DYNAMO OUTPUT CONTROL UNIT MODEL RB340

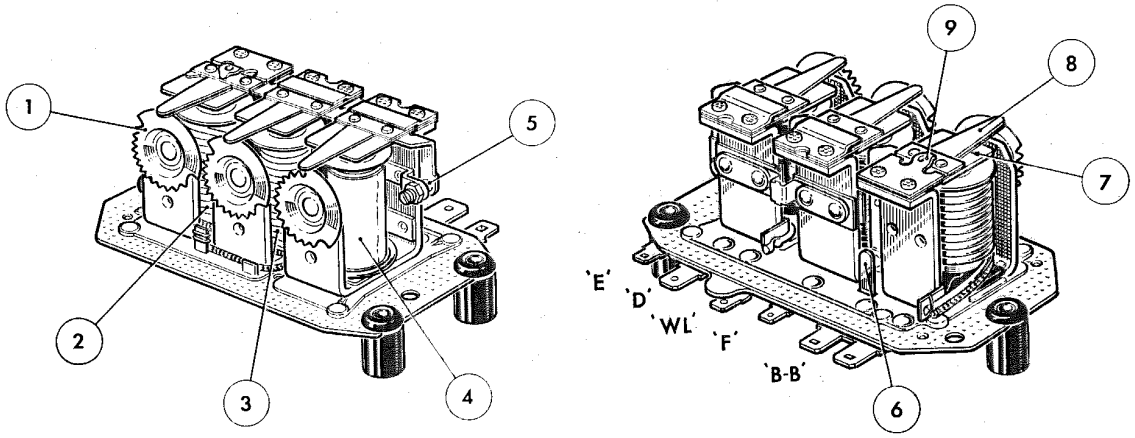

Fig. 1 Current-Voltage Regulator Model RB340
(Flat armature type)

1 Adjustment cams
2 Cut-out relay
3 Current regulator
4 Voltage regulator
5 Voltage regulator contacts
6 Fixed contact bracket
7 Bi-metal backing spring
8 Armature control spring
9 Armature stop

1. DESCRIPTION

The model RB340 is a three-bobbin control unit containing a voltage regulator, a current regulator and a cut-out. Later units have been modified internally by incorporating 'Flat' instead of conventional 'L'-shape armatures. Externally the revised control box is identical to the earlier type except for the part number.

RB340 control boxes, with part number 37563 onwards, incorporate the 'Flat' armature.

The current-voltage control system ensures that the battery is charged at a constant current until a predetermined battery voltage is reached. The voltage regulator then takes over, gradually reducing the charge current to a trickle. This system gives the advantage of maintaining a maximum safe dynamo output for a longer period of time.

The RB340 consists of a shunt (or voltage) winding and a series (or current) winding mounted on separate bobbins. There are two sets of regulator points connected in series. Each contact set is mounted on a separate bobbin.

The contacts are made to open and close under the magnetic influence of the energised windings around each bobbin. The series winding is responsive to variations in dynamo output current and the shunt winding to dynamo voltage.

The cut-out prevents the battery from discharging through the armature windings when the engine is stationary or is running at tick-over speed.

2. SERVICING

(a) Preliminary Check of Charging Circuit

Before disturbing any electrical adjustments, examine as follows to ensure that the fault does not lie outside the control box:

Check the battery by substitution or with a hydrometer.

Check the condition and tension of the dynamo driving belt.

Check the dynamo by disconnecting the cables from the two terminals on the commutator end bracket, and, using an ammeter, link the large terminal 'D' to the small terminal 'F'. Connect a voltmeter between terminal 'D' and earth. Run engine, slowly increasing speed until the voltmeter reads battery volts. Ammeter should read 2–3 amps.

Inspect the wiring of the charging circuit and carry out continuity tests between the dynamo, control box and battery.

Check the control box earth connection.

In the event of reported undercharging, ascertain that this is not due to low mileage.

(b) Voltage Regulator

Checking and Adjustment of the Open-Circuit Setting

IMPORTANT: The open-circuit (O.C.) setting of the voltage regulator varies according to the temperature of the unit and, ideally, the unit should

Dynamo Output Control Unit Model RB340

be 'cold' (i.e. at ambient temperature) when a check of the O.C. voltage is made. The O.C. voltage of a correctly set regulator will then be between the limits given in Col. 2 of the table (according to the ambient temperature given in Col. 1). However, when the regulator is at a higher-than-ambient temperature and cooling time is not available, check the O.C. voltage given in the temperature range 26°–40°C.

An O.C. setting that falls outside these limits BY NO MORE THAN 0.5 VOLTS and is non-fluctuating should be reset to the nearer end (i.e. the maximum or minimum) of the appropriate limits. For example, a regulator checked at 20°C and found to have an O.C. voltage of between 14 and 14.4 volts should be reset to 14.5 volts. It is inadvisable to reset any unit in which the O.C. setting departs from the limits given in Col. 2 by more than 0.5 volts. Such extreme deviation from the normal setting indicates a constructional fault and the control box should be replaced by another of the same part number.

Ambient Temperature	*O.C. Voltage*
0° – 25°C (32° – 77°F)	14.5 – 15.5
26° – 40°C (78° – 104°F)	14.25 – 15.25

Checking and, if necessary, adjusting should be completed as rapidly as possible so that false readings do not result due to heating of the coil windings.

Withdraw the cables from control box terminal blades 'B'.

NOTE 1. If the ignition switch is fed from terminal 'B', it will be necessary to join the ignition and battery feeds together with a suitable 'jumper lead', to enable the engine to be started.

Connect a first-grade 0–20 volt moving-coil voltmeter between control box terminal 'D' and a good earthing point.

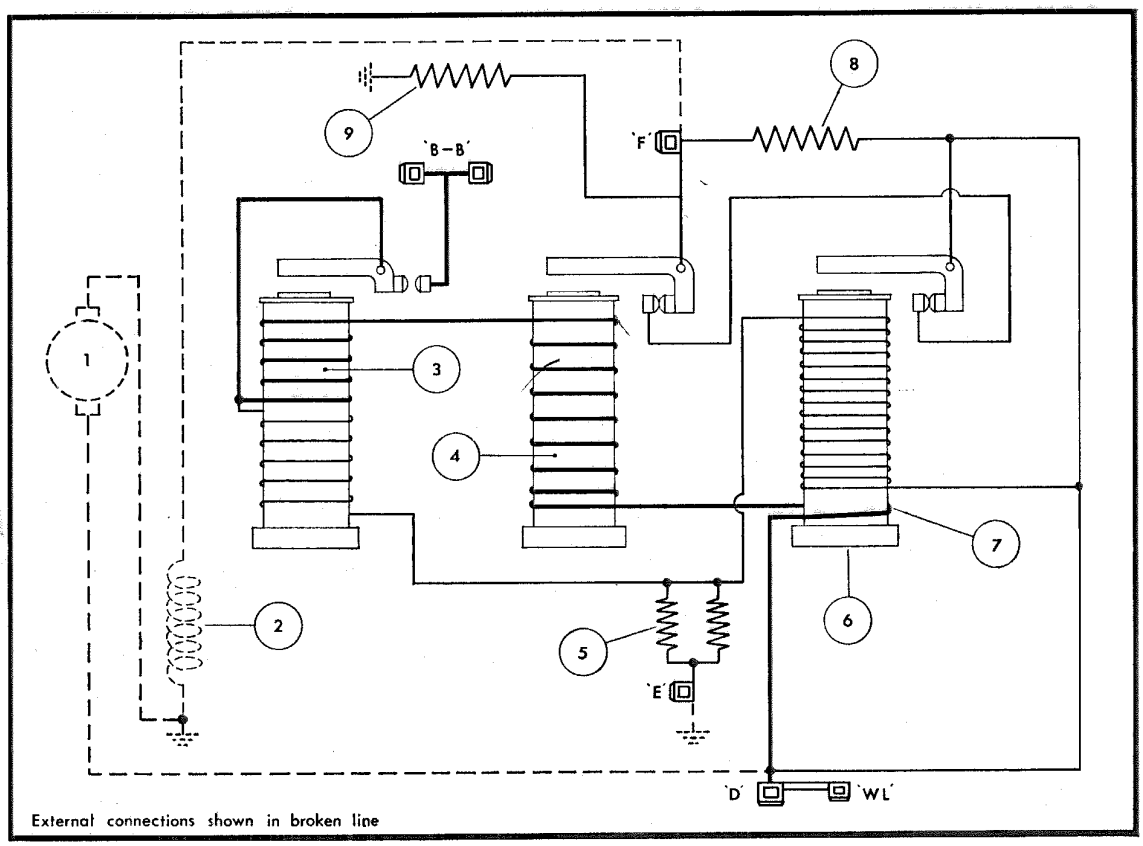

Fig. 2 Regulator internal connections

1 Dynamo armature
2 Dynamo field
3 Cut-out relay
4 Current regulator
5 Swamp resistor
6 Voltage regulator
7 Additional series turn (flat armature type only)
8 Field resistor
9 Field parallel resistor

NOTE 2. A convenient method of making this connection is to withdraw the cable from control box terminal 'WL' and to clip the voltmeter lead of appropriate polarity to this terminal, which is electrically common with terminal 'D'.

Start the engine and run the generator at 3,000 rev/min.

At this speed the voltmeter reading should be steady and lie between the appropriate limits given in Col. 2. An unsteady reading may be due to dirty contacts (see para. F). If the reading is steady but occurs outside the appropriate limits, adjust the unit as follows:

Stop the engine and remove the control box cover by pressing the centre core through each of the two 'Rokut' rivets. The rivets (and thus the cover) can then be lifted off. Re-start the engine and run the dynamo at 3,000 rev/min.

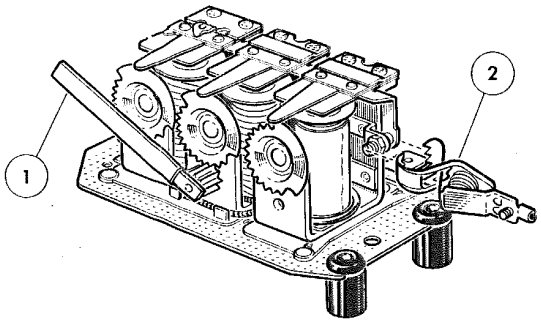

Fig. 3 Current regulator adjustment

1 Setting tool **2** 'Bulldog' clip

Using a suitable tool (e.g. Lucas No. 54381742, see Fig. 3), turn the voltage adjustment cam until the correct setting is obtained – turning the tool clockwise to raise the setting or anti-clockwise to lower it.

Check the setting by reducing the dynamo speed (engine speed at tickover), and then again raising it to 3,000 rev/min. Finally, restore the original connections and refit the cover.

(c) Current Regulator

(i) On-Load Setting

The current regulator on-load setting is equal to the maximum rated output of the dynamo. A table giving the current rating for all RB340 control boxes is given on pages 6 and 7.

NOTE: **Flat Armature Type only.** The closed circuit voltage of the charging system (with the current regulator in operation) can be higher than the open-circuit setting of the voltage regulator. This is due to the single series turn which is wound round the voltage regulator bobbin (in opposition to the voltage regulator shunt winding) to improve the charging and load balancing characteristics.

(ii) Method of Checking and Adjustment

The dynamo must be made to develop its maximum rated output, irrespective of the state of charge of the battery. The voltage regulator must, therefore, be rendered inoperative by clamping the contacts together with a bull-dog clip (see Fig. 3), or alternatively (without removing the cover) by connecting a 0.5 ohm resistor with a rating of not less than 30 amps, across the battery terminals. Withdraw the cables from control box terminal blades 'B'. Using a suitable 'jumper lead', connect the cables to the load side of a first-grade 0–40 amp moving-coil ammeter. Connect the other side of the ammeter to one of the control box terminal blades 'B'.

NOTE: Ensure that terminal 'B' carries only this one connection. All other load connections (including the ignition coil feed) must be made to the battery side of the ammeter.

Start the engine and run the generator at 4,500 rev/min.

The ammeter should indicate a steady reading equal to the maximum current rating of the dynamo. An unsteady reading may be due to dirty contacts (see para. F). If the reading is too high or too low, an adjustment must be made. In this event, continue as follows:

With the cover removed, use the cam adjustment tool to turn the cam until the correct setting is obtained – turning the tool clockwise to raise the setting or anti-clockwise to lower it.

Switch off the engine and restore the original connections.

Refit the control box cover.

(d) Cut-Out Relay

(i) Electrical Settings

(i) Cut-in voltage: 12.7 – 13.3

(ii) Drop-off voltage: 9.5 – 11.0

(ii) Method of Cut-in Adjustment

Checking and adjustment should be completed as rapidly as possible to avoid errors due to heating of the operating coil.

Connect a first-grade 0–20 volt moving-coil voltmeter between control box terminal 'D' and a good earthing point (see Note 2, para. 2b).

Switch on an electrical load, i.e. headlamps.

Start the engine and slowly increase its speed.

The voltage should rise steadily and then drop slightly at the instant of contact closure. The cut-in voltage is that which is indicated immediately before

the pointer drops back. It should occur between the limits 12.7–13.3 volts. If the cut-in occurs outside these limits, reduce engine speed to below cut-in value and adjust as follows:

Remove the control box cover. Turn the cut-out relay adjustment cam – clockwise to raise the setting or anti-clockwise to lower it. Repeat the above checking procedure until the correct setting is obtained.

Switch off the engine, restore the original connections and refit the cover.

(iii) Method of Drop-off Adjustment

Withdraw the cables from control box terminal blades 'B' (see Note 1, para. 2b).

Connect a first-grade 0–20 volt moving-coil voltmeter between control box terminal 'B' and earth.

Start the engine and run up to approximately 3,000 rev/min. Slowly decelerate and observe the voltmeter pointer.

Opening of the contacts, indicated by the voltmeter pointer dropping to zero, should occur between the limits 9.5–11.0 volts. If the drop-off occurs outside these limits adjust as follows:

Stop the engine and remove the control box cover. Adjust the drop-off voltage by carefully bending the fixed contact bracket. Reducing the contact gap will raise the drop-off voltage; increasing the gap will lower the drop-off voltage. Re-test and, if necessary, re-adjust until the correct drop-off setting is obtained.

Restore the original connections and refit the cover.

(e) Adjustment of Air Gap Settings.

Air gap settings are accurately adjusted during production of the control box and should require no further attention. If the original settings have been disturbed, it will be necessary to reset as follows:

(i) Armature-to-Bobbin Core Gaps of Voltage and Current Regulators (Fig. 4)

Turn the adjustment cam to the point giving minimum lift to the armature tensioning spring, i.e. by turning the tool anti-clockwise. Slacken the adjustable contact locking nut, and screw back the adjustable contact.

Insert a flat steel feeler gauge of 0.054″ ±0.002″ (1.37 ±0.05 mm) – Standard type, or 0.022″ ±0.003″ (0.559 ±0.076 mm) – Flat armature type, between the armature and the core face. Insert the gauge as far back as the rivet heads on the underside of the armature. Retain the gauge in this position and press the armature down squarely on to it, screw in the adjustable contact until it just touches the armature contact. Retighten the locking nut and withdraw the gauge.

Carry out the electrical setting procedure.

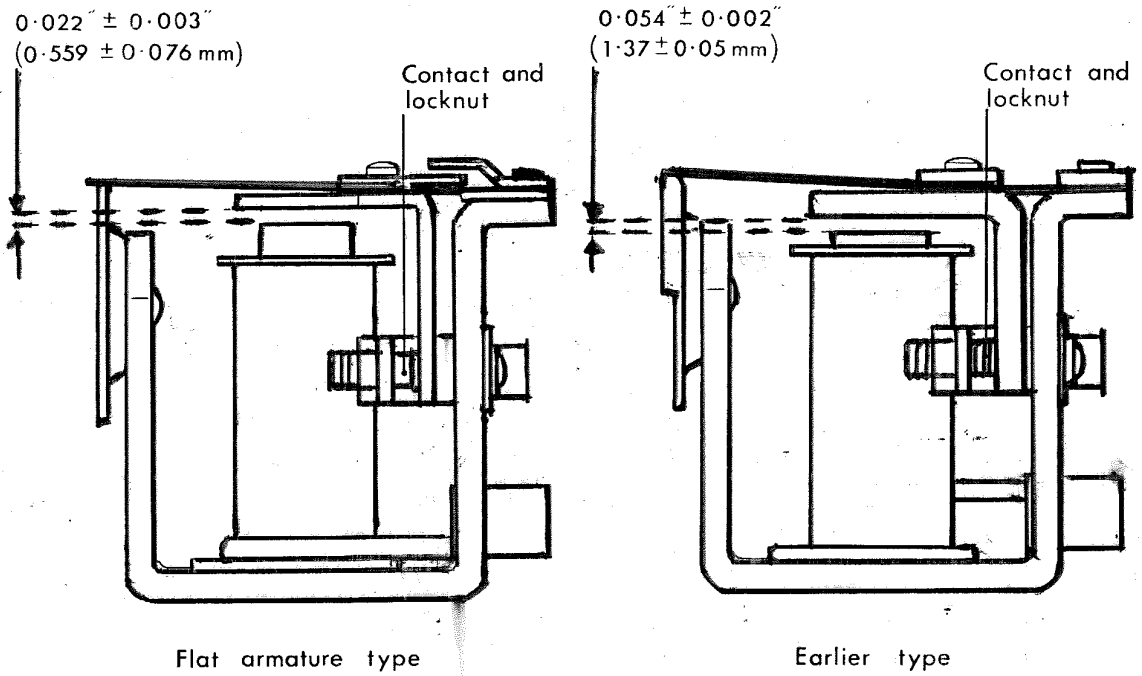

Fig. 4 Current and voltage regulators

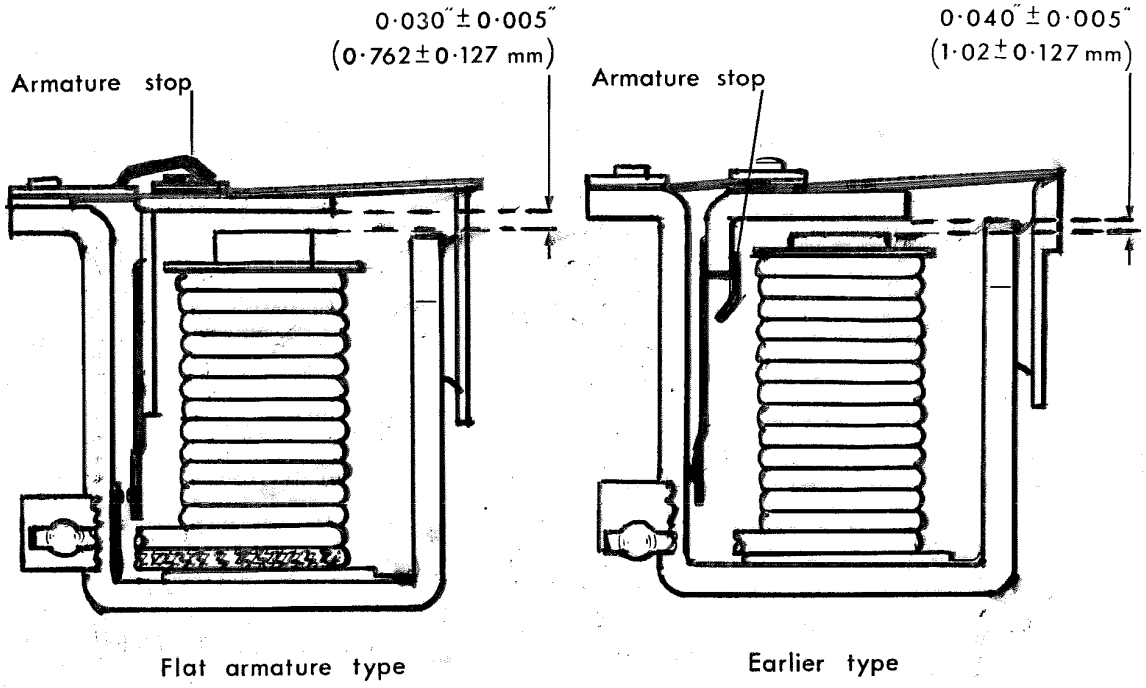

Fig. 5 Cut-out relay

(ii) Armature-to-Bobbin Core Gap of Cut-out Relay (Fig. 5)

Insert a flat steel feeler gauge of 0.015″ (0.38 mm) between the head of the core and the armature, using the rivet heads as a datum. Press the armature down and bend the fixed contact bracket until the two contacts just touch. (This is a preliminary setting for contact 'follow-through').

Check that the top gap, controlled by the armature stop and using the nearest rivet as a datum, is 0.040″ ±0.005″ (1.02 ±0.127 mm) – Standard type, or 0.030″ ±0.005″ (0.762 ±0.127 mm) – Flat armature type. Adjust the armature stop as necessary.

Check the cut-in and drop-off voltage settings.

(f) Cleaning Contacts

(i) Regulator Contacts

To clean the voltage or current regulator contacts, use fine carborundum stone or silicon carbide paper followed by methylated spirits (denatured alcohol).

(ii) Cut-out Relay Contacts

To clean the cut-out relay contacts, use a strip of fine glass paper – never carborundum stone or emery cloth.

(g) Resistance Values at 20°C (68°F)

(i) Contacts Resistors	*Resistance in ohms*	*Colour Identification*
As fitted to units controlling dynamos having 4.5 ohm field winding ...	37 – 43	Yellow
As fitted to units controlling dynamos having 5.25 or 6 ohm field windings	55 – 65	Red
As fitted to C48 dynamos	75 – 85	Violet

Dynamo Output Control Unit Model RB340

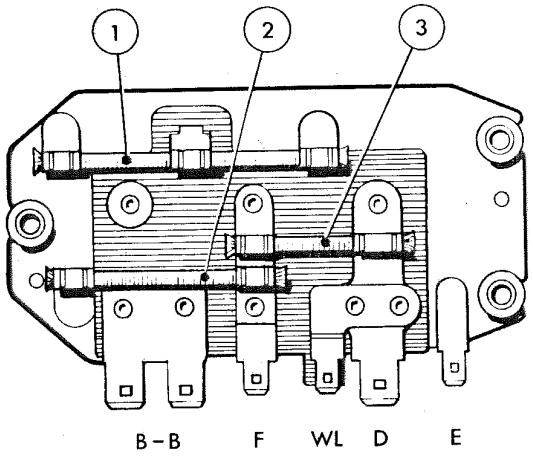

Fig. 6 Underside view of control box

1 Swamp resistor
2 Field parallel resistor (when fitted)
3 Contacts resistor

(ii) Swamp Resistors	*Resistance in ohms*	*Colour Identification*
Measured on unit between centre tag and base (terminals 'D', 'F' and 'WL' disconnected)	13.25 – 14.25	
Replacement resistor measured between end tags before fitting to unit ...	53 – 57	
(iii) Field Parallel Resistors		
As fitted to units controlling Model C48 dynamos and C42 Part Number 37517	95 – 105	Orange
(iv) Shunt Windings		
Voltage regulator ...	10.8 – 12.0	
Cut-out relay	8.8 – 10.5	

RB340 – CURRENT RATINGS AND ASSOCIATED DYNAMOS

Earlier Type

Part No.	*Associated Dynamo*	*Current Setting (Amps) at 4,500 rev/min*	*Part No.*	*Associated Dynamo*	*Current Setting (Amps) at 4,500 rev/min*
37331	C42	30 ±1	37451	C40T (5 turn)	22 ±1
37342	C40L	25 ±1			
37344	C40	22 ±1	37493	C40	19 ±1
37347	C42S	35 ±1	37497	C42	30 ±1
37354	C48	35 +0 −2 (4,000 rev/min)	37498	C40L	25 ±1
			37499	C42	30 ±1
37362	C40	22 ±1	37500	C40T (7 turn)	18 ±1
37363	C42	30 ±1	37501	C40	19 ±1
37374	C42	30 ±1	37503	C40A (7 turn)	10.5 ±0.5
37378	C42	30 ±1			
37392	C40	22 ±1	37517	C42	30 ±1
37419	C48	35 +0 −2 (4,000 rev/min)	37522	C40R	28 ±1
			37528	C40	22 ±1
			37529	C40L	25 ±1
37430	C40R	28 +2 −0	37530	C42	30 ±1
			37542	C40	22 ±1
37431	C40A (7 turn)	10.5 ±0.5	37543	C40L	25 ±1
			37544	C40T (5 turn)	22 ±1
37432	C40A (5 turn)	10.5 ±0.5			
37450	C40T (7 turn)	18 ±1	37547	C40T (5 turn)	22 ±1

Dynamo Output Control Unit Model RB340

Flat Armature Type

Part No.	*Associated Dynamo*	*Current Setting (Amps) at 4,500 rev/min*	*Part No.*	*Associated Dynamo*	*Current Setting (Amps) at 4,500 rev/min*
37563	C40	22 ±1	37573	C40T (5 turn)	22 ±1
37568	C40L	25 ±1			
37569	C40	22 ±1	37574	C40L	25 ±1
37570	C40	22 ±1	37575	C42	30 ±1
37571	C40T (5 turn)	22 ±1	37576	C42	30 ±1
			37577	C40A	10.5 ±0.5
37572	C40T (5 turn)	22 ±1	37578	C40T (7 turn)	19 ±1