Original instructions

HD5-B-xxx

Three position enabling device with safe AS-i slave
Read and understand this document
Please read and understand this document before using the products.
Please consult your ABB JOKAB SAFETY representative if you have any questions or comments.

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Several examples of applications that require special attention are listed below. These examples are not intended to be an exhaustive list of all the possible applications of the products and they should not be understood as meaning that products are suitable for the potential uses specified:

Use outside, use where there is the possibility of chemical exposure or electrical interference, or use under conditions not specified in this document.

Nuclear power control systems, incineration plants, railway installations, aviation systems, medical technology, gaming machines, vehicles, and industrial plants are subject to special industry or official regulations.

Facilities, machines, and equipment that may pose a danger to life or property.

Please observe and follow all prohibitions on the use of the products.

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PERFORMANCE DATA

Due to the fact that efforts have been made to ensure the accuracy of the information contained in this manual, ABB JOKAB SAFETY assumes no responsibility for errors or omissions and reserves the right to make changes and improvements without giving notice.

The performance data contained in this document is to provide the user with guidance when assessing usability and does not constitute a warranty-related assurance. The data may relate to test results from ABB JOKAB SAFETY. The user must compare this with the actual situation in which the application is taking place. The current performance is covered by the ABB JOKAB SAFETY warranty and limitations of liability.
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1. INTRODUCTION

Purpose
The purpose of this operating manual is to describe the HD5-B-xxx three position enabling device and to provide the information necessary for planning, assembly, maintenance, and operation.

Target group
This document is aimed at planners, as well as specialist staff working in assembly and maintenance. In addition, this operating manual is aimed at users who have received training and authorization, from the operator of the facility, in relation to these devices, how to handle them, and the hazards they pose.

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

- Basic knowledge of ABB JOKAB SAFETY products
- Knowledge of the AS-i Bus system
- Knowledge of safety products
- Knowledge of safety control devices with functions relevant to safety
- Knowledge of related facilities

Special instructions
Please pay attention to the following special instructions in this document:

<table>
<thead>
<tr>
<th>Attention!</th>
<th>Danger of personal injury!</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Failure to follow instructions or work sequences properly may result in personal injury.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Caution</th>
<th>Risk of damage to the equipment!</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Failure to follow instructions or work sequences properly may result in damage to the equipment.</td>
</tr>
</tbody>
</table>

| Note | Notes are used to provide important or explanatory information. |
2. **OVERVIEW**

**Product description**

The “HD5-B-xxx” is a three position enabling device with integrated AS-i technology. It operates in standard-addressing mode, in accordance with the V.3.0 specification. (See “AS-i data” section)

The “HD5-B-xxx” enabling device is designed to be connected to the AS-i Safety-Bus and is available in a range of configurations, which can be equipped with a maximum of two safe and one unsafe slaves.

There are two three-position enabling switches, which are both operated using one button providing a high level of safety. The contacts are only closed in the middle position and are opened both when the button is released and when it is pressed down further into the third and final position. Closing the contacts always requires the contacts to be released. (See Functional description)

The signals from the three-position enabling switches and the emergency stop button (if the device is equipped with this) are detected by the integrated electronics and transmitted to the AS-i safety monitor via the safe slave.

Signals used to provide haptic or visual feedback are transmitted from additional integrated command buttons and sensors to the AS-i logic and from the AS-i logic to the enabling device via a third, unsafe slave.

The enabling device is connected to the AS-i Bus in the usual way using a fixed spiral-cable or via a M12 connector built into the device.

If you have any questions regarding the existing configurations or the possibilities for a configuration adapted to your needs, please contact ABB JOKAB SAFETY.

**Application area**

The enabling device is used in machines and facilities to provide protection to people, who, because of their work (e.g. maintenance or installation work), move through danger zones in which other forms of protection for users is neither possible nor practical.

Performing a risk assessment is essential for choosing protective devices. This should be done by the manufacturer of the machine.

---

**Caution!**

Please note that failure to comply with the provisions and restrictions contained in this operating manual, (e.g. in relation to the duty cycle, temperature etc.), may lead to loss of functionality of the enabling device and to unintended machine stoppage.

If a shutdown has occurred, the enabling device will become functional again once the values drop below the limits. However, there may still be damage to the electronics and a reduction in service life.
Safety regulations

⚠️ Attention!

Read the manual carefully and in full before using the device.

The enabling device may only be installed by specialist personnel, in compliance with regulations for AS-i networks, the applicable regulations and standards, and the enclosed data sheet.

Failure to comply with the instructions, or a use that is not in accordance with the specified instructions, as well as the improper installation or operation of the device, may adversely affect the safety of the user and the facility.

A safety logic unit, configured in accordance with the specified use of the product, is required to monitor (evaluate the signals) of the enabling device, allowing the product to be used the specified way.

All liability is excluded if the instructions are not complied with, especially in cases of interference with or modifications to the product.
3. Functional description

Enabling button

The enabling button works in accordance with the three-position principle. This allows for operators to be protected if the button is released or fully pressed down (e.g. if cramping).

An enabling button with three positions transmits signals, which:

- When activated, allow the machine or equipment to be initiated using a separate start control and
- When deactivated, initiate a stop function which prevents the machine or equipment from starting

Two three-position enabling switches are operated and analyzed redundantly to create a two-channel architecture.

- The symbol for a three-position enabling switch identifies the three positions (OFF, ON, OFF) using O and I, the movement direction from left to right, as well as the possible ways to move the switch.
- An important feature of the three-position enabling switch is that when shifting back from position 3, the ON position is not actuated, i.e. the contacts remain open.

The three positions function as follows:

- Position 1 (O): OFF mode (enabling button has not been pressed, contact is open)
- Position 2 (I): ON mode  
  (Enabling button has been pressed as far as the release position, contact is closed)
- Position 3 (O): OFF mode (enabling button has been fully pressed down, contact is open).

When released, the three-position enabling switches always go back to position 1, regardless of whether they were in position 2 or 3.

Notice on operation

To ensure a correct and safe operation, the enabling button must be pressed in the middle with two fingers or three fingers.
Emergency stop button (optional)

The optional built-in emergency stop button is providing an emergency stop function for stopping hazardous functions and removing power to them.
The emergency stop button has two forcibly-guided normally closed contacts.

Note on safe actuation!

To allow for the emergency stop button to operate safely, we recommend to use and assembly our holders, designed especially for this enabling device.
Detailed description of this is to be found in the accessories section.

Attention!

Particular caution should be exercised in relation to enabling devices that are connected, as standard, using a connector. Be aware of the following items:

- The correct function of the emergency stop must be check monthly!
- The emergency stop function must always be available and functional, and should have priority over all other functions and operations in all operating modes of the machine without affecting any facilities which are designed to release trapped persons.
- No start command (whether intentional, unintentional or unexpected) should be able to affect working processes that were stopped by initiating the emergency stop function until the emergency stop function has been reset manually.
- If it is possible to remove emergency stop buttons (e.g. portable programming devices) or shut down sections of a machine, it must be ensured that operational and non-operational emergency stop buttons are not mixed up.
Feedback on the functioning of the emergency stop button

- Feedback LED integrated into the housing of the enabling device below the emergency stop button
  - Red LED row, can be controlled in a user-defined way via the AS-i Bus.
  - Green LED row, can be activated via the AS-i Bus. The function of the green LED depending of activation, see in the table below

<table>
<thead>
<tr>
<th>LED row red controlled via AS-I Bus</th>
<th>function LED green controlled via AS-I Bus</th>
<th>LED row green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>not activated</td>
<td>Off</td>
</tr>
<tr>
<td>On</td>
<td>not activated</td>
<td>Off</td>
</tr>
<tr>
<td>Off</td>
<td>activated</td>
<td>On</td>
</tr>
<tr>
<td>On</td>
<td>activated</td>
<td>Off</td>
</tr>
</tbody>
</table>

⚠️ Attention!

The controls for the feedback LED are independent from the emergency stop button function. The programmer is solely responsible for their signaling function. ABB JOKAB Safety does not accept any liability for damages of any kind caused by signaling that is not logical, and the resulting misjudgments and errors by users.
**Additional button No. 1**

This button is built-in as standard and is located above the enabling button in the front area. Its optimized ergonomic shape, as well as the tactile button beneath it, ensures it can be operated easily and safely. This is usually done using the index finger.

---

**Note on actuation!**

The button must be actuated by pressing it down vertically, to an angle of between 0° and 15°. If the angle is exceeded when actuating the switch, there is a possibility that the switch contact may be damaged, and the switching cycles specified in the technical data will not be achieved.

---

**Additional buttons No. 3 and No. 4 (optional)**

These buttons are installed on the grey housing. They can be controlled in a user-defined way via the AS-i Bus. Additional labelling of the buttons is an option for custom configurations.
Signal LED

The high-intensity LEDs are installed in the housing in such a way that they can easily be perceived even in the normal ambient light in the workplace.
The controls are user-defined and can be controlled in a user-defined way via the AS-i Bus.

Home position detector

A sensor, which can be implemented in the housing of the enabling device can recognize when the enabling device has been hung-up in the specially-designed holder. (This holder is available as an accessory).
The signal from the sensor is transmitted via the AS-i Bus.

Attention!

This signal is not failsafe and shall never be used for safety purposes.

Assist light (flashlight) (optional)

This function is an optional function and acts as an assist light to illuminate work spaces for short periods in which the ambient light is not sufficient.
The controls are user-defined and can be controlled in a user-defined way via the AS-i Bus.
When using these, you must comply with the following:

Notice on duty cycle

- On time = 60%, max. 15 min., ambient temperature ≤ 35°C
- On time = 40%, max. 10 min., ambient temperature > 35°C
- Calculation
  - On-time percentage = (on time/on time + off time) x 100
  - On time = (D%/100- D%) x off time
  - Off time = (100-D%/D%) x duty cycle

Caution! Increased heat build-up

Compliance with the requirements is absolutely vital, due to the additional heat generated by the assist light!
If the specified limits are exceeded, the possibility that the AS-i electronics may be damaged cannot be ruled out.

Attention! Hazards arising from glare

Avoid looking directly into the lens of the assist light. Looking directly into the lens, and the glare effect which may result from this, can sometimes impair vision, which may cause irritation, adverse effects, or even accidents.
Status LED for AS-i Bus

One green and one red LED will inform you, about the status of the slave on the AS-i Bus.
The LEDs are positioned in a way that means they are not directly visible when the enabling device is placed in the holder intended for this purpose.
They are positioned in this way so that these signals are not confused with those from the signal LEDs.

<table>
<thead>
<tr>
<th>AS-i (green)</th>
<th>Fault (red)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>No power supply to AS-i</td>
</tr>
<tr>
<td>ON</td>
<td>Off</td>
<td>Normal operation</td>
</tr>
<tr>
<td>Off</td>
<td>ON</td>
<td>AS-i communication disrupted</td>
</tr>
<tr>
<td>Flashing</td>
<td>ON</td>
<td>No data exchange because address = 0</td>
</tr>
<tr>
<td>alternating</td>
<td>alternating</td>
<td>Peripheral error</td>
</tr>
<tr>
<td>Off</td>
<td>flashing</td>
<td>Recognizes double addresses (ABB version only)</td>
</tr>
</tbody>
</table>

Connection with AS-i-Network

Connecting the enabling device with integrated AS-i technology, as described in the data sheet enclosed with the product (and available from ABB under the following link).

Pluggable

In this connector version, an M12 connector with A-coding is built into the base of the enabling device. The benefit of this version is that it is easy to switch the enabling device, e.g. during maintenance work, without any intervention in the electrical installation.

⚠️ Attention!

Please note, if an emergency stop button is implemented in the enabling device and the connection becomes disconnected, additional measures can be required, as described in Section 3 “Functional description, emergency stop button”.

>Note on the connection cable!

When connecting the version with a connector, always use cables without additional shielding in order to prevent interference.
The accessories section outlines how to obtain cables that can be used safely. These are also available on request.
If the enabling device is connected using a spiral cable and more than three HD5-B-xxx are used on an AS-i cable, you must reduce the AS-i cable by 12m per device.
4. Installation

General
The connection of the enabling device to the machine must only be carried out by specialist personnel who are qualified in this field, in accordance with the regulations for AS-i networks, the applicable guidelines and standards, as well as the data sheet enclosed with the product.

Attention should be paid to existing or preset addressing (delivery state) of the enabling device. If necessary, it should be adjusted before integrating it into the AS-i network!

The connection to the AS-i network uses a two-core connection cable. A suitable contact according to the connection methods to the AS-i network should be established.

It is recommended to follow the procedure shown in the picture on the right, using an M12 connector. Normally, the M12 connector should be attached to Pin1 (AS-i +) and Pin 3 (AS-i -).

⚠️⚠️ Please ensure

in accordance to the national electrical codes, the separate laying of cable that serve the power supply (control and main circuits) and the cable that serve to transmit control signals!

The connection cable of this device must be laid in the area for control signals!

All functions, especially those relevant to safety, shall be checked and tested to ensure they are working properly before commissioning takes place. If this is not done, the possible property damage or personal injury can occur!

Installing the holder

At mounting the specific holder “HD5-M-xxx” please ensure that the enabling device is hang up completely in the holder. The position should be selected in view of ergonomic and safety relevant aspects.

More Information in Section 10 “Accessories”
5. Commissioning

The enabling device should only be commissioned by specialist personnel who have been trained to work with the machine. It is always important to make sure that the operation of the device is not tampered with and ensure the intended use (see scope of application) is complied with.

⚠️ Attention!

Other protective measures must be taken in order to protect other people in the same or adjacent hazardous area.

Functional Test

At first commissioning after installation, a functional test based on the application case must be carried out in accordance with current guidelines for the case of application and the relevant harmonized standards.
6. Review, maintenance and cleaning

The enabling device itself does not require any maintenance in addition to regular functional testing and cleaning.

The emergency stop safety functions must to check monthly. All other safety functions and mechanisms must be tested regularly, at least once a year, to confirm that all of the safety functions are working as they should. Depending on the application, machine manufacturers may stipulate requirements for shorter maintenance intervals. If this is the case, such requirements should be given priority.

As a general rule, it is recommended to document all maintenance work.

To ensure that command buttons continue to function in the long term, it is advisable to regularly wash them with a soft cloth and a standard (soap-based) multi-purpose cleaner.

⚠️ Caution!

The degree of protection for the enabling device specified in the data sheet should be complied with during cleaning.

The operating surfaces are made out of soft, elastic and very thin material designed to be hard wearing. Using abrasive cleaning agents or sharp-edged tools can weaken or penetrate the surface, which results in the protection class being lost in a relatively short space of time. (Dirt and moisture may penetrate the housing) The use of cleaning agents containing solvents should be avoided. This is not only to protect the surfaces, but also to protect the health of employees.

⚠️ Attention!

If the device doesn’t have functionality or has become damaged, the device must immediately be put out of service. Please get in touch with your regular contact for maintenance work or your nearest ABB JOKAB SAFETY customer service or dealer. Do not attempt to repair the product yourself. Any attempt to interfere with the device will result in a loss of warranty. There is also a possibility of the product becoming damaged, affecting its safety and how it functions, which may lead to serious injury.

Product data

If you have any queries regarding the product or ordering spare parts, you can find the item number right on the base of the enabling device. You can also find further data in the QR-code, which can be read using a smartphone with a QR-code scanner app.

7. Disposal

We kindly ask you to think about the environment to recycle the device as electrical waste once it reaches the end of its service life.

Please comply with currently applicable disposal requirements.
8. Operation

The following points should provide you with examples of applications as well as the behavior of control and signaling devices.
User-defined statuses that are provided from machine/equipment manufacturer, must be documented. These are a part of this “original operating manual for HD5-B-xxx”.

Attention!

You can find further explanations and warnings relating to the below functions in Section 3. “Functional description”

Three-position enabling switch

Position 1 - “idle status” or “stop status”:
- Switch in off position, i.e. not pressed down
- Process initiation not permitted
- Until the button is put into the middle position (position 2 “operating status”)

Position 2 - “operating status”:
- Button pressed down, moved into middle position
- Signal sent to the controls, start process
- The process stops when the button is put into its end position (position 3, “stop status”)

Position 3 - “Stop status”:
- Button has been moved into the third and final position
- Signal sent to the controls, stop process
- The button must be put into “idle mode” (position 1) before it can be put back into “operating mode” (position 2).

Emergency stop button

The emergency stop button shall initiate an emergency stop function, thereby removing energy to the hazardous functions in the event of emergency.

The holders specifically developed for this enabling device allow for the emergency stop button to be pressed when the enabling device is placed there.
The feedback LED integrated into the actuator cap of the emergency stop button or the enabling button housing also offers a range of different possibilities for signaling as part of its functions.

Attention!

You can find further explanations and warnings relating to the below functions in Section 3. “Functional description”
Additional buttons 1 to 4
The functionality of the additional buttons is user-defined and can be used, for example, for a start/stop function for individual movements etc.

Signal LEDs
The controls for the LEDs can be controlled in a user-defined way via the AS-i Bus. They usually signal when the process is approved and whether the enabling button is ready.

Home position detector
This function, in conjunction with the HD5-M-001 holder, provides information as to whether the enabling device is in its holder.

Assist light (flashlight)
This can be turned on in a way that is defined by the user, so that the work areas can light up for a short, selected length of time.

Caution!
Please pay attention to the instructions in section 3. “Functional description”
9. **Model overview**

HD5-B-xxx enabling device with integrated AS-i technology are described below. It may be possible to produce additional custom solutions after checking feasibility and gaining approval from ABB JOKAB SAFETY. If interested please get in touch with ABB JOKAB SAFETY.

**Standard ABB versions**

- **Type name:** HD5-B-xxx
- **Item number:** 2TLA920502Rxxxx

<table>
<thead>
<tr>
<th>Position number</th>
<th>Function</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enabling button</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Emergency stop button (optional)</td>
<td>Feedback LED, integrated in the housing, placed beneath the emergency stop button</td>
</tr>
<tr>
<td>3</td>
<td>Additional button 1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-------------------------------------</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Additional button 3 (optional)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Additional button 4 (optional)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Red signal LED</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Green signal LED</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Home position detector</td>
<td>detection only possible with the HD5-M-001 holder</td>
</tr>
<tr>
<td>10</td>
<td>-------------------------------------</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Assist light (flashlight) (optional)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-------------------------------------</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Pluggable connection</td>
<td>M12 connector</td>
</tr>
</tbody>
</table>
Information on positions

- **No. 1**, enabling button
- **No. 2**, emergency stop button
- **No. 3**, additional button 1
- **No. 4**, additional button 2
- **No. 5**, additional button 3
- **No. 6**, additional button 4
- **No. 7**, red signal LED
- **No. 8**, green signal LED
- **No. 9**, home position sensor
- **No. 10**,------------------------
- **No. 11**, Assist light (flashlight)
- **No. 12**,------------------------
- **No. 13**, connection

**Feedback LED** implemented in case, translucent

**Integrated into housing**
- No. 9, home position sensor
- No. 10,------------------------
- No. 12,------------------------
10. Accessories

Active holder, “HD5-M-001”

The holder has been developed especially for the HD5-x-xxx enabling. Information on this is detailed in the list below:

- Holds the enabling device securely
- In emergencies, it is possible to press the emergency stop button even when the enabling device is hung up
- Activation of the home position detector (see section 3 “functional description”)
- High breaking strength
- Resistant to almost all cleaning fluids
- Shape created in accordance with hygienic design principles

- Type name: HD5-M-001
- Item number: 2TLA920509R0001

Passive holder, “HD5-M-002“

This holder functions in the same way and has the same properties when it comes to holding the enabling device as the holder “HD5-M-001”, however the home position detector is not activated when the enabling device is hung up.

Information on this is detailed in the list below:

- holds the enabling device securely
- in emergencies, it is possible to press the emergency stop button even when the enabling device is hung up
- high breaking strength
- Resistant to almost all cleaning fluids
- Shape created in accordance with hygienic design principles

- Type name: HD5-M-002
- Item number: 2TLA920509R0002
# 11. TECHNICAL DATA

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

### Power supply

<table>
<thead>
<tr>
<th>Operational voltage</th>
<th>30 VDC, AS-i Bus, tolerance 26 - 31,6 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall power consumption</td>
<td>&lt;150 mA</td>
</tr>
</tbody>
</table>

### General

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature for during operation</td>
<td>-10°C (no buildup of ice) up to +55°C (no direct sunlight)</td>
</tr>
<tr>
<td>Ambient temperature for storage</td>
<td>-20°C (no buildup of ice) up to +70°C (no direct sunlight)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>See drawing in section 12 “dimensions”</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 200 g without connection cable</td>
</tr>
</tbody>
</table>

### Material

| Housing | Fiberglass reinforced plastic, PPH G30 |
| Operating buttons | TPE |

### Actuating force

<table>
<thead>
<tr>
<th>enabling button</th>
<th>approx. 20 N, 1 → 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>additional buttons</td>
<td>approx. 45 N, 2 → 3</td>
</tr>
</tbody>
</table>

### Mechanical /electrical durability of

<table>
<thead>
<tr>
<th>enabling button</th>
<th>1 x 10⁶ switching cycles, position 1 → position 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>additional buttons</td>
<td>1 x 10⁶ switching cycles, position 2 → position 3</td>
</tr>
</tbody>
</table>

### Mechanical reliability B₁₀₀,

<table>
<thead>
<tr>
<th>enabling button</th>
<th>B₁₀₀ : 2 x 10⁶, position 1 → position 2 → position 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>emergency stop button</td>
<td>B₁₀₀ : 968,000, position 1 → position 3 → position 1</td>
</tr>
</tbody>
</table>

### Mechanical /electrical durability of

| emergency stop button | 5 x 10⁴ switching cycles |

### Mechanical reliability B₁₀₀d,

| emergency stop button | B₁₀₀d : 250,000 |

### Mechanical durability of

<table>
<thead>
<tr>
<th>additional button 1</th>
<th>2 x 10⁶ switching cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>additional buttons 2/3/4</td>
<td>5 x 10⁴ switching cycles</td>
</tr>
</tbody>
</table>

### Connection

| M12 connector 5 pin, A coded Pin1 (AS-i +) and Pin 3 (AS-i -) |
Information for use in USA/Canada (UL)

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature for operation</td>
<td>-10°C (no buildup of ice) up to +50°C (no direct sunlight)</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Type 1</td>
</tr>
<tr>
<td>Electrical supply</td>
<td>The device shall be supplied from an isolating transformer having a secondary overcurrent protective device that complies with UL 248 to be installed in the field rated max 4 Ampere. a) Max. 5 A for voltages 0-20 V (0-28.3 V peak), or b) 100/Vp for voltages of 20-30 V (28.3-42.4 V peak).</td>
</tr>
<tr>
<td>Supply Voltage HD5-B-xxx</td>
<td>26.0 to 31.6 VDC, supplied from Class 2 or LVLC</td>
</tr>
<tr>
<td>Supply Voltage HD5-S-xxx</td>
<td>20.4 to 27.6 VDC, supplied from Class 2 or LVLC</td>
</tr>
<tr>
<td>Supply Voltage HD5-C-xxx</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage HD5-R-xxx</td>
<td></td>
</tr>
<tr>
<td>Overall Current consumption</td>
<td>&lt; 150mA</td>
</tr>
<tr>
<td>For devices with field wiring leads smaller than AWG 26 following statement shall be provided on a separate sheet or on the device packaging:</td>
<td>Field wiring leads smaller than AWG 26 need to be terminated in a terminal block or similar connection device or shall be prepared by a wire termination.</td>
</tr>
</tbody>
</table>

Response time on the AS-i bus

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD5-B-xxx</td>
<td>The enabling device meets the requirements of AS-Interface Safety-at-Work in all respects. An additional extension of the response time in the transition to the safe state is not carried out by this.</td>
</tr>
<tr>
<td>ABB AS-i logic unit Pluto</td>
<td></td>
</tr>
<tr>
<td>Response time on the AS-i bus</td>
<td></td>
</tr>
<tr>
<td>1. transistor output             relay output</td>
<td>&lt; 16,5 ms + programme-execution time</td>
</tr>
<tr>
<td>2. &lt; 20,5 ms + programme-execution time</td>
<td></td>
</tr>
<tr>
<td>Response time on AS-i bus in case of error</td>
<td></td>
</tr>
<tr>
<td>1. transistor output             relay output</td>
<td>&lt; 29 ms (with setting „Short stop time”)</td>
</tr>
<tr>
<td>2. &lt; 39 ms (with setting „Disturbance immunity”)</td>
<td></td>
</tr>
<tr>
<td>3. &lt; 33 ms (with setting „Short stop time”)</td>
<td></td>
</tr>
<tr>
<td>4. &lt; 43 ms (with setting „Disturbance immunity”)</td>
<td></td>
</tr>
</tbody>
</table>

The response times refer exclusively to the AS-i monitor Pluto from the manufacturer ABB. When using an AS-i monitor from another manufacturer, the response times may differ.

Further information on the profile and addressing, see chapter "AS-i configuration"
## Safety / Harmonized Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60204-1:2006 + A1:2009,</td>
<td></td>
</tr>
<tr>
<td>SIL CL 3</td>
<td>PL e, category 4</td>
</tr>
<tr>
<td>UL/CSA 60947-5-1</td>
<td></td>
</tr>
<tr>
<td>UL/CSA 60947-5-5</td>
<td>only for variants with an E-Stop is included</td>
</tr>
</tbody>
</table>

## Certificates

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>TÜV Süd</td>
<td>UL</td>
</tr>
<tr>
<td>AS-International Assoziation</td>
<td></td>
</tr>
</tbody>
</table>
AS-i data

The enabling device with integrated AS-i technology contains up to three slaves, depending on the configuration.
The following bit description relates to functions that are generally possible, and is set out in detail in the data sheet enclosed with the product (or available from ABB), depending on the configuration.

### ABB versions HD5-B-xxx

(up to 12 enabling devices may be used on one AS-i cable)

<table>
<thead>
<tr>
<th>Slave</th>
<th>I/O type</th>
<th>Bit</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-7.B.1.E</td>
<td>Safe code1</td>
<td>D 0</td>
<td>0</td>
<td>emergency stop button</td>
</tr>
<tr>
<td></td>
<td>Safe code1</td>
<td>D 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safe code2</td>
<td>D 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safe code2</td>
<td>D 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non safe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DO 0</td>
<td>0</td>
<td>red feedback LED in emergency stop button or below, OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>red feedback LED in emergency stop button or below, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DO 1</td>
<td>0</td>
<td>green feedback LED, not activated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>green feedback LED, activated</td>
</tr>
<tr>
<td>S-0.B.2.E</td>
<td>Safe code1</td>
<td>D 0</td>
<td></td>
<td>enabling button</td>
</tr>
<tr>
<td></td>
<td>Safe code1</td>
<td>D 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safe code2</td>
<td>D 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safe code2</td>
<td>D 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-7.A.7.7</td>
<td>Input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non safe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DI 0</td>
<td>0</td>
<td>additional button 1, not actuated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>additional button 1, actuated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DI 1</td>
<td>0</td>
<td>home position sensor, enabling device not hung up in holder</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>home position sensor, enabling device hung up in holder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DI 2</td>
<td>0</td>
<td>additional button 3, not actuated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>additional button 3, actuated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DI 3</td>
<td>0</td>
<td>additional button 4, not actuated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>additional button 4, actuated</td>
</tr>
<tr>
<td></td>
<td>Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non safe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DO 0</td>
<td>0</td>
<td>green signal LED, OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>green signal LED, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DO 1</td>
<td>0</td>
<td>red signal LED, OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>red signal LED, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DO 2</td>
<td>0</td>
<td>assist light (flashlight), OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>assist light (flashlight), ON</td>
</tr>
</tbody>
</table>
12. Dimensions

- All the dimensions are given in millimeters (mm)

3-position enabling device

Device specified Holder
13. EC DECLARATION OF CONFORMITY

EC Declaration of conformity
(according to 2006/42/EC, Annex ZA)

We, ABB AB, JOKAB SAFETY,
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden,
declare that the safety components of ABB AB manufacture
with type designations and safety functions as listed below,
are in conformity with the Directives

2006/42/EC – Machines
2014/30/EU – EMC
2011/65/EU – RoHS2
2015/631 – RoHS3

Authorised to compile the technical file
ABB AB, JOKAB SAFETY,
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

Product
Three position device,
HDS-B-xxx

EC-Type Examination Certificate
MBA 049833 CC28 Rev.00

Notified Body
TÜV Süd
Richterstrasse 65
80339 Munich
Germany
Notified Body No 0123

Used harmonized standards
EN ISO 13849-1:2010, EN ISO 13849-1:2015,
EN ISO 13849-2:2012, EN 62061:2015,
EN 61000-6-3:2007

Tobias Genzfell
Global R&D Manager
Kungsbacka 2019-03-08

www.abb.com/jokabsafety

Original