

# INSTALLATION INSTRUCTIONS 

## DD-EX2

DOUBLE DECK SYSTEM 7223B001 7223B003


Estimated Unit Weight: 259 kg ( 570 lbs ) (7223B001)

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250 \mathrm{~kg}(552 \mathrm{lbs})(7223 \mathrm{~B} 003)
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Link Mortuary Equipment, a division of Link Mfg., Ltd. www.linkmortuaryequipment.com

## 1. INTRODUCTION

Thank you for choosing a Link Mortuary Equipment DD-EX2 Double Deck system. We want to help you to get the best results from the deck and to operate it safely. This manual contains information to introduce you to the Link DD-EX2 and to assist you with its operation. The manual is intended solely for use with this product.
All information in this manual is based on the latest information available at the time of printing. Link Manufacturing reserves the right to change its products or manuals at any time without notice. Contact Link Mortuary Equipment at (800) 248-3057 for information on recent changes to products.

Damaged components should be returned to Link with a pre-arranged Returned Goods Authorization (RGA) number through the Customer Service Department. The damaged component may then be replaced if in compliance with warranty conditions.

## 2. SAFETY SYMBOLS, TORQUE SYMBOL, and NOTES

| A DANGER | DANGER indicates a hazardous situation which if not avoided, will result in death or serious <br> injury. |
| :--- | :--- |
| AWARNING | WARNING indicates a potentially hazardous situation which, if not avoided, could result in <br> death or serious injury. |
| ACAUTION | CAUTION indicates a potentially hazardous situation which, if not avoided, could result in <br> minor or moderate injury. |
| NOTICE | NOTICE indicates a potentially hazardous situation which, if not avoided, may result in <br> property damage. |
| TORQUE | TORQUE indicates named fasteners are to be tightened to a specified torque value. |
| NOTE: | A Note provides information or suggestions that help you correctly perform a task. |

## 3. SAFE WORKING PRACTICES

3.1 During normal operation, the DD-EX2 Double Deck System produces less than 76 dBa

Link products must be installed by a trained technician when being placed into an Electric Vehicle (EV).


Electric Vehicles have higher voltage batteries and cables, and drilling into Electric Vehicles may cause serious bodily harm and possible death.
$\triangle$ WARNING
Note: Link is not responsible for optional configurations or equipment that restrict the installation of the product in any way. Consult OEM body builder guides for additional installation guidelines.

## 4. ASSEMBLY GUIDELINES

ACAUTION The operation of the DD-EX2 Double Deck transport system involves moving parts.
ACAUTION During the course of travel pinch points may exist between components.
$\triangle$ CAUTION Keep hands and fingers clear of moving components during operation.
ACAUTION Practice safe lifting procedures.
ACAUTION The deck weldments are heavy, and can cause injury if lifted improperly or dropped.
ACAUTION Obtain help or the assistance of a crane when lifting heavy assemblies.
4.1 In order for this deck to operate properly, it must operate in the parameters specified by Link.
4.2 The installer must verify the vehicle is configured properly for the deck being added.
4.3 No alterations of any Link deck component is permitted without proper authorization from qualified Link personnel.

## $\triangle$ ACAUTION <br> The vehicle manufacturer should be consulted before any modifications are made to the frame of the vehicle.

ACAUTION Cutting or altering the frame in certain areas may affect the manufacturer's warranty.
4.4 No welding of any deck component is permitted except when specified by Link.


The vehicle manufacturer should be consulted before any modifications are made to the frame of the vehicle.
ACAUTION
Cutting or altering the frame in certain areas may affect the manufacturer's warranty.
$\triangle$ WARNING
Proper tightening of fasteners is important to the performance and safety of the deck.
AWARNING Improperly tightened fasteners may cause unsafe conditions and accelerate wear.

## 5. APPLICATION

- This double deck system is designed to be installed and operated inside a motor vehicle.
- The long DD-EX2 system (Part \#7223B001) fits, Extra Long WB Mercedes Vito, and LWB Vauxhall Vivaro vans.
- The intermediate DD-EX2 system (Part \#7223B003) fits, Ford Transit, Vauxhall Vivaro, Mercedes Vito Long vans.
- All other vehicles should be carefully evaluated for fit and function before installing a DD-EX2 system.


## 6. PRE-INSTALLATION CHECKLIST

Make certain the vehicle is placed on a level flat surface and that the parking brake is engaged.
Refer to the vehicle owner's manual to locate the power supply where the deck power wire will attach. This may be located under the driver's seat or under hood in the engine compartment.

## 7. INSTALLATION PROCEDURE

7.1 Begin by assembling the framework as shown on Page 11 and detailed below.
7.1.1 Start by loosely assembling the side frame tubes to the front and rear legs inside the van, using $3 / 8 \times 21 / 2$ bolts and $3 / 8$ serrated flange nuts. For a short deck, the rear leg should be oriented with the gussets facing rearward, as shown in Fig. 1. For a long deck, the gussets should face forward, as shown in Fig. 2. Position the rear leg so that the footprint of the system is spread out as far as possible without interfering with the wheel housings.

7.1.2 Assemble the front pivot bushings, front inner sleeves, torsion bar, front $1 / 2 \times 31 / 4$ pivot bolts, and $1 / 2$ centerlock hex nuts.

33 TORQUE the two pivot fasteners to 75-88 Nm.
7.1.3 Assemble the actuator mount plates to the side frames with $3 / 8 \times 31 / 2$ bolts and $3 / 8$ serrated flange nuts attach the actuators between the mounts with $1 / 2 \times 4$ bolts and $1 / 2$ centerlock hex nuts, and at the torsion arm with $1 / 2 \times 31 / 2$ bolts and $1 / 2$ centerlock hex nuts.

See picture below for approximate location ( 62.5 centimeters from front of frame tube).
\&TORQUE the front and rear actuator pivot fasteners to 41-54 Nm.
\& TORQUE the actuator mount plate fasteners to $34-47 \mathrm{Nm}$.
7.1.4 Assemble the rear pivot bushings, rear inner sleeves, rear swing arms, rear 1/2 $31 / 4$ pivot bolts, $1 / 2$ washers, and $1 / 2$ centerlock hex nuts.

Torque the two pivot fasteners to $75-88 \mathrm{Nm}$.

7.1.5 Assemble the tie rods, rod ends and $1 / 2$ jam nuts. Leave the jam nuts loose, so that the deck can be leveled after it is installed. Assemble the tie rods to the rear swing arms and the torsion arm with $1 / 2 \times 21 / 2$ bolts and $1 / 2$ centerlock hex nuts.

द3 TORQUE the four fasteners to 88-102 Nm.
7.1.6 Assemble the top deck mount brackets, bushings, inner sleeves, $1 / 2 \times 4$ bolts, washers, and $1 / 2$ center lock hex nuts.

TORQUE the four pivot fasteners to $75-88 \mathrm{Nm}$.
7.2 Assemble the front impact brackets to the upper and lower decks.
7.3 Assemble the top deck to the framework using $161 / 4-20$ button head cap screws and $1 / 4$ nylock nuts.
7.4 Slide the bottom deck in place, and evaluate the overall placement of the unit. Using an auxiliary 12V power source, cycle the deck up and down, and check all clearances with the van in all positions. Adjust as needed.
ACAUTION The top deck is heavy (intermediate version $=57 \mathrm{~kg}(126 \mathrm{lbs})$, long version $=61 \mathrm{~kg}(135 \mathrm{lbs})$. )
ACAUTION The deck weldments can cause injury if lifted improperly or dropped.
ACAUTION USE MULTIPLE PEOPLE WHEN MANUALLY HANDLING THE DECK.
ACAUTION The bottom deck is heavy (intermediate version $=59 \mathrm{~kg}$ ( 132 lbs ), long version $=64 \mathrm{~kg}$ ( 140 lbs ).)
ACAUTION The deck weldments can cause injury if lifted improperly or dropped.
ACAUTION USE MULTIPLE PEOPLE WHEN MANUALLY HANDLING THE DECK.
7.5 If the deck placement is acceptable, and the top deck raises and lowers smoothly, the framework is ready to be bolted to the van.

### 7.5.1 Remove the bottom deck.

7.5.2 Fasten the front leg to the floor of the van using two each of the fasteners and washer plates provided. The mount holes used will vary depending on the vehicle. See figures 4 and 5 below for examples. Spacer material should be added between the ribs of the van floor near the mount fasteners as needed to prevent crushing the floor ribs.

## TORQUE the two mount fasteners to 54-75 Nm.

AWARNING Check underneath vehicle to locate the best fastener location before drilling.
$\triangle$ WARNING
Verify that they will not interfere with fuel tanks, wiring bundles, or other important vehicle components.

## $\triangle$ WARNING

Damaging or drilling into vehicle components may create unsafe conditions, or affect the manufacturer's warrantee.

7.5.3 Fasten the rear leg to the floor of the van using two each of the fasteners and washer plates provided, items. Again, the mount holes used will vary depending on the vehicle. It may be possible to utilize existing cargo hold down holes. See figures 6 and 7 below for examples. Spacer material may again be needed.

## 3 TORQUE the two mount fasteners to $54-75 \mathrm{Nm}$.

AWARNING Check underneath vehicle to locate the best fastener location before drilling.


Verify that they will not interfere with fuel tanks, wiring bundles, or other important vehicle components.
$\triangle$ WARNING
Damaging or drilling into vehicle components may create unsafe conditions, or affect the manufacturer's warrantee.

7.6 Assemble the bottom deck to the unit.
7.6.1 The front of the deck is attached to the front leg by sliding the special mount tabs and bolts over the bottom lip of the aluminum deck extrusion and clamping the deck down.
7.6.2 The rear of the deck is attached to the van floor using the deck support brackets. The bracket attaches to the deck using the same fasteners that attach the plastic ramp pivot blocks. Fasten the brackets to the floor of the van using one of the provided fasteners and washer plate per bracket. It may be possible to utilize existing cargo hold down holes. See pictures below for examples.

## TORQUE the two mount fasteners to $\mathbf{5 4 - 7 5} \mathbf{~ N m}$.

7.7 Adjust the actuator position and the tie rod lengths to correctly and evenly position the upper deck so that it is just above the lower deck ( $2-4 \mathrm{~cm}$ above) when the actuator is fully extended. Tighten the jam nuts on the tie rods.

## TORQUE the twelve actuator mount plate fasteners to $34-47 \mathrm{Nm}$.

7.8 Tighten the eighteen fasteners attaching the front and rear legs to the side frames.

AWARNING Check underneath vehicle to locate the best fastener location before drilling.


Verify that they will not interfere with fuel tanks, wiring bundles, or other important vehicle components.
$\triangle$ WARNING
Damaging or drilling into vehicle components may create unsafe conditions, or affect the manufacturer's warrantee.


## TORQUE the leg mount fasteners to 34-47 Nm.

7.9 Attach the rear plastic ramp. It is supplied without holes and not attached to the ramp tube so it can be customized as needed for the specific vehicles.
7.10 Install the electrical control system. Refer to Pages 8 and 9 for details.
7.10.1 Install the electrical control box in the left rear corner of the van. Be mindful of pinch points when locating it.

AWARNING Follow the vehicle manufacturer recommendations located in the owner's manual pertaining to accidental air bag deployment whenever performing service on system wiring.
$\triangle$ WARNING If in doubt, contact the vehicle manufacturer.

7.10.2 Using the provided bracket, install the limit switch near the upper, rear corner of the side door opening. Position and adjust the switch so that the switch is actuated when the door is closed.
7.10.3 Route the wires from the control box and connect them as shown in the electrical schematic on Page 7. Install the provided in-line fuse holder with 30 amp fuse near the vehicle battery.
AWARNING It is the installers' responsibility to mount the control box in a safe location.
AWARNING Improper mounting may expose the user to injury from moving components.
7.11 After completing the system installation, conduct a thorough examination of the system including a functional test to ensure the system is properly installed.
$\square$ Check the electrical system function; ensure the battery is connected, then turn on the key switch.
$\square$ Check that the Reset button illuminates, and disables the system when the side door is opened.
$\square$ Check that the Reset button light extinguishes and remains off when the button is depressed after closing the side door, and that the deck is re-enabled.

AWARNING $\widehat{\Delta}$ Do not "piggy back" or tap into either side of any fuse in the vehicle's fuse box.
AWARNING $\widehat{\Delta}$ Improper wiring may cause injury to operator, or damage to vehicle systems.
$\square$ Cycle the deck up and down, check all clearances around moving components.
$\square$ Place a 270 kg load on the upper deck, cycle the deck up and down while checking for proper function. Ensure that no binding or excessive deflection occurs in the mechanism.
$\square$ Check that the deck is level front to back, and side to side in the raised and lowered positions, as well as while traveling. Check that both sides travel at the same rate.
$\square$ Verify the safe placement of the control box. Ensure that the operator is clear of all moving components while operating the deck.
Record and file evidence of this examination and functional testing.

## Control System Electrical Schematic



For vans with dual side doors, wire additional safety switches in series with first safety switch.

| WIRE INFORMATION TABLE |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | END 1 |  | END 2 |  |
| WIRE ID | $\begin{aligned} & \text { WIRE } \\ & \text { COLOR } \end{aligned}$ | MINIMUM WIRE SIZE | WIRE LENGTH (INCHES) | CONNECTOR | CONNECTS TO | CONNECTOR | CONNECTS TO |
| WIRE 1 | RED | 10 ga . | 274" | 1/4 FEMALE INSUL. TERM. | FUSE, TERM. 1 | NONE (STRIPPED WIRE) | OUT OF BOX TO 12 VDC (VEHICLE BATT.) |
| WIRE 2 | RED | 12 ga . | $9{ }^{\prime \prime}$ | 1/4 FEMALE INSUL. TERM. | FUSE, TERM. 2 | NONE (STRIPPED WIRE) | KEY SWITCH, TERM. 1 |
| WIRE 3 | BROWN | 12 ga. | 166" | NONE (STRIPPED WIRE) | RAISE/LOWER CONTROL SWITCH, TERM. 3 | FEMALE TERMINAL FOR PACKARD 56 CONN. | OUT OF BOX TO ACTUATOR CONN. 1, TERM. 1 |
| WIRE 4 | BLUE | 12 ga. | 166" | NONE (STRIPPED WIRE) | RAISE/LOWER CONTROL SWITCH, TERM. 1 | FEMALE TERMINAL FOR PACKARD 56 CONN. | OUT OF BOX TO ACTUATOR CONN. 1, TERM. 2 |
| WIRE 5 | BLACK | 12 ga. | 36" | NONE (STRIPPED WIRE) | $\begin{gathered} \hline \text { RAISE/LOWER CONTROL } \\ \text { SWITCH, TERM. } 6 \\ \hline \end{gathered}$ | NONE (STRIPPED WIRE) | OUT OF BOX TO GROUND |
| WIRE 6 | RED | 12 ga . | 7" | NONE (STRIPPED WIRE) | RAISE/LOWER CONTROL SWITCH, TERM. 2 | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. 4 |
| WIRE 7 | BLACK | 12 ga . | 5.5" | NONE (STRIPPED WIRE) | RAISE/LOWER CONTROL SWITCH, TERM. 6 | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 1 |
| WIRE 8 | PURPLE | 14 ga . | $7{ }^{\prime \prime}$ | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. 1 | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 2 |
| WIRE 9 | RED | 14 ga . | 8" | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. B | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 4 |
| WIRE 10 | RED | 14 ga . | 8" | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. 8 | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 4 |
| WIRE 11 | PURPLE | 14 ga . | 6.5 " | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. 5 | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 3 |
| WIRE 12 | YELLOW | 14 ga . | 150" | NONE (STRIPPED WIRE) | $\begin{array}{\|c\|} \hline \text { OUT OF BOX TO DOOR SWITCH, } \\ \text { TERM. } 4 \\ \hline \end{array}$ | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 3 |
| WIRE 13 | PURPLE | 14 ga . | 150" | NONE (STRIPPED WIRE) | $\begin{gathered} \hline \text { OUT OF BOX TO DOOR SWITCH, } \\ \text { TERM. } 3 \\ \hline \end{gathered}$ | NONE (STRIPPED WIRE) | KEY SWITCH, TERM. 2 |
| WIRE 14 | RED | 12 ga . | $7{ }^{\prime \prime}$ | NONE (STRIPPED WIRE) | KEY SWITCH, TERM. 2 | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. 7 |
| WIRE 15 | YELLOW | 14 ga . | $6 "$ | NONE (STRIPPED WIRE) | RESET SWITCH, TERM. 1 | 1/4 FEMALE INSUL. TERM. | RELAY, TERM. A |
| WIRE 16 | BLUE | 12 ga. | 104" | NONE (ULTRASONIC WELD) | WIRE 4, NEAR ACTUATOR CONNECTOR | FEMALE TERMINAL FOR PACKARD 56 CONN. | CONN. 2, TERM. 2 |
| WIRE 17 | BROWN | 12 ga. | 104" | NONE (ULTRASONIC WELD) | WIRE 3, NEAR ACTUATOR CONNECTOR | FEMALE TERMINAL FOR PACKARD 56 CONN. | CONN. 2, TERM. 1 |



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PARTS LIST FOR
DOUBLE DECK ASSEM
$7223 B 001 \& 7223 B 003$




| ITEM | DESCRIPTION | QTY | ITEM | DESCRIPTION |  |
| :---: | :--- | :---: | :---: | :--- | :---: |
| 1 | $1 / 4 \times 3 / 4$ UNC PAN HD PH MACH SCR, ZINC | 4 | 11 | FRAME-DECK | QTY |
| 2 | $1 / 4$ UNC HEX NYLOCK NUT (GR B) | 12 | 12 | GUARD-ANGLE, REAR |  |
| 3 | $1 / 4-20 \times 7 / 16$ SLAB BASE WELD NUT | 60 | 13 | GLIDE STRIP | 1 |
| 4 | DECAL-CAUTION, MANUAL HANDLING | 1 | 14 | BRACKET-IMPACT, FRONT |  |
| 5 | $1 / 4-20 \times 3 / 4$ SOCKET BUTTON HD SS CAP SCREW | 8 | 15 | GLIDE STRIP | 2 |
| 6 | $\# 10 \times 3 / 4$ SS FLAT HD TAP SCR | 56 | 16 | GLIDE STRIP | 1 |
| 7 | $1 / 4 \times 5 / 8$ FLANGE HEAD BOLT | 32 | 17 | BOARD-DECK | 2 |
| 8 | $1 / 4 \times 3 / 4$ FLANGE HEAD BOLT | 28 | 18 | SUPER SIZED RECESSED COT CUP | 2 |
| 9 | BIER PIN PLATE (4 HOLE) | 2 | 19 | BIER PIN PLATE | 1 |
| 10 | BUMPER-RECESSED, 1.50 O.D. $\times .63 ~ H ~$ | 4 | 20 | BIER PIN PLATE | 2 |



| ITE | DESCRIPTION | QTY | ITEM | DESCRIPTION | QTY |
| :---: | :--- | :---: | :---: | :---: | :--- | :---: |
| 1 | $1 / 4 \times 3 / 4$ UNC PAN HD PH MACH SCR, ZINC | 4 | 13 | TUBE-MOUNT, RAMP | 1 |
| 2 | $1 / 4$ UNC HEX NYLOCK NUT (GR B) | 12 | 14 | FRAME-DECK | 1 |
| 3 | $1 / 4-20 \times 7 / 16$ HT PROPELLER TEE | 4 | 15 | GUARD-ANGLE, REAR | 1 |
| 4 | $1 / 4-20 \times 7 / 16$ SLAB BASE WELD NUT | 60 | 16 | GLIDE STRIP | 2 |
| 5 | DECAL-CAUTION, MANUAL HANDLING | 1 | 17 | BRACKET-IMPACT, FRONT | 1 |
| 6 | $1 / 4-20 \times 3 / 4$ SOCKET BUTTON HD SS CAP SCREW | 8 | 18 | GLIDE STRIP | 2 |
| 7 | \#10 $3 / 4$ SS FLAT HD TAP SCR | 56 | 19 | GLIDE STRIP | 2 |
| 8 | $1 / 4 \times 5 / 8$ FLANGE HEAD BOLT | 32 | 20 | BOARD-DECK | 1 |
| 9 | $1 / 4 \times 3 / 4$ FLANGE HEAD BOLT | 28 | 21 | SUPER SIZED RECESSED COT CUP | 3 |
| 10 | BIER PIN PLATE (4 HOLE | 2 | 22 | $1 / 4 \times 11 / 4$ UNC TRUSS HD PH MACH SCR, | 4 |
| 11 | BUMPER-RECESSED, 1.50 O.D. X. 63 | 4 | 23 | BIER PIN PLATE | 2 |
| 12 | TUBE-MOUNT, RAMP | 1 | 24 | BIER PIN PLATE | 4 |



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