

Multifunctional Access Box Installation Instructions

Original instructions in English



ATTENTION: Read this document and the documents that are listed in the Additional Resources section about installation, configuration, and operation of this equipment before you install, configure, operate or

maintain this product. Users are required to familiarize themselves with the installation and wiring instructions and the requirements of all applicable codes, laws, and standards including:

- ISO 14119: Interlocking devices that are associated with guards;
- ISO 14120: General requirements for the design, construction, and selection of guards;
- ISO 13855: For the positioning of safeguards;
- ISO 13857: For the calculation of minimum (safe) distances;
- For functional safety, either IEC 62061 or ISO 13849-1 and ISO 13849-2;
- And other applicable standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to conduct suitably trained personnel in accordance with the applicable code of practice.

This device is intended to be part of the safety-related control system of a machine. Improper selection or installation of the device affects the integrity of the safety-related control system. First, a risk assessment must be performed to determine whether the specifications of this device are suitable for all foreseeable operational and environmental characteristics of the application. Use appropriate screws, bolts, or nuts that are fitted by tools to mount the switch and actuators to avoid the risk of tampering. Do not over torque the mounting hardware.

Management controls, working procedures, training, and extra protective measures should be used to minimize the motivation to defeat and to manage the use and availability of spare actuators.

Personnel injury or death, property damage, or economic loss can result if this document and applicable codes, laws, and standards are not followed.

CE The products that are shown on this document conform with the Essential Health and Safety Requirements (EHSRs) of the European Machinery Directive.

Declaration of Conformity and certification:
www.rockwellautomation.com/certification/overview.page

Additional Resources

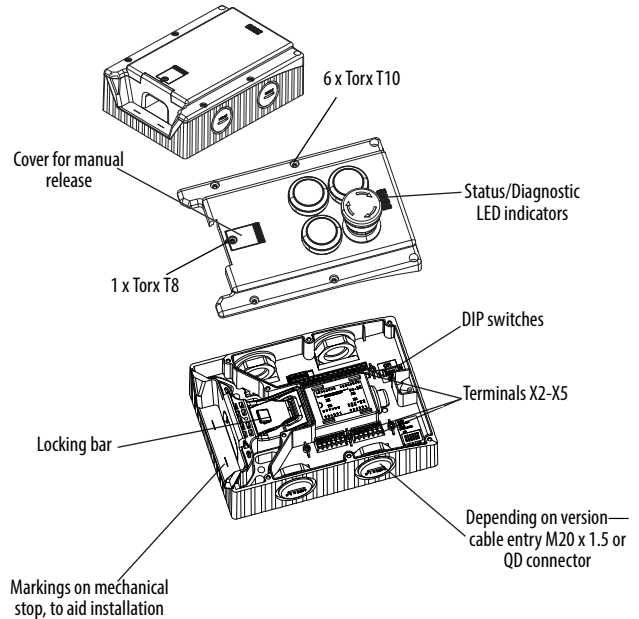
The QR Code on the switch provides a link to the 442G Multifunctional Access Box User Manual (442G-UM001A-EN-P).

Resource	Description
多功能通道锁	442G-IN001A-ZH-P
Caja de acceso multifuncional instrucciones de instalación	442G-IN001A-ES-P
Caixa de acesso multifuncional instruções de instalação	442G-IN001A-PT-P
多機能アクセスボックス インストレーションインストラクション	442G-IN001A-JA-P
Multifunktions-Zugangsbox – Installationsanleitung	442G-IN001A-DE-P
"Notice d'installation de la gâche d'accès multifonctions"	442G-IN001A-FR-P
Istruzioni per l'installazione	442G-IN001A-IT-P
多功能存取盒安裝指南	442G-IN001A-ZC-P
Multifunctional Access Box User Manual	442G-UM001A-EN-P
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, http://www.rockwellautomation.com/products/certification	Provides declarations of conformity, certificates, and other certification details.

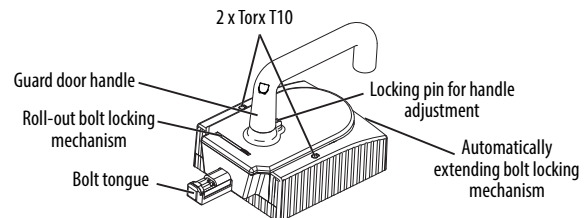
You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley® distributor or Rockwell Automation sales representative.

The Guardmaster 442G Multifunctional Access Box is an electromagnetic interlocking device with guard locking. The device consists of one locking module and one handle assembly. An escape release is optional. The device provides guard position monitoring and lock monitoring in accordance with ISO 14119.

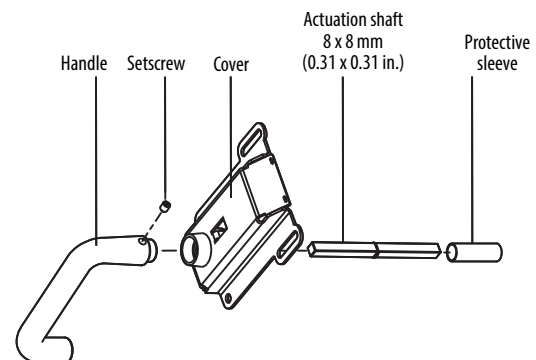
Locking Module



Handle Assembly

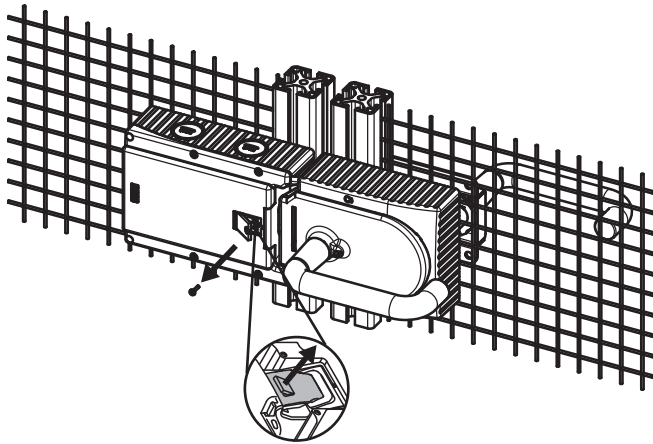


Escape Release (optional)



IMPORTANT The length of the actuation shaft (115 mm (4.53 in.)) is optimized for mounting on 40 mm (1.57 in.) and 45 mm (1.77 in.) profiles. For mounting on profiles larger than 45 mm (or if using mounting plates on a 45 mm profile), an extended shaft is required (order separately, 442G-MABASHFT). See the user manual for instructions about sizing the extended shaft and mounting the escape release on smaller or larger profiles.

Auxiliary/Manual Release



1. Undo locking screw.
2. Lift locking arm using a screwdriver and actuate the guard door handle.



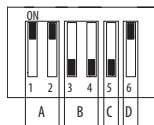
ATTENTION: The locking screw must be screwed back in and sealed after assembly and after use of the manual release (for example, with sealing lacquer). Tightening torque is 0.5 Nm.

Clearing Faults

Reset a non-latching fault by opening the guard door and closing it again. Clear latching faults by cycling power or applying 24V to the RST signal for a minimum of three seconds.

IMPORTANT The guard door must be in the open position to clear a latching fault.

Dip Switch Configuration



Detail	Switch	Function ¹
A	1+2	on: Device is configured for standalone operation (factory setting) off: Device is configured for series operation
B	3+4	on: Guard lock monitoring is deactivated off: Guard lock monitoring is activated (factory setting)
C	5	on: DIP switch configuration enabled off: DIP switch configuration inhibited (factory setting)
D	6	on: Release monitoring is activated (factory setting) off: Release monitoring is deactivated

¹ See the 442G Multifunctional Access Box User Manual (442G-UM001A-EN-P) for information on changing the default settings.

Inspection and Service

Periodically check the correct operation of the switching function. Also check for signs of abuse or tampering. Inspect the switch casing for damage. Check the safe function of the device particularly after any of the following: set-up work, the installation or replacement of an 442G-MAB module, an extended period without any use, a fault condition, or any change to the DIP switch setting.



ATTENTION: If there is a malfunction or damage to the product, attempts at repair must not be made. The unit must be replaced or alternative safeguarding must be implemented before machine-operation is allowed. An exception is allowed for the replacement of the lock module control cover.

Handle Configuration

The unique-coded handle assembly must be assigned to the locking module before the system is functional.

During configuration of the handle, the safety outputs are switched off.

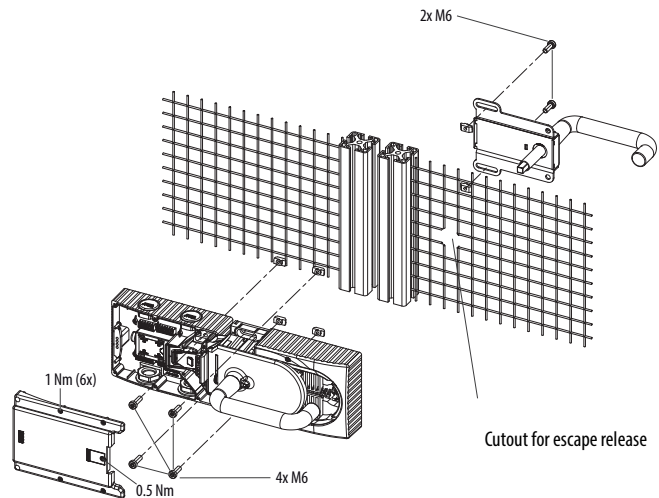
1. Insert bolt tongue in the locking module.
2. Apply operating voltage (U_A and U_B).
3. The State LED flashes green (5 Hz) as the device performs a self-test (up to 8 seconds).
4. Programming begins when the State LED flashes (1 Hz). After approximately 60 seconds, the State LED turns off.
5. To complete the configuration, switch off the operating voltage (U_B) for a minimum of 3 seconds or apply 24V to the input RST for a minimum of 3 seconds.

IMPORTANT The locking module disables the code for the previous handle assembly if configuration is conducted for a new handle assembly. A disabled handle assembly can be configured again only after a third handle assembly has been configured.

Mounting

The 442G-MAB is designed to use on hinged or sliding doors. The use of mounting plates is optional.

IMPORTANT With two-wing hinged guard doors, one of the two guard door wings must also be latched mechanically.



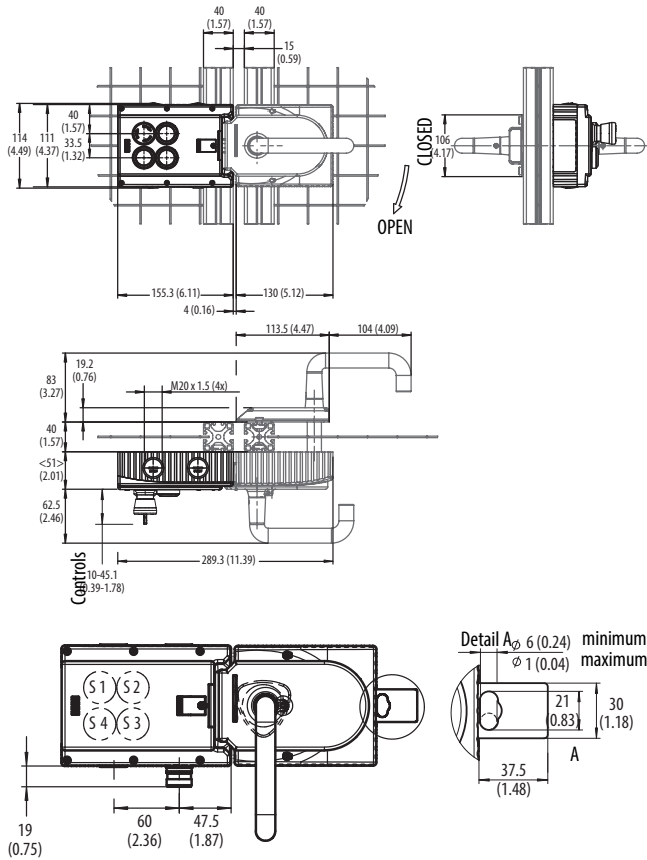
Installation example for a guard door that is hinged on the right (general view)

IMPORTANT It must be possible to insert the bolt tongue in the locking module. To check, close the safety guard several times and actuate the guard door handle. If available, check the function of the escape release. It must be possible to operate the escape release from the inside without excessive force (approximately 40 N).



ATTENTION: The escape release must ONLY be accessible from inside the safeguarded area. The installation must not allow access to the escape release from outside the safeguarded area.

Dimensions [mm (in.)]

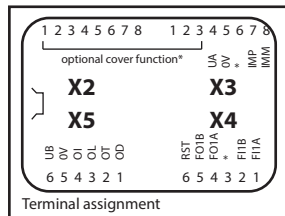
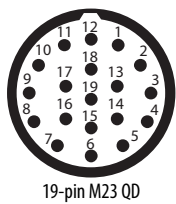


Electrical Connection

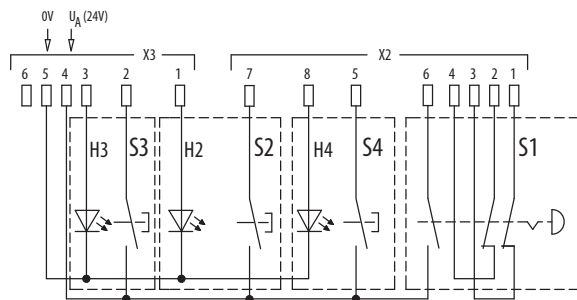
The electrical connections must either be isolated from the mains supply by a safety transformer according to IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent isolation measures.

For detailed information on the electrical connection, refer to the user manual.

Terminal Assignments and Wiring



Connection of Cover Controls and Indicators



M23 QD	19-Conductor Cordset ¹	MAB Internal Wire Color	Terminal	Function	Description
1	Violet	Brown	X3.7	IMP	Lock command
2	Red	Yellow	X2.1	S1.A1	E-stop circuit A
3	Grey	White	X2.2	S1.B1	E-stop circuit B
N/A	N/A	No Connection	X4.1	F1A	Safety input channel A ²
N/A	N/A	No Connection	X4.2	F1B	Safety input channel B ²
4	Red/Blue	Green	X4.4	F01A	Safety output channel A, ON when guard is locked
5	Green/Black	Grey	X4.5	F01B	Safety output channel B, ON when guard is locked
6	Blue	Black	X3.5	0V	Connected internally to X5.5
7	Grey/Pink	Pink	X4.6	RST	Reset, apply 24V for at least 3 seconds
8	White/Green	Violet	X5.2	OT	Bolt monitoring output, ON when guard is closed and bolt is extended
9	White/Yellow	Brown/Green	X5.4	OI	Fault diagnostic, ON when the switch is in a fault state
10	White/Grey	Red/Blue	X2.3	S1.A2	E-stop circuit A
11	Black	Grey/Pink	X2.4	S1.B2	E-stop circuit B
N/A	N/A	No Connection	X2.6	S1 Aux.	E-stop monitoring contact
12	Green/Yellow	N/A	N/A	GND	Connector housing GND
13	Yellow/Brown	Grey/Brown	X2.7	S2	Push button switching element (S2)
14	Brown/Green	White/Yellow	X3.1	H2	Push button LED (H2)
15	White	Yellow/Brown	X3.2	S3	Push button switching element (S3)
16	Yellow	White/Grey	X3.3	H3	Push button LED (H3)
N/A	N/A	No Connection	x5.1	OD	Door monitoring output, ON when the door is closed
17	Pink	White/Green	X5.3	OL	Lock Monitoring output, ON when guard is locked
18	Grey/Brown	Yellow/Black	X3.8	IMM	Reserved for future use
19	Brown	Blue	X3.4	UA	Power for solenoid and monitoring outputs
			X5.6	UB	Power for safety outputs

¹ 19-pin mating cordset Cat. No. 889M-F19RM-*

² The lock modules are factory preset for standalone operation. See the user manual for configuring the device for series operation (cable entry models only).

³ On QD models, terminal X5.6 is connected internally to terminal X3.4.

For models with E-stop and three push buttons (lock module catalog numbers ending in -C04):

17	Pink	White/Green	X2.5	S4	Push button non-switching element (S4)
18	Grey/Brown	Yellow/Black	X2.8	H4	Push button LED (H4)

IMPORTANT Connection of this device with a conduit is not allowed. The connection method needs to consist of flexible cord that is connected to the product with a UL Listed cable gland suitable for 22...17 AWG wire sizes (for example, Type HSK-KM20 x 1.5 manufactured by Hummel AG).

4 Multi-functional Access Box Installation Instructions

Specifications

Safety Ratings	
Standards	IEC 60947-5-3, EN ISO 13849-1, ISO 14119, UL 508 (evaluated for risks of electrical shock and fire; only suitable for NFPA 79 applications only)
Safety Classification	Type 4 interlocking device with guard locking and high-coded RFID actuators according to ISO 14119
Functional Safety Data	PFHD: 2.47×10^{-8} ; PL, Cat. 4 (according to ISO 13849-1). Mission time: 20 years. B10d for E-stop: 1.0×10^5 cycles
Certifications	cULUS (UL 508) and CE Marked for all applicable EU directives
Outputs	
Safety Outputs (F01A/F01B)	Semiconductor outputs, PNP
Output Current, maximum (each)	200 mA
Output voltage U_{F01A} / U_{F01B}^1 @ 50 mA switching current	ON: $U_B - 2V \dots U_B$, OFF: $0 \dots 1V$ DC
Monitoring Outputs	
Monitoring Outputs (OD, OT, OL, OI)	P-switching and short circuit-proof
Output Voltage	$U_A - 2V \dots U_A$
Maximum Load (each)	50 mA, maximum
Controls and Indicators	
Operating Voltage	$5 \dots 24V$ DC
Operating Current	$1 \dots 100$ mA
Breaking Capacity, maximum	250 mW
Power Supply LED	24V DC
Operating Characteristics	
Torque Settings, maximum	1 Nm lock module cover screws (6x) 0.5 Nm manual release locking screw 2 Nm handle set screw (handle and escape release)
Locking Force F_{max}	2600 N
Holding Force F_{zh}	2000 N
Maximum Impact Energy Withstand	300 J
Locking Bolt Alignment Tolerance	Horizontal: ± 4 mm; Vertical: ± 5 mm
Operating Voltage U_B	Class 2 PELV 24V DC +10/-15% required
Auxiliary Power U_A	Class 2 PELV 24V DC +10/-15% required

Operating Characteristics (continued)	
Protection Type	Short circuit and reverse polarity protected, cross-fault detection
Current Consumption I_{UB} (no load on any outputs)	80 mA
Current Consumption I_{UA}	
With energized guard-locking solenoid and unloaded outputs OI, OL, OT and OD	350 mA
Push button (no load, per LED)	5 mA
External Fuse	Refer to 442G-MAB Multifunctional Access Box User Manual
Response Time (On)	570 ms
Risk Time (per IEC 60947-5-3)	350 mS
Discrepancy Time	10 ms (maximum)
Start-up Time (availability)	0.5 s configured for standalone operation 8 s configured for series operation
Maximum Length of Switch Chain	10 MAB devices
Utilization Category (IEC 60947-5-2)	DC-13 24V 200 mA
Insulation Voltage U_i (IEC 60947-1)	30V
Impulse Withstand Voltage U_{imp}	1.5 kV
Pollution Degree (IEC 60947-1)	3
Manual Release	Built in accordance with ISO 14119
Mechanical Life	1,000,000 operations
Environmental	
Ambient Temperature [C (F)] at $U_B = DC 24V$	$-20 \dots +55^\circ (-4 \dots +131^\circ)$
Storage Temperature [C (F)]	$-20 \dots +65^\circ (-4 \dots +149^\circ)$
Enclosure Rating	IP65
Operating Humidity	$5 \dots 80\%$ relative
Vibration/Shock	Resilience to vibration in accordance with EN IEC 60947-5-3
Physical Characteristics	
Weight	Lock module with cover 750 g, handle assembly 1000 g, escape release 500 g
Materials	Glass fiber reinforced plastic, nickel-plated die-cast zinc, anodized aluminum handle, stainless steel hardware

Status/Diagnostic LED Indicators

Operating Mode	LED Indicator				State ¹
	Power (Green)	State (Green)	Diagnostic (Red)	Lock (Yellow)	
Diagnostics	On	Green flash 1 x	On	Off	Error during handle configuration or invalid DIP switch setting
		Green flash 2 x		Off	Input error (only applies when switch is configured for series operation) ²
		Green flash 3 x		Off	Handle assembly read error
		Green flash 4 x		Off	Output error ²
		Off		Yellow flash 1 x	Signal sequence erroneous, escape release or manual release was actuated ²
		Off		Off	Internal fault ²
Setup	Off	Off	Off	Off	Handle configuration completed. Cycle power to resume normal operation.
Normal Operation	Off	Flashes green approximately every three seconds	Off	Off	Normal operation, door open

¹ See the user manual (pub. no. 442G-UM001A-EN-P) for more information on Troubleshooting.

² These are latching faults. All other faults are non-latching. Reset according to the "Clearing Faults" section.

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