SIEMENS

Automatic Door Controls

SIDOOR

Door Control Systems ATD4xxW for industrial applications

System Manual

Edition 11/2018

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ATD4xxW Door Controller for Industrial Applications

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Preface

Content of the System Manual

This system manual describes:

- The controllers ATD401W, ATD410W, ATD420W and ATD430W, which you use for industrial applications.
- Geared motors, power supplies, additional units that you can use with the control units.

Target group

The system manual is intended for fitters, commissioning engineers, operators, service personnel and project engineers for protective machine doors.

Firmware versions

This system manual applies to SIDOOR ATD401W, ATD410W, ATD420W and ATD430W industrial door controllers with firmware version 1.12 or higher.

Note

You will find the current firmware versions for **SIDOOR ATD4xxW** control gear at Industry Online Support (http://support.automation.siemens.com/WW/view/en/50247080/133100).

Figures

The illustrations in this system manual show the SIDOOR USER SOFTWARE version 1.2 and the SIDOOR controller. The illustrations for other versions may differ slightly.

Information on the Internet

You can find more information about SIDOOR door drives and their application on the Internet (http://www.siemens.com/sidoor).

Parameter documentation

Record the determined, optimal parameter settings in the configuration protocol (see appendix "Configuration protocol (Page 342)"). Have this record to hand when you call the Hotline and for documentation purposes.

Recycling and disposal

The products are low in pollutants and are recyclable. For ecologically compatible recycling and disposal of your old device, contact a certificated waste disposal service for electronic scrap.

History

Revision of the system manual	Change
06/2016	First edition
01/2017	Revision of MDG700 NMS
06/2018	Changes according to firmware update V1.12 **Note:** Please note the instructions in the following sections before updating to V1.12:· • Deactivation of the service buttons during emergency stop (as of V1.12) (Page 103) After the update, the default command sources must be reset.
11/2018	Change for motors

Security information

Siemens offers products and solutions with industrial security functions that support secure operation of plants, systems, machines and networks. In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a comprehensive, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept. Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the Internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place. Additionally, Siemens' guidance on appropriate security measures should be taken into account. You can find more information on industrial security at (https://www.siemens.com/industrialsecurity) .

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats. To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at (https://www.siemens.com/industrialsecurity) .

WARNING

Access protection to the controllers/parameters

Access to the controller and the parameter assignment of the controller must be protected against unauthorized access. Appropriate measures must be taken for specific applications, e.g. installation in a closed control cabinet, to ensure access only by authorized personnel.

WARNING

Verification of safety-relevant functions

The SIDOOR controller is only a subsystem (incomplete machine). In general, the correct parameter assignment of the SIDOOR controller and the effectiveness of the safety-relevant functions must be checked at regular intervals by testing the safety-relevant functions during commissioning and depending on the application.

Table of contents

Sign posts 1

System manuals

For each application (industrial applications, elevators, railway applications) there are system manuals describing the SIDOOR system with the applicable devices and their commissioning.

Quick start operating instructions

The quick start operating instructions provide an overview of the SIDOOR devices:

- The devices that you can use together
- The article numbers for ordering these devices
- Information on installation
- Important safety information
- Where you can get more information about the devices

Documentation download

This documentation is available for download free-of-charge on the Internet: (http://www.siemens.com/automation/service&support)

Changes and additions to the manuals are documented in a product information file.

"mySupport" documentation

In the Documentation area in "mySupport" you can combine entire manuals or only parts of these to your own manual.
You can export the manual as PDF file or in a format that can be edited later.

You can find "mySupport" - Documentation on the Internet (http://support.industry.siemens.com/My/ww/en/documentation).

Applications & Tools

Applications & Tools support you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus on individual products.

You can find Applications & Tools on the Internet (https://support.industry.siemens.com/cs/ww/en/ps/18286/ae)

System overview 2

2.1 SIDOOR Door Control Systems

What is SIDOOR?

The SIDOOR product series is a door control system mainly for operation of sliding doors as well as lifting and roller doors. SIDOOR door drives are drives for doors and gates in various areas of application.

What is a door control system?

Door control system is the general term for the controller of an access system.

Door control systems are characterized by the fact that there are always two defined states, namely for the open and closed positions of the door. The door is always controlled between these two positions in accordance with the guidelines of the respective application.

SIDOOR for industrial applications

The door control systems are primarily designed for machine doors in industrial applications. In accordance with the integration of the machine in industrial communication networks, the controllers can be integrated in the networks with different communication options, including safety functionality.

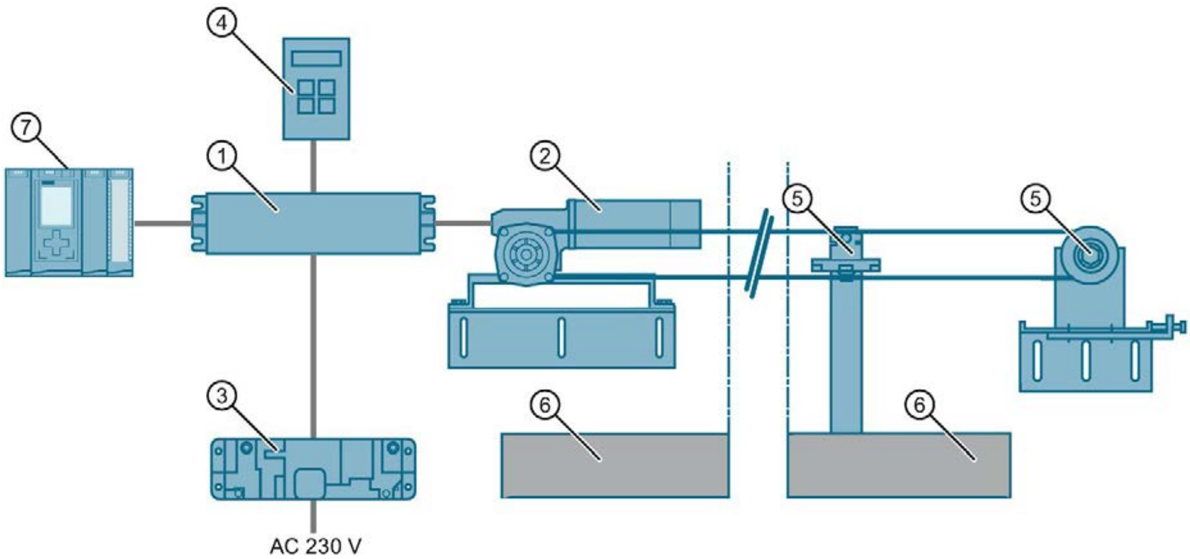
Customer benefits

- The controllers are optimally configured for their areas of application. With SIDOOR, doors are always checked and opened and closed in an application-specific manner.
- Our intelligent system solution calculates the optimal drive characteristics for a door automatically, and ensures that these are continuously maintained – in accordance with the guidelines of the application.
- The entire commissioning process requires just the push of a single button. In a defined learn run, the door system independently determines the values for the door width, the dynamic mass to be moved and the drive direction of the geared motor, and stores these data in a non-volatile memory.
- Assisted Drive and Impulse Stop support the movement of the heaviest doors without buttons or sensors. Impulse Drive allows doors to be opened at closed with a brief, light touch. The door moves completely autonomously.
- The screwless enclosure concept, with plug-in terminal connectors, allows the device to be opened and closed without tools, thereby reducing installation times.
- Thanks to the independence of the door system, SIDOOR is highly flexible and can be easily expanded with modular communication interfaces. SIDOOR door controllers can be completely controlled by a SIMATIC S7 controller. The control, configuration and diagnostics is performed via USS, PROFIBUS or PROFINET.
- The system's reliability, ruggedness and long-term precision minimize the need for maintenance and repair work. Obstruction and belt tear detection provides more safety.

2.2 System configuration and area of application

Overview of system configuration

The graphic uses an example of a machine protection door to illustrate the general configuration of automatic door control with the SIDOOR system including additional components, such as a power supply and drive.



① Controller
② Geared motor
③ Power supply
④ Optional additional unit (for example SIDOOR SERVICE TOOL, SIDOOR SOFTWARE KIT)
⑤ Accessories
⑥ Sliding door
⑦ SIMATIC S7-1500

Figure 2-1 System configuration

System configuration with a communication link

A system configuration with a communication link to the higher-level control, such as SIMATIC S7 via PROFIBUS or PROFINET, is furthermore possible.

System configuration with safety functionality

SIDOOR also offers a system structure with safety functionality, because safe limitation of forces and energies is guaranteed within the drive system.

The system allows for the implementation of additional customized safety measures, such as two-hand operation.

WARNING

Danger of injury and material damage when determining position

Position determination, as described in the relevant chapters and generally available, is not guaranteed with a view to safe travel without endangering man or machine. All available and determined position data of the SIDOOR controller must be regarded as a guideline with an equivalent inaccuracy, which is strongly dependent on the overall structure of the door and the associated mechanical components. In addition, when changing speed, the distances for acceleration, braking distances and controller deceleration must also be taken into account. The precision and reliability of the position determination must therefore be determined anew for each application as a whole.

Industrial applications

The SIDOOR ATD4xxW door controllers are "intelligent" door drives. They are used, for example, to drive machine protection doors. The force limitation and energy limitation safe functions fulfill the requirements according to DIN EN ISO 13849-1:2016 for Category 2 and Performance Level d. The drives are suitable for power-operated isolating guards according to EN ISO 14120:2015 Section 5.2.5.2 "Operating forces".

The SIDOOR ATD4xxW door controllers enable connection to various fieldbus systems. This makes integration into the industrial//SIMATIC environment possible. PROFINET IO, PROFIBUS DP and USS are currently specified as fieldbuses. The PROFIdrive "variable-speed drives" profile is generally used as the higher-level device profile.

- SIDOOR ATD401W

  The "offline" relay variant can be used for simple automation tasks. As there is no possibility of interfacing to a bus, it provides a limited scope of functions.

- SIDOOR ATD410W

  The controller is interfaced to a **USS bus** by means of a permanently integrated USS module.

  You can find additional information about the USS protocol online at Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/24178253).

- SIDOOR ATD420W

  The **PROFIBUS DP** interface is realized with a permanently integrated PROFIBUS module. This module comes with its own firmware.

- SIDOOR ATD430W

  The **PROFINET IO** interface is realized with a permanently integrated PROFINET module. This module comes with its own firmware.

The contents and structure of the user data transferred by the fieldbus systems correspond to the PROFIdrive "variable speed drives" profile. Use of this profile is also the basis for integration of the controller in the industrial environment. Both communicative integration via a fieldbus system and safety-related aspects play an important role here.

SIDOOR ATD4xxW machine door drives enable connection of door closed/opened position sensors (DCOPS), simple light barriers, pressure-sensitive edges as well as type 2 light arrays in compliance with IEC 61496 (ESPE - electro-sensitive protective equipment).

The SIDOOR ATD410W, SIDOOR ATD420W and SIDOOR ATD430W machine door drives are characterized by their many functions, including "AssistedDrive" (motor-assisted sliding of the door) and "ImpulseDrive" (automatic door movement initiated by applying light force).

2.3 Products

2.3.1 Controllers

Control units are electronic controllers connected to the power supply via an external power supply unit (e.g. SITOP PSU 8200, SIDOOR NT40). They are generally connected to the higher-level controller via digital or fieldbus interfaces, and can be configured via a user interface.

The controllers are designed for different areas of application.

Controllers for industrial applications

The following table provides an overview of the control units for doors in industrial applications.

Controller	Article No.	Description
SIDOOR ATD401W	6FB1141-1AT11-3WE2	Relay module
SIDOOR ATD410W	6FB1141-4AT10-3WE2	USS bus interface to the higher-level controller (USS module)
SIDOOR ATD420W	6FB1141-2AT10-3WE2	PROFIBUS interface to the higher-level controller (PROFIBUS module)
SIDOOR ATD430W	6FB1141-3AT10-3WE2	PROFINET interface to the higher-level control system (PROFINET module)

2.3.2 Geared motors

Geared motors form the maintenance-free drive unit in the door drive. The geared motors feature DC motors with non-self-locking gearing and are speed-controlled. The set force and speed limits are not exceeded.
The power is transmitted to the door by a toothed belt, gear rack or chain.
Toothed belts or chains pass over a deflector pulley, and can be fitted with two door clutch holders. This enables it to drive both single-sided and centrally-opening doors.

Versions

Geared motor	Article No.	Description
SIDOOR M3 L	6FB1103-0AT10-4MB0	• Geared motor, fixed pinion (size 176 mm) left, max. 180 kg door weight • Cable length 1.5 m
SIDOOR M3 R	6FB1103-0AT11-4MB0	• Geared motor, fixed pinion (size 176 mm) right, max. 180 kg door weight • Cable length 1.5 m
SIDOOR MDG3 L	6FB1103-0AT14-4MB1	• Geared motor, drive shaft left, max. 180 kg door weight • Without cable*
SIDOOR MDG3 R	6FB1103-0AT13-4MB1	• Geared motor, drive shaft right, max. 180 kg door weight • Without cable*
SIDOOR M4 L	6FB1103-0AT10-3MC0	• Geared motor, fixed pinion (size 176 mm) left, max. 400 kg door weight • Cable length 1.5 m
SIDOOR M4 R	6FB1103-0AT11-3MC0	• Geared motor, fixed pinion (size 176 mm) right, max. 400 kg door weight • Cable length 1.5 m
SIDOOR MDG4 L	6FB1103-0AT14-3MC2	• Geared motor, drive shaft left, max. 400 kg door weight • Without cable*
SIDOOR MDG4 R	6FB1103-0AT13-3MC2	• Geared motor, drive shaft right, max. 400 kg door weight • Without cable*

Geared motor	Article No.	Description
SIDOOR M5 L	6FB1103-0AT10-3MD0	• Geared motor, fixed pinion (size 176 mm) left, max. 600 kg door weight • Cable length 1.5 m
SIDOOR M5 R	6FB1103-0AT11-3MD0	• Geared motor, fixed pinion (size 176 mm) right, max. 600 kg door weight • Cable length 1.5 m
SIDOOR MDG5 L	6FB1103-0AT14-3MG2	• Geared motor, without pinion, max. 700 kg door weight • Without cable*
SIDOOR MDG5 R	6FB1103-0AT13-3MG2	• Geared motor, without pinion, max. 700 kg door weight • Without cable*

* Cable can be ordered: See section Accessories (Page 21)

2.3.3 Power supply

SIDOOR power supplies connect the controllers to the respective application-specific power supply.

Device selection

Power supply	Article No.	Description
SITOP PSU8200	6EP3446-8SB10-0AY0	Power supply for controllers without an integrated power supply unit.
SIDOOR NT40	6FB1112-0AT20-3PS0	
SIDOOR TRANSFORMER	6FB1112-0AT20-2TR0	
SIDOOR TRANSFORMER UL	6FB1112-0AT21-2TR0	
DC voltage supply	-	

2.3.4 Accessories

Accessories	Article No.	Description
SIDOOR rubber-metal anti-vibration mount	6FB1104-0AT01-0AD0	• Rubber-metal anti-vibration mount for quiet operation of the door drive system • Recommended for mounting SIDOOR M4 R / L, MDG4 R / L, M5 R / L and MDG5 R / L geared motors
	6FB1104-0AT02-0AD0	• Rubber-metal anti-vibration mount for quiet operation of the door drive system • Recommended for mounting SIDOOR M3 R / L and MDG3 R / L geared motors
SIDOOR MDG-PULLEY 10-S8M-56	6FB1104-0AT10-0AS1	Belt pulley MDG PULLEY for DC geared motor MDG3 and toothed belt S8M, pitch diameter 56 mm
SIDOOR MDG PULLEY 14-S8M-56	6FB1104-0AT14-0AS1	Belt pulley MDG PULLEY for DC geared motor MDG4, MDG5 and toothed belt S8M, pitch diameter 56 mm
SIDOOR mounting bracket	6FB1104-0AT01-0AS0	Mounting bracket for mounting the SIDOOR rubber-metal anti-vibration mount on which, in turn, a SIDOOR geared motor is mounted
	6FB1104-0AT02-0AS0	• Mounting bracket with tensioning device for deflector pulley • For mounting the SIDOOR deflector unit and for tensioning the SIDOOR toothed belt
SIDOOR deflector pulley	6FB1104-0AT04-0AS2	Deflector pulley for deflecting the SIDOOR toothed belt (1 unit)
SIDOOR deflector unit	6FB1104-0AT03-0AS0	• Deflector unit with deflector pulley • For deflecting the SIDOOR toothed belt in the same height and depth, aligned with motor drive pinion
SIDOOR door clutch holder	6FB1104-0AT01-0CP0	• Door clutch holder for 12 mm-wide toothed belt • For attaching both ends of the toothed belt, and for connecting the respective door panel to the toothed belt
	6FB1104-0AT02-0CP0	• Door clutch holder for 14 mm wide toothed belt • For attaching both ends of the toothed belt, and for connecting the respective door panel to the toothed belt

Accessories	Article No.	Description
SIDOOR toothed belt	6FB1104-0AT01-0AB0	• Single-toothed STS • Super Torque toothed belt • Length 4 m, width 12 mm.
	6FB1104-0AT02-0AB0	• Single-toothed STS • Super Torque toothed belt • Length 45 m, width 12 mm.
	6FB1104-0AT03-0AB0	• Single-toothed STS • Super Torque toothed belt • Length 4 m, width 14 mm.
	6FB1104-0AT04-0AB0	• Single-toothed STS • Super Torque toothed belt • Length 55 m, width 14 mm.
SIDOOR MDG2 CABLE 5m	6FB1104-0AT05-0CB2	• Cable for connecting the SIDOOR MDG3, MDG4 and MDG5 geared motors and the SIDOOR ATD4xxW controllers • Cable length 5 m
SIDOOR MDG2 CABLE 10m	6FB1104-0AT10-0CB2	• Cable for connecting the SIDOOR MDG3, MDG4 and MDG5 geared motors and the SIDOOR ATD4xxW controllers • Cable length 10 m
SIDOOR MDG2 CABLE 15 m	6FB1104-0AT15-0CB2	• Cable for connecting the SIDOOR MDG3, MDG4 and MDG5 geared motors and the SIDOOR ATD4xxW controllers • Cable length 15 m
SIDOOR MDG2 CABLE 20 m	6FB1104-0AT20-0CB2	• Cable for connecting the SIDOOR MDG3, MDG4 and MDG5 geared motors and the SIDOOR ATD4xxW controllers • Cable length 20 m
PROFIBUS FC bus connector RS 485	6GK1500-0FC10	Bus connector with axial cable outlet (180°, 20m) for connecting SIDOOR ATD410W and SIDOOR ATD420W controllers to the USS / PROFIBUS bus cable
PROFIBUS FC Standard Cable GP	6XV1830-0EH10	PROFIBUS cable for connecting SIDOOR ATD410W and SIDOOR ATD420W controllers to the higher-level SIMATIC controller
IE FC RJ45 plug 180 4X2	6GK1901-1BB11-2AB0	Plug connector with axial cable outlet (180°) for connecting the SIDOOR ATD430W controller to the PROFINET bus cable
IE FC TP Standard Cable GP	6XV1878-2A	Cable for connecting the SIDOOR ATD430W controller to the higher-level SIMATIC controller
DIN rail holder	6FB1144-0AT00-3AS0	DIN rail holder with fixing screws for SIDOOR ATD4xxW controllers

You will find more accessories in the Industry Mall (http://www.siemens.com/siplus/mall)

2.3.5 Optional additional units

Additional units meet a range of customer requirements in order to ensure the universal implementation and maintenance of the system.

The additional units are easy to connect to a deenergized controller via the interfaces provided – and are available for use as soon as the power supply is connected.

Additional units

The SIDOOR SERVICE TOOL is available as additional tool for door control systems in industrial applications.

Additional unit	Article No.	Description
SIDOOR SERVICE TOOL	6FB1105-0AT01-6ST0	The SIDOOR SERVICE TOOL can be used to enter door commands, to change the drive parameters and to read the taught parameters, the door states, the input and output signals of the service data and the current firmware version.

2.3.6 Software

The optional SIDOOR SOFTWARE KIT facilitates user-friendly operation and detailed diagnostics via a PC.

Selection

Software	Article No.	Description
SIDOOR SOFTWARE KIT	6FB1105-0AT01-6SW0	The package includes the following components: • Installation CD (Software Kit) – SIDOOR USER SOFTWARE – SIDOOR MANAGER – Siemens HCS12 Firmware Loader – SIDOOR USB to UART Bridge Driver – License provisions – SIDOOR SOFTWARE KIT operating instructions • 1 x USB adapter • 1 x USB connecting cable • 1x D-SUB connecting cable (9-pin, plug/socket) • 1x D-SUB connecting cable (9-pin, socket/socket)

All the contents of the installation CD from the SIDOOR SOFTWARE KIT are also available as installation package (https://support.industry.siemens.com/cs/ww/en/view/109481599)in the Industry Online Support.

You can find additional information about the SIDOOR SOFTWARE KIT in the SIDOOR SOFTWARE KIT operating instructions (https://support.automation.siemens.com/WW/view/en/92711247).

SIDOOR functions 3

Overview

This section describes all the functions of the SIDOOR controllers.

The functions are divided into:

- **Basic functions:** Functions that you always require to use a SIDOOR door controller.
- **System functions:** Functions that enable you to better monitoring and diagnose the system.
- **Extended functions:** Functions that you can use to implement application-specific requirements.
- **Safety functions:** Functions that serve to extend the system with optional safety equipment and for using the inputs according to performance level d (PL d).

Functions

Table 3- 1 Available SIDOOR functions

Functions	SIDOOR	
	ATD401W	ATD410W/ ATD420W/ ATD430W
Basic functions		
Learn run (Page 28)	✓	✓
Force limit for learn run (Page 35)	✓ (as of V1.05)	✓ (as of V1.05)
Output transmission (Page 36)	✓ (as of V1.05)	✓ (as of V1.05)
Drive orders (Page 37)	✓	✓
CLOSE DOOR (command given via digital inputs) (Page 43)	✓	✓ 4)
OPEN DOOR (command given via digital inputs) (Page 44)	✓	✓ 4)
Stop (Page 45)	✓	✓
Partial opening (Page 45)	✓	✓
Obstruction detection (Page 74)	✓	✓
Force and energy profiles (NDG mode) (Page 47)	✓	✓
Slow travel curve profile (Page 48)	—	✓
DCOPS (Door Closed / Opened Position Sensor) (Page 49)	✓ 1) 3)	✓ 2) 3)

Functions	SIDOOR	
	ATD401W	ATD410W/ ATD420W/ ATD430W
System functions		
Restart after power failure (Page 51)	✓	✓
Initial run/reference run (Power ON) (Page 52)	✓	✓
Overload protection (Page 52)	✓	✓
Vandalism protection/continuous door monitoring (Page 53)	✓	✓
Belt break monitoring (Page 54)	✓	✓
Friction compensation (Page 55)	✓	✓
Oscillation protection (Page 56)	✓	✓
Automatic energy limiting (Page 57)	✓	✓
External closing force (Page 61)	—	—
Synchronizing the door position (Page 61)	✓	✓
Cyclic process values via fieldbus (Page 62)	—	✓
Monitoring of encoder defects	✓	✓
Parameter checksum (as of V1.12) (Page 63)	✓	✓
Extended functions		
ImpulseDrive (Page 65)	—	✓
Automatic ImpulseDrive (Page 67)	—	✓
ImpulseStop (Page 68)	—	✓
Automatic ImpulseStop (Page 69)	—	✓
AssistedDrive (Page 70)	—	✓
Automatic AssistedDrive (Page 72)	—	✓
Positioning mode (Page 73)	—	✓
Free function blocks (Page 79)	—	✓
Basic parameter editor (Page 93)	✓ (as of V1.10)	✓ (as of V1.10)
Special range of motion can be configured (as of V1.12)	—	✓ (As of V1.12)
Cold-storage function (as of V1.12) (Page 92)	✓ (As of V1.12)	✓ (As of V1.12)
Masking of the fieldbus drive commands (as of V1.12) (Page 95)	—	✓ (As of V1.12)
Test run (as of V1.12) (Page 96)	✓ (As of V1.12)	✓ (As of V1.12)

Functions	SIDOOR	
	ATD401W	ATD410W/ ATD420W/ ATD430W
Safety functions		
Optional safety equipment		
Light barrier (Page 98)	—	✓[2)]
ESPE Type 2 (Page 100)	✓[3)]	✓[3)]
Pressure-sensitive edge (Page 102)	✓[3)]	✓[3)]
Deactivation of the service buttons during emergency stop (as of V1.12) (Page 103)	—	✓ (As of V1.12)
Safe input signals according to PLd		
Internal signal routing (Page 105)	✓	✓
Redundant antivalent signal logic with discrepancy analysis (Page 106)	—	✓
Frequency-based input signals (Page 107)	—	✓
Two-hand operation (Page 108)	—	✓
Emergency stop (Page 110)	✓	✓
Fail-safe digital control (Page 112)	—	✓

1) Light barrier and DCPS/DCOPS (ATD401W) cannot be implemented simultaneously.
2) Light barrier and DCOPS can be implemented simultaneously by connecting to a fieldbus system.
3) DCOPS, type 2 ESPE or pressure-sensitive edge cannot be implemented simultaneously.
4) Evaluated by PLC.

Drive function parameter assignment

The relevant parameters for the drive functions in ATD401W control units can be changed to a limited extent. The parameters are set via the integrated terminal module, the optional SIDOOR SERVICE TOOL accessory or the SIDOOR SOFTWARE.

The drive functions listed above can be assigned parameters, calibrated and configured on SIDOOR ATD410W, ATD420W and SIDOOR ATD430W controllers. This is mainly done using the higher-level controller (parameter channel). Refer to the corresponding function descriptions for details of the parameters associated with the drive functions listed. You can find additional information on parameters in the section Parameter assignment (ATD4xxW) (Page 190).

ATD401W

The input signal wiring can be switched between three fixed configurations (for more, see Digital input signals (Page 122)).

See also

Obstruction detection process (Page 75)

3.1 Basic functions

Introduction

You will also need the basic functions described below to use a SIDOOR door controller.

3.1.1 Learn run

Description of function

The following system properties are determined and stored with a learn run:

- Door width
- Effective door weight and counterweight
- Door friction
- Direction of rotation of the motor and pulse encoder

As of V1.10: As an alternative to the learn run, the basic parameters determined during the learn run can be configured using the basic parameters editor. This allows initial commissioning of the SIDOOR door controller without a learn run (see section "Basic parameters editor (Page 93)").

Note

For the motors M3, MDG3, M4, MDG4, M5 and MDG5, the output transmission (Page 36) must be checked prior to each learn run and adjusted if necessary.

Mass determination

⚠ WARNING
Door weight determined with the learn run
Depending on the mechanical coupling between the motor and door panel, the door weight determined during the learn run can differ from the actual door weight. For the M5 and MDG5 motors, the maximum possible weight is always preset after the learn run. The door weight determined during the learn run has to be checked and if necessary corrected using the basic parameters editor (from V1.10).

During the learn run, the weight to be moved (m_{eff}) (effective total weight) of all moving elements of the motor, the door mechanism and the door is determined.

The weight to be moved (m_{eff}) is calculated from the sum of the mass equivalent of the rotor inertia of the motor (m_{rot}), the moving door weight (m_{door}) and the moving weight of the door mechanism (m_{mech}):

$$m_{eff} = m_{door} + m_{rot} + m_{mech}$$

No general information can be provided here for the mass of the door (m_{door}) and the moving mass of the door mechanism (m_{mech}). These values are determined for the specific door system.

The mass equivalent of the rotor inertia of the motor (m_{rot}) depends on the motor type, the output ratio on the motor axis and the transmission efficiency.

The following tables list the mass equivalent of the rotor inertia for SIDOOR motors with a transmission efficiency of 85%.

For the SIDOOR M3, M4 and M5 motors, the mass equivalent of the rotor inertia of the motor is constant:

Motor	Mass equivalent (m_{rot})
M3	22 kg
M4	22 kg
M5	93 kg

For the SIDOOR MDG3, MDG4 and MDG5 motors, the mass equivalent of the rotor inertia depends on the transmission output ratio of the motor:

MDG3, MDG4	
Transmission ratio	**Mass equivalent (m_{rot})**
88 mm/rev	86 kg
90 mm/rev	82 kg
95 mm/rev	74 kg
100 mm/rev	67 kg
105 mm/rev	60 kg
110 mm/rev	55 kg
115 mm/rev	50 kg

MDG3, MDG4	
120 mm/rev	46 kg
125 mm/rev	43 kg
130 mm/rev	39 kg
140 mm/rev	34 kg
150 mm/rev	30 kg
160 mm/rev	26 kg
170 mm/rev	23 kg
180 mm/rev	21 kg
190 mm/rev	18 kg
200 mm/rev	17 kg
210 mm/rev	15 kg
220 mm/rev	14 kg
230 mm/rev	13 kg
240 mm/rev	12 kg
250 mm/rev	11 kg
260 mm/rev	10 kg
270 mm/rev	9 kg
280 mm/rev	8 kg
300 mm/rev	7 kg
330 mm/rev	6 kg
350 mm/rev	5 kg

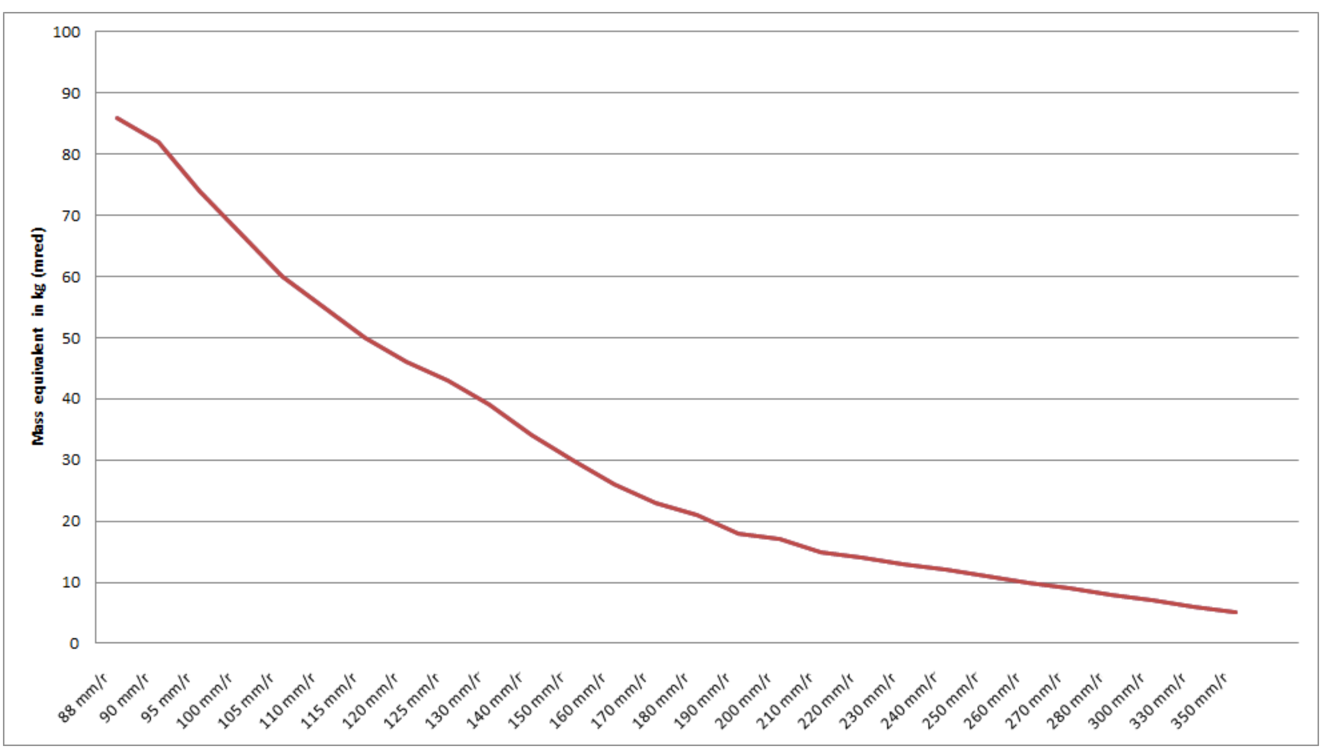


Figure 3-1 MDG3, MDG4

MDG5	
Transmission ratio	**Mass equivalent (mrot)**
88 mm/rev	367 kg
90 mm/rev	351 kg
95 mm/rev	315 kg
100 mm/rev	284 kg
105 mm/rev	258 kg
110 mm/rev	235 kg
115 mm/rev	215 kg
120 mm/rev	197 kg
125 mm/rev	182 kg
130 mm/rev	168 kg
135 mm/rev	156 kg
140 mm/rev	145 kg
144 mm/rev	135 kg
150 mm/rev	126 kg
155 mm/rev	118 kg
160 mm/rev	111 kg
165 mm/rev	104 kg
170 mm/rev	98 kg
175 mm/rev	93 kg
180 mm/rev	88 kg
185 mm/rev	83 kg
190 mm/rev	79 kg
195 mm/rev	75 kg
200 mm/rev	71 kg
205 mm/rev	68 kg
210 mm/rev	64 kg
220 mm/rev	59 kg
230 mm/rev	51 kg
240 mm/rev	49 kg
250 mm/rev	45 kg
260 mm/rev	42 kg
270 mm/rev	39 kg
280 mm/rev	36 kg
290 mm/rev	34 kg
300 mm/rev	32 kg
310 mm/rev	30 kg
320 mm/rev	28 kg
330 mm/rev	26 kg
340 mm/rev	25 kg
350 mm/rev	23 kg

MDG5	
360 mm/rev	22 kg
370 mm/rev	21 kg
380 mm/rev	20 kg
388 mm/rev	19 kg

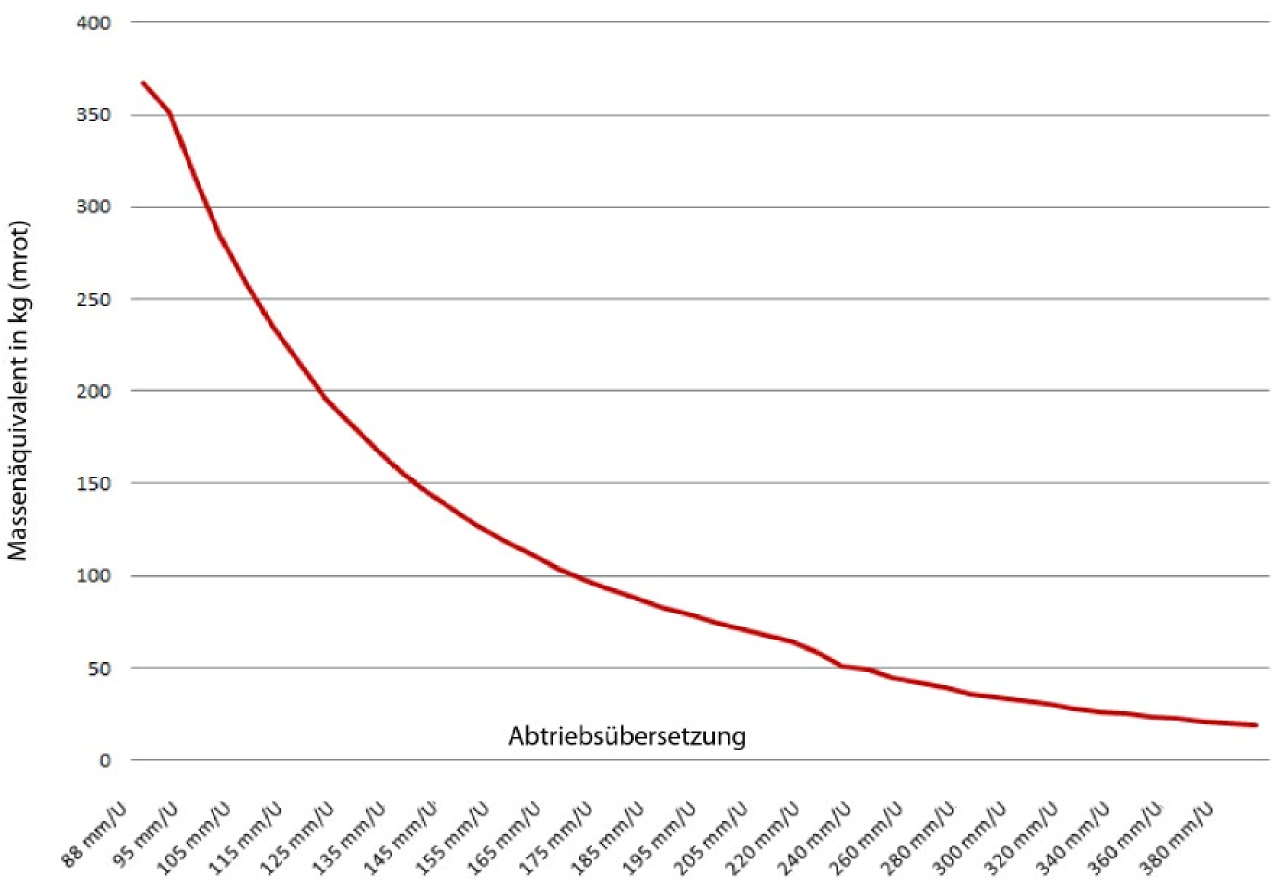


Figure 3-2 MDG5

Types of learn run (via learn run button)

Two types of learn run can be made if the learn run button is pressed as follows:

- **When the line voltage is applied**

  If the learn run button is operated directly when the line voltage is applied, the connected motor type is learned. All travel curve parameters and force and energy limiting parameters are automatically reset to their factory defaults before the learn run begins. The learn run determines the door width, weight and friction. In addition, the speed and the maximum closing and opening speeds are limited depending on the determined mass and parameterized energy limitation. Friction compensation is also coordinated with the determined door parameters.

  Application examples: initial commissioning or when commissioning a new motor type

- **During operation**

  If the learn run button is actuated during ongoing operation, a learn run is started to determine the door's width, weight and friction. In addition, the speed and the maximum closing and opening speeds are limited depending on the determined mass and parameterized energy limitation. Friction compensation is also coordinated with the determined door parameters. The travel curve parameters and force and energy limiting parameters are retained.

  Application examples: modifying the properties of the door system (door width or friction)

Learning new motors

The learned motor type is stored in the controller and compared with the connected motor when the controller is switched on. The controller's operating status display shows the status code "5" if the learned motor type differs from the connected one. A new learn run (when the line voltage is applied) or a special learn run is needed to learn in the new motor type.

The SIDOOR ATD4xxW controller enables learning of a new motor type by means of a special learn run, which can be started as follows:

- DCMD "Start learn run" (see DCMD signal (Page 319)) and DCMD extension bit "special" (see DCMD extension bits (Page 319))
- In the service terminal via *MAIN MENU > General setup > Start learn run with new motor*

Note

If a learn run is started with a new motor and if the learned motor type differs from the connected one, for safety reasons the energy limiting parameters (p1202, p1203 and p1204) and internal friction compensation are reset for all travel curve parameters.

The output transmission [mm/rev] must be configured for the M3, MDG3, M4, MDG4, M5 and MDG5 motors. For MDG3, MDG4 and MDG5, the circumference of the wheel must be adjusted depending on the output belt pulley that is used. For the M3, M4 and M5 motors, set the default value to 176 mm/rev.

The learn run does not start when a value is set outside the permitted value range for the output transmission (for example, default value: 0).

Starting a learn run via the learn run button

You can start a learn run by pressing the learn run button (S401). Proceed as described in the section Operation using service buttons (Page 177).

Interrupting the learn run

Users can interrupt the learn run. The system signals an interrupted learn run through the door fault status and by changing to a special mode. The operating status display shows the warning "_". For more, see also the Operating state display (Page 304) heading in the Diagnostics (Page 304) section.

The following actions interrupt an active learn run:

- Repeated operation of the learn run button (S401)
- Operating the OPEN or CLOSE service buttons (S402 or S403)
- Door command change (except "deenergized") via the terminal, the service interface or the fieldbus system
- Interruption of the ESPE or the pressure-sensitive edge

Querying determined values

The values determined during the learn run (basic parameters) can be queried via the terminal module.

The SIDOOR ATD410W, ATD420W and ATD430W control units also enable the parameters to be queried via the PROFIdrive interface.

Table 3- 2 Values (basic parameters) determined with the learn run

Parameter ID	Description
p2101	Mass to be moved
p2103	Door width
p2104	Friction in the opening direction (as of V1.10)
p2105	Friction in the closing direction (as of V1.10)
p2107	Average current for the friction in the opening direction (as of V1.10)
p2108	Average current for the friction in the closing direction (as of V1.10)
p2109	Direction of rotation of the motor (as of V1.10)
p2110	Direction of rotation of the pulse encoder (as of V1.10)

3.1.2 Force limit for learn run

Description of function

Maximum force that is active during the learn run. The force limit is active in the closing and opening direction.

The parameter depends on the existing output transmission and the maximum permissible output force of the motor gearbox. In the basic setting, the force limit is set to the maximum value for the default output transmission of 176 mm/rev.

Note

The force only needs to adjusted for easily-moved door systems and door systems with soft end stops. A smooth-running door system has a mass to be moved <100 kg and maximum frictional forces of <20N.

Connection and parameter assignment

The force limit can be configured via the terminal module (*Main menu > General setup > Special parameters > Force limit for learn run*).

SIDOOR ATD410W / ATD420W / ATD430W

The force limit is set via the parameter p1242. See section Calibration and function parameters (Page 196) for more on this.

3.1.3 Output transmission

Description of function

The output transmission must be configured for the M3, MDG3, M4, MDG4, M5 and MDG5 motors. The output transmission describes the transformation of rotational into translational motion. Therefore: The distance [mm] that the door travels with one revolution [rev] of the transmission output shaft. The output transmission can be adjusted within the range 0...384 mm/rev. The permitted values are between 88...384 mm/rev. The default value for a newly trained motor type is 0 mm/rev.

MDG3 Mass to be moved	MDG4 Mass to be moved	MDG5 Mass to be moved	Output transmission [mm/rev] < 200	Output transmission [mm/rev] < 250	Output transmission [mm/rev] < 300	Output transmission [mm/rev] < 384
< 50 kg	< 100 kg	< 150 kg	X	X	X	X
< 100 kg	< 200 kg	< 350 kg	X	X	X	n.r.
< 150 kg	< 300 kg	< 500 kg	X	X	n.r.	n.r.
< 180 kg	< 400 kg	< 700 kg	X	n.r.	n.r.	n.r.

n.r. = not recommended

Note

For the M3, M4 and M5 motors, set the default value to 176 mm/rev.

Note

The output transmission should be checked before each learn run and adjusted if necessary.

Note

The determined door width has to be checked after each learn run.

Note

Activation of the learn run via the bus interface (as of V1.09)

The learn run can only be started when a permissible output transmission (parameter p4602) has been configured. The value for the door width should then be read back via the parameter r2103 and checked.

Connection and parameter assignment

The drive transmission can be configured via the terminal module (*Main menu > General setup > Special parameters > Output transmission*).

SIDOOR ATD410W / ATD420W / ATD430W

The output transmission is set via the parameter p4602. See section Calibration and function parameters (Page 196) for more on this.

3.1.4 Drive orders

The drive is controlled by means of drive orders. A drive order is composed of the following:

Drive order = door command + door command expansion bit

Combinations

The following table shows the combination of the door command and the door command expansion bit that lead to modification of the applicable door command. In the case of combinations/fields that are not marked, only the door command is effective. In the case of some drive orders, the dependence of the normal, initial or learn run modes must also be considered.

Table 3- 3 Combining door command and door command expansion bit

Door command expansion bit	**Door command**								
	Deenergize (not a door command)	Stop	Open	Close	Automatic AssistedDrive **(Page 72)**	Automatic ImpulseDrive **(Page 67)**	Positioning **(Page 73)**	Learn run **(Page 28)**	Stop with disable DCU
Slow (Page 48)			x	x	x	x	x		
ImpulseStop (Page 68)						Automatic ImpulseStop (Page 69)			
NDG (Page 47)			x	x	x	x	x		
Special		Corresponds to Deenergize (source voltage brake inactive)						Learn run with a new motor (Page 28)	Corresponds to Deenergize (EMF brake inactive)

Door command expansion bit	Door command							
	Deenergize (not a door command)	Stop	Open	Close	Automatic AssistedDrive **(Page 72)**	Automatic ImpulseDrive **(Page 67)**	Positioning **(Page 73)**	Learn run **(Page 28)**	Stop with disable DCU
Partial opening (Page 45)			x	x	x	x			
DCOPS (Page 49)			x	x		x			
LB sensor (Page 98)	x	x	x	x	x	x	x	x	

Not a door command (Deenergize)

The system evaluates the Deenergized (no current) door command as "inactive" or "not a door command".

"Special stop" drive order

The door command with the highest priority is Stop. The status following the ramp stop can be defined by means of the "special" door command expansion bit: EMF brake activated or de-energized (corresponds to free running mode).

You can find more information on individual drive orders in the sections linked in the "Combining door commands and door command expansion bits" table above.

Stop with disable DCU

The door command is a separate command without DCMD extension or no combination with DCMD extension bits. It has the value 8 in the "DCMD signals" table. Causes a stop and the door commands via the other source, such as service buttons, are disabled.

Shutdown/deceleration functions

In an unlimited system, the shutdown and deceleration functions are split into the following: "rapid stop", "ramp stop" and "coasting down". These definitions **do not** apply in a door system because these are to be considered as limited systems.

Table 3- 4 Shutdown/deceleration functions in an unlimited system

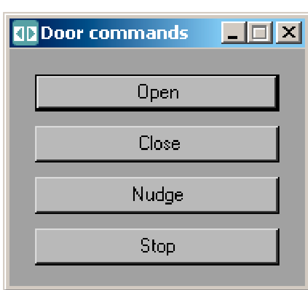
Function	Description
Rapid stop	Decelerates the drive to standstill with the maximum braking ramp (taking into account technical and safety-related limit areas).
Ramp stop	Same meaning as rapid stop, but a configured ramp is used to decelerate the drive to standstill.
Coasting down	The drive is not actively braked, it can run freely and is only slowed by the friction inherent in the system (e.g. gearing).

In SIDOOR systems, coasting down is equivalent to the Deenergize (no current) door command. For safety reasons, however, direct coasting down must not take place due to the limits implemented in a door system (safety reasons). This is why the following definitions apply to the SIDOOR door drive:

Table 3- 5 SIDOOR door drive shutdown/deceleration functions (limited system)

<table>
<tr><th>Function</th><th>Description</th></tr>
<tr><td>Not a door command/Deenergize</td><td rowspan="2">Decelerates the drive with a configured ramp (p3674 "DecRampOp" or p3677 "DecRampCls") down to a standstill and subsequently goes into free running mode.</td></tr>
<tr><td>Special stop</td></tr>
<tr><td>Stop</td><td>Decelerates the drive with a configured ramp (p3674 "DecRampOp" or p3677 "DecRampCls") down to a standstill and subsequently goes into virtual short-circuit mode (50% PWM → EMF brake active).</td></tr>
<tr><td>Reverse</td><td>Direction of travel reversal by local sensor (e.g. light curtain and pressure-sensitive edge) or "Open → Close" or "Close → Open" drive order change.
Decelerates the drive to standstill with a configured ramp (p3675 "RevRampOpToCls" or p3678 "RevRampClsToOp"). The further behavior depends on the current system state and the parameterized reversing behavior.</td></tr>
</table>

Sources of drive orders

<table>
<tr><th>Drive order source</th><th colspan="2">Description</th></tr>
<tr><td rowspan="2">Service button</td><td colspan="2">Activating a service button results an immediate switchover to the local mode (see Local/master operation (Page 161)). The Deenergize drive order is active where no button is pressed. If the "Stop with disable DCU" command is active, the controller cannot be operated via the service buttons.</td></tr>
<tr><td>
</td><td>S401 (learn run)
If S401 is pressed for approx. 5 s in the Power ON state, the special learn run (learn run with new motor) drive order is activated. You can find additional information in Learn run (Page 28).
The button can be released once the learn run has started. The learn run can be canceled at any time (see Learn run (Page 28)).
S402
The Open drive order is active as long as the button is pressed.
S403
The Close drive order is active as long as the button is pressed.</td></tr>
<tr><td rowspan="2">Software Kit (PC) and Service Tool or local terminal</td><td colspan="2">Service Tool or local terminal
Some menu areas of the terminal are categorized as being safety-related. Follow the instructions in Chapter Local/master operation (Page 161). The Stop drive order is activated within this area.
In addition, the Open, Close, NDG close, learn run, and learn run with new motor drive orders can be activated via the terminal (Main menu > General setup or Quick setup). If the "Stop with disable DCU" command is active, the controller cannot be operated via the service buttons.
Software Kit (PC)</td></tr>
<tr><td>
</td><td>Drive orders can be simulated via the "Drive orders" window. The following applies to the ATD4xxW:
Open → "Open" drive order
Close → "Close" drive order
Nudge → "NDG close" drive order
Stop → "Stop" drive order</td></tr>
<tr><td>Process data
(USS, PROFIBUS, PROFINET)
FBLOCK system
(digital INPUT1, 2, 3, 4 and X5)</td><td colspan="2">Process data
Drive orders can be sent via the process image. To this end, the DCMD (door command) and DCMD expansion bit (door command expansion bit) signals are defined in TSW1 – Technology control word 1. Drive orders are part of control words and are valid only when the drive is in the "S4: Z_BETRIEB" (see Figure 4-4 Sequential control state graph (Page 163)).
FBLOCK system
The digital inputs of the SIDOOR controller can be combined with drive orders via the parameterizable FBLOCK logic (see Free function blocks (FBLOCK) (Page 79)).
The default command mode is defined by the p100 parameter. See description of parameter p100, section Parameter assignment (Page 190).</td></tr>
</table>

Prioritization of door command sources

Door commands can be issued via different sources. A higher-priority drive order overwrites a lower-priority drive order. The service interfaces generally have the highest priority because they are intended for commissioning and service purposes.

Table 3- 6 Prioritization of door command sources

Priority		Door command source	Remarks
High	1.	Service buttons S401, S402 and S403	Local command at the controller. If the "Stop with disable DCU" command is active, the controller cannot be operated via the service buttons.
	2.	Software Kit (PC) and Service Tool or local terminal	Command local via service terminal or PC tool. If the "Stop with disable DCU" command is active, the controller cannot be operated via the software kit (PC) and Service Tool.
	3.	Process data (USS, PROFIBUS, PROFINET) FBLOCK system (digital INPUT1, 2, 3, 4 and X6)	Drive orders are mutually prioritized
Low	4.	FBLOCK system (edge-controlled drive orders "latched")	Only for edge-controlled digital input signals of the FBLOCK system (latched drive orders)

Note

If the "Stop with disable DCU" command is active, command input via the service buttons, the terminal module and the Software Kit (PC) is disabled.

Mutual prioritization of door commands

When a command is issued via the process image, there can be no mutual prioritization of door commands because the corresponding DCMD signal is based on an enumerative structure and therefore only ever one door command can be active. Prioritization is applied in the case of interconnections within the FBLOCK system or the service buttons, for example.

Table 3- 7 Prioritization of the door commands

Priority		Door command	Remarks
High	1.	Stop	After the ramp down, the EMF brake is deactivated with the extension "special" (as of V1.12: Stop with disable DCU). If the "Stop with disable DCU" command is active, the controller cannot be operated via the service buttons. → Free running mode / deenergized with highest priority
	2.	Open	
	3.	Close	
	4.	Automatic AssistedDrive, Automatic ImpulseDrive, Positioning	Same priority (internal processing sequence determines the drive order)
	5.	Learn run	Learn run can be interrupted
Low	6.	Deenergize	Neutral door command corresponds to the idle state, equivalent to inactive → Free running mode / deenergized with highest priority via "Special stop" drive order

3.1.5 DOOR CLOSE (command given via digital inputs)

Description of function

The DOOR CLOSE command closes the door according to the set driving curve as long as the command is present. The door reaches the CLOSED position at slow end speed close.

The CLOSE DOOR command must remain present continuously in order to close the door. After the door has closed, it is held in this position by the torque that can be adjusted by the parameter "Continuous torque CLOSE" as long as the command remains present.

Note

If the commands CLOSE DOOR and OPEN DOOR are present simultaneously, the door always moves in the OPEN direction.

SIDOOR ATD410W/ATD420W/ATD430W

See also section Free function blocks (FBLOCK) (Page 79).

Note

As an alternative, the signal can also be evaluated via the PLC (process image).

Connection

SIDOOR ATD401W:

The "CLOSE DOOR" function is connected to "Input 3" (X6). See also section Digital input signals (Page 122).

For the door commands to be given via the digital inputs, "Main menu → General setup → Special parameters → FBLOCK configuration → Standard input" must be selected in the operating menu.

Signals

Signal	Meaning
1 (voltage applied)	The CLOSE DOOR command is pending
0 (voltage not applied)	The CLOSE DOOR command is not pending

3.1.6 DOOR OPEN (command given via digital inputs)

Description of function

The OPEN DOOR command opens the door according to the configured travel curve as long as the command is present. The door reaches the OPEN position at slow start speed. Then, if the OPEN DOOR command is present, the door is held open by the torque that can be adjusted by the parameter "Continuous torque open".

The OPEN DOOR command has priority over all other control commands.

Note

If the commands CLOSE DOOR and OPEN DOOR are present simultaneously, the door always moves in the OPEN direction.

SIDOOR ATD410W/ATD420W/ATD430W

See also section Free function blocks (FBLOCK) (Page 79).

Note

As an alternative, the signal can also be evaluated via the PLC (process image).

Connection

SIDOOR ATD401W:

The "DOOR OPEN" function is connected to "Input 4" (X6). See also section Digital input signals (Page 122).

For the door commands to be given via the digital inputs, "Main menu → General setup → Special parameters → FBLOCK configuration → Standard input" must be selected in the operating menu.

Signals

Signal	Meaning
1 (voltage applied)	The OPEN DOOR command is pending
0 (voltage not applied)	The OPEN DOOR command is not pending

3.1.7 Stopping

Function description

See Table 3-5 SIDOOR door drive shutdown/deceleration functions (limited system) (Page 39).

3.1.8 Partial opening

Description of function

A second open position can be implemented using the "partial opening" drive function. A "partial opening" describes an opening movement with a set curve profile up to the partial opening position.

When partial opening is active, the learned or real door width is replaced with the parameterized partial opening width. All drive functions are supported in partial opening mode (e.g. curve profile, force and energy limiting, obstruction detection, etc.). Activating positioning mode overwrites partial opening mode.

If the drive is in the area between the first and second open positions when partial opening mode is activated, this is detected as an invalid area. In this area, the controller reduces the drive's speed automatically. The normal curve profile becomes active again as soon as the drive has moved out of the invalid area or has exited partial opening mode. The scenario described is not to be evaluated as a fault or an invalid situation.

The continuous torque in the opening direction is not applied at the virtual end stop of the second open position. The drive is stopped as long as the open command is present (winding short-circuited "source voltage brake").

Requirements for partial opening mode

The drive can only switch to partial opening mode if the corresponding drive order with expansion bit is active and the following conditions are met:

- The controller is in normal mode
- The drive is at a stop

Partial opening mode can only be terminated actively (reset of the DCMD expansion bit "partial") at standstill, but is terminated automatically if the controller switches to initial or learn run mode.

Connection and parameter assignment

The partial opening width can be configured via the driving parameters or the terminal module (*Main menu > General setup > Special parameters > Partly open width*).

SIDOOR ATD401W

The "Partial opening" function is connected to "Input 2" of terminal X6. See also Section Digital input signals (Page 122).

SIDOOR ATD410W/ATD420W/ATD430W

The partial open width is defined via the parameter p1206. See Section Calibration and function parameters (Page 196).

3.1.9 Obstruction detection CLOSE

Description of function

See the section Obstruction detection (Page 74).

3.1.10 Obstruction detection OPEN

Description of function

See the section Obstruction detection (Page 74).

3.1.11 Force and energy profiles (NDG mode)

SIDOOR ATD4xxW controllers support two individually parameterizable force and energy profiles.

Parameter assignment

You can configure the following parameters equally via the parameter interface, the service tool and the terminal.

Table 3- 8 Force and energy profile parameter overview

Normal operation	NDG operation
Force limiting	
p3682 "LimForceOp"	p3685 "LimForceNdg"
p3683 "LimForceCls"	
p3684 "LimForceEndCls"	
Energy limiting	
p1202 "KinEnergyLimCls"	p1204 "KinEnergyLimNdg"
p1203 "KinEnergyLimOp"	
Speed limiting (influenced by energy limiting)	
p3668 "MaxSpdCls"	p3672 "NdgSpd"
p3664 "MaxSpdOp"	

Drive order for profile switching

To switch to NDG mode, the DCMD expansion bit "NDG" must be set (see Table A-17 DCMD expansion bits (Page 320)). In combination with an applicable DCMD drive order (see Table A-16 DCMD signal (Page 319)), the drive travels with the NDG force and energy profile.

Switching profiles

The drive switches over to the NDG force and energy profile when the corresponding drive order with expansion bit is active and the controller is in normal mode. If the NDG mode is activated or deactivated during travel, the system automatically stops with the configured braking ramp and continues moving with the applicable force and energy profile after having stopped.

Independent values, which are not influenced by the force and energy profiles described here, apply to force and energy limiting in the initial or learn run mode.

Drive response in NDG mode

In NDG mode, all drive functions are supported without restriction.

3.1.12 Slow driving curve profile

SIDOOR ATD4xxW controllers support a parameterizable, decelerated speed profile (slow profile), to which it is possible to switch over to flexibly.

Parameter assignment

You can configure the following parameters equally via the parameter interface, the service tool and the terminal.

Table 3- 9 Force and energy profile parameter overview

Normal profile	Slow profile
Energy limiting	p3667 "SlowIniSpdOp" p3671 "SlowIniSpdCls"
p1202 "KinEnergyLimCls"	
p1203 "KinEnergyLimOp"	
p1204 "KinEnergyLimNdg"	
Speed limiting *(influenced by energy limiting)*	
p3668 "MaxSpdCls"	
p3664 "MaxSpdOp"	
p3672 "NdgSpd"	

Drive order for profile switching

To switch to the slow profile, the DCMD expansion bit "slow" (see Table A-17 DCMD expansion bits (Page 320)) must be set. In combination with an applicable DCMD drive order (see Table A-16 DCMD signal (Page 319)), the drive switches to the slow profile.

Switching profiles

The drive switches over to the slow profile when the corresponding drive order with expansion bit is active and the controller is in normal mode. The slow profile can be activated or deactivated dynamically during travel. The system accelerates or brakes the drive automatically to the slow profile's speed according to the configured ramps.

Independent values, which are not influenced by the speed parameters described here, apply to the speed in the initial or learn run mode.

Drive response

When the slow profile is active, all drive functions are supported without restriction.

3.1.13 DCOPS (door closed/opened position sensor)

Description of function

"DCOPS" stands for door closed/opened position sensor. A door closed/opened position sensor can consist of two end position sensors (closed/open).

The DCOPS enables the door to travel immediately after the line voltage is switched on without an initialization run in normal operation.

When the DCOPS signal is active in initial mode, the controller switches directly to normal mode with a corresponding "Open" or "Close" drive order when an obstruction (end stop) is detected. To prevent the erroneous detection of a blocking obstruction as an end stop, the DCOPS signal must not be activated until 1 to 2 cm before the respective end stop.

Example sequence when using DCOPS

1. Power ON
2. Controller is in the initial mode. No fault present. The system is in any position along the travel path.
3. An "Open" or "Close" door command is present.
4. The system opens or closes.
5. The DCOPS signal is activated as from 2 cm before the respective end stop.
6. The system reaches the end stop and detects it as an "obstruction".
7. The system switches to the normal mode and assumes the applicable "open" or "closed" status.

Connection and parameter assignment

The DCOPS signal can be connected to SIDOOR ATD4xxW controllers via "Input 1" of the terminal X6. See also Section Digital input signals (Page 122).

The connected signal must be activated via the SIDOOR Service Tool (*Main menu > General setup > Special parameters > Input 1*).

Note

The type 2 ESPE, pressure-sensitive edge and DCOPS functions cannot be implemented simultaneously.

SIDOOR ATD410W/ATD420W/ATD430W

The DCOPS signal can be sent as shown in Figure 4-5 Sensor signals (Page 166), via the process image (see Table A-17 DCMD expansion bits (Page 320)) and/or via the local sensor input ("Input 1" via p4600 - see Table 4-33 Other parameters (Page 192)).

Note

- The status of the sequential control must be considered when using the DCOPS signal (process image). The process data is only valid in the "S4: Z_ operation" state (see Figure 4-4 Sequential control state graph (Page 163)).
- The light barrier and DCOPS functions can be implemented simultaneously by connecting to a fieldbus system (process image).
- The DCOPS, type 2 ESPE or pressure-sensitive edge functions cannot be implemented simultaneously as sensor functions at input 1.

You can find more detailed information on DCOPS in Section Overview (Page 166).

3.2 System functions

Introduction

The system functions described below enable better monitoring and diagnostics of the system.

3.2.1 Restart after power failure

Description of function

After a power failure, the controller has to redetermine the end positions of the door travel. To do this, the door travels at reduced speed (initial speed) until the controller has detected the OPEN and CLOSED end positions. The door then resumes traveling at normal speed.

The door travels at normal speed immediately if the DCPS is installed (see section DCOPS (door closed/opened position sensor) (Page 49)). In this case, the door must be in the CLOSED position for the restart.

SIDOOR ATD410W/ATD420W/ATD430W

After Power ON, the sequential control system is in the "S1: Switching On Inhibited" mode (see Figure 4-4 Sequential control state graph (Page 163)).

3.2.2 Initial run/reference run (Power ON)

Description of function

After Power ON, the controller is in initial mode. Initial mode is necessary because there is no absolute value encoder. After Power ON, the controller must therefore verify the end stops that have been previously learned (= reference run). As long as both end stops have not been verified by reaching them, the drive only moves with a decelerated travel profile (initial travel profile). Force limitation is active in accordance with the learned parameters (friction compensation is active). The tolerance with which the learned end stops are detected in initial mode is adjustable.

- **Speed** Initial speed of the drive is defined by the parameters p3667 "Slow initial speed open" or p3671 "Slow initial speed close".
- **Force limit** during the initial drive and in normal operation, "Static force limit open" is defined by the parameter p3682 and "Static force limit close" by the parameter p3683.
- **Door width tolerance** with which the learned end stops are detected in initial mode is adjustable via the parameter p1208.

With power On, the sequential control system is in the state "S1: Z_closing lockout" (applies only to ATD410W, ATD420W and ATD430W) (see Sequential control (Page 163)).

Using an end position sensor

You can skip initial mode by connecting a DCOPS end position sensor (Door Closed/Opened Position Sensor). Depending on the application, 1 end position sensor can be used in the open or closed position or 2 end position sensors can be used in both end positions. The responsibility for verification of the learned end positions is thus transferred to the user (see Section DCOPS (door closed/opened position sensor) (Page 49)).

3.2.3 Overload protection of the geared motor

Description of function

If the geared motor placed under a high load with frequent OPEN DOOR and CLOSE DOOR commands in quick succession, the hold-open time is automatically lengthened. The next closing movement is delayed even if a CLOSE DOOR command is present, the 7-segment display (H401)/digital display (H1) shows "4". This function prevents thermal overloading of the motor.

The fault "4" is generated if the drive is moved continuously in one direction for more than 65 s. This is intended to prevent thermal overloading of the motor. This can occur only with extremely high system friction, low door speeds and large door widths.

3.2.4 Vandalism protection/continuous door monitoring

Description of function

The vandalism protection/continuous door monitoring function offers protection against undesired external system motion. If the motor is deenergized, the motor speed is monitored by the controller.

If the maximum speed of 250 mm/s is exceeded, the controller actively decelerates the motor to 50 mm/s, and then switches the drive back to "deenergize".

As of V1.10: With the M5 and MDG5 motors, the maximum speed at which vandalism protection is applied is 200 mm/s.

SIDOOR ATD410W/ATD420W/ATD430W

If the maximum configurable speed (p1200) is exceeded, the controller actively decelerates the motor to 50 mm/s, and then switches the drive back to "deenergize".

Parameter assignment

SIDOOR ATD410W/ATD420W/ATD430W

The "Continuous door monitoring" function is pre-installed and activated, and can be deactivated if necessary with parameter p1200. This is done by setting the value of parameter p1200 to "0". See Table 4-35 Calibration and function parameters (Page 196).

3.2.5 Belt break monitoring

Description of function

The function detects a torn belt. The detection is active in normal mode and initial mode.

A torn belt is detected when the door movement exceeds the defined distance* (in the opening or closing direction).

* The distance is defined as follows:

Mode	Distance	
Initial operation	Learnt door width +	50 cm (p1201)
Normal operation	Learnt door width +	50 cm (p1201)

Parameter assignment

Belt break detection is suppressed if parameter p1201 is set to "0". In this case, there is no fault or fault reaction on the part of the controller.

The status code "t" signals a torn belt. The controller changes to the status "S6: Z_Störung" (see Figure 4-4 Sequential control state graph (Page 163)).

If the parameter set of the controller is invalid, the maximum possible door width of 5 m is used as the door width.

See Table 4-35 Calibration and function parameters (Page 196).

3.2.6 Friction compensation

Description of function

The friction force profile of the door system is recorded with the current measuring device of the controller. The measurement data for both the opening and closing directions is recorded during the learn run.

Recording of measurement data

The recording of measurement data **in the opening direction** is divided into two subranges because the door movement is not constant throughout the total range. The ranges are:

- Travel path ≤ 25 cm
  - The measurement data in this range are recorded in the second opening movement and after reaching the speed trigger level (learn run speed). As from this moment, the door movement is almost constant. The measurement data are recorded every 2 cm, the first measured value is recorded 2 cm after the trigger level position (transient distance).
- Travel path > "End of weight determination"
  - The measurement data in this range are recorded after the weight determination has finished and the speed trigger level has been reached (learn run speed). As from this moment, the door movement is almost constant. The measurement data are recorded every 2 cm, the first measured value is recorded 2 cm after the trigger level position (transient distance).

The measurement data are recorded **in the closing direction** throughout the entire closing movement within the learn run and after reaching the speed trigger level (learn run speed). As from this moment, the door movement is almost constant. The measurement data are recorded every 2 cm, the first measured value is recorded 2 cm after the trigger level position (transient distance). The measured values are recorded until the system reaches the "Cutter distance CLOSE" range (p3663).

Calculations

1. The values "MEAN FRICTION FORCE OPEN/CLOSE [A]" and "STANDARD DEVIATION OPEN/CLOSE [A]" in the "open" and "closed" positions are calculated on the basis of the measurement data.
2. The values calculated in step 1 are converted to a force [N] with the aid of the motor constants [N/A]
3. The force calculated in step 2 is added internally to the parameterized forces p3682, p3683, p3684, and p3685

   Note

   The friction force is not taken into account in the parameterized torques p3679, p3680 and p3681 (effective in the end stops) in order to avoid unnecessary heating of the motor.

Note

The corresponding internal force value, which is the result of the addition of the parameterized force value and the calculated friction force, is limited to the maximum value of the respective parameter.

3.2.7 Oscillation protection

The oscillation protection prevents permanent oscillation of the door at the end stop.

End position "open"

If the system is pressed out of the end position with the drive order "open" present, the system detects that the "open" position has been left, and attempts to return to the end stop with the set static opening force.

After reaching the end stop, the drive is energized with the set continuous torque.

The behavior described may be repeated five times (oscillation). After the fifth repetition, the drive is energized for 30 s with the set continuous torque without any response to further oscillations. After a protective period of 30 s, the system responds once again to corresponding oscillations.

End position "closed"

If the system is pressed out of the end position with the drive order "close" present, the system detects that the "closed" position has been left, and attempts to return to the end stop with the set static cutter force.

After reaching the end stop, the drive is energized with the set cutter press-on torque. After 2 s, the cutter press-on torque is limited to the set continuous torque.

The behavior described may be repeated five times (oscillation). After the fifth repetition, the drive is energized for 30 s with the set continuous torque without any response to further oscillations. After a protective period of 30 s, the system responds once again to corresponding oscillations.

3.2.8 Automatic energy limitation

Description of function

SIDOOR controllers have a system that automatically limits the kinetic energy in the closing direction.

> **⚠ WARNING**
>
> **Risk of injury due to moving mechanical parts**
>
> After the door drive has been commissioned in the complete system, arrange for the forces and energies to be checked by the service personnel, and adjusted if they exceed their limit values. Please observe the valid applicable standards and directives for the respective application, as well as the following guidelines:
>
> - The drive is suitable for use with power-operated isolating guards in accordance with EN ISO 14120:2015, section 5.2.5.2.
> - In the factory state, the force and energy limitation parameters in the opening/closing direction are 4 J and 75 N. Subject to a safety assessment of the overall system and with the reversing function activated (automatic reopening of guard) these parameters can be increased in accordance with the standard up to a maximum of 10 J and 150 N.
> - These force and energy parameters can be exceeded for specific applications if an additional protective device (e.g. ESPE type 2 or pressure-sensitive edge) is used.

SIDOOR ATD4xxW controllers include a system that automatically limits the kinetic energy in the opening and closing directions.

The values for the energy limit are determined via the parameter p1202 (in the closing direction) or p1203 (in the opening direction) and P1204 (NDG mode). After successfully completing the learn run, the speed values of the drive curve parameters p3668, p3664 and p3672 are determined according to the mass and configured energy limit are determined and overwritten.

As of V1.10: If a value greater than 0 is set for parameter p1202 (Energy limit close), p1203 (Energy limit open) and p1204 (Energy limit NDG), parameters p3664 (Max. speed open), p3668 (Max. speed close) and p372 (NDG speed) always set to the speed that is calculated from the configured energy limit and the configured mass:

$$v = \sqrt{\frac{2 \cdot E}{m}}$$

If the value 0 is set for the energy limit, the automatic energy limit is switched off and any speed within the parameter limits can be selected.

Force and energy profiles

See section Force and energy profiles (NDG mode) (Page 47).

Speed limit curve (in opening and closing direction)

The speed limit curve is the characteristic that determines the maximum permissible door speed (closing speed), v_{max}, as a function of the total door panel weight. According to machine protection guideline EN ISO 14120:2015, the maximum kinetic energy of the door in the closing direction must not exceed 10 joules.

W_{KIN} = 1/2 m • v² = 10 J.

Example from the following speed limit curve:

- Moved mass m = 180 kg => v_{max} = 0.33 m / s.

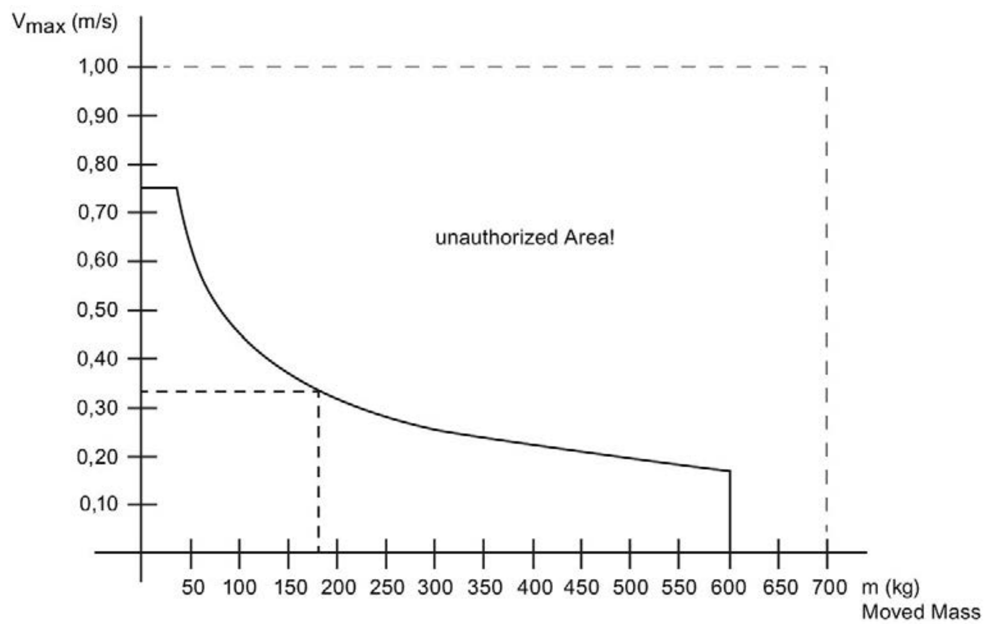


Figure 3-3 Speed limit curve for W_{KIN}=10Y

If the reversing device is switched off, the maximum kinetic energy must not exceed 4 joules.

W_{KIN} = 1/2 m • v² = 4 J.

Example from the following speed limit curve:

- Moved mass m = 180 kg => v_{max} = 0.21 m / s.

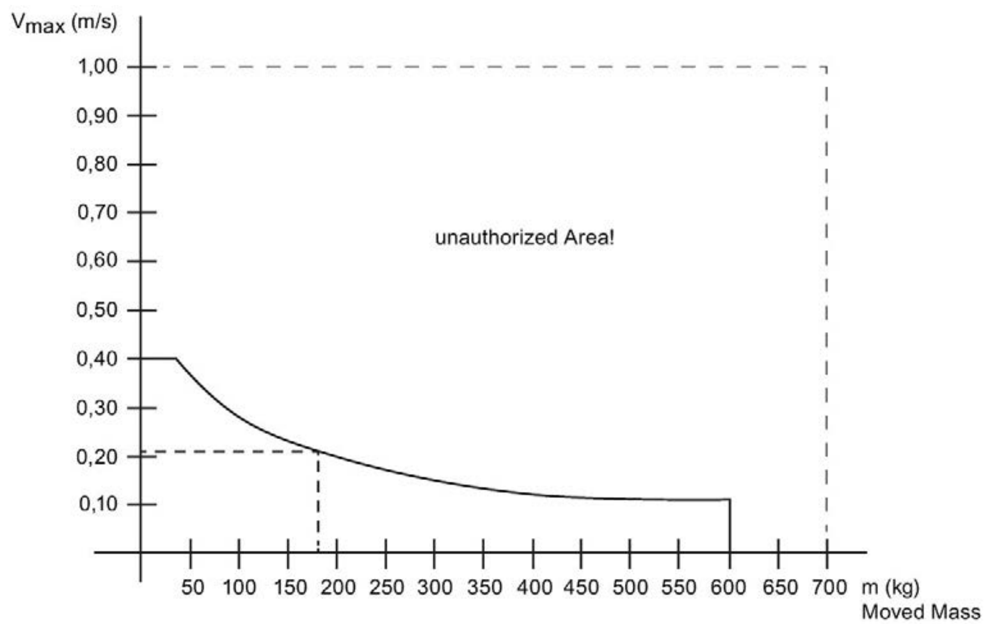


Figure 3-4 Speed limit curve for W_{KIN}=4J

Adjustment ranges

You can find the adjustment ranges in section Profiles and adjustment ranges (Page 331).

Maximum speeds

The following table shows the maximum speeds depending on moved weight and energy limit:

Table 3- 10 **Maximum speeds [mm/s] as a function of moving mass and energy limit**

Door weight	Energy [J]					
[kg]	4	10	25	50	75	100
50	400	632	1000	1414	1732	2000
100	283	447	707	1000	1225	1414
150	231	365	577	816	1000	1155
200	200	316	500	707	866	1000
250	179	283	447	632	775	894
300	163	258	408	577	707	816
350	151	239	378	535	655	756
400	141	224	354	500	612	707
450	133	211	333	471	577	667
500	126	200	316	447	548	632
550	121	191	302	426	522	603
600	115	183	289	408	500	577

Parameter assignment

The determination of the values for the energy limit is performed using the following parameters:

- In closing direction: p1202
- In opening direction: p1203
- NDG mode: p1204

Parameter assignment is possible via the travel curve parameters or the terminal module.

If one of the two energy limitation parameters is set to 0, the speed limitation is suppressed according to the kinetic energy.

3.2.9 External closing force

Description of function

> ⚠ **WARNING**
>
> **Risk of injury due to moving mechanical parts**
>
> Make sure that with an additional external closing force the sum of external closing force and force set in the controller does not exceed the maximum force limit of 150 N (according to EN ISO 14120:2015).
>
> Check the final application-specific limit values and adjust the limit values accordingly.

3.2.10 Synchronization of the door position

Description of the function

The determined door position is set to zero when an obstruction of the door in the range of 1 cm before the learned CLOSED position has been detected or the door moves beyond the learned CLOSED position.

As of V1.09: The determined door position is set to zero when the door has passed at least the trained door width plus 1 cm from the OPEN position in the CLOSE direction and detects an obstruction or the door moves beyond the trained CLOSED position.

3.2.11 Cyclic process values via fieldbus

As of firmware version V1.09, cyclic process values can be transferred via fieldbus USS, PROFIBUS or PROFINET to a higher-level controller using the technology status words TZW3, TZW4 and TZW5. The content of these technology status words can be configured with the parameters p4700, p4701 and p4702. The following process values are available:

- Digital inputs, D-IN
- Digital outputs, D-OUT
- Button
- Door position in mm
- Door setpoint speed in mm/s
- Door actual speed in mm/s
- Motor current in mA
- Motor current limitation in mA
- Voltage of the motor output stage in V
- Remaining power capacity of the braking resistor in J
- Currently displayed operating status (as of V1.12)

The default values of parameters p4700, p4701, p4702 correspond to the settings for TZW3, TZW4, TZW5 in firmware versions prior to V1.09.

To use the technology status words. see also Appendix TZW3, TZW4, TZW5 - Technology status words 3, 4, 5 (Page 329).

3.2.12 Parameter checksum (as of V1.12)

Description of the function

Firmware version V1.12 or higher:

To ensure that certain parameter ranges have not been changed, it is possible to read out a checksum:

- r200: Checksum for the default parameters
- r201: Checksum for the learn run/basic parameters (p2101 to p2111)

As soon as a parameter of the respective range changes, its checksum is immediately recalculated.

A retentive change counter (r202) is incremented by one every time a parameter from the default range is changed. After resetting the parameters to the factory setting with p91, the change counter is set to zero.

The respective parameters can also be read out via the service menu.

Parameter	Meaning	Included in default checksum (r200)	Included in learn run checksum (r201)	Change counter default parameter (r202)
p90	Write protection	No	No	+1
p91	Reset to factory settings	Yes	Yes	Set to "0"
p92	Reset FBLOCK parameter set to factory settings (command parameters)	No	No	0
p93	Load factory settings of the driving curve parameter set	No	No	+1
p95	Activation of a test run	No	No	0
p100	Default command mode	Yes	No	+1
r200 – r202	Checksums/change counters of the parameters (ReadOnly) (new)	No	No	0
p1200 – p1242	Calibration and function parameters	Yes	No	+1
p1250 – p1251	Calibration and function parameters for old calibration functions	Yes	No	+1
p2020 – p2023	USS communication channel parameters	No	No	0
p2040	USS monitoring time for master monitoring	Yes	No	+1
p2080 – p2081	DCMD fieldbus/ext.DCMD filter	Yes	No	+1
p2101 – p2111	Calibration and function parameters - basic parameters	No	Yes	0
p2200 – p2205	Parameters for position block	Yes	No	+1
p3660 – p3685	Driving parameters	Yes	No	+1
p3686 – p3689	Parameters for reduced door range of motion	Yes	No	+1
p3850 – p3885	Obstruction and reversing parameters	Yes	No	+1
p4600	Local sensor type	Yes	No	+1

Parameter	Meaning	Included in default checksum (r200)	Included in learn run checksum (r201)	Change counter default parameter (r202)
p4601	Discrepancy time in the function test of the OSSD system	Yes	No	+1
p4602	Output transmission	Yes	No	+1
p4610 – p4611	Discrepancy analysis times (AND0 and AND2)	Yes	No	+1
p4700 – p4702	USS value selection for cyclic transfer of process values	No	No	0
p20000 – p20030	FBLOCK DCMD	Yes	No	+1
p20057 – p20060	FBLOCK DCMD for old calibration functions	Yes	No	+1
p20100 – p20122	FBLOCK REF	Yes	No	+1
p20127 – p20130	FBLOCK REF for old calibration functions	Yes	No	+1

3.3 Extended functions

Introduction

You can use the advanced features described below to implement application-specific requirements.

3.3.1 ImpulseDrive

Description of function

The ImpulseDrive analysis process detects and evaluates external impulses applied to the door system (for example, slight force exerted on the door in the opening or closing direction).

In conjunction with the automatic ImpulseDrive system (see Section Automatic ImpulseDrive (Page 67)), a heavy door can be set in motion by applying a slight force to the door handle or door frame.

When the process detects an external impulse, corresponding status information (see Table A-30 IMPDRVIncr signal (Page 326) and Table A-31 IMPDRVVelo signal (Page 326)) is generated.

The ImpulseDrive detection properties can be individually parameterized to enable adaption to different door systems.

Parameter assignment

The detection algorithm consists of a distance and a speed component. The sensitivity levels of both components can be parameterized separately (p1221 and p1222). A parameterizable lead time (p1220) is added to the detection algorithm to prevent problems caused by the spring effects of sealing or rubber lips.

See Table 4-35 Calibration and function parameters (Page 196).

Note

Configuring ImpulseDrive detection directly affects the automatic ImpulseDrive, the automatic AssistedDrive and the automatic AssistedStop system.

Requirements for ImpulseDrive detection

- Parameters are matched to the target system
- Controller is not in learn run
- Drive command is "deenergize" ("DCMD := 0")
- No obstruction has been detected in the detected direction of motion

Distance-based ImpulseDrive analysis

The analysis is based on the increments of the motor encoder in relation to an internal reference value. This reference value is always specified when the door command is changed to "deenergize" within the "S4: Z_operation" system state (see Figure 4-4 Sequential control state graph (Page 163)) and the lead time (p1220) has expired.

The sensitivity level can be specified in parameter p1221. The higher it is, the higher the number of increments counted before the signal IMPDRVInc changes to high (active).

Speed-based ImpulseDrive analysis

The analysis is based on the increments of the motor encoder or the actual speed derived from it. The evaluation is only made in the "S4: Z_operation" system state (see Figure 4-4 Sequential control state graph (Page 163)) after the door command has been changed to "deenergize" and the lead time (p1220) has expired.

Both analyses use a sign to distinguish the directions.

3.3.2 Automatic ImpulseDrive

Function description

The automatic ImpulseDrive system generates a drive order based on ImpulseDrive detection.

If the ImpulseDrive analysis process detects an external impulse, the automatic ImpulseDrive system generates a drive order with a normal drive profile. Both ImpulseDrive detection output signals, IMPDRVVelo and IMPDRVIncr, are evaluated. If an enable command is present, the automatic system initiates opening or closing with a normal drive profile.

The automatic ImpulseDrive can only be used with an active enable. The enabling signal (DCMD := 7) is an element of the DCMD signal (see Table A-16 DCMD signal (Page 319)).

Note

The configuration of ImpulseDrive detection directly affects the automatic ImpulseDrive system.

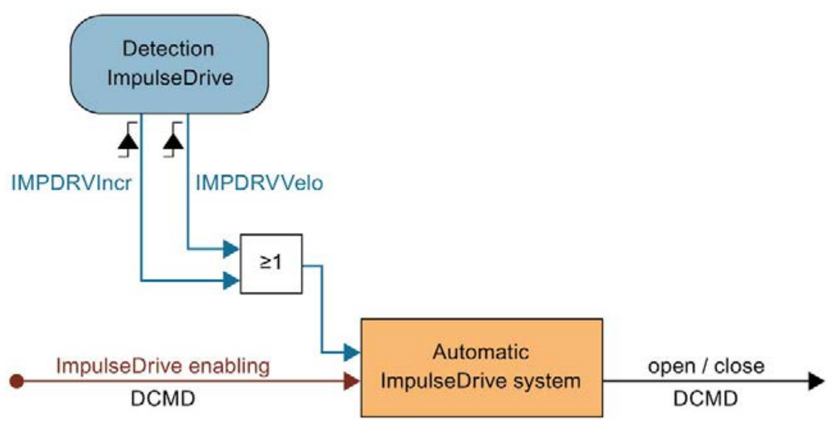


Figure 3-5 Automatic ImpulseDrive system

3.3.3 ImpulseStop

Function description

The ImpulseStop analysis process detects and analyzes external forces acting on the door system/drive system.

In conjunction with the automatic ImpulseStop system (see Section Automatic ImpulseStop (Page 69)), a door can be stopped with a light tug against the direction of travel.

The process signals when an external opposing force (force with an opposite direction vector to that of the door movement) acts on the door or the drive. It is signaled by the ASStp signal (see Table A-33 ASStp signal (Page 327)).

Parameter assignment

The detection properties of ImpulseStop can be individually parameterized, thus enabling the feature to be adapted to different door systems. The limit values for detecting an external opposing force can be specified for each drive direction with the following parameters:

- p1240 in the opening direction
- p1241 in the closing direction

The parameters define a proportion of the learned reference value for each direction. This proportion is added to the reference value, and thus forms the limit value for detecting ImpulseStop.

3.3.4 Automatic ImpulseStop

Function description

The automatic ImpulseStop system is an expansion of the automatic ImpulseDrive system. This means that all the properties, configurations and preconditions defined for it are also applicable here.

The system can be activated by the "ImpulseStop" expansion bit (see Table A-17 DCMD expansion bits (Page 320)) in conjunction with automatic ImpulseDrive enabling (see Table A-16 DCMD signal (Page 319)).

If the "ImpulseStop" expansion bit is active, the automatic ImpulseDrive system works in the slow drive profile. The drive orders "slow open" and "slow close" are generated instead of "open" and "close" respectively. The active drive order is canceled ("deenergized") as soon as the ImpulseStop analysis/detection signals a corresponding opposing force (the rising signal edge is decisive).

Note

Configuring ImpulseDrive analysis and detection directly affects the automatic ImpulseStop system.

Note

The automatic ImpulseStop is a dynamic function. It can be enabled and disabled during a door movement.

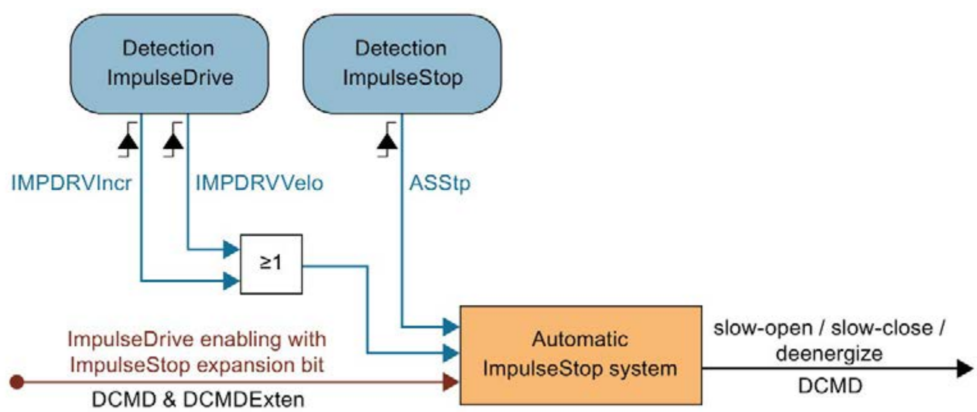


Figure 3-6 Automatic ImpulseStop system

3.3.5 AssistedDrive

Function description

AssistedDrive is an analysis process that detects and analyzes external forces acting on the door or drive system.

In conjunction with the automatic AssistedDrive system (see Section Automatic AssistedDrive (Page 72)), a door can be moved with motor assistance without the need for buttons or sensors.

AssistedDrive signals (see Table A-32 ASDRV signal (Page 327)) whenever an external assisting force (force with the same direction vector as that of the door movement) acts on the door or the drive.

Parameter assignment

The detection properties of AssistedDrive can be individually parameterized, thus enabling the feature to be adapted to different door systems. The thresholds for the detection of external opposing forces can be specified for each drive direction with the following parameters:

- p1231 in the opening direction
- p1232 in the closing direction

The "slow" speed profile is adjusted with both of the following driving parameters:

- p3666 in the opening direction
- p3669 in the closing direction

See Table 4-32 Driving parameters (Page 191).

Note

The configuration of AssistedDrive detection directly affects the automatic AssistedDrive system.

Prerequisites for AssistedDrive

AssistedDrive detection is only active during the following internal system states:

- **Initial mode** (closing, closed, opening and open)
- **Normal mode** (closing, partial closure, closed, opening, partial opening and open)
- **Slow drive profile** (DCMD – expansion bit "slow", see Table A-17 DCMD expansion bits (Page 320))

If the system switches into one of the three system states, the signal ASDrv is always set to active. The actual threshold analysis of the motor current starts after the parameterized switch-off delay (p1230) and as soon as the value of the square of the difference between the setpoint and actual speeds falls below 70 mm/s.

The result of the analysis is output by the signal state ASDrv. The falling signal edge therefore indicates that the assisting force has become too low. Assisted mode can be exited. This signal is independent of the drive direction.

Note

The falling edge of the ASDRV signal can only be reached when the difference between the setpoint and actual speeds falls below the defined value. Therefore a speed and/or force adjustment of the system may be required.

3.3.6 Automatic AssistedDrive

Function description

The automatic AssistedDrive system is composed of both the ImpulseDrive and AssistedDrive detection systems.

On the one hand, ImpulseDrive is used to generate a corresponding drive order with a normal drive profile. On the other hand, the drive order is canceled ("deenergized") with the aid of AssistedDrive.

To do this, automatic AssistedDrive evaluates the edges of the IMPDRVIncr, IMPRDRVVelo and ASDR signals.

The automatic AssistedDrive system can only be used with an active enable. The enabling signal for the automatic AssistedDrive system (DCMD := 6) is an element of the DCMD signal (see Table A-16 DCMD signal (Page 319)). This ensures the unambiguity of the active drive order at all times.

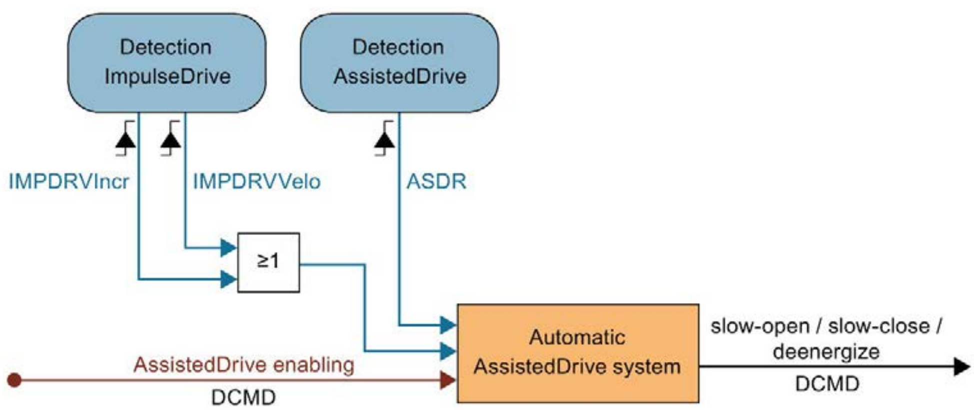


Figure 3-7 Automatic AssistedDrive system

Note

After the automatic AssistedDrive system has canceled a drive order on account of an inadequate assisting force, ImpulseDrive detection becomes active again. However, the ImpulseDrive lead time (p1220) must be taken into account. It directly affects the signal chain of the automatic AssistedDrive system.

Note

Configuring ImpulseDrive and AssistedDrive detection directly affects the automatic AssistedDrive system.

3.3.7 Positioning mode

Positioning mode serves to absolutely position the drive. The positioning system calculates a travel profile for the optimum movement of the drive to the required target position on the basis of the travel curve parameters and the current distance from the target position. Positioning mode does not include any position control and operates with an accuracy of 1 cm. The source voltage brake is activated once the target position has been reached. After the target position has been reached, the door can be moved ±2 cm out of the target position before the drive returns to the target position. The positioning system operates with hysteresis. The drive responds dynamically (including reversing) to changes in the target position data while keeping to the values parameterized for force and energy limiting.

NOTICE
Obstruction detection
The obstruction detection system is not active in positioning mode (see section Obstruction detection SIDOOR ATD4xxW (Page 74)).

Activation

Positioning mode can only be activated from normal mode and at standstill via the "positioning" door command. It can be modified by the "NDG" and "slow" door command extensions. The target position is transferred as the DESTPOS signal (see DESTPOS signal (Page 321)) in technology control word 2 (TSW2) of the process image. The target position is automatically limited to the learned door boundaries.

Sensors

Sensor signals are evaluated in positioning mode. You can find the response of the controller/drive to the corresponding sensor signals in the section ESPE type 2 (Page 100) or Pressure-sensitive edge (SR) (Page 102).

Motor protection

To protect the motor, a monitoring function is active that switches off (deenergizes) the drive if the specified target position cannot be reached, e.g. due to an obstruction.

3.3.8 Obstruction detection

Description of function

SIDOOR ATD401W

If the controller detects an obstruction in the opening or closing direction with the aid of obstruction detection, it reverses once by 20 cm, starts an attempt to retract and then switches to wait mode. Slow obstruction approach, force obstruction detection and stop obstruction detection are active.

Note

Obstruction detection

The factory-set obstruction detection response of the ATD410W, ATD420W and ATD430W controllers corresponds to that of the SIDOOR ATD401W controller.

The factory-set obstruction behavior of SIDOOR ATD410W, ATD420W and ATD430W controllers is parameterizable.

The factory-set obstruction behavior of the SIDOOR ATD401W controller is not parameterizable.

A detected obstruction is signaled by the DBLOCK (see DBLOCK signal (Page 324)).

The subsequent response to a detected obstruction depends on the user-defined parameter assignment. The following properties can be configured separately for the opening and closing directions:

- Obstruction detection
- Direct response
- Behavior following an obstruction

Basically, the same parameters are available for both drive directions. This means that either the same or different obstruction behavior can be configured for each direction.

The obstruction detection is a dynamic system that responds as a function of both position and time. The obstruction detection is dynamically activated or deactivated according to these dependencies. You can find more detailed information in the section Expert configuration (Page 78).

3.3.8.1 Obstruction detection process

The obstruction detection is based on two processes that are independent of the direction: force obstruction detection and stop obstruction detection.

The following definitions are based on the speeds and are thus independent of the direction.

The obstruction detection systems assume that the system is actively being moved (drive order).

- **Force obstruction detection**

  The current speed is > 90 mm/s, and drops by more than 90 mm/s in comparison to the maximum speed reached during the current movement.

  If the system then moves for the set duration (p3854 and/or p3871) at the upper force limitation, a force obstruction is detected in the current drive direction.

- **Stop obstruction detection**

  If the current speed for the configured time (p3853 or p3870) is less than 10 mm/s, a stop obstruction corresponding to the current direction of travel is detected.

As of V1.09:

If the door has been in the CLOSE position for at least 3 seconds and it is then subjected to extreme force with the pending command CLOSE DOOR, the travel in the CLOSE direction will detect no obstruction.

3.3.8.2 Overcome obstruction

The overcome obstruction system can be used to overcome a blocking obstruction by repeated pushing. The system remains active as long as the initial drive order is not actively changed.

Example

1. The drive order "close" is present.
2. The system closes.
3. An obstruction is detected before reaching the "Closed" end stop.
4. The second of four retries is made.
5. The drive order "close" is overwritten by any other drive order.
6. The retry system is immediately exited.
7. The system responds according to the new drive order.

Parameter assignment

The number of retries to overcome the obstruction can be set in parameter p3860 or p3877. If the number is set to "0", the overcome obstruction system is disabled in the corresponding direction.

A variable waiting time can be configured before each retry (p3861 or p3878).

The type of drive control during this wait time can be "stop" or "deenergize" (p3862 or p3879).

After the configured number of retries have been made, wait mode is activated (see the following Section "Wait mode"). A following drive order can also be configured, which is activated at the same time as the switch to wait mode (p3863 or p3880).

While the retry system is active, any external change to a drive order (see Table A-16 DCMD signal (Page 319)) immediately ends all open retry actions (including the cancelation of wait mode).

3.3.8.3 Reversing (Retraction attempt)

When an obstruction is detected, the obstruction reversing system can be used to initiate an immediate full or partial reverse - a retraction attempt. This system is simply termed "reverse". The system remains active as long as the initial drive order is not actively changed. You can find an example of this in Section Overcome obstruction (Page 76).

Parameter assignment

The number of reversals (retraction attempts) can be defined in parameters p3864 and p3881. If the number is set to "0", the obstruction reversing system is disabled in the corresponding direction.

A variable wait time can be configured (p3865 and p3882) after each retraction attempt (on reaching the corresponding reverse target position). The drive remains stopped during the wait time.

The reversing distance or the type of reverse (full or partial reverse) can be configured to an accuracy of ±2 cm in parameters p3866 and p3883.

If the system is obstructed while reversing, all still open reversing actions are immediately ended, and wait mode is activated (see Wait mode (Page 78)). A following drive order can also be configured in parameters p3867 and p3884, which is activated at the same time as the switch to wait mode.

After the configured number of reversing operations/retraction attempts have been made, wait mode is activated (see Wait mode (Page 78)). A following drive order can also be configured, which is activated at the same time as the switch to wait mode (p3868 and p3885).

While the obstruction reversing system is active, any change in an external drive order (see Table A-16 DCMD signal (Page 319)) immediately ends all open reversing actions (including the cancelation of wait mode).

Note

A reverse due to a drive order being changed is part of the basic software, and is not affected by the reversing on account of an obstruction described here (Open → Close, Close → Open).

3.3.8.4 Combination of retry and reverse

The reverse and retry systems can be combined. The combination is subject to the following rules:

- A reverse is made after executing the configured number of retries. The action is repeated for the number of configured reverses.
- Parameters p3863 and p3880 have no effect when reversing is activated.
- Wait mode becomes active after the last reverse.
- If the number of retries and reversing operations is set to "0", the "retry" following drive order has a higher priority than the "reverse" drive order.

3.3.8.5 Slow obstruction approach

The position of the last obstruction in the drive direction is automatically stored in the system. The speed is automatically reduced to the corresponding creep speed (p3670 or p3666) on approaching this position. The system calculates a braking ramp so that the reduced speed is reached at the set distance (parameter p3855 or p3872) from the stored position of the obstruction. If the obstruction can be overcome, the system adjusts the speed after the same distance back to the "normal" driving curve.

Slow obstruction approach can be activated or deactivated for each drive direction in parameter p3850.

3.3.8.6 Wait mode

Wait mode is activated according to the configurations of the overcome obstruction system and the obstruction reversing system. If the system is in wait mode, this is ended any external change to a drive order. Wait mode is signaled by the process data signal "DBLCWAIT" (see "Table A-27 DBLCWAIT signal (Page 325)").

Note

If the parameters p3860 and p3864, or p3877 and p3881 are set to "0", the signal DBLCWAIT becomes active immediately after an obstruction is detected.

3.3.8.7 Expert configuration

The obstruction detection system has been designed so that it can be adapted to the widest range of system environments, structures and properties. The following parameters are mainly provided for such adaptations, and have to be changed for standard systems.

Parameter assignment

- **Function configuration**

  Stop and force obstruction detection can be deactivated for each drive direction in parameter p3850 (bits 0 and 1, and 4 and 5 respectively). The counting of obstructions can also be suppressed for each drive direction (bits 2 and 5).

- **Lead times**

  After a drive order is changed or the direction of motion is reversed, the obstruction detection is activated after a variable ON-delay time (p3852 and p3869).

- **Range restriction**

  Obstruction detection is suppressed in a variable range **beforereaching** the relevant end stop (p3856 and p3873).

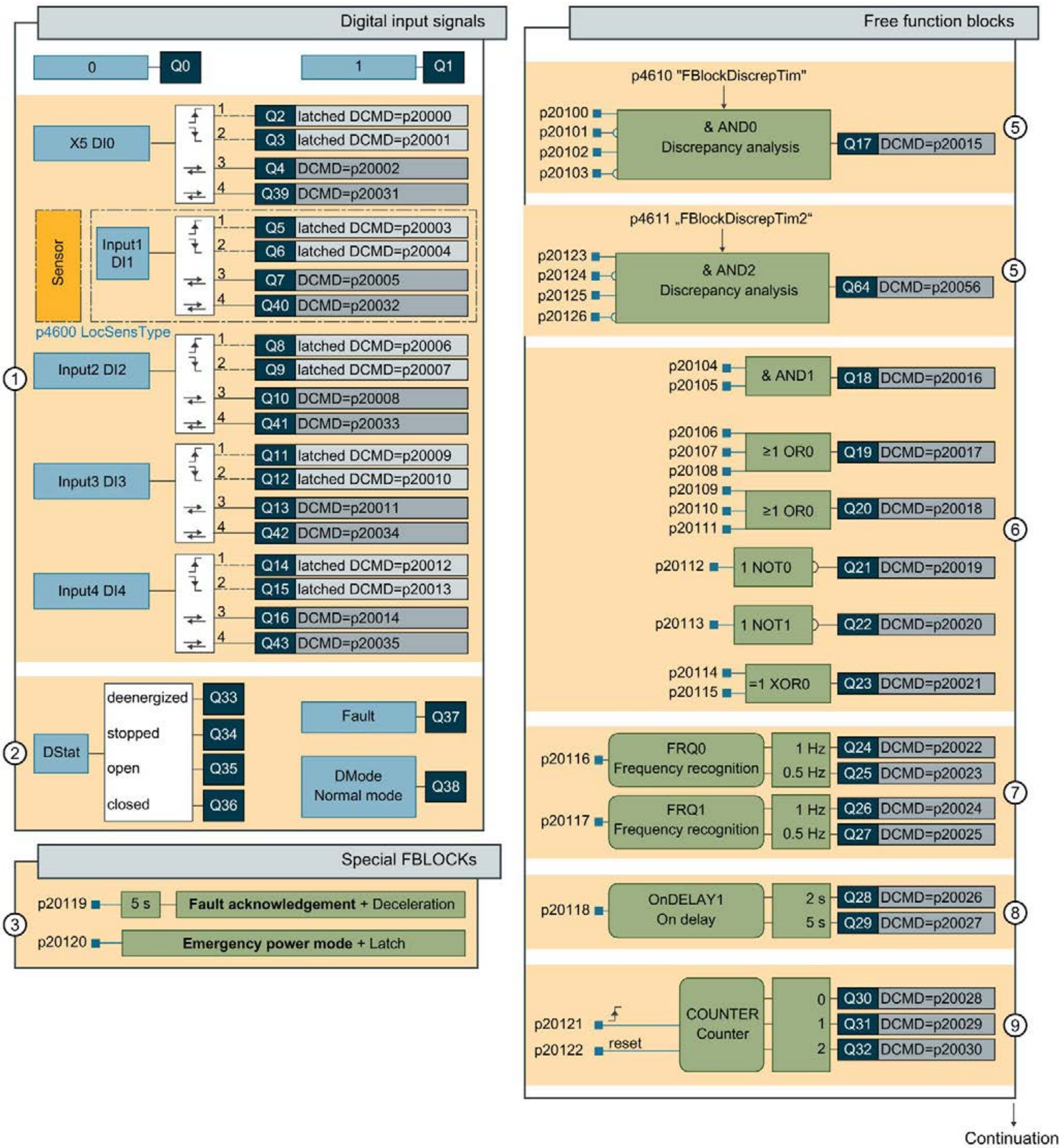
  It is also suppressed **after leaving** the relevant end stop (p3857 and p3874).

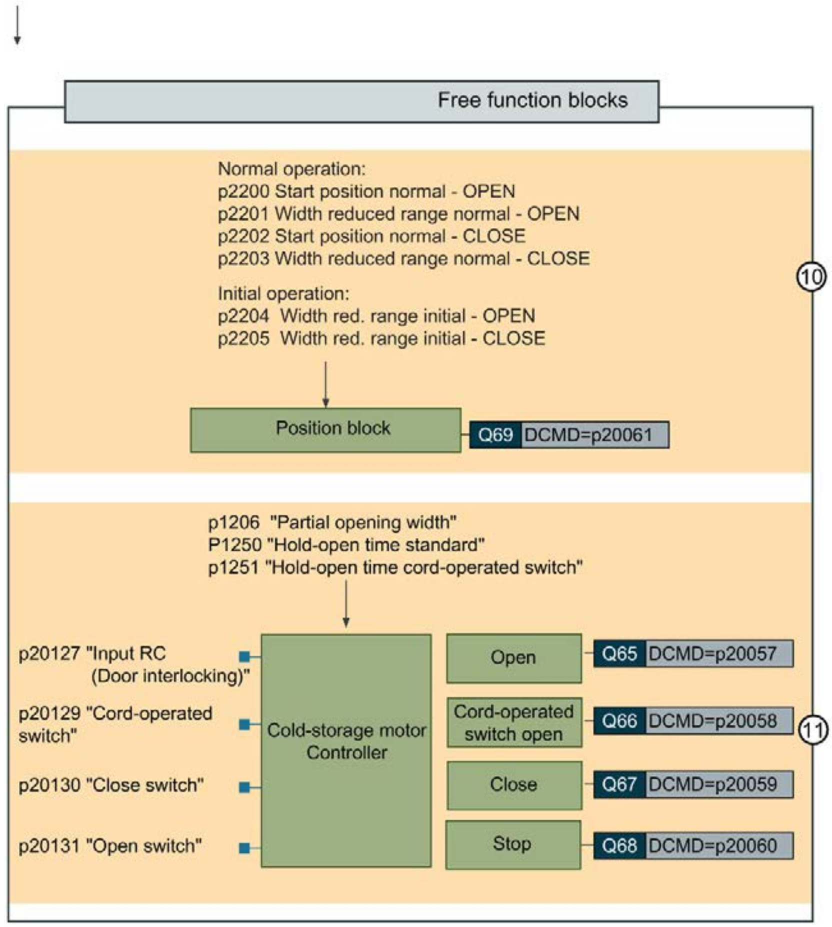
  Force obstruction detection, in particular, is suppressed **before** the creep distance (p3858 and p3875). It is suppressed in a variable range **after** the last obstruction (p3859 and p3876).

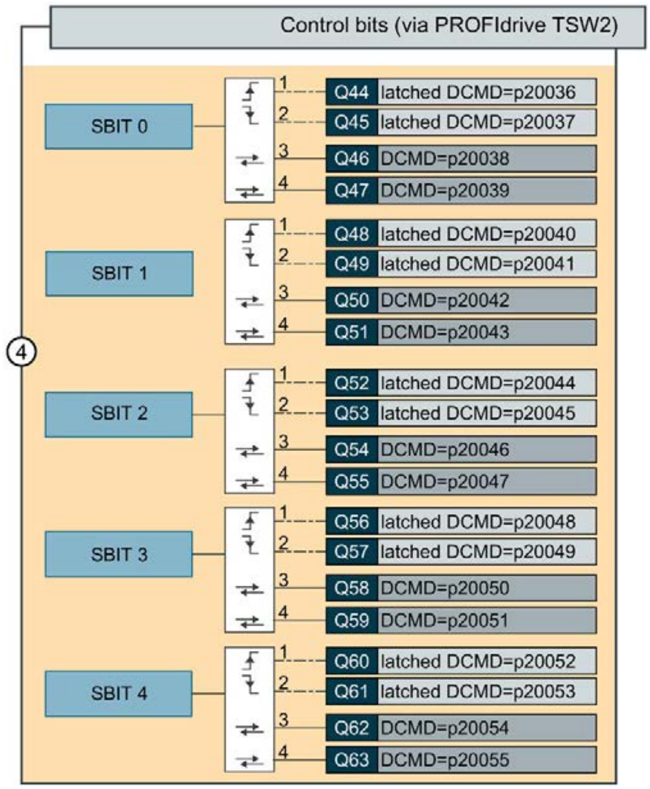
3.3.9 Free function blocks (FBLOCK)

3.3.9.1 Overview

In some applications it is necessary to control the drive via digital signals. To this end, you can configure an individual logic using the logic elements shown in the following figure.




Free function blocks
Normal operation:
p2200 Start position normal - OPEN
p2201 Width reduced range normal - OPEN
p2202 Start position normal - CLOSE
p2203 Width reduced range normal - CLOSE
Initial operation:
p2204 Width red. range initial - OPEN
p2205 Width red. range initial - CLOSE
Position block
Q69 DCMD=p20061
10
p1206 "Partial opening width"
P1250 "Hold-open time standard"
p1251 "Hold-open time cord-operated switch"
p20127 "Input RC (Door interlocking)"
p20129 "Cord-operated switch"
p20130 "Close switch"
p20131 "Open switch"
Cold-storage motor Controller
Open
Cord-operated switch open
Close
Stop
Q65 DCMD=p20057
Q66 DCMD=p20058
Q67 DCMD=p20059
Q68 DCMD=p20060
11



① Digital and logical input signals (Page 84)
② Digital and logical input signals (Page 84)
③ Special function blocks (Page 85)
④ Control bits (Page 85)
⑤ Discrepancy analysis blocks (Page 86)
⑥ Basic blocks (Page 86)
⑦ Frequency analysis blocks (Page 87)
⑧ On delay block (Page 87)
⑨ Counter block (Page 88)
⑩ Position function block (Page 88)
⑪ Cold storage function block (Page 92)

Figure 3-8 FBLOCK overview

3.3.9.2 Configuring the logic

The free function blocks are configured at the parameter level. The input of a function block can be linked to any output by entering the output's Q number in the input's REF parameter.

The Q numbers of the outputs can be found in the Overview (Page 79).

The REF parameters can be found in Table 4-40 FBLOCK-REF parameters (Page 206).

Example logic

The following figure shows an example logic. In the example logic, the level-controlled outputs of the digital inputs DI3 and DI2 and a 1 ("high") are linked via the FBLOCK "AND0" with the FBLOCK "Fault acknowledgement".

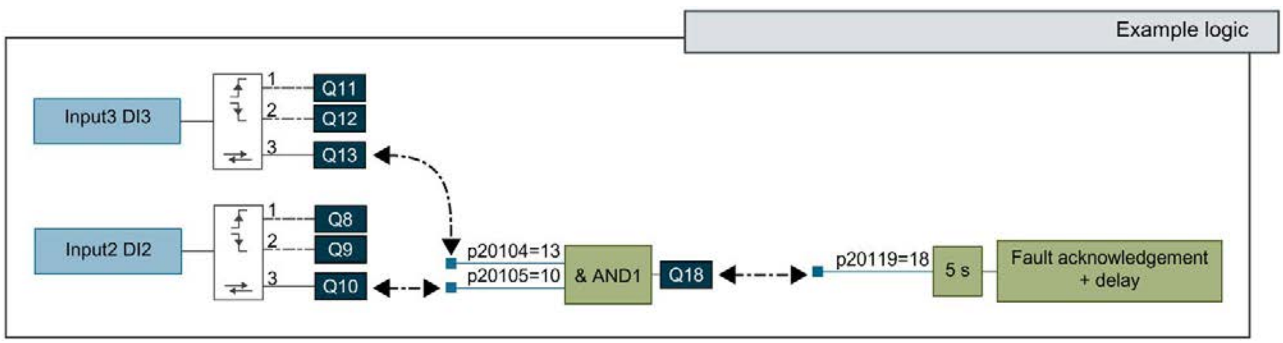


Figure 3-9 Example logic

Drive orders

In parallel with logical signal combination, a drive order can be assigned to the Q outputs. Door commands that are assigned to the outputs are only active as long as the assigned output is active (jog mode). A drive order is composed of a door command "DCMD" and an optional door command expansion bit "DCMD expansion".

Drive order = door command + door command expansion bit

Both commands are expressed as 16-bit values. The structure of the DCMD and DCMD expansion bit fields corresponds to the technology control world 1 (TSW 1) signals of the same names, see Table A-15 Technology control word 1 (TSW1) (Page 319). The "LB" and "DCOPS" and expansion bits are not evaluated here.

15 … 8	7	6	5	4	3	2	1	0
DCMD	**DCMD expansion**							

Example

- The value 0x0301hex corresponds to the "close slowly" drive order.
- The value 0x0215hex corresponds to the "slow, partial opening in NDG mode" drive order.

The default command mode is defined by the p100 parameter.

For the controllers ATD410W, ATD420W, ATD430W, command input via the bus system is activated in the factory setting. Parameter p100 is set to the value 0. This means that the FBLOCK drive orders can only be executed in the drive state "S4: Z_OPERATION" (see Figure 4-4 Sequential control state graph (Page 163)).

For the ATD401W controller with relay module, no command input is possible via the bus system. Parameter p100 is set to the value 1. See description of parameter p100, section 4.9.5.3 Parameter assignment (Page 190).

Note

If the controllers ATD410W, ATD420W, ATD430W are to be operated without bus connection (offline), the default command mode must be redirected to the FBLOCK logic. Set parameter p100 to the value 2.

You can find more detailed information in section Drive orders (Page 37).

Parallel drive orders

Door commands that are active during a processing cycle are assigned the following priorities:

- Stop > Open > Close

All other door commands are determined on the basis of the processing sequence.

Parallel door command expansion bits

The door command expansion bits that are active during a processing cycle are combined (logically ORed).

Signal processing

All outputs are recalculated in each processing cycle (10 ms) on the basis of the current input signal states. The cycle's output signals are calculated exactly in the order of the Q numbers (beginning with Q0). If the output Q22 ("NOT0") is used as the input signal of "AND0", its output Q17 is not recalculated until the next cycle.

3.3.9.3 Digital and logical input signals

Digital input signals

Level-controlled

The controller possesses 5 digital inputs (with 30 ms debouncing), which can be combined with any function blocks and/or can be combined directly with drive orders. Drive orders that are assigned to the level-controlled input signals are only active as long as the assigned digital input is active (jog mode).

Note

The signals of the digital inputs are additionally provided in an inverted form.

Edge-controlled

Each digital input can also be evaluated with edge control. Note that edge-controlled signals are available for the current processing cycle only. Drive orders that are assigned directly to the edge-controlled input signals are, therefore, "latched" automatically. "Latched" means that the drive orders are stored and stay active until they are overwritten by another drive order. These elements are marked as shown in Overview (Page 79).

Note

Latched drive orders are processed separately and are stored as door commands with an associated door command expansion bit. Any other, unlatched door command apart from "deenergized" overwrites or clears the latched drive order including the expansion bit.

Logical input signals

To be able to map internal dependencies in the logic, selected system states are made available as logical input signals.

Logical signal source	Meaning
Q0	Logical 0 "low"
Q1	Logical 1 "high"
Q33	Motor deenergized
Q34	Motor stopped
Q35	System opened
Q36	System closed
Q37	Fault
Q38	System in normal mode

3.3.9.4 Control bits (as of V1.10)

5 control bits SBIT 0 ... 4, can be transmitted via the technology control word 2 (TSW2), bit 10 ... bit 14.

Like digital input signals, these control bits can be controlled by their edge, level, inverted and non-inverted, linked to any function blocks and/or directly with motion tasks.

See also A.1.2.4 TSW2 - Technology control word 2 (Page 321).

3.3.9.5 Special function blocks

An active system fault can be acknowledged by means of the special "fault acknowledgement" function block. The acknowledgement is triggered after the input signal has been active for at least 5 s.

The controller's emergency power mode can be activated by means of the special "emergency power mode" function block. You can find additional details about the emergency power mode in the section Emergency power mode.

3.3.9.6 Discrepancy analysis blocks

The discrepancy analysis block "AND0" has four time-monitored inputs, two of which are negated or inverted. The output signal at Q17 behaves according to the following rules:

- The output signal only becomes active if all inputs were activated synchronously within the time defined via parameter p4610.
- The output signal becomes inactive as soon as at least one input signal has become inactive.
- The output signal can only be reactivated after all input signals have been inactive.

As of V1.10: The second discrepancy analysis block "AND2" behaves like "AND0". The output signal is available at Q64. The discrepancy time is set with parameter p4611.

As of V1.12: A violation of the discrepancy time is indicated for "AND0" and for "AND2" in the following ways:

- TZW2 – bits 6 (AND0) and 7 (AND2) - see section TZW2 - technology status word 2 (Page 326)
- As "a" on the operating status display - see section Status display (Page 304)

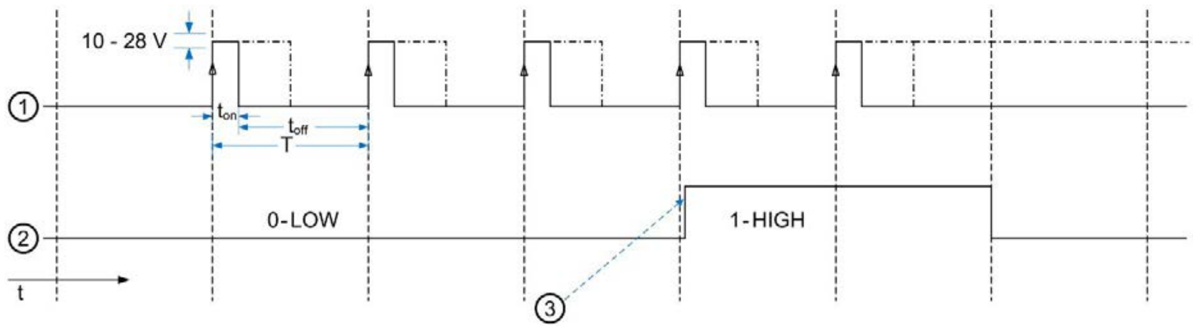
3.3.9.7 Basic blocks

The basic function blocks "AND", "OR", "NOT" and "XOR" are provided to be able to map basic logical combinations.

3.3.9.8 Frequency analysis blocks

An input signal can be analyzed for specific frequencies and duty factors via the "FRQ" frequency blocks. Two identical frequency analysis blocks are available, capable of detecting frequencies of 1 Hz and 0.5 Hz with a duty factor of 20 %.

The detection criteria and the valid tolerances are described in detail in the following figure.



① Input signal
② Output signal
③ The output signal changes after 3 detected signal periods after the 4th edge

- An input tolerance of (±) 40 ms is assumed.
- Duty cycle: 20 % (17 to 23 %)
- **1 Hz frequency detection:**
  - T = 1000 ms (±2 %)
  - t_{on} = 200 ms
  - t_{off} = 800 ms
  - Pulse/pulse ratio V = 25 %
- **0.5 Hz frequency detection:**
  - T = 2000 ms (±2 %)
  - t_{on} = 400 ms
  - t_{off} = 1600 ms
  - Pulse/pulse ratio V = 25 %

Figure 3-10 Frequency-based input signal detection

The outputs Q24 or Q26 become active when the analysis algorithm detects a frequency of 1 Hz with a 20 % duty factor in the input signal. The outputs Q25 or Q27 become active when the analysis algorithm detects a frequency of 0.5 Hz with a 20 % duty factor in the input signal.

The maximum response time at the output, i.e. the time after which the system can detect an error or a deviation in the input signal frequency, corresponds to the period of the frequency to be detected. Accordingly, a frequency of 1 Hz results in a maximum response time of 1 s and a frequency of 0.5 Hz results in a maximum response time of 2 s.

3.3.9.9 On delay block

The "OnDELAY" block delays the input signal at the output Q28 by 2 s and at the output Q29 by 5 s.

3.3.9.10 Counter block

The "COUNTER" block increments the internal counter value in the event of a positive edge at the input.

The maximum counter value is 2. The counter value is reset in the event of an overflow:
0 → 1 → 2 → 0

- Counter value 0 → output Q30 active
- Counter value 1 → output Q31 active
- Counter value 2 → output Q32 active

After the controller has been switched on, the counter value is initialized automatically with 0. You can reset the counter value to 0 via the "reset" input. As long as the "reset" input is active, the counter value is 0.

3.3.9.11 Position function block (as of V1.12)

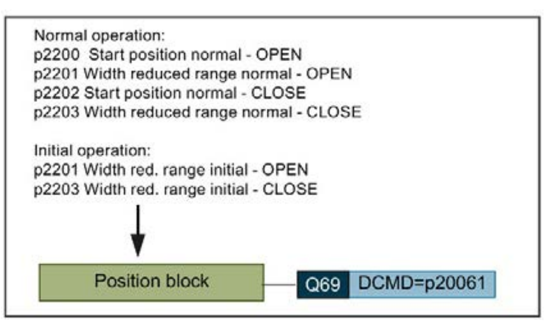
Description of the function

A separate motion behavior with regard to force and speed can be defined with the help of the specific door range of motion within a door motion in opening direction as well as in closing direction over a specific distance. This is helpful, for example, when the machine needs a greater force at lower speed in a specific area.

Depending on the current position of the door, the position function block outputs a corresponding door command. The configured door command is triggered as soon as the door reaches the area. The original door command is triggered once again as of the time when the door leaves the area again.

A corresponding area can be specified during normal operation for the opening direction as well as the closing direction. The area is configured with a start position and a width in centimeters (cm).

During initial mode, the position block is viewed as distance from the current door position. Therefore, one parameter exists for the opening direction and one for the closing direction.



A distinction is made for the specific door area whether the controller is in initial mode or normal operation.

Parameter ID	Meaning	Direction	Explanations/Definitions
Normal operation:			
p2200	Start position	OPEN	In centimeters, starting from the closed position.
p2201	Width	OPEN	Specification in cm. = 0: Output signal is always **inactive** (no reduced door range of motion defined). <>0: Output signal from start position to Startpos.+width **active.**
p2202	Start position	CLOSE	In centimeters, starting from the closed position.
p2203	Width	CLOSE	Specification in cm. = 0: Output signal is always **inactive** (no reduced door range of motion defined). <>0: Output signal from start position to Startpos.+width **active.**
Initial mode (absolute position is unknown):			
p2204	Width	OPEN	Specification in cm. =0: Output signal is always **inactive.** >= Door width: Output signal is always **active**. < Door width: Output signal for the travel distance, relative from the current start position of the door command **active**.
p2205	Width	CLOSE	Specification in cm. =0: Output signal is always **inactive**. >= Door width: Output signal is always **active**. < Door width: Output signal for the travel distance, relative from the current start position of the door command **active**.

WARNING

The position function block is not a safe function and must not be used in the context of an area where injuries can occur. To ensure safe use, the appropriate guards must be used by the user.

WARNING

Danger of injury and material damage when determining position

Position determination, as described in the relevant chapters and generally available, is not guaranteed with a view to safe travel without endangering man or machine. All available and determined position data of the SIDOOR controller must be regarded as a guideline with an equivalent inaccuracy, which is strongly dependent on the overall structure of the door and the associated mechanical components. In addition, when changing speed, the distances for acceleration, braking distances and controller deceleration must also be taken into account. The precision and reliability of the position determination must therefore be determined anew for each application as a whole.

According to the technical options, a maximum deviation between the determined position in the controller and the actual position of the door of up to +/- 2 cm can occur during position detection.

Example calculation for the determination of the driving accuracy: When using accessories offered by Siemens (toothed belts, pulleys, etc.), a maximum position variance of +/-1 cm can be expected for an effective force of 300 N over an effective length of 4 m. The condition for this example calculation is a properly tensioned toothed belt, which means that any skipping of the toothed belt can also be ruled out.

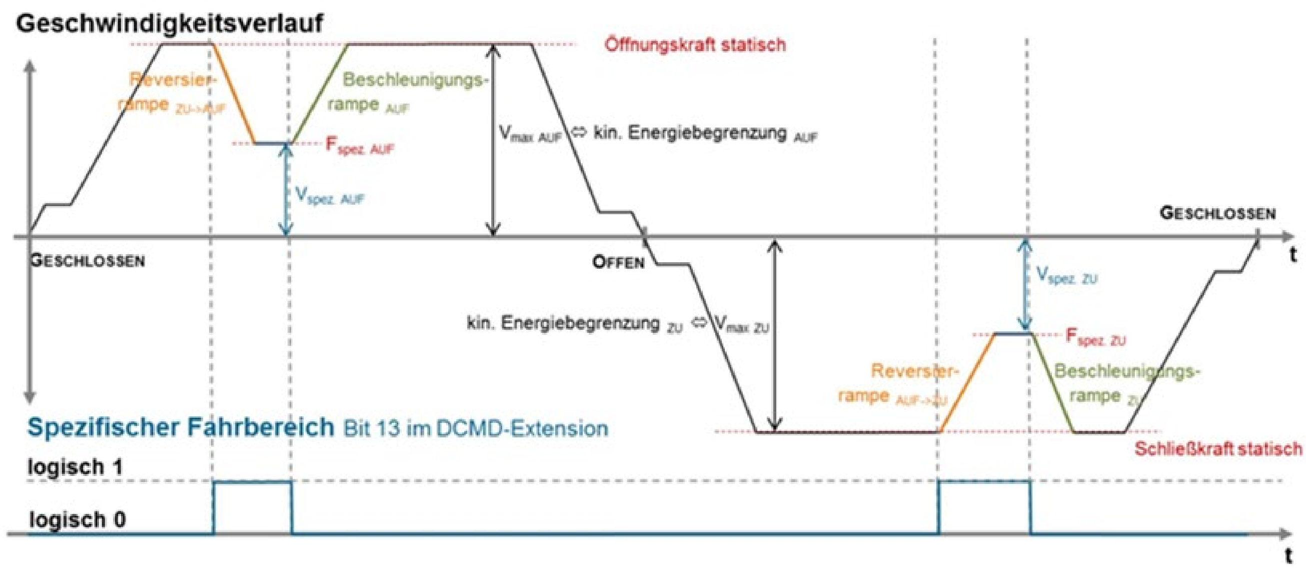
Accuracy of the position detection

According to the technical options, a maximum deviation between the determined position in the controller and the actual position of the door of up to +/- 2 cm can occur during position detection. The distances required for acceleration and braking also must be taken into account when the user changes the speed.

3.3.9.12 Specific door range of motion

Description of the function

By activating the specific door range of motion with a DCMD extension bit, the user can set the switchover of the drive behavior, for example, as door command via the fieldbus interface. In addition, it can interconnect the extension bit with other conditions, e.g. with digital inputs, using the FBLOCK logic.



DCMD extension bit	Meaning
8	Slow (Slow profile)
9	Automatic ImpulseStop
10	Second force and energy profile (NDG mode)
11	Special
12	Partial opening
13	Specific door range of motion
14	Door Closed / Opened Position Sensor (DCOPS sensor)
15	Photoelectric barrier (LB sensor)

Note

A higher-level masking of the extended door command via the DCMD extension bits is additionally available as of firmware version 1.12.

3.3.9.13 Cold storage function block (as of V1.12)

This function block can be used to link inputs and door commands especially for use with cold storage doors.

The main functions in this context are:

- The inputs "Input RC", "Cord-operated switch", "Close pushbutton" and "Open pushbutton" are pulse inputs, which means a positive edge at the input signal triggers a door command.
- Automatic closing of the door after configurable times (for complete and partial opening)
- Cord-operated switch mode over which a special door command (default: partial opening) can be configured

---

Note

Although the RC input is activated, it is always possible to move the door using the service buttons.

SIDOOR ATD401W:

For the ATD401W there is a special menu command available for activating the cold storage functions (see Section (Page 276)).

The various door commands are preset with the following default values:

Output	Meaning	DCMD parameter	Default DCMD
Q65	**Open**	p20057	0x0002
Q66	**Cord-operated switch - Open**	p20058	0x1002
Q67	**Close**	p20059	0x0003
Q68	**Stop**	p20060	0x0001

3.3.10 Basic parameter editor (as of V1.10)

Description of the function

The parameters determined in a learn run can be set via PROFIdrive or operating menu. These parameters are called "basic parameters (Page 190)".

The basic parameters editor can be used to perform initial commissioning of a door control unit only by setting parameters without a learn run.

For example, the parameter set can be determined once for identical door systems. Each door control unit is configured with this parameter set at the factory. When replacing a door control unit, the parameter set can be copied from the old controller to the new controller.

It is recommended to determine the basic parameters for a door system once with a learn run and then to adapt or copy it to other door control units.

When the motor type or the door mechanism are changed, the basic parameters must be adjusted accordingly.

WARNING

Basic parameter editor

There is no plausibility check of the basic parameters by the control unit when basic parameters are changed. Incorrect parameter assignment may result in undesirable travel behavior of the door. When the moving mass and configured energy limit are changed, the configured speed is automatically adjusted for the permissible kinetic energy. After changing the basic parameters, the drive curve parameters must be checked and adjusted if necessary.

Changed basic parameters only take effect at standstill.

If the write protection is set via parameters p90, the basic parameters cannot be changed through the menu system.

During initial commissioning, after resetting the parameter memory via p91, or after changing the motor type, the basic parameters are reset to their default values. Subsequently, all basic parameters must be confirmed by writing at least once (even if the value displayed corresponds to the desired value).

After setting the basic parameters, the limits for the drive curve parameters (deceleration and acceleration ramps, maximum speeds and forces) are calculated according to the basic parameters (door weight and output ratio). If the previously set drive curve parameters are outside the calculated limits, the drive curve parameters are corrected so that they are within the parameter limits.

After changing the basic parameters (in particular the door weight and output ratio), it is recommended to check and adjust the travel curve parameters or to load the default parameters.

Control of the basic parameter editor via PROFIdrive

The status of the basic parameters editor can be determined and changed via parameter p2111:

Read p2111:
0 -> Basic parameter editor is not active. The basic parameters are read-only.
1 -> Basic parameter editor is running. The basic parameters can be changed.

Write p2111:
0 -> Cancel basic parameter editor. Changed basic parameters are discarded.
1 -> Start basic parameter editor. Basic parameters can be changed.
2 -> Close basic parameter editor and save the parameters.

If not all basic parameters were written with an initial commissioning or after resetting the parameter memory via p91, the write operation is terminated with an error message (6 wrong value). Changes to the parameter settings are discarded.

Control of the basic parameter editor via menu system

With the menu command "General setup -> Basic parameters", you can open basic parameters editor in the menu (see also section "Navigation Structure in SIDOOR Service Tool (Page 276)").

If the menu command "Change Basic Parameters" is not selected with CR, the basic parameters are only displayed.

If the menu command "Change Basic Parameters" was selected with CR, it changes to "Save Basic Parameters" and the basic parameters can be changed.

After all basic parameters have been changed or confirmed with CR, you can select "Save basic parameters". The basic parameters are saved and the menu command returns to "Change Basic Parameters".

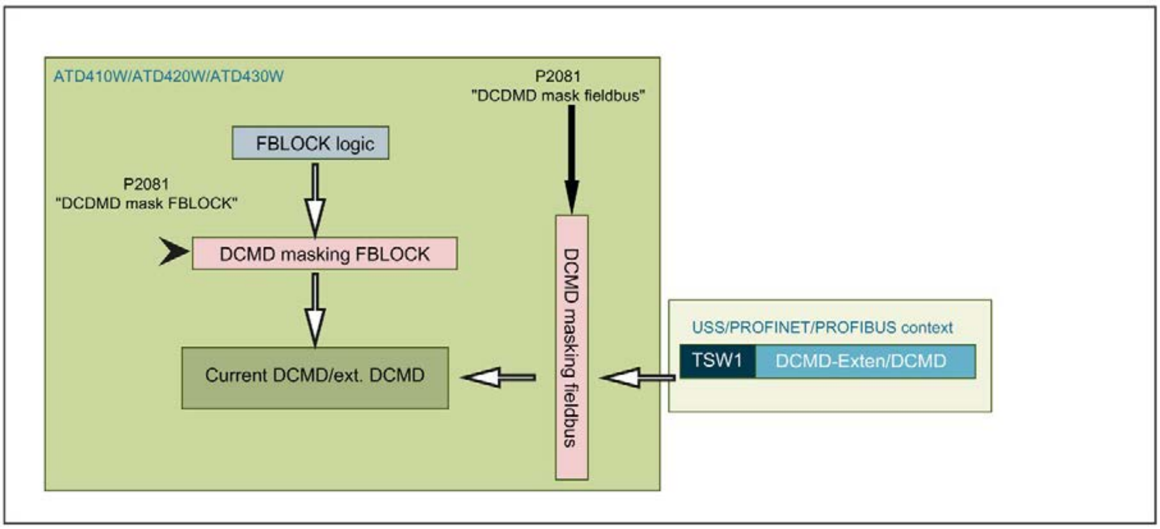
If not all basic parameters were changed or confirmed with CR with an initial commissioning or after resetting the parameter memory via p91, an error message is displayed. Changes to the parameter settings are discarded.

3.3.11 Masking of door commands (as of V1.12)

Description of the function

With this function it is possible to mask door commands from the two door command sources "Fieldbus" and "FBLOCK". In particular, masking is provided for the DCMD extension bits.

The masks can be used to define which bits of the door commands are still to be effective according to Section (Page 319) and which are not.



The two masks are stored in the following parameters:

Table 3- 11 Table 3- 2 Masking of door commands

Parameter ID	Value range	Default value:	Description
p2080	0..65535	**0xFFFF** (All bits of TSW1 from the fieldbus are allowed to pass.)	**DCMD masking fieldbus** Each bit in the mask filters the corresponding bit in TSW1: 0: CMD bit is not allowed to pass 1: CMD bit is allowed to pass
p2081	0..65535	**0xFFFF** (All bits of the DCMD/ext. DCMD are allowed to pass.)	**DCMD masking FBLOCK** 0: CMD bit is not allowed to pass 1: CMD bit is allowed to pass

Because DCMD is normally not to be considered bitwise (but as a numeric value), the mask for DCMD should be either 0xFF or 0x00. As soon as the user enters a value unequal to 0 (0x01 to 0xFE), it is immediately and automatically corrected to 0xFF by the firmware.

Example:

To deactivate the NDG switchover via the fieldbus, the parameter value must be set to 0xFBFF.

3.3.12 Test run (as of V1.12)

Description of the function

The test run is used to measure the closing and opening forces during final inspection and commissioning. There is no reversing reaction during the test run.

The test run can be activated with the menu command "Test run" in the General setup menu. It enables the reversing to be deactivated for exactly the next door command. Afterwards, the function is automatically deactivated again. The menu command shows the status of an active test run.

During the test run, all other drive parameter values (e.g. speed and force) are maintained as they were previously configured. This means that even though a test obstruction is detected during the test run, the present force remains in effect until a new door command, e.g. STOP, is issued.

3.4 Safety functions

Introduction

Using the safety functions described below, you can:

- Expand the system with optional safety devices
- Use the inputs with secure input signals

WARNING
The effectiveness of the safety functions must be checked during commissioning of the system and at regular intervals, depending on the application.

3.4.1 Optional safety equipment

3.4.1.1 Light barrier

Note

If the light barrier is operated according to this chapter (without sensor function test), no performance level is determined for it.

Description of function

If no power is supplied at the light barrier input, this is interpreted as an interruption of the light barrier. The door cannot then close.

If the light barrier is interrupted while the DOOR CLOSE command is active, the door is moved in the OPEN direction. An interruption of the light barrier while the DOOR CLOSE command is inactive does not change the state.

Exception: If the door is open less than 1 cm, the light barrier signal is ignored.

Connection and parameter assignment

SIDOOR ATD410W/ATD420W/ATD430W

The sensor signal must be generated by the PLC as part of the process image. See Table A-17 DCMD expansion bits (Page 320).

The status of the sequential control must be considered when using the LB signal. The process data (including the LB signal) are only valid in the status "S4: Z_ operation" (see Figure 4-4 Sequential control state graph (Page 163)). The LB signal is evaluated in the low-active state, but is not tested during the sensor function test.

Note

The light barrier signal is evaluated in the low-active state and must therefore be assigned 1 (= not interrupted).

When not in operating status "S4: Z_ operation" (see Figure 4-4 Sequential control state graph (Page 163)), the sensor signals are automatically assigned their resting signal value so that they have no effect on the system status.

The travel range within which the controller reacts to the light barrier signal can be restricted by parameter p1210. See Calibration and function parameters (Page 196).

You can find more detailed information on the light barrier in section Overview (Page 166).

Signals

Signal	Meaning
1 (voltage applied)	Light barrier is not interrupted and the door closes when the DOOR CLOSE command is present
0 (voltage not applied)	Light barrier is interrupted and the door opens when the DOOR CLOSE command is present*

* The response of SIDOOR ATD4xxW controllers also depends on the particular system mode. See the table below.

Table 3- 12 Response of SIDOOR ATD4xxW controllers to an interrupted light barrier

Mode	Response
Learn run mode	Learn run is canceled and the drive is **deenergized**.
Initial mode	The system is **stopped** via a ramp down in conjunction with the active "Close" drive order.
Normal mode	**Reverses** the system in conjunction with the active "Close" drive order. The system response to an obstruction detected while reversing can be configured accordingly. The following drive order can be defined with parameter p1211 (see section Calibration and function parameters (Page 196)). In positioning mode, the drive is **stopped** via a ramp down.
Special mode	The system is **stopped** via a ramp down in conjunction with the active "Close" drive order.

See also

Digital input signals (Page 122)

3.4.1.2 Type 2 ESPE

Function description

A light array / light curtain is the part of the electro-sensitive protective equipment (ESPE) that is connected to the machine controller and assumes a defined state when the sensing device is triggered during intended use.

Connection and parameter assignment

A type 2 ESPE can be connected to SIDOOR ATD4xxW controllers via "Input 1" of the terminal X6.

If the SIDOOR controller's sensor logic is configured for ESPE, the "TestOUT" function test signal is output automatically at the terminal X100.1. See Section Sensor function test (Page 169).

The sensor type of the sensor connected to "Input 1" of terminal X6 can be configured as follows:

- Parameter p4600
- Service menu: *MAIN MENU > General setup > Special parameters > Function Input 1*

The travel range within which the controller reacts to the OSSD signal can be restricted by parameter p1210 (see Section Calibration and function parameters (Page 196)).

You will find a circuit diagram and detailed information about the connection of a type 2 ESPE in Section Overview (Page 166).

Note

The DCOPS, type 2 ESPE or pressure-sensitive edge functions cannot be implemented simultaneously as sensor functions at input 1.

Signals

Signal	Description
1 (voltage applied)	Light curtain is not interrupted.
0 (voltage not applied)	Light curtain is interrupted*.

* The response of SIDOOR ATD4xxW controllers also depends on the particular system mode. See the table below.

Table 3- 13 Response of SIDOOR ATD4xxW controllers to an active light curtain signal

Mode	Response
Learn run mode	Learn run is canceled and the drive is **deenergized**.
Initial mode	The system is **stopped** via a ramp down in conjunction with the active "Close" drive order.
Normal mode	**Reverses** the system in conjunction with the active "Close" drive order. The system response to an obstruction detected while reversing can be configured accordingly. The following drive order can be defined with parameter p1211 (see Section Calibration and function parameters (Page 196)). In positioning mode, the drive is **stopped** via a ramp down.
Special mode	The system is **stopped** via a ramp down in conjunction with the active "Close" drive order.

3.4.1.3 Pressure-sensitive edge (SR)

Function description

The pressure-sensitive edge is connected to the machine control and assumes a defined state if the sensor device is addressed during proper operation.

Connection and parameter assignment

The output signal switching device of the pressure-sensitive edge is connected to "Input 1" of the terminal X6.

If the SIDOOR controller's sensor logic is configured for a pressure-sensitive edge, the "TestOUT" function test signal is output automatically at the terminal X100.1. See Section Sensor function test (Page 169).

The sensor type of the sensor connected to "Input 1" of terminal X6 can be configured as follows:

- Parameter p4600
- Service menu: *MAIN MENU > General setup > Special parameters > Function Input 1*

The travel range before the "Closed" position in which the controller responds to the pressure-sensitive edge's signal can be restricted by parameter p1210 (see Section Calibration and function parameters (Page 196)). The controller does not respond to the pressure-sensitive edge's signal in the range of ± 2 cm before the "Open" position.

Note

The DCOPS, type 2 ESPE or pressure-sensitive edge functions cannot be implemented simultaneously as sensor functions at input 1.

You will find a circuit diagram and detailed information about connection of a pressure-sensitive edge in Section Overview (Page 166).

Signals

Signal	Meaning
1 (high)	Pressure-sensitive edge is not interrupted and is fault-free.
0 (low)	Pressure-sensitive edge is interrupted or defective*.

* The response of SIDOOR ATD4xxW controllers also depends on the particular system mode. See the table below.

Table 3- 14 Response of SIDOOR ATD4xxW controllers to an active pressure-sensitive edge signal

Mode	Response
Learn run mode	Learn run is canceled and the drive is **deenergized**.
Initial mode	The system is **stopped** and then **deenergized** via a ramp down in conjunction with the active drive order.
Normal mode	The system reverses by **20 cm** in conjunction with the active drive order. The drive is **stopped** and then **deenergized** if an obstruction is detected during reversing. In positioning mode, the drive is **stopped** and **deenergized** via a ramp down.
Special mode	No response

3.4.1.4 Deactivation of the service buttons during emergency stop (as of V1.12)

Function description

To prevent a door command being issued during a triggered emergency stop (e.g. using the service buttons), you can block door commands after an emergency stop as of firmware version V1.12.

First of all, the emergency stop function must be defined as such in the emergency stop circuit. This is done by using the door command available as of V1.12 with the value "8" (Stop with disable DCU) (see TCW1 - technology control word 1 (Page 319)) in the emergency stop interconnections according to the section Emergency stop after category 1 stop concept (Page 110), Safe digital control door OPEN/CLOSE via four digital inputs concept (Page 112) and Safe digital control door OPEN/CLOSE with emergency stop via three digital inputs concept (Page 115).

Note

To activate this function after the update to version V1.12, a new selection of the pre-configured emergency stop interconnection according to section Digital input signals (Page 122) is required for the ATD401W.

In the case of an ATD4x0W controller, the emergency stop door command must be changed to activate this function. The door command is not adapted automatically.

3.4.2 Security policy

The SIDOOR controllers ATD4xxW dispose of an extensive safety package. The safety functions fulfill the requirements according to DIN EN ISO 13849-1 Cat 2 PL d (Performance Level).

The scope of the safety functions includes:

- Safe force output
- Safe speed observance (energy limiting)
- Safe input signals

3.4.2.1 Safe force output

The maximum forces configured by the user must always be observed for safety reasons. The safe force output of the SIDOOR system ensures that the torque output by the motor does not increase in case of an error. Unintentional increases in the torque are recognized and result in a defined error response.

3.4.2.2 Safe speed observance (energy limiting)

The speeds configured by the user must always be observed for safety reasons. The safe speed observance of the SIDOOR system ensures that the energy of the door does not increase in case of an error. Unintentional increases in speed are recognized and result in a defined error response.

3.4.2.3 Safe input signals according to PLd

SIDOOR ATD4xxW controllers have five digital inputs (see Digital input signals (Page 122)), through which safety-related signals can also be sent. This section describes two different methods for transferring safety-related signals to the controller.

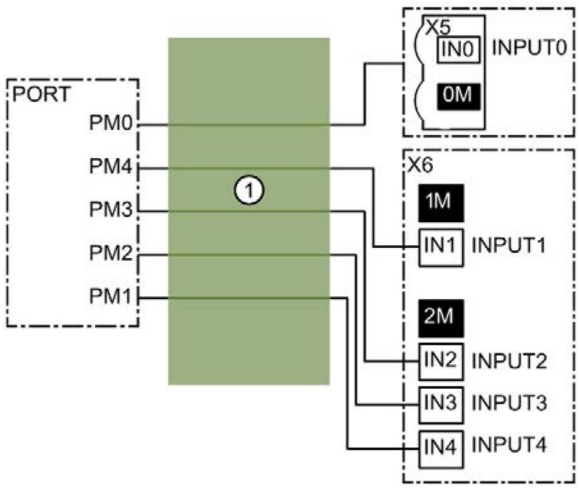
Two concepts are also presented for two-hand operation and emergency stop applications.

The concepts described in this section for implementing safe input signals according to PLd (Performance Level d) enable detection of the following faults:

- Discontinuity of one single terminal
- Short-circuit between any two terminals
- Stuck-at fault (short-circuit to 1 and 0 in the case of an isolated input or an interrupted output)
- Static signal "0" and "1" at all inputs and outputs, individually or simultaneously
- Parasitic oscillation of outputs
- Modification of characteristic values (e.g. input/output voltage of analog devices)

3.4.2.4 Internal signal routing

The following figure illustrates the input terminals and the internal wiring to the processor. The input signals are located at processor port M. Separate reference potentials 0M, 1M and 2M can each be defined for Input 2, Input 3, Input 4 and for Input 1 and Input 0. The input signals are provided with internal pull-ups and there are no components between the input terminals and the processor that are capable of oscillation.



① No components capable of oscillation and internal pull-up circuit

0M Ground potential 1

1M Ground potential 2

2M Ground potential 3

Figure 3-11 Internal wiring of input terminals

3.4.2.5 Redundant antivalent signal logic with discrepancy analysis

In the case of 1oo2 evaluation, the sensor is routed to two different, mutually antivalent channels and is therefore evaluated by the controller twice. The discrepancy analysis is performed between the two channels of the 1oo2 evaluation in the controller. If there is a discrepancy between the input signals after expiry of the parameterized discrepancy time, e.g. due to breakage of a sensor cable, the internal signal is set to "0". The discrepancy analysis at the input channels is performed with the "AND0" discrepancy analysis block (for more, see also section Free function blocks (Page 79)). This special kind of signal routing achieves PLd and enables both high availability and error detection.

The following graphics show an example of 2-channel antivalent wiring of a sensor (antivalent).

Antivalent connection of an antivalent sensor to two channels

A 2-channel sensor is required for the signal (1oo2 evaluation)

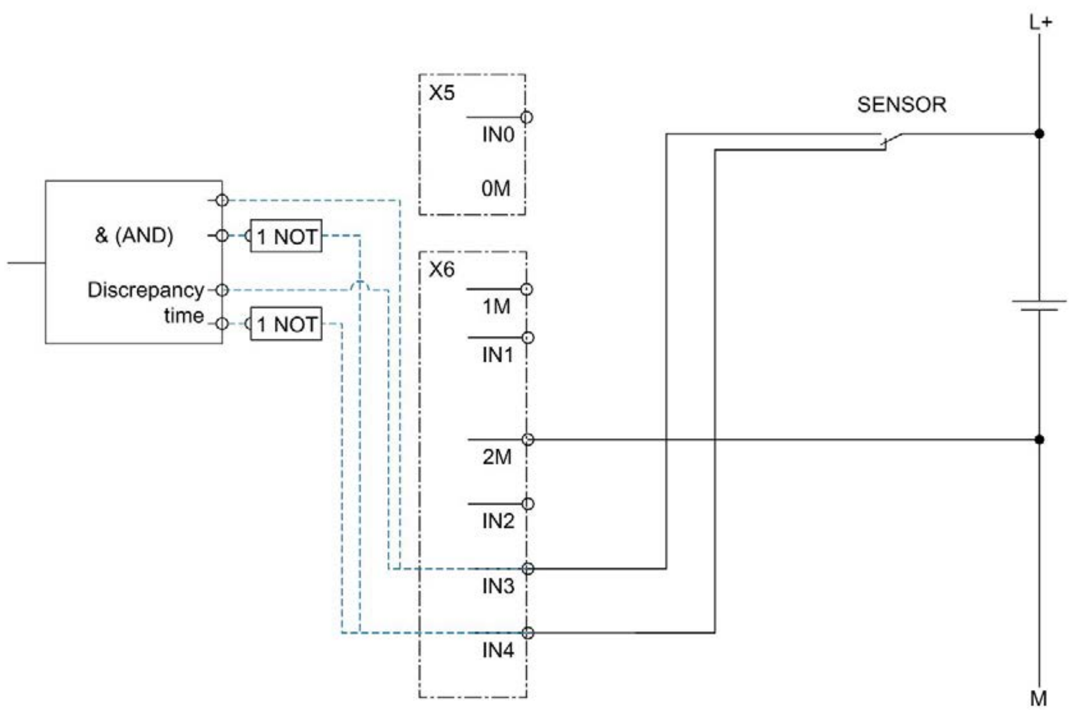


Figure 3-12 Connect the switchgear to the change-over contact, 2-channel nonequivalent

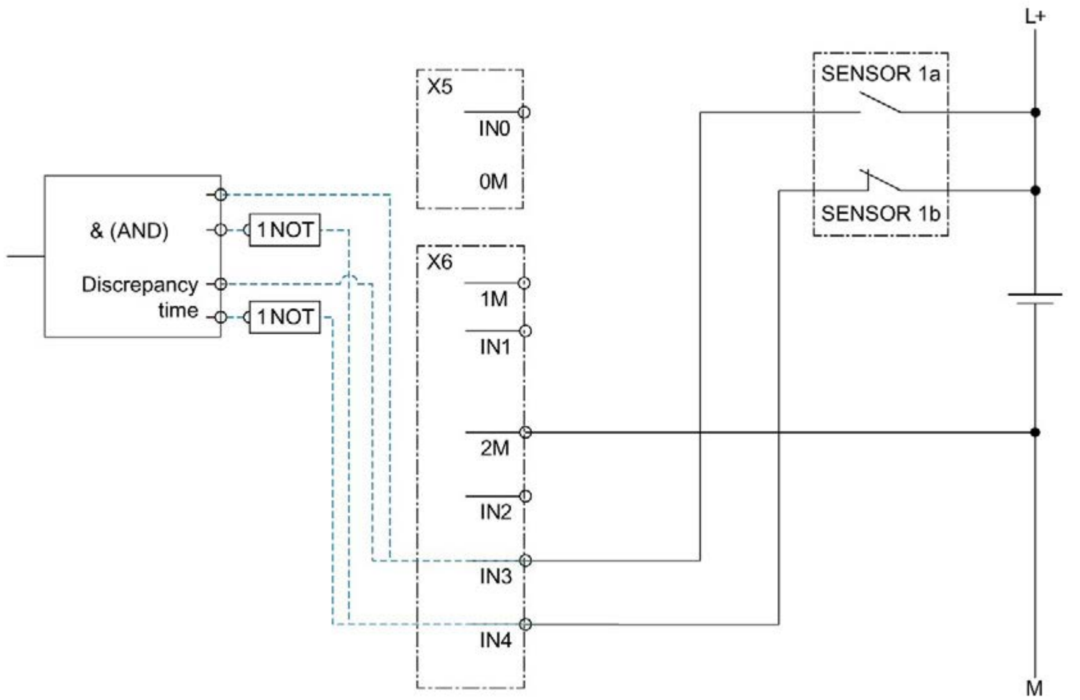


Figure 3-13 Connect the switchgear to two separate non-equivalent change-over contacts, 2-channel non-equivalent*

* Two 1-channel sensors can also be connected as an alternative.

3.4.2.6 Frequency-based input signals

As well as 1oo2 evaluation with antivalent channels, a frequency-based system can also be used to implement fail-safe inputs according to PLd.

Two frequency analysis blocks are available for this purpose, and can be linked to any input channel. For more, see also section Free function blocks (Page 79).

3.4.2.7 Two-hand operation concept (according to Cat. IIIA)

This concept describes implementation of two-hand operation in compliance with DIN EN 574:2008-12, Category IIIA. To achieve the specified Category IIIA, it is imperative that a discrepancy time of ≤ 500 ms be parameterized.

Note

Only Category I is possible with discrepancy times > 500 ms.

Where a two-hand control device is used, two sensors are routed to the SIDOOR controller in a safety-related fashion and are internally evaluated via the "AND0" discrepancy analysis block.

Antivalent connection of two redundant antivalent sensors to two channels

Two redundant antivalent sensors are needed for the signal (1oo2 evaluation)

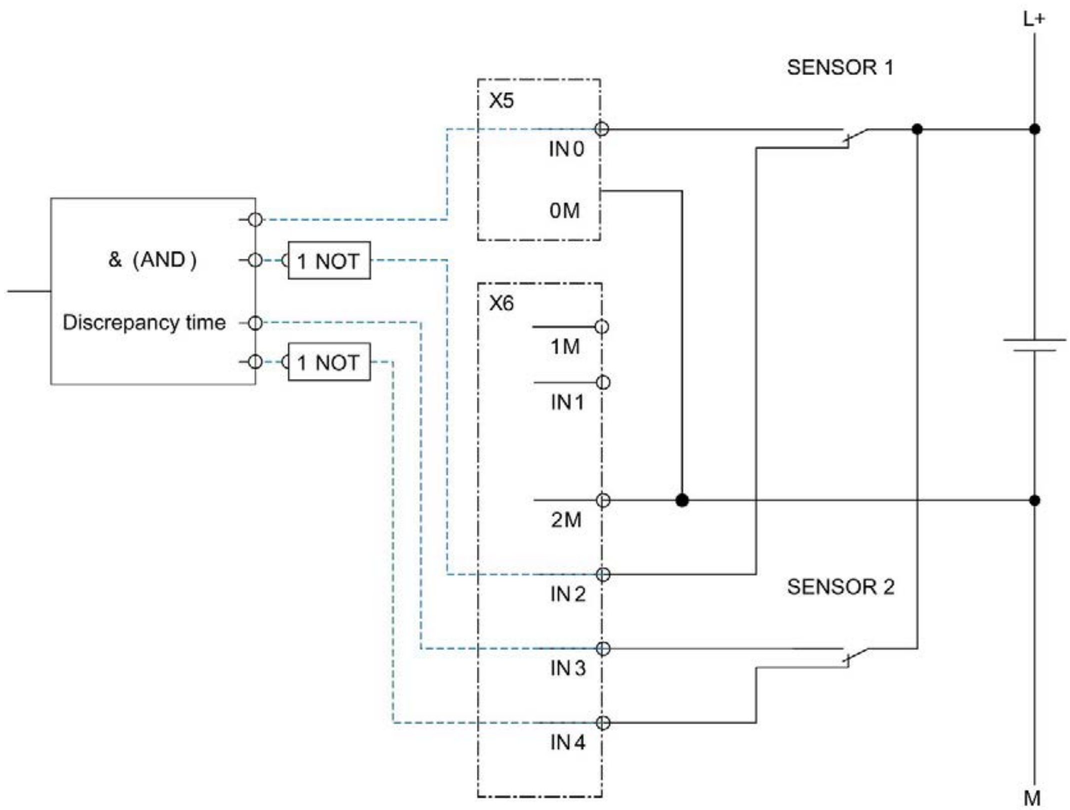


Figure 3-14 Two-hand control device example

Antivalent connection of two redundant, two-channel antivalent sensors to two channels

Two redundant 2-channel antivalent sensors are needed for the signal (1oo2 evaluation)

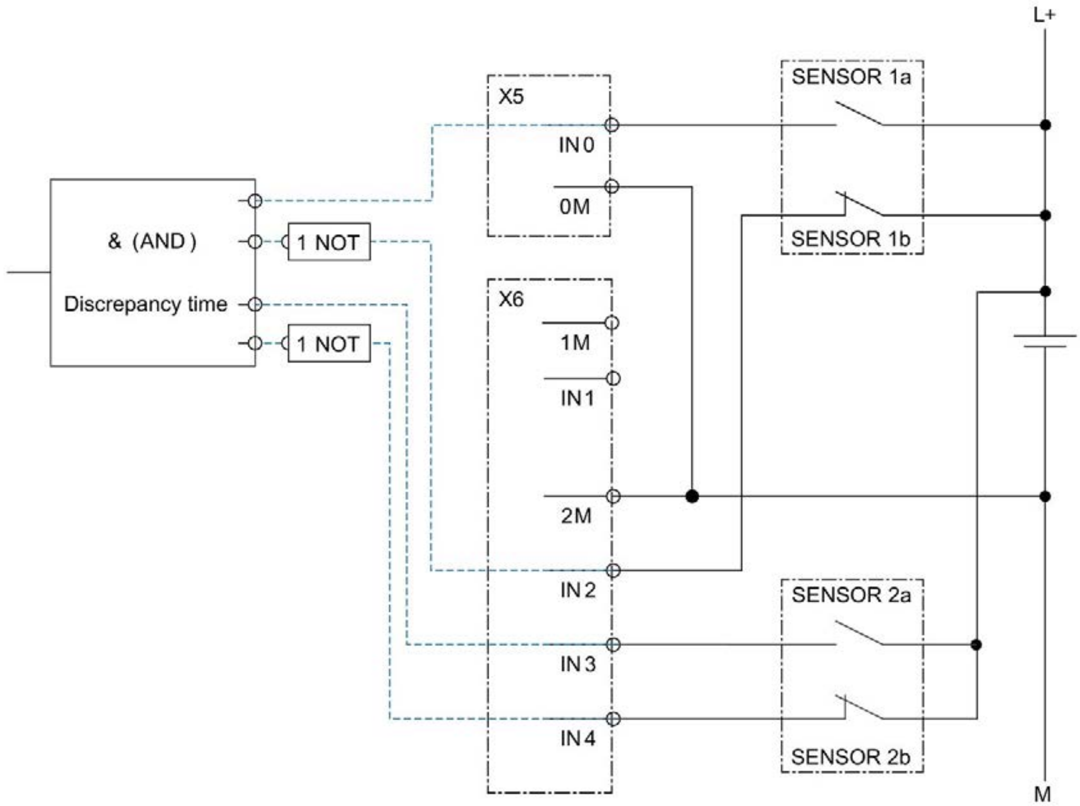


Figure 3-15 Two-hand control device example

The output of the "AND0" block can be directly assigned a drive order or can be assigned the prioritized STOP door command via an additional negation block. This corresponds to enabling for the actual drive order. The following example illustrates this:

- Open drive order is activated.
- 2-hand control device inactive → STOP (highest priority)
- 2-hand control device active → STOP is cleared → OPEN becomes active

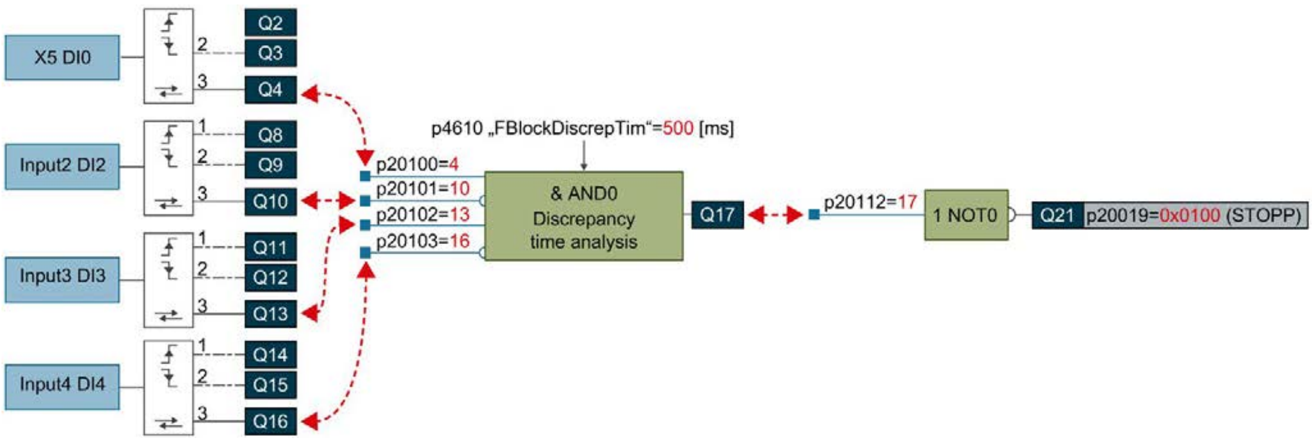


Figure 3-16 Two-hand control device example parameterization

3.4.2.8 Emergency stop concept in accordance with stop category 1

This concept describes the implementation of the emergency stop function according to stop category 1 according to EN ISO 13850:2015 section 4.1.3 Stop category 1.

Safe motor shutdown

SIDOOR ATD4xxW controllers have an internal, cyclically tested and monitored second shutdown route according to PLd. This ensures safe shutdown of the motor (emergency stop).

Door commands

The door command with the highest priority is STOP → ramp stop.

The status following the ramp stop can be defined with the "special" door command expansion bit: EMF brake activated or de-energized (free running mode or de-energized).

Implementation

For the implementation of an emergency stop circuit, the emergency stop signal must be routed to the SIDOOR controller in a safety-related manner (frequency-based or 2-channel antivalent evaluation) and internally linked with a stop door command. A negation block must be configured if a low-active emergency stop signal is used.

The following figure shows an example of a low-active emergency stop signal with frequency-based channel protection at INPUT0.

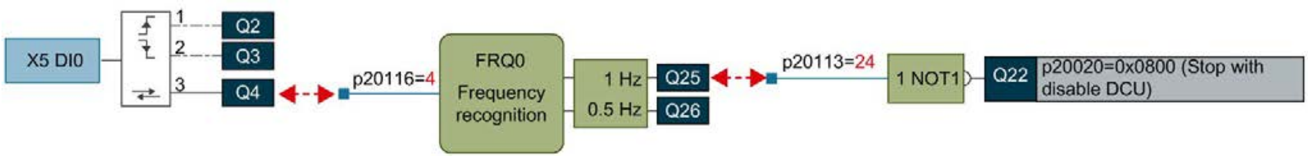


Figure 3-17 Example emergency stop parameterization

3.4.2.9 Concept of fail-safe digital control (door OPEN/CLOSE) with emergency stop via 4 digital inputs

This concept describes an implementation variant of the emergency stop function according to stop category 1 of EN ISO 13850, with safe control (according to PLd) of the drive orders OPEN/CLOSED via four digital inputs.

Safe motor shutdown

SIDOOR controllers have an internal, cyclically tested and monitored second shutdown route according to PLd. This ensures safe shutdown of the motor (emergency stop).

The figures below show examples of the safe controller (according to PLd) door OPEN/CLOSE with emergency stop according to stop category 1 via four digital inputs via a redundant antivalent channel protection.

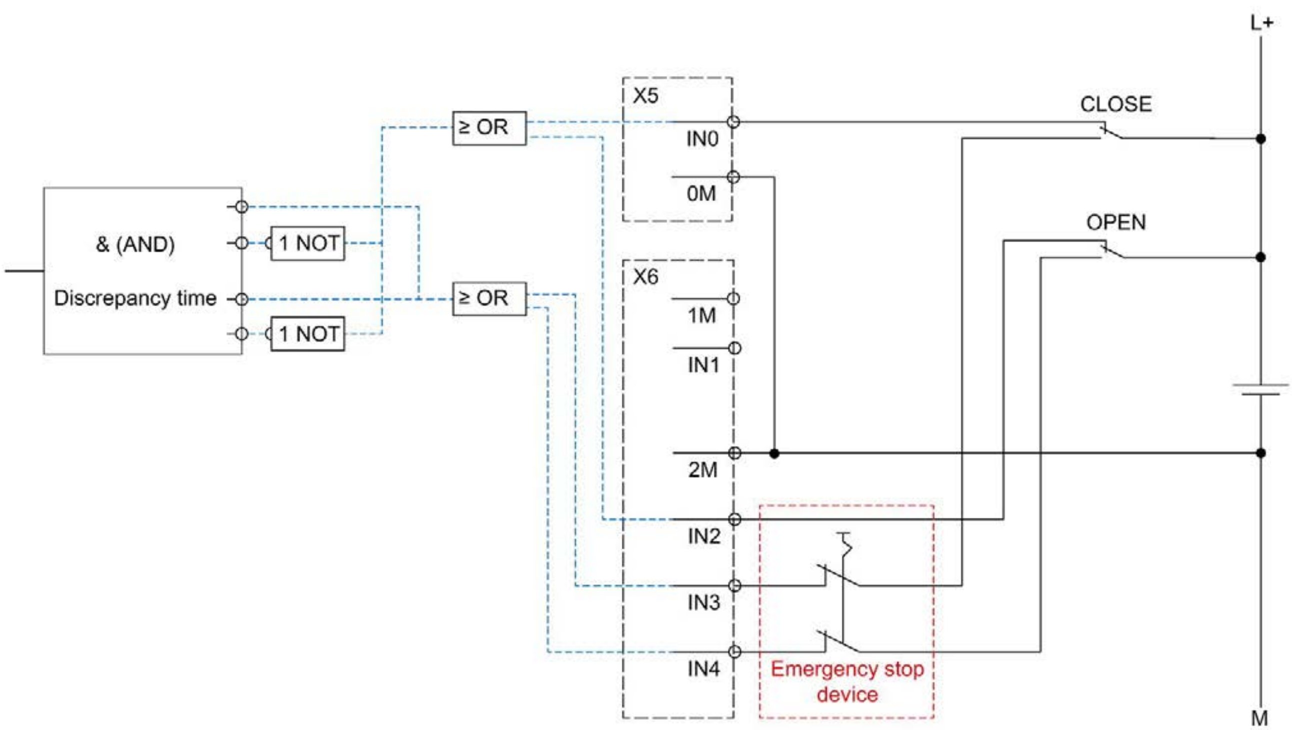


Figure 3-18 Interfacing safe (PLd) digital door control (OPEN/CLOSE) with emergency stop (encoder type 1) via 4 digital inputs

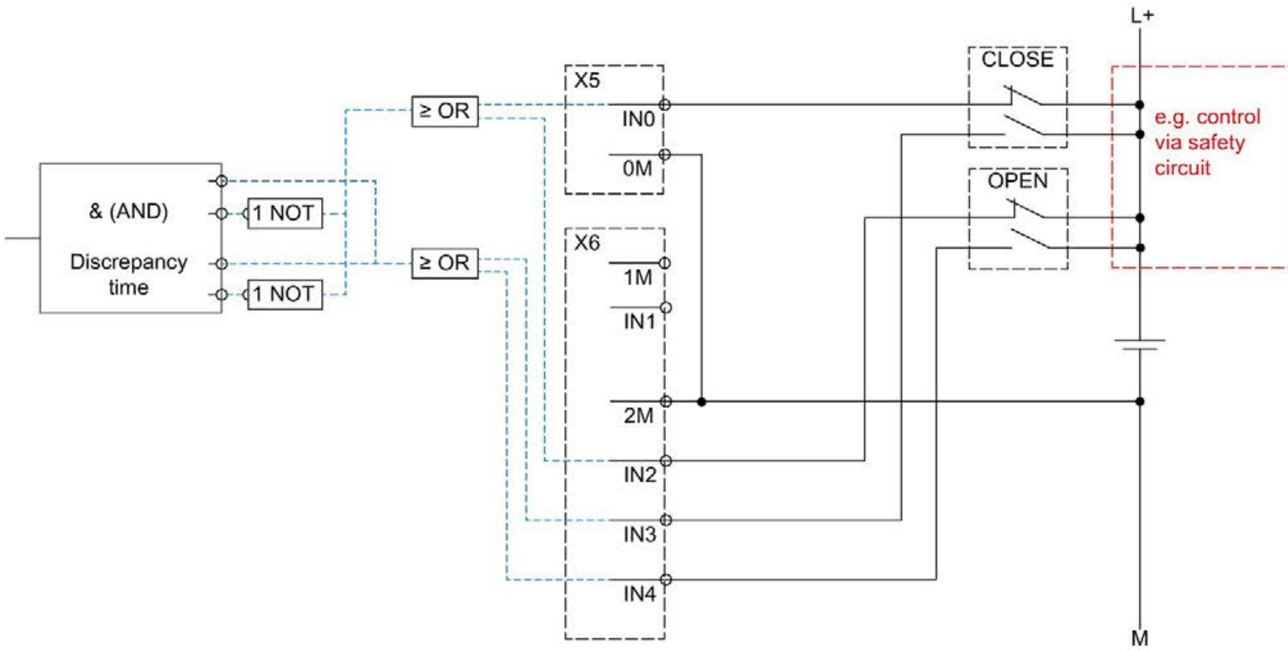


Figure 3-19 Interfacing safe (PLd) digital door control (OPEN/CLOSE) with emergency stop (encoder type 2)

Door commands

The door command with the highest priority is STOP → ramp stop.

The status following the ramp stop can be defined using the "special" door command expansion bit as either EMF brake activated or de-energized (free running mode or de-energized).

Implementation

To implement this interfacing connection, the emergency stop signal must be routed in a safety-related manner to the SIDOOR controller (2-channel antivalent evaluation here) and internally linked with a stop door command.

A negation block must be configured because a low-active emergency stop signal is used here.

The OPEN (door OPEN) and CLOSE (door CLOSE) door commands can only become active if no emergency stop signal is present.

All signals are safeguarded by redundant antivalence and therefore comply with PLd.

The emergency stop signal is only active in combination with the issuing of a door command via the external OPEN (door OPEN) or CLOSE (door CLOSE) encoders.

All digital inputs available on the SIDOOR controller can be used for this application.

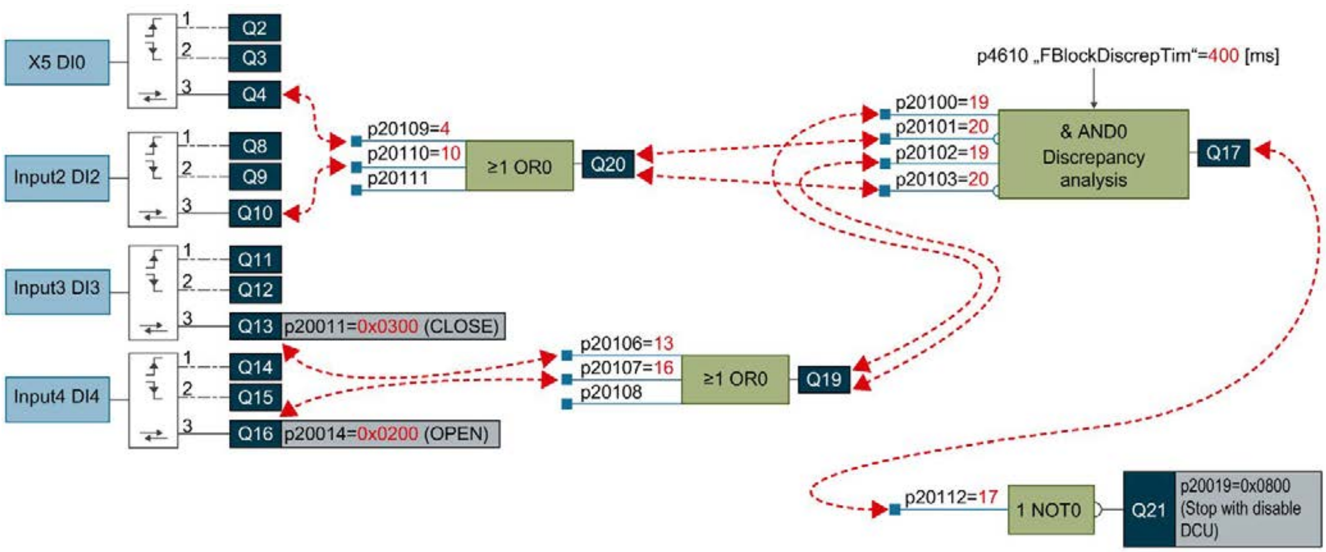


Figure 3-20 Example emergency stop parameterization (digital control) via 4 digital inputs

3.4.2.10 Concept of fail-safe digital control (door OPEN/CLOSE) with emergency stop via 3 digital inputs

This concept describes an implementation variant of the emergency stop function according to stop category 1 of EN ISO 13850, with safe control (according to PLd) of the drive orders OPEN/CLOSED via three digital inputs.

Safe motor shutdown

SIDOOR controllers have an internal, cyclically tested and monitored second shutdown route according to PLd. This ensures safe shutdown of the motor (emergency stop).

The following figures show examples of safe OPEN/CLOSE door control (in accordance with PLd) with emergency stop in accordance with stop category 0 via 3 digital inputs via redundant antivalent channel safeguarding.

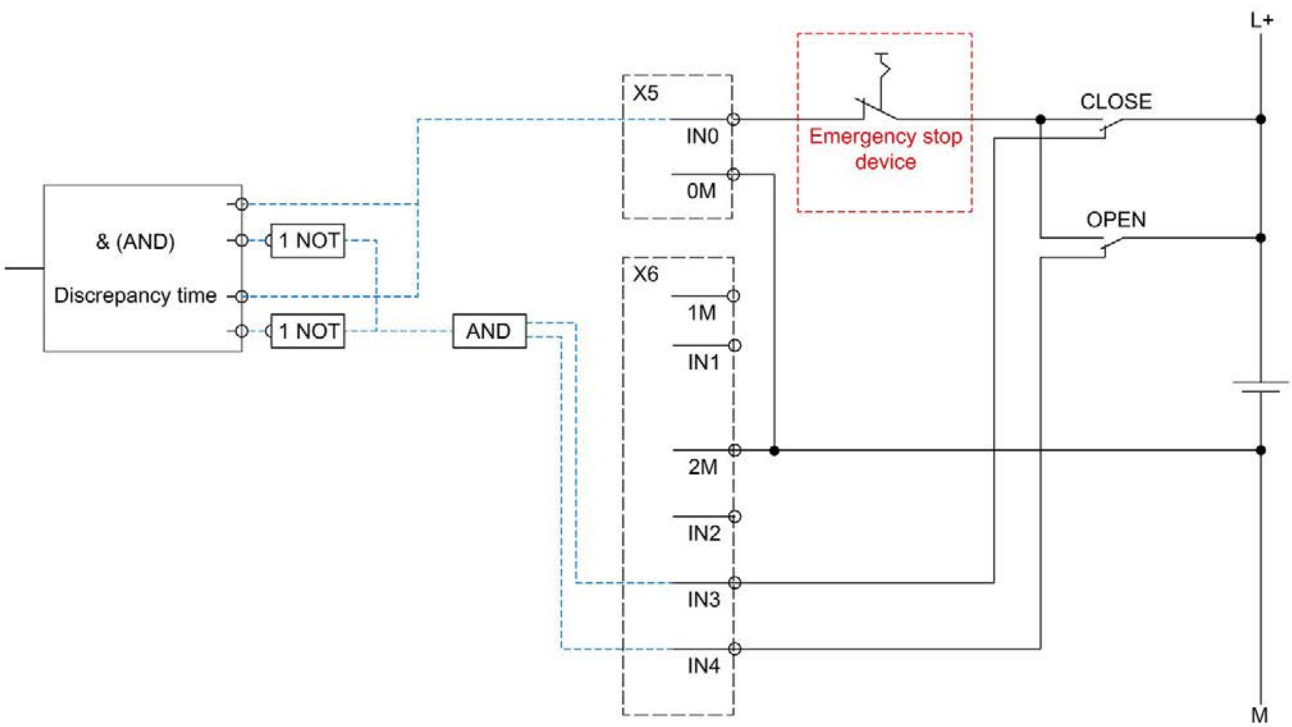


Figure 3-21 Interfacing safe (PLd) digital door control (OPEN/CLOSE) with emergency stop (encoder type 1) via 3 digital inputs

Door commands

The door command with the highest priority is STOP → ramp stop.

The status following the ramp stop can be defined using the "special" door command expansion bit as either EMF brake activated or de-energized (free running mode or de-energized). With ATD401W, the drive command extension is permanently set to "free running mode".

Implementation

For the implementation of this interfacing variant, the emergency stop signal is integrated into the redundant antivalent safety circuit. The emergency stop element itself is only routed to the SIDOOR controller through 1 channel. It is combined via an internal enabling logic with a STOP door command of the highest priority.

The OPEN (door OPEN) and CLOSE (door CLOSE) door commands can only become active if no emergency stop signal is present. The emergency stop signal is integrated in a low-active branch. This is taken into account in the internal enabling logic.

After an emergency stop, a door command can only be activated again after both door commands have been inactive together.

The OPEN (door OPEN) and CLOSE (door CLOSE) door commands are read in at the inputs 4 or 3 with negative logic (low-active).

The emergency stop signal is only active in combination with the issuing of a door command via the external OPEN (door OPEN) or CLOSE (door CLOSE) encoders.

All digital inputs available on the SIDOOR controller can be used for this application.

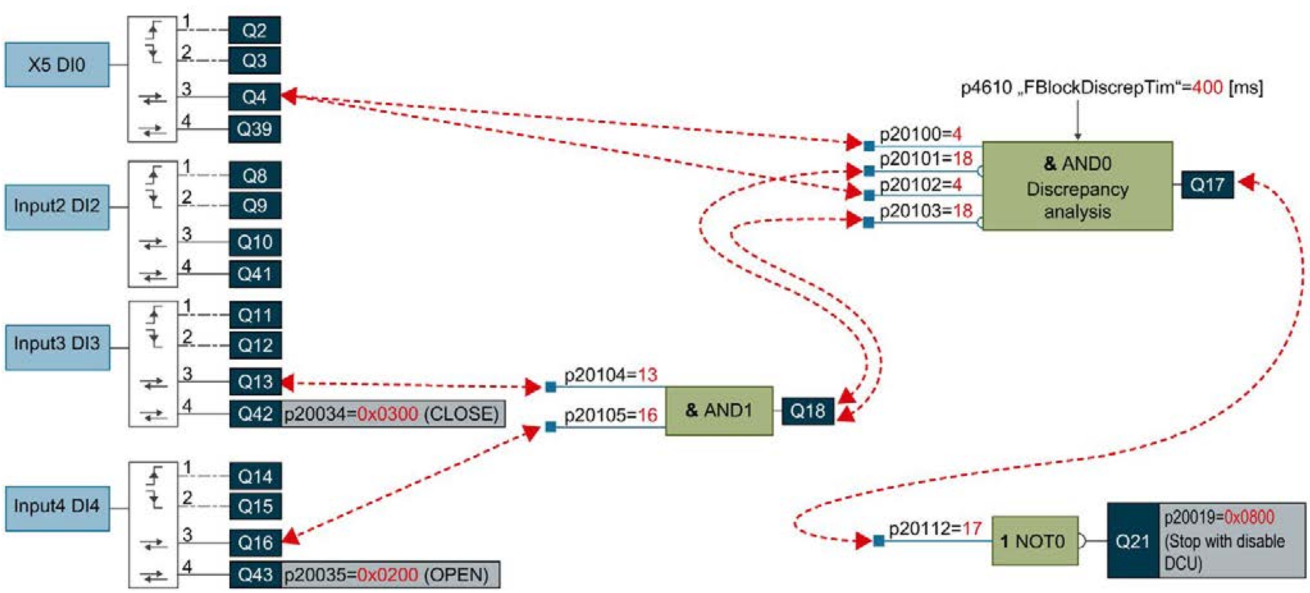


Figure 3-22 Example emergency stop parameterization (digital control) via 3 digital inputs

Information regarding PLd

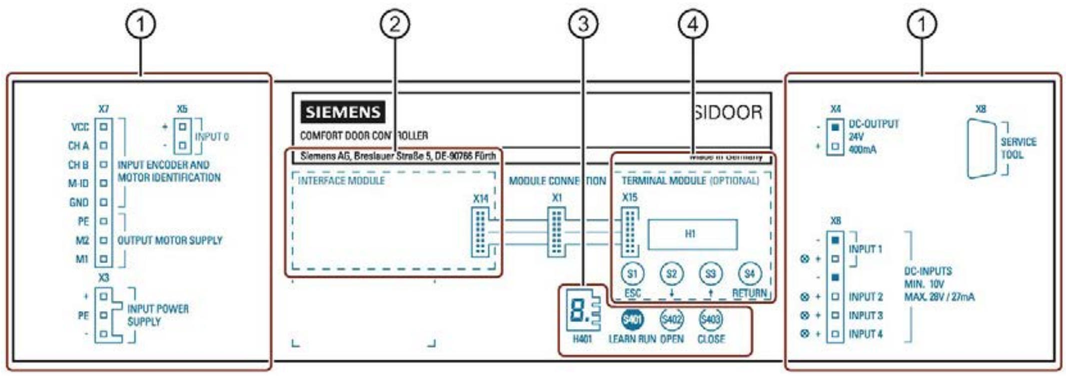
In the case of this interfacing variant, compliance with PLd only ensures that the motor control is reliably read in by the OPEN (door OPEN) or CLOSE (door CLOSE) door commands and the emergency stop signal in accordance with stop category 1. This does not affect the distinction between the OPEN (door OPEN) and CLOSE (door CLOSE) door commands.

Controllers 4

4.1 Description of controller

Overview

SIDOOR ATD4xxW



① Connecting terminals
② Relay module/USS module/PROFIBUS module/PROFINET module
③ Service buttons/Minimal editor
④ Terminal module

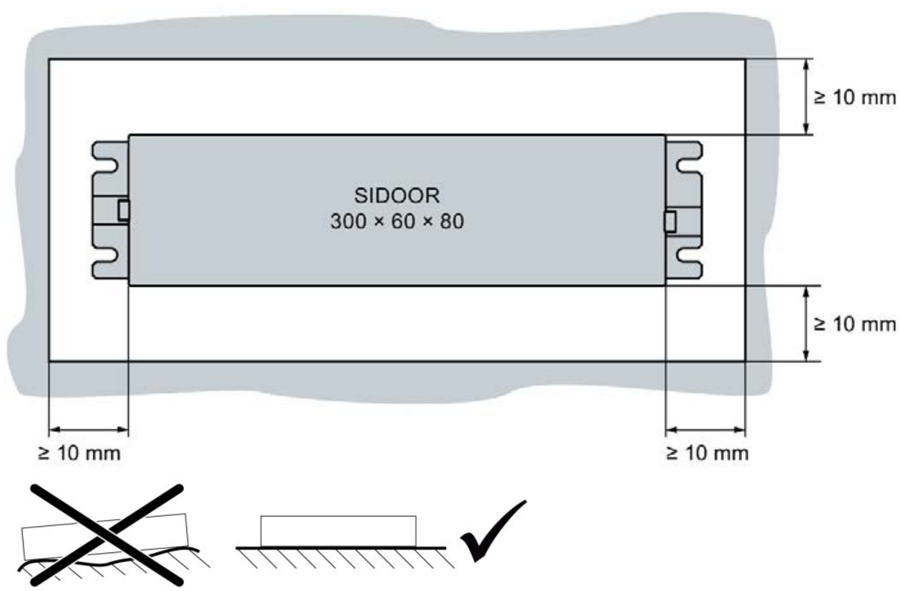
4.2 Installing the control unit

Requirement

The installation site must fulfill the following requirements:

- Minimum clearance to surrounding parts 1 cm
- Even mounting surface
- Maximum distance from the power supply on account of the cable length:
  - SIDOOR NT40 / SIDOOR TRANSFORMER / SIDOOR TRANSFORMER UL: 1.5 m
- Maximum distance from the geared motor on account of the cable length:
  - For SIDOOR M3, M4 and M5: 1.5 m
  - With SIDOOR MDG3, MDG4, MDG5: 5m / 10m / 15m / 20m

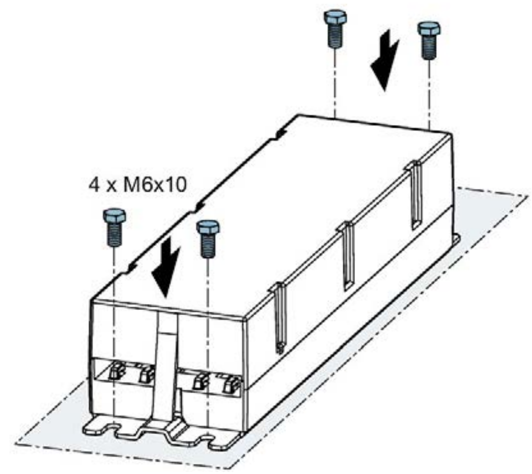
    (Length depends on the MDG cable used)



WARNING
Risk of injury as a result of incorrect installation
Final application-specific requirements must be observed.
Installation outside a control cabinet only in horizontal mounting position.

Installation

Proceed as follows to install the controller:

<table>
<tr><th colspan="2">Steps</th><th>Figure</th></tr>
<tr><td>1.</td><td>Drill the holes for the screws as shown in the dimension drawing.</td><td rowspan="2">
</td></tr>
<tr><td>2.</td><td>Secure the controller with 4 (M6 x 10) screws.</td></tr>
</table>

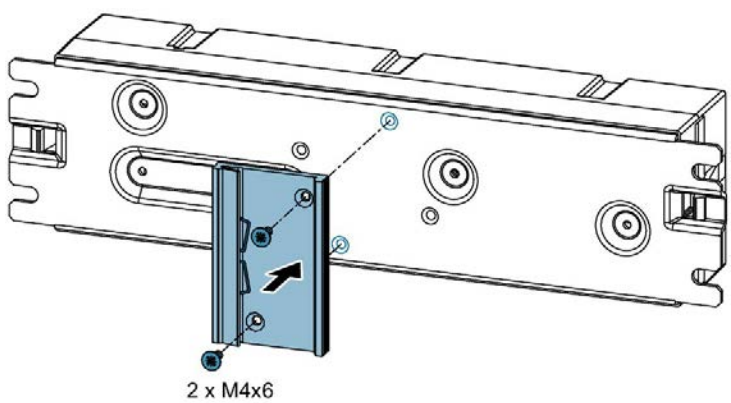
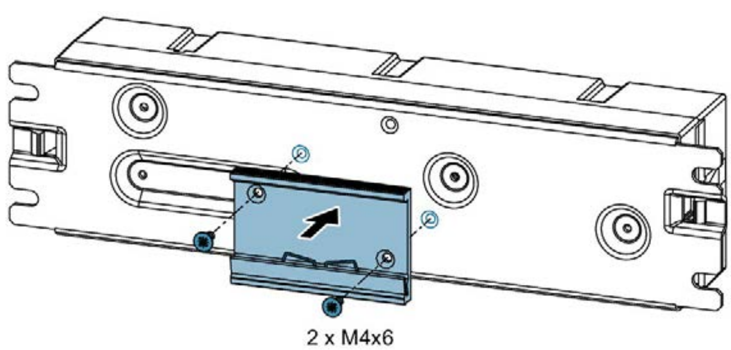
Installation on a mounting rail

You need the SIDOOR standard rail mounting to mount a SIDOOR controller on a standard mounting rail.

The SIDOOR standard rail mounting can be mounted on the controller in two different ways. This enables the controller to be mounted both vertically and horizontally on a standard mounting rail.

NOTICE
Material damage The maximum screw depth when mounting a SIDOOR standard rail mounting on a controller is 2.5 mm. The use of longer screws can result in damage to the controller. For this reason, use only the fixing screws supplied for mounting the SIDOOR standard rail mounting.

Proceed as follows to mount the standard rail mounting:

Steps		Figure
1.	Select either a vertical or horizontal orientation for mounting the controller on the standard mounting rail.	**Vertical**  **Horizontal** 
2.	Screw the SIDOOR standard rail mounting tightly to the controller with 2 (M4 x 6) screws. Use the predrilled holes in the controller for this purpose.	

4.3 Wiring instructions

NOTICE
Material damage
Use only cables with a temperature range ≥ 85°C

Terminal information and wiring rules

Table 4- 1 Terminal information for SIDOOR ATD4xxW

Interface	Name	Terminal	Tool	Solid conductor	Stranded conductor	AWG	Nm	Stripping insulation
X3	Input power supply	WAGO: 721-103/026-045	SZS 0.6X3.5	1x 1.5-2.5 mm^2	1x 1.5-2.5 mm^2	15 - 12	-	8-9 mm
X4	DC output	PHOENIX: 1792757	SZS 0.6X3.5	1x 0.2-2.5 mm^2	1x 0.2-2.5 mm^2	30 - 12	0.5 - 0.6	7 mm
X5	Input 0	PHOENIX: 1792249 only with ATD410W, ATD420W, ATD430W	SZS 0.6X3.5	1x 0.2-2.5 mm^2	1x 0.2-2.5 mm^2	30 - 12	0.5 - 0.6	7 mm
		PHOENIX: 1779987 for ATD401W	SZS 0.6X3.5	1x 0.2-2.5 mm^2	1x 0.2-2.5 mm^2	30 - 12	0.5 - 0.6	7 mm
X6	Input 1…4	PHOENIX: 1792799	SZS 0.6X3.5	1x 0.2-2.5 mm^2	1x 0.2-2.5 mm^2	30 - 12	0.5 - 0.6	7 mm
X7	Motor plug	PHOENIX: 1757077	SZS 0.6x3.5	1x 0.2-2.5 mm^2	1x 0.2-2.5 mm^2	30 - 12	0.5 - 0.6	7 mm
X11, X12, X13	Relay module Relay outputs 1 *	PHOENIX: 1757022	SZS 0.6X3.5	1x 0.2 – 2.5 mm^2	1x 0.25 – 2.5 mm^2	30 - 12	0.5 - 0.6	7 mm
X100	USS/PROFIBUS/ PROFINET module relay outputs 1 **	PHOENIX: 1803594	SZS 0.4X2.5	1x 0.14 – 1.5 mm^2	1x 0.14 – 1.5 mm^2	30 – 14	0.22 - 0.25	7 mm

1 Only for modules with the corresponding module

* Only with ATD401W

** ATD410W, ATD420W, ATD430W only

4.4 Connecting terminals

4.4.1 Digital input signals

Slot X6

You can connect certain signals for drive functions at the inputs Input 1, Input 2, Input 3, Input 4 (X6) and Input 0 (X5). The following table shows how the drive function and input are assigned depending on the controller.

Table 4- 2 Overview of signals for drive functions at slots X5 and X6

Slot X5/X6	ATD401W Standard input [1]	ATD401W Emergency stop with three inputs [2] (see Fail-safe digital control concept (Page 112))	ATD401W Cold storage function [3]	ATD410W/ATD420W/ ATD430W
Input 0	NDG (second force and energy profile) [3]	Stop (inverted)	RC[4] (door interlocking)	INPUT 0: Functions configurable (Page 74) via free function blocks (FBLOCK) INPUT 1: Configurable as a local sensor type or via function blocks (FBLOCK) (Page 74)
Input 1	Parameterizable (local sensor type)	Parameterizable (local sensor type)	Parameterizable (local sensor type)	
Input 2	Partial opening operation	Partial opening operation	Cord-operated switch (cord-operated switch OPEN/CLOSE)	Functions configurable (Page 74) via free function blocks (FBLOCK)
Input 3	CLOSE DOOR	CLOSE DOOR (inverted)	CLOSE DOOR (pulse controlled)	
Input 4	OPEN DOOR	OPEN DOOR (inverted)	OPEN DOOR (pulse controlled)	
Input 1, Input 2, Input 3 and Input 4 inactive	Deenergize (not a door command)	–	–	–

[1] Adjustable via the service menu *"General setup > Special parameters > FBLOCK configuration > FBLOCK config. Standard input"*

[2] Adjustable via the service menu *"General setup > Special parameters > FBLOCK configuration > FBLOCK config. Emergency stop 3 inp."*

[3] Adjustable via the service menu *"General setup > Special parameters > FBLOCK configuration > FBLOCK config. Cold storage mode"*

[4] Note: Although the RC input is activated, it is always possible to move the door using the service buttons.

Note

To avoid issuing unintentional door commands, remove the terminals X6 and X5 before changing the FBLOCK input configuration.

Note

SIDOOR ATD410W/ATD420W/ATD430W

Input 0 to input 4 are not assigned functions on control units with a fieldbus connection in the factory state. Parameter assignment is performed with the free function blocks (FBLOCK) (Page 74).

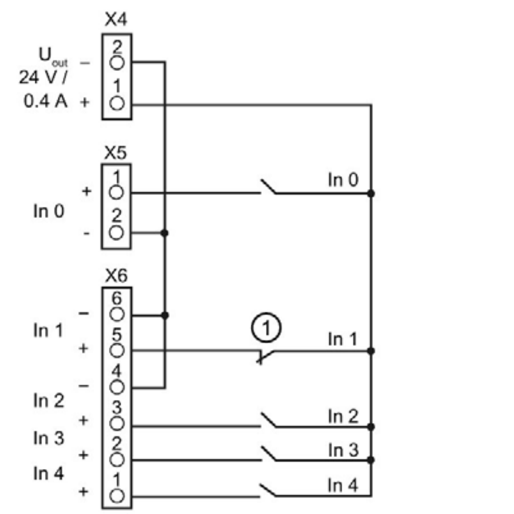
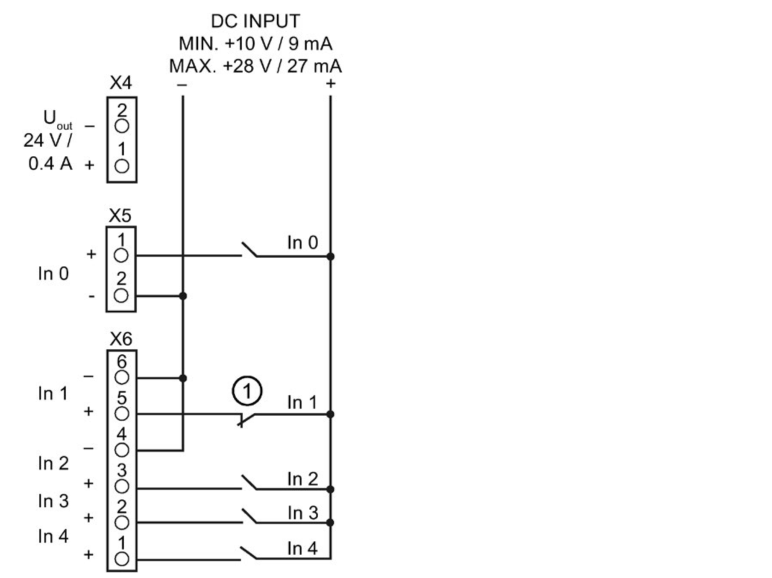
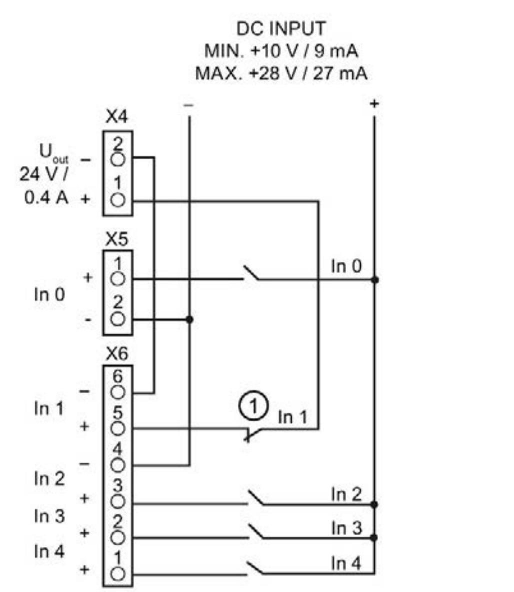
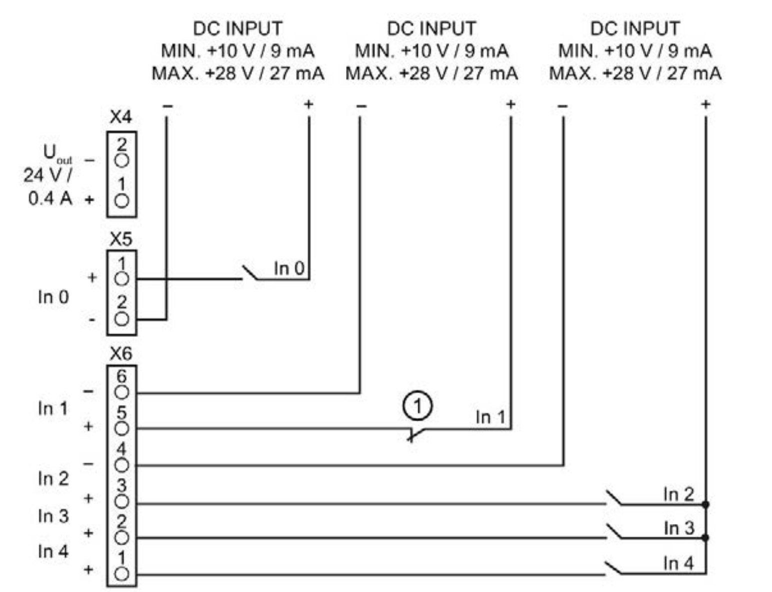
Note

Input 1 is isolated from input 0, input 2, input 3 and input 4. Therefore, input 1 can be connected independently of input 0, input 2, input 3 and input 4 as follows:

1. Connection to the internal 24 V control voltage (see figure c below.)
2. Connection to the same or a different external control voltage as input 0, input 2, input 3 and input 4 (see figures b and d below.)

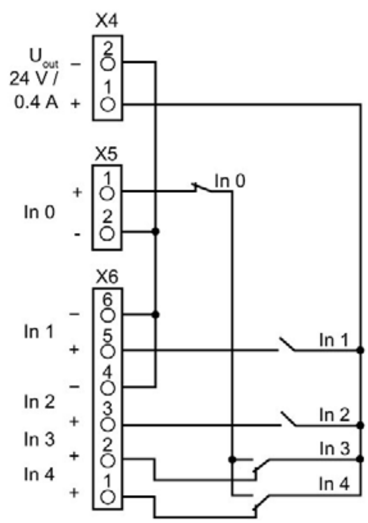
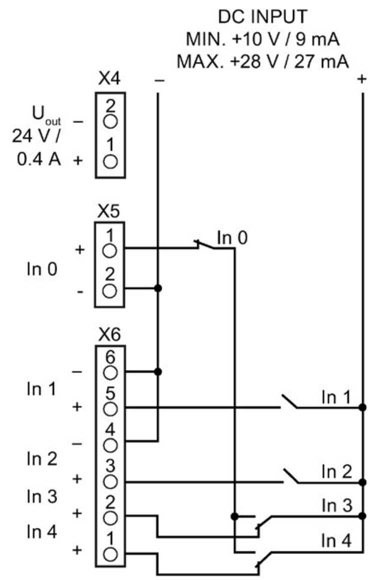
Terminal circuit diagrams

Table 4- 3 Terminal circuit diagrams for digital input signals / cold-storage function

a.	Connection to an internal 24 V control voltage	b.	Connection to an external control voltage
			
c.	Connection to an internal 24 V control voltage (input 1) and an external control voltage (input 0, input 2, input 3 and input 4)	d.	Connection to an external 24 V control voltage (input 0 isolated from input 1 and isolated from input 2, input 3 and input 4)
			

① Light barrier, DCPS sensor, jumpered or switch. The wiring depends on the sensor type and the configuration of Input 1.

Table 4- 4 Terminal circuit diagrams for emergency stop with 3 digital inputs

<table>
<tr><th>Connection to an internal 24 V control voltage</th><th>Connection to an external control voltage</th></tr>
<tr><td>
</td><td>
</td></tr>
</table>

Configurable via the service menu *"General setup > Special parameters > FBLOCK configuration > FBLOCK Config. Emergency stop 3 inp."*

In 0: Emergency stop device

In 1: Wiring depends on the sensor type and the configuration of Input 1.

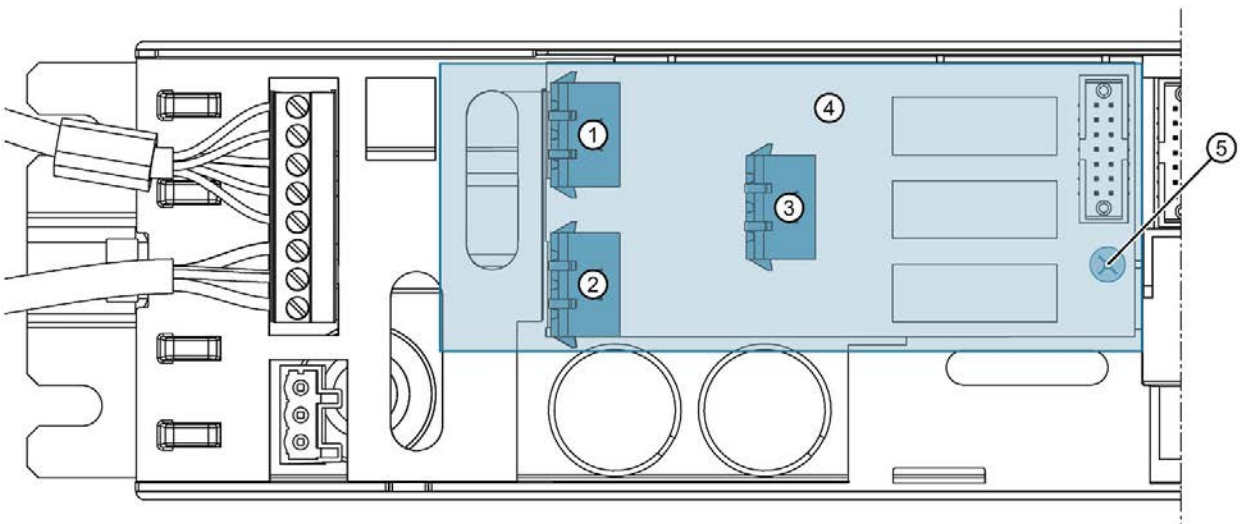
4.4.2 Voltage output

Slot X4	Function
DC OUTPUT	24 V ±15 %, max. 400 mA / max. 100 mA

4.5 Relay and fieldbus interfaces

4.5.1 Relay module

Overview



① X11
② X13
③ X12
④ Protective cover
⑤ Fixing screw for the protective cover

Figure 4-1 Relay module

Task

The relay module's relay contacts can be used to report the following door states to the higher-level controller:

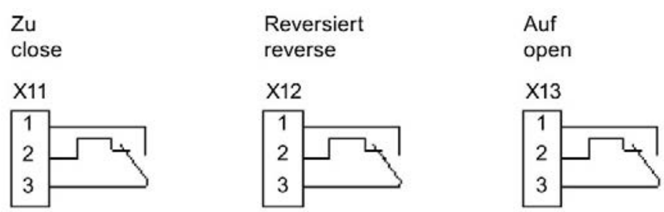
Table 4- 5 SIDOOR ATD401W door states

Relay contact	Designation	Function
X11	CLOSE (closed)	The system's internal door state "closed" is signaled via this relay (relay contact is closed). This state is not only position-dependent. Note the following conditions: • The "closed" state can **only** be achieved with a drive order • The "closed" state cannot be achieved by external pushing • The "closed" state can be terminated by means of a drive order or external pushing
X12	REVERSE (reversing)	The relay is additionally influenced by the sensor configuration (parameter p4600). See also section Sensors and external sensor interface module (Page 166). • **Sensor function test inactive** The control signals that the current drive order's direction is reversed. Example: automatic reversing due to an obstruction, provided that the applicable reversing response is parameterized. The relay is active as long as the current drive order is inversed. • **Sensor function test active** The "TestOUT" sensor function test signal is output.
X13	OPEN	The system's internal door state "open" is signaled via this relay (relay contact is closed). This state essentially depends on the current door position. • The "open" state can be achieved both by means of a drive order and also by external pushing. • The state can be terminated by means of a drive order or external pushing
X11 and X13	FAULT	There is a fault in the system if both relays are simultaneously active (relay contacts closed).

Connection

> ⚠ **DANGER**
>
> **Risk of injury from dangerous electrical voltages**
>
> Only safety extra-low voltages may be applied to the relay module. <=30 V DC.

Terminal circuit diagram of the relay contacts

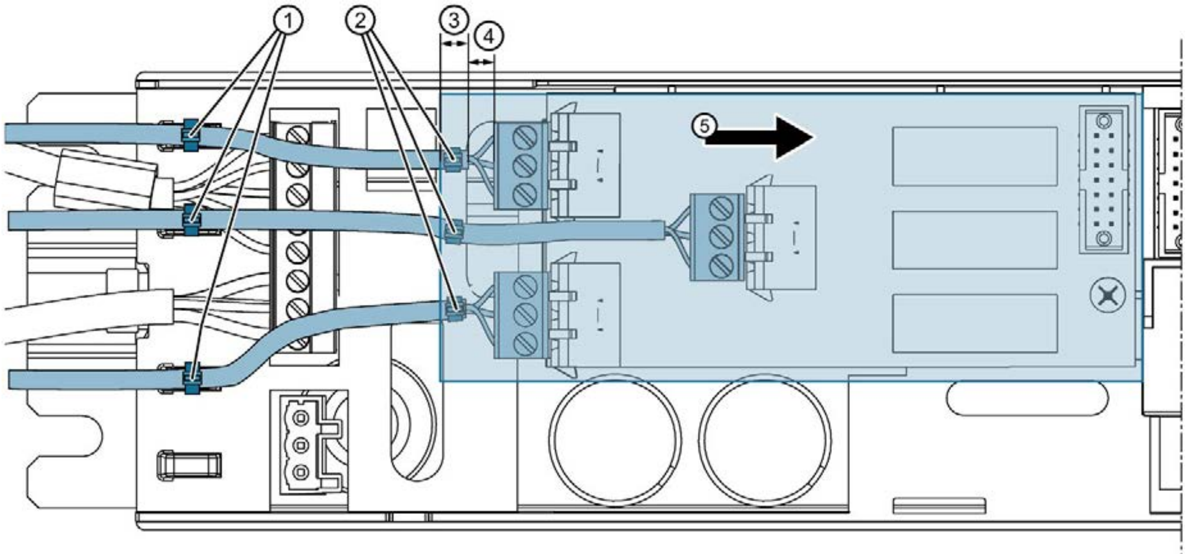


Procedure

Note

Specifications for connecting the relay module

- The cables connected must be suitable for the voltage used and have appropriate (double or reinforced) insulation. Cables with an external diameter of 6 to 7 mm are recommended.
- Components of the controller and connecting cable, such as the motor plug and its wires, may only come in contact with the additional (or reinforced) insulation of the current-carrying wires.



① Cable ties (strain relief in housing)
② Cable ties (security against being pulled out within the protective cover)
③ Minimum length of the cable jacket within the protective cover: 5 mm
④ Minimum length of the single-insulation on the single cores: 5 mm
⑤ Insertion direction for the protective cover

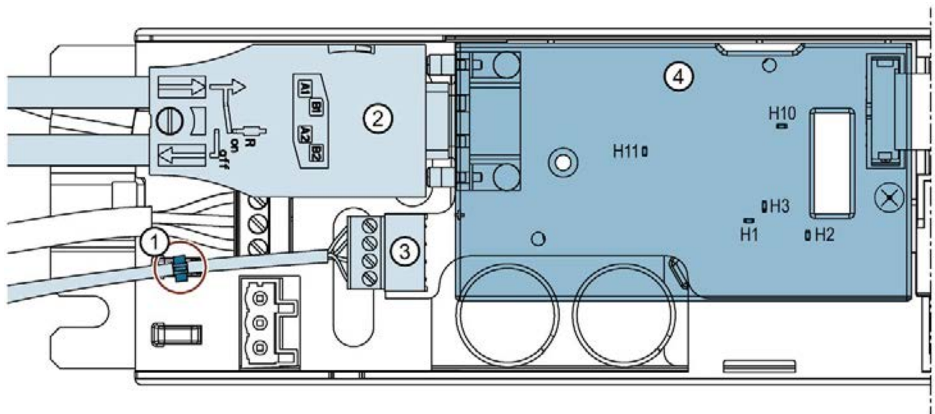
1. Unscrew the fixing screw holding the protective cover on the relay module.
2. Slide the protective cover against the insertion direction and remove it.
3. Connect connectors X11, X12 and X13.
4. Ensure that, inside the cover, the single-insulation is removed from the single cores at least 5 mm from the cable entry openings, and the cores connected to the terminal connectors are as short as possible.
5. Secure the cables inside the plastic cover against being pulled out through the oval aperture in the relay cover. Use cable ties for this purpose, tie each of them tightly round the cable.

   Ensure that the cable tie is tied so that at least 5 mm of the outer cable jacket lies inside the protective cover.
6. Provide additional strain relief by attaching more cable ties to the fixing points provided in the housing.
7. Slide the protective cover in the insertion direction back into its correct position.
8. Screw the fixing screw holding the protective cover on the relay module back in.

4.5.2 USS

4.5.2.1 USS module

Overview



① Cable ties
② X705
③ X100
④ Protective cover

Task

The USS module enables the SIDOOR ATD410W door controller to be connected to a USS fieldbus.

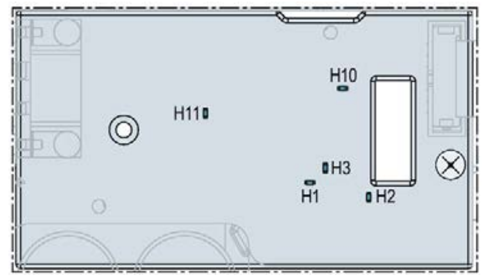
A maximum of 32 nodes (1 master, 31 slaves) can be connected to the USS bus.

Interface

Data is transmitted according to the standard EIA 485 (/2/). The transmission is in principle half duplex, this means that sending and receiving take place alternately and have to be controlled by the software.

LED signals

The following five status LEDS are available on the USS module:

LED	Description	Position
H1	**Relay K1 picked up** LED H1 switches on when the controller has detected the CLOSED position and the pulse generator ceases to output pulses. The LED H1 is controlled by the basic module (signal X200.11).	
H2	**Relay K2 picked up** LED H2 switches on when the current distance of the door to the OPEN position falls below 2 cm and the relay has switched on. The LED H2 is controlled by the basic module (signal X200.9).	
H3	**Valid incoming telegram** LED H3 is controlled by the basic module (signal X200.12), and indicates the communication status. The LED flashes to indicate incoming, valid telegrams. Each signal change stands for such a telegram.	
H10	**P5V = OK**	
H11	**P5V_ISO (X705.6) = OK**	

4.5.2.2 Wiring and connecting the USS plug

Requirement

NOTICE
PROFIBUS connector
Use only the recommended PROFIBUS connectors from Siemens for the USS connection. See section Accessories (Page 21).

NOTICE
Material damage resulting from the connection of a PROFIBUS connector to service connection X8
Connecting a PROFIBUS connector to service connection X8 can damage the SIDOOR controller and the connected device.
For this reason, only connect a bus connector to connection X705.

Note

- Always use shielded cables.
- For stationary operation, it is advisable to remove the insulation of the shielded cable and to establish contact on the shield/PE conductor bar.
- If there is a potential difference between the grounding points, an impermissibly high compensating current can flow through the shield grounded at both ends. To rectify the problem, do not, under any circumstances, open the shield of the bus cable.

  Install an additional equipotential bonding conductor parallel to the bus cable to carry the shield current.
- You will find more detailed information in Manual SIMATIC Net PROFIBUS Networks (http://support.automation.siemens.com/WW/view/de/1971286/0/en).

Wiring

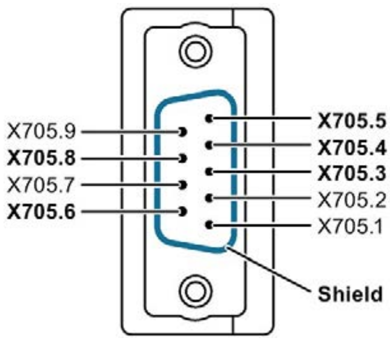


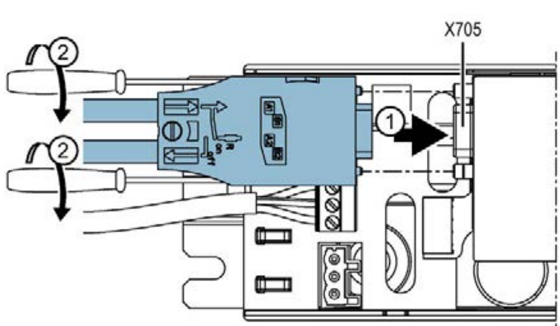
Table 4- 6 Assignment of X705

Pin	Assignment	Description
1	NC	Not connected
2	NC	Not connected
3	**RS 485P**	RS 485 interface (receive and send signals (+)) **Note:** For 6GK1500-0FC10: "B" (red)
4[1)]	**CNTR-P**	Repeater direction control
5	**GND**	Interface ground
6	**P5V**	5 V max. 10 mA, to be used in connector for bus network terminator only
7	NC	Not connected
8	**RS 485N**	RS 485 interface (receive and send signals (-)) **Note:** For 6GK1500-0FC10: "A" (green)
9	NC	Not connected
Shield	**Shield**	FE - functional grounding (bus cable shield)

1) with SIDOOR ATD420W

Connection

The wired PROFIBUS connector is connected to connection X705 and fastened by tightening the screws.



4.5.2.3 Wiring and connecting relay outputs

Wiring

The USS module has 2 relay outputs (closer contact).

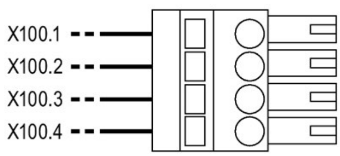
A maximum voltage of 42.0 V (SELV according to EN60950-1) may be applied to the USS module.

Contact rating of the relay outputs:

- DC max: 30 V DC, 500 mA

The matching 4-pole mating connector (PHOENIX MC1.5/4-ST-3.81) with the screw terminals is delivered along with the module (plugged in).

The pin assignments are:



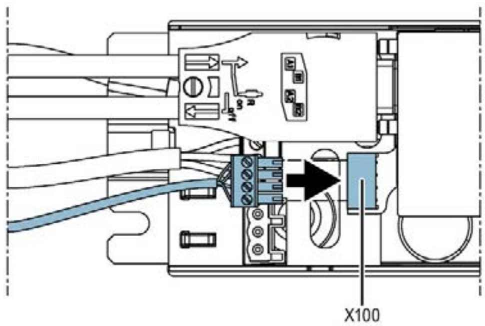
Relay control

Table 4- 7 Relay control for USS module

Terminal	Assignment	Description
X100.1 X100.2	CLOSE (closed)	The relay is additionally influenced by the sensor configuration (parameter p4600). See also section Sensors and external sensor interface module (Page 166). • **Sensor function test inactive** The system's internal door state "closed" is signaled via this relay (relay contact is closed). This state is not only position-dependent. Note the following conditions: – The "closed" state can **only** be achieved with a drive order. – The "closed" state cannot be achieved by external pushing. – The "closed" state can be terminated by means of a drive order or external pushing. • **Sensor function test active** – The "TestOUT" sensor function test signal is output.
X100.3 X100.4	OPEN (open)	The system's internal door state "open" is signaled via this relay (relay contact is closed). This state essentially depends on the current door position. • The "open" state can be achieved both by means of a drive order and also by external pushing. • The "open" state can be terminated by means of a drive order or external pushing.

Connection

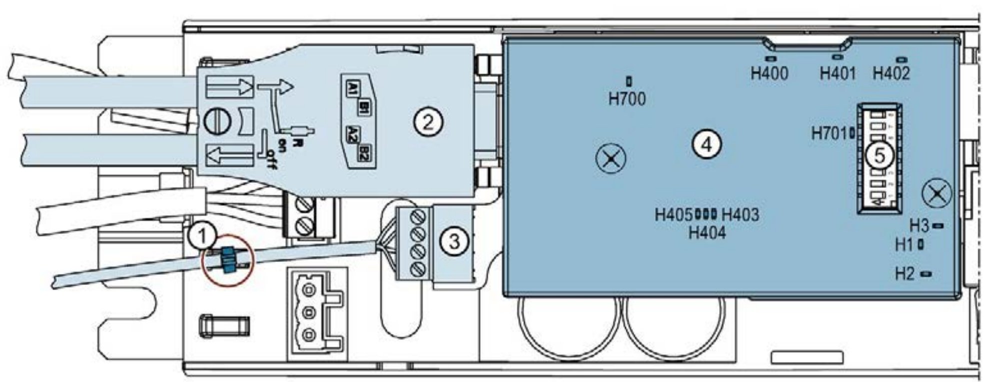
The wired relay connector is connected to connection X100.



4.5.3 PROFIBUS

4.5.3.1 PROFIBUS module

Overview



① Cable ties
② X705
③ X100
④ Protective cover
⑤ DIP switches

All standard PROFIBUS baud rates from 9.6 kbit/s to 12,000 kbit/s are supported. The baud rate is detected automatically.

GSD file

All other slave functionality is described in the corresponding GSD file.

Table 4- 8 GSD file

GSD file	Download
SIEM81BA.GSD	The GSD file is available online at Industry online support (http://support.automation.siemens.com/WW/view/en/99008084).

You can find explanations of the basic functions and communication properties of the DP slave in the section PROFIBUS communication (Page 142).

Task

The PROFIBUS module enables the SIDOOR ATD420W door controller to be connected to a PROFIBUS fieldbus.

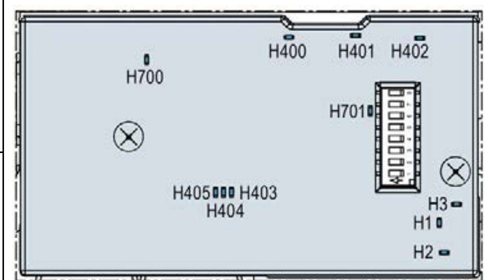
Interface

The ATD420W system is implemented as a slave using the DP-V0 protocol. Data transfer is cyclic with a class 1 DP master.

An ASIC of the "SPC3" type is used for interfacing to PROFIBUS. RS 485 in accordance with ANSI TIA/EIA 485-A is used as the transmission technology. Corresponding bus connections must be provided at the individual bus stations or nodes for fail-safe functioning of the PROFIBUS.

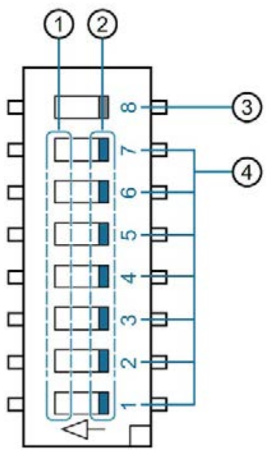
LED signals

The following five status LEDs are available on the PROFIBUS module:

LED	Color	Description	Position
H1	Green	**Relay K1 picked up** LED H1 switches on when the controller has detected the CLOSED position and the pulse generator ceases to output pulses. The LED H1 is controlled by the basic module (signal X200.11).	
H2	Green	**Relay K2 picked up** LED H2 switches on when the current distance of the door to the OPEN position falls below 2 cm and the relay has switched on. The LED H2 is controlled by the basic module (signal X200.9).	
H3	Green	**Valid incoming telegram** LED H3 is controlled by the basic module (signal X200.12), and indicates the communication status. The LED flashes to indicate incoming, valid telegrams. Each signal change stands for such a telegram.	
H400	Red	**"Bus error" PROFIBUS communication disrupted** The H400 LED flashes red in the event of PROFIBUS communication errors.	
H401	Red	**"Group error" internal communication disrupted** The H401 LED flashes red in the event of internal communication errors. Extended PROFIBUS diagnostic data is being transferred	
H402	Green	**Power on** LED H401 lights a continuous green after Power on.	
H403	Yellow	**Internal communication to main controller**	
H404	Yellow	LEDs H403 and H404 toggle each time after the master has sent or received an error-free telegram.	
H405	Yellow	**Boot**	
H700	Orange	**P5V_ISO (X705.6) = OK**	
H701	Yellow	**P5V = OK**	

DIP switches (S501)

The DIP switches (S501) on the device are used to set the PROFIBUS address of the DP slave.



① Status: 1≙ on
② Status: 0 ≙ off
③ DIP switch without function
④ DIP switches for setting the address

Figure 4-2 DIP switches (S501)

Setting the address

The individual DIP switches 1 to 7 (④) are used to specify the address. DIP switch 8 (③) is reserved.

Addresses within the range from 0 to 127 can be set with combinations of the seven DIP switches (①, ②). The addresses are coded according to BCD code (Binary Coded Decimal).

Note

A DP slave address change only becomes effective after a power-on reset or system restart.

The following example shows the setting for the address "89":

DIP switches	1	2	3	4	5	6	7
Status (0 ≙ off / 1≙ on)	1	0	0	1	1	0	1
Address	89 (≙ 59_{hex})						

4.5.3.2 Wiring and connecting PROFIBUS connectors

Requirement

NOTICE
PROFIBUS connector
Use only the recommended PROFIBUS connectors from Siemens. For more, see also section Accessories (Page 21).

NOTICE
Material damage resulting from the connection of a PROFIBUS connector to service connection X8
Connecting a PROFIBUS connector to service connection X8 can damage the SIDOOR controller and the connected device. For this reason, only connect a bus connector to connection X705.

Note

- Always use shielded cables.
- For stationary operation, it is advisable to remove the insulation of the shielded cable and to establish contact on the shield/PE conductor bar.
- If there is a potential difference between the grounding points, an impermissibly high compensating current can flow through the shield grounded at both ends. To rectify the problem, do not, under any circumstances, open the shield of the bus cable.

  Install an additional equipotential bonding conductor parallel to the bus cable to carry the shield current.
- You can find additional information in the manual SIMATIC NET PROFIBUS Networks (https://support.industry.siemens.com/cs/ww/en/view/1971286).

Wiring

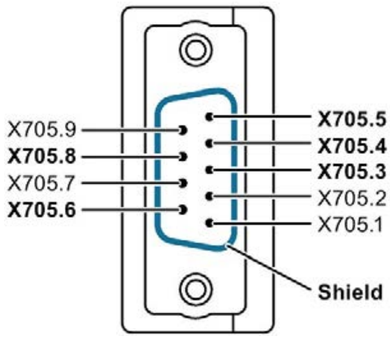


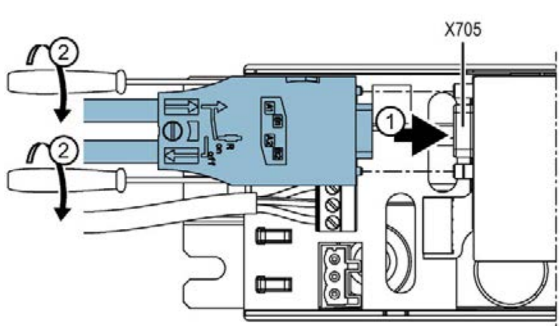
Table 4- 9 Assignment of X705

Pin	Assignment	Description
1	NC	Not connected
2	NC	Not connected
3	**RS 485P**	RS 485 interface (receive and send signals (+)) **Note:** For 6GK1500-0FC10: "B" (red)
4[1)]	**CNTR-P**	Repeater direction control
5	**GND**	Interface ground
6	**P5V**	5 V max. 10 mA, to be used in connector for bus network terminator only
7	NC	Not connected
8	**RS 485N**	RS 485 interface (receive and send signals (-)) **Note:** For 6GK1500-0FC10: "A" (green)
9	NC	Not connected
Shield	**Shield**	FE - functional grounding (bus cable shield)

[1)] with SIDOOR ATD420W

Connection

The wired PROFIBUS connector is connected to connection X705 and fastened by tightening the screws.



4.5.3.3 Wiring and connecting relay outputs

Wiring

The PROFIBUS module has 2 relay outputs (closer contact).

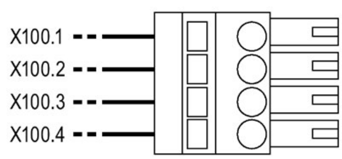
A maximum voltage of 42.0 V (SELV according to EN60950-1) may be applied to the PROFIBUS module.

Contact rating of the relay outputs:

- DC max: 30 V DC, 500 mA

The matching 4-pole mating connector (PHOENIX MC1.5/4-ST-3.81) with the screw terminals is delivered along with the module (plugged in).

The pin assignments are:



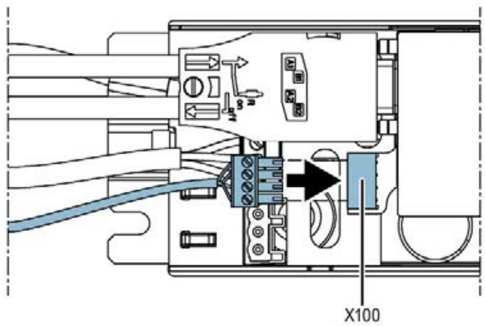
Relay control

Table 4- 10 Relay control for PROFIBUS module

Terminal	Assignment	Description
X100.1 X100.2	CLOSE (closed)	The relay is additionally influenced by the sensor configuration (parameter p4600). For more, see also section Sensors and external sensor interface module (ATD4xxW) (Page 166). • **Sensor function test inactive** The system's internal door state "closed" is signaled via this relay (relay contact is closed). This state is not only position-dependent. Note the following conditions: – The "closed" state can **only** be achieved with a drive order. – The "closed" state cannot be achieved by external pushing. – The "closed" state can be terminated by means of a drive order or external pushing. • **Sensor function test active** – The "TestOUT" sensor function test signal is output.
X100.3 X100.4	OPEN (open)	The system's internal door state "open" is signaled via this relay (relay contact is closed). This state essentially depends on the current door position. • The "open" state can be achieved both by means of a drive order and also by external pushing. • The "open" state can be terminated by means of a drive order or external pushing.

Connection

The wired relay connector is connected to connection X100.



4.5.3.4 PROFIBUS communication

Parameter assignment

The DP master transfers parameters during initialization of the DP slave. This includes the transfer of standard parameters and specific SIDOOR parameters for the device. The specific parameters are written in the GSD file. No user data can be exchanged without initialization.

The DP master sends the parameters to the DP slave in a set parameters telegram. The DP slave answers with a short acknowledgment.

The set parameters telegram consists of user data with 7 to 244 bytes. The first 7 bytes of the parameters are bindingly specified in the standard. Bytes 8 to 10 are permanently written in DP-V1, and are not used here. The subsequent bytes are manufacturer-specific. Another 8 bytes are reserved for this with the PROFIBUS module.

SIDOOR-specific parameters

The SIDOOR internal communication channel (internal bus) can be configured with the following parameters:

- Data communication
- Baud rate
- Slave address
- Telegram type
- Cycle time

In order to establish error-free, stable communication, the settings on the connected SIDOOR controller (internal bus) have to be matched.

Table 4- 11 User parameter byte 1

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	User parameter byte 1
							x	**Data communication** Data communication is deactivated if this bit is set to 0. Factory setting = 1 (activated)
			x	x	x	x		**Baud rate** The baud rate is set with bits 1 to 4. Codes: 9600 = 0000 19200 = 0001 38400 = 0010 57600 = 0011 115200 = 0100 187500 = 0101 250000 = 0110 300000 = 0111 375000 = 1000 500000 = 1001 750000 = 1010 Factory setting = 115200 (0100)
0	0	0						Reserved

Table 4- 12 User parameter byte 2

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	User parameter byte 1
			x	x	x	x	x	**Slave address** The slave address is set with bits 0 to 4. Address range = 0 to 31 Factory setting = address 1
0	0	0						Reserved

Table 4- 13 User parameter byte 3

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	User parameter byte 1
			x	x	x	x	x	**Telegram type** The telegram type is set with bits 0 to 2. Codes: Standard telegram = 0000 Mirror telegram = 0001 Broadcast = 0010 Special telegram = 0011 Special telegram with broadcast = 0100 Factory setting = standard telegram (0000)
0	0	0						Reserved

Table 4- 14 User parameter bytes 4 and 5

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	User parameter byte 1
0 to 234 (0x00 to 0xEA)								**Cycle time (high byte)**
0 to 96 (0x00 to 0x60)								**Cycle time (low byte)** The cycle time is given in [ms]. The cycle time defines the minimum time intervals at which the slave is queried by the master. Time range = 10 to 60000 ms. Factory setting = 100 ms (0x0014)

Table 4- 15 User parameter bytes 6, 7 and 8

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	User parameter byte 1
0	0	0	0	0	0	0	0	Reserved

Configuration

For efficient communication between DP master (higher-level controller (PLC)) and DP slave, the DP master has to know how many bytes it sends to the DP slave, and how many bytes it receives from the DP slave. The values for the outputs and inputs are specified in the configuration.

The configuration of a DP slave is specified in the GSD file. Before the DP slave can exchange user data with a DP master, the valid configuration must be transferred from the DP master to the DP slave and confirmed.

Each DP slave has slots . Each slot can be a module. The SIDOOR ATD420W controller is designed as a modular DP slave and has exactly one slot. The standard module is available for this slot.

The configuration for the standard module consists of 22-byte inputs and outputs, and a manufacturer-specific byte.

The 22-byte inputs and outputs form the process image which, as standard, consists of 7 words for the process data (PZD) and 4 words for the parameter identifier value (PKW). The reserved manufacturer-specific byte is currently used only as a placeholder.

The configuration described gives the following code for the standard module: `0xC1 0x15 0x15 0x00`

Diagnostics

Extensive diagnostic possibilities are supported in the PROFIBUS DP. A DP master can query the current diagnostics from the DP slave at any time. Diagnostic telegrams can write additional device-specific diagnostics in the GSD file next to the standard diagnostics.

The DP slave can report in the data telegram at any time that current diagnostics are queued. To do this it labels its data telegram (High Priority) in the cyclic data communication.

In normal cyclic data communication, the DP slave always answers with a (Low Priority) data telegram. If an event requires a diagnostic query, the DP slave answers in the next cycle with high priority. The DP master queries the diagnostics, and continues with the cyclic data communication.

The diagnostic telegram is divided into several parts. The first 6 bytes and their meanings are bindingly specified in the standard. The obligatory 6 bytes are followed by optionally one or several diagnostic blocks.

Three additional device-related diagnostic bytes are defined for the PROFIBUS module. The first device-related diagnostic byte defines the header, and the next two define the number of diagnostic bytes.

These diagnostic blocks have the format for the device-related diagnostics, and are not specified any further in DP-V0. The meanings of the individual bits are specified in the GSD file. The following table shows the exact meanings of the bits for the SIDOOR ATD420W controller. The diagnostic data relate exclusively to the internal communication bus between the SIDOOR controller and the communication module.

Table 4- 16 Device-related diagnostic bits

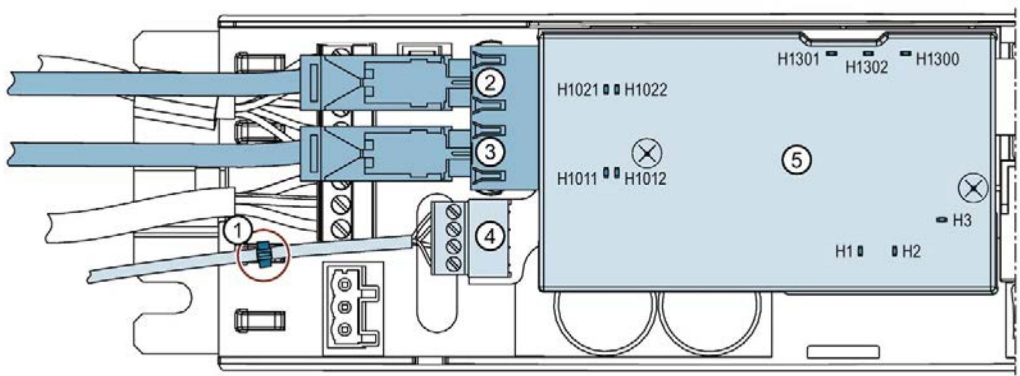
1.2	1.1	1.0	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0	Device-related diagnostic bits
										x	Telegram length (LGE) false
									x		Remaining runtime exceeded
								x			Block check character (BCC) false
							x				Telegram start (STX) false
						x					Telegram type unknown (ADR)
					x						Slave address false
				x							Memory overflow
			x								Parity error
		x									Internal error
	x										Answer delay time exceeded
x											Telegram type not identical

The 11 diagnostic bits are correspondingly divided between the two device-related diagnostic bytes, i.e. bits 1.3 to 1.7 are not used or are reserved.

4.5.4 PROFINET

4.5.4.1 PROFINET module

Overview



① Cable ties
② X1000 - Port 2
③ X1000 - Port 1
④ X100
⑤ Protective cover

The ASIC of the type "ERTEC200P" is used for the PROFINET connection. Ethernet is used as the transmission technology. The SIDOOR ATD430W controller supports conformance class C (CC-C).

All further IO device functionality of the SIDOOR ATD430W controller is described in the GSD file.

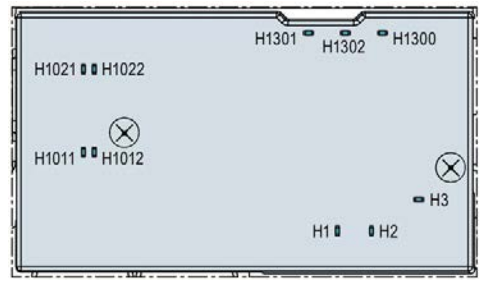
You can find explanations of the basic functions and communication properties of the SIDOOR ATD430W IO device in section PROFINET communication (Page 157).

Task

The PROFINET module enables the SIDOOR ATD430W door controller to be connected to a PROFINET fieldbus.

LED signals

The following five status LEDs are available on the PROFINET module:

LED	Color	Description	Position
H1	Green	**Relay K1 picked up** LED H1 switches on when the controller has detected the CLOSED position and the pulse generator ceases to output pulses. The LED H1 is controlled by the basic module (signal X200.11).	
H2	Green	**Relay K2 picked up** LED H2 switches on when the current distance of the door to the OPEN position falls below 2 cm and the relay has switched on. The LED H2 is controlled by the basic module (signal X200.9).	
H3	Green	**Valid incoming telegram** LED H3 is controlled by the basic module (signal X200.12), and indicates the communication status. The LED flashes to indicate incoming, valid telegrams. Each signal change stands for such a telegram.	
H1011	Green	Port 1: LINK	
H1012	Orange	Port 1: ACT	
H1021	Green	Port 2: LINK	
H1022	Orange	Port 2: ACT	
H1300	Green	Power on	
H1301	Red	**"Bus error" PROFINET communication disrupted** The H1301 LED flashes red in the event of a PROFINET communication error.	
H1302	Red	**"Group error" internal communication disrupted** The H1302 LED flashes red in the event of an internal communication error.	

Network structure/network topologies

The ATD430W IO device supports the star, line, tree and ring structure network topologies.

The IO device has an integrated switch for the line and ring structures. The MRP redundancy process is used in the case of the ring structure. In this case, the IO device is the MRP client and cannot be used as the redundancy manager (MRP manager). This must be provided for separately in the network structure.

GSD file

The characteristic communication features of the ATD430W IO device are specified in the form of an electronic device data sheet (device master data file, GSD file). The GSD file has been certified by the ComDeC test center for PROFINET field devices according to EN 61158 and IEC 61784.

The GSD file is provided in various GSDML scheme versions to ensure compatibility with older configuration tools.

Table 4- 17 GSD files

Scheme	GSD file
2.31	GSDML-V2.31-Siemens-SIDOOR-TD430W-20140829.xml
2.3	GSDML-V2.3-Siemens-SIDOOR-TD430W-20140829.xml
2.25	GSDML-V2.25-Siemens-SIDOOR-TD430W-20140829.xml

The GSD files are equivalent in terms of the ATD430W controller's functional scope.

PROFINET communication

Besides using the MAC address and the IP address, PROFINET also uses a device name to identify PROFINET devices. The device name must be unique in the PROFINET network.

Assigning a device name

During commissioning, each PROFINET device is assigned a device name using the configuration system (node initialization).

The device name is written to the IO device via an IO supervisor using the DCP (Discovery and Configuration Protocol). The device name is stored retentively in the ATD430W.

If the device is replaced, this operation must be repeated with the replacement device. Since the name is assigned with the standardized DCP, this step can be performed with any tool (e.g. SIMATIC Manager or TIA Portal).

Topology-based initialization

Device names can also be assigned by the IO controller based on the topology. This requires the topology to be structured as planned and all involved devices to fulfill the requirements of class B (support of LLDP and SNMP) as a minimum. The device must also be set to its factory default settings (IP address = 0.0.0.0 and device name = "").

Assigning an IP address

For the expansion of an application relationship, each PROFINET device must have an IP address. To ensure that the right device is accessed online, it is recommended that IP addresses be assigned to every PROFINET device at the start of the commissioning process. When configuring the IO system, both the IO controller and the IO devices are assigned an IP address by the configuration tool. The IO controller receives an IP assignment list via the system configuration. The IP addresses are assigned to the IO devices on initialization of the application relationships.

The IO device ATD430W offers the possibility of having the IP address assigned by the IO controller. This function is activated in many configuration tools by default. To this end, a PROFINET connection must, of course, exist between the IO device and the IO controller and the device name of the IO device must match up with the configured device name. When this function is used, a communication connection to the IO controller must be established so that the IO device is assigned an IP address and TCP services (e.g. firmware updates) are available.

When the device is used for the first time, it has the pre-configured IP address **192.168.0.1** (subnet mask 255.255.255.0).

Note

If reset to the factory defaults, the pre-configured IP address is deleted and set to 0.0.0.0. If the IP address is assigned by the IO controller based on the system configuration, the retentively stored IP address is deleted and is replaced with 0.0.0.0 in accordance with the PROFINET standard.

Identification flashing

Identification is performed via flash test. The flash test can be initiated via the configuration tool. The two LINK LEDs H1011 (Port1) and H1021 (Port2) flash synchronously, at a frequency of 2 Hz.

Restore factory settings

The "Restore factory settings" function clears the previously defined settings and restores the default values.

- IP Address: 0.0.0.0
- Device name: (empty)

The I&M data 1 to 4 are additionally cleared when the factory settings are restored.

MAC addresses

The ATD430W IO device uses a total of three MAC addresses. The IO device itself has one MAC address and the two ports (Port 1, Port 2) each have an incremented MAC address. See the following example:

IO device: `00-1B-1B-65-AC-61`
Port 1: `00-1B-1B-65-AC-62`
Port 2: `00-1B-1B-65-AC-63`

Supported PROFINET functionality

The ATD430W IO device supports the following functionality of conformance classes A, B and C (CC-A, CC-B, CC-C).

- Cyclic data exchange (RT)
- Acyclic parameter data (Read/Write Record)
- Device diagnostics, alarms (alarm handling)
- Device identification (I&M 0)
- Extended device identification (I&M 1 to 4)
- Topology information (LLDP)
- Network diagnostics (SNMP)
- Port-related statistics (PDEV)
- Automatic addressing (DCP)
- Media redundancy (MRP)
- Isochronous data exchange (IRT)

Cyclic data exchange

Cyclic data communication contains the data that the central processing unit sends to the IO devices so that it can be output to the outputs as well as the data that an IO device reads in at its inputs and sends to the central processing unit for processing. Non-isochronous data exchange is called RT. RT telegrams are transferred directly via Ethernet.

Acyclic parameter data

Acyclic data communication consists of sending parameterization and configuration data to the IO device on starting or sending a diagnostic message from the IO device to the central processing unit during ongoing operation. Acyclic data uses UDP/IP.

Device diagnostics, alarms

Alarms are special acyclic messages that are sent from the IO device to the controller whenever required. They are time-critical and therefore sent directly via Ethernet just like cyclic data. Contrary to cyclic data, however, they must be confirmed by the recipient.

Besides generating standard alarms, the ATD430W generates a diagnostic alarm, based on the GSD definition, in the event of disruptions on the internal SIDOOR bus.

I&M 0 and I&M 1 to 4

Device parameters can be read and written for device identification.

The identification and maintenance record 0 (I&M 0 - device identification) is the record for the unique identification of the IO device. This record is **read-only**.

The standardized records I&M 1 to 4 are intended for extended device identification. These can be both **read** and **written** (on DAP).

The I&M records consists of the following parameters:

Table 4- 18 I&M 0 and I&M 1 to 4 data

I&M record	Fields (standardized)	Access authorization
I&M 0	MANUFACTURER_ID ORDER_ID SERIAL_NUMBER HARDWARE_REVISION SOFTWARE_REVISION REV_COUNTER PROFILE_ID PROFILE_SPECIFIC_TYPE IM_VERSION IM_SUPPORTED	Read
I&M 1	TAG_FUNCTION TAG_LOCATION	Read and write (on DAP)
I&M 2	INSTALLATION_DATE	
I&M 3	DESCRIPTOR	
I&M 4	SIGNATURE	

Topology information

The Link Layer Discovery Protocol (LLDP) is used to detect the network neighborhood and thus also to determine topology information. The status of individual connections can be read out at any time.

Network diagnostics

The Simple Network Management Protocol (SNMP) is used to support network diagnostics. The ATD430W IO device supports MIB-II for TCP/IP in accordance with RFC1213.

Port-related statistics

The topology presentation data is stored in the physical device of the ATD430W IO device. The PDEV data is addressed as from subslot 0x8000. From a communication perspective, the ATD430W IO device always consists of the interface and the ports 1 and 2.

The PDEV is represented by the following submodules of the device access point (DAP):

- Submodule 0x8000 → Interface
- Submodule 0x8001 → Port1
- Submodule 0x8002 → Port 2

Automatic addressing

The Discovery and basic Configuration Protocol (DCP) is compulsory for the automatic assignment of IP addresses.

Media redundancy

In the case of PROFINET, the Media Redundancy Protocol (MRP) is used for the media redundancy of ring topologies. The ATD430W IO device assumes the role of an MRP client. The MRP manager function is not supported.

Isochronous data exchange

The ATD430W IO device also supports the IRT protocol and thus class C functionality (CC-C). This supports isochronous data exchange up to 250 µs. The IO device forwards all data isochronously. The application program on the ATD430W does not operate isochronously.

4.5.4.2 Wiring and connecting a PROFINET connector

Requirement

Note

Use an Industrial Ethernet cable with a maximum length of 100 m to connect RJ45 connectors.

Wiring

The PROFINET module provides two PROFINET ports:

- **Port 1:** Signals are connected crossed. The assignments correspond to switch assignments (MDI-X)
- **Port 2**: signals are connected on a 1:1 basis. The assignments correspond to the default assignments for terminal devices (MDI) 1.

The RJ45 sockets used do not contain any integrated transmitters or LEDs for signaling.

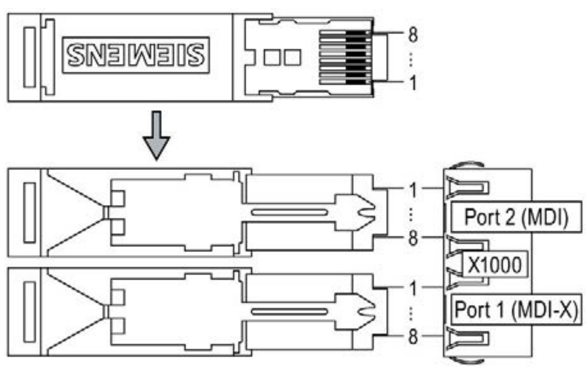
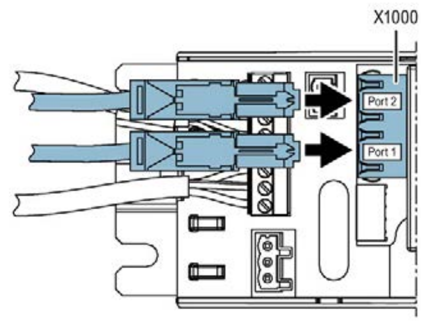


Table 4- 19 X1000 assignments (Port 1/Port 2)

Pin	Signal name	Type	Description
1	TXP	O	Ethernet transmit differential signal
2	TXN	O	Ethernet transmit differential signal
3	RXP	I	Ethernet receive differential signal
4	TERM		Termination
5	TERM		Termination
6	RXN	I	Ethernet receive differential signal
7	TERM		Termination
8	TERM		Termination

Connection

The wired RJ45 connectors are connected to the two X1000 Port 1 and X1000 Port 2 terminals.



4.5.4.3 Wiring and connecting relay outputs

Wiring

The PROFINET module has 2 relay outputs (closer contact).

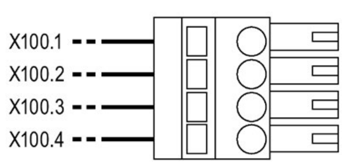
A maximum voltage of 42.0 V (SELV according to EN60950-1) may be applied to the PROFINET module.

Contact rating of the relay outputs:

- DC max: 30 V DC, 500 mA

The matching 4-pole mating connector (PHOENIX MC1.5/4-ST-3.81) with the screw terminals is delivered along with the module (plugged in).

The pin assignments are:



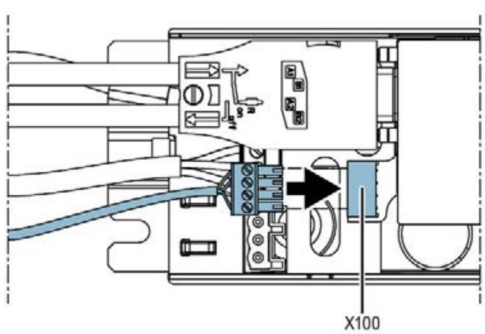
Relay control

Table 4- 20 Relay control for PROFINET module

Terminal	Assignment	Description
X100.1 X100.2	CLOSE (closed)	The relay is additionally influenced by the sensor configuration (parameter p4600). For more, see also section Sensors and external sensor interface module (ATD4xxW) (Page 166). • **Sensor function test inactive** The system's internal door state "closed" is signaled via this relay (relay contact is closed). This state is not only position-dependent. Note the following conditions: – The "closed" state can **only** be achieved with a drive order. – The "closed" state cannot be achieved by external pushing. – The "closed" state can be terminated by means of a drive order or external pushing. • **Sensor function test active** – The "TestOUT" sensor function test signal is output.
X100.3 X100.4	OPEN (open)	The system's internal door state "open" is signaled via this relay (relay contact is closed). This state essentially depends on the current door position. • The "open" state can be achieved both by means of a drive order and also by external pushing. • The "open" state can be terminated by means of a drive order or external pushing.

Connection

The wired relay connector is connected to connection X100.



4.5.4.4 PROFINET communication

Parameterization/startup record

When setting up a connection, the startup parameter record (record 1) is sent from the IO controller to the ATD430W as specified in the GSD file (see Table 4-17 GSD files (Page 149)). Only the **cycle time** parameter is visible in the configuration tool.

The structure of the 8-bytes-long startup parameter record 1 is described below (for informational purposes only):

Table 4- 21 Startup parameter record byte 1

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data exchange and baud rate parameter
							X	**Data communication** Data communication on the internal bus is deactivated if this bit is set to 0. Default = 1 (activated)
			X	X	X	X		**Baud rate** The baud rate is set with bits 1 to 4. The following coding results: 9600 = 0000 19200 = 0001 38400 = 0010 57600 = 0011 115200 = 0100 187500 = 0101 250000 = 0110 300000 = 0111 375000 = 1000 500000 = 1001 750000 = 1010 Default = 11520
0	0	0						Reserved

Table 4- 22 Startup parameter record byte 2

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Slave address parameter
			X	X	X	X	X	**Slave address** The slave address on the internal bus is set via bits 0 to 4. The address range is from 0 to 31. Default = address 0
0	0	0						Reserved

Table 4- 23 Startup parameter record byte 3

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Telegram type parameter
			X	X	X	X	X	**Telegram type** The telegram type on the internal bus is set via bits 0 to 2. The following coding results: Default telegram = 0000_b Mirror telegram = 0001_b Broadcast = 0010_b Special telegram = 0011_b Default = default telegram
0	0	0						Reserved

Table 4- 24 Startup parameter record bytes 4 and 5

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Cycle time parameter
0 to 234 (0x00 to 0xEA)								**Cycle time (high byte)**
0 to 96 (0x00 to 0x60)								**Cycle time (low byte)** The cycle time is given in [ms]. The time range is between 10 and 60000 ms. The cycle time specifies at what minimum intervals communication takes place on the internal bus. The default is 100 ms = 0064_{hex}

Table 4- 25 Startup parameter record bytes 6, 7 and 8

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Parameter
0	0	0	0	0	0	0	0	Reserved

Configuration

The resulting configuration data is in the GSD file (see Table 4-17 GSD files (Page 149)).

The structure expected by the PROFINET module is described below (for informational purposes only):

Table 4- 26 PROFINET configuration data

Slot	Api	Subslot	Module ID	Submodule ID	Description
0	0	0001_{hex}	1	1	DAP (ATD430W)
0	0	8000_{hex}	1	2	Interface
0	0	8001_{hex}	1	3	Port 1
0	0	8002_{hex}	1	3	Port 2
1	0	0001_{hex}	28_{hex}	1	22 bytes IO (4 words of PKW and 7 words of PZD are mapped)

Diagnostics

The internal communication bus between the SIDOOR controller and the communication module is monitored by the master driver of the communication module (PROFINET module). A PROFINET diagnostic alarm is triggered if communication is interrupted or quality becomes too poor. This diagnostic alarm is then present for at least 5 seconds and is structured as follows:

Table 4- 27 Properties of diagnostic alarm

Property of diagnostic alarm	Value											
Slot	1											
Subslot	1											
Channel	1											
Error ID	$1B_{hex}$											
Extended channel error type	1											
Extended channel error value	**Bit**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Telegram length (LGE) false											X
	Remaining runtime exceeded										X	
	Block check character (BCC) false									X		
	Telegram start (STX) false								X			
	Telegram type unknown (ADR)							X				
	Slave address false						X					
	Memory overflow					X						
	Parity error				X							
	Internal error			X								
	Answer delay time exceeded		X									
	Telegram type not identical	X										
	Bits 15 to 11 are reserved.											
Maintenance	No											

Device roles and provider-consumer model

IO Controller

A PROFINET IO controller has control over the field devices. The process data and alarms arrive in the IO controller and are processed in the user program. In an automation system, an IO controller is normally a programmable logic controller (PLC). The communication channels are established by the IO controller during system startup.

IO supervisor

A PROFINET IO supervisor is an engineering station in a system, for example, that can have temporary access to the field devices for commissioning purposes.

IO device

The PROFINET IO device is a process-oriented field device that is connected in a distributed fashion. It expects the configuration from an IO controller/supervisor and cyclically transfers its process data to the IO controller.

Provider-consumer model

During data exchange, PROFINET IO operates according to the provider/consumer model. The provider provides the data and the consumer processes it. The SIDOOR ATD430W controller is an IO device. If the IO controller's output data is invalid ("poor" output data provider status), e.g. if the user program in the IO controller is stopped, then communication in the internal SIDOOR bus is stopped. The corresponding response can be performed by the master monitoring of the SIDOOR controller (see Section Master monitoring (Page 162)).

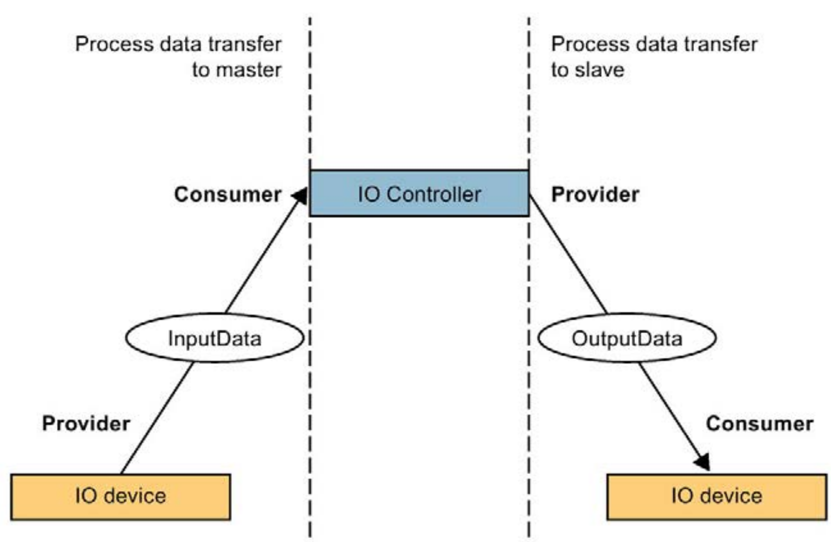


Figure 4-3 Provider-consumer model

4.5.5 Local/master operation

The slave (= SIDOOR control unit) generally signals via StatW1 (bit 9 = 1 "control requested") that the master (= higher-level PLC on the fieldbus) should assume control. If the PLC signals via STW1 (bit 10 = 1 "control by the programmable logic controller") that it is taking over control, the process data is deemed to be valid and must be processed accordingly. See Figure 4-4 Sequential control state graph (Page 163).

If the PLC does not assume control (bit 10 = 0 "no control") or if the slave does not request control (ZSW1 bit 9 = 0 "local operation"), the process data is discarded and the sequential control remains in the "S1:Z_switching on inhibited" state (see Figure 4-4 Sequential control state graph (Page 163)).

For safety reasons, the controller automatically switches to local mode under the following conditions:

- Service button S402 (Open), S403 (Close) or S401 (Learn run) operated
- An external drive order is pending via the service interface (X8, terminal for service tool and USB adapter)
- The local commissioning terminal module (H1, terminal module with S1 to S4, operator control buttons for terminal module) is in a safety-related state through the use of the operator control buttons

---

Note

Protected areas

Some areas of the navigation system are categorized as being safety-related. These include, among others, all areas that affect the processing of the travel curve parameters. Local operation mode ends and control is requested again by the PLC only upon leaving these protected areas.

4.5.6 Master monitoring

Master monitoring monitors the internal communication channel to the higher-level PLC. This ensures a defined response to the following situations:

- Cable breakage (or bus interruption)
- Hardware fault in the sending/receiving unit
- Incorrect communication configuration (e.g. baud rate, polling list/slave addresses)
- Failure of the master system

Master monitoring is also referred to as a process timeout because it operates based on the user data received at the application level. The parameter p2040 defines the monitoring time in ms. If no user data is received within this period, the sequential control assumes the "S1:Z_switching on inhibited" state (see Figure 4-4 Sequential control state graph (Page 163)). Monitoring can be deactivated by setting the parameter p2040 to "0". The master cycle time and the type of telegram communication must be considered when configuring the monitoring time. The occurrence of a process timeout is visualized by the status code "y". A master timeout does not need to be acknowledged because it is only to be evaluated as an alarm. A process timeout error is subject to an off delay of 2 s.

4.6 Sequential control

The following figure illustrates the sequential control of SIDOOR ATD4xxW control unit in the form of a state graph:

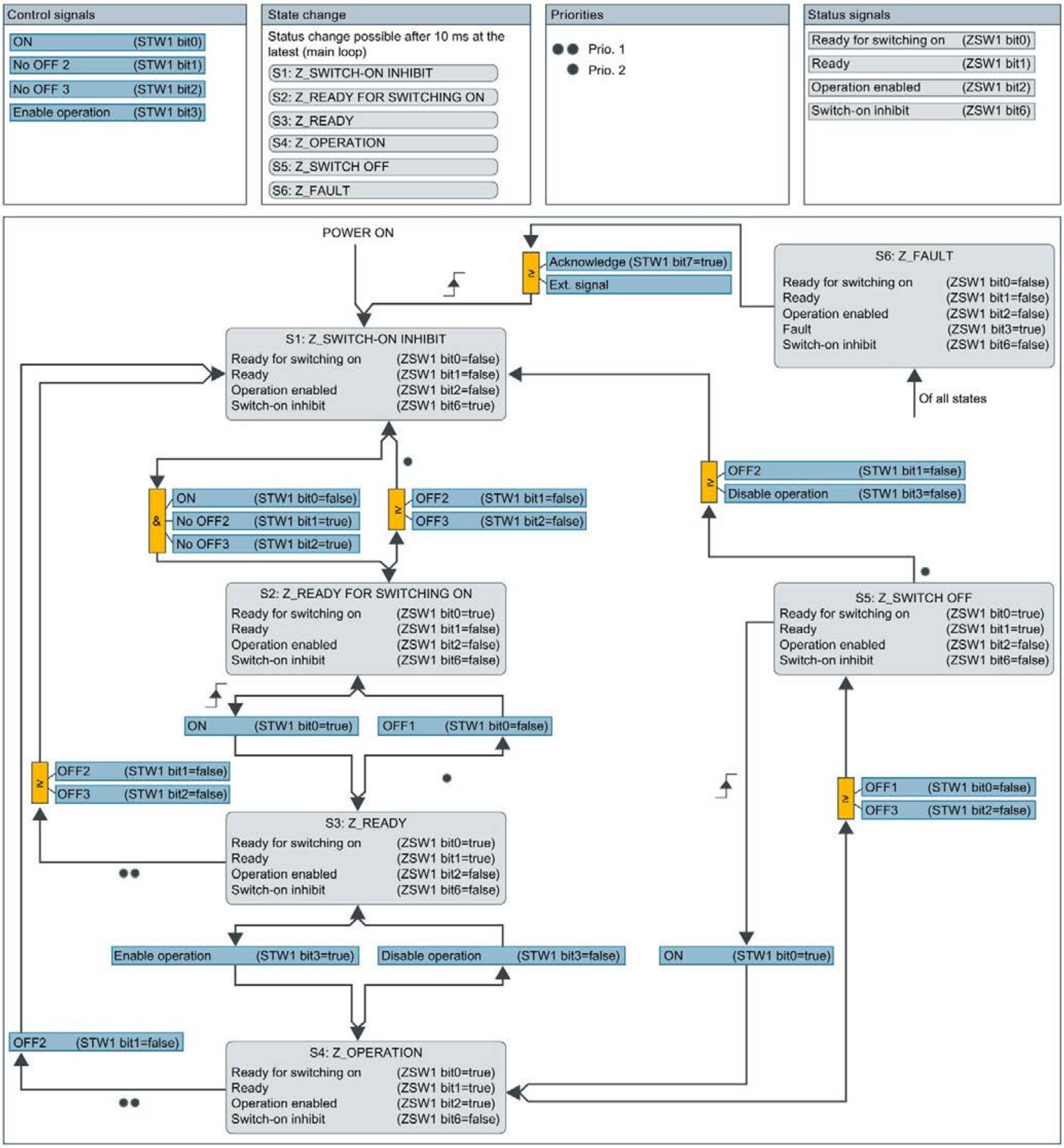


Figure 4-4 Sequential control state graph

The following table describes the properties of different states of the sequential control and their impact on the system with respect to the slave (= SIDOOR control unit).

Status	Status word	Control word	System impact	Comment/note
S1: Z_EINSCHALTSPERRE	Valid	Invalid	Deenergize	After a ramp down the motor is switched to the free-running mode (deenergize).
S2: Z_EINSCHALTBEREIT	Valid	Invalid	Deenergize	After a ramp down the motor is switched to the free-running mode (deenergize).
S3: Z_BETRIEBSBEREIT	Valid	Invalid	Deenergize	After a ramp down the motor is switched to the free-running mode (deenergize).
S4: Z_BETRIEB	Valid	Valid	Control via PLC (TSW1 evaluation)	ImpDrv is reset at the state transition.
S5: Z_ABSCHALTEN	Valid	Invalid	Ramp stop (stop/source voltage brake)	
S6: Z_STOERUNG	Valid	Invalid	Ramp stop (stop/source voltage brake)	

Switching the SIDOOR control unit to operating mode

The door drive can be transferred to operating mode via the sequential control. The following illustration shows an example for the two necessary steps:

Step 1

→ Set the control word STW = 0x040E

Bit	Name	Value
0	ON/OFF	0
1	**OFF2**	**1**
2	**OFF3**	**1**
3	**Operation enable**	**1**
7	Acknowledge fault	0
10	**Control by PLC**	**1**

→ Status word ZSW = 0x0231

Bit	Name	Value
0	**Ready for switching on**	**1**
1	Ready	0
2	Operation enabled	0
3	Fault	0
4	**No OFF2**	**1**
5	**No OFF3**	**1**
6	Switch-on inhibit	0
9	**Controlled by PLC**	**1**

Step 2

→ Set the control word STW = 0x040F

Bit	Name	Value
0	**ON/OFF**	**1**
1	**OFF2**	**1**
2	**OFF3**	**1**
3	**Operation enable**	**1**
7	Acknowledge fault	0
10	**Control by PLC**	**1**

→ Status word ZSW = 0x0237

Bit	Name	Value
0	**Ready for switching on**	**1**
1	**Ready**	**1**
2	**Operation enabled**	**1**
3	Fault	0
4	**No OFF2**	**1**
5	**No OFF3**	**1**
6	Switch-on inhibit	0
9	**Controlled by PLC**	**1**

Note

Operation enable

The operation enable can also be set later. In this example, it is set immediately.

4.7 Sensors and external sensor interface module

4.7.1 Overview

The signals in the figure below are processed and generated via the internal signal logic of SIDOOR ATD4xxW controllers. The system response to the signals shown is described in the section SIDOOR functions (Page 25).

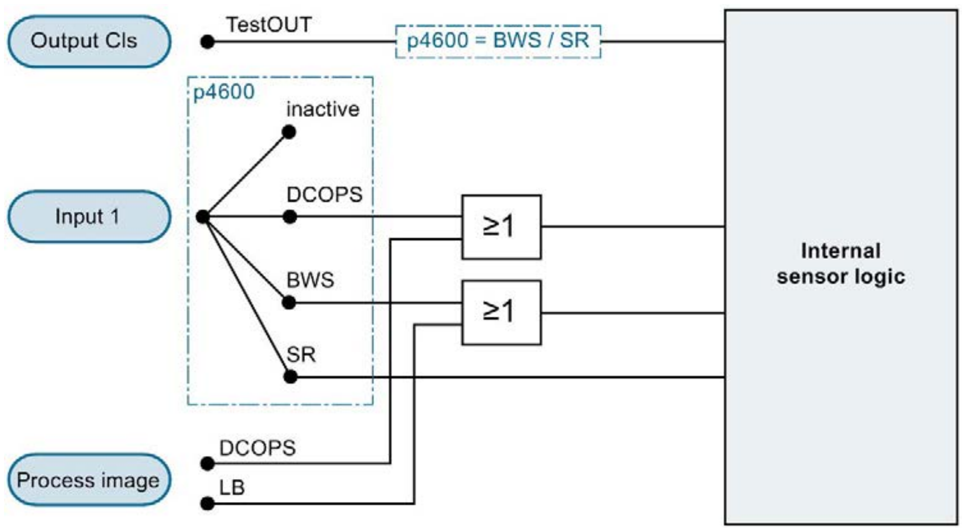


Figure 4-5 Sensor signals

Table 4- 28 Sensor signals

Signal	Meaning	Source
DCOPS	Door Closed / Opened Position Sensor (Door Closed / Opened Position Sensor)	Signal can be transferred locally (terminal X6, "Input1") and/or via the process image (for more, see table DCMD extension bits (Page 319))
LB	Light barrier (Light barrier)	Signal is only contained in the process image (for more, see DCMD extension bits (Page 319))
TestOUT	Function test signal	Signal is automatically output by the controller via a digital relay output. • Relay module terminal X12 (reversing relay) • Fieldbus module terminal X100.1, X100.2 (closed relay)
ESPE	Electrosensitive protective equipment	Function-tested 0 active local signal (terminal X6, "Input 1")
SR	Pressure-sensitive edge	Function-tested 0 active local signal (terminal X6, "Input 1")

Configuration of the connected sensor type

The sensor type of the sensor connected to "Input 1" of terminal X6 can be configured as follows:

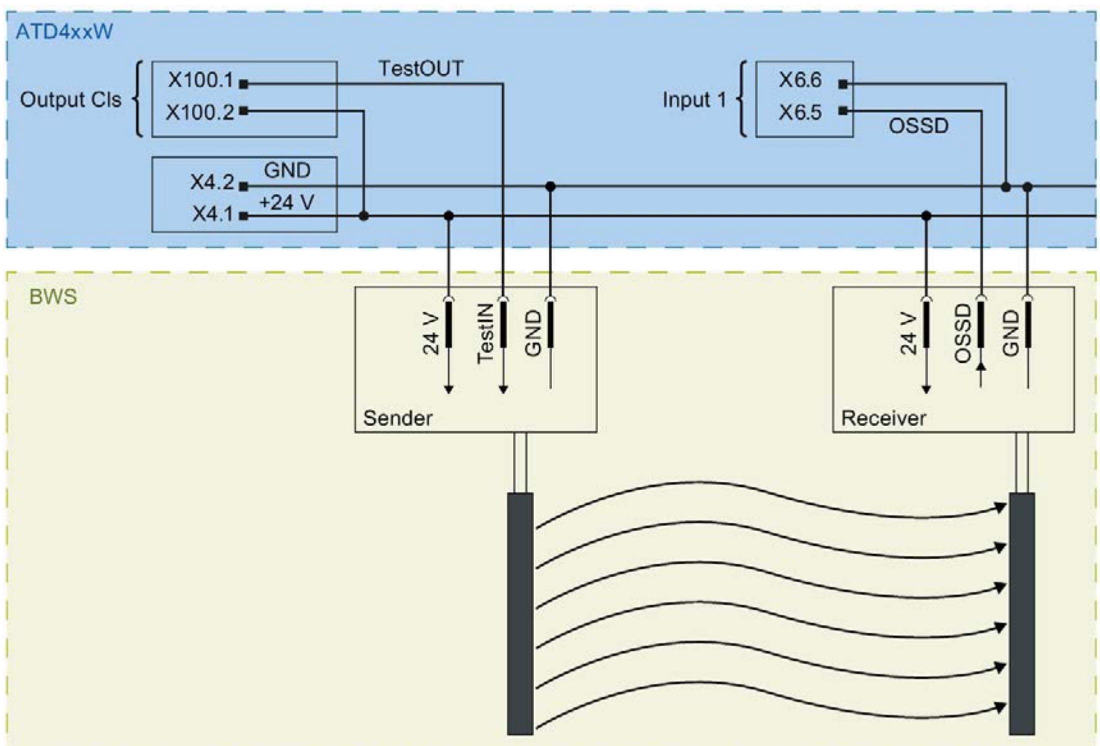
- Parameter p4600
- Service menu: *MAIN MENU > General setup > Special parameters > Function Input 1*

Note that, internally, some signals (e.g. ESPE and LB) are logically ORed (corresponding to the depiction in the "Sensor signals" figure). If the signal logic is configured for ESPE or SR, the TestOUT function test signal is generated automatically.

Type 2 ESPE* can be connected to SIDOOR ATD4xxW controllers.

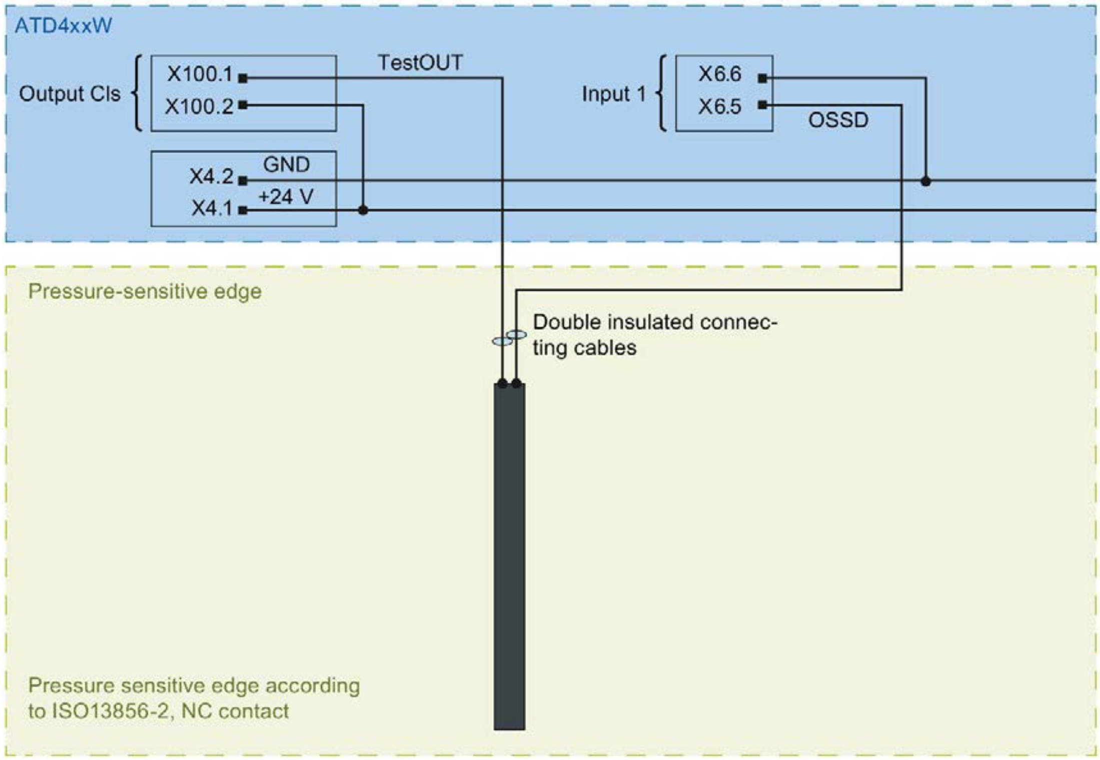
* according to DIN EN 61496-1: Safety of machinery - Electrosensitive protective equipment – Part 1: "General requirements and tests Type 2 (SIL 1)"

The figure below is a circuit diagram of a type 2 ESPE unit connected to a SIDOOR ATD4xxW controller:



As an alternative to the ESPE system, a pressure-sensitive edge (SR) can be connected to the SIDOOR ATD4xxW controller.

The figure below is a schematic diagram of a pressure-sensitive edge according to ISO13856-2 connected to a SIDOOR controller:


ATD4xxW
Output CIs
X100.1
X100.2
TestOUT
Input 1
X6.6
X6.5
OSSD
X4.2
GND
X4.1
+24 V
Pressure-sensitive edge
Double insulated connec-
ting cables
Pressure sensitive edge according
to ISO13856-2, NC contact

4.7.2 Sensor function test

Equipment for a periodic test is required if type 2 ESPE or a pressure-sensitive edge is connected. This test is intended to detect a hazardous failure. If the SIDOOR controller's sensor logic is configured for ESPE or a pressure-sensitive edge, the "TestOUT" function test signal is output automatically at the terminal X100.1 or X12.

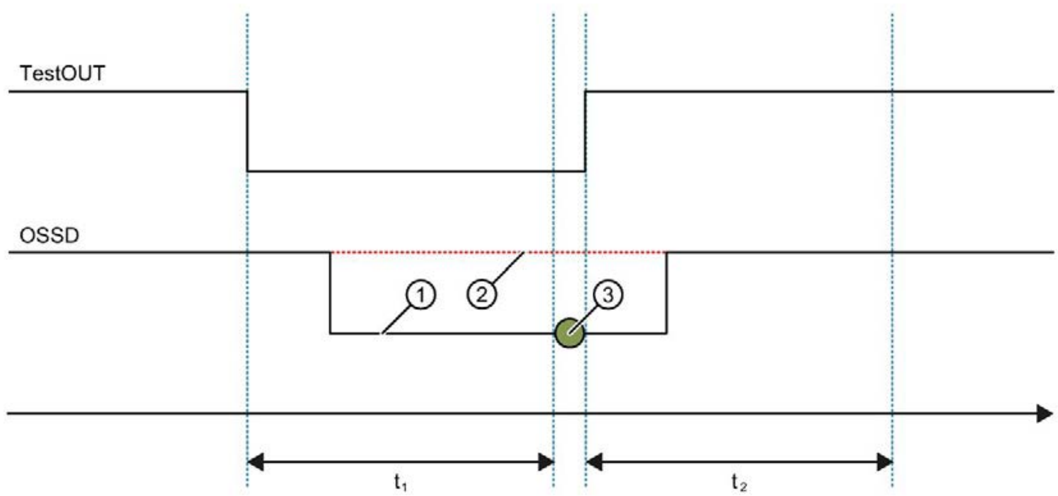
As soon as the system exits the "opened" end stop active in **Normal mode** (by door command), a function test signal is automatically generated.

The appropriate configuration results in the following minimum test sequence duration:

$t_{test,min} = 2 \times (t_{reaction} + t_{discrepancy,min})$

The fault "8" is generated if the test operation fails. This fault must be acknowledged in accordance with the sequential control (cf. Fault management (Page 305)).

The figure below describes the timing of the "TestOUT" function test signal generated by the SIDOOR controller and the timing requirements for the OSSD signal of the ESPE.



①	Protective equipment is fault-free
②	A fault occurs when controlling the protective equipment
t_1; t_2	$t_1 = t_2 = t_{reaction} + t_{discrepancy}$
$t_{reaction}$	Internal reaction time and switching times
$t_{discrep-ancy}$	Discrepancy time of the OSSD $t_{discrepancy}$ = p4601
③	Test point, evaluation of the OSSD signal • Signal profile 1 "low level" → fault-free • Signal profile 2 "high level" → fault

Figure 4-6 Sensor function test

4.7.3 Reaction times

The reaction time to an interrupted light array (ESPE) or a pressure-sensitive edge can be determined by measuring the motor current reduction. To this end, the ESPE or pressure-sensitive edge system can be activated (interrupted or triggered) during constant travel so that the drive reverses.

The reaction times are independent of the sensor type (ESPE or pressure-sensitive edge). The reaction time is 70 ms and the maximum reaction time is 80 ms.

4.7.4 Stopping distances

The table below shows the expected stopping distances depending on different braking ramps and different starting speeds, taking into account a reaction time of 80 ms (ESPE and/or pressure-sensitive edge; see Section Reaction times (Page 170)).

Table 4- 29 Expected stopping distances [mm] taking into account the ESPE running time (80 ms)

Initial speed [mm/s]	Set braking ramp [mm/s²]					
	1400	**1200**	**1000**	**800**	**600**	**400**
300	56	62	69	80	99	137
350	72	79	89	105	130	181
400	89	99	112	132	165	232
450	108	120	137	163	205	289
500	129	144	165	196	248	353
550	152	170	195	233	296	422
600	177	198	228	273	348	498
650	203	228	263	316	404	580
700	231	260	301	362	464	669
750	261	294	341	412	529	763

4.8 Technical specifications

Technical specifications

Article number	6FB1141-1AT11-3WE2	6FB1141-4AT10-3WE2	6FB1141-2AT10-3WE2	6FB1141-3AT10-3WE2
General information				
Product type designation	ATD401W	ATD410W	ATD420W	ATD430W
Product version	With relay outputs	With USS interface	With PROFIBUS interface	With PROFINET interface
Optional product expansion	TRANSFORMER (6FB1112-0AT20-2TR0), TRANSFORMER UL (6FB1112-0AT21-2TR0), NT40 (6FB1112-0AT20-3PS0), DIN rail holder (6FB1144-0AT00-3AS0)			
Manufacturer's article no. of the usable motor	6FB1103-0AT10-4MB0, 6FB1103-0AT10-3MC0, 6FB1103-0AT10-3MD0, 6FB1103-0AT11-4MB0, 6FB1103-0AT11-3MC0, 6FB1103-0AT11-3MD0, 6FB1103-0AT14-4MB1, 6FB1103-0AT13-4MB1, 6FB1103-0AT14-3MC2, 6FB1103-0AT13-3MC2, 6FB1103-0AT14-3MG2, 6FB1103-0AT13-3MG2			
Manufacturer's article no. of the usable power supply unit	6FB1112-0AT20-2TR0, 6FB1112-0AT21-2TR0, 6FB1112-0AT20-3PS0, 6EP3446-8SB10-0AY0			
Installation type/mounting				
Installation and mounting instructions	No direct solar radiation, final application-specific requirements must be observed. Installation outside a control cabinet only in horizontal mounting position			
Supply voltage				
Design of the power supply	Via SIDOOR TRANSFORMER / SIDOOR TRANSFORMER UL / NT40 / SITOP PSU8200 13 A, 36 V or via DC			
Rated value (DC)	36 V			
permissible range, lower limit (DC)	19.2 V			
permissible range, upper limit (DC)	38 V			
Protection in case of DC supply	Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11			
Input current				
I^2t, min.	30 $A^2 \cdot s$			
Encoder supply				
Output voltage (DC)	24 V			
short-circuit proof	Yes			
Overload-proof	Yes			
Remark	Ensure correct polarity! CAUTION: Do not supply with external voltage!			
Output current				
• For output (24 V DC), max.	400 mA			

Article number	6FB1141-1AT11-3WE2	6FB1141-4AT10-3WE2	6FB1141-2AT10-3WE2	6FB1141-3AT10-3WE2
Power				
Active power input	145 W			
Active power input, max.	540 W			
Active power input (standby mode)	5 W			
Digital inputs				
Control inputs isolated	Yes			
Control inputs p-switching	Yes			
Input voltage				
• per DC input, min.	10 V; Observe polarity !			
• per DC input, max.	28 V; Observe polarity !			
Input current				
• per DC input, min.	9 mA			
• per DC input, max.	27 mA			
Digital outputs				
Relay outputs				
Switching capacity of contacts				
– at 30 V DC, min.	0.01 A			
– at 30 V DC, max.	1 A	0.5 A		
Mechanical data				
Opening width of door, min.	0.3 m			
Opening width of door, max.	5 m			
Weight of door, max.	600 kg			
Operating cycle frequency of door, max.	180 1/h			
Counterforce, max.	75 N			
Kinetic energy, max.	100 J			
Interfaces				
Interfaces/bus type	without	USS according to EIA 485, IEC 61800-7-200 Type 3	PROFIBUS according to IEC 61784-3	PROFINET IO according to Conformance Class C
Number of bus nodes		32		
Isolation				
Overvoltage category	2			
Degree and class of protection				
IP degree of protection	IP20			

Article number	6FB1141-1AT11-3WE2	6FB1141-4AT10-3WE2	6FB1141-2AT10-3WE2	6FB1141-3AT10-3WE2
Standards, approvals, certificates				
Certificate of suitability according to EN 81	No			
CE mark	Yes			
UL approval	Yes	No	Yes	
EAC (formerly Gost-R)	Yes			
TÜV Inspectorate approval	Yes			
PNO certificate			Yes	
China RoHS compliance	Yes			
Standard for EMC	EN 61000-6-2 / EN 61000-6-4			
Standard for safety	EN 60950-1 / UL 61010-1 / UL 61010-2-201 / EN ISO 13849-1 Cat. 2 PL d	EN 60950-1 / EN ISO 13849-1 Cat. 2 PL d	EN 60950-1 / UL 61010-1 / UL 61010-2-201 / EN ISO 13849-1 Cat. 2 PL d	
Ambient conditions				
Ambient temperature during operation				
• min.	-20 °C			
• max.	50 °C			
• Remark				Screw control device thermally conductive onto a metallic mounting surface or standard rail mounting, otherwise the maximum operating temperature is only 40 °C
Ambient temperature during storage/transportation				
• Storage, min.	-40 °C			
• Storage, max.	70 °C			
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m			
Relative humidity				
• No condensation, min.	10 %			
• No condensation, max.	93 %			

Article number	6FB1141-1AT11-3WE2	6FB1141-4AT10-3WE2	6FB1141-2AT10-3WE2	6FB1141-3AT10-3WE2
Dimensions				
Width	320 mm			
Height	60 mm			
Depth	80 mm			

Dimension drawing

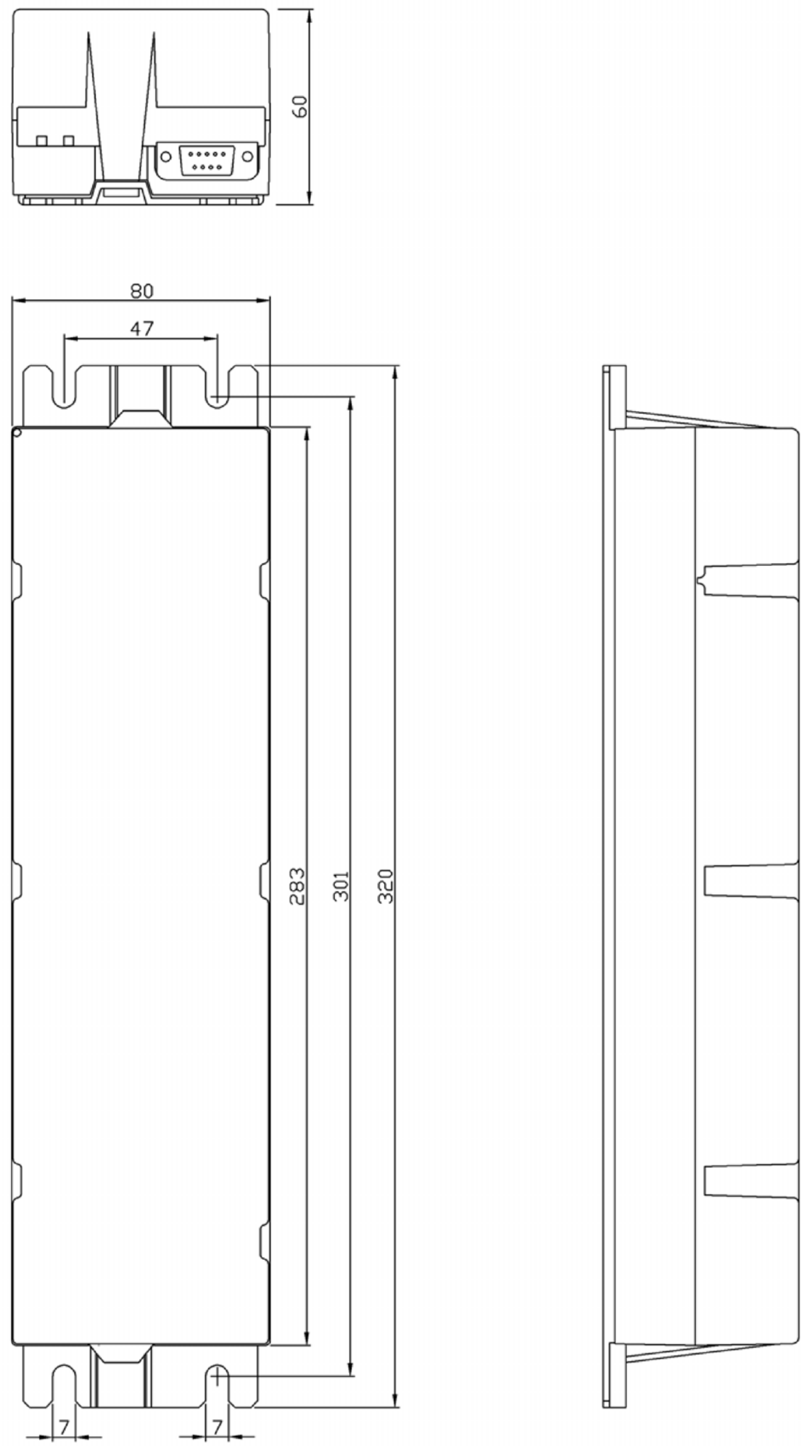


Figure 4-7 Controller

4.9 Operation and configuration of the control unit

The service buttons can be used to operate the controller.

The following options are available to parameterize the controller.

1. Parameter assignment via the PROFIdrive PKW interface
2. Parameter assignment with the terminal module
3. Parameter assignment via supplementary devices (SIDOOR SERVICE TOOL, SIDOOR SOFTWARE KIT)

WARNING

Verify parameters.

In the case of parameter assignment via the SIDOOR SOFTWARE KIT or via the PROFIdrive PKW interface, parameter values must be read back after modification and verified.

WARNING

Access protection to the controllers/parameters.

Access to the controller and the parameter assignment of the controller must be protected against unauthorized access. Appropriate measures must be taken for specific applications, e.g. installation in a closed control cabinet, to ensure access only by authorized personnel.

WARNING

Verification of safety-relevant functions

The SIDOOR controller is only a subsystem (incomplete machine). In general, the correct parameter assignment of the SIDOOR controller and the effectiveness of the safety-relevant functions must be checked at regular intervals by testing the safety-relevant functions during commissioning and depending on the application.

Note

After the optimal parameter settings have been determined, note them in the configuration protocol (see appendix Configuration record (Page 342)). Have this record to hand when you call the Hotline.

Note

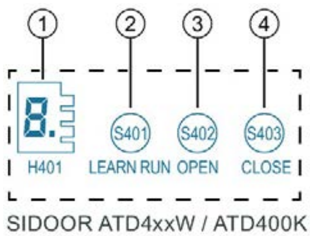
Parameter changes

Parameters should always be adjusted during normal operation with the door at standstill, because the controller then accepts the values immediately.

As of V1.09: The parameter changes are also applied in initial mode with standstill of the door.

4.9.1 Service buttons

Overview



① 7-segment display
② Learn run button
③ Service button OPEN
④ Service button CLOSE

Figure 4-8 Overview of minimal editor

4.9.1.1 Operation using service buttons

7-segment display "H401"

You can see the operating states on the "H401" 7-segment display. You can find the description of the 7-segment display in the section Operating state display (Page 304).

Learn run button

You can start a learn run with the learn run button (S401).

Note

Two types of learn run can be carried out. See section Learn run (Page 28).

Learn run (when the supply voltage is applied)

Table 4- 30 Starting a learn run when the line voltage is applied

Procedure		H401 display	H1 display
1.	Push the door into the CLOSED position.		
2.	Disconnect the power supply from X3 (DC).		
3.	Press and hold the learn run button (S401).		
4.	Connect the power supply to X3 (DC).		
5.	Initial commissioning or motor adaption: The output transmission ratio [mm/rev] must be configured for the first commissioning or motor adaptation for the M3, MDG3, M4, MDG4, M5 and MDG5 motors. For the M3, M4 and M5 motors, set default value to 176 mm/rev. Abtriebsuebers 176 mm / Umd output trans. fac. 176 mm / rot		
6.	Press and hold the learn run button (S401)		
7.	The learn run starts automatically, and the learn run button can be released.		'H': learn run active
8.	During the learn run, the door is opened about 10 cm, and closed once or twice at slow start speed. The friction of the door system is then determined by opening and closing the door once through a range of 25 cm at slow start speed. The door then opens and closes through its complete range of movement at reduced speed. After the door has opened by approximately 15 cm, it passes through an additional short acceleration ramp to determine the mass to be moved.		
9.	The door parameters and the determined door width are saved when the door is in the CLOSED position. This means that the door width and the mass to be moved are re-adapted and saved. The default parameters for energy limitation, speed limitation, friction compensation and all other travel curve parameters are also loaded.		
10.	Learn run completed.		'u': door is closed
11.	First commissioning or motor adaptation. The currently determined door width is output on the terminal module for the M3, MDG3, M4, MDG4, M5 and MDG5 motors. Tuerweite 613 mm door width 613 mm		

Learn run (during operation)

Table 4- 31 Starting a learn run during operation

Procedure		H401 display	H1 display
1.	Push the door into the CLOSED position.		
2.	Press and hold the learn run button (S401).		
3.	The learn run starts automatically, and the learn run button can be released.		'H': learn run active
4.	During the learn run, the door is opened about 10 cm, and closed once or twice at slow start speed. The friction of the door system is then determined by opening and closing the door once through a range of 25 cm at slow start speed. The door then opens and closes through its complete range of movement at reduced speed. After the door has opened by approximately 15 cm, it passes through an additional short acceleration ramp to determine the mass to be moved.		
5.	The door parameters and the determined door width are saved when the door is in the CLOSED position. This means that the door width, mass to be moved, energy limiting, speed limiting and friction compensation[3)] are re-adapted and saved.		
6.	Learn run completed.		'u': door is closed

Service buttons open/close

Note

The service buttons are not evaluated when the Stop command with disable DCU is active.

Door movements in the OPEN and CLOSE directions can also be made manually with the service buttons S402 (OPEN) and S403 (CLOSE).

The service buttons are parallel to the drive commands OPEN and CLOSE that placed at X6. Each of these service buttons has to be pushed continuously to reach the limit position of the door, because the door stops when the button is released.

If the OPEN and CLOSE buttons are pressed simultaneously or the OPEN and CLOSE drive commands are used simultaneously, the door always moves in the **OPEN** direction.

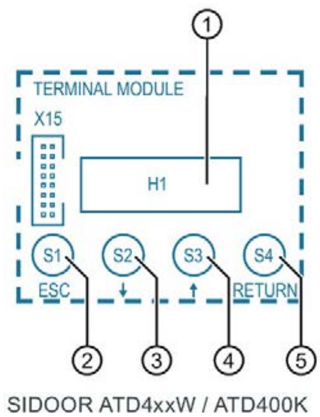
Note

Operation with the SIDOOR SERVICE TOOL or the SIDOOR USER SOFTWARE

The doors can also be controlled with the SIDOOR SERVICE TOOL or the SIDOOR USER SOFTWARE. In this case, the external input signals are disabled in some menus. Additional information is available in the section SIDOOR SERVICE TOOL (Page 273) and in the SIDOOR SOFTWARE KIT Operating Instructions (http://support.automation.siemens.com/WW/view/en/92711247).

4.9.2 Parameter assignment via the terminal module

Overview



① Digital display
② Escape key
③ Menu selection key
④ Menu selection key
⑤ Enter key

Figure 4-9 Overview of terminal module

Function

The integrated terminal module can be used for diagnostics and setting parameters.

Operation

↵	Enter key – jumps to the next menu below
ESC	Escape key – jumps back to the menu above
↑	Menu selection key – increases a parameter value
↓	Menu selection key – decreases a parameter value

Parameters can be changed in both of the following menus:

- *"MAIN MENU > Quick setup > Parameter setting"*
- *"MAIN MENU > General setup > Profile parameters"*

The desired parameter is selected with the menu selection keys ↑ and ↓, and activated for the setting with the Enter key ↵ (parameter value flashes).

The parameter value can then be increased or decreased by pressing the corresponding key (see above). The value is accepted by pressing the Enter key again.

Menu navigation

You can find the menu navigation of the SIDOOR SERVICE TOOL in the section (Page 273).

Digital display "H1"

You can see the operating states on the "H1" display. You can find the meaning of the digital display in the section Operating state display (Page 304).

4.9.3 Parameter assignment using additional devices

Description

In addition to the parameter assignment options integrated in the controller, you can also assign parameters via additional units. The following additional units are available for parameter assignment:

- **SIDOOR USER SOFTWARE**
  The SIDOOR USER SOFTWARE is part of the SIDOOR SOFTWARE KIT. You can find a detailed description of the SIDOOR SOFTWARE KIT in the SIDOOR SOFTWARE KIT Operating Instructions (http://support.automation.siemens.com/WW/view/en/92711247).
- **SIDOOR SERVICE TOOL**
  A detailed description of the SIDOOR SERVICE TOOL is available in the section SIDOOR SERVICE TOOL (Page 273).

4.9.4 Parameter names

Some of the parameter names are abbreviated in the software because of the limited number of characters in the display. The full names of the parameters are used in this manual.

The following table shows the full parameter names and the equivalent names used in the software:

Full parameter name	Parameter name as shown in the software
Profile parameter	
Slow end distance open	Slow end distance open
Slow start distance open	Slow start distance open
Slow start distance close	Slow start distance close
Slow end distance close	Slow end distance close
Maximum speed open	Maximum speed open
Slow end speed open	Slow end speed open
Slow start speed open	Slow start speed open
Slow initial speed open	Slow initial speed open
Maximum speed close	Maximum speed close
Slow start speed close	Slow start speed close
Slow end speed close	Slow end speed close
Slow initial speed close	Slow initial speed close
NDG speed (reduced)	Nudging speed / NDG speed (redu)[1)]
Acceleration ramp open	Acceler. ramp open
Deceleration ramp close	Deceleration ramp open
Reversal ramp open/close	Reversal ramp op/cl
Acceleration ramp close	Acceler. ramp close
Deceleration ramp close	Deceler. ramp close
Reversal ramp close/open	Reversal ramp cl/op

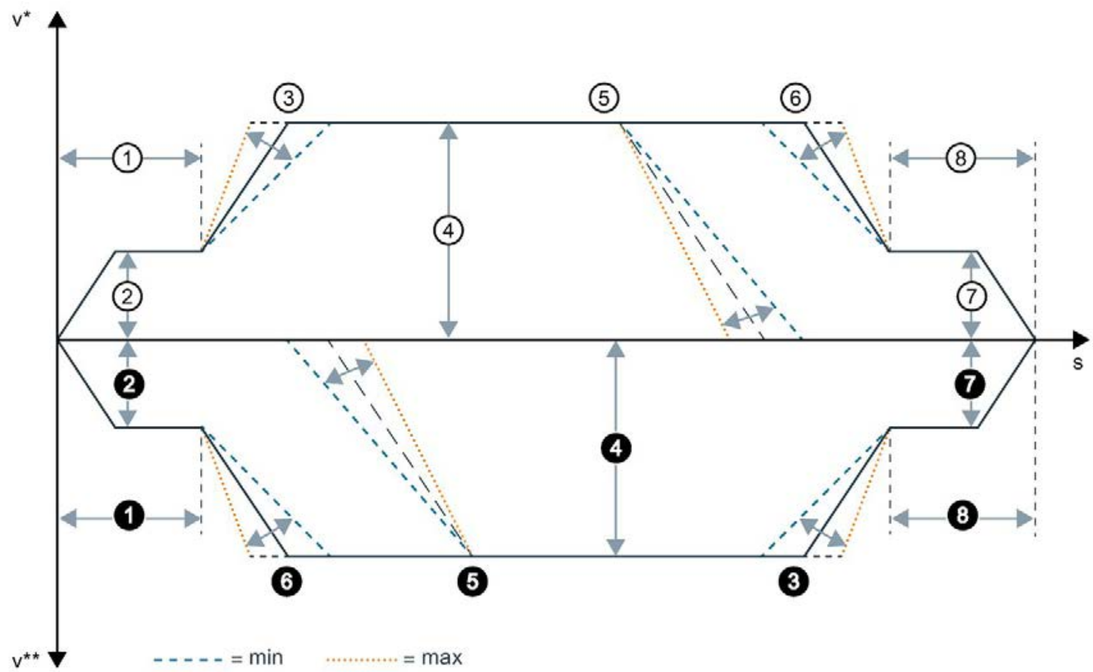
Full parameter name	Parameter name as shown in the software
Idle torque open	Idle torque open
Idle torque close	Idle torque close
Peak torque close	Peak torque close
Static force limit open	Limit force open
Static force limit close	Limit force close
Limit force end close	Limit force end close
Static NDG-force (reduced)	Limit force close nudging / NDG-force (redu)1)
Additional profile parameters for SIDOOR ATD4xxW	
Limit energy close	Limit energy close
Limit energy open	Limit energy open
Limit energy NDG	Limit energy NDG
Special parameters for SIDOOR ATD4xxW	
Slave ID	Slave ID
Int. baud rate	Int. baud rate
PKW words	PKW words
PZD words	PZD words
Function input 1	Function input - 1
Partial opening width	Partial opening width
FBLOCK configuration	FBLOCK configuration
Output transmission	Output transmission
Force limit for learn run	Force limit for learn run
Default command input	Default command input
Hold-open time standard	Hold-open time standard
Hold-open time cord-operated switch	Hold-open time cord-operated switch
Speed critical range OPEN	Speed critical range OPEN
Force critical range open	Force critical range open
Speed critical range CLOSE	Speed critical range CLOSE
Force critical range CLOSE	Force critical range CLOSE
Basic parameter SIDOOR ATD4xxW	
Output transmission	Output transmission
Motor direction	Motor direction
Pulse encoder direction	Pulse encoder direction
Door width	Door width
Dynamic mass	Dynamic mass
Frictional force open	Frictional force open
Frictional force close	Frictional force close
Average friction current open	Average: Friction current open
Average friction current close	Average: Friction current close

4.9.5 Adjustable parameters

4.9.5.1 Driving curve

The optimum drive characteristics of the door are calculated and maintained continuously.

The driving curve transitions are rounded off so that the door movement is smooth and jerk-free.



v*	Speed open	v**	Speed close
①	Slow start distance open	❶	Slow end distance close
②	Slow start speed open	❷	Slow end speed close
③	Acceleration ramp open	❸	Acceleration ramp close
④	Maximum speed open	❹	Maximum speed close
⑤	Reversal ramp open/close	❺	Reversal ramp close/open
⑥	Deceleration ramp open	❻	Deceleration ramp close
⑦	Slow end speed open	❼	Slow start speed close
⑧	Slow end distance open	❽	Slow start distance close

Reversal ramp close/open = Reversal of travel in direction "CLOSE" in direction "OPEN".

Reversal ramp open/close = Reversal of travel in direction "OPEN" in direction "CLOSE".

When reversing, the door is braked with the reversal ramp and starts the travel in the opposite direction with the acceleration ramp.

4.9.5.2 Forces

The following forces and currents can be configured for the travel curve:

Continuous torque (power) OPEN

Continuous torque in the door position OPEN.

This parameter is effective when an open command is present and the door is in the OPEN position.

The current generates a continuous torque against the end position of the door in the opening direction.

Adjustment ranges

The parameter can be adjusted in accordance with the adjustment ranges of the parameters (see section Profiles and adjustment ranges (Page 331)). The value of the parameter must be selected so that the door is held in the OPEN position.

Continuous torque (power) CLOSE

Continuous torque in the door position CLOSED.

This parameter is effective when a close command is present and the door is in the CLOSED position.

The current generates a continuous torque against the end position of the door in the closing direction.

Adjustment ranges

The parameter can be adjusted in accordance with the adjustment ranges of the parameters (see section Profiles and adjustment ranges (Page 331)). The value of the parameter must be selected so that the door is held in the CLOSED position.

Cutter press-on torque

The cutter press-on torque presses the door against a door cutter.

If an obstruction is detected within a tolerance range of 1 cm around the CLOSED position, then the cutter press-on torque is applied for approx. 2 seconds.

Adjustment ranges

The parameter can be adjusted in accordance with the adjustment ranges of the parameters (see section Profiles and adjustment ranges (Page 331)). The value of the parameter must be selected so that the cutter force opposing the door is overcome, and the door is closed completely.

Static opening force

This force is effective during the opening movement if an open command is present.

The following diagram shows the dependence on motor current and force for motors with standard pinion (output transmission ratio 176 mm/rev).

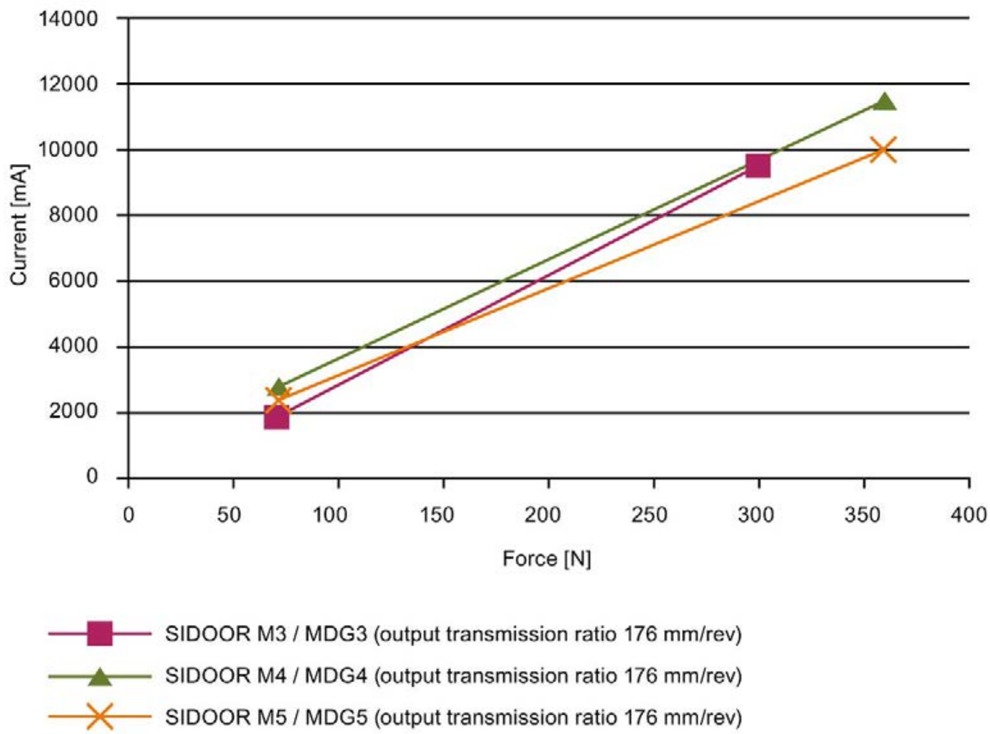


Figure 4-10 Current – force – motor characteristic in opening direction for drive transmission ratio 176 mm/rev

Adjustment ranges

The parameter can be adjusted in accordance with the adjustment ranges of the parameters (see section Profiles and adjustment ranges (Page 331)). The value of the parameter must be selected so that the door moves across the entire door width in the opening direction if an open command is present. Inadequate force can lead to an obstruction of the door.

In the factory setting, the opening force is preset to a minimum value (see section Profiles and adjustment ranges (Page 331)).

Static closing force

This force is effective during the closing movement if a close command is present.

The following diagram shows the dependence on motor current and force for motors with standard pinion (output transmission ratio 176 mm/rev).

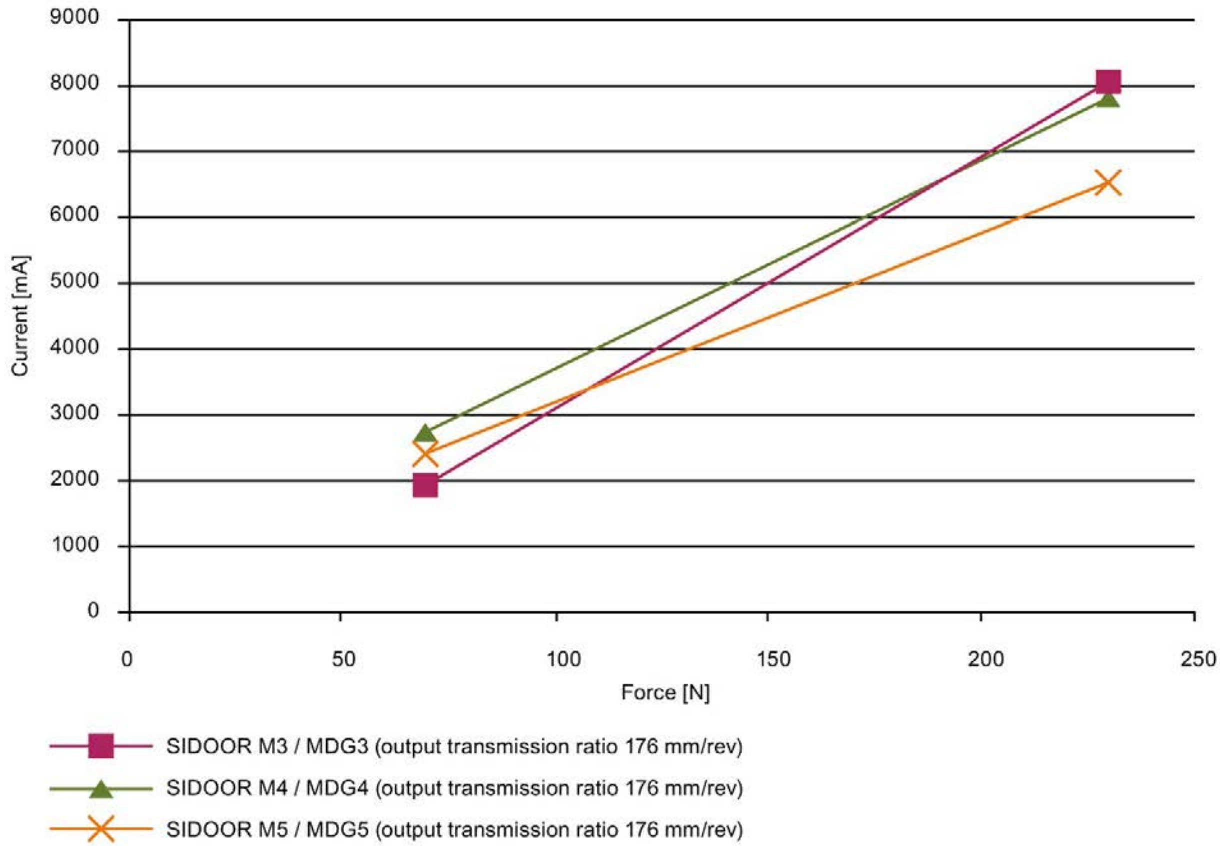


Figure 4-11 Current – force – motor characteristic in closing direction for output transmission ratio 176 mm/rev

Adjustment ranges

The value of the parameter must be selected so that the door moves across the entire door width in the closing direction if a close command is present. Inadequate force can lead to an obstruction of the door.

The closing force can be set for the geared motors within the adjustment ranges of the parameters (see section Profiles and adjustment ranges (Page 331)).

A warning appears on the digital display of the terminal module if the set closing force of 150 N is exceeded. The stated values refer to doors opening to one side. A load cell in the middle of centrally opening doors would show only half the value.

⚠ WARNING

Risk of injury and material damage due to excessive closing force of the door

When the closing force is set, it is imperative that any effective closing weight is taken into account.

The desired closing force must be reduced by 10 N for each 1 kg of counterweight. This affects the:

- Closing force CLOSE
- Closing force cutter distance CLOSE

Example: Closing weight = 4 kg

Desired static force limit CLOSE = 150 N

The counterweight of 4 kg corresponds to a force of 40 N. The force limit then has to be adjusted to 150 N – 40 N = 110 N.

In the factory setting, the closing force is preset to a minimum value (see section Profiles and adjustment ranges (Page 331)).

Limit force end CLOSE

This force serves to overcome the cutter distance in the closing direction.

A higher force is often required to overcome the cutter distance than for the rest of the distance the door travels.

This parameter is effective in the closing direction when the door is within the cutter distance.

Adjustment ranges

The parameter can be adjusted in accordance with the adjustment ranges of the parameters (see section Profiles and adjustment ranges (Page 331)). The value of the parameter must be selected so that the cutter distance is overcome in the closing direction.

In the factory setting, the closing force is preset to a minimum value (see section Profiles and adjustment ranges (Page 331)).

4.9.5.3 Parameter assignment

The tables below show all the parameters that are available via the PKW interface. The parameters are generally subdivided into:

- Driving parameters
- Fieldbus parameters
- Other parameters
- Calibration and function parameters
- Obstruction and reversing parameters
- FBLOCK parameters
- Basic parameters

Note

Write-protected parameters (read only) are indicated in the documentation by an "r" before the parameter number.

Read / write parameters can be changed, and are indicated by a "p" before the parameter number.

Driving parameters

Note

For safety reasons, changes to the driving parameters are only accepted when the controller is at a complete stop.

Note

Write protection

When write protection is activated (see Table 4-33 Other parameters (Page 192)), the drive curve parameters can only be changed via the SIDOOR user commissioning software and the PKW interface. A write-protected parameter can only be configured via the PKW interface, and is automatically reset by an initial learn run (learn run when line voltage applied).

Table 4- 32 Driving parameters

Parameter ID	Unit	Parameter name	Description
Distances			
p3660	mm	Slow end distance open	Slow end distance in the open position
p3661	mm	Slow start distance open	Slow start distance in the closed position
p3662	mm	Slow start distance close	Slow start distance in the open position
p3663	mm	Slow end distance close	Slow end distance in the closed position
Speeds			
p3664	mm/s	Maximum speed open	Maximum speed in the opening direction
p3665	mm/s	Slow end speed open	Slow end speed in the opening direction
p3666	mm/s	Slow start speed open	Slow start speed in the opening direction
p3667	mm/s	Slow initial speed open	Initial speed in the opening direction
p3668	mm/s	Maximum speed close	Maximum speed in the closing direction
p3669	mm/s	Slow start speed close	Slow start speed in the closing direction
p3670	mm/s	Slow end speed close	Slow end speed in the closing direction
p3671	mm/s	Slow initial speed close	Initial speed in the closing direction
p3672	mm/s	NDG speed (reduced)	Speed in NDG mode in the opening and closing direc-tions
Acceleration and deceleration			
p3673	mm/s^2	Acceleration ramp open	Acceleration ramp in the opening direction
p3674	mm/s^2	Deceleration ramp open	Deceleration ramp in the opening direction
p3675	mm/s^2	Reversal ramp open/close	Reversal ramp OPEN → CLOSE
p3676	mm/s^2	Acceleration ramp close	Acceleration ramp in the closing direction
p3677	mm/s^2	Deceleration ramp close	Deceleration ramp in the closing direction
p3678	mm/s^2	Reversal ramp close/open	Reversal ramp CLOSE → OPEN
p3679	mA	Idle torque open	Idle torque in the open position
p3680	mA	Idle torque close	Idle torque in the closed position
p3681	mA	Peak torque close	Peak torque close in closed position for approx. 2 s

Parameter ID	Unit	Parameter name	Description
Forces			
p3682	N	Static force limit open	Static force limit open
p3683	N	Static force limit close	Static force limit close
p3684	N	Limit force end close	Limit force end in the closing direction
p3685	N	Static NDG-force (reduced)	Force in NDG mode in the opening and closing directions

You will find the corresponding factory settings and adjustment ranges (depending on the motor used) for the driving parameters in Section Profiles and adjustment ranges (Page 331).

Other parameters

Table 4- 33 Other parameters

Parameter ID	Adjustment range	Factory setting	Unit	Description
Sensor Module				
p4600	0 ≙ inactive 1 ≙ BWS type 2 2 ≙ DCOPS 3 ≙ pressure sensitive edge	0	—	Local sensor type
p4601	20 … 5000	30	ms	Discrepancy time in the function test of the OSSD system
p4610	10 … 30000 0 ≙ "AND0" discrepancy analysis deactivated	400	ms	Discrepancy analysis time of the input monitoring block FBLOCK "AND0"
p4611	10 … 30000 0 ≙ discrepancy analysis "AND2" deactivated	400	ms	Discrepancy analysis time of the input monitoring block FBLOCK "AND2"
Faults and alarms				
r2100	—	—	—	Status code ASCII code of the 7-segment display (see section Figure 4-4 Sequential control state graph (Page 163))
r2102	0 ≙ special motor 1 ≙ M2 2 ≙ M3 / MDG3 3 ≙ M4 / MDG4 4 ≙ M5 / MDG5 255 ≙ unknown motor			Connected motor

Parameter ID	Adjustment range	Factory setting	Unit	Description
Display and operation				
p90	0 ≙ deactivated 1 ≙ activated	0	—	Write protection Activates (1) or deactivates (0) write protection for all travel curve parameters in the service menu. As of V1.09: When write protection is activated via parameter p90, the FBLOCK configuration, the force for the learn run and the configuration of digital input 1 can no longer be changed via the operating menu. As of V1.10: When write protection is activated, the basic parameter cannot be changed via the operating menu.
p91	**Write:** 1 ≙ reset complete parameter set (load all factory defaults) (As of V1.10) 2 ≙ Trigger restart of the control unit 3 ≙ Reset full parameter set and trigger restart of the control unit **Read:** 1 ≙ parameter set validated and valid 0 ≙ parameter set invalid and/or reset to factory settings	—	—	**Note:** All saved parameters are reset to factory setting! The controller must be restarted for the factory settings to take effect. **Note:** A learn run is mandatory for "0" (parameter set invalid or factory settings loaded)!
p92	1 ≙ load factory defaults of the FBLOCK parameter set	—	—	**Note:** all saved FBLOCK parameters are reset to their factory defaults!
p93	1 ≙ load factory defaults of the travel curve parameter set	—	—	**Note:** All saved travel curve parameters are reset to their factory defaults! • Loads travel curve parameters of the default travel curve profile • In addition, the following parameters are reset: p1202, p1203, p1204, p2104, p2105, p1242

Parameter ID	Adjustment range	Factory setting	Unit	Description
p100	0 = FBLOCK + Bus 1 = FBLOCK + relay 2 = FBLOCK > Bus	0	—	Default command mode: For the ATD410W, ATD420W, ATD430W controllers the command input via the bus system is activated in the default setting -> parameter p100 = 0. This means that the FBLOCK drive orders can only be executed in the drive state "S4: Z_MODE" (see Figure 4-4 State graph sequential control system). For the ATD401W controller with relay module, no command mode is possible via the bus system. For this controller variant, parameter p100 = 1 must always be set. If the ATD410W, ATD420W, ATD430W controllers are to be operated without bus connection (offline) (FBLOCK drive orders independent of drive state), the default command mode must be redirected to the FBLOCK logic -> Parameter p100 = 2.
r200	0 … 65535	—	—	Checksum for the default parameters (see Checksum parameters (as of V1.12) (Page 63))
r201	0 … 65535	—	—	Checksum for the learn run parameters (see Checksum parameters (as of V1.12) (Page 63))
r202	0 … 65535	—	—	Change counter for the default parameters (see Checksum parameters (as of V1.12) (Page 63))
p2080	0 … 65535	FFFF (hex)	—	**DCMD masking fieldbus** Each bit in the mask filters the corresponding bit in TSW1: 0: CMD bit is not allowed to pass 1: CMD bit is allowed to pass
p2081	0 … 65535	FFFF (hex)	—	**DCMD masking FBLOCK** Each bit in the mask filters the corresponding bit in TSW1: 0: CMD bit is not allowed to pass 1: CMD bit is allowed to pass

See also

Operating state display (Page 304)

Fieldbus parameters

Table 4- 34 USS fieldbus parameters

Parameter ID	Adjustment range	Factory setting	Description
Communication channel			
p2020	0 ≙ 9600 1 ≙ 19200 2 ≙ 38400 3 ≙ 57600 4 ≙ 115200 5 ≙ 187500 6 ≙ 250000 7 ≙ 300000 8 ≙ 375000 9 ≙ 500000 10 ≙ 750000	4	Baud rate
p2021	0 … 31	0	Slave address
p2022	0 to 16 words	7	Number of PZDs
p2023	0 ≙ no PKW proportion 3 ≙ (3 words) 4 ≙ (4 words) 127 ≙ (variable length)	4	Number of PKWs
Statistical data			
r2029	0 ≙ rejected telegrams 1 ≙ character frame 2 ≙ start character 3 ≙ block check character 4 ≙ telegram length 5 ≙ remaining execution time 6 ≙ telegram type 7 ≙ buffer overflow	—	Error statistics
Monitoring			
p2040	0 to 65535 ms 0 ≙ monitoring deactivated	1000 ms	Monitoring time for master monitoring
Cyclic process values			
p4700	0 … 10	0	As of V1.09: Value selection for cyclic transmission of process value TZW3 (Page 329)
p4701	0 … 10	1	As of V1.09: Value selection for cyclic transmission of process value TZW4 (Page 329)
p4702	0 … 10	2	As of V1.09: Value selection for cyclic transmission of process value TZW5 (Page 329)

Calibration and function parameters

Table 4- 35 Calibration and function parameters

Parameter ID	Adjustment range	Factory setting	Unit	Description
Advanced functions				
p1200	50 … 1000 0 ≙ deactivated	250 Motor M5 / MDG5: 200	mm/s	Speed from which vandalism protection is activated.
p1201	1 … 4000 0 ≙ deactivated	500	mm	Belt break monitoring Distance after which a torn belt is detected / reported.
p1202	0 … 100 0 ≙ no limit	4	J	Kinetic energy limiting in closing direction 0 ≙ no limiting based on energy
p1203	0 … 100 0 ≙ no limit	4	J	Kinetic energy limiting in opening direction 0 ≙ no limiting based on energy
p1204	0 … 100 0 ≙ no limit	4	J	Kinetic energy limiting in NDG mode 0 ≙ no limiting based on energy
p1206	30 … 500	30	cm	Partial opening width (virtual open position)
p1208	1 … 20	10	mm	Door width tolerance (buffer distance at the end stops)
p1242	70 … 360/k	360/k	N	Force limit for learn run The parameter depends on the output transmission and is defined by k factor (existing output transmission/176 [mm/rev]). The value is limited to the motor-specific maximum value depending on the motor, see motor type in section Profiles and adjustment ranges. (Page 331)
Light barrier				
p1210	0 … 60000	10	—	Distance from the closed stop at which the light barrier and pressure-sensitive edge reaction are suppressed.
p1211	0 ≙ deenergize 1 ≙ stop 2 ≙ open	0	ms	Following drive order, for reversing (in the opening direction) because of an interrupted light barrier
ImpulseDrive				
p1220	500 … 60000	1000	ms	Lead time effective after the door command "deenergize" (current-free)
p1221	1 … 1000 0 ≙ deactivated	80	—	Detection sensitivity for distance-based detection **Note:** 1 ≙ very sensitive
p1222	1 … 1000 0 ≙ deactivated	20	—	Detection sensitivity for speed-based detection **Note:** 1 ≙ very sensitive

Parameter ID	Adjustment range	Factory setting	Unit	Description
AssistedDrive				
p1230	0 … 60000	100	ms	Switch-off delay for the ASDrv signal. After expiry of this delay time, the ASDrv signal switches from active to inactive.
p1231	1 … 100	60	%	Threshold value for digital detection of external slide support during the opening movement (The proportion of force from which AssistedDrive is detected in relation to the learnt reference value)
p1232	1 … 100	60	%	Threshold value for digital detection of external slide support during the closing movement (The proportion of force from which AssistedDrive is detected in relation to the learnt reference value)
Output transmission				
p4602	88…384	0	mm/rev	M3, MDG3, M4, MDG4, M5 and MDG5 motors → Value configurable. The permissible values are between 88…384 mm/rev. After change of the output transmission ratio, a learn run must be carried out or the basic parameters must be adjusted and confirmed.
ImpulseStop				
p1240	1 … 100	50	%	Limit value for digital detection of an external opposing force during the opening movement (The proportion of force before ImpulseStop is detected in relation to the learnt reference value/friction force)
p1241	1 … 100	50	%	Limit value for digital detection of an external opposing force during the closing movement (The proportion of force before ImpulseStop is detected in relation to the learnt reference value/friction force)
Cold-storage function (as of V1.12)				
p1250	1 … 60	6	s	"Standard" hold-open time in the cold storage function in seconds. As soon as the door receives the open status, the specified time starts running and closes automatically when the time has elapsed. If 0 s is specified, the function is deactivated.
p1251	1 … 60	0	s	"Cord-operated switch" hold-open time in the cold storage function in seconds. As soon as the door receives the open status, the specified time starts running and closes automatically when the time has elapsed. If 0 s is specified, the function is deactivated.

Parameter ID	Adjustment range	Factory setting	Unit	Description
Basic parameters				
<V1.10: r2101 >=V1.10: p2101	0 … 1100	1100	Kg	Effective door weight As of V1.10: Writable
<V1.10: r2103 >=V1.10: p2103	300 … 5000	300	Mm	Door width As of V1.10: Writable
<V1.10: r2104 >=V1.10: p2104	0 … 300	0	N	Friction in open direction As of V1.10: Writable
<V1.10: r2105 >=V1.10: p2105	0 … 300	0	N	Friction in close direction As of V1.10: Writable
p2107	-12000 … 12000	0	mA	As of V1.10: Average current for the friction in the opening direction
p2108	-12000 … 12000	0	mA	As of V1.10: Average current for the friction in the closing direction
p2109	0 … 1	1	—	As of V1.10: Direction of rotation of the motor 1 = normal, 0 = inverse
p2110	0 … 1	1	—	As of V1.10: Direction of rotation of the pulse encoder 1 = normal, 0 = inverse
p2111	0 … 2	0	—	As of V1.10: Status of the basic parameter editors: Read: 0 = Basic parameter editor is not running, 1 = Basic parameter editor active Write: 0 = Close basic parameter editor 1 = Start Basic parameter editor 2 = Transfer data to basic parameter editor
Position block (as of V1.12)				
p2200	0..500	0	cm	Normal operation: Indication of the position of the area in the OPEN direction starting from the "Closed" position.
p2201	0..500	0	cm	Normal operation: Specifies the width of the area in the OPEN direction. 0 ≙ area deactivated.
p2202	0..500	0	cm	Normal operation: Indication of the position of the area in CLOSE direction starting from the "Closed" position.
p2203	0..500	0	cm	Normal operation: Specifies the width of the area in the CLOSE direction. 0 ≙ area deactivated.

Parameter ID	Adjustment range	Factory setting	Unit	Description
p2204	0..500	0	cm	Initial operation: Because the absolute position is not known in initial operation, the width in OPEN direction is specified here starting from the current position. 0 ≙ area deactivated.
p2205	0..500	0	cm	Initial operation: Because the absolute position is not known in initial operation, the width in Close direction is specified here starting from the current position. 0 ≙ area deactivated.
p3686	See p3682 corresponding motor type in section Profiles and adjustment ranges (Page 331)		N	Force limitation in the position block area in OPEN direction
p3687	See p3683 corresponding motor type in section Profiles and adjustment ranges (Page 331)		N	Force limitation in the position block area in CLOSE direction
p3688	See p3664 corresponding motor type in section Profiles and adjustment ranges (Page 331)		mm/s	Speed limitation in the position block area in OPEN direction
p3689	See p3668 corresponding motor type in section Profiles and adjustment ranges (Page 331)		mm/s	Speed limitation in the position block area in CLOSE direction

Obstruction and reversing parameters

Table 4- 36 Obstruction and reversing parameters (general)

Parameter ID	Adjustment range	Factory setting	Unit	Description
General				
p3850 1)	Bit x = 1 ≙ function activated Bit x = 0 ≙ function deactivated	0x00FF	—	Function control Bit 0 ≙ stop obstruction detection in the closing direction Bit 1 ≙ force obstruction detection in the closing direction Bit 2 ≙ obstruction counter in the closing direction Bit 3 ≙ slow obstruction approach in the closing direction Bit 4 ≙ stop obstruction detection in the opening direction Bit 5 ≙ force obstruction detection in the opening direction Bit 6 ≙ obstruction counter in the opening direction Bit 7 ≙ slow obstruction approach in the opening direction

1) Expert parameters, see Section Expert configuration (Page 78).

The parameters in the table below refer to the closing direction only.

Table 4- 37 Obstruction and reversing parameters (in the closing direction)

Parameter ID	Adjustment range	Factory setting	Unit	Description
Timing				
p3852 1)	0 … 60000	1000	ms	ON-delay time for obstruction detection
p3853 1)	0 … 60000	300	ms	Minimum detection time for stop obstruction
p3854 1)	0 … 60000	100	ms	Minimum detection time for force obstruction
Ranges				
p3855 1)	0 … 60000	20	mm	Distance for slow obstruction approach before and after the obstruction
p3856 1)	0 … 60000	10	mm	Range of suppression of obstruction detection before the closed end stop
p3857 1)	0 … 60000	10	mm	Range of suppression of obstruction detection after the open end stop
p3858 1)	0 … 60000	20	mm	Range of suppression of force obstruction detection before the creep distance
p3859 1)	0 … 60000	50	mm	Range of suppression of force obstruction detection after the last obstruction

Parameter ID	Adjustment range	Factory setting	Unit	Description
Retries				
p3860	0 to 0xFFFF 0 ≙ no retry, 0xFFFF ≙ unlimited retries	0	—	Number of retries to overcome the obstruction
p3861	0 … 60000	2000	ms	Wait time before each retry
p3862	0 ≙ deenergize 1 ≙ stop	0	—	Drive control during the wait time (before retries)
p3863	0 ≙ deenergize 1 ≙ stop 2 ≙ open 3 ≙ close	0	—	Drive control after all retries have been executed (if reversing is not configured)
Reversing				
p3864	0 to 0xFFFF 0 ≙ no reversing 0xFFFF ≙ unlimited reversing	2 1 (V1.03 and higher)	—	Number of reverses
p3865	0 … 60000	2000	ms	Wait time before each reverse
p3866	0 … 60000 0 ≙ full reverse	200	mm	Reversing distance
p3867	0 ≙ deenergize 1 ≙ stop 2 ≙ open 3 ≙ close	0	—	Drive control for obstruction while reversing
p3868	0 ≙ deenergize 1 ≙ stop 2 ≙ open 3 ≙ close	0	—	Drive control after all reverses have been executed

1) Expert parameters, see Section Expert configuration (Page 78).

The parameters in the table below refer to the opening direction only.

Table 4- 38 Obstruction and reversing parameters (in the opening direction)

Parameter ID	Adjustment range	Factory setting	Unit	Description
Timing				
p3869 1)	0 … 60000	1000	ms	ON-delay time for obstruction detection
p3870 1)	0 … 60000	500	ms	Minimum detection time for stop obstruction
p3871 1)	0 … 60000	100	ms	Minimum detection time for force obstruction
Ranges				
p3872 1)	0 … 60000	20	mm	Distance for slow obstruction approach before and after the obstruction
p3873 1)	0 … 60000	10	mm	Range of suppression of obstruction detection after the closed end stop

Parameter ID	Adjustment range	Factory setting	Unit	Description
p3874 1)	0 … 60000	10	mm	Range of suppression of obstruction detection before the open end stop
p3875 1)	0 … 60000	20	mm	Range of suppression of force obstruction detection before the creep distance
p3876 1)	0 … 60000	50	mm	Range of suppression of force obstruction detection after the last obstruction
Retries				
p3877	0 to 0xFFFF 0 ≙ no retry 0xFFFF ≙ unlimited retries	3 0 (V1.03 and higher)	—	Number of retries to overcome the obstruction
p3878	0 … 60000	2000	ms	Wait time before each retry
p3879	0 ≙ deenergize 1 ≙ stop	0	—	Drive control during the wait time (before retries)
p3880	0 ≙ deenergize 1 ≙ stop 2 ≙ open 3 ≙ close	0	—	Drive control after all retries have been executed (if reversing is not configured)
Reversing				
p3881	0 to 0xFFFF 0 ≙ no reversing 0xFFFF ≙ unlimited reversing	0 1 (V1.03 and higher)	—	Number of reverses
p3882	0 … 60000	2000	ms	Wait time before each reverse
p3883	0 … 60000 0 ≙ full reverse	0 200 (V1.03 and higher)	mm	Reversing distance
p3884	0 ≙ deenergize 1 ≙ stop 2 ≙ open 3 ≙ close	0	—	Drive control for obstruction while reversing
p3885	0 ≙ deenergize 1 ≙ stop 2 ≙ open 3 ≙ close	0	—	Drive control after all reverses have been executed

1) Expert parameters, see Section Expert configuration (Page 78).

FBLOCK parameters

FBLOCK-DCMD parameters

Drive orders can be assigned to the "Q" outputs with the following FBLOCK-DCMD parameters. A drive order only becomes active if the assigned output "Q" is active (positive logic). In the case of edge-controlled signals, the output signal is active for one cycle only. This is why a correspondingly assigned drive order is latched automatically.

You will find details of the functions and logic of the individual function blocks in Section Free function blocks (FBLOCK) (Page 79).

Table 4- 39 FBLOCK-DCMD parameters

<table>
<tr><th>Parameter ID</th><th>Name</th><th colspan="2">Description</th></tr>
<tr><td colspan="4">Digital Input</td></tr>
<tr><td>p20000</td><td>DCMD_DI0_Q2</td><td>Rising (positive) edge</td><td rowspan="2">Output becomes active for one cycle when input edge detected.
The entered drive order (DCMD) is latched (stored) automatically.</td></tr>
<tr><td>p20001</td><td>DCMD_DI0_Q3</td><td>Falling (negative) edge</td></tr>
<tr><td>p20002</td><td>DCMD_DI0_Q4</td><td colspan="2">Level-controlled output; output follows the input directly</td></tr>
<tr><td>p20003</td><td>DCMD_DI1_Q5</td><td>Rising (positive) edge</td><td rowspan="2">Output becomes active for one cycle when input edge detected.
The entered drive order (DCMD) is latched (stored) automatically.</td></tr>
<tr><td>p20004</td><td>DCMD_DI1_Q6</td><td>Falling (negative) edge</td></tr>
<tr><td>p20005</td><td>DCMD_DI1_Q7</td><td colspan="2">Level-controlled output; output follows the input directly</td></tr>
<tr><td>p20006</td><td>DCMD_DI2_Q8</td><td>Rising (positive) edge</td><td rowspan="2">Output becomes active for one cycle when input edge detected.
The entered drive order (DCMD) is latched (stored) automatically.</td></tr>
<tr><td>p20007</td><td>DCMD_DI2_Q9</td><td>Falling (negative) edge</td></tr>
<tr><td>p20008</td><td>DCMD_DI2_Q10</td><td colspan="2">Level-controlled output; output follows the input directly</td></tr>
<tr><td>p20009</td><td>DCMD_DI3_Q11</td><td>Rising (positive) edge</td><td rowspan="2">Output becomes active for one cycle when input edge detected.
The entered drive order (DCMD) is latched (stored) automatically.</td></tr>
<tr><td>p20010</td><td>DCMD_DI3_Q12</td><td>Falling (negative) edge</td></tr>
<tr><td>p20011</td><td>DCMD_DI3_Q13</td><td colspan="2">Level-controlled output; output follows the input directly</td></tr>
<tr><td>p20012</td><td>DCMD_DI4_Q14</td><td>Rising (positive) edge</td><td rowspan="2">Output becomes active for one cycle when input edge detected.
The entered drive order (DCMD) is latched (stored) automatically.</td></tr>
<tr><td>p20013</td><td>DCMD_DI4_Q15</td><td>Falling (negative) edge</td></tr>
<tr><td>p20014</td><td>DCMD_DI4_Q16</td><td colspan="2">Level-controlled output; output follows the input directly</td></tr>
<tr><td>p20031</td><td>DCMD_DI0_39</td><td colspan="2" rowspan="5">Level-controlled output; output follows the input inverted
(firmware version 1.03 or higher)</td></tr>
<tr><td>p20032</td><td>DCMD_DI1_40</td></tr>
<tr><td>p20033</td><td>DCMD_DI2_41</td></tr>
<tr><td>p20034</td><td>DCMD_DI3_42</td></tr>
<tr><td>p20035</td><td>DCMD_DI4_43</td></tr>
</table>

Parameter ID	Name	Description	
Control bits (as of V1.10)			
p20036	DCMD_SBIT0_Q44	Rising (positive) edge	Output is active for one cycle when input edge is detected. The entered driver order (DCMD) is automatically latched (stored).
p20037	DCMD_SBIT0_Q45	Falling (negative) edge	
p20038	DCMD_SBIT0_Q46	Level-controlled output, output follows the input directly	
p20040	DCMD_SBIT0_Q48	Rising (positive) edge	Output is active for one cycle when input edge is detected. The entered driver order (DCMD) is automatically latched (stored).
p20041	DCMD_SBIT0_Q49	Falling (negative) edge	
p20042	DCMD_SBIT0_Q50	Level-controlled output, output follows the input directly	
p20044	DCMD_SBIT0_Q52	Rising (positive) edge	Output is active for one cycle when input edge is detected. The entered driver order (DCMD) is automatically latched (stored).
p20045	DCMD_SBIT0_Q53	Falling (negative) edge	
p20046	DCMD_SBIT0_Q54	Level-controlled output, output follows the input directly	
p20048	DCMD_SBIT0_Q56	Rising (positive) edge	Output is active for one cycle when input edge is detected. The entered driver order (DCMD) is automatically latched (stored).
p20049	DCMD_SBIT0_Q57	Falling (negative) edge	
p20050	DCMD_SBIT0_Q58	Level-controlled output, output follows the input directly	
p20052	DCMD_SBIT0_Q60	Rising (positive) edge	Output is active for one cycle when input edge is detected. The entered driver order (DCMD) is automatically latched (stored).
p20053	DCMD_SBIT0_Q61	Falling (negative) edge	
p20054	DCMD_SBIT0_Q62	Level-controlled output, output follows the input directly	
p20039	DCMD_SBIT0_Q47	Level-controlled output; output follows the input inverted	
p20043	DCMD_SBIT0_Q51		
p20047	DCMD_SBIT0_Q55		
p20051	DCMD_SBIT0_Q59		
p20055	DCMD_SBIT0_Q63		
AND			
p20015	DCMD_AND0_Q17	Output is logically AND-combined with inputs. A discrepancy analysis of the inputs can be additionally activated.	
p20016	DCMD_AND1_Q18	Output is logically AND-combined with inputs.	
(As of V1.10)			
p20056	DCMD_AND2_Q64	Output is logically ANDed with inputs. a discrepancy analysis of the inputs can be additionally activated.	
OR			
p20017	DCMD_OR0_Q19	Output is logically OR-combined with inputs.	
p20018	DCMD_OR1_Q20		
NOT			
p20019	DCMD_NOT0_Q21	Output is logically NOT-combined with inputs (negation).	
p20020	DCMD_NOT1_Q22		

Parameter ID	Name	Description
XOR		
p20021	DCMD_XOR0_Q23	Output is logically exclusively OR-combined with inputs.
FRQ		
p20022	DCMD_FRQ0_Q24	Output becomes active as soon as the frequency is detected.
p20023	DCMD_FRQ0_Q25	
p20024	DCMD_FRQ1_Q26	
p20025	DCMD_FRQ1_Q27	
DELAY		
p20026	DCMD_OnDELAY_Q28	Output follows positive input signal delayed by the set delay time.
p20027	DCMD_OnDELAY_Q29	
COUNTER		
p20028	DCMD_COUNTER_Q30	Output is active as long as the counter value is 0.
p20029	DCMD_COUNTER_Q31	Output is active as long as the counter value is 1.
p20030	DCMD_COUNTER_Q32	Output is active as long as the counter value is 2.
COLD-STORAGE FUNCTION (as of V1.12)		
p20057	DCMD_CSR_Q65	Output is active as long as the cold storage FBLOCK applies the open signal (see cold storage function block (as of V1.12)). Replace with "function block" here and in the following block).
p20058	DCMD_CSR_Q66	Output is active as long as the cold storage FBLOCK applies the cord-operated switch open signal (see Cold storage function block (as of V1.12) (Page 92)).
p20059	DCMD_CSR_Q67	Output is active as long as the cold storage FBLOCK applies the open signal (see Cold storage function block (as of V1.12) (Page 92)).
p20060	DCMD_CSR_Q68	Output is active as long as the cold storage FBLOCK applies the stop signal (see Cold storage function block (as of V1.12) (Page 92)).
Position block (as of V1.12)		
p20061	DCMD_POS_Q69	Output is active as long as the door position is within the parameterized range.

FBLOCK-REF parameters

The inputs of the various F blocks can be connected or linked to any "Q" outputs (signal sources) via the following FBLOCK-REF parameters. To this end, the number of the Q element must be entered directly in the REF parameter (Q{0 to 38}).

Table 4- 40 FBLOCK-REF parameters

Parameter ID	Name	Description
AND		
p20100	REF_AND0_IN1	Input 1 logical AND gate 0
p20101	REF_AND0_IN2	Input 2 logical AND gate 0
p20102	REF_AND0_IN3	Input 3 logical AND gate 0
p20103	REF_AND0_IN4	Input 4 logical AND gate 0
p20104	REF_AND1_IN1	Input 1 logical AND gate 1
p20105	REF_AND1_IN2	Input 2 logical AND gate 1
(As of V1.10)		
p20123	REF_AND2_IN1	Input 1 logical AND gate 2
p20124	REF_AND2_IN2	Input 2 logical AND gate 2
p20125	REF_AND2_IN3	Input 3 logical AND gate 2
p20126	REF_AND2_IN4	Input 4 logical AND gate 2
OR		
p20106	REF_OR0_IN1	Input 1 logical OR gate 0
p20107	REF_OR0_IN2	Input 2 logical OR gate 0
p20108	REF_OR0_IN3	Input 3 logical OR gate 0
p20109	REF_OR1_IN1	Input 1 logical OR gate 1
p20110	REF_OR1_IN2	Input 2 logical OR gate 1
p20111	REF_OR1_IN3	Input 3 logical OR gate 1
NOT		
p20112	REF_NOT0_IN1	Input logical NOT gate 1 (negation)
p20113	REF_NOT1_IN1	Input logical NOT gate 2 (negation)
XOR		
p20114	REF_XOR0_IN1	Input 1 logical exclusive OR (XOR)
p20115	REF_XOR0_IN2	Input 2 logical exclusive OR (XOR)
FRQ		
p20116	REF_FRQ0_IN1	Input frequency detection
p20117	REF_FRQ1_IN1	Input frequency detection
DELAY		
p20118	REF_OnDELAY_IN1	ON delay
Special		
p20119	REF_ACK	Fault acknowledgement (preceded by 5 s ON delay)
p20120	REF_BATTMODE	Emergency power operation (drive order is latched automatically until the next end stop is reached)

Parameter ID	Name	Description
COUNTER		
p20121	REF_COUNTER_IN	Count input of the counter (a positive edge increments the counter)
p20122	REF_COUNTER_RESET	Reset input of the counter (counter is reset to 0)
COLD-STORAGE FUNCTION (as of V1.12)		
p20127	REF_CSR_IN_RC	Door interlocking input Input that prevents any movement of the door in the corresponding state (Deenergize).
p20129	REF_CSR_IN_PS	Cord-operated switch input "Partial OPEN" / "CLOSE" pulse until door is either partially opened or closed again.
p20130	REF_CSR_IN_CLOSE	Close button input Normal travel "CLOSE" pulse until door is completely closed
p20131	REF_CSR_IN_OPRN	Close button input Normal travel OPEN pulse until the door is completely open.

Note

After the optimal parameter settings have been determined, they can be noted in the configuration protocol (see appendix Configuration protocol (Page 342)). These records should also be kept at hand when asking questions on the Hotline.

Geared motors 5

5.1 Description

Overview

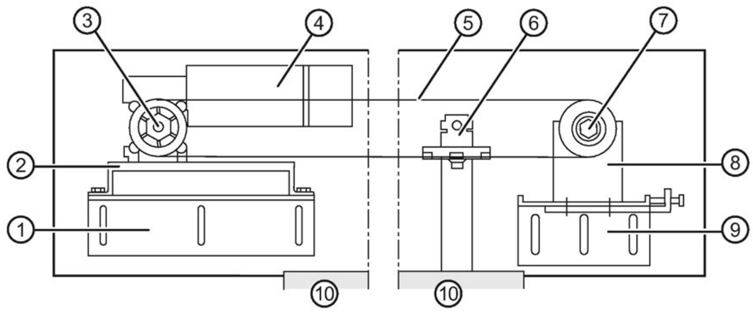
Figure 5-1 Geared motors (pinion left*)

* The gear outlet direction is defined as left or right when viewing the gear unit from the front.

The maintenance-free drive unit consists of a speed-controlled DC motor with non-self-locking gearing. The geared motors must be selected according to the mass to be moved.

5.2 Installation

Overview



① Mounting bracket
② Motor mount
③ Drive pinion
④ Geared motor
⑤ Toothed belt
⑥ Door clutch holder
⑦ Deflector pulley
⑧ Deflector unit (with deflector pulley)
⑨ Tensioning device / mounting bracket
⑩ Door

Note

Optional components

The rubber-metal anti-vibration mount, mounting bracket, tensioning device / mounting bracket, deflector unit / deflector pulley, and door clutch holder are optional components and can be obtained from Siemens. You can find further information in the section Technical specifications standard mounting rail holder (Page 225).

MDG3, MDG4 and MDG5 motors

Note

Do not strike the shaft and bearings of the motors. Do not exceed the permissible axial and radial forces on the shaft extension as specified by the configuration regulations.

Only fit and remove output elements (for example, coupling, gear, belt pulley) using suitable equipment (see figure):

- Using threaded hole in the shaft extension.
- Warm output element if necessary.
- Use washers to maintain the centering in the shaft extension for removal.
- If necessary, fully balance the motor with output elements according to ISO 1940.

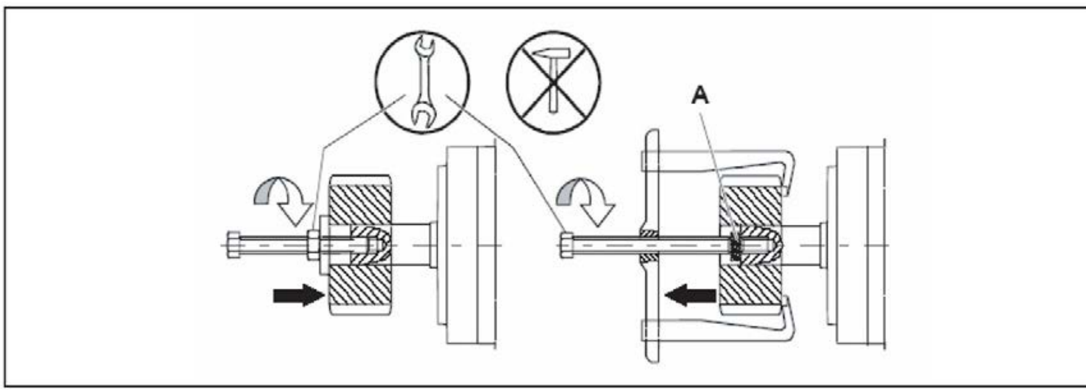


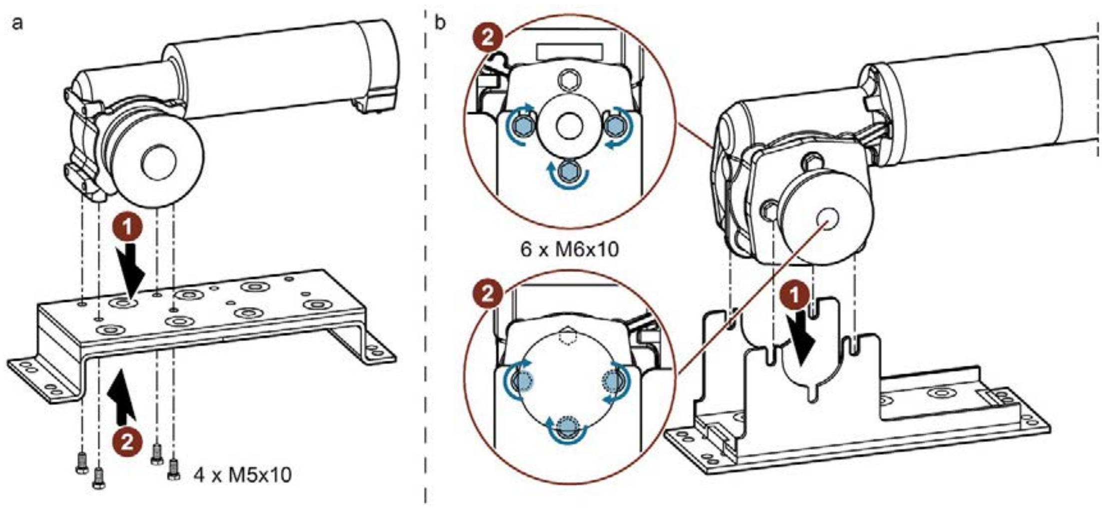
Figure 5-2 Fitting and removing output elements; A = intermediate washer (for maintaining the centering in the shaft extension)

Procedure

WARNING
Risk of injury and damage to property as a result of incorrect installation
Improper and incorrect installation can lead to serious injuries.
Observe the instructions for safe installation.

The mechanical installation of the geared motor is performed in the following steps:

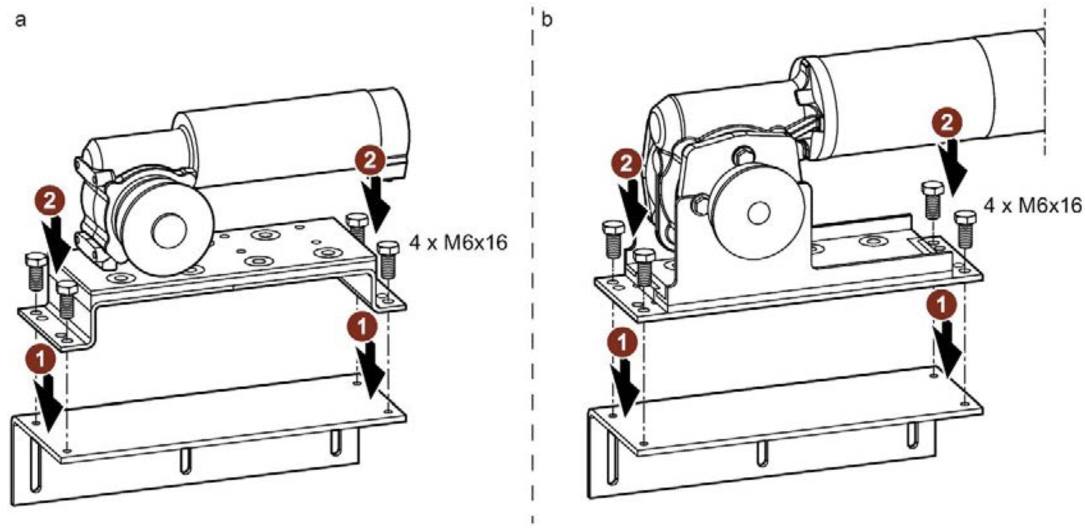
1. Mount the geared motor on the rubber-metal anti-vibration motor mounting.



a SIDOOR M3 / MDG3

b SIDOOR M4 / MDG4 / M5 / MDG5

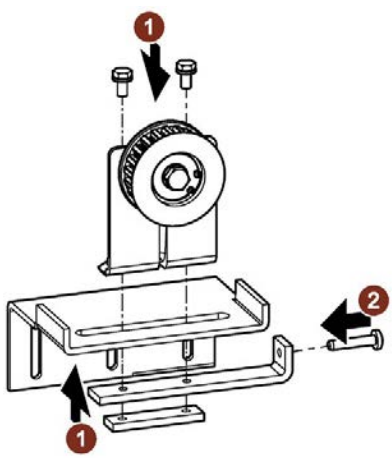
Then, if necessary, mount the geared motor on the mounting bracket.



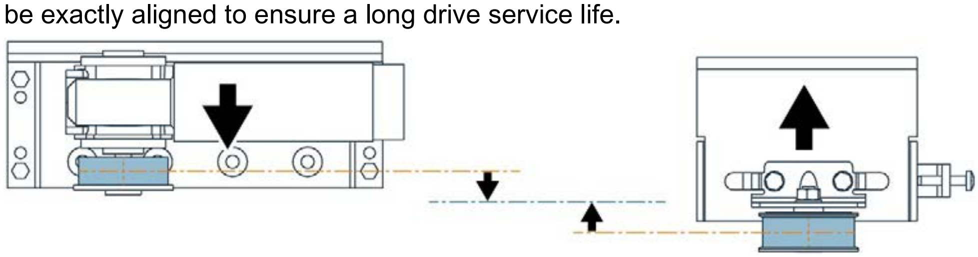
a SIDOOR M3 / MDG3

b SIDOOR M4 / MDG4 / M5 / MDG5

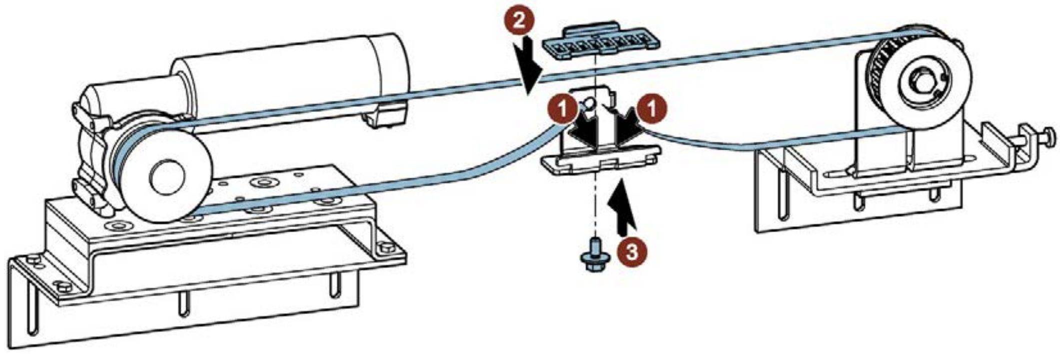
2. Mount the deflector unit, if necessary with a mounting bracket.



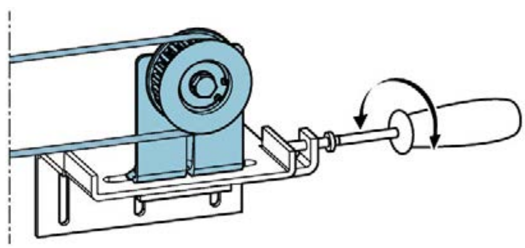
Ensure that the drive pinion and deflector pulley are aligned when doing so. They have to be exactly aligned to ensure a long drive service life.



3. Pass the toothed belt over the deflector pulley and drive pinion. Place both open ends of the toothed belt in the door clutch holder. Screw the door clutch holder together.



4. Tension the toothed belt with the aid of the tensioning device.



Span tension

The span tension T of the belt is calculated as follows:

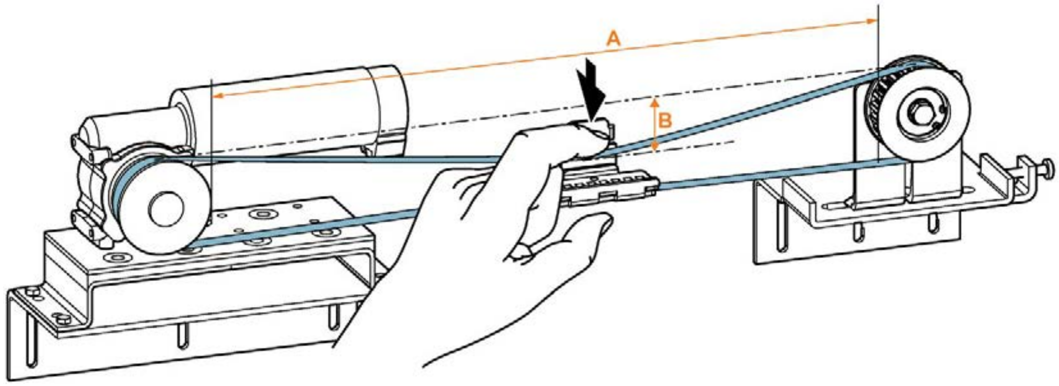
$T = 4 \cdot k \cdot L^2 \cdot f^2$

T: Span tension [N]
k: Weight per meter [kg/m]
L: Belt length [m]
f: Frequency (Hz)

The following table shows the natural frequency (f) of the belt for the recommended span tension (T) at different belt lengths (L).

Belt system	CONTI SYNCHROLINE STS-S8M, 12 mm	CONTI SYNCHROLINE STS-S8M 14 mm
Article No.	6FB1104-0AT01-0AB0 6FB1104-0AT02-0AB0	6FB1104-0AT03-0AB0 6FB1104-0AT04-0AB0
Recommended span tension (T)	160 N ±10 N	160 N ±10 N
Weight per meter (k)	0.062 kg/m	0.072 kg/m
Belt length (L)	**Frequency (f)**	**Frequency (f)**
0.3 m	84.7 Hz	78.6 Hz
0.5 m	50.8 Hz	47.1 Hz
1.0 m	25.4 Hz	23.5 Hz
1.5 m	16.9 Hz	15.7 Hz
2.0 m	12.7 Hz	11.8 Hz
2.5 m	10.2 Hz	9.4 Hz
3.0 m	8.5 Hz	7.9 Hz
3.5 m	7.2 Hz	6.7 Hz
4.0 m	6.3 Hz	5.9 Hz
4.5 m	5.6 Hz	5.2 Hz
5.0 m	5.0 Hz	4.7 Hz

In some applications a simple adjustment of the belt tension as follows may be sufficient:



You will recognize the correct belt tension by how far the belt is pressed in (B). The depth (B) the belt is pressed in depends on the distance between the drive pinion and deflector pulley (A).

The following depths of the pressed-in belt (B) apply as a function of the distance between the drive pinion and deflector pulley (A).

A (cm)	50	100	150	200
B (cm)	1.5	3	4.5	6

5.3 Connecting terminals

5.3.1 Conductor assignment of the motor plug

SIDOOR M3, MDG3, M4, MDG4, M5 and MDG5

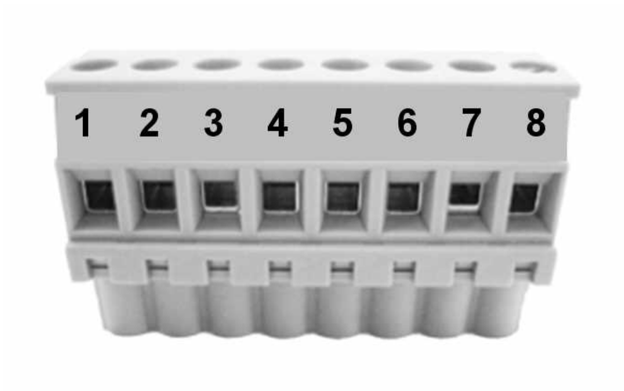


Figure 5-3 Conductor assignment of the motor plug

Table 5- 1 Motor plug (slot X7)

Terminal	Signal	SIDOOR M3 / MDG3	SIDOOR M4 / MDG4	SIDOOR M5 / MDG5
1	+5 V	Gray	Gray	Gray
2	Channel A	Yellow	Yellow	Yellow
3	Channel B	Green	Green	Green
4	Motor identification (motor ID)	Brown	Brown	Brown
5	GND	White	White	White
6	PE	Yellow-green	Yellow-green	Yellow-green
7	Motor+	Black 1	Black 1	Black 1
8	Motor-	Black 2	Black 2	Black 2

5.4 Technical specifications

5.4.1 Technical specifications MDG3 R/L

Article number	6FB1103-0AT13-4MB1	6FB1103-0AT14-4MB1
General information		
Product type designation	MDG3 R	MDG3 L
Product version	Right gearbox output with groove and feather key	Left gearbox output with groove and feather key
Supply voltage		
Rated value (DC)	30 V	30 V
Input current		
Operational current (rated value)	4 A	4 A
Power		
Active power input	120 W	120 W
Mechanical data		
Torque of the rotary operating mechanism (rated value)	3 N·m	3 N·m
Speed, max.	0.65 m/s	0.65 m/s
Mass to be moved, max.	180 kg	180 kg
Gear unit	Yes	Yes
Gear ratio	15	15
Number of pulses per revolution, max.	100	100
Fixed output gear	No	No
Degree and class of protection		
IP degree of protection		
• of the motor	IP56	IP56
• of the gear unit	IP56	IP56
Standards, approvals, certificates		
CE mark	Yes	Yes
UL approval	Yes	Yes
EAC (formerly Gost-R)	Yes	Yes
China RoHS compliance	Yes	Yes
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	50 °C	50 °C
Ambient temperature during storage/transportation		
• Storage, min.	-40 °C	-40 °C
• Storage, max.	85 °C	85 °C

Article number	6FB1103-0AT13-4MB1	6FB1103-0AT14-4MB1
Cables		
Fixed connecting cable	No	No
Dimensions		
Diameter of output gear, min.	28 mm	28 mm
Diameter of output gear, max.	122 mm	122 mm
Height of motor	98 mm	98 mm
Length of motor	264 mm	264 mm
Diameter of motor	63 mm	63 mm
Width of gearbox	85 mm	85 mm

5.4.2 Technical specifications MDG4 R/L

Article number	6FB1103-0AT13-3MC2	6FB1103-0AT14-3MC2
General information		
Product type designation	MDG4 R	MDG4 L
Product version	Right gearbox output with groove and feather key	Left gearbox output with groove and feather key
Supply voltage		
Rated value (DC)	30 V	30 V
Input current		
Operational current (rated value)	4 A	4 A
Power		
Active power input	120 W	120 W
Mechanical data		
Torque of the rotary operating mechanism (rated value)	3 N·m	3 N·m
Speed, max.	0.75 m/s	0.75 m/s
Mass to be moved, max.	400 kg	400 kg
Gear unit	Yes	Yes
Gear ratio	15	15
Number of pulses per revolution, max.	100	100
Fixed output gear	No	No
Degree and class of protection		
IP degree of protection		
• of the motor	IP56	IP56
• of the gear unit	IP56	IP56
Standards, approvals, certificates		
CE mark	Yes	Yes
UL approval	Yes	Yes
EAC (formerly Gost-R)	Yes	Yes
China RoHS compliance	Yes	Yes

Article number	6FB1103-0AT13-3MC2	6FB1103-0AT14-3MC2
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	50 °C	50 °C
Ambient temperature during storage/transportation		
• Storage, min.	-40 °C	-40 °C
• Storage, max.	85 °C	85 °C
Cables		
Fixed connecting cable	No	No
Dimensions		
Diameter of output gear, min.	28 mm	28 mm
Diameter of output gear, max.	122 mm	122 mm
Height of motor	115 mm	115 mm
Length of motor	303 mm	303 mm
Diameter of motor	63 mm	63 mm
Width of gearbox	106 mm	106 mm

5.4.3 Technical Specifications MDG5 R/L

Article number	6FB1103-0AT13-3MG2	6FB1103-0AT14-3MG2
General information		
Product type designation	MDG5 R	MDG5 L
Product version	Right gearbox output with groove and feather key	Left gearbox output with groove and feather key
Supply voltage		
Rated value (DC)	30 V	30 V
Input current		
Operational current (rated value)	7.5 A	7.5 A
Power		
Active power input	225 W	225 W
Mechanical data		
Torque of the rotary operating mechanism (rated value)	6 N·m	6 N·m
Speed, max.	0.5 m/s	0.5 m/s
Mass to be moved, max.	700 kg	700 kg
Gear unit	Yes	Yes
Gear ratio	15	15
Number of pulses per revolution, max.	100	100
Fixed output gear	No	No

Article number	6FB1103-0AT13-3MG2	6FB1103-0AT14-3MG2
Degree and class of protection		
IP degree of protection		
• of the motor	IP56	IP56
• of the gear unit	IP56	IP56
Standards, approvals, certificates		
CE mark	Yes	Yes
UL approval	Yes	Yes
EAC (formerly Gost-R)	Yes	Yes
China RoHS compliance	Yes	Yes
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	50 °C	50 °C
Ambient temperature during storage/transportation		
• Storage, min.	-40 °C	-40 °C
• Storage, max.	85 °C	85 °C
Cables		
Fixed connecting cable	No	No
Dimensions		
Diameter of output gear, min.	28 mm	28 mm
Diameter of output gear, max.	122 mm	122 mm
Height of motor	124 mm	124 mm
Length of motor	348 mm	348 mm
Diameter of motor	80 mm	80 mm
Width of gearbox	109 mm	109 mm

5.4.4 Technical specifications M3 L/R

Article number	6FB1103-0AT10-4MB0	6FB1103-0AT11-4MB0
General technical data:		
Product brand name	SIDOOR	SIDOOR
Design of the product	With driven gear on the left	With driven gear on the right
Supply voltage:		
Operating current Rated value	4 A	4 A
Mechanical data:		
Torque of the rotary actuator Rated value	3 N·m	3 N·m
Speed maximum	0.65 m/s	0.65 m/s
Transmission ratio of gearbox	15	15
Number of pulses per revolution maximum	100	100
Weight of door maximum	180 kg	180 kg
Ambient conditions:		
Ambient temperature		
• during operation	-20 ... +50 °C	-20 ... +50 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
Protection class IP		
• of the motor	IP54	IP54
• of gearbox	IP40	IP40
Installation/ mounting/ dimensions:		
Height of the motor	98 mm	98 mm
Length of the motor	236 mm	236 mm
Diameter of the motor	63 mm	63 mm
Width of gearbox including drive pinion	85 mm	85 mm

5.4.5 Technical specifications M4 L/R

Article number	6FB1103-0AT10-3MC0	6FB1103-0AT11-3MC0
General information		
Product type designation	M4 L	M4 R
Product version	With driven gear on the left	With driven gear on the right
Supply voltage		
Rated value (DC)	30 V	30 V
Input current		
Operational current (rated value)	4 A	4 A
Power		
Active power input	120 W	120 W
Mechanical data		
Torque of the rotary operating mechanism (rated value)	3 N·m	3 N·m
Speed, max.	0.75 m/s	0.75 m/s
Gear ratio	15	15
Number of pulses per revolution, max.	100	100
Weight of door, max.	400 kg	400 kg
Degree and class of protection		
IP degree of protection		
• of the motor	IP54	IP54
• of the gear unit	IP40	IP40
Standards, approvals, certificates		
CE mark	Yes	Yes
UL approval	Yes	Yes
EAC (formerly Gost-R)	Yes	Yes
TÜV Inspectorate approval	Yes	Yes
China RoHS compliance	Yes	Yes
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	50 °C	50 °C
Ambient temperature during storage/transportation		
• Storage, min.	-40 °C	-40 °C
• Storage, max.	85 °C	85 °C
Dimensions		
Height of motor	115 mm	115 mm
Length of motor	275 mm	275 mm
Diameter of motor	63 mm	63 mm
Width of gear unit, including drive pinion	105 mm	105 mm

Article number	6FB1103-0AT11-3MD0	6FB1103-0AT10-3MD0
General technical data:		
Product brand name	SIDOOR	SIDOOR
Design of the product	With driven gear on the right	With driven gear on the left
Supply voltage:		
Operating current / Rated value	7.5 A	7.5 A
Mechanical data:		
Torque / of the rotary actuator / Rated value	6.8 N·m	6.8 N·m
Speed / maximum	0.5 m/s	0.5 m/s
Transmission ratio / of gearbox	15	15
Number of pulses / per revolution / maximum	100	100
Weight / of door / maximum	600 kg	600 kg
Ambient conditions:		
Ambient temperature		
• during operation	-20 ... +50 °C	-20 ... +50 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
Protection class IP		
• of the motor	IP54	IP54
• of gearbox	IP54	IP54
Installation/ mounting/ dimensions:		
Height / of the motor	124 mm	124 mm
Length / of the motor	344 mm	344 mm
Diameter / of the motor	80 mm	80 mm
Width / of gearbox / including drive pinion	111 mm	111 mm

5.4.6 Technical specifications for rubber-metal anti-vibration mount

Article number		6FB1104-0AT01-0AD0	6FB1104-0AT02-0AD0
General technical data:			
Product brand name		SIDOOR	
Installation/ mounting/ dimensions:			
Width of rubber-bonded metal	mm	78	
Height of rubber-bonded metal	mm	78	35
Length of rubber-bonded metal	mm	230	

5.4.7 Technical specifications for mounting bracket

Article number		6FB1104-0AT01-0AS0	6FB1104-0AT02-0AS0
General technical data:			
Product brand name		SIDOOR	
Design of the product			with tensioning device for deflector pulley
Installation/ mounting/ dimensions:			
Width of mounting bracket	mm	90	100
Height of mounting bracket	mm	60	
Length of mounting bracket	mm	230	135

5.4.8 Technical specifications for deflector unit

Article number		6FB1104-0AT03-0AS0
General technical data:		
Product brand name		SIDOOR
Design of the product		with deflector pulley
Installation/ mounting/ dimensions:		
Width of the support including belt pulley	mm	55
Height of the support including belt pulley	mm	100
Length of the support	mm	70
Width of belt pulley including flanged pulley	mm	25
Diameter of belt pulley including flanged pulley	mm	61

5.4.9 Technical specifications for door clutch holder

Article number		6FB1104-0AT02-0CP0	6FB1104-0AT01-0CP0
General technical data:			
Product brand name		SIDOOR	
Installation/ mounting/ dimensions:			
Width of door clutch holder	mm		40
Height of door clutch holder	mm	43	
Length of door clutch holder	mm	68	
Width of toothed belt	mm	14	12

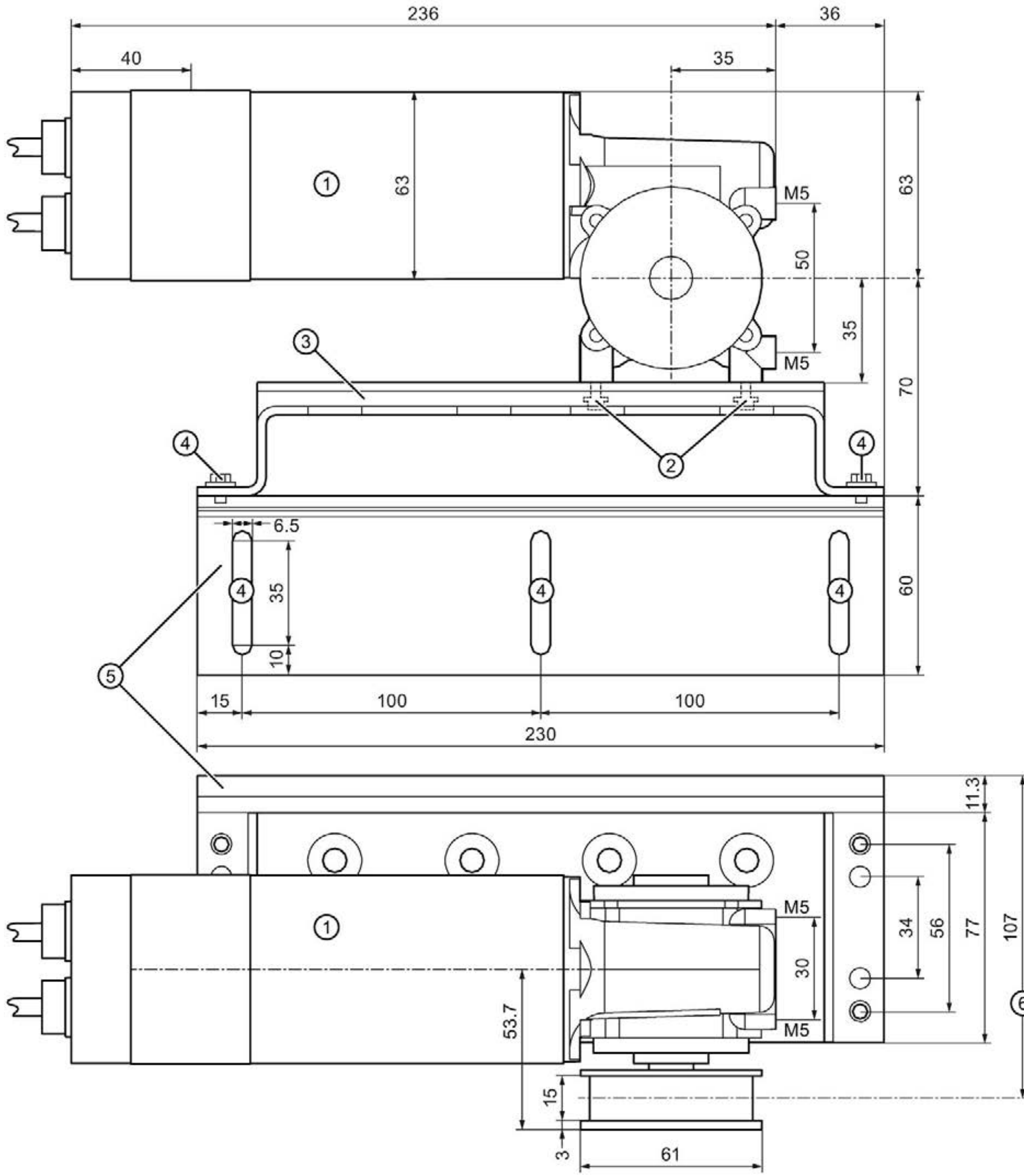
5.4.10 Technical specifications for toothed belt

Article number		6FB1104-0AT01-0AB0	6FB1104-0AT02-0AB0	6FB1104-0AT03-0AB0	6FB1104-0AT04-0AB0
General technical data:					
Product brand name		SIDOOR			
Design of the product		With STS tooth profile, 12 mm wide and 4 m long	With STS tooth profile, 12 mm wide and 45 m long	With STS tooth profile, 14 mm wide and 4 m long	With STS tooth profile, 14 mm wide and 55 m long
Installation/ mounting/ dimensions:					
Type of toothed belt		STS-S8M			
Length of toothed belt	m	4	45	4	55
Width of toothed belt	mm	12		14	

5.4.11 Technical specifications standard mounting rail holder

Article number		6FB1144-0AT00-3AS0
General technical data:		
Product brand name		SIDOOR
Installation/ mounting/ dimensions:		
Length of the support	mm	70

5.4.12 Dimension drawing of SIDOOR M3 with rubber-metal anti-vibration mount and mounting bracket



① Geared motor SIDOOR M3 L / MDG3 L
② 4 x M5x10 safety hexagonal screws
③ SIDOOR rubber-metal anti-vibration mount
④ 7 x M6x16 safety hexagonal screws
⑤ SIDOOR mounting bracket
⑥ Mean toothed belt clearance

Figure 5-4 Geared motor with rubber-metal anti-vibration mount and mounting bracket (motor M3)

5.4.13 Dimension drawing SIDOOR MDG3

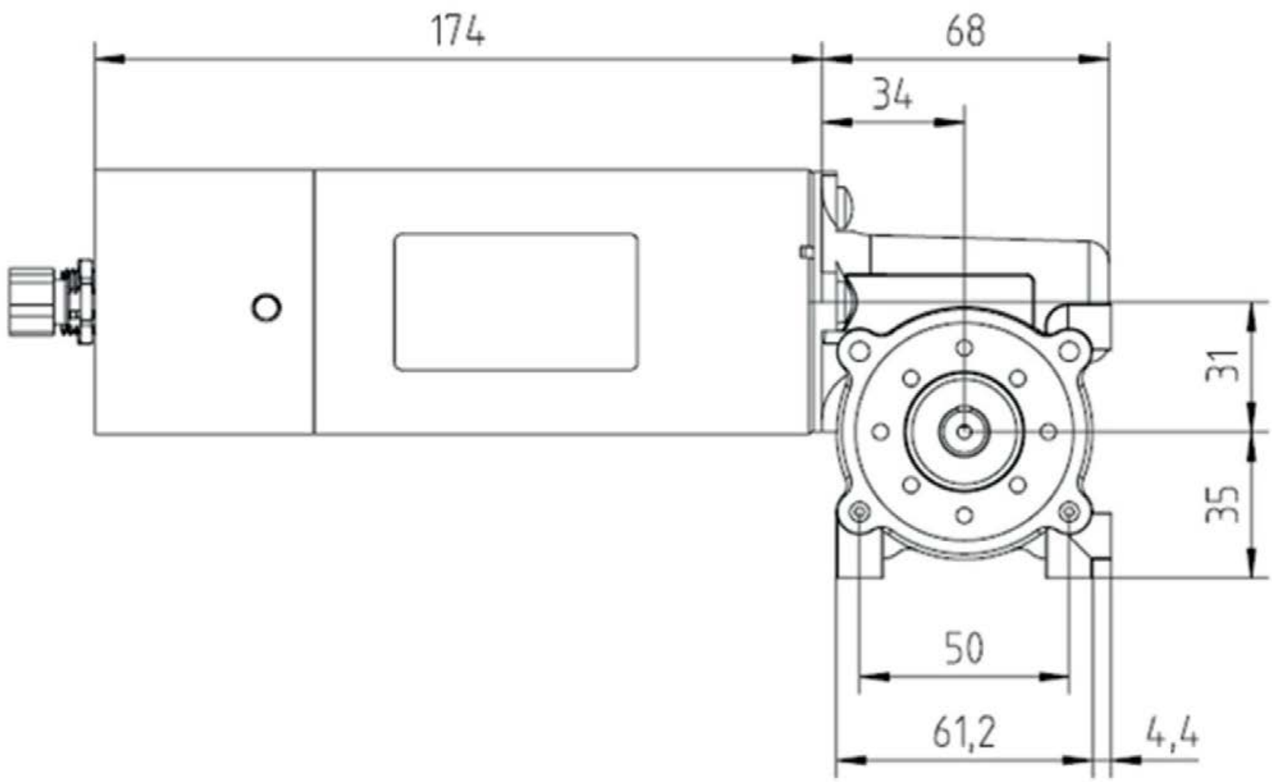


Figure 5-5 Geared motor MDG3

5.4.14 Dimension drawing of SIDOOR M4 with rubber-metal anti-vibration mount and mounting bracket

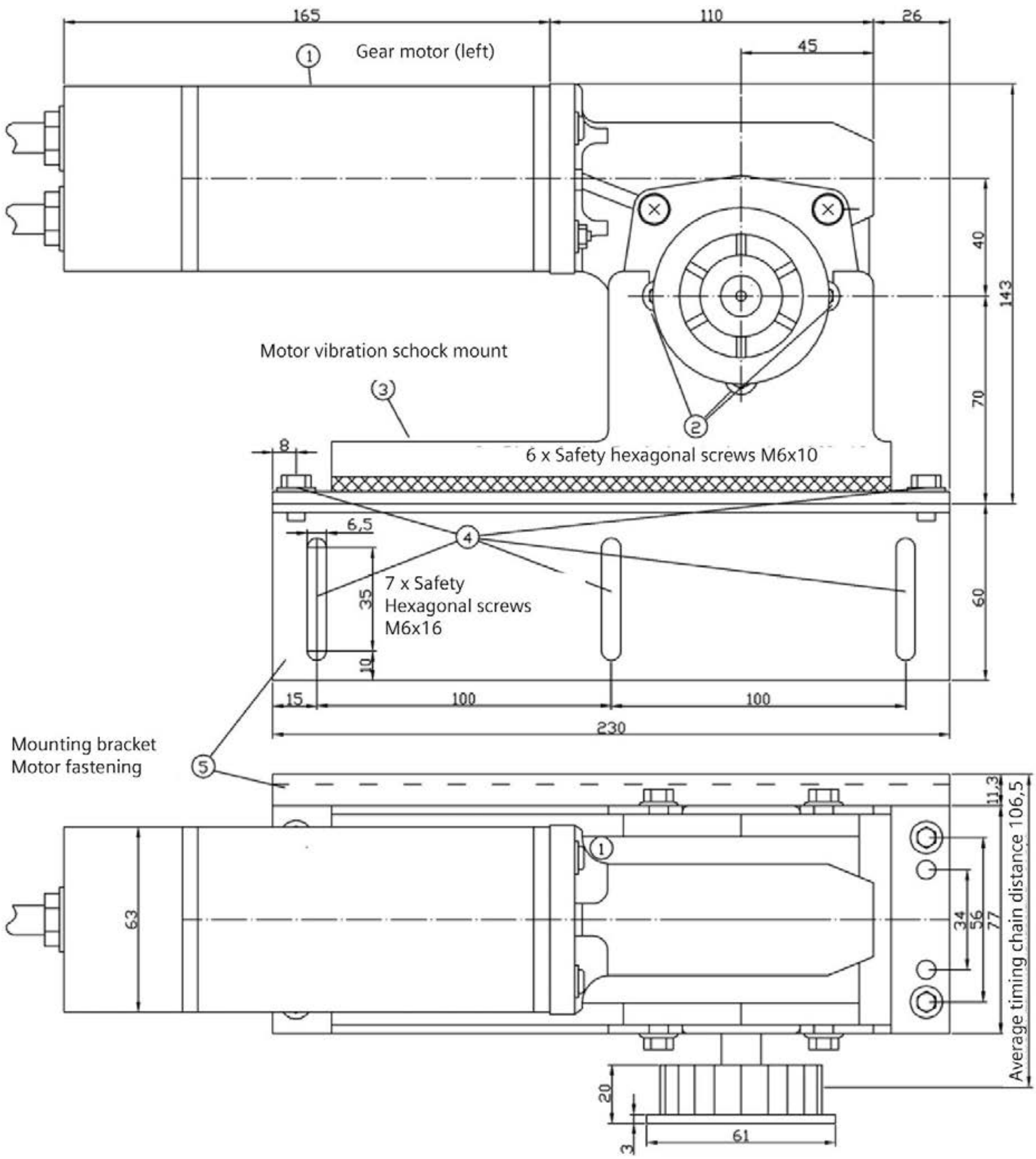


Figure 5-6 Geared motor with rubber-metal anti-vibration mount and mounting bracket (M4 motor)

5.4.15 Dimension drawing SIDOOR MDG4

Front view

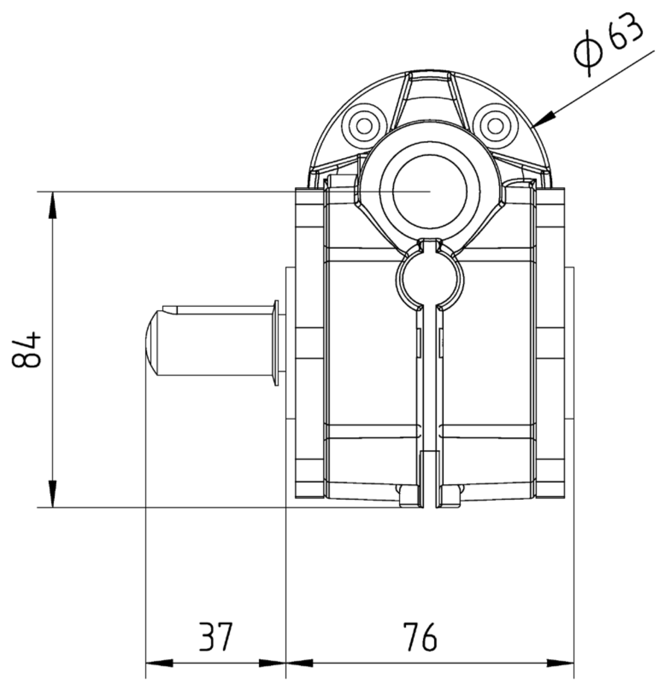


Figure 5-7 SIDOOR MDG4 Front view

Side view

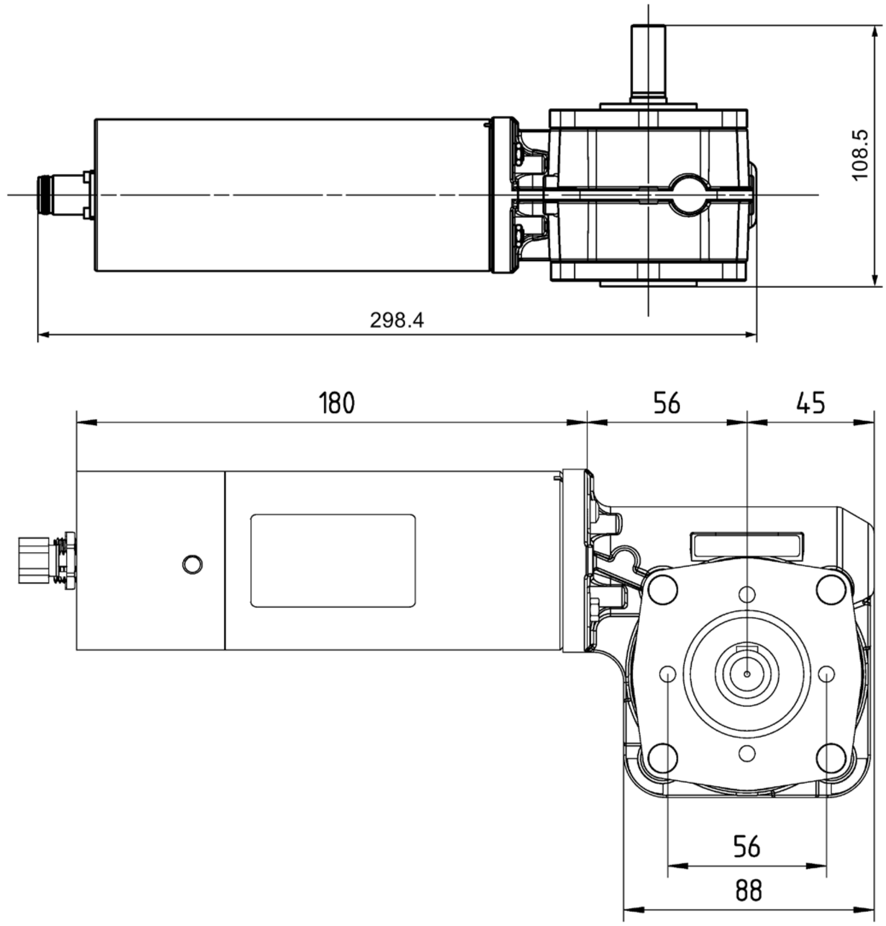
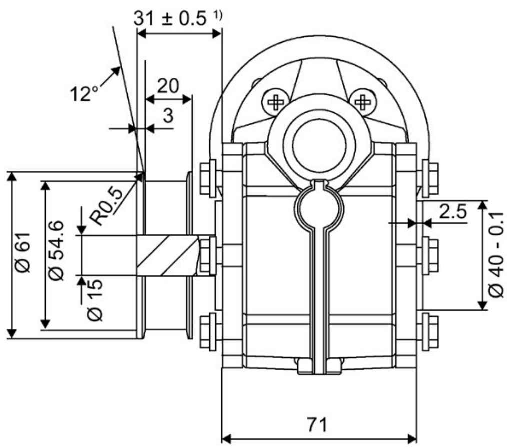


Figure 5-8 Dimension drawing SIDOOR MDG4

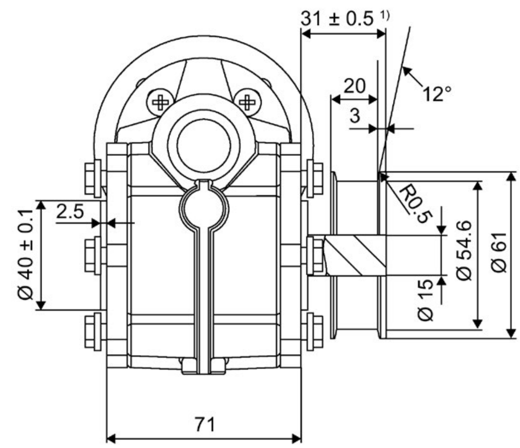
5.4.16 Dimension drawing of SIDOOR M5

Front view

Motor on left



Motor on right



Side view

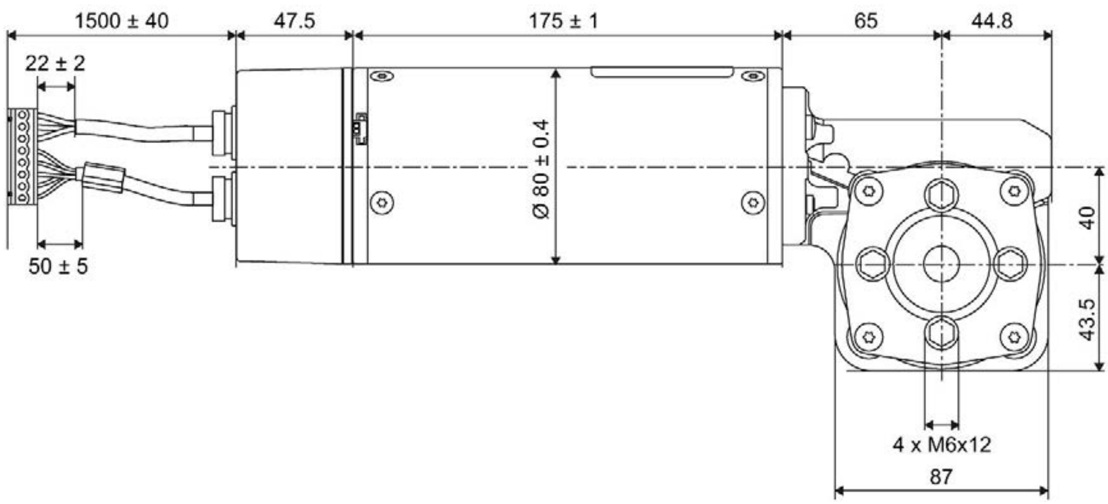


Figure 5-9 SIDOOR M5

Note

Rubber-metal anti-vibration mount

When installing the M5 motor, use the same rubber-metal anti-vibration mount as for the M4 motor. See section Dimension drawing of SIDOOR M4 with rubber-metal anti-vibration mount and mounting bracket (Page 228) and sectionAccessories (Page 21).

5.4.17 Dimension drawing SIDOOR MDG5

Front view

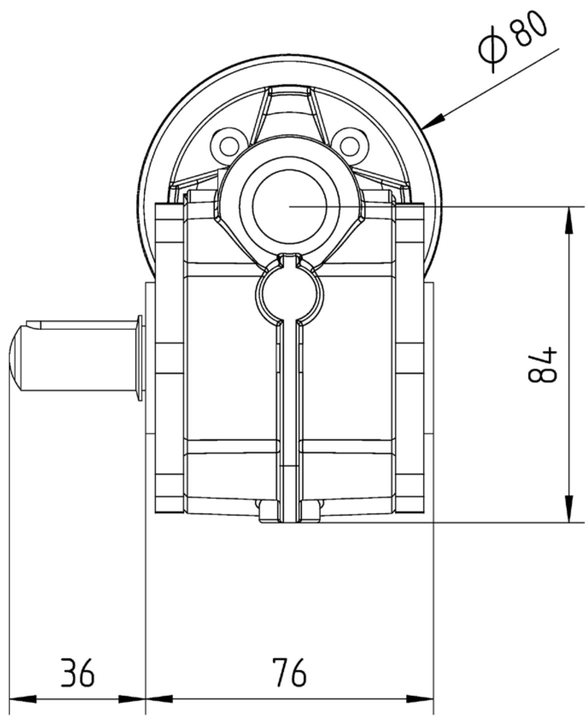


Figure 5-10 SIDOOR MDG5 Front view

Side view

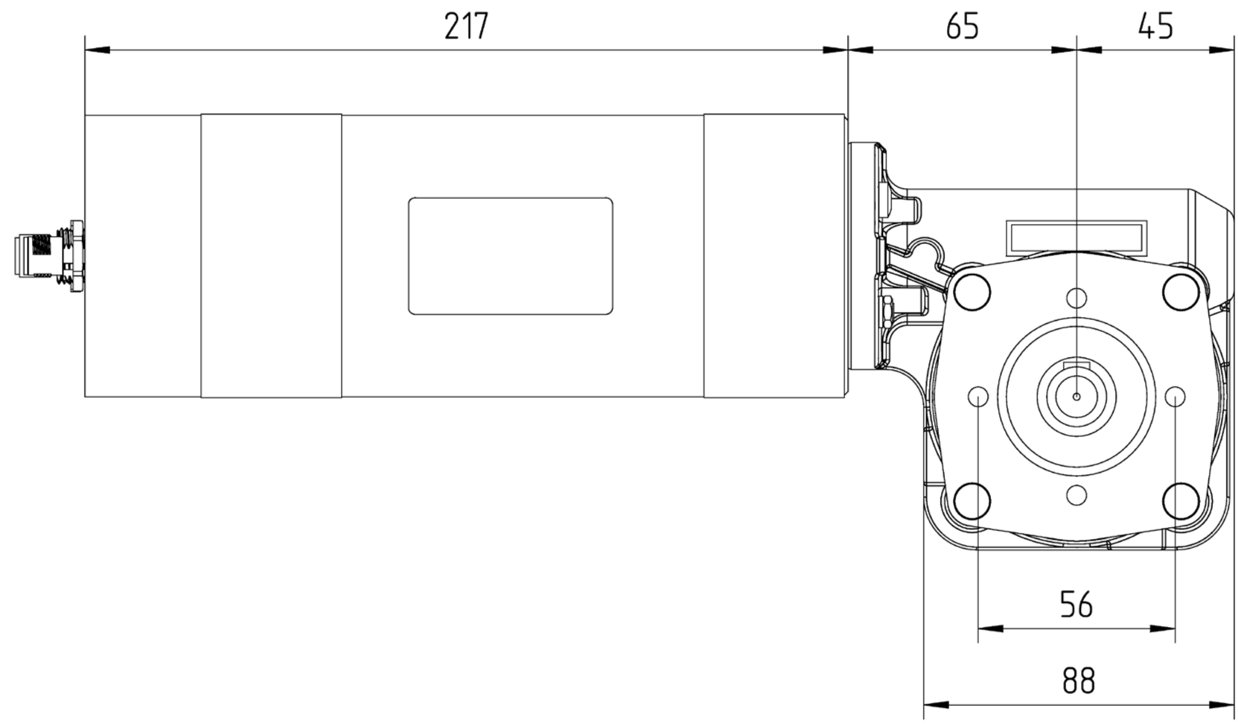


Figure 5-11 SIDOOR MDG5 Side view

5.4.18 Dimension drawing of motor cable MDG2-CABLE

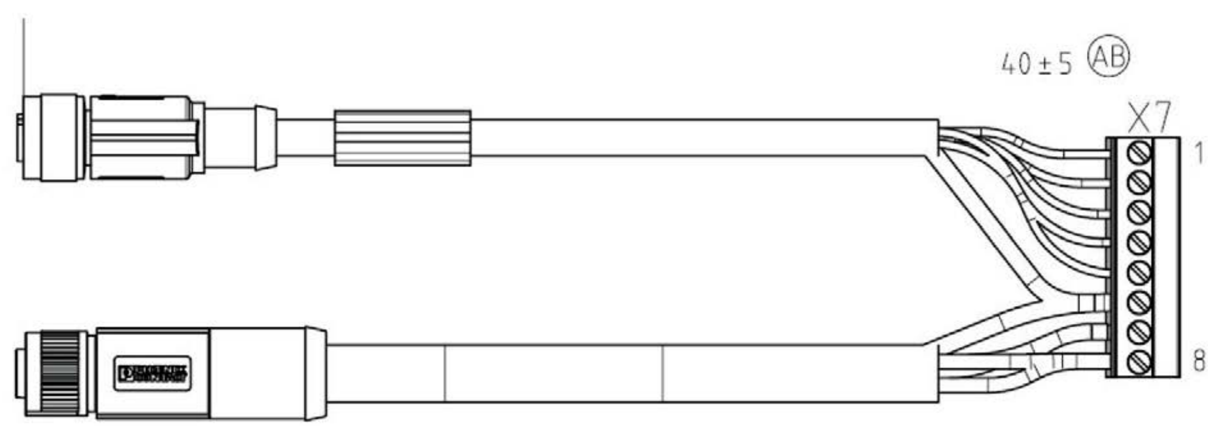


Figure 5-12 Motor cable MDG2 CABLE

5.4.19 Dimension drawing of deflector pulley with tensioning device and mounting bracket

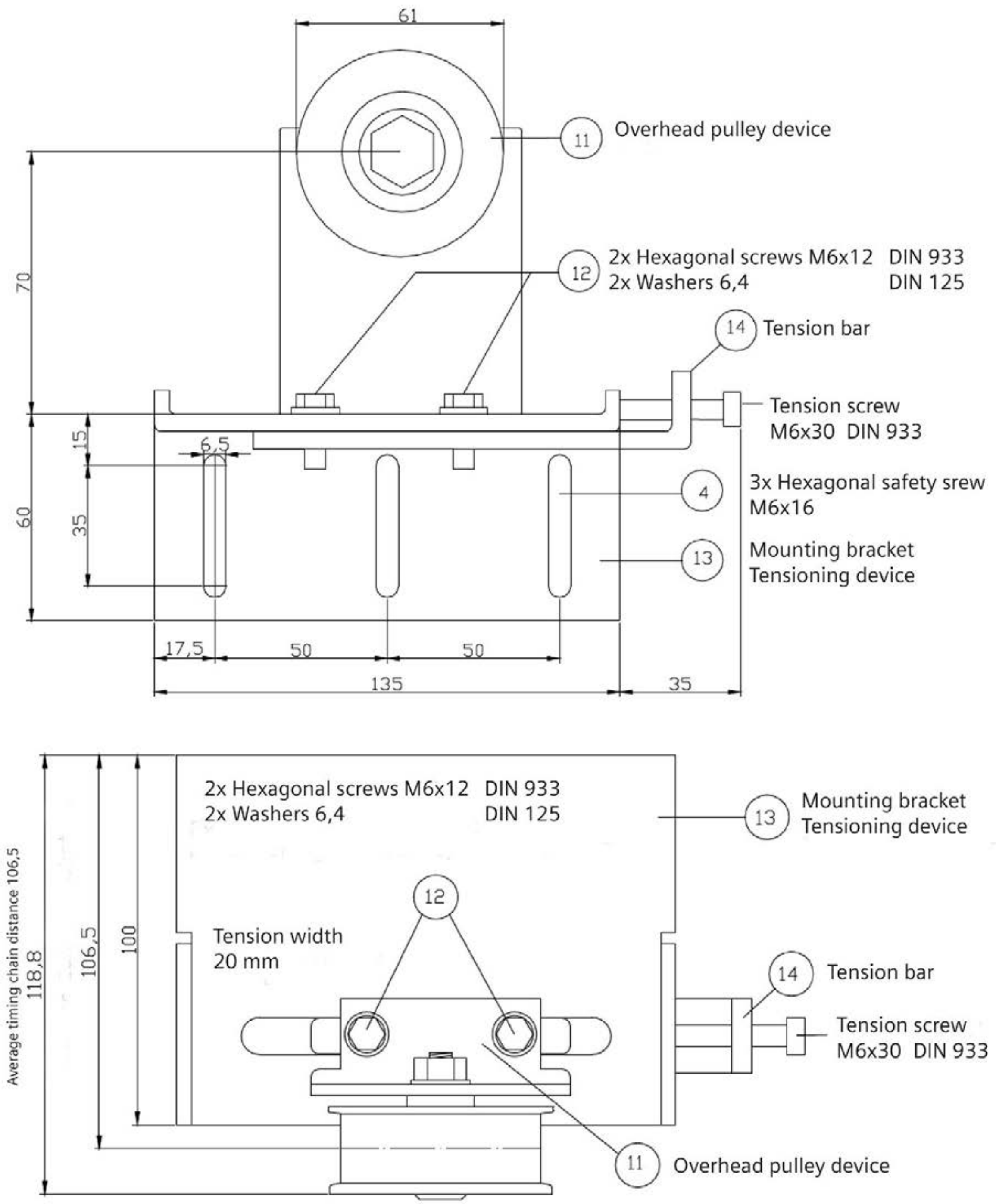


Figure 5-13 Deflector pulley with tensioning device and mounting bracket

5.4.20 Dimension drawing of door clutch holder

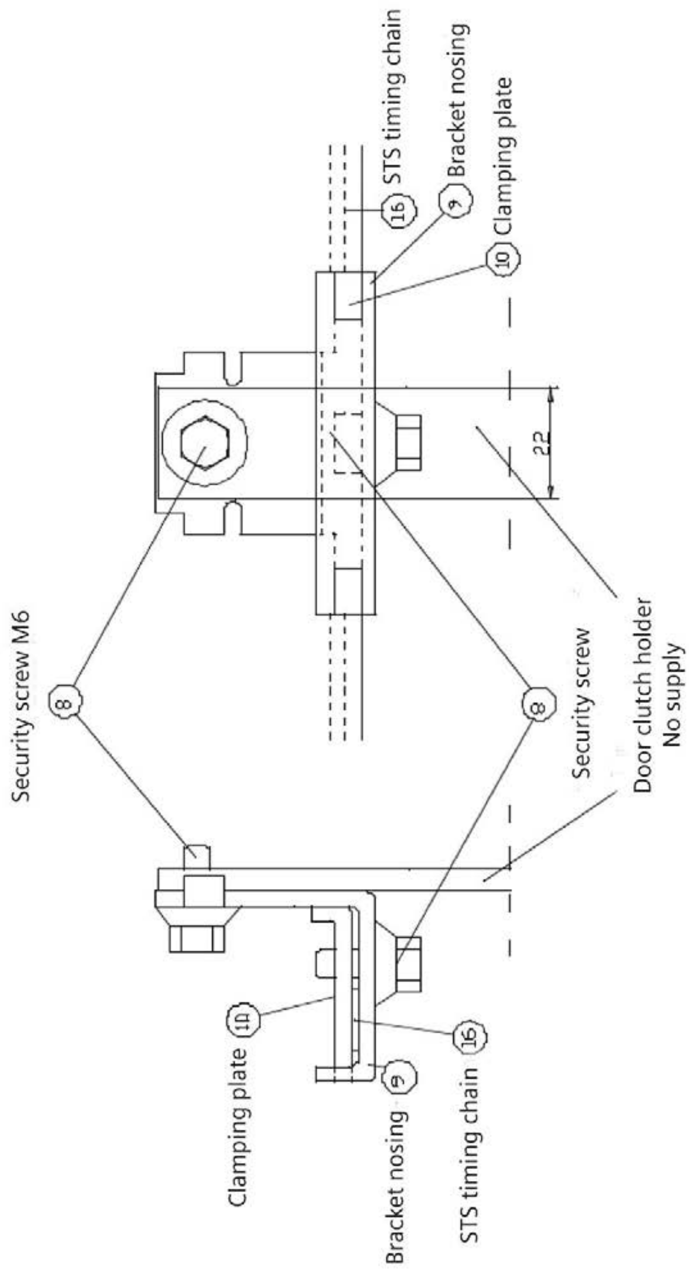


Figure 5-14 Door clutch holder

5.4.21 Dimension drawing SIDOOR MDG PULLEY

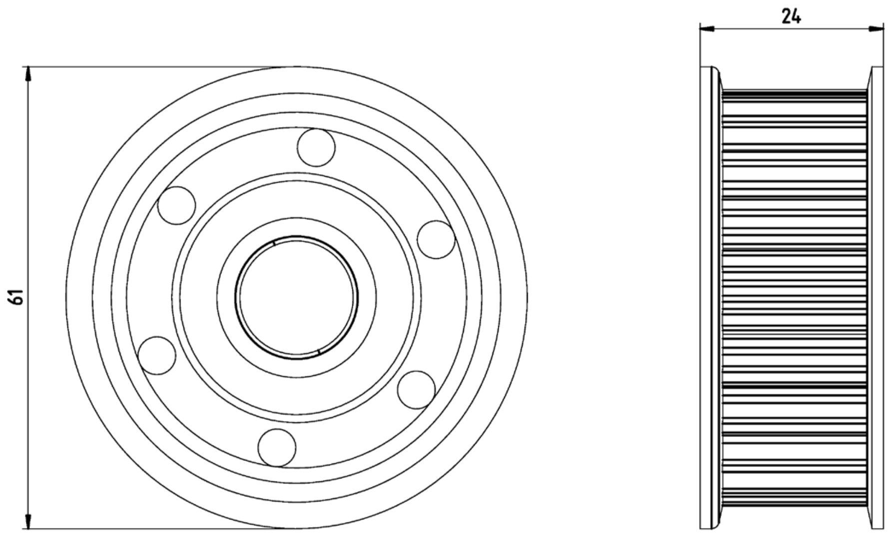


Figure 5-15 SIDOOR MDG Pulley transmission ratio 176 mm/rev

Power supply 6

6.1 SIDOOR NT40

6.1.1 Description

Intended use

The device is only intended for operation in industrial environments and may only be used in combination with the controllers specified in 2.3.1 (Page 18) Other loads must not be connected to the output connector X2.

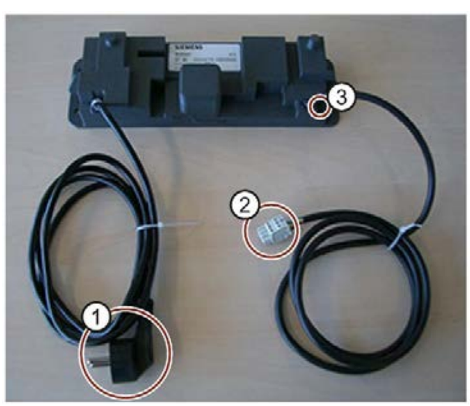
Note

Electromagnetic compatibility

The SIDOOR NT40 power supply meets the requirements of the EMC standard EN 61000-6-4.

The SIDOOR NT40 power supply can cause interference if used in a residential environment. The commissioning engineer is responsible for interference suppression.

Design



① Power plug X1 (Schuko plug)
230 V AC (± 15 %) 50 / 60 Hz

② Output X2 (output to controller)
36 V DC (± 3%) 2.5 A (15 A for < 2 s)

③ LED L1

Figure 6-1 SIDOOR NT40

Function

The SIDOOR NT40 is a 230 V AC (± 15 %) 50 / 60 Hz power supply unit for supplying SIDOOR controllers for mass to be moved up to 600 kg.

On the output side, the switch mode power supply supplies a 36 V DC (± 3 %) SELV at a rated output power < 100 W. The device can briefly (< 2 s) deliver a 15 A current to enable fast acceleration (corresponds to a brief power output of 540 W).

Short-circuit protection

Output X2 is short-circuit proof.

LED display

LED L1 indicates the presence of the output voltage.

Note

If the LED does not light up despite being correctly connected to the X1 supply line and if there is no measurable output voltage, this indicates a short circuit on the output side or a defective module!

The device can be operated by the controller without load to establish whether the module is defective. If the LED at the output does not light up in this mode of operation, and there is no measurable voltage at the output, this indicates that the device is defective!

6.1.2 Installation

Requirements

Observe the following installation rules:

- Minimum clearance to surrounding parts: 1 cm
- Even mounting surface
- The installation point should, as far as possible, be vibration-free. The permissible climatic conditions (operating or storage and transport temperature) must be respected.
- Maximum distance from the power supply due to cable length:
  - Connecting cable input line (network ⇔ NT40): 200 cm
  - Connecting cable output line (NT40 ⇔ controller): 150 cm
- Operation outside the specified temperature range can lead to danger, malfunctions and failure of the equipment.
- Protection class | according to EN 60950-1:2006
- The device must be installed in places that are accessible only to qualified personnel.
- In order to protect the modules from static electrical discharges, personnel must discharge themselves electrostatically before opening control cabinets or terminal boxes.
- It is essential to ensure that the maximum temperature of 55 °C is not exceeded in the mounting position. The device must not be exposed to direct sunlight.

> **WARNING**
>
> **Dangerous electrical voltage!**
>
> When electrical devices are used, certain parts of them have to carry dangerous voltages. Failure to observe the operating instructions can therefore lead to serious injuries or material damage.
>
> Observe the operating instructions.

Procedure

Carry out the following steps in the given order:

1. Check that the operating data matches the values on the rating plate.
2. Mount the device with the aid of 4 (M6) screws and washers.

6.1.3 Connecting terminals

Input line X1

X1 is the connection line to the power supply.

Connections	L, N, PE 195 - 265 VAC
Cable type	H05RN-F 3G1
Cable length	2 m
Connector(s)	Extruded protective Schuko-type socket, 10 / 16 A, 250 V AC, double-protected connecting cable according to DIN 49.441, CEE7 / VII.

Output line X2

X2 is the output line connecting to the SIDOOR controller.

Connections	UA+, UA-, FE
Cable type	H05RN-F 3G1
Cable length	1.5 m
Connector(s)	WAGO 721-103/026-045

The rated data of the output are:

Rated output voltage	36 V
Rated output current	2.5 A
Continuous output power rating	<100 W

WARNING

Dangerous electrical voltage.

May cause death, serious injury or property damage.

The third line brought out at the output is only a functional grounding connection, this must not be regarded or used as a ground in the sense of a PE connection!

Connection specifications

> **⚠ WARNING**
>
> **Dangerous electrical voltage!**
>
> When electrical devices are used, certain parts of them have to carry dangerous voltages. Failure to observe the operating instructions can therefore lead to serious injuries or material damage.
>
> Observe the operating instructions.

Observe the following connection regulation:

- The regulations for the construction of high voltage installations must be observed when carrying out the electrical installation.
- The switch mode power supply may only be connected to the power supply by connected supply lines.
- The power supply (230 V AC ± 15%) must be connected according to VDE 0100 and VDE 0160.
- The supply voltage to the device must be equipped with a protective device (automatic circuit breaker) (10 A / tripping characteristic B).
- The protective conductor is connected via the supply line X1.
- Output lines may only to be connected to the SIDOOR controller.
- When the device is connected to the power supply, it must be ensured that this supply meets the requirements of overvoltage category II (see EN 60950-1:2006). If necessary, external overvoltage protection must be connected upstream in order to comply with the requirements of overvoltage category II (see EN 60950-1:2006).

Procedure

> **Note**
>
> **Risk of injury through moving mechanical parts.**
>
> The control system will become ready for operation after the supply line has been connected. If a control signal is present, the door will move in the set direction.
>
> Always connect the supply lines last of all!

Carry out the following steps in the given order:

1. Connect the controller to the output line, observing the polarity printed on the device.
2. Connect the supply lines to the network.
3. When the supply is switched on, the device is ready for operation.

   The green LED lights up.

For more, see also section Connecting and commissioning (Page 290)

6.1.4 Technical specifications

Order number		6FB1112-0AT20-3PS0
General technical data:		
product brand name		SIDOOR
Product designation		Switched-mode power supply
Design of the product		NT40
Electical data:		
Supply voltage at AC	V	230
Supply voltage frequency at AC	Hz	47 ... 63
Relative symmetrical tolerance of the supply voltage	%	15
Input current at rated input voltage 230 V Rated value	A	0.7
Operating current of fuse protection at input when installing		6 ... 10
Consumed current		
• for 2 s maximum	A	3.5
Apparent power consumption maximum	V·A	650
Supplied active power		
• maximum	W	100
• limited to 2 s	W	540
Efficiency at 100 W active power output at 230 V AC	%	90
Operating resource protection class		I
Overvoltage category		2
Output voltage at DC Rated value	V	36
Output voltage at DC Rated value Note		SELV
Relative symmetrical tolerance of the output voltage	%	3
Output current		
• minimum rated value	A	0
• maximum rated value	A	2.5
Consumed active power maximum Rated value	W	100
Short-term overload current for maximum 2 s	A	15
Tripping characteristic class of fuse protection at input when installing		B
Connections:		
Type of electrical connection		
• at input		SCHUKO connector DIN 49.441, CEE7/VII
• at output		WAGO 721-103/026
Wire length		
• line-side	m	2
• Output side	m	1.5

Order number		6FB1112-0AT20-3PS0
Ambient conditions:		
Ambient temperature		
• during operation	°C	-20 ... +55
• during operation Note		No direct exposure to the sun
• during storage	°C	-20 ... +70
• during transport	°C	-40 ... +70
Relative humidity without condensation	%	10 ... 93
Installation altitude at height above sea level maximum	m	2 000
Protection class IP		IP54
Installation/ mounting/ dimensions:		
Mounting type		Four 5-mm screws
Width	mm	270
Height	mm	55
Depth	mm	80
Standards:		
Standard		
• for EMC		EMC Directive 2004/108/EC, EN 12015, EN 12016
• for safety		EN 60950-1:2006

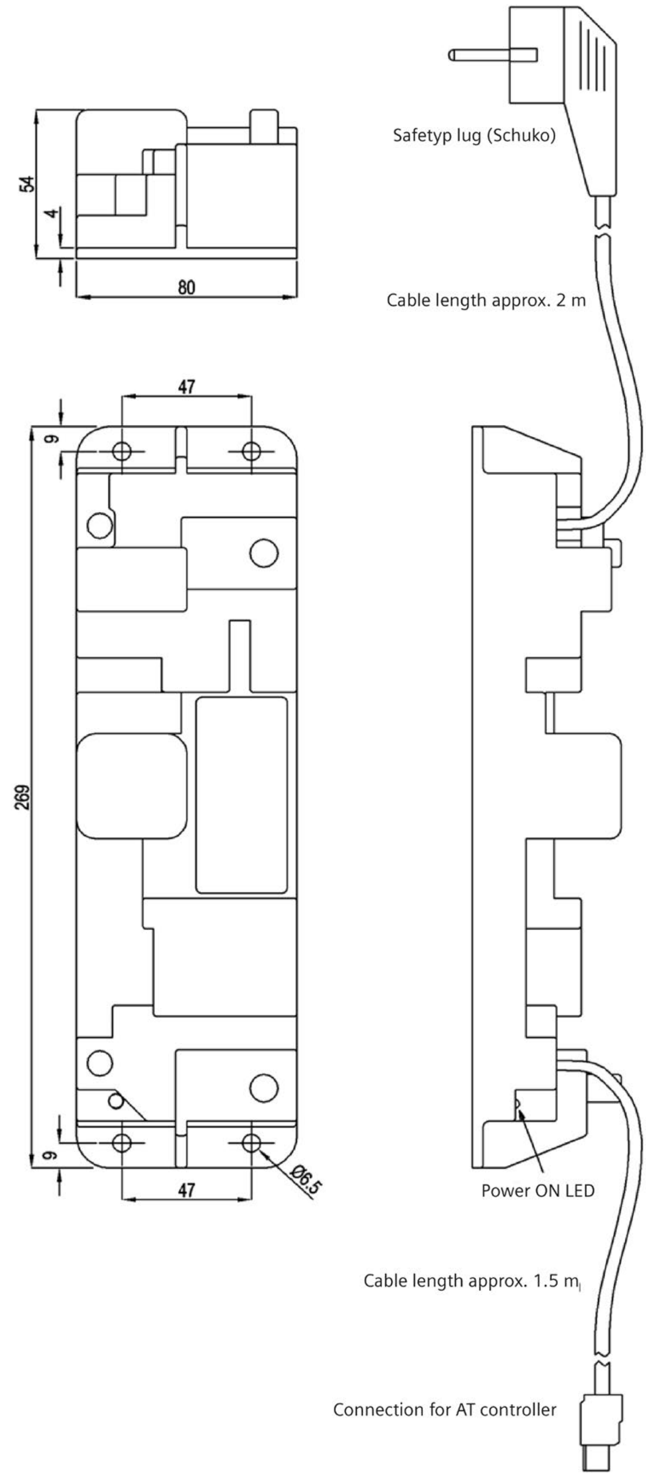


Figure 6-2 Dimensions of switch mode power supply NT40

6.2 SIDOOR TRANSFORMER

6.2.1 Description

Intended use

The device is only intended for operation in combination with the controllers specified in 2.3.1 (Page 18). Other loads must not be connected to the output connector.

Design

①	Schuko plug 220-240 V AC +/-10% 50/60 Hz
②	Length approx. 2 m
③	Connection to the controller
④	Length approx. 1.5 m
⑤	Height of the mains transformer approx. 65 mm; width approx. 145 mm, depth approx. 126 mm
⑥	∅ 6.1 mm, width across flats 10, L > 70 mm

Figure 6-3 SIDOOR TRANSFORMER

Function

The SIDOOR TRANSFORMER is a 220-240 V AC (± 10%) 50/60 Hz standard power supply unit for supplying SIDOOR controllers without an integrated power supply.

6.2.2 Installation

Requirements

The installation site must fulfill the following requirements:

- Minimum clearance to surrounding parts: 1 cm
- Even mounting surface
- Maximum distance from the power supply due to cable length:
  - Connecting cable input line (network ⇔ transformer): 200 cm
  - Connecting cable output line (transformer ⇔ controller): 150 cm

CAUTION

Risk of fire

The temperature of the housing of the transformer can rise to over 105 °C in the event of a fault in the controller or a short circuit in the output line of the transformer.

As a result, you should take the following safety measures:

- Only mount the transformer on surfaces with no risk of ignition, and which cannot be touched by unauthorized persons.
- Inform the service personnel about the risk of fire.

CAUTION

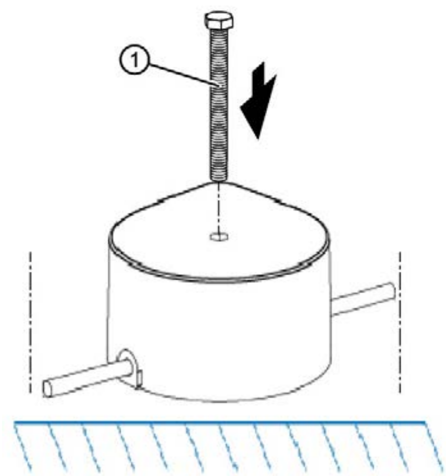
Material damage

The transformer power supply cable cannot be replaced.

If the cable is damaged, the device must be scrapped.

Procedure

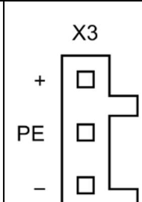
Proceed as follows to install the transformer:

Steps		Figure
1.	Drill the hole for the screw ① as shown in the dimension drawing.	
2.	Secure the transformer with 1 screw (M6, minimum length 70 mm) ① on a flat metal surface.	

6.2.3 Connecting terminals

Slots

The slots for the SIDOOR TRANSFORMER are as follows:

Controller	Slot
SIDOOR ATD4xxW	

6.2.4 Test voltage

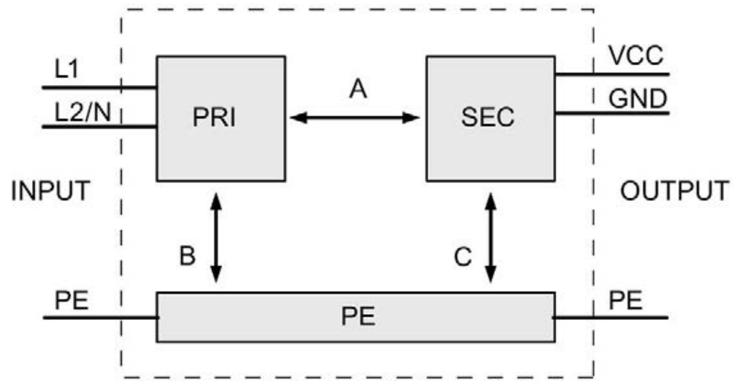


Figure 6-4 Diagram test voltage

The type test and the manufacturing test can only be performed by the manufacturer. The field can also be performed by the user.

Requirements for performing the field test:

General

The following applies to SIDOOR TRANSFORMER:

Disconnect SIDOOR TRANSFORMER from the power supply by pulling out the power plug,

disconnect the connection to the SIDOOR control circuit device.

Inspection (A) & (B)

- Interconnecting input lines (PRI) L1 and L2/N
- Interconnecting output cables (SEC) VCC, GND and PE

Inspection (C)

- Interconnecting output cables (SEC) VCC and GND and measuring against PE

Table 6- 1 Test voltage

	Test time	PRI<->SEC (A)	PRI<->PE (B)	SEC<->PE (C)
Type test	60 s	4000 VAC	4000 VAC	1500 VAC
Manufacturing test	1 s	4000 VAC	4000 VAC	1500 VAC
Field test	1 s	1500 VAC	1500 VAC	350 VAC
	1 s	2250 VDC	2250 VDC	500 VDC

Remark:
Tripping current for measuring DC: 0 mA
tripping current for measuring AC: <100 mA

6.2.5 Technical specifications

6.2.5.1 SIDOOR TRANSFORMER

Article number		6FB1112-0AT20-2TR0
General technical data:		
Product brand name		SIDOOR
Product designation		TRANSFORMER
Design of the product		Power supply unit for SIDOOR controllers
Electical data:		
Relative symmetrical tolerance of the supply voltage	%	10
Operating current of fuse protection at input when installing		6 ... 10
Consumed current		
• maximum	A	1.6
Supplied active power		
• maximum	W	115
Overvoltage category		2
Output voltage with pulsating direct voltage RMS value		
• at full load	V	17.3
Output current		
• maximum rated value	A	14.3
Tripping characteristic class of fuse protection at input when installing		D6, C10
Connections:		
Type of electrical connection		
• at input		SCHUKO connector DIN 49.441, CEE7/VII
• at output		WAGO 721-103/026
Wire length		
• line-side	m	2
• Output side	m	1.5
Ambient conditions:		
Ambient temperature		
• during operation	°C	-20 ... +55
• during operation Note		No direct exposure to the sun
• during storage	°C	-20 ... +70
• during transport	°C	-40 ... +70
Relative humidity without condensation	%	10 ... 93
Installation altitude at height above sea level maximum	m	2 000
Protection class IP		IP54

Article number		6FB1112-0AT20-2TR0
Installation/ mounting/ dimensions:		
Mounting type		Hexagon head bolt M6, L > 70 mm
Width	mm	145
Height	mm	65
Depth	mm	126
Standards:		
Standard		
• for EMC		EN 12015 / EN 12016 / EN 61000-6-2 / EN 61000-6-3 / EN 61000-3-2 / EN 61000-3-3
• for safety		Low Voltage Directive (LVD) 2014/35/EU

6.2.5.2 Dimensional drawing SIDOOR TRANSFORMER

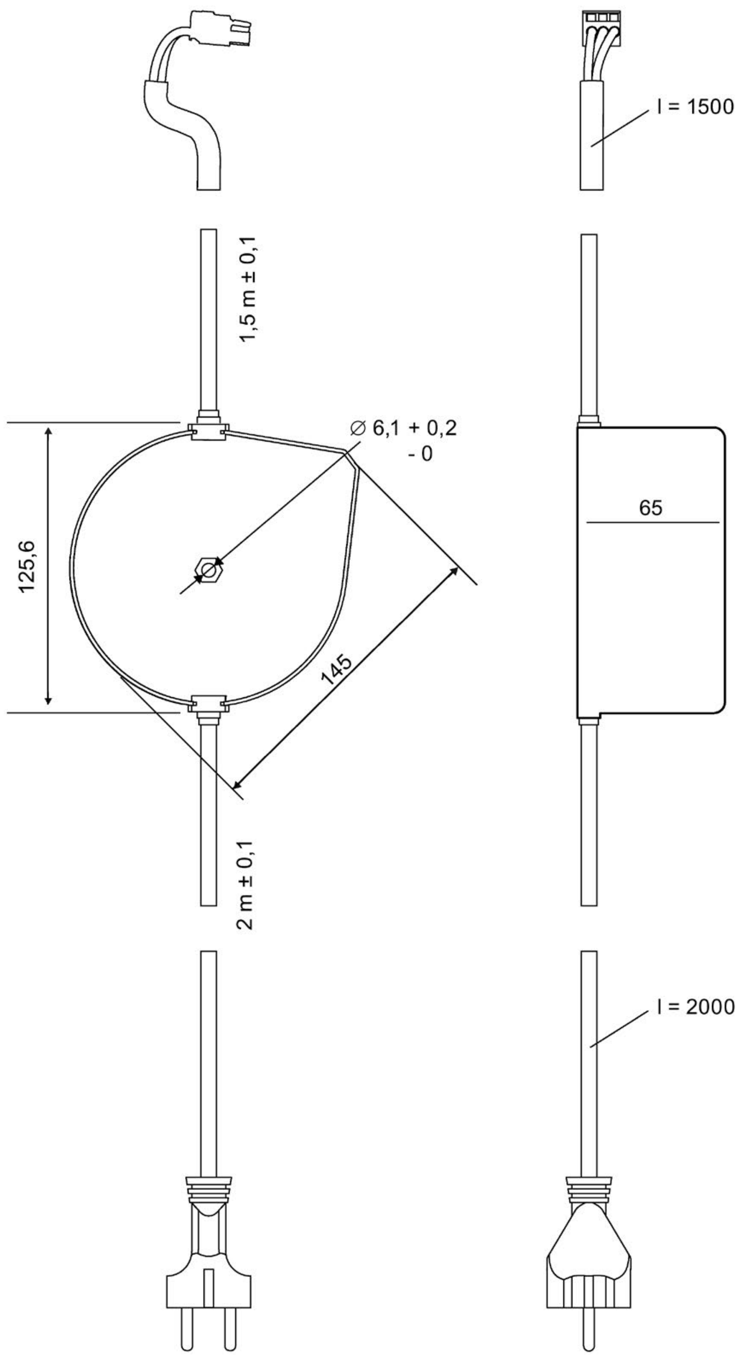


Figure 6-5 Dimensions of the SIDOOR TRANSFORMER

6.3 SIDOOR TRANSFORMER UL

6.3.1 Description

Intended use

The device is only intended for operation in combination with the controllers specified in 2.3.1 (Page 18). Other loads must not be connected to the output connector.

Configuration

① No mains connection 220-240 V AC +/-10% 50/60 Hz
② Length approx. 2 m
③ Connector for connection to the controller
④ Length approx. 1.5 m
⑤ Height of the mains transformer approx. 65 mm; width approx. 145 mm, depth approx. 126 mm
⑥ Diam. 6.1 mm, Size 10, L>70 mm

Figure 6-6 SIDOOR TRANSFORMER UL

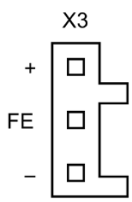
Function

The SIDOOR TRANSFORMER UL is a 220-240 V AC (± 10%) 50/60 Hz standard power supply unit for supplying SIDOOR controllers without an integrated power supply.

Output line

The output line is connected to slot X3 of the SIDOOR controller.

The pin assignment at slot X3 is as follows:

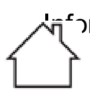


6.3.2 Installation

Requirements

The installation site must fulfill the following requirements:

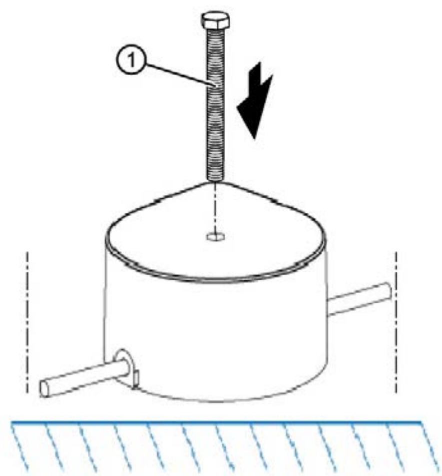
- Minimum clearance to surrounding parts: 1 cm
- Flat mounting surface made of metal
- Maximum distance from the power supply due to cable length:
  - Connecting cable input line (network ⇔ transformer): 200 cm
  - Connecting cable output line (transformer ⇔ controller): 150 cm

CAUTION
Risk of fire  The transformer housing temperature can rise to over 105 °C in the event of a fault in the controller or a short circuit in the output line of the transformer. As a result, you should take the following safety measures: • Only mount the transformer on surfaces with no risk of ignition, and which cannot be touched by unauthorized persons. • Inform the service personnel about the risk of fire.  For indoor use only

CAUTION
Material damage The connection cables of the transformer cannot be replaced. If the cable is damaged, the device must be scrapped.

Procedure

Proceed as follows to install the transformer:

Steps		Figure
1.	Drill the hole for the screw ① as shown in the dimension drawing.	
2.	Secure the transformer with 1 screw (M6, minimum length 70 mm) ① on a flat metal surface.	

6.3.3 Connection

Requirements

WARNING

Dangerous electrical voltage!

When electrical devices are operated, parts of these devices will necessarily carry dangerous voltages. Failure to observe the operating instructions can therefore lead to serious injuries or material damage.

Observe the operating instructions:

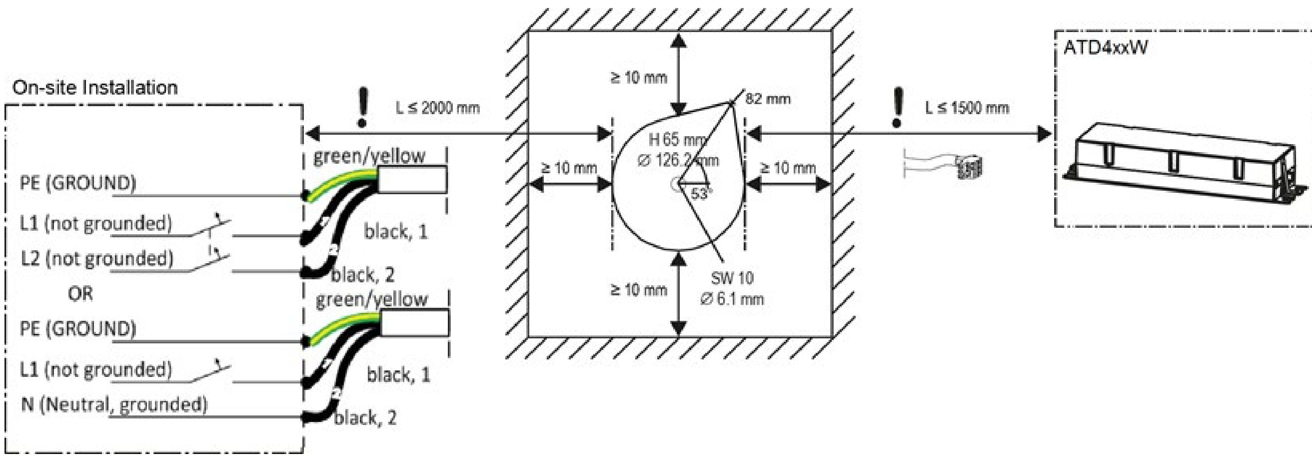
Before performing work on the device, all power sources must be switched off and secured with a switch-on guard.

Installation and maintenance work is to be performed by qualified personnel.

In addition, please adhere to national regulations.

- If the SIDOOR TRANSFORMER UL is supplied by two ungrounded wires (for example L1, L2), fusing has to be implemented by a 2-pole miniature circuit breaker with coupled switching element. When there is a connection between an ungrounded wire (L) and a grounded wire (N), only a 1-pole miniature circuit breaker in the L-branch is required.
- Make sure that the on-site (customer-provided) fuse meets these requirements:
  - For the CE setting with a miniature circuit breaker to IEC60898-1, 10 A tripping characteristic C or 6 A tripping characteristic D
    for example 1-pole miniature circuit breaker: 5SY4110-7 or 5SY4106-8
    e.g. 2-pole miniature circuit breakers: 5SY4210-7 or 5SY4206-8
  - For the NFPA setting miniature circuit breaker to UL489 listed, CCN DIVQ, UR≥240VAC, 10 A Class C or 6 A Class D
    e.g. 1-pole miniature circuit breaker: 5SJ4110-7HG41 or 5SJ4106-8HG41
    e.g. 2-pole miniature circuit breakers: 5SJ4210-7HG41 or 5SJ4206-8HG41

Procedure



- Connect the wires as shown in the drawing.
- Be sure to connect the protective ground (green-yellow) correctly.
- Ensure that there is a mains disconnecting device near the equipment that is easily accessible clearly marked (for example, using a suitable miniature circuit breaker).
- The description of the complete electrical setting and commissioning of the controller and of the associated components is available in the section Connecting and commissioning (Page 290).

Note

Risk of injury through moving mechanical parts.

The control system will become ready for operation after the supply line has been connected. If a control signal is present, the door will move in the set direction.

Always connect the supply lines last of all!

Carry out the following steps in the given order:

1. Connect the output line of the SIDOOR TRANSFORMER UL to slot X3 on the controller. Observe the polarity printed on the device.
2. Connect the supply line to the network.

See the section Connecting and commissioning (Page 290).

6.3.4 Test voltage

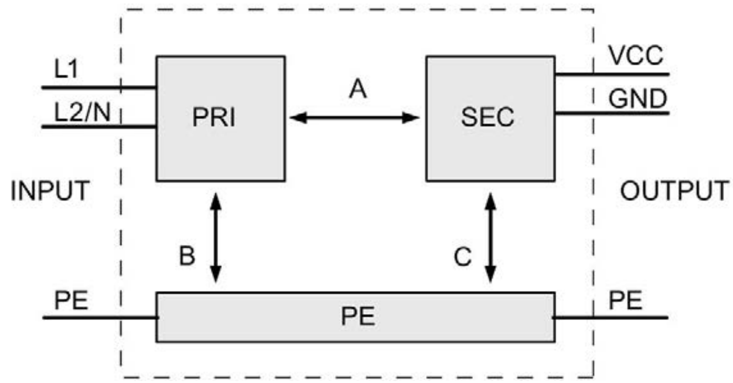


Figure 6-7 Diagram test voltage

The type test and the manufacturing test can only be performed by the manufacturer. The field can also be performed by the user.

Requirements for performing the field test:

General

The following applies to SIDOOR TRANSFORMER UL:

Disconnect SIDOOR TRANSFORMER UL from the power supply by pulling out the power plug,

disconnect the connection to the SIDOOR control circuit device.

Inspection (A) & (B)

- Interconnecting input lines (PRI) L1 and L2/N
- Interconnecting output cables (SEC) VCC, GND and PE

Inspection (C)

- Interconnecting output cables (SEC) VCC and GND and measuring against PE

Table 6- 2 Test voltage

	Test time	PRI<->SEC (A)	PRI<->PE (B)	SEC<->PE (C)
Type test	60 s	4000 VAC	4000 VAC	1500 VAC
Manufacturing test	1 s	4000 VAC	4000 VAC	1500 VAC
Field test	1 s	1500 VAC	1500 VAC	350 VAC
	1 s	2250 VDC	2250 VDC	500 VDC

Remark:
Tripping current for measuring DC: 0 mA
tripping current for measuring AC: <100 mA

6.3.5 Technical specifications

6.3.5.1 SIDOOR TRANSFORMER UL

Article number	6FB1112-0AT21-2TR0
General information	
Product brand name	SIDOOR
Product designation	TRANSFORMER UL
Product version	Power supply unit for SIDOOR controllers
Installation type/mounting	
Mounting type	Hexagon head bolt M6, L > 70 mm
Supply voltage	
permissible range, lower limit (AC)	220 V
permissible range, upper limit (AC)	240 V
relative symmetrical tolerance of the supply voltage	10 %
Line frequency	
• permissible range, lower limit	50 Hz
• permissible range, upper limit	60 Hz
Mains filter	
• integrated	Yes
Input current	
Current consumption, max.	1.6 A
Operational current of fuse protection at input, min.	6 A
Operational current of fuse protection at input, max.	10 A
Tripping characteristic class of fuse protection at input	D6, C10
Output voltage	
RMS value (pulsating DC voltage at full load)	17.3 V; At 230 V AC
RMS value (pulsating DC voltage at 0.7 mA peak current), max.	27 V; At 264 V AC
RMS value (pulsating DC voltage at full load), min.	16.5 V
RMS value (pulsating DC voltage at full load), max.	18 V
Output current	
Rated value, max.	14.3 A; t on 2 s / t off 8 s
Power	
Emitted active power, max.	115 W; Average value above 10 s
Isolation	
Overvoltage category	2
Degree of pollution	2
Degree and class of protection	
IP degree of protection	IP54

Article number	6FB1112-0AT21-2TR0
Standards, approvals, certificates	
Standard for EMC	EN 12015 / EN 12016 / EN 61000-6-2 / EN 61000-6-3 / EN 61000-3-2 / EN 61000-3-3
Standard for safety	UL 61010-1, CSA C22.2 No. 61010-1-12, Low Voltage Directive (LVD) 2014/35/EU
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	55 °C
• Remark	No direct exposure to the sun
Ambient temperature during storage/transportation	
• Storage, min.	-20 °C
• Storage, max.	70 °C
• Transportation, min.	-40 °C
• Transportation, max.	70 °C
Air pressure acc. to IEC 60068-2-13	
• Installation altitude above sea level, max.	2 000 m
Relative humidity	
• No condensation, min.	10 %
• No condensation, max.	93 %
Cables	
Cable length	
• Input side	2 m
• Output side	1.5 m
Connection method	
Design of electrical connection at input	Equipped with ferrules
Design of electrical connection at output	WAGO 721-103/026
Dimensions	
Width	145 mm
Height	65 mm
Depth	126 mm

6.3.5.2 Dimension drawing SIDOOR TRANSFORMER UL

Dimension drawing SIDOOR TRANSFORMER UL

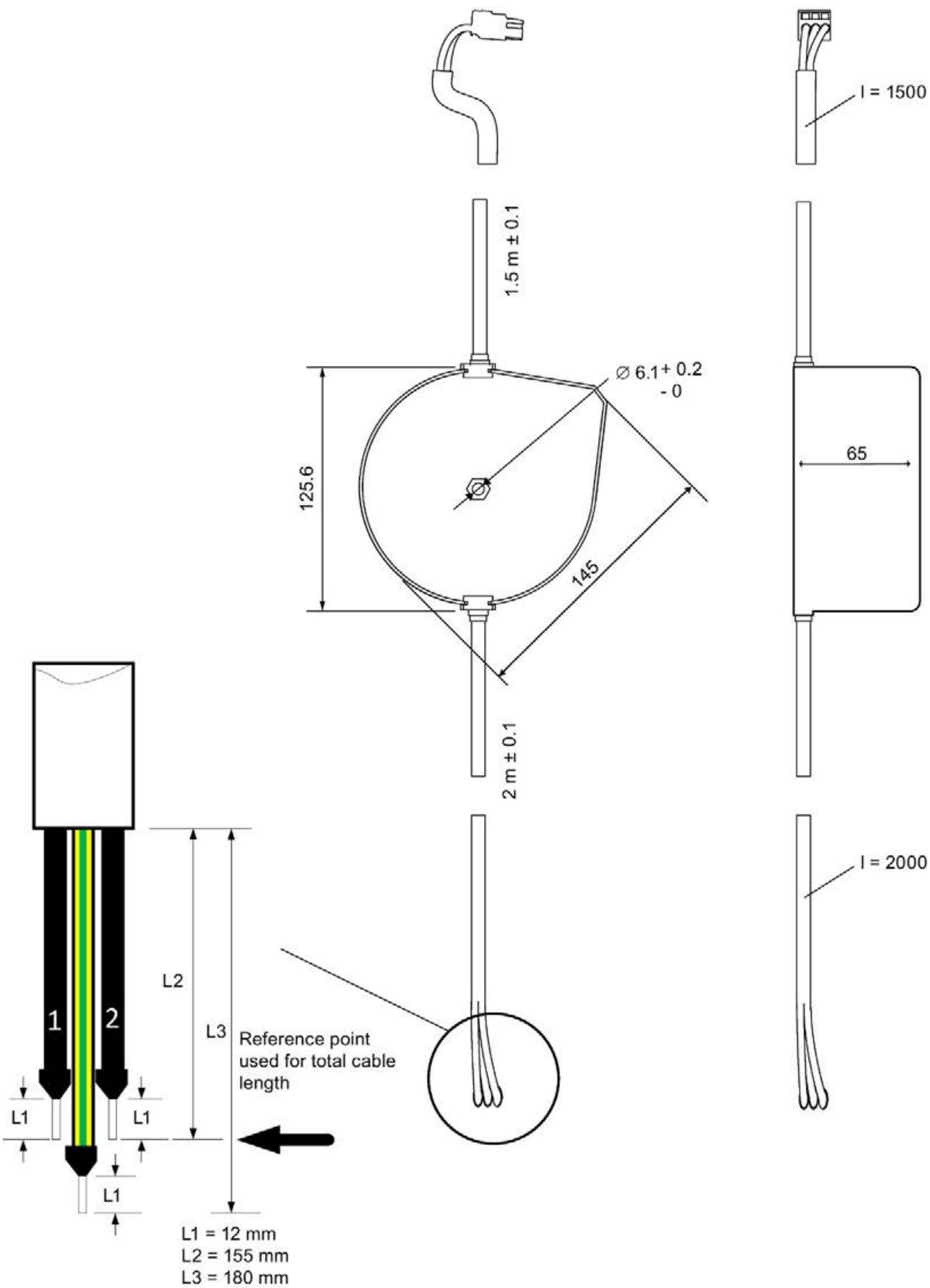
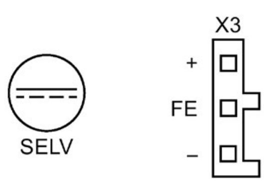


Figure 6-8 Dimension drawing TRANSFORMER UL

6.4 SITOP PSU8200 13A/36V 3-phase

SITOP PSU8200 13A/36V

Connecting SITOP PSU8200 on the ATD4xxW door control unit

Slot			Function
		X3	
 SELV	1	+	Plus
	2	FE	Functional grounding
	3	-	Minus

6.4.1 Power supply requirements of SITOP PSU8200

NOTICE
SITOP PSU8200 may only be used as of firmware version ATD4xxW> = 1.04.

Fuse protection

A circuit breaker according to EN 60898-1, 8A, C-characteristic

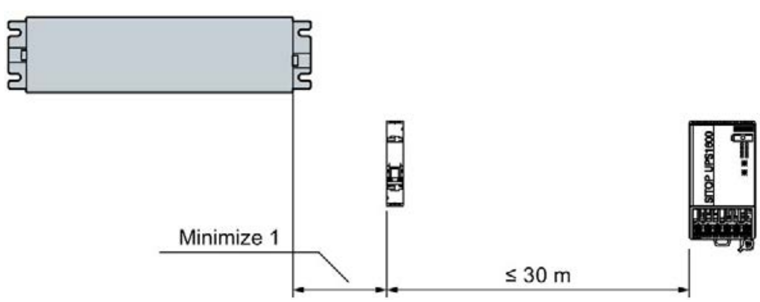
of the type SIEMENS: 5SY4108-7 must be installed in the supply branch on site. It must be ensured that the miniature circuit breaker is only operated within the permissible range. The circuit breaker must be mounted close to the SIDOOR controller at a similar ambient temperature.

Default topology

Only the SIDOOR controller may be connected to the SITOP PSU8200; additional consumers are not allowed. The spatial expanse of the used power supply circuit must be less than 30m.

6.4.2 Installation

A miniature circuit breaker (type SIEMENS: 5SY4108-7) is an absolute requirement for SITOP PSU8200.



[1] The circuit breaker must be mounted close to the SIDOOR controller (at a similar ambient temperature).

6.4.3 Technical specifications

Core statement

Order number	**6EP3446-8SB10-0AY0**
Product	SITOP PSU8200
Power supply, type	36 V/13 A
Input	
Input	3-phase AC
Rated voltage value Vin rated	400 ... 500 V
Voltage range AC	320 ... 575 V
Wide-range input	Yes
Mains buffering at Iout rated, min.	15 ms; at Vin = 400 V
Rated line frequency 1	50 Hz
Rated line frequency 2	60 Hz
Rated line range	47 ... 63 Hz
Input current	
• at rated input voltage 400 V	1.2 A
• at rated input voltage 500 V	1 A
Switch-on current limiting (+25 °C), max.	16 A
I^2t, max.	0.8 $A^2 \cdot s$
Built-in incoming fuse	none
Protection in the mains power input (IEC 898)	Required: 3-pole connected miniature circuit breaker 6 ... 16 A characteristic C or circuit breaker 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489)
Output	
Output	Controlled, isolated DC voltage
Rated voltage Vout DC	36 V
Total tolerance, static ±	3 %
Static mains compensation, approx.	0.1 %
Static load balancing, approx.	0.2 %
Residual ripple peak-peak, max.	100 mV
Spikes peak-peak, max. (bandwidth: 20 MHz)	200 mV
Adjustment range	36 ... 42 V
Product function Output voltage adjustable	Yes
Output voltage setting	via potentiometer; max. 480 W
Status display	Green LED for 36 V OK
Signaling	Relay contact (NO contact, rating 60 V DC/ 0.3 A) for 36 V OK
On/off behavior	No overshoot of Vout (soft start)
Startup delay, max.	2.5 s
Voltage increase time of the output voltage maximum	500 ms
Rated current value Iout rated	13 A
Current range	0 ... 13 A

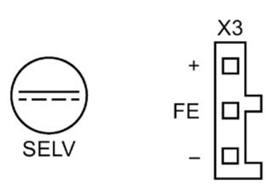
Order number	6EP3446-8SB10-0AY0
Product	SITOP PSU8200
Power supply, type	36 V/13 A
• Note	+60 ... +70 °C: Derating 2%/K
Supplied active power typical	468 W
Short-term overload current	
• at short-circuit during operation typical	39 A
Duration of overloading capability for excess current	
• at short-circuit during operation	25 ms
Constant overload current	
• on short-circuiting during the start-up typical	14 A
Parallel switching for enhanced performance	Yes; switchable characteristic
Numbers of parallel switchable units for enhanced performance	2
Efficiency	
Efficiency at Vout rated, Iout rated, approx.	94 %
Power loss at Vout rated, Iout rated, approx.	30 W
Closed-loop control	
Dynamic mains compensation (Vin rated ±15 %), max.	0.1 %
Dynamic load smoothing (Iout: 50/100/50 %), Uout ± typ.	1 %
Load step setting time 50 to 100%, typ.	0.2 ms
Load step setting time 100 to 50%, typ.	0.2 ms
Dynamic load smoothing (Iout: 10/90/10 %), Uout ± typ.	2 %
Load step setting time 10 to 90%, typ.	0.2 ms
Load step setting time 90 to 10%, typ.	0.2 ms
Setting time maximum	10 ms
Protection and monitoring	
Output overvoltage protection	< 48 V
Current limitation, typ.	14 A
Property of the output Short-circuit proof	Yes
Short-circuit protection	Alternatively, constant current characteristic approx. 14 A or latching shutdown
Enduring short circuit current RMS value	
• typical	14 A
Overcurrent overload capability in normal operation	overload capability 150 % Iout rated up to 5 s/min
Overload/short-circuit indicator	LED yellow for "overload", LED red for "latching shutdown"
Safety	
Primary/secondary isolation	Yes
Galvanic isolation	Safety extra low output voltage Vout according to EN 60950-1
Protection class	Class I
Leakage current	
• maximum	3.5 mA

Order number	6EP3446-8SB10-0AY0
Product	SITOP PSU8200
Power supply, type	36 V/13 A
• typical	0.9 mA
CE mark	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259
Explosion protection	No
FM approval	-
CB approval	Yes
Marine approval	GL, ABS
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature	
• during operation	-25 ... +70 °C
– Note	with natural convection
• during transport	-40 ... +85 °C
• during storage	-40 ... +85 °C
Humidity class according to EN 60721	Climate class 3K3, no condensation
Mechanics	
Connection technology	screw-type terminals
Connections	
• Supply input	L1, L2, L3, PE: 1 screw terminal each for 0.2 ... 4 mm² single-core/finely stranded
• Output	+, -: 2 screw terminals each for 0.2 ... 4 mm²
• Auxiliary	13, 14 (alarm signal): 1 screw terminal each for 0.14 ... 1.5 mm²; 15, 16 (Remote): 1 screw terminal each for 0.14 ... 1.5 mm²
Width of the enclosure	70 mm
Height of the enclosure	125 mm
Depth of the enclosure	125 mm
Required spacing	
• top	50 mm
• bottom	50 mm
• left	0 mm
• right	0 mm
Weight, approx.	1.2 kg
Product feature of the enclosure housing for side-by-side mounting	Yes

Order number	**6EP3446-8SB10-0AY0**
Product	SITOP PSU8200
Power supply, type	36 V/13 A
Installation	Snaps onto DIN rail EN 60715 35x7.5/15
Electrical accessories	Buffer module
Mechanical accessories	Device identification label 20 mm × 7 mm, pale turquoise 3RT1900-1SB20
Other information	Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified)

6.5 Building DC voltage supply

Connector pin assignment

Slot			**Function**
		X3	
 SELV	1	+	Plus
	2	FE	Functional grounding
	3	-	Minus

6.5.1 Power supply requirements

NOTICE
The DC power supply for the SIDOOR ATD4xxW controller may be used only with firmware version ATD4xxW > = 1.04.

The following requirements must be met by the building DC power supply:

Supply voltage

In **normal operation** a non-grounded SELV voltage according to EN 60950-1: 2014, NFPA environment UL61010-2-201: 1st Edition 2014 with a typical voltage of 36 V is to be used.

Note 1: Operation of the SIDOOR device is possible down to 19.2V. However, this is associated with performance loss for the drive with respect to the achievable forces, speeds and acceleration.

Note 2: With >45V, irreversible damage is done to the SIDOOR device!

In case of a **fault scenario** of the **power supply unit** the output voltage of the power supply unit has to remain smaller than 60 V.

In case of a **fault** in the **SIDOOR controller** voltages of up to 60 V can occur.

Supply current

Normal operation requires an operational peak current of up to 14A for up to 3s as well as a continuous current of up to 9A. Smaller current values can result in operating faults, depending on the selected settings (ramps, end speeds, forces) and the door properties (friction, weight).

To ensure triggering of the automatic circuit breaker in case of a fault of the SIDOOR controller, the utilized power supply unit must have the following properties (see figure below):

- ≥13A continuous current, even in case of a short-circuit

- OR -

- Effective short-circuit current ≤8ARMS, period duration ≤10s, peak current ≤55A

In the case of a fault on the part of the power supply unit or of the SIDOOR controller the current is limited by the miniature circuit breaker C8 Automat according to EN 60898-1.

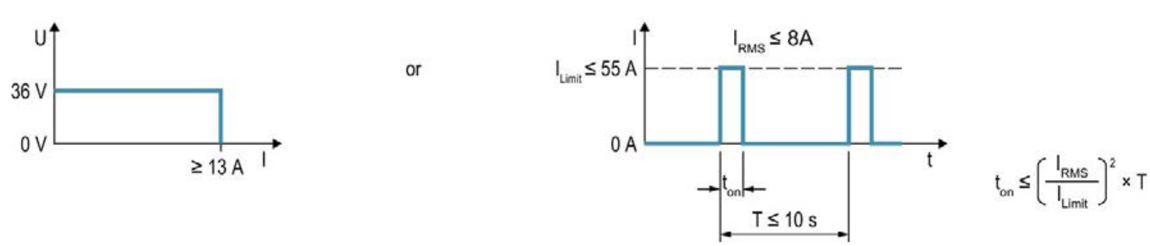


Figure 6-9 Properties of the supplying power supply unit in case of an error of the SIDOOR controller

Fuse protection

A miniature circuit breaker according to EN 60898-1, 8A, C-characteristic of the type SIEMENS: 5SY4108-7 or 5SY4108-7KK11 is to be inserted into the supply network by the customer. It must be ensured that the miniature circuit breaker is only operated within the permissible range. The circuit breaker must be mounted close to the SIDOOR controller at a similar ambient temperature.

Voltage immunity of the power supply unit at an energetic recovery system

The controller does not have an energetic recovery system protection.

This means the voltage at the terminals increases when the doors are braked. In normal operation, this voltage is limited to values less than 42V by the ballast circuit integrated in the controller. In faulty operation, however, this voltage can increase to values of less than 60V. This must be considered when selecting the supply.

Default topology

Only the SIDOOR controller may be connected to the incoming power supply; additional consumers are not allowed. The spatial expanse of the used power supply circuit must be less than 30m.

Requirements for the supplying mains

The supplied alternating current mains may have a maximum overvoltage category 2 according to EN60950:2014, EN60335-1:2012, NFPA environment UL60101-2-201: 1st Edition 2014.

EMC

Immunity according to EN 61000-6-2:2005, Table 3, Table 3 – Interference immunity – direct current network inputs and outputs.

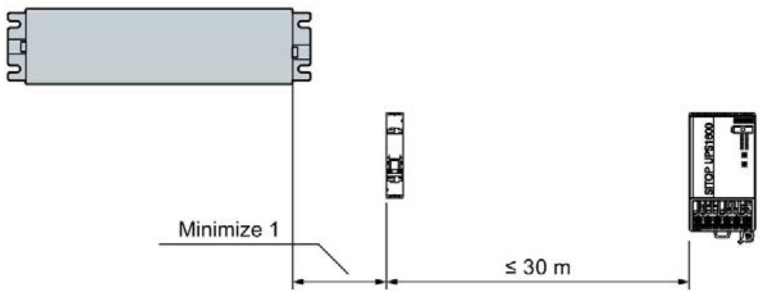
Conducted interference emission is not defined for direct current supply according to EN 61000-6-4:2007+A1:2011. If the limits of the 61000-6-4: 2007+A1:2011, Table 2 (Emission – Low voltage AC mains port) are applied, an appropriate filter must be connected upstream.

Without filters, these limits are exceeded by up to 12dBµV in the range of 150KHz ... 4.6MHz.

The limits can be maintained with an upstream B84112-B-B110 filter, for example, from the company EPCOS. The cable length between ATD4xxW and the filter must be kept as short as possible, less than 0.5m. The filter and the ATD4xxW need to be electrically connected over a common flat metallic structure.

6.5.2 Installation

A miniature circuit breaker (type SIEMENS: 5SY4108-7 or 5SY4108-7KK11) is mandatory at a direct voltage supply by the customer (for example SITOP PSU300S 20A).



[1] Install the miniature circuit breaker in the vicinity of the SIDOOR controller (similar ambient air temperature).

6.6 Uninterruptible power supply (UPS)

Overview

The SIDOOR drive system can be supplied with an uninterruptible power supply (UPS) for a certain period of time the criteria on the design of the UPS described below must be taken into account here.

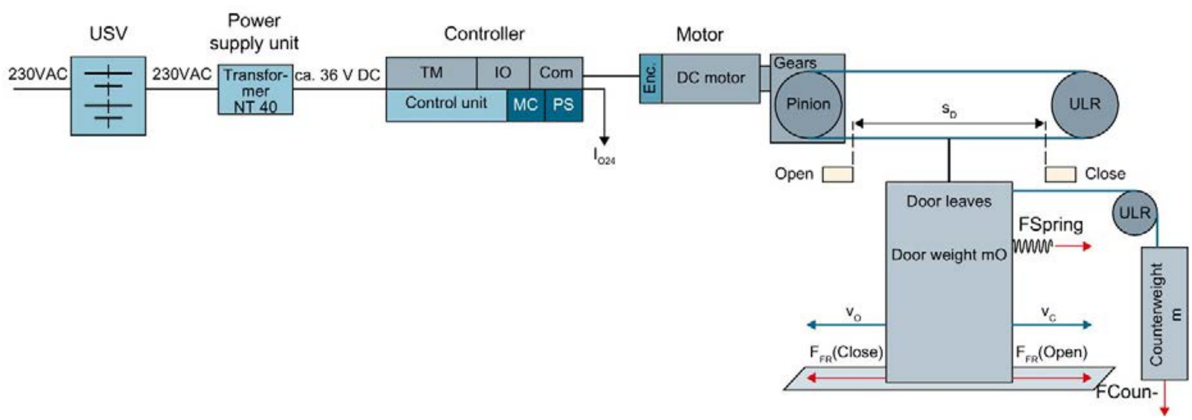


Figure 6-10 SIDOOR system block diagram

In the observation, three main criteria need to be considered:

1. The peak power of the UPS (for approx. 3 seconds) should be ≥ 600 W.
2. With the use of the transformer, the UPS must be designed as an online double converter. Classification: VFI (according to IEC 62040-3)
3. The energy storage of the UPS must be adapted to the entire drive system and the time to be bridged.

Energy requirements

The entire energy requirements are derived from the following three physical effects:

- Energy requirements of the control unit → W_{AT}
  Quiescent current consumption of the controller over the time to be bridged
- Energy requirements due to holding powers → W_{HOLD}
  Current consumption due to continuous torques
- Energy requirements due to door movement W_{MOVE}
  Current consumption during traversing due to system friction and acceleration of the door leaves

The energy to be stored by the UPS is therefore derived as follows:

$W_{AKKU} := W_{AT} + W_{HOLD} + W_{MOVE}$

The corresponding mathematical equations of these terms are as follows:

Energy requirements of the control unit	$W_{AT} := \frac{4W + 24V \cdot I_{O24}}{0.4} \cdot (T_{STBY} + T_{HO} + T_{HC})$
Energy requirements of the holding powers	$W_{HOLD} := \frac{1 \cdot W}{140 \cdot N^2} \cdot (F_{HO}^2 \cdot T_{HO} + F_{HC}^2 \cdot T_{HC})$
Energy requirements of the door movement	$W_{MOVE} := 4.1 N_C \cdot [0.5 m_D \cdot (v_O^2 + v_C^2) + 2 F_{FR} \cdot s_D)$
Energy requirements of the UPS ACCU	$W_{AKKU} := W_{AT} + W_{HOLD} + W_{MOVE}$

Definitions of tags

Tag	Unit	Definition
F_{FR}	N	Friction force door
F_{HC}	N	Holding power door closed
F_{HO}	N	Holding power door open
I_{O24}	A	Current consumption 24 V external
m_D	kg	Door weight
N_C	–	Number of OPEN/CLOSED cycles
s_D	m	Distance door leaves
T_{HC}	s	Holding time CLOSED
T_{HO}	s	Holding time OPEN
T_{STBY}	s	Standstill time without holding power
v_C	m/s	Closing speed
v_O	m/s	Opening speed

Recommendations on UPS data

Output voltage	230V ± 10%
Output frequency	47 … 53 Hz
Output power	> 600 W
Wave type	Sine
Current voltage distortion	< 5% at full load
Classification (according to IEC 62040-3)	VFI

Example calculation for an M3 motor

<table>
<tr><th colspan="3">Input data</th><th>Calculation</th></tr>
<tr><th>Tag</th><th>Value</th><th>Definition</th><td rowspan="12">$W_{AT} := \frac{4W + 24V \cdot I_{O24}}{0.4} \cdot (T_{STBY}+T_{HO}+T_{HC})$
$W_{AT} = 5.6 \cdot 10^3$ J

$W_{HOLD} := \frac{1 \cdot W}{140 \cdot N^2} \cdot (F_{HO}{}^2 \cdot T_{HO}+F_{HC}{}^2 \cdot T_{HC})$
$W_{HOLD} = 1 \cdot 10^3$ J

$W_{MOVE} := 4.1N_C \cdot [0.5m_D \cdot (v_O{}^2+v_C{}^2)+ 2F_{FR} \cdot s_D)$
$W_{MOVE} = 3 \cdot 10^3$ J

$W_{USV} := W_{AT}+W_{HOLD}+W_{MOVE}$
$W_{USV} = 1 \cdot 10^4$ J</td></tr>
<tr><td>F_{FR}</td><td>80 N</td><td>Door friction without counter-weight</td></tr>
<tr><td>F_{HC}</td><td>60 N</td><td>Holding time CLOSED</td></tr>
<tr><td>F_{HO}</td><td>70 N</td><td>Holding power OPEN</td></tr>
<tr><td>I_{O24}</td><td>0.1 A</td><td>External power supply 24 V</td></tr>
<tr><td>m_D</td><td>180 kg</td><td>Door weight, total</td></tr>
<tr><td>N_C</td><td>5</td><td>Cycles OPEN/CLOSED</td></tr>
<tr><td>s_D</td><td>0.8 m</td><td>Door width, 1 leaf in meters</td></tr>
<tr><td>T_{HC}</td><td>20 s</td><td>Hold time closed</td></tr>
<tr><td>T_{HO}</td><td>20 s</td><td>Hold time open</td></tr>
<tr><td>T_{STBY}</td><td>310 s</td><td>Standstill time without holding power</td></tr>
<tr><td>v_C</td><td>0.3 m/s</td><td>Closing speed</td></tr>
</table>

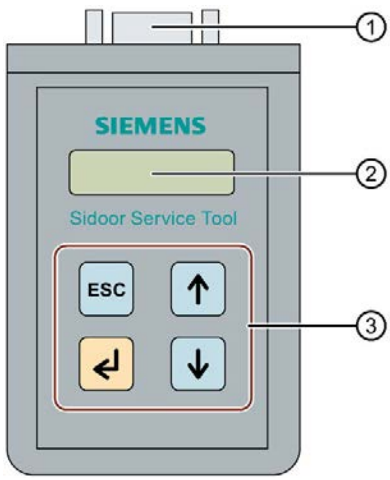
A UPS with 600 W and a bridging time of 10 minutes makes approx. 30,000 J available.

SIDOOR SERVICE TOOL

7

7.1 Description

Overview



① Connection plug to connect the SIDOOR SERVICE TOOL to the controller
② Display
③ Control keys

7.2 Connection

Connection of the SIDOOR SERVICE TOOL is effected with the associated cable to the plug-in connector **X8** of the controller.

Note

The cover of the controller does not have to be removed to connect the SIDOOR SERVICE TOOL.

⚠ CAUTION
Material damage For this reason, only connect suitable SIDOOR accessories.

7.3 Operation

Parameters can be changed in both of the following menus:

- *MAIN MENU > Quick setup > Parameter setting*
- *MAIN MENU > General setup > Profile parameters*

Note

If the SIDOOR SERVICE TOOL is in the "Quick setup" or "General setup" menu, the door commands of the controller are blocked by the command inputs of the terminal strip X6.

Key functions

Key	Description	Function
	Enter key	Jump to next menu below
	Escape key	Jump back to menu above
	Menu selection key	Increases a parameter value
	Menu selection key	Decreases a parameter value

Operating principle

Action		Key		Remarks
1	Select required parameter	↑	↓	
2	Activate parameter for setting using the Return key	↵		Parameter value flashes
3	Increase or decrease parameter value	↑	↓	
4	Accept parameter value by press- ing Return key again	↵		Displayed parameter value stops flashing after acceptance.
5	• Select the next parameter (Step 1) or	-		
	• exit the menu	ESC		

Note

Parameter changes are accepted with the door at a complete stop or in the OPEN or CLOSED position.

⚠ WARNING

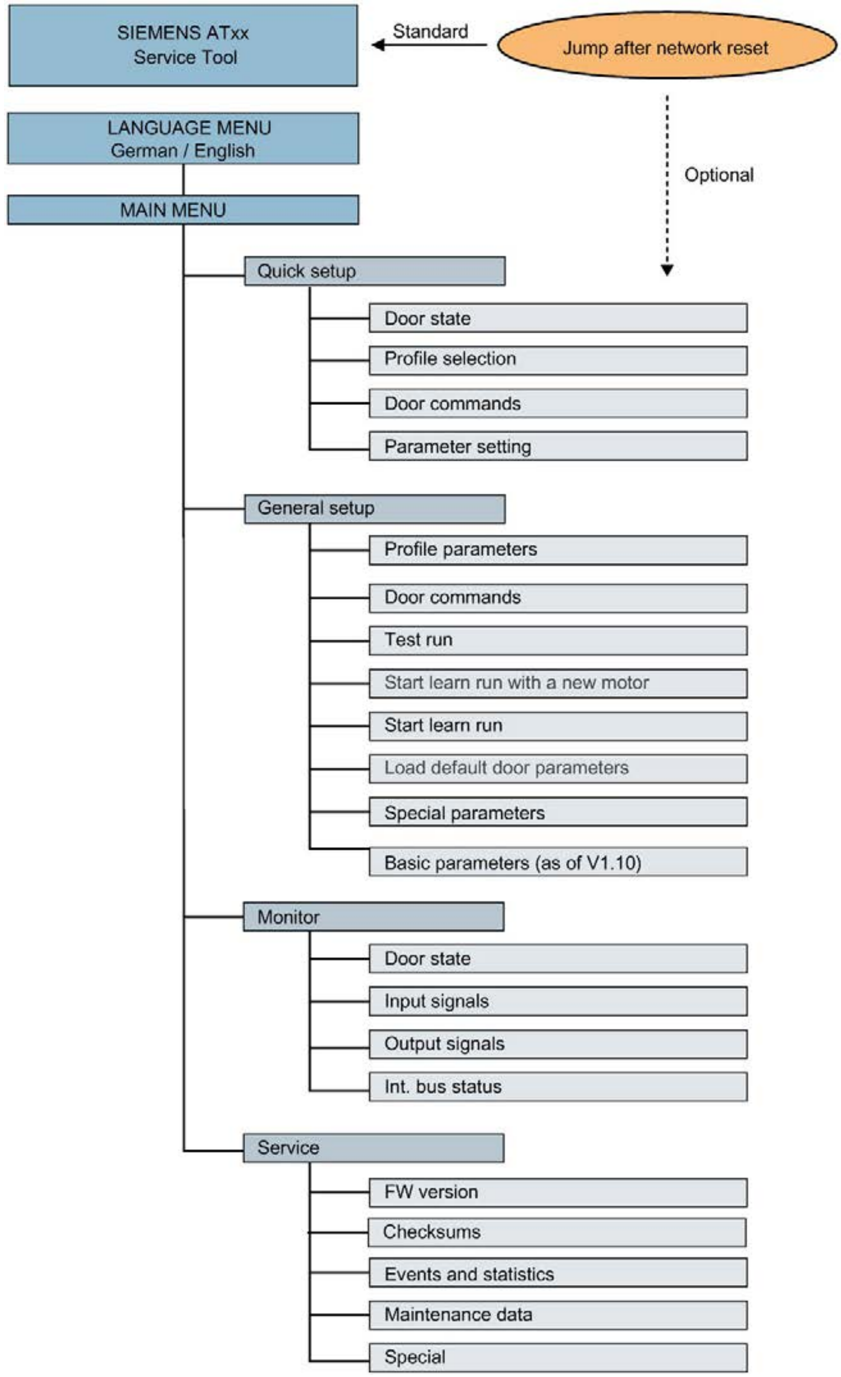
Risk of injury due to moving mechanical parts

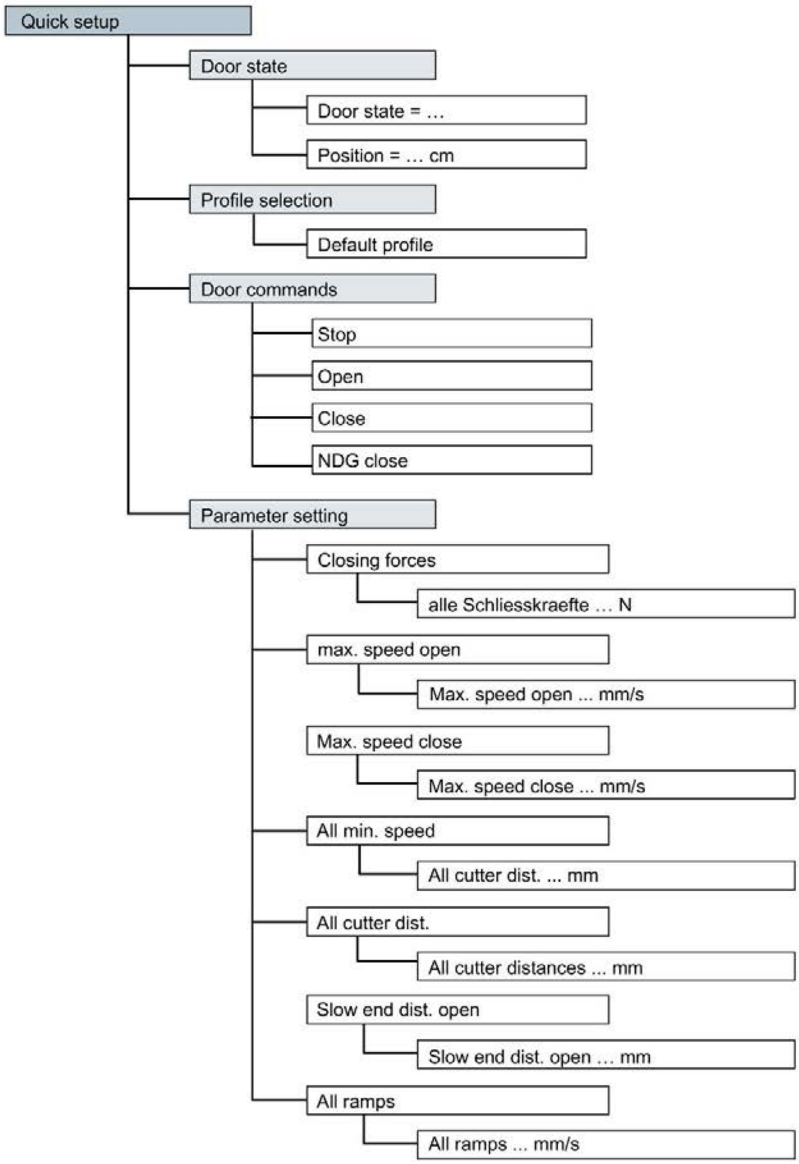
The permissible energies, forces and safety-relevant functions such as light barriers, emergency stop or two-hand operation must be checked by the service personnel after changing the parameters on the door in the overall system.

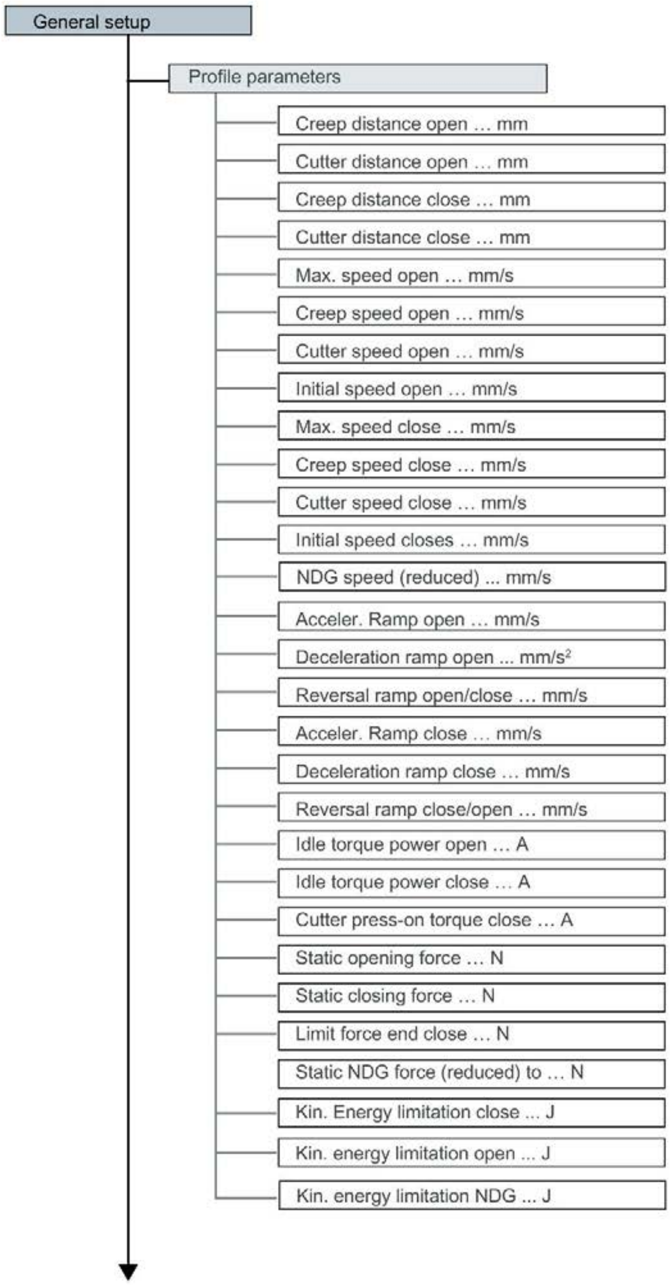
Menu navigation

The menu-based operation of the SIDOOR SERVICE TOOL is described in the section Navigation structure SIDOOR SERVICE TOOL (Page 276).

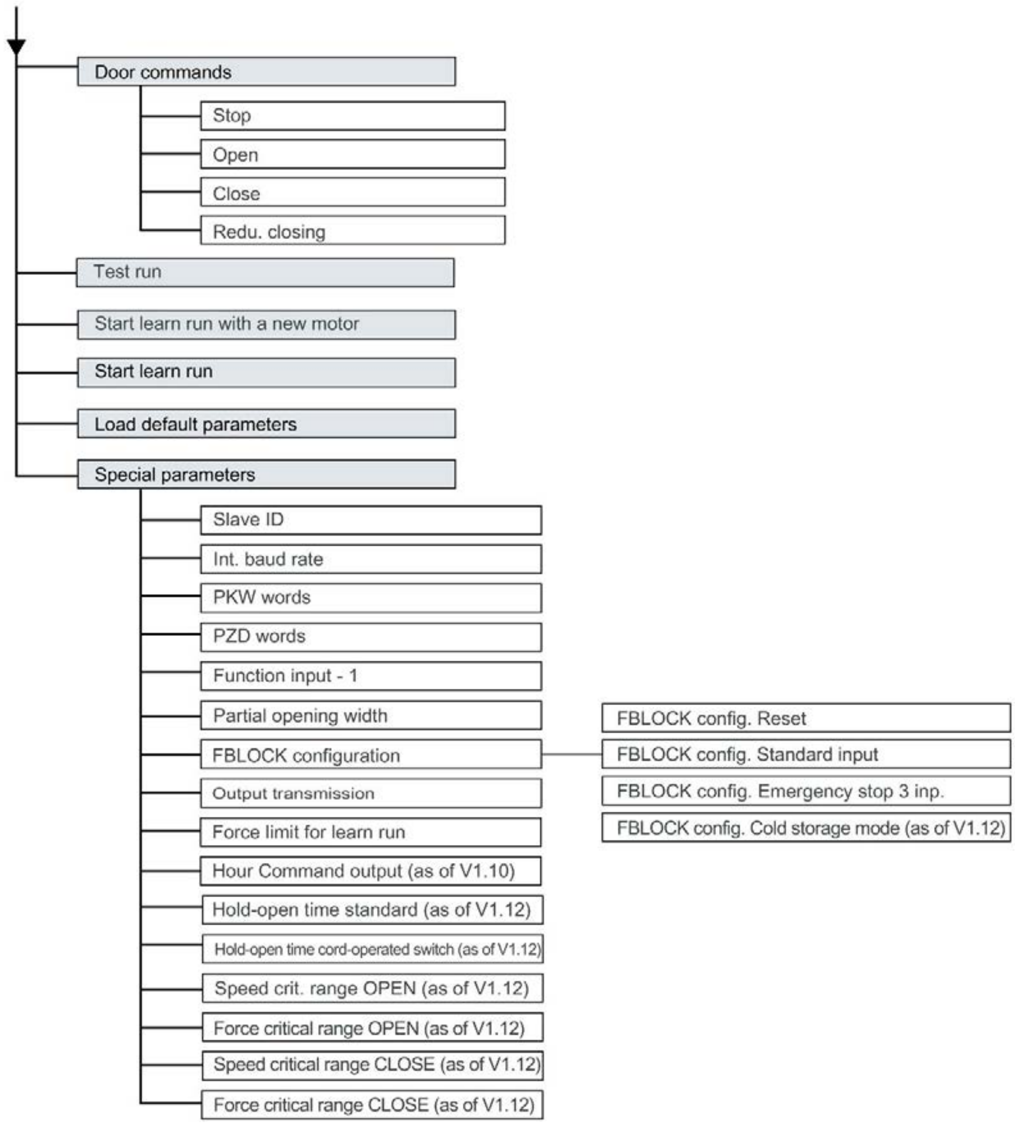
7.4 Navigator structure in the SIDOOR SERVICE TOOL

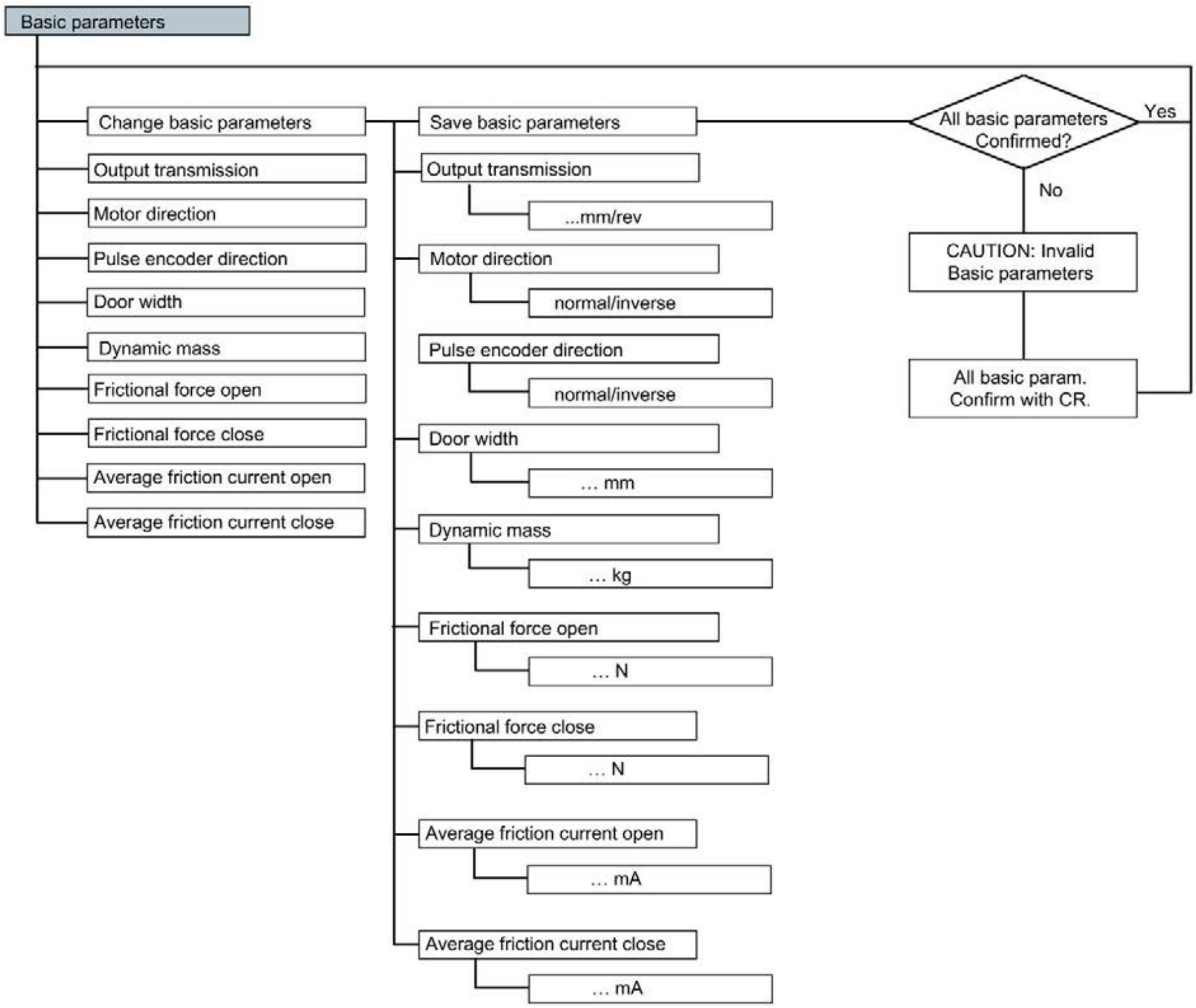


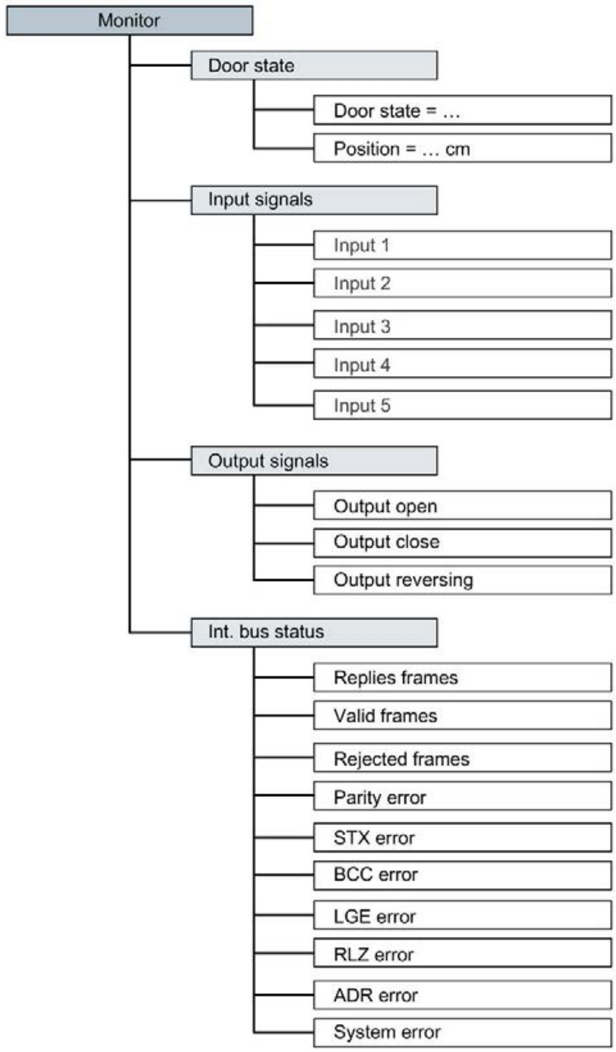

Quick setup
Door state
Door state = …
Position = … cm
Profile selection
Default profile
Door commands
Stop
Open
Close
NDG close
Parameter setting
Closing forces
alle Schliesskraefte … N
max. speed open
Max. speed open ... mm/s
Max. speed close
Max. speed close ... mm/s
All min. speed
All cutter dist. ... mm
All cutter dist.
All cutter distances ... mm
Slow end dist. open
Slow end dist. open … mm
All ramps
All ramps ... mm/s

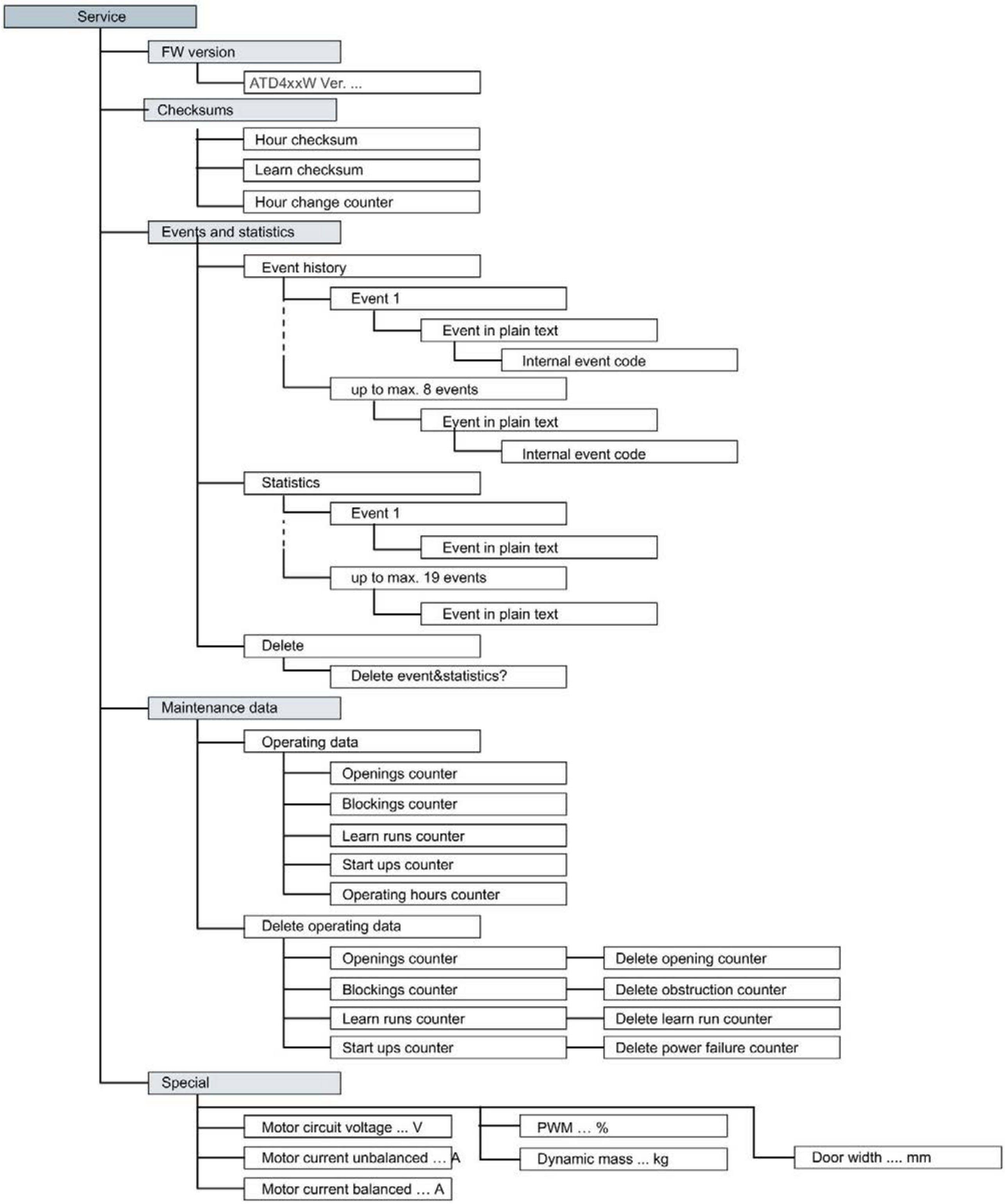


Continue to next page


Door commands
Stop
Open
Close
Redu. closing
Test run
Start learn run with a new motor
Start learn run
Load default parameters
Special parameters
Slave ID
Int. baud rate
PKW words
PZD words
Function input - 1
Partial opening width
FBLOCK configuration
Output transmission
Force limit for learn run
Hour Command output (as of V1.10)
Hold-open time standard (as of V1.12)
Hold-open time cord-operated switch (as of V1.12)
Speed crit. range OPEN (as of V1.12)
Force critical range OPEN (as of V1.12)
Speed critical range CLOSE (as of V1.12)
Force critical range CLOSE (as of V1.12)
FBLOCK config. Reset
FBLOCK config. Standard input
FBLOCK config. Emergency stop 3 inp.
FBLOCK config. Cold storage mode (as of V1.12)


Basic parameters
Change basic parameters
Output transmission
Motor direction
Pulse encoder direction
Door width
Dynamic mass
Frictional force open
Frictional force close
Average friction current open
Average friction current close
Save basic parameters
Output transmission
...mm/rev
Motor direction
normal/inverse
Pulse encoder direction
normal/inverse
Door width
… mm
Dynamic mass
… kg
Frictional force open
… N
Frictional force close
… N
Average friction current open
… mA
Average friction current close
… mA
All basic parameters Confirmed?
Yes
No
CAUTION: Invalid Basic parameters
All basic param. Confirm with CR.


Monitor
Door state
Door state = …
Position = … cm
Input signals
Input 1
Input 2
Input 3
Input 4
Input 5
Output signals
Output open
Output close
Output reversing
Int. bus status
Replies frames
Valid frames
Rejected frames
Parity error
STX error
BCC error
LGE error
RLZ error
ADR error
System error


Service
FW version
ATD4xxW Ver. ...
Checksums
Hour checksum
Learn checksum
Hour change counter
Events and statistics
Event history
Event 1
Event in plain text
Internal event code
up to max. 8 events
Event in plain text
Internal event code
Statistics
Event 1
Event in plain text
up to max. 19 events
Event in plain text
Delete
Delete event&statistics?
Maintenance data
Operating data
Openings counter
Blockings counter
Learn runs counter
Start ups counter
Operating hours counter
Delete operating data
Openings counter
Delete opening counter
Blockings counter
Delete obstruction counter
Learn runs counter
Delete learn run counter
Start ups counter
Delete power failure counter
Special
Motor circuit voltage ... V
Motor current unbalanced … A
Motor current balanced … A
PWM … %
Dynamic mass ... kg
Door width .... mm

7.5 Technical specifications

Article number		6FB1105-0AT01-6ST0
Product brand name		SIDOOR
Product designation		SIDOOR SERVICE TOOL
Design of the product		Diagnostic and parameterization tool
Wire length of the connecting cable	m	2
Width	mm	65
Height	mm	100
Depth	mm	25

Configuration and programming in STEP 7 8

Configuration

The configuration of the control unit ATD420W on PROFIBUS or ATD430W on PROFINET is made via certified GSD files. This ensures compatibility with different industrial automation systems.

Before configuring, you must import the relevant GSD file into the configuration tool, for example STEP 7.

Programming

A function block is provided for quick and easy connection of an SIDOOR drive to a SIMATIC controller via PROFIBUS or PROFINET communication.

8.1 PROFINET integration via GSD file

Install the GSD file (see GSD files (https://support.industry.siemens.com/cs/ww/en/view/103949094)) in the applicable configuration tool before configuring the SIDOOR ATD430W PROFINET controller.

After installation, you will find the ATD430W controller under the following category:

"PROFINET IO > Drives > SIDOOR"

Note

Configuration notes

- Modify the Ethernet or PROFINET settings according to the applicable system.
- Make sure that the I/O addresses start at the same value.
- When the system is configured, the device parameters are assigned the following default values specified by the GSD:
  Cycle time [ms]: "100"

You can find more information on the PROFINET functions and protocols supported in the sections PROFINET module (Page 147)and PROFINET communication (Page 157).

8.2 PROFIBUS integration via GSD file

Install the GSD file (see Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/99008084)) in the applicable configuration tool before configuring the SIDOOR ATD420W PROFIBUS controller.

After installation, you will find the ATD420W controller under the following category:

"PROFIBUS DP > Further field devices > Drives > SIDOOR"

Note

When configuring the device, ensure that the input and output addresses both start with the same value.

When the system is configured, the device parameters are automatically assigned the following default values specified by the GSD.

- Data exchange: "Enabled"
- Baud rate: "115200"
- Slave address: "0"
- Frame type: "Standard telegram"
- Cycle time [ms]: "100"

You can find additional information in the section PROFIBUS module (Page 135).

8.3 Programming SIDOOR instructions

PROFINET or PROFIBUS SIDOOR controllers are configured via certified GSD files. This ensures compatibility with different industrial automation systems. A function block is provided for fast and simple interfacing of a SIDOOR drive to a SIMATIC. This function block was implemented for PROFIBUS or PROFINET communication and for various SIMATIC families. The blocks always operate in accordance with the principle described below.

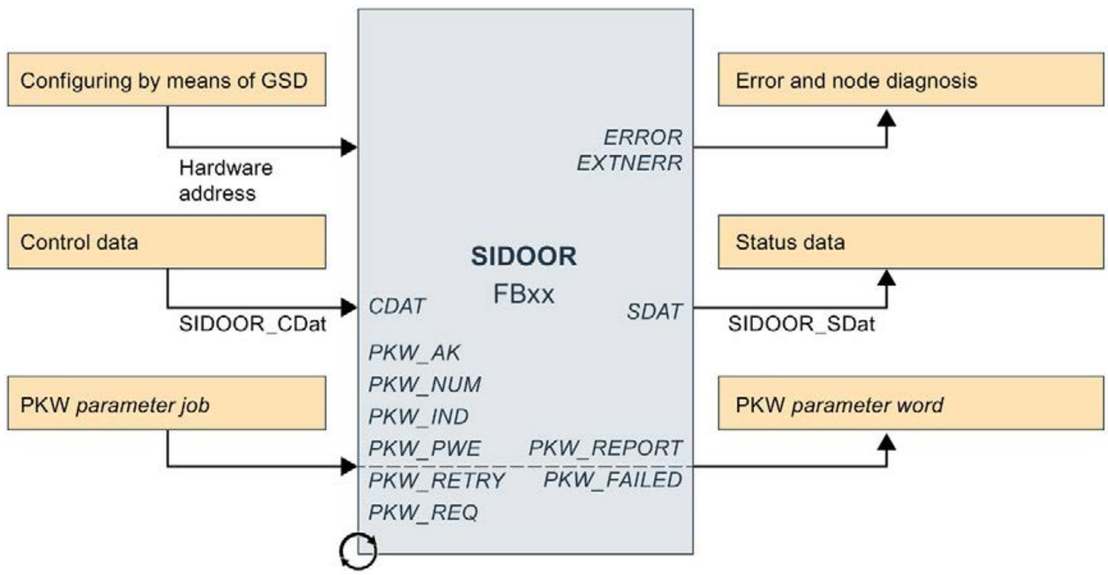


Figure 8-1 SIDOOR function block

The SIDOOR function block handles the data processing of exactly one SIDOOR controller. Therefore the block has to be called with a data instance for each SIDOOR bus node. There are no restrictions on the call cycle of the SIDOOR function block. A cycle time of >10 ms is recommended to make optimal use of the resources.

The selected SIDOOR bus node is localized by specifying a hardware address ID. Every time the function block is called, the control data is transferred to the controller according to the "SIDOOR_CDat" structure. Additionally, the current status data is updated in accordance with the "SIDOOR_SDat" structure. The availability of the SIDOOR bus node is also checked, and the node diagnostics data is updated. A parameter job is acyclic, and is processed during the course of several call cycles of the SIDOOR function block. The block returns the result and the status of the parameter job. The block number can be changed.

Response to errors

If communication and/or the block is interrupted (ERROR ≠ 0000_{hex}), the response is as follows:

- No parameter job is accepted.
- The states of the output parameters PKW_REPORT and PKW_FAILED remain unchanged.
- All control data (CDAT) is rejected.
- All elements of the SDAT status data structure are set to 0.

Parameter channel (PKW)

The parameter channel is only used actively when a parameter job mapped by the parameters PKW_NUM, PKW_IND, PKW_PWE and PKW_RETRY is started by a positive edge on PKW_REQ. Therefore, all "PKW" parameters can be set to "0" if the parameter channel is inactive or will not be used.

On a positive edge of PKW_REQ, a parameter job is copied into the internal job buffer, and the evaluation is started. PKW_REQ is automatically reset after the job has been executed or terminated by an error. An active job is canceled by resetting PKW_REQ. The job is canceled automatically if a diagnostic or communication error occurs during processing. A job is not evaluated as error-free until the empty job has been sent automatically in the last step and correspondingly answered.

Note

After a job has finished, the parameter channel is automatically reset by an empty job. This need not be done by the user.

The function block can be called at any cyclic frequency. Please note, however, that the parameter channel is processed step-by-step. Each block call executes precisely one step in the processing of the parameter job.

1. Check parameter job data and start job
2. Wait for a response from the addressed node
3. Evaluate the response, and enable the job interface with an empty job

The number of wait steps is limited by the input parameter PKW_RETRY, and depends directly on the call cycle. Depending on the job, the SIDOOR ATD430W controller requires at least 30 ms to process a parameter job (including response).

8.3.1 "SIDOOR_CDat" data type

The "SIDOOR_CDat" data type maps the structure of the control words (master → slave). These are identical for the process image in the case of PROFIBUS and PROFINET. The terminal block assignments are specified in Process data (Page 316). The data type is used for all S7 systems in SIMATIC Manager and TIA Portal.

Table 8- 1 "SIDOOR_CDat" UDT

Name	Data type	Description	See also
CtrlW	WORD	Control word (STW1)	Table A-13 Control word 1 (STW1) (Page 317)
DCMD	BYTE	Door commands / drive orders	Table A-16 DCMD signal (Page 319)
DCMDExten	BYTE	Extension/modification of door commands	Table A-17 DCMD expansion bits (Page 320)
DESTPOS	WORD	Target position in positioning mode	Table A-19 DESTPOS signal (Page 321)
SBIT	BIT	The control bits SBit0 to 4 can be linked as input signals to the FBLOCK logic. See the section Free function blocks (FBLOCK) (Page 79)	Control bits (as of V1.10) (Page 321)

8.3.2 "SIDOOR_SDat" data type

The "SIDOOR_SDat" data type maps the structure of the control words (slave → master). These are identical for the process image in the case of PROFIBUS and PROFINET. The terminal block assignments are specified in Process data (Page 316). The data type is used for all S7 systems in SIMATIC Manager and TIA Portal.

Table 8- 2 UDT "AT_SDat"

Name	Data type	Description	See also
StatW	WORD	Status word (ZSW1)	Table A-21 Status word 1 (ZSW1) (Page 322)
DPos	BYTE	Percentage door position	Table A-28 DPOS signal (Page 325)
DBlock	BYTE	Obstruction detection	Table A-26 DBLOCK signal (Page 325)
DBlcWait	BOOL	Wait obstruction mode	Table A-27 DBLCWAIT signal (Page 325)
ASDrv	BOOL	(Basic signal) AssistedDrive	Table A-32 ASDRV signal (Page 327)
ASStp	BOOL	(Basic signal) ImpulseStop	Table A-33 ASStp signal (Page 327)
DTErrAND2	BOOL	Discrepancy error at AND2 (as of firmware V1.12)	AND2 (Page 328)
DTErrAND0	BOOL	Discrepancy error at AND0 (as of firmware V1.12)	AND0 (Page 327)
DMode	BYTE	Door mode	Table A-25 DMODE signal (Page 324)
DStat	BYTE	Door state	Table A-24 DSTAT signal (Page 324)
ImpDrv_s	BYTE	ImpulseDrive (distance-based)	Table A-30 IMPDRVIncr signal (Page 326)
ImpDrv_v	BYTE	ImpulseDrive (speed-based)	Table A-31 IMPDRVVelo signal (Page 326)
DIn	BYTE	Digital inputs	D_IN (Page 329)
DOut	BYTE	Digital outputs	D_OUT (Page 330)
PB	BYTE	Function button	Button (Page 330)

9 Connecting and commissioning

9.1 Overview of safety and commissioning

> **WARNING**
>
> **Dangerous electrical voltage!**
>
> When electrical devices are used, certain parts of them have to carry dangerous voltages. Failure to observe the operating instructions can therefore lead to serious injuries or material damage.
>
> Observe the operating instructions.

> **WARNING**
>
> **Risk of injury during commissioning**
>
> - The door movements cannot always be externally controlled while the controller is being commissioned (in particular during the automatic determination of parameters). The light barrier is not active during the learn run.
> - During the learn run, the force is > 75 N and the energy > 4 J.
>
> An authorized person must therefore be posted near the door to ensure that no one else can enter the vicinity of the door during commissioning.

> **WARNING**
>
> **Verification of safety-relevant functions**
>
> The SIDOOR controller is only a subsystem (incomplete machine). In general, the correct parameter assignment of the SIDOOR controller and the effectiveness of the safety-relevant functions must be checked at regular intervals by testing the safety-relevant functions during commissioning and depending on the application.

Note

The motor temperature must not be below 0°C during the learn run, as otherwise the mass to be moved will be incorrectly determined, and the opening and closing speed may lie in an impermissible range.

Working on the door drive

WARNING

Risk of injury due to dangerous electrical voltages and moving mechanical parts.

Disconnect the door drive by unplugging the power plug from the power supply before you start work on the door drive.

WARNING

Risk of injury due to moving mechanical parts

If power-operated guards are used, ensure that they have been tested prior to initial commissioning. Power-operated guards must also be tested annually.

CAUTION

Risk of injury due to moving mechanical parts

If required by the drive application, suitable protective equipment must be installed for safe door interlocking.

Parameter assignment and configuration

WARNING

Risk of injury and material damage due to excessive force of the door

Exceeding the maximum static closing force or the opening force in some cases may lead to injuries to persons or damage to the door drive and mechanical components of the door.

After commissioning, have the maximum static force checked by the service personnel, and adjusted to the limit value if it is excessive.

Note the limits of the applicable standard and adjust the setting accordingly.

WARNING

Door weight determined with the learn run

Depending on the mechanical coupling between the motor and door panel, the door weight determined during the learn run can differ from the actual door weight. The door weight determined during the learn run has to be checked and if necessary corrected using the basic parameters editor (from V1.10).

WARNING

Change to basic parameters

There is no plausibility check of the basic parameters by the control unit when basic parameters are changed. Incorrect parameter assignment may result in undesirable travel behavior of the door. After changing the basic parameters, the drive curve parameters must be checked and adjusted if necessary (as of V1.10).

WARNING

Verify parameters

In the case of parameter assignment via the SIDOOR SOFTWARE KIT, or via the PROFIdrive PKW interface, parameter values must be read back after modification and verified.

WARNING

Access protection to the controllers/parameters

Access to the controller and the parameter assignment of the controller must be protected against unauthorized access. Appropriate measures must be taken for specific applications, e.g. installation in a closed control cabinet, to ensure access only by authorized personnel.

Note

Application-specific measures for emergency operation

In the event of a controller failure, measures must be taken for emergency operation according to the application.

Modifications to the door drive

CAUTION

Loss of liability for defects and material damage

Changes to the door drive lead to the loss of liability for defects and compensation rights, and the correct function of the door drive is no longer guaranteed.

Observe the following rules:

- Do not make any modifications to the door drive (motor, controller, power supply).
- Never remove the grounding-type (Schuko) plug of the SIDOOR TRANSFORMER and NT40 (e.g. by cutting). IT IS USED FOR THE REQUIRED DISCONNECTION FROM THE MAINS.
- The power supply cord of the power supply (SIDOOR TRANSFORMER, SIDOOR TRANSFORMER UL or SIDOOR NT 40) cannot be replaced. Scrap the power supply if the supply cable is damaged.

Notes on maintenance

The SIDOOR system should be included in the maintenance schedule for the system as a whole, and inspected in the course of the maintenance intervals stated in the schedule.

An inspection should cover the following points:

- Visual inspection of the controller for contamination and damage
- Visual inspection of the motor for dirt and damage
- Visual and mechanical inspection of the mechanical system, in as far as it is part of the SIDOOR elevator system. This includes checking the following components:
- Attachment of the motor holder, deflector pulley and mounting bracket
- Wear on the toothed belt
- Check and remeasure the parameters for the safety-relevant force and energy settings set during commissioning.
- Effectiveness of safety-relevant functions, e.g. light barriers, emergency stop, two-hand operation.

Overview of commissioning a door drive

We recommend the following initial commissioning procedure for a door drive:

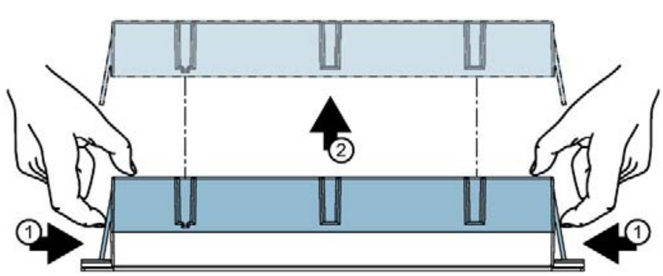
Table 9- 1 Procedure for commissioning a door drive

Step	Procedure	Reference
1	Preparing the control unit	Preparing the control unit (Page 294) section
2	Connecting a geared motor to the control unit	Connecting a geared motor to the control unit (Page 295) section
3	Connect relay outputs of the control unit (optional, only for control units with relay outputs)	Relay module (Page 126) section
4	Connecting the control unit to the fieldbus (optional, only for controllers with the corresponding module): • USS • PROFIBUS • PROFINET	• USS module (Page 130) section • PROFIBUS module (Page 135) section • PROFINET (Page 147) section
5	Connecting the power supply to the network and executing a learn run	Connecting the power supply to the network and executing a learn run (Page 297) section
6	Connecting digital input signals	Digital input signals (Page 298) section
7	Commissioning the control unit on the fieldbus (optional, only for control units with corresponding module)	Commissioning the control unit on the fieldbus (Page 299) section
8	Final settings and checks	Final settings and checks (Page 302) section

9.2 Preparing the control unit

Preparing the control unit for connection and installation

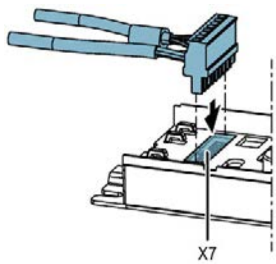
1. Nudge the door into the CLOSED position.
2. Open the housing cover.



9.3 Connecting a geared motor to the control unit

Connecting a geared motor to the control unit

1. Connect the motor connector with slot X7 on the SIDOOR ATD4xxW control unit

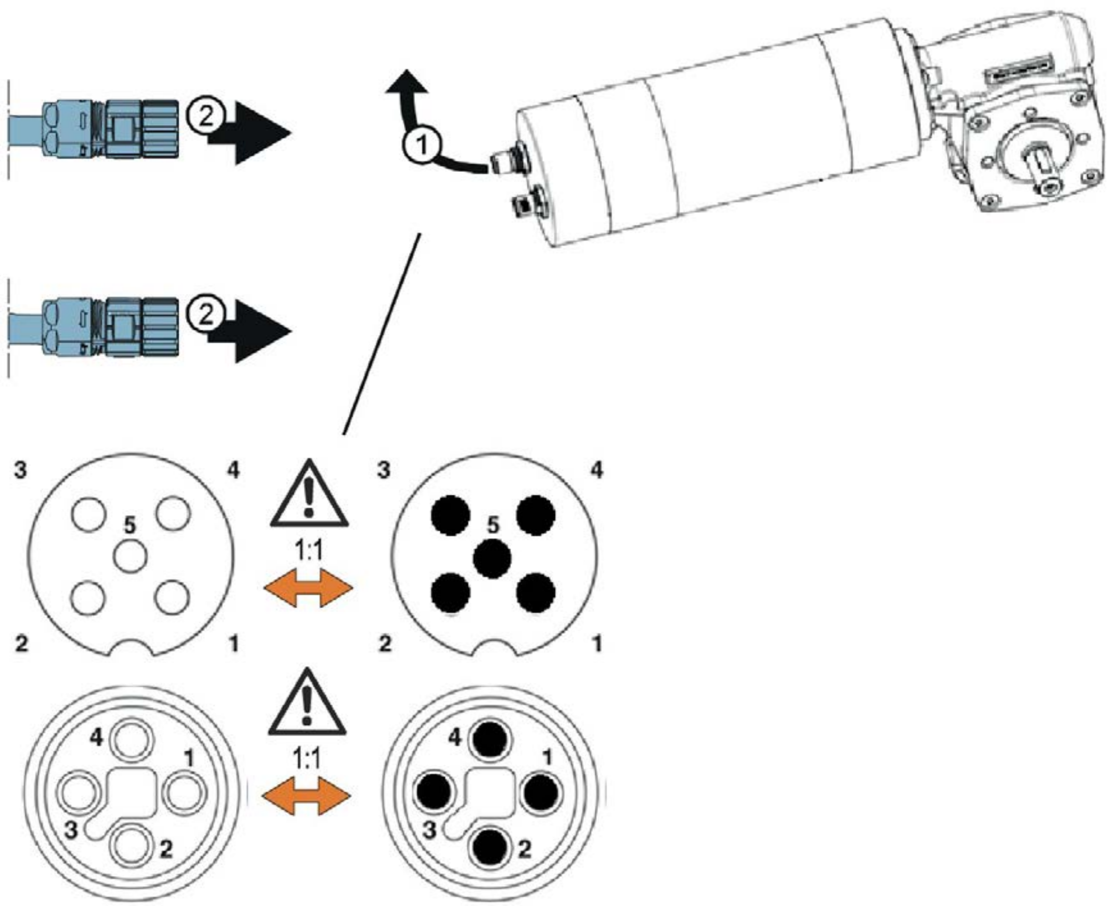


Note

The X6 control inputs plug is not plugged in during commissioning in order to prevent uncontrolled movements.

---

2. Plug the motor cable connector into the SIDOOR MDG3, MDG4 or MDG5 geared motor.
   - Remove the protective cover from the connection plug of the motor.
   - Plug the round connector of the cable (6FB1104-0AT..-0CB.) into the motor plug socket (6FB1103-0AT1.-.M..). Ensure that the round connector is in the correct position. Turn the round connector so that the outer code rings match the code rings on the plug socket.
   - Fasten the round connector in place with screws. Ensure that the round connector is screwed tightly in place to comply with IP56 degree of protection.



9.4 Connecting the power supply to the network and executing a learn run

Connecting the power supply to the network

1. Connect the power supply to the network.
   – SIDOOR NT40: When the supply is switched on, the device is ready for operation. The green LED lights up.

Note

On-site fuse

The on-site fuse must not exceed 10 A.

Note

For all motors, the output transmission must be checked prior to each learn run with SIDOOR ATD4xxW and adjusted if necessary.

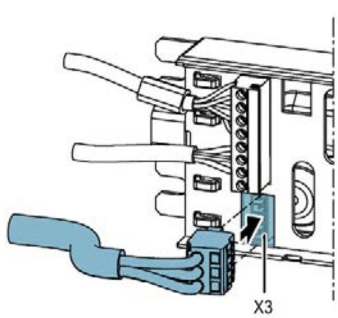
Perform a learn run

Note

Ensure that 15 to 25 cm of the door's range of motion from the CLOSED position are unobstructed during the learn run.

---

1. Make sure that the door is in the CLOSED position.
2. Press and hold down the learn run button S401.
3. Connect the voltage supply with slot X3 on the SIDOOR ATD4xxW control unit



4. For the M3, MDG3, M4, MDG4, M5 and MDG5 motors, the output transmission [mm/rev] must be configured for the first commissioning or motor adaptation (see section Learn run (Page 28)). For the M3, M4 and M5 motors, set default value to 176 mm/rev. The learn run buttons S401 on the IDOOR ATD4xxW must be pressed and held again.
5. The learn run starts automatically, and the learn run button can be released. (See table Starting a learn run when the line voltage is applied (Page 177))

6. The display on the controller is as follows:
   – The 7-segment display (H401) shows "H.". The decimal point in the 7-segment display (H401) flashes during the save process.

     The 7-segment display (H401) shows "u" when saving has finished. If a light barrier / pressure sensitive edge (SIDOOR ATD4xxW) is used, the 7-segment display (H401) shows "O." because X6 is not connected yet.
     For the M3, M4 and M5 motors, the determined door width is shown on the LCD for the first commissioning or motor adaptation.
   – The LCD display (H1) shows "'H': learn run activated".
7. The door can now be opened with the OPEN button (S402).
   – The 7-segment display (H401) shows "o" while the door is opening.
8. Switch off the controller by pulling out the power plug or the connector X3.

9.5 Connecting digital inputs

Connecting digital inputs

Connecting digital input signals

1. Insert the terminal connectors for the digital control inputs in X6, X5 and X4. See section Digital input signals (Page 122) for more on this.

   Note

   Risk of injury through moving mechanical parts.

   The controller will be operative after the next switch-on. If a control signal is present, the door will move in the set direction.

   ---

2. Select the FBLOCK configuration according to the wiring of the input signals via the service menu. See section Digital input signals (Page 122) for more on this.

9.6 Commissioning the control unit on the fieldbus

Introduction

If your control unit has a USS, PROFIBUS or PROFINET module, you can operate the control unit on each field bus with a higher-level controller.

The following procedure describes how to commission a SIDOOR control unit on the respective fieldbus.

Commissioning the control unit on the USS fieldbus

We recommend the following initial commissioning procedure for a control unit as USS slave on the USS fieldbus:

Table 9- 2 Procedure for commissioning the control unit as a USS slave on the USS bus

Step	Procedure	See...
1	Commission the control unit without a fieldbus connection as described in the previous sections.	Sections Preparing the control unit (Page 294) to Connecting digital inputs (Page 298)
2	Configuring a USS master	Documentation of the USS master
3	Switch on supply voltage for USS master	Documentation of the USS master
4	Switch on supply voltage for control unit (USS slave)	Connecting the power supply to the network and executing a learn run (Page 297) section
5	Loading the configuration in the USS master	Documentation of the configuration tool
6	Switch USS master to RUN mode	Documentation of the USS master
7	Controlling LEDs on the control unit	Final settings and checks (Page 302) section

Commissioning the control unit on PROFIBUS

We recommend the following initial commissioning procedure for a control unit as DP slave on PROFIBUS DP:

Table 9- 3 Procedure for commissioning the control unit as a DP slave on PROFIBUS DP

Step	Procedure	See...
1	Commission the control unit without a fieldbus connection as described in the previous sections.	Sections Preparing the control unit (Page 294) to Connecting digital inputs (Page 298)
2	Configure the DP master (including PROFIBUS address)	Documentation of the DP master
3	Switch on supply voltage for DP master	Documentation of the DP master
4	Switch on supply voltage for control unit (DP slave)	Connecting the power supply to the network and executing a learn run (Page 297) section
5	Load the configuration in the DP master	Online help of the configuration tool, e.g. STEP 7
6	Switch DP master to RUN mode	Documentation of the DP master
7	Controlling LEDs on the control unit	Final settings and checks (Page 302) section

Commissioning the control unit on PROFINET

We recommend the following initial commissioning procedure for a control unit as IO device on PROFINET IO:

Table 9- 4 Procedure for commissioning the control unit as an IO device on PROFINET IO

Step	Procedure	See...
1	Commission the control unit without a fieldbus connection as described in the previous sections.	Sections Preparing the control unit (Page 294) to Connecting digital inputs (Page 298)
2	Configuring an IO controller	Documentation of the IO controller
3	Switch on the supply voltage for IO controller	Documentation of the IO controller
4	Switch on supply voltage for control unit (IO device)	Connecting the power supply to the network and executing a learn run (Page 297) section
5	Load the configuration into the I/O controller	Online help of the configuration tool, e.g. STEP 7
6	Switch I/O controller to RUN mode	Documentation of the IO controller
7	Controlling LEDs on the control unit	Final settings and checks (Page 302) section

9.7 Final settings and checks

Final settings

1. Activate the application-specific relay module functionalities. (Optional, only for controllers with a relay module)

   Proceed as described in the section Relay module (Page 126).
2. Configure the connected sensor type.

   Proceed as described in the section Sensors and external sensor interface module (ATD4xxW) (Page 166).
3. Switch on the controller by connecting the power supply to the controller and to the network.

The four LEDs alongside the plug connector X6 indicate which control signal is currently active. The function of the control signals depends on the selected configuration, or FBLOCK parameter assignment, see section Digital input signals (Page 122), or Free function blocks (FBLOCK) (Page 79). After switching on, the control is in initial mode until the end positions of the door have been detected or the closed or open position has been Signaled via the DCOPS limit switch. In initial mode, the door moves at initial speed. Once the controller has detected the door settings, the subsequent traversing movements proceed at normal speed once again.

Final checks

Final check of the permissible energies and forces.

WARNING

Risk of injury due to moving mechanical parts

Check permissible forces and energies after the door drive has been commissioned in the complete system and adjust them if they exceed their limit values.

Observe the valid applicable standards and directives for the respective application, as well as the following guidelines:

- The drive is suitable for use with power-operated isolating guards in accordance with EN ISO 14120:2015, section 5.2.5.2. Protective devices trigger an automatic reopening of the guard (reversing function).
- Gearing up or down is not allowed on the toothed belt because this would change the kinetic energies or static forces on the door. The door width would then no longer be valid.

WARNING

Risk of injury and material damage due to excessive closing or opening force of the door

Exceeding the maximum static closing and opening force may lead to personal injuries or damage to the door drive and to mechanical components of the door.

The maximum static closing and opening forces at the closing edge without additional protective equipment must not exceed 150 N!

Under the application of standard EN ISO 14120:2015, Section 5.2.5.4, and with the reversing device disabled and without additional protective equipment, the maximum static closing and opening forces must not exceed 75 N.

WARNING

All safety functions (e.g. forces, energies, configured safety-related input signals, emergency stop, two-hand control, light grid or pressure-sensitive safety edges) must be verified on commissioning or re-parameterization of the mounted drive.

Diagnostic and maintenance 10

10.1 Operating state display

Operating states are indicated on the "H401" 7-segment display or the "H1" digital display of the control unit.

The SIDOOR ATD410W/ATD420W/ATD430W controllers additionally enable retrieval of status information via the parameter r2100 ("Status code") or, as of firmware version V1.12, via the technology status word TZW3, TZW4 and TZW5 (see section TZW3, TZW4, TZW5 - Technology status words - 3, 4, 5 (Page 329)).

The following operating states are shown:

Display	Meaning
Info	
O[1)]	Light barrier / pressure-sensitive edge interrupted
6	Motor obstructed in the closing direction
c	Obstruction while opening
d	Door remains stationary during initialization run (no OPEN or CLOSE signal present, or door has reached end position)
H	Determination of parameters (learn run)
o	Function OK
u	Door closed
Fault	
1	RAM, EEPROM or CPU error (system error)
2	Braking chopper defective
3	Error in the second shutdown route
4	Motor protection, maximum opening or closing time of 65 s has been exceeded
5	Motor undefined – no learn run carried out with this motor type (If a different motor version is used, the learn run must be repeated at power on as described in these Operating Instructions. See Table 4-30 Starting a learn run when the line voltage is applied (Page 178))
7	Error in pulse generator
8	OSSD (ESPE type 2 or pressure-sensitive edge) – Function test failed
9	Motor overcurrent
E	Motor overvoltage
F	Motor undervoltage
n	Output stage defective
L	Current measurement error
t	Belt torn
U	Max. mass to be moved:
Alarm	
4	Automatic extension of the hold-open time (motor protection)
5	New motor type detected - learn run is required

Display	Meaning
P	Parameter error (error during learn run)
y	Master timeout
_	Controller has no parameters and is waiting for learn run
a	As of V1.12: Discrepancy error occurred with AND0 or AND2 (Page (Page 86))
Reserve	
b	–
h	–

1) See section SIDOOR functions (Page 25)

10.2 Fault management

Faults

Faults are all arising system faults that need acknowledgement.

You will find a list of faults in the Section Operating state display (Page 304).

SIDOOR ATD410W/ATD420W/ATD430W

The system responds to faults according to the sequential control (see Figure 4-4 Sequential control state graph (Page 163)). After acknowledgement, the controller automatically triggers a reset after a protection time of 5 s.

Fault acknowledgment

Fault acknowledgement can take place in relation to one of the following three possibilities:

- Corresponding terminal input prompt
- FBLOCK "fault acknowledgement" *
- Corresponding acknowledgment bit (bit 7) in STW1 (see Section TSW1 - technology control word 1 (Page 319)) *

* SIDOOR ATD410W/ATD420W/ATD430W

Alarms

Remedying alarms

Display	Remedy
4	If possible, the system's drive cycle time should be reduced. Check whether the door oscillates in the end positions. Then possibly increase the continuous pressure torque or leave the door command in the end positions.
5	The new motor type must undergo a learn run. See Section Learn run (Page 28).
P / _	It is imperative that a new learn run be performed during ongoing operation.
a	As of V1.12: All inputs of the triggering discrepancy analysis block must be reset/set (Page (Page 86)).
y[1]	Communication with the master system is interrupted. The alarm is cleared as soon as communication is restored.

[1] SIDOOR ATD410W/ATD420W/ATD430W

10.3 Maintenance

The SIDOOR system should be included in the maintenance schedule for the door system as a whole, and inspected in the course of the maintenance cycles stated in the schedule.

Note

Recommended maintenance cycles provided in the table below may vary according to the ambient conditions and the stress on the system.

Object	Recommended maintenance interval
DC geared motor	Maintenance-free
SIDOOR control unit	Maintenance-free
Visual inspection of the control unit, the fastening of the motor mount, the pulley and the mounting brackets for dirt, damage and proper installation. In addition, an inspection of the door function is recommended for running or grinding noises.	1 year
The belt tension should be checked	1 year
With mechanical changes of the system, for example, due to maintenance or wear (friction, dirt, engine replacement, belt replacement or modification of the general door mechanism), an inspection is recommended for the commissioning parameters relating to the safety-related settings for forces and energies/velocities.	

Appendices

A

A.1 Structure of user data/process data

The structure of the user data block in the telegram is independent of the specification of the USS/PROFINET/PROFIBUS specification used for data transfer. The structure (contents and structure) of the user/process data largely corresponds to the specifications for the cyclic data exchange of the PROFIBUS "variable-speed drives" profile. This ensures that users can use the same mechanisms to access the process data (= control/status words and setpoints/actual values) and parameters of a device irrespective of whether this is done via USS, PROFIBUS DP or PROFINET IO.

Telegram data structure

The user data for cyclic data transfer are subdivided into two areas that can be transferred in every telegram:

- **Parameter area (PKW)**

  The PKW area handles the parameter transfer between two communication partners (for example SIMATIC and SIDOOR).

  This involves, for example, reading and writing parameter values and reading parameter descriptions.

  The PKW interface generally contains tasks for operation and display, maintenance and diagnostics.

- **Process data area (PZD)**

  The PZD area consists of signals that are required for automation:

  – Control words and setpoints from the master to the slave

  – Status words and actual values from the slave to the master

  The contents of the parameter area and the process data area are defined by the slave drives. You will find additional information about this in the drive documentation.

<table>
<tr><td>Report data</td><td colspan="10">Parameter channel (PKW)</td><td colspan="11">Process data channel (PZD)</td></tr>
<tr><td>Word representation</td><td colspan="2">PKW1</td><td colspan="2">PKW2</td><td colspan="2">PKW3</td><td colspan="2">PKW4</td><td></td><td>PKWx</td><td colspan="2">PZD1</td><td colspan="2">PZD2</td><td colspan="2">PZD3</td><td colspan="2">PZD4</td><td>:::</td><td colspan="2">PZD16</td></tr>
<tr><td>PKW / PZD structure</td><td colspan="2">PWE</td><td colspan="2">IND</td><td colspan="2">PWE1</td><td colspan="2">PWE2</td><td></td><td>PWEx</td><td colspan="2">STW1
ZSW1</td><td colspan="2">Data</td><td colspan="2">Data</td><td colspan="2">Data</td><td>:::</td><td colspan="2">Data</td></tr>
<tr><td>Byte representation</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td></td><td>P</td><td>P+1</td><td>P+2</td><td>P
+2</td><td>P
+4</td><td>P
+5</td><td>P
+6</td><td>P
+7</td><td>P
+8</td><td>:::</td><td></td><td>N</td></tr>
</table>

Figure A-1 User data structure

Length of the PKW and PZD areas

The lengths of the PKW and PZD areas can be parameterized independently (p2022 (number of PZDs), p2023 (number of PKWs)). The master and slave communication partners have to agree on the lengths of the individual areas.

- **Constant number of user data**

  If telegrams are to be used only with a constant number of user data, the sum of the numbers of PKWs and PZDs must not exceed 126. According to the specification, a maximum of 252 bytes (126 words) of user data are permissible.

- **Variable PKW proportions**

  If telegrams with variable proportions of PKWs are to be used, the parameter for the number of PKWs (p2023) must be set to 127, irrespective of how the parameter for the number of PZDs is parameterized.

You will find further information about the number of PKWs in the Section Parameter value (PWE) (Page 314) and about the number of PKWs in the Section Process data (Page 316).

A.1.1 Parameter interface

The PROFIBUS "variable-speed drives" profile defines the user data structure with which a master can access slaves.

The area for the parameter channel of the telegram can be used for monitoring and / or changing any parameters in the slave.

The parameter channel can be used to edit and monitor process data (read / write) as described below.

Parameter channel

The parameter channel comprises 3 or 4 words according to the channel type.

Parameter channel		
PKE	IND	PWE
1st word	2nd word	3rd and 4th word

PKE Parameter ID

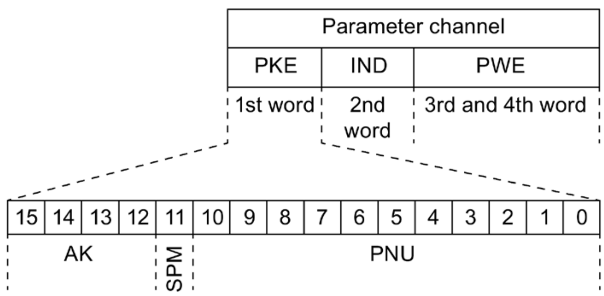
IND Parameter index

PWE Parameter value

Figure A-2 Structure of the parameter channel in the telegram structure

A.1.1.1 Parameter ID (PKE)

Overview



Structure

Table A- 1 Composition of the parameter ID (PKE)

Area	Bits	Description	Function
PNU	0 … 10	Parameter number	Contains the rest of the parameter number Value range is defined from 0 to 1999. If parameter numbers ≥ 1999 are addressed, a parameter page must be selected from the high byte of the IND array (page index). Each parameter page contains 2000 parameter numbers
SPM	11	Spontaneous message	Function currently not supported
AK	12 … 15	Requirement or response ID	Defines the requirement ID (master → slave) and the corresponding response ID (slave → master)

Requirement ID (AK)

In the following table, the abbreviation "W" is used for word (16 bits) and "DW" for double word (32 bits).

Table A- 2 Requirement ID (master → slave)

Requirement ID					Description		Response ID			
Dec.	Bit 15	Bit 14	Bit 13	Bit 12			Positive			Negative
0	0	0	0	0	No PKW order		0	No response	–	7
1	0	0	0	1	Request PWE (parameter value)		1 / 2	Transfer PWE (parameter value)	W, DW	7
2	0	0	1	0	Change PWE (parameter value)	W	1	Transfer PWE (parameter value)	W	7
3	0	0	1	1	Change PWE (parameter value)	DW	2	Transfer PWE (parameter value)	DW	7
4	0	1	0	0	Request PBE (parameter description element) [1]		3	Transfer PBE element	–	7
5	0	1	0	1	Change PBE (parameter description element) [1]		3	Transfer PBE element	–	7
6	0	1	1	0	Request PWE (parameter value) [2]	Array	4 / 5	Transfer PWE (parameter value)	Array, W, DW	7
7	0	1	1	1	Change PWE (parameter value) [2]	Array, W	4	Transfer PWE (parameter value)	Array, W	7
8	1	0	0	0	Change PWE (parameter value) [2]	Array, DW	5	Transfer PWE (parameter value)	Array, DW	7
9	1	0	0	1	Request number of array elements	–	6	Transfer number of array elements	–	7
10	1	0	1	0	*Reserved*	–	–	–	–	7
11	1	0	1	1	*Reserved*	–	–	–	–	7
12	1	1	0	0	*Reserved*	–	–	–	–	7
13	1	1	0	1	*Reserved*	–	–	–	–	7
14	1	1	1	0	*Reserved*	–	–	–	–	7
15	1	1	1	1	*Reserved*	–	–	–	–	7

1) The element number used is transferred in the IND array subindex.

2) The position in the array is stated in the IND array subindex.

Response ID (AK)

Table A- 3 Response ID (slave → master)

Response ID					Description	
Dec.	Bit 15	Bit 14	Bit 13	Bit 12		
0	0	0	0	0	No response	
1	0	0	0	1	Transfer PWE (parameter value)	Word
2	0	0	1	0	Transfer PWE (parameter value)	Double word
3	0	0	1	1	Transfer PBE (parameter description element) [1)]	
4	0	1	0	0	Transfer PWE (parameter value) [2)]	Array, word
5	0	1	0	1	Transfer PWE (parameter value) [2)]	Array, double word
6	0	1	1	0	Transfer number of array elements	
7	0	1	1	1	Order not executable (with error number)	
8	1	0	0	0	*Reserved*	
9	1	0	0	1	*Reserved*	
10	1	0	1	0	*Reserved*	
11	1	0	1	1	*Reserved*	
12	1	1	0	0	*Reserved*	
13	1	1	0	1	*Reserved*	
14	1	1	1	0	*Reserved*	
15	1	1	1	1	*Reserved*	

1) The element number used is transferred in the IND array subindex.

2) The position in the array is stated in the IND array subindex.

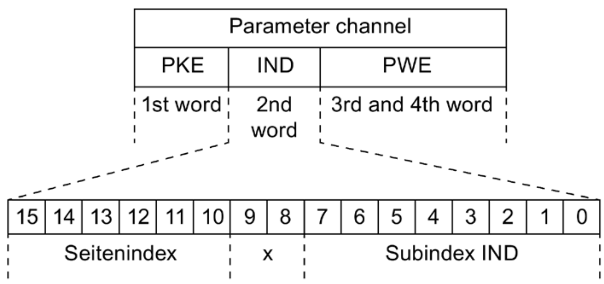
If orders cannot be executed, the order receiver sends the response ID "Order not executable", and transfers the corresponding error ID in the parameter value (PWE).

Table A- 4 Error IDs for the response ID "Order not executable"

Error ID	Description
0	Impermissible parameter ID
1	Parameter value cannot be changed.
2	Parameter limits not observed
3	Subindex outside the array
4	Parameter is not an array
5	Parameter type is invalid (mismatch word and double word)
102	Communication channel too small for the required response
104	Invalid value, parameter allows only certain values
106	Request not observed or task not supported

A.1.1.2 Parameter index (IND)

Overview



Structure

The IND array (parameter index) is subdivided as follows:

Table A- 5 IND structure

IND															
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Page index						x	x	IND subindex							

IND subindex

The IND subindex array is an 8-bit value that is transferred in the low byte (bits 0 to 7) of the (IND) parameter index. In the PROFIBUS "variable-speed drives" profile, the subindex field is simply named "Subindex".

Parameter page index

The page index is used to select parameter pages. This enables the PNU value range to the extended (0 to 1999). The resulting parameter ID then has the value range from 0 to 65,999.

The page index is coded in bits 10 to 15 of the high byte of IND.

Bits 8 and 9 are reserved, and not used.

The page index is defined as multiple of 2000. The binary representation is also scrambled. The exact assignment of the bits is described below.

Table A- 6 Parameter page index

IND															
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
a	**d**	**c**	**b**	**f**	**e**										

Table A- 7 Page index assignment

Value range of parameter ID		Bits for page index						Hex value	+ parameter number (PNU)
from	to	a	d	c	b	f	e		
0000	1999	0	0	0	0	0	0	0x00	0x0000 to 0x07CF
2000	3999	1	0	0	0	0	0	0x80	0x0000 to 0x07CF
4000	5999	0	0	0	1	0	0	0x10	0x0000 to 0x07CF
6000	7999	1	0	0	1	0	0	0x90	0x0000 to 0x07CF
8000	9999	0	0	1	0	0	0	0x20	0x0000 to 0x07CF
…	…	…	…	…	…	…	…	…	
32.000	33.999	0	0	0	0	0	1	0x04	0x0000 to 0x07CF
…	…	…	…	…	…	…	…	…	
64.000	65.999	0	0	0	0	1	0	0x08	0x0000 to 0x07CF

A.1.1.3 Parameter value (PWE)

The number of PWEs can vary according to the configuration. The number can be configured in parameter p2023 (Number of PKWs).

A PKW channel width of at least 3 words is required to transfer 16-bit values. This means that PWE1 is provided.

If 32-bit values are transferred, the PKW channel has to be expanded to 4 words. Correspondingly, PWE1 and PWE2 are then available.

Note

Variable PKW proportions and variable telegram lengths are not currently supported. This means that description texts, texts and complete arrays cannot be transferred.

Note

If a 16-bit value is transferred in a 32-bit channel in the PWE2, then the content of PWE1 is 0.

Structure

Table A- 8 32-bit PKW channel

32-bit parameter channel (PKW)			
Word 1	Word 2	Word 3	Word 4
PKE	IND	**PWE1**	**PWE2**

Table A- 9 16-bit PKW channel

16-bit parameter channel (PKW)		
Word 1	Word 2	Word 3
PKE	IND	**PWE1**

Table A- 10 Variable PKW channel

Variable parameter channel (PKW)				
Word 1	Word 2	Word 3	…	Word x [1)]
PKE	IND	**PWE1**		**PWEx** [1)]

[1)] 0 < x < (124 - "number of PZDs")

A.1.1.4 Parameter ID

The parameter ID comprises the PNU (array within PKE) and the page index (array within IND). In general, the parameter ID name is simplified to just PNU (parameter number).

SIDOOR controllers support parameter numbers in the range from 0 to 65535. The exact assignment of the parameter number is described in Section Parameter assignment (Page 190).

A.1.1.5 Parameter description (PBE)

The notation of the parameter description states the element number of the parameter description in the IND array subindex.

Table A- 11 Elements of the parameter description

Element number	Description	Data type
0	*Reserved*	–
1	Designation ID	16 bit
2	Number of array elements	8 bit
3	*Reserved*	–
4	*Reserved*	–
5	*Reserved*	–
6	*Reserved*	–
7	Lower limit value	16 bit
8	Upper limit value	16 bit
9	Default value (factory setting)	16 bit
10 … 15	*Reserved*	–

The subindex 255 for transferring a complete parameter description or a complete array requires a variable telegram length which is not currently supported.

The designation ID (element number 1) consists of the following bits:

Bit	Description
0 … 7	Data type of the parameter value
8	Scaling and major attribute relevant
9	Write-protected
10	Additional text available
11	*Reserved*
12	Parameter differs from factory settings
13	Parameter can only be reset
14	Parameter is an array
15	*Reserved*

A.1.2 Process data

Telegrams

The type of telegram on the drive side defines which process data is to be transferred between master and slave.

From the point of view of the slave, there are receive words and send words.

The receive and send words comprise the following elements:

- **Receive words:** Control words or setpoints
- **Send words:** Status words or actual values

Telegram type used

The supported telegram type is specific to the manufacturer, and structured according to internal company specifications. The internal process data connections are set automatically by the system.

Process data

The desired scope of the process data can be configured with parameter p2022 (number of PZDs). The assignment order is not additionally configurable.

The table below describes the structure of the process data and its subdivision into:

- Control word (STW) – status word (ZSW)
- Technology control words (TSW) – technology status words (TZW)

Table A- 12 Overview of process data

PZD	1	2	3	4	5	6	7		16
Master → slave	STW1 (Page 317)	TSW0 (Page 318)	TSW1 (Page 319)	TSW2 (Page 321)	*Reserved*	*Reserved*	*Reserved*	…	*Reserved*
Slave → master	ZSW1 (Page 322)	TZW0 (Page 323)	TZW1 (Page 324)	TZW2 (Page 326)	TZW3 (Page 329)	TZW4	TZW5		*Reserved*

A.1.2.1 STW1 - control word (CtrlW)

Control word -1 (STW1) is identical to the specification in the PROFIBUS profile "Variable-speed drives".

Bits 0 to 10 correspond exactly to the specifications for the PROFIBUS profile "Variable-speed drives". The use and non-use of specific bits is marked accordingly.

The table below describes the assignments of the bits in control word 1.

Table A- 13 Control word 1 (STW1)

Bit	Description
0	ON / OFF 1 (0 → 1)
1	OFF2 (coast down of the drive), after a ramp down the motor is switched to the free-running mode (deenergize).
2	OFF3 (rapid stop of the drive)
3	Operation enable (drive start)
4	*Reserved*
5	*Reserved*
6	*Reserved*
7	Acknowledge fault (0 → 1)
8	*Reserved*
9	*Reserved*
10	Control by PLC
11 ... 15	*Reserved*

The following overview describes the relevant bits in control word 1. See also Figure 4-4 Sequential control state graph (Page 163).

Table A- 14 Explanation of bits in STW1

Bit	Description	Value	Remarks
0	ON / OFF1	1	Switch drive ready for operation (master switched on and voltage ready)
		0	Not ready for switching on (master switched off and voltage off) Shutdown according to defined ramp → corresponds to stop
	Note: The positive edge is decisive here (0 → 1).		
1	OFF2 (drive coasts down)	1	OFF2 command is canceled Does not run down to standstill
		0	Coast down motor (coasts down to a standstill) → After a ramp down the motor is switched to the free-running mode (deenergize).
2	OFF3	1	OFF3 commands are canceled
	(Rapid stop of the drive)	0	Motor stop
3	Operation enable	1	Execution of drive orders (evaluation of technology control words)
	(drive start)	0	No execution of drive orders
7	Acknowledge fault	1	Acknowledge fault
		0	No significance

	Note: The positive edge is decisive here (0 → 1).		
10	Control by PLC	1	Control via PLC (master) Process data are marked as valid, and are thus accepted and effective
		0	No control via PLC (master) Process data invalid Local operation is possible Signs of life are excluded from this (master monitoring)
	Note: Do not set the bit to 1 until control is requested by the master (ZSW1 bit 9 = true)		

A.1.2.2 TSW0 - technology control word 0

Technology control word 0 (TSW0) is not assigned for compatibility reasons. It serves as a placeholder.

A.1.2.3 TSW1 - technology control word 1

Table A- 15 Technology control word 1 (TSW1)

TSW1								
15	14	13	12	11	10	9	8	7 … 0
DCMD expansion								**DCMD**

DCMD signal

The DCMD signal is located in the low byte (bits 0 to 7) of TSW1. It has an enumerative structure and is assigned door commands (DCMDs).

If a reserved value is transferred, it is rejected and the last valid value is retained.

You can find more information on door commands in Section Drive orders (Page 37).

Table A- 16 DCMD signal

DCMD signal value	Name	Description
0	Deenergize	Motor coasts down, is not energized
1	Stop	The door system is at a stop. The winding is shorted (source-voltage brake)
2	Open	Drive moves in learned opening direction
3	Close	Drive moves in learned closing direction
4	Start learn run	Learn run with active parameter set (see Section Learn run (Page 28))
5	Positioning	Enable command for positioning mode (see Section Positioning mode (Page 73))
6	Automatic AssistedDrive	Enable command for automatic AssistedDrive (see Section Automatic AssistedDrive (Page 72))
7	Automatic ImpulseDrive	Enable command for automatic ImpulseDrive (see Section Automatic ImpulseDrive (Page 67))
8	Stop with disable DCU	As of V1.12: An additional door command is disabled by a different command source (e.g. service control button) when this stop command is executed.
…		
255	*Reserved*	

DCMD expansion bits

The door command expansion bits for the DCMD signal are located in the high byte (bits 8 to 15) of TSW1.

Table A- 17 DCMD expansion bits

Bit	Description
8	Slow (see Section Slow driving curve profile (Page 48))
9	Automatic ImpulseStop (see Section Automatic ImpulseStop (Page 69))
10	NDG (second force and energy profile; see Force and energy profiles (NDG mode) (Page 47))
11	Special (see Section Learn run (Page 28))
12	Partial (see Section Partial opening (Page 45))
13	Spec. Travel range (see section Position function block (as of V1.12) (Page 88))
14	DCOPS sensor (see Section DCOPS (door closed/opened position sensor) (Page 49))
15	LB sensor (see Section Light barrier (Page 98))

Note

The light barrier signal is low-active. The signal must, therefore, be connected to a 1 (high) in the idle state. Closing commands would otherwise be converted to an opening command due to the reversing effect of the interrupted light barrier signal.

A.1.2.4 TSW2 - technology control word 2

Table A- 18 Technology control word 2 (TSW2)

TSW2		
15	(as of V1.10) 14 ... 10	9 … 0
	SBIT4 ... 0	**DESTPOS**

The value of the target position for positioning mode is located in the bit 0 to bit 9 range of TSW2. It has a numerical structure.

See Section Positioning mode (Page 73).

(As of V1.10) Control bits SBit0 to 4 are located in the area bit 10 to 14 of TSW2. The control bits can be linked to the FBLOCK logic as input signals. For more, see section Free function blocks (FBLOCK) (Page 79)

Table A- 19 DESTPOS signal

DESTPOS signal value	Name	Description
0 … 1024	Target position	Target position in [cm] (the value is automatically limited to the learnt door width)

Table A- 20 Control bits (as of V1.10)

Bit	SBIT	Value	Meaning
10	0	0/1	Control bit 0 inactive/active
11	1	0/1	Control bit 1 inactive/active
12	2	0/1	Control bit 2 inactive/active
13	3	0/1	Control bit 3 inactive/active
14	4	0/1	Control bit 4 inactive/active

A.1.2.5 ZSW1 - status word (StatW)

Status word 1 (ZSW1) is identical to the specification in the PROFIBUS profile "Variable-speed drives".

Bits 0 to 10 correspond exactly to the specifications for the PROFIBUS profile "Variable-speed drives". The use and non-use of specific bits is marked accordingly.

The table below describes the assignments of the bits in status word 1.

Table A- 21 Status word 1 (ZSW1)

Bit	Description
0	Ready for switching on
1	Ready
2	Operation enabled
3	Fault active
4	No OFF2 (no coast down)
5	No OFF3 (no rapid stop)
6	Switch-on inhibit
7	*Reserved*
8	*Reserved*
9	Control requested by PLC
10	*Reserved*
11 … 15	*Reserved*

The following overview describes the relevant bits in status word 1. See also Figure 4-4 Sequential control state graph (Page 163).

Table A- 22 Explanation of bits in ZSW1

Bit	Description	Value	Note
0	Ready for switching on	1	Power supply switched on and system initialized
		0	Not ready for switch on
1	Ready	1	Ready to run, system is switched on ("ON" command present), no fault active, system can start as soon as the "Enable operation" command is given (see also STW1 bit 0)
		0	Not ready to run, no "ON" command
2	Operation enabled	1	Operation enabled, drive order is executed (system follows the setpoints) See also STW1 bit 3
		0	Drive order is not executed, operation is locked
3	Fault active	1	Drive is faulty and therefore out of service. The drive switches to "switching on inhibited" once the fault has been acknowledged and the cause has been remedied
		0	No fault present
4	No OFF2	1	No OFF2 active
	(no coast down)	0	Coast down (deenergize) active, an OFF2 command is present
5	No OFF3	1	No OFF3 active
	(no rapid stop)	0	Rapid stop (stop) active, an OFF3 command is present
6	Switch-on inhibit	1	Switching on inhibited, restart is only possible by means of OFF1 and then ON
		0	No switching on inhibited, switching on is possible
9	Control requested by PLC	1	Control requested, the automation system (PLC) is requested to take over control
		0	Control is only possible on the device, the PLC is not the current controller

Note

The operation is also conditional on the operating mode of the door control system.

Initial mode is active in the event of a non-learnt or incorrectly learnt door. Normal mode is not attained until both end positions have been determined after power on, and these end positions match those that have been learnt.

A.1.2.6 TZW0 - Technology status word 0

Technology status word 0 is not assigned for compatibility reasons. It serves as a placeholder.

A.1.2.7 TZW1 - Technology status word 1

Table A- 23 Technology status word 1 (TZW1)

TZW1				
15 … 9	8	7 … 6	5 … 4	3 … 0
DPOS	**DBLCWAIT**	**DBLOCK**	**DMODE**	**DSTAT**

DSTAT signal

The DSTAT signal is located in the low nibble of the low byte of TZW1 (bits 0 to 3). It has an enumerative structure and is assigned the door status (DSTAT).

Table A- 24 DSTAT signal

DSTAT signal word	Name	Description
0	Undefined	Door status is unknown.
1	Motor not energized	Motor current-free (deenergized)
2	Closing	The door system is moving in the learnt closing direction
3	Opening	The door system is moving in the learnt opening direction
4	Stopped (source voltage brake)	The door system has stopped, winding is short-circuited
5	Closed	The door system is completely closed.
6	Open	The door system is completely open.
7	Error	The door system is in an error state
…		
16	*Reserved*	

DMODE signal

The DMODE signal is located in the low byte of TZW1 (bits 4 to 5). It has an enumerative structure and is assigned the door mode (DMODE) .

Table A- 25 DMODE signal

DMODE signal value	Name	Description
0	Normal mode	Both end positions determined after power on, ready to run
1	Initial mode	Both end positions must be determined after power on
2	Learn run mode	Both end positions and other door properties are determined
3	Special mode	The system is in an error state or special mode (system is shutting down, powering up or saving safety-related parameters)

DBLOCK signal

The DBLOCK signal is located in the low byte of TZW1 (bits 6 to 7). It has an enumerative structure and is assigned the obstruction detection (DBLOCK).

Table A- 26 DBLOCK signal

DBLOCK signal value	Name	Description
0	None	There is no obstruction
1	In opening direction	An obstruction was detected in the opening direction
2	In closing direction	An obstruction was detected in the closing direction
3	*Reserved*	

DBLCWAIT signal

The DBLCWAIT signal is located in the high byte of TZW1 (bit 9). It has a binary structure and is assigned the special obstruction mode "wait mode".

Table A- 27 DBLCWAIT signal

DBLCWAIT signal value	Name	Description
0	Wait mode inactive	See Section Wait mode (Page 78) for a signal description
1	Wait mode active	See Section Wait mode (Page 78) for a signal description

DPOS signal

The DPOS signal is located in the high byte of TZW1 (bits 9 to 15). It has an enumerative structure and is assigned the current door position (DPOS) in %.

Table A- 28 DPOS signal

DPOS signal value	Name	Description
0 … 100	Door position	Door position in % **Note:** The value is only valid in normal mode The 100 % and 0 % door positions can only be reached in conjunction with the "open" or "close" drive orders. The 99 % and 1 % door positions correspond to fully open or fully closed without an active drive order. Values between 99 % and 1 % specify the door position as a percentage value. 127 or $7F_{hex}$ is sent (>100 %) if no valid position value is available. In partial opening mode, the door position continues to be referred to the real door width. The values 100 and 99 % are not reached in partial opening mode.

A.1.2.8 TZW2 - Technology status word 2

Table A- 29 Technology status word 2 (TZW2)

TZW2						
15 … 11	10 … 9	8	7	6	5 … 3	2 … 0
Reserved	ASStp	ASDRV	DTErrAND2	DTErrAND0	IMPDRVVelo	IMPDRVIncr

IMPDRVIncr and IMPDRVVelo signals

The signals IMPDRVIncr and IMPDRVVelo are in the low byte of TZW2 (bits 0 to 2, and bits 3 to 5). Both have a numeric structure.

Table A- 30 IMPDRVIncr signal

IMPDRVIncr signal value	Name	Description
0	ImpDrvInaktiv	No ImpDrv detected or inactive *(distance-dependent detection)*
1	ImpDrvOpen	ImpDrv is detected in the opening direction *(distance-dependent detection)*
2	ImpDrvClose	ImpDrv is detected in the closing direction *(distance-dependent detection)*
…		
8	*Reserved*	

Table A- 31 IMPDRVVelo signal

IMPDRVVelo signal value	Name	Description
0	ImpDrvInaktiv	No ImpDrv detected or inactive *(speed-dependent detection)*
1	ImpDrvOpen	ImpDrv is detected in the opening direction *(speed-dependent detection)*
2	ImpDrvClose	ImpDrv is detected in the closing direction *(speed-dependent detection)*
…		
8	*Reserved*	

Note

When the sequential control system changes to the state "S4: Z_Mode" (see Figure 4-4 Sequential control state graph (Page 163)) the IMPDRVIncr and IMPDRVVelo signals as well as the lead time are reset. This decouples the ImpDrv signals from the service mode (local operation) and operating mode.

You will find further information about the IMPDRVIncr and IMPDRVVelo signals and the corresponding drive function in Section ImpulseDrive (Page 65).

ASDRV signal

The ASDRV signal is located in the high byte of TZW2 (bit 8). It has a binary structure.

Table A- 32 ASDRV signal

ASDRV signal value	Name	Description
0	AssistedDrive active	An external assisting force within the parameterized threshold values has been found
1	AssistedDrive inactive	An external assisting force within the parameterized threshold values has not been found

You will find further information about the ASDRV signal and the corresponding drive function in Section AssistedDrive (Page 70).

ASStp signal

The ASStp signal is located in the high byte of TZW2 (bit 9). It has a binary structure.

Table A- 33 ASStp signal

ASStp signal value	Name	Description
0	ImpulseStop inactive	An external opposing force within the parameterized limit values was not found
1	ImpulseStop active	An external opposing force within the parameterized limit values was found

You will find further information about the ASStp signal and the corresponding drive function in the Section ImpulseStop (Page 68).

DTErrAND0 signal

Firmware version V1.12 or higher:

The DTErrAND0 signal is located in the upper byte of the TZW2 (bit 6). It has a binary structure.

Table A- 34 DTErrAND0 signal

DTErrAND0 signal value	Name	Description
0	No discrepancy error AND0	No discrepancy error was detected at function block AND0.
1	Discrepancy error AND0	A discrepancy error was detected at function block AND0.

You can find more information on the DTErrAND0 signal and the corresponding function in the section Discrepancy analysis blocks (Page 86).

DTErrAND2 signal

Firmware version V1.12 or higher:

The DTErrAND2 signal is located in the upper byte of the TZW2 (bit 7). It has a binary structure.

Table A- 35 DTErrAND2 signal

DTErrAND0 signal value	Name	Description
0	No discrepancy error AND2	No discrepancy error was detected at function block AND2.
1	Discrepancy error AND2	A discrepancy error was detected at function block AND2.

You can find more information on the DTErrAND2 signal and the corresponding function in the section Discrepancy analysis blocks (Page 86).

A.1.2.9 TZW3, TZW4, TZW5 - Technology status words 3, 4, 5

The values monitored in the technology status words TZW3, TZW4 and TZW5 can be set via the parameters p4700, p4701 and p4702.

Table A- 36 Value setting for TZW3, TZW4, TZW5

Parameter	Value range	Default value	Description
p4700	0 … 10	0	Value selection for TZW3 (see following tables)
p4701	0 … 10	1	Value selection for TZW4 (see following tables)
p4702	0 … 10	2	Value selection for TZW5 (see following tables)

The default values of the parameters p4700, p4701, p4702 correspond to the settings for TZW3, TZW4, TZW5 in FW versions < V1.09.

Table A- 37 Value selection for TZW3, TZW4, TZW5

Value	Description	Format
0	D-IN	For data structure, see table A-35
1	D-OUT	For data structure, see table A-37
2	Button	For data structure, see table A-39
3	Door position in mm	16-bit unsigned integer
4	Door setpoint speed in mm/s	16-bit unsigned integer
5	Door actual speed in mm/s	16-bit unsigned integer
6	Motor current in mA	16-bit signed integer
7	Motor current limitation in mA	16-bit signed integer
8	Voltage of the motor output stage in V	16-bit unsigned integer
9	Remaining power capacity of the braking resistor in J	16-bit signed integer
10	As of V1.12: Operating status display	ASCII value of the currently displayed operating status (see section Operating status display (Page 304))

Table A- 38 TZW data structure for value "D-IN"

TZW3, TZW4, TZW5					
15 - 5	4	3	2	1	0
Reserved	**D-IN**				

Table A- 39 Bits "D-IN"

Group	Bit	Meaning	Comment
D-IN	0	Input 0	X6, INPUT 4
	1	Input 1	X6, INPUT 3
	2	Input 2	X6, INPUT 2
	3	Input 3	X6, INPUT 1
	4	Input 4	X5, INPUT 0
	5 - 15	*Reserved*	

Table A- 40 Data structure for value "D-OUT"

TZW3, TZW4, TZW5			
15 - 3	2	1	0
Reserved	**D-OUT**		

Table A- 41 Bits "D-OUT"

Group	Bit	Meaning	Comment
D-OUT	0	Output 1	Digital output "close"
	1	Output 2	Not available
	2	Output 3	Digital output "open"
	3 - 15	*Reserved*	

Table A- 42 TZW data structure for value "Button"

TZW3, TZW4, TZW5			
15 - 3	2	1	0
Reserved	**Button**		

Table A- 43 Bits "Button"

Group	Bit	Meaning	Comment
Button	0	Service button	S401, Service button learn run
	1	Close button	S403, Service button close
	2	Button Open	S402, Service button OPEN
	3 - 15	*Reserved*	

A.2 Profiles and adjustment ranges

A.2.1 Profile name

	SIDOOR …		
Profile	M3 R / L	M4 R / L	M5 R / L
	MDG3 R / L	MDG4 R / L	MDG5 R / L
1	M3 default profile	M4 default profile	M5 default profile

A.2.2 SIDOOR M3 L / R

Table A- 44 Parameters and setting ranges for SIDOOR M3 L / R

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Slow end distance open	p3660	mm	30	0 … 100
Slow start distance open	p3661	mm	30	0 … 100
Slow start distance close	p3662	mm	20	0 … 100
Slow end distance close	p3663	mm	40	0 … 100
Maximum speed open	p3664	mm/s	650	100 … 650 30 … 650 (as of V1.03)
Slow end speed open	p3665	mm/s	40	30 … 90
Slow start speed open	p3666	mm/s	60	30 … 90
Slow initial speed open	p3667	mm/s	90	30 … 90
Maximum speed close	p3668	mm/s	281	100 … 650 30 … 650 (as of V1.03)
Slow start speed close	p3669	mm/s	60	30 … 90
Slow end speed close	p3670	mm/s	40	30 … 90
Slow initial speed close	p3671	mm/s	90	30 … 90
NDG speed (reduced)	p3672	mm/s	281	50 … 650 30 … 650 (as of V1.03)
Acceleration ramp open	p3673	mm/s^2	1300	300 ... 1400 As of (V1.09): 250 ... 1400

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Deceleration ramp open	p3674	mm/s²	600	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Reversal ramp open/close	p3675	mm/s²	1200	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Acceleration ramp close	p3676	mm/s²	500	300 ... 1400 As of (V1.09): 250 ... 1400
Deceleration ramp close	p3677	mm/s²	500	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Reversal ramp close/open	p3678	mm/s²	850	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Idle torque open	p3679	A	1	0 … 2.5
Idle torque close	p3680	A	1	0 … 2.5
Peak torque close	p3681	A	3	0 … 5
Static force limit open	p3682	N	75	70 … 300
Static force limit close	p3683	N	75	70 … 300
Limit force end close	p3684	N	75	70 … 300
Static NDG-force (reduced)	p3685	N	75	70 … 300
Limit energy close	p1202	J	4	0 … 100
Limit energy open	p1203	J	4	0 … 100
Limit energy NDG	p1204	J	4	0 … 100

* Default profile (this profile is automatically loaded at the first commissioning)

A.2.3 SIDOOR MDG3 L / R (as of V1.12)

Firmware version V1.12 or higher:

The following parameter values depend on the output transmission and are defined by the factor *k*1.

Maximum parameter values:

- Speeds: 999 mm/s
  As of V1.12: Speeds: 1500 mm/s
- Acceleration ramps: 3000 mm/s^2
- The maximum force is limited to 300 N.

$$k1 = \frac{\text{Existing output transmission ratio}}{\text{Standard output transmission ratio}} = \frac{x}{176\ \frac{mm}{Umd}}$$

The following parameter values depend on the maximum motor force and are defined by the factor *k*2.

Maximum parameter values:

- Deceleration ramp: 3000 mm/s^2

$$k2 = \frac{\text{Force limit}}{\text{Determined dynamic weight}}$$

The default values and the set values are automatically set to the upper limit if the upper limit is exceeded. It is therefore possible that the actual default values differ from the default values in the table below.

Table A- 45 Parameters and setting ranges for SIDOOR MDG3 L / R

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Slow end distance open	p3660	mm	30	0 … 100
Slow start distance open	p3661	mm	30	0 … 100
Slow start distance close	p3662	mm	20	0 … 100
Slow end distance close	p3663	mm	40	0 … 100
Maximum speed open	p3664	mm/s	650	30 … 650*k1
Slow end speed open	p3665	mm/s	40	30 … 90
Slow start speed open	p3666	mm/s	60	30 … 90
Slow initial speed open	p3667	mm/s	90	30 … 90
Maximum speed CLOSE	p3668	mm/s	281	30 … 650*k1
Slow start speed close	p3669	mm/s	60	30 … 90
Slow end speed close	p3670	mm/s	40	30 … 90
Slow initial speed close	p3671	mm/s	90	30 … 90
NDG speed (reduced)	p3672	mm/s	281	30 … 650*k1
Acceleration ramp open	p3673	mm/s2	1300	250 … 1400*k1
Deceleration ramp open	p3674	mm/s2	600	150 … k2

Reversal ramp open/close	p3675	mm/s2	1200	150 … k2
Acceleration ramp close	p3676	mm/s2	500	250 … 1400*k1
Deceleration ramp close	p3677	mm/s2	500	150 … k2
Reversal ramp close/open	p3678	mm/s2	850	150 … k2
Idle torque open	p3679	A	1	0 … 2.5
Idle torque close	p3680	A	1	0 … 2.5
Peak torque close	p3681	A	3	0 … 5
Static force limit open	p3682	N	75	70 … 300/k1
Static closing force	p3683	N	75	70 … 300/k1
Limit force end close	p3684	N	75	70 … 300/k1
Static NDG-force (reduced)	p3685	N	75	70 … 300/k1
Limit energy close	p1202	J	4	0 … 100
Limit energy open	p1203	J	4	0 … 100
Limit energy NDG	p1204	J	4	0 … 100

* Default profile (this profile is automatically loaded at the first commissioning)

A.2.4 SIDOOR M4 L / R

Table A- 46 Parameters and setting ranges for SIDOOR M4 L / R

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Slow end distance open	p3660	mm	30	0 … 100
Slow start distance open	p3661	mm	30	0 … 100
Slow start distance close	p3662	mm	20	0 … 100
Slow end distance close	p3663	mm	40	0 … 100
Maximum speed open	p3664	mm/s	600	100 … 800 30 … 800 (as of V1.03)
Slow end speed open	p3665	mm/s	40	30 … 90
Slow start speed open	p3666	mm/s	60	30 … 90
Slow initial speed open	p3667	mm/s	90	30 … 90
Maximum speed close	p3668	mm/s	177	100 … 800 30 … 800 (as of V1.03)
Slow start speed close	p3669	mm/s	60	30 … 90
Slow end speed close	p3670	mm/s	40	30 … 90
Slow initial speed close	p3671	mm/s	90	30 … 90
NDG speed (reduced)	p3672	mm/s	177	50 … 800 30 … 800 (as of V1.03)

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range ATD4xxW
Acceleration ramp open	p3673	mm/s^2	1300	300 ... 1400 As of (V1.09): 250 ... 1400
Deceleration ramp open	p3674	mm/s^2	600	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Reversal ramp open/close	p3675	mm/s^2	1200	(V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Acceleration ramp close	p3676	mm/s^2	500	300 ... 1400 As of (V1.09): 250 ... 1400
Deceleration ramp close	p3677	mm/s^2	500	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Reversal ramp close/open	p3678	mm/s^2	850	300 ... 1400 (V1.09): 250 ... 1400 (as of V1.10): 150 ... 1400
Idle torque open	p3679	A	1	0 … 2.5
Idle torque close	p3680	A	1	0 … 2.5
Peak torque close	p3681	A	3	0 … 5
Static force limit open	p3682	N	75	70 … 360
Static force limit close	p3683	N	75	70 … 360
Limit force end close	p3684	N	75	70 … 360
Static NDG-force (reduced)	p3685	N	75	70 … 360
Limit energy close	p1202	J	4	0 … 100
Limit energy open	p1203	J	4	0 … 100
Limit energy NDG	p1204	J	4	0 … 100

* Default profile (this profile is automatically loaded at the first commissioning)

A.2.5 SIDOOR MDG4 L / R

A.2.5.1 SIDOOR MDG4 L / R

Firmware version V1.12 or higher:

The following parameter values depend on the output transmission and are defined by the factor *k*1.

Maximum parameter values:

- Speeds: 999 mm/s
  As of V1.12: Speeds: 1500 mm/s
- Acceleration ramps: 3000 mm/s²
- The maximum force is limited to 500 N.

$$k1 = \frac{\text{Existing output transmission ratio}}{\text{Standard output transmission ratio}} = \frac{x}{176\ \frac{mm}{Umd}}$$

The following parameter values depend on the maximum motor force and are defined by the factor *k*2.

Maximum parameter values:

- Deceleration ramp: 3000 mm/s²

$$k2 = \frac{\text{Force limit}}{\text{Determined dynamic weight}}$$

The default values and the set values are automatically set to the upper limit if the upper limit is exceeded. It is therefore possible that the actual default values differ from the default values in the table below.

Table A- 47 Parameters and setting ranges for SIDOOR MDG4 L / R

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Slow end distance open	p3660	mm	30	0 … 100
Slow start distance open	p3661	mm	30	0 … 100
Slow start distance close	p3662	mm	20	0 … 100
Slow end distance close	p3663	mm	40	0 … 100
Maximum speed open	p3664	mm/s	600	30 … 800*k1
Slow end speed open	p3665	mm/s	40	30 … 90
Slow start speed open	p3666	mm/s	60	30 … 90
Slow initial speed open	p3667	mm/s	90	30 … 90
Maximum speed CLOSE	p3668	mm/s	177	30 … 800*k1
Slow start speed close	p3669	mm/s	60	30 … 90
Slow end speed close	p3670	mm/s	40	30 … 90
Slow initial speed close	p3671	mm/s	90	30 … 90
NDG speed (reduced)	p3672	mm/s	177	30 … 800*k1

Acceleration ramp open	p3673	mm/s2	1300	300 … 1400*k1 250 … 1400*k1 (as of V1.09)
Deceleration ramp open	p3674	mm/s2	600	300 … k2 250 … k2 (V1.09) 150 … k2 (as of V1.10)
Reversal ramp open/close	p3675	mm/s2	1200	300 … k2 250 … k2 (V1.09) 150 … k2 (as of V1.10)
Acceleration ramp close	p3676	mm/s2	500	300 … 1400*k1 250 … 1400*k1 (as of V1.09)
Deceleration ramp close	p3677	mm/s2	500	300 … k2 250 … k2 (V1.09) 150 … k2 (as of V1.10)
Reversal ramp close/open	p3678	mm/s2	850	300 … k2 250 … k2 (V1.09) 150 … k2 (as of V1.10)
Idle torque open	p3679	A	1	0 … 2.5
Idle torque close	p3680	A	1	0 … 2.5
Peak torque close	p3681	A	3	0 … 5
Static force limit open	p3682	N	75	70 … 360/k1
Static closing force	p3683	N	75	70 … 360/k1
Limit force end close	p3684	N	75	70 … 360/k1
Static NDG-force (reduced)	p3685	N	75	70 … 360/k1
Limit energy close	p1202	J	4	0 … 100
Limit energy open	p1203	J	4	0 … 100
Limit energy NDG	p1204	J	4	0 … 100

* Default profile (this profile is automatically loaded at the first commissioning)

A.2.6 SIDOOR M5 L / R

Table A- 48 Parameters and setting ranges for SIDOOR M5 L / R

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Slow end distance open	p3660	mm	30	0 … 100
Slow start distance open	p3661	mm	30	0 … 100
Slow start distance close	p3662	mm	20	0 … 100
Slow end distance close	p3663	mm	40	0 … 100
Maximum speed open	p3664	mm/s	200	100 … 500 30 … 500 (as of V1.03)
Slow end speed open	p3665	mm/s	40	30 … 90
Slow start speed open	p3666	mm/s	60	30 … 90
Slow initial speed open	p3667	mm/s	90	30 … 90
Maximum speed close	p3668	mm/s	162	100 … 500 30 … 500 (as of V1.03)
Slow start speed close	p3669	mm/s	60	30 … 90
Slow end speed close	p3670	mm/s	40	30 … 90
Slow initial speed close	p3671	mm/s	90	30 … 90
NDG speed (reduced)	p3672	mm/s	162	50 … 500 30 … 500 (as of V1.03)
Acceleration ramp open	p3673	mm/s^2	450	300 … 650 250 … 650 (as of V1.09)
Deceleration ramp open	p3674	mm/s^2	300	300 … 650 250 … 650 (V1.09) 150 … 650 (as of V1.10)
Reversal ramp open/close	p3675	mm/s^2	500	300 … 650 250 … 650 (V1.09) 150 … 650 (as of V1.10)
Acceleration ramp close	p3676	mm/s^2	400	300 … 650 250 … 650 (as of V1.09)

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Deceleration ramp close	p3677	mm/s^2	400	300 … 650 250 … 650 (V1.09) 150 … 650 (as of V1.10)
Reversal ramp close/open	p3678	mm/s^2	650	300 … 650 250 … 650 (V1.09) 150 … 650 (as of V1.10)
Idle torque open	p3679	A	2.5	0 … 2.5
Idle torque close	p3680	A	2.5	0 … 2.5
Peak torque close	p3681	A	5	0 … 5
Static force limit open	p3682	N	75	70 … 360
Static force limit close	p3683	N	75	70 … 360
Limit force end close	p3684	N	75	70 … 360
Static NDG-force (reduced)	p3685	N	75	70 … 360
Limit energy close	p1202	J	4	0 … 100
Limit energy open	p1203	J	4	0 … 100
Limit energy NDG	p1204	J	4	0 … 100

* Default profile (this profile is automatically loaded at the first commissioning)

A.2.7 SIDOOR MDG5 L / R

The following parameter values depend on the output transmission and are defined by the factor *k*1.

Maximum parameter values:

- Velocities: 999 mm/s
  As of V1.09: Velocities: 1500 mm/s
- Acceleration ramps: 3000 mm/s²
- The maximum force is limited to 500 N.

$$k1 = \frac{\text{Existing output transmission}}{\text{Standard output transmission}} = \frac{x}{176\ \frac{mm}{rev}}$$

The following parameter values depend on the maximum motor force and are defined by the factor *k*2.

Maximum parameter values:

- Deceleration ramp: 3000 mm/s²

$$k2 = \frac{\text{Force limit}}{\text{Determined dynamic mass}}$$

The default values and the set values are automatically set to the upper limit if the upper limit is exceeded. It is therefore possible that the actual default values differ from the default values in the table below.

Table A- 49 Parameters for SIDOOR MDG5 L / R

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Slow end distance open	p3660	mm	30	0 … 100
Slow start distance open	p3661	mm	30	0 … 100
Slow start distance close	p3662	mm	20	0 … 100
Slow end distance close	p3663	mm	40	0 … 100
Maximum speed open	p3664	mm/s	200	30 … 500*k1
Slow end speed open	p3665	mm/s	40	30 … 90
Slow start speed open	p3666	mm/s	60	30 … 90
Slow initial speed open	p3667	mm/s	90	30 … 90
Maximum speed close	p3668	mm/s	162	30 … 500*k1
Slow start speed close	p3669	mm/s	60	30 … 90
Slow end speed close	p3670	mm/s	40	30 … 90
Slow initial speed close	p3671	mm/s	90	30 … 90
NDG speed (reduced)	p3672	mm/s	162	30 … 500*k1
Acceleration ramp open	p3673	mm/s2	450	250 … 650*k1
Deceleration ramp open	p3674	mm/s2	300	150 … k2
Reversal ramp open/close	p3675	mm/s2	500	150 … k2
Acceleration ramp close	p3676	mm/s2	400	250 … 650*k1

Parameter	Parameter ID	Unit	Profile 1*	Adjustment range
				ATD4xxW
Deceleration ramp close	p3677	mm/s2	400	150 … k2
Reversal ramp close/open	p3678	mm/s2	650	150 … k2
Idle torque open	p3679	A	2.5	0 … 2.5
Idle torque close	p3680	A	2.5	0 … 2.5
Peak torque close	p3681	A	5	0 … 5
Static force limit open	p3682	N	75	70 … 360/k1
Static force limit close	p3683	N	75	70 … 360/k1
Limit force end close	p3684	N	75	70 … 360/k1
Static NDG-force (reduced)	p3685	N	75	70 … 360/k1
Limit energy close	p1202	J	4	0 … 100
Limit energy open	p1203	J	4	0 … 100
Limit energy NDG	p1204	J	4	0 … 100

* Default profile (this profile is automatically loaded at the first commissioning)

A.3 Configuration record

Commissioning engineer	
Date	

Controller

Industrial applications

☐ SIDOOR ATD401W

☐ SIDOOR ATD410W

☐ SIDOOR ATD420W

☐ SIDOOR ATD430W

FW version: ____________

Motor

☐ SIDOOR M3 L/R

☐ SIDOOR MDG3 L/R

☐ SIDOOR M4 L/R

☐ SIDOOR MDG4 L/R

☐ SIDOOR M5 L/R

☐ SIDOOR MDG5 L/R

Power supply

☐ SIDOOR NT40

☐ SIDOOR TRANSFORMER

☐ SIDOOR TRANSFORMER UL

☐ SITOP PSU8200

☐ Building DC voltage supply

Software / additional devices

☐ SIDOOR SOFTWARE KIT

☐ SIDOOR SERVICE TOOL

Note

Parameter changes

Parameters should always be adjusted during normal operation with the door in the CLOSED position, because the controller then accepts the values immediately.

WARNING

When changing parameters, also refer to the section Final settings and checks (Page 302).

Parameter	Unit	Set value
Slow end distance open	mm	
Slow start distance open	mm	
Slow start distance close	mm	
Slow end distance close	mm	
Maximum speed open	mm/s	
Slow end speed open	mm/s	
Slow start speed open	mm/s	
Slow initial speed open	mm/s	
Maximum speed close	mm/s	
Slow start speed close	mm/s	
Slow end speed close	mm/s	
Slow initial speed close	mm/s	
NDG speed (reduced)	mm/s	
Acceleration ramp open	mm/s^2	
Deceleration ramp open	mm/s^2	
Reversal ramp open/close	mm/s^2	
Acceleration ramp close	mm/s^2	
Deceleration ramp close	mm/s^2	
Reversal ramp close/open	mm/s^2	
Idle torque open	A	
Idle torque close	A	
Peak torque close	A	
Static force limit open	N	
Static force limit close	N	
Limit force end close	N	
Static NDG-force (reduced)	N	
Additional profile parameters		
Limit energy close	J	
Limit energy open	J	
Limit energy NDG	J	
Special parameters		
Slave ID	–	
Int. baud rate	Bd	
PKW words	–	
PZD words	–	
Function input 1	–	
Partial opening width	cm	
FBLOCK configuration	–	
Output transmission	mm/rev	
Force limit for learn run	N	
Default command input	–	

Parameter	Unit	Set value
Hold-open time standard	s	
Hold-open time cord-operated switch	s	
Speed critical Range OPEN	mm/s	
Force critical range OPEN	N	
Speed critical Range CLOSE	mm/s	
Force critical range CLOSE	N	
Basic parameters (as of V1.09)		
Output transmission	mm/rev	
Motor direction		
Pulse encoder direction		
Door width	mm	
Dynamic mass	kg	
Frictional force open	N	
Frictional force close	N	
Average friction current open	mA	
Average friction current close	mA	

A.4 Standards, directives and laws

A.4.1 Safety

EN ISO 13849-1:2015

The safety standard EN ISO 13849 deals with the general design principles for the safety-related parts of control systems. Part 1 defines general design principles.

A.4.2 EMC

Immunity

EN 61000-6-2:2005

Generic standards – Immunity for industrial environments

Emission standard for residential environments

EN 61000-6-3: 2007+A1:2011

Generic standards – Interference emission for residential, business and commercial areas as well as small businesses

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Note

The specifications of DIN EN 61000-6-3 are met when the SIDOOR TRANSFORMER or SIDOOR TRANSFORMER UL is used as a power supply component. EN 61000-6-3 is not fulfilled if the SIDOOR NT40 is used as the power supply component.

Emission standard for industrial environments

EN 61000-6-4:2007 +A1:2011

Generic standards – Interference emission for industrial environments

A.4.3 Communications

The EIA 485 standard applies to physical data transfer (RS 485 interface).

USS protocol specification, Edition 09.94 by Walter Möller-Nehring, Siemens AG, ASI 1 D SP, Erlangen and Wolfgang Bohrer, Siemens AG, ASI 1 D SP, Erlangen

PROFIBUS was defined in DIN 19245 in 1991/1993, changed to EN 50170 in 1996 and has been defined in IEC 61158/IEC 61784 since 1999.

PROFINET DIN EN 61158 and IEC 61784-2

A.4.4 Application-specific standards

WARNING

Compliance with these standards requires appropriate hardware, parameter assignment, setup and verification.

power-operated guards

EN ISO 14120:2015 Safety of machinery – Isolating protective devices –

General requirements for the design and construction of fixed and movable guards, Type B Standard

For **EN ISO 14120:2015, particular attention must be paid to section 5.2.5.4:**

Power-operated guards

"Where guards are power operated they shall not be capable of causing injury (e.g. from contact pressure, force, speed, sharp edges). If an isolating or a non-isolating protective device is fitted which automatically initiates a reopening of the non-isolating protective device as soon as a person or an object comes into the contact with the isolating protective device, the closing force must not exceed 150 N and the kinetic energy of the isolating protective device must not exceed 10 J. If no such protective device is fitted these values shall be reduced to 75 N and 4 J, respectively. These values only apply if there is a wide closing edge and no risk of cutting or shearing."

Machine tools – Safety – Turning machines

EN ISO 23125:2015 Machine tools safety – Turning machines, Type C standard

Section 5.2.2.2 b) "For power-operated guards"

Excerpt from ISO 23125:2015, Section 5.2.2.2 b):

"3) the force to prevent the guard from closing shall not exceed 75 N and the kinetic energy of the guard shall not exceed 4 J. When the guard is fitted with a protective device which automatically initiates reopening of the guard on actuation, this may be a maximum of 150 N and the kinetic energy a maximum of 10 J;"

Injection molding machines

EN 201:2009 Plastics and rubber machines – Injection molding machines – Safety requirements; Type C standard

Section 5.8.10 "Power operated guards"

Excerpt from DIN EN 201:2009, Section 5.8.10:

"For power operated guards the following additional requirements shall apply:

- where there are contact forces more than 75 N and less or equal to 150 N, a pressure sensitive edge in accordance with EN 1760-2:2001+A1:2009 shall be supplied. Actuation of the sensitive edge shall stop the closing movement of the guard in accordance with EN ISO 13849-1:2008, PLr = c;
- where there are contact forces more than 150 N, these shall not exceed 300 N and a pressure sensitive edge in accordance with EN 1760-2:2001+A1:2009 shall be supplied. Actuation of the sensitive edge shall stop the closing movement of the guard in accordance with EN ISO 13849-1:2008, PLr = c, and allow the reversing movement without creating any additional hazard. Closing of the guard shall be achieved by a hold-to-run control device in accordance with of EN ISO 13849-1:2008, PLr = c; ..."

A.4.5 Protective devices

Electrosensitive protective equipment

EN 61496-1:2013 Safety of machinery - Electrosensitive protective equipment – Part 1: General requirements and tests, Type B standard.

This part defines the general requirements for design, production and testing of electrosensitive protective equipment (ESPE) that is specially designed for detection of persons as part of a safety-related system.

Pressure-sensitive protective equipment

EN ISO 13856-2:2013 Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for the design and testing of pressure-sensitive edges and pressure-sensitive bars, Type B2 standard

This part of ISO 13856 establishes general principles and specifies requirements for the design and testing of pressure-sensitive edges and pressure-sensitive bars used as safeguards and not as actuating devices for normal operation.

Note

Die EN1760-2:2001+A1:2009 has been withdrawn and replaced with ISO 13856-2:2013.

Two-hand control devices

EN 574:1996+A1:2008 Safety of machinery – Two-hand control devices – Functional aspects – Design principles.

Chapters 6 describes the requirements for controllers

Table A- 50 List of types of two-hand control devices and minimum safety requirements

Requirements	Clause	Types				
		I	II	III		
				A	B	C
Use of both hands (simultaneous actuation)	5.1	x	x	x	x	x
Relationship between input signals and output signal	5.2	x	x	x	x	x
Cessation of the output signal	5.3	x	x	x	x	x
Prevention of accidental operation	5.4	x	x	x	x	x
Prevention of defeat	5.5	x	x	x	x	x
Reinitiation of the output signal	5.6	*)	x	x	x	x
Synchronous actuation	5.7			x	x	x
Use of category 1 (EN 954-1:1996)	6.2	x		x		
Use of category 3 (EN 954-1:1996)	6.3		x		x	
Use of category 4 (EN 954-1:1996)	6.4					x

*) NOTE for the selection of Type I see 8.6.

Source: DIN EN 574:2008-12, Table 1

ISO 13851:2002 Safety of machinery – Two-hand control devices – Functional aspects

Chapter 4 describes the requirements for controllers

Table A- 51 List of two-hand control device types and the minimum safety requirements

Requirements	Section	Types				
		I	II	III		
				A	B	C
Use of both hands (simultaneous operation)	5.1	x	x	x	x	x
Relationship between input signals and output signal	5.2	x	x	x	x	x
Termination of the output signal	5.3	x	x	x	x	x
Avoidance of unintentional operation	5.4	x	x	x	x	x
Preventing bypassing	5.5	x	x	x	x	x
Creating the output signal again	5.6	*)	x	x	x	x
Synchronous operation	5.7			x	x	x
Application of category 1 (ISO 13849-1)	6.2	x		x		
Application of category 3 (ISO 13849-1)	6.3		x		x	
Application of category 4 (ISO 13849-1)	6.4					x

*) REMARK for the selection of type I see 8.6.

Source: ISO 13849-1

A.5 Service & support

Product information

You will find current product information and further links on the Product page SIDOOR Automatic Door Controls (https://www.siemens.com/sidoor).

Online catalog and ordering system

The online catalog and the online ordering system can also be found at Industry Mall homepage (https://www.siemens.com/industrymall)

Online support

The Online support (https://www.siemens.com/automation/service&support) gives you direct access to information about products, systems and services, as well as a large number of programming, configuration and application examples.

Furthermore, the Online Support portal gives central access to further Services and contact persons (https://www.siemens.com/automation/partner).

Technical Support

Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

If you have any technical questions, contact Technical Support at:

Email Technical Support (mailto:support.automation@siemens.com)

Support Request (https://www.siemens.com/automation/support-request)

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