

### Product Description

The robust option module ST2451 enables the incorporation of command functions in the safety switch and key transfer system SAFEMASTER STS. It has 3 selectable command devices and allows for starting and stop of safety-relevant functions. Emergency stop buttons, illuminated buttons or selector switches, with or without key operation, are available as command devices.

With just a few individual components from the SAFEMASTER STS system, a great variety of different interlocking units can be created and combined with various option modules. Numerous units with command functions can be created. This enables a switch unit or locking switch to grow into a true "control centre" from where command functions, status displays, release signals, main- and maintenance access gates can be controlled. The special ribbon cable with plug-in connector ensures rapid and problem-free internal connection of the individual components. Installation a standalone command device is also possible through M20 or M25 cable entries and double cage clamp terminals. The standard version made on stainless steel guarantees the highest degree of stability and safety, even in harsh environmental conditions. A comprehensive range of accessories enables simple and time-saving installation directly at the access point.

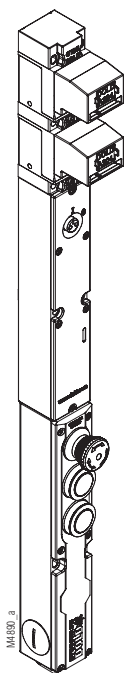
### Your Advantages

- Simple incorporation of command functions into the SAFEMASTER STS systems
- High flexibility through comprehensive selection of command functions
- Saves costs through reduction of engineering, assembly and wiring costs
- Increased plant availability through faster access resulting from:
  - Direct installation on protective doors
  - High level of user-friendliness
  - Faster service for the command devices
- Suitable for harsh environmental conditions due to robust stainless steel housing
- Space-saving installation on protective barriers thanks to a slim design
- Can also be incorporated into the safety circuit as standalone command device
- Connection technology and cable entries for heavy industry requirements
- Simple module connection via plug-in connectors
- Different coloured panels and symbol plates selectable

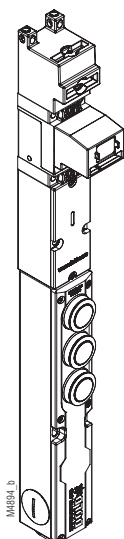
### Features

- Command functions via illuminated buttons
- Emergency stop via emergency stop button
- Connection technology with double-spring clamp terminals for wires up to 1.5 mm<sup>2</sup>
- Enclosure made from stainless steel
- Can be individually mounted
- Can be cascaded
- M20 cable entries underneath and two M25 cable entries on side
- M20 cable entries on top when installed as a standalone option module
- Optional connection set for plug-in connectors between switch module / locking switch module and option module
- Plug-in connection between command device in the cover and option module ST2451

### Installation Examples



Option module ST2451.001  
with 1 e-stop button,  
2 illuminated pushbuttons  
connected with solenoid lock  
ZRH02M



Option module ST2451.002  
with 3 illuminated pushbuttons  
connected with switch module  
SX01A

### Approvals and Markings



### Applications

- For machines and systems where emergency stop functions and command devices are required directly at the point of access
- For simple expansion of command functions and enhancement of the connection technology of the SAFEMASTER STS system
- For integration as standalone command device into the safety circuit

## Design and Function

There are various option modules available for the integration command functions into the safety switch and key transfer system SAFEMASTER STS. In doing so, up to 3 command devices can be incorporated per module. These may comprise illuminated buttons and emergency stop buttons. The illuminated buttons can be provided with different symbols and colours by the customer. A transparent coloured trim and an unprinted symbol plate are included. Further coloured trims and symbol plates are available as accessories.

The option module is installed underneath electrical modules such as switch modules or locking switch modules. The connection can be implemented via special connection sets or conventional wiring between electrical modules and option modules. With the wiring sets, the connection with plug-in connectors is established by means of a ribbon cable with switch modules or 2 ribbon cables with locking switch modules. The option module also allows a simple and direct connection of 2 wires per contact with a cross-section of up to 1.5 mm<sup>2</sup> at a double cage clamp terminal. The double cage clamp terminals can be plugged in and enable option modules to be cascaded. The terminal numbering of the electrical modules will be continued in the option module. With the incorporation of an option module into the SAFEMASTER STS switch / locking switch units, the attached functionalities can significantly increase the operating speed of the SAFEMASTER STS system. With switch / locking switch units that monitor one or more access points, this can also reduce the down times of the machine.

## Technical Data

Enclosure:	Stainless steel V4A / AISI 316L
Degree of protection:	IP 54
Temperature range:	- 25°C ... + 60°C
Storage temperature:	- 40°C ... + 80°C
Connection method:	double cage clamp terminal
min. connection cross-section:	0.2 mm <sup>2</sup>
max. connection cross-section:	1.5 mm <sup>2</sup>
Cable entry	
bottom:	1 x M20 x 1.5
top:	1 x M20 x 1.5 (only when installed as a standalone option module)
side:	2 x M25 x 1.5
Nominal voltage U <sub>N</sub> (rated voltage):	AC/DC 24 V
Nominal voltage range:	0.85 ... 1.1 U <sub>N</sub>
Rated impuls voltage:	0.8 kV
Rated insulation voltage:	≤ 50 V
max. operating current:	1 A
Installation:	according to DIN EN 50041
Repair and replacement:	by manufacturer only
Test intervals::	
for PL a to d:	min. once a year
for PL e:	min. once at month

## E-stop button

For proper, intended use, the applicable requirements for the installation and operation of emergency stop buttons in particular must also be observed:

- EN 60204-1:2006
- EN 13849-1/-2:2008
- EN ISO 13850:2008

Contacts:	2 Öffner, 1 Schließer (Goldkontakte)
Tamper proof:	yes
Switch position display:	yes
Blocking protection sleeves:	no
Unlock	Clockwise and anticlockwise
Degree of protection:	IP 54
Temperature range	
Storage temperature:	- 25°C ... + 80°C
Operating temperature:	- 25°C ... + 70°C
Mechanical life:	50.000 switching cycles
Electrical service life:	50.000 switching cycles at rated load
Bouncing time	
NO contact:	< 10 ms
NC contact	< 10 ms
Contact elements	
Forced opening NO contact:	IEC EN 60947-5-1 Appendix K

## Technical Data

### Illuminated pushbutton

Contacts:	1 NC contact, 1 NO contact (gold contacts)
Actuation stroke:	2.3 mm
Mechanical life:	10 <sup>6</sup> switching cycles
Electrical service life:	10 <sup>6</sup> switching cycles
Insulation resistance	
NO contact / NC contact:	< 50 mΩ (Au)
Bouncing time	
NO contact / NC contact:	< 10 ms
Forced opening NO contact:	IEC EN 60947-5-1 Appendix K

### Indicator light (not replaceable)

Lamp voltage:	max. AC/DC 30 V
Lamp power:	max. 14 mA (at DC 24 V)

## Ordering Designation

Option module ST2451.001 Article number: 0066342	1 e-stop button, 2 buttons
Option module ST2451.002 Article number: 0066343	3 buttons
Option module ST2451.003 Article number: 0066989	separately controlled buttons
Option module ST2451.005 Article number: 0067643	with indicator light
Option module ST2451.006 Article number: 0067702	with blind cover
Option module ST2451.008 Article number: 0067939	3 buttons, LED, separately connectable
Button connections see „Terminal designation examples“	

## Accessories

For simple and rapid connection of the switch / locking switch modules and the option module, we recommend the special connection sets comprising ribbon cable with plug-in connectors, sealing elements and circuit board adapters.

Connection set solenoid lock ST2453.1 consisting of:

- 2 Flat cable with connector
  - 1 PCB adapter A
  - 1 PCB adapter B
  - 2 Sealing elements (O-rings)
- Article number: 0066644

Connection set switch ST2453.2 consisting of:

- 1 Flat cable with connector
  - 1 PCB adapter C
  - 2 Sealing elements (O-rings)
- Article number: 0066645

Coloured cap and symbol plates ST2451.3 consisting of:

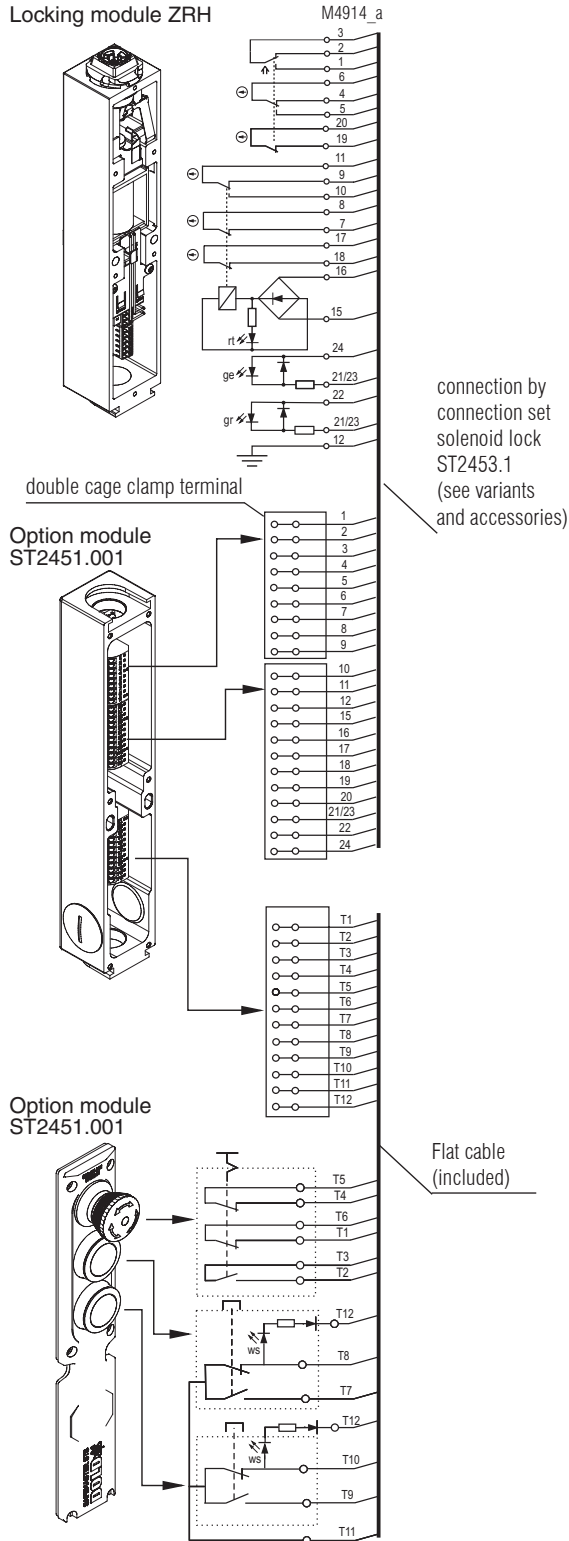
- 4 coloured caps: red, green, blue, yellow
  - 4 symbol plates: EIN, AUS, ON, OFF
- Article number: 0066802

Cover option module ST2454.1  
(Suitable replacement cover for option module ST2451.001)  
Article number: 0066800

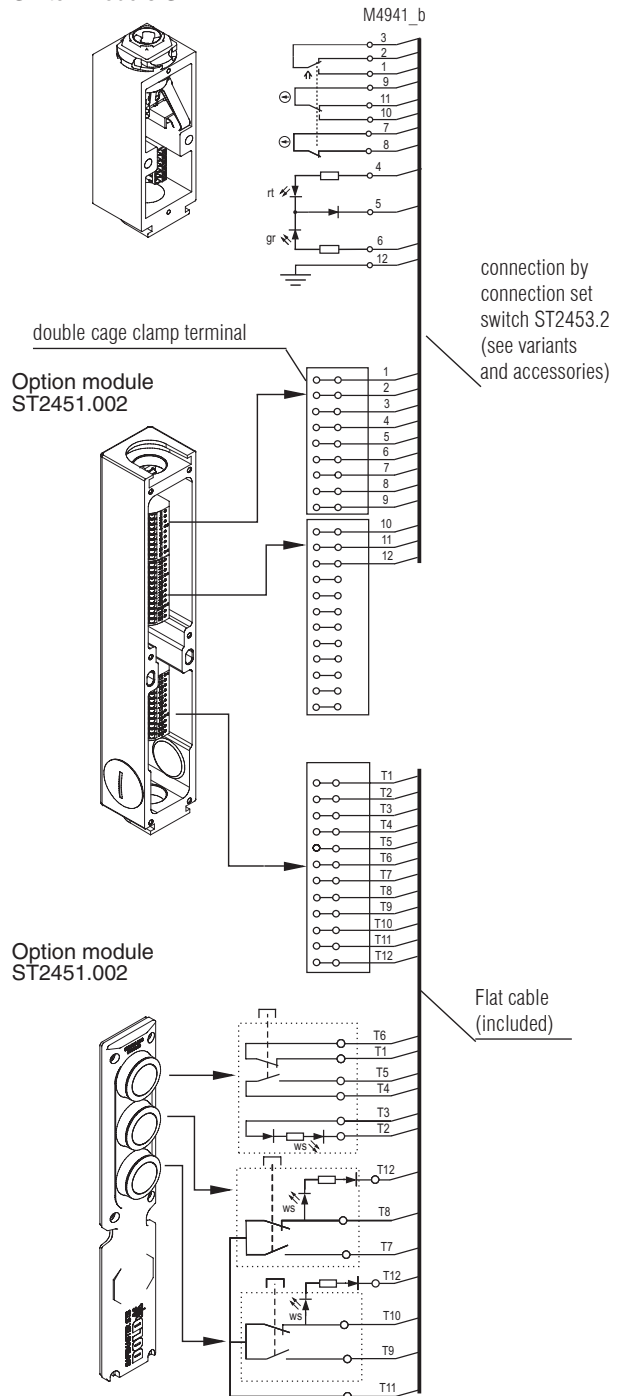
Cover option module ST2454.2  
(Suitable replacement cover for option module ST2451.002)  
Article number: 0066801

Cover option module ST2454.5  
(Suitable replacement cover for option module ST2451.005)  
Article number: 0067720

## Locking module ZRH

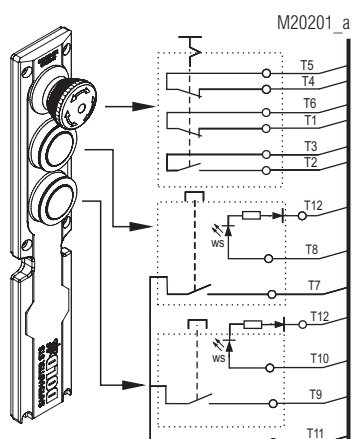


## Switch module SX

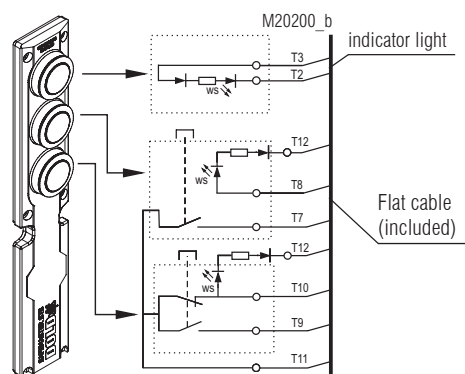


## Terminal designation examples

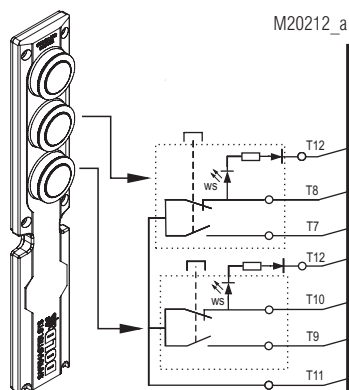
Option module  
ST2451.003



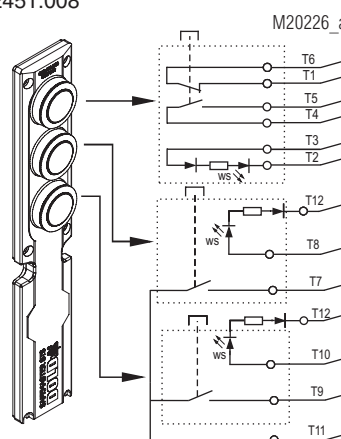
Option module  
ST2451.005

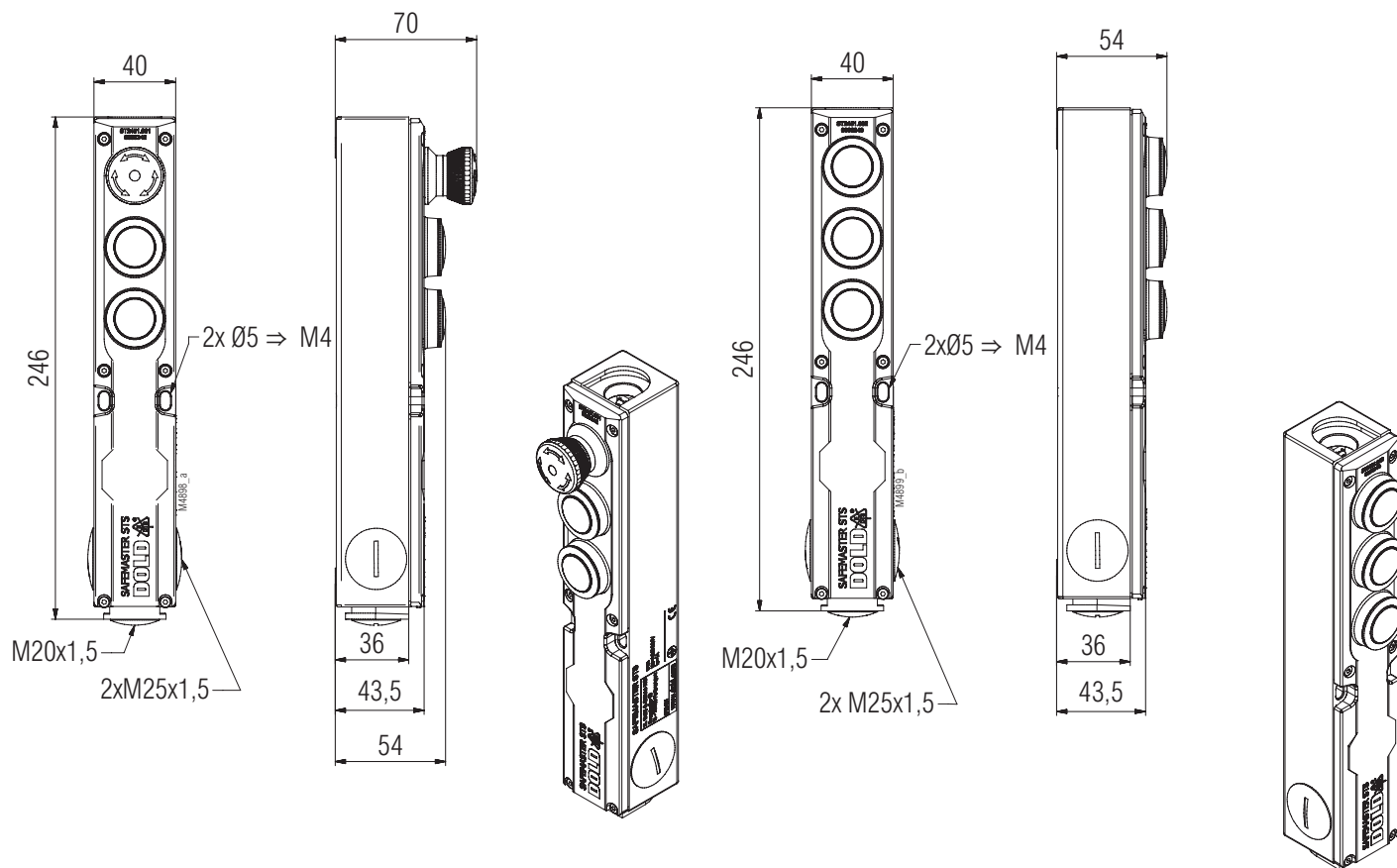


Optionsmodul  
ST2451.006



Optionsmodul  
ST2451.008





Option module ST2451.001 und ST2451.003

Option module ST2451.002; .005; .006; .008

Overview of variants and characteristics

Order designation	Article number	Lower control element		Middle control element		Upper control element	
		Actuator	Contacts	Actuator	Contacts	Actuator	Contacts
Option module TTN ST2451.001	0066342	illuminated pushbuttons	1 NO, 1 NC with illumination in series	illuminated pushbuttons	1 NO, 1 NC with illumination in series	e-stop button	1 NO, 2 NC
Option module TTT ST2451.002	0066343	illuminated pushbuttons	1 NO, 1 NC with illumination in series	illuminated pushbuttons	1 NO, 1 NC with illumination in series	illuminated pushbuttons	1 NO, 1 NC, 1 indicator light (separate control)
Option module TTN ST2451.003	0066989	illuminated pushbuttons	1 NO, 1 indicator light (separate control)	illuminated pushbuttons	1 NO, 1 indicator light (separate control)	e-stop button	1 NO, 2 NC
Option module TTL ST2451.005	0067643	illuminated pushbuttons	1 NO, 1 NC with illumination in series	illuminated pushbuttons	1 NO, 1 indicator light (separate control)	indicator light	1 indicator light
Option module TTX ST2451.006	0067702	illuminated pushbuttons	1 NO, 1 NC with illumination in series	illuminated pushbuttons	1 NO, 1 NC with illumination in series	blind cover	
Option module TTT ST2451.008	0067939	illuminated pushbuttons	1 NO, 1 indicator light (separate control)	illuminated pushbuttons	1 NO, 1 indicator light (separate control)	illuminated pushbuttons	1 NO, 1 NC, 1 indicator light (separate control)

