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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 exceeded 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:

![WARNING](image)

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

![DANGER](image)

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

![CAUTION](image)

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

![NOTICE](image)

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

The safety information in this document is provided for informational purpose only and does not purport to be comprehensive. The customer use of this equipment might present hazard that were not present during the definition of this instruction. If an hazardous situation is not avoided, will result in death or serious body injury. Perform your own specific situation evaluation including safety requirements such as personnel protective equipment.
Safe practice

It is mandatory that the instructions provided within this booklet shall be consulted to ensure safe interaction between the device and personnel and/or the facility and its equipment. The user has the responsibility of establishing a safety program that addresses the proper interaction with the equipment. This booklet is not intended to replace a safety program.

Take into considerations:
• customer specific work safety regulations for putting into service and operations
• safety standards and specifications of the country where the apparatus is installed.

ANSI notes:
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 should be permitted to work with Cable test truck and OneFit.

NOTICE

PPE (Personal Protective Equipment) adequate for the equipment voltage class and arc flash level shall be used.

DANGER

Failure to observe the requirements of osha standard 1910.269 can cause death or severe burns and disfigurement. That standard specifically prohibits the wearing of polyester, acetate, nylon, or rayon clothing by employees working with exposure to electric arcs or flames.
Introduction

OneFit

OneFit is the latest ABB hard-bus retrofill design concept featuring an integrally safe plug-in technology for easy connection of new standard apparatus to a wide range of existing panels. Retrofill is a modernization process involving replacement of the circuit-breaker and the main functional components of the original switchgear. OneFit is designed to replace apparatus while maintaining the existing switchgear in a serviceable condition.

OneFit comprises a frame housing the circuit-breaker, connected to the existing switchgear bushings by an additional power circuit that acts as an internal interface with the new breaker. The adaptation system (the OneFit kit) allows you to fit completely standard ABB withdrawable apparatus into the old panel.

OneFit units can be equipped with the following apparatus (in the procedure named CB):
- VD4, Vmax, VM1 series vacuum circuit-breakers;
- HD4 series SF6 gas circuit-breakers;
- V-Contact VSC series vacuum contactors;
- Operational trucks.

The instructions in this manual refer to the OneFit cable test and temporary earthing truck. For correct use of the apparatus, please refer to the relevant “Installation and maintenance instructions”.

OneFit solution is designed for a large number of installation configurations. However, it allows further technical and constructional modifications to be made, so as to adapt to special installation requirements. Consequently, the information given below may sometimes not contain certain instructions concerning special configurations requested by the customer.

Apart from the manual, it is therefore always necessary to consult the latest technical documentation (circuit and wiring diagrams, foundation plans, any protection coordination studies, etc.), especially regarding any modifications requested in relation to the standard configurations.

For maintenance, only use original spare parts.

Cable test truck

OneFit provides a service truck on demand required to enable the service and maintenance operations to be conducted. The cable test truck allows the insulation tests to be carried out on the power cables without accessing the feeder unit or disconnecting the cables from the switchgear.
Scope of the instruction manual

The purpose of this manual is to provide instructions for receiving, handling, operation, storage and maintenance of the cable test and temporary earthing truck for OneFit. This manual shall be carefully read and used as a guide during these operations. The following procedure shows how to operate a cable test truck within OneFit frame and to access the truck terminals providing safety information. This document gives the step by step operation procedure suggested to safely use a cable test truck and access potentially live parts. It is mandatory to follow all the steps. See relevant latest OneFit operation manual OneFit: 1VCS005985 to complete the knowledge of the product. All information in this booklet was current at the time of printing. This procedure is based on the usage of a dedicated cable test truck relevant “striped” door. Instead, the short wording “door” is used for the OneFit dead front cover element.

WARNING

The equipment may contain voltages at a level which may cause death or serious injury. This equipment should only be operated by qualified personnel. Follow usage instructions and safety precautions. Only use this equipment for its nameplate rating.
Cable test and temporary earthing truck and its accessories are subject to complete factory routine tests and inspection prior to packaging and shipment. The shipping package is designed to provide reasonable protection during shipment and to provide convenient handling.

Receiving
Immediately upon receipt of a Cable test and temporary earthing truck with its accessories (on demand), examine the cartons to determine if any damage or loss was sustained during transit. If damage or indication of rough handling is evident, file a damage claim at once with the carrier and promptly notify the nearest district office. ABB is not responsible for damage of goods after delivery to the carrier. Use care in unpacking to avoid damaging any Cable test truck parts.

Unpack the Cable test truck as soon as possible after receipt. If unpacking is delayed, difficulty may be experienced in making a claim for damages not evident upon receipt. Check the contents of each carton against the packing list before discarding any packing material. If any discrepancy is discovered, promptly notify your ABB sales representative. Information specifying the purchase order number, carton number and part numbers of damaged or missing parts should accompany the claim.

Handling
Cable test truck device shipping containers are designed to be handled by a fork lift. Lifting equipment may be used to uncrate the device. Once removed from the shipping container, the Cable test truck may be transported using a lift truck. Lifting labels are placed on Cable test truck frame, which identify two holes to be used to insert the safety hooks for lifting.

**CAUTION**

Damage from improper handling of the Cable test truck may reduce the dielectric strength of the device.

**CAUTION**

Take all precautions when moving the Cable test truck, to avoid any injure to the hands as this is a heavy object. Take all precautions when moving the Cable test truck fixed on the carrier truck on station floor.
Product description

Cable test truck

The cable test truck allows the insulation tests to be carried out on the power cables without accessing the feeder unit or disconnecting the cables from the switchgear. The use of these trucks foresees removal of the switching device from the switchgear (circuit-breaker or contactor) and its replacement with the truck, as shown in figure 1. During the racking-in phase in OneFit frame the metallic shutter shall be open and the truck opens the ANSI insulating shutters if present and, by means of its connectors allows connection to the switchgear cable side.

Cable test truck can be delivered on demand with a trolley for its transportation, as shown in figure 2 (1). Cable test truck mounts earthing plier (2), insulators (4) and clusters (3) for the connection with the OneFit copper adaptation system.

Figure 1. Schematic diagram

Figure 2. Cable test truck features, side view

Figure 3. Cable test truck features, front view

1  Phase terminal for test lead connection
2  Ball earth terminal for Live working - Portable equipment earthing connection
3  Cable test truck racking operation point
4  VPIS capacitive insulator (optional)
5  Ball phase terminal for portable equipment for earthing connection
6  Rating label
7  VPIS voltage presence indicating system according to IEC 62271-206 (on demand)
Product description

Cable test truck indicator
When Cable test truck is in racked out position, the red “connected” position label is not visible, as shown in the figure 4 (1).

Figure 4. Connected indicator dropped.

When Cable test truck is in racked in / service position, the red “connected” position indicator is visible, as shown in the figure 5 (1).

Figure 5. Connected indicator lifted up

Cable test truck striped door
The Cable test truck striped door provides personnel protection and prevents access to the ball earth terminal, ball phase terminals and phase terminals for test lead connections (cable testing).

The striped door delivered with Cable test truck, shows clearly it is different from usual OneFit door and enables the Cable test truck procedure. Striped door cannot be used alternatively to the usual OneFit door and vice versa.

Striped door is provided in two variants, the one shown in figure 6 with insulated transparent window, figure 6 (1), moving upward and locking handle, figure 6 (2), for OneFit versions exiting from original panels and a second variant shown in figure 7 with insulated transparent window, figure 7 (1), opening on side hinges, figure 7 (2), and release locking bolt, figure 7 (3), for OneFit versions that stay behind original panel door.

Figure 6. Striped door for OneFit versions exiting from original panels.
The two different interlocked and vertical opening or side opening window versions enable to better provide access to the cable test truck once in racked-in/service position to execute cable testing and earthing procedure in different OneFit retrofit installation conditions.

For OneFit versions exiting from original panels, the handle lock is a tool based interlock. When released, the red locking button comes out and shows unlocked condition (opening), as shown in figure 8. The window can then be lifted to the high stable position to be locked again.

For OneFit versions that stay behind original panel door, the locking bolt is a tool based interlock, release the locking bolt as shown in figure 9.

The handle lock figure 6 (2) and the locking bolt figure 7 (3) are tool based interlocks, they unlock the insulated transparent window, figure 6 (1) and figure 7 (1), for access to the cable test truck. Window opening is with a dedicated key, its use shall be guaranteed to qualified and authorized personnel only.

The key should be placed in a safe room with access guarantee to qualified and authorized personnel only.

(*) By Elesa
Overall dimensions

Figure 10. Overall dimensions of cable test truck P210 for OneFit version, lower side connection.

Figure 11. Overall dimensions of cable test truck P150 for OneFit version, lower side connection.

VPIS accessory on demand.
In some switchgear the cable side may be the upper one, in such cases the same procedure can be applied using a cable test truck with the upper side contact arms.

Figure 12. Overall dimensions of cable test truck P150 for OneFit version, upper side connection. VPIS accessory on demand.
Cable test truck procedure

Preliminary instructions

With the cable test truck in service position and the OneFit shutter open, the OneFit door interlock is in locked position and prevents the door removal. Such condition intentionally prevents access to live parts for safety. It is mandatory to review the following procedure and customize as needed to ensure no live part access will be possible without proper procedure and tools to ensure personnel safety.

**DANGER**

Such procedure shall be revised and approved by the customer safety officer or person responsible for the specific site equipment operation to ensure it considers the available tools and network configuration and provide the safety conditions required.

**DANGER**

Review the following procedure and customize as needed to ensure no live part access will be possible without proper procedure and tools to ensure personnel safety.

**WARNING**

The operational need arises in case of cable testing operation, as it is required to access the terminals of the cable test truck to connect testing equipment leads. In the versions providing portable equipment for earthing, the same equipment can be used to provide safe earthing of a feeder cable side, providing earth fault current capability up to declared value. Rated values are available on ratings label. Upper or lower terminals are available depending on original panel cable side.

The earth fault capability needs to be coordinated between the Cable test truck, portable equipment for earthing, OneFit earthing blade, earth connection to original panel and earth conductors. Maximum earth fault capability is limited by the component with lowest capability in the above earthing chain. Rated values of each component are available on its ratings label.
Check and in case clean the insulating surfaces and grease the power disconnect clusters and the earthing plier before using the Cable test truck. See “Maintenance” chapter.

Disconnect the ground and test cables from all the Cable test truck terminals (earthing and phases) before insert the Cable test truck inside OneFit frame.

Check the OneFit frame to certain that it is free of obstructions, tools, or other equipment before inserting Cable test truck.

The standard procedure in OneFit shall be executed as follow starting from the circuit breaker (CB) in operation, racking out (closing insulating ANSI shutters if present), closing the OneFit metal shutter and then interlocks are released and the door can be removed.

The relevant latest OneFit operation manual must be read carefully.

**DANGER**

Due to the safety concerns in such type of operation it is very important to clearly indicate on each truck the intended function by a specific warning label that shall be attached in site depending on the specific type of connection.

**WARNING**

Due to the safety concerns for the following procedure the work area and cable test equipment shall be properly identified as a live equipment area and segregated during the complete sequence execution.

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**Instructions**

1) Insert Cable test truck in OneFit frame, referring to the OneFit operation manual. Engage OneFit retaining grooves with Cable test truck handles and secure racked-out/test position.

When Cable test truck is in racked out position, the red “connected” position label is not visible, as shown in the figure 4 (1).

Figure 13. Trucks and OneFit frame.
Cable test truck procedure

2) Engage and lock down the cable test truck striped door, referring to the OneFit operation manual. Striped door shows clearly it is different from usual OneFit door and enables the cable test truck procedure. Striped door can not used alternatively to the usual OneFit door and vice versa.

3) Open OneFit shutter, referring to the OneFit operation manual. Striped door provides personnel protection and it prevents access to the ball earth terminal, ball phase terminals and phase terminals for test lead connections (cable testing).

4) Rack-in the cable test truck, referring to the OneFit operation manual “Apparatus racking in/out” chapter. When Cable test truck is completely in racked in / service position, the red “connected” position indicator is visible, as shown in the figure 5 (1).

4a) In the version provided with Voltage Presence Indication System, figure 3 (7), check the voltage presence before next step, in event of:

- any light is on or flickering, do not access.
- all light is off, still consider the equipment live until properly earthed.

In every conditions, shall be always used adequate PPE as if the equipment was live.

![Figure 14. Cable test truck striped door side view.](image)

![Figure 15. Cable test truck striped door frontal view.](image)

**WARNING**

The equipment may contain voltages at a level which may cause death or serious injury. This equipment should only be operated by qualified personnel. Follow usage instructions and safety precautions. Only use this equipment for its nameplate rating.

**NOTICE**

PPE (Personal Protective Equipment) adequate for the equipment voltage class and arc flash level shall be used.
5) Unlock by tool the handle lock or locking bolt and open the insulated transparent window for access to the cable test truck. The handle lock can be released only with the dedicated key. Figure 16a shows the insulated transparent window for OneFit versions exiting from original panels.

How to use locking system: see “Cable test truck striped door description” chapter.

DANGER

Tool based lock bypass: such action expose personnel to HV live parts hazard, only trained personnel with proper Personal Protection Equipment shall execute it according to approved procedure. From this point on all equipment shall be considered live.
Cable test truck procedure

6) Open the insulated transparent window.

![WARNING]

**WARNING**

Consider the equipment live until completely earthed.

6a) For OneFit versions exiting from original panels, move upwards the insulated transparent window and when it is in the high stable position push the red signal button to lock again, as shown in figures 17a and 17b. Check locking engages the pin seat in the top door position and likewise when closing it at the bottom position.

6b) For OneFit versions that stay behind original panel door, rotate the insulated transparent window and stop it in a stable position.

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**Figure 17a. Insulated transparent window moves upward.**

**Figure 17b. Insulated transparent window locked.**
7) Check voltage presence.

The metal OneFit door still provides a metal partition but the large window enables to access the cable test truck terminals for voltage presence verification with proper insulating high voltage tester. Check the rating of the insulating high voltage tester is adequate to the equipment voltage class. Check voltage presence on each phase terminals with a proper high voltage tester and PPE (Personal Protective Equipment). Check each phase.

**DANGER**

Proceed only if the installation has proven effectively dead.

**WARNING**

Strictly follow the information in the HV presence tester instruction manual.

**NOTICE**

PPE (Personal Protective Equipment) adequate for the equipment voltage class and arc flash level shall be used.

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Figure 18a. HV presence tester, front view.

Figure 18b. HV presence tester, side view.
Cable test truck procedure

8) Connect to earth clamping the ball earth terminal as shown in figure 19a (25mm diameter) and ball phase terminals as shown in figure 19b (25mm diameter) by a portable equipment for earthing as shown in figure 19c, using an insulating rod and PPE; that they are adequate to the equipment voltage class. Check the device fault level capability according to IEC 61230 Live working - Portable equipment for earthing or earthing and short-circuiting.

Temporary work earthing ensure solid grounding of the cable test truck and only when such device is in place it is safe to connect the testing equipment leads to the terminals.

Consider the equipment live until completely earthed.
9) Connect the test lead connections and remove the portable equipment for earthing by using the insulating rod tool.

10) Proceed with cable testing according to customer procedure.

11) Ensure that customer cable test equipment is switched off and disconnect its power supply. Beware of residual voltage that may be present of cables, especially when DC tested. This may lead to sparks when earthing the terminals.

12) Connect to earth clamping the ball earth terminal and ball phase terminals (25mm diameter) by a portable equipment for earthing, using an adequate insulating rod and PPE.

13) Disconnect the test lead connections.

14) Disconnect the portable equipment for earthing.

15) Lock back in secure closed position the insulated transparent window, blocking access to the cable test truck terminals. Follow the reverse instructions from step No.5 to step No.1.

Figure 19c. Portable equipment for earthing

Please note the earth fault capability needs to be coordinated between the Cable test truck, the portable equipment for earthing and OneFit earthing blade and earth connection to original panel earth conductor. Maximum earth fault capability is limited by the weakest component in this chain. Rated values of each component are available on its ratings label.

CAUTION

From this point on all connections and test equipment shall be considered live.
Storage

When the cable test truck is not in use, it can be stocked on its dedicated trolley for transportation, as shown in figure 20. The trolley enables to stock together the striped door and to protect the cable test truck from dust and environmental contaminants with a protective closure (grey shield, at right), as shown in figures 21. Additional protection or bag and humidity absorbents use are recommended in aggressive, humid or contaminants conditions. When a period of storage is foreseen, our workshops can (on demand) provide suitable packing for the specified storage conditions. Store in a covered, well-ventilated, dry, dust-free, noncorrosive ambient, away from any easily flammable materials and at a temperature between –5 °C and +45 °C. In any case, avoid any accidental impacts or positioning which stresses the structure of the apparatus.

![Figures 20. Cable test truck on trolley.](image1)

![Figures 21. Additional protection placed.](image2)
Maintenance

Before using the cable test truck:
- Visual inspection of the power disconnect clusters and the earthing plier: they must be free of any deformation or erosion. Clean and lubricate the contact elements with industrial vaseline grease.
- Checking interlock operation: the interlocks provided must operate correctly.
- Visual inspection of the insulating surfaces: the parts in resin and polycarbonate sheets must be free of any accumulation of dust, dirt, cracks, discharges or traces of surface discharges. Clean using a soft microfiber cloth or moist non-abrasive sponge, gently wash before with warm water and then with little diluted soap. Rinse with lukewarm clean water. The parts must be completely dry and without soap residues before using them.

WARNING

Maintenance should only be performed by qualified and knowledgeable personnel.