

THE CHALLENGE

A global industrial OEM engaged RELY to stabilize supply and protect production continuity on a critical aluminum head casting used in a power systems application.

The component was manufactured offshore, transported through a cross-border supply chain, and consumed at a U.S. assembly plant where functional failures could trigger immediate line stoppage.

The customer initially requested inspection support. Early containment revealed a larger issue: over 50% of incoming parts were falling out of specification, with multiple independent failure modes affecting a press-fit bushing feature essential to downstream assembly.

With thousands of parts already in motion, the customer required an immediate, scalable solution to sort, recover, and release qualified product without disrupting production schedules.

> 2500 PARTS INSPECTED + REWORKED

RESULTS

- Restored critical functional features to specification
- Prevented downstream assembly disruptions and line stoppage
- Enabled continued production flow without schedule interruption
- Avoided significant scrap cost through cost-effective rework
- Stabilized a complex cross-border supply chain in real-time

RELY

RELY converted a high-risk quality event into a controlled, repeatable recovery process while protecting the end customer from supply chain disruption.

OUR SOLUTION

RELY implemented a rapid-response containment and correction program combining full incoming inspection, targeted rework, and end-to-end supplier coordination.

Our team delivered real-time tactical execution to:

- Immediately sort conforming vs. nonconforming material
- Identify and isolate multiple defect modes
- Develop rework pathways to recover usable inventory
- Validate corrective actions through documented quality controls

Where internal machining was not feasible, RELY sourced and managed 3 qualified machine shop partners, securing competitive quotes and coordinating execution on the customer's behalf. This approach transformed an inspection request into a complete recovery and supply stabilization program.

100% INSPECTION RATE

“RELY didn't just inspect parts – they stabilized our supply chain and kept our production line running.”

– Client Quality Engineer

COMPONENT PROFILE

The part is a complex aluminum die casting weighing approx. 10–12 lb and measuring:

16.375 in (L) × 10.750 in (W) × 7.44 in (H)

Post-casting operations include extensive machining, multiple tapped features, and several pressed-in components—most critically, a brass bushing with tight positional and dimensional requirements.

INSPECTION & REWORK EXECUTION

1. 100% Incoming Inspection
 - Visual verification of all machined features
 - Go/No Go gauging of drilled holes
 - Dimensional verification of bushing ID and press depth using custom gauges designed and procured by RELY.
2. Targeted Machining Rework
 - Bushing ID correction via custom designed and built machining tools for controlled re-machining to target size
 - Depth correction through localized feature rework using custom designed and built machining tooling
 - Verification of reworked features prior to release
3. Process Control & Documentation
 - Standardized inspection criteria
 - Segregation of conforming vs. reworked material
 - Full traceability maintained through completion

PROGRAM SCALE

- Total program volume exceeded 2,500 pieces, requiring 100% inspection and selective rework prior to production release.
- Due to evolving discovery of defect modes, the program required multiple inspection passes and dynamic adjustment of workstreams as new issues emerged.

TECHNICAL SCOPE

- Part Type: Aluminum die-cast head casting
- Downstream Use: Power systems / industrial equipment
- Manufacturing Flow: Die cast → machined → assembled with pressed-in components → cross-border logistics

Key Features:

- Multiple machined and tapped holes
- Press-fit brass bushing (functional interface)
- Machined mounting surfaces and reference datums

IDENTIFIED FAILURE MODES

Incoming inspection identified recurring nonconformances tied primarily to the brass bushing feature and associated machined holes:

1. Bushing ID Out of Specification
 - Requirement: 1.001 in ID
 - Condition: Undersize / inconsistent IDs impacting mating components
2. Bushing Insertion Depth Nonconformance
 - Requirement: ≤ 0.14 in depth
 - Condition: Excessive or inconsistent press depth
3. Drilled Hole Verification Failures
 - Gauge requirement: 1.75 in pass
 - Condition: Hole geometry preventing gauge acceptance
4. Missing or Incomplete Machined Features
 - Feature presence required for downstream assembly
 - These issues posed both functional risk and significant line-stoppage potential at the customer's U.S. plant.

RELY