Scalar, Vector and DTC Control of Three-Phase Induction Motor Drive

Model No.: NIAD01

Category: Advanced Electrical Drives

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of new control algorithm

Control Methods

Scalar Control

(Open & Closed Loop)

Vector Control

Direct Torque Control

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

Three phase sq. cage induction motor with mechanical loading

Digital controller based on STM32F407VG uC

High power rectifier, DC link capacitor, inverter

Sensing circuits for AC/DC current, DC voltage and speed

Performance Investigation of Computerized Scalar, Vector and DTC Control Technique of Three-Phase Induction Motor Drive

Electrical drivefor studying different control techniques of induction motor control using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface,

9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

Contact

National Infotech

Address: 202 – Second Floor, A-19/20, Road # 9, S V Road, Udhyog Nagar, Udhana, Surat – 394210, Gujarat - India.

Phone: +91- 9427 752 256,

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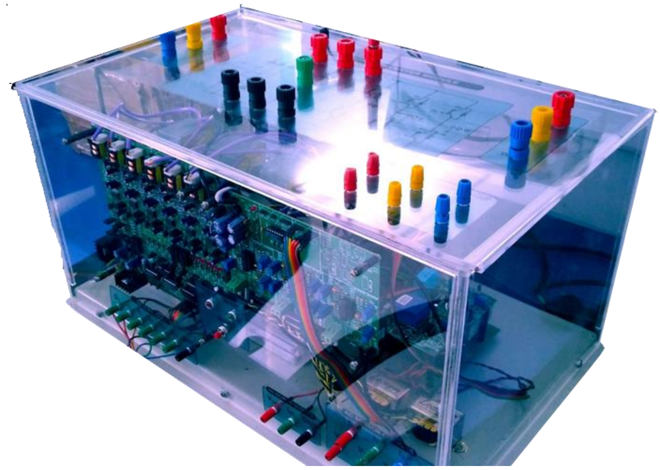
Web: http://www.national-infotech.com

High Power Module with Protection



Input – 415V AC, Output – 3 Phase 400V, 10A suitable for 1.5 HP AC motor having proper heat dissipation arrangements

1200 V, 25 A diode rectifier with electrolyte DC capacitor for Input AC-DC conversion,

3 Phase Inverter Power Module with IGBT Rating @ 1200 V, 30 Amp with detailed protection and snubber circuits arrangement, interface circuit arrangement with controller using appropriate connectors, On-board driver circuit with protection and PWM isolation, IGBT with desaturation protection against overload and short-circuit.

Over current trip circuit is provided with trip status indicator, RESET switch.

Sensing circuit for three AC output currents, one DC current and one DC voltage. All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1.5 HP, 415 V, 1440 RPM, 50 Hz, Star connected with all 6 wires brought out for 230 V Delta connection, 3-Phase Sq. cage induction Motor with Mechanical loading arrangement.

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Speed Control of 5-phase Induction Motor using ARM Cortex 32-bit Microcontroller

Model No.: NIAD02

Category: Advanced Electrical Drives

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of new control algorithm
- Scalar Control(Open & Closed Loop)

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

Five phase sq. cage induction motor with mechanical loading

Digital controller based on STM32F407VG uC

High power rectifier, DC link capacitor, inverter

Sensing circuits for AC/DC current, DC voltage and speed

Performance Investigation of Computerized Speed Control of 5-phase Induction Motor using ARM Cortex 32-bit Microcontroller

Electrical drivefor studying speed control of 5-phase induction motor using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface,

9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

Contact

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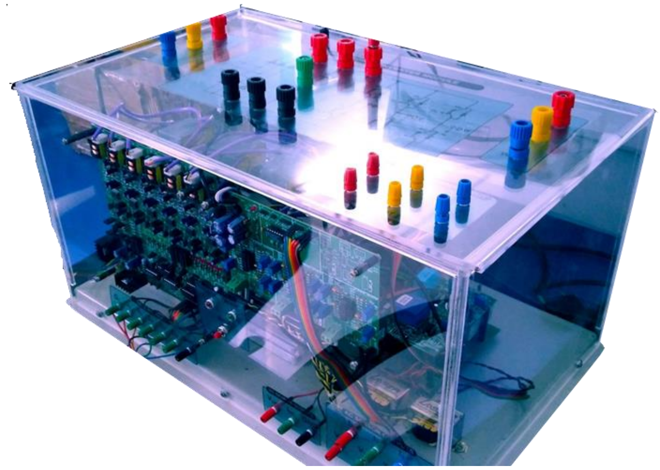
High Power Module with Protection



Input – 415V AC, Output – 5 Phase 200V, 10A suitable for 1.5 HP 5-phase AC motor having proper heat dissipation arrangements

1200 V, 25 A diode rectifier with electrolyte DC capacitor for Input AC-DC conversion,

3 Phase Inverter Power Module with IGBT Rating @ 1200 V, 30 Amp with detailed protection and snubber circuits arrangement, interface circuit arrangement with controller using appropriate connectors, On-board driver circuit with protection and PWM isolation, IGBT with desaturation protection against overload and short-circuit.

Over current trip circuit is provided with trip status indicator, RESET switch.

Sensing circuit for three AC output currents, one DC current and one DC voltage. All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1.0 – 1.5 HP / 5 Phase / 100 V - 200 V / 1400 RPM / Starconnected / 50 Hz. / SPDP / Foot Mounted /Ins. Cl. B / Singleshaft extended / Sq. Cage Induction Motor with Mechanicalloading arrangement having linear scales

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Performance Investigation of Digitally controlled BLDC Motor Drive

Model No.: NIAD03

Category: Advanced Electrical Drives

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of new control algorithm
- Controller: ARM Cortex M4 32 bit Microcontrollers

Drives Consist of

0.5 HP BLDC motor with mechanical loading

Digital controller based on STM32F407VG uC

High power rectifier, DC link capacitor, inverter

Sensing circuits for AC/DC current, DC voltage and speed

Contact

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Performance Investigation of Digitally controlled BLDC Motor Drive

Electrical drive for studying control of Brushless DC motor drive using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

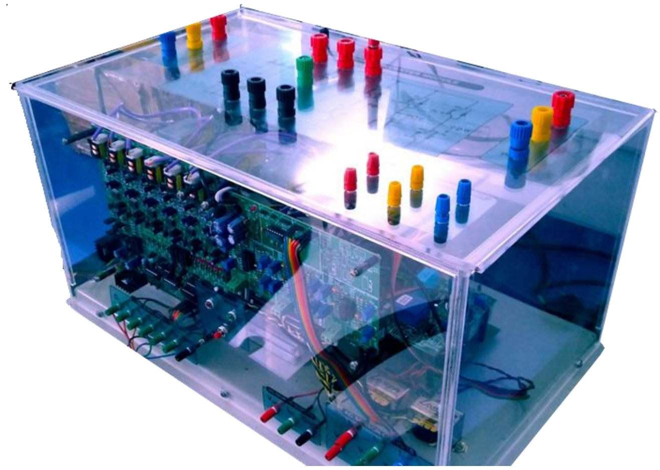
3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface,

9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

High Power Module with Protection



Input – 230V single-phase AC, Output – 3 Phase 50V, 10A suitable for BLDC motor having proper heat dissipation arrangements

1200 V, 25 A diode rectifier with electrolyte DC capacitor for Input AC-DC conversion,

3 Phase Inverter Power Module with IGBT Rating @ 1200 V, 30 Amp with detailed protection and snubber circuits arrangement, interface circuit arrangement with controller using appropriate connectors, On-board driver circuit with protection and PWM isolation, IGBT with desaturation protection against overload and short-circuit.

Over current trip circuit is provided with trip status indicator, RESET switch.

Sensing circuit for three AC output currents, one DC current and one DC voltage. All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

0.5 HP / 48 V / 1500 RPM / BLDC Motor with mechanical loading arrangement having inbuilt sensor

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Performance Investigation of Digitally controlled PMSM Vector Control Drive

Model No.: NIAD04

Category: Advanced Electrical Drives

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of new control algorithm

Control Methods

Scalar Control

(Open & Closed Loop)

Vector Control

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

1 HP PMSM with mechanical loading

Digital controller based on STM32F407VG uC

High power rectifier, DC link capacitor, inverter

Sensing circuits for AC/DC current, DC voltage and speed

Performance Investigation of Digitally controlled PMSM Vector Control Drive

Electrical drive for studying different control techniques of PMSM motor control using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface,

9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

Contact

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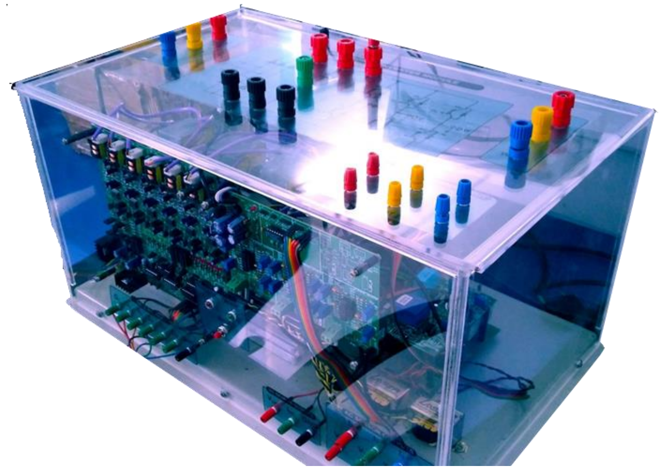
High Power Module with Protection



Input – 415V AC, Output – 3 Phase 400V, 10A suitable for 1.5 HP AC motor having proper heat dissipation arrangements

1200 V, 25 A diode rectifier with electrolyte DC capacitor for Input AC-DC conversion,

3 Phase Inverter Power Module with IGBT Rating @ 1200 V, 30 Amp with detailed protection and snubber circuits arrangement, interface circuit arrangement with controller using appropriate connectors, On-board driver circuit with protection and PWM isolation, IGBT with desaturation protection against overload and short-circuit.

Over current trip circuit is provided with trip status indicator, RESET switch.

Sensing circuit for three AC output currents, one DC current and one DC voltage. All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1 HP / 230 V / 3000 RPM / 4 Pole / 3 Phase / PMSM Motor with mechanical loading arrangement having linear scales.

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Digitally Controlled Four-Quadrant Chopper fed DC Motor Drive

Model No.: NIAD05 **Category: Advanced Electrical Drives**

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of control algorithm

Control

Forward and reverse motoring operation with first and third quadrant chopper operation

Open Loop and Closed Loop Control

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

DC Shunt Motor with mechanical loading

Digital controller based on STM32F407VG uC

High power rectifier, DC link capacitor, inverter

Sensing circuits for AC/DC current, DC voltage and speed

Performance Investigation of Digitally and Computerized Controlled Four-Quadrant Operation of DC Motor Drive

Electrical drive for studying four quadrant chopper fed DC Motor drive using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface,

9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

Contact

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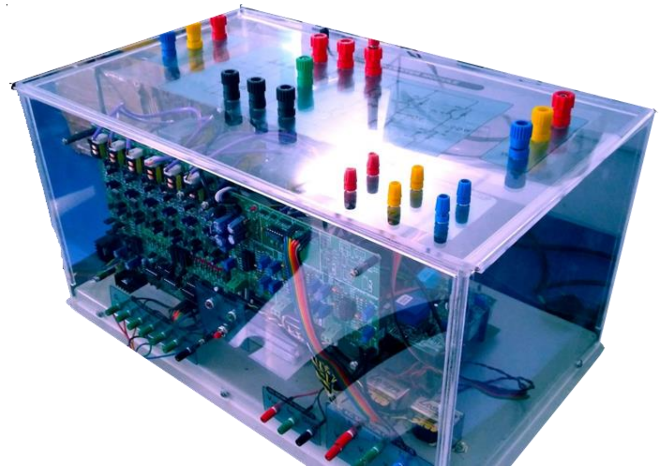
High Power Module with Protection



Input – 230V single phase AC, Output – 220V DC suitable for 1.5 HP DC motor having proper heat dissipation arrangements

1200 V, 25 A diode rectifier with electrolyte DC capacitor for Input AC-DC conversion,

Inverter Power Module with IGBT Rating @ 1200 V, 30 Amp with detailed protection and snubber circuits arrangement, interface circuit arrangement with controller using appropriate connectors, On-board driver circuit with protection and PWM isolation, IGBT with desaturation protection against overload and short-circuit.

Over current trip circuit is provided with trip status indicator, RESET switch.

Sensing circuit for three AC output currents, one DC current and one DC voltage. All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1.5 HP, 220V, 1500 rpm, DC Shunt Motor with spring balance load arrangement for loading

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Single Phase Dual Converters fed DC Motor Drive

Model No.: NIAD06 **Category: Advanced Electrical Drives**

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of control algorithm

Control Methods

Circulating Current Mode of Operation

Non-circulating Current Mode of Operation

Open Loop and Closed Loop Control

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

DC Shunt Motor with mechanical loading

Digital controller based on STM32F407VG uC

High power thyristor bridge with Inductor

Sensing circuits for DC current, DC voltage and speed

Performance Investigation of Digitally and Computerized Controlled Four-Quadrant Operation of DC Motor using 1-Phase Dual Converters with analysis of Circulating and Non Circulating Modes.

Electrical drive for studying single phase dual converter working in circulating and non-circulating mode using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface, 9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

Contact

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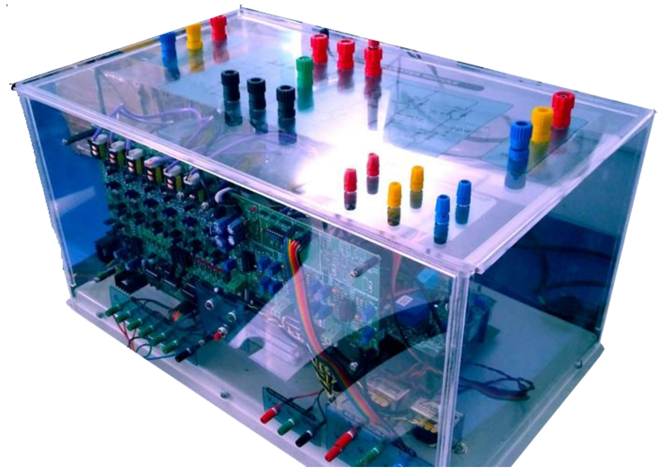
High Power Module with Protection



Input – 230V, 50 Hz single phase AC, Output – 220V DC suitable for 1.5 HP DC motor having proper heat dissipation arrangements

800 V, 25 A thyristor rectifier with circulating inductor for AC-DC conversion,

Observation of gate pulses and speed sensor outputs

Provision to operate in Open loop and closed loop speed control of motor.

Sensing circuit for DC current.

All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1.5 HP, 220V, 1500 rpm, DC Shunt Motor with spring balance load arrangement for loading

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Digitally Controlled Single-phase Controlled Rectifier fed DC Motor Drive

Model No.: NIAD07

Category: Advanced Electrical Drives

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of control algorithm
- Control Methods: Open Loop and Closed Loop Control

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

DC Shunt Motor with mechanical loading

Digital controller based on STM32F407VG uC

High power thyristor bridge with Inductor

Sensing circuits for DC current, DC voltage and speed

Performance Investigation of Digitally controlled single-phase controlled rectifier fed DC Motor Drive.

Electrical drive for studying single phase controlled rectifier fed DC motor drives using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface, 9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

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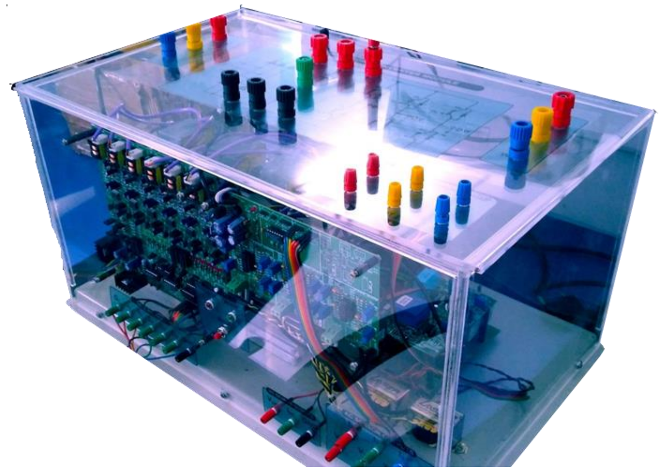
High Power Module with Protection



Input – 230 V, 50 Hz single phase AC, Output – 220V DC suitable for 1.5 HP DC motor having proper heat dissipation arrangements

800 V, 25 A thyristor rectifier with circulating inductor for AC-DC conversion,

Observation of gate pulses and speed sensor outputs

Provision to operate in Open loop and closed loop speed control of motor.

Sensing circuit for DC current.

All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1.5 HP, 220V, 1500 rpm, DC Shunt Motor with spring balance load arrangement for loading

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.

Digitally Controlled Switched Reluctance Motor Drive

Model No.: NIAD08

Category: Advanced Electrical Drives

Unique Features

- Complete advanced learning platform
- Self-written program
- Model based program
- MATLAB/C language coding support
- Rapid development of control algorithm

Controller

ARM Cortex M4 32 bit Microcontrollers

Generic industry standard platform

Drives Consist of

SRM Motor with mechanical loading

Digital controller based on STM32F407VG uC

High power IGBT power module

Sensing circuits for DC current, DC voltage and speed

Performance Investigation of digitally controlled Switched Reluctance Motor Drive.

Electrical drive for studying switched reluctance motor drives using latest ARM Cortex M4 32 bit Microcontrollers.

Motor Controller

ARM Cortex M4 32-bit microcontroller for programming (STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core)

STM32F407VGT6 ARM Cortex-M4 Board featuring 32-bit ARM Cortex-M4F core, 168 MHz, 1 MB Flash, 192 KB RAM in an LQFP100 package.

On-board ST-LINK/V2 for programming and debugging with selection mode switch, Power supply: through USB bus or from an external.

On-board ADC, DAC, USB/JTAG terminal facility

Port pins are routed to header on mother board for easy connection and having:

8 General purpose input lines, 8 General purpose output lines, 16x2 LCD interface, 5 keys interface.

3 high speed digital outputs and 2 High speed digital input lines. 6 PWM outputs, 3 QEI inputs.

SPI bus for SPI slave interface, 9 Analog inputs, 2 Analog Universal outputs

D-type connector for RS232 interfaces.

Contact

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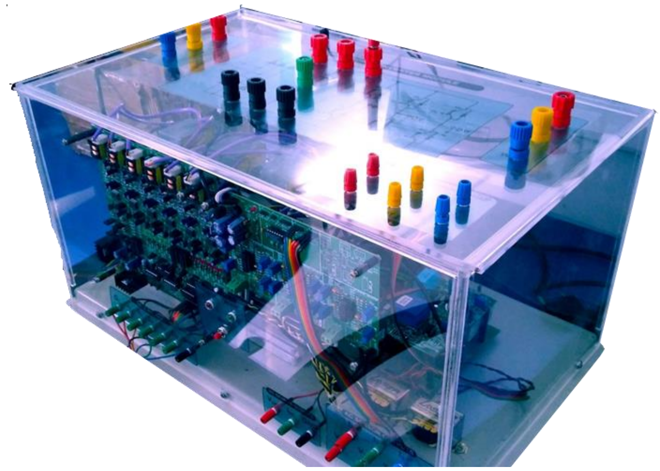
High Power Module with Protection



Input – 230V single phase AC, Output – 220V DC suitable for 1.5 HP DC motor having proper heat dissipation arrangements

1200 V, 25 A diode rectifier with electrolyte DC capacitor for Input AC-DC conversion,

Inverter Power Module with IGBT Rating @ 1200 V, 30 Amp with detailed protection and snubber circuits arrangement, interface circuit arrangement with controller using appropriate connectors, On-board driver circuit with protection and PWM isolation, IGBT with desaturation protection against overload and short-circuit.

Over current trip circuit is provided with trip status indicator, RESET switch.

Sensing circuit for three AC output currents, one DC current and one DC voltage. All connections terminated with banana connector.

Motor Setup

Motor setup consist of Benn make

1 HP, 3000 rpm, 8/6 Switched Reluctance Motor with spring balance load arrangement for loading

Essential speed and other sensors as per control and feedback requirement.

Computer and Programing Arrangement

Complete arrangement with personal computer having minimum following configuration is provided for programming the drive.

Intel Core-i3 (6th generation) 3.3 GHz processor, Mother Board - ASUS/GIGA-BITE or equivalent, RAM- 8 GB, Hard disk min.- 500 GB, DVD writer, Screen (18.5 Inch) – LG or equivalent, with required essential accessories.

Facility for self-written C program as well as model based programming.

MATLAB and C Language Coding support.