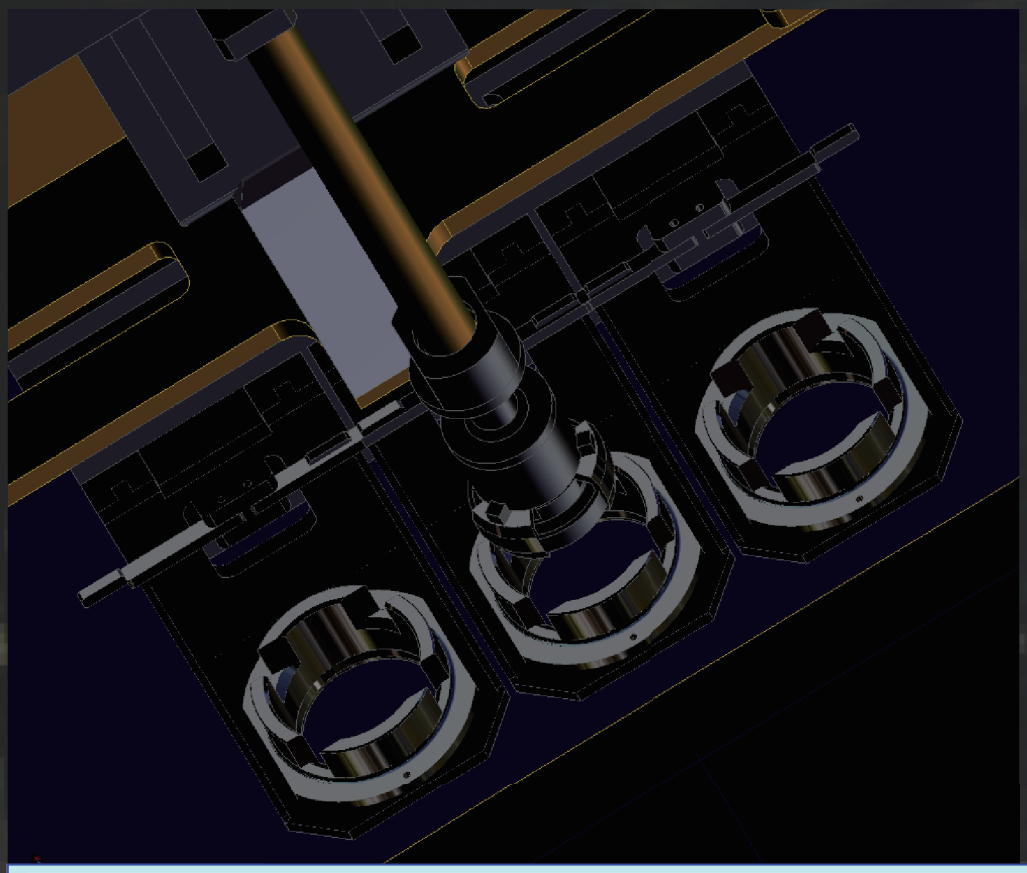
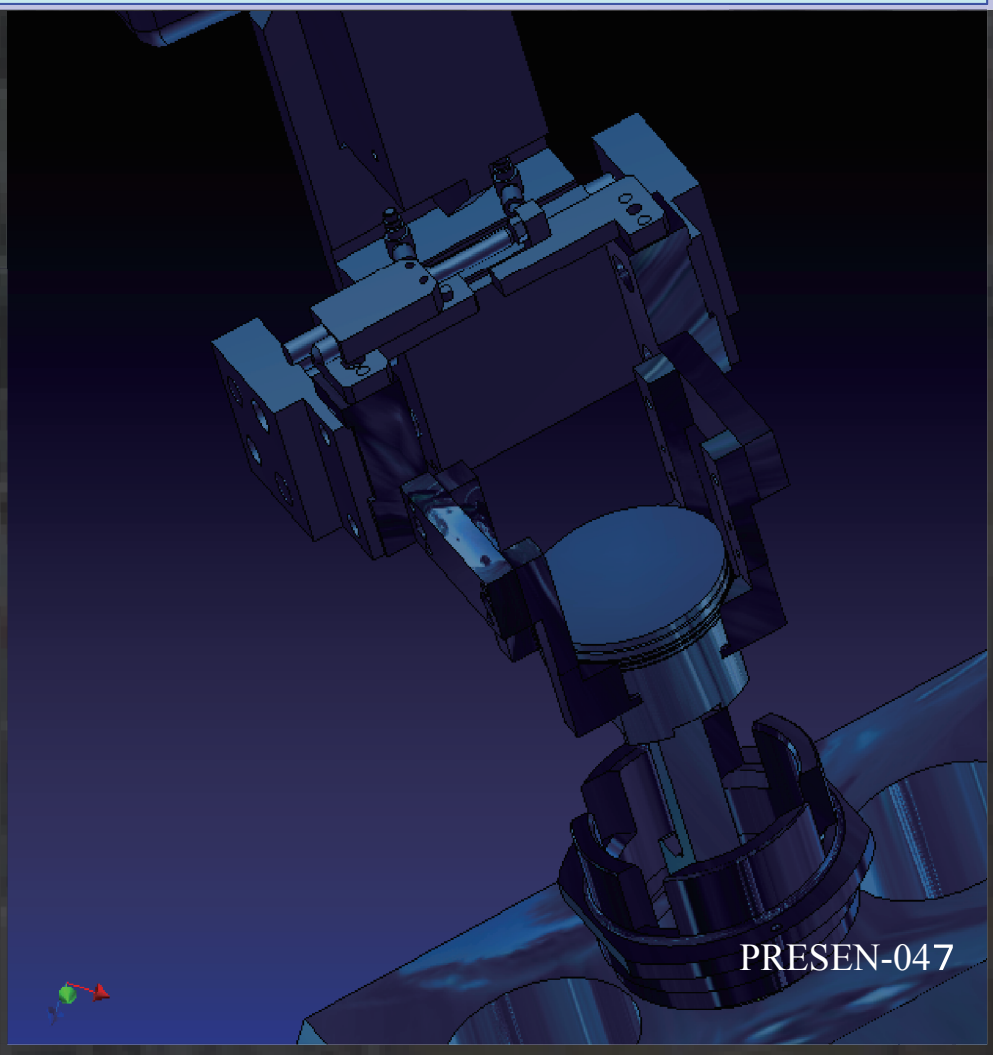
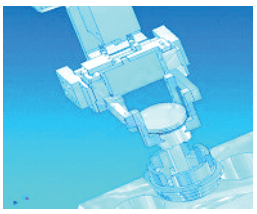


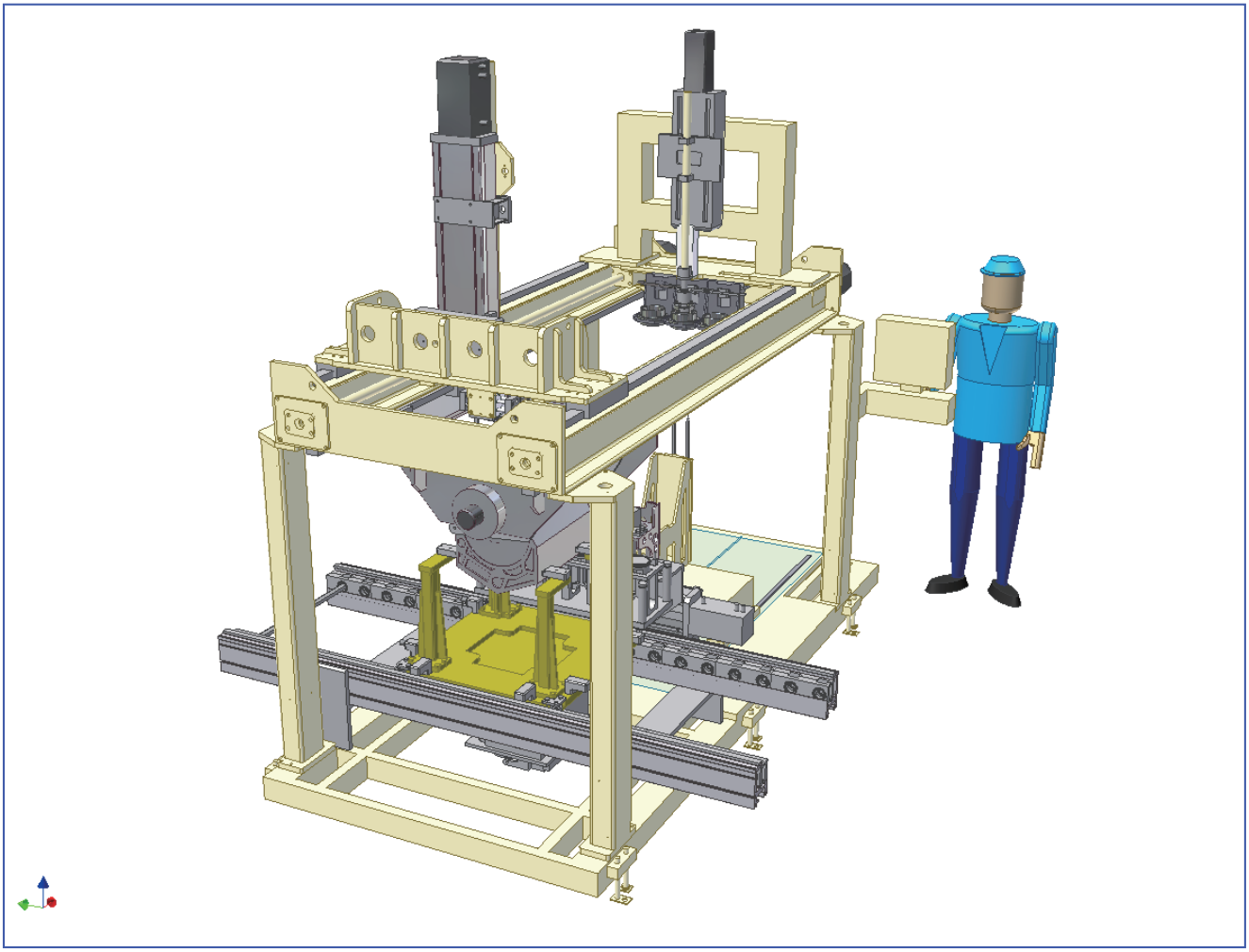
Piston stuffing equipment

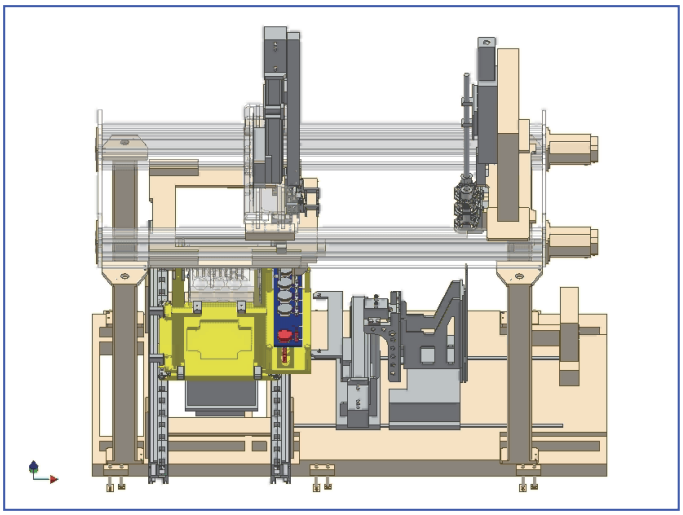


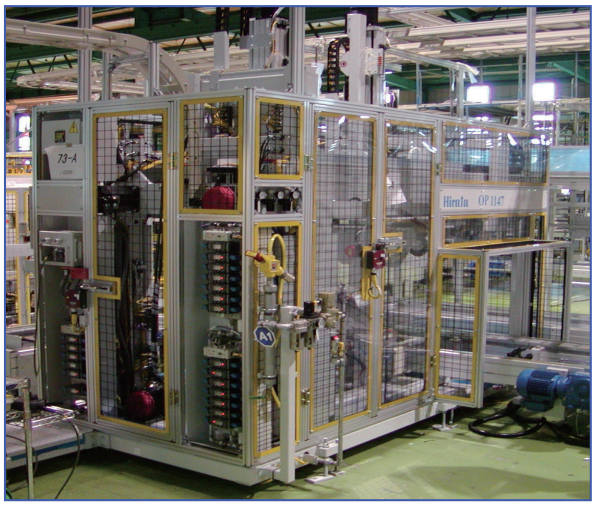
PRESEN-047

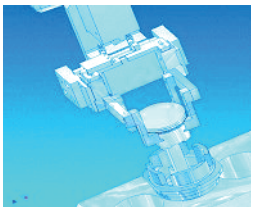


Appearance









Equipment Outline -------

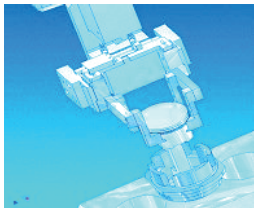
・The first fully-automatic assembly machine in the industry that is capable of handling the series of assembly procedures for engine blocks of all types (V-type or straight), starting from fitting of the pistons to fastening the connecting rods, by a single piece of equipment.

・This equipment performs tasks such as fitting of pistons and fastening of screws by temporarily transferring the engine block to the work area off the conveyor belt.

・The engine block is held by the engine block gripper unit, which is capable of vertically positioning the combustion surface for any angle of the V shape. The crankshaft rotating unit is capable of rotating the crankshaft to the position in which the pistons can be fitted to the engine.

・Moreover, the multiple-point halting engine block slider unit is capable of positioning itself next to the piston hole, and the multiple fitting jigs make it possible to perform the appropriate piston-fitting motions for the shape.

・A series of flexible motions enabled by these features achieves the piston fitting capability for all types of engines. This level of compatibility is achieved in some cases by adapting attachment pieces, such as an end chuck, without making any substantial change to the equipment itself.



Operation Outline -------

(1) Engine block is received from the conveyor belt and held in such a way that the combustion surface of the block is vertically aligned. The crankshaft is rotated at the same time to prepare for the piston fitting.

↓

(2) Engine block is horizontally transferred to the work area (the piston fitting position).

↓

(3) Piston fitting jigs are aligned with the combustion surface.

↓

(4) Pistons are gripped and clamped by the gripper unit and inserted into the fitting jigs.

↓

(5) Pistons are pushed down further into the combustion chamber and then the connecting rod guide unit is lowered.

↓

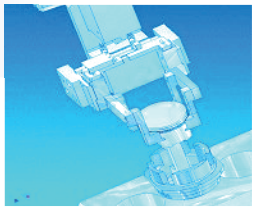
(6) Connecting rod cap fastening unit is raised, tightening the connecting rod caps.

↓

(7) Above steps (3) to (6) are repeated for each cylinder. In the case of a V engine block, the block is rotated as much as the V angle during the interval.

↓

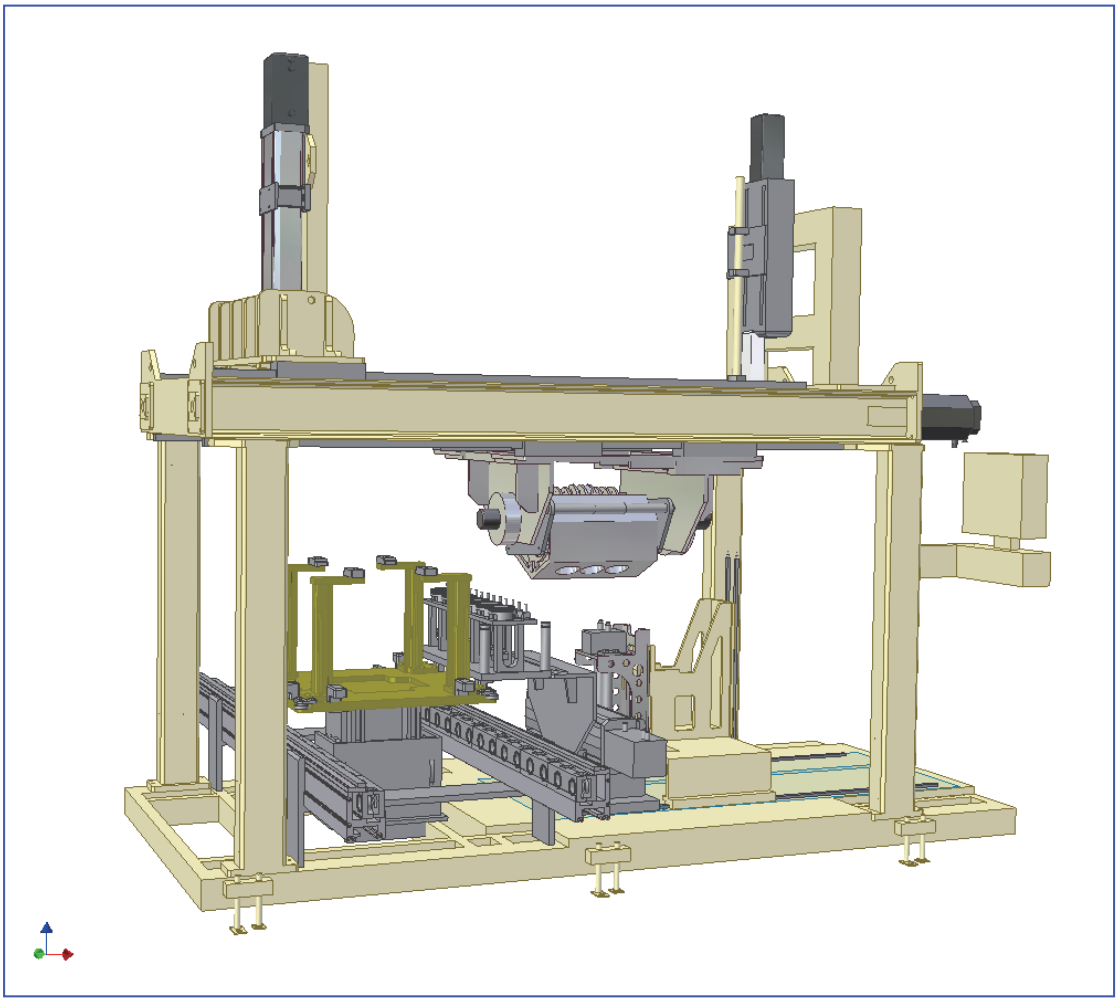
(8) The process of fitting and fastening the pistons and connecting rod caps to the engine block is completed. The block returns to the conveyor belt via the block slider unit.

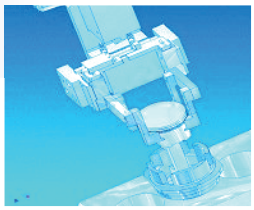


Features -------

Transferring Engine Blocks to Work Area

Conventionally, pistons were assembled while the engine blocks were placed on the conveyor belt, which involved various methods such as fitting pistons from the sides and preparing a pit on the floor to secure enough room for piston fitting motions. This resulted in poor work quality as well as maintenance difficulties.
We successfully resolved this problem by implementing the innovative idea of moving the entire engine block to a separate work area.



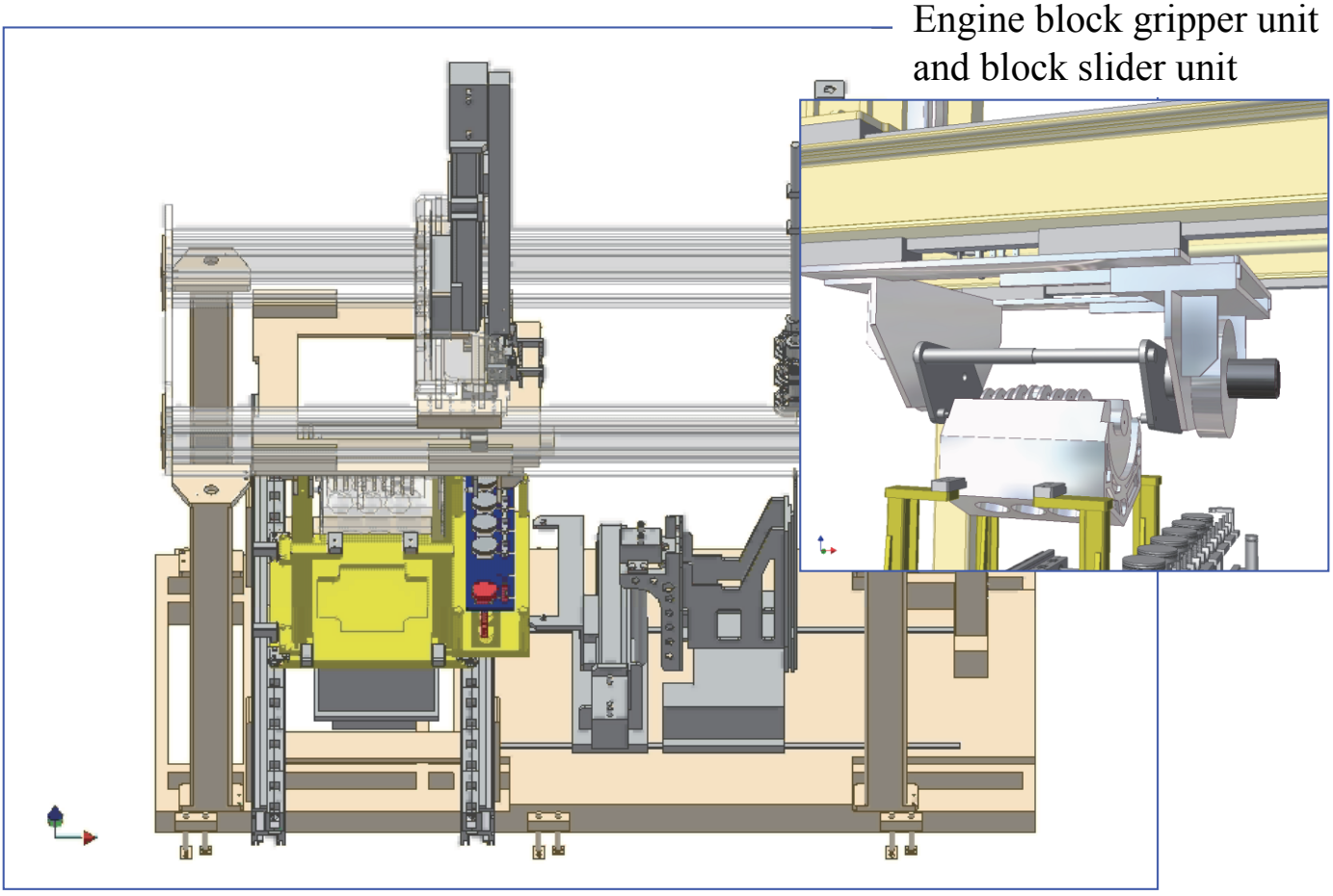


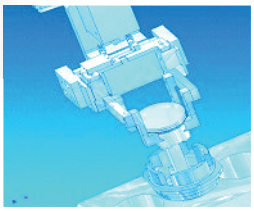
Features -------

Compatibility with Various Engine Block Types (in terms of V angles, number of cylinders and cylinder intervals)

The multiple-point halting engine block gripper unit and the multiple-point halting block slider unit make it possible to hold engine blocks with any V angle in a position such that their combustion surfaces are vertical, and to move the blocks to an arbitrary piston fitting position.
Moreover, the crankshaft rotating unit is capable of halting the rotation of the crankshaft so that it is aligned with the position in which the pistons can be fitted to the engine.

Engine block gripper unit and block slider unit



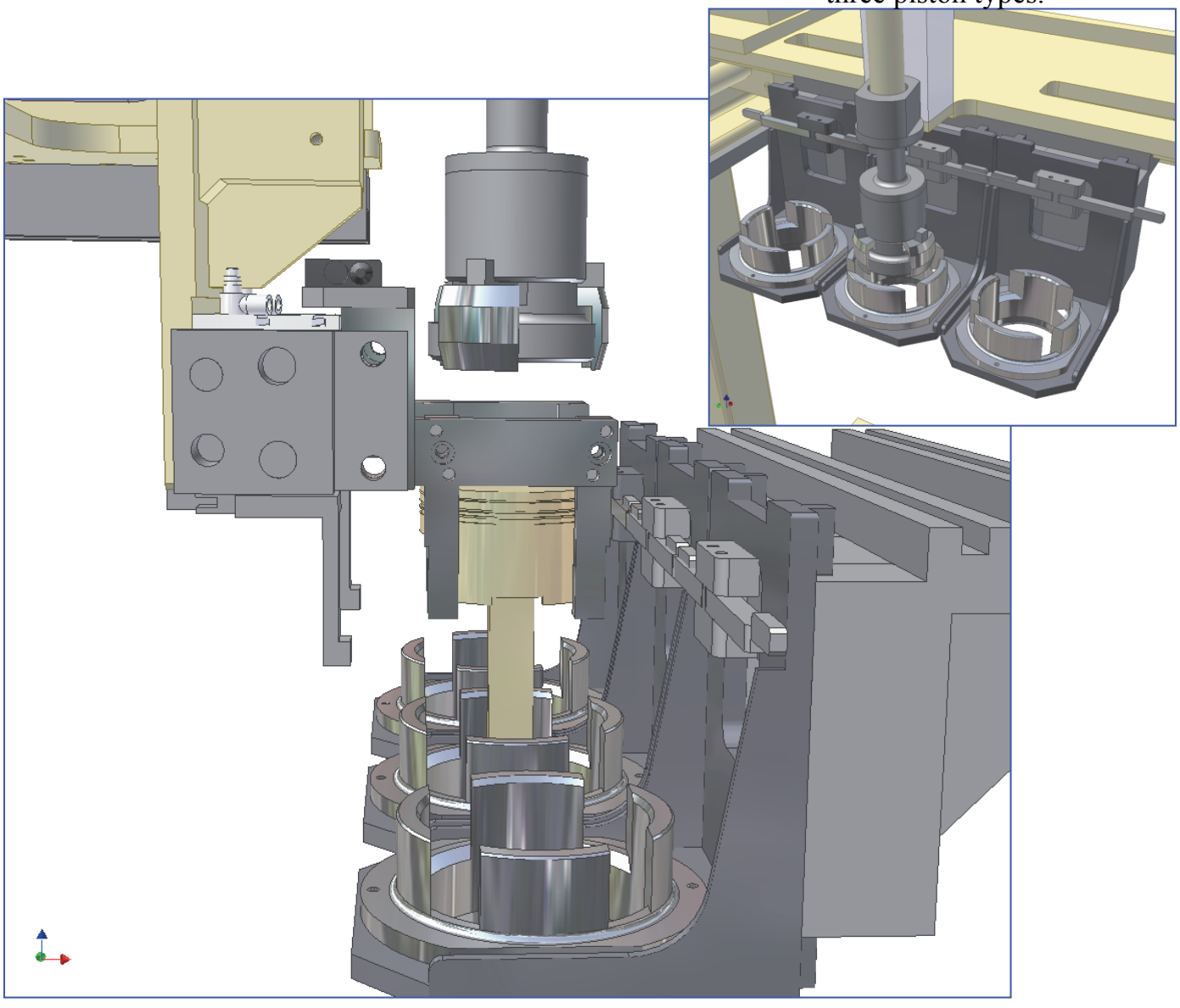


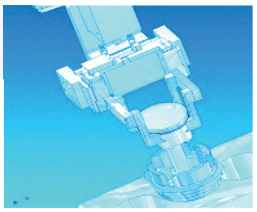
Features -------

Compatibility with Various Piston Types (diameter, piston types and ring types)

The piston fitting jigs, piston gripper unit and piston fitting unit coordinate to perform fitting tasks for various types of pistons using a single machine.

The equipment below is compatible with three piston types.

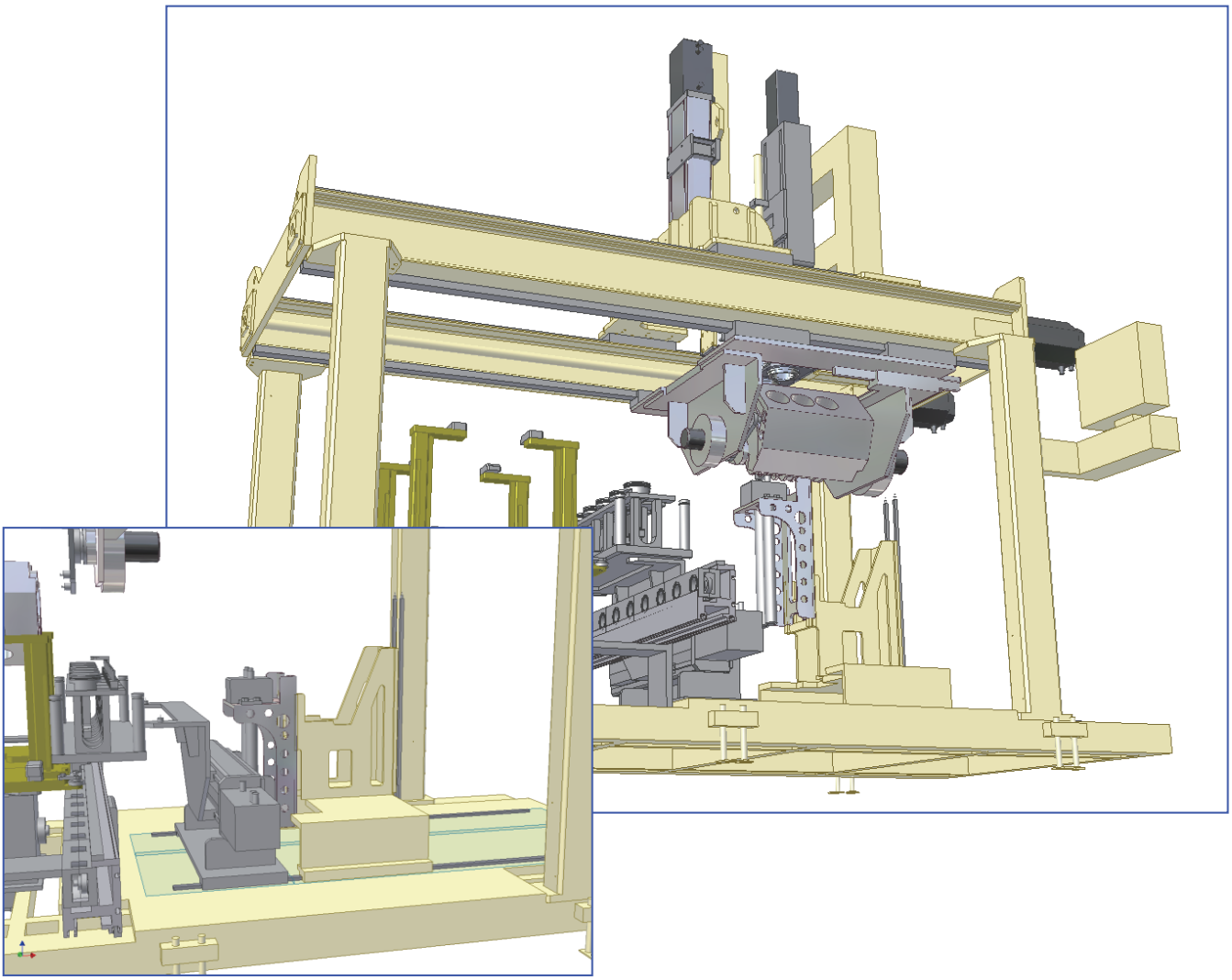




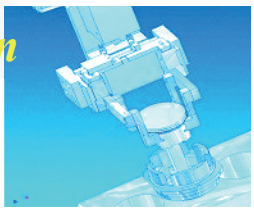
Features -------

A Single Machine for Fitting Pistons and Fastening Con-Rods

This single piece of equipment is capable of handling the series of assembly procedures starting from fittings of the pistons to fastening the connecting rods. The connecting rod cap gripper unit, connecting rod guide unit and connecting rod cap fastening unit coordinate to perform fitting tasks for fastening (screwing) the connecting rods efficiently.



Task-switching shift unit



External Dimensions -------