January 2006 - L106

Custom Electronics Solutions

www.DanaherMotion.com

Servo Drives

KOLLMORGEN™

Solutions by DANAHER MOTION

Custom Electronic Solutions are provided by Specialty Electronics

Why do Customiztion?

- When standard products do not address your specific requirements
- Size -Need to fit in space
- Features and Functionality
- Cost Optimization - for example a multi- drive solution on a single board
- Economies of scale - quantities of components purchased by Danaher Motion are leveraged for the benefit of your custom solution
- Dedicated engineering resources have their core competence in servo and motion systems
- Building Blocks methodology -use of proven tested modules to construct a solution
- Performance - design optimized to perform to exact requirements
- Single source for all motion system components - one responsible source to make your system work

Danaher Motion Values

- Application Expertise
- Broad & Innovative Motion Control Products and Systems
- Customer Focus
- Motion Control Pioneers with Global Staying Power
- Operational Excellence

OFDL

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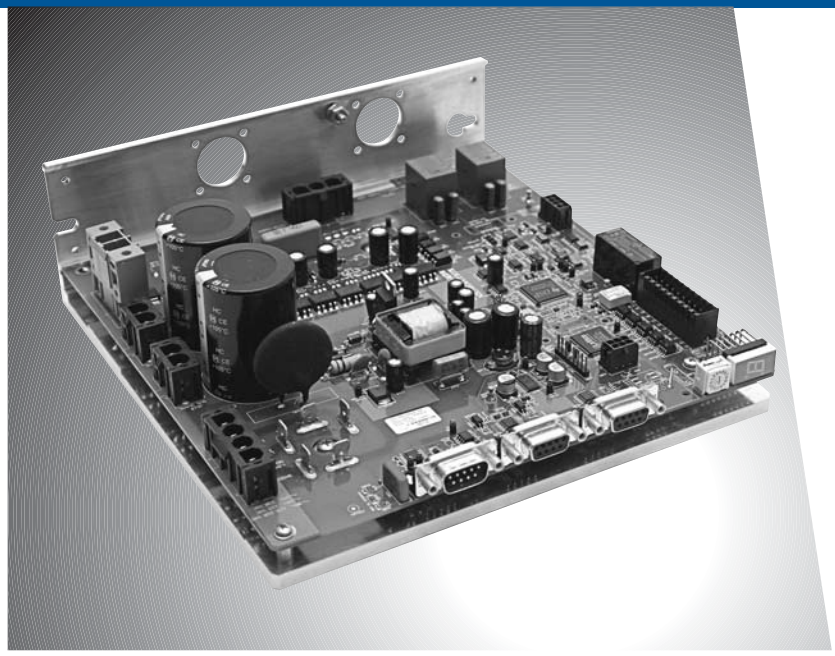


DESCRIPTION

The OFDL (Open Frame Drive L-shape) is an integrated digital servo drive that controls the electric motor and the machine operation, and interfaces with the machine controller and other programming maintenance tools. The OFDL consists of a single circuit board including both the power stage and the digital circuitry.
The OFDL is designed to meet low cost requirement but at the same time it is a fully featured drive.

RATIONALE

The Motivating factor behind this development effort was the need to have an alternative low cost system. At the same time, the new product meets:

- Aggressive cost target
- Fully featured drive
- Compatibility with existing cabinet

SOLUTION

- Digital brushless servo system with innovative electronics to meet reliability and costs targets.
- Open frame drive for direct mounting within the existing enclosure.
- Modular software architecture for simple implementation of new features.

Solutions by DANAHER MOTION

Applications

- Painting machine, Plasma-cutting machine, packaging machine, Textile

FEATURES

Real-Time Data Monitoring

- Bus voltage
- Analog inputs
- Drive temperature
- Setup tool: SEPLink for windows
- Motor Current

Feedback

- Resolver
- Auxiliary encoder feedback (Master/Slave)
- Encoder Sensor bearing SKF
- Auxiliary Encoder feedback dual loop operation (future)
- Work with AKM motors

Servo Control

- Fully digital current,velocity and position loops.
- Patented torque angle control enhances motor performances
- PWM switching frequency 16 kHz
- Velocity loop bandwidths up to 400 Hz
- Analog velocity control loop
- Advanced patented sinewave comutation technology provides smooth, precise low-speed control as well as high-speed performance
- Sinusoidal Commutation
- Accurate torque control due to precision balanced current loops with open loop sensors

Reference Command

- 12 bit analog-to-digital conversion
- Pulse following control, configured as an encoder follower or pulse/direction counter
- Serial command
- Designed for future support of CANOpen controller

Motion Options

- Point-to-point incremental or absolute with trapeze and S-Curve profiles acceleration and deceleration control
- Motion indexing profiles in memory
- Homing functions

I/O's

- 7-Segment Indicator
- 1 Analog input
- Fault relay
- Motor temperature sensor
- Brake Relay
- Digital I/O (Configurable):
  - Optically isolated
  - 7 bi-directional inputs + HW Enable input
  - 2 Outputs

Communication

- RS-232
- CanOpen (future development)
- RS-485 Half Duplex
- ModBus communication rates: 9.6, 19.2, 38.4, 57.6, 115 kbps
- ModBus RTU protocol

Additional Features

- Encoder simulation
- 16-positions rotary switch for drive addressing
- New HW features can be added using high-density pin header connector

Robust Power Stage Options

- Self-protecting power modules
- DC Bus sharing
- Full protection against short circuit, under-voltage, over voltage, over current, motor and drive over-temperature, over-current, feedback loss, over speed and break (regeneration)
- Flexible current foldback protection
- External regen resistor readiness

Rating

AC Input	Output Continuous Current Per Phase (RMS/Phase)@ 45°	Output Peak Current Per Phase (RMS/Phase)	AC Line Input Voltage (VAC)	Rated Input Power (kW)	Rated Output Continuous Power (kW)
1 Phase	9 amps	18 amp. (0.5 sec)*	115	2.0	1.4
			220	3.9	2.7
3 Phase	9 amps	18 amp. (0.5 sec)*	115	2.0	1.4
			135	3.9	2.7

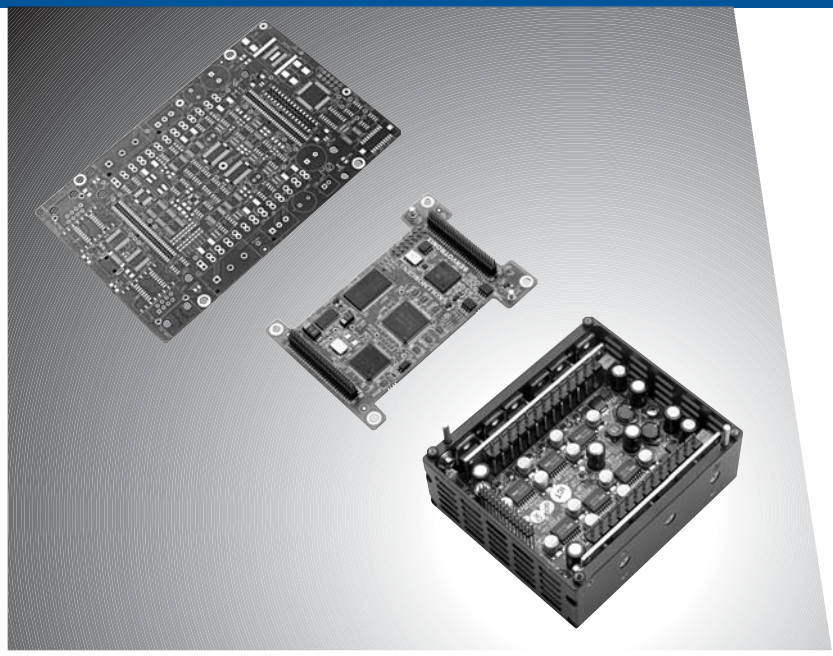
Rated DC voltage: 160 VDC-325 VDC
Lower ratings are available upon request, can be ordered with or without heat sink
* Forced cooling is required

Mechanical Dimensions

2.7" (height) x 7.5" (width) x 7.5" (length)

Low Voltage Amplifier

www.DanaherMotion.com



DESCRIPTION

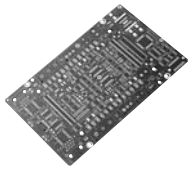
Compact, low voltage dual axis drive.

RATIONALE

- Low profile, compact product application specific connectors & communication board
- High precision servo performance
- Customer specific algorithms embedded in the product

SOLUTION

- Dual axis drive
- Customer specific board



Customer specific board

CPU Board

Power Stage

Solutions by DANAHER MOTION

Applications

- Robotics, Medical, Electronics assembly.

FEATURES

Customer Specific board containing:

- Feedback type circuitry
- I/Os circuitry
- Connectors
- Communication circuitry

CPU Board

- Servo Control Fully digital current, velocity and position loops
- Advanced patented sinewave commutation technology provides smooth, precise low- speed control as well as high- speed performance
- Accurate torque control due to precision balanced current loops with closed loop sensors
- Patented torque angle control enhances motor performance
- Velocity loop bandwidths up to 400 Hz
- Motion Options Point- to- point, incremental or absolute, PVT
- Homing functions, Configurable I/ O

Robust Design

- Self- protecting power modules
- Full protection against short circuit, over- voltage, under- voltage, motor and drive over- temperature, over- current and feedback loss
- Flexible current foldback protection

Rating

Power supply DC Input	Output Continuous Current Per Phase (RMS/Phase) @ 45˚C	Output Peak Current Per Phase (RMS/Phase) 1 sec	DC Line Input Voltage (DC)	Rated Input Power (W)	Rated Output Continuous Power (W)	VBUS
20-60	10	20	48	680	480	48

Logic power supply 24 VDC ¯ 5% at 500 mA
Note: current can be degrated according to the application.

Mechanical Dimensions

box 1.56" (height) X 4" (width) X 3.48" (length)

Indexer Servo Controller

www.DanaherMotion.com

DESCRIPTION

Fast 360° per second Indexing Speed controller, Multiple- line LCD Display providing fast and easy setups - Store up to 50 Programs (up to 1000 steps per program) All- Digital Control supports either brush or brushless motor indexers.

RATIONALE

5C Rotary Indexing System with an all-digital servo control generations ahead of the electronic features in today's benchmark unit.

SOLUTION

Digital control with an intelligent power module (drive electronics) for cool and quiet operation resulting in a highly efficient system. This combination of high- level servo control technology backed by Danaher Motion, and the reliability that Hardinge has engineered into the mechanical indexer offers the user fast indexing and programming.

Solutions by DANAHER MOTION

Applications

- 5C Rotary Indexing System

FEATURES

Servo control multiple line LCD display that lets you view and edit the program number, step number, loop and preparatory code all on one screen. You can store up to 50 programs with up to 1000 steps in each program. The parameter number as well as its definition can be viewed in logical English. Error and fault messages are displayed to help diagnose problems quickly. The four line display means you are viewing all critical data, eliminating scrolling and spending less time referring to the operator's manual. The servo control has the ability to handle baud rates up to 56 k supporting the latest speeds for sending and receiving data. RS-232 communication parameters can be adjusted to support stop bits, data bits and different baud rates to work with different machine tool brands, and is accessible for remote diagnostics and the servo control can be used as a direct replacement for trouble-shooting. The current benchmark control in conjunction with either brush or brushless motor indexers. Parameters are common to the benchmark unit to ease operator integration from one brand to the other.
Download programs can be done via serial communication RS-232 connected to a PC or via IR InfraRed communication and Pocket PC.

Feedback

- Incremental encoder with halls and index pulse

Motion Options

- Point-to-Point incremental or absolute with trapezoidal and S-Curve profiles acceleration and deceleration control
- Motion indexing profiles in memory
- Homing functions

Velocity

- 360 deg/sec
- Resolution 0.001 degree

Motor

- Custom AKM with new shaft and cabling design, P/N AKM41H-CSMN2-02

I/O's

- 2 Input's, emergency stop, start motion
- 1 output, motion done

Communication

- Serial communication RS-232
- ASCII Infrared communication for pocket PC
- Keypad

Additional Features

- Serial communication RS-232 daisy chain
- Emergency stop button

Rating

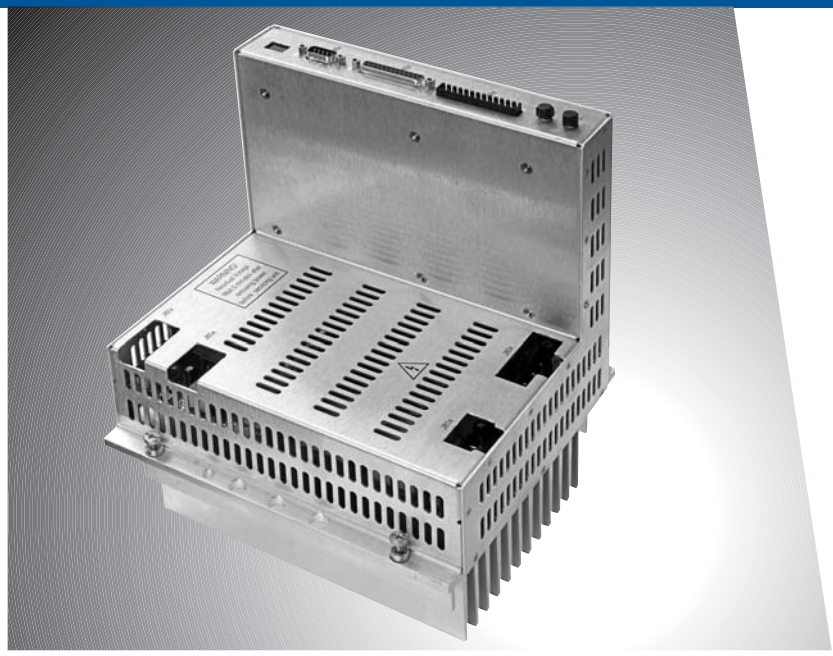
Type	Power supply AC Input One phase	Output Continuous Current Per Phase (RMS/Phase) @ 45˚C	Output Peak Current Per Phase (RMS/Phase) 1 sec	VBUS
1	110-230	4.5	18	160-320

Mechanical Dimensions

5.9" (height) X 11" (width) X 9.5" (length)

High Voltage Amplifier

www.DanaherMotion.com



DESCRIPTION

The L-shape high voltage high power (18 kW) amplifier is a high- performance, fully- featured digital servo drive, for use in applications requiring connection to high voltage. It comprises high power stage with the CD Series 5 control board, thus providing the CD Series 5 feature set.

RATIONALE

- High power drives for extending existing robotics product line.
- Customer specific mechanical shape to accomodate to the customer's cabinet.
- SERCOS communication.

SOLUTION

- One high voltage power supply and six high voltage L-shape amplifiers per system, that fit into customer cabinet.
- Mechanical shape per customer request.
- Design new power stage and use the well known digital board of the CD series 5.
- Short development cycle.

Solutions by DANAHER MOTION

Applications

- Robotics, Machine tools, Electronic assembly.

FEATURES

Operation Modes

- 9kW, 15 kW & 18 kW.
- Feedback Sine Encoder, 5 V Stegmann Hiperface, Resolver or encoder
- Servo Control Fully digital current, velocity and position loops
- Advanced patented sinewave commutation technology provides smooth, precise low- speed control as well as high- speed performance
- Accurate torque control due to precision balanced current loops with closed loop sensors
- Patented torque angle control enhances motor performance
- Velocity loop bandwidths up to 400 Hz
- Self- tuning velocity loop algorithm
- Reference Command SERCOS operation.
- Motion Options Point- to- point, incremental or absolute
- Homing functions

Configurable I/ O

- 3 digital inputs and 1 digital output, configurable to a variety of functions
- Analog output for monitoring various parameters
- Robust Design Self- protecting power modules
- Full protection against short circuit, over- voltage, under- voltage, motor and drive over- temperature, over- current and feedback loss
- Flexible current foldback protection

Power Supply Rating

AC Input 3 Phase [VAC]	Output Continuous BUS voltage	Rated Output Continuous [kW]	Rated Output Peak [kW]
400	565	12	36

24 VDC @ 0.5 amp logic input supply, to separate from mains supply.

L-shape Amplifier Rating

DC Input [VDC]	Output Continuous Current Per Phase [RMS/Phase] @ 60˚C	Output Peak Current Per Phase [RMS/Phase]	Rated Output Continuous Power [kW]
565	15 amps	32 amp. (2 sec)	9
565	25 amps	65 amp (2 sec)	15
565	30 amps	84 amp 2 (sec)	18

24 VDC @ 0.5 amp logic input supply, to separate from mains supply.

L-shape Amplifier Mechanical Dimensions

8.46″ (height) X 8″ mm (width) X 10.63″ (length)

Variable Reluctance Motor Control System 8 Axis

www.DanaherMotion.com

DESCRIPTION

Complete high power control chassis, which drives 8 linear variable reluctance motors. The control chassis consists of 6 kW regulated power supply and 8 independent amplifiers. Each amplifier performs current control of the motor's three independent phases.

RATIONALE

- Special motor with unique bridge structure and PWM pattern demanding current loop requirement
- Non linear electro-mechanical structure
- Special safety requirements
- Stablized power supply voltage at peak acceleration condition

SOLUTION

- Chassis with signal distribution panel
- Boost Power supply topology
- Safety features on distribution panel
- High sampling rate digital controller
- Adaptive gains

Solutions by DANAHER MOTION

Applications

- SMT assembly machine

FEATURES

- Fully digital
- Current loop mode, externally commutated
- Sampling time 25 micro seconds, BW > 3 kHz
- PWM frequency 20 kHz
- Analog input,
- 3 dedicated inputs
- Fault output
- Special breaking algorithm in feedback sensor absence

Rating

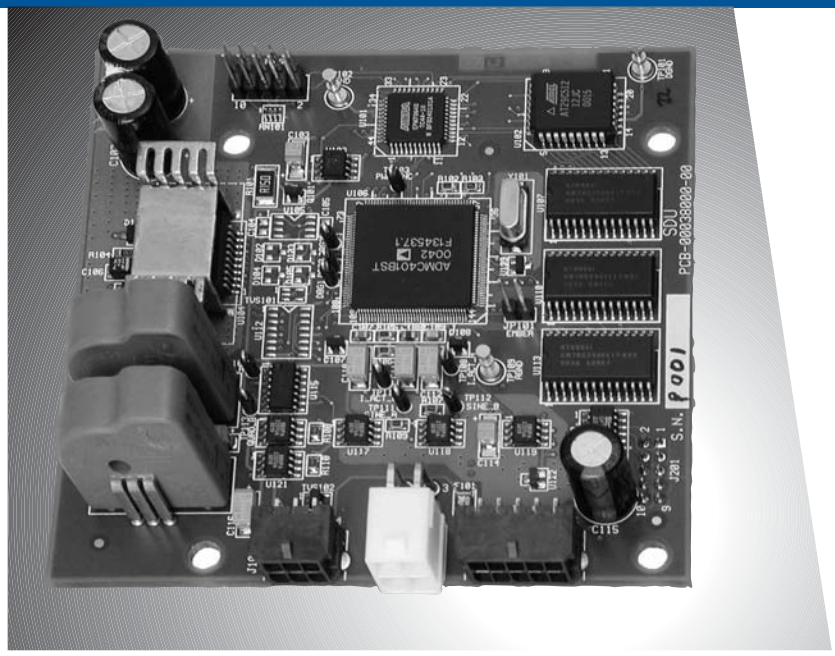
- Power Supply - 6 kW, 230 VAC three phase input, Power peaks 22 kW
- Amplifier (each) - 380 VDC, 10 amp continues ADC, 30 amp peak ADC.

Mechanical Dimensions

19" (height) X 18" (width) X 21.3" (length)

MINIATURE SERVO AMPLIFIER

www.DanaherMotion.com



DESCRIPTION

Measuring only 4"by 4", the miniature servo amplifier provides digital current and velocity loops with an integrated power stage.The system operates in velocity mode,executing a motion profile that is communicated over the serial communications link.The SDU drives an IL-030 DDL linear motor, achieving an effective resolution of 20 nm.

RATIONALE

A very light,low profile amplifier had to be assembled on the moving part of a linear motor .
The motivating factor was the need to have more accurate, lower costs replacement for the existing gear-based servo system.
At the same time the new product had to:

- Perform specific motion profile
- Serial communication RS-232 with the host computer
- Meet aggressive target costs

SOLUTION

Very small,single board,frameless,fully digital servo drive, driving a linear motor in precision scanning.

Solutions by DANAHER MOTION

Applications

- Used by Medical scanners

FEATURES

Feedback

- Sine Encoder (A/B)interface with 256x interpolation
- Incremental Encoder (A/B)
- Commutation initialization at power up

Servo Control

- Fully digital current and velocity loops
- Sinewave commutation provides smooth,precise low-speed control as well as high-speed performance
- Accurate torque control
- PDFF velocity loop
- Programmable velocity loop output filter.
- Selectable 400 Hz filter on the feedback.

Motion Options

- Motion commanded via serial port instructions
- Homing to limit switch
- Motion profile based on precise velocity control

I/O's

- Positive and negative direction limit switches

Communication

- Serial communications - RS-232

Robust Design

- Self-protecting power modules
- DC Bus sharing
- Full protection against short circuit, over-voltage, under-vltage, motor and drive over-temperature, over-current and feedback loss
- Flexible current foldback protection

Rating

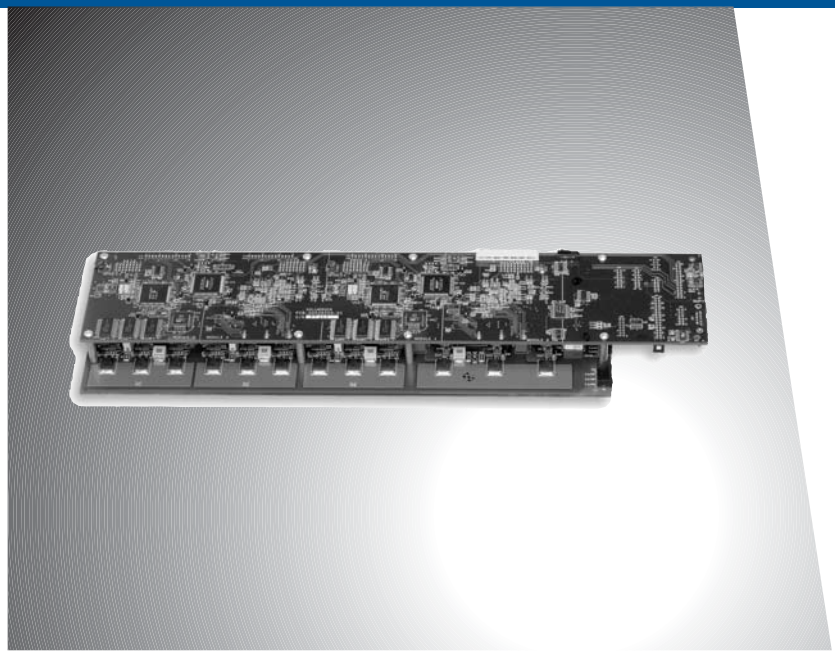
- 24 VDC bus power supply, 5 VDC logic supply
- 1.4 A_{RMS} continuous and 2.3 A_{RMS}

Mechanical Dimensions

4" (length) x 4" (width)

4-AXIS MULTI-DRIVE UNIT

www.DanaherMotion.com



DESCRIPTION

The Multi-Drive Unit (MDU) consists of 4 independent servodrives assembled in a single package to be mounted inside the SCARA robot body. The MDU controls frameless RBE motors, customized and packaged by Danaher Motion for the customer.

RATIONALE

By having the drives embedded inside the mechanics structure of the semiconductor application robotics, long, and complicated cables could be avoided. At the same time,the new products had to include:

- Special communication protocol to fit to exiting customer's controller .
- Two versions:3-axis module and 4-axis for two different robotics systems .
- Exact fit to the compact robotics design.

SOLUTION

- Integrated 4-axis and 3-axis modules for meeting size and cost target.
- Open frame drive for direct mounting to the robotics structure .
- Simplified,short cables between the module,the motors, the feedback series and the I/Os, for simplified solution.

Solutions by DANAHER MOTION

Applications

- Semicondutor wafer handling robotics

FEATURES

Operation Modes

- Current mode
- Velocity mode

Feedback

- Stegmann Hiperface Sine Encoder

I/O's

- ±10 VDC analog reference command
- Encoder simulation generated by the MDU
- Single fault signal from the MDU to the controller
- Individual remote enable signals for each drive
- Customer-specific parallel bus for configuration and status

Benefits

- Motors and motor stack (housings) custom built to suit the robot's mechanical structure
- Custom servo drive designed to be mounted within the robot body
- Short development time: 4 months from specification to prototype integration

Rating

- 3 drives rated at 2 A_{RMS} continuous and 6 A_{RMS} peak
- 1 drive rated at 5 A_{RMS} continuous and 10 A_{RMS} peak
- Rated DC bus voltage 45 VDC

Mechanical Dimensions

1.1" (height) X 5.9" (width) X 4.96" (length)

12-AXIS MULTI-DRIVE UNIT

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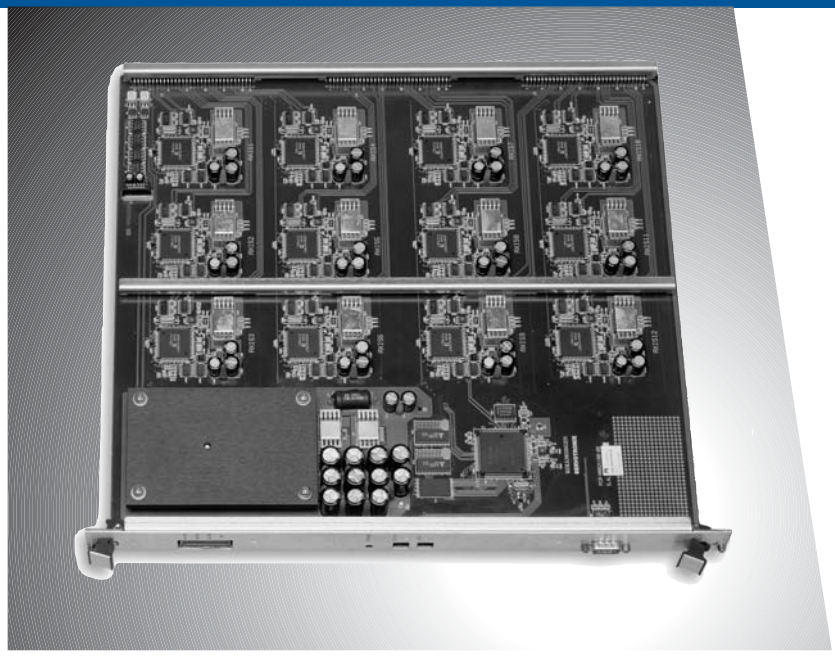

DESCRIPTION

This Multi-Drive Unit (MDU) consists of 12 independent servo drives assembled on a 9U PCB. Depending on the end-user's requirements, anywhere from 100 to 200 of these MDUs may be in use in a single machine. A CAN Communications Processor (CCP) controls the process and communicates with the MDUs.

The servodrives operate in Gear Mode only, following a Master Encoder value that comes from an encoder mounted on the main shaft of the machine. This value is broadcast every 1 milisecond over one of the CAN channels .

RATIONALE

The motivating factor behind the development effort was the need to have easy, faster setup and programming flexibility in controlling up to 2200 axes per machine, replacing a mechanical CAM shaft.

In addition,the new product had to meet:

- Outstanding Compact Size
- CAN communication with host controller.
- Aggressive cost target.
- Very High reliability.

SOLUTION

- Optimal arrangement of 12 axes per module and 8 modules in a rack.
- Centralized CAN operator for each module .

Solutions by DANAHER MOTION

Applications

- Tufting machine (carpet industry)

FEATURES

Operation Modes

- Gearing mode only: the servo drives follow a master encoder. Each servo drive has its own independent gear ratio.

Feedback

- Differential inceremental encoder

Communications

- Dual CAN bus communications between the controller (CCP) and the MDU
- A central CPU on the MDU distributes information to the DSPs over an SSI bus.

Rating

- The servo drives are rated at 1.4 A_{RMS} continuous and 2 A_{RMS} peak
- Rated DC bus voltage 28 VDC

Mechanical Dimensions

1.1" (height) X 5.9" (width) X 4.96" (length)

DUAL AXIS SYNQNET AMPLIFIER

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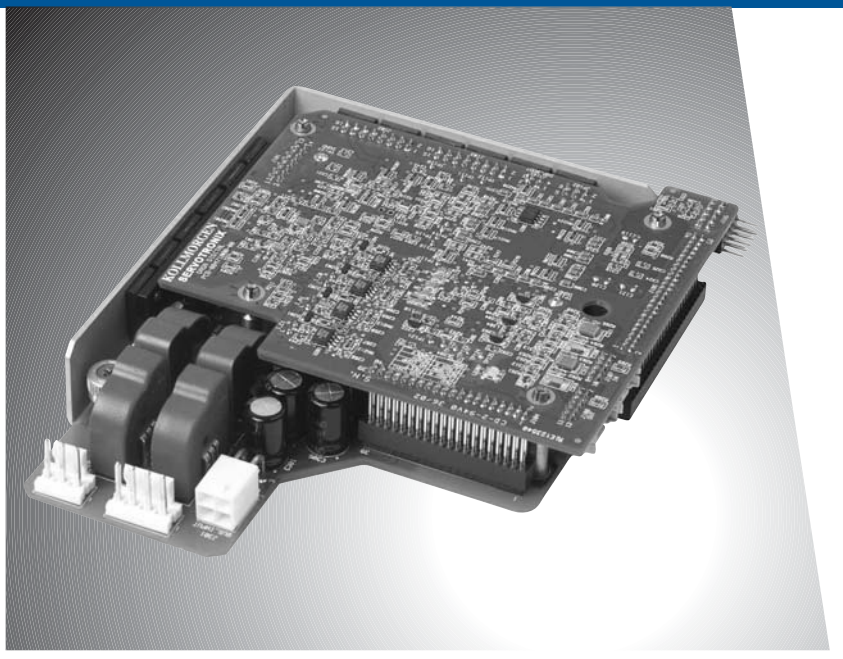


DESCRIPTION

The Dual Axis SynqNet™Amplifier (DASA) is a SynqNet™ servodrive. This extremely compact package incorporates two independent servodrives designed to each provide up to 5 A_{RMS} continuous current from a 48 VDC bus. The SynqNet™ interface enables the OEM to drastically cut down on the machine's wiring and, at the same time, simplifying machine assembly. I/O monitoring in realtime is supported by SynqNet™ at the servo update rate,which can be up to 16 kHz for the DASA.

RATIONALE

The motivating factor behind the development effort was the need to introduce an innovative, small size new generation robot system. At the same time the drive had to include:

- SynqNet communication with the host controller.
- Special mechanical structure to fit to the robot enclosure .
- I/O board developed by the customer that is added as an extension board to the drive .

SOLUTION

- Very compact Dual Axis SynqNet module that fits to the small size robot structure .
- Open frame drive for direct mounting within the existing enclosure .
- Special layout and specific pin-header connector for interfacing the customer's I/O board.

Solutions by DANAHER MOTION

Applications

- Wafer handing robotics

FEATURES

Real-Time Data Monitoring

- Bus voltage
- Drive temperature
- Current
- Analog inputs

Feedback

- Incremental Encoder

Servo Control

- Fully digital current loop
- Accurate torque control
- Patented torque angle control enhances motor performance

I/O's

- Dedicated brake control
- 14 digital I/O points,configurable over SynqNet™ to be either inputs or outputs
- 6 general purpose analog inputs

SynqNet™

- Network bandwidth for torque updates up to 16 kHz
- Remote diagnostics of motor drive performance
- Remote drive configuration and setup
- Real-time diagnostic programming/data collection over SynqNet
- Automatic network configuration and integrity check
- Cabling over 100 meters between each node
- Electrical isolation for robust noise immunity

Rating

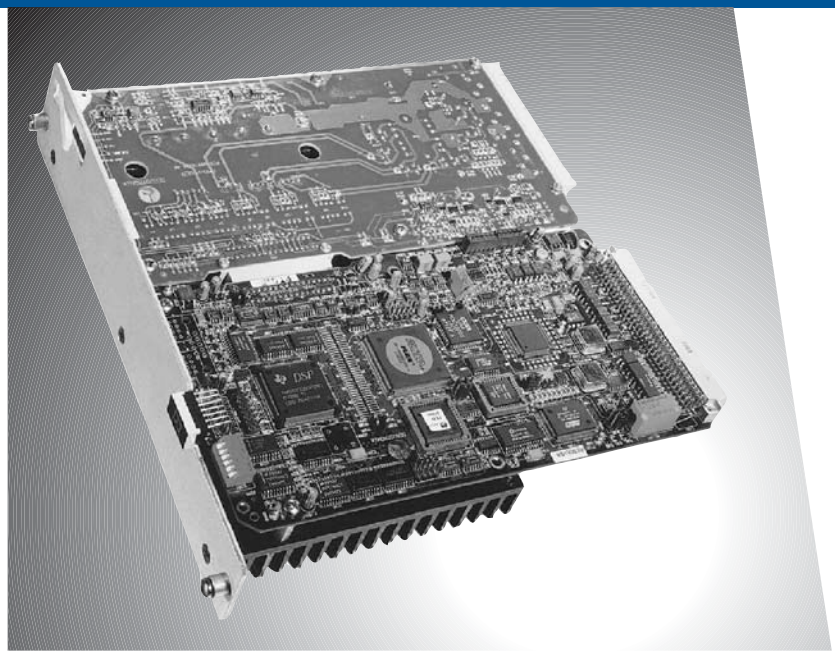
- 5 A_{RMS} cont 11 A_{RMS} peak.
- Rated DC bus voltage 48 VDC.

Mechanical Dimensions

1.1" (height) X 5.9" (width) X 4.96" (length)

RACK MOUNT SERVO DRIVE

www.DanaherMotion.com



DESCRIPTION

The Rack Mount Module (RMM)is a High Performance servo drive.
Numerous Position Control options are offered, ranging from the classical ±10 VDC command,through encoder following and pulse-and-direction,all the way to SERCOS control.

- Fully digital servo loops
- Three power ratings
- SERCOS or ±10 VDC Analog command
- Sinusoidal Commutation
- Self-protecting power stage
- Opto-isolated inputs and outputs
- 300 VDC Bus voltage
- Encoder,resolver,or sine encoder feedback
- Easy setup using MOTIONLINK®for Windows™

RATIONALE

The motivating factor behind this development effort was the need to have more reliable alternative to the existing brush motor system. At the same time, the new products had to meet:

- Reduce number of cables and wiring
- Meet aggressive cost target
- Fit into minimal size cabinet

SOLUTION

Rack Mounted module that fits into a 19"rack. The RMM communicates with the controller via SERCOS .
The backplane reduces the number of the cables for interconnections among the drives, single pair of SERCOS cables for the host controller to the rack, and single machine I/O cable from the robot cell to the rack reduces the number of cables.

Solutions by DANAHER MOTION

Applications

- Used by a robot manufacturer in a wide range of anthropomorphic robots
- Used by a systems integrator in a four-axis servo power module,with an integrated high voltage power supply and a rack supplied by Danaher Motion
- Used by a wood processing maching builder

FEATURES

Feedback

- Encoder feedback supported to 12 MHz
- Resolver
- Sine Encoder
- Secondary encoder feedback,used to close a Dual Loop around the load,or as an input for handwheel or pulse-and-direction oper ation

Servo Control

- Fully digital current,velocity and position loops
- Patented torque angle control enhances motor performance
- Velocity loop bandwidths up to 400 Hz
- Advanced patented sinewave commutation technology provides smooth, precise low-speed control and high-speed performance
- Self-tuning to the load
- Accurate torque control due to precision balanced current loops with closed loop sensors

Position Command

- 14 bit Analog-to-Digital conversion for ±10 VDC operation
- Serial command
- SERCOS operation,designed for use with Danaher Motion's Kollmorgen SERVO**STAR**™ MC multi-axis motion controller
- Pulse following control,configured as an encoder follower,up/down counter,or pulse/direction counter

Motion Indexing

- Stores up to 4 motion profiles in memory
- Start motion through serial command or digital input
- Homing functions

I/O's

- Three digital inputs and 1 digital output,can be configured to a variety of functions

Robust Design

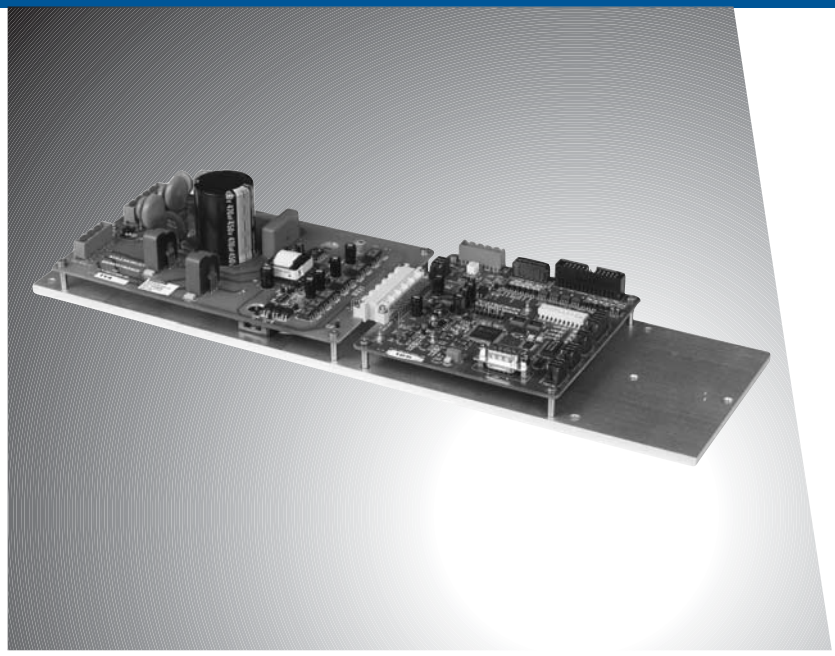
- Self-protecting power modules
- Full protection against short circuit, over-voltage, under-vltage, motor and drive over-temperature, over-current and feedback loss
- Flexible current foldback protection of motor and drive

Rating

- 3 A_{RMS} continuous: 8 A_{RMS} peak
- 6 A_{RMS} continous: 20 A_{RMS} peak
- 15 A_{RMS} continous: 45 A_{RMS} peak
- 300 VDC bus voltage

INTELLIGENT CONTROL UNIT CANopen Amplifier

www.DanaherMotion.com



DESCRIPTION

The **Intelligent Control Unit CANopen Amplifier** (ICU) is a CANopen servo drive designed to meet customer-specific cost,function and dimension requirements.The CANopen interface enables the OEM to drastically cut down on the machine's wiring and at the same time, simplify machine assembly. I/O monitoring in realtime is supported by CANopen.
A KEYPAD can be connected to the servo drive and master via the master host.

RATIONALE

The ICU was developed for a customer in the textile industry, aiming to replace and thus upgrade performances of existing multi-axis, pneumatics based application.
In addition it had to:

- Be mounted ON the machine,within a pre-defined space for minimal mechanical changes .
- Meet low cost design in order to reduce overall machine cost.
- Interface to CAN,and implementation of CAN OPEN protocol,for dramatic reduction of wiring costs and complications .
- Interface to a metric of machine I/Os which included driving a set of solenoids .

SOLUTION

Low cost high performance,open fame drive.
Minimal heat sink could be used by utilizing the machine body as the major heat dissipation piece .

Solutions by DANAHER MOTION

Applications

- Printing applications

FEATURES

Feedback

- Resolver

Servo Control

- Fully digital current,velocity and position servo loops
- Advanced patented sinewave commutation technology provides smooth,precise low-speed control as well as high-speed performance
- Accurate torque control due to precision balanced current loops with closed loop sensors
- Patented torque angle control enhances motor performance
- Velocity loop bandwidths up 400 Hz

I/O's

- 6 digital Input points over the CAN Bus
- 8 digital Output points over the CAN Bus
- Analog input over the CAN Bus

Robust Design

- Self-protecting power modules
- Full protection against short circuit,over-voltage,under-voltage,motor and drive over-temperature,over-current and feedback loss
- Flexible current foldback protection

Rating

AC Input	Output Continuous Current Per Phase (RMS/Phase)@ 45°	Output Peak Current Per Phase (RMS/Phase)	AC Line Input Voltage (VAC)	Rated Input Power (kVA)	Rated Output Continuous Power (kVA)
1 Phase	3 amps	6 amp. (0.5 sec)	115	0.44	0.35
			230	0.89	0.7
3 Phase	3 amps	6 amp. (0.5 sec)	230	1.4	1.1

- Power supply: 1 or 3-phase 208 to 250 VAC Line-to-Line
- Rated DC bus voltage: 160 VDC -325 VDC
- 24 VDC at 0.5 amp logic input supply, to separate from mains supply

Mechanical Dimensions

2.75" (height) X 4.72" (width) X 16.2" (length)

DUAL AXIS DRIVE

www.DanaherMotion.com

DESCRIPTION

The Dual-Axis Drive incorporates two independent servo drives in a single enclosure, and provides high performance with fully digital current, velocity and position loop control. From a power stage point of view the DAD consists of two 6 amp power stages with an integrated power supply.

RATIONALE

Dual axis solution saves size and costs where the mechanical structure includes two motors that are physically located one next to the other. That was the case with a wafer handling robot structure.

SOLUTION

A Dual-Axis Drive in a Single-Axis size enclosure. Single digital board capable of handling the two axes for saving size and costs.
Two power stages sharing the same rectifier circuitry and same heat sink.
Common connectors for machine I/Os, AC Power Supply, and communication simplify the system wiring, reducing the overall number of cables.

Solutions by DANAHER MOTION

Applications

- Pick and place robot

FEATURES

Feedback

- Heidenhain EnDat® sine encoder
- Interpolation x256
- Commutation initialization at power up
- Incremental Encoder and halls

Operational Modes

- Current Mode: ±10 VDC reference command
- Velocity Mode: ±10 VDC reference command
- Position Mode: Pulse and direction reference command

Servo Control

- PDFF velocity loop
- Programmable velocity loop output filter. This filter can be programmed as a low-pass or as a notch filter, for effective compensation of system resonances.
- Selectable 400 Hz filter on the feedback

I/O's

- Individual Enable signals
- Individual ±10 VDC reference command
- Individual Pulse & Direction command
- Individual InPosition indicator
- Ready Output: Set active when both drives are enabled without faults
- Alarm Output: Set active if either of the drives has faulted
- Clear Input:Toggling this signal low to high clears the fault

Communications

- Serial communications RS-232
- Daisy chain for connection of up to 15 DADs (30 axes) on the bus

Rating

- 3 A_{RMS} continuous and 9 A_{RMS} peak per axis
- 6 A_{RMS} continuous and 18 A_{RMS} per axis with additional heat sink
- Rated DC bus voltage 160 VDC- 325 VDC

Mechanical Dimensions

11.65" (height) X 3.15" (width) X 5.9" (length)

To contact Specialty Electronics:

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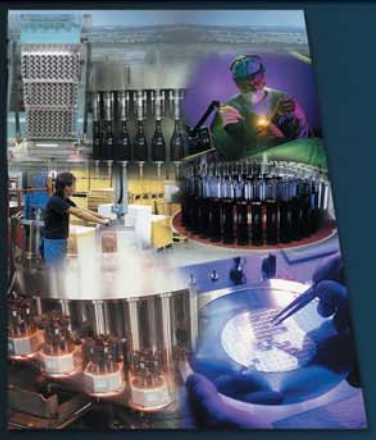

KOLLMORGEN™

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