Allen-Bradley

1336 IMPACT™ AC DRIVE

Precision Torque Control in an Easy-To-Use AC Drive.

Allen-Bradley
RELIANCE ELECTRIC
DODGE
ROCKWELL SOFTWARE
Rockwell Automation

Bringing Together Leading Brands in Industrial Automation

1336 IMPACT AC Drive

Stand-alone Torque Control

Product Highlights

- Force Technology™ for demanding speed and torque performance
- Patented current regulator provides true control of motor torque
- Simple Start-Up feature provides for fast commissioning and quick auto-tuning of speed and torque loops using motor nameplate data
- 16-step speed profiling feature for changing speed based on time, encoder counts or hardware inputs through the L-option card
- Encoderless Field-Oriented Control
- SCANport™ protocol provides common interface for programming devices
- Internal Process Trim Controller
- Common power platform of 1336 PLUS II and 1336 FORCE™ family of drives

Flexible, Yet Uncomplicated

The 1336 IMPACT drive is designed for simple set-up and operation but still provides the features of more complicated drives. The Quick Motor Tune procedure steps the operator through menus to load simple motor data, while the other required parameters are automatically loaded. This eliminates the need for complex motor parameter information. The configurable analog, digital I/O and various communication modules allow you to make your preferred communication choice.

High Performance Speed and Torque Control

The 1336 IMPACT AC drive with Force Technology provides the precise motor speed and torque control necessary to handle some of the most demanding drive applications, including many that are typically reserved for DC drives. Force Technology, an Allen-Bradley patented Field-Oriented Control method, has a proven and unique ability to separate and independently control motor flux and torque allowing the 1336 IMPACT drive to deliver full torque down to zero speed. Force Technology, originally designed for customized drive systems, is now available in a compact, easy-to-use, stand-alone package.

Using the optional encoder interface, speed regulation is +/- 0.001% of top speed over a 100:1 speed range with an operating speed range of 1000:1. Torque regulation of 2% is equal to some of our most powerful DC drives. Encoderless speed regulation of +/- 0.5%, and up to a 120:1 speed range with torque regulation of 5%, help reduce the need for expensive motor-mounted encoders in many applications.

The 1336 IMPACT drive is also offered in a wide variety of pre-engineered and custom packages that exceed the standard product offering. Configured drives are available in IP20 (NEMA Type 1), IP54 (NEMA Type 12), and IP65 (NEMA Type 4) packaging. Custom drives are available in all drive ratings and packaging styles for your requirements.

Member of the 1336 Family

The 1336 IMPACT AC drive shares many features with the 1336 PLUS II and 1336 FORCE AC drive family, including a common power structure, communications interface, and the Allen-Bradley line of communication modules. The power structure uses the latest IGBT technology to provide smooth performance and quiet operation. The 1336 IMPACT drive connects to a wide variety of networks, utilizing the same communication modules as many other Allen-Bradley drives. In addition, the Human Interface Module (HIM), DriveTools32™ and DriveExecutive™ software can be used to interface to the 1336 IMPACT drives.

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1336 IMPACT™ AC DRIVE PRODUCT DATA

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Product Description

The 1336 IMPACT AC Drive

The 1336 IMPACT AC drive is the latest addition to the 1336 family and offers high performance control of an AC motor. Its precise speed and torque control make it ideal for controlling most demanding applications.

Combining patented field-oriented control, current regulated pulse width modulation (CRPWM), and microprocessors permits motor speed regulation within 0.001% and precise control of torque at all speeds.

The 1336 IMPACT AC drive shares many features with the 1336 PLUS II and 1336 FORCE™ AC drives, including human interface, space-saving packaging, and communications capabilities. The IGBT power structure technology provides smooth current output to the motor, reducing motor heating.

Simplicity

The 1336 IMPACT drive provides the ultimate in simplicity. The Quick Motor Tune procedure helps set up basic drive parameters, verify motor and encoder (if used) lead connections, and run auto-tune tests.

The Human Interface Module (HIM) is fast to program, and easy to read and understand.

Flexibility

Parameter linking gives you control over how information is used by the drive.

Digital Programming – All programming is done with parameters, displayed in text and engineering units.

Easy-to-use parameters are organized in groups for quick access to related functions.

Performance

Field-oriented control provides accurate speed and torque control of an AC motor, with or without the use of a motor-mounted encoder.

Motor temperature compensation is accomplished without the need for costly motor sensors.

High performance velocity regulator maintains speed regulation of 0.001% over a 100:1 speed range (with optional encoder feedback) with an operating speed range of 1000:1. Encoderless operation can provide ±0.5% speed regulation and up to 120:1 speed range.

Integral process trim regulator may eliminate the need for separate external dancer or load cell controllers.

Features

Programmable

- Dynamic Braking Values
- Electronic Motor Overload
- Separately Adjustable Accel/Decel Times
- Programmable Velocity Loop
- 1 External Torque Reference
- 7 External/Preset Speeds
- 2 Jog Speeds
- Speed Droop
- Auto Tuning Speed and Torque Loop
- Selectable Speed/Torque Modes
- Internal Process Trim Regulator
- Current, Torque and Power Limits
- Programmable Setpoints
- Function Blocks
  - Timer Delay
  - State Machine
  - Add/Subtract
  - Maximum/Minimum
  - Logical Add/Subtract
  - Logical Multiply/Divide
  - Up/Down
  - Multiply/Divide
  - Scale
  - Hysteresis
  - Band

I/O Interface

- SCANport™ Peripheral Interface
- Qty-2, Analog Inputs, 0 to ± 10V DC
- Analog Input, 4-20 mA
- Qty-2, Analog Outputs, 0 to ± 10V DC
- Analog Output, 4-40 mA
- Pulse Train Input
- Discrete Outputs
  - 4 Programmable Outputs

Diagnostics

- Detection and Trip:
  Undervoltage
  Overvoltage
  Drive Overcurrent
  Drive Overtemperature
  External Signal
  Drive Output Short
  Ground Fault
- Motor Stall
- Electronic Motor Overload
- 32-Message Fault Buffer
- 32-Message Warning Buffer

Packaging

Small size conserves expensive panel space.

"Planar Construction" eliminates most internal cables and connectors. Increases reliability.

Laminar Bus Design reduces internal inductance, thereby reducing snubber losses and improving IGBT performance.

Common Human Interface Module provides simplicity of programming and flexibility of operation.

Thermal Dissipation Management design and extensive infra-red testing minimizes hot spots to maximize reliability.

NEMA and International standards designed for acceptability throughout the world.

Common AC/DC Bus accommodates both stand-alone and common bus using standard Motor Control Center (MCC) vertical sections.

Electrical

IGBTs (Insulated Gate Bipolar Transistors)

- Quiet motor operation through programmable carrier frequency.
- Used on complete line – 0.37 – 597 kw (0.5-800 HP)
- Third Generation devices — Reduced switching and conduction losses.

Isolated Power and Logic minimizes noise to improve reliability and stable operation.

Field-Oriented Control provides high-performance speed and torque control of AC motor.

Independent Certification C-UL Certification for dual US and Canadian applications. Designed to meet IEC, VDE, CE and other international standards.

DC Cooling Fan on many ratings eliminates the need for a transformer and voltage tapping; accommodates global usage.

Internal Logic Supply from DC Bus does not require separate control power wiring, and improves ride-through capability.

Communications built-in SCANport™ interface provides ease of integration to a wide variety of peripheral devices.

Specifications

Control Specifications

Current Torque Control

Indirect Self-Organized, Field-Oriented Control

Current-regulated, sine-coded PWM with programmable carrier frequency.

HP	Drive Rating	Carrier Range
7.5-30 HP	4 kHz	1-12 kHz
40-60 HP	4 kHz	1-12 kHz
75-125 HP	2 kHz	1-6 kHz
150-250 HP	2 kHz	1-6 kHz
300-650 HP	2 kHz	1-4 kHz
600-650 HP	1.5 kHz	1-4 kHz
700-800 HP	1 kHz	1-4 kHz

Refer to Derating Guidelines on **Pages 43 to 51.**

Output Voltage Range

Three voltage ranges are available. Each voltage range is line dependent and can power a motor between the following voltages:
200 - 240V AC (line dependent)
380 - 480V AC (line dependent)
500 - 600V AC (line dependent)
If the voltage required for your application is not shown, contact Allen-Bradley for specific information.
Note: Due to internal voltage drops in the power structure and voltage margins required for regulation, the drive is unable to produce full output voltage at base speed. If full horsepower is required at or above base speed, an increase in current is required to produce rated horsepower. This effect will occur in all drives, but is usually only significant in F, G, and, especially, H frame drives since the voltage drop is proportional to source inductance and load current.

Output Frequency Range

0 to 250 Hz.

Speed Regulation:

With Encoder Feedback: 0.001% of Top Speed Over a 100:1 Speed Range, 1000 to 1 operating range.
Encoderless: 0.5% of Top Speed Over a 120:1 typical Speed Range.

Accel/Decel

Independently programmable accel and decel times.

Program from 0 to 6553 seconds in 0.1 second increments.

Intermittent Overload Capability

Constant Torque: 150% of Rated Drive Output for 1 minute.

(Not to exceed 150% of Rated Drive Output Limit.)

Current Limit

Current Limit programmable to 400% of rated motor current. (May require oversized drive)
Independent Motoring and Regenerative Limits.

Inverse Time Overload Capability

Class 20 protection with speed-sensitive response.
Adjustable from 0-200% of rated output current in 3 speed ranges — 2:1, 4:1 & 10:1.
UL Certified — Meets NEC Article 430.

Electrical Specifications

AC Input Specifications

Voltage Tolerance: -10% of Minimum, +10% of Maximum.
Frequency Tolerance: 48-62 Hz.
Number of Phases: 3 — 100% Drive Rating.
1 — 50% Drive Rating.

Refer to Derating Guidelines on **Pages 43 to 51.**

Displacement Power Factor

0.37-597 kW (0.5 - 800 HP): 0.95

Efficiency

97.5% at rated amps, nominal line volts.

Maximum Short Circuit Current Rating

200,000 A rms symmetrical, 600 volts (when used with AC line fuses specified on **Page 32**).

Load Specifications

Requirements

A balanced 3-phase inductive motor load is typical. Drive power rating is based on a typical NEMA Design B, 4- or-6 pole motor. Other motor loads may require application assistance.

Environmental Specifications

Altitude	1000 m (3300 ft) maximum without derating. Refer to the Derating Guidelines on **Pages 43 to 51.**
Ambient Operating Temperature	IP00, Open: Chassis — 0 to 50°C (32 to 122°F). IP20, NEMA Type 1: 0 to 40°C (32 to 104°F). IP65, Nema Type 4: 0 to 40˚C (32 to 104˚F) Refer to Derating Guidelines on **Pages 43 to 51.**
Storage Temperature (all constructions)	– 40 to 70°C (– 40 to 158°F).
Relative Humidity	5 to 95% non-condensing.
Shock	15G peak for 11 ms duration (±1.0 ms).
Vibration	0.006 inches (0.152 mm) displacement, 1G peak.
Agency Certification	U.L. Listed
	Marked for all applicable directives[1] Emissions EN 55011 Class B Immunity EN 50082-1 EN 50082-2 IEC 801-2, 3, 4 per EN 50082-1, 2

[1] *Note: Installation guidelines called out in Appendix E of the 1336 IMPACT User Manual (publication 1336 IMPACT-5.0) must be adhered to.*

Protection Specifications

	200-240V Drive	380-480V Drive	500-600V Drive
AC Input Overvoltage Trip	285V AC	570V AC	690V AC
AC Input Undervoltage Trip	138V AC	280V AC	343V AC
Bus Overvoltage Trip	405V DC	810V DC	975V DC
Bus Undervoltage Trip	200V DC	400V DC	498V DC
Heat Sink Thermistor	Monitored by microprocessor.		
Drive Overcurrent Trip	200% of rated output current.		
Line Transients	Up to 6000 volts peak per IEEE C62.41-1991.		
Control Logic Noise Immunity	Showering arc transients up to 1500 volts peak.		
Power Ride-Through	15 milliseconds at full load.		
Logic Control Ride-Through	0.5 seconds minimum, 2 seconds typical.		
Ground Fault Trip	Phase-to-Ground on Drive Output.		
Short Circuit Trip	Phase-to-Phase on Drive Output.		

Optional Encoder Inputs

Line Driver Encoder 5V DC or 8-15V DC Output
Minimum Current – 10 mA per channel
Quadrature
Maximum Input Frequency – 125 kHz

Specifications

Input/Output Ratings

Requirements

Shown below are 1336 IMPACT AC drive input and output current ratings grouped by drive voltage ratings [1].

200-240V

Cat. No.	Input kVA	Input Amps	Output kVA	Output Amps
AQF05	1-1.2	2.8	0.92	2.3
AQF07	1.2-1.5	3.5	1.20	3.0
AQF10	1.9-2.2	5.4	1.79	4.5
AQF15	2.5-3.0	7.3	2.39	6.0
AQF20	3.4-4.0	9.7	3.19	8.0
AQF30	5.0-5.9	14.3	4.78	12.0
AQF50	7.4-8.9	21.3	7.17	18.0
A007	10-12	28	11	27.2
A010	12-14	35	14	33.7
A015	17-20	49	19	48.2
A020	23-28	67	26	64.5
A025	25-30	73	31	78.2
A030	27-30	79	32	80.0
A040	43-51	123	48	120.3
A050	53-64	154	60	149.2
A060	60-72	174	72	180.4
A075	82-99	238	96	240.0
A100	100-120	289	116	291.4
A125	112-135	325	130	327.4

380-480V

Cat. No.	Input kVA	Input Amps	Output kVA	Output Amps
BRF05	0.9-1.2	1.4	0.96	1.2
BRF07	1.4-1.7	2.1	1.35	1.7
BRF10	1.8-2.3	2.8	1.83	2.3
BRF15	2.3-2.9	3.5	2.39	3.0
BRF20	3.2-4.0	4.8	3.19	4.0
BRF30	4.7-6.0	7.2	4.78	6.0
BRF50	8-10	12	8.29	10.4
BRF75	9-12	14	11.07	13.9
BRF100	16-21	25	19.92	25
B015	18-23	28	22	27.2
B020	23-29	35	27	33.7
B025	23-26	43	33	41.8
B030	32-41	49	38	48.2
BX040	40-50	62	47	58.7
B040	41-52	63	52	64.5
B050	48-60	75	61	78.2
BX060	62	75	61	78.2
B060	61-77	93	76	96.9
B075	78-99	119	96	120.3
B100	98-124	149	120	149.2
B125	117-148	178	143	180.4
BX150	148	178	143	180.4
B150	157-198	238	191	240.0
B200	191-241	290	233	291.4
B250	212-268	322	259	327.4
B300	265-335	403	324	406.4
BP300	265-334	402	324	406.4
BPR300	265-334	402	324	406.4
B350	300-379	455	366	459.2
BP350	300-378	455	366	459.2
BPR350	300-378	455	366	459.2
B400	330-416	501	402	505.1
BP400	313-396	476	383	481.0
BPR400	313-396	476	383	481.0
B450	372-470	565	454	570.2
BP450	346-437	526	424	531.7
BPR450	346-437	526	424	531.7
B500	391-494	594	477	599.2
B600	439-555	668	537	673.4
B700C	517-625	835	677	850
B800C	647-817	965	783	983

500-600V

Cat. No.	Input kVA	Input Amps	Output kVA	Output Amps
CWF10	2.6-3.1	3.0	2.49	2.5
CWF20	3.5-4.2	4.0	4.18	4.2
CWF30	5.2-6.2	6.0	5.98	6.0
CWF50	6.9-8.3	8	7.87	7.9
CWF75	9-10	10	10	9.9
CWF100	10-12	12	12	12.0
C015	17-20	19	19	18.9
C020	21-26	25	24	23.6
C025	27-32	31	30	30.0
C030	31-37	36	35	34.6
C040	40-48	46	45	45.1
C050	48-57	55	57	57.2
C060	52-62	60	62	61.6
C075	73-88	84	85	85.8
C100	94-112	108	109	109.1
C125	118-142	137	137	138.6
C150	136-163	157	157	159.7
C200	217-261	251	251	252.6
C250	244-293	282	283	283.6
C300	256-307	296	297	298.0
CX300	256-307	295	297	298.0
C350	304-364	351	352	353.6
CP350	301-361	347	349	350
CPR350	301-361	347	349	350
C400	349-419	403	405	406.4
CP400	343-412	397	398	400
CPR400	343-412	397	398	400
C450	394-473	455	457	459.2
C500	434-520	501	503	505.1
C600	514-617	594	597	599.2
C650	578-694	668	671	673.4
C700	616-739	756	767	770
C800	639-767	786	797	800

[1] *Drive ratings are at nominal values. Refer to drive Derating Guidelines on* ***Pages 43 to 51.***

Serial Communications

Peripheral Interface	SCANport Protocol, up to 6 peripherals can be connected.
Remote I/O	Single drop remote I/O to Allen-Bradley PLC® and SLC 500™. Supports full block transfer and link mode discrete transfer.
RS232/422/485	DFI Protocol — DH485 Protocol — Customer Specific Protocol.
DeviceNet™	DeviceNet to SCANport module — Available for all drive ratings.
Flex™ I/O	Flex I/O to SCANport module — Available for all drive ratings.
SLC	SLC to SCANport module — Available for all drive ratings.
ControlNet™	ControlNet to SCANport Module — Available for all drive ratings.

Control Inputs

Option L4/L7E
Contact Closure Interface Board Requirements

Circuits used with Option L4/L7E must be capable of operating at 10mA without signal degradation. Reed type input devices are recommended.

The L4/L7E option is compatible with the following Allen-Bradley PLC modules:

- 1771-OYL
- 1771-OZL

Note: Option L7E is the same as Option L4 but with encoder feedback terminals.

Option L5/L8E
+24V AC/DC Interface Board Requirements

Circuits used with Option L5/L8E must be capable of operating with **high = true logic.**

DC external circuits in the low state must generate a voltage of no more than 8V DC.

Leakage current must be less than 1.5 mA into a 2.5k Ohm load.

AC external circuits in the low state must generate a voltage of no more than 10V DC.

Leakage current must be less than 2.5 mA into a 2.5k Ohm load.

Both AC and DC external circuits in the high state must generate a voltage of +20 to +26 volts and source a current of approximately 10 mA for each input.

The L5/L8E option is compatible with these Allen-Bradley PLC® modules:

- 1771-OB
- 1771-OQ
- 1771-OZL
- 1771-OBD
- 1771-OQ16
- 1771-OBB
- 1771-OBN
- 1771-OYL
- 1771-OB16

Note: Option L8E is the same as Option L5 but with encoder feedback terminals.

Option L6/L9E
115V AC Interface Board Requirements

Circuits used with Option L6/L9E must be capable of operating with **high = true logic**.

In the low state, circuits must generate a voltage of no more than 30V AC. Leakage current must be less than 10 mA into a 6.5k Ohm load.

In the high state, circuits must generate a voltage of 90-115V AC+/-10% and source a current of approximately 20 mA for each input.

The L5/L9E option is compatible with these Allen-Bradley PLC modules:

- 1771-OW
- 1771-OA
- 1771-OWN
- 1771-OAD (Contact Factory for Recommended Series/Rev. Level)

Note: Option L9E is the same as Option L6 but with encoder feedback terminals.

Control Outputs

Contact Outputs

115V AC, 30V DC – 8.0 Amp Resistive – 3.5 Amp Inductive.

(4) Programmable Contact Outputs.

Function Description

Analog Inputs

Analog Input Specifications

4-20 mA, Differential

Resolution:	12 bit, Signed
Input Impedance:	130 Ohms

(2) 0 to ± 10V DC, Differential

Resolution:	12 bit, Signed
Input Impedance:	20k Ohms

Digital scale and offset for each input, definable in firmware.

Analog Outputs

Analog Output Specifications

4-20 ma, Differential

Resolution:	12 bit, Signed
Output Impedance:	20 Ohms

(2) 0 to ± 10V DC Differential

Resolution:	12 bit, Signed
Output Current:	10 mA maximum per output
Output Impedance:	100 Ohms

Digital Scale and offset, definable in firmware.

Pulse Reference Input

Pulse Input Specifications

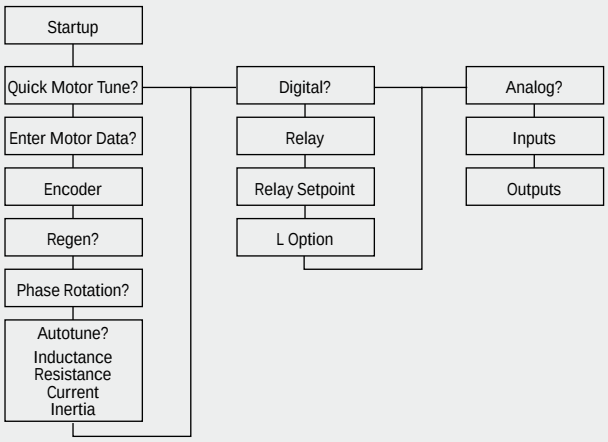
The pulse input signal must be an externally powered square wave pulse train.
Differential, 5 or 12V logic level.
Maximum frequency of 100 kHz.
10 mA minimum.

Simple Start-up

The 1336 IMPACT drive provides a menu driven start-up procedure that leads you through entering the motor nameplate information and running the auto-tune tests. It also sets up the digital I/O by helping you configure the relay output and L Option Card, and sets up the analog I/O by helping you create links between the I/O and references. When the start-up procedure is complete, the drive should be set to perform basic functions.

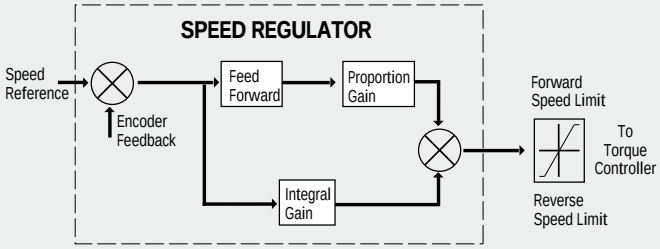
Auto-Tuning – Speed. The auto-tuning feature allows the drive to tune the speed loop to the connected load without the use of complicated formulas or procedures. The drive tests for motor inertia (motor disconnected from load), system inertia, and system friction. This information is then used to tune the speed loop.

Auto-Tuning – Torque Loop. The 1336 IMPACT AC drive tunes the torque loop to the motor without any special equipment or hard-to-find motor information. This unique feature allows the 1336 IMPACT drive to be used with most motors.



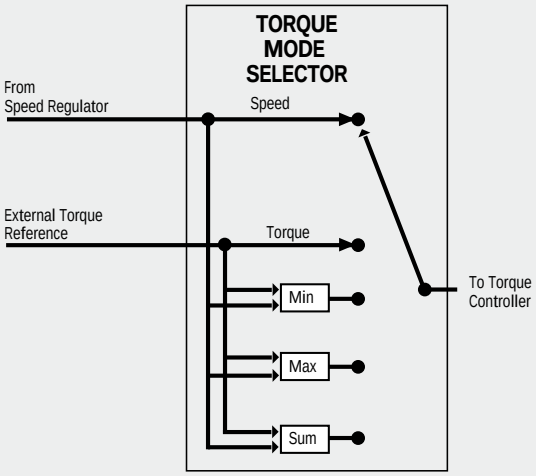
Speed Control

The 1336 IMPACT AC drive provides precise speed control through the use of a high-bandwidth velocity regulator resulting in a speed regulation specification of 0.001% over a 100 to 1 speed range, when using an encoder and an operating speed range of 1000 to 1. Encoderless operation provides a speed regulation specification of 0.5% and up to 120 to 1 speed range.



Torque Control

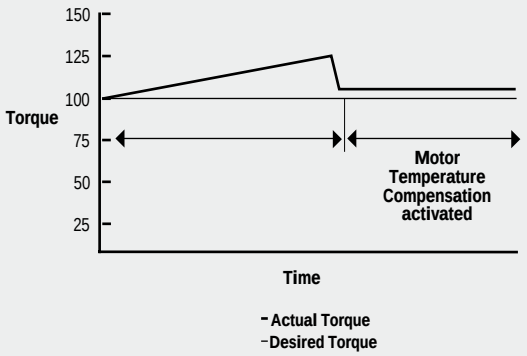
Torque control is achieved through the use of Field-Oriented Control and current-regulated PWM (CRPWM). The user can program the drive for speed control, torque control, or combinations of both, depending on application. Adjustable torque, power, and current limits allow maximum flexibility for controlling demanding applications.



Function Description

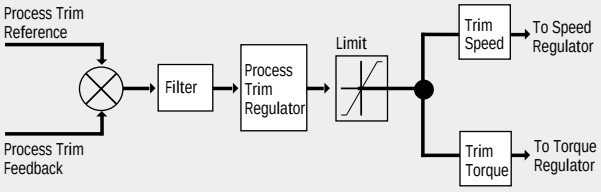
Motor Temperature Compensation

As motor temperature changes, the torque output of the motor changes. Typically, a motor temperature sensor is placed in the motor and used by the drive to maintain better control of torque. The 1336 IMPACT AC drive automatically compensates for changing motor temperature without the need for a special, motor-mounted temperature sensor.



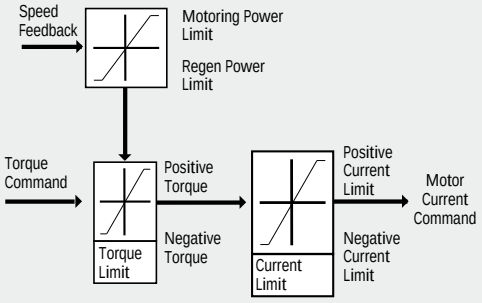
Process Trim Controller

A process trim controller is built into the 1336 IMPACT AC drive. Transducers, such as dancers or load cells, can be connected directly to the drive and used to trim either the speed or torque output of the the drive.



Torque, Power, and Current Limits

Separate limit parameters provide maximum flexibility to control the motor torque output, power output, and total motor current. Each set of limits is independently programmable and has separate adjustments for motoring and regenerative regions.



Fault Diagnostics

The 1336 IMPACT AC drive has advanced fault diagnostic capabilities that enable the user to quickly diagnose and troubleshoot the drive. All faults are stored in non-volatile memory. Drive faults are categorized as either Trip- or Warning-type faults. When a fault occurs, a fault time stamp provides the relative time data.

Trip faults cause drive shutdown. A fault message is displayed on program terminals and fault status is also available to any device connected to or monitoring the drive. These faults are defined as either hard or soft faults.

Warning faults are indicated to devices connected to the drive but do not cause an immediate drive shutdown. This enables the user to take corrective action without unwanted nuisance shutdowns. Some warning faults can be programmed as Trip faults, or completely disabled.

A separate Trip fault buffer and Warning fault buffer store the last 32 messages that have occurred. These buffers are maintained in non-volatile memory. Separate clear fault and clear buffer capabilities are built-in.

FAULT BUFFER

	FAULT CODE	FAULT MESSAGE
1	02016	Overvoltage
2	02018	Ground Fault
3	03025	Absolute Overspeed
•		
•		
•		
32		

WARNING BUFFER

	WARNING CODE	WARNING MESSAGE
1	01083	Motor Overload Pend
2	05086	External Fault In
3	01085	Motor Stalled
•		
•		
•		
32		

Owners

The 1336 IMPACT AC drive displays which of the available SCANport ports currently "owns" certain control functions. To avoid conflict, some owners are exclusive (only one device can issue a reference), while others can have multiple control (many devices can simultaneously issue a start command). Owner displays are excellent diagnostic tools, displaying precisely where drive control commands originate.

7	6	5	4	3	2	1	0	Port
0	0	0	0	0	0	1	0	

Indicates current speed command is issued from SCANport port 1 — Local Human Interface Module

Typical Owner Reference Source

Masks

All external control connections to the 1336 IMPACT AC drive are made through a multi-connection communication bus called SCANport. With the possibility of many devices able to issue drive control functions (start, stop, reverse, speed reference, etc.), the 1336 IMPACT AC drive offers a mask for each control function that gives you complete flexibility to lock out any function (except stop) from any port.

7	6	5	4	3	2	1	0	Port
1	1	1	1	0	1	1	1	

Allows jog from Adapter 1
Denies jog from Adapter 3

Typical Jog Mask

Braking Features

There are several choices for braking or decelerating the load with a 1336 IMPACT drive. These include an external Dynamic Brake, Brake Chopper kits or other regenerative method. When these are not present, the choices are Flux Braking, DC Braking or Bus Regulator. Select these options through firmware.

Flux Braking increases the motor flux current, which increases motor losses. The higher losses produce a shorter motor deceleration time.

DC Braking applies a DC current to the motor and becomes active only during a stop command. The amount of current applied is programmable and will affect the stopping time.

Bus Regulator is part of DC Bus Options and used to limit or control the bus voltage when decelerating or as regeneration occurs. At high bus voltage, the regulator becomes active and reduces the regenerative power limit to control bus voltage.

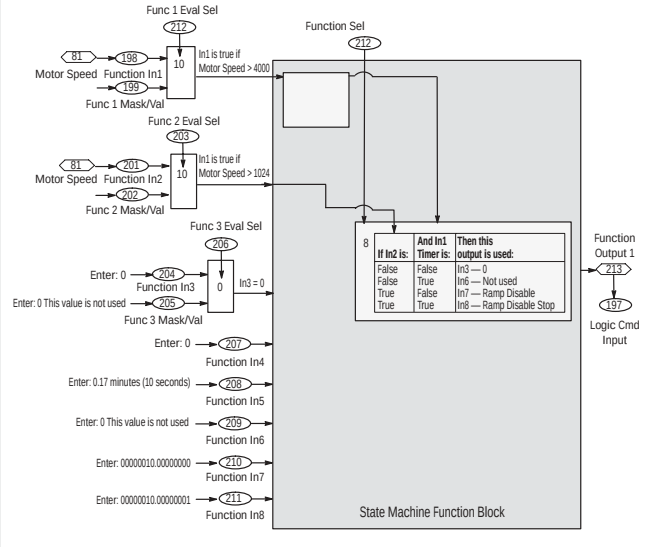
DC Bus Options

DC bus options provide bus control and sensing adjustability for ride through on line loss. Without a brake, the DC bus regulator will help prevent bus over voltage trips by reducing the regenerative torque.

Function Blocks

For applications requiring additional flexibility, the 1336 IMPACT drive has function blocks. This allows customizing of the drive operation by selecting one of eleven different functions. Functions available are a timer delay, state machine, add/subtract, maximum/minimum, up/down counter, multiply/divide, scale hysteresis, band, logical add/subtract, and logical multiply/divide block.

To use the state machine function block as an example, it defines a decision table. This table selects which value to use for the output, based on the values of the inputs.



1336 IMPACT AC Drive Pre-Installation

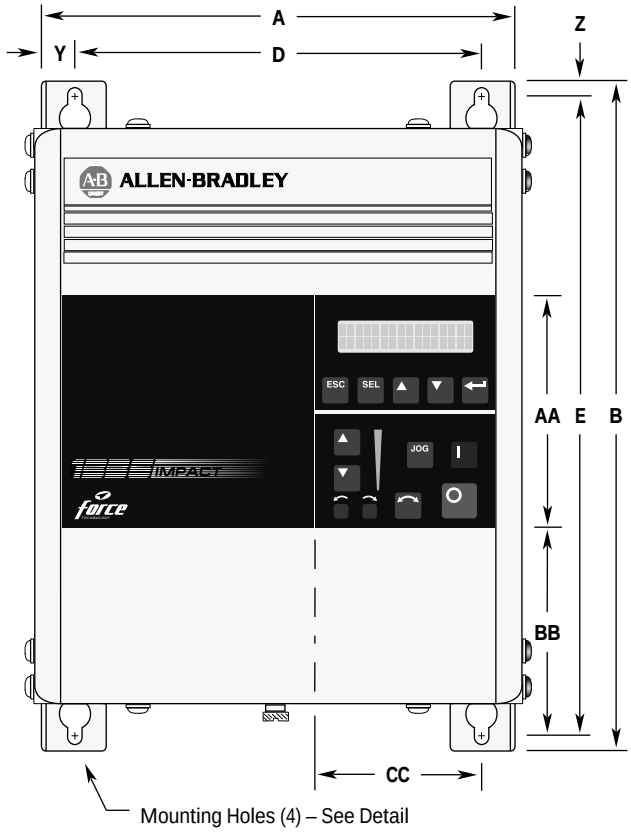
ATTENTION: The following information is merely a guide for proper installation. The Allen-Bradley Company cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment exists if codes are ignored during installation.

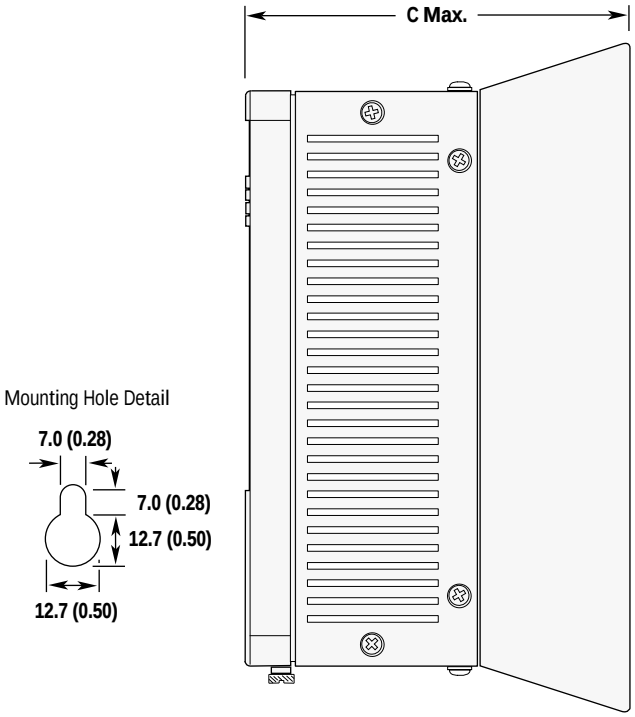
Frame Reference Guide

This Frame Reference Guide is referred to throughout this publication to provide a frame break reference for various options and drive ratings. Actual frame dimensions are given on the following (5) pages.

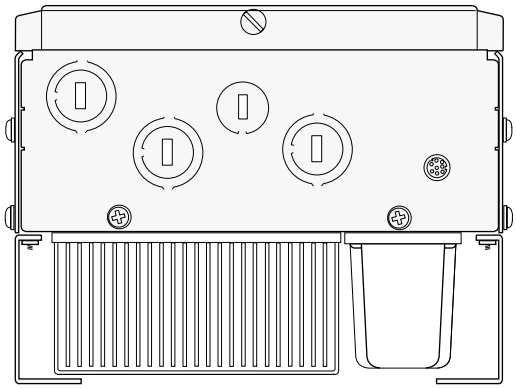
200-240V Drives	380-480V Drives	500-600V Drives	Frame Designation
0.37-0.75 kW (0.5-1 HP)	0.37-1.2 kW (0.5-1.5 HP)	— —	**A1**
1.2-1.5 kW (1.5-2 HP)	1.5-2.2 kW (2-3 HP)	— —	**A2**
2.2-3.7 kW (3-5 HP)	3.7 kW (5 HP)	— —	**A3**
— —	5.5-7.5 kW (7.5-10 HP)	0.75-3.7 kW (1-10 HP)	**A4**
5.5-11 kW (7.5-15 HP)	11-22 kW (15-30 HP)	11-15 kW (15-20 HP)	**B**
15-22 kW (20-30 HP)	30-45 kW (40-60 HP)	18.5-45 kW (25-60 HP)	**C**
30-45 kW (40-60 HP)	45-112 kW (60-150 HP)	56-93 kW (75-125 HP)	**D**
56-75 kW (75-125 HP)	112-187 kW (150-250 HP)	112-224 kW (150-300 HP)	**E**
— —	224-336 kW (300-450 HP)	261-336 kW (350-450 HP)	**F**
— —	224-448 kW (300-600 HP)	224-485 kW (300-650 HP)	**G**
— —	522-597 kW (700-800 HP)	522-597 kW (700-800 HP)	**H**

IP20 (NEMA Type 1) Dimensions — Frames A1, A2, A3 and A4





Bottom View Will Vary with HP – See *Bottom View Dimensions*



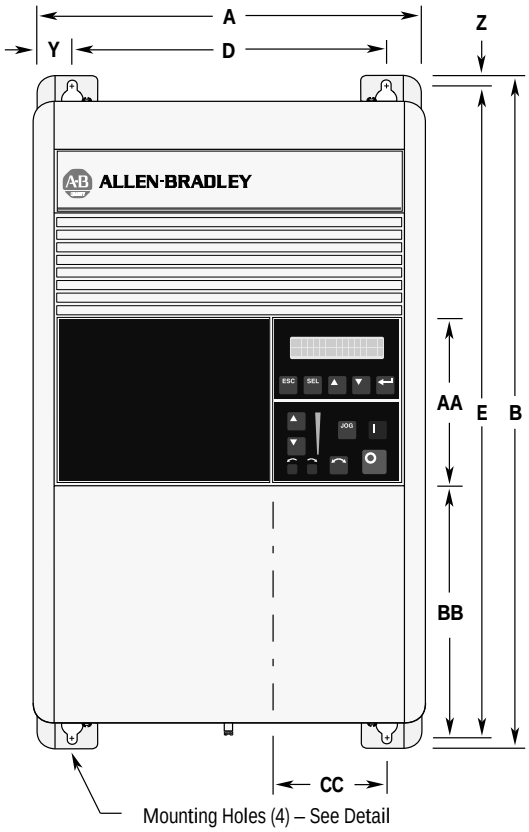
All Dimensions in Millimeters and (Inches)
All Weights in Kilograms and (Pounds)

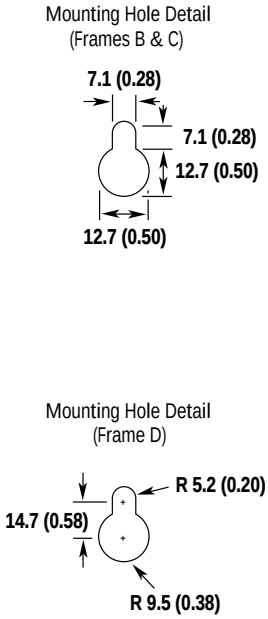
Three-Phase Rating 200 – 240V	380 – 480V	500 – 600V	Frame Reference
0.37 – 0.75 kW 0.5 – 1 HP	0.37 – 1.2 kW 0.5 – 1.5 HP	—	**A1**
1.2 – 1.5 kW 1.5 – 2 HP	1.5 – 2.2 kW 2 – 3 HP	—	**A2**
2.2 – 3.7 kW 3 – 5 HP	3.7 kW 5 HP	—	**A3**
—	**5.5 – 7.5 kW** **7.5 – 10 HP**	0.75 – 7.5 kW 1 – 10 HP	**A4**
5.5 – 11 kW 7.5 – 15 HP	**11 – 22 kW** **15 – 30 HP**	11 – 15 kW 15 – 20 HP	**B**
15 – 22 kW 20 – 30 HP	30 – 45 kW 40 – 60 HP	18.5 – 45 kW 25 – 60 HP	**C**
30 – 45 kW 40 – 60 HP	45 – 112 kW 60 – 150 HP	56 – 93 kW 75 – 125 HP	**D**
56 – 93 kW 75 – 125 HP	112 – 187 kW 150 – 250 HP	112 – 187 kW 150 – 250 HP	**E**
—	224 – 336 kW 300 – 450 HP	261 – 336 kW 350 – 450 HP	**F**
—	187 – 448 kW 300 – 600 HP	224 – 485 kW 300 – 650 HP	**G**

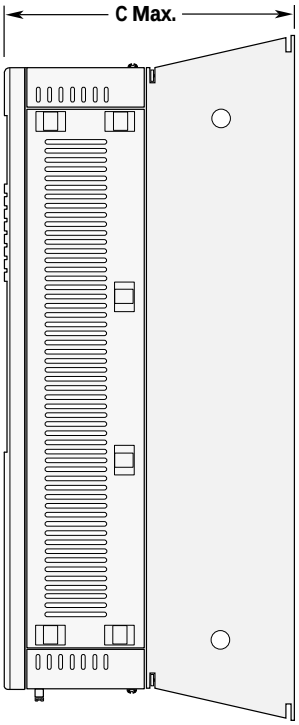
Use care when choosing Frame Reference — some ratings may exist in another frame size.

Frame Reference	A	B	C Max	D	E	Y	Z	AA	BB	CC	Shipping Weights
A1	215.9 (8.50)	290.0 (11.42)	160.0 (6.30)	185.2 (7.29)	275.0 (10.83)	15.35 (0.60)	7.5 (0.30)	130.0 (5.12)	76.2 (3.00)	85.3 (3.36)	4.31 kg (9.5 lbs)
A2	215.9 (8.50)	290.0 (11.42)	180.5 (7.10)	185.2 (7.29)	275.0 (10.83)	15.35 (0.60)	7.5 (0.30)	130.0 (5.12)	76.2 (3.00)	85.3 (3.36)	5.49 kg (12.1 lbs)
A3	215.9 (8.50)	290.0 (11.42)	207.0 (8.15)	185.2 (7.29)	275.0 (10.83)	15.35 (0.60)	7.5 (0.30)	130.0 (5.12)	76.2 (3.00)	85.3 (3.36)	6.71 kg (14.8 lbs)
A4	260.0 (10.24)	350.0 (13.78)	212.0 (8.35)	230.0 (9.06)	320.0 (12.60)	15.35 (0.60)	15.35 (0.60)	130.0 (5.12)	133.0 (5.23)	86.0 (3.39)	15.90 kg (35.0 lbs)

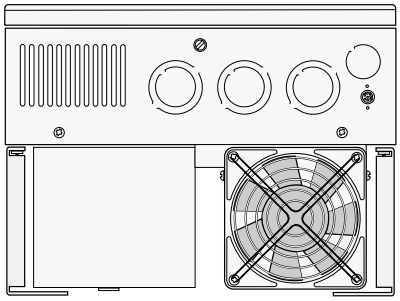
IP 20 (NEMA Type 1) Dimensions — Frames B, C and D







Bottom View Will Vary with HP – See *Bottom View Dimensions*

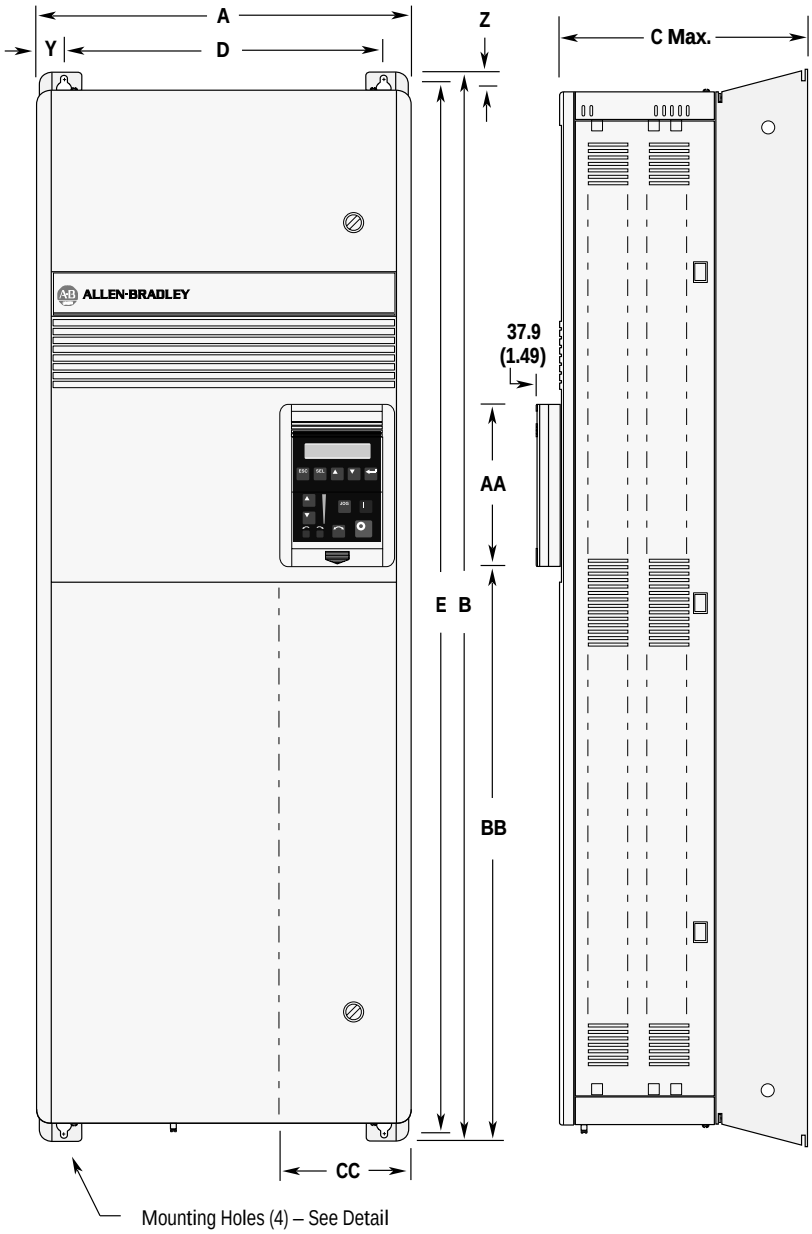


All Dimensions in Milimeters and (Inches)
All Weights in Kilograms and (Pounds).

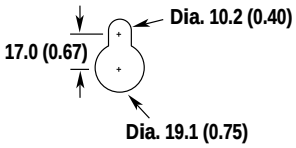
Frame[1] Reference	A	B	C Max.	D	E	Y	Z	AA	BB	CC	Shipping Weight
B	276.4 (10.88)	476.3 (18.75)	225.0 (8.86)	212.6 (8.37)	461.0 (18.15)	32.00 (1.26)	7.6 (0.30)	131.1 (5.16)	180.8 (7.12)	71.9 (2.83)	22.7 kg (50 lbs)
C	301.8 (11.88)	701.0 (27.60)	225.0 (8.86)	238.0 (9.37)	685.8 (27.00)	32.00 (1.26)	7.6 (0.30)	131.1 (5.16)	374.7 (14.75)	71.9 (2.83)	38.6 kg (85 lbs)
D	381.5 (15.02)	1240.0 (48.82)	270.8 (10.66)	325.9 (12.83)	1216.2 (47.88)	27.94 (1.10)	11.94 (0.47)	131.1 (5.16)	688.6 (27.11)	83.6 (3.29)	108.9 kg (240 lbs)

[1] *Refer to the Derating Guidelines on* ***Pages 43 to 51*** *for derating information.*

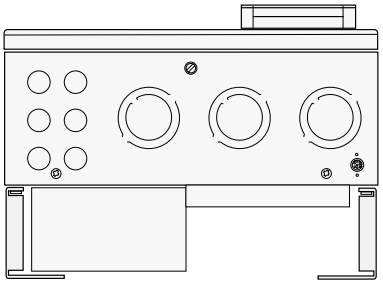
IP20 (NEMA Type 1) Dimensions — Frame E



Mounting Hole Detail



See Bottom View Dimensions for Details

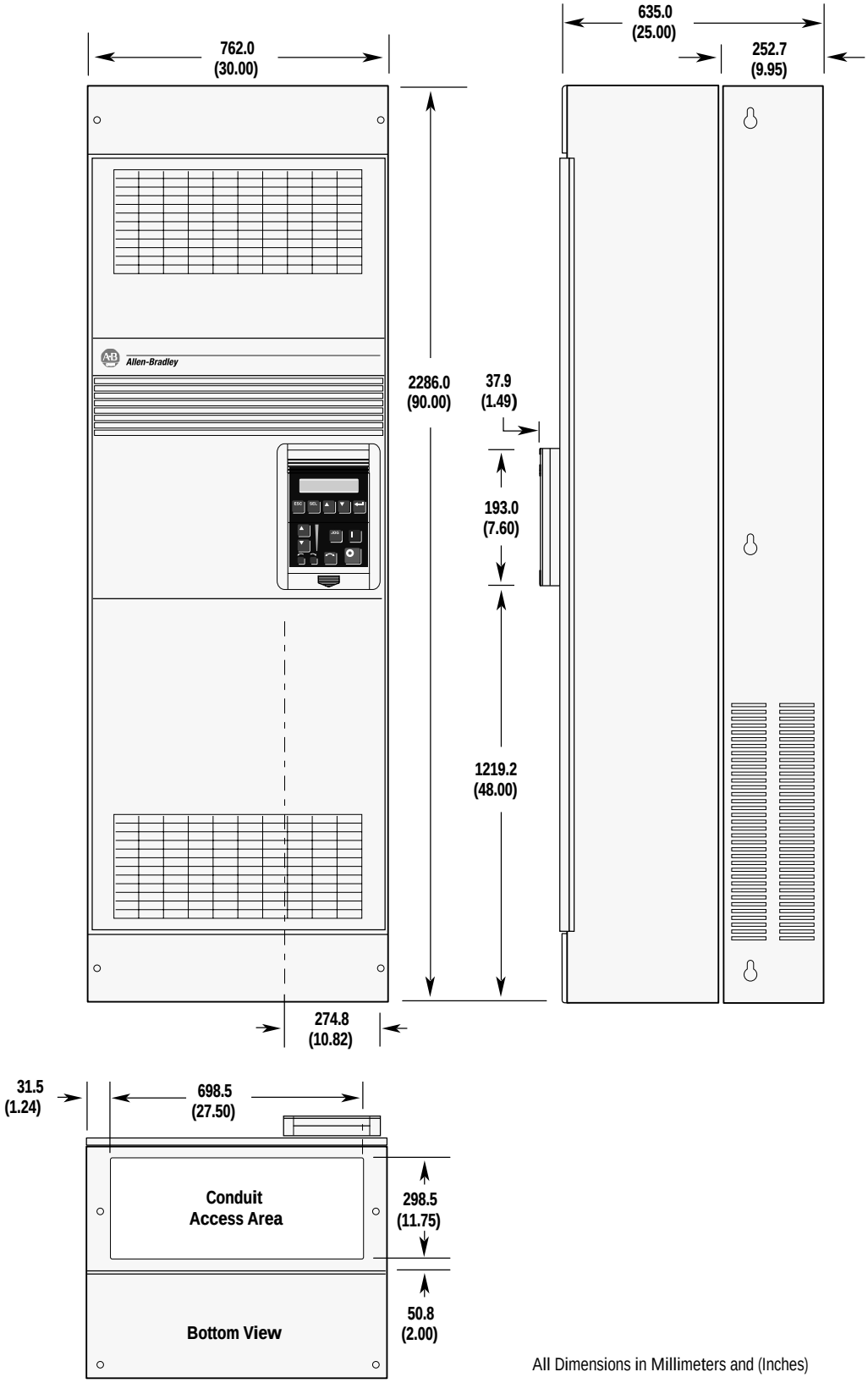


All Dimensions in Milimeters and (Inches).
All Weights in Kilograms and (Pounds).

Frame[1] Reference	A	B	C Max.	D	E	Y	Z	AA	BB	CC	Shipping Weight
E — Enclosed	511.0 (20.12)	1498.6 (59.00)	424.4 (16.71)	477.5 (18.80)	1447.8 (57.00)	16.8 (0.66)	40.1 (1.61)	195.0 (7.68)	901.4 (35.49)	151.9 (5.98)	186 kg (410 lbs)
E — Open	511.0 (20.12)	1498.6 (59.00)	372.6 (14.67)	477.5 (18.80)	1447.8 (57.00)	16.8 (0.66)	40.1 (1.61)	138.4 (5.45)	680.0 (26.77)	126.3 (4.97)	163 kg (360 lbs)

[1] *Refer to the Derating Guidelines on* ***Pages 43 to 51*** *for derating information.*

IP 20 (NEMA Type 1) Dimensions — Frame F

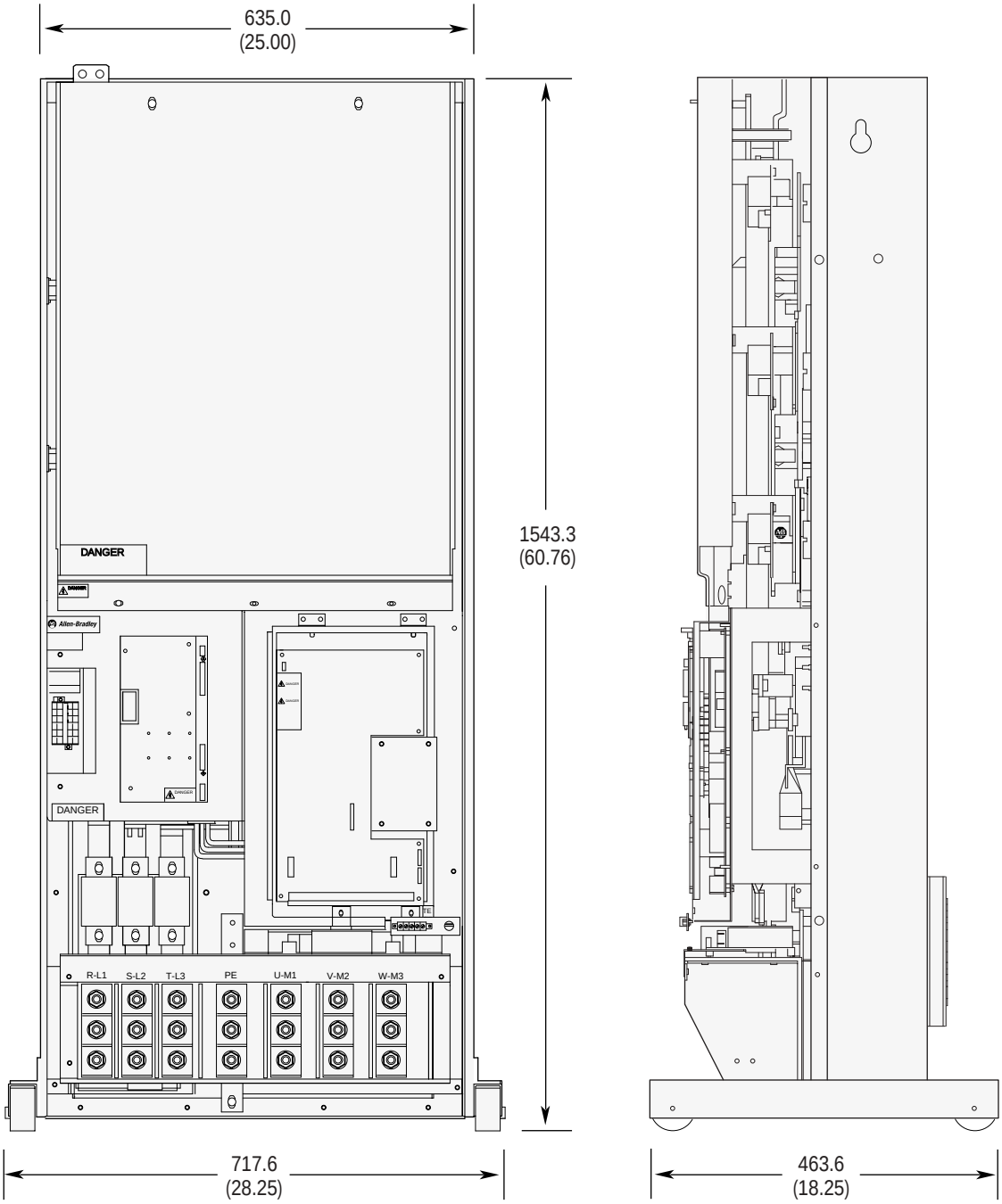


All Dimensions in Millimeters and (Inches)

For Frame Reference refer to the Derating Guidelines on **Pages 43 to 51** for derating information.

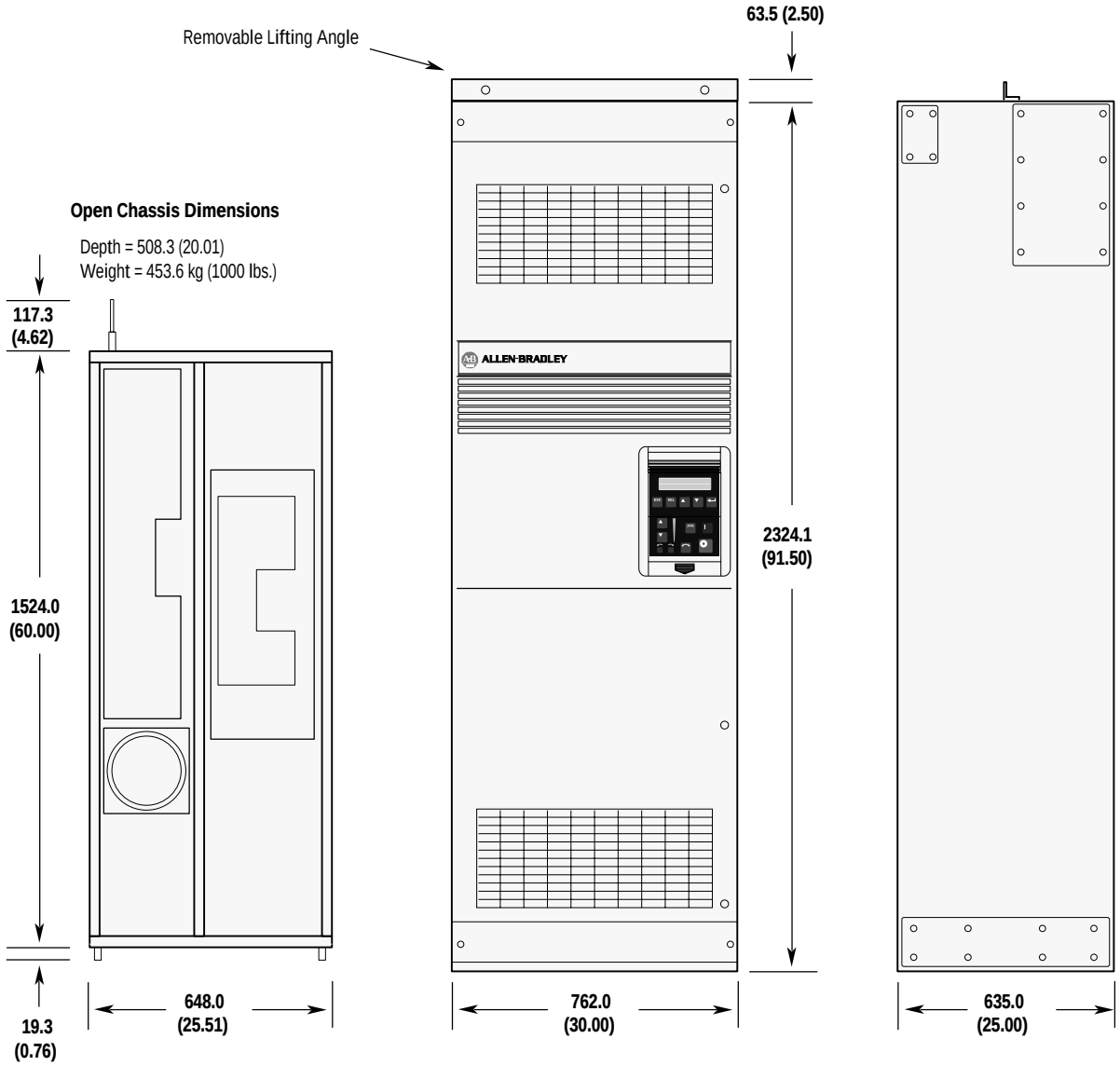
Open Dimensions — Frame F ”Roll-in“ Chassis

All Dimensions in Millimeters and (Inches)

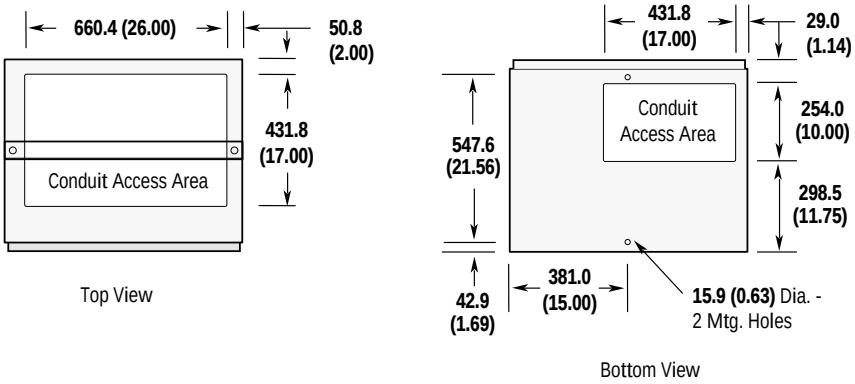


For Frame Reference refer to the Derating Guidelines on **Pages 43 to 51** for derating information.

IP 20 (NEMA Type 1) Dimensions — Frame G



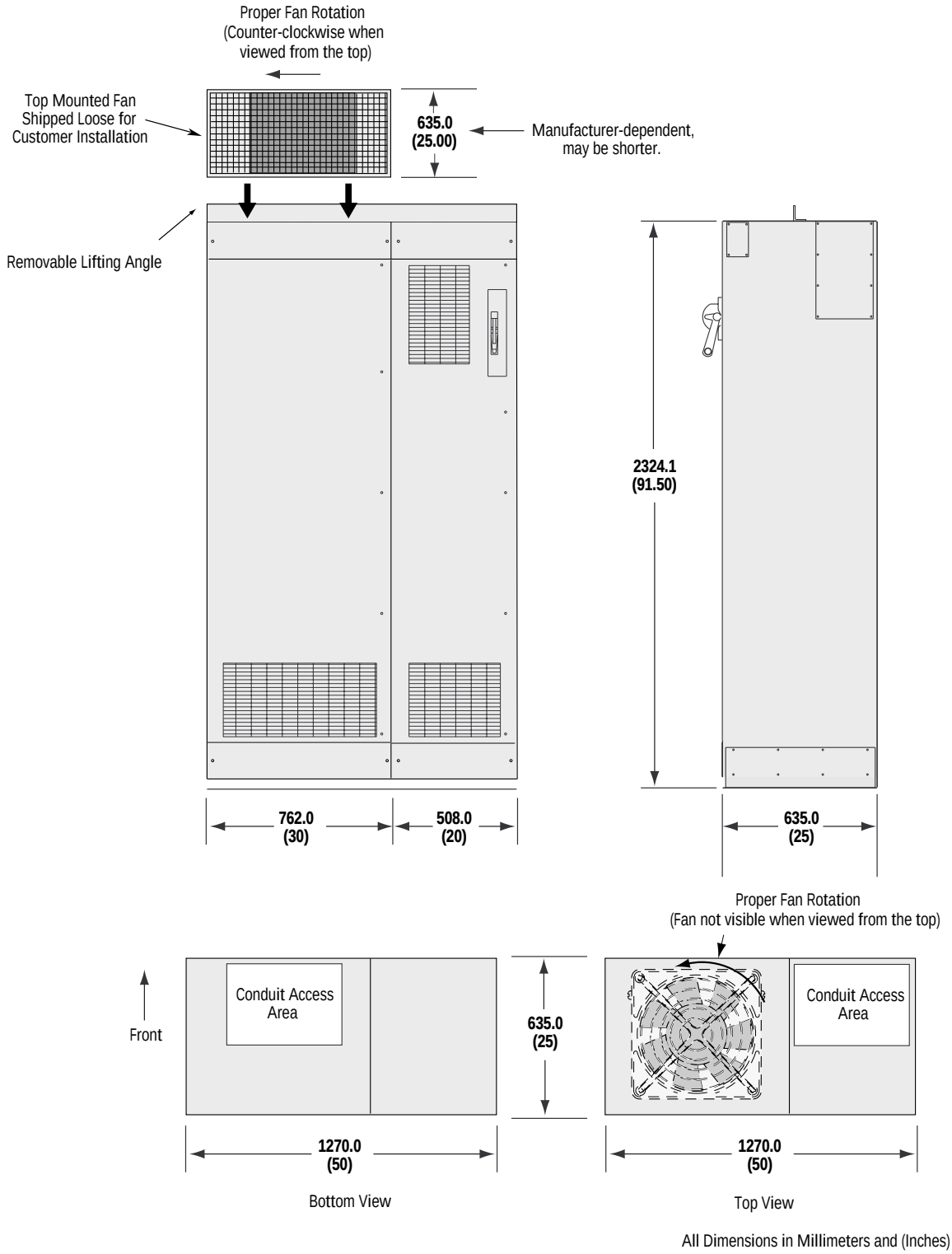
Important: Two (2) 725 CFM fans are required if an open type drive is mounted in a user supplied enclosure.



All Dimensions in Millimeters and (Inches)

For Frame Reference refer to the Derating Guidelines on **Pages 43 to 51** for derating information.

IP 20 (NEMA Type 1) Dimensions — Frame H

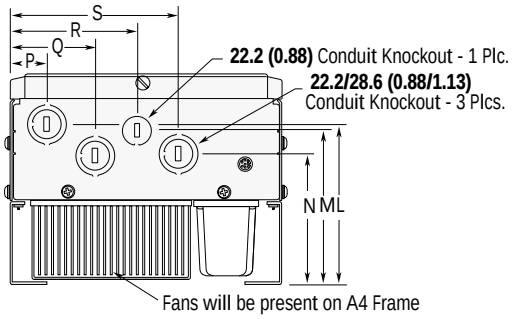


For Frame Reference refer to the Derating Guidelines on **Pages 43 to 51** for derating information.

Bottom View Dimensions — Frames A1 - E

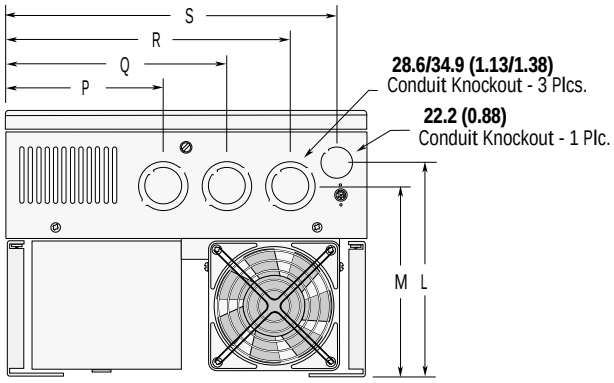
All Dimensions in Millimeters and (Inches).

Frames A1 through A4



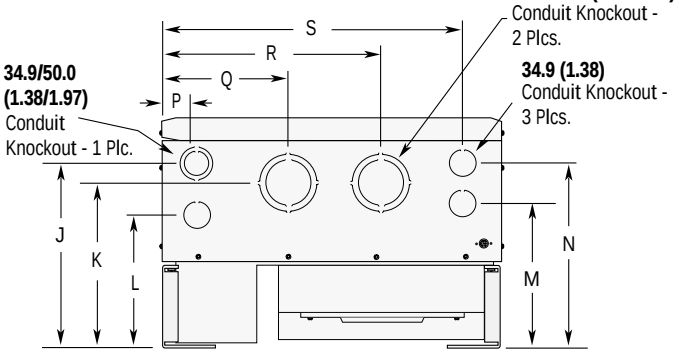
Frame Reference	L	M	N	P	Q	R	S
A1	111.8 (4.40)	105.4 (4.15)	86.3 (3.40)	25.4 (1.00)	63.2 (2.49)	102.1 (4.02)	135.4 (5.33)
A2	132.3 (5.21)	126.0 (4.96)	106.9 (4.21)	25.4 (1.00)	63.2 (2.49)	102.1 (4.02)	135.4 (5.33)
A3	158.8 (6.25)	152.4 (6.00)	133.4 (5.25)	25.4 (1.00)	63.2 (2.49)	102.1 (4.02)	135.4 (5.33)
A4	164.0 (6.45)	164.0 (6.45)	139.0 (5.47)	27.0 (1.06)	65.0 (2.65)	97.0 (3.82)	128.7 (5.07)

Frames B and C



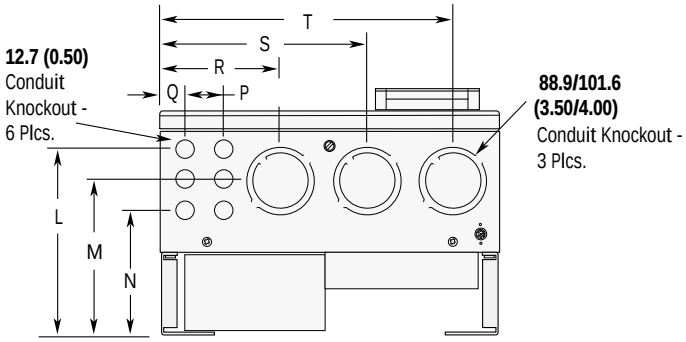
Frame Reference	L	M	P	Q	R	S
B	181.6 (7.15)	167.1 (6.58)	112.8 (4.44)	163.6 (6.44)	214.4 (8.44)	249.9 (9.84)
C	181.6 (7.15)	167.1 (6.58)	119.1 (4.69)	182.6 (7.19)	227.1 (8.94)	275.3 (10.84)

Frame D



Frame Reference	J	K	L	M	N	P	Q	R	S
D	198.1 (7.80)	169.4 (6.67)	131.6 (5.18)	153.7 (6.05)	204.5 (8.05)	52.1 (2.05)	144.0 (5.67)	261.4 (10.29)	343.9 (13.54)

Frame E

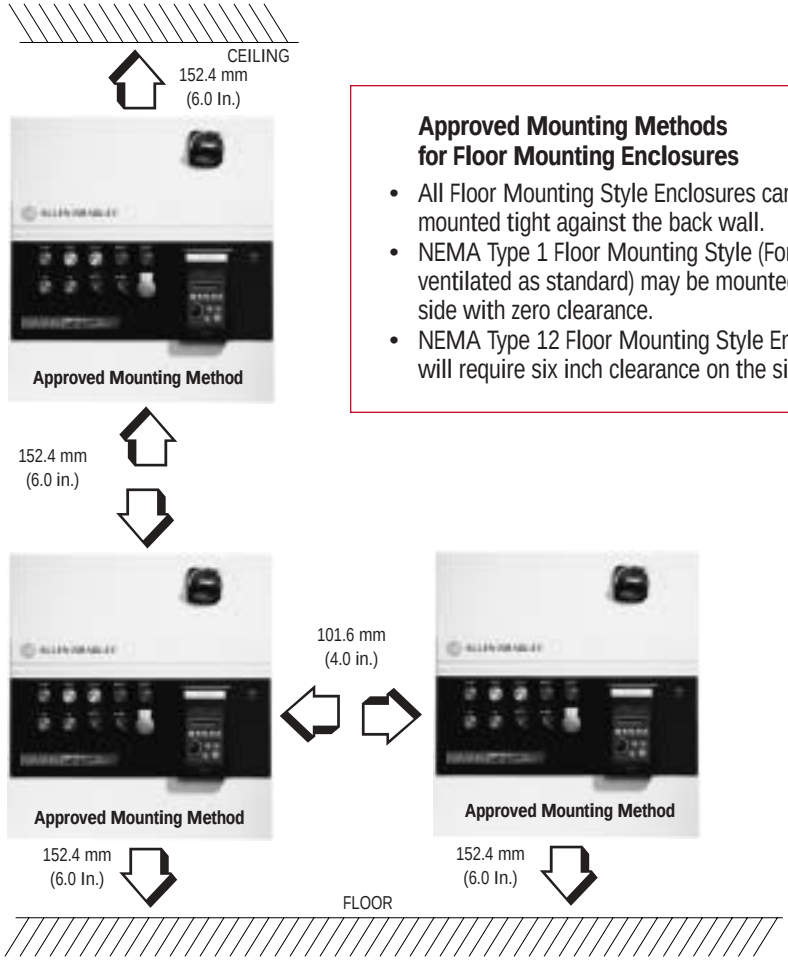


Frame Reference	L	M	N	P	Q	R	S	T
E	311.2 (12.25)	260.4 (10.25)	209.6 (8.25)	50.8 (2.0)	38.6 (1.52)	178.3 (7.02)	305.3 (12.02)	432.3 (17.02)

For Frame Reference refer to the Derating Guidelines on **Pages 43 to 51** for derating information.

Mounting and Spacing Requirements

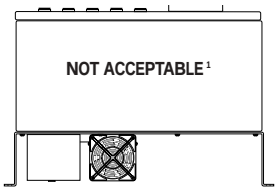
Approved Mounting Methods for Wall Mounting Enclosures



Approved Mounting Methods for Floor Mounting Enclosures

- All Floor Mounting Style Enclosures can be mounted tight against the back wall.
- NEMA Type 1 Floor Mounting Style (Force ventilated as standard) may be mounted side by side with zero clearance.
- NEMA Type 12 Floor Mounting Style Enclosures will require six inch clearance on the sides.

Not Acceptable



[1] *Some horizontal mounting conventions are acceptable provided the application and packaging is reviewed with Allen-Bradley.*

Input Conditioning

In general, the 1336 IMPACT drive is suitable for direct connection to a correct voltage AC line that has a minimum impedance of 1% (3% for 0.37-22 kW/0.5-30 HP drives) relative to the rated drive input kVA. If the line has a lower impedance, a line reactor or isolation transformer must be added before the drive to increase line impedance. If the line impedance is too low, transient voltage spikes or interruptions can create excessive current spikes that will cause nuisance input fuse blowing and may cause damage to the drive power structure.

The basic rules for determining if a line reactor or isolation type transformer is required are as follows:

1. If the AC input power system does not have a neutral or one phase referenced to ground (Refer to **Ungrounded Distribution Systems**), an isolation transformer with the neutral of the secondary grounded is highly recommended. If the line-to-ground voltages on any phase can exceed 125% of the nominal line-to-line voltage, an isolation transformer with the neutral of the secondary grounded, is always required.
2. If the AC line supplying the drive has power factor correction capacitors that are switched in and out, an isolation transformer or 5% reactors are recommended between the capacitors and drive. If the capacitors are permanently connected and not switched, the general rules for impedance mismatch above apply.
3. If the AC line frequently experiences transient power interruptions or significant voltage spikes, an isolation transformer or 5% reactors are recommended.

Line reactors and isolation transformers can be ordered as loose items or installed in the drive enclosure.

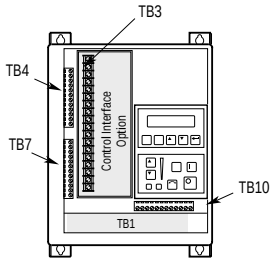
AC Supply Source

1336 IMPACT drives are suitable for use on a circuit capable of delivering up to a maximum of 200,000 rms symmetrical amperes, 600 volts maximum when used with the AC input line fuses specified on **Page 32.**

Typical Component and Terminal Block Locations

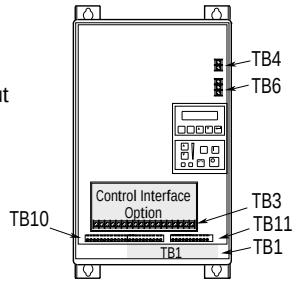
ATTENTION: The national codes and standards (NEC, VDE, BSA, etc.) and local codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire type, conductor sizes, branch circuit protection, and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

TB1	Power Terminal Block
TB4, 7, 10	Control & Signal Wiring
TB3	Control Interface Option

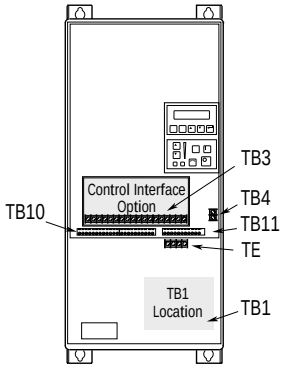


Frame Reference A1-A4

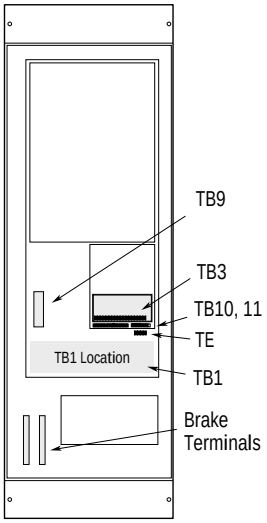
TB1	Power Terminal Block
TB10, 11	Control & Signal Wiring
TB3	Control Interface Option
TB4	24V DC Auxiliary Input
TB6	High Voltage DC Auxiliary Input
TB9	480V Output (F Frame Only)
TE	Shield Terminals



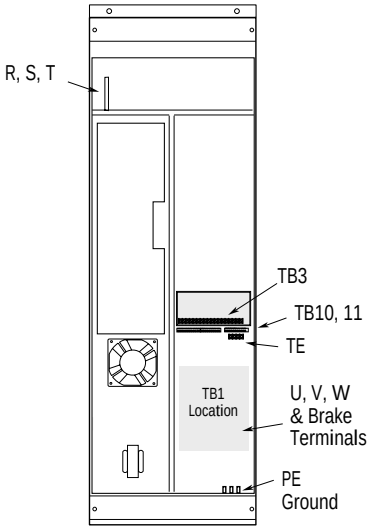
Frames B, C



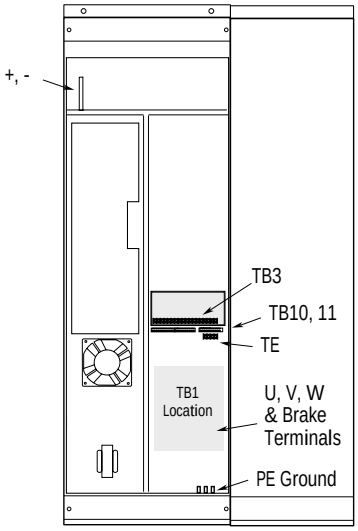
Frames D, E



Frame F



Frame G



Frame H (Preliminary)

Power Wiring

Input and output power connections are performed through terminal block, TB1. For maintenance and setup procedures, the drive may be operated without a motor connected.

ATTENTION: If you install control and signal wiring with an insulation rating of less than 600V, you must route this wiring inside the drive enclosure so that it is separated from any other wiring and uninsulated live parts. If you do not separate these wires, you may damage your equipment or have unsatisfactory drive performance.

ATTENTION: The hazard for injury or death from electric shock may exist if a disconnecting means is wired to drive output terminals and is opened during drive operation. Any disconnecting means wired to drive output terminals U, V, and W must be capable of disabling the drive if opened during drive operation. An auxiliary contact must be used to simultaneously disable the drive.

Input Fuses and Circuit Breakers

1336 IMPACT drive can be installed with either input fuses or an input circuit breaker. Local/national electrical codes may determine additional requirements for these installations.

Installations Per U.S. NEC/UL/CSA

Fuses

In general, the specified fuses are suitable for branch short circuit protection and provide excellent short circuit protection for the drive. The fuses offer a high interrupting capacity and are fast acting. Refer to the North American selections in the table on **Page 32**.

Circuit Breakers

The Westinghouse HMCP breakers specified in the table on **Page 26-27** also provide branch short circuit protection. Because circuit breakers are typically slower than fuses and those listed are magnetic trip only, they may not be as effective in offering short circuit protection to the drive in the event of an internal drive short circit. They may not be as effective in limiting damage to the drive.

IEC Installations

Fuses

For those installations that are not required to meet the U.S. NEC/UL/CSA, the specified fuses are suitable for branch short circuit protection and provide excellent short circuit protection for the drive. The fuses offer a high interrupting capacity and are fast acting. Refer to the European selections in the table on **Page 32**.

Circuit Breakers

For those installations that are not required to meet the U.S. NEC/UL/CSA requirements, additional devices are available as input circuit breakers. The Bulletin 140 and KTA3 devices meet the circuit breaker requirements of IEC947-2, but do not meet UL/CSA circuit breaker requirements. They can be used in “non-U.S.” installations where local/national codes allow, if they are installed per their installation instructions.

ATTENTION: The 1336 IMPACT drive does not provide input power short circuit protection. Specifications for the recommended fuse or circuit breaker to provide drive input power protection against short circuits are provided.

1336 IMPACT AC Drive Pre-Installation

Recommended AC Line Circuit Breakers (user supplied)

Drive Catalog Number	Maximum Rated VT kW (HP)	IEC Installations per IEC947-2 Bulletin 140 Circuit Breaker[1]		UL/CSA Installations HMCP Circuit Breaker[2]		
		Catalog Number	Rated Service Short Circuit Capability	Catalog Number	MCP Trip Setting	Max. Short Circuit Amps[3]
			400/415V			480V
1336E-AQF05	0.37 (0.5)	140-MN-0400	100,000	HMCPS007C0	H	65,000
1336E-AQF07	0.56 (0.75)	140-MN-0400	100,000	HMCPS015E0C	E	65,000
1336E-AQF10	0.75 (1)	140-MN-0630	100,000	HMCPS015E0C	E	65,000
1336E-AQF15	1.2 (1.5)	140-MN-1000	16,000	HMCPS015E0C	F	65,000
1336E-AQF20	1.5 (2)	140-MN-1000	16,000	HMCPS030H1C	E	65,000
1336E-AQF30	2.2 (3)	140-MN-1600	6,000	HMCPS030H1C	F	65,000
1336E-AQF50	3.7 (5)	140-MN-2500	6,000	HMCPS030H1C	H	65,000
1336E-A007	5.5 (7.5)	140-CMN-4000	65,000	HMCPS030H1C	H	65,000
1336E-A010	7.5 (10)	140-CMN-4000	65,000	HMCPS050K2C	F	65,000
1336E-A015	11 (15)	140-CMN-6300	50,000	HMCPS050K2C	H	65,000
1336E-A020	15 (20)	140-CMN-6300	50,000	HMCPS100R3C	G	65,000
1336E-A025	18.5 (25)	140-CMN-9000	25,000	HMCPS100R3C	H	65,000
1336E-A030	22 (30)	140-CMN-9000	25,000	HMCPS100R3C	H	65,000
1336E-A040	30 (40)	KTA3-160S-125	65,000	HMCP150T4C	F	65,000
1336E-A050	37 (50)	KTA3-160S-160	65,000	HMCP150T4C	G	65,000
1336E-A060	45 (60)	KTA3-250S-200	65,000	HMCP250A5	E	65,000
1336E-A075	56 (75)	KTA3-250S-250	65,000	HMCP250A5	E	65,000
1336E-A100	75 (100)	KTA3-400S-320	65,000	HMCP400J5	I	65,000
1336E-A125	93 (125)	KTA3-400S-320	65,000	HMCP400J5	I	65,000
1336E-BRF05	0.37 (0.5)	140-MN-0250	100,000	HMCPS003A0	E	65,000
1336E-BRF07	0.56 (0.75)	140-MN-0250	100,000	HMCPS003A0	G	65,000
1336E-BRF10	0.75 (1)	140-MN-0400	100,000	HMCPS003A0	G	65,000
1336E-BRF15	1.2 (1.5)	140-MN-0400	100,000	HMCPS007C0	B	65,000
1336E-BRF20	1.5 (2)	140-MN-0630	100,000	HMCPS007C0	C	65,000
1336E-BRF30	2.2 (3)	140-MN-1000	16,000	HMCPS015E0C	B	65,000
1336E-BRF50	3.7 (5)	140-MN-1000	16,000	HMCPS015E0C	D	65,000
1336E-BRF75	5.5 (7.5)	140-MN-1600	6,000	HMCPS015E0C	H	65,000
1336E-BRF100	7.5 (10)	140-MN-2000	6,000	HMCPS030H1C	H	65,000
1336E-B010	11 (15)	140-MN-2000	6,000	HMCPS030H1C	E	65,000
1336E-B015	15 (20)	140-MN-2500	6,000	HMCPS030H1C	H	65,000
1336E-B020	18.5 (25)	140-CMN-4000	65,000	HMCPS050K2C	H	65,000
1336E-B025	22 (30)	140-CMN-4000	65,000	HMCPS050K2C	H	65,000
1336E-B030	22 (30)	140-CMN-6300	50,000	HMCPS050K2C	H	65,000
1336E-BX040	30 (40)	140-CMN-6300	50,000	HMCPS050K2C	H	65,000
1336E-B040	37 (50)	140-CMN-6300	50,000	HMCPS100R3C	G	65,000
1336E-B050	45 (60)	140-CMN-9000	25,000	HMCPS100R3C	G	65,000
1336E-BX060	45 (60)	140-CMN-9000	25,000	HMCPS100R3C	G	65,000
1336E-B060	56 (75)	KTA3-160S-125	65,000	HMCPS150T4C	F	65,000
1336E-B075	75 (100)	KTA3-160S-125	65,000	HMCPS150T4C	H	65,000
1336E-B100	93 (125)	KTA3-160S-160	65,000	HMCPS150U4C	E	65,000
1336E-B125	112 (150)	KTA3-250S-200	65,000	HMCP250K5	H	65,000
1336E-BX150	112 (150)	KTA3-250S-200	65,000	HMCP250K5	H	65,000
1336E-B150	149 (200)	KTA3-400S-320	65,000	HMCP250L5	I	65,000
1336E-B200	187 (250)	KTA3-400S-320	65,000	HMCP400N5	H	65,000
1336E-B250	224 (300)	KTA3-400S-400	65,000	HMCP400N5	I	65,000
1336E-BP250	224 (300)	KTA3-400S-400	65,000	HMCP400R5	I	65,000
1336E-B300	261 (350)	NA	—	NA	—	—
1336E-BP300	261 (350)	KTA3-400S-400	65,000	HMCP400R5	I	65,000
1336E-B350	298 (400)	NA		NA	—	—
1336E-BP350	261 (350)			HMCP600L6W	E	65,000
1336E-B400	336 (450)			NA	—	—
1336E-BP400	298 (400)			HMCP600L6W	E	65,000
1336E-B450	373 (500)			NA	—	—
1336E-BP450	336 (450)			HMCP600L6W	E	65,000
1336E-B500	448 (600)			NA	—	—
1336E-B600	448 (600)			NA	—	—

Recommended AC Line Circuit Breakers (user supplied) (continued)

Drive Catalog Number	Maximum Rated VT kW (HP)	IEC Installations per IEC947-2 Bulletin 140 Circuit Breaker[1]		UL/CSA Installations HMCP Circuit Breaker[2]		
		Catalog Number	Rated Service Short Circuit Capability	Catalog Number	MCP Trip Setting	Max. Short Circuit Amps[3]
			400/415V			480V
1336E-C001	0.75 (1)	140-MN-0400	100,000	HMCPS003A0	E	65,000
1336E-C003	2.2 (3)	140-MN-0630	100,000	HMCPS007C0	E	65,000
1336E-C007	5.5 (7.5)	140-MN-1000	16,000	HMCPS015E0C	E	65,000
1336E-C010	7.5 (10)	140-MN-1600	6,000	HMCPS015E0C	E	65,000
1336E-C015	11 (15)	140-MN-2000	6,000	HMCPS030H1C	F	65,000
1336E-C020	15 (20)	140-MN-2500	6,000	HMCPS030H1C	H	65,000
1336E-C025	18.5 (25)	140-CMN-4000	65,000	HMCPS050K2C	E	65,000
1336E-C030	22 (30)	140-CMN-4000	65,000	HMCPS050K2C	G	65,000
1336E-C040	30 (40)	140-CMN-6300	50,000	HMCPS050K2C	G	65,000
1336E-C050	37 (50)	140-CMN-6300	50,000	HMCPS100R3C	E	65,000
1336E-C060	45 (60)	140-CMN-6300	50,000	HMCPS100R3C	E	65,000
1336E-C075	56 (75)	140-CMN-9000	25,000	HMCPS100R3C	G	65,000
1336E-C100	75 (100)	KTA3-160S-125	65,000	HMCP150T4C	E	65,000
1336E-C125	93 (125)	KTA3-160S-160	65,000	HMCP150T4C	E	65,000
1336E-C150	112 (150)	KTA3-400S-160	65,000	HMCP250J5	G	65,000
1336E-C200	149 (200)	KTA3-400S-320	65,000	HMCP250K5	I	65,000
1336E-C250	187 (250)	KTA3-400S-320	65,000	HMCP400W5	G	65,000
1336E-CX300	224 (300)	KTA3-400S-320	65,000	HMCP400W5	H	65,000
1336E-C300	224 (300)	KTA3-400S-320	65,000	NA		
1336E-C350	261 (350)	KTA3-400S-400	65,000			
1336E-C400	298 (400)	KTA3-400S-400	65,000			
1336E-C450	336 (450)	NA				
1336E-C500	373 (500)					
1336E-C600	448 (600)					

NA = *Not Available – No device exists, uses fuses shown on* ***Page 32***.

[1] *Bulletin 140 – At 480 volts, circuit breaker must have a fuse backup. Refer to the AB Industrial Control Catalog. At 600 volts, additional restrictions apply. Not limitations in source short circuit ratings.*

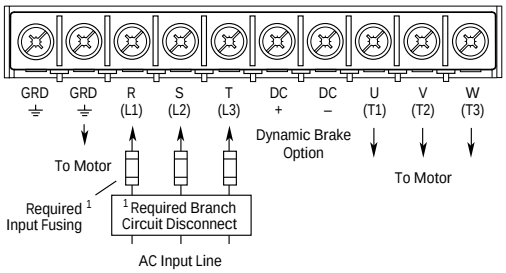
[2] *HMCP Circuit Breaker – HMCP Breaker is a magnetic trip device only. Always set the trip setting as low as possible in a particular application. Note information in HMCP application handbook.*

[3] *Current limiting option can extend this value to 200,000A RMS.*

Power Wiring — TB1

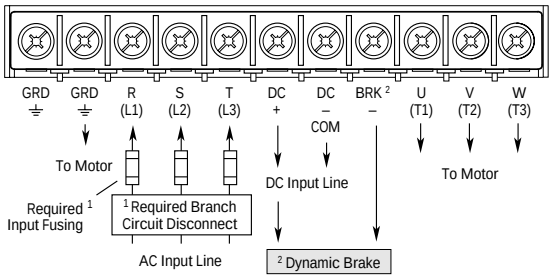
A1-A3 Frame

200-240V, 0.37-3.7 kW (0.5-5 HP) Terminal Designations
380-480V, 0.37-3.7 kW (0.5-5 HP) Terminal Designations



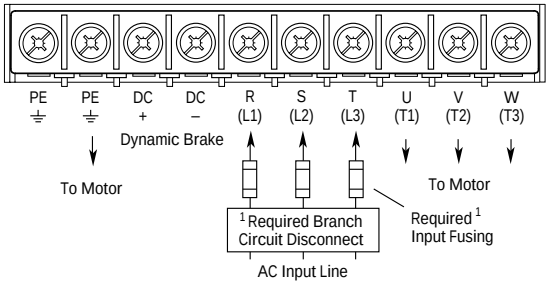
A4 Frame

380-480V, 5.5-7.5 kW (7.5-10 HP) Terminal Designations
500-600V, 0.75-7.5 kW (1-10 HP) Terminal Designations



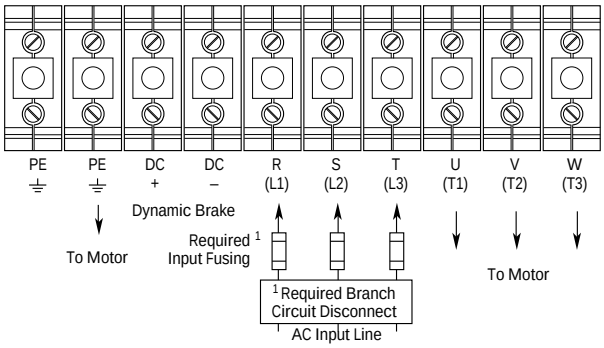
B1 Frame

200-240V, 5.5 kW (7.5 HP) Terminal Designations
380-480/500-600V, 5.5-11 kW (15 HP) Terminal Designations



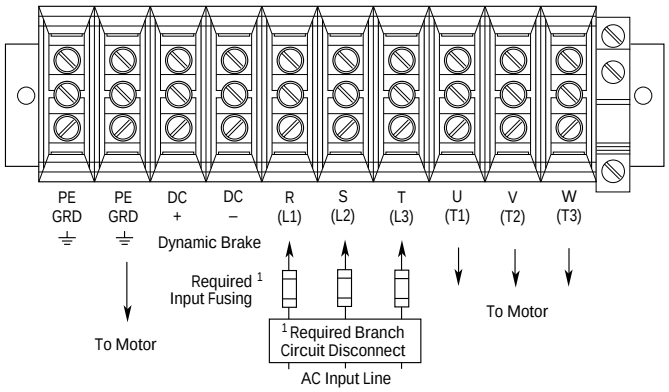
B2 Frame

200-240V, 7.5-11 kW (10-15 HP) Terminal Designations
380-480V, 15-22 kW (20-30 HP) Terminal Designations
500-600V, 15 kW (20 HP) Terminal Designations



C Frame

200-240V, 15-22 kW (20-30 HP) Terminal Designations
380-480V, 30-45 kW (40-60 HP) Terminal Designations
500-600V, 18.5-45 kW (25-60 HP) Terminal Designations



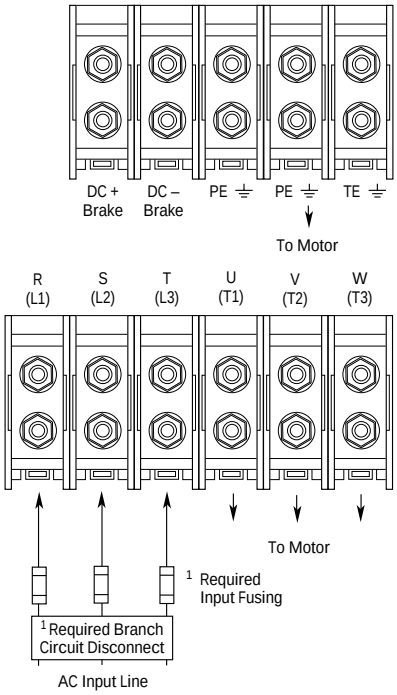
[1] *User supplied.*

[2] *Before wiring your dynamic brake for the A4 frame, double check the terminals. You should attach the + terminal on the brake to the DC+ terminal on your drive and the - terminal on the brake to the BRK - terminal on your drive. If your BRK - terminal i s labeled VBUS -, connect the - terminal on the brake to the VBUS - terminal on your drive.*

Power Wiring — TB1

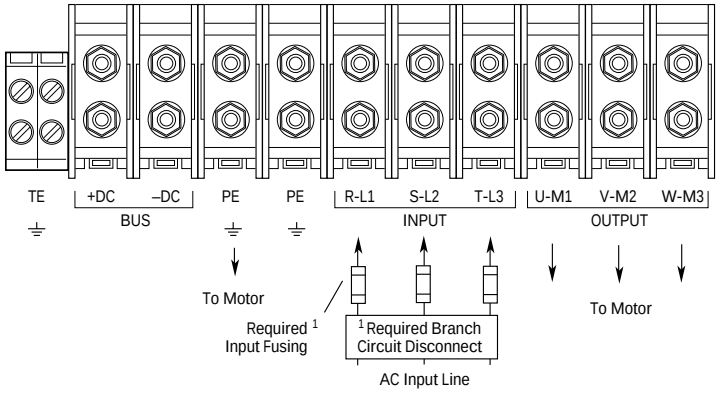
D Frame

200-240V, 30-45 kW (40-60 HP) Terminal Designations
380-480V, 45-112 kW (60-150 HP) Terminal Designations
500-600V, 56-112 kW (75-150 HP) Terminal Designations



E Frame

200-240V, 56-75 kW (75-100 HP) Terminal Designations
380-480V, 112-187 kW (150-250 HP) Terminal Designations
500-600V, 112-149 kW (150-200 HP) Terminal Designations

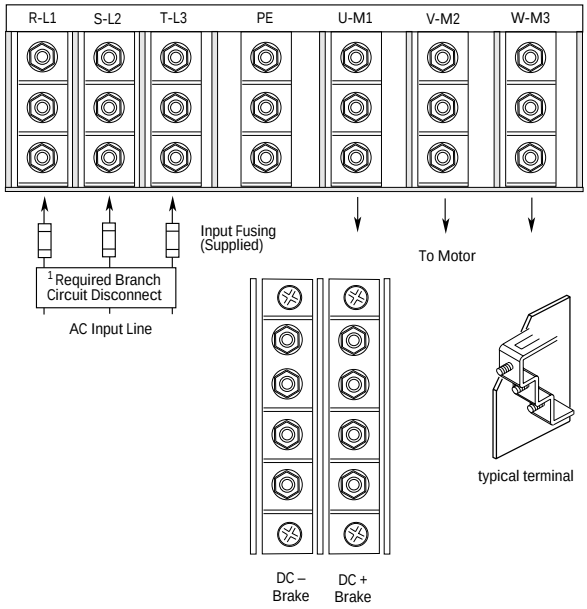


[1] *User supplied.*

Power Wiring — TB1

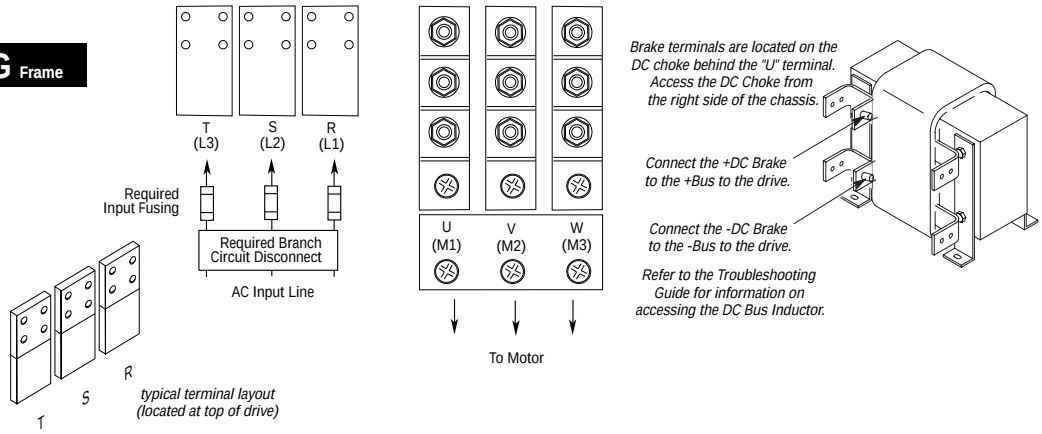
380-480V, 187-336 kW (250-450 HP) Terminal Designations

F Frame



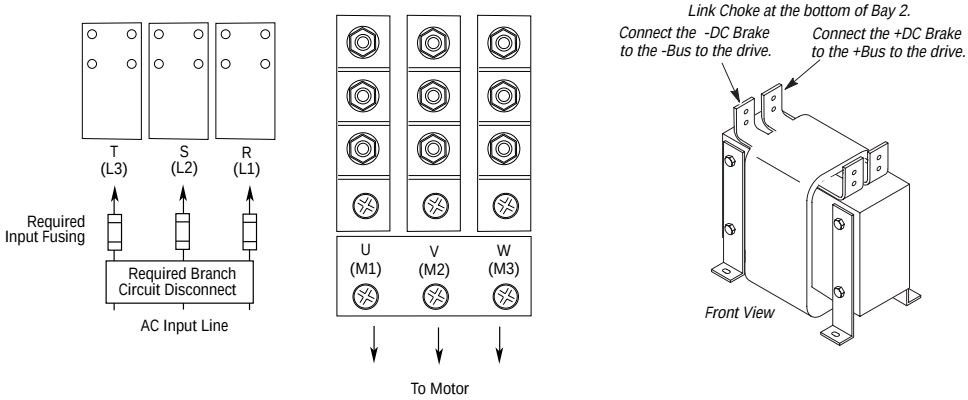
380-480V, 224-448 kW (300-600 HP) Terminal Designations
500-600V, 187-448 kW (250-600 HP) Terminal Designations

G Frame



380-480V, 522-597 kW (700-800 HP) Terminal Designations
500-600V, 522-597 kW (700-800 HP) Terminal Designations

H Frame



[1] *User supplied.*

Power Wiring — TB1

ATTENTION: An incorrectly applied or installed system can result in component damage or reduction in product life. The most common causes are:

- Wiring AC line to drive output or control terminals.
- Output circuits which do not connect directly to the motor.
- Incorrect or inadequate AC supply.
- Excessive ambient temperature.

Contact Allen-Bradley for assistance with application or wiring.

Power Wiring — TB1

Terminal	Description
PE ⏚	Power earth ground
TE ⏚	True earth ground
R (L1), S (L2), T (L3)	AC Line Input Terminals
+DC, -DC	DC Bus Terminals
U (T1), V (T2), W (T3)	Motor Connection

TB1 Specifications — Use 75° C Rated Copper Wire Only

Terminal Block Type	Max./Min. Wire Size[1] mm^2 (AWG)	Maximum Torque N-m (lb.-in.)[1]
A1 -A4 **(Page 28)**	5.3/0.8 (10/18)	1.81 (16)
B1 **(Page 28)**	8.4/0.8 (8/18)	1.81 (16)
B2 **(Page 28)**	13.3/0.5 (6/20)	1.70 (15)
C **(Page 28)**	26.7/0.8 (3/18)	5.65 (50)
D **(Page 29)**[3]	127.0/2.1 (250 MCM/14) 67.4/2.1 (00/14)[2]	6.00 (52) 6.00 (52)
E **(Page 29)**[3]	253.0/2.1 (500 MCM/14)	10.00 (87)
F **(Page 30)**[3]	303.6/2.1 (600 MCM/14)	23.00 (200)
G **(Page 30)**[3]	303.6/2.1 (600 MCM/14)	23.00 (200)
H **(Page 30)**[3]	303.6/2.1 (600 MCM/14)	23.00 (200)

1 *Wire sizes given are maximum/minimum sizes that TB1 will accept – these are not recommendations.*

2 *Applies to 30 kW (40 HP) 200-240V, 45 & 56 kW (60 & 75 HP) 380-480V, 56 kW (75 HP) 500-600V drives only.*

3 *These configurations of TB1 are stud type terminations and require the use of lug type connectors to terminate the field installed conductors. Lug kits (1336-LUG-xxxx) are available for use with these configurations. Wire size used is determined by selecting the proper lug kit based on the drive catalog number.*

Power Wiring — TB1

ATTENTION: The 1336 IMPACT does not provide input power short circuit fusing. Specifications for the recommended fuse size and type to provide drive input power protection against short circuits are provided below. Branch circuit breakers or disconnect switches cannot provide this level of protection for drive components.

Maximum Recommended AC Input Line Fuse Ratings – fuses are user supplied

European Installations	North American Installations	Drive Catalog Number	kW (HP) Rating	200-240V Rating	380-480V Rating	500-600V Rating
The recommended fuse is Class gG, general industrial applications and motor circuit protection. BS88 (British Standard) Parts 1 & 2 *, EN60269-1, Parts 1 & 2, type gG or equivalent should be used for these drives. Fuses that meet BS88 Parts 1 & 2 are acceptable for Frames A - F. * Typical designations include, but may not be limited to the following: Parts 1 & 2: AC, AD, BC, BD, CD, DD, ED, EFS, EF, FF, FG, GF, GG, GH.	UL requirements specify that UL Class CC, T or J [1] fuses must be used for all drives in this section*. * Typical designations include: Type CC: KTK, FNQ-R Type J: JKS, LPJ Type T: JJS, JJN	1336E- _ _ F05, 7	0.37-0.56 (0.5-0.75)	6A [4]	3A [4]	—
		1336E- _ _ F10	0.75 (1)	10A [4]	6A [4]	3A
		1336E- _ _ F15	1.2 (1.5)	15A [4]	6A [4]	—
		1336E- _ _ F20	1.5 (2)	15A [4]	10A [4]	6A
		1336E- _ _ F30	2.2 (3)	25A [4]	15A [4]	10A
		1336E- _ _ F50	3.7 (5)	40A [4]	20A [4]	10A
		1336E- _ _ F75	5.5 (7.5)	40A	20A	15A
		1336E- _ _ F100	7.5 (10)	50A	30A	20A
		1336E- _ _ 001	0.75 (1)	10A	6A	6A
		1336E- _ _ 003	2.2 (3)	15A	10A	10A
		1336E- _ _ 007	5.5 (7.5)	40A	20A	15A
		1336E- _ _ 010	7.5 (10)	50A	30A	20A
		1336E- _ _ 015	11 (15)	70A	35A	25A
		1336E- _ _ 020	15 (20)	100A	45A	35A
		1336E- _ _ 025	18.5 (25)	100A	60A	40A
		1336E- _ _ 030	22 (30)	125A	70A	50A
		1336E- _ _ X040	30 (40)	150A	80A	60A
		1336E- _ _ 040	30 (40)	150A	80A	60A
		1336E- _ _ 050	37 (50)	200A	100A	80A
		1336E- _ _ X060	45 (60)	—	100A	—
		1336E- _ _ 060	45 (60)	250A	125A	90A
		1336E- _ _ 075	56 (75)	300A	150A	110A
		1336E- _ _ 100	75 (100)	400A	200A	150A
		1336E- _ _ 125	93 (125)	450A	250A	175A
		1336E- _ _ X150	112 (150)	—	250A	—
		1336E- _ _ 150	112 (150)	—	300A	225A
		1336E- _ _ 200	149 (200)	—	400A	350A
		1336E- _ _ 250	187 (250)	—	450A	400A
		1336E- _ _ X300	224 (300)	—	—	400A
The recommended fuse is Class gG, general industrial applications and motor circuit protection. BS88 (British Standard) Part 4, EN60269-1, Part 4 *, type gG semiconductor fuses or equivalent should be used for these drives. G Frame drives require semiconductor fuses and should be fused with Part 4 fuses. * Typical designations include, but may not be limited to the following: Part 4: CT, ET, FE, EET, FEE, RFEE, FM, FMM.	Bussmann FWP/Gould Shawmut A-70Q or QS semiconductor type fuses must be used for all drives in this section.	1336E- _ _ 300	224 (300)	—	500A	400A
		1336E- _ _ P300 [2]	224 (300)	—	500A [2]	—
		1336E- _ _ 350	261 (350)	—	600A	450A
		1336E- _ _ P350 [2]	261 (350)	—	600A [2]	—
		1336E- _ _ 400	298 (400)	—	600A	500A
		1336E- _ _ P400 [2]	298 (400)	—	600A [2]	—
		1336E- _ _ 450	336 (450)	—	800A	600A
		1336E- _ _ P450 [2]	336 (450)	—	700A [2]	—
		1336E- _ _ 500	373 (500)	—	800A	800A
		1336E- _ _ 600	448 (600)	—	900A	800A
		1336E- _ _ 650	485 (650)	—	—	800A
		1336E- _ _ 700C	522 (700)	—	600A [3]	700A [3]
		1336E- _ _ 800C	597 (800)	—	700A [3]	700A [3]

[1] *For all types listed, both fast acting and slow blow are acceptable.*

[2] *Fuses are supplied with F frame drives.*

[3] *Two fuses in parallel are required.*

[4] *Dual element – time delay fuses are recommended.*

Motor Cables

A variety of cable types are acceptable for drive installations. For many installations, unshielded cable is adequate, provided it can be separated from sensitive circuits. As an approximate guide, allow a spacing of 0.3 meter (1 foot) for every 10 meters (32.8 feet) of length. In all cases, long parallel runs must be avoided. Do not use cable with an insulation thickness ≤ 15 mils.

The cable should be 4-conductor with the ground lead being connected directly to the drive ground terminal (PE) and the motor frame ground terminal.

Shielded Cable

Shielded cable is recommended if sensitive circuits or devices are connected or mounted to the machinery driven by the motor. The shield must be connected to the drive ground and motor frame ground. It is important that the connection be made at both ends to minimize interference.

If cable trays or large conduits are to be used to distribute the motor leads for multiple drives, shielded cable is recommended to reduce or capture the noise from the motor leads and minimize "cross coupling" of noise between the leads of different drives. The shield should be connected to the ground connections at both the motor and drive ends.

Armored cable also provides effective shielding. Ideally it should be grounded only at the drive (PE) and motor frame. Some armored cable has a PVC coating over the armor to prevent incidental contact with grounded structure. If, due to the type of connector, the armor must be grounded at the cabinet entrance, shielded cable should be used within the cabinet if power leads will be run close to control signals.

Conduit

If metal conduit is preferred for cable distribution, the following guidelines must be followed.

1. Drives are normally mounted in cabinets and ground connections are made at a common ground point in the cabinet. Normal installation of conduit provides grounded connections to both the motor frame (junction box) and drive cabinet ground. These ground connections help minimize interference. This is a noise reduction recommendation only and does not affect the requirements for safety grounding.
2. No more than three sets of motor leads can be routed through a single conduit. This will minimize "cross talk" that could reduce the effectiveness of the noise reduction methods described. If more than three drive/motor connections per conduit are required, shielded cable as described above must be used. If practical, each conduit should contain only one set of motor leads.

ATTENTION: To avoid a possible shock hazard caused by induced voltages, unused wires in the conduit must be grounded at both ends. For the same reason, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled. This will eliminate the possible shock hazard from "cross coupled" drive motor leads.

Motor Lead Lengths

Installations with long cables to the motor may require the addition of output reactors or cable terminators to limit voltage reflections at the motor. Refer to the table below for the maximum length cable allowed for various installation techniques. For installations that exceed the recommended maximum lengths listed, contact the factory.

Cable Charging Current

While cable length limits for reflected wave protection should be followed, drives rated 0.37 to 1.2 kW (0.5 to 1.5 HP) may have additional cable length restrictions. Capacitive charging of long motor cables may divert current in excess of the rating of a smaller drive. To assure proper operation, limit smaller drives to the distances listed below, then take the appropriate protection for voltage reflection listed on **Pages 34 and 35.**

Cable Derating for PWM Frequency – 0.37-1.2 KW (0.5-1.5 HP) Only

Drive PWM Frequency	Shielded Cable	Unshielded Cable
2 kHz	91 m (300 ft.)	91 m (300 ft.)
4 kHz	91 m (300 ft.)	60 m (200 ft.)
8 kHz	30 m (100 ft.)	30 m (100 ft.)
12 kHz	30 m (100 ft.)	30 m (100 ft.)

Motor Cables

Motor Lead Lengths

Installations with long cables to the motor may require the addition of output reactors or cable terminators to limit voltage reflections at the motor. Refer to the following tables for the maximum length cable allowed for various installation techniques. For installations that exceed the recommended maximum lengths listed, contact the factory.

Maximum Motor Cable Length Restrictions — 380V-480V Drives[1]

			No External Devices				w/1204-TFB2 Term.			w/1204-TFA1 Terminator					Reactor at Drive [2]	
			Motor				Motor			Motor					Motor	
			A	B	1329	1329R, HR & L	A or B		1329	A		B		1329	A	B or 1329
Drive Frame	**Drive kW** (HP)	**Motor kW** (HP)	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable* [7]	**Cable Type** *Shld.* [3]	*Unshld.*	*Any Cable*	**Cable Type** *Shld.* [3]	*Unshld.*	**Cable Type** *Shld.* [3]	*Unshld.*	*Any Cable*	*Any Cable*	*Any Cable*
A1	0.37 (0.5)	0.37 (0.5)	12.2 (40)	33.5 (110)	114.3 (375)	91.4 (300)	Use 1204-TFA1 Terminator			30.5 (100)	61.0 (200)	30.5 (100)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
	0.75 (1)	0.75 (1)	12.2 (40)	33.5 (110)	114.3 (375)	91.4 (300)				30.5 (100)	30.5 (100)	30.5 (100)	30.5 (100)	182.9 (600)	22.9 (75)	182.9 (600)
		0.37 (0.5)	12.2 (40)	33.5 (110)	114.3 (375)	91.4 (300)				30.5 (100)	61.0 (200)	30.5 (100)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
A2	1.2 (1.5)	1.2 (1.5)	12.2 (40)	33.5 (110)	114.3 (375)	91.4 (300)				30.5 (100)	30.5 (100)	61.0 (200)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
		0.75 (1)	12.2 (40)	33.5 (110)	114.3 (375)	91.4 (300)				30.5 (100)	30.5 (100)	61.0 (200)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
		0.37 (0.5)	12.2 (40)	33.5 (110)	114.3 (375)	121.9 (400)				30.5 (100)	30.5 (100)	61.0 (200)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
	1.5 (2)	1.5 (2)	7.6 (25)	12.2 (40)	114.3 (375)	91.4 (300)	91.4 (300)	91.4 (300)	91.4 (300)	30.5 (100)	30.5 (100)	91.4 (300)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
		1.2 (1.5)	7.6 (25)	12.2 (40)	114.3 (375)	182.9 (600)	91.4 (300)	182.9 (600)	182.9 (600)	30.5 (100)	30.5 (100)	91.4 (300)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
		0.75 (1)	7.6 (25)	12.2 (40)	114.3 (375)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	30.5 (100)	30.5 (100)	91.4 (300)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
		0.37 (0.5)	7.6 (25)	12.2 (40)	114.3 (375)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	30.5 (100)	30.5 (100)	91.4 (300)	61.0 (200)	182.9 (600)	22.9 (75)	182.9 (600)
	2.2 (3)	2.2 (3)	7.6 (25)	12.2 (40)	114.3 (375)	91.4 (300)	182.9 (600)	182.9 (600)	182.9 (600)	Use 1204-TFB2 Terminator					22.9 (75)	182.9 (600)
		1.5 (2)	7.6 (25)	12.2 (40)	114.3 (375)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
		0.75 (1)	7.6 (25)	12.2 (40)	114.3 (375)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
		0.37 (0.5)	7.6 (25)	12.2 (40)	114.3 (375)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
A3	3.7 (5)	3.7 (5)	7.6 (25)	12.2 (40)	114.3 (375)	**Note** For applications/ installations using new motors, no restrictions in lead length due to voltage reflection are necessary. You should observe standard practices for voltage drop, cable capacitance, and other issues. For retrofit situations, check with the motor manufacturer for insulation rating.	182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
		2.2 (3)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
		1.5 (2)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
		0.75 (1)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
		0.37 (0.5)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						22.9 (75)	182.9 (600)
A4	5.5-7.5 (7.5-10)	5.5-7.5 (7.5-10)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						24.4 (80)	182.9 (600)
B	5.5-22 (7.5-30)	5.5-22 (7.5-30)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						24.4 (80)	182.9 (600)
C	30-45 (X40-X60)	30-45 (40-60)	7.6 (25)	12.2 (40)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						76.2 (250)	182.9 (600)
D	45-112 (60-X150)	45-112 (60-150)	12.2 (40)	30.5 (100)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						61.0 (200)	91.4 (300)
E	112-187 (150-250)	112-224 (150-300)	12.2 (40)	53.3 (175)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						182.9 (600)	182.9 (600)
F	224-336 (300-450)	224-336 (300-450)	18.3 (60)	53.3 (175)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						182.9 (600)	182.9 (600)
G	224-448 (300-600)	224-448 (300-600)	18.3 (60)	53.3 (175)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						182.9 (600)	182.9 (600)
H	522-597 (700-800)	522-597 (700-800)	18.3 (60)	53.3 (175)	114.3 (375)		182.9 (600)	182.9 (600)	182.9 (600)						182.9 (600)	182.9 (600)

Type A Motor Characteristics: No phase paper or misplaced phase paper, lower quality insulation systems, corona inception voltages between 850 and 1000 volts.

Type B Motor Characteristics: Properly placed phase paper, medium quality insulation systems, corona inception voltages between 1000 and 1200 volts.

1329R Motors: These AC Variable Speed motors are "Power Matched" for use with Allen-Bradley Drives. Each motor is energy efficient and designed to meet or exceed the requirements of the Federal Energy Act of 1992. All 1329R motors are optimized for variable speed operation and include premium inverter grade insulation systems which meet or exceed NEMA MG1, Part 31.40.4.2.

Motor Cables

Maximum Motor Cable Length Restrictions — 500V-600V Drives [4]

All cable lengths given in meters (feet)

			No External Devices			w/1204-TFB2 Terminator			w/1204-TFA1 Terminator			Reactor at Drive [2]		
			Motor w/Insulation V_{P-P}			Motor w/Insulation V_{P-P}			Motor w/Insulation V_{P-P}			Motor w/Insulation V_{P-P}		
			1000V	1200V	1600V [6]	1000V	1200V	1600V [6]	1000V	1200V	1600V [6]	1000V	1200V	1600V [6]
Drive Frame	**Drive kW (HP)**	**Motor kW (HP)**	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*	*Any Cable*
A4	0.75 (1)	0.75 (1)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)	Not Recommended		
		0.37 (0.5)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
	1.5 (2)	1.5 (2)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		1.2 (1.5)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		0.75 (1)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		0.37 (0.5)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
	2.2 (3)	2.2 (3)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		1.5 (2)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		0.75 (1)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		0.37 (0.5)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
	3.7 (5)	3.7 (5)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		2.2 (3)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		1.5 (2)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		0.75 (1)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
		0.37 (0.5)	NR	NR	15.2 (50)	NR	182.9 (600)	335.3 (1100)	NR	61.0 (200)	182.9 (600)			
B	5.5-15 (7.5-20)	5.5-15 (7.5-20)	NR	9.1 (30)	15.2 (50)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	30.5 (100)	91.4 (300)	182.9 (600)
C	18.5-45 (25-60)	18.5-45 (25-60)	NR	9.1 (30)	12.2 (40)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	30.5 (100)	91.4 (300)	182.9 (600)
D	56-93 (75-125)	56-93 (75-125)	NR	9.1 (30)	33.5 (110)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	61.0 (200)	91.4 (300)	182.9 (600)
E	112-224 (150-X300)	112-224 (150-X300)	NR	9.1 (30)	21.3 (70)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)
F	224-336 (300-450)	224-336 (300-450)	NR	9.1 (30)	41.1 (135)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)
G	224-448 (300-600)	224-448 (300-600)	NR	9.1 (30)	41.1 (135)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)
H	522-597 (700-800)	522-597 (700-800)	NR	9.1 (30)	41.1 (135)	91.4 (300)	182.9 (600)	182.9 (600)	NR	61.0 (200)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)

NR = *Not Recommended*

1 *Values shown are for 480V nominal input voltage and drive carrier frequency of 2 kHz. Consult factory regarding operation at carrier frequencies above 2 kHz. Multiply values by 0.85 for high line conditions. For input voltages of 380, 400 or 415V AC, multiply the table values by 1.25, 1.20 or 1.15, respectively.*

2 *A 3% reactor reduces motor and cable stress but may cause a degradation of motor waveform quality. Reactors must have a turn-turn insulation rating of 2100 volts or higher.*

3 *Includes wire in conduit.*

4 *Values shown are for nominal input voltage and drive carrier frequency of 2 kHz. Consult factory regarding operation at carrier frequencies above 2 kHz. Multiply values by 0.85 for high line conditions.*

5 *Information not available at time of printing.*

6 *1329R only.*

7 *These distance restrictions are due to charging of cable capacitance and may vary from application to application.*

Output Devices

Common Mode Cores

Common mode cores will help reduce the common mode noise at the drive output and guard against nuisance tripping of the drive caused by capacitive leakage effects. The capacitive currents are larger at higher PWM carrier frequencies. Refer to the table on **Page 59.**

Cable Termination

Optional Output Reactor

The reactors listed on **Page 59** can be used for drive input and output. These reactors are specifically constructed to accommodate IGBT inverter applications with switching frequencies up to 20 kHz. They have a UL approved dielectric strength of 4000 volts, opposed to a normal rating of 2500 volts. The first two and last two turns of each coil are triple insulated to guard against insulation breakdown resulting from high dv/dt. When using motor line reactors, it is recommended that the drive PWM frequency be set to its lowest value to minimize losses in the reactors.

Important: By using an output reactor the effective motor voltage will be lower because of the voltage drop across the reactor — This may also mean a reduction of motor torque.

Optional Cable Terminator

Voltage doubling at motor terminals, known as reflected wave phenomenon, standing wave or transmission line effect, can occur when using drives with long motor cables.

Inverter duty motors with phase-to-phase insulation ratings of 1200 volts or higher should be used to minimize effects of reflected wave on motor insulation life.

Applications with non-invertor duty motors or any motor with exceptionally long leads may require an output inductor or cable terminator. An inductor or terminator will help limit reflection to the motor, to levels which are less than the motor insulation rating.

Maximum recommended cable lengths for unterminated cables are listed on the previous page since the voltage doubling phenomenon occurs at different lengths for different drive ratings. If your installation requires longer motor cable lengths, a cable terminator or one of the line reactors listed on **Page 59** only is recommended.

Important: Terminator Cat. No. 1204-TFB2 carries the following restrictions – at any kW (HP) rating, the maximum drive carrier frequency = 2kHz, and the maximum cable run is 183 meters (600 feet).

Control Interface Wiring — TB3

User control interface inputs are connected through TB3 on the L4/L7E,L5/L8E and L6/L9E Option Boards. Each board has nine control inputs. The function of each input must be selected through programming.

A variety of combinations made up of the following inputs are available.

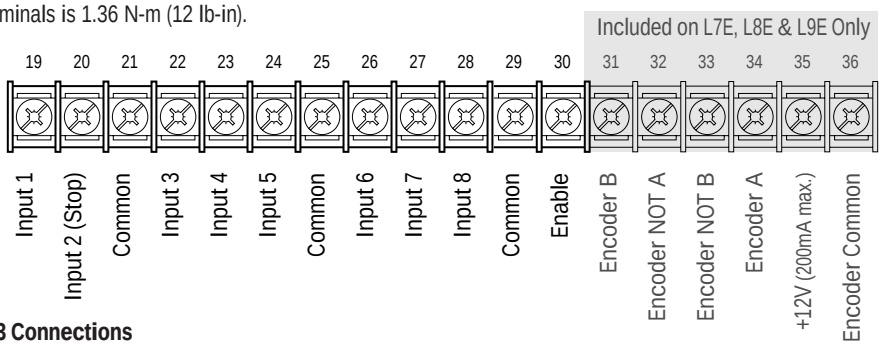
Start	**2 Accel/Decel Rates**	**2 Stop Mode Selects**	**3 Speed/Torque Selects**
Stop/Clear Fault	**3 Speed Selects**	**Run Forward**	**Ramp Disable**
Forward/Reverse	**Enable**	**Run Reverse**	
Digital Potentiometer (MOP)	**Reset**	**Local Control**	
Process Trim	**Jog**	**Flux Enable**	

ATTENTION: The drive is intended to be controlled by control input signals that will start and stop the motor. A device that routinely disconnects then reapplies line power to the drive for the purpose of starting and stopping the motor *IS NOT* recommended. If this type of circuit is used, a maximum of 3 stops in any 5-minute period with a minimum 1 minute rest between each cycle is required. These 5-minute periods must be separated by 10-minute rest cycles to allow the drive precharge resistors to cool. Refer to codes and standards applicable to your particular system for specific requirements and additional information.

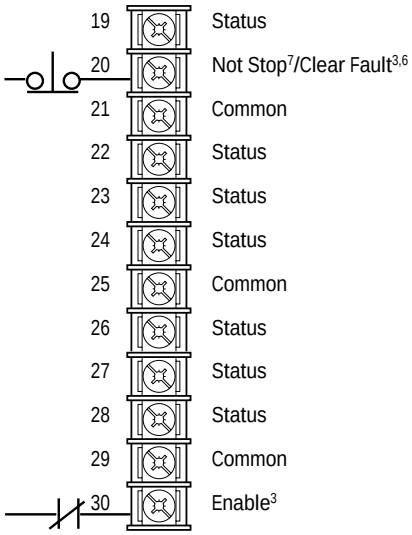
Control Interface Wiring — TB3

Maximum and Minimum Wire Size

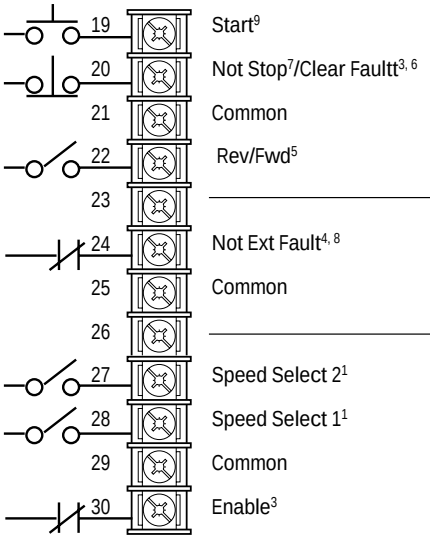
The maximum and minimum wire size accepted by TB3 is 2.1 and 0.30 mm2 (14 and 22 AWG). Maximum torque for all terminals is 1.36 N-m (12 lb-in).



Input Mode Selection and Typical TB3 Connections



***Input Mode* (parameter 102) = 1**
Factory Default



***Input Mode* (parameter 102) = 2-6, 17, 18, and 27**
Single-Source, Three-Wire Control

Mode

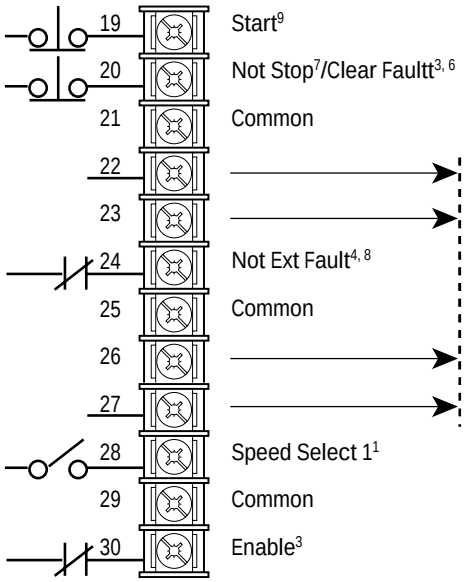
2	3	4	5[10]	6	17	18	27[10]
Jog	Stop Type[7]	2nd/1st Accel	Digital Pot UP	Jog	Process Trim	Flux Enable	Digital Pot UP
Speed Select 3[1]	Speed Select 3[1]	2nd/1st Decel	Digital Pot Dn	Local Control[2]	Ramp	Reset	Digital Pot Dn

1 *See Speed Select Table.*
2 *Drive must be stopped to take Local Control. Control by all other adapters is disabled (except Stop).*
3 *These inputs must be present before drive will start.*
4 *For Common Bus, this becomes Precharge Enable.*
5 *Bit 11 of Logic Options (parameter 17) must be 0 for reverse direction control.*
6 *For soft faults only. You need to recycle power to the drive or reset to clear hard faults. For hard faults, refer to the troubleshooting chapter.*
7 *To configure the stop type, refer to Logic Options (parameter 17).*
8 *This input must be present before the fault can be cleared and the drive will start. This can be disabled through Fault Select 2 (parameter 22) and Warning Select (parameter 23).*
9 *To configure the start type, refer to Logic Options (parameter 17). Latched (momentary) starts require a stop to stop the drive.*
10 *In Mode 5, the MOP value is not reset to zero when you stop. In Mode 7 the MOP value is reset to zero when you stop.*

Control Interface Wiring — TB3

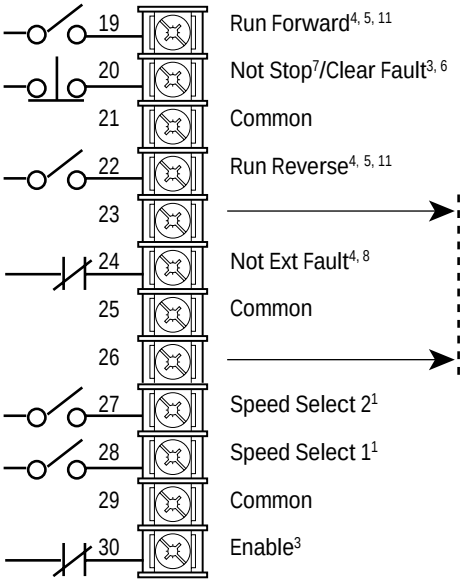
Input Mode Selection and Typical TB3 Connections

Input Mode **(parameter 102) = 7-11 and 19-22**
Multi-Source, Three-Wire Control



Mode

7	8	9	10	11	12	19	21	22	28[12]	29[12]
Reverse[5]	Reverse[5]	Digital Pot Up	Reverse[5]	1st Accel	Speed Torque 3[10]	Speed Torque 3[10]	Reverse[5]	Speed Torque 3[10]	Digital Pot Up	Reverse[5]
Forward[5]	Forward[5]	Digital Pot Dn	Forward[5]	2nd Accel	Speed Torque 2[10]	Speed Torque 2[10]	Forward[5]	Speed Torque 2[10]	Digital Pot Dn	Forward[5]
Jog	Speed Select 3[1]	Speed Select 3[1]	Digital Pot Up	1st Decel	Speed Torque 1[10]	Speed Torque 1[10]	Ramp	Speed Torque 1[10]	Speed Select 3[1]	Digital Pot Up
Speed Select 2[1]	Speed Select 2[1]	Speed Select 2[1]	Digital Pot Dn	2nd Decel	Process Trim	Flux Enable	Reset	Speed Select 2[1]	Speed Select 2[1]	Digital Pot Dn



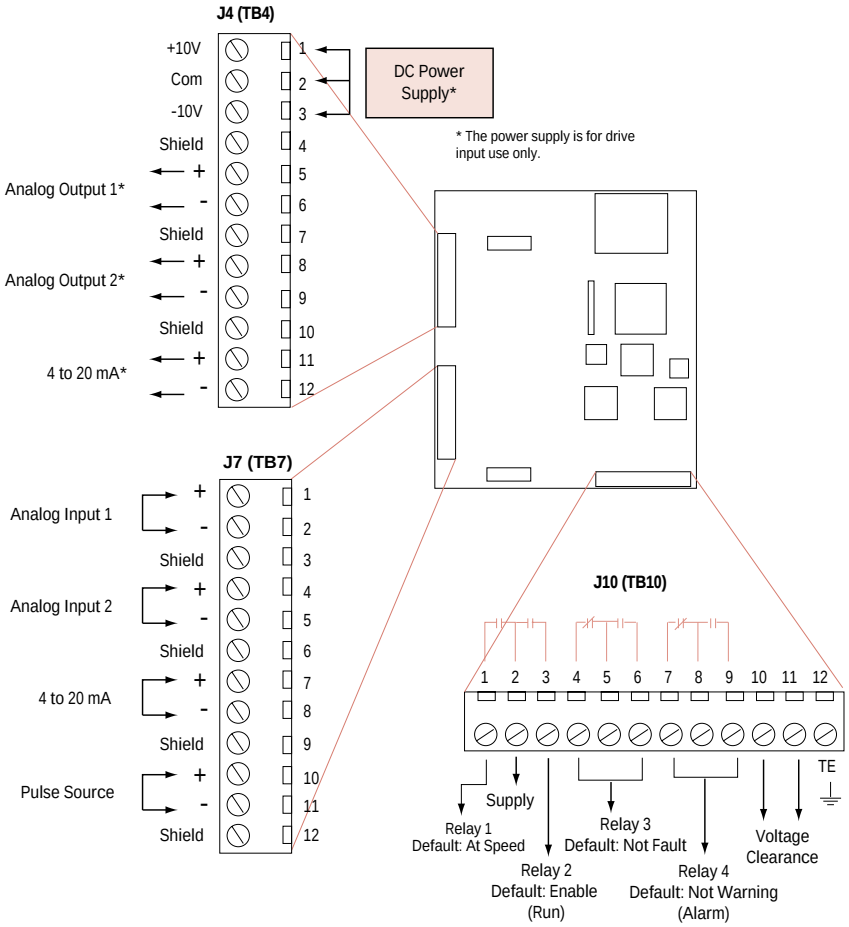
Input Mode **(parameter 102) = 12-16 and 23-25**
Single-Source, Two-Wire Control

Mode

12	13	14	15	16	23	24	25	26	30[12]
Local Control[2]	Stop Type[7]	2nd/1st Accel	Digital Pot UP	Local Control[2]	Process Trim	Flux Enabble	Process Trim	Jog	Digital Pot UP
Speed Select 3[1]	Speed Select 3[1]	2nd/1st Decel	Digital Pot Dn	Digital Pot Dn	Ramp	Reset	Ramp	Speed Select 3[1]	Digital Pot Dn

[1] *See Speed Select Table.*
[2] *Drive must be stopped to take Local Control. Control by all other adapters is disabled (except Stop).*
[3] *These inputs must be present before drive will start.*
[4] *For Common Bus, this becomes Precharge Enable.*
[5] *Bit 12 of Logic Options (parameter 17) must be 0 for reverse direction control.*
[6] *For soft faults only. You need to recycle power to the drive or reset to clear hard faults. For hard faults, refer to the troubleshooting chapter.*
[7] *To configure the stop type, refer to Logic Options (parameter 17).*
[8] *This input must be present before the fault can be cleared and the drive will start. This can be disabled through Fault Select 2 (parameter 22) and Warning Select 2 (parameter 23).*
[9] *To configure the start type, refer to Logic Options (parameter 17).*
[10] *See Speed/Torque Select table.*
[11] *Unlatched (maintained) start.*
[12] *In Modes 9, 10, and 15, the MOP value is not reset to 0 when you stop. In Modes 28, 29, and 30, the MOP value is reset to 0 when you stop.*

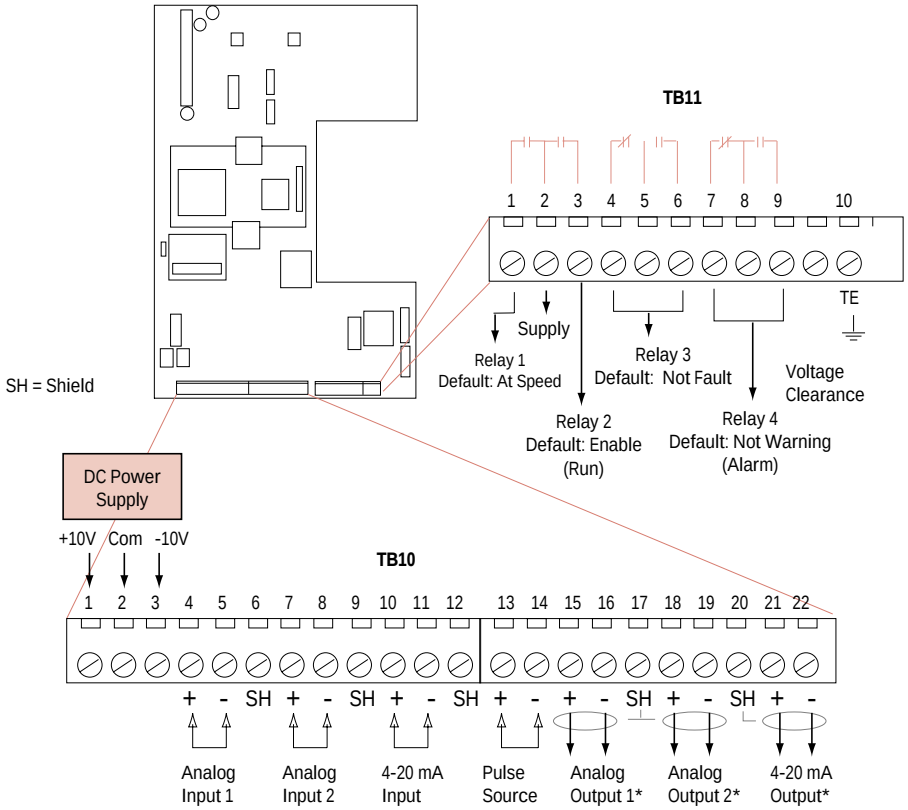
Control & Signal Wiring Frames A1, A2, A3 and A4



Terminal Block	Terminal Number(s)	Signal	
TB4	4, 7, 10	Shield Ground	
	1,2,3	DC Power Supply	+/- 10V DC 50 mA per voltage
	5, 6, 8, 9	0 to +/- 10V DC output:	Output Impedance = 100 Ohms; 10 mA maximum
	11, 12	4-20 mA DC output:	Output Impedance = 20 Ohms
TB7	3, 6, 9, 12	Shield Ground	
	1, 2, 4, 5	0 to +/- 10V DC input:	Input Impedance = 20k Ohms
	7, 8	4-20 mA input	Input Impedance = 130 Ohms
	10, 11	Pulse input for frequency reference	+5V DC — Jumper J8 Set to 1-2 +12V DC — Jumper J8 Set to 2-3 Scale Factor (Pulse PPR) must be set 10 mA minimum
TB10	12	Logic Earth Ground, Shield	
	1, 2, 3	Programmable Contacts	
	4,5,6	Fault Contact	Resistive Rating = 115V AC/30V DC,5.0A Inductive Rating = 115V AC/30V DC, 2.0A
	7, 8, 9	Alarm Contact	Resistive Rating = 115V AC/30V DC, 5.0A Inductive Rating = 115V AC/30V DC, 2.0A
	10, 11	Voltage Clearance	Provides physical space between the logic earth ground and other signals on the terminal block.

***Attention:** Analog I/O is Differential, Non-isolated I/O. Specifically, connecting the 4-20 mA output of the drive to a non-isolated input of another device may result in a drive component failure.

Control & Signal Wiring Frames B, C, D, E, F, G and H



Terminal Block	Terminal Number(s)	Signal	
TB10	6, 9, 12, 17, 20	Shield Ground	
	1,2,3	DC Power Supply	+/- 10V DC 50 mA per voltage
	4, 5, 7, 8	0 to +/- 10V DC input:	Input Impedance = 20k Ohms
	10, 11	4-20 mA Input:	Input Impedance = 130 Ohms
	13,14	Pulse Input for frequency ref.:	+5V DC — Jumper J4 Set to 1-2 +12V DC — Jumper J4 Set to 2-3 Scale Factor (Pulse PPR) must be set 10 mA minimum
	15, 16, 18, 19	0 to ±10V DC output	Output impedance = 100 Ohms; 10 mA maximum
	21, 22	4-20 mA DC output	Output impedance = 20 Ohms
TB11	10	Logic Earth Ground, Shield	
	1, 2, 3	Programmable Contacts	
	4, 5, 6	Fault Contact	Resistive Rating = 115V AC/30V DC,5.0A Inductive Rating = 115V AC/30V DC, 2.0A
	7, 8, 9	Alarm Contact	Resistive Rating = 115V AC/30V DC, 5.0A Inductive Rating = 115V AC/30V DC, 2.0A

***Attention:** Analog I/O is Differential, Non-isolated I/O. Specifically, connecting the 4-20 mA output of the drive to a non-isolated input of another device may result in a drive component failure.

Customer Supplied Enclosures

Requirements

1336 IMPACT AC drives installed in your enclosures may be mounted within an enclosure or may be mounted to allow the heatsink to extend outside the enclosure. Use the information below in combination with the enclosure manufacturer's guidelines for sizing.

200-240V DRIVES

Cat No.[10]	Base Derate Amps [1]	Derate Curve [2, 3]	Heat Dissipation Drive Watts [2, 3, 9]	Heatsink Watts [9]	Total Watts [9]
AQF05	2.3	**Figure 1**	13	15	28
AQF07	3.0	**Figure 1**	15	21	36
AQF10	4.5	**Figure 1**	17	32	49
AQF15	6.0	**Figure 1**	21	42	63
AQF20	8.0	**Figure 1**	25	56	81
AQF30	12.0	**Figure 1**	33	72	105
AQF50	18.0	**Figure 1**	42	116	158
A007	27.2	**NONE**	156	486	642
A010	33.7	**Figure 2**	200	721	921
A015	48.2	**Figure 3**	205	819	1024
A020	64.5	**Figure 4**	210	933	1143
A025	78.2	**Figure 5**	215	1110	1325
A030	80	**NONE**	220	1110	1330
A040	120.3	**Figure 6**	361	1708	2069
A050	149.2	**Figure 7**	426	1944	2370
A060	180.4	**Figure 8**	522	2664	3186
A075	240	**Figure 9**	606	2769	3375
A100	291.4	**Figure 10**	755	3700	4455
A125	325	**Figure 17**	902	4100	5002

380-480V DRIVES

Cat No.[10]	Base Derate Amps [1]	Derate Curve [2, 3]	Heat Dissipation Drive Watts [2, 3, 9]	Heatsink Watts [9]	Total Watts [9]
BRF05	1.2	**Figure 1**	12	9	21
BRF07	1.7	**Figure 1**	13	15	28
BRF10	2.3	**Figure 1**	15	20	35
BRF15	3.0	**Figure 1**	16	27	43
BRF20	4.0	**Figure 1**	19	36	55
BRF30	6.0	**Figure 1**	23	54	77
BRF50	9.0	**Figure 1**	29	84	113
BRF75	17.5	**Figure 1**	70	230	300
BRF100	25	**Figure 1**	89	331	420
B015	27.2	**Figure 11**	117	486	603
B020	33.7	**Figure 2**	140	628	768
B025	41.8	**Figure 12**	141	720	861
B030	48.2	**Figure 3**	141	820	961
BX040	58.7	**Figure 13**	175	933	1108
B040	64.5	**Figure 4**	175	933	1108
B050	78.2	**Figure 5**	193	1110	1303
BX060	78.2	**Figure 5**	193	1110	1303
B060	96.9	**NONE**	361	1708	2069
B075	120.3	**Figure 14**	361	1708	2069
B100	149.2	**Figure 15**	426	1944	2370
B125	180.4	**Figure 16**	522	2664	3186
BX150	180.4	**Figure 16**	606	2769	3375
B150	240	**Figure 9**	606	2769	3375
B200	292.4	**Figure 10**	755	3700	4455
B250	327.4	**Figure 17**	902	4100	5002
B300[5]	406.4	**NONE**	1005	4805	5810
BP/BPR300[8]	357	**Figure 18**	619	5342	5961
B350[5]	459.2	**NONE**	1055	5455	6510
BP/BPR350[8]	421	**Figure 19**	733	6039	6772
B400[5]	505.1	**NONE**	1295	6175	7470
BP/BPR400[8]	471	**Figure 20**	793	6329	7122
B450[5]	570.2	**NONE**	1335	6875	8210
BP/BPR450[8]	527	**Figure 21**	931	7000	7931
B500[5]	599.2	**Figure 22**	1400	7800	9200
B600[5]	673.4	**Figure 23**	1485	8767	10252
B700C	850	**Figure 37**	1700[6]	9700[6]	11400
B800C	983	**Figure 37**	1900[6]	12000[6]	13900

500-600V DRIVES

Cat No.[10]	Base Derate Amps [1]	Derate Curve [2, 3]	Heat Dissipation Drive Watts [2, 3, 9]	Heatsink Watts [9]	Total Watts [9]
CWF10	2.5	**Figure 24**	25	29	54
CWF20	4.2	**Figure 24**	29	57	86
CWF30	6	**Figure 24**	32	87	119
CWF50	7.9	**Figure 24**	35	117	152
CWF75	10	**Figure 24**	91	217	308
CWF100	12	**Figure 24**	103	251	354
C015	18.9	**NONE**	117	360	477
C020	23.6	**NONE**	140	467	607
C025	30	**NONE**	141	492	633
C030	34.6	**NONE**	141	526	667
C040	45.1	**NONE**	175	678	853
C050	57.2	**NONE**	193	899	1092
C060	61.6	**NONE**	193	981	1174
C075	85.8	**Figure 25**	361	1533	1894
C100	109.1	**Figure 26**	426	1978	2504
C125	138.6	**Figure 27**	522	2162	2683
C150	159.7	**Figure 28**	606	2315	2921
C200	252.5	**Figure 29**	755	3065	3820
C250	283.6	**Figure 30**	890	3625	4515
C300[5]	298	**NONE**	926	5015	5941
CX300	298		940	3990	4930
C350[5]	353.6	**NONE**	1000	5935	6935
CP/CPR350	350	**Figure 31**	580	6125	6705
C400[5]	406.4	**Figure 32**	1430	7120	8550
CP/CPR400	400	**Figure 33**	711	7000	7711
C500[5]	505.1	**Figure 34**	1500	8925	10425
C600[5]	599.2	**Figure 35**	1610	10767	12377
C650[5]	673.4	**Figure 36**	1700	12000	14000
C700C	770	**Figure 37**	1800	9400[7]	11200
C800C	850	**Figure 38**	2000	11300[7]	13300

[1] Base Derate Amps are based on nominal voltage (240, 480 or 600V). If input voltage exceeds Drive Rating, Drive Output must be derated. Refer to **Figure 40.**

[2] Drive Ambient Temperature Rating is 40°C. If ambient exceeds 40°C, the drive must be derated. Refer to **Figures 1-38.**

[3] Drive Rating is based on altitudes of 1,000 m (3,000 ft.) or less. If installed at higher altitude, drive must be derated. Refer to **Figure 39.**

[4] Not available at time of publication.

[5] **Important:** Two (2) 725 CFM fans are required if an open type drive is mounted in a user supplied enclosure.

[6] This is the inverter loss only, common bus configuration 2kHz PWM.

[7] This is the inverter loss only, common bus configuration 1kHz PWM.

[8] **Important:** 1336E-BPRXXX drives require two (2) fans capable of producing greater than 450 CFM. One (1) fan open type drive is mounted in a user-supplied enclosure.

[9] Rating is at 4kHz (2kHz for 224-448 kW/ 300-600 HP, 500-600V). If carrier frequencies above 4kHz are selected, drive rating must be derated. Refer to **Figures 1-40**.

[10] Due to drive losses, the output voltage to the motor is affected by the AC input voltage to the drive. This reduced motor voltage may require more motor torque, and therefore current, to achieve rated motor horsepower. Though most applications do not require full rated motor horsepower at full speed, the following information is provided to assist with proper motor/drive selection.

A. For 460V motors, operate with a minimum 480V Input AC line voltage.

B. Size the motor with the capability to operate with 8% more current.

C. Purchase a motor designed to operate at 440V.

Note: For items B and C above, make sure the drive current rating is adequate to support the motor.

Refer to **Figure 41**.

Derating Guidelines

Drive ratings can be affected by a number of factors. If more than one factor exists, consult Allen-Bradley Company.

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 1
1336E-AQF05-AQF50 and BRF05-BRF100

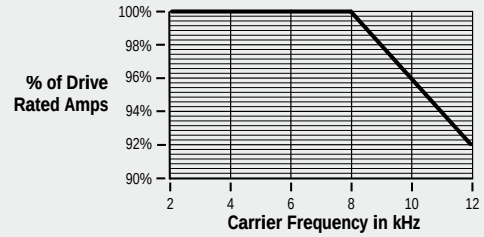


Figure 2
1336E-A010 and B020

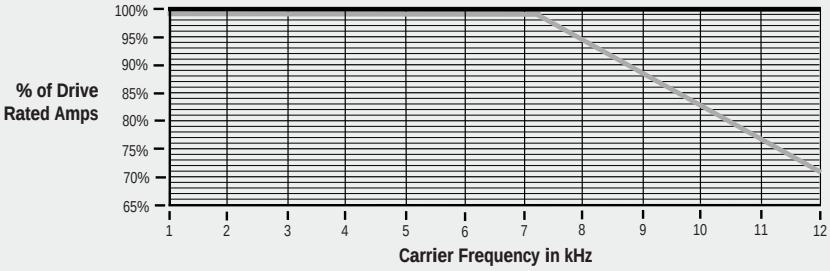


Figure 3
1336E-A015 and B030

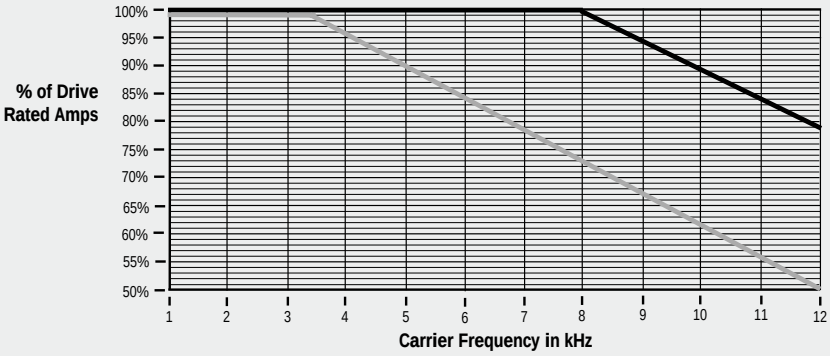


Figure 4
1336E-A020 and B040

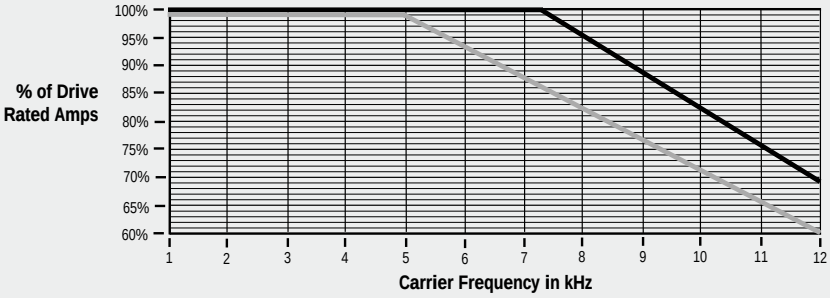
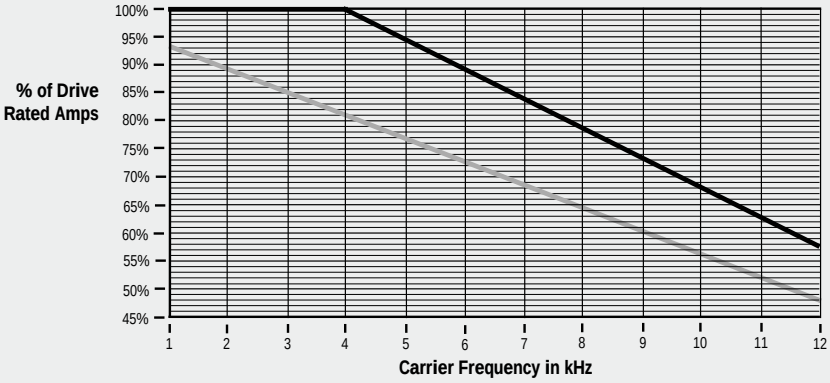


Figure 5
1336E-A025, B050 and BX060



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 6
1336E-A040

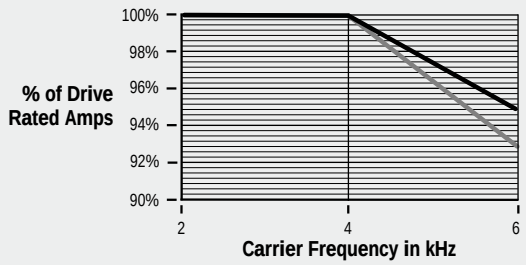


Figure 7
1336E-A050

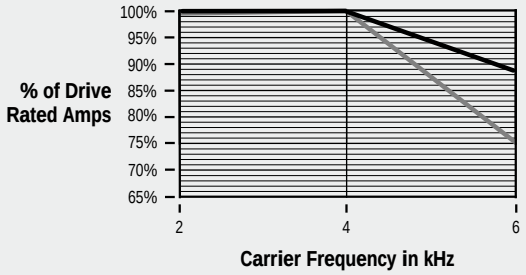


Figure 8
1336E-A060

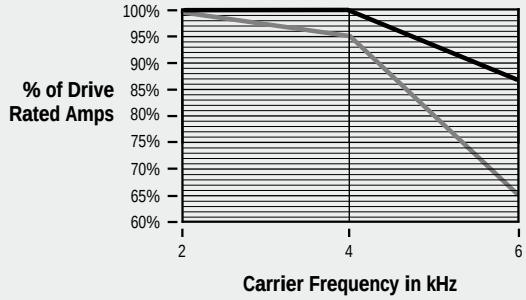
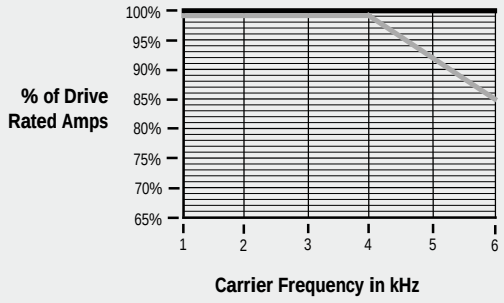


Figure 9
1336E-A075 and B150



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 10
1336E-A100 and B200

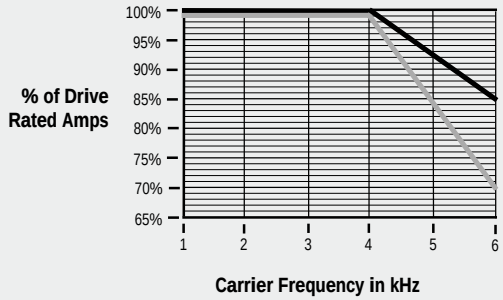


Figure 11
1336E-B015

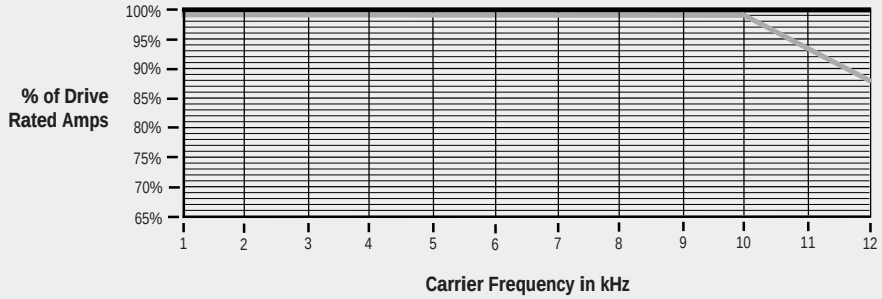


Figure 12
1336E-B025

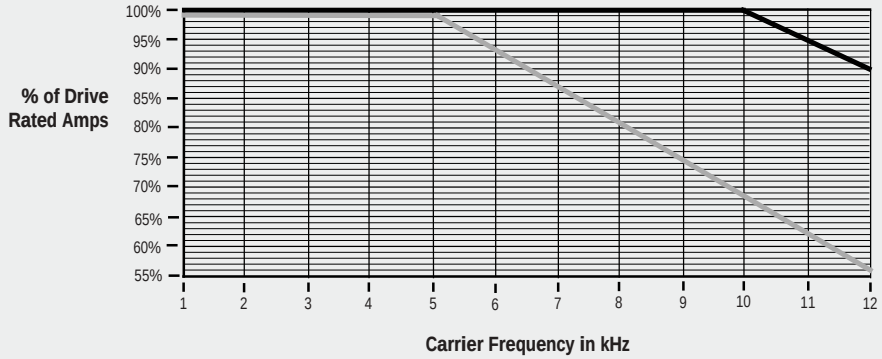
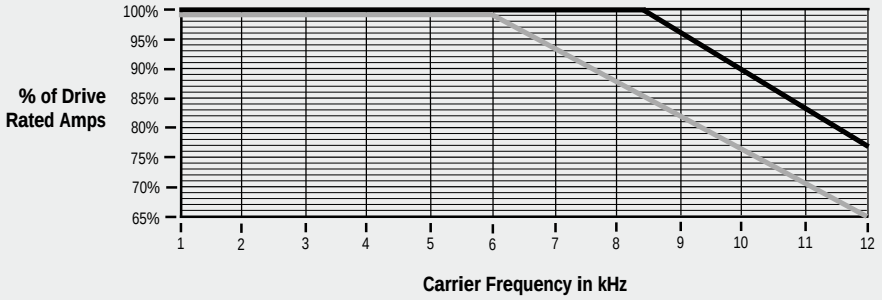


Figure 13
1336E-BX040



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 14
1336E-B075

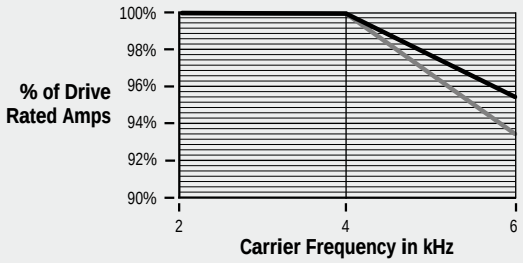


Figure 15
1336E-B100

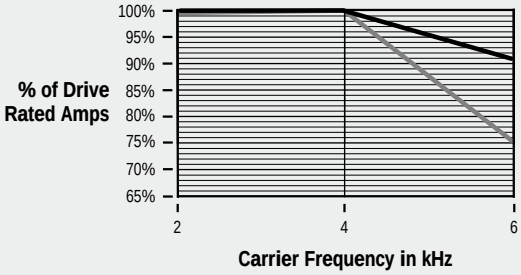


Figure 16
1336E-B125 and BX150

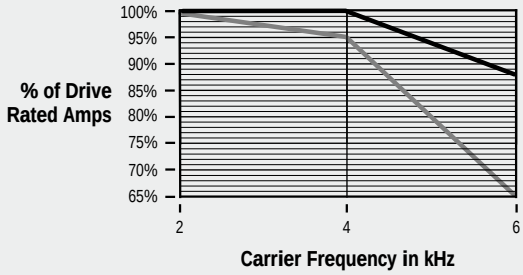
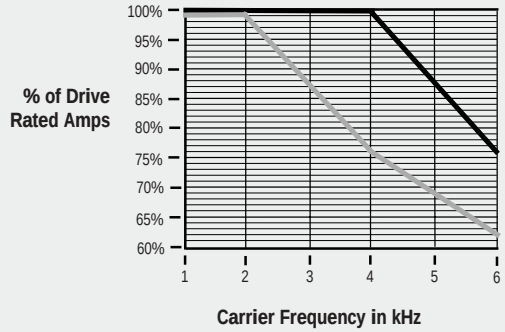


Figure 17
1336E-A125 and B250



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 18
1336E-BP300 and BPR300

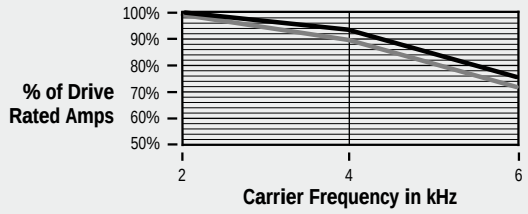


Figure 19
1336E-BP350 and BPR350

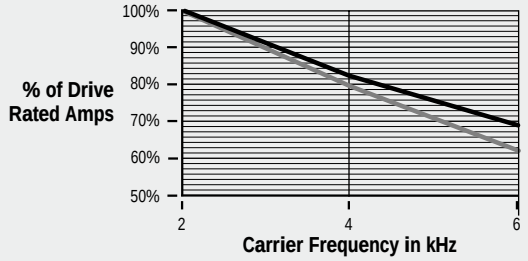


Figure 20
1336E-BP400 and BPR400

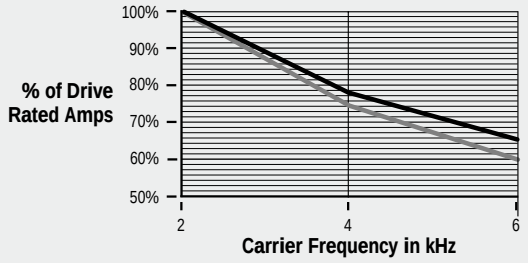
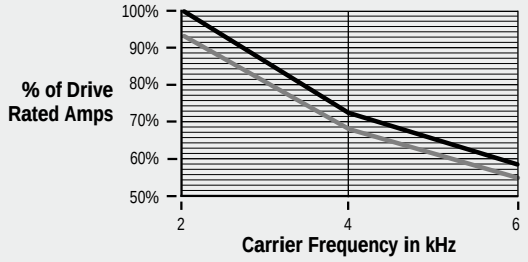


Figure 21
1336E-BP450 and BPR450



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 22
1336E-B500

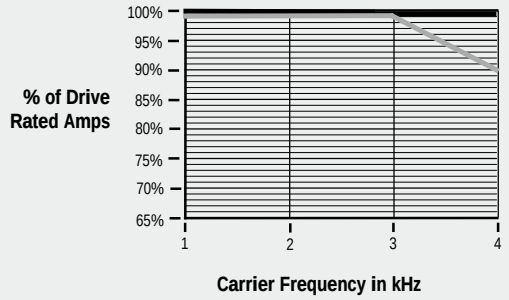


Figure 23
1336E-B600

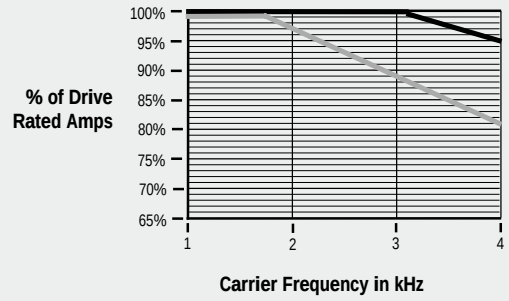


Figure 24
1336E-CWF10 through CWF100

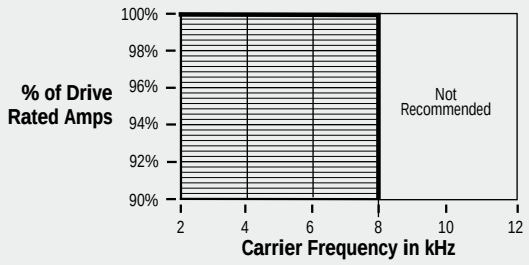


Figure 25
1336E-C075

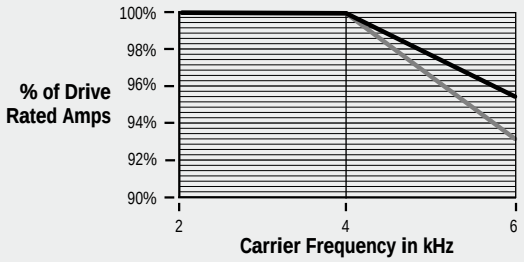
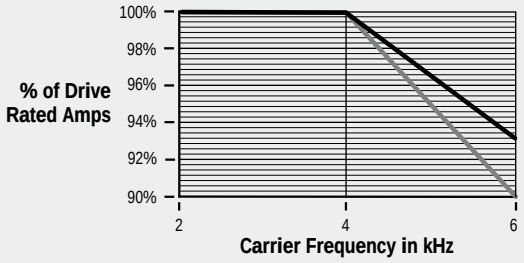


Figure 26
1336E-C100



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 27
1336E-C125

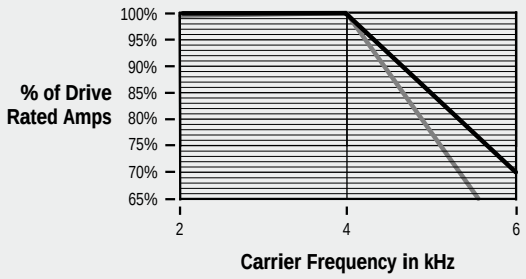


Figure 28
1336E-C150

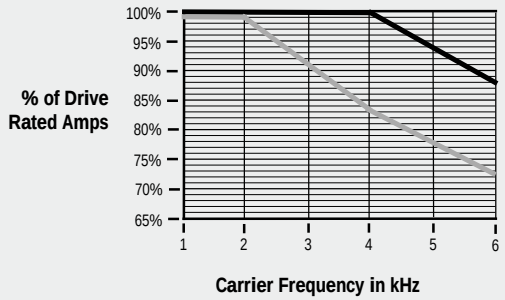


Figure 29
1336E-C200

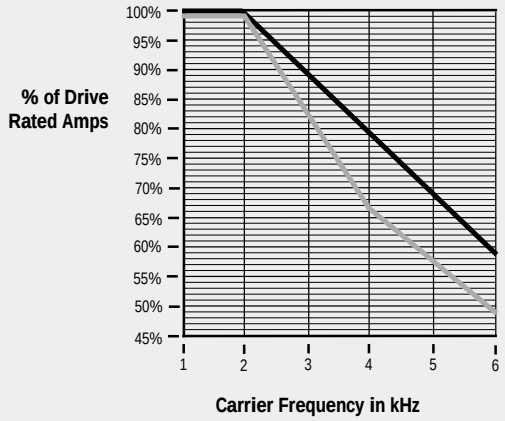
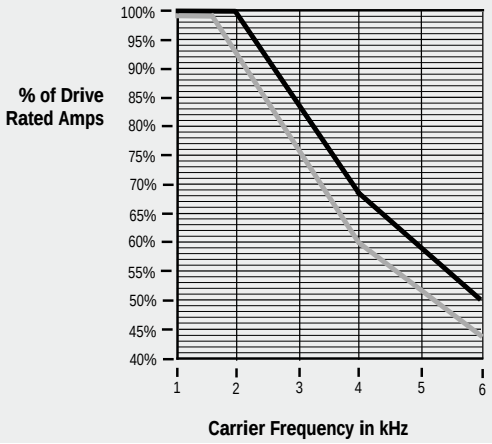


Figure 30
1336E-C250



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 31
1336E-CP350

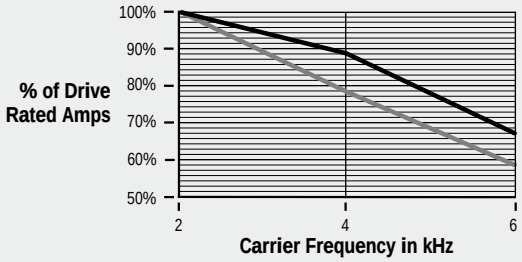


Figure 32
1336E-C400

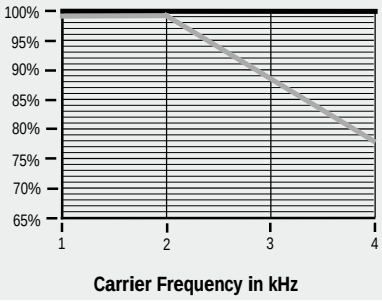


Figure 33
1336E-CP400

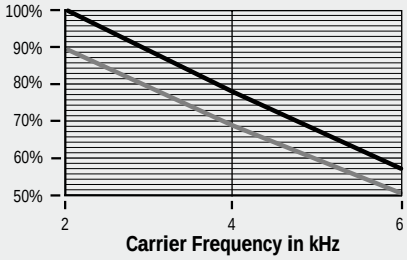


Figure 34
1336E-C500

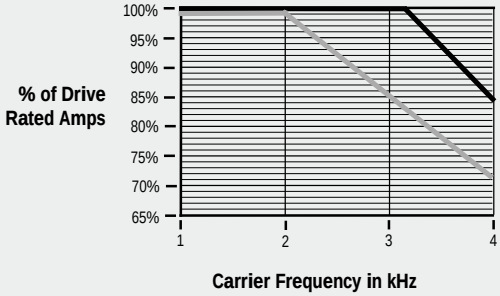


Figure 35
1336E-C600

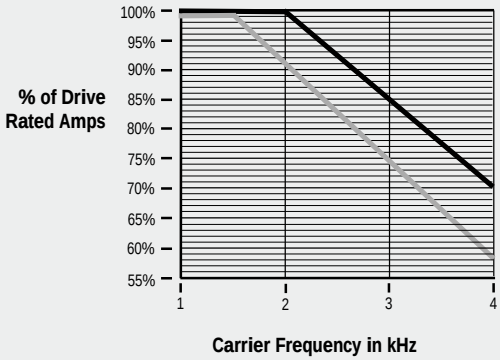
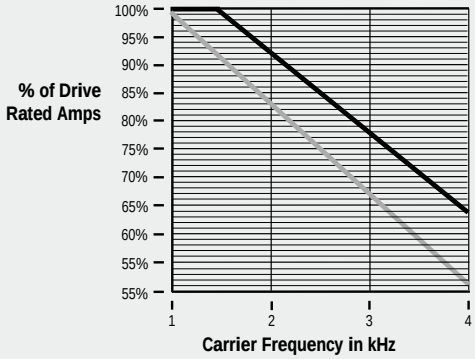


Figure 36
1336E-C650



Derating Guidelines

Standard Rating for Enclosed Drive in 40°C Ambient & Open Drive in 50°C Ambient.

Derating Factor for Enclosed Drive in Ambient between 41°C & 50°C.

Figure 37
1336E-B700C and B800C

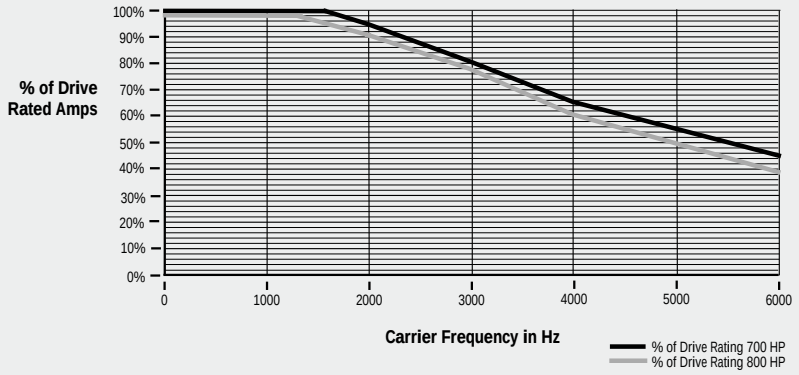


Figure 38
1336E-C700C and C800C

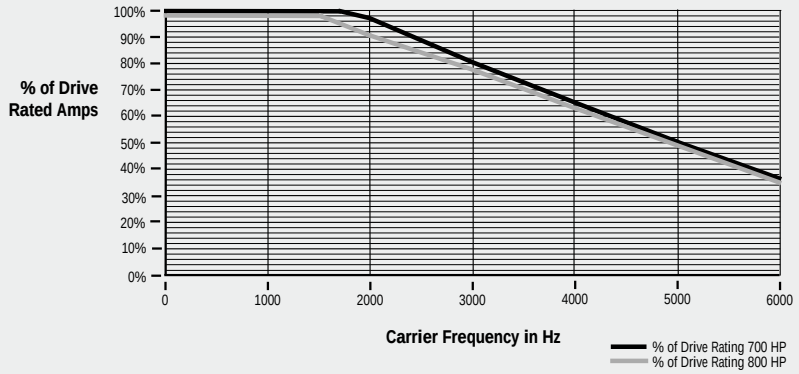


Figure 39
All Drive Ratings

Figure 40
Required Only for the following drives:

1336E-A/B/C-025 – 18.5 kW (25 HP) at 8 kHz
1336E-A/B/C – 22 kW (30HP) at 6-8 kHz
1336E-A/B/C – 45 kW (60 HP) at 6 kHz

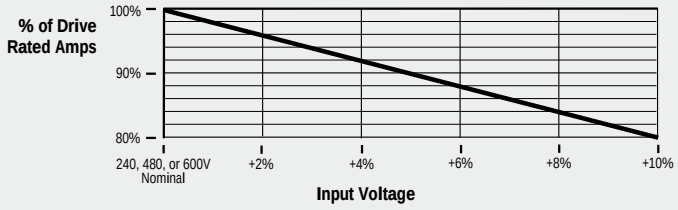
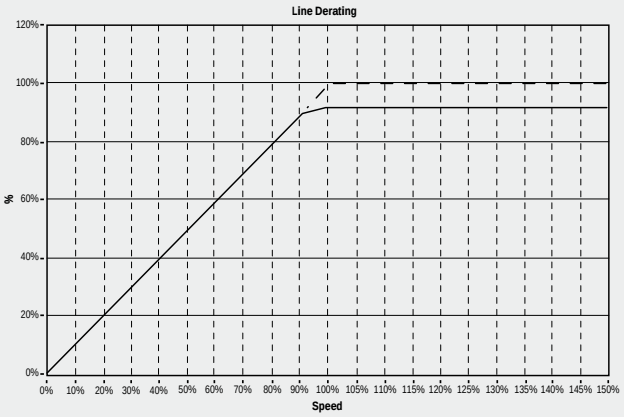


Figure 41
Drive Ratings

Definitions:
Calculated HP – Available motor HP output based on full voltage/current

Actual HP – Measured HP based on DPI typical drive losses

——— Actual Motor HP
------ Calculated Motor HP



Notes

Features

Catalog Number Explanation

1336E	B015	AA	EN	L6	HA1	GM1
BULLETIN NO.	**RATING** (MUST BE SPECIFIED)	**ENCLOSURE** (MUST BE SPECIFIED)	**LANGUAGE MODULE** (MUST BE SPECIFIED) [1]	**CONTROL INTERFACE** (OPTIONAL) [2]	**HUMAN INTERFACE** (OPTIONAL) [2]	**COMMUNICATION CARD** (OPTIONAL) [2]

[1] *A Language Module must be specified with each drive.*

[2] *At least one of either a Control Interface, Human Interface or Communication Card Option will be required to make the drive functional. The chosen option(s) may be ordered factory installed or as add-on kits.*

1336 IMPACT AC Drive Selection Guide

Drive Codes and Enclosures

200-240V

Frame Designation[1]	Drive Rating[2] Output Amps	Nominal HP	Rated kW	Open IP00 No Enclosure	NEMA Type 1 IP20 General Purpose[3]	NEMA Type 4 IP65 Resist Water, Dust	NEMA Type 12 IP54 Industrial Use
A1	2.3	1/2	0.37	1336E-AQF05-AN	1336E-AQF05-AA/AE	1336E-AQF05-AF	1336E-AQF05-AJ
	3.0	3/4	0.56	1336E-AQF07-AN	1336E-AQF07-AA/AE	1336E-AQF07-AF	1336E-AQF07-AJ
	4.5	1	0.75	1336E-AQF10-AN	1336E-AQF10-AA/AE	1336E-AQF10-AF	1336E-AQF10-AJ
A2	6.0	1-1/2	1.2	1336E-AQF15-AN	1336E-AQF15-AA/AE	1336E-AQF15-AF	1336E-AQF15-AJ
	8.0	2	1.5	1336E-AQF20-AN	1336E-AQF20-AA/AE	1336E-AQF20-AF	1336E-AQF20-AJ
A3	12.0	3	2.2	1336E-AQF30-AN	1336E-AQF30-AA/AE	1336E-AQF30-AF	1336E-AQF30-AJ
	18.0	5	3.7	1336E-AQF50-AN	1336E-AQF50-AA/AE	1336E-AQF50-AF	1336E-AQF50-AJ
B1	27.2	7.5	5.5	1336E-A007-AN	1336E-A007-AA/AE	1336E-A007-AF	1336E-A007-AJ
B2	33.7	10	7.5	1336E-A010-AN	1336E-A010-AA/AE	1336E-A010-AF	1336E-A010-AJ
	48.2	15	11	1336E-A015-AN	1336E-A015-AA/AE	1336E-A015-AF	1336E-A015-AJ
C	64.5	20	15	1336E-A020-AN	1336E-A020-AA/AE	1336E-A020-AF	1336E-A020-AJ
	78.2	25	18.5	1336E-A025-AN	1336E-A025-AA/AE	1336E-A025-AF	1336E-A025-AJ
	80.0	30	22	1336E-A030-AN	1336E-A030-AA/AE	1336E-A030-AF	1336E-A030-AJ
D	120.3	40	30	1336E-A040-AN	1336E-A040-AA/AE	4	1336E-A040C-AJ
	149.2	50	37	1336E-A050-AN	1336E-A050-AA/AE	4	1336E-A050C-AJ
	180.4	60	45	1336E-A060-AN	1336E-A060 AA/AE	4	1336E-A060C-AJ
E	240.0	75	56	1336E-A075-AN	1336E-A075-AA/AE	4	1336E-A075C-AJ
	291.4	100	75	1336E-A100-AN	1336E-A100-AA/AE	4	1336E-A100C-AJ
	327.4	125	93	1336E-A125-AN	1336E-A125-AA/AE	4	1336E-A125C-AJ

380-460V

Frame Designation[1]	Drive Rating[2] Output Amps	Nominal HP	Rated kW	Open IP00 No Enclosure	NEMA Type 1 IP20 General Purpose	NEMA Type 1 IP20 CE Conformance	NEMA Type 4 IP65 Resist Water, Dust	NEMA Type 12 IP54 Industrial Use
A1	1.2	1/2	0.37	1336E-BRF05-AN	1336E-BRF05-AA	1336E-BRF05-AE	1336E-BRF05-AF	1336E-BRF05-AJ
	1.7	3/4	0.56	1336E-BRF07-AN	1336E-BRF07-AA	1336E-BRF07-AE	1336E-BRF07-AF	1336E-BRF07-AJ
	2.3	1	0.75	1336E-BRF10-AN	1336E-BRF10-AA	1336E-BRF10-AE	1336E-BRF10-AF	1336E-BRF10-AJ
	3.0	1-1/2	1.2	1336E-BRF15-AN	1336E-BRF15-AA	1336E-BRF15-AE	1336E-BRF15-AF	1336E-BRF15-AJ
A2	4.0	2	1.5	1336E-BRF20-AN	1336E-BRF20-AA	1336E-BRF20-AE	1336E-BRF20-AF	1336E-BRF20-AJ
	6.0	3	2.2	1336E-BRF30-AN	1336E-BRF30-AA	1336E-BRF30-AE	1336E-BRF30-AF	1336E-BRF30-AJ
A3	9.0	5	3.7	1336E-BRF50-AN	1336E-BRF50-AA	1336E-BRF50-AE	1336E-BRF50-AF	1336E-BRF50-AJ
A4	13.9	7.5	5.5	1336E-BRF75-AN	1336E-BRF75-AA	1336E-BRF75-AE	1336E-BRF75-AF	1336E-BRF75-AJ
	24	10	7.5	1336E-BRF100-AN	1336E-BRF100-AA	1336E-BRF100-AE	1336E-BRF100-AF	1336E-BRF100-AJ
B1	27.2	15	11	1336E-B015-AN	1336E-B015-AA	1336E-B015-AE	1336E-B015-AF	1336E-B015-AJ
B2	33.7	20	15	1336E-B020-AN	1336E-B020-AA	1336E-B020-AE	1336E-B020-AF	1336E-B020-AJ
	41.8	25	18.5	1336E-B025-AN	1336E-B025-AA	1336E-B025-AE	1336E-B025-AF	1336E-B025-AJ
	48.2	30	22	1336E-B030-AN	1336E-B030-AA	1336E-B030-AE	1336E-B030-AF	1336E-B030-AJ
C	58.7	40	30	1336E-BX040-AN	1336E-BX040-AA	1336E-BX040-AE	1336E-BX040-AF	1336E-BX040-AJ
	64.5	40	30	1336E-B040-AN	1336E-B040-AA	1336E-B040-AE	1336E-B040-AF	1336E-B040-AJ
	78.2	50	37	1336E-B050-AN	1336E-B050-AA	1336E-B050-AE	1336E-B050-AF	1336E-B050-AJ
	78.2	60	45	1336E-BX060-AN[5]	1336E-BX060-AA	1336E-BX060-AE	1336E-BX060-AF[5]	1336E-BX060-AJ[5]
D	96.9	60	45	1336E-B060-AN	1336E-B060-AA	1336E-B060-AE	4	1336E-B060C-AJ
	120.3	75	56	1336E-B075-AN	1336E-B075-AA	1336E-B075-AE	4	1336E-B075C-AJ
	149.2	100	75	1336E-B100-AN	1336E-B100-AA	1336E-B100-AE	4	1336E-B100C-AJ
	180.4	125	93	1336E-B125-AN	1336E-B125-AA	1336E-B125-AE	4	1336E-B125C-AJ
	180.4	150	112	1336E-BX150-AN	1336E-BX150-AA	1336E-BX150-AE	4	1336E-BX150C-AJ

1 *Refer to **Pages 15-22** for frame dimensions.*

2 *Drive rating is based on nominal voltage and carrier frequency at altitudes of 1000 meters or less. Refer to Derating Guidelines on **Pages 43 to 51** for derating information.*

3 *Conformance to CE also requires an EMC Filter and installation per the 1336 IMPACT User Manual, publication 1336 IMPACT-5.0.*

4 *Not available in this rating.*

5 *480 volts only.*

Drive Codes and Enclosures

380-460V

Frame Designation[1]	Drive Rating[2] Output Amps	Nominal HP	Rated kW	Open IP00 No Enclosure	NEMA Type 1 IP20 General Purpose	NEMA Type 1 IP20 CE Conformance[3]	NEMA Type 4 IP65 Resist Water, Dust	NEMA Type 12 IP54 Industrial Use
E	240.0	150	112	1336E-B150-AN	1336E-B150-AA	1336E-B150-AE	4	1336E-B150C-AJ
	291.4	200	149	1336E-B200-AN	1336E-B200-AA	1336E-B200-AE	4	1336E-B200C-AJ
	327.4	250	187	1336E-B250-AN	1336E-B250-AA	1336E-B250-AE	4	1336E-B250C-AJ
F[5]	406.4	300	224	1336E-BP300-AN	1336E-BP300-AA	–	4	4
				1336E-BPR300-AN	–	1336E-BPR300A-AE		
	459.2	350	261	1336E-BP350-AN	1336E-BP350-AA	–	4	4
				1336E-BPR350-AN	–	1336E-BPR350-A-AE		
	481.0	400	298	1336E-BP400-AN	1336E-BP400-AA	–	4	4
				1336E-BPR400-AN	–	1336E-BPR400A-AE		
	531.7	450	336	1336E-BP450-AN	1336E-BP450-AA		4	4
				1336E-BPR450-AN	–	1336E-BPR450A-AE		
G	406.4	300	224	1336E-B300-AN	1336E-B300A-AA	1336E-B300A-AE	4	1336E-B300C-AJ
	459.2	350	261	1336E-B350-AN	1336E-B350A-AA	1336E-B350A-AE	4	1336E-B350C-AJ
	505.1	400	298	1336E-B400-AN	1336E-B400A-AA	1336E-B400A-AE	4	1336E-B400C-AJ
	570.2	450	336	1336E-B450-AN	1336E-B450A-AA	1336E-B450A-AE	4	4
	599.2	500	373	1336E-B500-AN	1336E-B500A-AA	1336E-B500A-AE	4	4
	673.4	600	448	1336E-B600-AN	1336E-B600A-AA	1336E-B600A-AE	4	4
H1 (6 pulse)	850.0	700	522	4	1336E-B700C-AA	4	4	4
	983.0	800	597	4	1336E-B800C-AA	4	4	4

500-600V

Frame Designation[1]	Drive Rating[2] Output Amps	Nominal HP	Rated kW	Open IP00 No Enclosure	NEMA Type 1 IP20 General Purpose	NEMA Type 4 IP65 Resist Water, Dust	NEMA Type 12 IP54 Industrial Use
A4	2.5	1	0.75	1336E-CWF10-AN	1336E-CWF10-AA	1336E-CWF10-AF	1336E-CWF10-AJ
	4.2	2	1.5	1336E-CWF20-AN	1336E-CWF20-AA	1336E-CWF20-AF	1336E-CWF20-AJ
	6.0	3	2.2	1336E-CWF30-AN	1336E-CWF30-AA	1336E-CWF30-AF	1336E-CWF30-AJ
	7.9	5	3.7	1336E-CWF50-AN	1336E-CWF50-AA	1336E-CWF50-AF	1336E-CWF50-AJ
	9.9	7.5	5.5	1336E-CWF75-AN	1336E-CWF75-AA	1336E-CWF75-AF	1336E-CWF75-AJ
	12.0	10	7.5	1336E-CWF100-AN	1336E-CWF100-AA	1336E-CWF100-AF	1336E-CWF100-AJ
B	18.9	15	11	1336E-C015-AN	1336E-C015-AA	1336E-C015-AF	1336E-C015-AJ
	23.6	20	15	1336E-C020-AN	1336E-C020-AA	1336E-C020-AF	1336E-C020-AJ
C	30.0	25	18.5	1336E-C025-AN	1336E-C025-AA	1336E-C025-AF	1336E-C025-AJ
	34.6	30	22	1336E-C030-AN	1336E-C030-AA	1336E-C030-AF	1336E-C030-AJ
	45.1	40	30	1336E-C040-AN	1336E-C040-AA	1336E-C040-AF	1336E-C040-AJ
	57.2	50	37	1336E-C050-AN	1336E-C050-AA	1336E-C050-AF	1336E-C050-AJ
	61.6	60	45	1336E-C060-AN	1336E-C060-AA	1336E-C060-AF	1336E-C060-AJ
D	85.8	75	56	1336E-C075-AN	1336E-C075-AA	4	1336E-C075C-AJ
	109.1	100	75	1336E-C100-AN	1336E-C100-AA	4	1336E-C100C-AJ
	138.6	125	93	1336E-C125-AN	1336E-C125-AA	4	1336E-C125C-AJ
E	159.7	150	112	1336E-C150-AN	1336E-C150-AA	4	1336E-C150C-AJ
	252.5	200	149	1336E-C200-AN	1336E-C200-AA	4	1336E-C200C-AJ
	283.6	250	187	1336E-C250-AN	1336E-C250-AA	4	1336E-C250C-AJ
F	350.0	350	261	1336E-CP350-AN	1336E-CP350-AA	4	4
				1336E-CPR350-AN	–	4	4
	400.0	400	298	1336E-CP400-AN	1336E-CP400-AA	4	4
				1336E-CPR400-AN	–	4	4
G	298.0	300	224	1336E-C300-AN	1336E-C300A-AA	4	1336E-C300C-AJ
	353.6	350	261	1336E-C350-AN	1336E-C350A-AA	4	1336E-C350C-AJ
	406.4	400	298	1336E-C400-AN	1336E-C400A-AA	4	1336E-C400C-AJ
	459.2	450	336	1336E-C450-AN	1336E-C450A-AA	4	4
	505.1	500	373	1336E-C500-AN	1336E-C500A-AA	4	4
	599.2	600	448	1336E-C600-AN	1336E-C600A-AA	4	4
	673.4	650	485	1336E-C650-AN	1336E-C650A-AA	4	4
H1 (6 pulse)	770.0	700	522	4	1336E-C700C-AA	4	4
	800.0	800	597	4	1336E-C800C-AA	4	4

1 *Refer to **Pages 15-22** for frame dimensions.*
2 *Drive rating is based on nominal voltage and carrier frequency at altitudes of 1000 meters or less. Refer to Derating Guidelines on **Pages 43 to 51** for derating information.*
3 *Conformance to CE also requires an EMC Filter and installation per the 1336 IMPACT User Manual, publication 1336 IMPACT-5.0.*
4 *Not available in this rating.*
5 *Option -CM (common mode choke) or Option -NCM (no common mode choke) must be specified with each F frame drive.*

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Control Interface Kits (Factory Installed)

Description	Used With . . .	Option Code (Installed)
Control Interface	ALL 1336E Drives	
Contact Closure		– L4
+24V AC/DC		– L5
115V AC		– L6
Control Interface with Encoder Feedback	All 1336E Drives	
Contact Closure		– L7E
+24V AC/DC		– L8E
115V AC		– L9E

Human Interface Module Kits (Factory Installed)

Description	Used With . . .	Option Code (Installed)
Human Interface Module, NEMA Type 1	IP00 (Open) and	
Blank - No Functionality	IP20 (NEMA Type 1)	-HAB
Programmer Only	Drives	-HAP
Programmer/Controller with Analog Pot		-HA1
Programmer/Controller with Digital Pot		-HA2
Human Interface Module, NEMA Type 12	IP66 or IP54	
Programmer Only	(NEMA Type 12)	-HJP[1]
Programmer/Controller with Digital Pot	Drives	-HJ2[1]

Communications Options (Factory Installed)

Description	Used With . . .	Option Code
Single Point RIO	Frame B, C, D, E, F, G & H	-GM1[2]
RS232/422/485, DF1 & DH485 Protocol		-GM2[2]
DeviceNet		-GM5[2]
Enhanced DeviceNet		-GM6[2]

Common Mode Choke for F Frame Drives Only (Factory Installed — Select One)

Description	Used With . . .	Option Code
No Common Mode Choke	All F Frame Drives	-NCM
Internal Common Mode Choke – Installed		-CM
Internal Common Mode Choke – Installed	All G Frame Drives	-CM

Control Interface Kits (For Customer Installation)

Description	Used With . . .	Option Code (Installed)
Control Interface	All 1336E Drives	
Contact Closure		1336-L4
24V AC/DC		1336-L5
115V AC		1336-L6
Control Interface with Encoder Feedback	All 1336E Drives	
Contact Closure		1336-L7E
24V AC/DC		1336-L8E
115V AC		1336-L9E

Gasket and Enclosure Kits (For Customer Installation)

Description[3]	Used with Frame Designation[3]	Catalog Number (Loose Kit) 200-240V	380-480V	500-600V
Gasket Kits	A1, A2, A3	1336-RF3	1336-RF3	–
For mounting 1336E Drives	A4	–	1336-RF2	1336-RF2
in User Supplied IP54 or 65	B	1336-RF4	1336-RF4	1336-RF4
(NEMA Type 12 or 4) Enclosures	C	1336-RF5	1336-RF5	1336-RF5
Gasket Kits	D	1336-RF6	1336-RF6	1336-RF6
For mounting 1336E Drives	E	1336-RF7	1336-RF7	1336-RF7
in User Supplied IP54				
(NEMA Type 12) Enclosures				
Enclosure Kits	A1, A2, A3	1336E-AA3	1336E-AA3	–
IP20 (NEMA Type 1)	A4	–	1336E-AA2	1336E-AA2
	B	1336E-AA4	1336E-AA4	1336E-AA4
	C	1336E-AA5	1336E-AA5	1336E-AA5
	D	1336E-AA6	1336E-AA6	1336E-AA6
	E	1336E-AA7	1336E-AA7	1336E-AA7
Enclosure Kits	A1, A2, A3	1336E-AE3	1336E-AE3	–
IP20 (NEMA Type 1)	A4	1336E-AE2	1336E-AE2	–
for CE Conformance	B	1336E-AE4	1336E-AE4	1336E-AE4[5]
	C	1336E-AE5	1336E-AE5	1336E-AE5[5]
	D	1336E-AE6	1336E-AE6	1336E-AE6[5]
	E	1336E-AE7	1336E-AE7	1336E-AE7[5]
Enclosure Kits	A1, A2, A3	1336E-AJA3	1336E-AJA3	–
IP54 (NEMA Type 12)	A4	–	1336E-AJA4B	1336E-AJA4C
	B1	1336E-AJB1A	1336E-AJB1B	1336E-AJB1C
	B2	1336E-AJB2A	1336E-AJB2B	1336E-AJB2C
	C	1336E-AJCA	1336E-AJCB	1336E-AJCC
Enclosure Kits[4]	A1, A2, A3	1336E-AFA3	1336E-AFA3	–
IP65 (NEMA Type 4)	A4	–	1336E-AFA4B	1336E-AFA4C
	B1	1336E-AFB1A	1336E-AFB1B	1336E-AFB1C
	B2	1336E-AFB2A	1336E-AFB2B	1336E-AFB2C
	C	1336E-AFCA	1336E-AFCB	1336E-AFCC

1 *This option may be used on an IP65 or IP66 rated enclosure to meet watertight indoor applications.*
2 *Requires a Communication Option Cable (1202-C03/C10/C30/C90) to be functional. These units are not acceptable for NEMA Type 4 door mounting or UL Type 4x outdoor duty.*
3 *Refer to* ***Page 14*** *for frame designations.*
4 *Use of a door mounted Human Interface Module on these enclosures will void the NEMA Type 4 rating.*

Language Group (Factory Installed)

Description	Used With . . .	Option Code
English	All 1336E Drives	-EN
French		-FR
German		-DE
Italian		-IT
Portuguese		-PT
Spanish		-ES

Language Group (User Installed)

Description	Used With . . .	Option Code
English/English	All 1336E Drives with 3.xx firmware	1336E-EN31
English/French		1336E-FR31
English/German		1336E-DE31
English/Italian		1336E-IT31
English/Portuguese		1336E-PT31
English/Spanish		1336E-ES31

Dynamic Brake Kits (For Customer Installation)

Description[1]	Used With . . .	Catalog Number Complete Brake	Catalog Number Brake Chopper
for 200-240V AC Drives	0.37-3.7 kW (0.5-5 HP)	1336-MOD-KA005	1336-WA018
	5.5-7.5 kW (7.5-10 HP)	1336-MOD-KA010	1336-WA018
	11-22 kW (15-30 HP)	NA	1336-WA070
	30-56 kW (40-75 HP)	NA	1336-WA115
for 380-480V AC Drives	0.37-3.7 kW (0.5-5 HP)	1336-MOD-KB005	1336-WB009
	5.5-7.5 kW (7.5-10 HP)	1336-MOD-KB010	1336-WB009
	11-37 kW (15-50 HP)	1336-MOD-KB050	1336-WB035
	45-149 kW (60-200 HP)	NA	1336-WB110
for 500-600V AC Drives	0.37-3.7 kW (0.5-5 HP)	1336-MOD-KC005	1336-WC009
	5.5-7.5 kW (7.5-10 HP)	1336-MOD-KC010	1336-WC009
	11-30 kW (15-40 HP)	1336-MOD-KC050	1336-WC035
	37-149 kW (50-200 HP)	NA	1336-WC085

Terminator Kits (For Customer Installation)

Description[1]	Used With . . .	Catalog Number
IP65 (NEMA Type 4x) Connection Cable Included	0.75-3.7 KW (1-5 HP), 460V Drives	1204-TFA1[4]
	2.2-448 KW (3-600 HP), 460 & 575V Drives	1204-TFB2

Communication Option Kits (For Customer Installation)

Description	Used With . . .	Catalog Number (Loose Kit)
Remote Mounted With Integral 115V AC Power Supply	All 1336E Drive Ratings	
Single Point RIO		1203-GD1[2]
RS232/422/485, DF1 and DH485 Protocol		1203-GD2[2]
Remote Mounted, For Use With 24V DC Power Supply	All 1336E Drive Ratings	
Single Point RIO		1203-GK1[2]
RS232/422/485, DF1 and DH485 Protocol		1203-GK2[2]
DeviceNet		1203-GK5[2]
Communication Option Cable Kits	All Communications Options Listed Above	
One-Third Meter Length		1202-C03
One Meter Length		1202-C10
Three Meter Length		1202-C30
Nine Meter Length		1202-C90
SCANport Expander Module	All Drive Ratings	
One to Two		1203-SG2
One to Four		1203-SG4
Drive Mounted and Drive Powered	1336E Drives – Frames B, C, D, E, F and G	
Single Point RIO		1336-GM1
RS232/422/485, DF1 and DH485 Protocol		1336-GM2
DeviceNet		1336-GM5
Flex I/O Terminal		
Flex I/O Terminal Base	All Drive Ratings	1203-FB1 [3]
Flex I/O Module	All Drive Ratings	1203-FM1 [2, 3]
SLC Communication Module	All Drive Ratings	1203-SM1

1 *Multiple kits may be utilized together to obtain higher HP ratings. Refer to Publication 1336-5.64 or 1336-5.65 for guidance.*
2 *Requires a Communication Option Cable (1202-C03/C10/C30/C90) to be functional.*
3 *Each Flex I/O SCANport requires (1)1203-FB1 and (1)1203-FM1.*
4 *Limited to motor cable lengths of 61 meters (200 feet).*

Human Interface Module Kits (For Customer Installation)

Description	Used With (Loose Kit)	Catalog Number
NEMA Type 1 (Normal)	All Open Chassis and NEMA Type 1 1336E Drives	
Blank-No Functionality		1201-HAB
Programmer Only		1201-HAP
Programmer/Controller with Analog Pot		1201-HA1
Programmer/Controller with Digital Pot		1201-HA2
NEMA Type 4	All NEMA Type 4 & 12 1336E Drives	
Programmer Only		1201-HFP[1]
Programmer/Controller with Digital Pot		1201-HF2[1]
Door Mount Bezel Kit, NEMA Type 1	Customer Supplied NEMA Type 1 Enclosures and Normal NEMA Type 1 HIM Modules	1201-DMA
Option Cable Kits	All Human Interface Modules Not Mounted on the Drive Chassis	
(Connects to HIM Cradle Port)		
One-Third Meter Length		1202-H03
One Meter Length		1202-H10
Three Meter Length		1202-H30
Nine Meter Length		1202-H90
(Connects to Communication Port)		
One-Third Meter Length		1202-C03
One Meter Length		1202-C10
Three Meter Length		1202-C30
Nine Meter Length		1202-C90

[1] *Requires a Communication Option Cable (1202-C03/C10/C30/C90) to be functional.*

Lug Kits (For Customer Installation)

Description	Voltage	Horsepower	Frame Designation	Catalog Number (Loose Kit)
Lug Kit, Includes:				
(3) Input Lugs	240V AC/310 V DC	40 HP	D	1336-LUG-AQ040
(3) Output Lugs		50 HP	D	1336-LUG-AQ050
(2) DC Bus Lugs		60 HP	D	1336-LUG-AQ060
(2) TE Ground Lugs		75 HP	E	1336-LUG-AQ075
(1) PE Ground Lug		100 HP	E	1336-LUG-AQ100
	480V AC/620V DC	60 HP	D	1336-LUG-BR060
		75 HP	D	1336-LUG-BR075
		100 HP	D	1336-LUG-BR100
		125 HP	D	1336-LUG-BR125
		X150 HP	D	1336-LUG-BRX150
		150 HP	D	1336-LUG-BR150
		200 HP	E	1336-LUG-BR200
		250 HP	E	1336-LUG-BR250
	600V AC/775V DC	60 HP	D	1336-LUG-CW060
		75 HP	D	1336-LUG-CW075
		100 HP	D	1336-LUG-CW100
		125 HP	D	1336-LUG-CW125
		150 HP	E	1336-LUG-CW150
		200 HP	E	1336-LUG-CW200
		250 HP	E	1336-LUG-CW250

Common Mode Choke Kits (For Customer Installation)

Description[1]	Used With . . .	Catalog Number
Open Style, 1A	Communication and Signal Type Cables	1321-M001
Open Style, 9A (with Terminal Block)	All Drives Rated: 230V, 0.37-1.5 kW (0.5-2 HP) 480V, 0.37-3.7 kW (0.5-5 HP)	1321-M009
Open Style, 48A	All Drives Rated: 230V, 2.2-11 kW (3-15 HP) 480V, 5.5-22 kW (7.5-30 HP) 600V, 0.75-30 kW (1-40 HP)	1321-M048
Open Style, 180A	All Drives Rated: 230V, 15-45 kW (20-60 HP) 480V, 30-112 kW (40-X150 HP) 600V, 37-112 kW (50-150 HP)	1321-M180
Open Style, 670A	All Drives Rated: 230V, 56-93 kW (75-125 HP) 480V, 112-448 kW (150-600 HP) 600V, 149-448 kW (200-600 HP)	1321-M670

Line Reactor Kits (For Customer Installation)

LINE REACTORS and ISOLATION TRANSFORMERS
(FOR REMOTE CUSTOMER INSTALLATION)

SPECIFICATIONS:

LINE REACTORS – Iron core, 3% impedance, 600V, Class H insulation, 115°C rise, copper wound, 50.60 Hz., terminal blocks (80A and below), copper box lugs (160A and above), UL, CSA.

ISOLATION TRANSFORMERS:

230V/230V or 460V/460V Delta primary/Wye secondary. Class H insulation, 150°C rise, aluminum wound, 60 Hz ±5% taps, (1) NC thermostat per coil, UL, CSA.

Line reactors 200-230V AC Input

Drive Ratings kW (HP)	Input or Output Line Reactor – 3% Impedance		Input or Output Line Reactor – 5% Impedance	
	IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0.37 (0.50)	1321-3R2-D	1321-3RA2-D	1321-3R2-A	1321-3RA2-A
0.56 (0.75)	1321-3R4-A	1321-3RA4-A	1321-3R4-B	1321-3RA4-B
0.75 (1)	1321-3R4-A	1321-3RA4-A	1321-3R4-B	1321-3RA4-B
1.2 (1.5)	1321-3R8-A	1321-3RA8-A	1321-3R8-B	1321-3RA8-B
1.5 (2)	1321-3R8-A	1321-3RA8-A	1321-3R8-B	1321-3RA8-B
2.2 (3)	1321-3R12-A	1321-3RA12-A	1321-3R12-B	1321-3RA12-B
3.7 (5)	1321-3R18-A	1321-3RA18-A	1321-3R18-B	1321-3RA18-B
5.5 (7.5)	1321-3R25-A	1321-3RA25-A	1321-3R25-B	1321-3RA25-B
7.5 (10)	1321-3R35-A	1321-3RA35-A	1321-3R35-B	1321-3RA35-B
11 (15)	1321-3R45-A	1321-3RA45-A	1321-3R45-B	1321-3RA45-B
15 (20)[1]	1321-3R55-A[1]	1321-3RA55-A[1]	1321-3R55-B[1]	1321-3RA55-B[1]
15 (20)	1321-3R80-A	1321-3RA80-A	1321-3R80-B	1321-3RA80-B
18.5 (25)	1321-3R80-A	1321-3RA80-A	1321-3R80-B	1321-3RA80-B
22 (30)	1321-3R80-A	1321-3RA80-A	1321-3R80-B	1321-3RA80-B
30 (40)	1321-3R130-A	1321-3RA130-A	1321-3R130-B	1321-3RA130-B
37 (50)	1321-3R160-A	1321-3RA160-A	1321-3R160-B	1321-3RA160-B
45 (60)	1321-3R200-A	1321-3RA200-A	1321-3R200-B	1321-3RA200-B
56 (75)	1321-3RB250-A	1321-3RA250-A	1321-3RB250-B	1321-3RA250-B
75 (100)	1321-3RB320-A	1321-3RA320-A	1321-3RB320-B	1321-3RA320-B
93 (125)	1321-3RB320-A	1321-3RA320-A	1321-3RB320-B	1321-3RA320-B

1 *Input Reactor Only.*

Line Reactor Kits (For Remote Customer Installation)

LINE REACTORS and ISOLATION TRANSFORMERS
(FOR REMOTE CUSTOMER INSTALLATION)

SPECIFICATIONS:

LINE REACTORS – Iron core, 3% impedance, 600V, Class H insulation, 115°C rise, copper wound, 50.60 Hz., terminal blocks (80A and below), copper box lugs (160A and above), UL, CSA.

ISOLATION TRANSFORMERS:

230V/230V or 460V/460V Delta primary/Wye secondary. Class H insulation, 150°C rise, aluminum wound, 60 Hz ±5% taps, (1) NC thermostat per coil, UL, CSA.

LINE REACTORS 380-480V AC INPUT

Drive Ratings kW (HP)	Input or Output Line Reactor – 3% Impedance		Input or Output Line Reactor – 5% Impedance	
	IP00 (Open Style)	IP10 (NEMA Type 1)	IP00 (Open Style)	IP10 (NEMA Type 1)
	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0.37 (0.50)	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
0.56 (0.75)	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
0.75 (1)	1321-3R2-A	1321-3RA2-A	1321-3R2-B	1321-3RA2-B
1.2 (1.5)	1321-3R4-B	1321-3RA4-B	1321-3R4-C	1321-3RA4-C
1.5 (2)	1321-3R4-B	1321-3RA4-B	1321-3R4-C	1321-3RA4-C
2.2 (3)	1321-3R8-B	1321-3RA8-B	1321-3R8-C	1321-3RA8-C
3.7 (5)	1321-3R8-B	1321-3RA8-B	1321-3R8-C	1321-3RA8-C
5.5 (7.5)	1321-3R12-B	1321-3RA12-B	1321-3R12-C	1321-3RA12-C
7.5 (10)	1321-3R18-B	1321-3RA18-B	1321-3R18-C	1321-3RA18-C
11 (15)	1321-3R25-B	1321-3RA25-B	1321-3R25-C	1321-3RA25-C
15 (20)	1321-3R35-B	1321-3RA35-B	1321-3R35-C	1321-3RA35-C
18.5 (25)	1321-3R35-B	1321-3RA35-B	1321-3R35-C	1321-3RA35-C
22 (30)	1321-3R45-B	1321-3RA45-B	1321-3R45-C	1321-3RA45-C
30 (40)	1321-3R55-B	1321-3RA55-B	1321-3R55-C	1321-3RA55-C
37 (50)	1321-3R80-B	1321-3RA80-B	1321-3R80-C	1321-3RA80-C
45 (60)	1321-3R80-B	1321-3RA80-B	1321-3R80-C	1321-3RA80-C
56 (75)	1321-3R100-B	1321-3RA100-B	1321-3R100-C	1321-3RA100-C
75 (100)	1321-3R130-B	1321-3RA130-B	1321-3R130-C	1321-3RA130-C
95 (125)	1321-3R160-B	1321-3RA160-B	1321-3R160-C	1321-3RA160-C
112 (150)	1321-3R200-B	1321-3RA200-B	1321-3R200-C	1321-3RA200-C
149 (200)	1321-3RB250-B	1321-3RA250-B	1321-3RB250-C	1321-3RA250-C
187 (250)	1321-3RB320-B	1321-3RA320-B	1321-3RB320-C	1321-3RA320-C
224 (300)	1321-3RB400-B	1321-3RA400-B	1321-3RB400-C	1321-3RA400-C
261 (350)[1]	1321-3RB400-B	1321-3RA400-B	1321-3RB400-C	1321-3RA400-C
261 (350)	1321-3R500-B	1321-3RA500-B	1321-3R500-C	1321-3RA500-C
298 (400)	1321-3R500-B	1321-3RA500-B	1321-3R500-C	1321-3RA500-C
336 (450)[1]	1321-3R500-B	1321-3RA500-B	1321-3R500-C	1321-3RA500-C
336 (450)	1321-3R600-B	1321-3RA600-B	1321-3R600-C	1321-3RA600-C
373 (500)	1321-3R600-B	1321-3RA600-B	1321-3R600-C	1321-3RA600-C
448 (600)	1321-3R750-B	1321-3RA750-B	1321-3R750-C	1321-3RA750-C
522 (700)	1321-3R850-B	1321-3RA850-B	1321-3R850-C	1321-3RA850-C
597 (800)	1321-3R1000-B	1321-3RA1000-B	1321-3R1000-C	1321-3RA1000-C

1 *Input Reactor on G Frame Drives Only.*

LINE REACTORS 500-600V AC INPUT

Drive Ratings kW (HP)	Input or Output Line Reactor – 3% Impedance		Input or Output Line Reactor – 5% Impedance	
	IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0.75 (1)	1321-3R4-C	1321-3RA4-C	1321-3R4-D	1321-3RA4-D
1.5 (2)	1321-3R4-C	1321-3RA4-C	1321-3R4-D	1321-3RA4-D
2.2 (3)	1321-3R8-C	1321-3RA8-C	1321-3R8-D	1321-3RA8-D
3.7 (5)	1321-3R8-B	1321-3RA8-B	1321-3R8-C	1321-3RA8-C
5.5 (7.5)	1321-3R8-B	1321-3RA8-B	1321-3R8-C	1321-3RA8-C
7.5 (10)	1321-3R12-B	1321-3RA12-B	1321-3R12-C	1321-3RA12-C
11 (15)	1321-3R18-B	1321-3RA18-B	1321-3R18-C	1321-3RA18-C
15 (20)	1321-3R25-B	1321-3RA25-B	1321-3R25-C	1321-3RA25-C
18.5 (25)	1321-3R25-B	1321-3RA25-B	1321-3R25-C	1321-3RA25-C
22 (30)	1321-3R35-B	1321-3RA35-B	1321-3R35-C	1321-3RA35-C
30 (40)	1321-3R45-B	1321-3RA45-B	1321-3R45-C	1321-3RA45-C
37 (50)	1321-3R55-B	1321-3RA55-B	1321-3R55-C	1321-3RA55-C
45 (60)	1321-3R80-B	1321-3RA80-B	1321-3R80-C	1321-3RA80-C
56 (75)	1321-3R80-B	1321-3RA80-B	1321-3R80-C	1321-3RA80-C
75 (100)	1321-3R100-B	1321-3RA100-B	1321-3R100-C	1321-3RA100-C
95 (125)	1321-3R130-B	1321-3RA130-B	1321-3R130-C	1321-3RA130-C
112 (150)	1321-3R160-B	1321-3RA160-B	1321-3R160-C	1321-3RA160-C
149 (200)	1321-3R200-B	1321-3RA200-B	1321-3R200-C	1321-3RA200-C
187 (250)	1321-3RB250-B	1321-3RA250-B	1321-3RB250-C	1321-3RA250-C
224 (300)	1321-3RB320-B	1321-3RA320-B	1321-3RB320-C	1321-3RA320-C
261 (350)	1321-3RB400-B	1321-3RA400-B	1321-3RB400-C	1321-3RA400-C
298 (400)	1321-3RB400-B	1321-3RA400-B	1321-3RB400-C	1321-3RA400-C
336 (450)	1321-3R500-B	1321-3RA500-B	1321-3R500-C	1321-3RA500-C
373 (500)	1321-3R500-B	1321-3RA500-B	1321-3R500-C	1321-3RA500-C
448 (600)	1321-3R600-B	1321-3RA600-B	1321-3R600-C	1321-3RA600-C
485 (650)	1321-3R750-B	1321-3RA750-B	1321-3R750-C	1321-3RA750-C
522 (700)	1321-3R850-B	1321-3RA850-B	1321-3R850-C	1321-3RA850-C
597 (800)	1321-3R850-B	1321-3RA850-B	1321-3R850-C	1321-3RA850-C

ISOLATION TRANSFORMERS

Drive Ratings kW (HP)	230V Primary & Secondary	460V Primary & Secondary	575V Primary & Secondary
	IP20 (NEMA Type 1)	IP20 (NEMA Type 1)	IP20 (NEMA Type 1)
	Catalog Number	Catalog Number	Catalog Number
0.37 (0.50)	1321-3TH005-AA	1321-3TH005-BB	–
0.56 (0.75)	1321-3TH005-AA	1321-3TH005-BB	–
0.75 (1)	1321-3TH005-AA	1321-3TH005-BB	1321-3TH005-CC
1.2 (1.5)	1321-3TH005-AA	1321-3TH005-BB	–
1.5 (2)	1321-3TH005-AA	1321-3TH005-BB	1321-3TH005-CC
2.2 (3)	1321-3TH005-AA	1321-3TH005-BB	1321-3TH005-CC
3.7 (5)	1321-3TH007-AA	1321-3TH007-BB	1321-3TH007-CC
5.5 (7.5)	1321-3TH011-AA	1321-3TH011-BB	1321-3TH011-CC
7.5 (10)	1321-3TH014-AA	1321-3TH014-BB	1321-3TH014-CC
11 (15)	1321-3TH020-AA	1321-3TH020-BB	1321-3TH020-CC
15 (20)	1321-3TH027-AA	1321-3TH027-BB	1321-3TH027-CC
18.5 (25)	1321-3TH034-AA	1321-3TH034-BB	1321-3TH034-CC
22 (30)	1321-3TH040-AA	1321-3TH040-BB	1321-3TH040-CC
30 (40)	1321-3TH051-AA	1321-3TH051-BB	1321-3TH051-CC
37 (50)	1321-3TH063-AA	1321-3TH063-BB	1321-3TH063-CC
45 (60)	1321-3TH075-AA	1321-3TH075-BB	1321-3TH075-CC
56 (75)	1321-3TH093-AA	1321-3TH093-BB	1321-3TH093-CC
75 (100)	1321-3TH118-AA	1321-3TH118-BB	1321-3TH118-CC
93 (125)	1321-3TH145-AA	1321-3TH145-BB	1321-3TH145-CC
112 (150)	–	1321-3TH175-BB	1321-3TH175-CC
149 (200)	–	1321-3TH220-BB	1321-3TH220-CC
187 (250)	–	1321-3TH275-BB	1321-3TH275-CC
224 (300)	–	1321-3TH330-BB	1321-3TH330-CC
261 (350)	–	1321-3TH440-BB	1321-3TH440-CC
298 (400)	–	1321-3TH440-BB	1321-3TH440-CC
336 (450)	–	1321-3TH550-BB	1321-3TH550-CC
373 (500)	–	1321-3TH550-BB	1321-3TH550-CC
448 (600)	–	1321-3TH660-BB	1321-3TH660-CC
485 (650)	–	–	1321-3TH770-CC
522 (700)	–	1321-3TH770-BB	1321-3TH770-CC
597 (800)	–	1321-3TH880-BB	1321-3TH880-CC

Notes

Notes

Small in Size – Not in Applications or Performance

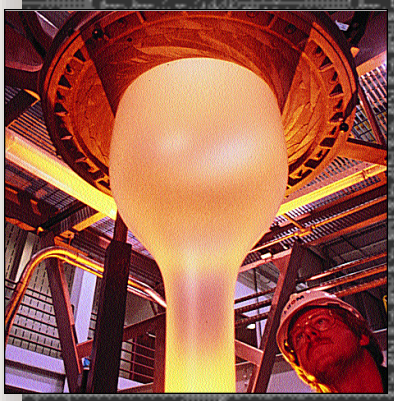
The Allen-Bradley 1336 family of AC drives offers advanced electronic technology. From the IGBT-based power structure to the advanced microprocessors, the 1336 variable frequency drives offer opportunities for increased productivity and energy savings.

Material Handling

The 1336 IMPACT drive with Force Technology is well suited for some of the toughest material handling applications, such as sorting, diverting and load sharing conveyors. Varying load requirements, full torque at zero speed, and precise speed control are easily handled with the 1336 IMPACT drive. Features such as speed/torque selection, preset speeds, speed profiling, droop control, process trim, and linking capabilities provide application flexibility. Force Technology torque control offers virtually tripless operation by protecting against overcurrent trips due to shock loads often seen in conveyor applications. Also, the 1336 IMPACT drive has the high bandwidth and fast response required for cut-to-length applications.

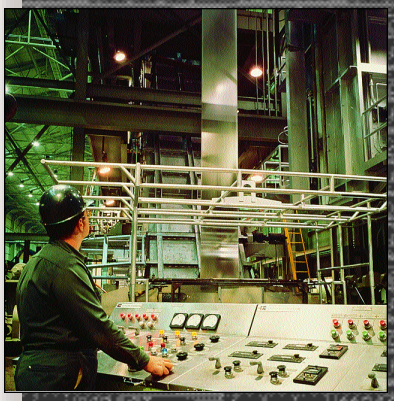
Extruders and Mixers

The 1336 IMPACT drive is designed to meet the most demanding requirements of extruders and similar applications. Constant torque from zero to full speed, more than rated torque at start-up, and virtually tripless operation are some of the specifications needed. The 1336 IMPACT drive provides overload capability of 150% current for 1 minute, with a programmable motor current limit up to 400%. With the optional encoder interface, the 1336 IMPACT drive provides speed regulation of 0.001%. This helps provide the precise speed control required for some mixing and metering applications. In addition, PI control and programmable process display give the drive flexibility to meet many critical process control needs.



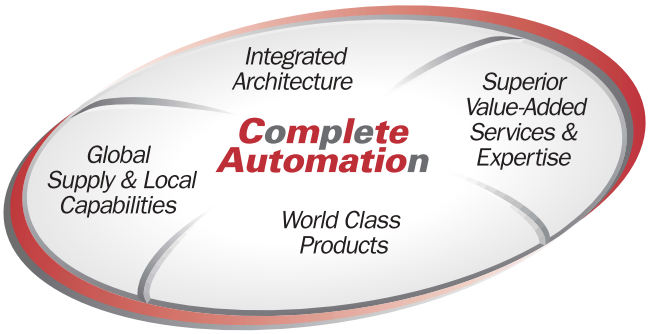
Special Applications

With flexible parameters and options, the 1336 IMPACT drive can be applied to a broad range of specialized applications, such as winders, machine tools and rapid-traverse. Programmable I/O function blocks, optional encoder feedback, speed control, torque control and communication options allow this drive to handle most specialized applications. In addition to the standard drive products, the OEM (Original Equipment Manufacturer) drives program allows OEM's to engineer the 1336 IMPACT drives into packages to handle special applications, such as crane/hoist, test stands and others.



Packaging and Design Flexibility

Additional options in the Configured Drives Program are available to help meet your application requirements. Most of the available options are completely pre-defined and manufacturing begins immediately after order entry. More complex option choices will require varying amounts of engineering and special handling, with delivery time varying by complexity. These offerings vary by country, contact your local Rockwell Automation office for availability.



The 1336 IMPACT™ AC drive is a world class product that will help to provide you with a single solution for virtually all of your speed control requirements. Its common design and control interface functions will help save you time and money in set-up, integration, and maintenance of your automation system.

For Allen-Bradley Drives support, there are specialists at local sales offices and distributor locations across North America and around the world. We also offer Global Technical Services, specializing in a full spectrum of value-added services and expertise to help simplify maintenance and enhance productivity.

Rockwell Automation is committed to helping you meet ever-changing customer demands for more, less expensive product in less time. Our capabilities enable us to become your "Complete Automation™" partner.

For technical information refer to our web site: www.ab.com/drives

www.rockwellautomation.com

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