Sentry 6140
User Manual

Tip Flow Monitor
Safety Information

TeeJet Technologies is not responsible for damage or physical harm caused by failure to adhere to the following safety requirements.

As the operator of the vehicle, you are responsible for its safe operation.

The Sentry 6140 is not designed to replace the vehicle’s operator.

The Sentry 6140 is designed to support and improve efficiency while working in the field. The driver has full responsibility for the quality and work related results.

Photos and illustrations may vary form the actual components provided. This may be due to different installation options, operation modes or production models.

Always try to use original parts. Built to the highest standards of safety and reliability, TeeJet Technologies parts are to be used for this system as others might jeopardize the safety and function of the system. TeeJet is not responsible for any redesign or adaptations of the Sentry 6140. Any changes to the Sentry 6140 voids the company warranty.
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## Sentry 6140 Tip Flow Monitor

### COMPONENTS

Unpack the installation kit and identify the required parts for your installation.

<table>
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<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
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<td>B</td>
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<td>Tip Flow Monitor Interface (TFMI)</td>
<td>1</td>
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<td>C</td>
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<td>Tip Flow Monitor Interface (TFMI) Harness</td>
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<td>D</td>
<td>78-05091</td>
<td>Boom Interface Module (BIM)</td>
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<td>E</td>
<td>45-10142*</td>
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<td>Terminator, Start (Female)</td>
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*Actual harness may be machine specific.*

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Section 1
The sections are numbered from left to right while standing at the back of the machine and begin at the Start Terminator.
**Boom Interface Module Harness Connection**

With each machine having a different possible switchbox configuration, it is impossible to specify the exact location to T-Tap into the valve harness. However, the following guidelines may provide some assistance in completing the installation.

1. Identify boom section cable that runs from the Boom Switchbox to the boom valves.
2. Use a T-Tap (or similar product) to connect into the signal wire.
   
   *NOTE: In some cases, the Boom Interface Module Harness wires can be connected directly to the switches inside the Switchbox using the proper spade terminal.*

3. Repeat this process for each individual boom section.

*Figure 2: Boom Interface Module Harness Connection*
SYSTEM COMPONENTS

If there are questions concerning the installation of the Sentry 6140 system on this vehicle, or due to the changes in component specifications the parts supplied in the kit are not exactly as presented in this document, please contact your dealer or TeeJet Customer service representative for clarification before installation. TeeJet Technologies is not responsible for misuse or incorrect installation of the system.

Sentry 6140 Console

The Sentry 6140 Console is designed to provide years of service under typical agricultural operating conditions. A tight fitting enclosure means that typical dusty environments will not cause operational problems. While occasional splashing of water will not damage the unit, the Sentry 6140 Console is not designed for direct exposure to rain. Take care not to operate the Sentry 6140 Console in wet conditions.

Nozzle Body with Flow Meter and Tip Sensor Interface

The turbine style flow meter used with the Sentry 6140 Tip Flow Monitor is compact, reliable and proven. The threaded connection allows the sensor to be added onto a wide range of standard TeeJet single and multiple outlet nozzle bodies. ChemSaver® diaphragm check valves remain in place allowing for positive spray tip shutoff. Ample clearance inside the flow meter means minimal flow restriction and generous free passage for particles contained in the spray solution. Long wearing materials are used in bearing surfaces to ensure a consistent flow reading and the flow meter sensor is mounted externally to prevent any direct contact with the spray solution for long-term reliability.
Flow Meter Assembly
The flow meter gasket has two different sides. The side with the larger center is to be inserted towards the sensor or inside the flow meter.

Figure 5: Flow Meter and Gasket

Flow Meter

Flow Meter

Gasket

Figure 6: Gasket Detail

Towards flow meter

Kit Assembly
1. Remove end cap from nozzle body.
2. Attach end cap to flow meter (J).
3. Attach flow meter to nozzle body. Hand tighten.
4. Loosely secure Tip Sensor Interface (H or I) close to nozzle body / flow meter assembly. Cable ties (not included) can be threaded through Tip Sensor Interface slots.
5. Push sensor of Tip Sensor Interface into slot on flowmeter. Clips on flow meter should be in the groves on the center of the sensor.
7. Connect Start Terminator (L) to section 1 Tip Sensor Interface.
8. Connect each Tip Sensor Interface moving from left to right (while standing at the back of the machine).
   ▶ Extension cables from Boom Interface Module Harness (E) and Tip Flow Monitor Interface Harness (C) will connect between two Tip Sensor Interfaces.
9. Connect End Terminator (K) to the last section’s Tip Sensor Interface.

Figure 7: Nozzle Body with Flow Meter Assembly

Figure 8: Sensor & Clips

Figure 9: Tip Sensor Interface Slots
Sentry 6140 Tip Flow Monitor

POWER

Slide the POWER SWITCH to power on or off the console.

On power up the console detects the number of Tip Sensor Interfaces (TSI) (H or I) on the boom and displays the status of the sensors and the system. The LED’s on each TSI are turned on and go off as each is detected and given their unique address.

The addresses start at #1 and continue across the boom. Tips are numbered from left to right while standing in the forward facing direction of the machine and begin at the Start Terminator.

► Sensor connected to the Start Terminator [female] (L) on the left side of the machine will be #1
► Sensor connected to the End Terminator [male] (K) on the right side of the machine will be the last sensor.

The Status Box displays if all tips are OK or if any errors are found.

Figure 10: Splash Screen

Figure 11: Tip Sensor Interface LEDs

Single Tip Sensor Interface

Dual Tip Sensor Interface

NOTE: Screen options may vary depending on enabled or disabled functions as well as function availability.

The Balance button will be unavailable or grayed out if all boom sections and the master switch are not on.
SETUP

If there are questions concerning the setup of the Sentry 6140, please contact your dealer or TeeJet Customer service representative for clarification before operation. TeeJet Technologies is not responsible for misuse or incorrect operation of the system.

Setup is used to configure Display Brightness, Master Sound, Tip Alarm Percentage, Tip Alarm Delay, Number of Sections, Number of Tips per Section and Boom Section On/Off Beep.

Figure 13: Setup Button on Home Screen

Figure 14: Buttons on Setup Screens

Figure 15: Setup Screen Order

- Display Brightness – Sets the brightness level of the display
- Master Sound – Enable/disable console sound
- Tip Alarm Percentage – Sets the error reporting range for the tip sensors
- Tip Alarm Delay – Sets the time the console will wait after an error has been encountered before sounding a tip alarm
- Number of Sections – Sets the number of boom sections
- Number of Tips per Section – Enters the number of tips on each boom section
- Boom Section On/Off Beep – Enable/disable beep when a boom section is turned on or off
Display Brightness

Sets the brightness level of the display. Range is 5% to 100% in 5% increments.

1. Press the MINUS/PLUS buttons to adjust the brightness.
2. Press
   ➤ NEXT PAGE button to proceed to Master Sound.
   ➤ PREVIOUS PAGE button to go back to Boom Section On/Off Beep.

Figure 16: Display Brightness

Master Sound

Enable/disable console sound.

1. Press the UP/DOWN buttons to toggle the sound on or off.
2. Press
   ➤ NEXT PAGE button to proceed to Tip Alarm Percentage.
   ➤ PREVIOUS PAGE button to go back to Display Brightness.

Figure 17: Master Sound

Tip Alarm Percentage

Sets the error reporting range for the tip sensors. If the flow rate of an individual tip falls below, or rises above this range, the console will generate an alarm. The value entered is the percentage above and below the average flow that a tip must pass to trigger an alarm. Range is 0% to 100%.

1. Press the MINUS/PLUS buttons to adjust the percentage.
2. Press
   ➤ NEXT PAGE button to proceed to Tip Alarm Delay.
   ➤ PREVIOUS PAGE button to go back to Master Sound.

Figure 18: Tip Alarm Percentage

Tip Alarm Delay

Sets the time the console will wait after an error has been encountered before sounding a tip alarm. If the error is corrected within this time, no alarm will sound or error will display on screen. The delay value is selectable from 1 to 10 seconds.

1. Press the MINUS/PLUS buttons to adjust the time.
2. Press
   ➤ NEXT PAGE button to proceed to Number of Sections.
   ➤ PREVIOUS PAGE button to go back to Tip Alarm Percentage.

Figure 19: Tip Alarm Delay
**Number of Sections**

⚠️ Select the number of boom sections. The sections are numbered from left to right while standing in the forward facing direction of the machine and begin at the Start Terminator. Range is 1 to 15 sections.

1. Press the MINUS/PLUS buttons  to adjust the number of boom sections.
2. Press
   - NEXT PAGE button  to proceed to Number of Tips per Section.
   - PREVIOUS PAGE button  to go back to Tip Alarm Delay.

**Number of Tips per Section**

⚠️ Enter the number of tips on each boom section. Sections are numbered from left to right while standing in the forward facing direction of the machine and begin at the Start Terminator. Range is 1 to 120 tips.

1. Press the MINUS/PLUS buttons  to set the number of tips per the current section.
2. At the boom section 1, press
   - PREVIOUS PAGE button  to go back to Number of Sections.
   - NEXT PAGE button  to cycle through all available boom sections.
3. At the last boom section, press
   - NEXT PAGE button  to proceed to Boom Section On/Off Beep.
   - PREVIOUS PAGE button  to go back to previous boom sections.

**Boom Section On/Off Beep**

⚠️ Enable/disable beep when a boom section is turned on or off. This feature is useful if a BoomPilot system frequently changes boom sections.

1. Press the UP/DOWN buttons  to toggle the mute function on or off.
2. Press
   - NEXT PAGE button  to proceed to Display Brightness.
   - PREVIOUS PAGE button  to go back to last boom section of the Number of Tips per Section setup.
TIP BALANCE

Balancing the tips is required for the system to compare and monitor individual tips. The system will scan all the tips to get the flow rate. The flow rate of each tip must be within the tip balance percentage range of the average flow rate in order to balance successfully. If any tip is outside this range, an error will be generated, and the user will need to inspect the tip.

NOTE: In order to maintain system accuracy, balancing the tips is required anytime a tip is changed.

The console will not be able to detect small flow changes until a tip balancing is completed successfully.

Tip Balance Percentage is OEM specified. Default balance is +/-15%.

To check if the tips are balanced:
1. Machine must be spraying at normal operation parameters.
2. Press BALANCE button on the Home Screen.
3. Press BALANCE button to start the balance check. The on-screen boom sections will flow on and off during this check.
4. If an error occurs, the Status Box and boom section will flash red. The Status Box show the tip or tips that are at fault including their percentage of error or N/C for “not connected”. Inspect the tip(s) noted on the Status Box. The LED on the Tip Sensor Interface (H or I) will also be illuminated corresponding to the tip or tips that are at fault.
   The NEXT ERROR button is only enabled if more than one error is found when balancing the tips.
5. After correcting the problem, press BALANCE button to start new balance check.
OPERATION

After the tips are balanced, the user can enter Operation mode. The system will monitor all the tips and their the flow rate if their respective boom section is turned on. The flow rate of each tip must be within the percentage range (entered in the Setup mode). If any tip is outside this range, an error will be generated, and the user will need to inspect the tip that is at fault. The LED on the Tip Sensor Interface (H or I) will also be illuminated corresponding to the tip or tips that are at fault.

On Screen Indicators

Boom Sections
► Blue, spray shown – turned on
► Empty, no spray – turned off
► Red – a tip on that section has an error and needs to be inspected.

Status Box
► Green Check Mark – shows all tips are operating normally
► Red flashing – an error occurred,
  • Tip error – the Status Box will show the tip number(s) that is at fault with the percentage off or “N/C” when the specified tip is not connected.
  • System error – the Status Box will show an error code

Buttons
► Reset button – inactive unless an error occurs. It is then enabled to run the system again after checking the tips.
► Next Error button – only enabled if more than one error is found when operating. It allows the user to cycle through the list of tips that need to be checked.

System Errors

The errors that prevent the console from going into normal operation are now displayed as error codes in the Status Box.

Error Codes:
• #1 - Number of tips or boom sections entered in setup mode does not match number of tips or boom sections detected
• #2 - Terminator (K or L) not detected
• #3 - Boom Interface Module (E) not detected
• #4 - Lost communication with Tip Flow Monitor Interface (TFMI) (B)

If any of these errors occur while in normal operation, the system will beep 3 times to alert that an error has occurred.

Figure 27: Operation – System Error
Identifying Plugged Spray Tips Has Never Been Easier

Worn, plugged or partially blocked spray tips can have a significant impact on the quality of your spraying job. Streaks in the field caused by misapplication can result in yield reductions, increased weed pressure and the need to re-apply – all of which can be costly. The Sentry 6140 Tip Flow Monitor provides a simple, reliable solution to this age-old problem. Flow sensors, mounted at each spray tip location, precisely measure the flow passing through the tip and provide instantaneous feedback to the operator should a tip become clogged, lost, or a nozzle body unintentionally rotated to an incorrect position. By eliminating the need to detect plugged tips visually from the cab, operators can cover more acres in a day, and know, with confidence, that their spray tips are operating properly.