

ARTEC MACHINE SYSTEMS Develops NEW HD High Density Output Twin Screw Extruders

Special twin-screw extruders (synchronous) must be able to absorb very high torques and axial forces imposed by the extrusion process. Artec Machine Systems has developed an extruder gear series with a double power-splitting system and proprietary high axial load capacity thrust bearings.



ARTEC's robust line of twin-shaft extruder drives has been built for Super High Density/Torque applications for food processing industries. These NEW transmission drives are available to produce the highest working reliability for a given application.

Technical Parameters:

Model	Main Motor	CD	Reducer ratio	Rated Output Speed	Torque	Axial Thrust Per shaft	Extrusion Pressure
AEX192CR	373 kw (500 hp)	192 mm	105 rpm	17 rpm	204 kNm	3000 Kn (670,000 lbsf)	40 – 50 Mpa (6,000 – 7,000 psi)
AEX type	*As requested	130 – 200 mm			Up to 220 kNm	Up to 3500 kN	Up to 50 Mpa (7,000 psi)

*We can offer customer-made solutions of up to 220 kNm!



26 Commerce Drive North Branford, Connecticut USA 06471

ARTEC's AEX Counter and Co-Rotating gearboxes:

- transmit power from the motor to the extruder screws
- reduce the motor speed to the desired screw rpm
- maintain the angular timing of the screws
- absorb the thrust load from the screws
- have a compact integrated design with high performance through the use of highstrength steel (what is actually interesting about the steel?)
- are designed for optimal smoothness of operating and quietness by ground helical gears and optimized tooth geometry
- are very efficient due to a minimum number of rotating parts
- Superior reliability

The AEX drives are built within an extruder screw center distance range from 130 to 200 mm. The appropriate torques and rotating speeds are available depending on the application requirements.

Gear teeth are case hardened and ground. Properly designed gear tooth forms handle bending and torsional loads. ARTEC's long-standing background experience in the precision high-speed high industrial gear drives industry have enabled us to ensure our NEW product is designed and manufactured to meet the most stringent requirements for utmost continuous performance.

The AEX gear system is separated into two distinct parts—the reduction input section and the distribution output section;

- The reduction section of the system is a conventional helical gearbox. It is adapted to the motor speed with a single- or two-stage reduction unit integrally mounted from Bonfiglioli's standard reducer program. This section reduces the motor input speed (1,800 rpm, for example) to the distribution section, which may be anywhere from 30 to 350 rpm.
- The distribution gear section takes a single-shaft input from the reduction gear and transmits it to two (2) parallel output shafts subsequently further reducing the system to the desired screw output speed. The power split of the torque 50% and 25%/25% occurs within the input pinion. The output torque is recombined and distributed equally 50%/50% to the two extruder output shafts by combining the loads with the telescoping articulated pinion shafts lying on the top of the other.







Internals of the AEX-CR unit

The AEX distribution unit is designed to accept the extreme axial force loads from the extruder's screws by means of High Load Axial Tandem bearings and Self-Aligning Roller Thrust bearings. The tandem bearing system consists of multiple thrust bearings layered (up to 8) one behind the other.



This gear unit's housing is made of thick-walled fabricated steel with strongly ribbed interior and exterior elements. This robust design safely contains all working gear train forces and fully absorbs the extreme axial loads from the extruder forces.







The main VSD drive motor is can be top mounted to the gearbox drive to save space and is integrally aligned to the reduction section of the system and is coupled with mechanical over torque coupling and automatically uncouples/disengages the motor if the torque exceeds a preset level.

The system is equipped with a self-contained lubrication oil systems which is a fully integrated system with combined splash and pressure lubrication. An electrical oil pump ensures that all gears and bearings are sufficiently lubricated. The gearbox housings are used as the oil reservoir.

Condition Monitoring Systems:

- A built-in torque meter senses and analyzes the extrusion process torsional load and vibrations in real time.
- The 2 output shafts, individually known as the through shaft and tandem output shafts, are supplied with the following monitoring devices;
 - The through shaft is equipped with an axial load cell measuring real time axial forces of the extruder screws.
 - The tandem shaft is equipped with an eddy current axial positioning probe to monitor axial tandem bearing position and wear.
- The casings are equipped with 2 externally mounted accelerometers to detect and observe bearing and tooth mesh frequencies for real time condition monitoring.



- The AEX oil system is equipped with an oil debris Sensor System. The MetalSCAN 3500 Series oil debris sensor monitors metal particles generated from the internal rotating elements due to bearing and gear wear. The oil debris monitoring system enables early and simple assessment of how much time the operator has to schedule maintenance prior to potential equipment failure.
- System temperature and pressure monitoring of the lube system are respectively controlled by the cooler automated temperature control valve and pressure regulating flow system.
- An oil filter monitoring system; measures high differential pressure across filter elements indicating when the filter needs to be inspected and changed.



The control of all ARTEC's AEX extruder drive parts as well as the test run of each gear unit ensures a continuous high-quality standard.

ARTEC has developed this optimal solution with industry leaders where power is to be efficiently and safely transmitted to ensure our customers' success.