Original instructions

Smile
Emergency stop with indication
Read and understand this document

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1 Introduction

Scope
The purpose of these instructions is to describe the emergency stop Smile and to provide the necessary information required for installation and operation.

Audience
This document is intended for authorized installation personnel.

Prerequisites
It is assumed that the reader of this document has knowledge of the following:

- Basic knowledge of ABB Jokab Safety products.
- Knowledge of machine safety.

Special notes
Pay attention to the following special notes in the document:

**Warning!**
Danger of severe personal injury!
An instruction or procedure which, if not carried out correctly, may result in injury to the technician or other personnel.

**Caution!**
Danger of damage to the equipment!
An instruction or procedure which, if not carried out correctly, may damage the equipment.

NB: Notes are used to provide important or explanatory information.
2 Overview

General description

In order to fulfil the need for a small and easy to install E-stop, Smile has been developed. The size of the device makes it possible to be installed wherever needed. With M12 connections or cable and centralized mounting holes. Smile is very easy to install, especially on aluminium extrusions. There are different versions available, either with one or two M12 connections or cable. Two M12 connectors are used to enable the connection of E-stops in series. On the top of the Smile E-stop unit, an LED indicates the status.

⚠️ Warning! The emergency stop Smile normally needs to be complemented with other safety functions such as interlocking guards etc. Refer to risk analysis.

NB: The emergency stop shall not be used as normal stop of the machine, only in case of emergency.

Safety regulations

⚠️ Warning!

Carefully read through this entire manual before using the device.

The devices shall be installed by a trained electrician following the Safety regulations, standards and the Machine directive.

Failure to comply with instructions, operation that is not in accordance with the use prescribed in these instructions, improper installation or handling of the device can affect the safety of people and the plant.

For installation and prescribed use of the product, the special notes in the instructions must be carefully observed and the technical standards relevant to the application must be considered.

In case of failure to comply with the instructions or standards, especially when tampering with and/or modifying the product, any liability is excluded.
3 Connections

Electrical connections - Smile

M12 5-pole male seen from cable side

M12 5-pole female seen from cable side

Smile 10EA

Input
1 ) Input 1
2 ) Input 2
3 ) 0 VDC
4 ) Output 2, feedback
5 ) Output 1, feedback

Output
M12 5-pole female
1 ) Output 1
2 ) Output 2
3 ) 0 VDC
4 ) Input 2, feedback
5 ) Input 1, feedback

Smile 10EA

5-pole wired
1 ) Brown: Input 1
2 ) White: Input 2
3 ) Blue: 0 VDC
4 ) Black: Output 2
5 ) Grey: Output 1

4x wires

1 ) Input 1
2 ) Input 2
3 ) 0 VDC
4 ) Output 2
5 ) Output 1

Smile 11EA

M12 5-pole male

1 ) Input 1
2 ) Input 2
3 ) 0 VDC
4 ) Output 2
5 ) Output 1

1. To be connected only if LED indication is required.

NB: Smile 10EA/11EA/12EA can be used with any safety PLC or safety relay, but if LED indication is required the voltage over pin-1 (+) and pin-3 (-) must be between 19.2 – 28.8 VDC.

Caution!
When connected to an ABB Jokab Safety safety relay (such as an RT6 or RT9) and voltage (+) is supplied from the output S13, a maximum of three Smile units may be connected in series. This must be done with caution (especially in warm environments) as this affects the heat generation within the safety relay.

If more than three units are connected in series, voltage (+) should be supplied from another source (e.g. A1).
Connection examples

Connection example – Smile 10EA

Smile 10EA can be connected to either Pluto or a safety relay. The connection cable exits from underneath the unit.

Single channel example with LED indication. Safety category 1

![Single channel example with LED indication. Safety category 1](image)

Two channel example with LED indication. Safety circuit category 4

![Two channel example with LED indication. Safety circuit category 4](image)
Connection example – Smile 11EA

Smile 11EA can be connected to either Pluto or a safety relay. Connection via M12 connector.

Single channel example with LED indication. Safety category 1

Two channel example with LED indication. Safety circuit category 4
Connection example – Smile 12EA

Smile 12EA can be connected to either Pluto or a safety relay.

Single channel example with LED indication.

Safety category 1. Connection via M12 connector + termination connector.

![Diagram](image1)

Two channel example with LED indication.


![Diagram](image2)

Two channel serial connection example with LED indication.

Safety circuit category 3. Connection via M12 connector + termination connector. Note that there is no termination connector for the Smile 12EA (C), this unit is being connected back to the Pluto/safety relay via a separate cable.

![Diagram](image3)
Connection example – Smile 11EA & -12EA

Both Smile 11EA and -12EA can be connected to either Pluto or a safety relay.

Two channel example with LED indication.

Safety category 3. Connection via M12 connectors. Note that there is no termination connector as the Smile 11EA (C) completes the circuit without the need for a termination connector (JST2) or return cable.

LED indication example

The table shows the LED indication status of the emergency stop actuators from the connection example above.

<table>
<thead>
<tr>
<th>Emergency stop actuator status</th>
<th>LED indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Released Released Released</td>
<td>Green</td>
</tr>
<tr>
<td>Released Released Pressed</td>
<td>Green</td>
</tr>
<tr>
<td>Released Pressed Released</td>
<td>Green</td>
</tr>
<tr>
<td>Released Pressed Pressed</td>
<td>Green</td>
</tr>
<tr>
<td>Pressed Released Released</td>
<td>Red</td>
</tr>
<tr>
<td>Pressed Released Pressed</td>
<td>Red</td>
</tr>
<tr>
<td>Pressed Pressed Released</td>
<td>Red</td>
</tr>
<tr>
<td>Pressed Pressed Pressed</td>
<td>Red</td>
</tr>
</tbody>
</table>

NB: More information about the LED indication can be found in chapter Operation.
4 Installation and maintenance

Installation precautions

First mount Smile to the surface with two M5 bolts, and then attach the M12 connection(s).

⚠️ Warning! All the safety functions must be tested before starting up the system.

Maintenance

⚠️ Warning!

The safety functions and the mechanics shall be tested regularly, at least once every year to confirm that all the safety functions are working properly (EN 62061:2005).

In case of breakdown or damage to the product, contact the nearest ABB Jokab Safety Service Office or reseller. Do not try to repair the product yourself since it may accidentally cause permanent damage to the product, impairing the safety of the device which in turn could lead to serious injury to personnel.
5 Operation

⚠️ **Warning!** The maximum number of operations (cycles) for the emergency stop Smile is 6050 operations.

**LED indication**

<table>
<thead>
<tr>
<th>LED on button</th>
<th>Indication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Safety device OK. Safety circuit closed.</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>Safety circuit interrupted (when an emergency stop actuator is pressed down, all following units in the safety circuit lose the LED function).</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Safety device actuator pressed down. Safety circuit interrupted.</td>
<td></td>
</tr>
</tbody>
</table>
# Model overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile 11EA</td>
<td>2TLA030051R0000</td>
<td>Emergency stop, red button, M12 5-pole male</td>
</tr>
<tr>
<td>Smile 11EAR</td>
<td>2TLA030051R0100</td>
<td>Emergency stop, red button, M12 5-pole male, reversed</td>
</tr>
<tr>
<td>Smile 12EA</td>
<td>2TLA030051R0200</td>
<td>Emergency stop, red button, M12 5-pole male, M12 5-pole female</td>
</tr>
<tr>
<td>Smile 10EA</td>
<td>2TLA030051R0400</td>
<td>Emergency stop, red button, 1 m cable (5-pole)</td>
</tr>
<tr>
<td>Smile 10EK</td>
<td>2TLA030051R0600</td>
<td>Emergency stop, red button, short leads (4x wires, no LED connection)</td>
</tr>
<tr>
<td>Smile 11SA</td>
<td>2TLA030051R0900</td>
<td>Safety stop, black button, M12 5-pole male</td>
</tr>
<tr>
<td>Smile 12SA</td>
<td>2TLA030051R1000</td>
<td>Safety stop, black button, M12 5-pole male, M12 5-pole female</td>
</tr>
<tr>
<td>Smile 11SAR</td>
<td>2TLA030051R1100</td>
<td>Safety stop, black button, M12 5-pole male, reversed</td>
</tr>
</tbody>
</table>

## Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JST2</td>
<td>2TLA030051R1300</td>
<td>Termination for Smile 12</td>
</tr>
<tr>
<td>Emergency stop sign</td>
<td>2TLA030054R0700</td>
<td>Ø32.5 mm, Swedish, Danish, Finnish. For reversed Smile.</td>
</tr>
<tr>
<td>Emergency stop sign</td>
<td>2TLA030054R0800</td>
<td>Ø32.5 mm, English, French, German. For reversed Smile.</td>
</tr>
</tbody>
</table>

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**JST2**

Termination for Smile 12

Article number: 2TLA030051R1300

**Emergency stop sign**

For reversed Smile

Article number: S, DK, FIN: 2TLA030054R0700
EN, F, D: 2TLA030054R0800
## Technical data

| Manufacturer | ABB JOKAB SAFETY  
| Varlabergsvägen 11  
| SE-434 39 Kungsbacka  
| Sweden |

### Power supply

<table>
<thead>
<tr>
<th>Operating voltage (LED)</th>
<th>17-27 VDC ±10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption (LED)</td>
<td>15 mA</td>
</tr>
<tr>
<td>Minimum current (switches)</td>
<td>10 mA 10 VDC/10 VAC</td>
</tr>
<tr>
<td>Maximum current (switches)</td>
<td>2 A 24 VDC</td>
</tr>
</tbody>
</table>

### General

| Protection class | IP65 |
| Ambient temperature | Storage: -30…+70°C  
| Operation: -10…+55°C |
| Housing material | Polyamide PA66, Macromelt, polybutylene terephthalate PBT, Polypropene PP, UL 94 V0 |
| Contact material | Silver alloy, gold plated |
| Connectors | Smile 10EA: 5-pole cable, 1 m  
| Smile 10EK: 4x wires  
| Smile 11x*: M12 5-pole male  
| Smile 12x*: M12 5-pole male, M12 5-pole female  
| * - x can be all models -EA, -EAR, -SA, -SAR |
| Size | 84 x 40 x 52 (L x W x H) – see drawing |
| Weight | ~ 65 g |
| Colour | Yellow base, red or black button |
| Actuator force (E-stop button) | 22 ± 4N |
| Actuator travel | ~ 4 mm to latch |
| Mechanical life | > 50,000 operations |
| Impact resistance (half sinusoidal) | Max. 150 m/s², pulse width 11 ms, 3-axis (as per EN IEC 60068-2-27) |
| Vibration resistance (half sinusoidal) | Max. 50m/s² at 10 Hz, 10 cycles, 3-axis (as per EN IEC 60068-2-6) |

### Climate resistance

| Damp heat, cyclical | 96 hours, +25°C / 97%, +55°C / 93% relative humidity, as per EN IEC 60068-2-30 |
| Damp heat, sustained | 56 days, +40°C / 93% relative humidity, as per EN IEC 60068-2-78 |
| Dry heat | 96 hours, +70°C, as per EN IEC 60068-2-2 |
| Cooling | 96 hours, -40°C, as per EN IEC 60068-2-1 |
| Salt mist | 96 hours, +35°C in a chemical solution with NaCl as per EN IEC 60068-2-11 |
Safety-related characteristic data and Conformity

| Conformity                                        | European Machinery Directive 2006/42/EC  
| EN ISO 13849-1                                    | Up to PL e, cat. 4 depending on system architecture  
| Certificates                                     | Inspecta  
| Safety data                                      | Mechanical reliability B10d  
|                                                  | Emergency stop: Fault exclusion, up to 6050 operations  

NB: A safety function with an emergency stop Smile can achieve Cat. 4/PL e according to EN 954-1/EN ISO 13849-1 only when a single Smile unit is connected to the control unit (safety-PLC or safety relay) in a dual channel configuration.

Dimensions

**Dimensions – Smile**

NB: All measurements in millimetres.
8 EC Declaration of conformity

EC Declaration of conformity
(according to 2000/14/EC, Annex 2A)

We, ABB AB
JOKAB SAFETY
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

declare that the safety components of ABB AB make with type designations and
safety functions as listed below, is in conformity with the Directives
2006/42/EC
2006/95/EC

Authorised to compile the technical file

ABB AB
JOKAB Safety
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

Product
Emergency stop device Smyle, versions 10EA, 10EAK, 11EA, 12EA, 11EAR
Emergency stop device INCA 1
Emergency stop wire Stop Line
Emergency stop wire JSNY10

Certificate
11-SKM-CM-0103
11-SKM-CM-0103

Certification body
Inspecta Sweden AB
Box 30100
SE-104 25 Stockholm
Sweden

Used harmonized standards

Jesper Kristensson
PRU Manager
Kungsbacka 2012-08-03

www.abb.com
www.jokabsafety.com

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