

MODEL

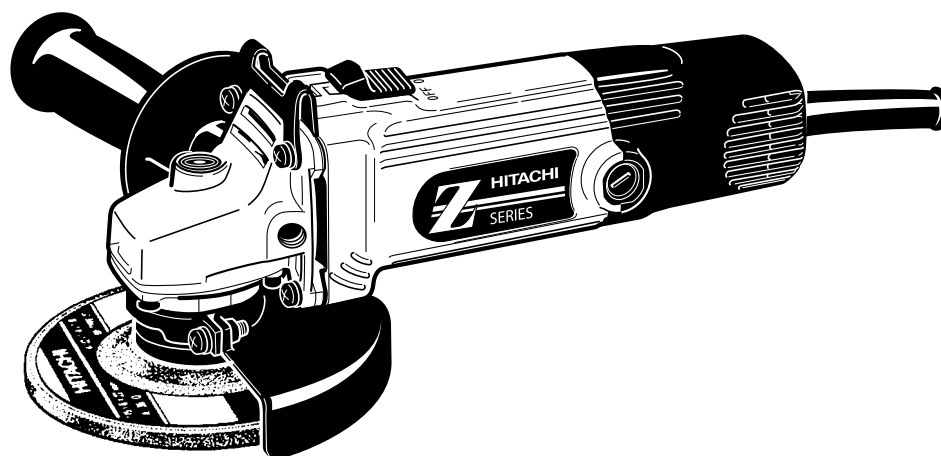
FG 12SB2

HITACHI
POWER TOOLS

DISC GRINDER
FG 12SB2

TECHNICAL DATA
AND
SERVICE MANUAL

F



LIST No. F879

Feb. 2003

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

REMARK:

Throughout this TECHNICAL DATA AND SERVICE MANUAL, a symbol is used in the place of company name and model name of our competitor.

The symbol utilized here is as follows:

Symbol Utilized	Competitor	
	Company Name	Model Name
B	BOSCH	PWS6-115



CONTENTS

	Page
1. PRODUCT NAME	1
2. MARKETING OBJECTIVE	1
3. APPLICATIONS	1
4. SELLING POINTS	1
5. SPECIFICATIONS	2
6. COMPARISONS WITH SIMILAR PRODUCTS	3
6-1. Specification Comparisons	3
7. PRECAUTIONS IN SALES PROMOTION	4
7-1. Handling Instructions	4
7-2. Cautions on Name Plate	4
7-3. Precautions on Usage	5
8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY	6
8-1. Disassembly	6
8-2. Reassembly	7
8-3. Lubrication Points and Types of Lubricant	8
8-4. Tightening Torque	9
8-5. Wiring Diagram	9
8-6. Insulation Tests	9
8-7. No-Load Current Value	9
9. STANDARD REPAIR TIME (UNIT) SCHEDULES	10
Assembly Diagram for FG 12SB2	

1. PRODUCT NAME

Hitachi Disc Grinder, Model FG 12SB2 115 mm (4-1/2")

2. MARKETING OBJECTIVE

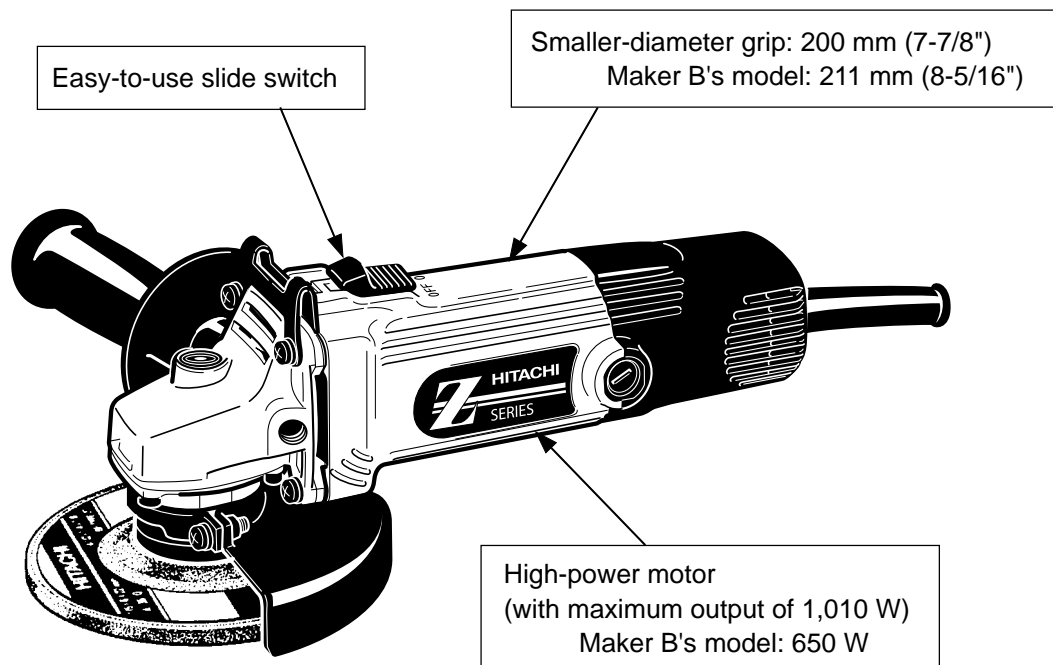
The Model FG 12SB2 is the upgraded version of the previous Model FG 12SB of Z series, developed under the concept for a more powerful, convenient and competitively priced model to expand our market share and increase sales doubly. The key features of the Model FG 12SB2 in comparison with the previous model are as follows:

- 1) Increased input and maximum output
- 2) Increased overload durability
- 3) Compact and lightweight, and easy-to-use slide switch
- 4) Low operating noise
- 5) Prolonged service life of the carbon brushes

3. APPLICATIONS

- Removal of casting fin and finishing of various types of steel, bronze, aluminum and various other metallic materials
- Grinding of welds, or sections cut by means of a cutting torch
- Grinding of synthetic resins, slate, brick, marble, etc.

4. SELLING POINTS



5. SPECIFICATIONS

Model		FG 12SB2																		
Item																				
Depressed center wheel	Dimensions	O.D. 115 mm (4-1/2") x Thickness 6 mm (1/4") x I.D. 22 mm (7/8")																		
	Max. practical peripheral speed	4,800 m/min. (15,756 ft/min., 80 m/s)																		
Power source		AC single phase 50 or 60 Hz																		
Voltage, current and power input		<table><tr><td>Voltage (V)</td><td>Current (A)</td><td>Power input (W)</td></tr><tr><td>110</td><td>6.1</td><td>650</td></tr><tr><td>120</td><td>5.0</td><td>580</td></tr><tr><td>220</td><td>3.0</td><td rowspan="3">650</td></tr><tr><td>230</td><td>2.9</td></tr><tr><td>240</td><td>2.8</td></tr></table>			Voltage (V)	Current (A)	Power input (W)	110	6.1	650	120	5.0	580	220	3.0	650	230	2.9	240	2.8
Voltage (V)	Current (A)	Power input (W)																		
110	6.1	650																		
120	5.0	580																		
220	3.0	650																		
230	2.9																			
240	2.8																			
No-load speed		11,000 /min.																		
Type of motor		AC single phase commutator motor																		
Type of switch		Slide switch																		
Enclosure		Material: Housing (off-black green) } Glassfiber reinforced polyamide resin Tail cover (black) } Gear cover, Packing gland } Aluminium alloy die casting Inner cover }																		
Weight	Net *1	1.4 kg (3.1 lbs.)																		
	Gross	2.4 kg (5.3 lbs.)																		
Packaging		Corrugated cardboard box																		
Standard accessories *2		Side handle 1 Wrench 1																		

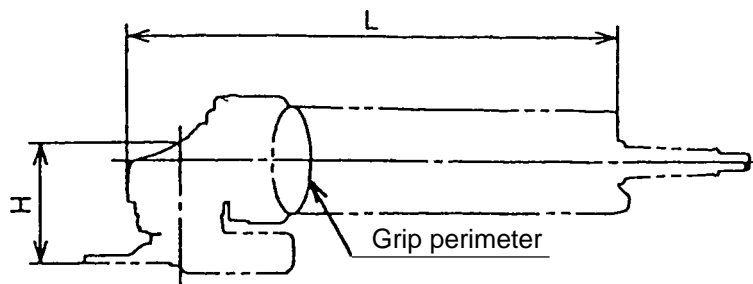
^{*1)} Net weight excludes cord, side handle, depressed center wheel, wheel nut, wheel washer and wheel guard.

^{*2)} Standard accessories may vary depending on market area.

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

Maker		HITACHI		B
Model		FG 12SB2	FG 12SB	
Wheel diameter	mm	115	115	115
Power input * ¹	W	650	600	650
Output * ¹	W	370	370	290
Max. output * ¹	W	1,010	840	650
No-load speed	/min.	11,000	11,000	11,000
No-load sound pressure level	dB/A	86	87	—
Service life of carbon brushes * ²	hr	140	90	—
Grip perimeter	mm	200 (7-7/8")	207 (8-1/8")	211 (8-5/16")
Dimensions	L	mm	254 (10")	261 (10-1/4")
	H	mm	60 (2-3/8")	60 (2-3/8")
Weight * ³	kg	1.4 (3.1 lbs.)	1.6 (3.5 lbs.)	1.4 (3.1 lbs.)
(Actual weight)		(1.5) (3.3 lbs.)	(1.6) (3.5 lbs.)	(1.4) (3.1 lbs.)



*¹ Depends on the market.

*² Service life of carbon brushes in the continuous rated load test.

*³ Weight excludes cord, side handle, depressed center wheel, wheel nut, wheel washer and wheel guard.

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model FG 12SB2 Disc Grinder by all of 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 Name Plate or Caution Plate attached to each tool.

7-1. Handling Instructions

Although every effort is made in each step of design, manufacture and inspection to provide protection against safety hazards, the dangers inherent in the use of any electric power tool cannot be completely eliminated.

Accordingly, general precautions and suggestions for the use of electric power tools, and specific precautions and suggestions for the use of the disc grinder are listed in the Handling Instructions to enhance the safe, efficient use of the tool by the customer. Salespersons must be thoroughly familiar with the contents of the Handling Instructions to be able to offer appropriate guidance to the customer during sales promotion.

7-2. Cautions on Name Plate

Each tool is provided with a Name Plate which lists the following basic safety precautions in the use of the tool.

(1) For European countries



7-3. Precautions on Usage

(1) The wheel guard must be aligned in relation to the side handle mounting position.

As illustrated in Figs. 1 and 2, the customer should be instructed that the wheel guard mounting angle must be aligned and fixed in accordance with the side handle mounting position so that the operator's hand will not contact the depressed center wheel.

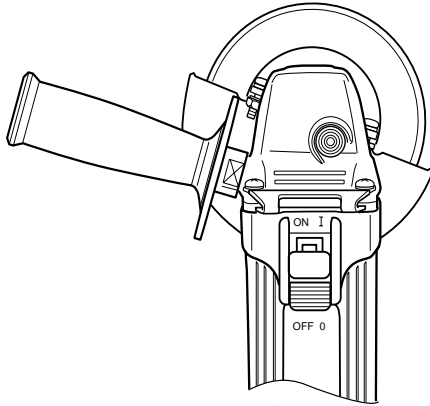


Fig. 1

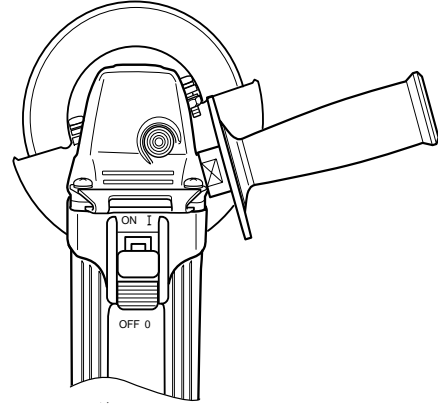


Fig. 2

(2) Never press the pushing button while the depressed center wheel is rotating.

If the pushing button is pressed while the depressed center wheel is rotating, the spindle will stop immediately. In such a case, there is a danger that the wheel nut may be loosened so that the depressed center wheel flies off unexpectedly to cause possible serious injury.

8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

The **[Bold]** numbers in the descriptions below correspond to the numbers in the Parts Lists and exploded assembly diagram for the Model FG 12SB2.

8-1. Disassembly

(1) Replacement of the Armature and Stator

- ① Remove the Brush Caps **[46]** and take off the Carbon Brushes **[47]**.
- ② Loosen the four Tapping Screws D5 x 25 (Black) **[1]** which fix the Gear Cover Ass'y **[4]**, and take off the Inner Cover **[9]** together with the Armature **[10]** from the Housing Ass'y **[38]**.
At this time, make sure that the Rubber Bushing **[16]** is fitted in the housing ball bearing chamber. If the rubber bushing comes off the housing ball bearing chamber or adheres to the Ball Bearing **[15]**, reassemble the disc grinder according to "8-2. Reassembly".
- ③ Loosen the two Tapping Screws (W/Flange) D4 x 45 **[56]** securing the Tail Cover **[55]** and remove the Tail Cover **[55]**.
- ④ Remove the four internal wires from the Stator **[13]** connected with the Brush Holder **[48]**, the Pillar Terminal **[44]** and the Switch **[49]**.
- ⑤ Loosen the two Hex. Hd. Tapping Screws D4 x 65 **[12]** securing the Stator **[13]** and remove the Stator **[13]** from the Housing Ass'y **[38]**. If you have any trouble with removing the Stator **[13]**, heat the Housing Ass'y **[38]** to about 60°C for easier dismantling.

(2) Replacement of the rubber bushing

Insert the J-201 Spring Hook H-75 (Special Repair Tool) between the Rubber Bushing **[16]** assembled in the Housing Ass'y **[38]** and the housing ball bearing chamber and pull out the Rubber Bushing **[16]**.

(3) Replacement of the Dust Seal

- ① Insert the hooks of the J-204 Bearing Puller (Special Repair Tool, Code No. 970982) between the Ball Bearing **[15]** and the Dust Seal **[14]** and fix the hooks with the wing bolts. Be careful not to insert the hook too much.
- ② Put the bearing puller on an appropriate stand. Push down the armature shaft with a hand press and pull out the Ball Bearing **[15]**.
- ③ Pull out the Dust Seal **[14]** from the armature shaft.

(4) Disassembly of the gear

- ① Loosen the four Seal Lock Screws (W/Sp. Washer) M4 x 12 **[26]** that secure the Packing Gland **[25]** to the Gear Cover Ass'y **[4]** and remove the Packing Gland **[25]** from the Gear Cover Ass'y **[4]**.
- ② Remove the Retaining Ring for D11 Shaft **[18]** that secures the Gear **[20]** to the Spindle M14 **[28]**.
- ③ Remove the Wave Washer **[19]** and the Gear **[20]** from the Spindle M14 **[28]**.

8-2. Reassembly

Put the parts together in the reverse order of disassembly, with the precautions given below.

- (1) Generously lubricate the teeth of Gear [20] and Pinion [6] with grease. Rub grease onto the teeth with your fingers so that the grease reaches each tooth bottom. Note that the Gear [20] and the Pinion [6] may wear at a faster rate if under-lubricated.
- (2) Be sure to soak the inner diameter of the Felt Packing [24] with machine oil. Otherwise, its dust-sealing function will fail to work properly, resulting in an earlier damage of the Ball Bearing [23].
- (3) When replacing the Armature [10] and the Ball Bearing [15] on the commutator side, press inward on the Dust Seal [14] while taking care of its direction until the end face of the Dust Seal [14] hits against the a butting surface of the Armature [10] and make sure that Dust Seal [14] cannot turn freely. Keep the end face of the armature shaft approximately 0.2 mm (reference) distance inward of the end face of the Ball Bearing [15].
(See Fig. 3.)

The Dust Seal [14] is an important element for improved dust protection of the Ball Bearing [15]. Be sure to use a new one upon replacement.

Fit the Rubber Bushing [16] into the housing ball bearing chamber before installing the Armature [10].

(See Fig. 4.)

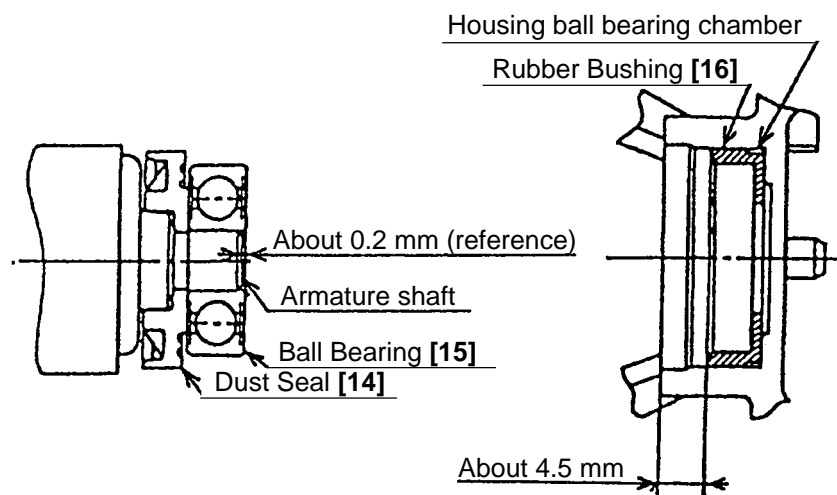


Fig. 3

Fig. 4

- (4) When installing the Stator [13] into the Housing Ass'y [38], insert it while taking care of the placement of the internal wires of the Stator [13] as indicated in Fig. 5.
- Connect the four internal wires of Stator [13] with the parts indicated in Fig. 5.

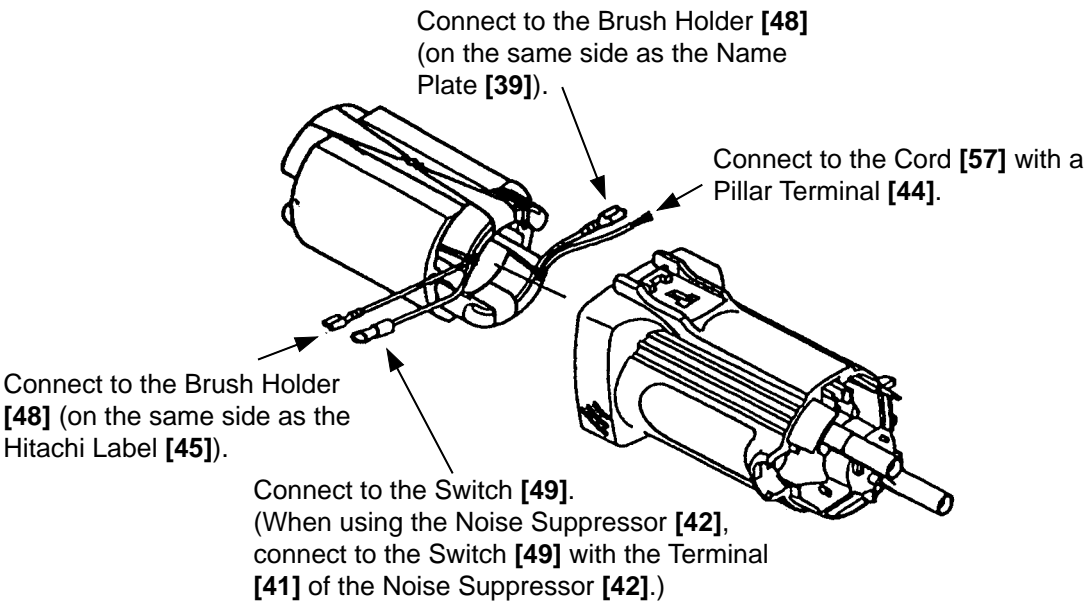


Fig. 5

- (5) When connecting the Earth Terminal [40] to the internal wire (the middle wire among three) of the Noise Suppressor [42], strip the insulation sheath on the internal wire by about 6 mm and press-connect it together with the Earth Terminal [40] with a clamping tool on the market.

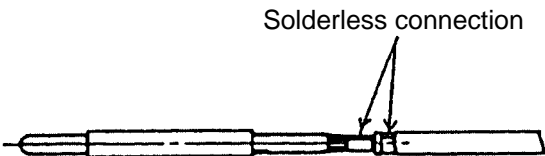


Fig. 6

- (6) When replacing the Gear Cover Ass'y [4], lubricate the metal part with mixed oil.
- Mixed oil: Mixture of Hitachi power tool grease No. 2 (Unilube No. 00) and turbine oil
- Mixture ratio ... 1:1 (weight ratio)
 - Volume ... 0.5 cc

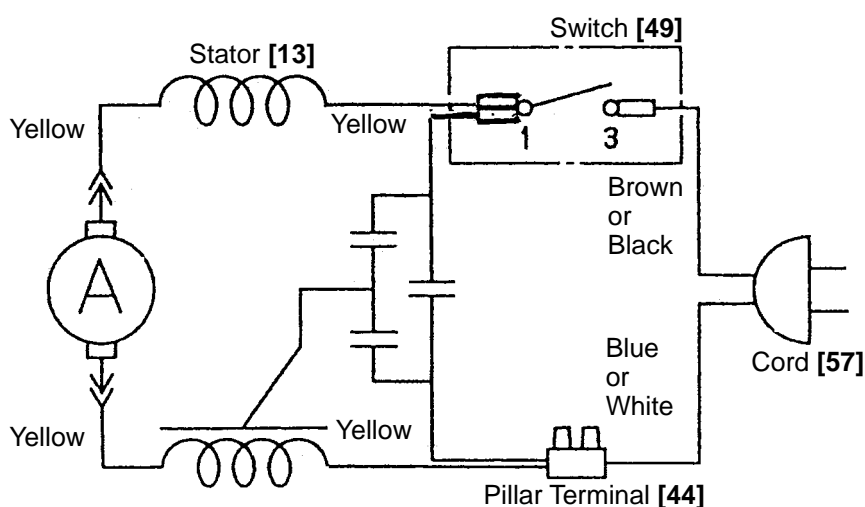
8-3. Lubrication Points and Types of Lubricant

Pinion chamber of Gear Cover Ass'y [4]	Nippeko grease (SEP-3A) 10 g
	Generously rub grease onto the gear and pinion.
Metal	Mixed oil 0.5 cc
	Mixed oil: Mixture of Hitachi power tool grease No. 2 (Unilube No. 00) and turbine oil
	Mixture ratio 1:1 (weight ratio)

8-4. Tightening Torque

Tapping Screw (W/Flange) D4 [53] [56]	2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 1.5 ± 0.4 ft-lbs.)
Slotted Hd. Screw (Seal Lock) M4 x 10 [7]	1.8 ± 0.4 N·m (18 ± 4 kgf·cm, 1.3 ± 0.3 ft-lbs.)
Seal Lock Screw (W/Sp. Washer) M4 [21] [26]	1.8 ± 0.5 N·m (18 ± 4 kgf·cm, 1.3 ± 0.3 ft-lbs.)
Tapping Screw D5 x 25 [1]	2.9 ± 0.5 N·m (30 ± 5 kgf·cm, 2.2 ± 0.4 ft-lbs.)
Machine Screw (W/Sp. Washer) M5 x 16 [29]	3.4 ± 0.7 N·m (35 ± 7 kgf·cm, 2.5 ± 0.5 ft-lbs.)
Special Nut M6 [5]	4.9 ± 1.0 N·m (50 ± 10 kgf·cm, 3.6 ± 0.7 ft-lbs.)
Brush Cap [46]	1.0 ± 0.5 N·m (10 ± 5 kgf·cm, 0.7 ± 0.4 ft-lbs.)

8-5. Wiring Diagram



8-6. Insulation Tests

On completion of disassembly and repair, measure the insulation resistance and conduct the dielectric strength test.

Insulation resistance: 7 MΩ or more with DC 500 V Megohm Tester

Dielectric strength: AC 4000 V/1 minute, with no abnormalities 220 V – 240 V
 AC 2500 V/1 minute, with no abnormalities 110 V – 127 V

8-7. No-Load Current Value

After no-load operation for 30 minutes, the no-load current value should be as follows:

Voltage	110 V	120 V	220 V	230 V	240 V
Current (A) max.	3.5	3.3	1.9	2.0	1.8

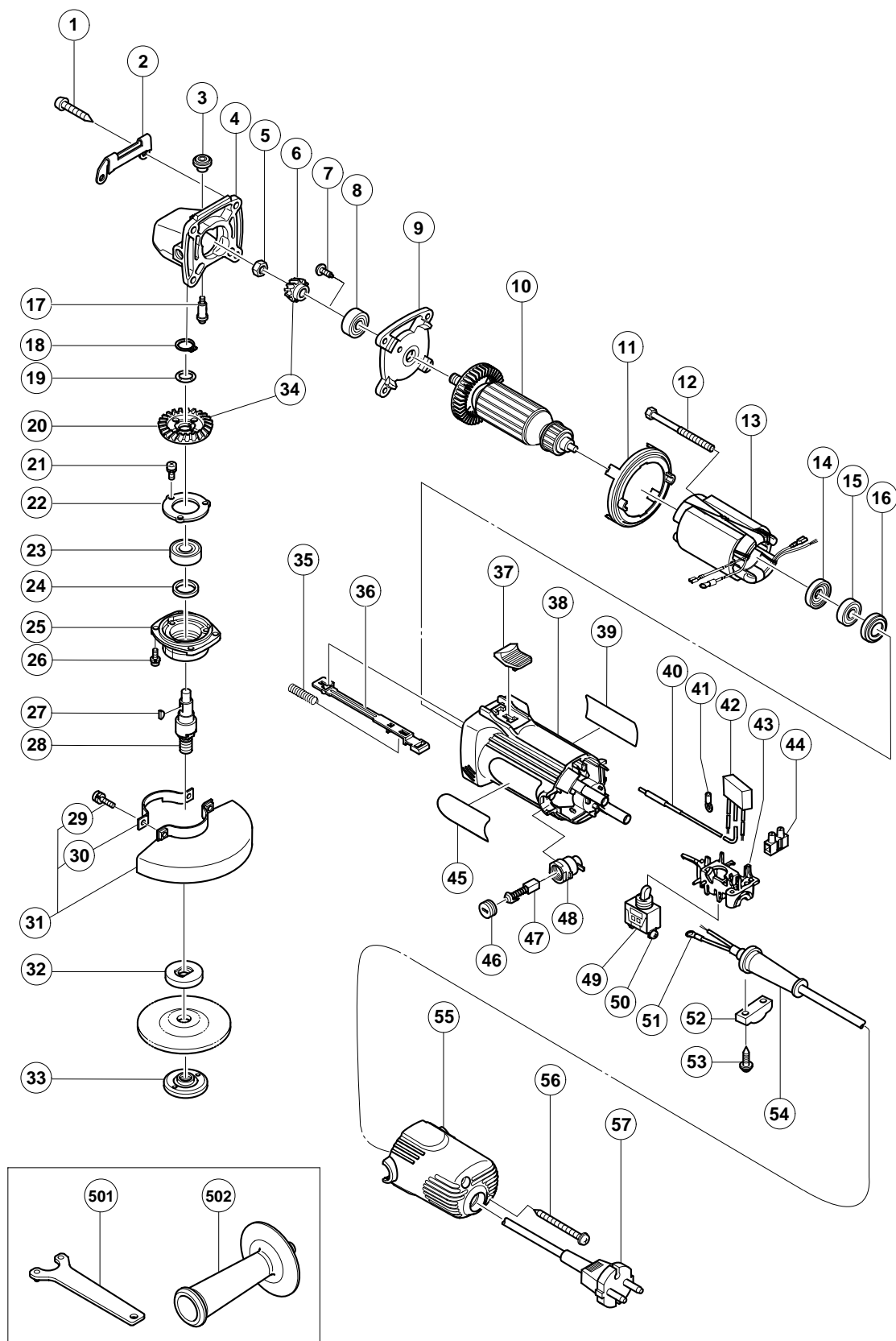
9. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
FG 12SB2		Work Flow						
		Switch Tail Cover Cord Cord Armor		Housing Ass'y Stator Slide Bar Spring Slide Knob				
		General Assembly		Armature Pinion Ball Bearing (608VV) Inner Cover Dust Seal Ball Bearing (626VV) Rubber Bushing				
				Gear Cover Ass'y Pushing Button Lock Pin Gear	Packing Gland Ball Bearing (6001VV) Spindle Gear and Pinion Ass'y			
		Wheel Guard Ass'y						

ELECTRIC TOOL PARTS LIST

DISC GRINDER Model FG 12SB2

2003 • 2 • 5
(E1)



PARTS

FG 12SB2

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	320-523	TAPPING SCREW D5X25 (BLACK)	4		
2	302-149	GUARD PLATE	1		
3	301-944	PUSHING BUTTON	1		
4	314-125	GEAR COVER ASS'Y	1	INCLUD. 3, 17	
5	309-191	SPECIAL NUT M6	1		
6	321-724	PINION	1		
7	314-430	SLOTTED HD. SCREW (SEAL LOCK) M4X10	2		
8	608-VVM	BALL BEARING 608VVC2PS2L	1		
9	301-935	INNER COVER	1		
10	360-605E	ARMATURE 220V-240V	1		
11	306-840	FAN GUIDE	1		
12	963-712	HEX. HD. TAPPING SCREW D4X65	2		
13	340-552E	STATOR 220V-230V	1		
14	321-722	DUST SEAL	1		
15	626-VVM	BALL BEARING 626VVC2PS2L	1		
16	309-929	RUBBER BUSHING	1		
17	301-943	LOCK PIN	1		
18	316-487	RETAINING RING FOR D11 SHAFT	1		
19	316-486	WAVE WASHER	1		
20	321-725	GEAR	1		
21	987-201	SEAL LOCK SCREW (W/SP. WASHER) M4X10	3		
22	938-058	BEARING COVER (B)	1		
23	600-1VV	BALL BEARING 6001VVCMP2L	1		
24	301-946	FELT PACKING	1		
25	301-947	PACKING GLAND	1		
26	987-203	SEAL LOCK SCREW (W/SP. WASHER) M4X12	4		
27	302-047	WOODRUFF KEY	1		
28	321-729	SPINDLE M14	1		
29	308-386	MACHINE SCREW (W/SP. WASHER) M5X16 (BLACK)	2		
30	301-949	SET PLATE	1		
31	315-492	WHEEL GUARD ASS'Y	1	INCLUD. 29, 30	
32	937-817Z	WHEEL WASHER	1		
33	994-324	WHEEL NUT M14	1		
34	321-723	GEAR AND PINION ASS'Y	1	INCLUD. 6, 20	
35	314-429	SPRING	1		
36	314-427	SLIDE BAR	1		
37	314-428	SLIDE KNOB	1		
38	321-744	HOUSING ASS'Y	1	INCLUD. 16	
39		NAME PLATE	1		
* 40	314-854	EARTH TERMINAL	1	FOR NOISE SUPPRESSOR	
* 41	980-063	TERMINAL	1	FOR NOISE SUPPRESSOR	
42	994-273	NOISE SUPPRESSOR	1		
43	314-432	SWITCH HOLDER	1		
44	938-307	PILLAR TERMINAL	1		
45		HITACHI LABEL	1		
46	936-551	BRUSH CAP	2		
47	999-021	CARBON BRUSH (1 PAIR)	2		
48	313-777	BRUSH HOLDER	2		
49	314-603	SWITCH (1P SOLDER TYPE)	1	INCLUD. 50	
50	305-499	MACHINE SCREW (W/WASHER) M3.5X6	2		
* 51	980-063	TERMINAL	1	FOR CORD	

PARTS

FG 12SB2

[illegible]

STANDARD ACCESSORIES

FG 12SB2

[illegible]

OPTIONAL ACCESSORIES

[illegible]

