Quick Start Guide

Digitax HD M75X Series

Variable speed AC drive for Servo motors

5 YEAR WARRANTY

Part Number: 0478-0500-05 Issue: 5

Original Instructions

English is the language of the original instructions for the purposes of compliance with the EU Machinery Directive 2006/42/EC.

General information and access to additional documentation

This guide is intended to provide basic information required to install the drive. Detailed installation and operational information, and PC tools for setting up the drive are available to download from:

www.drive-setup.com/digitaxhd

PC tools and documentation available:

- Connect drive commission PC tool
- Machine Control Studio programming environment
- Digitax HD M75X Installation and Technical Guide
- Digitax HD M750, M751, M753 & M754 Control User Guides
- Digitax HD M750, M751, M753 & M754 Parameter Reference Guides
- Digitax HD M75X SI-Option Mounting Kit Installation Sheet
- Digitax HD M75X Series Capacitor Module Installation Sheet
- Digitax HD M75X Compact Braking Resistor Installation Sheet
- KI-Compact 485 Adaptor Installation Sheet
- Using a Beckhoff PLC and TwinCAT 3 with a Control Techniques drive over EtherCAT
- Commissioning a Control Techniques drive using Connect

Warnings, Cautions and Notes

WARNING

A Warning contains information which is essential for avoiding a safety hazard.

CAUTION

A Caution contains information which is necessary for avoiding a risk of damage to the product or other equipment.

NOTE

A **Note** contains information which helps to ensure correct operation of the product.

WARNING

This guide does not include safety information. Incorrect installation or operation of the drive could cause personnel injury or equipment damage. For essential safety information, please refer to the Digitax HD M75X Installation and Technical Guide at www.drive-setup.com/digitaxhd.

Issue Number: 0478-0500-05

Contents

IMPORTANT NOTICE

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. It is the responsibility of the installer to ensure that the design of the complete machine, including its safety-related control system, is carried out in accordance with the requirements of the Machinery Directive and any other relevant legislation. The use of a safety-related drive in itself does not ensure the safety of the machine. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters. The drive must be installed only by professional installers who are familiar with requirements for safety and EMC. The assembler is responsible for ensuring that the end product or system complies with all relevant laws in the country where it is to be used. For more information regarding Safe Torque Off, refer to the Product Documentation.

Important safety information

Hazards

This guide applies to Digitax HD drives (Basic Drive Module (BDM)). Safety information that must be observed is contained in the Installation and Technical Guide.

Responsibility

It is the responsibility of the installer to ensure the safety of the complete system. The manufacturer of the drive accepts no liability for any consequences resulting from inappropriate, negligent, or incorrect design and installation or the failure of the drive.

Compliance with Regulations

The installer is responsible for complying with all relevant regulations, such as national wiring regulations.

Enclosure

The Basic Drive Module (BDM) is open-type and must be mounted in an enclosure which prevents access except by trained and authorised personnel.

Electrical Hazards

The voltages used in the drive can cause severe electrical shock and/or burns and could be lethal. Care is necessary when working with or adjacent to the drive.

System design

System design, installation, commissioning, start-up and maintenance must be carried out by personnel with the necessary training and competence who must read all of the safety information and instructions in the Installation and Technical Guide.

In any application where a malfunction of the drive or its control system could lead to or allow damage, loss, or injury, a risk analysis must be carried out, and where necessary, further measures taken to reduce the risk. For example, an over-speed protection device in case of failure of the speed control, or a fail-safe mechanical brake in case of loss of motor braking. With the sole exception of the Safe Torque Off function, none of the drive functions must be used to ensure safety of personnel.

Warning Before using this product you must read and understand the safety information within the product documentation at the URL below.	**Avertissement** Avant d'utiliser ce produit, il est impératif de lire et de bien comprendre les consignes de sécurité du Guide de mise en service, disponible à l'adresse ci-dessous.
Avvertenza Prima di utilizzare questo prodotto leggere e assicurarsi di aver compreso le informazioni sulla sicurezza contenute nella Guida dell'utente consultabile all'URL indicato qui sotto.	**Warnung** Bevor Sie dieses Produkt verwenden, müssen Sie die Sicherheitshinweise in der Betriebsanleitung unter der nachstehenden URL lesen und verstehen.
Advertencia Antes de utilizar este producto, debe leer y comprender la información de seguridad de la Guía del usuario en la siguiente URL.	**Предупреждение** Преди да използвате този продукт, трябва да прочетете и разберете информацията за безопасност в ръководството за потребителя на URL адреса по-долу.
Upozorenje Prije upotrebe ovog proizvoda morate pročitati i razumjeti sigurnosne informacije iz Korisničkog vodiča na donjem URL-u.	**Varování** Před použitím tohoto výrobku si musíte na níže uvedené adrese URL přečíst v návodu k použití bezpečnostní informace a porozumět jim.
Προειδοποίηση Πριν από τη χρήση αυτού του προϊόντος, πρέπει να διαβάσετε και να κατανοήσετε τις πληροφορίες ασφαλείας που περιλαμβάνει ο Οδηγός χρήστη στην παρακάτω διεύθυνση.	**Aviso** Antes de utilizar este produto, deve ler e compreender as informações de segurança contidas no guia do utilizador que pode encontrar no URL abaixo.
Advarsel Før du tager dette produkt i brug, skal du have læst og forstået sikkerhedsoplysningerne i brugervejledningen på webadressen nedenfor.	**Figyelem** A termék használata előtt el kell olvasnia és meg kell értenie a Felhasználói útmutatóban található biztonsági információkat az alábbi URL-címen.
Avertizare Înainte de a utiliza acest produs, trebuie să citiți și să înțelegeți informațiile referitoare la siguranță din Ghidul de utilizare de la adresa URL de mai jos.	**Waarschuwing** Vóór gebruik van dit product moet u de veiligheidsinformatie in de Handleiding op de URL hieronder lezen en begrijpen..
Upozornenie Pred použitím tohto produktu si musíte prečítať a porozumieť všetkým bezpečnostným pokynom uvedeným v Používateľskej príručke, ktorú nájdete na nasledujúcej adrese URL.	**Hoiatus** Enne selle toote kasutamise alustamist peate lugema ja mõistma alltoodud URL-aadressil asuvas kasutusjuhendis toodud ohutusalast teavet.
Brīdinājums Pirms šā produkta lietošanas ir jāizlasa un jāizprot informācija par drošību, kas iekļauta lietošanas pamācībā tālāk norādītajā URL.	**Opozorilo** Pred uporabo tega izdelka morate prebrati in razumeti varnostne informacije v navodilih za uporabo na spodnjem spletnem naslovu.
Varoitus Ennen kuin käytät tätä tuotetta, sinun on luettava ja ymmärrettävä turvallisuusohjeet, jotka sisältyvät alla mainitussa verkko-osoitteessa olevaan käyttöoppaaseen.	**Įspėjimas** Prieš pradėdami naudoti šį gaminį perskaitykite ir įsitikinkite, kad supratote saugos informaciją, pateiktą naudotojo vadove, esančiame toliau nurodytu universaliu adresu.
Twissija Qabel ma tuża dan il-prodott inti għandek taqra u tifhem l-istruzzjonijiet ta' sikurezza fi ħdan il-Gwida għall-Utent fil-URL t'isfel.	**Varning** Innan du använder denna produkt måste du läsa och förstå säkerhetsinformationen i användarhandboken på nedanstående URL-adress.
Ostrzeżenie Przed przystąpieniem do użytkowania produktu należy przeczytać ze zrozumieniem informacje dotyczące bezpieczeństwa przedstawione w Podręczniku użytkownika dostępnym pod następującym adresem.	

www.controltechniques.com/support

1 Product information

1.1 Ratings

Table 1-1 Drive ratings, cable sizes and AC fuse ratings for single axis circuit protection and short circuit current rating up to 5 kA

Model	No of input phases	Typical AC input current (single axis)	AC Fuse ratings (single axis)		Cable size (single axis)				Nominal current	Peak current	Typical continuous output power
					Input		Output				
		A	IEC gG	UL Class CC, J or T*	mm^2	AWG	mm^2	AWG	A	A	kW
01200022	1	3.7	8	15	0.75	14	0.75	14	1.1	6.6	0.3
01200040	1	6.9	12	15	1.5	14	0.75	14	2.2	12	0.7
01200065	1	11.4	16	15	2.5	12	0.75	14	3.5	19.5	1.1
02200090	1	17.7	25	25	4	10	0.75	14	5.6	27	1.8
02200120	1	23	32	30	6	10	0.75	14	7.5	36	2.3
03200160	1	31.5	32	40	6	8	1.5	14	10.8	48	3.4
01200022	3	5.8	8	15	0.75	14	0.75	14	2.2	6.6	0.7
01200040	3	7.9	12	15	1.5	14	0.75	14	4	12	1.3
01200065	3	10.5	16	15	2.5	14	0.75	14	6.5	19.5	2
02200090	3	16.7	25	25	4	10	1	14	9	27	2.7
02200120	3	20.3	32	30	6	10	1.5	12	12	36	3.7
03200160	3	27.9	32	40	6	8	2.5	12	16	48	5
01400015	3	3.1	6	15	0.75	14	0.75	14	1.5	4.5	0.8
01400030	3	4.8	8	15	0.75	14	0.75	14	3	9	1.6
01400042	3	5.3	8	15	0.75	14	0.75	14	4.2	12.6	1.9
02400060	3	10.1	16	25	2.5	14	0.75	14	6	18	3.1
02400080	3	12.1	16	25	2.5	12	0.75	14	8	24	4.2
02400105	3	14.9	20	25	4	12	1.5	14	10.5	31.5	5.6
03400135	3	20.8	32	30	6	10	2.5	12	13.5	40.5	6.9
03400160	3	22	32	30	6	10	2.5	12	16	48	7.6

* These are fast acting fuses.

An MCB (miniature circuit breaker) may be used in place of fuses under the following conditions:

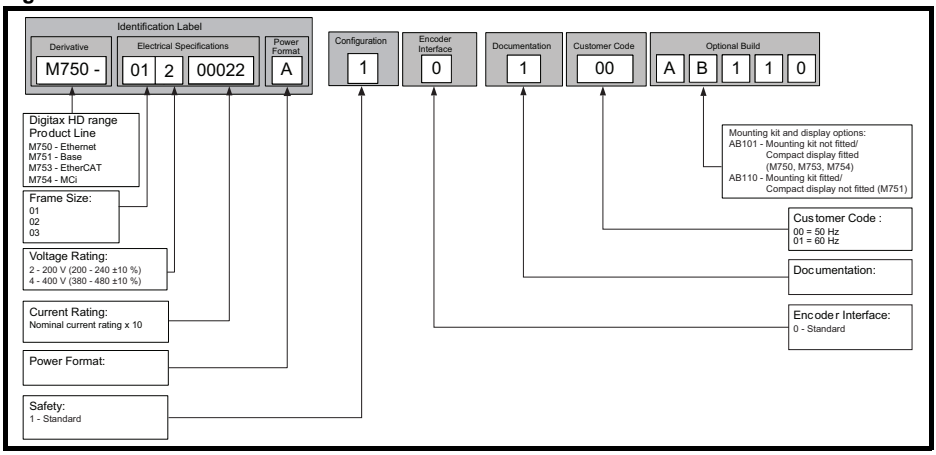
- The fault-clearing capacity must be sufficient for the installation
- The I^2t rating of the MCB must be less than or equal to that of the fuse rating listed above.

A fuse or other protection must be included in all live connections to the AC supply.

For installations with a short circuit rating of up to 100 kA or for parallel DC bus systems, refer to the Digitax HD M75X Series Installation and Technical Guide.

1.2 Model number

Figure 1-1 Model number



1.3 Drive features

Figure 1-2 Feature diagram (Frame 1 shown)

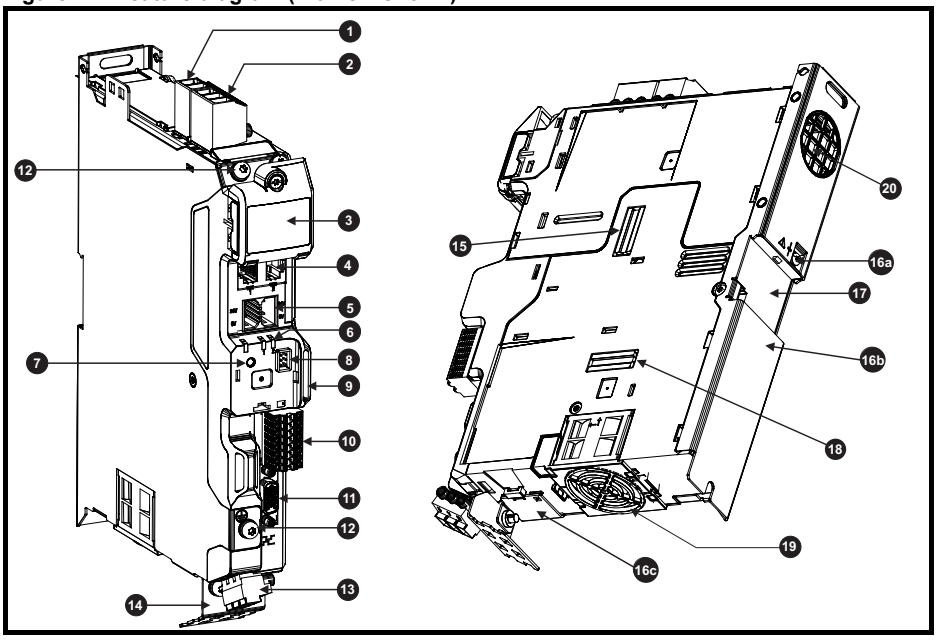


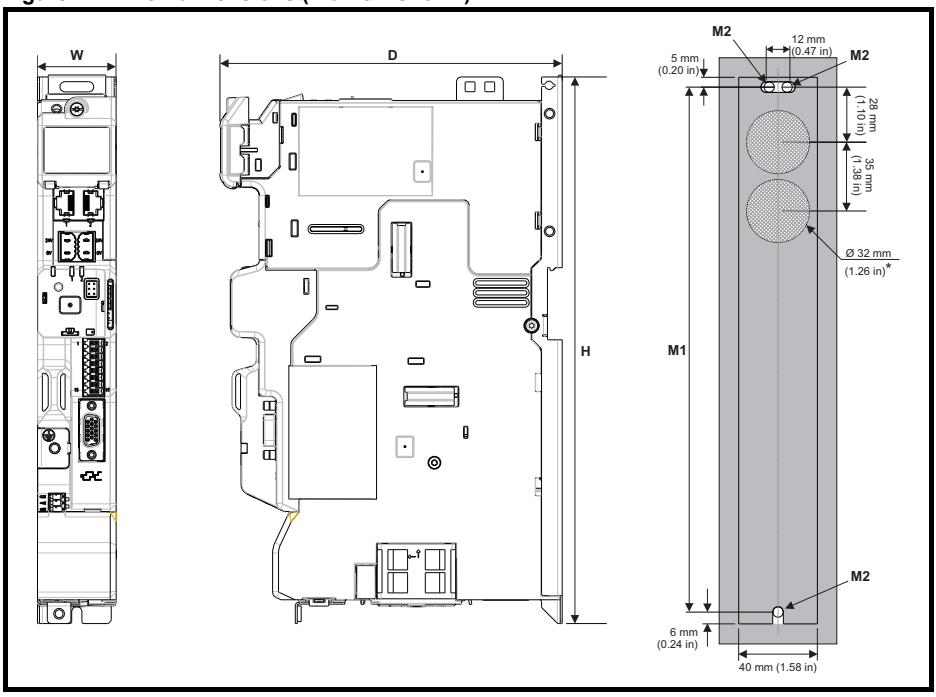
Table 1-2 Key to features of the drive

Number	Description
1	Braking terminals
2	AC supply terminals
3	DC bus terminal cover
4	Communication port connections
5	External 24 V supply terminals
6	Status and communication LEDS
7	Reset
8	Display connection
9	SD card slot
10	Control and holding brake terminals
11	Position feedback connection
12	Ground screw
13	Motor terminals
14	Cable screen bracket
15	Option module slot 1 cover*
16a	Internal EMC filter screw (frame 1)
16b	Internal EMC filter screw position (frame 2)
16c	Internal EMC filter screw position (frame 3)
17	DIN rail alignment
18	Option module slot 2 cover*
19	Cooling fan
20	Ultraflow™ rear vent

* Additional SI-Option mounting kit required when connecting option modules where not already installed.

2 Mechanical installation

Figure 2-1 M75X dimensions (Frame 2 shown)



* Cut outs only required for the Ultraflow™ rear venting, refer to the *Digitax HD M75X Series Installation and Technical Guide* for further information.

Table 2-1 Dimensions by frame size (refer to Figure 2-1)

Frame size	H		W*		D		M1		M2 (Ø)**	
	mm	in	mm	in	mm	in	mm	in	mm	in
1	233	9.17	40	1.58	174	6.85	222	8.74	5.2	0.21
2	278	10.95	40	1.58	174	6.85	267	10.51	5.2	0.21
3	328	12.91	40	1.58	174	6.85	317	12.48	5.2	0.21

* 62 mm (2.44 in) with option module support installed.

** For single axis stand alone drives, two M5 screws are required in the top mounting position and one in the lower mounting position. For multi axis (side by side installation) with no DIN rail attachment, one M5 screw is required in the top mounting position and one in the lower mounting position for each drive. For multi axis (side by side installation) with DIN rail attachment one M5 screw in the top mounting position is sufficient to fix the drive to the back plate.

NOTE

- All frame sizes require a minimum clearance of 100 mm (3.94 in) above and below the product.
- A minimum clearance of 10 mm (0.39 in) should be maintained between the enclosure side wall and the drive.

Drives may be mounted side by side with no spacing between them. For further information on mechanical installation refer to the *Digitax HD M75X Series Installation and Technical Guide*.

3 Electrical installation

A simplified diagram of the electrical connections / terminals is included on the back page of this manual.

3.1 Control stage external 24 Vdc supply requirements

An external 24 Vdc supply is required to provide power to the control circuits within the drive.

The drive will power down if the external 24 Vdc power supply is removed, but high voltages may still be present on the AC input, DC bus, brake resistor and motor output terminals.

Table 3-1 Working voltage range and maximum fuse rating for the external 24 Vdc input

All frame sizes	
Nominal operating voltage	24.0 Vdc
Minimum continuous operating voltage	20.4 Vdc
Maximum continuous operating voltage	28.8 Vdc
Minimum start up voltage	20.4 Vdc
Maximum fuse rating	30 A

Table 3-2 Typical input current and power requirements for the external 24 Vdc input

Device	Typical input current with 24 V supply (mA)	Typical input power (W)
Digitax HD frame 1 or 2 drive*	905	22
Digitax HD frame 3 drive*	1050	25
High current brake output	1200	29
SI-option module	450	11

* Typical 24 Vdc input current demand with inverter in the run condition, encoder connection, KI-Compact Display fitted and cooling fan(s) at full speed.

Therefore, a Digitax HD frame 3 drive using the high current brake output and fitted with two SI-option modules would have a typical input requirement of 3.15 A.

3.2 AC supply requirements

Table 3-3 Supply requirements

Model	Voltage	Input phases	Frequency range
Digitax HD M75X 200 V	200 V to 240 V ±10 %	Single or three*	45 to 66 Hz
Digitax HD M75X 400 V	380 V to 480 V ±10 %	Three*	

* Maximum supply imbalance: 2 % negative phase sequence (equivalent to 3 % voltage imbalance between phases).

The supply and motor ground connections are made using the M4 threaded holes in the metal side plate of the drive. Connections are located at the top and bottom of the drive, for further information refer to the *Digitax HD M75X Series Installation and Technical Guide.*

For input currents, fuse ratings and recommended cable sizes, refer to section 1.1 *Ratings*.

3.3 DC supply requirements

The drive is able to operate from a DC supply with a range from 24 Vdc to the maximum DC volts as follows.

Minimum continuous operating voltage:	26 V
Minimum start up voltage:	32 V
Maximum recommended continuous DC voltage:	230 V drives: 375 V
	400 V drives: 750 V
Over voltage trip threshold	230 V drives: 415 V
	400 V drives: 830 V

3.4 Terminal size and torque settings

Table 3-4 Drive terminal data

Terminal description	Max cable size	Min cable size	Recommended torque	Tool
AC power terminal connector	6 mm^2 (8 AWG)	0.5 mm^2 (20 AWG)	0.7 N m (6.2 lb in)	2.5 mm flat blade screwdriver
Motor power terminal connector	4 mm^2 (8 AWG)	0.5 mm^2 (20 AWG)	0.5 N m (4.4 lb in)	
Brake terminal connector	6 mm^2 (8 AWG)	0.5 mm^2 (20 AWG)	0.7 N m (6.2 lb in)	
Control terminal	1.5 mm^2 (16 AWG)	0.2 mm^2 (24 AWG)		
+24 V supply connector	6 mm^2 (8 AWG)	0.5 mm^2 (20 AWG)	0.5 N m (4.4 lb in)	
DC busbar			2 N m (17.7 lb in)	T20 Torx screwdriver
Ground connections			2 N m (17.7 lb in)	
Optional				
Internal EMC filter screw			0.8 N m (7.1 lb in)	T10 Torx screwdriver
Compact brake resistor mounting screw			0.8 N m (7.1 lb in)	T10 Torx screwdriver
Compact brake resistor thermistor screw			0.3 N m (2.7 lb in)	2.5 mm flat blade screwdriver

3.5 EMC

This equipment is not intended for use in residential locations and may not provide adequate protection to radio reception in such locations in which case the user may be required to take adequate measures.

For EMC (Electromagnetic compatibility) requirements refer to the 'Electrical installation' (chapter 4) of the *Digitax HD M75X Series Installation and Technical Guide*.

4 Getting started

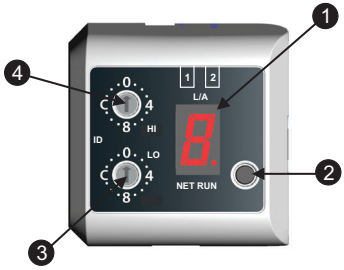
See the rear cover of this user guide for a power and control connection diagram for the drive.

Digitax HD M75X series drives are factory configured in RFC-S mode which is suitable for controlling synchronous motors such as permanent magnet servo motors. To control a different type of motor, refer to the relevant *Digitax HD M75X Control User Guide*.

4.1 Understanding the display

Digitax HD series drives are supplied fitted with a KI-Compact Display (except Digitax HD M751). This display provides basic status information for the drive, a reset button and two hexadecimal rotary switches which can be used for setting the communications address. In most cases it is not necessary to set the communication address via the rotary switches, and if not being used, then these should both be set to 0.

Figure 4-1 KI-Compact Display



1. Single Character display.
2. Reset switch.
3. Rotary switch for the least significant setting of the communications address.
4. Rotary switch for the most significant setting of the communications address.

Table 4-1 Single character status indication codes

Display Character	Description
	The drive is in the inhibit state. This indicates that the Safe Torque Off (STO) input is low, or the software enable is not present.
	The drive is in the ready state. This indicates that the drive is ready to run but a run command is not present.
	The output stage of the drive is active.
	The drive is in the under voltage state. Indicates that the d.c. bus voltage is below the under-voltage threshold.
	The drive is in the trip state. The display will show "E" and then a series of numbers relating to the trip. For example, E024-4 indicates an over temperature or open circuit of the thermistor connected to pin 15 of the position interface D-type connector.
	The display has lost communication with the drive.

The decimal point on the display will flash if the drive has an active alarm.

4.1.1 Optional KI-Compact 485 Adapter

On any model of Digitax HD the optional KI-Compact 485 Adapter (part number 82700000020300) can be used in place of the KI-Compact Display to provide an EIA-485 serial communications port. This serial communications port allows either a remote keypad to be connected to the drive, or with the addition of the USB to EIA-485 serial communications cable (part number 4500-0096) can allow a PC to communicate with the drive. This serial communications port uses a fixed baud rate of 115200 baud with 8 data bits, 1 stop bit, no parity and a default node address of 1.

4.2 Setting up the drive via Connect

The recommended method for setting up the Digitax HD is to use the Connect drive commissioning PC tool which can be downloaded from **www.drive-setup.com/digitaxhd**.

Connect can scan for drives connected to the PC to establish communications and provides guided setup screens for setting up the drive. Below are instructions to allow Connect to communicate with the drive.

Digitax HD M750 and M754

- Ensure the drive is connected to the PC either directly with an Ethernet cable or via an Ethernet switch.
- In Connect, select "New project from network scan" and the select "Scan Ethernet network".
- When the required drive has been found, select "New project with selected drives".
- Follow the drive configuration tool to set up and tune the drive.

Digitax HD M751 (or using the KI-Compact 485 Adapter on any model)

- Ensure the drive is connected to the PC with an EIA-485 serial communications connection. A USB to EIA-485 serial communications cable (part number 4500 0096) is available for this purpose.
- In Connect, select "New project from network scan" and the select "Scan serial RTU network".
- When the required drive has been found, select "New project with selected drives".
- Follow the drive configuration tool to set up and tune the drive.

Digitax HD M753

- Ensure the drive and PC are connected to the EtherCAT master and the EtherCAT master supports either ADS (Automation Device Specification) or EoE (Ethernet over EtherCAT).
- In Connect, select "New project from network scan" and either enter ADS Net ID for the EtherCAT master and select "Scan TwinCAT ADS network", or select "Scan Ethernet network via gateway/EoE". To support ADS the firmware of the EtherCAT interface in the drive must be V01.12.00 or later.
- When the required drive has been found, select "New project with selected drives".
- Follow the drive configuration tool to set up and tune the drive.

4.3 Unimotor HD plug and play auto-configuration

Control Techniques Dynamics (CTD) Unimotor hd servo motors manufactured from August 2025 onwards (serial number 2532xxxxx onwards) and fitted with an EnDat 2.2 encoder (CTD feedback codes: EG, FG, EF, FF, GB, HB), contain an electronic nameplate which a drive with firmware V01.61.01.00 or later will automatically read on first power up or after the drive has been returned to factory defaults settings in RFC-S mode. The motor must be connected to the drive using the HYB hybrid combined power and signal cable (single cable solution), or the feedback cable must be of the SE*E type.

If a defaulted drive with firmware V01.61.01.00 or later is connected to one of these CT Dynamics motors, then the drive will automatically discover the encoder type and read the electronic nameplate from the encoder setting up all motor related parameters. As long as the motor and feedback connections are correct, then this will mean that the drive will be ready to run the motor without the need to enter motor data or perform an autotune. The drive is then ready to be optimized for the load and application, and it is recommended to use the Connect PC tool for this.

The drive will not re-read the electronic nameplate from the encoder again unless the drive is returned to factory defaults settings in RFC-S mode, or parameter **03.038** is set to Discovery (-1).

4.4 Connecting a remote keypad to the drive

The KI-Compact Display provides basic drive status information only. A remote keypad can be connected to the drive to provide more detailed status information and access to all the parameters in the drive for configuration, monitoring or diagnostics purposes. Two remote keypad options are available as follows.

Keypad	Part number	Description
	82400000019600	**Remote Keypad RTC** Remote Keypad with an LCD display and a real time clock.
	82400000022700	**KI-Keypad Plus** Remote multilingual keypad with a 2.8" colour TFT display, real time clock and Bluetooth connectivity.

Either of the above keypads can be connected to the drive via a KI-Compact 485 Adapter (part number 82700000020300) fitted in place of the KI-Compact Display. Both keypads and the KI-Compact 485 Adapter have an 8P8C connector and the communications cable between these should be wired one-to-one.

If the Digitax HD M751 is being used, then the keypad can be connected to the user 485 port on the drive instead of going via the KI-Compact 485 Adapter.

4.5 Setting up the drive via a remote keypad

The instructions below are applicable for setting up a synchronous motor such as a permanent magnet servo motor in RFC-S mode with position feedback. To setting up the drive to control a different type of motor, refer to the relevant Digitax HD M75x Control User Guide.

Action	Detail
Before power-up	Ensure: • The drive enable signal is not given (terminal 2 & 6) • Run signal is not given • Motor and feedback device are connected
Power-up the drive	Verify that the required user drive mode in Pr **00.048** is RFC-S. If the mode is incorrect refer to the relevant *Digitax HD M75X Control User Guide* on how to change the drive mode. Ensure: • Drive displays 'Inhibit' If the drive trips refer to the diagnostics section of the relevant *Digitax HD M75X Control User Guide*.

Action	Detail
Setup encoder power supply (Not applicable for resolver feedback)	Enter: • Encoder power supply in Pr **03.036** = 5 V (0), 8 V (1) or 15 V (2). **NOTE** If output voltage from the encoder is > 5 V, then the termination resistors must be disabled Pr **03.039** to 0.  **CAUTION** Setting the encoder voltage supply too high for the encoder could result in damage to the feedback device.
Set motor feedback parameters*	**Incremental AB or SC encoder with commutation outputs** • Select AB Servo (3) or SC Servo (12) in Pr **03.038** • Set encoder Lines Per Revolution (LPR) in Pr **03.034** according to the encoder **EnDat encoder with or without incremental signals** • Select EnDat (8), SC EnDat (9), EnDat Alt (18) or EnDat 3 (21) in Pr **03.038** • If Pr **03.038** = EnDat (8) or EnDat Alt (18), set encoder comms baud rate / clock frequency in Pr **03.037** - For EnDat 2.2 only encoder, set baud rate to 4M (8) - Otherwise, set baud rate to 2M (7) • All encoder parameters will be auto configured after a drive reset. **Hiperface encoder** • Select SC Hiperface (7) in Pr **03.038** • All encoder parameters will be auto configured after a drive reset. **BiSS encoder with or without incremental signals, which contains a BiSS BP3 profile** • Select BiSS (13), SC BiSS (17) or BiSS Alt (20) in Pr **03.038** • All encoder parameters will be auto configured after a drive reset. **Resolver** • Select Resolver (14) in Pr **03.038** • Set number of resolver poles in Pr **03.065** • Set resolver excitation in Pr **03.066** - 6kHz 3V Fast (4) for 3:1 resolvers and 3, 6 or 12 kHz switching frequencies - 8kHz 3V Fast (5) for 3:1 resolvers and 4, 8 or 16 kHz switching frequencies - 6kHz 2V Fast (6) for 2:1 resolvers and 3, 6 or 12 kHz switching frequencies - 8kHz 2V Fast (7) for 2:1 resolvers and 4, 8 or 16 kHz switching frequencies
Enter motor nameplate details	Enter: • Motor rated current in Pr **00.046** (A) • Number of poles in Pr **00.042** • Motor rated voltage in Pr **00.044** (V)

<table>
<tr><th>Action</th><th>Detail</th></tr>
<tr><td>Set maximum speed</td><td>Enter:
• Maximum speed in Pr 00.002 (rpm)</td></tr>
<tr><td>Set acceleration / deceleration rates</td><td>Enter:
• Acceleration rate in Pr 00.003 (s/1000 rpm).
• Deceleration rate in Pr 00.004 (s/1000 rpm).
• If a braking resistor is installed, set Pr 00.015 = Fast. Also ensure Pr 10.030, Pr 10.031 and Pr 10.061 are set correctly, otherwise premature 'Brake R Too Hot' trips may be seen.</td></tr>
<tr><td>Autotune</td><td>The drive is able to perform either a stationary or a rotating autotune. The motor must be at a standstill before an autotune is enabled. If the motor is free to rotate it is recommended that a "Rotating" autotune is performed. If the motor is not free to rotate then a "Full Stationary" autotune should be performed.

The rotating autotune will rotate the motor up to 2 mechanical revolutions in the direction selected, regardless of the reference provided. After a short delay, the motor is further rotated through an electrical revolution. The enable signal must be removed before the drive can be made to run at the required revolution. The enable signal must be removed before the drive can be made to run at the required reference. The drive can be stopped at any time by removing the run signal or removing the drive enable.

To perform an autotune:
• Set Pr 00.040 = 5 for a Full Stationary autotune, or Pr 00.040 = 2 for a Rotating autotune.
• Close the run signal (terminal 11 or 13).
• Close the drive enable signal (terminal 2 & 6).
• The upper row of the display will flash 'Auto Tune' while the drive is performing the test.
• Wait for the drive to display 'Ready' or 'Inhibit' and for the motor to come to a standstill.
If the drive trips it cannot be reset until the drive enable signal (terminal 2 & 6) has been removed.
Refer to the diagnostics chapter of the relevant Digitax HD M75X Control User Guide.
• Remove the drive enabled and run signal from the drive.</td></tr>
<tr><td>Save parameters</td><td>Select 'Save Parameters' in Pr mm.000 (alternatively enter a value of 1001 in Pr mm.000) and press red reset button  or toggle the reset digital input.</td></tr>
<tr><td>Run</td><td>Drive is now ready to run.</td></tr>
</table>

*For more information on setting up one of the other supported feedback devices, refer to the relevant *Digitax HD M75X Control User Guide*.

5 Digitax HD M75X UL Listing Information

This section is intended to be used in conjunction with the *Digitax HD M75X Series Installation and Technical Guide.*

5.1 General

All models have been accessed to both Canadian and US requirements. Products have been approved through Underwriter Laboratories (UL) and are cULus listed under file number E171230, product code NMMS7 Power Conversion Equipment and 8D14 Industrial Control Equipment.

Applicant and Listee:

Nidec Control Techniques Ltd
The Gro
Pool Road
Newtown
Powys
SY16 3BE
UK.

5.2 Overvoltage category

The Over Voltage Category is OVC III.

OVC III applies to equipment permanently connected in fixed installations (Downstream of and including the main distribution board).

5.3 Electrical Installation

Electrical installation must conform to the US National Electrical Code, the Canadian Electrical Code and any additional local codes, as required.

5.4 Electrical ratings

Electrical ratings are shown in section 1.1 *Ratings*.

5.5 Cable sizes

The recommended cable sizes and fuse ratings are shown in section 1.1 *Ratings*. Field Wiring Input & Output Power Conductors shall not be smaller than 14 AWG. Field Wiring Control Conductors shall not be smaller than 18 AWG. Only a single conductor is allowed in each field wiring terminal when connected in group installation arrangement.

5.6 Multiple wiring arrangements

The drives can operate from either a single phase or a three-phase AC supply.

Additionally, the drives can operate from a DC supply with a range from 24 Vdc up to the maximum rated DC supply voltage. It is possible for the drive to go from operating on a normal line power supply voltage to operating on a much lower supply voltage without interruption. The wiring arrangements are shown in the 'Electrical installation' (chapter 4) of the Digitax HD M75X Series Installation and Technical Guide.

5.7 External 24 V supply

An external 24 Vdc supply is required to power the low voltage circuits within the drive. The low voltage circuits are isolated from the live circuits. The 24 V supply must be protected by a supplemental fuse with a maximum rating of 30 A. Refer to the 'Electrical installation' (chapter 4) of the Digitax HD M75X Series Installation and Technical Guide.

5.8 Terminals

The Earth (Ground) connections and the DC power connections must use UL Listed ring terminals sized according to the field wiring. Only one cable is permitted to be connected to each field wiring terminal.

5.9 Modular drive systems, group installation

Devices from the same manufacturer may be connected in a configuration comprising a single converter and two or more inverter sections intended to be used together to control multiple motors, where a single inverter controls a single motor. The total capacity of all inverters connected to the converter shall not exceed the converter rating. Refer to 'Multi axis system design (chapter 5) of the Digitax HD M75X Series Installation and Technical Guide.

5.10 Branch circuit protection and short circuit current rating (SCCR)

EN: When protected by fuses or circuit breakers with maximum ratings as specified in Table 5-1, this product is suitable for use on a circuit capable of delivering not more than 100 kA RMS symmetrical, 480 V maximum (up to the rated voltage of the drive module).

FR: Ave une protection par des fusibles ou un disjoncteur de calibre nominal maximal comme spécifié dans le Tableau 6-1, ce produit est convient aux circuits non susceptibles de délivrer plus de 100 kA symétriques eff., maximum 480 V (jusqu'à la tensionnominale du module variateur).

5.10.1 Non-group and group installation up to 5 kA

These products can be connected to a circuit capable of delivering not more than 5 kA RMS symmetrical amperes, 480 V maximum when protected by a 40 A Listed fuse, selected from the UL248 range of fuses (JDDZ) classes J, T or CC or when protected by a 40 A (DIVQ/DIVQ7) listed circuit breaker rated with a minimum 10 kA short circuit rating. The fuse or circuit breaker current rating must not exceed 40 A. Refer to section 1.1 *Ratings*.

5.10.2 Non-group installation up to 100 kA

These products can be connected to a circuit capable of delivering not more than 100kA RMS symmetrical, when protected by a 63 A Recognised fuse. Fuses can be any type chosen from Table 5-1 below. The fuse current rating must not exceed 63 A.

5.10.3 Group installation up to 100 kA

These products can be connected as a Modular Drive Systems with a Common DC bus as shown in the 'Multi axis system design' (chapter 5) of the Digitax HD M75X Series Installation and Technical Guide.

The Converter section of a Modular Drive System can be connected to a circuit capable of delivering not more than 100 kA RMS symmetrical, when protected by a 63 A Recognised fuse in series with a 40 A Listed fuse. The Recognised fuses can be any type chosen from Table 5-1.

Table 5-1 Recognised (JFHR2) semiconductor fuses

Fuse Manufacturer	Fuse Series	Manufacturers Part No.	Max clearing I^2t ($A^2s \times 10^3$)	Package style	UL File
Bussmann	FWP	FWP-63A22F	4.00	22x58	E91958
Bussmann	FWP	FWP-63A22FI	3.08	22x58	E91958
Mersen	A70QS	A70QS63-22F	1.85	22x58	E76491
Mersen	FR22	FR22GC69V63	2.46	22x58	E76491
Mersen	FR22	FR22GC69V63T	2.46	22x58	E76491
Mersen	A070URD	A070URD30**0063	1.20	URD30	E76491
SIBA	URDC	20 292 20.63	0.69	NH 000 DIN 80	E180276

EN: THE OPENING OF THE BRANCH-CIRCUIT PROTECTIVE DEVICE MAY BE AN INDICATION THAT A FAULT HAS BEEN INTERRUPTED. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CURRENT-CARRYING PARTS AND OTHER COMPONENTS OF THE CONTROLLER SHOULD BE EXAMINED AND REPLACED IF DAMAGED. IF BURNOUT OF THE CURRENT ELEMENT OF AN OVERLOAD RELAY OCCURS, THE COMPLETE OVERLOAD RELAY MUST BE REPLACED

FR: LE DÉCLENCHEMENT DU DISPOSITIF DE PROTECTION DU CIRCUIT DE DÉRIVATION PEUT ÊTRE DÛ À UNE COUPURE QUI RÉSULTE D'UN COURANT DE DÉFAUT. POUR LIMITER LE RISQUE D'INCENDIE OU DE CHOC ÉLECTRIQUE, EXAMINER LES PIÈCES PORTEUSES DE COURANT ET LES AUTRES ÉLÉMENTS DU CONTRÔLEUR ET LES REMPLACER S'ILS SONT ENDOMMAGÉS. EN CAS DE GRILLAGE DE L'ÉLÉMENT TRAVERSÉ PAR LE COURANT DANS UN RELAIS DE SURCHARGE, LE RELAIS TOUT ENTIER DOIT ÊTRE REMPLACÉ

5.11 Solid-state short circuit protection

The drives include integral solid-state short circuit protection for the motor output. However, this does not provide branch circuit protection for the input. Input branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

5.12 Motor overload protection and thermal memory retention

All drives incorporate internal overload protection for the motor load that does not require the use of an external or remote motor overload protection device. In order for the motor protection to work properly, the correct motor rated current must be entered into parameter **00.046** or **05.007**.

The duration of the overload is dependent on motor thermal time constant, which is defined by parameter **04.015**. The level of the motor protection accumulator is shown in parameter **04.019**. At power down the drive stores the level of the motor protection accumulator and uses this as the initial value at next power up.

The drives are provided with user terminals that can be connected to a motor thermistor to protect the motor from high temperature in the event of a motor cooling fan failure.

5.13 Enclosure rating

All drives are Open Type. An enclosure must be provided by the installer.

Overall drive weights:

Digitax HD M75X Frame 1: 1.9 kg (4.2 lb)

Digitax HD M75X Frame 2: 2.3 kg (5.1 lb)

Digitax HD M75X Frame 3: 2.5 kg (5.5 lb)

5.14 Operating temperature

The drives are suitable for use up to 40 °C (104 °F) surrounding air temperature. Operation up to 55 °C (131 °F) is permitted with de-rated output. Refer to 'Technical Data' (chapter 6) of the Digitax HD M75X Series Installation and Technical Guide.

5.15 Mounting

The drive must be mounting on a flat rigid surface.

For single axis drives standalone drives, two M5 screws are required in the top mounting position and one in the lower mounting position to fasten the drive to the mounting surface.

For multi-axis drive mounting, including DIN rail alignment refer to 'Multi axis system design' (Chapter 5) of the Digitax HD M75X Series Installation and Technical Guide.

Ensure adequate access to the drive is provided for adjustment and maintenance.

5.16 Ultraflow™ rear vent kit

The Ultraflow™ rear vent kit cooling system is UL approved. Refer to the 'Mechanical installation' (chapter 3) of the Digitax HD M75X Series Installation and Technical Guide.

5.17 Pollution degree

Drives are designed for operation in a pollution degree 2 environment or better (dry, nonconductive pollution only).

5.18 Plenum rating

The drives are not suitable for installation in a compartment (duct) handling conditioned air.

6 Declarations of Conformity

EU Declaration of Conformity

1. Product range

Unidrive M, Commander, Digitax HD and derivative products. Adjustable speed AC motor drives, including option modules and accessories.

2. Name and address of the manufacturer and authorised representative

Manufacturer	Authorised representative in the EU
Nidec Control Techniques Ltd The Gro Pool Road Newtown Powys SY16 3BE UK Registered in England and Wales. Company Reg. No. 01236886 Telephone: +44 1686 612000 E mail: cthoadmin@mail.nidec.com Web: www.controltechniques.com	Nidec Netherlands B.V. Kubus 155 3364 DG Sliedrecht Netherlands.

3. Responsibility

This declaration is issued under the sole responsibility of the manufacturer.

4. Object of the declaration

Variable speed drives

Model number	Interpretation	Nomenclature aaaa - bbc ddddde
aaaa	Basic series	C200, C300, M100, M101, M200, M201, M300, M400, M600, M608, M700, M701, M702, M708, M709, M750, M751, M753, M754, M880, M881, M882, M888, M889, E300, E301, F300, F600, H300, HS30, HS70, HS71, HS72, M000, RECT
bb	Frame size	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12
c	Voltage rating	1 = 100 V, 2 = 200 V, 4 = 400 V, 5 = 575 V, 6 = 690 V
ddddd	Current rating	Example 01000 = 100 A
e	Drive format	A = 6P Rectifier + Inverter (internal choke), D = Inverter, E = 6P Rectifier + Inverter (external choke), T = 12P Rectifier + Inverter (external choke)

The model number may be followed by additional characters that do not affect the ratings.

Accessories

Type	Model number or name
Option Modules	SI-Applications Compact, SI-Applications Plus, SI-CANOpen, SI-CiA417, SI-DeviceNet, SI-Encoder, SI-EtherCAT, SI-Ethernet, SI-Interbus 500kBd, SI-Interbus 2MBd, SI-IO, SI-IO 24 Plus, SI-Powerlink, SI-PROFIBUS, SI-PROFINET V2, SI-Universal Encoder, PTi210, SI-PROFINET RT, SI-Safety, MCi200, MCi210, MiS210, MiS250, AI-485 Adaptor, AI-485 Adaptor 24V, AI-Backup adaptor, AI-Smart adaptor
Control pods	Mxxx-STANDARD011100A0100, Mxxx-MASTER11100A0100, M000-FOLLOWER011100A0100 (where Mxxx denotes M600, M700, M701, M702, HS70, HS71 or HS72)
Displays, keypads, other accessories	KI-Keypad, KI-Keypad RTC, KI-HOA keypad RTC, KI-Compact Display, KI-485 adaptor, KI-Compact 485 adaptor, Remote Keypad (LCD), Remote Keypad RTC, CI-Keypad, CI-485 Adaptor, Capacitor module M75C, External DC cable connection kit, Multi axis kit (standard - with and without SI option mounting kit fitted), Cable grommet kit, External EMC filter, Fan replacement kit, Input inductor, Vent kit, Compact brake resistor kit, External brake resistor 20/40 or 80 ohm, Digitax HD to Uni M panel mounted & through hole mounted DC bus paralleling kits

5. Declaration

The object of the declaration is in conformity with the relevant European Union harmonisation legislation.

Low Voltage Directive (2014/35/EU)

Electromagnetic Compatibility Directive (2014/30/EU)

Restriction of Hazardous Substances Directives (2011/65/EU and 2015/863/EU).

Regulation 2019/1781 of directive 2009/125/EC (Energy related products)

6. References to the relevant harmonised EN standards

The variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-1:2007 + A1:2017 + A11: 2021	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
EN 61800-3: 2018	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
EN 61000-6-2: 2019	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4: 2019	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 61000-3-2:2019+A2:2021	Electromagnetic compatibility (EMC) - Part 3-2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3:2013+A1:2019 + A2:2021	Electromagnetic compatibility (EMC) - Part 3-3: Limitation of voltage changes, voltage fluctuations and flicker in public, low voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
EN 61000-3-12: 2011	Electromagnetic compatibility (EMC) - Part 3-12: Limits. Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase.

7. Responsible person

Jonathan Holman-White
Vice President, Research and Development
Date: 13th February 2025
Newtown, Powys, UK

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters.

The drives must be installed only by professional installers who are familiar with requirements for safety and EMC. Refer to the Product Documentation. An EMC data sheet is available giving detailed information. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used.

EU Declaration of Conformity (including 2006 Machinery Directive)

1. Product model

Unidrive M, Digitax HD and derivative products incorporating a Safe Torque Off (STO) function used as a safety component of a machine. Only the Safe Torque Off function may be used as a safety component of a machine.

2. Name and address of the manufacturer and authorised representative

Manufacturer	Authorised representative in the EU
Nidec Control Techniques Ltd The Gro Pool Road Newtown Powys SY16 3BE UK Registered in England and Wales. Company Reg. No. 01236886 Telephone: +44 1686 612000 E mail: cthoadmin@mail.nidec.com Web: www.controltechniques.com	Nidec Netherlands B.V. Kubus 155 3364 DG Sliedrecht Netherlands.

3. Responsibility

This declaration is issued under the sole responsibility of the manufacturer.

4. Object of the declaration

Model number	Interpretation	Nomenclature aaaa - bbc ddddde
aaaa	Basic series	M600, M700, M701, M702, M608, M708, M709, CSD1, HS70, HS71, HS72, E200, E300, E301, M880, M881, M882, M889, F300, F600, H300, M751, M753, M750, M754
bb	Frame size	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12
c	Voltage rating	1 = 100 V, 2 = 200 V, 4 = 400 V, 5 = 575 V, 6 = 690 V
ddddd	Current rating	Example 01000 = 100 A
e	Drive format	A = 6P Rectifier + Inverter (internal choke), D = Inverter, E = 6P Rectifier + Inverter (external choke), T = 12P Rectifier + Inverter (external choke)

The model number may be followed by additional characters that do not affect the ratings.

(Refer to the TUV Revision List: 01_205(U)_5270_0x_2x_RL_2025_01_09).

5. Declaration

The safety function STO within the above drive series fulfils the requirements of SIL 3 of EN 61800-5-2 / EN 61508 and Cat 4 / PLe of EN ISO 1384901 and can be used in safety related applications up to these safety levels and in the application area of EN IEC 62061:2021.

Further it can be used for electric passenger and goods lifts within the scope of EN 81-20, clause 5.9.2.5.4 d) as a SIL 3 drive control featuring a defined interface for stopping of the drive by a means of static elements.

The object of the declaration is in conformity with the following European Union harmonisation legislation:

Machinery Directive (2006/42/EC)

Electromagnetic Compatibility Directive (2014/30/EU)

Type examination has been carried out by the following notified body:

TUV Rheinland Industrie Service GmbH, Am Grauen Stein, D-51105 Köln, Germany

Notified body identification number: 0035

EC type-examination certificate number: 01/205/5270.03/22 dated 2022-08-26, valid until 2027-08-26.

6. References to the relevant harmonised standards used

The variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-2:2017	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
EN 61800-5-1:2007 + A1: 2017 + A11: 2021, 4.3, 5.2.3.8, 5.2.6	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
EN ISO 13849-1:2015	Safety of Machinery, Safety-related parts of control systems, General principles for design
IEC 61508 Parts 1 - 7:2010	Functional safety of electrical/ electronic/programmable electronic safety-related systems

7. Responsible person

Jonathan Holman-White

Vice President, Research and Development

Date: 24th July 2025

Newtown, Powys, UK

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters.

The drives must be installed only by professional installers who are familiar with requirements for safety and EMC. Refer to the Product Documentation. An EMC data sheet is available giving detailed information. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used.

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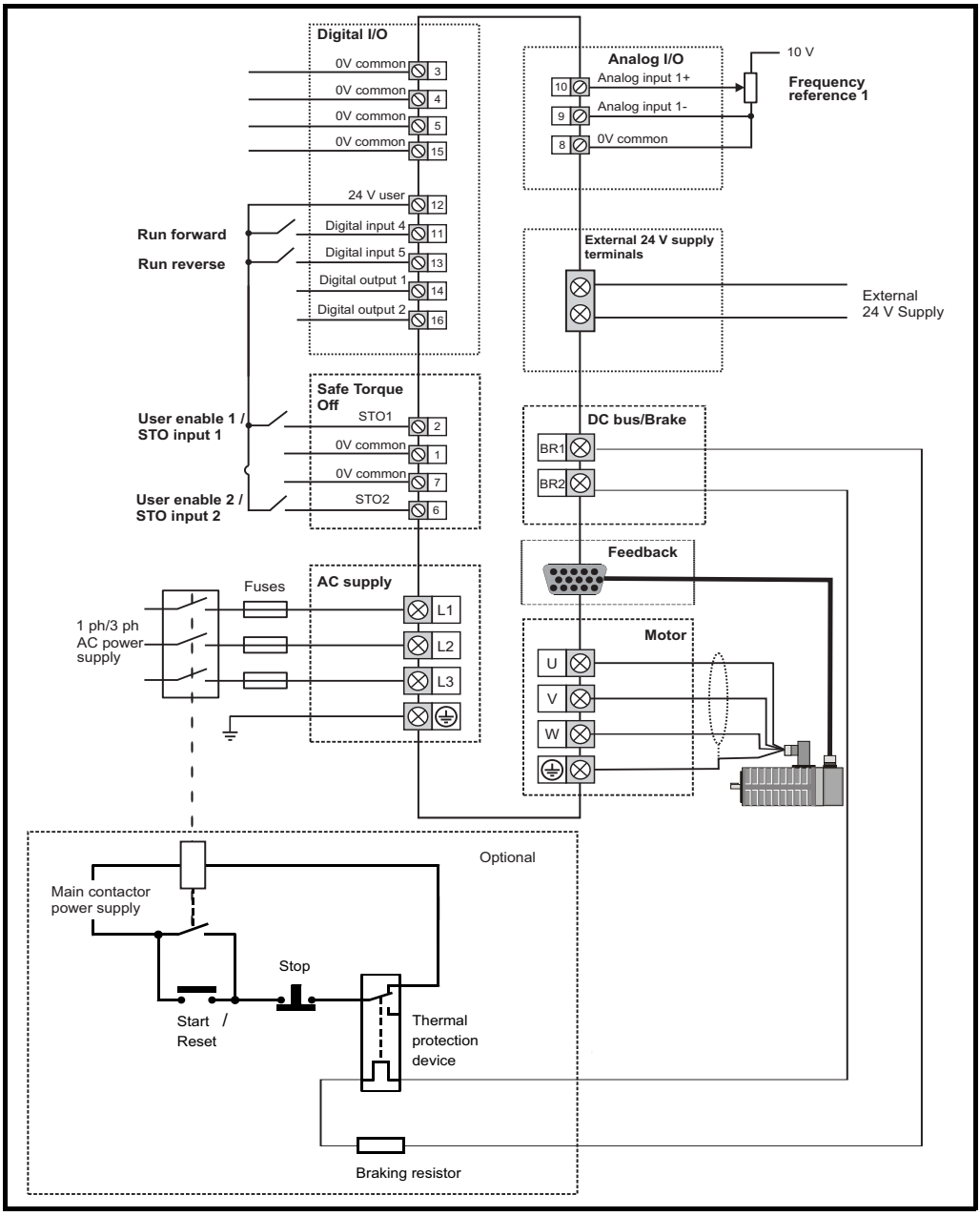
CONTROL TECHNIQUES

KB


Digital I/O
0V common
0V common
0V common
0V common
3
4
5
15
24 V user
12
Run forward
Digital input 4
11
Run reverse
Digital input 5
13
Digital output 1
14
Digital output 2
16
Analog I/O
10
Analog input 1+
9
Analog input 1-
8
0V common
10 V
Frequency reference 1
External 24 V supply terminals
External 24 V Supply
Safe Torque Off
STO1
2
User enable 1 / STO input 1
0V common
1
0V common
7
STO2
6
User enable 2 / STO input 2
DC bus/Brake
BR1
BR2
Feedback
Fuses
AC supply
1 ph/3 ph AC power supply
L1
L2
L3
Motor
U
V
W
Optional
Main contactor power supply
Stop
Start / Reset
Thermal protection device
Braking resistor

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