



CASE STUDY

MOTOR HOUSING
ASSEMBLY SYSTEM
FOR A LEADING
HANDHELD OUTDOOR POWER
EQUIPMENT MANUFACTURER



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INTRODUCTION

A large privately-held southeastern manufacturer boasts selling the number one brand of gasoline powered handheld outdoor power equipment in the US, as well as the number one selling brand of chain saws in the world. The company produces more than 260 model variations of handheld outdoor power equipment, including chain saws, trimmers/brushcutters, blowers, edgers, pressure washers, lawn mowers, hand tools, and more.

The company isn't number one in its category by accident. It has made strategic decisions about its distribution channel and manufacturing operations that have shaped the company's success. The company does not sell its products online or in large retail stores but rather through a network of dealers who sell one-on-one in their showrooms or storefronts. This practice allows the consumer to examine the product first hand, explore the product's features and functions, as well as ask questions—which helps the consumer make a better informed decision.

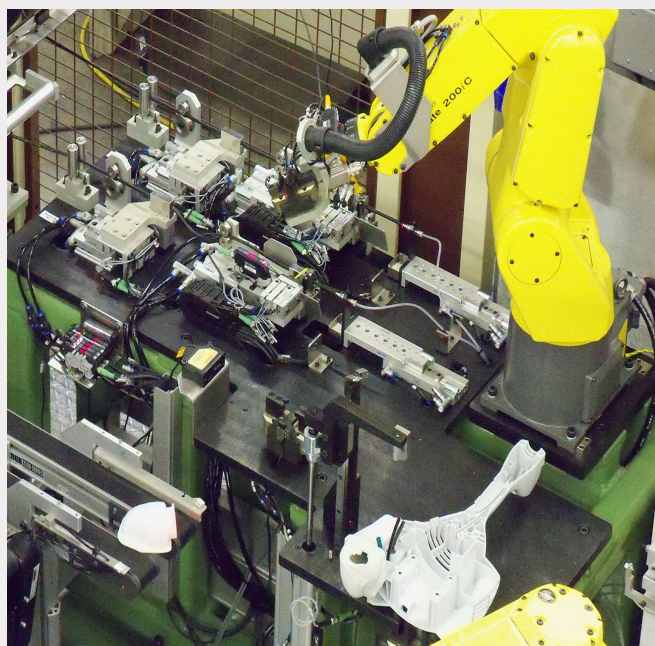
The company's US manufacturing facility is vertically integrated; parts assembly and parts manufacturing, including engines, crankshafts, manifolds, and pistons, are both done under one roof. In addition, the company runs a plastic-injection molding operation, which produces plastic covers, fuel tanks, handles, and triggers. As a vertically integrated plant, the company has a competitive advantage—it can quickly respond to market demands, such as increasing production of chain saws during hurricane season.

A strong dealer network, vertically integrated plant, flexible assembly lines, quality products, and committed employees keep this company on top; however, it still finds ways, big or small, to stay competitive. Over the years, the company has implemented numerous factory automation cells that solve mass production, heavy lifting, speed, and

accuracy issues as well as eliminate highly tedious and repetitive tasks.

When the company needed to address how it could improve the quality and efficiency of two production processes for its professional trimmers, the company contacted ABCO Automation to design and build an automated cell for a portion of the motor housing assembly process. The tasks were straightforward but required precision assembly. With an automated cell, the company would realized the following benefits:

- Perform multiple operations, such as picking, placing, and assembling from a single robot
- Increase quality; precise robot movements reduce measuring mistakes
- Improve product consistency and accuracy with automatic welding—electronic controllers ensure weld integrity
- Reduce labor costs while increasing throughput; speeds are set by the machine not the operator
- Leverage fully-automated end-of-arm tool change-over to handle multiple or new products more easily and cost-effectively





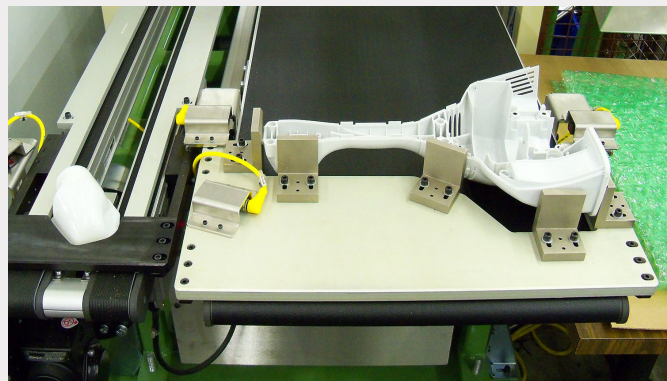
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APPROACH

ABCO's automated motor housing assembly system utilizes both company employees and robots. The process begins when an operator orients and places a motor housing on the housing infeed conveyor. A sensor detects the presence of the housing, and after a slight delay, the operator releases the part and the conveyor automatically indexes forward. Subsequently the operator orients and places a gas tank on the tank infeed conveyor. A sensor detects the presence of the tank, and after a slight delay, the operator releases the part and the conveyor automatically indexes forward. Located at the end of the infeed conveyor, ABCO added a FANUC M-10iA robot to pick up the motor housing and the tank via a dual-tooled gripper end effector. The robot positions the housing in tooling designed to accept a vent. At the vent and tubing insertion station, ABCO added a second robot, LR Mate 200iC, to remove a vent from the vent bowl feeder and place it into the tooling.



Tubing is de-reeled from two reels by a pneumatic gripper/shuttle mechanism to specific lengths. While the robot holds the tubing near the area to be cut, a pneumatic guillotine cutter slices the tubing, and the shuttle gripper and the second gripper release the tubing. The LR Mate robot holds the tubing, dips its end into a lubricant reservoir, and presses the tubing onto the vent. The LR Mate



picks up the vent/tubing subassembly and places it on a plastic stem in the motor housing. ABCO added an air cylinder that extends and presses the vent/tubing subassembly into position. The tube holding and cutting process is repeated for the second piece of tubing.

At the customer-supplied welder, the M-10iA robot picks up and places the tank and the motor housing into their respective welding tooling nests. The housing and tank undergo welding while the robot repeats the process. After the welding cycle is complete, the M10iA robot removes the welded subassembly and releases it into a good parts chute.





MOTOR HOUSING ASSEMBLY SYSTEM

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COMPONENTS

- FANUC robot with a two-camera guidance package and custom end effector with three gripper type end effectors
- An indexing belt infeed conveyor for the fan housing
- An indexing belt infeed conveyor for the tank
- FANUC robot with custom dual gripper type end effector
- Vibratory bowl feeder with singulation track and escapement
- Machined tooling to receive the vent from the robot
- Tubing de-reelers
- Pneumatically actuated tubing feed and cut mechanisms
- Tubing lube reservoir
- Air cylinder
- Gravity chute for finished parts
- Gravity chute for rejected parts
- Perimeter guarding
- Bielomatik welder
- Control system with touchscreen operator interface

AUTOMATION SYSTEM BENEFITS

- Turnkey system ensures all components work together from the onset
- ABCO single contact point for design, build, installation, and startup of machines keeps the project on track, on budget, and online
- ABCO after-startup support ensures continual operations
- Fully automated operations maintain product standards, increase throughput, and reduce labor costs
- Centralized control station consolidates setup, alarm, maintenance, and operational functions
- Customized solution meets all production process criteria and allows for the integration of specialized equipment

