

# My Machine

Service Library

Service  
Troubleshooting



# Overview

- Information is currently spread across 8+ systems for troubleshooting
- With information so difficult to find, we have had a steady rise in Troubleshooting cases over the last 8 years (roughly 9% year over year)
- Currently we average 1008 new troubleshooting cases a month, in addition to 1600 returning cases
  - This is an indication that we are not supplying the information needed to diagnose current machines
  - Results in increased down time of machines
  - Machines are getting more complex, and this trend would continue or increase without a solution

# Introducing My Machine

- We have developed a system called My Machine which will serve as a “All-in-one” diagnostic solution
  - This system will go live on June 14<sup>th</sup> to all dealers
- Incorporates Service Library, Machine IQ data, IRW information, as well as symptom and code based **Guided Troubleshooting**

The screenshot displays the Bobcat My Machine service interface. At the top, the navigation bar includes 'Bobcat SERVICE', 'MY MACHINE', and 'SERVICE LIBRARY'. The main content area shows a machine with serial number B4CD11122 and model S76. Key metrics include 511.5 Operating Hours and 44% Fuel Level. A 'Machine IQ' status bar shows the date 5/25/2021 07:56 AM. To the right, a location is listed as unnamed road, Carver County, Minnesota, US, with a 'View the map' link. A 'Available Software - Latest Version' section for 'Service Analyzer' v.89.06 is shown. On the left, a sidebar menu lists: Dashboard, Manuals, Schematics, Troubleshooting, Diagnostic History, Fault Codes, Field Modifications, Warranty, Safety Instructions, Location History, Machine Options, and Maintenance Schedule. The 'Fault Codes' section indicates 'There are no active fault codes on this asset.' The 'Diagnostic History' section shows 10/21 entries with columns for Status, Title, Date, Description, and Origin.

# Machine IQ data

- If the machine is equipped with telematics and assigned to your dealer/enterprise, you now have telematics data to assist with diagnosis.

Machine specific information

B4CD11122  
S76



Machine IQ

5/25/2021 07:56 AM

511.5  
Operating Hours

44%  
Fuel Level

Location  
unnamed road  
Carver County  
Minnesota  
US  
[View the map](#)

 V2 Bobcat Engine Analyzer  
ECU v.0.0.54

Available Software - Latest Version

 Service Analyzer  
v.89.06

Search Guided Troubleshooting



Error symptom or fault code

Active fault codes displayed here, with option to view all fault codes ever logged

Fault Codes

[View All +](#)

Active Fault Codes



There are no active fault codes on this asset.

Field Modifications

[View](#)

PENDING A 02R316 Expires on 4/29/2023  
Engine Oil Level Monitoring

# Manuals and Schematics One Click Away

No more searching for correct schematic or manual in a different system; serial-based schematics and manuals provided

Change Serial number:

B4CD11122 - S76

- Dashboard
- Manuals
- Schematics
- Troubleshooting
- Diagnostic History
- Fault Codes
- Field Modifications

## Schematics

### Electric

Wiring Schematic



Options



### Hydraulic

Standard Control with Options



Standard Control



Selectable Joystick Control



Selectable Joystick Control with Options



## Change Serial number:

B4CD11122 - S76

### Dashboard

### Manuals

### Schematics

### Troubleshooting

### Diagnostic History

## Manuals

### Operation & Maintenance Manual

S/N B4CD11001 - B4CD99999

English



S/N B4CD11001 - B4CD99999

Español



S/N B4CD11001 - B4CD99999

Français



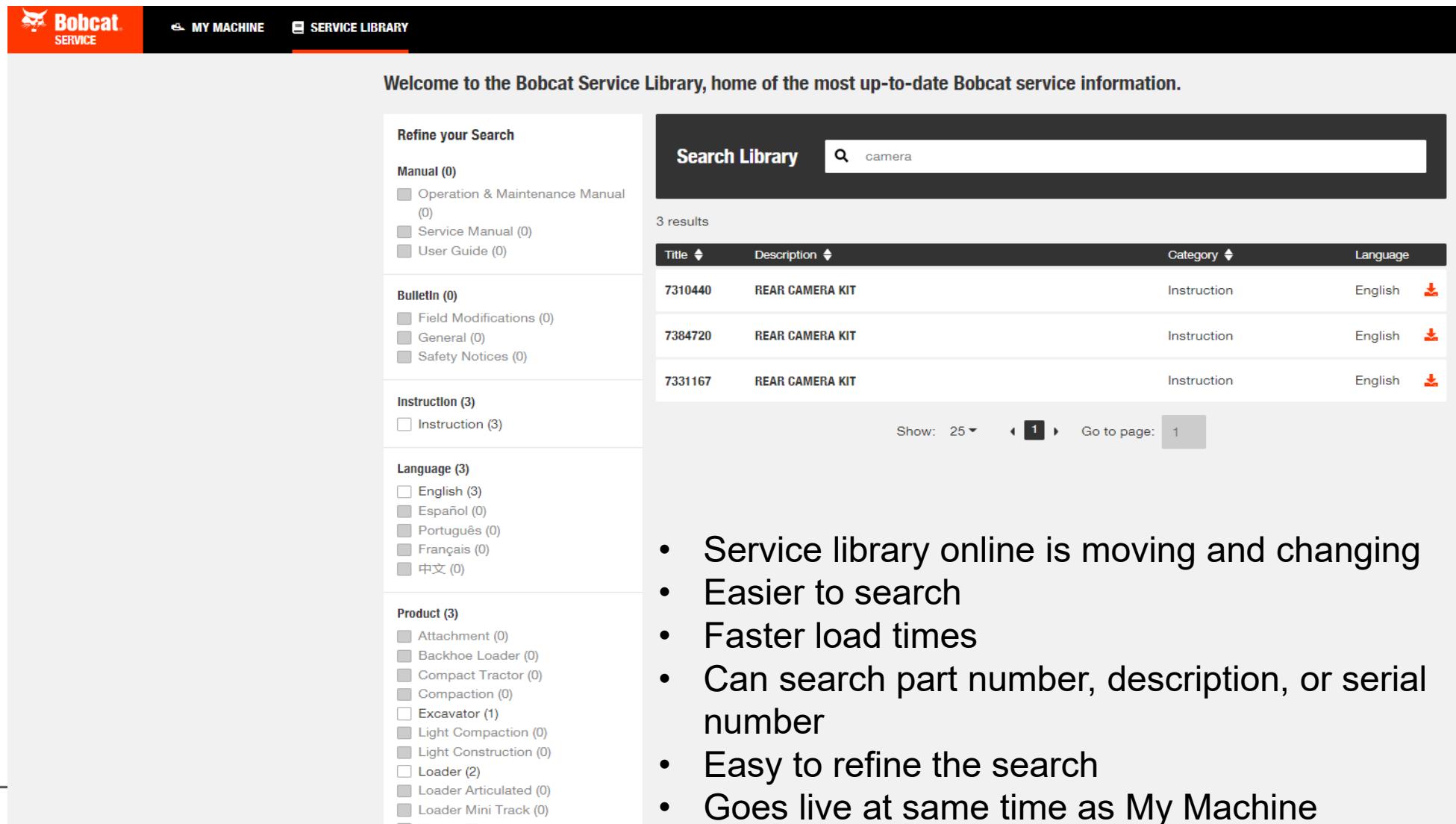
### Service Manual

S/N B4CD11001 - B4CD99999

English



# The New Service Library



Welcome to the Bobcat Service Library, home of the most up-to-date Bobcat service information.

Refine your Search

Manual (0)

- Operation & Maintenance Manual (0)
- Service Manual (0)
- User Guide (0)

Bulletin (0)

- Field Modifications (0)
- General (0)
- Safety Notices (0)

Instruction (3)

- Instruction (3)

Language (3)

- English (3)
- Español (0)
- Português (0)
- Français (0)
- 中文 (0)

Product (3)

- Attachment (0)
- Backhoe Loader (0)
- Compact Tractor (0)
- Compaction (0)
- Excavator (1)
- Light Compaction (0)
- Light Construction (0)
- Loader (2)
- Loader Articulated (0)
- Loader Mini Track (0)
- Machine (0)

Search Library  Search

3 results

Title	Description	Category	Language
7310440	REAR CAMERA KIT	Instruction	English <span>Download</span>
7384720	REAR CAMERA KIT	Instruction	English <span>Download</span>
7331167	REAR CAMERA KIT	Instruction	English <span>Download</span>

Show: 25 ▾ 1 Go to page: 1

- Service library online is moving and changing
- Easier to search
- Faster load times
- Can search part number, description, or serial number
- Easy to refine the search
- Goes live at same time as My Machine

# IRW Information At Your Fingertips

Current warranty coverage and pending/completed Field Mods supplied

Change Serial number:

- Dashboard
- Manuals
- Schematics
- Troubleshooting
- Diagnostic History
- Fault Codes
- Field Modifications
- Warranty**

## Warranty

Status	Plan Description	Type	Start date	End date	Hours
ACTIVE	Standard - 60Months - 3000Hours - Emissions	Standard	10/29/2020	10/28/2025	3000
ACTIVE	Standard - 24Months - Unlimited Hours - Battery	Standard	10/29/2020	10/28/2022	99999
ACTIVE	Standard - 24Months - 2000Hours - Full	Standard	10/29/2020	10/28/2022	2000

Current coverage and start/end date provided

Error symptom or fault code

View All +

## Field Modifications

View All +

PENDING A 02R316 Expires on 4/29/2023  
Engine Oil Level Monitoring

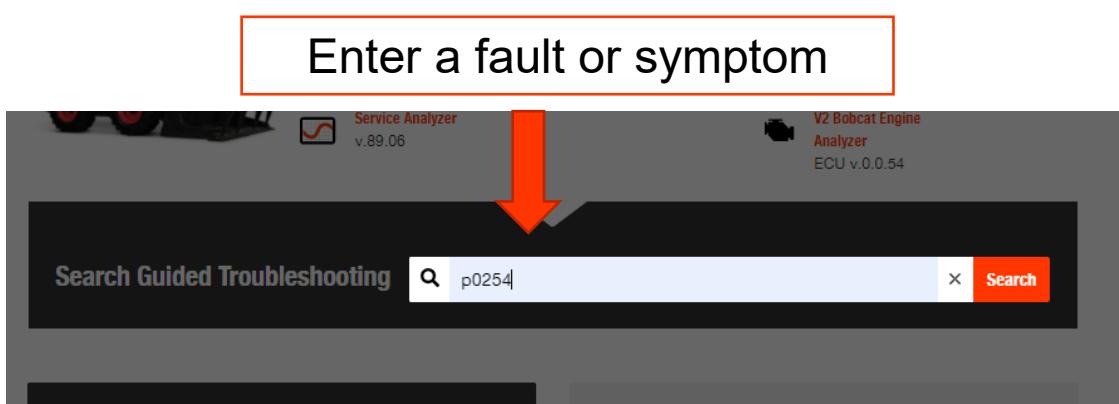


View all pending or completed Field Mods

# What is Guided Troubleshooting?

- Currently we provide a diagnostic “tree” in BATS that tells different tests to run, maybe leading to a solution
  - No information on how to perform the tests or specifications are provided
  - No visuals showing what is a good vs. bad test
  - Only provided code-based diagnosis
  - Doesn’t link to any other information on the failure
- With guided troubleshooting we are able to provide technicians with all the information they need to diagnose a machine properly
- We can now provide symptom-based diagnosis, as well as link all related material into a single, guided troubleshooting experience.

# Guided Troubleshooting



Enter a fault or symptom

One Tough Animal.

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**Troubleshooting**

Rank

**P0002 and P0254 - Fuel Restriction or Sucking Air**

A low pressure fuel system restriction and/or an air leak can cause Bobcat engines to be hard to start and set codes P0002 (E000157-21/E0015711) and/or P0254 (E001076-16) for rail pressure

**P0002 (E000157-21)**

Code: P0002: ( E000157-21 )Rail Pressure Control Fault (IMV only)

Description: If the resistance of IMV is out of the threshold during restricted condition, fault code is raised within 1 second.

**Note:** CE lamp Flashing

**Note:** Torque Reduction Lv1

Components:

- Connector Pin-Out
- Component Location

Possible Cause:

- Faulty IMV (sticking, leaking etc)
- Faulty Injector
- LPC(Low pressure circuit)problem.
- (leakage, fuel is not supplied due to some reason.)
- HPC(High pressure circuit)problem.(leakage etc)
- Faulty rail pressure sensor. (Aged or malfunction)

Conditions for Code:

- During engine running

Conditions for Clearing Code:

- If the resistance of IMV is within the threshold during restricted condition, fault code is cleared within 1 second.

**P0254 (E001076-16)**

Code: P0254: ( E001076-16 )IMV Current Trim Drift Low Fault (High Condition)

# Guided Troubleshooting

Serial: B4CD11122  
Product: SSL S76

Fault Overview

Diagnostic Session for P0002

PAUSE SESSION FINISH SESSION

Perform IMV Valve Test

Details

Current DTC List

P0002 Fuel Rail Pressure Fault • Active

What test do I perform?

Related Information (graphs, pictures, etc)

Possible causes listed in order of most likely to least

How do I perform the test? (See next slide)

5 Possible Causes Suggested

- 1 FAULTY IMV
- 2 HP PUMP
- 3 FAULTY INJECTOR(S)
- 4 HP FUEL SYSTEM REPLACEMENT REQUIRED
- 5 ESCALATE CONCERN

NEXT QUESTION Feedback

Diagnostic Test History

- Session Start
- Install a clear line between the fuel filter and HP pump and run the machine. Do you observe air bubbles in the clear fuel line?  
No

# Just in Time Training- The Details Tab

We can now teach technicians how to perform the requested test right in the guide

More Information

IMV Valve Test Engine D18 / D24 / D34

Purpose: to determine the performance capability of IMV Valve

Test Logic:  
- Increasing amp of IMV Valve from 100mA to 500mA over a 14 second span and repeat

Test Conditions  
- Engine: Stop  
- Ignition Key: Key On  
- Parking Brake: Parking  
- Fuel Temp: 10 ~ 75 degC

Procedure:

1. Go to Input/Output Tests in Bobcat Engine Analyzer
2. Select "IMV Valve Test"
3. Click "Show Graph"
4. Click "Auto Start"
5. Test in progress
6. Test Finished
7. Review graph to look for signs that the IMV is not following demand well.  
1. Note that the min/max values of the IMV demand and actual might not be the same resulting in a different scale on the graph for each value. This can be changed by double clicking in the table on the graph window.

**Theory of Operation,  
Description of Test, and  
Operating Conditions Provided**

**How its Done**

**CLOSE**

**NEXT QUESTION**

# Changing Troubleshooting Cases

- Escalate an issue to a case if a solution is not found or incorrect solution provided
- Automatically redirects you to case system, filling in the serial number, diagnostic guide used, and linking your session summary(*see next slide*)
- ECU, DCU, and Service logs no longer required on connected machines unless requested
- **Only way** to submit a case going forward

**Diagnostic Session for P0002** i Related Content

✓ Solution

Escalate Concern

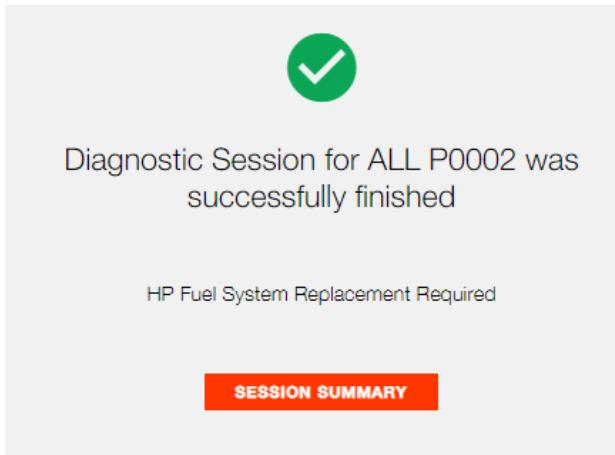
You have reached the end of this guide. If your issue was resolved, please select "Finish Session" below.

If further assistance is needed, please escalate the concern as needed via the option below.

**FINISH SESSION** **CREATE SERVICE TROUBLESHOOTING CASE**

# Getting Techs and Troubleshooters on the Same Page

- When a session is finished or escalated, a session summary is created.
- This information tells the troubleshooter exactly what tests have been done and the outcome
- Troubleshooter is now able to “hit the ground running” with the tech, working from the guide to provide the next steps
  - No more trying to get on the same page for first couple comments
- This session can be saved/downloaded and attached to a warranty claim
  - Helps to tell the story of what was done and why a component was replaced



## Vehicle Session Summary

Case Number: 60ad09d1ac680730ac5c168a  
User: apiuser  
Status: Closed New Solution on May 25, 2021 11:17 AM  
VIN: B4CD11122  
Make: SSL  
Model: S76  
Year:

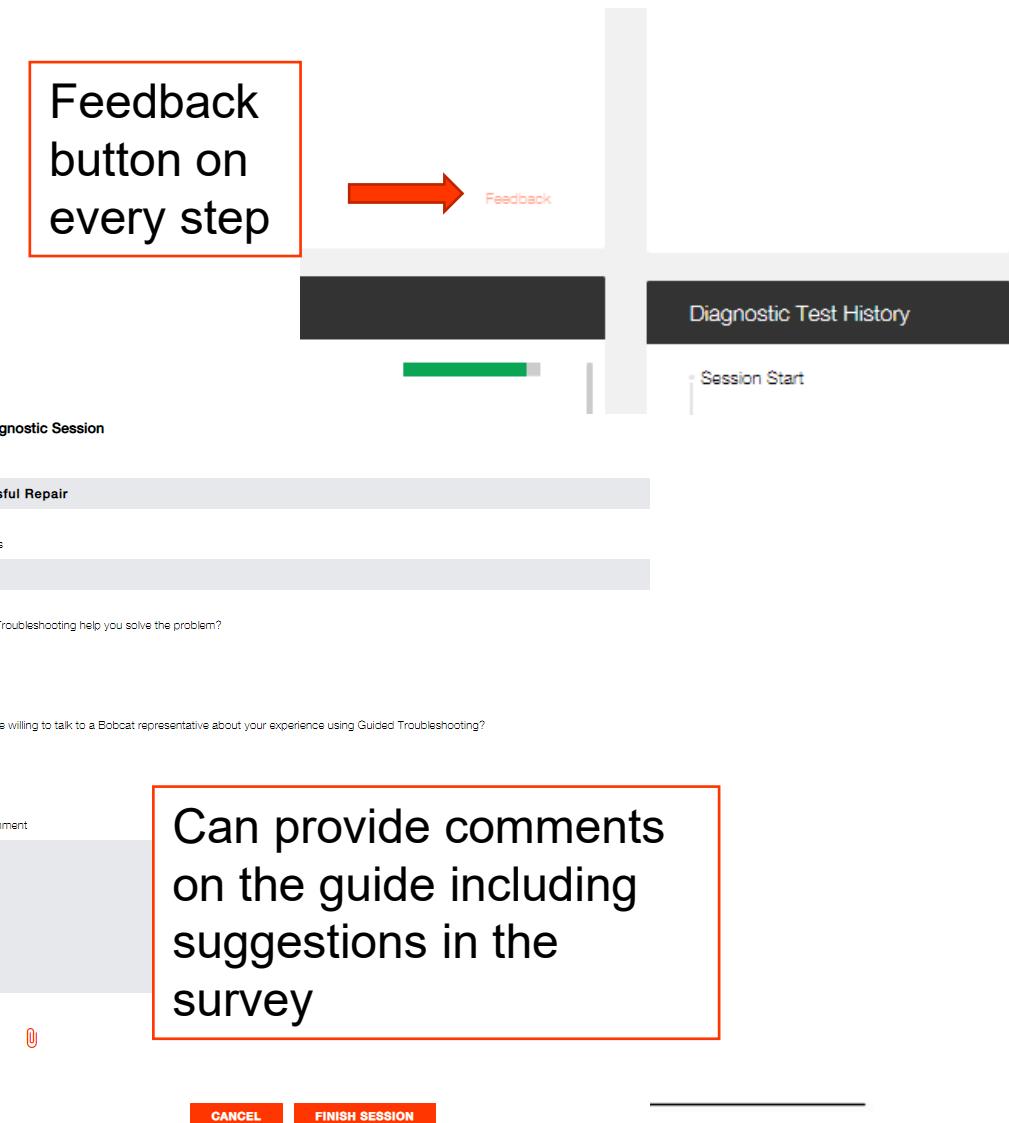
Engine Code:  
Engine Description:  
Odometer:  
Session Start: May 25, 2021 10:29 AM  
Session End: May 25, 2021 11:17 AM  
Total Session Time: 48 minutes  
Session State: new-solution

## Diagnostic Session History

00:00:00	Vehicle Session Started
00:00:00	Diagnostic Session Started
	Selected DTC ALL-P0002 Active
Question	Install a clear line between the fuel filter and HP pump and run the machine Do you observe air bubbles in the clear fuel line?
Answer	No
Solution	Escalate Concern
Question	Install a clear line between the fuel filter and HP pump and run the machine Do you observe air bubbles in the clear fuel line?
Answer	No
Question	Perform IMV Valve Test Perform the IMV Valve Test in Bobcat Engine Analyzer under the 'Input/Output Test' menu. See attached instructions. Does the IMV feedback follow demand?
Answer	Yes
	Perform a Injector Dynamic Test (V1 Engine Only) When performing this test do the following: This test MUST be performed with Bobcat Engine Analyzer. 1/8 in. clear line needs to be connected to the fuel returns on each injector and leading to containers to catch and measure the fuel that has backleaked for

# Continually Changing Content

- We now have a team that's primary function is content creation and improving diagnostic guides
- Multiple ways for dealers to provide feedback
  - This information taken and quickly incorporated into guides
- As trends in repairs develop, the guides will be adjusted to get to the correct solution quicker
- BATS content was imported to get us off the ground. Currently only about 150 "enhanced" guides exist.
  - We will be building content based on most used/searched faults and KBA's
  - BATS system will be discontinued with implementation of this system



The screenshot shows a diagnostic software interface with a feedback survey. At the top, there is a 'Feedback' button with a red arrow pointing to it. The survey includes fields for 'Session Start' (with a progress bar), 'Successful Repair', 'Engine Hours', and 'Did Guided Troubleshooting help you solve the problem?' with 'Yes' and 'No' radio buttons. It also asks 'Would you be willing to talk to a Bobcat representative about your experience using Guided Troubleshooting?' with 'Yes' and 'No' radio buttons. A 'General Comment' field is present, and an 'Attachments' section shows a red '0' indicating no attachments. At the bottom, there are 'CANCEL' and 'FINISH SESSION' buttons.

Feedback button on every step

Session Start

Diagnostic Test History

Finish Diagnostic Session

Select State

Successful Repair

Engine Hours

Did Guided Troubleshooting help you solve the problem?

Yes

No

Would you be willing to talk to a Bobcat representative about your experience using Guided Troubleshooting?

Yes

No

General Comment

Attachments 0

CANCEL FINISH SESSION

Can provide comments on the guide including suggestions in the survey

# Thank You!

