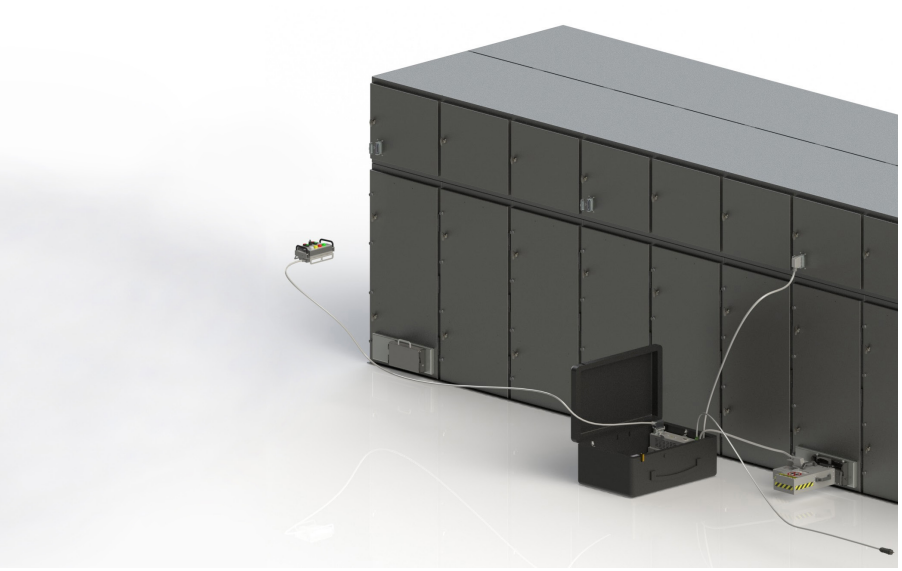
DISTRIBUTION SOLUTIONS

TruckMaster FR
Operation manual



Index

For your safety!

- Make sure that the installation room (space and environment) is suitable for the electrical apparatus.
- Check that all the installation, putting into service and maintenance operations are carried out by qualified personnel with suitable knowledge of the apparatus.
- Make sure that the standard and legal prescriptions are complied with during installation, putting into service and maintenance, so that installations are performed according to the rules of good working practice and safety in the work place.
- Strictly follow the information in this instruction manual.
- Check that the rated performance of the apparatus is not exceed during service.
- Check that the personnel operating the apparatus have this instruction manual at hand as well as the necessary information for correct use.
- Pay special attention to the danger notes indicated in the manual by the following safety notifications.

Responsible behaviour safeguards your own and others' safety!
Please contact the ABB Assistance Service for any further requirements.

For your safety!

Safety notations alert personnel to possible death, injury or property damage situations. The safety notations appear before the step in which the condition applies. The one safety notice and three hazard levels notations are:

WARNING

WARNING indicates a hazardous situation that has some probability of severe injury and substantial property damage.

DANGER

DANGER indicates a hazardous situation that has a high probability of death, severe injury, and substantial property damage.

CAUTION

CAUTION indicates a hazardous situation that may result in minor or moderate injury and/or property damage.

NOTICE

NOTICE indicates a statement of company policy as it relates to the safety of personnel or protection of property.

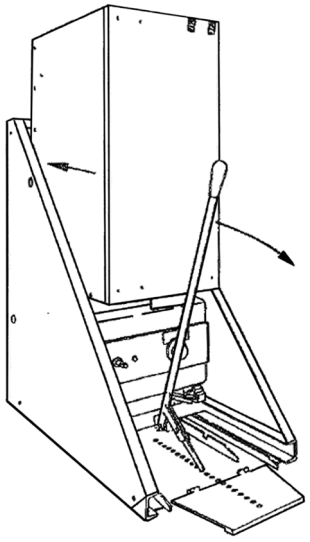
1. Foreword

1.1. Introduction

TruckMaster is the portable remote racking unit implementing the remote racking operations of the circuit breakers, offering a new level of safety to substation personnel.
An electric arc can occur for several reasons, such as human error or bad connections. Accidents are quite unusual but when they happen their consequences may be very severe. Operators are always exposed to these risks when working in the switchgear room. Flames, ejected parts, smoke and overpressure are the main effects of an arc fault in a non-arc classified switchgear. When the fault happens in an arc-classified switchgear not equipped with a proper exhaust gas duct, smoke is released in the room.
Maintaining a safe distance between personnel and equipment during operations provides the most effective means of avoiding injury by keeping people out of harm's way.
Remote racking provides a safe operating environment for personnel through the proven method of adding distance between the operator and arc flash incident energy at the switchgear site.
Enhanced switchgear operability preventing human errors can be achieved: integrating a motor operated racking system on each new or retrofit breaker, when frequent operations from control system is required.
Installing a TruckMaster rack in-out device per each switchgear line-up for maintenance related operations by station personnel.
TruckMaster is composed of three elements:

- Docking unit
- Portable driver
- Remote console

The docking unit is applied to the circuit breaker compartment door to accept the link with the portable driver. A single portable driver and the relevant remote console are needed in the switchroom to implement the remote racking operations.



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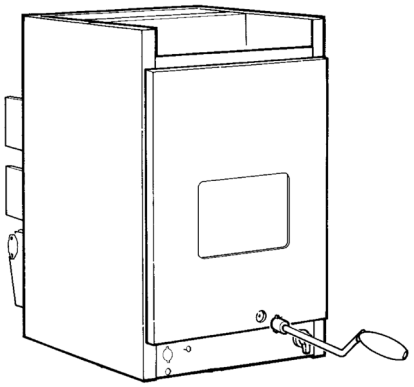

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02

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01 Floor-rolling apparatus with linear ratchet racking system;
02 Apparatus with rotary racking mechanism.

1. Foreword

Different TruckMaster variants are available in order to satisfy a huge range of application needs:

- TruckMaster CS for rotative racking mechanisms
- TruckMaster FR for ratchet linear racking mechanisms

This publication contains the information required to install closed door remote racking TruckMaster FR and put it into service. For correct use of the product, please read it carefully.
TruckMaster FR is designed for different installation configurations. However, they do allow further technical and construction modifications to be performed (at the customer's request) so as to adapt to special installation requirements.
For this reason, the information given below may sometimes not contain instructions concerning special configurations. Apart from this manual, it is therefore always necessary to consult the latest technical documentation (circuit and wiring diagrams, assembly and installation drawings, protection coordination studies, etc.), especially regarding any variants requested in relation to the standardized configurations. Always refer to the specific circuit breaker operation and maintenance manual before installing, commissioning and operating TruckMaster rack in-out device. The circuit breaker retrofit is designed for connection to the portable external driver in the racking phases. The driver can be moved from one cubicle position to the next, thus only one portable driver is required per switchgear. Operators will be able to safely control circuit breaker racking in and out operations from a remote console connected to TruckMaster FR by 15 meters / 50 feet cable.
This solution allows operating personnel to carry out the racking procedures from a safety distance with the panel door closed.
During retrofit commissioning a driver docking will be mounted on the doors of each circuit breaker cubicle in order to connect TruckMaster.

1.2. Environmental protection program

TruckMaster kits are manufactured in accordance with the ISO 14000 Standard (Guidelines for environmental management). The production processes are carried out in compliance with the Standards for environmental protection in terms of reducing energy consumption as well as use of raw materials and production of waste. All this is guaranteed thanks to application of the medium voltage apparatus manufacturing facility's environmental management system.

1.3. Information about this booklet

This booklet provides information for the TruckMaster racking in-out solution as described below. Not all sections of the publication apply to all types of TruckMaster. All information in this booklet was current at the time of printing. Unless different indications are given, all references in this booklet refer to the circuit breaker viewed from the front.

WARNING

All the installation, putting into service, running and maintenance operations must be carried out by skilled personnel with in-depth knowledge of the apparatus.

2. Introduction and safe practices

2.1. Introduction

The purpose of this manual is to provide instructions for unpacking, storing, installing, operating and servicing the TruckMaster FR racking in-out device. Read and use this manual carefully as a guide during installation, initial operation, and maintenance. The specific ratings of TruckMaster FR are listed on the individual nameplates. It must never be applied beyond its nameplate ratings.

⚠ WARNING

The TruckMaster FR described in this booklet has been designed and tested to operate within its nameplate ratings.
Operation beyond these ratings may cause the equipment to fail, resulting in property damage, bodily injury and/or death.
All safety codes, safety standards and/or regulations that apply to this type of equipment must be strictly observed.

2.2. Safe practices

The TruckMaster FR racking in-out device is equipped with high energy mechanisms. The design includes several interlocks and safety features which help ensure safe and proper operating sequences. Comply with the following recommendations to ensure the safety of personnel who install, operate and service these racking in-out devices.
Only qualified persons, as defined in the National Electric Safety Code, who are familiar with the installation and maintenance of medium voltage circuits and equipment must be permitted to work on these racking in-out devices.
Read these instructions carefully before attempting to install, operate or service these racking in-out devices.

Do not work on a circuit breaker unless all components are disconnected by means of a visible breaker and are securely grounded.
Do not override the safety interlocks. This may result in bodily injury, death and/or damage to the equipment.
Do not work on a closed circuit breaker.
Do not leave a circuit breaker in an intermediate position in a cell. Always set the circuit breaker to the disconnected or connected position.

⚠ CAUTION

Failure to observe the requirements of osha standard 1910.269 can cause death or severe burns and disfigurement.
The above standard specifically forbids workers exposed to electric arcs or flames to wear polyester, acetate, nylon, or rayon clothing.

2.3. Standards and regulations

2.3.1. Manufacture

The TruckMaster racking in-out device conforms to the following Standards:
DIN VDE 0670, part 104, and IEC 62271-100
DIN VDE 0847, part 4, and IEC 61000-4

2.3.2. Installation and operation

For installation and operation, please refer to the relative regulations, particularly to:

- ANSI / NFPA70
- NEC

2.3.3. Service conditions

Normal service conditions comply with the recommendations in standards IEC 62271-1, IEC 62271- 100 and IEC 62271-200.
In more detail:

Ambient temperature	
Maximum	+ 40 °C
Average maximum over 24 hours	+ 35 °C
Minimum (according to class – 5), apparatus for indoor installation	- 5 °C

Humidity
The average relative humidity value measured for over 24 hours must not exceed 95%
The average water steam pressure value without condensation measured for over 24 hours must not exceed 2.2 kPa.
The average relative humidity value measured for over 1 month must not exceed 90%.
The average water steam pressure value measured for over 1 month must not exceed 1.8 kPa.

Altitude
≤ 1000 (3300 ft.) m above sea level. C37.20.2 is applicable for installation above 1000m (3300 ft.)

Climate
To avoid the risk of corrosion or other damage in areas:
– with a high level of humidity, and/or
– with rapid and extensive temperature variations, take appropriate steps (for example, by using suitable electric heaters) to prevent condensation from forming.

For special installation requirements or other operating conditions, please contact ABB.

3. Arrival, handling and storage

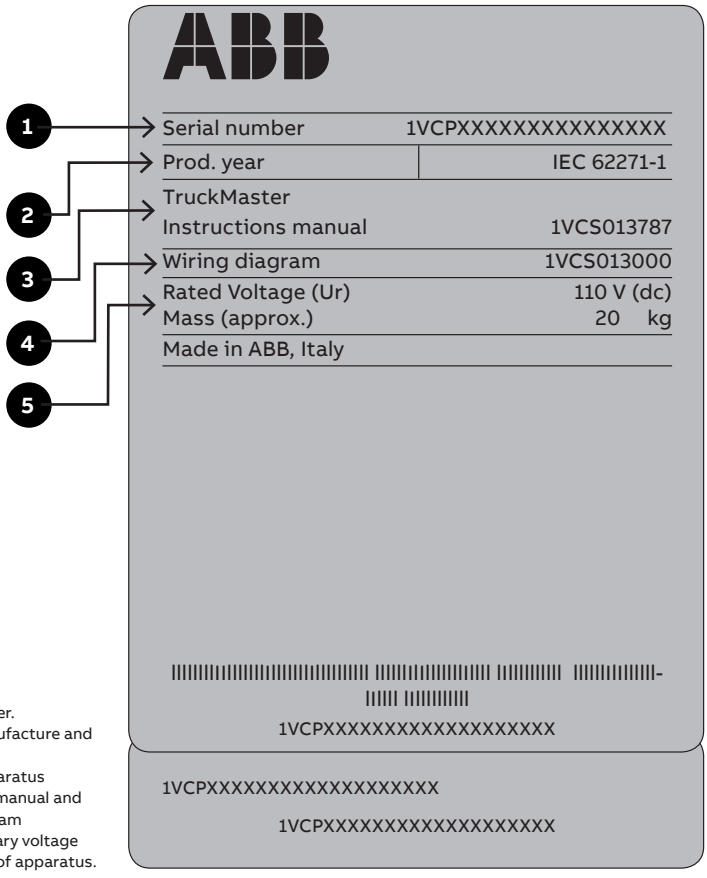
The TruckMaster FR racking in-out device is subjected to complete factory production tests and inspection prior to packaging and shipment. The shipping packaging is designed to provide reasonable protection during shipment and to facilitate the handling operations.
Each part of the device is protected by a plastic cover to prevent water from infiltrating during the loading and unloading operations and to keep dust out during storage.

3.1. Arrival

CAUTION

The shipping containers provided are not designed for stacking.

As soon as it arrives, check the state of the device, make sure that the packing is undamaged and that the nameplate data (see fig. 1) corresponds to the specifications in the order confirmation and accompanying shipping notes.



Key
1 Serial number.
2 Year of manufacture and standard
3 Type of apparatus
4 Instruction manual and circuit diagram
5 Rated auxiliary voltage and weight of apparatus.

Fig. 1

Also make sure that all the materials described in the shipping notes are included in the supply.
The device is only supplied with the accessories specified at the time of ordering and validated in the order confirmation sent by ABB.
The accompanying documents included in the shipping packaging comprise:
- instruction manual (this document)
- test certification
- identification label
- copy of the shipping documents
- circuit diagram

Other documents which are sent prior to shipment of the apparatus are:
- order confirmation
- original shipping advice notes
- drawings or documents referring to special configurations/conditions (if any).

As soon as the racking in-out device/s arrive/s, examine the box/es to establish whether any damage or loss was sustained during transport. If damage or evidence of rough handling is discovered, immediately file a damage claim with the carrier and promptly notify the nearest district office.
ABB is not responsible for damage to goods, which occur after delivery. However, ABB will provide assistance if notified of claims. Use care in unpacking to avoid damaging any parts.

Unpack the racking in-out device as soon as possible after arrival. If unpacking is delayed, difficulty may be experienced in making a claim for damages not evident upon receipt.
Check the contents of each box against the packing list before discarding any packing material. If any discrepancy is discovered, promptly notify the nearest district office. Information specifying the purchase order number, box number, and part numbers of damaged or missing parts should accompany the claim.

3.2. Handling

TruckMaster FR shipping containers are designed to be handled by fork lift (not supplied).
All the components are stored in a trolley with wheels that can be easily transported near the switchgear for performing operations (fig. 2)

Fig. 2

To lift and handle the motorbox device proceed as follows (fig. 3):

- use a special lifting tool (not supplied) fitted with ropes with safety hooks;
- insert the hooks in the lifting handles fig. 3 item 1 and lift;
- on completion of the operation (and in any case before putting into service) unhook the lifting tool.

Care must be taken not to damage the secondary plug when transporting or handling the TruckMaster FR rack in-out device.

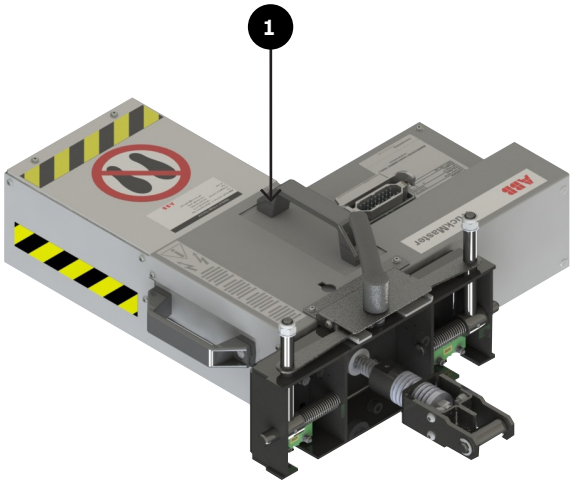


Fig. 3

3.3. Storage

When a period of storage is foreseen, our workshops can (on request) provide suitable packing for the specified storage conditions.
As soon as it arrives, the apparatus must be carefully unpacked and checked as described in chapter 3.1 .
If immediate installation is not possible, the apparatus must be repacked in the original material supplied.
Include special hygroscopic substances in the packing, using at least one standard packet per piece of apparatus. Should the original packing be unavailable and immediate installation is not possible, store the apparatus indoors in a well-ventilated, dry, dust-free, non-corrosive place, well away from any flammable materials and at a temperature between – 5 °C and + 45 °C.
TruckMaster FR should be installed in its permanent location as soon as possible. If the TruckMaster racking in-out devices are not put into service for some time, it is advisable to provide adequate means of protection. This may be done by keeping the racking in-out device in its original shipping container and storing it in a warm, dry, and uncontaminated atmosphere. The racking in-out device should be stored in conditions where there is a minimum amount of condensation. Moisture can deteriorate the metal parts and insulation.
Prior to storage of the racking in-out device, check to make sure that it is free from damage due to transport and that it is in a satisfactory operating condition.

TruckMaster FR loads	
TruckMaster FR portable driver	18,5 Kg
TruckMaster FR remote console	5 Kg
TruckMaster FR kit complete with trolley (trolley 860 x 560 x 355 mm)	52 Kg

4. Description and operations

4.1. General

TruckMaster FR is suitable for different kinds of breakers and switchgear. Refer to ABB for any detailed information required. It must be used for the specific application for which it has been designed, as indicated on the nameplate (fig. 1), and cannot be applied to other equipment.
The apparatus is always in the withdrawable version, mounted on a truck that allows the following positions to be obtained in relation to the panel frame:

CONNECTED:
- main and auxiliary circuits connected;

ISOLATED:
- partially isolated with main circuits disconnected and auxiliary circuits connected (plug connector connected);
- totally isolated with main and auxiliary circuits disconnected (plug connector disconnected);

WITHDRAWN:
- main and auxiliary circuits disconnected and apparatus racked out of the switchgear.

In the connected and isolated positions the apparatus remains in the frame with the door closed and is visible through the switchgear inspection window if available.
The apparatus is equipped with a special coupling system, located on the front crosspiece, which is designed in order to house the portable driver connection hook (fig. 13).
A lock prevents the truck from being racked into the switchgear (for example, when the earthing switch is closed). If the truck is in an indefinite position (between connected and isolated), the lock prevents both mechanical and electrical closing of the apparatus. Please refer to the relative circuit breaker instruction booklet for further details.
TruckMaster units are pre-assembled and tested in the factory. All normal service operations are carried out at a distance from the front of the unit, with TruckMaster FR mechanically and electrically connected to the original panel.
The door of the circuit breaker compartment can be fitted with the withdrawable circuit breaker retrofit solution suitable for remote racking in-out operations. For special installation requirements, please contact ABB.

4.2. TruckMaster FR remote console

Description:
The unit is used to operate the portable driver and control CB movement from partially isolated to the connected position and from connected to the partially isolated position. The electrical connection from and to the portable driver passes through an umbilical 16-pin electrical plug at the end.

Key
1 Remote console unit
2 Umbilical cord
3 Electrical plug
4 Light for TruckMaster CS ready to start (green)
5 Light for fault condition (red)
6 Light for circuit breaker isolated position (yellow)
7 Light for circuit breaker in connected position (white)
8 Push buttons for TruckMaster CS: push button for confirm operations (green) and for reset command (emergency pushing button - red)
9 Push buttons for TruckMaster rack-in (green) and rack-out (red)
10 Contact key
11 Handles

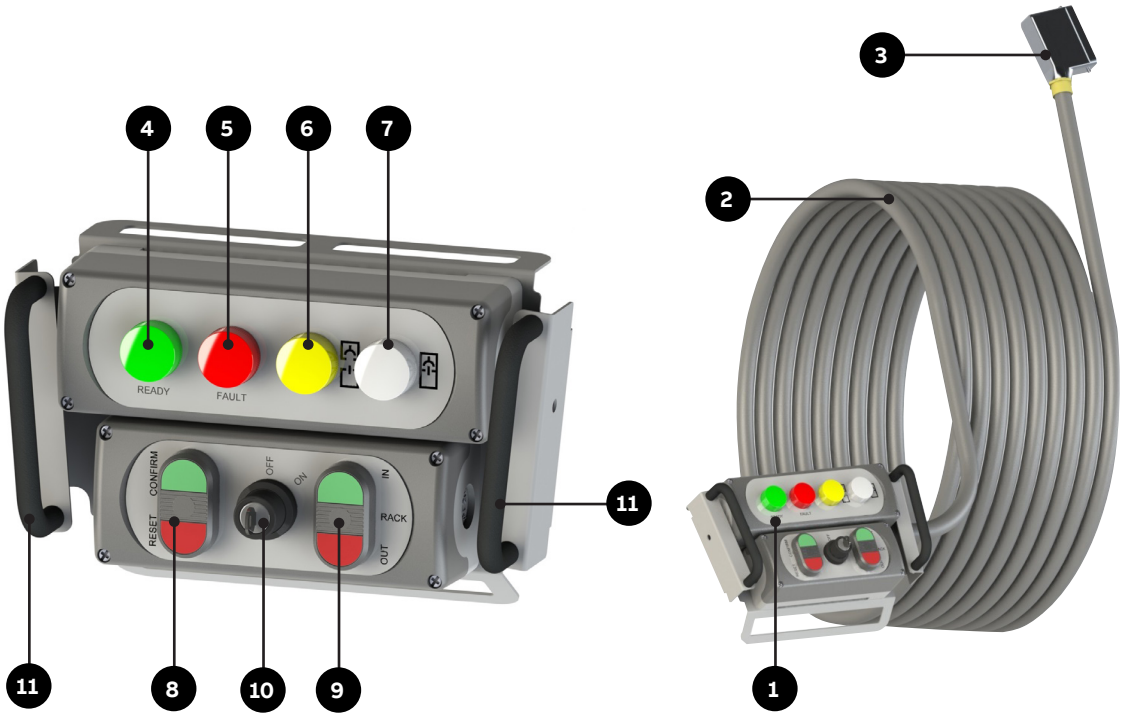


Fig. 4

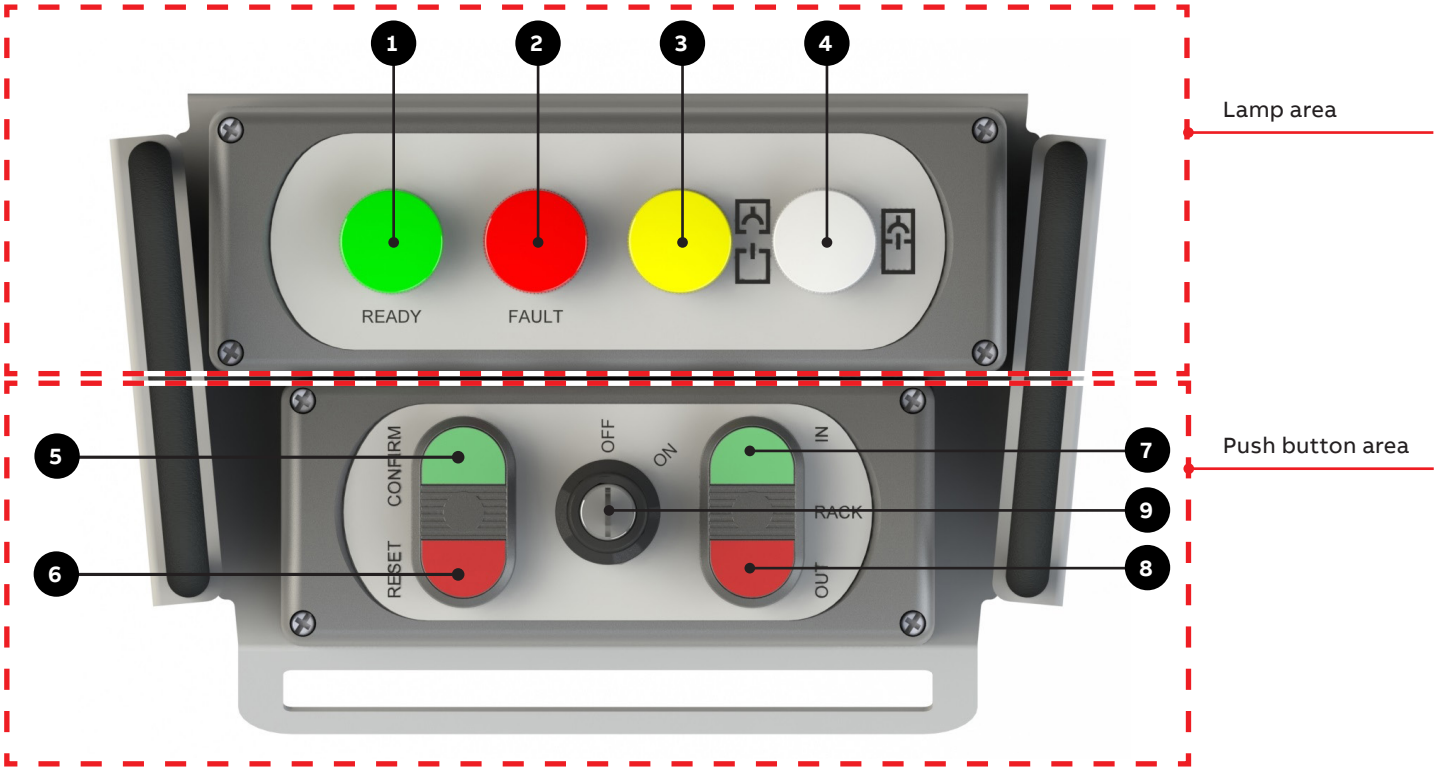


Fig. 5

1 The green light indicates to the operator the TruckMaster FR is ready to use. It takes about 20 seconds to turn on when power is supplied or after a reset button press.
2 The red light has the purpose to show to the operator the TruckMaster FR has detected a problem.
3 The yellow light has the purpose to indicate to the operator the circuit breaker is isolated.
4 The white light has the purpose to indicate to the operator the circuit breaker is connected.
5 The “confirm” push button has the purpose to set the TruckMaster FR in order to proceed in racking in-out the circuit breaker.
6 The “reset” push button has the purpose to stop any TruckMaster FR operation. This action is required when the operator notices an anomaly during insertion or extraction. The “reset” push button can also be used to restore the kit, after fault.
7 The “rack in” push button pressed concurrently with the “confirm” push button, has the purpose to proceed in racking in the circuit breaker.
8 The “rack out” push button pressed concurrently with the “confirm” push button, has the purpose to proceed in racking out the circuit breaker.
9 The central contact key has the purpose to switch off the remote console in order to avoid any accidental racking in-out operation.

Push buttons 5, 6, 7 and 8 must be actuated only by impulse

WARNING

Signals lamps shown position of limit switches inside the Truckmaster FR device and the block pin mounted on the apparatus. Circuit breaker real test /disconnected and connected position verifications is the operator responsibility.

Push button area

The “rack-in” push button has the purpose to start the rack in operation. The push button is enabled in one case only, see the following coordination table

Lamp Status on TruckMaster FR remote				Rack in push button
Ready	Fault	Disconnected	Connected	
on	off		✓	Disable
off	on	any	any	Disable
on	off	✓		Enable

4. Description and operations

The “rack-out” push button has the purpose to make the rack out operation. The push button is enable in one case only, see the following coordination lamps table

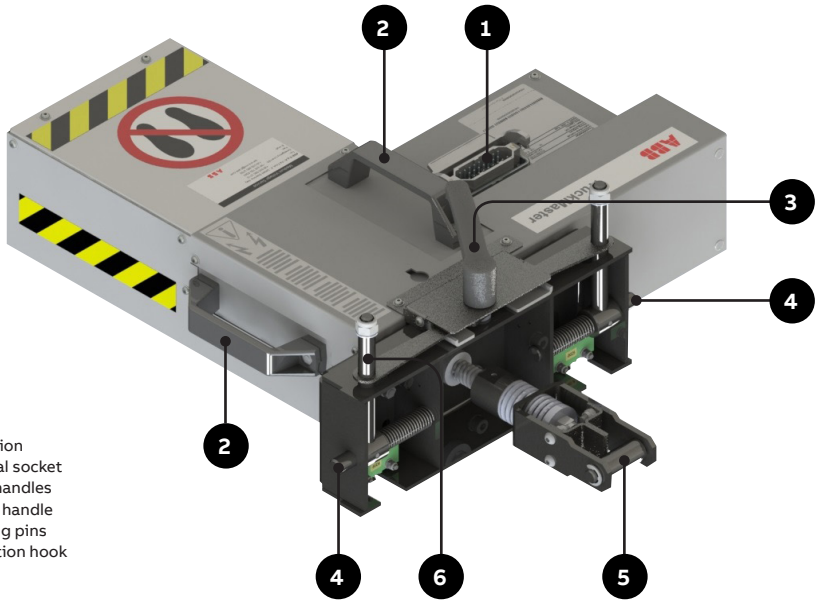
Lamp Status on TruckMaster FR remote				Rack out push button
Ready	Fault	Disconnected	Connected	
on	off		✓	Enable
off	on	any	any	Disable
on	off	✓		Disable

Never disconnect the portable driver unit or the other connectors from the panel or from the logical box assembly with the circuit breaker in intermediate position between disconnected and connected position. Refer to emergency operation chapter 4.6.4 for further actions.

Check that circuit breaker position is the same indicated by remote console lamp (it depends whether the pre-settings have been done or not)

4.3. TruckMaster portable driver

The portable driver is used to move the CB from partially isolated to the connected position and from connected to the partially isolated position. The motor drive is designed to be fixed onto the circuit breaker compartment door and is connected to the circuit breaker by the connection hook. The panel must be equipped with sheet metal door adapter flanges. The panel door must be fixed to the panel sidewall in order to prevent deformation due to the circuit breaker insertion load.

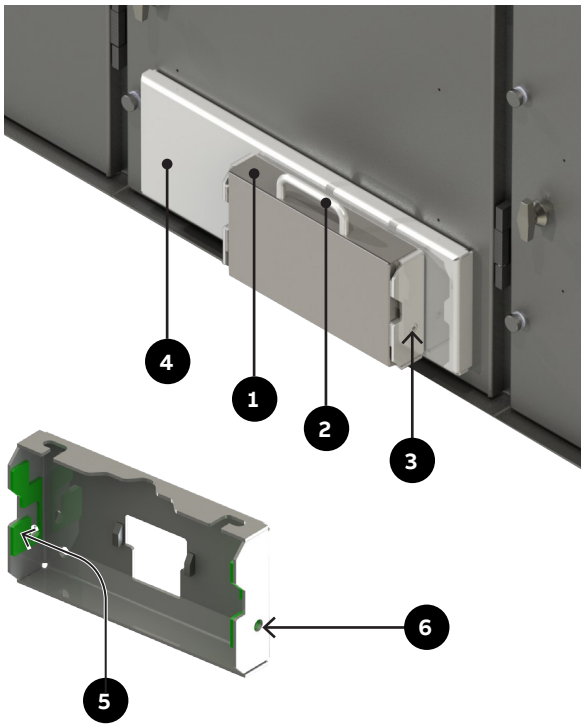


Items Caption
1 Electrical socket
2 Lifting handles
3 Locking handle
4 Retaining pins
5 Connection hook
6 Guides

Fig. 6

4.4. TruckMaster safety door

The safety door prevents accidental contact with the operator and reduces the possibility of animals entering the panel.



Key
1 Safety door
2 Lifting handle
3 Retaining screws
4 Sheet metal door adapter flanges
5 Door adapter guides
6 Retaining holes

Fig. 7

4.5. Preliminary operations

4.5.1. Connection of the auxiliary circuits

Note: the minimum cross-section of the wires used for the auxiliary circuits must not be less than the one used for internal wiring AWG16. Furthermore, they must be insulated for 3 kV test voltage.
Please note that the auxiliary circuits must be energized with 2 kV (maximum test voltage), as indicated in the standards.
These components are part of panel retrofitting activities.

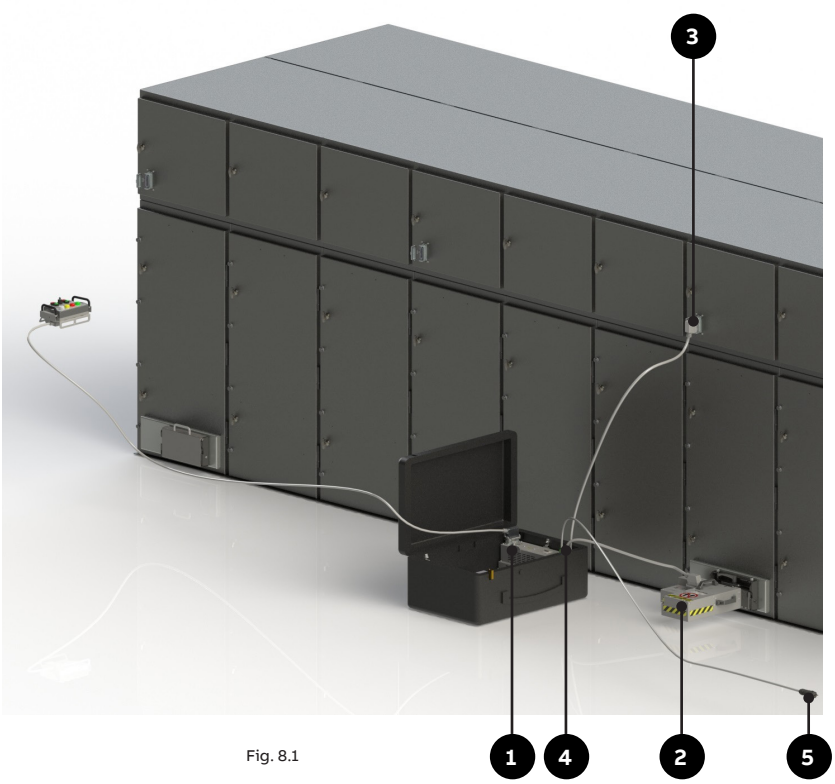


Fig. 8.1

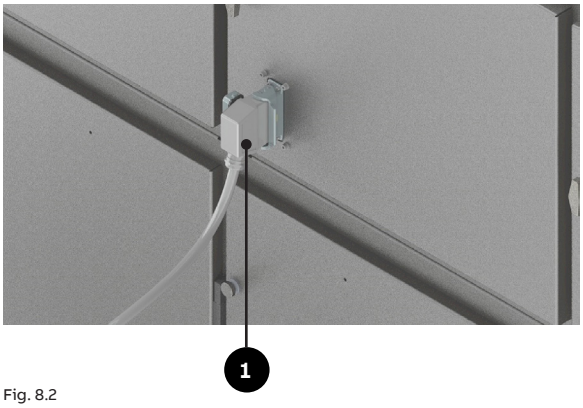


Fig. 8.2

4.5.2. Connection of the auxiliary plugs

Connect the secondary electrical plug as follow:

- Connect the remote control mobile plug (-XDB10 – 16 poles) to the correspondent fixed socket placed in the logical box in the trolley (see fig. 8.1-9 item 1) and fix it by locking element
- Connect the mobile socket (-XDB11 – 25 poles) out coming from logical box to the correspondent fixed plug placed on the Truckmaster Portable driver (see fig. 9 item 2)and fix it by locking element (see fig. 8.1 item 2).
- Connect the mobile socket (-XDB15 – 16 poles) out coming from logical box to the correspondent fixed plug placed on the panel (see fig. 9 item 3) and fix it by locking element (see fig. 8.1 item 3 and fig. 8.2 item 1).
- Connect the supply cable connector (-XDB9) to the correspondent plug placed on the logical box (see fig. 9 item 4) and connect the other side to the supply source (see fig. 8.1 item 5)

WARNING

Accettable inpult voltage range:
110 ÷ 230 VAC
110 ÷ 230 VDC

4.5.3. Preliminary racking operations

Rack in operation starts by pressing at the same time the confirm and rack in push buttons fig. 5 items 5-7, the jackscrew will stop in the completely extended position.
Rack out operation starts by pressing at the same time the confirm and rack out push buttons fig. 5 items 5-8, the jackscrew will stop in the completely retracted position.
If during preliminary operation the fault lamp is activated or is missed the secondary supply voltage fails refer to emergency operation chapter 4.6.4.1.
The required action depends on the circuit breaker and portable driver statuses. Use table T1 below to perform the correct action.
Pay specific attention about T1: the portable driver is not connected to the driver docking.

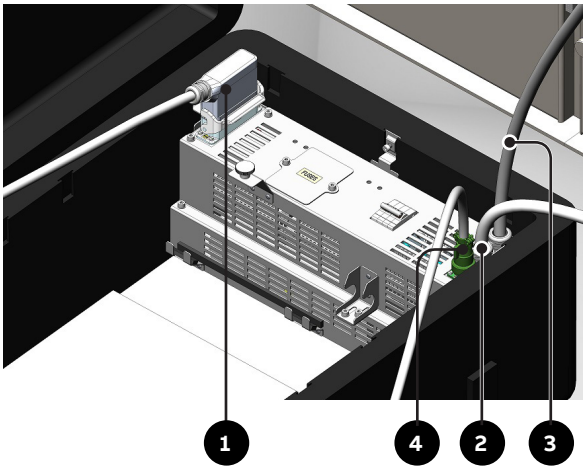


Fig. 9

4. Description and operations

Circuit breaker status				TruckMaster FR status		TruckMaster FR action
Open	Closed	Connected	Isolated	Connected	Isolated	
✓			✓		✓	No action
	✓		✓		✓	Open CB
✓		✓			✓	Rack in
	✓	✓			✓	Open CB + Rack In
✓			✓	✓		Rack out
	✓		✓	✓		Open CB + Rack out
✓		✓		✓		No action
	✓	✓		✓		Open CB

4.6. Commissioning and operation

4.6.1. General procedures

CAUTION

All operations regarding putting into service must be carried out by ABB personnel or by the customer's suitably qualified personnel with in depth knowledge of the apparatus and of the installation. Should the operations be obstructed, do not OVERRIDE the mechanical interlocks but check that the operating sequence is correct.

- remove padlocks from the circuit breaker handle (if present) to avoid any malfuntioning of the Truck-Master;
- supply the auxiliary circuits with power;
- do not attempt to insert the circuit breaker into any compartment prior to inspection;
- compare the circuit breaker name plate rating with the switchgear rating;
- do not attempt to rack a closed circuit breaker;
- always inspect the circuit breaker compartment to ensure that it is free of obstructions, tools, or other equipment;
- do not force the mechanical interlocks;
- make sure that the electrical connection of the portable driver is connected.

4.6.2. Putting into service: Preliminary operations

4.6.2.1 Safety door removal: fig. 10

1. Unscrew the two screws (fig. 7 items 3)
2. Hold the handle, then lift the door up and backwards (fig. 7)
3. Fit the two screws back into the relative safety door nuts
4. Store the safety door in a dedicated area

4.6.2.2 Portable driver installation: fig. 11

1. The portable unit must be preset as indicated in chapter 4.5.3
2. Hold the portable unit by lifting the handle (fig. 5 item 3)
3. Hold the locking handle (fig. 5 item 4) and turn it completely counter-clockwise as shown in fig. 12 (item 1)
4. Align the portable motor unit guides (fig. 5 items 7) with the door adapter guides (fig. 7 items 5)
5. Slide the portable unit towards the door panel until it stops, then slide the portable unit down until it reaches the mechanical stop (fig. 11).
6. Release the locking handle (fig. 5 item 4) and make sure that the locking pins (fig. 5 item 5) are aligned with the retaining holes of the sheet metal door adapter flanges (fig. 7 item 6) and fully engage the locking pins by turning the locking handle clockwise.
7. Make sure that the portable driver connection hook (fig. 13 item 1) is in the undercut on the circuit breaker cross beam (fig. 13 item 2).

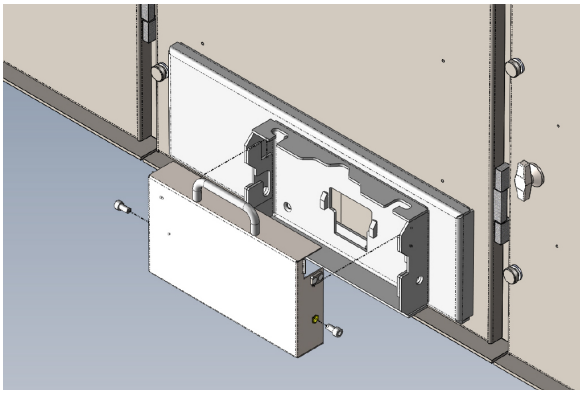


Fig. 10

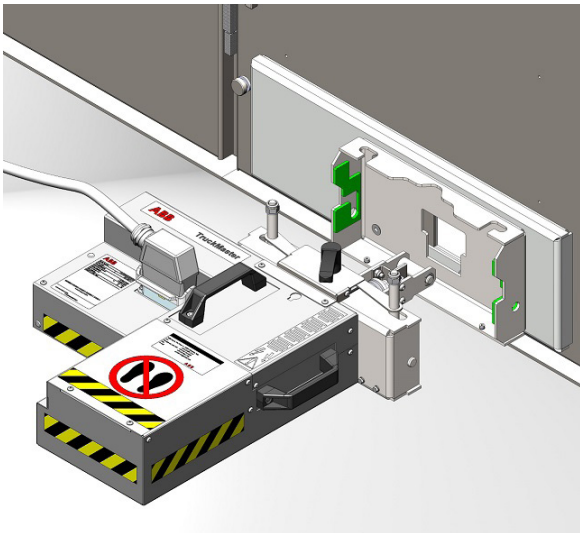


Fig. 11

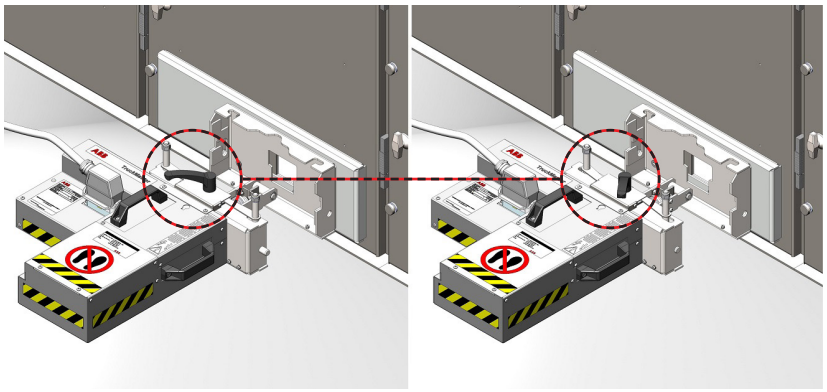


Fig. 12

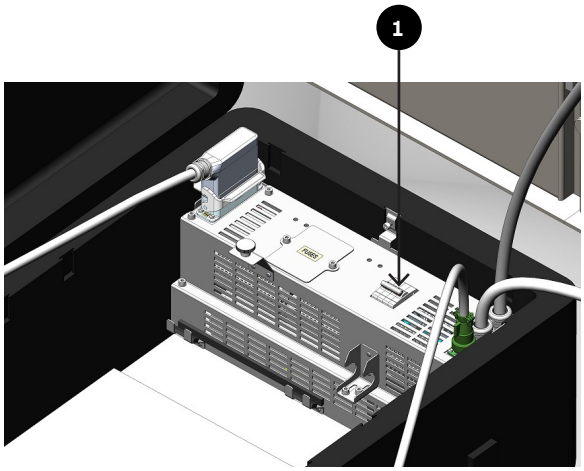


Fig. 12.1

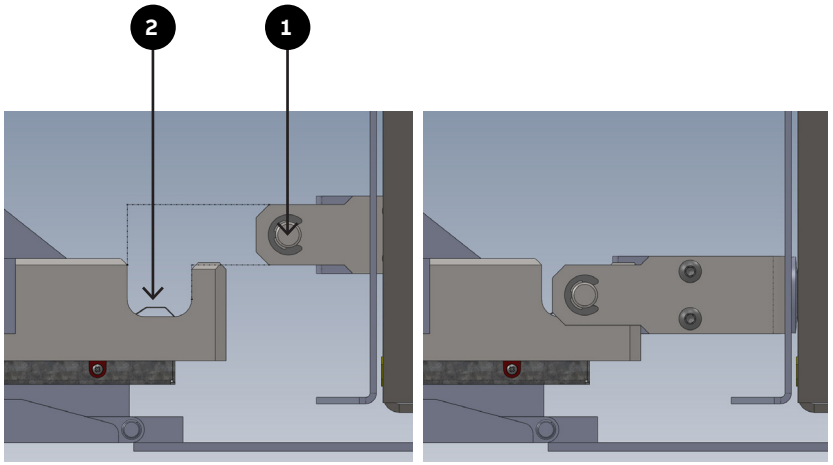
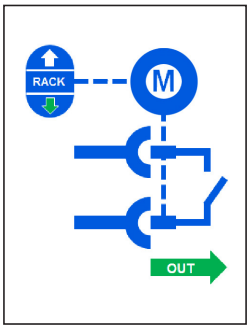


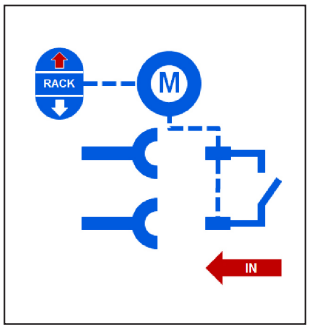
Fig. 13

4. Description and operations

4.6.3. Racking operation

1. Hold the remote portable unit by the handles and move a safe distance away from the front panel
2. Be sure that the main circuit breaker is open, switch on the power supply circuit breaker (fig.12.1 item 1) in the trolley, insert and switch on the key (fig.5 item 9). Wait about 20" until the green light "READY" (fig. 5 item 1) is on. Press at the same time Confirm + Rack in push buttons (fig. 5 items 5-7) if the circuit breaker is in disconnected position or press confirm + rack out push button (fig. 5 items 5-8) if the circuit breaker is in connected position, see tab T2.





T2

Circuit breaker status			Press push button
Connected	Disconnected	Open	
✓		✓	CONFIRM+RACK-OUT
	✓	✓	CONFIRM+RACK-IN

3. During the racking operation, check the external condition of the panel and kit and in case of visible mechanical deformation press reset push button.
4. Once the racking operation has terminated, the TruckMaster kit can be left electrically and mechanically connected or can be electrically and mechanically disconnected, in order to remove the power cord and or remote control unit (see 4.5.5).

4.6.4. Emergency operation

4.6.4.1 Recovery operation during preliminary operation

In case of emergency during preliminary operation (TruckMaster not connected to the circuit breaker – see 4.5.3) for motor fault, reset button pressed or loss secondary supply voltage loss, follow the next steps:

1. Check fuses in the trolley logical box, and replace it if failed (see 5.1.4)
2. Check that all auxiliary plugs are connected and fixed (see 4.5.1)
3. Check if the protection C.B. (fig. 12.1 item 1) is ON. Switch OFF and ON again.
4. Check the key fig.5 item 9 is ON.
5. Wait about 20" until the green light "READY" (fig. 5 item 1) is on.
6. Restart from 4.5.3.

If during the above steps the problem persist please contact ABB.

4.6.4.2 Emergency operation during racking operation

Note:
Emergency operation shall be performed in full safety conditions with de-energized panel.
In case of emergency during racking operation (TruckMaster connected to the circuit breaker – see 4.6.3) for motor fault, reset button pressed or loss secondary supply voltage loss, follow the next steps:

1. Check fuses in the trolley logical box, and replace it if failed (see 5.1.4).
2. Check that all auxiliary plugs are connected and fixed (see 4.5.1).
3. Check if the protection CB (fig. 12.1 item 1) is ON. Switch OFF and ON again.
4. Check the key fig. 5 item 9 is ON.
5. Wait about 20" until the green light "READY" (fig.5 item 1) is on.
6. Re-start from 4.6.3 racking operation; if the TruckMaster doesn't works proceed with following steps.
7. Remove TruckMaster portable driver from the door adapter guide fig. 7
8. Perform a complete rack-in and rack-out preliminary operation see 4.5.3.
9. TruckMaster works correctly follow the next steps, otherwise please contact ABB.
10. Open the door.
11. Disconnect the circuit breaker umbilical cords
12. Eventually complete manually the rack-out operation with handle tool.
13. Remove circuit breaker from the cubicle.

14. Circuit breaker check status:
    a. Turn lock handle and check that the lock pin lifts up (see circuit breaker overall dimension)
    b. Visual inspection of circuit breaker main parts
    c. Racking circuit breaker in-out with handle tool and open door to ensure any possible obstacle or mechanical interference is removed.
15. Check the status of the switchgear. For its maintenance and periodic checks, please refer to the switchgear technical documentation.
16. If all of the above steps are respected, follow the next steps, otherwise please contact ABB.
17. Connect all umbilical cords (CB and TM).
18. Insert the CB into the cubicle and close the door.
19. Perform preliminary rack-out operation on the TruckMaster.
20. Connect portable driver to the door adapter guide.
21. Perform racking in and out operations 4.7.3 must be allowed and done.

4.6.5. Portable driver removing operation

1. Release the locking handle (fig. 12) and decouple the locking pins
2. Move up the portable driver, hold it by handles, until it reaches the mechanical stop and slide the portable driver backward until it is free.
3. Leaving all the plugs connected perform a rack-out operation so that the jackscrew is retracted.
4. Store the portable driver unit in the trolley.
5. To reconnect the portable driver following the preliminary operation chapter 4.5.

4.6.6. Power cord removing operation

1. The power cord or remote control electrical cords removal during racking operation shall be avoided. The portable driver must be in an end position - either fully racked in or fully racked out.
2. Observed the above condition release the panel plug locking element and disconnect it.
3. Release the portable driver plug locking elements and disconnect it.
4. Store the power cord and the remote control in the trolley
5. To reconnect the power cord and remote control following the preliminary operation chapter 4.5.

4.7. Interlocks

The TruckMaster kit includes interlocks to prevent incorrect racking operations. Never make any modifications to the TruckMaster kit. If the operations are obstructed, do not force the mechanical interlocks but check that the operating sequence is correct.
These interlocks are provided to prevent incorrect operations and/or malfunction. The interlocks are described below:

- the withdrawable truck can only be moved from the test/disconnected position to the service/ connected position (and vice versa) if the circuit breaker is open (this means that before the circuit breaker must be opened).
- the circuit breaker can be closed if the withdrawable truck is exactly in the defined disconnected position or in the connected position (electric interlock).
- the circuit breaker can be opened manually in the service/connected or test/disconnected positions when power supply is off.

DANGER

Modification to interlocks can result in serious bodily injury or death. Do not override, by-pass or adjust interlocks.

5. Maintenance

The TruckMaster kit is designed for minimum maintenance. TruckMaster used in a clean, non-corrosive environment only requires annual inspection. It must be inspected more often in dusty or corrosive environments, at the user's discretion. Inspection is required after each interrupted fault.

DANGER

DO NOT work on TruckMaster with the circuit breaker energized.

- **DO NOT work on TruckMaster unless all components are disconnected by means of a visible breaker, are securely grounded and mechanically separated.**
- **DO NOT work on TruckMaster when power is supplied to the secondary control circuit.**
- **DO NOT override the safety interlocks. This may result in bodily injury, death and/or damage to equipment.**
- **DO NOT work on TruckMaster when circuit breaker is closed.**
- **DO NOT use a circuit breaker by itself as the sole means of isolating a high voltage circuit.**
- **DO NOT leave a circuit breaker in an intermediate position in a cell. Always ensure that the circuit breaker is in the isolated or connected position**

CAUTION

Before performing any operation, always make sure that the Truckmaster kit is electrically and mechanically disconnected from the panel.

5.1. General

TruckMaster features simple, sturdy construction and long life.
The drive is maintenance-free for its entire operating life and only requires functional inspections.
The servicing operations and their frequency depend on the environmental conditions and operating sequence.

Note
Comply with the following regulations when performing maintenance work:

- the specifications given in the “Standards and Specifications” chapter;
- the regulations for safety in the workplace given in the “Putting into service and operations” chapter;
- the regulations and specifications in force in the country where the apparatus is installed.

Maintenance operations can only be carried out by trained personnel in compliance with all the safety regulations. We recommend calling ABB service personnel, at least to check service performance and for any repair work. Turn off the power supply and put the apparatus in a safe condition during maintenance work.

5.1.1. Portable driver

Visually inspect the apparatus to make sure there is no mechanical deformation or leaking lubricant. Contact ABB if such conditions are noted and do not use the drive. Call ABB for preventive maintenance after every 1000 racking in-out operations or every 5 years.
Lubricate the jackscrew surfaces once a year. Remove any grease from the jackscrew surfaces. Only use SHELL Gadus S2 V100 2 grease. If the grease becomes caked and dirty, remove with a clean cloth and reapply lubricant.

5.1.2. Remote console and umbilical cord

Visually inspect the remote control and umbilical cord. Make sure that the lamps, case and push button are present and undamaged. Contact ABB if damage is discovered and do not use the apparatus. The electrical components must not be damaged in any way. The electrical cord and plugs must not show signs of breaks or burns. Contact ABB if damage is discovered and do not use the apparatus.

5.1.3. Repairs

Replacement of spare parts and accessories must only be carried out by ABB personnel or suitably qualified and specially trained personnel.
Always work with the TruckMaster electrically and mechanically disconnected from the panel.
All power supply sources must be disconnected and made safe against reclosing during removal and installation work.

CAUTION

Should maintenance be carried out by the customer's personnel, responsibility for the interventions remains with the customer.

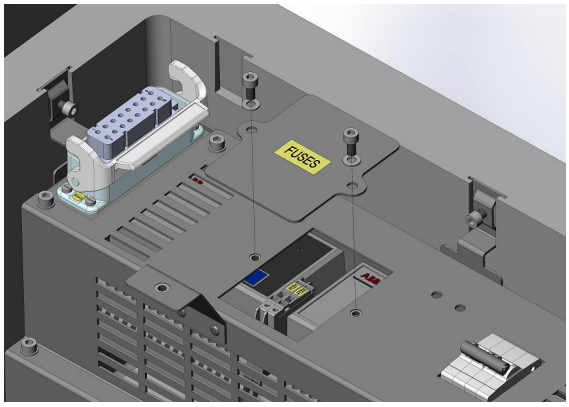


Fig. 14

5.1.4. Fuses replacement

To access to the fuses for replacement remove the two screws and the fuses cover as indicated in fig. 14.

6. Spare parts and accessories

WARNING

All assembly operations of spare parts/ accessories must be carried out following the instructions enclosed with the spare parts. Only ABB personnel or the customer's suitably qualified personnel with in-depth knowledge of the apparatus (ANSI/IEEE C37.04 - C37.54 - C37.09 - C37.55 Standards, NETA Standards, NEC NPFA70 Standards) and all the standards governing the performance of such interventions in safe conditions must be allowed to assemble spare parts/accessories. Should maintenance be carried out by the customer's personnel, responsibility for the interventions remains with the customer. Before carrying out any operation, always make sure that truckmaster is completely disconnected from the panel.

When ordering spare parts for TruckMaster, refer to the ordering sales codes and always state the following:

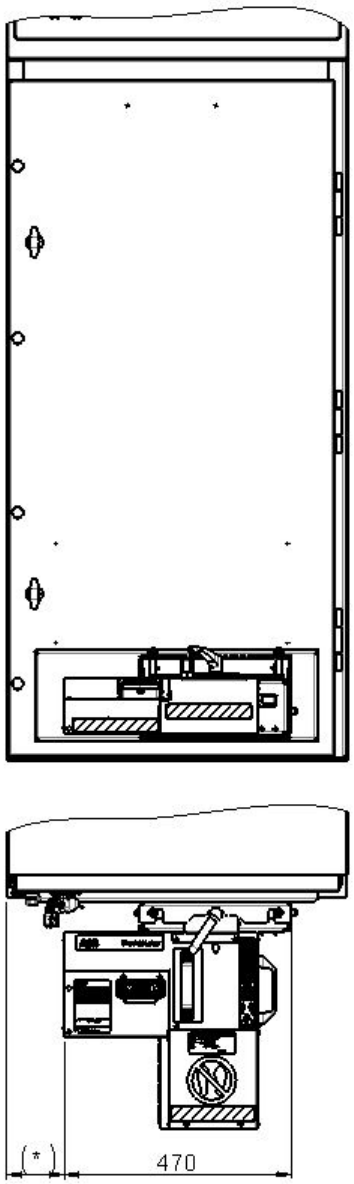
- type of circuit breaker
- rated voltage of the circuit breaker
- rated normal current of the circuit breaker
- breaking capacity of the circuit breaker
- serial number of the TruckMaster
- rated voltage of any electrical spare parts.

For ordering and availability of spare parts, please contact our Service office.

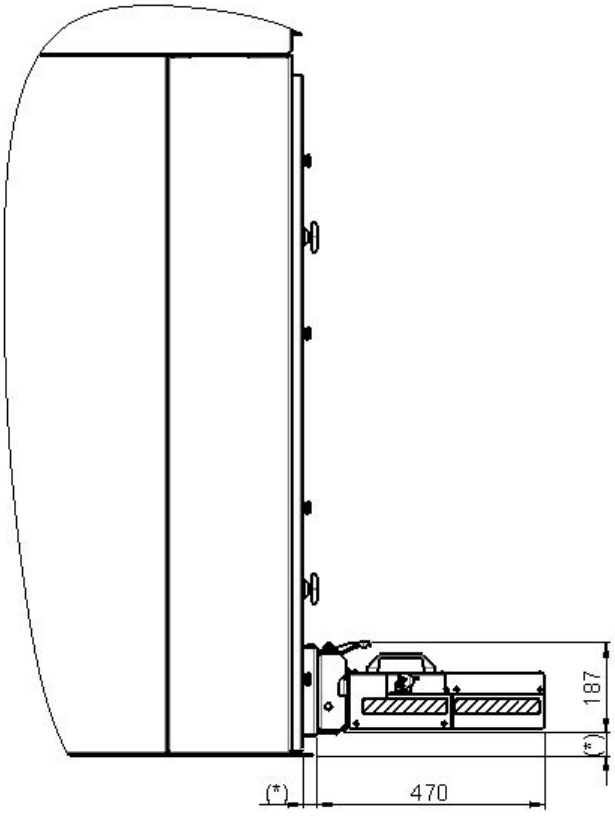
6.1. List of spare parts

- Portable driver
- Safety door
- Remote console
- Remote console lamps
- Remote console buttons
- Umbilical cords
- Remote console ON-OFF key selector
- Trolley
- Logical box assembly
- Fuses

7. TruckMaster FR overall dimensions



Trolley 860 x 560 x 355 mm



(*) Variable dimensions depending from the existing circuit breaker/switchgear.

8. Electric circuit diagram

TruckMaster FR standard electrical diagram is 1VCS013000 Please ask ABB last version available.

9. Product quality and environmental protection

The apparatus is manufactured in compliance with the requirements established by the international standards governing the quality management system and environmental management system. Quality certificates in accordance with ISO 9001 and an EMS conforming to ISO 14 001 testify to the excellent levels achieved in this respect.

Product end of life
ABB complies with the relevant laws and other requirements governing environmental protection in accordance with standard ISO 14 001.
The duty of company is to facilitate subsequent recycling or disposal at the end of product life. Always comply with the local laws in force when disposing of the product.

Disposal methods
The product can either be disposed of in an incineration plant or waste site.

Raw material	Recommended disposal method
Metal (Fe, Cu, Al, Ag, Zn, W, others)	Separation and recycling or disposal
Thermoplastics	Local requirements / waste site
Epoxy resin	Removal from equipment and further recycling or disposal
Rubber	Removal from equipment and further recycling or disposal

Notes

For more information please contact:

More product information:
www.abb.com/mediumvoltage
Your contact center:
www.abb.com/contactcenters
More service information:
www.abb.com/service

TruckMaster webpage:

1VCS013787 - Rev.A, en - Operation Manual - 2018.06 (TruckMaster (gs)