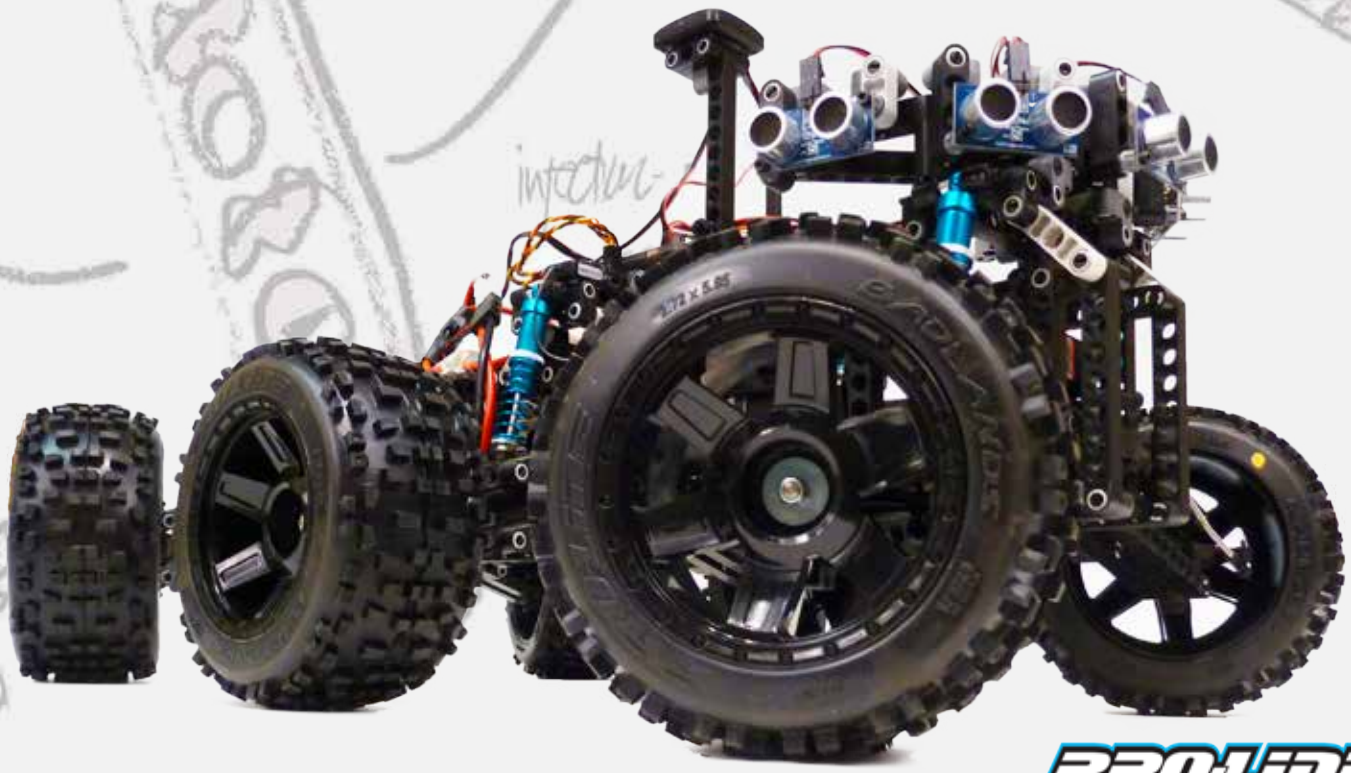
MINDS-i®

MCK-MRDR-001

Marz Rover

Self Driving Unmanned Ground Vehicle



PRO-LINE
RACING TO BRING YOU THE BEST!

Helpful instructional videos available at: mindsieducation.com

MINDS-i® PRODUCT SAFETY INFORMATION

When safety precautions are followed, your MINDS-i® system will provide years of enjoyment. Use care and good sense at all times when operating this product. Failure to use your system in a safe, sensible manner can result in injury or damage to property. You and you alone must insure that the instructions are carefully followed and all safety precautions are obeyed.

- **Water can cause the electronics to short out and can cause permanent damage.**
- **Always turn on the transmitter before turning on the receiver.**
- **Fully extend the transmitter antenna before operating your vehicle.**
- **Before turning on your radio system, check to make sure that no one else is running on the same frequency.**
-  **)KING HAZARD: Do not allow children under age 3 or any individuals who have a tendency to place objects in their mouths to play with any part of the MINDS-i system, including, but not limited to: connectors, pieces, electronics, radio transmitters, wheels, tires. The system contains small parts which could accidentally be swallowed and cause suffocation.**
- **When the system is powered and/or in motion, keep fingers, face, tools, loose clothing, hair, and all other body parts away from gears, wheels, etc. Do no wear gloves while operating machinery. Even plastic parts can pinch, cut, or crush.**
- **The transmitter's antenna could also cause injury if played with violently or pointed towards someone's face.**
- **Never operate your MINDS-i® system on streets or in any areas where full-size vehicles are.**
- **Do not pick up your MINDS-i® system when it is in motion.**
- **Never charge, run or store your MINDS-i® system in a location subject to high temperatures, low temperatures or high humidity.**

Do not store in direct sunlight.

- **To avoid electronic malfunction, do not allow the vehicle to become wet. Short circuits will produce a very strong electrical current. Should your MINDS-i® system become wet, stop using it immediately.**
-  **RNING! Electrocution Hazard. Do not use the materials provided for other than its intended purpose.**
- **Do not put it into fire.**
- **Always use recommended batteries. If improper batteries are used, they may become hot, leak and may rupture.**
- **Do not attempt to recharge non-rechargeable batteries.**
- **Only batteries of the same equivalent type as recommended are to be used. Do not mix old and new batteries.**
- **Exhausted batteries are to be removed from the system and replaced with new ones. Recycle all used batteries.**
- **Do not lick batteries. If battery appears to be leaking or has a crystalline deposit on the outside, dispose of it immediately (wear gloves when handling, preferably nitrile or other non-reactive material).**
- **Do not run a wire between battery terminals, as wire will get very hot, can be irreparably damaged or explode.**
- **Make sure the batteries are installed with the correct polarity as shown. Do not disassemble your batteries. Never allow them to become hot or to burn. To avoid short-circuits, avoid getting them wet. Do not short circuit batteries.**
- **If liquid from inside the batteries contacts your skin or clothes, wash them with water. If leaked battery fluid gets into your eyes, flush them immediately with cool water and seek medical attention. Do not rub eyes.**
- **Always wear safety glasses to protect your eyes. Note that normal glasses, while usually made of impact-resistant plastic, will not afford sufficient protection from shrapnel or flying debris.**
- **Always wear close-toed shoes to protect your feet from heavy or sharp objects, which might be dropped.**
- **If you have long hair, keep it tied back or under a hat to avoid it becoming caught in moving parts.**
- **The MINDS-i® system contains small parts. Do not ingest. Do not insert into any orifice (e.g. nostrils, ears, etc).**
- **The system contains metal parts. Cutting or bending can cause parts to break; resulting in sharp edges which can cut skin.**
- **Battery disposal. Do not throw batteries into the trash, especially rechargeable batteries. Contact your local waste disposal office for information on battery disposal. Batteries should be stored as directed by your local hazardous materials disposal office until pickup (usually in a hard sided waterproof, non-conductive container, e.g. a plastic bucket).**

 **...RNING! IMPORTANT! RESPONSIBLE ADULT SUPERVISION IS REQUIRED FOR CHILDREN UNDER THE AGE OF 14. THIS PRODUCT IS NOT DESIGNED FOR UNSUPERVISED USE BY CHILDREN YOUNGER THAN 14 YEARS OLD.**

All pictures descriptions and specifications found in this instruction manual are subject to change without notice.

MINDS-i® maintains no responsibility for inadvertent errors in this manual. Visit www.mymindsi.com for the latest updates and information.

MINDS-i® is a high-performance Construction/RC/Robotics System, which is NOT intended for use on the public roads or congested areas where its operation may conflict with or disrupt pedestrian or vehicular traffic. Read all enclosed information before operating. Fully illustrated, step-by-step instructions describe adjustment, operation, and required maintenance procedures. MINDS-i® should not be operated in a crowd, or without adequate space. In an effort to continually upgrade our products, MINDS-i® reserves the right to make improvements and modifications to this system, which may not be reflected in the photographs and specifications printed on this box. PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and/or birth defects or other reproductive harm.

Terms & Conditions: All orders placed with MINDS-i, Inc (phone, fax, mail, internet/web & email) constitute the acknowledgment and acceptance of all conditions listed below. All purchases remain the property of MINDS-i®, Inc until paid for in full. All orders shipped to a Washington State address must pay sales tax as required by the Washington State Department of Revenue. In the event that an order placed on our web-site does not calculate sales tax and the order is being shipped to a Washington State address, MINDS-i® will calculate the sales tax when the order is processed and call or email the customer with the new amount. All prices, materials, design, color, contents included with a product and product specifications are subject to change without notice. Some product images may be shown with optional items that are sold separately. Depending on the products ordered and the destination of the order, certain shipping services may not be available. MINDS-i® will not be responsible for pricing errors and may cancel the order. Orders will not be shipped until all Credit Card information is verified and matched. All other orders (check or money order) will not be shipped until payment has been received in full. All unpaid orders will be canceled after 30 calendar days. All weights shown for products are used for shipping calculation only and may not reflect actual weight of the product.

Product Warranty: MINDS-i® warrants to the original buyer that our products are free from defects in materials and workmanship for a period of 120 days from the original date of purchase (original purchase receipt required). This warranty does not cover abuse, misuse, incorrect wiring, modifications, alterations, connector damage, wear and tear or robot competition damage. If the Product is determined to be defective within the warranty period, MINDS-i® or its authorized service provider will, at our sole option, repair or replace any defective parts free of charge, or refund the purchase price. What you must do: Return the Product in its original packaging or packaging affording equal protection, freight prepaid, with proof of purchase, to an authorized MINDS-i® service provider. You are responsible for all shipping charges. For more information, contact MINDS-i® at (509) 252-5767 or info@mymindsi.com.

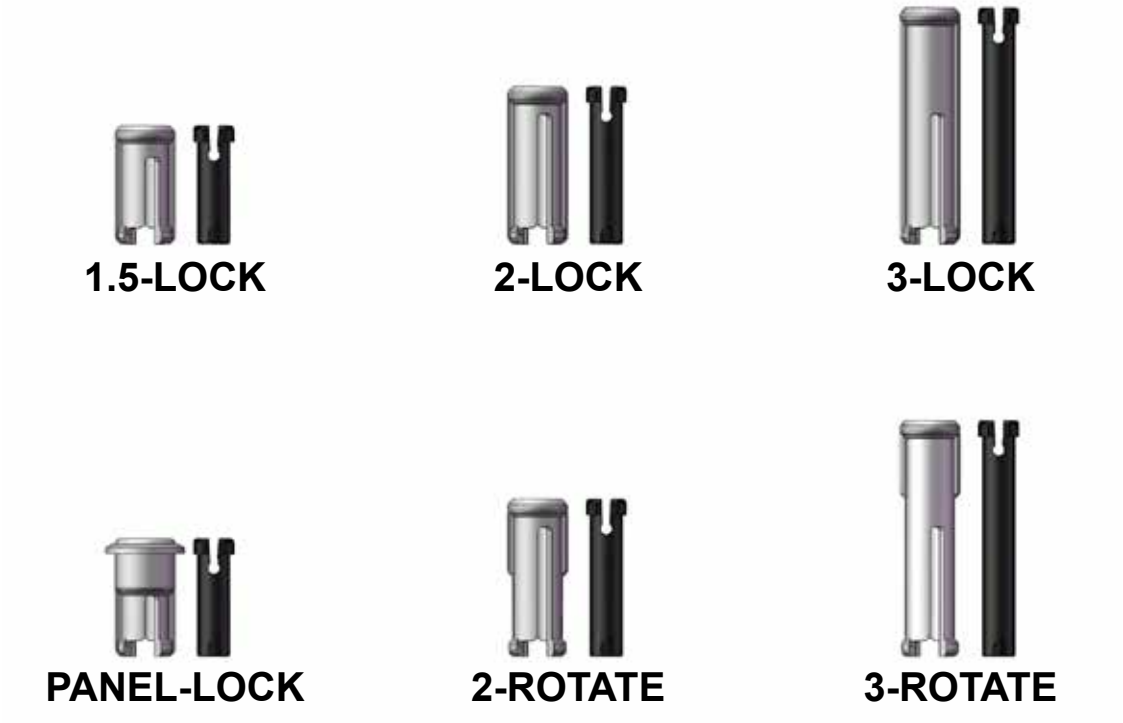
Shipping Errors and Defective Products: Claims for shipping shortages, errors, or defective materials must be in writing and received by MINDS-i® within ten (10) days after receipt of shipment by buyer. Failure to make such claim within the stated period shall constitute an irrevocable acceptance of the goods and an admission that the goods fully comply with all the terms and conditions of the buyer's order.

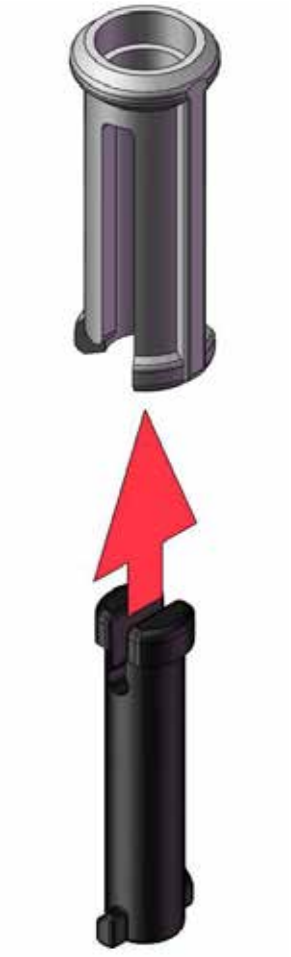
MINDS-i® is Designed and Manufactured in the United States
Some components are manufactured in China and the Philippines.

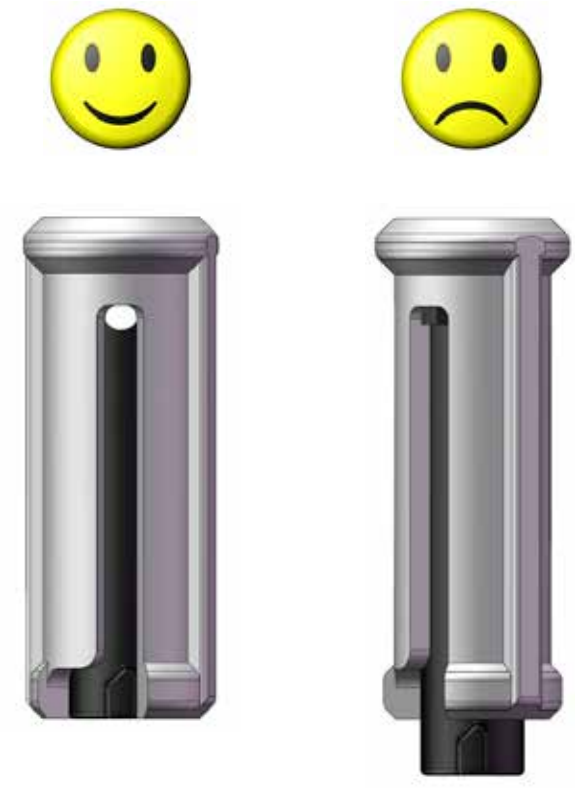
MINDS-i, Inc
22819 East Appleway Avenue
Liberty Lake, WA 99019
USA

CONNECTOR ASSEMBLY AND USAGE

HELPFUL INSTRUCTIONAL VIDEOS AVAILABLE AT: www.mindsieducation.com







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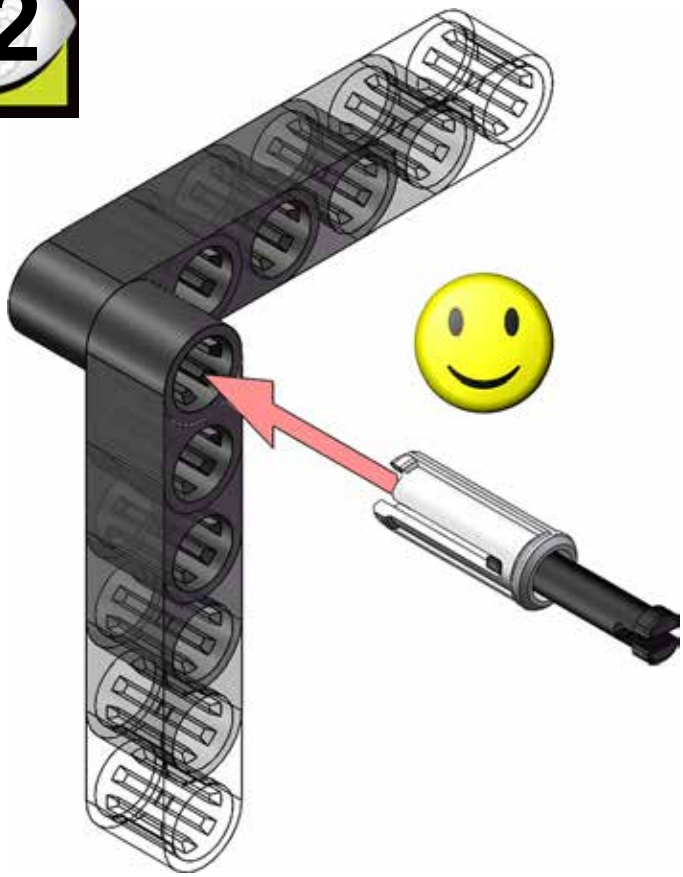

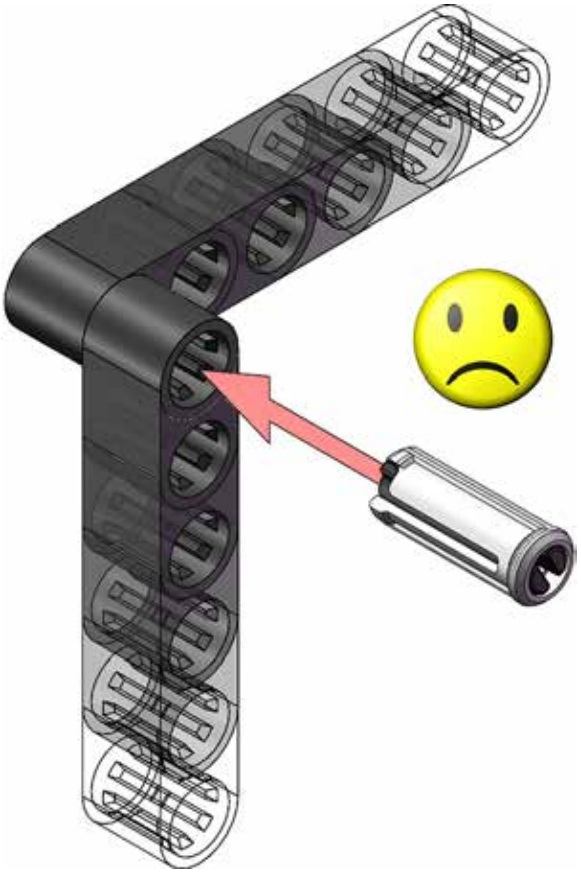

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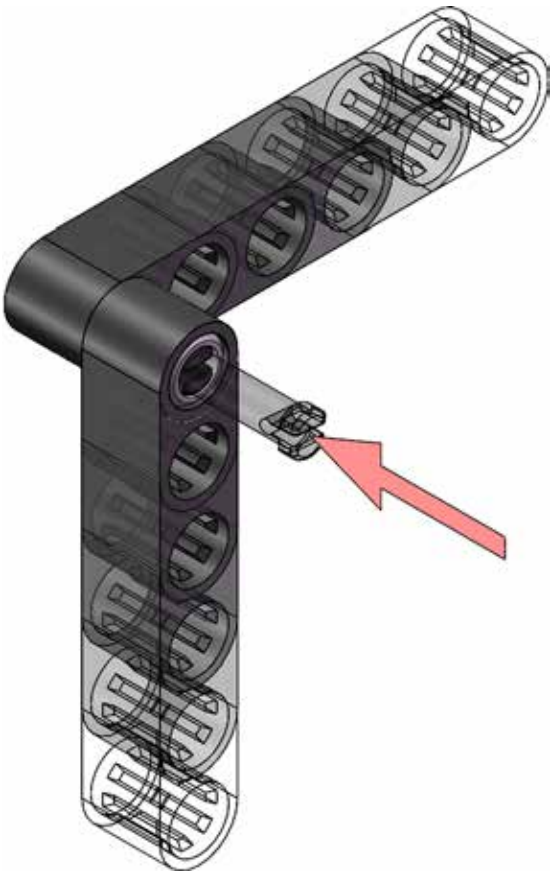

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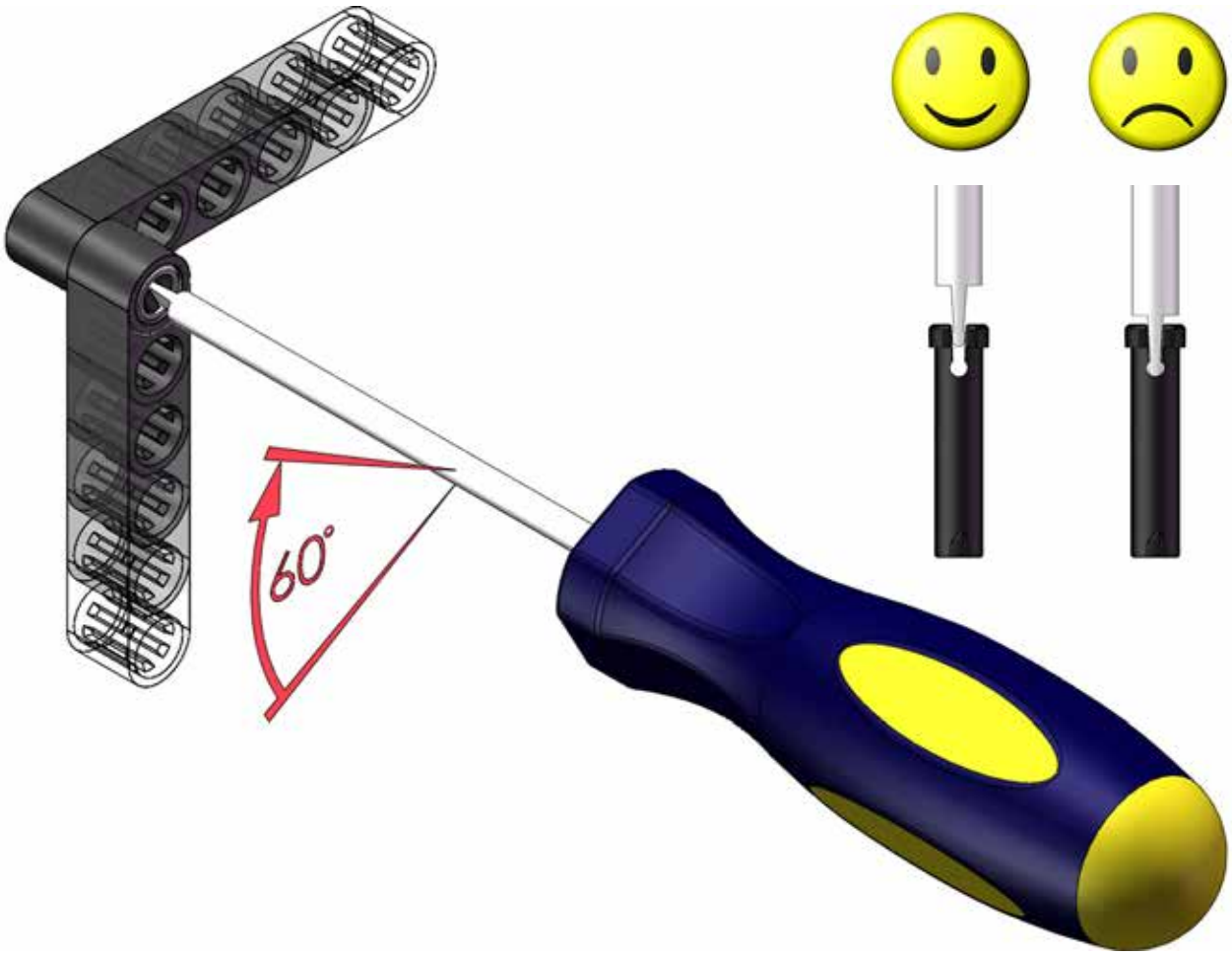

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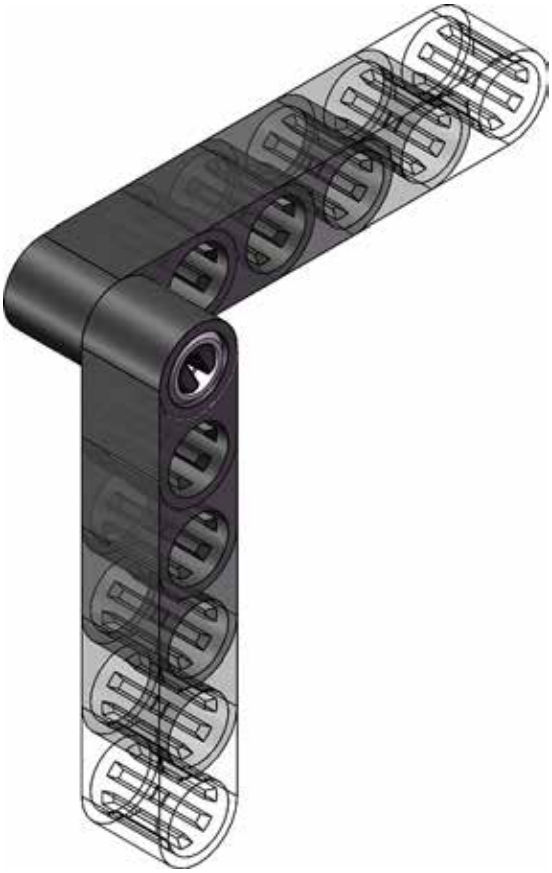

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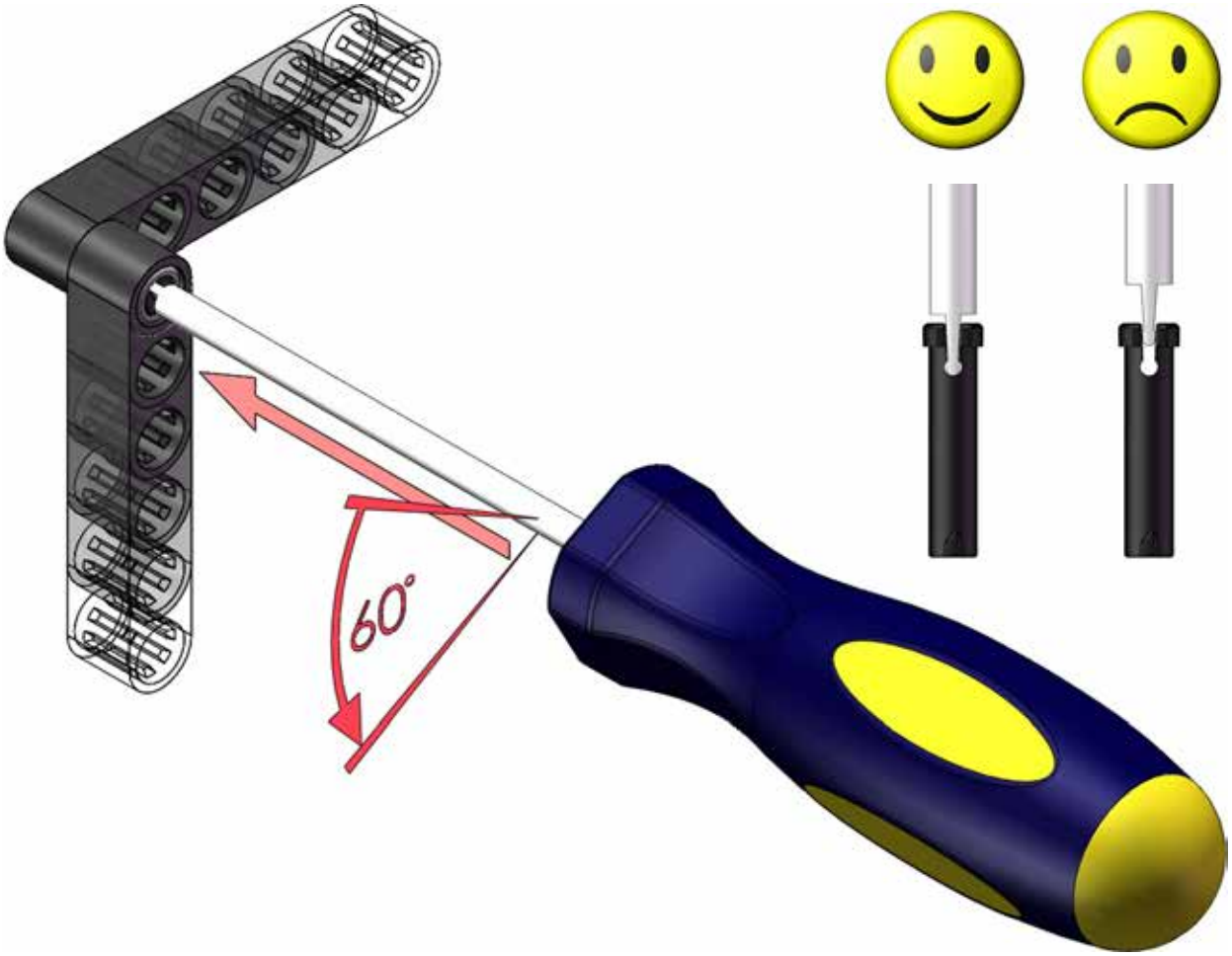

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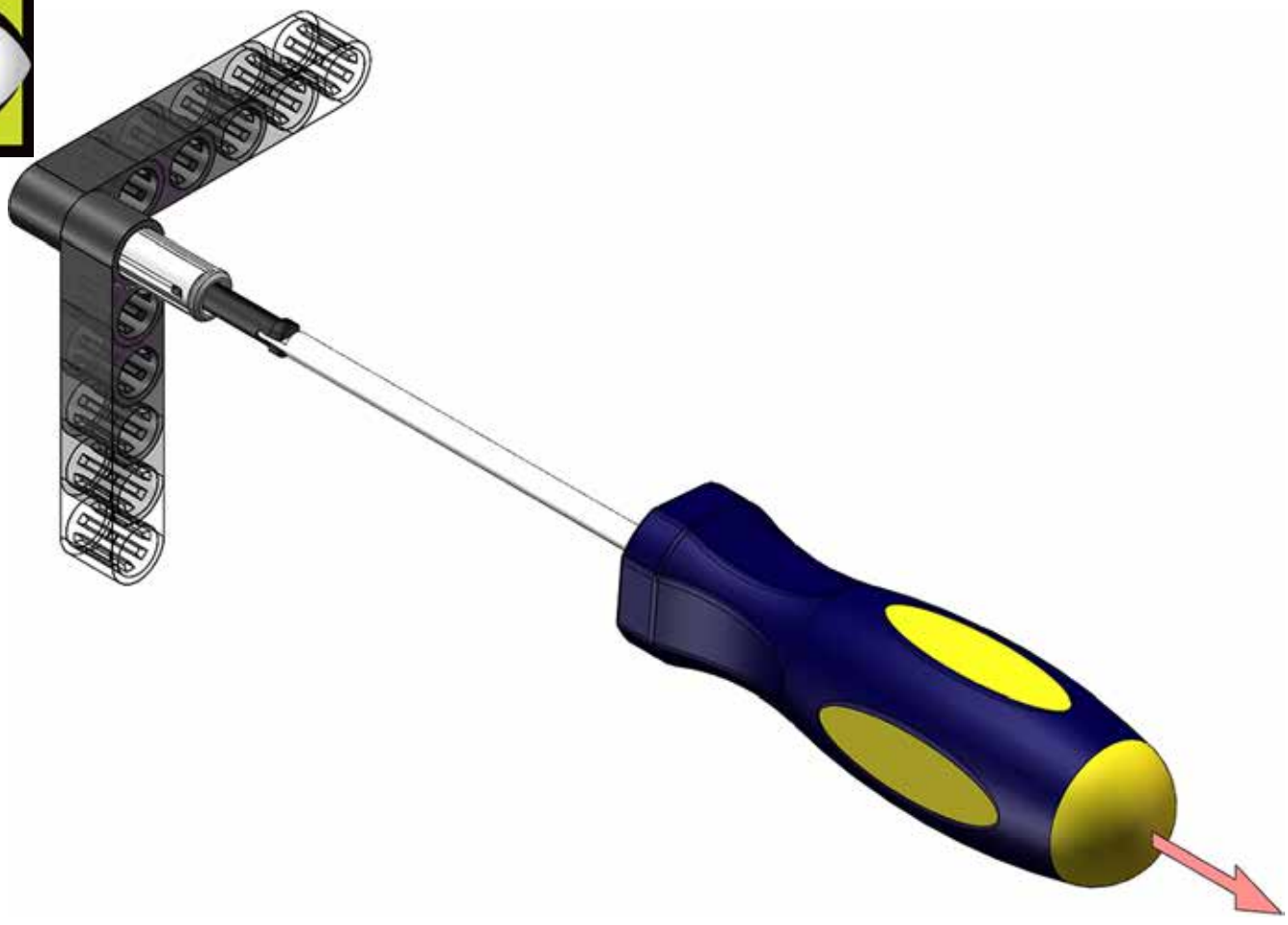


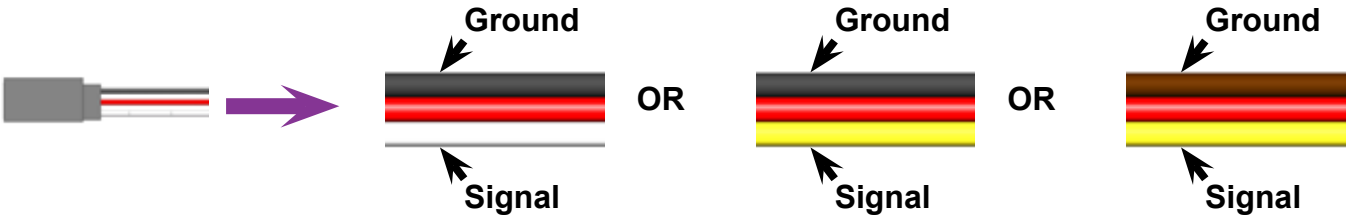
MARZ ROVER & LUNAR ROVER BUILD STEPS

PART IDENTIFICATION REFERENCE

Due to variance in manufacture some parts may differ in shape and color from those pictured in this manual.

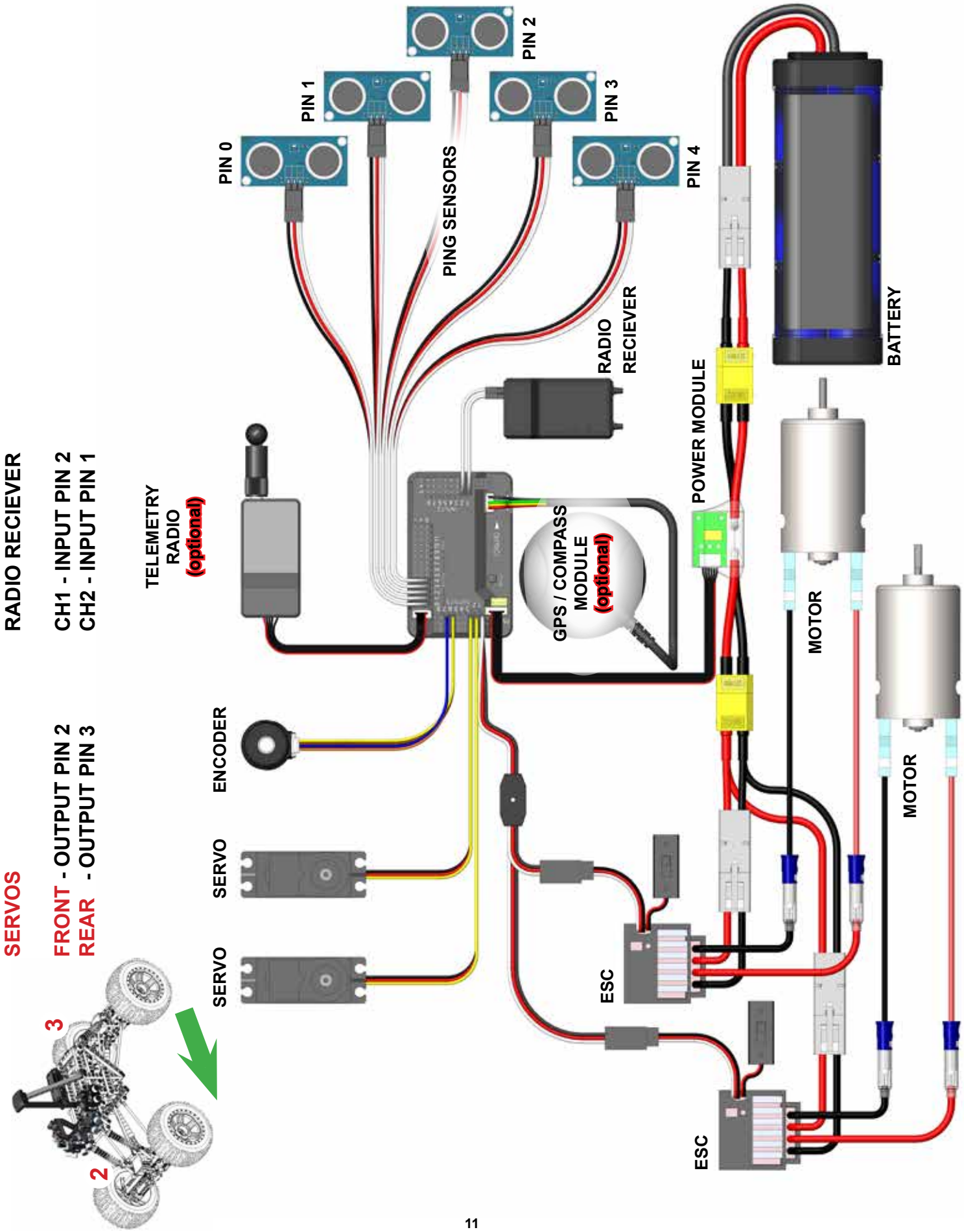
WIRES

For a 2 or 3 wire plug the lightest wire is the signal and the darkest wire is the ground. Colors may NOT match those pictured in the diagrams. Possible variations include:



WIRING GUIDE FOR ELECTRONICS

USE FOR STEPS: 07-09 & 17 - 21

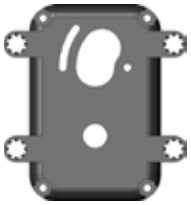


6x6

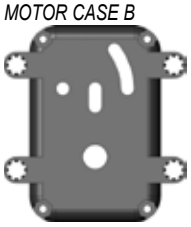
MOTOR CASE ASSEMBLY

(Without Encoder)

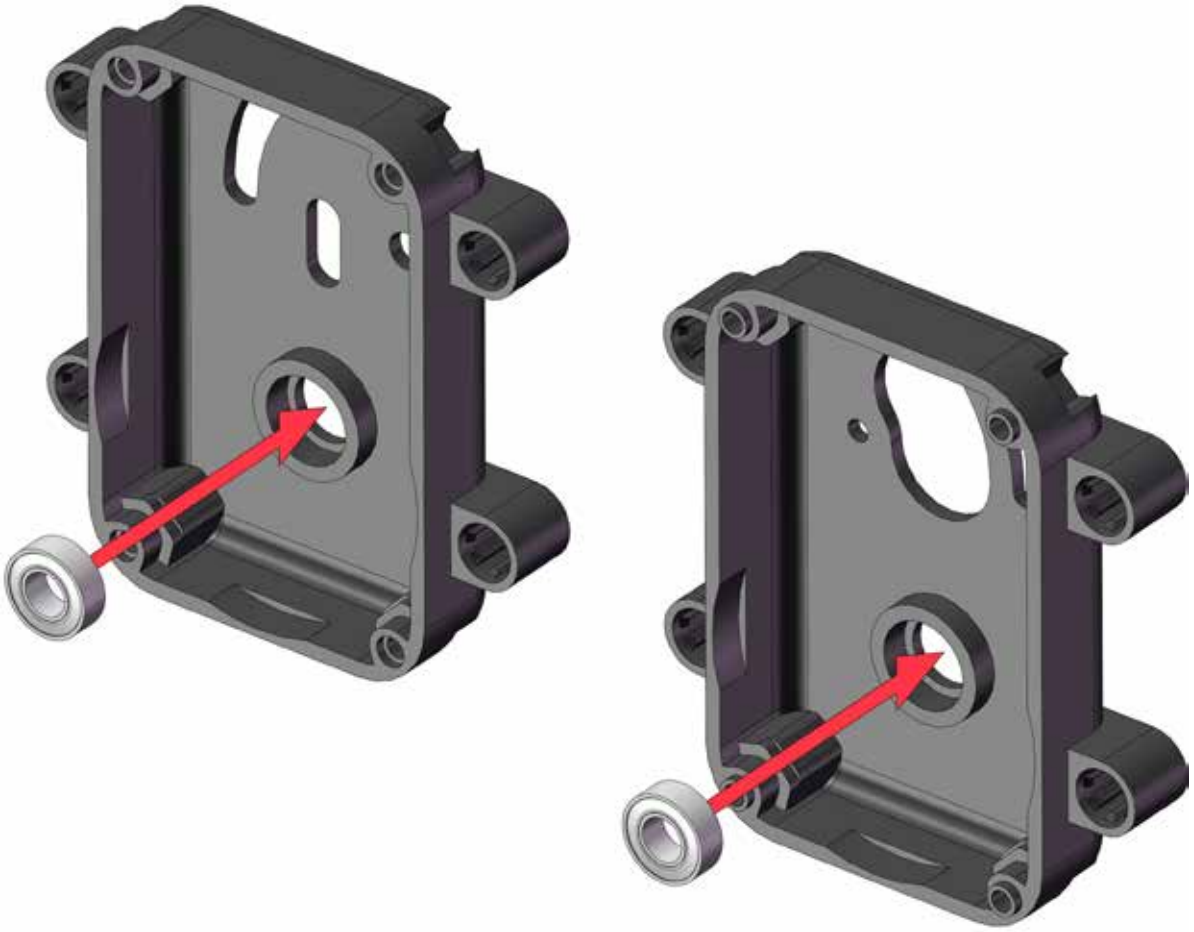
x1
MOTOR CASE A



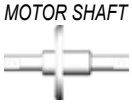
x1
MOTOR CASE B



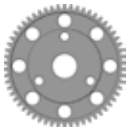
x2
6x12x4mm BEARING



x1
MOTOR SHAFT

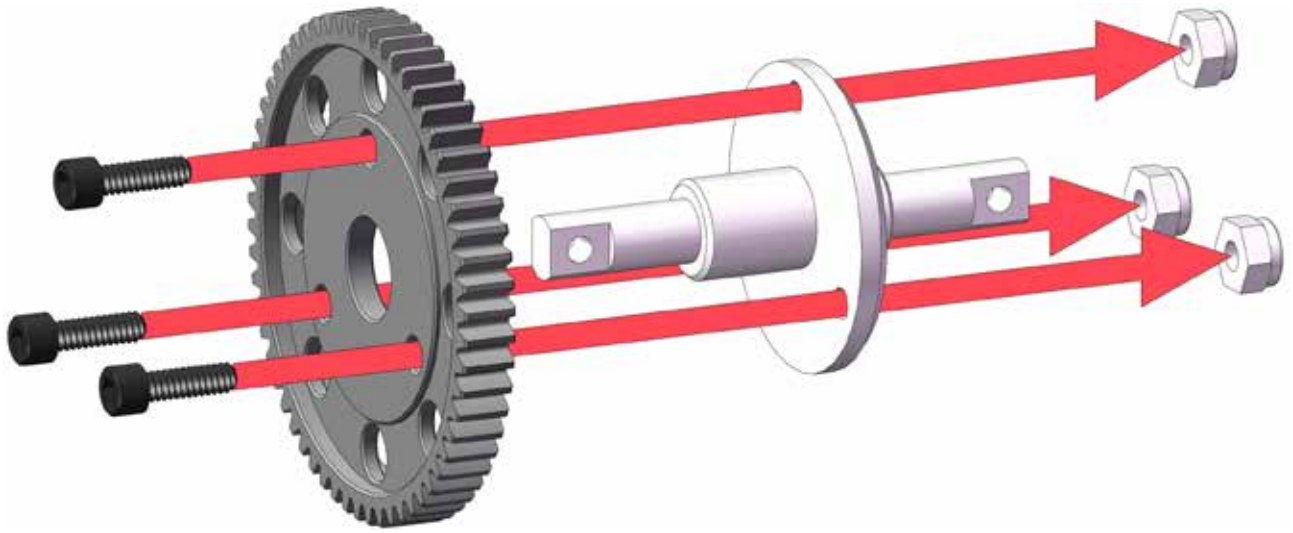


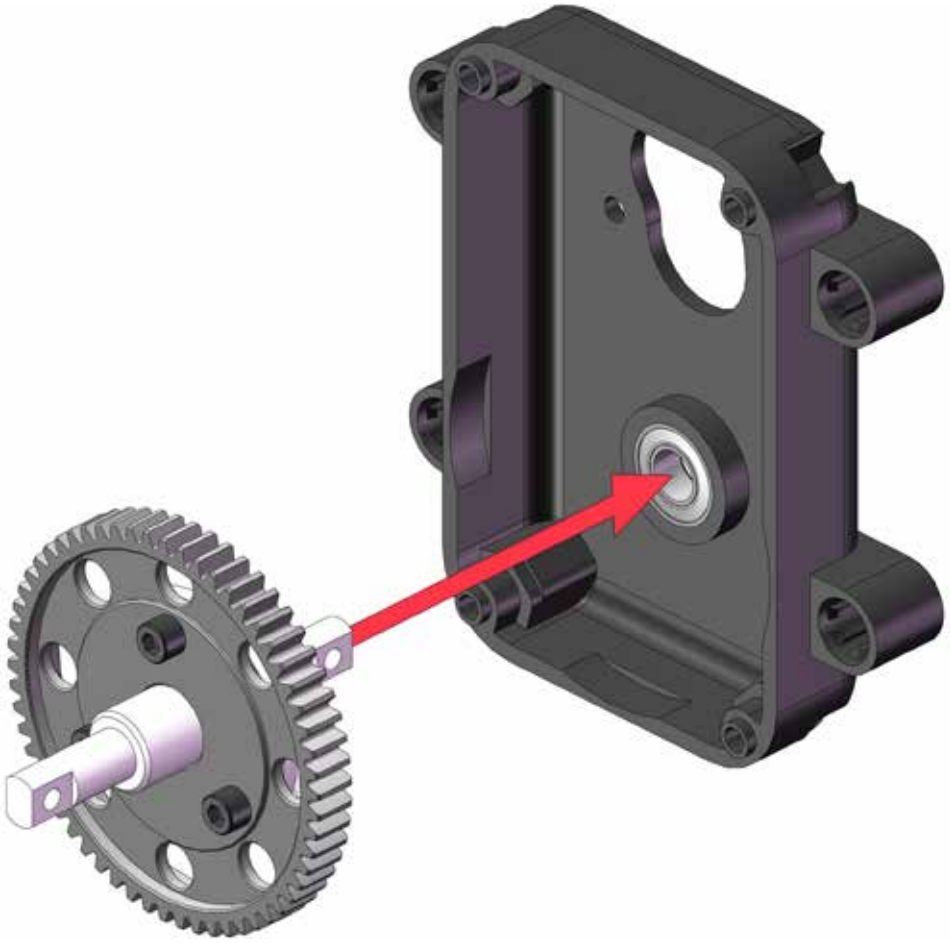
x1
58T 32P SPUR GEAR



x3
#4-40 x 3/8" SCREW

x3
#4-40 NUT





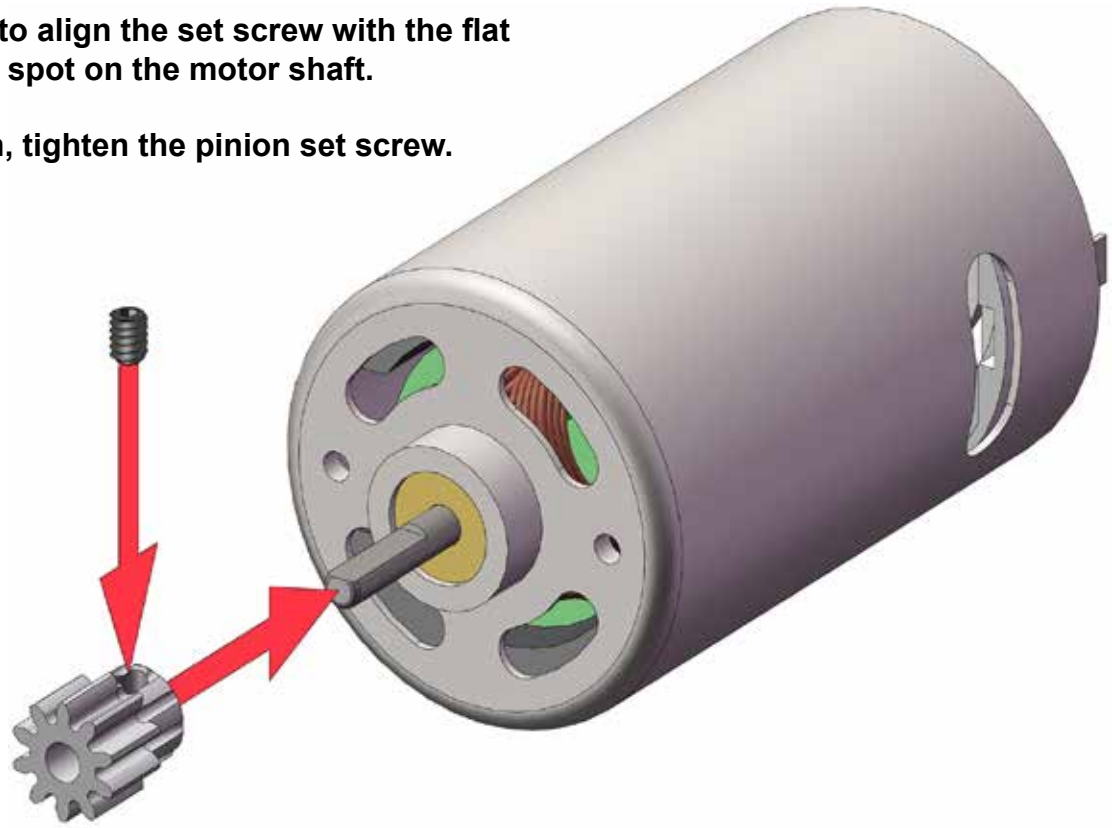
Be sure to align the set screw with the flat spot on the motor shaft.

Then, tighten the pinion set screw.

x1
5,000 RPM MOTOR

x1
10T 32P PINION GEAR

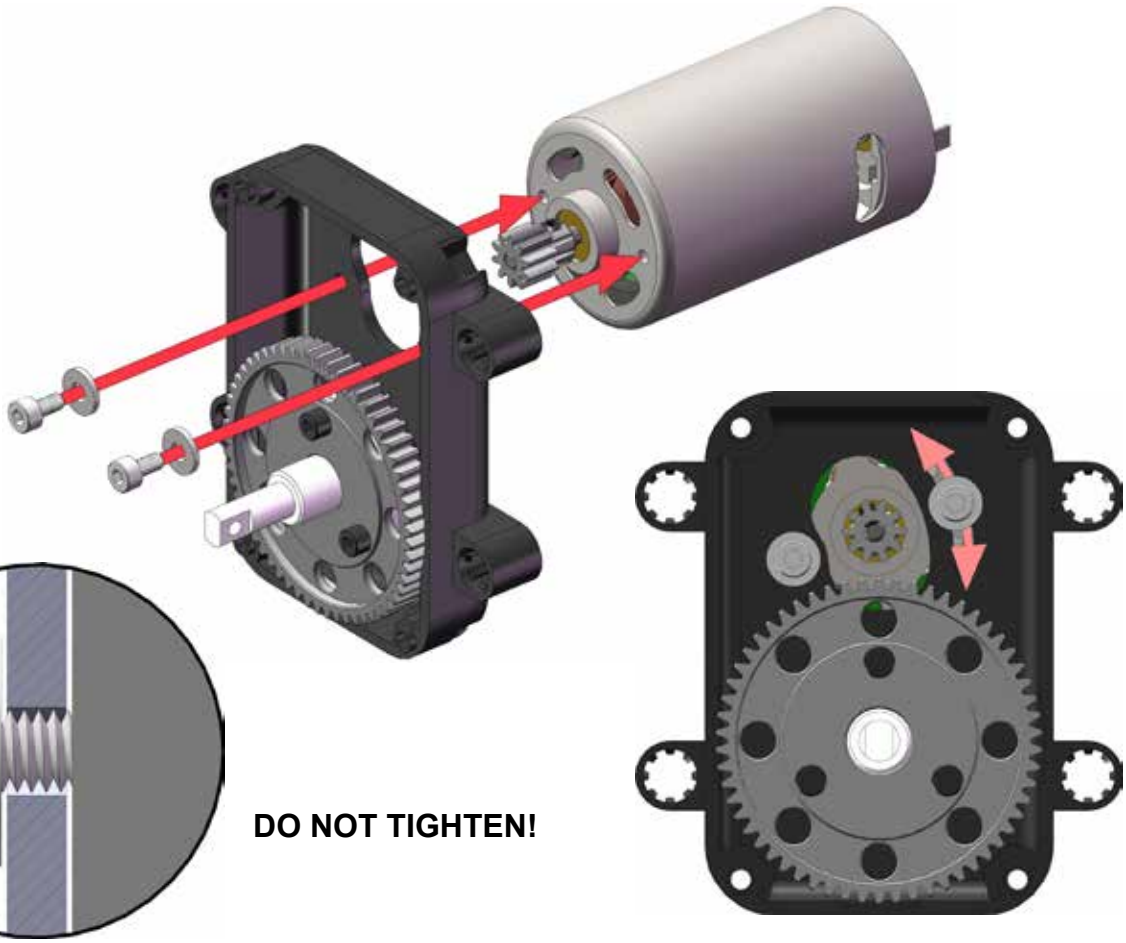
x1
PINION SET SCREW



Mount the pinion gear flush with the end of the motor shaft.

x1
M3x6mm SCREW

x2
M3 WASHER

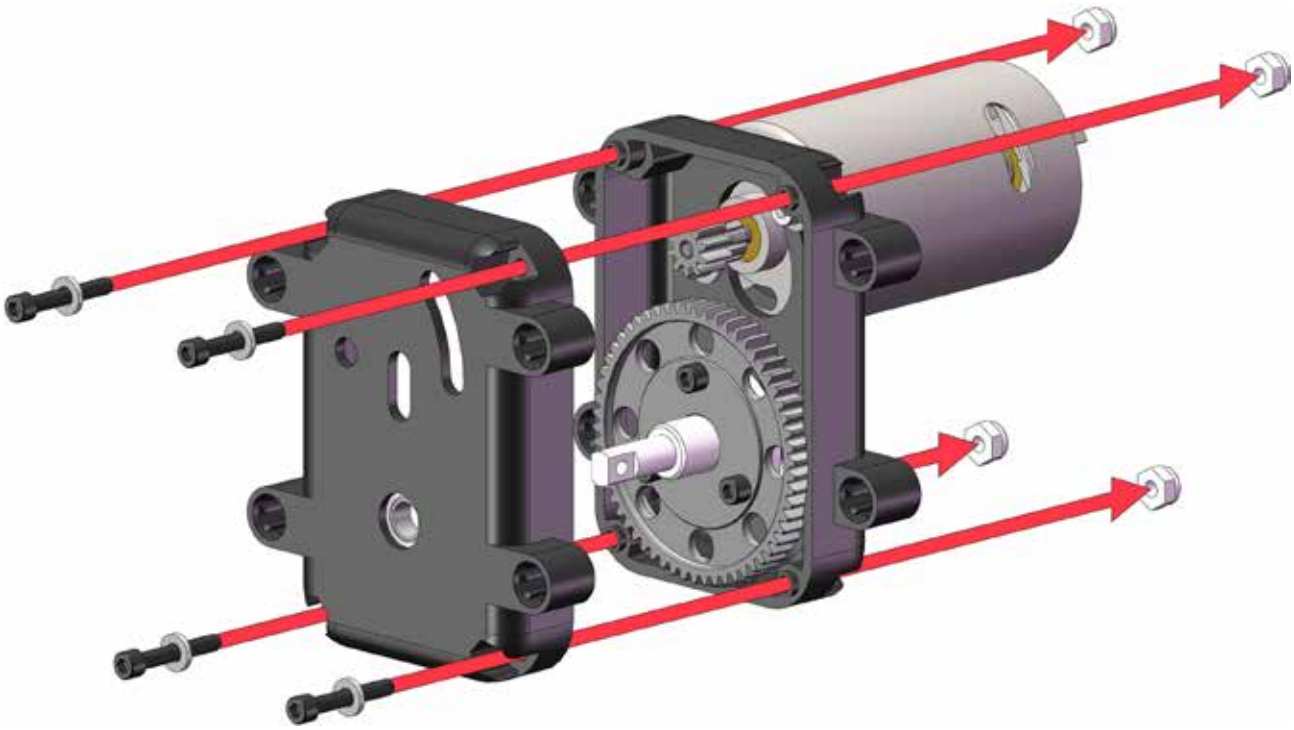


DO NOT TIGHTEN!

x4
#4-40 x 3/4" SCREW

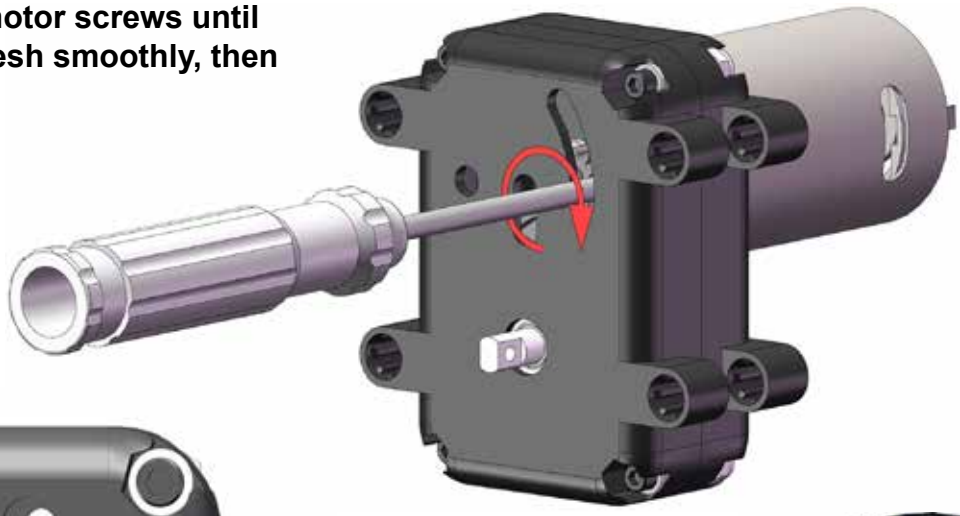
x4
#4-40 NUT

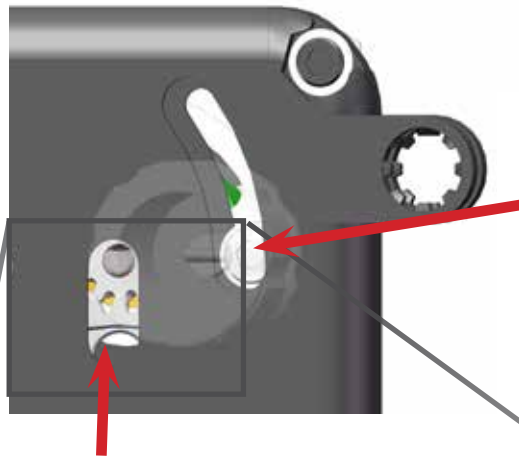
x4
#4 WASHER



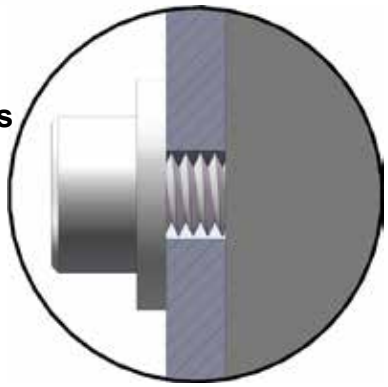
07

Adjust motor screws until gears mesh smoothly, then tighten.

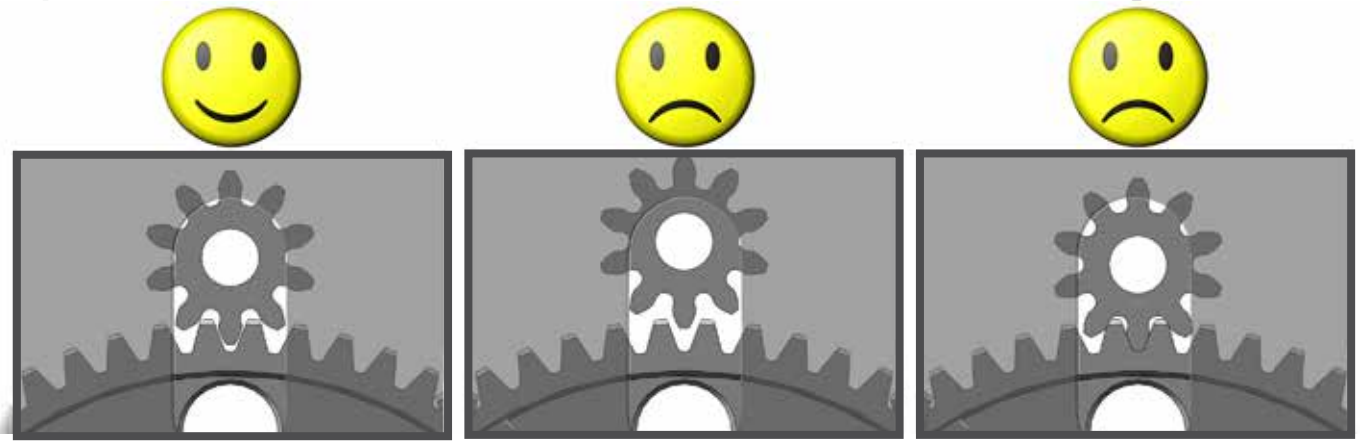




Tighten both screws after gears mesh.



Check that the gears mesh.



The motor case with the encoder is pre-assembled.

DIFFERENTIAL ASSEMBLY

x2

x1
RING GEAR

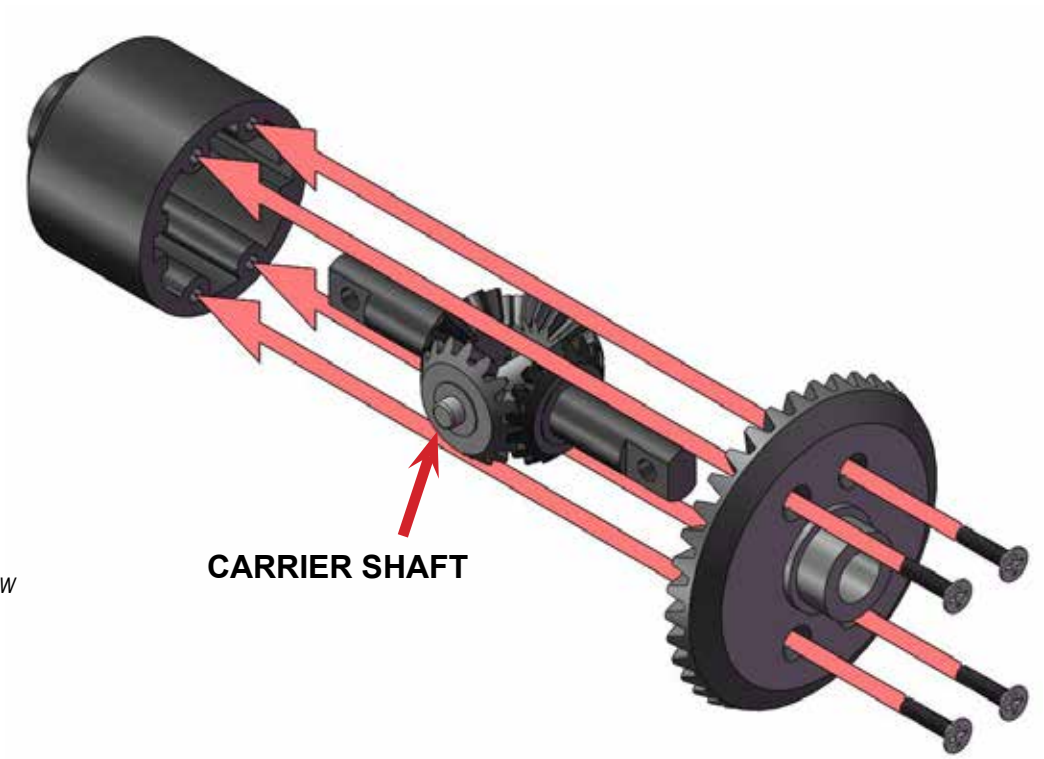
x1
DIFFERENTIAL CARRIE

x1
CARRIER SHAFT

x4
CARRIER SCREW

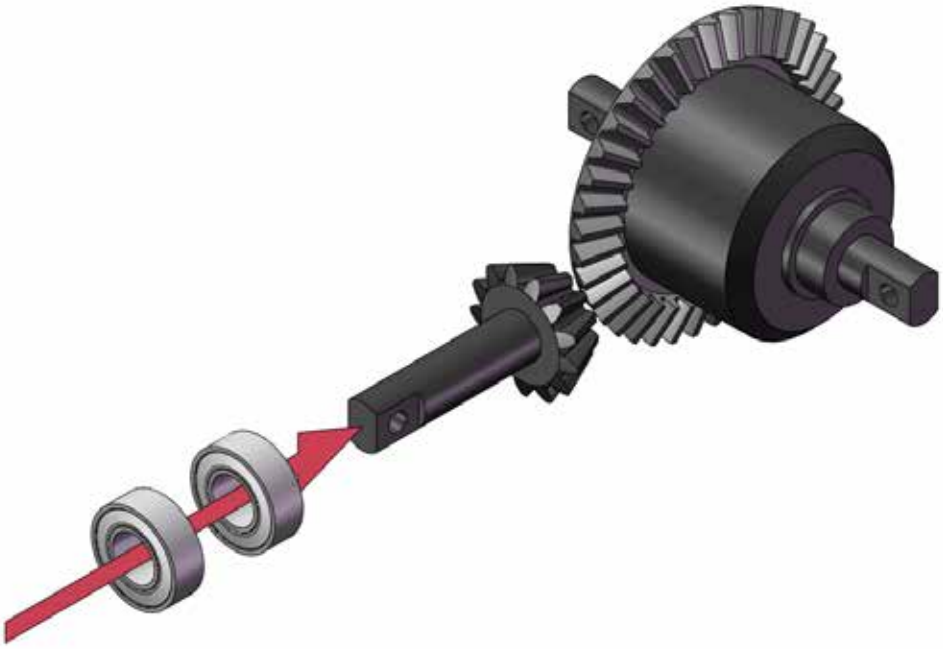
x2
OUTPUT GEAR SHAFT

x2
SPIDER GEAR



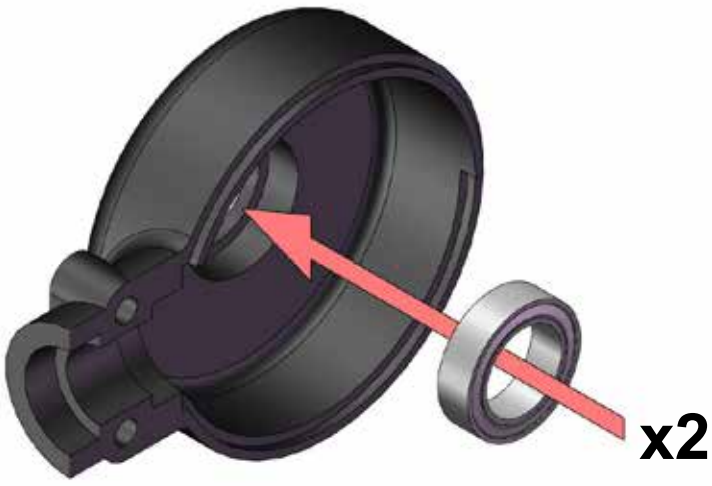
x1
PINION GEAR

x2
6x12x4mm BEA



x2
DIFFERENTIAL CASE

x2
10x15x4mm BEARING



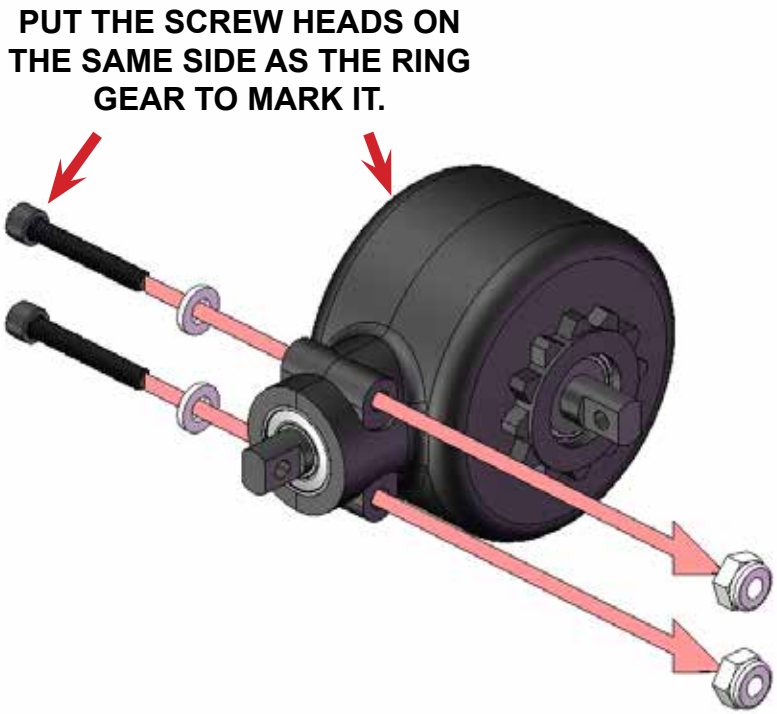
04

05

x2
#4-40 x 3/4" SCREW

x2
#4 WASHER

x2
#4-40 NUT



Repeat steps 1 - 5: x2

CENTER DIFFERENTIAL ASSEMBLY

x1
RING GEAR

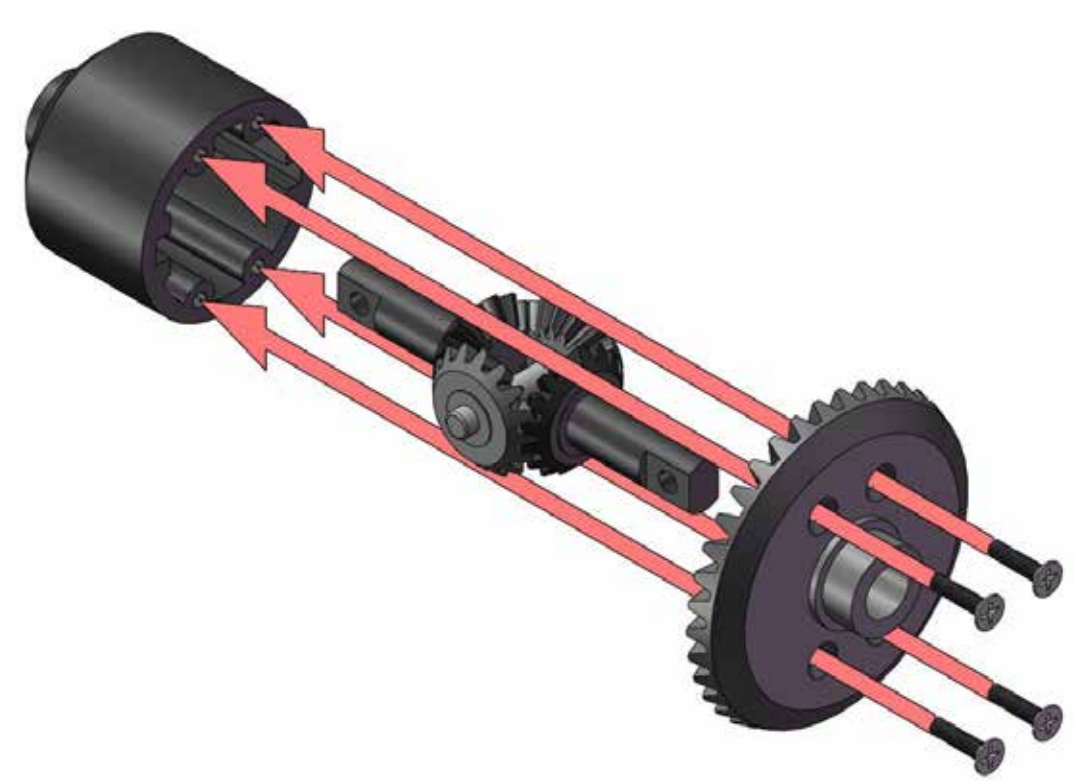
x1
DIFFERENTIAL CARRIER

x1
CARRIER SHAFT

x4
CARRIER SCREW

x2
OUTPUT GEAR SHAFT

x2
SPIDER GEAR

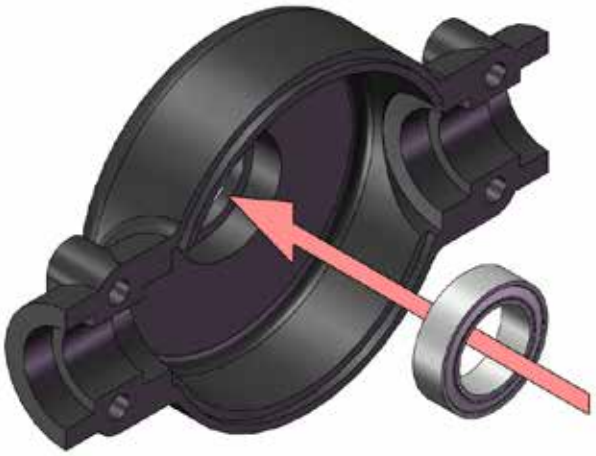


x2
PINION GEAR

x4
6x12x4mm BEARING

x2
CENTER DIFFERENTIAL CASE

x2
10x15x4mm BEARING



x2

04

MARK THE SIDE THE RING GEAR IS ON FOR FUTURE REFERENCE.

05

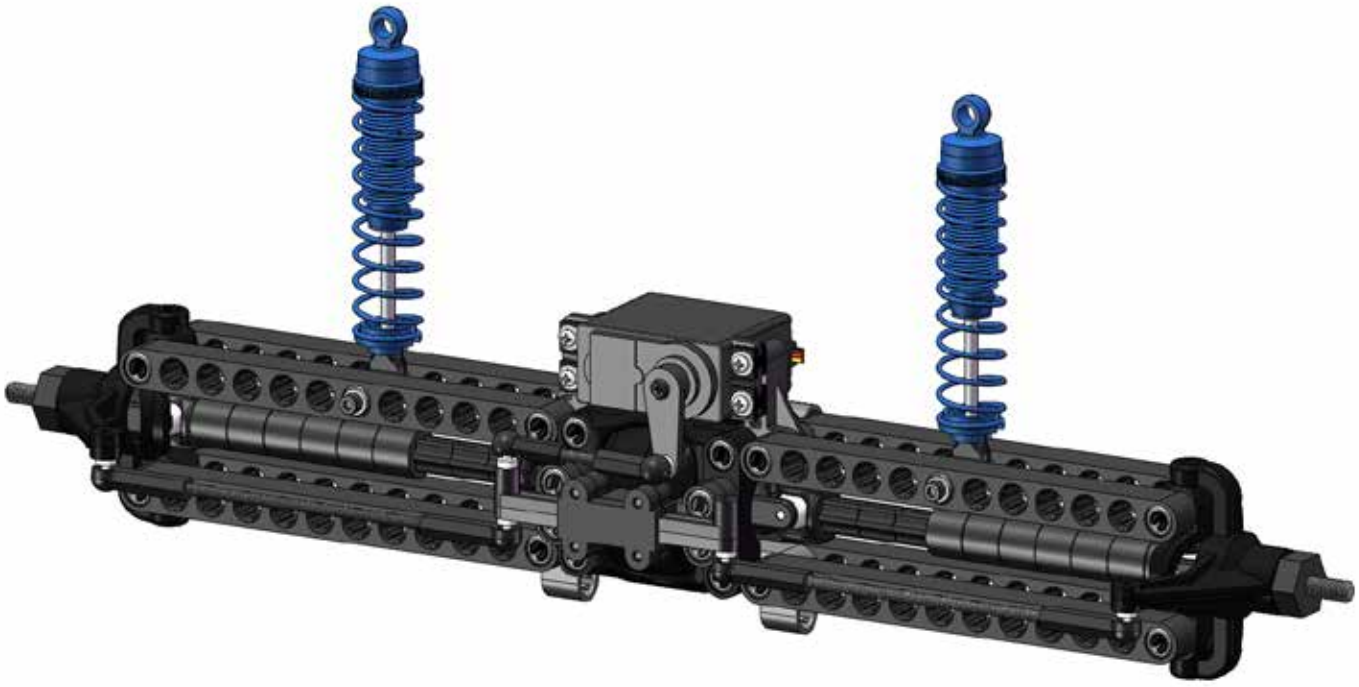
PUT THE SCREW HEADS ON THE SAME SIDE AS THE RING GEAR TO MARK IT.

x4
#4-40 x 3/4" SCREW

x4
#4 WASHER

x4
#4-40 NUT

FRONT AXLE



01

x2
6-DRIVELINE

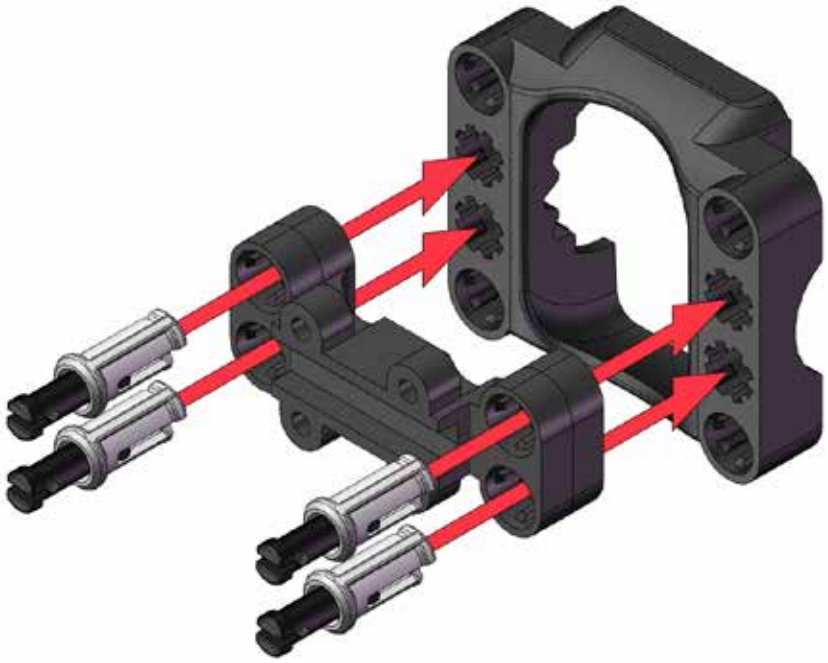
x2
M5 WHEEL END SHAFT

x4
U-JOINT SET SCREW

x1
AXLE HOUSING

x1
STEERING BRACKET

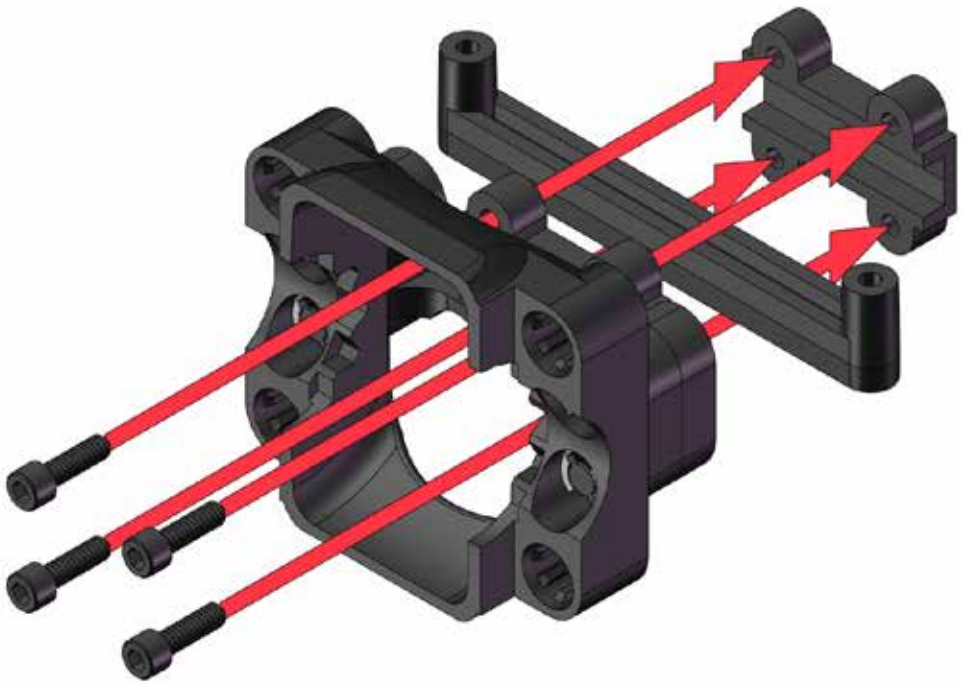
x4
1.5-LOCK



x1
STEERING BAR

x1
STEERING PLATE

x4
#4-40 x 3/8" SCREW



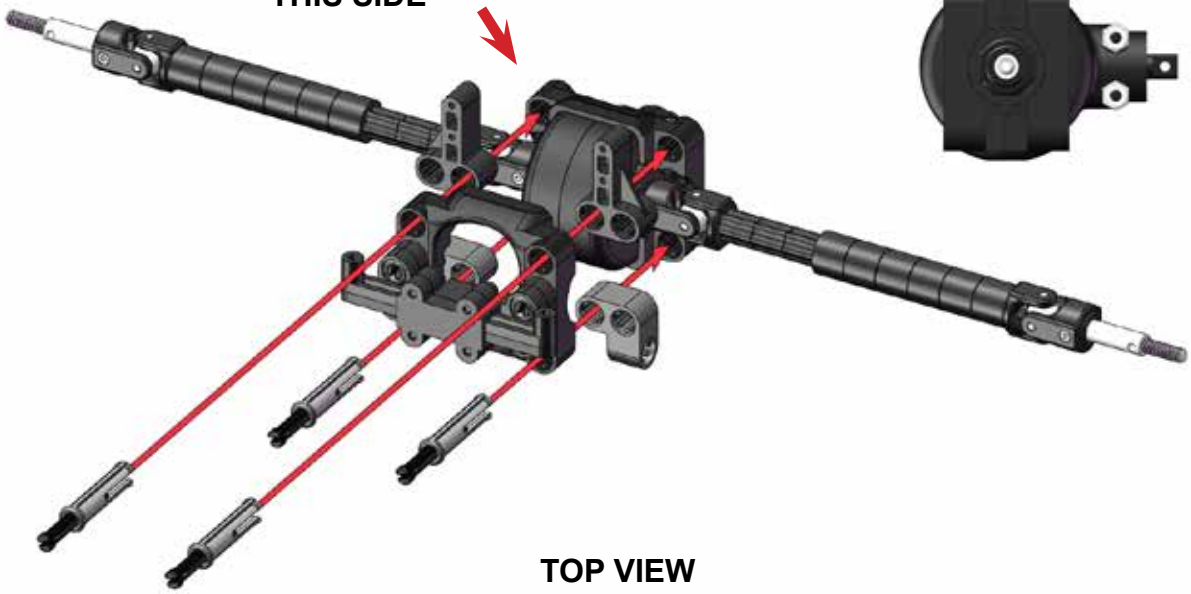
04

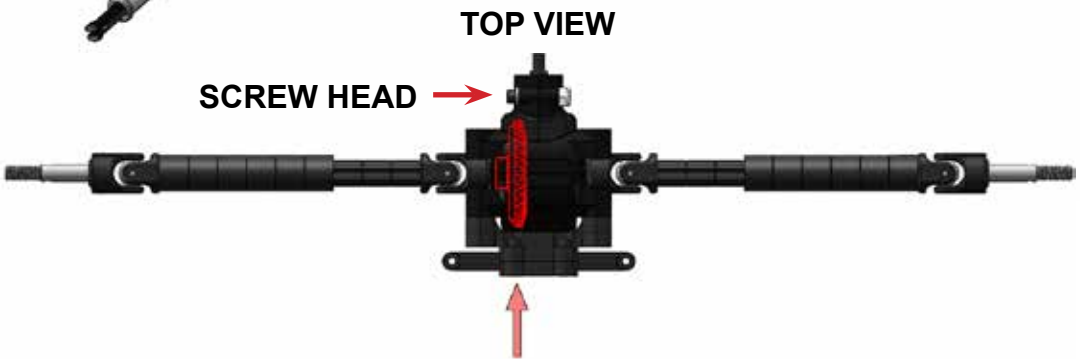
x1
AXLE HOUSING

x2
SERVO MOUNT

x2
TRANSITION

x4
3-LOCK



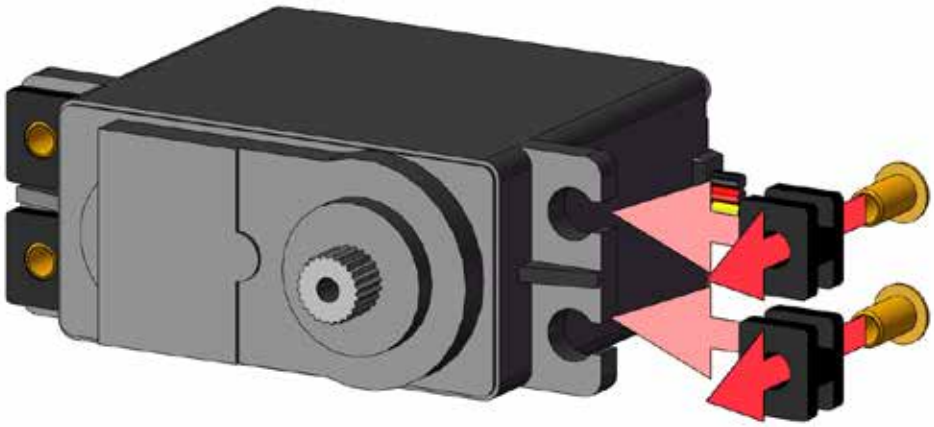


05

x1
HS-485HB SERVO

x4
SERVO BUSHING

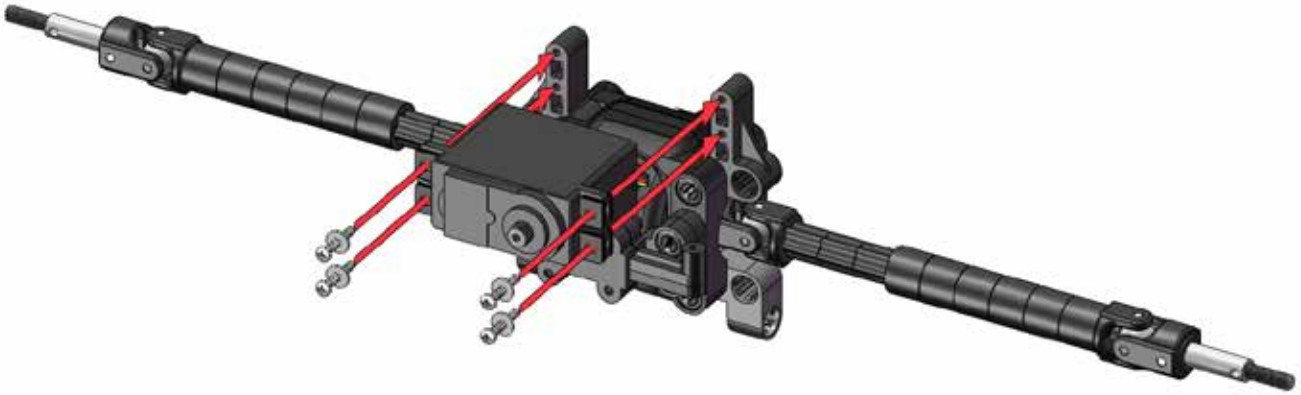
x4
SERVO BUSHING SLEEVE



06

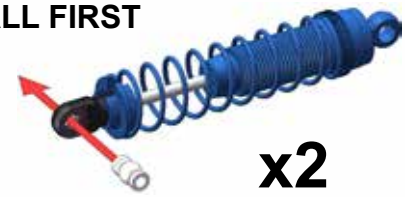
x4
#2-32 x 5/8" SCREW

x4
#2 WASHER



07

INSERT THE ROD END BALL FIRST



x2

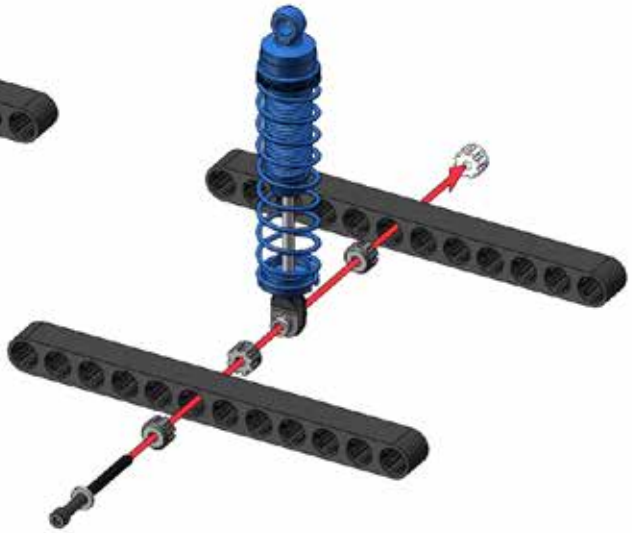
x4
12-BEAM

x2
90mm SHOCK

x2
#4-40 x 1-3/8" SCREW

x2
#4 WASHER

x2
ROD END BALL



x6
CLEARANCE THREAD ADAPTER

x2
INTERFERENCE THREAD ADAPTER

08

x4
12-BEAM

x2
FRONT WHEEL HUB

x2
FRONT WHEEL KNUCKL

x4
3-ROTATE

x4
6x12x4mm BEARING

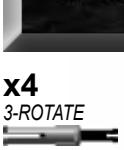
ASSEMBLE THE ENDS FIRST

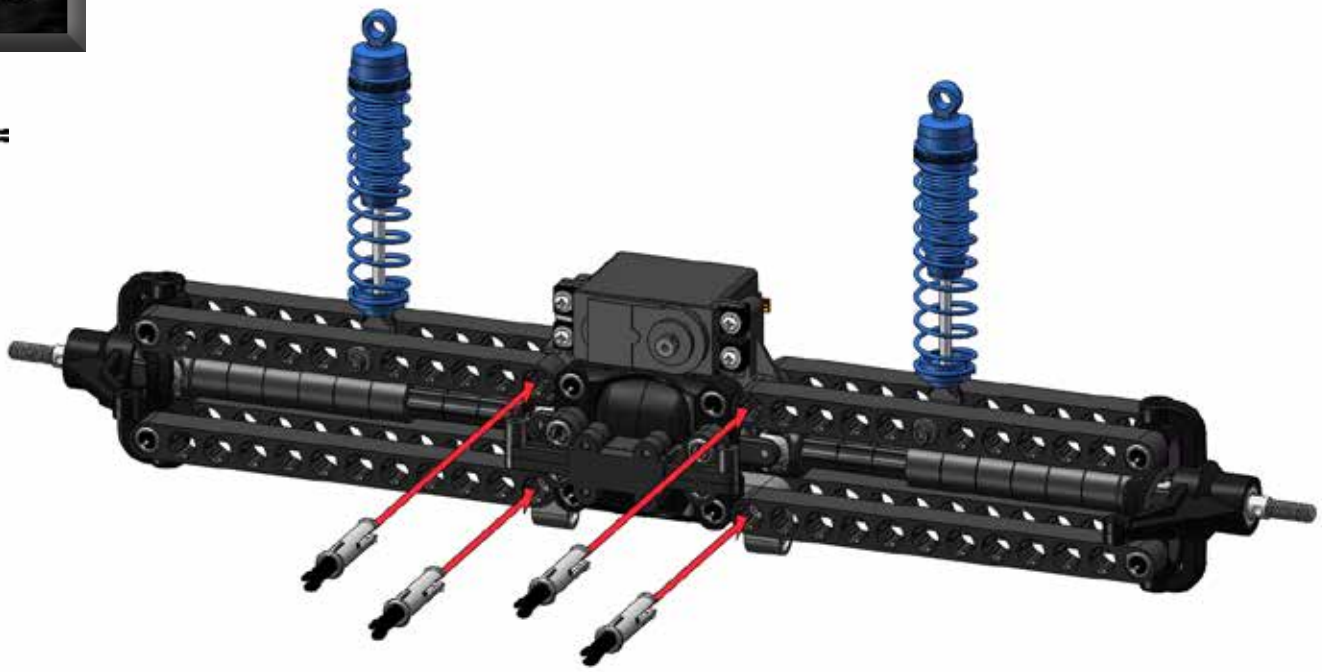
x2

09

10

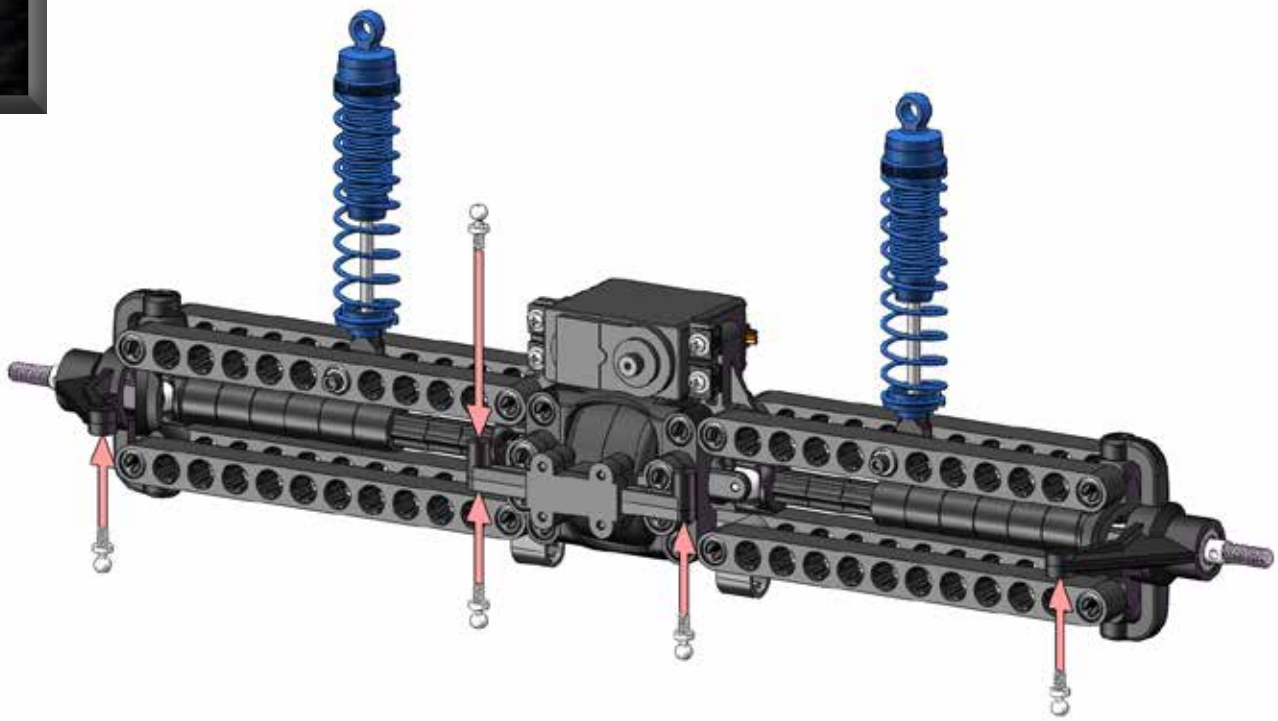
x4
3-ROTATE





11

x5
3/16" BALL STUD

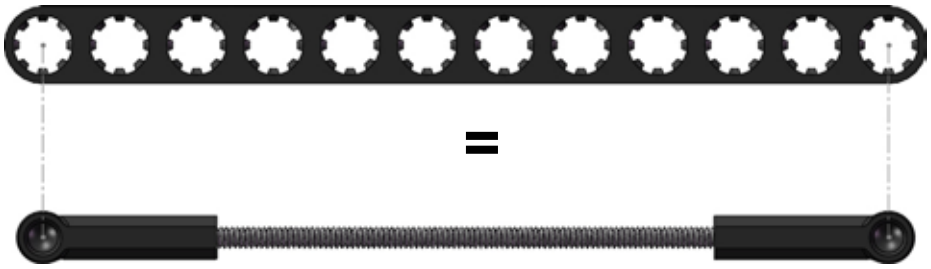


12

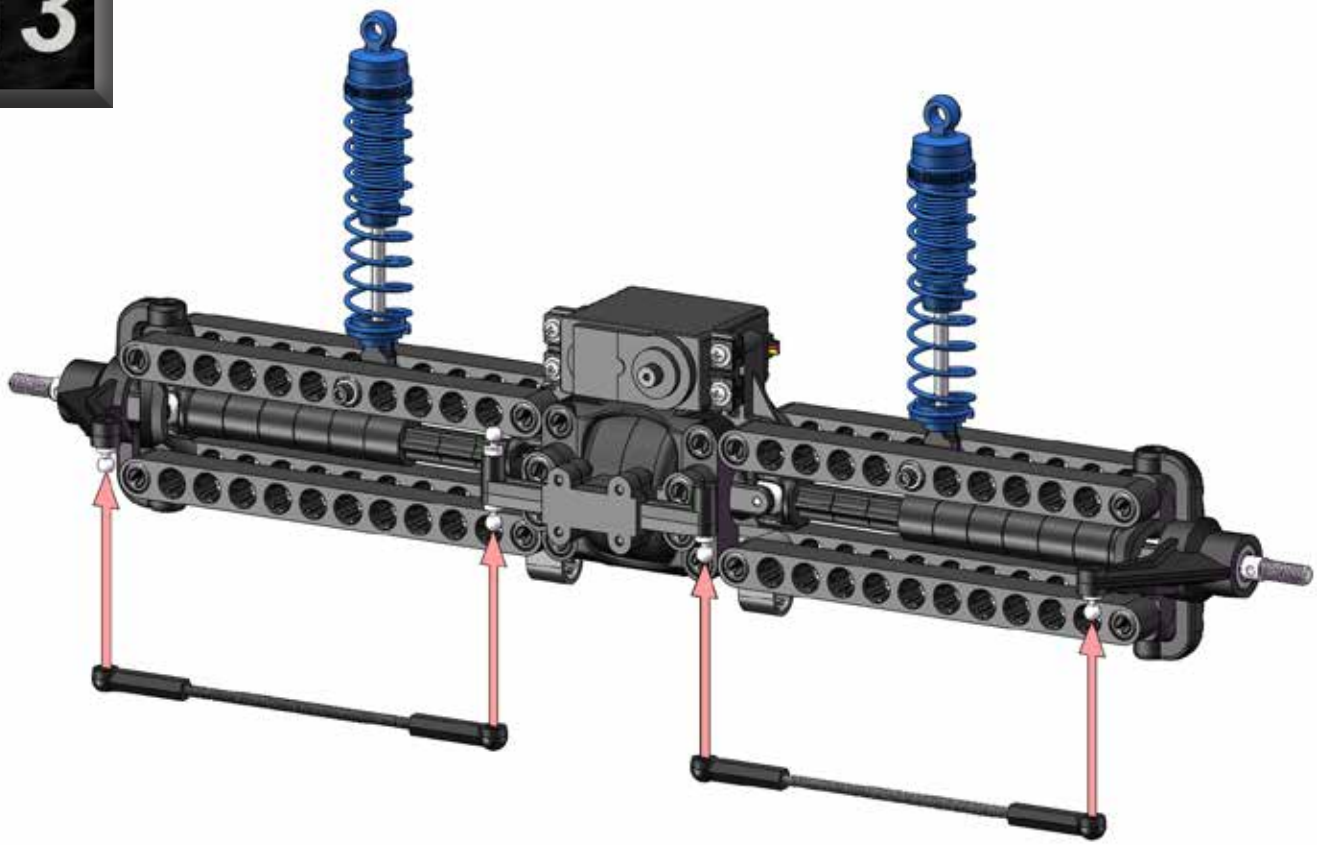
x2
#4-40 x 3-3/4" THREAD ROD

x4
23mm BALL CUP

x2

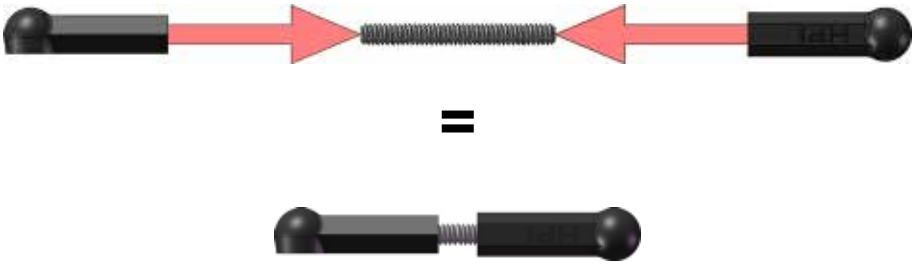


13



x1
#4-40 x 1" THREAD ROD

x2
18mm BALL CUP



x1
STEERING SERVO HORN

x1
3/16" BALL STUD

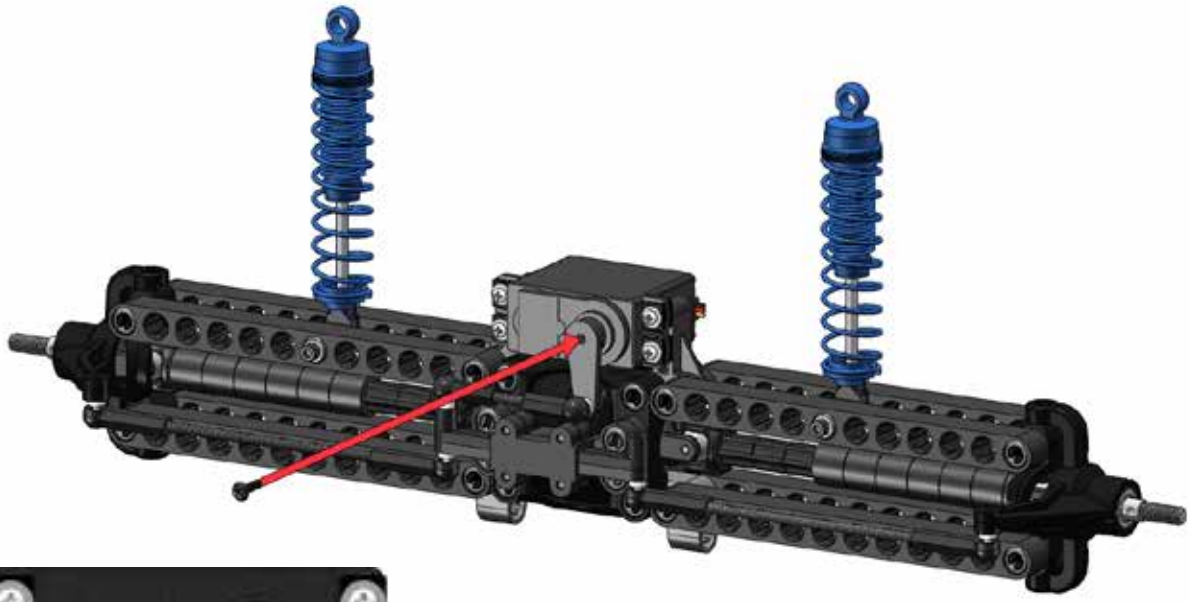
16

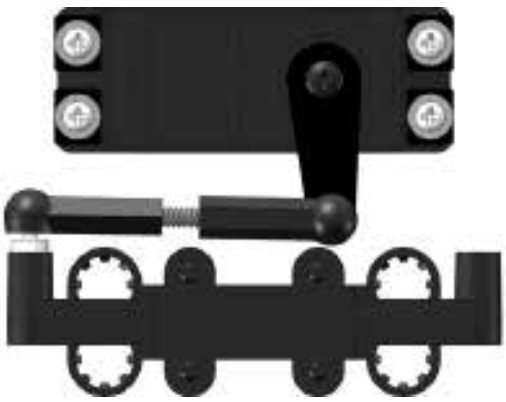
POSITION OF SERVO HORN ON SERVO WILL BE SET AFTER SERVO IS POWERED.

17

x1

SERVO HORN SCREW



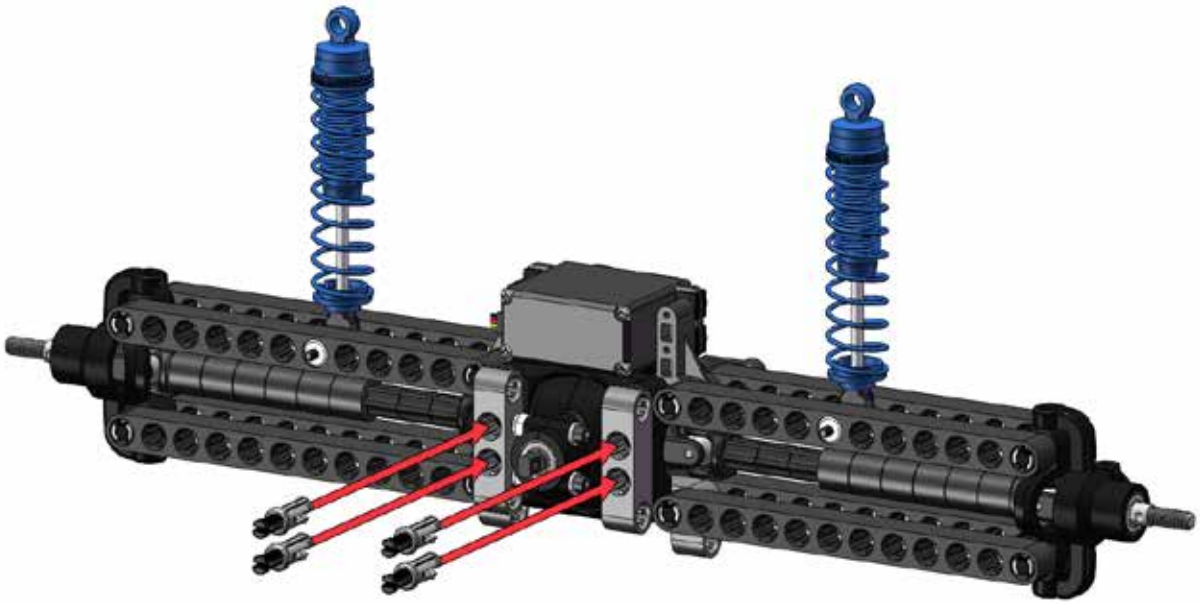


DO NOT TIGHTEN. SERVO WILL CHANGE POSITION AFTER IT IS POWERED ON FOR THE FIRST TIME.

18

x2
DUAL TRANSITION

x4
1.5-LOCK

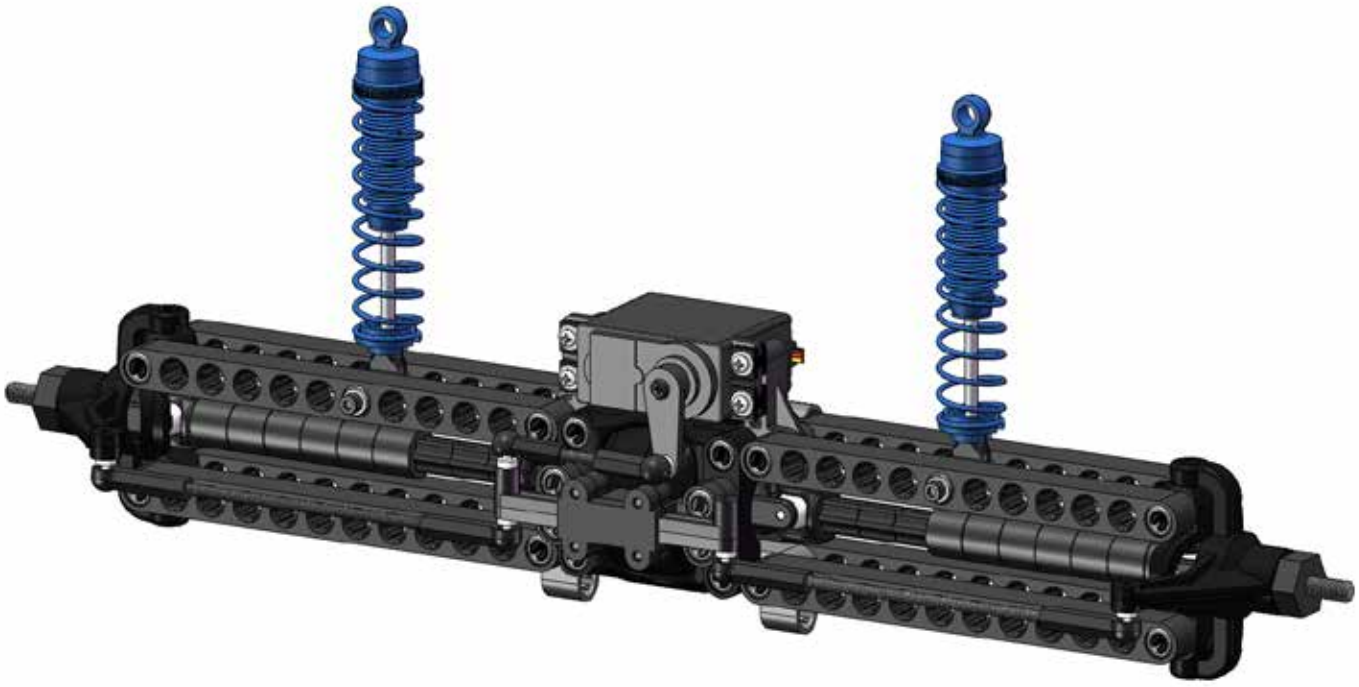


19

x2
14mm WHEEL NUT

x2
2.5x10mm DOWEL PIN

REAR AXLE



x2
6-DRIVELINE

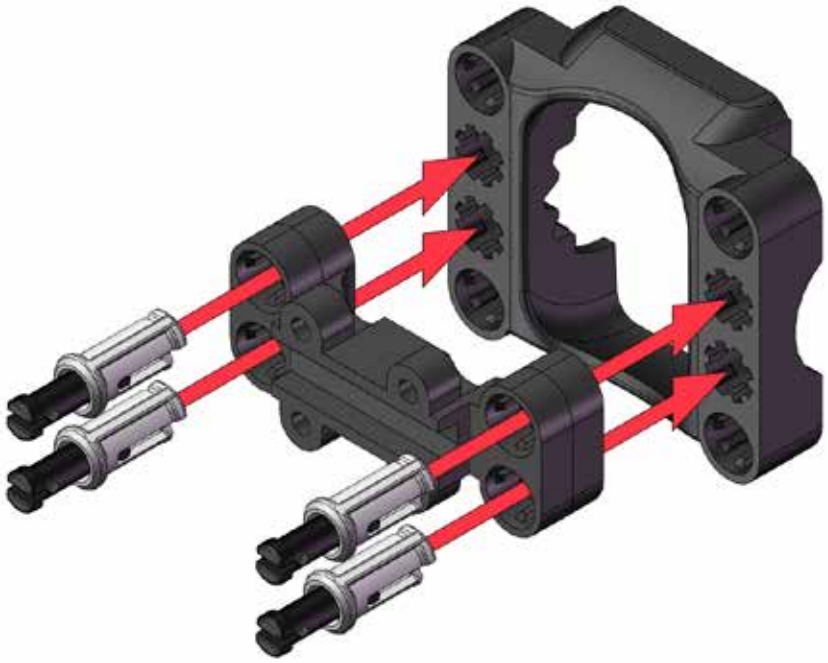
x2
M5 WHEEL END SHAFT

x4
U-JOINT SET SCREW

x1
AXLE HOUSING

x1
STEERING BRACKET

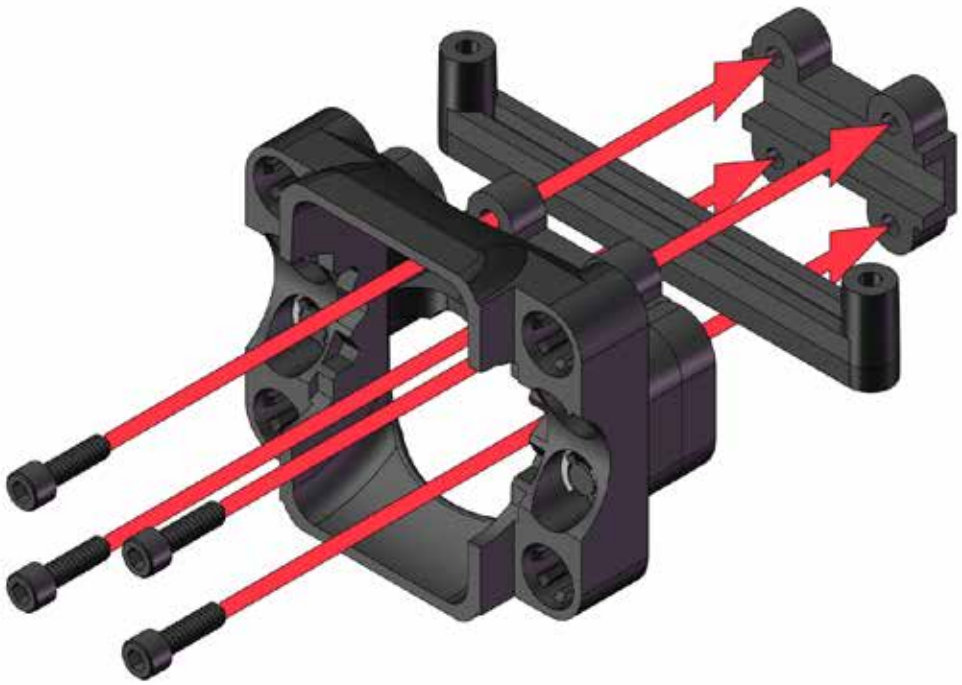
x4
1.5-LOCK



x1
STEERING BAR

x1
STEERING PLATE

x4
#4-40 x 3/8" SCREW



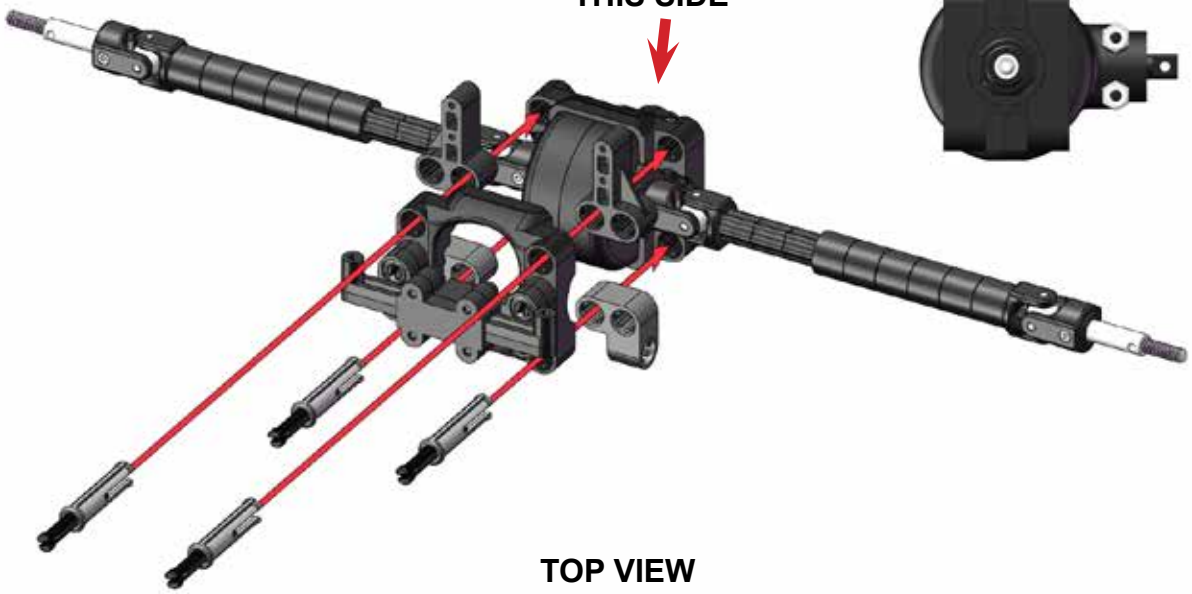
04

x1
AXLE HOUSING

x2
SERVO MOUNT

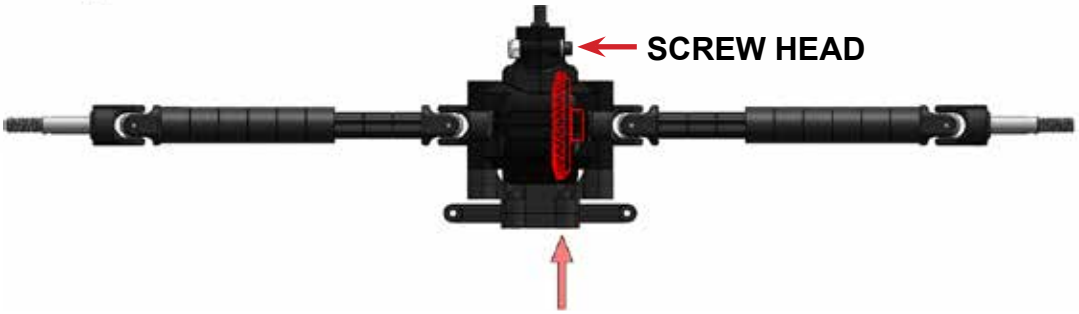
x2
TRANSITION

x4
3-LOCK



SIDE VIEW

TOP VIEW

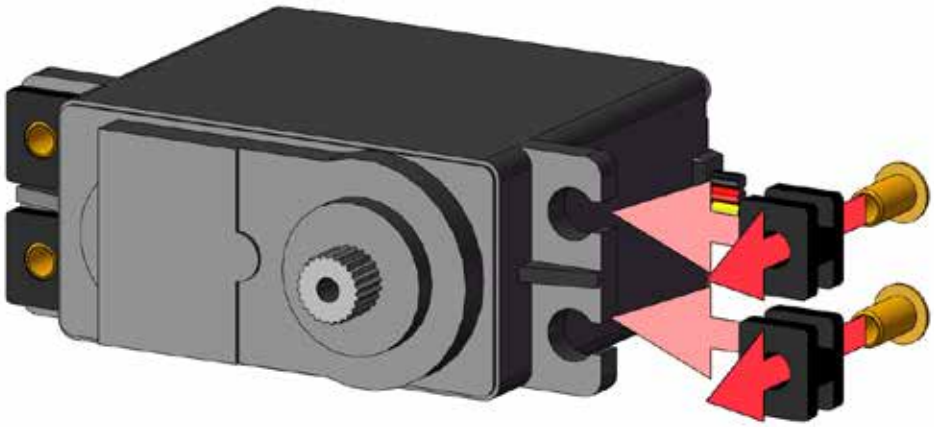


05

x1
HS-485HB SERVO

x4
SERVO BUSHING

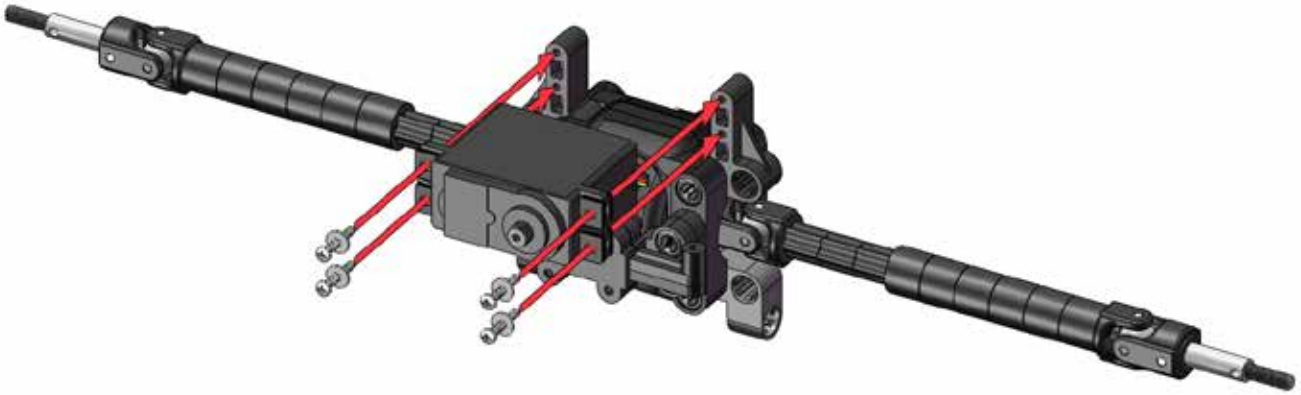
x4
SERVO BUSHING SLEEVE



06

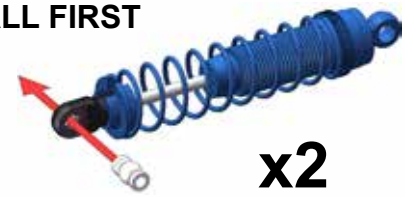
x4
#2-32 x 5/8" SCREW

x4
#2 WASHER



07

INSERT THE ROD END BALL FIRST



x2

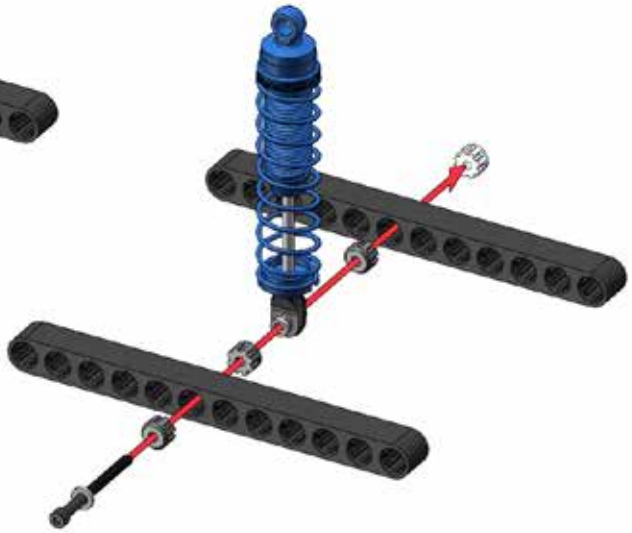
x4
12-BEAM

x2
90mm SHOCK

x2
#4-40 x 1-3/8" SCREW

x2
#4 WASHER

x2
ROD END BALL



x6
CLEARANCE THREAD ADAPTER

x2
INTERFERENCE THREAD ADAPTER

08

x4
12-BEAM

x2
FRONT WHEEL HUB

x2
FRONT WHEEL KNUCKL

x4
3-ROTATE

x4
6x12x4mm BEARING

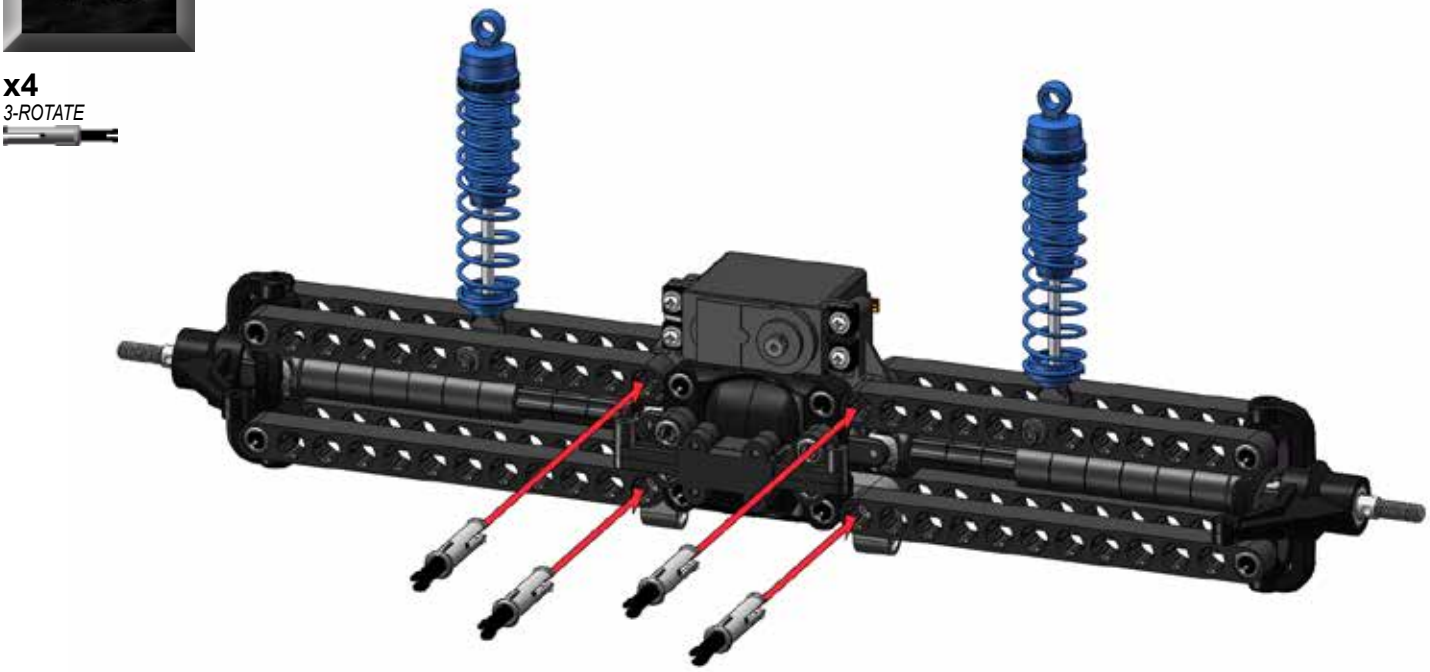
ASSEMBLE THE ENDS FIRST

x2

09

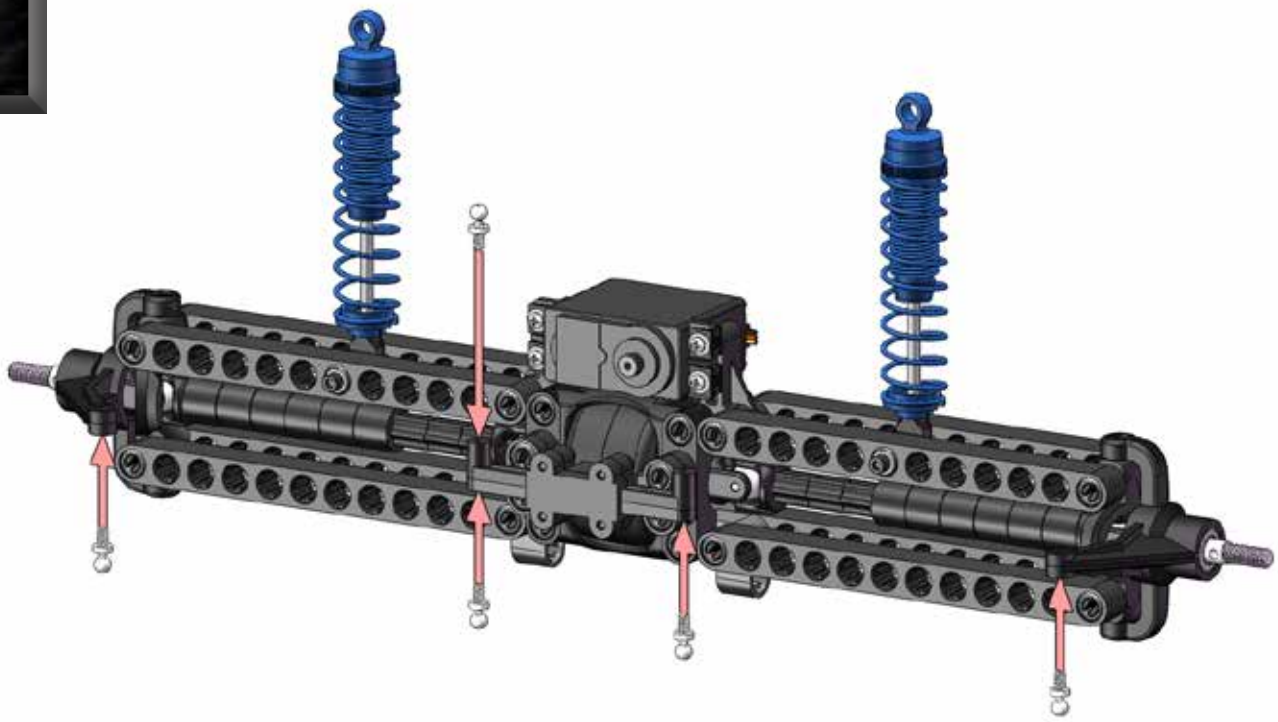
10

x4
3-ROTATE



11

x5
3/16" BALL STUD

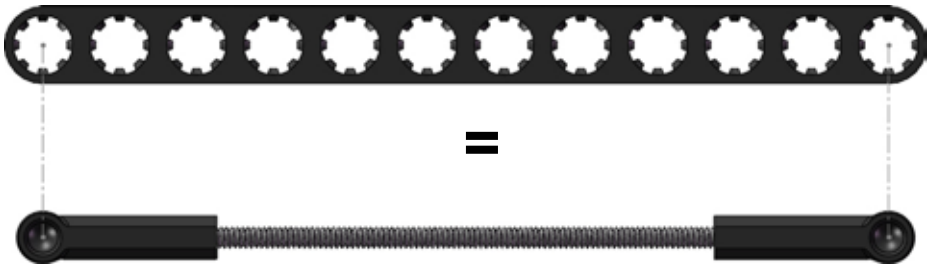


12

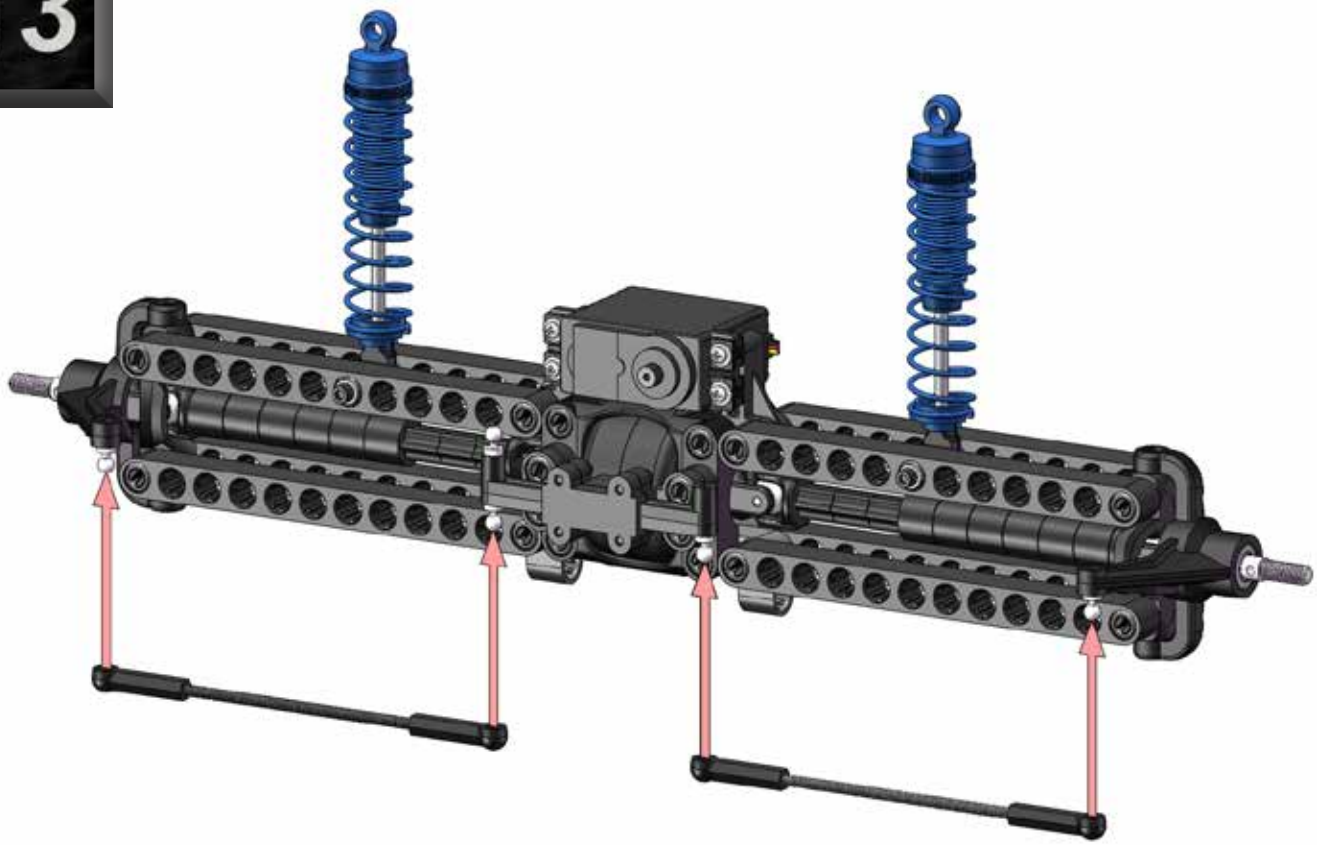
x2
#4-40 x 3-3/4" THREAD ROD

x4
23mm BALL CUP

x2

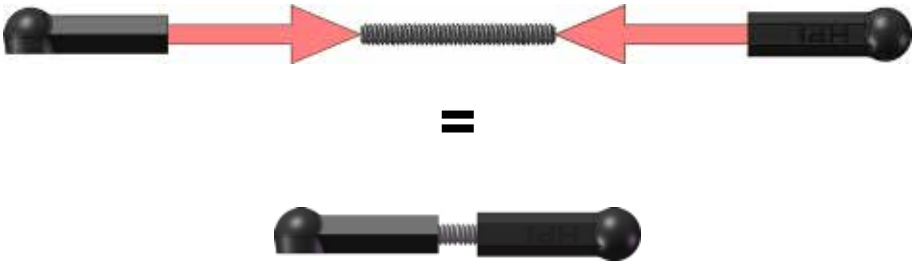


13



x1
#4-40 x 1" THREAD ROD

x2
18mm BALL CUP



x1
STEERING SERVO HORN

x1
3/16" BALL STUD

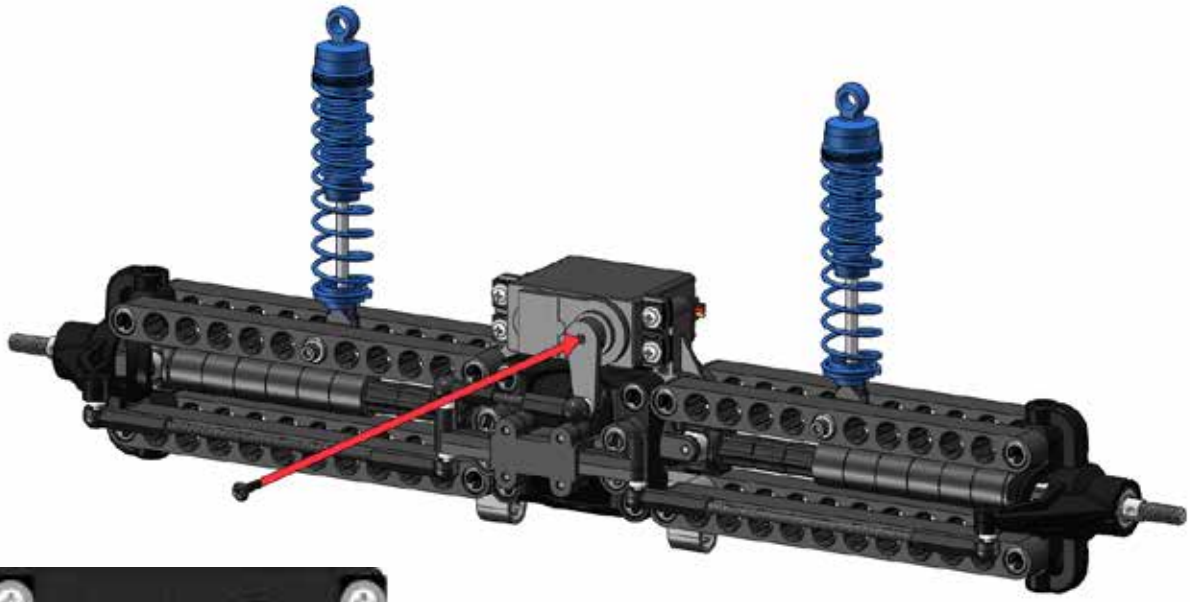
16

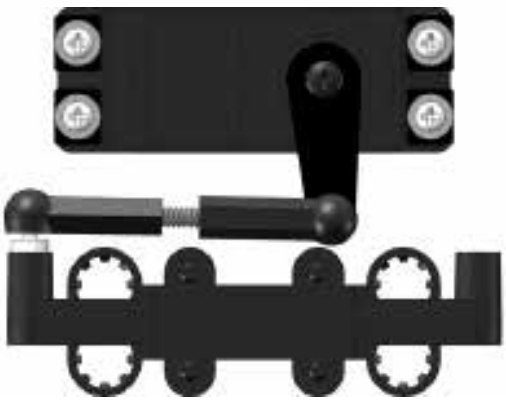
POSITION OF SERVO HORN ON SERVO WILL BE SET AFTER SERVO IS POWERED.

17

x1

SERVO HORN SCREW



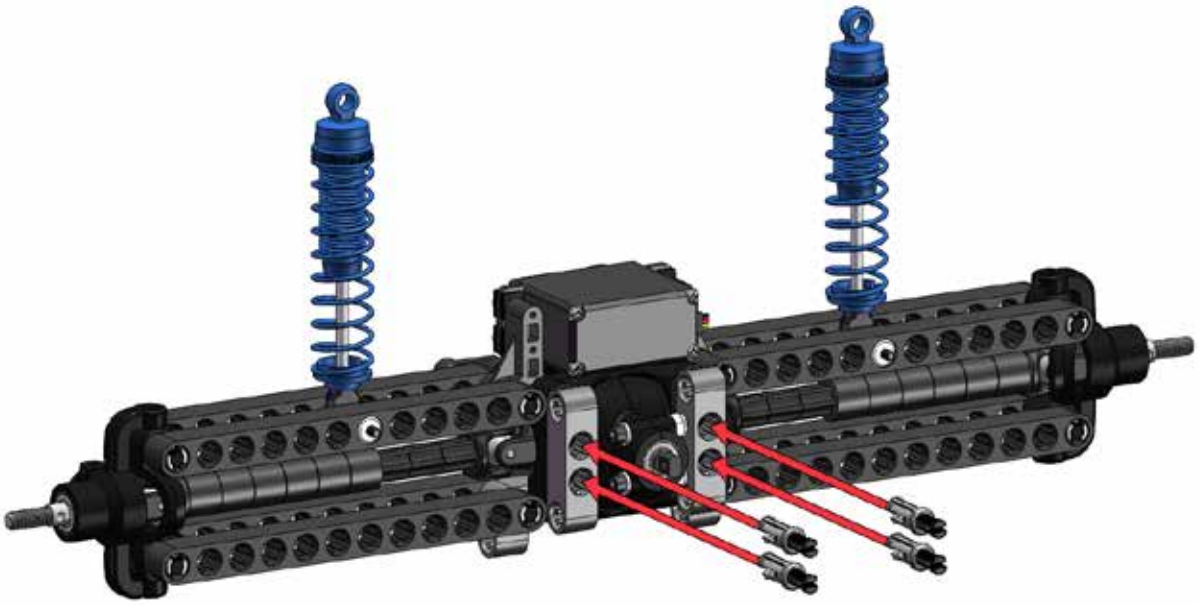


DO NOT TIGHTEN. SERVO WILL CHANGE POSITION AFTER IT IS POWERED ON FOR THE FIRST TIME.

18

x2
DUAL TRANSITION

x4
1.5-LOCK

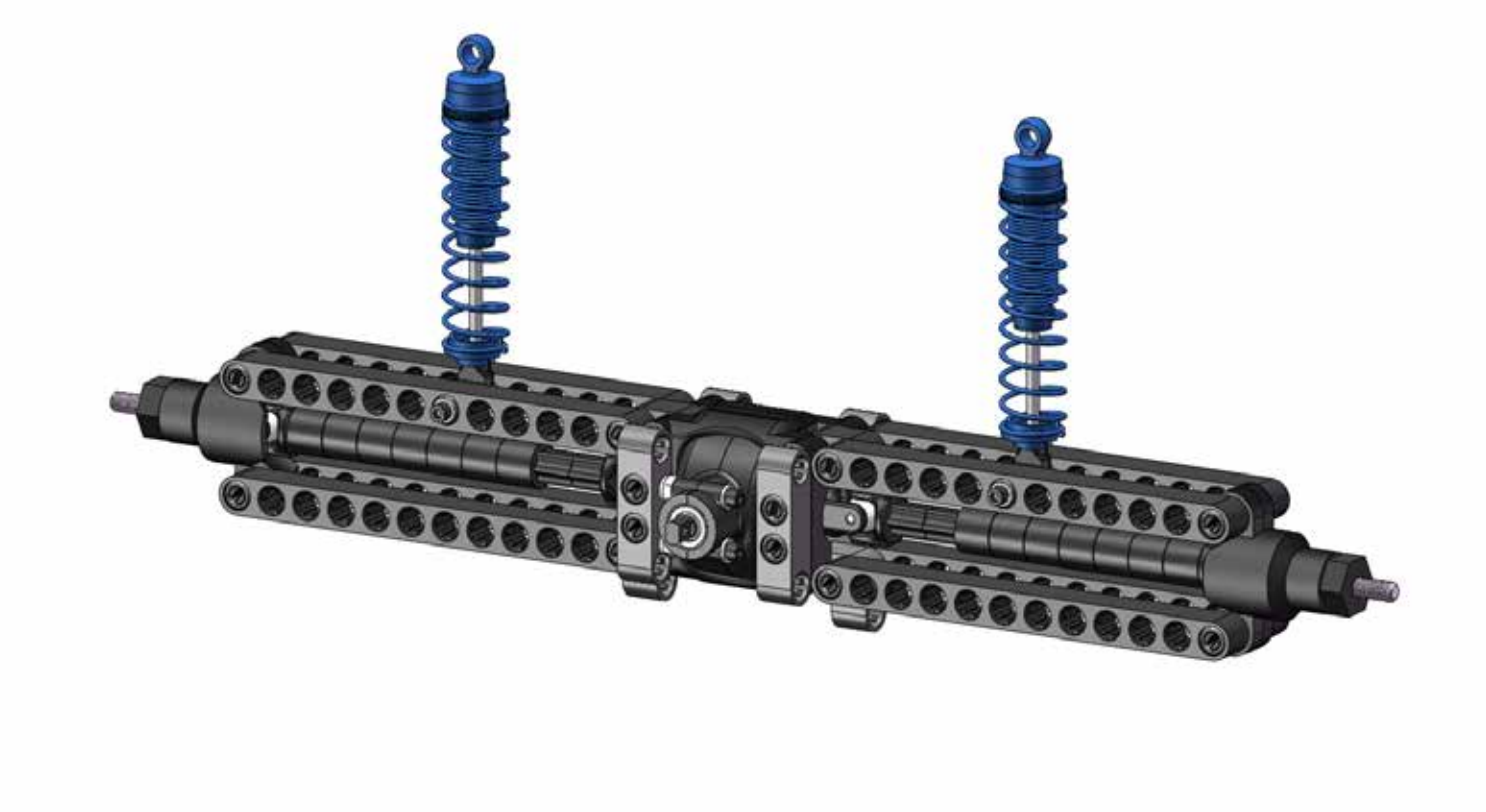


19

x2
14mm WHEEL NUT

x2
2.5x10mm DOWEL PIN

MIDDLE AXLE



01

x2
6-DRIVELINE

x2
M5 WHEEL END SHAFT

x4
U-JOINT SET SCREW

02

x2
AXLE HOUSING

x2
TRANSITION

x2
2-BEAM

x4
3-LOCK

03

x4
12-BEAM

x2
90mm SHOCK

x2
#4-40 x 1-3/8" SCREW

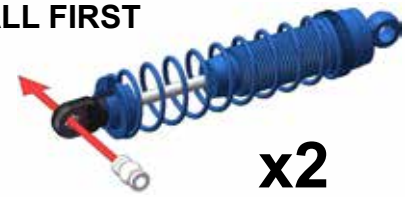
x2
#4 WASHER

x2
ROD END BALL

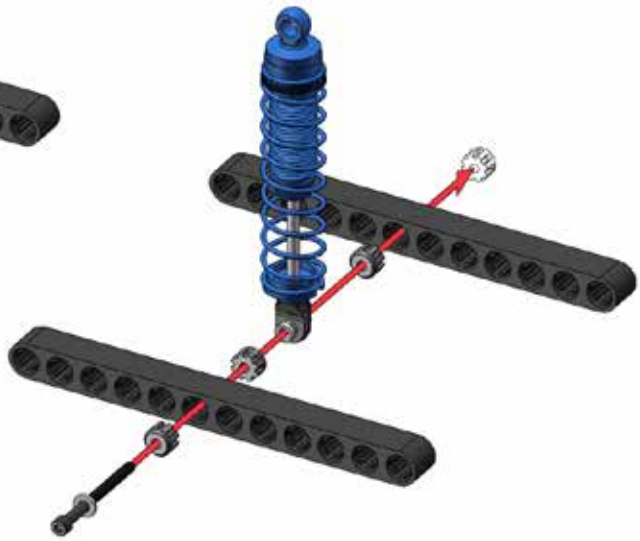
x6
CLEARANCE THREAD ADAPTER

x2
INTERFERENCE THREAD ADAPTER

INSERT THE ROD END BALL FIRST



x2



04

x4
12-BEAM

x2
REAR WHEEL HUB

x4
3-ROTATE

x4
6x12x4mm BEARING

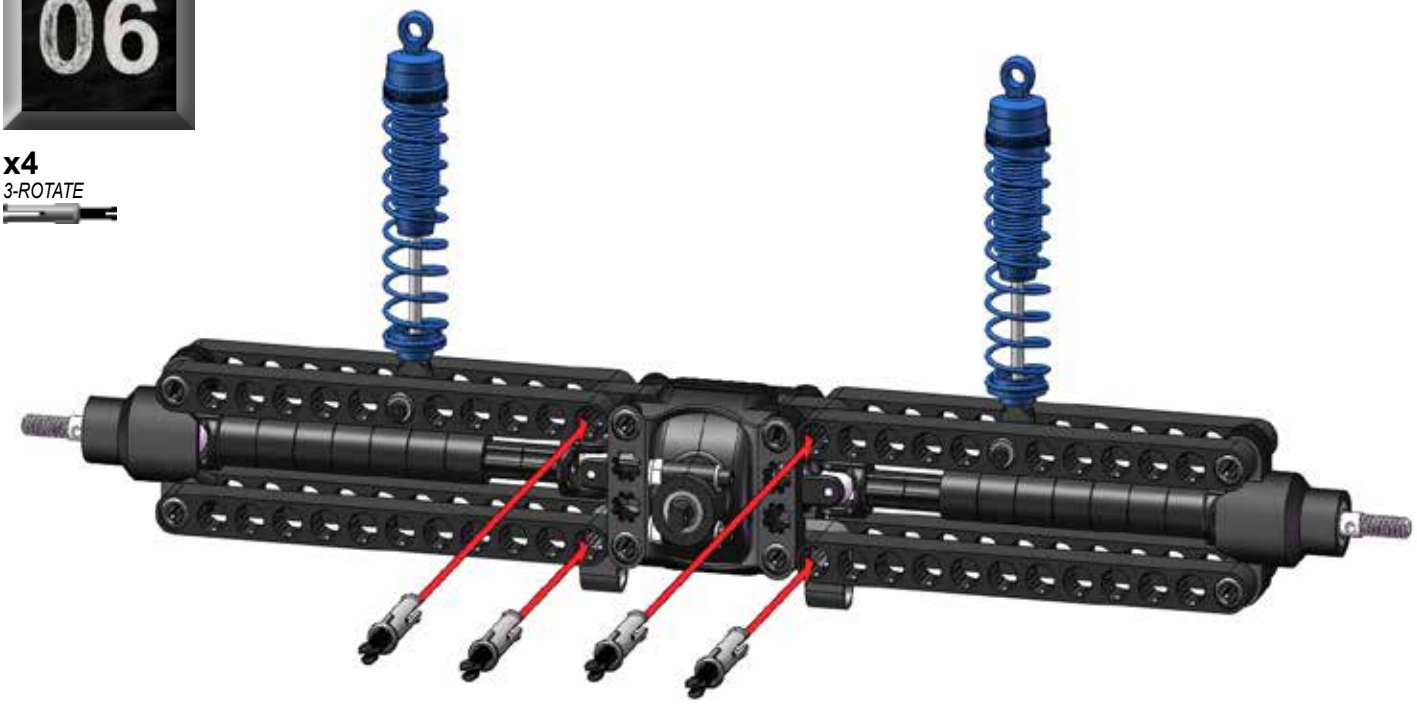
ASSEMBLE THE ENDS FIRST

x2

05

06

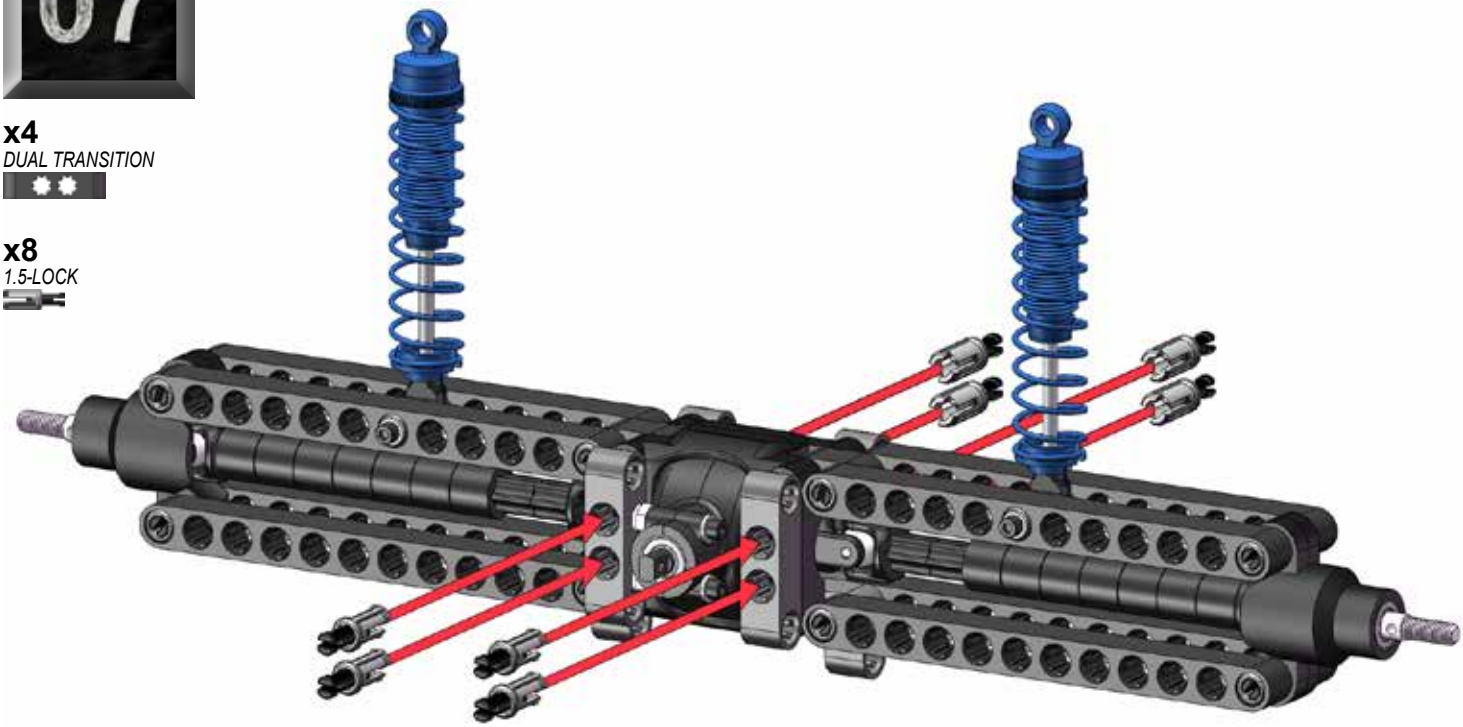
x4
3-ROTATE



07

x4
DUAL TRANSITION

x8
1.5-LOCK



x2
14mm WHEEL NUT

x2
2.5x10mm DOWEL PIN

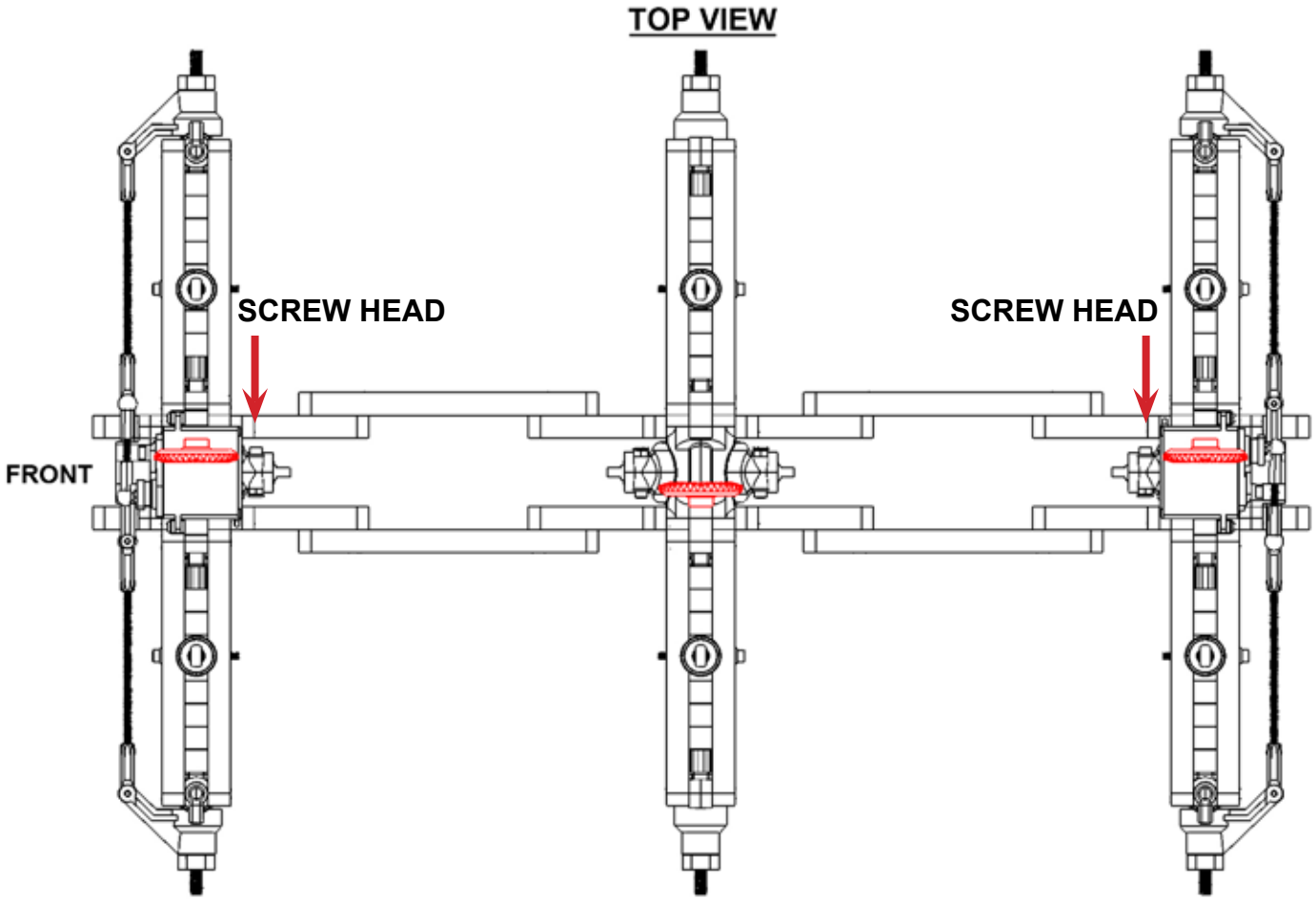
DIFFERENTIAL ORIENTATION

THE DIFFERENTIALS MUST BE ORIENTED PROPERLY OR THE WHEELS WILL NOT SPIN IN THE CORRECT DIRECTION.

REFER TO THE DIAGRAM BELOW WHEN ATTACHING THE AXLES. THE FRONT AND REAR AXLES ARE NOT EXCHANGEABLE. NOTE THE DIRECTION OF THE SCREW HEADS.

CHECK THE ROTATION OF THE DRIVE TRAIN BY SPINNING IT BY HAND BEFORE INSTALLING THE ELECTRONICS. BOTH AXLES SHOULD SPIN IN THE SAME DIRECTION WHEN THE DIFFERENTIAL INPUTS ARE TWISTED CLOCKWISE.

IF THE DIFFERENTIALS ORIENTATION IS WRONG THE FRONT AND REAR WHEELS WILL SPIN IN OPPOSITE DIRECTIONS; SEE THE TROUBLESHOOTING GUIDE.



01

x2
15-BEAM

x4
13-BEAM

x4
12-BEAM

x8
2-LOCK

02

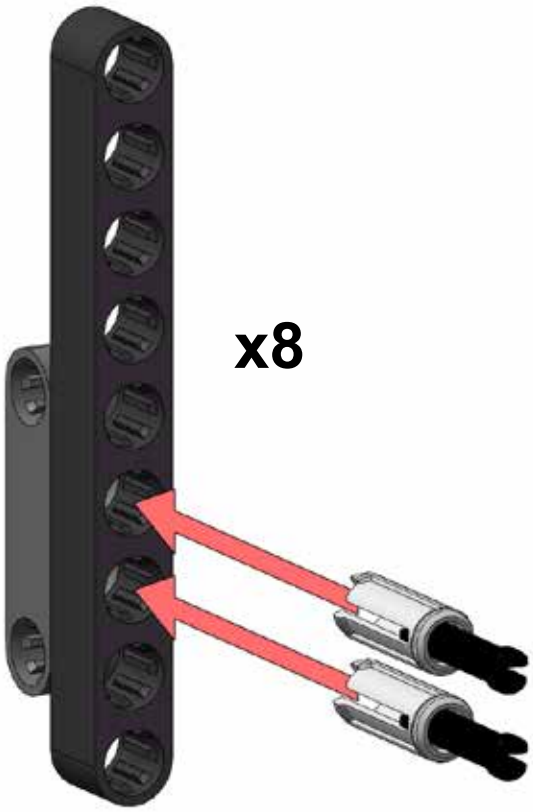
x6
2-LOCK

03

x8
9-BEAM

x8
DUAL TRANSITION

x16
2-LOCK



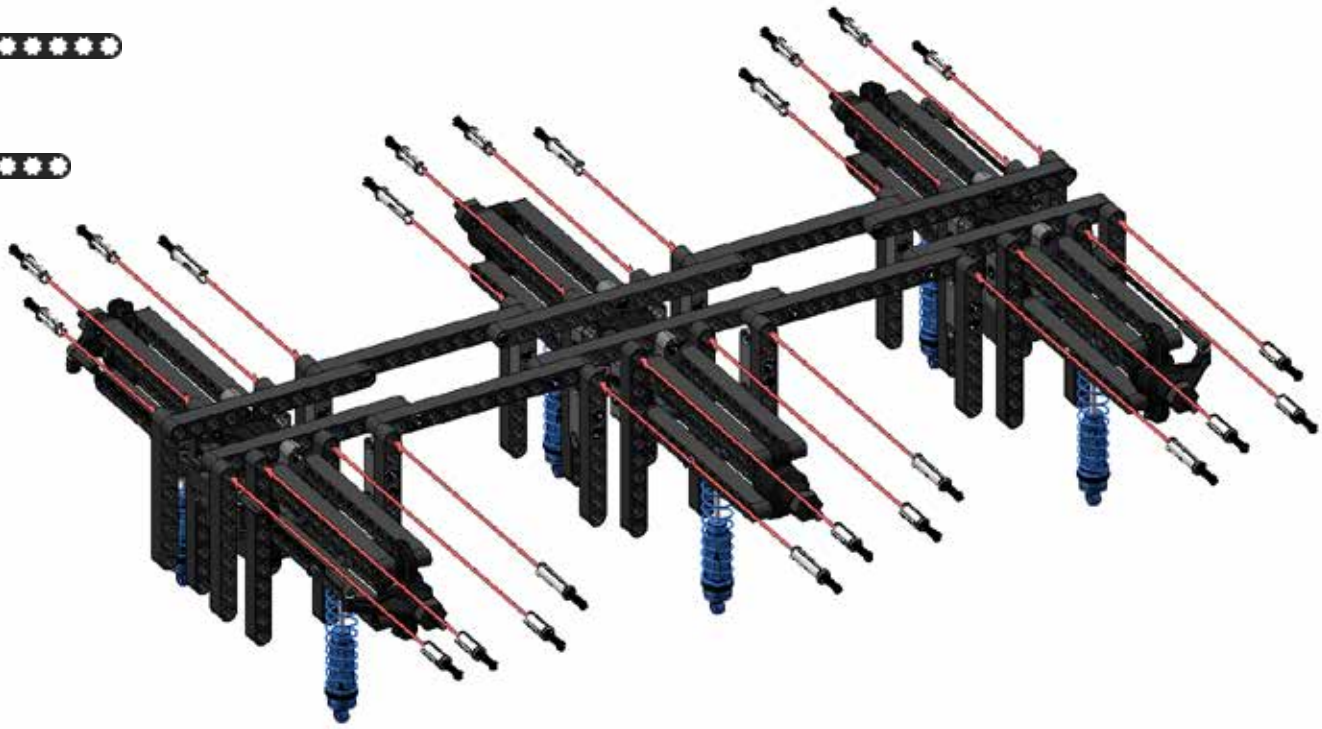
04

x12
11-BEAM

x4
9-BEAM

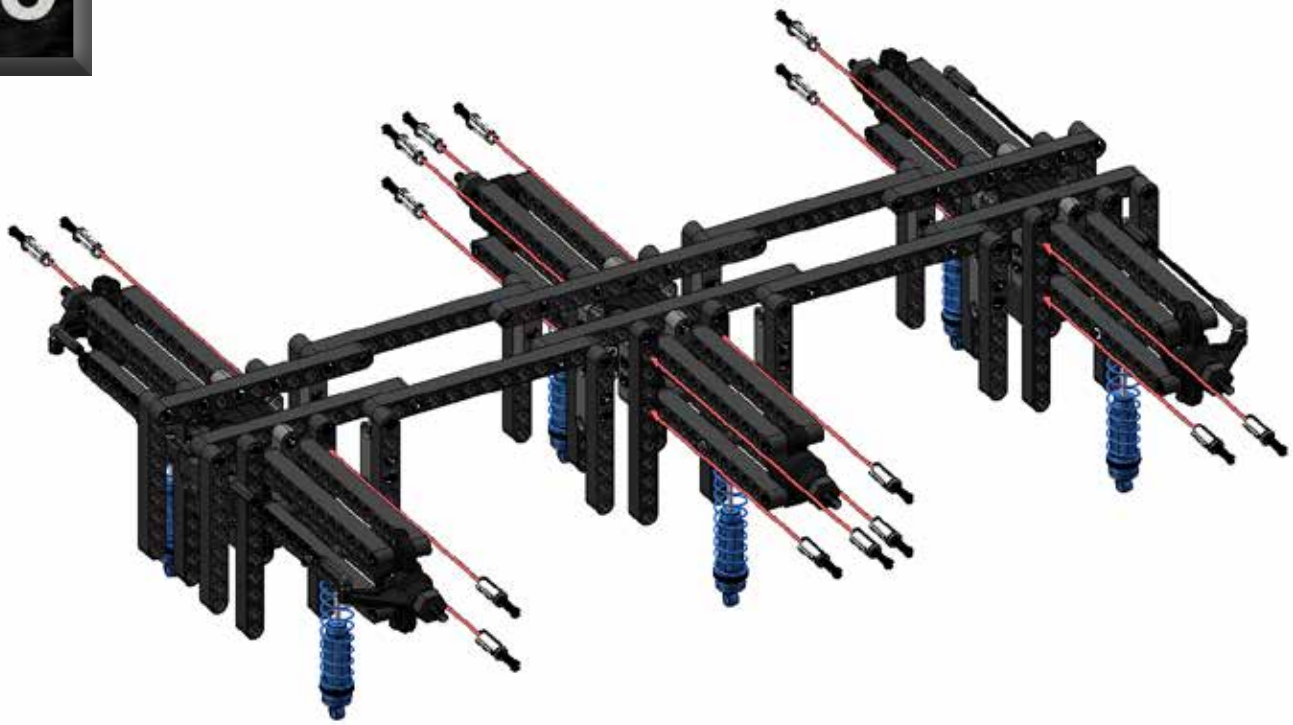
x8
3-LOCK

x16
2-LOCK



05

x16
2-LOCK

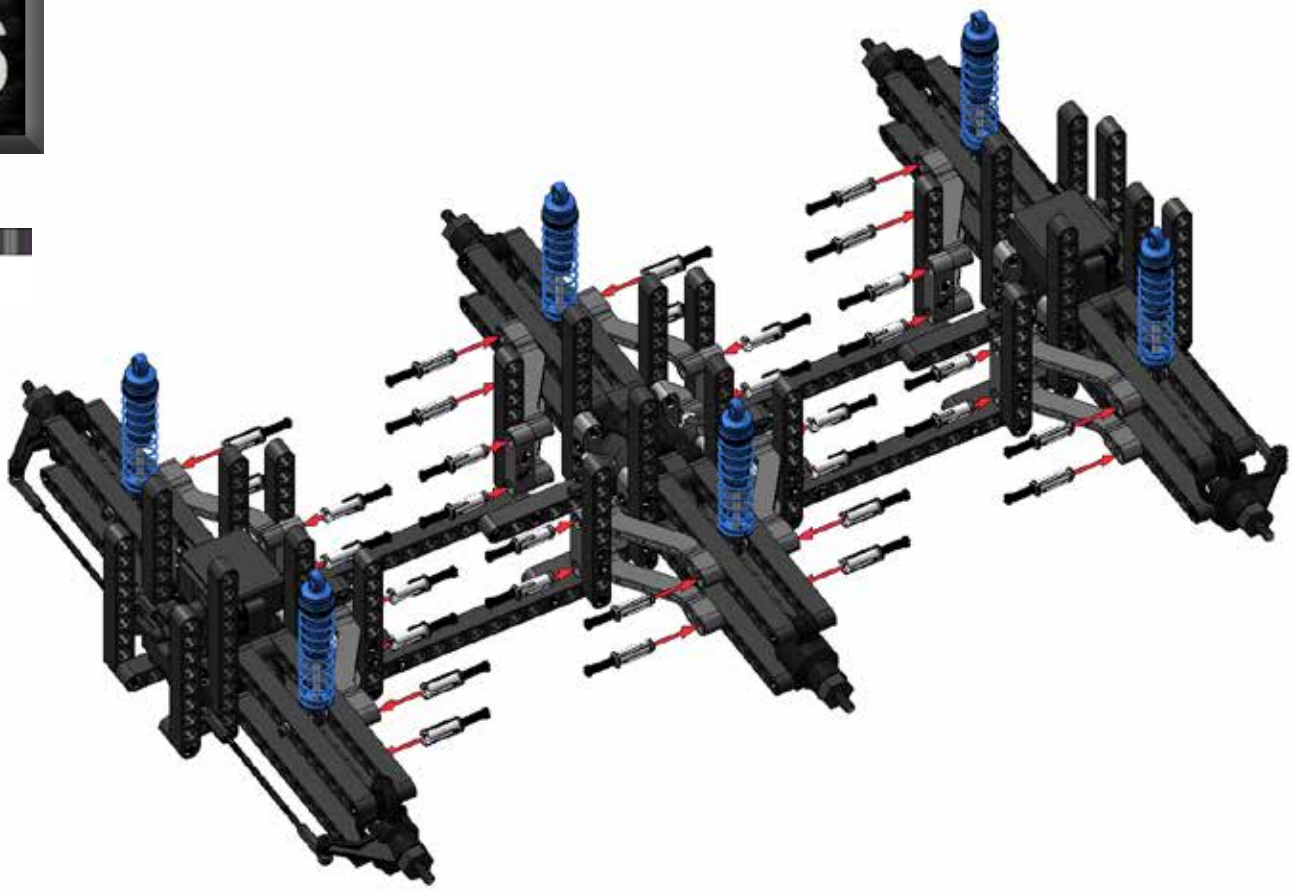


06

x16
SUPPORT ARM

x16
2-LOCK

x16
2-ROTATE

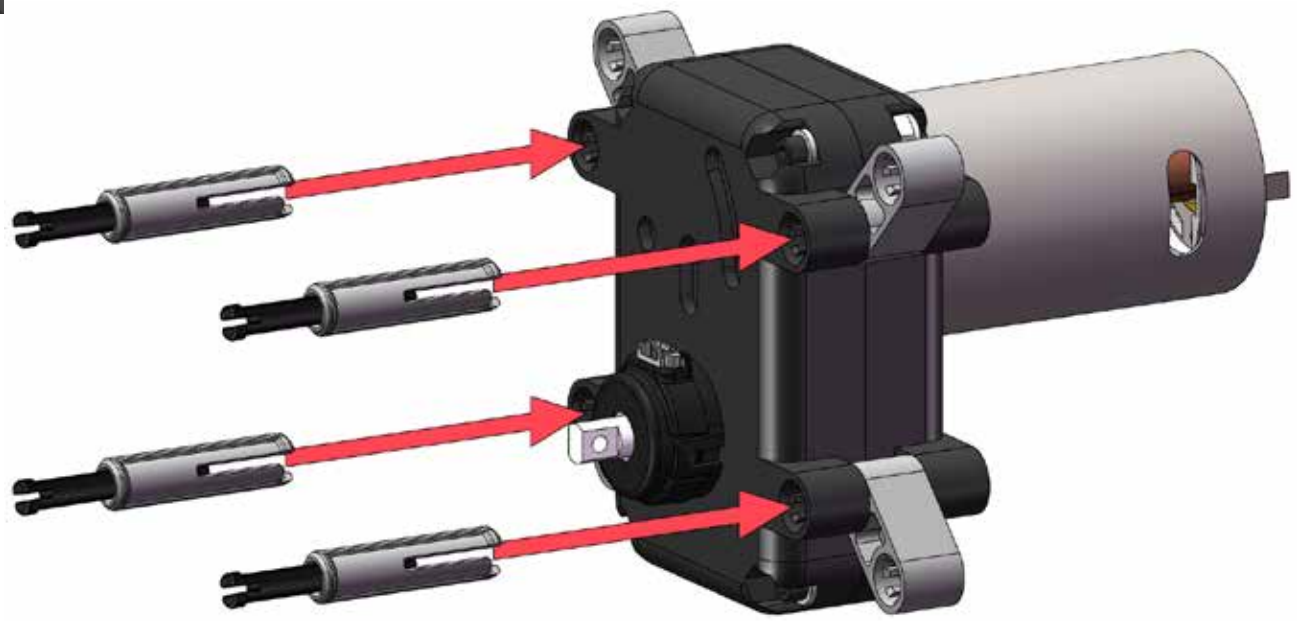


07

USE ONE MOTOR ASSEMBLY WITH ENCODER

x4
2-45 BEAM

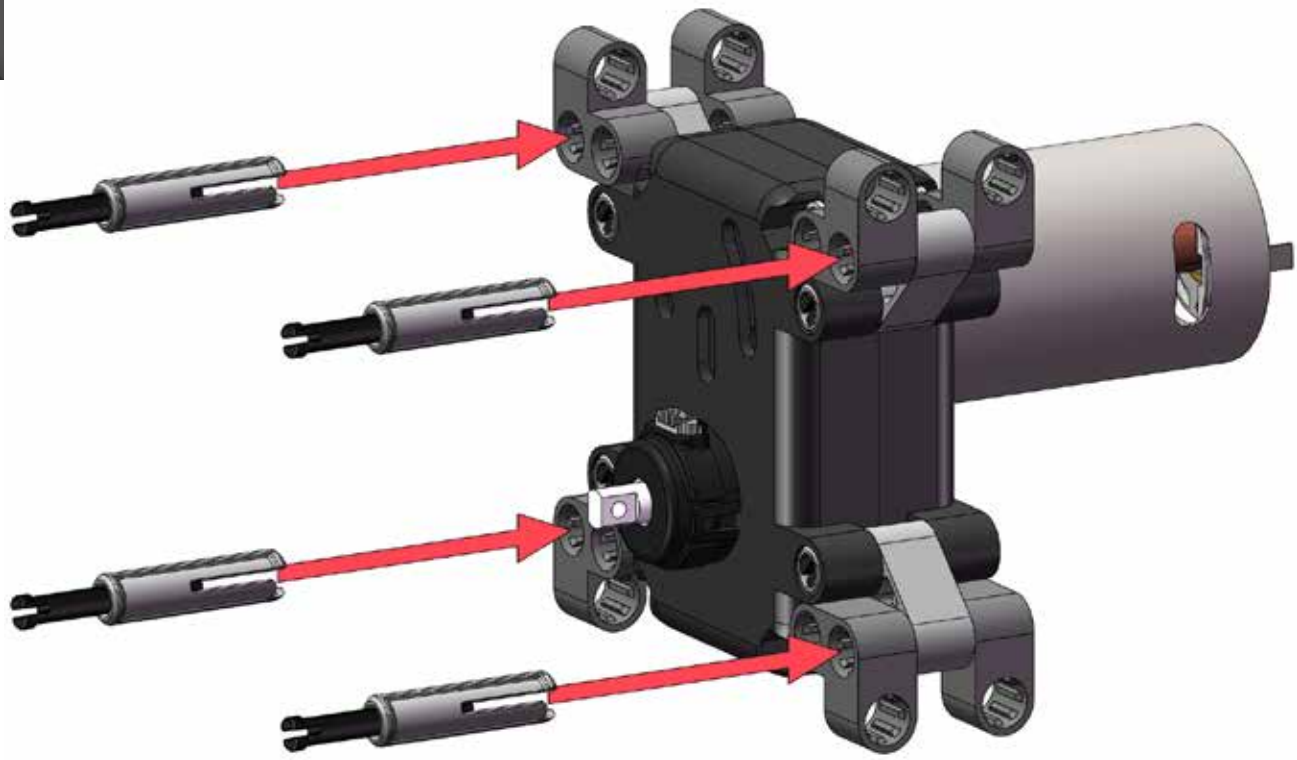
x4
3-LOCK



08

x8
TRANSITION

x4
3-LOCK

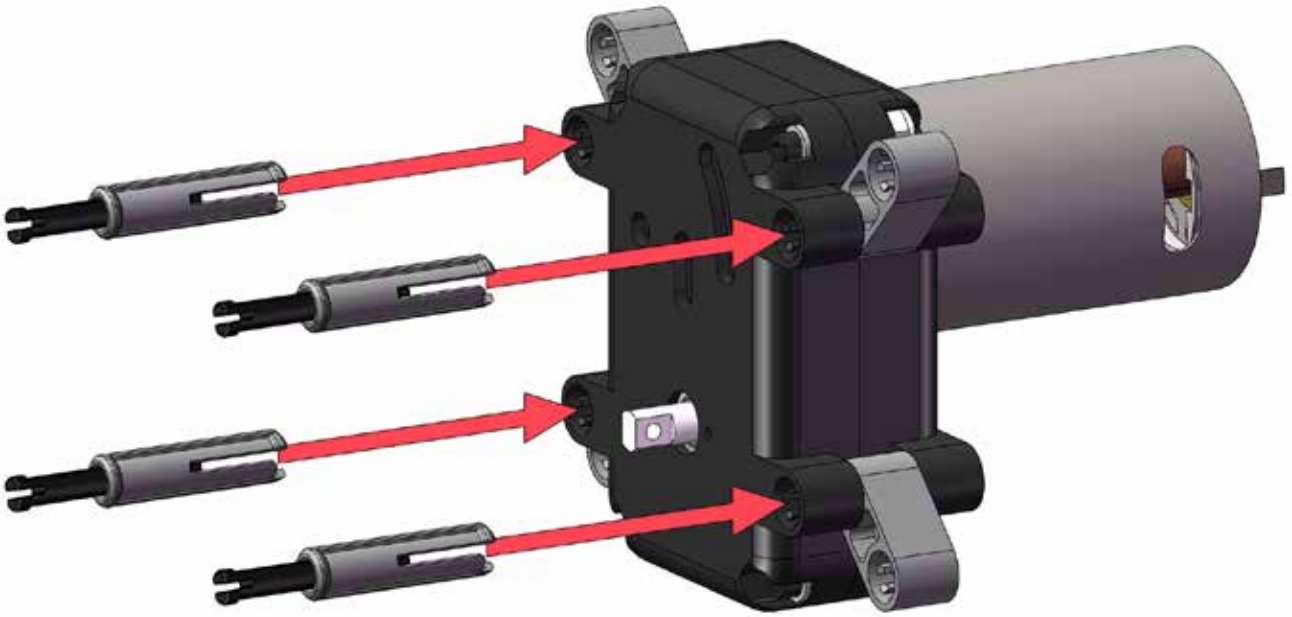


09

USE THE OTHER WITHOUT ENCODER

x4
2-45 BEAM

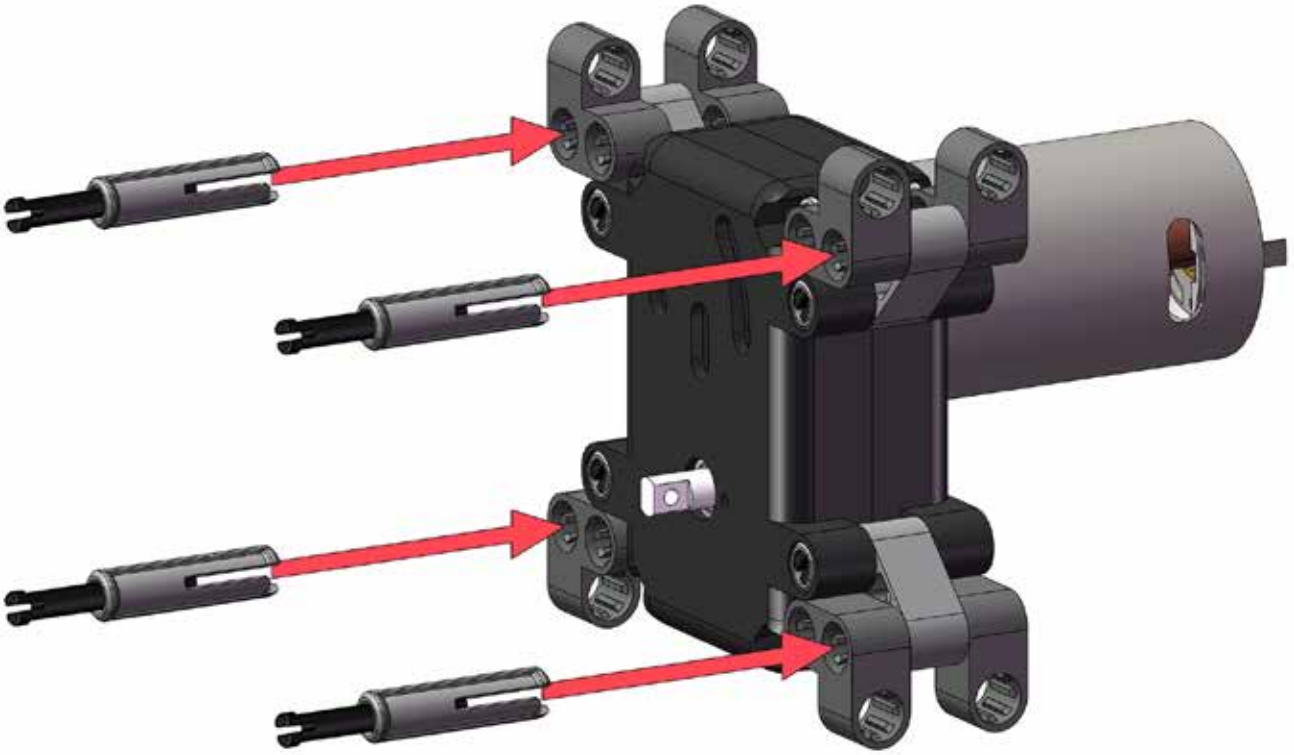
x4
3-LOCK



10

x8
TRANSITION

x4
3-LOCK



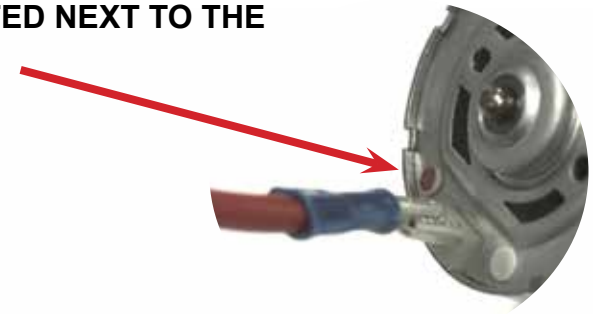
11

CONNECT THE MOTOR WIRES TO THE MOTORS. IF THE WIRES ARE ATTACHED TO EACHOTHER PULL THE ENDS APPART SLIGHTLY.

x2
MOTOR WIRE - BLACK

x2
MOTOR WIRE - RED

SEE THAT THE RED WIRE IS CONNECTED NEXT TO THE RED DOT.

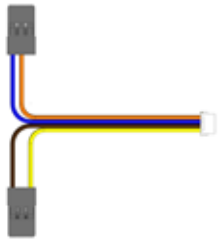


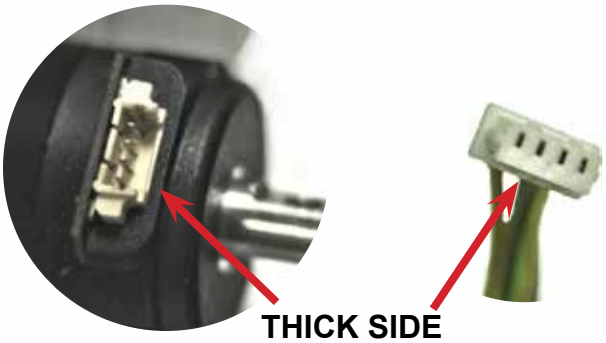
x2

12

CONNECT THE MOTOR ENCODER CABLE TO THE ENCODER PLUG. THE CABLE ONLY FITS IF THE ORIENTATION IS CORRECT.

x1
ENCODER CABLE





THICK SIDE

MAKE CERTAIN THE PLUG IS ORIENTED CORRECTLY.

13

x1
3-DRIVELINE

x2
1-DRIVELINE

x8
U-JOINT SET SCREW

x1
0-DRIVELINE

14

x8
2-LOCK

15

x6
15-BEAM

x4
12-BEAM

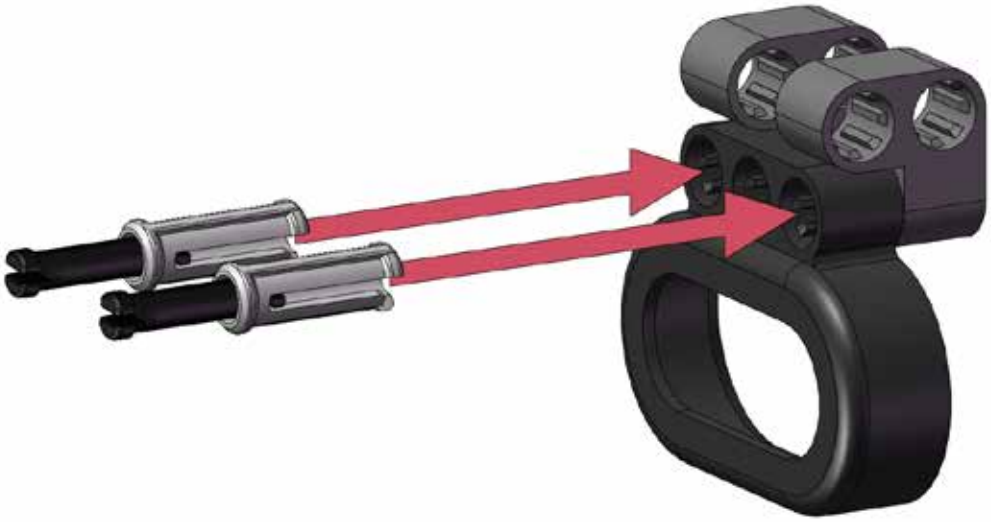
x8
2-LOCK

16

x2
BATTERY CAP

x4
TRANSITION

x4
2-LOCK



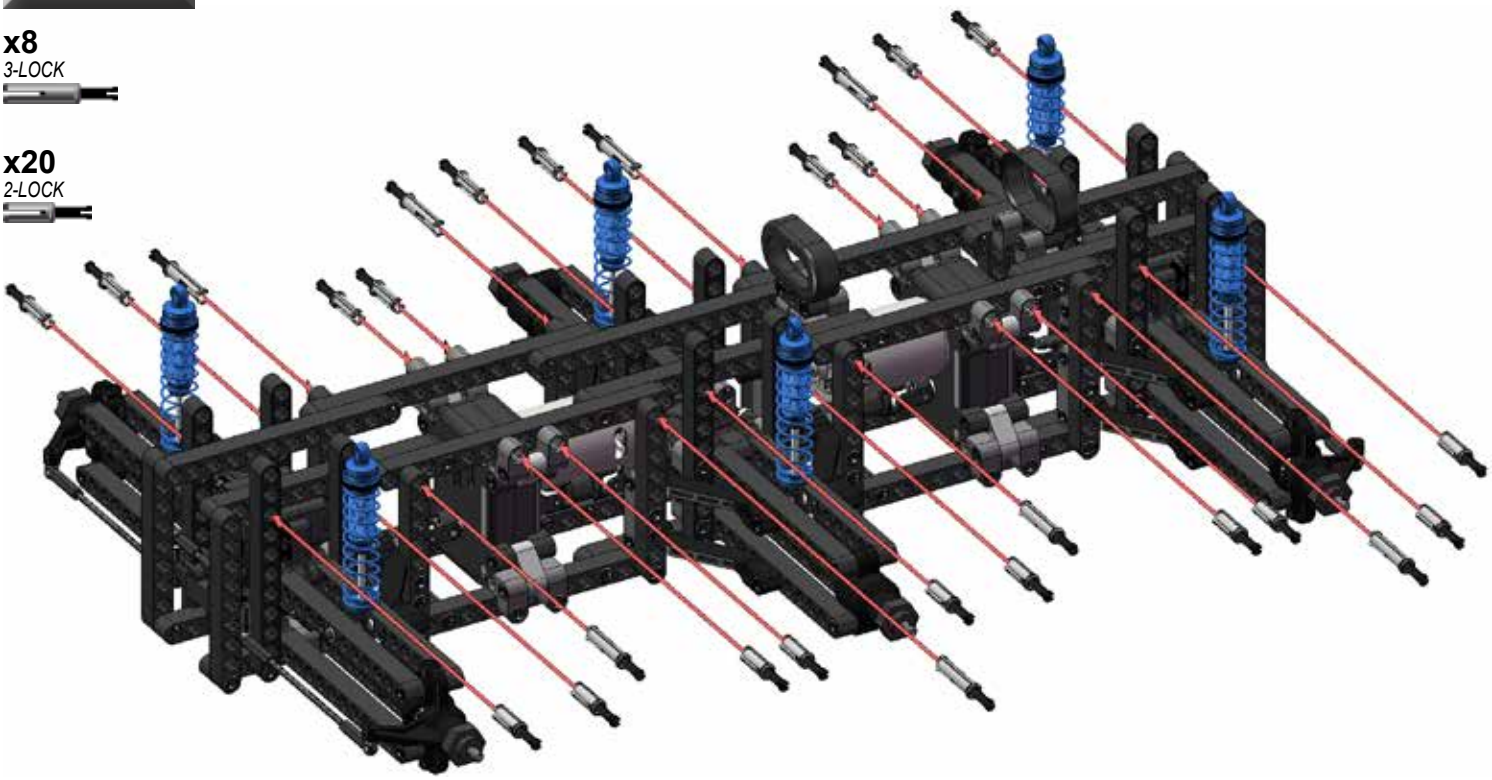
17

x4
3-LOCK

18

x8
3-LOCK

x20
2-LOCK



19

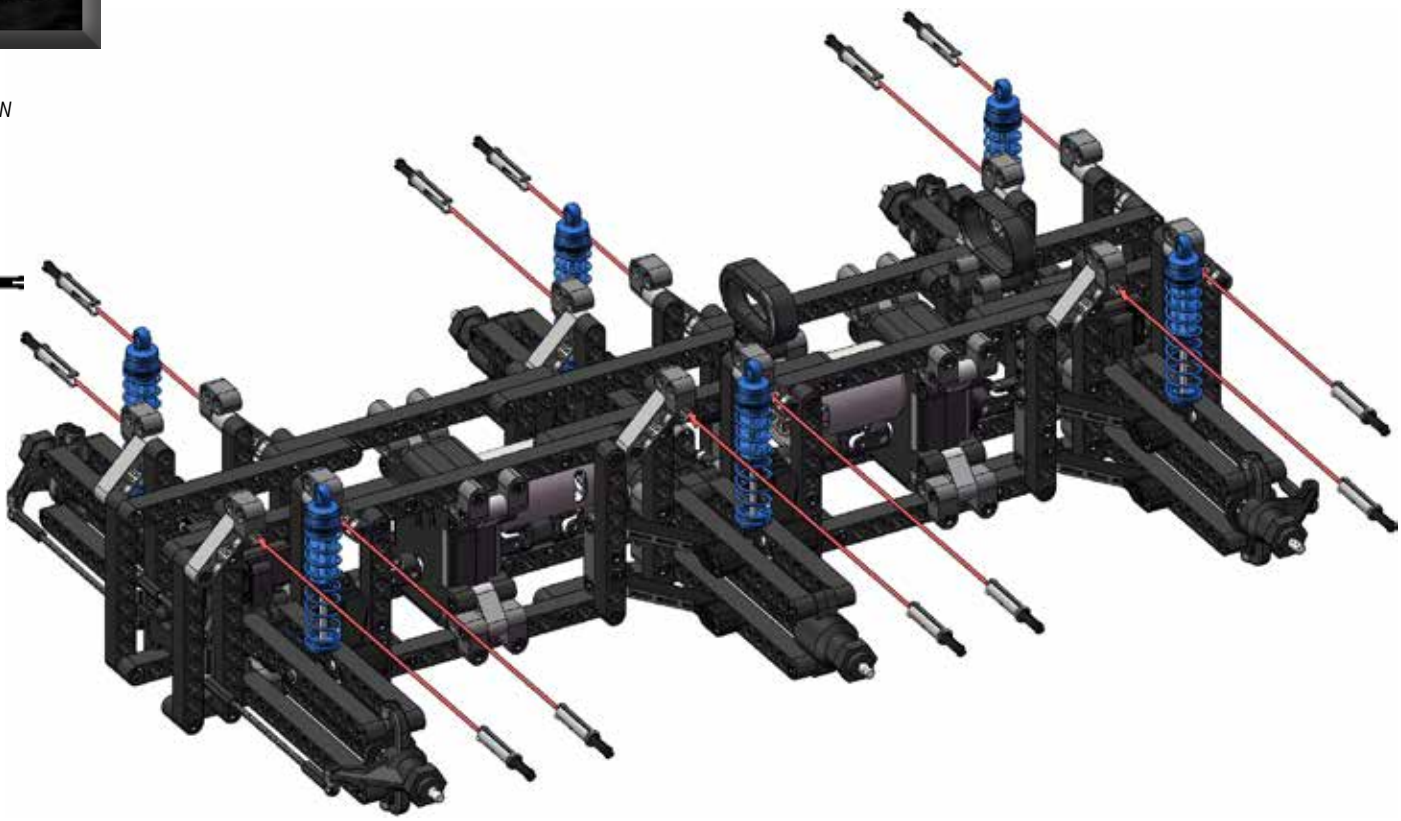
x12
3-45 BEAM

x12
3-LOCK

20

x12
TRANSITION

x12
3-LOCK



21

x6
13-BEAM

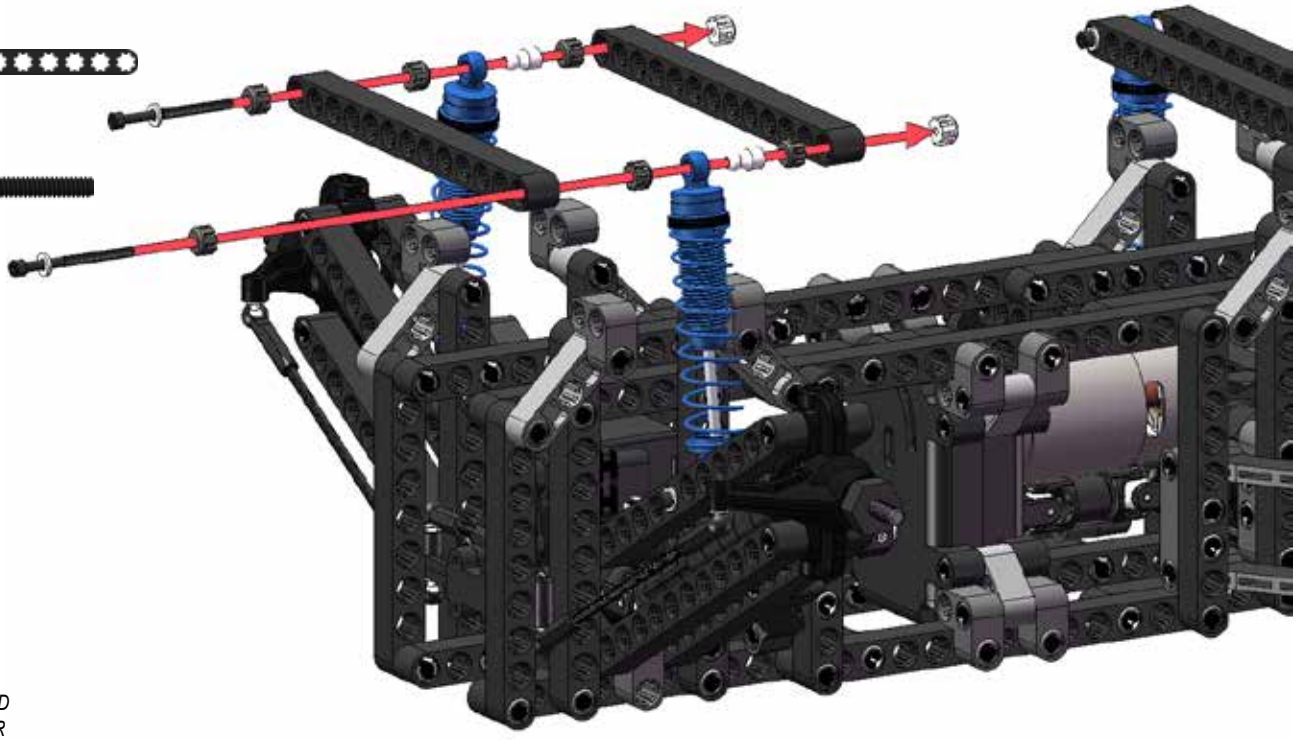
x6
#4-40 x 1-3/8" SCREW

x6
#4 WASHER

x6
SHOCK MOUNT

x18
CLEARANCE THREAD ADAPTER

x6
INTERFERENCE THREAD ADAPTER



22

x12
2-LOCK

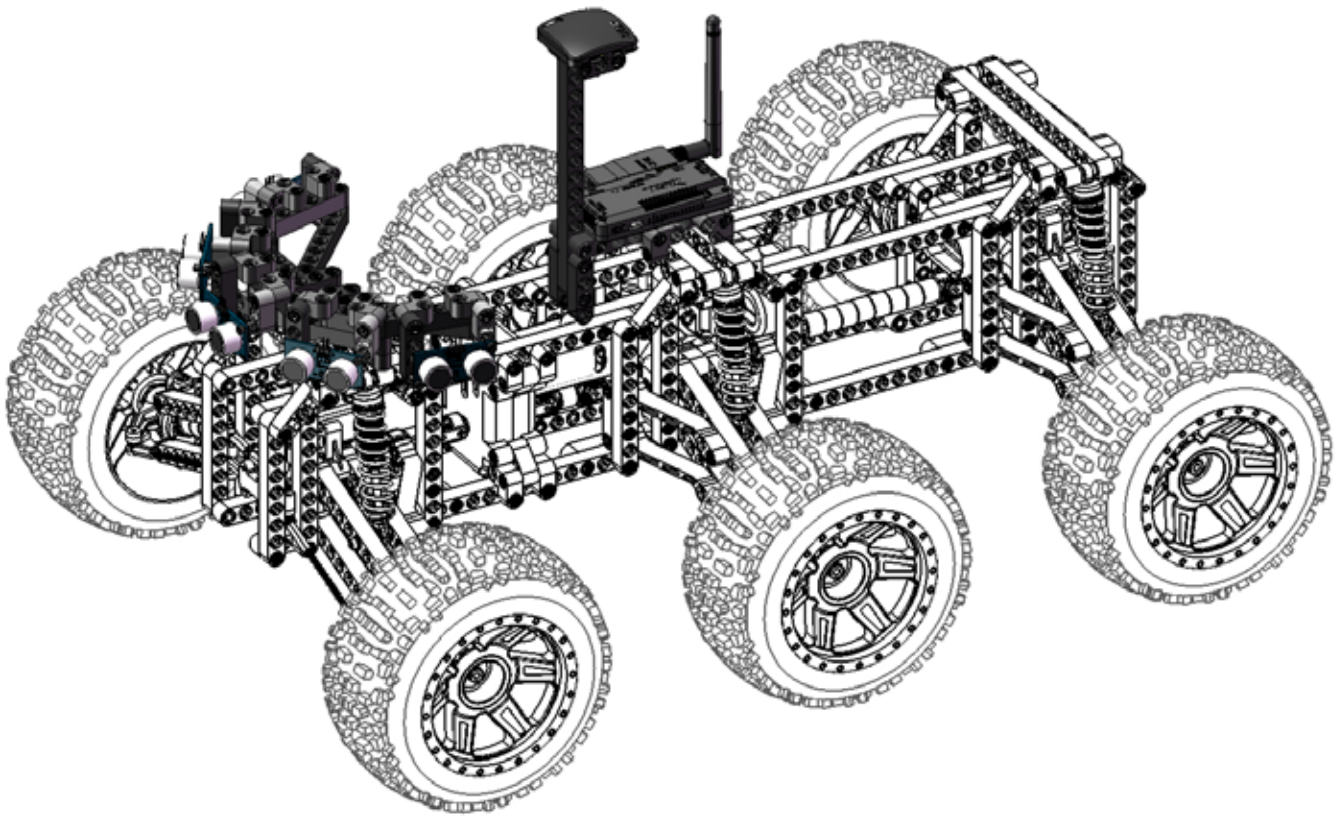
23

x6
BADLANDS 2.2" TIRE & DESPERADO WHEEL

x6
M5 WASHER

x6
M5 NUT

5-PIN SENSOR ARRAY

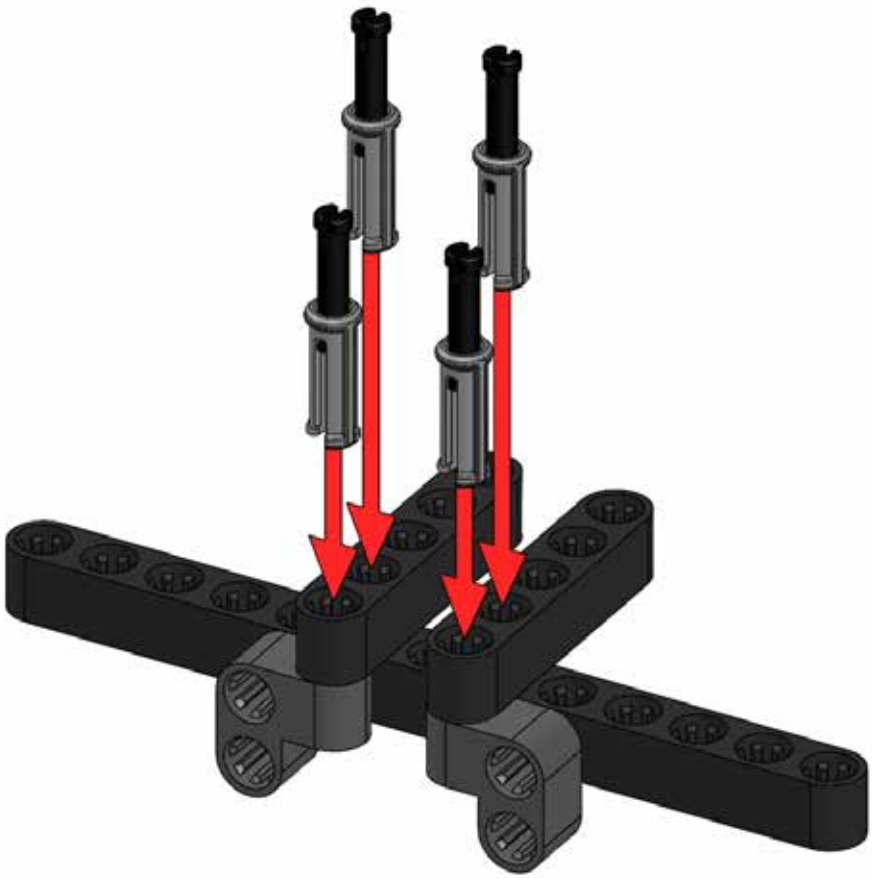


x1
13-BEAM

x2
5-BEAM

x2
TRANSITION

x4
2-LOCK



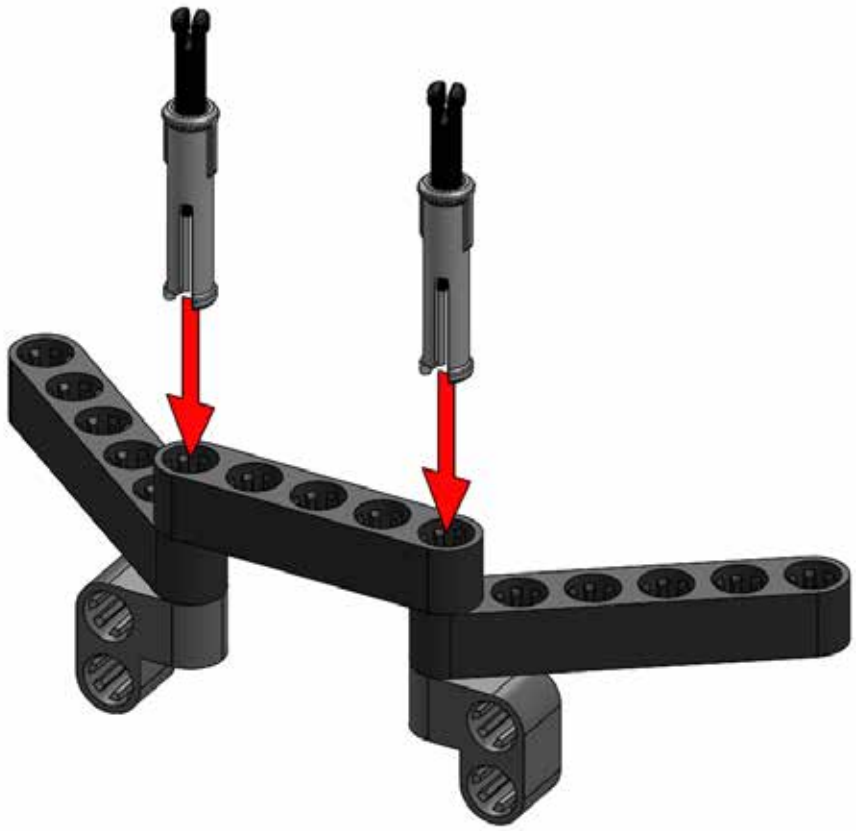
02

x2
6-BEAM

x1
5-BEAM

x2
TRANSITION

x2
3-ROTATE



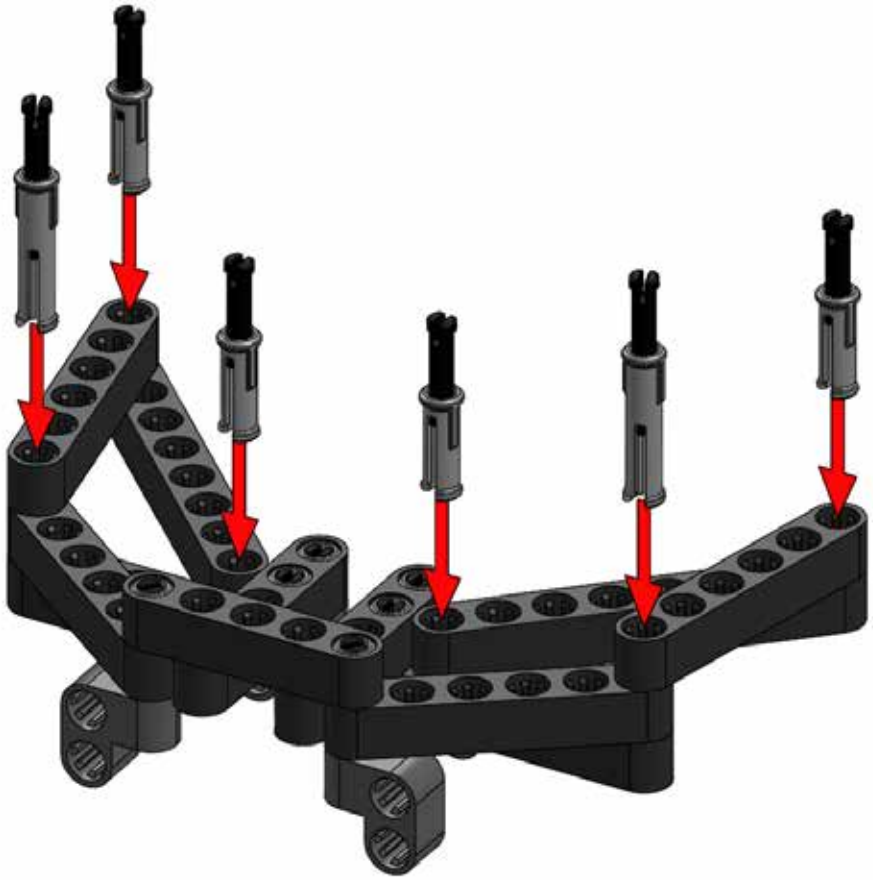
03

x2
8-BEAM

x2
6-BEAM

x2
3-ROTATE

x4
2-ROTATE

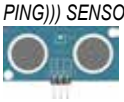


04

x5
4-BEAM

x5
2-45 BEAM

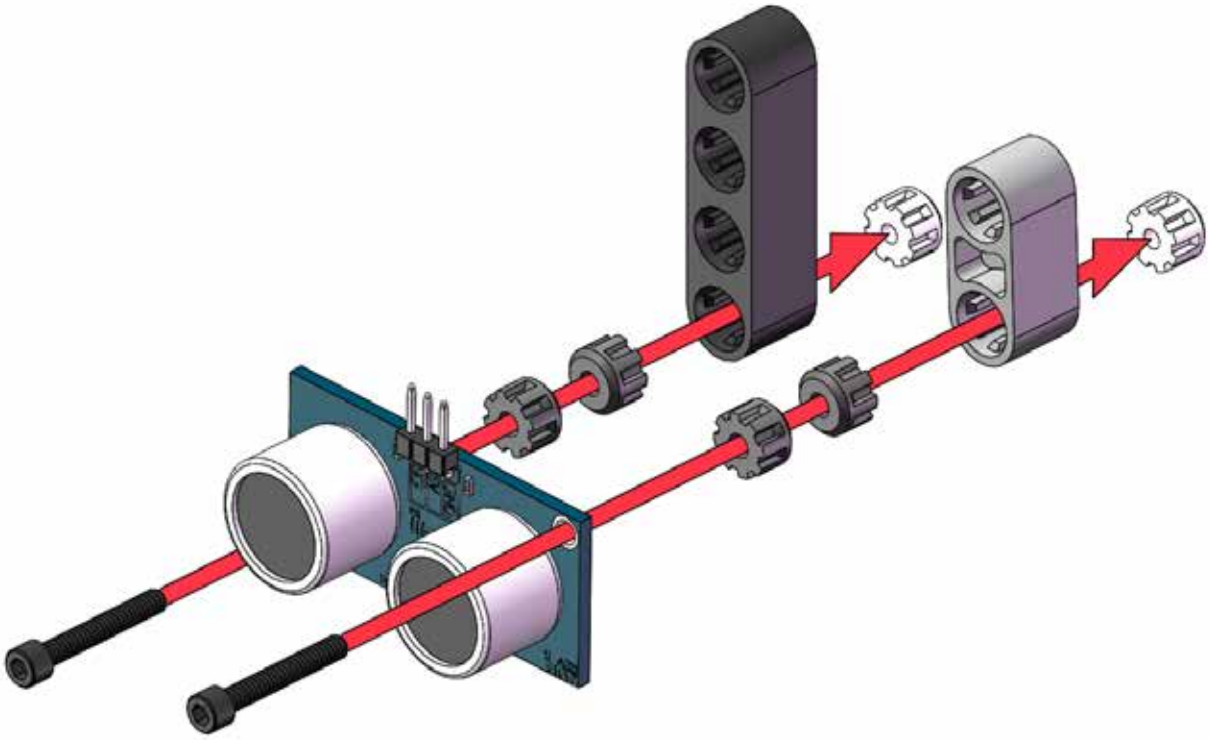
x5
PING))) SENSOR



x10
#4-40 x 3/4" SCREW

x20
CLEARANCE THREAD ADAPTER

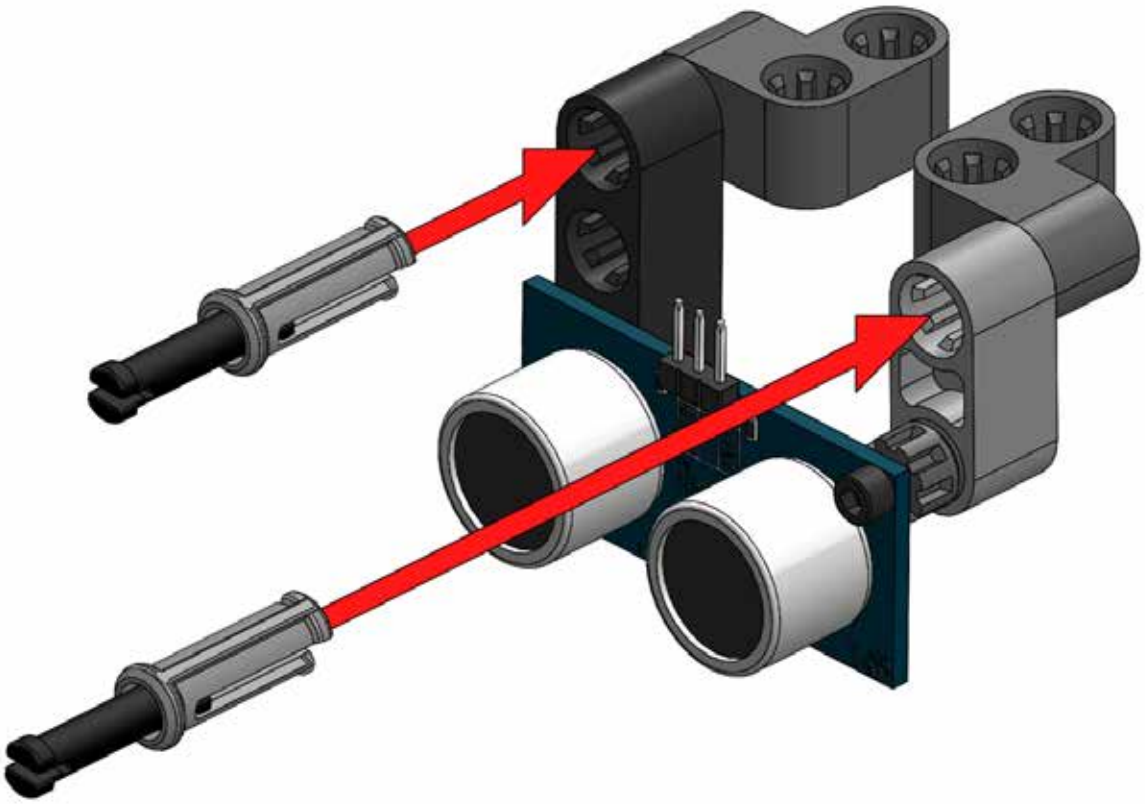
x10
INTERFERENCE THREAD ADAPTER



05

x10
TRANSITION

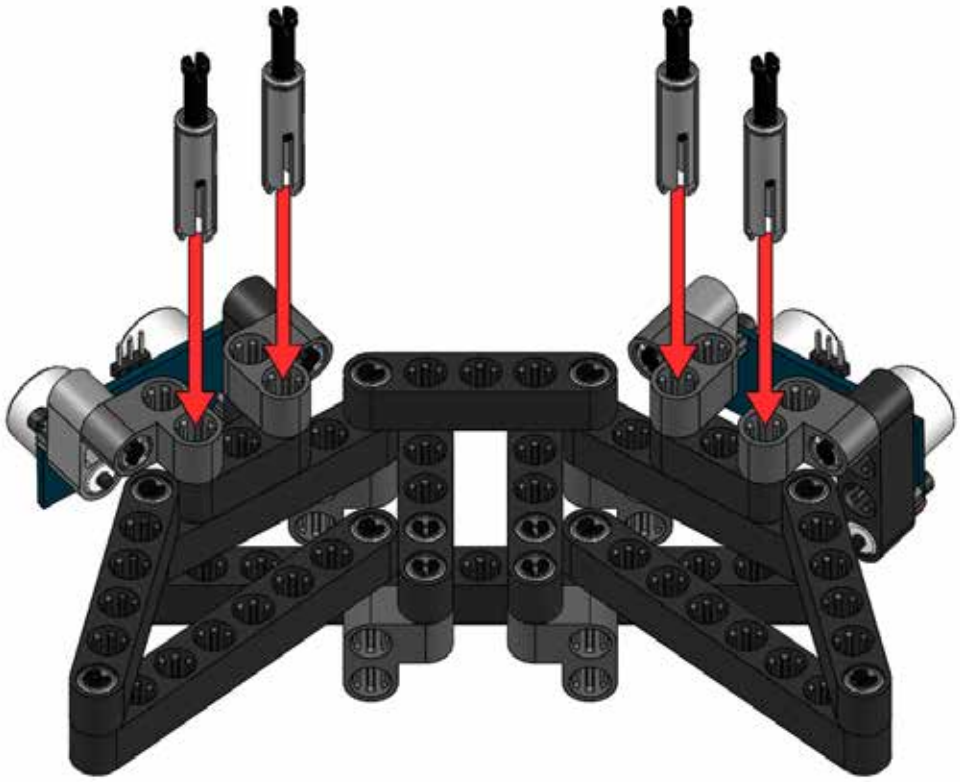
x10
2-LOCK



06

x2
3-BEAM

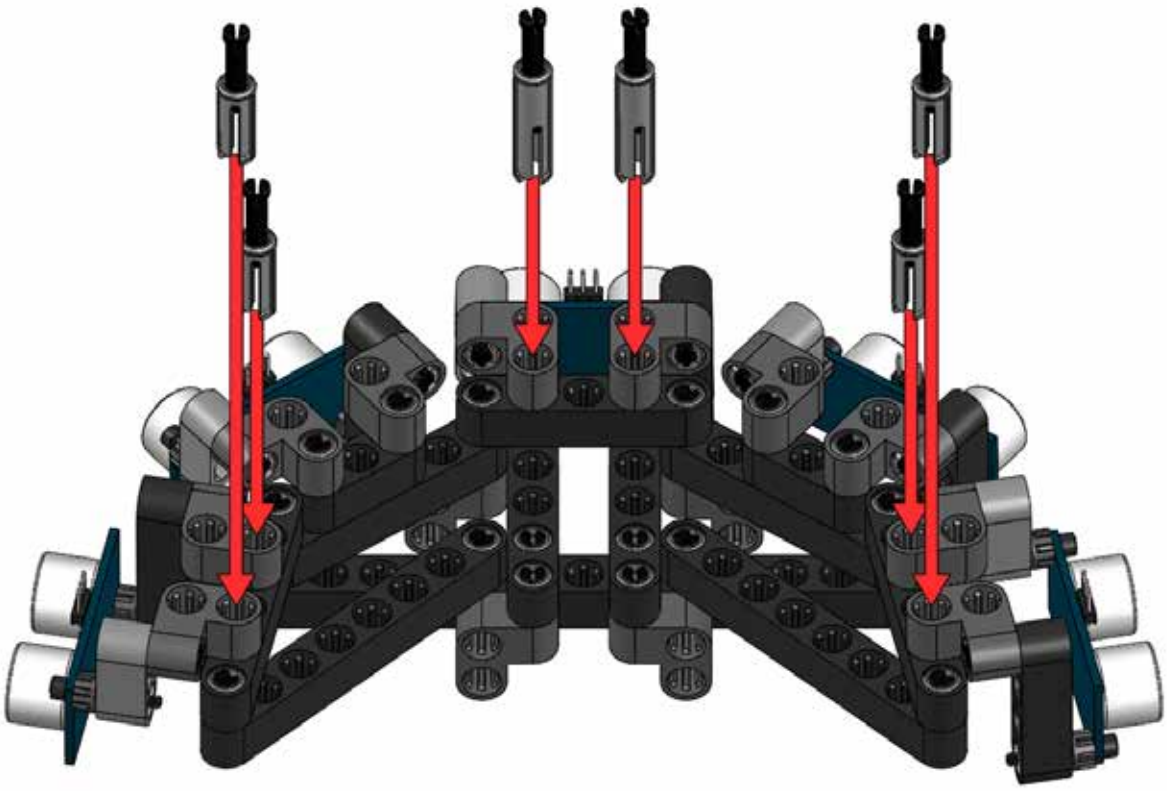
x4
3-LOCK



07

x2
3-LOCK

x4
2-LOCK



08

x1
15-BEAM

x2
9-BEAM

x1
7-BEAM

x2
4-BEAM

x2
3-BEAM

x6
3-LOCK

09

x5
TRANSITION

x1
3-LOCK

x4
2-LOCK

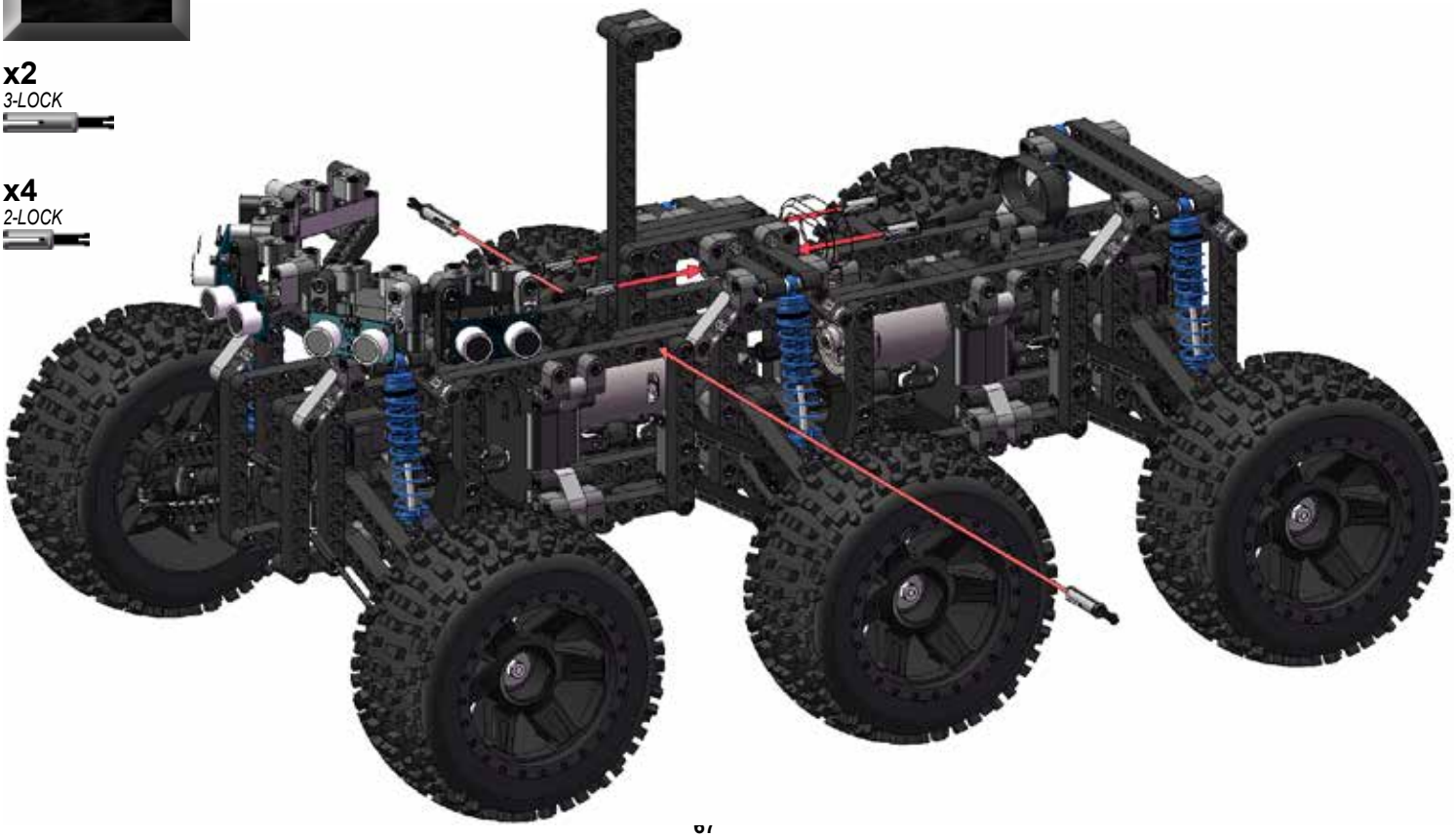
10

x4
2-LOCK

11

x2
3-LOCK

x4
2-LOCK

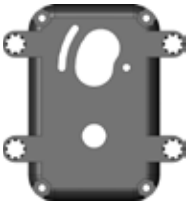


4X4 SUPER CRAWLER

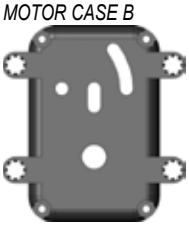
MOTOR CASE ASSEMBLY

(Without Encoder)

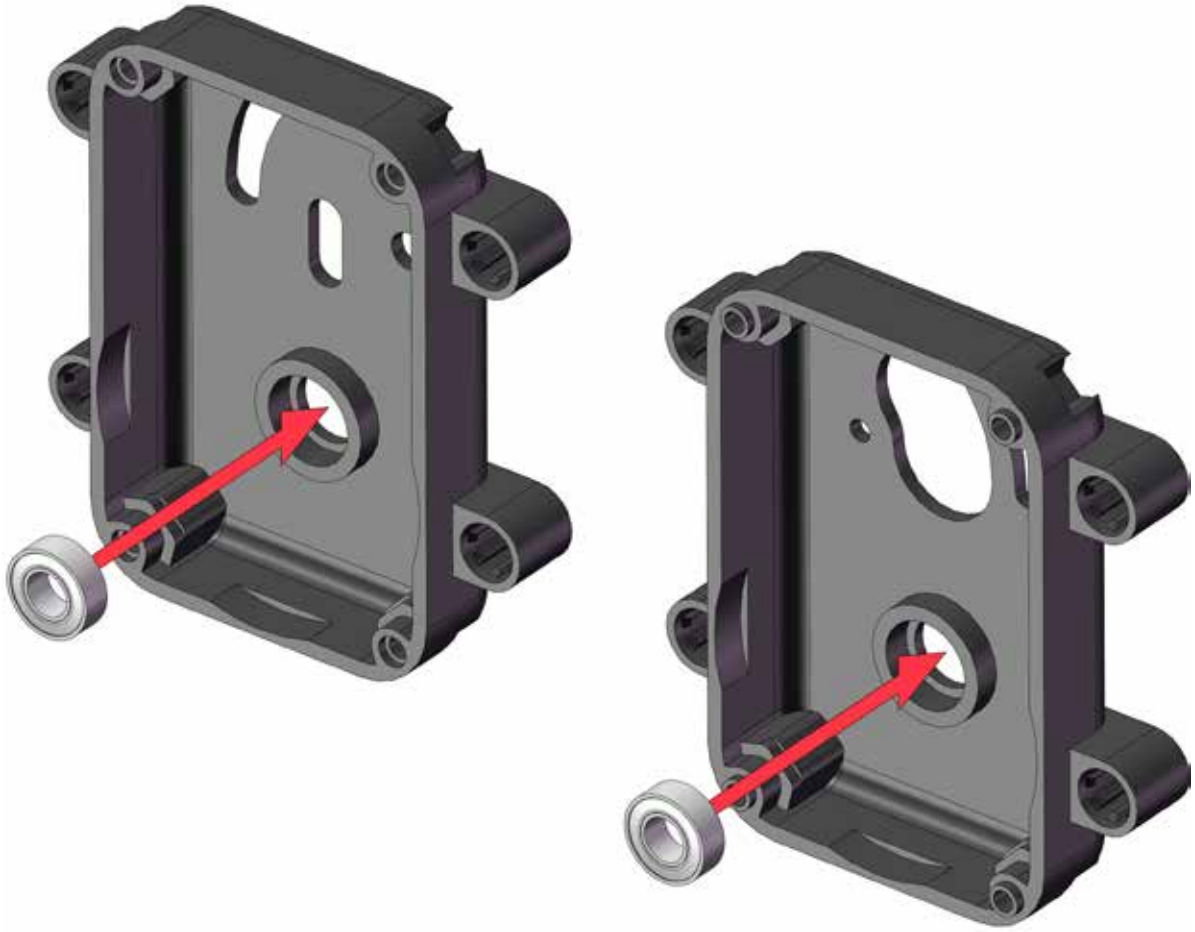
x1
MOTOR CASE A



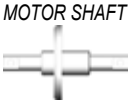
x1
MOTOR CASE B



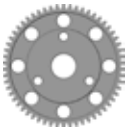
x2
6x12x4mm BEARING



x1
MOTOR SHAFT

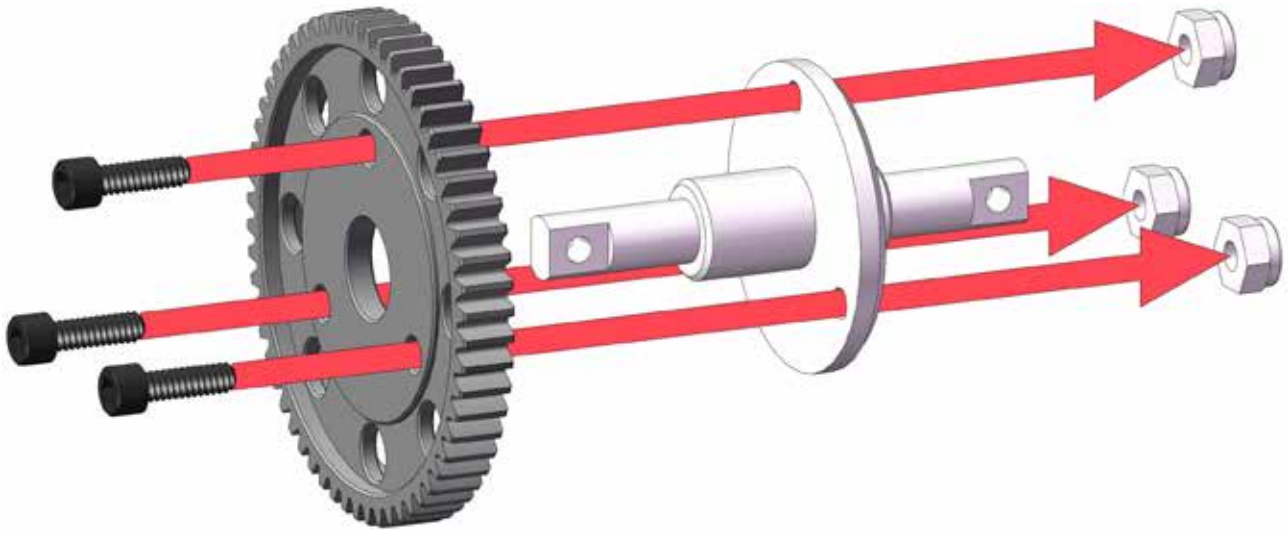


x1
58T 32P SPUR GEAR

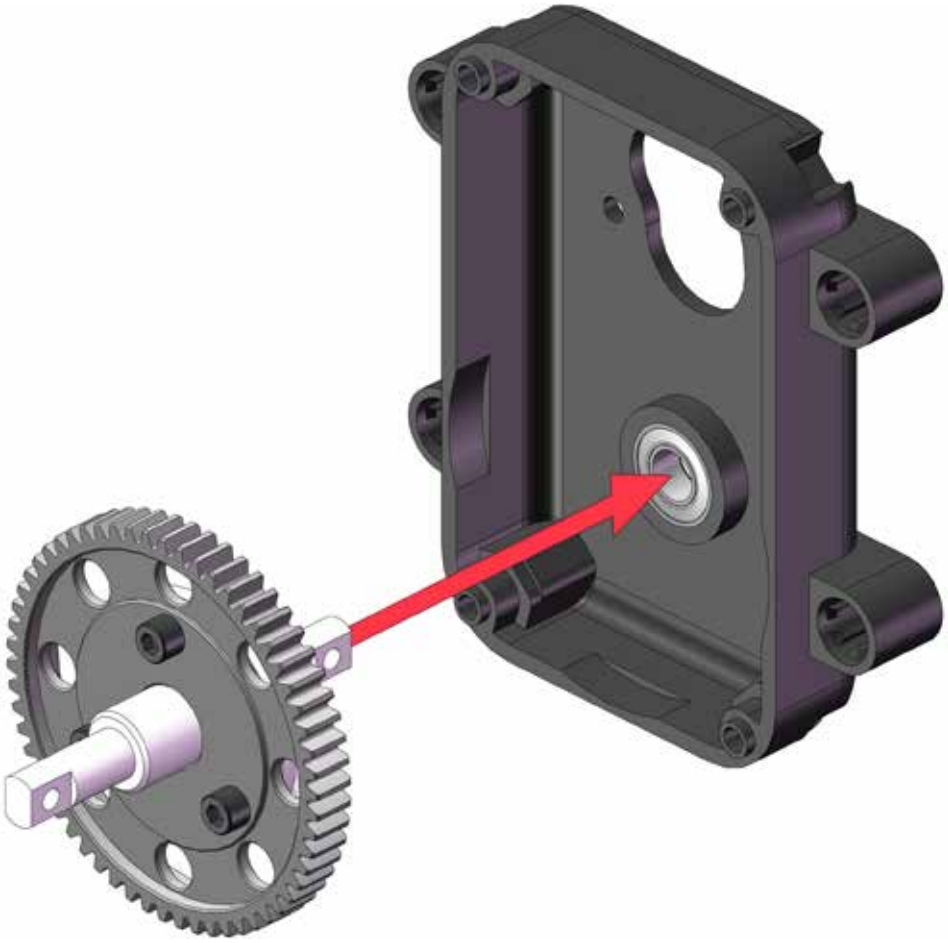


x3
#4-40 x 3/8" SCREW

x3
#4-40 NUT



03



04

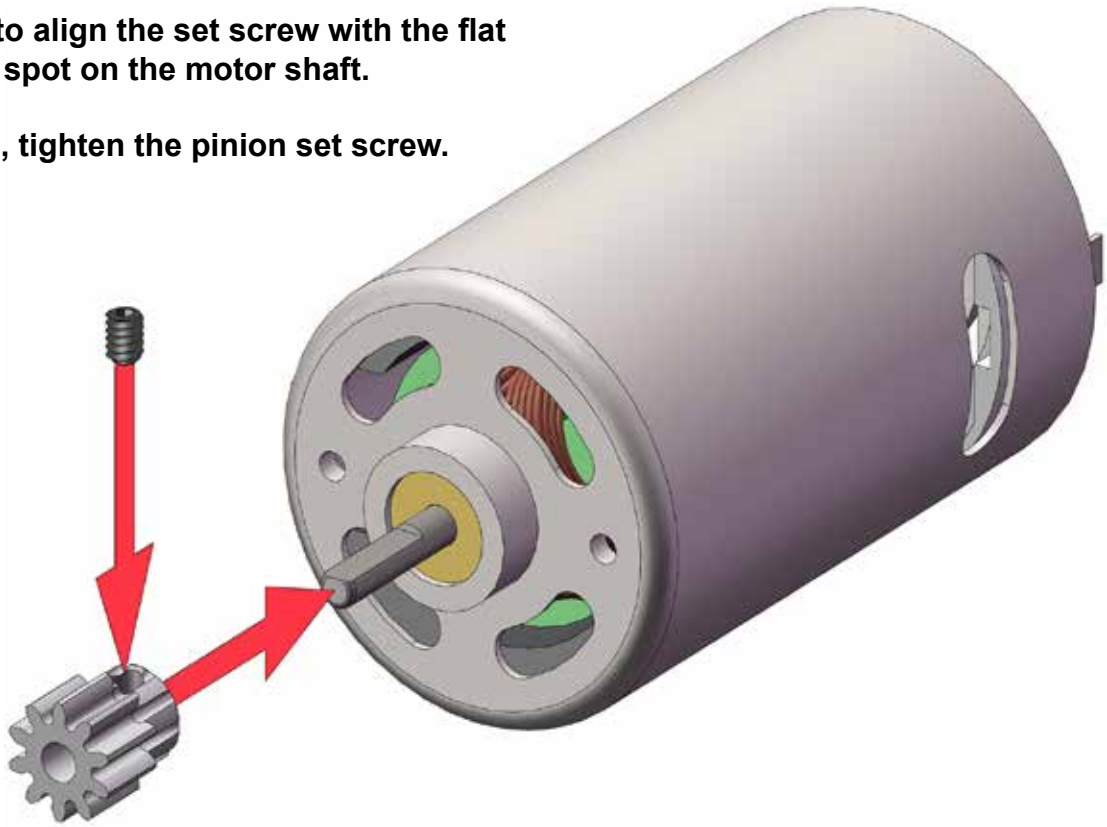
x1
5,000 RPM MOTOR

x1
10T 32P PINION GEAR

x1
PINION SET SCREW

Be sure to align the set screw with the flat spot on the motor shaft.

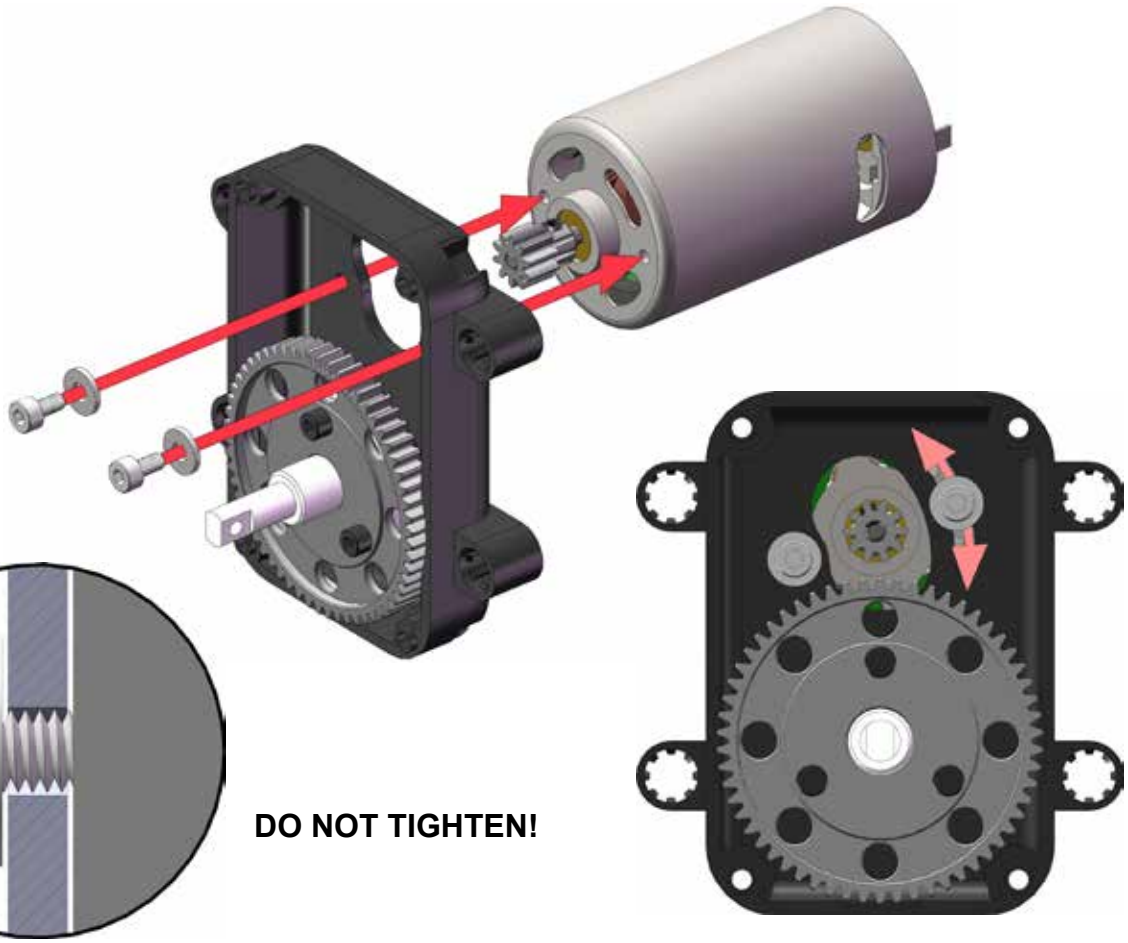
Then, tighten the pinion set screw.



Mount the pinion gear flush with the end of the motor shaft.

x1
M3x6mm SCREW

x2
M3 WASHER

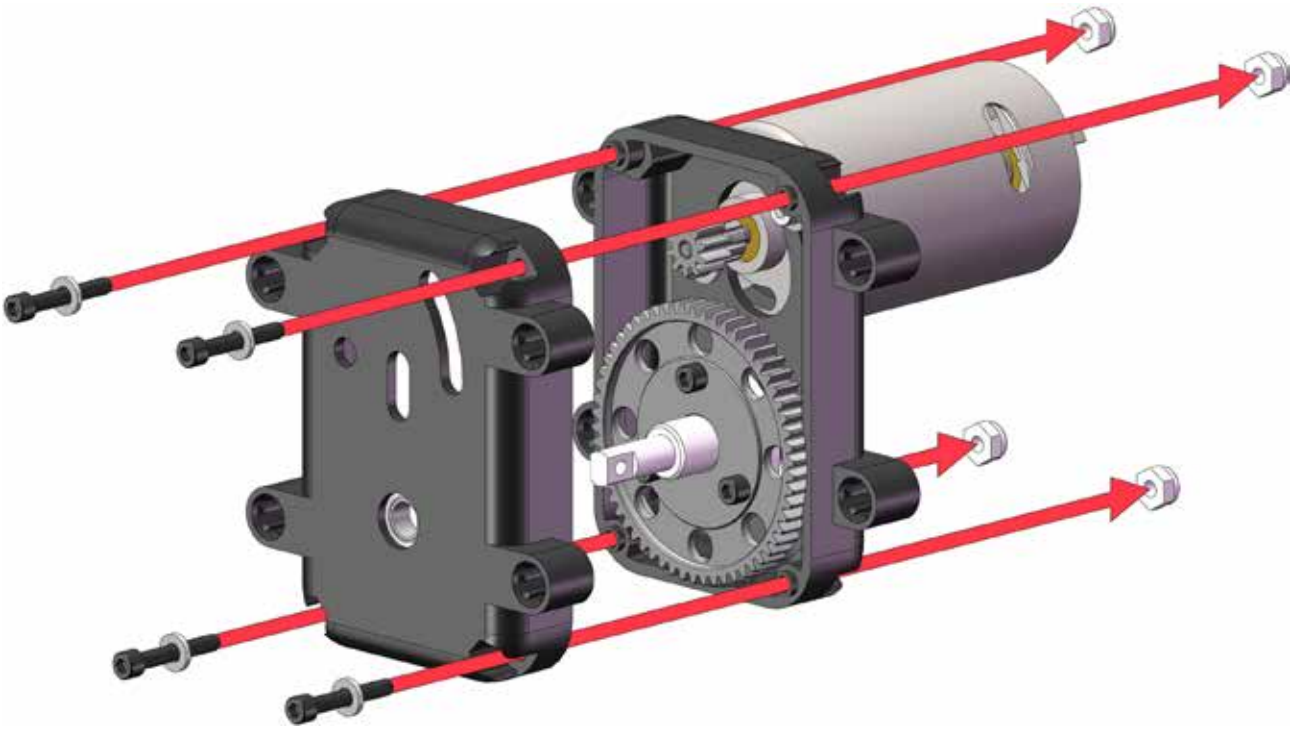


DO NOT TIGHTEN!

x4
#4-40 x 3/4" SCREW

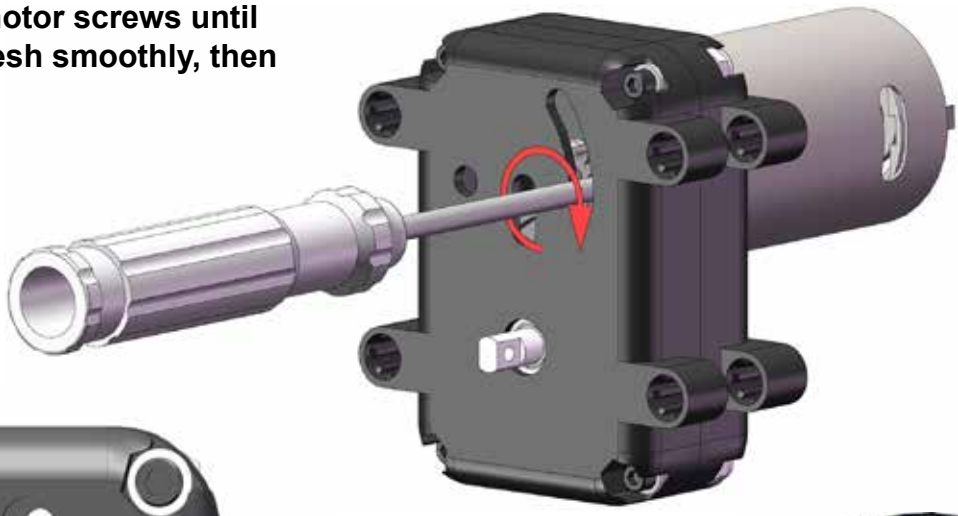
x4
#4-40 NUT

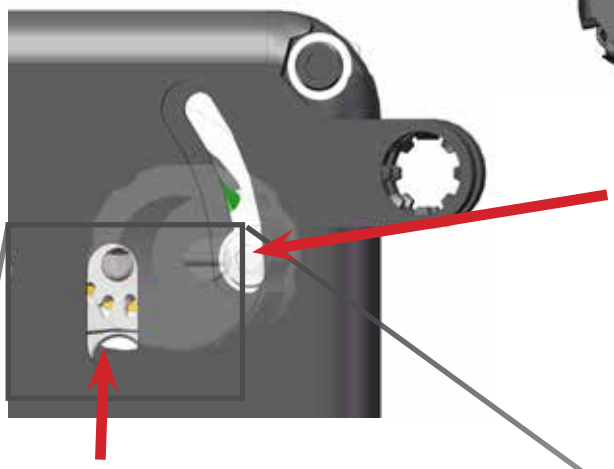
x4
#4 WASHER



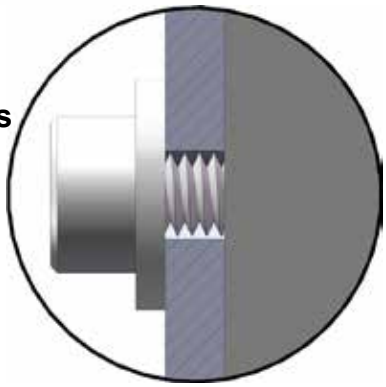
07

Adjust motor screws until gears mesh smoothly, then tighten.

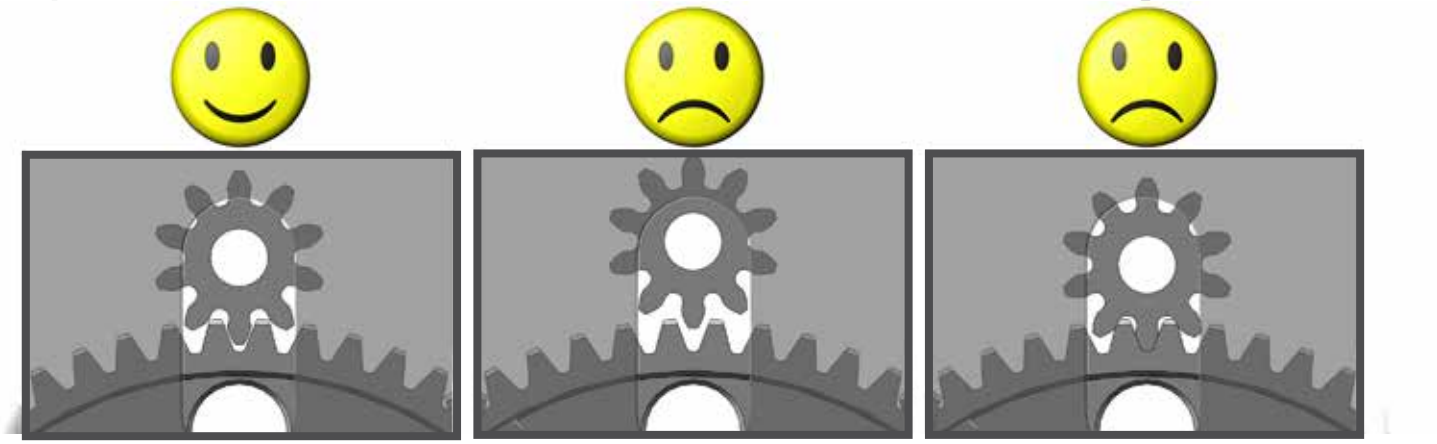




Tighten both screws after gears mesh.



Check that gears mesh.



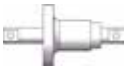
The motor case with the encoder is pre-assembled.

DIFFERENTIAL ASSEMBLY

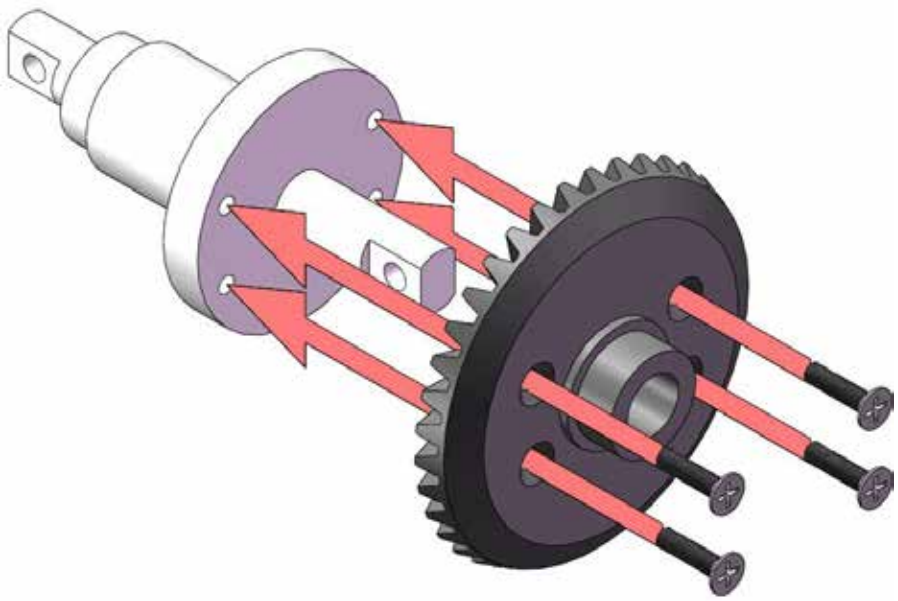
x2

x1
RING GEAR

x1
DIFFERENTIAL SPOOL

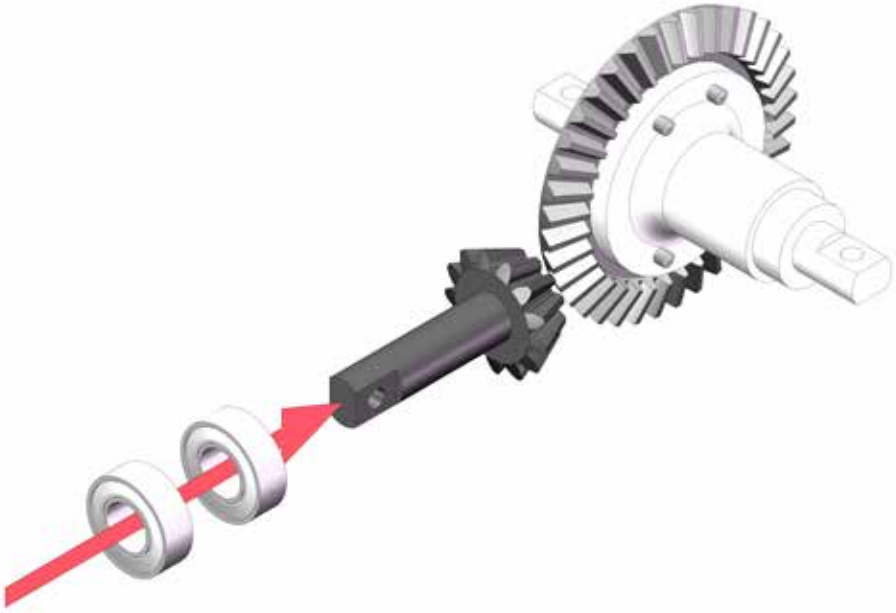


x4
CARRIER SCREW



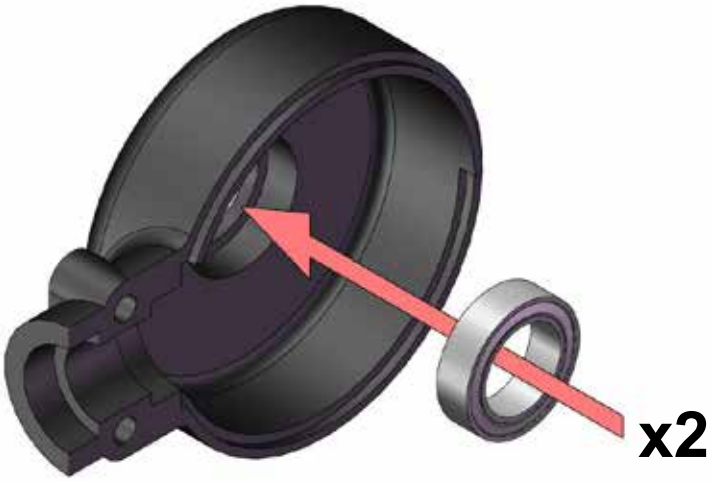
x1
PINION GEAR

x2
6x12x4mm BEA



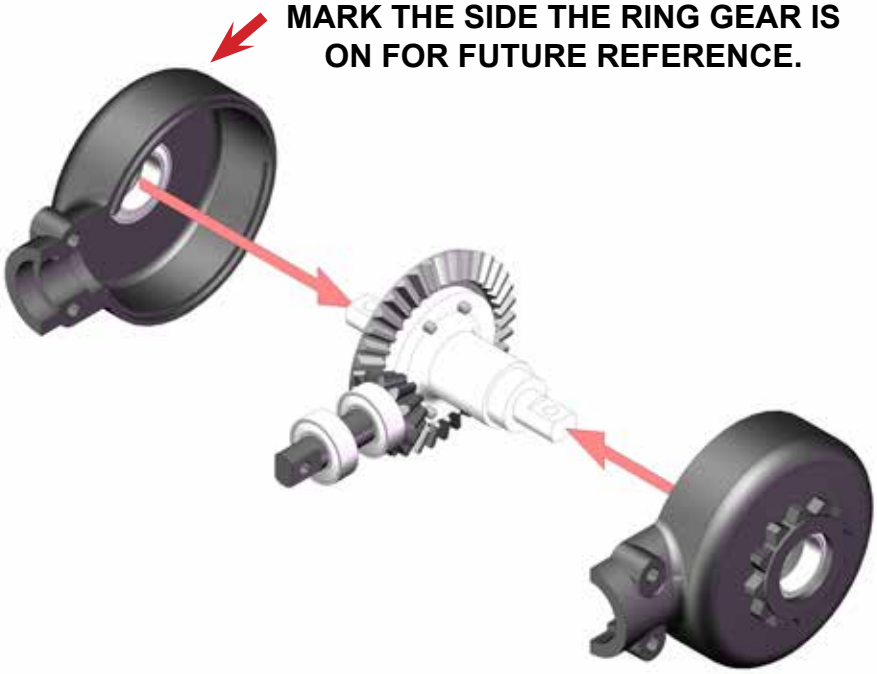
x2
DIFFERENTIAL CASE

x2
10x15x4mm BEARING



04

MARK THE SIDE THE RING GEAR IS ON FOR FUTURE REFERENCE.



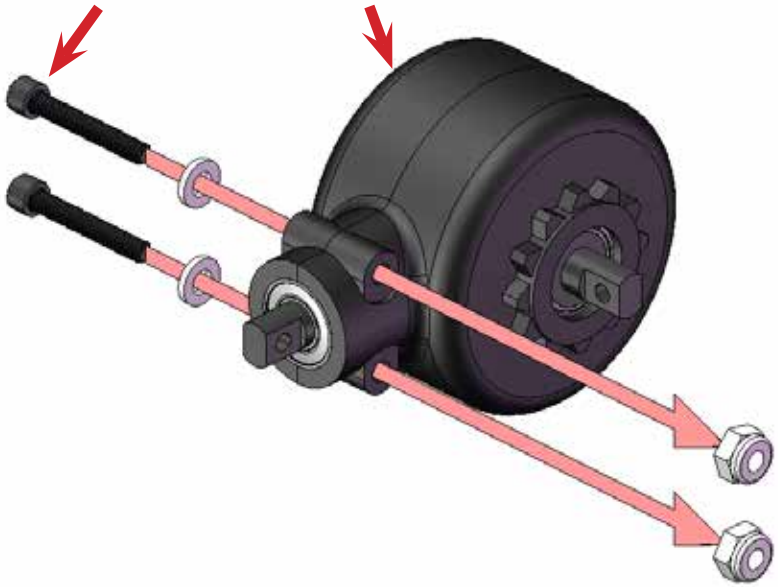
05

x2
#4-40 x 3/4" SCREW

x2
#4 WASHER

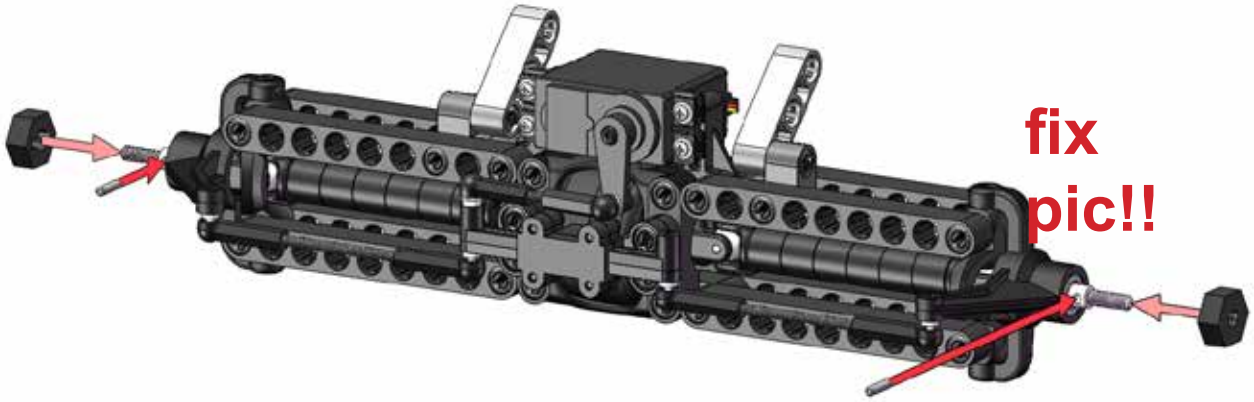
x2
#4-40 NUT

PUT THE SCREW HEADS ON THE SAME SIDE AS THE RING GEAR TO MARK IT.



Repeat steps 1- 5: x2

REAR AXLE



x2
6-DRIVELINE

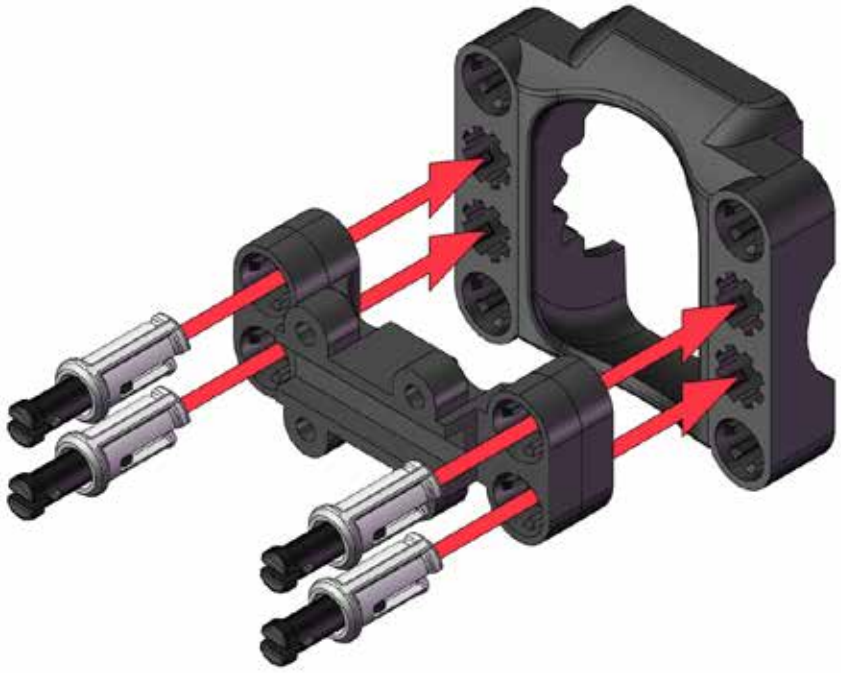
x2
M5 WHEEL END SHAFT

x4
U-JOINT SET SCREW

x1
AXLE HOUSING

x1
STEERING BRACKET

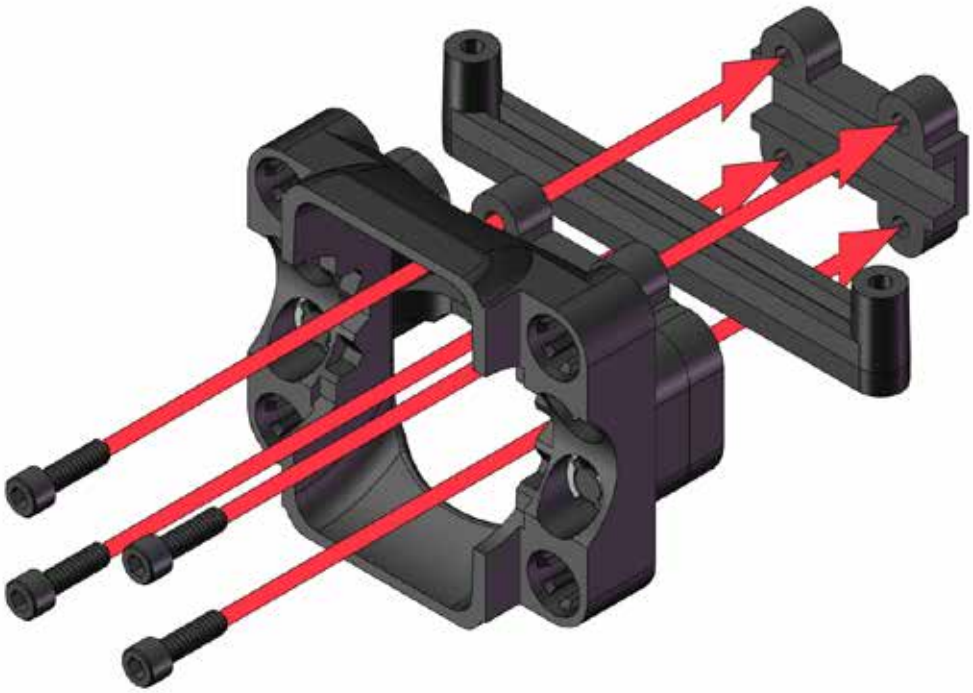
x4
1.5-LOCK



x1
STEERING BAR

x1
STEERING PLATE

x4
#4-40 x 3/8" SCREW



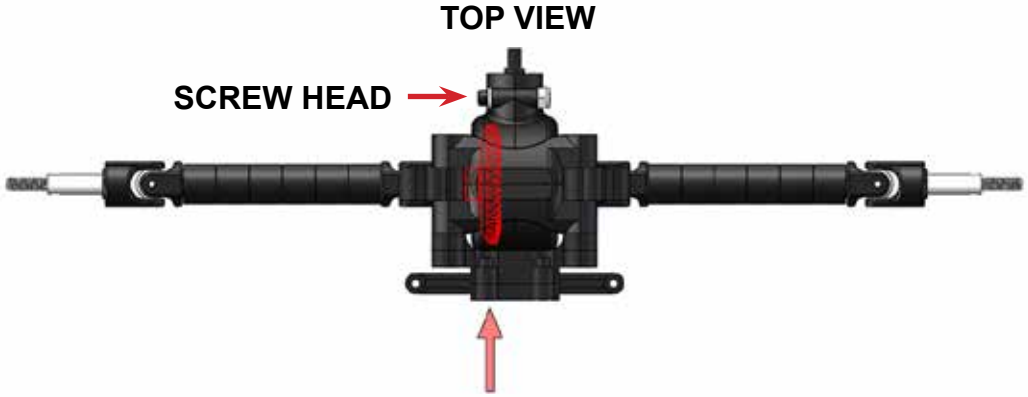
04

x1
AXLE HOUSING

x2
SERVO MOUNT

x2
2-BEAM

x4
3-LOCK

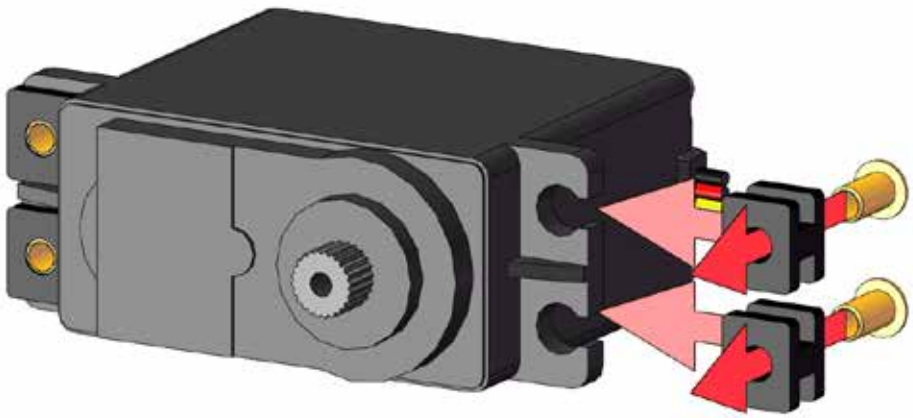


05

x1
HS-485HB SERVO

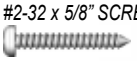
x4
SERVO BUSHING

x4
SERVO BUSHING SLEEVE

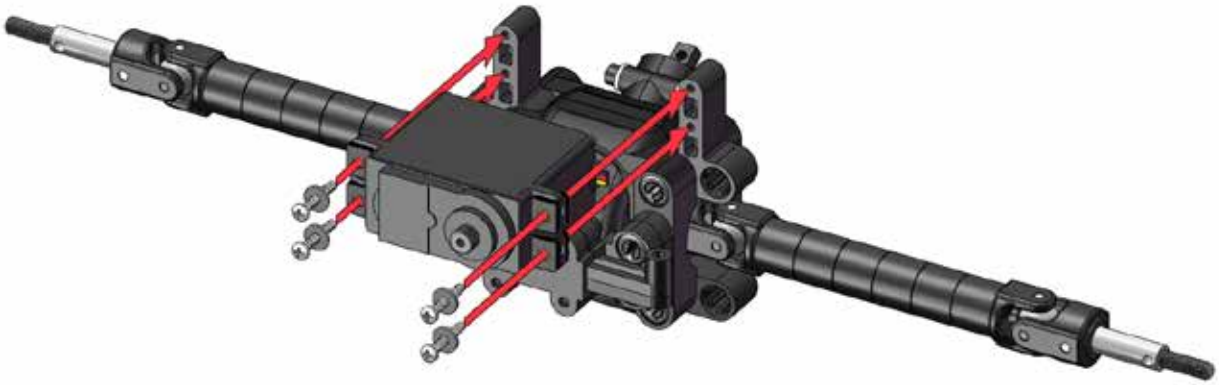


06

x4
#2-32 x 5/8" SCREW



x4
#4 WASHER



07

ASSEMBLE WHEEL HUB FIRST

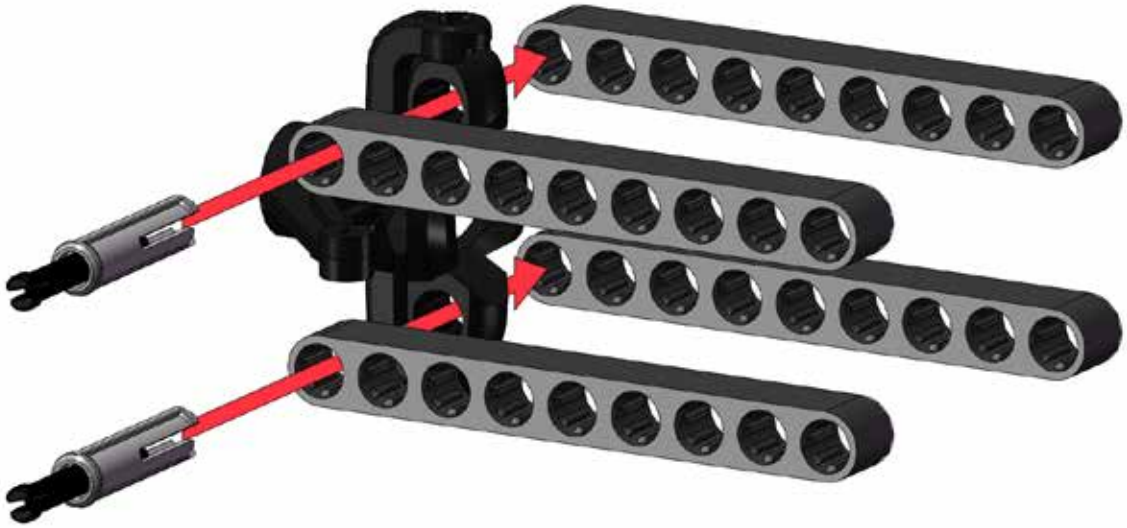
x8
9-BEAM

x2
FRONT WHEEL HUB

x2
FRONT WHEEL KNUCKLE

x4
3-LOCK

x4
6x12x4mm BEARING

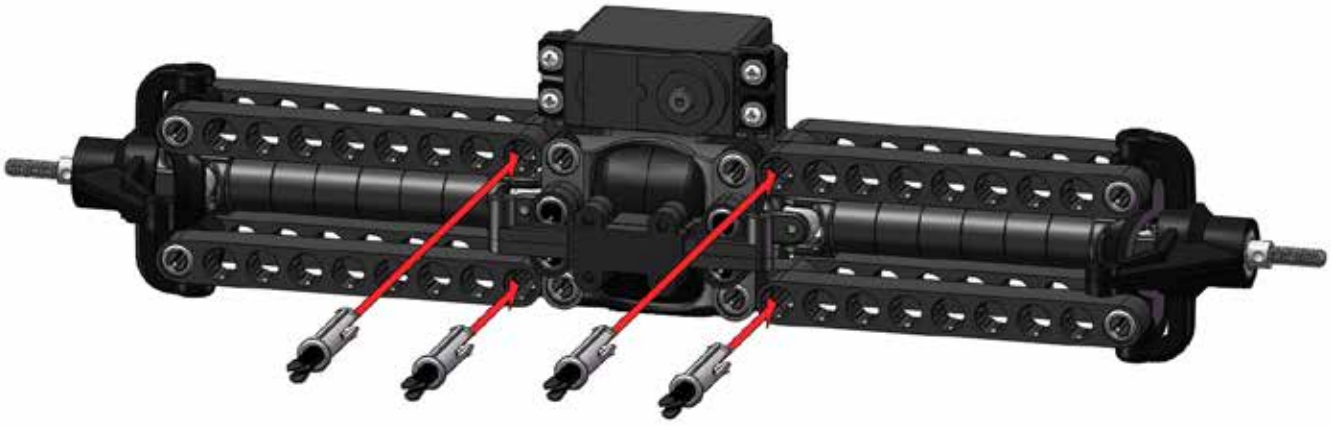


08

09

x4

3-LOCK



10

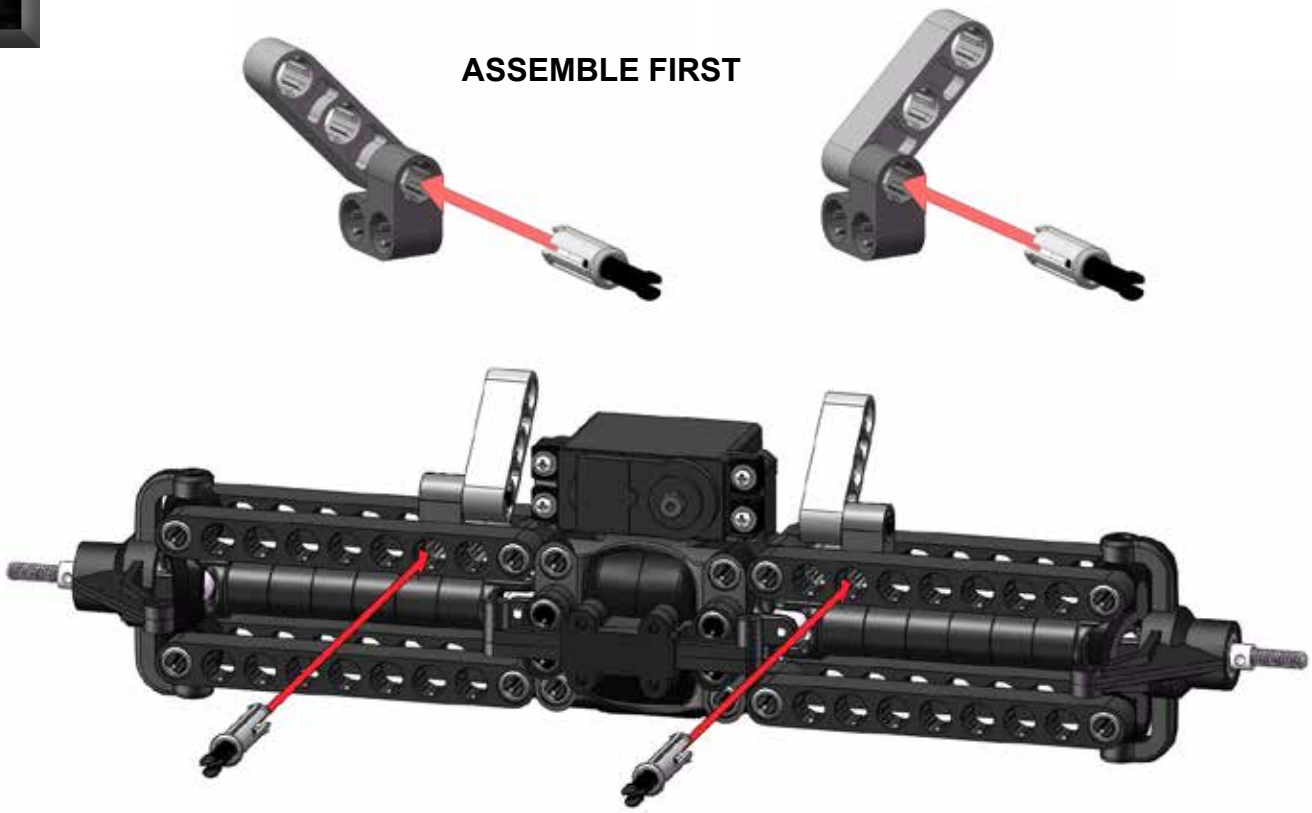
x2
3-45 BEAM

x2
TRANSITION

x2
3-LOCK

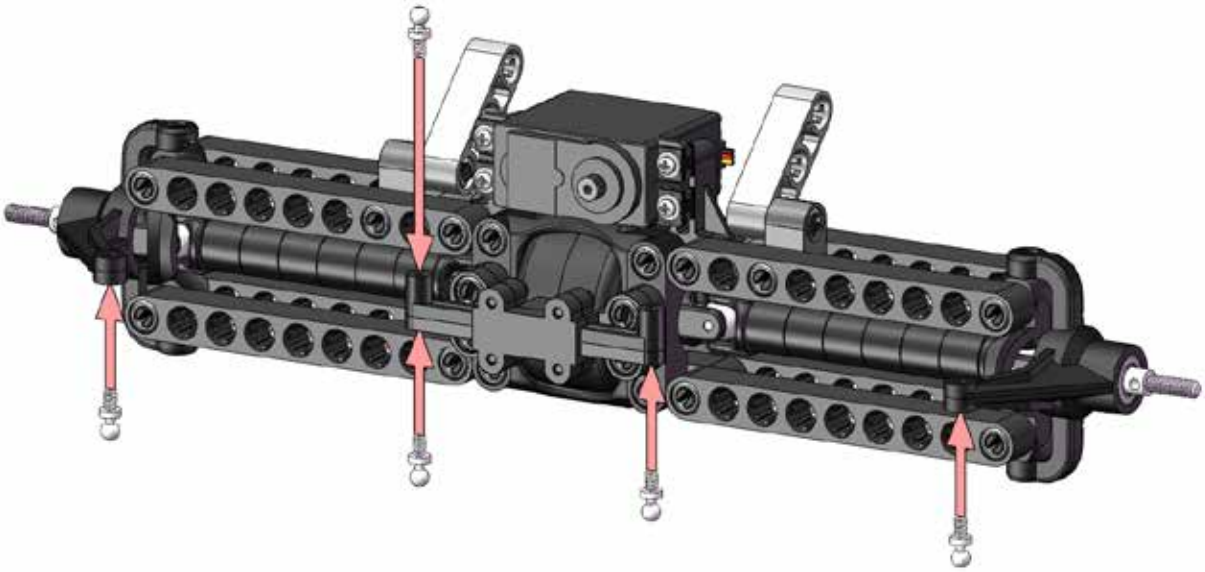
x2
2-LOCK

ASSEMBLE FIRST



11

x5
3/16" BALL STUD

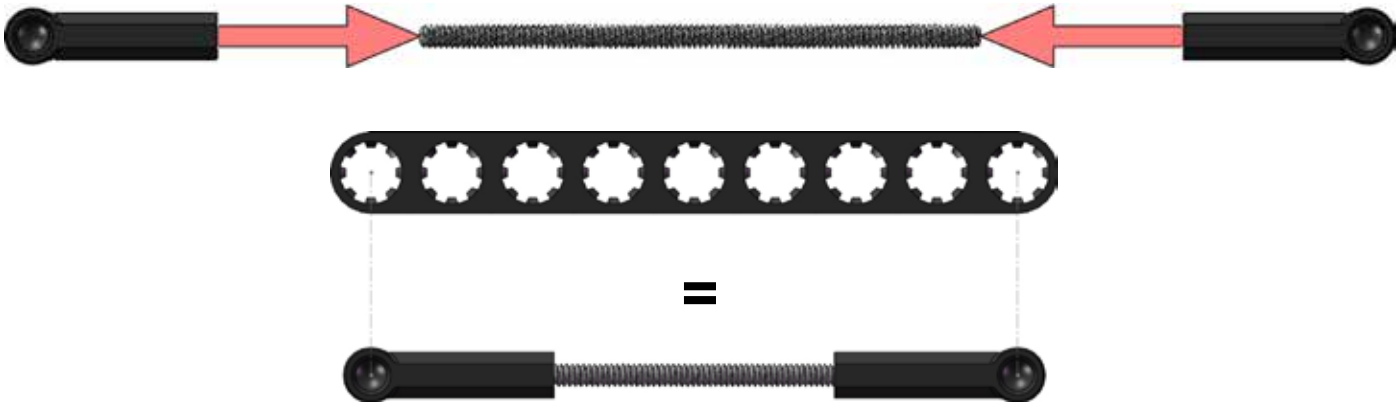


12

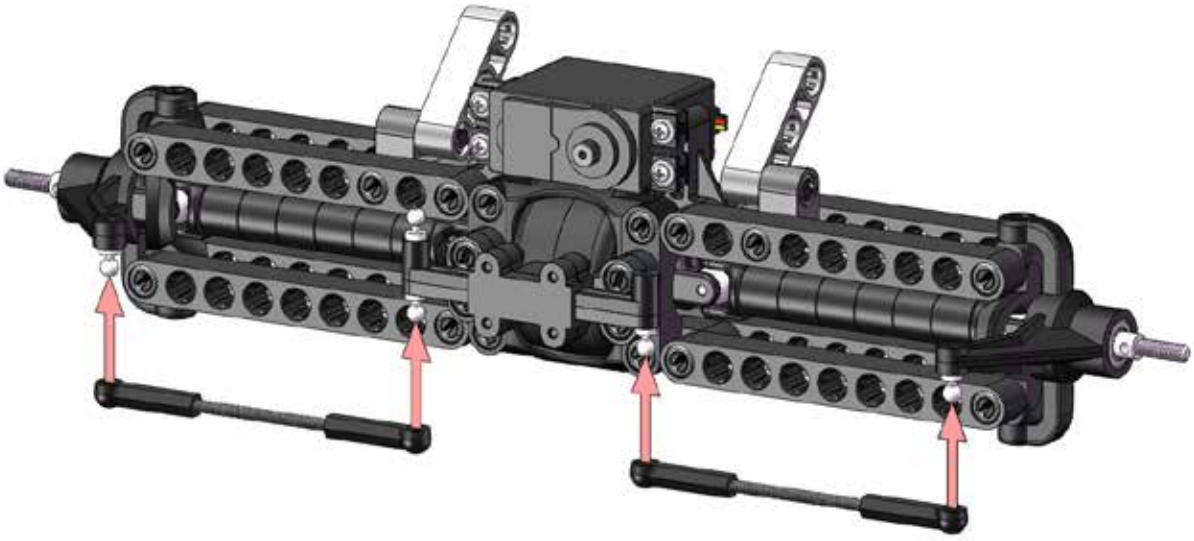
x2
#4-40 x 2-3/4" THREAD ROD

x4
23mm BALL CUP

x2

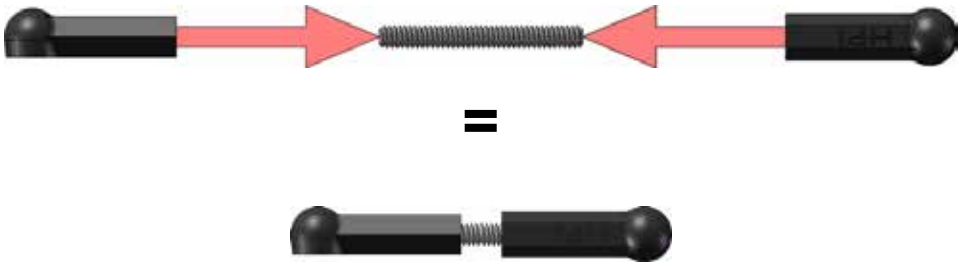


13



x1
#4-40 x 1" THREAD ROD

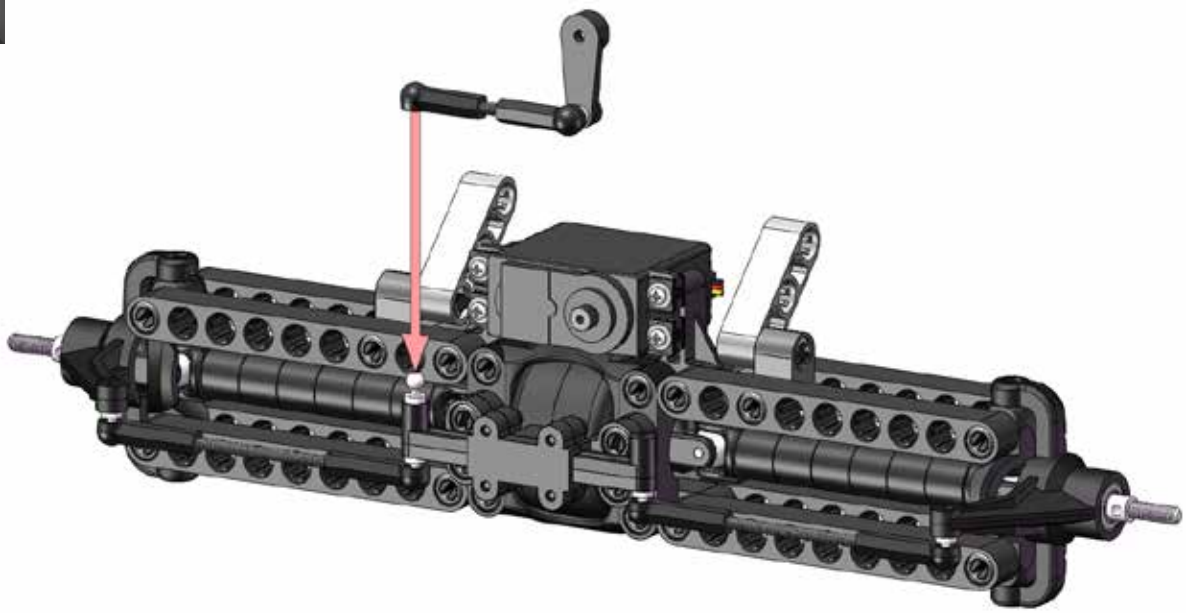
x2
18mm BALL CUP



x1
STEERING SERVO HORN

x1
3/16" BALL STUD

16

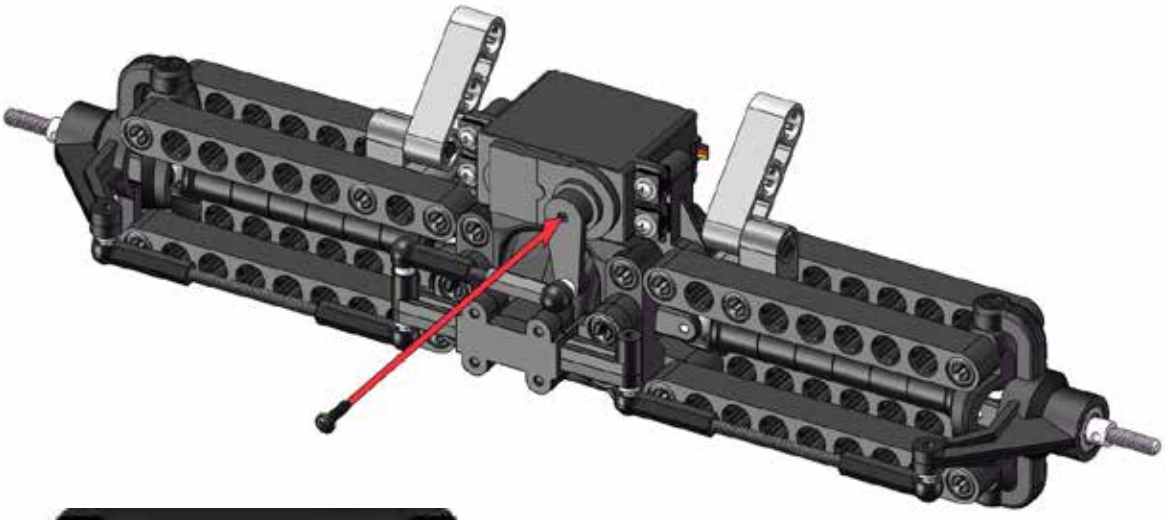


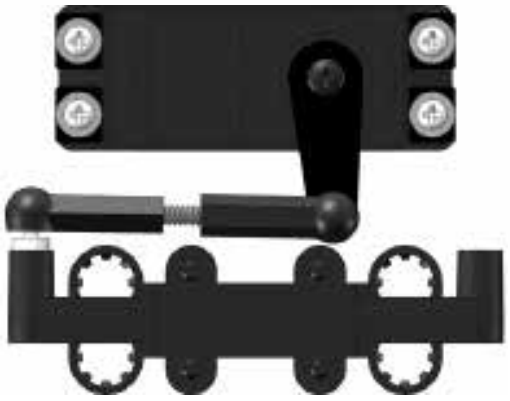
POSITION OF SERVO HORN ON SERVO WILL BE SET AFTER RADIO IS SETUP.

17

x1

SERVO HORN SCREW



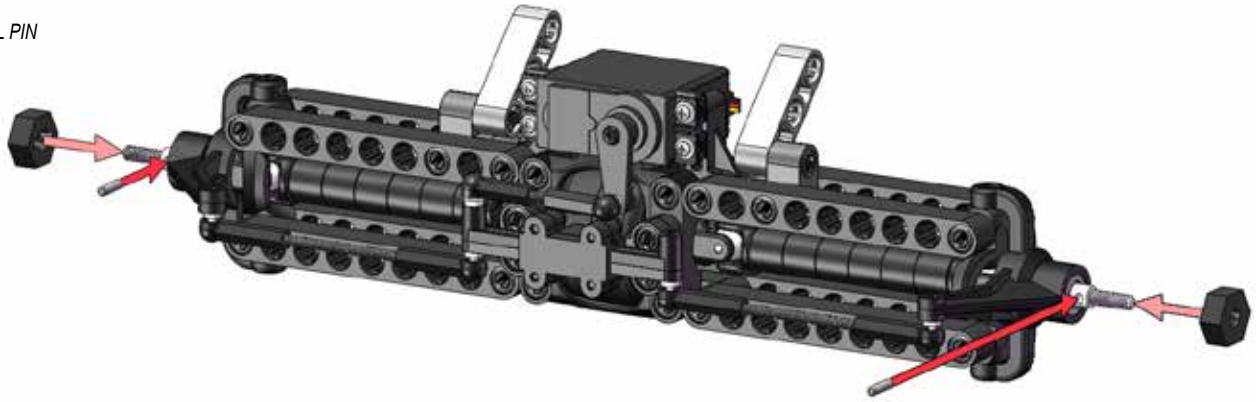


DO NOT TIGHTEN. SERVO WILL CHANGE POSITION AFTER IT IS POWERED ON FOR THE FIRST TIME.

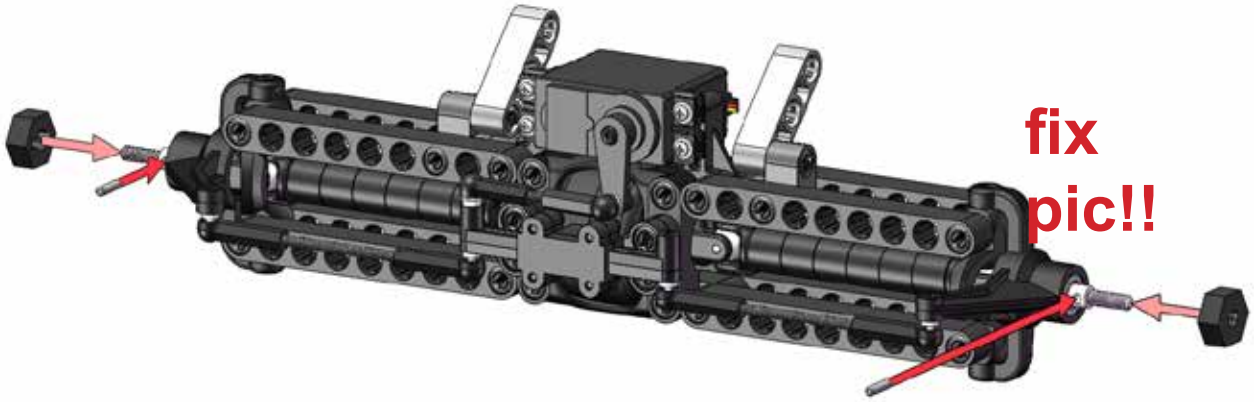
18

x2
14mm WHEEL NUT

x2
2.5x10mm DOWEL PIN



FRONT AXLE



01

x2
6-DRIVELINE

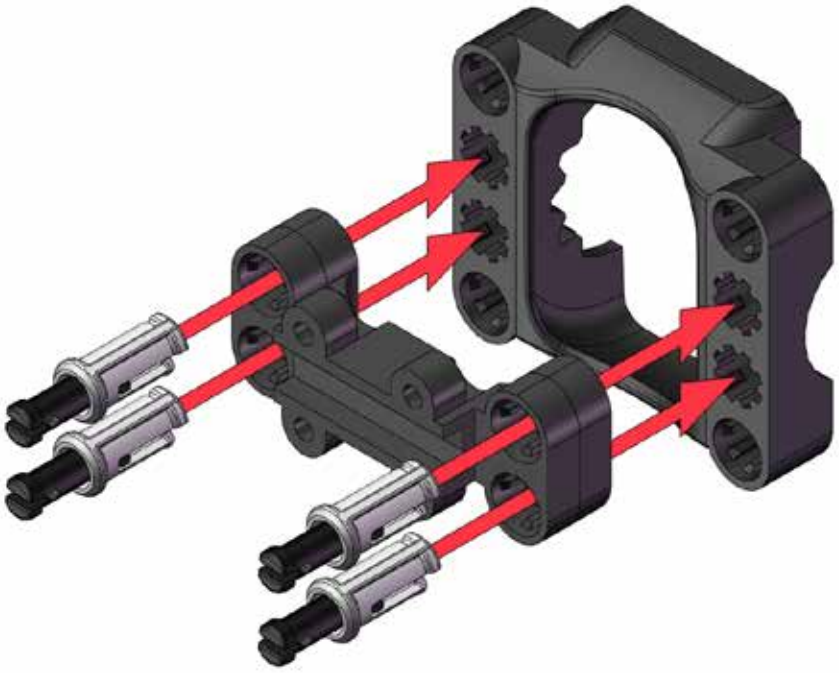
x2
M5 WHEEL END SHAFT

x4
U-JOINT SET SCREW

x1
AXLE HOUSING

x1
STEERING BRACKET

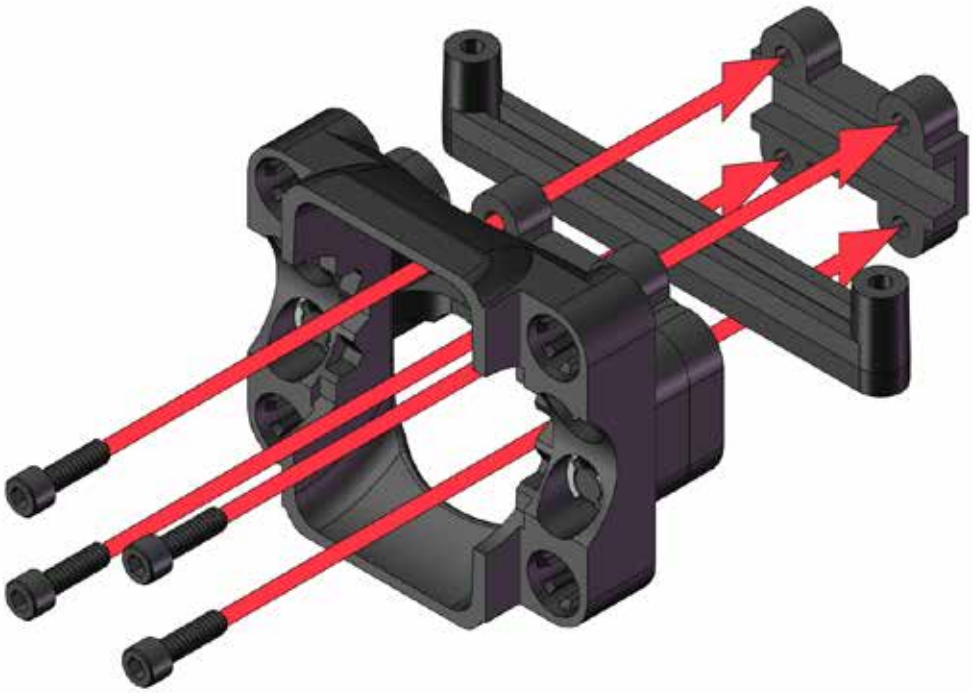
x4
1.5-LOCK



x1
STEERING BAR

x1
STEERING PLATE

x4
#4-40 x 3/8" SCREW



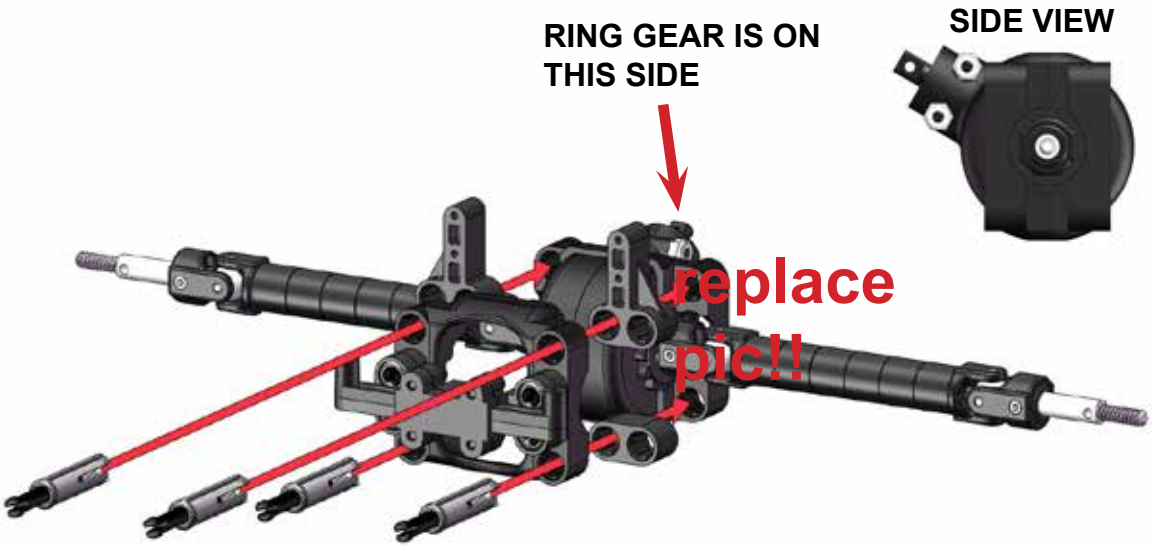
04

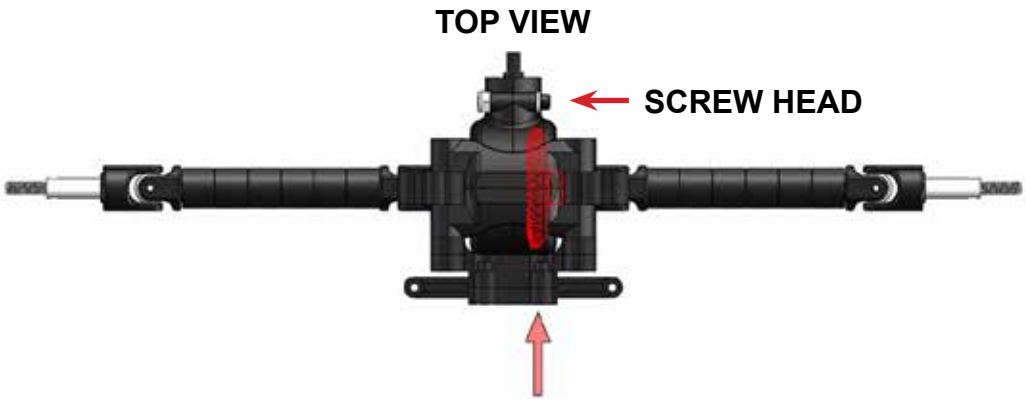
x1
AXLE HOUSING

x2
SERVO MOUNT

x2
2-BEAM

x4
3-LOCK



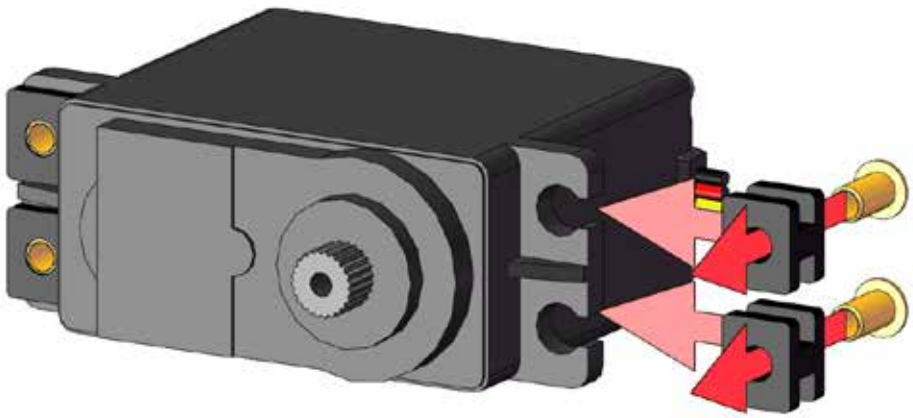


05

x1
HS-485HB SERVO

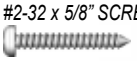
x4
SERVO BUSHING

x4
SERVO BUSHING SLEEVE

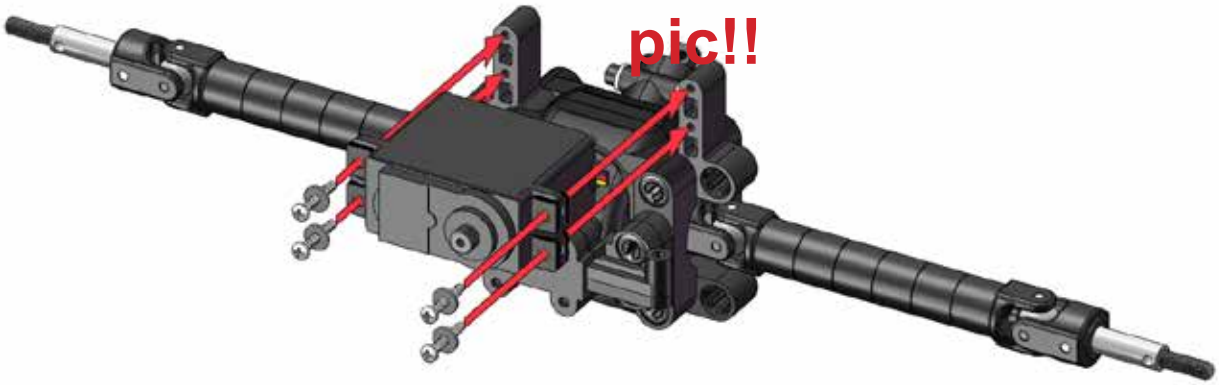


06

x4
#2-32 x 5/8" SCREW



x4
#4 WASHER



07

x8
9-BEAM

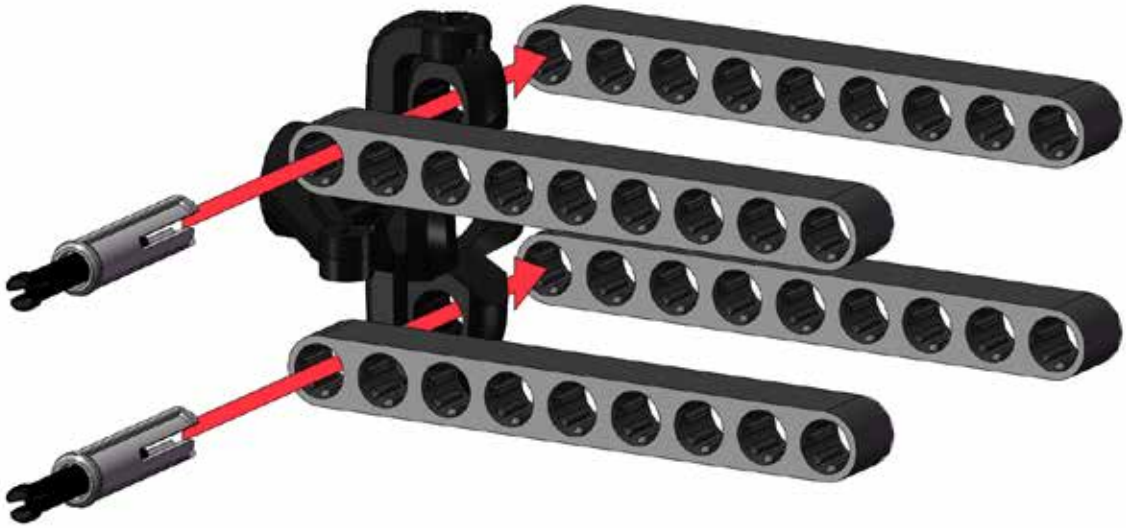
x2
FRONT WHEEL HUB

x2
FRONT WHEEL KNUCKLE

x4
3-LOCK

x4
6x12x4mm BEARING

ASSEMBLE WHEEL HUB FIRST

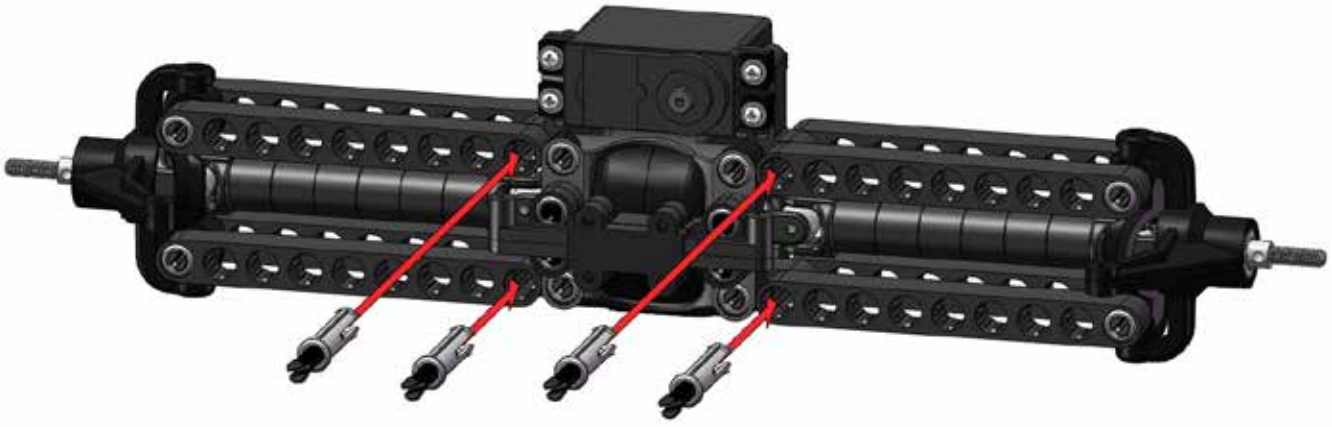


08

09

x4

3-LOCK



10

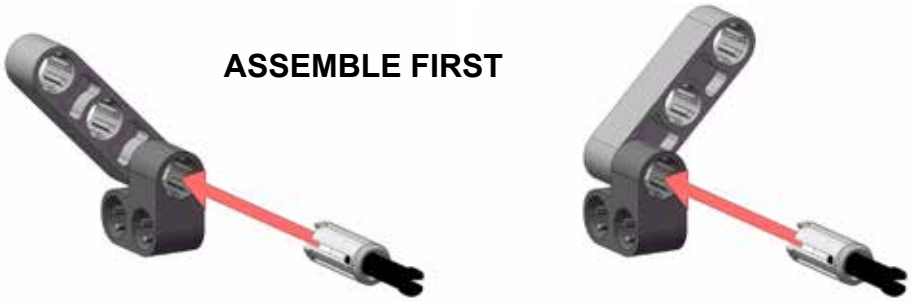
x2
3-45 BEAM

x2
TRANSITION

x2
3-LOCK

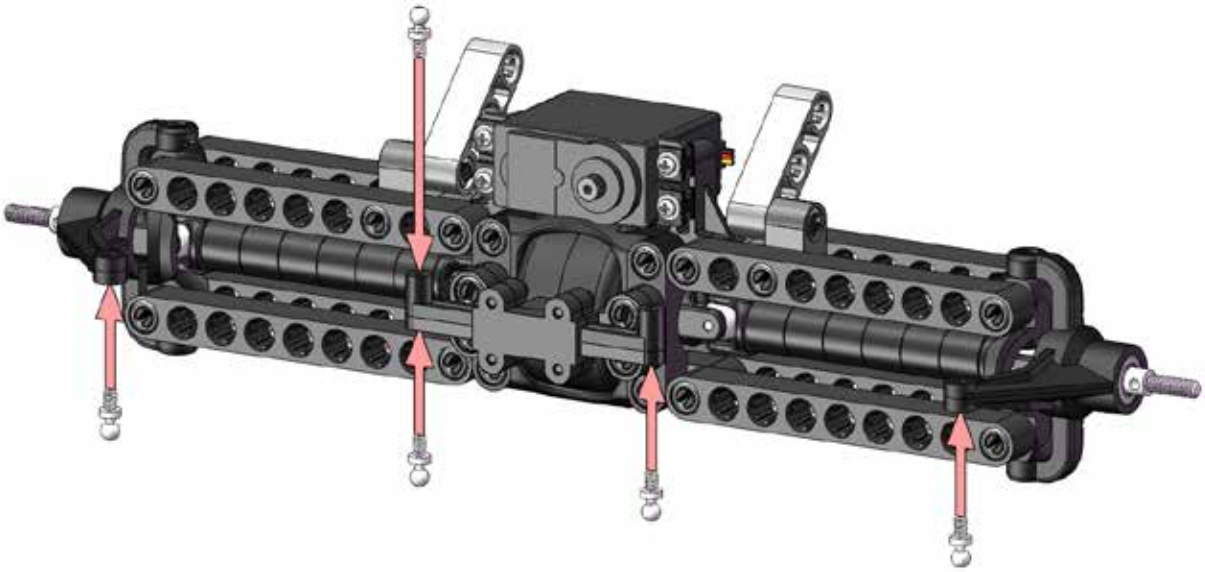
x2
2-LOCK

ASSEMBLE FIRST



11

x5
3/16" BALL STUD

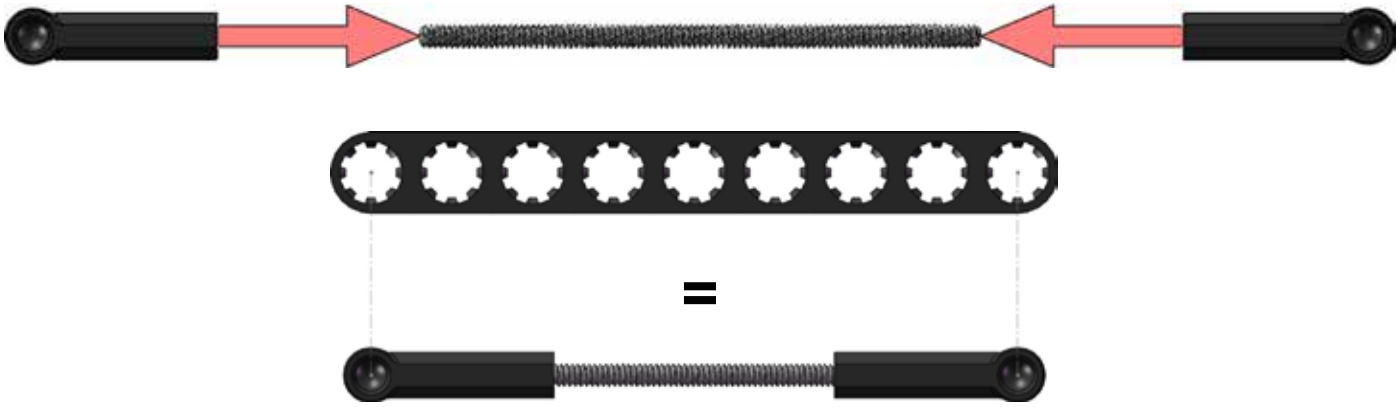


12

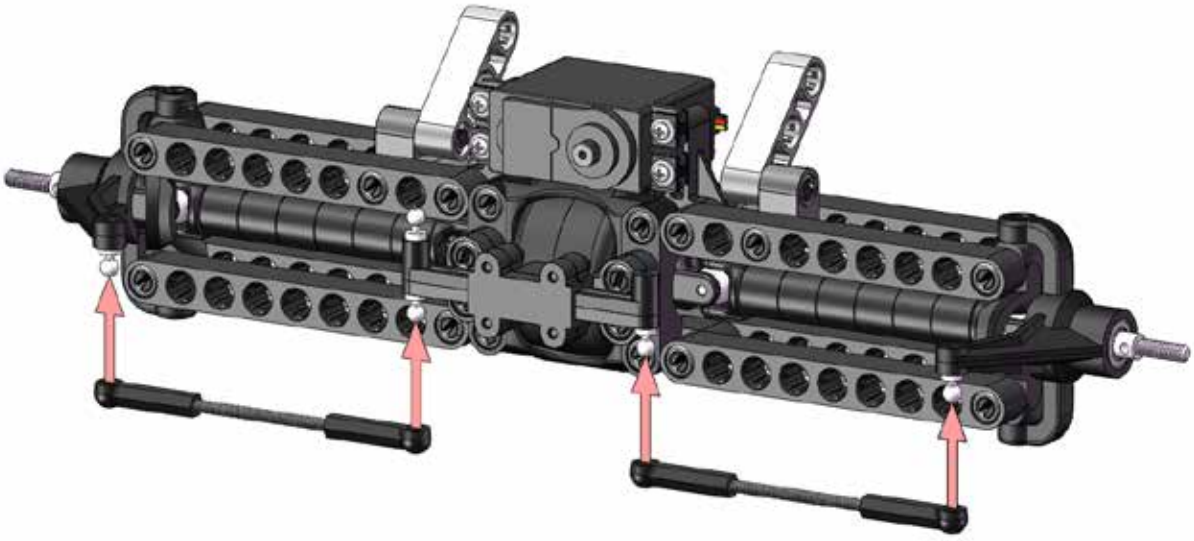
x2
#4-40 x 2-3/4" THREAD ROD

x4
23mm BALL CUP

x2

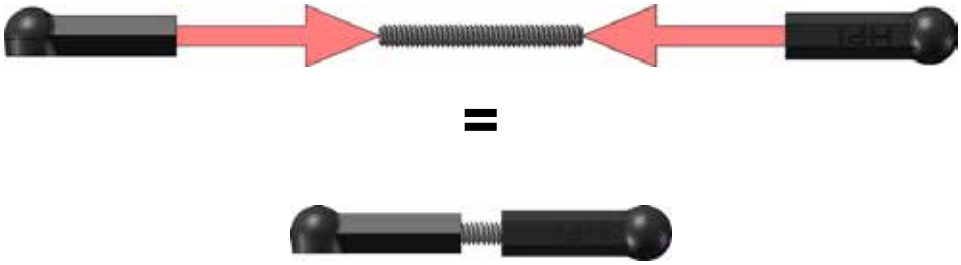


13



x1
#4-40 x 1" THREAD ROD

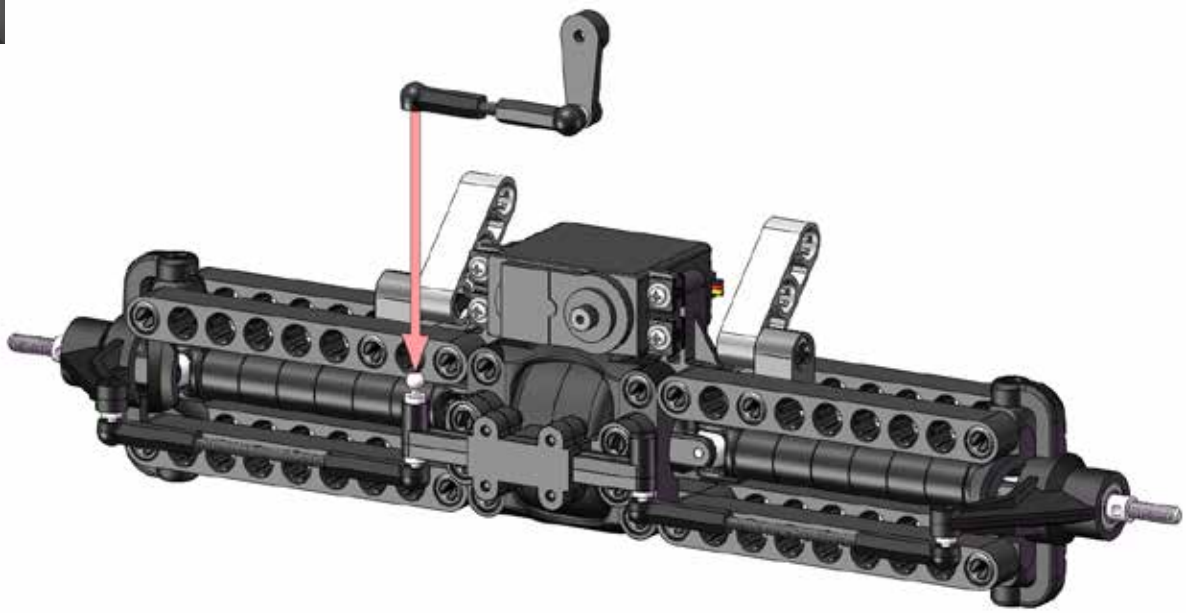
x2
18mm BALL CUP



x1
STEERING SERVO HORN

x1
3/16" BALL STUD

16

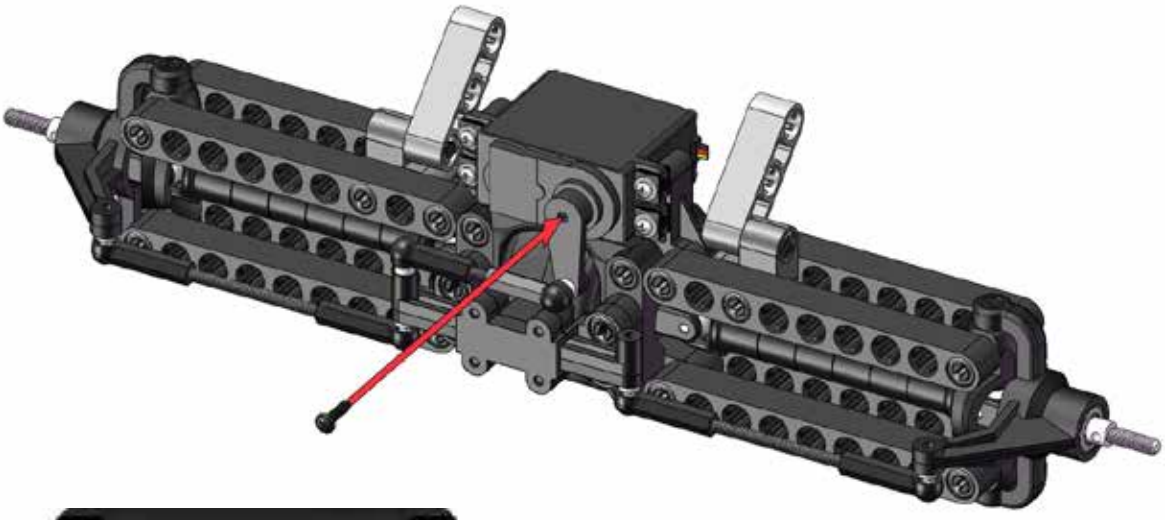


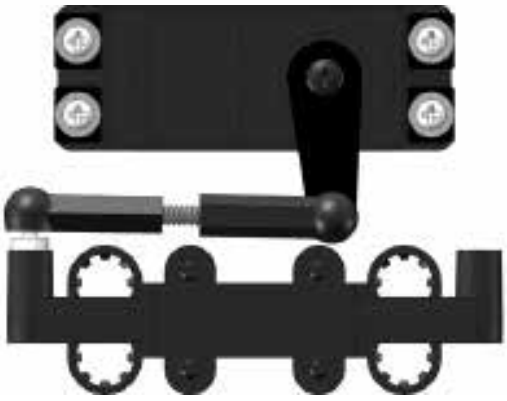
POSITION OF SERVO HORN ON SERVO WILL BE SET AFTER RADIO IS SETUP.

17

x1

SERVO HORN SCREW

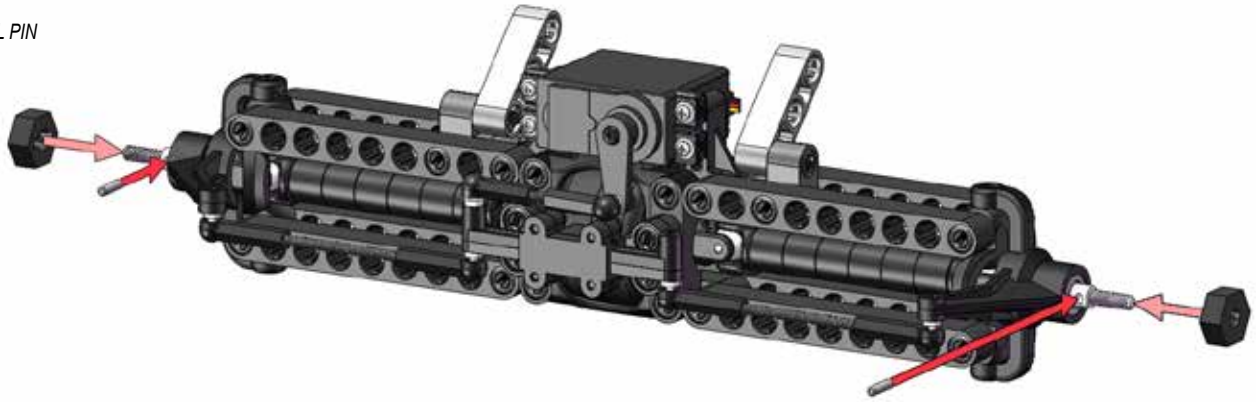




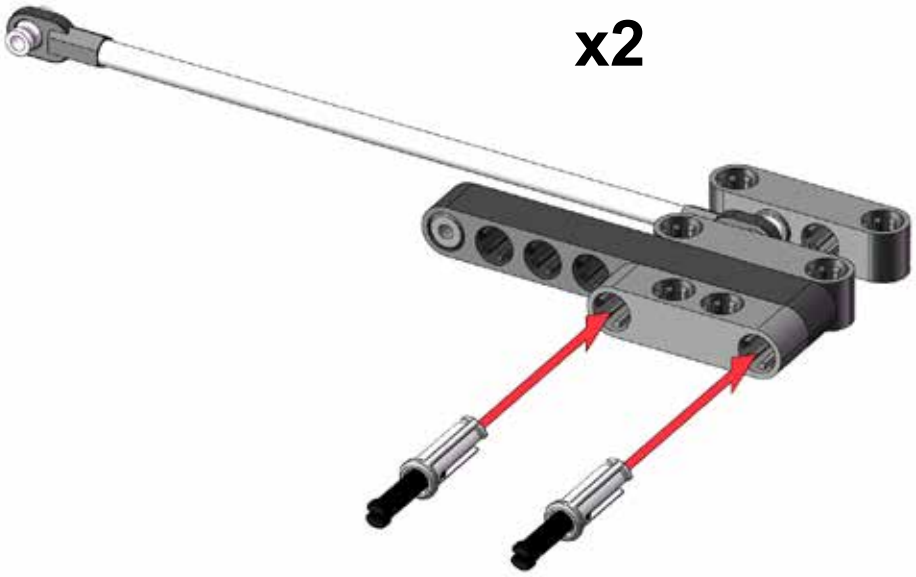
DO NOT TIGHTEN. SERVO WILL CHANGE POSITION AFTER IT IS POWERED ON FOR THE FIRST TIME.

x2
14mm WHEEL NUT

x2
2.5x10mm DOWEL PIN



AXLE CONNECTORS



x2
DUAL TRANSITION

x1
#4-40 x 1-3/8" SCREW

x1
#4 WASHER

x3
CLEARANCE THREAD ADAPTER

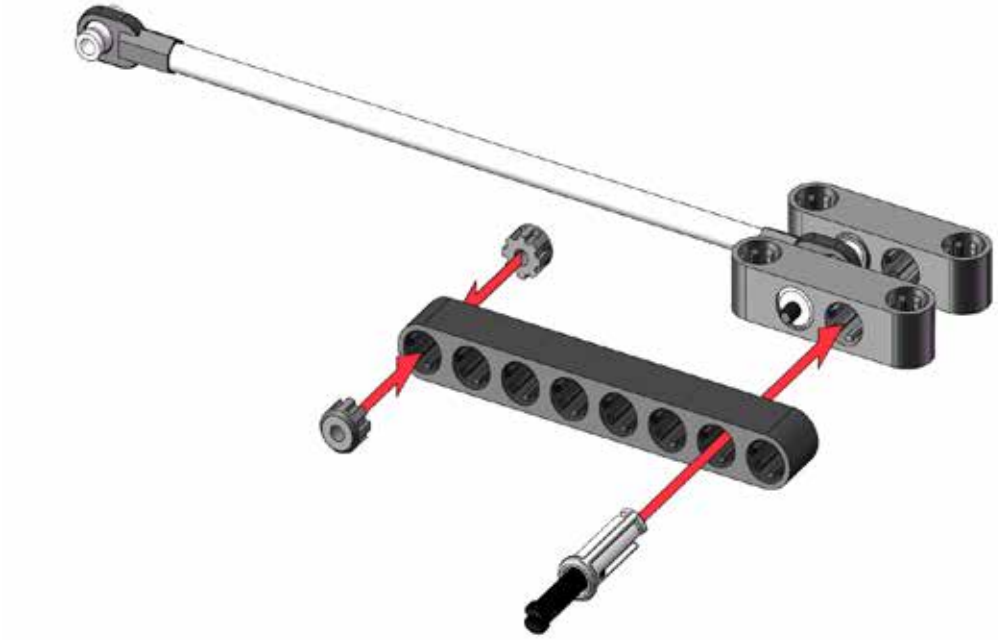
x1
INTERFERENCE THREAD ADAPTER

02

x1
8-BEAM

x1
2-LOCK

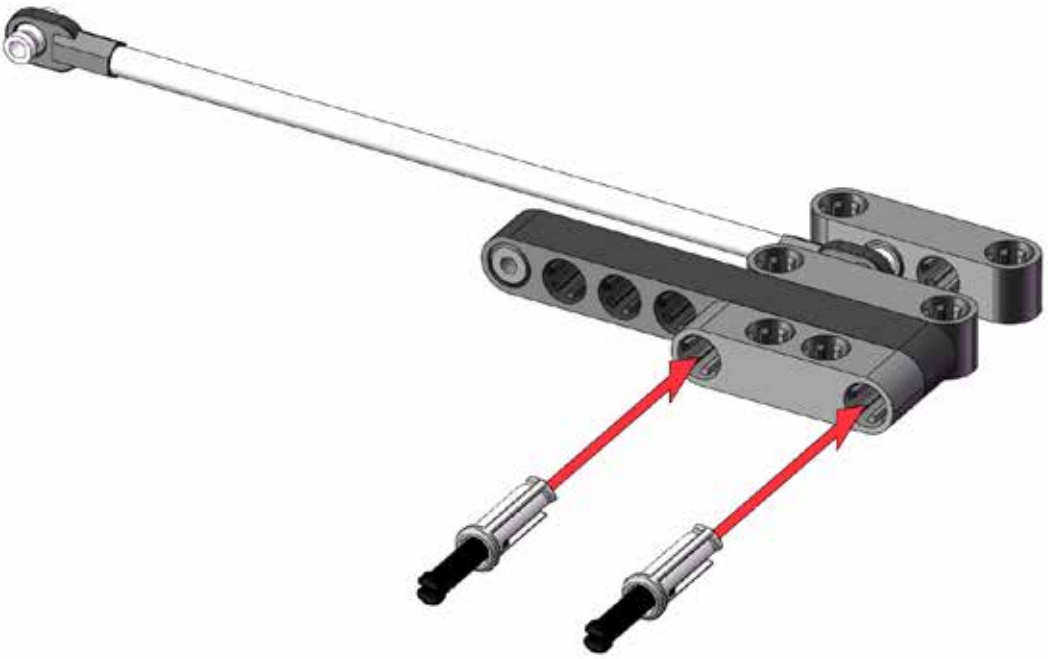
x2
CLEARANCE THREAD ADAPTER



03

x1
DUAL TRANSITION

x2
2-LOCK



Repeat steps 1 - 3: x4

Add page showing differentials for 4 wheeler

USE ONE MOTOR ASSEMBLY WITH ENCODER

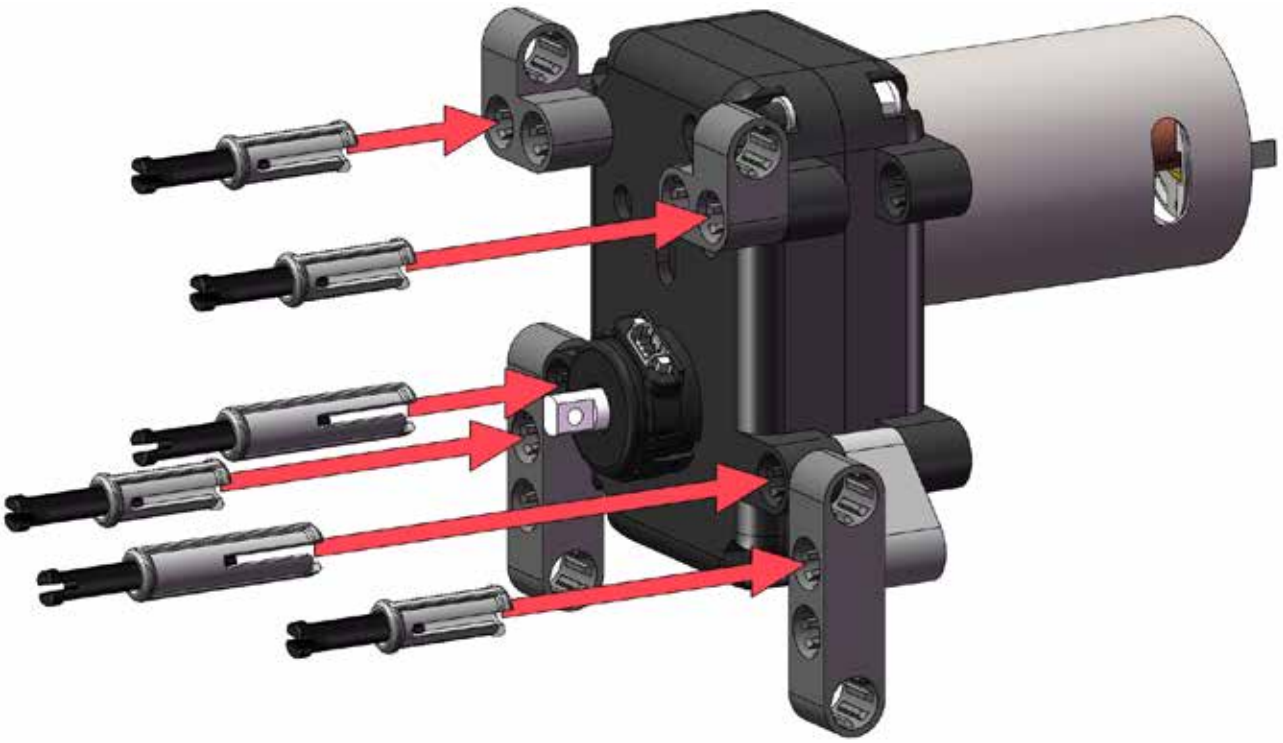
x2
2-45 BEAM

x2
DUAL TRANSITION

x2
TRANSITION

x2
3-LOCK

x4
2-LOCK



USE THE OTHER WITHOUT ENCODER

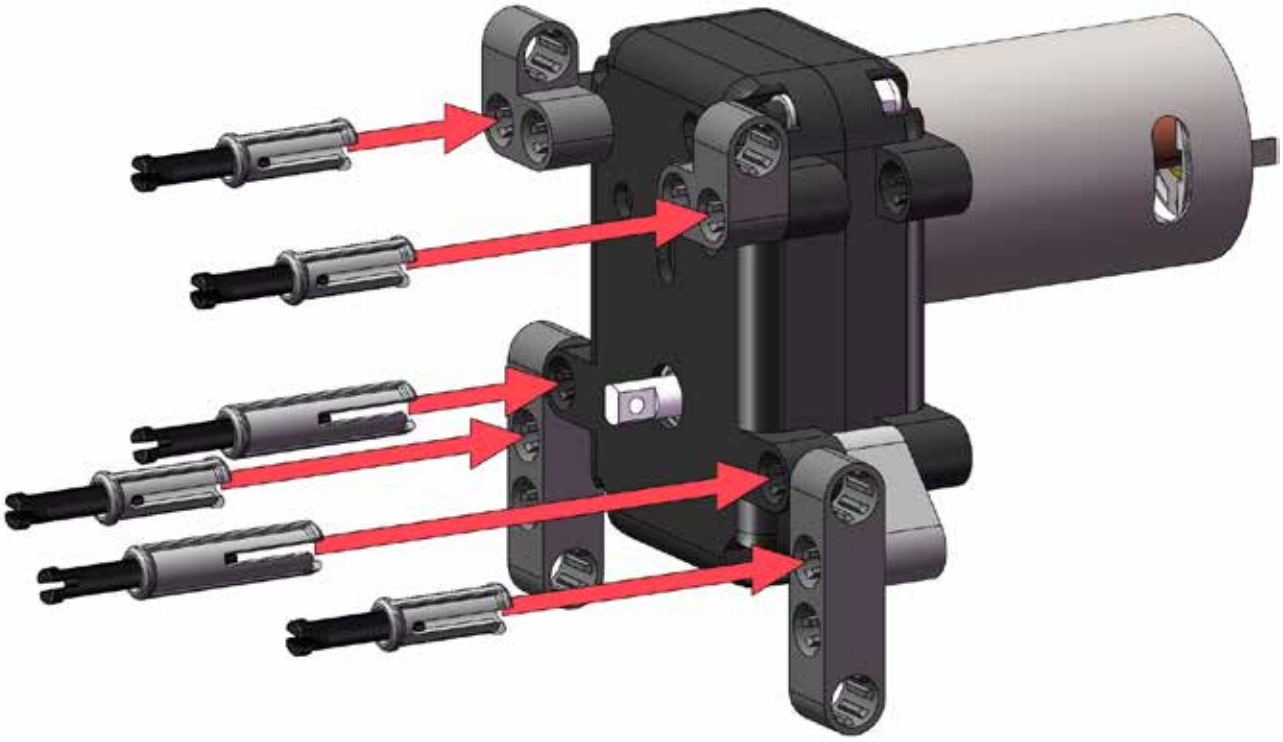
x2
2-45 BEAM

x2
DUAL TRANSITION

x2
TRANSITION

x2
3-LOCK

x4
2-LOCK



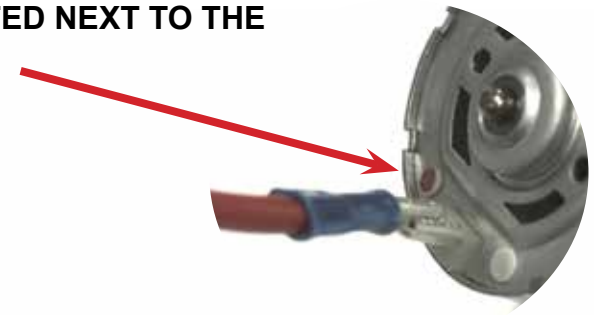
03

CONNECT THE MOTOR WIRES TO THE MOTORS. IF THE WIRES ARE ATTACHED TO EACHOTHER PULL THE ENDS APPART SLIGHTLY.

x2
MOTOR WIRE - BLACK

x2
MOTOR WIRE - RED

SEE THAT THE RED WIRE IS CONNECTED NEXT TO THE RED DOT.

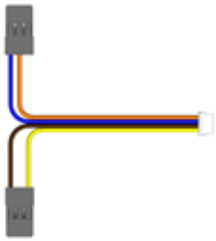


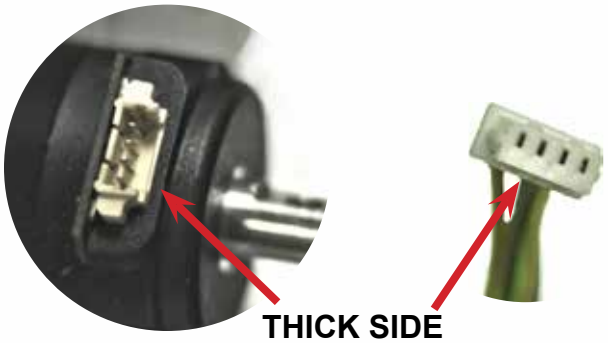
x2

04

CONNECT THE MOTOR ENCODER CABLE TO THE ENCODER PLUG. THE CABLE ONLY FITS IF THE ORIENTATION IS CORRECT.

x1
ENCODER CABLE





THICK SIDE

MAKE CERTAIN THE PLUG IS ORIENTED CORRECTLY.

04

x8
4.8" FOUR LINK ARM

x16
ROD END

x16
ROD END BALL

x16

x8

05

x4
11-BEAM

x4
7-BEAM

x4
3-LOCK

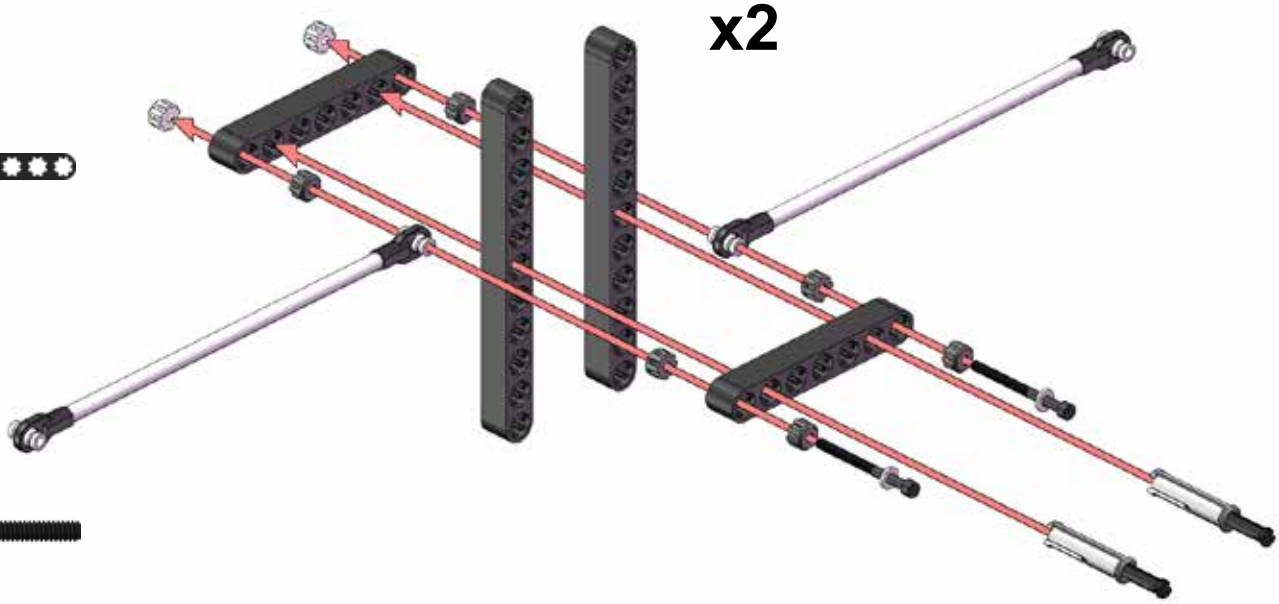
x4
#4-40 x 1-3/8" SCREW

x4
#4 WASHER

x12
CLEARANCE THREAD ADAPTER

x4
INTERFERENCE THREAD ADAPTER

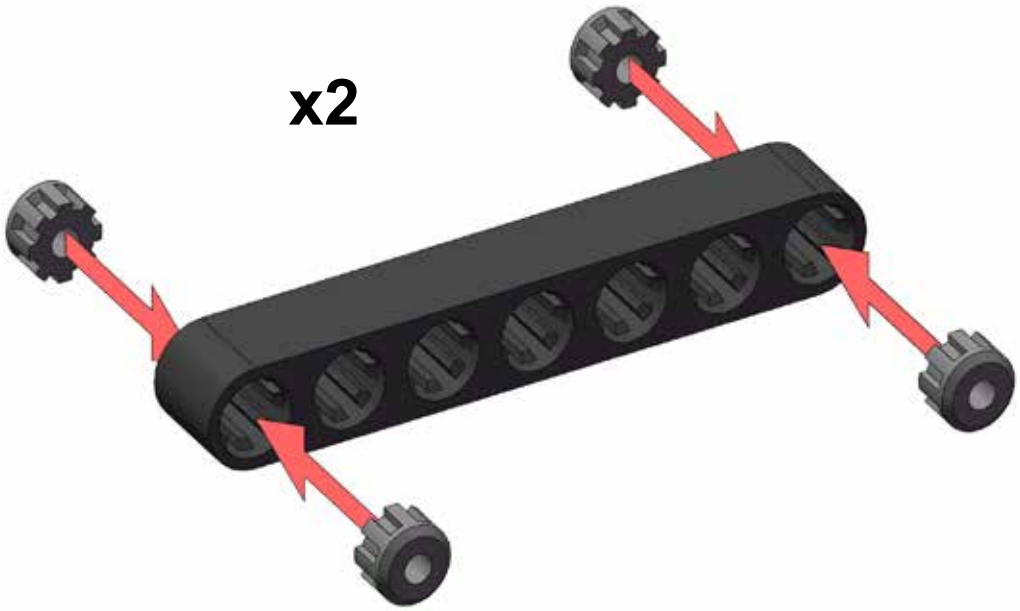
x2



06

x2
7-BEAM

x8
CLEARANCE THREAD ADAPTER



07

x4
3-LOCK

x4
2-LOCK

08

x2
13-BEAM

x2
BATTERY CAP

x4
TRANSITION

x6
2-LOCK

09

x4
11-BEAM

x4
10-BEAM

x4
90mm SHOCK

x2
2.0" THREAD COLLAR

x4
#4-40 x 1-3/8" SCREW

x4
#4 WASHER

x4
SHOCK MOUNT

x4
ROD END BALL

x16
CLEARANCE THREAD ADAPTER

INSERT THE ROD END BALL FIRST

10

x2
11-BEAM

x8
3-LOCK

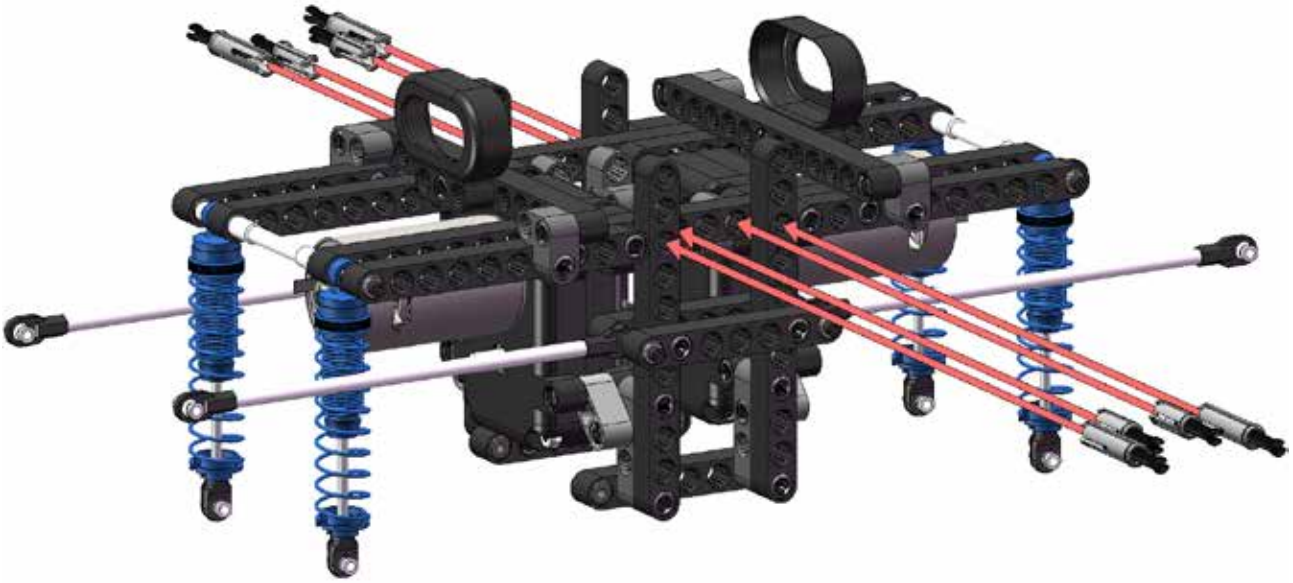
11

x4
2-LOCK

12

x4
3-LOCK

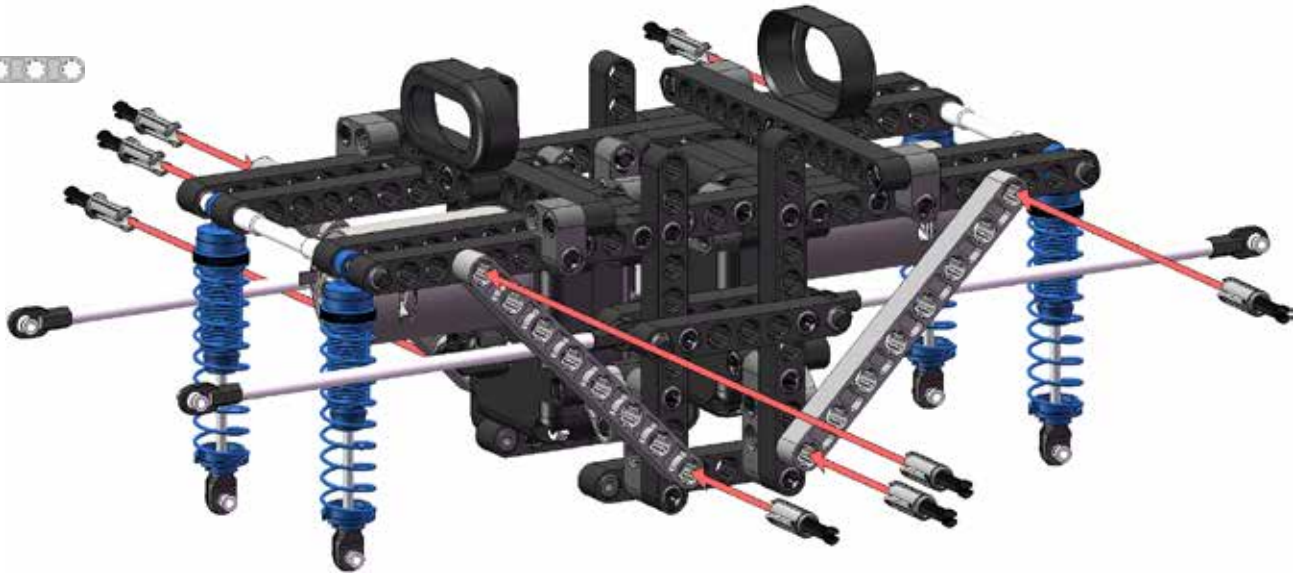
x4
2-LOCK



13

x4
8-45 BEAM

x8
2-LOCK



14

x2
1.2" THREAD COLLAR

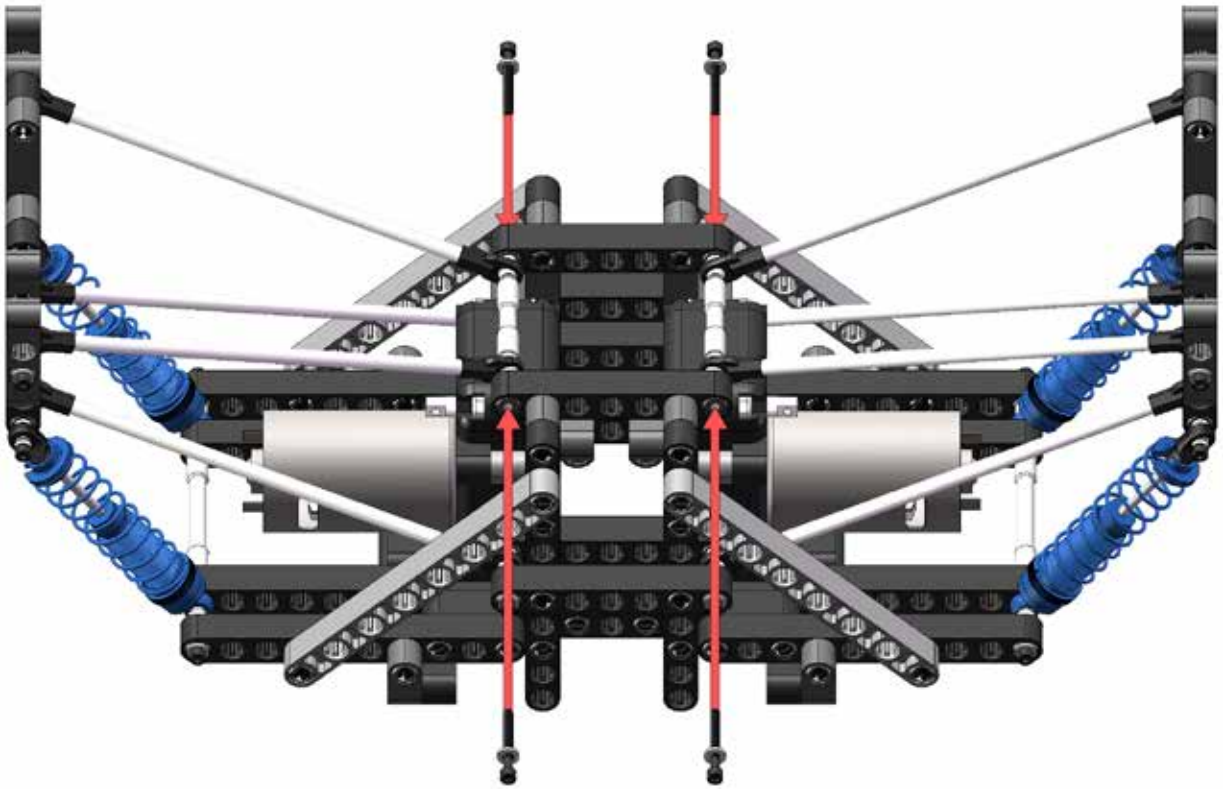
x4
#4-40 x 1-3/8" SCREW

15

x2
1.2" THREAD COLLAR

x4
#4-40 x 1" SCREW

x4
#4 WASHER



16

x2
13-BEAM

x4
9-BEAM

x4
2-LOCK

17

x4
3-45 BEAM

x4
TRANSITION

x4
3-LOCK

x2

18

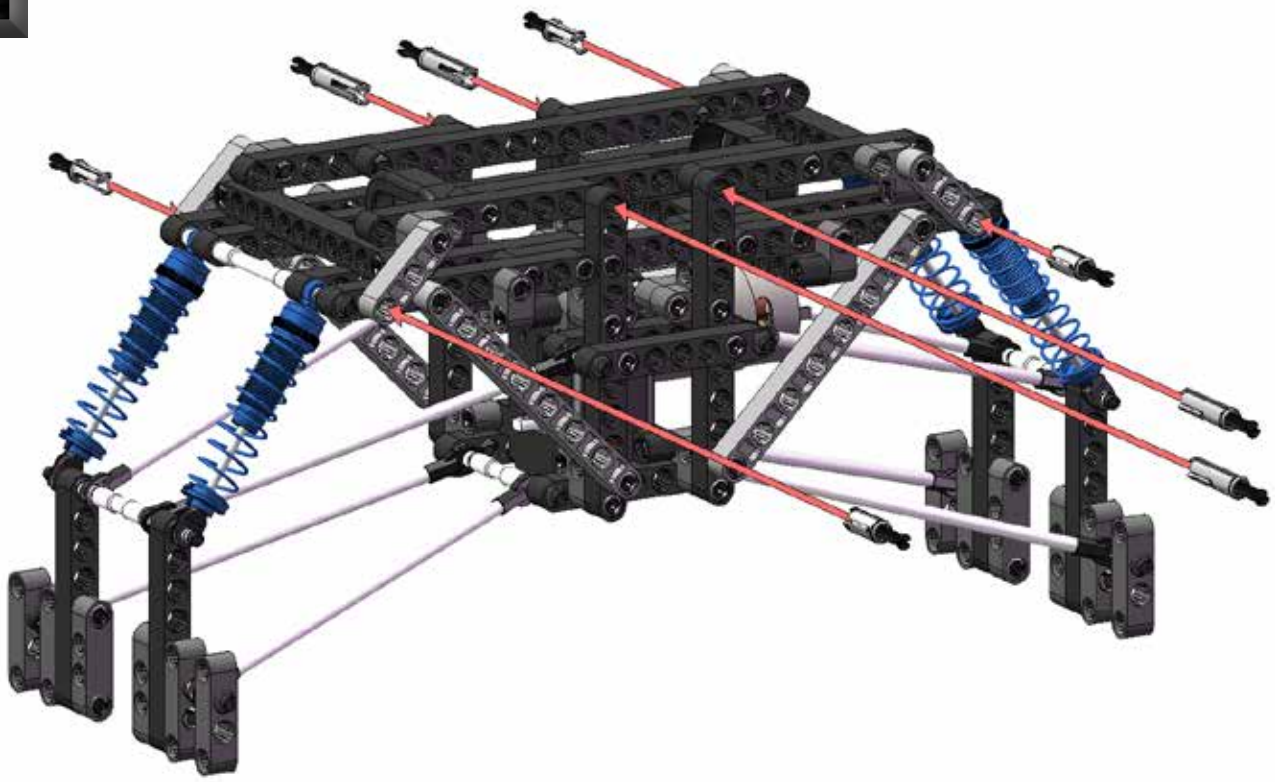
x2
11-BEAM

x4
2-LOCK

19

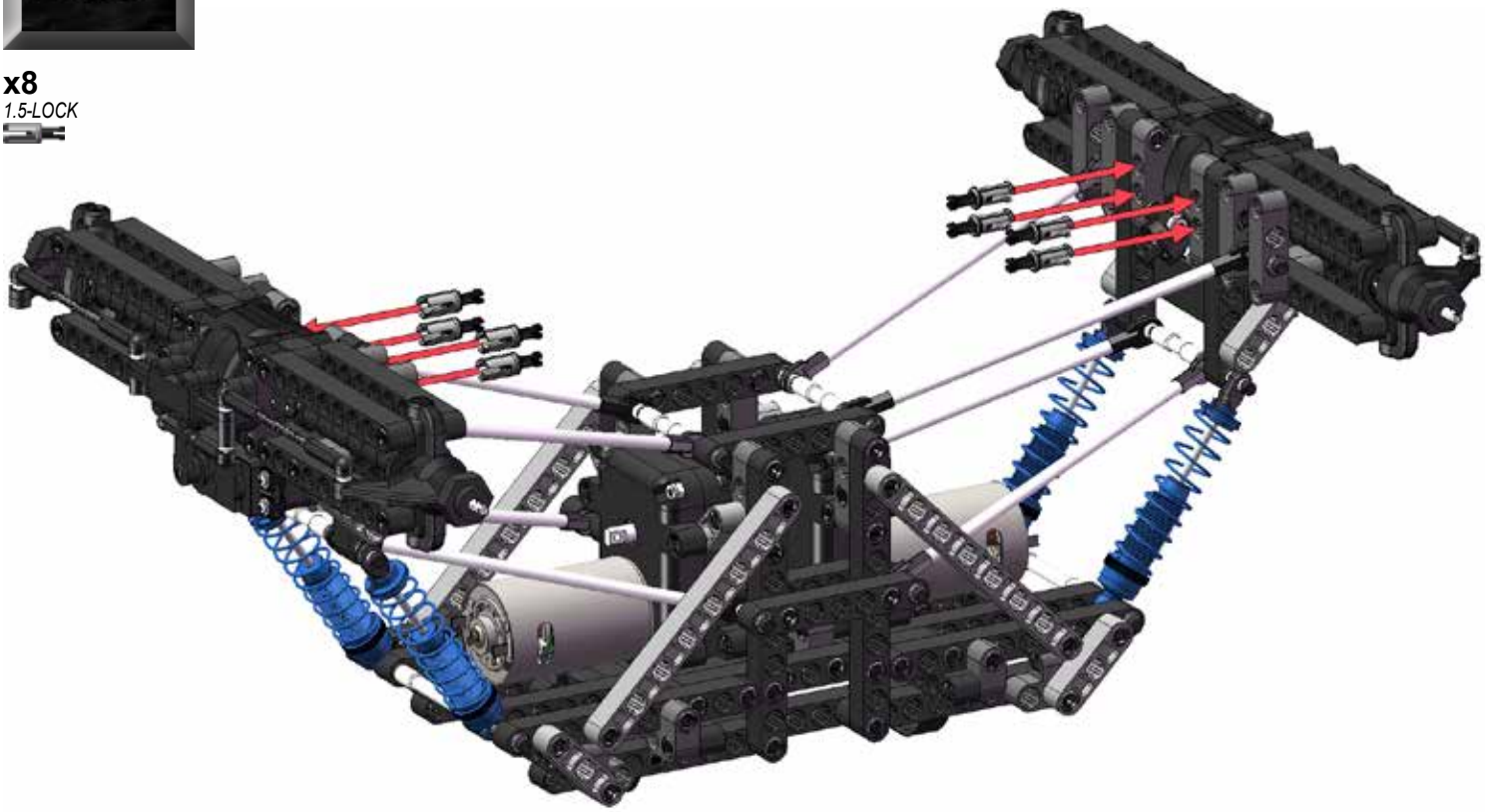
x4
3-LOCK

x4
2-LOCK



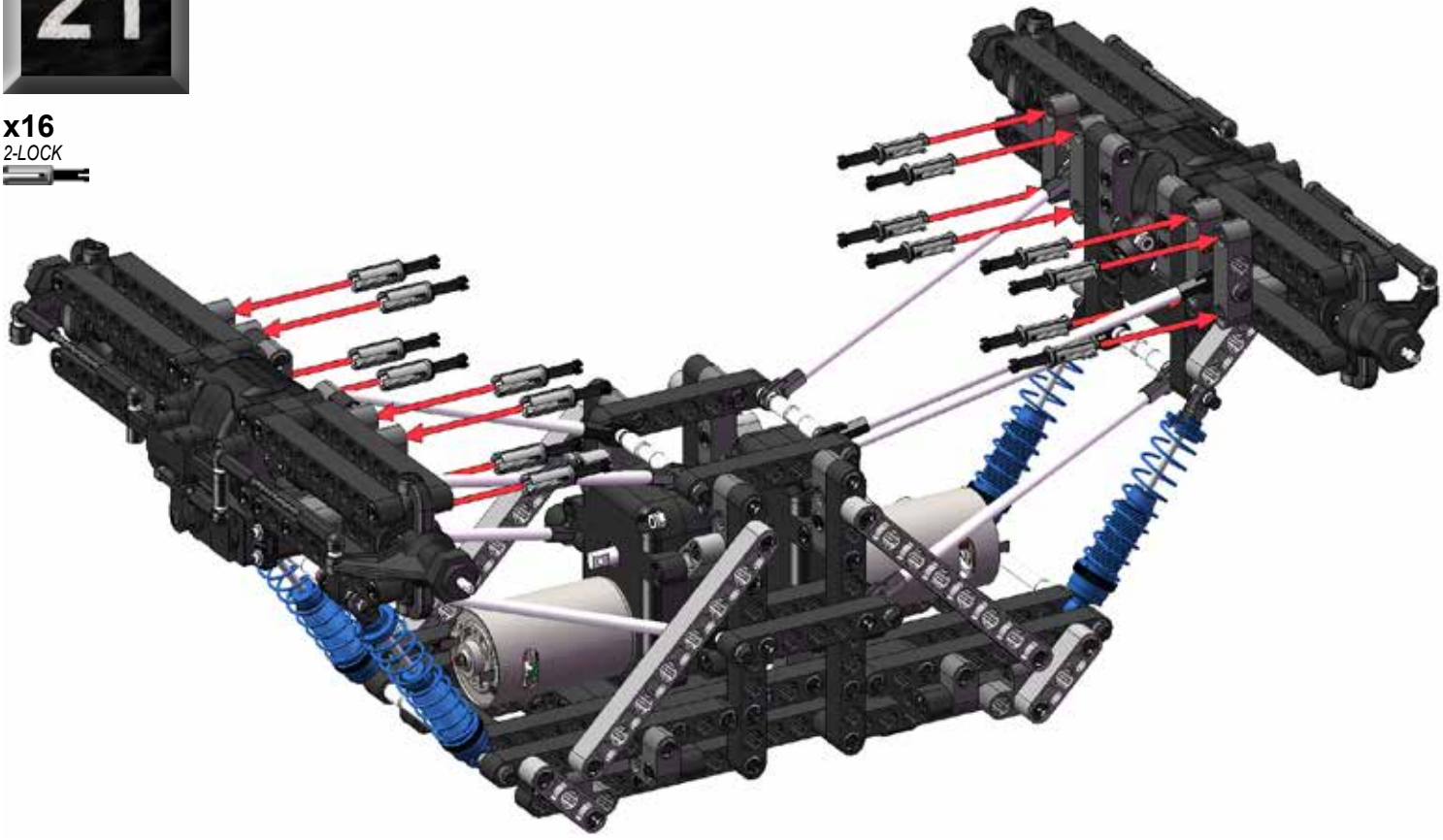
20

x8
1.5-LOCK



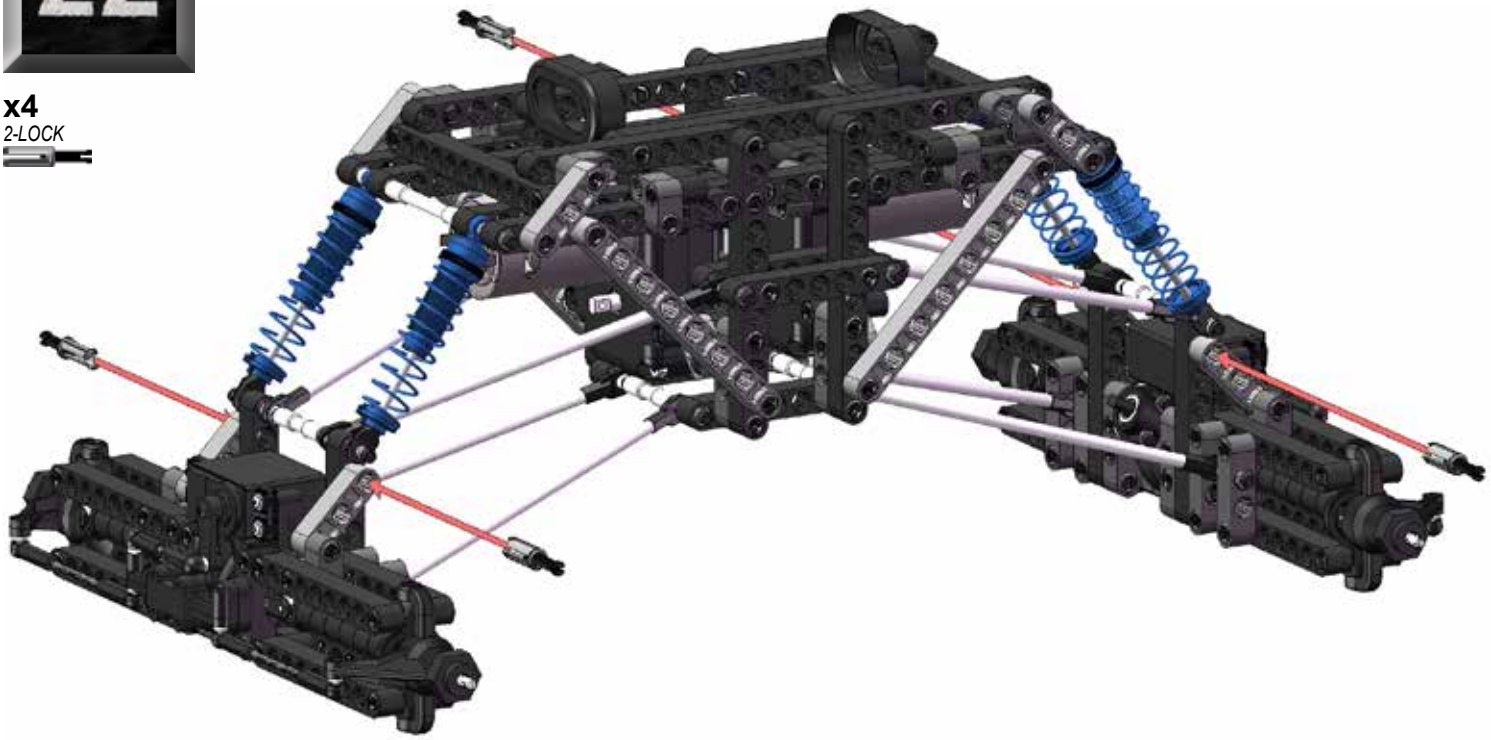
21

x16
2-LOCK



22

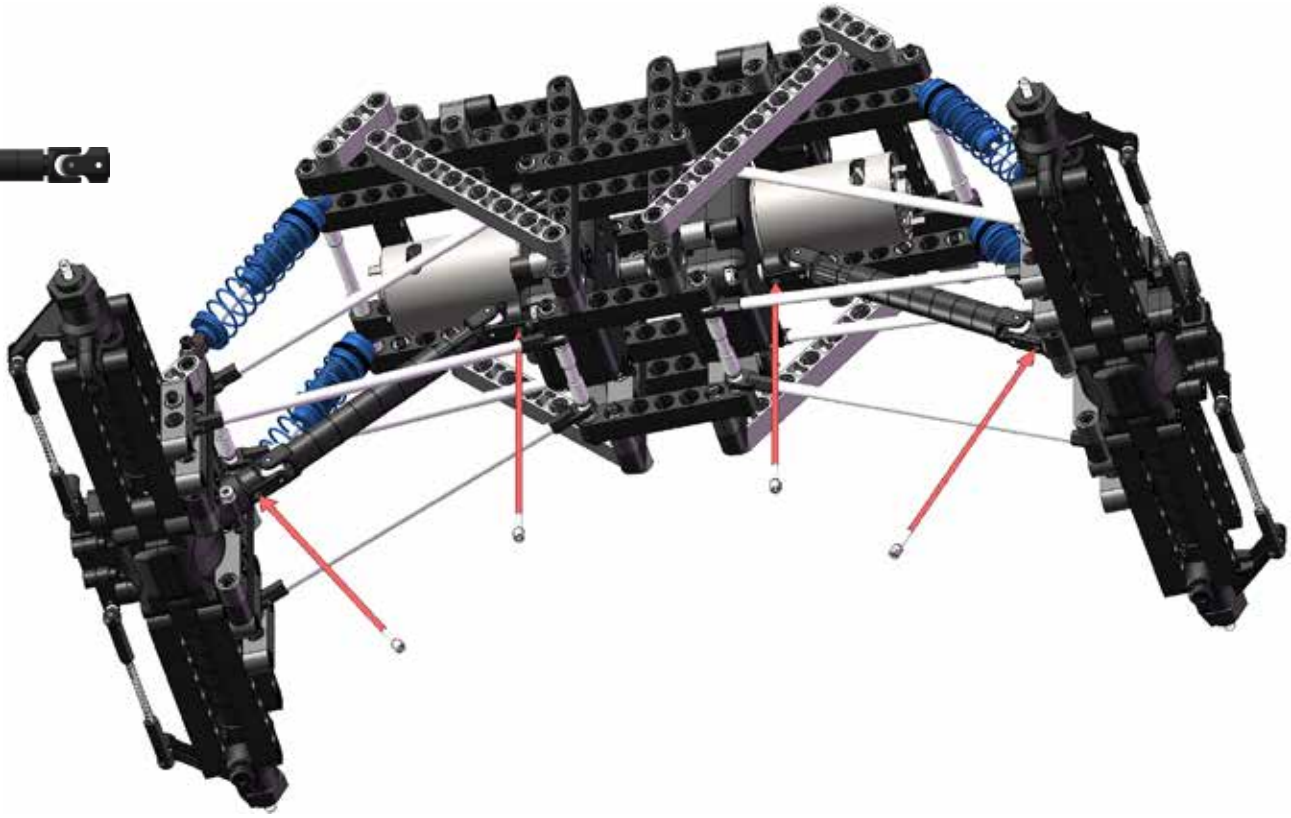
x4
2-LOCK



23

x2
7-DRIVELINE

x4
U-JOINT SET SCREW

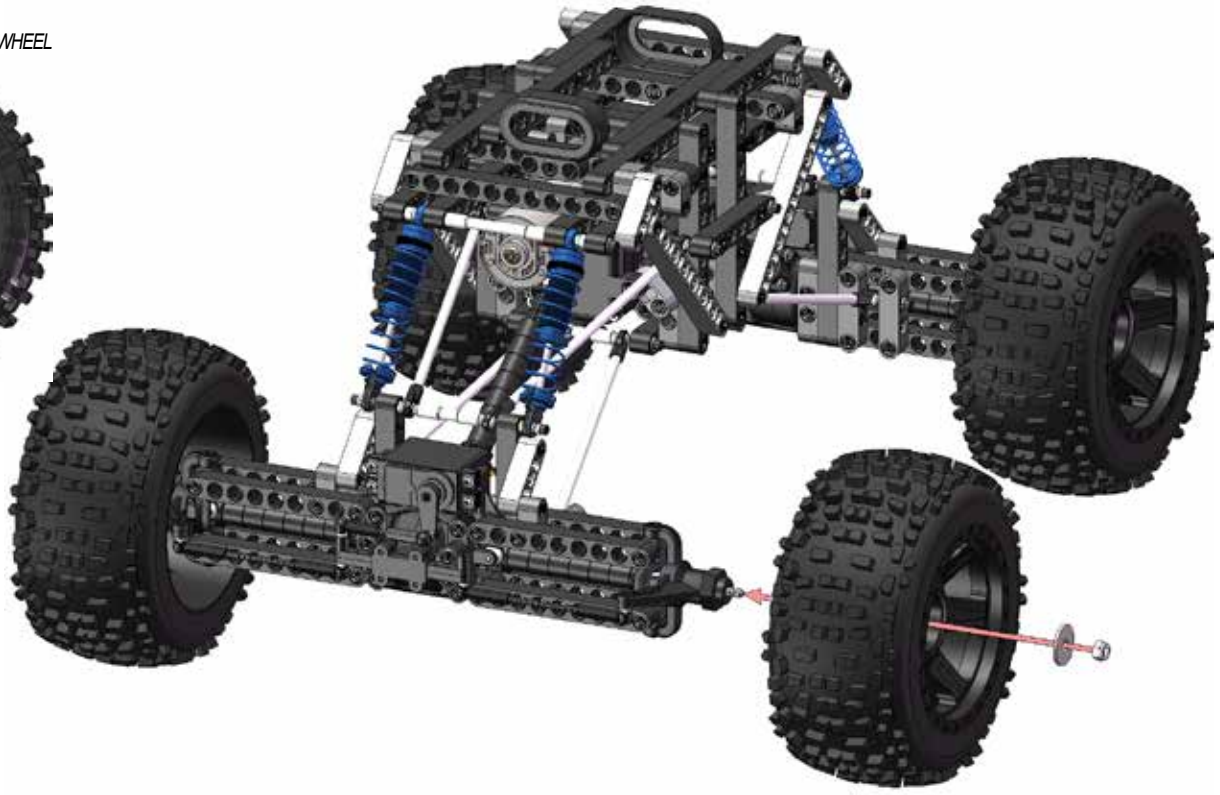


24

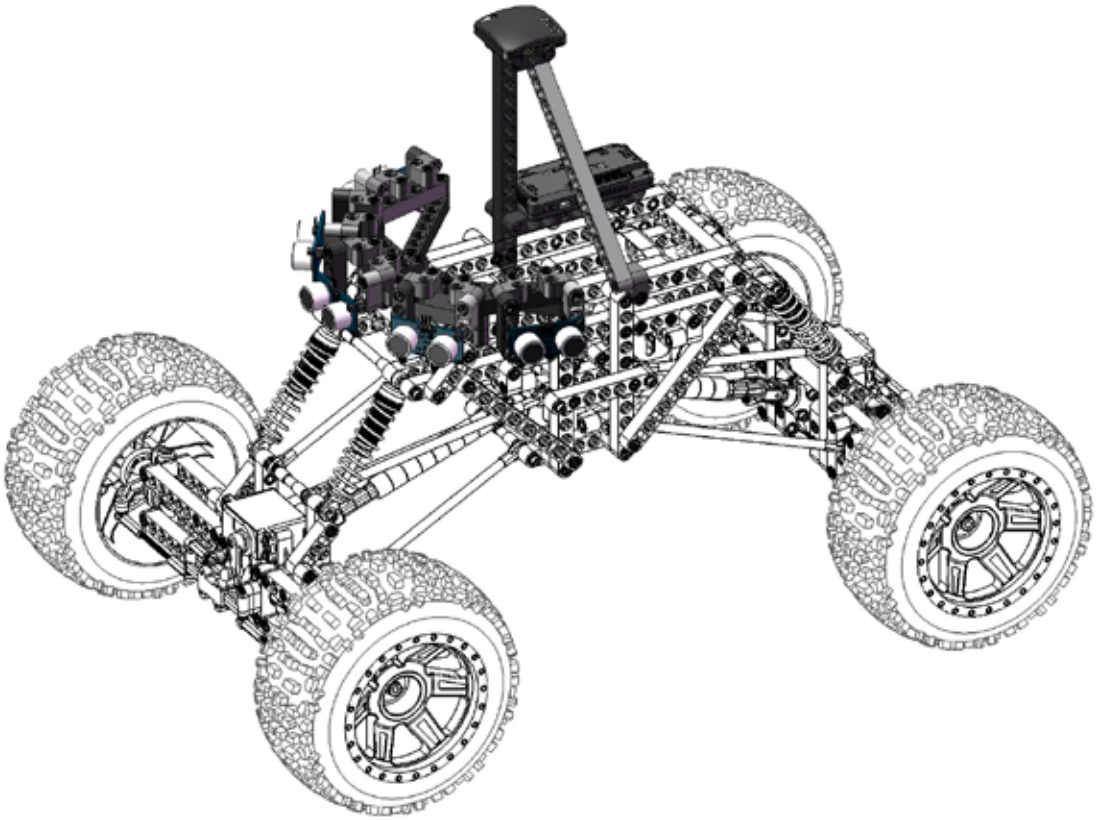
x4
BADLANDS 2.2" TIRE & DESPERADO WHEEL

x4
M5 WASHER

x4
M5 NUT



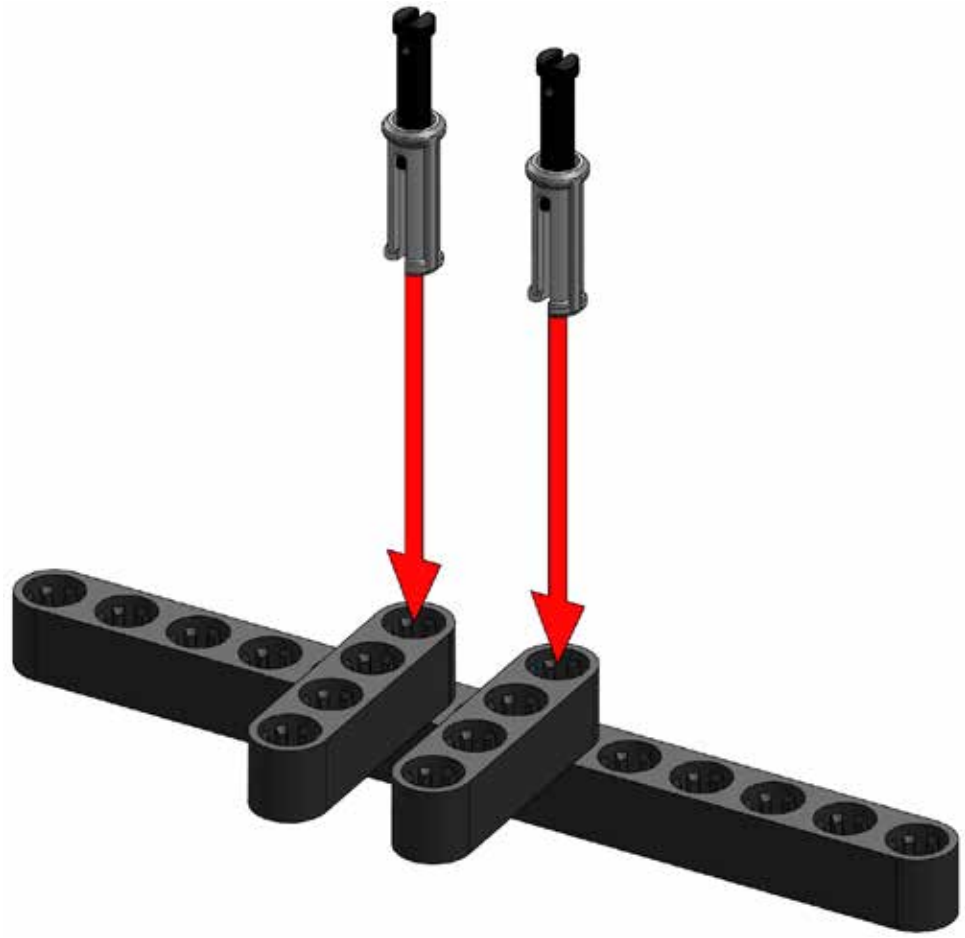
5-PING SENSOR ARRAY



x1
13-BEAM

x2
4-BEAM

x2
2-LOCK



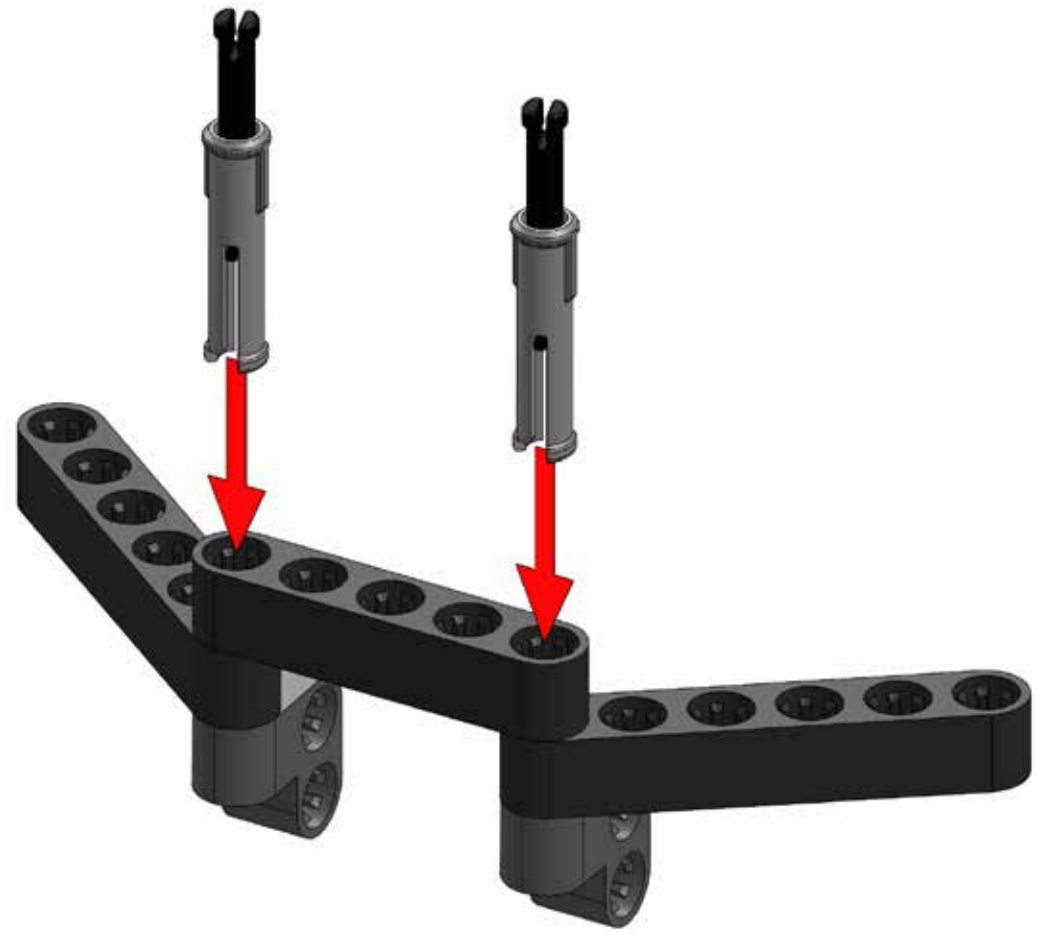
02

x2
6-BEAM

x1
5-BEAM

x2
TRANSITION

x2
3-ROTATE



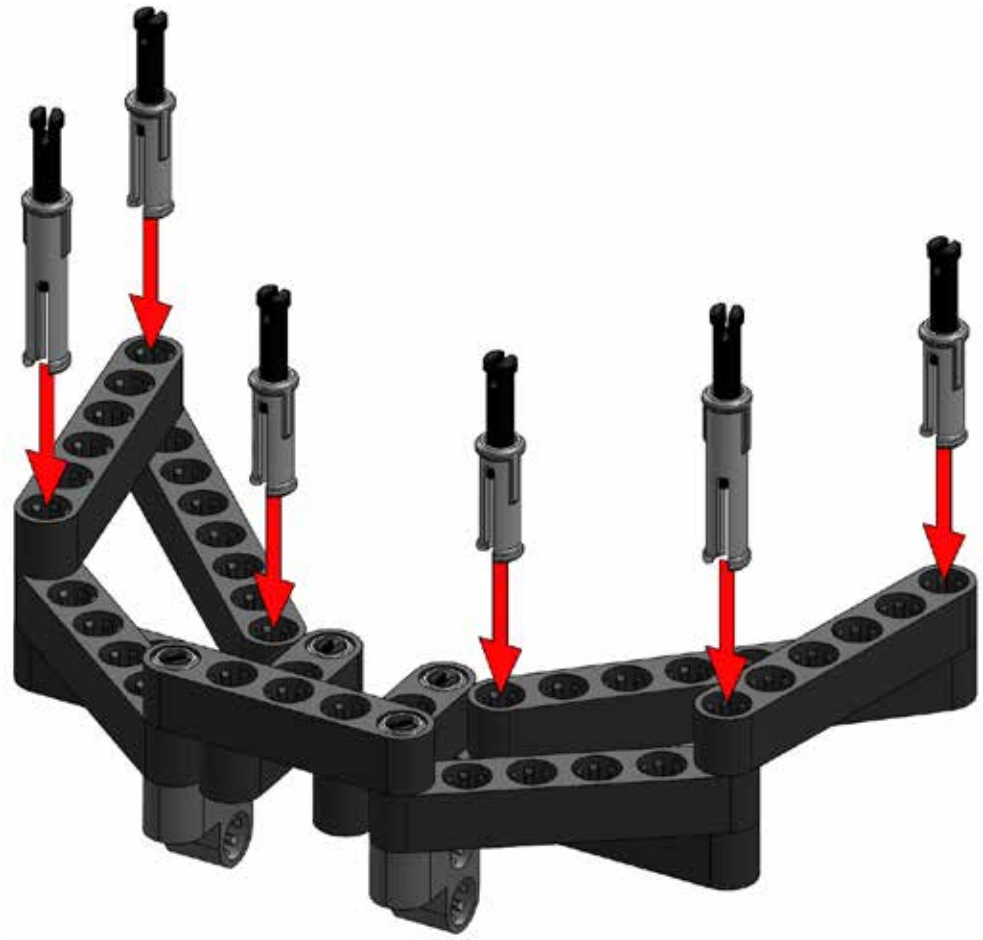
03

x2
8-BEAM

x2
6-BEAM

x2
3-ROTATE

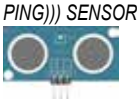
x4
2-ROTATE



x5
4-BEAM

x5
2-45 BEAM

x5
PING))) SENSOR



x10
#4-40 x 3/4" SCREW

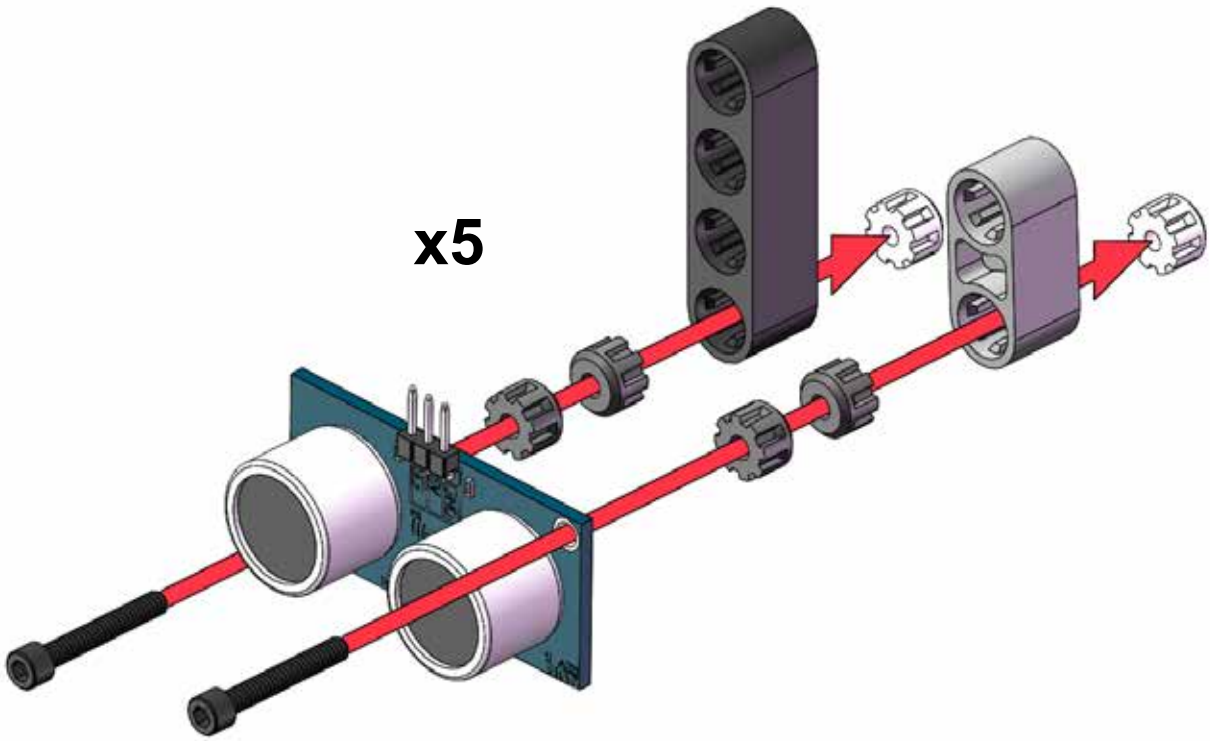
x20
CLEARANCE THREAD ADAPTER

x10
INTERFERENCE THREAD ADAPTER

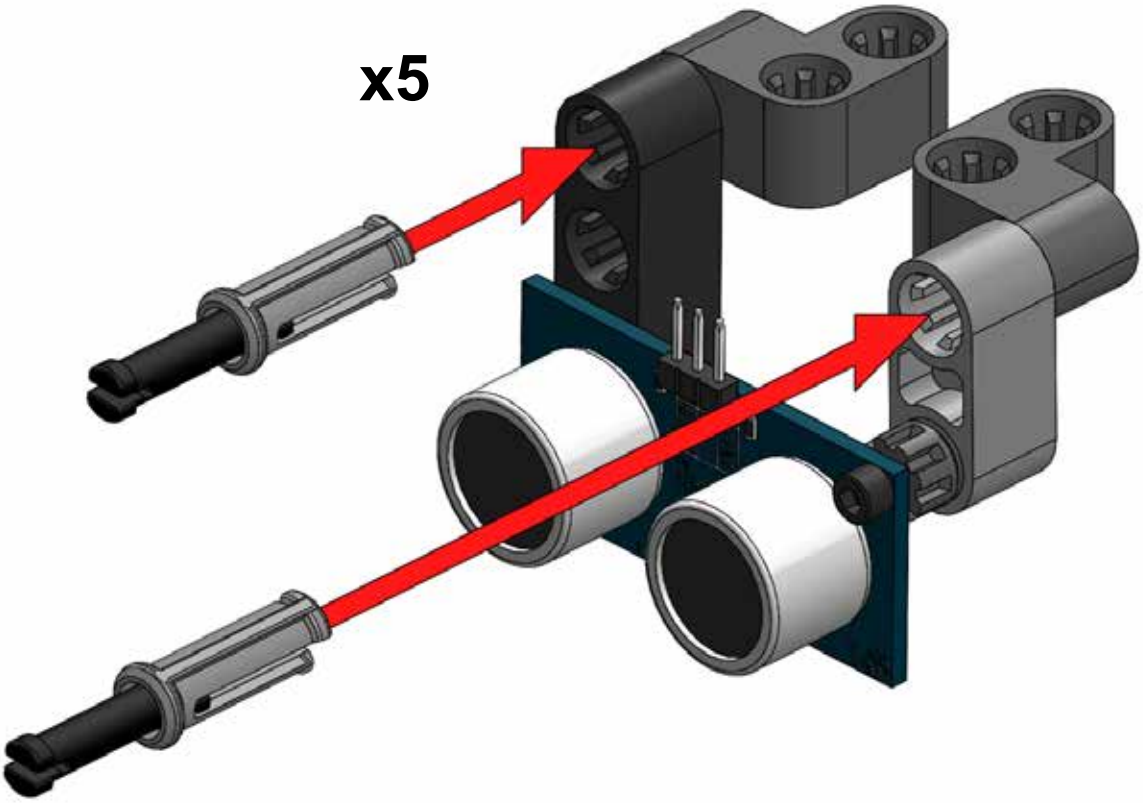
x10
TRANSITION

x10
2-LOCK

x5



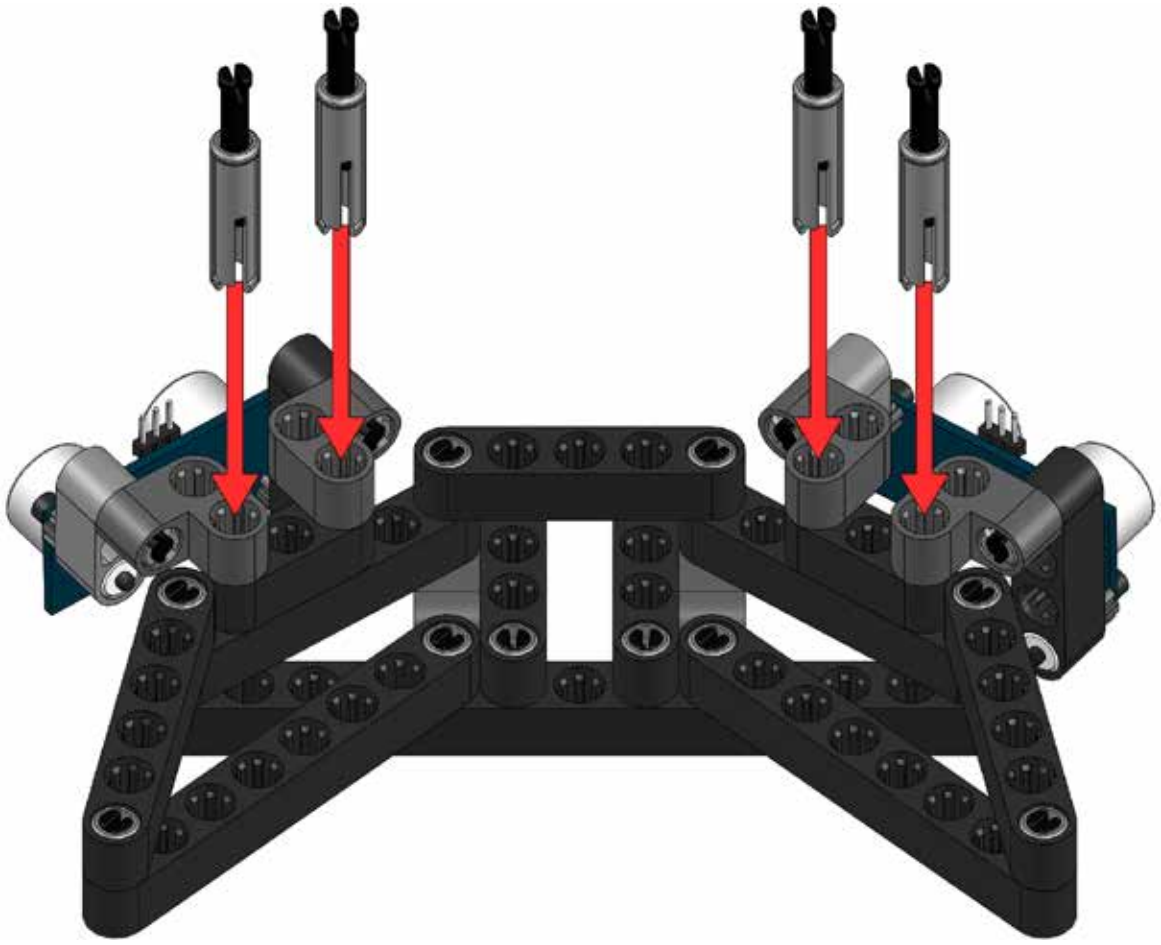
x5



06

x2
3-BEAM

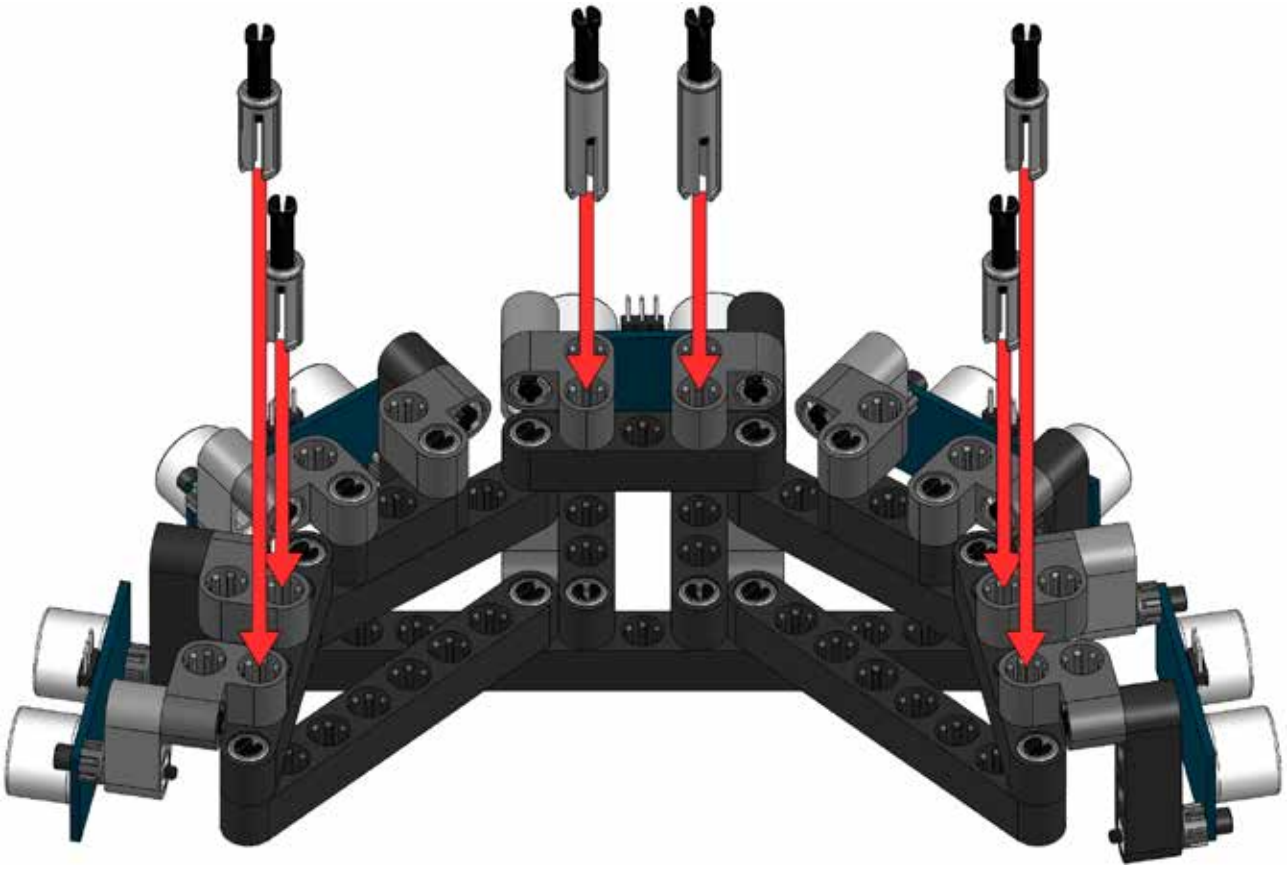
x4
3-LOCK



07

x2
3-LOCK

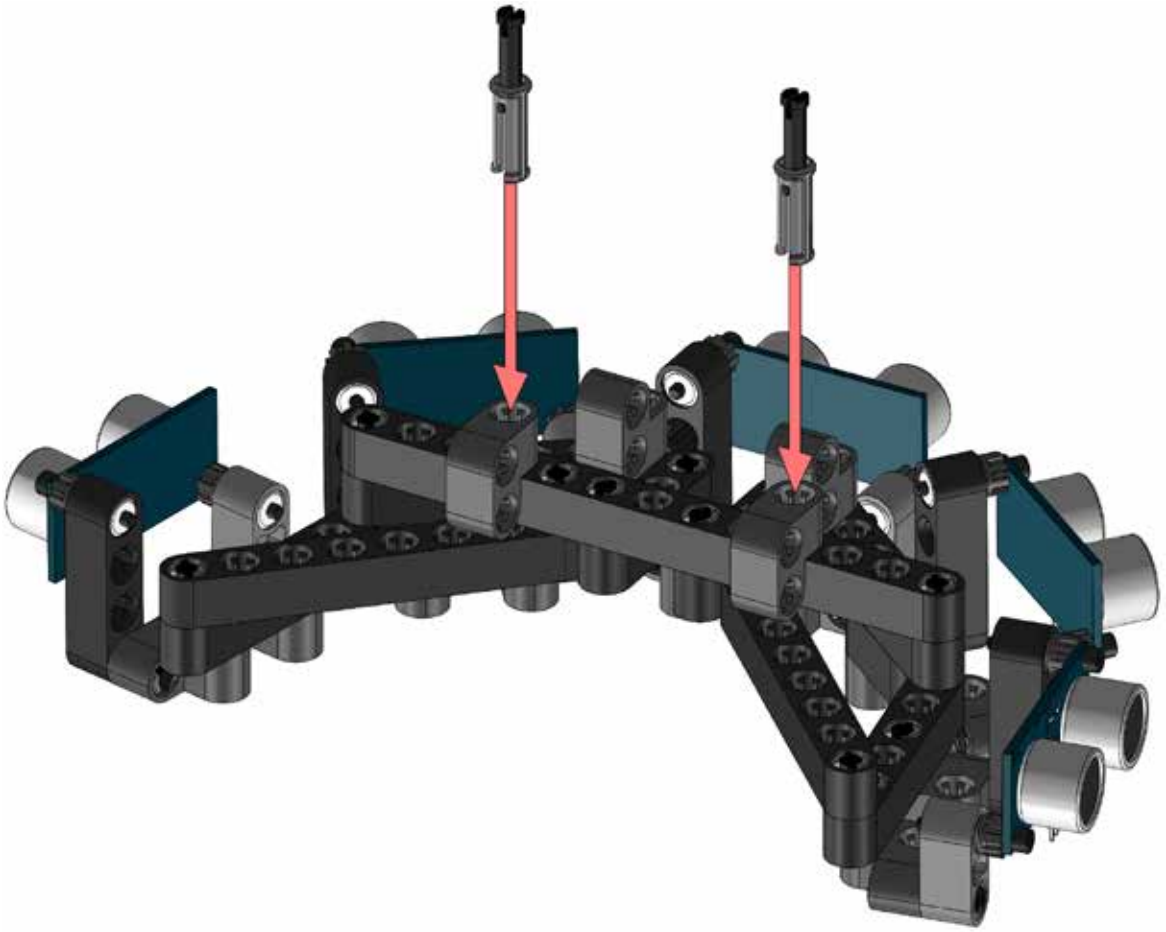
x4
2-LOCK



08

x2
TRANSITION

x2
2-LOCK



09

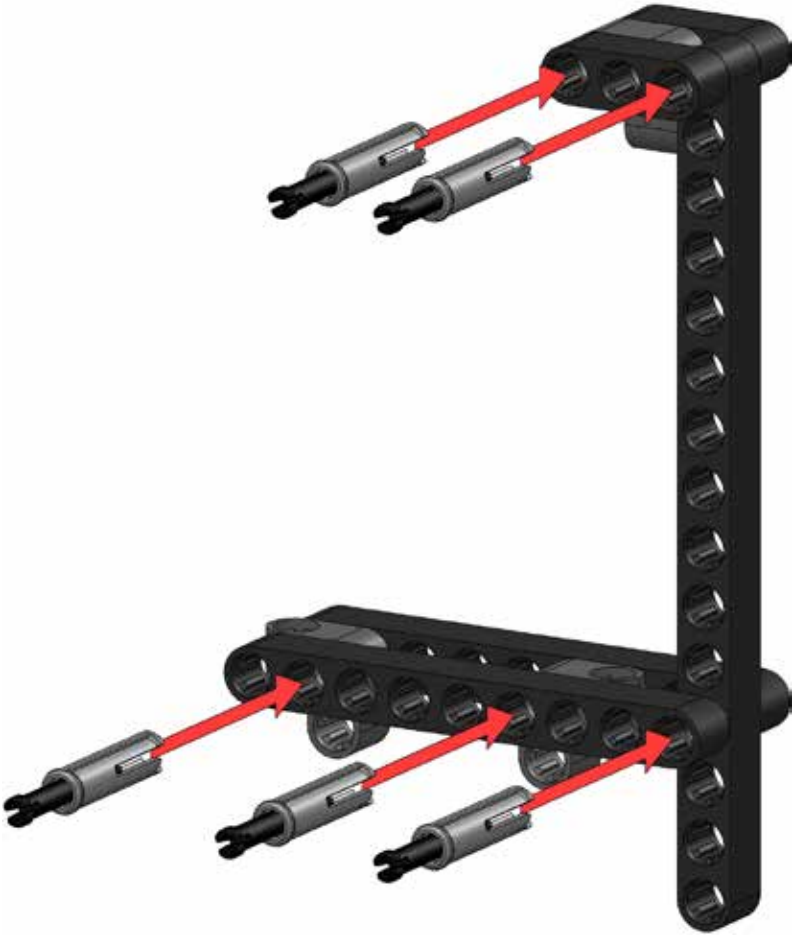
x1
15-BEAM

x2
9-BEAM

x2
3-BEAM

x3
TRANSITION

x5
3-LOCK



10

x1
11-45 BEAM

x1
TRANSITION

x2
2-LOCK

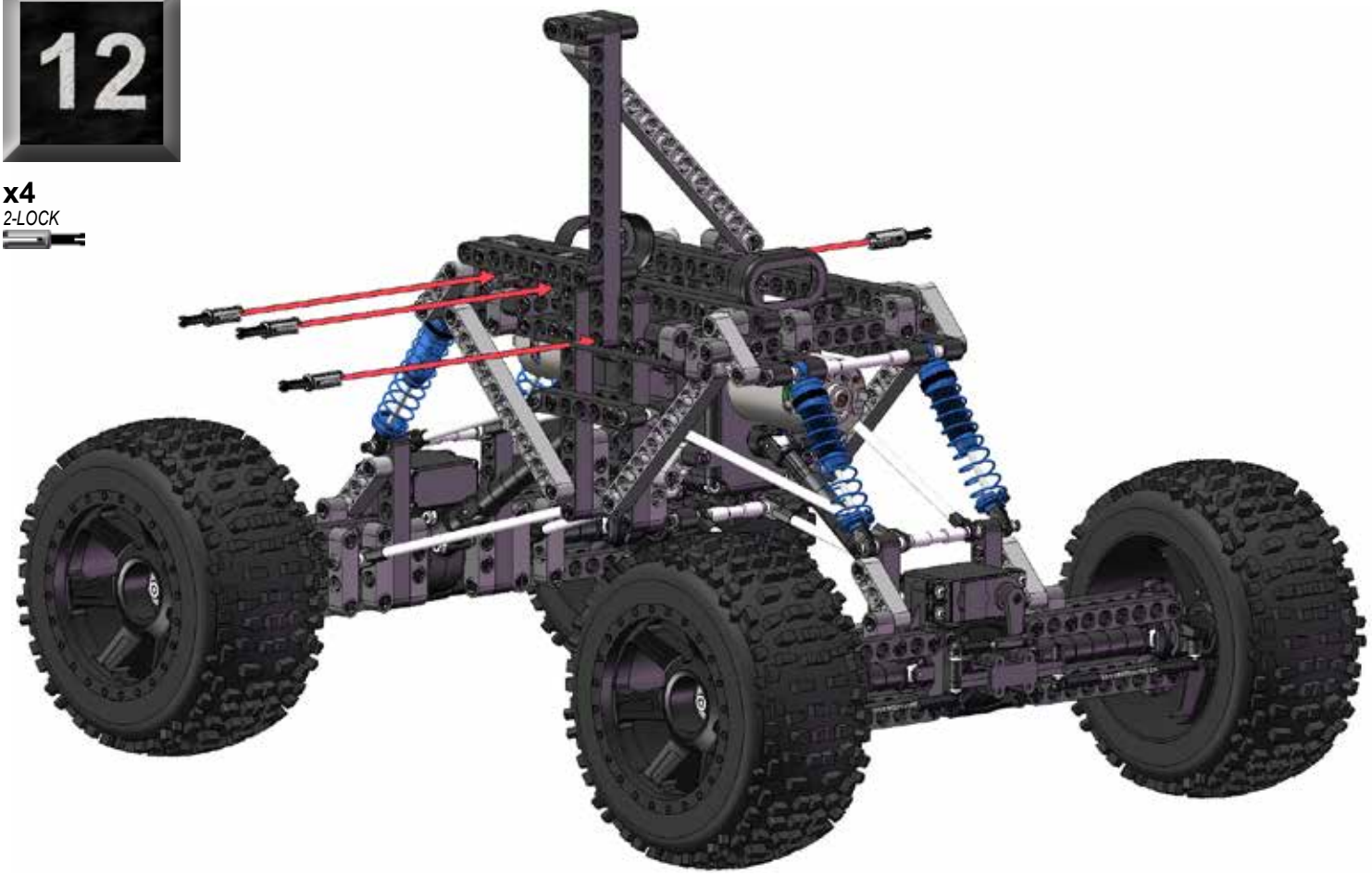
11

x2
TRANSITION

x2
2-LOCK

12

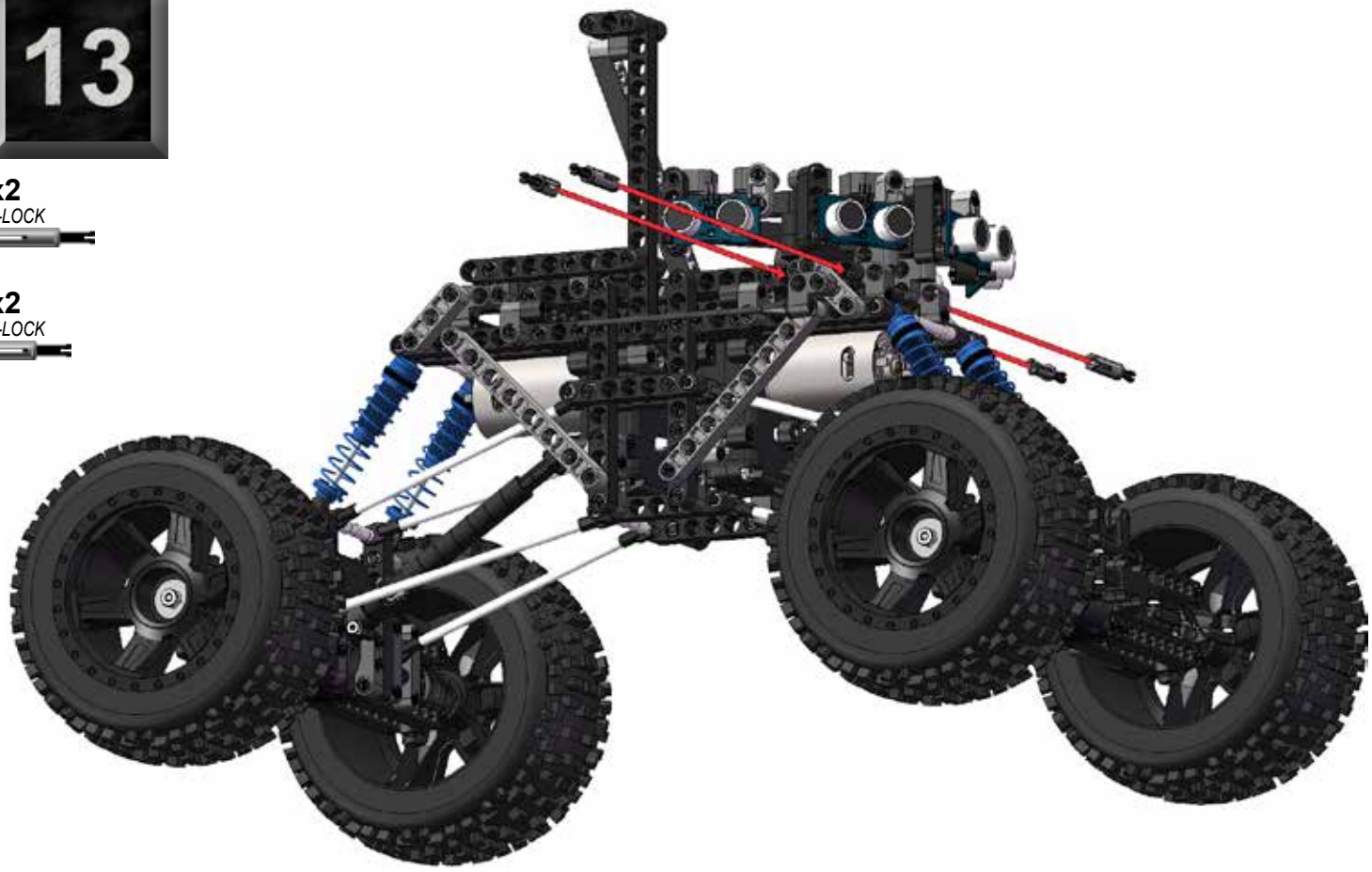
x4
2-LOCK



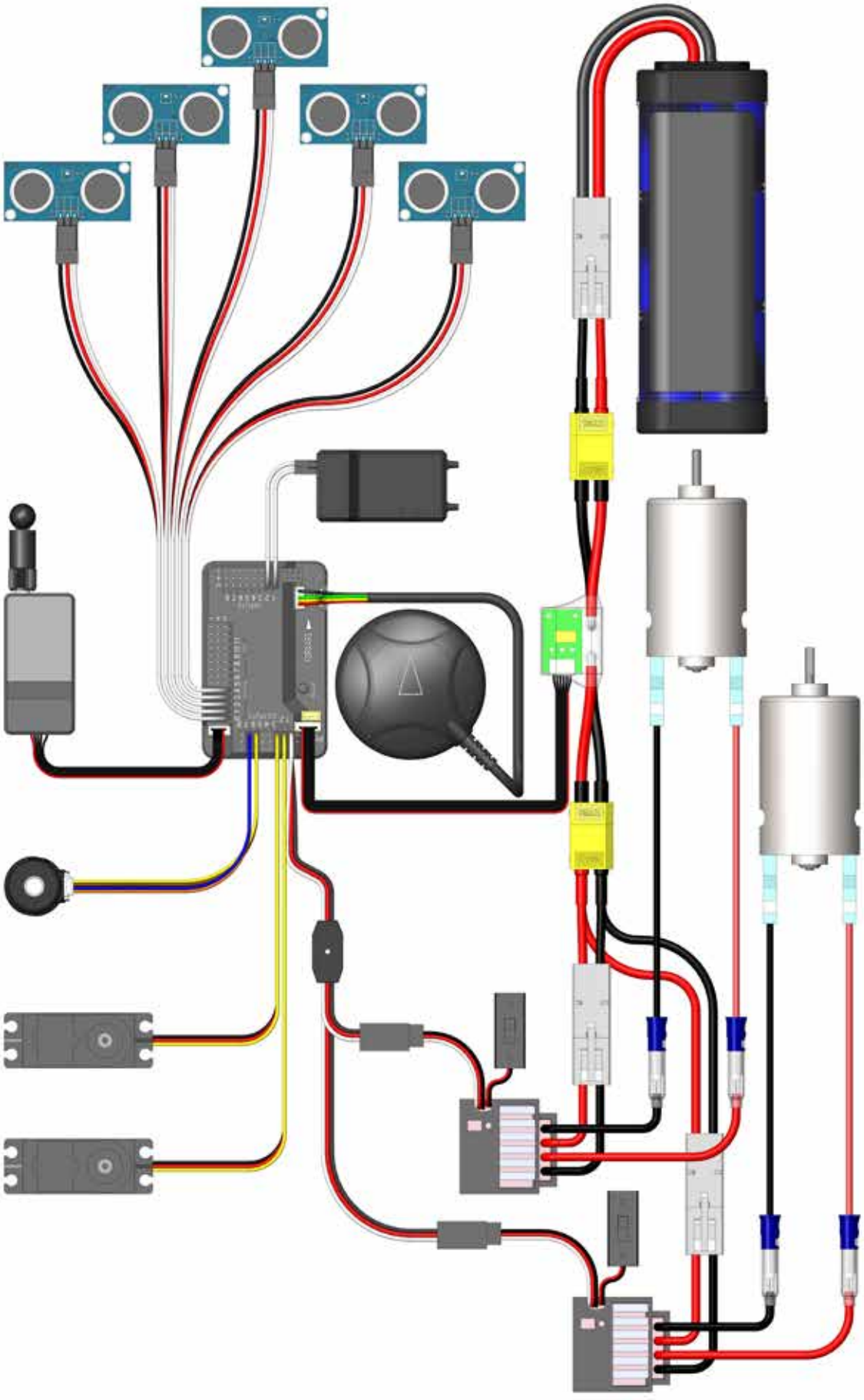
13

x2
3-LOCK

x2
2-LOCK



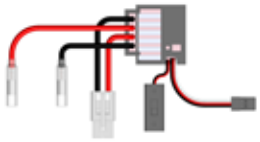
Electronics Wiring

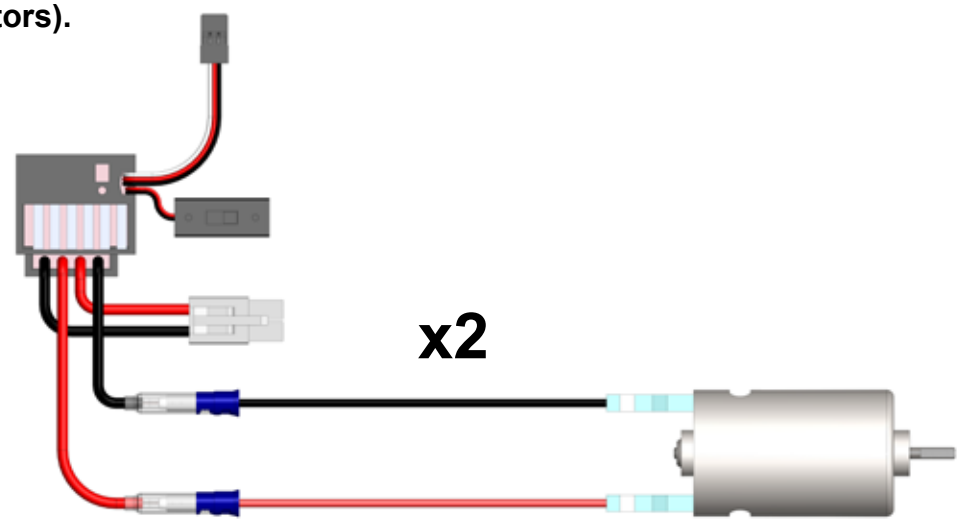


01 Wire Control Box on Robot

01 **Connect the ESC's to the Motors. (The red & black motor wires should already be attached to the motors).**

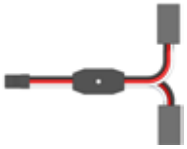
x2
ESC

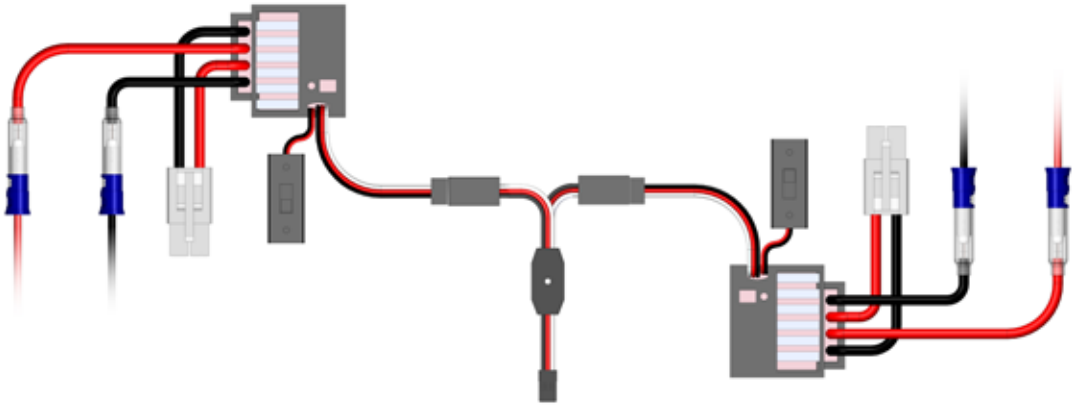




02 **Connect the Y-Harnes to the ESCs.**

x1
Y-Harness

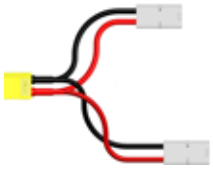


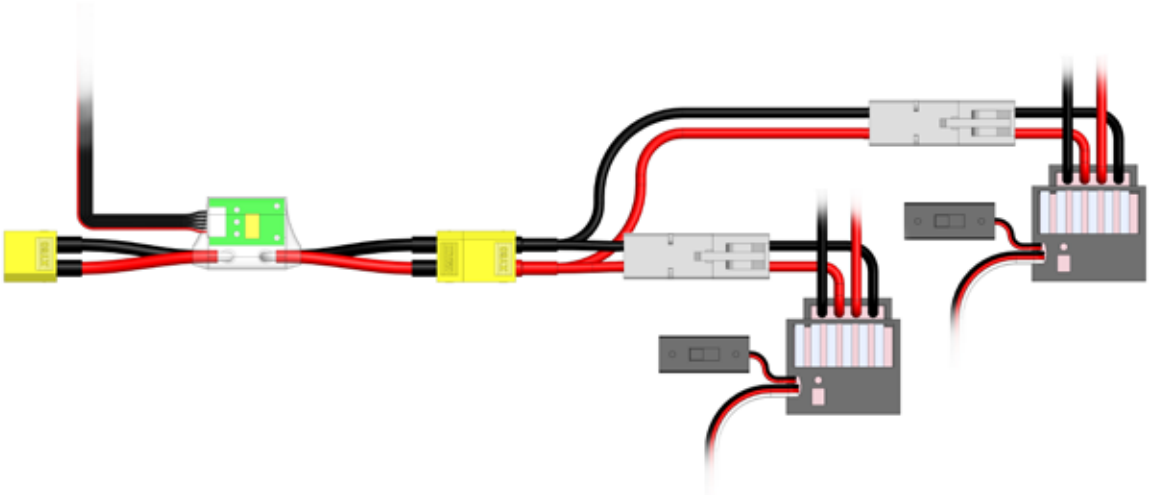


03 **Connect the ESCs to the Power Module through the Power Y.**

x1
Power Module

x1
ESC to Power Y

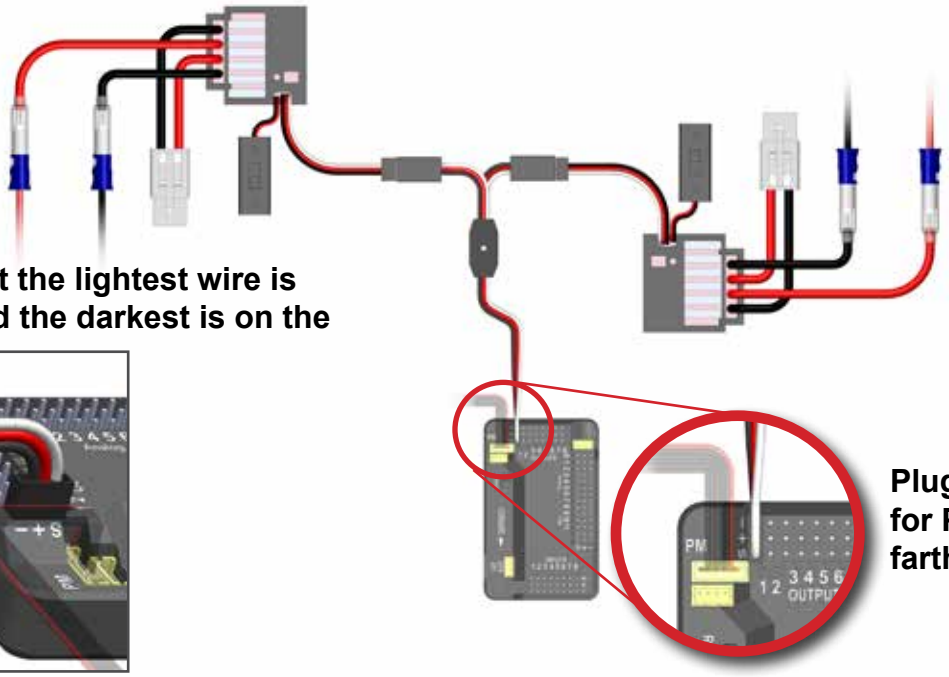




04 Connect the Power module to the flight controller box.

x1
Flight Controller Box

05 Connect the ESCs through the Y-Harness to Pin 1 on the flight controller box.

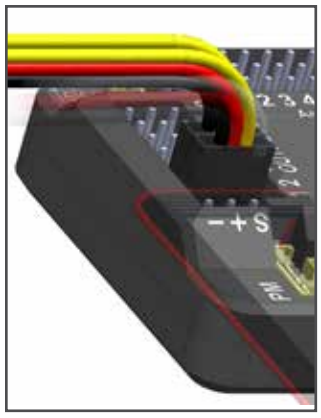


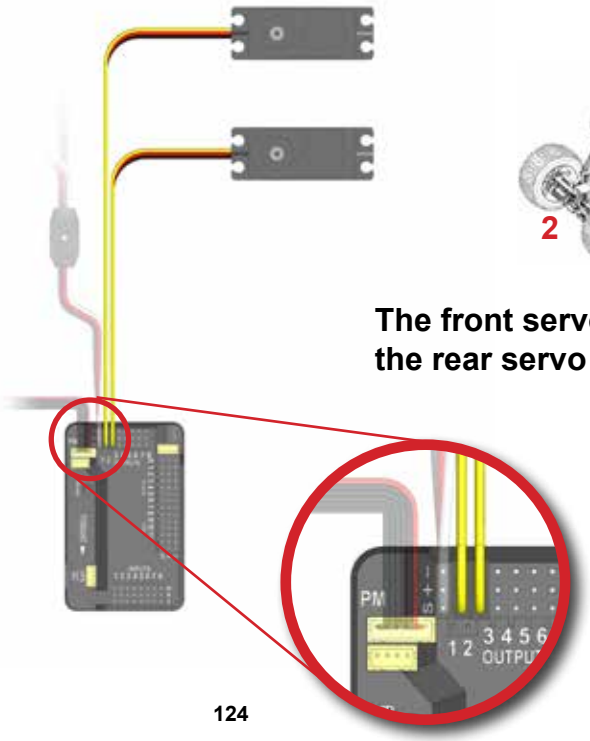
Make certain that the lightest wire is on the inside and the darkest is on the outside.

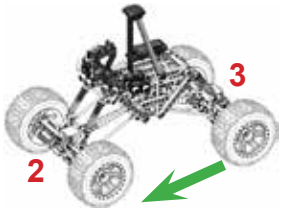
Plug into socket for Pin 1, the farthest to the left.

06 Connect the servos on the front and rear axles into pins 2 and 3 respectively on the flight controller box.

Make certain that the lightest wire is on the inside and the darkest is on the outside.





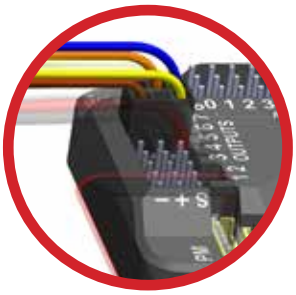


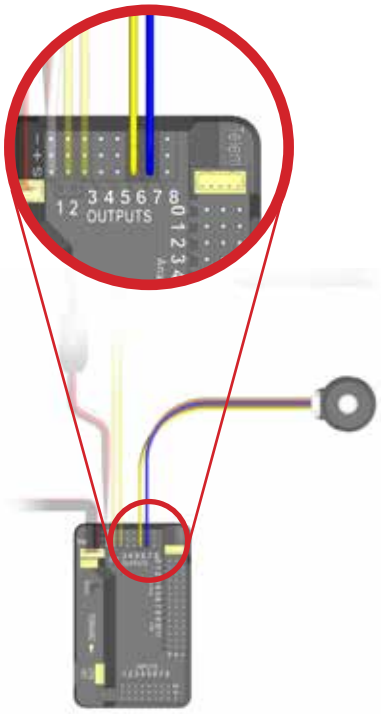
The front servo goes into Pin 2 and the rear servo goes into Pin 3.

07

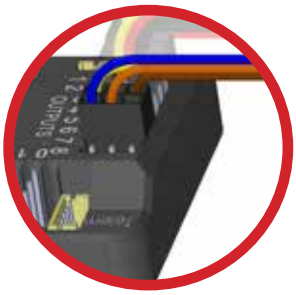
Connect the two plugs coming from the encoder (already mounted in one of the motor assemblies) to pins 6 and 7 on the flight controller box. The orientation of the plugs is as pictured.

The plug with the wires spread goes into pin 6.





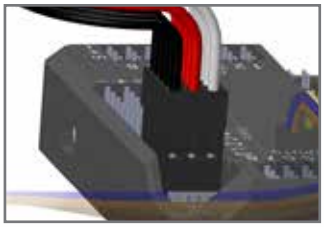
The plug with the wires close together goes into pin 7.

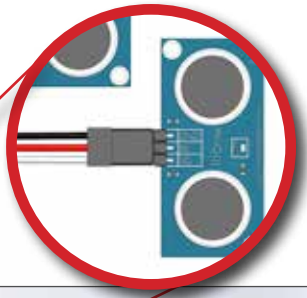


08

Connect the ping array to pins 0 through 4 from left to right.

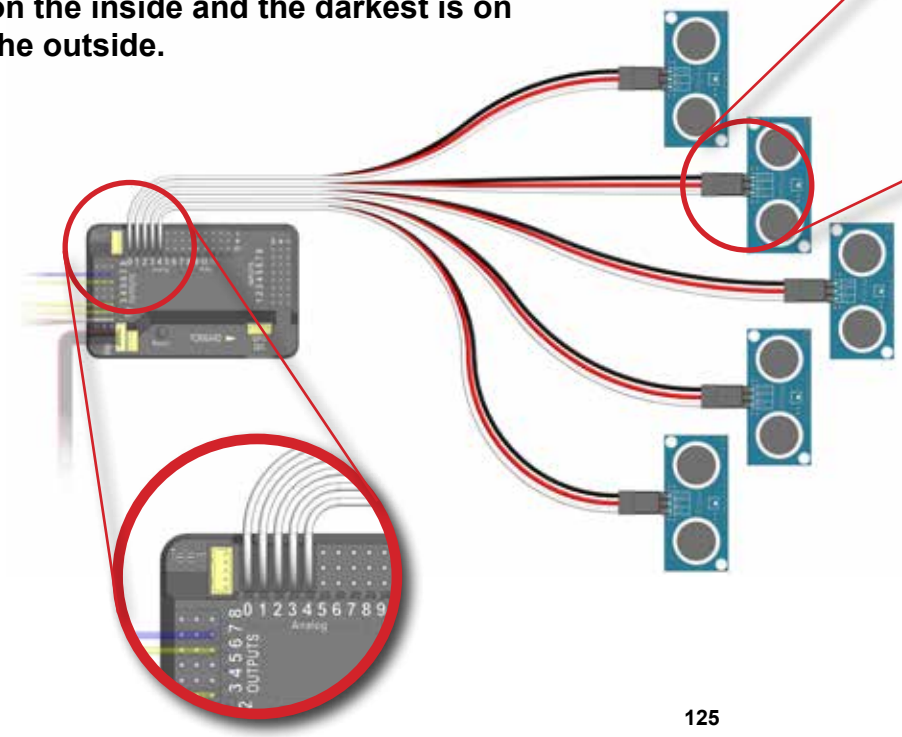
x5
3-PIN CABLE FLAT TO LATCH

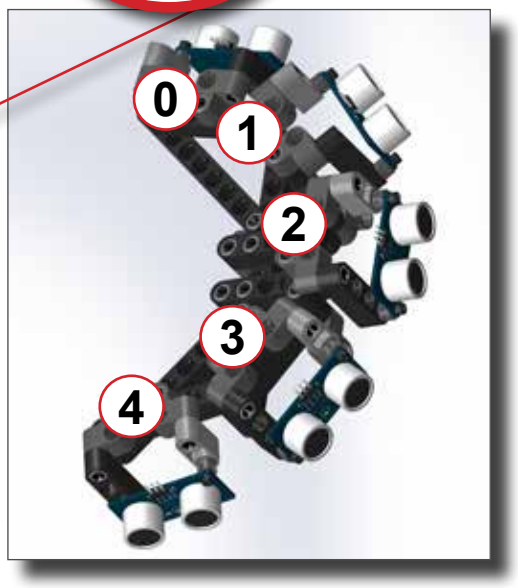




Match this plug orientation.

Make certain that the lightest wire is on the inside and the darkest is on the outside.



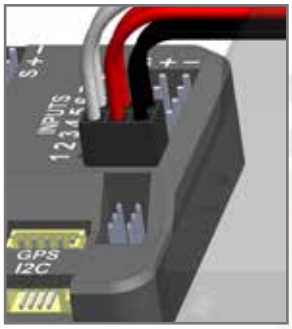


09

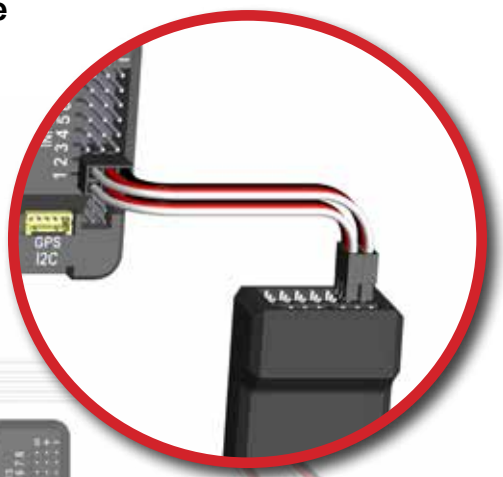
Connect the radio reciever to Input pins 1 and 2 using the male to male servo cable.

x1
Radio Reciever

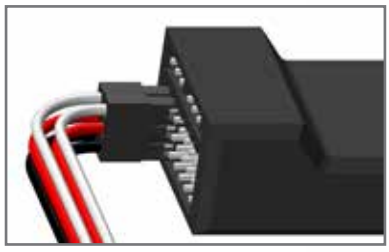
x2
SERVO CABLE MALE TO MALE

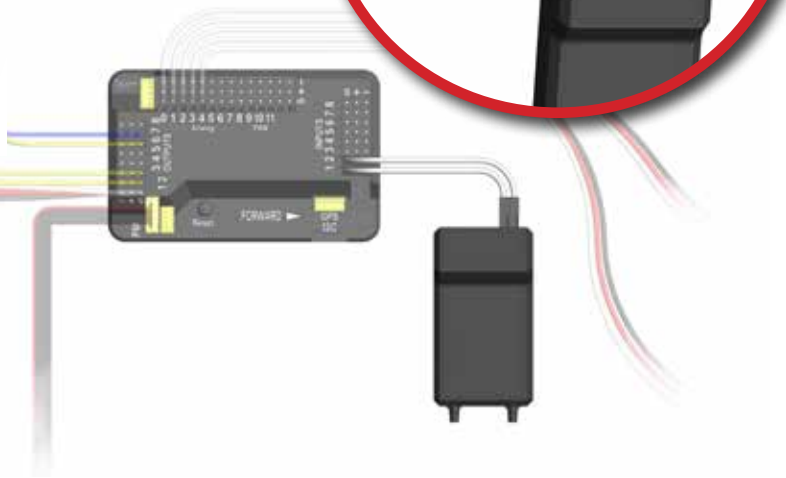


Ch1 is connected to pin 2 and Ch2 is connected to pin1.



The lightest wire is to the inside and the darkest on the outside for both connections.

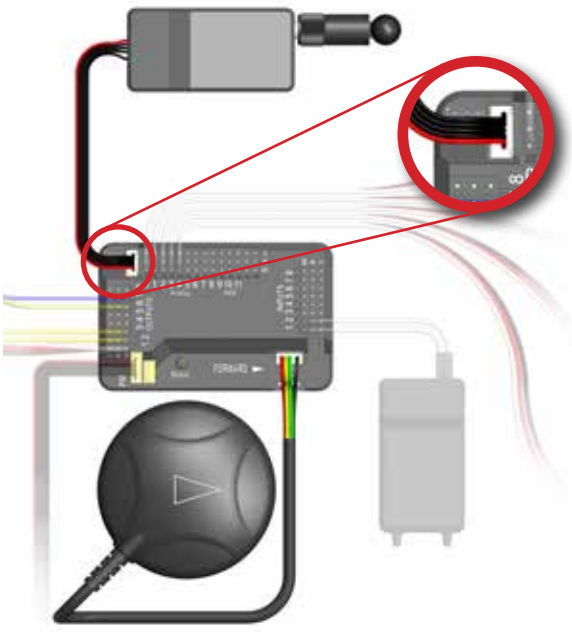




10

Attach the optional parts: telemetry radio and gps / compass module.
TO USE THE INTERNAL COMPASS ON THE FLIGHT CONTROLLER INSTEAD OF THE COMPASS ON THE GPS SEE PG ? OF APPENDEX ?.

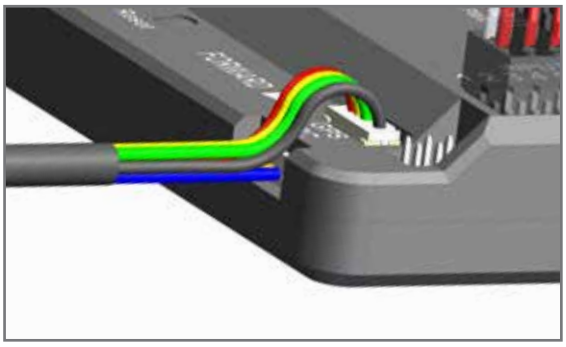
Plug the 5 pin plug from the telemetry radio into the port marked “telem” on the flight controller. Make certain the orientation is correct.



The gps / compass module has two plugs: a 5 pin and a 4 pin. Both plugs need to plug into the flight controller module. These plugs go into the two sockets labeled “GPS”.

The 5 pin goes into the top face above the “GPS” lable. The 4 pin plug goes into the side face below the “GPS” label as shown below. Make certain the plug orientation is correct.

TO GPS ←



Flight Controller Programming & Radio Control Setup

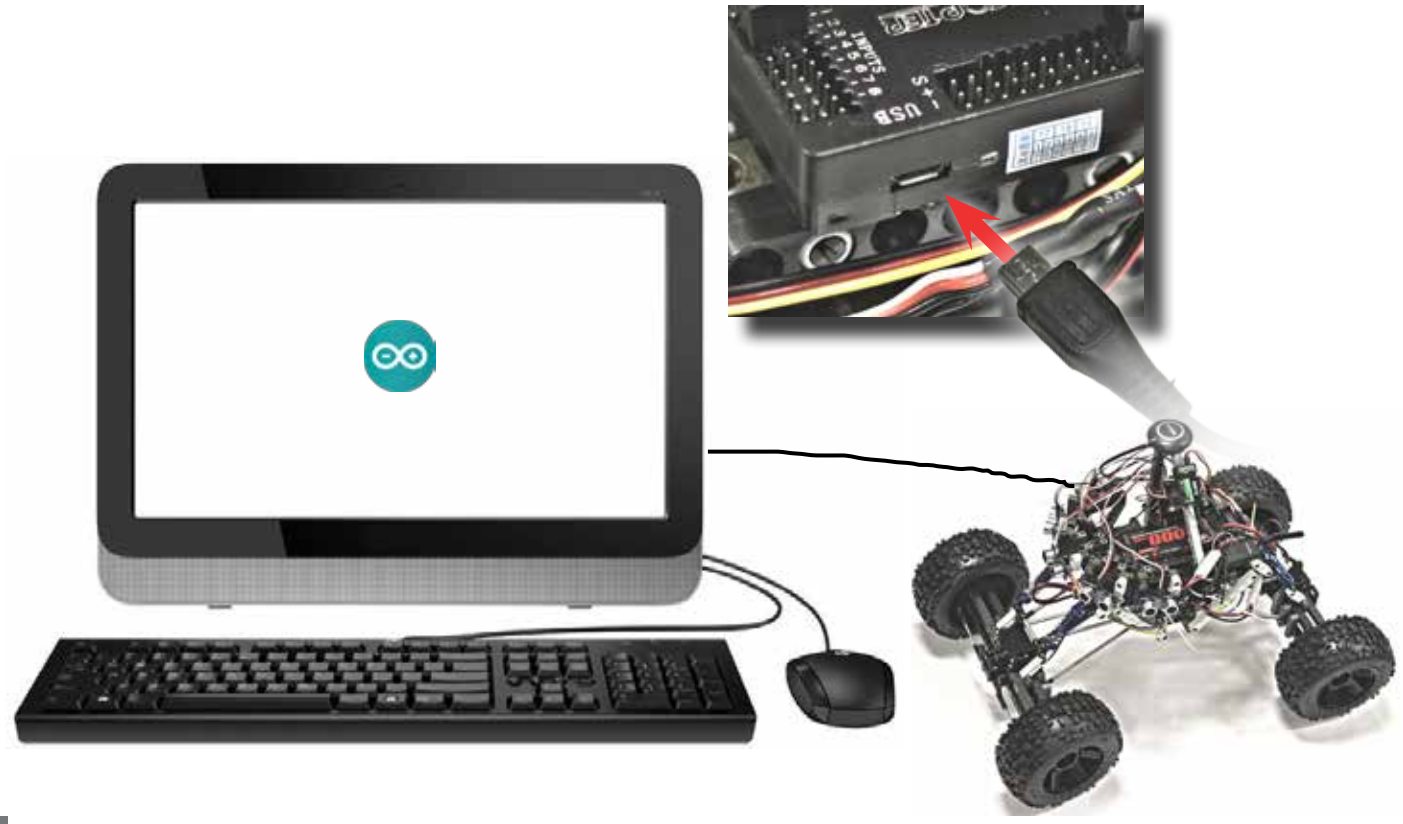
01 Introduction

The following steps will cover programming the flight controller and setting up the radio. There are three parts to this:

- **Calibrating the sensors**
- **Loading the drive program on the controller box.**
- **Setting up the radio**
- **Connecting the steering servos**

Data is saved in the electronics after the sensor calibration and the radio setup. DO NOT OMIT! Both of these steps must be performed for software in the controller box to function.

01 **Plug the flight controller into the computer using the usb cable. LEAVE THE BATTERY UNPLUGGED.**



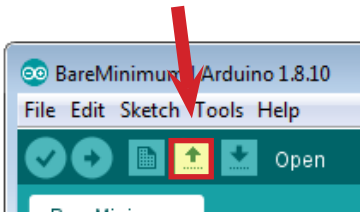
02 **Open the arduino program loaded on the computer.**

For more information on installing and working with arduino see the “Arduino Users Guide” included with this kit.

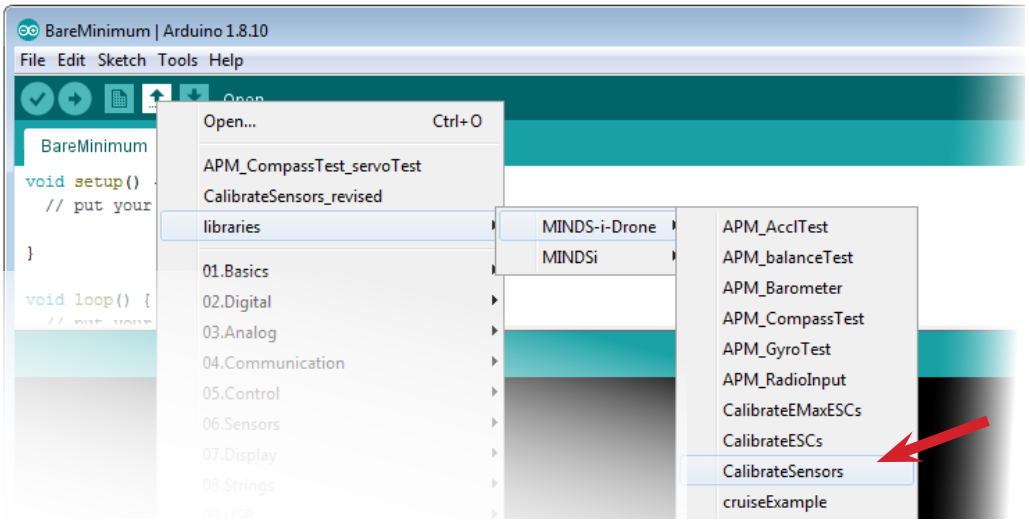
02 Calibrate Sensors

01 **In arduino, open the program: CalibrateSensors**

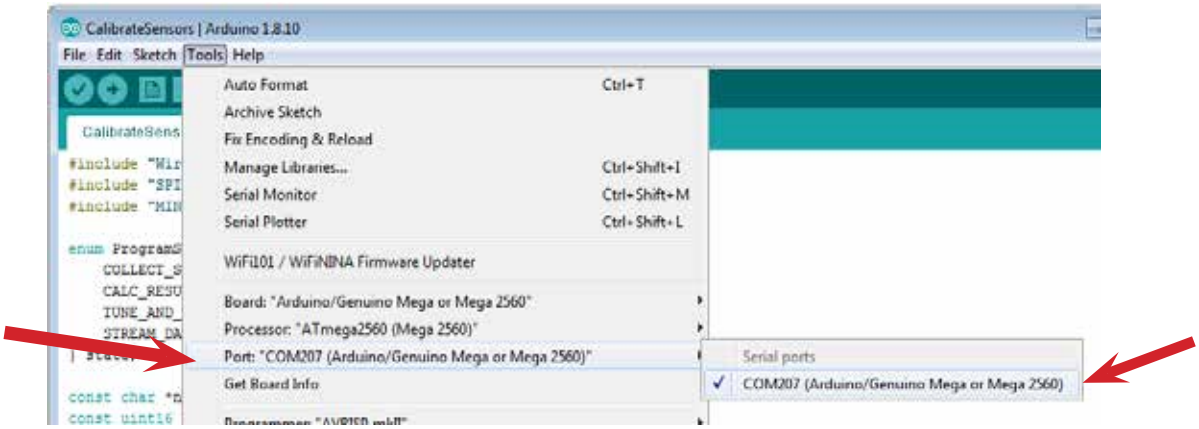
Click the open icon



OPEN: libraries > MINDS-i-Drone > CalibrateSensors

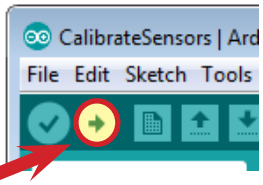


02 **Check that the correct board (mega 2560) and port are selected as shown:**

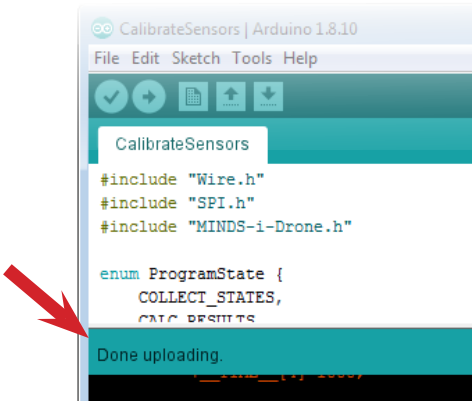


03 **Upload the calibrate sensors code onto the flight controller box:**

Upload the code:

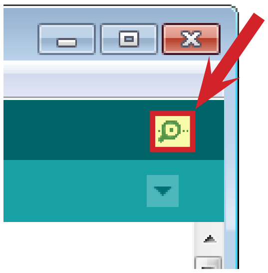


Wait until the upload completes:

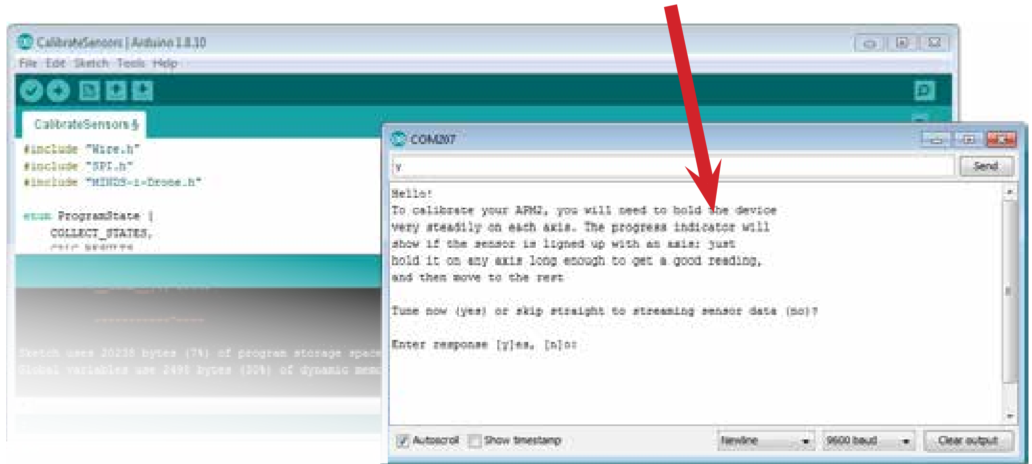


04 Once the upload is complete, open the serial monitor:

Click the serial monitor icon.



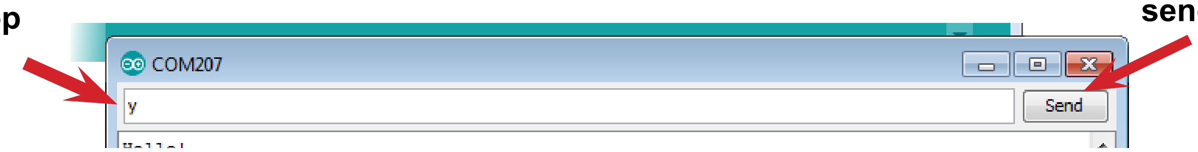
Wait until a message is displayed in the serial monitor.



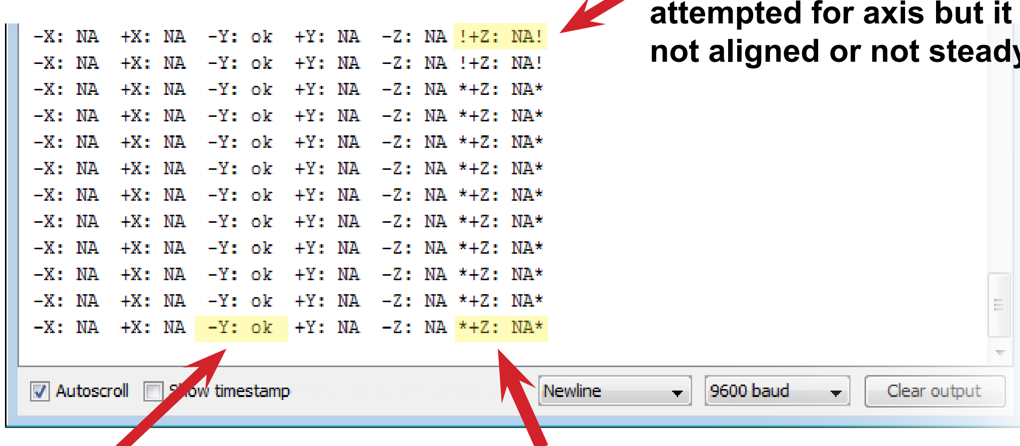
05 Once the message is displayed answer yes to the prompt.

Enter 'y' in the top bar.

Hit send.



Lines of scrolling text will apear with labels for the axes: x,y and z. Each axis will have two columns, one for its positive direction and one for its negative direction.



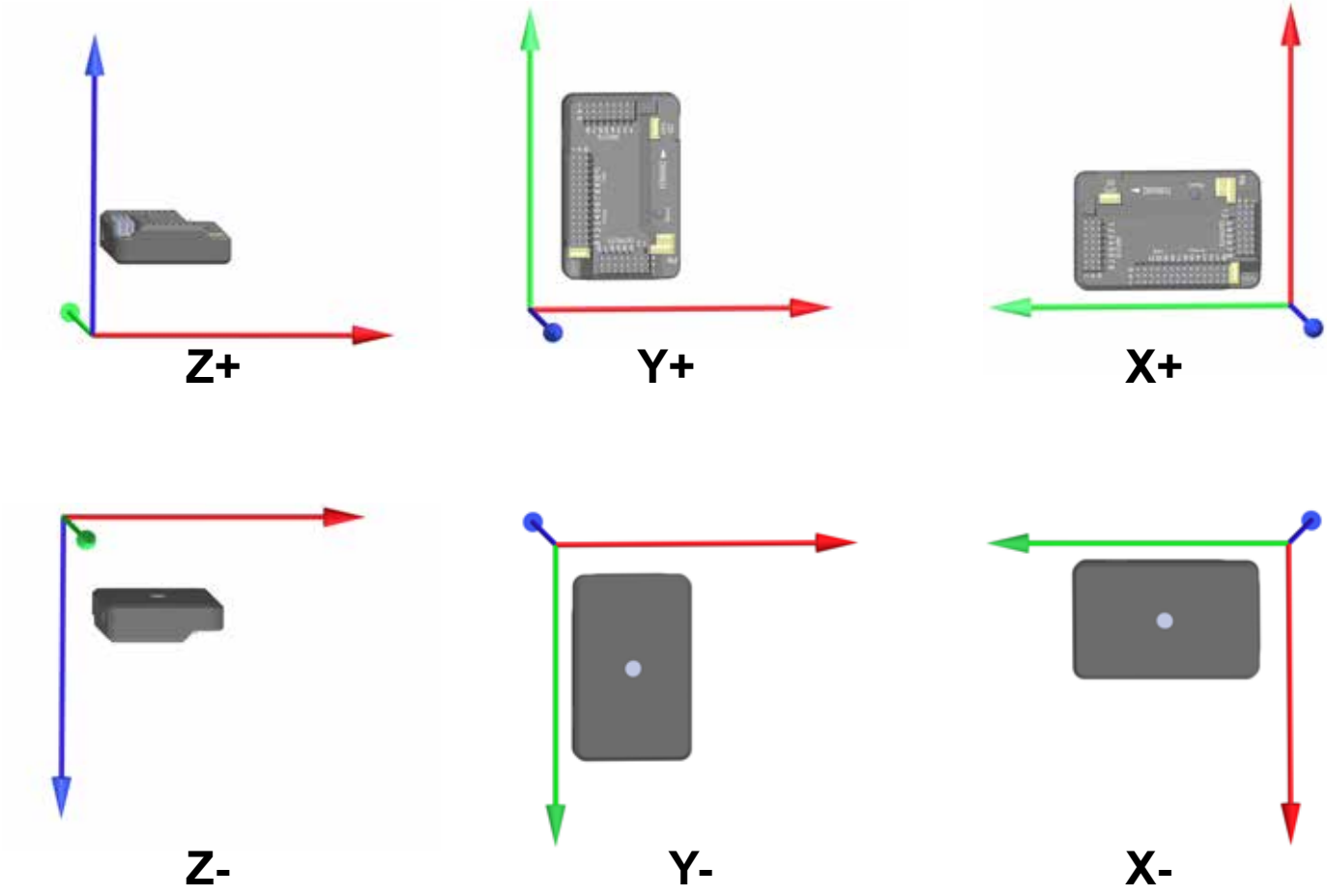
' ! ' : Calibration is being attempted for axis but it is not aligned or not steady.

'ok' : Axis calibration is complete.

' * ' : Axis is being calibrated.

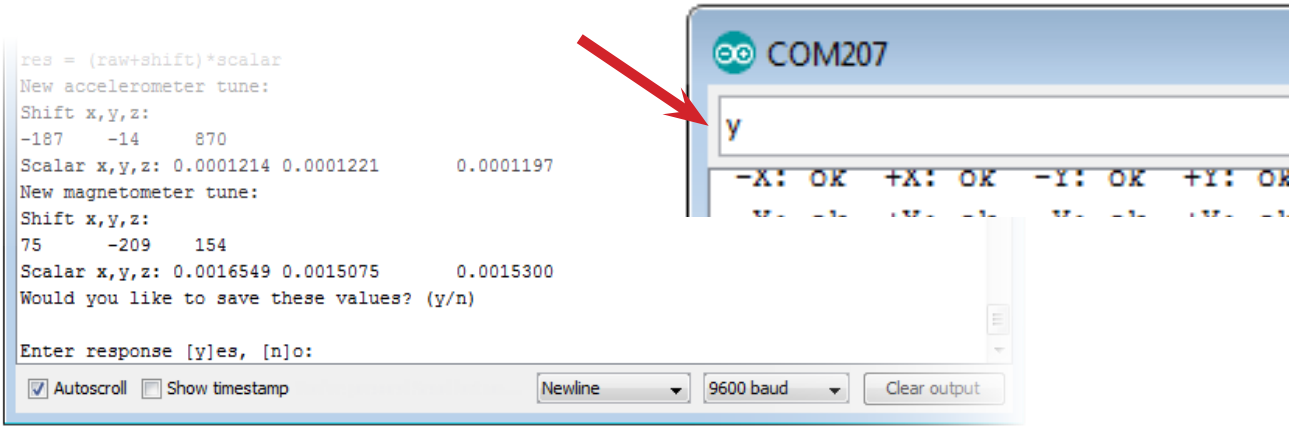
06 **Calibrate the accelerometer chip for each of the six possible orientations as shown below.**

For each orientation hold the controller box as steady as possible until the indicator beside the orientation label changes from “NA” to “ok”.



Once the accelerometer has been calibrated for all axes, the scrolling will stop.

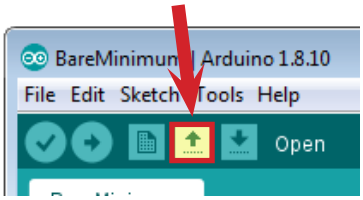
07 **Once the scrolling stops answer the prompt with ‘y’.**



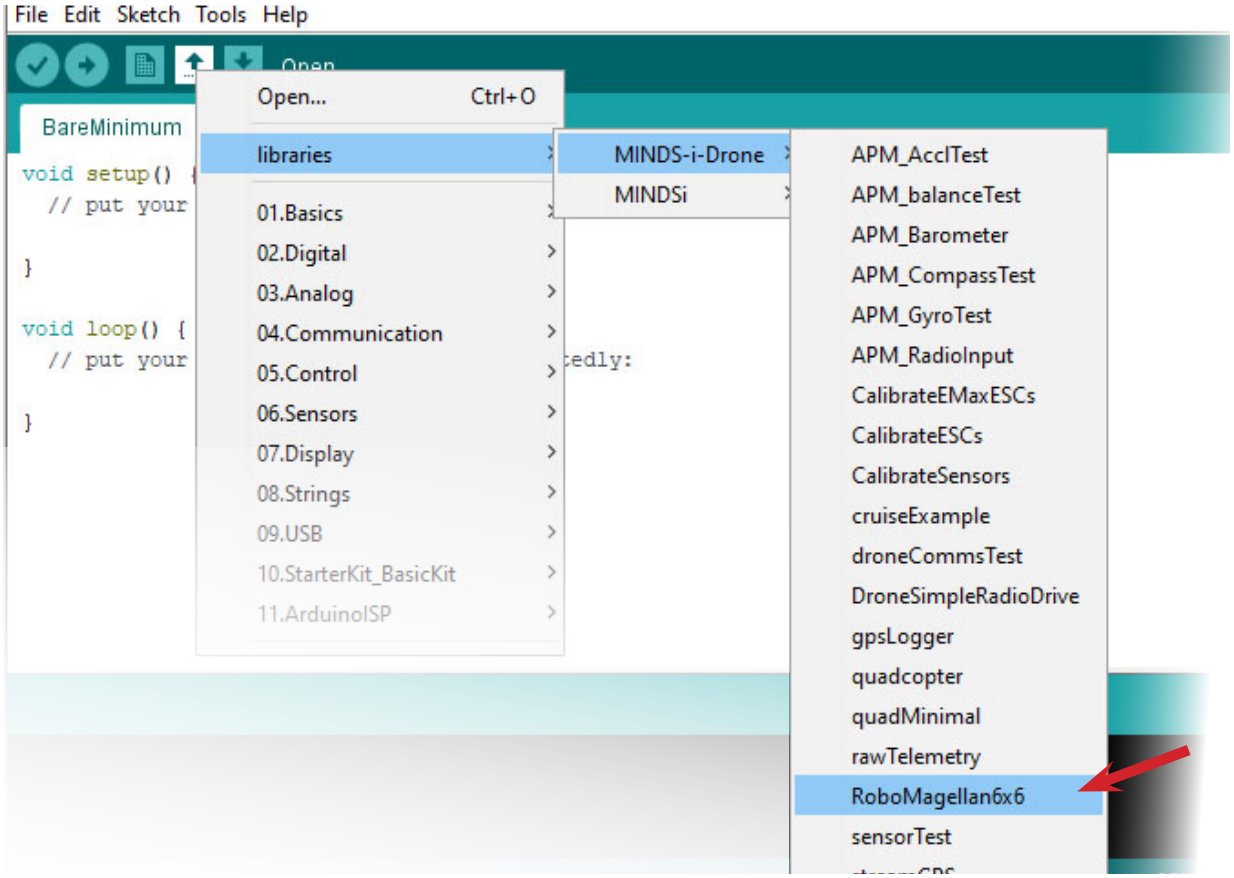
Another screen with scrolling values will appear. Unplug the controller box from the computer

03 Load Control Program

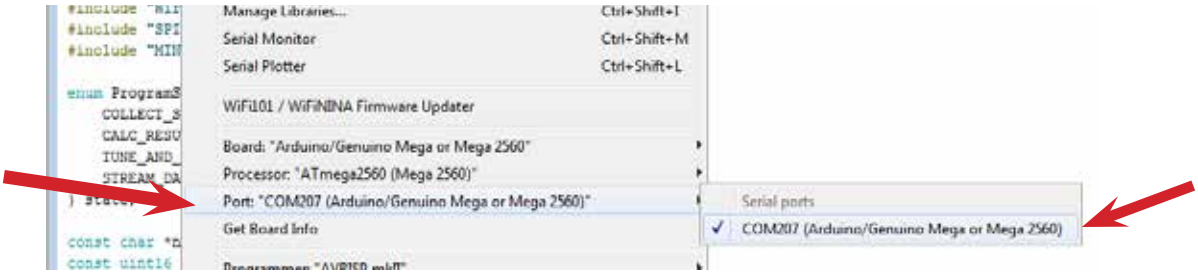
01 **In arduino, open the program: RoboMagellan6x6**



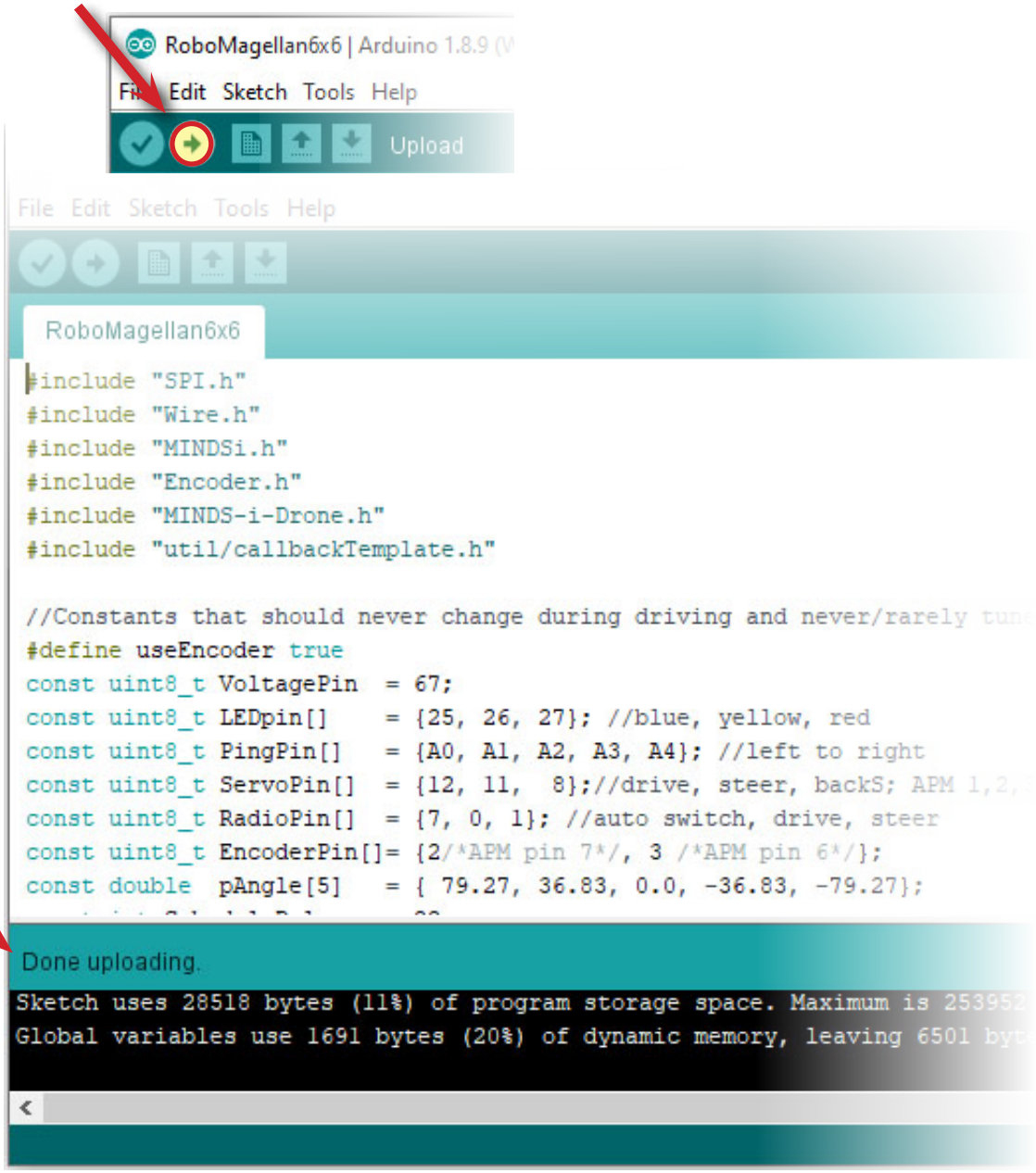
OPEN: libraries > MINDS-i-Drone > RoboMagellan6x6



02 **Check under the “tools” drop down menu, that the correct board (mega 2560) and port are selected as shown before:**



03 Upload the code:



Wait until the upload completes:

03 Unplug the USB cable from the Flight Controller.

Setup The Transmitter

TURNIGY TGY-I6S
Transmitter Operation Reference:

01 **Turing the transmitter on:**

Move left stick down

Move all the switches up.

HOLD BOTH BUTTONS AT THE SAME TIME UNTIL IT TURNS ON

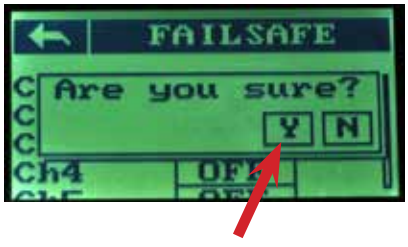
02 **Turn the transmitter off by pressing and holding both buttons simultaneously until it turns off.**

HOLD BOTH BUTTONS AT THE SAME TIME UNTIL IT TURNS OFF

01 **To get into the configuration menu press: “Setup”.**

02 **Once in a menu, to save changes and/or exit back to the main screen, press the back icon as many times as necessary.**

03 **If a prompt appears, answer “Y” to save changes.**



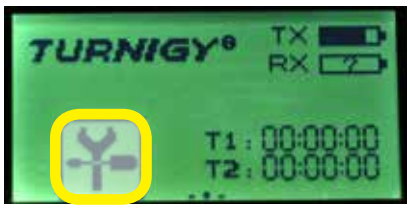
Additional operations are discussed in the appendex.

04

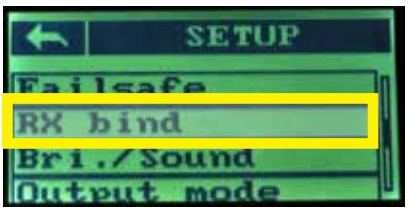
Bind the transmitter to the receiver on the robot.

This step allow the transmitter unit to control a specific drone. MAKE CERTAIN THE BATTERY IS NOT PLUGGED INTO THE ROBOT.

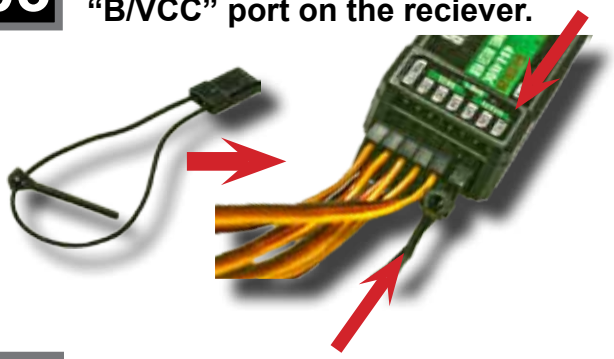
01 From the main screen of the transmitter press: 



02 Scroll down to “rx bind” and press it.

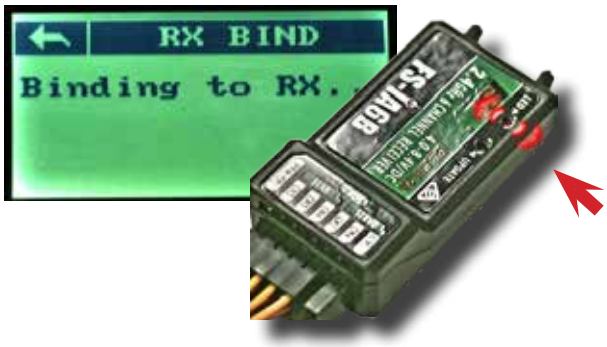


03 Connect the bind cable to the: “B/VCC” port on the reciever.

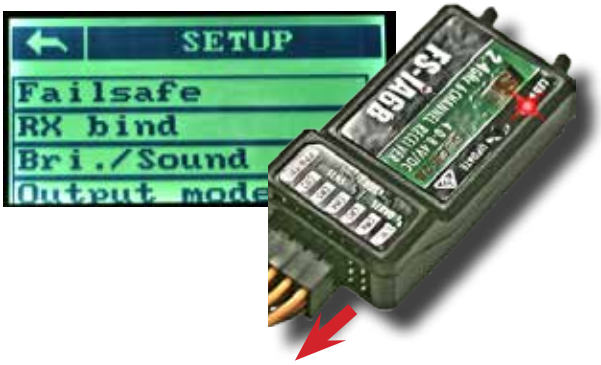


04 Make certain the transmitter is plugged into the flight controller. Plug the flight controller into the computer.

05 Wait for the led on the receiver to stop flashing.

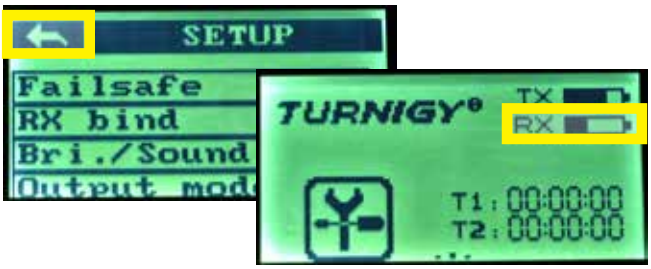


06 When the led turns solid **REMOVE THE BIND CABLE**.

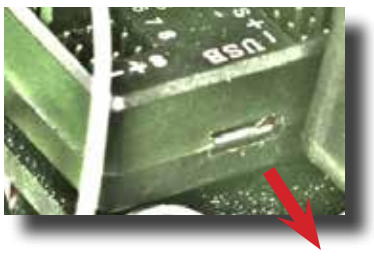


07 Press  to finish and return to the main screen.

If the bind was successful the battery icon to the left of “RX” should be partially filled instead of showing a question mark.

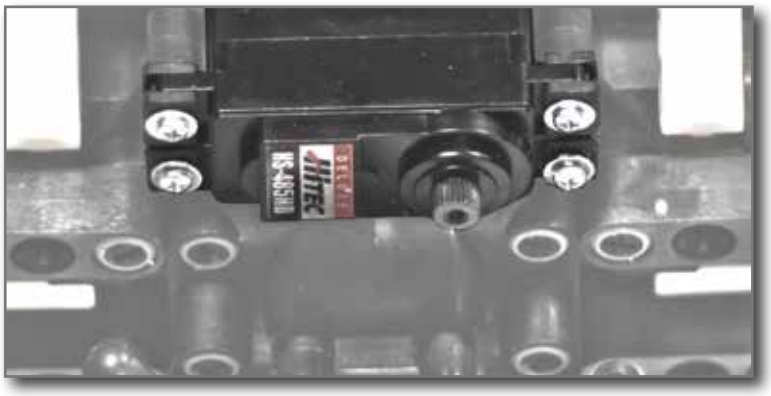


08 The usb power cable may now be unplugged from the robot.



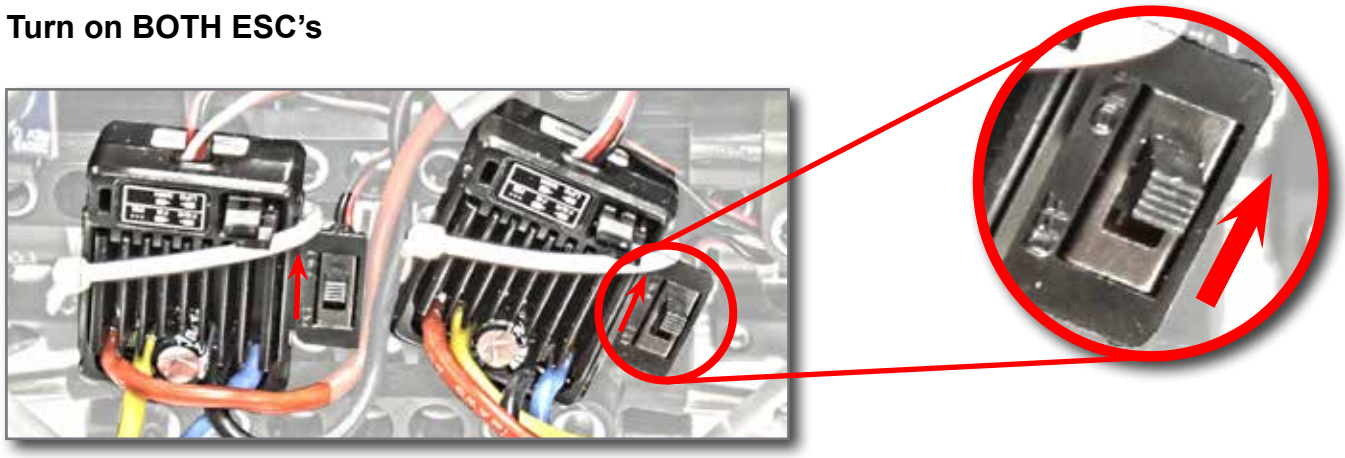
05 Connect the Steering Servos

01 **Disconnect the servo horns from the servos on the front & rear axles.**



02 **Turn the transmitter on**

03 **Turn on BOTH ESC's**



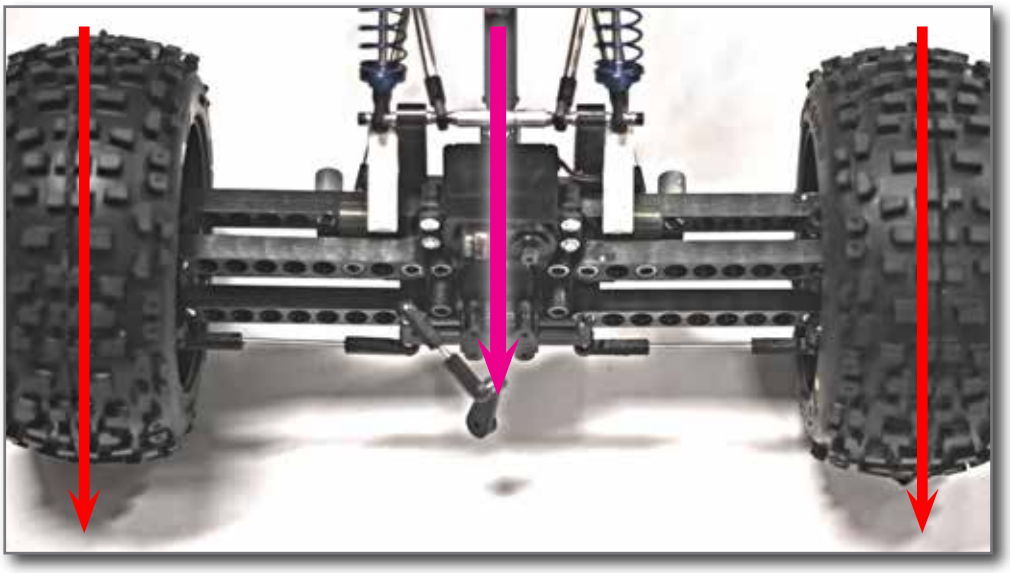
04 **Plug the battery into the robot using the adapter.**

x1
Adapter Plug

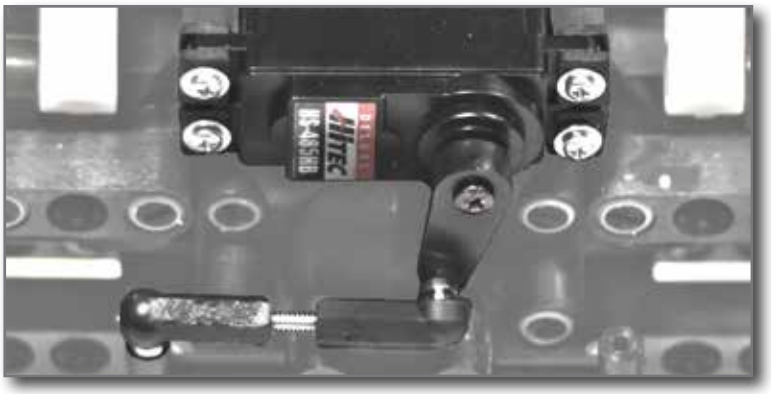
x1
Battery

After the flight controller is powered the servos will usually move slightly to their centered positions.

04 Align the wheels of the vehicle so that they are straight.



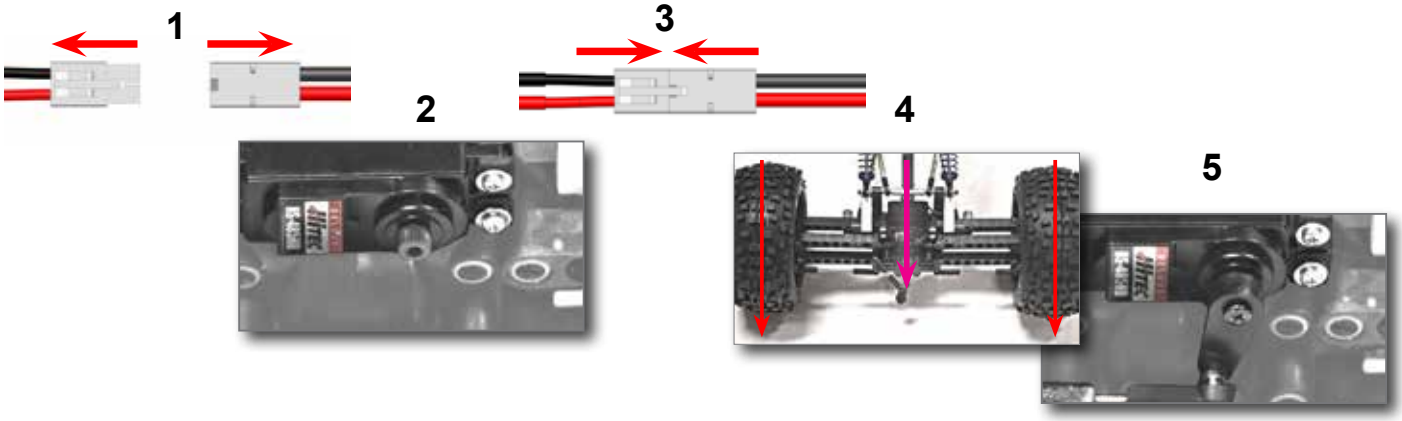
05 Connect the servo horns by gently pushing them back onto the servos. If the horn does not go on easily, twist it very slightly and push again. The teeth on the servo horn must slide between the teeth on the servo.



If the servo horn still does not slide on use the screw to push it onto the servo.

Be careful not to twist the servo or the wheels when connecting the servo horn.

If the servo is twisted by accident: unplug the battery; disconnect the servo from the horn; plug the battery back in; straighten the wheels; then connect the servo.



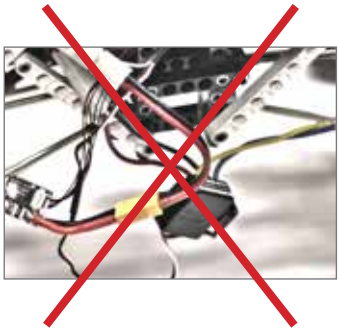
Use zip ties and velcro to secure the electronic components to the robot’s frame.

Operation

01 Checklist

Wear Safety Glasses if driving over loose material or outdoors.

Make certain that the battery is the correct voltage. Only use a 7.2V NiMH. Do NOT connect a battery without the adapter plug.



Make certain nothing is broken, no wires are loose and the battery, and other parts, are firmly secured.

Make certain the wheels can turn freely. Check for hair and other obstructions.

NEVER DRIVE THE ROBOT INTO PEOPLE, INCLUDING OPERATOR!!!

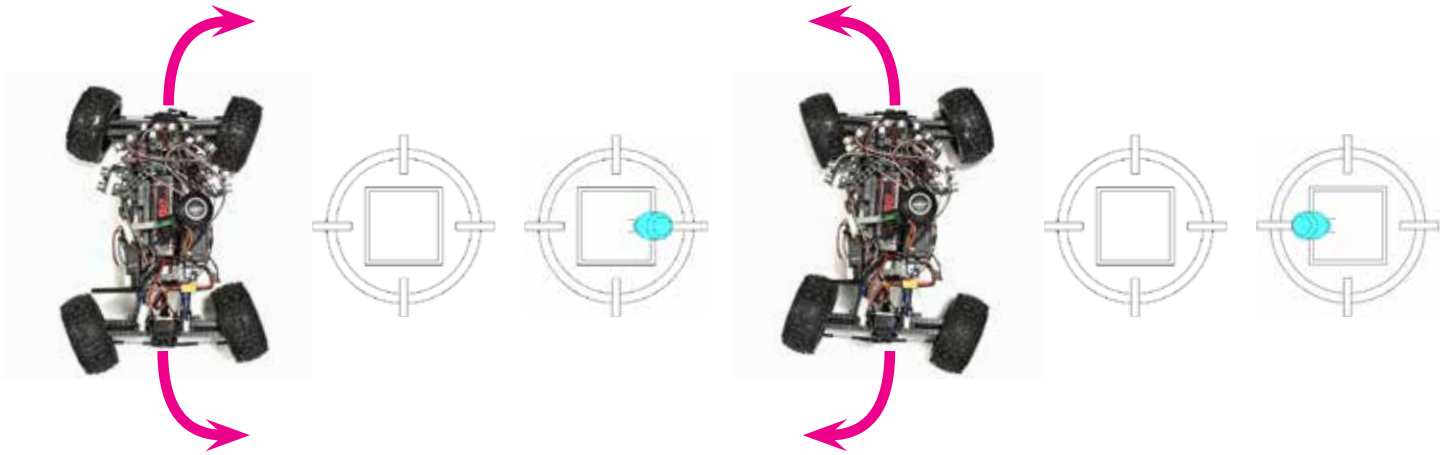
02 RC Operation

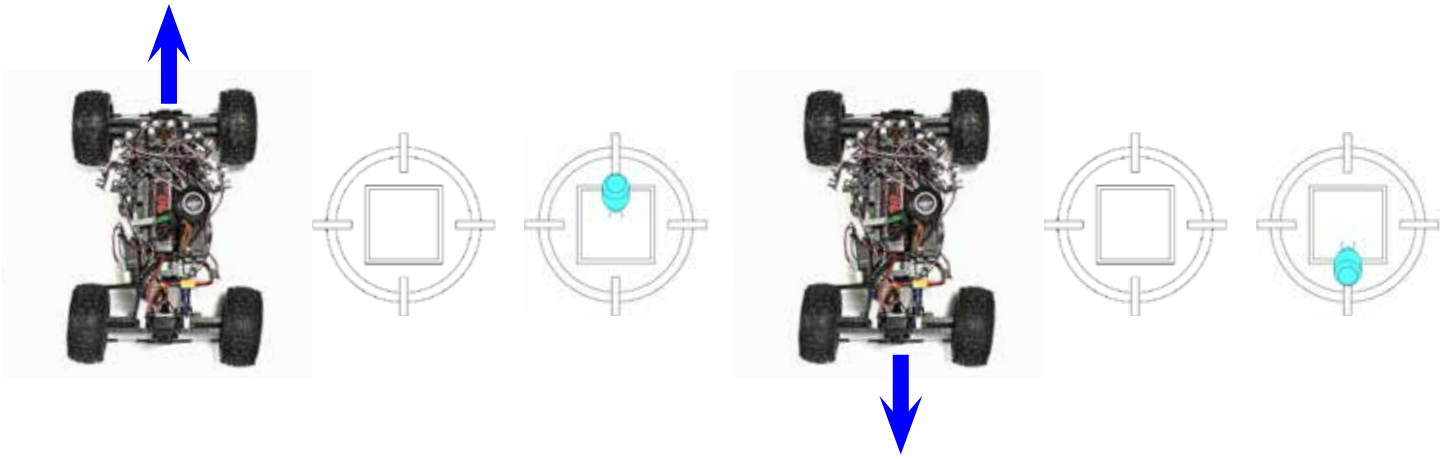
01 Follow the “Checklist”

02 Turn the transmitter on, then turn the ESC’s on.

03 Plug the battery into the robot.

Controls:





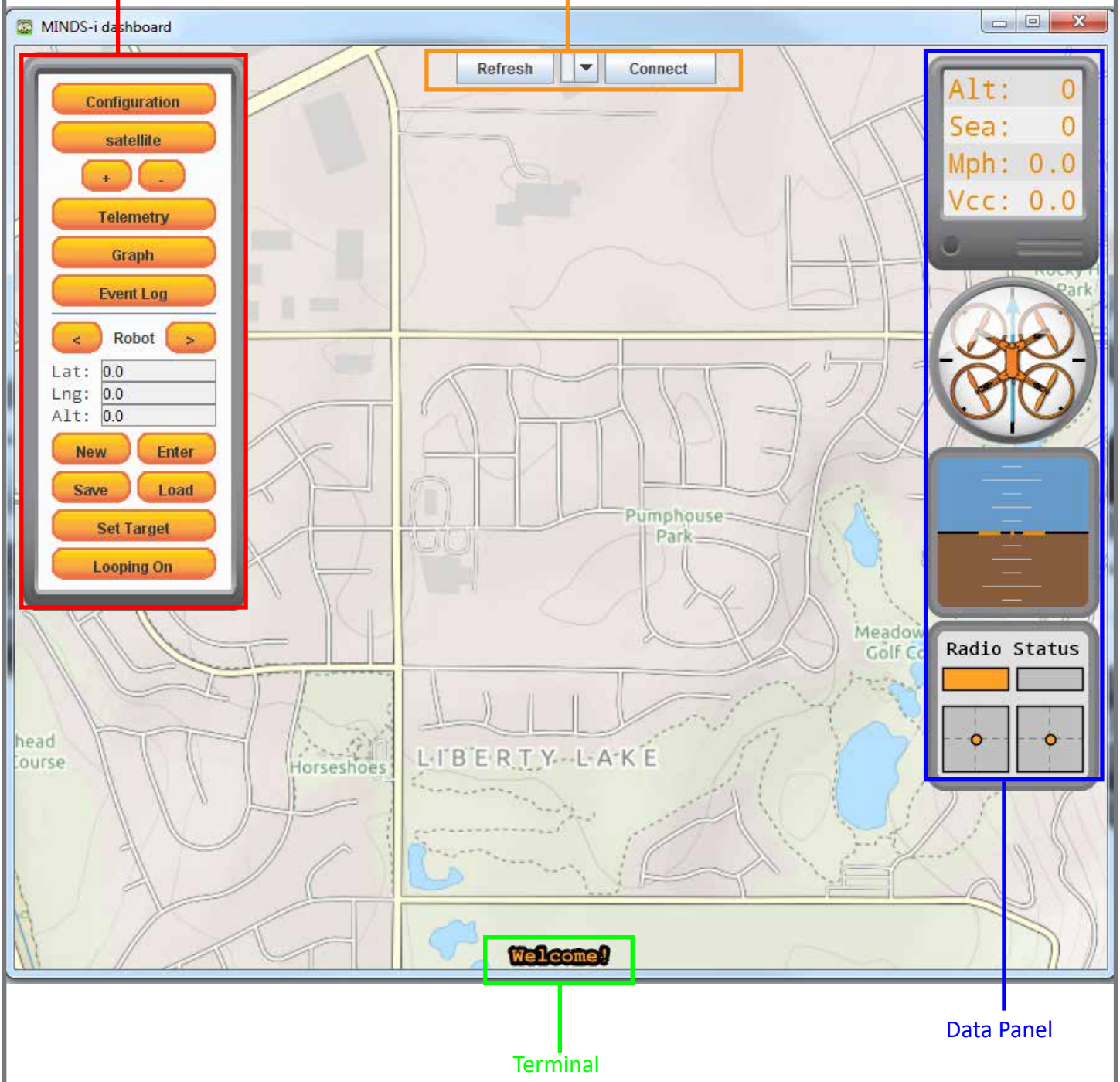
DRONES

MINDS-i®

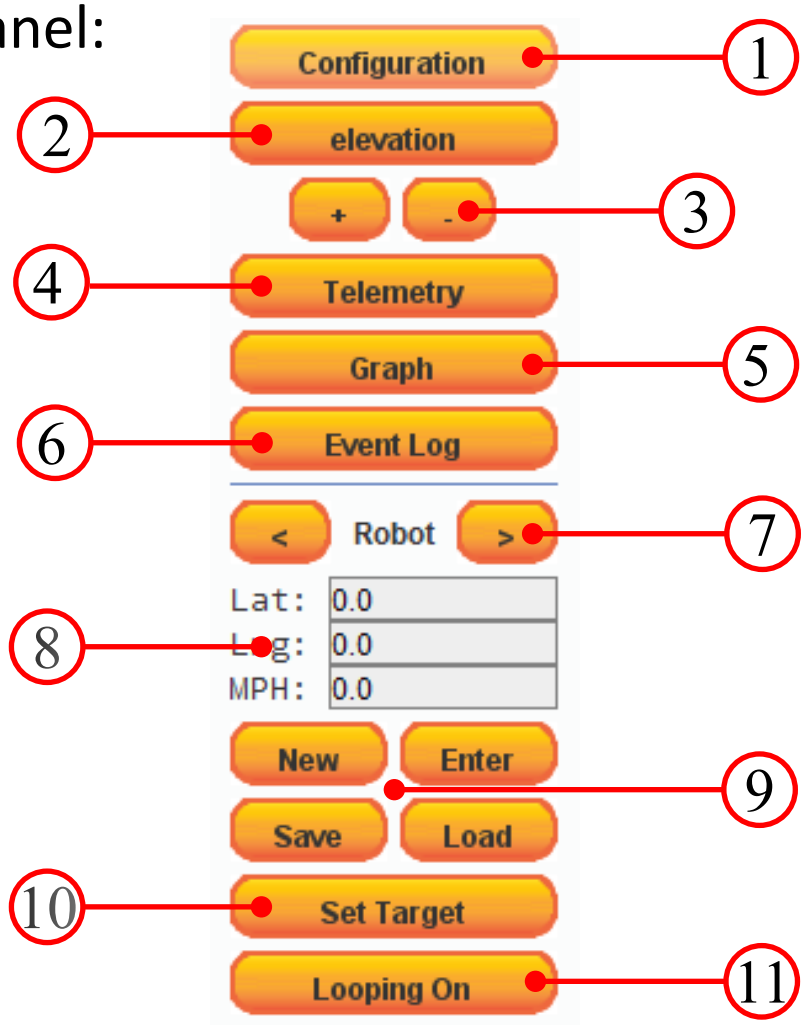
STEM INTEGRATED ROBOTICS

MINDS-i Dashboard

Dashboard Features & Functions

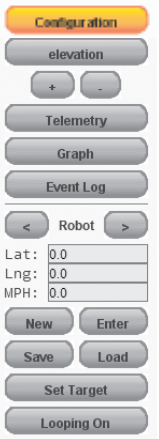


Waypoint Panel:



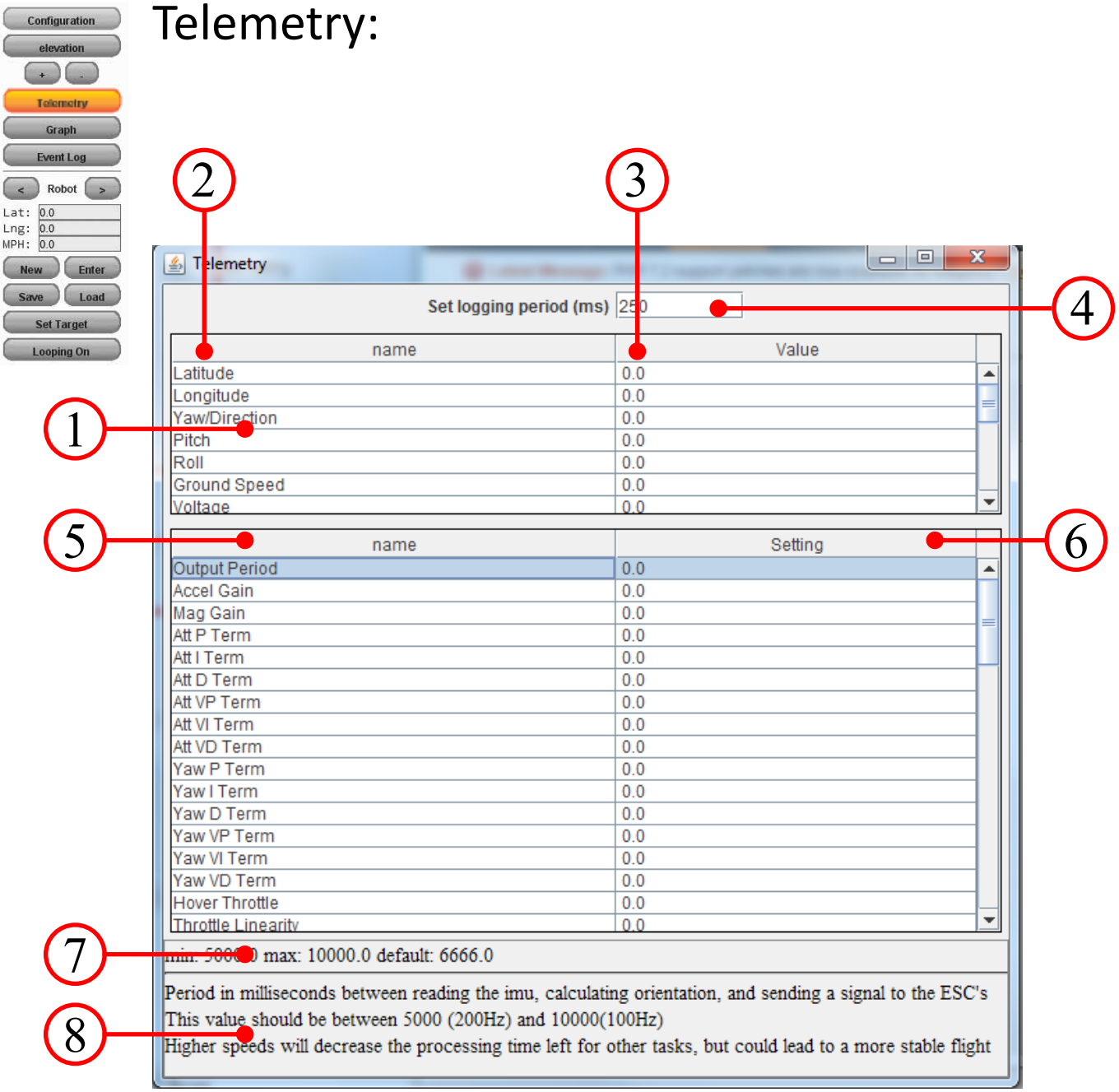
1. Configuration: Opens a pop up window with the Telemetry Radio Configuration tool.
2. View Button: This button switches the map between satellite and elevation views.
3. Navigation: Zoom in and out.
4. Telemetry: Opens a window allowing you to select the information that will be recorded in the log as well as all of the adjustable settings for the vehicle.
5. Graph: Opens a pop up window with a live data graphing function.
6. Event Log: Opens up the log for the active session.
7. Waypoint selector: moves the selection up and down the list of waypoints.
8. Waypoint entry: Will be filled with the latitude, longitude and altitude (MultiRotor) or speed (UGV) of selected waypoint. You can also edit the waypoint location information.
9. New & Enter, Save & Load: Used to create save and load the GPS waypoint list as a .gpx file.
10. “Set target”: Click set target to redirect the robot to the selected waypoint.
11. Looping Button: Toggles whether or not the robot will stop when it reaches the last waypoint or if it will loop around and drive to the first and on from there.

Configuration:



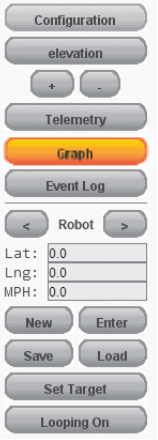
1. Toggle ground/air mode: Switches between ground and air mode.
2. Driver Installer: Launches the installer for the radio driver.
3. Refresh: Refreshes the serial port list.
4. Com Port List: Shows the open com ports.
5. Baud Rate: Used to set the communication speed.
6. Connect: Connects to the telemetry radio to adjust the settings.
7. Settings Window: Shows all of the radio settings.
8. Import Defaults: Allows you to set all of the options back to default.
9. Save Changes: Saves any settings you have changed.

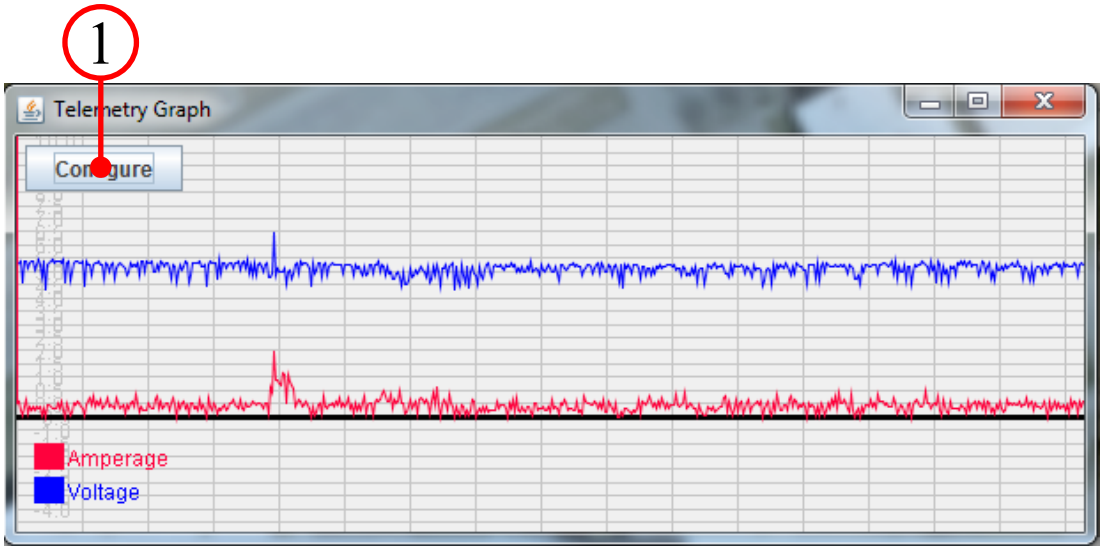
Telemetry:

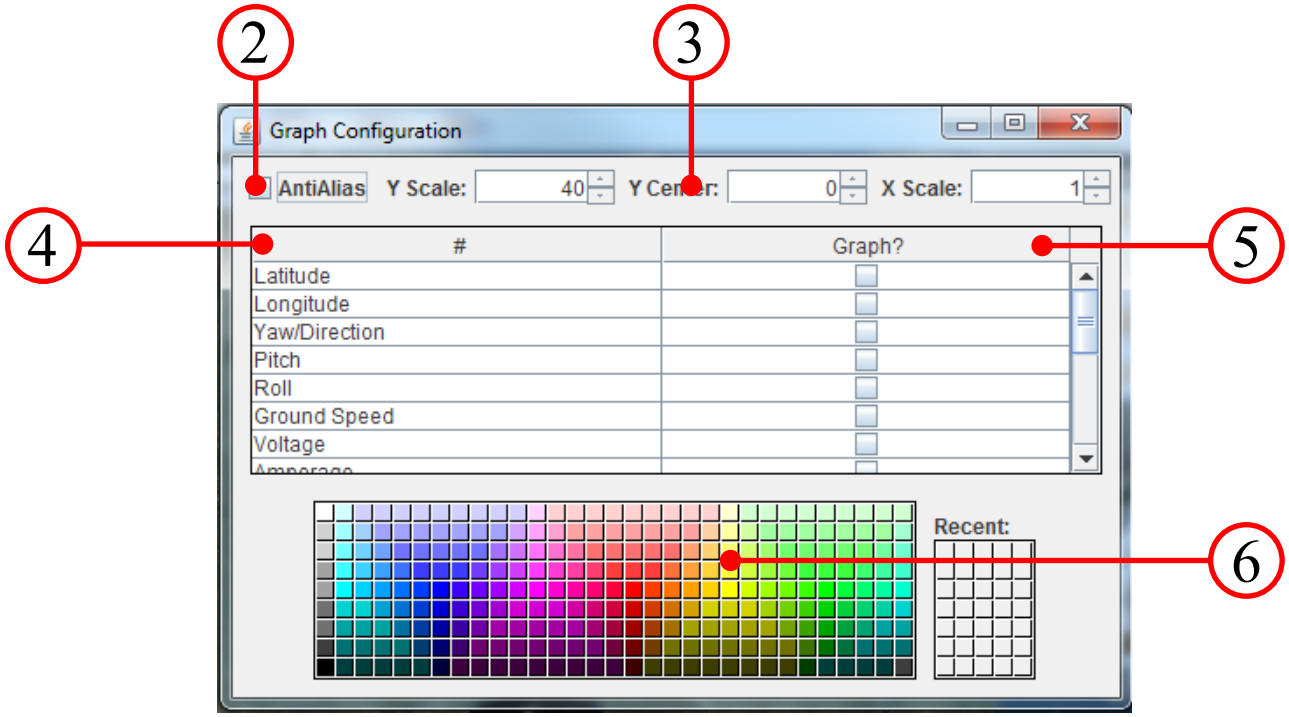


1. Data Log Window: The data log opens in a new window.
2. ID Column: Lists the names of the preset data to be logged as well as the open slots.
3. Value Column: Includes the value for each row of data.
4. Data Log Interval: Period of time between saving data.
5. Setting Names
6. Setting Value: Used definable settings, used to adjust performance
7. Setting limits: Shows operator the minimum, maximum and default value for each setting.
8. Setting Description: Describes what each setting adjusts.

Graph:

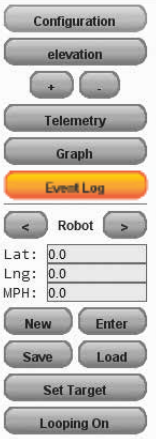




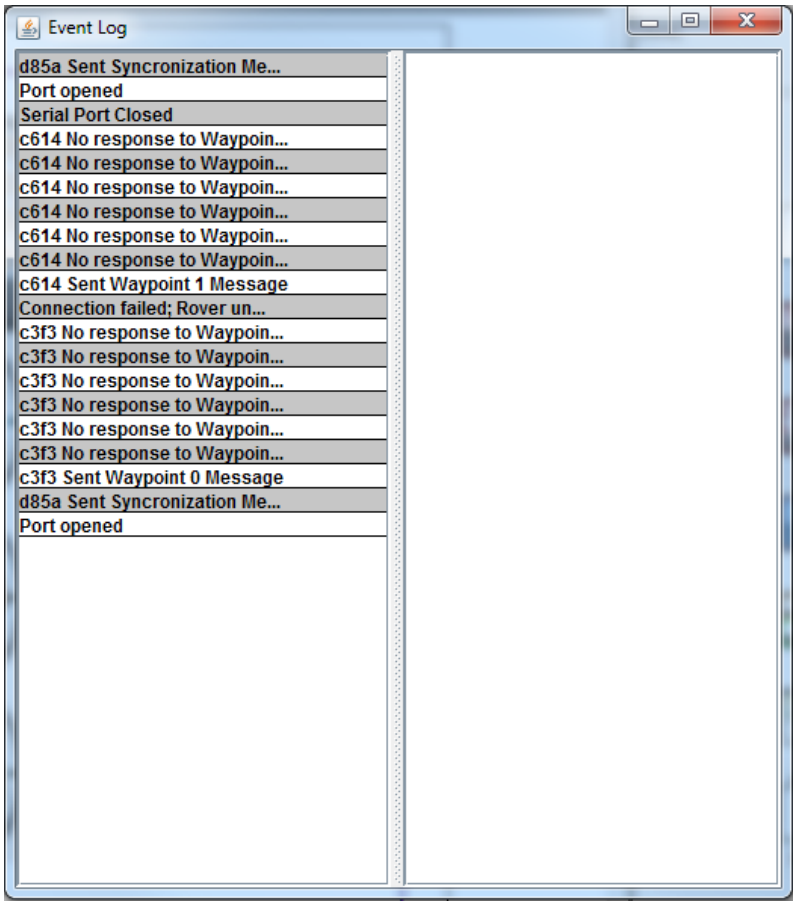


1. Configure: Opens Graph Configuration.
2. Anti Alias: Used to smooth jagged edges on curved lines and diagonals.
3. Scaling: Adjusts the scale of the graph.
4. Data Name
5. Check Box: User input for the data to be graphed.
6. Color Settings: User selected color for each row of data selected.

Select the check box in the row of the data desired to be graphed then select the color you would like the line to be on the graph, repeat for each row of data.

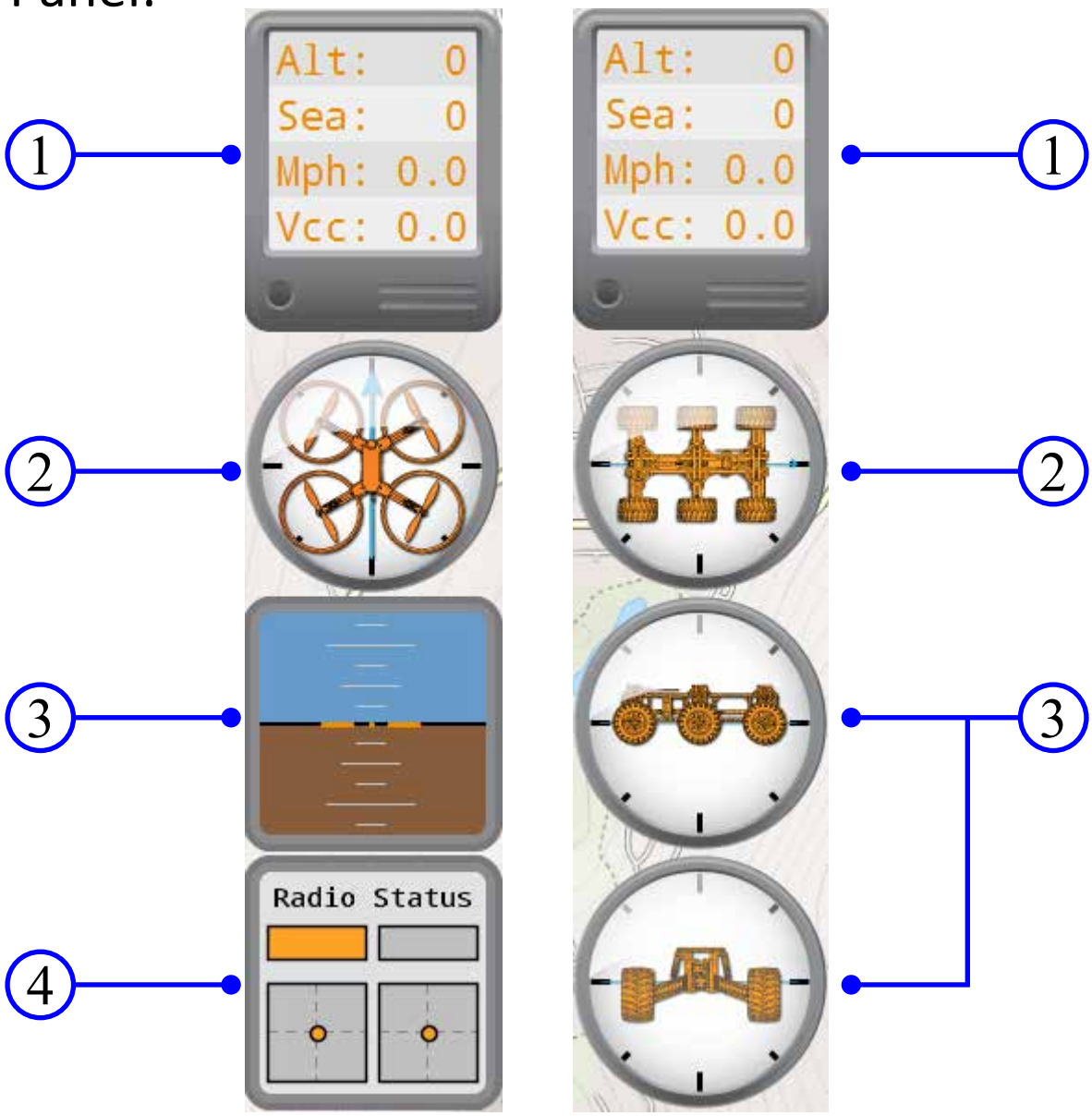


Event Log:



1. Event Log: Lists all attempts of communication between the vehicle and the Dashboard software (successful or not).

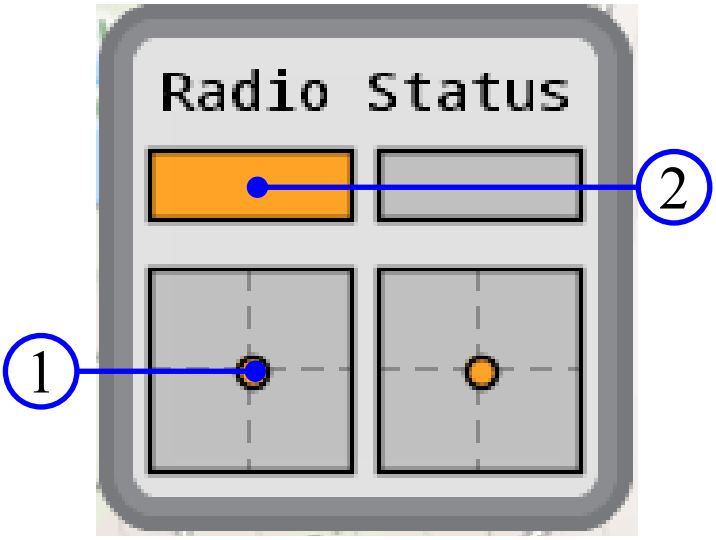
Data Panel:

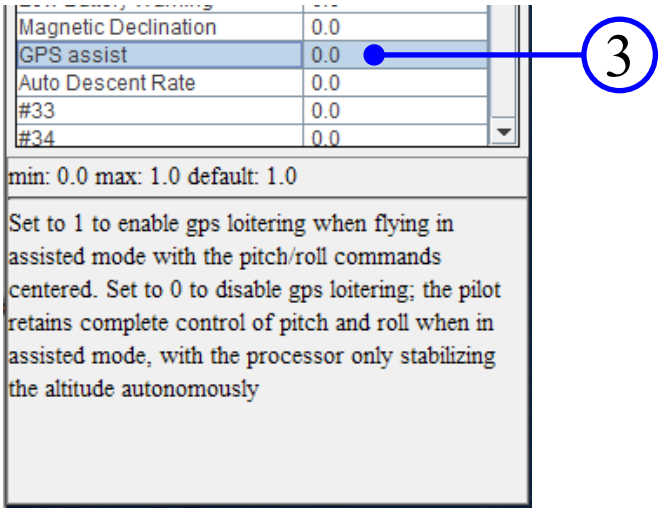


Data from the robot will populate this panel when connected. A lack of data when connected could indicate a failing connection to the robot, possibly from distance or obstacles blocking the signal.

1. Altitude (Above Ground), Altitude (Sea Level), Speed (MPH), Battery Voltage (Vcc).
2. Vehicle Direction (compass heading)
3. Vehicle Pitch & Roll (front to back tilt & side to side tilt)
4. Radio Status (current position of control sticks)

Flight Modes:



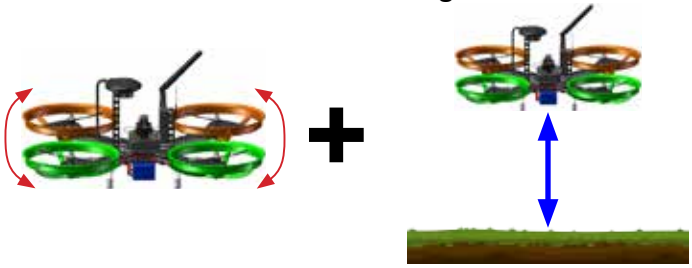


1. Stick Movements: This will show you how the inputs from the radio are being received by the ardunio code. You will want to make sure that the stick movements of your controller match the movements of the orange dots. If their movements don't match you will need to either reverse the channel or double check that you have correctly connected the radio receiver to the flight controller.

2. Flight Mode Indicator: This will toggle between the left and right boxes to indicate if the MultiRotor is in Stabilize or Altitude Hold. The box highlighted orange indicates the current flight mode.

A. Stabilize: Maintains level flight only.

B. Altitude Hold: Maintains level flight and holds altitude.

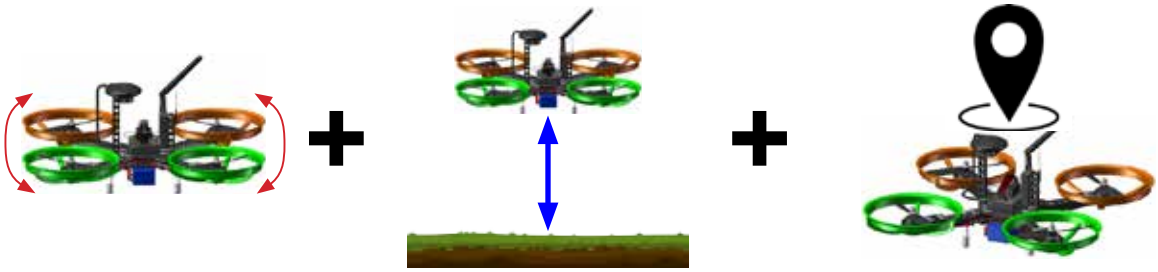


A

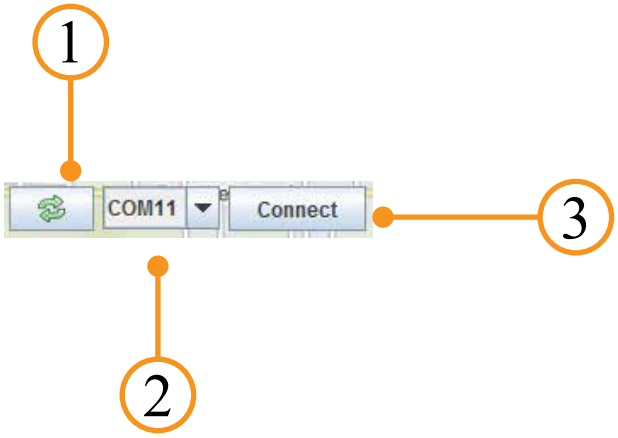
B

3. GPS Assist (Loiter Mode): Setting this value to 1 will replace Altitiude Hold with Loiter Mode. The MultiRotor will hold latitude and longitude while you aren't moving the right stick on the remote.

C. Loiter Mode: Maintains level flight, holds altitude and GPS position.



Connection Panel:

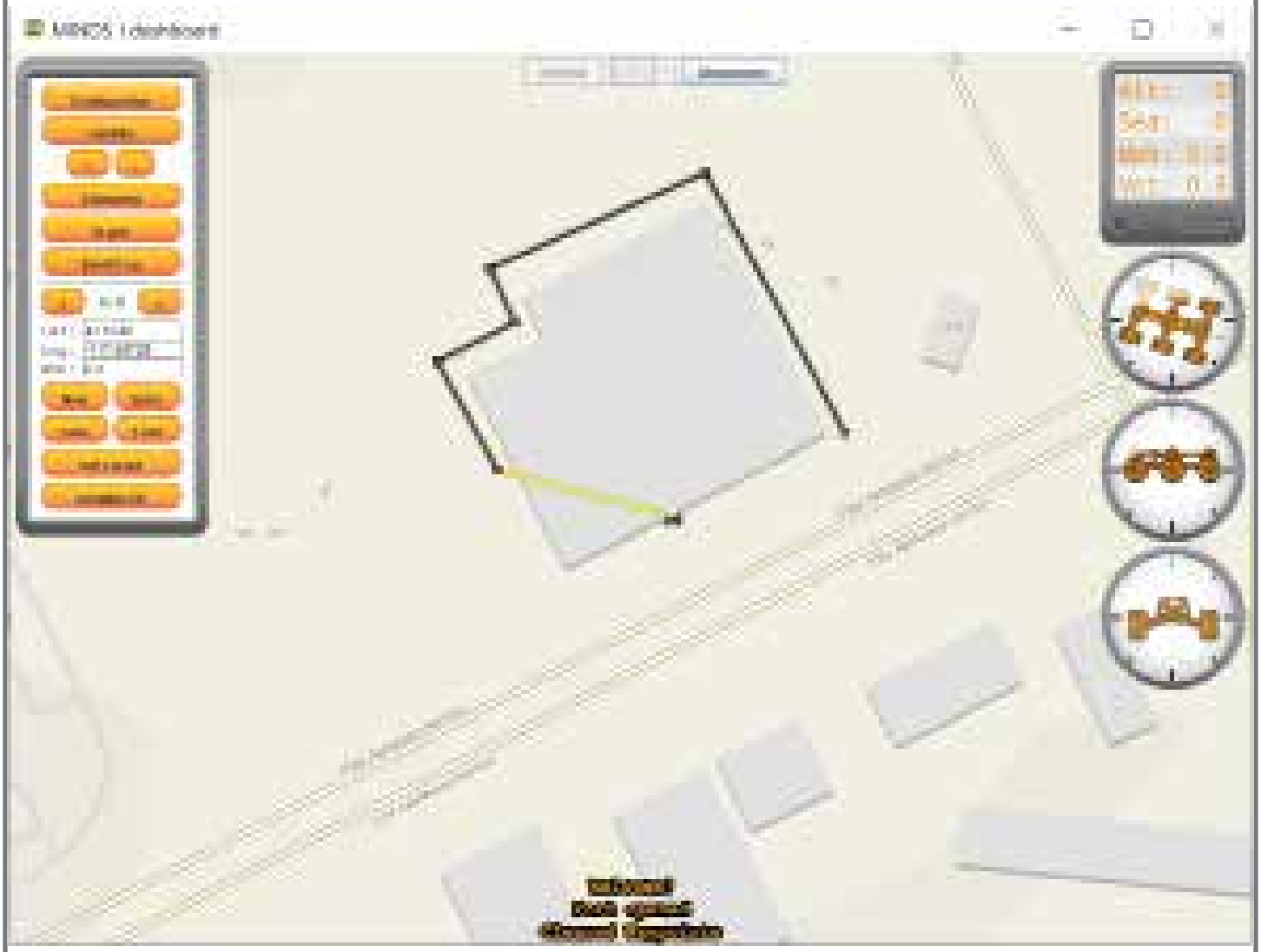


1. The refresh button will repopulate the drop down menu with the currently available serial ports
2. To connect, select the appropriate serial port in the drop down and press connect.
3. When a connection has been established, the “Connect” button will change to say “Disconnect”

Terminal:

- The terminal will display status updates of the communication messages.
- If the dash is forced to give up on a message it will inform you which message did not make it to the robot.
- Malformed or misunderstood messages coming from the robot are signs of a failing connection but not themselves cause for worry.

Map View:



-  The rover will automatically be placed on the map where the GPS indicates it is located
- Click and drag on the map to pan your view
- Scroll on the map or click the  to zoom
- Click on any empty part of the map to add a waypoint to the end of the current path
- Click on any waypoint to select it. The current waypoint will be green 
- Click on a path to “break” it and add a waypoint in the middle
- Right click on a waypoint to remove it from the path
- Click a waypoint and drag to reposition it
- The Yellow line is the direct path from the Drones current location to the next waypoint.

Switching Between Ground and Air Mode

To switch the dashboard between ground drone and air drone mode, Open the configuration window, press “Toggle ground/air mode”, and then restart the dashboard

Artificial Horizon

When in air mode, the artificial horizon widget can be clicked on to open a full size window with altitude and heading overlaid on the right and top edge respectively.

Waypoint Targeting

When in ground mode, clicking the map will place a GPS waypoint at that location that a connected rover will attempt to drive to. To add a waypoint at the end of the path, click on the map. Click on an existing path’s line to “break” it and add a new point in-between. Right click on a point to delete that waypoint

Log Files

The dashboard makes a .log and a .telem file in the log directory each time its run.

.log files contain a record of errors, warnings, and messages received from the robot while its running.

.telem files contain the robots telemetry data storing in CSV format with the first column containing the timestamp that data was stored at, and the remaining columns being each index of telemetry in order.

The frequency that received telemetry is logged can be changed in the telemetry window, accessible from the left navigation box in the dashboard.

For technical questions or to place an order:

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