CONTROL TECHNIQUES

DIGITAX HD

Actual size

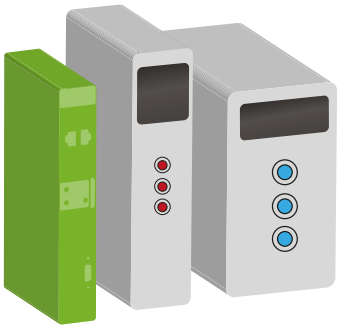
Just 40 mm (1.6 in)

Downsize cost and upsize floor space.

With a tiny footprint but exceptional power density, Digitax HD is one of the smallest servo drives on the market today. Build the most compact cabinets possible.

The market's narrowest servo drive

- Digitax HD is just 40mm (1.6 in) wide
- 25 drives, up to 16A per drive, can fit in just 1 metre(40 in) of cabinet space



40mm (1.6 in) Typical competitors

MINIMUM SIZE,
MAXIMUM PERFORMANCE

1.5 A – 16 A with 48 A peak
200 V 400 V | 0.25 kW - 7.5 kW

Digitax HD Highlights

- Drive width of only 40mm
- Reduce cabinet height with UltraFlow™ technology which dissipates heat directly outside of the cabinet
- Install Digitax HD in a cabinet just 200mm deep
- 300% peak current performance pulse-duty overload
- Optimized control loops for high dynamic performance
- Up to 16 kHz switching frequency
- Single AC input, 24v and communication links, and common DC bus
- DIN rail alignment, single cable technology and easy access pluggable connectors
- Fast programming and commissioning PC tools

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KEY SERVO FEATURES

Servo Series					
		M753 EtherCAT	M751 Base	M750 EtherNet	M754 MCi
Interface	Onboard Communications	2-port EtherCAT switch	2-port RS485	2-port EtherNet switch	2-port EtherNet switch
	Fieldbus	EtherCAT	Modbus RTU	Modbus TCP/IP, EtherNet/IP, PROFINET RT	Modbus TCP/IP
	Real Time Motion	EtherCAT (CoE)	None	RTMoE	RTMoE
	Analog I/O	1 Analog Input ± 10V, 12 bits (11 bits + sign)			
	Digital I/O	2 DI, 2 DO (100 mA), 1 motor brake output (1 A, max 1.3 A)			
	Pulse Train Input	Frequency/Direction 5 V differential, 500 kHz			
	Encoder Feedback	2 x Encoder input and 1 simulated encoder output			
	Supported Encoders	Resolver, Quadrature, AB Servo, SinCos, EnDat (2.1/2.2), SSI, BiSS, Hiperface			
	Safety	2 x Safe Torque Off (STO) via terminal, PLe, SIL3			
Control	Motor Control Modes	V/F, Open loop vector, Rotor flux control-Asynchronous for induction motors (Sensorless or with feedback 'Closed Loop'), Rotor flux control-Synchronous (Sensorless or with feedback 'Closed Loop')			
	Control Modes	Position control, speed control, torque control			
	Control Features	Stationary autotune for permanent magnet motors			
		Advanced bi-quad filters for suppression of mechanical resonances			
Onboard Intelligence	Motion	Advanced Motion Controller			MCi
		Parameterised motion			Programmable motion
		1.5 Axes			Up to 5 Axes
		Positioning digital lock control			Positioning digital lock control camming
		Real-time tasks			
	PLC	Onboard PLC			Onboard Machine Controller
		IEC61131-3 programming (IL, LD, FBD, SFC, ST, CFC)			
Performance	Update Rates	Current Loop Update: 62 µs			
		Speed Loop Update: 250 µs			
		Position Loop Update: 250 µs			
	Overload	*Closed-loop Overload: Maximum closed loop peak current for 0.25 s (from cold: 300 % for 8 s or 200 % for 60 s)			
		*Open-loop Overload: Maximum open loop peak current for 8 s (from cold: 150 % for 100 s)			
	Max Output Frequency	550 Hz (RFC-A and RFC-S) 599 Hz (Open Loop)			
	Switching Frequency	Configurable range: 2, 3, 4, 6, 8, 12, 16 kHz			
		Default: 8kHz			

RFC-S: Rotor Flux Control for Synchronous (permanent magnet brushless) motors

RFC-A: Rotor Flux Control for Asynchronous (induction) motors

*** The stated percentages apply only to three phase continuous current**

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SPECIFICATION

Digitax HD	
Items supplied with the drive	Documents: Quick Start Guide, Safety Information Booklet, Certificate of Quality. Accessories: Power input connector, Brake connector, I/O connector, 24 Vdc supply connector, cable screen bracket, 3 x M4x8 screws (motor earth, supply earth, cable screen bracket), motor connector.
Storage temperature	-40°C to 55°C (-40°F to 131°F)
Operating temperature without de-rate	-20°C to 40°C (-4°F to 104°F)
Operating temperature with de-rate	40°C to 55°C (104°F to 131°F)
Supply requirements	200 V to 240 V ± 10% single or three phase. 380 V to 480 V ± 10% three phase.
Switching frequency range	2,3,4,6,8,12,16 kHz (Factory default = 8 kHz)
Approvals	CE (European Union), cUL Listed (USA and Canada), KC (Korea), RCM (Australia/ New Zealand), EAC (Russian Customs Union)
Product safety standard	EN61800-5-1
Functional safety (single STO function)	Independently assessed by TUV to IEC 61800-5-2 SIL 3 and EN ISO 13849-1 PL
Altitude	1000 m to 3000 m (3300 ft to 9900 ft). 1% de-rate per 100 m (330 ft) above 1000 m (3300 ft)
Humidity	95% Non-condensing at 40°C (104°F)
Pollution	Degree 2. Dry, non-conducting pollution only
IP Rating	IP20 – Pollution degree 2
Vibration	Maximum recommended continuous (random) vibration level 0.14 g r.m.s. broadband 5 to 200 Hz. Reference standard IEC60068-2-27 (bump test), IEC60068-2-64 (random vibration test), IEC60068-2-6, EN61800-5-1 (sinusoidal vibration test). Tested to Environmental Category ENV3.
Mounting methods	Horizontal or vertical surface mounting with DIN rail alignment.
Output frequency/speed range	550 Hz (RFC-A/RFC-S); 599 Hz (Open loop)
Braking	In-built braking transistor, external resistor required (drive mountable resistor or external resistor)
Operating modes	Open-loop, RFC-A (enhanced open-loop performance), RFC-S (servo mode)
Overload capability	Open-loop (from cold) 150 % for 100 s, Open-loop (from 100%) 150 % for 8 s. RFC (from cold) 300% for 8 s, RFC (from 100%) 300% for 0.25 s
Overvoltage category	Evaluated for OVC III.
Corrosive environments	Concentrations of corrosive gases must not exceed the levels given in: Table A2 of EN 50178:1998, Class 3C2 of IEC 60721-3-3 This corresponds to the levels typical of urban areas with industrial activities and/or heavy traffic, but not in the immediate neighbourhood of industrial sources with chemical emissions.

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Immunity Compliance	IEC61800-3, IEC 61000-4-2, IEC 61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11, IEC61000-6-1, IEC 61000-6-2.
Emission compliance	Capable of meeting the requirements of Equipment Category C3 without external filters or line reactors. Capable of meeting the requirements of Equipment Category C1 when installed with the recommended filters (dependant on switching frequency). EN61000-6-2, EN61000-6-4, EN61000-3-2, EN61000-3-3
Cooling	Ultraflow™ rear venting option available
Safe Torque off	Dual STO channels. SIL3/PLe compliant
Communications	M750 – EtherNet (multiprotocol) M751 – RS-485 M753 – EtherCAT M754 - EtherNet SI Options - EtherCAT, PROFIBUS, Ethernet, DeviceNet, CANopen, PROFINET V2
Control I/O	1 x Analogue input, 2 x Digital input, 2 x Digital output, 1 x Motor brake output, 7 x 0 V common, 1 x 24V user output. Pluggable control connector with push in spring connection. (Additional I/O available with SI-I/O option module). 2 x External 24 Vdc User supplied ports for control supply. Pluggable connector with screw connection.
Accuracy	Frequency 0.01%, Analog input 1: 11 bit plus sign. Current typical 2%.
On-Board advanced motion controller	Advanced 1.5 axes Motion Controller, key features include: – Real-time tasks – 250 µs cycle time – Motion profile generator – Electronic gearbox – Interpolated CAM – Homing functions – High speed position freeze
Keypad	Single 7 segment display with 2 x rotary dials for node address setting. Remote keypad with Real-time clock available as option (Optional on M751).
Parameter backup and cloning	Smartcard and SD card (using SD card adapter)
PC Tools	'Connect' commissioning and cloning tool including CT Oscilloscope, Machine Control Studio for On-board PLC programming.
Warranty	2 years
Supported options	SI-EtherCAT, SI-PROFIBUS, SI-Ethernet, SI-DeviceNET, SI-CANopen, SI-PROFINET, SI-I/O, SI-Encoder (speed feedback), Remote I/O, SI-Powerlink, SI-Universal Encoder, MCi200, MCi210, SI-Apps Compact and PTi210.
Accessories	Rear vent, Compact brake resistor & External brake resistors, Encoder breakout connector, KI-485 adaptor, KI compact display (supplied with M750, M753, and M754 Drives), Digitax ST retrofit brackets, SI-Option module mounting kit. External EMC filters, Fan replacement kits, Remote Keypad RTC, Multi-axis kits (24Vdc link, DC bus link, Comms link), Unidrive M to Digitax HD DC busbar adaptor kits, Capacitor Module to extend DC bus capacity and Cable grommet kit.

Documentation & Downloads

Product documentation and PC tools available for download from:
www.controltechniques.com/support

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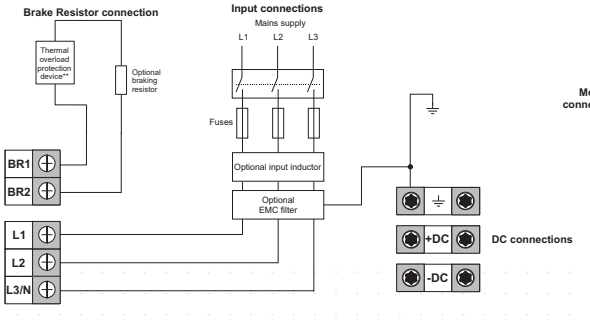
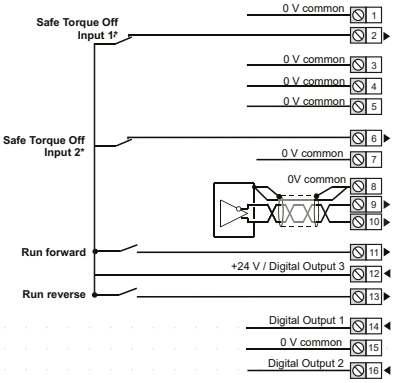
DIMENSIONS

Frame Size	Overall Dimensions						Mounting Dimensions				Mounting Hole Diameter		Weight	
	mm			in			mm		in		mm	in	kg	lb
	H	W	D	H	W	D	H	W	H	W				
1	233	40	174	9.17	1.58	6.85	222	12	8.74	0.47	5.2	0.21	1.9	4.2
2	278	40	174	10.95	1.58	6.85	267	12	10.51	0.47	5.2	0.21	2.3	5.1
3	328	40	174	12.91	1.58	6.85	317	12	12.48	0.47	5.2	0.21	2.5	5.5

CONNECTIONS



Typical Power Connections



Default Control Connections

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PART NUMBERS

Derivative	Electrical Specification			Configuration		Encoder Interface	Documentation	Default	Optional build				
M753	01	2	00022	A	1	0	1	00	A	B	1	0	1

Digitax HD range

M750	Ethernet
M751	Base
M753	EtherCAT
M754	MCi

Frame Size

01	Frame 1
02	Frame 2
03	Frame 3

Voltage Rating

2-200 V (200-240 ± 10%)
4-400 V (380-480 ± 10%)

Current Rating

Nominal current rating x 10

Safety

1 – Standard (2 x STO)

Region

00	50 Hz
01	60 Hz

Option module support:

AB10	Not fitted (M750,M753,M754)
AB11	Fitted (M751 only)

Documentation

1 – Multilingual

Display Option

0	KI-Compact Display not fitted (M751 only)
1	KI-Compact Display fitted (M750, M753, M754)

Encoder Interface:

0 – Standard

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MODEL NUMBER AND RATINGS

200 V Single Phase

Frame Size W x D x H mm (in)	Frame Size 01 40 x 174 x 233 (1.57 x 6.85 x 9.17)			Frame Size 02 40 x 174 x 278 (1.57 x 6.85 x 10.94)		Frame Size 03 40 x 174 x 328 (1.57 x 6.85 x 12.91)
Line Supply	Single Phase AC 200 V...240 V (± 10%) @ 45...66 Hz					
M75X-...	01200022	01200040	01200065	02200090	02200120	03200160
Output Servo						
Rated Current (A)	1.1	2.2	3.5	5.6	7.5	10.8
Max Peak Current (A)	6.6	12	19.5	27	36	48
Output AC Induction						
Max Continuous Current (A)	1.1	2.2	3.5	5.6	7.5	10.8
Open Loop Peak Current (A)	3.3	6	9.8	13.5	18	24
Closed Loop Peak Current (A)	6.6	12	19.5	27	36	48
Motor Power at 230 V (kW)	0.18	0.37	0.75	1.1	1.5	2.2
Motor Power at 230 V (hp)	0.25	0.5	1.0	1.5	2.0	3.0
Overload						
Closed-loop Overload	Maximum closed loop peak current for 0.25 s					
Open-loop Overload	Maximum open loop peak current for 8 s					

200 V Three Phase

Frame Size W x D x H mm (in)	Frame Size 01 40 x 174 x 233 (1.57 x 6.85 x 9.17)			Frame Size 02 40 x 174 x 278 (1.57 x 6.85 x 10.94)		Frame Size 03 40 x 174 x 328 (1.57 x 6.85 x 12.91)
Line supply	Three Phase AC 200 V...240 V (± 10%) @ 45...66 Hz					
M75X-...	01200022	01200040	01200065	02200090	02200120	03200160
Input						
Max Power (kW)	4			5.3		10*
Output Servo						
Rated Current (A)	2.2	4	6.5	9	12	16
Max Peak Current (A)	6.6	12	19.5	27	36	48
Output AC Induction						
Max Continuous Current (A)	2.2	4	6.5	9	12	16
Open Loop Peak Current (A)	3.3	6	9.8	13.5	18	24
Closed Loop Peak Current (A)	6.6	12	19.5	27	36	48
Motor Power at 230 V (kW)	0.37	0.75	1.1	2.2	2.2	4.0
Motor Power at 230 V (hp)	0.5	1.0	1.5	2.0	3.0	5.0
Overload						
Closed-loop Overload	300 % for 0.25 s or 200 % for 4 s					
Open-loop Overload	150 % for 8 s					

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400 V Three Phase

Frame Size W x D x H mm (in)		Frame Size 01 40 x 174 x 233 (1.57 x 6.85 x 9.17)			Frame Size 02 40 x 174 x 278 (1.57 x 6.85 x 10.94)			Frame Size 03 40 x 174 x 328 (1.57 x 6.85 x 12.91)	
Line supply		Three Phase AC 380 V...480 V (± 10%) @ 45...66 Hz							
	M75X-...	01400015	01400030	01400042	02400060	02400080	02400105	03400135	03400160
Input									
Max Power (kW)			6.5			8.7			10/13*
Output Servo									
Rated Current (A)		1.5	3	4.2	6	8	10.5	13.5	16
Max Peak Current (A)		4.5	9	12.6	18	24	31.5	40.5	48
Output AC Induction									
Max Continuous Current (A)		1.5	3	4.2	6	8	10.5	13.5	16
Open Loop Peak Current (A)		2.3	4.5	6.3	9	12	15.8	20.3	24
Closed Loop Peak Current (A)		4.5	9	12.6	18	24	31.5	40.5	48
Motor Power at 400 V (kW)		0.37	0.75	1.5	2.2	3.0	4.0	5.5	5.5
Motor Power at 400 V (hp)		0.75	1.5	2.0	3.0	5.0	5.0	7.5	10.0
Overload									
Closed-loop Overload		300 % for 0.25 s or 200 % for 4 s							
Open-loop Overload		150 % for 8 s							

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