

Subject: Application Overview	Product: Motion Products	Doc#: AO.MCD.06.M62
Title: Extrusion		

Extrusion

Application Overview

Extrusion machines are used to create product by forcing raw material, such as plastic, through a die. Extruders are used to create a wide range of products such as tubing, sheet goods, and insulation. Food processing is a popular application for extruders. Extruders employ a main drive motor to supply power to a screw, which provides the force necessary to push the raw material through the die.

Application Challenges:

- Replace hydraulically operated or DC powered drives
- **Precise speed control** – extrusion speed is critical to the quality and integrity of the product in other portions of the manufacturing process
- **High torque at low speeds** – high torque is often required at low speeds in order to

Yaskawa Products:

Product	Feature	Benefit
MP2600iec with SGD V Amplifier	Machine control capabilities in single-axis controller	Reduce third-party devices by combining machine control with motion control
	EtherNet/IP communication option	Sigma-5 w/ MP2600iec can act a master or slave device
	MotionWorks IEC Programming Software	IEC61131-3 based programming makes new production runs only a few mouse clicks away
	Variable ratio digital gearing	Independently driven axes can be perfectly synchronized
SMC-3010 w/LEGEND Amplifier	Ethernet based motion controller	Provide real-time data monitoring and connectivity to a range of devices including Yaskawa AC drives
	Distributed control of up to 8 axes	Control up to 8 distributed SMC3010 axes
	YTerm Programming Software	Faster development time available
Sigma-5 Servomotors	High resolution serial encoder	Up to 20-bit resolution translates into excellent speed and torque ripple characteristics. High noise immunity if afforded by serial encoder technology utilizing error-checking algorithms.
	High torque to inertia ratio	Dynamic performance in a small space-saving design
	Auto ID Encoder	Machine commissioning requires no loading of motor data into the amplifier – plug and play operation
	Speed range of 5000:1	Improved control at low speed to properly drive screw across wide speed range

Subject: Application Overview	Product: Motion Products	Doc#: AO.MCD.06.M62
Title: Extrusion		

Application Details:

The extruder main drive motor supplies power to the extruder screw providing the force necessary to push the raw material through the die.

Yaskawa motion control products are digitally controlled and fully capable of developing high torque at low speeds. Since the extruders are often started with the barrels full of dense material; such as plastic, they need to quickly develop a large amount of torque to overcome the inertia.

The precise control of speed offered by the Yaskawa servo drives allows the operator of the extrusion machine to repeatedly produce product that are within design tolerances. This reduces cost and waste and saves precious resources.

Other benefits of Yaskawa motion control solutions include application programming flexibility and integration to a wide variety of third-party devices. Recipe tables can easily be created offering great flexibility for various product runs. Acceleration and deceleration controls allow the operator to easily change from hard to soft mixtures without ever worrying about specific values.

Other features are designed to protect the equipment. Torque limiting controls are available in the servo and can easily be added to the user program to protect the motor from overload if the mixture's consistency changes.

