



# 409-10104

For tooling revisions C and above Part number 1976330-1



Original instructions



### SUPPORT CENTER

#### CALL TOLL FREE +1 800 522 6752 (CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)

The **Support Center** offers a means of providing technical assistance when required. In addition, Field Service Specialists are available to provide assistance in the adjustment or repair of the application equipment when problems arise that your maintenance personnel cannot correct.

#### INFORMATION REQUIRED WHEN CONTACTING THE SUPPORT CENTER

When calling the Support Center regarding service to equipment a person familiar with the device should be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be avoided in this manner.

When calling the Support Center, be ready with the following information:

- Customer name
- Customer address
- Person to contact (name, title, telephone number, and extension)
- Person calling
- Equipment number (and serial number, if applicable)
- Product part number (and serial number, if applicable)
- Urgency of request
- Nature of problem
- Description of inoperative components
- Additional information that might be helpful

© Copyright 2025 TE Connectivity Ltd. family of companies. All rights reserved.

TE Connectivity, TE Connectivity (logo), and TE (logo) are trademarks. Other logos and product or company names may be trademarks of their respective owners.

PRODUCT INFORMATION +1 800 522 6752

This controlled document is subject to change.

For the latest revision and Regional Customer Service, visit our website at www.te.com.



### Contents

1		Introduction5					
2		Description					
3		Ор	eration	. 8			
3		3.1 Crimping		1	Crimping	. 8	
	3.	2	Inspecting the crimp	11			
3.3		3.3 Finishing the splice		13			
4	4 N		intenance	14			
	4.	1	Charging the battery pack	14			
	4.	2	Daily maintenance	15			
	4.3		Periodic visual inspection	15			
	4.	4	Lubrication	16			
5		Tro	publeshooting	17			
6		Replacement and repair1					
7	7 Revision summary						



### SAFETY PRECAUTIONS — AVOID INJURY — READ THIS FIRST!



#### NOTE

Keep all decals clean and legible. Replace them when necessary.



#### DANGER ELECTRIC SHOCK HAZARD

This tool is not insulated. When using this unit near energized electrical lines, use proper personal protective equipment.

Failure to observe this warning could result in severe injury or death.



### DANGER

Denotes an imminent hazard that can result in moderate or severe injury.



#### SKIN INJECTION HAZARD

Do not use hands to check for oil leaks. Highly pressurized oil punctures the skin, causing serious injury, gangrene, or death. If injured, seek immediate medical help to remove the oil.



#### DANGER FIRE HAZARD

Do not use solvents or flammable liquids to clean the crimping tool. Solvents or flammable liquids could ignite and cause serious injury or property damage.

Failure to heed these warnings could result in severe injury from harmful fumes or burns from flying debris.



### DANGER

Inspect the tool and jaws/dies before each use. Replace any worn or damaged parts. A damaged or improperly assembled tool can break and strike nearby personnel.

Failure to observe this warning could result in severe injury or death.



### CAUTION

Do not place the tool in a vise. The crimping tool is designed for hand-held operation.

Protect the crimping tool from rain and moisture. Water damages the crimping tool and battery.

Failure to observe these precautions can result in injury or property damage.



#### CAUTION

Do not perform any service or maintenance other than as described in this manual. Injury or damage to the tool can result.

Failure to observe these precautions can result in injury or property damage.

Safeguards are designed into this application equipment to protect operators and maintenance personnel from most hazards during equipment operation. However, certain safety precautions must be taken by the operator and repair personnel to avoid personal injury, as well as damage to the equipment. For best results, application equipment must be operated in a dry, dust-free environment. Do not operate equipment in a gaseous or hazardous environment.

Carefully observe the following safety precautions before and during operation of the equipment:



Always wear approved eye protection while operating equipment.



Always wear appropriate ear protection while using equipment.



Moving parts can crush and cut. Always keep guards in place during normal operation.



Electrical shock hazard.



Always turn off the main power switch and disconnect the electrical cord from the power source when performing repair or maintenance on the equipment.



Always turn off the main power switch and disconnect the electrical cord from the power source when performing repair or maintenance on the equipment.



Never alter, modify, or misuse the equipment.



Do not operate equipment if the guards are removed.



Read and understand this entire document before using equipment.



# **1** Introduction

This tool is available for rent only from TE approved tool distributors. Rental information and approvals require user training by TE Application Tooling personnel. Contact TE Field Service for more information (refer to section 6).

This manual covers the operation and maintenance of Cordless Electric Power Tool Kit 1976330-1, which is used to apply COPALUM<sup>™</sup> splices to solid-conductor wire. Read this manual carefully before attempting to operate the tool for the first time. The performance of the tool depends largely on the intelligent use of the information contained in this manual.



This manual is for tooling revisions C and above.

The tool is used in the <u>TE Connectivity Aluminum Wire Re-termination Program</u>, which provides materials and procedures to modify branch circuits in aluminum- wired homes in compliance with the National Electrical Code. The program is intended only for qualified electricians and uses only materials listed by Underwriters Laboratories.

The program consists of permanently joining a short length, or pigtail, of solid-copper wire to existing number 12 and 10 solid aluminum wires in 15 ampere and 20 ampere branch circuits. The wires are spliced using COPALUM splices and TE tooling. The pigtailed copper wire is then connected to the electrical device. Ordinary branch-circuit wiring methods are used. Aluminum-to-aluminum wire splices are modified by permanently joining the wires using COPALUM splices and TE tooling.

This program covers modifications of all 15 ampere and 20 ampere branch circuit connections (such as plug receptacles, switch devices, and junction boxes) and all field-wired appliances(such as lighting fixtures, garbage disposals, furnace fans and controls, electrical accessories on gas appliances, exterior lighting fixtures, breaker boxes, and other electrical panels).

Height	337.8 mm [13.3 in.]	
Width	76.2 mm [3.0 in.]	
Length	317.5 mm [12.5 in.]	
Weight	4.67 kg [10.3 lb.]	
Battery pack life	300 crimps	
(full charge)	(approximate)	

#### Table 1: Tool kit specifications

When reading this manual, pay particular attention to DANGER, CAUTION, and NOTE statements.



# Denotes an imminent hazard that can result in moderate or severe injury.

DANGER

**CAUTION** Denotes a condition that can result in product or equipment damage.



Highlights special or important information.



# 2 **Description**

Cordless Electric Power Tool Kit 1976330-1 is a portable, battery powered hand tool kit featuring an integral die set with two crimping chambers. (Refer to Figure 3.) These crimp chambers allow the tool operator to splice a wide variety of wire sizes and combinations without having to remove and replace die sets. The kit contains a crimp tool, a battery pack, a battery charger, and a carrying case.

Figure 1 shows the components of the tool. Splices are crimped by an integral die set with two crimping chambers. The crimping head can be rotated 330° for better access to tight corners and other difficult working conditions. The tool has an ergonomically-formed plastic housing and is powered by a rechargeable 3 Ah lithium-ion battery. A red LED indicates battery charging, tool functions, and faults (see Table 5). A white LED illuminates the work area. Pressing the control button triggers the crimping action.



Figure 1: Components

The tool is powered by a removable, rechargeable battery pack, which is supplied with a recharging unit. The recharging unit operates on 115 Vac line power, and charges the battery pack from full discharge to full charge in approximately 30 minutes.

With a fully-charged battery pack installed in the tool, the operator places a splice onto the wire to be crimped. The splice is then loaded into the appropriate crimp chamber of the tool. When the control button is pressed, the motor starts, operating a hydraulic cylinder that pushes up on the die anvil, bottoming the dies. A special



feature of the tool produces high-quality, consistent crimps by ensuring that each splice is fully crimped before the dies reopen. When the control button is released, a brake stops the forward motion of the dies.

An integrated pressure sensor measures the crimping force during every crimping operation. An automatic retraction feature returns the piston to its starting position when the maximum operating pressure is achieved. If the maximum pressure is not achieved, an audible alert sounds and a red LED flash (see Table 5).

The tool includes a microprocessor that:

- Automatically shuts off the motor after the crimp is completed.
- Indicates service intervals and low battery conditions.
- Performs internal checks, sending out audible and optical warning signals if a fault is detected.

# **3 Operation**

### 3.1 Crimping

### NOTE

i

The tool is designed to provide a complete crimp with every cycle. When the control button is pressed and held, the tool will cycle until it has returned to the starting position.

Depending on the size and type of wires, the operator will use one of two splice sizes, along with the corresponding die set in the tool. To determine the correct splice and die set for your application, refer to Figure 3. Find the correct size, composition, and combination of wires encountered, then determine the correct splice as shown in Figure 4.

Also listed is the color code found on the splice and on the proper die set on the tool.

1. Use Table 2 to select the correct splice size, based on the size and composition of the wires to be spliced.

Ma	aximum nui	mber of wir	es		Kit part number	Dot color on dies		
Alun	ninum	Copper		Splice size			Splice color	
12 AWG	12 AWG 10 AWG		12 AWG					
1	-	—	1					
2	-	_	—					
—	1	—	1					
3	—	—	—					
2	—	—	1		Red	608501-1	Red	
	1	1	—	8				
1	1	—	—					
1		1	—					
1	_	2	—					
1		3	—					
2	_	1	—					
	2	_	1					
3	—	—	1					
4	—	—	1					
	2	—	—					
	3	—	—					
4	—	—	—					
	1	—	2	6	Blue	608502-1	Blue	
_	2	1	_					
	3	<b>—</b>	1					
3	—	1	_					
4	—	1	—					
5	—	_	_					
	4	—	—					

#### Table 2: Wire combination by size and composition



#### **NOTE** If more wires must be spliced than allowed by Table 2, use piggyback crimps as shown in Figure 2.



Figure 2: Piggyback crimp

- **1** Aluminum wire
- 2 Copper wire
- **3** To fixture
- 4 To box
- 2. Ensure that each wire extends a minimum of 25.4 mm [1 in.] from any electrical box or wall surface (Figure 3).
- 3. Strip each wire to the length indicated in Figure 3. Do **not** nick or cut the conductors. If a conductor is damaged, cut the wire and strip it again.



Figure 3: Stripping wires (not to scale)

- **1** Minimum wire length 25.4 [1.0]
- **2** Strip length 19.05 [0.75]



- 4. Place the correct splice on the stripped wire.
- 5. Identify the correct crimping chamber for this splice. The color code dot on the dies **must** match the color code stripe on the splice.
- 6. Insert the correct splice into the crimping chamber until the back of the splice butts against the urethane stop behind the crimping dies.
- 7. Press the control button of the tool until the moving anvil grips the splice. Check for proper positioning of splice in the crimp chamber.



### DANGER

Keep fingers clear of the crimping dies during the crimping operation.

- 8. Continue to press the control button to crimp the splice. The tool should cycle and stop. Release the control button immediately when the cycle stops. Allow tool to retract fully open position before pressing control button again. If the tool stops mid-cycle, the battery pack must be changed. Refer to Paragraph 4.1, Battery Charging, for detailed information on replacing the pack.
- 9. When the tool stops, remove the crimped splice from the tool. See Figure 7.



Figure 4: Removing the splice

10. Trim the ends of the wires.



### 3.2 Inspecting the crimp

1. Check each splice for the features shown in Figure 5.





- 1 No wire insulation in crimped splice and no cross-overs
- 2 3.30 [0.13] minimum, 4.57 [0.18] typical
- 3 Crimp is centered in splice
- 4 Wire extends past end of splice
- 5 No open crack at seam of splice
- 6 Size stamped on splice matches wire combination (Table 2)
- 7 Die proof mark exists on underside of splice (Table 3)

Table 3: Die proof marks

Dies	Proof mark
#6	
#8	

- 2. Check each crimped splice with the secondary crimp gage to be sure of a proper crimp.
- 3. Find the gage end with the color code dot matching the color code stripe on the splice.
- 4. Align the splice as shown in Figure 6.



5. Insert the splice into the gage. The splice should enter the gage easily.



Figure 6: Inserting splice into secondary crimp gage

- Secondary crimp gage
- 2 Color code dot
- 3 Splice
- 6. If the splice does not meet the gage test, verify that the proper wire sizes and combinations listed in Table 2 were used. Cut off the splice, strip the wires, and apply a new splice.
- 7. If the splice still does not meet the gage test, return the tool to TE for service (see section 6, Replacement and repair).

### 3.3 Finishing the splice

- 1. Place a 38.1 mm [1.50 in.] section of heat shrink tubing over the crimped splice.
- 2. Center the splice in the tubing (Figure 7), with approximately 12.7 mm [.50 in.] of tubing on each side of the splice.

Figure 7: Centering the splice in the heat shrink tubing



3. Heat the tubing with a heat gun until the tubing shrinks to the shape of the splice (Figure 8). Do **not** overheat wires.

L
L

**NOTE** Also apply tubing to bare ground wires.





4. For stranded copper wire attached directly to a device, use a wire nut to connect the stranded wire to a solid copper pigtail (Figure 9).



DANGER

Do not use a wire nut to connect the stranded copper wire directly to the aluminum wire.



Figure 9: Connecting copper wires with a wire nut



### 4 Maintenance

These instructions have been approved by the TE Design, Production, and Quality Control Engineers to provide documented maintenance and inspection procedures. Through TE test laboratories and the inspection of production assembly, the procedures in this manual have been established to ensure the quality and reliability of Cordless Electric Power Tool 1976330-1.

### 4.1 Charging the battery pack

To remove the battery pack, push the release button on the battery pack. Pull the pack out and replace with a fully-charged pack.



### CAUTION

The cavity in the tool is keyed to prevent the battery pack from being installed incorrectly. Do not attempt to defeat this keying feature. Incorrect installation of the battery pack can damage the tool.



### DANGER

Keep fingers away from the crimping area when changing the battery pack.

To charge the battery pack, make sure that the charging unit is plugged in, then insert the pack into the charging unit as shown in Figure 10. The charger indicator becomes green when the battery pack is fully charged. A full charge takes about 30 minutes.



### Figure 10: Charging the battery pack

- 1 Battery pack
- 2 Charging unit



Make each operator aware of (and responsible for) the following daily maintenance requirements:

- Remove dust, moisture, and other contaminants with a clean, soft brush or soft, lint-free cloth. Do **not** use objects that could damage the tool.
- Make sure that all external pins and screws are in place.
- When the tool is not in use, remove the battery pack and store the tool in the carrying case. Do **not** store the battery pack in the charger.

### 4.3 Periodic visual inspection

Regular inspections should be performed by quality control personnel. A record of scheduled inspections should remain with the tool or be supplied to personnel responsible for the tool. Base your inspection frequency on the amount of use, working conditions, operator training and skill, and established company standards.

- 1. Remove all excess lubrication from the crimping area of the tool.
- 2. Check dies for damage or excessive wear.
- 3. Inspect the crimping area for metal particles. The presence of metal particles indicates a lack of lubrication or misaligned or worn parts.
- 4. If damage or abnormal wear is evident, return the tool to TE for repair. Refer to section 6, **Replacement and repair**).



### 4.4 Lubrication

Lubricate the tool at regular intervals (Table 4) to ensure minimum wear and dependable service. Use any good grade SAE<sup>™</sup> 20 motor oil. Figure 11 indicates the proper lubrication areas.

How tool is used	When to lubricate	
In daily production	Daily	
Daily (occasional)	Weekly	
Weekly	Monthly	

0

Figure 11: Lubrication points



# 5 Troubleshooting

- If the red LED is flashing or an audible alert sounds, refer to Table 5 for problems, probable causes, and remedies. If the problem cannot be resolved by the action recommended in Table 5, contact TE Field Service (see section 6, **Replacement and repair**).
- If the tool loses oil, contact the Tooling Assistance Center. Do not open the tool or damage the seal of the tool.
- If the red LED flashes three times and simultaneously three audible alert warning signals occur (see Table 5). A serious fault has occurred. If this fault occurs repeatedly, contact TE Field Service. Do not open the tool or damage the seal of the tool.

Red LED	White LED	Audible alert	When	Why
20 sec			After working cycle	Low battery charge
			After inserting battery	Self-check
20 sec/2 Hz			After working cycle	Service required
******* 20 sec/2 Hz			While exceeding temperature limit	Unit is too hot
20 sec 20 sec 20 sec/2 Hz				Service required
- <b>•</b> - 1 x		<b>N)</b>	After working cycle	<b>Error:</b> Required pressure not achieved. Operator interrupted crimping cycle while motor was running.
	☆☆☆ 3 x	<b>3</b> 0))		Serious error: Required pressure not achieved while motor was running

Table 5: Troubleshooting



# 6 Replacement and repair

Tool rental and training is available through your TE Field Service representative. For field service, go to the <u>Service and Repair</u> page on the TE website, or send an e-mail to <u>Fieldservicesnortharmerica@te.com</u>.

Figure 12: Service and repair



# 7 Revision summary

Since the last revision of this document, the following changes were made:

• Corrected revision error in all pages.