



ISA-TOPE

Components to Understand



MINNESOTA STATE
Transportation Center of Excellence



DUE #2054997

Covered Topics in this Section

1. Left joystick controls.
2. Right Joystick controls
3. Auxiliary controls
4. 2D system



Left joystick

Functions

Forward travel

Backwards travel

Right turn

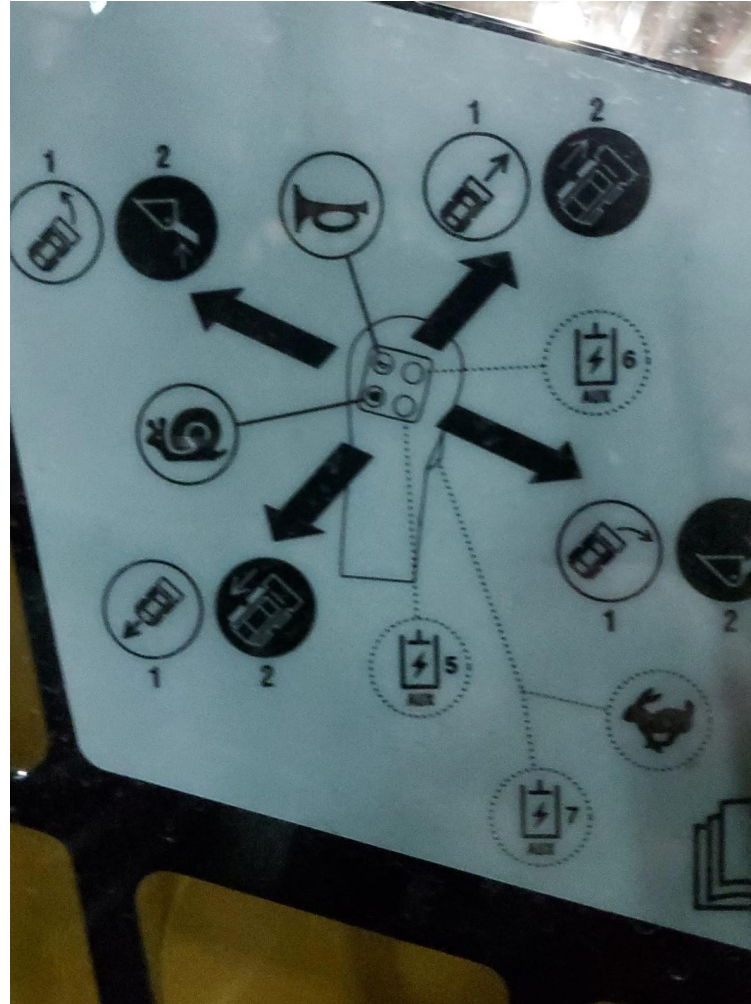
Left turn

Horn

Two speed control

Creep control

Aux 5-7



Forward



Forward Travel - Push the joystick forward to travel forward.

Backward



Backward Travel - Pull back on the joystick to travel in reverse.

Right Turn



Right Turn - Move the joystick to the right to turn the machine to the right.

Left Turn



Left Turn - Move the joystick to the left to turn the machine to the left.



Horn



Horn - Press the switch to sound the horn. Use the horn to alert personnel.

Two Speed Control



Two-Speed - Press the trigger and release the trigger on the front of the left-hand joystick to activate rabbit mode. To activate rabbit mode, the Multifunction Switch must also be in the two-speed position. Refer to "Multifunction Switch for the Left-Hand Trigger (3)" above for instructions about the switch.

Note: Keep the work tool close to the ground when you travel in rabbit mode. This method will maximize the stability of the machine.



Creep Control

The Creep Control allows the operator to select a maximum machine travel speed at full joystick movement. Use creep control for operations that require slow, constant speed independent of engine idle speed.

Creep Control - Press the bottom left-hand joystick to turn on the creep control feature. Creep mode will be engaged the next time the joystick passes through NEUTRAL position. Either during a change of direction or travel initiation from a stopped position. Press the bottom left-hand button on the left-hand joystick to turn off the creep control. Creep mode will be disengaged the next the joystick passes through the NEUTRAL position, either during a change of direction or stopping the machine.



Right joystick

Functions

Lower

Dump

Raise

Tilt back

Float

Aux 1-4



Lower



Lower - Push the joystick forward to lower the work tool.

Dump



Dump - Move the joystick to the right to tilt the work tool downward.

Raise



Raise - Pull the joystick backward to raise the work tool.

Tilt Back



Tilt Back - Move the joystick to the left to tilt the work tool upward.



Tilt Back



Tilt Back - Move the joystick to the left to tilt the work tool upward.

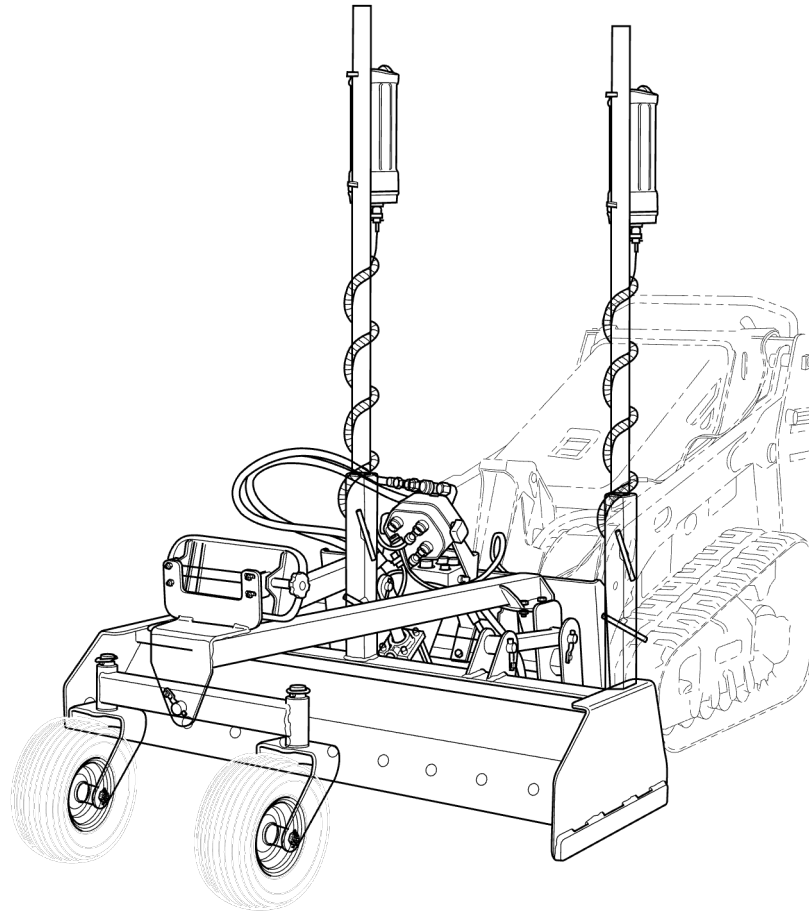
Float



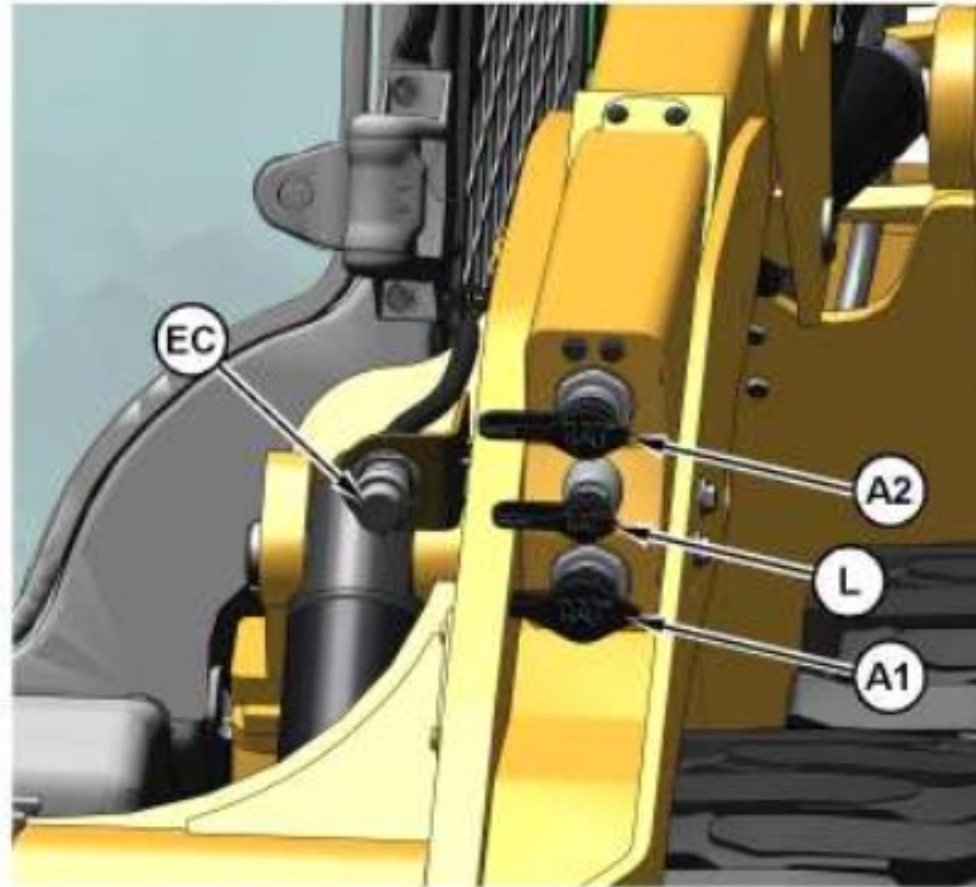
Float - Float allows the work tool to follow the contour of the ground.

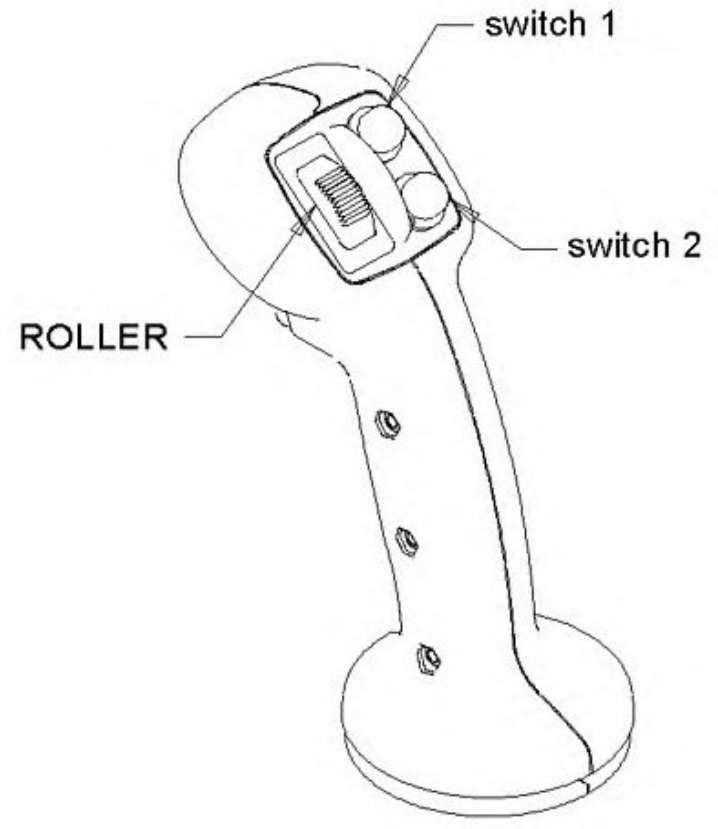
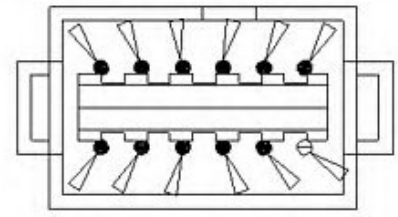
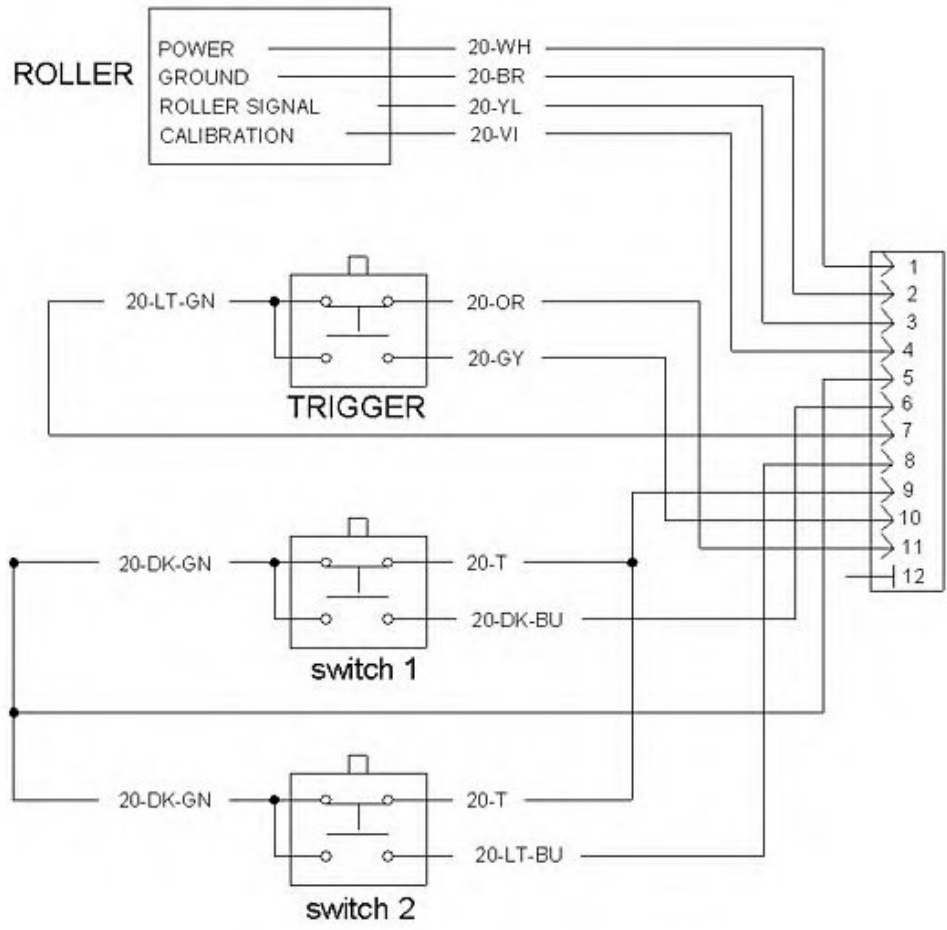


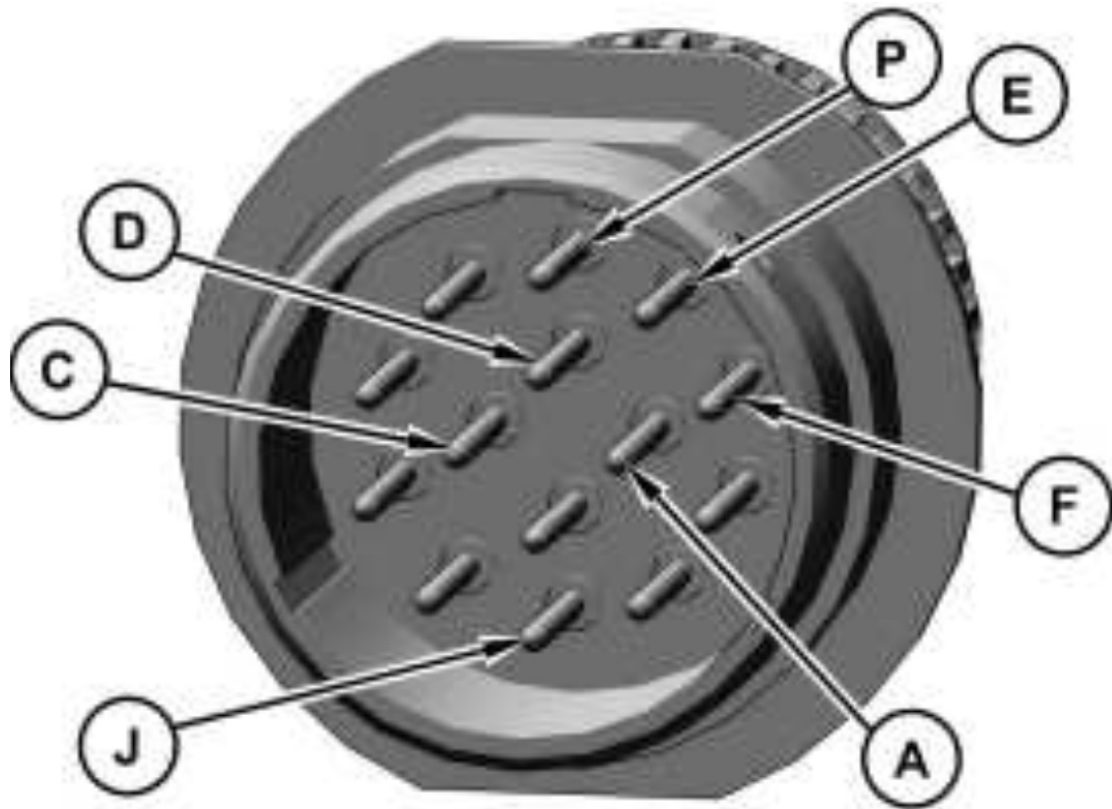
Auxiliary Controls



(EC) Work Tool Electrical
Connector
(A2) 1/2-inch Hydraulic
Supply
(A1) 3/8-inch Case Drain
(L) 1/2-inch Hydraulic
Return







- ▶ Typical electrical connection on the loading arm
- (A) Left-Hand Trigger Control “AUX 7”
- (C) C- Control
- (D) C+ Control
- (E) C2 Control
- (F) C1 Control
- (J) Auxiliary Electrical Control “AUX 8”
- (P) +12V with KEY ON





- ▶ **Auxiliary Hydraulic Control (A1)** - This control provides hydraulic oil flow to the auxiliary connections on the loader arm. Engage the control to provide hydraulic oil flow to the female connectors (A1) and (a1)





- ▶ **Auxiliary Hydraulic Control (A2)** - This control provides hydraulic oil flow to the auxiliary connections on the loader arm. Engage the control to provide hydraulic oil flow to the male connectors (A2) and (a2).





- ▶ **Auxiliary Electrical Control 3 (C-)** - This control provides electrical power to activate additional work tool functions using a three-position diverter valve that is on some work tools. Press the switch and hold the switch to send power to the pin (C) this action will activate the required Work Tool function. Release the switch to deactivate the control. If auxiliary hydraulic controls (A1/A2), and continuous flow is inactive, and a work tool featuring auto reverse functionality (such as cold planers) is connected, pressing the switch will send power to pin (C) and provide hydraulic flow to the female connectors (A1) and (a1).





- ▶ **Auxiliary Electrical Control 4 (C+)** - This control provides electrical power to activate additional work tool functions using a three-position diverter valve that is on some work tools. Press the switch and hold the switch to send power to the pin (D). This action will activate the required Work Tool function. Release the switch to deactivate the control. If auxiliary hydraulic controls (A1/A2), and continuous flow is inactive and a work tool featuring auto reverse functionality (such as cold planers) is connected, pressing the switch will send power to pin (D) and provide hydraulic flow to the female connectors (A1) and (a1).





- ▶ **Auxiliary Electrical Control 5 (C2)** - This control provides electrical power to activate additional work tool functions using a three-position diverter valve that is on some work tools. Press the switch and hold the switch to send power to the pin (E) this will activate the required Work Tool function. Release the switch to deactivate the control.





- ▶ **Auxiliary Electrical Control (C1)** - This control provides electrical power to activate additional work tool functions using a three-position diverter valve that is on some work tools. Press the switch and hold the switch to send power to pin (F). This action will activate the required Work Tool function. Release the switch to deactivate the control.





- ▶ **Left-Hand Trigger** - Pull the trigger and hold the trigger on the left-hand joystick to provide electrical power to pin (A). Release the trigger to deactivate the control.



Continuous Flow Switch (18)

Continuous Flow - Continuous flow control (18) supplies continuous flow of hydraulic fluid to the auxiliary hydraulic circuit without continuously holding the auxiliary hydraulic control. Press the bottom of the continuous flow rocker switch. The continuous flow alert indicator will flash continuously indicating the system is in the "Continuous Flow Ready Mode". Press either of the two auxiliary hydraulic switches (1) or (2) that are on the right-hand joystick. If equipped, you may also move the thumb wheel on the right-hand joystick to the desired flow position and hold either of these commands for several seconds. The continuous flow alert indicator will stop flashing and remain lit continuously. Releasing the button or thumb wheel now will engage Continuous Flow Mode, providing flow to the auxiliary hydraulic circuit without further command input. To disengage continuous flow, either press the bottom of the continuous flow switch, press either of the two auxiliary hydraulic switches or operate the thumb wheel in either direction.



2D (Reference Elevation)

- Sensor Based (Cross Slope/Depth and Slope)
- Laser (Single or Dual)



Types of 2D systems

▶ Cross Slope

- ▶ Use of sensors to determine slope
 - ▶ Mostly found on graders but also found on small dozers and compact machines
 - ▶ Types of sensors are Angle Sensors/IMU's (AS400, GS520) and Rotation Sensors (RS400)



▶ Laser Systems

- ▶ Laser Receivers provide the elevation
- ▶ Laser receivers require a laser to be mounted somewhere, most commonly on a tripod.
 - ▶ (For Dual Laser)
When both receivers are benched on the laser plane they form a constant slope.



2D and Laser Systems

- **2D refers to elevation and slope**
 - Laser Receivers provide the elevation on machines that are set up and configured to use them.





The cross slope is either determined by an angle sensor or by adding a second laser receiver to the blade

- When both receivers are locked on to the laser plane, they form a constant slope between them allowing the blade to cut the desired slope.
- Laser receivers require a laser to be mounted somewhere on a tripod for stability. This is the simplest form of infrastructure and provides the most precise vertical control.



Resources:?

<https://sis2.cat.com/#/detail?tab=service&serialNumber=CW9&infoType=13&serviceMediaNumber=M0091175&serviceSystemControlNumber=i07372804>



Get in touch.



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