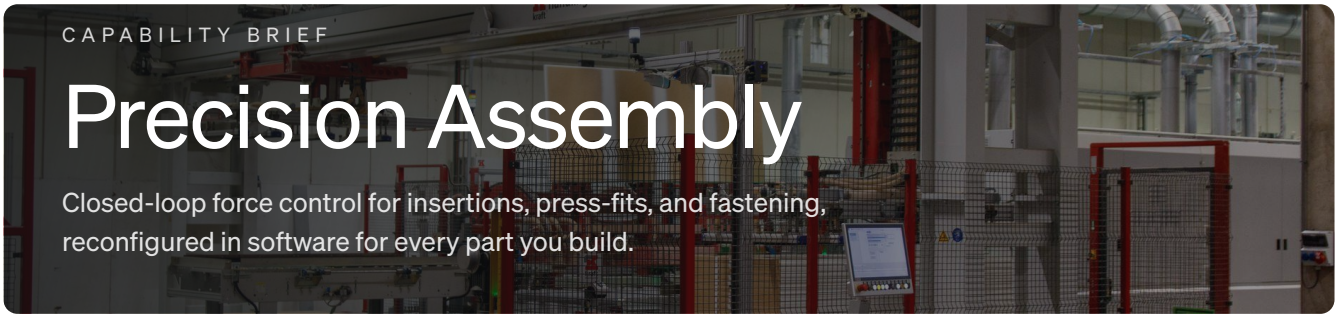

CAPABILITY BRIEF

Precision Assembly

Closed-loop force control for insertions, press-fits, and fastening, reconfigured in software for every part you build.

Contact-rich assembly defeats position-only robots. A play-back arm that nails one trajectory has no answer when a part sits a millimeter off, a bore runs tight, or a clip needs seating force without crushing the housing. Fixed tooling and hard automation make it worse: every new part means new fixtures, new programming, weeks of downtime. High-mix lines change parts faster than rigid cells can be retooled, so the work stays manual.

Relling runs assembly under closed-loop force control. The cell feels contact, regulates insertion and seating forces, and corrects pose from vision rather than assuming a fixtured part. One workcell carries a library of assembly skills and reconfigures in software per part, so changeover is a recipe swap, not a retool. Every skill is qualified against your tolerances and force limits at Relling HQ before the cell ships.

AT A GLANCE

Footprint	~2 × 2 m
Payload	12.5 kg
Reach	1.3 m
Placement	±0.05 mm
Power	Single-phase
Install	≤ 2 weeks

01 The work we take on

THE TASK PROFILE

A

Force regulation

Six-axis force-torque sensing closes the loop on contact, holding insertion and seating forces to target instead of driving blind to a commanded position.

B

Active compliance

The cell yields along constrained axes, letting parts self-align into bores and mates without jamming, galling, or fracturing fragile features.

C

Vision-guided mating

Cameras locate the part and feature in real time, correcting for fixture slop and presentation variance so insertions start aligned.

D

Tolerance search

Spiral and wiggle search strategies find the hole when clearance is tight, seating peg-in-hole fits that exceed position-only repeatability.

E

Software changeover

Per-part recipes select skills, forces, and search bounds, so a new part loads as a configuration change rather than new tooling and reprogramming.

02 Why now

THE CASE FOR MOVING NOW

Skilled assembly labor is gone

Manual contact-rich assembly depends on tactile workers who are increasingly hard to hire and retain. Closed-loop force control captures that feel in software, holding assembly throughput as the experienced workforce ages out and turnover climbs.

High-mix breaks fixed tooling

Shorter runs and more variants mean rigid cells spend more time being retooled than running. A force-controlled cell that reconfigures per part in software absorbs the mix without new fixtures, recovering capacity lost to changeover.

Rework is the hidden cost

Cross-threaded fasteners, cracked housings, and unseated connectors surface late and cost far more to fix than to prevent. Force-verified assembly catches bad joints at the station, cutting scrap, rework, and warranty exposure as work reshores.

OEMS WE WORK WITH

BECKHOFF · Rockwell Automation · SIEMENS · FANUC · KUKA · ABB · YASKAWA

03 What the service covers

TASKS ON THE LINE

A — Press-fits
Seat bearings, bushings, and pins to target force with press-distance and force verification.

B — Snap-fits
Engage plastic snaps and clips, confirming seating by the force signature at lock-in.

C — Threaded fastening
Drive screws and bolts to specified torque with cross-thread detection and reject handling.

D — Connector insertion
Mate electrical connectors and ribbon cables, confirming full seat by insertion force.

E — Gasket seating
Place and press gaskets and seals into grooves under controlled, even compression.

F — Peg-in-hole
Insert shafts and dowels into tight-clearance bores using force-guided alignment search.

G — Alignment & mating
Locate, align, and join mating subassembly halves before fastening or bonding.

H — Torque verification
Fasten to spec and log torque and angle per joint for downstream traceability.

WHAT A CELL HOLDS

≤ 2 wk	±0.05 mm	100%
Install to running on your floor, not months of integration	In-hand placement for fit- and safety-critical parts	Inspection on every part — checked, not sampled

Representative configuration. Final specs are issued with the proposal.

04 Working with us

FROM YOUR PART TO A QUALIFIED CELL, IN ~TWO WEEKS ON-SITE

A · SCOPE & PO

We start with your part

We work from your part, volumes, takt, and the line you'd deploy on. A short scoping engagement confirms fit, defines acceptance criteria, and puts a fixed scope and price in writing — capital purchase and robotics-as-a-service, side by side.

B · PRE-BUILD AT RELLING HQ

We build & qualify it first

We build the cell on our own production floor and run it against your parts until it meets the acceptance criteria. The trial-and-error happens here, not on your line — so what ships is already proven.

C · ON-SITE CONFIGURATION

It arrives pre-built

The qualified cell shows up ready. On-site work is tuning, not assembly: under two weeks to integrate with your line, MES/ERP, and safety, followed by a supervised run on real product.

D · ACCEPTANCE & FIRST UNIT

Proven, then handed over

We run supervised until your safety engineer signs off and the cell hits its numbers. Your technicians operate it day to day; maintenance and software updates are covered.

05 Let's talk

We started Relling to help this country make more of what it needs. If you have a task that's hard to staff or hard to automate, send it over — we'll tell you straight whether a cell fits, and scope it if it does.

Talk to us: jai.relan@rellingsystems.com · rellingsystems.com

EXCEPTIONAL ENGINEERING, TEAM FROM

SPACEX · NASA · BOEING · TESLA · RIVIAN · ANYSIGNAL · coinbase