CXL-40T, CXL-100T, CXL-200T, CXL-400T
100/70 V Transformers

CXL-800, CXL-1600 Rackmount Housings

Installation Guide

Important Safety Notes

It should be recognised that 100 V- or 70 V-line speaker systems have the potential to deliver an electric shock. Installers must ensure that access to the secondary (output) terminals of transformers is restricted, either by the use of the purpose-designed CXL Series rackmount housings, or by mounting and wiring the transformers in such a way that neither the transformers nor their connections can be touched accidently.

In all cases, transformers and associated speakers will need to comply with local electrical regulations for AC voltages up to 100 V_{rms} (141 V_{peak}).

Do not expose transformers to rain or moisture.

Transformers must be installed in a safe manner. Cloud Electronics Ltd. accept no responsibility for hazardous installations.

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Introduction

Thank you for buying this Cloud product.

The CXL range of high-performance 100/70 V toroidal transformer assemblies are intended for use with various models of Cloud power amplifiers and mixer-amplifiers, with applications in background music, public address and PA/VA. They interface the amplifiers' low-impedance outputs to 100 V-line or 70 V-line loudspeaker systems.

There are four models of transformer in the range, each suitable for use with amplifier channels having a particular maximum power rating:

Transformer Type	For use with amplifiers with a power rating (into 4 ohms) of:	Dia.	Height
CXL-40T	50 W per channel	65 mm	30 mm
CXL-100T	120 W per channel	80 mm	36 mm
CXL-200T	240 W per channel	100 mm	65 mm
CXL-400T	400 W per channel	120 mm	66 mm

The CXL-800 and CXL-1600 19" rackmount housings are each designed to accept up to eight transformers (see "Transformer/Rackmount Housing compatibility" on page 5 for compatibility details). It is recommended that these housings are used in conjunction with the transformers, as the complete assembly provides good safety protection.

Scope of this manual

The primary purpose of this manual is to describe:

- how to mechanically install CXL Series transformers into the rackmount housings;
- how to fit the transformer connectors to the rear panels of the housings;
- how to correctly connect the assembly to the amplifier and the loudspeaker system.

It also gives information about configuring the amplifiers for use with 100/70 V-line systems.

The CXL range of transformers may also be used without the rackmount housings; instructions on how to achieve this safely are included.

Box contents

Transformers:

- CXL Series transformer (CXL-40T, CXL-100T, CXL-200T or CXL-400T)
- Mating connectors: 1 x 2-way and 1 x 3-way 5 mm-pitch screw terminal type
- M6 bolt, locknut and washer
- Abridged Instruction Guide

Rackmount Housings:

- CXL-800 or CXL-1600 rackmount housing
- PVC rear connector cover
- Fibreglass internal safety cover (CXL-800 only)
- Set of rubber feet
- 6 x 25 mm M3 hex pillars, with nuts and washers (flat and shakeproof)
- 16 (CXL-800) or 20 (CXL1600) x M3 x 6 mm pozi screws
- Transformer fitting template (CXL-1600 only)
- This manual

Transformer/Amplifier compatibility

The four models of CXL Series transformers are compatible with current Cloud products as shown in the table below. One transformer is required for each amplifier channel to be connected to a 100/70 V-line loudspeaker system.

TRANSFORMER	MODEL	
CX-40T	CX-A850	8 channel amplifier
	CX-A450	4 channel amplifier
	46/50	4 zone mixer-amplifier
	36/50	2 zone (+ utility) mixer amplifier
CX-100T	CX-A6	6 channel amplifier
	VTX4120	4 channel amplifier
CXL-200T	VTX4240	4 channel amplifier
CXL-400T	VTX4400	4 channel amplifier

Discontinued models:

Some CXL Series transformers may also be compatible with various Cloud amplifiers no longer in production. Please contact Cloud's Technical Dept. for advice if you are adding transformers to older models.

Transformer/Rackmount Housing compatibility

CXL-800

The CXL-800 is of open construction and is designed to accommodate up to eight CXL-40T or CXL-100T transformers (including any mixture of the two types). It is not suitable for CXL-200T or CXL-400T transformers.

CXL-1600

The CXL-1600 is of more substantial construction, in the form of a fully sealed enclosure with top and side ventilation grilles. This design provides a greater degree of safety protection, as the transformers are fully enclosed, and is also more suited for the extra weight of the higher power transformers.

The CXL-1600 can accommodate up to four CXL-200T or CXL-400T transformers (including a mixture of the two models), or up to eight CXL-40T or CXL-100Ts (or a mixture of the two), as per the CXL-800. It is also possible to fit various other combinations; the table below summarises the maximum quantity of each transformer type that may be fitted when the two categories (CXL-200T/400T and CXL-40T/100T) are mixed:

CXL-1600 TRANSFORMER CAPACITY	
CXL-200T or CXL-400T	CXL-40T or CXL-100T
4	0
3	1
2	4
1	5
0	8

Installing transformers in the CXL-800 rackmount housing

The CXL-800 is a steel 19" rackmount tray of open construction; it has a depth of 225 mm, but a minimum rack depth of 250 mm is recommended to allow adequate clearance for rear connectors and cables.

Up to eight CXL-40T or CXL-100T transformers may be installed in a CXL-800. Any mixture of the two types may also be fitted, up to a total of eight transformers.

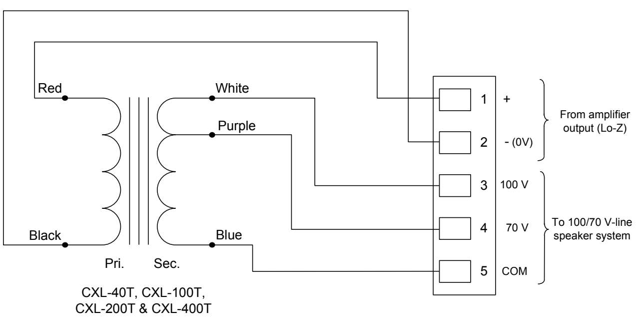
The CXL-800 is not designed for CXL-200T or CXL-400T transformers. These types should only be fitted into the CXL-1600 rackmount housing.

Each transformer is fitted to the chassis baseplate with a single M6 bolt (one supplied with each transformer). Identify the eight pre-drilled 6 mm holes in the baseplate (in two rows of four); insert the bolt from the underside of the chassis, place the transformer in position with the bolt through the central hole, and secure in place with the washer and locknut supplied. Before final tightening, rotate the toroids to ensure that the cable assemblies for all the transformers emerge from the windings at a neat orientation for wiring to the rear panel.

If the CXL-800 is being fitted with less than its full complement of transformers, they may be mounted in any of the positions, as convenient. Spacing them across the width of the baseplate to give a good mechanical balance is generally sensible.

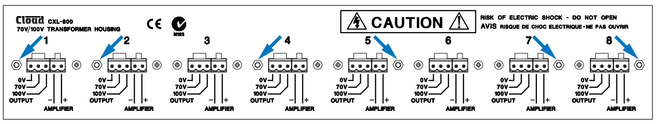
Fitting the connectors

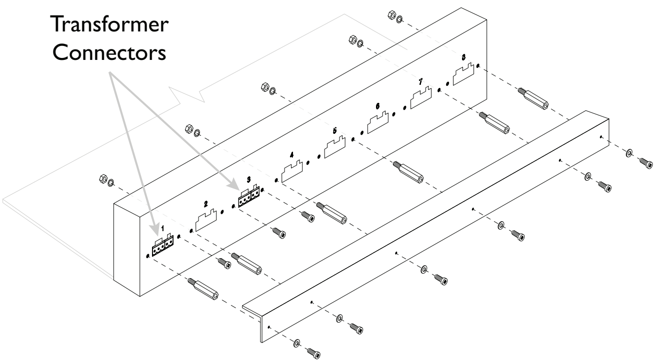
Note that each of the transformer positions is aligned with one of the rear panel connector positions.



Each transformer has five colour-coded wires which terminate on a small PCB. A 2-way and a 3-way 5 mm-pitch female connector and two M3 fixing brackets are fitted to the PCB. Locate the connectors into the rectangular rear panel slot which is in line with the transformer's position. Note that, looking at the rear panel, the 3-way connector goes to the left of the slot.

Secure each PCB/connector assembly in place with EITHER two M3 x 6 mm Pozi screws, OR one M3 x 6 mm Pozi screw and one M3 x 25 mm hex pillar. The screws and/or pillars should be passed through the fixing holes and tightened into the tapped holes in the fixing brackets. Which of the two fixing options is used depends on the connector (from 1 to 8) being fitted. The diagram below shows a rear panel with all eight connectors fitted; the arrows indicate the correct locations for the hex pillars.





IMPORTANT: If less than eight transformers are installed in the rackmount housing, it is still important to fit all six hex pillars (supplied) in the positions indicated. If a connector position requiring a hex pillar is empty (due there being no transformer in that position), use an M3 shakeproof washer and nut (supplied) to secure the hex pillar in place.

Re-assembling the housing

Tidy the transformer wires inside the housing so that they follow the base of the chassis. Fit the fibreglass safety cover (Part No. PC340144) inside the rear panel so that the transformer wires pass under it and it covers the rear connectors. Note the four fixing holes (arrowed) should be uppermost. Screw the cover to the folded rear panel flange with four of M3 x 6 mm Pozi screws.

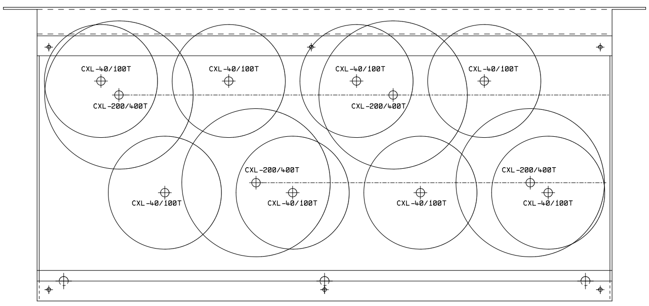
Installing transformers in the CXL-1600 rackmount housing

The CXL-1600 is a fully enclosed steel 19" rackmount housing; it has a depth of 225 mm, but a minimum rack depth of 250 mm is recommended to allow adequate clearance for rear connectors and cables.

Up to four CXL-200T or CXL-400T transformers may be installed in a CXL-1600. Any mixture of the two types may also be fitted, up to a total of four transformers. The CXL-1600 will also accept up to CXL-40T and/or CXL-100T transformers, in the same manner as the CXL-800. Mixtures of all transformer types are permissible, up to the maximum limits specified in the table in "Transformer/Rackmount Housing compatibility" on page 5

Remove the top cover of the housing and retain the screws.

Each transformer is fitted to the chassis baseplate with a single M6 bolt (one supplied with each transformer). Identify the twelve pre-drilled 6 mm holes in the baseplate. If fitting a mixture of transformer types, note that certain constraints exist as to transformer positioning, due to the larger diameter of the higher-powered transformers. See the template supplied with the housing, which illustrates the locating options. Note that when fitting four CXL-200T and/or CXL-400T transformers, only the four odd-numbered positions are available as combinations. Specific baseplate holes are provided to cater for these transformer types.

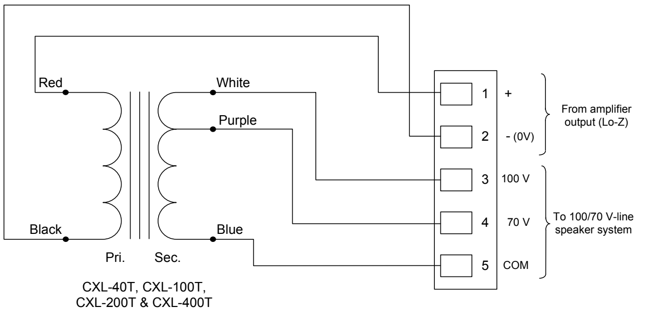


When each transformer position has been determined, insert the bolt from the underside of the chassis, place the transformer in position with the bolt through the central hole, and secure it in place with the washer and locknut supplied. Before final tightening, rotate the toroids to ensure that the cable assemblies for all the transformers emerge from the windings at a neat orientation for wiring to the rear panel.

If the CXL-1600 is being fitted with less than its full complement of transformers, any positions may be used as convenient, provided the spacing constraints of mixed transformer sizes are observed.

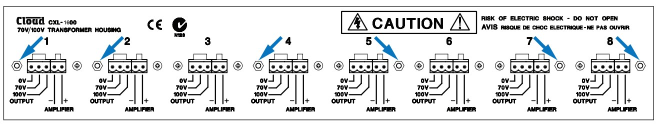
Fitting the connectors

Note that each of the transformer positions is aligned with one of the rear panel connector positions.



Each transformer has five colour-coded wires which terminate on a small PCB. A 2-way and a 3-way 5 mm-pitch female connector, and two M3 fixing brackets are fitted to the PCB. Locate the connectors into the rectangular rear panel slot which is in line with the transformer's position. Note that, looking at the rear panel, the 3-way connector goes to the left of the slot.

Secure each PCB/connector assembly in place with EITHER two M3 x 6 mm Pozi screws, OR one M3 x 6 mm Pozi screw and one M3 x 25 mm hex pillar. The screws and/or pillars should be passed through the fixing holes and tightened into the tapped holes in the fixing brackets. Which of the two fixing options is used depends on the connector (from 1 to 8) being fitted. The diagram below shows a rear panel with all eight connectors fitted; the arrows indicate the correct locations for the hex pillars.



See diagram on page 6 for details of connector mountings

IMPORTANT: If less than eight transformers are installed in the rackmount housing, it is still important to fit all six hex pillars (supplied) in the positions indicated. If a connector position requiring a hex pillar is empty (due there being no transformer in that position), use an M3 shakeproof washer and nut (supplied) to secure the hex pillar in place.

Re-assembling the housing

Replace the lid of the housing and secure using the original screws.

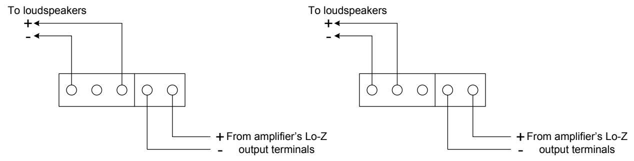
Wiring the rackmount housings

Inputs:

The transformer inputs should be connected to the low-impedance output of the relevant amplifier channel. Use the mating 2-pin 5 mm-pitch screw-terminal connectors supplied with the transformers, and wire with two-core stranded cable of at least 1.5 mm^2 gauge. (In the case of the model CXL-400T, 2.5 mm^2 cable is recommended if the transformers are not adjacent to the amplifier.)

Outputs:

The transformer outputs may be connected to the loudspeaker system. Use the mating 3-pin 5 mm-pitch screw-terminal connectors supplied with the transformers, and two-core stranded cable of at least 0.75 mm^2 gauge (CXL-40T, CXL-100T & CXL-200T) or 1 mm^2 gauge (CXL-400T). Note that pins 1 and 3 should be wired for a 100 V-line system, and pins 1 and 2 for a 70 V-line system.



Wiring for 100 V-line systems   Wiring for 70 V-line systems

When all the connections have been made, fit the PVC external safety cover over the rear panel connectors. The six fixing holes in the cover should align with the six hex pillars. Secure it in place with six of the supplied M3 x 6 mm Pozi screws.

Installing transformers without CXL Series rackmount housings

Where appropriate, CXL Series transformers may be installed in various ways without the use of CXL-800 or CXL-1600 rackmount housings. However, it is important to appreciate that correct use of the rackmount housings provides good safety protection from the high voltages involved (see "Important Safety Notes" on page 2).
If fitting the transformers without rackmount housings, careful attention must be paid to the safety aspects of the installation, to prevent the risk of electric shocks.

A transformer may be mounted horizontally or vertically onto any convenient clear, flat surface with the single M6 fixing bolt through the toroid's centre hole. Mounting it immediately adjacent to the amplifier is not mandatory, though may often be the most practical solution. Consideration should be given to ventilation, particularly if multiple transformers are housed together and/or the amplifier has a high duty cycle (i.e., handling audio continuously).

Refer to "Fitting the connectors" on page 6. The transformer's windings are terminated in a 2-pin (primary) and a 3-pin (secondary) 5 mm–pitch female screw-terminal connector mounted on a PCB. When mounting a transformer without a rack tray, the connector assembly should be removed by cutting it off. Connection to the amplifier's low-impedance output and to the loudspeaker system can be made using insulated terminal blocks (see Safety Notes below).

Take care to observe the wire colour coding:

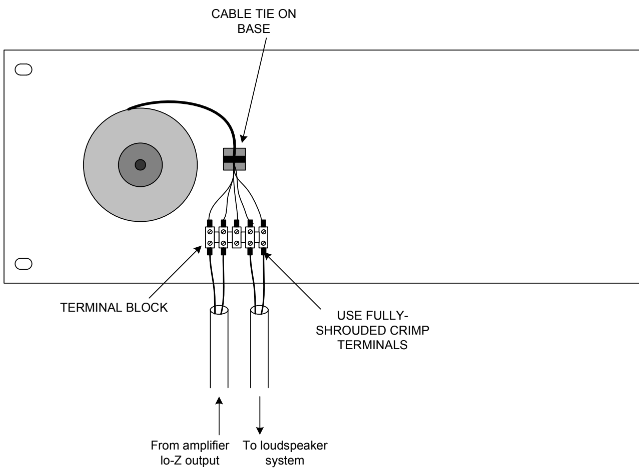
100V SYSTEMS			
Connection			Colour
Primary	From amplifier's lo-Z output	+	Red
		-	Black
Secondary	To 100V-line loudspeaker system	+	White
		-	Blue

70V SYSTEMS			
Connection			Colour
Primary	From amplifier's lo-Z output	+	Red
		-	Black
Secondary	To 70V-line loudspeaker system	+	Purple
		-	Blue

Use wire of the correct gauge for the transformer/amplifier power rating; this applies to both primary and secondary connections. The minimum wire gauges to be used are given in the following table:

TYPE	CONNECTION	MIN. WIRE GAUGE
CXL-40T	Primary (input)	1.5 mm^2
	Secondary (output)	0.75 mm^2
CXL-100T	Primary (input)	1.5 mm^2
	Secondary (output)	0.75 mm^2
CXL-200T	Primary (input)	1.5 mm^2
	Secondary (output)	1 mm^2
CXL-400T	Primary (input)	1.5 mm^2
	Secondary (output)	1 mm^2

The wiring should make use of insulated terminal blocks and fully-shrouded crimp terminals. Where possible, secure the terminal blocks to the panel on which the transformers are mounted with screws or nuts and bolts as appropriate. Keep the transformers' leads neat with cable ties and sticky-back bases.



If transformers are being freely-mounted on a panel within an equipment rack, fit lockable side and rear doors, and blank 19" panels as necessary to the rack, to prevent access to the terminations. If the transformers are to be housed externally to a rack, the use of a lockable IP-rated enclosure fitted with the appropriate cable grommets is recommended.

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