

SIEMENS

Safety Relays 3TK2845 Multifunction Device

Manual

Important Information,
Table of Contents

Product Description **1**

Functional Information **2**

Technical Data **3**

Mounting, Wiring,
Initial Start-up **4**

Applications **5**

Order No.: 3TK2890-0A (German)
Order No.: 3TK2890-0B (English)
Order No.: 3TK2890-0C (French)

Version 07/2007 V1.3

GWA 4NEB 926 2087-22 DS 01

Last update: 09 August 2007

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. These notices are highlighted in the manual by a safety alert symbol. The notices shown below are graded according to the degree of danger:



Safety notice

Contains important information for the acceptance test and the safety-related use of the product.



Danger

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



Warning

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



Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken.

Caution

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

Notice

Contains important information on the product, on product handling or pertaining to a particular part of the documentation which should be taken into particular consideration.

Qualified personnel

Only **qualified personnel** may install and work on this equipment. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed usage

Note the following:



Warning

This device may only be used for applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Copyright Siemens AG 2007 All rights reserved

The reproduction, transmission or use of this document or its contents is not permitted without express written authority. Offenders will be liable for damages. All rights, including rights created by patent grant or registration of a utility model or design, are reserved.

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. Suggestions for improvements are welcomed.

Technical Assistance:	Telephone: +49 (0) 911-895-5900 (8 ⁰⁰ am - 5 ⁰⁰ pm CET)	Fax: +49 (0) 911-895-5907
	E-mail: technical-assistance@siemens.com	
	Internet: www.siemens.de/lowvoltage/technical-assistance	

Technical support:	Telephone: +49 (0) 180 50 50 222
---------------------------	----------------------------------

Siemens AG
Bereich Automatisierungs- und Antriebstechnik
Geschäftsgebiet Niederspannungs-Schalttechnik
D-90327 Nürnberg

© Siemens AG 2007
Technical data subject to change without notice.

Table of Contents

1	Product Description	1-1
1.1	3TK2845 Multifunction Device	1-2
1.2	Function, Properties	1-3
1.3	3TK2845 Order Numbers	1-4
2	Functional Information	2-1
2.1	General Information	2-2
2.1.1	System Description	2-7
2.2	Versions	2-8
2.2.1	3TK2845-.HB.. "Monitored and Automatic Start-Up"	2-8
2.2.2	3TK2845-.DB.. "Monitored Start-Up"	2-13
2.2.3	3TK2845-.EB.. "Enabling Button"	2-18
2.2.4	3TK2845-.FB.. "Spring Force Interlocked Tumbler"	2-22
2.2.5	3TK2845-.GB.. "Magnetic Force Interlocked Tumbler"	2-24
3	Technical Data	3-1
3.1	Technical Data	3-2
3.2	Terminals	3-3
3.3	Terminal Assignment	3-4
3.4	Dimensional Drawings	3-5
4	Mounting, Wiring, Initial Start-up	4-1
4.1	Mounting and Coding	4-3
4.2	Wiring	4-4
4.3	Meaning of the LED Indicators	4-6
5	Applications	5-1
5.1	3TK2845-.HB40 "Monitored Start-up and Automatic Start-up", Instantaneous Outputs	5-2
5.2	3TK2845-.HB41 "Monitored Start-up and Automatic Start-up", Time-Delayed Outputs	5-4
5.3	3TK2845-.DB40 "Monitored Start-Up", Instantaneous Outputs	5-6
5.4	3TK2845-.DB41 "Monitored Start-Up", Time-Delayed Outputs	5-8
5.5	3TK2845-.EB40 "Enabling Button"	5-10
5.6	3TK2845-.FB41/2/4 "Spring Force Interlocked Tumbler"	5-12
5.7	3TK2845-.GB41/2/4 "Magnetic Force Interlocked Tumbler"	5-14

Figures

Fig. 1-1:	Illustration of the device version with screw connection, instantaneous enabling circuit	1-2
Fig. 1-2:	Illustration of the device version with spring-loaded terminal connection, delayed enabling circuits	1-2
Fig. 3-1:	Terminal assignment	3-4
Fig. 3-2:	Dimensional drawing	3-5
Fig. 4-1:	3TK2845 multifunction device for snap-on or screw mounting	4-3
Fig. 4-2:	Mounting and coding of the removable terminals	4-3
Fig. 4-3:	Overview of the terminal cross sections/maximum permissible torques	4-4
Fig. 4-4:	Sealable cover cap	4-5

Tables

Table 2-1: Use of the graphics	2-4
Table 2-2: Device type	2-4
Table 2-3: Description of symbols	2-7
Table 2-4: Monitored and automatic start-up, instantaneous (simplified representation)	2-9
Table 2-5: Monitored and automatic start-up, time-delayed (simplified representation)	2-10
Table 2-6: Monitored start-up, instantaneous (simplified representation)	2-14
Table 2-7: Monitored start-up, time-delayed (simplified representation)	2-15
Table 2-8: Enabling button, instantaneous (simplified representation)	2-18
Table 2-9: Enabling button, time-delayed (simplified representation)	2-19
Table 2-10: Spring force interlocked tumbler (simplified representation)	2-22
Table 2-11: Magnetic force interlocked tumbler (simplified representation)	2-24
Table 3-1: Technical Data	3-2
Table 3-2: Rated operating currents I_e	3-3



Important Information

Purpose of manual

The information contained in this manual is designed to assist you in configuring safety-related features as part of an entire system or machine.

Readers

This manual applies to persons who possess the necessary qualifications for commissioning and operating 3TK2845 multifunction devices.

For additional information refer also to the Safety Integrated System Manual.

Scope of application

This manual applies to the multifunction devices with the following order numbers:

3TK2845-.HB40 *)
3TK2845-.HB41 *)
3TK2845-.HB42 *)
3TK2845-.HB44 *)

3TK2845-.DB40 *)
3TK2845-.DB41 *)
3TK2845-.DB42 *)
3TK2845-.DB44 *)

3TK2845-.EB40 *)
3TK2845-.EB41 *)
3TK2845-.EB42 *)
3TK2845-.EB44 *)

3TK2845-.FB41 *)
3TK2845-.FB42 *)
3TK2845-.FB44 *)

3TK2845-.GB41 *)
3TK2845-.GB42 *)
3TK2845-.GB44 *)

*) 8th digit of order No.: 1 = Screw connection, 2 = Spring-loaded terminal connection

Standards and certifications

The 3TK2845 safety relays can be used for EMERGENCY-STOP equipment complying with EN 418 and for safety circuits complying with EN 60 204-1 (11.98) e.g. for movable guards and protective doors as well as for non-contact protective equipment complying with IEC 61496-1 (06.98).

Depending on the external circuit, Category 4 can be obtained in compliance with DIN EN 954-1 or SIL3 in compliance with IEC 61 508.

Disclaimer of liability

The products described were designed to perform safety-related features as part of an entire system or machine. A complete safety-related system generally consists of sensors, signal evaluators, signaling devices and concepts for safe switch-off. It is the responsibility of the manufacturer to ensure that the systems and machines function reliably. Siemens will also not accept liability for recommendations that are given or implicated by the following product description.

Siemens will also not accept liability for recommendations that are given or implicated by the following product description. It is not possible to derive any new warranty or liability claims beyond Siemens' general terms of delivery from the following product description.

Constant up-to-date information

Additional assistance is available under the following telephone numbers:

Technical Assistance: Telephone: +49 (0) 911-895-5900 (8⁰⁰ am - 5⁰⁰ pm CET)
Fax: +49 (0) 911-895-5907

or via Internet:

E-mail: technical-assistance@siemens.com
Internet: www.siemens.de/lowvoltage/technical-assistance

Technical support: Telephone: +49 (0) 180 50 50 222

Suggestion sheet

A suggestion sheet is enclosed at the end of this manual. Please use this sheet to write any suggestions (i.e. what can be improved or amended, revisions to the text etc.) that you may have and send the sheet back to us. This will help us to improve the quality of the next manual.

Product Description

1

Chapter	Subject	Page
1.1	3TK2845 Multifunction Device	1-2
1.2	Function, Properties	1-3
1.3	3TK2845 Order Numbers	1-4

1.1 3TK2845 Multifunction Device

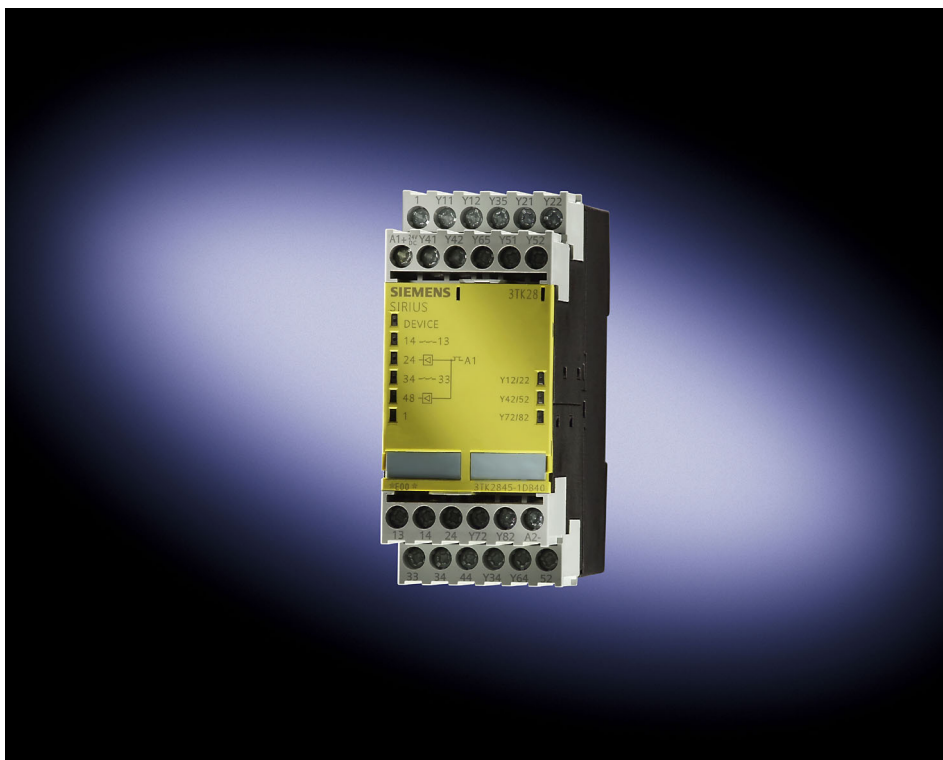


Fig. 1-1: Illustration of the device version with screw connection, instantaneous enabling circuit

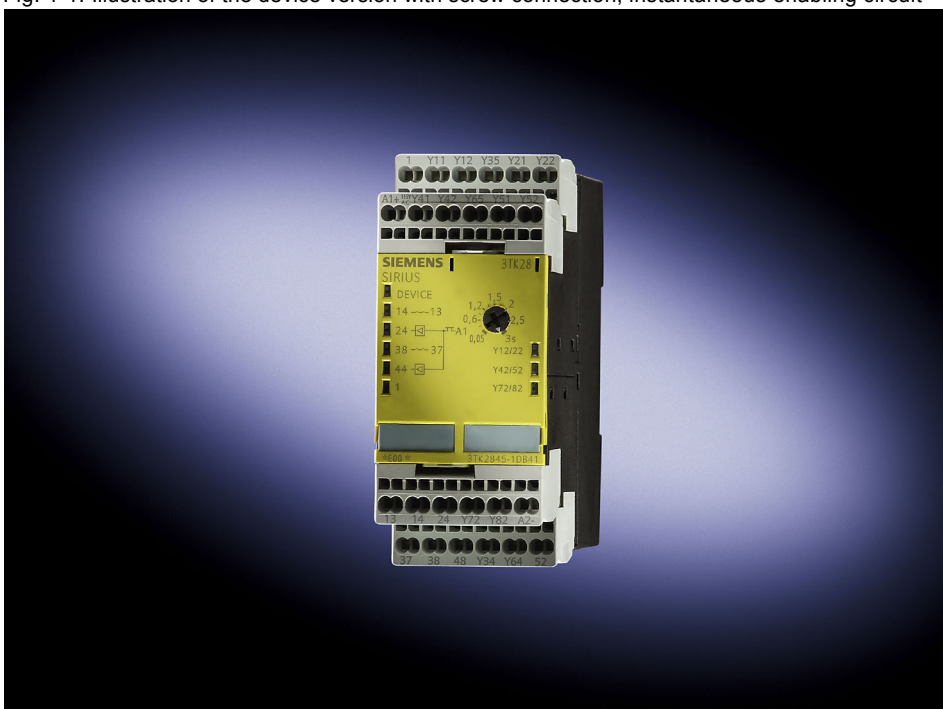


Fig. 1-2: Illustration of the device version with spring-loaded terminal connection, delayed enabling circuits

1.2 Function, Properties

The 3TK2845 multifunction device is used to implement safety-related functions such as EMERGENCY-STOP monitoring, protective door monitoring and monitoring functions using non-contact protective equipment (BWS) such as light curtains and safety mats in machines with movable components.

The device is especially suited for

- operating machines that function without being connected to a bus system (isolated operation)
- operating machines that require several safety functions (e.g. EMERGENCY-STOP and a protective door, enabling button and protective door and locked protective door tumblers)
- operating machines having components which must be switched off during operation (i.e. for servicing)

The advantage of using this device is the fact that several safety-related functions can be implemented using only one 3TK2845 multifunction device rather than using several safety relays. In addition, the device is also suited for operational switching, cascading and adding safety relays either using contacts or switching electronically.

Note:

A simulation of the devices illustrating how they work can be found at www.siemens.de/lowvoltage (Support → Tools & Downloads → Monitoring and Control → Safety Relays 3TK28).

1.3 3TK2845 Order Numbers

Order number	Type	Delay time	Terminal
3TK2845-1HB40	Monitored and automatic start-up	Instantaneous	Screw connection
3TK2845-1HB41	Monitored and automatic start-up	Time-delayed 0.05 to 3 s	Screw connection
3TK2845-1HB42	Monitored and automatic start-up	Time-delayed 0.5 to 30 s	Screw connection
3TK2845-1HB44	Monitored and automatic start-up	Time-delayed 5 to 300 s	Screw connection
3TK2845-2HB40	Monitored and automatic start-up	Instantaneous	Spring-loaded terminal connection
3TK2845-2HB41	Monitored and automatic start-up	Time-delayed 0.05 to 3 s	Spring-loaded terminal connection
3TK2845-2HB42	Monitored and automatic start-up	Time-delayed 0.5 to 30 s	Spring-loaded terminal connection
3TK2845-2HB44	Monitored and automatic start-up	Time-delayed 5 to 300 s	Spring-loaded terminal connection
3TK2845-1DB40	Monitored start-up	Instantaneous	Screw connection
3TK2845-1DB41	Monitored start-up	Time-delayed 0.05 to 3 s	Screw connection
3TK2845-1DB42	Monitored start-up	Time-delayed 0.5 to 30 s	Screw connection
3TK2845-1DB44	Monitored start-up	Time-delayed 5 to 300 s	Screw connection
3TK2845-2DB40	Monitored start-up	Instantaneous	Spring-loaded terminal connection
3TK2845-2DB41	Monitored start-up	Time-delayed 0.05 to 3 s	Spring-loaded terminal connection
3TK2845-2DB42	Monitored start-up	Time-delayed 0.5 to 30 s	Spring-loaded terminal connection
3TK2845-2DB44	Monitored start-up	Time-delayed 5 to 300 s	Spring-loaded terminal connection
3TK2845-1EB40	Enabling button	Instantaneous	Screw connection
3TK2845-1EB41	Enabling button	Time-delayed 0.05 to 3 s	Screw connection
3TK2845-1EB42	Enabling button	Time-delayed 0.5 to 30 s	Screw connection
3TK2845-1EB44	Enabling button	Time-delayed 5 to 300 s	Screw connection
3TK2845-2EB40	Enabling button	Instantaneous	Spring-loaded terminal connection
3TK2845-2EB41	Enabling button	Time-delayed 0.05 to 3 s	Spring-loaded terminal connection
3TK2845-2EB42	Enabling button	Time-delayed 0.5 to 30 s	Spring-loaded terminal connection
3TK2845-2EB44	Enabling button	Time-delayed 5 to 300 s	Spring-loaded terminal connection
3TK2845-1FB41	Spring force interlocked tumbler	Time-delayed 0.05 to 3 s	Screw connection
3TK2845-1FB42	Spring force interlocked tumbler	Time-delayed 0.5 to 30 s	Screw connection
3TK2845-1FB44	Spring force interlocked tumbler	Time-delayed 5 to 300 s	Screw connection
3TK2845-2FB41	Spring force interlocked tumbler	Time-delayed 0.05 to 3 s	Spring-loaded terminal connection
3TK2845-2FB42	Spring force interlocked tumbler	Time-delayed 0.5 to 30 s	Spring-loaded terminal connection
3TK2845-2FB44	Spring force interlocked tumbler	Time-delayed 5 to 300 s	Spring-loaded terminal connection
3TK2845-1GB41	Magnetic force interlocked tumbler	Time-delayed 0.05 to 3 s	Screw connection
3TK2845-1GB42	Magnetic force interlocked tumbler	Time-delayed 0.5 to 30 s	Screw connection
3TK2845-1GB44	Magnetic force interlocked tumbler	Time-delayed 5 to 300 s	Screw connection
3TK2845-2GB41	Magnetic force interlocked tumbler	Time-delayed 0.05 to 3 s	Spring-loaded terminal connection
3TK2845-2GB42	Magnetic force interlocked tumbler	Time-delayed 0.5 to 30 s	Spring-loaded terminal connection
3TK2845-2GB44	Magnetic force interlocked tumbler	Time-delayed 5 to 300 s	Spring-loaded terminal connection

Functional Information

2

Chapter	Subject	Page
2.1	General Information	2-2
2.1.1	System Description	2-7
2.2	Versions	2-8
2.2.1	3TK2845-.HB.. "Monitored and Automatic Start-Up"	2-8
2.2.2	3TK2845-.DB.. "Monitored Start-Up"	2-13
2.2.3	3TK2845-.EB.. "Enabling Button"	2-18
2.2.4	3TK2845-.FB.. "Spring Force Interlocked Tumbler"	2-22
2.2.5	3TK2845-.GB.. "Magnetic Force Interlocked Tumbler"	2-24

2.1 General Information

SIRIUS safety relays in the safety chain

In general, a safety chain is made up of the three parts detection, evaluation and switching-off.

Detection: means the detection of a safety requirement, e.g. when someone activates an EMERGENCY-STOP or enters a hazardous area protected by sensors such as light grids or laser scanners.

Evaluation: means the detection of a safety requirement and the safe initiation of the reaction (e.g. switching-off of the enabling circuits).

Switching-off: means the switching-off of the hazard (e.g. of a power supply via the downstream contactors).

SIRIUS safety relays play a role in the evaluation and reaction part of the safety chain.

The safety functions are shown in a uniform schematic diagram (refer to [Chapter 2.2](#)) for a quick overview of the special functions of the individual device types.

The sensor interface inputs, the actuator interface outputs and enabling circuits as well as the special safety logic can all be seen at a glance.

Cascading input

1. Safe linking of safety devices

In this application a higher-level safety device switches off the 3TK2845 via a safe output and the cascading input.

Example:

A -- higher-level -- EMERGENCY-STOP circuit must switch off the whole system.

Several lower-level functional groups (e.g. protective doors) with local switch-off can be operated.

Notice

If faults can be excluded (protected wiring of the control cable), the application's safety category is the same as the safety category of the higher-level safety relay.

2. Additional safety sensor circuit

The cascading input is AND-connected with the sensor inputs Y12, Y22. Safety category 2 according to EN 954-1 can be achieved when the cascading input is wired to single-channel safety sensors (positive opening) and the routing of the connecting cable is protected. The start function is set to automatic start-up. Cascading input 1 can be switched with floating or electronic switching elements. Both types of switching elements must be fed by the same power supply as the device.

3. Operational switching

The cascading input can be used for operational (non-safe) switching. Switching is possible with floating or electronic switching elements. Floating switching elements must be fed by the same power supply as the device.

Automatic sensor detection

Sensors such as EMERGENCY-STOP control switches or position switches and safety mats have different modes of operation. While EMERGENCY-STOP control switches, for example, interrupt the sensor circuit when activated, safety

mats establish a cross-circuit between the two input channels of the evaluation system when stepped on. This means that

1. in the case of a sensor which interrupts the sensor circuit, a cross-circuit leads to a fault.
2. in the case of safety mats an interruption of the sensor circuit leads to a fault.

All safety mats and switching strips with 4-conductor-technology functioning according to the cross-circuit tripping principle can be connected to the 3TK2845 safety relays.

The tripping of the 3TK2845 is initiated by a cross-circuit in the sensor cables.

A safe evaluation according to DIN EN 1760-1 and DIN EN 1760-2 is possible with a safety mat resistance of $< 1000 \Omega$ for the safety mat + connecting cables.

The 3TK2845 automatically recognizes the mode of operation of the connected sensor.

If, during first activation of the sensor after a device restart,

1. an opening of the sensor circuits is detected, the 3TK2845 only accepts sensors which open the sensor circuits (floating NC contacts such as EMERGENCY-STOP control switches or position switches). A cross-circuit between the sensor circuits leads to a fault.
2. a cross-circuit is detected between the sensor circuits, the 3TK2845 only accepts sensors causing a sensor circuit short-circuit (safety mats). An opening of the sensor circuits leads to a fault.

Use of the graphics

The device inputs (number and type) are shown in the sensor interface. The safety logic is shown in the middle. The safety logic is used to explain the mode of operation of the device (how the inputs affect the outputs). The type and number of the enabling circuits or signaling outputs are shown in the actuator interface. The setting possibilities (parameters) of the device are shown at the lower end of the graphic. The legend explains the meaning of the symbols.

To simplify the presentation, the schematics only show those inputs and outputs which are necessary to explain the safety logic. The power supply inputs as well as the sensor or actuators which might be connected to the interfaces are not shown since they are not relevant for the presentation of this function.

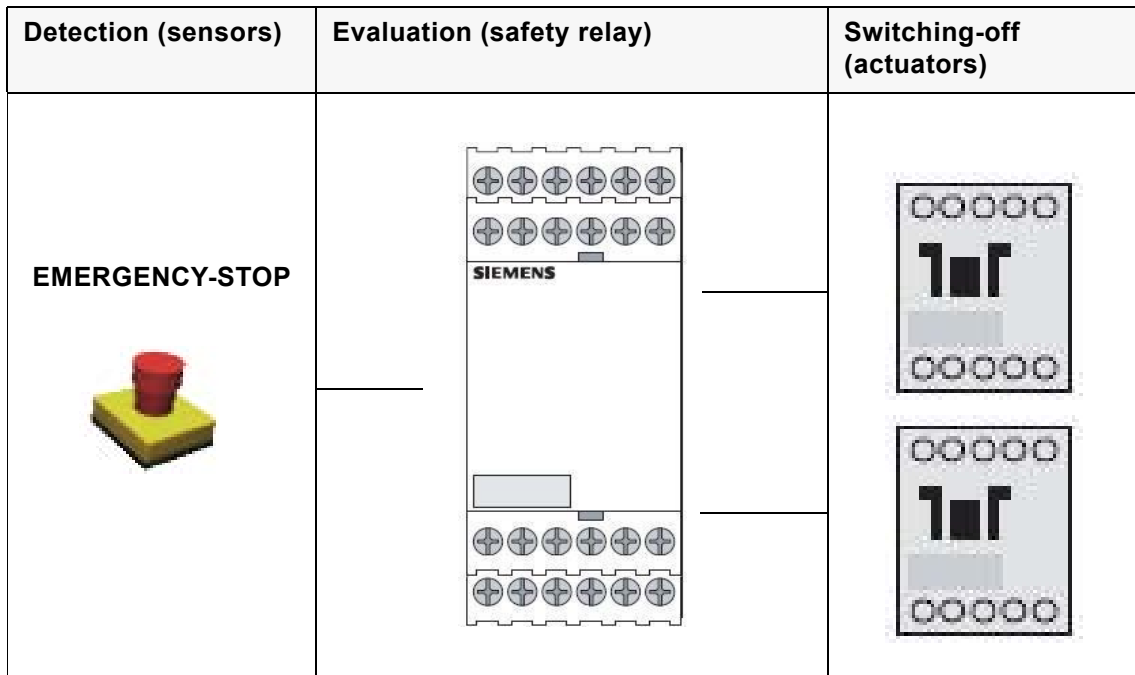


Table 2-1: Use of the graphics

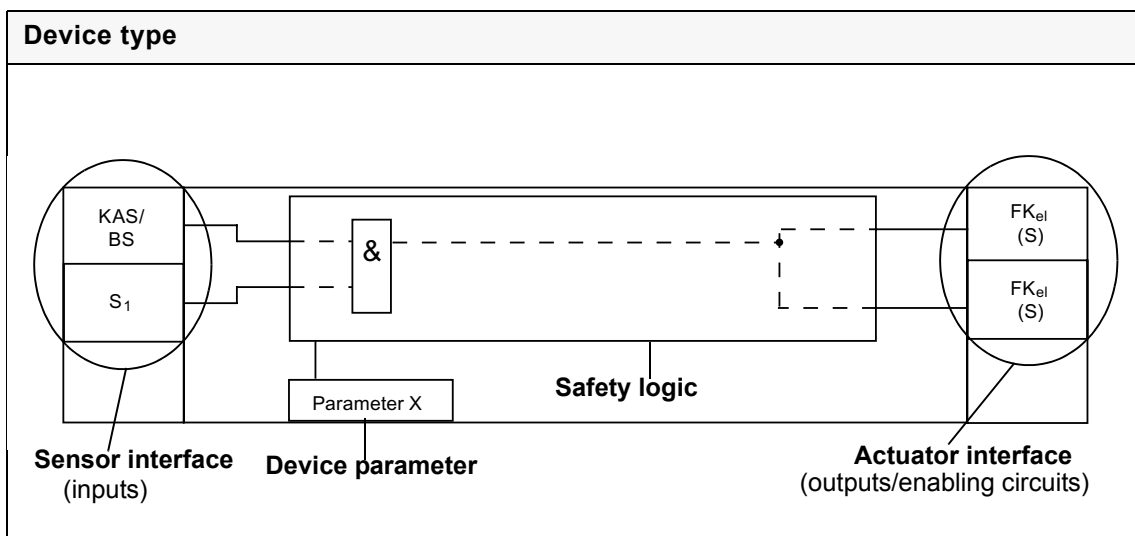




Table 2-2: Device type

Legend

Sensor interface

S _x	Sensor input
CAS/OS	Cascading input or operational switching (operational switching: connection of, for example, a PLC output. Three enabling circuits and the connected consumers can then be switched via the machine controls. The safety function is higher-level).
Key-operated switch	<p>3TK2845-.HB.. : Bridging of the sensor connected to S2 (standard operation/maintenance)</p> <p>3TK2845-.DB.. : Bridging of the sensor connected to S2 (standard operation/maintenance)</p> <p>3TK2845-.EB.. : Bridging of the protective door function and activation of the enabling button</p> <p>3TK2845-.FB.. : Enabling of the protective door</p> <p>3TK2845-.GB.. : Enabling of the protective door</p>

Safety logic

AS	Automatic start-up: Device starts automatically after the enabling conditions have been fulfilled. A manual start-up is possible when a START button is integrated in the feedback circuit (up to Category 3 according to EN 954-1).
MS	Monitored start-up: The device only starts after the enabling conditions have been fulfilled and a start signal has been issued.
AS/MS	Automatic or monitored start-up, depending on the parameterization
	Switch-off delay
	Switch-on delay

Parameters

AS/MS	Automatic or monitored start-up, depending on the device type/parameterization
CC	with/without cross-circuit monitoring

Actuator interface

EC _{xx} (Y)	XX =	el:	Electronic enabling circuit (potential-bound)
		rel:	Relay contact enable contact (floating)
	Y =	NO:	NO contact
		NO _{td} :	Time-delayed NO contact
SC _{xx} (Y)	XX =	el:	Electronic signaling circuit (potential-bound)
	Y =	NO:	NO contact
		NC:	NC contact

2.1.1 System Description

Description of symbols





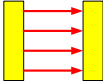

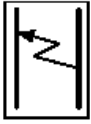
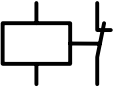

Symbol	Description
	START button
	EMERGENCY-STOP
	Protective door
	Enabling button
	Light curtain, light grid, light barrier
	Safety mat
	Cross-circuit monitoring
	Feedback circuit
	Key-operated switch

Table 2-3: Description of symbols

2.2 Versions

2.2.1 3TK2845-.HB.. "Monitored and Automatic Start-Up"

The 3TK2845-.HB.. has two sensor inputs (S1 with monitored start-up, S2 with automatic start-up), one cascading input (CAS/OS with automatic start-up) as well as one switching input (key-operated switch). On the output side there are two relay and two electronic enabling circuits as well as an electronic signaling output.

Standard operation

In standard operation (key-operated switch "OFF") all enabling circuits are activated. All input blocks are AND-connected to one another and affect all enabling circuits at the same time, whereby some are time-delayed.

Maintenance

During maintenance (key-operated switch "ON") only two of the four enabling circuits are activated. In this case, sensor input S2 (e.g. protective door) has no function. The hazardous area can be entered since the dangerous motion has been switched off via the two inactive enabling circuits. The sensor input S1 and the cascading input CAS/OS still affect the active enabling circuits.

Safety logic

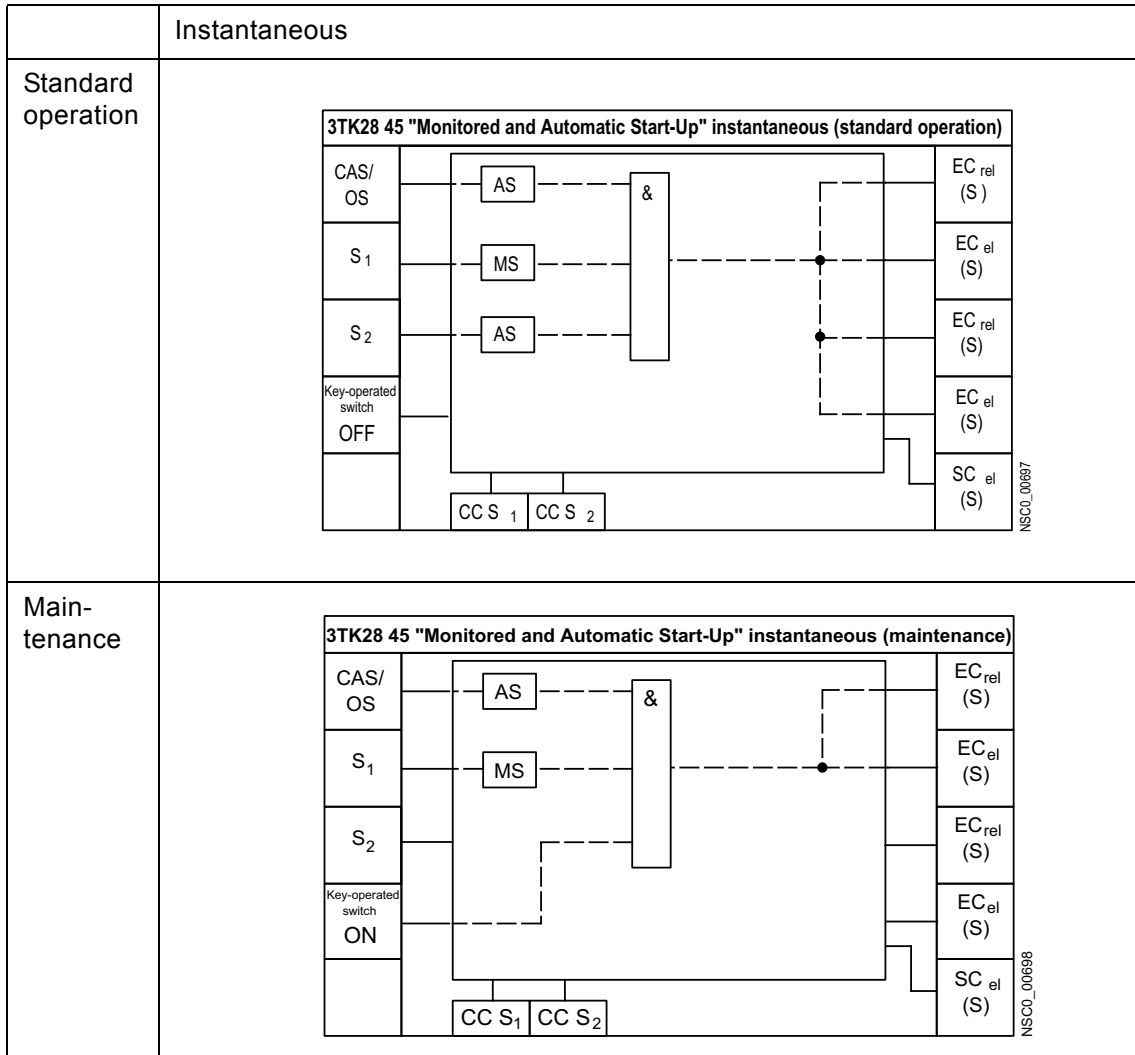


Table 2-4: Monitored and automatic start-up, instantaneous (simplified representation)

Safety logic

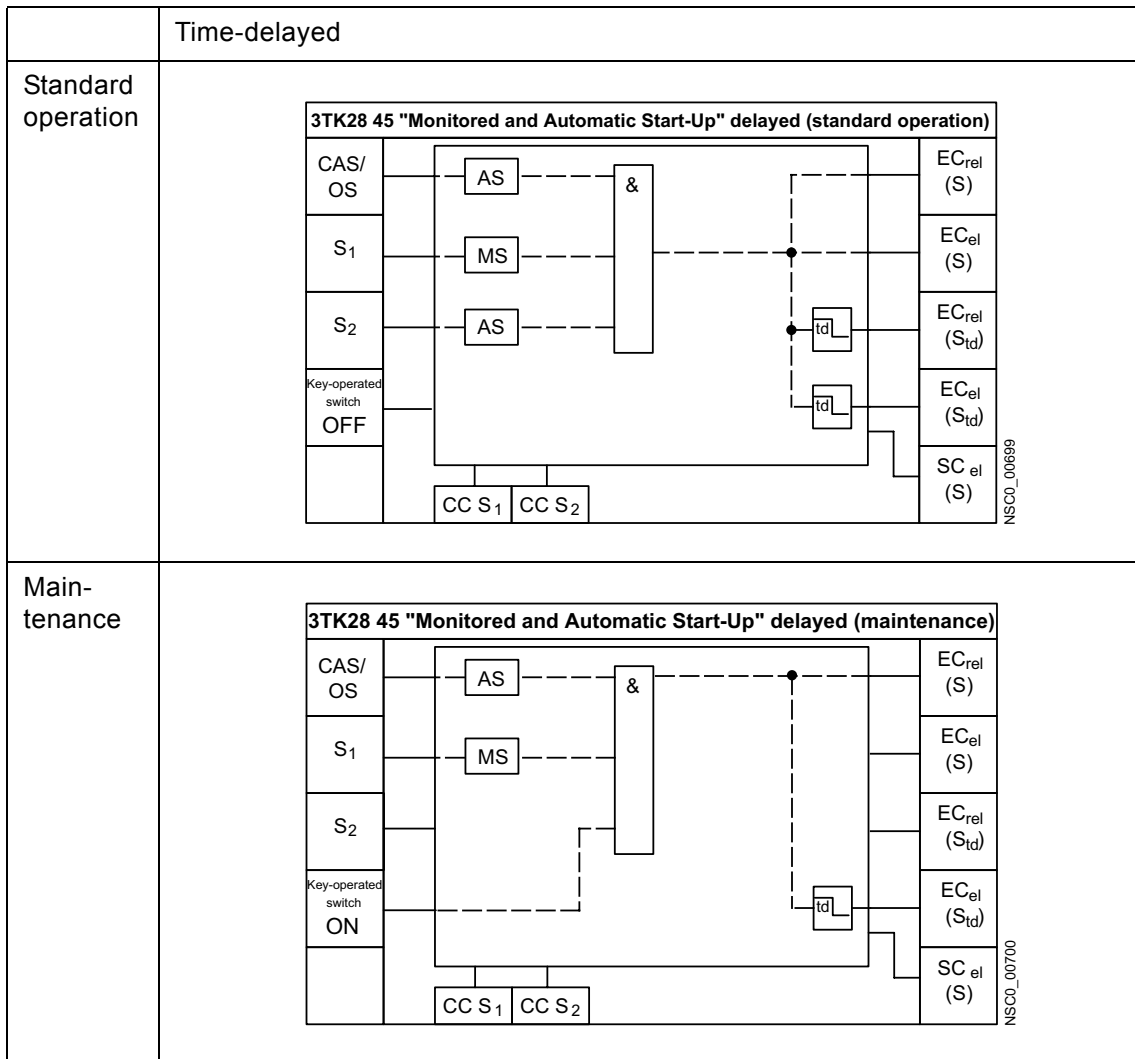














Table 2-5: Monitored and automatic start-up, time-delayed (simplified representation)












Connections: Monitored and automatic start-up instantaneous

Sensor	Input block	Terminals	Description	Safety logic	Description	Terminal	Output block	
	CAS/OS Automatic start-up	1	Cascading					
 or  or  or 	S₁ Monitored start-up	Y11 Y12 Y21 Y22	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel}
		Y34	START button			Safe electronic output instantaneous	24	EC_{el} (S)
		Y35	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Safe relay output instantaneous	33 34	EC_{rel} (S)
 or  or 	S₂ Automatic start-up	Y41 Y42 Y51 Y52	Sensor connection			Safe electronic output instantaneous	44	EC_{el} (S)
		Y65	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC_{el} (S)
	Key-operated switch	Y72 Y82	Key-operated switch					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

Terminals: Monitored and automatic start-up, time-delayed

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal		
	CAS / OS Automatic start-up	1	Cascading					
 or  or  or 	S₁ Monitored start-up	Y11 Y12	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel}(S)
		Y21 Y22				Safe electronic output instantaneous	24	EC_{el}(S)
		Y34			START button		Safe relay output time delayed	37 38
 or  or 	S₂ Automatic start-up	Y41 Y42	Sensor connection			Safe electronic output time delayed	48	EC_{el}(S_{td})
		Y51 Y52				Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC_{el}(S)
	Key-operated switch	Y72 Y82	Key-operated switch					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

2.2.2 3TK2845-.DB.. "Monitored Start-Up"

The 3TK2845-.DB.. has two sensor inputs (S1, S2 with monitored start-up), one cascading input (CAS/OS with automatic start-up) as well as one switching input (key-operated switch). On the output side there are two relay and two electronic enabling circuits as well as an electronic signaling output.

Standard operation

In standard operation (key-operated switch "OFF") all enabling circuits are activated. All input blocks are AND-connected to one another and affect all enabling circuits at the same time, whereby some are time-delayed.

Maintenance

During maintenance (key-operated switch "ON") only two of the four enabling circuits are activated. In this case, sensor input S2 (e.g. protective door) has no function. The hazardous area can be entered since the dangerous motion has been switched off via the two inactive enabling circuits. The sensor input S1 and the cascading input CAS/OS still affect the active enabling circuits.

Safety logic

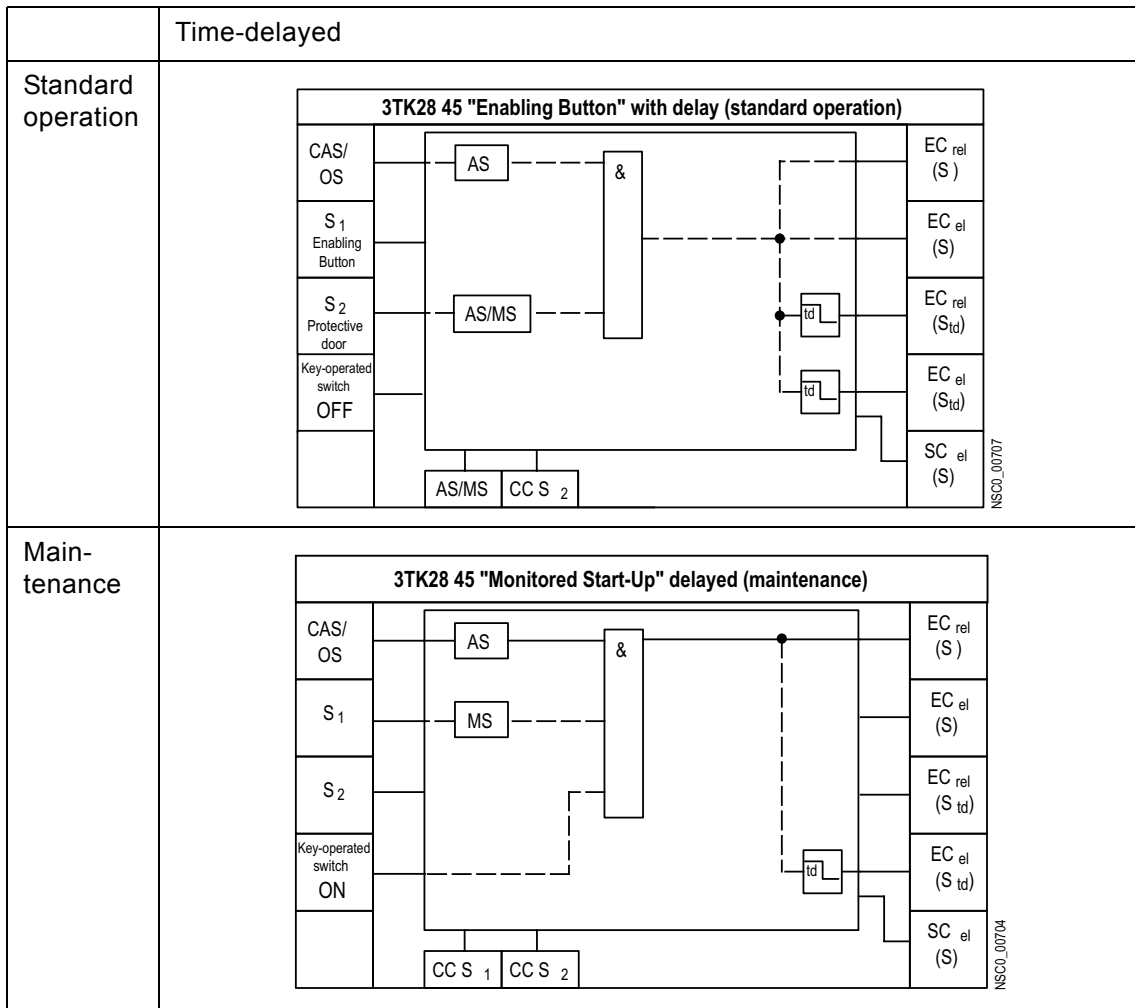














Table 2-7: Monitored start-up, time-delayed (simplified representation)














Connections: Monitored start-up instantaneous

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal	Output block	
	CAS / OS Automatic start-up	1	Cascading					
 or  or  or 	S₁ Monitored start-up	Y11 Y12	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel} (S)
		Y21 Y22				Safe electronic output instantaneous	24	EC_{el} (S)
		Y34	START button			Safe relay output instantaneous	33 34	EC_{rel} (S)
		Y35	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 					
 or  or 	S₂ Monitored start-up	Y41 Y42	Sensor connection			Safe electronic output instantaneous	44	EC_{el} (S)
		Y65			<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 		Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52
	Key-operated switch	Y72 Y82	Key-operated switch					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

Connections: Monitored start-up time-delayed

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal	Output block	
	CAS / OS Automatic start-up	1	Cascading					
 or  or  or 	S₁ Monitored start-up	Y11 Y12	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel} (S)
		Y21 Y22				Safe electronic output instantaneous	24	EC_{el} (S)
		Y34			START button		Safe relay output time delayed	37 38
		Y35	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 					
 or  or 	S₂ Monitored start-up	Y41 Y42	Sensor connection			Safe electronic output time delayed	48	EC_{el} (S_{td})
		Y51 Y52						
		Y65	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC_{el} (S)
	Key-operated switch	Y72 Y82	Key-operated switch					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

2.2.3 3TK2845-.EB.. "Enabling Button"

The 3TK2845-.EB.. has two sensor inputs (S1 enabling button with automatic start-up, S2 protective door with monitored start-up/automatic start-up), one cascading input (CAS/OS with automatic start-up) as well as one switching input (key-operated switch). On the output side there are two relay and two electronic enabling circuits as well as an electronic signaling output.

Standard operation

In standard operation (key-operated switch "OFF") all enabling circuits are activated. The cascading input CAS/OS and the protective door input S2 are AND-connected with each other and affect all enabling circuits at the same time, whereby some are time-delayed. Input S1 for the enabling button has no function in this context. The opening of the protective door or a missing signal at the cascading input CAS/OS deactivates all enabling circuits.

Maintenance

During maintenance (key-operated switch "ON") only two of the four enabling circuits are activated. In this case, sensor input S2 (e.g. protective door) has no function. The hazardous area can be entered since the dangerous motion has been switched off via the two inactive enabling circuits. The dangerous motion can be started again via the enabling button at sensor input S1 despite the protective door being open.

Safety logic

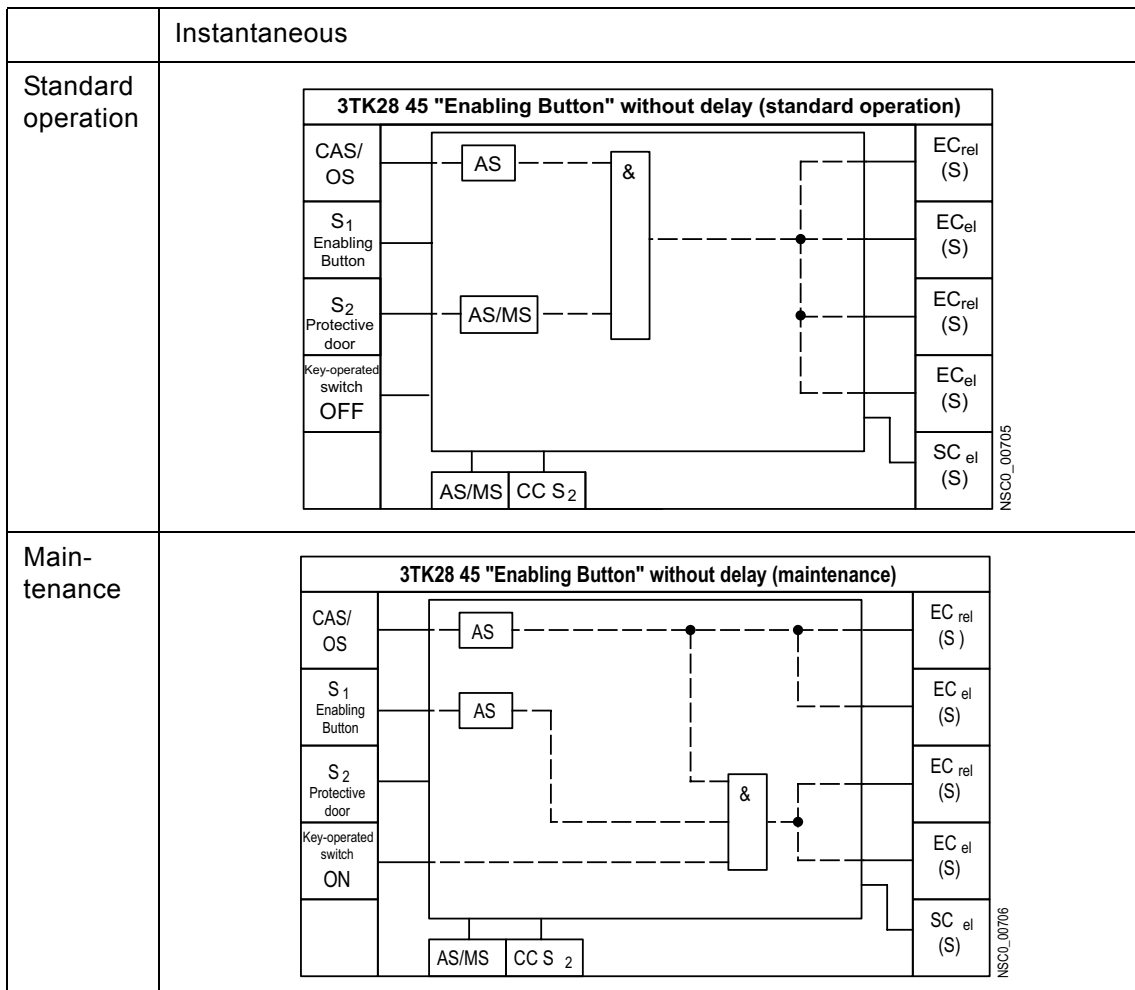


Table 2-8: Enabling button, instantaneous (simplified representation)

Safety logic

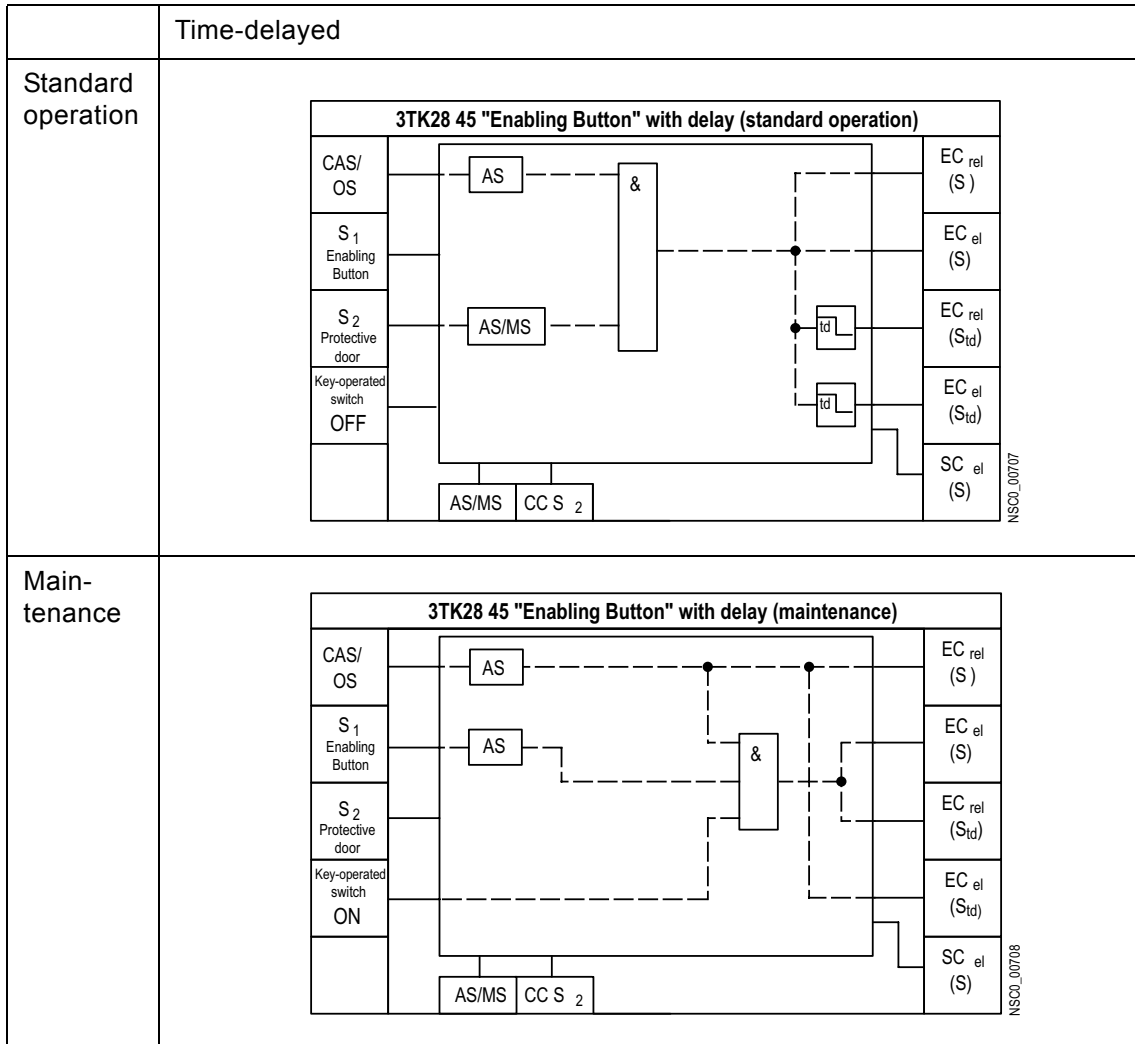










Table 2-9: Enabling button, time-delayed (simplified representation)









Connections: Enabling button instantaneous

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal	Output block	
	CAS / OS Automatic start-up	1	Cascading					
	S₁ Monitored start-up	Y11 Y12 Y21 Y22	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel} (S)
 or  or 	S₂	Y41 Y42 Y51 Y52	Sensor connection			Safe electronic output instantaneous	24	EC_{el} (S)
	Monitored start-up Automatic start-up	Y34	START button			Safe relay output instantaneous	33 34	EC_{rel} (S)
		Y32	<ul style="list-style-type: none"> Monitored start-up (not connected) Automatic start-up (with 24 V DC = terminal A1 connected) 			Safe electronic output instantaneous	44	EC_{el} (S)
		Y65	<ul style="list-style-type: none"> with cross-circuit detection (not connected) Without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC_{el} (S)
	Key-operated switch	Y72 Y82	Key-operated switch					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

Connections: Enabling button time-delayed

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal	Output block	
	CAS / OS Automatic start-up	1	Cascading					
	S₁ Monitored start-up	Y11 Y12 Y21 Y22	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel} (S)
 or  or 	S₂	Y41 Y42 Y51 Y52	Sensor connection			Safe electronic output instantaneous	24	EC_{el} (S)
	Monitored start-up Automatic start-up	Y34	START button			Safe relay output time delayed	37 38	EC_{rel} (S_{td})
		Y32	<ul style="list-style-type: none"> Monitored start-up (not connected) Automatic start-up (with 24 V DC = terminal A1 connected) 			Safe electronic output time delayed	48	EC_{el} (S_{td})
		Y65	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC_{el} (S)
	Key-operated switch	Y72 Y82	Key-operated switch					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

2.2.4 3TK2845-.FB.. "Spring Force Interlocked Tumbler"

The 3TK2845-.FB.. has two sensor inputs (S1 EMERGENCY-STOP with monitored start-up, S2 protective door with tumbler and monitored start-up), one cascading input (CAS/OS with automatic start-up) as well as one door enable input. On the output side there are one relay enable circuit and two electronic enabling circuits as well as a solenoid control output and an electronic signaling output.

Not enabled

If the protective door is not enabled, it cannot be opened. Cessation of the signal at the inputs S1 or CAS/OS deactivates the enabling circuits.

Enabled

The solenoid control output and the second electronic enabling circuit are activated via a signal to the door enable input after the delay time has passed. This enables the protective door.

Safety logic

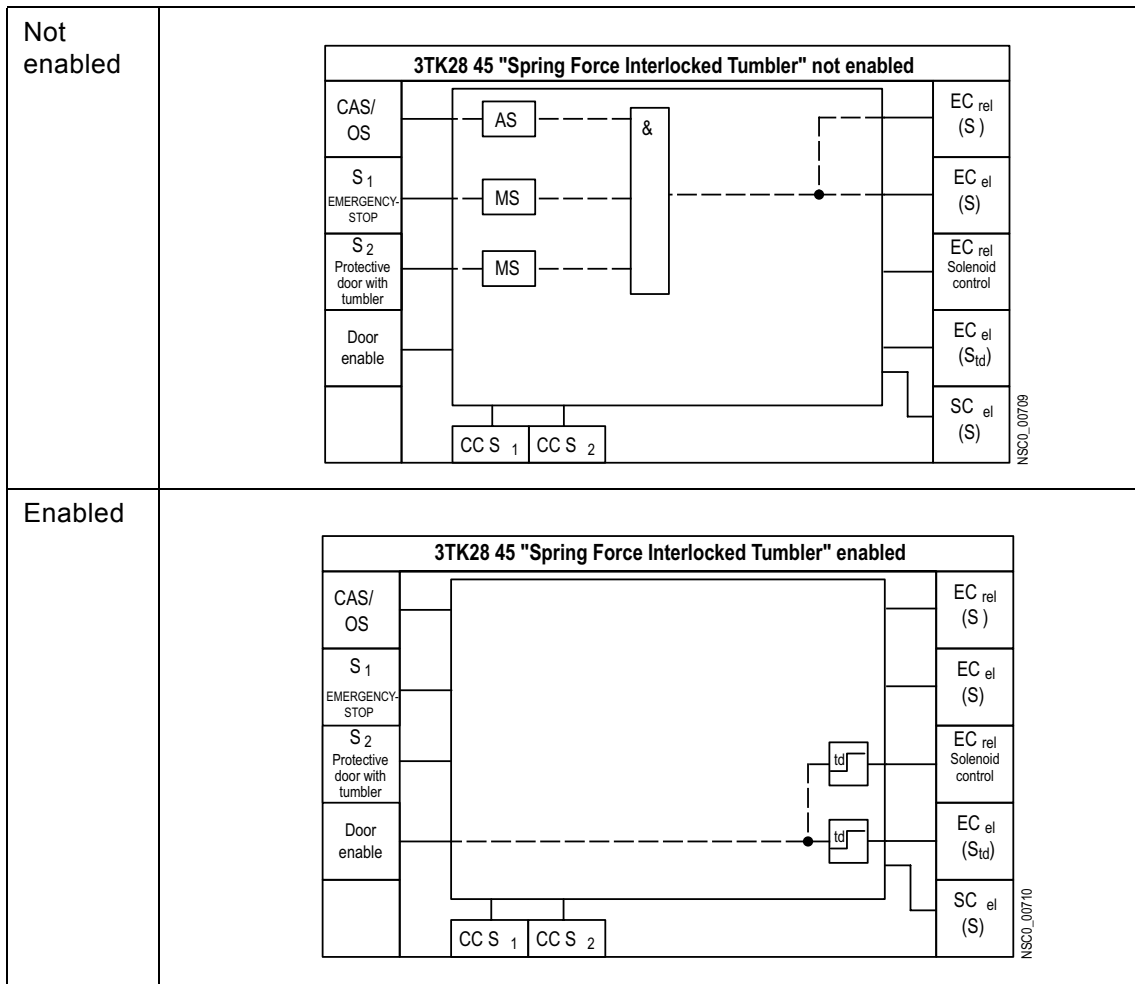










Table 2-10: Spring force interlocked tumbler (simplified representation)

Connections: Spring force interlocked tumbler

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal	Output block	
	CAS / OS Automatic start-up	1	Cascading					
	S ₁ Monitored start-up	Y11 Y12 Y21 Y22	Sensor connection			Safe relay output instantaneous	13 14	EC _{rel} (S)
		Y34	START button			Safe electronic output instantaneous	24	EC _{el} (S)
		Y35	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 					
 or  or 	S ₂ Monitored start-up	Y41 Y42 Y51 Y52	Sensor connection			safe relay output switch-on delay e.g. door lock	37 38	EC _{rel} (S _{td})
		Y65	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			safe electronic output switch-on delay e.g. door lock	48	EC _{el} (S _{td})
	Door enable	Y72	Solenoid monitoring			Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC _{el} (S)
		Y82	Door enable					
		Y64	Feedback circuit					

1) **Electronic signaling output**

Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

2.2.5 3TK2845-.GB.. "Magnetic Force Interlocked Tumbler"

The 3TK2845-.GB.. has two sensor inputs (S1 EMERGENCY-STOP with monitored start-up, S2 protective door with tumbler and monitored start-up), one cascading input (CAS/OS with automatic start-up) as well as one door enable input. On the output side there are one relay enable circuit and two electronic enabling circuits as well as a relay solenoid control output and an electronic signaling output.

Not enabled

If the protective door is not enabled, it cannot be opened. Cessation of the signal at the inputs S1 or CAS/OS deactivates the enabling circuits (13, 14; 24).

Enabled

The solenoid control output and the second electronic enabling circuit are deactivated via a signal to the door enable input after the delay time has passed. This enables the protective door.

Safety logic

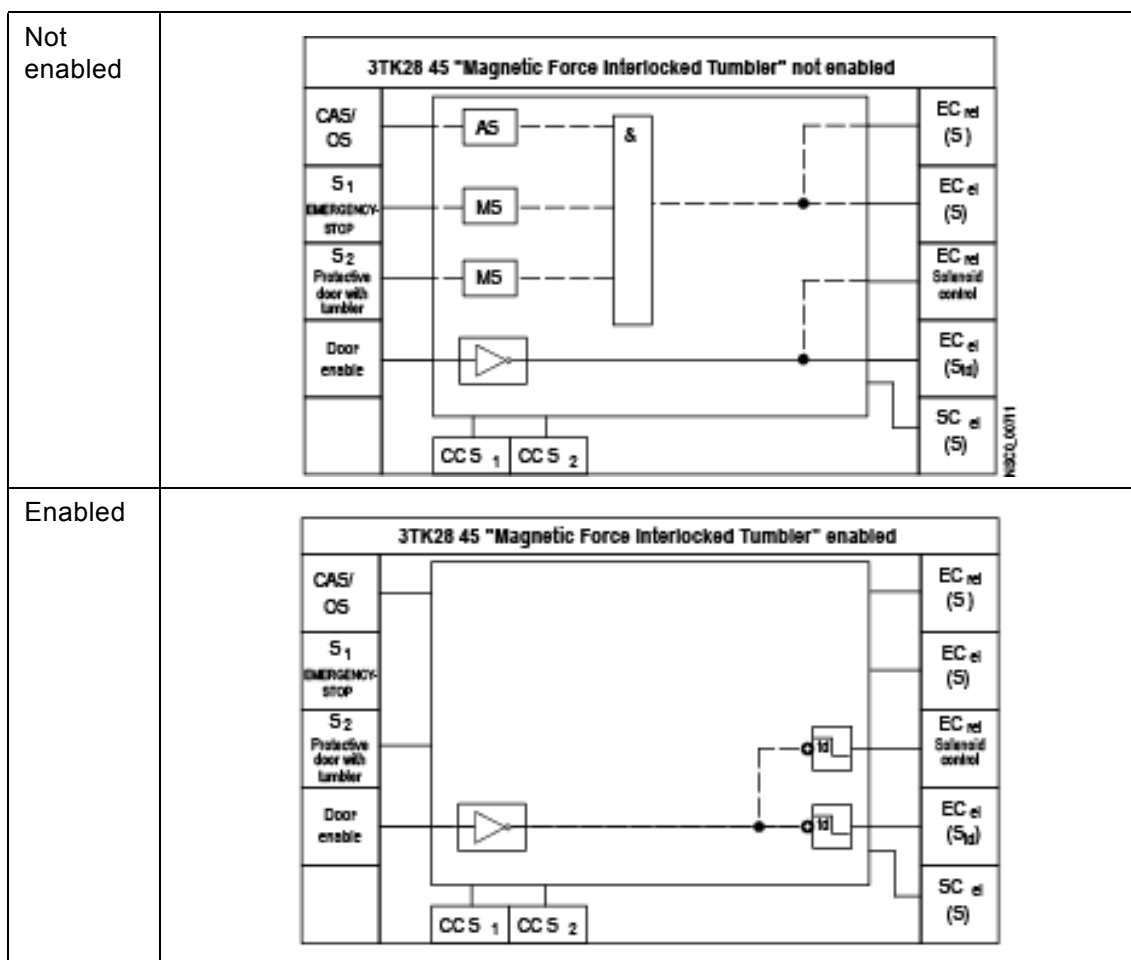










Table 2-11: Magnetic force interlocked tumbler (simplified representation)

Connections: Magnetic force interlocked tumbler

Sensor	Input block	Terminals	Description	S a f e t y l o g i c	Description	Terminal	Output block	
	CAS / OS Automatic start-up	1	Cascading					
	S₁ Monitored start-up	Y11 Y12	Sensor connection			Safe relay output instantaneous	13 14	EC_{rel} (S)
		Y21 Y22						
		Y34			START button			
		Y35	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Safe electronic output instantaneous	24	EC_{el} (S)
 or  or 	S₂ Monitored start-up	Y41 Y42	Sensor connection			Safe relay output with opening time delay e.g. door lock	37 38	EC_{rel} (S_{td})
		Y51 Y52						
		Y65	<ul style="list-style-type: none"> with cross-circuit detection (not connected) without cross-circuit detection (with 24 V DC = terminal A1 connected) 			Safe electronic output With opening time delay e.g. door lock	48	EC_{el} (S_{td})
	Door enable	Y72	Solenoid monitoring			Electronic signaling output ¹⁾ (should not be used for safety-related applications)	52	SC_{el} (S)
		Y82	Door enable					
		Y64	Feedback circuit					

1) Electronic signaling output	
Enabling circuit active:	Signaling output OFF
Enabling circuit inactive:	Signaling output ON
Key-operated switch operation:	Signaling output clocked (approx. 1.2 Hz)

Technical Data

3

Chapter	Subject	Page
3.1	Technical Data	3-2
3.2	Terminals	3-3
3.3	Terminal Assignment	3-5
3.4	Dimensional Drawings	3-6

3.1 Technical Data

Type	3TK2845-.....
Specifications	EN 60204-1, EN 954-1, IEC 61508
EMC	EN 60947-5-1
Category according to EN 954-1	4
Safety Integrity Level (SIL)	3
Test certifications	TÜV (German Technical Inspectorate)
Rated insulation voltage U_i	300 V
Rated impulse withstand voltage U_{imp}	4 kV
Rated supply voltage U_s	24 V DC
Operating range	0.85 to 1.15 U_s
Rated power consumption	2.5 W
Short-circuit protection	Short-circuit-proof, use fuse links at the isolated protected outputs: LV type 3NA, DIAZED type 5SB, NEOZED type 5SE
Switching frequency z during rated operation	2000 1/h
Response time	max. 60 ms
Release time, (Stop category 0) during EMERGENCY-STOP	45 ms
Release time, (Stop category 1) at the safe outputs during EMERGENCY-STOP	max. 300 seconds (adjustable)
Mains buffering	25 ms
Recovery time during EMERGENCY-STOP/ power failure	min. 200 ms/min. 8 seconds
Min. recommended duration of EMERGENCY-STOP command	30 ms
Duration of command for START button	0.2 to 5 seconds
Permissible ambient temperature T_a during operation and storage	-25 up to +50 °C/-40 up to +80 °C
Total resistance of sensor circuit R_{SG}	Max. 250 Ω
Total capacity of sensor circuit C_{SG}	Max. 500 nF
Degree of protection according to EN 60529, casing/terminals	IP20
Shock-hazard protection, DIN VDE 0106/Part 100	Protection against direct contact
Weight	0.4 kg
Permissible mounting position	Any
Shock resistance	Sine wave 8/10 and 15/5 g/ms

Table 3-1: Technical Data

Type	3TK2845-.....
PFH	6.303×10^{-11}
SFF [%]	97.17
T1	10 years

Table 3-1: Technical Data

Rated operating currents I_e according to IEC 60 947-5-1

Notice

A 4 A gL/gG quick fuse (DIN EN60947-5-1) must be connected upstream of the device as short-circuit protection.

Terminal(s)	Utilization category	Rated operating voltage U_e	Rated operating current I_e
13, 14; 33, 34; 37, 38	DC-13	24 V	1.0 A
13, 14; 33, 34; 37, 38	AC-15	230 V	3.0 A
24; 44; 48	DC-13	24 V	1.0 A
52	DC-13	24 V	0.5 A

Table 3-2: Rated operating currents I_e

3.2 Terminals

The 3TK2845 multifunction device has a total of 24 terminals available in either screw connection technology or spring-loaded terminal connection technology, which are suitable for the following terminal cross sections:

- Terminal connection
 - finely stranded with end sleeve 2 x 0.5 up to 1.5 mm²;
1 x 0.5 up to 2.5 mm²
 - single-wire 2 x 0.5 up to 2.5 mm²;
1 x 0.5 up to 4 mm²

Cable cross section, single or multi-stranded: 2 x AWG 20 up to 14

Tightening torque: 0.8 to 1.2 Nm

- Spring-loaded terminals (1 or 2 cables are connectable at each terminal)
 - single-wire 2 x 0.25 up to 1.5 mm²
 - finely stranded with end sleeve 2 x 0.25 up to 1.0 mm²
 - finely stranded without end sleeve 2 x 0.25 up to 1.5 mm²

Cable cross-section, solid or stranded: 2 x AWG 24 up to 16

The rated supply voltage U_s (24 V DC) is applied at terminals A1(L+) and A2(M).

The terminals have degree of protection IP20 according to EN 60 529.

Protection against direct contact is given as shock-hazard protection according to DIN VDE 0106, Part 100.

3.3 Terminal Assignment

3TK2845-1DB40
 3TK2845-1HB40
 3TK2845-1FB40
 3TK2845-1GB40

3TK2845-1EB40

3TK2845-1DB41/42/44
 3TK2845-1HB41/42/44
 3TK2845-1FB41/42/44
 3TK2845-1GB41/42/44

3TK2845-1EB41/42/44

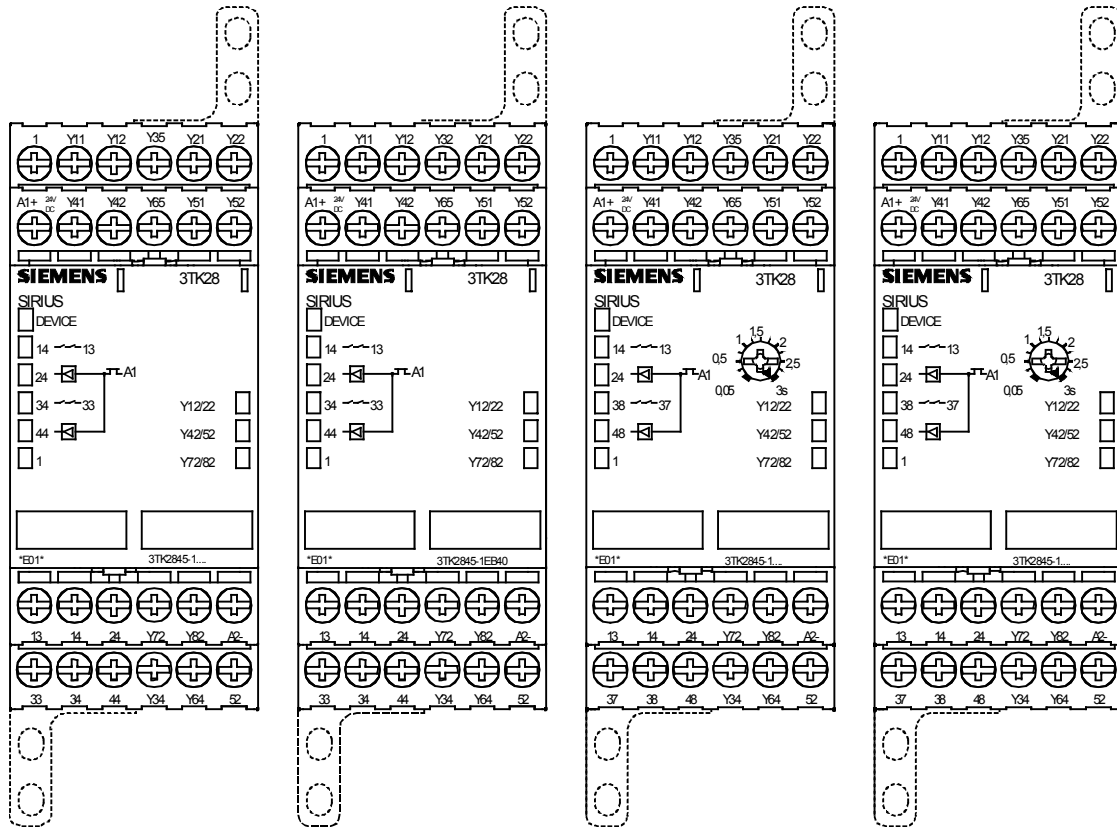


Fig. 3-1: Terminal assignment

3.4 Dimensional Drawings

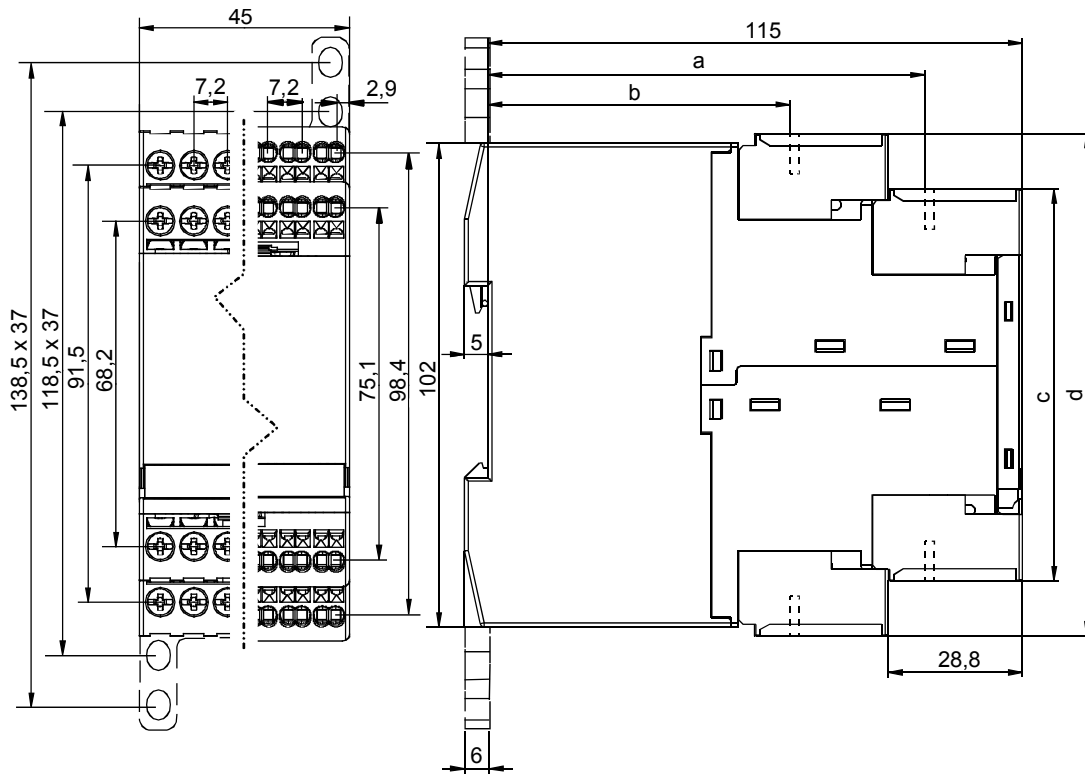


Fig. 3-2: Dimensional drawing

	3TK2845-1...	3TK2845-2...
a	94	-
b	65	-
c	82,6	84,8
d	105,9	107,7

Mounting, Wiring, Initial Start-up

4

Chapter	Subject	Page
4.1	Mounting and Coding	4-3
4.2	Wiring	4-4
4.3	Meaning of the LED Indicators	4-6



Warning

Dangerous electrical voltage! Can result in electrical shock and burns. Shut off all electricity prior to working on the system and device.

Notice

Depending on the ambient conditions, the devices must be installed in switchgear cabinets exhibiting degree of protection IP23, IP43 or IP54.

Notice

The actuators/sensors must be actuated at least once a year. (Fault detection according to IEC 61508)

4.1 Mounting and Coding

The 3TK2845 multifunction device is designed for snap-on mounting on a 35 mm standard mounting rail complying with EN 50 022. The devices can also be screw mounted with two push-in lugs, order number 3RP1903.

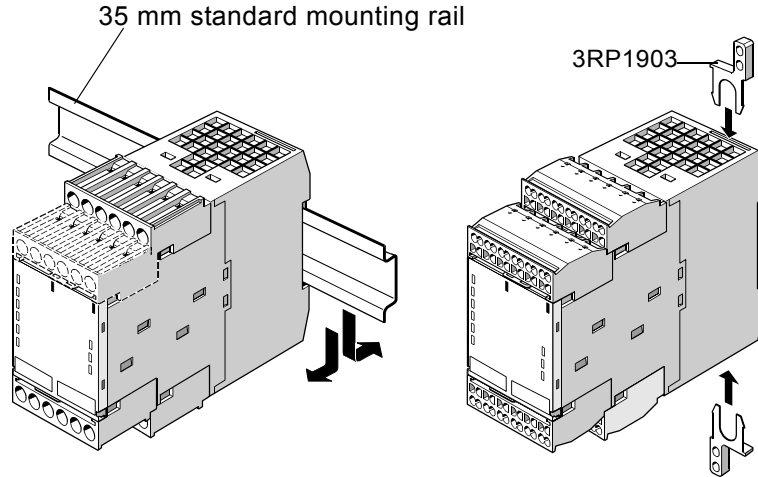


Fig. 4-1: 3TK2845 multifunction device for snap-on or screw mounting

Removable terminals simplify exchanging the device according to need. The terminals are coded to prevent a mix-up.



Warning

Before exchanging the terminals, disconnect power from system and device.

The terminal blocks can be disconnected in the order **a, b** and can be connected in the order **c, d**.

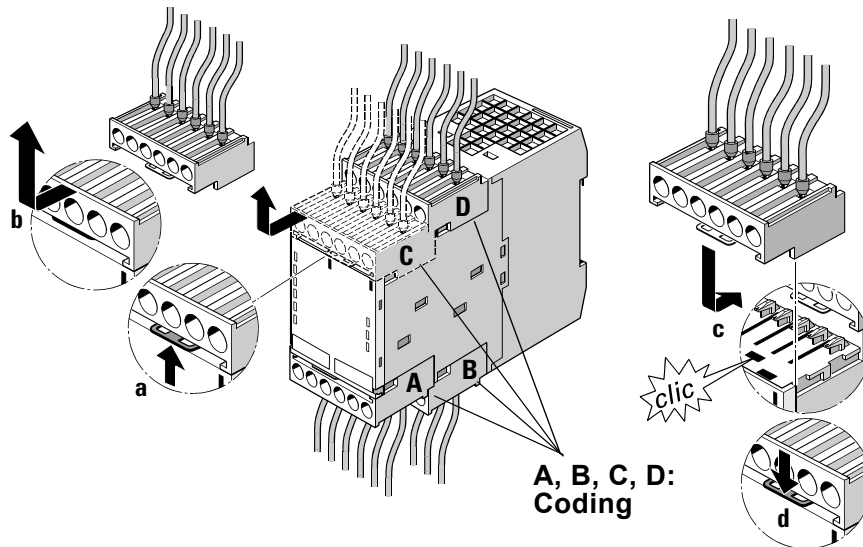


Fig. 4-2: Mounting and coding of the removable terminals

4.2 Wiring

The 3TK2845 multifunction device is available either with screw connections or spring-loaded terminal connections. Please refer to the table below for the required terminal cross sections and maximum permissible torques.

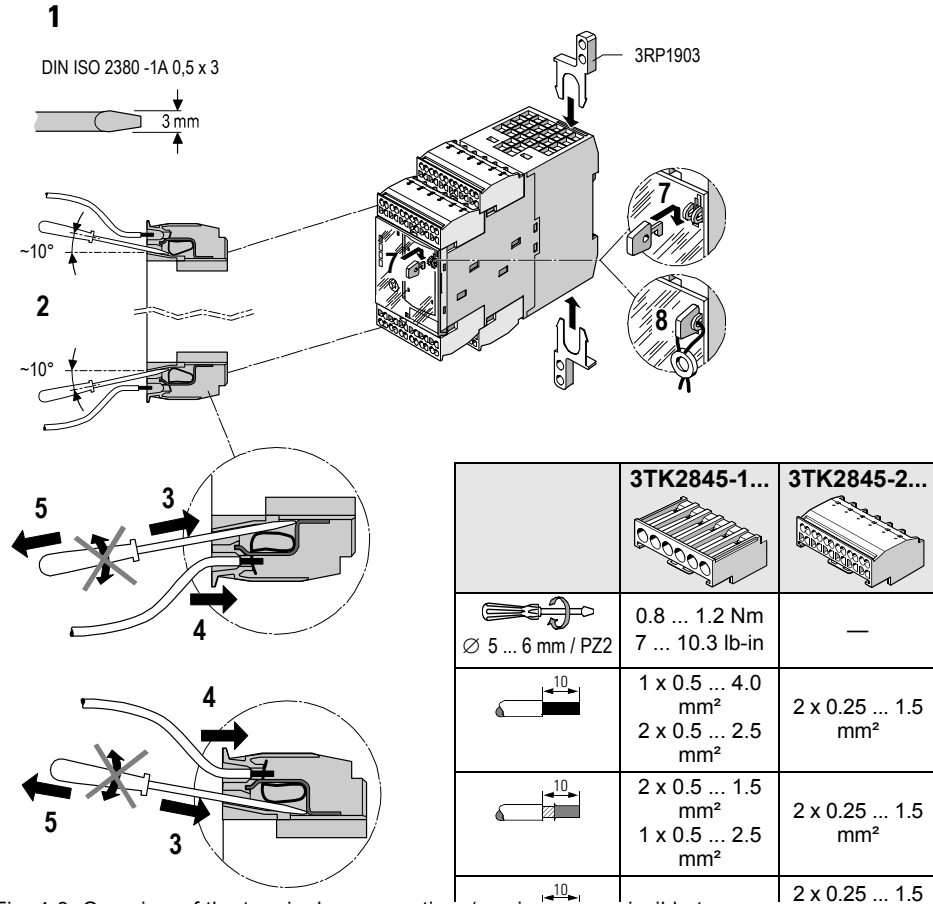


Fig. 4-3: Overview of the terminal cross sections/maximum permissible torques



Warning

Use a power pack complying with IEC 60 536 safety class III (SELV or PELV) as the power supply.



Caution

For the non-floating outputs (24, 44, 48, 52) it must be ensured that the actuators or consumers to be switched have the same earth potential as the 3TK2845.

Notice

External loads must be equipped with a protective circuit which is suitable for the respective load (e.g. RC elements, varistors, suppressors) to reduce electromagnetic interference and to enhance the service life of the OSSD.

The 3TK2845 multifunction device is ready for operation after the power supply is connected at terminals A1 and A2. The device runs a self-test during which

the proper functionality of the internal electronics is checked. The internal circuit elements are cyclically monitored for faults during operation.

Activating any sensor leads to a safe switching-off of the multifunction device.

Devices equipped with a time delay (3TK2845-B41/B42/B44) have a sealable cover cap to protect the set delay time against unauthorized changes.

It can be ordered as accessory (order number 3RP19 02).

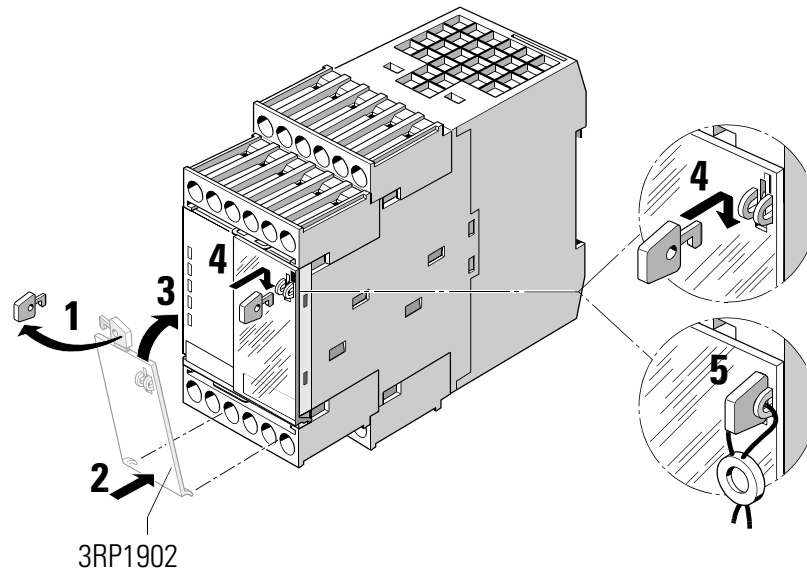


Fig. 4-4: Sealable cover cap

4.3 Meaning of the LED Indicators

Nine LEDs indicate the operating status and the function of the device.

Display during self-test:

2 s lamp test: all LEDs light up, i.e. the two-color "DEVICE" LED lights up yellow and then the device LED blinks green for approximately 4 seconds.

LED		Meaning
Device	OFF	No supply voltage / supply voltage too low or internal fuse tripped.
	Green	Supply voltage in permissible operating range
	Green blinking	Self-test after restart
	Red	Device defective → exchange device
	Red blinking	Sensor fault (cross-circuit, configuration changed during operation) → remedy fault and restart device
14 -- 13	OFF	Output passive
	Green	Output active
24	Off	Output passive
	Green	Output active
	Green blinking	Feedback circuit open
34 -- 33 (38 -- 37)	OFF	Output passive
	Green	Output active
44 (48)	OFF	Output passive
	Green	Output active
	Green blinking	Feedback circuit open
Y 12/22	OFF	Input passive (switch-on condition not fulfilled)
	Green	Input active If the device LED flashes red: Configuration has been changed during operation.
	Green blinking	Cross-circuit at the input (device blinks red), Sensor simultaneity not fulfilled
Y 42/52	OFF	Input passive (switch-on condition not fulfilled)
	Green	Input active If the device LED flashes red: Configuration has been changed during operation.
	Green blinking	Cross-circuit at the input (device blinks red), Sensor simultaneity not fulfilled
Y 72/82	OFF	Input passive
	Green	Input active

Table 4-1: Meaning of the LED Display

Applications

5

The following chapter lists common applications. The 3TK2845 multifunction device can be used for all of these applications. The advantage of using this device is the fact that several safety-related functions, e.g. protective door monitoring, monitoring functions using non-contact protective equipment (BWS), such as light curtains, safety mats and EMERGENCY-STOP control switches, can be implemented using only one 3TK2845 multifunction device rather than using several safety relays. In addition, the device is also suited for operational switching, cascading and adding safety relays (either using contacts or switching electronically).

This chapter contains only a few examples of possible applications. Depending on the application, the wiring can differ from the examples shown here.

Chapter	Subject	Page
5.1	Monitoring an EMERGENCY-STOP control switch with monitored start-up, protective door monitoring with automatic start-up and maintenance according to Category 4, EN 954-1.	5-2
5.2	Monitoring an EMERGENCY-STOP control switch with monitored start-up and a protective door with automatic start-up and maintenance according to Category 4, EN 954-1.	5-4
5.3	Monitoring an EMERGENCY-STOP control switch and a protective door with monitored start-up and maintenance according to Category 4, EN 954-1.	5-6
5.4	Monitoring an EMERGENCY-STOP control switch with monitored start-up and a protective door with automatic start-up and maintenance according to Category 4, EN 954-1.	5-8
5.5	Monitoring an EMERGENCY-STOP control switch and a protective door with monitored start-up and maintenance with enabling button according to Category 4, EN 954-1.	5-10
5.6	Monitoring an EMERGENCY-STOP control switch and protective door monitoring with tumbler (spring force, locked when de-energized) according to Category 4, EN 954-1.	5-12
5.7	Monitoring an EMERGENCY-STOP control switch and protective door monitoring with tumbler (magnetic force, locked when switched on) according to Category 4, EN 954-1.	5-14

5.1 3TK2845-.HB40 "Monitored Start-up and Automatic Start-up", Instantaneous Outputs

Brief description:

Monitoring an EMERGENCY-STOP control switch with monitored start-up, protective door monitoring with automatic start-up and maintenance according to Category 4, EN 954-1.

Properties:

Stop category 0 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
 U_s 24 V DC

Function: Standard operation:

When the EMERGENCY-STOP control switch is activated, outputs 14, 24 (M1) and 34, 44 (M2) switch off. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the feedback circuit at Y64 is closed and the START button Y34 is activated.

When the protective door is activated, outputs 14, 24 (M1) and 34, 44 (M2) also switch off.

The outputs are automatically switched back on again when the protective door is closed.

Maintenance:

When the key-operated switch is operated, outputs 34, 44 (M2) switch off and the position switches of the protective door are not evaluated. When the key-operated switch is operated once again with the protective door closed, outputs 34, 44 (M2) switch on automatically.

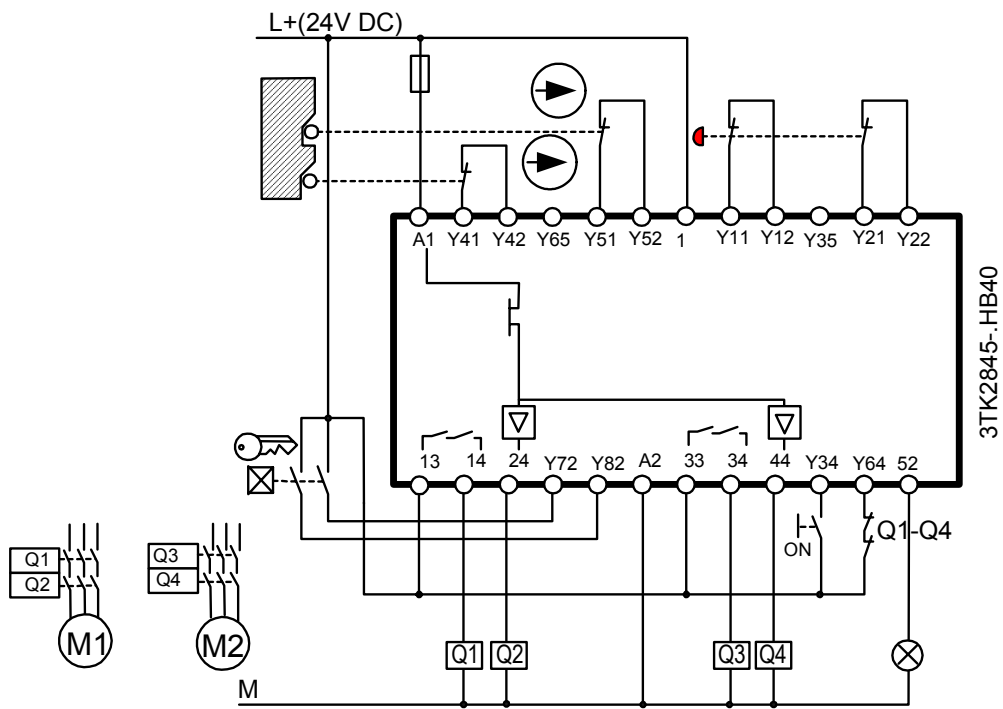
When the EMERGENCY-STOP control switch is activated during maintenance, outputs 14 and 24 (M1) also switch off. The outputs can only be switched back on again when the EMERGENCY-STOP control switch releases, the feedback circuit at Y64 is closed and the START button Y34 is activated.

Note:

Connecting several position switches in series for protective door monitoring is not permissible for Category 4 according to EN 954-1 (fault detection).

Notice

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.



5.2 3TK2845-.HB41 "Monitored Start-up and Automatic Start-up", Time-Delayed Outputs

Brief description:

Monitoring an EMERGENCY-STOP control switch with monitored start-up, and a protective door with automatic start-up and maintenance according to Category 4, EN 954-1.

Properties:

Stop category 0/1 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
Us 24 V DC

Function: Standard operation:

When the EMERGENCY-STOP control switch is activated, outputs 14 and 24 (M1) switch off instantaneously and outputs 38 and 48 (M2) switch off as soon as the specified time has expired. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the feedback circuit at Y64 is closed and the START button Y34 is activated.

When the protective door is operated, outputs 14, 24 (M1) also switch off instantaneously and 38 and 48 (M2) switch off with a time delay.

The outputs are automatically switched back on again when the protective door is closed.

Maintenance:

When the key-operated switch is operated, output 24 switches off instantaneously and output 38 switches off with a time delay. The position switches of the protective door are not evaluated. When the key-operated switch is operated once again with the protective door closed, outputs 24 and 38 switch on automatically.

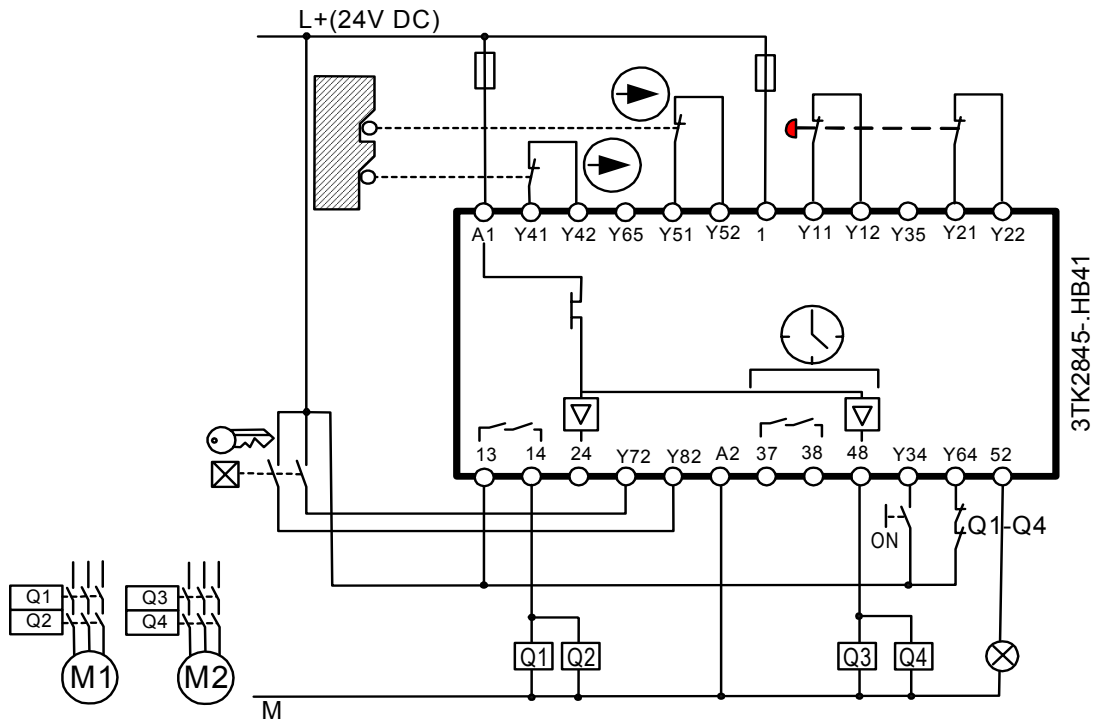
When the EMERGENCY-STOP control switch is activated during maintenance, output 14 switches off instantaneously and output 48 switch off with a time delay. The outputs can only be switched back on again when the EMERGENCY-STOP control switch releases, the feedback circuit at Y64 is closed and the START button Y34 is activated.

Note:

Connecting several position switches in series for protective door monitoring is not permissible for Category 4 according to EN 954-1 (fault detection).

Notice

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.



5.3 3TK2845-.DB40 "Monitored Start-Up", Instantaneous Outputs

Brief description:

Monitoring an EMERGENCY-STOP control switch and a protective door with monitored start-up and maintenance according to Category 4, EN 954-1.

Properties:

Stop category 0 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
Us 24 V DC

Function: Standard operation:

When the EMERGENCY-STOP control switch or the protective door is activated, outputs 14, 24 (M1) and 34, 44 (M2) switch off. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the protective door is closed, the feedback circuit at Y64 is closed and the START button at Y34 is activated.

Maintenance:

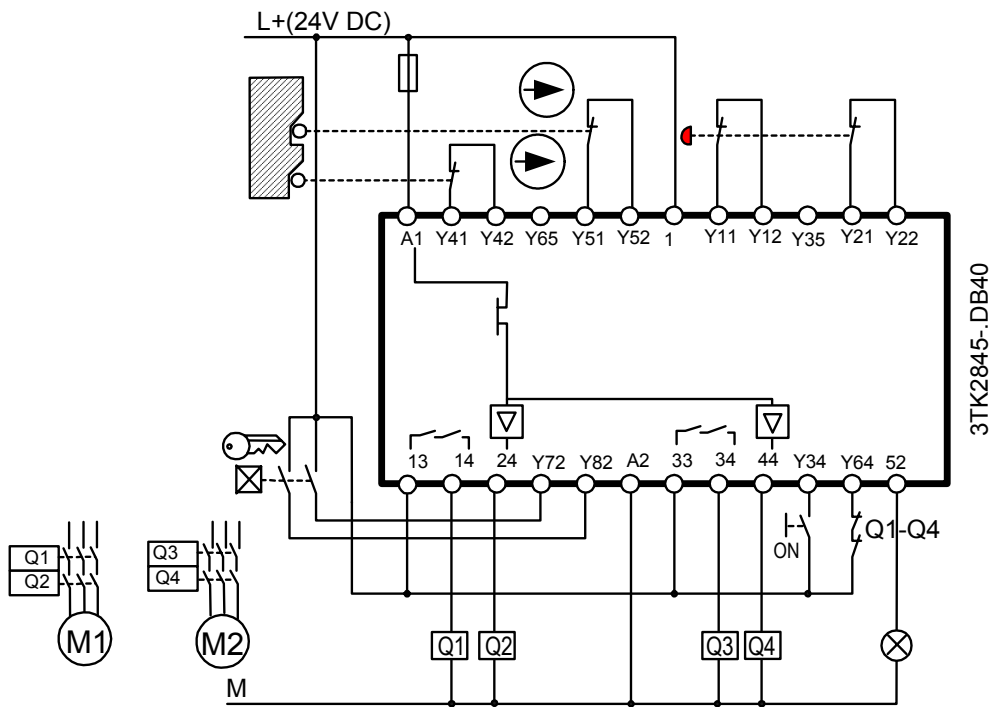
When the key-operated switch is operated, outputs 34, 44 (M2) switch off and the position switches of the protective door are not evaluated. When the key-operated switch is operated once again with the protective door closed and the START button Y34 is activated, outputs 34, 44 (M2) switch on. If, however, the protective door is not opened after the key-operated switch was activated, outputs 34, 44 (M2) automatically switch on after the key-operated switch is activated once again.

Note:

Connecting several position switches in series for protective door monitoring is not permissible for Category 4 according to EN 954-1 (fault detection).

Notice

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.



5.4 3TK2845-.DB41 "Monitored Start-Up", Time-Delayed Outputs

Brief description:

Monitoring an EMERGENCY-STOP control switch with monitored start-up, and a protective door with automatic start-up and maintenance according to Category 4, EN 954-1.

Properties:

Stop category 0/1 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
Us 24 V DC

Function: Standard operation:

When the EMERGENCY-STOP control switch is activated, outputs 14 and 24 (M1) switch off instantaneously and outputs 38 and 48 (M2) switch off as soon as the specified time has expired. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the feedback circuit at Y64 is closed and the START button on Y34 is activated.

When the protective door is operated, outputs 14, 24 (M1) also switch off instantaneously and 38 and 48 (M2) with a time delay.

The outputs are automatically switched back on again when the protective door is closed.

Maintenance:

When the key-operated switch is operated, output 24 switches off instantaneously and output 38 switches off with a time delay. The position switches of the protective door are not evaluated. When the key-operated switch is operated once again with the protective door closed, outputs 24 and 38 switch on automatically.

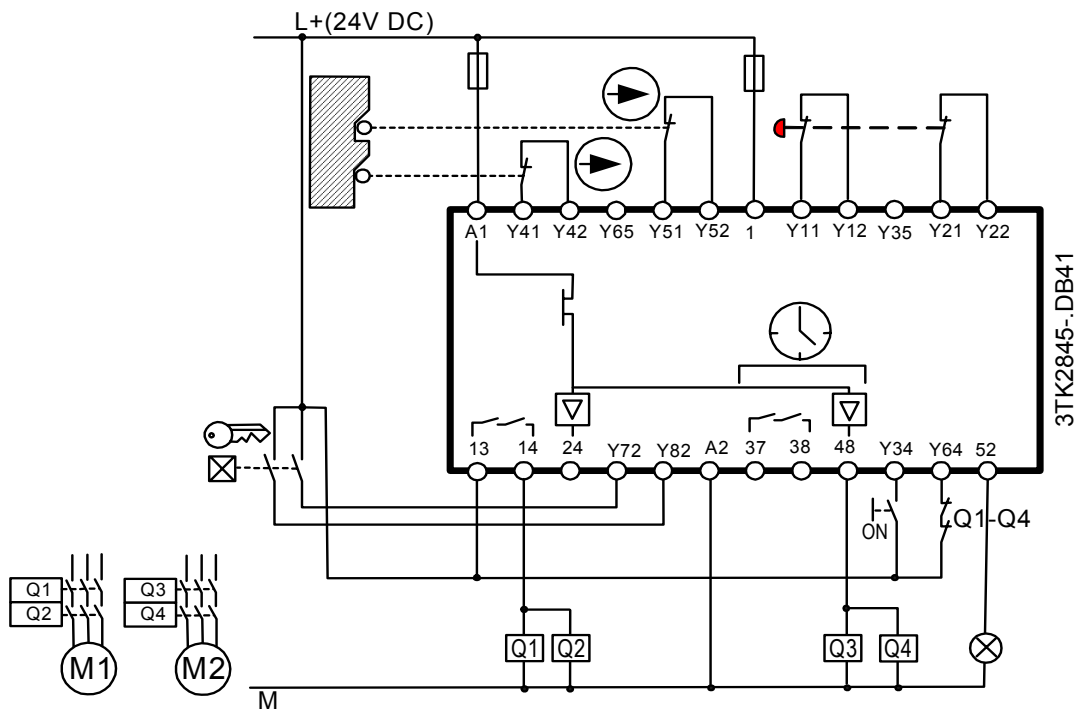
When the EMERGENCY-STOP control switch is activated during maintenance, output 14 switches off instantaneously and output 48 with a time delay. The outputs can only be switched back on again when the EMERGENCY-STOP control switch releases, the feedback circuit at Y64 is closed and the START button Y34 is activated.

Note:

Connecting several position switches in series for protective door monitoring is not permissible for Category 4 according to EN 954-1 (fault detection).

Notice

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.



5.5 3TK2845-.EB40 "Enabling Button"

Brief description:

Monitoring an EMERGENCY-STOP control switch and a protective door with monitored start-up and maintenance with enabling button according to Category 4, EN 954-1.

Properties:

Stop category 0 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
U_s 24 V DC

Function: Standard operation:

When the EMERGENCY-STOP control switch or the protective door is activated, outputs 14, 24 (M1) and 34, 44 (M2) switch off. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the protective door is closed, the feedback circuit at Y64 is closed and the START button at Y34 on the 3TK281-.BB40 is activated.

Maintenance:

When the key-operated switch is operated, outputs 34, 44 (M2) switch off and the position switches of the protective door are not evaluated. If the enabling button is activated, outputs 34, 44 (M2) are switched on. When the key-operated switch is operated once again with the protective door closed and the ON button Y34 is activated, outputs 34, 44 (M2) switch on. If, however, the protective door is not opened after the key-operated switch was activated, outputs 34, 44 (M2) automatically switch on after the key-operated switch is activated once again.

Note:

Terminal Y32 can be used to choose between autostart (24 V) and monitored start (0 V) for protective door input (Y41/Y42 and Y51/Y52).

Note:

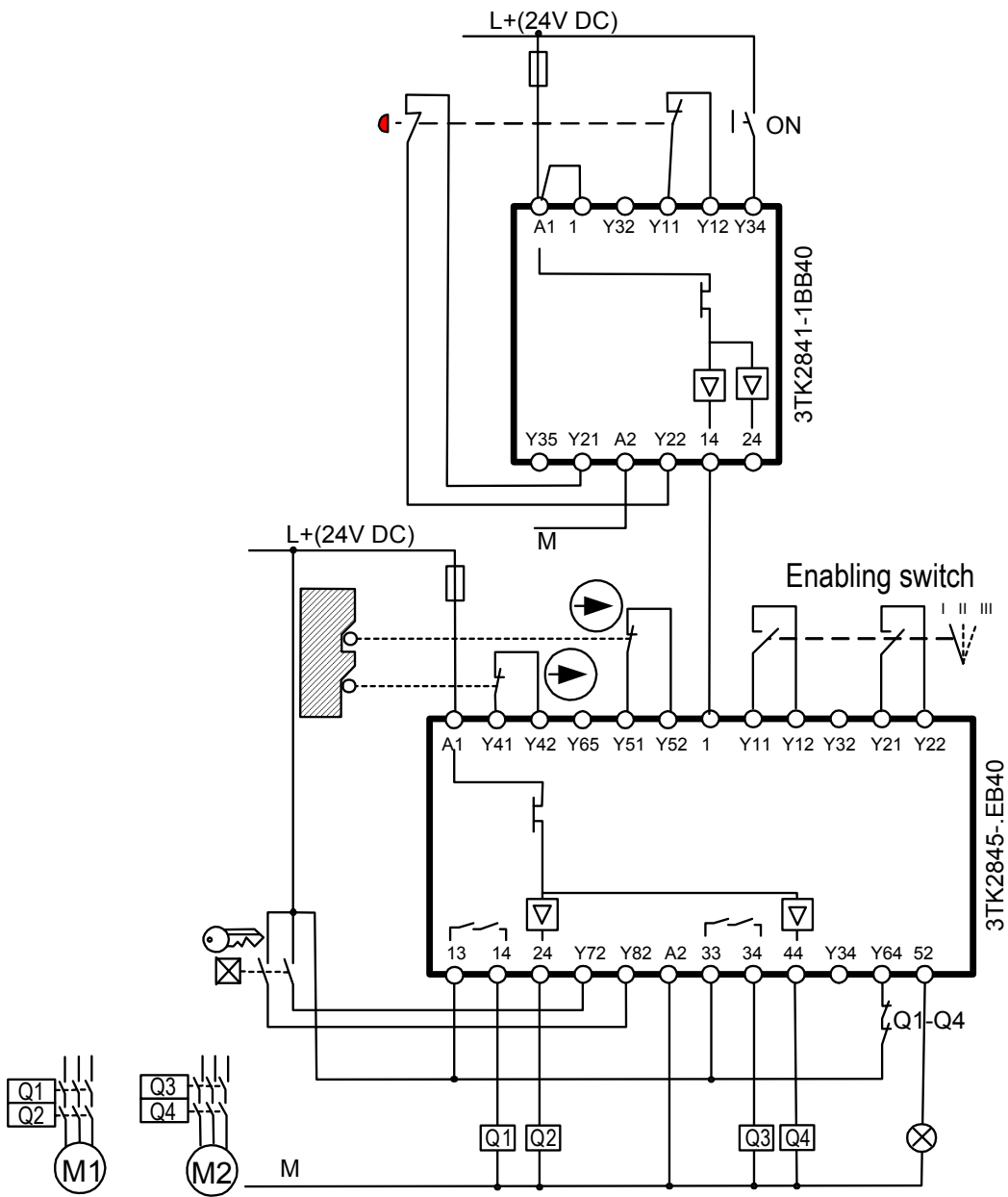
Connecting several position switches in series for protective door monitoring is not permissible for Category 4 according to EN 954-1 (fault detection).

Notice:

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.

Notice:

If faults can be excluded (protected wiring of the control cable), the application's safety category is the same as the safety category of the higher-level safety relay.



5.6 3TK2845-.FB41/2/4 "Spring Force Interlocked Tumbler"

Brief description:

Monitoring an EMERGENCY-STOP control switch and protective door monitoring with tumbler (spring force, locked when de-energized) according to Category 4, EN 954-1.

Properties:

Stop category 0 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
U_s 24 V DC

Function: Locked:

When the EMERGENCY-STOP control switch is activated, outputs 14, 24 (M1) switch off. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the protective door locks, the feedback circuit at Y64 is closed and the START button Y34 is activated.

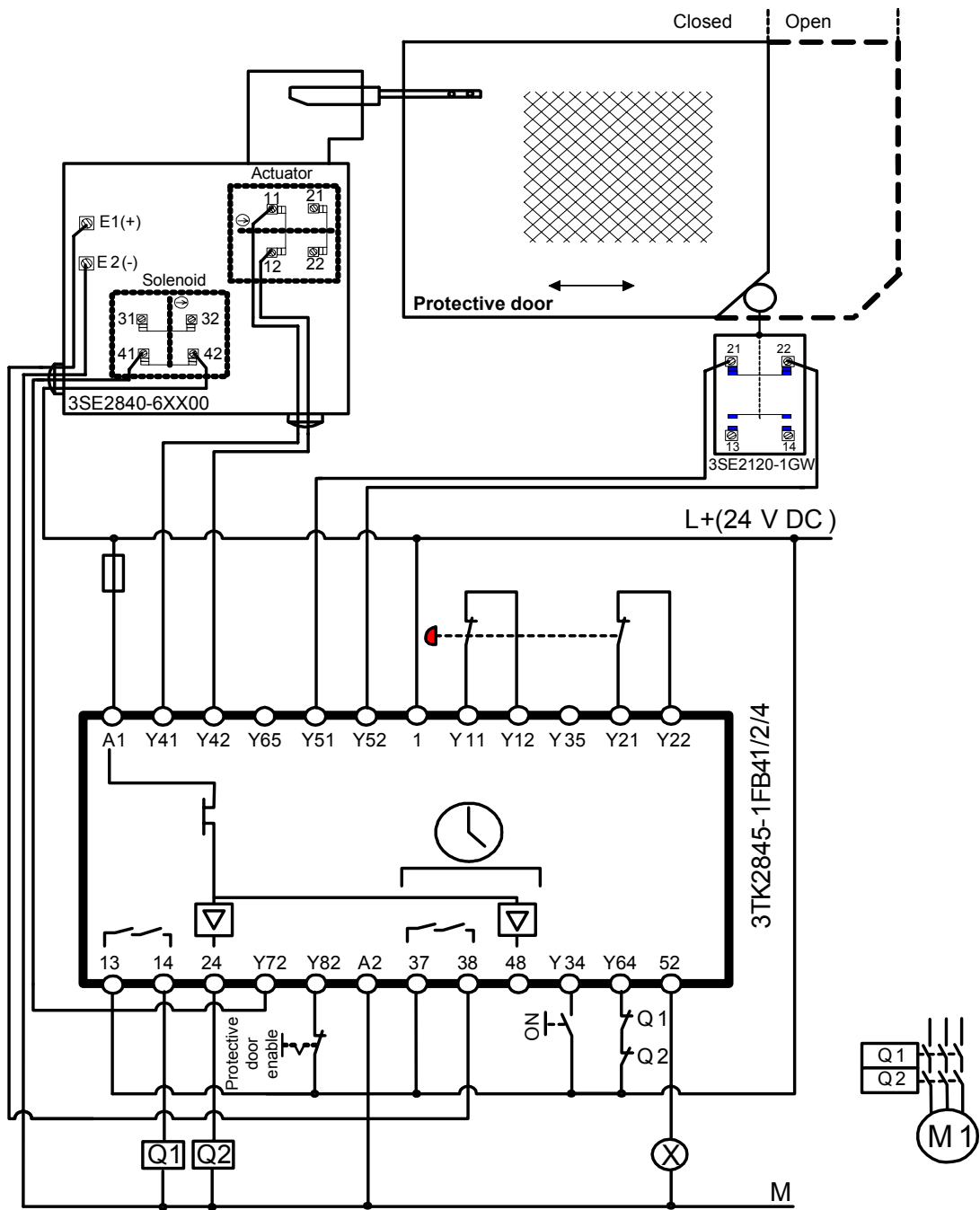
Enabled:

When the protective door enable Y28 is activated, outputs 14, 24 (M1) switch off and outputs 38, 48 (solenoid control) are switched on with a time delay and the protective door is released. When the protective door enable is activated once again, outputs 38, 48 are switched off and the protective door is locked. Outputs 14, 24 (M1) can be switched back on again when the EMERGENCY-STOP control switch releases, the protective door locks, the feedback circuit at Y64 is closed and the START button Y34 is activated. If the protective door is not opened when released, the device starts automatically after the door locks.

When the EMERGENCY-STOP control switch is activated and the protective door enable is activated after the delay time set on the device has elapsed, outputs 38, 48 are switched on immediately.

Notice

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.



5.7 3TK2845-.GB41/2/4 "Magnetic Force Interlocked Tumbler"

Brief description:

Monitoring an EMERGENCY-STOP control switch and protective door monitoring with tumbler (magnetic force, locked when switched on) according to Category 4, EN 954-1.

Properties:

Stop category 0/1 according to EN 60204-1;
Two electronic enabling circuits;
Two floating enabling circuits;
One electronic signaling output;
U_s 24 V DC

Function: Locked:

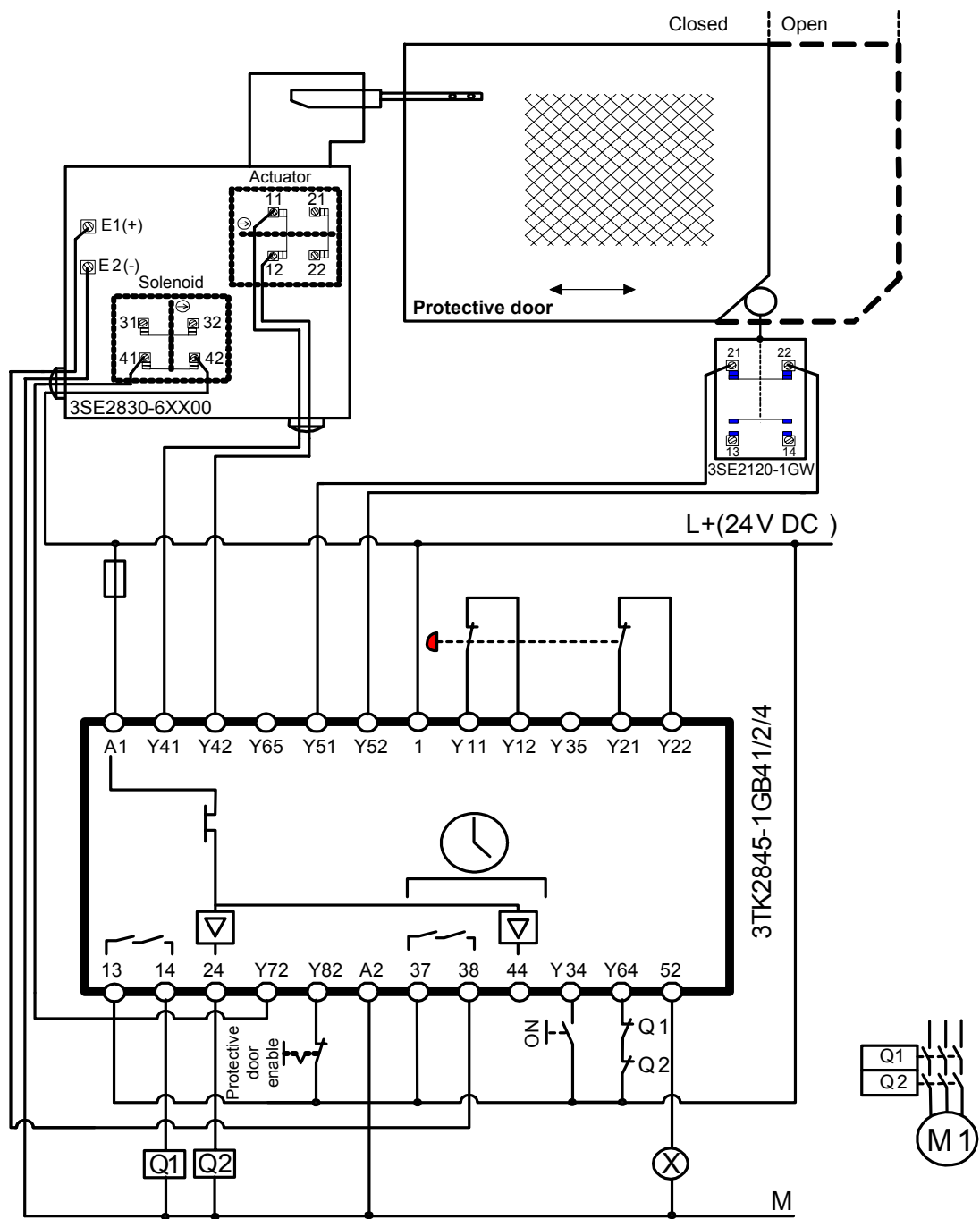
When the EMERGENCY-STOP control switch is activated, outputs 14, 24 (M1) switch off. The outputs are switched back on again when the EMERGENCY-STOP control switch releases, the protective door locks, the feedback circuit at Y64 is closed and the START button Y34 is activated.

Enabled:

When the protective door enable Y82 is activated, outputs 14, 24 (M1) switch off and outputs 38, 48 (solenoid control) are switched off with a time delay and the protective door is released. When the protective door enable is activated once again, outputs 38, 48 are switched on and the protective door is locked. Outputs 14, 24 (M1) can be switched back on again when the EMERGENCY-STOP control switch releases, the protective door locks, the feedback circuit at Y64 is closed and the START button Y34 is activated. If the protective door is not opened when released, the device starts automatically after the door locks. When the EMERGENCY-STOP control switch is activated and the protective door enable is activated after the delay time set on the device has passed, outputs 38, 48 are switched off immediately.

Notice

Sensor cables should be routed in a protected manner; only safety sensors with positively-opening contacts may be used as sensors.





To
SIEMENS AG
A&D CD MM 3
P.O. Box 1954

92220 Amberg, Germany

Fax: 09621 / 80-3337

Sender (please complete)
Name
Company/Department
Address
Telephone No.
Fax

Manual for Safety Switchgear 3TK2845 Multifunction Device

Did you come across any mistakes while reading this manual? Please inform us about these mistakes by indicating them on the form provided.
We appreciate any comments and/or suggestions that you may have.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

