

Lingo Service Manual

Lingo power supply for LP12 Turntable

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Introduction

About the Lingo

Introduced: 1990

The Linn LINGO is a high precision, direct coupled, power supply designed to sit alongside the LP12 turntable.

How it works

At the heart of the Lingo are two very low noise crystal oscillators derived from the Linn Numerik digital studio recording system – one for 33.33rpm and one for 45rpm. The switch on the turntable selects the appropriate oscillator, the output of which is fed into a synchronous counter to produce a 50 Hz or 67.5 Hz square wave for 33 rpm and 45 rpm respectively.

As the LP12 motor runs at its quietest when driven with a clean sinusoidal waveform, a precision filter is employed in the Lingo to remove harmonics from the square wave, leaving only a pure wave-form.

The most uniform torque is delivered from the motor when both phases are driven at ninety degrees with respect to one another. This is achieved by a ninety-degree phase-shift network after the filter. The two resulting sinusoids drive two high voltage class A amplifiers, the outputs of which drive the two motor windings.

“Stall” mode explained

The Lingo has what we call a “Stall” mode. When the Lingo is switched on via the turntable switch, it supplies the turntable motor with a much higher than normal voltage to get the heavy LP12 platter up to running speed. We call this “stall” mode. Once the platter is up to speed, the voltage drops to a much lower level and the motor just maintains the platter's own inertia to keep it going silently.

If someone or something slows the platter during normal use, e.g. someone changes the record while the platter is turning, the “Stall detect” circuitry will detect this and apply the higher voltage again for a short time to get the platter back up to speed again.

When the Lingo is in “stall” mode, the LED on the turntable switch (red or green depending on whether 33 or 45 running) will brighten for the duration of the stall and then dim when running normally.

Stall mode contributes to the sound quality of the Lingo, as minimal power to the motor gives minimal interference.

Lingo Power

A toroidal transformer on the PCB, and a mains filter, give a very high degree of electrical isolation from the mains voltage supply.

Lingo Test Procedure

The Lingo Test Procedure (accessible via Linn Website Product Information) takes you through the functional testing and adjustment of the Lingo.

About this manual

This manual is designed to help you as a Linn Retailer or Distributor to provide the best possible service for your customer should a problem arise.

If you have any suggestions or comments regarding this manual, please contact Paul O'Neill at Linn

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Retailer & Distributor Obligations

Linn Specialist Retailers or Distributors are obliged to carry out the repairs in this manual under the terms of the contract & warranty agreements. You should return a faulty product to Linn for repair, only if the fault is not covered in this Service Manual. If a product, which is under warranty, is returned to Linn for repair and the fault is covered in the service manual, Linn may levy a charge and this charge should not be passed to the customer.



How to use this manual

The main body of this manual, the fault table, is designed to be as quick and simple as possible to use when you are confronted with a faulty product and so it is arranged by fault symptom as the symptom is usually all that you will know about the fault.

If you are unsure about the meaning of any words or phrases, look in the Glossary.(Accessible via Linfo Website Product Information)

A Lingo Test Procedure is available. This takes you through the functional test and adjustment of the Lingo (Accessible via Linfo Website Product Information)

Before embarking on any Service work, you should read the Service Procedures section (accessible via Linfo Website Product Information), as there are certain procedures that must be followed in order to ensure the problem is resolved quickly and permanently

Table of contents & fault symptoms

Look firstly at the table of contents and find the category that covers the symptom you are seeing, then look down the list of faults in that section until you find the symptom or symptoms that best describe the problem.

Circumstances

Then simply follow the table along – the table specifies circumstances surrounding the fault symptom – e.g. whether the fault is likely to be intermittent or constant, if the fault only occurs within a range of serial numbers etc.

Possible causes

The next column details possible causes – this is effectively the most important section, probably the main reason you are looking at this manual at all. There may be several possible causes for the symptom you have – it is worth checking out all of these (and bear in mind that there may be more than one fault). For some faults, simple checks are detailed that you can use to rule out the problem without replacing any parts, whereas for other faults, the simplest way to rule out the problem is to replace the component(s) listed

Cure

Quite simply the action that you must take to cure the problem.

Links within this manual

You should be able to simply click on the words & phrases highlighted in red to access the section or document they represent.

Installation

Important Safety Information

Mains connections

This appliance **must** be earthed – both for Safety and functional reasons.

The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow	:	Earth
Blue	:	Neutral
Brown	:	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire coloured **Green & Yellow** must be connected to the terminal in the plug that is marked with the letter **E** (earth) or the **Earth symbol**; or is coloured **Green** or **Green/Yellow**.

The wire coloured **Blue** must be connected to the terminal that is marked with the letter **N** (neutral) or coloured **Black**.

The wire coloured **Brown** must be connected to the terminal that is marked with the letter **L** (live) or coloured **Red**.



Lethal Voltages

Inside the Lingo, lethal voltages are present – do not touch any part of the circuitry with any part of your body or with metallic or conductive objects. Avoid especially the mains inlet and its connectors, however on the Lingo there are several areas of circuitry containing lethal voltages.

Installation

Unpack the product & retain the packing for future transportation.

See LP12 Circuitry Installation Procedure (Accessible via Linfo Website Product Information) for instructions on correct fitting etc.

As a Linn retailer, you are responsible for ensuring correct installation of the product. Consult the user manual and read the Placement & Handling information below.

Placement

Location & Environment

Do not locate near electronic products that may transmit RF, such as microcomputers, fax machines, TVs etc, or connect them to the same mains socket as these devices. Also avoid close contact with the mains or signal leads of such products – careful routing of the cables may be required.

Although the Lingo can usually be stacked along with other products with no problem, it is better if possible to keep it apart from other products to prevent its operation being adversely affected by the heat and strong electrical field emitted by some products.

Avoid locations that have high humidity or the chance of the unit getting wet.

Avoid locations where there is a lot of dust.

Handling & general maintenance.

No standard maintenance is possible or advisable.

Always handle the Lingo with great care.

Always turn off the unit before connecting or disconnecting the plug to/from the socket at the back of the unit.

If you are carrying out any work on the unit with its' sleeve removed, remember that lethal voltages are present and **ALWAYS** take anti-static precautions as tiny static discharges from your body, which you may be completely unaware of, can damage electronic circuitry and cause major problems. Anti-static earth mats & wrist straps must be used when handling any of the circuit boards or any spare parts.



Power-up problems

Important note - It is very important to differentiate between “powering up” and “switching on” the Lingo. We define “powering up” as connecting the unit to the mains & switching on the Power switch on the Lingo fascia. “Switching on”, on the other hand comprises of pressing the switch on the LP12 to start the platter turning. This section deals with Power up only – Switch on is dealt with in the “Switch on & LED problems” section below.

It is also important to note the difference between the “Power LED”, i.e. the LED at the Lingo fascia and the “switch LEDs”, i.e. the green & red LEDs on the turntable switch.

See the Lingo Test Procedure (Accessible via Linfo Website Product Information) for instructions on how to check the function and adjust the Lingo

<u>Power up problems</u>			
Symptom	Circumstances	Possible Cause(s)	Cure
Won't power up. Power LED dead & no function	Constant	Fuse blown in unit and/or in mains plug.	Replace fuse(s) with correct value & type. Fuse in mains lead should be 5A. Fuse in Lingo should be “Slow Blow” – look for a ‘T’ before the rating on the fuse. Correct type: 110/115V - 300mA 220/240V - 200mA
Won't power up - Power LED dead & no function	May be intermittent	Mains lead faulty	Replace faulty mains lead.
Power LED dead	Lingo functions okay otherwise. May be intermittent	LED is faulty, has a broken leg, bad connection, poor positioning (i.e. LED lights okay but is positioned such that its light cannot be seen through fascia)	Replace, repair or reposition LED
Power LED dies intermittently & unit stops working for a while.	At any time	Mains voltage dropping too low for Lingo to function correctly (known as ‘Brown outs’ as these voltage drops also sometimes cause the lights to dim.)	Consult an electrician or your power company.
Doesn't power up or Powers up (power LED may or may not be lit) but no function	May be intermittent	Wrong mains voltage for voltage setting – mains voltage is too low. (e.g. 240V Lingo being used with 115V mains supply.)	Check voltage rating at rear of Lingo. If wrong, adjust to correct mains setting.
Doesn't power up or Powers up (power LED may or may not be lit) but no function	May be intermittent	Transformer faulty.	Replace transformer – Linn part no: MCAS 010. When replacing Lingo transformer – be aware that the screen-print indicating which colour of wire goes where has an error. The writing on the board will read: “Red/Blk, Red/Blue, Or/Blk, Or/Blk...”etc. The second Or/Blk should read Or/Blu



Does not power up.	May be intermittent – may power up and then die or possibly will work sometimes and not work at other times	Mains inlet assembly faulty – may be the mains switch or the inlet itself that is causing the fault.	Replace mains inlet assembly – Linn part no: MISS 341/B
Doesn't power up or Powers up (power LED may or may not be lit) but no function.	Intermittent - tapping or bumping the unit makes fault come & go	Bad connection either inside or outside the unit.	Find and eradicate bad connection. It may be something as simple as a connector not pushed fully home and may be easily visible. If fault is intermittent, see Introduction to Fault Finding (Accessible via Linfo Website Product Information) section on intermittent faults. If fault is not intermittent, it may be possible to trace the fault – again see Introduction to Fault Finding – Substitution & Isolation

<u>Fuse blowing</u>			
Symptom	Circumstances	Possible Cause(s)	Cure
Fuse blowing	May be intermittent	Wrong type of fuse fitted	Replace fuse(s) with correct value & type. Fuse in mains lead should be 5A. Fuse in Lingo should be "Slow Blow" – look for a 'T' before the rating on the fuse. Correct type: 110/115V - 300mA 220/240V - 200mA
Fuse blowing	Probably constant	Wrong mains voltage for voltage setting – mains voltage is too high. (e.g. 115V Lingo being used with 230V mains supply.)	Check voltage rating at rear of Lingo. If wrong, adjust to correct mains setting.
Fuse blowing	Probably constant	Transformer faulty	Replace transformer – Linn part no: MCAS 010. When replacing Lingo transformer – be aware that the screen-print indicating which colour of wire goes where has an error. The writing on the board will read: "Red/Blk, Red/Blue, Or/Blk, Or/Blk..."etc. The second Or/Blk should read Or/Blu
Fuse blowing	Probably random & sporadic	Mains surges	Consult an electrician or your power company



Switch on & LED Problems

It is assumed at this point that you have checked that the Lingo is definitely the cause of the fault – not a bad connection etc or anything on the LP12. If you have not, please do so before proceeding – if you can get access to another LP12 configured for Lingo, try connecting the Lingo to that to rule out the turntable etc or see the Lingo Test Procedure (Accessible via Linfo Website Product Information) for details on how to check the function of the Lingo.

Please note – It is very important to differentiate between “powering up” and “switching on” the Lingo. We define “powering up” as connecting the unit to the mains & switching on the Power switch on the Lingo facia. “Switching on”, on the other hand comprises of pressing the switch on the turntable to start the platter turning. In this section, we are referring only to the switch and LEDs on the turntable, not the LED & switch on the Lingo facia (any problems with the facia switch/LED are dealt with in the ‘Power Up Problems’ section above.)

It is also important to note the difference between the “Power LED”, i.e. the LED at the Lingo facia and the “switch LEDs”, i.e. the green & red LEDs on the turntable switch.

<u>Switching & LED problems</u>			
Symptom	Circumstances	Possible Cause(s)	Cure
Will not switch to 33 or 45		Unit not powered up - See 'Power up problems' section above.	See 'Power up problems' section above.
Will not switch to 33 or 45	Unit powers up okay but won't switch turntable	"Lingo Kit" incorrectly installed or connected	Check all connections between Lingo and Lingo Kit (installed inside LP12) see LP12 Circuitry Installation Procedure (Accessible via Linfo Website Product Information) for instructions on correct fitting etc.
Will not switch to 33 or 45	Unit powers up okay but won't switch turntable	Turntable switch or Lingo Kit faulty. Try another Lingo kit in the turntable if you have one, or if you can get access to another LP12 configured for Lingo, try connecting the Lingo to it to see if the fault remains	Repair and/or replace Lingo Kit – Linn part no: Lingo Kit
Will not switch to 33 or 45	Probably constant	U7 and/or U8 faulty	Replace both U7 and U8, even if only one is faulty. Linn part number for both IC's – IC 013. BE EXTREMELY CAREFUL WHEN REPLACING THESE IC'S – there are very delicate tracks attached which are easily damaged. Do not attempt to remove the IC's from the board intact – instead, snip every leg of the IC, remove the body of the IC, carefully extract each leg individually by melting the solder and gently tugging the leg, then clear the holes by desoldering.



Will not switch from 33 to 45	Probably constant	U7 and/or U8 faulty	<p>Replace both U7 and U8, even if only one is faulty. Linn part number for both IC's – IC 013.</p> <p>BE EXTREMELY CAREFUL WHEN REPLACING THESE IC'S – there are very delicate tracks attached which are easily damaged. Do not attempt to remove the IC's from the board intact – instead, snip every leg of the IC, remove the body of the IC, carefully extract each leg individually by melting the solder and gently tugging the leg, then clear the holes by desoldering.</p>
Will not switch off – toggles from 33 to 45 & back again	Probably constant	U7 and/or U8 faulty	<p>Replace both U7 and U8, even if only one is faulty. Linn part number for both IC's – IC 013.</p> <p>BE EXTREMELY CAREFUL WHEN REPLACING THESE IC'S – there are very delicate tracks attached which are easily damaged. Do not attempt to remove the IC's from the board intact – instead, snip every leg of the IC, remove the body of the IC, carefully extract each leg individually by melting the solder and gently tugging the leg, then clear the holes by desoldering.</p>
Will not switch to 33 – works at 45 only.	Probably constant	U7 and/or U8 faulty	<p>Replace both U7 and U8, even if only one is faulty. Linn part number for both IC's – IC 013.</p> <p>BE EXTREMELY CAREFUL WHEN REPLACING THESE IC'S – there are very delicate tracks attached which are easily damaged. Do not attempt to remove the IC's from the board intact – instead, snip every leg of the IC, remove the body of the IC, carefully extract each leg individually by melting the solder and gently tugging the leg, then clear the holes by desoldering.</p>



Will not switch to 45 – works at 33 only	Probably constant	U7 and/or U8 faulty	Replace both U7 and U8, even if only one is faulty. Linn part number for both IC's – IC 013. BE EXTREMELY CAREFUL WHEN REPLACING THESE IC'S – there are very delicate tracks attached which are easily damaged. Do not attempt to remove the IC's from the board intact – instead, snip every leg of the IC, remove the body of the IC, carefully extract each leg individually by melting the solder and gently tugging the leg, then clear the holes by desoldering.
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Turntable Motor Problems

It is assumed at this point that you have checked that the Lingo is definitely the cause of the fault – not a bad connection etc or anything on the LP12. If you have not, please do so before proceeding – if you can get access to another LP12 configured for Lingo, try connecting the Lingo to it to rule out the turntable etc or see the Lingo Test Procedure (Accessible via Linfo Website Product Information) for details on how to check the function of the Lingo

<u>Turntable Motor Problems</u>			
Symptom	Circumstances	Possible Cause(s)	Cure
Turntable motor has low torque & may have problems getting up to speed or May fail to start at all or May go backwards.	Fault is constant, but symptoms may vary.	C21 and/or C20 (the two large electrolytic capacitors beside the output socket) faulty. See Lingo Test Procedure (Accessible via Linfo Website Product Information) for details on testing the Lingo output waveforms. If one of the waveforms is faulty at the negative leg of C20/C21 then check the positive leg of these. Both ends of the capacitor should measure the same in ac volts, so if the positive end measures 60V ac and the negative end has much less (anywhere from 0V to about 40V ac) then the capacitor is faulty.	If you find that the capacitor is faulty – replace it. Check the brand name on the capacitors – if the name “Jamicon” is written on these capacitors, then replace all three – C20, C21 & C3. Linn part no for all three capacitors: CAP 045.



<p>Turntable motor has low torque & may have problems getting up to speed (may need a push)</p> <p>or</p> <p>May fail to start at all</p> <p>or</p> <p>May go backwards.</p>	<p>Fault will be constant, but platter direction may be random.</p>	<p>This happens when one of the motor output phases has failed – may be dead, reduced in amplitude or distorted.</p> <p>The most common reason for this (apart from Jamicon capacitors as noted above) is the failure of one of the 150Kohm resistors in the output stages.</p>	<p>The resistors should measure 150Kohm.</p> <p>If the Blue Phase is faulty (see Lingo Test Procedure - accessible via Linfo Website Product Information) check resistors: R28, R29, R35 (beside transformer) R66, R41, R20 (beside Q23 – one of the 4 big transistors that are clamped to the heatsink) R48, R67 (beside the output socket)</p> <p>If the Red Phase is faulty check resistors: R54, R70, R21 (the print beside R21 may read R2, but do not be confused – R21 is beside R54 & R70 – all three can be found between the transformer and the left hand side of the board) R45, R44, R11 (beside Q6 – one of the 4 big transistors that are clamped to the heatsink) R58, R60 (can be found near the transformer).</p> <p>If any of the above resistors should fail (a faulty resistor will usually go open circuit or high impedance (Megohms)) – replace them – Linn part no: RES 162</p>
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