Synchro™
Quick Reference Guide

orchard.capstanag.com

Make a Profile From a web Device

A computer or mobile device with Internet access can be used to make a profile.

1. Navigate to https://orchard.capstanag.com.

2. Enter information for your machine, refer to Page 3.

3. Name your profile and select **Download Profile** (1).

   - The profile is now downloaded to your device. If you are using a device that is not mobile, move the profile to a mobile device such as a phone, tablet, or laptop or to a virtual location (cloud storage DropBox, Google Drive, or email).

4. The Profile is now ready to transmit.

   NOTE: Once a profile is transmitted to the controller, it cannot be deleted. It must be overwritten by another file of the same name.
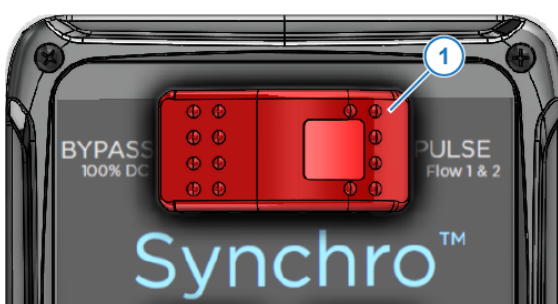
SYNCHRO 209XXXX

192.168.0.1/generate.html

Make a Profile From the Controller Wi-Fi

1. Toggle the red Synchro switch (1) to **PULSE**.

2. Connect your device to the SYNCHRO 209XXXX WI-FI.

   - XXXX = last 4 digits of controller serial number.

   - No password is required.

3. Navigate to 192.168.0.1/generate.html.

4. Enter information for your machine, refer to Page 3.

5. Name your profile and select **Save Profile** (2).

6. The Profile is now ready to transmit (3).

   NOTE: Once a profile is transmitted to the controller, it cannot be deleted. It must be overwritten by another file of the same name.

SYNCHRO 209XXXX

192.168.0.1/transmit.html

Transfer the Profile

1. Toggle the red Synchro switch (1) to **PULSE**.
2. On your device, connect to the **SYNCHRO 209XXXX WI-FI**.

    The **XXXX** shown above will be the last 4 digits of the controller serial number.

    There is no password for this Wi-Fi connection.
3. Open a web browser and go to 192.168.0.1/transmit.html.

    The top line (2) will always show the active profile. This is the profile that will spray when the system is turned on.
4. If a saved profile is being loaded, Proceed to Step 5. If you have created a profile using the internet rather than the controller wifi, click **Choose File** (3) and browse to the location where the profile was saved.

    The selected file name will display on the screen. Proceed to Step 6.
5. To load a profile that was created using the controller wifi, or has already been saved to the controller, click on the drop down menu (4) to select desired profile to transmit.
6. Click **Transmit Profile** (5).

    As the profile is sent to the controller, **Profile transmission started** will show on the screen.

    When the transmission is successful, **Profile transmitted successfully** will display in green (6).

    This profile is now the active profile on the controller, and will stay active until another profile is transmitted to the controller.

    Once transmitted, profile is stored on controller, and available to reload at a later date.

    Note: Once a profile is transmitted to the controller it cannot be deleted. However, a profile can be overwritten by another file with the exact same name.
7. If there is any red text on the screen (7), an error in the transmission communication has occurred.

    Move closer to the controller and click **Transmit Profile** again.
8. Upon completion of the transmission, the machine is ready to spray.

Website Description

Left Side of Screen

Profile Name: Name of the profile for the sprayer

Flow 1 Rate (gpa): The rate of application of product (Flow 1)

Speed (mph): The target speed the machine will be moving when product is applied

Row Spacing (ft): The distance between the rows

Tip Size: Tip size of the nozzles. Tip size is equivalent to the flow in gallons per minute at 40 pounds per square inch multiplied by 10, i.e. a #8 tip will flow 0.8 gpm at 40 psi. Refer to the correct tip chart to find these values.

If a multi-tip vane is used then the tip size value should be set to the sum of tips at each nozzle. i.e. for a splitter with three tips, one #8 and two #3 then the tip size input will be #14. Tip Size equivalent for Disc-Core is GPM@40psi multiplied by 10.

Boom Pressure (psi): The force at the boom at which you want to spray. This pressure setting may differ from the pump pressure. It is the responsibility of the operator to maintain this pressure

Density (lbs/gal): Water is equal to 8.33

Multi Tip Vane: Check this box if the machine uses multiple tip vanes

Multiple Tip Sizes: Check this box if multiple tip sizes are used on the boom. A Tip Size column will display on the right side of the screen.

Show Nozzle Duty Cycle: Check this box and a Duty Cycle column will show on the right side of the screen.

Change Flow Distribution: Check this box to change the flow nozzle by nozzle

Invert Nozzle Order: Check this box to invert the nozzle order. Nozzle #1 on the valve harnesses must be closest to the controller.

Use Flow 2: Check this box to create a Flow 2 profile. A Flow 2 Rate box will display below Flow 1 Rate on the left side of the screen. Columns for Flow 2 will display on the right side of the screen. The column currently being adjusted will be highlighted.

Profile Name:	
Flow 1 Rate (gpa):	100
Speed (mph):	2
Row Spacing (feet):	20
Tip Size: *hover for details*	8
Boom Pressure (psi):	100
Density (lbs/gal):	8.33

- ☐ Multi-Tip Vane
- ☐ Multiple Tip Sizes
- ☑ Show Nozzle Duty Cycle
- ☑ Change Flow Distribution
- ☐ Invert Nozzle Order
- ☐ Use Flow 2

Center of Screen

Visual Representation of the Sprayer: As the information changes on this screen the graphic will change to show how the sprayer will electronically control operation of nozzle valves.

Nozzle color indicates:

   Gray — Nozzle off

   Green — Nozzle on and the settings are within the system parameters

   Red — Not within system parameters and changes must be made for the system to function

Note: The nozzle line length is proportional to the flow. i.e. the longer the line, the greater the flow.

Nozzle Order Numbers: Nozzle 16 will show at the top of the sprayer and Nozzle 1 will be at the bottom. Choose Invert Nozzle Order to make Nozzle 1 show at the top of the sprayer.
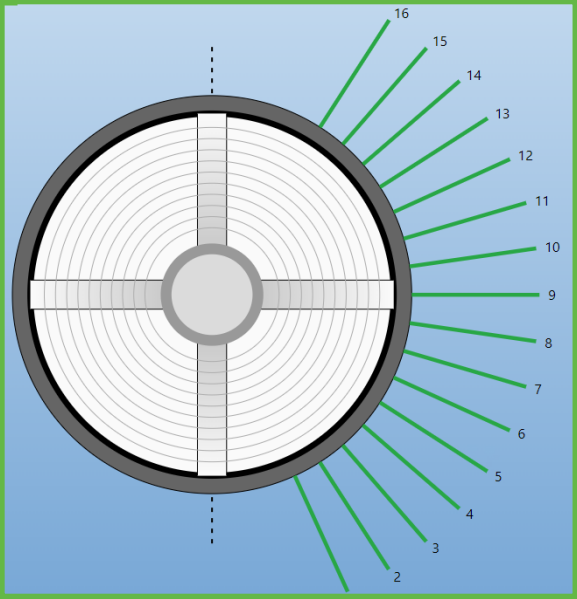
Right Side of Screen

Master Switches: A Nozzle # icon that is green will spray. A Nozzle # icon that is gray is off and will not spray.

Flow Scalar(s): Enter the desired percentage of total flow per nozzle to apply the amount of product as desired for the field and/or crop.

A nozzle error message will show and the visual representation of the nozzle will change to red when the flow is outside of the system parameters.

Adjust the nozzle flow, change the tip size, or change the pressure to remove the error.

Duty Cycle: This is information only. You cannot change the duty cycle values in the location.

Flow 1 ON/OFF	Flow 1	Duty Cycle %
16	6.3	22
15	6.3	22
14	6.3	22
13	6.3	22
12	6.3	22
11	6.3	22
10	6.3	22

Synchro Operation

1. Ready system and machine for operation. Refer to Pages 2—3 to create, edit, and upload spraying profiles.

2. Make sure that the controller **Synchro** switch (1) is set to **PULSE** when ready to spray.

3. Toggle the **L** (left) (2) and **R** (right) (3) boom switches to **ON** to apply product.

   IMPORTANT: If the sprayer pump is on, spraying may commence as soon as boom switches are toggled to **ON**. The left and right side of the sprayer can be operated separately or together.

4. Press and hold **L** and/or **R** switches in **Flow 2** position at the same time or individually to apply with a programmed Flow 2 profile. Release to return to **Flow 1** profile.

5. Operate the sprayer.

6. When spraying is complete, toggle the boom switch(es) **OFF** and the Synchro switch to **BYPASS**.

   IMPORTANT: If any switch left **ON**, the system will still pull a current that can drain the battery.

Bypass Mode

If one or both boom switches are **ON** but the **Synchro** switch is in **BYPASS**, the system will operate with a constant equal flow of product through all nozzles and not use the profile parameters. The sprayer will function as it would without the CapstanAG system. This can be used to flush the system, or can be used to spray conventionally, if needed, during a failure.

Status LED

When the red Synchro switch (1) is toggled to PULSE, the status LED (4) in the bottom left corner of the cab box should flash through a sequence of colors before settling on a solid color.

LED Status		System Condition
Green	Solid	GPS is sending good data
Red	Solid	GPS is disconnected or not sending data
	Blinking	GPS is sending bad data
Blue	Blinking	Travel speed is too fast or too slow for the given flow target. (Only occurs during spraying with Flow 1 or Flow 2 profiles)

Troubleshooting

Coil Testing and Inspection

1. Set multimeter to measure resistance (Ohms Ω).

2. Unplug the coil from the harness and insert the multimeter leads into each side of the 2-pin plug.

   • The specification for a good coil is 10 to 11.5 Ohms Ω.

3. If the coil tests outside of this range it should be replaced.

4. If the valve is not working, but the coil tests good, disassemble and clean the valve assembly.

Item	Description	Part Number		Item	Description	Part Number
1	Coil	625147-011		3	O-ring	715022-204
2	Plunger	716009-111		4	Valve Body	621083-001