

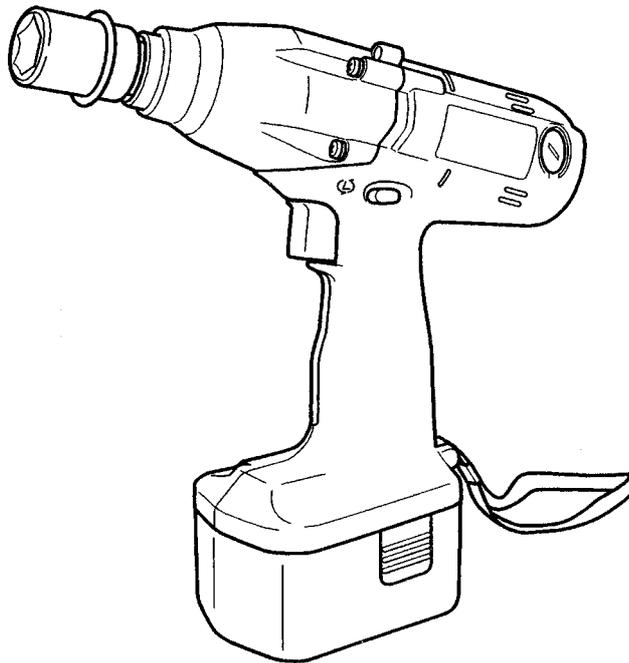
MODEL

WR 14DH

HITACHI
POWER TOOLS

CORDLESS IMPACT WRENCH
WR 14DH

TECHNICAL DATA
AND
SERVICE MANUAL



LIST No. F841

Aug. 2000

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Notice for use

Specifications and parts are subject to change for improvement.
Refer to Hitachi Power Tool Technical News for further information.

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1. PRODUCT NAME

Hitachi Cordless Impact Wrench, Model WR 14DH

2. MARKETING OBJECTIVE

The current cordless impact wrenches Model WR 8DH (9.6 V) and WR 12DH (12 V) are well reputed on the market. Now, the new Model WR 14DH (14.4 V) is being introduced to respond to users' requests for a more powerful impact wrench with higher torque. The Model WR 14DH has the following key features:

1. Higher torque: 147 Nm (25% higher than Model WR 12DH)
2. Externally accessible carbon brushes for longer motor life
3. Compact body and lower center height 27 mm (1-1/16")
4. User-friendly and optimally balanced design thanks to the strap, brake and grip rubber

The Model WR 14DH broadens our lineup of cordless impact wrenches from 9.6 V to 14.4 V. Vigorous sales promotion of the impact wrench series is anticipated in various applications such as construction, electric equipment, sanitary facilities, and motor vehicles.

3. APPLICATIONS

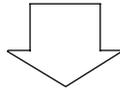
- Construction industry: Assembly of scaffolding, roofing, fencing, etc.; removal of plastic cones from concrete forms, mounting/removal of form ties; drilling into the wood frames of concrete forms, etc.
- Manufacturing industry: Assembly work for automobiles, rolling stock, shipbuilding, agricultural machinery and tools, industrial machines, etc.
- Service industry: General repair work; installation of advertising signs, automobile repair, assembly of garages and carports storage sheds, etc.
- Various other assembly, construction or repair facilities.

4. SELLING POINTS

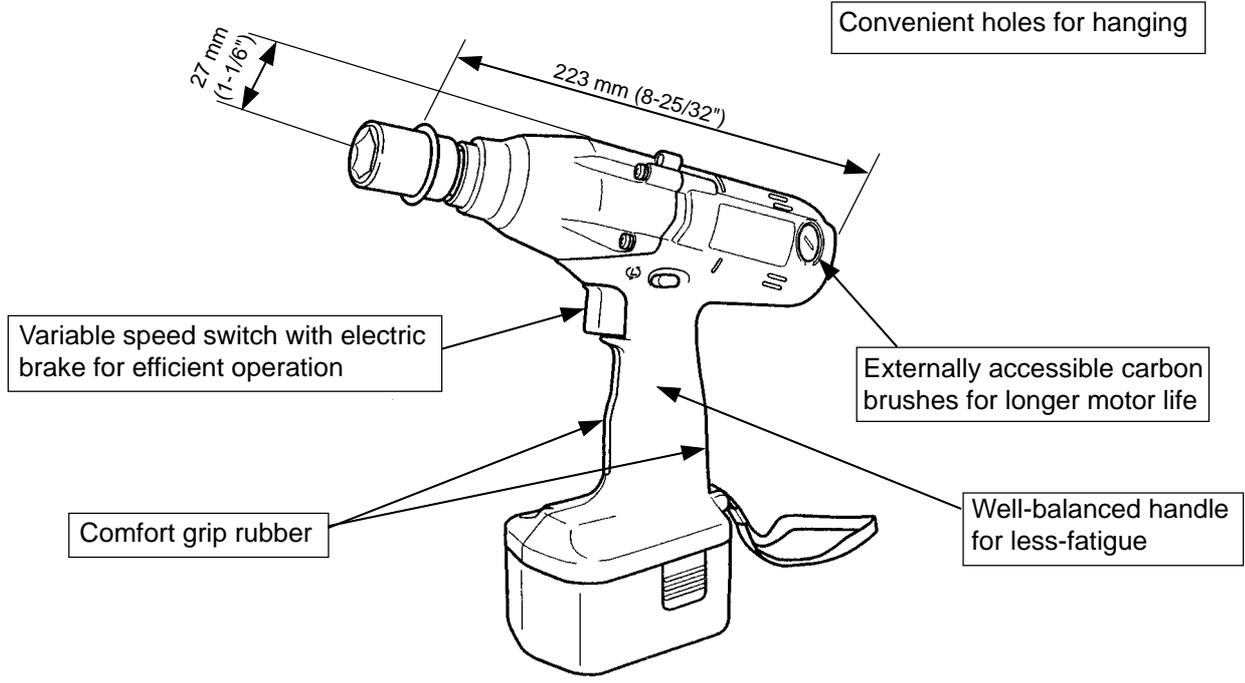
Model WR 14DH Cordless Impact Wrench

Higher tightening torque 147 N•m
(1,500 kgf•cm, 1,302 in-lbs.)

Compact and lightweight
(2.2 kg, 4.85 lb.)

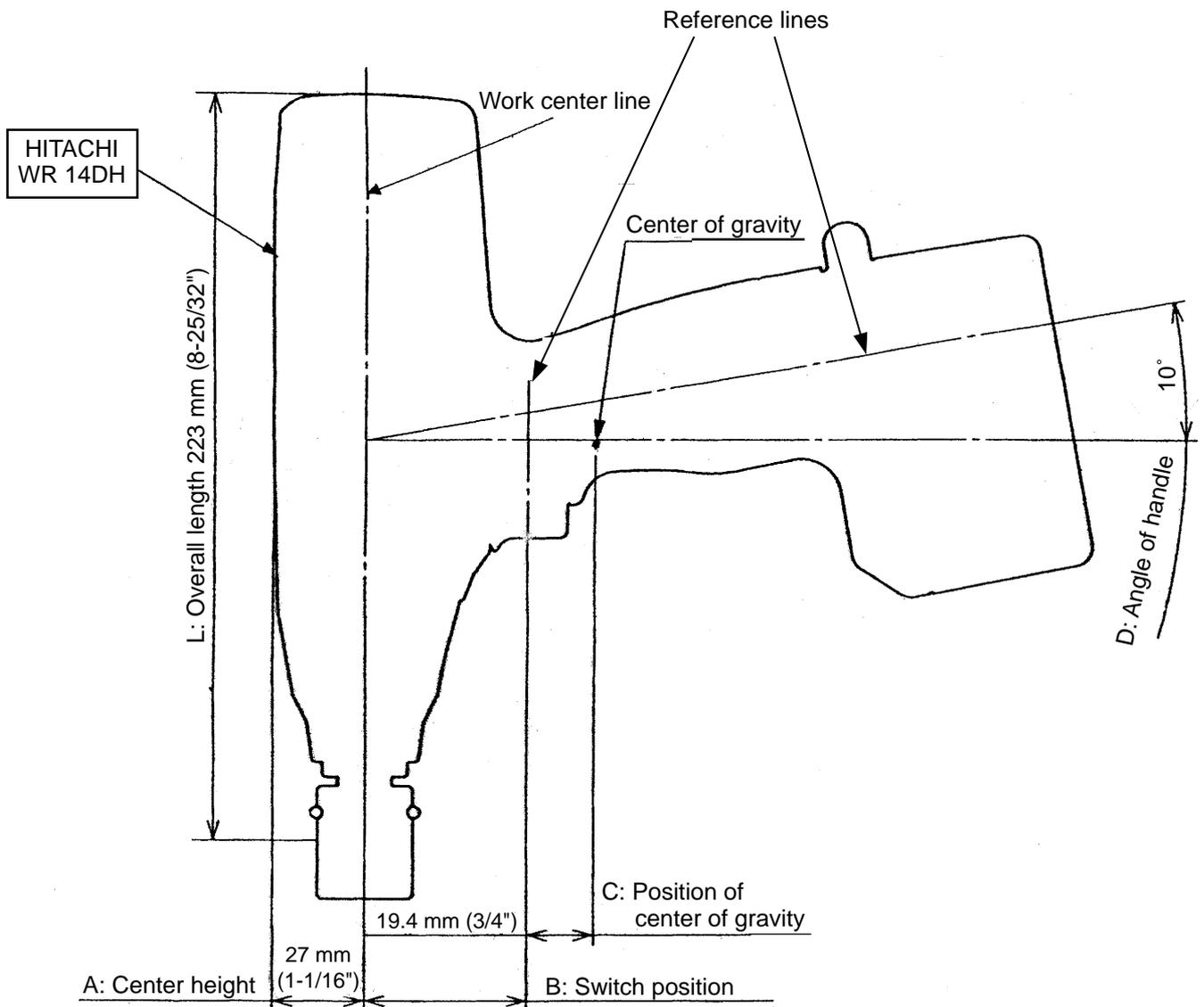


Convenient holes for hanging



4-1. Selling Point Descriptions

(1) Compact and lightweight, and well-balanced handle



Maker • Model			Hitachi			C
			WR 14DH	WH 12D	WR 12DH	
L	Overall length	mm	223 (8-25/32")	230 (9-3/64")	176 (6-15/16")	225 (8-53/64")
A	Center height	mm	27 (1-1/16")	33.5 (1-5/16")	26 (1-1/64")	32 (1-1/4")
B	Switch position	mm	47.2 (1-53/64")	47.5 (1-53/64")	43 (1-11/16")	46 (1-51/64")
C	Position of center of gravity	mm	19.4 (3/4")	19 (23/32")	32.5 (1-1/4")	31 (1-7/32")*
D	Angle of handle	°	10	5	5	10
Weight	Catalog weight	kg	2.2 (4.85 lbs.)	2.3 (5.07 lbs.)	1.7 (3.75 lbs.)	1.2 (2.65 lbs.) (Main body only)
	Actual weight	kg	2.22 (4.89 lbs.)	2.38 (5.25 lbs.)	1.73 (3.81 lbs.)	1.29 (2.84 lbs.) (Main body only)

*: This value indicates the symmetric position of C with respect to the reference line of the Model WR 14DH.

Remarks

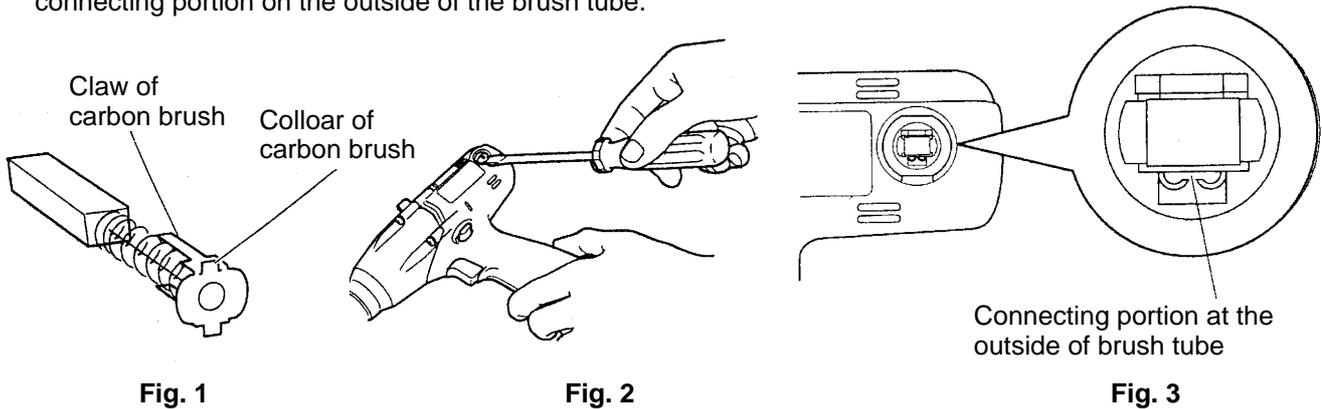
- (1) The Model WR 14DH is easy to operate because the switch position is near to and parallel with the work center line.
- (2) The body is well balanced because the center of gravity is positioned near the reference lines.

(2) Improved motor performance

The Model WR 14DH has high power thanks to the fan-cooled DC magnet motor. They 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 size by about 70% (volume) compared to our previous model.

(3) 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 hooking the claw of the carbon brush on the connecting portion on the outside of the brush tube.

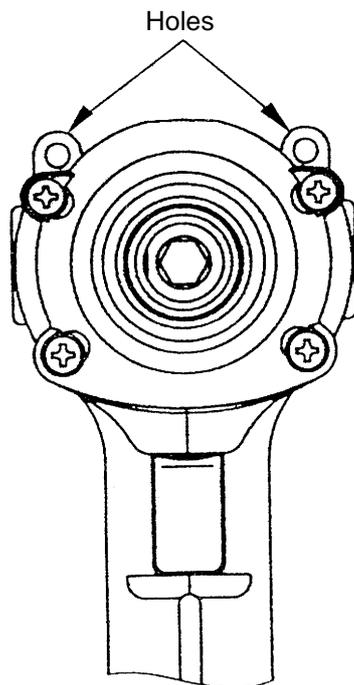


(4) Safe handle shape

Compared with the previous WH 12D, the housing of the Model WR 14DH does not produce gaps caused by vibration because front and rear grip inserts [part name: grip (R) and grip (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 so not to interfere with the base of the operator's thumb.

(5) Convenient holes for suspending

The Model WR 14DH has two holes on the hammer case. These holes are convenient for hanging the Model WR 14DH from a hook.



5. SPECIFICATIONS

5-1. Specifications

Item	Model	Cordless impact wrench WR 14DH
Capacity		Ordinary bolt M8 – M16 (5/16" – 5/8") High-strength bolt M8 – M12 (5/16"– 15/32")
Tightening torque		147 N•m (1,500 kgf•cm, 1,302 in-lbs.) *1
Tip condition		12.7 mm (1/2") square drive
Type of motor		Fan cooled DC magnet motor
Enclosure		Main body: Polyamide resin Housing Aluminum alloy die casting Hammer case Storage battery: Polyamide resin Charger: ABS resin (black)
Type of switch		Trigger switch with forward/reverse changeover pushing button (with brake and variable)
Handle configuration		T-type
No-load rotational speed		0 – 2,300 /min.
Impact rate		0 – 3,200 /min.
Weight	Main body	2.2 kg (4.85 lbs.) (Includes battery) *2
	Battery	0.82 kg (1.81 lbs.)
Overall length x height		223 mm (8-25/32") x 239 mm (9-13/32")
Center height		27 mm (1-1/16")
Battery (Type EB 14B)		Sealed cylindrical nickel-cadmium batteries Nominal voltage: DC 14.4 V Nominal life: Charging/discharging approximately 1,000 cycles (in case of Model UC 14YF2) Nominal capacity: 2.0 Ah
Battery (Type EB 1430H)		Sealed cylindrical nickel-cadmium batteries Nominal voltage: DC 14.4 V Nominal life: Charging/discharging approximately 500 cycles (in case of Model UC 14YF2) Nominal capacity: 3.0 Ah
Charger (UC 14YF2)		Sealed 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 (ΔV 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 (68°F)) Approx. 90 minutes (for H-type storage battery at 20°C (68°F)) Product weight: 1.3 kg Operable ambient temperature range: 0°C – 40°C (32°F – 104°F) The maximum allowable temperature of the EB 14B type battery is 60°C (140°F) and the EB 1430H type battery is 45°C (113°F).

*1: This torque is based on tightening an M16 (5/8") bolt (F10T) for 3 seconds with a hexagonal socket.

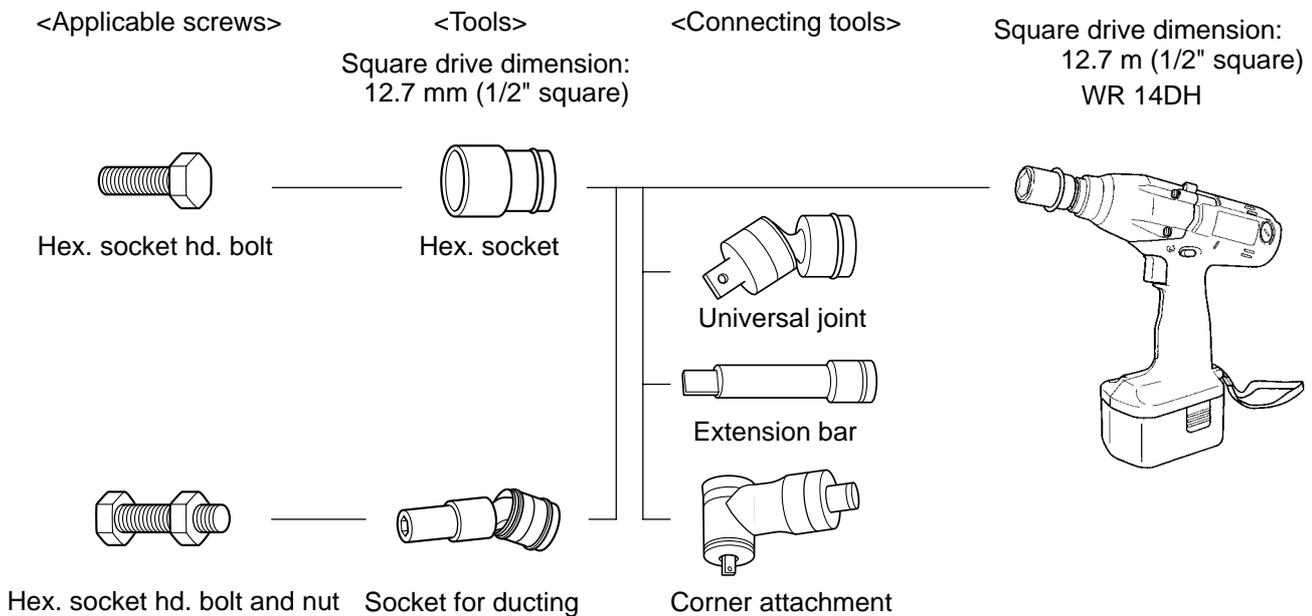
*2: Main body does not include accessory tools (hexagonal bit, etc.).

Pilot to lamp indications (UC 14YF2)

Red pilot lamp remains lit or 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.

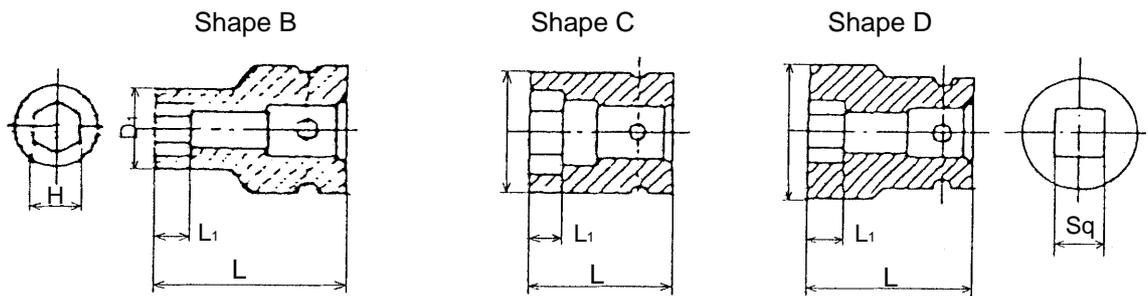
5-2. Optional Accessories

(1) Combination of optional accessories and applications



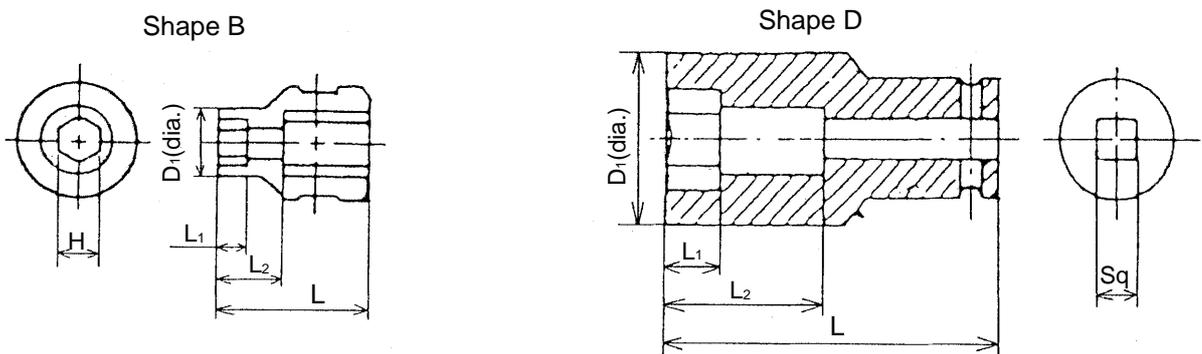
(2) Optional accessories for the Model WR 14DH

- Each dimension and applicable bolt for each hexagon socket



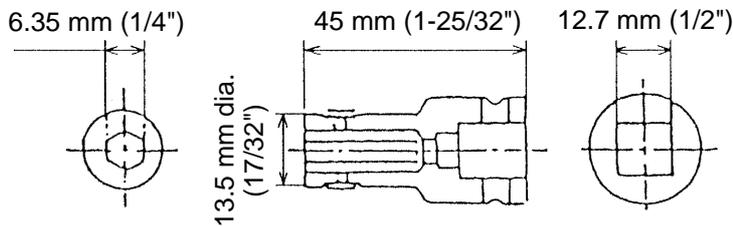
Square drive dimension Sq	Part Name	Code No.	Nominal diameter of applicable bolts				Dihedral width H (mm)	Shape	Socket primary dimensions (mm)			
			ISO (high-strength)	ISO (ordinary)	ISO (small type)	Inch screw			L	L ₁	D ₁	
12.7 mm (1/2")	Hexagon socket	10 mm	944291	—	M 6 (1/4")	—	—	10 (3/8")	B	40 (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")
		24 mm	873629		M 16 (5/8")	M 18 (23/32")		24 (15/16")	D	40 (1-9/16")	15 (9/16")	38 (1-1/2")

- Each dimension and applicable bolt for each long socket



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 (4-47/51")	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")
		24 mm	955146	—	—	M 16 (5/8")	M 18 (23/32")	—	24 (15/16")	D	52 (2-3/64")	25 (63/64")	34 (1-11/32")	34 (1-11/32")

- Bit adapter (Code No. 991476)



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

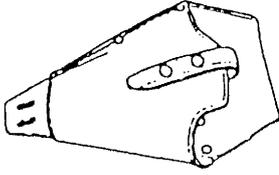
Dihedral width of applicable bolts	Code No.
12 (15/32")	993658
13 (1/2")	992613
14 (9/16")	992615

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

- Holster (Code No. 307824)

Use the holster to hold the unit during its operation.

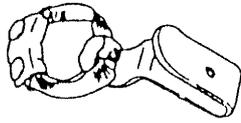
Carefully read the warnings attached to the holster for safe use.



- Hook (Code No. 308090)

Use the holster to hold the unit during its operation.

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



6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

Item		Maker		HITACHI			C
		Model		WR 14DH	WH 12D	WR 12DH	
Catalog specifications	Capacity	Ordinary bolt		M8 – M16 (5/16" – 5/8")	M6 – M14 (1/4" – 9/16")	M6 – M14 (1/4" – 9/16")	M12 – M16 (15/32" – 5/8")
		High-strength bolt		M8 – M12 (5/16" – 15/32")	M6 – M12 (1/4" – 15/32")	M6 – M10 (1/4" – 3/8")	M8 – M12 (5/16" – 15/32")
	Max. tightening torque		N•m	147 *1 (1,500 kgf•cm, 1,302 in-lbs.)	127 *2 (1,300 kgf•cm, 1,128 in-lbs.)	118 *2 (1,200 kgf•cm, 1,042 in-lbs.)	147 *1 (1,500 kgf•cm, 1,302 in-lbs.)
	No-load rotation speed		min ⁻¹	0 – 2,300	0 – 1,500	0 – 2,200	1,900
	Impact rate		min ⁻¹	0 – 3,200	0 – 2,300	0 – 3,000	2,300
	Main body weight *3		kg	2.2 (4.85 lbs.)	2.3 (5.07 lbs.)	1.7 (3.75 lbs.)	1.2 (2.65 lbs.) (Main body only)
Measured figures	Max. tightening torque		N•m	160 *1 (1,630 kgf•cm, 1,415 in-lbs.)	138 *2 (1,410 kgf•cm, 1,224 in-lbs.)	127 *2 (1,300 kgf•cm, 1,129 in-lbs.)	185 *1 (1,890 kgf•cm, 1,641 in-lbs.)
	No-load rotation speed		min ⁻¹	0 – 2,320	0 – 1,560	0 – 2,180	1,990
	Impact rate		min ⁻¹	0 – 3,290	0 – 2,290	0 – 2,900	2,700
	Overall length x height		mm	223 x 239 (8-25/32" x 9-13/32")	230 x 253 (9-3/64" x 9-15/16")	180 x 245 (7-1/8" x 9-21/32")	225 x 179 (8-53/64" x 7-3/64")
	Center height		mm	27 (1-1/6")	33.5 (1-5/16")	26 (1-1/64")	32 (1-1/4")
	Main body weight *3		kg	2.22 (4.89 lbs.)	2.38 (5.25 lbs.)	1.73 (3.81 lbs.)	1.29 (2.84 lbs.) (Main body only)
	No-load sound pressure level		dB(A)	69.3	65.2	69	73.7
Tool tip mounting system			12.7 mm (1/2" square drive) Plunger type	12.7 mm (1/2" square drive) Plunger type	12.7 mm (1/2" square drive) Plunger type	—	
Type of switch			Trigger switch with forward/reverse changeover pushing button with brake and variable	Variable speed switch with forward/reverse changeover lever	Trigger switch with forward/reverse changeover pushing button with brake and variable	Trigger switch with forward/reverse changeover lever	
Type of motor			DC magnet	DC magnet	DC magnet	DC magnet	
Voltage		V	14.4	12	12	14.4	
Current		A	21	14	17	23.5	
Battery	Type		EB 14B or EB 1430H	EB 12B	EB 12B or EB 12H	1402	
	Nominal capacity	Ah	EB 14B: 2.0 EB 1430H: 3.0	2.0	EB 12B: 2.0 EB 12H: 2.2	4.0 (Shoulder type)	
	Nominal voltage	V	14.4	12	12	14.4	
	Ambient temperature	°C	0 – 40	5 – 40	0 – 40	—	
Charger	Model		UC 14YF2	UC 12Y	UC 14YF2	DC 1401	
	Power input capacity	VA	44	51	44	140	
	Recharging voltage	V	7.2 – 14.4	2.4 – 12	7.2 – 14.4	14.4	
Standard accessories			<ul style="list-style-type: none"> Plastic tool case Charger (UC 14YF2) 	<ul style="list-style-type: none"> Plastic tool case Charger (UC 12Y) 	<ul style="list-style-type: none"> Plastic tool case Charger (UC 14YF2) 	<ul style="list-style-type: none"> Plastic tool case Charger (DC 1401) 	

*1: Max. tightening torque is based on tightening an M16 (5/8") bolt (F10T) for 3 seconds with a hexagon socket.

*2: Max. tightening torque is based on tightening an M14 (9/16") bolt (strength grade: 12.9) for 3 seconds with a hexagon socket.

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

6-2. Tightening Torque

6-2-1. Tightening torque characteristic comparisons

The Model WR 14DH provides greater tightening torque than the previous models thanks to the high power 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 Model WR 14DH with previous models are shown in Fig. 4. It should be noted that M16 (5/8") bolt (F10T) 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.

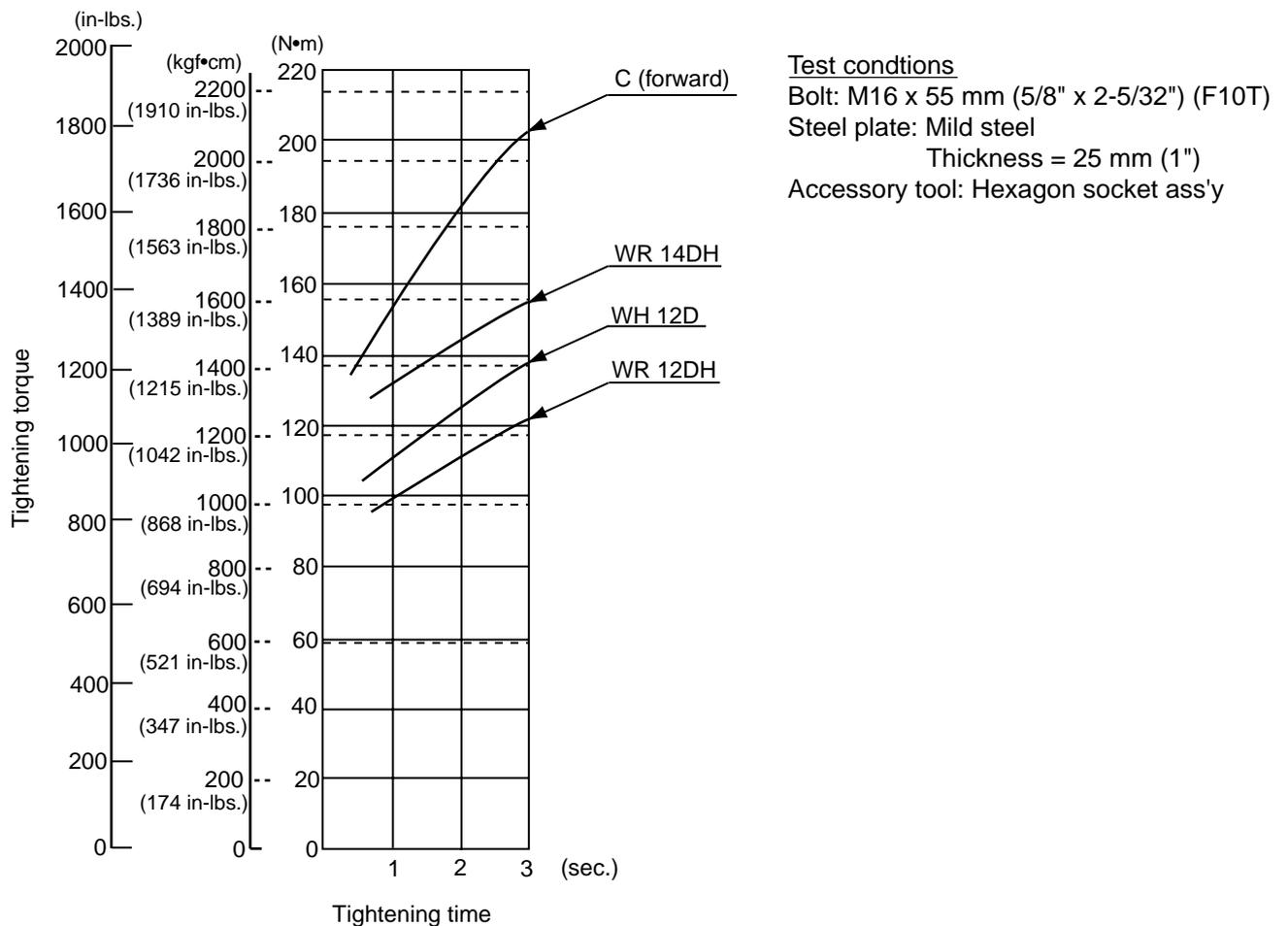


Fig. 4

6-2-2. 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.

$$T = 9.8 k \cdot d \cdot p / 100$$

T: Appropriate tightening torque (N•m)

k: Torque coefficient (0.17)

d: Nominal diameter for the screw (mm)

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

$p = \text{rated axial stress (kgf/mm}^2) \times 0.8 \times \text{effective sectional area of the thread (mm}^2)$

- 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 (3/8")	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

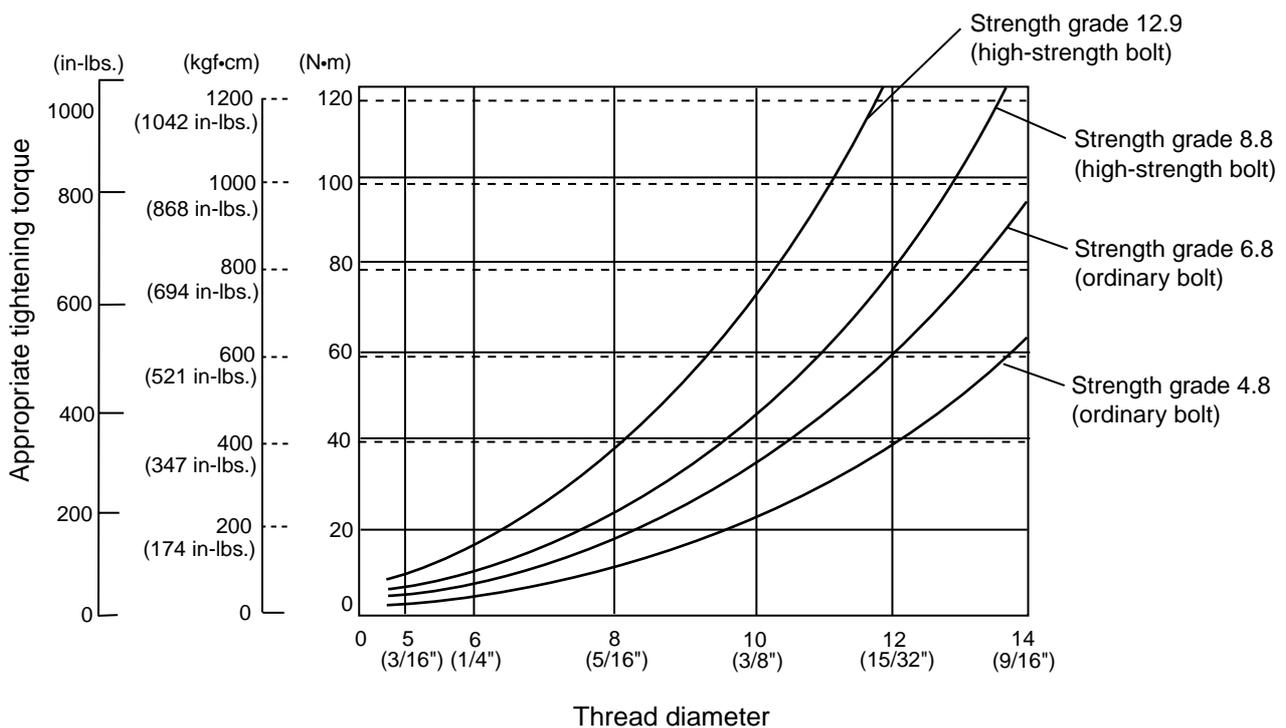


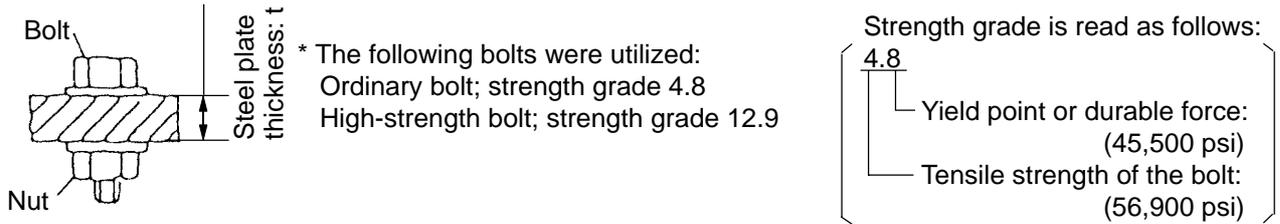
Fig. 5

6-2-3. Bolt tightening torque characteristics

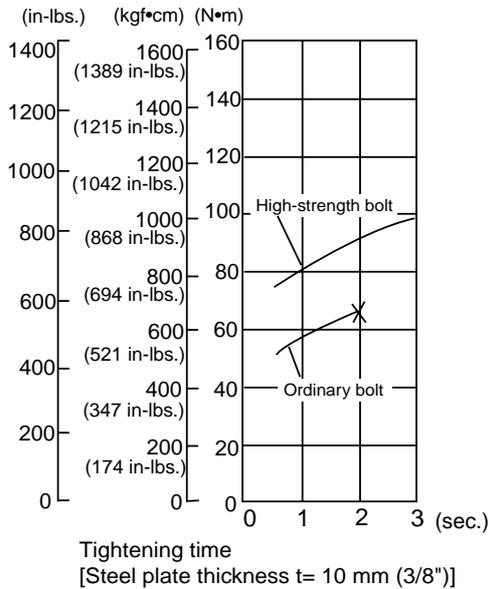
Figure 6 shows relationships between time and tightening torque for individual bolt types and sizes. While the data are useful for handy reference, actual tightening torque will vary depending on tightening conditions and other variables. For details, please refer to Para. 7-3, Tightening Torque Variation.

(Note)

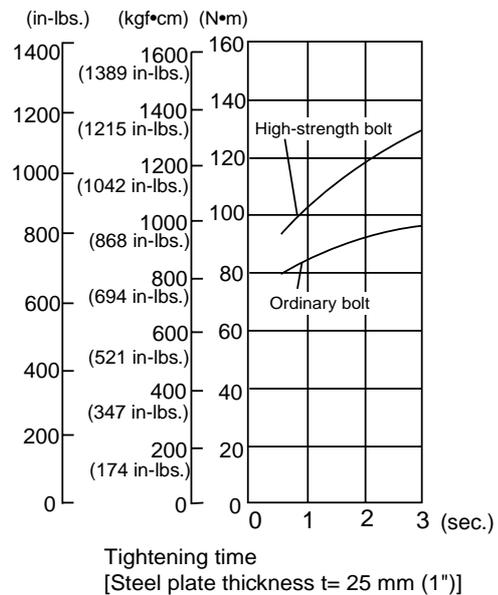
- The term "tightening time" indicates the impact time after the lower surface of the bolt has come in contact with the material into which it is being tightened.
- In the tightening conditions shown in Fig. 6, the screws are being tightened directly into a steel plate; accordingly, the torque goes up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



M10 x 30 (3/8" x 1-5/32")



M12 x 45 (15/32" x 4/3")



M14 x 50 (9/16" x 1-15/16")

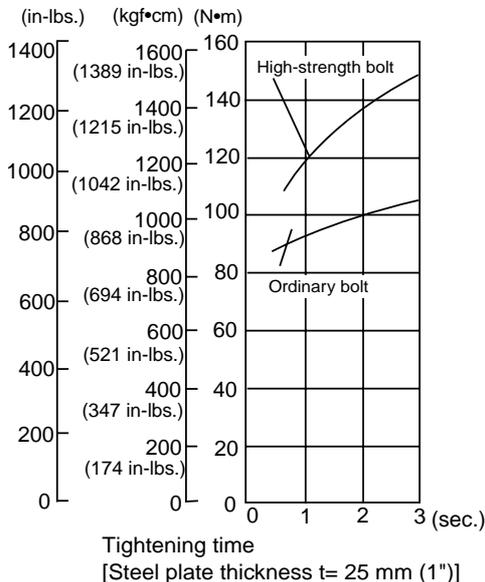


Fig. 6

6-3. Number of Bolts Driven

Per-charge working capacity comparisons

Test data on the number of 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 bolts which can be tightened per charge will vary slightly depending on bolts tightening conditions, bolt sizes, ambient temperatures and the charging capacity of the battery.

Ordinary bolt (Cordless impact wrench)

Tightening condition		Model	HITACHI WR 14DH	HITACHI WH 12D	HITACHI WR 12DH
		Battery	EB 14B	EB 12B	EB 12B
M10 (3/8") ordinary bolt	Number of bolts		1160	780	750
	Time (sec.)		0.3	0.4	0.5
M12 (15/32") ordinary bolt	Number of bolts		700	530	470
	Time (sec.)		0.5	0.6	0.8
M14 (9/16") ordinary bolt	Number of bolts		500	350	310
	Time (sec.)		0.7	0.9	1.2

7. PRECAUTIONS IN SALES PROMOTION

7-1. Safety Instructions

In the interest of promoting the safest and most efficient use of Model WR 14DH 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 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 14B or EB 1430H Storage Battery to the Model 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 electric 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 14B or EB 1430H Storage Battery

Ensure that all customers understand that Type EB 14B or EB 1430H 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 the U.S.A. (excludes French) or Canada

Warning

- To reduce the risk of injury, user must read and understand Instruction Manual.

AVERTISSEMENT

- Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi.

(2) The following cautions are listed on the Name Plate attached to each Type EB 14B or EB 1430H 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.

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

For the U.S.A.

CAUTION

- For safe operation, see Instruction Manual.
- Charge 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.

7-2. Tightening Torque Inspection Prior to Operation

As described and shown in Para. 6-2-3, the output tightening torque of which the Model WR 14DH is 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 wrenches). 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 bolt tightening operations and adjust the tightening time as necessary by measuring the tightening torque with an appropriate torque wrench before commencing continuous operation.

7-3. Tightening Torque Variation

The tightening torque of the cordless impact wrench may vary slightly in accordance with the factors described below. Sales persons 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. 6-2-2 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 M16 x 55 mm (5/8" x 2-5/32") bolts tightened is shown in Fig. 7 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 wrench, salespersons are requested to ensure that the customer is fully aware of and understands this characteristic.

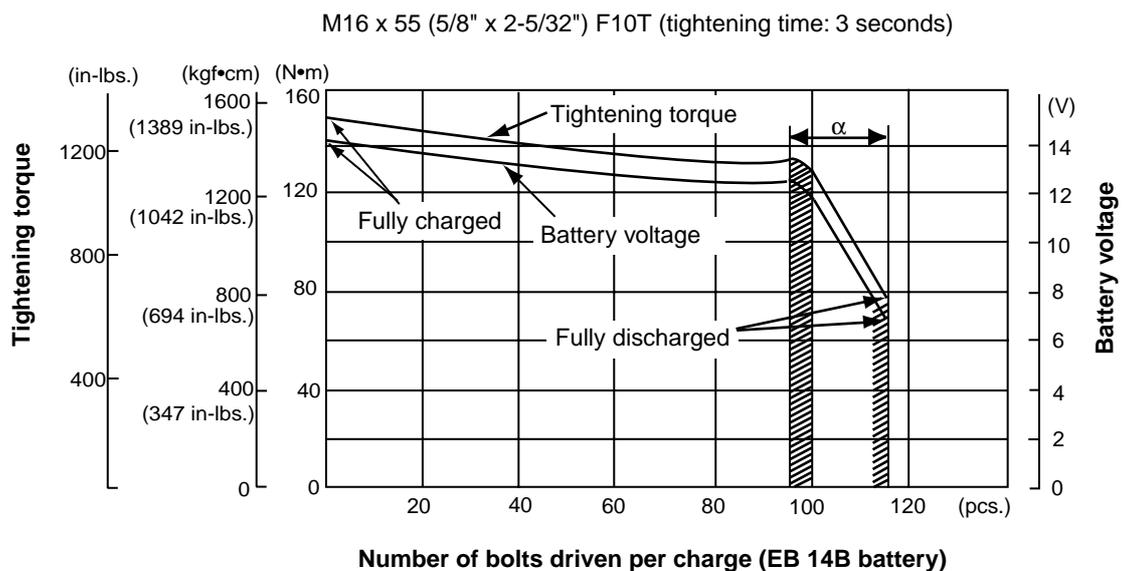


Fig. 7

(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 and/or hexagonal portion of the socket 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.

7-4. Suggestions and Precautions for the Efficient Use of the Charger

(1) Batteries may not be rechargeable immediately after use

If the type EB 14B or EB 1430H 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 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 temperatures.

8. 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. 5-2 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 periodical replenish the grease in the hammering section to ensure proper lubrication of moving and sliding components.

(4) Vent holes in the handle

Do not stop up or cover the holes on either face of the handle. They are essential for ventilation.

9. REPAIR GUIDE

WARNING : Without fail, remove the Model EB 14B or EB 1430H 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.

9-1. Precautions in Disassembly and Reassembly

The **[Bold]** numbers correspond to the item numbers in the Parts List and the exploded assembly diagram.

9-1-1. Disassembly

(1) Removal of the Hammer Case [2] and the Inner Cover [19]

Remove the four Tapping Screws D4 x 35 [1] that connect the Hammer Case [2] with the Housing (A).(B) Set [29]. Remove the Hammer Case [2], the Inner Cover [19] and the Damper [21] together from the Housing (A).(B) Set [29].

2) Removal of Housing (B)

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

(3) Remove the DC-Speed Control Switch [31], Fin Ass'y [33], Motor [22], Grip (F) [34] and Grip (R) [35] together. Remove the Pushing Button [32] and the Strap [36].

(4) Disassembly of the switch ass'y

Remove the two Machine Screws M3 x 5 [30] that secure the flag terminal and then disconnect the internal wires (purple and black) of the Motor [22] from the DC-Speed Control Switch [31]. Remove the S-Tight Screw D3.5 x 6 [37] to remove the Fin Ass'y [33] 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) Disassembly of the hammer assembly

Mount the hammer assembly onto the J-297 base for washer (S). With a hand press, push down the top of the Spindle [13] to compress Spring (A) [10]. In this position, remove the Stopper [12] with a flat-blade screwdriver, then release the hand press. (See Fig. 8.)

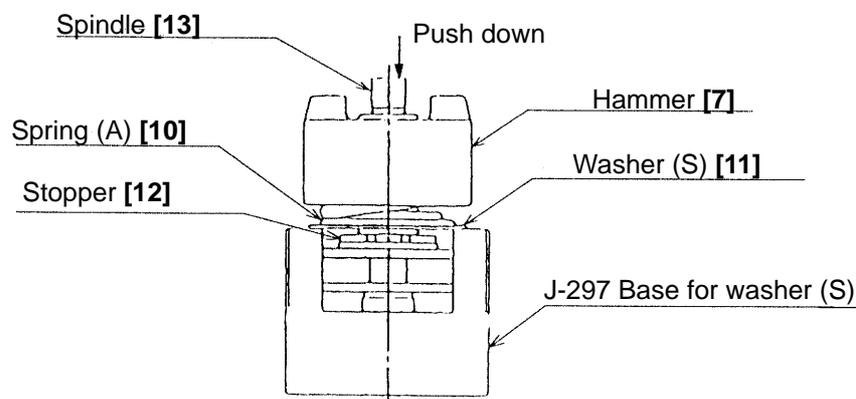


Fig. 8

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

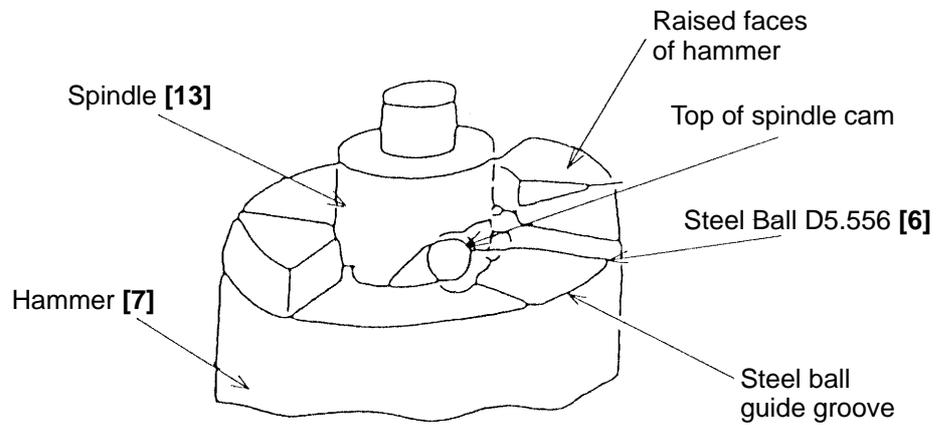


Fig. 9

9-1-2. 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 **[22]** to the DC-Speed Control Switch **[31]**, fasten them with the Machine Screws (W/SP. Washer) M3 x 5 **[30]** being careful of the angle of the terminal (Fig. 10).

(c) When mounting the Motor **[22]** together with the Rear Damper **[25]** to housing (A) with the internal wires of the Motor **[22]** arranged in the grooves of the Rear Damper **[25]**, properly fit the brush cap of the Motor **[22]** and the rib that prevents the motor body from rotating in housing (A) (Fig. 11).

(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 **[31]** 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 **[32]**. Secure the Fin Ass'y **[33]** to the FET of the DC-Speed Control Switch **[31]** with the S-Tight Screw D3.5 x 6 **[37]**.

(Note 1) The lead wires of the new DC-Speed Control Switch **[31]** are stretched as shown in Fig. 10.

When replacing the DC-Speed Control Switch **[31]** with a new one, fold the lead wires as shown in Fig. 11 before mounting the new DC-Speed Control Switch **[31]** to housing (A).

(Note 2) Make sure that the three internal wires from the FET are passed above the DC-Speed Control Switch **[31]**.

(2) Reassembly of the Housing (A).(B) Set **[29]**

Mount the Strap **[36]**, Grip (F) **[34]**, Grip (R) **[35]** and Housing (B) to Housing (A), and secure them with the seven Tapping Screws D4 x 20 **[26]**.

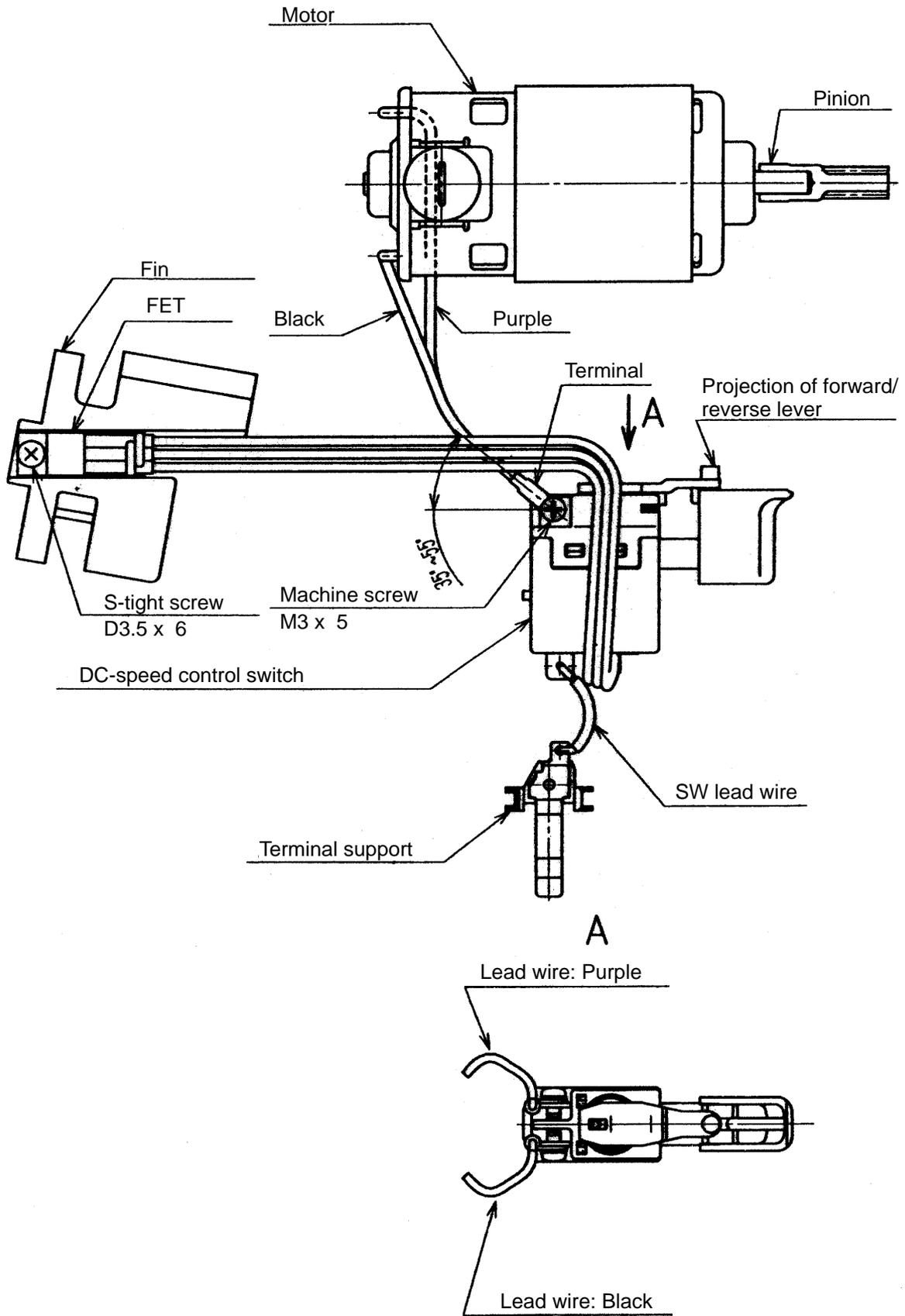
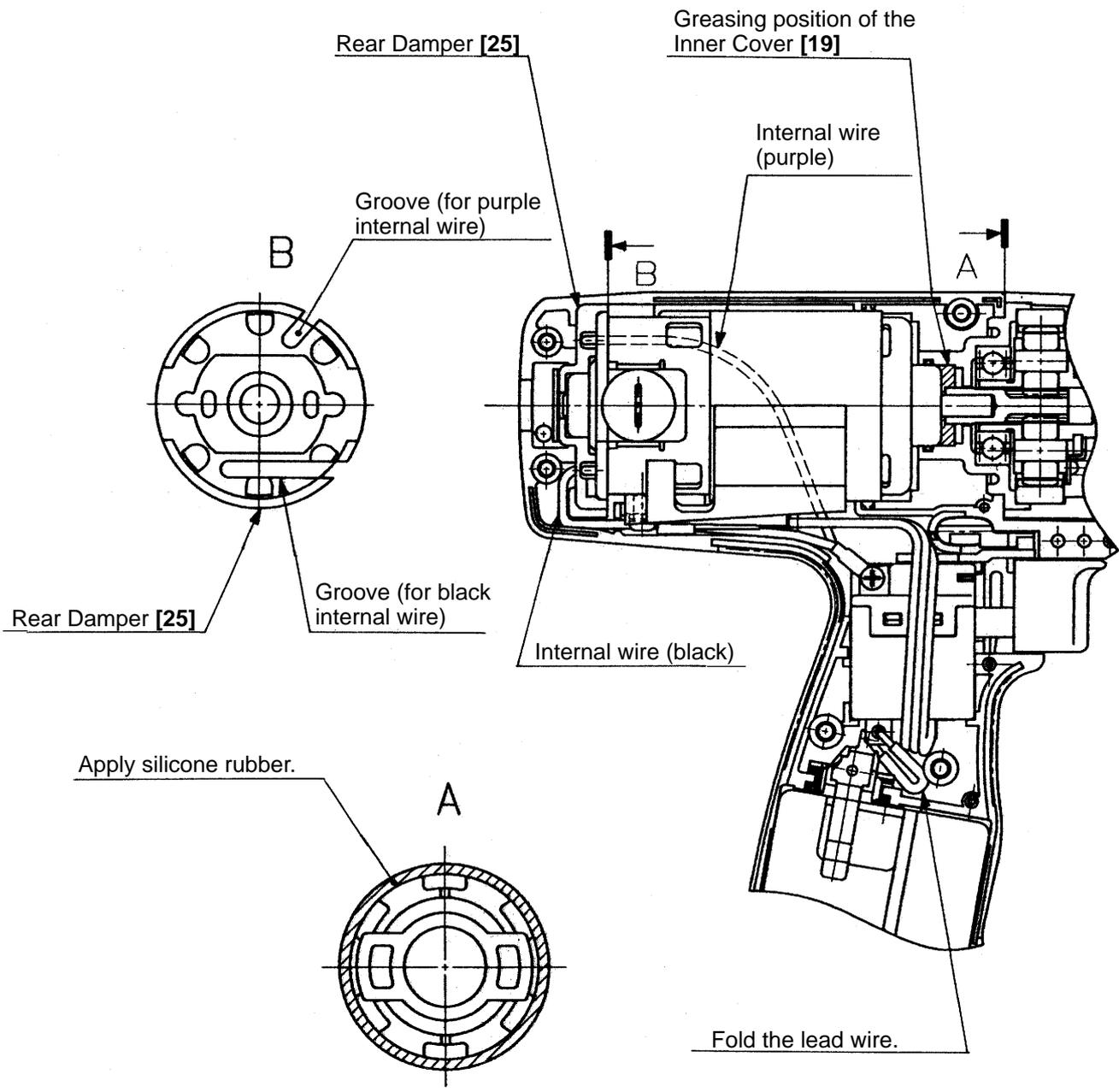


Fig. 10



Application of silicone rubber to the Inner Cover [19]

Fig. 11

(3) Reassembly of the hammer assembly

- (a) Put Washer (S) **[11]** onto the shaft of the Spindle **[13]** and mount the Hammer **[7]** containing the thirty Steel Balls D3.175 **[8]**, Washer (J) **[9]** and Spring (A) **[10]** to the Spindle **[13]**.
- (b) Align the top of the cam groove on the Spindle **[13]** with the steel ball guide groove on the Hammer **[7]** as illustrated in Fig. 9. Press down either of the raised faces of the hammer **[7]** with a hand press to compress Spring (A) **[10]** until the end surface of the Hammer contacts the flange of the Spindle **[13]**.
- (c) Insert the two Steel Balls D5.556 **[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 **[13]** to compress Spring (A) **[10]**. On this condition, mount the Stopper **[12]** onto the spindle shaft and then release the hand press.
- (e) Mount the Ring Gear **[16]**, Ball Bearing **[18]**, Inner Cover **[19]**, O-Ring **[20]** and Damper **[21]** to the above reassembly. Furthermore, mount the other mechanical parts and Anvil (C) Ass'y **[4]**, then the Hammer Case **[2]**.

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

Push the assembly from the Hammer Case **[2]** to the Inner Cover **[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 D 4 x 35 **[1]**.

(5) Check whether the direction of rotation of Anvil (C) Ass'y **[4]** coincides with the directional markings on the push-on side of the Pushing Button **[32]**. When the Pushing Button **[32]** is turned to the (R) side, the direction of rotation of Anvil (C) Ass'y **[4]** should be clockwise, as viewed from behind.

(6) Lubrication

(a) ATTOLUB MS No.2

- Cam groove of the Spindle **[13]**
- Cam groove of the Hammer **[7]**
- Sliding section of the Hammer and the Spindle
- 8 m diameter hole of Anvil (C) Ass'y **[4]**
- Sliding section between Anvil (C) Ass'y **[4]** and the metal
- Two Steel Balls D5.556 **[6]**
- Pinion tooth flanks of the Motor **[22]**
- Tooth flanks of the Ring Gear **[16]**
- Thirty Steel Balls D3.175 **[8]**
- Inner Cover **[19]** mating portion with Motor **[22]**

(b) MOLUB-ALLOY 777-1

- Needle Roller **[15]**

(c) Silicone rubber (ThreeBond 1221)

- Contacting surfaces between the Inner Cover **[19]** and Housing (A).(B) Set (Fig. 11)

(7) Screw tightening torque

- Tapping Screw (W/SP. Washer) D4 x 35 1.96 ± 0.49 N•m (20±5 kgf•cm, 17.4±4.3 in-lbs.)
- Tapping Screw (W/Flange) D4 x 20 1.96 ± 0.49 N•m (20±5 kgf•cm, 17.4±4.3 in-lbs.)
- S-Tight Screw D3.5 x 6 1.47 – 1.96 N•m (15 – 20 kgf•cm, 13 – 17.4 in-lbs.)
- Machine Screw M3 x 5 0.29 – 0.39 N•m (3 – 4 kgf•cm, 2.6 – 3.5 in-lbs.)

9-2. 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 14YF2 battery charger.

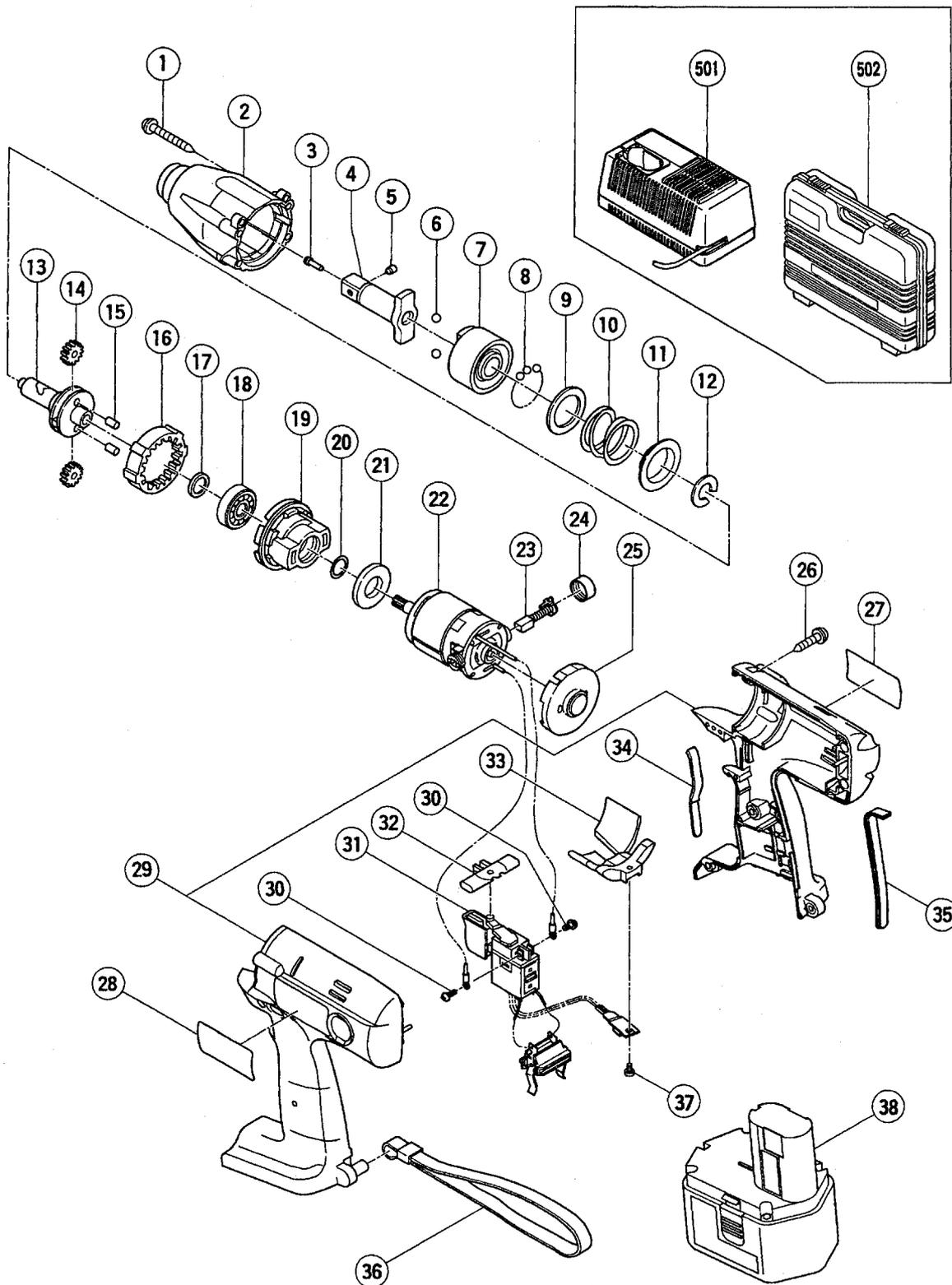
10. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
WR 14DH		Work Flow						
		DC-speed Control Switch Fin Ass'y			Housing (A).(B) Set			
		Inner Cover O-ring (S-20) Damper Motor						
	General Assembly			Hammer Case Anvil (B)	Steel Ball Hammer Spring (A) Spindle Idle Gear Set Needle Roller Ring Gear Ball Bearing (6001VV)			

ELECTRIC TOOL PARTS LIST

■ CORDLESS IMPACT WRENCH
Model WR 14DH

2000•6•20
(E1)



STANDARD ACCESSORIES

WR 14DH

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
501		CHAGER (MODEL UC 14YF2)	1	
502	318-392	CASE	1	

OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
601	318-372	BATTERY EB 1430H (W/ENGLISH N.P.)	1	
602		CORNER ATTACHMENT ASS'Y	1	INCLUD.603-619
603	955-300	HOUSING	1	
604	955-301	METAL	3	
605	955-302	SPINDLE	1	
606		HITACHI LABEL	1	
607	955-303	BEARING RACE	2	
608	955-304	NEEDLE THRUST BEARING (NTA-1413)	2	
609	955-305	COVER	1	
610	955-306	NEEDLE BEARING (NTN BK1012)	1	
611	948-227	RETAINING RING FOR D47 HOLE	1	
612	955-307	PINION	1	
613	955-308	SLEEVE	1	
614	955-309	WASHER	1	
615	955-310	SOCKET COVER	1	
616	955-311	SOCKET	1	
617	303-247	SEAL LOCK HEX. SOCKET HD. BOLT M5X25	6	
618	873-537	SOCKET PIN	1	
619	873-187	O-RING (J1SW1516)	1	
620	991-481	FORM TIE SOCKET ASS'Y 11.3MMX95L	1	INCLUD.621,622
621	873-537	SOCKET PIN	1	
622	873-187	O-RING (J1SW1516)	1	
623	992-610	UNIVERSAL JOINT ASS'Y	1	INCLUD.621,622
624	955-153	UNIVERSAL JOINT PIN	1	
625	991-476	BIT ADAPTER ASS'Y	1	INCLUD.621,622
626	991-480	HEX. SOCKET ASS'Y (LONG) 21MMX125L	1	INCLUD.621,622
627	944-291	HEX. SOCKET ASS'Y 10MMX40L	1	INCLUD.621,622
628	873-632	HEX. SOCKET ASS'Y 12MMX40L	1	INCLUD.621,622
629	873-539	HEX. SOCKET ASS'Y 13MMX40L	1	INCLUD.621,622
630	873-540	HEX. SOCKET ASS'Y 14MMX40L	1	INCLUD.621,622
631	873-536	HEX. SOCKET ASS'Y 17MMX32L	1	INCLUD.621,622
632	873-624	HEX. SOCKET ASS'Y 19MMX34L	1	INCLUD.621,622
633	873-626	HEX. SOCKET ASS'Y 21MMX36L	1	INCLUD.621,622
634	873-627	HEX. SOCKET ASS'Y 22MMX40L	1	INCLUD.621,622
635	986-058	HEX. SOCKET FOR PLASTIC CONE 12MMX70L	1	INCLUD.621,622
636	873-633	EXTENSION BAR ASS'Y (SQUARE) 12.7MMX100L	1	INCLUD.637
637	873-537	SOCKET PIN	1	
638	955-151	HEX. SOCKET ASS'Y (LONG) 21MMX75L	1	INCLUD.621,622
639	955-138	HEX. SOCKET ASS'Y (LONG) 12MMX52L	1	INCLUD.621,622
640	955-139	HEX. SOCKET ASS'Y (LONG) 13MMX52L	1	INCLUD.621,622
641	955-140	HEX. SOCKET ASS'Y (LONG) 14MMX52L	1	INCLUD.621,622

