

# Chapter 1 Product Overview

## INTRODUCTION

This manual provides the necessary information to plan, install and commission the 620 Vector series drives.

**IMPORTANT:** Motors used must be suitable for inverter duty.

## Division of Information

This manual comprises eight chapters, plus appendices.

- Chapter 1 summarises the 620 Vector drive's electrical and mechanical specifications.
- Chapter 2 covers the planning required prior to installing a 620 Vector drive.
- Chapter 3 describes the mechanical and electrical procedures for installing a 620 Vector drive.
- Chapter 4 shows how to commission an installation and how to adapt the 620 Vector drive to the motor/application.
- Chapter 5 describes the function blocks.
- Chapter 6 lists the diagnostic facilities built into the drive.
- Chapter 7 EMC and the 'CE' mark, explains how Eurotherm are assisting their customers in achieving European conformance.
- Chapter 8 contains routine maintenance and repair information.
- Chapter 9 Appendices.

This manual contains the information required to set up a motor drive system which automatically tunes itself to the motor and provides control of speed, ramp up and down times and similar functions. The 620 Vector series provides a further host of sophisticated programming options as standard.

## GENERAL DESCRIPTION

The 620 Vector drive allows high performance speed control of AC asynchronous induction motors fitted with an encoder. It is available with a range of power ratings in three variants:

**620STD** STANDARD for use in systems incorporating analogue setpoints and logic control systems.

**620COM** As above with the addition of a Serial port for use in Eurotherm Drives serial protocols and a reference encoder input for phase control applications.

**620L** As above with the addition of a Link co-processor, LINK fibre optic ports for use in Eurotherm Drives LINK fibre-optic based networks. This drive is programmed using ConfigEd Release 4.0+ available and documented separately.

This manual only covers the 620Std and the hardware / software differences for the 620. For more information on the 620L refer to Link documentation.

## PRODUCT RANGE

The 620 is available in four chassis types as follows:

CHASSIS	POWER (208 to 240 volts)	POWER (380 to 460 volts)
TYPE 4	0.75 - 4.0kW;	0.75 - 7.5kW
TYPE 5	5.5 - 7.5kW;	1.0 - 15.0kW
TYPE 6	11 - 18kW;	8.0 - 37.0kW
TYPE 7	22 - 37kW;	5.0 - 75.0kW
TYPE 8*		90 - 132kW
TYPE 9		160 - 200kW
TYPE 10		250 - 280kW

Table 1.1 620 Vector Drive variants

The 620 models are housed in chassis of similar appearance with a 32 character Man-Machine Interface (MMI) - an alphanumeric display utilising multi-level menus to present all parameters, diagnostics and alarms (refer to

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\* Documented separately in HA463284 584s/620 Type 8,9,10 Manual Addendum

# 1-2 Product Overview

Figure 1.1). The chassis size increases with power rating. The models are further identified by the product code, refer to "**PRODUCT CODE**" in this chapter.

## Optional Equipment

The following equipment options are available for the 620 Vector Drives:

1. Dynamic Braking Module (fitted internally). This is a factory fitted option and usually fitted as standard
2. UL Type 1 Top Cover.
3. Glandbox.

## COMPONENT IDENTIFICATION

This manual refers to various connector terminals within the equipment which are accessible to the user for installation purposes. An exploded view of a 620 Vector Drive is shown in Figure 1.1.

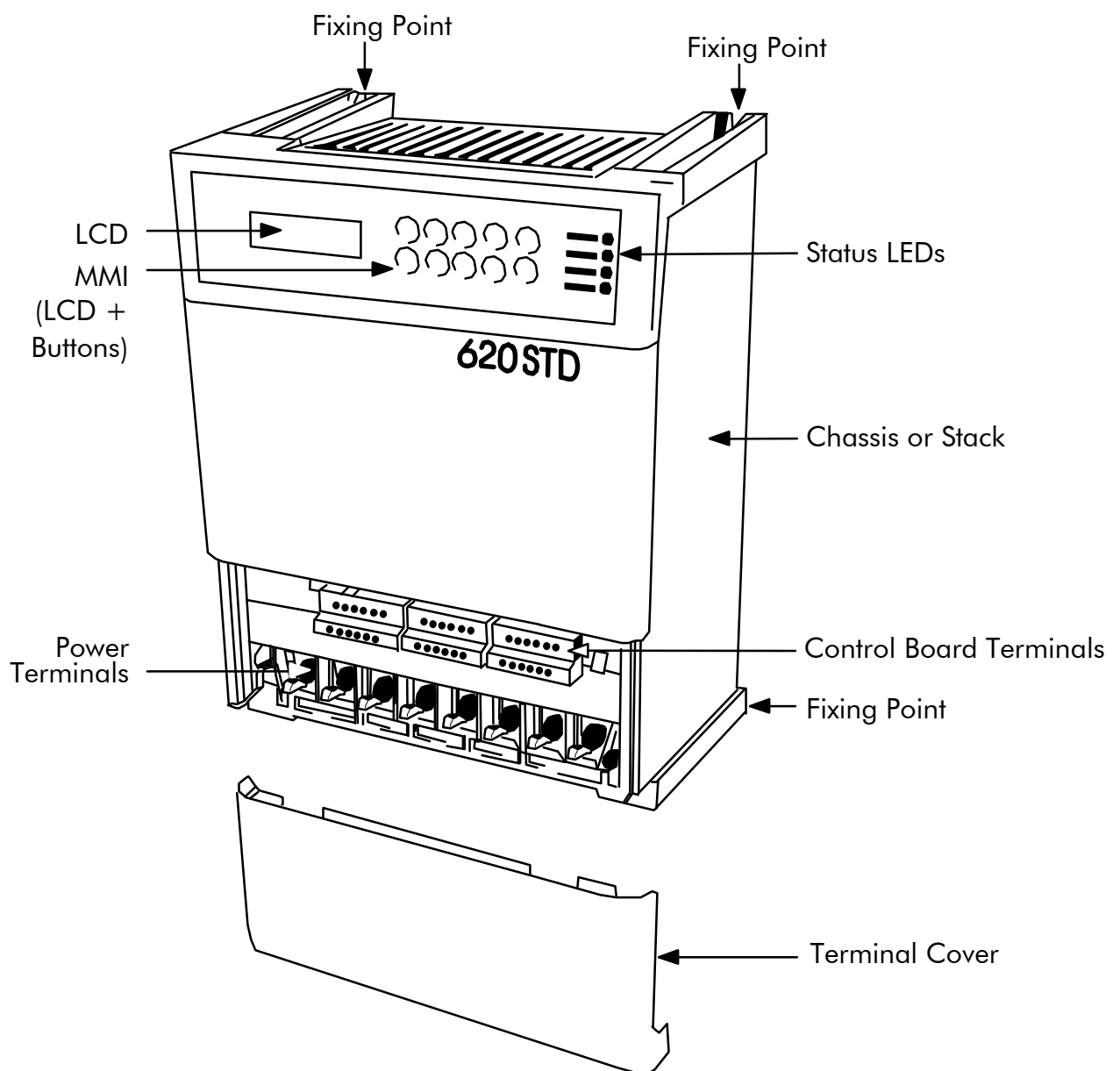


Figure 1.1 - 620 Vector Drive Exploded View

**TECHNICAL SPECIFICATION**

The following paragraphs provide technical information regarding the features and performance characteristics of the 620 Vector Drives.

**General**

The MMI display menus provides full access to all the drive's parameters.

Output Frequency	0-240Hz (for higher frequencies contact Eurotherm Drives Technical Support).
Switching Frequency	5 or 3kHz depending on type
Preset Speeds	8
Overload rating	150% for 60s
Speed control range	0-8 x base speed, 1000:1 of max. speed
Speed control precision	$\pm 0.01\%$ steady state of max. setpoint (digital setpoint) $\pm 0.1\%$ steady state of max. setpoint (analogue setpoint).
Speed ref. resolution	$\pm 0.01\%$ digital $\pm 0.025\%$ analogue (12 bit)
Stopping Modes	Ramp, Fast stop, Coast

**Protection**

The 620 Vector series drives will trip under the following conditions:

- Short circuit line - line
- Short circuit line - earth
- Earth fault
- Overcurrent >220%
- Overvoltage
- Undervoltage
- Stall
- Overspeed
- 5703 repeater error
- External trip
- Heatsink overtemperature
- Motor thermistor overtemperature

**Diagnostics and monitoring**

Full diagnostics/monitoring is provided by the MMI display and status LEDs.

**Inputs and Outputs**

The following range of inputs and outputs are provided:

- 5 Analogue Inputs (4 programmable)
- 2 Analogue Outputs (both programmable)
- Digital Inputs (24V DC) for Run, Fast Stop, Coast Stop, Jog, Enable, Ramp Hold, Preset 1, 2, and 3 (the last 4 inputs are programmable).
- Three programmable digital outputs are provided (24V DC).
- A 24V DC supply is available for interfacing external digital inputs.
- A +10V and -10V DC supply is available for interfacing external analogue inputs.
- 2 or 4 wire RS-485 serial communications.

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## Electrical Ratings - Power Circuit

### Input Voltage 380V to 460V\* $\pm 10\%$ , 50/60Hz

	TYPE 4							TYPE 5		TYPE 6				TYPE 7		
Power (kW)	0.75	1.1	1.5	2.2	4.0	5.5	7.5	11	15	18	22	30	37	45	55	75
Input Current (A)	3.0	4.5	6.0	8.0	11	15	18.0	25	31	40	46	61	72	91	110	150
Output Current (A)	2.3	3.3	4.5	6.3	9.4	13	16	24	30	39	46	61	72	91	110	150
Input power factor	0.95							0.86								
Input Fuse/(Circuit Breaker) (A)	10				15	20		40 <sup>1</sup>	40 <sup>1</sup>	50 <sup>1</sup>	63 <sup>1</sup>	100 <sup>1</sup>	125 <sup>1</sup>	160 <sup>1</sup>	200 <sup>1</sup>	
Approx. loss (W)	60	70	85	110	150	200	250	350	400	550	630	820	1050	1300	1600	2200
Switching Frequency	5kHz													3kHz		

### Input Voltage 208V to 240V\* $\pm 10\%$ , 50/60Hz

	TYPE 4					TYPE 5		TYPE 6			TYPE 7		
Power (kW)	0.75	1.1	1.5	2.2	4.0	5.5	7.5	11	15	18	22	30	37
Input Current (A)	5.5	7.5	9.5	12	19	25	31	46	61	72	86	120	145
Output Current (A)	4.3	6	8	10.5	17	24	30	46	61	72	86	120	145
Input p.f.	0.95				0.86								
Input Fuse/(Circuit Breaker) (A)	10		15	20		40 <sup>1</sup>	40 <sup>1</sup>	63 <sup>1</sup>	100 <sup>1</sup>		125 <sup>1</sup>	160 <sup>1</sup>	200 <sup>1</sup>
Approx. loss (W)	70	90	100	130	210	270	360	510	680	830	980	1300	1600
Switching Frequency	5kHz											3kHz	

### Common data

	TYPE 4	TYPE 5	TYPE 6	TYPE 7
Output Voltage (max)	Input Voltage			
Output Overload	150% for 60s			
Output Frequency	0 to 240Hz			
Ambient Operating Temperature Range	0 to 50°C 0 to 40°C for 2.2kW (380 - 460V)			
UL Type 1	0 to 40°C			
Earth Leakage Current	> 50mA AC. Permanent Protective Earthing Required			

(\* Suitable for earth referenced (TN) and non earth referenced (IT) supplies.)

Table 1-2 - 620 Electrical Specifications

Note:-

<sup>1</sup> For installations requiring UL compliance, short circuit protection Semiconductor Fuses should be installed in the 3-phase supply to the 620 products. These fuses are suitable for branch circuit short-circuit protection of the solid-state motor controllers only. For installations NOT requiring UL compliance, use class "T" fuses or a circuit breaker.

## Electrical Ratings - Control Circuit

The following ratings relate to all 620 variants.

### Supplies

Reference Supplies (for all analogue inputs)	+10V $\pm$ 0.1V, 10mA max - 10V $\pm$ 0.1V, 10mA max
Supply (for all digital inputs)	+24V $\pm$ 10%, 200mA max. This is in addition to the digital outputs.

Table 1-3 Reference Inputs

### Analogue I/O

	INPUT	OUTPUT
Impedance	100k $\Omega$	Min load 3k $\Omega$ to 0v
Range	$\pm$ 10V	$\pm$ 10V
Resolution	12 bit (1 in 4096) + sign Approx. 2.5mV resolution	12 bit (1 in 4096) + sign
Sample Rate	Synchronous with block diagram  Terminal C4 (Direct I/P) 1.1mS. (1.76mS for drive sizes 7 and upwards.)	Synchronous with block diagram
Current (max.)	1mA	3mA

Table 1-4 Analogue Interface Specification

### Digital Inputs

Input voltage	Nominal 24V DC, Max. +30V DC
Input impedance	4k7 $\Omega$
Sample Rate	Synchronous with block diagram
Threshold	V <sub>low</sub> < +6V DC Typical +12V DC V <sub>in high</sub> > +18V DC

Table 1-5 Digital Inputs

### Digital Outputs

Digital outputs are open circuit when Off. The On specification is shown in Table 1-7.

On Voltage	+24V $\pm$ 10%
Maximum On Current	50mA (Source)
Short Circuit Duration	Indefinite

Table 1-6 Digital Outputs

# 1-6 Product Overview

## Pilot Output

Pilot output is an open collector output that is off while the drive is healthy. The specification is shown in Table 1-7.

Open Collector 0V to 24V	50mA (Current Sink).
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Table 1-7 Pilot Output

## Encoder Inputs

Input Voltage	-30V to +30V differential
Input Threshold Voltage	4V $\pm$ 1V DIL 7-12 switch on 9V $\pm$ 1V DIL 7-12 switch off
Input Current	10mA $\pm$ 3mA
Maximum Input Frequency	250kHz on each of A and B $MaxFreq = \frac{MaxSpeedRPM}{60} * NoOfLines$

Table 1-8 Control Terminal Specifications

## Encoder Supply Output

Output Voltage	10 - 21V (0 to 200mA load) 16V $\pm$ 1V (Recommended load). The Output Voltage may be set by altering the variable "Setup Parameters::Calibration::Encoder Supply".
Recommended Load Current	50 - 200mA
Short Circuit Duration	Indefinite

Table 1-9 Encoder Supply Output Specifications

## Serial Interface

Voltage Levels	RS-485
Isolation from other terminals	> 1M $\Omega$
Max. withstand voltage to any other control terminal	30v RMS

Table 1-10 Encoder Supply Output Specifications

## Mechanical Details

The mechanical details of all the 620 vector series controllers are shown in Tables 1-11 to 1-14. The general layout of the cases is shown in Chapter 3.

### 620 TYPE 4

DIMENSIONS	Refer to figure 3.1
MOUNTING ORIENTATION	Vertical
WEIGHT	8kg max.
AIR FLOW CLEARANCE	Refer to figure 3.1
POWER TERMINATIONS	M5 slotted screws. Tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft).
EARTH (GROUND) TERMINATIONS	<b>Gland box not fitted:</b> 2 x M4 bolt and washer, tightening torque 1.3Nm (11.5lb-in, 0.9lb-ft) and M5 slotted screw and washer, tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft). <b>Gland box fitted:</b> 2 x M5 stud, nut and washer, tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft) and M5 slotted screw and washer, tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft).
CONTROL TERMINATIONS	Removable screw connectors for 0.75mm <sup>2</sup> wire. Terminals will accept up to 3.3mm <sup>2</sup> wire (12 AWG). Tightening torque 0.56-0.79Nm (5-7lb-in, 0.42-0.58lb-ft).
	Spring terminal connectors. Terminals will accept up to 0.8mm <sup>2</sup> wire (18 AWG).

Table 1-11 620 type 4 mechanical details

### 620 TYPE 5

DIMENSIONS	Refer to figure 3.1
MOUNTING ORIENTATION	Vertical
WEIGHT	12kg
AIR FLOW CLEARANCE	Refer to figure 3.1
POWER TERMINATIONS	M5 slotted screws. Tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft).
EARTH (GROUND) TERMINATIONS	<b>Gland box not fitted:</b> 2 x M5 nut and washer, tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft). <b>Gland box fitted:</b> 2 x M5 stud, nut and washer, tightening torque 2.5Nm (22.1lb-in, 1.8lb-ft).
CONTROL TERMINATIONS	Removable screw connectors for 0.75mm <sup>2</sup> wire. Terminals will accept up to 3.3mm <sup>2</sup> wire (12 AWG). Tightening torque 0.56-0.79Nm (5-7lb-in, 0.42-0.58lb-ft)
	Spring terminal connectors. Terminals will accept up to 0.8mm <sup>2</sup> wire (18 AWG).

Table 1-12 620 type 5 mechanical details

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## 620 TYPE 6

DIMENSIONS	Refer to figure 3.1
MOUNTING ORIENTATION	Vertical
WEIGHT	31kg
AIR FLOW CLEARANCE	Refer to figure 3.1
POWER AND EARTH (GROUND) TERMINATIONS	Compact high current terminal blocks. Terminals accommodate wire range 0.8 - 53.5mm <sup>2</sup> (18 - 1/0 AWG). Tightening torque 3.4 - 5.6Nm (30 - 50lb-in, 2.5 - 4.2lb-ft).
CONTROL TERMINATIONS	Removable screw connectors for 0.75mm <sup>2</sup> wire. Terminals will accept up to 3.3mm <sup>2</sup> wire (12 AWG). Tightening torque 0.56 - 0.79Nm (5-7lb-in, 0.42-0.58lb-ft).
	Spring terminal connectors. Terminals will accept up to 0.8mm <sup>2</sup> wire (18 AWG).

Table 1-13 620 type 6 mechanical details

## 620 TYPE 7

DIMENSIONS	Refer to figure 3.1
MOUNTING ORIENTATION	Vertical
WEIGHT	83kg
AIR FLOW CLEARANCE	Refer to figure 3.1
POWER AND EARTH (GROUND) TERMINATIONS	<p>(a) Supply (L1-3), Motor (M1-3), Brake (DB1,2) terminals: Compact high current terminal blocks. Terminals accommodate wire range 33.6-107.2mm<sup>2</sup> (2-4/0 AWG) Tightening torque 20Nm (175lb-in, 14.6lb-ft).</p> <p>(b) D.C. interconnection terminals (DC+, DC-): Compact high current terminal blocks. Terminals accommodate wire range 33.6-152mm<sup>2</sup> (2AWG-300kcmil (MCM)) Tightening torque 30.5Nm (270lb-in, 22.5lb-ft)</p> <p>(c) Earth (ground) <math>\oplus</math> : Compact high current terminal blocks. Terminals accommodate wire range 33.6-107.2mm<sup>2</sup> (2-4/0 AWG) tightening torque 22.6Nm (200lb-in, 16.7lb-ft).</p>
CONTROL TERMINATIONS	Removable screw connectors for 0.75mm <sup>2</sup> wire . Terminals will accept up to 3.3mm <sup>2</sup> wire (12 AWG). Tightening torque 0.56-0.79Nm (5-7lb-in, 0.42-0.58lb-ft).
	Spring terminal connectors. Terminals will accept up to 0.8mm <sup>2</sup> wire (18 AWG).

Table 1-14 620 type 7 mechanical details

## ENCLOSURE

IP20 (as standard), to be built into a suitable cubicle.

IP40 (with UL Type 1 top cover) Type 4,5,6 and 7 only, suitable for wall mounting in Europe.

## EMC Specification

Refer to Chapter 7.



**HIGH POWER AC (types 8, 9 and 10)**

HPAC Product Manual HA463284 details the technical specification of these builds, the following is for information only.

**Electrical Ratings - Power Circuits (620 Constant Torque)**

	TYPE 8			TYPE 9			TYPE 10	
Input Voltage	380V to 460V <sup>1</sup> ±10%, 50/60Hz							
Product Code Block 2	0900	1100	1320	1600	1800	2000	2500	2800
Nominal Motor Power (kW) @ 380V	90	110	132	160	180	200	250	280
Nominal Motor Power (kW) @ 415/440V	90	110	150	185	200	220	280	315
Motor Power (Hp) @ 460V (as specified within NEC/NFPA-70)	150	150	200	250	300	300	400	450
Output Current (A)	180	216	250	316	361	375	480	520
Input Current (A) <sup>23</sup>	180	220	260	320	360	400	490	550
Fundamental Input Power Factor	0.95							
Input Bridge I <sup>2</sup> t	245 000 A <sup>2</sup> s			813 000 A <sup>2</sup> s				
Fuse Rating/Circuit Breaker <sup>4</sup> (A)	200	250	300	350	400	450	550	600
Approx. loss @ 3kHz (kW)	2.4	2.9	3.5	4.3	4.8	5.4	6.7	7.5
Switching Frequency	3kHz							
Output Voltage (max)	Input Voltage							
Output Overload	150% for 60 seconds							
Output Frequency	0 to 120Hz							
Fan Inlet temperature Range	0 to 40°C							
IP Rating	IP20 Enclosure IP00 power terminals							
Earth Leakage Current	>>100mA. Product must be permanently earthed							

Table 1-15

<sup>1</sup> Suitable for earth referenced (TN) and non earth referenced (IT) supplies

<sup>2</sup> **IMPORTANT: 3% line impedance MUST be provided for each module**, and is assumed in the quoted input current values. Failure to do so will severely curtail DC link capacitor lifetime and could result in damage to the input bridge.

<sup>3</sup> Input current quoted is for 380V supply at the stated motor power. Motor efficiency of 93% is assumed

<sup>4</sup> Short circuit protection Semiconductor Fuses should be installed in the 3-phase supply to the drive module to protect the input bridge. Circuit breakers or HRC fuses will not protect the input bridge.

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## Special Considerations For Installations Requiring Compliance with UL Standards

### Motor Overload Protection

An external motor overload protective device must be provided by the installer.

Motor overload protection is provided in the controller by means of the thermal device in the motor winding. This protection cannot be evaluated by UL hence it is the responsibility of the installer and/or the local inspector to determine whether the overload protection is in compliance with the National Electrical Code or Local Code requirements.

### Branch Circuit/Short Circuit Protection Requirements

#### Model 620 Type 4 Series

UL Listed (JDDZ) non-renewable cartridge fuses or UL Listed (JDRX) renewable cartridge fuses, rated 300Vac or 600Vac as appropriate (depending on the rated input voltage of the drive), must be installed upstream of the drive. For fuse current ratings, see Chapter 1 “Electrical Ratings - Power Circuit”.

#### Model 620 Type 5 and 6 Series

UL Recognized Component (JFHR2) semiconductor fuses must be installed upstream of the drive. For fuse current ratings, see Chapter 1 “Electrical Ratings - Power Circuit”. Refer to Table 1-16 below for recommended semiconductor fuse manufacturer and model numbers.

Fuse Current Rating	Bussmann Model No.
40A	170M3808
50A	170M3809
63A	170M3810
100A	170M3812
125A	170M3813

Table 1-16 - Bussmann International Fuses (Rated 660Vac)

#### Model 620 Type 7 Series

These devices are provided with solid state short circuit (output) protection. Branch circuit protection should be provided as specified in the National Electrical Code, NEC/NFPA-70.

### Short Circuit Ratings

#### Model 620 Type 4, 5, 6 Series.

Suitable for use on a circuit capable of delivering not more than 5000 RMS Symmetrical Amperes, 240/460V maximum.

#### Model 620 Type 7 Series.

Suitable for use on a circuit capable of delivering not more than (the value shown in Table 1- 17) RMS Symmetrical Amperes, (the value of rated voltage shown in Table 1- 17)V maximum.

Output Rating - kW	Rated Voltage - V	Short Circuit Rating RMS Symmetrical Amperes
22 - 37	208 - 240	5,000
45 - 75	380 - 460	10,000

Table 1-17

### Field Wiring Temperature Rating

Model 620 Type 4, 5, 6 Series - Use 60°C copper conductors only.

Model 620 Type 7 Series - Use 75°C copper conductors only.

### Motor Base Frequency

The motor base frequency rating is 240Hz maximum.

### Operating Ambient Temperature

For operating ambient temperature range, see “**Electrical Ratings - Power Circuit**” on page 1-4

### Environmental Rating

Model 620 Type 4, 5, 6, 7 Series with a Product Code Block IV designation xx2x are suitable for direct wall-mounting as they have a “Type 1 Enclosure” rating.

In order to preserve this enclosure rating, it is important to maintain the environmental integrity of the enclosure. The installer must provide correct Type 1 closures for all unused clearance/knockout holes within the drive glandbox.

Additionally, in order to preserve the "Type 1 Enclosure" rating for 620 Type 7 models, the installer must ensure that the blanking plates are fitted to the ventilation apertures provided within the glandbox.

## Environmental Requirements

The environmental limits for the 620 Vector series controllers are shown in Table 1-18.

Humidity (max.)	85% relative humidity (non-condensing) at 40°C
Altitude	Above 1000m derate power by 1% per 100m up to a maximum 5000m
Atmosphere	Non flammable, non corrosive and dust free (Pollution Degree 2)
Operating temperature range	0°C to 50°C 0°C to 40°C UL Type 1 option fitted
Storage temperature	Minimum -25°C to maximum +55°C
Transport temperature	Minimum -25°C to maximum +70°C
Enclosure	IP20 (direct conduit connection and UL Type 1 options)
Climatic Conditions	Class 3k3 as defined by EN50178 (1998)
Pollution Degree	2
Installation / Overvoltage Category	3

Table 1-18 620 Series environmental requirements

## Product Code

All 620 units are fully identified using an eleven block alphanumeric code, as shown in figure 1-2. This code details the drive calibration and settings on despatch from the factory. The product code appears as the "Model No." on the rating label at the side of the unit.

Example Code	620STD	/0750	/400	/0010	/UK	/ENW	/0000	/000	/B1	/000	/000
Block Number	1	2	3	4	5	6	7	8	9	10	11

Figure 1-2 Product code blocks

Details of each block of the product code are given in Table 1-19.

Block No.	Variable	Description
1	620STD 620COM 620L 620ADV	620 Vector Standard 620 Vector Communications 620 Vector Link 620 Advance Drive (not available for new designs)
2	0007 0011 0015 0022 0040 0055 0075 0110 0150 0180 0220 0300 0370 0450 0550 0750	Four numbers specifying the power rating in kW 0.75 kW 1.1 kW 1.5 kW 2.2 kW 4.0 kW 5.5 kW 7.5 kW 11 kW 15 kW 18 kW 22 kW 30 kW 37 kW 45 kW (380-460V only) 55 kW (380-460V only) 75 kW (380-460V only)

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Block No.	Variable	Description
3	230 400	Three numbers specifying the nominal input voltage rating 208 to 240V ( $\pm 10\%$ ) 50/60Hz 380 to 460V ( $\pm 10\%$ ) 50/60Hz
4	00xx 01xx-99xx  xx1x xx2x  xx3x xx5x xx6x  xxx0	Four digits specifying the mechanical package including livery and mechanical package style  First two digits: Livery Standard Eurotherm Drives livery Defined customer liveries  Third digit: Mechanical packaging style Standard (IP20), protected panel mounting IP20 and falling dirt protection (UL Type1) with glandplate cable entry Enclosed (IP20), through panel mounting IP20 with falling dirt protection only IP20 with glandcable entry only Note: Option 3 applies to type 7 power ratings only.  Fourth digit: Operator Station Standard product (always 0) - Built in MMI
5	UK US	Two characters specifying the user interface language These characters are the same as used for computer keyboard specifications: English 50Hz default English 60Hz default
6	ENW	Three characters specifying any feedback option installed over and above the standard features of the product, e.g. Encoder (Wire-ended)
7	0000 N/A	Four characters specifying the communications protocol and its hardware implementation method No communications options fitted Indicates the particular communications option
8	000 N/A	Three characters specifying any optional loaded software No software options loaded Indicates the particular software option
9	00 B0  B1	Two characters specifying the braking option Brake power switch not fitted Brake power switch fitted - no braking resistors supplied Brake power switch fitted and default value braking resistors supplied <b>(recommended)</b> Note: Extra braking resistors can be specified and ordered separately
10	000 TBA	Three characters specifying the aux supply required No aux supply option fitted Code for the filtering option installed
11	000 nnn	3 digits specifying engineering special options: No special options Code for the special engineering option installed

Table 1-19 - Product Code Block Descriptions

**Example Code:**

620STD/0750/400/0010/UK/ENW/0000/000/B1/000/000

This code indicates a drive, which is:

- a 620 Standard product
- 75kW power rating
- 380-460v input supply
- Eurotherm Drives livery
- Enclosed mechanical package (IP20)
- No additional optional operator station
- UK language
- Wire-ended 15V encoder option
- No optional communications
- No optional loaded software
- Brake switch fitted with default value resistors supplied
- No aux supply option fitted
- No special options.



## Chapter 2 Pre-Installation Planning

### INTRODUCTION

This chapter contains a functional description of the 620 Vector Drive to enable a sound understanding of the system, and notes for consideration prior to installation.

### FUNCTIONAL OVERVIEW

The 620 Vector enables very high performance control of 3-phase AC induction motors fitted with a compatible encoder. It offers the user great system flexibility, allowing easy integration into various control schemes. The plain language Man-Machine Interface (MMI) greatly simplifies setting up and commissioning the 620 Vector.

A simplified block diagram of a 620 is shown in Figure 2.13. This illustrates the basic internal arrangement of the drive with the circuitry split between the control circuits and power circuits.

The control circuits are common to all types of the 620 Vector Drive.

Chassis types 5 and 7 use a slightly different power circuit from types 4 and 6. The general principles of operation remain the same, however.

### Control Circuits and Software

The control circuits and software element contain the intelligence of the 620 Vector series. They comprise a sophisticated microprocessor system with digital and analogue inputs and outputs, the MMI and circuits to interface between the microprocessor and the inverter circuits.

Speed feedback signals from the motor shaft encoder are processed by the microprocessor to determine the rotational speed of the shaft. An PI algorithm within the software uses this information to produce varying gate drive signals to the inverter circuits. These signals cause the inverter to output the required voltage and frequency for a particular motor speed.

Analogue inputs to the microprocessor are digitised and can be used to set parameters such as speed.

Digital inputs to the microprocessor signal various commands and conditions such as stop, start and required direction of rotation.

Digital outputs from the microprocessor (e.g. Health) can be used by external control equipment.

A detailed block diagram of the logical blocks which comprise the control circuits and software is shown in Figure 2.13.

### Power Circuits

The 3-phase supply input on terminals L1, L2 and L3 is rectified to give a DC output to the DC Link capacitors, which smooth the DC power. The DC power is fed to the inverter circuits, which convert the fixed voltage DC into three phase variable frequency and voltage drive outputs to the motor. The frequency and voltage are set by the gate drive signals from the microprocessor.

During motor deceleration or at other times when the motor acts as a generator, energy flows from the motor into the DC link capacitors and causes the DC link voltage to rise. The drive will trip if the DC link voltage rises above a pre-set level, to avoid damage to the drive.

### Dynamic Braking

If the dynamic braking option is fitted, an external brake resistor is switched across the DC Link by the Dynamic Brake Switch to dissipate the excess energy and prevent the drive from tripping.

Chapter 3 describes the power and resistance rating requirements for the dynamic braking resistor.

### Built-in diagnostics

Number and logic diagnostics are values and settings that can be displayed via the diagnostic menu within the MMI. These values are read-only and are provided for the user to determine operating or fault conditions. Refer to Chapter 6 for further information and descriptions of the diagnostics.