UNICO

FTS™

*Embedded
Feed-to-Stop
Control*

Overview

The FTS™ software module is engineered specifically for controlling roll-feed applications. The program is embedded within the controller of a UNICO drive, eliminating the need for an external control rack. When used in conjunction with a programmable controller, the drive forms a powerful automation work cell that can either stand alone or be easily integrated with other UNICO automation cells to build a complete control system for a metal-processing line. Embedded control reduces system complexity while taking full advantage of the exceptional performance, flexibility, and ease of use of UNICO drives.

Features

Single-Stroking Profile Mode

In this mode, the feeder follows an internally simulated profile using the feed initiate and cut engage inputs to control the feed cycle. The feeder starts the feed when the feed initiate input is set. When the feed is complete, the feed complete output is set. The shear can then be cycled to clear feed initiate and set the cut engage bit. When cut engage is set, the feed complete output is cleared. As the shear continues to cycle, the feed initiate input is again set to start another feed.

Synchronous Profile Mode

In synchronous profile mode, the feeder is electronically line-shafted to the press or shear. It follows an external reference signal, typically a pulse generator or a resolver mounted on the press or shear. By taking advantage of the full feed angle, this mode results in higher production rates while minimizing slippage. The feeder responds quickly to changes in line speed, allowing the line to accelerate rapidly without risk of jamming. The feeder never operates faster than is necessary, thereby minimizing violence in the loop between the feeder and leveler.

Trapezoidal Mode

Trapezoidal feeding smoothes the command by rounding the sharp corners of the velocity profile. While most feeders operate in a profiling mode, trapezoidal mode can be used to attain the lowest speed for a given length.

Jog Feed

Jog feed is a manual function useful during set-up that jogs the feeder forward or reverse one part length. When the length is reached, the drive stops and remains in position until the jog feed input is received again. The drive can also be jogged any distance forward or reverse.

Features
(continued)

Single Feed
The single feed function feeds one length at a preprogrammed speed. The single feed input must be toggled for subsequent single feeds.

Back-Up
The feeder can be commanded to reverse slightly after the shear or press has gone through bottom dead center. This reduces material drag on the rising blade and improves blade life. It also helps prevent damage to the leading edge of the material.

Micro Adjust
The micro adjust feature minutely adjusts the feed length by adding or subtracting a programmable offset to the current feed length.

Quick Length Change
Lengths may be quickly changed on the fly by entering a new length into the next length location, then setting an input to make the changeover.

Multiple Part Counting
The operator can specify the number of parts to be counted in applications where multiple pieces are cut or stamped with each feed or die hit.

Batching
The operator can set up batches consisting of a quantity of feeds of a given length that the drive will perform before stopping.

Early Warning
An early warning output is set when the batch is nearly completed. The output can be used to alert the operator or to slow the line down.

Velocity Clamping
The feed velocity may be clamped to a reference or input velocity. In conjunction with loop control, this feature can be used to control line speed on shear lines.

Pilot Pins
Pilot pins are typically used to align the indexed feed within a die. The feeder reduces its torque limit when the pilot pin is engaged in the material to allow the alignment to occur. When the pilot pin is released, the feeder can either reset its position using the newly aligned position as its zero point or maintain its current position.

Press Cam Outputs
The program monitors the feedback device on the press or shear and generates up to eight outputs that can be configured to turn on or off at specified press positions. These outputs can trigger various other line functions and replace mechanical cam switches.

Reject
A reject function is provided to allow the operator to reject material of in specified lengths. A reject output may be used externally for proper counting and stacking.

Feed and Delay
A programmable delay allows the user to adjust the time between the completion of a feed and the firing of the shear to meet machine requirements.

Line Pulse Generator
While most feeders operate using a line pulse generator (LPG) to track material movement, some lines do not have a measuring wheel or operate without an LPG at certain times. An input allows the user to selectively enable and disable this functionality.

Programmability
The control can be customized to a specific installation using *UEdit*™, a powerful Windows-based programming tool that lets users add their own ladder logic and function-block programming.

Communications

Serial Communications:
- Two isolated RS-232/422/485 synchronous/asynchronous serial ports up to 1 Mbaud

Fiber-Optic Communications:
- One isolated fiber-optic synchronous/asynchronous serial port up to 1 Mbaud
- One RS-232/422/485 synchronous/asynchronous serial port up to 1 Mbaud

Communications Options:
- Profinet interface
- ControlNet interface
- Profibus DP interface
- Ethernet interface
- EtherCAT interface

Transducer Options

A variety of motor-mounted transducers are available to provide feedback of motor position, velocity, and acceleration.

Incremental Encoder:
Two quadrature channels with marker pulse operating up to a maximum frequency of 300 kHz per channel

Single-Turn Resolver:
Up to 14-bit resolution

Multiturn Absolute Encoder:
24-bit resolution with RS-422/485 synchronous serial communication

Inputs and Outputs

Input Converters:
2.5 to 28 V DC @ 30 mA, 90 to 140 V AC @ 11 mA, or 180 to 280 V AC @ 5 mA

Output Converters:
5 to 60 V DC @ 3 A, 12 to 140 V AC @ 3 A, or 24 to 280 V AC @ 3 A

Relay Converters:
250 V AC @ 8 A, normally open or normally closed

Control Module Relay Contacts:
Form A 250 V AC @ 5 A

Inputs/Outputs

A variety of input/output functions are provided for integrating the feed-to-stop control with external devices. The user can select the functions required by a given system and specify their corresponding hardware or serial I/O points.

Inputs
- motor on
- fault reset
- manual
- auto
- auto run
- jog forward
- jog reverse
- jog feed forward
- jog feed reverse
- feed initiate
- motion enable
- cut engage
- line pulse generator enable
- single feed
- profile
- single-stroking profile
- back-up feed
- pilot pin
- load length
- acceleration 1
- tuning 1
- fast stop
- batch reset
- clamp velocity
- reject
- micro adjust reset
- micro adjust positive
- micro adjust negative
- reset position

Outputs
- relay outputs 1-4
- outputs 0-31
- serial outputs 0-15
- motor on
- no fault
- manual
- auto
- motion
- reverse motion
- forward motion
- feed plus delay
- batch complete
- line pulse generator enable
- profile
- single-stroking profile
- pilot pin
- reject
- feed complete
- press reference
- feed initiate
- feed error
- cut engage
- early warning
- cam 1
- cam 2
- cam 3
- cam 4
- cam 5
- cam 6
- cam 7
- cam 8
- motor rms warning
- thermal warning

FTS™

Embedded Feed-to-Stop Control

UNICO — Worldwide

Corporate Headquarters

Unico, LLC.
3725 Nicholson Rd.
P. O. Box 0505
Franksville, WI
53126-0505

262.886.5678 main
262.504.7396 fax
www.unicous.com

Unico is a leading global innovator of motion-control solutions for industry. Founded in 1967, the company develops, manufactures, and services variable-speed drives, application-engineered drive products, integrated drive systems, and ancillary products that improve operations by increasing productivity, safety, and equipment life while lowering energy and maintenance costs.