TrueTracker

IMPLEMENT STEERING SYSTEM

INSTALLATION INSTRUCTIONS

LAFORGE DynaTrack Hitch

- ULTIMA
- PREMIUM+
- CLASSIC

Version 8.00
Revision A
September, 2020
P/N 54067-30-E08

Trimble

Legal Notices

Agriculture Business Area

Trimble Agriculture Division
10368 Westmoor Drive
Westminster, CO 80021-2712
USA
www.trimble.com

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Release Notice

This is the September 2020 release (Revision A) of the TrueTracker Implement Steering System Installation Instructions, part number 54067-30-E08. It applies to version 8.00 of the TrueTracker automated steering system.

The following limited warranties give you specific legal rights. You may have others, which vary from state/jurisdiction to state/jurisdiction.

Product Limited Warranty

Trimble warrants that this Trimble product and its internal components (the "Product") shall be free from defects in materials and workmanship and will substantially conform to Trimble's applicable published specifications for the Product for a period of one (1) year, starting from the earlier of (i) the date of installation, or (ii) six (6) months from the date of product shipment from Trimble. This warranty applies only to the Product if installed by Trimble or a distributor authorized by Trimble to perform Product installation services.

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Trimble's sole liability and your exclusive remedy under the warranties set forth above shall be, at Trimble's option, to repair or replace any Product that fails to confirm to such warranty ("Nonconforming Product"), and/or issue a cash refund up to the purchase price paid by you for any such Nonconforming Product, excluding costs of installation, upon your return of the Nonconforming Product to Trimble in accordance with Trimble's standard return material authorization process.
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Class B Statement – Notice to Users. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This

equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

Notice to Our European Union Customers

For product recycling instructions and more information, please go to:
http://www.trimble.com/Corporate/Environmental_Compliance.aspx
Recycling in Europe: To recycle Trimble WEEE, Call
+31 497 53 2430, and ask for the "WEEE Associate"
Or
Mail a request for recycling instructions to:
Trimble Europe BV
c/o Menlo Worldwide Logistics
Meerheide 45
5521 DZ Eersel, NL

Safety Information

Always follow the instructions that accompany a Warning or Caution. The information they provide is intended to minimize the risk of personal injury and/or damage to property. In particular, observe safety instructions that are presented in the following format:

⚠ **WARNING –** This alert warns of a potential hazard, which, if not avoided, can cause severe injury.

⚠ **CAUTION –** This alert warns of a hazard or unsafe practice which, if not avoided, can cause injury or damage.

NOTE – An absence of specific alerts does not mean that there are no safety risks involved.

Warnings

⚠ **WARNING –** Before you begin work, ensure that the vehicle is parked on a clean, dry, and level surface. An uneven surface could cause the implement to shift or fall, resulting in serious injury or death, as well as implement damage.

⚠ **WARNING –** When you are working with a heavy, raised implement, there is a risk of the implement dropping. This can cause serious injury or death, or damage to the implement. Before you start to install the TrueTracker system on the implement, make sure that all people are clear of the vehicle. Lower the implement to the ground, place the tractor in park, turn off the engine, and remove the key.

⚠ **WARNING –** If you must raise the primary implement, be aware that the implement can fall, causing serious injury. Use bar stands to support it. Securely support all implement components that must be raised.

⚠ **WARNING –** Using the TrueTracker joystick while the machine's cab is unattended could cause serious or fatal injuries. To avoid this possibility, make sure that someone is in the machine cab at all times when operating the joystick.

⚠ **WARNING –** Make sure that the oil flow to the control valve is turned off for road travel either by turning off the SCV remote providing oil or closing shut-off valves to the steering control valve (not provided in kit). Failure to do so could cause serious or fatal injuries and/or damage to the machine.

Cautions

⚠ **CAUTION –** When routing a cable, make sure that it is in a protected place and does not touch moving components.

⚠ **CAUTION –** Make sure that the steering pot is at the center of its travel when the tongue is straight. Otherwise, the steering pot may over-travel and fail. A correctly centered pot shows 2.5 Volts.

Contents

1

Introduction

This manual describes how to install the Trimble® TrueTracker™ implement steering system.

Even if you have used other Global Positioning System (GPS) products before, Trimble recommends that you spend some time reading this manual to learn about the special features of this product. If you are not familiar with GPS, visit the Trimble website (www.trimble.com) for an interactive look at Trimble and GPS.

Technical assistance

If you have a problem and cannot find the information you need in the product documentation, contact Trimble technical support:

1. Log into http://agpartners.trimble.com.
2. Click the *Feedback* link at the right of the screen. A form appears.
3. Complete the form and then click **Submit Feedback**.

Required components

Platform kit

Kits required	Trimble part number
Platform Kit, TrueTracker, LAFORGE DynaTrac ULTIMA, PREMIUM Hitches	54067-30
Platform Kit, TrueTracker, LAFORGE DynaTrac CLASSIC Hitches	54067-31
FmX® integrated display / FM-1000™ integrated display	

Accessory part numbers

Kits required	Trimble part number
Pole bracket, Orthman Tracker IV	54065-17
40' extension cable for 10-pin data cable	AG 0793-1290-450
Weather-proof enclosure for NavController	54065-14 (included in the platform kit)
Enclosure mounting plate bracket	54065-16 (included in the platform kit)
Cable Kit, TrueTracker, Manual Steering Retrofit kit	92485-06

FmX/FM-1000, TMX-2050/XCN-2050 display accessories

Kits required	Trimble part number
Extension cable for 65' LMR400 antenna cable	67473
FmX implement steering cable kit	54065-07
TMX-2050 installations	64425-07

2

Installation

This chapter describes how to install the manifold on the implement.

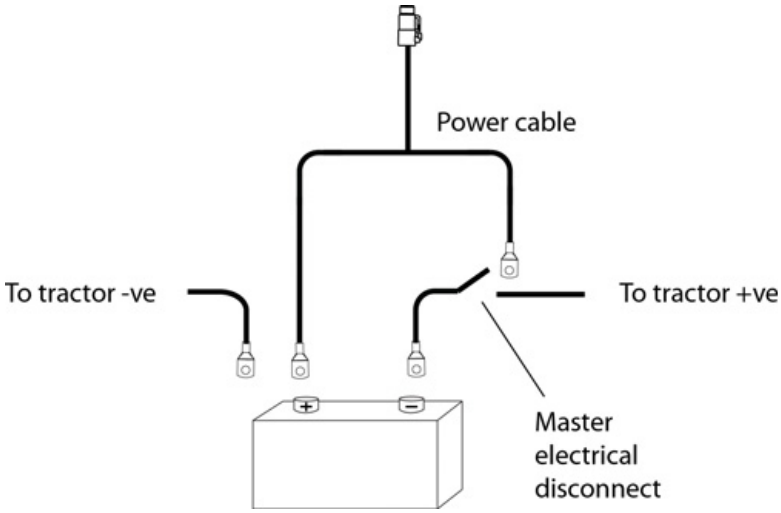
Installing the LAFORGE DynaTrack hitch

Follow the instructions in the LAFORGE DynaTrac Installation and User Guide documentation.

Master disconnect

1. Before proceeding further with the installation, make sure you know whether the vehicle has a master disconnect.
2. If the vehicle has a master electrical disconnect, make sure that the power cable ground connections are not directly attached to the battery terminal, shown as the negative pole in the graphic below.
3. Attach the ground connections of the power cable to the chassis side of the main disconnect so that it is as close as possible to the battery but still gets disconnected when the master disconnect is turned off.

NOTE – If a Master disconnect is installed on either the positive or ground path of the battery, the ring terminals of the power cable should always be connected behind the master disconnect device.



⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

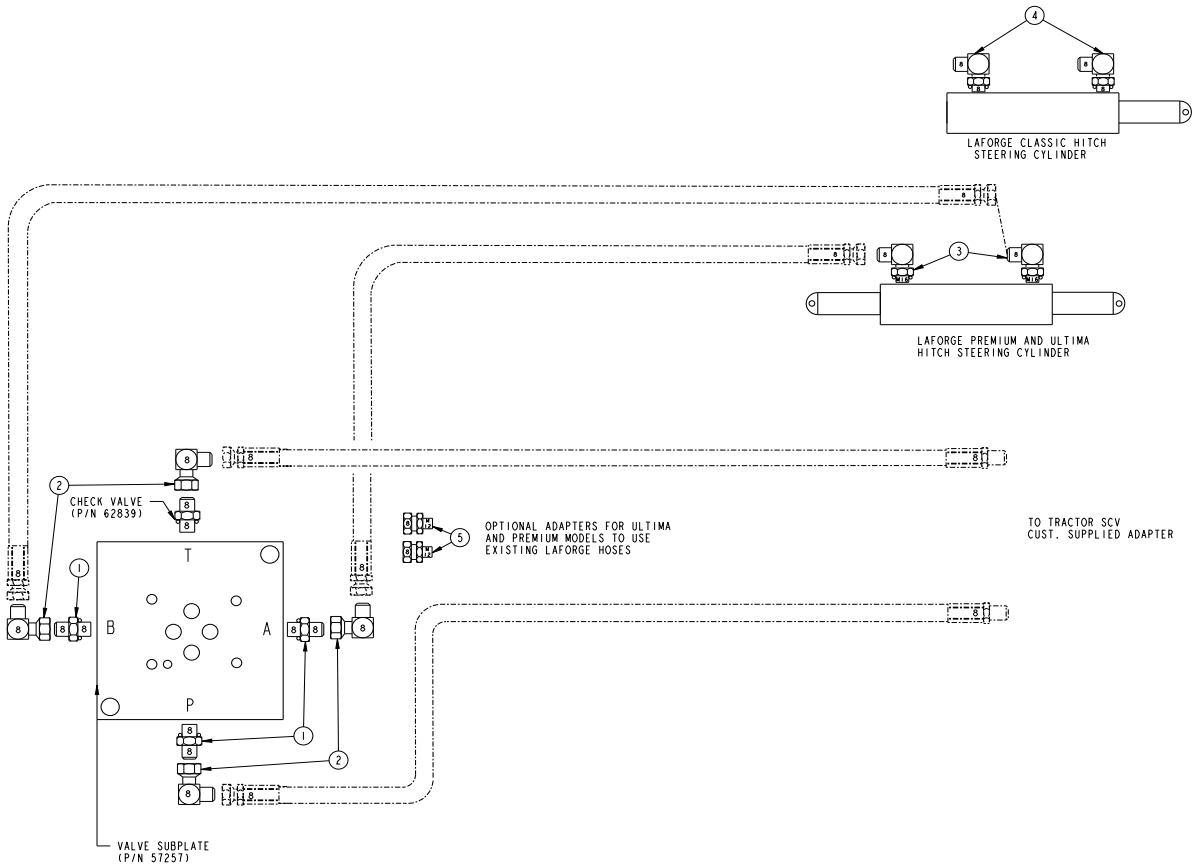
3

Hydraulic Control Valve Installation

- Hydraulic system components
- Installing the hydraulic components

⚠ **WARNING –** The TrueTracker valve only requires 5 gallons per minute (19 L/min). Please ensure when connected to a remote/SCV, set the SCV flow to 15%. Setting the SCV flow too high will cause excess heat generation within the hydraulic system. Where possible, also set this SCV for 'Priority flow'.

Hydraulic system components



Fittings

Item	Description	Part number	Qty
1	Fitting	8 F50X	3
2	Fitting	8 C6X	4
3	Fitting	8 M16C80MX	2
4	Fitting	8 C50X	2
5	Fitting	5 M12F680MXS	2

NOTE – Part numbers are Parker numbers and are for reference only.

Installing the hydraulic components

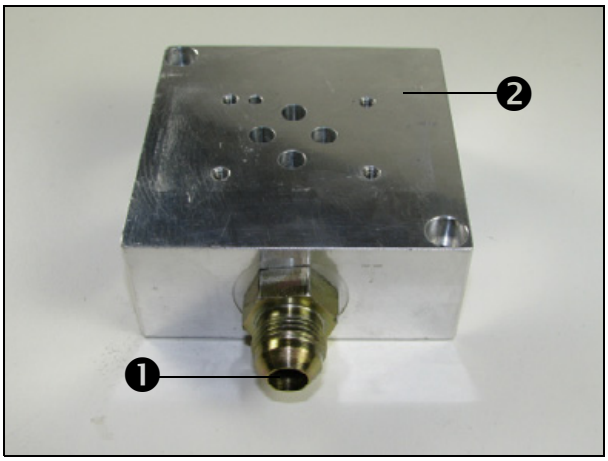
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Gather the manifold, fittings and cartridges for preparing the manifold on a clean work surface.

Preparing the manifold

Step 1

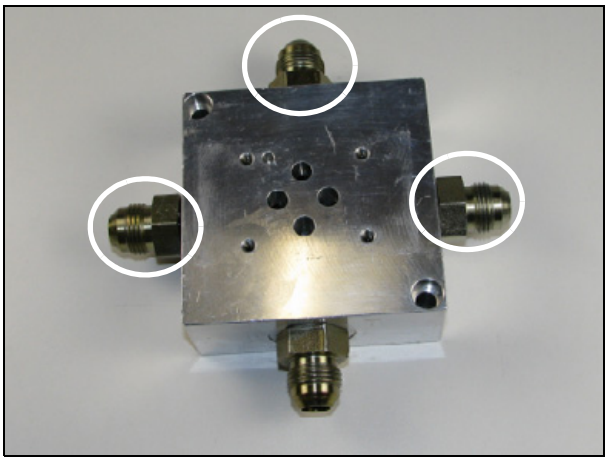
Attach the supplied check valve P/N 62839 (❶) fitting to the T port of the manifold (❷).



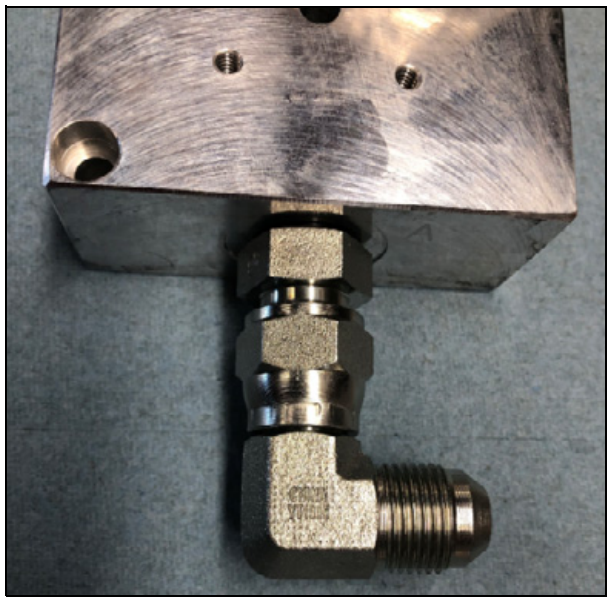
Step 2

Attach three -8 ORB fittings to the manifold.

NOTE – Depending on the hoses and configuration chosen, the installation of different fittings to the manifold may be required.



NOTE – Depending on the hydraulic hose configuration, the included 90° fittings may be required.



NOTE – If you want to use the existing LAFORGE hydraulic hoses, there are two JIC to Metric adapters included in the hydraulic fitting kit to adapt to the A and B ports.

New hydraulic hoses may be required for the A and B ports if the LAFORGE hoses do not reach the valve mounting location.

Step 3

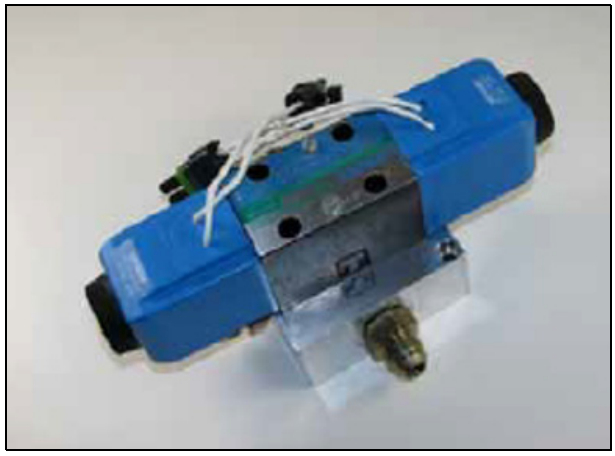
Remove the tractor hydraulic connectors from the LAFORGE hydraulic hoses and connect the swivel connector to the JIC to metric fitting installed in previous step.

NOTE – If new hoses are used for the ULTIMA and PREMIUM hitches, the metric to JIC 90° adapters are included in the hydraulic fitting kit. Disconnect the hose from the hitch steering cylinder and install the 90° adapters.

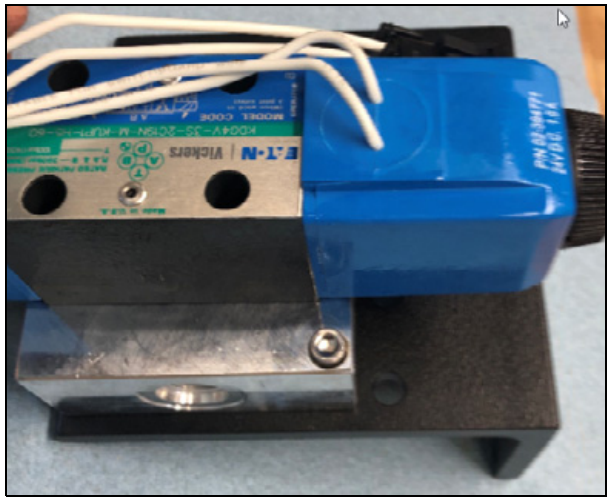
Then attach the new hose to the JIC fitting.

Step 4

Attach the hydraulic control valve to the sub-plate manifold using the supplied hardware.



NOTE – If necessary, locate the valve mounting bracket P/N 85095, and mount the valve and manifold to the bracket using the hardware provided.



Mounting the manifold - CLASSIC hitch

NOTE – The manifold must be mounted on a flat surface. To achieve this, you may need to weld a plate with mounting holes to the implement

Do one of the following:

- Bolt the manifold to the welded plate.
- Drill and tap two ¼"–20 mounting holes in the implement and mount the manifold using the provided hardware.

Mounting the manifold - PREMIUM hitch

Access the manifold mounting location inside the left compartment of the hitch.

Attach the manifold using the supplied bracket.

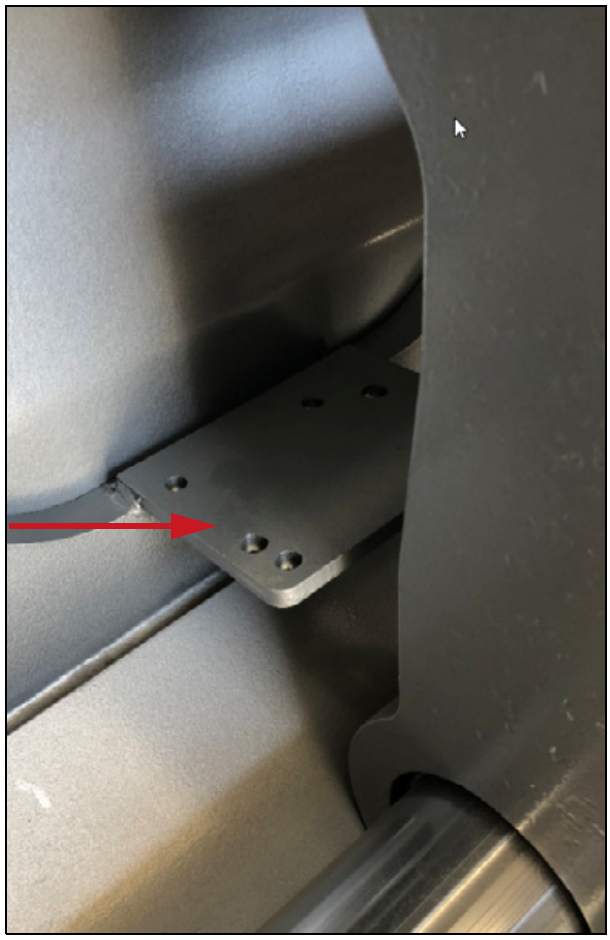
NOTE – Additional holes may be required to be drilled to secure the bracket to the hitch.

Mounting the manifold - ULTIMA hitch

The manifold mounting location on the ULTIMA hitch is on the left rear side of the hitch.

Attach the manifold using the supplied hardware.

NOTE – Additional holes may be required to be drilled to secure the bracket to the hitch.



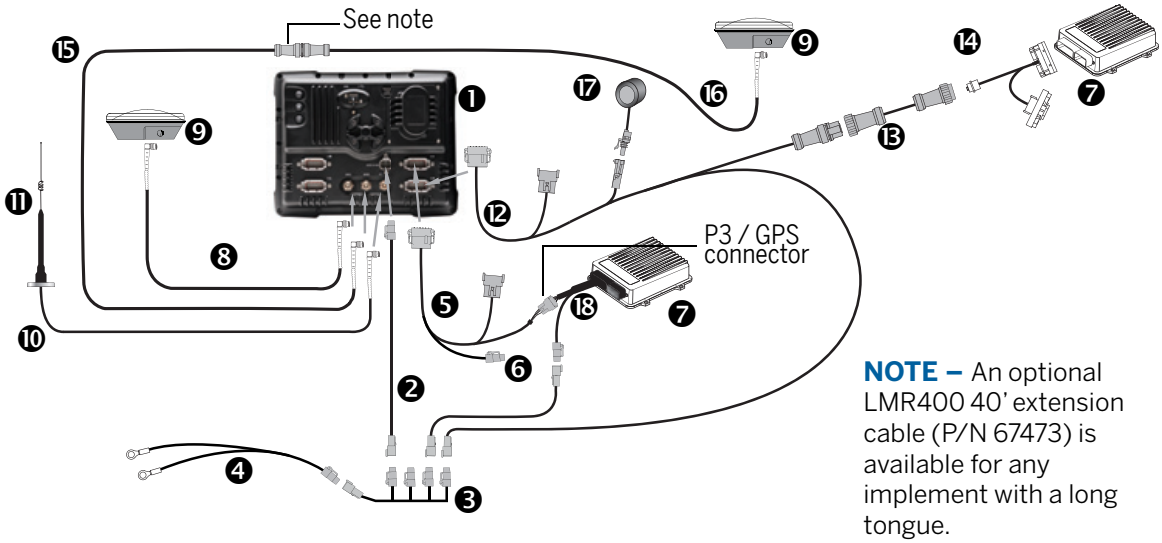
⚠ **WARNING –** The TrueTracker valve only requires 5 gallons per minute (19 L/min). Please ensure when connected to a remote/SCV, set the SCV flow to 15%. Setting the SCV flow too high will cause excess heat generation within the hydraulic system. Where possible, also set this SCV for 'Priority flow'.

4

Trimble Component Installation

- Cable components for the FmX integrated display with the Autopilot and TrueTracker systems
- Cable components for the TMX-2050 display with the Autopilot and TrueTracker systems
- Installing the cab harness
- Attaching the controller and antenna mast
- Securing the NavController and mounting the AG-25 GNSS antenna
- Routing the cabling for the TrueTracker system
- TrueTracker manual steering joystick

Cable components for the FmX integrated display with the Autopilot and TrueTracker systems



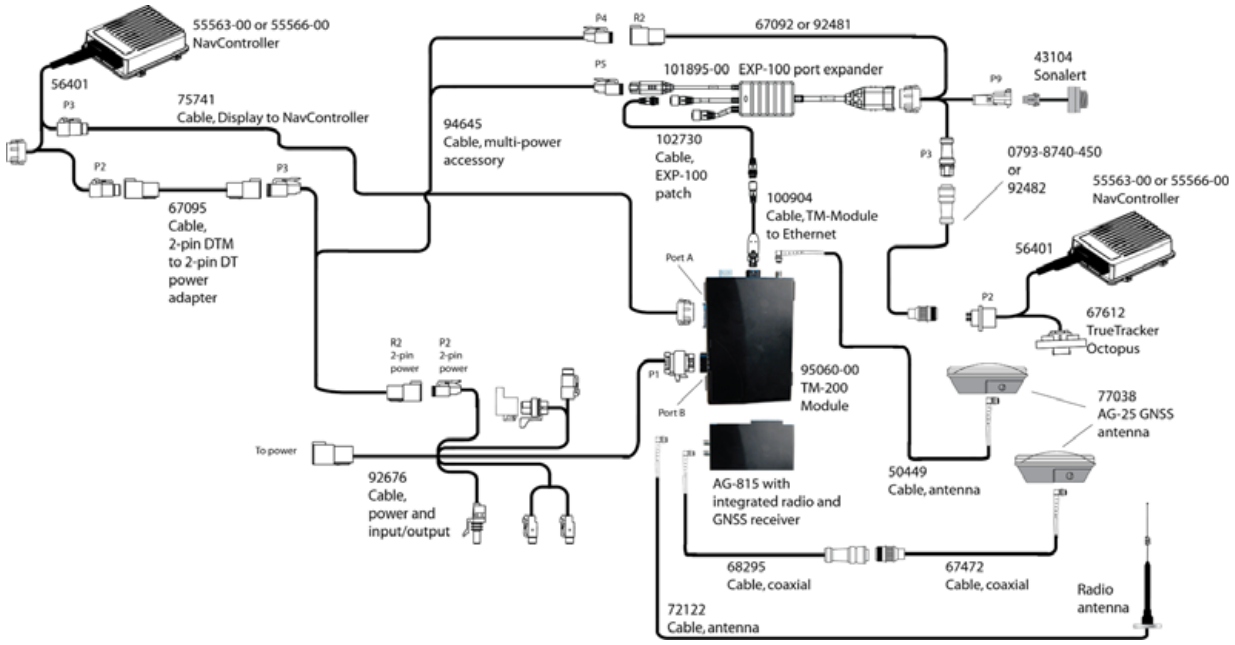
NOTE – An optional LMR400 40' extension cable (P/N 67473) is available for any implement with a long tongue.

Item	Description	Trimble part number
1	FmX integrated display	93100-02
2	FmX power cable	66694
3	FmX power cable with relay and switch (power bus)	67259
4	Basic power cable	67258
5	FmX to NavController II cable with port replicator	75741
6	2-pin DTM to 2-pin DT power adaptor	67095
7	NavController II (x2)	55563-00
8	8m GPS TNC/TNC RT angle cable	50449
9	AG-25 GNSS antenna (x2)	77038-00
10	NMO-to-TNC 20 ft antenna cable and base	72122
11	900 MHz radio antenna kit	22882-10
12	FmX to TrueTracker cable	67092
13	Implement extension cable	0793-8740-450
14	FmX to NavController II and TrueTracker main harness	67612
15	Coaxial 160" N/f + TNC/m-ra cable	68295
16	Coaxial 480" N/m + TNC/m-ra cable	67472
17	Sonalert	43104
18	Main NavController II cable	54601

Cable components for the TMX-2050 display with the Autopilot and TrueTracker systems

⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the power cable ground connections are not directly attached to the battery terminal. Attach the ground connections of the power cable to the chassis side of the main disconnect so that it is as close as possible to the battery, but still gets disconnected when the master disconnect is turned off. Failure to connect the power cable ground will cause damage to the display. For more information, see Chapter 2, Master disconnect.

⚠ **CAUTION –** Connecting the Port Replicator of the NavController cable to the P4 or P12 connector of the NavController harness will result in damage to the equipment, and will void the warranty.



NOTE – For installation of the TrueTracker joystick with manual steering, see the document 92405-06-E05.

Trimble part number	Description
43104	Sonalert
50449	Cable, antenna 8M TNC
54601	Cable, NavController main
55563-00, 55566-00	NavController
67092	Cable, TrueTracker to display
67095	Cable, 2-pin DTM to 2-pin DT power adapter
67472	Cable, coaxial N/m + TNC/m-ra
67612	Cable, Display to TrueTracker octopus

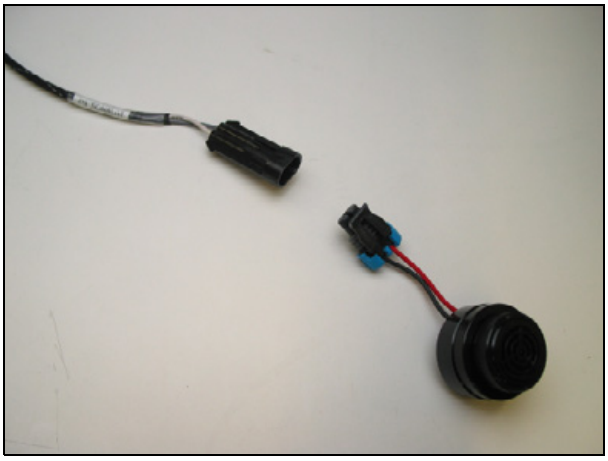
Trimble part number	Description
68295	Cable, coaxial N/f + TNC/m-ra
72122	Cable, Antenna with magnetic base
75741	Cable, Display to NavController
77038	AG25 GNSS antenna
92481	Cable, TrueTracker in-cab harness
92482	Cable, TrueTracker extension
92483	Cable, TrueTracker NavController harness
92676	Cable, TM-200 Module power, CAN and input/output
94645	Cable, Multi-power accessory
95060-00	TM-200 Module
95093-xx, 95094-xx, or 95095-xx	AG-815 with integrated radio and GNSS receiver
100904	Cable, EXP-100 adapter, TM-200 Module to Ethernet
101895-00	EXP-100 port expander
102730	Cable, EXP-100 patch 1 meter

Installing the cab harness

Step 1

Attach the Sonalert to the extension on the cab interconnect cable.

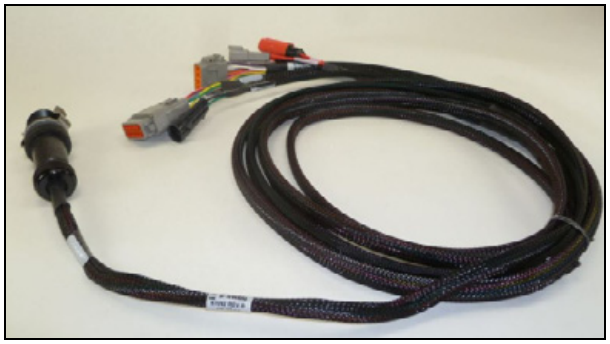
NOTE – The second Sonalert provides implement feedback separate from the vehicle.



Step 2

Connect the implement controller connection of cable P/N 67092 to port D on the FmX display.

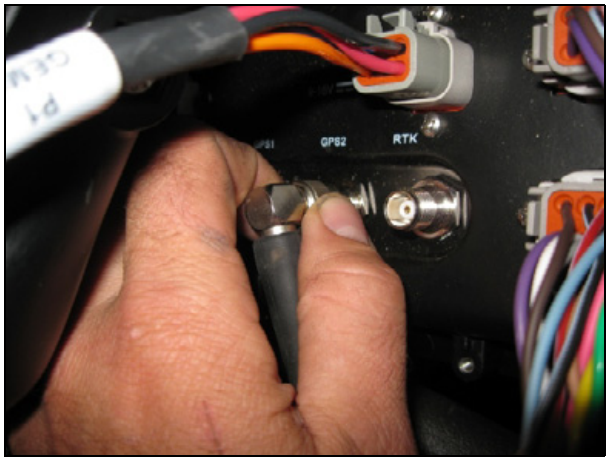
Connect the implement controller connection of cable P/N 67092 to the EXP-100 for the TMX-2050 display.



Step 3

Connect the implement antenna cable P/N 68295 to the GPS 2 port on the FmX display.

Connect the implement antenna cable P/N 68295 to the GPS 2 port on the TMX-2050 TM-200 module.



Step 4

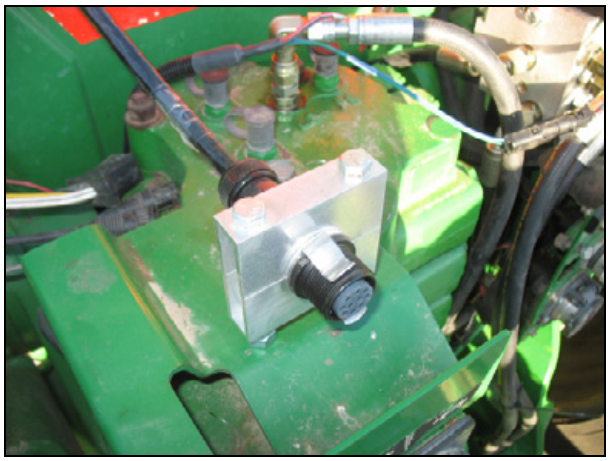
Route the jumper and GNSS antenna cable out of the cab to the bulkhead at the rear of the tractor.

Step 5

Attach the provided bulkhead clamp and quick-disconnect end of the cable to the tractor.

To attach the aluminum bulkhead, do one of the following:

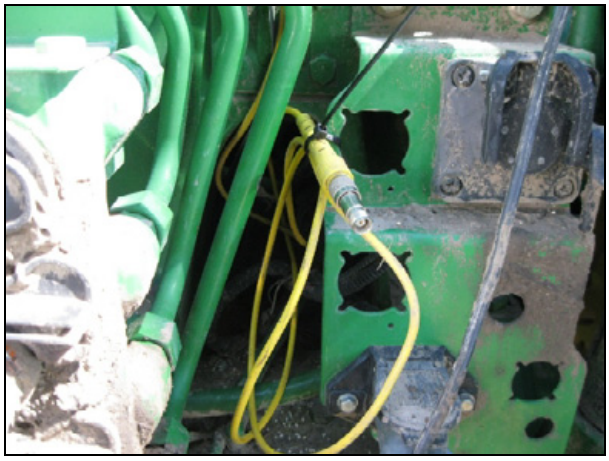
- Tap $^{5}/_{16}$" holes into existing brackets and attach the bulkhead to the tractor.



- Weld the provided bar stock to the tractor and attach the bulkhead to the bar stock.

Step 6

Secure the implement GNSS cable near the bulkhead connector. Make sure that it will not be pinched or damaged by any hitches, lift arms, linkages, etc.



Attaching the controller and antenna mast

The TrueTracker NavController and antenna must be mounted to the frame of the implement. This can be done with structures on the implement or using the optional antenna/controller mast. Either method should ensure the NavController and antenna are on the main frame of the implement.

NOTE – For ULTIMA and PREMIUM hitches:

Always install the NavContoller III and the antenna on the same moving frame—they need to move together.

CLASSIC hitch

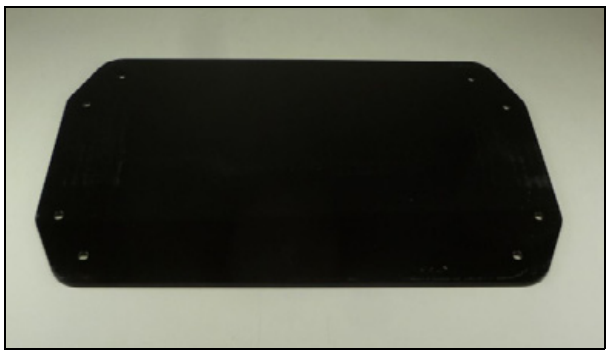
Step 1

Attach the controller/antenna mast to the main frame of the implement.

When you secure the mast, use a level.

Ensure that the antenna and controller mount is square with the implement frame and rigidly secured.

Once the antenna mast is securely mounted to the implement, attach the enclosure mounting plate P/N 54065-16 to the mast using the provided hardware.



Attach the enclosure to the enclosure mounting plate with the provided hardware as shown.

Securing the NavController and mounting the AG-25 GNSS antenna

Step 1

Locate the main and auxiliary harness: P/N 67612 and P/N 54602.

Step 1

Attach the round AMP bulkhead connector on the main harness using #40 screws.

Attach the provided gasket between the bulkhead and electrical box.

Step 2

Attach the bulkhead on the main harness using the provided hardware:

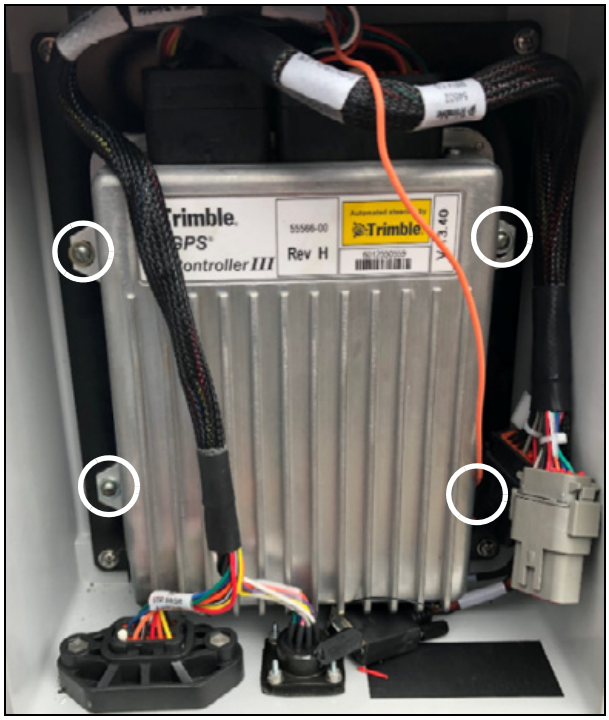
❶ Black DT: two 6 mm Phillips head screws

Step 3

Attach the main harness and auxiliary harness to the controller.

Step 4

Attach the controller on the aluminum mounting plate with the connectors pointing up. Use 10-32 screws.



Step 5

Attach the AG-25 antenna to the controller/antenna mast. The antenna must be clear of obstructions that can block satellite signals.

NOTE – If you need to reposition the mast, enter the measured distance in the calibration/setup page.

Routing the cabling for the TrueTracker system

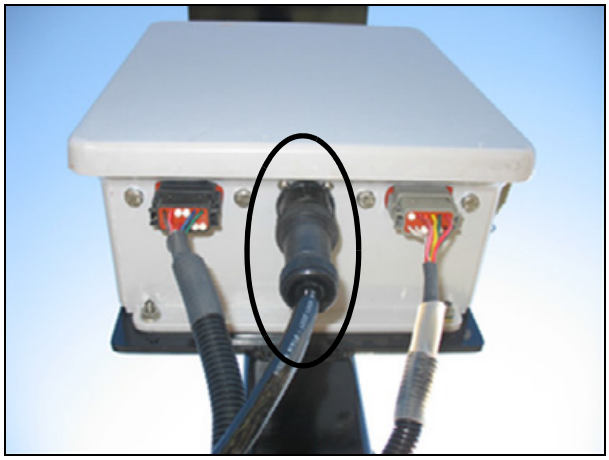
Step 1

Connect the TNC antenna cable to the AG-25 antenna.

Step 2

Route the cable down the antenna mast and along the tongue of the implement to the hitch. Make sure that the cable will not be pinched or damaged when the implement is turned, raised, lowered or folded for road transport, etc.

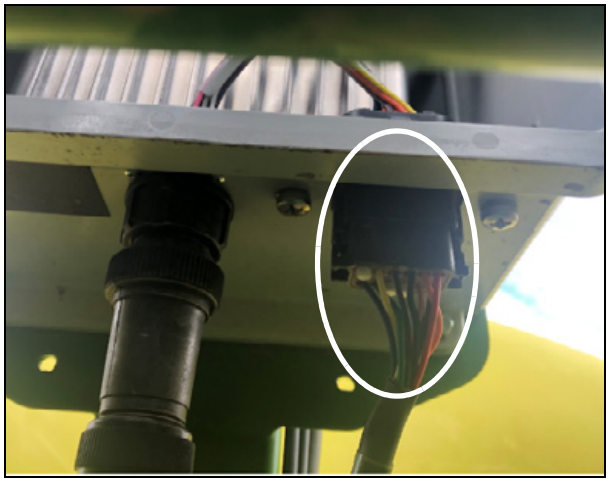
Connect the implement extension cable to the round bulkhead connector at the controller.



Route the implement extension cable along the implement to the tractor.

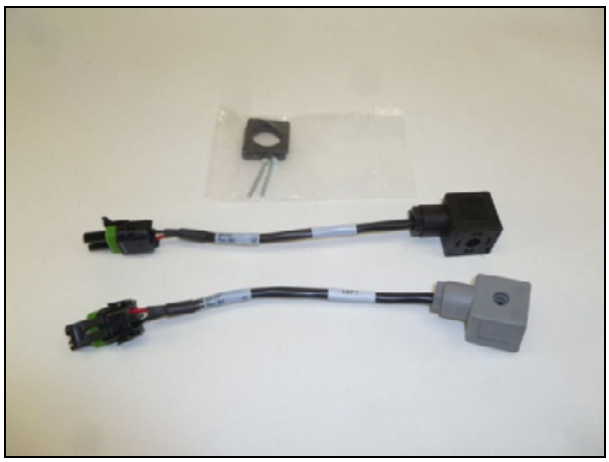
⚠ **CAUTION –** Make sure that the cabling is in a protected place and does not touch moving components.

Connect the P/N 60632 cable to the port on the enclosure as shown.



Locate the following cables:

- P/N 50137 Din adapter cables



- P/N 69502 steering valve harness extension cable

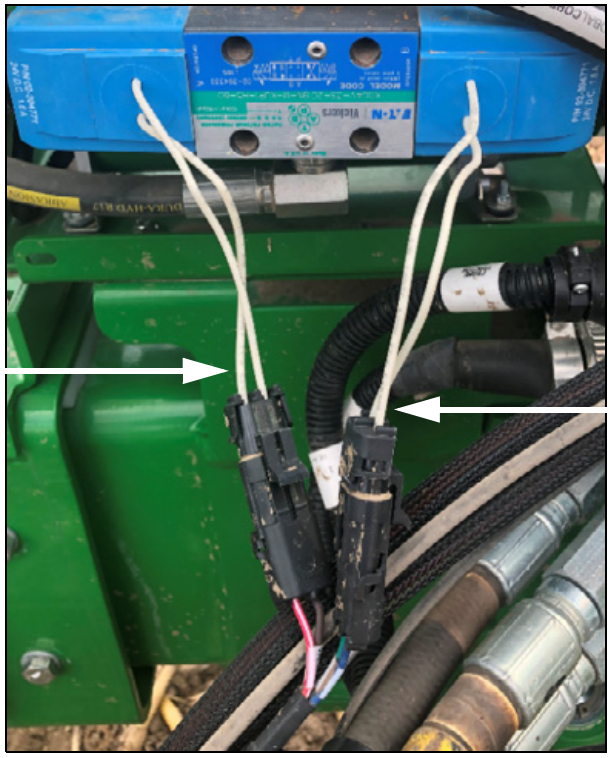
- P/N 69503 steering pot extension cable

Step 3

Attach the steering valve harness extension and the steering pot extension (if required) to the connectors on the P/N 60632 cable and then route the cable to the steering valve and steering potentiometer.

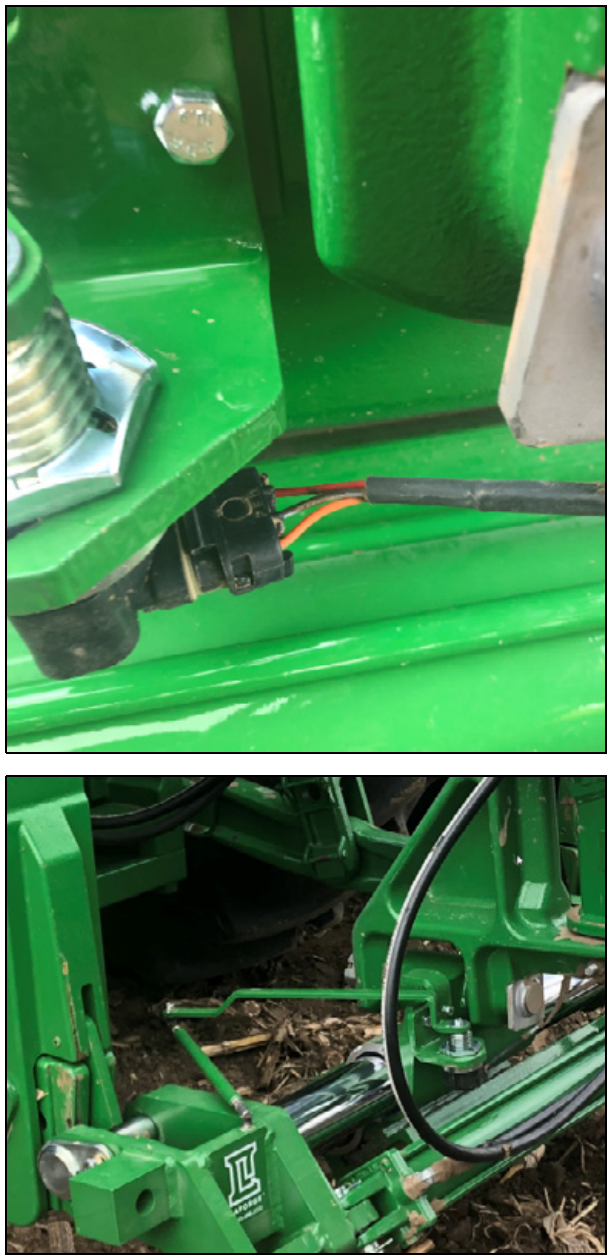
Connect the following:

- Valve A connector to the left valve coil
- Valve B connector to the right valve coil



Step 4

Connect the cable to the steering sensor on the LAFORGE CLASSIC hitch as shown.



Steer sensor CLASSIC hitch

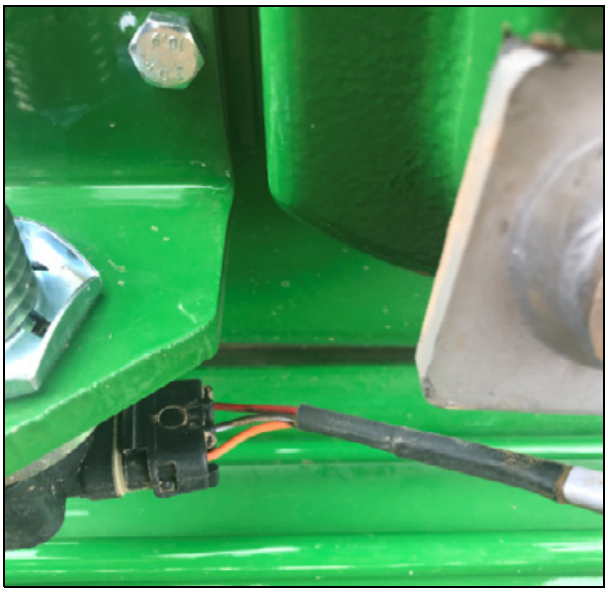
NOTE – The steering sensor on the ULTIMA and PREMIUM hitches is currently not used with the current VDB.

Steer sensor PREMIUM

Steer sensor ULTIMA hitch

Step 5

Connect the 3-pin connector to the P/N 69503 or 60632 cable as shown.



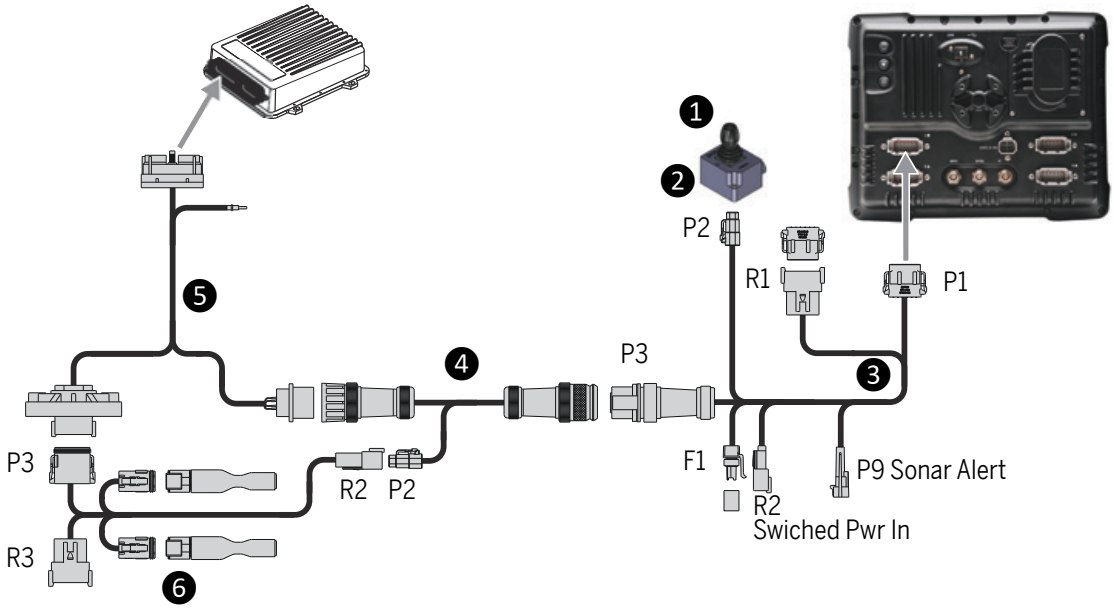
Steer sensor CLASSIC hitch

TrueTracker manual steering joystick

Required components

Item	Description	Part Number
1	TrueTracker joystick	92485
2	TrueTracker joystick mounting kit	92491
3	TrueTracker in-cab harness	92481
4	TrueTracker extension cable	92482
5	TrueTracker NavController main harness	92483
6	TrueTracker manual steering relay harness	92484

System schematic



Installing the joystick

To install the joystick, some existing TrueTracker cables must be replaced:

1. Cable P/N 92481 replaces cable P/N 67092 in the cab. Remove cable 67092 and lay in the new cable 92481 in the same fashion. Note that cable 92481 has an additional 4-pin connector (P2) for the joystick and is slightly longer on the main harness. Route P2 to the desired location of the joystick.
2. Cable P/N 92482 replaces the main extension cable P/N 0793-8740-450. Remove cable 0793-8740-450 and replace it with cable 92482. Make sure that the cable is routed in a fashion that will not pinch or snare and the breakway connector can freely come apart if needed.

3. Cable P/N 92483 replaces P/N 67612. Open the NavController enclosure, remove the 12-pin Deutsch bulkhead and round bulkhead from the enclosure. Remove the 40-pin connector from the NavController. Reinstall the same bulkheads on cable 92483 in the same location and then attach the 40-pin connector on cable 92483 to the NavController.
4. Insert cable P/N 92484 between the NavController enclosure and the valve drive/sensor cabling. Remove the 12-pin Deutsch connector with the valve drive and sensor cabling from the enclosure and plug P3 of the 92484 cable into the enclosure. Plug the 12-pin Deutsch connector from the valves/sensor cable into R3 on cable 92484. Plug the 4-pin R2 receptacle into the 4-pin plug on the main harness.
5. In the cab, locate the desired mounting location for the TrueTracker joystick. Use either the magnetic mount, fastening hardware, or the very high bond plate and magnetic mount to attach the joystick to the mounting location.
6. Connect the 4-pin plug P2 on cable P/N 92481 to the joystick.
7. Make sure that all cables are connected properly, and routed and secured in such a fashion that they will not be pinched or damaged by movement of the tractor or the implement.

Operation

- The joystick can only be used with implement Vehicle Database Files (VDBs) that have the **+** manual label at the end in VDBs v4.5 or later. Using older implement VDBs will cause faults in the system.
- When moved left and right the joystick will manipulate the implement but only when the power bus is supplying power to the joystick, and the TrueTracker control valve has pressure to it (the SCV is to providing oil flow). No satellite reception or active guidance line is required.
- If TrueTracker system is engaged, it will be disengaged when the joystick is used. The user may use the button on the top of the joystick to reengage the TrueTracker system if engagement criteria are met.

⚠ **WARNING –** Using the TrueTracker joystick while the machine's cab is unattended could cause serious or fatal injuries. To avoid this possibility, make sure that someone is in the machine cab at all times when operating the joystick.

⚠ **WARNING –** Make sure that the oil flow to the control valve is turned off for road travel either by turning off the SCV remote providing oil or closing shut-off valves to the steering control valve (not provided in kit). Failure to do so could cause serious or fatal injuries and/or damage to the machine.

5

Calibration and Operation Tips

Deadzone calibration

1. Put the implement offline by 10 cm or more.
2. Manually enter low DZL and DZR values (e.g., 20).
3. Drive slowly (1 kph) and engage the TrueTracker.
4. Increase manually the DZL and DZR values (21, 22, 23...), until you see the implement moving and advancing in line.

   The average value for Deadzone is around 30.

   NOTE – Don't increase too much the Deadzone values.

Finish calibration

Perform the following calibrations:

- P-Gain calibration
- Line acquisition
- Roll offset

ULTIMA and PREMIUM hitch operation

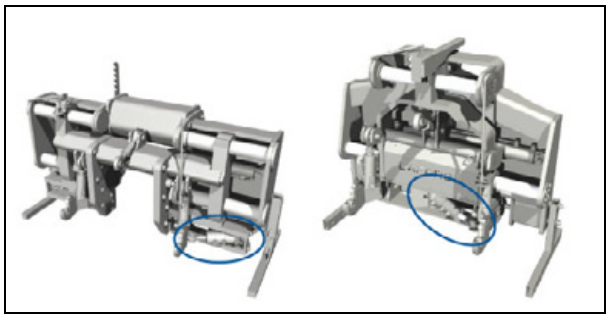
Unlock the road cylinder while in the field:

Step 1

Route the cable down the antenna mast and along the tongue of the implement to the hitch. Make sure that the cable will not be pinched or damaged when the implement is turned, raised, lowered, or folded for road transport.

Step 2

Make sure you unlock the road cylinder while in the field, otherwise performances will be degraded.



6

Final Machine Check

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

To perform the final machine check:

1. Connect the battery.
2. Start the machine and check for hydraulic leaks. Correct as needed.
3. Update the Trimble display and the Autopilot™ NavController to the latest firmware from http://agpartners.trimble.com.

   You can use FlashLoader 200 software version 3.19 to update the NavController: Download it from http://agpartners.trimble.com.
4. Load the correct configuration file into the Autopilot NavController for the vehicle model being used.

   Download the latest set of configuration files from http://agpartners.trimble.com.

   You can use Autopilot Toolbox II software version 2.92 or later to load the configuration file into the Autopilot controller. You can download the Autopilot Toolbox II software from http://agpartners.trimble.com.
5. The TrueTracker valve only requires 5 gallons per minute (19 L/min). Please ensure when connected to a remote/SCV, set the SCV flow to 15%. Setting the SCV flow too high will cause excess heat generation within the hydraulic system. Where possible, also set this SCV for 'Priority flow'.
6. Calibrate the Autopilot system using the Trimble display or Autopilot Toolbox II software version 2.92 or later. Depending on your machine type, the following items must be calibrated before you can use the Autopilot system:
   - NavController mounting orientation
   - Valve deadzone
   - Autopilot P-gain
   - Antenna height/Antenna axle offset, and Roll offset