

# SC1™/TC1 Side Shift Implement Steer Installation Manual

016-8000-151 Rev. A

2/2020

E34426



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## SAFETY

### **NOTICE**

Follow the operation and safety instructions included with the implement and/or controller and read this manual carefully before installing or operating this Raven system.

- Follow all safety information presented within this manual. Review implement operation with your local dealer.
- Contact a local Raven dealer for assistance with any portion of the installation, service, or operation of Raven equipment.
- Follow all safety labels affixed to system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. Contact a local Raven dealer to obtain replacements for safety labels.

Observe the following safety measures when operating the implement after installing this Raven system:

- Do not operate this Raven system or any agricultural equipment while under the influence of alcohol or an illegal substance.
- Be alert and aware of surroundings and remain in the operator seat at all times when operating this Raven system.
  - Do not operate the implement on any public road with this Raven system enabled.
  - Disable this Raven system before exiting the operator seat.
  - Determine and remain a safe working distance from obstacles and bystanders. The operator is responsible for disabling the system when a safe working distance has diminished.
  - Disable this Raven system prior to starting any maintenance work on the implement or components of this Raven system.
- Do not attempt to modify or lengthen any of the system control cables. Extension cables are available from a local Raven dealer.

## DISPLAYS AND CONTROL CONSOLES

- If the display will not be used for an extended period, it is best to remove the display from the machine and store it in a climate controlled environment. This may help to extend the service life of electronic components.
- To prevent theft, secure the display and GPS antenna when leaving the machine unattended.

## **WARNING**

### HYDRAULIC SAFETY

When installing or servicing a hydraulic system or hydraulic components, be aware that hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.

- Always wear appropriate personal protective equipment when installing or servicing hydraulic systems.
- Never attempt to open or work on a hydraulic system with the implement running.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.
- Care should always be taken when servicing or opening a system that has been pressurized.
- The implement or machine must remain stationary and switched off with booms or implement sections unfolded and supported during installation or maintenance.
- Take precautions to prevent foreign material or contaminants from being introduced into the implement's hydraulic system. Contaminants that are able to bypass the hydraulic filtration system will reduce performance and may damage hydraulic components.
- Stand clear of the implement when starting the system for the first time after installing or servicing hydraulic components in case a hose has not been properly connected or tightened.

To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

## **CAUTION**

### ELECTRICAL SAFETY

- Always verify that power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the Raven system or other components.
- To prevent personal injury or fire, replace defective or blown fuses with only fuses of the same type and amperage.
- Do not connect the power leads to the battery until all system components are mounted and all electrical connections are completed.
- To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

### TOUCH SCREEN

- Only touch the touch-screen with your finger or by using a special touch-screen stylus/pen. Operating the touch-screen with sharp objects may cause permanent damage to the screen.
- Only clean the screen using a damp cloth. Never use caustic or other aggressive substances.

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## RECOMMENDATIONS AND BEST PRACTICES

### HOSE ROUTING

The word “hose” is used to describe any flexible, fluid carrying components. Use the following guidelines and recommendations when connecting and routing hoses while installing or maintaining this Raven system:

- Leave protective caps/covers over hose ends until connecting the end into the hydraulic system to help prevent contaminants from entering the system.
- Follow existing hose runs already routed on the implement as much as possible. Proper hose routing should:
  - Secure hoses and prevent hoses from hanging below the implement.
  - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
  - Protect hoses from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).
  - Protect hoses from sharp bends, twisting, or flexing over short distances and normal implement operation.
  - Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp hoses securely to force controlled movement of the hose.
  - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
  - Avoid areas where the operator or service personnel might step or use as a grab bar.
- Do not connect, affix, or allow hoses to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of hose components.
  - Hoses should be protected or shielded if routing requires the hose to be exposed to conditions beyond hose component specifications.
- Avoid routing hoses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).

### HARNESS ROUTING

The word “harness” is used to describe any electrical cables and leads, both bundled and unbundled. Use the following guidelines and recommendations when connecting and routing harnesses while installing or maintaining this Raven system:

- Leave protective caps/covers over harness connectors until needed to avoid dirt and moisture from contaminating electrical circuits.
- Secure the harness to the frame or solid structural members at least every 30 cm [12 in].
- Follow existing harness runs already routed on the implement as much as possible. Proper harness routing should:
  - Secure harnessing and prevent the harness from hanging below the implement.
  - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
  - Protect harnessing from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).

- Protect harnessing from sharp bends, twisting, or flexing over short distances and normal implement operation.
- Connectors and splices should not be located at bending points or in harness sections that move.
- Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp harnessing securely to force controlled movement of the harness.
- Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
- Do not connect, affix, or allow harnessing to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of harness components.
  - Harnessing should be protected or shielded if routing requires the hose to be exposed to conditions beyond harnessing component specifications.
- Avoid routing harnesses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).
- Avoid routing harnesses in areas where the operator or service personnel might step or use as a grab bar.

**IMPORTANT:** Avoid applying direct spray or pressure washing of electrical components and connections. High pressure streams and sprays can penetrate seals, cause corrosion, or otherwise damage electrical components.  
When performing maintenance:

- Inspect electrical components and connectors for corrosion, damaged pins or housings, etc. Repair or replace components or harnessing as necessary.
- Ensure connectors are kept clean and dry. Apply dielectric grease to the sealing surfaces of all connections exposed to moisture, dirt, debris, and other contaminants. Repair or replace harnessing as necessary.
- Clean electrical components with pressurized air, aerosol electrical cleaning agent, or low pressure rinse.
- Remove visible surface water from electrical components and connections using pressurized air or an aerosol cleaning agent. Allow components to dry thoroughly before reconnecting cables.



The SC1™/TC1 side shift implement steering system uses a frame and cylinder to shift the implement tow point and is designed to provide accurate positioning of a towed implement based upon GNSS position information during field operations.

The following chapters contain important information to install, service, or maintain the side shift implement steering system.

**NOTE:** This manual is a general guide and is not intended for any specific implement make or type.

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## PREPARING FOR INSTALLATION

Before installing the Side Shift Implement Steering system, park the implement where the ground is level, clean, and dry. Leave the implement and any connected equipment turned off for the duration of the installation process.

During the installation process, follow good safety practices. Be sure to carefully read the instructions in this manual as you complete the installation process.

## RECOMMENDATIONS

Raven Industries recommends the following before installing or operating the implement steering system for the first time, at the start of the season, or when moving the implement steering system to another machine:

- Ensure the hydraulic filters have been changed recently and there are no issues with the machine hydraulic system (e.g. pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Operate each of the hydraulic functions (i.e., tilt, raise or lower, or other hydraulic valve functions) three times to ensure the machine hydraulic valve is using fresh oil and debris is flushed from the hydraulic hoses, valves, etc.

Raven Industries recommends the following when installing the implement steering system.

- Use part numbers to help identify parts.
- Do not remove the plastic wrap from a part until it is necessary for installation.
- Do not remove plastic caps from a part until it is necessary for installation.
- Upon completing installation of the implement steering system, operate the machine manual hydraulic control functions first before operating the implement steer system via the controller/field computer to ensure the hydraulic system has been installed correctly and air is released from the system.

### TOOLS NEEDED

The following tools are recommended for installation of the Side Shift Implement Steering system:

- Wrenches (Metric or Imperial)
- Sockets (Metric or Imperial)
- Cable ties
- Set of tools

### POINT OF REFERENCE

The instructions in this manual assume that you are standing behind the machine, looking toward the cab.

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### INSTALLATION OVERVIEW

**NOTE:** The installed system produces less than 70 dBA.

It is advised to assemble the side shift steering in the order listed below:

**NOTE:** Specific installation and safety instructions can be found in the Installation Manual – Side-Shift Implement Frame.

1. Install the side shift cylinder (if necessary).
2. Check the hydraulic manifold.
3. Mount the manifold and connect the hydraulic hoses.
4. Mount the implement drive unit.
5. Mount the angle sensor.
6. Mount the GPS antenna.
7. Mount the SC1 terrain compensation module.
8. Route and connect cable harnesses.

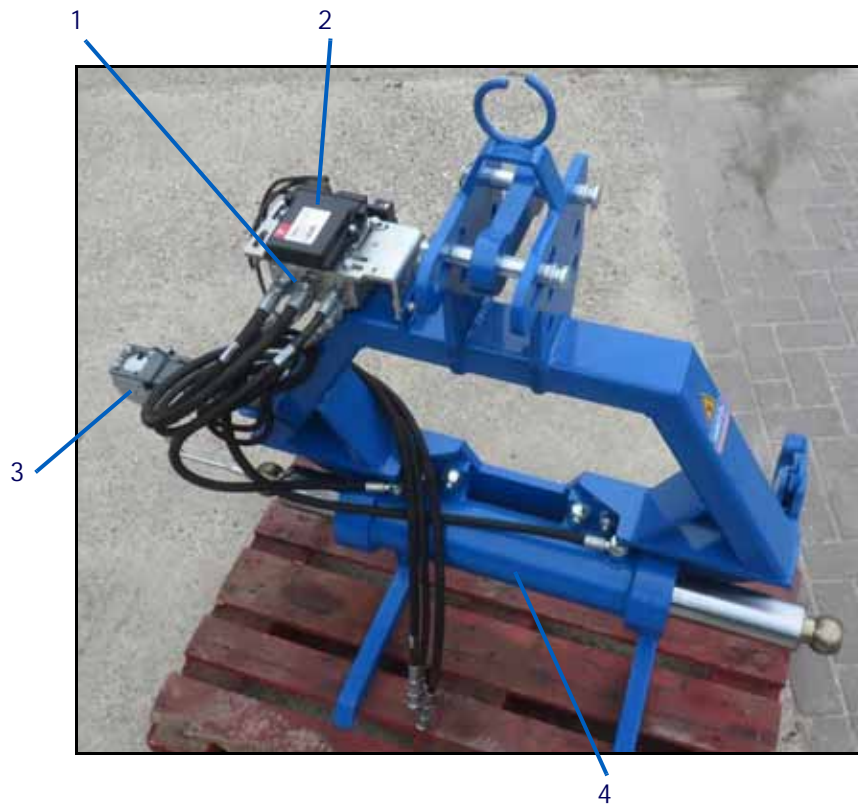
**NOTE:** It is recommended to mount both the GPS antenna and the SC1 terrain compensation module on the implement when using the side shift adapter frame. Keep the distance to the cylinder as short as possible. In case of frequent implement changes, the SC1 terrain compensation module could be placed on the adapter frame.

For additional information on the component installation, refer to the:

- *Mount the Angle Sensor* section on page 15
- *Mount the Hydraulic Manifold* section on page 20
- *Mount the Side Shift Cylinder* section on page 21
- *Mount the Implement Drive Unit (IDU) ECU* section on page 22
- *Mount the SC1 ECU* section on page 23
- *Mount the GPS antenna* section on page 24
- *Connect Harness Leads and Cables* section on page 25

The image below shows approximate installation locations for system components.

FIGURE 1. Example Component Locations



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TABLE 1. System Componets

Item	Description
1.	Hydraulic Manifold
2.	IDU (Implement Drive Unit)
3.	Angle Sensor
4.	Side Shift Cylinder

## HYDRAULIC FITTINGS

This manual may reference the following types of hydraulic fittings:

- SAE O-ring fittings
- ORFS (O-Ring Face Seal) fittings
- JIC fittings

SAE O-Ring Fittings



ORFS Fittings



JIC Fitting



## KIT CONTENTS

This section provides an overview of all basic components. The exact content of the side shift steering set depends upon the brand and type of machine.

All necessary parts are supplied, including this manual. Verify that all items listed on the packing list are actually present.

## SIDE SHIFT ASSEMBLY

FIGURE 2. Side Shift Adapter Frame and Cylinders

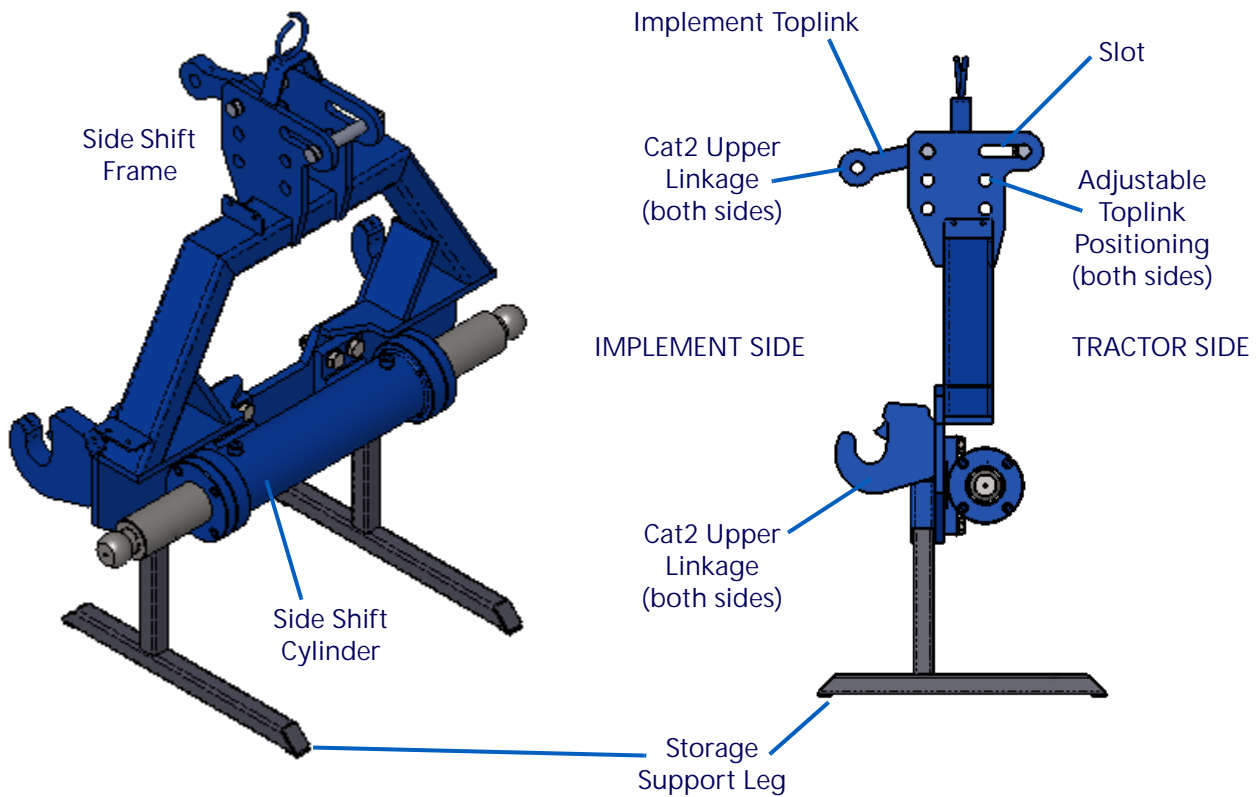


TABLE 2. Implement Antenna Cabling Options

Item Description	Part Number
Cable, 1.5 m [5'] Smart Antenna Implement Steer	115-4010-159
Cable, 4.5 m [15'] Smart Antenna Implement Steer	115-4010-130
Cable, 6.0 m [20'] Smart Antenna Implement Steer	115-4010-160
Cable, 1.8 m [6'] 9-pin Master to Gen 1 ISOBUS Adapter	115-7100-006
Cable, 1.8 m [6'] Gen 1 ISOBUS Extension	115-7100-001

FIGURE 3. Implement ECU Kit (P/N 117-8000-475)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	063-0174-070	ECU, ISO, TC1, LOW SPEED STEERING
2	1	063-0173-935	ECU, IMPL. DRIVER UNIT (IDU)
3	1	115-4010-112	CBL, IMPLEMENT, SC1/600S
4	1	115-8000-437	CABLE, RTK CORRECTIONS SPLIT

FIGURE 4. Load Sense Side Shift Steering Kit (P/N 117-8000-016)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	334-8000-001	MANIFOLD, IMPLEMENT, LS, 5L
2	1	115-8000-385	HRNS, HDU, IMPL. MANIFOLD
3	1	115-8000-193	HARNESS, WAS, 1.5M
4	1	016-8000-151EN	MANUAL, SIDESHIFT STEERING, SC1/TC1 INSTALL

FIGURE 5. Open Center Side Shift Steering Kit (P/N 117-8000-089)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	334-8000-007	MANIFOLD, IMPLEMENT, OC, 5L
2	1	115-8000-385	HRNS, HDU, IMPL. MANIFOLD
3	1	115-8000-193	HARNESS, WAS, 1.5M
4	1	016-8000-151EN	MANUAL, SIDESHIFT STEERING, SC1/TC1 INSTALL

FIGURE 6. Generic Side Shift Mounting Kit (P/N 117-8000-491)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	117-8000-308	KIT, WAS LINK, M8 210, RAD-AXL
2	1	107-8000-007	BRACKET, DYNAMIQ, V1
3	1	107-8000-005	BRACKET, WAS, 90 DEGREE
4	1	107-8000-062	BRACKET, MANIFOLD V3, GENERIC
5	1	107-8000-006	BRACKET, STU, MANIFOLD V3
6	1	063-8000-157	WAS ASSEMBLY, IN BRACKET, 12V 90°, 35CM CABLE, 4P M12,
7	1	117-8000-311	KIT, BOLT+NUT, 5/8 UNC SS, ANT
8	1	407-4001-024	BULKHEAD TNC CONNECTOR

FIGURE 7. Side Shift (Cat.2 Dimension/Cat.3 Lower Hitch Points) Implement Frame Kit (P/N 117-8000-492)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	063-8000-017	SIDESHIFT IMPL. FRAME CAT.2/3
2	1	107-8000-062	BRACKET, MANIFOLD V3, GENERIC
3	1	063-8000-157	WAS ASSEMBLY, IN BRACKET, 12V 90°, 35CM CABLE, 4P M12,
4	1	107-8000-086	BRACKET, WAS, SIDESHIFT FRAME
5	1	107-8000-006	BRACKET, STU, MANIFOLD V3
6	1	117-8000-308	KIT, WAS LINK, M8 210, RAD-AXL
7	1	117-8000-311	KIT, ANTENNA, UNC BOLT & NUT
8	1	407-4001-024	BULKHEAD TNC CONNECTOR

FIGURE 8. Side Shift (Cat.3 Dimension/Lower Hitch Points) Implement Frame Kit (P/N 117-8000-493)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	063-8000-046	SIDESHIFT IMPLEMENT FRAME TYP3
2	1	107-8000-062	BRACKET, MANIFOLD V3, GENERIC
3	1	063-8000-157	WAS ASSEMBLY, IN BRACKET, 12V 90°, 35CM CABLE, 4P M12,
4	1	107-8000-086	BRACKET, WAS, SIDESHIFT FRAME
5	1	107-8000-006	BRACKET, STU, MANIFOLD V3
6	1	117-8000-308	KIT, WAS LINK, M8 210, RAD-AXL
7	1	117-8000-311	KIT, ANTENNA, UNC BOLT & NUT
8	1	407-4001-024	BULKHEAD TNC CONNECTOR

FIGURE 9. Side Shift Mounting Kit (P/N 117-8000-494)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	334-8004-003	CYLINDER, CAT3 4.5T
2	8	311-4050-447K	HEX BOLT, DIN931 8.8 - M20X70
3	16	313-6000-031K	WASHER, ZN, DIN125A M20
4	8	312-6001-107K	HEX L NUT DIN985-8 M20x2.5 ZN

FIGURE 10. Side Shift Mounting Kit (P/N 117-8000-495)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	334-8004-006	CYLINDER, CAT3 8T
2	8	311-4050-447K	HEX BOLT, DIN931 8.8 - M20X70
3	16	313-6000-031K	WASHER, ZN, DIN125A M20
4	8	312-6001-107K	HEX L NUT DIN985-8 M20x2.5 ZN

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## UPDATES

Software and manual updates are available on the Raven Applied Technology website:

<https://ravenprecision.com>

At Raven Industries, we strive to make your experience with our products as rewarding as possible. One way to improve this experience is to provide us with feedback on this manual.

Your feedback will help shape the future of our product documentation and the overall service we provide. We appreciate the opportunity to see ourselves as our customers see us and are eager to gather ideas on how we have been helping or how we can do better.

To serve you best, please send an email with the following information to

[techwriting@ravenind.com](mailto:techwriting@ravenind.com)

- SC1™/TC1 Twin Disc Implement Steer Installation Manual
- 016-8000-150 Rev. A
- Any comments or feedback (include chapter or page numbers if applicable).
- Let us know how long have you been using this or other Raven products.

We will not share your email or any information you provide with anyone else. Your feedback is valued and extremely important to us.

Thank you for your time.

NOTE: This document was originally written and published in English.





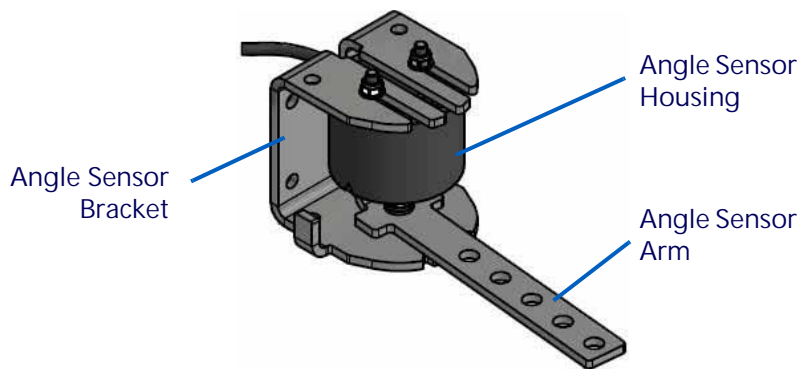
MOUNT THE ANGLE SENSOR

The angle sensor measures the position of the side shift cylinder during operation. The angle sensor is required to display the position of the side shift cylinder on the UT as well as to allow the operator to use the "Auto-Center" feature.

NOTE: The angle sensor and angle sensor bracket are shipped already assembled.

FIGURE 1. Assembled Angle Sensor

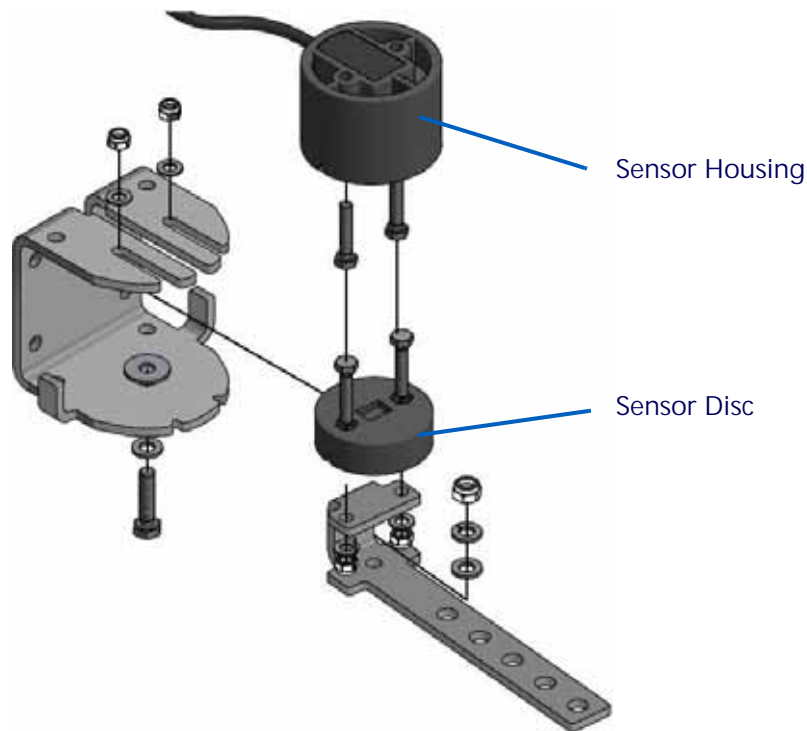
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ASSEMBLE THE ANGLE SENSOR

Complete the following steps to assemble the angle sensor and angle sensor mounting bracket:

FIGURE 2. Angle Sensor Exploded View



1. Use the supplied M5 bolts, washers, and lock nuts to attach the sensor disc to the angle sensor arm.
2. Insert M5 bolts in the sensor housing and place housing over the sensor disc.
3. Attach the angle sensor arm to the angle bracket with an M6 bolt, three washers, lock washer, and lock nut (refer to Figure 2 on page 16). The bolts at the top of the sensor housing should slide into the notches at the top of the angle sensor bracket.
4. Tighten the locking nut firmly and then loosen it a 1/4 turn so that the angle sensor is able to turn freely.
5. Secure the sensor housing with the supplied washers and lock nuts.

**NOTE:** Before mounting the angle sensor bracket to the implement, check that the sensor disc can move freely in the sensor housing when turning the sensor arm. The triangular notches carved in the disc and housing should line up when the implement is in the center position.

#### SIDE SHIFT CONTROL

Mount the angle sensor to the side shift cylinder via the threaded hole at the end of the rod. Mount the angle sensor so that the sensor arm travels freely in the same direction as the cylinder rod. The threaded rod should be an extension between the cylinder and the angle sensor arm.

FIGURE 3. Angle Sensor Mounting on Side Shift Adapter Frame



FIGURE 4. Top View of Angle Sensor Mounting



**NOTE:** The angle sensor and angle sensor bracket are shipped already assembled.

Keep in mind that the max angle of the sensor is around 90°. A good reference position is to have the 8th hole in the sensor arm on the same line as the side shift cylinder. Cut the threaded rod between the ball joints at the desired length, make sure the cylinder is in its middle position and the sensor arm is facing straight downwards when doing so. The center voltage of the angle sensor will now correspond with the center position of the cylinder.

**NOTE:** The range of measurement of the angle sensor lies between 0.5 and 4.5 V.

When using the Side-Shift adapter frame, a metal strip is placed for installing the angle sensor bracket.

## DRAWBAR

When using a drawbar steering the angle sensor needs to be placed near the articulation joint of the drawbar.

FIGURE 5. Angle Sensor Mounting on Side Shift Adapter Frame



Determine the position of the angle sensor bracket by moving the drawbar in its outer left and right position. The angle that the arm of the angle sensor bracket makes in outer left and right position should be more or less the same. Keep in mind that the maximum angle of the sensor is around 90°. It's desirable that the angle sensor makes a total angle of 90° between the outer left and outer right position. However, the system will also function when the total angle is smaller.

**IMPORTANT:** The sensor housing needs to be mounted facing downwards so moisture and filth cannot get trapped in the sensor.

## HYDRAULIC SYSTEM CONNECTIONS

### CHECK THE HYDRAULIC MANIFOLD

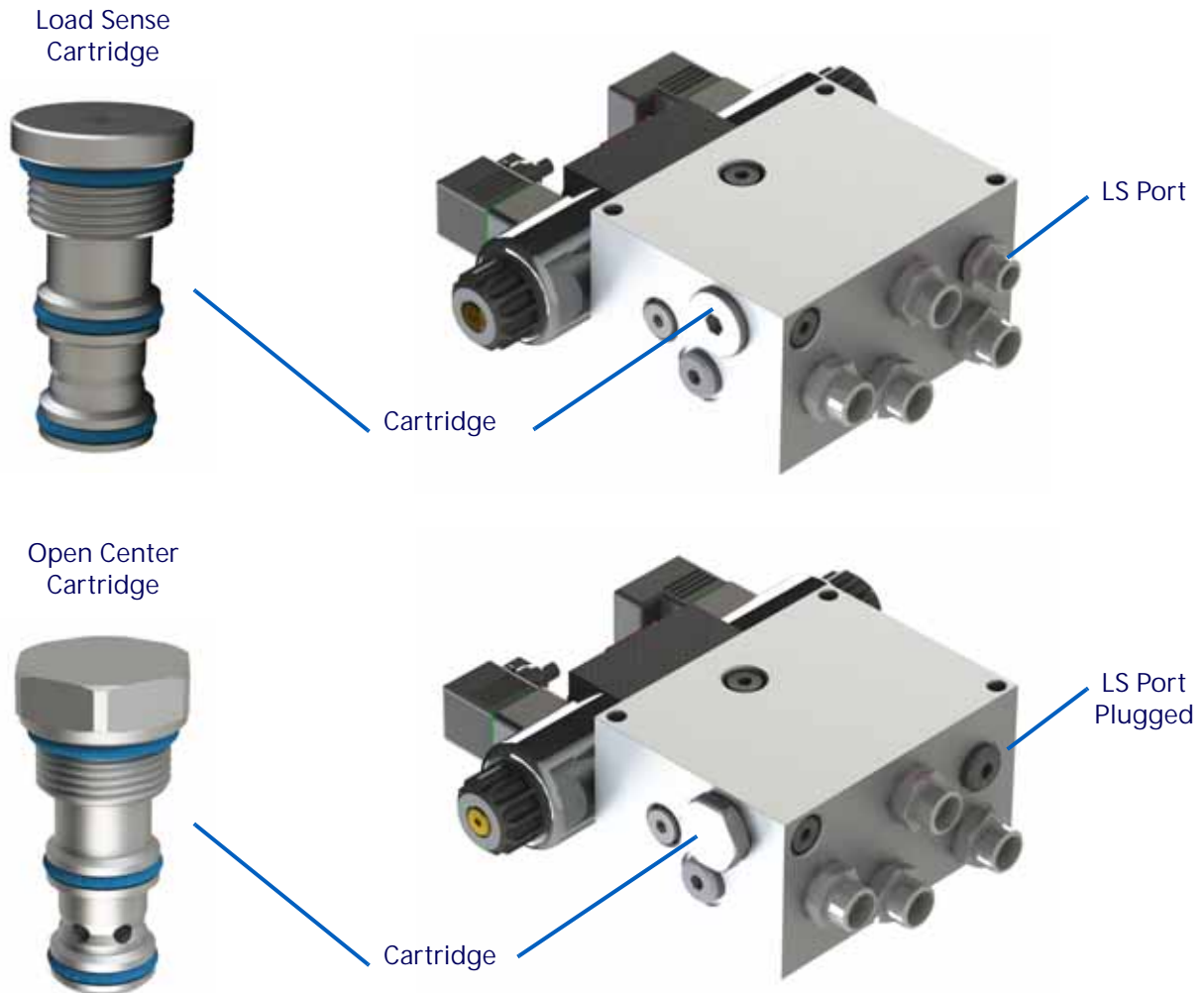
The manifold can be used either in Load Sense (LS) mode or in Open Center (OC) mode. Different selector cartridges are required for Open Center or Load Sense hydraulic systems.

TABLE 1. Manifold Selector Cartridge

System Type	Selector Plug	Part Number
Load Sense (LS)	Cartridge, LS T 30/3 Valve Plug	334-8001-031
Open Center (OC)	Cartridge, OC ELP30	334-8000-002

Check the type of selector plug before mounting the manifold.

FIGURE 6. Selector Cartridge and Cartridge Types



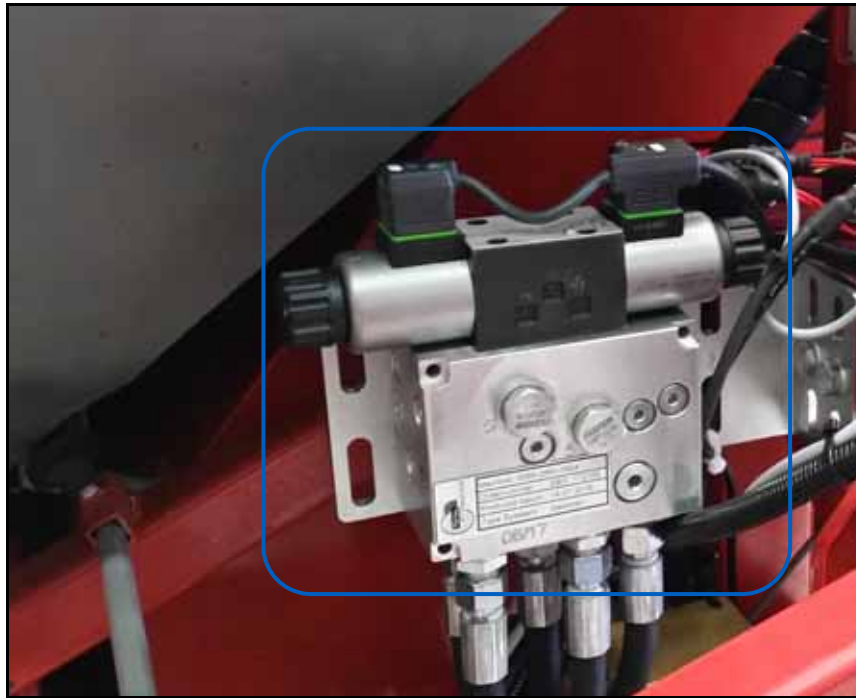
- If the manifold is connected to the auxiliary hydraulic connectors at the rear of the tractor, the manifold must be configured in Open Center mode. The LS port of the manifold must be plugged.
- If the manifold is connected to the power beyond connection at the back of the tractor, the manifold must be configured in LS mode. The LS mode is the preferred mode.

## MOUNT THE HYDRAULIC MANIFOLD

The manifold provides threaded M8 holes for mounting to a bracket or mounting plate. Attach the manifold to the bracket supplied.

FIGURE 7. Hydraulic Manifold Mounted

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Mount the manifold on the implement in such a way that the hydraulic hoses may be easily routed toward the tractor and control cylinder. Ensure that the DIN connectors on the valve can be connected after fitting the manifold. Connect the control cylinder to the A and B ports of the manifold.

### LOAD SENSE

1. Connect the pressure line to P, the return line to T and the sensor line to LS on the manifold.
2. Use the Load Sense (LS) connections of the tractor.

### OPEN CENTER

1. Connect the pressure line to P and the return line to T on the manifold.
2. Use the external hydraulic valve of the tractor.

**NOTE:** The side shift cylinder may also be manually steered by pressing the pin on the proportional valve.

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FIGURE 8. Proportional Valve Pin Used for Manual Steer

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### MOUNT THE SIDE SHIFT CYLINDER

The hydraulic cylinder is available in two weight categories (4.5, and 8 ton). It is possible to either mount directly to the implement or to use the adapter frame. With the adapter frame, it is possible to mount different types of mounted implements.

When mounting the cylinder directly to an existing implement, it is important to place the cylinder the same way as the original linkage points. This prevents the machine from getting further behind the tractor.

**IMPORTANT:** Make sure that the PTO shaft can move freely without hitting the frame at the limits of the linkage (up and down) and at the limits of the side shift cylinder (left and right).

**IMPORTANT:** Make sure the side shift cylinder is in the center position before lifting the implement.



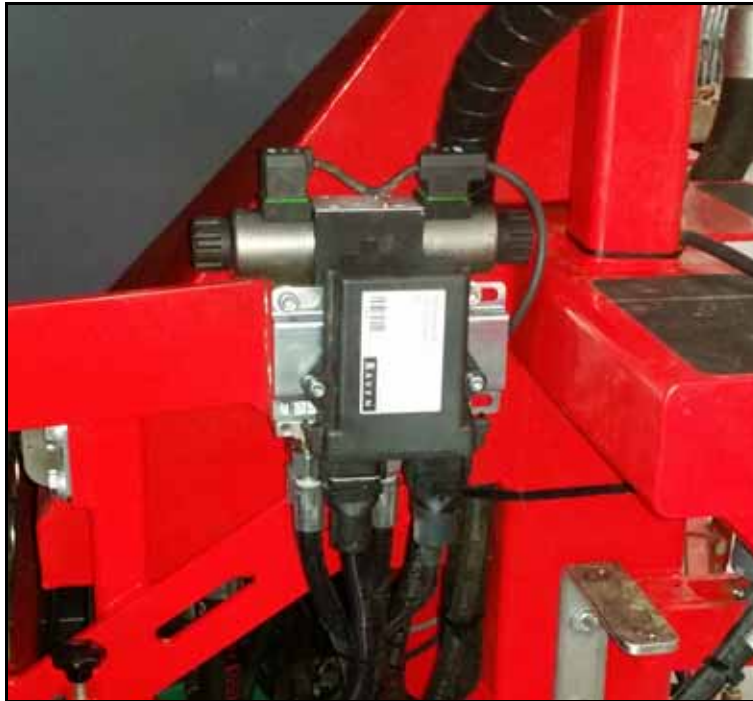
## ELECTRICAL SYSTEM CONNECTIONS

### MOUNT THE IMPLEMENT DRIVE UNIT (IDU) ECU

The Implement Drive Unit (IDU - Side Shift steering) can be mounted to the manifold using the IDU bracket or directly to the frame of the implement. Be sure to mount the IDU close enough to the manifold, keeping the length of the IDU harness in mind.

FIGURE 9. IDU (Implement Drive Unit) Installed

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It is recommended to mount the IDU flat or with the connectors pointed downwards to prevent water collecting in the connectors.



## MOUNT THE SC1 ECU

Mount the SC1 terrain compensation ECU on a flat surface free from vibrations and preferably with the connectors pointing to the rear (default configuration). A good place would be on the main frame of the implement.

If the IDU and SC1 are stacked, make sure that the SC1 is mounted nearest to the implement frame.

FIGURE 10. SC1 ECU Mounted



## MOUNT THE GPS ANTENNA

The best position for the GPS antenna will depend upon the implement being used:

- When using mounted implements with side shift steering, it's advised to mount the antenna as close to the cylinder as possible.
- When using trailed machines with drawbar steering it's advised to mount the antenna as close to the articulation joint of the drawbar as possible.

FIGURE 11. Examples of Antenna Mounting Positions



It is recommended to attach the GPS antenna as low as possible and at the center of the implement.

Be sure to provide a clear view at an angle of 20 degrees (in relation to the horizon). If the cabin roof is the highest point, the GPS antenna does not need to be mounted as high, depending on how far it is mounted behind the tractor.

In addition, the construction needs to be rigid enough to prevent the GPS antenna from being affected by vibrations.

**NOTE:** Use extendable tubing to mount the GPS antenna as low as possible. If satellite reception is blocked, the tube may be extended to provide a better view of the sky and better satellite reception.

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## CONNECT HARNESS LEADS AND CABLES

An Implement-ready wiring harness is required on the tractor for connecting the disc or wheel control unit. The IBBC connector will be used to connect the disc or wheel control to the tractor.

FIGURE 12. IBBC and IBBC Bracket with Antenna Connection

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The implement harness is used to connect the IDU and terrain compensation module to the tractor. The hydraulic harness needs to be connected to the IDU. This hydraulic harness ensures the control of the proportional valve and the readout of the angle sensor.

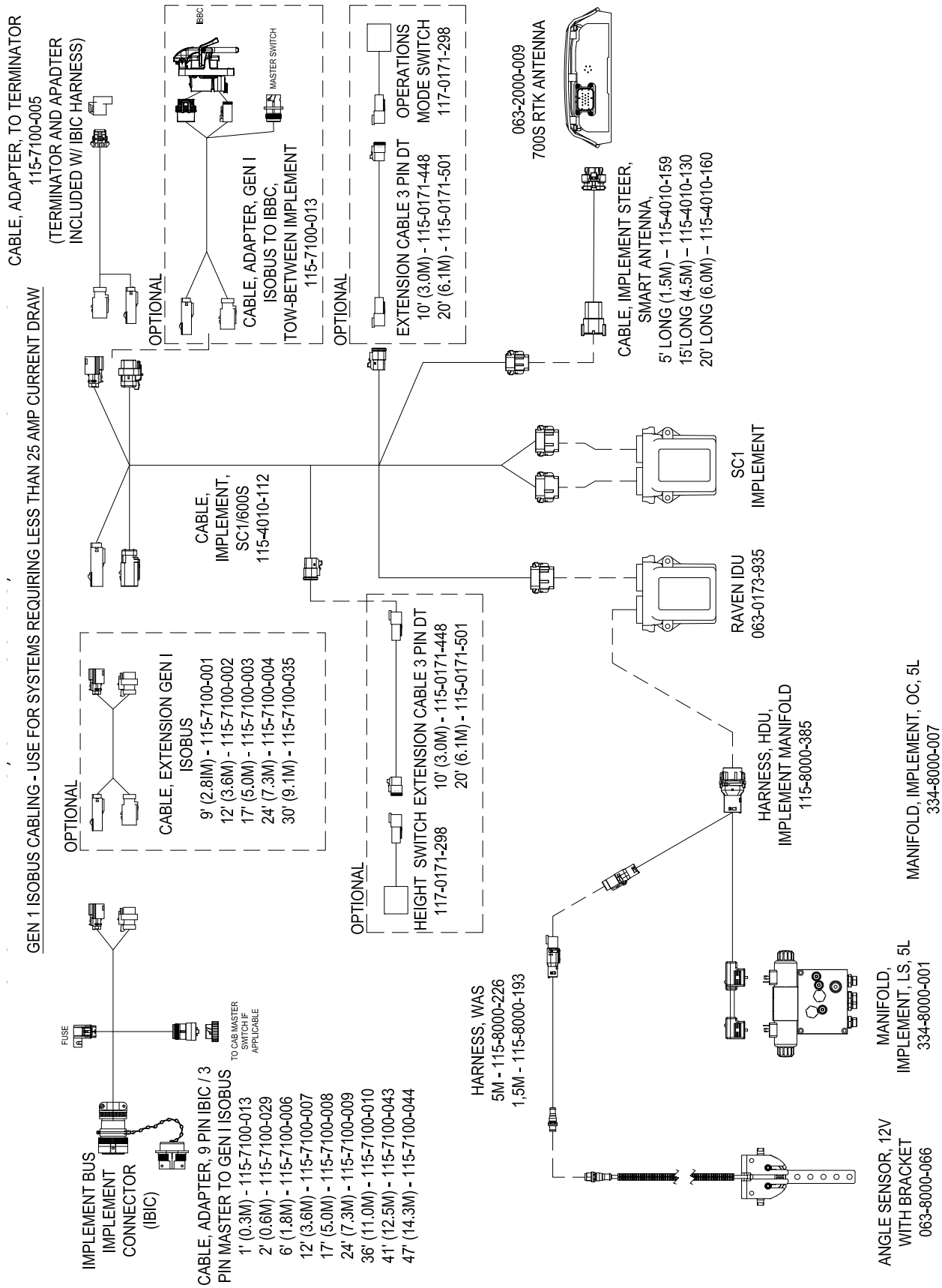
**NOTE:** Tie-wrap the leads to ensure that they are attached free from vibration and friction.

**IMPORTANT:** Mount the CAN implement lead in such a way that the separate conductors coming from the protective sleeve are directed downwards. This will help prevent water from penetrating into the protective sleeve.

**IMPORTANT:** Ensure that the leads do not get damaged during installation.

**IMPORTANT:** Press the connectors firmly into place until they click.

FIGURE 13. CAN Implement Harness Schematic



## A

## IMPLEMENT DRIVE UNIT (IDU)

TABLE 1. IDU A connector (Gray)

Pin	Description
1	HC Power in 1
2	HC Power in 2
3	ECU Power
4	Resume Switch Input
5	CAN2 High
6	CAN1 High
7	CAN1 Low
8	Operator Presence Input
9	Master Switch Input
10	ECU Ground
11	HC Ground IN1
12	HC Ground IN2

TABLE 2. IDU B Connector (Black)

Pin	Description
1	PWM Out Left
2	Ground
3	Lock Valve Output Switched
4	Sensor Power Output (12V)
5	Pressure Sensor Input
6	Sensor Power Output (12V)
7	Angle Sensor Input
8	Input 2
9	Input 5
10	Sensor Power Ground
11	HC Power Ground
12	PWM Ground Out Right

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## ANGLE SENSOR

TABLE 3. Angle sensor 12V

Pin	Description	Wire Color
1	5V sensor power	-
2	ECU ground	Blue
3	Sensor signal	Black
4	12V sensor power	Brown

# LIMITED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

## WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.**

# EXTENDED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

## WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to [www.ravenhelp.com](http://www.ravenhelp.com) and select Product Registration.

## HOW LONG IS THE EXTENDED WARRANTY COVERAGE PERIOD?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

## WHAT IS NOT COVERED BY THE EXTENDED WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.**