Subject: Screw Feeder Overview	Product: A1000, V1000 and G7 Drives	Doc#: AO.AFD.53
Title: Screw Feeder		

Screw Feeder

Application Overview

Screw feeders are used in various industries for the metering of material into a production process. Screw feeder design closely resembles that of a screw conveyor, but unlike a screw conveyor, a screw feeder is required to be very precise and accurate. The screw in a screw feeder is completely filled with material, compared to a screw conveyor which is typically 40-50% filled. That is part of the reason the material is accurately discharged when the feeder screw is rotating at a controlled rate.

Application Challenges:

- Fast response – Capable of accurately regulating material feed.
- Load detection – Capable of detecting an overload or no material in the screw situation.
- Speed range – Be able to provide the required amount of torque throughout the speed range.
- Trip-less operation – The drive must be capable of continuing to operate after a momentary power loss or a fault.

Yaskawa Products:

Product	Feature	Benefit
A1000, V1000 or G7 Drives	Open Loop and Closed Loop Flux Vector Motor Control (Closed Loop only available in A1000 and G7)	Excellent speed stability and low speed torque production is possible due to Yaskawa's Flux Vector Control technology.
	Overtorque and Undertorque Detection	Both the Overtorque and the Undertorque Detection functions can sense if there is an overloaded feeder or lack of material.
	PID	Accurate and quick response control of material into the production process
	Auto-Restart after momentary power loss	Feeders can quickly restart after fault or momentary power loss.
	Power loss Ride-Through	The material feed is not interrupted during brief power loss.
	Torque Limit	Use of Torque Limit can prevent screw or gear damage due to excessive torque from foreign material in the load.

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Application Details:

Screw feeders can generally be classified in one of two categories: volumetric or gravimetric. Both these types of feeders are required to be precise in the amount of material that is fed into the process. A volumetric feeder accomplishes its accurate feed rate by maintaining a commanded speed, which through calibration of the feeder would deliver a specific feed rate of material into the process. The screw speed can be set linearly through the drive's analog inputs or preset with digital inputs. The Yaskawa drive can accurately maintain the commanded speed by providing the correct amount of torque to maintain speed.

Gravimetric feeders, on the other hand, have more accuracy than volumetric feeders. Gravimetric feeders operate in a closed-loop system by monitoring the weight of fed material. Gravimetric feeders may monitor the material weight and feed rate and utilize the PID functionality in the Yaskawa drive. The speed of the feed screw can be precisely regulated to maintain an accurate feed rate and adjust for any feed rate variations that occur.

In addition to being capable of providing precise speed and torque, Yaskawa drives can monitor torque to detect an undertorque or overtorque condition. An undertorque condition for a screw feeder could be an indication that the screw is not completely filled. Not detecting this condition could give a false indication of material that has been fed into the process and result in a bad process batch. An overtorque condition for a screw feeder could be an indication that the screw is jammed or has seized. This could result in costly damage to the feeder screw. Yaskawa V1000 or A1000 drives can be programmed to alert the operator of alarm situations or bring the feeder to a stop if required.

The Yaskawa V1000 and A1000 drives can continue to operate through momentary power losses of (< 5 ms) decreasing the chance of losing a batch of material.

The Yaskawa V1000 and A1000 drives are fully capable of meeting the challenges that are faced in screw feeder applications.