MODEL

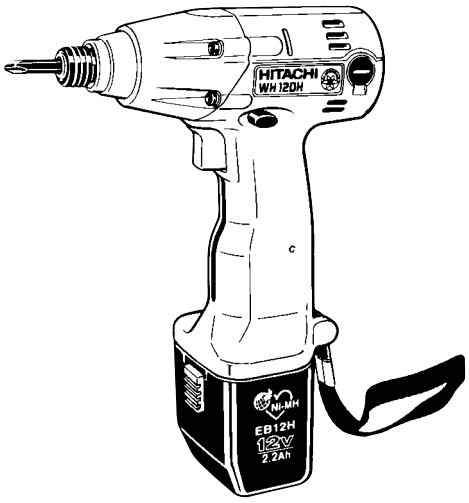
WH 12DH

WR 12DH

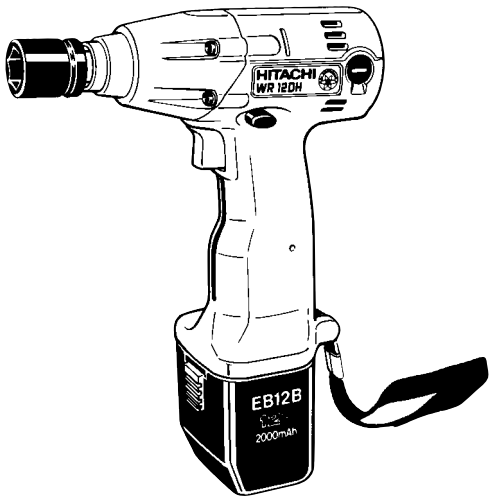
HITACHI
POWER TOOLS

CORDLESS IMPACT DRIVER
WH 12DH
CORDLESS IMPACT WRENCH
WR 12DH

TECHNICAL DATA AND SERVICE MANUAL



WH 12DH



WR 12DH

W

LIST No. F829, 830 Mar. 1999

REMARK:

Throughout this TECHNICAL DATA AND SERVICE MANUAL, a symbol(s) is(are) used in the place of company name(s) and model name(s) of our competitor(s). The symbol(s) utilized here is(are) as follows:

WH 12DH

Symbol Utilized	Competitor	
	Company Name	Model Name
C	MAKITA	6914D

WR 12DH

Symbol Utilized	Competitor	
	Company Name	Model Name
C	MAKITA	6911D

CONTENTS

1. PRODUCT NAME

Hitachi Cordless Impact Driver, Model WH 12DH

Hitachi Cordless Impact Wrench, Model WR 12DH

2. MARKETING OBJECTIVE

The current Hitachi cordless impact driver series has provided excellent workability thanks to their performance that produces no reaction force in tightening screws and bolts and also no damage to the screw heads. Now, we bring out the new cordless impact driver Model WH 12DH developed based on the previous Model WH 12DC. The Model WH 12DH has more compact body, better tightening performance and longer service life than those of the previous model, and is equipped with a replaceable carbon brush motor. The new cordless impact wrench Model WR 12DH is also brought out. The Model WR 12DH has more compact and lightweight body than that of the previous Model WH 12D. The construction of the Model WR 12DH is the same as that of the Model WH 12 DH except the anvil (K) ass'y and the hammer case.

3. APPLICATIONS

- Tightening/loosening of small screws, tapping screws, wood screws, bolts, nuts, etc.
- Drilling into wood and various other materials (with use of optional accessory drill chuck adapter).

[Applicable Markets]

- Wood-product assembly: Tightening/loosening of wood screws.
- Construction industry: Assembly of scaffolding, roofing, aluminum sashes, fencing, etc.; removal of plastic cones from concrete forms, mounting/removal of form ties; drilling into the wood frames of concrete forms, etc.
- Manufacturing industry: Assembly work for automobiles, rolling stock, shipbuilding, agricultural machinery and tools, industrial machines, steel furniture, etc.
- Utility industry: Assembly and installation of electric equipment, plumbing facilities, air conditioning (duct assembly, etc.), sanitary fixtures and various other facilities.
- Service industry: General repair work; installation of advertising aids, automobile repair, assembly of garages and carports storage sheds, etc.
- Various other assembly, construction or repair facilities.

4. PRODUCT DESIGNATION IN MODEL NAME

To differentiate impact wrenches clearly from impact drivers, the "WH" formerly used for both impact drivers and impact wrenches will be "WR" for impact wrenches from now on.

(1) Cordless impact driver

1. Type	2. Capacity	3. Essential division	4. Optional division
WH	12	D	H
Impact driving (Wrenching Hammer)	Ordinary bolt: M12	Cordless	Order of release

(2) Cordless impact wrench

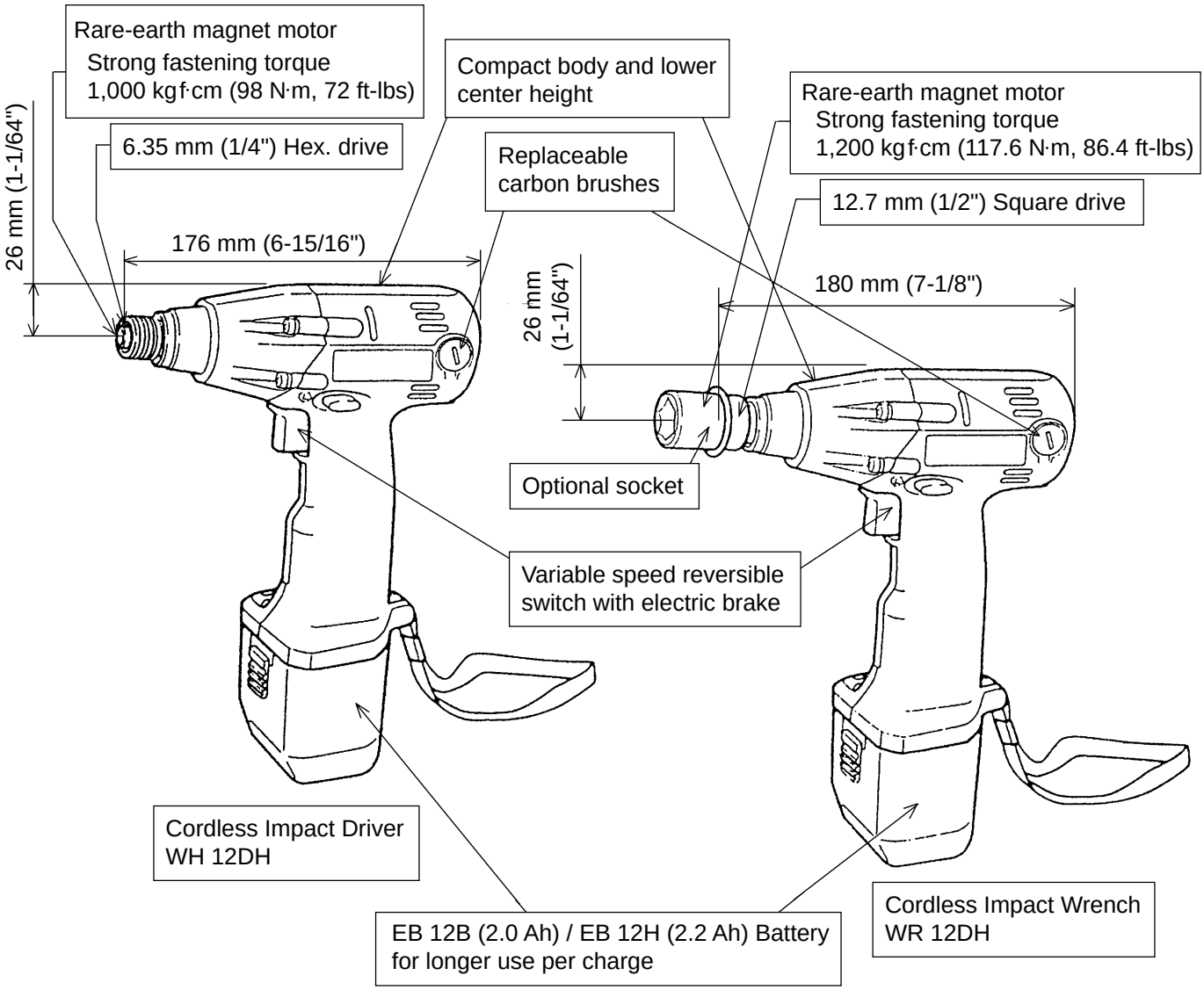
1. Type	2. Capacity	3. Essential division	4. Optional division
WR	12	D	H
Impact driving (Wrenching Revolving-bolt)	High-strength bolt: M12	Cordless	Order of release

5. SELLING POINTS

Compact and well-balanced body for less-fatigue

Higher rotation speed/min. and higher blows/min. for high power and faster fastening

Improved motor performance
- Replaceable carbon brushes for longer motor life
- Fan cooled rare-earth magnet motor
- Generates the same high torque at both forward & reverse modes

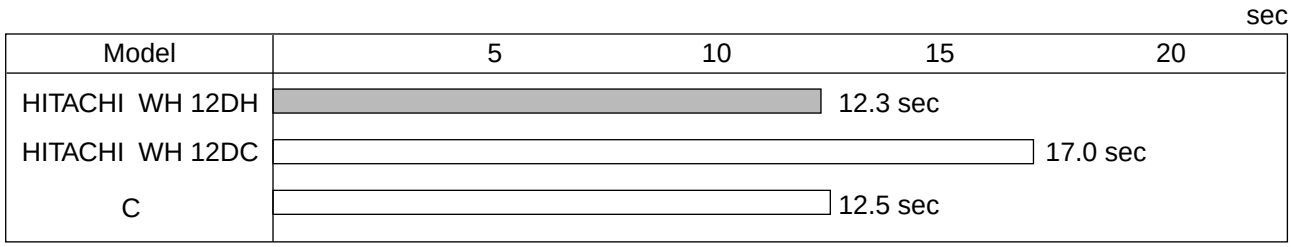


5-1. Selling Point Descriptions

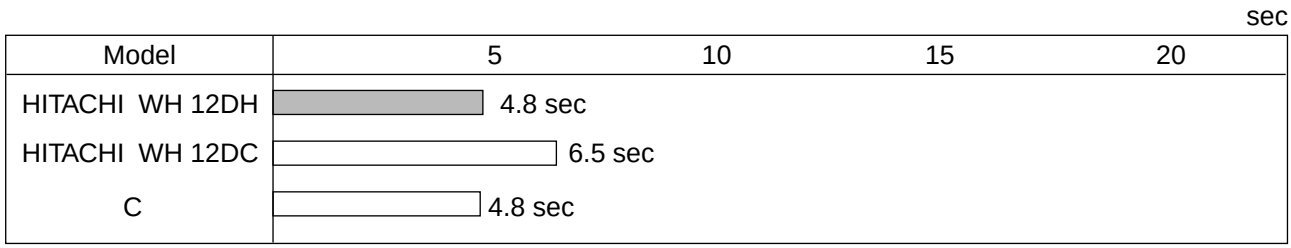
(1) Faster tightening speed

The Model WH 12DH provides faster driving speed than the previous model thanks to the high power rare-earth magnet motor and the higher moment of inertia of the hammer. The comparisons with the previous Model WH 12DC and maker C's model are shown below.

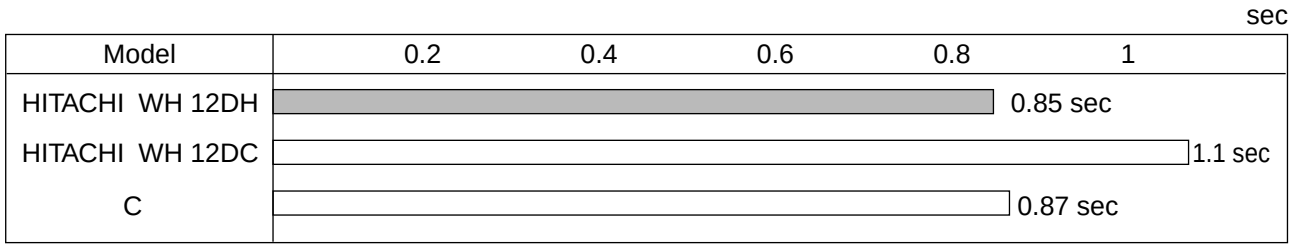
① Tightening time (sec) (Wood screw 5.5 mm dia. x 120 mm length, hemlock spruce)



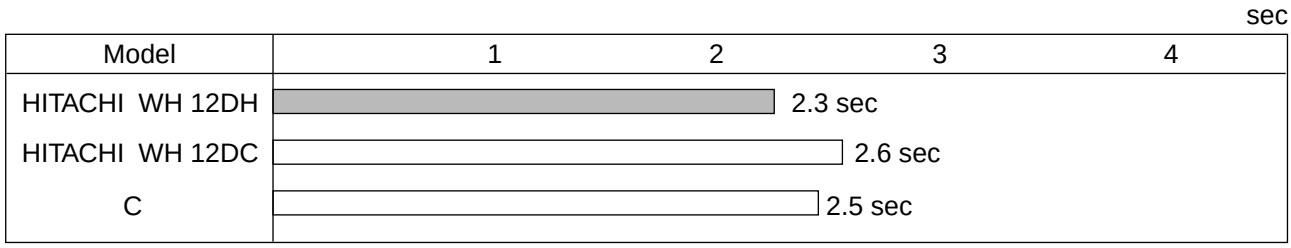
② Tightening time (sec) (Wood screw 4.2 mm dia. x 90 mm length, hemlock spruce)



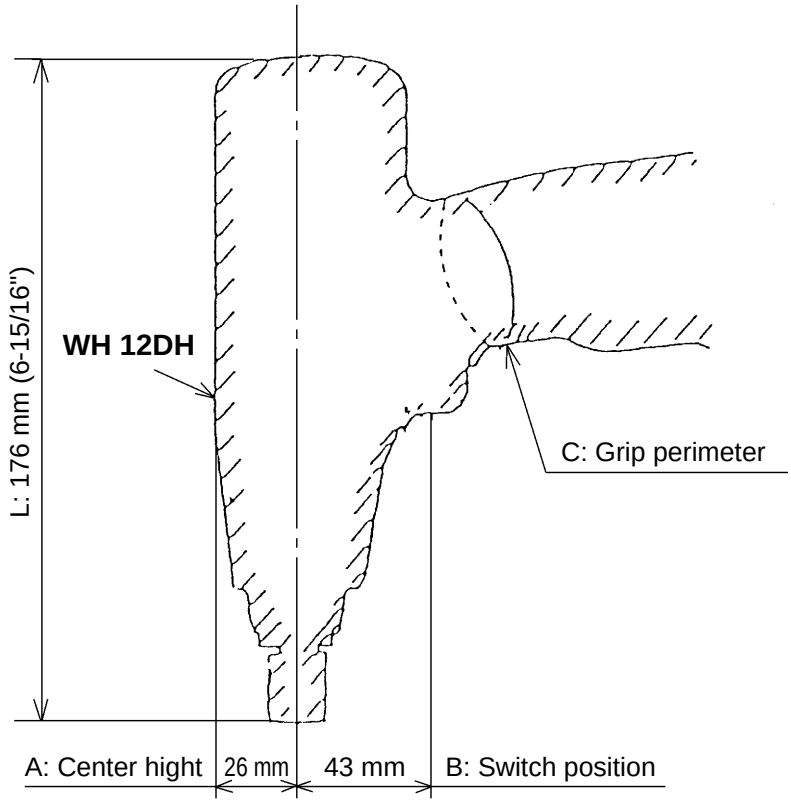
③ Tightening time (sec) (Wood screw 3.8 mm dia. x 20 mm length, lauan)



④ Tightening time (sec) (Teks screw 4 mm dia. x 13 mm length, SPCC 1.6 t)



(2) Compact



Item		Model / mm	WH 12DH	WH 12DC	WR 12DH	WH 12D
L	Overall length	mm	176 (6-15/16")	198 (7-25/32")	180 (7-1/8")	230 (9")
A	Center height	mm	26 (1-1/64")	26 (1-1/64")	26 (1-1/64")	33.5 (1-15/16")
B	Switch position	mm	43 (1-11/16")	43 (1-11/16")	43 (1-11/16")	46.5 (1-25/32")
C	Grip perimeter	mm	125 (4-29/32")	125 (4-29/32")	125 (4-29/32")	128 (5-1/32")
Weight	Catalog weight	kg	1.7 (3.7 lbs)	1.7 (3.7 lbs)	1.7 (3.7 lbs)	2.3 (5.1 lbs)
	Actual weight	kg	1.73 (3.81 lbs)	1.73 (3.81 lbs)	1.73 (3.81 lbs)	2.39 (5.31 lbs)

(3) Improved motor performance

The Models WH 12DH and WR 12DH are compact and have high power thanks to the rare-earth magnet motor. Furthermore, these models have better heat resistance because the built-in fan enhances cooling efficiency. Their motors have replaceable carbon brushes, and the service life of the carbon brush has been extended by increasing its volume (by about 30 % compared to our previous model) and making seven slots in a motor armature core.

(4)Construction of replaceable carbon brushes

The carbon brush can be easily removed from the motor with a flat-blade screwdriver as shown in Fig. 2 and can also be easily and securely mounted to the motor by hanging the claw of the carbon brush on the connecting portion at the outside of the brush tube.

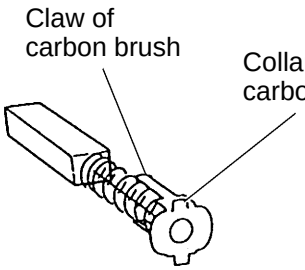


Fig. 1

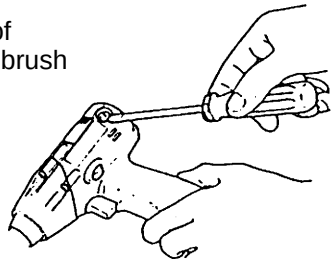


Fig. 2

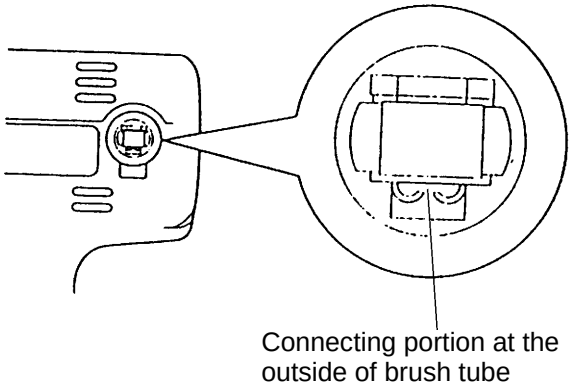


Fig. 3

(5) Safe handle shape

Compared with the previous WH 12DC, the housing of the Model WH 12DH produces no clearance caused by vibration because grips (R) and (F) (made of rubber) are provided at the juncture of the handle and the housing is secured with two screws at the center of the handle to prevent the operator's hand from being pinched. Furthermore, the rear portion of the housing is shaped upward not to interfere with the base of the operator's thumb.

(6) 9.6 V Battery is also available.

As the 9.6 V battery (EB 9S type) is popular in the market, it is a strong selling point that both the Models WH 12DH and WR 12DH can also use this battery. The following table shows that the tightening torque is a little lower because of a lower voltage, but there is little harm in operation.

• **Model WH 12DH**

Voltage	12 V (EB 12 type battery)	9.6 V (EB 9 type battery)
Tightening torque (M12 high-strength bolt, 3 sec tightening)	1,000 kgf·cm (98 N·m, 72 ft-lbs)	800 kgf·cm (78.5 N·m, 57.6 ft-lbs)

• **Model WR 12DH**

Voltage	12 V (EB 12 type battery)	9.6 V (EB 9 type battery)
Tightening torque (M12 high-strength bolt, 3 sec tightening)	1,200 kgf·cm (117.6 N·m, 86.4 ft-lbs)	950 kgf·cm (93.1 N·m, 68.4 ft-lbs)

6. SPECIFICATIONS

6-1. Specifications

Item \ Model		Cordless Impact Driver WH 12DH	Cordless Impact Wrench WR 12DH
Capacity		Small screw M4 ─ M8 (5/32" ─ 5/16")*1 Ordinary bolt M5 ─ M12 (3/16" ─ 15/32")	Ordinary bolt M6 ─ M14 (1/4" ─ 9/16") High-strength bolt M6 ─ M10 (1/4" ─ 3/8")
Tightening torque		1,000 kgf·cm (98 N·m, 72 ft-lbs)*2	1,200 kgf·cm (117.6 N·m, 86.4 ft-lbs)*3
Tip condition		6.35 mm (1/4") Bit holder	12.7 mm (1/2") Square drive
Type of motor		Fan cooled rare-earth magnet motor	
Enclosure		Main body: Polyamide resin ····· Housing Aluminum alloy die casting ····· Hammer case Storage battery: ABS resign (black) Charger: ABS resin (black)	
Type of switch		Trigger switch with forward / reverse changeover pushing button (with brake)	
Handle configuration		T-type	
No-load rotational speed		0 ─ 2,200/min	
Impact rate		0 ─ 3,000/min	
Weight	Main body	1.7 kg (3.7 lbs) (Includes battery)*4	
	Battery	0.62 kg (1.4 lbs)	
Overall length x height		176 mm (6-15/16") x 245 mm (9-21/32")	180 mm (7-1/8") x 245 mm (9-21/32")
Center height		26 mm (1-1/64")	
Battery (Type EB 12B)		Sealed cylindrical nickel-cadmium batteries Nominal voltage: DC 12V Nominal life: Charging/discharging approximately 1,000 cycles (in case of Model UC 14YF or UC 14YF2) Nominal capacity: 2,000 mAh	
Battery (Type EB 12H)		Sealed cylindrical nickel-metal hydride batteries Nominal voltage: DC 12V Nominal life: Charging/discharging approximately 500 cycles (in case of Model UC 14YF2) Nominal capacity: 2,200 mAh	
Charger (Model UC 14YF or UC 14YF2)		Charger power source: single-phase AC, 50/60 Hz Voltage: Depending on the order specification Power input: 44 W Charging system: Constant current charge with full wave phase control Overcharge protection system: (1) Battery voltage detection (△^{2}V system) (2) Battery surface temperature detection (thermostat or thermistor) (3) 120 minute timer Output voltage: 7.2 V ─ 14.4 V Output current: 1.9 A Charging time: Approx. 60 minutes (for B-type storage battery at 20 °C) Approx. 70 minutes (for H-type storage battery at 20 °C) Product weight: 1.3 kg Operable ambient temperature range: 0 °C ─ 40 °C The maximum allowable temperature of the EB12B type battery is 60 °C and the EB 12H type battery is 45 °C when recharging with the charger Model UC 14YF2.	

*1: In the case of tapping screws and wood screws, a minimum of M3 (1/8") is possible.
*2: This torque is based on tightening an M12 (15/32") bolt (strength grade: 12.9) for 3 sec. with a hexagonal socket.
*3: This torque is based on tightening an M14 (9/16") bolt (strength grade: 12.9) for 3 sec. with a hexagonal socket.
*4: Main body does not include accessory tools (hexagonal bit, etc.).

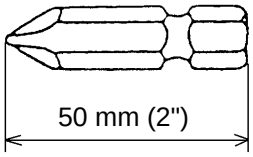
Pilot lamp indications (Model UC 14YF/UC 14YF2)

Red pilot lamp remains lit of flashes	Prior to charging	Blinks	0.5 sec ON, 0.5 sec OFF	
	During charging	Lit	Stays ON constantly	
	Charging completed	Blinks	0.5 sec ON, 0.5 sec OFF	
	Charging not possible	Flickers	0.1 sec ON, 0.1 sec OFF	Storage battery or charger is faulty.
Green pilot lamp is lit	High battery temperature	Lit	Stays ON constantly	Charging not possible because storage battery temperature is too high.

6-2. Optional Accessories

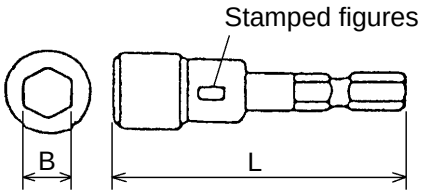
(1) Optional accessories for the Model WH 12DH

• Plus driver bit



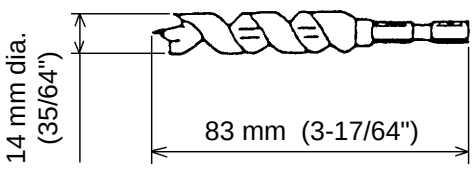
Bit No.	Code No.
No. 2	992671
No. 3	992672

• Hexagon socket



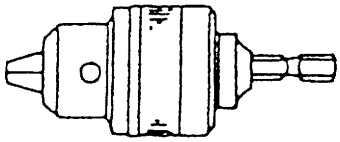
Part Name	Stamped figures	L (mm)	B (mm)	Code No.
5 mm Hexagon socket	8	65 (2-9/16")	8 (5/16")	996177
6 mm Hexagon socket	10	65 (2-9/16")	10 (3/8")	985329
5/16" Hexagon socket	12	65 (2-9/16")	12 (15/32")	996178
8 mm Hexagon socket	13	65 (2-9/16")	13 (1/2")	996179
10 mm Hexagon socket (small type)	14	65 (2-9/16")	14 (9/16")	996180
10 mm Hexagon socket	16	65 (2-9/16")	16 (5/8")	996181
10 mm Hexagon socket	17	65 (2-9/16")	17 (21/32")	996182
1/2" Hexagon long socket	21	166 (6-17/32")	21 (53/64")	996197

• Woodworking drill bit (Code No. 959183)



• Drill chuck adaptor set (Code No. 996195)

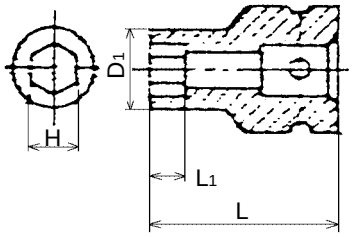
The drill chuck adaptor set permits mounting of various types of locally-available drill bits for a variety of drilling operations.



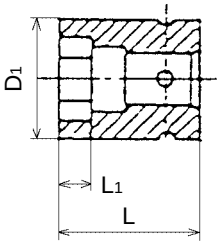
(2) Optional accessories for the Model WR 12DH

• Each dimension and applicable bolt for each hexagon socket

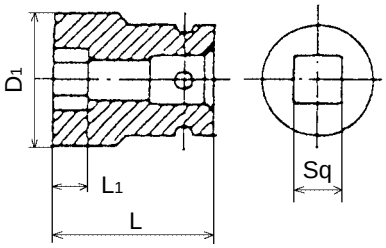
Shape B



Shape C



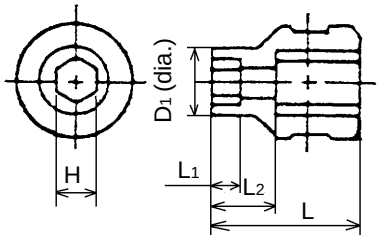
Shape D



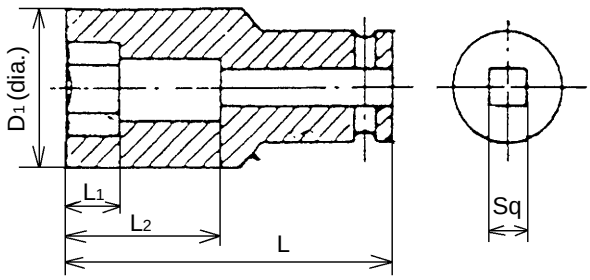
Square drive dimension Sq	Part Name		Code No.	Nominal diameter of applicable bolts				Dihedral width H (mm)	Shape	Socket primary dimensions (mm)		
				ISO (high-strength)	ISO (ordinary)	ISO (small type)	Inch screw			L	L_1	D_1
12.7 mm (1/2")	Hexagon socket	10 mm	944291	—	M 6 (1/4")	—	—	10 (3/8")	B	40 (1-9/16")	8 (5/16")	18 (23/32")
		12 mm	873632	—	—	M 8 (5/16")	W 5/16"	12 (15/32")	B	40 (1-9/16")	8 (5/16")	20 (25/32")
		13 mm	873539	—	M 8 (5/16")	—	—	13 (1/2")	B	40 (1-9/16")	9 (11/32")	25 (1")
		14 mm	873540	—	—	M 10 (3/8")	—	14 (9/16")	B	40 (1-9/16")	9 (11/32")	25 (1")
		17 mm	873536	—	M 10 (3/8")	M 12 (15/32")	W 3/8"	17 (21/32")	C	32 (1-1/4")	8 (5/16")	28 (1-3/32")
		19 mm	873624	—	M 12 (15/32")	M 14 (9/16")	W 7/16"	19 (23/32")	C	34 (1-11/32")	9 (11/32")	28 (1-3/32")
		21 mm	873626	—	—	—	W 1/2"	21 (53/64")	D	36 (1-13/32")	10 (3/8")	32 (1-1/4")
		22 mm	873627	M 12 (15/32")	M 14 (9/16")	M 16 (5/8")	—	22 (7/8")	D	40 (1-9/16")	14 (9/16")	35 (1-3/8")

• Each dimension and applicable bolt for each long socket

Shape B

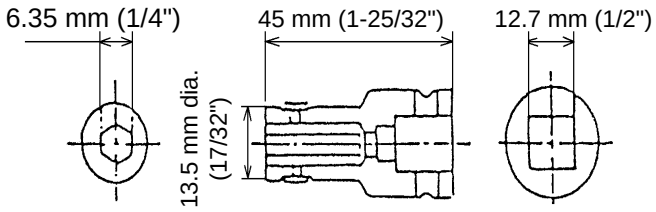


Shape D



Square drive dimension Sq	Part Name		Code No.	Nominal diameter of applicable bolts				Dihedral width H (mm)	Shape	Socket primary dimensions (mm)			
				ISO (high-strength)	ISO (ordinary)	ISO (small type)	Inch screw			L	L_1	L_2	D_1
12.7 mm (1/2")	Long socket	12 mm	955138	—	—	M 8 (5/16")	W 5/16"	12 (15/32")	B	52 (2-3/64")	20 (25/32")	34 (1-11/32")	20 (25/32")
		13 mm	955139	—	M 8 (5/16")	—	—	13 (1/2")	B	52 (2-3/64")	20 (25/32")	34 (1-11/32")	21.5 (53/64")
		14 mm	955140	—	—	M 10 (3/8")	—	14 (9/16")	B	52 (2-3/64")	20 (25/32")	34 (1-11/32")	22 (7/8")
		17 mm	955141	—	M 10 (3/8")	M 12 (15/32")	W 3/8"	17 (21/32")	B	52 (2-3/64")	24 (15/16")	34 (1-11/32")	25 (1")
		17 mm	955149	—	M 10 (3/8")	M 12 (15/32")	W 3/8"	17 (21/32")	B	75 (2-15/16")	24 (15/16")	57 (2-1/4")	25 (1")
		19 mm	955142	—	M 12 (15/32")	M 14 (9/16")	W 7/16"	19 (23/32")	B	52 (2-3/64")	24 (15/16")	34 (1-11/32")	28 (1-3/32")
		19 mm	955150	—	M 12 (15/32")	M 14 (9/16")	W 7/16"	19 (23/32")	B	75 (2-15/16")	24 (15/16")	57 (2-1/4")	28 (1-3/32")
		21 mm	955143	—	—	—	W 1/2"	21 (53/64")	D	52 (2-3/64")	24 (15/16")	34 (1-11/32")	31 (1-7/32")
		21 mm	955151	—	—	—	W 1/2"	21 (53/64")	D	75 (2-15/16")	24 (15/16")	57 (2-1/4")	31 (1-7/32")
		21 mm	991480	—	—	—	W 1/2"	21 (53/64")	D	125 (2-15/16")	24 (15/16")	107 (4-7/32")	31 (1-7/32")
		22 mm	955144	M 12 (15/32")	M 14 (9/16")	M 16 (5/8")	—	22 (7/8")	D	52 (2-3/64")	24 (15/16")	34 (1-11/32")	32.5 (1-9/32")

- Bit adaptor (Code No. 991476)



Part name	Overall length (mm)	Code No.
Plus hds. driver bit No.2	45 (1-25/32")	955229
	70 (2-3/4")	955654
Plus hds. driver bit No.3	45 (1-25/32")	955230
	70 (2-3/4")	955655

- Extension bar [Overall length 100 mm (3-15/16")] (Code No. 873633)
- Universal joint (Code No. 992610)
- Socket ass'y for duct ·····

Hexagonal two side width of applicable bolts	Code No.
12 (15/32")	993658
13 (1/2")	992613
14 (9/16")	992615

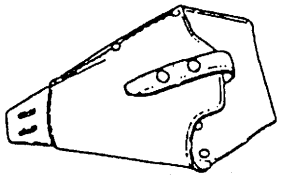
- EW-14R corner attachment (Code No. 9329-9001)

(3) Optional accessories for the Models WH 12DH and WR 12DH

- Holster (Code No. 307824)

  Use the holster to hold the unit during its operation.

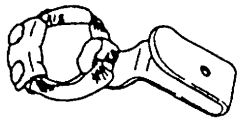
  Carefully read the warnings attached to the holster for safe use.



- Hook (Code No. 308090)

  Use the hook to hold the unit during its operation.

  Carefully read the instructions that come with the hook to learn how to use it.



7. COMPARISONS WITH SIMILAR PRODUCTS

7-1. Specification Comparisons (Cordless Impact Driver)

Item \ Maker / Model				HITACHI		C
				WH 12DH	WH 12DC	
Catalog specifications	Capacity	Small screw		M 4 – M 8 (5/32" – 5/16")*1	M 4 – M 8 (5/32" – 5/16")*1	M 4 – M 8 (5/32" – 5/16")
		Ordinary bolt		M 5 – M 12 (3/16" – 15/32")	M 5 – M 12 (3/16" – 15/32")	M 5 – M 12 (3/16" – 15/32")
		High-strength bolt		M 5 – M 10 (3/16" – 3/8")	M 5 – M 10 (3/16" – 3/8")	M 5 – M 10 (3/16" – 3/8")
	Max. tightening torque*2		kgf·cm	1,000 (98 N·m, 72 ft-lbs)	900 (88.2 N·m, 65 ft-lbs)	1,000 (98 N·m, 72 ft-lbs)
	No-load rotation speed		/min	0 – 2,200 [1,700]	0 – 2,000	0 – 2,200
	Impact rate		/min	0 – 3,000 [2,700]	0 – 2,900	0 – 3,000
	Main body weight*3		kg	1.7 (3.7 lbs) [1.6 (3.5 lbs)]	1.7 (3.7 lbs)	1.7 (3.7 lbs)
Measured figures	Max. tightening torque*2		kgf·cm	1,070 (104.9 N·m, 77 ft-lbs) [860 (84.3 N·m, 62 ft-lbs)]	930 (91 N·m, 67 ft-lbs)	1,000 (98 N·m, 72 ft-lbs)
	No-load rotation speed		/min	0 – 2,180 [1,680]	0 – 2,010	0 – 2,160
	Impact rate		/min	0 – 2,900 [2,700]	0 – 2,900	0 – 2,860
	Overall length x height		mm	176 x 245 [221] (6-15/16"x 9-21/32" [8-45/64"])	198 x 245 (7-25/32" x 9-21/32")	176 x 232 (6-15/16" x 9-1/8")
	Center height		mm	26 (1-1/64")	26 (1-1/64")	26 (1-1/64")
	Main body weight*3		kg	1.73 (3.8 lbs)	1.73 (3.8 lbs)	1.73 (3.8 lbs)
	No-load sound pressure level		dB(A)	69	69	69
Tool tip mounting system				Driver chuck	Driver chuck	Driver chuck
Type of switch				Variable speed switch with forward/reverse changeover lever	Variable speed switch with forward/reverse changeover lever	Variable speed switch with forward/reverse changeover lever
Type of motor				DC magnet	DC magnet	DC magnet
Voltage			V	12 [9.6]	12	12
Current			A	17 [13]	17	17
Battery	Type			EB 12B, EB 12H	EB 12	1222
	Nominal capacity		mAh	EB 12B: 2,000 EB 12H: 2,200 [1,200]	1,200	2,000
	Nominal voltage		V	12 [9.6]	12	12
	Ambient temperature		°C	0 – 40	5 – 40	—
Charger	Model			UC 14YF or UC 14YF2	UC 12Y	DC1411
	Power input capacity		VA	44	51	—
	Recharging voltage		V	7.2 – 14.4	2.4 – 12	7.2 – 14.4
Standard accessories				• Plastic tool case • Charger (UC 14YF or UC 14YF2)	• Plastic tool case • Charger (UC 12Y)	• Plastic tool case • Charger (DC1411)

[ ]: in the case of EB9 type battery

*1: In the case of tapping screws and wood screws, a minimum of M3 (1/8") is possible.

*2: Max. tightening torque is based on tightening an M12 (5/32") bolt (strength grade: 12.9) for 3 sec. with a hexagon socket.

*3: Main body weight does not include accessory tools (hexagon bit, etc.).

7-2. Specification Comparisons (Cordless Impact Wrench)

Item \ Maker / Model				HITACHI WR 12DH	HITACHI WH 12D	C
Catalog specifications	Capacity	Ordinary bolt		M 6 – M 14 (1/4" – 9/16")	M 6 – M 14 (1/4" – 9/16")	M 8 – M 14 (5/16" – 9/16")
		High-strength bolt		M 6 – M 10 (1/4" – 3/8")	M 6 – M 12 (1/4" – 15/32")	M 6 – M 12 (1/4" – 15/32")
	Max. tightening torque *1		kgf·cm	1,200 (117.6 N·m, 86.4 ft-lbs)	1,200 (117.6 N·m, 86.4 ft-lbs)	1,200 (117.6 N·m, 86.4 ft-lbs)
	No-load rotation speed		/min	0 – 2,200	0 – 1,500	0 – 1,800
	Impact rate		/min	0 – 3,000	0 – 2,300	0 – 2,500
	Main body weight *2		kg	1.7 (3.7 lbs)	2.3 (5.1 lbs)	1.8 (3.9 lbs)
Measured figures	Max. tightening torque *1		kgf·cm	1,300 (127.4 N·m, 93.6 ft-lbs)	1,200 (117.6 N·m, 86.4 ft-lbs)	1,270 (124.5 N·m, 91.4 ft-lbs)
	No-load rotation speed		/min	0 – 2,180	0 – 1,550	0 – 1,990
	Impact rate		/min	0 – 2,900	0 – 2,300	0 – 2,500
	Overall length x height		mm	180 x 245 (7-1/8" x 9-21/32")	230 x 253 (9" x 10")	221 x 230 (8-3/4" x 9-1/8")
	Center height		mm	26 (1-1/64")	33.5 (1-5/16")	33 (1-5/16")
	Main body weight *2		kg	1.73 (3.8 lbs)	2.3 (5.1 lbs)	1.94 (4.3 lbs)
	No-load sound pressure level		dB(A)	69	65	72
Tool tip mounting system				Pin/O-ring or plunger	Pin/O-ring or plunger	—
Type of switch				Variable speed switch with forward/reverse changeover lever	Variable speed switch with forward/reverse changeover lever	Variable speed switch with forward/reverse changeover lever
Type of motor				DC magnet	DC magnet	DC magnet
Voltage			V	12	12	12
Current			A	17	16	17
Battery	Type			EB 12B, EB 12H	EB 12B	1222
	Nominal capacity		mAh	EB 12B: 2,000 EB 12H: 2,200	2,000	2,000
	Nominal voltage		V	12	12	12
	Ambient temperature		°C	5 – 40	5 – 40	—
Charger	Model			UC 14YF or UC 14YF2	UC 12Y	DC1201
	Power input capacity		VA	44	51	—
	Recharging voltage		V	7.2 – 14.4	2.4 – 12	2.4 – 12
Standard accessories				• Plastic tool case • Charger (UC 14YF or UC 14YF2)	• Plastic tool case • Charger (UC 12Y)	• Plastic tool case • Charger (DC1201)

*1: Max. tightening torque is based on tightening an M14 (9/16") bolt (strength grade: 12.9) for 3 sec. with a hexagon socket.
*2: Main body weight does not include accessory tools (hexagon bit, etc.).

7-3. Tightening torque

7-3-1. Tightening Torque Characteristic comparisons

The Model WH 12DH and WR 12DH provide greater tightening torque than that of the previous models thanks to the high power rare-earth magnet motor and the higher moment of inertia of the hammer. The tightening torque does not drop even when loosening bolts because the motor runs at the same torque and speed in both the forward and reverse directions.

Tightening torque comparisons of Models WH 12DH and WR 12DH with previous models are shown in Figs. 4-1 and 4-2. It should be noted that M12 (15/32") and M14 (9/16") strength grade 12.9 high-strength bolts were utilized in the tests to ensure that the bolts were not stripped or distorted, even though such bolts are actually beyond the recommended maximum capacity of these models. Accordingly, the data in the figures below are intended for reference purposes only.

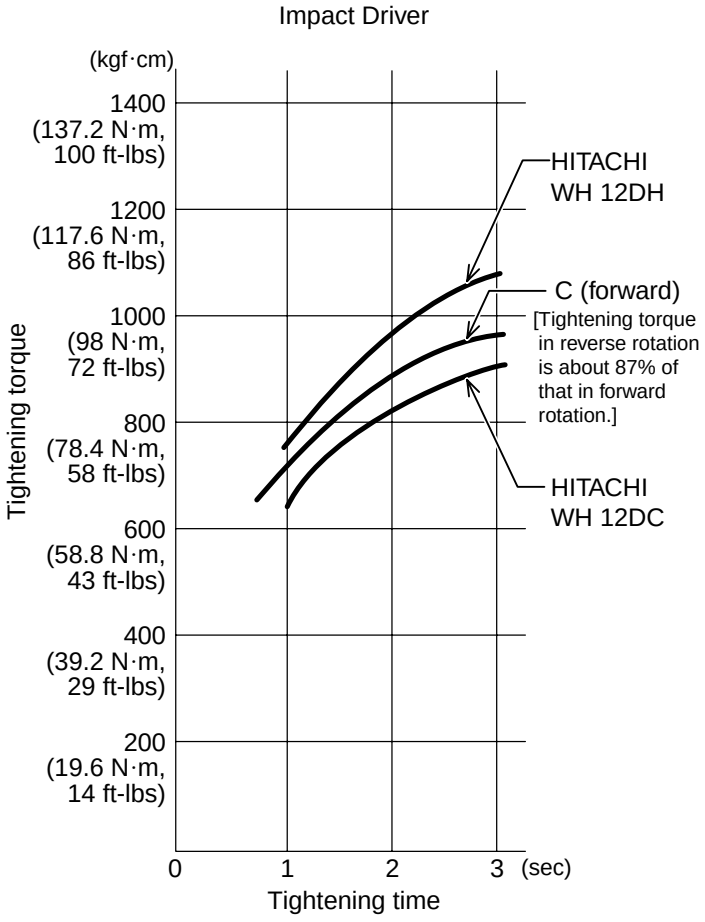


Fig. 4-1

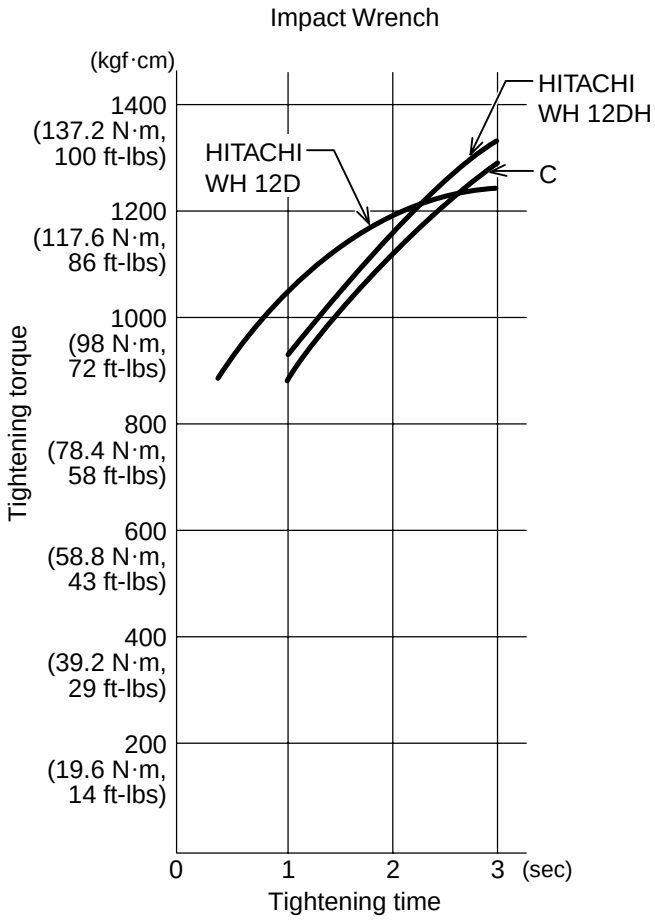


Fig. 4-2

Test conditions

Bolt: M12 x 45 mm (15/32" x 1-25/32")
(strength grade: 12.9)
Steel plate: Mild steel, thickness: 25 mm (1")
Accessory tool: Hexagon socket

Bolt: M14 x 50 mm (9/16" x 2")
(strength grade: 12.9)
Steel plate: Mild steel, thickness: 25 mm (1")
Accessory tool: Hexagon socket

7-3-2. Screw Diameter and Appropriate Tightening Torque

Generally speaking, the appropriate tightening torque for a screw can be determined by the strength grade of the screw and the material tightened. Tables 1 and 2, and Fig. 5 below list data relative to the strength grade of various screws and the appropriate tightening torque. For further reference, appropriate tightening torque is calculated with the following formula. Study and use this formula for accurate selection of tightening torque.

$T=k \cdot d \cdot p$

T: Appropriate tightening torque (kgf·cm)

d: Nominal diameter for the screw (mm)

p: Recommended axial tightening force to be applied to the screw (kgf)

p=rated axial stress (kgf/cm^2) x 0.8 x effective sectional area of the thread (mm^2)

K: Torque coefficient (0.17)

• Strength grade and rated axial stress of threads

Table 1

Strength grade	4.8	6.8	8.8	12.9
Rated axial stress (kgf/mm^2)	29.1	43.7	58.2	95
Material	Mild steel		Alloy steel including Ni, Mn, Cr, etc.	
Heat treatment	None		Processed-hard material	

• Diameter and effective sectional areas of threads

Table 2

Kind of thread (x pitch)	M5 x 0.8 mm (3/16")	M6 x 1 mm (1/4")	M8 x 1.25 mm (5/16")	M10 x 1.5 mm (3/18")	M12 x 1.75 mm (15/32")	M14 x 2 mm (9/16")
Effective sectional area of thread (mm^2)	14.2	20.1	36.6	58.0	84.3	115

• Thread diameter and appropriate tightening torque

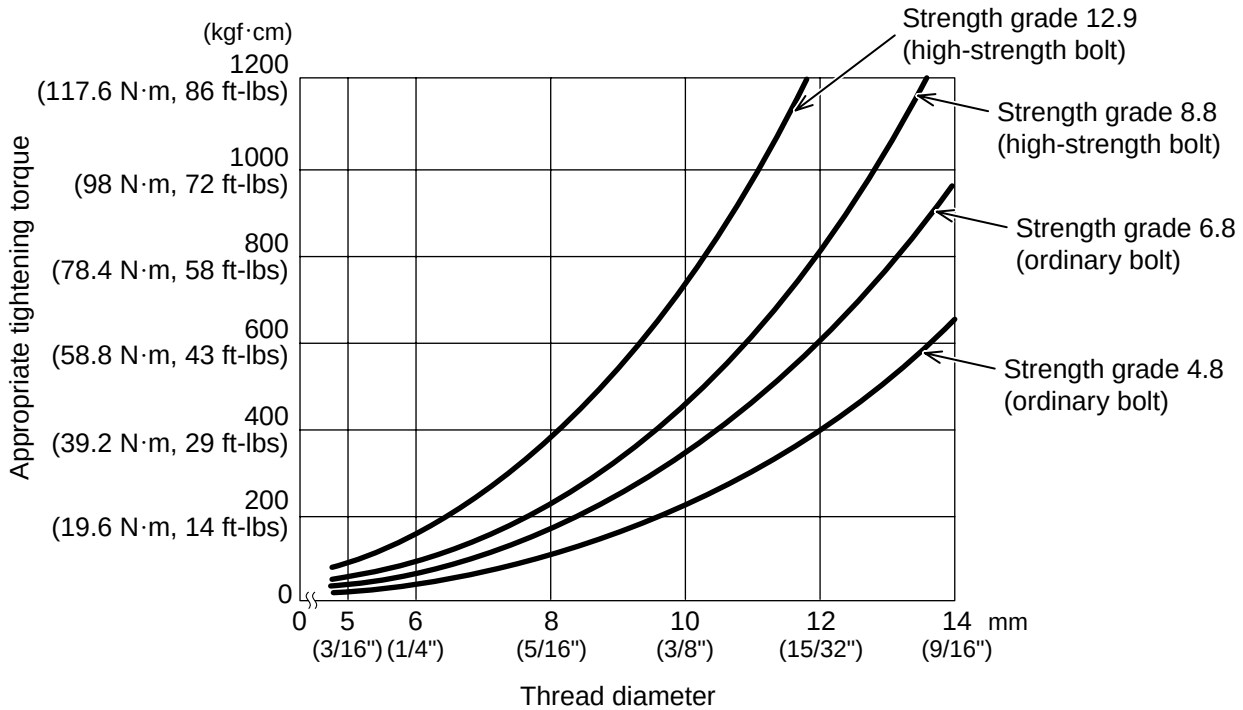


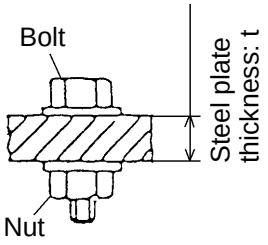
Fig. 5

7-3-3. Bolt Tightening Torque Characteristics

Figs. 6-1 and 6-2 show relationships between time and tightening torque for individual bolt types and sizes. While the data are useful for handy reference, actual tightening torque will vary depending on tightening conditions and other variables. For details, please refer to Para. 8-3, Tightening Torque Variation.

(Note)

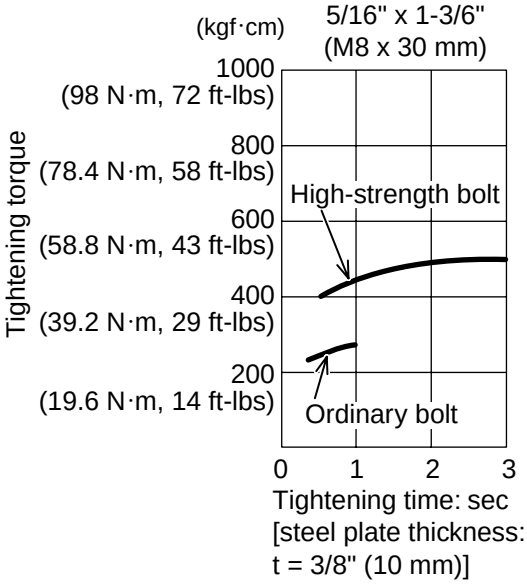
- The term "tightening time" indicates the impact time after the lower surface of the bolt has come in contact with the material into which it is being tightened.
- In the tightening conditions shown in Figs. 6-1 and 6-2, the screws are being tightened directly into a steel plate; accordingly, the torque goes up very abruptly in comparison with ordinary bolt tightening conditions.

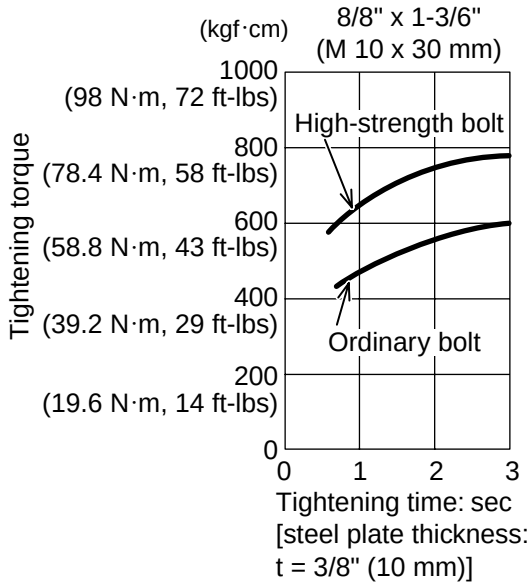


* The following bolts were utilized:
Ordinary bolt; strength grade 4.8
High-strength bolt; strengh grade 12.9

Strength grade is read as follows:
4.8
Yield point or durable force: (45,500 psi)
Tensile strength of the bolt: (56,900 psi)

• Model WH 12DH





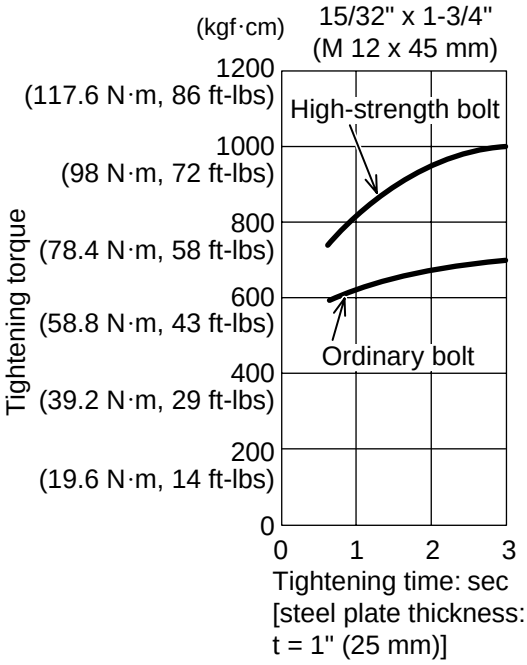


Fig. 6-1

• Model WR 12DH

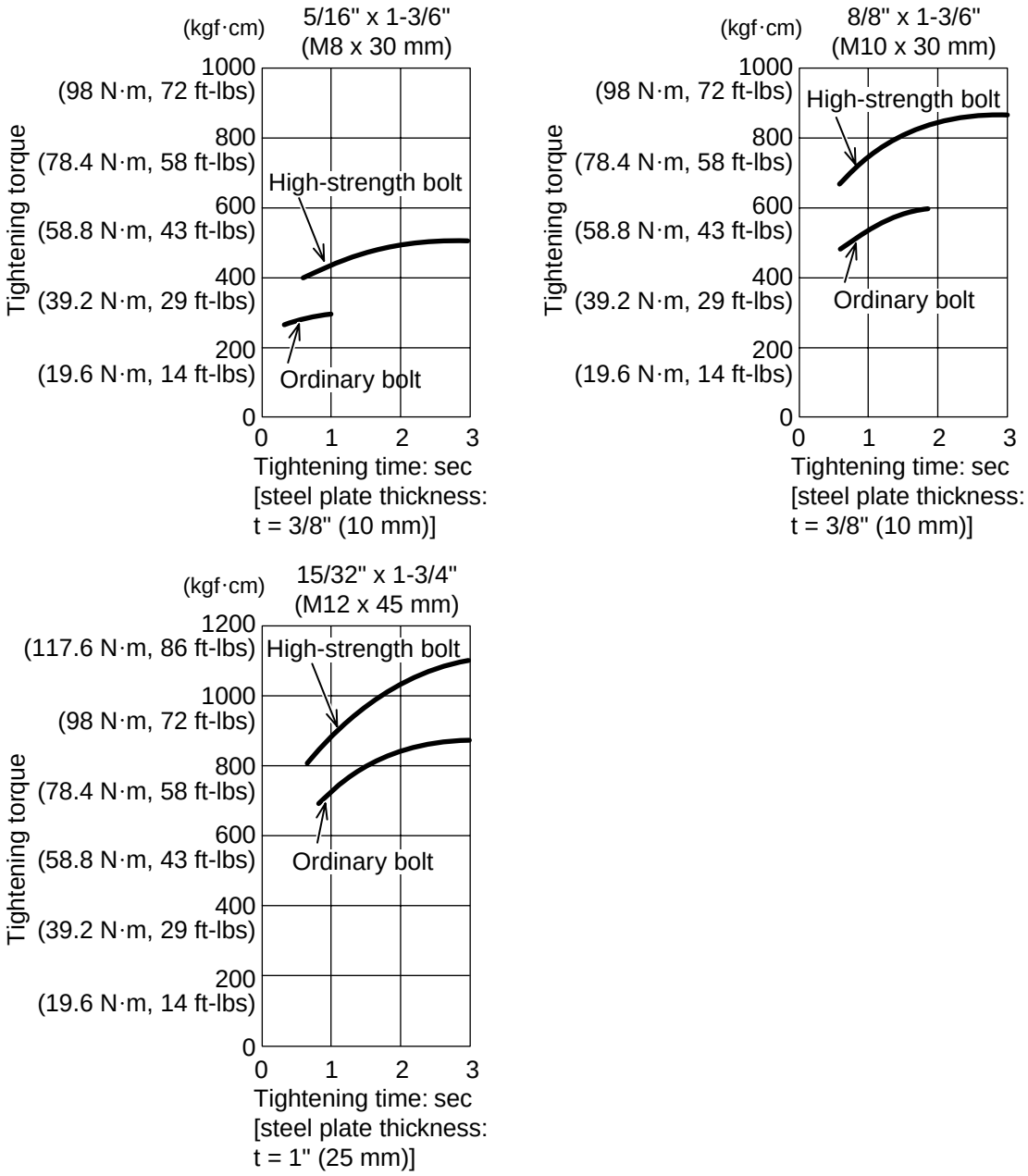


Fig. 6-2

7-4. Number of Screws or Bolts Driven

7-4-1. Per-Charge Working Capacity Comparisons

Test data on the number of screws or bolts which can be driven per battery charge by the new models vs. the previous models are shown in the tables below. Please note that the data below are intended for general reference only as the number of screws which can be tightened per charge will vary slightly depending on screw tightening conditions, screw sizes, ambient temperatures and the charging capacity of the battery.

(1) Number of screws or bolts driven (Cordless impact driver)

Model / Tightening condition	HITACHI WH 12DH	HITACHI WH 12DC	C
Battery	EB 12B	EB 12B	1222 (Corresponding EB 12B)
Wood screw 3.8 mm dia. x 20 mm (soft wood)	820	800	820
Wood screw 4.5 mm dia. x 50 mm (soft wood)	450	450	450
Wood screw 4.2 mm dia. x 75 mm (soft wood)	270	270	270
Machine screw (M8 x 16 mm)	1,400	1,400	1,400
Machine screw (M8 x 25 mm)	1,230	1,230	1,230
Tex screw 4.0 mm dia. x 13 mm SPCC t=1.6	210	210	210

(2) Ordinary bolt (Cordless impact wrench)

Model / Tightening condition		HITACHI WH 12DH	HITACHI WH 12D	C
Battery		EB 12B	EB 12B	1222 (Corresponding EB 12B)
M8 ordinary bolt	Number of bolts Time (sec)	1,960 0.2	2,240 0.2	1,880 0.2
M10 ordinary bolt	Number of bolts Time (sec)	780 0.5	900 0.5	750 0.5
M12 ordinary bolt	Number of bolts Time (sec)	490 0.8	660 0.8	470 0.8

7-4-2. Tightening Time and Number of Screws Driven Per Battery Charge

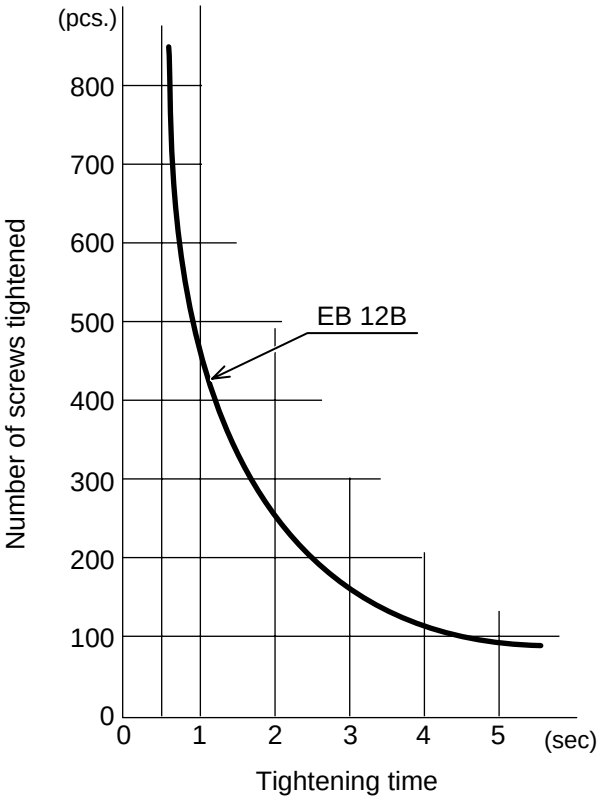


Fig. 7 Tightening time and number of screws tightened

Fig. 7 shows the relationship between the tightening time and the number of screws which can be tightened in a single battery charge in the case of the EB 12B. (Tightening time is defined as the period of time elapsed from the commencement of the screw tightening operation to the completion. As it can be seen, when the tightening time is prolonged, the number of screws which can be tightened per charge is decreased.) Please note that the data below are intended for general reference only, as the number of screws which can be tightened per charge will vary slightly depending on screw tightening conditions, screw sizes, ambient temperatures and the charging capacity of the battery.

8. PRECAUTIONS IN SALES PROMOTION

8-1. Safety Instructions

In the interest of promoting the safest and most efficient use of these tools by all our customers, it is very important that at the time of sale the salesperson carefully ensures that the buyer seriously recognizes the importance of the contents of the Handling Instructions, and fully understands the meaning of the precautions listed on the Caution Plate and Name Plate attached to each tool.

A. Handling Instructions

Salespersons must be thoroughly familiar with the contents of the Handling Instructions in order to give pertinent advice to the customer. In particular, they must have a thorough understanding of the precautions in the use of the cordless (battery charger type) electric power tools which are different from those of ordinary electric power tools

(1) Before use, ensure that the unit is fully charged.
New units are not fully charged. Even if the units were fully charged at the factory, long periods without use, such as during shipping, cause the storage battery to lose its charge. Customers must be instructed to fully charge the unit prior to use.

(2) When charging storage batteries, use only the exclusive Model UC 14YF or UC 14YF2 Charger provided with the tool. Because of the designed rapid-charging feature (about one hour), use of other battery chargers is hazardous.

(3) Follow prescribed steps in using the charger.
First connect the EB 12 Storage Battery to the Model UC 14YF or UC 14YF2 Charger, then plug the charger into an AC outlet (ensuring that the voltage matches that indicated on the unit). If this order is reversed, the charger may not function properly.

(4) Ensure the power source voltage is the same as that indicated on the Name Plate of the charger. Use of any other power source (DC outlet, fuel powered generator, etc.) will cause the charger to overheat and burn out.

(5) Do not use any voltage increasing equipment (transformer, etc.) between the power source and the charger.
If the charger is used with voltage over and above that indicated on the unit, it will not function properly.

(6) Conduct battery charging at an ambient temperature range of 0 °C ─ 40° C (32 °F ─ 104 °F).
Special temperature sensitive devices are employed in the charger to permit rapid charging. Ensure that customers are instructed to use the charger at the indicated ambient temperature range. At temperatures under 0 °C (32 °F), the thermostat will not function properly, and the storage battery may be over-charged. At temperatures over 40 °C (104 °F), the storage battery cannot be sufficiently charged. The optimum temperature range is 20 °C ─ 25 °C (68 °F ─ 77 °F).

(7) The battery charger should not be used continuously.
At high ambient temperatures, if over three storage batteries are charged in succession, the temperature of the coils on the transformer will rise and there is a chance that the temperature fuse inserted in the interior of the transformer will inadvertently melt. After charging one battery, please charge the next battery after about a fifteen-minute interval.

(8) The charger case is equipped with air vents to protect the internal electronic components from overheating.
Caution the customer not to allow foreign materials, such as metallic or flammable objects, to be dropped or inserted into the air vents. This could cause electrical shock, fire or other serious hazards.

(9) Do not attempt to disassemble the storage battery or the charger.

Special devices, such as a thermostat, are built into the storage battery and charger to permit rapid charging. Incorrect parts replacement and/or wiring will cause malfunctions which could result in fire or other hazards. Instruct the customer to bring these units to an authorized service center in the event repair or replacement is necessary.

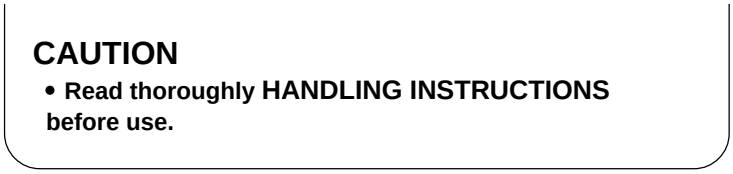
(10) Disposal of the Type EB 12B or EB 12H Storage Battery

Ensure that all customers understand that Type EB 12B or EB 12H Storage Batteries should be turned into any Hitachi power tool sales outlet or authorized service center when they are no longer capable of being recharged or repaired. If thrown into a fire, the batteries may explode, or if discarded indiscriminately, leakage of the cadmium compound contained in the battery may cause environmental pollution.

B. Caution Plates

(1) The following precautions are listed on the Name Plate attached to the main body of each tool.

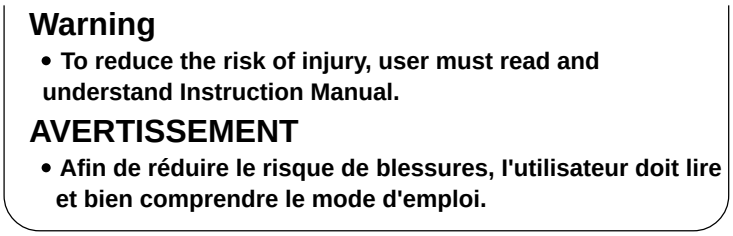
For Europe



For Germany, Switzerland and Austria

For France

For the U.S.A. (excludes French) or Canada



(2) The following cautions are listed on the Name Plate attached to each Type EB 12B or EB 12H Storage battery:

For Europe

CAUTION • **Read thoroughly HANDLING INSTRUCTIONS before use.** • **Do not disassemble nor throw into fire.**

For the U.S.A.

CAUTION • **For safe operation, see Instruction Manual.**

(3) The following caution is listed on the Name Plate attached to the Model UC 14YF or UC 14YF2 Charger.

For the U.S.A.

CAUTION

- **For safe operation, see Instruction Manual.**
- **Charger HITACHI rechargeable batteries Type EB 7, EB 9, EB 12 and EB 14 series. Other types of batteries may burst causing personal injury and damage.**
- **Charge between 32 and 104 °F.**
- **Indoor use only.**
- **Replace defective cord immediately.**

8-2. Tightening Torque Inspection Prior to Operation

As described and shown in Para. 7-3-3, the output tightening torque of which the Models WH 12DH and WR 12DH are capable in excess of the rated tightening torque of certain bolts and screws. Accordingly, if the tightening time is prolonged for such bolts and screws, it could cause damage to their threads or, in the worst case, cause them to be sheared off. (This phenomenon is common to all existing impact drivers.) Particularly when tightening M6 (1/4") or smaller screws, tightening time must be kept extremely short: 0.5 seconds or less. The customer should be advised to carry out several screw tightening operations and adjust the tightening time as necessary by measuring the tightening torque with an appropriate torque wrench or driver before commencing continuous operation

8-3. Tightening Torque Variation

The tightening torque of the cordless impact driver or wrench may vary slightly in accordance with the factors described below. Salespersons are requested to advise the customer to confirm that appropriate tightening torque is obtained by measuring the torque with an appropriate torque wrench or torque driver at the beginning of the tightening operations, and as necessary during the tightening operations. In addition, the torque values shown in Para. 7-3-2 above are useful as a handy reference, and may be utilized as tentative standards.

(1) Voltage of battery

Tightening torque is affected by the voltage output of the battery. For example, the relationship between tightening torque and the number of M14 x 50 mm (9/16" x 1-7/8") high-strength bolts tightened is shown in Fig. 8 below. As can be seen in the graph, tightening torque decreases as the number of bolts tightened increases. This phenomenon is caused by the decline in voltage output of the battery due to the increasing number of bolts tightened. In particular, the tightening torque decreases rapidly just before the battery is fully discharged (range "a" in the graph). As this phenomenon is an inherent drawback in any cordless impact driver, salespersons are requested to ensure that the customer is fully aware of and understands this characteristic.

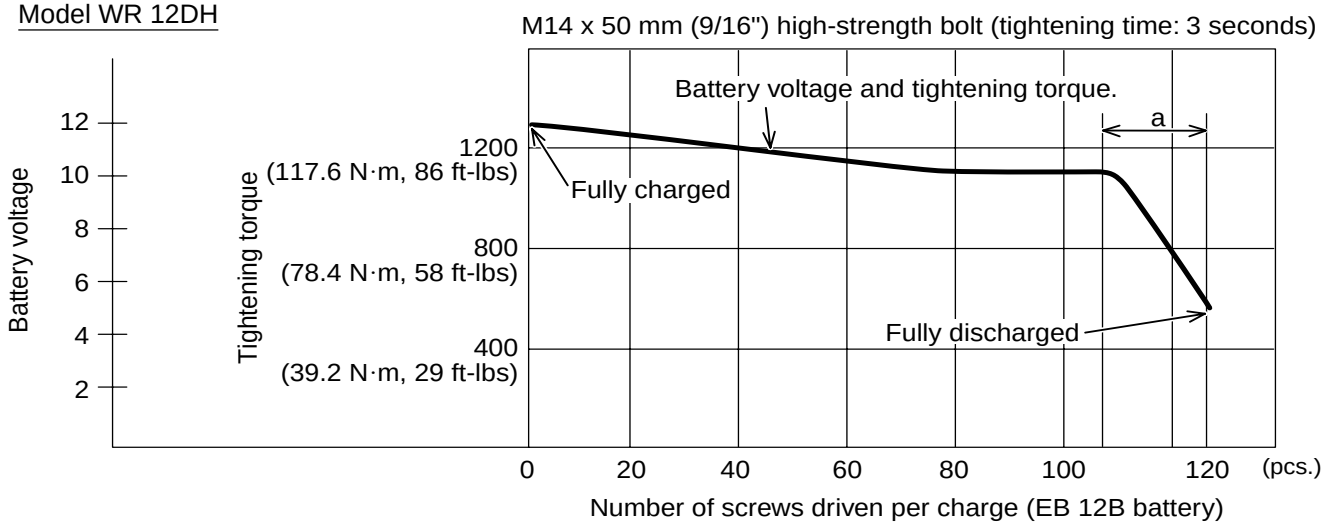


Fig. 8

(2) Effects of low ambient temperatures

The tightening torque required may be reduced at low ambient temperatures or under the influence of grease and different torque coefficients (dependent on manufacturing and finishing processes, and specified by bolt manufacturers).

(3) Different bolt diameter

Differences in bolt diameter will cause variation of the required levels of tightening torque. Generally speaking, tightening torque is higher for large bolts.

(4) Different materials being tightened

When a bolt is tightened into a soft material such as aluminum, plastic, wood, etc., the tightening torque is considerably less than when the bolt is tightened into a hard material such as steel.

(5) Different tightening conditions

The tightening torque may vary in accordance with bolt torque coefficient (dependent on manufacturing process, and specified by bolt manufactures), bolt grade and bolt length, even though the dimensions of the bolts are the same. Tightening torque may also vary depending on the surface finishing state of tightening materials (steel, aluminum, etc.), and materials to be tightened. In addition, if there is seal packing, clearance, etc., between tightening materials, the tightening torque is decreased.

(6) Wear and looseness of the socket

With extended use, the hexagonal portion of the socket which is fitted to the head of the bolt or drill bit, and/or hexagonal portion of the driver chuck which is fitted onto the anvil in the main body will become worn and loose. Wear and looseness will cause a proportionate loss of tightening torque.

In addition, use of an incorrect size socket (slightly larger than the bolt being tightened) will also result in decreased torque.

(7) Bolt and nut rotate together

Tightening torque that can be achieved will be considerably decreased if the bolt and nut rotate together during the tightening operation. The customer should be advised to carefully observe the operation and ensure this does not occur.

8-4. Suggestions and precautions for the Efficient Use of the Charger

(1) Batteries may not be rechargeable immediately after use

If the Model EB 12B or EB 12H Storage Batteries are exposed to direct sunshine for an extended period, or if the temperature of the batteries is 40 °C (104 °F) or higher immediately after they have been used in the tool, the pilot lamp may not light up when the batteries are connected to the Model UC 14YF or UC 14YF2 Charger. This is because the built-in thermostat functions to stop the charging when the temperature of the storage batteries reach 40 °C (104 °F) or more. In such a case, the customer should be advised to place the batteries in a shaded area with a good airflow, and allow sufficient cooling before recharging.

This phenomenon is common to all existing batteries which employ temperature sensitive overcharge devices. The cooling time required before charging can be accomplished varies from a few minutes to about 30 minutes, depending on the load, duration of use, and ambient temperature.

9. OTHER PRECAUTIONS

(1) Check for cracks or other damage on the socket

Cracks or any other faults on the socket are very hazardous. In addition, cracks or other damage to accessories will cause loss of tightening torque efficiency. Advise the customer to inspect accessories often, and ensure there are no abnormalities.

(2) Socket dimensions

Without fail, utilize an appropriate socket which matches the bolt and/or nut dimensions. If the socket dimensions are larger than the bolts or nuts, it will not only cause insufficient tightening torque, but could also easily cause damage to the socket. Please refer to the tables in Para. 6-2 for appropriate socket dimensions.

(3) Hammering section lubrication

Grease (ATTOLUB MS No. 2) is utilized in the hammering section. Frequent or continuous use of the tool will cause excessive temperature rise of the hammering section, resulting in depletion of the grease and subsequent increased wear of components which will, in turn, cause loss of tightening efficiency. Accordingly, it is necessary to periodically replenish the grease in the hammering section to ensure proper lubrication of moving and sliding components.

10. REPAIR GUIDE

WARNING: Without fail, remove the Model EB 12B or EB 12H Battery from the main body before starting repair or maintenance work. Because the tool is cordless, if the battery is left in and the switch is activated inadvertently, the motor will start rotating unexpectedly, which could cause serious injury.

10-1. Precautions in Disassembly and Reassembly

The **[bold]** and **<bold>** numbers correspond to the item numbers in the Parts List and the exploded assembly diagram. (**[ ]**: WH 12DH, **< >**: WR 12DH)

10-1-1. Disassembly

(1) Removal of the Hammer Case **[6] <2>** and the Inner Cover **[21] <19>**

Remove the four Tapping Screws D4 x 30 **[5] <1>** that connect the Hammer Case **[6] <2>** with the Housing (A).(B) Set **[28] <26>**. Remove the Hammer Case **[6] <2>**, the Inner Cover **[21] <19>** and the Damper **[22] <20>** together from the Housing (A).(B) Set **[28] <26>**.

(2) Removal of Housing (B)

Remove the seven Tapping Screws D4 x 20 **[26] <24>** from the main body to remove Housing (B).

(3) Remove the DC-Speed Control Switch **[30] <28>**, the Fin Ass'y **[32] <30>**, the Motor **[23] [21]**, Grip (F) **[33] [31]** and Grip (R) **[37] <35>** together. Remove the Pushing Button **[31] <29>** and the Strap **[35] <33>.**

(4) Disassembly of the switch ass'y

Remove the two Machine Screws M3 x 5 **[29] <27>** that secure the flag terminal and then disconnect the internal wires (purple and black) of the Motor **[23] <21>** from the DC-Speed Control Switch **[30] <28>**.

Remove the S-Tight Screw D3.5 x 6 **[36] <34>** to remove the Fin Ass'y **[32] <30>** from the FET of the DC-Speed Control Switch .

(Note) Do not disconnect the three FET internal wires soldered to the DC-Speed Control Switch.

(5) Removal of the Guide Sleeve **[4]** (for WH 12DH only)

By following the procedure shown in Figs. 9-1 to 9-4, you can remove the Retaining Ring **[1]**, Washer (D) **[2]**, the Guide Spring **[3]** and the Guide Sleeve **[4]** in this order. Be sure not to lose the Steel Ball D3.5 **[7]** in Anvil (B) **[8]**.

1

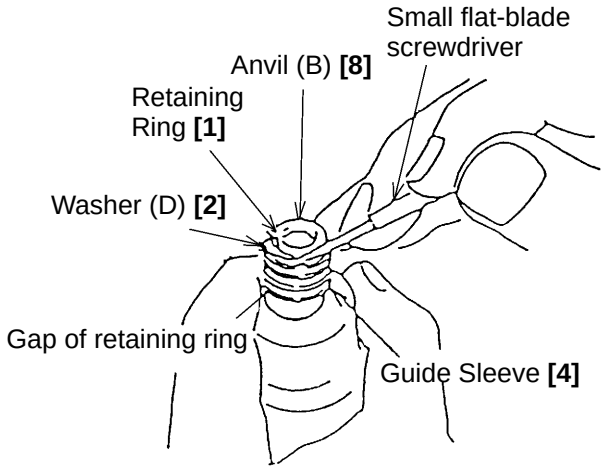


Fig. 9-1

Hold the body and adjust gap of the retaining ring to groove of the anvil (B), then insert a small flat-blade screwdriver into the groove at an angle.

2

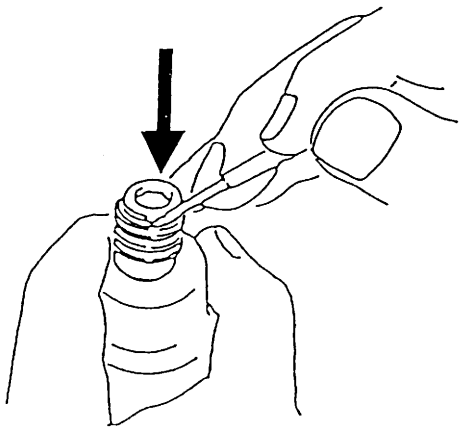


Fig. 9-2

Press down the washer (D) with the screwdriver.

3

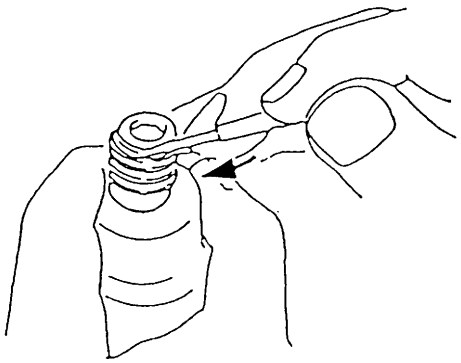


Fig. 9-3

Slide the screwdriver under one side of the gap of the retaining ring.

4

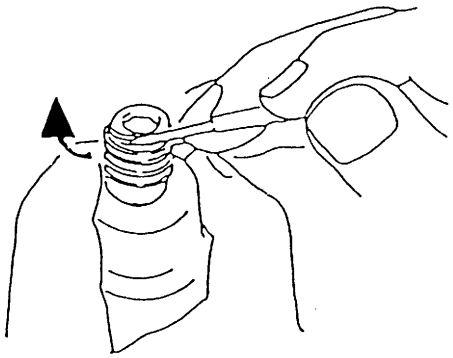


Fig. 9-4

Slowly raise the retaining ring using the end face of the guide sleeve as a fulcrum.

Then slowly raise the other side of the retaining ring with the screwdriver until it is free. The Guide Sleeve **[4]** can now be removed. Avoid quickly raising the retaining ring or it may fly out forcefully.

The retaining ring can also be easily removed by widening the gap of the retaining ring with the jig for retaining ring and slowly raising the retaining ring with a small flat-blade screwdriver.

(6)

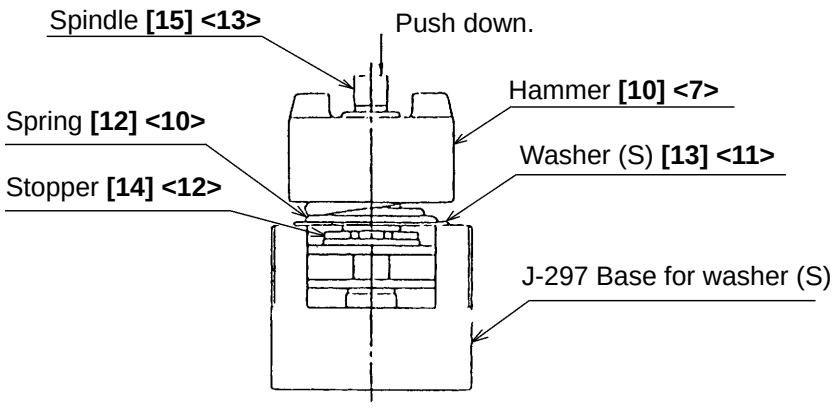


Fig. 10

Mount the hammer assembly onto the J-297 base for washer (S). With a hand press, push down the top of the Spindle **[15] <13>** to compress the Spring **[12] <10>**. In this position, remove the Stopper **[14] <12>** with a flat-blade screwdriver, then release the hand press. (See Fig. 10.)

Remove the hammer assembly from the J-297 base for washer (S) and support the end surface of the Spindle **[15] <13>**. With a hand press, push down either of the raised faces of the Hammer **[10] <7>** to compress the Spring **[12] <10>**. In this position, extract the two Steel Balls D5.556 **[9] <6>** from the cam grooves of the Spindle **[15] <13>** and the Hammer **[10] <7>** with a small flat-blade screwdriver or a similar tool. Then, slowly release the hand press and lift the Hammer **[10] <7>** and Washer (S) **[13] <11>** together to extract them from the Spindle **[15] <13>**. The Spring **[12] <10>** can then be removed.

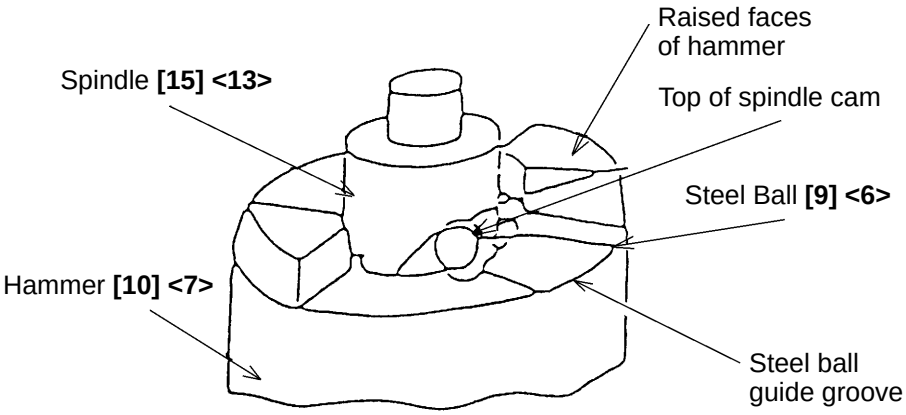


Fig. 11

10-1-2. Reassembly

Reassembly can be accomplished by following the disassembly procedures in reverse. However, special attention should be given to the following items.

(1) Reassembly of Housing (A) assembly

(a) Be sure to follow the wiring diagram (Fig. 12-1) for proper wiring.

(b) When connecting the internal wires of the Motor **[23] <21>** to the DC-Speed Control Switch **[30] <28>**, tightly fasten them with the Machine Screw M3 x 5 **[29] <27>** paying close attention to the direction of the flag terminal (Fig. 12-2).

(c) Mount the Motor **[23] <21>** into Housing (A) so that the CB cap of the Motor **[23] <21>** and the rib for preventing motor body from rotating fit in Housing (A).

(Note) Make sure that the internal wire (purple) is passed under the Motor so that it is not caught between the Motor and Housing (A).

(d) Mount the DC-Speed Control Switch **[30] <28>** to Housing (A) so that the projection of the forwarding/ reversing lever at the top of the Switch is inserted into the U-shaped groove of the Pushing Button **[31] <29>**. Secure the Fin Ass'y **[32] <30>** to the FET of the DC-Speed Control Switch **[30] <28>** with the S-Tight Screw D3.5 x 6 **[36] <34>**.

(Note) Make sure that the three internal wires from the FET are passed above the DC-Speed Control Switch **[30] <28>**.

(2) Reassembly of the Housing (A).(B) Set **[28] <26>**

Mount the Strap **[35] <33>**, Grip (F) **[33] <31>**, Grip (R) **[37] <35>** and Housing (B) to Housing (A), and secure them with the seven Tapping Screws D4 x 20 **[26] <24>**.

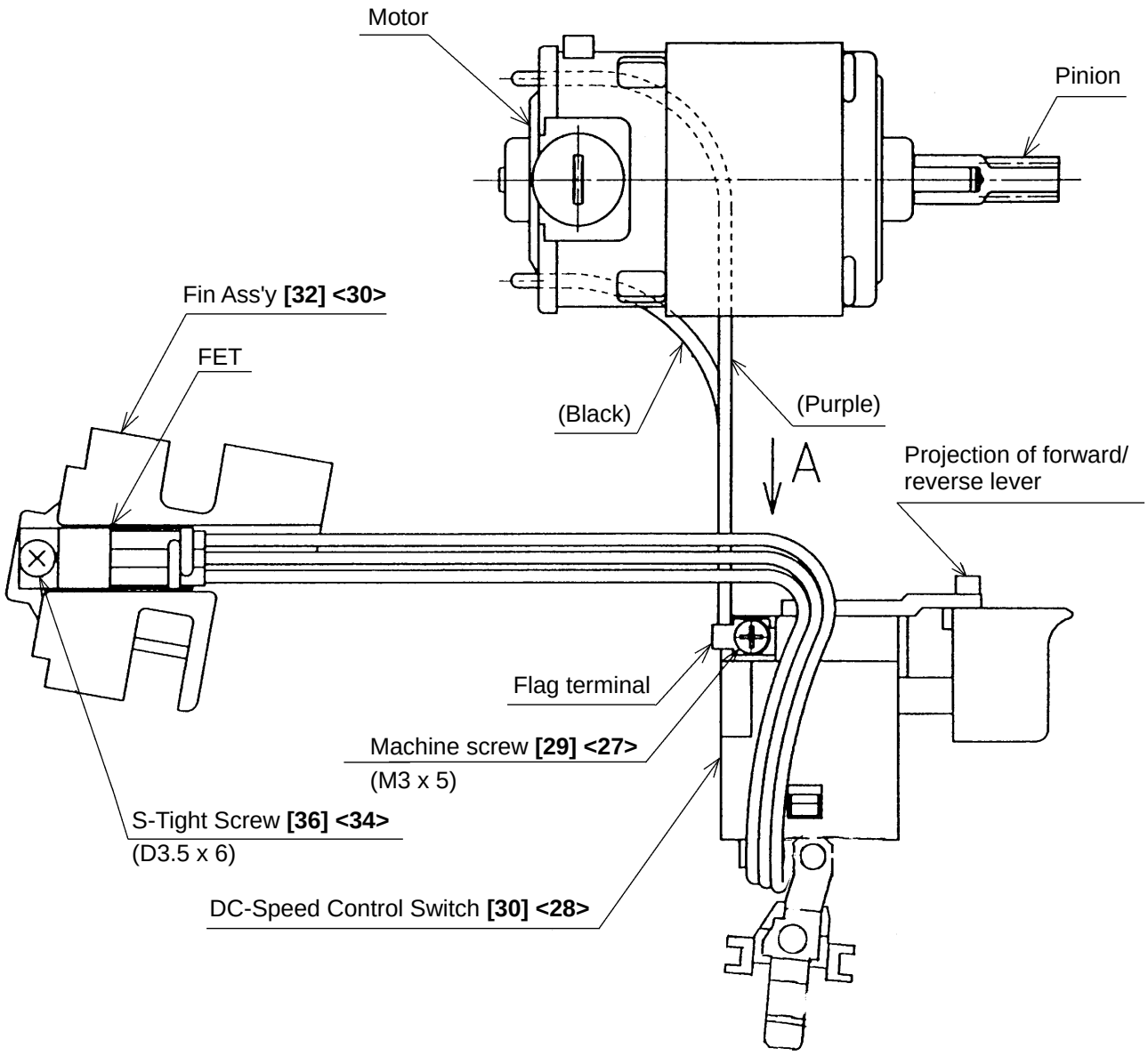
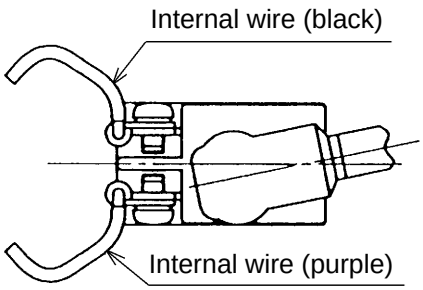


Fig. 12-1



Schematic diagram viewed from A

Fig. 12-2

(3) Reassembly of the Mechanical Parts

(a) Put the Washer (S) **[13] <11>** onto the shaft of the Spindle **[15] <13>** and mount the Hammer **[10] <7>** containing the twenty-five Steel Balls D3.5 **[7] <8>**, Washer (J) **[11] <9>** and the Spring **[12] <10>** to the Spindle **[15] <13>**.

(b) Align the top of the cam groove on the Spindle [**15] <13>** with the steel ball guide groove on the Hammer **[10] <7>** as illustrated in Fig. 11. Press down either of the raised faces of the Hammer **[10] <7>** with a hand press to compress the Spring **[12] <10>** until the end surface of the Hammer contacts the flange of the Spindle **[15] <13>**.

(c) Insert the two Steel Balls D5.556 **[9] <6>** into the steel ball guide groove. Check that the Steel Balls are properly inserted in the cam groove. Then release the hand press.

(d) Mount the hammer assembly onto the J-297 base for washer (S). With a hand press, push down the top of the Spindle **[15] <13>** to compress the Spring **[12] <10>**. On this condition, mount the Stopper **[14] <12>** onto the spindle shaft and then release the hand press.

(e) Mount the Ring Gear **[18] <16>**, the Ball Bearing **[20] <18>**, the Inner Cover **[21] <19>** and the Damper **[22] <20>** to the above reassembly. Furthermore, mount the other mechanical parts and Anvil (B) **[8]** or Anvil (K) Ass'y **<4>**, then the Hammer Case **[6] <2>**. When mounting Anvil (B) **[8]**, use the J-296 anvil cap (Fig. 13).

(Note) The oil seal may be turned inside out if the anvil cap is not used.

(4) Mounting the assembly from the Hammer Case **[6] <2>** to Inner Cover **[21] <19>** to the housing assembly

Push the assembly from the Hammer Case **[6] <2>** to the Inner Cover **[21] <19>** into the housing assembly by turning them clockwise and counterclockwise. Check that the Anvil can be easily turned. (If it cannot be turned, check for correct mesh of the gears.) Secure the above assembly with the four Tapping Screws D4 x 30 **[5] <1>**.

(5) Reassembly of the Guide Sleeve **[4]** (for WH 12DH only)

Insert the Steel Ball D3.5 **[7]** into the hole of the Anvil (B) **[8]**. Mount the Guide Sleeve **[4]**, the Guide Spring **[3]** and Washer (D) **[2]** in sequence. Mount the Retaining Ring **[1]** into the groove of Anvil (B) using the J-295 jigs (A) and (B) for retaining ring as illustrated in Fig. 14.

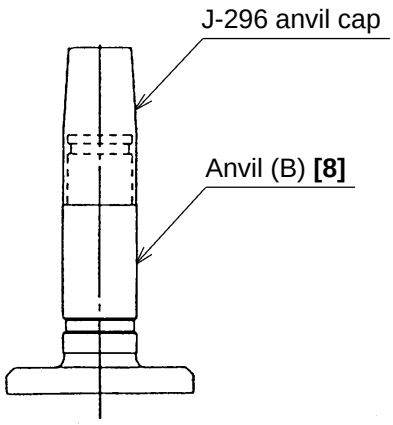


Fig. 13

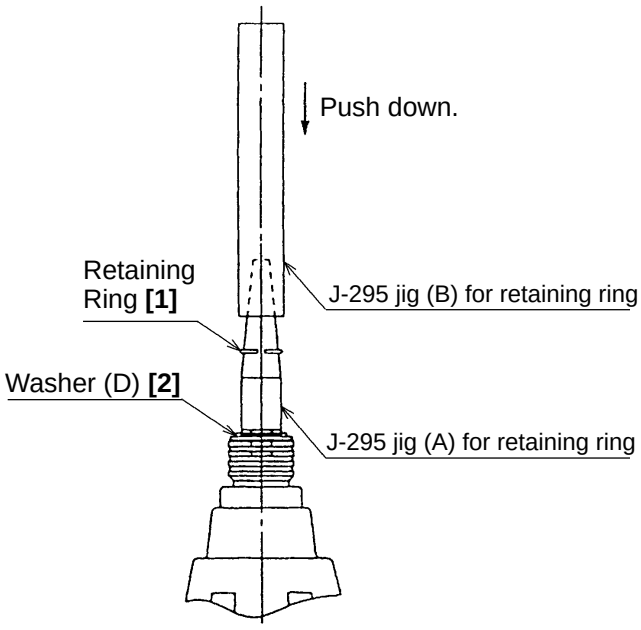


Fig. 14

(6) Check whether the direction of rotation of Anvil (B) **[8]** or Anvil (K) Ass'y **<4>** coincides with the directional markings on the push-on side of the Pushing Button **[31] <29>**. When the Pushing Button **[31] <29>** is turned to the (R) side, the direction of rotation of Anvil (B) **[8]** or Anvil (K) Ass'y **<4>** should be clockwise, as viewed from behind.

(7) Lubrication

(a) ATTOLUB MS No. 2

- Cam groove of the Spindle **[15] <13>**
- Cam groove of the Hammer **[10] <7>**
- Sliding section of the Hammer and the Spindle
- 8 mm Diameter hole of Anvil (B) **[8]** or Anvil (K) Ass'y **[4]**
- Sliding section between Anvil (B) **[8]** or Anvil (K) Ass'y **[4]** and the metal
- Two Steel Balls D5.556 **[9] <6>**
- Pinion tooth flanks of the Motor **[23] <21>**
- Tooth flanks of the Ring gear **[18] <16>**
- Twenty-five Steel Balls D3.5 **[7] <8>**

(b) HITACHI MOTOR GREASE No. 29 (for WH 12DH only)

- Steel Ball D3.5 **[7]**
- Sliding section of Anvil (B) **[8]** and the Guide Sleeve **[4]**

(8) Screw tightening torque

- Tapping Screw (with sp. washer) D4 x 30 ····· 20 ± 5 kgf·cm (1.96 ± 0.49 N·m, 1.44 ± 0.36 ft-lbs)
- Tapping Screw (with flange) D4 x 20 ····· 20 ± 5 kgf·cm (1.96 ± 0.49 N·m, 1.44 ± 0.36 ft-lbs)
- S-Tight Screw D3.5 x 6 ····· 15 – 20 kgf·cm (1.96 – 2.61 N·m, 1.44 – 1.92 ft-lbs)
- Machine Screw M3 x 5 ····· 3 – 4 kgf·cm (0.294 – 0.392 N·m, 0.22 – 0.29 ft-lbs)

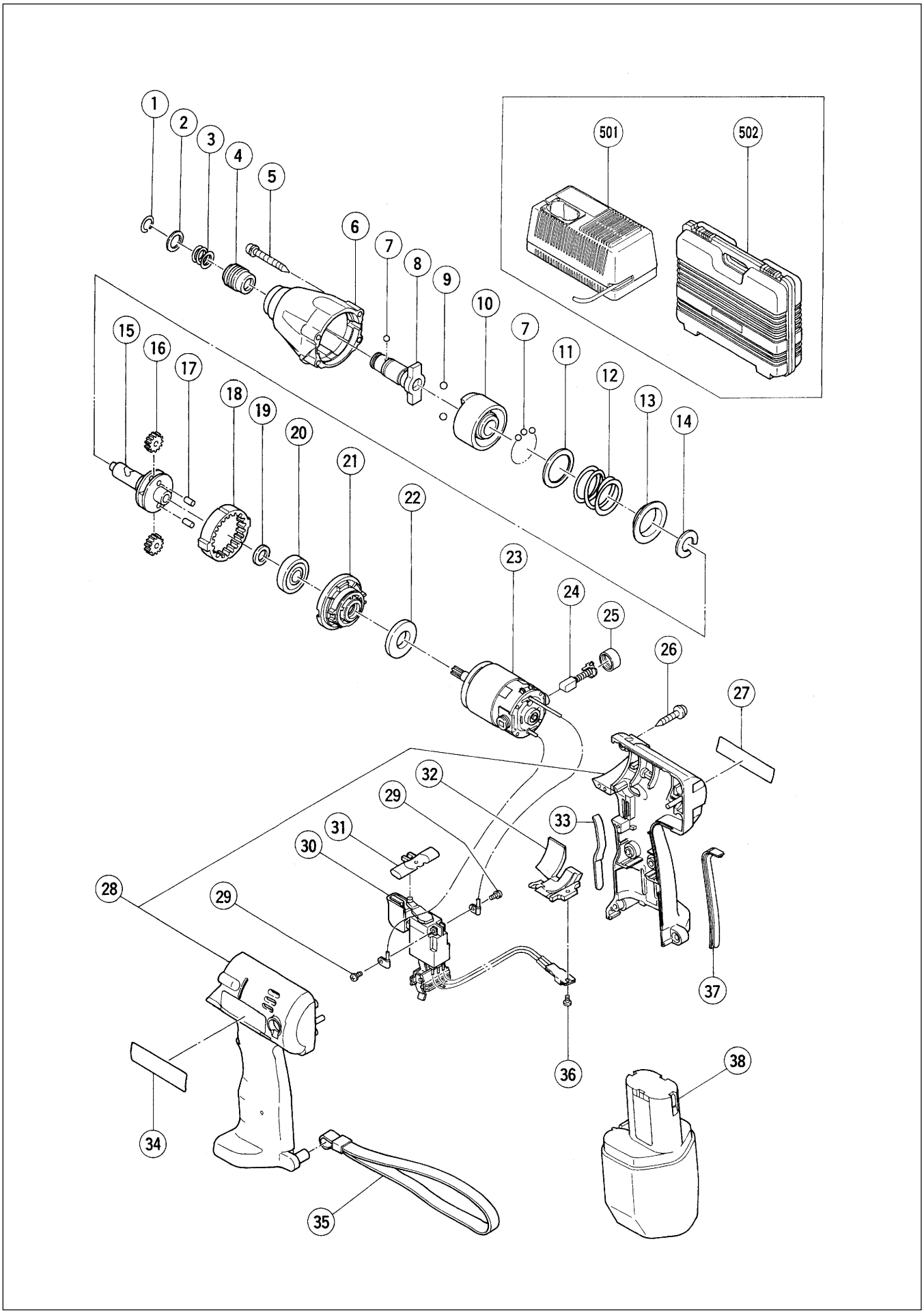
10-2. Precautions in Disassembly and Reassembly of Battery Charger

Refer to the Technical Data and Service Manual for precautions in disassembly and reassembly of the Model UC 14YF or UC 14YF2 Battery Charger.

11. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable / Fixed	10	20	30	40	50	60 min.
WH 12DH WR 12DH	General Assembly Fixed Cost Handle Cover, Switch, Terminal Piece: 0 min. Others: 20 min.	Work Flow Handle Cover Switch Terminal Piece	Inner Cover Motor O-Ring Rubber Ring Hammer Case Washer Anvil Ring Gear	Housing Steel Ball Hammer Ass'y Spring Sheet Spring Spindle Idle Gear Needle Roller Ball Bearing (6001)			

Assembly Diagram for WH 12DH



	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
	1	315-984	RETAINING RING	1		
	2	315-983	WASHER (D)	1		
	3	315-982	GUIDE SPRING	1		
	4	315-981	GUIDE SLEEVE	1		
	5	307-851	TAPPING SCREW (W/SP. WASHER) D4X30(BLACK	4		
	6	317-339	HAMMER CASE	1		
	7	315-980	STEEL BALL D3.5	25		
	8	317-338	ANVIL (B)	1		
	9	959-154	STEEL BALL D5.556 (10 PCS.)	2		
	10	316-168	HAMMER	1		
	11	315-978	WASHER (J)	1		
	12	316-170	SPRING	1		
	13	316-172	WASHER (S)	1		
	14	316-171	STOPPER	1		
	15	316-169	SPINDLE	1		
	16	316-313	IDLE GEAR	2		
	17	991-449	NEEDLE ROLLER	2		
	18	302-337	RING GEAR	1		
	19	991-455	WASHER (C)	1		
	20	600-1VV	BALL BEARING 6001VVCMPS2L	1		
	21	316-167	INNER COVER	1		
	22	310-319	DAMPER	1		
	23	316-173	MOTOR	1		
	24	999-054	CARBON BRUSH 5X6X11.5 (1 PAIR)	2		
	25	316-180	BRUSH CAP	1		
	26	302-086	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	7		
	27		NAME PLATE	1		
	28	317-340	HOUSING (A).(B) SET	1	INCLUD.33,37	
	29	994-532	MACHINE SCREW (W/SP. WASHER) M3X5	2		
	30	316-783	DC-SPEED CONTROL SWITCH	1		
	31	316-166	PUSHING BUTTON	1		
	32	316-179	FIN ASS'Y	1	INCLUD.36	
	33	316-178	GRIP (F)	1		
	34		HITACHI LABEL	1		
	35	306-952	STRAP	1		
	36	311-131	S-TIGHT SCREW D3.5X6	1		
	37	316-177	GRIP (R)	1		
*	38	310-378	BATTERY EB 12B (W/ENGLISH N.P.)	1		
*	38	310-452	BATTERY EB 12B (W/ENGLISH N.P.)	1	FOR NZL,AUS	
*	38	310-453	BATTERY EB 12B (W/ENGLISH N.P.)	1	FOR USA,CAN	
*	38	316-665	BATTERY EB 12H (W/ENGLISH N.P.)	1		

* : ALTERNATIVE PARTS

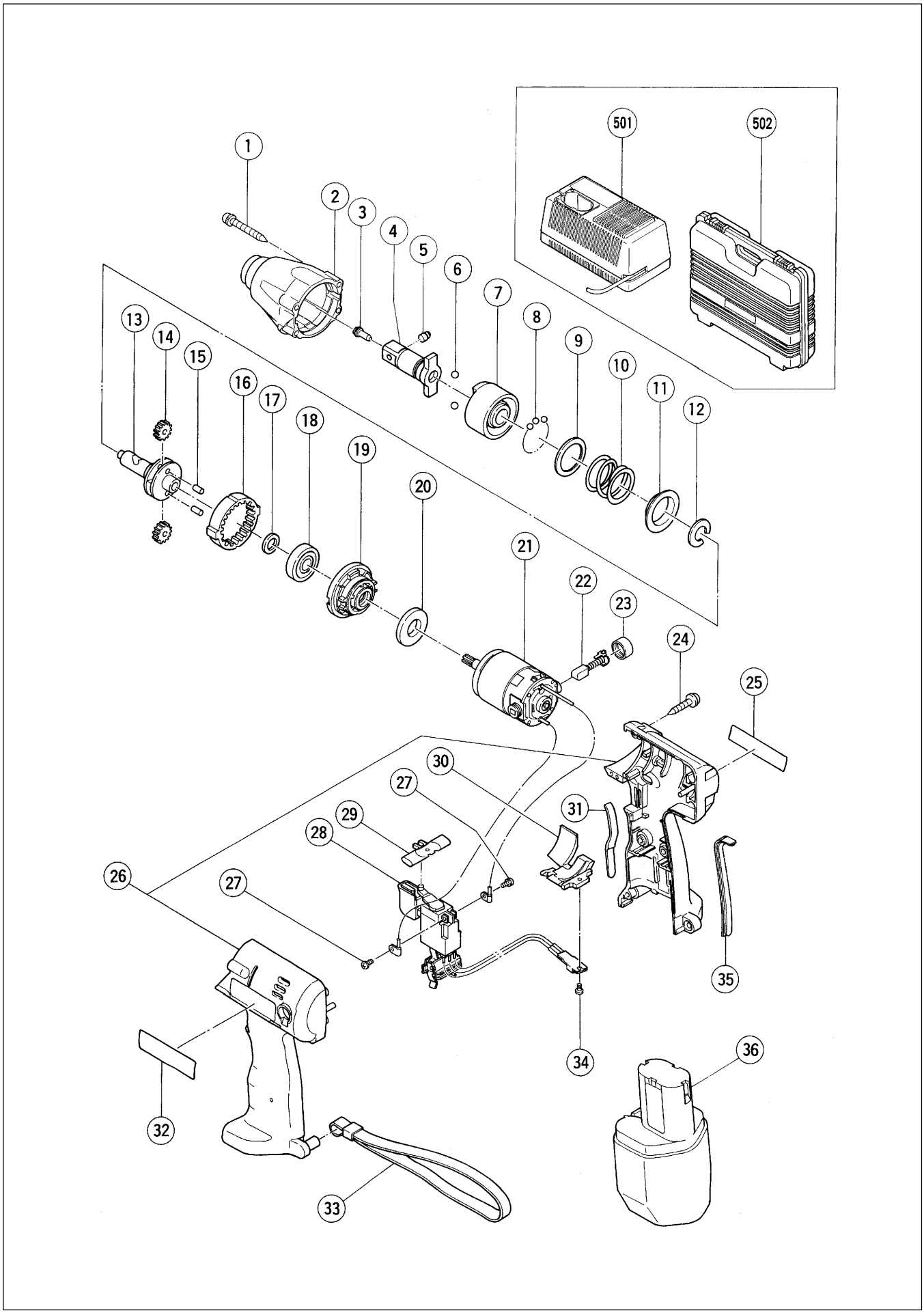
STANDARD ACCESSORIES

	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
*	501		CHARGER (MODEL UC 14YF)	1	DEPENDING ON ORDER SPEC.	
*	501		CHARGER (MODEL UC 14YF2)	1	DEPENDING ON ORDER SPEC.	
	502	306-306	CASE	1		

OPTIONAL ACCESSORIES

	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
	601	992-671	+ DRIVER BIT (B) NO.2 50L	1		
	602	992-672	+ DRIVER BIT (B) NO.3 50L	1		
	603	996-177	NON-MAGNETIC HEX. SOCKET 8MM 65L	1		
	604	985-329	NON-MAGNETIC HEX. SOCKET 10MM 65L	1		
	605	996-178	NON-MAGNETIC HEX. SOCKET 12MM 65L	1		
	606	996-179	NON-MAGNETIC HEX. SOCKET 13MM 65L	1		
	607	996-180	NON-MAGNETIC HEX. SOCKET 14MM 65L	1		
	608	996-181	NON-MAGNETIC HEX. SOCKET 16MM 65L	1		
	609	996-182	NON-MAGNETIC HEX. SOCKET 17MM 65L	1		
	610	996-197	HEX. SOCKET (LONG) 21MMX166L	1		
	611	996-195	DRILL CHUCK AND ADAPTER SET	1	INCLUD.612,613	
	612	930-119	CHUCK WRENCH 6.5G	1		
	613	307-543	CHUCK ADAPTER	1		
	614	307-824	HOLSTER	1		
	615	308-090	HOOK (FOR CORDLESS TOOLS)	1		
*	616	316-665	BATTERY EB 12H (W/ENGLISH N.P.)	1	EXCEPT FOR NZL,AUS,USA,CAN	
	617	309-922	GREASE FOR IMPACT DRIVER (500G)	1		

Assembly Diagram for WR 12DH



	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
	1	307-851	TAPPING SCREW (W/SP. WASHER) D4X30(BLACK	4		
	2	317-343	HAMMER CASE	1		
	3	985-209	PIN RETAINER	1		
	4	317-342	ANVIL (K) ASS'Y	1	INCLUD.3,5	
	5	985-208	PLUNGER	1		
	6	959-154	STEEL BALL D5.556 (10 PCS.)	2		
	7	316-168	HAMMER	1		
	8	315-980	STEEL BALL D3.5	25		
	9	315-978	WASHER (J)	1		
	10	316-170	SPRING	1		
	11	316-172	WASHER (S)	1		
	12	316-171	STOPPER	1		
	13	316-169	SPINDLE	1		
	14	316-313	IDLE GEAR	2		
	15	991-449	NEEDLE ROLLER	2		
	16	302-337	RING GEAR	1		
	17	991-455	WASHER (C)	1		
	18	600-1VV	BALL BEARING 6001VVCMPS2L	1		
	19	316-167	INNER COVER	1		
	20	310-319	DAMPER	1		
	21	316-173	MOTOR	1		
	22	999-054	CARBON BRUSH 5X6X11.5 (1 PAIR)	2		
	23	316-180	BRUSH CAP	2		
	24	302-086	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	7		
	25		NAME PLATE	1		
	26	317-340	HOUSING (A).(B) SET	1	INCLUD.31,35	
	27	994-532	MACHINE SCREW (W/SP. WASHER) M3X5	2		
	28	316-783	DC-SPEED CONTROL SWITCH	1		
	29	316-166	PUSHING BUTTON	1		
	30	316-179	FIN ASS'Y	1	INCLUD.34	
	31	316-178	GRIP (F)	1		
	32		HITACHI LABEL	1		
	33	306-952	STRAP	1		
	34	311-131	S-TIGHT SCREW D3.5X6	1		
	35	316-177	GRIP (R)	1		
*	36	310-378	BATTERY EB 12B (W/ENGLISH N.P.)	1		
*	36	310-452	BATTERY EB 12B (W/ENGLISH N.P.)	1	FOR NZL,AUS	
*	36	310-453	BATTERY EB 12B (W/ENGLISH N.P.)	1	FOR USA,CAN	
*	36	316-665	BATTERY EB 12H (W/ENGLISH N.P.)	1		

STANDARD ACCESSORIES

	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
*	501		CHARGER (MODEL UC 14YF)	1	DEPENDING ON ORDER SPEC.	
*	501		CHARGER (MODEL UC 14YF2)	1	DEPENDING ON ORDER SPEC.	
	502	306-306	CASE	1		

OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
601		CORNER ATTACHMENT ASS'Y	1	INCLUD.602-618	
602	955-300	HOUSING	1		
603	955-301	METAL	3		
604	955-302	SPINDLE	1		
605		HITACHI LABEL	1		
606	955-303	BEARING RACE	2		
607	955-304	NEEDLE THRUST BEARING (NTA-1413)	2		
608	955-305	COVER	1		
609	955-306	NEEDLE BEARING (NTN BK1012)	1		
610	948-227	RETAINING RING FOR D47 HOLE	1		
611	955-307	PINION	1		
612	955-308	SLEEVE	1		
613	955-309	WASHER	1		
614	955-310	SOCKET COVER	1		
615	955-311	SOCKET	1		
616	303-247	SEAL LOCK HEX. SOCKET HD. BOLT M5X25	6		
617	873-537	SOCKET PIN	1		
618	873-187	O-RING (J1SW1516)	1		
619	991-481	FORM TIE SOCKET ASS'Y 10MMX95L	1	INCLUD.617,618	
620	992-610	UNIVERSAL JOINT ASS'Y	1	INCLUD.617,618	
621	955-153	UNIVERSAL JOINT PIN	1		
622	991-476	BIT ADAPTER ASS'Y	1	INCLUD.617,618	
623	944-291	HEX. SOCKET ASS'Y 10MMX40L	1	INCLUD.617,618	
624	873-632	HEX. SOCKET ASS'Y 12MMX40L	1	INCLUD.617,618	
625	873-539	HEX. SOCKET ASS'Y 13MMX40L	1	INCLUD.617,618	
626	873-540	HEX. SOCKET ASS'Y 14MMX40L	1	INCLUD.617,618	
627	873-536	HEX. SOCKET ASS'Y 17MMX32L	1	INCLUD.617,618	

* : ALTERNATIVE PARTS

OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
628	873-624	HEX. SOCKET ASS'Y 19MMX34L	1	INCLUD.617,618	
629	873-626	HEX. SOCKET ASS'Y 21MMX36L	1	INCLUD.617,618	
630	873-627	HEX. SOCKET ASS'Y 22MMX40L	1	INCLUD.617,618	
631	986-058	HEX. SOCKET FOR PLASTIC CONE 12MMX70L	1	INCLUD.617,618	
632	955-151	HEX. SOCKET ASS'Y (LONG) 21MMX75L	1	INCLUD.617,618	
633	955-138	HEX. SOCKET ASS'Y (LONG) 12MMX52L	1	INCLUD.617,618	
634	955-139	HEX. SOCKET ASS'Y (LONG) 13MMX52L	1	INCLUD.617,618	
635	955-140	HEX. SOCKET ASS'Y (LONG) 14MMX52L	1	INCLUD.617,618	
636	955-141	HEX. SOCKET ASS'Y (LONG) 17MMX52L	1	INCLUD.617,618	
637	955-142	HEX. SOCKET ASS'Y (LONG) 19MMX52L	1	INCLUD.617,618	
638	955-149	HEX. SOCKET ASS'Y (LONG) 17MMX75L	1	INCLUD.617,618	
639	955-150	HEX. SOCKET ASS'Y (LONG) 19MMX75L	1	INCLUD.617,618	
640	955-143	HEX. SOCKET ASS'Y (LONG) 21MMX52L	1	INCLUD.617,618	
641	955-144	HEX. SOCKET ASS'Y (LONG) 22MMX52L	1	INCLUD.617,618	
642	991-480	HEX. SOCKET ASS'Y (LONG) 21MMX125L	1	INCLUD.617,618	
643	873-633	EXTENSION BAR ASS'Y (SQUARE) 12.7MMX100L	1	INCLUD.617,618	
644	992-613	SOCKET ASS'Y FOR DUCT 13MMX95L	1	INCLUD.617,618,645	
645	992-614	SOCKET FOR DUCT 13MMX52L	1		
646	992-615	SOCKET ASS'Y FOR DUCT 14MMX95L	1	INCLUD.617,618,647	
647	992-616	SOCKET FOR DUCT 14MMX52L	1		
648	993-658	SOCKET ASS'Y FOR DUCT 12MMX95L	1	INCLUD.617,618,649	
649	993-659	SOCKET FOR DUCT 12MMX52L	1		
650	992-616	SOCKET FOR DUCT 14MMX52L	1		
651	307-780	HOOK (FOR CORDLESS TOOLS)	1		
652	307-824	HOLSTER	1		
653	316-665	BATTERY EB 12H (W/ENGLISH N.P.)	1	EXCEPT.NZL,AUS,USA,CAN	
654	309-922	GREASE FOR IMPACT DRIVER (500G)	1		

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