

FE060-60C-CM

FlexPro® Series

Product Status: Active

SPECIFICATIONS

Current Continuous

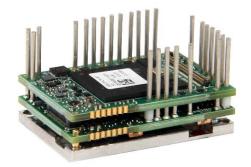
DC Supply Voltage

Network Communication

60 A

10 – 55 VDC

CANopen



The **FE060-60C-CM** is a FlexPro® series servo drive with IMPACTTM architecture.

The **FE060-60C-CM** offers full tuning control of all servo loops and is designed to drive brushed and brushless servo motors, stepper motors, and AC induction motors. The drive accepts a variety of external command signals, or can use the built-in Motion Engine, an internal motion controller used with Sequencing and Indexing commands. Programmable digital and analog I/O are included to enhance interfacing with external controllers and devices.

The **FE060-60C-CM** features a CANopen interface for network communication and USB connectivity for drive configuration and setup. All drive and motor parameters are stored in non-volatile memory.

IMPACTTM (Integrated Motion Platform And Control Technology combines exceptional processing capability and high-current components to create powerful, compact, feature-loaded servo solutions. IMPACTTM is used in all FlexPro® drives and is available in custom products as well.

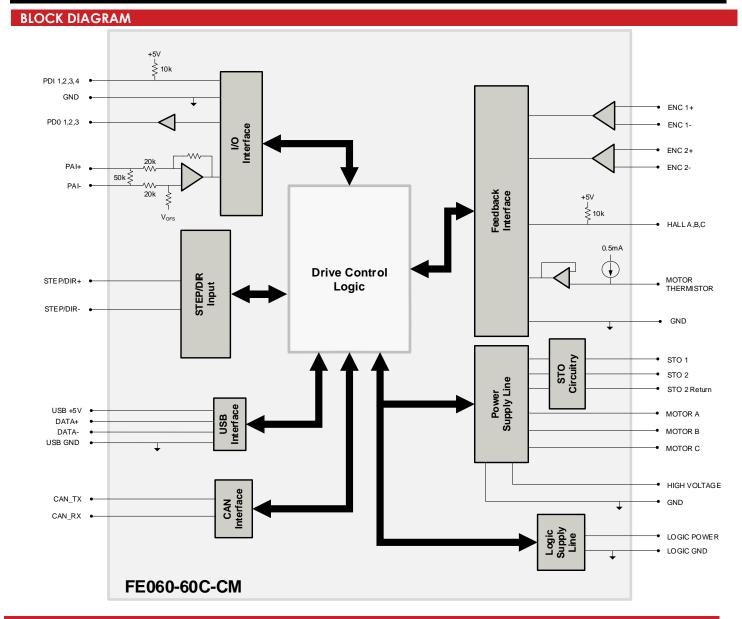
FEATURES

- Follows the CAN in Automation (CiA) 301 Communications Profile and 402 Device Profile
- Four Quadrant Regenerative Operation
- Programmable Gain Settings
- PIDF Velocity Loop
- Space Vector Modulation (SVM) Technology

- Fully Configurable Current, Voltage, Velocity and Position Limits
- Compact Size, High Power Density
- On-the-Fly Mode Switching
- On-the-Fly Gain Set Switching
- Dedicated Safe Torque Off (STO) Inputs

Feedback Supported	 Incremental Encoder 	Motors Supported	 Three Phase Single Phase Stepper AC Induction	Modes of Operation	 Profile Modes Cyclic Synchronous Modes Current Velocity Position Interpolated Position Mode (PVT)
Command Sources	• Indexing	Inputs / Outputs	 4 Programmable Digital Inputs 3 Programmable Digital Outputs 1 Programmable Analog Input 	Agency Approvals	RoHSUL (Pending)CE (Pending)TUV Rheinland (STO) (Pending)





INFORMATION ON APPROVALS AND COMPLIANCES



The RoHS Directive restricts the use of certain substances including lead, mercury, cadmium, hexavalent chromium and halogenated flame retardants PBB and PBDE in electronic equipment.



Description Secription Units Value	SPECIFICATIONS		
Nominal DC Supply Input Range		Electric	al Specifications
DC Supply Input Range DC Supply Indervoltage DC Supply Overvoltage VDC 88 Logic Supply Range (required) VDC 10 55 Sofe Torque Off Voltage (Default) VDC 55 Minimum Required External Bus Capacitance μF 500 Maximum Continuous Current Output! A (Arms) Minimum Load Inductance (line to-line)? W 33 Minimum Load Inductance (line to-line)? WH 13 (Inductance (line to-line)? WH 20 Maximum Output PWM Duty Cycle Toes (Politage Septiment) Description Description Description Description Commond Sources - CANopen (USB for configuration) Absolute Encoder (BSS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Inchameter (£10V) Modes of Operation Modes of Operation Modes of Operation More Supported [§] - Programmable Digital Inputs/Outputs - Progra	Description		
DC Supply Undervoltage VDC 8 CSupply Uniout Range (required) VDC 10 - 55 Sofe Torque Off Yoltoge (Default) VDC 10 - 55 Sofe Torque Off Yoltoge (Default) VDC 5 Sofe Torque Off Yoltoge (Default) VDC 5 Sofe Torque Off Yoltoge (Default) VDC 5 Maximum Required Externed Bus Capacitance μF 500 Maximum Continuous Current Output A (Arms) 80 (80) Efficiency of Rated Power % 9 99 Maximum Continuous Output Power W 3267 Maximum Continuous Output Power W 33 Maximum Continuous Output Power W 33 Maximum Continuous Output Power W 33 Maximum Load Inductance (line-to-line)? μH 150 (@ 48VDC supply): 75 (@24VDC supply): 40 (@12VDC supply) Switching Frequency 8 83 Maximum Output PWM Duty Cycle 8 83 Maximum Output PWM Duty Cycle 8 83 Control Specifications Value Description Ust Value Power Now Power Now Power Power Now Power Now Power Power Power Now Power Power Power Now Power	Nominal DC Supply Input Range	VDC	12 – 48
DC Supply Overvoltage VDC 58	DC Supply Input Range	VDC	10 – 55
Logic Supply Input Range (required) VDC 10 – 55 Safe Torque Off Voltage (Default) VDC 5 Minimum Required External Bus Capacitance μF 500 Maximum Continuous Current Output! A (Arms) 80 (60) Maximum Continuous Current Output! W 3267 Maximum Power Dissipation at Rated Power W 33 Minimum Load Inductance (line-to-line)? μH 150 (@ 48VDC supply); 75 (@24VDC supply); 40 (@12VDC supply) Switching Frequency ½ kttz 20 Assimum Power Dissipation of Control Specifications Volue Commonication Interfaces - CANopen (USB for configuration) Command Sources - 2 (ANopen (USB for configuration) Command Sources - 2 (ANopen (USB for configuration) Absolute Fencedre (SBS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Inchange (Encoder) Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported ³ - Thre	DC Supply Undervoltage	VDC	8
Sofe Torque Off Voltage (Default) VDC 5 Minimum Required External Bus Capacitance μF 500 Maximum Continuous Current Output¹ A (Arms) 500 (60) Efficiency at Rated Power % 99 Maximum Continuous Output Power W 3267 Maximum Power Dissipation at Rated Power W 33 Minimum Loud Inductance (line-to-line)² μH 150 (@ 48VDC supply); 75 (@24VDC supply); 40 (@12VDC supply) Switching Frequency kHz 20 Maximum Output PWM Duty Cycle % 83 Control Specifications Description Communication Interfaces CANopen (USB for configuration) Communication Interfaces CANopen (USB for configuration) Communication Methods 1 £10 V Analog, Over the Network, Sequencing, Indexing, Jogging, Step & Elocation Recoder Following Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagowa/Nikon), Hall Sendark Supported Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagowa/Nikon), Hall Sendark Supported Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagowa/Nikon), Hall Sendark Supported Mod	DC Supply Overvoltage	VDC	58
Maximum Required External Bus Capacitance μF 500	Logic Supply Input Range (required)	VDC	10 – 55
Maximum Continuous Current Output* A (Arms)	Safe Torque Off Voltage (Default)	VDC	5
Efficiency at Rated Power Maximum Continuous Output Power Maximum Continuous Output Power Maximum Power Dissipation at Rated Power Maximum Power Dissipation at Rated Power Minimum Load Inductance (line-lo-line) ² ### 150 (@ 48VDC supply); 75 (@24VDC supply); 40 (@12VDC supply) Switching Frequency Maximum Output PWM Duty Cycle ### 20 ###	Minimum Required External Bus Capacitance	μF	500
Maximum Continuous Output Power W 3267 Maximum Power Dissipation of Rated Power W 33 Minimum Load Inductance (line-10-line)² μH 150 (@ 48VDC supply); 75 (@24VDC supply); 40 (@12VDC supply) Switching Frequency kHz 20 Maximum Output PWM Duty Cycle % 8.3 Control Specifications Units Value Command Sources CANopen (USB for configuration) Command Sources - CANopen (USB for configuration) Feedback Supported - CANopen (USB for configuration) Feedback Supported - Absolute Encoder Reliability Commutation Methods - Sinuscidal, Trapezoidal Modes of Operation - Sinuscidal, Trapezoidal Motors Supported³ - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motory Cover (Index) - - - - - - - - -	Maximum Continuous Current Output ¹	A (Arms)	60 (60)
Maximum Power Dissipation at Rated Power Minimum Load Inductance (line-to-line)? W 33 Minimum Load Inductance (line-to-line)? μH 150 (@ 48VDC supply); 75 (@24VDC supply); 40 (@12VDC supply) Switching Requency kHz 20 Moximum Output PWM Duty Cycle % 83 Control Specifications Units Value Communication Interfaces - CANopen (USB for configuration) Command Sources - CANopen (USB for configuration) Command Sources - LIO V Analog, Over the Network, Sequencing, Indexing, Jogging, Step & Direction, Encoder Following Feedback Supported - Sinsors, Incremental Encoder, Auxiliary Incremental Encoder, Tachometer (£10V) Commutation Methods - Sinsoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Interpolated Position Mode (PVT) Motory Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Mire Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Cl	Efficiency at Rated Power	%	99
Minimum Load Inductance (line-to-line)2	Maximum Continuous Output Power	W	3267
Switching Frequency kHz 20 Maximum Output PPM Duty Cycle % 83 Control Specifications Units Value Communication Interfaces - CANopen (USB for configuration) Command Sources - £ 10 V Analog, Over the Network, Sequencing, Indexing, Jogging, Step & Direction, Encoder Following A boslute Encoder (BISS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Tachemeter (±10V) Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Motors Supported³ - 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 5 VDC, not isolated Current Loop Sample Time µs 50 Velocity Loop Sample Time µs	Maximum Power Dissipation at Rated Power	W	33
Maximum Output PWM Duty Cycle % 83 Communication Interfaces - CANopen (USB for configuration) Communication Interfaces - CANopen (USB for configuration) Command Sources - £ 10 V Analog, Over the Network, Sequencing, Indexing, Jogging, Step & Direction, Encoder Following Feedback Supported - & Direction, Encoder BisS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Search and Proceedings of Communication Methods Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2 or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection - 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time µs 100 Position Loop	Minimum Load Inductance (line-to-line) ²	μН	150 (@ 48VDC supply); 75 (@24VDC supply); 40 (@12VDC supply)
Description Units Value Communication Interfaces - CANopen (USB for configuration) Command Sources - & Direction, Encoder Following Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Feedback Supported - Sinusoidal, Trapezoidal Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - - Frime Phase (Brushed Servo, Voice Coil, Inductive Load), Single Phase (Br	Switching Frequency	kHz	20
Description Units Value Communication Interfaces - CANopen (USB for configuration) Command Sources ±10 V Analog, Over the Network, Sequencing, Indexing, Jogging, Step & Direction, Encoder Following Feedback Supported Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Seasons, Incremental Encoder, Auxiliary Incremental Encoder, Factor (Biss) (Endough) Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Proffile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Inductive Load), Stepper (2- or 3-Phase (Brushes Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 5 VDC, not isolated Current Loop Sample Time μs 100 Velocity Loop Sample Time μs 100 Postion Loop Sample Time μs 100 Moximum Encoder Frequency MHz	Maximum Output PWM Duty Cycle	%	83
Communication Interfaces - CANopen (USB for configuration) Command Sources - ±10 V Analog, Over the Network. Sequencing, Indexing, Jogging, Step & Direction, Encoder Following Feedback Supported - Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Feedback Supported - Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Tachometer (±10V) Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2º or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection - 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage, Short Circuit (Phase-Phase		Contro	ol Specifications
Command Sources - ± 10 V Analog, Over the Network, Sequencing, Indexing, Jogging, Step & Direction, Encoder Following Feedback Supported - Absolute Encoder (BiSS C-Mode, EnDat 2.2. Tamagawa/Nikon), Hall Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Tachometer (±10V) Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Interpolated Position Mode (PVT) Motors Supported³ - Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 100 Velocity Loop Sample Time μs 100 Moximum Encoder Frequency MHZ 20 (5 pre-quadrature) Mechanical Specifications Value Size (H x W x D)		Units	
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Absolute Encoder (BiSS C-Mode, EnDat 2.2, Tamagawa/Nikon), Hall Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Tachometer (±10V) Commutation Methods	Command Sources	_	
Feedback Supported - Sensors, Incremental Encoder, Auxiliary Incremental Encoder, Tachometer (±10V) Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2 - or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Inductive Load), Stepper (2 - or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) - Wotor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time µs 50 Velocity Loop Sample Time µs 100 Position Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Units Value Size (H x W x D) Mesight - goz) 19.8 (0.7) Ambient Operating Temperature Range4 °C (°F) 0 - 65 (32 - 149) Storage Temperature Range °C (°F) - 40 - 85 (-40 - 185) Relative Humicitity - 0.95%, non-condensing POST - CONNECTOR*			·
Commutation Methods Tachometer (±10V) Modes of Operation - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection - 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 100 Velocity Loop Sample Time μs 100 Velocity Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Mechanical Specifications Weight g (0z) 19.8 (0.7) Ambient Operating Temperature Range4 °C (°F) 0-65 (32 - 149) Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form	5 " 10 10		
Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Motors Supported³ - Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection - 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 100 Velocity Loop Sample Time μs 100 Position Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Value Size (H x W x D) mm (in) 38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45) Weight g (oz) 19.8 (0.7) Ambient Operating Temperature Range °C (°F) -0-65 (32 - 149) Storage	Feedback Supported	-	
Profile Modes, Cyclic Synchronous Modes, Current, Velocity, Position, Interpolated Position Mode (PVT) Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection	Commence destinated to the state		
Interpolated Position Mode (PVT) Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector) Hardware Protection Programmable Digital Inputs/Outputs Programmable Analog Inputs/Outputs Primary I/O Logic Level Current Loop Sample Time Velocity Loop Sample Time Maximum Encoder Frequency MHz Description Description Meight Ag (oz) Program Size (H x W x D) Meight Ag (oz) Anbient Operating Temperature Range4 Post Mount of M	Commutation Methods	-	
Motors Supported3-Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector)Hardware Protection40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under VoltageProgrammable Digital Inputs/Outputs-4/3Programmable Analog Inputs/Outputs-1/0Primary I/O Logic Level-5 VDC, not isolatedCurrent Loop Sample Timeμs100Velocity Loop Sample Timeμs100Maximum Encoder FrequencyMHz20 (5 pre-quadrature)Mechanical SpecificationsVeightg (oz)19.8 (0.7)Ambient Operating Temperature Range4°C (°F)0 - 65 (32 - 149)Storage Temperature Range°C (°F)0 - 65 (32 - 149)Storage Temperature Range°C (°F)-40 - 85 (-40 - 185)Felative Humidity-0.95%, non-condensingForm Factor-PCB MountedP1 SIGNAL CONNECTOR*-80-pin 0.4mm spaced connector	Modes of Operation	-	
Closed Loop Vector Hardware Protection			Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil,
Hardware Protection - 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 50 Velocity Loop Sample Time μs 100 Position Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) **Mechanical Specifications** Units Value Size (H x W x D) mm (in) 38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45) Weight g (αz) 19.8 (0.7) Ambient Operating Temperature Range ⁴ **C (°F) 0-65 (32 - 149) Storage Temperature Range **C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector	Motors Supported ³	-	Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction
Hardware Protection - Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 100 Velocity Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Value Size (H x W x D) mm (in) 38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45) Weight g (oz) 19.8 (0.7) Ambient Operating Temperature Range4 °C (°F) 0-65 (32 - 149) Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector			
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Programmable Digital Inputs/Outputs - 4/3 Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 50 Velocity Loop Sample Time μs 100 Position Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Units Value Size (H x W x D) mm (in) 38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45) Weight g (oz) 19.8 (0.7) Ambient Operating Temperature Range4 °C (°F) 0 - 65 (32 - 149) Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector	Hardware Protection	-	
Programmable Analog Inputs/Outputs - 1/0 Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time		+	
Primary I/O Logic Level - 5 VDC, not isolated Current Loop Sample Time μs 50 Velocity Loop Sample Time μs 100 Position Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Mechanical Specifications Size (H x W x D) mm (in) 38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45) Weight g (oz) 19.8 (0.7) Ambient Operating Temperature Range ⁴ °C (°F) 0 - 65 (32 - 149) Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector		-	
Current Loop Sample Timeμs50Velocity Loop Sample Timeμs100Position Loop Sample Timeμs100Maximum Encoder FrequencyMHz20 (5 pre-quadrature)Mechanical SpecificationsDescriptionUnitsValueSize (H x W x D)mm (in)38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45)Weightg (oz)19.8 (0.7)Ambient Operating Temperature Range4°C (°F)0 - 65 (32 - 149)Storage Temperature Range°C (°F)-40 - 85 (-40 - 185)Relative Humidity-0-95%, non-condensingForm Factor-PCB MountedP1 SIGNAL CONNECTOR*-80-pin 0.4mm spaced connector		-	
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Size (H x W x D) mm (in) 38.1 x 25.4 x 11.5 (1.50 x 1.00 x 0.45) Weight g (oz) 19.8 (0.7) Ambient Operating Temperature Range4 °C (°F) 0 - 65 (32 - 149) Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector	 Description		
Weight g (oz) 19.8 (0.7) Ambient Operating Temperature Range4 °C (°F) 0 - 65 (32 - 149) Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector			
Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector		g (oz)	
Storage Temperature Range °C (°F) -40 - 85 (-40 - 185) Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector	Ambient Operating Temperature Range ⁴	°C (°F)	0 – 65 (32 – 149)
Relative Humidity - 0-95%, non-condensing Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector	Storage Temperature Range	°C (°F)	-40 – 85 (-40 – 185)
Form Factor - PCB Mounted P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector		-	0-95%, non-condensing
P1 SIGNAL CONNECTOR* - 80-pin 0.4mm spaced connector		-	
	P1 SIGNAL CONNECTOR*	-	80-pin 0.4mm spaced connector
	TERMINAL PINS	-	26x Terminal Pins

- 1. Continuous Arms value attainable when RMS Charge-Based Limiting is used.
 2. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
 3. Maximum motor speed for stepper motors is 600 RPM. Consult the hardware installation manual for 2-phase stepper wiring configuration.

*Mating Connector Kit

Surface mount board connector for P1 and board spacers can be ordered as a kit using ADVANCED Motion Controls' part number KC-MC1XFE01.

Additional cooling and/or heatsink may be required to achieve rated performance. Repeated over temperature events may cause damage to the drive due to the drive's high power density. Ensure that proper thermal management is adhered to during drive operation.



PIN FUNCTIONS GROUND Ground GND GROUND GND Ground PAI-1+ Differential Programmable Analog Input or DATA+ USB 1/0 USB Data Channel PAI-1-Reference Signal Input (12-bit Resolution) DATA- USB 1/0 THERMISTOR Motor Thermal Protection 8 GROUND GND I²C Data Signals for Addressing, Network 9 GROUND Ground GND 10 SCLA 0 Error LED, and Bridge Status LED, See Differential Data Line for Absolute Encoders 11 ENC 1 DATA+ / A+ I/O 12 SDAA I/O Hardware Manual for more info. (BiSS: SLO+/-) or Differential Incremental 13 ENC 1 DATA- / A-1/0 14 HALL A Fncoder A Differential Clock Line for Absolute HALL B 15 ENC 1 CLK+ / B+ 1/0 16 Single-ended Commutation Sensor Inputs 1 Encoders (BiSS: MA+/-) or Differential 17 ENC 1 CLK- / B-1/0 18 HALL C Incremental Encoder B. GND GROUND GND 19 GROUND 20 21 ENC 1 REF+ / I+ Differential Reference Mark for Absolute 1 22 ENC 2 A+ Ī Encoders (Leave open for BiSS) or Differential Incremental Encoder A. 23 ENC 1 REF- / I-Differential Incremental Encoder Index. 1 24 ENC 2 A-1 CAN Transmit Line (requires external 26 FNC 2 B+ 25 CAN TX I/O 1 transceiver) Differential Incremental Encoder B. CAN Receive Line (requires external 27 CAN_RX 1/0 28 FNC 2 Bī transceiver) 29 CAN STANDBY Low power CAN mode control 1/0 30 ENC 2 I+ Differential Incremental Encoder Index 31 PDI-1 Programmable Digital Input 32 ENC 2 I-33 PDI-2 Programmable Digital Input 34 PDO-1 Programmable Digital Output (TTL/8mA) 0 35 PDI-3 Programmable Digital Input 36 PDO-2 Programmable Digital Output (TTL/8mA) 0 37 PDI-4 Programmable Digital Input 38 PDO-3 Programmable Digital Output (TTL/8mA) 0 GROUND 39 Ground **GND** 40 GROUND Ground **GND** 41 RESERVED Reserved. Do not connect. 42 RESERVED Reserved. Do not connect 43 RESERVED Reserved. Do not connect. 44 RESERVED Reserved. Do not connect. 45 RESERVED Reserved. Do not connect. 46 RESERVED Reserved. Do not connect. RESERVED 47 RESERVED Reserved. Do not connect 48 Reserved. Do not connect 50 49 RESERVED Reserved. Do not connect. RESERVED Reserved. Do not connect. RESERVED RESERVED 51 Reserved. Do not connect 52 Reserved. Do not connect 53 RESERVED Reserved. Do not connect. 54 RESERVED Reserved. Do not connect. 55 RESERVED Reserved. Do not connect 56 RESERVED Reserved. Do not connect 57 RESERVED Reserved. Do not connect. 58 RESERVED Reserved. Do not connect. GND GROUND **GND** GROUND 59 Ground 60 Ground RESERVED Reserved. Do not connect. Reserved. Do not connect 61 RESERVED 62 RESERVED RESERVED Reserved. Do not connect Reserved. Do not connect. 63 64 RESERVED Reserved, Do not connect, RESERVED Reserved. Do not connect. 65 66 RESERVED STEP Step Input. Reserved. Do not connect 68 67 69 RESERVED Reserved. Do not connect. 70 DIR Direction Input. П RESERVED RESERVED Reserved. Do not connect. 72 Reserved. Do not connect 71 +5VDC unprotected supply for local logic 74 RESERVED 73 +5V \bigcirc Reserved. Do not connect. (See Note 1) 75 +5V_USER +5VDC User Supply for feedback or 0 76 +3V3 +3.3VDC supply for local logic signals 0 external devices (See Note 1) 77 +5V_USER 0 78 +3V3 (100 mA max) 0 79 GROUND GND 80 GROUND Ground GND DAT A- USB +3V3 76 80-pin, 0.4mm spaced **Connector Information** +3V3 78 - 4 DATA+ USB connector H GROUND 80 GROUND PANASONIC: P/N AXT380224 **Mating Connector Details** Mating Connector No Included with Drive GROUND 79 -- 1 GROUND +5V USER 77 PAI-1+ +5V USER 75 - 5 PAI-1-

Notes

Drive Status LED and Node Addressing

SCLA (P1-10); SDAA (P1-12)

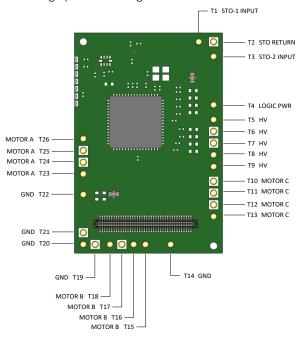
The SCLA and SDAA pins allow Drive Status LED monitoring and Node Addressing to be performed with an I²C bus I/O expander. For more information on how to utilize and configure the I/O expander into an interface board, consult the hardware installation manual.

^{1.} Total current through pins P1-73/75/77 should not exceed 300mA, while no single pin should be loaded more than 150mA.



TERMINAL PIN LOCATIONS

The 26 Terminal Pins provide connection to the high power drive signals. Terminal Pins must be soldered to an interface board.



Pin	Name	Description / Notes	I/O
T1	STO-1 INPUT	Safe Torque Off – Input 1	I
T2	STO RETURN	Safe Torque Off Return	STORET
T3	STO-2 INPUT	Safe Torque Off – Input 2	I
T4	LOGIC PWR	Logic Supply Input (10 – 55VDC) (required)	I
T5	HV		I
T6	HV	DC Supply Input (10 - 55 VDC). Minimum 500µF external capacitance required between HV and POWER GND.	
T7	HV		
T8	HV		
T9	HV		I
T10	MOTOR C		0
T11	MOTOR C	Motor Phase C. All provided motor phase output pins must be used.	
T12	MOTOR C		
T13	MOTOR C		0
T14	POWER GND	Ground.	GND
T15	MOTOR B		
T16	MOTOR B	Make Disease D. All agrained and acceptance and acceptance and acceptance and	0
T17	MOTOR B	Motor Phase B. All provided motor phase output pins must be used.	
T18	MOTOR B		0
T19	POWER GND		GND
T20	POWER GND	Count	GND
T21	POWER GND	Ground.	
T22	POWER GND		GND
T23	MOTOR A		0
T24	MOTOR A	Motor Phase A. All provided motor phase output pins must be used.	
T25	MOTOR A		
T26	MOTOR A		0

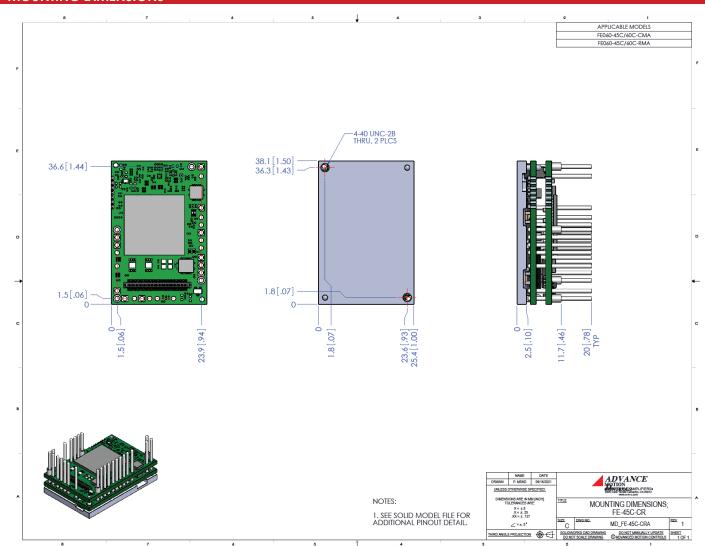
Terminal Pin Details

Safe Torque Off (STO) Inputs

The Safe Torque Off (STO) inputs are dedicated +5VDC sinking single-ended inputs. For applications not using STO functionality, disabling of the STO feature is required for proper drive operation. STO may be disabled by following the STO Disable wiring instructions as given in the hardware installation manual. Consult the hardware installation manual for more information.



MOUNTING DIMENSIONS





PART NUMBERING AND CUSTOMIZATION INFORMATION E 060-60C-C M F **Drive Series Feedback** FlexPro® Multi Encoder (BiSS, 5V Incremental) M **Environment Network Communication** EXtended Environment Ε **E**therCAT С **C**ANopen Form Factor RS485/232 R FlexPro® Embedded Ethernet/IP D FlexPro® E (W/ Development board) **Continuous Current** FlexPro® Machine Mount 5 **5**A Maximum DC Bus Voltage 10 **10**A 060 60 VDC 25 **25**A 50 **50**A 100 100 VDC 60C 60A (continuous only, no peak)

ADVANCED Motion Controls also has the capability to promptly develop and deliver specified products for OEMs with volume requests. Our Applications and Engineering Departments will work closely with your design team through all stages of development in order to provide the best servo drive solution for your system. Equipped with on-site manufacturing for quick-turn customs capabilities, ADVANCED Motion Controls utilizes our years of engineering and manufacturing expertise to decrease your costs and time-to-market while increasing system quality and reliability.

Examples of Customized Products

- Optimized Footprint
- Private Label Software
- ▲ OEM Specified Connectors
- No Outer Case
- ▲ Increased Current Resolution
- ✓ Increased Temperature Range
- Custom Control Interface
- Integrated System I/O

- Tailored Project File
- ▲ Silkscreen Branding
- ▲ Optimized Base Plate
- ▲ Increased Current Limits
- ▲ Increased Voltage Range
- ▲ Conformal Coating
- ▲ Multi-Axis Configurations
- Reduced Profile Size and Weight

Feel free to contact us for further information and details!

Available Accessories

ADVANCED Motion Controls offers a variety of accessories designed to facilitate drive integration into a servo system. Visit www.a-m-c.com to see which accessories will assist with your application design and implementation.

Development Board

The FE060-60C-CM is offered in a pre-soldered development board assembly to provide easy connections to motor, power, and signal functions. The development board assembly can be ordered as model number **FD060-60C-CM**.



All specifications in this document are subject to change without written notice. Actual product may differ from pictures provided in this document.