TECHNICAL INFORMATION

Models No. ➤ BDF454
Description ➤ 18V Cordless Driver Drill

CONCEPT AND MAIN APPLICATIONS

Model BDF454 has been developed as the 2-speed version of 3-speed Model BDF451. While having the same maximum fastening torque as BDF451, BDF454 features more powerful motor, ensuring higher operation efficiency in heavy duty applications. Also features the same compact and lightweight design as BDF451, providing easy control and high maneuverability.

Note:
18V/1.5Ah Lithium-ion battery BL1815 cannot be used as a power unit for BDF454.

14.4V model is also available as Model BDF444.
(See Technical Information of BDF444 for detailed information.)

Model BDF454 is available in the following variations.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Battery type</th>
<th>Battery capacity</th>
<th>Charger</th>
<th>Plastic carrying case</th>
<th>Offered to</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDF454</td>
<td>BL1830</td>
<td>3.0 Ah</td>
<td>DC18RA</td>
<td>Yes</td>
<td>USA, Canada, Mexico, Panama</td>
</tr>
<tr>
<td>BDF454RF</td>
<td>Li-ion 3.0Ah</td>
<td></td>
<td></td>
<td></td>
<td>All countries except the four listed above</td>
</tr>
</tbody>
</table>

The models also include the accessory listed below in "Standard equipment".

 Specification

<table>
<thead>
<tr>
<th>Battery type</th>
<th>Voltage: V</th>
<th>Capacity: Ah</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
<td>3.0</td>
</tr>
</tbody>
</table>

| Max output: W | 375 |
| No load speed: min^{-1}=rpm |
| 2nd (High) | 0 - 1,700 |
| 1st (Low)  | 0 - 400   |

| Capacity of drill chuck: mm (") | 1.5 - 13 (1/16 - 1/2) |
| Capacity: mm (") |
| Steel | 13 (1/2) |
| Wood  | 65 (2-9/16) |

| Torque setting | 16 stage + drill mode |
| Clutch torque setting: N.m (kgf.cm) [in.lbs] | 1.0 - 5.9 (10 - 60) [9 - 52] |
| Lock torque: N.m [in.lbs] | 63 [560] |
| Max. fastening torque: N.m (kgf.cm) [in.lbs] |
| Hard joint | 80 (815) [708] |
| Soft joint | 40 (408) [354] |

| Electric brake | Yes |
| Mechanical speed control | Yes (2 speed) |
| Variable speed control | Yes |
| Reverse switch | Yes |
| Net weight [with battery BL1830]: kg (lbs) | 2.1 (4.6) |

 Standard equipment

(+)(-) Bit 2-65 (double-end) .... 2 Belt clip.......................... 1 Grip assembly.......... 1
Bit holder.......................... 1 (+) Screw M4x12 .......... 2

Note: The standard equipment for the tool shown above may differ by country.

 Optional accessories

Battery BL1830 Charger DC24SA (for North America only) Drill bits for wood
Fast charger DC18RA Charger DC24SC (for all countries except North America) Drill bits for steel
Charger DC18SD Driver bits
CAUTION: Remove the battery cartridge from the machine for safety before repair/maintenance!

[1] NECESSARY REPAIRING TOOLS

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Description</th>
<th>Use for</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>Hex wrench 10</td>
<td>Removing /mounting Drill chuck</td>
</tr>
<tr>
<td>1R359</td>
<td>Chuck removing tool</td>
<td>Removing Drill chuck (See &quot;Note&quot; on the bottom of this page.)</td>
</tr>
</tbody>
</table>

[2] LUBRICATION
It is not required to lubricate the gear section because the portion is replaced as a factory-lubricated Gear assembly.

[3] DISASSEMBLY/ASSEMBLY


DISASSEMBLING

Note: It is required to remove Drill chuck when replacing Gear assembly, but you need not when replacing only Housing.

1) Open the jaws of Drill chuck fully, and remove M6x22 Flat head screw (left-handed and threadlocker coated) by turning clockwise using impact driver in Forward rotation mode with slotted bit. (Fig. 1)
2) Set Action mode change lever in Drill mode, Speed change lever in Low speed. And push F/R change lever from the left side of Housing to set the direction of rotation to reverse. (Fig. 2)
3) Fix the short leg of a hex wrench 10 in Drill chuck, then clamp the long leg of the hex wrench securely in vise. (Fig. 2)
4) Install Battery and hold the machine securely with both hands, then remove Drill chuck from Gear assembly by pulling Switch trigger slowly to minimize the impact of kickback.

Important 1:
For safety, before pulling trigger, make sure that:
1. Action mode change lever is in Drill mode position.
2. Speed change lever is in Low speed position.
3. F/R change lever is in Reverse rotation position.

Important 2:
The machine rotates in the direction of the arrow with very strong force at the moment when Switch trigger is pulled. (Fig. 3)
Therefore, be very careful not to pinch your hand or finger between the machine and the vise.

Note: Use Chuck removing tool (1R359) if Drill chuck cannot be removed in the way as described above.
See page 69 of "Repair Tool List" for how to use.

--- Hex wrench 10 Removing/mounting Drill chuck
Chuck removing tool 1R359 Removing Drill chuck (See "Note" on the bottom of this page.)
Repair

[3] DISASSEMBLY/ASSEMBLY
[3] -1. Drill Chuck (cont.)

ASSEMBLING

1) Make sure that Flat washer 13 is set in place before installing Drill chuck. (Fig. 4)
2) Turn Drill chuck clockwise until it sits on the end of the threaded portion of Spindle. (Fig. 4)
3) Insert a hex wrench into drill chuck, and fix the other end of hex wrench in vise. Install battery. Then set Action mode change lever in Drill mode, Speed change lever in Low speed, and F/R change lever in Forward rotation mode. (Fig. 5)
4) Slowly pull the switch trigger to rotate Spindle until the motor is locked.

Important: Be sure to release the switch trigger just after Spindle is locked.

Note: If you reuse the removed M6x22 Flat head screw, apply threadlocker (ThreeBond 1321B/1342 or Loctite 242) to the threaded portion.

[3] DISASSEMBLY/ASSEMBLY
[3]-2. Gear Ass’y, Motor Section

DISASSEMBLING

(1) Remove Drill chuck. (Refer to the previous page.)
(2) Remove Housing R and Rear cover by removing 4×20 Tapping screws (4 pcs.) and Bind PT 3×16 Tapping screws (10 pcs.).
(3) Pull out Heat sink with FET and the same time remove Gear ass’y, Speed change lever ass’y, Motor section and Brush holder complete from Housing L. (Fig. 6)
(4) Separate Speed change lever ass’y from Gear ass’y. Remove Motor section from Gear ass’y. (Fig. 7)
Repair

[3] DISASSEMBLY/ASSEMBLY


DISASSEMBLING

(5) Shift Torsion springs from the tops of carbon brushes to the notches of Brush holder. Then disconnect Carbon brushes from commutator. (Fig. 8)

(6) Pull off Armature together with Yoke unit from Brush holder. Then pull off Armature from Yoke unit. (Fig. 9) complete.

Fig. 8

![Carbon brush](image1)

![Torsion spring](image2)

![Brush holder complete](image3)

Note: Pay attention not to pinch your finger between Yoke unit and Armature when removing. Do not scratch the copper wires of Armature. Yoke unit draws Armature by its considerable strong magnet force.

ASSEMBLING

1) Assemble the motor section.

**Note 1.** Yoke unit is not reversible when assembled to Armature. Be sure to assemble so that the notch in Yoke unit is positioned on the drive-end of Armature as illustrated in Fig. 10R. If assembled wrong as illustrated in Fig. 10F, Motor section cannot be assembled to Housing L.

**Note 2.** Pay attention not to pinch your finger between Yoke unit and Armature when assembling. Yoke unit draws Armature by its considerable strong magnet force.

Fig. 10R

<table>
<thead>
<tr>
<th>Correct Assembling</th>
<th>Wrong Assembling</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Correct Assembling" /></td>
<td><img src="image5" alt="Wrong Assembling" /></td>
</tr>
</tbody>
</table>

2) Insert the pinion gear on Armature shaft into Gear ass’y, and engage it with the plant gears in Gear ass’y.

Making sure that the pinion gear is engaged in Gear ass’y, push Armature into Gear ass’y. (Fig. 7)

3) Assemble Speed change lever ass’y to the protrusion on Gear ass’y. (Fig. 7)

**Note:** Before installing Gear ass’y, make sure that Leaf spring (2 pcs.) and Compression spring (2 pcs.) are set in place on Speed change lever as illustrated in Fig. 11.
[3] DISASSEMBLY/ASSEMBLY
[3]-2. Gear Ass’y, Motor Section

ASSEMBLING

(4) Push rear Compression spring 4 with the protrusion A of Gear ass’y and compress Speed change lever ass’y to insert the protrusion B of Gear ass’y into the front Compression spring 4. (Fig. 12)

(5) After inserting the protrusion B of Gear ass’y into the front Compression spring 4, slide Speed change lever to the either position 2 (High speed mode) or 1 (Low speed mode). (Fig. 13)

(6) Mount the inner parts to Housing L as illustrated in Figs. 14 and 15.

(7) To mount Housing R exactly to Housing L, make sure that Yoke unit and Brush holder complete are assembled as illustrated in Fig. 16.
**Repair**

[3] - 2. Gear Ass’y and Motor Section (cont.)

**ASSEMBLING**

8) Install Carbon brush. *(Fig. 15)*

9) Assemble Rear cover and Housing R to Housing L by tightening Bind PT3x16 Tapping screw (10 pcs) and 4x20 Tapping screw (4 pcs.)

**Fig. 15**

![Diagram of Carbon brush installation and lead wire routing](image)

- **Correct**
  - Lead wire of Carbon brush
  - Route the lead wire of Carbon brush through this outside slot in Brush holder.

- **Wrong**
  - Lead wire correctly routed
  - Tail of Torsion spring
  - Torsion spring

- The lead wire routed wrong may interfere the tail of Torsion spring.

**Fig. 16**

- **Assembling**
  - Put the projection on Switch between the prongs of F/R change lever. *(Fig. 16)*

**Circuit diagram**

**Fig. D-1**

- **Brush holder complete**
- **Heat sink**
- **FET**
- **LED**
- **Light circuit**
- **Connector**
- **Switch**
- **Connector**
- **Terminal**

<table>
<thead>
<tr>
<th>Color index of lead wires' sheath</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>Orange</td>
</tr>
<tr>
<td>Blue</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Yellow</td>
</tr>
</tbody>
</table>
**Wiring diagram**

[1] Lead Wires of Light Circuit

Fix the lead wires (red, black) to LED with the lead wire holders.

Do not cross the lead wires (red, black) to LED in the circled portion.

Route the lead wires (red, black) to LED between the rib A and the rib B.

**Note:**
1. Make sure that the wires are tight in the circled portion.
2. Be careful not to route over the rib.

With the lead wire (orange) to Connector positioned on the Terminal installation side, fix Light circuit with the holder.

[2] Lead Wires of Switch, Brush Holder Complete and FET

Fix the three lead wires of FET (black, blue, yellow from left to right) with the lead wire holders on switch as illustrated.

Be careful not to route lead wires on the inlaid edge of Housing L in the circled portion.

Between the rib and Light circuit, route the three lead wires (white, red, black) connected to the Connector of Switch.

Connect the Connector of Light circuit with that of Switch. Then fix them in these holders. Be sure to fix all the lead wires on each Connector by routing through the slits in the holder.