AG-FLOW Automatic Flow Control System

Manual

Part No: AAP800-806   REV: A
NOTES

The software and hardware described in this manual is furnished under the license and may only be used or copied in accordance with the terms of the license.

Copyright © AG-NAV Inc. 2012
Revision: 1.0
Release date: April 2012

All rights are reserved. No part of this publication or the components it describes may be reproduced, stored in a retrieval system or transmitted, in any form, or by any means, electronic, mechanical, photo-copying, recording, or otherwise, without prior written consent from AG-NAV Inc.

AG-NAV Inc. provides this manual “as is”, without warranty of any kind and reserves the right to make improvements and/or changes to the product described in this manual at any time and without notice.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES. To the maximum extent permitted by applicable law, in no event shall the company or its suppliers be liable for any damages whatsoever (including without limitation, direct or indirect damages for personal injury, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of this product, even if the company has been advised of the possibility of such damages. In any case, the company’s and its suppliers’ entire liability shall be limited to the amount actually paid by the owner of the product for the product. Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to the user.

TRADEMARKS

- AG-NAV® or AGNAV is a registered trademark of AG-NAV Inc.
- Guía or Guía™ is a registered trademark of AG-NAV Inc.
- Ag-Nav Ag-Flow is a pending trademark of AG-NAV Inc.
- Automatic Target flow is a pending trademark of AG-NAV Inc.
- All other brand names are trademarks of their respective holders
CONTACT INFORMATION

Contact the AG-NAV Technical Support Line at:

Toll Free for Canada and the United States Telephone: 1-800-99 AGNAV (24628)

AG-NAV Inc.
Telephone: 1-705-734-0909 or 647-236-3477 (after hours) or 416-434-1166 (after hours)
Fax: 1-705-735-0880
E-mail: general@agnav.com
Website: www.agnav.com

In the event of a problem that can not be resolved using the information supplied, please contact AG-NAV. You can also gain assistance through the User’s Area on our web page at www.agnav.com.

For further assistance, contact the AG-NAV Technical Support Line by telephone, fax, or e-mail. AGNAV Customer Support personnel will discuss your situation, determine the cause of problem and provide the appropriate technical assistance.
Table of Contents

1. Getting Started
   1.1 About the Ag-Flow controller system 5
   1.2 Parts List 5
   1.3 Before Installation 6
   1.4 Installation Plan 6
   1.5 Tools required 6

2. Installing the Ag-Flow Components
   2.1 Determining the Ag-Flow Valve Assembly Orientation 7-8
   2.2 Valve/Turbine Installation Considerations 8-9
   2.3 Installing the Ag-Flow Valve Assembly 9-10
   2.4 Installing the Turbine/Sensor Assembly 11-12
   2.5 Checking the Turbine Installation 12-13
   2.6 Installing the Turbine Sensor 13-14
   2.7 Installing the Control Box 14-15
   2.8 Fastening the Control Box 16
   2.9 Installing the 3-Way Run/Off/Dump Switch 16
   2.10 Function of the 3 Position Run/Off/Dump switch 16-17
   2.11 Connecting the Wiring Harness 17
   2.12 Final Installation Checklist 18

3. Setting up the Guia and Ag-Flow Controller
   3.1 Guia and Ag-Flow Operation 19
   3.2 Guia and Ag-Flow Communication Interface 19
   3.3 Flow Controller Settings 19-22

4. Ag-Flow Controller Test
   4.1 Ag-Flow Testing Procedure 22-25
   4.2 Ag-Flow Calibration Procedures 26

5. Data Display
   5.1 Guia/Ag-flow Information Display 27-29

6. Maintenance
   6.1 Checking and Cleaning the Turbine Assembly 30
   6.2 Checking the Ball Valve 30

7. Troubleshooting Guide 31
1. Getting Started

1.1 About the Ag-Nav Ag-Flow controller system

The Ag-Flow Automatic Flow Control System is the next step to integrate today’s advanced technology into the world of aerial application. The Ag-Flow is designed to provide an even and accurate application over a vast range of application rates, eliminating the need to manually adjust your spray system’s output. The operator can effortlessly enter the desired application rate in the Guia navigation console, pre-generate job files with a set application rate using our NavView/SprayView software, or easily change the application rate on the fly. The Ag-Flow also supports variable rate prescription files.

1.2 Parts List

Before Installation, please check that all components are included in the package (shown below).

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Quantity</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag-Flow valve assembly kit</td>
<td>1</td>
<td>AAP800-806</td>
</tr>
<tr>
<td>Ag-Flow Controller box</td>
<td>1</td>
<td>AAP180-D</td>
</tr>
<tr>
<td>All components below are part of the Ag-Flow valve assembly kit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Way ball valve housing (Stainless steel)</td>
<td>1</td>
<td>MO0915-919</td>
</tr>
<tr>
<td>Flow controller actuator</td>
<td>1</td>
<td>MO0920</td>
</tr>
<tr>
<td>Flow meter turbine assembly (1 turbine per system)</td>
<td>1</td>
<td>MO0912 / MO0921 / MO0903 / MO0913</td>
</tr>
<tr>
<td>Flow meter sensor</td>
<td>1</td>
<td>MO0902</td>
</tr>
<tr>
<td>Actuator bracket</td>
<td>1</td>
<td>MO0922</td>
</tr>
<tr>
<td>Actuator bolt 1/4-20 X 1/2 hex flange</td>
<td>7</td>
<td>MO0923</td>
</tr>
<tr>
<td>Actuator nut 1/4-20 coated</td>
<td>3</td>
<td>MO0924</td>
</tr>
<tr>
<td>Ag-Flow controller harness</td>
<td>1</td>
<td>CA0120-A-CONN</td>
</tr>
<tr>
<td>Installation Guide</td>
<td>1</td>
<td>Ag-Flow Installation CD</td>
</tr>
</tbody>
</table>
1.3 Before Installation

Before you begin installation, please make sure to carefully read the installation instructions. If any questions arise, please contact Ag-Nav customer support. Contact information is located on page 3 of this manual.

1.4 Installation Plan

- Select optimal mounting locations
- Install components
- Double check hose clamp connections
- Connect wiring
- Test

1.5 Tools Required

- Hacksaw
- Measuring tape
- Drill with 3/16” and ½” drill bit
- Stainless steel hose clamps x 4
- Wrench or ratchet set
- Stainless support bar or strap (recommended to support valve assembly)
- Black permanent marker
2. Installing the Ag-Flow Components

2.1 Determining the Ag-Flow Valve Assembly Orientation

When considering the orientation for the Ag-Flow housing, please refer to the system diagram below (see Figure 1.0.1).

Please note that the Ag-Flow housing also has flow direction arrows to determine the orientation of the valve (see Figure 1.0.2).

![System diagram](image_url)

**Figure 1.0.1**
System diagram
2.1 Determining the Ag-Flow Valve Assembly Orientation (cont’d)

![Ag-Flow Valve Assembly](image)

**Figure 1.0.2**
Flow direction arrows

2.2 Valve/Turbine Flow Meter Installation Considerations

When selecting a suitable location to install the Valve/Turbine flow meter assembly, it is important to take the following into consideration:

- Leaving a distance of $10 \times \text{(Pipe diameter)}$ between the main On/Off valve and any elbows is a basic principle to follow.

Example = If you are using our 2 inch Ag-Flow valve, you will need to install the valve assembly so that there is 20 inches between the flow meter face and the main On/Off valve or any elbows (see Figure 1.0.3).
2.2 Valve/Turbine Flow Meter Installation Considerations (cont’d)

** Not following this recommendation can cause flow profile distortion and degrade measurement accuracy. Flow-profile distortion and swirl are the two most prominent types of fluid disturbance that affect a meter’s flow coefficients and are typically the result of improper piping configuration.

2.3 Installing the Ag-Flow Valve Assembly

- Using a hacksaw; cut out a section of your spray system’s pipe to accommodate for the Ag-Flow valve.
- Insert the Ag-Flow housing and install 2 stainless steel hose clamps on each flanged end of the Ag-Flow housing.
- In some cases an extra brace may need to be fabricated to support the weight of the Ag-Flow valve.

Please refer to the following images for an example of a recommended location for the Ag-Flow valve assembly on a fixed wing type aircraft (see Figure 1.0.4) and a helicopter (see Figure 1.0.5).
2.3 Installing the Ag-Flow Valve Assembly (cont’d)

Figure 1.0.4
Fixed wing type aircraft - valve installation example

Figure 1.0.5
Helicopter - valve installation example
2.4 Installing the Turbine/Sensor Assembly

When installing the flow turbine, please ensure that the orientation of the flow turbine is correct. Flow direction arrows are located on the bottom of the turbine (see Figure 1.0.6).

![Figure 1.0.6](Image)

Flow direction arrows

- Insert the flow turbine into the threaded turbine well of the valve assembly (see Figure 1.0.7).

![Figure 1.0.7](Image)

Inserting the flow turbine
2.4 Installing the Flow Turbine/Sensor Assembly (cont’d)

- Tighten turbine in a clockwise direction using your hand only (see Figure 1.0.8).

*** Do not use any tools to tighten the turbine. Over tightening may damage the turbine ***

![Figure 1.0.8](image1.png)

**Figure 1.0.8**
Tightening turbine

2.5 Checking the Turbine Installation

Once the turbine is installed correctly it should look like the following image (see Figure 1.0.9). Notice that the turbine blades are fully seated in the sensor well. The turbine blades should spin freely in this position.

![Figure 1.0.9](image2.png)

**Figure 1.0.9**
Correct turbine installation
2.5 Checking the Turbine Installation (cont’d)

If the turbine is installed incorrectly it may look like the following image (see Figure 1.1.0).

Notice that the turbine is not seated at the bottom of the sensor well. The system will not operate correctly when the turbine is in this position and may also leak under any pressure. This problem may be caused by inserting the turbine in the wrong direction, not tightening the turbine enough, or cross threading the turbine.

![Incorrect turbine installation](image1)

**Figure 1.1.0**
Incorrect turbine installation

2.6 Installing the Turbine Sensor

Please ensure that the magnetic sensor pick-up point is free from any metal filings (see Figure 1.1.1).

![Turbine sensor magnetic pick-up point](image2)

**Figure 1.1.1**
Turbine sensor magnetic pick-up point
2.6 Installing the Turbine Sensor (cont’d)

When removing the sensor during maintenance, store the sensor in a zip lock bag or sealed container. This sensor is magnetized and is susceptible to attracting foreign metal objects if not stored in a clean area.

Insert the sensor into the threaded hole of the turbine and tighten the sensor using in a clockwise direction (see Figure 1.1.2).

*** Do not use any tools to tighten the sensor. Over tightening may damage the sensor ***

![Figure 1.1.2](image)

Installed turbine sensor

2.7 Installing the Control Box

When locating an optimal area to mount the controller box, the following recommendations must be considered:

1. Install inside the aircraft.
2. Install in an area free of high moisture levels.
3. Install away from major heat sources such as an engine or exhaust manifold.
4. Use all 4 mounting screws.
5. Tie wires to airframe to avoid wires from rubbing on any sharp metal edges.
6. Install wires away from any moving mechanical parts.
7. Connect both power wires (2 pairs) to a dedicated 10A circuit breaker. Refer to Figure 1.1.6 for wiring diagram.
2.7 Installing the Control Box (cont’d)

Please refer to the following examples for a suitable location of the controller box mounted in either a fixed wing type aircraft or a helicopter. (See Figure 1.1.3 for fixed wing, Figure 1.1.4 for helicopter)

**Figure 1.1.3**
Fixed wing- example installation of the controller box

**Figure 1.1.4**
Helicopter - example installation of the controller box
2.8 Fastening the Control Box

1. Using the control box for a mounting template, mark the 4 mounting holes on the aircraft mounting surface with a black permanent marker or other marking device.
2. Using a 3/16” drill bit, drill the 4 mounting holes.
3. Fasten the control box using 8-32 x ½” stainless steel bolts and #8 stainless steel lock nuts. (All 4 fasteners should be used to support the control box.)

2.9 Installing the 3-Way Run/Off/Dump Switch

Using the mechanical specification diagram as reference, locate a suitable area to mount the Run/Dump switch. This switch should be mounted in the aircraft cockpit front panel for easy access. Before installing, the following should be considered:

1. Locate suitable area to mount the switch.
2. Drill hole using ½” drill bit in accordance with specifications in Figure 1.1.5.
3. Install 3-way switch.
4. Label the panel with the following modes: Run/Off/Dump.

---

**Figure 1.1.5**
Run/Off/Dump switch panel cut out dimensions

2.10 Function of the 3 Position Run/Off/Dump Switch

The 3-way switch functions are as follows:

- **RUN** - The “RUN” position will enable the Ag-Flow operational. This switch must stay in this position while using the controller during flight, testing, or during calibration.
- **OFF** - The “OFF” position will disable the Ag-Flow.
- **DUMP** - The “DUMP” position will bypass the controller commands and apply power directly to the valve motor. This will set the ball valve to the fully open position and allow full flow through the Ag-Flow system.
2.11 Connecting the Wiring Harness

Please refer back to the system diagram (see Figure 1.0.1) for an overview on the system’s connections. For a more detailed pin-out of the cable harness, please refer to Figure 1.1.6 below.

![Ag-Flow cable harness diagram](image)

**Figure 1.1.6**
Ag-Flow cable harness diagram

All connections are clearly labeled and are keyed to prevent the wrong connection from occurring. Make sure the aircraft main power is off when making any of the following connections.

***Use a dedicated 10 Amp breaker for the Ag-Flow system***

1. Attach the connector from the cable harness labeled “To valve motor” to the valve motor.
2. Attach the connector from the cable harness labeled “To flow meter” to the flow meter.
3. Attach the connector from the cable harness labeled “To Ag-Nav com3/com4” to the Guia com3/com4 connector.
4. Connect the wires from the cable harness labeled “Power-In 12-28V” to the dedicated 10A breaker. Please note that there are 2 wires that need to be connected. One wire connects directly to the Run/Off/Dump switch and the other connects directly to the control box.
5. Connect wires labeled ground directly to the GND bus or directly to the battery ground. Do not use the airframe as ground.
2.12 Final Installation Check

- Double check all hose-connections going to the Ag-Flow valve and ensure that all of the hose clamps are properly tightened.
- Tie up all loose wires and secure to airframe.
- Label switch functions on aircraft front panel.
- Label the dedicated 10A circuit breaker.

Once these checks have been completed, the system is ready for configuration and testing.
3. Setting up the Guia and Ag-Flow controller

3.1 Guia and Ag-Flow Operation

To improve the effectiveness and accuracy of your application, a Guia can be accompanied by an Ag-Nav flow controller. While the Guia system provides the pilot with accurate guidance, the Ag-Nav flow controller regulates and provides calculated and even application on the treated areas. During the flight, the Guia will constantly calculate the flow rate based on the target application rate and speed of aircraft. This information will then be sent to the flow controller. The controller has a continuous read of the chemical flow from a flow sensor, adjusts the flow valve to meet the target flow rate, and returns the actual flow rate to the Guia. The Guia displays flow data on screen and records the data for spray analysis.

3.2 Guia – Flow Controller Interface

Guia communicates with the Ag-Flow controller via comport 4. The settings must be 9600 baud rate, 8 data bits, no parity and 1 stop bit.

3.3 Flow Controller Settings

For utmost performance of the flow control system, the Guia must “know” that the Ag-Nav flow controller is present.

This is done by selecting “Application” from the Main Menu. (See Figure 1.1.7)

![Guia Main Menu](image)

Figure 1.1.7
Guia Main Menu
3.3 Flow Controller Settings (cont’d)
When the Application is initiated, select, “Settings” → “Flow Controller”. The editor for flow controller settings will open. Select Ag-Nav flow controller if you are using the Ag-Flow system (see figure 1.1.8).

![Flow Controller settings](image)

The Flow Controller settings include:

- **Comport**: The value selected, must be 4. This comport is used to interface with the Ag-Nav flow controller.

- **Baud rate**: The value must be 9600. This is the data communication rate.

- **Flow controller**: Type of flow controller. The entry must be “AG-NAV”.

- **Flow lead time**: Time in advance you want the Guia to send the target flow rate to the flow controller. The default is 0.5 seconds. This parameter is more applicable when using variable flow rates. For a single rate, this value is not used.

- **Default Application Rate**: The target rate you to be achieved when using the flow controller. The entry should be in Gallons per Acres (GPA) if US measurement system used or Liters/Ha (LPH) if metric system used.

- **Guia Output Interval**: How often you want the Guia to send commands to the flow controller. The value should be 0.2 seconds.
3.3 Flow Controller Settings (cont’d)

After editing all parameters, select “OK” to save the settings. You should save the current settings to your own/a personal *.ini file. To do this, select “Settings” → “Save Settings” (see Figure 1.1.9).

Figure 1.1.9
Save Settings

Figure 1.2.0
Save new settings

Select the filename or select “NEW_Settings” and enter a new name for your settings.
3.3 Flow Controller Settings (cont’d)

Use the virtual keyboard to enter the filename. The extension “.ini” will be appended to the filename, for example “SCOTT.ini”, so you do not have to enter the file extension. When done, select “OK” to accept the filename.

![Virtual Keyboard]

Figure 1.2.1
Enter Settings filename

To copy this “*.ini” file to a USB key, use the File Manager. After finishing all settings, you must exit to the Main Menu and run “Application” again for the new settings to become effective.

4.0 Ag-Flow Controller Test

After installing the flow controller, you should initiate a test to ensure the communications between the Guia and flow controller are good.

4.1 Ag-Flow Testing Procedure

1. Select the “Run” position of the 3-way switch before powering on the system.
2. Turn on the Guia system and Ag-Flow system.
3. The Ag-Flow system will automatically run a self test on power up. The self test will do the following: fully open the valve, fully close the valve, and complete by opening halfway. By looking at the indicator arrow on top of the motor during the test, you will see the indicator arrow following the position of the ball valve. This quick test will confirm that the ball valve is connected correctly (see figure 1.2.2).
4.1 Ag-Flow Testing Procedure (cont’d)

4. On the Main Menu, select “Test”.

5. Select “Flow Controller” from the “Test” Menu.

6. On the “Flow Control” screen, make sure “Comport 4”, “Baud rate 9600” is set. Use key <IIII> to move the cursor to the button “Connect” and press <Enter> to initiate the communications with the flow controller (see figure 1.2.3).

![Figure 1.2.2](image1)

**Figure 1.2.2**
Valve arrow indicator

![Figure 1.2.3](image2)

**Figure 1.2.3**
Test flow controller
4.1 Ag-Flow Testing Procedure (cont’d)

7. If the communications is OK, the flow controller will once again run the Self Test. Check the motor arrow indicator to confirm that the motor is running and the flow valve is moving. At the end of the self test, the valve should be half open. Following the self test, the Guia will attain setting information from the flow controller and display it on the screen.

In the Flow Controller Test program, you can do other tasks as well.

The following tasks can be selected from the Function:

- **Fully Close Valve**: To fully close the flow valve.

- **Change Unit**: To set the unit (Liters or Gallons) of volume of liquid used for flow controller calibration. The selection is shown in the Unit parameter. After selecting “Change Unit”, move the cursor to the “Unit” parameter and select “Met” for liters or “US” for gallons. Move the cursor to the “Process” button and press <Enter> to activate the change.

- **Change Calibration Volume**: To enter the amount of liquid used for calibration. The volume can be liters or gallons depending on the Unit set above. After selecting “Change Calibration Volume”, move the cursor to the “Values” parameter and enter the amount of liquid you want to use for calibration. Then move the cursor to the “Process” button and press <Enter> to activate the change.
4.1 Ag-Flow Testing Procedure (cont’d)

- **Edit Pulses/Liter**: To change the flow sensor setting. Each flow controller is set with the default or manufacturer’s settings. For the flow sensor, the Pulses/Liter setting indicates how many pulses the flow sensor will generate for each liter of liquid flowing through the pipe. If you find the amount of chemical actually sprayed more than expected, you should reduce the Pulses/Liter value. If the amount of chemical actually sprayed is less than expected, you should increase the Pulses/Liter value. After selecting “Edit Pulses/Liter”, move the cursor to the “Values” parameter and enter the desired value of Pulses/Liter. Then move the cursor to the “Process” button and press <Enter> to activate the change. To permanently update the Pulses/Liter in the flow controller, you must move the cursor to the “Update Pulses/Liter” button and press <Enter>.

Other tasks can be done with buttons:

- **Start Calibration**: To start flow controller calibration
- **Stop Calibration**: To stop flow controller calibration.
- **Update Pulses/Liter**: To send the new Pulses/Liter value to the flow controller to update the flow sensor setting (as discussed above).
- **Fully Open Valve**: To fully open flow valve.
- **Exit**: To close comport and exit the Flow Controller test program.
4.2 Ag-Flow Calibration Procedures

Before you do the calibration, make sure you have set “AG-NAV” for Flow Controller in “Application” → “Settings” → “Flow Controller”. To calibrate the flow controller:

a) Select “Test” → “Flow Controller”.

b) Make sure “Comport 4” and “Baud rate 9600” are shown on screen. Then move the cursor to the “Connect” button to initiate the communication.

c) In the function, select “Change Unit” and enter the correct unit “Met” for liters and “US” for gallons you will use for volume of water used for calibration. Note that you have to select “Process” to activate the change.

d) In the function, select “Change Calibration Volume” and enter the correct amount of water you use for calibration. At least 100 liters or 25 gallons of water should be used. Note that you have to select “Process” to activate the change. Make sure you have this amount of water in the tank. As an example, assuming that we use 100 liters.

e) Move the cursor to the “Fully Open Valve” button and press <Enter>.

f) Move the cursor to the “Start Calibration” button and press <Enter>.

g) Turn your spray system on and pump out the water.

h) Move the cursor to the “Stop Calibration” button, **DO NOT PRESS <ENTER>**.

i) When the full amount of water, i.e. 100 liters as in the example, has flowed through the valve, press <Enter> to stop calibration.

j) Check the new or calculated Pulses/Liter shown on the screen; compare it with the current Pulses/Liter. If you agree with the result, move the cursor to the “Update Pulses/Liter” button and press <Enter>. This will update the sensor setting in the flow controller.

k) If you do not agree with the result or make a mistake, you can refill the tank with water and Start Calibration (step f) again.

When you finish testing and calibrating the flow controller, move the cursor to the “Exit” button and press <Enter> to exit the Flow Controller Test program.
5.0 Data Display

5.1 Guia/Ag-Flow Information Display

When AgNav flow controller is used, the bottom left corner of screen will show “APP” for applied application rate in gallons/acre or liters/ha, and “TAR” for target application rate in the same unit. In normal case, the 2 numbers should match within 1 second.

The data display is on when there is data being transferred from the flow controller. The Data Communication Indicator is flashing when the communication between Guia and flow controller is achieved. If communication cannot be achieved, the indicator shows a solid dot (see figure 1.2.4).

When the Flow Controller Type is "None" in the “Settings” ➔ “Flow Controller”, the dot, “APP” and “TAR” will not appear on the screen.

There are two functions you can select during flight: Change Application Rate and Turn Off flow controller. To select either of these functions, you must assign them to one of the Control Menus of Old Area.
5.1 Guia/Ag-Flow Information Display (cont’d)

Figure 1.2.7
Flow Control Functions

Change Application Rate: During flight, you can change the application rate by using “AppRate”. To do this, press <Enter> until you see the function “AppRate” in the Control Menu. Select this key to open the dialog. Use keys <I> to reduce or <II> to increase the target rate. When the correct target is shown, select “OK” to accept the rate and return to normal display.

Figure 1.2.8
Change Application Rate
5.1 Guia/Ag-Flow Information Display (cont’d)

Note that this rate is used until you exit the Application program. If you want to use this rate in the next flight, you have to change the Application Rate in Settings → Flow Controller.

**Flow Controller Off**: For any reason, if you want to control the flow manually, you can turn off the communications with flow controller by using “FCOff”. To do this, press <Enter> until you see the function “FCOFF” in the Control Menu. Press this key and <Enter> to confirm your decision. Guia will command the flow controller to fully open the valve and then stop sending data to the flow controller.
6.0 Maintenance

6.1 Checking and Cleaning the Turbine Assembly

The Ag-Flow turbine should be cleaned on a regular basis. We recommend cleaning the turbine following each day of spraying to obtain maximum performance, especially when using higher viscosity chemicals. Please follow these steps for maintaining your turbine:

1. Remove the turbine sensor.
2. Remove the turbine assembly.
3. Using low pressure water and a mild soap to clean the turbine.
4. Using very low air pressure (Max 30 PSI) to blow through the turbine blades - the turbine should spin freely.
5. Re-Install the turbine.
6. Re-Install the turbine sensor.

6.2 Checking the Ball Valve

Maintenance should be performed on the ball only if the valve seems to become sluggish or after 3 months of use. Please follow these steps for maintaining your ball valve:

1. Remove the Valve motor wiring.
2. Remove the 3 bolts that fasten the motor to the ball valve bracket.
3. Remove the motor from the valve assembly.
4. Using a large flat head screw driver, turn the ball valve pin back and forth. The ball valve should move with a slight force. Add some lubricating oil to the ball valve and continue to turn the ball valve pin back and forth until the rotation of the pin becomes easier to move.
7.0 Troubleshooting Guide

The purpose of this guide is to provide our customers with some basic troubleshooting guidelines to follow before calling the Ag-Nav support line.

- **No Response from Flow Controller**: Check “Settings” ➔ “Flow Controller”, make sure “comport 4”; “baud rate 9600”, and “Flow Controller AG-NAV” are selected. Run Test to see if data communication is OK. If no data is shown on screen, check cable and check voltage applied to flow controller.

- **Flow Valve Not Working**: If the data communication is OK between Guia and flow controller, but the flow valve or motor is not working, check the voltage supplied to the flow controller and Run/Off/Dump switch. Confirm that the switch is in the “RUN” position.

- **Flow Controller Hunting When Spraying**: Try to reduce the RPM or adjust the pump pressure so that extensive pressure is not applied to the valve when opening the booms. When you reduce the pressure or RPM, the flow controller will open the valve more and it will be easier to adjust the flow this way. This is an exceptional help when the application rate is small.

- **Wrong Target Rate**: When the “TAR” for target rate shown on screen is wrong, check if the correct rate has been entered in “Settings” ➔ “Flow Controller”. Note that the Application Rate in the Pilot Information is not used for flow controller.

- **Intermittent Application rate displayed on screen**: Check sensor wiring. Follow Turbine maintenance instruction in section 6.0 of this manual.

For further help or information, please contact AG-NAV staff at:

Toll Free (Canada & U.S.A. only): 1 (800) 99 AGNAV (24628)

Office: 1-705-734-0909

After Hours Support 1: 1-647-236-3477

After Hours Support 2: 1-416-434-1166

Fax: 1-705-735-0880

Email: general@agnav.com

Mail: AG-NAV Inc.
     30 Churchill Drive
     Barrie, ON
     L4N8Z5, Canada