



INSTRUCTION BULLETIN

No. 9021688
Machine: T17
Published: 10-2021
Rev. 00

NOTE: DO NOT DISCARD the Parts List from the Instruction Bulletin. Place the Parts List in the appropriate place in the machine manual for future reference. Retaining the Parts List will make it easier to reorder individual parts and will save the cost of ordering an entire kit.

NOTE: Numbers in parenthesis () are reference numbers for parts listed in Bill of Materials.

Installation instructions for **kit number 9021685**

Kit installation must be performed by TennantTrue[®] service or an authorized service provider.

SYNOPSIS:

This kit contains the parts needed to install a power steering kit onto T17 scrubbers
(NA 011000-) (EU U00400-)
Please follow step-by-step instructions.

SPECIAL TOOLS / CONSIDERATIONS: NONE

(Estimated time to complete: 4 hours)



PROTECT THE ENVIRONMENT

Please dispose of packaging materials, used machine components such as batteries and fluids in an environmentally safe way according to local waste disposal regulations.

Always remember to recycle.

PREPARATION:

1. Remove the access panel from the machine.
Set the access panel and hardware aside.
(Fig. 1)



FIG. 1

2. Turn the steering wheel so the master link/
master link lock on the steering chain are
easy to see/access and mark the master link.

NOTE: Locating/marketing the location of master link will make it easier to locate and remove the master link/master link lock from the steering chain if the master link should end up in an area on the steering mechanism where it is difficult to see or access.

3. Turn on the machine, drive the machine so the drive wheel (front wheel) is oriented straight out from the front of the machine, turn off the machine, set the parking brake, and remove the key. (Fig. 2)



FIG. 2

FOR SAFETY: Before leaving or servicing machine, stop on level surface, turn off machine, and remove key.

4. Disconnect the battery cable from the machine.

WARNING: Always disconnect battery cables from machine before working on electrical components.

INSTALLATION:

1. Remove the hardware securing the left control panel to the machine and carefully lift the left control panel from the steering shroud. Do not break any wire/cable connection when lift the left control panel from the steering shroud. Set all mounting hardware aside. (Fig.3)



FIG. 3

2. Remove the SEMS M8 hex screw (steering tension) from the steering support channel and bearing support plate. Set the SEMS M8 hex screw aside. (Fig. 4/Fig.5)

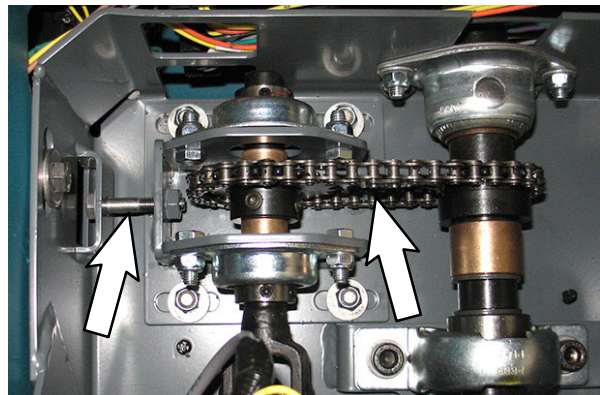


FIG. 4

3. Remove the steering chain from the steering assembly. Set the steering chain and the chain link aside. (Fig. 4/Fig.5)

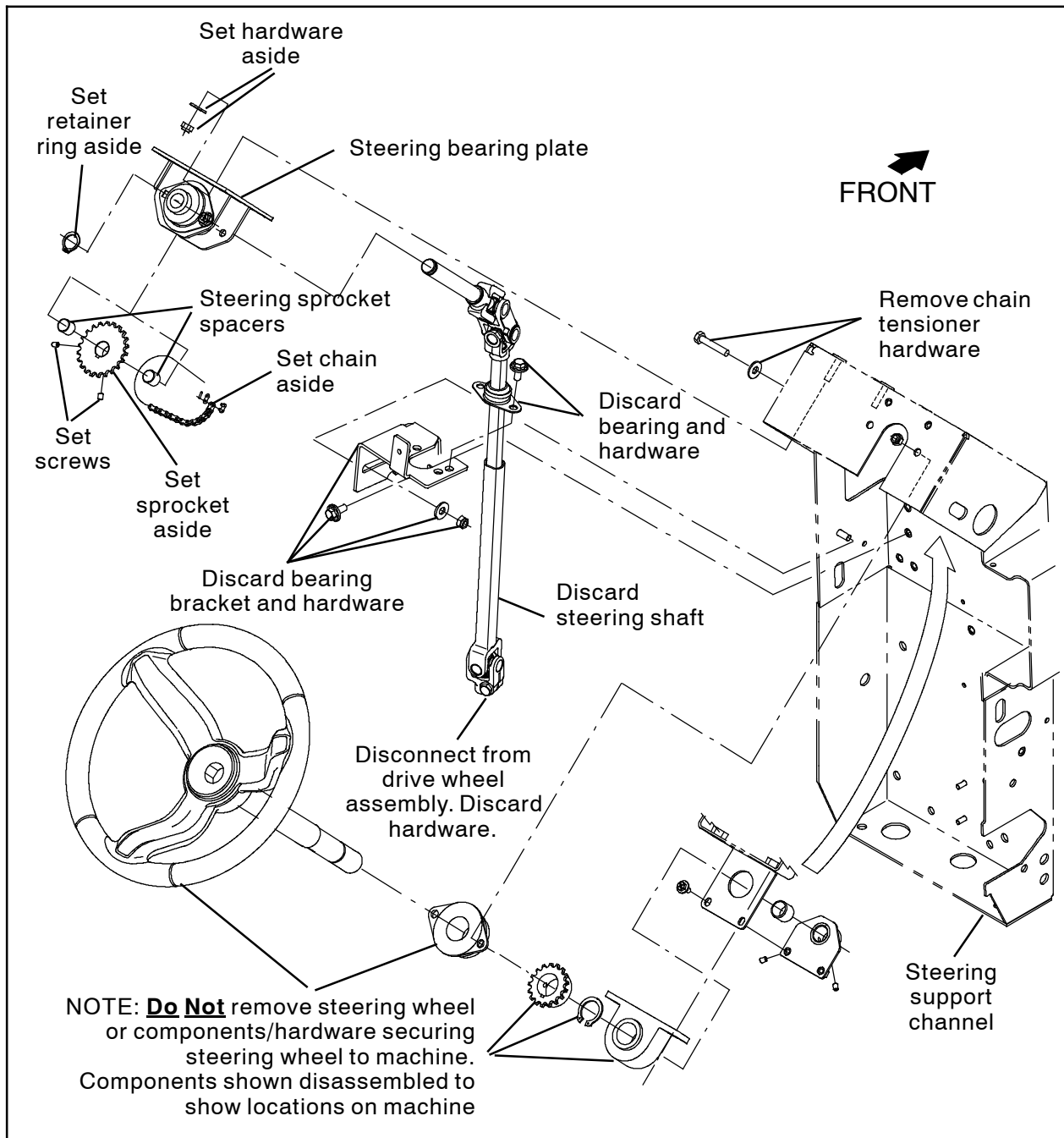


FIG. 5

4. Remove the hardware securing the steering bearing assembly to the steering support channel. Set the hardware aside. (Fig. 5)
5. Remove the hardware securing the bearing bracket to the steering support channel. Set the hardware aside. (Fig. 5)
6. Remove the steering shaft/items attached to the steering shaft from the machine. Remove the steering bearing assembly from the steering shaft and set steering bearing assembly aside. Discard the steering shaft/remaining items attached to the steering shaft. (Fig. 5)

7. Disassemble all parts from the bearing support plate removed in the previous step. Set the both flange bearings and the sprocket aside. Discard the two set screws, the two sprocket spacer sleeves, and bearing support plate. (Fig. 6)

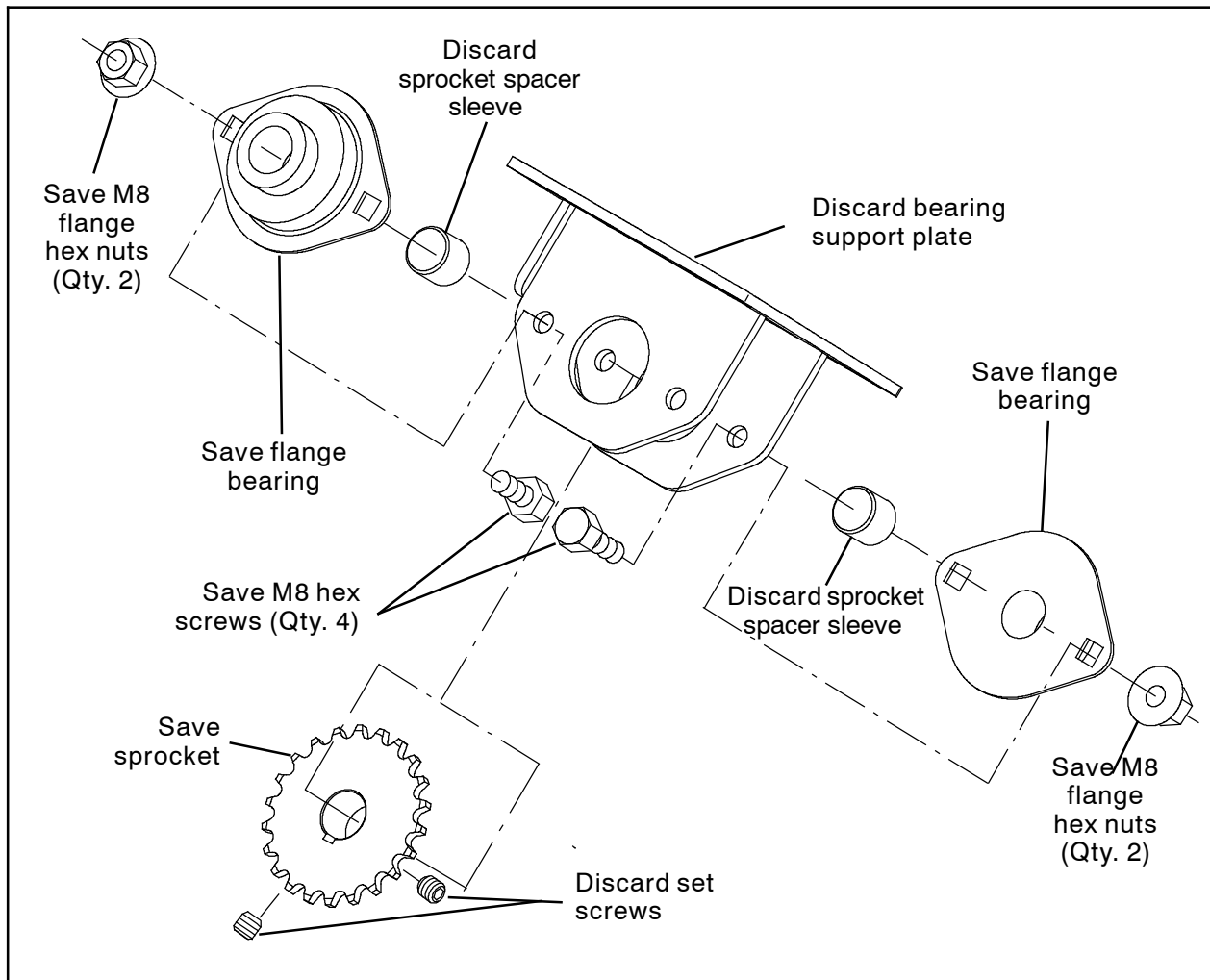


FIG. 6

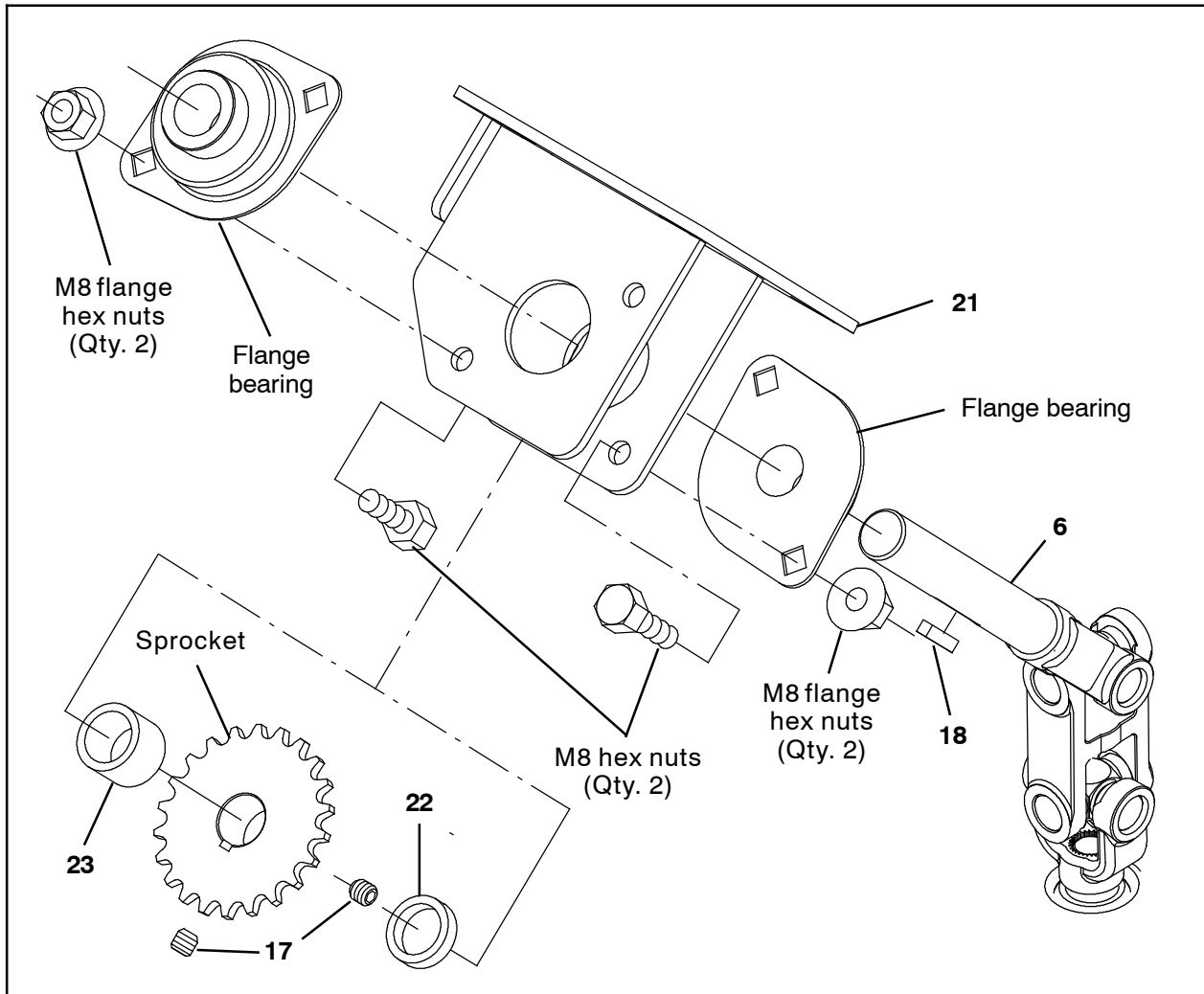


FIG. 7

8. Install one saved flange bearing onto the power steering shaft (6). (Fig. 8/Fig. 7)



FIG. 8

9. Slide the sprocket spacer sleeve (22) onto the power steering shaft (6) and insert the key (18) into the notch in the power steering shaft. (Fig. 9/Fig. 7)

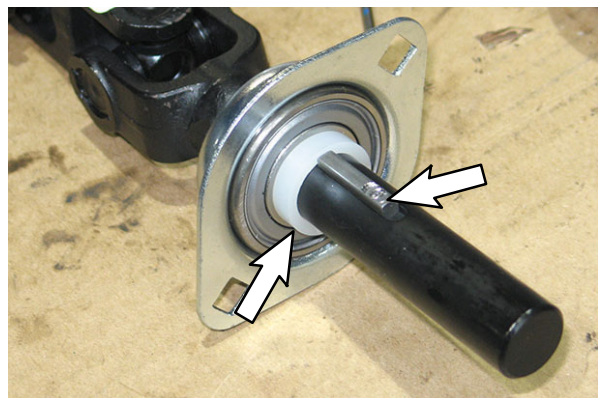


FIG. 9

10. Align the notch in the sprocket with the key (18) in the power steering shaft (6) and slide the sprocket and steering bearing bracket (21) onto the power steering shaft. (Fig. 10/Fig. 7)

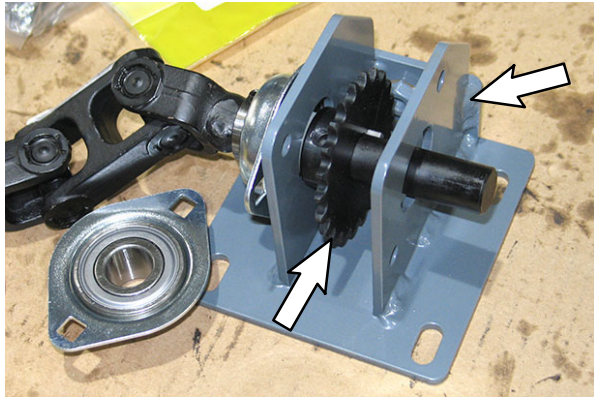


FIG. 10

11. Install the set screws (17) into the sprocket to secure the sprocket onto the power steering shaft (6). (Fig. 11/Fig. 7)

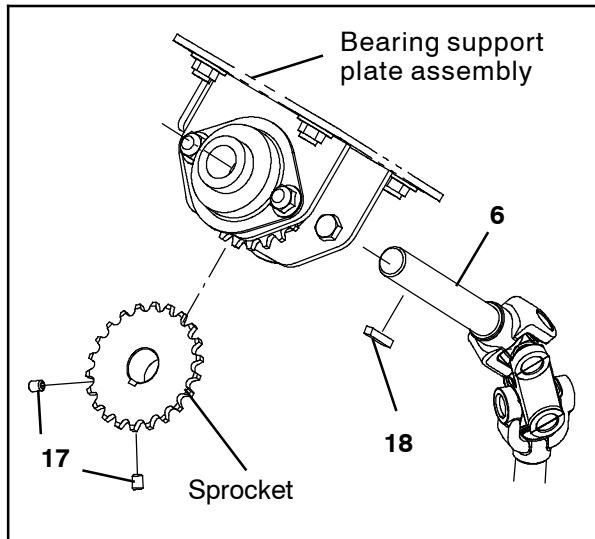


FIG. 11

12. Slide the other sprocket spacer sleeve (23) and remaining flange bearing onto the power steering shaft (6). (Fig. 12/Fig. 7)

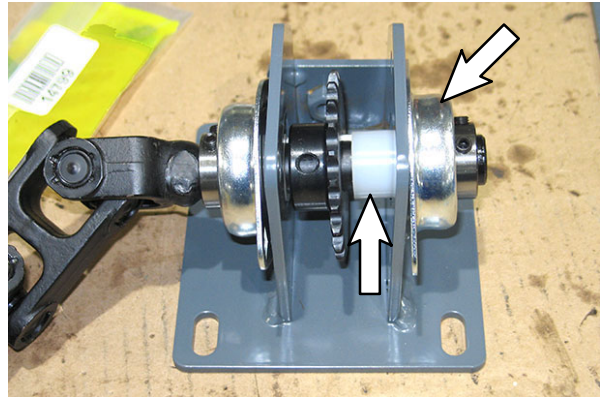


FIG. 12

13. Use two M8 hex screws and two M8 flange nuts to secure the flange bearing to the bottom of the steering bearing bracket (21). (Fig. 13/Fig. 7)

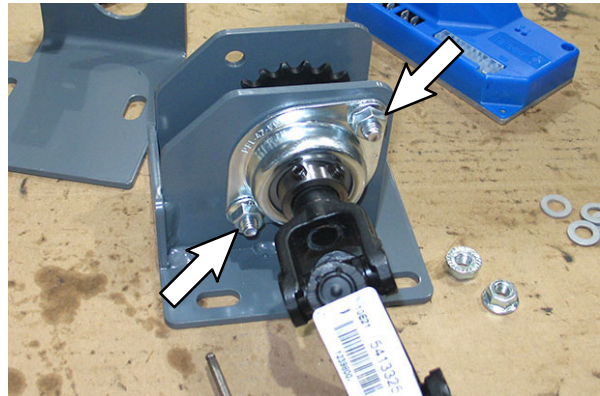


FIG. 13

14. Use two M8 hex screws and two M8 flange nuts to secure the flange bearing to the top of the steering bearing bracket (21). (Fig. 14/Fig. 7)

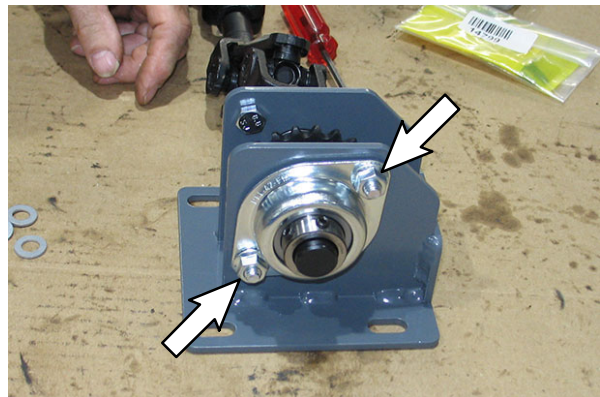


FIG. 14

15. Install the retainer ring onto the steering shaft (6). (Fig. 15/ Fig. 5)

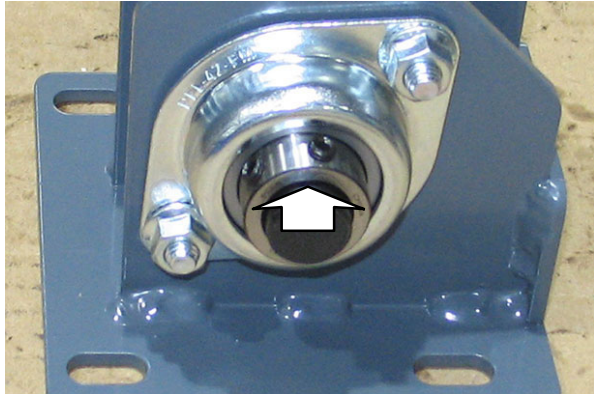


FIG. 15

16. Install the chain onto the steering bearing assembly. (Fig. 16)

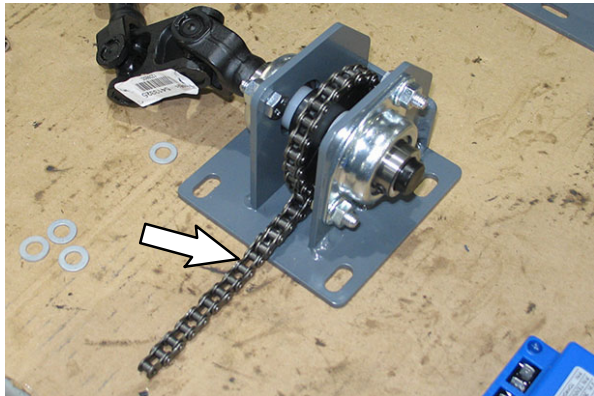


FIG. 16

17. Use a cable tie to secure the chain onto the steering bearing assembly. (Fig. 17)

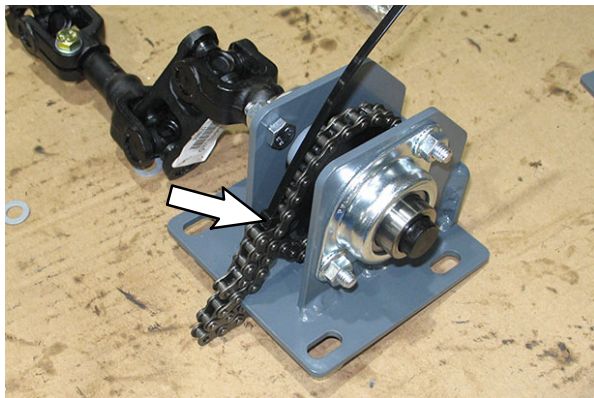


FIG. 17

18. Use two M8 hex screws (2), four flat washers (5), and two M8 hex nuts (3) to install the flange bearing (4) onto the steering bearing bracket (7). (Fig. 18/ Fig. 19)

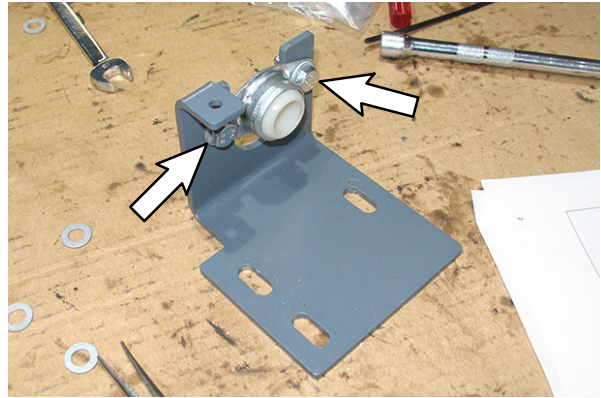


FIG. 18

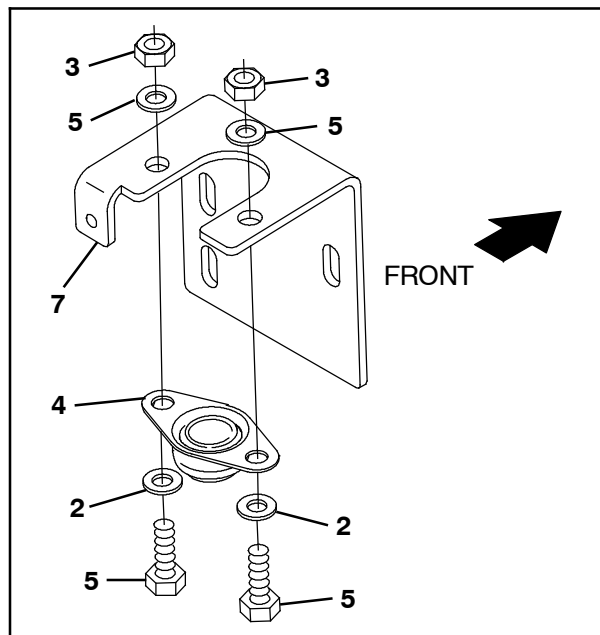


FIG. 19

19. Remove the M8 hex screw securing the lower portion of the upper power steering shaft (6) to the upper portion and pull the two portions of the upper power steering shaft apart. (Fig. 20)

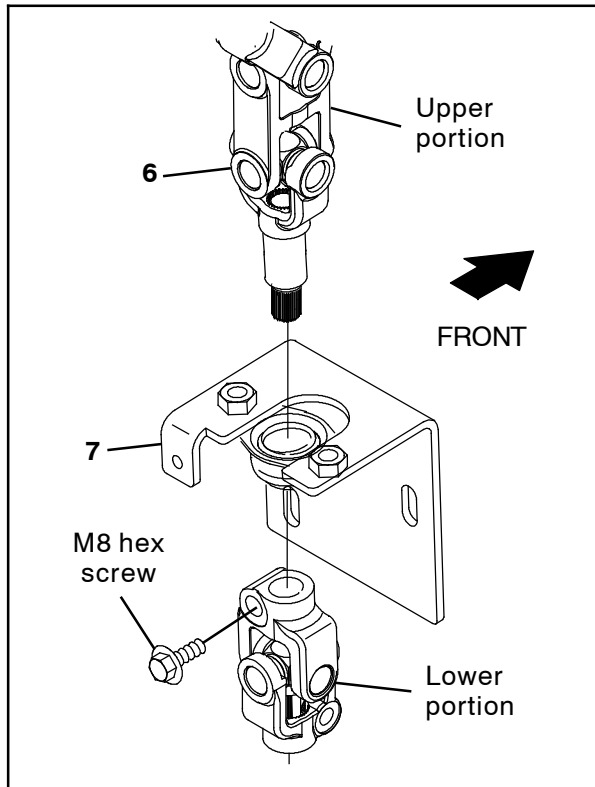


FIG. 20

20. Install the steering bearing bracket assembly (7) onto the upper power steering shaft (6). (Fig. 20)

21. Reinstall the lower portion of the upper power steering shaft (6) onto the upper portion, and reinstall the SEMS M8 hex screw to secure the portions together. Torque the SEMS M8 hex screw to 22 Nm (16 ft lbs). (Fig. 20/ Fig. 21)

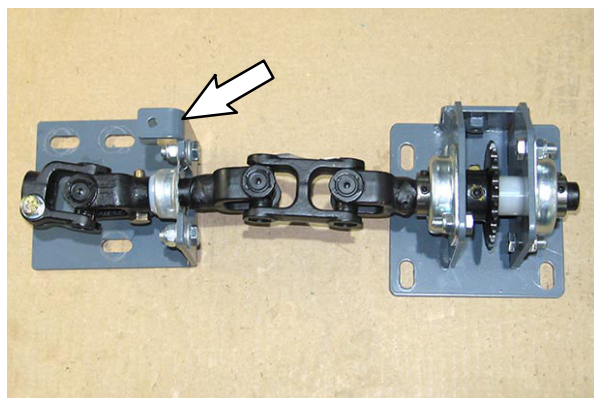


FIG. 21

22. Use two M4 pan screws (15) to install the new steering controller (14) onto the steering support channel. (Fig. 22)

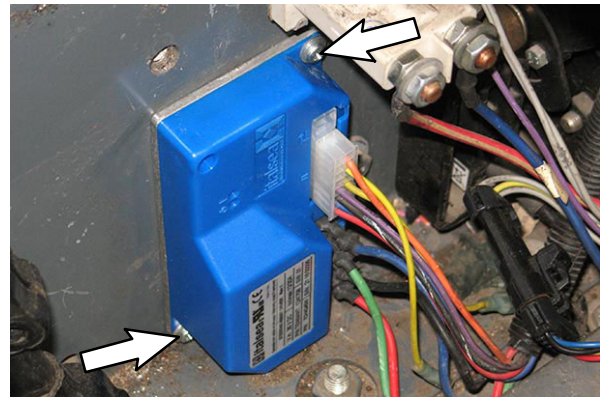


FIG. 22

23. Connect the power steering harness (19) to the steering controller (14). (Fig. 23/ Fig. 50)

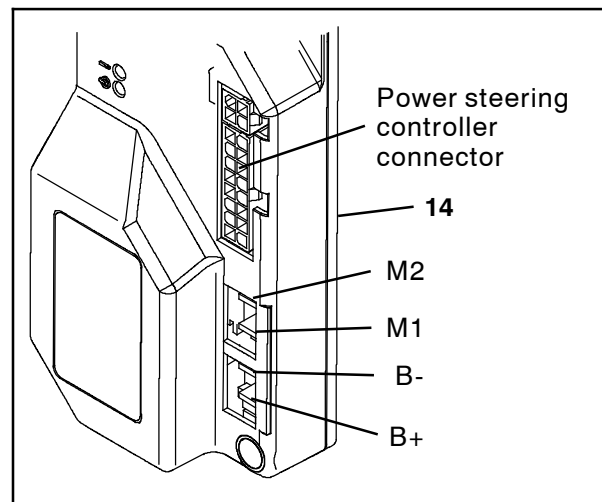


FIG. 23

24. Connect the power steering harness (19) to the main wire harness. (Fig. 46/Fig. 49)
25. Connect the power steering harness (19) to the Curtis controller B- terminal. (Fig. 24/ Fig. 46)

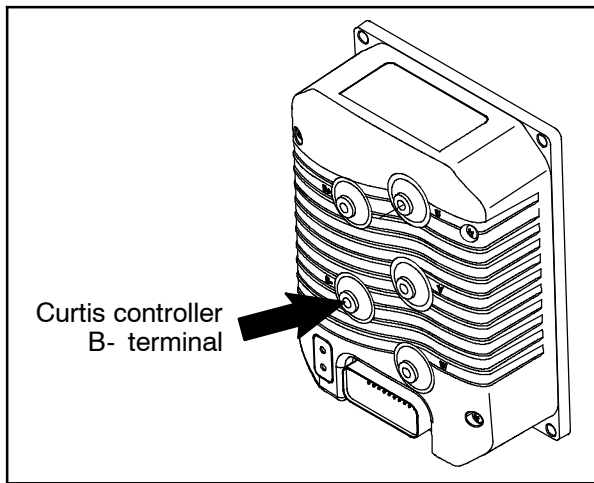


FIG. 24

26. Use four M8 hex nuts and four flat washers to install the steering bearing mount bracket onto the steering support channel. Do not completely tighten hardware. Hardware is tightened during later adjustment. (Fig. 25)

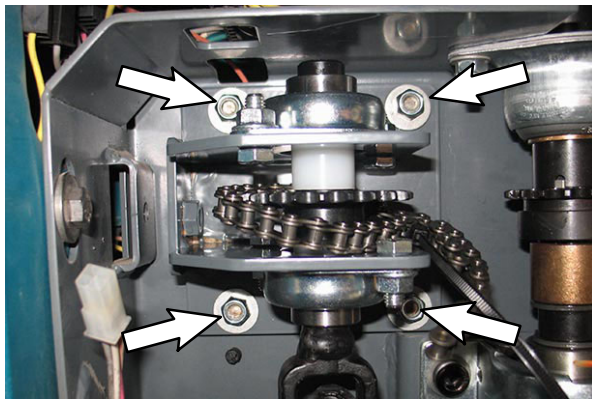


FIG. 25

27. Stretch the chain from the sprocket on the steering bearing mount assembly and around the sprocket located on the steering column tube and use the chain link to secure the chain onto the two sprockets. (Fig. 26)

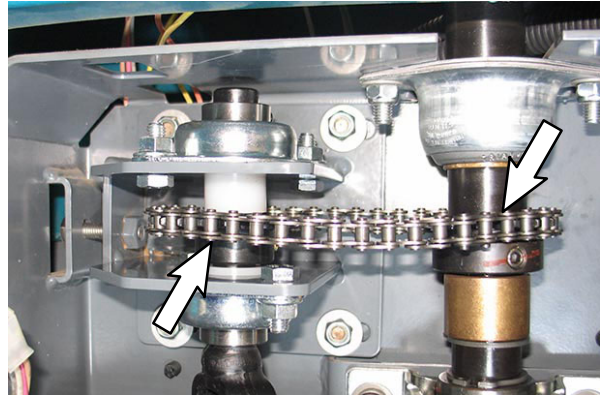


FIG. 26

28. Use three SEMS M8 hex screws (8) to install the steering shaft bearing bracket assembly (7) onto the steering support channel. Do not completely tighten hardware. Hardware is tightened during later adjustment. (Fig. 27)

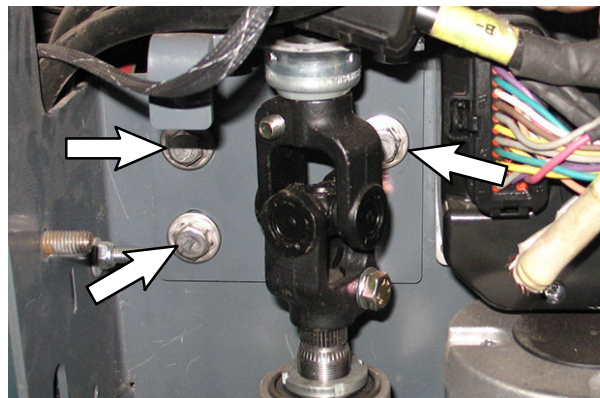


FIG. 27

29. Thread the saved M8 hex screw into the steering support channel. (Fig. 28)

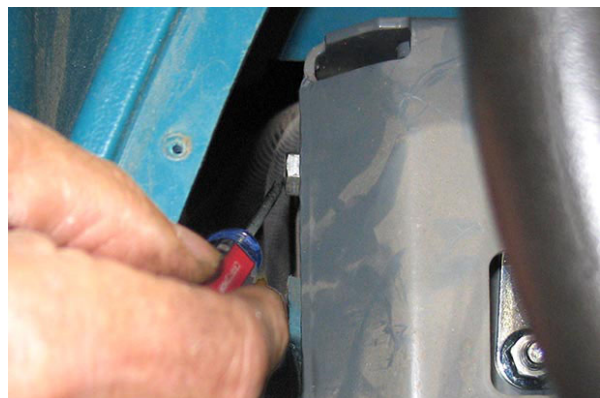


FIG. 28

30. Use four M6 hex screws (11) and four flat washers (12) to install the new power steering motor (10) onto the motor support bracket (9). (Fig. 29/Fig. 30)

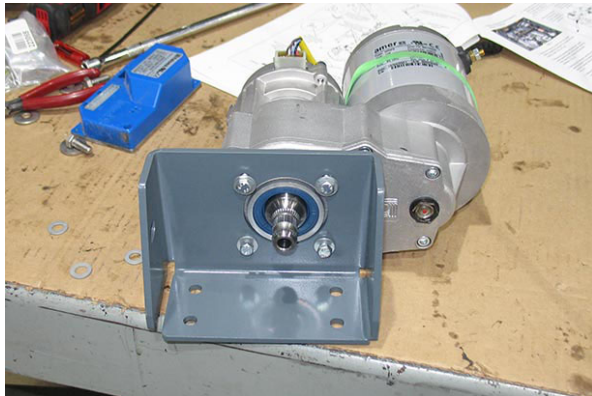


FIG. 29

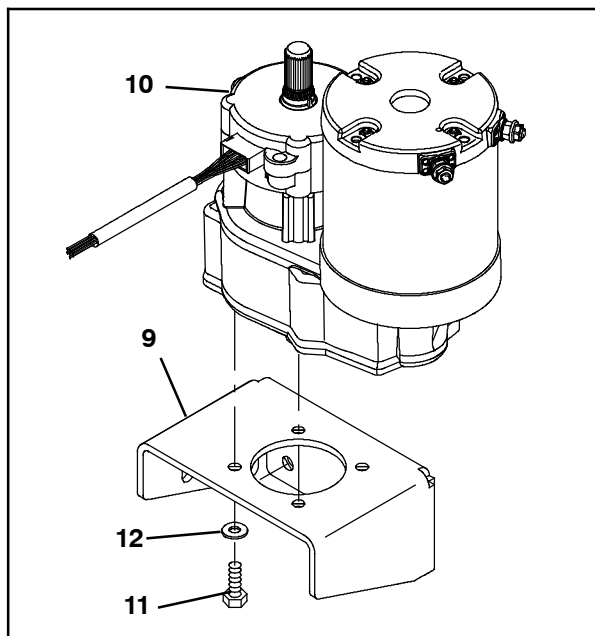


FIG. 30

31. Install the lower power steering shaft (13) onto the steering transmission input shaft. (Fig. 31)

32. Remove the two M8 hex screws from the lower power steering shaft. Set the M8 hex screws aside. (Fig. 31)

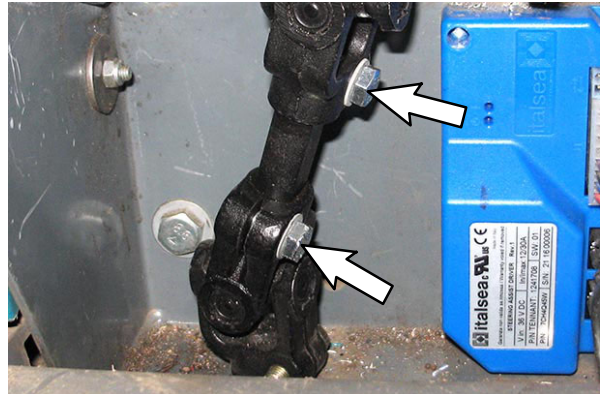


FIG. 31

33. Tap the lower power steering shaft (13) down enough to install the power steering motor assembly (9)/(10) into the steering support channel and install the lower power steering shaft onto the power steering motor assembly. (Fig. 32)

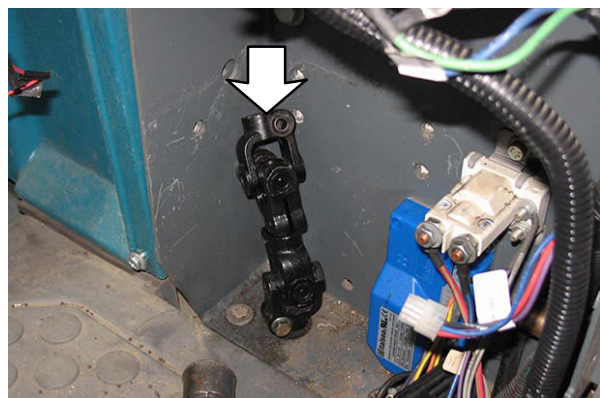


FIG. 32

34. Connect the power steering harness (19) green wire to the power steering motor (18) negative (-) terminal and the blue wire to the power steering motor positive (+) terminal. (Fig. 33/Fig. 34/Fig. 46)

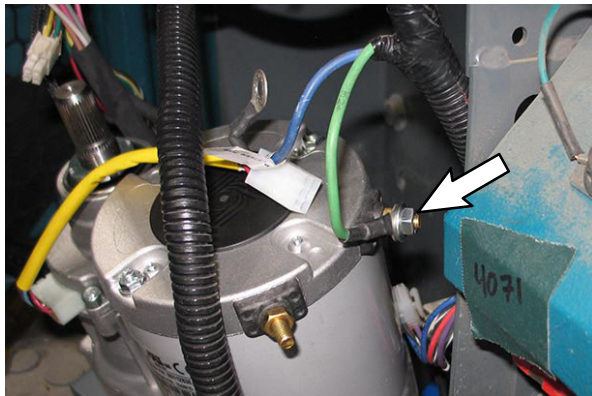


FIG. 33

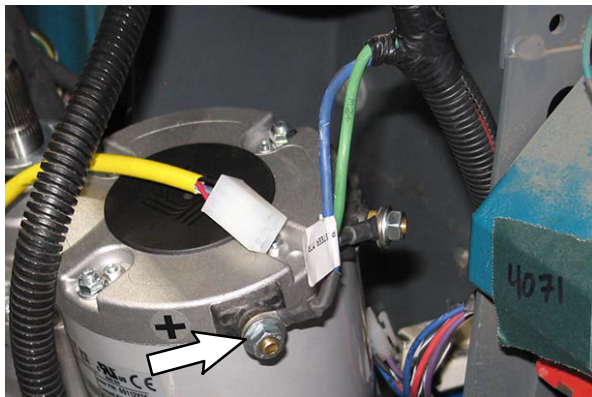


FIG. 34

35. Use five SEMS M8 hex screws (8) to install the power steering motor assembly (9)/(10) onto the steering support channel. Torque the SEMS M8 hex screws to 22 Nm (16 ft lbs). (Fig. 35)

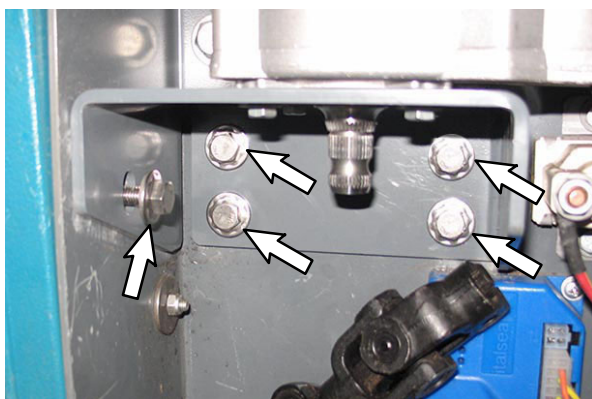


FIG. 35

36. Connect the power steering harness (19) encoder connector to the power steering motor (10). (Fig. 46)

37. Install bottom of the power steering top shaft (6) onto the power steering motor (10). (Fig. 36)

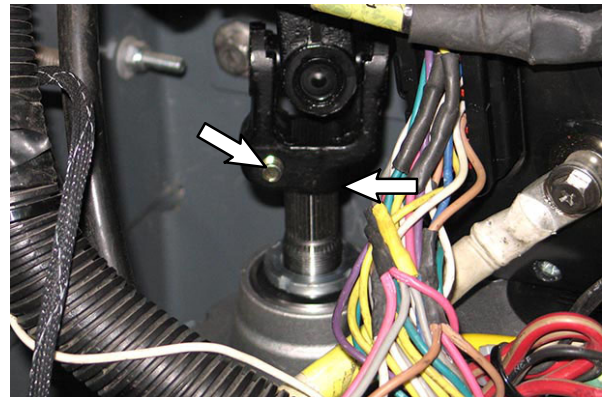


FIG. 36

38. Tighten hardware to secure the power steering motor (10) into the bottom of the power steering top shaft (6). Torque the SEMS M8 hex screws to 22 Nm (16 ft lbs). (Fig. 37)

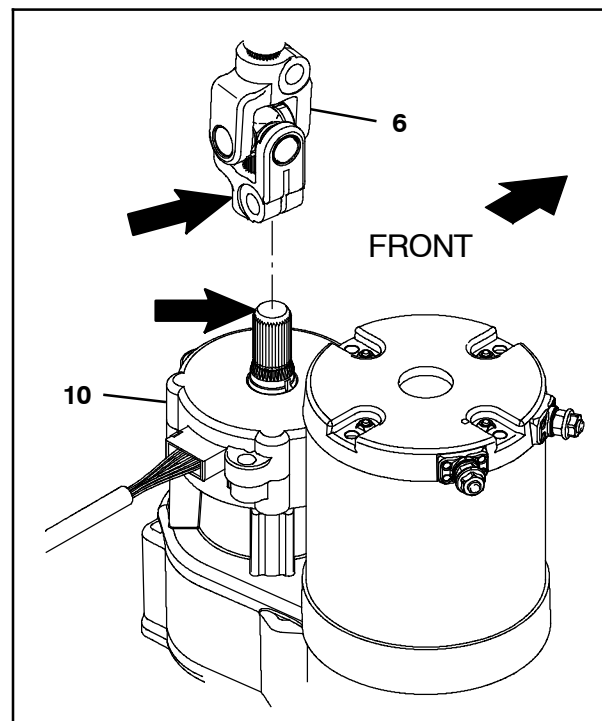


FIG. 37

39. Carefully pull the circuit breaker bracket out far enough to access the main wire harness connectors located behind the bracket. **Do Not** break any wire connections. (Fig. 38)

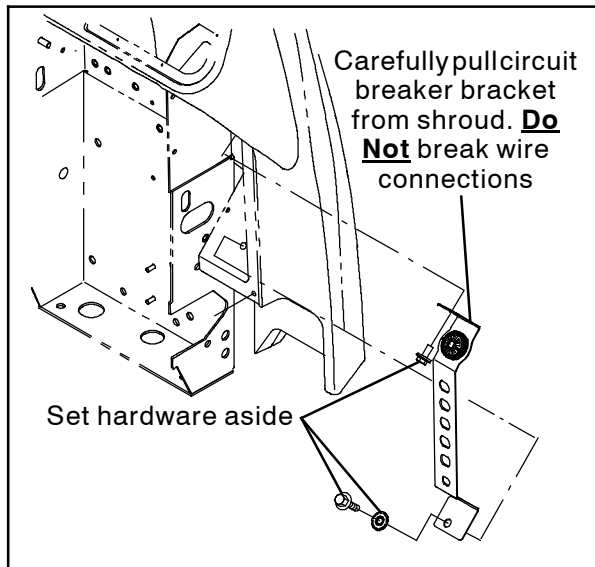


FIG. 38

40. Route the steering harness (19) into the circuit breaker compartment. (Fig. 38/Fig.46)

41. Connect the power steering harness (19) and main wire harness to the 30- Amp circuit breaker (20). (Fig. 39/Fig. 47/Fig. 51)

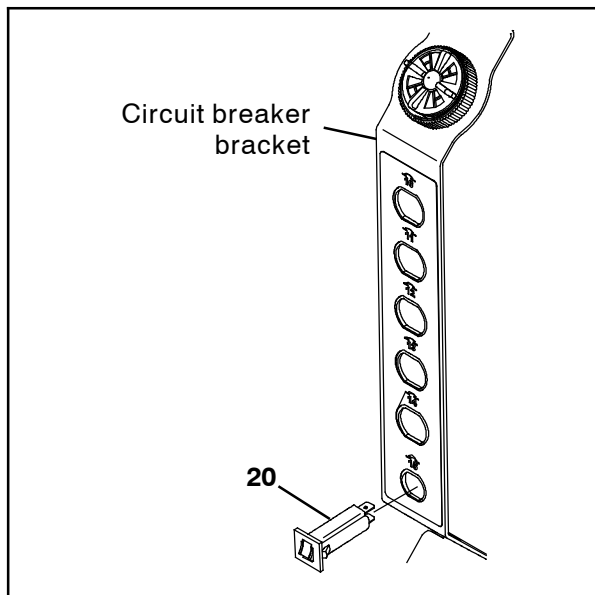


FIG. 39

42. Connect the power steering harness (19) to the main wire harness. (Fig. 47/Fig. 51)

43. Insert the 30- Amp circuit breaker (9) into circuit breaker location 15 in the circuit breaker bracket. (Fig. 39)

44. Reinstall the circuit breaker bracket onto the machine. (Fig.38)

45. Use several cable ties to secure the power steering harness (19) to the main wire harness, away from any moving steering components. (Fig.40)

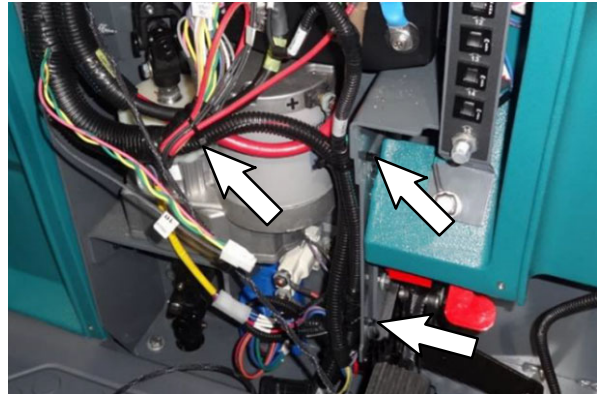


FIG. 40

46. Orient the steering wheel so it is positioned correctly on the machine. (Fig. 41)



FIG. 41

47. Install the lower power steering shaft (13) onto the bottom power steering motor (10) shaft. (Fig. 42)

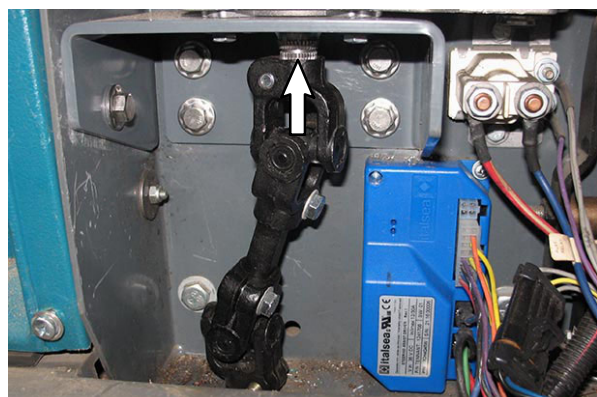


FIG. 42

48. Tap up on the lower power steering shaft (13) up until the power steering motor (10) shaft is flush with the surface on the lower power steering shaft as shown. (Fig. 43)

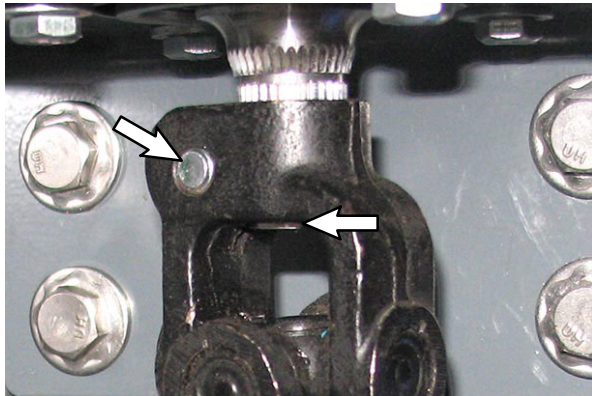


FIG. 43

49. Tighten hardware to secure the lower power steering shaft (13) onto the power steering motor (10) shaft. Torque the SEMS M8 hex screws to 22 Nm (16 ft lbs). (Fig. 43)

50. Reinstall the two previously removed M8 hex screws into the lower power steering shaft (13). Torque the SEMS M8 hex screws to 22 Nm (16 ft lbs). (Fig. 44)

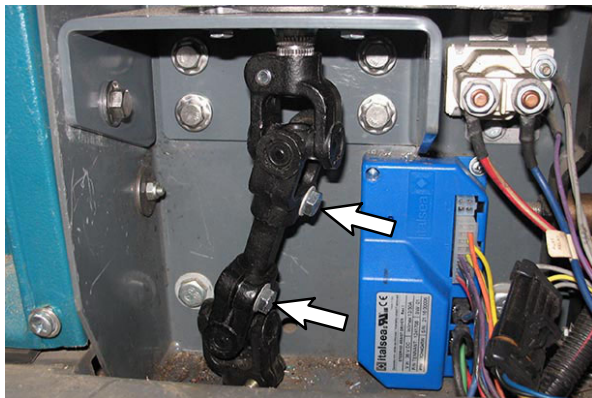


FIG. 44

51. Tighten all remaining loose hardware to fully secure all power steering assembly components onto the steering support channel. Torque all SEMS M8 hex screws to 22 Nm (16 ft lbs).

52. Check the steering chain tension. Turn the steering wheel in the complete range of motion to both the left and right. The steering chain should move on the sprockets without the chain becoming too tight or loose. (Fig. 45)

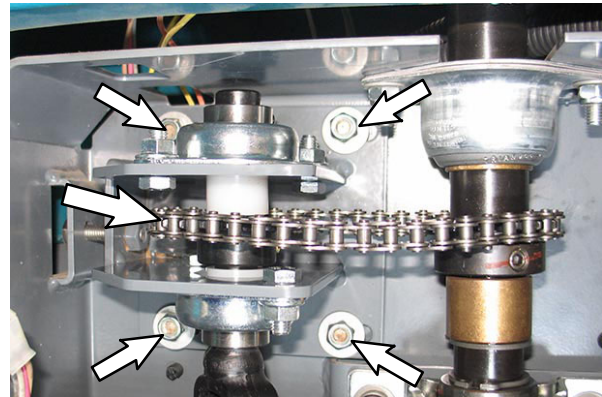


FIG. 45

Loosen the four M8 hex nuts securing the steering bearing mount bracket (1) to the steering support channel and tighten/loosen the M8 hex screw in the steering support channel/steering bearing mount bracket (1) as necessary to adjust the steering chain tension. (Fig. 46/Fig. 45)

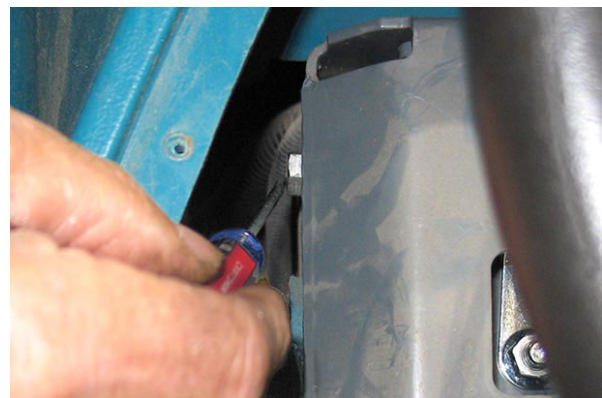


FIG. 46

Tighten the four M8 hex nuts securing the steering bearing mount bracket (1) to the steering support channel. (Fig. 45)

53. Recheck the steering chain tension. Repeat previous step as necessary until steering chain is at correct tension.

54. Reinstall the left control panel onto the machine.

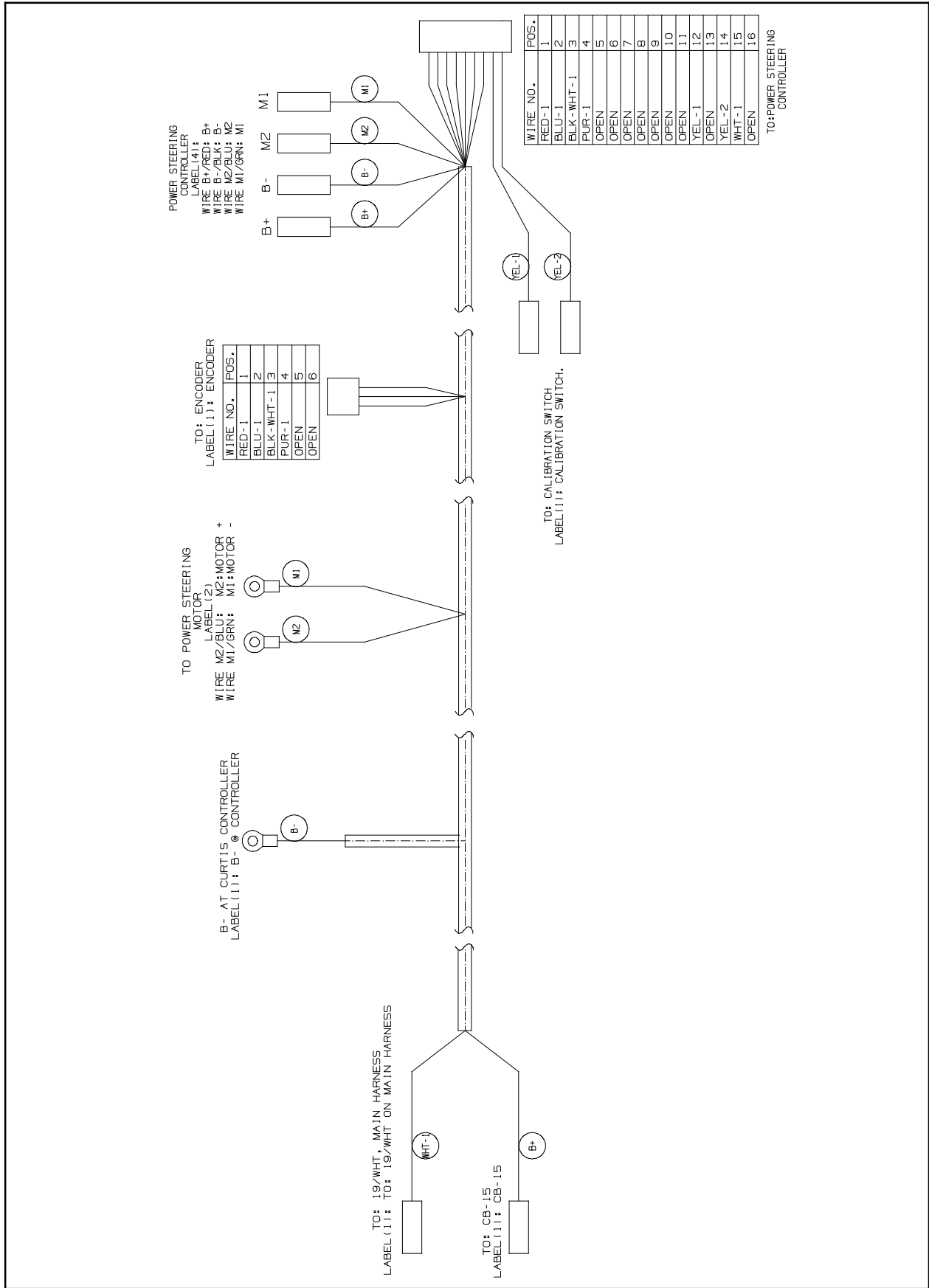


FIG. 47

55. Reconnect the battery cable to the machine.

56. **Calibration:** Connect power steering wire harness YEL- 1 wire and YEL- 2 wire located on the power steering harness (19) to the switch (16). (Fig. 48/Fig. 49/Fig. 47)

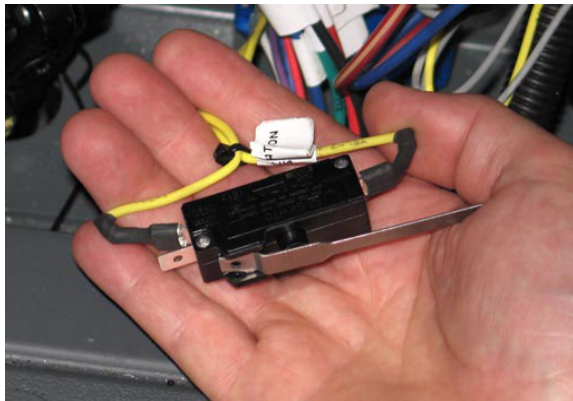


FIG. 48

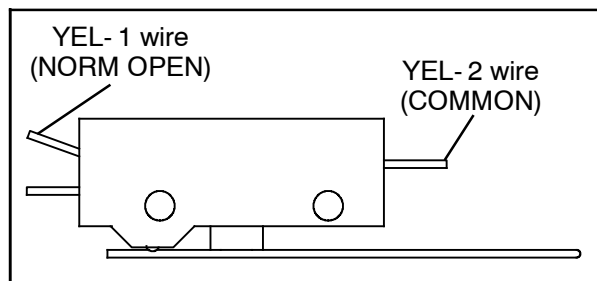


FIG. 49

57. **Calibration:** Turn the key to the ON position.

58. **Calibration: Turn OFF all machine functions and options.** All functions/options (spray nozzle, lights, etc...) must be **OFF** before the power steering system can be calibrated. The power steering system will not calibrate if functions/options are on.

59. **Calibration:** Quickly squeeze/activate the switch (16) lever four times within 3 seconds. The power steering controller (14) LED will illuminate each time the snap switch lever is squeezed. The LED will remain illuminated for 2 seconds the fourth time the snap switch lever is squeezed to show the sequence is completed. (Fig. 50)

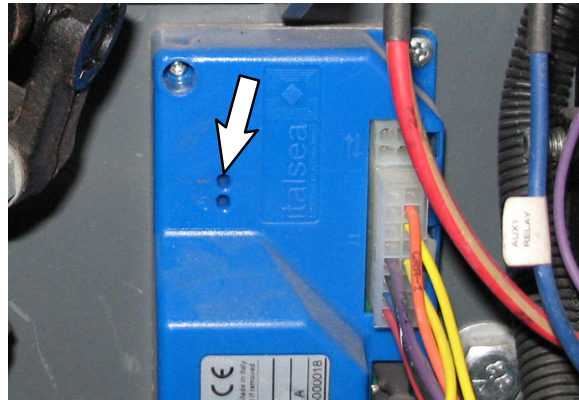


FIG. 50

60. **Calibration:** Test the machine. Turn the steering wheel in the complete range of motion in both directions. The machine should steer smoothly and with the same amount of resistance in both directions. Recenter the steering wheel and repeat calibration if the steering is not functioning smoothly with the same amount of resistance when turned in either direction. Do not turn on any machine functions/options when testing the machine.

NOTE: To complete calibration, all functions and options must remain OFF until after the key is turned to the OFF position.

61. **Calibration:** Turn the key to the OFF position.

62. **Calibration:** Disconnect the power steering wire harness (19) YEL- 1 wire and YEL- 2 wire from the snap switch (16).

63. Reinstall the access panel onto the machine.

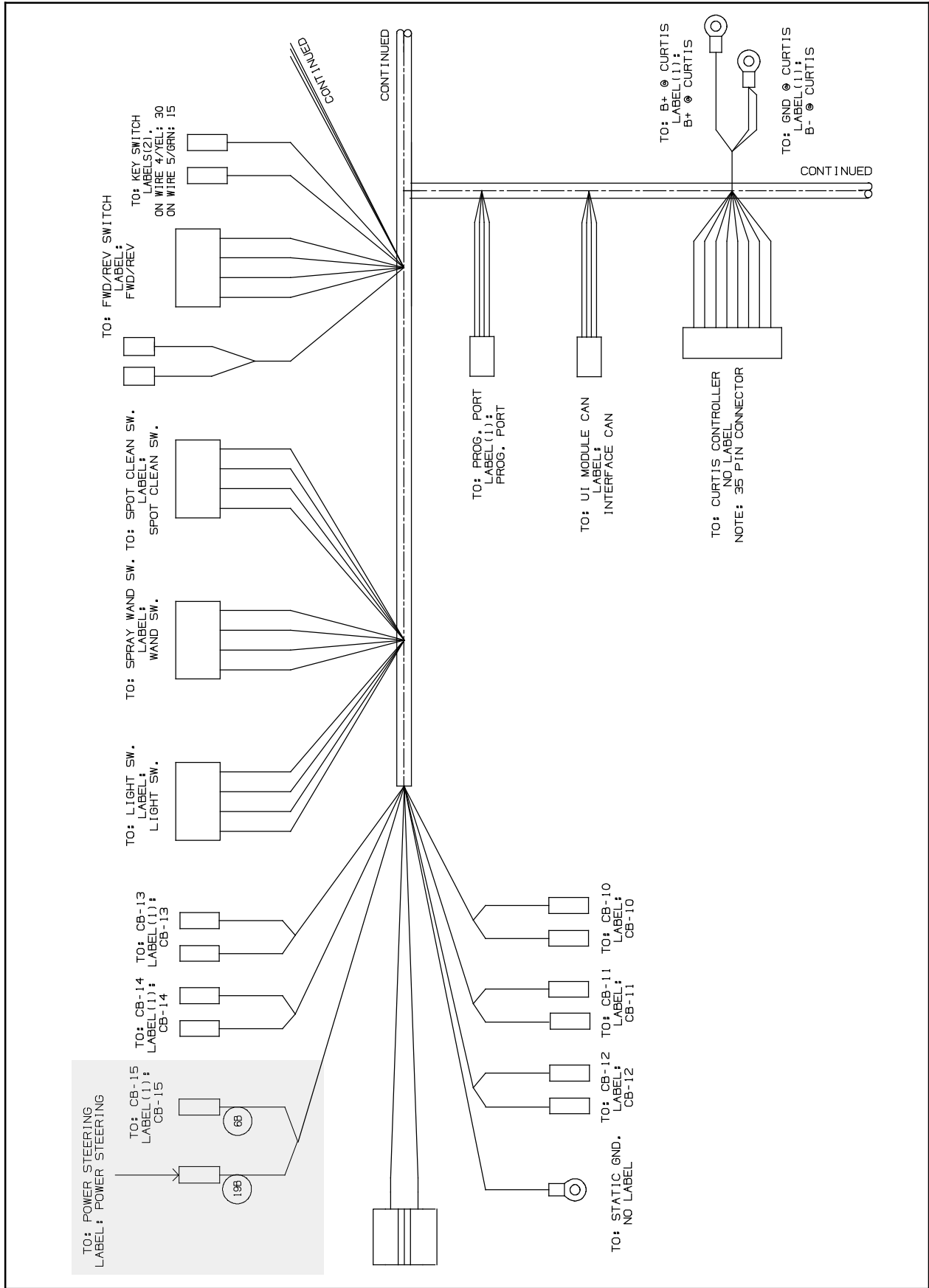


FIG. 51

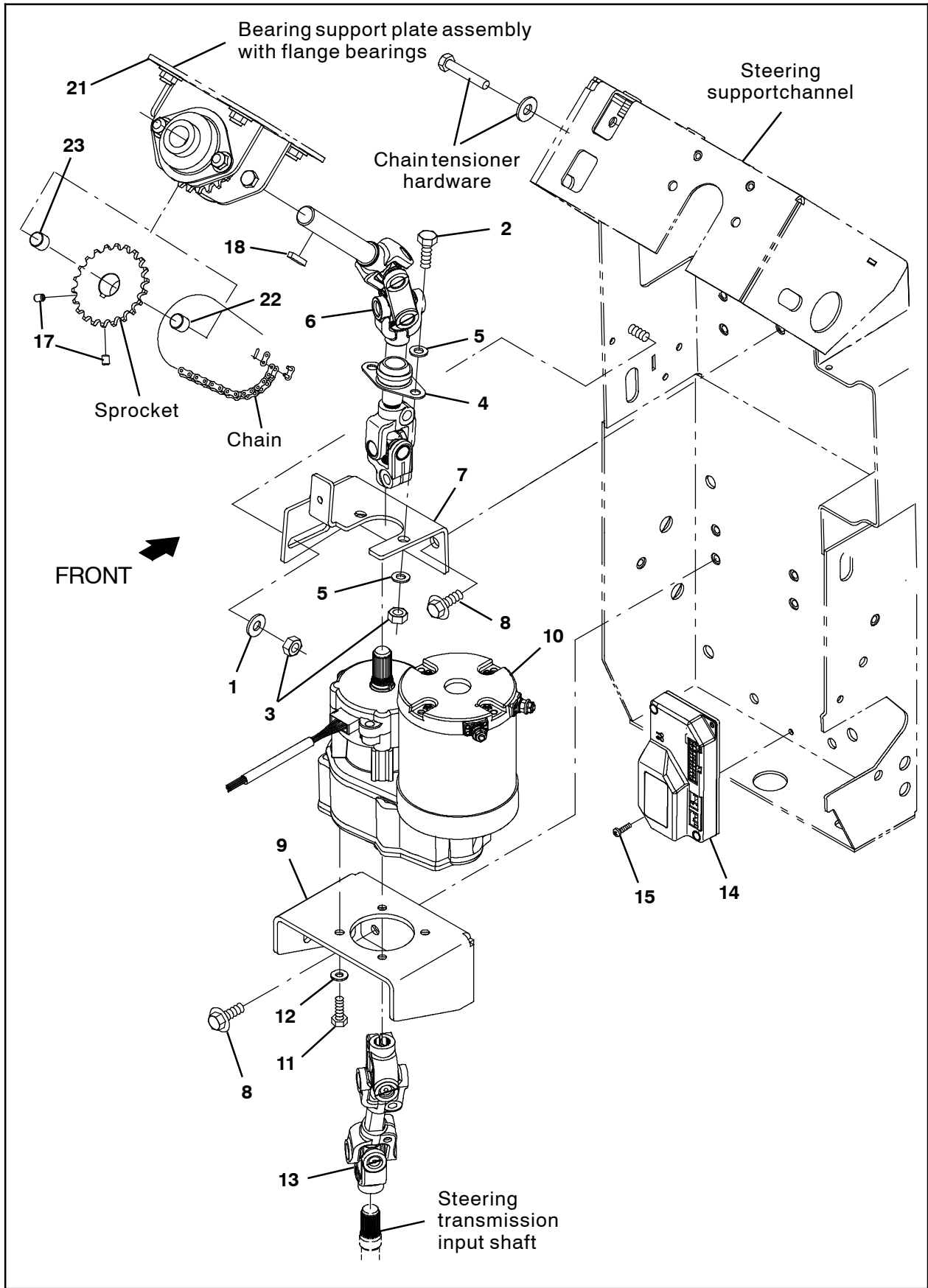


FIG. 53

Bill Of Materials For Kit, Power Steering, CI [T17] - 9021685

Ref.	Tennant Part No.	Description	Qty.
1	32491	Washer, Flat, 0.31, Std	1
2	16931	Screw, Hex, M8 X 1.25 X 20, 8.8	2
3	08709	Nut, Hex, Lock, M8 X 1.25, NI	3
4	223065	Bearing, Flng, 2hole, 0.75b [Nyl]	1
5	39349	Washer, Flat, 0.31, SAE	2
6	1239800	Shaft, Steering, Power	1
7	1249795	Bracket, Shaft Bearing, Steering	1
8	1020341	Screw, Hex, M8 X 1.25 X 20, SS, SEMS	7
9	1214622	Bracket, Sppt, Motor	1
10	1244815	Motor, Steering, 36V	1
11	12274	Screw, Hex, M6 X 1.00 X 20, 8.8, NI	4
12	32483	Washer, Flat, 0.25, SAE	4
13	1224776	Shaft, Steering, Power, Lower	1
14	1241708	Controller, Steering, 36v	1
15	06927	Screw, Pan, Phl, M4 X 0.70 X 16, 4.8	2
16	1008142	Switch, Snap, 25a Spdt	1
17	1224893	Screw, Set, M8 X 1.25 X 8, Lock	2
18	00911	Key, Sq, 0.19 X 0.19, 0.75l	1
19	1074598	Harness, Ele [Steering, M17/T17]	1
20	383725	Circuit Breaker, 30.0a, Resettable	1
21	1256311	Bracket Wldt, Mtg, Bearing, Steering	1
22	1255953	Sleeve, Spacer, Sprocket, 19.0mm	1
23	1248121	Sleeve, Sprocket Spacer, 6.35	1
24	1210807	Wire, Tie [w/.25" Fir Tree Clip]	2

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