

ALSPA MV3000 MicroCubicle™ BUYER'S GUIDE

ALSPA MV3000

MicroCubicle™ BUYER'S GUIDE

Basic Drive Modules to 315 kW

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HOW TO USE THIS BUYER'S GUIDE

Welcome to the ALSPA MV3000 MicroCubicle™ Buyer's Guide. This guide has been designed to assist you in selecting all the items necessary for an ALSPA MV3000 inverter drive application without reference to individual product technical documents.

The inside front cover contains a fold-out Quick Look-Up Selection Chart with page references. This will lead you from a basic drive configuration through to the selection of options for a more sophisticated application.

To assist with listing the equipment you need for each application, the Appendix includes an Equipment List and Price Fill-In Sheet which may be photocopied as required. Please refer to your ALSTOM Power Conversion Sales Office or Representative for Price Lists in your local currency.

A Recommended Spares Lists plus a full list of all documentation is also included for convenience.

HELP! Should you have any problems whatsoever in specifying the necessary items, we have included at the end of this buyer's guide an enquiry sheet which you can fill in and send to us. Fill in as many of the spaces as possible and fax the sheet in to your local ALSTOM Power Conversion Sales Office or representative. You will then be advised of all the items you need.

RELATED DOCUMENTS

ALSPA MV3000 DELTA Buyer's Guide – For inverter drives between 150 to 3600 kW. The ALSPA MV3000 DELTA based inverter's are available in both air and liquid cooled versions. This is available from your ALSTOM Power Conversion Sales Office or Representative.

Variable Speed Drives Price List – This is available from your ALSTOM Power Conversion Sales Office or Representative.

See over for ALSPA MV3000 Quick Look-Up Selection Chart



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Default Wiring Diagram

1. Introduction

The ALSPA MV3000 range of variable speed AC drives provides powerful features at an economical price. As standard the, ALSPA MV3000 is a simple to use inverter for general-purpose applications for ratings from 22 kW to 3600 kW. For more advanced applications, open up the parameter menus, add Fieldbus communications, hardware expansion and programming enhancement facilities, and the power of ALSPA MV3000 comes alive. Add to this universal control strategies such as frequency control, closed loop flux vector control and encoderless flux vector control, and ALSPA MV3000 easily manages a vast spectrum of industrial applications. A typical ALSPA MV3000 drive unit is shown with the optional Drive Data Manager™ (Keypad) fitted.

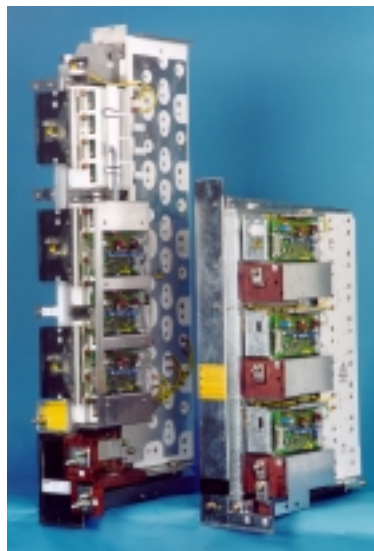


ALSPA MV3000 is available in a number of hardware packages dependent upon rating and cooling method. These are indicated in the table below.

FORM	DESCRIPTION
MicroCubicle™	Fully self-contained inverter drive unit – also available fully packaged
Delta – Air Cooled	Modular inverter building blocks – available in kit form or fully packaged
Delta – Liquid Cooled	Modular inverter building blocks – available in kit form or fully packaged



MicroCubicle™
Ratings up to 315 kW

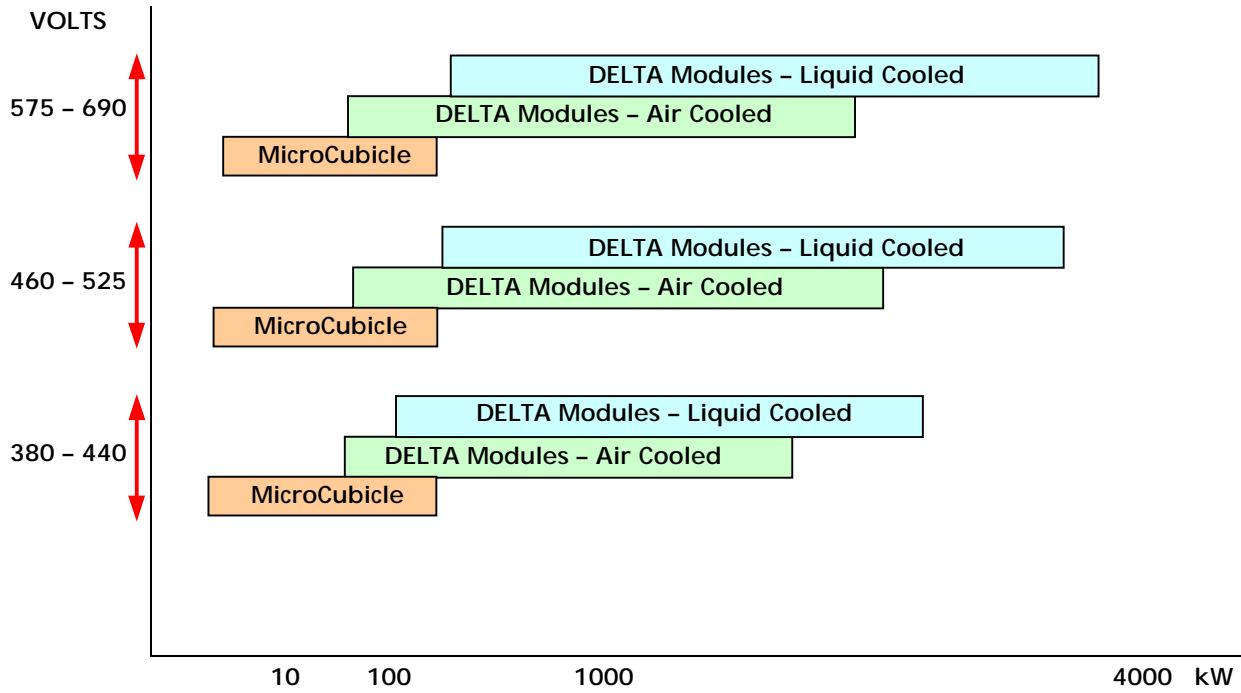


DELTA Modules
Inverter building blocks



Fully Packaged DELTA Inverter
Ratings up to 3600 kW

All inverters are available in three AC supply voltage ranges as indicated in the following table.



This Buyer's Guide covers only the ALSPA MV3000 MicroCubicle range of inverters up to 315 kW.

Please refer to ALSTOM or the ALSPA MV3000 DELTA Buyer's Guide for details of higher rated inverters.

1.1 The MicroCubicle™

The ALSPA MV3000 MicroCubicle™ combines innovations in design, compactness, power to weight ratio, ease of use and speed of maintenance previously unknown in an AC inverter drive.

A mixture of wide power and voltage supply range, increased functionality and improved usability allow the ALSPA MV3000 to be applied in virtually all types of applications in all corners of the globe.

MicroCubicle™ Overview

- AC Variable Speed Inverter Drive
- 3 Voltage Ranges : 380-440 V, 460-525 V, 575-690V – 50/60 Hz
- Dual Overload 150% Constant Torque, 110% Variable Torque Pump & Fan
- Control Modes : Frequency Control, Open and Closed Loop Flux Vector Control

Mechanical Outline

- Bookcase format
- High packing density
- Space saving
- Dimensions to fit standard cubicles

Expandability

- Front access to withdrawable control module
- Post-sale option fitting e.g. Fieldbus cards
- Fast fit, options slide and click into place

Access and Serviceability

- hinged gate access to power and control sections
- internal components front accessible
- withdrawable modules e.g. controller, DB unit, rectifier
- fast servicing with minimum number of fasteners
- moulded channels to assist cable routing

Built-in Reliability

- intelligent action in the event of adverse process conditions
- extensive protection features
- AC reactor for protection from line transients
- Rugged output bridge withstands DOL
- Long capacitor and fan life

Configuration and Programming

- Easy to use: 3 wire in, 3 wire out: press 'start'!
- Quick start guide for step-by-step easy instructions
- Simple parameter menu for basic applications
- Open further menus for more advanced applications
- Drive Data Manager™ keypad – on drive or handheld
- ALSPA Drive Coach PC based set up tool

Further Features

- PID Controller on board
- Skip frequencies
- Energy saving modes
- Speed, torque and position control modes

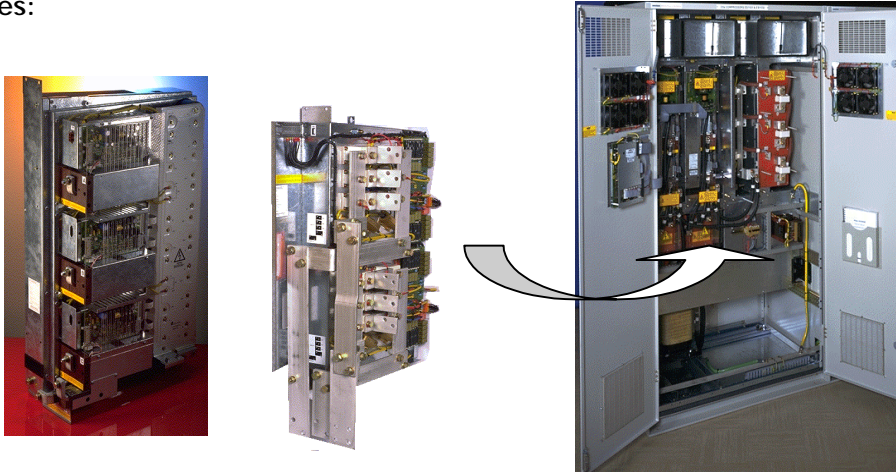


1.2 The DELTA Concept

The Concept:

For drive ratings above 315 kW ALSPA MV3000 is designed to be fully packaged. To provide flexibility of construction and commonality of components over a wide power range, the 'DELTA' concept was conceived. It is a modular approach to the construction of AC inverter drives where the major drive components have been built into conveniently sized building blocks – called 'DELTA Modules'. A complete inverter drive is constructed using a number of these modules. Further, parallel capability allows higher ratings to be achieved using the same modules.

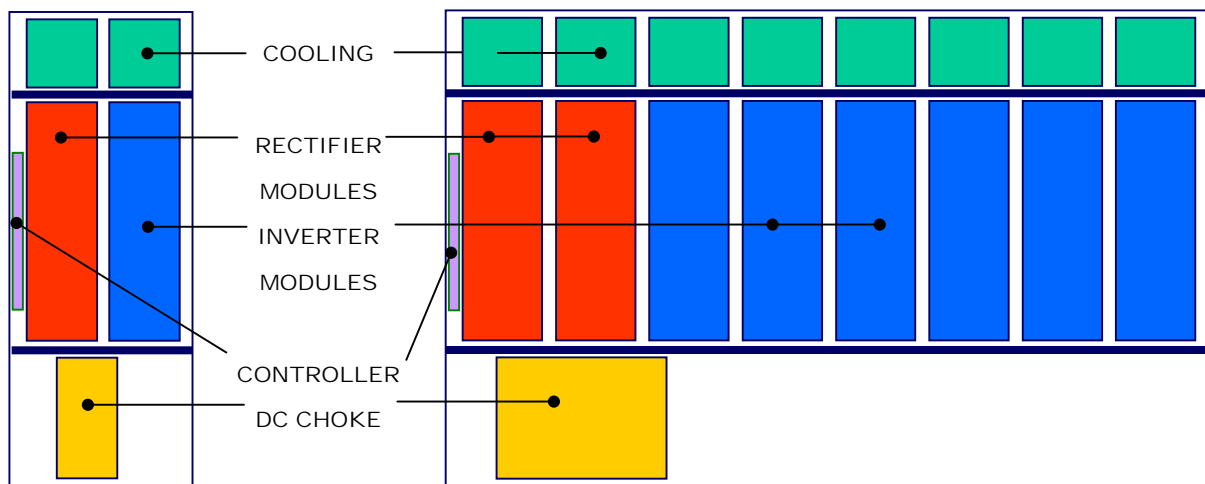
The Modules:



DELTA Inverter Module DELTA Rectifier Module Fully Packaged DELTA based inverter

Parallel Capability:

Inverter drives spanning a wide power range can take advantage of common building blocks providing benefits in drive construction, minimisation of spares holding and identical set-up procedure.



We provide everything you need:

To assist the System Builder, we provide all the necessary items to complete the package: the hardware building blocks, typical kit list and schematics, assembly instructions, electrical wiring instructions, full technical specifications and cubicle planning suggestions.

For details of Inverters rated up to 3600 kW, refer to ALSTOM or ALSPA MV3000 'DELTA' Buyer's Guide.

2. Product Overview

2.1 Data Common to all Units

Motor shaft power range	22 kW to 1800 kW (air cooled), Up to 3600 kW (liquid cooled)
Supply Voltage	3 Phase, 380-440, 460-525, 575-690 Volts. Voltage range as selected.
Voltage Variation	±10% long term, ±15% for 0.5 to 30 cycles with loss of performance but no trip.
Voltage Imbalance	Negative sequence voltage 3%
Frequency	50 Hz, 60 Hz as selected.
Freq. Variation	±2% with rate of change ±2% per second
Network Type	With earthed/grounded neutral (i.e. TN or TT) or isolated neutral (i.e. IT network). For IT networks, transient suppression (e.g. to UL 1449) and earth fault protection must be provided external to the drive.
Output Overload	Constant Torque: 150% full load current for 60s, giving up to 160% related motor torque at breakaway. Variable Torque: 110% full load current for 60s where selected (see rating tables)
Voltage	3 Phase, compensated to give maximum voltage level equal to the supply voltage
Frequency	0 - 200 Hz (800 Hz on MicroCubicle™)
Motor Control Type	3 Modes available: Variable Voltage Variable Frequency, Flux Vector without encoder, Flux vector with encoder
Switching Frequency	1.25 kHz default. Programmable up to 7.5 kHz
Enclosure protection	MicroCubicle™: IP20 (NEMA 1). Optional canopy for IP21. DELTA based inverters: IP00 modules. Packaged drives available for higher IP ratings - refer.
Operating - Temperature	0°C to 40°C. Derate output by 2.5% per °C above 40 °C up to 50 °C max.
- Altitude	Up to 1000m. Derate by 0.73% per additional 100m to a maximum of 2000m.
- Humidity	5% to 95% relative humidity non-condensing.
- Vibration	IEC 60721-3-3 Class 3M1 & EN50178
Storage - Temperature	-25°C to 55°C
- Humidity	5% to 95% relative humidity non-condensing.
Transport - Temperature	-25°C to 70°C
- Humidity	≤ 95% relative humidity non-condensing.
- Vibration	IEC 60721-3-2 Class 2M1
Cooling - Method	Forced air cooled, with internal fans.
- Air Quality	Clean, free from dust, condensation and conductive vapours (i.e. pollution degree 2 according to IEC 60664-1 and UL840). If optional dirty air kit is fitted, the power devices can use unfiltered air that does not contain corrosive, conductive or explosive dust or gases.
EMC	Complies with EN61800/IEC61800 Part 2 and Part 3.
CE	CE marked to comply with the European Union Low Voltage Directive 73/23/EEC.
Control sources	Optional Drive Data Manager™ - mounts on drive module, cubicle, or is hand held. Control terminals for remote control (analogue and digital) wiring. Control via Serial Link.
Languages	English, French, German.
Serial communications	RS485, RS232, with MODBUS ASCII/RTU, GEM80 ESP. Drive to drive link. Opt: WorldFIP, PROFIBUS, DeviceNet.
Analogue inputs	2 x 12 bit resolution, +/- 10VDC or +/- 20mA.
Analogue outputs	2 x 12 bit resolution, +/- 10VDC or +/- 20 mA.
Digital inputs	6 configurable, 1 fixed, 10 - 50 VDC
Digital outputs	3 x C/O relays. All configurable.
High Speed Digital I/O	1 x RS422 Programmable as: Frequency input for speed reference or Frequency output of motor speed
Encoder Feedback	4 channel differential line receiver for interface to incremental encoder (A, A*, B, B*, Z, Z*). Max 1 MHz
Performance	Frequency: Resolution: 0.01%, Control Accuracy: 0.1%. Speed: Resolution: 0.01%, Accuracy (absolute) 0.01%

2.2 Rating and Protection Data – 50 Hz

Drive		Motor Rating		Drive Output Rating		Input Line Reactor
Model	Frame Size	Nominal Power (1.1/1.5) kW	Nominal Power (1.1/1.5) HP	Continuous Current (1.1) (1.5) A A		Model Number (All models shown are 50 Hz) Rating (1.1/1.5)
380 – 440 V						
MV3058A4A1	3	30/22	40/29	58	44	MV3ACL030A4 / MV3ACL022A4
MV3071A4A1	3	37/30	50/40	71	58	MV3ACL037A4 / MV3ACL030A4
MV3086A4A1	4	45/37	60/50	86	71	MV3ACL045A4 / MV3ACL037A4
MV3105A4A1	4	55/45	74/60	105	86	MV3ACL055A4 / MV3ACL045A4
MV3140A4A1	4	75/55	101/74	140	105	MV3ACL075A4 / MV3ACL055A4
MV3168A4A1	6	90/75	121/101	168	140	MV3ACL090A4 / MV3ACL075A4
MV3204A4A1	6	110/90	147/121	204	168	MV3ACL110A4 / MV3ACL090A4
MV3244A4A1	6	132/110	177/147	244	204	MV3ACL132A4 / MV3ACL110A4
MV3292A4A1	6	160/132	214/177	292	244	MV3ACL160A4 / MV3ACL132A4
MV3364A4A1	6	200/160	268/214	364	292	MV3ACL200A4 / MV3ACL160A4
MV3449A4A1	7	250/200	335/268	449	364	MV3ACL250A4 / MV3ACL200A4
MV3503A4A1	7	280/250	375/335	503	449	MV3ACL280A4 / MV3ACL250A4
690 V						
MV3062A6A1	4	55/45	74/60	61	50	MV3ACL055A7 / MV3ACL045A7
MV3077A6A1	4	75/55	101/74	82	61	MV3ACL075A7 / MV3ACL055A7
MV3099A6A1	4	90/75	121/101	98	82	MV3ACL090A7 / MV3ACL075A7
MV3125A6A1	6	110/90	147/121	119	98	MV3ACL110A7 / MV3ACL090A7
MV3144A6A1	6	132/110	177/147	142	119	MV3ACL132A7 / MV3ACL110A7
MV3192A6A1	6	160/132	214/177	170	142	MV3ACL160A7 / MV3ACL132A7
MV3242A6A1	6	200/160	268/214	211	170	MV3ACL200A7 / MV3ACL160A7
MV3289A6A1	7	250/200	335/268	260	211	MV3ACL250A7 / MV3ACL200A7
MV3336A6A1	7	280/250	375/335	291	260	MV3ACL280A7 / MV3ACL250A7
MV3382A6A1	7	315/280	422/375	327	292	MV3ACL315A7 / MV3ACL280A7

Drive Model	Mains Supply Rating			Losses Total Drive † Approx. Losses (Maximum) kW	Ventilation		Fan Fuses Rating A
	Mains I/P Current (1.1/1.5) A	IEC Rated Fuse (1.1/1.5) A	UL Rated Fuse (1.1/1.5) A		Typical Drive Airflow m ³ /h	cu ft/min	
380 – 440 V							
MV3058A4A1	59/44	63/50	80/60	1.1	140	85	N/A
MV3071A4A1	73/59	80/63	100/80	1.3	140	85	N/A
MV3086A4A1	88/73	100/80	100/100	1.6	255	150	2
MV3105A4A1	107/88	125/100	150/110	1.8	255	150	2
MV3140A4A1	145/107	160/125	200/150	2.4	255	150	2
MV3168A4A1	173/145	200/160	225/200	3.0	680	400	4
MV3204A4A1	210/173	250/200	300/225	3.4	680	400	4
MV3244A4A1	251/210	315/250	350/300	4.0	680	400	4
MV3292A4A1	304/251	315/315	400/350	4.4	680	400	4
MV3364A4A1	379/304	400/315	500/400	5.6	680	400	4
MV3449A4A1	473/379	500/400	600/500	6.5	850	500	4
MV3503A4A1	529/473	630/500	700/600	7.5	850	500	4
690 V							
MV3062A6A1	62/51	63/63	‡	1.6	255	150	2
MV3077A6A1	84/62	100/63		2.0	255	150	2
MV3099A6A1	100/84	100/100		2.4	255	150	2
MV3125A6A1	122/100	125/100		3.0	680	400	4
MV3144A6A1	146/122	160/125		3.4	680	400	4
MV3192A6A1	176/146	200/160		4.1	680	400	4
MV3242A6A1	220/176	250/200		4.6	680	400	4
MV3289A6A1	274/220	315/250		5.4	850	500	4
MV3336A6A1	307/274	315/315		6.2	850	500	4
MV3382A6A1	345/307	400/315		7.1	850	500	4

† Including input line filter

‡ UL/CSA approvals not applicable at this voltage

2.3 Rating and Protection Data – 60 Hz

Drive		Motor Rating		Drive Output Rating		Input Line Reactor
Model	Frame Size	Nominal Power (1.1/1.5) kW	Nominal Power (1.1/1.5) HP	Continuous Current (1.1) (1.5) A A		Model Number (All models shown are 60 Hz) Rating (1.1/1.5)
460 – 525 V						
MV3052A5A1	3	30/22	40/30	52	40	MV3ACL040B5 / MV3ACL030B5
MV3065A5A1	3	37/30	50/40	65	52	MV3ACL050B5 / MV3ACL040B5
MV3077A5A1	4	45/37	60/50	77	65	MV3ACL060B5 / MV3ACL050B5
MV3096A5A1	4	56/45	75/60	96	77	MV3ACL075B5 / MV3ACL060B5
MV3124A5A1	4	75/56	100/75	124	96	MV3ACL100B5 / MV3ACL075B5
MV3156A5A1	6	93/75	125/100	156	124	MV3ACL125B5 / MV3ACL100B5
MV3180A5A1	6	112/93	150/125	180	156	MV3ACL150B5 / MV3ACL125B5
MV3240A5A1	6	149/112	200/150	240	180	MV3ACL200B5 / MV3ACL150B5
MV3302A5A1	6	187/149	250/200	302	240	MV3ACL250B5 / MV3ACL200B5
MV3361A5A1	7	224/187	300/250	361	302	MV3ACL300B5 / MV3ACL250B5
MV3414A5A1	7	261/224	350/300	414	361	MV3ACL350B5 / MV3ACL300B5
MV3477A5A1	7	298/261	400/350	477	414	MV3ACL400B5 / MV3ACL350B5
600 V						
MV3062A6A1	4	45/37	60/50	62	52	MV3ACL060B6 / MV3ACL050B6
MV3077A6A1	4	56/45	75/60	77	62	MV3ACL075B6 / MV3ACL060B6
MV3099A6A1	4	75/56	100/75	99	77	MV3ACL100B6 / MV3ACL075B6
MV3125A6A1	6	93/75	125/100	125	99	MV3ACL125B6 / MV3ACL100B6
MV3144A6A1	6	112/93	150/125	144	125	MV3ACL150B6 / MV3ACL125B6
MV3192A6A1	6	149/112	200/150	192	144	MV3ACL200B6 / MV3ACL150B6
MV3242A6A1	6	187/149	250/200	242	192	MV3ACL250B6 / MV3ACL200B6
MV3289A6A1	7	224/187	300/250	289	242	MV3ACL300B6 / MV3ACL250B6
MV3336A6A1	7	261/224	350/300	336	289	MV3ACL350B6 / MV3ACL300B6

Drive Model	Mains Supply Rating			Losses Total Drive † Approx. Losses (Maximum) kW	Ventilation		Fan Fuses Rating A
	Mains I/P Current (1.1/1.5) A	IEC Rated Fuse (1.1/1.5) A	UL Rated Fuse (1.1/1.5) A		Typical Drive Airflow m ³ /h	cu ft/min	
460 - 525 V							
MV3052A5A1	53/40	63/40	70/50	1.0	140	85	N/A
MV3065A5A1	66/53	80/63	90/70	1.2	140	85	N/A
MV3077A5A1	79/66	80/80	100/90	1.5	255	150	2
MV3096A5A1	98/79	100/80	125/100	1.7	255	150	2
MV3124A5A1	130/98	160/100	175/125	2.2	255	150	2
MV3156A5A1	162/130	200/160	225/175	2.9	680	400	4
MV3180A5A1	194/162	200/200	250/225	3.1	680	400	4
MV3240A5A1	258/194	315/200	350/250	4.0	680	400	4
MV3302A5A1	321/258	400/315	450/350	4.7	680	400	4
MV3361A5A1	385/321	400/400	500/450	5.6	850	500	4
MV3414A5A1	448/385	500/400	600/500	6.4	850	500	4
MV3477A5A1	512/448	630/500	650/600	7.6	850	500	4
600 V							
MV3062A6A1	64/53	80/63	80/70	1.6	255	150	2
MV3077A6A1	79/64	80/80	100/80	1.8	255	150	2
MV3099A6A1	105/79	125/80	150/100	2.4	255	150	2
MV3125A6A1	130/105	160/125	175/150	3.1	680	400	4
MV3144A6A1	156/130	160/160	200/175	3.3	680	400	4
MV3192A6A1	207/156	250/160	300/200	4.4	680	400	4
MV3242A6A1	258/207	315/250	350/300	5.0	680	400	4
MV3289A6A1	309/258	315/315	400/350	6.0	850	500	4
MV3336A6A1	359/309	400/315	450/400	7.0	850	500	4

† Including input line filter

2.4 Main Features and Parameters

The following table lists the main features and parameters available as standard within ALSPA MV3000. Parameters are grouped in 50 functional menus for ease of use. It is possible to hide and reveal menus in order to customise the complexity of the user interface.

<p>CONTROL PANEL FUNCTIONS</p> <p>Full Drive Control Start/Stop Speed Reference Adjust Forward/Reverse Parameter View and Programming Help Facility Multi-Language Select</p> <p>CONTROL FEATURES</p> <p>Frequency Control Speed Control Torque Control open & closed loop Open Loop (Encoderless) Flux Vector Control Position Control Rotary Linear Position Shaper Tacho Feedback Encoder Feedback Slip Compensation Fwd/Rev Separate Ramps Volt Free Output Relays Start Modes: Normal Ramp Start Synchronous starting Synchro Start only after a trip D.O.L. Motor Start Stop Modes: Coast Stop Normal Ramp Stop Saturation Braking (High Trq Stop) DC Injection Braking PID Controller Alpha-numeric Display Numeric Keypad Entry PC Software Frequency Skipping Multi-Level Password Authorisation Separate Auxiliary Supply Reference Sequencer Reference Shaper Multiple Reference Sources Master/Slave Operation Local/Remote Operation Motor Parameter Identification Energy Saving Economy Mode Analogue I/O Digital I/O High Speed Digital I/O Control and Status Flags General Purpose Logic Blocks Speed Droop Motorised Potentiometer</p> <p>PROTECTION FEATURES</p> <p>I²t Overload Current Limit Current Clipping Instantaneous Short Circuit Earth Fault Phase Loss Overvoltage Undervoltage Heatsink Overtemperature Ambient Overtemperature Motor Modelling Motor Thermistor Motor Stall Microprocessor Fault Keypad Fault</p>	<p>TRIP AVOIDANCE FEATURES</p> <p>Supply Dip/Loss Ridethrough Shock Load Ridethrough Load Shedding on Overload Overload Early Warning Signal Reference Loss Action Motor Thermal Modelling Auto Restart Auto Restart Delay Auto Reset after Trip Auto Reset Delay Stall Prevention Overhauling Load Current Limited Acceleration Current Limited Deceleration DC Link Voltage Limited Deceleration Voltage Boost Load Fault Detection Window Action on Load Fault Regeneration Power Limit Back-Up Control and Reference Sources</p> <p>MONITORING/DISPLAY</p> <p>AC Supply Voltage Motor Voltage DC Link Voltage Current Frequency Motor Power Motor Speed rpm Motor Speed m/s Motor Thermal State Speed Reach Torque Hours Run Days Run Hours Energised Days Energised kWhrs MWhrs Warning Fault Trip Fault History Record - Set-Up - Monitor - Playback - Trigger Source - Printing</p> <p>Trip Log Time Since Last Trip Drive Status Word Output Bridge Temperature Control Electronics Temperature Dynamic Braking Unit Temperature Interlock</p> <p>PROGRAMMABLE ADJUSTMENTS</p> <p>Internal Frequency Reference Trim Reference Source Trim Reference Scale Factor Current Limit PID Setpoint PID Error Deadband P Value I Value D Value Principal Control Source Backup Control Source Principal Reference Source Backup Reference Source Reference Cascade</p>	<p>Multi-Level Security Codes Auto Locking of keypad Motor Base Volts & Frequency Motor Poles Action on Low Motor Volts Motor 150% Overload Duration Action on Motor I²t Time-out Motor Cooling Fan Type Process Speed at Base Frequency Start up Frequency Fwd and Rev Acceleration Rates Fwd and Rev Deceleration Rates Max and Min Fwd Frequency Max and Min Rev Frequency Wait time prior to ramp up Wait time prior to ramp down Speed Reach Frequency Speed Reach Detection Range Fixed Voltage Boost Auto Voltage Boost Variable Voltage Boost Torque Boost IR Compensation Slip Compensation Fan Fluxing V/f Ratio Saturation Braking DC Injection Braking DC Injection Frequency DC Injection Current DC Injection Duration Current limit Response Speed Ride-through by Regeneration from Motor Stop Time Limit Analogue Input Mode and Polarity Analogue Output Mode and Polarity Frequency Comparator Levels Action on Trip Serial Link Configuration Serial Link Loss Timeout Number of Auto Reset Attempts Auto Reset Delay Supply Loss Timeout Inst OC Auto Reset Timed OC Auto Reset Under Volts Auto Reset Over Volts Auto Reset Motor Thermal Trip Auto Reset Interlock Auto Reset Control Loss Auto Reset Temperature Trip Auto Reset Overtemperature Avoidance Enable Load Fault Auto Reset Load Fault Detection Window Load Fault Violation Time Action on Load Fault Force Synchrostart Enable Number of Skip frequencies Skip Frequency Band Centres Skip Frequency Band Widths Timed Overcurrent Avoidance History Record Channels History Record Configuration Reference Sequencer Configuration Printer Message Configuration Motor Magnetisation Current Motor Parameterisation Method Frequency Multiplier Print Options Dynamic Braking Unit Set-Up Dynamic Braking Resistor Parameterisation Switching Mode Hide/Reveal Menu Control Upload Template to ALSPA Drive Coach</p>
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2.5 Standards of Compliance

EC Directives	CE Marked: complies with EN50178 LVD. Complies with EN61800-3 EMC when used and installed as directed.
BS 7671:1992	Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition. (Related to IEC 60364)
NFPA 70 - 1999	National electrical code, including the safe installation of electrical conductors
IEC 60038:1983	IEC standard voltages
IEC 60417-1:1998	Graphical symbols for use on equipment - Part 1: Overview and application.
IEC 60417-2:1998	Graphical symbols for use on equipment - Part 2: Symbol originals
IEC 60664-1:1992	Insulation co-ordination for equipment within low voltage systems - Part 1: Principles, requirements and tests
IEC 60664-3:1992	Insulation co-ordination for equipment within low voltage systems - Part 3: Use of coatings to achieve insulation co-ordination of printed circuit assemblies
(BS) EN 50178:1998	Electronic equipment for use in power installations. General requirements.
(BS) EN 50082-2:1995	Electromagnetic compatibility. Generic immunity standard. Industrial environment.
(BS) EN 55011:1998 CISPR 11:1999	Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
IEC 60065:1998	Audio, video and similar electronic apparatus - Safety requirements
(BS) EN 60068-2-6:1996 IEC 60068-2-6:1995	Environmental testing - Part 2: Tests - Test Fc Vibration (Sinusoidal)
(BS) EN 60073:1997 IEC 60073:1996	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indication devices and actuators
(BS) EN 60146-1-1:1993 IEC 60146-1-1:1991	Semiconductor convertors - General requirements and line commutated convertors - Part 1-1: Specifications of basic requirements
(BS) EN 60204-1:1998 IEC 60204-1:1997	Electrical equipment of industrial machines - Part 1: General requirements
(BS) EN 60529:1992 IEC 60529:1989	Degrees of protection provided by enclosures (IP-Code).
(BS) EN 60721-3-2:1997 IEC 60721-3-2:1997	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transportation
(BS) EN 60721-3-3:1995 IEC 60721-3-3:1994	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weather protected locations
IEC 60950:1999	Safety of information technology equipment
IEC 61000-2-2:1990	Electromagnetic compatibility (EMC) - Part 2: Environment - Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems
(BS) EN 61000-2-4:1995 IEC 61000-2-4:1994	Electromagnetic compatibility (EMC) - Part 2: Environment - Section 4: Compatibility levels in industrial plants for low-frequency conducted disturbances
(BS) EN 61000-4-2:1995 IEC 61000-4-2:1995	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test. Basic EMC Publication
(BS) EN 61000-4-3:1997 IEC 61000-4-3:1995	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test
(BS) EN 61000-4-4:1995 IEC 61000-4-4:1995	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test. Basic EMC Publication
(BS) EN 61000-4-5:1995 IEC 61000-4-5:1995	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test
(BS) EN 61136-1:1998 IEC 61136-1:1992	Semiconductor power convertors - Adjustable speed electric drive systems - General requirements - Part 1: Rating specifications, particularly for D.C. motor drives
(BS) EN 61800-1:1998 IEC 61800-1:1997	Adjustable speed electrical power drive systems - Part 1: General requirements - Rating specifications for low voltage adjustable speed D.C. power drive systems
(BS) EN 61800-2:1998 IEC 61800-2:1998	Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency AC power drive systems
(BS) EN 61800-3:1997 IEC 61800-3:1996	Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods
ANSI/UL 508C	Power conversion equipment.
UL 840	Insulation co-ordination including clearances and creepage distances.
CAN/CSA C22.2-14:1995	Industrial Control Equipment. Industrial Products.

2.6 Drive Performance Data

Frequency – Resolution	0.01%		
– Control accuracy	0.1%		
Speed – Resolution	0.01%		
– Accuracy (absolute)	0.01%		
	VVVF	ENCODERLESS FLUX VECTOR	FLUX VECTOR WITH ENCODER
Speed Control Range	50 : 1	50 : 1	>1000 : 1
Speed Control Bandwidth	N/A	20 Rad/s	100 Rad/s
Torque Control Bandwidth	< 1 Rad/s	> 500 Rad/s	> 500 Rad/s
Torque Control Accuracy	≅ 10 %	≅ 10 %	≅ 5 %
Speed Control Accuracy	≅ 1 %	≅ 0.5 %	≅ 0.02 %

3. Basic Drive Selection

3.1 General Purpose Selection Flow Chart

In order to match the right inverter to the application, one first needs to establish basic data about the mains electricity supply and also the motor nameplate details.

Mains Electricity Supply		
Mains Supply Voltage:		Volts
Motor Nameplate Details		
Motor Base Voltage:		Volts
Motor Base Frequency:		Hz
Motor Full Load Current:		Amps
Motor Power:		kW
Motor Base Speed:		r/min

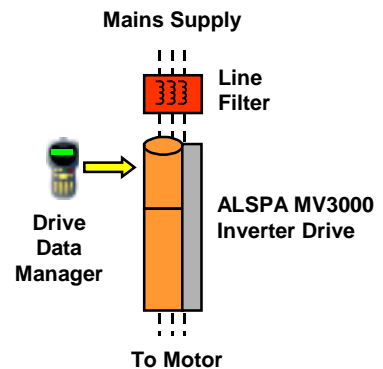
The next step is to categorise the application in order to choose an inverter with the right overload duty to match the application requirements.

In general we distinguish between two types of applications:

- 1) Variable Torque Applications: centrifugal pump/fan loads (110% overload)
- 2) Constant Torque Applications: for all other types of loads (150% overload)

The simplest configuration for such applications comprises three items:

- 1) ALSPA MV3000 AC Inverter Drive
- 2) Line Filter
- 3) Drive Data Manager™ Keypad



Application		
Centrifugal Pump or Fan ?	Yes (1.1 O/L)	No (1.5 O/L)

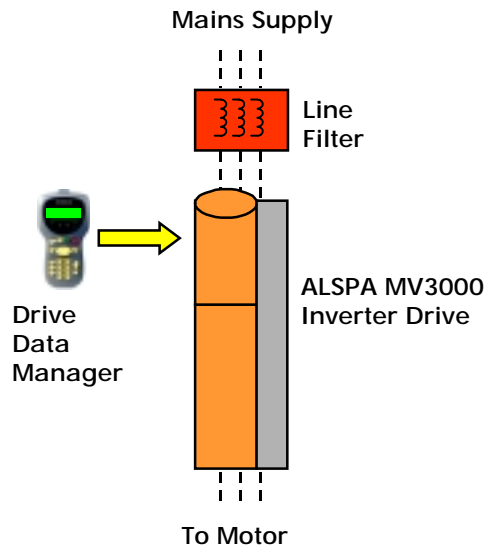
Supply Voltage Range*
380 – 440 V AC 50 Hz
575 - 690 V AC 50 Hz
460 - 525 V AC 60 Hz
575 – 690 V AC 60 Hz

Go To Page	Go To Page
3-2	3-6
3-3	3-7
3-4	3-8
3-5	3-9

* All drives are suitable for 50 and 60 Hz supplies. Typical territorial voltage/frequency ranges shown.

3.1.1 Variable Torque - Pump & Fan - Applications : 380 – 440 V 50 Hz

Variable torque loads generally comprise centrifugal pump and fan applications where 110% of full load current overload is sufficient. Fan fluxing (square law) and economy modes are included to assist with energy saving.



Select matching set of:

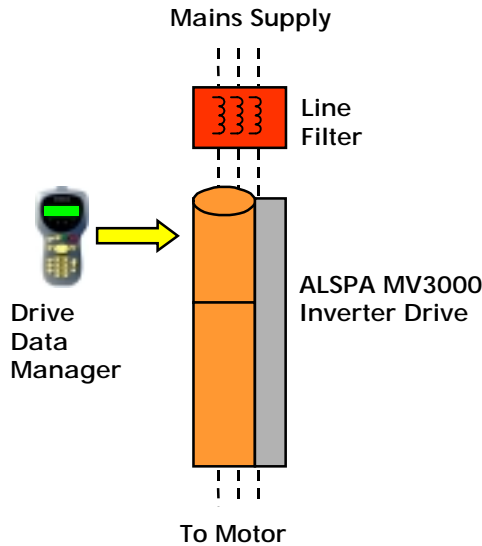
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 380 - 440 V : Overload 110% of FLC					
Rating @ 400 V 50 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter VT	Drive Data Manager™
30	40	58	MV3058A4A1	MV3ACL030A4	MVS3000-4001
37	50	71	MV3071A4A1	MV3ACL037A4	
45	60	86	MV3086A4A1	MV3ACL045A4	
55	74	105	MV3105A4A1	MV3ACL055A4	
75	101	140	MV3140A4A1	MV3ACL075A4	
90	121	168	MV3168A4A1	MV3ACL090A4	
110	147	204	MV3204A4A1	MV3ACL110A4	
132	177	244	MV3244A4A1	MV3ACL132A4	
160	214	292	MV3292A4A1	MV3ACL160A4	
200	268	364	MV3364A4A1	MV3ACL200A4	
250	335	449	MV3449A4A1	MV3ACL250A4	
280	375	503	MV3503A4A1	MV3ACL280A4	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.2 Variable Torque - Pump & Fan - Applications : 575 – 690 V 50 Hz

Variable torque loads generally comprise centrifugal pump and fan applications where 110% of full load current overload is sufficient. Fan fluxing (square law) and economy modes are included to assist with energy saving.



Select matching set of:

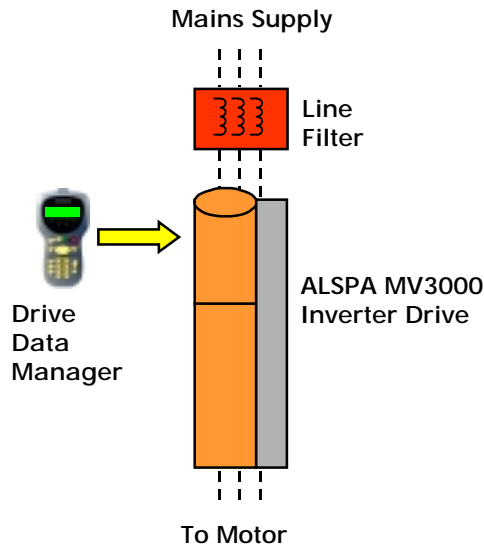
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 575 - 690 V : Overload 110% of FLC					
Rating @ 690 V 50 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter VT	Drive Data Manager™
55	74	61	MV3062A6A1	MV3ACL055A7	MVS3000-4001
75	101	82	MV3077A6A1	MV3ACL075A7	
90	121	98	MV3099A6A1	MV3ACL090A7	
110	147	119	MV3125A6A1	MV3ACL110A7	
132	177	142	MV3144A6A1	MV3ACL132A7	
160	214	170	MV3192A6A1	MV3ACL160A7	
200	268	211	MV3242A6A1	MV3ACL200A7	
250	335	260	MV3289A6A1	MV3ACL250A7	
280	375	291	MV3336A6A1	MV3ACL280A7	
315	422	327	MV3382A6A1	MV3ACL315A7	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.3 Variable Torque - Pump & Fan - Applications : 460 – 525 V 60 Hz

Variable torque loads generally comprise centrifugal pump and fan applications where 110% of full load current overload is sufficient. Fan fluxing (square law) and economy modes are included to assist with energy saving.



Select matching set of:

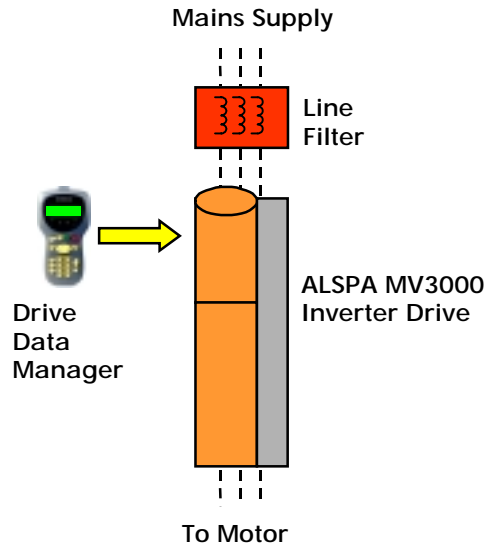
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 460 - 525 V : Overload 110% of FLC					
Rating @ 480 V 60 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter VT	Drive Data Manager™
30	40	52	MV3052A5A1	MV3ACL040B5	MVS3000-4001
37	50	65	MV3065A5A1	MV3ACL050B5	
45	60	77	MV3077A5A1	MV3ACL060B5	
56	75	96	MV3096A5A1	MV3ACL075B5	
75	100	124	MV3124A5A1	MV3ACL100B5	
93	125	156	MV3156A5A1	MV3ACL125B5	
112	150	180	MV3180A5A1	MV3ACL150B5	
149	200	240	MV3240A5A1	MV3ACL200B5	
187	250	302	MV3302A5A1	MV3ACL250B5	
224	300	361	MV3361A5A1	MV3ACL300B5	
261	350	414	MV3414A5A1	MV3ACL350B5	
298	400	477	MV3477A5A1	MV3ACL400B5	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.4 Variable Torque - Pump & Fan - Applications : 575 – 690 V 60 Hz

Variable torque loads generally comprise centrifugal pump and fan applications where 110% of full load current overload is sufficient. Fan fluxing (square law) and economy modes are included to assist with energy saving.



Select matching set of:

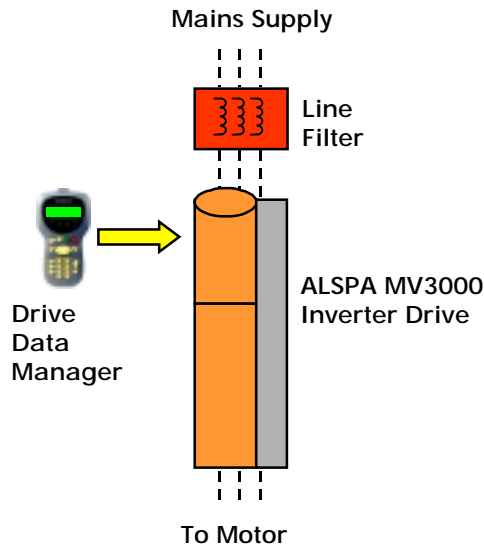
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 575 - 690 V : Overload 110% of FLC					
Rating @ 600 V 60 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter VT	Drive Data Manager™
45	60	62	MV3062A6A1	MV3ACL060B6	MVS3000-4001
56	75	77	MV3077A6A1	MV3ACL075B6	
75	100	99	MV3099A6A1	MV3ACL100B6	
93	125	125	MV3125A6A1	MV3ACL125B6	
112	150	144	MV3144A6A1	MV3ACL150B6	
149	200	192	MV3192A6A1	MV3ACL200B6	
187	250	242	MV3242A6A1	MV3ACL250B6	
224	300	289	MV3289A6A1	MV3ACL300B6	
261	350	336	MV3336A6A1	MV3ACL350B6	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.5 Constant Torque Applications : 380 – 440 V 50 Hz

With the exception of centrifugal pump and fan loads, all types of applications, in all industries, may be classified as constant torque loads. These have a requirement for up to 150% of full load current overload.



Select matching set of:

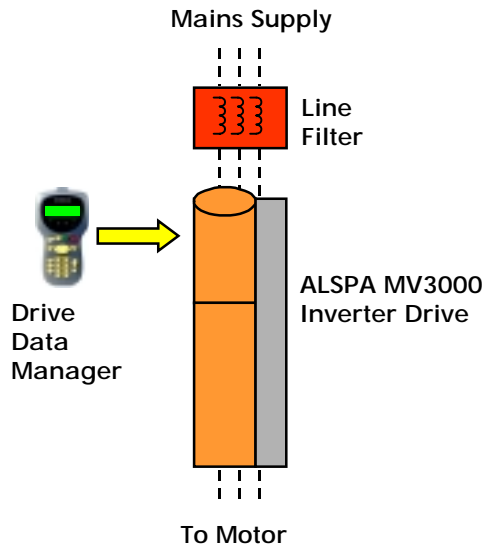
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 380 - 440 V : Overload 150% of FLC					
Rating @ 400 V 50 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter CT	Drive Data Manager™
22	29	44	MV3058A4A1	MV3ACL022A4	MVS3000-4001
30	40	58	MV3071A4A1	MV3ACL030A4	
37	50	71	MV3086A4A1	MV3ACL037A4	
45	60	86	MV3105A4A1	MV3ACL045A4	
55	74	105	MV3140A4A1	MV3ACL055A4	
75	101	140	MV3168A4A1	MV3ACL075A4	
90	121	168	MV3204A4A1	MV3ACL090A4	
110	147	204	MV3244A4A1	MV3ACL110A4	
132	177	244	MV3292A4A1	MV3ACL132A4	
160	214	292	MV3364A4A1	MV3ACL160A4	
200	268	364	MV3449A4A1	MV3ACL200A4	
250	355	449	MV3503A4A1	MV3ACL250A4	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.6 Constant Torque Applications : 575 – 690 V 50 Hz

With the exception of centrifugal pump and fan loads, all types of applications, in all industries, may be classified as constant torque loads. These have a requirement for up to 150% of full load current overload.



Select matching set of:

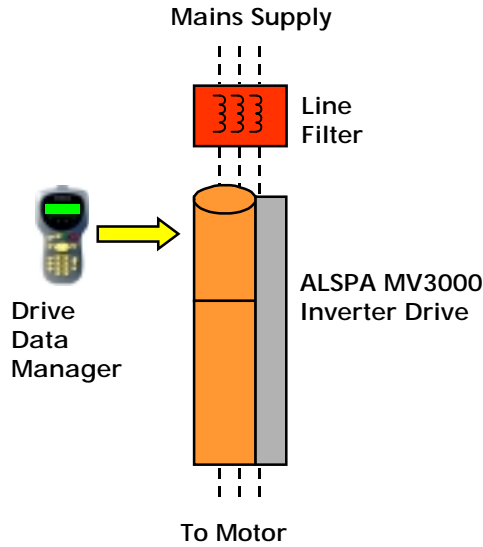
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 575 - 690 V : Overload 150% of FLC					
Rating @ 690 V 50 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter CT	Drive Data Manager™
45	60	50	MV3062A6A1	MV3ACL045A7	MVS3000-4001
55	74	61	MV3077A6A1	MV3ACL055A7	
75	101	82	MV3099A6A1	MV3ACL075A7	
90	121	98	MV3125A6A1	MV3ACL090A7	
110	147	119	MV3144A6A1	MV3ACL110A7	
132	177	142	MV3192A6A1	MV3ACL132A7	
160	214	170	MV3242A6A1	MV3ACL160A7	
200	268	211	MV3289A6A1	MV3ACL200A7	
250	335	260	MV3336A6A1	MV3ACL250A7	
280	375	292	MV3382A6A1	MV3ACL280A7	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.7 Constant Torque Applications : 460 – 525 V 60 Hz

With the exception of centrifugal pump and fan loads, all types of applications, in all industries, may be classified as constant torque loads. These have a requirement for up to 150% of full load current overload.



Select matching set of:

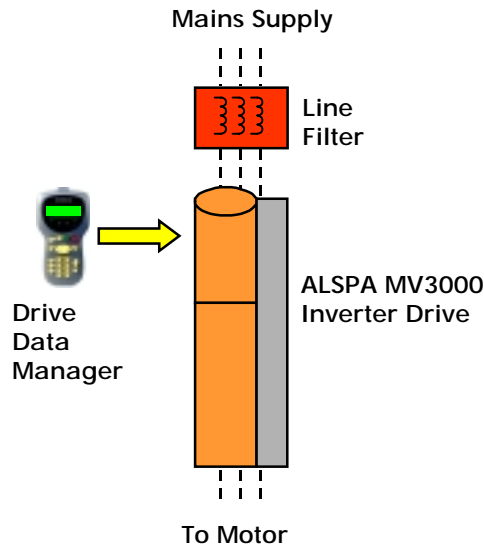
ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 460 - 525 V : Overload 150% of FLC					
Rating @ 480 V 60 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter CT	Drive Data Manager™
22	30	40	MV3052A5A1	MV3ACL030B5	MVS3000-4001
30	40	52	MV3065A5A1	MV3ACL040B5	
37	50	65	MV3077A5A1	MV3ACL050B5	
45	60	77	MV3096A5A1	MV3ACL060B5	
56	75	96	MV3124A5A1	MV3ACL075B5	
75	100	124	MV3156A5A1	MV3ACL100B5	
93	125	156	MV3180A5A1	MV3ACL125B5	
112	150	180	MV3240A5A1	MV3ACL150B5	
149	200	240	MV3302A5A1	MV3ACL200B5	
187	250	302	MV3361A5A1	MV3ACL250B5	
224	300	361	MV3414A5A1	MV3ACL300B5	
261	350	414	MV3477A5A1	MV3ACL350B5	

Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

3.1.8 Constant Torque Applications : 575 – 690 V 60 Hz

With the exception of centrifugal pump and fan loads, all types of applications, in all industries, may be classified as constant torque loads. These have a requirement for up to 150% of full load current overload.



Select matching set of:

ALSPA MV3000 MicroCubicle™ + Line Filter + Drive Data Manager™

AC Input Voltage 575 - 690 V : Overload 150% of FLC					
Rating @ 600 V 60 Hz			Order Codes		
kW	HP	Amps	MicroCubicle™	Line Filter CT	Drive Data Manager™
37	50	52	MV3062A6A1	MV3ACL050B6	MVS3000-4001
45	60	62	MV3077A6A1	MV3ACL060B6	
56	75	77	MV3099A6A1	MV3ACL075B6	
75	100	99	MV3125A6A1	MV3ACL100B6	
93	125	125	MV3144A6A1	MV3ACL125B6	
112	150	144	MV3192A6A1	MV3ACL150B6	
149	200	192	MV3242A6A1	MV3ACL200B6	
187	250	242	MV3289A6A1	MV3ACL250B6	
224	300	289	MV3336A6A1	MV3ACL300B6	

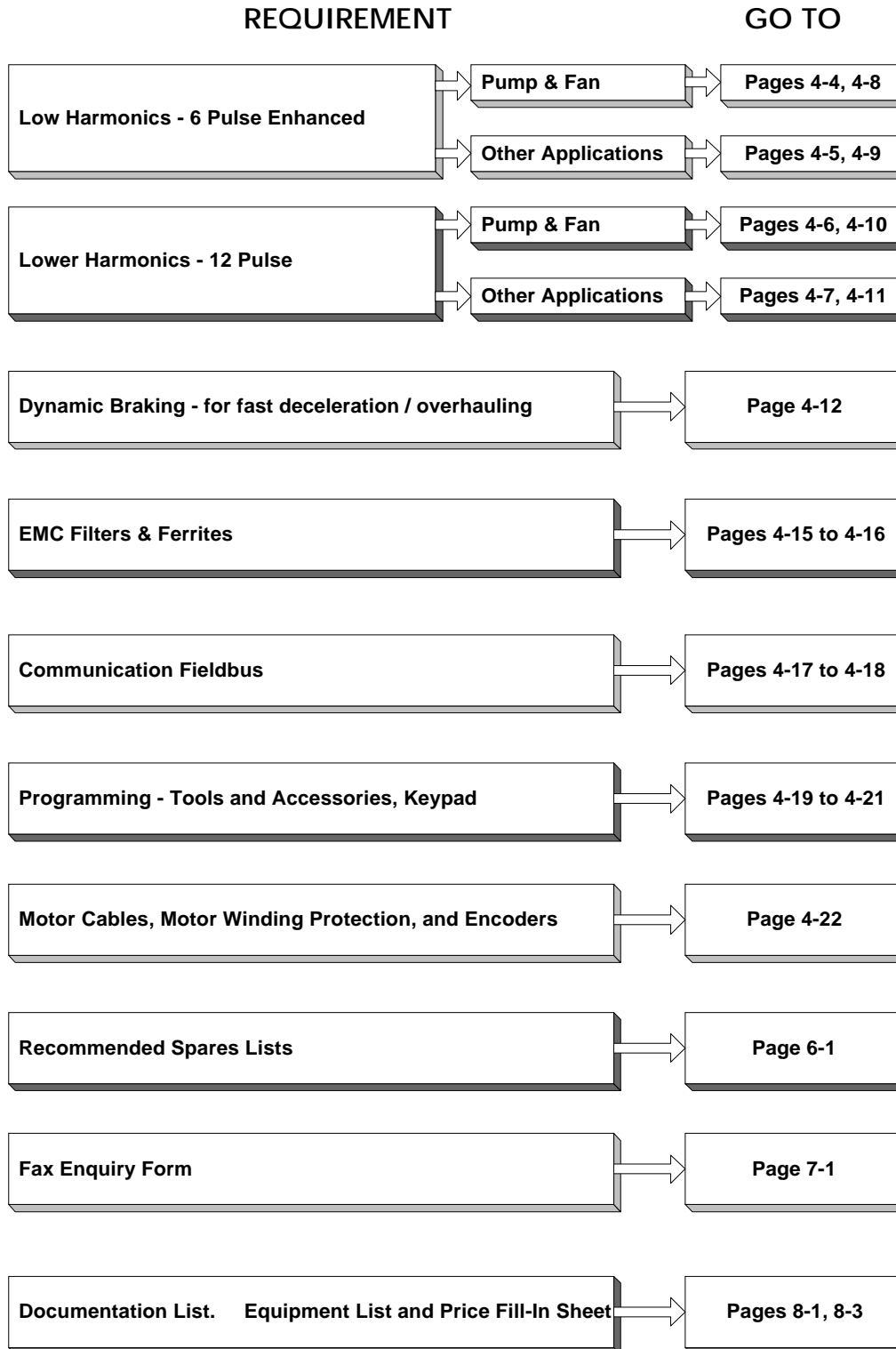
Special Note: If the drive is to be used in a 12 Pulse configuration, then the Input Line Filter is not required if it is supplied from its own dedicated 12 Pulse Supply Transformer. Where a number of drives are supplied from a common 12 pulse transformer, then each drive must have its own Input Line Filter.

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4. Extended Applications

Some applications may require the addition of further components to meet the needs of local regulations, system integration, or performance.

The following chart lists situations when further components may be necessary and indicates where the selection rules are to be located.



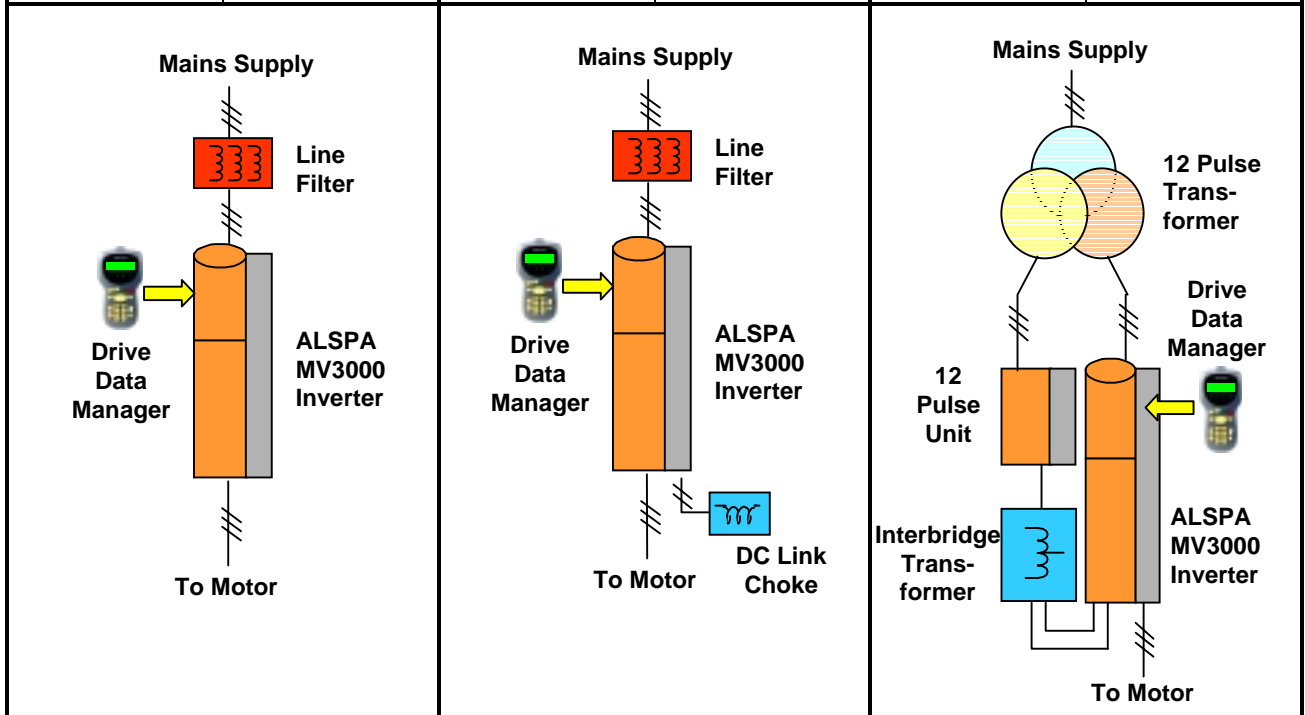
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4.1 Low Harmonics

Various configurations are available to progressively reduce harmonic levels to meet site requirements or local regulations. The following table shows harmonic levels for three configurations, beginning with the standard 6 pulse configuration and two other configurations with improved harmonic levels. **Note:** these levels will be affected by existing supply harmonic levels, supply imbalance and supply impedance.



6 Pulse - Standard		6 Pulse - Enhanced		12 Pulse	
Harmonic Order	6 Pulse % of Fund.	Harmonic Order	6 Pulse % of Fund.	Harmonic Order	12 Pulse % of Fund.
1	100	1	100	1	100
5	44.69	5	28.00	5	1.00
7	20.11	7	10.40	7	0.69
11	7.26	11	7.90	11	8.35
13	4.13	13	4.70	13	4.52
17	3.35	17	4.00	17	0.29
19	1.96	19	2.85	19	0.26
23	1.84	23	2.30	23	1.99
25	1.23	25	1.90	25	1.69
29	1.12	29	1.40	29	0.17
31	0.89	31	1.20	31	0.16
THD (Current)	49.9 %	THD (Current)	31.8 %	THD (Current)	9.9 %



Application Torque	Go to Page	Application Torque	Go to Page	Application Torque	Go to Page
Variable	3-2 – 3-5	Variable	4-4, 4-8	Variable	4-6, 4-10
Constant	3-6 – 3-9	Constant	4-5, 4-9	Constant	4-7, 4-11

4.1.1 Low Harmonics – 6 Pulse Enhanced – Variable Torque – 50 Hz

For 6 Pulse Enhanced configuration, the addition of a DC Link Choke will be required to meet the harmonic level indicated on Page 4-3.

Rating at 400 V			MicroCubicle™	Line Filter	DC Link Choke
kW	HP	Amps	380 - 440 V	Variable Torque	Variable Torque
30	40	58	MV3058A4A1	MV3ACL030A4	MV3DCL030A4
37	50	71	MV3071A4A1	MV3ACL037A4	MV3DCL037A4
45	60	86	MV3086A4A1	MV3ACL045A4	MV3DCL045A4
55	74	105	MV3105A4A1	MV3ACL055A4	MV3DCL055A4
75	101	140	MV3140A4A1	MV3ACL075A4	MV3DCL075A4
90	121	168	MV3168A4A1	MV3ACL090A4	MV3DCL090A4
110	147	204	MV3204A4A1	MV3ACL110A4	MV3DCL110A4
132	177	244	MV3244A4A1	MV3ACL132A4	MV3DCL132A4
160	214	292	MV3292A4A1	MV3ACL160A4	MV3DCL160A4
200	268	364	MV3364A4A1	MV3ACL200A4	MV3DCL200A4
250	335	449	MV3449A4A1	MV3ACL250A4	MV3DCL250A4
280	375	503	MV3503A4A1	MV3ACL280A4	MV3DCL280A4
Rating at 690 V					
kW	HP	Amps	575 - 690 V		
55	74	61	MV3062A6A1	MV3ACL055A7	MV3DCL055A7
75	101	82	MV3077A6A1	MV3ACL075A7	MV3DCL075A7
90	121	98	MV3099A6A1	MV3ACL090A7	MV3DCL090A7
110	147	119	MV3125A6A1	MV3ACL110A7	MV3DCL110A7
132	177	142	MV3144A6A1	MV3ACL132A7	MV3DCL132A7
160	214	170	MV3192A6A1	MV3ACL160A7	MV3DCL160A7
200	268	211	MV3242A6A1	MV3ACL200A7	MV3DCL200A7
250	335	260	MV3289A6A1	MV3ACL250A7	MV3DCL250A7
280	375	291	MV3336A6A1	MV3ACL280A7	MV3DCL280A7
315	422	327	MV3382A6A1	MV3ACL315A7	MV3DCL315A7

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4.1.2 Low Harmonics – 6 Pulse Enhanced – Constant Torque – 50 Hz

For 6 Pulse Enhanced configuration, the addition of a DC Link Choke will be required to meet the harmonic level indicated on Page 4-3.

Rating at 400 V			MicroCubicle™	Line Filter	DC Link Choke
kW	HP	Amps	380 - 440 V	Const Torque	Const Torque
22	29	44	MV3058A4A1	MV3ACL022A4	MV3DCL022A4
30	40	58	MV3071A4A1	MV3ACL030A4	MV3DCL030A4
37	50	71	MV3086A4A1	MV3ACL037A4	MV3DCL037A4
45	60	86	MV3105A4A1	MV3ACL045A4	MV3DCL045A4
55	74	105	MV3140A4A1	MV3ACL055A4	MV3DCL055A4
75	101	140	MV3168A4A1	MV3ACL075A4	MV3DCL075A4
90	121	168	MV3204A4A1	MV3ACL090A4	MV3DCL090A4
110	147	204	MV3244A4A1	MV3ACL110A4	MV3DCL110A4
132	177	244	MV3292A4A1	MV3ACL132A4	MV3DCL132A4
160	214	292	MV3364A4A1	MV3ACL160A4	MV3DCL160A4
200	268	364	MV3449A4A1	MV3ACL200A4	MV3DCL200A4
250	355	449	MV3503A4A1	MV3ACL250A4	MV3DCL250A4
Rating at 690 V					
kW	HP	Amps	575 - 690 V		
45	60	50	MV3062A6A1	MV3ACL045A7	MV3DCL045A7
55	74	61	MV3077A6A1	MV3ACL055A7	MV3DCL055A7
75	101	82	MV3099A6A1	MV3ACL075A7	MV3DCL075A7
90	121	98	MV3125A6A1	MV3ACL090A7	MV3DCL090A7
110	147	119	MV3144A6A1	MV3ACL110A7	MV3DCL110A7
132	177	142	MV3192A6A1	MV3ACL132A7	MV3DCL132A7
160	214	170	MV3242A6A1	MV3ACL160A7	MV3DCL160A7
200	268	211	MV3289A6A1	MV3ACL200A7	MV3DCL200A7
250	335	260	MV3336A6A1	MV3ACL250A7	MV3DCL250A7
280	375	292	MV3382A6A1	MV3ACL280A7	MV3DCL280A7

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4.1.3 Low Harmonics – 12 Pulse – Variable Torque – 50 Hz

For a 12 Pulse configuration, additional items will be required to meet the harmonic level indicated on Page 4-3.

Rating at 400 V			MicroCubicle™	12 Pulse Unit	Interbridge T'former	12 P Transformer*
kW	HP	Amps	380 - 440 V		Variable Torque	Variable Torque
30	40	58	MV3058A4A1	N/A	N/A	N/A
37	50	71	MV3071A4A1	N/A	N/A	N/A
45	60	86	MV3086A4A1	MV3R140A6A1	MV3IBTA045A4	MV3TPT045zppp/aaa
55	74	105	MV3105A4A1	MV3R140A6A1	MV3IBTA055A4	MV3TPT055zppp/aaa
75	101	140	MV3140A4A1	MV3R140A6A1	MV3IBTA075A4	MV3TPT075zppp/aaa
90	121	168	MV3168A4A1	MV3R364A6A1	MV3IBTA090A4	MV3TPT090zppp/aaa
110	147	204	MV3204A4A1	MV3R364A6A1	MV3IBTA110A4	MV3TPT110zppp/aaa
132	177	244	MV3244A4A1	MV3R364A6A1	MV3IBTA132A4	MV3TPT132zppp/aaa
160	214	292	MV3292A4A1	MV3R364A6A1	MV3IBTA160A4	MV3TPT160zppp/aaa
200	268	364	MV3364A4A1	MV3R364A6A1	MV3IBTA200A4	MV3TPT200zppp/aaa
250	335	449	MV3449A4A1	TBA	MV3IBTA250A4	MV3TPT250zppp/aaa
280	375	503	MV3503A4A1	TBA	MV3IBTA280A4	MV3TPT280zppp/aaa
Rating at 690 V						
kW	HP	Amps	575 - 690 V			
55	74	61	MV3062A6A1	MV3R140A6A1	MV3IBTA055A7	MV3TPT055zttt/ddd
75	101	82	MV3077A6A1	MV3R140A6A1	MV3IBTA075A7	MV3TPT075zttt/ddd
90	121	98	MV3099A6A1	MV3R140A6A1	MV3IBTA090A7	MV3TPT090zttt/ddd
110	147	119	MV3125A6A1	MV3R364A6A1	MV3IBTA110A7	MV3TPT110zttt/ddd
132	177	142	MV3144A6A1	MV3R364A6A1	MV3IBTA132A7	MV3TPT132zttt/ddd
160	214	170	MV3192A6A1	MV3R364A6A1	MV3IBTA160A7	MV3TPT160zttt/ddd
200	268	211	MV3242A6A1	MV3R364A6A1	MV3IBTA200A7	MV3TPT200zttt/ddd
250	335	260	MV3289A6A1	TBA	MV3IBTA250A7	MV3TPT250zttt/ddd
280	375	291	MV3336A6A1	TBA	MV3IBTA280A7	MV3TPT280zttt/ddd
315	422	327	MV3382A6A1	TBA	MV3IBTA315A7	MV3TPT315zttt/ddd

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* 12 Pulse Transformer Codes

Primary Voltage ppp = 380, 400, 415, 440, 3k3, 6k6, 11k
 (Supply Volts at 50 Hz) ††† = 690, 3k3, 6k6, 11k

Secondary Voltage aaa = 380, 400, 415, 440
 (Motor Volts at 50 Hz) ddd = 690

Transformer z = A (open type) IP00
 Enclosure Type z = B (enclosed) IP21 (indoors only)

Notes:

1. Input Line Filter is not required if the drive is supplied from a dedicated 12 Pulse Supply Transformer.
2. Where a number of drives are supplied from one common 12 pulse transformer, then each drive must have a line filter. Since there are two input bridges in this configuration, two line filters are required. To allow for imbalance, each filter should be rated at 55% of the total drive rating.

4.1.4 Low Harmonics – 12 Pulse – Constant Torque – 50 Hz

For a 12 Pulse configuration, additional items will be required to meet the harmonic level indicated on Page 4-3.

Rating at 400 V			MicroCubicle™	12 Pulse Unit	Interbridge T'former	12 P Transformer*
kW	HP	Amps	380 - 440 V		Const Torque	Const Torque
22	29	44	MV3058A4A1	N/A	N/A	N/A
30	40	58	MV3071A4A1	N/A	N/A	N/A
37	50	71	MV3086A4A1	MV3R140A6A1	MV3IBTA037A4	MV3TPT037zppp/aaa
45	60	86	MV3105A4A1	MV3R140A6A1	MV3IBTA045A4	MV3TPT045zppp/aaa
55	74	105	MV3140A4A1	MV3R140A6A1	MV3IBTA055A4	MV3TPT055zppp/aaa
75	101	140	MV3168A4A1	MV3R364A6A1	MV3IBTA075A4	MV3TPT075zppp/aaa
90	121	168	MV3204A4A1	MV3R364A6A1	MV3IBTA090A4	MV3TPT090zppp/aaa
110	147	204	MV3244A4A1	MV3R364A6A1	MV3IBTA110A4	MV3TPT110zppp/aaa
132	177	244	MV3292A4A1	MV3R364A6A1	MV3IBTA132A4	MV3TPT132zppp/aaa
160	214	292	MV3364A4A1	MV3R364A6A1	MV3IBTA160A4	MV3TPT160zppp/aaa
200	268	364	MV3449A4A1	TBA	MV3IBTA200A4	MV3TPT200zppp/aaa
250	355	449	MV3503A4A1	TBA	MV3IBTA250A4	MV3TPT250zppp/aaa
Rating at 690 V						
kW	HP	Amps	575 - 690 V			
45	60	50	MV3062A6A1	MV3R140A6A1	MV3IBTA045A7	MV3TPT045zttt/ddd
55	74	61	MV3077A6A1	MV3R140A6A1	MV3IBTA055A7	MV3TPT055zttt/ddd
75	101	82	MV3099A6A1	MV3R140A6A1	MV3IBTA075A7	MV3TPT075zttt/ddd
90	121	98	MV3125A6A1	MV3R364A6A1	MV3IBTA090A7	MV3TPT090zttt/ddd
110	147	119	MV3144A6A1	MV3R364A6A1	MV3IBTA110A7	MV3TPT110zttt/ddd
132	177	142	MV3192A6A1	MV3R364A6A1	MV3IBTA132A7	MV3TPT132zttt/ddd
160	214	170	MV3242A6A1	MV3R364A6A1	MV3IBTA160A7	MV3TPT160zttt/ddd
200	268	211	MV3289A6A1	TBA	MV3IBTA200A7	MV3TPT200zttt/ddd
250	335	260	MV3336A6A1	TBA	MV3IBTA250A7	MV3TPT250zttt/ddd
280	375	292	MV3382A6A1	TBA	MV3IBTA280A7	MV3TPT280zttt/ddd

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* 12 Pulse Transformer Codes

Primary Voltage ppp = 380, 400, 415, 440, 3k3, 6k6, 11k
 (Supply Volts at 50 Hz) ††† = 690, 3k3, 6k6, 11k

Secondary Voltage aaa = 380, 400, 415, 440
 (Motor Volts at 50 Hz) ddd = 690

Transformer z = A (open type) IP00
 Enclosure Type z = B (enclosed) IP21 (indoors only)

Notes:

1. Input Line Filter is not required if the drive is supplied from a dedicated 12 Pulse Supply Transformer.
2. Where a number of drives are supplied from one common 12 pulse transformer, then each drive must have a line filter. Since there are two input bridges in this configuration, two line filters are required. To allow for imbalance, each filter should be rated at 55% of the total drive rating.

4.1.5 Low Harmonics – 6 Pulse Enhanced – Variable Torque – 60 Hz

For 6 Pulse Enhanced configuration, the addition of a DC Link Choke will be required to meet the harmonic level indicated on Page 4-3.

Rating at 480 V			MicroCubicle™	Line Filter	DC Link Choke
kW	HP	Amps	460 - 525 V	Variable Torque	Variable Torque
30	40	52	MV3052A5A1	MV3ACL040B5	MV3DCL040B5
37	50	65	MV3065A5A1	MV3ACL050B5	MV3DCL050B5
45	60	77	MV3077A5A1	MV3ACL060B5	MV3DCL060B5
56	75	96	MV3096A5A1	MV3ACL075B5	MV3DCL075B5
75	100	124	MV3124A5A1	MV3ACL100B5	MV3DCL100B5
93	125	156	MV3156A5A1	MV3ACL125B5	MV3DCL125B5
112	150	180	MV3180A5A1	MV3ACL150B5	MV3DCL150B5
149	200	240	MV3240A5A1	MV3ACL200B5	MV3DCL200B5
187	250	302	MV3302A5A1	MV3ACL250B5	MV3DCL250B5
224	300	361	MV3361A5A1	MV3ACL300B5	MV3DCL300B5
261	350	414	MV3414A5A1	MV3ACL350B5	MV3DCL350B5
298	400	477	MV3477A5A1	MV3ACL400B5	MV3DCL400B5
Rating at 600 V					
kW	HP	Amps	575 - 690 V		
45	60	62	MV3062A6A1	MV3ACL060B6	MV3DCL060B6
56	75	77	MV3077A6A1	MV3ACL075B6	MV3DCL075B6
75	100	99	MV3099A6A1	MV3ACL100B6	MV3DCL100B6
93	125	125	MV3125A6A1	MV3ACL125B6	MV3DCL125B6
112	150	144	MV3144A6A1	MV3ACL150B6	MV3DCL150B6
149	200	192	MV3192A6A1	MV3ACL200B6	MV3DCL200B6
187	250	242	MV3242A6A1	MV3ACL250B6	MV3DCL250B6
224	300	289	MV3289A6A1	MV3ACL300B6	MV3DCL300B6
261	350	336	MV3336A6A1	MV3ACL350B6	MV3DCL350B6
298	400	382	MV3382A6A1	MV3ACL400B6	MV3DCL400B6

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4.1.6 Low Harmonics – 6 Pulse Enhanced – Constant Torque – 60 Hz

For 6 Pulse Enhanced configuration, the addition of a DC Link Choke will be required to meet the harmonic level indicated on Page 4-3.

Rating at 480 V			MicroCubicle™	Line Filter	DC Link Choke
kW	HP	Amps	460 - 525 V	Const Torque	Const Torque
22	30	40	MV3052A5A1	MV3ACL030B5	MV3DCL030B5
30	40	52	MV3065A5A1	MV3ACL040B5	MV3DCL040B5
37	50	65	MV3077A5A1	MV3ACL050B5	MV3DCL050B5
45	60	77	MV3096A5A1	MV3ACL060B5	MV3DCL060B5
56	75	96	MV3124A5A1	MV3ACL075B5	MV3DCL075B5
75	100	124	MV3156A5A1	MV3ACL100B5	MV3DCL100B5
93	125	156	MV3180A5A1	MV3ACL125B5	MV3DCL125B5
112	150	180	MV3240A5A1	MV3ACL150B5	MV3DCL150B5
149	200	240	MV3302A5A1	MV3ACL200B5	MV3DCL200B5
187	250	302	MV3361A5A1	MV3ACL250B5	MV3DCL250B5
224	300	361	MV3414A5A1	MV3ACL300B5	MV3DCL300B5
261	350	414	MV3477A5A1	MV3ACL350B5	MV3DCL350B5
Rating at 600 V					
kW	HP	Amps	575 - 690 V		
37	50	52	MV3062A6A1	MV3ACL050B6	MV3DCL050B6
45	60	62	MV3077A6A1	MV3ACL060B6	MV3DCL060B6
56	75	77	MV3099A6A1	MV3ACL075B6	MV3DCL075B6
75	100	99	MV3125A6A1	MV3ACL100B6	MV3DCL100B6
93	125	125	MV3144A6A1	MV3ACL125B6	MV3DCL125B6
112	150	144	MV3192A6A1	MV3ACL150B6	MV3DCL150B6
149	200	192	MV3242A6A1	MV3ACL200B6	MV3DCL200B6
187	250	242	MV3289A6A1	MV3ACL250B6	MV3DCL250B6
224	300	289	MV3336A6A1	MV3ACL300B6	MV3DCL300B6

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4.1.7 Low Harmonics – 12 Pulse – Variable Torque – 60 Hz

For a 12 Pulse configuration, additional items will be required to meet the harmonic level indicated on Page 4-3.

Rating at 480 V			MicroCubicle™	12 Pulse Unit	Interbridge T'former	12 P Transformer*
kW	HP	Amps	460 - 525 V		Variable Torque	Variable Torque
30	40	52	MV3052A5A1	N/A	N/A	N/A
37	50	65	MV3065A5A1	N/A	N/A	N/A
45	60	77	MV3077A5A1	MV3R140A6A1	MV3IBTA060A5	MV3TPT060zqqq/bbb
56	75	96	MV3096A5A1	MV3R140A6A1	MV3IBTA075A5	MV3TPT075zqqq/bbb
75	100	124	MV3124A5A1	MV3R140A6A1	MV3IBTA100A5	MV3TPT100zqqq/bbb
93	125	156	MV3156A5A1	MV3R364A6A1	MV3IBTA125A5	MV3TPT125zqqq/bbb
112	150	180	MV3180A5A1	MV3R364A6A1	MV3IBTA150A5	MV3TPT150zqqq/bbb
149	200	240	MV3240A5A1	MV3R364A6A1	MV3IBTA200A5	MV3TPT200zqqq/bbb
187	250	302	MV3302A5A1	MV3R364A6A1	MV3IBTA250A5	MV3TPT250zqqq/bbb
224	300	361	MV3361A5A1	TBA	MV3IBTA300A5	MV3TPT300zqqq/bbb
261	350	414	MV3414A5A1	TBA	MV3IBTA350A5	MV3TPT350zqqq/bbb
298	400	477	MV3477A5A1	TBA	MV3IBTA400A5	MV3TPT400zqqq/bbb
Rating at 600 V						
kW	HP	Amps	575 - 690 V			
45	60	62	MV3062A6A1	MV3R140A6A1	MV3IBTA060A6	MV3TPT060zrrr/cc
56	75	77	MV3077A6A1	MV3R140A6A1	MV3IBTA075A6	MV3TPT075zrrr/cc
75	100	99	MV3099A6A1	MV3R140A6A1	MV3IBTA100A6	MV3TPT100zrrr/cc
93	125	125	MV3125A6A1	MV3R364A6A1	MV3IBTA125A6	MV3TPT125zrrr/cc
112	150	144	MV3144A6A1	MV3R364A6A1	MV3IBTA150A6	MV3TPT150zrrr/cc
149	200	192	MV3192A6A1	MV3R364A6A1	MV3IBTA200A6	MV3TPT200zrrr/cc
187	250	242	MV3242A6A1	MV3R364A6A1	MV3IBTA250A6	MV3TPT250zrrr/cc
224	300	289	MV3289A6A1	TBA	MV3IBTA300A6	MV3TPT300zrrr/cc
261	350	336	MV3336A6A1	TBA	MV3IBTA350A6	MV3TPT350zrrr/cc

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* 12 Pulse Transformer Codes

Primary Voltage qq = 480, 500, 3k3, 6k6, 11k
 (Supply Volts at 60 Hz) rrr = 600, 3k3, 6k6, 11k

Secondary Voltage bbb = 480, 500
 (Motor Volts at 60 Hz) ccc = 600

Transformer z = A (open type) IP00
 Enclosure Type z = B (enclosed) IP21 (indoors only)

Notes:

1. Input Line Filter is not required if the drive is supplied from a dedicated 12 Pulse Supply Transformer.
2. Where a number of drives are supplied from one common 12 pulse transformer, then each drive must have a line filter. Since there are two input bridges in this configuration, two line filters are required. To allow for imbalance, each filter should be rated at 55% of the total drive rating.

4.1.8 Low Harmonics – 12 Pulse – Constant Torque – 60 Hz

For a 12 Pulse configuration, additional items will be required to meet the harmonic level indicated on Page 4-3.

Rating at 480 V			MicroCubicle™	12 Pulse Unit	Interbridge T'former	12 P Transformer
kW	HP	Amps	460 - 525 V		Const Torque	Const Torque
22	30	40	MV3052A5A1	N/A	N/A	N/A
30	40	52	MV3065A5A1	N/A	N/A	N/A
37	50	65	MV3077A5A1	MV3R140A6A1	MV3IBTA050A5	MV3TPT050zqqq/bbb
45	60	77	MV3096A5A1	MV3R140A6A1	MV3IBTA060A5	MV3TPT060zqqq/bbb
56	75	96	MV3124A5A1	MV3R140A6A1	MV3IBTA075A5	MV3TPT075zqqq/bbb
75	100	124	MV3156A5A1	MV3R364A6A1	MV3IBTA100A5	MV3TPT100zqqq/bbb
93	125	156	MV3180A5A1	MV3R364A6A1	MV3IBTA125A5	MV3TPT125zqqq/bbb
112	150	180	MV3240A5A1	MV3R364A6A1	MV3IBTA150A5	MV3TPT150zqqq/bbb
149	200	240	MV3302A5A1	MV3R364A6A1	MV3IBTA200A5	MV3TPT200zqqq/bbb
187	250	302	MV3361A5A1	TBA	MV3IBTA250A5	MV3TPT250zqqq/bbb
224	300	361	MV3414A5A1	TBA	MV3IBTA300A5	MV3TPT300zqqq/bbb
261	350	414	MV3477A5A1	TBA	MV3IBTA350A5	MV3TPT350zqqq/bbb
Rating at 600 V						
kW	HP	Amps	575 - 690 V			
37	50	52	MV3062A6A1	MV3R140A6A1	MV3IBTA050A6	MV3TPT050zrrr/cc
45	60	62	MV3077A6A1	MV3R140A6A1	MV3IBTA060A6	MV3TPT060zrrr/cc
56	75	77	MV3099A6A1	MV3R140A6A1	MV3IBTA075A6	MV3TPT075zrrr/cc
75	100	99	MV3125A6A1	MV3R364A6A1	MV3IBTA100A6	MV3TPT100zrrr/cc
93	125	125	MV3144A6A1	MV3R364A6A1	MV3IBTA125A6	MV3TPT125zrrr/cc
112	150	144	MV3192A6A1	MV3R364A6A1	MV3IBTA150A6	MV3TPT150zrrr/cc
149	200	192	MV3242A6A1	MV3R364A6A1	MV3IBTA200A6	MV3TPT200zrrr/cc
187	250	242	MV3289A6A1	TBA	MV3IBTA250A6	MV3TPT250zrrr/cc
224	300	289	MV3336A6A1	TBA	MV3IBTA300A6	MV3TPT300zrrr/cc

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* 12 Pulse Transformer Codes

Primary Voltage qq = 480, 500, 3k3, 6k6, 11k
 (Supply Volts at 60 Hz) rrr = 600, 3k3, 6k6, 11k

Secondary Voltage bbb = 480, 500
 (Motor Volts at 60 Hz) ccc = 600

Transformer z = A (open type) IP00
 Enclosure Type z = B (enclosed) IP21 (indoors only)

Notes:

1. Input Line Filter is not required if the drive is supplied from a dedicated 12 Pulse Supply Transformer.
2. Where a number of drives are supplied from one common 12 pulse transformer, then each drive must have a line filter. Since there are two input bridges in this configuration, two line filters are required. To allow for imbalance, each filter should be rated at 55% of the total drive rating.

4.2 Dynamic Braking

A Dynamic Braking Unit is used in conjunction with an externally mounted braking resistor to dissipate surplus kinetic energy regenerated back into the inverter during deceleration or overhauling.



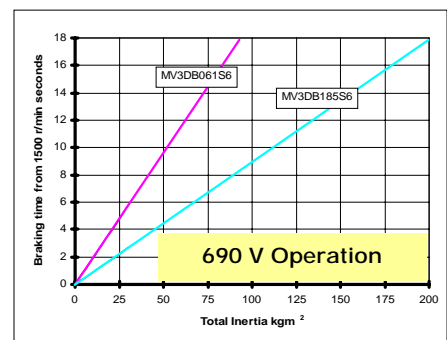
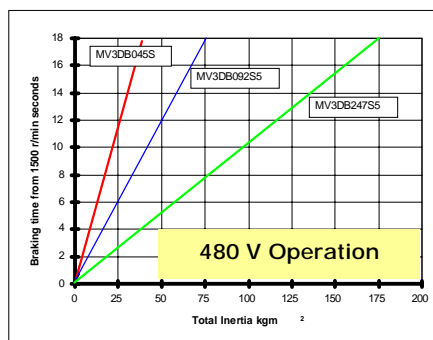
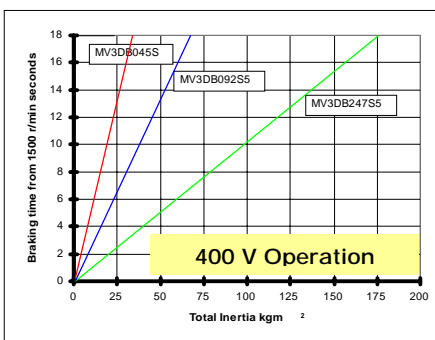
ALSPA MV3000

Open control & power gates.

Remove blanking plate.

Insert DB unit.

Dynamic Braking Unit				Dynamic Braking Resistor				
DB Unit	Used with drives		Nominal Current	Nominal Power 18 seconds ON time	Resistance		DB resistor	
	Frame Size	Nominal Voltage			Minimum	Maximum		
Order Code		Volts	Amps	kW	Ohms	Ohms	Order Code	Ohms
MV3DB045S5	3	400	45	28.1	13.61	16.6	MV3DBR045S4	13.6
MV3DB092S5	4	400	92	57	6.77	8.21	MV3DBR092S4	6.8
MV3DB247S5	6	400	247	153.3	1.58	3.05	MV3DBR247S4	2.6
TBA	7	400	TBA	TBA	TBA	TBA	TBA	TBA
MV3DB045S5	3	480	38	28.3	15.31	23.6	MV3DBR038S5	15.3
MV3DB092S5	4	480	76	56.7	7.62	11.8	MV3DBR076S5	7.6
MV3DB247S5	6	480	231	171.7	1.78	3.89	MV3DBR231S5	3.3
TBA	7	480	TBA	TBA	TBA	TBA	TBA	TBA
MV3DB061S6	4	600/690	61	56.7	11	20.3	MV3DBR061S6	11.0
MV3DB185S6	6	600/690	185	171.7	3.7	6.71	MV3DBR185S6	5.2
TBA	7	600/690	TBA	TBA	TBA	TBA	TBA	TBA



Stopping times from 1500 r/min at various supply voltages using standard braking resistors tabled

Drive to Dynamic Braking Unit Compatibility Table

Each dynamic braking unit is mechanically matched to a particular drive frame size and hence is not interchangeable. The following table lists all drives against its dedicated dynamic braking unit.

Drive	Frame Size	DB Unit	DB Resistor (Maximum Duty)	Resistance Ohms
400 V				
MV3058A4A1	3	MV3DB045S5	MV3DBR045S4	13.6
MV3071A4A1	3	MV3DB045S5	MV3DBR045S4	13.6
MV3086A4A1	4	MV3DB092S5	MV3DBR092S4	6.8
MV3105A4A1	4	MV3DB092S5	MV3DBR092S4	6.8
MV3140A4A1	4	MV3DB092S5	MV3DBR092S4	6.8
MV3168A4A1	6	MV3DB247S5	MV3DBR247S4	2.6
MV3204A4A1	6	MV3DB247S5	MV3DBR247S4	2.6
MV3244A4A1	6	MV3DB247S5	MV3DBR247S4	2.6
MV3292A4A1	6	MV3DB247S5	MV3DBR247S4	2.6
MV3364A4A1	6	MV3DB247S5	MV3DBR247S4	2.6
MV3449A4A1	7	TBA	TBA	TBA
MV3503A4A1	7	TBA	TBA	TBA
480 V				
MV3052A5A1	3	MV3DB045S5	MV3DBR038S5	15.3
MV3065A5A1	3	MV3DB045S5	MV3DBR038S5	15.3
MV3077A5A1	4	MV3DB092S5	MV3DBR076S5	7.6
MV3096A5A1	4	MV3DB092S5	MV3DBR076S5	7.6
MV3124A5A1	4	MV3DB092S5	MV3DBR076S5	7.6
MV3156A5A1	6	MV3DB247S5	MV3DBR231S5	3.3
MV3180A5A1	6	MV3DB247S5	MV3DBR231S5	3.3
MV3240A5A1	6	MV3DB247S5	MV3DBR231S5	3.3
MV3302A5A1	6	MV3DB247S5	MV3DBR231S5	3.3
MV3361A5A1	7	TBA	TBA	TBA
MV3414A5A1	7	TBA	TBA	TBA
MV3477A5A1	7	TBA	TBA	TBA
600/690 V				
MV3062A6A1	4	MV3DB061S6	MV3DBR061S6	11.0
MV3077A6A1	4	MV3DB061S6	MV3DBR061S6	11.0
MV3099A6A1	4	MV3DB061S6	MV3DBR061S6	11.0
MV3125A6A1	6	MV3DB185S6	MV3DBR185S6	5.2
MV3144A6A1	6	MV3DB185S6	MV3DBR185S6	5.2
MV3192A6A1	6	MV3DB185S6	MV3DBR185S6	5.2
MV3242A6A1	6	MV3DB185S6	MV3DBR185S6	5.2
MV3289A6A1	7	TBA	TBA	TBA
MV3336A6A1	7	TBA	TBA	TBA
MV3382A6A1	7	TBA	TBA	TBA

Alternative resistor selection

If the braking duty is less than given above, an alternative resistor within the minimum-maximum limits specified may be used. Refer below for calculations.

Calculation Based on Power

Dynamic Braking Resistance $R = \frac{V_{DB}^2}{P_p} \Omega$ Where V_{DB} = DB Operating Voltage
 P_p = Peak power during braking

AC Voltage	V_{DB}
400	732
480	846
600/690	1118

Alternatively a lower value of resistor may be used, but not below the specified minimum value.

Calculation based on Inertia

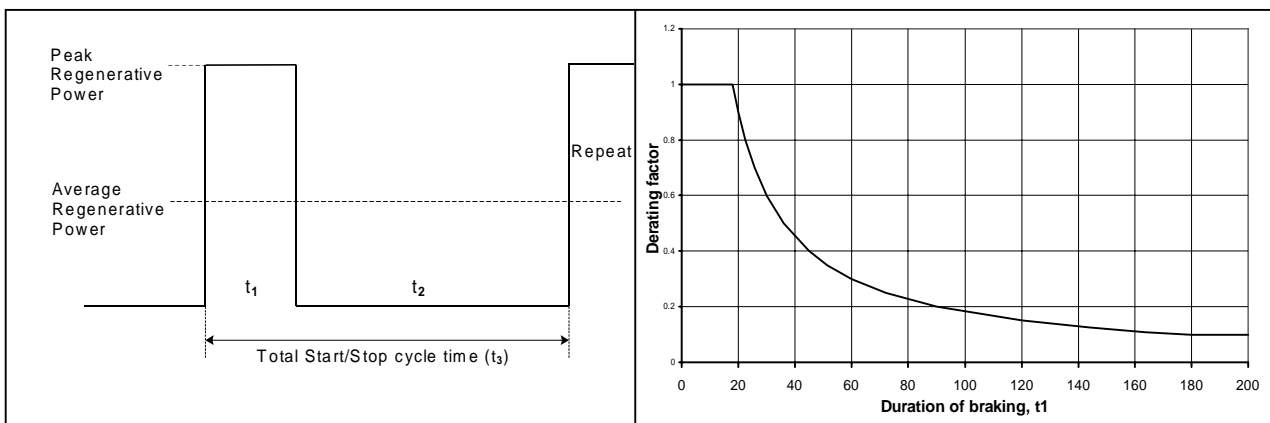
Dynamic Braking Resistance $R = \frac{91.2V_{DB}^2 t_1}{JN_2(N_2 - N_1)} \Omega$

Where V_{DB} = DB Operating Voltage
 J = system inertia (kgm²)
 t_1 = braking time (seconds)
 N_1 = initial speed r/min
 N_2 = final speed r/min

Note: $J = J_{motor} + (J_{load} \times 1/(\text{gear box ratio})^2)$
 If there is no gear box, gear box ratio = 1

Peak Power (at start of braking) = $P_p = \frac{JN_2(N_2 - N_1)}{91.2 t_1}$

Resistor Peak Power Capability and Peak Power Derating



The calculated resistor value should have a peak power capability equal to the power during braking and be able to withstand this power for the braking time t1. The calculated resistor value should also have an average power capability given by:

$$\text{Long term average power} = \text{Average power during braking} \times t_1 / t_3$$

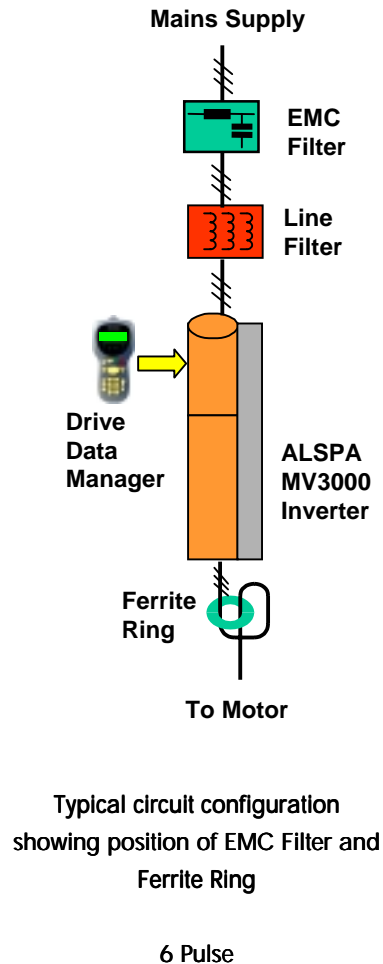
The dynamic braking unit has a 10% duty factor, which corresponds to an 18 second ON time in any 180 second period. If the braking ON time is longer than 18 seconds, the Peak Power must be derated by applying the derating factor indicated by the curve above.

4.3 EMC Filters & Ferrites – 6 Pulse & 6 Pulse Enhanced

EMC filters and ferrites will assist the inverter installation to meet EMC emission requirements. This generally applies when operating in non-industrial environments or when the inverter is installed in the proximity of sensitive equipment.

For 6 Pulse configurations, one EMC filter plus one motor cable ferrite ring will be required to meet EMC emission requirements.

MicroCubicle™	EMC Filter	EMC Ferrite
380 - 440 V		
MV3058A4A1	MV3FLT083A4A1	MV3FLT140B6A1
MV3071A4A1	MV3FLT083A4A1	MV3FLT140B6A1
MV3086A4A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3105A4A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3140A4A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3168A4A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3204A4A1	MV3FLT250A5X1	MV3FLT566B6A1
MV3244A4A1	MV3FLT250A5X1	MV3FLT566B6A1
MV3292A4A1	MV3FLT400A5X1	MV3FLT566B6A1
MV3364A4A1	MV3FLT400A5X1	MV3FLT566B6A1
MV3449A4A1		MV3FLT566B6A1
MV3503A4A1		MV3FLT566B6A1
440 - 525 V		
MV3052A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3065A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3077A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3096A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3124A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3156A5A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3180A5A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3240A5A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3302A5A1	MV3FLT320A6X1	MV3FLT566B6A1
MV3361A5A1		MV3FLT566B6A1
MV3414A5A1		MV3FLT566B6A1
MV3477A5A1		MV3FLT566B6A1
575 - 690 V		
MV3062A6A1	MV3FLT150A6X1	MV3FLT140B6A1
MV3077A6A1	MV3FLT150A6X1	MV3FLT140B6A1
MV3099A6A1	MV3FLT150A6X1	MV3FLT140B6A1
MV3125A6A1	MV3FLT150A6X1	MV3FLT566B6A1
MV3144A6A1	MV3FLT150A6X1	MV3FLT566B6A1
MV3192A6A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3242A6A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3289A6A1	MV3FLT320A6X1	MV3FLT566B6A1
MV3289A6A1		MV3FLT566B6A1
MV3336A6A1		MV3FLT566B6A1
MV3382A6A1		MV3FLT566B6A1

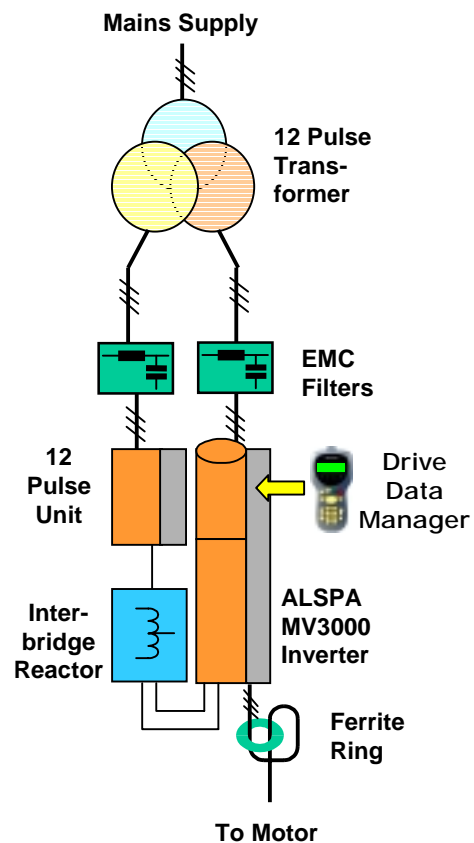


4.4 EMC Filters & Ferrites – 12 Pulse

EMC filters and ferrites will assist the inverter installation to meet EMC emission requirements. This generally applies when operating in non-industrial environments or when the inverter is installed in the proximity of sensitive equipment.

For 12 Pulse drive configurations, two x EMC filters (one per input rectifier) plus one motor cable ferrite ring will be required to meet EMC emission requirements.

MicroCubicle™	EMC Filter	EMC Ferrite
	Qty Req'd = 2	
380 - 440 V		
MV3058A4A1	N/A	N/A
MV3071A4A1	N/A	N/A
MV3086A4A1	MV3FLT083A4A1	MV3FLT140B6A1
MV3105A4A1	MV3FLT083A4A1	MV3FLT140B6A1
MV3140A4A1	MV3FLT083A4A1	MV3FLT140B6A1
MV3168A4A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3204A4A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3244A4A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3292A4A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3364A4A1	MV3FLT250A5X1	MV3FLT566B6A1
MV3449A4A1	MV3FLT250A5X1	MV3FLT566B6A1
MV3503A4A1	MV3FLT400A5X1	MV3FLT566B6A1
440 - 525 V		
MV3052A5A1	N/A	N/A
MV3065A5A1	N/A	N/A
MV3077A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3096A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3124A5A1	MV3FLT180A5A1	MV3FLT140B6A1
MV3156A5A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3180A5A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3240A5A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3302A5A1	MV3FLT180A5A1	MV3FLT566B6A1
MV3361A5A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3414A5A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3477A5A1	MV3FLT320A6X1	MV3FLT566B6A1
575 - 690 V		
MV3062A6A1	MV3FLT150A6X1	MV3FLT140B6A1
MV3077A6A1	MV3FLT150A6X1	MV3FLT140B6A1
MV3099A6A1	MV3FLT150A6X1	MV3FLT140B6A1
MV3125A6A1	MV3FLT150A6X1	MV3FLT566B6A1
MV3144A6A1	MV3FLT150A6X1	MV3FLT566B6A1
MV3192A6A1	MV3FLT150A6X1	MV3FLT566B6A1
MV3242A6A1	MV3FLT150A6X1	MV3FLT566B6A1
MV3289A6A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3289A6A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3336A6A1	MV3FLT250A6X1	MV3FLT566B6A1
MV3382A6A1	MV3FLT250A6X1	MV3FLT566B6A1



Typical circuit configuration showing position of EMC Filter and Ferrite Ring

12 Pulse

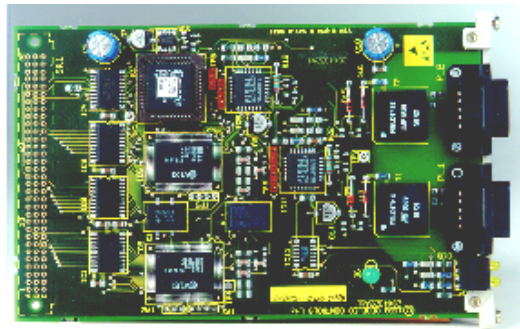
4.5 Fieldbus Communication

4.5.1 WorldFIP Fieldbus

The WorldFIP Fieldbus board may be retrofitted on all ALSPA MV3000 inverter drives. Boards providing a dual redundant WorldFIP Fieldbus are available for 1 Mbit/s and 2.5 Mbit/s operation.

FIP bus arbiter functionality is not supported, and must be provided by another device on the FIP network.

The FIP board is parameterised and controlled using the same parameter interface as for the host drive unit. The board may be configured over the drive's serial link, but not over the FIP link itself.



SPECIFICATION

Fieldbus

- Dual redundant FIP Fieldbus: Options - 1 Mbit/s
- 2.5 Mbit/s

Protocol

- WorldFIP Profile A, IEC 1158-2 and FIP, NFC 46-603/4

Data Refresh Rate

- Two drive data refresh rates - fast scan : 10 mS
- slow scan : 100 mS

Environment

- Storage
 - Altitude 3000m (max)
 - Temperature range -25°C to + 70°C
 - Relative Humidity 5% to 95% non-condensing
- Transport
 - Altitude 3000m (max)
 - Relative Humidity ≤ 95% non-condensing
 - Vibration, drop IEC 60721-3-2 Class 2M1
- Operating
 - Altitude 3000m (max)
 - Temperature range 0°C to +50°C
 - Relative humidity 5% to 95% non-condensing
 - Vibration IEC 60721-3-3 Class 3M1 & EN50178

Dimensions - 160 mm x 100 mm. Fits internally to the drive unit.

Weight - 140 g

Safety - EN50178 Electronic Equipment for use in power installations

EMC - EN61800-3 / IEC61800-3

Order Codes:

MVS3002-4001	ALSPA MV3000 FIP Board 1 Mbit/s
MVS3002-4002	ALSPA MV3000 FIP Board 2.5 Mbit/s
MVS3002-4010	FIP Cable with moulded on connector 3 m length
8892-4300	FIP Link AC Earth Connection (2 required)

4.5.2 PROFIBUS Fieldbus

The PROFIBUS Fieldbus Coupler may be retrofitted on all ALSPA MV3000 inverter drives and allows connection to a PROFIBUS-DP network.

The PROFIBUS board is parameterised and controlled using the same parameter interface as for the host drive unit. The board may be configured over the drive's serial link, but not over the PROFIBUS link itself.



SPECIFICATION

Fieldbus communication rates:

- 9.6K, 19.2K, 93.75K, 187.5K, 500K, 1.5M bit/s

Protocol

PROFIBUS-DP Field bus protocol to DIN 19245

Data Refresh Rate

10 mS

Data Volume

- Cyclic Channel Receive:
 - 1 control word (16 bit), and 5 reference demands (16 bit)
 - or
 - 2 control words (16 bit), and 4 reference demands (16 bit)
- Cyclic Channel Transmit:
 - 1 status word (16 bit), and 5 monitor values (16 bit)

Power Supply

Internal 5V supply. Current consumption : 315 mA.

Environment

- Storage
 - Altitude 3000m (max)
 - Temperature range -25°C to + 70°C
 - Relative Humidity 5% to 95% non-condensing
- Transport
 - Altitude 3000m (max)
 - Relative Humidity ≤ 95% non-condensing
 - Vibration, drop IEC 60721-3-2 Class 2M1
- Operating
 - Altitude 3000m (max)
 - Temperature range 0°C to +50°C
 - Relative humidity 5% to 95% non-condensing
 - Vibration IEC 60721-3-3 Class 3M1 & EN50178

Dimensions - 160 mm x 100 mm. Fits internally to the drive unit.

Weight - 165 g

Safety - EN50178 Electronic Equipment for use in power installations

EMC - EN61800-3 / IEC61800-3

Order Code:

MVS3007-4001	ALSPA MV3000 PROFIBUS Fieldbus Coupler
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4.6 Programming

4.6.1 Drive Data Manager™

Drive Data Manager™



The Drive Data Manager™ is the keypad programming tool for ALSPA MV3000.

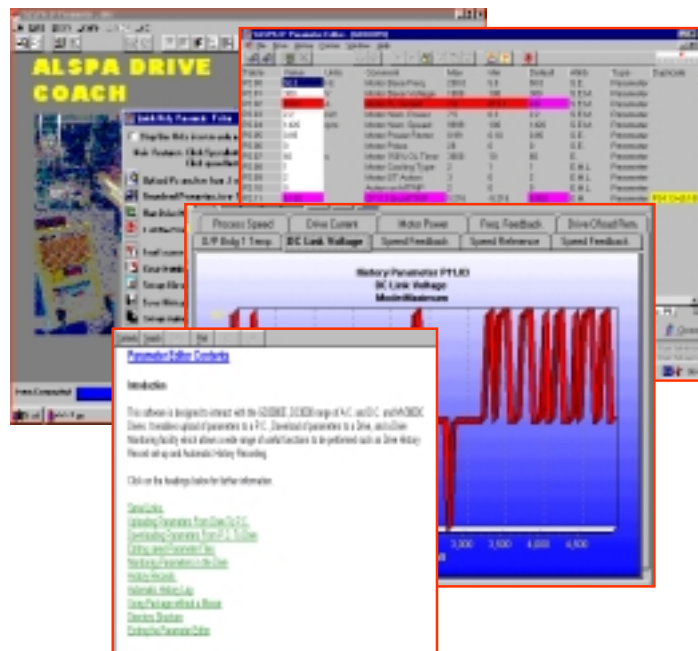
The ergonomically designed unit features:

- parameter editing
- 4 line backlit display
- wide angle, magnified view
- multilingual text display
- telephone style navigation key
 - menu and parameter access
- numeric keys for fast data entry and shortcut parameter access
- versatile to use:
 - mounts directly on drive unit
 - mounted on enclosure
 - handheld
- parameter storage for faster multi-drive commissioning
 - upload/download to/from drive
- on-line 'HELP' key for extra parameter information
- diagnostic help and history record viewing
- optional cable and IP65 seal for enclosure door mounting

Order Codes:

MVS3000-4001	Drive Data Manager™
MVS3001-4001	Drive Data Manager™ Lead 3m and IP65 Door Mounting Kit

4.6.2 ALSPA Drive Coach



ALSPA Drive Coach is a PC based programming tool providing a superior programming and diagnostic viewing environment.

Facilities include:

- drive parameter editing
- upload parameters from drive to PC
- download parameters from PC to drive
- save parameters to disk
- save history record to disk
- view history record
- graphical display of data
- archiving
- Hypertext Help Facility
- Windows™ based

Order Codes:

MVS3004-4001	ALSPA Drive Coach
GDS1009-4001	PC Programming Lead 3m

4.6.3 Demonstration Briefcase



A self-contained demonstration briefcase simulating the complete functionality of the ALSPA MV3000.

Comprising:

- MV3000 Control board
- Drive Data Manager™
- Drive Data Manager™ Lead for handheld use
- Analogue and Digital I/O Control panel
- Built-in 110/240 V power supply with lead
- PC connection cable for use with optional ALSPA Drive Coach
- Power frame simulation

The following facilities are provided:

- Off-line programming & learning
- Full use of ALSPA Drive Coach PC programming package
- Fault simulation
- Diagnostics

The unit allows training of engineering staff and machine operators before actual equipment hands-on. Further, the unit allows development of plant programs or SCADA simulations in a safe development environment.

Order Codes

MV3000 CASE DEMO/E	ALSPA MV3000 Demonstration Case (English)
MV3000 CASE DEMO/F	ALSPA MV3000 Demonstration Case (French)
MV3000 CASE DEMO/D	ALSPA MV3000 Demonstration Case (German)

4.7 Cables, Motors and Encoders

4.7.1 Motor Cables

To avoid EMC problems, the motor cable should be screened (e.g. NYCWY according to VDE 0271 or steel wire armoured) or fully enclosed in metallic trunking. The screen or metallic trunking must be continuous throughout its length and be connected directly to both the drive cabinet and motor.

Outside the drive cabinet the motor cable must be segregated from other cables by at least 300mm (12in)

4.7.2 Motor Insulation

Motors with Insulation Peak Voltage Withstand ratings of 1200 V (400V motors), 1500 V (500V motors) and 2250 V (690 V motors) can be operated with ALSPA MV3000 without risk to the motor winding insulation, for cable lengths up to 500m (1640 ft). Such motors are available from reputable manufacturers, as standard motors up to 500 V and with an enhanced insulation system for voltages greater than 500 V up to 690 V.

For motor cable lengths greater than 500 metres, please refer to ALSTOM.

4.7.3 Encoders

When operating in closed loop flux vector control or position control, encoder feedback is required. Only RS422A type encoders can be used with ALSPA MV3000. A marker pulse is only required when in position control mode.

The MV3000 is equipped with power supplies suitable for two types of encoders:

- 1) Encoders requiring +5 V supply and producing an RS422 output
- 2) Encoders requiring +24 V supply and producing an RS422 output

Note: 24V differential outputs are not compatible. The pulse train must be RS422.

Encoder Resolution

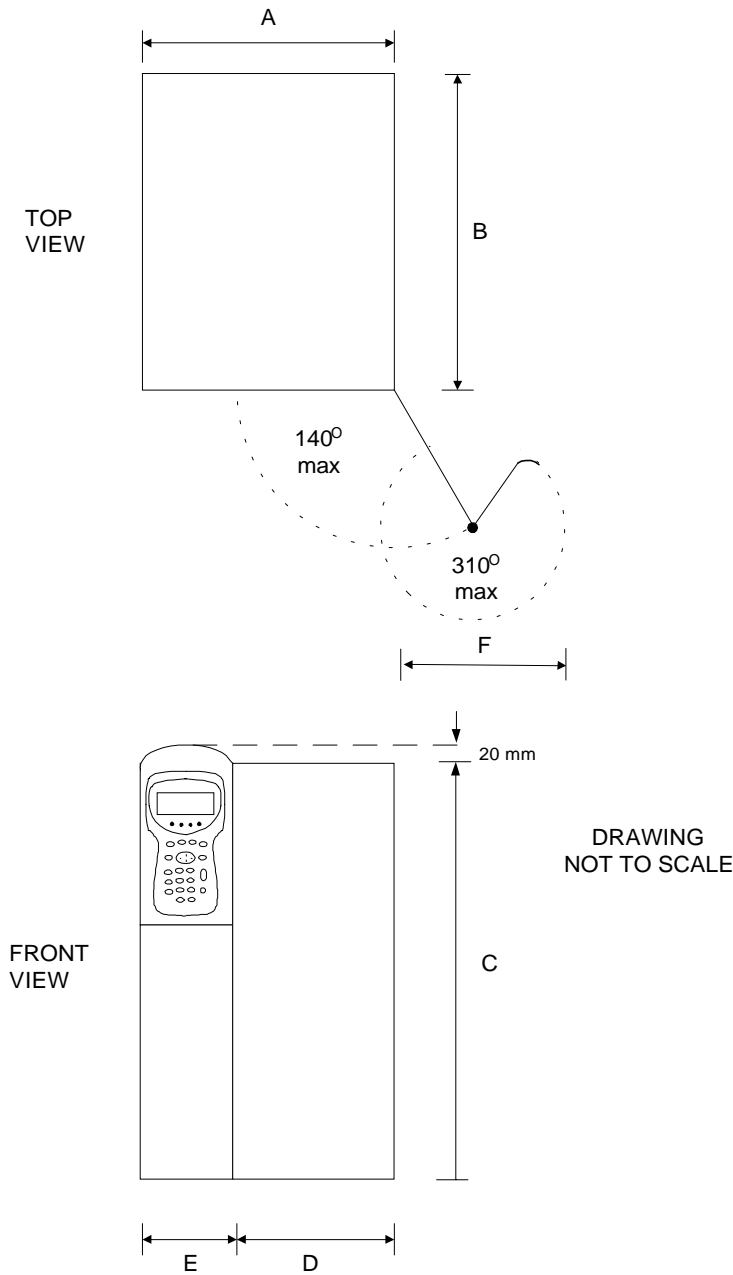
For accurate speed control, a resolution not less than 1024 pulse/revolution is suggested.

The drive will allow a maximum of 64,000 pulse/revolution, however since the frequency of pulses is affected by the maximum motor speed, the frequency of pulses must not exceed 1.5 MHz. Therefore the encoder resolution must not exceed:

$$\frac{90 \times 10^6}{\text{Required top speed (r/min)}} \text{ Pulses per revolution}$$

5. Technical Data

5.1 Weights & Dimensions – MicroCubicle™



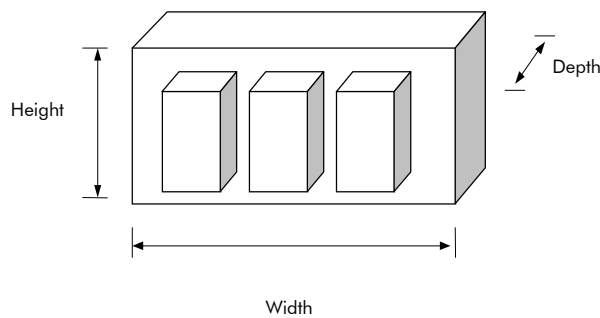
MicroCubicle™ physical dimensions

Frame Size*	Dimensions mm (in)						Weight Kg (lb)
	A	B	C	D	E	F (max)	
3	170 (6.7)	350 (13.8)	600 (23.7)	60 (2.37)	110 (4.33)	156 (6.1)	27.0 (59.4)
4	255 (10.0)	370 (14.6)	789 (31.2)	145 (5.7)	110 (4.33)	210 (8.3)	45 (99)
6	430 (17.0)	420 (16.6)	873 (34.4)	320 (12.6)	110 (4.33)	355 (14)	100.5 (221.1)
7	485 (19.1)	450 (17.8)	1155 (45.5)	372 (14.7)	110 (4.33)	355 (13.8)	156 (344.0)

* Please refer to Section 2.2 Rating and Protection Data for correspondences between Frame Size and actual MicroCubicle™ unit.

5.2 Weights & Dimensions – Line Filters

Line Filter Part No.	Dimensions			Weight kg/lb	Frame Size
	Height mm/in	Width mm/in	Depth mm/in		
400 V					
MV3ACL022A4	195/7.68	180/7.09	166/6.54	12/26.4	3
MV3ACL030A4	195/7.68	180/7.09	166/6.54	12/26.4	3
MV3ACL037A4	195/7.68	180/7.09	166/6.54	12/26.4	3 / 4
MV3ACL045A4	250/9.84	240/9.45	170/6.69	17/37.4	4
MV3ACL055A4	260/10.24	280/11.02	170/6.69	14/30.8	4
MV3ACL075A4	260/10.24	280/11.02	190/6.69	18/39.6	4 / 6
MV3ACL090A4	320/12.6	346/13.62	225/8.86	25/55	6
MV3ACL110A4	320/12.6	346/13.62	235/9.25	30/66	6
MV3ACL132A4	320/12.6	346/13.62	245/9.65	35/77	6
MV3ACL160A4	320/12.6	346/13.62	245/9.65	35/77	6
MV3ACL200A4	320/12.6	346/13.62	255/10.04	45/99	6
MV3ACL250A4	372/14.64	430/16.93	275/10.83	50/110	7
MV3ACL280A4	372/14.64	430/16.93	290/11.42	56/123.2	7
MV3ACL315A4	373/14.7	430/16.93	300/11.81	70/154	7
690 V					
MV3ACL045A7	250/9.84	240/9.45	170/6.69	16/35.2	4
MV3ACL055A7	250/9.84	240/9.45	170/6.69	16/35.2	4
MV3ACL075A7	250/9.84	240/9.45	190/7.48	19/41.8	4
MV3ACL090A7	250/9.84	240/9.45	190/7.48	21/46.2	4 / 6
MV3ACL110A7	320/12.6	346/13.62	235/9.25	35/77	6
MV3ACL132A7	320/12.6	346/13.62	245/9.65	35/77	6
MV3ACL160A7	320/12.6	346/13.62	235/9.25	35/77	6
MV3ACL200A7	320/12.6	346/13.62	255/10.04	50/110	6
MV3ACL250A7	372/14.65	430/16.93	275/10.83	50/110	7
MV3ACL280A7	372/14.65	430/16.93	290/11.42	56/123.2	7
MV3ACL315A7	375/14.8	430/16.93	300/11.81	70/154	7



5.3 Weights & Dimensions – DC Link Chokes

DC Link Choke Part No.	Dimensions			Weight kg / lb	Losses Watts
	Height mm/in	Width mm/in	Depth mm/in		
400 V					
MV3DCL022A4	148/5.8	137/5.4	150/5.9	9/19.8	40
MV3DCL030A4	180/7.1	170/6.7	150/5.9	12.5/27.5	50
MV3DCL037A4	180/7.1	170/6.7	175/6.9	16/35.2	55
MV3DCL045A4	220/8.7	220/8.7	145/5.7	17/37.4	70
MV3DCL055A4	220/8.7	220/8.7	215/8.5	20/44	80
MV3DCL075A4	220/8.7	220/8.7	230/9.1	24/52.8	95
MV3DCL090A4	230/9.1	220/8.7	230/9.1	24.5/53.9	110
MV3DCL110A4	245/9.6	240/9.4	265/10.4	34.5/75.9	120
MV3DCL132A4	245/9.6	240/9.4	290/11.4	43/94.6	125
MV3DCL160A4	290/11.4	286/11.3	285/11.2	51/112	140
MV3DCL200A4	290/11.4	286/11.3	310/12.2	60/132	160
MV3DCL250A4	300/11.8	286/11.3	320/12.6	68/150	180
MV3DCL280A4	420/16.5	280/11.0	320/12.6	60/132	300
MV3DCL315A4	420/16.5	280/11.0	330/13.0	66/145	320
690 V					
MV3DCL045A7	220/8.7	220/8.7	145/5.7	16.5/36.3	75
MV3DCL055A7	220/8.7	216/8.5	170/6.7	20/44	80
MV3DCL075A7	220/8.7	220/8.7	180/7.0	24.5/53.9	100
MV3DCL090A7	220/8.7	220/8.7	230/9.1	25/55	105
MV3DCL110A7	245/9.6	240/9.4	265/10.4	35/77	120
MV3DCL132A7	245/9.6	240/9.4	290/11.4	43/94.6	125
MV3DCL160A7	290/11.4	286/11.3	285/11.2	51/112	150
MV3DCL200A7	290/11.4	286/11.3	310/12.2	61/134	165
MV3DCL250A7	300/11.8	286/11.3	320/12.6	70/154	175
MV3DCL280A7	420/16.5	280/11.0	320/12.6	60/132	300
MV3DCL315A7	420/16.5	280/11.0	330/13.0	67/147	300

5.4 Weights & Dimensions – 12 Pulse Units

12 Pulse Unit Part No.	Dimensions			Weight	Losses	Airflow
	Height mm/in	Width mm/in	Depth mm/in	kg/lb	Watts @ FLC	cfm
380 - 690 V						
MV3R140A6A1	378/14.9	218/8.6	370/14.6	16/35.2	190	100.0
MV3R364A6A1	480/18.9	248/9.8	420/16.6	26/57.2	490	100.0
FS 7 - TBA						

5.5 Weights & Dimensions – Interbridge Transformers 50 Hz

Interbridge Transformer Part No.	Dimensions			Weight Kg/lb	Losses Watts
	Height mm/in	Width mm/in	Depth mm/in		
380 - 440 V					
MV3IBTA037A4	240/9.4	140/5.5	250/9.8	19/41.8	90
MV3IBTA045A4	240/9.4	155/6.1	250/9.8	21/46.2	100
MV3IBTA055A4	240/9.4	155/6.1	250/9.8	25/55.0	100
MV3IBTA075A4	260/10.2	195/7.7	270/10.6	36/79.2	130
MV3IBTA090A4	250/9.8	290/11.4	240/9.4	45/99.0	150
MV3IBTA110A4	290/11.4	280/11.0	290/11.4	50/110	170
MV3IBTA132A4	290/11.4	290/11.4	290/11.4	55/121	190
MV3IBTA160A4	290/11.4	300/11.8	290/11.4	60/132	230
MV3IBTA200A4	300/11.8	310/12.2	290/11.4	68/149.6	250
MV3IBTA250A4	420/16.5	330/13.0	280/11.0	70/154	320
MV3IBTA280A4	420/16.5	350/13.8	280/11.0	75/165	350
MV3IBTA315A4	420/16.5	370/14.6	280/11.0	83/182.6	390
690 V					
MV3IBTA037A7	240/9.4	140/5.5	250/9.8	19/41.8	90
MV3IBTA045A7	240/9.4	155/6.1	250/9.8	21/46.2	100
MV3IBTA055A7	240/9.4	155/6.1	250/9.8	25/55.0	100
MV3IBTA075A7	260/10.2	195/7.7	270/10.6	38/83.6	130
MV3IBTA090A7	250/9.8	280/11.0	240/9.4	45/99.0	150
MV3IBTA110A7	290/11.4	280/11.0	290/11.4	50/110	170
MV3IBTA132A7	290/11.4	290/11.4	290/11.4	55/121	190
MV3IBTA160A7	290/11.4	300/11.8	290/11.4	60/132	230
MV3IBTA200A7	300/11.8	310/12.2	290/11.4	68/149.6	250
MV3IBTA250A7	420/16.5	330/13.0	280/11.0	70/154	320
MV3IBTA280A7	420/16.5	350/13.8	280/11.0	75/165	350
MV3IBTA315A7	420/16.5	370/14.6	280/11.0	83/182.6	390

5.6 Weights & Dimensions – Interbridge Transformers 60 Hz

Interbridge Transformer Part No.	Dimensions			Weight Kg/lb	Losses Watts
	Height mm/in	Width mm/in	Depth mm/in		
460 – 525 V					
MV3IBTA050A5	240/9.4	140/5.5	250/9.8	19/41.8	90
MV3IBTA060A5	240/9.4	155/6.1	250/9.8	21/46.2	100
MV3IBTA075A5	240/9.4	155/6.1	250/9.8	36/79.2	100
MV3IBTA100A5	260/10.2	195/7.7	270/10.6	38/83.6	130
MV3IBTA125A5	250/9.8	290/11.4	240/9.4	45/99	150
MV3IBTA150A5	290/11.4	290/11.4	290/11.4	55/121	190
MV3IBTA200A5	290/11.4	300/11.8	290/11.4	60/132	230
MV3IBTA250A5	300/11.8	310/12.2	290/11.4	68/149.6	250
MV3IBTA300A5	420/16.5	330/13.0	280/11.0	70/154	320
MV3IBTA350A5	420/16.5	350/13.8	280/11.0	75/165	350
MV3IBTA400A5	420/16.5	370/14.6	280/11.0	83/182.6	390
600 V					
MV3IBTA050A6	240/9.4	140/5.5	250/9.8	19/41.8	90
MV3IBTA060A6	240/9.4	155/6.1	250/9.8	21/46.2	100
MV3IBTA075A6	240/9.4	165/6.5	250/9.8	36/79.2	130
MV3IBTA100A6	260/10.2	195/7.7	270/10.6	38/83.6	130
MV3IBTA125A6	250/9.8	290/11.4	240/9.4	45/99	150
MV3IBTA150A6	290/11.4	290/11.4	290/11.4	55/121	190
MV3IBTA200A6	290/11.4	300/11.8	290/11.4	60/132	230
MV3IBTA250A6	300/11.8	310/12.2	290/11.4	68/149.6	250
MV3IBTA300A6	420/16.5	330/13.0	280/11.0	70/154	320
MV3IBTA350A6	420/16.5	350/13.8	280/11.0	75/165	350
MV3IBTA400A6	420/16.5	370/14.6	280/11.0	83/182.6	390

5.7 Weights & Dimensions – 12 Pulse Supply Transformers

12 Pulse Transformer Common Specification			
Primary	3 Phase Star or Delta	Operating Temperature	0 - 40°C
Secondary 1	Star	Storage/Transport Temp	-25 to +55/70°C
Secondary 2	Delta	Ventilation	Naturally ventilated
Frequency	50 Hz	Relative Humidity	0 - 95 % non-condensing
Overload	1.5 x 60 sec 6 times/hr	Altitude	1000 m without derating
Type	Isolated	Accessories	T-type thermistors

5.7.1 Open Type IP00 Supply Voltage 380 – 440 V

12 Pulse Supply Transformer Part No. Prefix	Primary kVA	Dimensions			Weight Kg/lb	Losses Watts
		Height mm/in	Width mm/in	Depth mm/in		
MV3TPT037	45	700/27.6	350/13.8	650/25.6	290/638	1700
MV3TPT045	54	750/29.5	400/15.7	650/25.6	350/770	2000
MV3TPT055	66	750/29.5	420/16.5	650/25.6	400/880	2300
MV3TPT090	90	760/29.9	375/14.8	1020/40.2	515/1133	3200
MV3TPT090	107	760/29.9	400/15.7	1020/40.2	550/1210	3600
MV3TPT110	130	800/31.5	450/17.7	1100/43.3	615/1353	3800
MV3TPT132	156	900/35.4	450/17.7	1100/43.3	690/1518	4300
MV3TPT160	188	1000/39.4	500/19.7	1150/45.3	750/1650	4500
MV3TPT200	235	1000/39.4	550/21.7	1200/47.2	850/1870	5900
MV3TPT250	293	1100/43.3	550/21.7	1250/49.2	1100/2420	6200
MV3TPT280	328	1100/43.3	550/21.7	1300/51.2	1200/2640	6750
MV3TPT315	369	1100/43.3	650/25.6	1350/53.1	1250/2750	7500

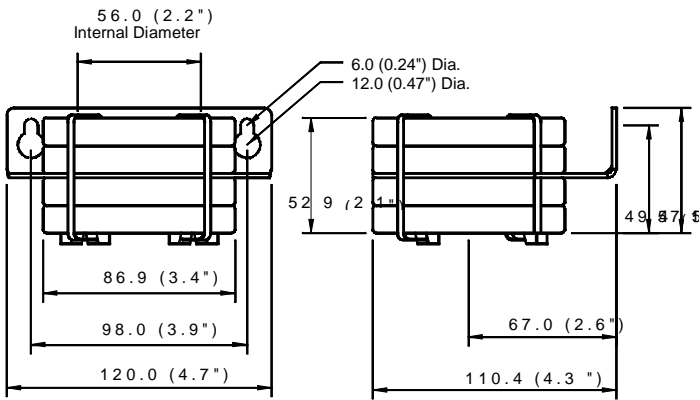
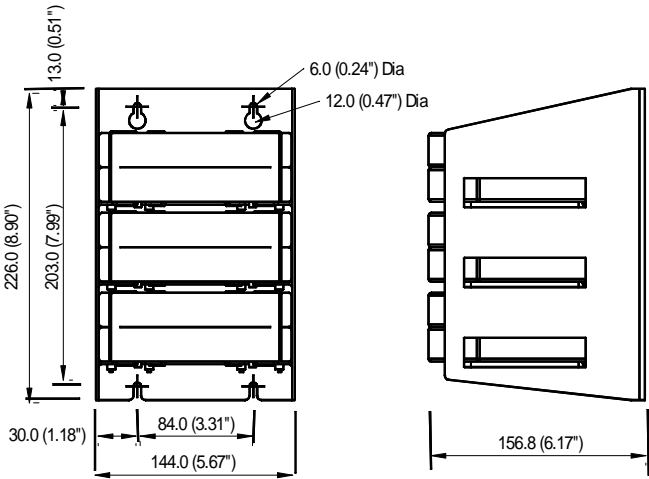
5.7.2 Enclosed Type IP21 Supply Voltage 380 – 440 V

12 Pulse Supply Transformer Part No. Prefix	Primary kVA	Dimensions			Weight Kg/lb	Losses Watts
		Height mm/in	Width mm/in	Depth mm/in		
MV3TPT037	45	1100/43.3	600/23.6	1050/41.3	340/748	1700
MV3TPT045	54	1100/43.3	600/23.6	1050/41.3	410/902	2000
MV3TPT055	66	1100/43.3	600/23.6	1050/41.3	460/1012	2300
MV3TPT090	90	1250/49.2	800/31.5	1200/47.2	575/1265	3200
MV3TPT090	107	1250/49.2	800/31.5	1200/47.2	625/1375	3600
MV3TPT110	130	1250/49.2	800/31.5	1200/47.2	690/1518	3800
MV3TPT132	156	1250/49.2	800/31.5	1200/47.2	765/1683	4300
MV3TPT160	188	1250/49.2	800/31.5	1300/51.2	825/1815	4500
MV3TPT200	235	1550/61	900/35.4	1400/55.1	1000/2200	5900
MV3TPT250	293	1550/61	900/35.4	1400/55.1	1250/2750	6200
MV3TPT280	328	1550/61	900/35.4	1500/59.1	1350/2970	6750
MV3TPT315	369	1550/61	1000/39.4	1500/59.1	1450/3190	7500

5.8 Weights & Dimensions – EMC Filters

EMC Filter Part No.	Dimensions			Weight Kg/lb
	Height mm/in	Width mm/in	Depth mm/in	
MV3FLT083A4A1	220/8.66	329/12.9	80/3.2	4/8.8
MV3FLT150A6X1	300/11.8	160/6.3	120/4.7	6.5/14.3
MV3FLT180A5A1	300/11.8	210/8.3	120/4.7	6.5/14.3
MV3FLT250A5X1	300/11.8	230/9.1	125/4.9	7/15.4
MV3FLT250A6X1	300/11.8	230/9.1	125/4.9	7/15.4
MV3FLT320A6X1	386/15.2	260/10.2	115/4.5	10.5/23.1
MV3FLT400A5X1	386/15.2	260/10.2	115/4.5	10.5/23.1

5.9 Weights & Dimensions – EMC Ferrites

<p>Part No: MV3FLT140B6A1</p> <p>Weight: 0.91 kg / 2 lb</p>	
<p>Part No: MV3FLT566B6A1</p> <p>Weight: 5.11 kg / 11.24 lb</p>	

5.10 Acoustic Noise Levels – MicroCubicle™

Acoustic noise levels

Frame Size*	Maximum noise level 1.0 m (39.4 in) in any direction from drive
	dB(A)
3	63
4	66
6	76
7	80

* Please refer to Section 2.2 Rating and Protection Data for correspondences between Frame Size and actual MicroCubicle™ unit.

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6. Recommended Spares List

6.1 MicroCubicle™ Spares

The following spares are available for ALSPA MV3000 MicroCubicles. Spares for DELTA based inverters comprise complete module replacement. Please refer to the **ALSPA MV3000 DELTA Buyer's Guide** for details.

MicroCubicle	Frame	Control Module	Fan	Rectifier Module	Transistor - Transistor Module	Rectifier-Transistor Module	SMPS (Switch Mode Power Supply)	Precharge Fuses (3 off Req'd)
400 V								
MV3058A4A1	3	S41Y7784/40	S41Y7786/10	S41Y7782/10	-	-	S20X4320/10	S82028/220
MV3071A4A1	3	S41Y7784/40	S41Y7786/10	S41Y7782/20	-	-	S20X4320/10	S82028/220
MV3086A4A1	4	S41Y7784/40	S98101/153	S41Y8008/30	-	-	S20X4320/10	S82028/260
MV3105A4A1	4	S41Y7784/40	S98101/153	S41Y8008/20	-	-	S20X4320/10	S82028/260
MV3140A4A1	4	S41Y7784/40	S98101/153	S41Y8008/10	-	-	S20X4320/10	S82028/260
MV3168A4A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/40	S41Y7771/30	S20X4321/20	S82028/280
MV3204A4A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/40	S41Y7771/30	S20X4321/20	S82028/280
MV3244A4A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/40	S41Y7771/20	S20X4321/20	S82028/280
MV3292A4A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/30	S41Y7771/10	S20X4321/20	S82028/280
MV3364A4A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/10	S41Y7771/70	S20X4321/20	S82028/280
MV3449A4A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/10	S41Y8082/10	S20X4321/20	S82028/280
MV3503A4A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/20	S41Y8082/20	-	S82028/280
MV3566A4A1	7	-	-	-	-	-	-	-
480 V								
MV3052A5A1	3	S41Y7784/40	S41Y7786/10	S41Y7782/30	-	-	S20X4320/20	S82030/366
MV3065A5A1	3	S41Y7784/40	S41Y7786/10	S41Y7782/30	-	-	S20X4320/20	S82030/366
MV3077A5A1	4	S41Y7784/40	S98101/153	S41Y8008/40	-	-	S20X4320/20	S82028/240
MV3096A5A1	4	S41Y7784/40	S98101/153	S41Y8008/40	-	-	S20X4320/20	S82028/240
MV3124A5A1	4	S41Y7784/40	S98101/153	S41Y8008/50	-	-	S20X4320/20	S82028/240
MV3156A5A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/80	S41Y7771/50	S20X4320/20	S82028/240
MV3180A5A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/80	S41Y7771/50	S20X4321/30	S82028/240
MV3240A5A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/80	S41Y7771/60	S20X4321/30	S82028/240
MV3302A5A1	6	S41Y7784/40	SMV98101/151	-	S41Y7770/20	S41Y7771/40	S20X4321/30	S82028/240
MV3361A5A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/40	S41Y8082/30	S20X4321/30	S82028/270
MV3414A5A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/50	S41Y8082/30	S20X4321/30	S82028/270
MV3477A5A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/60	S41Y8082/40	S20X4321/30	S82028/270

MicroCubicle	Frame	Control Module	Fan	Rectifier Module	Transistor - Transistor Module	Rectifier- Transistor Module	SMPS (Switch Mode Power Supply)	Precharge Fuses (3 off Req'd)
600/690 V								
MV3062A6A1	4	S41Y7784/40	S98101/153	S41Y8008/60	-	-	S20X4321/10	S82028/240
MV3077A6A1	4	S41Y7784/40	S98101/153	S41Y8008/60	-	-	S20X4321/10	S82028/240
MV3099A6A1	4	S41Y7784/40	S98101/153	S41Y8008/60	-	-	S20X4321/10	S82028/240
MV3125A6A1	6	S41Y7784/40	SMV98101/151	-	S41Y8036/40	S41Y8045/40	S20X4321/10	S82028/260
MV3144A6A1	6	S41Y7784/40	SMV98101/151	-	S41Y8036/40	S41Y8045/30	S20X4321/10	S82028/260
MV3192A6A1	6	S41Y7784/40	SMV98101/151	-	S41Y8036/30	S41Y8045/20	S20X4321/10	S82028/260
MV3242A6A1	6	S41Y7784/40	SMV98101/151	-	S41Y8036/10	S41Y8036/10	S20X4321/10	S82028/260
MV3289A6A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/70	S41Y8082/50	S20X4321/10	S82028/270
MV3336A6A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/70	S41Y8082/60	S20X4321/10	S82028/270
MV3382A6A1	7	S41Y7784/40	SMV98101/151	-	S41Y8081/80	S41Y8082/60	S20X4321/10	S82028/270

6.2 Precharge Fuses

Data for precharge fuses is shown below. The data is given here in addition to the part numbers shown in Section 6.1 to allow local purchase of fuses, which may be helpful during commissioning. Replacing these fuses with another rating or type will invalidate safety approvals.

Frame size	Fuse rating A	Fuse type (Qty. 3)
400 V		
3	2	Bussmann KTK-2
4	4	Bussmann KTK-4
6	6	Bussmann KTK-6
7	6	Bussmann KTK-6
480 V		
3	2	Littelfuse KLKD002.T
4	3	Bussmann KTK-3
6	3	Bussmann KTK-3
7	5	Bussmann KTK-5
600/690 V		
4	3	Bussmann KTK-3
6	4	Bussmann KTK-4
7	5	Bussmann KTK-5

7. Fax Enquiry Form

Should you have any problems selecting your ALSPA MV3000 or options, please fill in as many questions as possible in the following form and fax it to your local ALSTOM Power Conversion Sales Office or Representative.

If you consider that any of the items are not applicable, just leave them blank.

We will be able to determine the drive type and any necessary options from the information that you provide. However, if there is any other information you consider relevant, or know that you may need a particular option, please add this information in the space at the bottom of the form or add further sheets as necessary.

ALSPA MV3000 - FAX ENQUIRY FORM

To: _____ Fax: _____ Page 1 of _____

From: Name / Position		
Company		
Company Address		
Phone:	Fax:	Email Address:

AC Induction Motor Nameplate Details		• Motor Base Speed	rpm
• Motor Power	kW/HP	• Motor FLC Amps	A
• Motor Volts	V	• Motor Base Frequency	Hz
• Power Factor		• Cable Length	m

Mains Network Supply Details			
• Supply Voltage	V AC	• Supply Frequency	Hz

Application		• Maximum speed of application	rpm
• Centrifugal Pump or Fan?	Yes/No	• Duty Cycle (Add diagram)	
If No: describe		• Requirement for low speed running	Yes/No
• Overload Magnitude/Duration	% / sec	• Encoder Line Count	ppr

Environmental Details	
• Is the drive installed in a normal industrial environment? Yes/No	
- If No: describe	

Ambient Conditions	
• Maximum Ambient Temperature	• Altitude
• Air Quality e.g. contaminants, humidity	• Acoustic Noise Limit
	dBa @ 1m

Driven or overhauling load?	
• Is the motor linked to any other driven machinery, or does it hold the load against gravity? Yes/No	
- If yes, details required:	
• Does the slow down or stop time matter? Yes/No	
- If yes, what ramp time or rate required : _____ - What is the load inertia:	
• Is precise speed control required, e.g. speed matching? If yes, to what accuracy?	

Supply Harmonics	
• Specify if supply harmonics of concern?	
• Is the total load of existing inverters more than 50% of the LV supply feeder?	

Communication Requirements	
• Is there a Serial Communication or Fieldbus link?	If yes, Protocol:

Other Requirements
Please list any other information, which you may consider relevant. Add further sheets as necessary.

8. Appendix

8.1 Documentation

T1676	MV3000 Getting Started Guide (3 Language Set)
T1676DE	MV3000 Getting Started Guide (German)
T1676EN	MV3000 Getting Started Guide (English)
T1676FR	MV3000 Getting Started Guide (French)
T1679DE	MV3000 Software Technical Manual (German)
T1679EN	MV3000 Software Technical Manual (English)
T1679FR	MV3000 Software Technical Manual (French)
T1684DE	MV3000 Dynamic Braking Units MV3DB Series (German)
T1684EN	MV3000 Dynamic Braking Units MV3DB Series (English)
T1684FR	MV3000 Dynamic Braking Units MV3DB Series (French)
T1686DE	MV3000 Direct FIP Technical Manual (German)
T1686EN	MV3000 Direct FIP Technical Manual (English)
T1686FR	MV3000 Direct FIP Technical Manual (French)
T1689	MV3000 Delta Installation Manual (English only)
T1691	MV3000 Demonstration Case User Guide
T1692	ALSPA Drive Coach Quick Start Guide Pack
T1692EN	ALSPA Drive Coach User's Guide (English)
T1693	ALSPA MV DELTA Liquid Cooled System Tech Manual (English)
T1694DE	MV3000 Profibus Manual (German)
T1694EN	MV3000 Profibus Manual (English)
T1694FR	MV3000 Profibus Manual (French)
T1698	MV3000 12 Pulse Adapter Unit Tech Manual Set
T1698EN	MV3000 12 Pulse Adapter Unit Tech Manual (English)
T1699EN	ALSPA MV3000 Buyer's Guide (English)
T1915DE	MV3000 Keypad instruction sheet (German)
T1915EN	MV3000 Keypad instruction sheet (English)
T1915FR	MV3000 Keypad instruction sheet (French)
T1916DE	MV3000 Keypad mounting kit instruction sheet (German)
T1916EN	MV3000 Keypad mounting kit instruction sheet (English)
T1916FR	MV3000 Keypad mounting kit instruction sheet (French)
T1917DE	MV3000 FIP Cable instruction sheet (German)
T1917EN	MV3000 FIP Cable instruction sheet (English)
T1917FR	MV3000 FIP Cable instruction sheet (French)
T1921DE	MV3000 Ferrite Ring Assembly Instruction sheet (German)
T1921EN	MV3000 Ferrite Ring Assembly Instruction sheet (English)
T1921FR	MV3000 Ferrite Ring Assembly Instruction sheet (French)
T1922DE	MV3000 DC Link Inductors Instruction sheet (German)

T1922EN	MV3000 DC Link Inductors Instruction sheet (English)
T1922FR	MV3000 DC Link Inductors Instruction sheet (French)
T1923DE	ALSPA MV3000 12 Pulse Adapter User Manual (German)
T1923EN	ALSPA MV3000 12 Pulse Adapter User Manual (English)
T1923FR	ALSPA MV3000 12 Pulse Adapter User Manual (French)
T1924DE	Conversion Kit MV Delta to GD Delta (German)
T1924EN	Conversion Kit MV Delta to GD Delta (English)
T1924FR	Conversion Kit MV Delta to GD Delta (French)
T1925	Instruction Sheet for MV3000 FS3 Installation (English)
T1926	Instruction Sheet for MV3000 FS4 Installation (English)
T1927	Instruction Sheet for MV3000 FS6 Installation (English)
T1928	Ferrite Assembly Instruction Sheet for FS6 & FS7
T1929	Instruction Sheet for MV3000 FS7 Installation (English)
T1930	DELTA Mains Voltage Monitor Unit Instruction Sheet Pack
T1930DE	DELTA Mains Voltage Monitor Unit Instruction Sheet (German)
T1930EN	DELTA Mains Voltage Monitor Unit Instruction Sheet (English)
T1930FR	DELTA Mains Voltage Monitor Unit Instruction Sheet (French)

8.2 Equipment List and Price Fill-In Sheet

Photocopy as required

Enquiry Number: _____

Customer: _____

Project: _____ Drive Reference: _____

ITEM NUMBER	GENERIC DESCRIPTION	PRICE
Basic Configuration		
	ALSPA MV3000 MicroCubicle™ Inverter Drive	
	Line Filter	
	Drive Data Manager™	
	Fan Fuses	
Extended Requirements and Options		
	DC Link Choke	
	12 Pulse Adapter Unit	
	Interbridge Transformer	
	12 Pulse Transformer	
	Dynamic Braking Unit	
	Dynamic Braking Resistor	
	EMC Filter	
	EMC Ferrite	
	FIP Fieldbus Module	
	FIP Fieldbus Cable	
	FIP Link AC Earth Connector	
	Profibus Module	
	Drive Data Manager™ Lead and Door Mounting Kit	
	ALSPA Drive Coach PC Programming Tool	
	PC Programming Lead	
Recommended Spares		
	Control Module	
	Fan	
	Rectifier Module	
	Transistor - Transistor Module	
	Rectifier - Transistor Module	
	Switch Mode Power Supply	
	Precharge Fuses	
Other Items		

TOTAL

