

Original instructions

JSHD4 AS-i

Enabling device with safe AS-i input slave

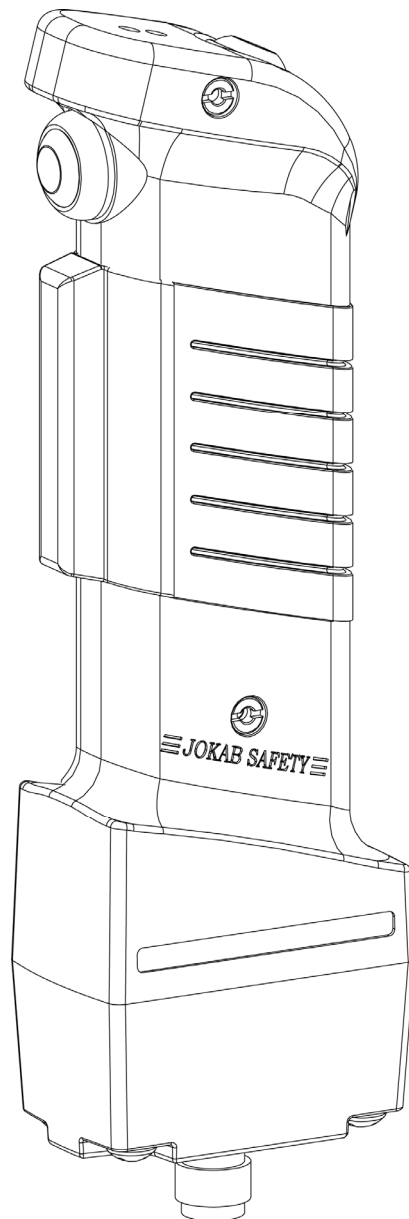


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1 Introduction

Scope

The purpose of these instructions is to describe the three-position enabling device 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 Jokab Safety products.
- Knowledge of the AS-i system.
- 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

JSHD4 AS-i is a 3-position enabling device with a built-in dual channel safe AS-i input slave. Some versions also include a standard input slave for extra push-buttons and anti tampering protection. The AS-i bus and the safety around it is specified by the two organisations “AS-International Association” and “AS-Interface Safety at Work”, and is described in the publication “AS-Interface The Automatic Solution”.

The anti tampering device consist of a capacitive sensor and an accelerometer, by combining these sensors the device can be used to determine if a person is holding the enabling device. This can be used if there is a risk for tampering of the enabling device.

 **Warning!** The anti tampering device is not a safety function; the safety relies on the operator using the three-position-button.

Safety regulations

 **Warning!**

Carefully read through this entire manual before using the device.

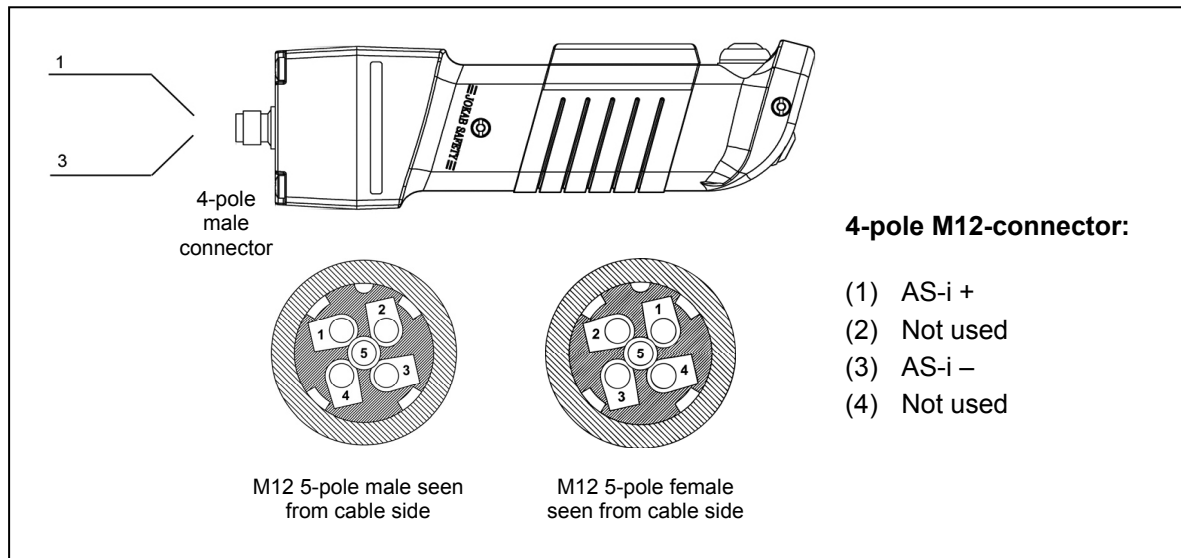
The devices shall be installed by a trained electrician following the Safety regulations, Standards and the Machine directive.

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



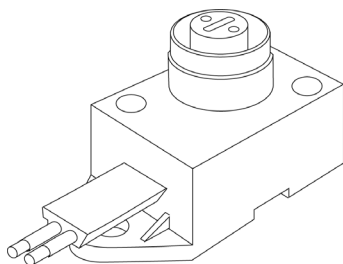
Standard slave bit description (input only)

The standard, non-safe input slave (available in some versions) send a 4-bit message to indicate the press of the top and/or front button, and if the anti tampering device detect an operator or not.

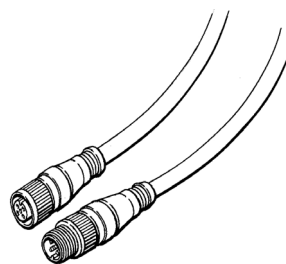
Bit no	Value	Description
1	1	Top button pressed
	0	Top button not pressed
2	1	Front button pressed
	0	Front button not pressed
3	1	Anti tampering device detect an operator
	0	Anti tampering device does not detect an operator
4	-	Not used

Accessories for connection to the AS-i bus

Type	Article number	Description
AS-i T-connector with M12	20-073-00	Flat cable connector to M12
M12-C112	20-056-20	1 m cable, 5-pole, 0.34 mm ² , M12 female + male
M12-C312	20-056-21	3 m cable, 5-pole, 0.34 mm ² , M12 female + male

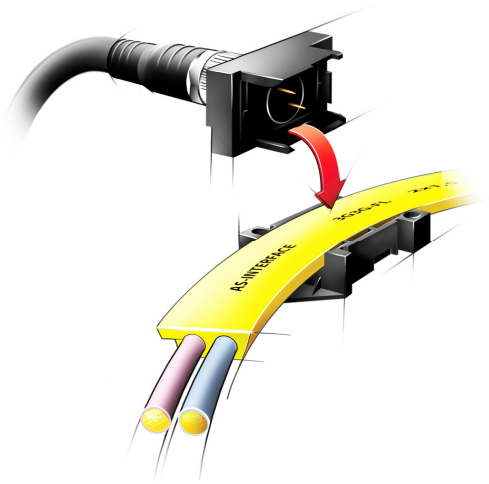


Flat cable connector to M12
Article number: 20-073-00



5 x 0.34 mm² cable, screen with straight female + male M12 connectors.
Screen connected to pin 3 (0 VDC) on male connector.
Article number: 20-056-20 (1 m), 20-056-21 (3 m)

4 Installation and maintenance



JSHD4 AS-i is supplied with 30 VDC from the AS-i bus.

Recommended connection to the AS-i bus is through a flat cable connector to M12 (see figure to the left), making it possible to quickly and easily connect JSHD4 AS-i to the yellow AS-i cable.

The unit can also be connected directly to the AS-i bus using only two cables (pin-1 and 3 of the M12-connector on the unit) according to “Connections” above.

Installation precautions



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).



Warning! In case of breakdown or damage to the product, contact Jokab Safety. Do not try to repair the product since it may accidentally cause permanent damage, impairing the safety of the device which in turn could lead to serious injury to personnel.

5 Operation

Three-position button

The three possible positions of the main button represent three different states according to the figure below.

State 1 – "Waiting state":

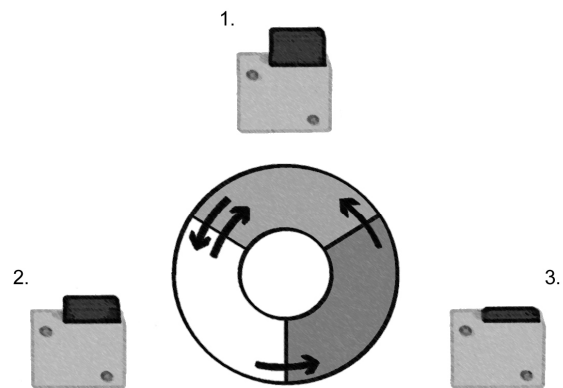
- Button free, i.e. not pressed.
- Process not allowed to run.
- Waiting for the button to be pressed into its middle position ("running state").

State 2 – "Running state":

- Button pressed into its middle position.
- Process is allowed to run.
- Process is stopped if the button is released or pressed to its end position ("stopping state").

State 3 – "Stopping state":

- Button is pressed to its end position.
- Process is stopped.
- To restart the process the button must first be completely released ("waiting state"), then pressed into its middle position ("running state").



Front and top button

The front and top button functionality are user defined and determined in the PLC program, see "Standard slave bit description" above for details.

Anti-tampering device

The anti-tampering device has two requirements to determine if JSHD4 AS-i is operated correctly:

1. A capacitive sensor determines if the device is held by a hand.
2. An accelerometer determines if the device is moving.

Faulty operation is reported if the device is not held by a hand or if it has not moved for more than 20 seconds.

NB: Not all models are equipped with the additional (front and/or top) button or the anti-tampering device (see "Model overview" below).



Warning! The front and/or top button, as well as the anti-tampering device, are connected to a non-safe input slave and must **never** be used for safety functions.

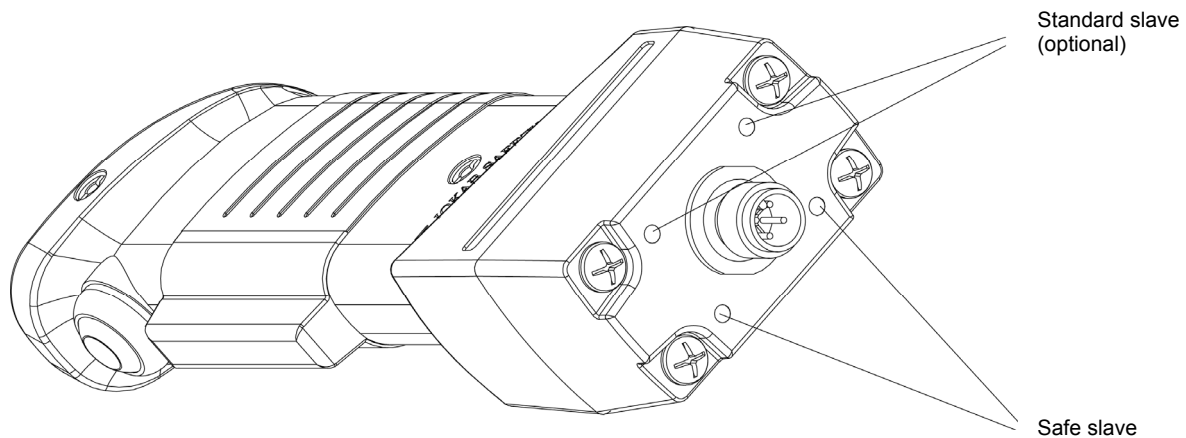
LED indication

LEDs on the top of the device:

LED	Indication	Description
Red	ON	Out bit 1 (safe slave) ON
	OFF	Out bit 1 (safe slave) OFF
Green	ON	Out bit 2 (safe slave) ON
	OFF	Out bit 2 (safe slave) OFF

AS-i LED and Fault LED in combination:

Depending on the model, there are one or two pairs of LEDs on the underside of the device. The combination of the individual LEDs indicates the status of a corresponding input slave.



A LED pair consists of a green “AS-i” LED and a red “Fault” LED. If there are two pairs of LEDs, the device is equipped with an additional standard input slave and the LED pairs are then placed as shown in the figure above. Both LED pairs indicate respective slave status as described in the table below.

AS-i (Green)	Fault (Red)	Description
OFF	OFF	AS-i power missing
ON	OFF	Normal operation
ON	ON	No data exchange with master
Flash	ON	No data exchange because address = 0

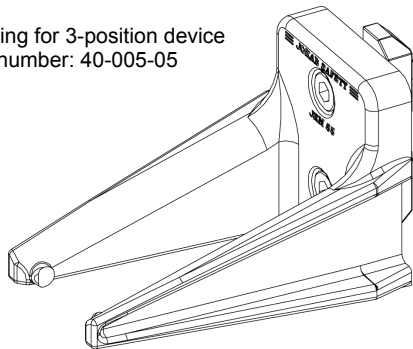
6 Model overview

Type	Article number	Description
JSHD4-2-AF	19-995-08	3-position-, front- and top button Safe- and non-safe slave
JSHD4-2-AF-A	19-995-07	3-position-, front- and top button Safe- and non-safe slave Anti-tampering device
JSHD4-3-AF-A	19-995-18	3-position button Safe- and non-safe slave Anti-tampering device
JSHD4-3-AG	19-995-19	3-position button Safe slave
JSHD4-4-AF	19-995-28	3-position- and front button Safe- and non-safe-slave
JSHD4-4-AF-A	19-995-29	3-position- and front button Safe- and non-safe slave Anti-tampering device
JSHD4-5-AF	19-995-38	3-position- and top button Safe- and non-safe-slave
JSHD4-5-AF-A	19-995-39	3-position- and top button Safe- and non-safe slave Anti-tampering device



Accessories

Type	Article number	Description
JSM55	40-005-05	Wall fixing for 3-position device

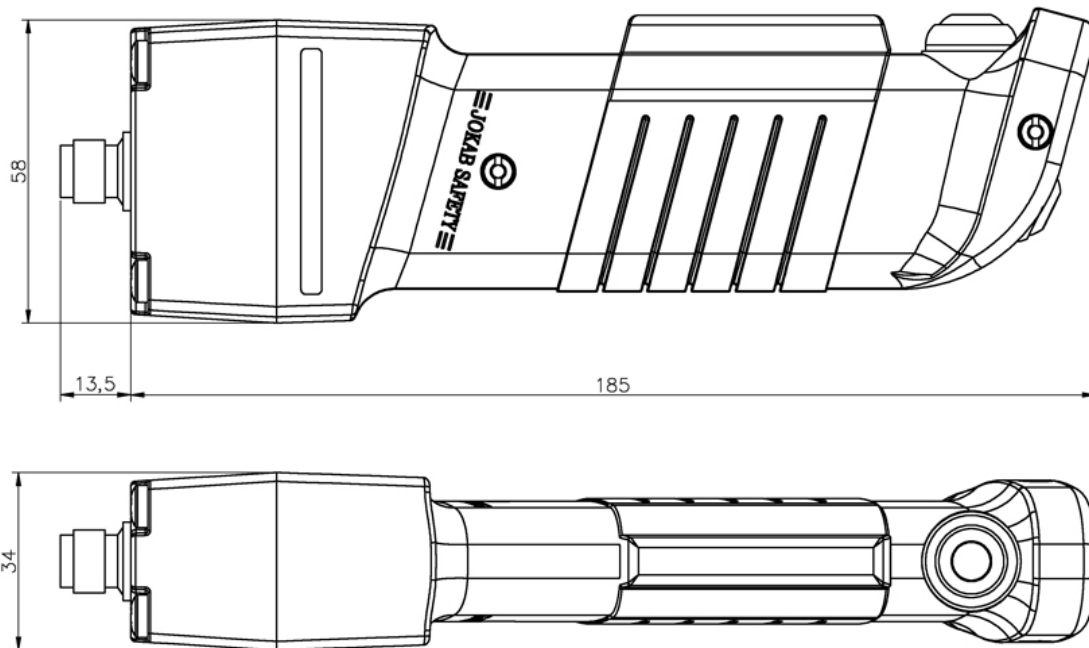
JSM55
Wall fixing for 3-position device
Article number: 40-005-05



7 Technical data

Manufacturer	
Address	JOKAB SAFETY AB Varlabergsvägen 11 S-434 39 Kungsbacka Sweden
AS-i data	
AS-i profile (safe slave)	S-7.B.0
Slave address at delivery (safe slave)	0
AS-i profile (std. slave)	S-0.A.0 (Not in JSHD4-3-AG)
Slave address at delivery (std. slave)	31A
Addressing	M12-connector (internal switch enable separation of nodes)
Response time over AS-i bus	5 ms (+ response time of safety monitor)
Power supply	
Operating voltage	30 VDC, AS-i bus. Tolerance 26.5 – 31.6 VDC
Total current consumption	< 100 mA
General	
Degree of protection	IP65
Ambient temperature	-10...+50°C
Size	See drawing
Operating force	Approx. 15N
Life, mechanical	1.000.000 operations to middle position
Safety / Harmonized standards	
IEC/EN 61508-1..7	SIL3, PFD _{avr} : 3,25*10 ⁻⁵ , PFH _d : 7,55*10 ⁻⁹
EN62061	SIL3
EN ISO 13849-1	Performance level PL e, Category 4, MTTF _d : high (if n _{op} < 6.5*10 ⁵)
EN 954-1	Category 4
Certifications	TÜV Nord  

Dimensions



NB: All measurements in millimetres.

CAD model

Complete CAD models are available through the webpage

- 1) Visit www.jokabsafety.com.
- 2) Choose language **English** in the menu at the top of the page.
- 3) In the menu to the left, choose **Products**.
- 4) A list of products is now shown. Choose **3D CAD files**. This will open a new window called "Jokab Safety AB – SolidComponents".
- 5) In the new window there is a menu to the left, showing different product categories. JSHD4 belong to the category **Control devices**, find it in the list and click it. If the language changed in the new window, click the corresponding flag at the top of the page to choose language again (Swedish, English or German available).
- 6) Choose **Three position units** in the list now shown.
- 7) Choose a preferred format in the scroll down list next to "CAD-format" (SolidWorks, ProE, Sat, Step, Parasolid, Iges, Dwg, Dxf).
- 8) Click the **save icon** in front of the desired CAD model.
- 9) The CAD model will now be added to the list of downloads. Click the **save icon** again in the new list to start the download.

8 EC Declaration of conformity

EC declaration of conformity

We JOKAB SAFETY AB declare that the safety components of JOKAB SAFETY manufacture, with type designations and safety functions as listed below, are in conformity with the Directives 2006/42/EC, (98/37/EC) and 2004/108/EC

Boplatsgatan 3
S-213 76 Malmö
Sweden

AS Interface safety slave JSHD4 AS-i
Type designations: JSHD4-2-AF-A, -2-AF, -3-AF-A, -3-AG, -4-AF-A, -4-AF, -5-AF-A and -5-AF; AS-i

Applicable harmonized standards EN 62061, EN ISO 13849-1, EN 60204-1, EN 50178, EN 61000-4-2, -3, -4, -5, -6 EN 55011 EN 60947-5-8

Other applicable standards and documents IEC/EN 61508-1..7

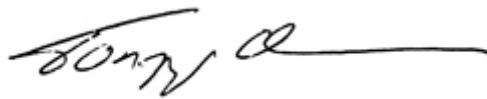
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