

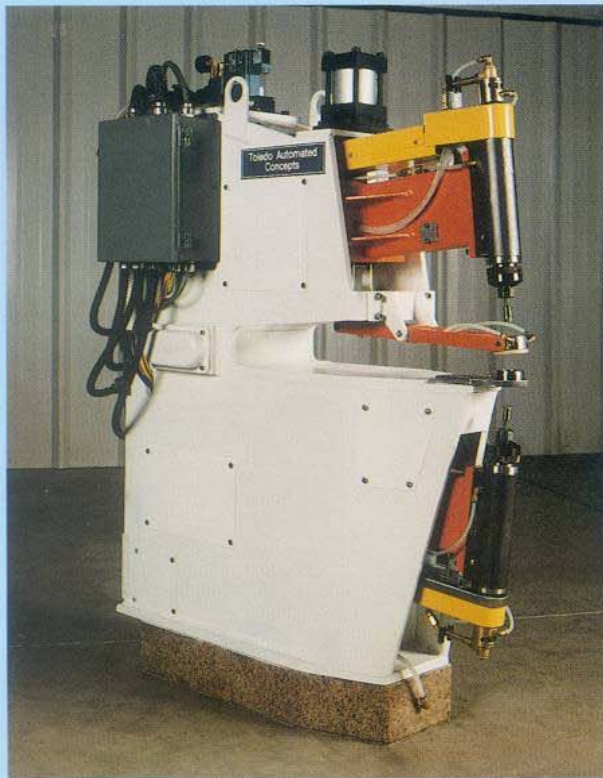


Toledo Automated
Concepts

TAC

TOLEDO AUTOMATED CONCEPTS

TAC OFFERS A COMPLETE LINE OF ENGINEERING AND DESIGN SERVICES FOR COLD END PROCESSING OF GLASS. SERVICES INCLUDE COMPLETE MECHANICAL, PNEUMATIC, HYDRAULIC AND ELECTRICAL ENGINEERING; INCLUDING THE USE OF COMPUTER AIDED DESIGN. **THEY ARE MANUFACTURERS OF TOOLS, JIGS, FIXTURES AND SMALL MACHINES FOR COLD END PROCESSING; AS WELL AS HIGHLY SOPHISTICATED AUTOMATED EQUIPMENT . . . DRILLING MACHINES, EDGE GRINDERS, SHUTTLE SYSTEMS, AND TRANSFER EQUIPMENT (CONVEYORS, ACCUMULATORS, AUTOMATIC GRINDER LOAD / UNLOAD SYSTEMS).** PRIMARY USE OF THE EQUIPMENT IS BY GLASS MANUFACTURERS AND AUTOMOBILE MANUFACTURERS TO MOVE, EDGE GRIND, AND DRILL GLASS FOR AUTOMOTIVE AND OTHER APPLICATIONS WHERE PIECES OF GLASS NEED EDGE WORK, AND HOLES DRILLED IN PRECISE LOCATIONS. **TAC MACHINERY DOES MORE THAN JUST GRIND AND DRILL GLASS, IT HANDLES THE GLASS FROM ITS ENTRANCE TO THE PROCESSING AREA UNTIL IT EXITS . . . MOVING THE GLASS TO PRECISE LOCATIONS WITH SPLIT SECOND ACCURACY.** TAC MACHINERY CAN POSITION THE GLASS TO SIMULTANEOUSLY OR SEQUENTIALLY DRILL, AND IF NECESSARY CHAMFER, ALL THE REQUIRED HOLES IN A SHEET OF GLASS. **TAC HAS TRANSFORMED MANUAL COLD END PROCESSING TASKS TO HIGHLY-AUTOMATED COMPUTER-CONTROLLED OPERATIONS.**



PIVOT-ACTION DRILL MACHINE

U.S. Patents No. 4,955,763 and No. 5,028,176

PIVOTING DRILL MOVEMENT PROVIDES DISTINCT ADVANTAGES

The pivoting drill mechanism is designed and built to provide several advantages over other types of glass drilling machines. Of primary importance is the location of moving parts away from the glass particles generated by drilling. By simply keeping these abrasive particles away from moving parts, a major wear problem is eliminated.

The design also simplifies maintenance and eliminates operator adjustments. And, when maintenance is needed, the simple replacement of two taper bearings brings the pivot back to spec.

DRILL DEPTH ACCURATE TO +/- 5% OF .001" - WITH MINIMAL OPERATOR INVOLVEMENT

Drill movement . . . feed rate, start of feed and drill depth . . . is through a zero backlash ball nut and screw, driven by a stepper motor. Operator involvement is limited to simply entering drill diameter and glass thickness. All other adjustments, including start of chamfer feed, are made automatically.

CORE DRILL REPLACEMENT SYSTEM ELIMINATES THE NEED FOR OPERATOR ADJUSTMENT AFTER CORE DRILL REPLACEMENT

Through use of a double collet system to hold core drills, the operator can preassemble drills and collets. When core drill replacement is required, the drill and collet assembly is changed. All that the operator has to do then is reset the depth counter by depressing a reset button.



EDGE GRINDING EQUIPMENT

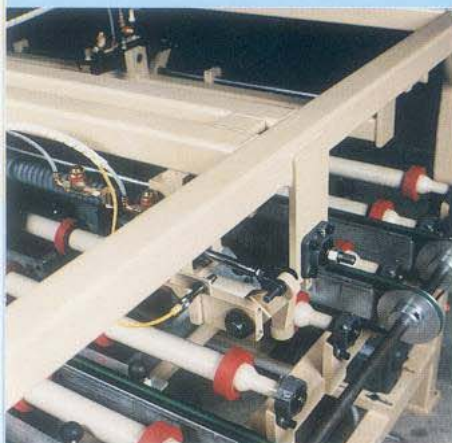
Programmable edge grinder has part storage ability, built-in diagnostics and error message display. Rotary table is designed for zero backlash operation. Cam fixtures and diamond wheel are designed for quick changeover. Attention to detail and close tolerance machining of components has eliminated the need for post-assembly alignment. This is also evident in the unique vacuum coolant system.



PROGRAMMABLE MULTI-HOLE LOCATOR

TAC's unique design eliminates the positioning table making this unit simpler, safer and faster than a table based design. An overhead arm and vacuum pick-up secures the glass, which is then rotated and positioned to pre-programmed locations. The locator accepts digitized data or operates in a "teach" mode, and has part storage and recall capability.

ENGINEERING FOR COLD END PROCESSING



PAIRING CONVEYOR

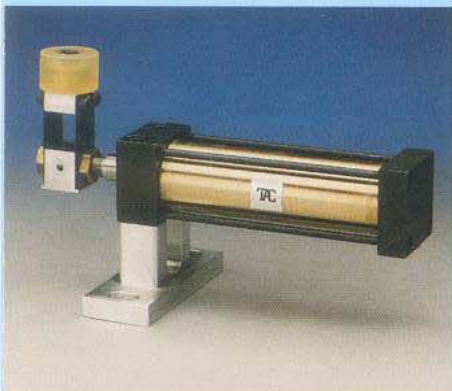
Specialty Part Handling Conveyor. All types of conveyors and transfers . . . roller, belt, in-line, 90 degree travel, lift and rotate, flipover . . . as well as any other standard or special design.



ACCUMULATOR

This special small batch accumulator is part of a specially designed TAC glass handling system. Similar individual accumulators, or a group of accumulators, can be designed and built for in-line or off-line accumulation of up to 60 parts.

OF GLASS FOR OVER A DECADE



RELOCATOR CYLINDER

Glass Repositioning Cylinder. 90 degree rotate and pull or push. Spring relieving head, different stroke lengths, and non-rotate style available.

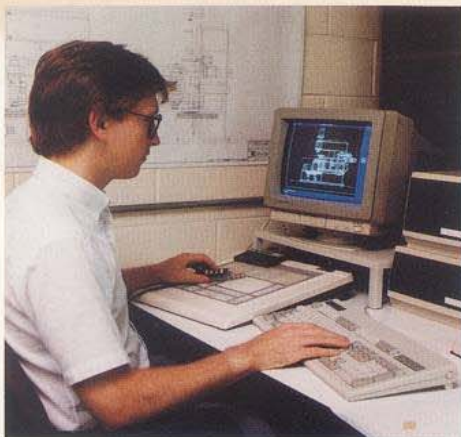


SHUTTLE

Unit shown is a three car glass transfer shuttle with 90 degree rotation of parts. Variations in number of cars, stroke lengths, and rotate angles are available; including programmable rotate angle and stroke.

COMPLETE CONTROL FROM INSIDE

NOTHING IS JOBBED OUT



In house CAD handles design; and from there TAC handles the fabrication of machinery and electronic cabinets, and machining of components, right through to a post assembly test run. From start to finish, TAC takes responsibility to do the job right.

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