
REF42plus HMI Cutting Tool

Safety Guide



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Table of contents

04	Safety information
05	1. Introduction 1.1 Document revision history 1.2 Related documentation 1.3 Symbols
06	2. Cutting tool overview 2.1 Overview 2.2 Tool components
07–08	3. Assembling the cutting tool 3.1 Charging the battery 3.2 Assembling the cutting head 3.3 Inserting the battery
09	4. Using the cutting tool
10	5. Maintenance
10	6. Troubleshooting
11	7. Technical data
11	8. Disposing of the device

Safety information

-  Before using the cutting tool, read the instructions carefully.
-  Do not use this tool to other purposes than instructed in the guide. Use only cutting heads designed for the device.
-  In case the offcut gatherer is not used, protect the personnel and the switchgear panel from flying offcuts.
-  Consider the performance data of the device.
-  Non-observance can result in death, personal injury or substantial property damage.
-  National and local electrical safety regulations must always be followed.
-  Always keep this manual inside the cutting tool brief case in a readable condition.
-  Use safety gloves, protective glasses, hearing protectors and a hard hat when operating the cutting tool. Be careful with the cut edges, which may be sharp and cause injury.
-  When the cutting tool is in use, there should be no one in front or next to the cutting head because of risk for injury.
-  Keep your hands away from the cut-out area where the cutting tool is in use.

1. Introduction

1.1 Document revision history

Document revision/date	Product series version	History
A/2015-06-26	1.0	First release
B/2018-12-22	1.0	Second release

1.2 Related documentation

Before taking the cutting tool into use, familiarize yourself with the applicable documents.

Name of the document	Document ID
REF542plus HMI Cutting Tool Safety Guide	1MRS758331
REF542plus HMI Cutting Tool Operating Guide	1MRS758332
REF542plus HMI Cutting Tool Operating Guide, video	1MRS758344 A

REF 542plus relay manuals can be downloaded from the ABB Website abb.com/mediumvoltage.

1.3 Symbols



The electrical warning icon indicates the presence of a hazard which could result in electrical shock.



The information icon alerts the reader of important facts and conditions.



The warning icon indicates the presence of a hazard which could result in personal injury.



The tip icon indicates advice on, for example, how to use a certain function.



The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.

Although warning hazards are related to personal injury, it is necessary to understand that under certain operational conditions, operation of damaged equipment may result in degraded process performance leading to personal injury or death. Therefore, all warning and caution notices must be fully complied.

2. Cutting tool overview

2.1 Overview

01 The tool kit parts are packed in a hard plastic case.

The cutting tool is a hand-held battery operated device for machining the existing HMI panel cutout. The tool consists of a power unit, a cutting head and offcut gatherer for offcuts. The power unit is a battery-operated power device for the cutting head. The cutting head consists of two parts, a punch and a die. By means of the cutting head, the existing HMI panel cutout is machined to the required size.



2.2 Tool components

Table 1: Cutting tool components

Tool kit	Product ordering code	Components and ordering codes
REF 542plus HMI Cutting tool kit	2RCA035147	Cutting tool power unit 2RCA032139
		Cutting head REF 542plus HMI 2RCA035148
		Two batteries 2RCA031785
		Battery charger 2RCA032140
		Offcut gatherer 2RCA036688



Figure 1: Cutting tool components

3. Assembling the cutting tool

3.1 Charging the battery

Charge the battery before taking the device into use. The charger is designed for 220...240 Volt and 50/60 Hz.

Plug in the charger to the power outlet and connect the battery to the charger. The charging time for an empty battery is approximately 45 minutes.

Indication LED on the charger

- Green: Battery is completely charged
- Red: Battery is charging
- Blinking: Battery is not completely inserted or battery is too hot. A signal is heard.



Use only recommended compatible batteries in the charger.



Ensure that the battery is always fully charged before starting the work. Using a worn-out or almost empty battery can halt the device during a cutting procedure, thus causing possible damages.



Recharge the battery immediately when the speed of the power unit slows down.



When charging two batteries one after another, wait approximately 15 minutes before loading the 2nd battery.

The optimal working temperature for the Battery Packed Compact Hydraulic Punch is 15...25°C. The charger charges all batteries 18...28 V and is compatible with NiCD, NiMH and Li-Ionen batteries. It observes the temperature automatically. The change between quick charges to conservation charging avoids overloading of the battery cells. A LED indicates the charging status.



Figure 2: Battery



Figure 3: Battery charger

3.2 Assembling the cutting head

1. Insert the springs (4 pcs) between the die and the punch. Both the die and the punch have slots for the springs.
2. Press the die and the punch together.
3. Insert the feed rod through the die and punch assembly.
4. Tighten the feed rod into the power unit.

 The die and the punch must have markings "REF 542plus" on the same side.

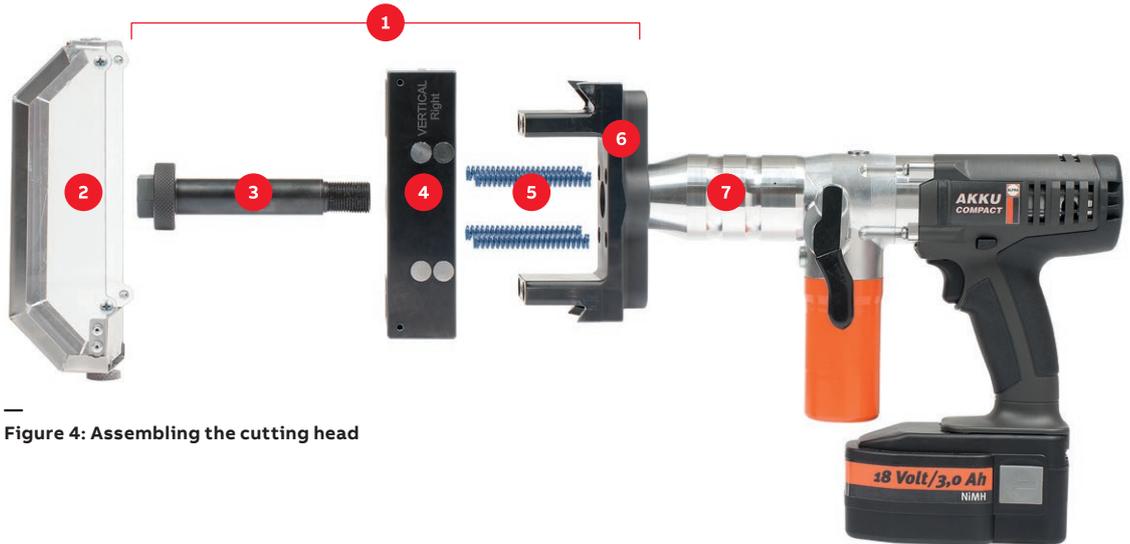


Figure 4: Assembling the cutting head

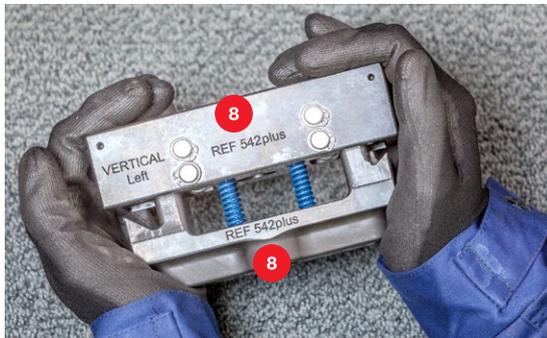


Figure 5: Cutting head markings

- 1 The cutting head consists of four parts (3-6)
- 2 Gatherer collects offcuts
- 3 Feed rod transmitting power to the cutting head
- 4 Die (part of the cutting head)
- 5 Coil springs (4 pcs). Pressing vent lever the punch moves backwards to the starting position.
- 6 Punch (part of the cutting head)
- 7 Power unit
- 8 Cutting head marking.
When assembled correctly, the marking "REF 542plus" appears on the same side of both the die and the punch.

3.3 Inserting the battery



Figure 6: Inserting the battery

After assembling the cutting head, insert the charged battery to the power unit. The battery can be inserted from either side.

4. Using the cutting tool

The cutting tool is designed for cutting sheet metal of 1.5...3.0 mm thickness. The tool must not be used for stainless steel or aluminum.

- ⚠ For your safety, keep your hands on the power unit, never on the cutting head. Beware of the sharp edges! Use safety gloves, protective glasses, hearing protectors and a hard hat.
- ⚠ The punch part of the cutting head should never be driven so far that it strikes the counterpart with pressure. This might lead to severe damages. By pressing the vent lever, the feed rod releases moving the punch and die apart.
- i If the cutting tool reaches its maximum pressure limit and still the cutting operation cannot be completed, then higher force has to be applied to the vent lever to release the feed rod. If this does not help, remove the battery, offcut gatherer and the feed rod. Refer to section 6 for troubleshooting.

1. Press the operating switch to start the punching. The switch must be pressed during the punching procedure.

Cutting head is in the starting position, see Figure 7. Press the operating switch to start the punching.

2. Press the vent lever once after each single cut (see Figure 8). The punch is vented and the rod moves backwards to the starting position.
3. To stop the operation, release the operating switch.

- i The cutting tool is not appropriate for continuous operation. Do not use the device longer than for 40...50 punchings. After that, let the device cool down for about 10...20 minutes.



Figure 7: Cutting head in the starting position. Keep your hands away from the area where the cutting tool is in use.



Figure 8: Pressing the vent lever

- ⚠ After each cut, release the operating switch and vent the device by pressing the vent lever.
- ⚠ Always remove the battery first before emptying the gatherer or changing the cutting head.
- ⚠ Overheating may cause damage to the device.
- ⚠ The power unit must not be operated in damp conditions.

5. Maintenance

The hydraulic punching unit must be kept clean and stored in a dry place. The battery and the charger must be protected against humidity.

The power unit is maintenance free. If the device does not build up necessary hydraulic pressure with fully charged batteries, see the troubleshooting section.

The cutting head needs to be replaced if the power unit needs more power for the punching procedures. This occurs if the cutting time is considerably longer than expected and the battery needs to be recharged more often.

If the cutting head is worn, replace the old cutting head with a new one. The ordering information is available in section 2.2.

 The power unit must not be opened. Should this happen, the warranty expires.

 After using the power unit, the pressure must always be released by pressing the vent lever. Leaving the power unit pressurized may damage the device.

 If the cutting tool is stored for a period longer than two months, it is recommended to operate the device regularly to keep all parts lubricated. This extends the lifetime of the device.

6. Troubleshooting

Table 2: Troubleshooting power unit failures

Symptom	Action
Slight oil leakage from a new device during usage or storage.	When the cutting tool power unit is assembled, some extra oil is used to install all sealings properly. This oil leaks out from the overflow hole in the aluminum body of the power unit. Leakage should end after a few operating hours.
Oil leakage during usage or storage.	Do not open the unit. Contact the supplier for further instructions.
Cutting tool reaches its maximum pressure limit, but the cutting operation cannot be completed.	Stop the punching process. First press the vent lever firmly to release the feed rod. Then press the operating switch for approximately ten seconds. If the failure persists, contact supplier for further instructions. Reasons for reaching the maximum pressure limit might be: <ul style="list-style-type: none"> • Broken or blunt cutting head • Cut-off from earlier cutting operation has not been removed • Metal sheet thickness or material

7. Technical data

Table 3: Weight of the cutting tool kit

Description	Value
Case set (kit)	12.2 kg

Table 4: Battery

Description	Value
Battery	18 V; 3.0 Ah NiMH
Charging time	45 min after complete discharge
Charging cycles	~ 500 in normal conditions
Operating temperature range	0°...+40°C Loses capacity under 0°C

Table 5: Punching time/capacity

Description	Value
Punching time	5...7 s, 150...250 punches/battery
Punching capacity	80 kN with pressure relief valve

Table 6: Maximum continuous operation/cooling time

Description	Value
Maximum continuous operation	40...50 punchings
Cooling time after maximum continuous operation	10...20 minutes

8. Disposing of the device

- Dispose of all components separately
- First drain the oil and then dispose it



Hydraulic oils pose a danger for ground water. Uncontrolled drain or inappropriate disposals carry a penalty.



The battery must be disposed of following the battery directive.



When disposing of the parts, follow the local environmental norms.



The device must not be disposed as a complete unit into the residual/non-recyclable waste, because it could damage the environment.



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For more information, please contact

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abb.com/mediumvoltage

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