

MAIN CATALOG

# Safety Products

## ABB Jokab Safety



# Programmable safety controller

## Pluto

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.

Pluto can control most types of 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.



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.



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.

### Communication with external networks

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



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.

## 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 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.



StatusBus logotype

#### 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.

## Features

### Pluto

#### 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 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.

#### 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.

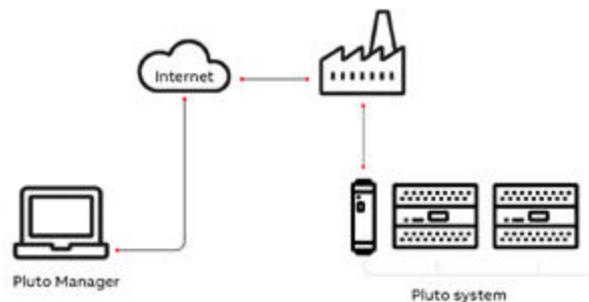
Pluto Manager also offers remote control of a Pluto system using the Internet and an Ethernet gateway.

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.



# Ordering information

## Pluto



2TLC000095V0201

Pluto S20 v2



2TLC000098V0201

Pluto A20 v2



2TLC000029V0201

Pluto D45

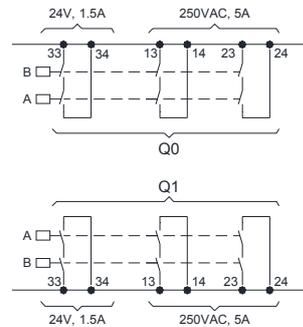
### Pluto ordering table

Pluto is available in different models depending on the needs of your application. Optional features includes bus communication, high resolution analog inputs and current monitoring.

Safety bus	Failsafe outputs <sup>a)</sup>	Failsafe inputs (max) <sup>b)</sup>	Analog inputs (max) <sup>b)</sup>	Fast counter inputs (max) <sup>b)</sup>	StatusBus inputs (max) <sup>b)</sup>	Non failsafe outputs (max) <sup>b)</sup>	Width mm	Type	Order code	
No	4	16	1 <sup>c)</sup>	-	4	8	45	Pluto S20	2TLA020070R4700	
	6	40	3 <sup>c)</sup>	-	4	16	90	Pluto S46	2TLA020070R1800	
Yes	-	22	1 <sup>c)</sup>	-	4	8	45	Pluto B22 <sup>e)</sup>	2TLA020070R4800	
	2	4	-	-	2	2	45	Pluto O2 <sup>f)</sup>	2TLA020070R8500	
	4	16	1 <sup>c)</sup>	-	4	8	45	Pluto A20 <sup>g)</sup>	2TLA020070R4500	
								Pluto B20	2TLA020070R4600	
				4 <sup>d)</sup> + 1 <sup>c)</sup>	-	4	8	45	Pluto D20	2TLA020070R6400
		6	40	3 <sup>c)</sup>	-	4	16	90	Pluto B46	2TLA020070R1700
		39	8 <sup>d)</sup>	4	4	15	90	Pluto D45	2TLA020070R6600	

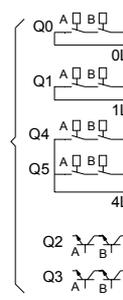
#### a) Failsafe outputs

- 2 failsafe outputs:  
 - 2 independent individually safe potential free relay outputs (Q0 and Q1) with 3 contacts each



- 4 failsafe outputs:  
 - 2 independent individually safe potential free relay outputs (Q0 and Q1)  
 - 2 independent individually safe transistor outputs (-24 VDC) (Q2 and Q3)

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



- b) -The number of failsafe inputs 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

## Ordering information

### Pluto accessories



2TLC1272609F0201

IDFIX-R



2TLC1272655F0201

IDFIX-RW



2TLC1272607F0201

IDFIX-DATA



2TLC1272611F0201

IDFIX-PROG 2k5



2TLC1272613F0201

IDFIX-PROG 10k



FIXA



2TLC1272624F0201

R120 Resistor

#### 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)
- 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)

Description	Type	Order code
Pre-programmed unique identification number.	IDFIX-R	2TLA020070R2000
Programmable identification number, i.e. the user can choose identification number.	IDFIX-RW	2TLA020070R2100
Programmable identification number and storage of AS-i safety codes.	IDFIX-DATA	2TLA020070R2300
Storage of the Pluto program, 2.5 Kbyte. Especially useful for stand-alone Pluto.	IDFIX-PROG 2k5	2TLA020070R2400
Storage of the Pluto program, 10 Kbyte. Especially useful for stand-alone Pluto.	IDFIX-PROG 10k	2TLA020070R2600

#### Pluto cables and connection accessories

Description	Type	Order code
Pluto programming and on-line monitoring cable. For a PC serial port, 9-pole D-sub connector.	Pluto cable serial	2TLA020070R5600
Pluto programming and on-line monitoring cable. For a PC USB port.	Pluto cable USB	2TLA020070R5800
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.	Pluto cable HMI	2TLA020070R5700
Cable for connecting HMI-panel ABB CP400 to Pluto programming port. Connector on HMI-side: 9-pole D-sub.	Pluto cable CP400	2TLA020070R6700
Cable for connecting HMI-panel ABB CP600 to Pluto programming port. Connector on HMI-side: 9-pole D-sub.	Pluto cable CP600	2TLA020070R6900
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . Ordered by meter, cut to size. Minimum order length 10 m.	PCABLE-000	2TLA020070R6800
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . 50-meter ring.	PCABLE-050	2TLA020070R6805
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . 100-meter ring.	PCABLE-100	2TLA020070R6810
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . 500-meter drum.	PCABLE-500	2TLA020070R6850
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . Halogen free. Ordered by meter, cut to size. Minimum order length 10 m.	PCABLE-000-HF	2TLA020070R8600
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . Halogen free. 50-meter ring.	PCABLE-050-HF	2TLA020070R8605
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . Halogen free. 100-meter ring.	PCABLE-100-HF	2TLA020070R8610
Bus cable for Pluto safety bus, 2 x 0.75 mm <sup>2</sup> . Halogen free. 500-meter drum.	PCABLE-500-HF	2TLA020070R8650

#### Other accessories

Description	Type	Order code
Set of function blocks for mechanical presses.	Pluto press block	2TLA020070R4100
Smile reset button for light button function with M12-5 connector.	Smile 11 RB	2TLA030053R0100
Handheld terminal for StatusBus. Used for e.g. addressing and test. Connection to PC via USB-micro cable	FIXA	2TLA020072R2000
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.	R120 Resistor	2TLA020070R2200

#### Pluto spare parts (included when ordering a Pluto)

Description	Type	Order code
Contact block for safety relays and Pluto. 7 poles. Grey.	Contact block 7 grey	2TLA081200R1500

## Ordering information

### DYNlink solution



Tina 2A

2TLC12453F0201



Tina 2B

2TLC12457F0201



Tina 3A

2TLC12458F0201



Tina 7A

2TLC12489F0201



Tina 10A

2TLC12473F0201



Tina 10B

2TLC12478F0201



Tina 10C

2TLC12479F0201



Tina 6A

2TLC12467F0201

#### 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.

Type of safety device	Type of connection to the DYNlink loop	Description	Type	Order code
Devices with positively driven force-guided contacts like E-stop buttons and key switches	Via the device connection	Mounted directly on the device enclosure to a M20 cable entry.	Tina 2A	2TLA020054R0100
	Placed inside the safety device enclosure		Tina 2B	2TLA020054R1100
	M12-5 male connector	Mounted directly on the device enclosure to a M20 cable entry.	Tina 3A	2TLA020054R0200
	M12-5 male connector with extra conductor for the supply of the safety device	Two circuits and with supply voltage for the safety sensor. Connects to a M20 cable entry.	Tina 3Aps	2TLA020054R1400
Devices with OSSD outputs like Orion light guards	Removable terminal blocks	Mounted on a DIN rail in the electrical cabinet. Note that the connected safety device(s) must be mounted on the same cabinet.	Tina 7A	2TLA020054R0700
	M12-5 male connector	Adaptation of OSSD to DYNlink. M12-8 connector for OSSD and M12-5 for DYNlink.	Tina 10A v2	2TLA020054R1210
		Adaptation of OSSD to DYNlink with possibility to connect a local reset button. M12-8 for OSSD and M12-5 for DYNlink and reset.	Tina 10B v2	2TLA020054R1310
Safety mats, edges and bumpers with short-circuit detection		Adaptation of OSSD to DYNlink with possibility to power the transmitter. M12-8 connector for OSSD and M12-5 for DYNlink and power.	Tina 10C v2	2TLA020054R1610
	M12-5 male connector	Short-circuit detection and adaptation to DYNlink.	Tina 6A	2TLA020054R0600

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

Description	Type	Order code
Connection block for serial connection of up to 4 DYNlink devices with M12-5 connectors	Tina 4A	2TLA020054R0300
Connection block for serial connection of up to 8 DYNlink devices with M12-5 connectors	Tina 8A	2TLA020054R0500
Connection block for serial connection of 2 DYNlink devices with M12-5 connectors	Tina 11A	2TLA020054R1700
Connection block for serial connection of 2 DYNlink devices with M12-8 connectors, e.g. Magne.	Tina 12A	2TLA020054R1800

#### 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.

Description	Type	Order code
Tina 1A is a blind plug connected to the unused M12 connectors of the connection blocks Tina 4A and Tina 8A.	Tina 1A	2TLA020054R0000

#### M12 Y-connectors

Description	Type	Order code
M12 Y-connector for series connection of DYNlink devices such as Eden, Smile, Inca and Tina.	M12-3A	2TLA020055R0000
M12 Y-connector for parallel connection of 2 DYNlink devices.	M12-3B	2TLA020055R0100
M12 Y-connector for the connection of 2 DYNlink devices or one DYNlink and one light button to Pluto safety PLC with only one cable.	M12-3E	2TLA020055R0200
M12 Y-connector for series connection of DYNlink devices with the StatusBus function.	M12-3S	2TLA020055R0600

## Ordering information

### Accessories



2TLC172509F0201

GATE-C2



2TLC172843F0201

GATE-EC



2TLC172331F0201

RSA 597



2TLC172469F0201

RSA 698



CP604

#### Pluto gateways

With the use of a gateway, Pluto can communicate with other control systems and form a part of a larger network. The gateway models GATE-D2 and C2 can also be used as an extension of the safety bus cable to extend the Pluto network.

Fieldbus	Ethernet	Type	Order code
CANopen		GATE-C2	2TLA020071R8100
DeviceNet		GATE-D2	2TLA020071R8200
PROFIBUS-DP		GATE-P2	2TLA020071R8000
EtherCAT	x	GATE-EC	2TLA020071R9100
Ethernet/IP	x	GATE-EIP	2TLA020071R9000
Modbus TCP	x	GATE-MT	2TLA020071R9400
PROFINET	x	GATE-PN	2TLA020071R9300
SERCOS III	x	GATE-S3	2TLA020071R9200

For more information, see the gateway manuals:

Pluto gateways [2TLC172009M0210](#)

Pluto Ethernet gateways [2TLC172285M0203](#)

#### Pluto safe encoders

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

Function	Shaft	Shaft diameter (mm)	Type of connection	Type	Order code
Single-turn	Solid	10	Connector male 12 poles	RSA 597 connector	2TLA020070R3600
		6	1.5 m cable	RSA 597 1.5 m cable	2TLA020070R3300
	Hollow	12	2 m cable	RHA 597 2 m cable	2TLA020070R3400
			10 m cable	RHA 597 10 m cable	2TLA020070R5900
Multi-turn	Solid	6	M12 connector	RSA 698 6 mm solid	2TLA020071R7800
		10	M12 connector	RSA 698 10 mm solid	2TLA020070R3700
	Hollow	12	M12 connector	RHA 698 hollow	2TLA020071R7900

For more information, see the manual:

Pluto safe encoders [2TLC172006M0206](#)

#### Pluto safe encoders accessories

Description	Type	Order code
Female 12 pole connector to be used with absolute encoder "RSA 597 connector". Connector to be mounted on the cable.	Connector for absolute encoder	2TLA020070R3900
M12 plug with Pluto safety bus termination resistor. To be used when the encoder is at one end of the Pluto safety bus.	M12-CANend	2TLA020061R0300

#### Operator panels

An operator panel (also called HMI) can be connected to the Pluto programming port (on the Pluto front) with a special cable and communicate with Pluto using MODBUS ASCII. We recommend the ABB CP600 series that offer the appropriate communication driver. An operator panel can also communicate with Pluto via a GATE-MT gateway.

Description	Type	Order code
Operator panel, 4.3" touch screen, 480 x 272 pixels	CP604	1SAP504100R0001

For more sizes and version, see: <http://new.abb.com/plc/control-panels>

## Technical data

### Pluto

#### Technical data

##### Approvals



##### Conformity



2006/42/EC - Machinery  
 2014/30/EU - EMC  
 2011/65/EU - RoHS  
 EN ISO 13849-1:2015, IEC 62061:2015+Corr.1:2015, EN 61496-1:2013(in extracts), EN 574:1996+A1:2008(in extracts), EN 692, EN 60204-1:2006+A1:2009+AC:2010, EN 50178:1997, EN 61000-6-2, EN 61000-6-4, EN 61000-4-1...6, IEC 61508:2010, IEC 61511-1, EN 50156-1, EN 50156-2:2015, ISO 13851:2002 (in extracts)

##### Functional safety data

		PFH <sub>d</sub> Failsafe relay outputs	PFH <sub>d</sub> Failsafe transistor outputs
EN 61508:2010	SIL3	2.00 × 10 <sup>-9</sup>	1.5 × 10 <sup>-9</sup>
EN 62061:2005+A1:2013	SILCL3	2.00 × 10 <sup>-9</sup>	1.5 × 10 <sup>-9</sup>
EN ISO 13849-1:2008	PL e/Cat.4	2.00 × 10 <sup>-9</sup>	1.5 × 10 <sup>-9</sup>

##### Electrical data

Electrical insulation 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)	Relay outputs AC-12: 250 V / 1.5 A VAC-15: 250 V / 1.5 A VDC-12: 50 V / 1.5 A DC-13: 24 V / 1.5 A	Pluto O2 Relay outputs AC-12: 250 V / 5 A AC-15: 250 V / 3 A DC-12: 60 V / 5 A DC-13: 24 V / 3 A	Pluto O2 Relay outputs (33-34) AC-12: 24 V / 1.5 A AC-15: 24 V / 1.5 A DC-12: 24 V / 1.5 A DC-13: 24 V / 1.5 A
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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

#### More information

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

Pluto hardware manual [2TLC172001M0211](#)

#### Connection diagrams

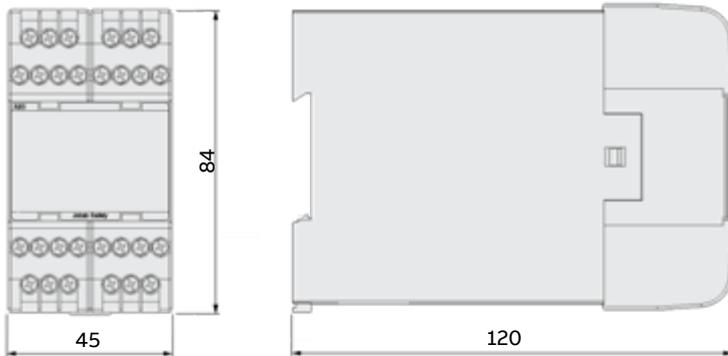
For Pluto connection diagrams please see <https://library.abb.com/>

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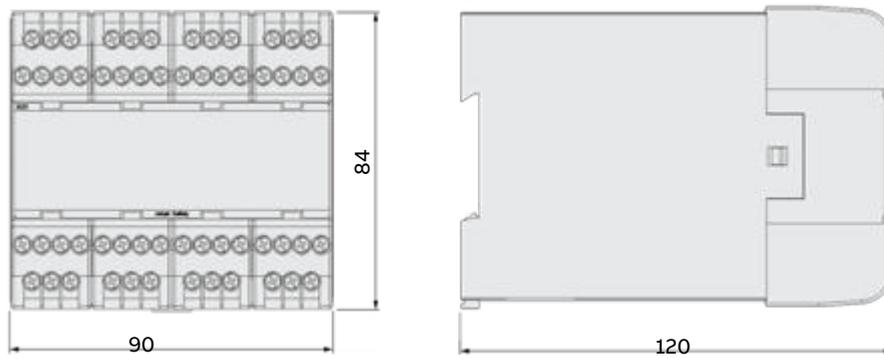
## Dimension drawings

### Pluto

#### Single size



#### Double size



All dimensions in mm