Retrofit an Existing Web Guide — Contrast Guiding — SCU5

Quick Start Guide

Controller: SCU5

Scan for
interactive guide

What You'll Achieve

After completing this guide, your existing guide runs on Roll-2-Roll control tracking a contrast boundary — a coating edge, color change, or stripe — and the new actuator steers the web to follow it the moment it drifts.

Estimated time: ~30–60 minutes

What You Need

Contrast Guiding — SCU5

- [ ] SCU5 web-guide controller (SKU 4-100121)
- [ ] MC QD motor-driver box, matched to your actuator
- [ ] Roll-2-Roll LHS linear actuator, supplied in your kit
- [ ] ODC Family white-light sensor, sized for the wander range of your contrast boundary
- [ ] Quick Disconnect Sensor Cable - 3m (10 ft) (U2-01975)
- [ ] Sensor mounting rail and bracket (SKU 7-020001 for 1 in sensors, SKU 7-020006 for 1.5 in)
- [ ] Backup roller (any roller or dead bar), mounted directly under the sensor
- [ ] 24 V DC Input Power Cable, Length 5 m (21218-5m)
- [ ] Motor-communication cable (SKU 21223), driver to controller
- [ ] Actuator cordset matched to your LHS model (SKU 21224 for LHS-005/020, SKU 21225 for LHS-030)
- [ ] Servo-center proximity sensor (SKU 7-140004)
- [ ] 24 VDC power supply, 5 A minimum (SKU 0-100006)

Prerequisites

- [ ] The machine is shut down and locked out per your facility's procedures.

[ ] Your existing web-guide frame and carriage are structurally sound, and the carriage moves freely through its full travel by hand.

[ ] 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 sensor, controller, and actuator onto your existing web-guide structure — reuse the mechanical carriage, replace the controls.

> **DANGER:** Match the actuator mount to your existing structure — Identify whether your existing carriage uses a fixed (-RF) or floating (-TG) mount before ordering or installing the actuator. Fixed structures take an LHS-RF actuator; floating structures take an LHS-TG, BLA, or RLA sized to the load. Installing a fixed-mount actuator on a floating structure — or a floating-mount actuator on a fixed structure — will damage the actuator.

Confirm the Existing Web-Guide Frame

- Confirm the frame is still solidly bolted to the machine through its base-plate holes, with no loose or missing fasteners.
- Confirm the web travels in the direction of the arrows on the frame. The guide corrects in one direction only, so a frame turned around during its service life fights the web instead of steering it.
- Confirm the frame is level — 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 guide roller.
- Rock the moving carriage by hand and feel for play in the guide bearings. Slop or a notchy, catching feel means worn bearings — plan to clean or replace them before you fit the new actuator.

Evaluate and Remove the Old Actuator

- Before you disturb anything, sketch or photograph how the old actuator attaches at both ends — to the machine frame at one end, the moving carriage at the other. Record the orientation, the pivot or bolt pattern, and the fastener sizes; you'll match the new actuator to this geometry.
- Note the old actuator's fully-retracted and fully-extended positions against the frame's travel extremes — this is the stroke the guide actually uses.
- Remove the old actuator. Mark and store its mounting hardware, and keep any pivot pins or brackets you plan to reuse.
- With the old actuator off, move the guide carriage by hand through its full range. It should slide smoothly end to end with no binding, notching, or stiff spots. If it binds, clean and re-lubricate or replace the guide bearings before you go on — a new actuator can't compensate for a structure that doesn't move freely.

Install the New Actuator

- Bench-test the new actuator before you mount it. Connect its cables to the controller, apply 24 VDC, and jog it end to end from the operator interface. It should travel smoothly the full stroke. If it doesn't move or it stalls, re-check the cabling and the supply before you commit it to the machine.
- Identify your mount type from the actuator's suffix — an -RF suffix is a fixed mount (a bolt-down mounting plate), and a -TG suffix is a floating mount (pinned, with a rod eye at the front and a spherical bearing or clevis at the rear). Either way, mount the new actuator in the same orientation as the one you removed, with its line of motion exactly in line with the carriage travel.
- Fixed (-RF) mount — fasten the mounting plate so the actuator's linear motion is exactly in line with the existing

carriage. Attach the front end to the moving structure through the threaded holes, bolts, or pivot pins that match the old actuator's orientation, and apply thread-locker to any fastener screwed directly into the actuator.

- Floating (-TG) mount — connect the front rod eye to the moving carriage and the rear spherical bearing or clevis to the frame. Add an anti-rotation feature at the spherical-bearing end so the actuator body can't spin, and let the pins carry the rotation so the actuator self-aligns as the guide moves.
- Check the alignment — jog the guide slowly across its full travel and watch it move without struggling or binding. If it fights at any point, loosen the mounts, re-square the actuator to the carriage, and re-check.
- Match the stroke to the guide travel — confirm the actuator's fully-retracted and fully-extended positions coincide with the frame's travel extremes, and center the stroke on the raceway center. If the actuator over-travels the guide, reduce the digital stroke length in the controller; if it under-travels, add mechanical stops.
- Install the servo-center proximity sensor (SKU 7-140004) so it switches exactly at mid-stroke — with the guide centered, position it to see metal within 2 mm for one half of the travel and clear space for the other half. Jog through mid-stroke and confirm its LED toggles on and off right at center; the controller uses this transition to find the actuator's home position during commissioning.

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 its rail in the exit span, but don't fully tighten it yet.
- Set the working distance from the sensor face to the web to 5–15 mm (0.2–0.6 in), and keep the web within 5–30 mm of the sensor as it wanders during guiding.
- 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 you commission. With the new actuator mounted, don't force the guide by hand — you can back-drive the actuator.
- Confirm the web travels in the direction of the arrows on the frame.
- Confirm the new actuator is mounted in line with the carriage travel, in the same orientation as the one you removed.
- Confirm the actuator's retracted and extended limits line up with the frame's travel extremes.
- Confirm the servo-center proximity sensor is installed and its LED changes state as the carriage passes mid-stroke.
- Confirm every cable is routed and strain-relieved, and that nothing is powered yet.

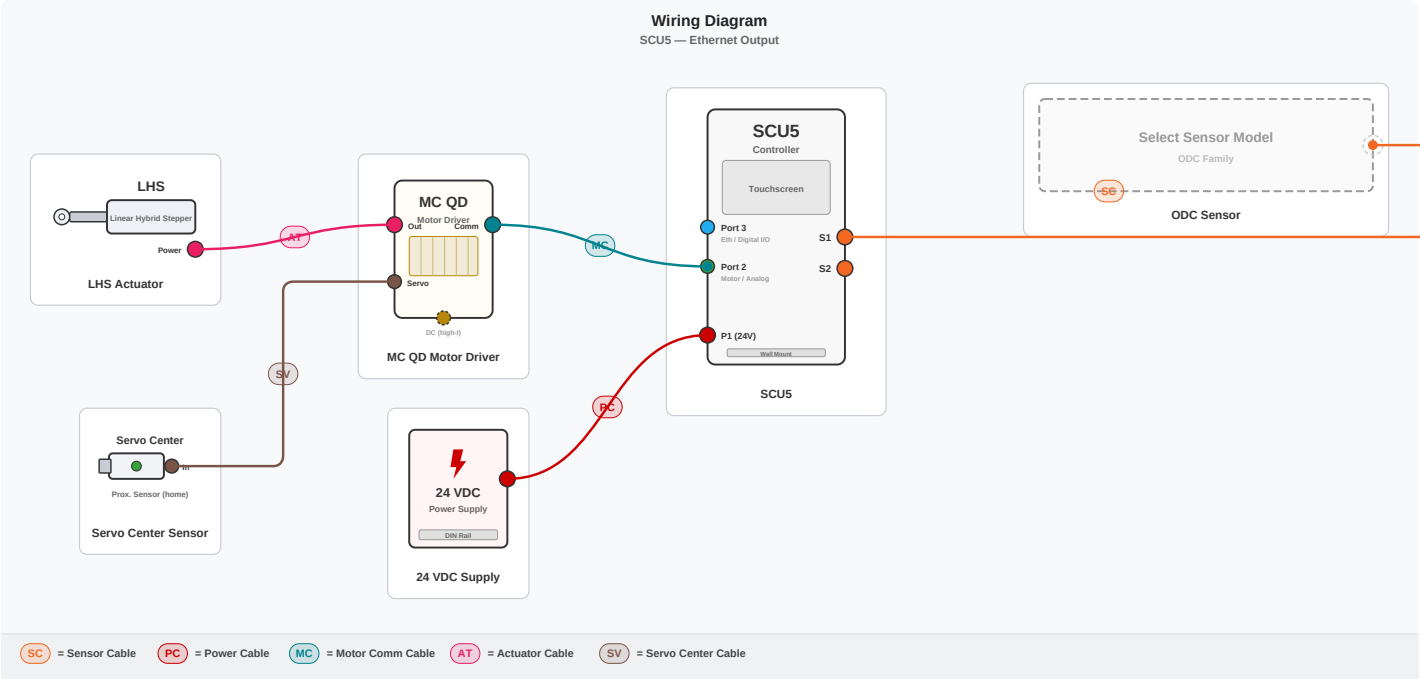
2. Install the Sensor

Install the Sensor — Contrast Guiding

- Contrast guiding uses a single ODC white-light sensor over the contrast boundary you're tracking — a coating edge, color change, or stripe. Position the sensor so that boundary sits near the middle of the sensor window, with room on both sides for it to wander.
- Set the working distance to 5 mm (0.2 in) from the sensor face to the web.
- Mount a backup roller (any roller or dead bar) directly under the sensor to steady the web and hold that 5 mm working distance — the sensor reads a plane change as a contrast change. Keep the web wrap on the backup roller to 20 degrees or less so it doesn't change how the web moves in the exit span.

3. Wire the System

Wiring Diagram



4. Configure & Verify

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

Contrast Guiding — Power Up and Commission

Commission single-sensor contrast guiding on your retrofitted guide — teach the boundary, prove the motion, then track it in automatic.

1. Power on the controller. If it wakes in Automatic, switch to Manual — it resumes whatever mode it was last in, and every step below runs from Manual.
2. Set the sensor to contrast sensing.
3. Teach the boundary. On the Operator ? Sensor screen, enter teaching mode, pick the contrast mode from the on-screen icons, and use the left/right arrows to land on your boundary (a coating edge, color change, or stripe) in the live image. Save with the gear button — it turns red and a green box locks around the boundary. Until a valid feature is taught, the controller stays interlocked and won't enter Automatic.
4. 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.
5. 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 instead of toward it, reverse Servo Center Polarity under Power User ? Actuator ? Servo Center Polarity, then servo-center again. If it hits a mechanical stop before finishing, re-check the servo-center sensor position from the pre-power checks.
6. Set the guide point. Tap Reset Guide Point to lock the target onto the boundary's current position. (To target a different position, drag the guide-point bar and press Accept.)
7. Switch to Automatic. The guide now tracks the taught boundary, and the Web Position Indicator holds steady near the target. If the controller won't enter Automatic, the boundary isn't taught or isn't in view — re-teach at step 3.
8. Check the correction direction. Nudge the web so the boundary moves off target. The guide should steer it back toward the guide point. If it steers away, reverse Error Polarity under Power User ? Controller, then watch it correct again.
9. Fine-tune the position. Still in Automatic, tap Jog Right (+) or Jog Left (?) to nudge the tracked boundary to the exact spot — about 0.25 mm (0.01 in) per tap.
10. Prove the safety hold. Pull the boundary out of the sensor's view. The guide should hold its last position (it won't recenter) until the boundary returns. When it holds, your retrofitted web guide is commissioned.

5. PLC Integration

The controller accepts remote commands two ways — over Industrial Ethernet, or through the DIO option's discrete 24 V dry-contact inputs. Either lets a PLC command guide mode and position without touching the controller screen.

- Industrial Ethernet (C(x) models) — send auto-mode on/off, jog, servo-center, and guide-point commands over EtherNet/IP, PROFINET, or EtherCAT.
- DIO option — hard-wired 24 V NPN dry-contact inputs for remote on/off and mode switching, no Ethernet required, wired straight from PLC digital outputs or relay contacts.
- The two can run together — Ethernet for data and fine control, DIO for hard-wired interlocks.
- Lock on Lost Edge inhibits actuator motion when the guided edge leaves the sensor's view; Loss of Contrast Inhibit does the same when a taught line or contrast feature is lost.

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

- **Intermediate Web Guide** — Install a new Roll-2-Roll web guide from scratch, when there's no existing structure to reuse
- **Web Width Measurement** — Measure web width alongside or independently of guiding
- **Unwind/Rewind Web Guide** — Shift heavy rolls on a retrofitted unwind or rewind stand using a high-thrust RLA

Need Help?
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