5 male</td>
<td>Smile 41 WWWWN AS-i</td>
<td>2TLA030056R0000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3 push-buttons</td>
<td>M12-5 male</td>
<td>Smile 41 EWWWA AS-i</td>
<td>2TLA030056R1000</td>
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<tr>
<td></td>
<td></td>
<td>1 safe key selector</td>
<td>2 push-buttons</td>
<td>M12-5 male</td>
<td>Smile 41 EKWWA AS-i</td>
</tr>
</tbody>
</table>

* E.g. Pluto AS-i and Pluto B42 AS-i

### Spare parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit of colored filters</td>
<td>Colored filters</td>
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Cables and connectors
Smile 41

Cable with connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Special feature</th>
<th>Type</th>
<th>Order code</th>
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</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
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<td>M12-C61</td>
<td>2TLA02006F0000</td>
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<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA02006F8000</td>
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<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>Harsh environment, halogen free</td>
<td>M12-C61HE</td>
<td>2TLA02006F8100</td>
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<tr>
<td></td>
<td>Female + male</td>
<td>0.3 m</td>
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<td>M12-C0312</td>
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<td>M12-C0612</td>
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<td>M12-C2012</td>
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<td>M12-8</td>
<td>Female</td>
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<td>M12-C63</td>
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<td>Female + male</td>
<td>0.06 m</td>
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<td>M12-C00634</td>
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<td>M12-C134</td>
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<td>M12-C334</td>
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Separate cables and connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12-5 pole female, straight</td>
<td>M12-C01</td>
<td>2TLA02005F1100</td>
</tr>
<tr>
<td>M12-5 pole male, straight</td>
<td>M12-C02</td>
<td>2TLA02005F1100</td>
</tr>
<tr>
<td>M12-8 pole female, straight</td>
<td>M12-C03</td>
<td>2TLA02005F1600</td>
</tr>
<tr>
<td>M12-8 pole male, straight</td>
<td>M12-C04</td>
<td>2TLA02005F1700</td>
</tr>
<tr>
<td>Cable with 5 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 m cable with 5 x 0.34 shielded conductors</td>
<td>CS cable 10 m</td>
<td>2TLA02005F700001</td>
</tr>
<tr>
<td>50 m cable with 5 x 0.34 shielded conductors</td>
<td>CS cable 50 m</td>
<td>2TLA02005F700005</td>
</tr>
<tr>
<td>100 m cable with 5 x 0.34 shielded conductors</td>
<td>CS cable 100 m</td>
<td>2TLA02005F700010</td>
</tr>
<tr>
<td>200 m cable with 5 x 0.34 shielded conductors</td>
<td>CS cable 200 m</td>
<td>2TLA02005F700020</td>
</tr>
<tr>
<td>500 m cable with 5 x 0.34 shielded conductors</td>
<td>CS cable 500 m</td>
<td>2TLA02005F700050</td>
</tr>
<tr>
<td>Cable with 8 conductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 50 m</td>
<td>2TLA02005F710005</td>
</tr>
<tr>
<td>100 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 100 m</td>
<td>2TLA02005F710100</td>
</tr>
<tr>
<td>200 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 200 m</td>
<td>2TLA02005F710200</td>
</tr>
<tr>
<td>500 m cable with 8 x 0.34 shielded conductors</td>
<td>C8 cable 500 m</td>
<td>2TLA02005F710500</td>
</tr>
<tr>
<td>Cables and connection accessories for AS-i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Type</td>
<td>Order code</td>
</tr>
<tr>
<td>Cable for AS-I, power and data, +30 VDC, yellow, EPDM</td>
<td>AS-i cable yellow</td>
<td>2TLA02007F490000</td>
</tr>
<tr>
<td>Cable for AS-I, additional power, +24 VDC, black, EPDM</td>
<td>AS-i cable black</td>
<td>2TLA02007F491000</td>
</tr>
<tr>
<td>M12-5 female connector with vampire connector for AS-i flat cable.</td>
<td>AS-i T-connector M12</td>
<td>2TLA02007F300000</td>
</tr>
<tr>
<td>AS-i flat cable splitter used to make T-connections and to extend cables.</td>
<td>AS-i splitter box</td>
<td>2TLA02007F300300</td>
</tr>
</tbody>
</table>
## Technical data

### Smile 41

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Smile 41</th>
<th>Smile 41 AS-i</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approvals</strong></td>
<td>TÜV NORD</td>
<td>TÜV NORD</td>
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<tr>
<td><strong>Conformity</strong></td>
<td></td>
<td></td>
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<tr>
<td>- CE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2006/42/EC - Machinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- EN 61508:2010 parts 1-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- EN 62061:2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- EN ISO 13849-1:2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- EN ISO 13849-2:2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 60947-5-5:2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functional safety data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- IEC 61508:2010</td>
<td>Up to SIL3, depending on system architecture</td>
<td>SIL3, PFH$_D$ = $2.87 \times 10^{-10}$</td>
</tr>
<tr>
<td>- EN/IEC 62061:2005</td>
<td>Up to SILCL3, depending on system architecture</td>
<td>SILCL3, PFH$_D$ = $2.87 \times 10^{-10}$</td>
</tr>
<tr>
<td>- EN ISO 13849-1:2008</td>
<td>Up to Cat. 4/PL e, depending on system architecture</td>
<td>Cat. 4/PL e, PFH$_D$ = $2.87 \times 10^{-10}$</td>
</tr>
<tr>
<td>- B10$\sigma$</td>
<td>65 000</td>
<td></td>
</tr>
<tr>
<td><strong>Electrical data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Operating voltage</td>
<td>+24 VDC ± 15%</td>
<td>+30 VDC (AS-i bus)</td>
</tr>
<tr>
<td><strong>Mechanical data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mechanical life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Emergency stop button</td>
<td>&gt; 50 000 operations</td>
<td></td>
</tr>
<tr>
<td>- Illuminated push button</td>
<td>1 000 000 operations</td>
<td></td>
</tr>
<tr>
<td>- Key selector</td>
<td>-</td>
<td>30 000</td>
</tr>
<tr>
<td>- Operating temperature</td>
<td>-25...+50 °C</td>
<td></td>
</tr>
<tr>
<td>- Protection class</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>- Weight</td>
<td>190 g</td>
<td></td>
</tr>
</tbody>
</table>

### More information

For more information, e.g. the complete technical information, see product manual for:
- Smile 41 [2TLC172280M0201](#)
- Smile 41 AS-i [2TLC172255M0201](#)
Dimension drawings
Smile 41

Smile 41

All dimensions in mm
Reset buttons
Smile

Smile reset buttons have compact housings with M12 connectors for easy connection.

The reset button contains an integrated white LED, and all buttons are delivered with a kit of colored filters to snap on the top of the button. In this way the color of the button can be chosen after delivery and is also possible to changed later.

The different models also allow a choice of:
- local reset connected directly to the sensor, or
- global reset connected to the safety control module.

Easy to install

Easy to attach to profiles
The centered mounting holes make Smile easy to attach to e.g. aluminum extrusions profiles.

Speed up installation
The housing requires no assembly and the M12 connectors speed up installation and reduce the risk of connection error.

Local reset
Local reset allows to have the reset button close to the safety device while reducing cabling.

Compact housing
A compact and appealing housing saves space and makes it easy to place.

Space saving

Optimum interface

Several button colors
All reset buttons are illuminated with a white LED and the color of each button can be chosen after delivery and changed later using colored snap-on filters.

Several button colors
Ordering information
Smile reset buttons

Ordering details

<table>
<thead>
<tr>
<th>Type of contact</th>
<th>Intended use</th>
<th>Connectors</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO</td>
<td>Most reset applications</td>
<td>M12-5 male</td>
<td>Smile 11 RA</td>
<td>2TLA020053SR0000</td>
</tr>
<tr>
<td>1 NO</td>
<td>Pluto Safety PLC light button function*</td>
<td>M12-5 male</td>
<td>Smile 11 RB</td>
<td>2TLA020053SR0100</td>
</tr>
<tr>
<td>1 NO</td>
<td>Local reset of Orion1 Base</td>
<td>M12-5 male</td>
<td>Smile 11 RO1</td>
<td>2TLA022316R0000</td>
</tr>
<tr>
<td>1 NC</td>
<td>Local reset of Orion2 Base and Extended, and Orion3 Extended</td>
<td>M12-5 male</td>
<td>Smile 11 RO2</td>
<td>2TLA022316R0100</td>
</tr>
<tr>
<td>1 NC</td>
<td>Local reset of Orion3 Base</td>
<td>M12-5 male</td>
<td>Smile 11 RO3</td>
<td>2TLA022316R0200</td>
</tr>
<tr>
<td>1 NO</td>
<td>Local reset of Eden DYN-Reset M12-5 and Eden OSSD-Reset M12-5</td>
<td>M12-5 male + female</td>
<td>Smile 12 RF</td>
<td>2TLA020053SR2600</td>
</tr>
<tr>
<td>1 NO</td>
<td>Local reset of Eden OSSD-Reset M12-8</td>
<td>M12-8 male</td>
<td>Smile 12 RG</td>
<td>2TLA020053SR2700</td>
</tr>
</tbody>
</table>

* See Pluto hardware manual for more information about the light button function.

Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y-connector for series connection of DYNLink devices with M12-5 connectors, e.g. Eden,</td>
<td>M12-3A</td>
<td>2TLA020055SR0000</td>
</tr>
<tr>
<td>Y-connector for series connection of Adam OSSD M12-8 with M12-5 cables</td>
<td>M12-3H</td>
<td>2TLA020055SR0800</td>
</tr>
<tr>
<td>Y-connector for series connection of Adam OSSD M12-8 with M12-8 cables</td>
<td>M12-3G</td>
<td>2TLA020055SR0700</td>
</tr>
<tr>
<td>Y-connector for connection of Smile reset button to Orion,</td>
<td>M12-3R</td>
<td>2TLA022316R0000</td>
</tr>
<tr>
<td>Adaptation unit of OSSD outputs to DYNLink signals for use with Vital control module or Pluto Safety PLC. Tina 10B has an extra M12 connector for connection of a reset button.</td>
<td></td>
<td>2TLA020054SR1300</td>
</tr>
</tbody>
</table>

Spare parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit of colored filters (yellow, green, white, blue, red)</td>
<td>Colored filters</td>
<td>2TLA020055SR0000</td>
</tr>
</tbody>
</table>
# Cables

## Smile reset buttons

### Cables for Smile RF (with Eden DYN/OSSD Reset M12-5)

<table>
<thead>
<tr>
<th>Description</th>
<th>Female/male</th>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>M12-C61</td>
<td>2TLA02006F8000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C101</td>
<td>2TLA02006F8100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C201</td>
<td>2TLA02006F81400</td>
</tr>
<tr>
<td>Female + male</td>
<td>1 m</td>
<td>M12-C112</td>
<td>2TLA02006F82000 X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td>M12-C312</td>
<td>2TLA02006F82100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td>M12-C612</td>
<td>2TLA02006F822000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C1012</td>
<td>2TLA02006F823000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C2012</td>
<td>2TLA02006F824000 X</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>6 m</td>
<td>M12-C62</td>
<td>2TLA02006F82000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C102</td>
<td>2TLA02006F81200</td>
</tr>
</tbody>
</table>

### Cables for Smile RG (with Eden DYN/OSSD Reset M12-8)

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>M12-C61</td>
<td>2TLA02006F8000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C101</td>
<td>2TLA02006F8100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C201</td>
<td>2TLA02006F81400</td>
</tr>
<tr>
<td>Female + male</td>
<td>1 m</td>
<td>M12-C112</td>
<td>2TLA02006F82000 X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td>M12-C312</td>
<td>2TLA02006F82100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td>M12-C612</td>
<td>2TLA02006F822000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C1012</td>
<td>2TLA02006F823000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C2012</td>
<td>2TLA02006F824000 X</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>6 m</td>
<td>M12-C62</td>
<td>2TLA02006F82000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C102</td>
<td>2TLA02006F81200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-8</td>
<td>Female</td>
<td>6 m</td>
<td>M12-C63</td>
<td>2TLA02006F83000 X</td>
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<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C103</td>
<td>2TLA02006F84000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C203</td>
<td>2TLA02006F84100</td>
</tr>
<tr>
<td>Female + male</td>
<td>1 m</td>
<td>M12-C334</td>
<td>2TLA02006F85000 X</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>3 m</td>
<td>M12-C634</td>
<td>2TLA02006F861000 X</td>
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<tr>
<td>Male</td>
<td>By meter</td>
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<td>M12-C04</td>
<td>2TLA02006F81700 X</td>
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</tbody>
</table>

### Cables for Smile 11 Rx and ROx

<table>
<thead>
<tr>
<th>Connector</th>
<th>Female/male</th>
<th>Length</th>
<th>Type</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12-5</td>
<td>Female</td>
<td>6 m</td>
<td>M12-C81</td>
<td>2TLA02006F80000 X</td>
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<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C101</td>
<td>2TLA02006F81000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C201</td>
<td>2TLA02006F81400</td>
</tr>
<tr>
<td>Female + male</td>
<td>1 m</td>
<td>M12-C112</td>
<td>2TLA02006F820000 X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>3 m</td>
<td>M12-C312</td>
<td>2TLA02006F82100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 m</td>
<td>M12-C612</td>
<td>2TLA02006F822000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C1012</td>
<td>2TLA02006F823000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 m</td>
<td>M12-C2012</td>
<td>2TLA02006F824000 X</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>6 m</td>
<td>M12-C62</td>
<td>2TLA02006F820000 X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>M12-C102</td>
<td>2TLA02006F81200</td>
</tr>
</tbody>
</table>

### Safety products catalog

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Connection examples
Smile reset buttons

Local reset to Orion with Tina 10A/C
Connection of Smile 11 ROx to Orion through M12-3R. For connection to any control module compatible with OSSD outputs.

Local reset to Orion with Tina 10B
Connection of Smile 11 ROx to Orion through Tina 10B. For connection to Vital control module or Pluto Safety PLC.

Local reset to Eden
Serial connection of Eden with local Smile reset buttons:
- Adam OSSD-Reset M12-8 with Smile 12 RG and M12-3G or M12-3H
- Adam DYN-Reset with Smile 12 RF and M12-3A

Global vs local reset
A global reset is connected directly to the control cabinet with separate cables. The safety controller in the control cabinet supervises the reset and decides the function and actions.

A local reset is connected directly to the safety device, and requires no communication with the control cabinet. The safety device supervises the reset and decides the actions. A local reset simplifies installation and minimizes cabling.
## Technical data

### Smile reset buttons

<table>
<thead>
<tr>
<th>Approvals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply</strong></td>
<td></td>
</tr>
<tr>
<td>LED operating voltage</td>
<td>+24 VDC (maximum +33 VDC)</td>
</tr>
<tr>
<td>LED current consumption</td>
<td>20 mA at +24 VDC, 30 mA at +33 VDC</td>
</tr>
<tr>
<td>Push button operating voltage</td>
<td>Min: +5 V, max: +35 V</td>
</tr>
<tr>
<td>Push button current</td>
<td>Min: 1 mA, max: 100 mA</td>
</tr>
<tr>
<td>Push button rated power</td>
<td>Max: 250 mW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Color - Enclosure</td>
<td>Yellow</td>
</tr>
<tr>
<td>Color - Push button</td>
<td>White</td>
</tr>
<tr>
<td>Material - Housing</td>
<td>Polyproylene PP</td>
</tr>
<tr>
<td>Material - Contact</td>
<td>Au</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 60 g</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td>Mechanical life</td>
<td>1,000,000 operations at 10 mA / +24 VDC</td>
</tr>
<tr>
<td>Switching reliability</td>
<td>$10 \times 10^{-6}$ at 5 mA / +24 VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25...+65 °C</td>
</tr>
<tr>
<td>Humidity range</td>
<td>35 to 85% (with no icing or condensation)</td>
</tr>
</tbody>
</table>

### More information

For more information, e.g. the complete technical information, see product manual for: Smile reset buttons [2TLC172097M0201](#)
Dimension drawings
Smile reset buttons

Smile 11 R

Smile 12 R

All dimensions in mm
## Fence

### Introduction and overview

<table>
<thead>
<tr>
<th>Selection guide</th>
<th>7/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fence - Quick-Guard</td>
<td>7/4</td>
</tr>
</tbody>
</table>
Quick-Guard is an ABB fencing solution with endless possibilities.

<table>
<thead>
<tr>
<th>Image</th>
<th>Quick-Guard Standard</th>
<th>Quick-Guard Express</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum fencing system</td>
<td>Aluminum fencing system</td>
</tr>
<tr>
<td>Type</td>
<td>Custom made fence with endless possibilities</td>
<td>Fence with few components and quick installation</td>
</tr>
<tr>
<td>Description</td>
<td>Fence designed and delivered according to drawing with mesh, solid or noise reduction panels</td>
<td>Fence sections with mesh or polycarbonate with possibility to modify on site</td>
</tr>
<tr>
<td>Application</td>
<td>- Custom design for each machine - Highly adaptable - Can be delivered preassembled - Mounting brackets for Jokab Safety sensors</td>
<td>- Fast installation - Minimum number of components - Cost effective - Can be cut and modified on site - Possible to adjust angles ± 45 degrees - Mounting brackets for Jokab Safety sensors</td>
</tr>
</tbody>
</table>
Fencing system
Quick-Guard

Quick-Guard is a very flexible fencing system used for machine enclosure or preventing access to a hazardous area.

It consists of a minimum of different components, such as aluminum profiles, patented assembly parts, net-locks, mesh, solid or noise reduction panels.

Thanks to our patented screw-lock system, we can supply all brackets pre-mounted with fixing screws and nuts. No holes need to be drilled in the profiles and all cuts are made straight. This makes assembly and modification very easy.

Easy to install

Aluminum profiles
Lightweight aluminum profiles allow ergonomic assembly.

Patented screw-lock system
Pre-mounted brackets with fixing screws and nuts simplifies assembly and modification.

Simple modification
It is easy to modify an existing fence design since the aluminum profiles are easy to saw into different lengths.

Speed up your projects

Highly adaptable to various needs
Numerous materials and components give endless possibilities.

Complete safety system
Quick-Guard has fittings and mounting brackets for all sensors, locks and switches from Jokab Safety.
Applications and features
Quick-Guard

Applications

Quick-Guard fencing system is designed to be used in different types of applications and can be customized to suit specific needs. Quick-Guard can be supplied to be designed by you on site (Quick-Guard Express) or designed and cut according to drawing (Quick-Guard standard). These two fencing system can also be combined to achieve a complete system.

Simple fencing for on site adaption
Quick-Guard Express is installed quickly and cost effectively. You order sections consisting of a few components which make it easy for you to install the fencing system by yourself on site. A manual mesh clipping tool, for easy cutting of the mesh, can be ordered if needed.

Advanced enclosure with endless possibilities
When ordering a Quick-Guard standard fencing system, you give us a simple sketch or AutoCAD® file of how you want the fencing system to look. We put this information into our AutoCAD-based software SafeCAD and design the fence in 3D. Cutting, component lists and quotations are generated automatically from SafeCAD.

Features

Patented assembly function
Our patented guide and locking method makes it simple to assemble and dismantle the fencing system. The nut has several advantages, it can easily be located into the profile and automatically positions itself when the screw is turned 90 degrees clockwise. When in this position the bracket being fixed can be adjusted as required and locked by turning the screw further clockwise. To remove the bracket the fixing screw is turned counterclockwise until the nut is in line with the profile slot.

All of our sensors, light grids, emergency stops and control devices are easy to mount, adjust and dismount in the profile’s T-slot thanks to our special nuts. Because we don’t have to drill in the profile, there are no marks if you want to move a sensor or rebuild.

SafeCAD
SafeCAD is a plug-in program for AutoCAD that enables you to quickly and easily customize safety solutions with our fencing system Quick-Guard. A simple sketch of the guarding system is used as the program input. The positions of doors and hatches, choice of mesh, polycarbonate, aluminum/steel sheet or noise reduction panels are typed in. The program automatically generates 3D drawings along with component and cutting lists. These drawings are also used as the basis for assembly/installation.
## Ordering information
### Quick-Guard Express

#### Express sections

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
<th>Profile mm</th>
<th>Width (CC) mm</th>
<th>Type</th>
<th>Order code</th>
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<td><strong>Express sections height 2000</strong></td>
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<tr>
<td>Section with one profile</td>
<td>Mesh</td>
<td>44 x 44</td>
<td>1100</td>
<td>JSM E11-N20X4</td>
<td>2TLA040101R0200</td>
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<tr>
<td></td>
<td></td>
<td>44 x 88</td>
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<tr>
<td></td>
<td></td>
<td>1500</td>
<td></td>
<td>JSM E15-N20X8</td>
<td>2TLA040101R0900</td>
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<tr>
<td></td>
<td>Mesh and polycarbonate</td>
<td>44 x 48</td>
<td>1100</td>
<td>JSM E11-NPC20X8</td>
<td>2TLA040104R0100</td>
</tr>
<tr>
<td>Section with two profiles</td>
<td>Mesh</td>
<td>44 x 88</td>
<td>1500</td>
<td>JSM E15-N20X8</td>
<td>2TLA040101R0900</td>
</tr>
<tr>
<td>Section without profiles (incl. netlocks and edge protection)</td>
<td>Mesh</td>
<td>-</td>
<td>1100</td>
<td>JSM E11-N20Z</td>
<td>2TLA040101R0400</td>
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<tr>
<td></td>
<td>Mesh and polycarbonate</td>
<td>-</td>
<td>1500</td>
<td>JSM E15-N20Z</td>
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<td>Door section (incl. Floorbrackets and netlocks)</td>
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<td>JSM E11-N20G</td>
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<td>Mesh and polycarbonate</td>
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</tr>
<tr>
<td>Sliding door section (incl. Suspension wheels, guiding components, for brackets and netlocks)</td>
<td>Mesh</td>
<td>44 x 44 / 44 x 88</td>
<td>1100</td>
<td>JSM E11-N20S</td>
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<td><strong>Express sections height 2200</strong></td>
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<td>Mesh</td>
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<tr>
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<td></td>
<td>1500</td>
<td></td>
<td>JSM E15-N20X8</td>
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<tr>
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<td>44 x 48</td>
<td>1100</td>
<td>JSM E11-NPC22X8</td>
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<td>Section without profiles (incl. netlocks and edge protection)</td>
<td>Mesh</td>
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<td>JSM E11-N20Z</td>
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<td>Mesh and polycarbonate</td>
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<td>JSM E15-N20Z</td>
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<td>Door section (incl. Floorbrackets and netlocks)</td>
<td>Mesh</td>
<td>44 x 44 / 44 x 88</td>
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<td>Mesh and polycarbonate</td>
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<td>1100</td>
<td>JSM E11-NPC22G</td>
<td>2TLA040105R0300</td>
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<td>Sliding door section (incl. Suspension wheels, guiding components, for brackets and netlocks)</td>
<td>Mesh</td>
<td>44 x 44 / 44 x 88</td>
<td>1100</td>
<td>JSM E11-N20S</td>
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<tr>
<td></td>
<td>Mesh</td>
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<td>JSM E15-N20S</td>
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<td>Mesh and Polycarbonate</td>
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<td>JSM E11-NPC22S</td>
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Ordering information
Quick-Guard Express

### Accessories

<table>
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<tr>
<th>Description</th>
<th>Height mm</th>
<th>Profile mm</th>
<th>Type</th>
<th>Order code</th>
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<tbody>
<tr>
<td>Section profile incl. two floor brackets and one support screw</td>
<td>2000</td>
<td>44 x 44</td>
<td>JSM E11-20Y4</td>
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<td>2200</td>
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<td>JSM E11-20Y8</td>
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<tr>
<td></td>
<td></td>
<td>44 x 88</td>
<td>JSM E11-22Y8</td>
<td>2TLC172235F0201</td>
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<tr>
<td>Emergency exit opener for conventional doors with 600-1270 mm openings.</td>
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<td>Panic Exit</td>
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<tr>
<td>Suitable for both right- and left-hand doors.</td>
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<td>Device P-1165</td>
<td>2TLC172235F0201</td>
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<tr>
<td>Lever handle for Panic Exit Device. Three keys included.</td>
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<td>Lever Handle</td>
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<tr>
<td>Mounting kit for Panic Exit Device. Brackets in stainless steel, delivered</td>
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<td></td>
<td>Mounting kit</td>
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<tr>
<td>pre-assembled.</td>
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<td>for Panic Exit Device</td>
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<tr>
<td>Cable duct 44 × 25 mm with holes c-c = 500 mm</td>
<td></td>
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<td>JSM A25A</td>
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<tr>
<td>diameter = 5. Natural anodized aluminum. Length 2000 mm.</td>
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<td>JSM A25A</td>
<td>2TLC172235F0201</td>
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<tr>
<td>Cable duct 44 × 88 mm without holes. Natural anodized aluminum. Length 2000</td>
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<td></td>
<td>JSM A88</td>
<td>2TLC172235F0201</td>
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<td>mm.</td>
<td></td>
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<td>JSM A88</td>
<td>2TLC172235F0201</td>
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<tr>
<td>Cable duct 44 × 60 mm with holes c-c = 500 mm diameter = 5. Natural anodized</td>
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<td>aluminum. Length 2000 mm.</td>
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<td>JSM A60A</td>
<td>2TLC172235F0201</td>
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<td>Door closer incl. mounting components, for conventional door/hatch.</td>
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<td>JSM D3</td>
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<tr>
<td>Door closer incl. mounting components, for sliding door.</td>
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<td>JSM D19</td>
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<td>Ball latch for conventional door/hatch.</td>
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<td>JSM D11B</td>
<td>2TLC172235F0201</td>
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<tr>
<td>Ball latch for sliding door.</td>
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<td>JSM D10C</td>
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<tr>
<td>Door bolt with spring for catch above the door (included),</td>
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<td>JSM D10A</td>
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<td>Brackets in zinc-plated steel, rod in stainless steel. Total height 1130 mm.</td>
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<tr>
<td>Door bolt with spring for hole in floor. Brackets in zinc-plated steel,</td>
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<tr>
<td>rod in stainless steel. Total height 995 mm.</td>
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<td>Cam lock including fitting. Brackets in aluminum and lock unit in black</td>
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<td>polyamide. Keys are excluded.</td>
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<td>Key to fit JSM D15 in black zinc.</td>
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<td>JSM D17</td>
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<tr>
<td>Bracket for padlock hasp, zinc plated steel. Two pieces needed for one</td>
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<td>JSM M4B</td>
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<tr>
<td>complete unit.</td>
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<td>JSM M5B</td>
<td>2TLC172235F0201</td>
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<tr>
<td>Special nut, M4 galvanized.</td>
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<td>JSM M6B</td>
<td>2TLC172235F0201</td>
</tr>
<tr>
<td>Special nut, M5 galvanized.</td>
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<td></td>
<td>JSM M6B</td>
<td>2TLC172235F0201</td>
</tr>
<tr>
<td>Special nut, M6 galvanized.</td>
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<td>JSM M6B</td>
<td>2TLC172235F0201</td>
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<td>Special nut, M8 galvanized.</td>
<td></td>
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<td>JSM M8B</td>
<td>2TLC172235F0201</td>
</tr>
</tbody>
</table>

**More information**

For components and ordering information for Quick-Guard standard please see the website
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