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MAKING BOWLING AMAZING

FLY'N DUCKS

Electric Bumpers
Installation/Owner's Manual

Original Instructions Written in English

www.qubicaamf.com

QubicaAMF Worldwide Technical Support
(International) 804.569.1000 ◊ (Domestic) 1.866.460.7263 option 3

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400-049-198 Rev. B
February 2024

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DOCUMENT UPDATES

This manual supersedes all previous versions of the FLY'N DUCKS E-BUMPERS Owner's Manual. QubicaAMF Worldwide, LLC. reserves the right to revise and/or update this manual at any time without obligation to notify any person or entity of such revision. The document number, revision level, and date below indicate the edition of this manual.

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QubicaAMF TECHNICAL SUPPORT

(USA) 1-866-460-7263 option 3
(Europe – Middle East – Africa) +39 051 4192630

For more contact information, go to
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Mechanicsville, Va. 23111

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E-Bumpers Installation/Owner's Manual

400-049-198 Rev. B

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Rev. B	24-0016

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Page	Change No.	Effective Date
All	Revision A	2/24/2023
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Table of Contents

Section 1 General Installation Notes 3
1.1. Improper Use of the E-Bumper System. 4
Section 2 Bumper Configurations 4
Section 3 Bumper Installation 5
Section 4 Electrical Installation 18
Section 5 Drawings and Part Numbers 19
5.1. 049-007-707-xxx E-Bumper 6' LH Assembly 19
5.2. 049-007-708-xxx E-Bumper 6' LH Assembly 20
5.3. 049-007-722-xxx E-Bumper 8' RH Assembly 21
5.4. 049-007-723-xxx E-Bumper 8' LH Assembly 22
5.5. 049-007-730-xxx E-Bumper 10' RH Assembly 23
5.6. 049-007-731-xxx E-Bumper 10' LH Assembly 24
5.7. Actuator Parts 25
5.8. 049-007-755 E Bumper Actuator Kit 26
5.9. 049-007-753 E Bumper Spare Parts Kit 27
5.10. BCU 4 Electrical 29

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Tel: (804) 569-1000

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web: www.qubicaamf.com - email: info@qubicaamf.com - eshop: eshop.qubicaamf.com

Section 1 General Installation Notes

For devices directly connected to the power, it is necessary to check that the electrical capacity of the system is suitable for the maximum power requirements of the equipment (as indicated on the labels of the equipment).

Always open the circuit breaker and disconnect the power plug from the powered units before looking for, and clearing, any problem.

To reduce the risk of fire or electrical shock, do not expose this equipment to moisture.

This appliance must be positioned such that the mains supply cord connector is accessible after installation.

Be aware of the voltage being supplied to the equipment (i.e., from 100V to 240V) and that the equipment is set for the correct voltage (when applicable). Failure to set the equipment for the correct voltage will result in damage to the equipment.

The electrical safety of the equipment is obtained only when the equipment is connected to an effective GROUNDING SYSTEM (in accordance with the existing electrical codes and safety regulations).

It is necessary to have the power and grounding inspected by a licensed and certified electrician.

The manufacturer cannot be responsible for possible injury, damages or malfunctioning of the equipment due to the absence of or improper grounding of the equipment.

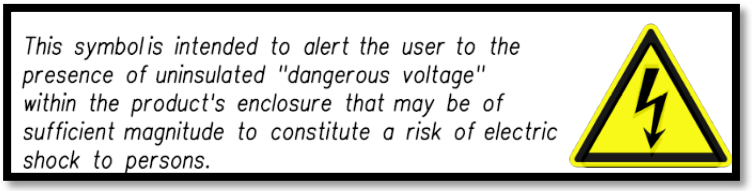
Hazards and Indicators.

During the installation of the components of the E-Bumper system, you will be exposed to potentially hazardous situations. To alert you to a possible hazard, the following symbols will be shown.

This symbol is "shorthand" for the warning and instructions in the textbox to the left. When you see this symbol, follow the instructions for the step carefully and ensure you have performed the following actions:

Before installing the E-Bumper system, read and understand the installation instructions.

Contact Technical Support for clarification if you do not understand an installation task or have any questions.



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1.1. Improper Use of the E-Bumper System.

The following points are a comprehensive but not necessarily complete to all the cases and scenarios that QubicaAMF considers to be an improper use of the E-Bumper system. Any damage or malfunction which is directly or indirectly a consequence of one of the behaviors listed below will be considered as enough basis for voiding the product warranty, as indicated in the QubicaAMF Warranty Schedule.

- Balls thrown and landing outside of the player's bowling lane, including any balls landing on an adjacent lane and hitting the lane's panels, gutters, bumpers or any other E-Bumper component.
- Balls thrown and directly hitting any of the following components of the E-Bumper system before touching the lane surface:
    1. Upper plastic rail
    2. Metallic bumper support structure
- Balls thrown at an excessive speed, namely a speed greater than the limit set for the lanes by the Conqueror Front Desk.
- Hitting, kicking or walking on the rails and their support structure either when extended in bumper mode or when they are retracted.
- Forcing the alignment of a rail by manually pulling or pushing it.
- Manually forcing or blocking the raising or the lowering of a bumper section. The system movement must only be controlled by the linear actuators installed under the gutters.
- Spilling any liquid on the electronic components of the bumper system. This includes washing or cleaning the E-Bumper components with means different from a correctly maintained and working bowling lane machine.
- Using the system without gutters or protection of the upper part of the rail
- Any action that causes directly or indirectly the breakage of the first E-Bumper rail section.
- Any action that causes directly or indirectly the breakage of the upper part of a rail section while not also breaking the rail bumper levers.

Section 2 Bumper Configurations

What follows is a chart of what length bumper assemblies are included in each E-bumper package. Note that LH/RH part numbers all begin with 049-007.

Package	Kit Part Number	Lane Length	8'		6'		10'	
			LH	RH	LH	RH	LH	RH
			723	722	707	708	731	730
Standard	049-007-737-XXX	24'	1	1			1	1
Midway	049-007-719-XXX	36'	1	1	2	2	1	1
3 Quarter	049-007-746-XXX	48'	1	1	1	1	3	3
Regulation	049-007-747-XXX	60'	1	1			5	5

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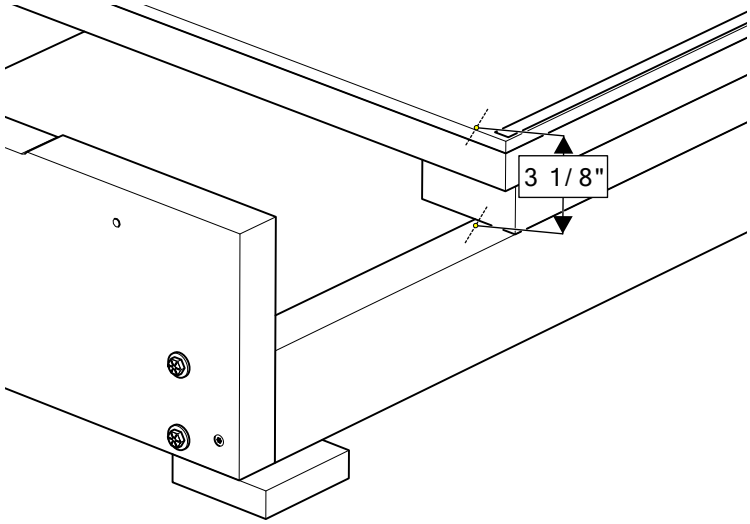
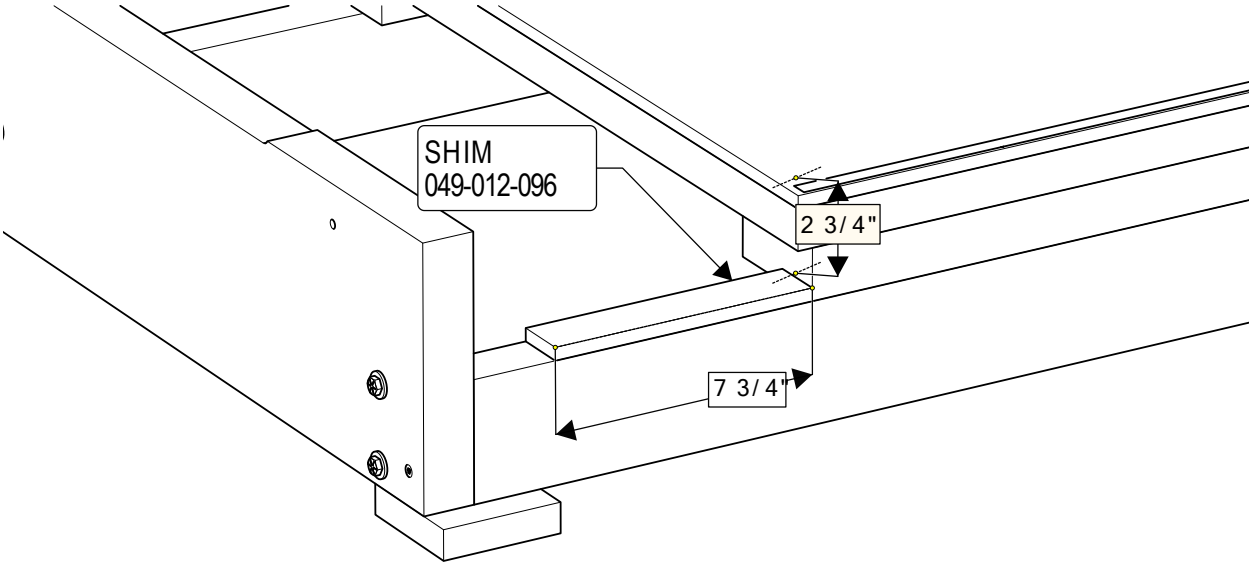
Section 3 Bumper Installation

Follow this procedure to correctly install the E-Bumper system.

1. Remove cover boards and capping from the lanes.
2. Remove gutters.
3. Remove the shims of all gutters.
4. Verify the height from the levelers to the lane surface:
   a. Install shim(s) on levelers to obtain 2 3/4".
   b. The shims need to be cut in the field to 7 ¾" from strips shipped with the foundation.





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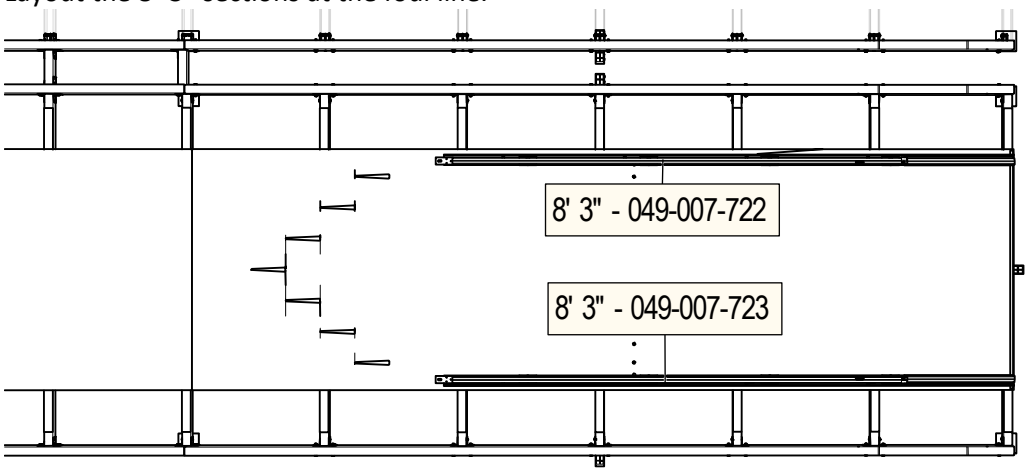
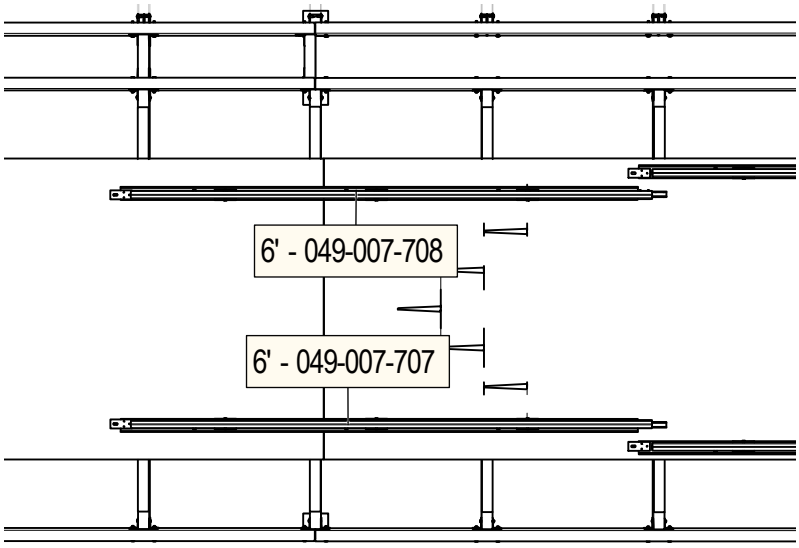
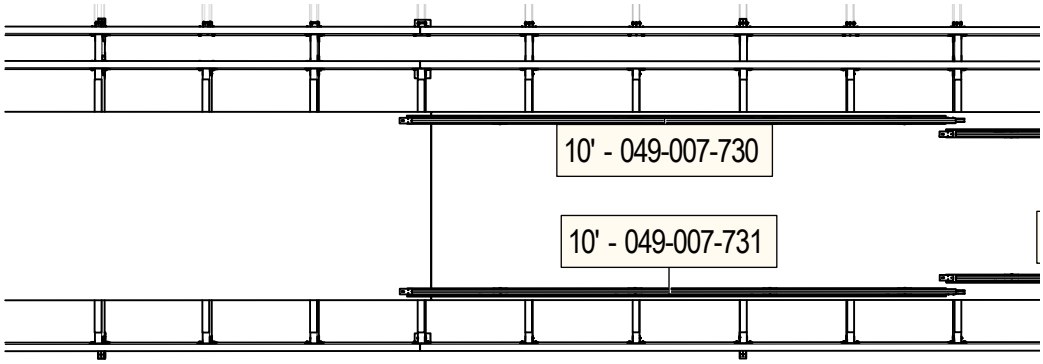
5. Lay out all bumper rails on the side of the lane.
   a. Layout the 8'-3" sections at the foul line.



   b. Layout the 6' sections (Midway and 3 Quarter).



   c. Layout the remaining 10' sections.



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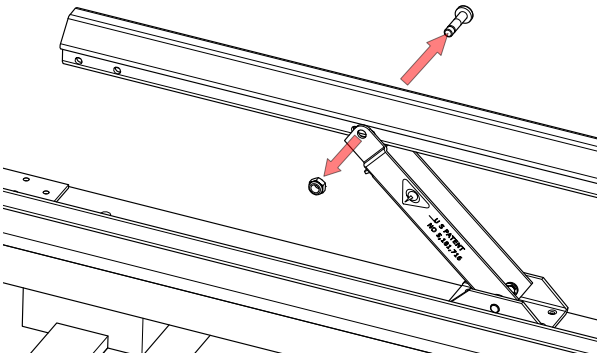
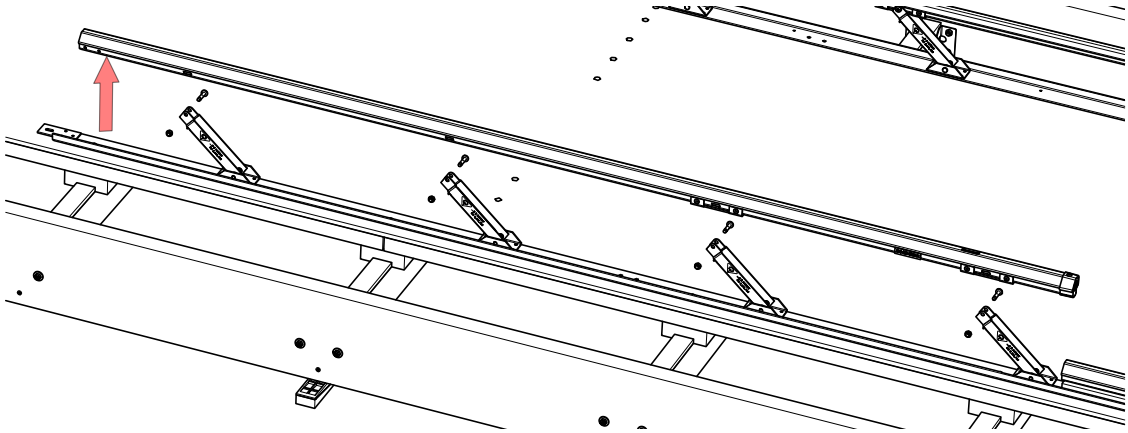
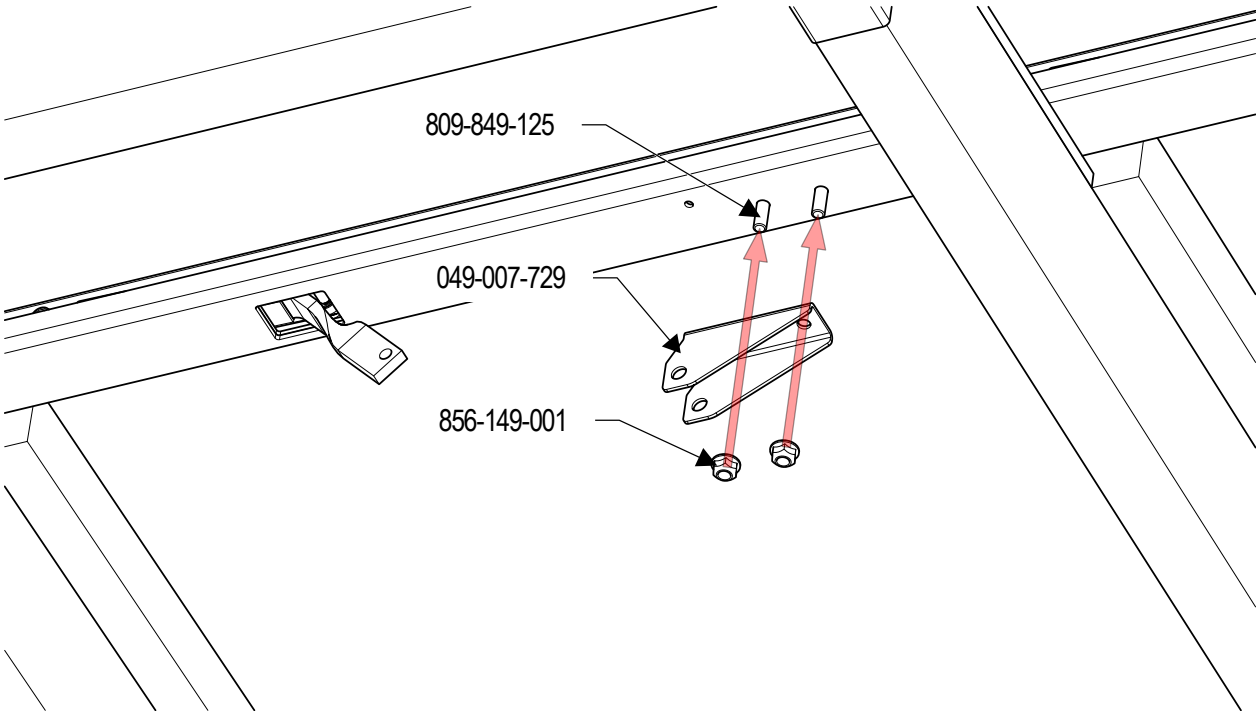
6. Install the actuators to the first sections.
   a. Remove the top rail.





   b. Mount the rear brackets to the bumper's base angle.



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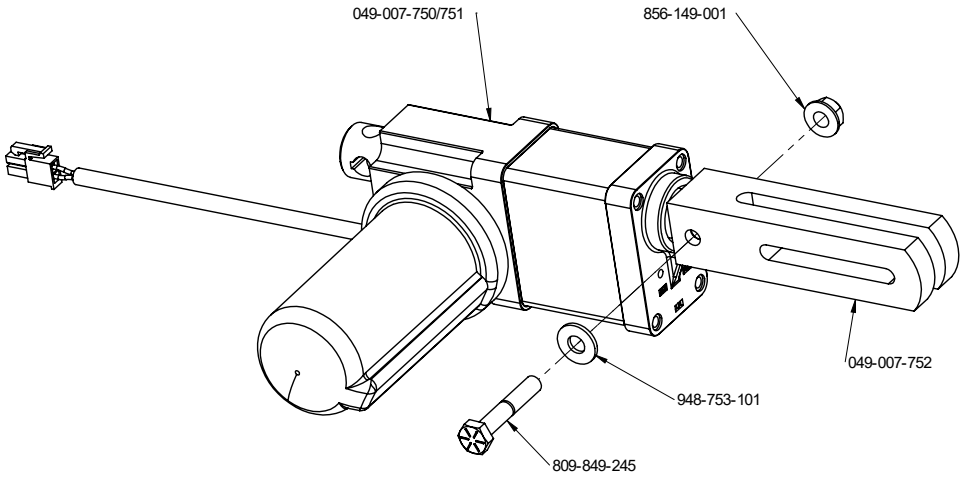
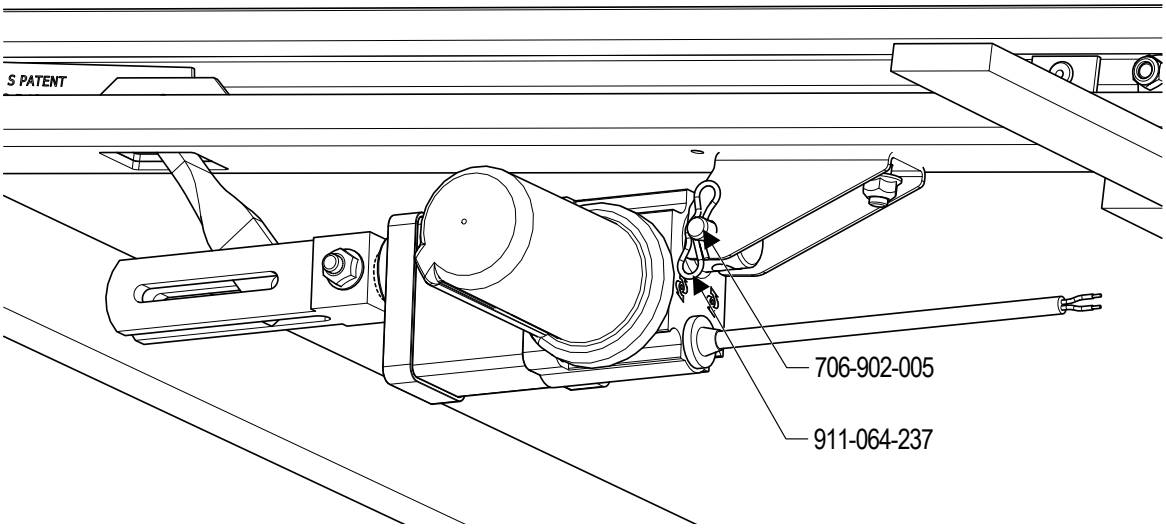
c. Bolt the clevis to the actuator shaft.



d. Mount the actuator to the rear bracket. Insert a 706-902-005 pin and secure it with a 911-064-237 bowtie clip.



e. Plug cable ends into actuator plug, route cable up the middle of the pair on top of the spacer blocks, use plastic wire staples as needed.
f. Route cable up through double division box, through wireway to the BCU4 unit mounted on the curtain wall.

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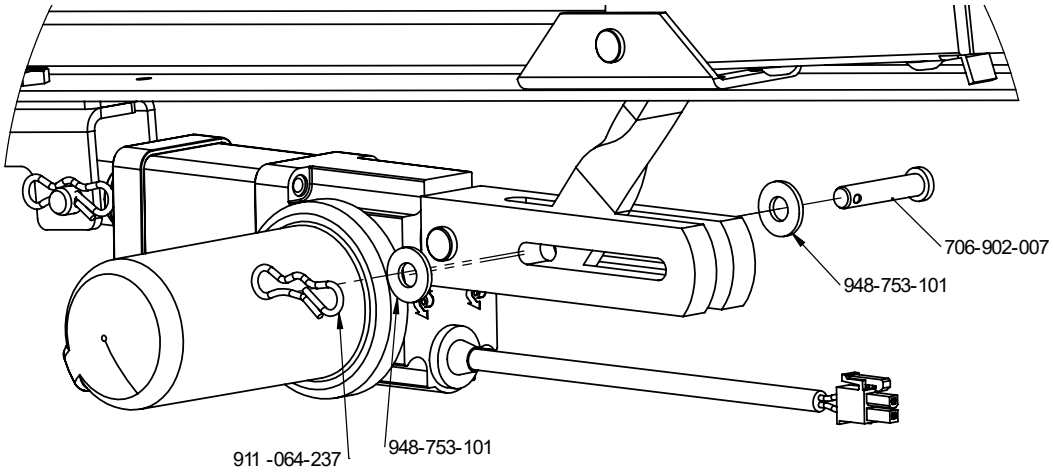
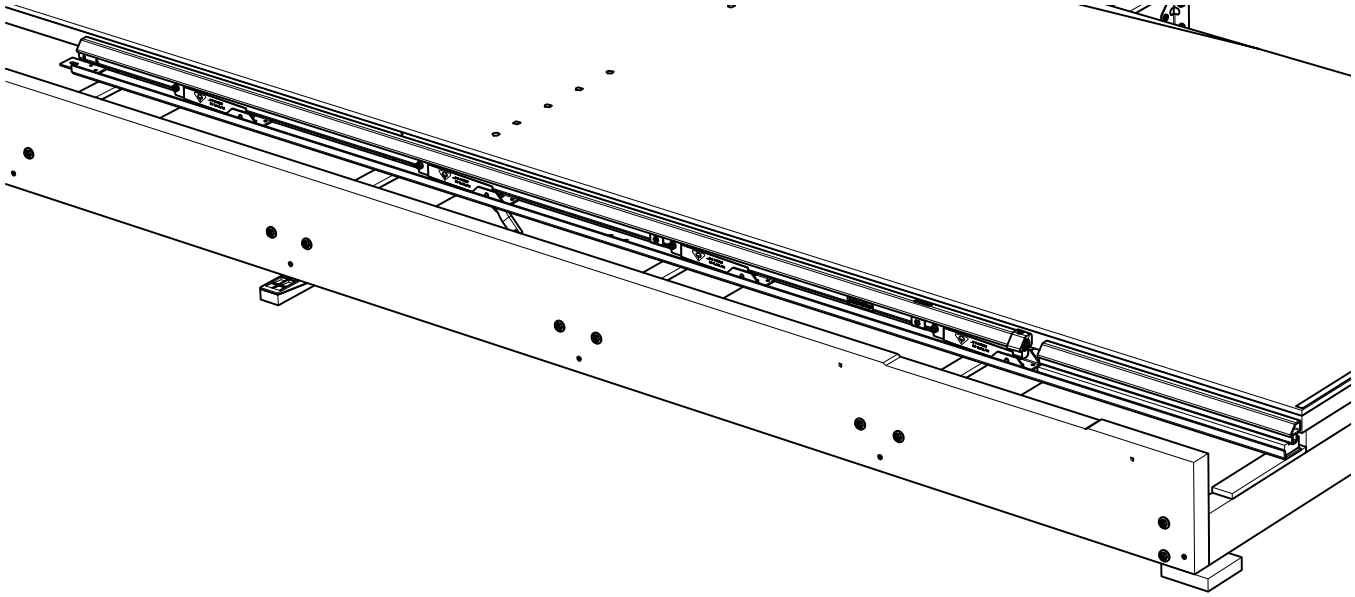
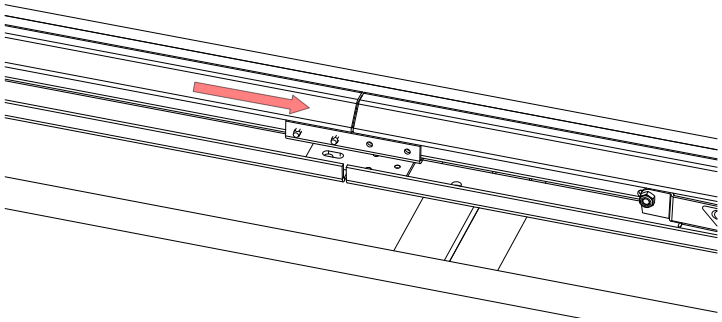
7. Mount the clevis to the actuator arm with a pin and flat washer and secure it with a flat washer and bowtie clip.



8. Lay out rail sections in the gutter channels.
   a. Place the 8' 3" sections against the approach and foundation in the gutter channel.



   b. Place the next section at the end of the 8' 3", press the end of the next section down underneath the bracket of the 8' 3" and line up the holes.



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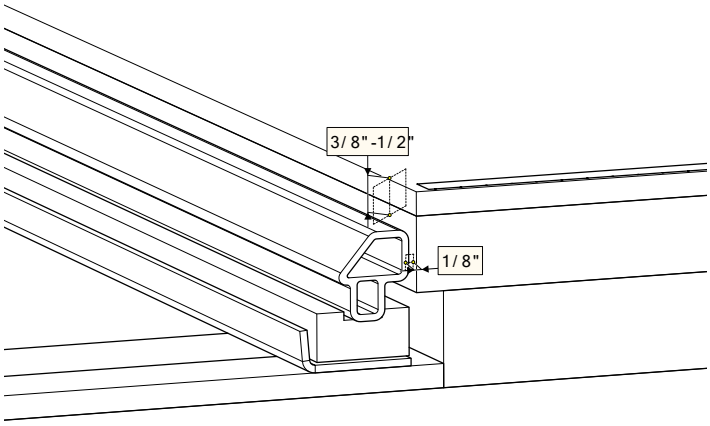
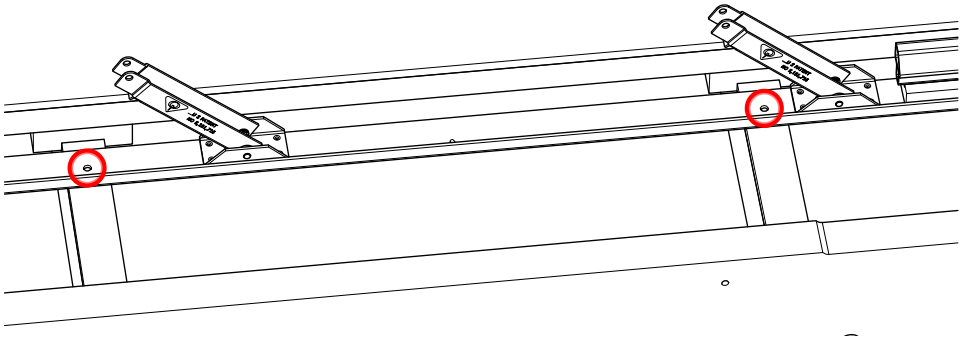
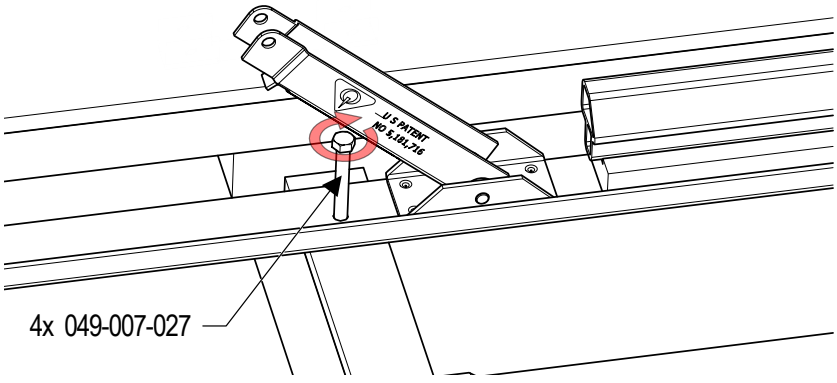
c. Lay out the remaining rails in the gutter channels but do not secure them.
d. Leave 1/8" space between the side of the lane and the rail.
e. Ensure a minimum of 5/8" clearance between the top of the lane and the top of the rail.



9. Install and secure the bumper rail.
   a. Mark and drill holes on the base angle of the 8'-3" bumper rail centered to the levelers.



   b. Lag screw the base angle to the levelers.



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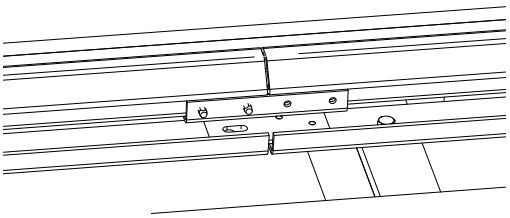
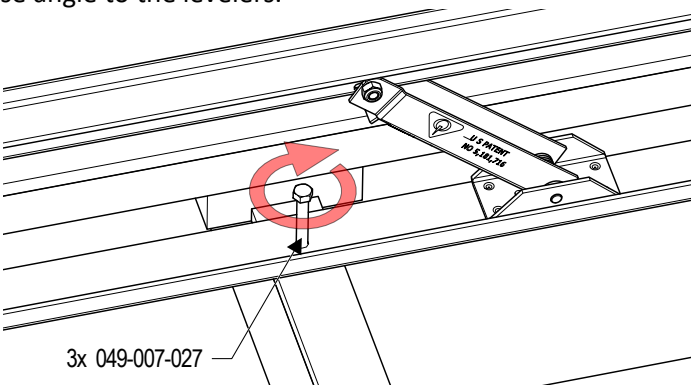
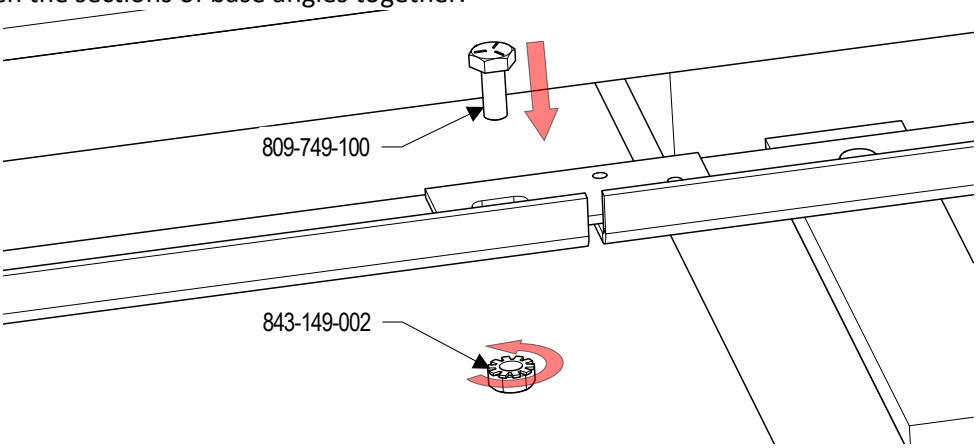
c. Slide the next section underneath the weld bracket.



d. Align the holes on the weld bracket and lower base angle.
e. Raise the bumper. Mark and drill holes on the base angles centered with the levelers.
f. Lag screw the base angle to the levelers.



g. Fasten the sections of base angles together.



h. Repeat for the remaining bumper rails except the last one.

***Remember to keep 1/8" gap between the lane and the bumper and 1/16" between the base angles**

i. Pull the excess length of the last section over the flat gutter adapter block. Make sure the bumper is down and mark where it needs to be trimmed.

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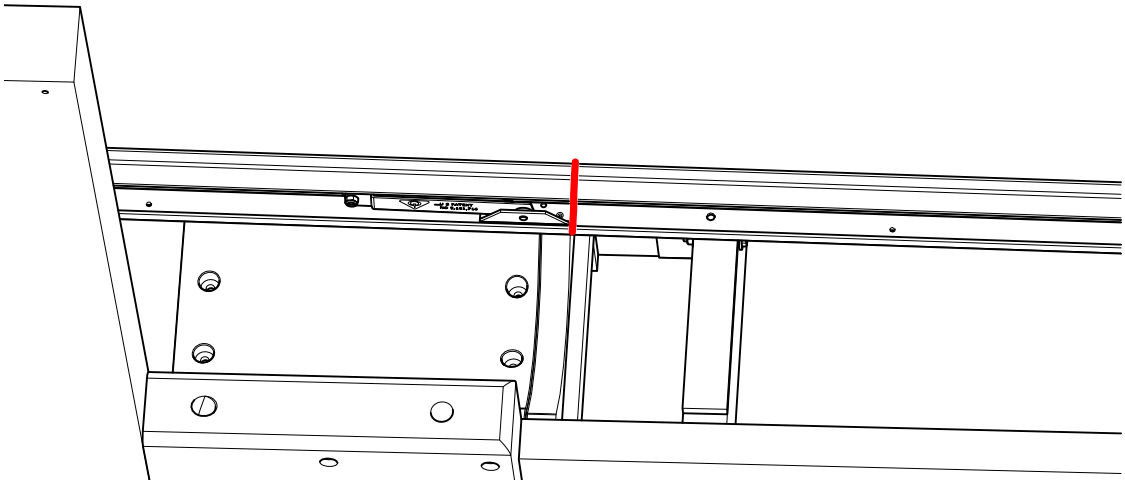
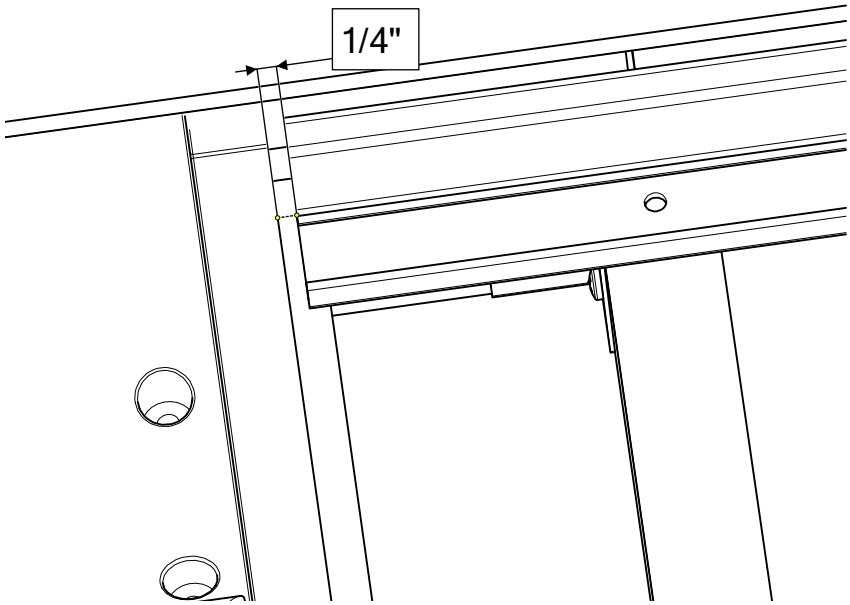
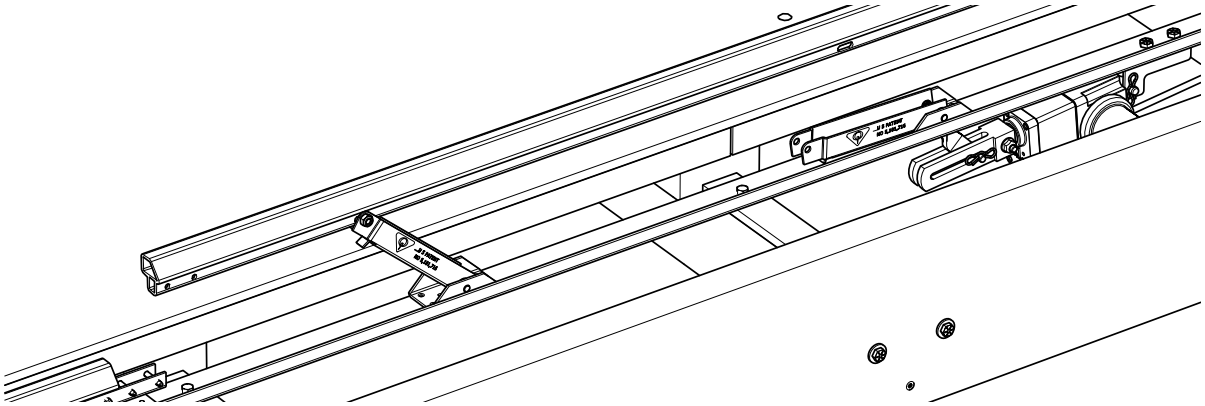


j. Trim the excess length and check to ensure that the bumper now fits (1/4" gap).



k. Secure and lag screw the trimmed section.

10. Reinstall the rail to the uprights. **DO NOT ATTACH THE ACTUATOR ARM UPRIGHT.**



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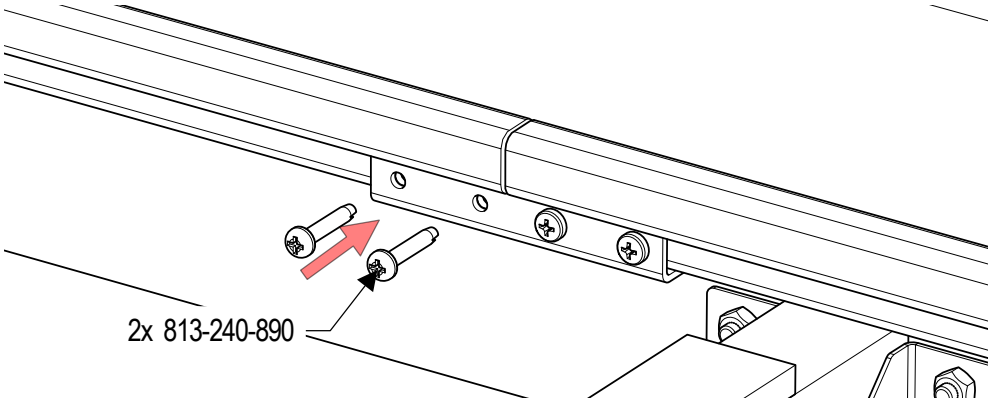
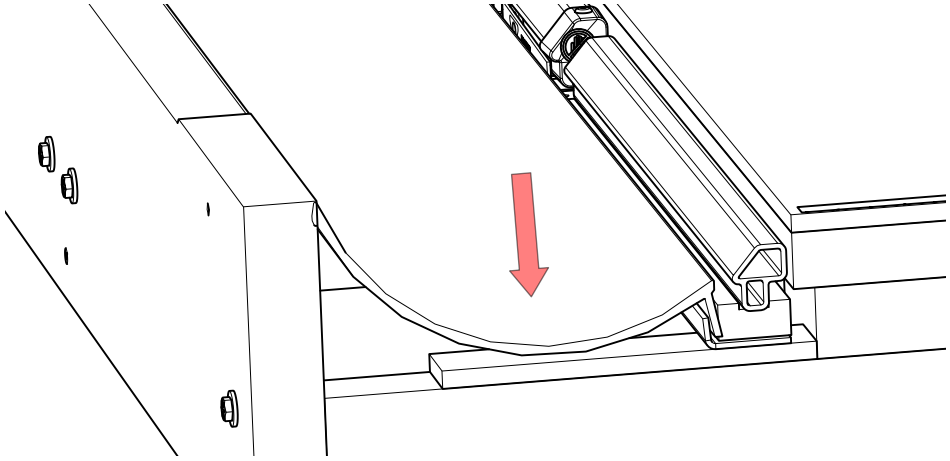
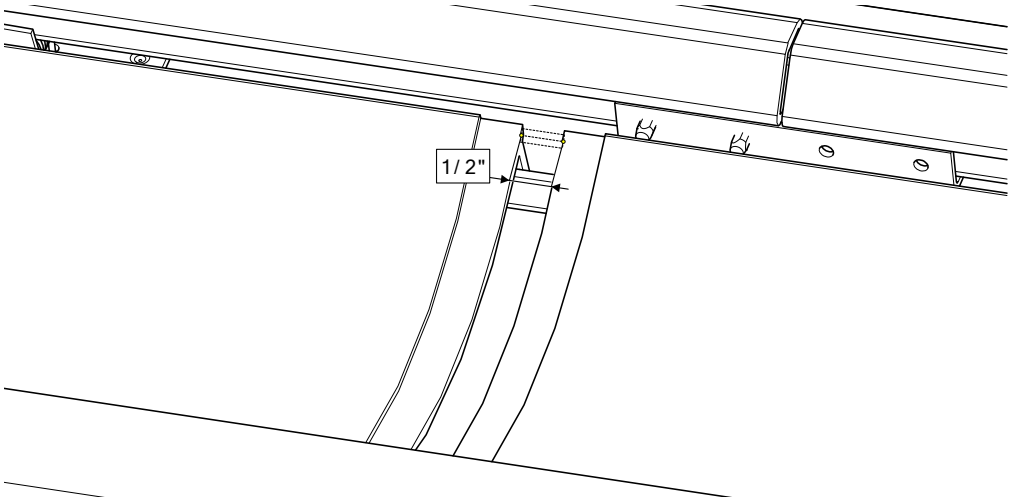
11. Secure the rails into the U-brackets.



12. Test the functionality by manually raising and lowering the bumpers.
13. Install the gutters.
    a. Starting at the foul line, lay down the 2 first sections of gutters so that the leg of the gutter is between the base angle lip and the bumper arm bracket.



    b. Leave ½" between the 2 sections of gutters.



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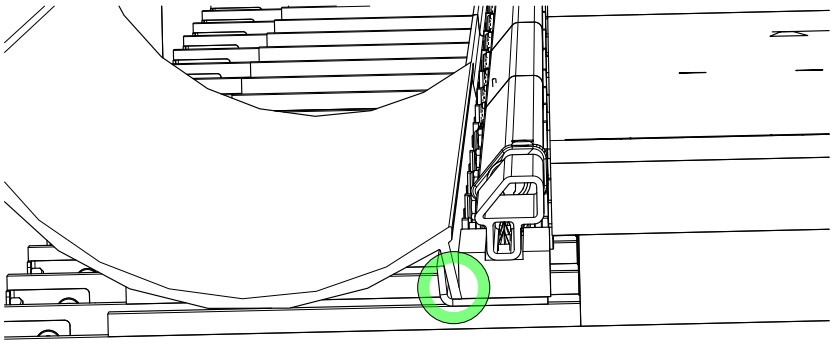
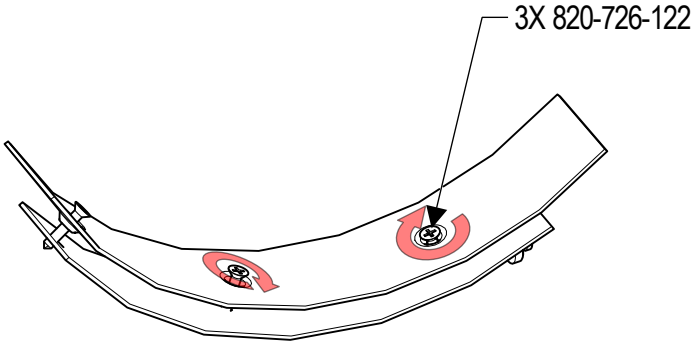
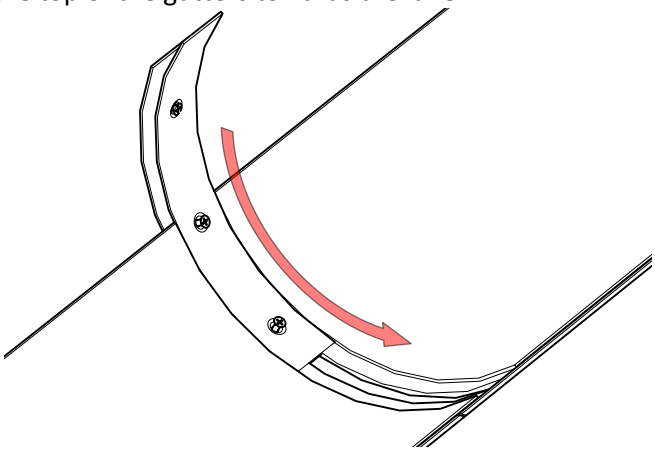
c. Press down or tap the edge until the leg of the gutter sinks and touches the bottom of the base angle.



d. Assemble the gutter coupling by inserting the screws partially through the top and the bottom gutter coupling plates.



e. Slide it over the top of the gutters towards the lane.



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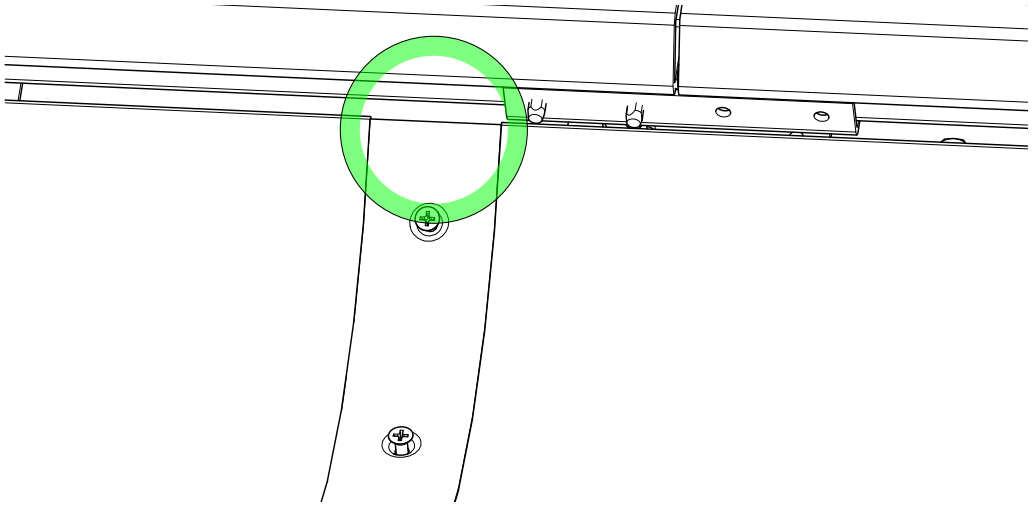
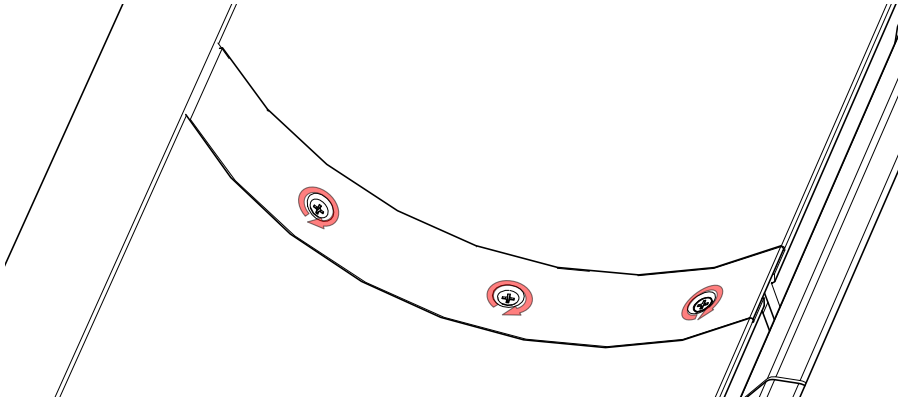
f. Tap the coupling until it is flush with both edges of the gutters.



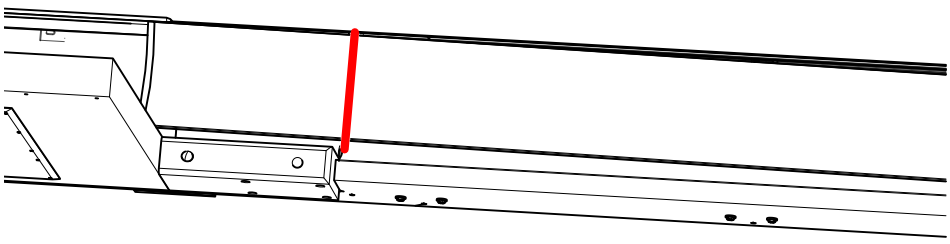
g. Tighten the screws. Ensure that the screw heads are not exposed.



h. Repeat the previous steps for the remaining gutters.

i. Lay the last gutter section and the last coupling where they should be located.

j. Pull the excess length over the rear adapter block, and mark where it needs to be trimmed.



k. Trim the excess length of the gutter.

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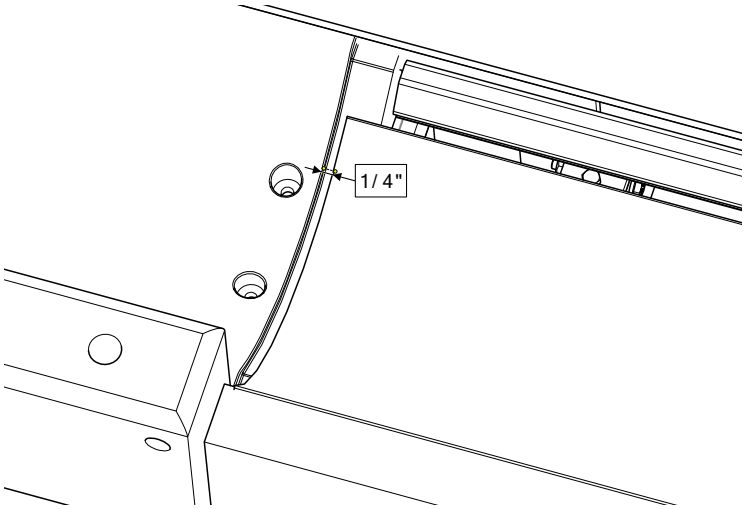
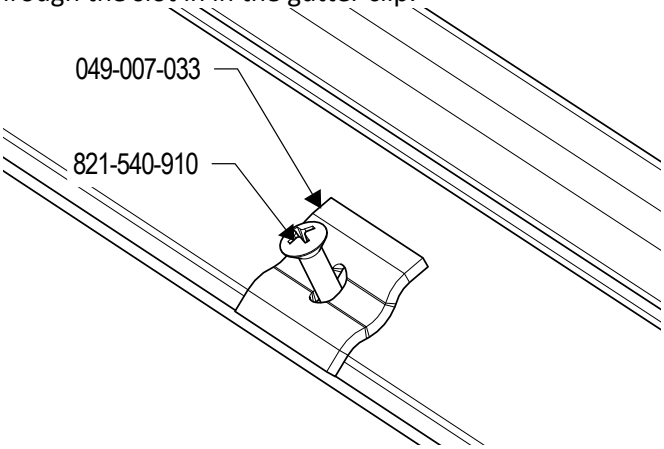
l. There should be a 1/4" gap between the end of the bumper and the adapter block.

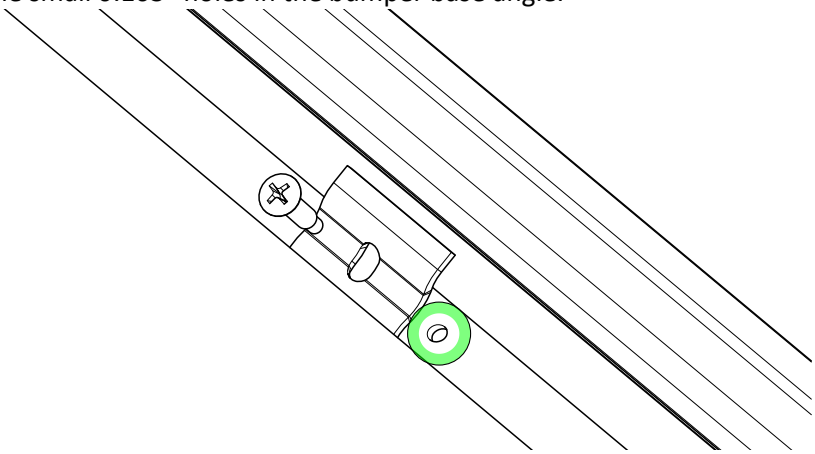


m. Install the last coupling.

14. Install capping.
15. Install bumper clips.
    a. Insert the screw through the slot in in the gutter clip.



b. Locate the small 0.163" holes in the bumper base angle.



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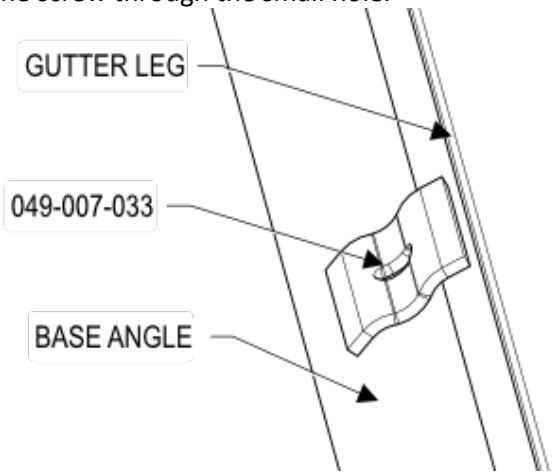
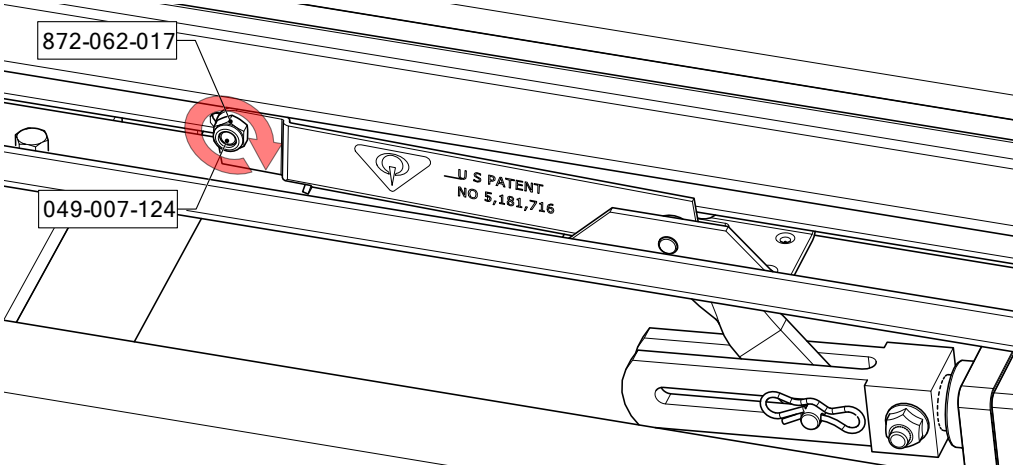
c. Secure the gutter clip against the base angle and the vertical gutter leg at an angle between 45-60° by driving the screw through the small hole.



16. Attach the actuator upright to the bumper rail.



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Section 4 Electrical Installation

DUCK MODE

There are two BCU4's per pair, two actuators per lane which are driven in parallel by one BCU4 through the separate output line – LCOM is connected and commands are processed.

10 - Bowler mode: ON (Bowler Input type: ON=Continuous, OFF=Momentary)

9 - Enable: ON (TMS Input: Move up only when TMS is Active. OFF=Ignore, ON=Active)

8 - Overcurrent: ON (Overcurrent Control ON=Reverse, OFF=Stop)

7 - Current Limit: ON (Current limit per actuator: ON=1.6 Amp, OFF=0.8 Amp)

6 - Actuator: ON (Mode: ON=Solenoid, OFF=Actuator) *those two, dip 6 and 7 determine the Duck mode, they must be ON

5 - off - off

4 - off - off

3 - off - off

2 - off - off

1 - off - on

off-off-off-off-off means even lane

off-off-off-off-on means odd lane

Note importance of switches 1 to 5 must be 00000 or 10000, other values are not accepted (meaning switches 2 through 5 must always be OFF)

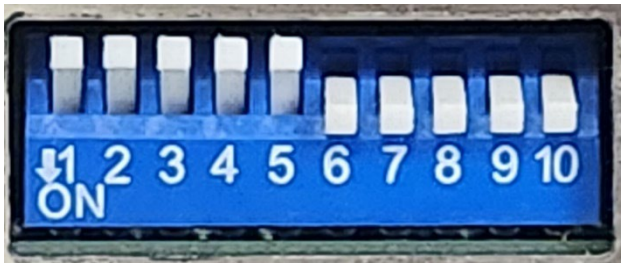

Figure 1 Even Lane

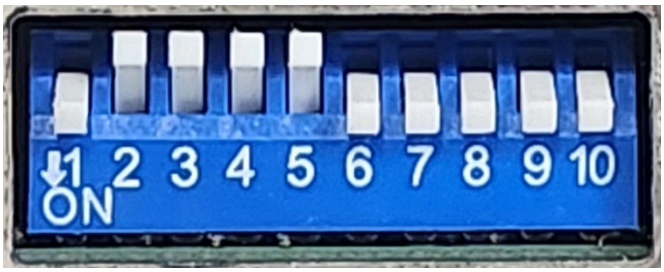

Figure 2 Odd Lane

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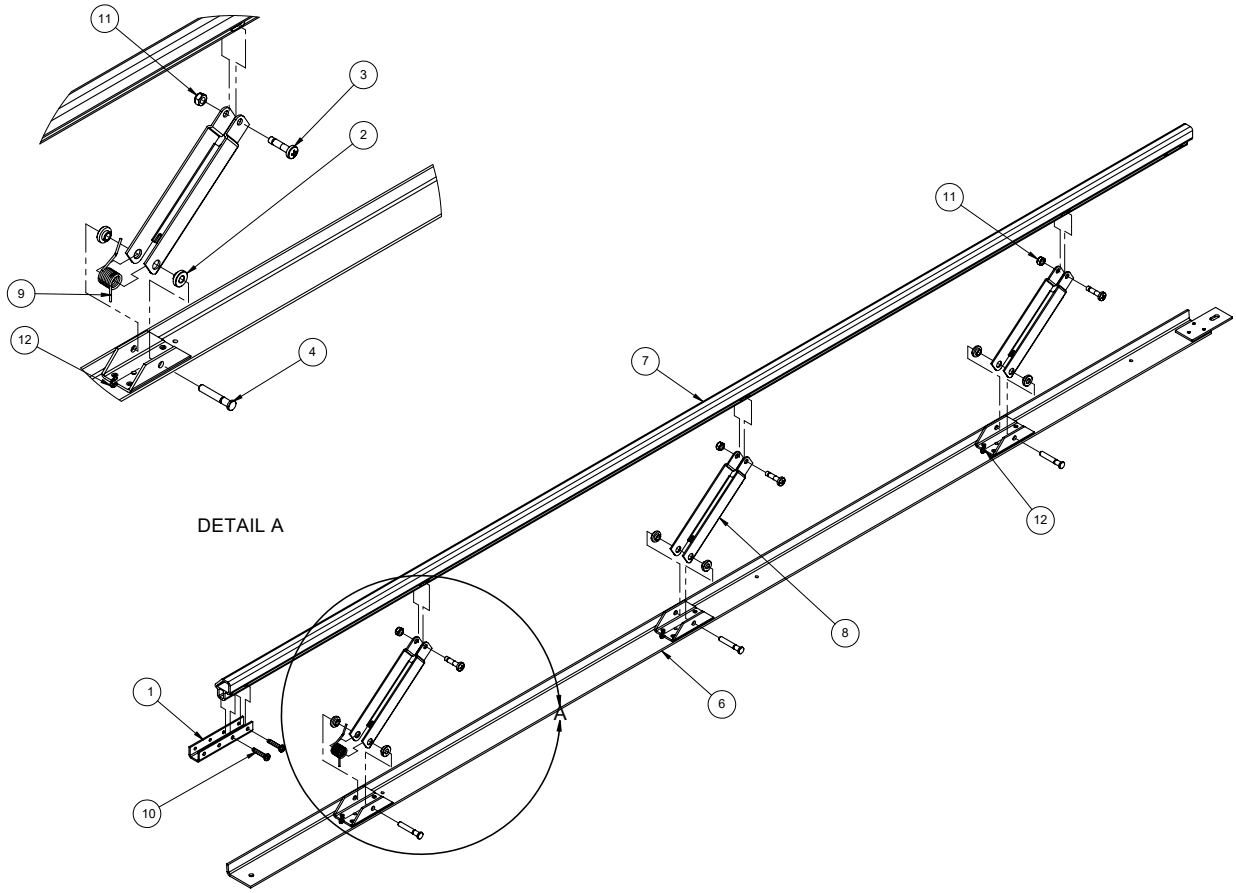
Section 5 Drawings and Part Numbers

5.1. **049-007-707-xxx E-Bumper 6' LH Assembly**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-029	BMP U-BRKT CONN
2	6	049-007-042	BUSHING
3	3	049-007-124	PHPSB M6-1 X 26 ZN
4	3	049-007-148	BMP LWR PIVOT PIN
5	1	049-007-707	LABEL, 6FT, LH
6	1	049-007-709	WDMT, E-BUMPER BASE 6' LH
7	1	049-007-713-XXX	BMP RAIL EXTRUSION 6' LH
8	3	049-007-720	E-BMP RAIL ARM
9	1	049-007-721	SPRING, BUMPER TORSION
10	2	863-050-257	PHPTS M5-.8 X 25 ZN
11	3	872-062-017	HLN M6-1 D-985 ZN NE
12	3	919-015-055	RNG E M5 X 0.030 PH

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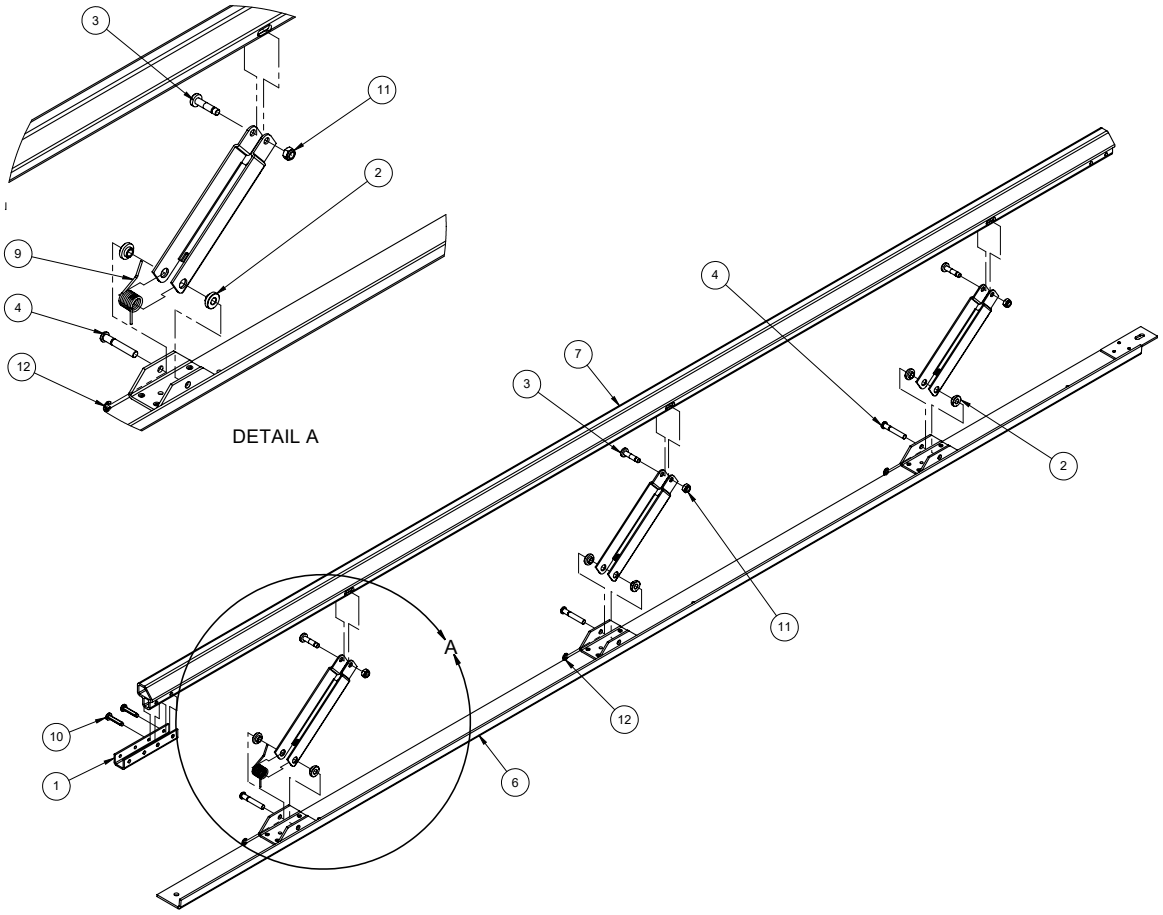
5.2. **049-007-708-xxx E-Bumper 6' LH Assembly**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-029	BMP U-BRKT CONN
2	6	049-007-042	BUSHING
3	3	049-007-124	PHPSB M6-1 X 26 ZN
4	3	049-007-148	BMP LWR PIVOT PIN
5	1	049-007-708	LABEL, 6FT, RH
6	1	049-007-710	WDMT, E-BUMPER BASE 6' RH
7	1	049-007-714-XXX	BMP RAIL EXTRUSION 6' RH
8	3	049-007-720	E-BMP RAIL ARM
9	1	049-007-721	SPRING, BUMPER TORSION
10	2	863-050-257	PHPTS M5-.8 X 25 ZN
11	3	872-062-017	HLN M6-1 D-985 ZN NE
12	3	919-015-055	RNG E M5 X 0.030 PH

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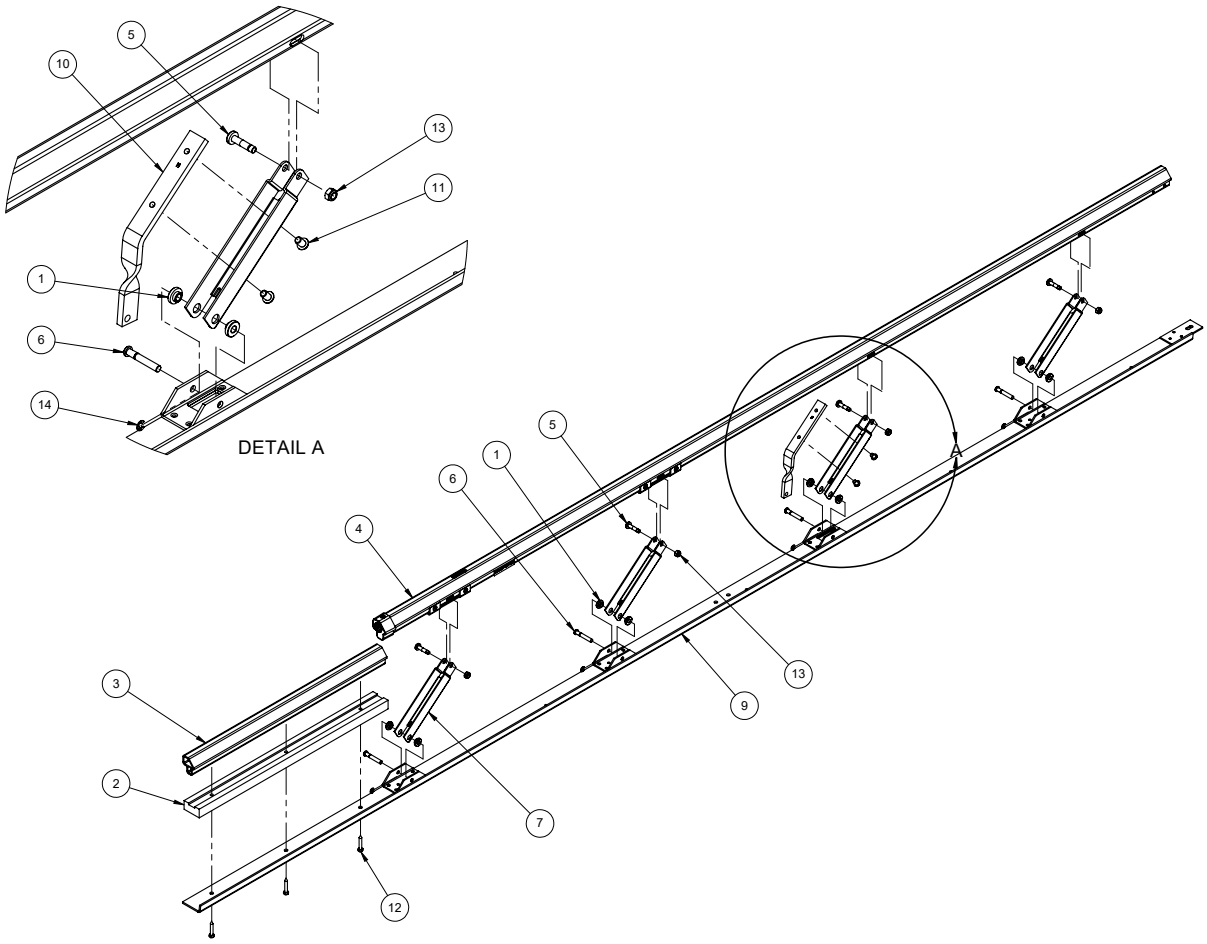
5.3. **049-007-722-xxx E-Bumper 8' RH Assembly**



ITEM	QTY	PART #	DESCRIPTION
1	8	049-007-042	BUSHING
2	1	049-007-062	BMP WOOD SPCR
3	1	049-007-079	BMP FILLER EXTRUSION LH/RH
4	1	049-007-091	BMP RAIL ASM 8' RH
5	4	049-007-124	PHPSB M6-1 X 26 ZN
6	4	049-007-148	BMP LWR PIVOT PIN
7	4	049-007-720	E-BMP RAIL ARM
8	1	049-007-722	LABEL, 8FT, RH
9	1	049-007-724	WDMT, E-BUMPER BASE 8' RH
10	1	049-007-728	ACTUATOR ARM, FD
11	2	808-549-060	BHSCS 1/4-20 X 0.38 BO
12	3	861-482-307	HHTS M4-.8-1.6 X 30 ZN
13	4	872-062-017	HLN M6-1 D-985 ZN NE
14	4	919-015-055	RNG E M5 X 0.030 PH

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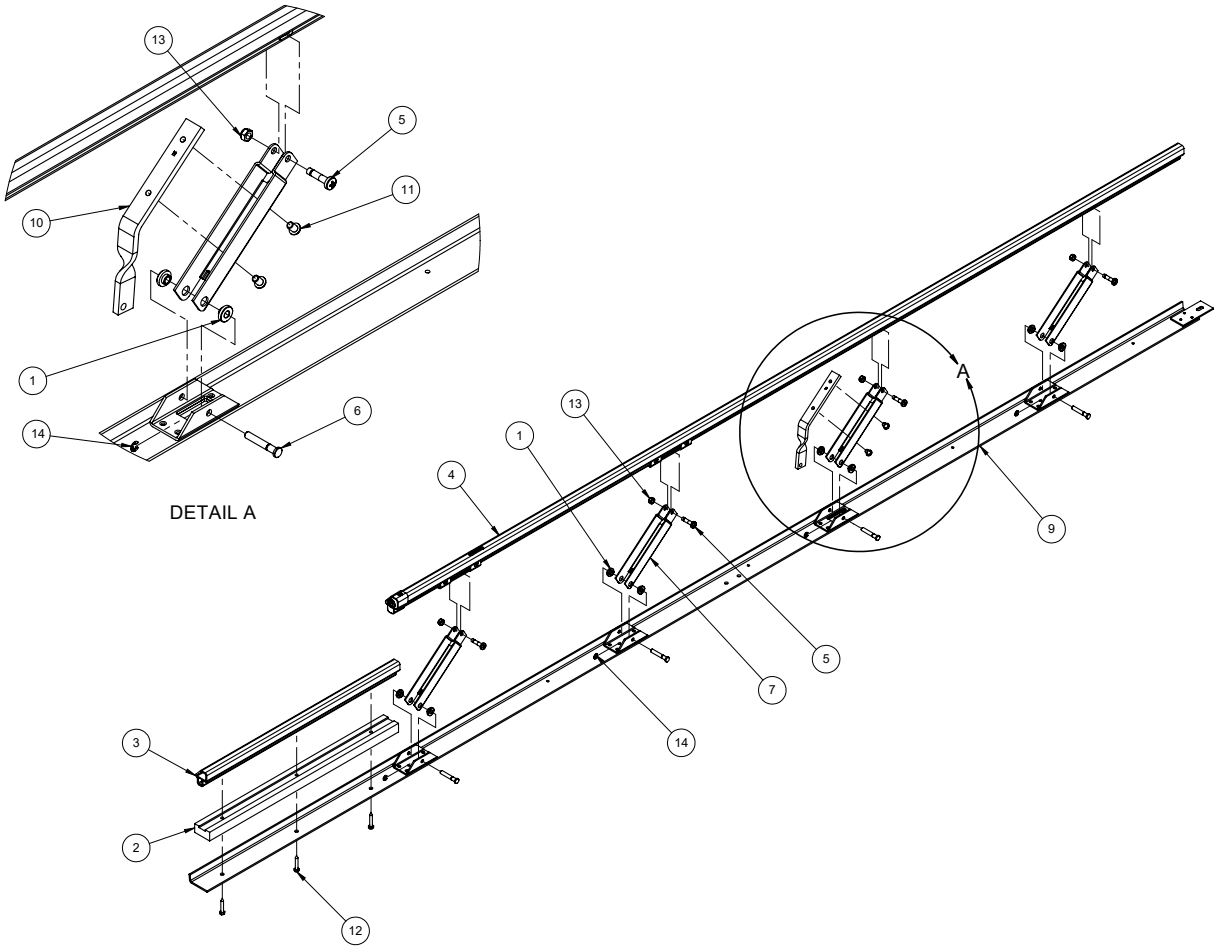
5.4. **049-007-723-xxx E-Bumper 8' LH Assembly**



ITEM	QTY	PART #	DESCRIPTION
1	8	049-007-042	BUSHING
2	1	049-007-062	BMP WOOD SPCR
3	1	049-007-079	BMP FILLER EXTRUSION LH/RH
4	1	049-007-092	BMP RAIL ASM 8' LH
5	4	049-007-124	PHPSB M6-1 X 26 ZN
6	4	049-007-148	BMP LWR PIVOT PIN
7	4	049-007-720	E-BMP RAIL ARM
8	1	049-007-723	LABEL, 8FT, LH
9	1	049-007-725	WDMT, E-BUMPER BASE 8' LH
10	1	049-007-728	ACTUATOR ARM, FD
11	2	808-549-060	BHSCS 1/4-20 X 0.38 BO
12	3	861-482-307	HHTS M4-.8-1.6 X 30 ZN
13	4	872-062-017	HLN M6-1 D-985 ZN NE
14	4	919-015-055	RNG E M5 X 0.030 PH

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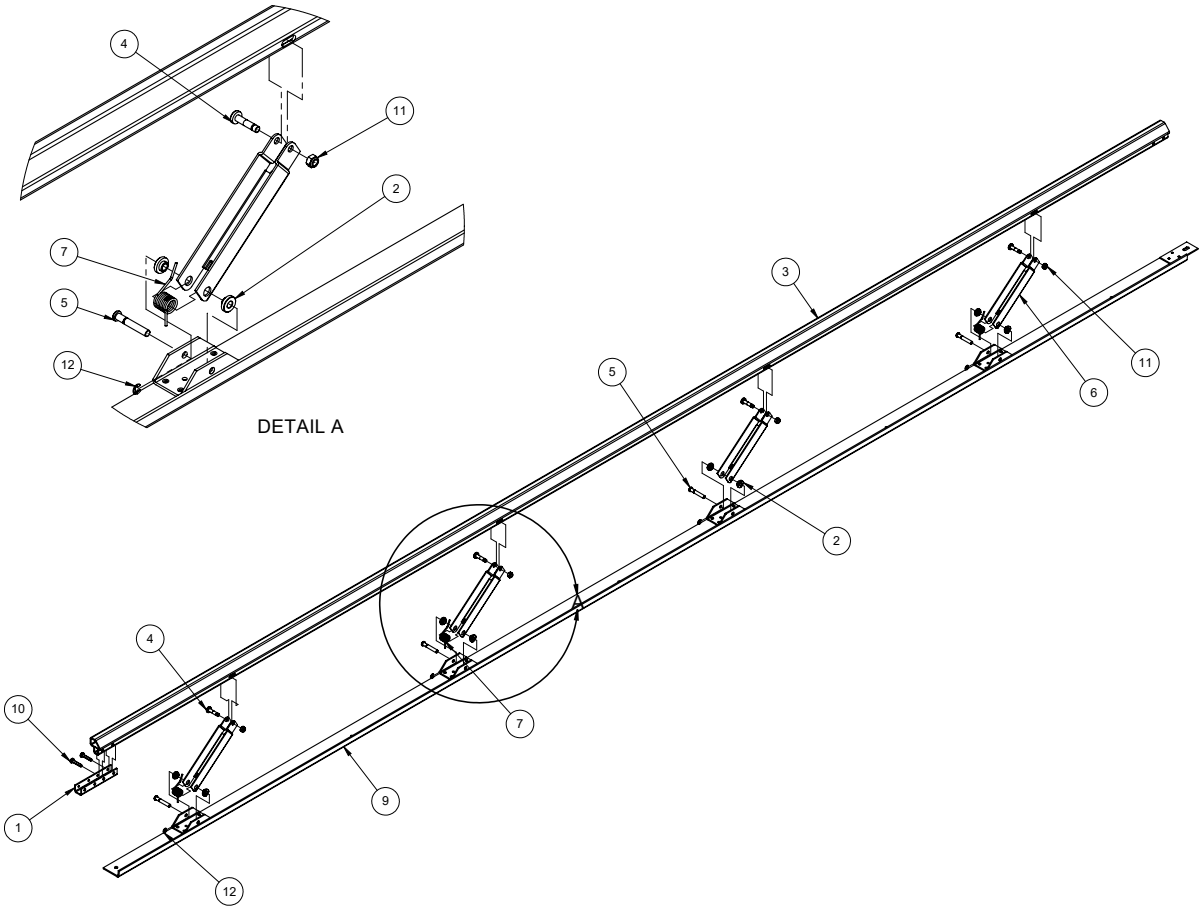
5.5. **049-007-730-xxx E-Bumper 10' RH Assembly**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-029	BMP U-BRKT CONN
2	8	049-007-042	BUSHING
3	1	049-007-075	BMP RAIL EXTRUSION 10' LH/RH
4	4	049-007-124	PHPSB M6-1 X 26 ZN
5	4	049-007-148	BMP LWR PIVOT PIN
6	4	049-007-720	E-BMP RAIL ARM
7	3	049-007-721	SPRING, BUMPER TORSION
8	1	049-007-730	LABEL, 10' RH
9	1	049-007-732	WDMT, E-BUMPER BASE 10' RH
10	2	863-050-257	PHPTS M5-.8 X 25 ZN
11	4	872-062-017	HLN M6-1 D-985 ZN NE
12	4	919-015-055	RNG E M5 X 0.030 PH

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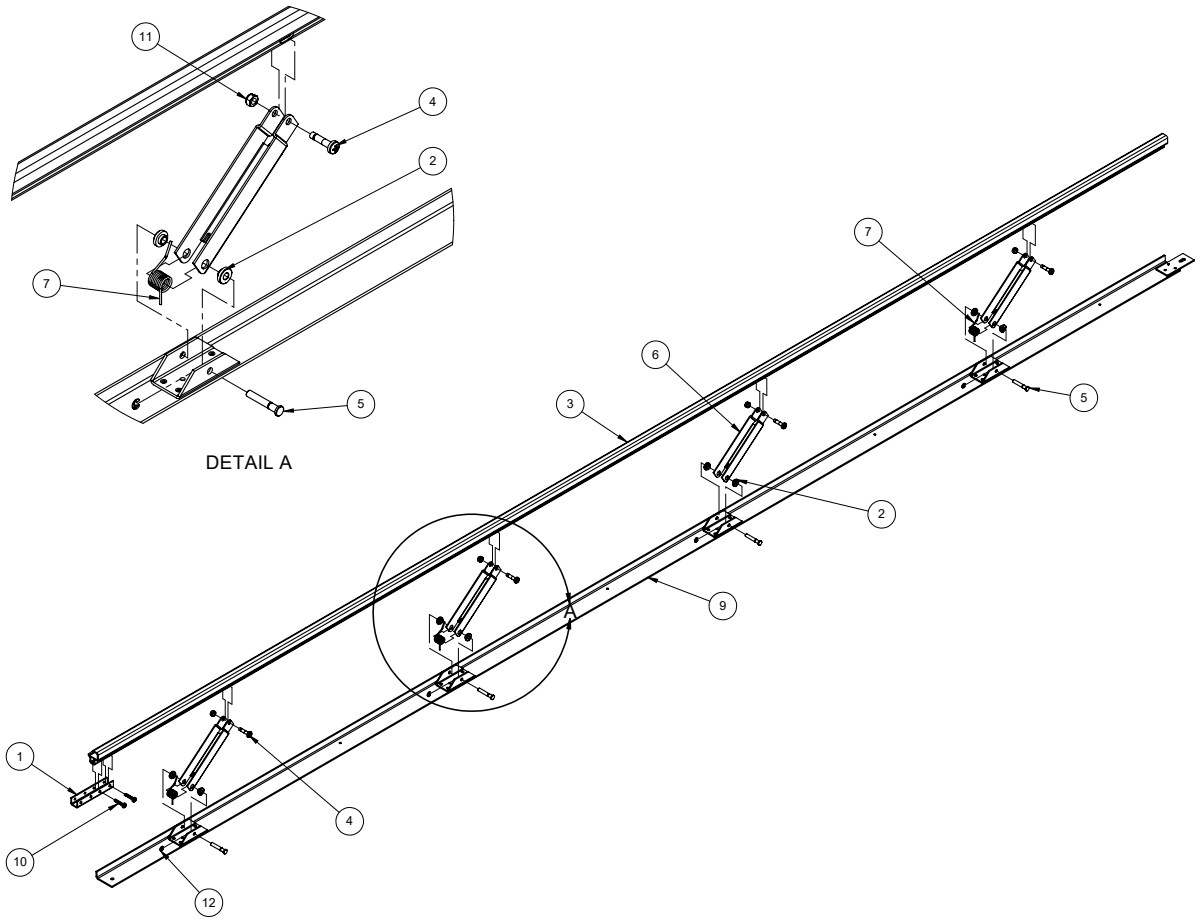
5.6. **049-007-731-xxx E-Bumper 10' LH Assembly**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-029	BMP U-BRKT CONN
2	8	049-007-042	BUSHING
3	1	049-007-075	BMP RAIL EXTRUSION 10' LH/RH
4	4	049-007-124	PHPSB M6-1 X 26 ZN
5	4	049-007-148	BMP LWR PIVOT PIN
6	4	049-007-720	E-BMP RAIL ARM
7	3	049-007-721	SPRING, BUMPER TORSION
8	1	049-007-731	LABEL, 10FT, LH
9	1	049-007-733	WDMT, E-BUMPER BASE 10' LH
10	2	863-050-257	PHPTS M5-.8 X 25 ZN
11	4	872-062-017	HLN M6-1 D-985 ZN NE
12	4	919-015-055	RNG E M5 X 0.030 PH

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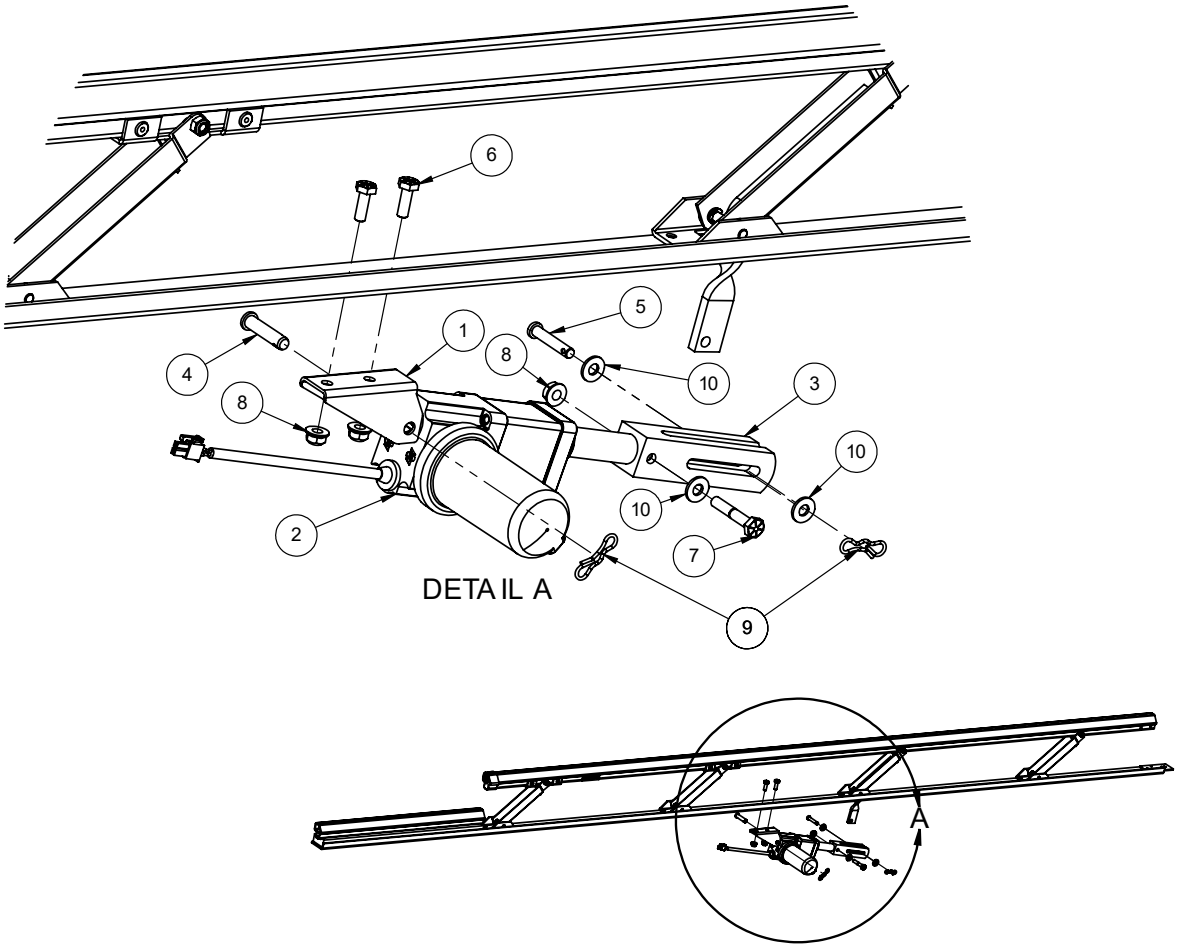
5.7. **Actuator Parts**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-729	E-BUMPER MTG BRKT FOR FLY'N-D
		049-007-750	ACTUATOR 290N 50mm, M0 (7 pin side) (not shown)
2	1	049-007-751	ACTUATOR 290N 50MM, M1 (10 pin side)
3	1	049-007-752	CLEVIS, DECOUPLING, 50MM, ACTL
4	1	706-902-005	PIN CL 0.31 X 1.13 ZN
5	1	706-902-007	PIN CL 0.25 X 1.19 ZN
6	2	809-849-125	HHCS 1/4-20 X 0.75 GR8 BO
7	1	809-849-245	HHCS 1/4-20 X 1.50 GR8 BO
8	3	856-149-001	HFLN 1/4-20 BO STV
9	2	911-064-237	PIN BC 0.07 X 1.38 ZN
10	3	948-753-101	FW 1/4 SAE BO

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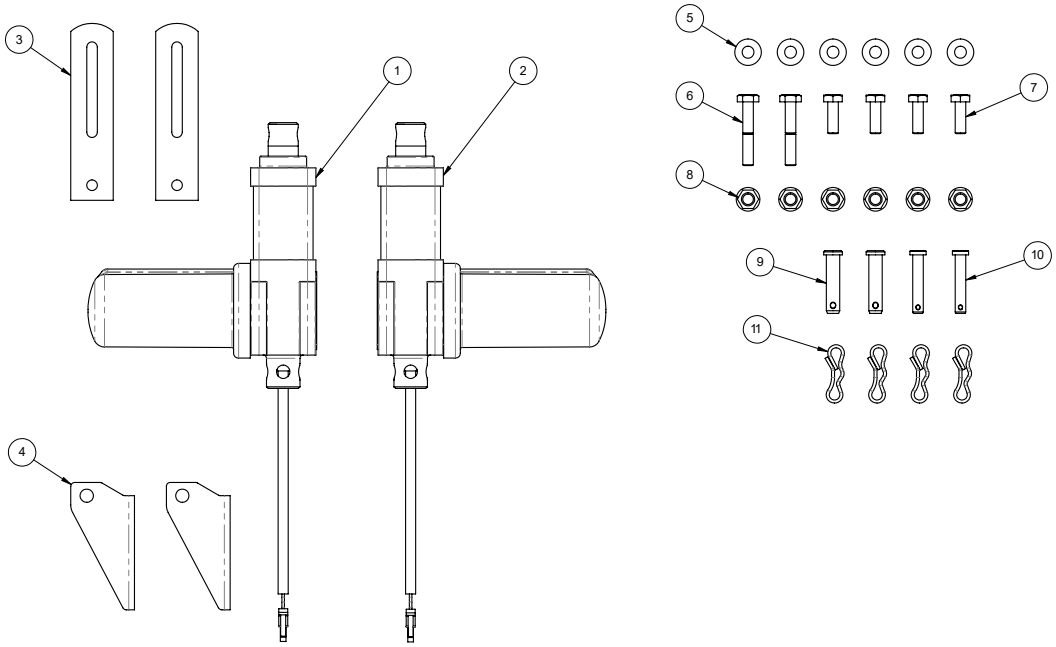
5.8. **049-007-755 E Bumper Actuator Kit**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-750	ACTUATOR 290N 50mm M0 (7 pin side)
2	1	049-007-751	ACTUATOR 290N 50mm M1 (10 pin side)
3	2	049-007-752	CLEVIS, DECOUPLING, 50MM, ACTL
4	2	049-007-729	E-BUMPER MTG BRKT FOR FLY'N-D
5	6	948-753-101	FW 1/4 SAE BO
6	2	809-849-245	HHCS 1/4-20 X 1.50 GR8 BO
7	4	809-849-125	HHCS 1/4-20 X 0.75 GR8 BO
8	6	856-149-001	HFLN 1/4-20 BO STV
9	2	706-902-005	PIN CL 0.31 X 1.13 ZN
10	2	706-902-007	PIN CL 0.25 X 1.19 ZN
11	4	911-064-237	PIN BC 0.07 X 1.38 ZN

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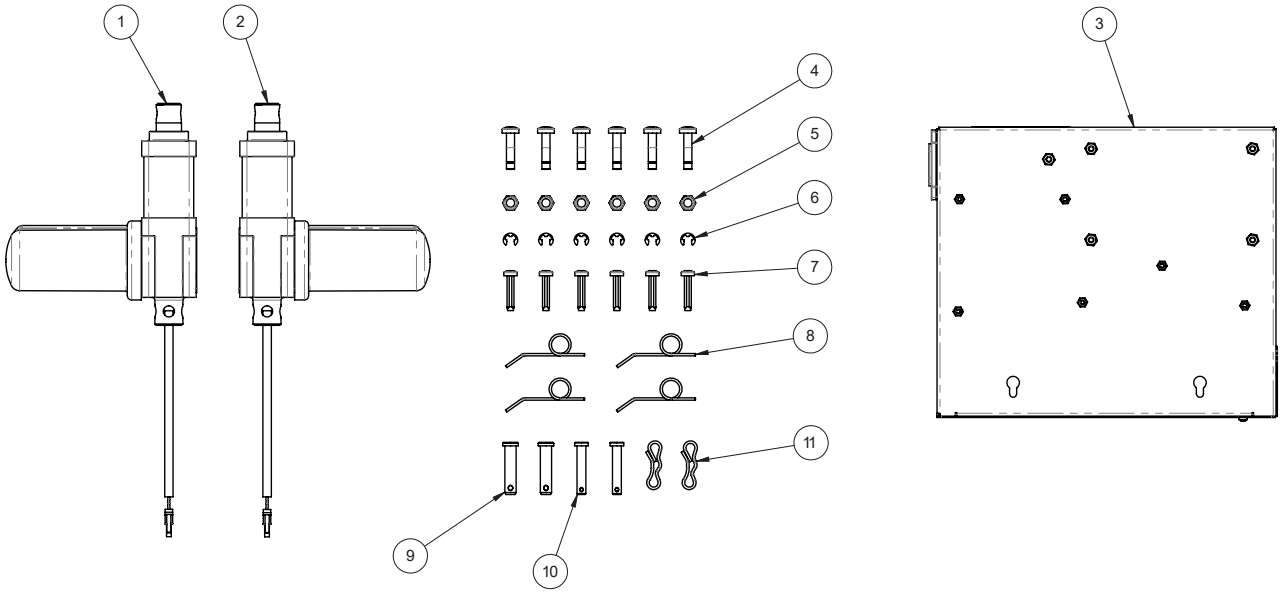
5.9. **049-007-753 E Bumper Spare Parts Kit**



ITEM	QTY	PART #	DESCRIPTION
1	1	049-007-750	ACTUATOR 290N 50mm M0 (7 pin side)
2	1	049-007-751	ACTUATOR 290N 50mm M1 (10 pin side)
3	1	288-950-011	BCU-4/B BUMPER CONTROLLER
4	6	049-007-124	PHPSB M6-1 X 26 ZN
5	6	872-062-017	HLN M6-1 D-985 ZN NE
6	6	919-015-055	RNG E M5 X 0.030 PH
7	6	863-050-257	PHPTS M5-.8 X 25 ZN
8	4	049-007-721	SPRING, BUMPER TORSION
9	2	706-902-005	PIN CL 0.31 X 1.13 ZN
10	2	706-902-007	PIN CL 0.25 X 1.19 ZN
11	2	911-064-237	PIN BC 0.07 X 1.38 ZN

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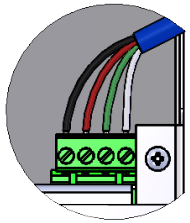
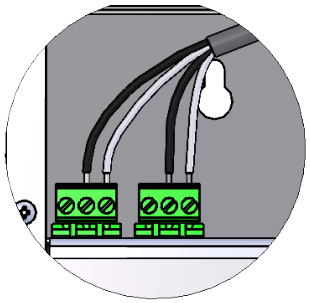
5.10. **BCU 4 Electrical**



DETAIL A



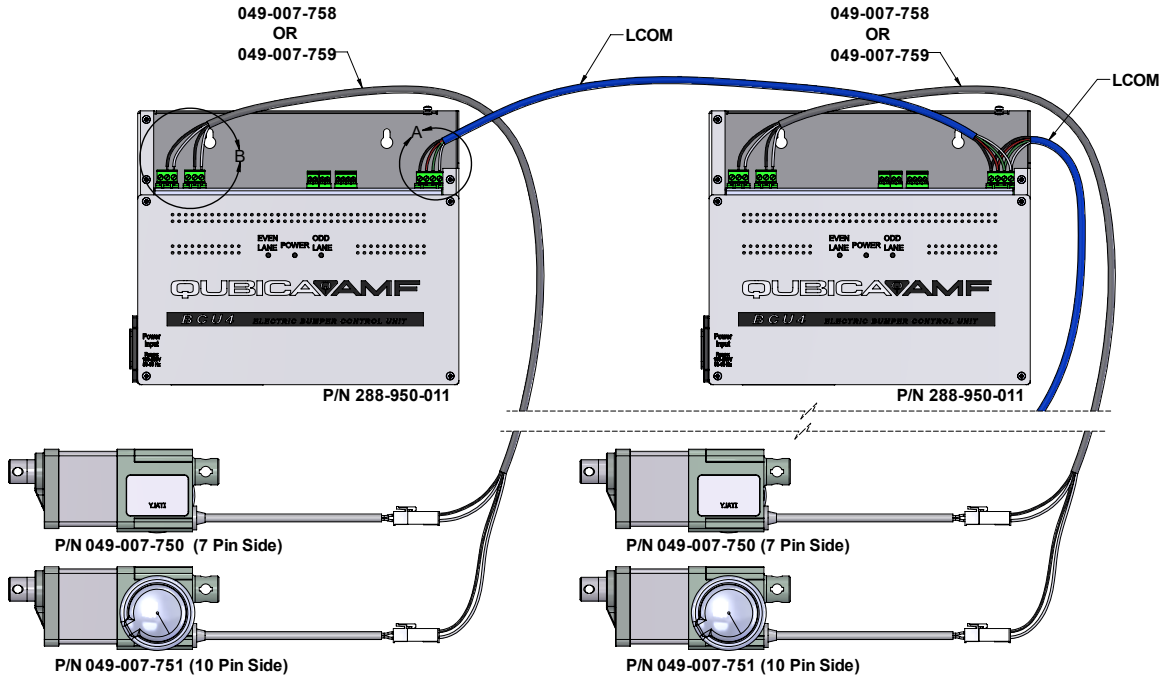
DETAIL B

ODD

DIP-SWITCH SETUP									
1 ON	2 OFF	3 OFF	4 OFF	5 OFF	6 ON	7 ON	8 ON	9 ON	10 ON

EVEN

DIP-SWITCH SETUP									
1 OFF	2 OFF	3 OFF	4 OFF	5 OFF	6 ON	7 ON	8 ON	9 ON	10 ON



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