

# INSTRUCTION SHEET

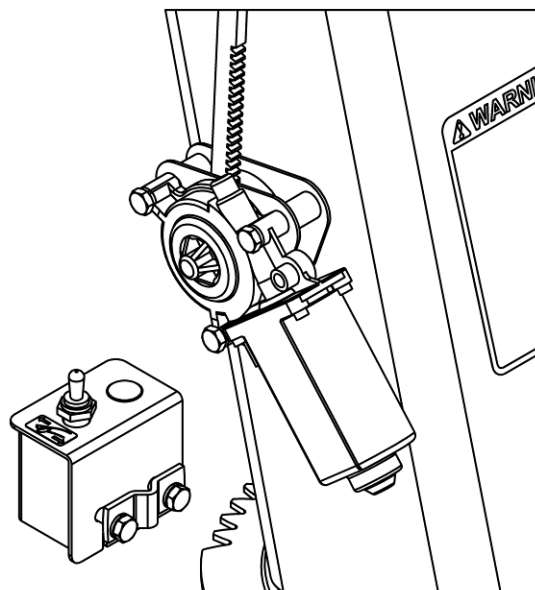
BX2820-A / Rev0 01-17

MANUAL PN 77700-08377



## ***BX2820 – Electric Deflector***

*Estimated assembly time: 60 minutes*



***For BX2816 50" Snowblower and BX2822 55" Snowblower***

**PLEASE READ THIS MANUAL CAREFULLY  
KEEP READY AT ALL TIMES**



# INTRODUCTION

This is the Instruction Sheet for the BX2820 Electric deflector option. This option can be used on the 50" Snowblower BX2816 and the 55" Snowblower BX2822. Consult the Operator's Manual of the snowblowers for complete Safety and Operation instructions.

## Illustrations

The illustrations may not necessarily reproduce the full detail and the exact shape of the parts or depict the actual models, but are intended for reference only.

## Direction Reference

All references to right and left, forward or rearward are determined by those seen by the operator located behind the equipment.

## **SAFETY FIRST**

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.



**DANGER :** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING :** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION :** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**IMPORTANT :** Indicates that equipment or property damage could result if instructions are not followed.

**NOTE :** Gives helpful information.

## Legal Disclaimer

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## California Proposition 65



## **WARNING**



Engine exhaust, some of its constituents, certain vehicle components and fluids, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.


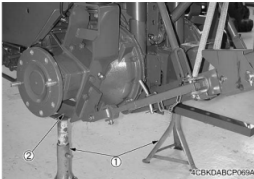
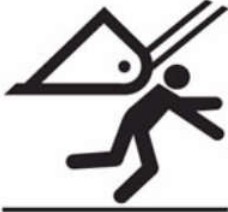


# GENERAL SAFETY INFORMATION

	<p><b>BEFORE YOU START SERVICE</b></p> <ul style="list-style-type: none"> <li>• Read all instructions and safety instructions in this manual and on your machine safety decals.</li> <li>• Clean the work area and machine.</li> <li>• Park the machine on a stable and level ground, and set the parking brake.</li> <li>• Lower the implement to the ground.</li> <li>• Stop the engine, then remove the key.</li> <li>• Disconnect the battery negative cable.</li> <li>• Hang a "DO NOT OPERATE" tag in the operator station.</li> </ul>		<p><b>No Smoking or Open Flames while Fueling</b></p> <ul style="list-style-type: none"> <li>• Fuel is extremely flammable and dangerous. Never smoke near fuel. If fuel is spilled on the machine, its engine, or electrical parts, it may cause a fire. If fuel is spilled, wipe it all up immediately.</li> <li>• Never smoke while filling the machine with fuel. And always tighten the fuel cap securely and wipe up any spilled fuel.</li> </ul>
	<ul style="list-style-type: none"> <li>• When performing maintenance on the equipment, hang the DO NOT OPERATE sign where it will be obvious from and around the driver's seat.</li> <li>• When performing maintenance or repairs, always lower attachments to the ground, stop the engine and secure the tracks with blocks.</li> <li>• When performing maintenance on the equipment, always disconnect the negative battery cable.</li> <li>• Before using tools, make sure you understand how to use them correctly and use tools in good condition and of the right size for the job.</li> </ul>		<ul style="list-style-type: none"> <li>• Before getting on/off of the machine, clean off around the steps so there is no mud on them. Always give yourself 3-point support when getting on/off the machine.</li> </ul> <p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• 3-point support means using both legs and one hand or both hands and one leg as you climb up/down.</li> </ul>
	<p><b>START SAFELY</b></p> <ul style="list-style-type: none"> <li>• Do not do the procedures below when you start the engine. <ul style="list-style-type: none"> <li>– short across starter terminals</li> <li>– bypass the safety start switch</li> </ul> </li> <li>• Do not alter or remove any part of machine safety system.</li> <li>• Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged positions.</li> <li>• Do not start the engine when you stay on the ground. Start the engine only from operator's seat.</li> </ul>		<ul style="list-style-type: none"> <li>• Do not remove the radiator cap when the engine operates, or immediately after it stops. If not, hot water can spout out from the radiator. Only remove the radiator cap when it is at a sufficiently low temperature to touch with bare hands. Slowly loosen the cap to release the pressure before you remove it fully.</li> </ul>
	<p><b>Starting the Machine Safely</b></p> <ul style="list-style-type: none"> <li>• Before starting the engine, always sit in the driver's seat and make sure the area is safe and clear.</li> <li>• As it is dangerous, never start the engine from anywhere but the driver's seat.</li> <li>• Always check and make sure control lever(s) are not engaged before starting the engine.</li> <li>• Never start the engine by hot-wiring the starter circuit. This is not only dangerous, but may damage the machine.</li> </ul>		<ul style="list-style-type: none"> <li>• The engine, muffler, radiator, hydraulic line, etc., have parts that remain very hot even after the engine has been stopped. Be sure to avoid these parts, as touching them can result in burns. Radiator coolant, hydraulic fluid and oil also remain hot. Therefore, do not attempt to remove caps and plugs, etc., before these fluids have sufficiently cooled.</li> <li>• Make sure the coolant temperature has dropped sufficiently before opening the radiator cap. Also, since the inside of the radiator is pressurized, when removing the cap, first loosen it to release the pressure before removing the cap completely.</li> </ul>
	<ul style="list-style-type: none"> <li>• Wear clothes appropriate for working on equipment. Do not wear loose-fitting clothes as they may catch on the machine controls.</li> <li>• When working on the equipment, use all safety gear, such as a helmet, safety glasses and shoes, that are required by law or regulation.</li> <li>• Never perform maintenance while drowsy or under the influence of alcohol or drugs.</li> </ul>		<ul style="list-style-type: none"> <li>• Grease is under high pressure inside the hydraulic cylinder. It is very dangerous to loosen a grease nipple quickly as it may shoot off. Always loosen grease nipples slowly.</li> <li>• And never face a grease nipple while loosening it.</li> </ul>
	<p><b>Be Ready for an Emergency</b></p> <ul style="list-style-type: none"> <li>• Keep a first-aid kit and fire extinguisher close at hand so you can use it when needed.</li> <li>• Keep emergency contact information for doctors, hospitals and ERs handy.</li> </ul>		<p><b>PREVENT A FIRE</b></p> <ul style="list-style-type: none"> <li>• Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.</li> <li>• To prevent sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.</li> <li>• The battery gas can cause an explosion. Keep the sparks and open flame away from the top of battery, especially when you charge the battery.</li> <li>• Make sure that you do not spill fuel on the engine.</li> </ul>
	<p><b>KEEP A GOOD AIRFLOW IN THE WORK AREA</b></p> <ul style="list-style-type: none"> <li>• If the engine is in operation, make sure that the area has good airflow. Do not operate the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.</li> </ul>		<p><b>Dispose of Waste Fluids Properly</b></p> <ul style="list-style-type: none"> <li>• Never dispose of waste fluids on the ground, in the gutter, a river, pond or lake. Always dispose of hazardous substances like waste oil, coolant and electrolytic fluid in accordance with the relevant environmental protection regulations.</li> <li>• Keep the safety plates clean so they can be read. If a safety plate is damaged and comes off or becomes illegible, put a plate with the same warnings back in its place.</li> </ul>



# GENERAL SAFETY INFORMATION

	<ul style="list-style-type: none"> <li>The pressure in the hydraulic circuit stays at pressure even after the engine stops. Before removing parts, such as hydraulic devices from the machine, first release the pressure. Please note that when releasing residual pressure, the machine itself and/or implements may move without warning, so be very careful when releasing the pressure.</li> <li>Oil gushing out under pressure is extremely dangerous as it may pierce your skin or your eyes. Similarly, oil leaking out of pinholes is not visible. So when checking for oil leaks, always wear safety glasses and gloves and use a piece of cardboard or a wood block to shield yourself from oil.</li> </ul>		<ul style="list-style-type: none"> <li>When you need to access the underside of the machine for maintenance purposes, but sure to support the machine with a safety stand. Getting under the machine while supporting the machine by machine's own hydraulic cylinder or using a hydraulic jack can be extremely dangerous in the event of a hydraulic fluid leakage or similar mishap.</li> </ul> <p>(1) Safety stand (2) Secure point for safety stand</p>
	<ul style="list-style-type: none"> <li>Do not open a fuel system under high pressure. The fluid under high pressure that stays in fuel lines can cause serious injury. Do not disconnect or repair the fuel lines, sensors, or any other components between the fuel pump and injectors on engines with a common rail fuel system under high pressure.</li> <li>Put on an applicable ear protective device (earmuffs or earplugs) to prevent injury against loud noises.</li> <li>Be careful about electric shock. The engine generates a high voltage of more than DC100 V in the ECU and is applied to the injector.</li> </ul>		<ul style="list-style-type: none"> <li>Whenever it is necessary to open the engine covers or hood in order to service the machine, always prop them open.</li> <li>If it is absolutely necessary to run the engine while working on the machine, make sure you are clear of all rotating or moving parts. Also take care not to leave anything, such as tools or rags, near any moving parts.</li> </ul>
	<ul style="list-style-type: none"> <li>Engage the loader control valve lock to prevent accidental actuation when the implement is not in use or during transport. Do not utilize the valve lock for machine maintenance or repair.</li> <li>Do not perform machine maintenance with loader in the air. If possible, follow loader instructions to remove loader before performing maintenance.</li> <li>If the machine has a backhoe, engage swing and boom locks.</li> </ul>		





# SAFETY INFORMATION

## **Before Operation**

1. Park the machine/implement on level ground, set the parking brake, lower the implement to the ground, place all control levers in neutral, shut off the engine and remove the ignition key and allow the rotating parts to stop BEFORE making any implement adjustments.
2. Do not put hands or feet under implement and frame.
3. Do not operate the machine/implement that is defective or has missing parts. Make sure that all recommended maintenance procedures are completed before operating the unit.
4. Keep the machine/implement clean. Snow, dirt or ice build-up can lead to malfunction or personal injury from thawing and refreezing in garage.
5. Do not modify or alter this equipment or any of its components, or any equipment function without first consulting your dealer. The manufacturer will not claim responsibility for fitment of unapproved parts and/or accessories and any damages as a result of their use.
6. Verify that all machine/implement safety protective devices are in place. Shields, guards and covers must be correctly installed at all times. When necessary to remove these for servicing, cleaning, or repair work, they must be reinstalled immediately.
7. Always make sure all implement components are properly installed and securely fastened.
8. Check for moving parts excessive wear regularly. ALWAYS USE GENUINE PARTS WHEN REPLACEMENT PARTS ARE REQUIRED.
9. Prior to operation, clear work area and mark all curbs, pipes, etc. that cannot be moved.
10. Inspect the machine/implement after striking any foreign object to assure that all machine/implement parts are safe and secure and not damaged.
11. Handle fuel with care, as it is highly flammable. Use approved fuel container.
12. Never add fuel to a running engine or a hot engine.
13. Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors. Replace fuel cap securely and wipe up spilled fuel.
14. Check all machine controls regularly and adjust where necessary. Make sure that the brakes are evenly adjusted. Periodically check all nuts and bolts for tightness, especially wheel hub and rim nuts.
15. Make sure the machine is counterweighted and has tire chains for better traction and stability as recommended by your dealer. Weights provide the necessary balance to improve stability, traction and steering. Use only those recommended by your dealer

# OPERATION – Safety information

## **During Operation**

1. Never allow anyone to operate the machine and implement until they have read the manuals completely and are thoroughly familiar with their basic operation. Lack of operating knowledge can lead to accidents.
2. Do not allow anyone to ride on the machine/implement at any time. The only one allowed is the operator that MUST sit in the driver seat.
3. Never allow anyone near the work area.
4. Never operate the implement without safety protective devices in place. All machine/implement shields, guards and covers must be correctly installed at all times.
5. Park the machine/implement on level ground, place the transmission in neutral, set the parking brake, disengage the driving system, lower the equipment to the ground, place all levers including auxiliary control levers in neutral, shut off the engine and remove the ignition key BEFORE LEAVING THE MACHINE.
6. Always drive the machine at speeds compatible with safety, especially when operating over rough ground, crossing ditches, slippery surface or when turning.
7. Use extra caution when backing up.
8. Operate only with a good visibility and during daylight hours, or when the area is well lit with bright artificial light.
9. Exercise extreme caution when operating on or crossing a gravel drive, walks, or roads. Stay alert for hidden hazards or traffic.
10. Never park the machine on a steep slope. Do not attempt to operate on steep slopes. If operating on slopes is necessary, exercise extreme caution when changing direction.

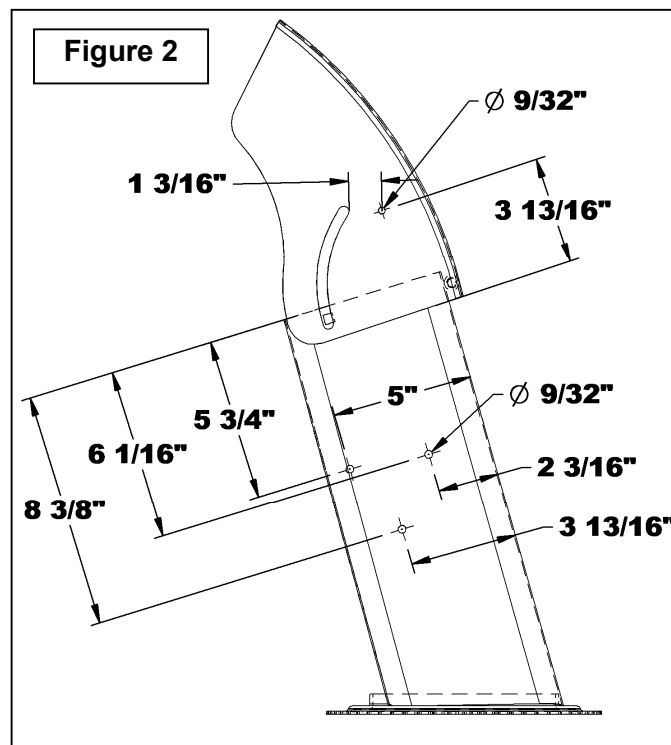
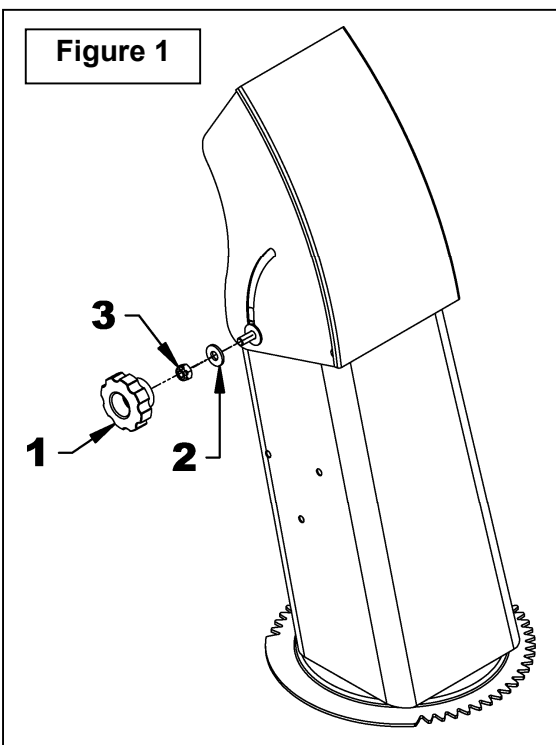
# INSTALLATION

**⚠ WARNING:** To avoid serious personal injury or death: Read and understand the SAFETY PRECAUTIONS on previous pages before installation and operation. Perform all assembly with unit properly blocked and supported. **TORQUE ALL THE BOLTS ACCORDING TO THE TORQUE SPECIFICATION TABLE ENCLOSED AT THE END OF THE INSTRUCTION SHEET.**

1. **Figure 1:** Remove the two manual knobs (item 1) on each side of the deflector and replace them with two 5/16" (3/8" hole) washers (item 2) and two 5/16"NC nylon insert locknuts (item 3). Leave a small gap (about 1/32") between the side of the deflector and the outer nylon washer.

**NOTE:** The deflector must move freely.

2. **Figure 2:** Drill a hole with a  $\varnothing 9/32$ " drill on the left side of deflector in the location defined in the figure.
3. **Figure 2:** Mark the three holes  $\varnothing 9/32$ " on the left side of the chute in the location defined in the figure.
4. **Figure 3:** Place the guide plate (item 7) on the side of the chute to confirm the marks of the holes. Ensure that the marks correspond to the holes of the guide plate and drill the three  $\varnothing 9/32$ " holes.





# INSTALLATION

5. **Figures 3A-3B:** Apply a light coat of grease on the teeth of the rack (item 1) and insert it inside the rack guide (item 2) until the teeth of the rack are approximately midway as shown on figure 3A.
6. **Figure 3B:** Attach the guide plate (item 7), the rack guide (item 2), the three spacer rings (item 6), the second guide plate (item 5) and the electric motor (item 4) on the chute with three 1/4"NC x 2" lg. hex bolts (item 3) and 1/4"NC nylon insert locknuts (item 9) in the order shown.

7. **Figure 3B:** Apply a light coat of grease inside the hole of the rack (item 1) and place two 7/16" nylon flat washers (item 11) between the deflector and the rack, to allow a small clearance. Install the remaining nylon washer (item 10) on the other side of the rack.

**IMPORTANT: The rack movements should not be hindered by the nylon washers (item 11).**

Secure to the deflector with the 1/4"NC x 1 1/4" lg. hex bolt (item 13), 1/4" (5/16" hole) flat washer (item 14), nylon washer (item 10), 3/8 "x 19/32" lg pivot bushing (item 12), two nylon washers (item 11) and 1/4"NC nylon insert locknut (item 15) in the order shown.

Figure 3B

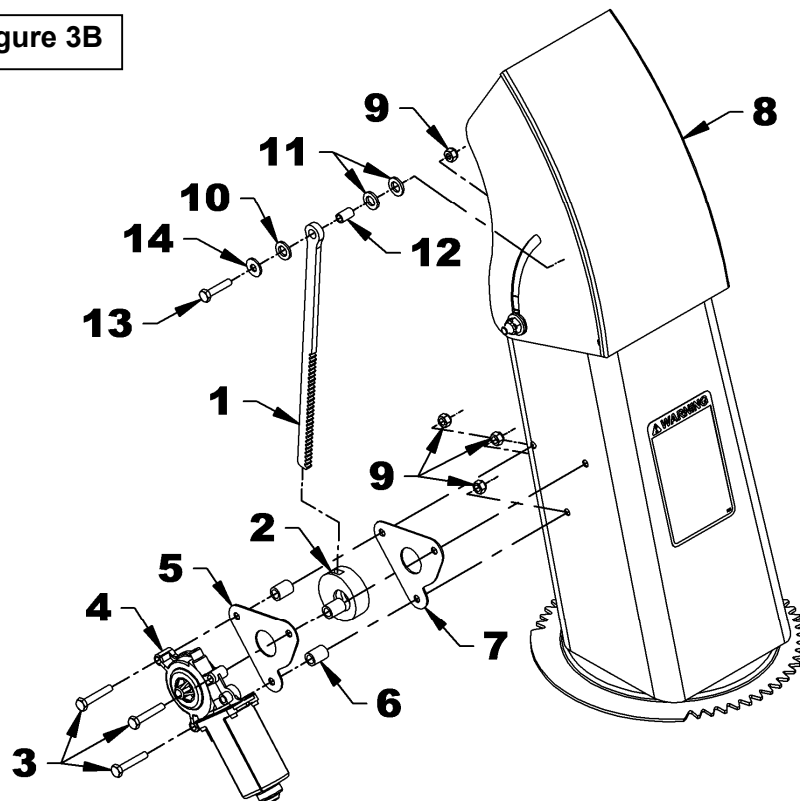
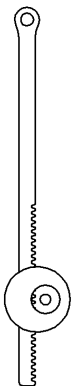


Figure 3A



# INSTALLATION

8. If the electric rotation is installed:
- Electrical harnesses supplied in the BX2820 kit will not be needed.
  - Cut the tie wrap installed around the electric motor.

9. **Figure 4:** Take out the green and white wires (item 2) from inside the wiring harness sheath (item 1).

10. If only the deflector is used:

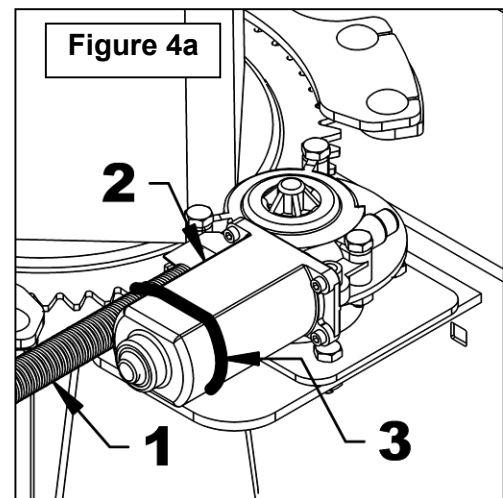
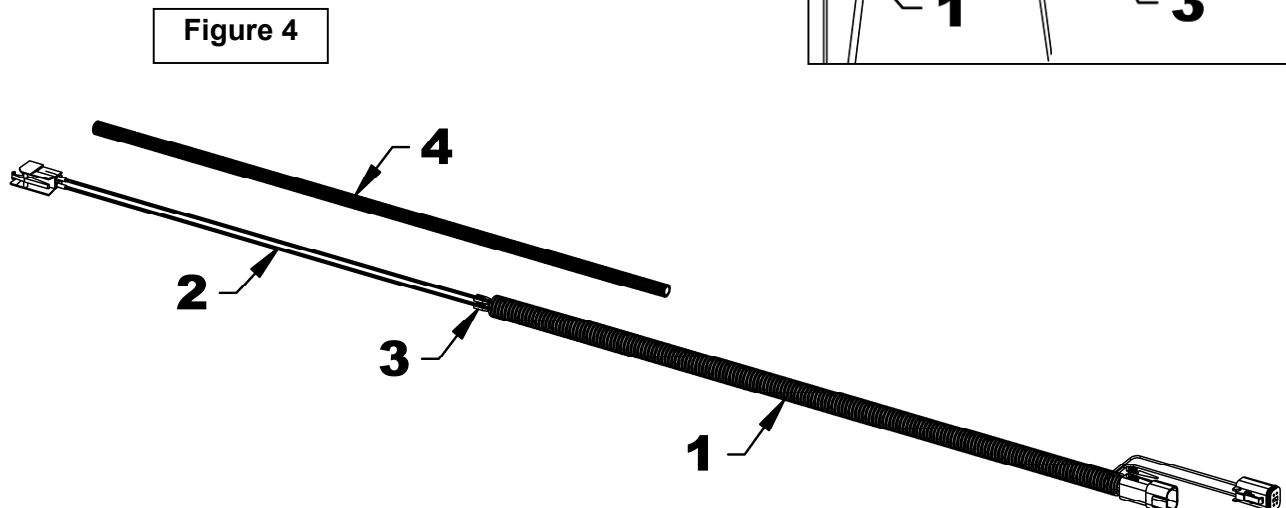
**Figure 4:** Isolate each of the blue and yellow terminals (item 3) of the BX2820 harness with electrical tape.

11. **Figure 4:** Place the loom (item 4) around the green and white wires (item 2) and secure the ends and the center of the loom with electrical tape.

12. If the electric rotation is installed:

➤ Attach a new tie wrap on the motor at the same location as that previously removed. Make sure both wires are located on the side of the motor electrical connector as shown in **Figure 4a**.

➤ Cut tie wrap excess to about 1/8 "of the link.



# INSTALLATION

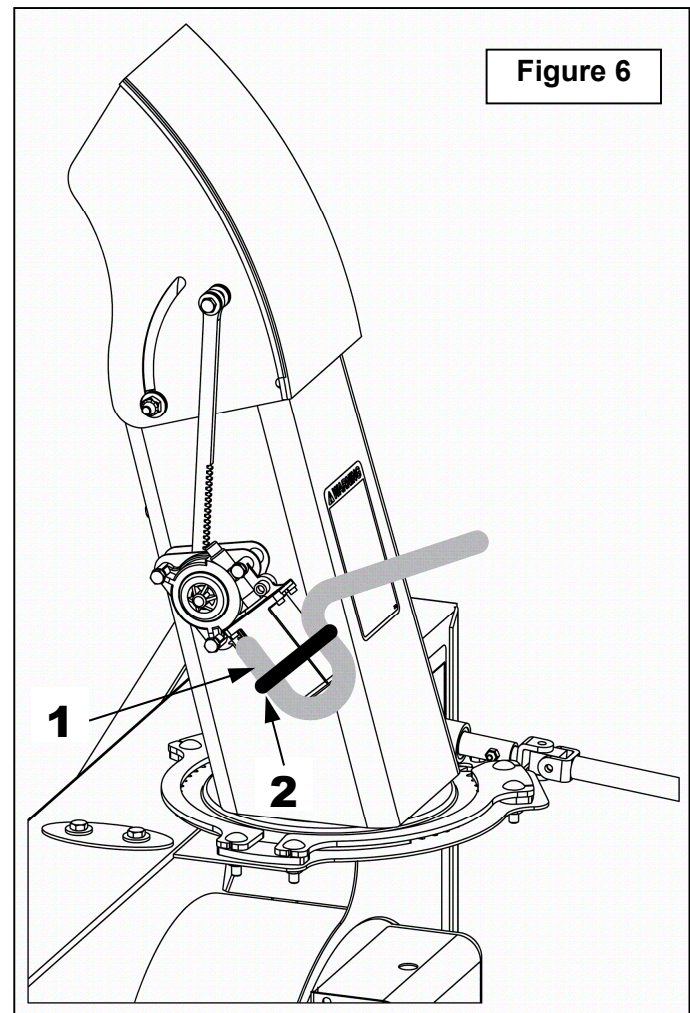
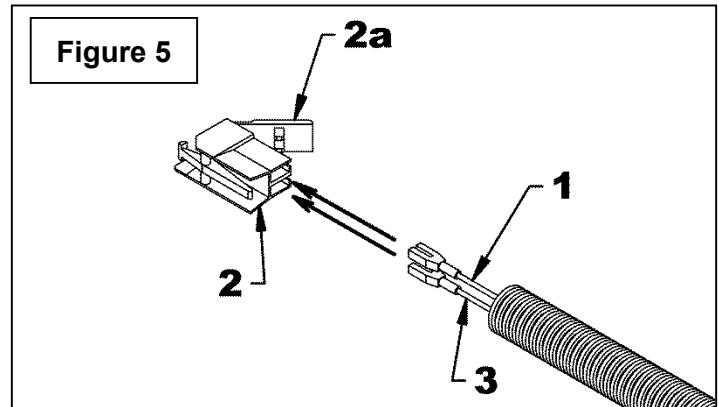
**⚠ WARNING:** To avoid serious personal injury or death: Park the machine on level ground, place the transmission in neutral, set the parking brake, disengage the drive system, put all levers to neutral, shut off the engine, remove the ignition key and wait for all movement to stop **BEFORE** starting installation or adjustment.

13. **Figure 5:** Connect the yellow wire connector (item 1) and the blue wire connector (item 3) of the 26" harness to the female connector (item 2) as shown on figure 5 and lock in place by pressing the plastic tab (item 2a)..

14. **Figure 6:** Turn the chute completely to the right and secure the female connector to the deflector motor. Attach and fix the motor sheath (item 1) with a tie wrap (item 2) as shown in the figure.

**IMPORTANT:** Make sure to not over tighten the harness when attaching the tie wrap.

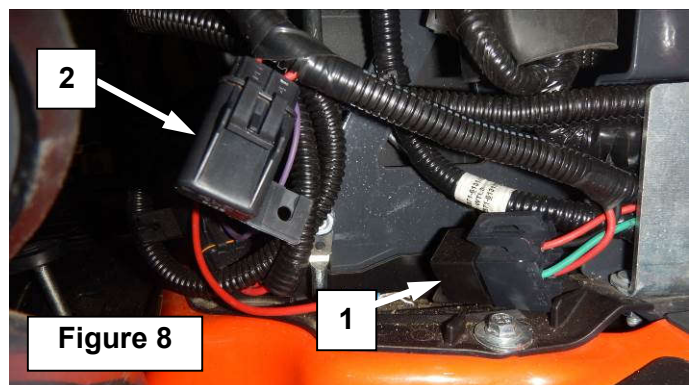
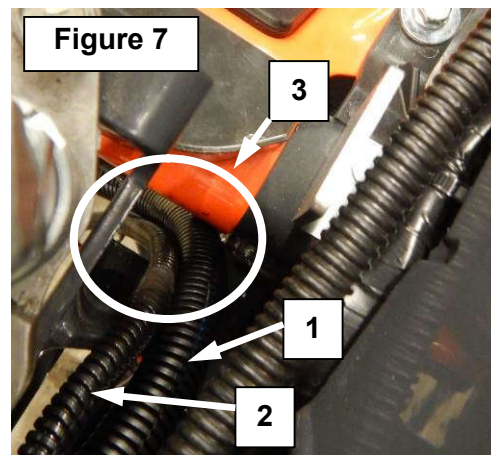
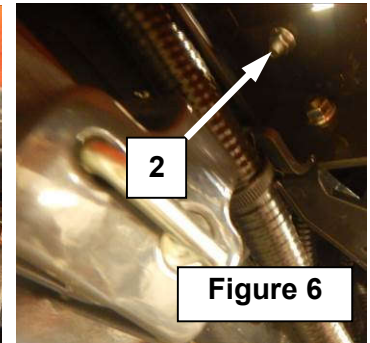
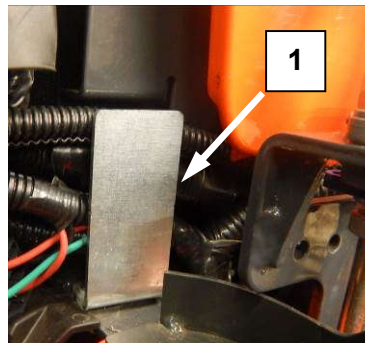
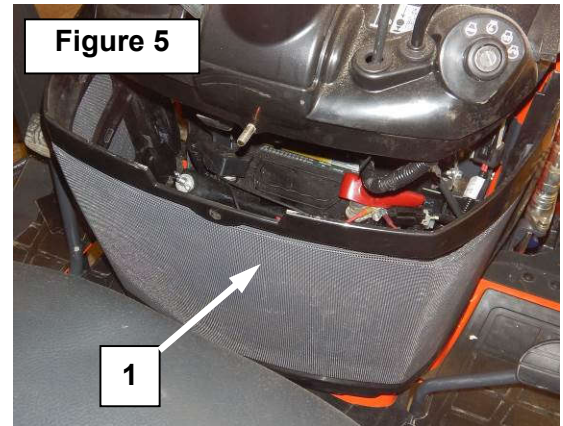
15. Cut tie wrap excess to about 1/8" from the tie area.



# INSTALLATION

## Installation of the Wiring Harness

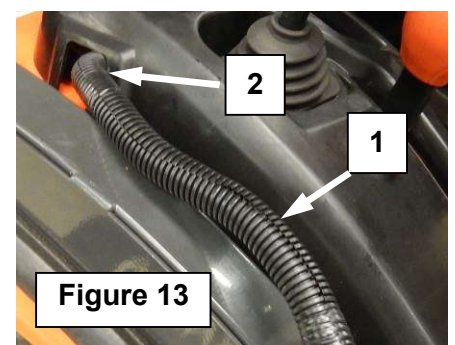
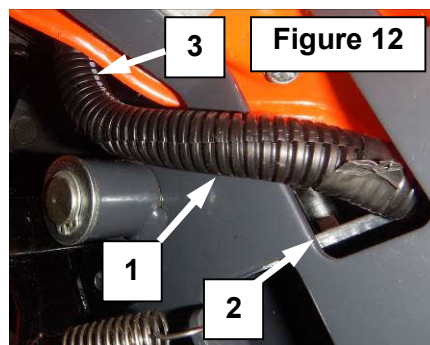
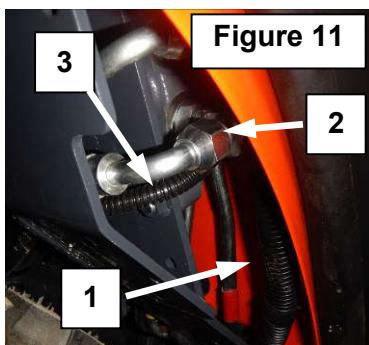
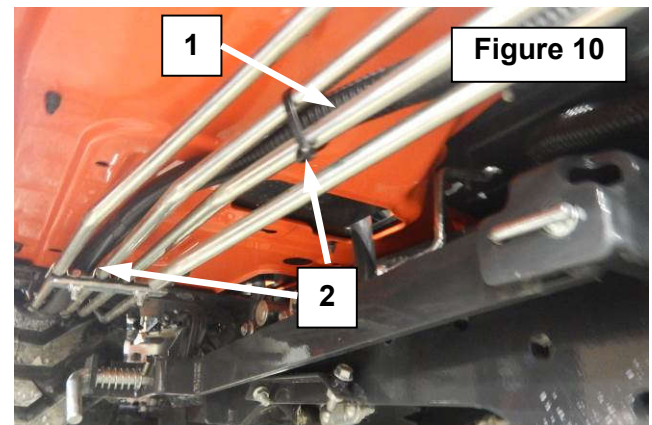
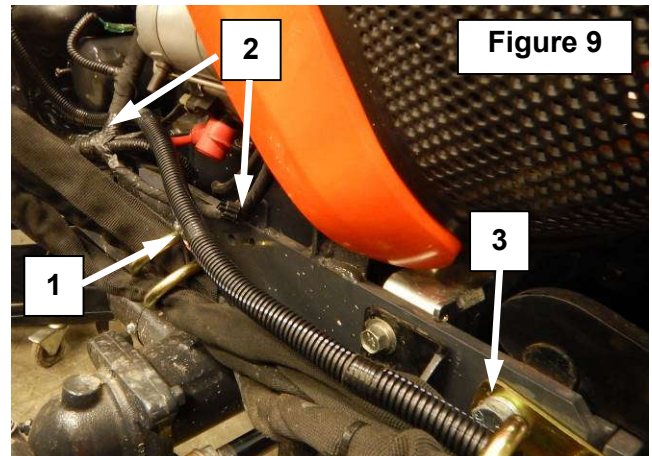
1. **Figure 5:** Remove the battery's protective cover (item 1) and open the tractor hood.
2. **Figure 6:** Locate the wiring harness retaining plate (item 1) on the right side of the steering console and loosen the serrated flange nut under the step plate (item 2) without removing it.
3. **Figure 7:** Insert the end of the harness with the switch terminals (item 1) and the accessory harness with the bullet terminal (item 2) in the hole (item 3) of the tractor quick coupler support.
4. **Figure 8:** Insert the end of the harness with the relay (item 1) and fuse support (item 2) behind the retaining plate as shown on figure.
5. **Figure 6:** Tighten the serrated flange nut (item 2) of the retaining plate (item 1).





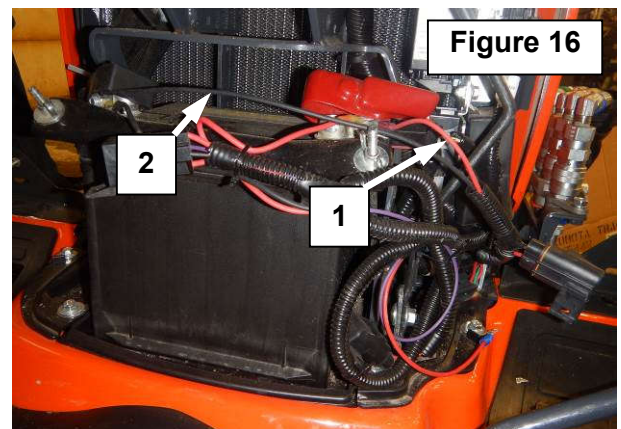
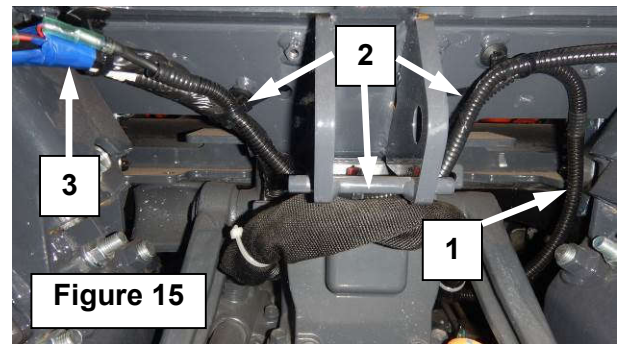
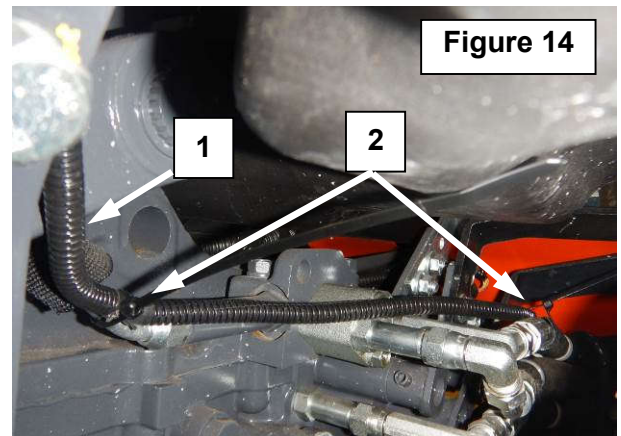
# INSTALLATION

6. **Figure 9:** Bring the end of the harness with the Deutsch connector (item 1) to the front of the tractor and attach loosely to the tractor harnesses (item 2) with tie wraps.
7. **Figure 9:** Insert the harness Deutsch connector in the hose support (item 3).
8. **Figure 10:** Attach loosely the harness inserted in the tractor quick coupler support to the tractor hydraulic tubes (item 1) with tie wraps (item 2).
9. **Figure 11:** Bring the end of the harness with the switch terminals (item 1) between the tractor fender and the hydraulic valve (item 2).
10. **Figure 12:** Run the harness (item 1) in the opening (item 2) of the valve support and under the right side of the console (item 3).
11. **Figure 13:** Run the harness (item 1) in the console's right side hole (item 2).
12. **Figure 11:** Run the harness with the bullet terminal (item 3) along the lower tractor valve hose (item 2).



# INSTALLATION

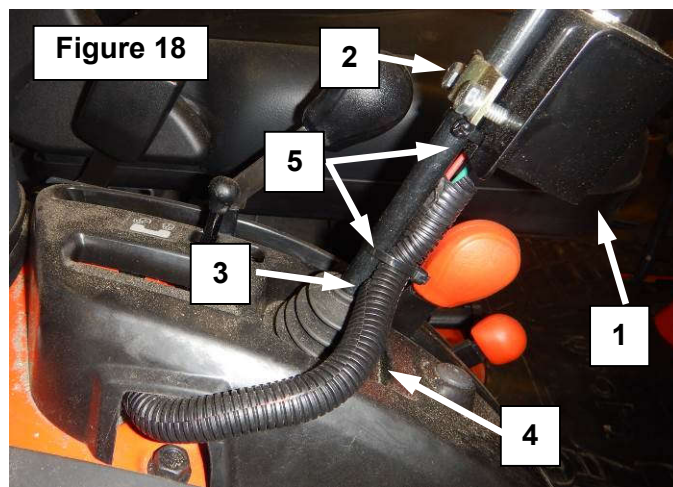
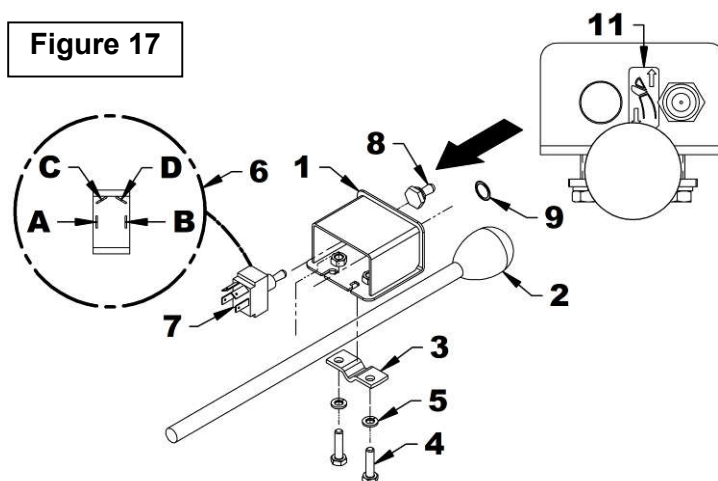
13. **Figure 14:** Attach the harness (item 1) without tightening along the tractor hydraulic hoses with tie wraps (item 2.)
14. **Figure 15:** Attach the harness (item 1) without tightening along the tractor electrical harness (item 2). (The 3 point upper arm was removed to make the figure clearer).
15. **Figure 15:** Open the electrical tape (item 3) to take out a RED and BLUE wire with a female bullet terminal.
16. **Figure 15:** Connect the harness male bullet terminal (item 1) to the tractor harness female bullet terminal.
17. Tighten all the tie wraps that secure the harness to the tractor.
18. **Figure 16:** Remove the fuse from the 102" T harness. Connect the round terminal of the red wire (item 1) to the positive terminal and the round terminal of the black wire (item 2) to the negative terminal of the battery. Reinstall the fuse.
19. Reinstall the battery's protective cover. Close the tractor hood and check that the harness is not jammed by the hood, if so, reposition the harness.



# INSTALLATION

## Connection to the Switchbox

1. **Figure 17:** Stick the decal (item 11) on the switchbox (item 1) on the left side of the switch.
2. **Figure 17:** Attach the switchbox (item 1) to the valve lever rod (item 2) with the box clamp (item 3), two 1/4" x 1" hex. Bolts (item 4) and two 1/4" lockwashers (item 5). Do not tighten to allow adjustment of the position later.
3. **Figure 17:** Connect the harness terminals (item 6) to the switch (item 7): red wire in **A**, black wire in **B**, yellow wire in **C** and blue wire in **D**.
4. **Figure 17:** Secure the switch (item 7) to the switchbox (item 1) with its nut and knurled nut and install rubber cap on switch (item 8).
5. **Figure 17:** Install plastic cap (item 9) in remaining hole if the electric deflector is not installed.
6. **Figure 18:** Place the switchbox (item 1) in a comfortable position for you and tighten the two 1/4" x 1" bolts (item 2) to secure the switchbox to the valve lever (item 3). Attach the harness (item 4) to the switchbox (item 1) and valve lever (item 4) with a tie wrap (item 5).
7. Connect the deflector motor harness to the harness permanently installed on the tractor.

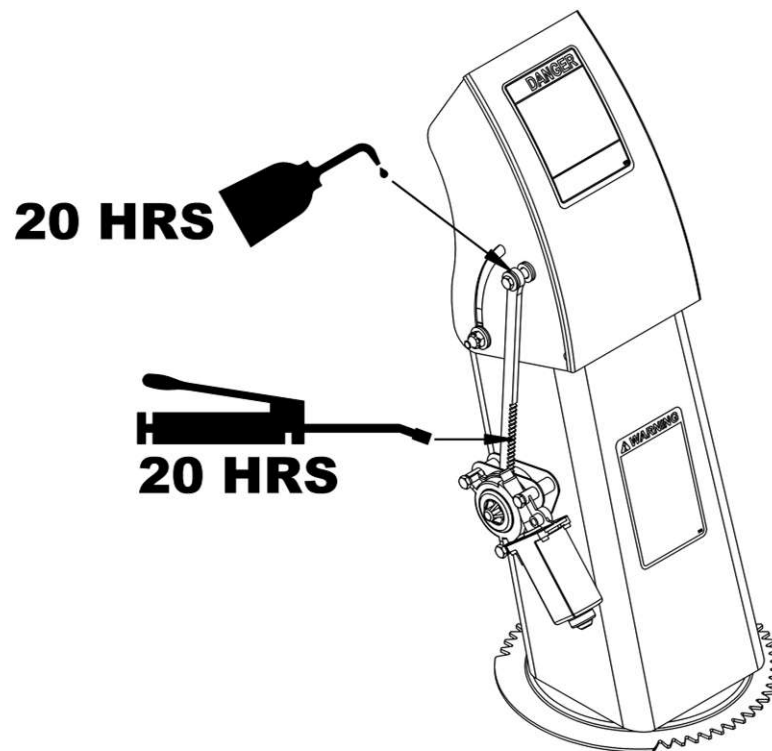




# LUBRICATION

Use oil or a grease gun and lubricate as follows:

DESCRIPTION	INTERVAL	LUBRICATION REQUIRED
Rack	20 hours of operation and at the end of the season	Apply a light coat of grease on the gear teeth and then do a few cycles of deflection
Pivot bushing	20 hours of operation and at the end of the season	Lubricate with a chainsaw heavy oil

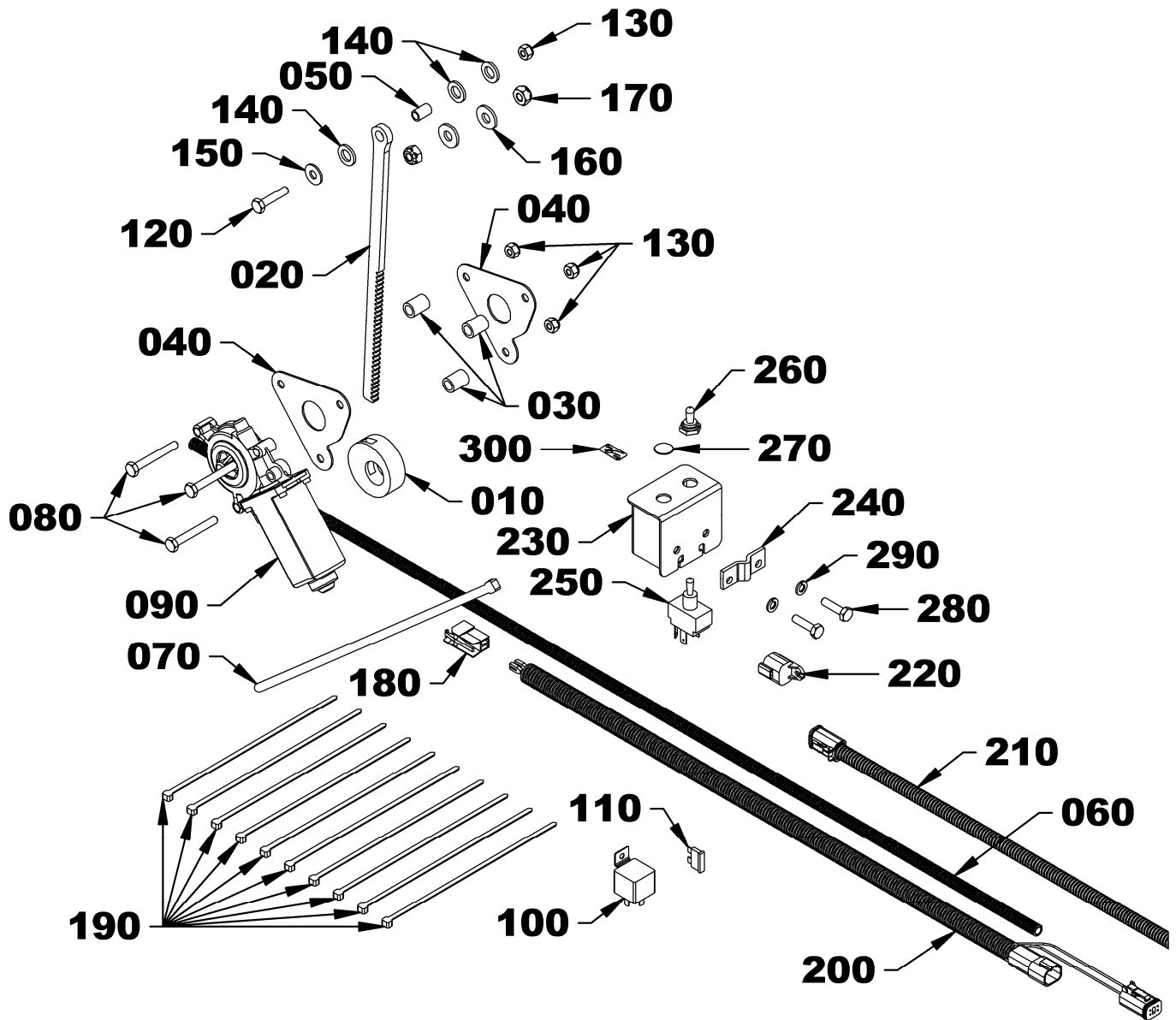


# PARTS

BX2820 – ELECTRIC DEFLECTOR				
REF.	PART #	QTY	DESCRIPTION	CODE
010	77700-04132	1	Nylon rack guide	670155
020	77700-04130	1	Rack	670153
030	77700-04133	3	Spacer ring 0.364" int. X 0.721" lg PTD	670156
040	77700-04131	2	Guide plate	670154
050	77700-04134	1	Bushing pivot 3/8" x 19/32" lg PTD	670157
060	77700-08376	1	Loom ø1/4" x 40"	671653
070	70060-02719	1	Nylon tie wrap 1/4" x 15" lg black	2100009
080	75599-01140	3	Bolt hex 1/4" x 2" gr.5 PTD	0100010
090	70060-04080	1	Electric motor	662455
100	77700-00951	1	Relay 12V plastic SPDT	4000028
110	77700-04875	1	Fuse ATO 30amp (included with 4000166)	663329
120	75599-01125	7	Hex. Bolt ø1/4" x 1 1/4" Gr.5 PTD	0100005
130	75599-31911	4	Nylon insert nut ø1/4" PTD	1000003
140	70060-03053	3	Nylon flat washer ø7/16"	658468
150	75599-32011	1	Flat washer ø1/4" (5/16" hole) PTD	1400002
160	75599-32012	2	Flat washer ø5/16" (3/8" hole) PTD	1400003
170	75599-31912	2	Nylon insert nut ø5/16" PTD	1000005
180	77700-01186	1	Female connector	662469
190	70060-02398	10	Nylon tie wrap 4.8mm x 8" lg black	2100003
200	77700-08375	1	Electric harness- snowblower motor	4000167
210	77700-08374	1	Electric harness 102" T - fuse included	4000166
220	77700-04127	1	Protector for Deutsch connector 4 cavities	4000101
230	77700-05904	1	Switchbox	670988
240	70060-02670	1	Switchbox clamp	667558
250	70060-01876	1	Switch 4 connections	663383
260	70060-01700	1	Rubber cap for switch	658666
270	77700-05932	1	Plastic cap	662530
280	75599-31015	2	Bolt hex 1/4"NC x 1" gr.5 PTD	0100004
290	75599-33011	2	Lockwasher 1/4" PTD	1200002
300	77700-05895	1	Decal chute deflector	2500788

# PARTS

## BX2820 – ELECTRIC DEFLECTOR






# TORQUE SPECIFICATION TABLE




## GENERAL SPECIFICATION TABLE

### USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

Note: These values apply to fasteners as received from supplier dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly disulfide greases or other extreme pressure lubricants are used. These values apply to dry conditions; under lubricated conditions reduce by 25% the torques in this table.

## BOLT HEAD IDENTIFICATION

<b>INCHES</b> Bolt Size	 Grade 2		 Grade 5		 Grade 8	
in-tpi <sup>1</sup>	N-m <sup>2</sup>	lbs-ft <sup>3</sup>	N-m	lbs-ft	N-m	lbs-ft
1/4" – 20NC	7.4	5.6	11	8	16	12
1/4" – 28NF	8.5	6	13	10	18	14
5/16" – 18NC	15	11	24	17	33	25
5/16" – 24NF	17	13	26	19	37	27
3/8" – 16NC	27	20	42	31	59	44
3/8" – 24NF	31	22	47	35	67	49
7/16" – 14NC	43	32	67	49	95	70
7/16" – 20NF	49	36	75	55	105	78
1/2" – 13NC	66	49	105	76	145	105
1/2" – 20NF	75	55	115	85	165	120
9/16" – 12NC	95	70	150	110	210	155
9/16" – 18NF	105	79	165	120	235	170
5/8" – 11NC	130	97	205	150	285	210
5/8" – 18NF	150	110	230	170	325	240
3/4" – 10NC	235	170	360	265	510	375
3/4" – 16NF	260	190	405	295	570	420
7/8" – 9NC	225	165	585	430	820	605
7/8" – 14NF	250	185	640	475	905	670
1" – 8NC	340	250	875	645	1230	910
1" – 12NF	370	275	955	705	1350	995
1 1/8" – 7NC	480	355	1080	795	1750	1290
1 1/8" – 12NF	540	395	1210	890	1960	1440
1 1/4" – 7NC	680	500	1520	1120	2460	1820
1 1/4" – 12NF	750	555	1680	1240	2730	2010
1 3/8" – 6NC	890	655	1990	1470	3230	2380
1 3/8" – 12NF	1010	745	2270	1670	3680	2710
1 1/2" – 6NC	1180	870	2640	1950	4290	3160
1 1/2" – 12NF	1330	980	2970	2190	4820	3560

<b>METRIC</b> Bolt Size	 Class 5.8		 Class 8.8		 Class 10.9	
mm <sub>x</sub> pitch <sup>4</sup>	N-m	lbs-ft	N-m	lbs-ft	N-m	lbs-ft
M 5 X 0.8	4	3	6	5	9	7
M 6 X 1	7	5	11	8	15	11
M 8 X 1.25	17	12	26	19	36	27
M 8 X 1	18	13	28	21	39	29
M10 X 1.5	33	24	52	39	72	53
M10 X 0.75	39	29	61	45	85	62
M12 X 1.75	58	42	91	67	125	93
M12 X 1.5	60	44	95	70	130	97
M12 X 1	90	66	105	77	145	105
M14 X 2	92	68	145	105	200	150
M14 X 1.5	99	73	155	115	215	160
M16 X 2	145	105	225	165	315	230
M16 X 1.5	155	115	240	180	335	245
M18 X 2.5	195	145	310	230	405	300
M18 X 1.5	220	165	350	260	485	355
M20 X 2.5	280	205	440	325	610	450
M20 X 1.5	310	230	650	480	900	665
M24 X 3	480	355	760	560	1050	780
M24 X 2	525	390	830	610	1150	845
M30 X 3.5	960	705	1510	1120	2100	1550
M30 X 2	1060	785	1680	1240	2320	1710
M36 X 3.5	1730	1270	2650	1950	3660	2700
M36 X 2	1880	1380	2960	2190	4100	3220

<sup>1</sup> in-tpi = nominal thread diameter in inches-threads per inch

<sup>2</sup> N-m = newton-meters

<sup>3</sup> lbs-ft= pounds-foot

<sup>4</sup> mm x pitch = nominal thread diameter in millimeters x thread Pitch

\*Torque tolerance +0%, -15% of torquing values. Unless otherwise specified use torque values listed above

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