

## INTRODUCTION

This supplement covers the construction, function, and servicing procedures of the Honda EM10000K1 (SH, SKH, LDH type) generators.

For service information that is not covered in this supplement, please refer to the EM10000K1/ET120000K1 base shop manual (part number 62Z2650).

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at anytime without notice.

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As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to this Honda product, other property, or the environment.

## SAFETY MESSAGES

Your safety and the safety of others are very important. To help you make informed decisions, we have provided safety messages and other safety information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing these products. You must use your own good judgement.

You will find important safety information in a variety of forms, including:

- Safety Labels – on the product.
- Safety Messages – preceded by a safety alert symbol

▲ and one of three signal words, DANGER, WARNING, or CAUTION.

These signal words mean:

**▲ DANGER** You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

**▲ WARNING** You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

**▲ CAUTION** You CAN be HURT if you don't follow instructions.

- Instructions – how to service these products correctly and safely.









OUTLINE OF CHANGES	
SPECIFICATIONS	1
SERVICE INFORMATION	2
MAINTENANCE	3
TROUBLESHOOTING	4
COVER	5
FUEL SYSTEM	6
GOVERNOR SYSTEM	7
GENERATOR/CHARGING SYSTEM	8
IGNITION SYSTEM	9
STARTING SYSTEM	10
OTHER ELECTRICAL	11
MUFFLER	12
ENGINE REMOVAL/INSTALLATION	13
LUBRICATION SYSTEM	14
CYLINDER	15
CRANKCASE	16
TECHNICAL FEATURES	17
WIRING DIAGRAMS	18
INDEX	

The marked sections contain no changes. They are not covered in this supplement.

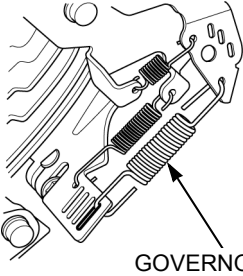
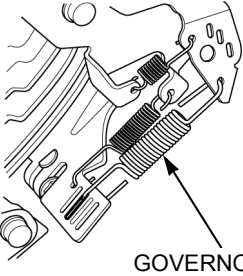
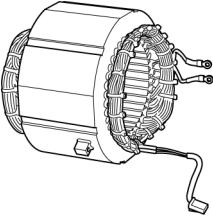
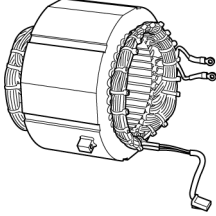
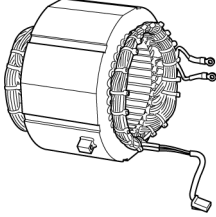
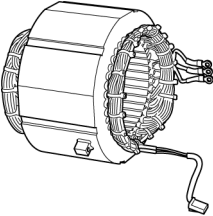
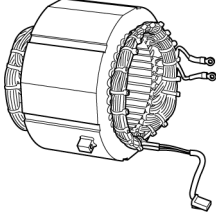
## How to use this manual

# SYMBOLS

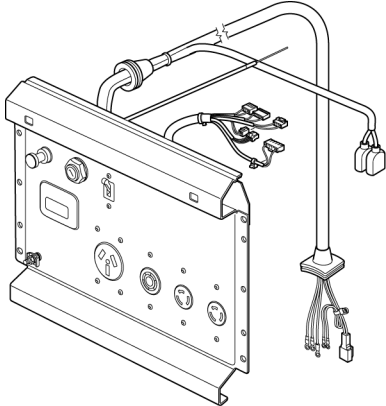
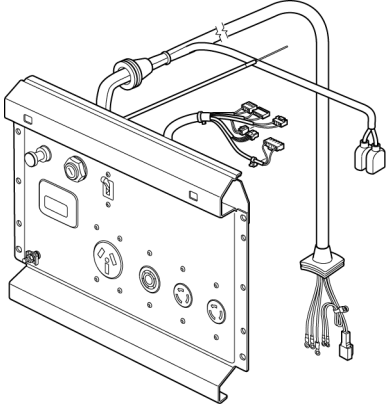
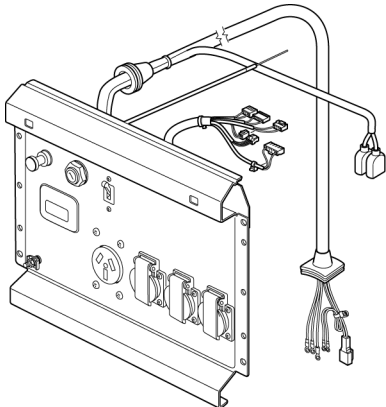
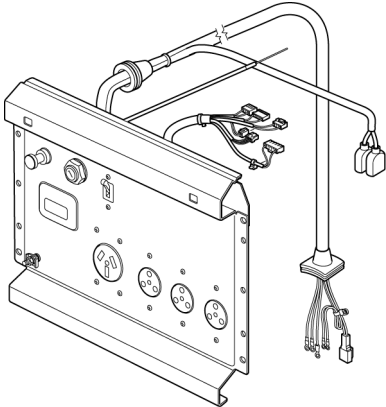
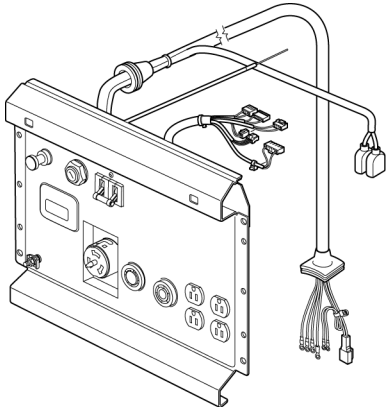
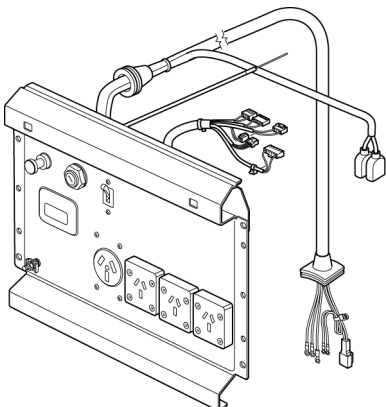
The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it will be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use the recommend engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Use marine grease (water resistant urea based grease).
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
	Use automatic transmission fluid.
(O x O) (O)	Indicates the diameter, length, and quantity of metric bolts used.
page 1-1	Indicates the reference page.

# OUTLINE OF CHANGES

Item	SH, SKH, LDH type	RRH, MH, KH, RGH, UH type
Governor spring installation position	 <p style="text-align: center;">GOVERNOR SPRING</p>	 <p style="text-align: center;">GOVERNOR SPRING</p>
Stator	<p>SH, SKH type:</p> <ul style="list-style-type: none"> <li>• Main winding resistance: 0.1 - 0.3 Ω</li> <li>• Exciter winding resistance: 1.6 - 2.0 Ω</li> </ul> 	<p>RRH, MH type:</p> <ul style="list-style-type: none"> <li>• Main winding resistance: 0.211 - 0.317 Ω</li> <li>• Exciter winding resistance: 1.503 - 2.255 Ω</li> </ul> 
	<p>LDH type:</p> <ul style="list-style-type: none"> <li>• Main winding resistance: <ul style="list-style-type: none"> <li>Red terminal - White terminal: 0.05 - 0.2 Ω</li> <li>Blue terminal - White terminal: 0.05 - 0.2 Ω</li> </ul> </li> <li>• Exciter winding resistance: 1.6 - 2.0 Ω</li> </ul>	<p>KH, RGH type:</p> <ul style="list-style-type: none"> <li>• Main winding resistance: 0.224 - 0.336 Ω</li> <li>• Exciter winding resistance: 1.503 - 2.255 Ω</li> </ul> 
		<p>UH type:</p> <ul style="list-style-type: none"> <li>• Main winding resistance: 0.266 - 0.399 Ω</li> <li>• Exciter winding resistance: 1.604 - 2.410 Ω</li> </ul> 

# OUTLINE OF CHANGES

Item	SH, SKH, LDH type	RRH, MH, KH, RGH, UH type
Control panel	<p>SH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 45 A</li> <li>• Receptacle: 60 A - 250 V, 30 A - 250 V, 20 A - 250 V</li> </ul> 	<p>RRH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 40 A</li> <li>• Receptacle: 60 A - 250 V, 30 A - 250 V, 20 A - 250 V</li> </ul> <p>KH, RGH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 38 A</li> <li>• Receptacle: 60 A - 250 V, 30 A - 250 V, 20 A - 250 V</li> </ul> 
	<p>SKH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 45 A</li> <li>• Receptacle: 60 A - 250 V, 16 A - 250V</li> </ul> 	<p>MH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 40 A</li> <li>• Receptacle: 60 A - 250 V, 16 A - 250V</li> </ul> 
	<p>LDH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 41 A</li> <li>• Receptacle: 50 A - 125/250 V, 30 A - 125/250 V, 30 A - 125 V, 20 A - 125 V</li> </ul> 	<p>UH type:</p> <ul style="list-style-type: none"> <li>• Circuit breaker: 36 A</li> <li>• Receptacle: 60 A - 250 V, 15 A - 250V</li> </ul> 

# 1. SPECIFICATIONS

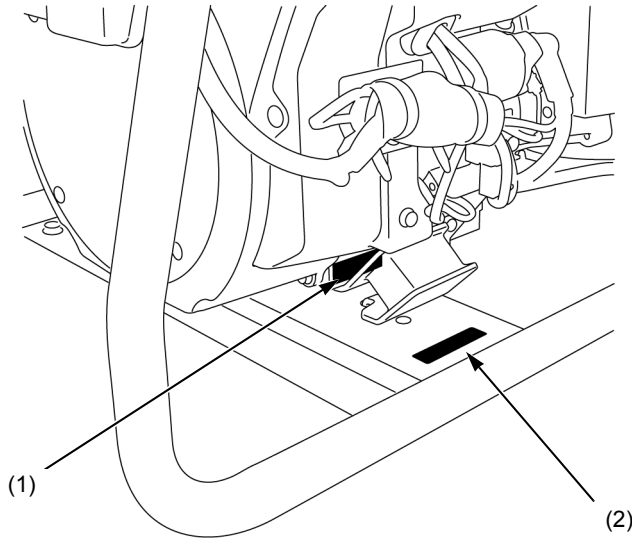
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SERIAL NUMBER LOCATION .....	1-2	PERFORMANCE CURVES .....	1-4
SPECIFICATIONS .....	1-2		

## SPECIFICATIONS

### SERIAL NUMBER LOCATION

The engine serial number (1) is stamped on the crankcase, and the frame serial number (2) is stamped on the engine bed. Refer to it when ordering parts or making technical inquiries.



## SPECIFICATIONS

### DIMENSIONS AND WEIGHTS

Model	EM10000K1		
Type	SH	SKH	LDH
Description code	EBTC		
Overall length	973 mm (38.3 in)		
Overall width	552 mm (21.7 in)		
Overall height	695 mm (27.4 in)		
Dry weight (Include battery)	162.3 kg (357.8 lbs)		
Operating weight (Include battery)	186.5 kg (411.2 lbs)		

### ENGINE

Model	GX630H
Description code	GCAJH
Type	4 stroke, overhead valve, 90° V-twin cylinder
Displacement	688.0 cm <sup>3</sup> (41.97 cu-in)
Bore x stroke	78.0 x 72.0 mm (3.07 x 2.83 in)
Compression ratio	9.3 : 1
Ignition system	C.D.I. (Capacitor Discharge Ignition) type magneto
Ignition timing	B.T.D.C. 18° / 3,600 min <sup>-1</sup> (rpm)
Spark plug	ZFR5F (NGK)
Lubrication system	Forced feed
Oil capacity	Without oil filter replacement: 1.5 ℓ (1.6 US qt, 1.3 Imp qt) With oil filter replacement: 1.7 ℓ (1.8 US qt, 1.5 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or later
Cooling system	Forced air
Starting system	Starter motor
Stopping system	Ignition primary circuit open
Carburetor	2 barrel horizontal type, butterfly valve
Air cleaner	Dual type
Governor	Mechanical centrifugal
Breather system	Reed valve type, PCV (Positive Crankcase Ventilation) type
Fuel used	Unleaded gasoline with a pump octane rating 86 or higher

**GENERATOR**

Model		EM10000K1		
Type		SH	SKH	LDH
Description code		EBTC		
Generator type		Double electrode field rotation type		
Excitation		Self-excitation and power coil excitation		
Voltage regulation system		Digital AVR (Automatic Voltage Regulator)		
Phase		Single phase		
Rotating direction		Counterclockwise (Viewed from the generator)		
Rated output	AC	9.0 kVA		
	DC	-		
Rated frequency		60 Hz		
AC	Rated voltage	220 V	120 / 240 V	
	Rated current	40.9 A	37.5 x 2 / 37.5 A	
DC	Rated voltage	-		
	Rated current	-		
Power factor		1.0 cos $\theta$		

**CHARACTERISTICS**

Model		EM10000K1		
Type		SH	SKH	LDH
Voltage variation rate	Momentary	15% max.		
	Average	7% max.		
	Average time	5 sec. max.		
Voltage stability		$\pm 1\%$ max.		
Frequency variation rate	Momentary	15% max.		
	Average	7% max.		
	Average time	5 sec. max.		
Frequency stability		$\pm 1$ Hz max.		
Insulation resistance		10 M $\Omega$ min.		
AC circuit protector		45 A	41 A	
DC circuit protector		-		
Insulation type		Type F		
Fuel tank capacity		31.0 ℓ (8.19 US gal, 6.82 Imp gal)		
Fuel consumption at rated load		5.8 ℓ (1.53 US gal, 1.28 Imp gal) /Hr.		
Max. operating hours at rated load		5.3 Hr.		
Sound power level (L <sub>WA</sub> ) at rated load		L <sub>WA</sub> 103.4 dB(A)		

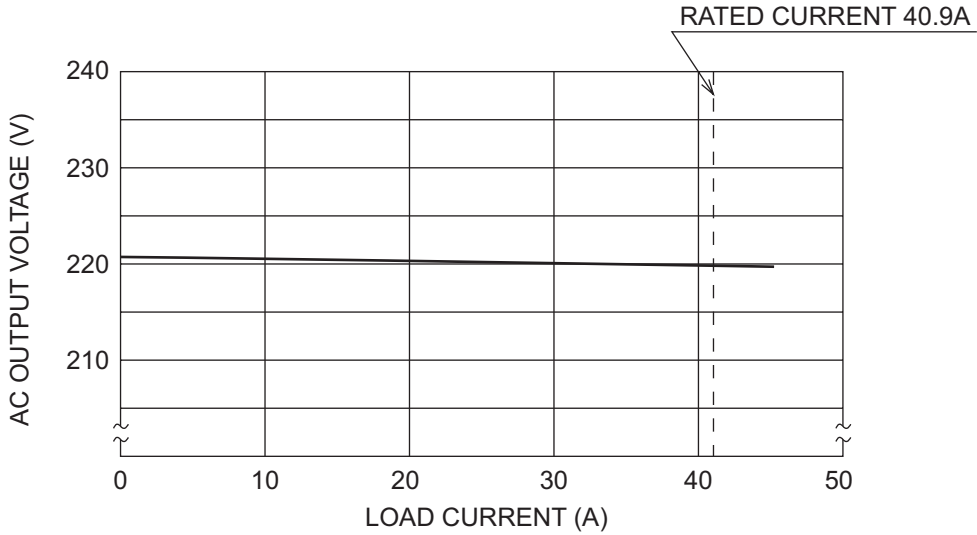
## SPECIFICATIONS

### PERFORMANCE CURVES

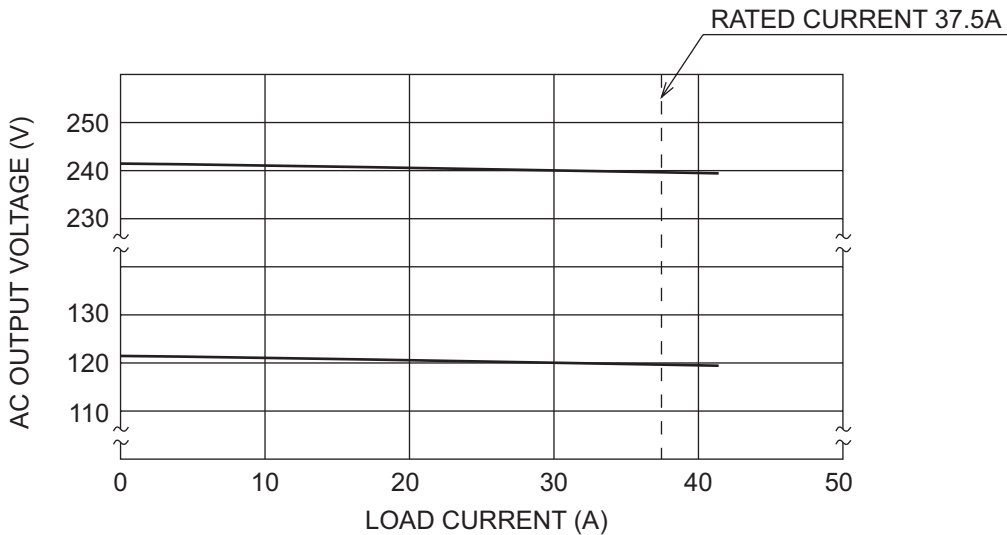
- The curve shows performance of the generator under average conditions.
- Performance may vary to some degree depending on ambient temperature and humidity.
- The output voltage will be higher than usual when the generator is still cold, immediately after the engine starts.

### AC EXTERNAL CHARACTERISTIC CURVES

SH, SKH type



LDH type





# 2. SERVICE INFORMATION

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MAINTENANCE STANDARDS .....2-2      HARNESS ROUTING..... 2-4

HOW TO READ  
CONNECTOR DRAWINGS .....2-3

## SERVICE INFORMATION

# MAINTENANCE STANDARDS

## ENGINE

ALL type

Unit: mm (in)

Part	Item	Standard	Service limit
Engine	Engine speed (at no load)	3,750 ± 150 min <sup>-1</sup> (rpm)	–
Carburetor	Pilot screw opening	No.1 cylinder	2 - 1/2 turns out
		No.2 cylinder	2 - 7/8 turns out

## GENERATOR

ALL type

Unit: mm (in)

Part	Item	Standard	Service limit
Brush holder	Brush length	15.5 (0.61)	9.5 (0.37)

SH, SKH type

Part	Item	Connector/terminal	Standard
Stator	Main winding voltage	(T2) (Red) - (T4) (Blue)	220 ± 11 VAC
	Main winding voltage (when the battery connected to the field winding)	(T1) (Red) - (T3) (Blue)	103 ± 15 VAC
	Main winding resistance	(T1) (Red) - (T3) (Blue)	0.1 - 0.3 Ω
	Exciter winding voltage (when the battery connected to the field winding)	(1) No.1 (Light green/White) - No.3 (Light green/White)	43 ± 8 VAC
	Exciter winding resistance	(1) No.1 (Light green/White) - No.3 (Light green/White)	1.6 - 2.0 Ω
Rotor	Field winding voltage	(T5) (Red/White) - (T6) (Black/White)	38 ± 6 VDC
	Field winding resistance	Between the slip rings	49 - 59 Ω
D-AVR	Resistance	(4) No.1 - No.5	1.0 kΩ minimum

LDH type

Part	Item	Connector/terminal	Standard
Stator	Main winding voltage	(T34) (Red) - (T38) (Blue)	240 ± 12 VAC
		(T34) (Red) - (T36) (White)	120 ± 6 VAC
		(T38) (Blue) - (T36) (White)	
	Main winding voltage (when the battery connected to the field winding)	(T33) (Red) - (T37) (Blue)	112 ± 20 VAC
		(T33) (Red) - (T35) (White)	56 ± 10 VAC
		(T37) (Blue) - (T35) (White)	
	Main winding resistance	(T33) (Red) - (T35) (White)	0.05 - 0.2 Ω
	(T37) (Blue) - (T35) (White)		
Exciter winding voltage (when the battery connected to the field winding)	(1) No.1 (Light green/White) - No.3 (Light green/White)	43 ± 8 VAC	
Exciter winding resistance	(1) No.1 (Light green/White) - No.3 (Light green/White)	1.6 - 2.0 Ω	
Rotor	Field winding voltage	(T5) (Red/White) - (T6) (Black/White)	38 ± 6 VDC
	Field winding resistance	Between the slip rings	49 - 59 Ω
D-AVR	Resistance	(4) No.1 - No.5	1.0 kΩ minimum

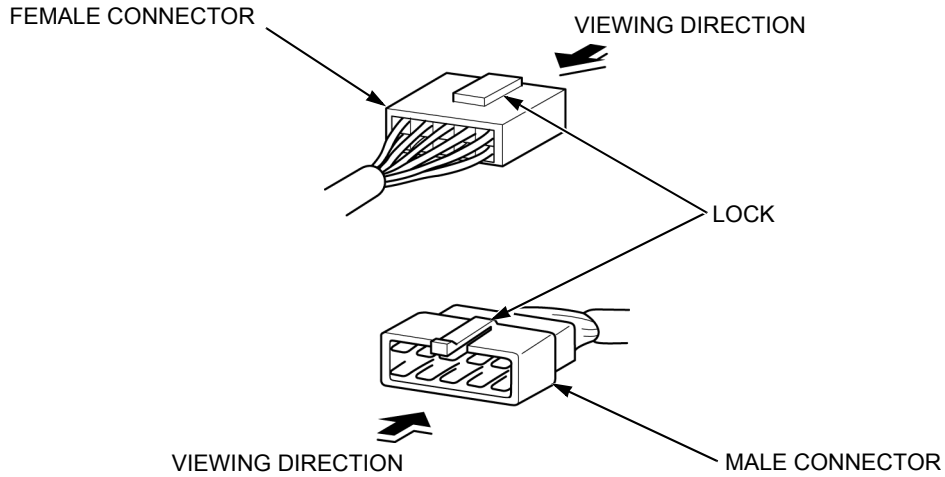
# HOW TO READ CONNECTOR DRAWINGS

Connector drawings show the terminal arrangement, terminal No., number of pins and the shape of terminal (male or female).

Both the male and female connectors are shown for the common connectors, while only the main wire harness side connectors are shown for the dedicated connectors.

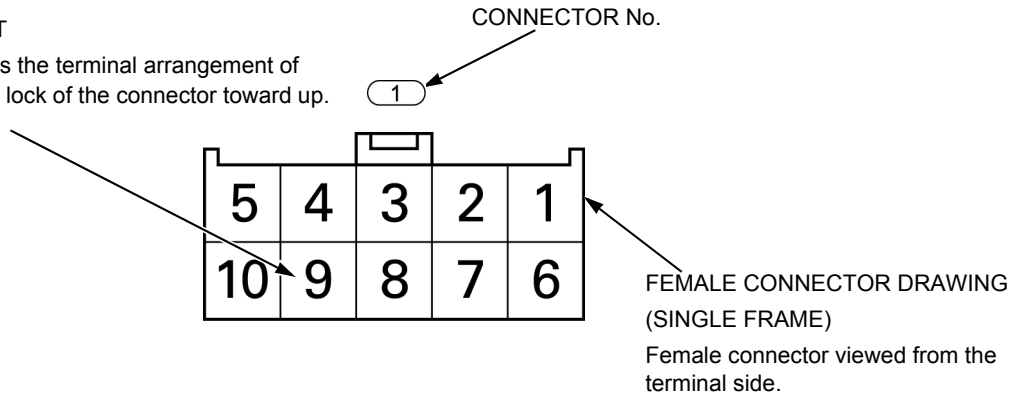
The double frame connectors represent the male connectors and the single frame connectors represent the female connectors.

Both the male and female connectors are shown by viewing them from the terminal side.



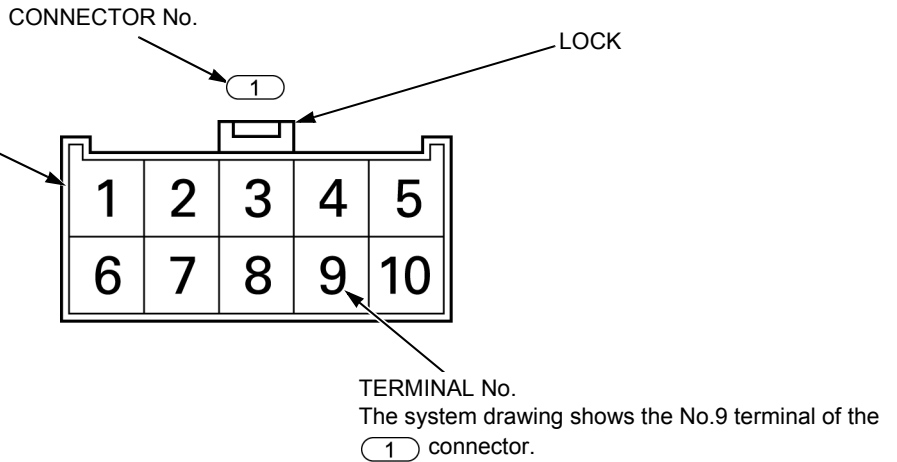
## TERMINAL ARRANGEMENT

The connector drawing shows the terminal arrangement of the (1) connector with the lock of the connector toward up.



## MALE CONNECTOR DRAWING (DOUBLE FRAME)

Male connector viewed from the terminal side.

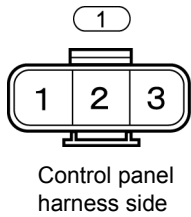
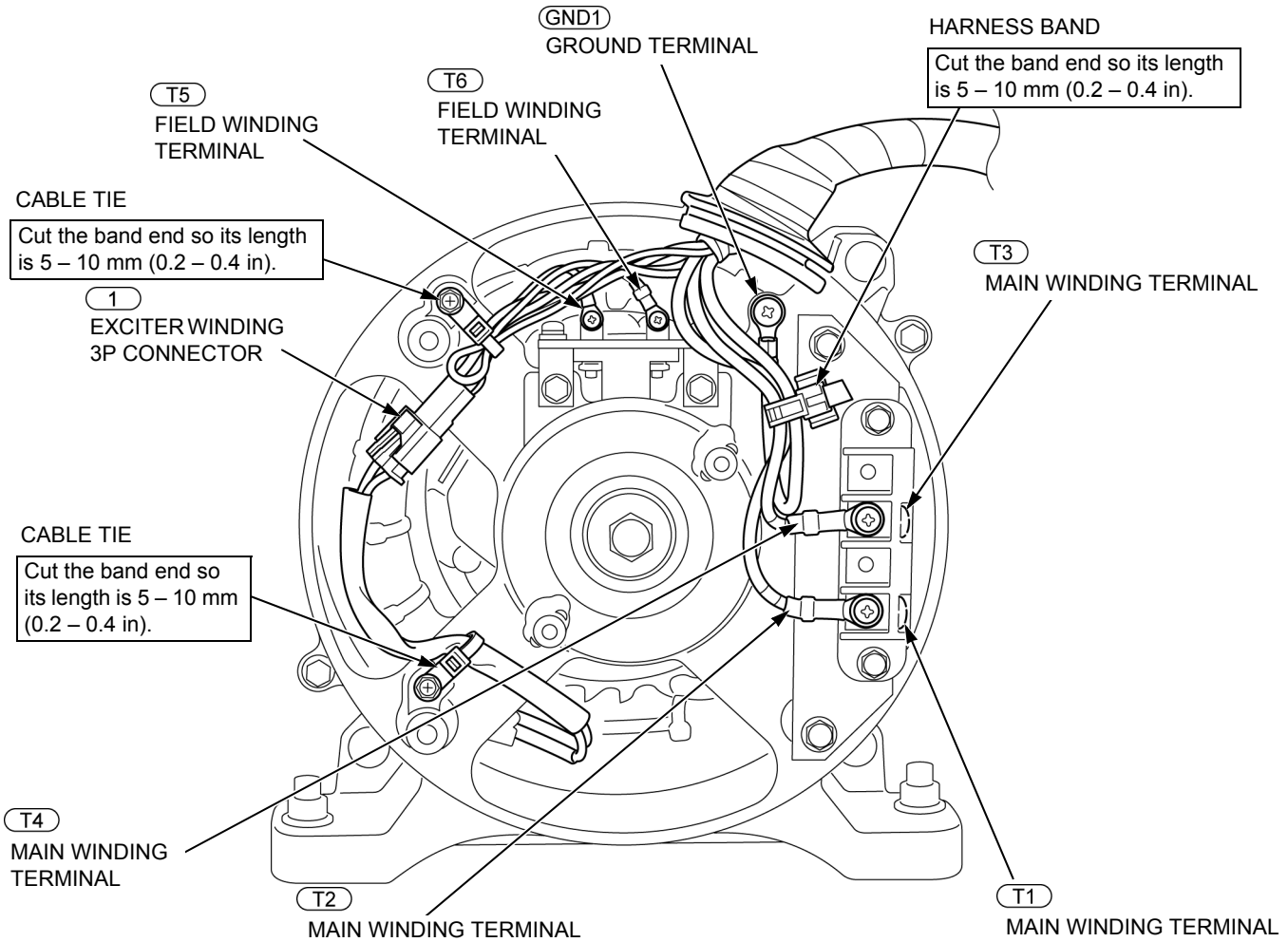


**SERVICE INFORMATION**

**HARNESS ROUTING**

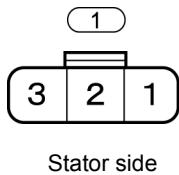
**GENERATOR**

SH, SKH type



Terminal number	Wire color
1	G/W
2	-
3	G/W

Terminal number	Wire color
<b>T1</b>	R
<b>T2</b>	R
<b>T3</b>	Bu
<b>T4</b>	Bu
<b>T5</b>	R/W
<b>T6</b>	Bl/W

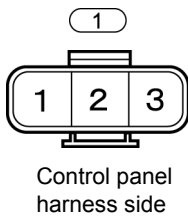
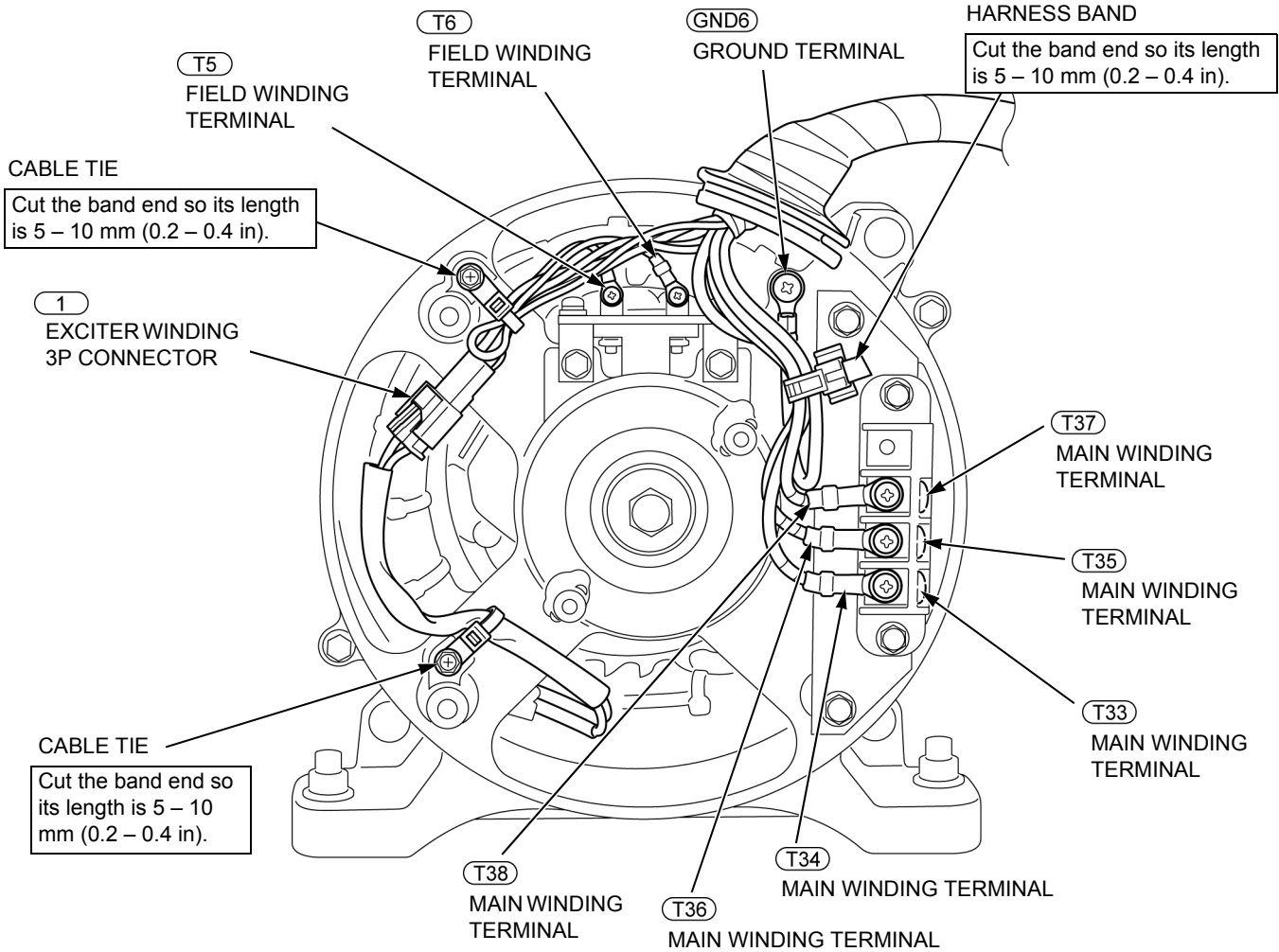


Terminal number	Wire color
1	Lg/W
2	-
3	Lg/W

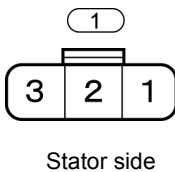
Terminal number	Wire color
<b>GND1</b>	Y/G

Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

**LDH type**



Terminal number	Wire color
1	G/W
2	-
3	G/W



Terminal number	Wire color
1	Lg/W
2	-
3	Lg/W

Terminal number	Wire color
T5	R/W
T6	Bl/W
T33	R
T34	R
T35	W
T36	W
T37	Bu
T38	Bu

Terminal number	Wire color
GND6	G

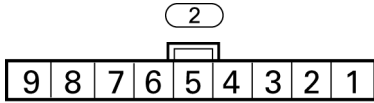
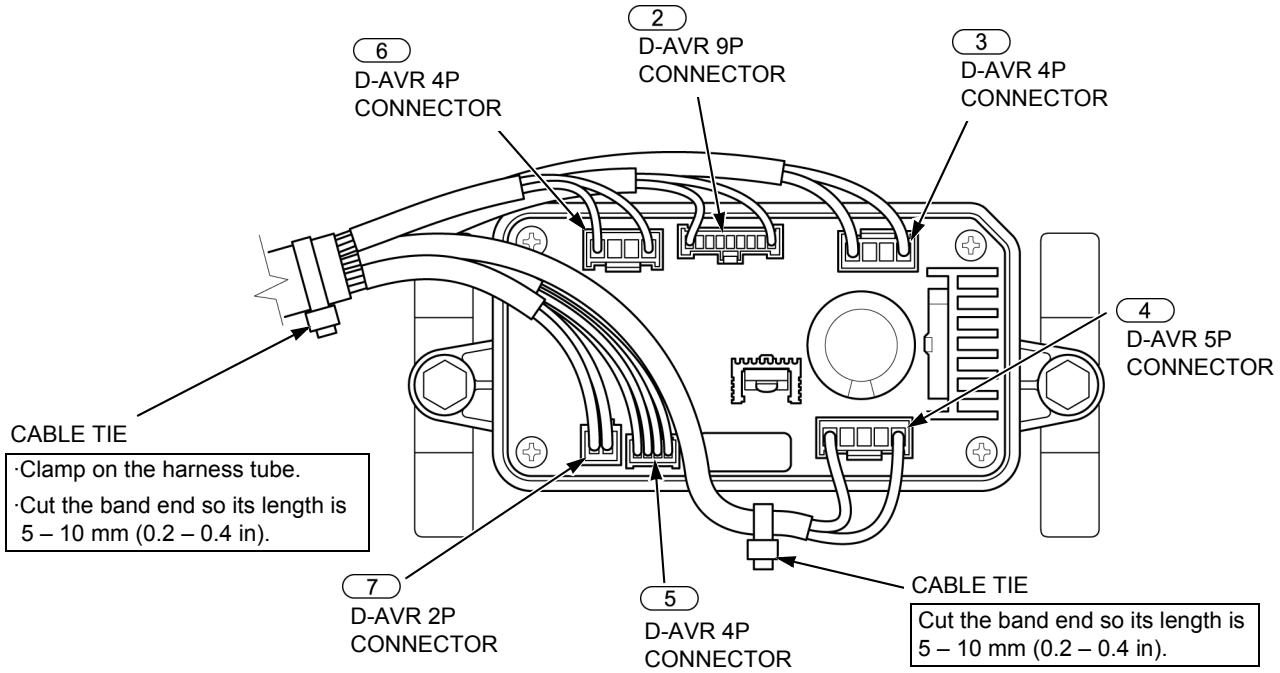
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

# SERVICE INFORMATION

## CONTROL BOX

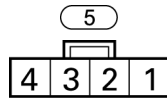
### D-AVR SIDE (INSIDE OF THE CONTROL BOX)

SH, SKH type



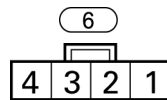
Control panel harness side

Terminal number	Wire color	Terminal number	Wire color
1	Bu	6	-
2	-	7	-
3	-	8	-
4	-	9	R
5	-		



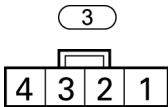
Control panel harness side

Terminal number	Wire color
1	Bl
2	W/Bl
3	W/Bu
4	R/Bl



Control panel harness side

Terminal number	Wire color
1	Bl
2	-
3	-
4	W



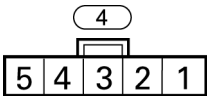
Control panel harness side

Terminal number	Wire color
1	G/W
2	-
3	-
4	G/W



Control panel harness side

Terminal number	Wire color
1	Y/G
2	Y

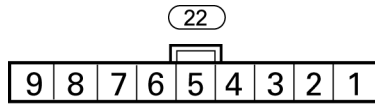
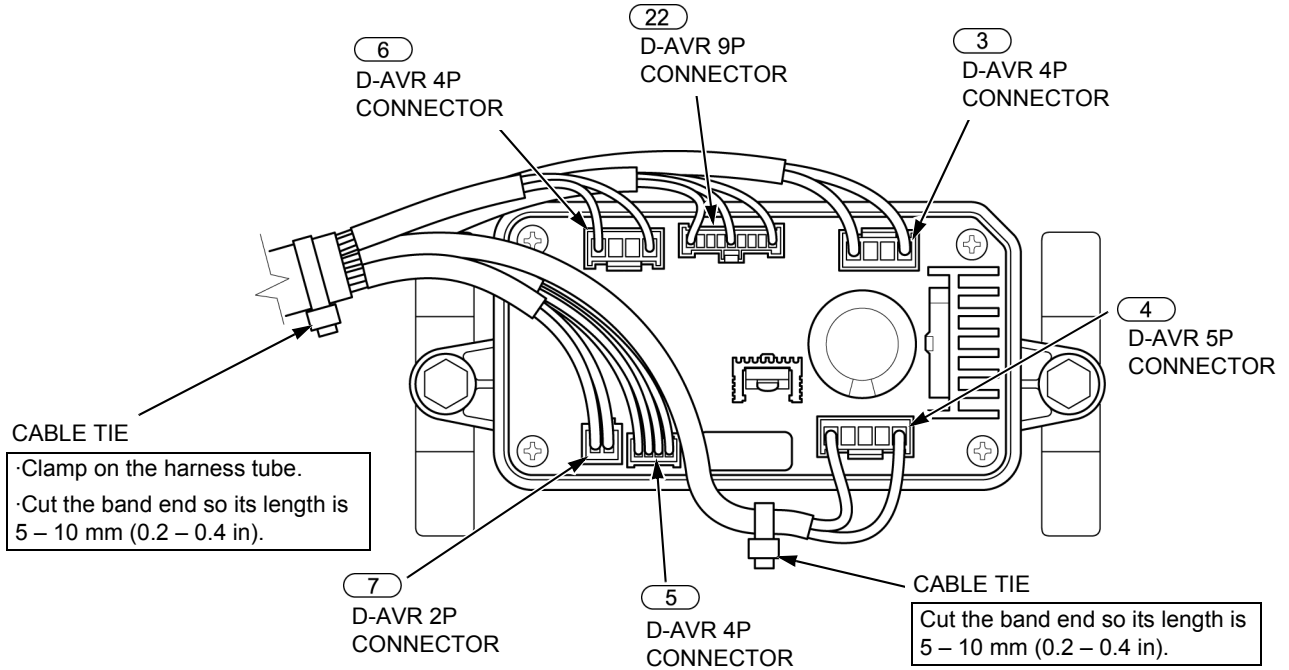


Control panel harness side

Terminal number	Wire color
1	R/W
2	-
3	-
4	-
5	Bl/W

Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

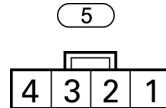
**LDH type**



Control panel harness side

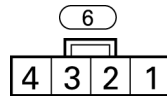
Terminal number	Wire color
1	Bu
2	–
3	–
4	–
5	W

Terminal number	Wire color
6	–
7	–
8	–
9	R



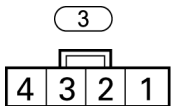
Control panel harness side

Terminal number	Wire color
1	Bl
2	W/Bl
3	W/Bu
4	R/Bl



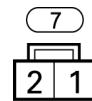
Control panel harness side

Terminal number	Wire color
1	Bl
2	–
3	–
4	W



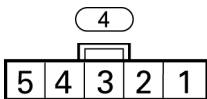
Control panel harness side

Terminal number	Wire color
1	G/W
2	–
3	–
4	G/W



Control panel harness side

Terminal number	Wire color
1	G
2	Y



Control panel harness side

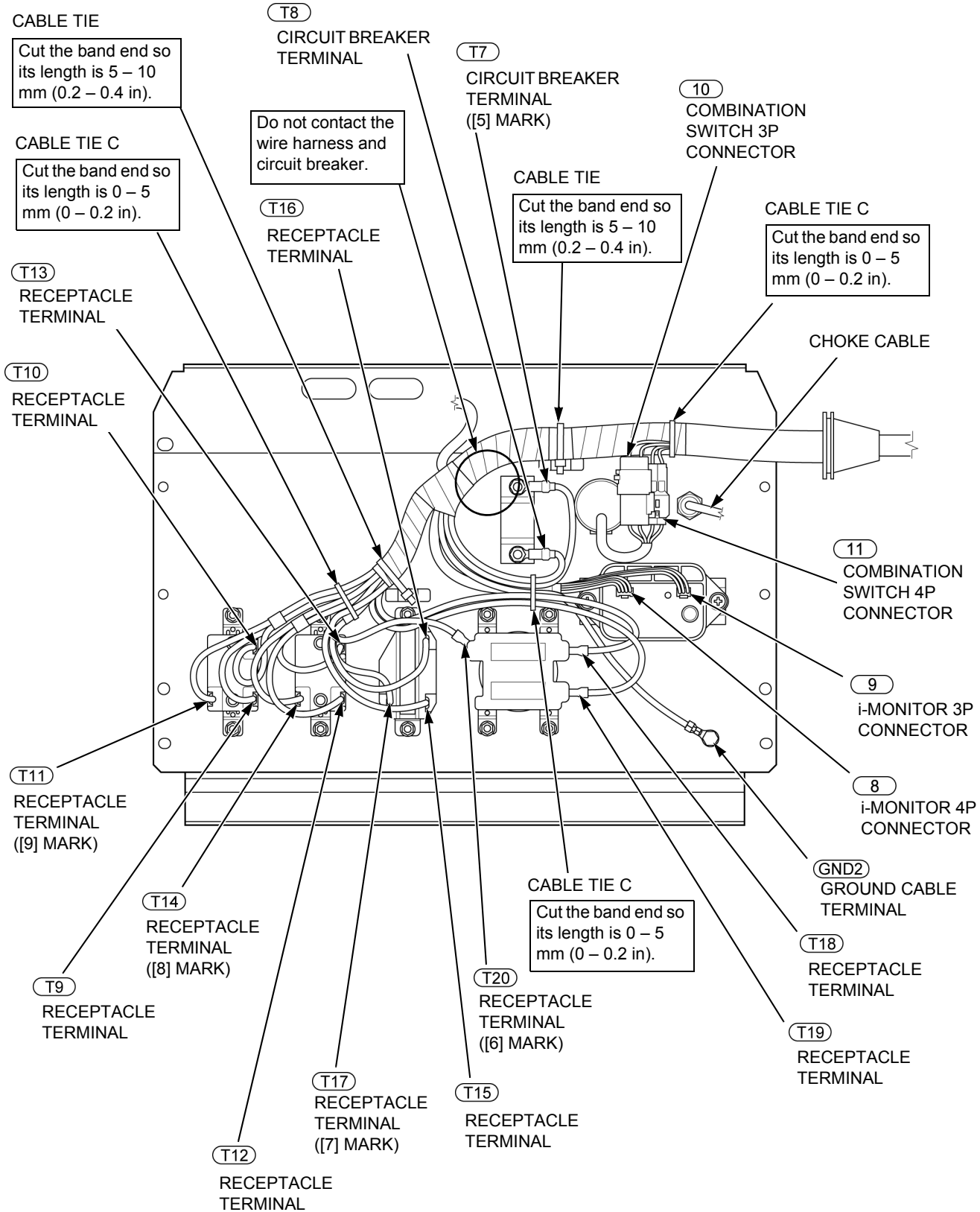
Terminal number	Wire color
1	R/W
2	–
3	–
4	–
5	Bl/W

Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

# SERVICE INFORMATION

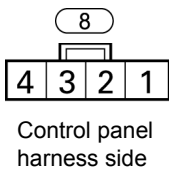
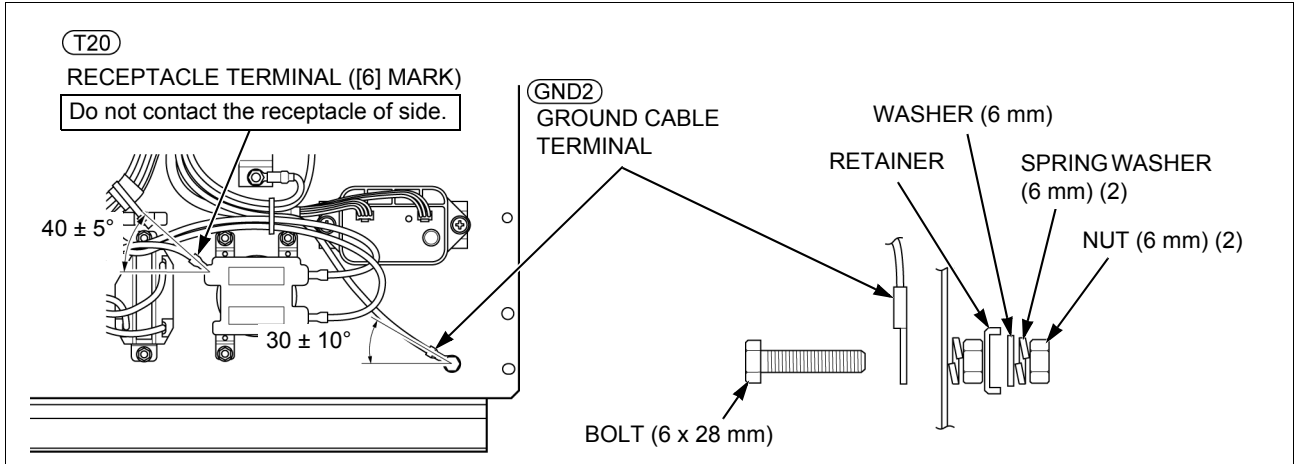
## CONTROL PANEL SIDE (INSIDE OF THE CONTROL BOX)

SH type

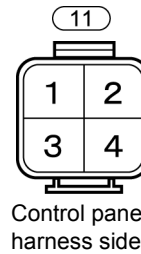




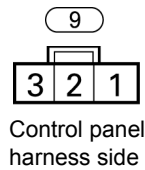
Cable/terminal specified angle/direction



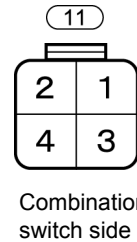
Terminal number	Wire color
1	Bl
2	W/Bl
3	W/Bu
4	R/Bl



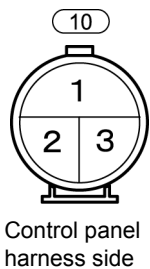
Terminal number	Wire color
1	Bl/Y
2	Bl
3	—
4	—



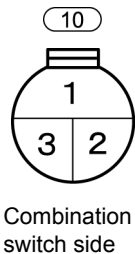
Terminal number	Wire color
1	G
2	Bu/Y
3	Lg



Terminal number	Wire color
1	Bl/Y
2	Bl
3	—
4	—



Terminal number	Wire color
1	W
2	G
3	Bl/W



Terminal number	Wire color
1	W
2	G
3	Bl/W

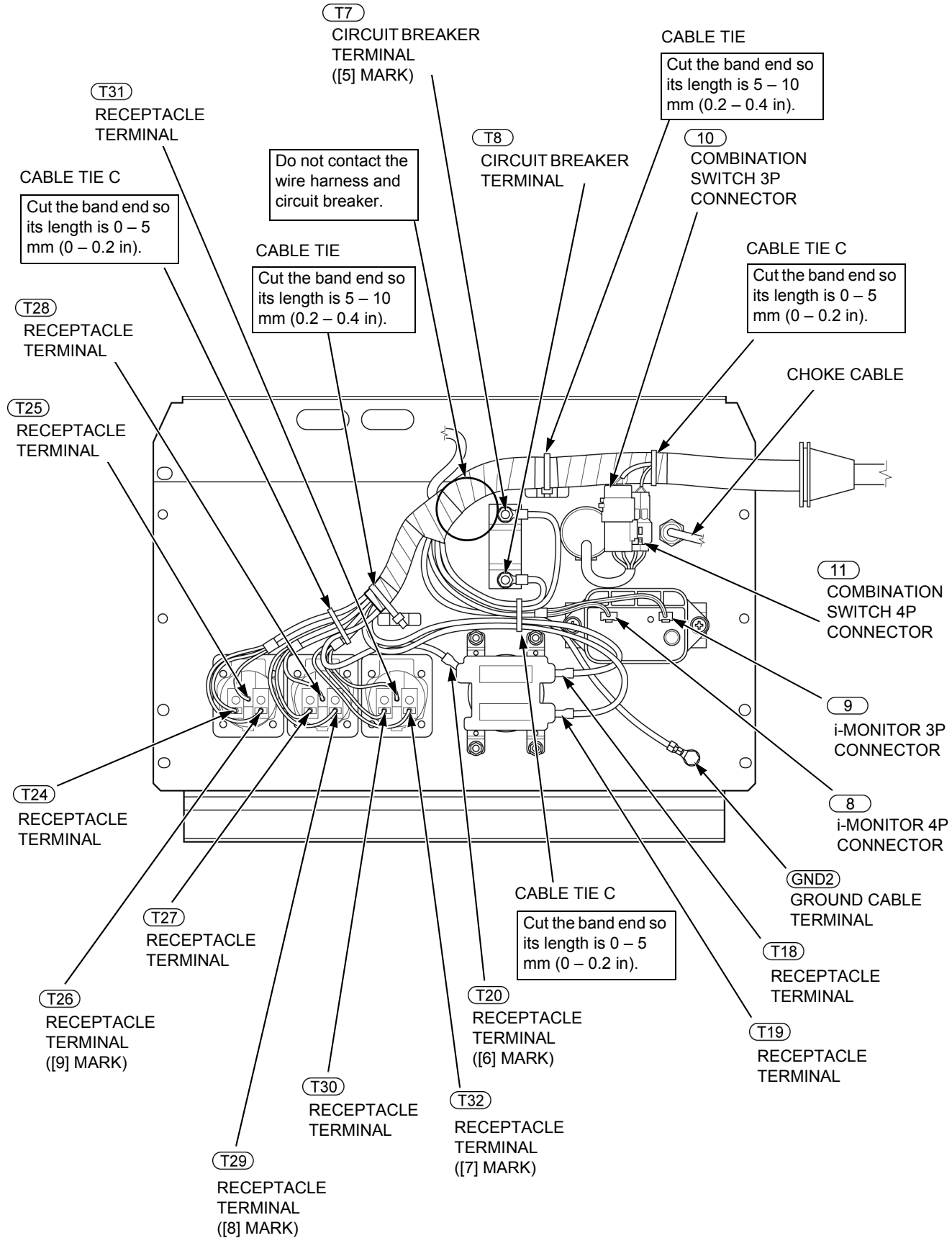
Terminal number	Wire color
(T7)	R
(T8)	R
(T9)	Bu
(T10)	Y/G
(T11)	R
(T12)	Bu
(T13)	Y/G
(T14)	R
(T15)	Bu
(T16)	Y/G
(T17)	R
(T18)	Bu
(T19)	Y/G
(T20)	R

Terminal number	Wire color
(GND2)	Y/G

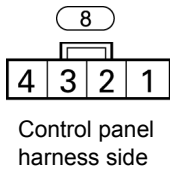
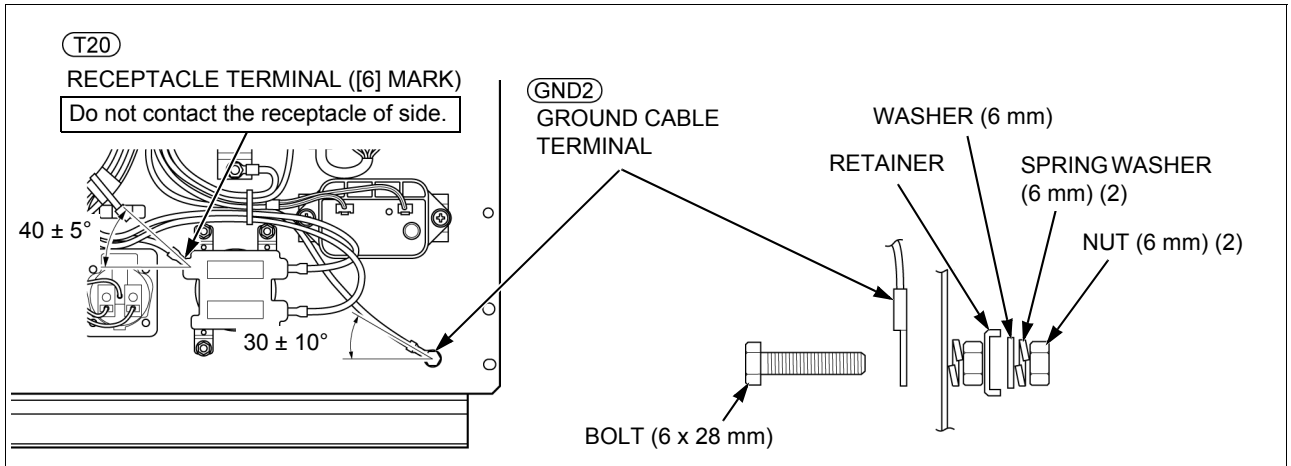
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

# SERVICE INFORMATION

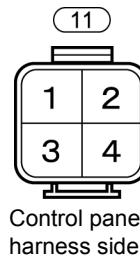
SKH type



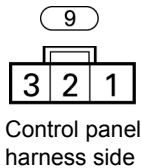
Cable/terminal specified angle/direction



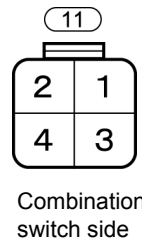
Terminal number	Wire color
1	Bl
2	W/Bl
3	W/Bu
4	R/Bl



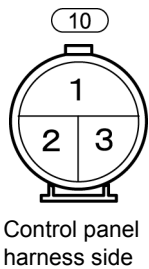
Terminal number	Wire color
1	Bl/Y
2	Bl
3	-
4	-



Terminal number	Wire color
1	G
2	Bu/Y
3	Lg



Terminal number	Wire color
1	Bl/Y
2	Bl
3	-
4	-



Terminal number	Wire color
1	W
2	G
3	Bl/W



Terminal number	Wire color
1	W
2	G
3	Bl/W

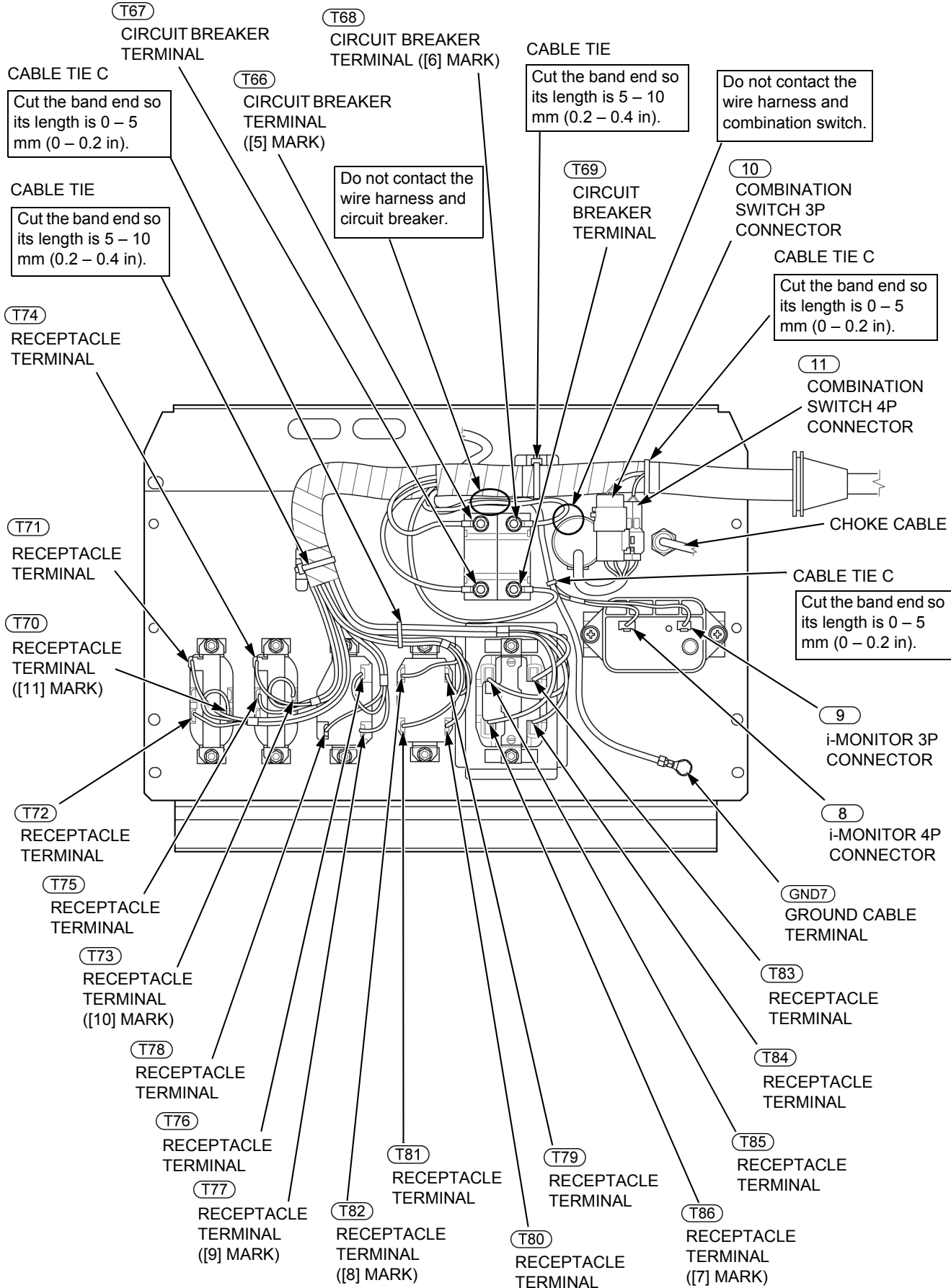
Terminal number	Wire color
(T7)	R
(T8)	R
(T18)	Bu
(T19)	Y/G
(T20)	R
(T24)	Bu
(T25)	Y/G
(T26)	R
(T27)	Bu
(T28)	Y/G
(T29)	R
(T30)	Bu
(T31)	Y/G
(T32)	R

Terminal number	Wire color
(GND2)	Y/G

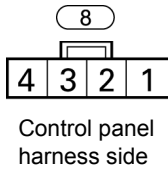
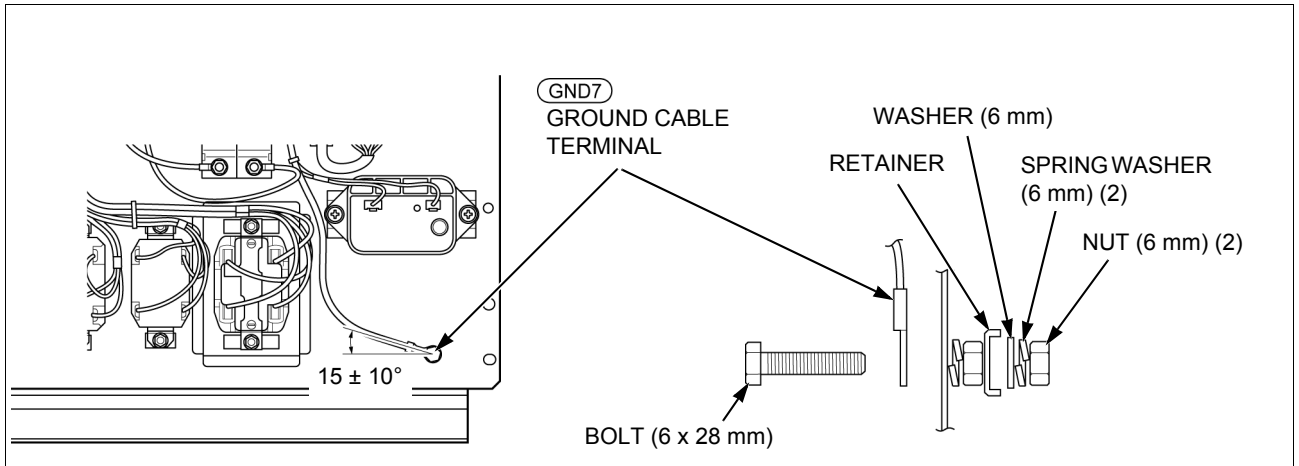
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

# SERVICE INFORMATION

## LDH type

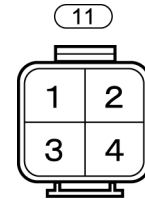


Cable/terminal specified angle/direction



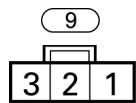
Control panel  
harness side

Terminal number	Wire color
1	Bl
2	W/Bl
3	W/Bu
4	R/Bl



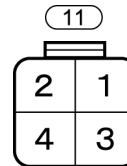
Control panel  
harness side

Terminal number	Wire color
1	Bl/Y
2	Bl
3	-
4	-



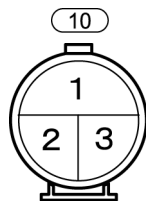
Control panel  
harness side

Terminal number	Wire color
1	G
2	Bu/Y
3	Lg



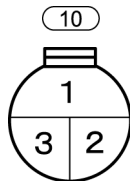
Combination  
switch side

Terminal number	Wire color
1	Bl/Y
2	Bl
3	-
4	-



Control panel  
harness side

Terminal number	Wire color
1	W
2	G
3	Bl/W



Combination  
switch side

Terminal number	Wire color
1	W
2	G
3	Bl/W

Terminal number	Wire color
(T66)	R
(T67)	R
(T68)	Bu
(T69)	Bu
(T70)	Bu
(T71)	G
(T72)	W
(T73)	R
(T74)	G
(T75)	W
(T76)	G
(T77)	Bu
(T78)	W
(T79)	G
(T80)	Bu
(T81)	W
(T82)	R
(T83)	W
(T84)	Bu
(T85)	G
(T86)	R

Terminal number	Wire color
(GND7)	G

Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

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**MEMO**

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# 7. GOVERNOR SYSTEM

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GOVERNOR ARM/CONTROL  
REMOVAL/INSTALLATION .....7-2

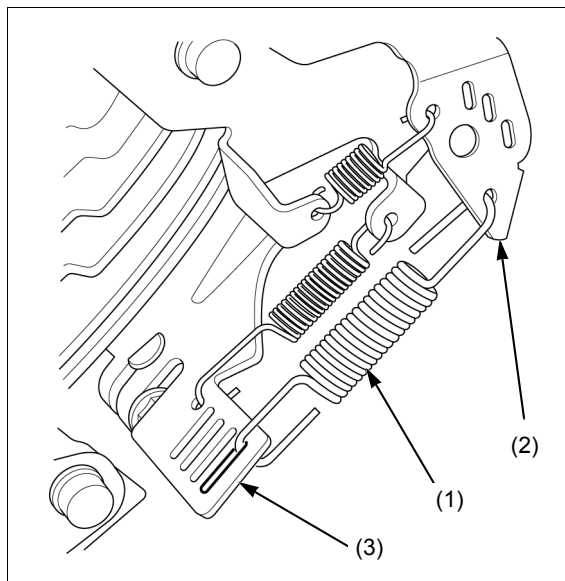
## GOVERNOR SYSTEM

---

### GOVERNOR ARM/CONTROL REMOVAL/INSTALLATION

#### GOVERNOR SPRING INSTALLATION

Hook the governor spring (1) to the throttle lever (2) of the control and the governor arm (3) as shown.





# 8. GENERATOR/CHARGING SYSTEM

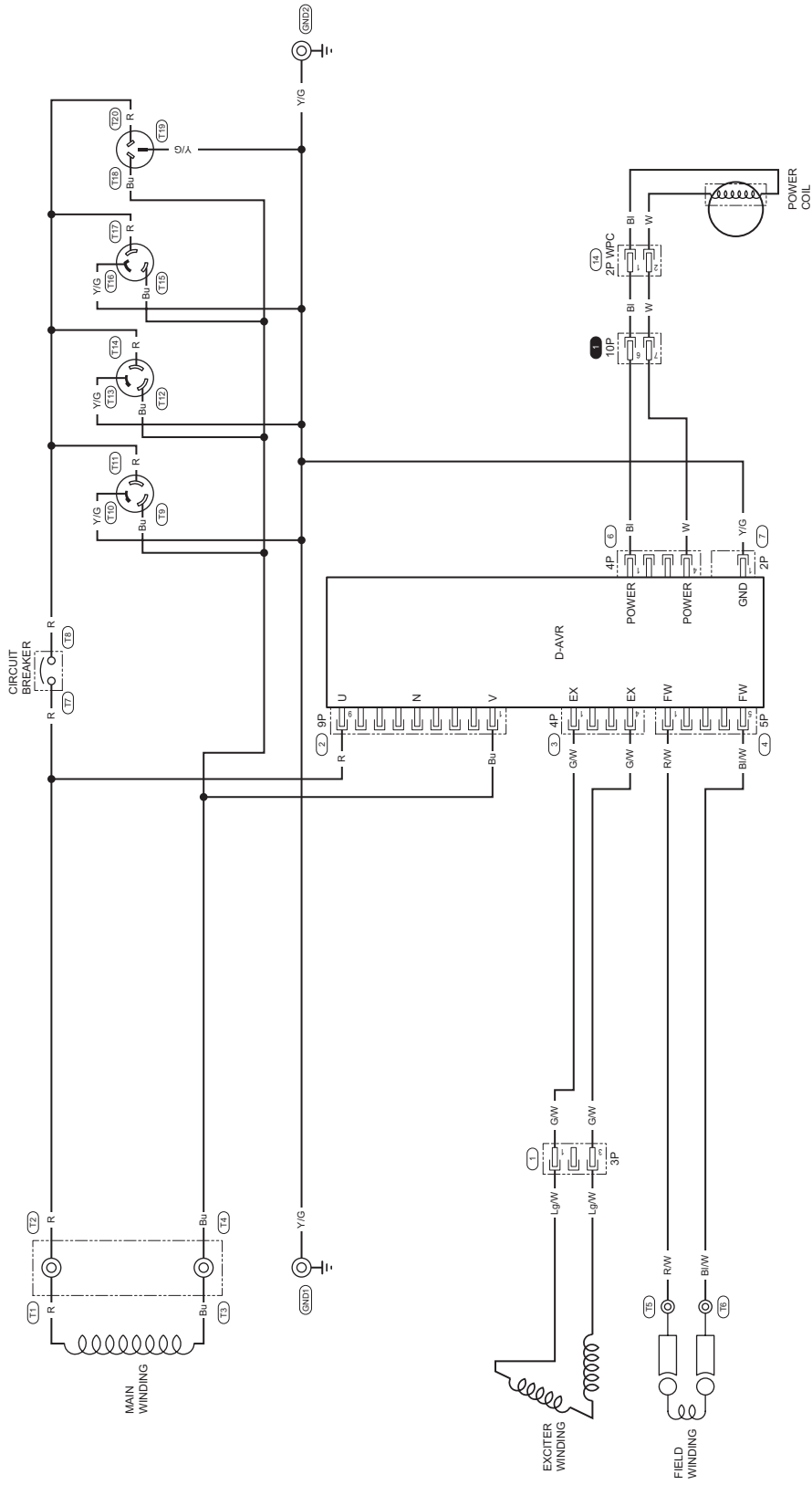
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GENERATOR SYSTEM DIAGRAM .....	8-2	MAIN WINDING INSPECTION .....	8-11
GENERATOR SYSTEM TROUBLESHOOTING .....	8-5	EXCITER WINDING INSPECTION .....	8-14
REAR HOUSING/STATOR REMOVAL/INSTALLATION .....	8-9	FIELD WINDING INSPECTION .....	8-15

# GENERATOR/CHARGING SYSTEM

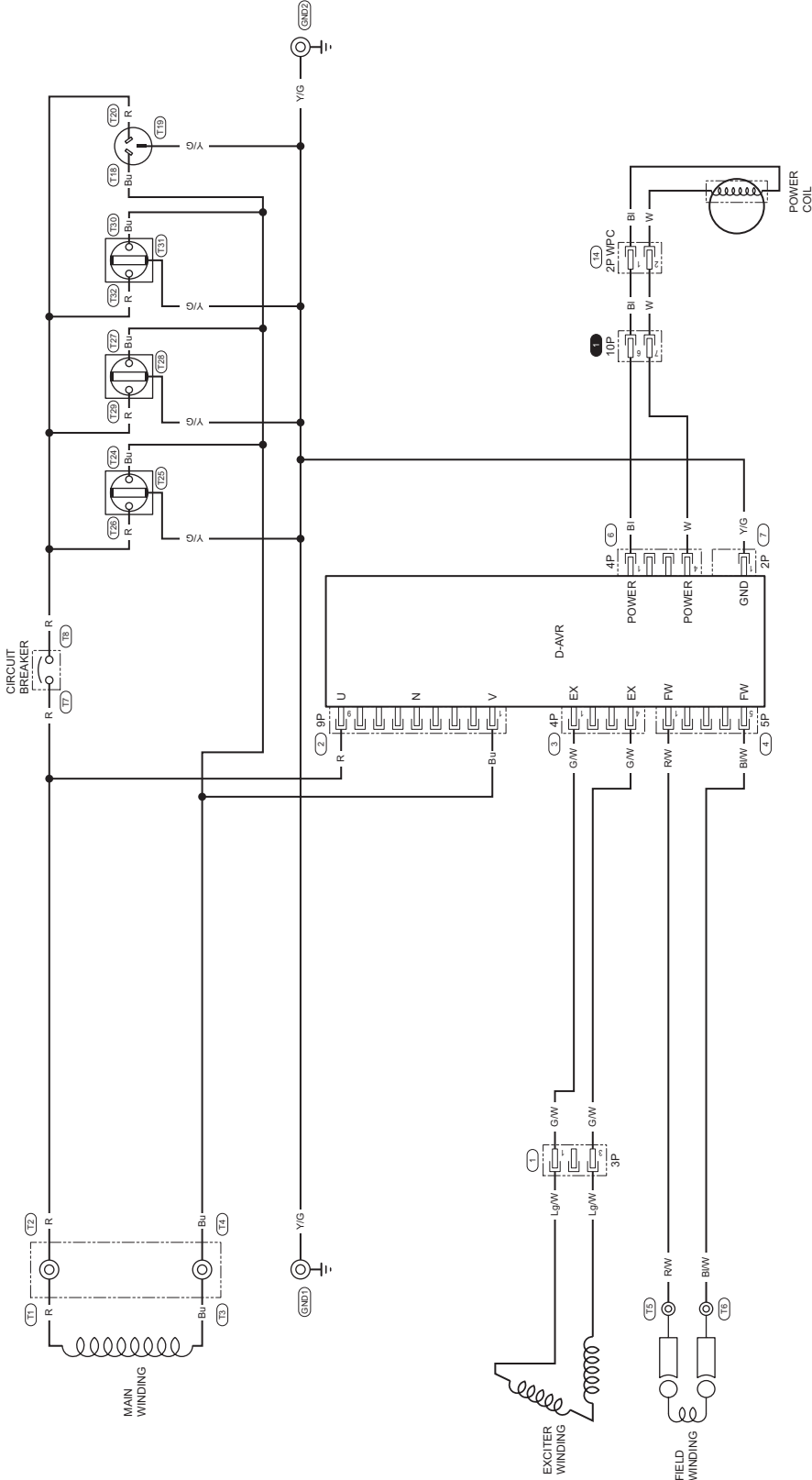
## GENERATOR SYSTEM DIAGRAM

SH type



Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

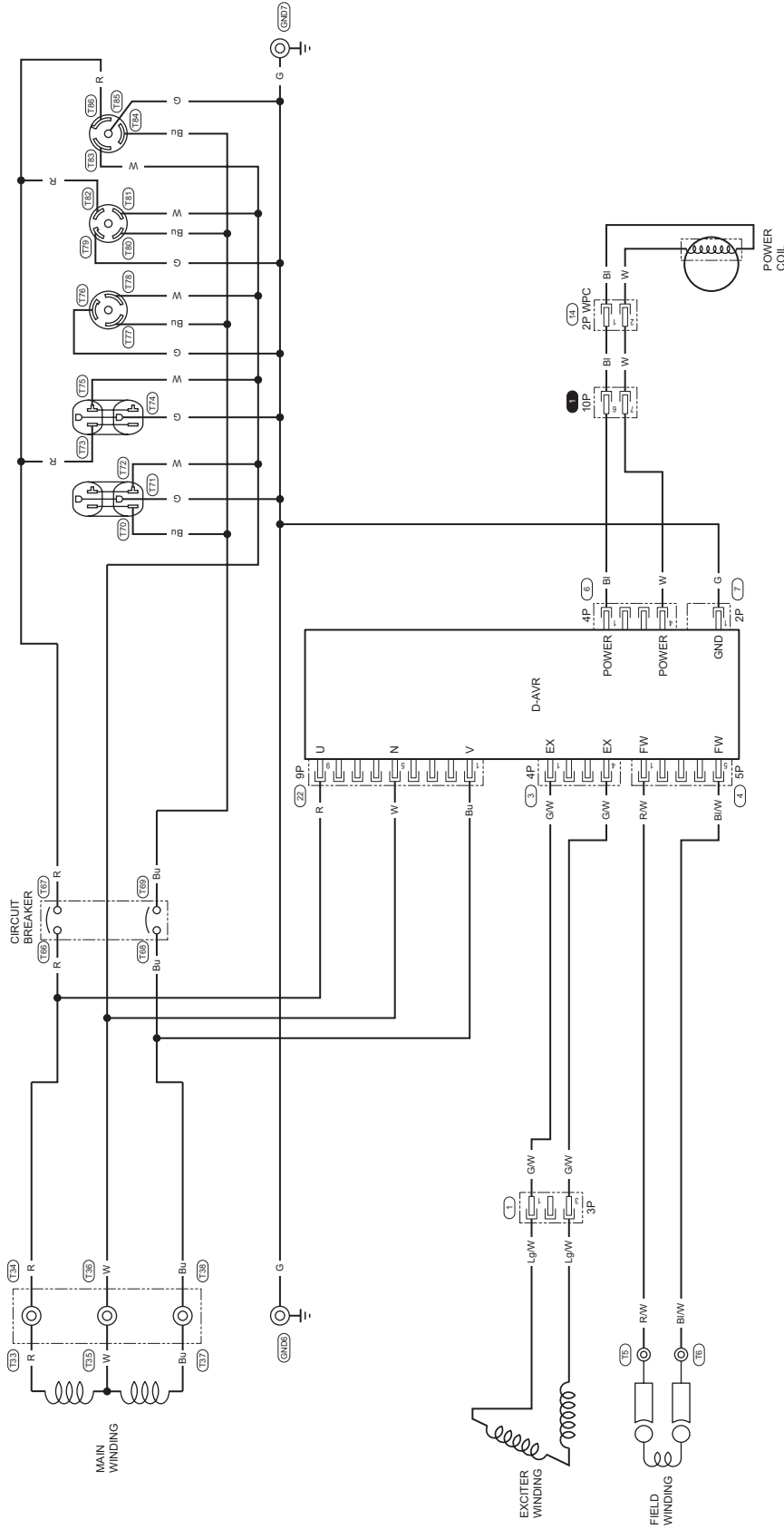
SKH type



Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

# GENERATOR/CHARGING SYSTEM

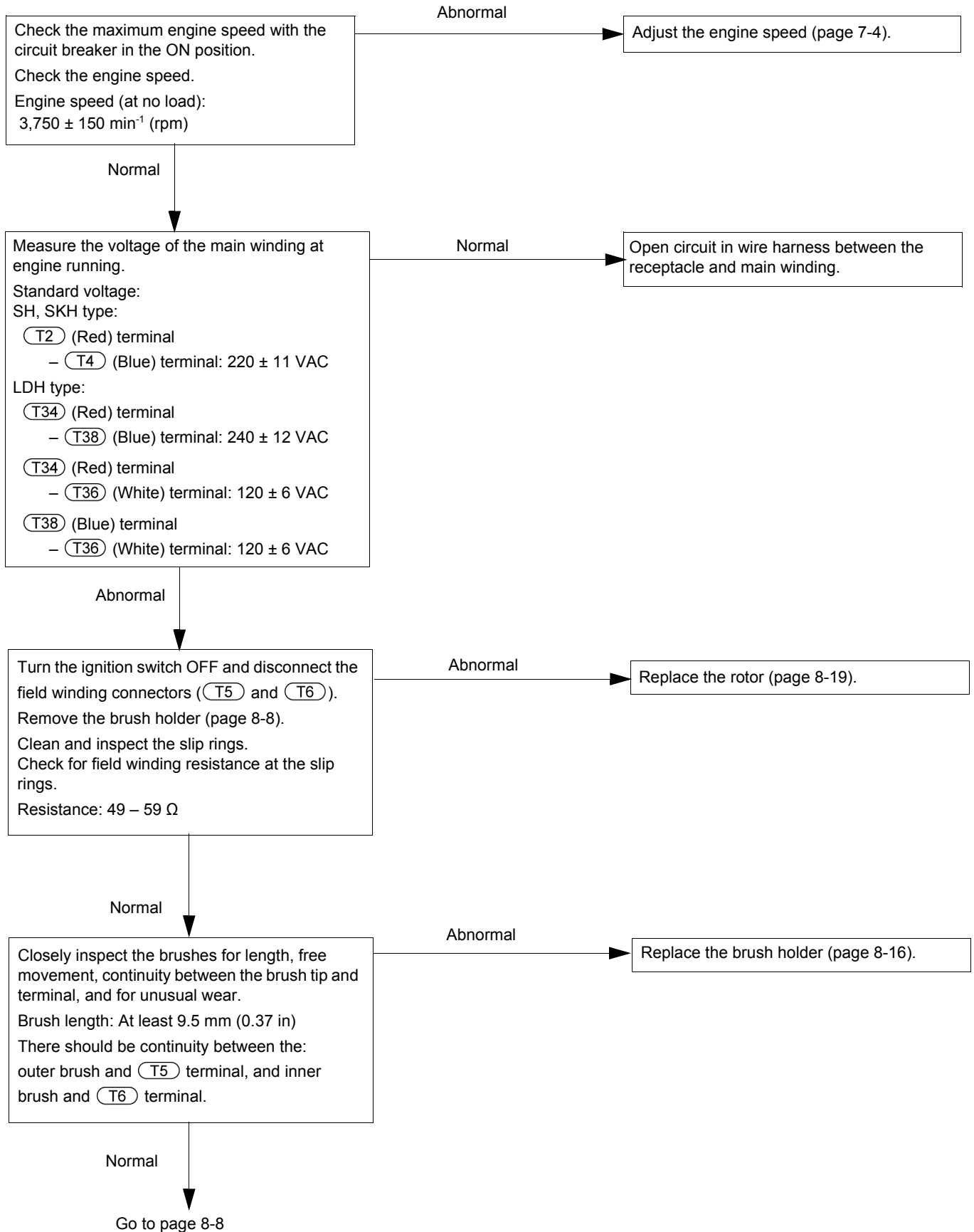
LDH type



Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

# GENERATOR SYSTEM TROUBLESHOOTING

## ABNORMAL OUTPUT (NONE, LOW OR HIGH) AT RECEPTACLE



From page 8-7

SH, SKH type:

Disconnect the main winding terminals (T2) and (T4) and exciter 3P connector (1).

LDH type:

Disconnect the main winding terminals (T34), (T36) and (T38) and exciter 3P connector (1).

Measure the resistance between the terminals of the stator winding.

Main winding standard resistance:

SH, SKH type:

- (T1) (Red) terminal
- (T3) (Blue) terminal: 0.1 – 0.3 Ω

LDH type:

- (T33) (Red) terminal
- (T35) (White) terminal: 0.05 – 0.2 Ω
- (T37) (Blue) terminal
- (T35) (White) terminal: 0.05 – 0.2 Ω

Exciter winding standard resistance:

ALL type:

- (1) No.1 (Light green/White) terminal
- No.3 (Light green/White) terminal : 1.6 – 2.0 Ω

Abnormal

Replace the stator (page 8-16).

Go to page 8-9

From page 8-8

SH, SKH type:  
Disconnect the main winding terminals (T2) and (T4), field winding connectors (T5) and (T6) and exciter 3P connector (1).

LDH type:  
Disconnect the main winding terminals (T34), (T36) and (T38), field winding connectors (T5) and (T6) and exciter 3P connector (1).

Connect a known good 12 V battery to the brush terminal (battery positive to (T5) and negative to (T6) terminals).

Measure the voltage between the terminals of the stator winding with the engine running at no load speed.

Main winding standard voltage:  
SH, SKH type:  
(T1) (Red) terminal  
- (T3) (Blue) terminal: 103 ± 15 VAC

LDH type:  
(T33) (Red) terminal  
- (T37) (Blue) terminal: 112 ± 20 VAC  
(T33) (Red) terminal  
- (T35) (White) terminal: 56 ± 10 VAC  
(T37) (Blue) terminal  
- (T35) (White) terminal: 56 ± 10 VAC

Exciter winding standard voltage:  
ALL type:  
(1) No.1 (Light green/White) terminal  
- No.3 (Light green/White) terminal : 43 ± 8 VAC

Abnormal

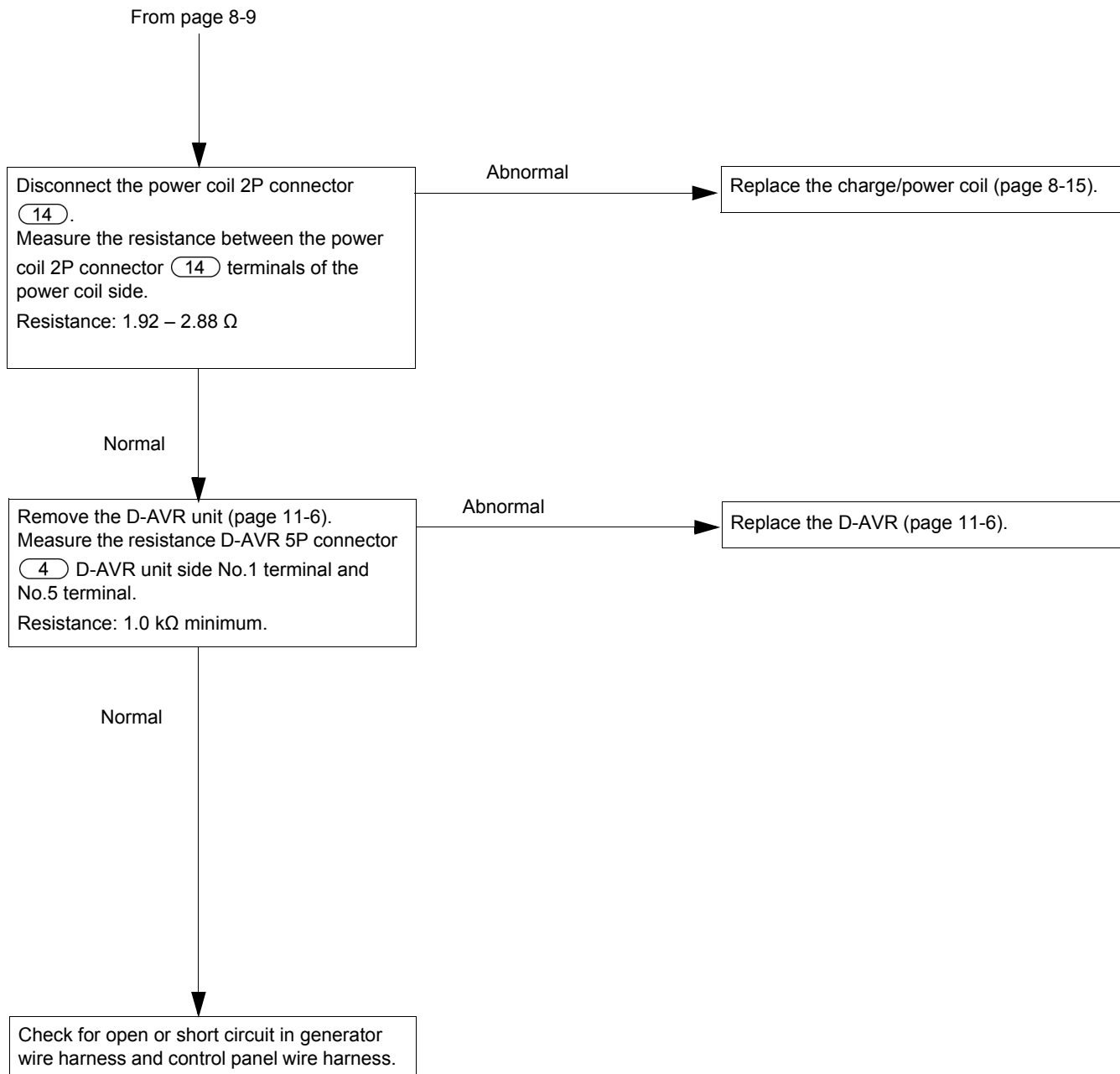
Replace the stator (page 8-16).

Normal

Go to page 8-10

## GENERATOR/CHARGING SYSTEM

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# REAR HOUSING/STATOR REMOVAL/INSTALLATION

## NOTICE

- Take care not to damage the stator coil and rotor coil when removing/installing them.
- Do not strike any part of the rotor when removing it. The rotor may be damaged.
- Place the stator core side down. Do not set the stator on the coil end. The coils may be damaged.
- If for some reason it is necessary to place the stator with the coil side down, be sure to lay it gently on top of cloth or other similar padding.
- Always remove the brush holder before removing the rear housing. If the rear housing is removed with the brush holder attached, damage to the brush holder will occur.

Remove the generator end cover (Base shop manual: page 5-2).

Open the harness band (1).

Disconnect the connector (2).

Remove the following:

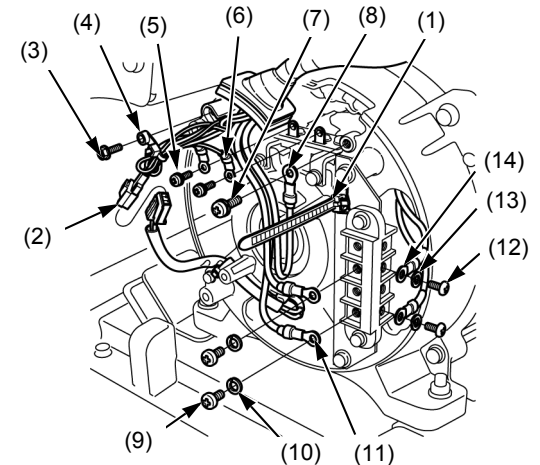
SH, SKH type:

- tapping screw (5 x 14 mm) (3)/cable tie (4)
- two washer-screws (4 x 8 mm) (5)/field winding terminals (6)
- washer-screw (6 x 12 mm) (7)/ground terminal (8)
- two screws (6 x 8 mm) (9)/spring washers (10)/main winding terminals (11)
- two screws (6 x 8 mm) (12)/spring washers (13)/main winding terminals (14)

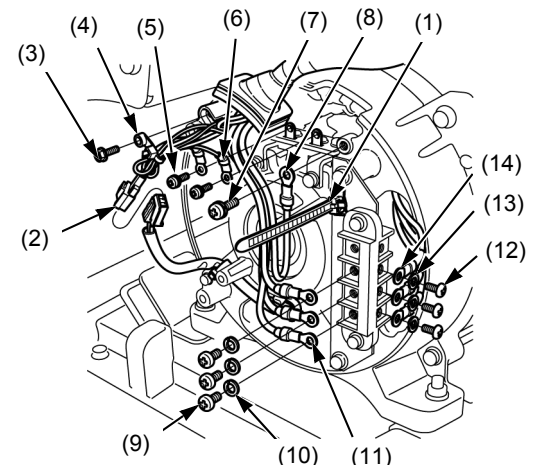
LDH type:

- tapping screw (5 x 14 mm) (3)/cable tie (4)
- two washer-screws (4 x 8 mm) (5)/field winding terminals (6)
- washer-screw (6 x 12 mm) (7)/ground terminal (8)
- three screws (6 x 8 mm) (9)/spring washers (10)/main winding terminals (11)
- three screws (6 x 8 mm) (12)/spring washers (13)/main winding terminals (14)

SH, SKH type:

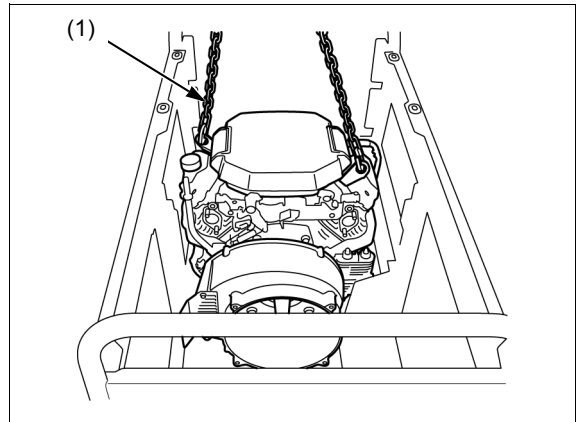


LDH type:



# GENERATOR/CHARGING SYSTEM

Attach a chain hoist (1) to the engine hangers and pull the chain tight to support the engine. Or place wooden blocks under the front housing to support the generator/engine assembly.



Remove the tapping screw.  
 Remove the washer-bolts and brush holder.  
 Remove the washer-bolts and terminal block.  
 Remove the washer-bolts and terminal block bracket.  
 Remove the bolts, nuts, rear housing and stator.

Installation is reverse order of removal.

- Route the harnesses properly (page 2-4, Base shop manual: page 2-12).

**TORQUE:**

**REAR HOUSING BOLT:** 20 N·m  
 (2.0 kgf·m, 15 lbf·ft)

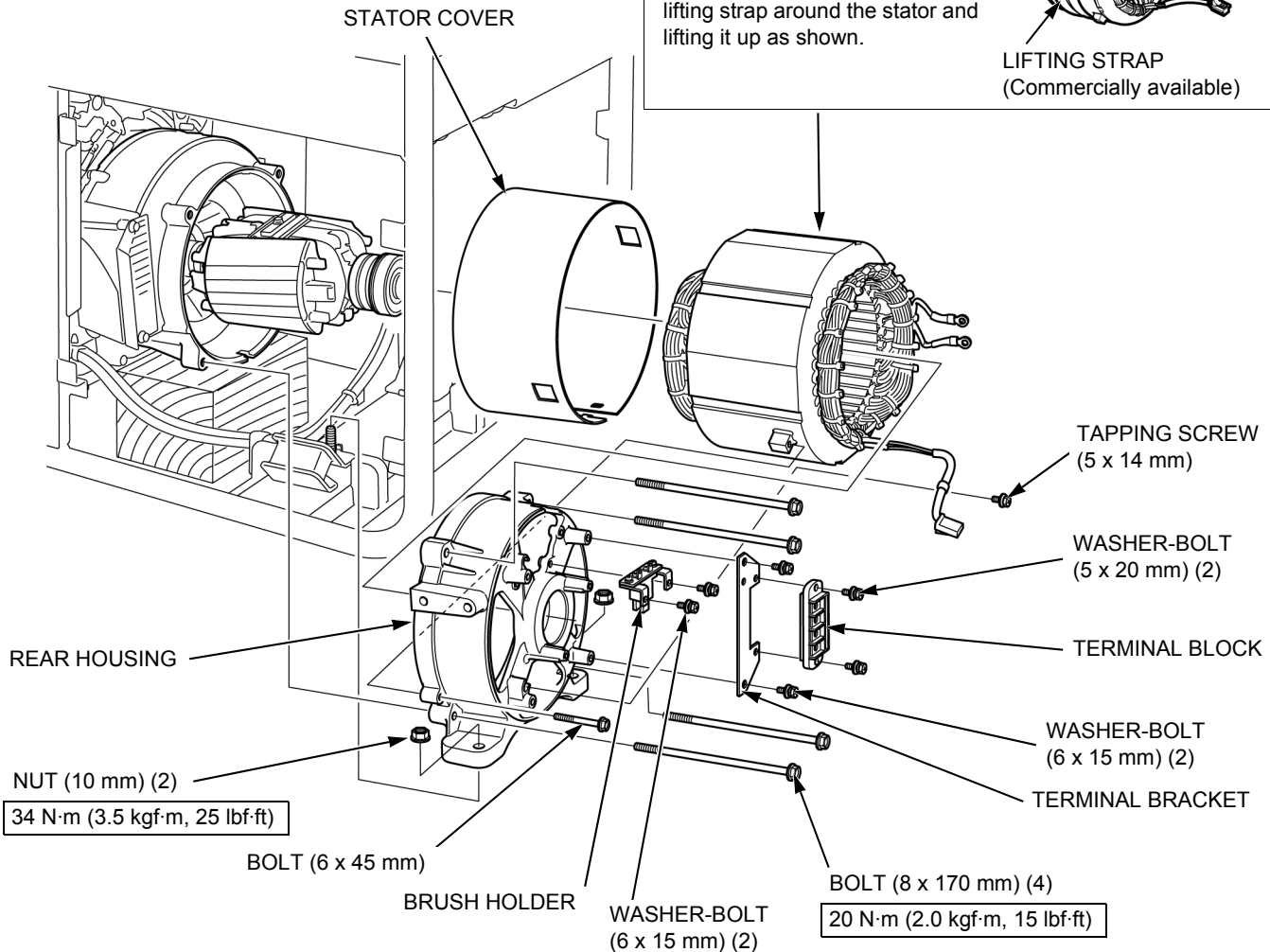
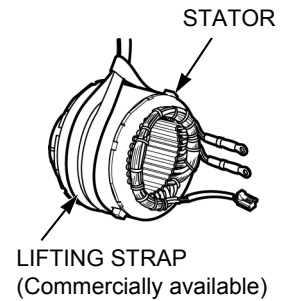
**REAR HOUSING MOUNTING NUT:** 34 N·m  
 (3.5 kgf·m, 25 lbf·ft)

SH, SKH type shown:

**STATOR**

**REMOVAL/INSTALLATION:**

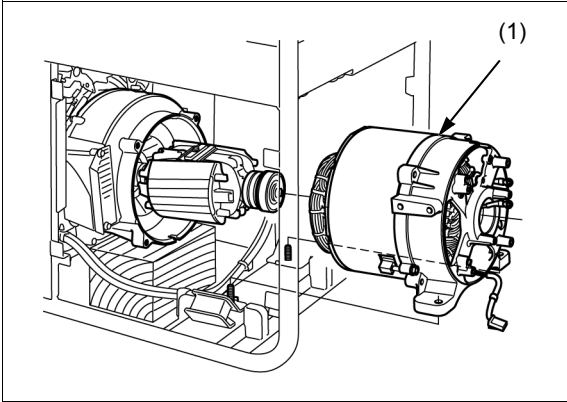
- The stator is heavy. Take care not to get injured during installation/removal of the stator.
- Remove/install the stator by winding a commercially available lifting strap around the stator and lifting it up as shown.



**REAR HOUSING/STATOR INSTALLATION**

Assemble the rear housing, stator and stator cover with the bolt (page 8-10).

Install the stator and rear housing assembly (1) to the front housing.



**MAIN WINDING INSPECTION**

**VOLTAGE INSPECTION**

Remove the generator end cover (Base shop manual: page 5-2).

Start the engine and measure the AC voltage between the terminals according to the table below.

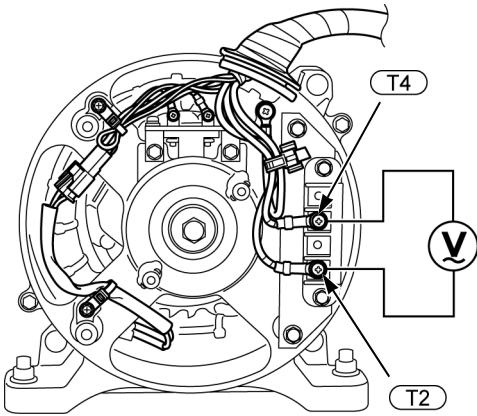
**SH, SKH type**

Main winding terminal	Voltage (VAC)
T2 (Red) – T4 (Blue)	220 ± 11

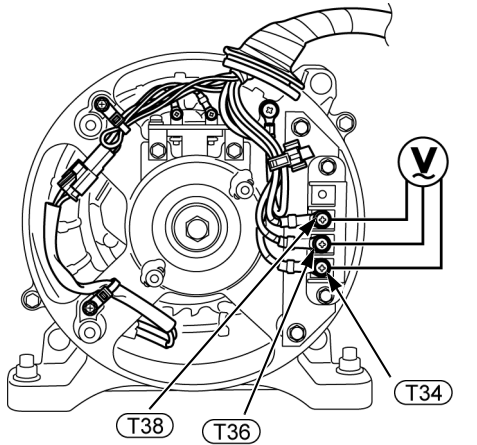
**LDH type**

Main winding terminal	Voltage (VAC)
T34 (Red) – T38 (Blue)	240 ± 12
T34 (Red) – T36 (White)	120 ± 6
T38 (Blue) – T36 (White)	

SH, SKH type:



LDH type:



## GENERATOR/CHARGING SYSTEM

SH, SKH type:

Disconnect the main winding terminals (T2) and (T4), field winding connectors (T5 and T6) and exciter 3P connector (1).

LDH type:

Disconnect the main winding terminals (T34, T36, and T38), field winding connectors (T5 and T6) and exciter 3P connector (1).

Connect a known good 12 V battery to the brush terminals.

- Battery positive to (T5) terminal and negative to (T6) terminal.

Start the engine and measure the AC voltage between the terminals according to the table below.

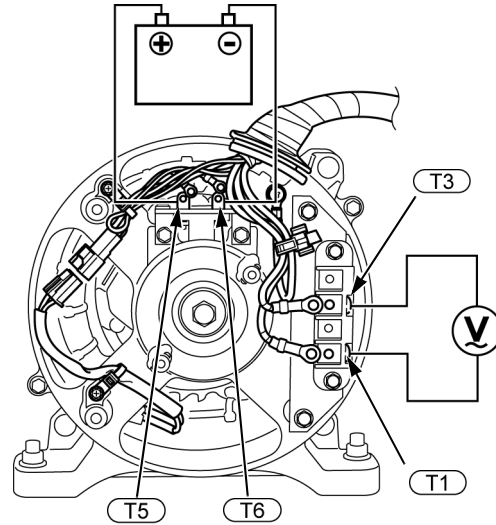
### SH, SKH type

Main winding terminal	Voltage (VAC)
(T1) (Red) – (T3) (Blue)	103 ± 15

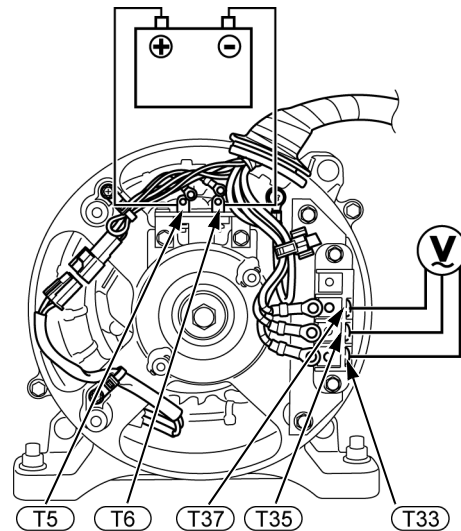
### LDH type

Main winding terminal	Voltage (VAC)
(T33) (Red) – (T37) (Blue)	112 ± 20
(T33) (Red) – (T35) (White)	56 ± 10
(T37) (Blue) – (T35) (White)	

SH, SKH type:



LDH type:



**CONTINUITY INSPECTION**

Remove the generator end cover (Base shop manual: page 5-2).

SH, SKH type:

Disconnect main winding terminals (T2) and (T4) and exciter 3P connector (1).

LDH type:

Disconnect the main winding terminals (T34), (T36), and (T38) and exciter 3P connector (1).

Measure the resistance between the stator side terminals according to the table below.

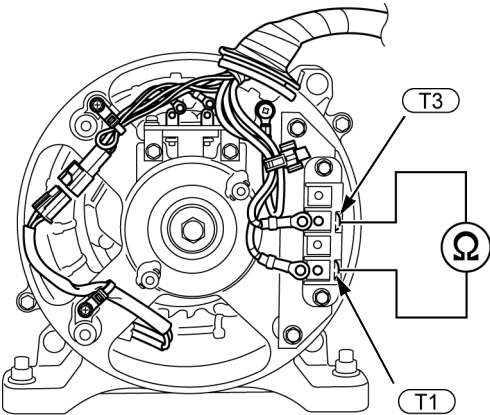
**SH, SKH type**

Main winding terminal	Resistance (Ω) (at 20 °C/68 °F)
T1 (Red) – T3 (Blue)	0.1 - 0.3

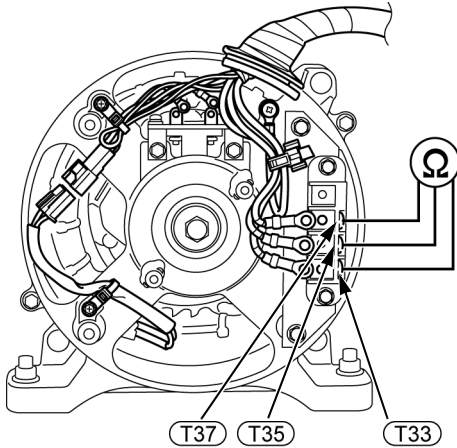
**LDH type**

Main winding terminal	Resistance (Ω) (at 20 °C/68 °F)
T33 (Red) – T35 (White)	0.05 - 0.2
T37 (Blue) – T35 (White)	

SH, SKH type:



LDH type:



**EXCITER WINDING INSPECTION**

**VOLTAGE INSPECTION**

Disconnect the main winding terminals (T2 and T4), field winding connectors (T5 and T6) and exciter 3P connector (1).

Connect a known good 12 V battery to the brush terminals.

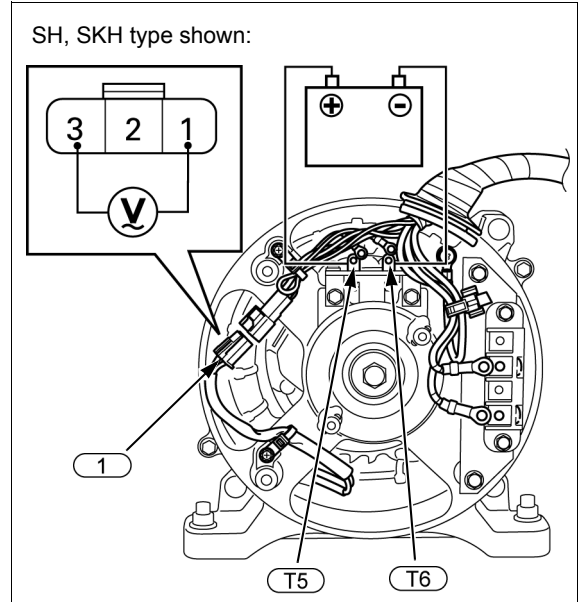
- Battery positive to T5 terminal and negative to T6 terminal.

Start the engine and measure the AC voltage between the exciter winding 3P connector (1) stator side No.1 (Light green/White) terminal and No.3 (Light green/White) terminal with connector connected.

**ALL type**

Exciter winding 3P connector (1)	Voltage (VAC)
No.1 (Light green/White) – No.3 (Light green/White)	43 ± 8

If the specified voltage is not obtained, inspect the resistance (page 8-14).



**RESISTANCE INSPECTION**

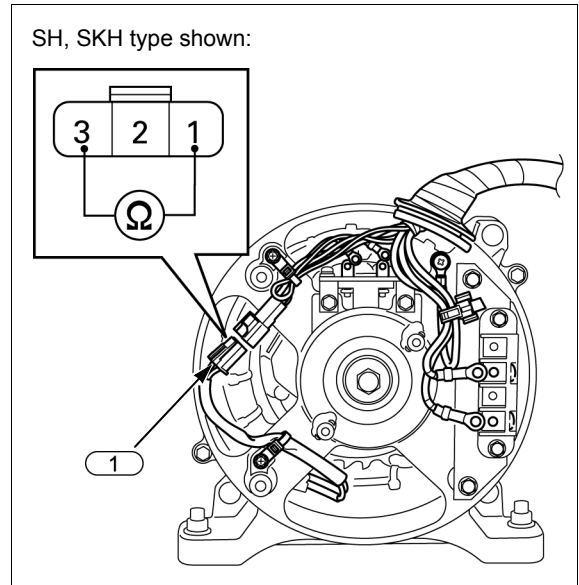
Stop the engine.

Measure the resistance between the exciter winding 3P connector (1) stator side No.1 (Light green/White) terminal and No.3 (Light green/White) terminal.

**ALL type**

Exciter winding 3P connector (1)	Resistance (Ω) (at 20 °C/68 °F)
No.1 (Light green/White) – No.3 (Light green/White)	1.6 - 2.0

If the specified resistance is zero or infinity, replace the stator (page 8-9).



# FIELD WINDING INSPECTION

## VOLTAGE INSPECTION

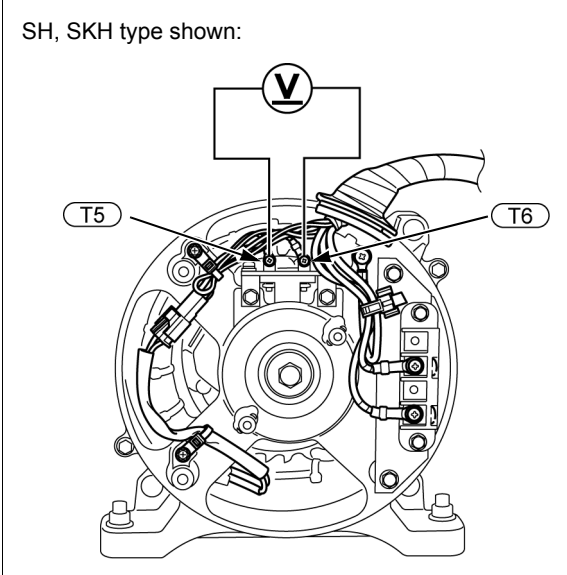
Remove the generator end cover (Base shop manual: page 5-2).

Start the engine and measure the DC voltage at the brush terminals.

**ALL type**

Field winding terminal	Voltage (VDC)
T5 (Red/White) – T6 (Black/White)	38 ± 6

If the specified voltage is not obtained, inspect the resistance (page 8-15).



## RESISTANCE INSPECTION

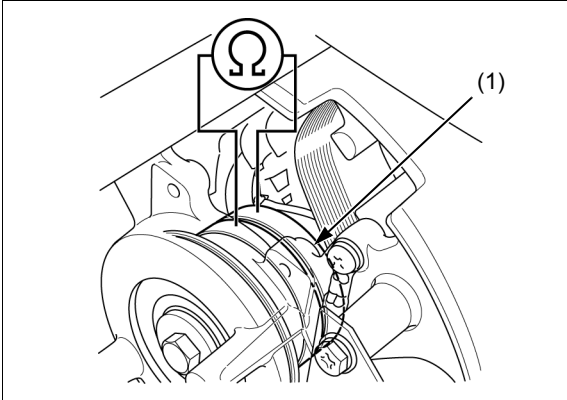
Stop the engine and remove brush holder assembly.

Measure the resistance between the slip rings (1).

**ALL type**

Resistance (Ω) (at 20 °C/68 °F)	49 - 59
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If the specified resistance is zero or infinity, clean the slip rings or replace the rotor (Base shop manual: page 8-19).



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**MEMO**

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**IGNITION COIL INSPECTION.....9-2**

## IGNITION SYSTEM

### IGNITION COIL INSPECTION

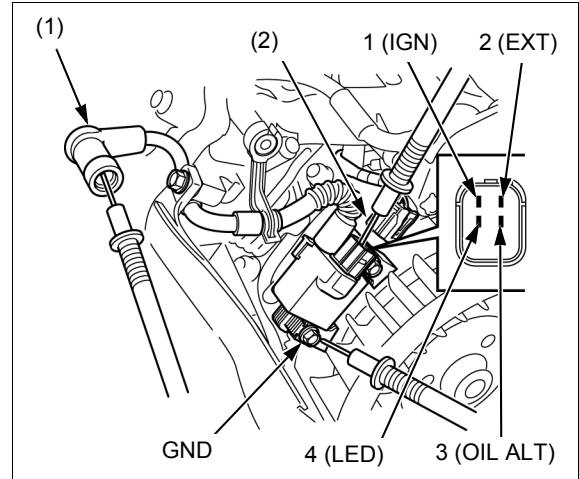
Remove the fan cover (Base shop manual: page 5-3).

Remove the spark plug cap (1).

Disconnect the ignition coil 4P connector (2).

Measure the resistance between the terminals and be sure that the measurements are within the specifications in the table below.

- Use a following range of recommended analog multimeter.  
 SP-18D (SANWA): k $\Omega$  range  
 TH-5H (KOWA): R x 100 range



Unit: k $\Omega$

		(+ ) Probe					
		GND	SPARK PLUG CAP	Terminal number			
				2 (EXT)	1 (IGN)	4 (LED)	3 (OIL ALT)
(-) Probe	GND	-	9.3 - 21.7	6.3 - 14.7	7.1 - 16.7	11.4 - 26.6	7.2 - 16.8
	SPARK PLUG CAP	9.3 - 21.7	-	$\infty$	$\infty$	$\infty$	$\infty$
	Terminal number						
	2 (EXT)	$\infty$	$\infty$	-	$\infty$	$\infty$	$\infty$
	1 (IGN)	$\infty$	$\infty$	$\infty$	-	$\infty$	$\infty$
	4 (LED)	$\infty$	$\infty$	$\infty$	$\infty$	-	$\infty$
3 (OIL ALT)	$\infty$	$\infty$	$\infty$	$\infty$	$\infty$	-	

# 11. OTHER ELECTRICAL

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CONTROL BOX  
REMOVAL/INSTALLATION .....11-2

CONTROL BOX  
DISASSEMBLY/ASSEMBLY .....11-5

CONTROL PANEL  
DISASSEMBLY/ASSEMBLY ..... 11-6

CIRCUIT BREAKER INSPECTION ..... 11-9

# CONTROL BOX REMOVAL/INSTALLATION

Remove the following:

- Maintenance cover/center beam (Base shop manual: page 5-2)
- Fuel tank (Base shop manual: page 6-4)
- Air cleaner (Base shop manual: page 6-6)
- Generator end cover (Base shop manual: page 5-2)

Open the harness band (1).

Disconnect the connector (2).

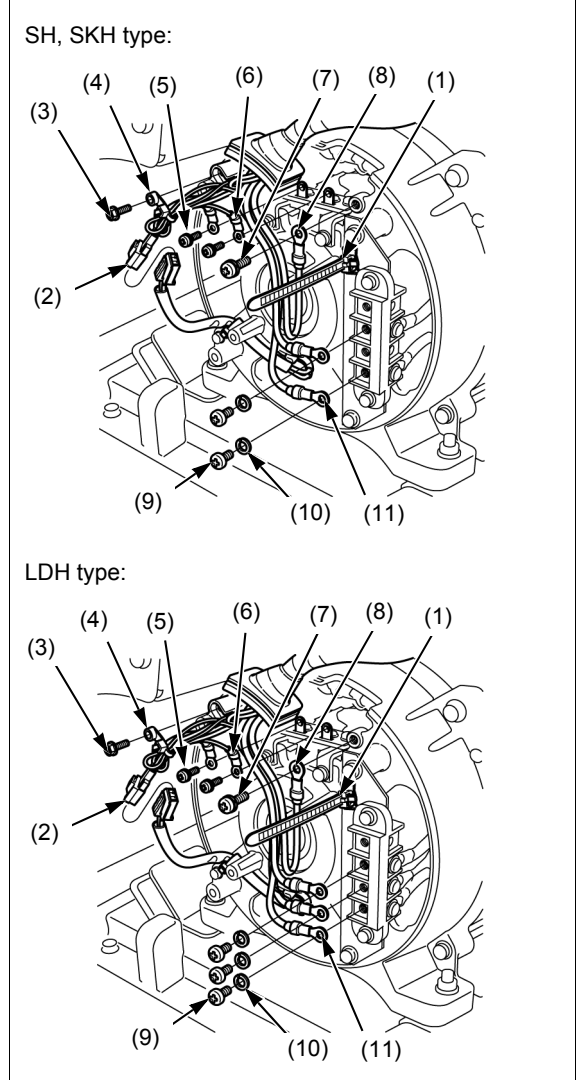
Remove the following:

SH, SKH type:

- tapping screw (5 x 14 mm) (3)/harness band (4)
- two washer-screws (4 x 8 mm) (5)/field winding terminals (6)
- washer-screw (6 x 12 mm) (7)/ground terminal (8)
- two screws (6 x 8 mm) (9)/spring washers (10)/main winding terminals (11)

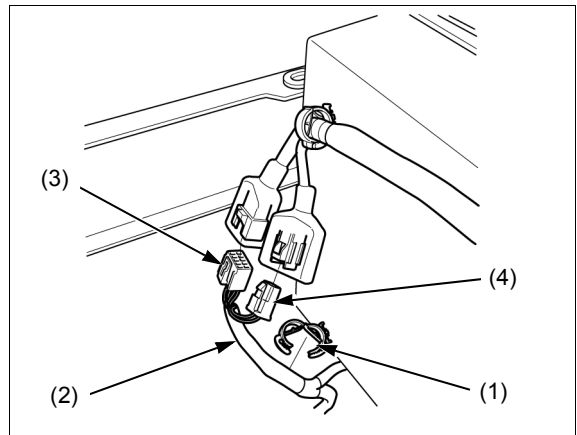
LDH type:

- tapping screw (5 x 14 mm) (3)/harness band (4)
- two washer-screws (4 x 8 mm) (5)/field winding terminals (6)
- washer-screw (6 x 12 mm) (7)/ground terminal (8)
- three screws (6 x 8 mm) (9)/spring washers (10)/main winding terminals (11)

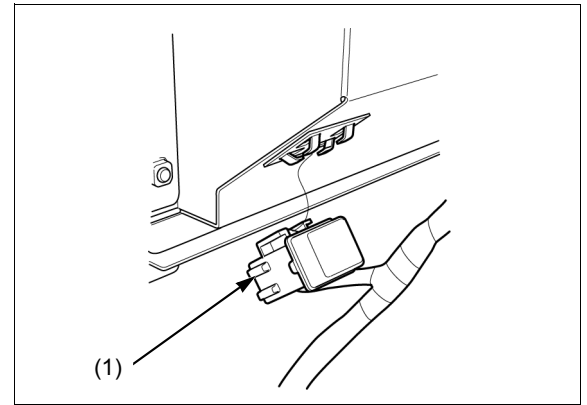


Open the harness clip (1) and release the wire harness (2).

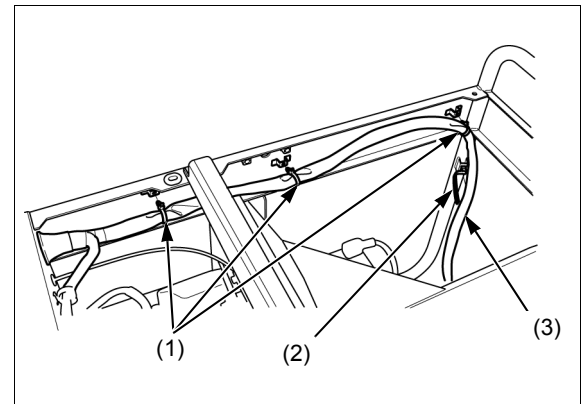
Disconnect the 10P connector (3) and 4P connector (4).



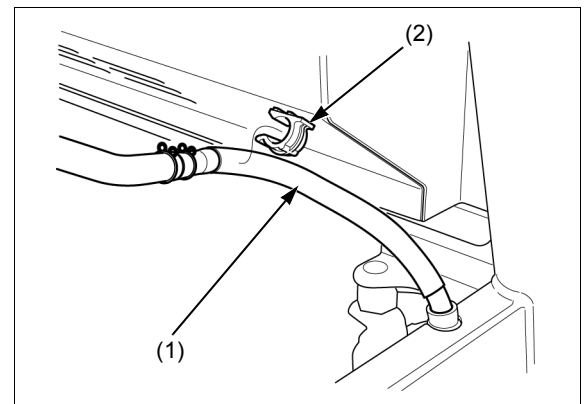
Remove the fuse holder (1) from the control box.



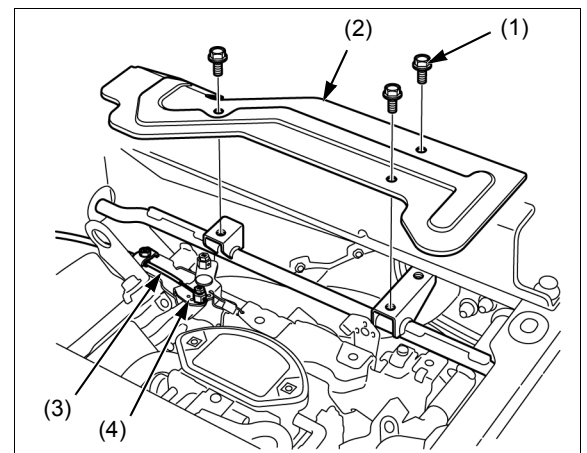
Remove the harness clips (1) from the frame.  
Open the harness clip (2) and release the wire harness (3).



Remove the fuel valve tube (1) from the tube clip (2) on the control box.



Remove the bolts (1) and air guide plate (2).  
Disconnect the choke cable (3) from the choke lever on the control base (4).



## OTHER ELECTRICAL

Remove the bolts and R/L. side covers.

Remove the mounting bolts and remove the control box as an assembly with the control panel.

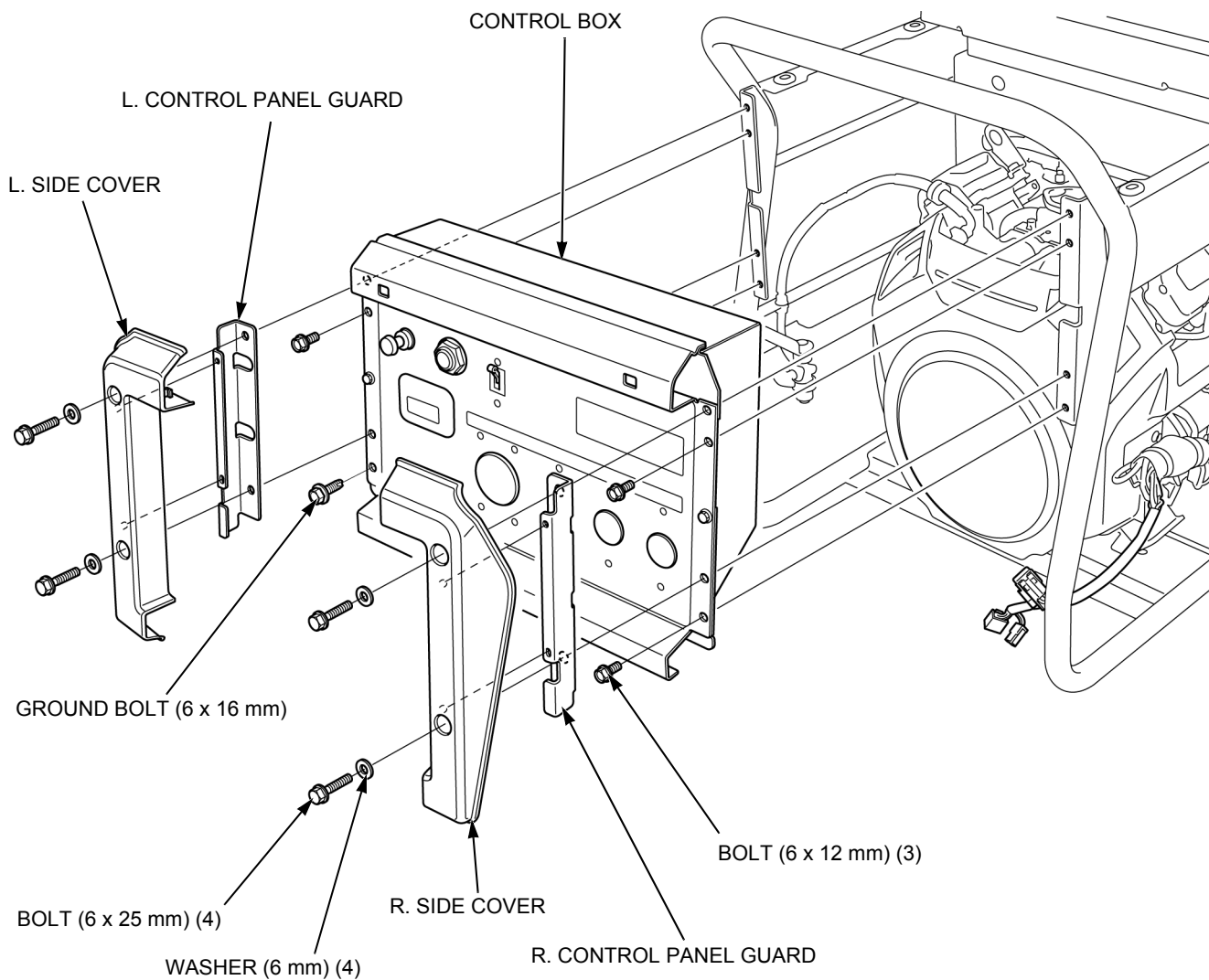
Installation is reverse order of removal.

- Route the harnesses properly (page 2-4, Base shop manual: page 2-12).

### TORQUE:

**CHOKE CABLE HOLDER** 2.5 N·m  
**RECESSED BOLT:** (0.26 kgf·m, 1.8 lbf·ft)

SH type shown:



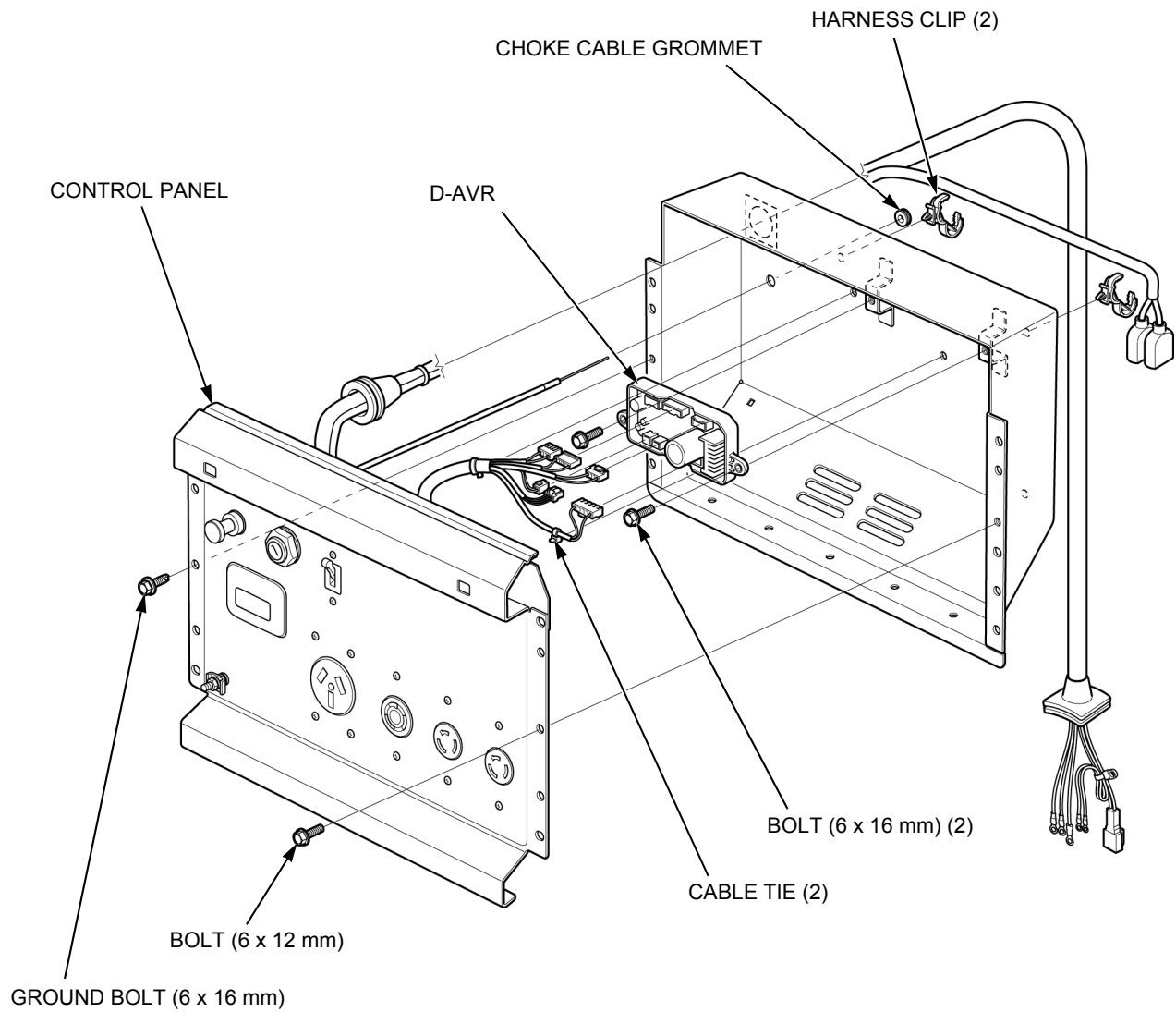
## CONTROL BOX DISASSEMBLY/ASSEMBLY

Remove the control box (page 11-2).

Installation is reverse order of removal.

- Route the harnesses properly (page 2-4, Base shop manual: page 2-12).

SH type shown:



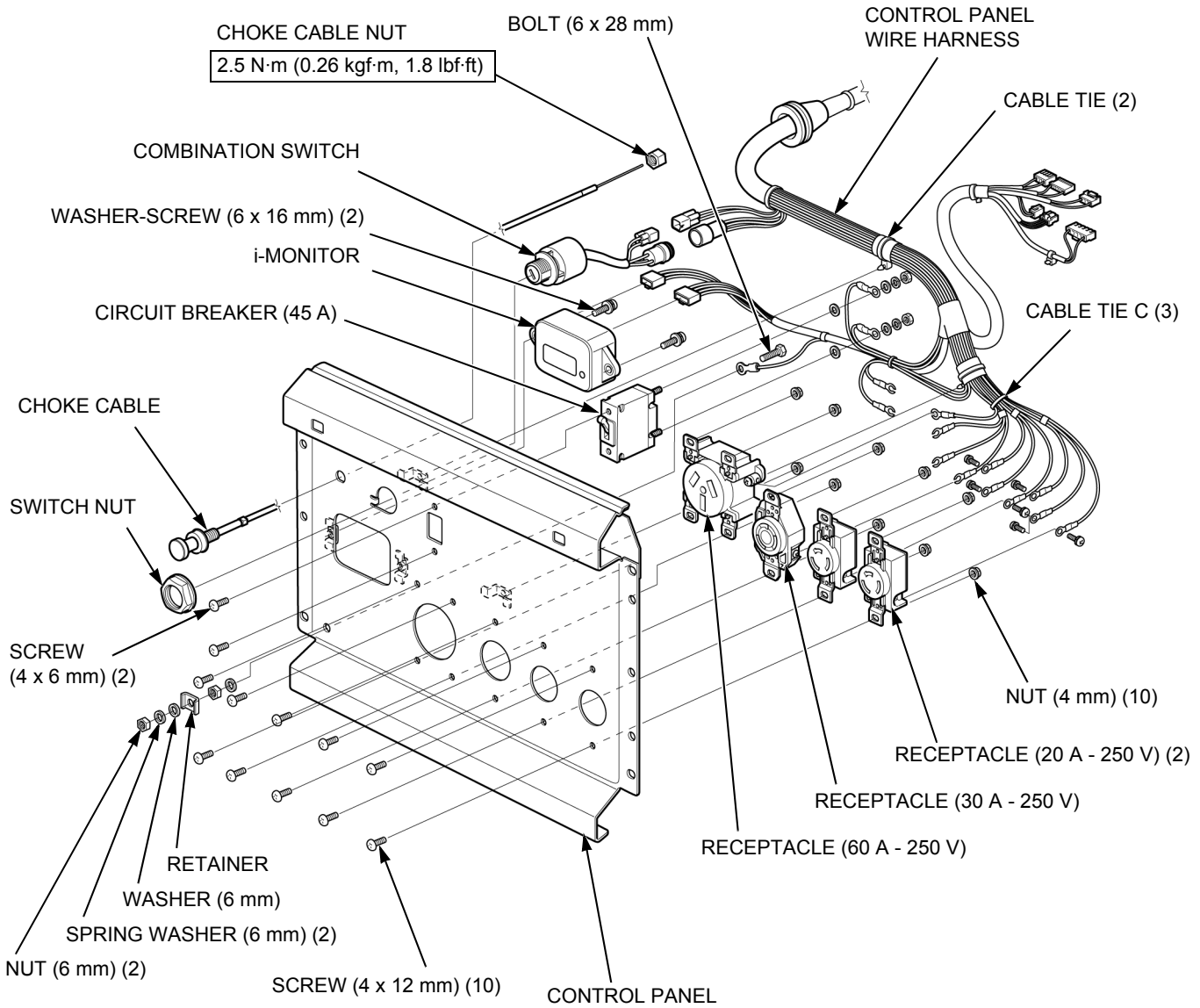
# CONTROL PANEL DISASSEMBLY/ASSEMBLY

Remove the control panel (page 11-5).

Installation is reverse order of removal.

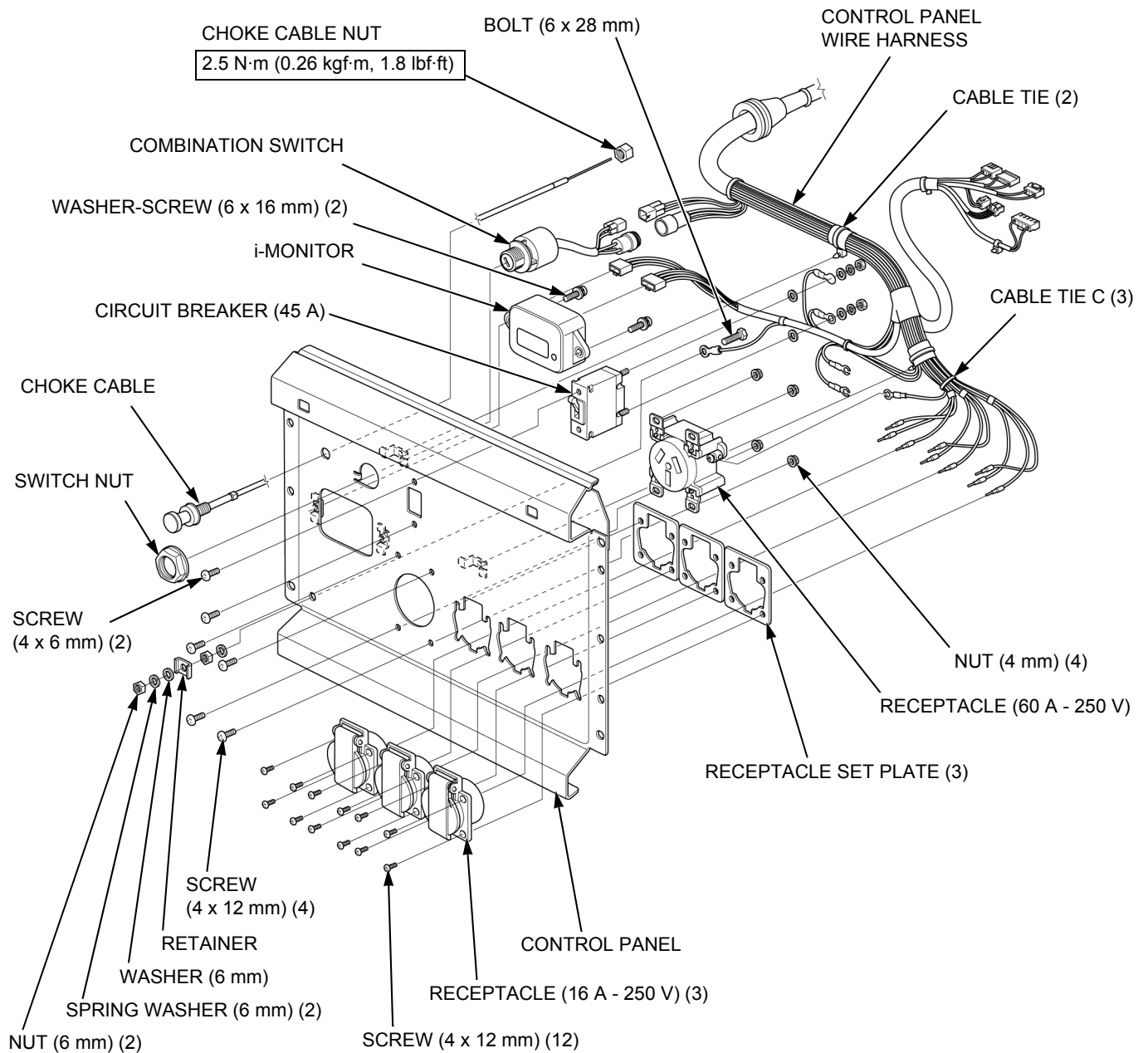
- Route the harnesses properly (page 2-4, Base shop manual: page 2-12).

**SH type**



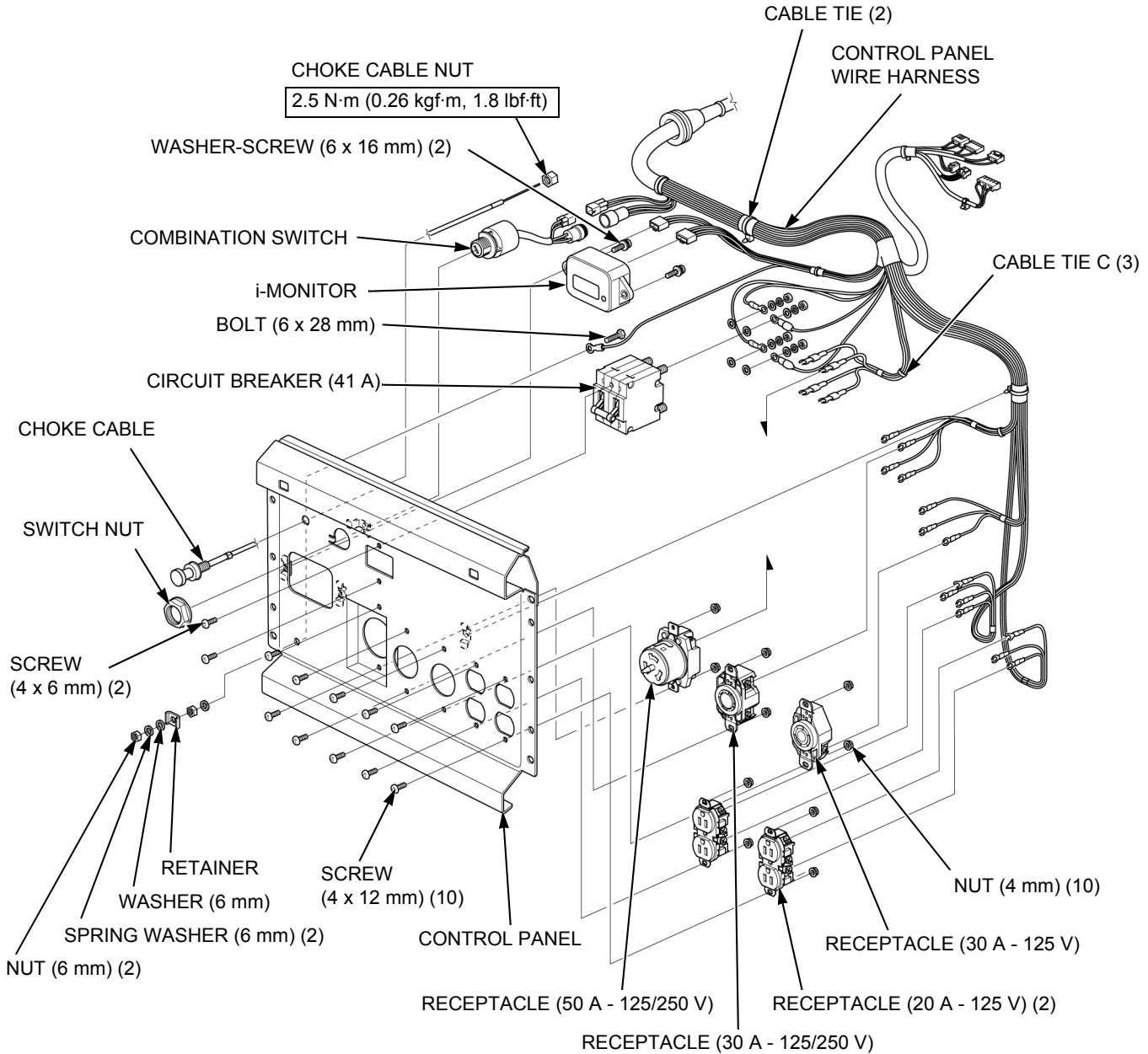


SKH type



# OTHER ELECTRICAL

LDH type



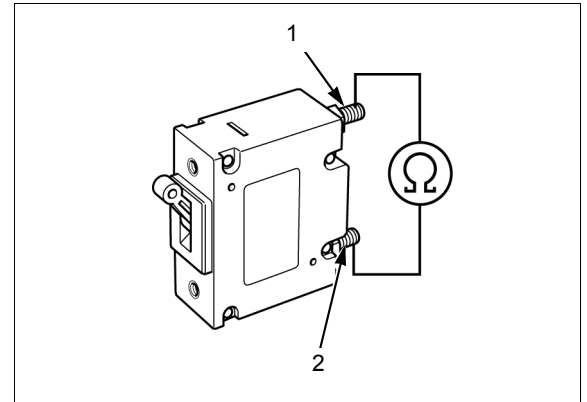
# CIRCUIT BREAKER INSPECTION

## SH, SKH TYPE

Remove the circuit breaker (page 11-6).

Check for continuity between the terminals according to the table below.

Terminal	Position	
	OFF	ON
1	No Continuity	Continuity
2		

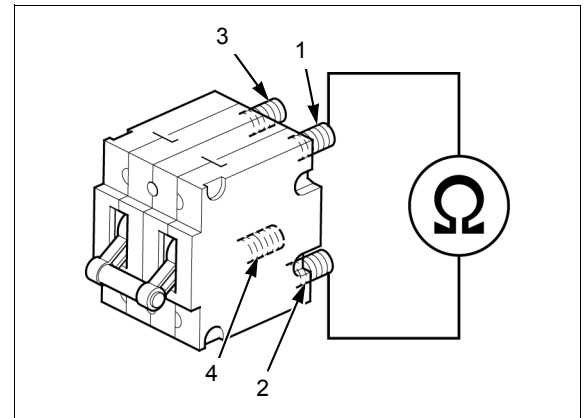


## LDH TYPE

Remove the circuit breaker (page 11-6).

Check for continuity between the terminals according to the table below.

Terminal	Position	
	OFF	ON
1	No Continuity	Continuity
2		
3	No Continuity	Continuity
4		



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**MEMO**

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# 18. WIRING DIAGRAMS

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HOW TO READ A WIRING DIAGRAM  
& RELATED INFORMATION .....18-2

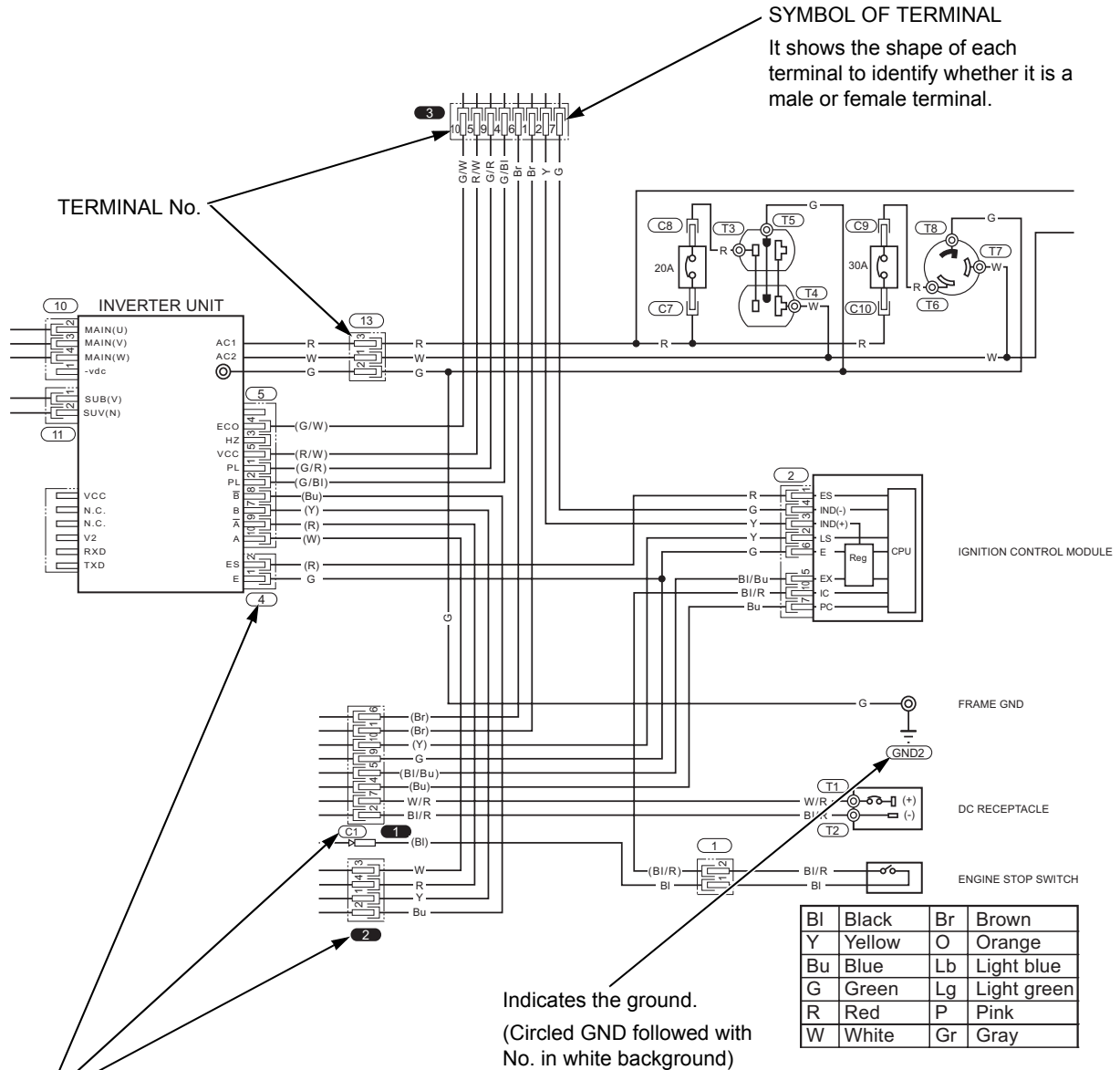
WIRING DIAGRAMS ..... 18-3

# WIRING DIAGRAMS

## HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION

The wiring diagram, connector general layout drawing, connector drawings, and the symbols used in troubleshooting are explained in this section.

### HOW TO READ WIRING DIAGRAM



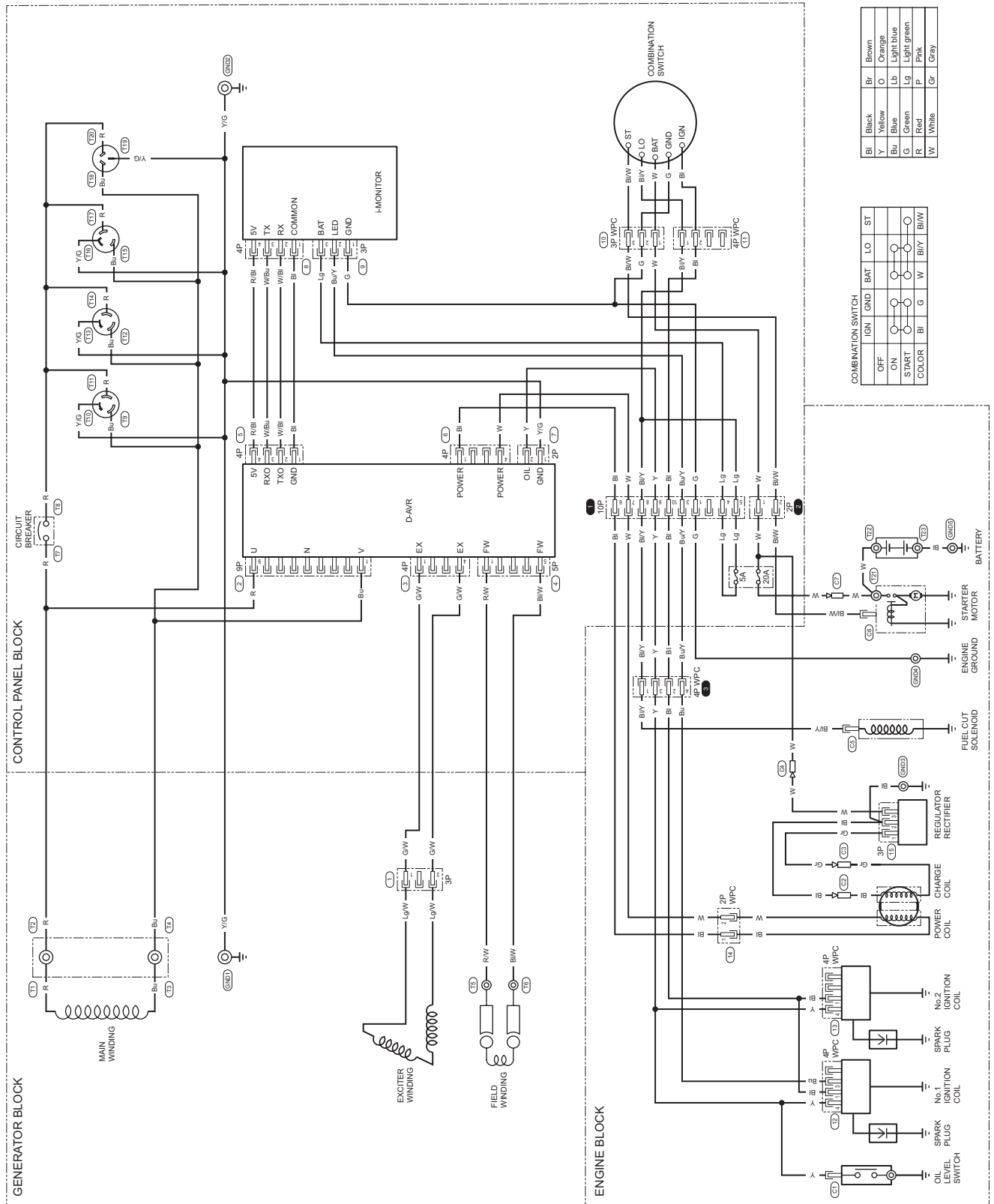
#### CONNECTOR/TERMINAL No.

Every connector and terminal has a number to help the users find the location and shape of the connector and the terminal arrangement by referring to the "Connector general layout drawing" and/or the "Connector drawing". All the connector/terminal numbers shown in this Service Manual are either of those shown in this section.

- 1** : Connector that relays from a harness to a harness (Circled No. in black background)
- 1** : Connector that connects to electrical equipment (Circled No. in white background)
- C1** : Connector (Circled C followed with No. in white background)
- T1** : Terminal (Circled T followed with No. in white background)
- GND1** : Ground (Circled GND followed with No. in white background)

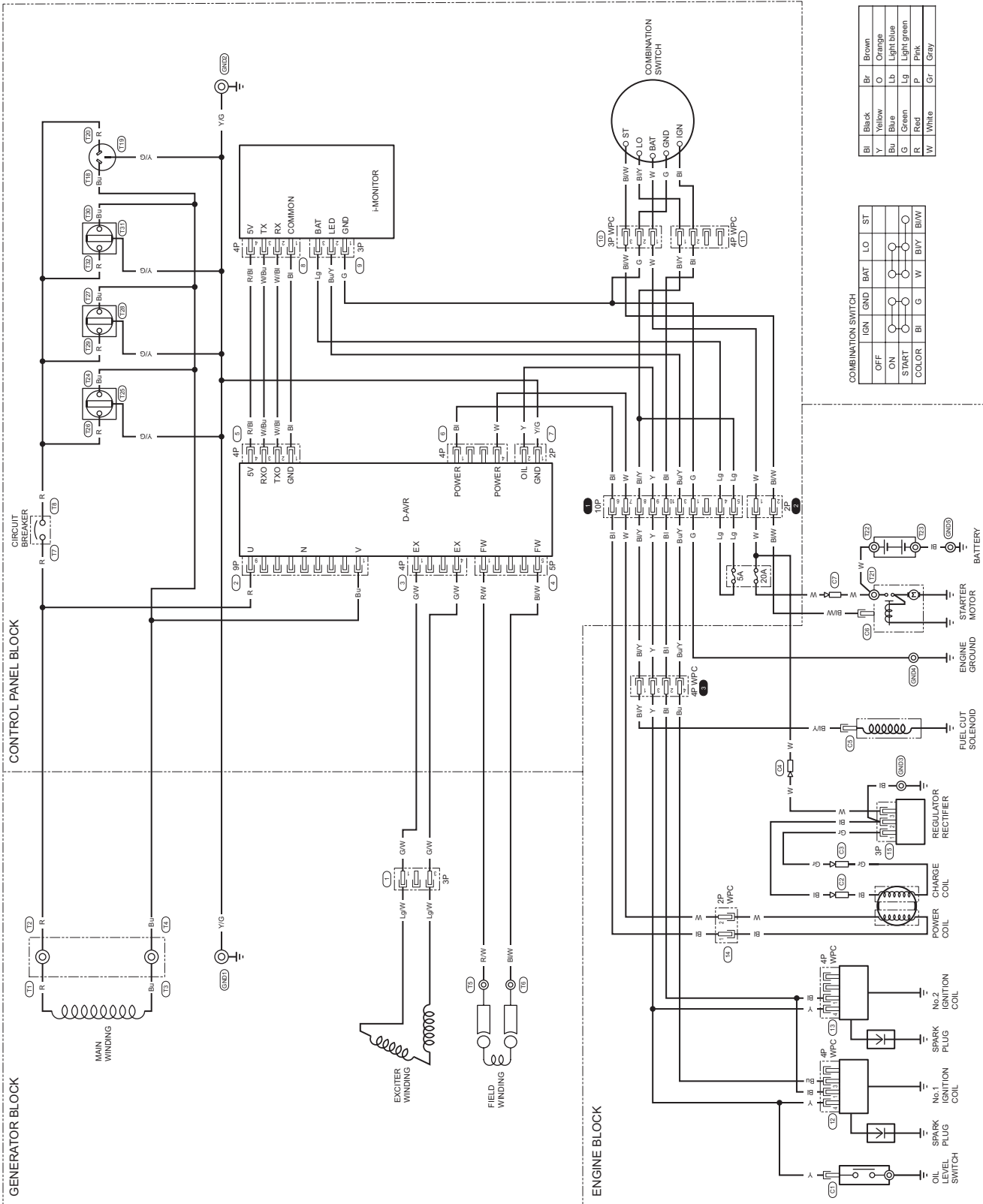
# WIRING DIAGRAMS

SH type



# WIRING DIAGRAMS

SKH type

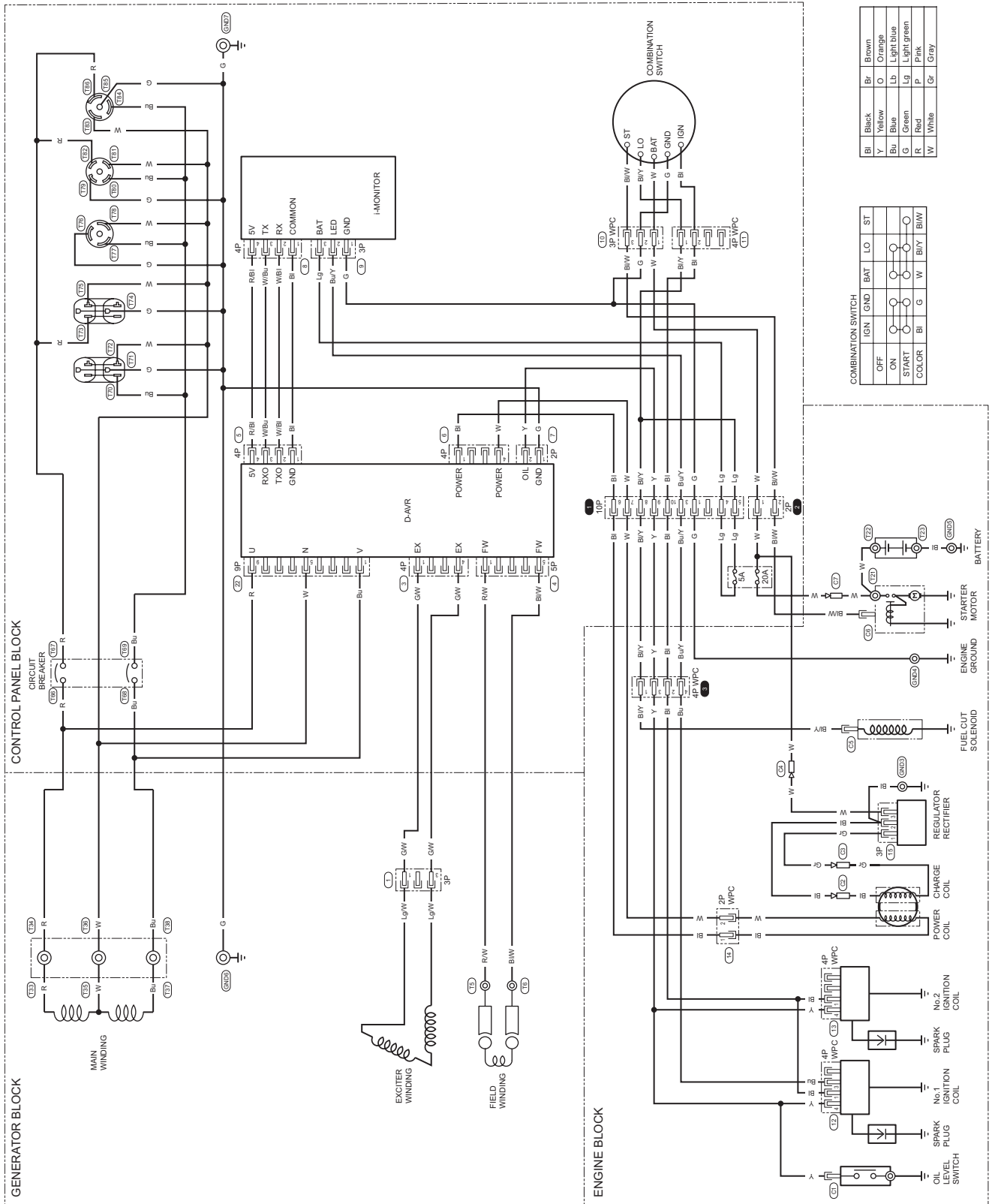


Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

OFF	IGN	GND	BAT	LO	ST
ON	IGN	GND	BAT	LO	ST
START	IGN	GND	BAT	LO	ST
COLOR	Bl	G	W	Bi/Y	Bi/W



LDH type



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**MEMO**

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# INDEX

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CIRCUIT BREAKER INSPECTION .....	11-9	MAIN WINDING INSPECTION .....	8-11
CONTROL BOX DISASSEMBLY/ASSEMBLY .....	11-5	MAINTENANCE STANDARDS .....	2-2
CONTROL BOX REMOVAL/INSTALLATION .....	11-2	PERFORMANCE CURVES .....	1-4
CONTROL PANEL DISASSEMBLY/ASSEMBLY .....	11-6	REAR HOUSING/STATOR REMOVAL/INSTALLATION .....	8-9
EXCITER WINDING INSPECTION .....	8-14	SERIAL NUMBER LOCATION .....	1-2
FIELD WINDING INSPECTION .....	8-15	SPECIFICATIONS .....	1-2
GOVERNOR ARM/CONTROL REMOVAL/INSTALLATION .....	7-2	SYSTEM DIAGRAM GENERATOR SYSTEM .....	8-2
HARNESS ROUTING .....	2-4	TROUBLESHOOTING GENERATOR SYSTEM .....	8-5
HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION .....	18-2	WIRING DIAGRAMS .....	18-3
HOW TO READ CONNECTOR DRAWINGS .....	2-3		
IGNITION COIL INSPECTION .....	9-2		

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