Intermediate Web Guide — Closed-Loop Oscillation — SCU5

Quick Start Guide

Controller: SCU5

Scan for
interactive guide

What You'll Achieve

After completing this guide, your web oscillates back and forth around a tracked feature, staying referenced to it as the feature moves.

Estimated time: ~30–60 minutes

What You Need

Closed-Loop Oscillation — SCU5

- [ ] SCU5 web-guide controller (SKU 4-100121)
- [ ] MC QD motor-driver box, ordered for your actuator
- [ ] Linear actuator — your ordered LHS model
- [ ] ODC Family sensor on the feature the web oscillates about, sized for your wander range
- [ ] Quick Disconnect Sensor Cable - 3m (10 ft) (U2-01975)
- [ ] 24 V DC Input Power Cable, Length 5 m (21218-5m)
- [ ] Motor-communication cable (SKU 21223), driver to controller
- [ ] Actuator cable for your ordered LHS model
- [ ] Servo-center proximity sensor (SKU 7-140004)
- [ ] 24 VDC power supply, 5 A minimum

Prerequisites

- [ ] The machine is shut down and locked out per your facility's procedures.
- [ ] A 24 VDC supply (5 A minimum) is available at the install location.
- [ ] Your web material is on the machine, ready to thread through the guide.

[ ] Keep the SCU5 Sensor and Web Guide Controller User Manual within reach (/documentation/manuals/scu5-sensor-and-web-guide-controller-user-manual-v36n) — you'll use it while commissioning.

1. Install the Web Guide

Install the Roll-2-Roll® Web Guide in two stages: first mount and align the web-guide frame on your machine, then mount the sensor for your guiding mode.

Install and Align the Web Guide Frame

- Bolt the frame to the machine through its base-plate holes.
- Mount it so the web travels in the direction of the arrows on the frame — the guide corrects in one direction only, so a backwards frame fights the web instead of steering it.
- Level the frame: set its rollers parallel to the machine idlers and square to web travel, with no tilt to either side. Check it with a machine square, a tram rod, or by measuring from each entry and exit roller to the web-guide roller — whichever you have.

Set the Correction Geometry

Set the geometry for the web guide type you received (your Roll-2-Roll application engineer chose it at purchase).

Displacement guide

- Wrap the web 90 degrees at the entry and exit rollers.
- Make the entry and exit spans each about one-half to one web width (two to three web widths for metal webs).
- Correction happens in the exit span.

Steering guide

- Make the entry span about three to five web widths (ten to twenty for metal webs).
- Wrap the guide roller 45 to 135 degrees.
- Keep the exit span perpendicular to the direction of roller motion.
- Correction happens in the entry span.

Mount the Motor Driver Box

- Mount the MC QD motor-driver box on the machine, close to the web guide and actuator. It has its own enclosure, so it does not need to sit inside another cabinet.
- Keep the box within about 10 m of the actuator — that is the reach of the motor-communication cable (SKU 21223) carrying the RS485 link and 24 V to the driver.

Choose the Sensor Location and Mount the Sensor

- Mount the sensor in the exit span, just after the guide roller — as close to the roller as your machine allows. The sensor must see the corrected web; mounted anywhere else, guiding becomes unstable.
- Clamp the sensor bracket to your extrusion rail in the exit span, but don't fully tighten it yet.
- Set the working distance from the sensor face to the web to 15-25 mm (0.6-1.0 in); aim for 25 mm.
- Keep everything at least 150 mm (6 in) behind the web clear in the sensor's view — the camera-style sensor can otherwise pick up background objects.
- Guiding a shiny, metallic, or clear web? Tilt the sensor a few degrees toward the web so its angled light returns to

the lens, then re-check the working distance.

- Tighten the bracket.
- If the web plane visibly lifts or drops in the exit span when the guide corrects hard (you'll confirm this during commissioning), add a backup roller with minimal wrap just before the sensor to steady the web — then keep the sensor close. Don't move the sensor farther downstream to escape the problem; distance costs you guiding response.

Pre-Power Mechanical Checks

- Do these with the power off, before commissioning. Don't move the web guide by hand at any point.
- Confirm the web travels in the direction of the arrows on the guide.
- Confirm the guide rollers sit parallel in their neutral position.
- Confirm the guide is level, with no tilt.
- Confirm the wrap angle and the entry and exit span lengths match your guide geometry.
- Install the servo-center inductive proximity sensor (SKU 7-140004) per the Servo Center installation document — the controller uses it to find the actuator's home position during commissioning.

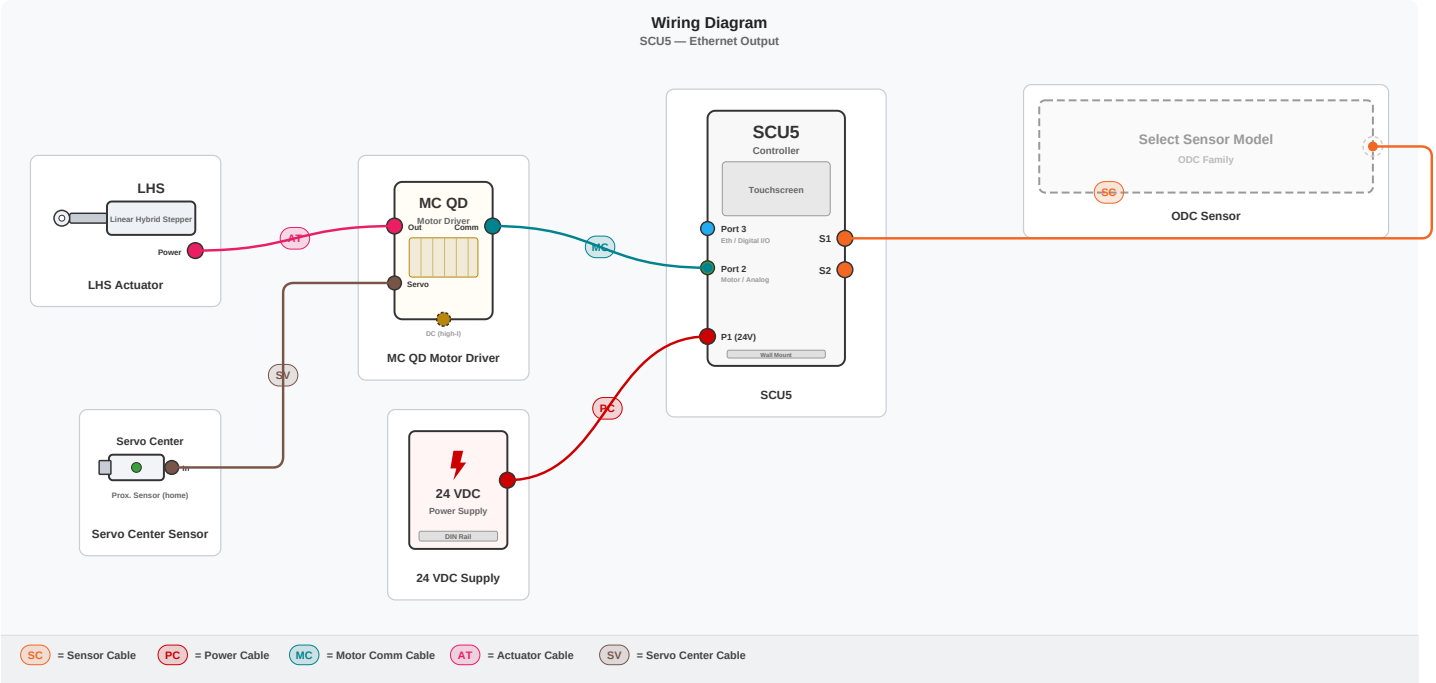
2. Install the Sensor

Install the Sensor — Closed-Loop Oscillation

- Closed-loop oscillation uses one ODC Family sensor on the feature the web oscillates about. Mount it as you would for that base mode — edge guiding for an edge, or contrast/line (with the backup roller) for a contrast feature.

3. Wire the System

Wiring Diagram



4. Configure & Verify

Power up the controller and commission the guide, one checked step at a time.

Closed-Loop Oscillation — Power Up and Commission

Commission closed-loop oscillation — set up guiding first, then oscillate the guide point so the web sweeps about the tracked feature.

1. Power on the controller. If it wakes in Automatic, switch to Manual — every step below runs from Manual.
2. Set up the base guiding first. Set the sensor for your reference — edge sensing for an edge, or contrast sensing plus a taught feature for a line or contrast reference. Set the sensor orientation and check the Web Position Indicator as you would for that mode (dark on the matching side, or a green box on a taught feature). Until the reference is valid, the controller stays interlocked.
3. Check the jog direction. Tap Jog Left, then Jog Right, and watch the guide. It should move the way each button says. If it moves the opposite way, reverse Motor Polarity under Power User ? Actuator ? Motor Polarity, then jog again to confirm.
4. Servo-center the actuator. Tap Servo Center and let the guide travel to its home position (half its stroke each way). If it heads away from home, reverse Servo Center Polarity under Power User ? Actuator ? Servo Center Polarity, then servo-center again.
5. Set the guide point the web should oscillate about. Tap Reset Guide Point to snap it to the feature's current position, or drag the guide-point bar and press Accept.
6. Switch to Automatic and confirm the base guiding holds the web on the guide point and corrects the right way. If it steers away, reverse Error Polarity under Power User ? Controller. Get steady guiding before adding oscillation.
7. Set the oscillation. Turn Oscillation ON, set the type to closed-loop, and set Amplitude as a percent of the sensor range, Speed as a percent of the actuator's top speed, and Dwell as a number of samples.
8. With the guide in Automatic, the guide point now ramps back and forth in a triangle and the web follows it, oscillating about the moving reference. Watch a few cycles and confirm it stays centered on the feature.
9. Prove the safety hold. The lost-feature inhibit still applies while oscillating — pull the reference out of view and confirm the guide holds. When the web oscillates cleanly about the tracked feature, your closed-loop oscillation is commissioned.

5. PLC Integration

Web guiding controllers support remote command via two routes: Industrial Ethernet PLC remote control, and the DIO option (discrete dry-contact inputs). Both allow a PLC or supervisory system to command guide mode and position without manual touchscreen interaction.

- Route 1 — PLC remote control (C(x) models): send auto mode on/off, jog, servo center, and guide-point commands over Industrial Ethernet (EtherNet/IP, PROFINET, EtherCAT)
- Route 2 — DIO option: discrete dry-contact 24 V NPN inputs for hard-wired remote on/off and mode switching — no Industrial Ethernet required; wired directly from PLC digital outputs or relay contacts
- Both routes can coexist — Ethernet for data and fine control, DIO for hard-wired safety/interlock inputs
- Lock on Lost Edge: when the web edge exits the sensor field of view during edge guiding, actuator motion is inhibited — prevents runaway
- Loss of Contrast Inhibit: for line/contrast guiding, actuator motion is inhibited if contrast is lost until the target feature is re-acquired

Note: The register map, EDS file (EtherNet/IP), and Add-on Instruction (AOI) for Studio 5000 are listed under **Your Products** below — grouped on the product card.

Go Further

Related Quick Start Guides

- **Unwind/Rewind Web Guiding** — High-thrust web guiding for shifting roll stands
- **Retrofit an Existing Web Guide** — Upgrade a legacy or competitor web guide system with Roll-2-Roll sensors and controllers
- **Web Width Measurement** — Measure web width alongside or independently of guiding
- **Position Measurement** — Measure edge, centerline, or contrast/line position
- **Splice Detection** — Add splice detection to your web processing line

Need Help?
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