Pin & Clip Installation Guide

> **Tip:** Set your PDF viewer to "Actual size" before printing to maintain scale.

Pin Installation Procedures

Pin Type	Installation Method	Tools Required	Key Tips
Cotter Pins	1. Insert through hole 2. Bend legs apart 45°	Pliers, side cutters	Use largest pin that fits hole, bend legs away from movement
Clevis Pins	1. Insert through yoke 2. Add washer 3. Secure with cotter pin	Hammer (if tight), pliers for cotter	Grip length = total thickness of all parts + washer
Dowel Pins	1. Ream hole to size 2. Press in with arbor press 3. Check for flush fit	Arbor press, reamer, pin punch	Press fit - requires 1-3 tons force, support workpiece
Spring Pins	1. Chamfer hole entrance 2. Start pin straight 3. Drive until flush	Pin punch, hammer, support fixture	Drive from chamfered end, use proper size punch
Roll Pins	1. Chamfer hole 2. Align slot with load 3. Drive in carefully	Roll pin punch, hammer	Slot should be perpendicular to primary load direction
Taper Pins	1. Ream tapered hole 2. Start pin by hand 3. Drive until resistance	Taper pin reamer, hammer, punch	1/4" per foot taper standard, drive from large end
Grooved Pins	1. Drill proper size hole 2. Chamfer entrance 3. Press or drive in	Press or hammer, punch	Grooves compress - easier than solid dowel pins
Quick-Release	1. Depress button 2. Insert through holes 3. Release button to lock	None (hand install)	Ensure button fully extends after installation

Retaining Ring Installation Procedures

Ring Type	Installation Steps	Tools Required	Safety Notes
External Retaining Ring	1. Compress ring with pliers 2. Guide over shaft 3. Release into groove 4. Rotate to check seat	External snap ring pliers	**WEAR SAFETY GLASSES** Ring can slip and fly out
Internal Retaining Ring	1. Expand ring with pliers 2. Guide into bore 3. Release into groove 4. Check 360° seating	Internal snap ring pliers	**WEAR SAFETY GLASSES** Expanded rings under tension
E-Clip	1. Slide onto shaft 2. Position at desired location 3. Press flat with screwdriver	Flat screwdriver or by hand	Ensure three prongs fully engage shaft
C-Clip	1. Open gap slightly 2. Slide over shaft 3. Release into groove	None (hand install)	Gap should face away from primary load direction
Push-On Retainer	1. Align with shaft 2. Push firmly until click 3. Check for proper seat	Press or vise (for large sizes)	One-time use only - teeth bite into shaft

Pin & Clip Installation Guide

Installation Best Practices

Hole Preparation

- Always chamfer hole entrance 30° to 45° for easier pin insertion
- Clean holes of dirt, chips, and burrs before installation
- Verify hole size with proper gauges before starting
- Ensure holes are aligned properly before driving pins

Pin Driving

- Use proper pin punches - never hammer directly on pins
- Support workpiece on solid surface or in fixture
- Drive pins straight - angled driving causes binding
- For spring pins, drive from chamfered end
- Stop when pin is flush - don't overdrive

Retaining Ring Installation

- **ALWAYS wear safety glasses** - rings under tension can slip
- Use correct pliers (internal vs. external, proper size)
- Compress/expand evenly - don't twist or bend ring
- Ensure ring fully seats in groove 360° around
- Rotate ring in groove to verify proper seating
- Check for burrs on groove edges that prevent full seating

Common Mistakes to Avoid

- ■ **No chamfer:** Pin can't enter hole, gets damaged or bends
- ■ **Wrong punch size:** Mushrooms pin end, damages pin
- ■ **Forcing misalignment:** Damages both pin and holes
- ■ **Over-driving:** Pin goes too deep, difficult to remove
- ■ **Not checking seat:** Retaining ring not fully in groove - will pop out
- ■ **Reusing damaged parts:** Bent cotter pins or damaged rings will fail