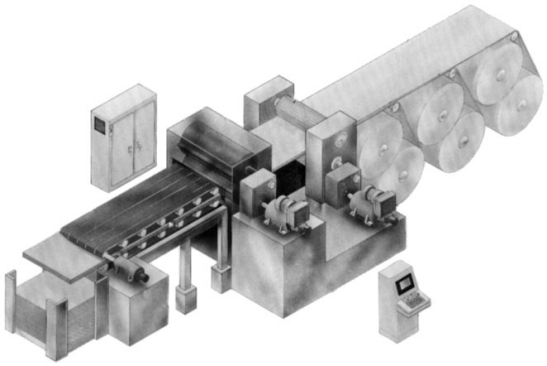

UNICO

SHEETER

High-Performance Sheeter Controls

Overview

Unico's high-performance sheeter control systems provide comprehensive solutions that yield optimal cut accuracy, throughput, and energy savings with paper and board applications.

Features

Flexibility

Sheeter systems utilize Unico's AC variable-speed drives—powerful, flexible products developed for complex, performance-oriented applications. Both AC flux vector and DC PWM versions are available. These drives offer diverse feedback, I/O, communication, and software options. They also incorporate a number of energy-conserving features, including a modular DC bus for sharing energy among multiple drives and line-regenerative capability for exporting energy back to the power grid. The optional regenerative converter virtually eliminates noise and harmonic disturbance on the incoming power lines.

Smart Drives

The drive's digital-signal-processor (DSP) based controller incorporates software that has been engineered specifically for constant-velocity and cyclic sheeters. This embedded program offers a number of programmable features that allow OEMs, integrators, and users to customize the functionality of the drive to the requirements of the application.

Runs All Preprint Product

The sheeter drive operates in either cut-to-length or cut-to-mark mode. In cut-to-mark mode, the system can cut either a single mark, a mark/space ratio format, or a pattern recognition format, all with plus/minus offset capability. Cutting to watermark is also possible using a specialized sensor. Windowing is used to prevent spurious mark detection.

Mechanical Resonance Filtration

Digital notch and low-pass filters ensure stabilized control by filtering the torque command of the drive to avoid exciting natural mechanical resonance. A unique mechanical compliance detection system employing dual-transducer feedback control delivers optimal cuts and compensates for mechanical windup and backlash conditions to improve mechanical stiffness.

Energy Savings

Multiple inverters can be operated from a single converter unit. This allows applications that naturally share regenerative energy, such as rotary cutoff knives, draw rolls, and tapes, to reuse energy rather than dissipate it as heat through resistors. Consequently, a much smaller converter is needed than would be required using individual integrated drives. Another inverter can optionally be used in place of the input converter to regenerate power to the main supply.

Features *(continued)*

Health and Safety

Unico drive systems conform to the most stringent health and safety codes and practices. Systems can incorporate EMC/RFI filters to reduce the effect of electro-magnetic disturbances from the drive while providing immunity from other electrical equipment.

Feedback Transducers

Reliable, accurate feedback is extremely important to the sheeter, and Unico selects the proper reference and feedback transducers for the system. Motor-mounted units must withstand the heat and vibration generated by operating the motor. Standard units normally meet these requirements, although selection of the mounting arrangement and motor/pulse generator coupling are critical. The web speed reference encoder ensures the sheets are cut to length within tolerance. Pulse counts up to 60,000 per revolution are available. Absolute and sine-cosine encoders are also available.

Communication Protocols

The drive supports a variety of serial communication protocols for connecting to virtually any PLC or HMI. The drive can also operate in a stand-alone mode using the built-in keypad/display with an ANSI protocol connection to a simple serial display unit.

- CANopen
- CC-Link
- ControlNet
- DeviceNet
- Ethernet
- Interbus
- Modbus Plus
- Modbus RTU
- Profibus
- Remote I/O†
- RS-232/422/485

†Supported only by the 2000 family platform

Peripheral Equipment Interface

Unico's drive and control systems interface with and/or control a wide variety of peripheral equipment to provide a complete electrical package, including:

- Web guides
- Slitters (anvils)
- Pneumatic brakes
- Electrical brakes
- Load cells
- Trim removers
- Stackers
- Register controls
- Unwinders (backstands)
- CCD cameras
- Dancer controls
- Lubrication systems
- Reject systems
- Tab inserters

Human Machine Interface

A monitor, in combination with a programmable control and/or a personal computer, provides production automation and data acquisition and display. Order and production requirements can be preset, and automatic sheet-length adjustment is provided. The HMI displays current order data, line speed, cuts per minute, sheets made and remaining, cut-to-mark window and offset, and sheeter status. Daily and shift data is recorded, stored, and can be displayed upon command or sent to the printer for hard-copy reporting.

Enhanced Diagnostics

The HMI can also log and sort a wide range of operational data and display it in a variety of formats. All machine setups—including draw roll, cutter, tapes, reject system, registration, line operation, length/speed table, and squaring—are software controlled and conveniently displayed for immediate fault diagnosis. Parallel I/O status is plainly shown in tabular format. A special diagnostics menu, designed for commissioning and rapid fault-finding, is also available on-screen or on-line through a modem for remote diagnostic service. Drive-recorded faults are stored historically until reset for assistance in any breakdown situation. An ongoing SPC analysis of cut error uses draw roll and cutter data samples to analyze performance.

Features *(continued)*

Plant-Wide Integration

Serial communications can be provided for integration with host computers, maintenance PCs, and plant-wide data acquisition and control systems.

Tapes Drives

Unico's range of AC IGBT-based flux vector drives can also power and control both high- and low-speed tape sections. Drives use digital master/slave control with an electronic gearbox. This electronic line-shafting (ELS) capability interfaces with the draw roll to ensure that cut sheets are removed rapidly from the knife and shingle properly before the stacker. Connecting the tape drives to the common DC bus reduces overall energy consumption.

Motorized Unwinders

Optional unwinder drives with embedded tension control provide dynamic and static tension with coulomb frictional compensation for systems using a load cell. Open-loop tension control is available for less demanding applications without a load cell or dancer.

Aftermarket Support Services

Unico provides a complete range of services to support its drive systems, including electrical installation, commissioning, service, training, spare parts, and repairs. A modem interface for direct connection to Unico's technical support department can also be provided.

Summary

Machine Performance

For machines operating up to 1,500 fpm and 600 cpm:

- Proven electrical cut accuracies of better than ±0.005" under all conditions over a sheet length of 16" to 64"
- Web widths up to 98"

Hardware

- Induction or brushless DC motor control up to 1,000 hp with an input voltage of 220 V to 600 V AC
- Servo performance with nonregenerative and four-quadrant operation systems
- Stand-alone drive or common DC bus sharing
- Multiple transducer and communication options to suit customers' interfacing preferences

Control

- Digital signal processor (DSP) for drive and application control
- Fiber-optic serial connection between draw roll and rotary cutoff
- Low RMS drive routine profile to minimize RMS motor torque and maximize production
- Automatic order change (AOC) for switching lengths when a batch has been completed
- Line speed calculation for maximum allowable speed based upon set length
- Programmable cam outputs based upon cutter angular position for user auxiliary controls

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