



QLIGHT™ DP
DIGITAL POWER SERIES
USER MANUAL

TQ-308DP
TQ-310DP
TQ-315DP
TQ-445DP
TQ-425DP
TQ-115DP

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user manual

QLight™ DP series

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An example of this equipment has been tested and found to comply with the following European and international Standards for Electromagnetic Compatibility and Electrical Safety:

EN60065	Product safety
EN55103-1	Electromagnetic emission
EN55103-2	Electromagnetic immunity

IMPORTANT SAFETY INFORMATION

Do not remove Covers. There are no user serviceable parts inside, please refer servicing to qualified service personnel. This equipment must be earthed.



CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
DO NOT EXPOSE TO RAIN OR MOISTURE



ATTENTION
RISQUE DE CHOC ELECTRIQUE
NE PAS ENLEVER
NE PAS EXPOSER A LA PLUIE NI A L'HUMITE



Important Safety Information

Please read carefully and keep the following instructions and safety information. Heed all warnings and follow all instructions.

Do not remove covers. There are no user serviceable parts inside, please refer servicing to qualified service personnel. This equipment must be earthed.

Do not block any of the ventilation openings. Install in accordance with manufacturer's instructions.

Clean only with a damp cloth.

Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

Only use attachments/accessories specified by the manufacturer.

Use only with a cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

INTRODUCTION

Thanks

Thank you for choosing a QLight™ series loudspeaker product for your application. Please spare a little time to read the contents of this manual, so that you can obtain the best possible performance from this unit.

All TURBOSOUND products are carefully engineered for world-class performance and reliability.

If you would like further information about this or any other TURBOSOUND product, please contact us. Detailed product information is available on our web site at www.turbosound.com

We look forward to helping you in the near future.

Congratulations, you have just purchased a professional loudspeaker system from the renowned Turbosound range, designed to give you the best in audio quality and many years of reliable, trouble free operation. It offers superior audio quality, unsurpassed vocal projection, full technical documentation including EASE data, and comprehensive rigging and flying hardware options. Please read through this manual carefully before you attempt to operate the loudspeaker system. It contains valuable information enabling you to quickly and easily set up and connect the loudspeakers, important system and set-up checks together with positioning and mounting instructions.

Unpacking the TQ series loudspeaker

After unpacking the unit please check carefully for damage. If damage is found, please notify the carrier concerned at once. You, the consignee, must instigate any claim. Please retain all packaging in case of future re-shipment.

FEATURES

- Superb audio quality: carefully designed and matched loudspeaker drive units are used to give you exceptional performance and many years of reliable, trouble free operation.
- Class D amplifiers with 96kHz DSP: operating efficiency in excess of 90% gives higher performance, reduced weight and less wasted heat.
- Converging Elliptical Waveguide™: used in TQ-308DP, TQ-310DP and TQ-315DP loudspeakers eliminates reflections in the horn throat and gives excellent pattern control.
- Controlled dispersion: the TQ-445DP exhibits a tightly controlled dispersion pattern which minimises room reflections and focuses the sound pressure directed at audience areas.
- Rotatable HF waveguides: high frequency waveguides used in the TQ-308DP, TQ-310DP and TQ-315DP are designed to accommodate 90° rotation within the enclosure to allow for horizontal or vertical orientation.
- Ease of use: QLight™ DP series products are exceptionally easy to set up and use with the minimum of technical knowledge required. The built-in digital amplifiers require only a mains connection and balanced signal input for correct operation.
- Three-way design: the TQ-445DP's exclusive use of cone transducers in the low and mid frequency bands guarantees a seamless low/mid crossover, greater power handling, lower distortion and minimal mechanical stress.
- Mode A / Mode B response: user-selectable frequency response profiles are provided to suit specific applications such as use with or without subs.
- Aligned components: low and high frequency components are physically aligned in the enclosure to ensure perfect time arrival at the listener's ear; TQ-445DP components are aligned within the on-board DSP.
- Solid construction: QLight™ DP series cabinets are built from high-grade birch plywood, rebated, screwed and glued together for maximum rigidity and durability.
- Integral rigging points: fitted as standard, enabling use with optional Turbosound flying hardware for fixed installations and mobile sound reinforcement applications.
- Compact enclosures: the overall dimensions of QLight™ DP series enclosures have been kept as small as possible to enable portable use as well as fitting easily into permanent installations.

PRODUCT RANGE SUMMARY

TQ-308DP self-powered two-way loudspeaker

The TQ-308DP is a compact trapezoidal self-powered two-way loudspeaker enclosure with an integral Class D amplifier and DSP module, designed for use in mobile speech and music sound reinforcement applications as well as a range of fixed installations. It incorporates two channels of digital power amplification with 96kHz DSP into one convenient and easily transportable package. The TQ-308DP delivers high quality full range audio from an unobtrusive and easily transportable package, and can be set up and operated quickly and with consistently repeatable results.

The TQ-308DP combines an 8" LF driver with a 1" HF compression driver on a rotatable 100° x 60° high frequency waveguide in a compact trapezoidal cabinet, making it possible to swap the horizontal and vertical coverage patterns. It features Turbosound's Converging Elliptical Waveguide™ (CEW™) technology which provides smooth and even coverage of a room.

All connections and operating controls are located on a recessed panel at the rear of the cabinet, including gain trim, low frequency contour, power switch and status LED's. The loudspeaker accepts a balanced input from an audio mixer on a 3-pin XLR, and a parallel link connection is provided to connect to additional powered loudspeakers. The power supply is auto-sensing, which allows the TQ-308DP to be connected to mains supplies ranging from 100 volts to 230 volts AC. The module is fully field-serviceable simply by removing four bolts and a multi-pin connector. An RS232 data port is provided to enable firmware upgrades.

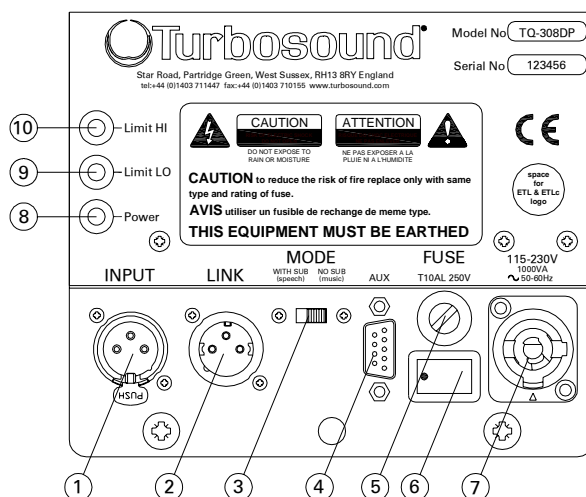
TQ-310DP self-powered two-way loudspeaker

The TQ-310DP is a trapezoidal self-powered two-way loudspeaker enclosure designed for use in mobile speech and music sound reinforcement applications, as well as in a wide range of fixed installations.

The loudspeaker complement consists of a front loaded 10" low frequency driver and a 1" high frequency compression driver on a rotatable 100°H x 60°V HF Converging Elliptical Waveguide.

The TQ-310DP features Turbosound's Converging Elliptical Waveguide™ (CEW™) technology. The comparatively short flare allows physical alignment of the HF and LF devices, and ensures that the wavefront is shaped smoothly, eliminating reflections in the throat area while giving excellent pattern control. Additionally this design does not suffer from the distortion typical of horns employing diffraction edges. The waveguide can be rotated within the enclosure, making it possible to swap the horizontal and vertical coverage patterns.

TQ-308DP and TQ-310DP connector panel functions



1. Signal input – lockable 3-pin XLR line input socket connects to audio mixer. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
2. Signal link – lockable 3-pin XLR line output socket links to additional cabinets. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
3. Mode switch – used to change the low frequency tuning when used with QLight™ series subwoofers or for stand-alone operation.
4. Aux – RS232 port used for updating settings or firmware.
5. Fuse – AC line fuse. Replace only with 10A 230V anti-surge fuse.
6. Mains switch – turns AC power on to the unit.
7. AC mains connection - accepts Neutrik PowerCon® 3-pin cable-end connector.
8. Power - Blue LED indicates when AC power is applied to the amplifier module.
9. Limit (low) – red LED indicates limiting threshold of the low frequency section.
10. Limit (high) – red LED indicates limiting threshold of the mid/high frequency section.

TQ-315DP self-powered two way loudspeaker

The TQ-315DP offers full range response and the highest performance from a two-way loudspeaker. The integrated Class D amplifiers and DSP ensure an optimum match between amplifiers and drive units, providing a convenient and easily transportable package.

It incorporates a 15" LF driver and a 1.4" exit (3" diaphragm) compression driver on an 80° x 50° Converging Elliptical Waveguide in an optimally ported trapezoidal enclosure.

All connections and operating controls are located on a recessed panel at the rear of the cabinet, including gain trim, low frequency contour, power switch and status LED's. The loudspeaker accepts a balanced input from an audio mixer on a 3-pin XLR, and a parallel link connection is provided to connect to additional powered loudspeakers. The power supply is auto-sensing, which allows the TQ-308DP to be connected to mains supplies ranging from 100 volts to 230 volts AC. The module is fully field-serviceable simply by removing four bolts and a multi-pin connector. An RS232 data port is provided to enable firmware upgrades.

TQ-445DP self-powered three-way loudspeaker

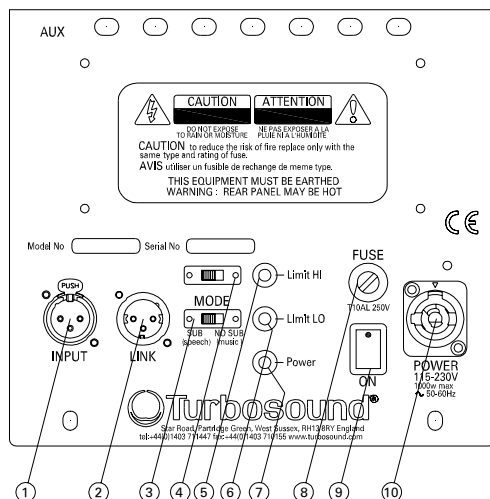
The TQ-445DP is a compact three-way self-powered full range enclosure including integral Class D power amplifiers and digital signal processing. The use of Class D power amplifier technology ensures an exact match between amplifier and speaker for optimum acoustic output, and offers exceptional ease of use by combining the entire electro-acoustic system in one convenient, easily transportable physical package with negligible additions to the cabinet weight.

It incorporates a custom-designed co-axial 12"/1" combination LF/HF driver in an optimally tuned vented trapezoidal enclosure handling the low and high frequency bands. The critical mid-range frequencies are handled by a proprietary 6.5" cone transducer on a 60° horizontal by 40° vertical nominal dispersion waveguide, loaded with a TurboMid™ device.

The exclusive use of cone transducers in both the low and mid frequency bands produces a seamless transition at the crossover frequency, with the result that all of the critical vocal range right up to 8kHz is lower in distortion than compression driver-based designs. In addition the 6.5" mid-range driver is a highly efficient device, and is able to handle large amounts of amplifier power.

The TQ-445DP is a full range loudspeaker, and used by itself will provide high quality audio for all speech and many music reproduction applications. In order to extend the effective bass frequency range of the loudspeaker by a further octave the use of the complementary TQ-425DP subwoofer is recommended.

TQ-315DP and TQ-445DP connector panel functions



1. AUX connection – RS232 port used for updating settings or firmware.
2. Signal link – lockable 3-pin XLR line input socket connects to audio mixer. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
3. Signal link – lockable 3-pin XLR line output socket connects to additional cabinets. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
4. Mode switch – used to change the low frequency tuning when used with QLight™ series subwoofers or for stand-alone operation.
5. Power – blue LED indicates when AC power is applied to the amplifier module.
6. Limit (low) – red LED used to indicate LF limiting, self test and protection.
7. Limit (high) – red LED used to indicate MF/HF limiting, self test and protection.
8. Fuse – AC line fuse. Replace only with 10A 230V anti-surge fuse.
9. Power – Blue LED indicates when AC power is applied to the unit.
10. AC Mains connection – accepts Neutrik PowerCon® 3-pin cable-end connector.

TQ-425DP self-powered subwoofer

The TQ-425DP is a self-powered dual 15" subwoofer designed for use with QLight™ series self-powered enclosures and when combined with the TQ-445DP it forms a formidable full-range sound reinforcement system with high SPL and negligible distortion.

Each of the high power neodymium 15" drive units are powered by an independent amplifier channel in order to preserve the maximum headroom capability and to ensure an optimum match with the drive units. The Class D amplifier module is located at the rear of the cabinet, removable for servicing, and carries all the necessary connections and operating controls.

The TQ-425DP can be permanently installed using flying strips which attach to the rigging points provided on the sides of the cabinet. In addition it is fitted with a pole mount socket that allows QLight™ series enclosures to be mounted on top at an optimum height.

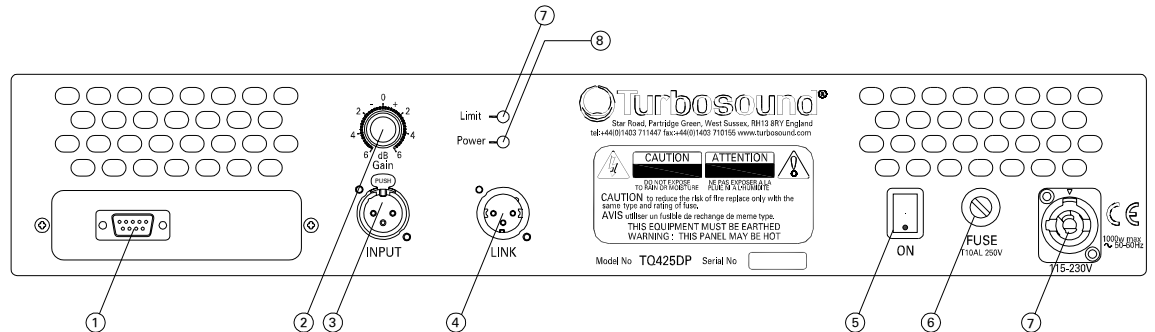
TQ-115DP self-powered subwoofer

The TQ-115DP is a self-powered single 15" subwoofer designed for use with QLight™ series self-powered enclosures. It is particularly effective when combined with TQ-308DP and TQ-310DP loudspeakers to form a high quality full range and compact sound reinforcement system.

Its Class D amplifier module is situated at the rear of the cabinet and offers XLR input and parallel link connections, Neutrik PowerCon® AC mains connection and power switch, as well as system status LEDs. The auto-switching power supply allows the unit to be connected to AC mains outlets ranging from 100 volts to 230 volts.

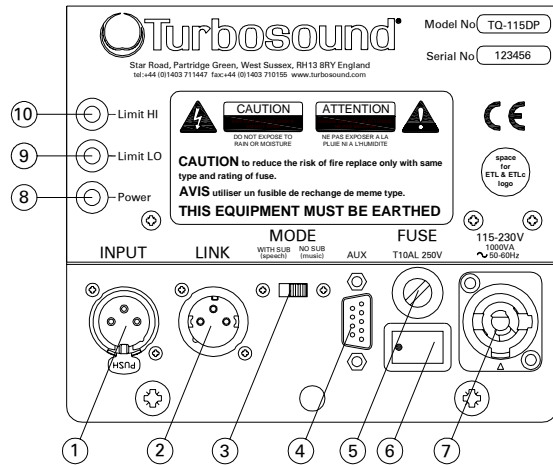
The TQ-115DP can be permanently installed using flying strips which attach to the rigging points provided on the sides of the cabinet. In addition it is fitted with a pole mount socket that allows QLight™ series enclosures to be mounted on top at an optimum height.

TQ-425DP connector panel functions



1. Aux – RS232 port used for updating settings or firmware.
2. Gain control – gain trim control ranges from +6dB to -6dB
3. Signal input – lockable 3-pin XLR line input socket connects to audio mixer. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
4. Signal link – lockable 3-pin XLR line output socket links to additional cabinets. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
5. Mains switch – turns AC power on to the unit.
6. Fuse – AC line fuse. Replace only with 10A 230V anti-surge fuse.
7. AC mains connection - accepts Neutrik PowerCon® 3-pin cable-end connector.
8. Limit – red LED indicates limiting threshold.
9. Power - Blue LED indicates when AC power is applied to the amplifier module.

TQ-115DP connector panel functions



1. Signal input – lockable 3-pin XLR line input socket connects to audio mixer. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
2. Signal link – lockable 3-pin XLR line output socket links to additional cabinets. Fully balanced, pin 2 Hot, pin 3 Cold and pin 1 not connected.
3. Mode switch – lifts the overall gain of the subwoofer by 3dB.
4. Aux – RS232 port used for updating settings or firmware.
5. Fuse – AC line fuse. Replace only with 10A 230V anti-surge fuse.
6. Mains switch – turns AC power on to the unit.
7. AC mains connection - accepts Neutrik PowerCon® 3-pin cable-end connector.
8. Power - Blue LED indicates when AC power is applied to the amplifier module.
9. Limit (low) – red LED indicates limiting threshold of the low frequency section.

SYSTEM REQUIREMENTS

System requirements – TQ-308DP, TQ-310DP and TQ-315DP

These products are two-way self-powered loudspeaker systems. They comprise two independent amplifier channels: one channel to power the low frequency driver (LF) plus another channel to power the high frequency (HF) driver; plus an active crossover to split the signal and feed it to the appropriate amplifier and driver section. Additional features such as limiting, digital time alignment and driver EQ are carried out in the on board DSP. These products do not require the use of external amplifiers or crossover/limiters.

Additional units may be daisy-chained together simply by linking the signal connections through the input / link XLR connectors. In this way exact coverage of an event or permanent installation may be achieved using a number of digitally powered loudspeakers. It is however necessary to route individual power cords to each enclosure as it is not possible to daisy-chain AC connections through the power connectors.

System requirements – TQ-445DP

The TQ-445DP is a three-way self-powered loudspeaker system. It comprises two independent amplifier channels: one channel to power the low frequency driver (LF) plus another channel to power the high frequency midrange (MF) and high frequency (HF) together; plus a frequency dividing network to split the signal and feed it to the appropriate driver section. Additional features such as limiting, digital time alignment and driver EQ are carried out in the on board DSP. The TQ-445DP does not require the use of external amplifiers or crossover/limiters.

Additional units may be daisy-chained together as above to achieve exact coverage of an event or permanent installation using a number of digitally powered loudspeakers.

System requirements – TQ-425DP and TQ-115DP

These products are self-powered subwoofer systems designed to accompany QLight™ series self-powered loudspeakers. The TQ-425DP comprises two independent amplifier channels: one channel to power each low frequency driver. The TQ-115DP uses one amplifier channel to power the single drive unit.

Additional units may be daisy-chained together as above to achieve exact coverage of an event or permanent installation using a number of digitally powered loudspeakers.

AMPLIFIER MODULES

Power Amplifiers

The digital power amplifiers used in QLight™ DP series loudspeakers are conservatively rated and designed with sufficient headroom to handle large signal transients without break-up or distortion. Each channel of the module will deliver 800 watts r.m.s. into an 8 ohm load.

AC Power Requirements

QLight™ DP series loudspeakers are equipped with Neutrik PowerCon® AC mains connectors which mate with the power cord supplied with your unit. They operate with mains voltages in the range from 100 to 240 volts. When connected to a mains supply the digital power amplifier modules will automatically detect the mains supply present. The mains fuse is a 10A 20mm 230V anti-surge type for all mains supplies. Should it be necessary always replace the fuse with the identical size and type.

Cooling

The Class D amplifiers are among the most efficient in their class, with operating efficiencies greater than 90%. Conventional heatsinks are not required to cool the amplifiers; they are cooled by the action of convection from the panel of the amplifier module at the rear of the enclosure. It is important to leave space around and especially above the rear panel to allow the convection of heat away from the loudspeaker. This cooling effect is sufficient to maintain the amplifiers within a normal operating temperature range.

In an ambient temperature of 25° C the rear panel of the unit can reach temperatures of 55° C and will feel warm to the touch. This is perfectly acceptable and is considered normal operation.

Audio Input

The signal inputs are fully balanced, with an input impedance of 10kΩ. The female input XLR connector is wired pin 2 hot (+ve), pin 3 cold (-ve), and pin 1 screen (shield). The male link XLR connector is wired pin 2 hot (+ve), pin 3 cold (-ve), and pin 1 not connected. Multiple self-powered enclosures may be driven from a single audio console, up to a practical limit of 16 units. A greater number may cause unacceptable signal loss due to the loading of the console output.

Limiting Functions

The amplifier modules are equipped with accurate limiters for both high frequency and low frequency sections. Because the HF and LF limiters work independently of each other, there is no possibility of either section compromising the performance of the other as is the case with a single broad-band limiter. Furthermore, each limiter has its attack and release time constants independently set and optimised according to the operating frequency range. These allow transient delivery whilst preventing overheating or over excursion of the transducers.

Limit LED Functions

At switch-on the power LED will illuminate and the red limit LED's will flash in unison for approximately 5 seconds as the unit performs an initial diagnostic self-test. Audio will be automatically muted during this period.

After initialisation, the limit LED's extinguish and the unit will now pass audio. During operation if either of the red limit LEDs flash this indicates that the DSP is taking corrective action by applying the limiter to that channel in order to avoid damage to the drive unit. You should reduce the signal accordingly so that the limit LED's light only occasionally. Both LED's flashing in unison under regular operating conditions indicates that the DSP is activating a protection feature, taking two possible courses of action: the input will either be attenuated to stop the unit being overdriven, or in extreme cases will be shut down.

Status	Condition	Action
Both Limit LED's flashing	System initialisation	
Both Limit LED's flashing	Protection activated	Reduce input level
Limit high LED flashing	DSP applying limiting to the high frequency channel	Reduce input level
Limit low LED flashing	DSP applying limiting to the low frequency channel	Reduce input level

⚠ WARNING ⚠

The limiters are designed to allow short-term transients in program material in order to preserve sufficient dynamic headroom, while at the same time optimising component life by protecting against long-term heating effects. DO NOT allow the loudspeaker to constantly run into limiting; this will not only degrade your sound quality by reducing the available dynamic range, but also in extreme cases may increase the risk of damage to the drive units.

Mode A / Mode B switch

This rear panel switch modifies the overall response of the system in order to give you optimised profiles for differing applications.

When the Mode A position is selected, the low frequency section is extended down to a nominal cut-off frequency of 35Hz, which makes the loudspeakers balanced for full range reproduction of a wide range of music. The low frequency extension is achieved by using low shelf @ 90Hz.

When the Mode B position is selected, the response of the system will exhibit a reduced low frequency. This roll-off setting is specially designed for use with Turbosound QLight™ DP subwoofers. This restricted LF response is also useful in speech applications where reduced LF levels can lead to better vocal intelligibility.

Updating firmware or loudspeaker parameters

Periodically Turbosound will release updated settings to improve the performance of your loudspeaker system. Your local Turbosound dealer will be able to give you the latest settings. These are released with comprehensive instructions on how to upgrade your units.

NOTE: When updating firmware both Limit LED's will light continuously while the download is taking place. Both LED's will operate normally during a settings upload.

EQUALISATION

QLight™ series enclosures are designed to provide smooth and even frequency response. They do not need excessive amounts of external equalisation to overcome the sonic deficiencies often found in many lesser designs.

Should an extended frequency response be required at more than moderate sound pressure levels, the use of complementary QLight™ subwoofer enclosures is strongly recommended.

In order to compensate for the room acoustics, QLight™ series enclosures require only minimal equalisation. As in any system, over-equalisation introduces phase shifts, distortion and a reduction in headroom, usually causing more problems than it cures. Under most circumstances a 1/3 or 1/2 octave graphic equaliser will generally be adequate, with the fader settings applied smoothly and as little as possible for the required room compensation. Most rooms will have resonances that will be excited at particular frequencies needing some cut to help tame the sound. These problems are most pronounced at the lower frequencies where loudspeakers generally exhibit very little directional control. If you find that the system needs a lot of boost at lower frequencies you may need additional sub-bass units. It is good practice to use as little equalisation as possible, aiming to cut frequencies rather than adding large amounts of boost.

CONVERGING ELLIPTICAL WAVEGUIDES™

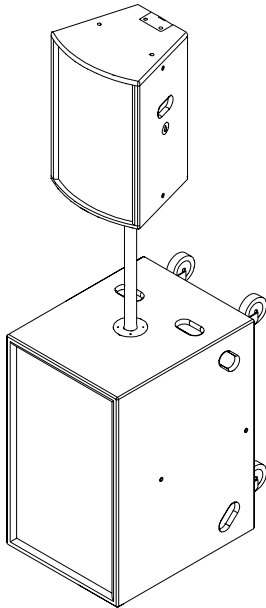
A design feature of the TQ-308DP, TQ-310DP and TQ-315DP loudspeakers is the Converging Elliptical Waveguide™ (CEW™). This gives many user advantages. The comparatively short flare length allows the HF and LF components to be physically aligned in the cabinet, so ensuring coherent arrival at the listener's ear irrespective of distance from the loudspeaker. The elliptical format shapes the wavefront smoothly, and eliminates reflections in the throat area. Additionally this design does not suffer from the distortion typical of horns employing diffraction edges.

The waveguides can be removed and rotated through 90° in the cabinet, which allows the products to be installed in either vertical or horizontal formats while retaining the required coverage.

MOUNTING AND FIXING

Rigging Hardware

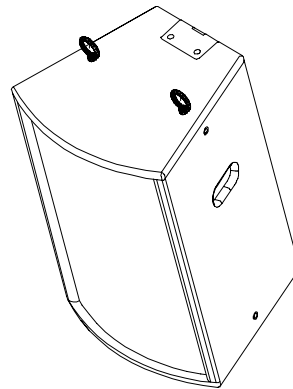
A versatile range of mounting hardware is available that allows enclosures to be used in a variety of ways, in either mobile applications or permanent installations.



A top hat stand type fitting is mounted in the base of QLight™ series cabinets for use with 35mm diameter loudspeaker stands with a load rating of at least 37kgs (82lbs).

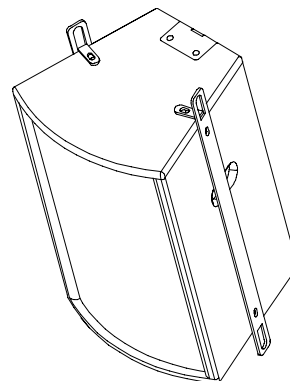
Pole mount sockets are also fitted to the top of QLight™ series subwoofers. This allows these two enclosures to be used together as an extended frequency range system as shown with the TQ-445DP mounted above the TQ-425DP. An optional 35mm diameter straight pole used between these enclosures enables a minimum footprint and ensures the correct vertical distance between cabinets.

Internal metric threaded rigging points are provided on the TQ-445DP cabinet enabling it to be flown using optional M10 shoulder eyebolts. Downward inclination of the enclosure can be adjusted using an additional rigging point on the rear of the cabinet. Note: these rigging points must NOT be used to rig a second enclosure in a vertical column.



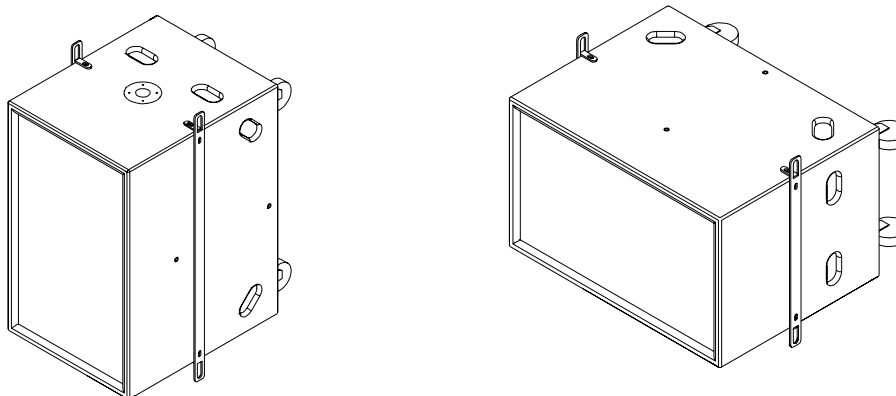
Side-mounted flying strips can be fitted to the sides of the TQ-445DP enclosure by removing the countersunk bolts on the top and sides of the cabinet and replacing them with the M10 bolts supplied with the hardware. Two flying strips are required for each enclosure; one attached to each side. This method offers a simple and cost effective method of flying single enclosures in permanent installations.

Enclosures may be arranged in a vertical column by coupling the flying strips together using QL-75



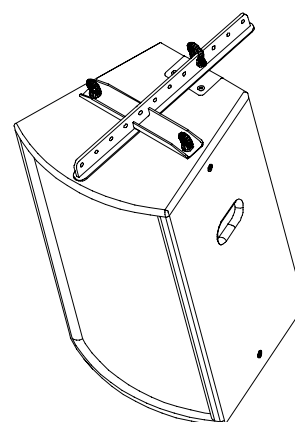
quicklinks or shackles. When used in this way the load is taken through the flying strips rather than through the woodwork of the enclosure.

Side-mounted flying strips can be fitted to the sides of QLight™ subwoofers to enable them to be flown as part of a permanent installation. Two different lengths of flying strips are optionally available for flying enclosures in either a vertical or horizontal orientation. These are fitted by removing the countersunk bolts on the top and sides of the cabinet and replacing them with the M10 bolts provided with the hardware. Two flying strips are required for each enclosure. This method offers a simple and cost effective method of flying single or multiple TQ-425 enclosures, with the load being taken through the steel strips rather than through the woodwork of the enclosure. Enclosures may be arranged in a vertical column by coupling the flying strips together using QL-75 quicklinks or shackles. FF-425 flying strips are load tested.



WARNING: Rigging eyebolts must not be used for flying this enclosure. You must use the optional Turbosound steel flying strips described above.

The universal FB-12 flybar assembly enables the use of several different fixing methods for the TQ-445DP, all shown in the diagram here. The flybar is attached to the cabinet using a pair of captive M10 shoulder eyebolts (supplied with the flybar assembly). There are 12 attachment points equally spaced along the length of the spine of the flybar. Depending on which point is chosen for the given attachment system, a wide range of downward inclination angles can be achieved over a range of approximately 70 degrees. The design of the flybar even allows for upward angles, for example for coverage of balconies that are higher than the loudspeaker location.



The FB-12 flybar assembly comes supplied with a **U-6 Unilock** fitting, which provides a single attachment point. The point at which the Unilock is attached to the flybar determines the vertical angle of the loudspeaker as shown in the table following.



A **pick-up point adapter** offers a further single attachment point. This option provides fast adjustment of vertical angle. The point at which the eyebolt adapter is attached to the flybar determines the vertical angle of the loudspeaker as shown in the table following.



The **SC-440 aluminium scaffold clamp** is attached to the T-bar by means of a simple clevis coupler. It is designed to rotate horizontally through 360° in order to enable accurate positioning of the loudspeaker. The point at which the scaffold clamp is attached to the flybar determines the vertical angle of the loudspeaker as shown in the table following.

The following table gives the predicted downward angle of the enclosure.

Attachment position	Vertical angle (negative angle denotes upwards)
Hole number 1 (front of cabinet)	-29°
Hole number 2	-23°
Hole number 3	-17°
Hole number 4	-10°
Hole number 5	-3°
Hole number 6	4°
Hole number 7	11°
Hole number 8	18°
Hole number 9	24°
Hole number 10	30°
Hole number 11	35°
Hole number 12 (rear of cabinet)	40°

Flying frames are available for use with the TQ-308DP, TQ-310DP and TQ-445DP. These enable the cabinets to be installed in semi-permanent applications with the maximum of security. They provide considerable variation of horizontal and vertical inclination, including upward angles, and is very easy to re-position and angle once rigged. Optional scaffold clamps and pole adapters are additionally available.

Permanent Installations

Any installation, whether temporary or permanent, must be securely attached to the structure of the building using chain, steel wires or web straps which are certified and load rated for the purpose. The combined weight of the sound system, its cables and the rigging system must be safely carried by the points at which attachment is made to the building or structure. Great care must be taken in selecting the attachment points and methods, being absolutely sure of the load carrying capacity of points chosen.

NOTE: The rigging of loudspeaker systems is an extremely serious matter with potentially lethal consequences should anything go wrong. It is of vital importance that you, or other people rigging the system, are suitably qualified to do so and have a full understanding of all the factors involved with safety as a number one priority. Turbosound accepts no responsibility for any accident, damage or failure of any rigged system. This rigging information is specifically related to the requirements of QLight™ enclosures only. For more detailed information on the whole topic of rigging various handbooks are available. If you are in any doubt contact your Turbosound dealer who will be able to refer you to an experienced rigging company.

Choosing the best location

When using any QLight™ system, certain room parameters will affect the resultant sound quality and coverage. For example, any boundary like a wall or floor will lift certain frequencies. If you are placing the unit in a corner then a lift at the bass end is to be expected and it may sound rather boomy. This can be compensated for moving the speaker or cutting low frequencies with a graphic equaliser.

When speakers are flown in free space then boundary effects are minimised. The result is a smooth frequency response without any boost at odd frequencies, but the bass end may appear subjectively light. In this case increase the sub-bass level to bring the low end up.

The relationship between sound pressure level and distance is an “inverse square law” so remember that every time the distance from the sound source is doubled the sound level decreases by 6dB. For every 3dB increase in SPL you need a doubling of input power and you can work out the wattage input needed to give the required SPL levels at various distances from the loudspeaker(s).

It was stated earlier that the TQ-445DP's tightly controlled directivity gives it essentially point and shoot qualities. Every room has its own unique set of characteristics that affect any sound introduced into the room. These include reverberation reflections and decay time, sound absorption of materials used, temperature and humidity, etc. A degree of experimentation with different locations (if possible) is best, especially if you are permanently installing the speaker and have particular requirements where you want to concentrate the sound into a specific area.

Any boundary like a wall or floor will lift certain frequencies. If you are fixing the unit to a wall, or in a corner then a lift at the bass end is to be expected and it may sound rather boomy. Either reduce the low end by means of a graphic equaliser or move the speaker.

Rooms with a lot of soft furnishings, curtains and drapes will absorb sound, especially at high frequencies. These rooms can sound rather dead and may appear to need more amplifier power to generate high SPL's but have the advantage that the sound needs less equalisation and is easier to control. In this case the listener receives mainly direct sound, that is the sound emanating directly from the loudspeaker, with little reflected sound.

If the room has a lot of hard, exposed surfaces such as wooden floors, brick or plaster walls or glass windows, these will reflect the sound, causing it to bounce around the room and sounding over bright. These rooms also tend to have various resonances that will be excited by high SPL's. Listening in the middle of the room you will hear a lot of reflected sound in comparison with the direct sound. Care is needed with speaker positioning, SPL's and equalisation. If the room is large and very reverberant then bass roll-off below about 250 Hz may be required to ensure a reasonable level of intelligibility.

For long, narrow rooms the traditional left and right stacks (floor, wall mounted or flown) can suffice with good stereo imaging in the centre of the room. For multi-tier venues such as theatres, speakers should be flown or wall mounted to project into each tier. In highly reverberant rooms often a central cluster is the best option. This acts as a virtual point source with all the sound emanating from one point in the room, but path lengths should be carefully calculated.

MAINTENANCE

If any of the drive units should cease functioning you are advised to remove the faulty unit from the cabinet and send it to a professional service centre authorised to recone Turbosound loudspeakers. This will ensure the continued high performance of your QLight™ series product.

Removal of the low frequency driver – TQ-308DP, TQ-310DP, TQ-315DP

Unscrew the six countersunk socket head screws at the side of the cabinet that hold the protective grille in place. Be careful when removing the grille as it is under tension and may spring outwards when released. Set the grille and fixing screws aside for later re-assembly.

Undo the four Allen head bolts holding the driver in place, and carefully pull it out and away from the cabinet. **WARNING** - this unit is heavy! Disconnect the cables from the loudspeaker terminals and completely remove the driver from the cabinet. Make a note of the driver polarity for later reconnection.

To reinstate the driver, simply reverse the procedure making sure you observe the correct polarity when reconnecting the cables back into the terminals of the drive units.

Removal of the HF unit – TQ-308DP, TQ-310DP

Remove the grille as described above. Set the grille and fixing screws aside for later re-assembly.

Unscrew the four Allen head bolts holding the high frequency range horn in place and carefully pull it out and away from the cabinet. **WARNING** - this unit is heavy! Disconnect the cables from the loudspeaker terminals and completely remove the driver from the cabinet. Make a note of the driver polarity for later reconnection.

To reinstate the driver, simply reverse the procedure making sure you observe the correct polarity when reconnecting the cables back into the terminals of the drive units.

Removal of the 12"/1" driver – TQ-445DP

Unscrew the eight countersunk screws from the two vertical battens which hold the protective grille in place. Be careful when removing the grille as it is under tension and may spring outwards when released. Set the battens, grille and fixing screws aside for later re-assembly.

Undo the eight M6 x 30mm Allen head bolts holding the driver in place and carefully pull it out and away from the cabinet. **WARNING** - This unit is heavy! You will notice that the 1" high frequency driver is attached to the back of the 12" low frequency driver by its screw adapter. Disconnect the cables from both HF and LF units and completely remove the driver assembly from the cabinet. Make a note of the driver polarity for later reconnection.

Separate the drive units by unscrewing the high frequency driver anti-clockwise and lift it away

from the low frequency driver. Depending on which section needs servicing, the appropriate drive unit should be returned to an authorised Turbosound service centre.

To reinstate the drivers, simply reverse the above procedure making sure you observe the correct polarity when reconnecting the cables back into the terminals of the drive units.

Removal of the midrange unit – TQ-445DP

If the midrange drive unit requires maintenance, it will first be necessary to remove the amplifier module. The midrange driver is held in place by a M10 x 25mm bolt through the rear of the cabinet into the back plate of the drive unit underneath the amplifier module. Once this is released the midrange horn and drive unit assembly can be removed.

Remove the amplifier module as described below and set it aside.

The M10 bolt securing the midrange driver will now be accessible in a recess in the enclosure rear panel. Using a 17mm socket, unscrew the bolt and set aside for later re-assembly.

Unscrew the eight countersunk screws from the two vertical battens which hold the protective grille in place. Be careful when removing the grille as it is under tension and may spring outwards when released. Set the battens, grille and fixing screws aside for later re-assembly.

The midrange horn is secured through the mounting flange with four #10 x 1/12" pan head wood screws. Unscrew these and lift out the horn and driver assembly.

Disconnect the cables, making a note of the polarity, and carefully lift the driver clear.

Removal of the low frequency driver – TQ-425DP

Unscrew the countersunk screws from the four battens which hold the protective grille in place.

Undo the four Allen head bolts holding the driver(s) in place, and carefully pull it out and away from the cabinet. **WARNING** - this unit is heavy! Disconnect the cables from the loudspeaker terminals and completely remove the driver from the cabinet. Make a note of the driver polarity for later reconnection.

To reinstate the driver, simply reverse the procedure making sure you observe the correct polarity when reconnecting the cables back into the terminals of the drive units.

Removal of the low frequency driver – TQ-115DP

Unscrew the six countersunk socket head screws at the side of the cabinet that hold the protective grille in place. Set the grille and fixing screws aside for later re-assembly.

Undo the four Allen head bolts holding the driver(s) in place, and carefully pull it out and away

from the cabinet. **WARNING** - this unit is heavy! Disconnect the cables from the loudspeaker terminals and completely remove the driver from the cabinet. Make a note of the driver polarity for later reconnection.

To reinstate the driver, simply reverse the procedure making sure you observe the correct polarity when reconnecting the cables back into the terminals of the drive units.

Removal of the amplifier module – all models

Release the M5 and M6 Allen head bolts securing the amplifier module to the rear of the cabinet and disconnect the spade connections from the module. The module can now be lifted clear of the cabinet and set aside.

Replacement is a straightforward reversal of the above procedure. The wires should be connected as follows:

Channel A + : Red
Channel A - : Black
Channel B + : Brown
Channel B - : Blue

APPENDIX A: SPARES AND ACCESSORIES

CD-114	1" (25mm) HF compression driver	TQ-445DP
CD-110	1" (25mm) HF compression driver	TQ-308DP, TQ-310DP
CD-208	1.4" (35mm) HF compression driver	TQ-315DP
LS-1018	10" (254mm) LF loudspeaker	TQ-310DP
LS-1214	12" (305mm) LF loudspeaker	TQ-445DP
LS-1526	15" (381mm) LF loudspeaker	TQ-425DP, TQ-115DP
LS-1520	15" (381mm) LF loudspeaker	TQ-315DP
LS-6505	6.5" (165mm) MF loudspeaker	TQ-445DP
LS-8010	8" (203mm) LF loudspeaker	TQ-308DP
RC-1018	Recone kit for LS-1018	TQ-310DP
RC-1214	Recone kit for LS-1214	TQ-445DP
RC-1526	Recone kit for LS-1526	TQ-425DP, TQ-115DP
RC-1520	Recone kit for LS-1520	TQ-315DP
RC-6505	Recone kit for LS-6505	TQ-445DP
RD-114	Replacement diaphragm	TQ-445DP
RD-110	Replacement diaphragm for CD-110	TQ-308DP, TQ-310DP
RD-208	Replacement diaphragm for CD-208	TQ-315DP

Flying accessories

BS-445	Biscuit
EB-10	M10 shoulder eyebolt
FB-12	Universal fly bar assembly
FH-PH	Pole holder for flying frame
FF-445	Flying strips (2 required per enclosure)
FF-425L	Flying strips (2 required per enclosure) vertical
FF-425S	Flying strips (2 required per enclosure) horizontal
FH-308	Flying frame
FH-310	Flying frame
FH-445	Flying frame
PP-445	Pick-up point adapter
SCLAMP	Scaffold clamp for flying frame
TS-445	Tilting strap
U-6	Unilock

APPENDIX B: TECHNICAL SPECIFICATIONS

	TQ-308DP	TQ-310DP	TQ-315DP
Dimensions	464mm x 270mm x 301mm (18.3" x 10.6" x 11.8")	525mm x 315mm x 300mm (20.7" x 12.4" x 11.8")	691mm x 443mm x 420mm (27.2" x 17.4" x 16.5")
Net weight	15.5kg (34.1lbs)	20.5kg (45.1lbs)	32kgs (70.4lbs)
Components	1 x 8" (203mm) LF driver 1 x 1" (25mm) HF compression driver	1 x 10" (254mm) LF driver 1 x 1" (25mm) HF compression driver	1 x 15" LF driver 1 x 1.4" HF driver
Frequency response	68Hz – 20kHz ±4dB	65Hz – 20kHz ±4dB	50Hz – 20kHz ±4dB
Nominal dispersion	100°H x 60°V @-6dB points	100°H x 60°V @-6dB points	80°H x 50°V @-6dB points
Max SPL	120dB cont., 126dB peak	124dB cont., 130dB peak	130dB cont., 136dB peak
Construction	12mm (1/2") birch plywood	12mm (1/2") birch plywood	18mm (3/4") birch plywood
Grille	Reticulated foam on expanded steel mesh	Reticulated foam on expanded steel mesh	Reticulated foam on expanded steel mesh
Connectors	(1) XLR female, (1) XLR male wired pin 2 hot	(1) XLR female, (1) XLR male wired pin 2 hot	(1) XLR female, (1) XLR male wired pin 2 hot
Mains	Neutrik PowerCon®	Neutrik PowerCon®	Neutrik PowerCon®
Options	TurboBlue™ semi-matt textured paint	TurboBlue™ semi-matt textured paint	TurboBlue™ semi-matt textured paint

Due to continuing product improvement the above specifications are subject to change.

	TQ-445DP	TQ-425DP	TQ-115DP
Dimensions	588mm x 409mm x 363mm (23.1" x 16.1" x 14.3")	836mm x 511mm x 632mm (32.9" x 20.1" x 24.9")	559mm x 450mm x 600mm (22" x 17.7" x 23.6")
Net weight	34.5kgs (75.9lbs)	57kg (125.4lbs)	32.2kg (70.8lbs)
Components	1 x 12/1" LF/HF driver 1 x 6.5" MF driver	2 x 15" (381mm) LF drivers	1 x 15" (381mm) LF driver
Frequency response	55Hz – 20kHz ±4dB	45Hz – 200Hz ±4dB	47Hz – 180Hz ±4dB
Dispersion	60°H x 40°V @-6dB points	N/A	N/A
Max SPL	131dB cont., 137dB peak	132dB cont., 138dB peak	126dB cont., 132dB peak
Construction	15mm (1/2") birch plywood	18mm (3/4") birch plywood	18mm (3/4") birch plywood
Grille	Reticulated foam on expanded steel mesh	Reticulated foam on expanded steel mesh	Reticulated foam on expanded steel mesh
Connectors	(1) XLR female, (1) XLR male wired pin 2 hot	(1) XLR female, (1) XLR male wired pin 2 hot	(1) XLR female, (1) XLR male wired pin 2 hot
Mains	Neutrik PowerCon®	Neutrik PowerCon®	Neutrik PowerCon®
Options	TurboBlue™ semi-matt textured paint	TurboBlue™ semi-matt textured paint	TurboBlue™ semi-matt textured paint

Due to continuing product improvement the above specifications are subject to change.

APPENDIX C: WARRANTY

Limited Warranty

This Turbosound loudspeaker product is warranted to the original end-user purchaser and all subsequent owners for a period of one (1) year for electronics assemblies and two (2) years for loudspeakers from the original date of purchase.

Warranty Coverage

Warranty coverage includes defects in materials and workmanship. It does not include:

- damage caused by accident, misuse, abuse, neglect or modification by any person other than an authorised Turbosound representative,
- damage caused by failure to operate the product in accordance with the instructions contained in the user manual,
- damage occurring during shipment in transit,
- claims based on any misrepresentation by the seller,
- products which do not have the original components as specified in the product engineering information,
- products on which the serial number has been removed or defaced.

Shipping

Should any fault develop with a component of your Turbosound system, please return the product, freight pre-paid, in its original packing carton, along with proof of purchase such as the original bill of sale or receipted invoice, and a description of the suspected fault to Turbosound Ltd. (Att: Customer Service), Star Road, Partridge Green, West Sussex RH13 8RY, England, or your local authorised Turbosound representative. The product serial number must be quoted in all correspondence relating to the claim. Insurance is recommended, as Turbosound or its representatives are not liable for loss or damage in transit. Turbosound will pay for return freight costs should repairs be covered under warranty.

Incidental and consequential damages

Turbosound's liability is limited to the repair or replacement, at our option, of any defective product, and shall not be liable for any incidental and consequential damages including, without limitation, injury to persons or property or loss of use.

Limitation of implied warranties

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

This warranty is in addition to, and in no way detracts from, your statutory rights as a consumer. No other warranty is expressed or implied.

Please record your purchase information below for future reference:

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