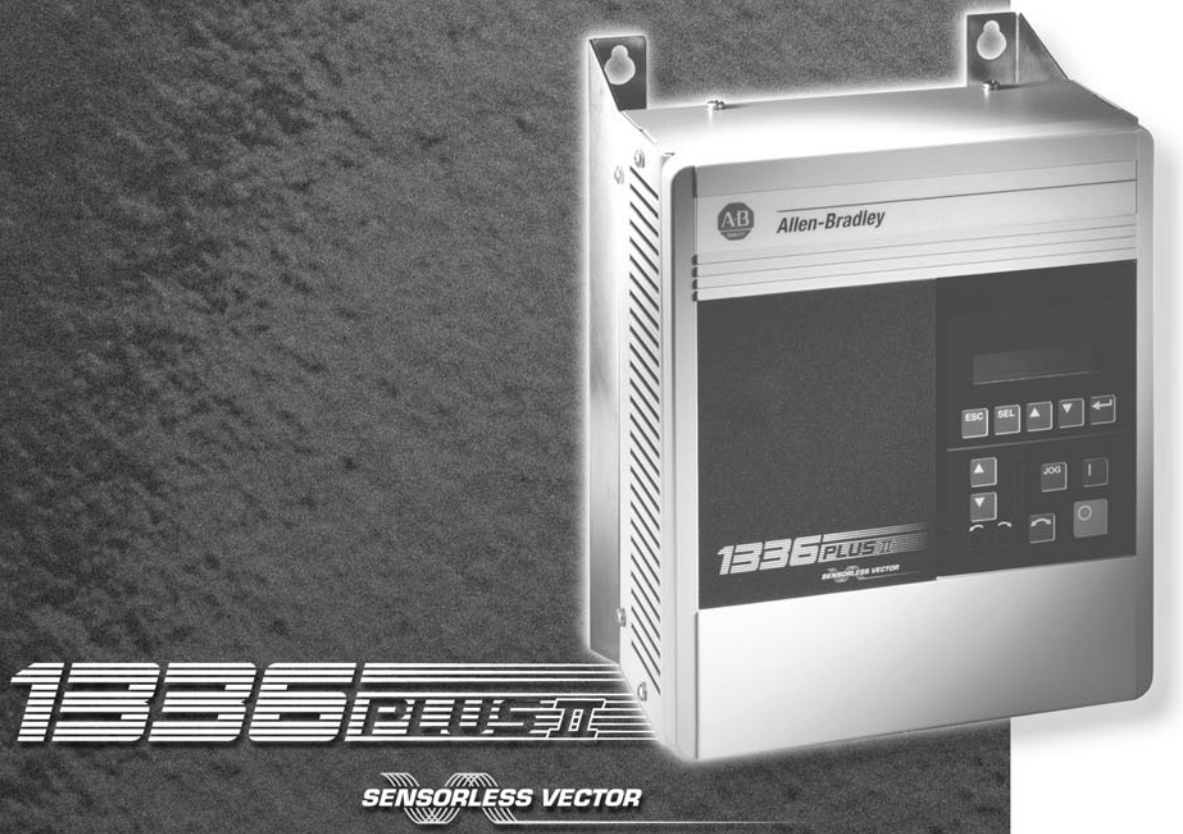
Allen-Bradley

Technical Data

# 1336 PLUS II Adjustable Frequency AC Drive




Rockwell Automation

# A Complete Line of Drives for a Complete Family of Products

Available in ratings from 0.37 to 448 kW (0.5 to 600 horsepower), the drive helps to provide a single solution for virtually all of your speed control requirements. Commonality of design across the entire range, coupled with identical control interface functions, device communications, training and maintenance, provide you with a tremendous advantage in your control needs. Add that to integration with Allen-Bradley SMC™ and SMP™ power products, the 1305 drive, the 1336 IMPACT™ and 1336 FORCE™ field-oriented control drives (all of which use the same control interface and communication options) and you've just gained significant advantage in system design, component integration, operator training and maintenance.

# 1336 PLUS II Product Data


Product Description . . . . . 4
Specifications . . . . . 6
Function Description . . . . . 11
Fault and Parameter List . . . . . 18

1336 PLUS II PRE-INSTALLATION . . . . . 21
IP 20 (NEMA Type 1) Dimensions . . . . . 22
IP 65/54 (NEMA Type 4/12) Dimensions . . . . . 28
IP 20 (NEMA Type 1) Bottom View Dimensions . . . . . 29
Mounting Requirements . . . . . 31
Input Conditioning . . . . . 31
AC Supply Source . . . . . 32
Power Wiring – TB1 . . . . . 36
Control and Signal Wiring . . . . . 40
General Wiring Information . . . . . 40
Terminal Block – TB2 . . . . . 41
Terminal Block – TB3 . . . . . 41
Encoder Inputs . . . . . 45
Pulse Input/Output . . . . . 46
Digital Outputs . . . . . 46
Analog Inputs/Outputs . . . . . 47
Motor Cables . . . . . 50
User Supplied Enclosures . . . . . 55
Derating Guidelines . . . . . 56
1336 PLUS II Remote Device Distances . . . . . 61

1336 PLUS II SELECTION GUIDE . . . . . 63
Catalog Number Explanation . . . . . 63
Constant/Variable Torque Drives and Enclosures . . . . . 64
Language Groups . . . . . 65
Dynamic Brake Kits . . . . . 65
Factory Installed Options . . . . . 66
Field Installed Options . . . . . 67

**Standard Packaged Drives Program . . . . . 69-119**

# Product Description

## Features

**Protective**
- Detection and Trip:

*Undervoltage*
*Overvoltage*
*Drive Overcurrent*
*Overtemperature*
*External Signal*
*Drive Output Short*
*Ground Fault*
*Encoder Loss*
*At temperature*
*Load Loss*
*Single Phase*

- Overcurrent Stall
- Overvoltage Stall
- Six Drive Alarms
- Fault Reset Input

**Special Function**
- Auto Economizer
- Process PI Controller
- Traverse Function
- Selectable Fault Reset & Run
- Auto Restart on Power Up
- Speed Sensitive Electronic Overload
- Auto-tuning
- Step Logic

**Operational**
- SENSORLESS VECTOR Control
- Selectable Volts/Hertz Mode
- Multi-lingual selection

**Programmable**
- Dual Accel/Decel Profiles
- Three Skip Frequencies
- DC Injection Braking
- Dynamic Braking
- Slip Compensation
- Negative Slip Compensation (Droop)
- S Curve Accel/Decel Profile
- Line Loss Restart Mode
- Proactive Current Limit
- Last Four Event Fault Memory
- Flying Start
- Seven Preset Speeds

**I/O Interface**
- Control Output Contacts (2) Form A (N.O.) (2) Form C (N.O. - N.C.) Programmable to 17 different drive variables.
- Flexible Analog Inputs/Outputs
- Pulse Train Input
- Encoder Feedback Closed Loop Speed Control
- High Speed Input

## Diagnostics

**Real time preventive maintenance coupled with customized status and fault reporting.**

Depending upon your particular drive configuration, status and fault conditions can be reported through the Human Interface Module or through the SCANport™ Communications Port. Fault diagnostic routines are started each time the 1336 PLUS II is powered up. Throughout the entire run sequence, the drive will continue to look for potential fault conditions.

To allow real-time preventive maintenance, drive output current and control conditions can be selectively monitored while the drive is running. The operator is made aware of alarm conditions such as current limit, bus voltage status, motor overload or drive overload before the drive reaches a fault level. Should a fault occur, plain language diagnostic messages will help identify and isolate the problem, allowing personnel to take quick, corrective action.

## Packaging

**Small size** conserves expensive panel space.

**Planer Construction** eliminates most internal cables and connectors. Increases reliability.

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

**Removable Human Interface** 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 European standards.** Designed for acceptability throughout the world.

**IP 65 & 54 (NEMA Type 4 & 12)** configurations accommodated with "heat sink through the back" design.

## Electrical

**IGBT's (Insulated Gate Bipolar Transistors)**
- Quiet motor operation through programmable carrier frequency.
- Third Generation devices – Reduced switching and conduction losses.
- Used on complete line 0.37-448 kW (0.5-600 HP).

**Status LEDs.** Four status indicators located on the control board.

**Dynamic Current Control**
- Multiple sensors.
- Exceptional torque production through SENSORLESS VECTOR Control.
- Proactive current limit control – Reduces trips.
- Ability to start low inductance motors.

**Independent Certification.** C-UL Listed for dual U.S. and Canadian Certification. Designed to meet EN, IEC, VDE and other international standards.

**Isolated Power and Logic** eliminates noise to provide reliable and stable operation.

**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, improved ride-thru capability.

**Communications**. Designed to accommodate on-board communications for all ratings.

## The 1336 PLUS II

**The standard solution to your application needs.**

The 1336 PLUS II provides ratings from 0.37-448 kW (0.5-600 HP) in three voltage ranges – 200-240V AC, 380-480V AC and 500-600V AC. The 1336 PLUS II is a micro-processor based adjustable frequency PWM AC drive. Its advanced design provides exceptional reliability when controlling 3-phase motors. The output can be tuned to provide optimum performance for virtually any load condition. Selectable SENSORLESS VECTOR or V/Hz operation provides outstanding motor control.

## Simplicity

**Design and programming simplicity is evident in:**

- **Condensed packaging** that allows for easy mounting, installation and wiring in all types of applications.
- **Common assembly parts** that reduces the need to stock a multitude of parts.
- **Easy to program parameters** that are organized in a group and element structure for quick access to related functions.
- **Simple tuning** for optimum torque performance.
- **An easy to read Supertwist Liquid Crystal Display** gives 2 lines of 16 characters each for easy "one finger" programming and drive monitoring.
- **Serial communications** that provide easy integration and access to peripheral equipment – Fully compatible with all Allen-Bradley PLC® or SLC™ equipment.
- **Common options** that are used throughout the entire family of Drives.

## Flexibility

**Digitally programmable to help provide precise and accurate control.**

The I336 PLUS II uses digitally programmable features to achieve precise and consistently accurate control, setup and operation. The drive can be programmed locally from the Human Interface Module or through a serial communications port using a PLC, SLC, or **DriveTools**™ programming software.

**Configurable I/O allows simple connection to many customer preformed control schemes.**

Control inputs and outputs can be programmed to meet nearly every application requirement.

## Performance

**Powerful algorithms provide unparalleled SENSORLESS VECTOR performance.**

Starting acceleration and running torque in excess of 250% combined with a constant torque speed range of 120:1 allow the 1336 PLUS II to handle the tough applications other drives can't.

*DriveTools, PLC, SLC and SCANport are registered trademarks of Rockwell Automation.*

# Specifications

## 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 | 1013V DC |
| Bus Undervoltage Trip | 200V DC | 400V DC | 498V DC |
| Nominal Bus Voltage | 324V DC | 648V DC | 810V DC |
| Heat Sink Thermistor | Monitored by microprocessor overtemp trip. | | |

| | | |
|---|---|---|
| Drive Overcurrent Trip | Software Current Limit: | 20 to 160% of VT rated current. |
| | Hardware Current Limit: | 180 to 250% of VT rated current (dependent on drive rating). |
| | Instantaneous Current Limit: | 220 to 300% of VT rated current (dependent on drive rating). |
| 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-Thru | 15 milliseconds at full load (refer to **Page 13**). | |
| Logic Control Ride-Thru | 0.5 seconds minimum, 2 seconds typical (refer to **Page 13**). | |
| Ground Fault Trip | Phase-to-Ground on Drive Output. | |
| Short Circuit Trip | Phase-to-Phase on Drive Output. | |

## Environmental Specifications

| | | |
|---|---|---|
| Altitude | 1000 m (3300 ft) maximum without derating.<br>(refer to the Derating Guidelines on **Pages 56-60**). | |
| Ambient Operating Temperature | IP00, Open: | 0 to 50 degrees C (32 to 122 degrees F). |
| | IP20, NEMA Type 1: | 0 to 40 degrees C (32 to 104 degrees F). |
| | IP54, NEMA Type 12: | 0 to 40 degrees C (32 to 104 degrees F). |
| | IP65, NEMA Type 4: | 0 to 40 degrees C (32 to 104 degrees F). |
| | (refer to the Derating Guidelines on **Pages 56-60**). | |
| Storage Temperature (all constructions) | - 40 to 70 degrees C (- 40 to 158 degrees 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<br>CSA Certified | |
| | Marked for all applicable directives[1] | |
| | Emissions | EN 50081-1<br>EN 50081-2<br>EN 55011 Class A<br>EN 55011 Class B |
| | Immunity | EN 50082-1<br>EN 50082-2<br>IEC 801-1, 2, 3, 4, 6, 8 per EN 50082-1, 2 |
| | Low Voltage | EN 60204-1<br>PREN 50178 |

[1] *Note: Installation guidelines called out in Appendix C of the 1336 PLUS II User Manual (publication 1336 PLUS-5.3) must be adhered to.*

## Electrical Specifications

| | | |
|---|---|---|
| Input Data | Voltage Tolerance: | –10% of Minimum, +10% of Maximum. |
| | Frequency Tolerance: | 48-62 Hz. |
| | Input Phases: | Three-Phase input provides full rating for all drives. Single-Phase operation is possible for A & B Frame drives at a derating of 50%. |
| | (refer to frame designations on **Page 22** and the Derating Guidelines on **Pages 56-60**). | |
| Displacement Power Factor | A1 - A3 Frame: | 0.80 Standard, 0.95 with Optional Inductor. |
| | A4 Frame & Up: | 0.95 Standard. |
| Efficiency | 97.5% at rated amps, nominal line volts. | |
| Maximum Short Circuit Current Rating | 200,000A rms symmetrical, 600 volts (when used with AC line fuses specified on **Page 37**). | |

## Control Specifications

| | | |
|---|---|---|
| Method | Sine coded PWM with programmable carrier frequency. Ratings apply to all drives. | |
| | A Frame | 2-10 kHz. Drive Rating based on 4 kHz. |
| | B Frame | 2-8 kHz. Drive Rating based on 4 kHz. |
| | C & D Frame | 2-6 kHz. Drive Rating based on 4 kHz. |
| | E Frame & Up | 2-6 kHz. Drive Rating based on 2 kHz. |
| | (refer to frame designations on **Page 22** and the Derating Guidelines on **Pages 56-60**). | |
| Output Voltage Range | 0 to rated voltage. | |
| Output Frequency Range | 0 to 400 Hz. | |
| Frequency Accuracy | Digital Input: | Within ±0.01% of set output frequency. |
| | Analog Input: | Within ±0.4% of maximum output frequency. |
| Selectable Motor Control | SENSORLESS VECTOR control with full tuning. Standard V/Hz with full custom capability. | |
| Accel/Decel | Two independently programmable accel and decel times. Each time may be programmed from 0 to 3600 seconds in 0.1 second increments[1]. | |
| Intermittent Overload | Constant Torque: | 150% of rated output for 1 minute. |
| | Variable Torque: | 115% of rated output for 1 minute. |
| Current Limit Capability | Proactive Current Limit programmable from 20 to 160% of rated output current. Independently programmable proportional and integral gain. | |
| Inverse Time Overload Capability | Class 10 protection with speed sensitive response. Investigated by U.L. to comply with N.E.C. Article 430. U.L. file E59272, volume 4/6. | |

## Display Specifications

| | |
|---|---|
| Local Programming and Display Panel | Backlit Supertwist LCD display. 2 lines, 16 characters each. Multi-lingual display of status, faults and programming. Process Display provides 2 lines, any 2 parameters, scalable with user text. Selectable "Power Up" display. |

## 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. |

[1] *0.1 second increments using a HIM or 0.01 with serial communications.*

# Specifications

## Input/Output Ratings

Requirements: Each 1336 PLUS II Drive has constant and variable torque capabilities.
Note: Drive ratings are at nominal values. Refer to Derating Guidelines on **Pages 56-60.**

| Cat. No. | Constant Torque Input kVA | Constant Torque Input Amps | Constant Torque Output kVA | Constant Torque Output Amps | Variable Torque Input kVA | Variable Torque Input Amps | Variable Torque Output kVA | Variable Torque Output Amps | Variable Torque Input kVA | Variable Torque Input Amps | Variable Torque Output kVA | Variable Torque Output Amps |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **200-240V Drives** | | | | **240V Drives** | | | | | | | |
| AQF05 | 1.1 | 2.8 | 0.9 | 2.3 | 1.1 | 2.8 | 0.9 | 2.3 | | | | |
| AQF07 | 1.4 | 3.5 | 1.2 | 3.0 | 1.4 | 3.5 | 1.2 | 3.0 | | | | |
| AQF10 | 2.2 | 5.4 | 1.8 | 4.5 | 2.2 | 5.4 | 1.8 | 4.5 | | | | |
| AQF15 | 2.9 | 7.3 | 2.4 | 6.0 | 2.9 | 7.3 | 2.4 | 6.0 | | | | |
| AQF20 | 3.9 | 9.7 | 3.2 | 8.0 | 3.9 | 9.7 | 3.2 | 8.0 | | | | |
| AQF30 | 5.7 | 14.3 | 4.8 | 12 | 5.7 | 14.3 | 4.8 | 12 | | | | |
| AQF50 | 8.5 | 21.3 | 7.2 | 18 | 8.5 | 21.3 | 7.2 | 18 | | | | |
| AQF75 | 9.0 | 22.6 | 8.8 | 22 | 9.0 | 22.6 | 8.8 | 22 | | | | |
| A007 | 10-12 | 28 | 8.8 | 22 | 10 | 23 | 8.8 | 22 | | | | |
| A010 | 12-14 | 35 | 14 | 34 | 14 | 35 | 14 | 34 | | | | |
| A015 | 17-20 | 49 | 19 | 48 | 20 | 49 | 19 | 48 | | | | |
| A020 | 22-26 | 63 | 26 | 65 | 26 | 63 | 26 | 65 | | | | |
| A025 | 26-31 | 75 | 31 | 77 | 31 | 75 | 31 | 77 | | | | |
| A030 | 27-33 | 79 | 32 | 80 | 33 | 79 | 32 | 80 | | | | |
| A040 | 41-49 | 119 | 48 | 120 | 49 | 119 | 48 | 120 | | | | |
| A050 | 52-62 | 149 | 60 | 150 | 62 | 149 | 60 | 150 | | | | |
| A060 | 62-74 | 178 | 72 | 180 | 74 | 178 | 72 | 180 | | | | |
| A075 | 82-99 | 238 | 96 | 240 | 99 | 238 | 96 | 240 | | | | |
| A100 | 100-120 | 289 | 116 | 291 | 120 | 289 | 116 | 291 | | | | |
| A125 | 112-134 | 322 | 129 | 325 | 134 | 322 | 129 | 325 | | | | |
| | **380-480V Drives** | | | | **480V Drives** | | | | **400V Drives** | | | |
| BRF05 | 0.9-1.0 | 1.3 | 0.9 | 1.1 | 1.1 | 1.4 | 1.0 | 1.2 | 0.9 | 1.4 | 1.0 | 1.33 |
| BRF07 | 1.3-1.6 | 2.0 | 1.3 | 1.6 | 1.7 | 2.1 | 1.4 | 1.7 | 1.4 | 2.1 | 1.4 | 1.89 |
| BRF10 | 1.7-2.1 | 2.6 | 1.7 | 2.1 | 2.2 | 2.8 | 1.8 | 2.3 | 1.8 | 2.8 | 1.8 | 2.55 |
| BRF15 | 2.2-2.6 | 3.3 | 2.2 | 2.8 | 2.8 | 3.5 | 2.4 | 3.0 | 2.3 | 3.5 | 2.4 | 3.33 |
| BRF20 | 3.0-3.7 | 4.6 | 3.0 | 3.8 | 3.8 | 4.8 | 3.2 | 4.0 | 3.2 | 4.8 | 3.2 | 4.44 |
| BRF30 | 4.2-5.1 | 6.4 | 4.2 | 5.3 | 5.7 | 7.2 | 4.8 | 6.0 | 4.7 | 7.2 | 4.8 | 6.66 |
| BRF50 | 6.6-8.0 | 10.0 | 6.7 | 8.4 | 8.5 | 10.7 | 7.2 | 9.0 | 7.0 | 10.7 | 7.2 | 9.99 |
| BRF75 | 8.9-11.3 | 13.6 | 10.6 | 13.3 | 13 | 15.7 | 12.3 | 15.4 | 10.3 | 15.7 | 12.3 | 19.43 |
| BRF100 | 10.8-13.6 | 16.4 | 12.8 | 16.1 | 18.6 | 22.4 | 17.5 | 22 | 14.7 | 22.4 | 17.5 | 22.00 |
| BRF150 | 16.1-20.4 | 24.5 | 19.1 | 24 | 20.4 | 24.5 | 19.1 | 24 | 16.1 | 24.5 | 19.1 | 24.00 |
| BRF200 | 18-23 | 28 | 22 | 27 | 23 | 28 | 22 | 27 | 18 | 28 | 22 | 27.75 |
| B015 | 16-21 | 25 | 19 | 24.2 | 23 | 28 | 22 | 27 | 18 | 28 | 22 | 29.97 |
| B020 | 21-26 | 32 | 25 | 31 | 29 | 35 | 27 | 34 | 23 | 35 | 27 | 37.74 |
| B025 | 26-33 | 40 | 31 | 39 | 36 | 43 | 33 | 42 | 28 | 43 | 33 | 46.62 |
| B030 | 30-38 | 46 | 36 | 45 | 41 | 49 | 38 | 48 | 32 | 49 | 38 | 53.28 |
| BX040 | 40-50 | 61 | 47 | 59 | 50 | 61 | 47 | 59 | 40 | 61 | 47 | 66.60 |
| B040 | 38-48 | 58 | 48 | 60 | 52 | 63 | 52 | 65 | 41 | 63 | 52 | 72.15 |
| B050 | 48-60 | 73 | 60 | 75 | 62 | 75 | 61 | 77 | 49 | 75 | 61 | 83.25 |
| BX060[1] | 62 | 75 | 61 | 77 | 62 | 75 | 61 | 77 | 62 | 75 | 61 | 85.47 |
| B060 | 54-68 | 82 | 68 | 85 | 77 | 93 | 76 | 96 | 61 | 93 | 76 | 106.56 |
| B075 | 69-87 | 105 | 84 | 106 | 99 | 119 | 96 | 120 | 78 | 119 | 98 | 133.20 |
| B100 | 90-114 | 137 | 110 | 138 | 124 | 149 | 120 | 150 | 98 | 149 | 120 | 166.50 |
| B125 | 113-143 | 172 | 138 | 173 | 148 | 178 | 143 | 180 | 117 | 178 | 143 | 199.80 |
| BX150 | 148 | 178 | 143 | 180 | 148 | 178 | 143 | 180 | 148 | 178 | 143 | 199.80 |
| B150 | 130-164 | 197 | 159 | 199 | 198 | 238 | 191 | 240 | 157 | 238 | 191 | 266.40 |
| B200 | 172-217 | 261 | 210 | 263 | 241 | 290 | 233 | 292 | 191 | 290 | 233 | 324.12 |
| B250 | 212-268 | 322 | 259 | 325 | 268 | 322 | 259 | 325 | 212 | 322 | 259 | 360.75 |
| BP/BPR250 | 212-268 | 322 | 259 | 325 | 297 | 357 | 287 | 360 | 235 | 357 | 287 | 399.60 |
| BX250 | 212-268 | 322 | 259 | 325 | 297 | 357 | 287 | 360 | 228 | 357 | 279 | 399.60 |
| B300 | 235-297 | 357 | 287 | 360 | 350 | 421 | 339 | 425 | 261 | 397 | 319 | 471.75 |
| BP/BPR300 | 235-297 | 357 | 287 | 360 | 350 | 421 | 339 | 425 | 277 | 421 | 339 | 471.75 |
| B350 | 277-350 | 421 | 339 | 425 | 392 | 471 | 378 | 475 | 294 | 446 | 359 | 527.25 |
| BP/BPR350 | 277-350 | 421 | 339 | 425 | 392 | 471 | 378 | 475 | 310 | 471 | 378 | 527.25 |
| B400 | 310-392 | 471 | 387 | 475 | 433 | 521 | 418 | 525 | 326 | 496 | 398 | 582.75 |
| BP/BPR400 | 310-392 | 471 | 378 | 475 | 438 | 527 | 424 | 532 | 347 | 527 | 424 | 532.05 |
| B450 | 343-433 | 521 | 418 | 525 | 486 | 585 | 470 | 590 | 372 | 565 | 454 | 654.90 |
| BP/BPR450 | 347-438 | 527 | 424 | 532 | 438 | 527 | 424 | 532 | 347 | 527 | 424 | 532.00 |
| B500 | 385-486 | 585 | 470 | 590 | 552 | 664 | 534 | 670 | 437 | 664 | 534 | 743.70 |
| B600 | 437-552 | 664 | 534 | 670 | 552 | 664 | 534 | 670 | 437 | 664 | 534 | 743.70 |

[1] *480 Volts Only.*

## Input/Output Ratings (continued)

| Cat. No. | Input kVA | Input Amps | Output kVA | Output Amps | Input kVA | Input Amps | Output kVA | Output Amps |
|---|---|---|---|---|---|---|---|---|
| | 500-600V Drives | | | | 600V Drives | | | |
| CWF10 | 2.1-2.5 | 2.4 | 2.1 | 2.0 | 2.5 | 2.4 | 2.1 | 2.0 |
| CWF20 | 4.2-5.0 | 4.8 | 4.2 | 4.0 | 5.0 | 4.8 | 4.2 | 4.0 |
| CWF30 | 6.2-7.5 | 7.2 | 6.2 | 6.0 | 7.5 | 7.2 | 6.2 | 6.0 |
| CWF50 | 8.3-10.0 | 9.6 | 8.3 | 8.0 | 10.0 | 9.6 | 8.3 | 8.0 |
| CWF75 | 9-11 | 10 | 10 | 10 | 11 | 10 | 10 | 10 |
| CWF100 | 11-13 | 12 | 12 | 12 | 13 | 12 | 12 | 12 |
| CWF150 | 17-20 | 19 | 19 | 19 | 20 | 19 | 19 | 19 |
| CWF200 | 21-26 | 25 | 24 | 24 | 26 | 25 | 24 | 24 |
| C025 | 27-32 | 31 | 30 | 30 | 32 | 31 | 30 | 30 |
| C030 | 31-37 | 36 | 35 | 35 | 37 | 36 | 35 | 35 |
| C040 | 38-45 | 44 | 45 | 45 | 45 | 44 | 45 | 45 |
| C050 | 48-57 | 55 | 57 | 57 | 57 | 55 | 57 | 57 |
| C060 | 52-62 | 60 | 62 | 62 | 62 | 60 | 62 | 62 |
| C075 | 73-88 | 84 | 85 | 85 | 88 | 84 | 85 | 85 |
| C100 | 94-112 | 108 | 109 | 109 | 112 | 108 | 109 | 109 |
| C125 | 118-142 | 137 | 137 | 138 | 142 | 137 | 137 | 138 |
| C150 | 144-173 | 167 | 167 | 168 | 173 | 167 | 167 | 168 |
| C200 | 217-261 | 251 | 251 | 252 | 261 | 251 | 251 | 252 |
| C250 | 244-293 | 282 | 283 | 284 | 293 | 282 | 283 | 284 |
| CX300 | 256-307 | 295 | 297 | 300 | 307 | 295 | 297 | 298 |
| C300 | 258-309 | 297 | 299 | 300 | 309 | 297 | 299 | 300 |
| C350 | 301-361 | 347 | 349 | 350 | 361 | 347 | 349 | 350 |
| CP/CPR350 | 301-361 | 347 | 349 | 350 | 361 | 347 | 349 | 350 |
| C400 | 343-412 | 397 | 398 | 400 | 412 | 397 | 398 | 400 |
| CP/CPR400 | 343-412 | 397 | 398 | 400 | 412 | 397 | 398 | 400 |
| C450 | 386-464 | 446 | 448 | 450 | 464 | 446 | 448 | 450 |
| C500 | 429-515 | 496 | 498 | 500 | 515 | 496 | 498 | 500 |
| C600 | 515-618 | 595 | 598 | 600 | 618 | 595 | 598 | 600 |

## Control Inputs

**Option L4E/L7E[1] or L4 Contact Closure Interface Board Requirements**

Contacts must be capable of operating at 10mA current levels without signal degradation. Reed type input devices are recommended.

The L4E/L7E options are compatible with the following Allen-Bradley PLC modules:

- 1771-OYL
- 1771-OZL

**Note:** *Option L4 is the same as Option L4E but without encoder feedback terminals.*

**Option L5E/L8E[1] or L5 +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 L5E/L8E options are compatible with these Allen-Bradley PLC® modules:

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

**Note:** *Option L5 is the same as Option L5E but without encoder feedback terminals.*

**Option L6E/L9E[1] or L6 115V AC Interface Board Requirements**

Circuits used with Option L6E/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 L6E/L9E options are compatible with these Allen-Bradley PLC® modules:

- 1771-OW
- 1771-OA
- 1771-OWN
- 1771-OAD

**Note:** *Option L6 is the same as Option L6E but without encoder feedback terminals.*

[1] *The encoder loss detection feature of the 1336 PLUS II requires the use of L7E, L8E or L9E.*

# Specifications

## Flexible Analog Inputs and Outputs

| | | |
|---|---|---|
| Analog Option Card Slot A | No Option Card | Two single-ended, non-isolated inputs configurable for a potentiometer reference, 0-10V, or 0-20 mA signal |
| | LA2 | Dual Isolated Input Card |
| | LA6 | Isolated Bipolar/Isolated Thermistor Input Card |
| | LA7 | Isolated Bipolar Input/Isolated Input Card |
| Analog Option Card Slot B | No Option Card | One single-ended, non-isolated input configurable for a potentiometer reference, 0-10V, or 0-20 mA signal and two single-ended, non-isolated 0-10V only outputs. |
| | LA1 | Dual Analog Output Card |
| | LA3 | Dual Isolated Output Card |
| | LA4 | Isolated Input/Isolated Output Card |
| | LA5 | Analog Output/Pulse Output/Pulse Input Card |

## Digital Inputs and Outputs

| | |
|---|---|
| Digital Input Specifications | Frequency Resolution:<br>Maximum frequency programmed divided by 32767 (15 bits).<br>60 Hz – 0.0018 Hz.<br>100 Hz – 0.003 Hz.<br>400 Hz – 0.012 Hz. |
| Contact Outputs | 115V AC, 30V DC – 5.0 Amp Resistive – 2.0 Amp Inductive.<br>(2) Form C Contacts.<br>(2) Form A Contacts.<br>All contacts are fully programmable for closure relative to 17 different drive variables selected through the "CR1-4 Out Select" parameters. |

## Encoder Inputs

| | |
|---|---|
| Requirements | Line Driver Encoder 5V DC or 8-15V DC Output.<br>Minimum Current – 10mA per Channel.<br>Quadrature or Pulse.<br>Single Ended or Differential.<br>Maximum Input Frequency – 250 kHz |

## Serial Communications Options

| | |
|---|---|
| Remote I/O | Single drop remote I/O to Allen-Bradley PLCs 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. |

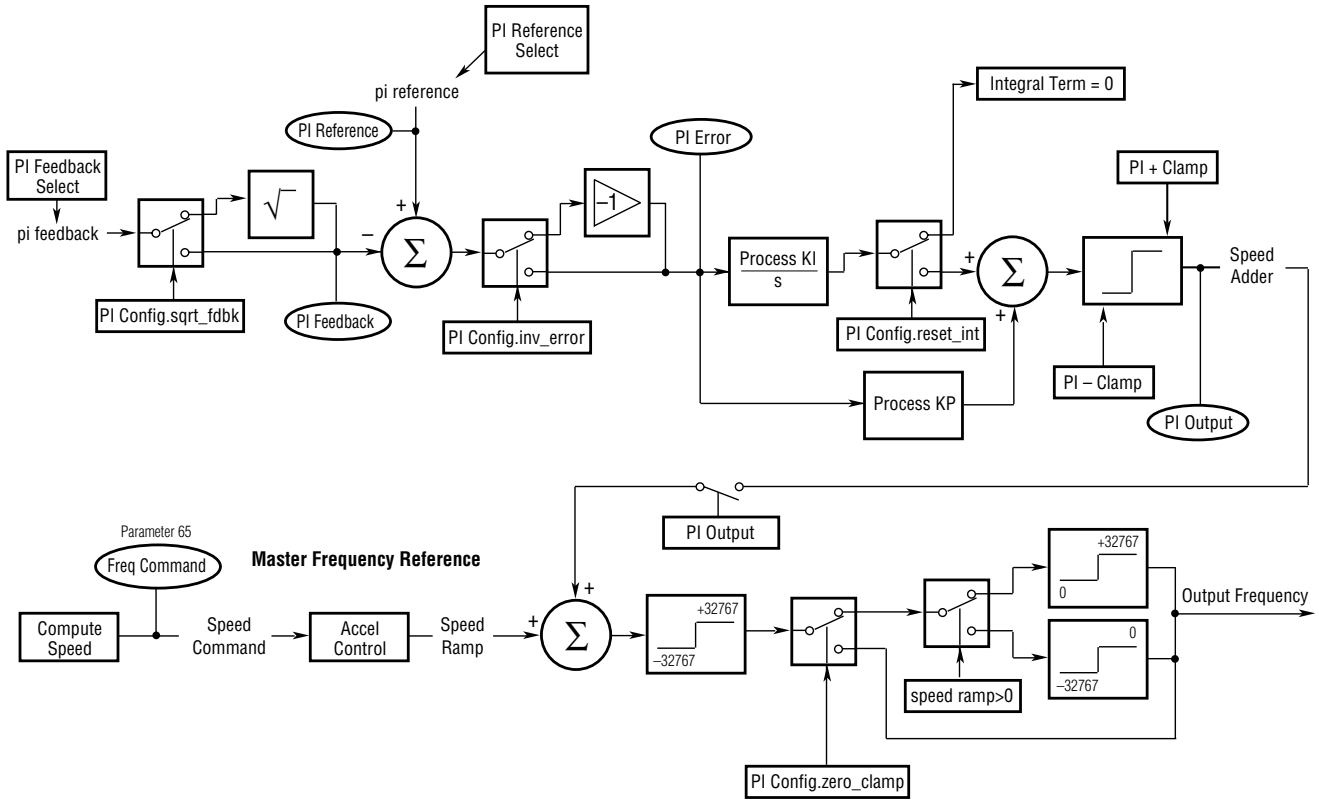
## Sensorless Vector Motor Control

New vector control adds exceptional torque performance to the 1336 PLUS II. This powerful algorithm provides the following performance enhancements.

- Outstanding low speed torque at speeds as low as 15 rpm, providing a 120:1 constant torque speed range.
- Improved acceleration control can provide up to 250% breakaway/acceleration torque to move the toughest loads with ease.
- Solid "out-of-the-box" performance. Enhanced performance can be gained by programming the setup parameters with actual motor nameplate values. Optimum results can be achieved by programming the actual amps required to generate no load flux and the actual voltage needed for IR compensation. If these values are not known, setup procedures can determine the exact values.
- A fast accel mode is provided. Disabling the Adaptive Current Limit feature provides the lowest possible acceleration time for low inertia applications.
- A fast flux-up mode is programmable to aid in acceleration with large motors.
- Selectable Volts/Hertz modes are also available. When selected, they provide full functionality including Start Boost and Run Boost, Boost Slope and "Full Custom" V/Hz operation.

## Process PI Control

Simple process control, monitoring a feedback device and adjusting drive output according to feedback requirements can be accomplished with the 1336 PLUS II Proportional and integral gain adjustments plus feedback scaling, error inversion, output clamping and integrator reset functions allow the Process PI function to control the output of the 1336 PLUS II based on the PI reference (setpoint) and the PI feedback. If the feedback device indicates that the process is moving away from the desired setpoint, the PI software responds by adjusting the drive output until the feedback again equals the setpoint. Selectable inputs provide "auto/manual" capability for open loop threading operation. Programmable presets and preloads assure smooth transitions.

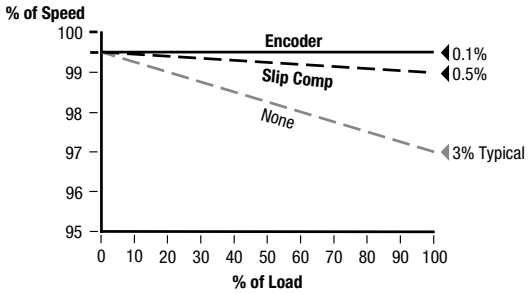


# Function Description

## Encoder Feedback

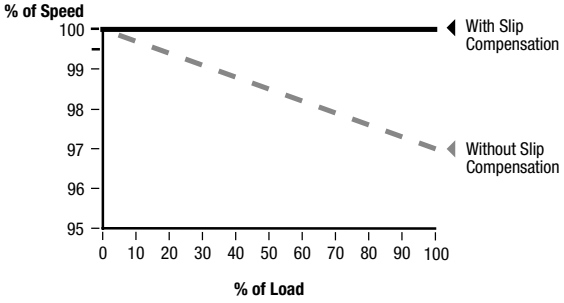
For those applications that require excellent speed regulation, the 1336 PLUS II offers optional encoder feedback. This option provides closed loop speed regulation from no load to full load of 0.1%. A feedback encoder and interface board (L4E, L5E or L6E*) with encoder inputs is required.

* *The encoder loss detection feature of the 1336 PLUS II requires the use of L7E, L8E or L9E.*




## Slip Compensation

To develop torque in an induction motor, rotor speed "slips" relative to stator speed. The amount of slip is proportional to the motor load. While this increased slip provides the necessary torque, load speed is sacrificed. For those applications where this speed decrease is unacceptable, the 1336 PLUS II offers Slip Compensation. As load increases, the drive automatically increases output frequency to provide needed motor slip without a decrease in speed. The amount of compensation is proportional to the load increase, allowing one setting for the entire speed range. The 1336 PLUS II Slip Compensation function can provide typical speed regulation of 0.5%.




- Slip compensation is based on programmed motor flux instead of drive rated amps, providing more accurate speed regulation.
- Slip compensation is active for both steady state and accel/decel conditions.
- Dynamic response to load changes is parameter adjustable.
- Slip compensation enhances torque performance at all speeds.

## Flying Start

Some applications require that the drive "pick up" a spinning load at its current speed and direction, then accelerate or decelerate to the actual commanded speed and direction. The 1336 PLUS II offers a programmable feature called Flying Start. This feature has the ability to determine the speed and direction of a rotating motor and begin its output at that speed. The drive will then bring the motor to the commanded speed. Flying start can be accomplished with or without a motor mounted encoder.

## Step Logic

The 1336 PLUS II can be programmed to perform seven logic steps with or without the use of a programmable controller. These steps can be based on:

- Time
- Digital Input
- Time and Digital Input
- Encoder Feedback Counts or Pulse Input Counts

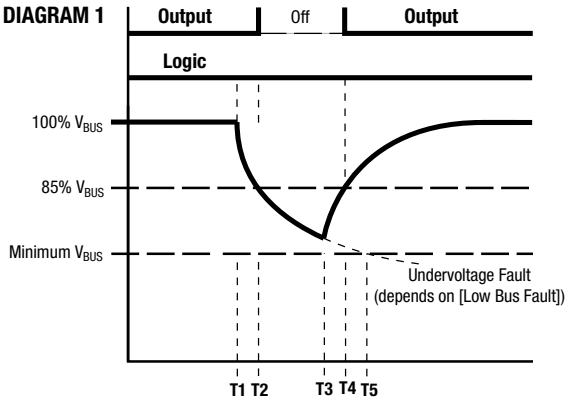
The Step Logic is selected as a continuous loop or fault (End Fault).

## Power Loss Ride-Thru

The 1336 PLUS II has the ability to ride through short power interruptions. On loss of input power to the drive, the drive offers two methods of operation.

With the Line Loss Fault parameter disabled, if a power interruption occurs (**T1**) the drive will continue to operate off stored DC bus energy until bus voltage drops to 85% of its nominal value (**T2**). At this point, the drive output is shut off, allowing the DC bus to discharge more slowly. The drive will retain its logic and operating status as long as bus voltage is above the absolute minimum bus voltage (refer to **Page 7**). If bus voltage should fall below this level (**T5**), the drive will trip and Undervolt Fault will be displayed. If input power is restored before this minimum is reached (**T3**) and bus voltage rises above the 85% level (**T4**), the drive will restore output power to the motor and resume running.

**DIAGRAM 1**

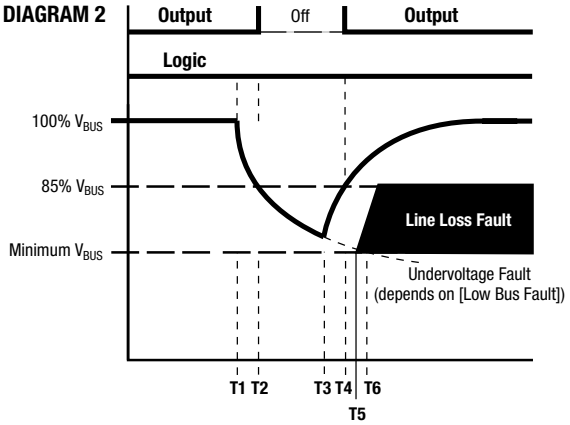



T1 = Loss of Power
T2 = Bus Level at 85% of Nominal, Outputs Shut Off
T3 = Power Returned
T4 = Outputs Turned On
T5 = Minimum Bus Voltage Level, Undervoltage Fault Point

With the Line Loss Fault parameter enabled, if input power is lost (**T1**) the drive will continue to operate until the bus voltage falls below 85% of nominal (**T2**). At this point the drive output is turned off and a 500 mS timer is started. One of the following conditions will then occur:

1. The bus voltage will fall below minimum before the time expires (**T6**). This will generate an Undervoltage Fault.
2. The bus voltage will remain below 85% but above minimum and the timer expires (**T5**). This will generate a Line Loss Fault.
3. The input power is restored (**T3**) and the bus voltage rises above the 85% level before the timer expires (**T4**). This allows the drive to turn its output on and resume running.

**DIAGRAM 2**




T1 = Loss of Power
T2 = Bus Level at 85% of Nominal, Outputs Shut Off
T3 = Power Returned
T4 = Outputs Turned On
T5 = 500mS Time Out, Line Loss Fault
T6 = Minimum Bus Voltage Level, Undervoltage Fault Point

## Line Loss Restart

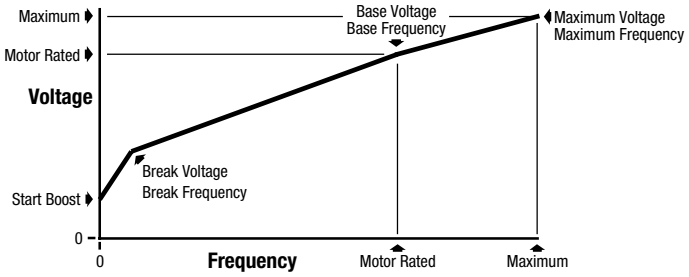
In the event that a line loss condition occurs, the 1336 PLUS II provides a variety of programmable selections to control the timing and method of reconnecting the motor after power returns. Choices include:

- Use flying start to determine motor speed.
- Check for motor terminal voltage to determine motor speed.
- Read the encoder, if present.
- Reconnect at last known output frequency.

# Function Description

## Volts-per-Hertz

The 1336 PLUS II offers a fully programmable Volts-per-Hertz mode that allows maximum performance for applications requiring multiple motors on a common drive, particularly if the motors are not of equal size and type (i.e. a 3.7 kW/5 HP and 11 kW/15 HP motor on a 15 kW/20 HP drive).



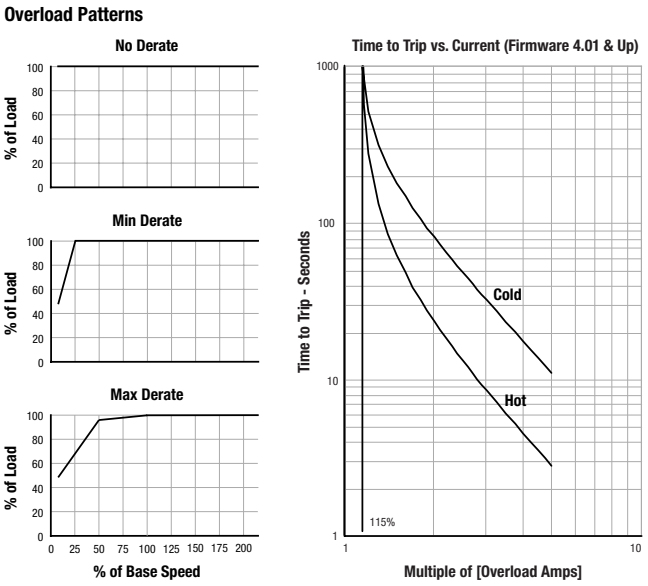

## Motor Overload Protection

Motor $I^2t$ protection is separated from the drive power overload feature. The electronic motor overload operates independently to provide improved Class 10 protection. Operation at full load amps will raise the overload to approximately 70-80% of its trip level. Overloading beyond FLA will move the value towards tripping level (100%) based on $I^2t$ Trip curves are provided for both hot and cold states. Parameter settings include:

- Overload Amps from the motor nameplate FLA.
- Motor OL Fault parameter to disable the fault condition.
- In addition, Bit 14 (Motor OL Trip) of the Drive Alarm parameter is high (1) any time the existing level of output current will cause an Overload Fault to occur.

The overload feature remains speed sensitive with 3 derating choices:

- Max Derate is used for motors not designed for variable speed.
- Min Derate is used for motors with a 4:1 speed range (not intended for operation below 25% of base Speed).
- No Derate is used for variable speed motors with a speed range capability of 10:1 or better.




## Auto Economizer

This feature combines stator flux control with an economizer routine to help the end user save energy costs. The Auto Economizer monitors drive current and compares it against the full load amps (Overload Amps) that the user has programmed into the drive. In load situations (i.e. idle) where the actual current draw of the motor is significantly less than the programmed overload amps, the drive will automatically begin reducing the output voltage to the motor. This minimizes flux current in a lightly loaded motor and results in a lower kW usage.

## Braking

Many applications require a "holding brake" function to stop motor rotation between operations. The 1336 PLUS II provides a programmable DC Hold level and DC Hold time to develop holding torque in the motor after a ramp-to-stop.

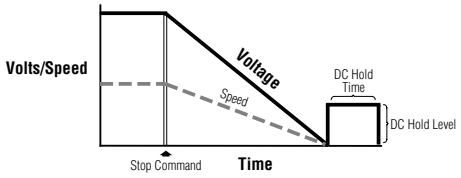
For applications that require a quick stopping time, the 1336 PLUS II can "inject" a DC voltage into the motor for a programmed time to brake the motor to a stop. While this does not take the place of an external brake for emergency stopping, it is an effective stopping method under normal operation.

The drive is capable of extended or unlimited injection braking for both stopping and holding a motor. It provides:

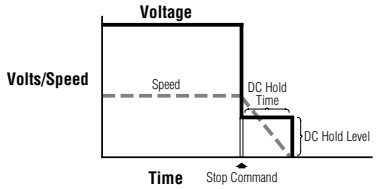
- Injection braking at selectable levels for extended periods up to 90 seconds.
- Extended Hold Braking (up to 90 seconds).
- Continuous (event ended) Hold Braking. This is accomplished by setting the Stop mode to "Ramp to Hold". In this mode, the drive will decelerate according to the programmed decel ramp. When the drive reaches zero Hertz output, it will supply programmed current for hold braking per the DC Hold Level parameter (limited to 70% of drive rating) until;

  a) a Start command is issued,
  *or*
  b) the Enable input is opened.

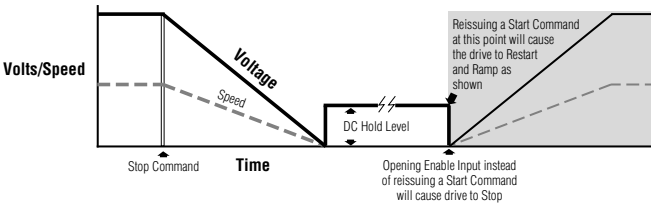
**Ramp-to-Stop**




**Brake-to-Stop**




**Ramp-to-Hold**

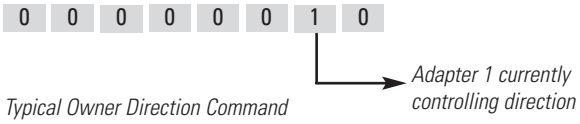



## Reset/Run

The 1336 PLUS II offers the ability to automatically reset a fault (if the condition that causes the fault is no longer present) and restart. Both the number of reset attempts (0-9) and the time between reset attempts (0-30 Sec.) are programmable. If the condition causing the fault is still present when the number of "reset/run tries" is exceeded, the drive will shut down and issue a "Max Retries Exceeded" Fault. This feature will not operate for ground faults or shorted output faults.

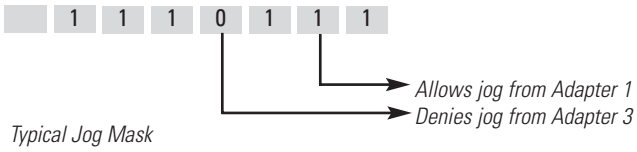
## Owners

The 1336 PLUS II displays which of the available adapters currently "owns" certain control functions. To avoid conflict, some owners are exclusive (only one device can issue a direction command), 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 are coming from.




## Masks

All external control connections to the 1336 PLUS II are made through a multi-connection communication bus called SCANport. A Frame drives have 5 available adapter ports while B Frame & larger drives have 6 ports. With the possibility of many devices able to issue drive control functions (start, stop, reverse, speed reference, etc.), the 1336 PLUS II offers a mask for each control function that gives the user complete flexibility to lock out any function (except stop) from any port.

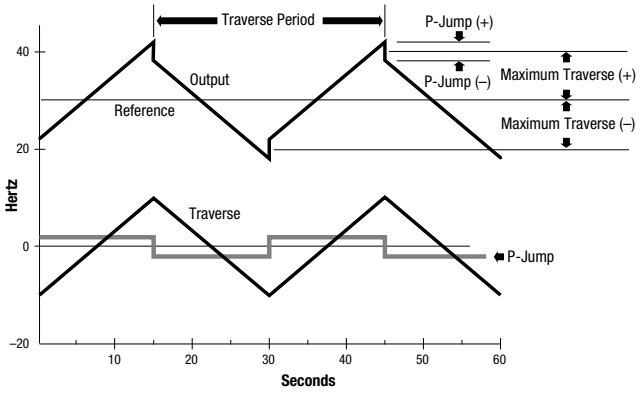


# Function Description

## Traverse Function

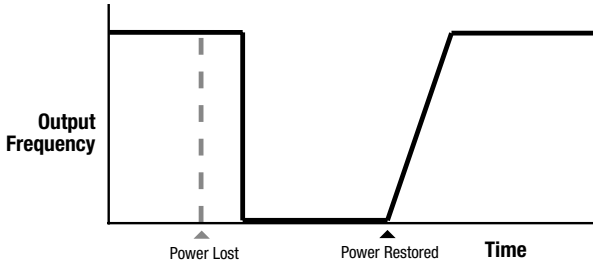
The 1336 PLUS II output frequency can be programmed to modulate around a set frequency. This is accomplished by programming three parameters to develop an inertia compensated triangular waveform – Traverse Period, Max Traverse, and P Jump. In surface driven winding applications, the waveform developed can be used by traverse drives to perform the traverse function electronically.

A traverse drive will move the thread back and forth in a diamond pattern to distribute the thread evenly across a tube surface. To prevent a build up of thread at the same points on the surface, this pattern must be altered. This can be accomplished by continuously varying the speed of the traverse in a cyclical manner over a specified speed range. With the use of inertia compensation, the result is a series of distributed diamond patterns over the entire tube surface.




## Run On Power Up

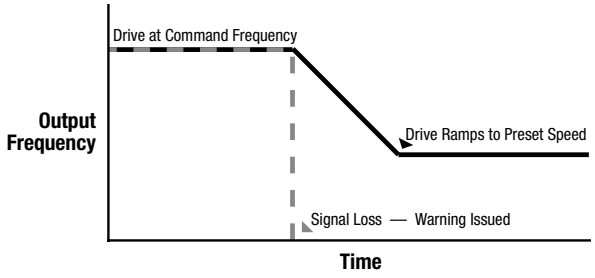
For applications that require unattended operation, the 1336 PLUS II offers the ability to resume running once power is restored after a power outage. If **"Run On Power Up"** is activated and input power is lost, when power is restored the drive will **automatically restart** and run at current command speed if all required signals are present (Enable, Auxiliary, Not-Stop and Start).




## 4-20mA Loss Select

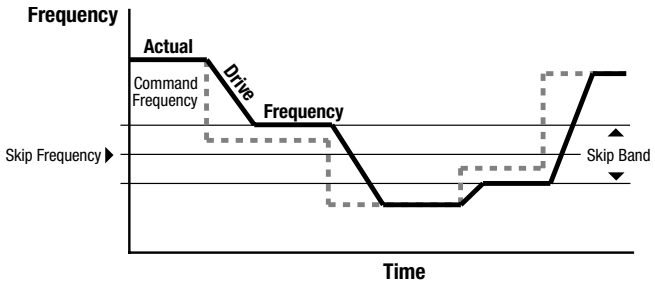
Many control systems issue a 4-20 mA control signal for the drive to use as a speed reference. The drive will run at minimum speed with a 4 mA signal and maximum speed with a 20 mA signal. The drive can also invert this signal to run minimum speed at 20 mA and maximum speed at 4 mA. Since a minimum signal of 4 mA is required, the drive must have a "fall back" instruction in the event of a signal loss (failed transducer or broken wire). The 1336 PLUS II contains a "loss select" parameter that offers five choices for signal failure mode.

1. Stop the drive and issue a fault.
2. Go to minimum speed and issue a warning.
3. Go to maximum speed and issue a warning.
4. Maintain speed and issue a warning.
5. Go to a preset speed and issue a warning.



## Skip Frequencies

Many mechanical systems have resonant frequencies that can cause severe vibration. If theses systems are run at these speeds continuously, this vibration can cause mechanical breakdowns. The 1336 PLUS II offers three programmable Skip Frequencies that prevent the drive from running continuously at resonant speeds. An additional parameter allows a programmable Skip Bandwidth around the skip frequencies

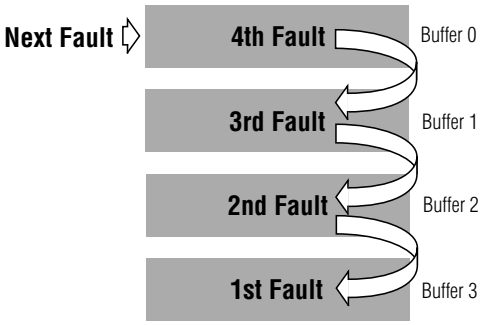



## Process Display

In order to provide complete flexibility in monitoring drive performance, the 1336 PLUS II offers a Process Mode for the liquid crystal super-twist display on the Human Interface Module. This feature provides two lines of 16 characters each that can display any two drive parameters scaled into user selectable units. Each line uses 8 value display characters and 8 programmable text characters to create the process display. Simple keystrokes can designate the process display as the standard display shown at power up.

## Fault Buffer

The 1336 PLUS II contains a fault buffer that records the last four faults the drive experienced. The buffer stores faults in a first-in first-out manner. Additional diagnostic parameters are listed in the Diagnostic Group (Refer to the Parameter List on **Page 18**).



# Parameter List

The 1336 PLUS II uses an extensive set of parameters divided into groups for ease of programming. Grouping replaces a sequentially numerical parameter list with functional parameter groups that increase operator efficiency and help reduce programming time.

| Group/Param. | No. | Disp. Units | Min./Max. Values | Default |
|---|---|---|---|---|
| **Metering** | | | | |
| Output Current | 54 | 0.1A | 0/200% Rtd. Drv. Out. Current | None |
| Output Voltage | 1 | 1 Volt | 0/200% Rtd. Drv. Out. Volts | None |
| Output Power | 23 | 1 kW | ±200% Rtd. Drv. Out. Power | None |
| DC Bus Voltage | 53 | 1 Volt | 0/200% DC Bus Volt Max. | None |
| Output Freq | 66 | 0.01 Hertz | ±400.00 Hz | None |
| Freq Command | 65 | 0.01 Hertz | ±400.00 Hz | None |
| Anlg In 0 Freq | 138 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Anlg In 1 Freq | 139 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Anlg In 2 Freq | 140 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Encoder Freq | 63 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Pulse Freq | 254 | 0.01 Hertz | 0.00/400.00 Hz | None |
| MOP Freq | 137 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Heatsink Temp | 70 | 1° C | 0/255° C | None |
| Power OL Count | 84 | 1 % | 0/200% | None |
| Motor OL Count | 202 | 1 % | 0/200% | None |
| Last Fault | 4 | Fault # | None | None |
| Torque Current | 162 | 0.1A | ±200% Drive Rating | None |
| Flux Current | 163 | 0.1A | ±200% Drive Rating | None |
| % Output Power | 3 | 1 % | ±200% Drv. Rated Out. Power | None |
| % Output Curr | 2 | 1 % | 0/200% Rated Drv. Out. Curr. | None |
| Elapsed Run Time | 279 | 0.1 Hr | 0/6553.5 | 0 |
| **Setup** | | | | |
| Input Mode | 241 | Mode # | None | Status |
| Freq Select 1 | 5 | Settings | Selection Parameter | Adapter 1 |
| Accel Time 1 | 7 | 0.1 Second | 0.0/3600.0 Sec | 10.0 Sec |
| Decel Time 1 | 8 | 0.1 Second | 0.0/3600.0 Sec | 10.0 Sec |
| Minimum Freq | 16 | 1 Hertz | 0/120 Hz | 0 Hz |
| Maximum Freq | 19 | 1 Hertz | 25/400 Hz | 60 Hz |
| Stop Select 1 | 10 | Settings | Selection Parameter | Coast |
| Current Limit | 36 | 1% | 20/300% (0.0/300.0***) Rated Amps | 150% |
| Current Lmt Sel | 232 | Settings | Selection Parameter | Current Lmt |
| Adaptive I Lim | 227 | Settings | Selection Parameter | Enabled |
| Overload Mode | 37 | Settings | Selection Parameter | No Derate |
| Overload Amps | 38 | 0.1A | 20/115% Drive Rated Amps | 115% Drv. Rtd. |
| VT Scaling | 203 | Settings | Selection Parameter | Disabled |
| Motor NP RPM | 177 | 1 RPM | 60/24000 RPM | 1750 RPM |
| Motor NP Hertz | 178 | 1 Hertz | 1/400 Hz | 60 Hz |
| Motor NP Volts | 190 | 1 Volt | 0/2 x Drive Rated Volts | Drv. Rated Volts |
| Motor NP Amps | 191 | 1 Amp | 0/2 x Drive Rated Amps | Drv. Rated Amps |
| **Advanced Setup** | | | | |
| Minimum Freq | 16 | 1 Hertz | 0/120 Hz | 0 Hz |
| Maximum Freq | 19 | 1 Hertz | 25/400 Hz | 60 Hz |
| PWM Frequency | 45 | 2 kHz | 2/8 kHz (A & B Frame) | Based on Drv Type |
| | | 2 kHz | 2/6 kHz (C Frame & up) | Based on Drv Type |
| Accel Time 2 | 30 | 0.1 Second | 0.0/3600.0 Sec | 10.0 Sec |
| Decel Time 2 | 31 | 0.1 Second | 0.0/3600.0 Sec | 10.0 Sec |
| Sync Time | 307 | 0.0 Second | 0.0/6000.0 Sec | 0.0 Sec |
| Stop Select 1 | 10 | Display Drive | None | Coast |
| DC Hold Time | 12 | 1 Second | 0/90.0 Sec | 0.0 Sec |
| DC Hold Level | 13 | 1 % | 0/150 % | 100 % |
| Hold Level Sel | 231 | Settings | Selection Parameter | DC Hold Lvl |
| Bus Limit En | 11 | Settings | Selection Parameter | Disabled |
| Motor Type | 41 | Settings | Selection Parameter | Induction |
| Stop Select 2 | 52 | Settings | Selection Parameter | Coast |
| KP Amps | 193 | NA | 25/400 | 100 |
| Speed Brake En* | 319 | Settings | Selection Parameter | Disabled |
| **Frequency Setup** | | | | |
| Freq Select 1 | 5 | Settings | Selection Parameter | Adapter 1 |
| Freq Select 2 | 6 | Settings | Selection Parameter | Preset 1 |
| Jog Frequency | 24 | 0.1 Hertz | 0.0/400.0 Hz | 10.0 Hz |
| Preset Freq 1 | 27 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Preset Freq 2 | 28 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Preset Freq 3 | 29 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Preset Freq 4 | 73 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Preset Freq 5 | 74 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Preset Freq 6 | 75 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Preset Freq 7 | 76 | 0.1 Hertz | 0.0/400.0 Hz | 0.0 Hz |
| Skip Freq 1 | 32 | 1 Hertz | 0/400 Hz | 400 Hz |
| Skip Freq 2 | 33 | 1 Hertz | 0/400 Hz | 400 Hz |
| Skip Freq 3 | 34 | 1 Hertz | 0/400 Hz | 400 Hz |
| Skip Freq Band | 35 | 1 Hertz | 0/15 Hz | 0 Hz |
| MOP Increment | 22 | 0.1 Hertz/Sec | 0/78% [Max. Freq]/Sec | 1.1 Hz/Sec |
| Save MOP Ref | 230 | Settings | Selection Parameter | Disabled |
| Freq Ref SqRoot | 229 | Settings | Selection Parameter | Disabled |

| Group/Param. | No. | Disp. Units | Min./Max. Values | Default |
|---|---|---|---|---|
| **Frequency Setup (continued)** | | | | |
| Pulse In Scale | 264 | Factor | 1/4096 | 1024 PPR |
| Encoder PPR | 46 | Factor | 1/4096 | 1024 PPR |
| **Feature Select** | | | | |
| Dwell Frequency | 43 | 0.1 Hertz | 0.0/7.0 Hz | 0.0 Hz |
| Dwell Time | 44 | 1 Second | 0/10 Sec | 0 Sec |
| Speed Control | 77 | Settings | Selection Parameter | Slip Comp |
| Slip @ F.L.A. | 42 | 0.1 Hertz | 0.0/10.0 Hz | 1.0 Hz |
| Slip Comp Gain | 195 | None | 1/40 | 1 |
| Run On Power Up | 14 | Settings | Selection Parameter | Disabled |
| Reset/Run Tries | 85 | 1 Try | 0/9 | 0 Tries |
| Reset/Run Time | 15 | 0.1 Second | 0.5/30.0 Sec | 1.0 Sec |
| S Curve Enable | 57 | Settings | Selection Parameter | Disabled |
| S Curve Time | 56 | 0.1 Second | 0.0/1800.0 Sec | 0.0 Sec |
| Language | 47 | Settings | Selection Parameter | English |
| Flying Start En | 155 | Settings | Selection Parameter | Disabled |
| FStart Forward | 156 | 1 Hz | 0/400 Hz | 60 Hz |
| FStart Reverse | 157 | 1 Hz | 0/400 Hz | 0 Hz |
| LLoss Restart | 228 | Settings | Selection Parameter | Track Volts |
| LLoss Mode | 256 | Settings | Selection Parameter | LoBus>Off |
| LLoss Volts | 320 | 1 Volt | 40/80/100 Volts/200/400/500 Volts | 59/117/146 Volts |
| Loss Recover | 321 | 1 Volt | 20/40/50 Volts/200/400/500 Volts | 29/59/73 Volts |
| Ride Thru Volts | 322 | 1 Volt | 40/80/100 Volts/200/400/500 Volts | 29/59/73 Volts |
| Min Bus Volts | 323 | 1 Volt | 100/200/250 Volts/200/400/500 Volts | 194/388/485 Volts |
| Traverse Inc | 78 | 0.01 Sec | 0.00/30.00 Sec | 0.00 Sec |
| Traverse Dec | 304 | 0.01 Sec | 0.00/30.00 Sec | 0.00 Sec |
| Max Traverse | 79 | 0.01 Hz | 0.00/50% [Maximum Freq] | 0.00 Hz |
| P Jump | 80 | 0.01 Hz | 0.00/25% [Maximum Freq] | 0.00 Hz |
| Bus Regulation | 288 | Settings | Selection Parameter | Disabled |
| Load Loss Det | 290 | Settings | Selection Parameter | Disabled |
| Load Loss Level | 291 | 1 % | 0/100 % | 0 % |
| Load Loss Time | 292 | 1 Second | 0/30 Sec | 0 Sec |
| Bus Reg Level**/ Max Bus Volts* | 325 | 1 Volt | 358/716/895 Volts 403/807/1009 Volts | 358/716/895 Volts |
| **Digital I/O** | | | | |
| Input Mode | 241 | Mode # | Selection Parameter | Status |
| TB3 Term 22 | 242 | Settings | Selection Parameter | Rev/For Input 3 |
| TB3 Term 23 | 243 | Settings | Selection Parameter | Jog Input 4 |
| TB3 Term 24 | 244 | Settings | Selection Parameter | Aux Fault Input 5 |
| TB3 Term 26 | 245 | Settings | Selection Parameter | Spd Sel 3 Input 6 |
| TB3 Term 27 | 246 | Settings | Selection Parameter | Spd Sel 2 Input 7 |
| TB3 Term 28 | 247 | Settings | Selection Parameter | Spd Sel 1 Input 8 |
| Input Status | 55 | Settings | Selection Parameter | |
| CR1 Out Select | 158 | Settings | Selection Parameter | At Speed |
| CR2 Out Select | 174 | Settings | Selection Parameter | Running |
| CR3 Out Select | 175 | Settings | Selection Parameter | Fault |
| CR4 Out Select | 176 | Settings | Selection Parameter | Alarm |
| Dig Out Freq | 159 | 0.01 Hz | 0.00 Hz/ [Maximum Freq] | 0.00 Hz |
| Dig Out Current | 160 | 0% | 0/200% | 0% |
| Dig Out Torque | 161 | 0.1A | 0.0/200% of [Rated Amps] | 0.0A |
| Dig At Temp | 267 | 1° C | 0/255° C | 0 |
| PI Max Error | 293 | 0.01 Hz | ±400.00 Hz | None |
| Pulse Out Select | 280 | Settings | Selection Parameter | Output Freq |
| Pulse Out Scale | 281 | Factor | 1/4096 | 1024 PPR |
| Pulse In Scale | 264 | Factor | 1/4096 | 1024 PPR |
| At Time* | 327 | 0.01 Sec | 0.00/360.00 | 0.00 Sec |
| Remote CR Output* | 326 | Settings | None | xxxx0000 |
| **Analog I/O** | | | | |
| Anlg In 0 Lo | 237 | 0.1 % | ±300.0% | 0.0% |
| Anlg In 0 Hi | 238 | 0.1 % | ±300.0% | 100.0% |
| Anlg In 1 Lo | 239 | 0.1% | ±300.0% | 0.0% |
| Anlg In 1 Hi | 240 | 0.1% | ±300.0% | 100.0% |
| Anlg In 2 Lo | 248 | 0.1% | ±300.0% | 0.0% |
| Anlg In 2 Hi | 249 | 0.1% | ±300.0% | 100.0% |
| Analog Trim En | 90 | Settings | Selection Parameter | Disabled |
| Anlg Signal Loss | 250 | Settings | Selection Parameter | Disabled |
| 4-20mA Loss Sel | 150 | Settings | Selection Parameter | Min/Alarm |
| Anlg Out 0 Sel | 25 | Settings | Selection Parameter | Frequency |
| Anlg Out 0 Offset | 154 | Disabled | Selection Parameter | Disabled |
| Anlg Out 0 Abs | 233 | Disabled | Selection Parameter | Enabled |
| Anlg Out 0 Lo | 234 | 0.1% | ±300.0% | 0.0% |
| Anlg Out 0 Hi | 235 | 0.1% | ±300.0% | 100.0% |
| Anlg Out 1 Sel | 274 | Settings | Selection Parameter | Current |
| Anlg Out 1 Abs | 277 | Enabled | Selection Parameter | Enabled |
| Anlg Out 1 Offset | 278 | Enabled | Selection Parameter | Disabled |
| Anlg Out 1 Lo | 275 | 0.1% | ±300.0% | 0.0% |
| Anlg Out 1 Hi | 276 | 0.1% | ±300.0% | 100.0% |
| Slot A Option | 252 | Settings | Selection Parameter | Standard |
| Slot B Option | 253 | Settings | Selection Parameter | Standard |

*Firmware 3.001 & later
**Firmware 4.001 & later
***Firmware 5.001 & later

# Parameter List

| Group/Param. | No. | Disp. Units | Min./Max. Values | Default |
|---|---|---|---|---|
| **Faults** | | | | |
| Fault Buffer 0 | 86 | Fault Code | Fault Storage | None |
| Fault Buffer 1 | 87 | Fault Code | Fault Storage | None |
| Fault Buffer 2 | 88 | Fault Code | Fault Storage | None |
| Fault Buffer 3 | 89 | Fault Code | Fault Storage | None |
| Clear Fault | 51 | Settings | Selection Parameter | Ready |
| Cur Lim Trip En | 82 | Settings | Selection Parameter | Disabled |
| Shear Pin Fault | 226 | Settings | Selection Parameter | Disabled |
| Motor OL Fault | 201 | Settings | Selection Parameter | Enabled |
| Motor Therm Flt | 268 | Fault Code | Fault Storage | Enabled |
| Line Loss Fault | 40 | Settings | Selection Parameter | Disabled |
| Blwn Fuse Flt | 81 | Settings | Selection Parameter | Enabled |
| Low Bus Fault | 91 | Settings | Selection Parameter | Enabled |
| Fault Data | 207 | Param. # | 1/255 | None |
| Flt Motor Mode | 143 | Settings | Read Only | None |
| Flt Power Mode | 144 | Settings | Read Only | None |
| Fault Frequency | 145 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Fault Status 1 | 146 | Bit 1/0 | Read Only | None |
| Fault Status 2 | 286 | Fault Code | Fault Storage | None |
| Fault Alarms 1 | 173 | Bit 1/0 | Read Only | None |
| Fault Alarms 2 | 287 | Fault Code | Fault Storage | None |
| Flt Clear Mode | 39 | Settings | Selection Parameter | Enabled |
| Ground Warning | 204 | Settings | Selection Parameter | Disabled |
| Phase Loss Mode* | 330 | Settings | Selection Parameter | Disabled |
| Phase Loss Level* | 331 | 0.1 Volts | 5.1/10.1/12.7Volts/22.5/45.0/56.2 Volts | 9.0/18.0/22.5 Volts |
| Precharge Fault* | 332 | Settings | Selection Parameter | Enabled |
| **Diagnostics** | | | | |
| Drive Status 1 | 59 | Bit 1/0 | Read Only | None |
| Drive Status 2 | 236 | Bit 1/0 | Read Only | None |
| Application Sts | 316 | Bit 1/0 | Read Only | None |
| Drive Alarm 1 | 60 | Bit 1/0 | Read Only | None |
| Drive Alarm 2 | 269 | Bit 1/0 | Read Only | None |
| Latched Alarms 1 | 205 | Bit 1/0 | Read Only | None |
| Latched Alarms 2 | 270 | Bit 1/0 | Read Only | None |
| Input Status | 55 | Bit 1/0 | Read Only | None |
| Freq Source | 62 | Settings | Read Only | Use Last |
| Freq Command | 65 | 0.01 Hertz | ±400.00 | None |
| Drive Direction | 69 | Settings | Read Only | None |
| Stop Mode Used | 26 | Settings | Read Only | Coast |
| Motor Mode | 141 | Settings | Read Only | None |
| Power Mode | 142 | Settings | Read Only | None |
| Output Pulses | 67 | 1 Pulse | 0/65535 | None |
| Current Angle | 72 | 1 Deg. | Read Only | None |
| Heatsink Temp | 70 | 1° C. | 0/255° C | None |
| Set Defaults | 64 | Settings | Selection Parameter | Ready |
| DC Bus Memory | 212 | 1 Volt | Read Only | None |
| Meas. Volts | 272 | 1 Volt | Read Only | None |
| EEPROM Cksum | 172 | None | Read Only | None |
| **Ratings** | | | | |
| Rated Volts | 147 | 1 Volt | Read Only | Drive Rating |
| Rated Amps | 170 | 0.1 A | Read Only | Drive Rating |
| Rated kW | 171 | kW | Read Only | Drive Rating |
| Firmware Ver. | 71 | None | Read Only | 0.00 |
| Cntrl Board Rev | 251 | None | Read Only | 0.00 |
| Rated CT Amps | 148 | 0.1A | Read Only | Drive Rating |
| Rated CT kW | 149 | kW | Read Only | Drive Rating |
| Rated VT Amps | 198 | 0.1A | Read Only | Drive Rating |
| Rated VT kW | 199 | kW | Read Only | Drive Rating |
| Drive Type | 61 | | Read Only | Drive Rating |
| **Masks** | | | | |
| Direction Mask | 94 | Bit 1/0 | 0/1 | 01111110 |
| Start Mask | 95 | Bit 1/0 | 0/1 | 01111111 |
| Jog Mask | 96 | Bit 1/0 | 0/1 | 01111111 |
| Reference Mask | 97 | Bit 1/0 | 0/1 | 01111111 |
| Accel Mask | 98 | Bit 1/0 | 0/1 | 01111111 |
| Decel Mask | 99 | Bit 1/0 | 0/1 | 01111111 |
| Fault Mask | 100 | Bit 1/0 | 0/1 | 01111111 |
| MOP Mask | 101 | Bit 1/0 | 0/1 | 01111111 |
| Traverse Mask | 305 | Bit 1/0 | 0/1 | 01111111 |
| Sync Mask | 308 | Bit 1/0 | 0/1 | 01111111 |
| Logic Mask | 92 | Bit 1/0 | 0/1 | 01111111 |
| Local Mask | 93 | Bit 1/0 | 0/1 | 01111111 |
| Alarm Mask 1 | 206 | Bit 1/0 | 0/1 | 01111111 |
| Alarm Mask 2 | 271 | Bit 1/0 | 0/1 | 01111111 |
| **Owners** | | | | |
| Stop Owner | 102 | Bit 1/0 | Read Only | None |
| Direction Owner | 103 | Bit 1/0 | Read Only | None |
| Start Owner | 104 | Bit 1/0 | Read Only | None |
| Jog Owner | 105 | Bit 1/0 | Read Only | None |
| Reference Owner | 106 | Bit 1/0 | Read Only | None |
| Accel Owner | 107 | Bit 1/0 | Read Only | None |
| Decel Owner | 108 | Bit 1/0 | Read Only | None |
| Fault Owner | 109 | Bit 1/0 | Read Only | None |

| Group/Param. | No. | Disp. Units | Min./Max. Values | Default |
|---|---|---|---|---|
| **Owners (continued)** | | | | |
| MOP Owner | 110 | Bit 1/0 | Read Only | None |
| Traverse Owner | 306 | Bit 1/0 | Read Only | None |
| Sync Owner | 309 | Bit 1/0 | Read Only | None |
| Local Owner | 179 | Bit 1/0 | Read Only | None |
| **Adapter I/O** | | | | |
| Data In (8) | 111-118 | Parameter # | None | 0 |
| Data Out (8) | 119-126 | Parameter # | None | 0 |
| Alt Type 2 Cmd | 315 | Settings | Selection Parameter | Disabled |
| **Process Display** | | | | |
| Process 1 Par | 127 | Parameter # | None | 1 |
| Process 1 Scale | 128 | Numeric | ±327.67 | +1.00 |
| Process 1 Txt 1-8 | 129-136 | ASCII Code | None | Volts |
| Process 2 Par | 180 | Parameter # | None | 54 |
| Process 2 Scale | 181 | Numeric | ±327.67 | +1.00 |
| Process 2 Txt 1-8 | 182-189 | ASCII Code | None | Amps |
| **Encoder Feedback** | | | | |
| Speed Control | 77 | Settings | Selection Parameter | Slip Comp |
| Encoder Type | 152 | Settings | Selection Parameter | Quadrature |
| Encoder PPR | 46 | Factor | 1/4096 | 1024 PPR |
| Maximum Speed | 151 | 1 Hertz | 0/400 Hz | 400 Hz |
| Motor Poles | 153 | 1 Pole | Read Only | None |
| Speed KI | 165 | Numeric | 0/20000 | 100 |
| Speed KP | 164 | Numeric | 0/20000 | 0 |
| Speed Error | 166 | 0.01 Hz | ±8.33% [Base Frequency] | None |
| Speed Integral | 167 | 0.01 Hz | ±8.33% [Base Frequency] | None |
| Speed Adder | 168 | 0.01 Hz | ±8.33% [Base Frequency] | None |
| Slip Adder | 255 | 0.01 Hz | ±8.33% [Base Frequency] | None |
| Motor NP RPM | 177 | 1 RPM | 60/24000 RPM | 1750 RPM |
| Motor NP Hertz | 178 | 1 Hertz | 1/400 Hz | 60 Hz |
| Encoder Counts | 283 | 1 Count | ±32767 | 0 |
| Enc Count Scale | 282 | | 0/4096 | None |
| Encoder Loss Sel | 284 | Settings | Selection Parameter | Disabled |
| Encoder Freq | 63 | 0.01 Hertz | 0.00/400.00 Hz | None |
| Max Enc Counts* | 328 | 1 Count | 0/32767 | 0 |
| **Process PI** | | | | |
| Speed Control | 77 | Settings | Selection Parameter | Slip Comp |
| PI Config | 213 | Bit 1/0 | 0/1 | 00000000 |
| PI Status | 214 | Bit 1/0 | Read Only | None |
| PI Ref Select | 215 | Settings | Selection Parameter | Preset 1 |
| PI Fdbk Select | 216 | Settings | Selection Parameter | Analog In 1 |
| PI Reference | 217 | 0.01 Hertz | ±400.00 Hz | None |
| PI Feedback | 218 | 0.01 Hertz | ±400.00 Hz | None |
| PI Error | 219 | 0.01 Hertz | ±400.00 Hz | None |
| PI Output | 220 | 0.01 Hertz | ±400.00 Hz | None |
| KI Process | 221 | N/A | 0/1024 | 128 |
| KP Process | 222 | N/A | 0/1024 | 256 |
| PI Neg Limit | 223 | 0.01 Hz | ±400.00 Hz | –8.33% [Max Freq] |
| PI Pos Limit | 224 | 0.01 Hz | ±400.00 Hz | +8.33% [Max Freq] |
| PI Preload | 225 | 0.01 Hz | ±8.33 [Max Freq] | 0.00 Hz |
| **Motor Control** | | | | |
| Control Select | 9 | Settings | Selection Parameter | Sens Vector |
| Flux Amps Ref | 192 | 0.1A | 0.0/75% Drive VT Rtd. Amps | 0.0A |
| IR Drop Volts | 194 | 1 Volt | 0/25% Drive Rated Voltage | 0 Volts |
| Flux Up Time | 200 | 0.1 Sec | 0.0/5.0 Sec | 0.0 Sec |
| Start Boost | 48 | 1 Volt | 0/9.5% Drive Rated Voltage | 0 Volts |
| Run Boost | 83 | 1 Volt | 0/9.5% Drive Rated Voltage | 0 Volts |
| Boost Slope | 169 | None | 1.0/8.0 | 1.5 |
| Break Voltage | 50 | 1 Volt | 0/50% Drive Rated Voltage | 25% Drive Rtd. V |
| Break Frequency | 49 | 1 Hertz | 0/120 Hz | 25% [Max. Freq] |
| Base Voltage | 18 | 1 Volt | 25/120% Drive Rated Voltage | Drive Rtd. Volts |
| Base Frequency | 17 | 1 Hertz | 25/400 Hz | 60 Hz |
| Maximum Voltage | 20 | 1 Volt | 25/120% Drive Rated Voltage | Drive Rtd. Volts |
| Run/Accel Volts | 317 | 1% | 50%/100% | 100% |
| Sync Loss Sel | 310 | Settings | Selection Parameter | Disabled |
| Sync Loss Gain | 311 | Numeric | 0/100 | 40 |
| Sync Loss Comp | 313 | 1 Volt | 0/25% of Drive Rtd. Volts | 0 Volts |
| Sync Loss Time | 312 | 1 Sec | 1/30 Sec | 5 Sec |
| PWM Comp Time** | 333 | None | 20/90 | 80 |
| Break Freq** | 334 | 0.01 Hz | 0/30 Hz | 0 Hz |
| **Step Logic** | | | | |
| SLx Logic Step*** | 335-371 | Settings | Selection Parameter | Step On Time |
| SLx Logic Jump*** | 336-372 | Settings | Selection Parameter | Do Not Step |
| SLx Step Jump*** | 337-373 | Settings | Selection Parameter | Jump to 0 |
| SLx Step Setting*** | 338-374 | Bit 1/0 | 0/1 | xxxx0000 |
| SLx Time*** | 339-375 | 0.01 Sec | 0.00/600.00 | 0.00 Sec |
| SLx Encoder Cnts*** | 340-376 | 1 Count | ±32767 | 0 |
| Current Step | 377 | None | 0/9 | 0 |

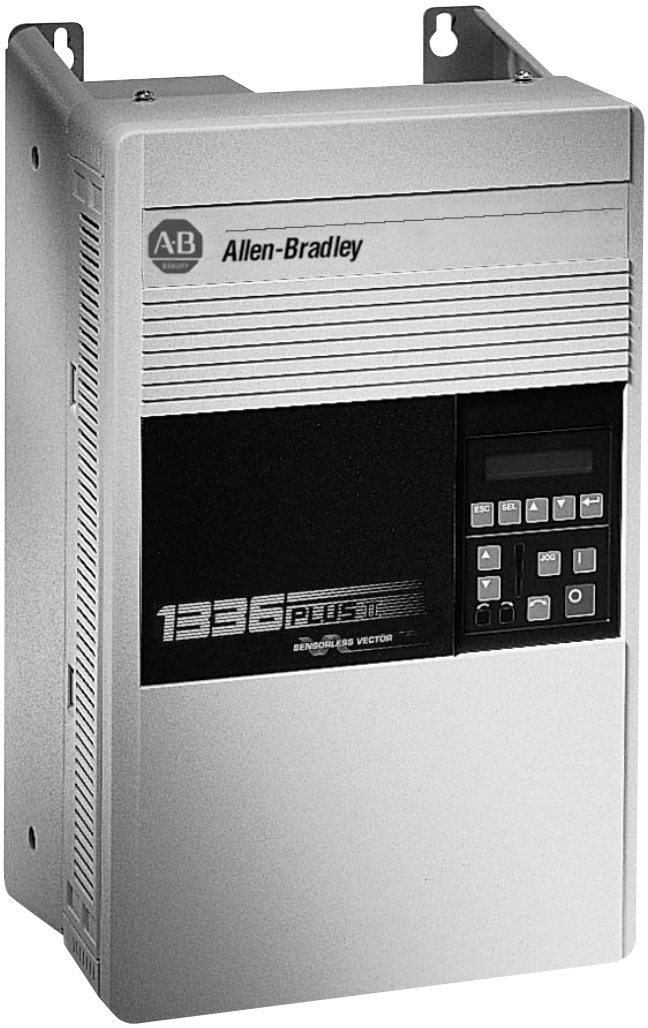
*Firmware 3.001 & later
**Firmware 4.001 & later
***Firmware 5.001 & later

# Fault List

Over 40 faults can be displayed through the Human Interface Module. The display indicates a fault by showing a brief text statement relating to the fault that will be displayed until a drive reset is initiated.

| Fault No. | Display Name | Fault Description |
|---|---|---|
| 02 | Auxiliary Fault | The auxiliary input interlock is open |
| 03 | Power Loss Fault | DC bus voltage remained below 85% of nominal for longer than 500ms |
| 04 | Undervolt Fault | DC Bus voltage fell below the minimum value |
| 05 | Overvolt Fault | DC bus voltage exceeded maximum value |
| 06 | Motor Stall Fault | Current remained over 150% of [Rated Amps] for more than 4 seconds |
| 07 | Overload Fault | Internal electronic overload trip |
| 08 | Overtemp Fault | Heatsink temperature exceeds a predefined value of 90° C (195° F) |
| 09 | Open Pot Fault | An external pot is connected and the common side of the pot is open |
| 10 | Serial Fault | A SCANport adapter has been disconnected and the [Logic Mask] bit for that adapter is set to "1" |
| 11 | Op Error Fault | A SCANport device requests a Read or Write of data type not supported |
| 12 | Overcurrent Flt | Overcurrent is detected in instantaneous overcurrent trip circuit |
| 13 | Ground Fault | A current path to earth ground in excess of 100A has been detected at one or more of the drive output terminals |
| 14 | Option Error | An analog option board has been installed in the wrong slot |
| 15 | Motor Thermistor | An analog option board with thermistor input is installed and the value at the terminals is less than 60 ohms or greater than 3300 ohms |
| 16 | Bipolar Dir Flt | 3 Wire-Bipolar input is the active frequency reference and direction control is not possible<br>2 Wire-Run Forward or Run Reverse commands attempt direction control, but bipolar input is not masked from direction control |
| 19 | Precharge Fault | The precharge device was open 20ms after the end of a line loss condition or the bus charging alarm remains on for 20 seconds |
| 22 | DSP Reset Fault | Power-up has been attempted with an Open Stop contact or Closed Start contact |
| 23 | Loop Overrn Fault | An overrun of the 2.5ms control loop has occurred |
| 24 | Motor Mode Fault | A fault has been detected originating from the Control Board |
| 26 | Power Mode Fault | The internal power mode variable received an incorrect value |
| 29 | Hertz Err Fault | This fault indicates that there is not a valid operating frequency |
| 30 | Hertz Sel Fault | A frequency select parameter has been programmed with an out-of-range value |
| 32 | EEPROM Fault | EEPROM is being programmed and will not write a new value |
| 33 | Max Retries Fault | Drive unsuccessfully attempted to reset a fault and resume running for the programmed number of tries |
| 34 | Prm Access Flt | A communication error occurred between the microprocessor and serial EEPROM or DSP |
| 35 | Neg Slope Fault | Drive software detected a portion of the v/hz curve with a negative slope |
| 36 | Diag C Lim Flt | The [Cur Lim Trip En] parameter was enabled |
| 38 | Phase U Fault | A phase-to-ground fault has been detected between the drive and motor in this phase |
| 39 | Phase V Fault | A phase-to-ground fault has been detected between the drive and motor in this phase |
| 40 | Phase W Fault | A phase-to-ground fault has been detected between the drive and motor in this phase |
| 41 | UV Short Fault | Excessive current has been detected between these two output terminals |
| 42 | UW Short Fault | Excessive current has been detected between these two output terminals |
| 43 | VW Short Fault | Excessive current has been detected between these two output terminals |
| 47 | Xsistr Desat Flt | Output transistor(s) operating in the active region instead of desaturation. (Frame C & Above) |
| 48 | Reprogram Fault | The drive was commanded to write default values to EEPROM |
| 49 | Input Phase Flt | The drive is operated on single phase power |
| 50 | Poles Calc Fault | Generated if the calculated value of [Motor Poles] is less than 2 or greater than 32 |
| 51 | Bgnd 10ms Over | Microprocessor loop fault |
| 52 | Fgnd 10ms Over | Microprocessor loop fault |
| 53 | EE Init Read | Trouble reading EEPROM during initialization or gate drive board needs replacing |
| 54 | EE Init Value | Stored parameter value out of range on initialization |
| 55 | Temp Sense Open | Heatsink thermistor is open or malfunctioning |
| 56 | Precharge Open | The precharge circuit was commanded to close, but was detected to be open |
| 57 | Ground Warning | A current path to earth ground in excess of 2A has been detected at one or more of the drive output terminals |
| 58 | Blwn Fuse Flt | The bus fuse in 30kW (40 HP) and up drives has blown |
| 61 | Mult Prog Input | A single source input function has been programmed to more than one input or more than one "Run Reverse" input |
| 62 | Ill Prog Input | [Fault Data] = 98: "3 Wire" is selected as the [Input Mode] and one or more digital inputs are programmed to "Run Reverse" |
| 63 | Shear Pin Fault | Programmed [Current Limit] amps has been exceeded |
| 64 | Power Overload | The drive rating of 150% for 1 minute has been exceeded |
| 65 | Adptr Freq Err | The SCANport adapter sent an illegal frequency reference to the drive |
| 66 | EEPROM Checksum | The checksum read from the EEPROM does not match the checksum calculated from the EEPROM data |
| 68 | ROM or RAM Fit | Internal power-up ROM or RAM tests have not executed properly |
| 69 | Step Logic Flt | [SLx Step Jump] is set to "End Fault" or [Encoder Counts] has reached the endpoint of ±32767 |

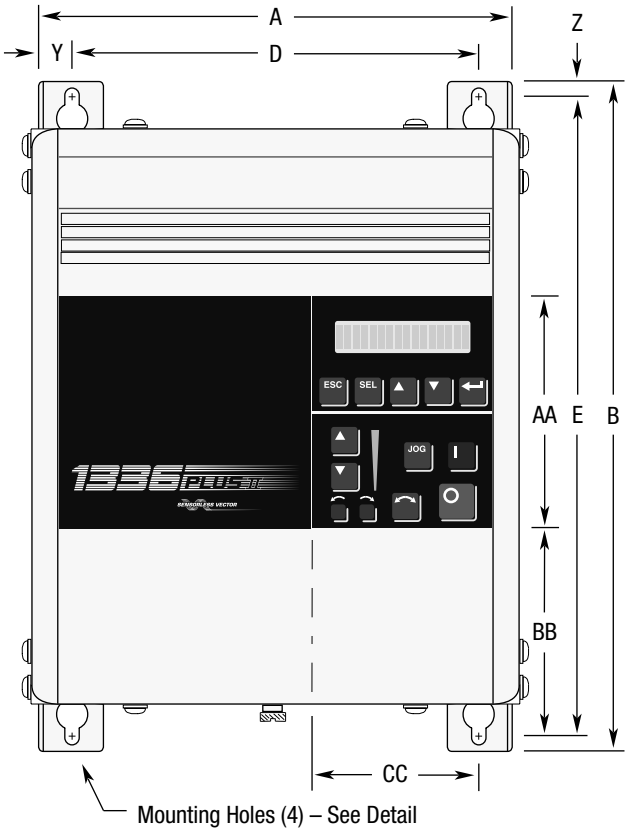
# 1336 PLUS II Pre-Installation

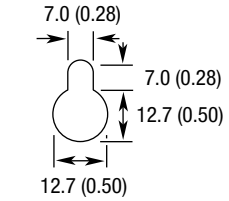


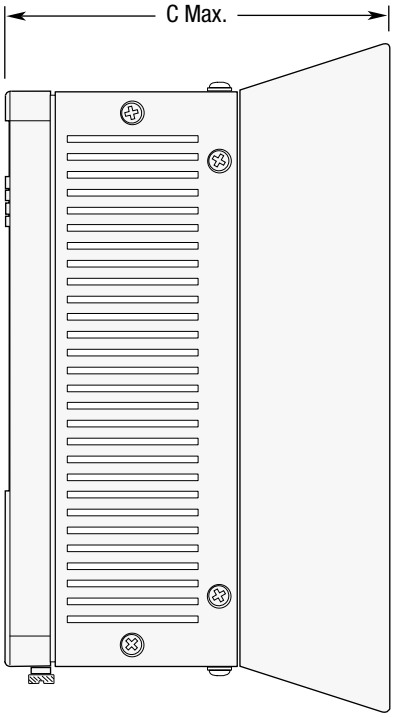

**ATTENTION:** The following information is merely a guide for proper installation. The Allen-Bradley Company cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment.

A hazard of personal injury and/or equipment exists if codes are ignored during installation.

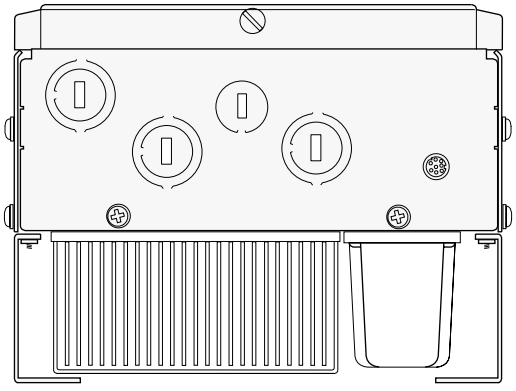
## IP 20 (NEMA Type 1) Dimensions – Frames A1 Through A4




Bottom View Will Vary with HP – See Bottom View Dimensions



| Three-Phase Rating [1, 2] 200-240V | 380-480V | 500-600V | Frame Reference |
|---|---|---|---|
| 0.37-0.75 kW<br>0.5-1 HP | 0.37-1.2 kW<br>0.5-1.5 HP | – | **A1** |
| 1.2-1.5 kW<br>1.5-2 HP | 1.5-2.2 kW<br>2-3 HP | – | **A2** |
| 2.2-3.7 kW<br>3-5 HP | 3.7 kW<br>5 HP | – | **A3** |
| – | **5.5-15 kW ***<br>**7.5-20 HP** | 0.75-15 kW<br>1-20 HP | **A4** |
| 5.5-11 kW<br>7.5-15 HP | **11-22 kW ***<br>**15-30 HP** | –<br>– | **B1/B2** |
| 15-22 kW<br>20-30 HP | 30-45 kW<br>40-60 HP | 18.5-45 kW<br>25-60 HP | **C** |
| 30-45 kW<br>40-60 HP | 45-112 kW<br>60-150 HP | 56-93 kW<br>75-125 HP | **D** |
| 56-93 kW<br>75-125 HP | 112-187 kW<br>150-250 HP | 112-187 kW<br>150-300 HP | **E** |
| – | 187-336 kW<br>250-450 HP | 261-298 kW<br>350-400 HP | **F** |
| – | 187-448 kW<br>250-600 HP | 224-448 kW<br>300-600 HP | **G** |

* Use care when choosing Frame Reference - Some ratings may exist in another frame size.

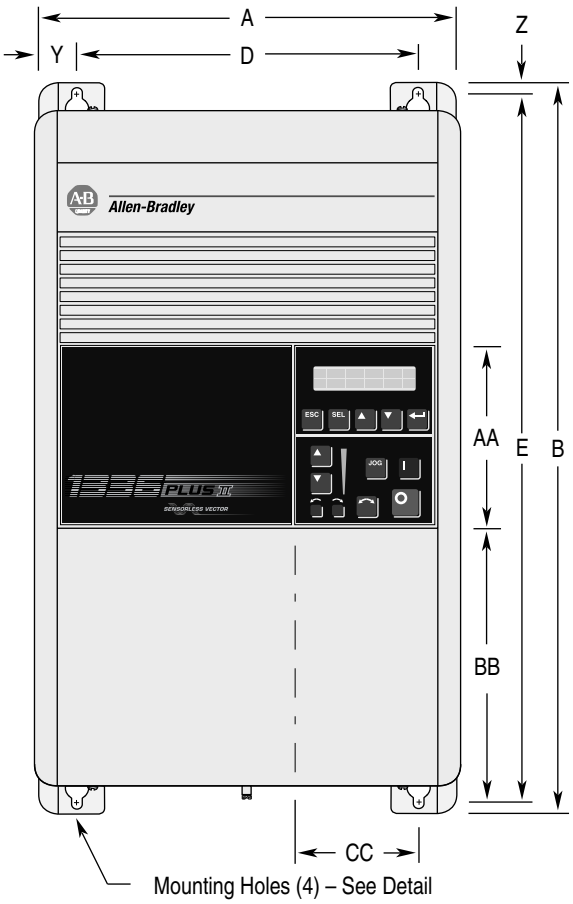
All Dimensions in Millimeters and (Inches)
All Weights in Kilograms and (Pounds)

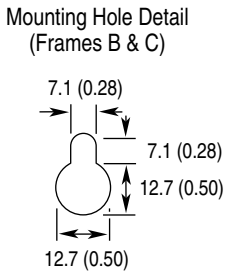
| Frame Reference | A | B | C Max. | D | E | Y | Z | AA | BB | CC | Shipping Weights |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **A1** | 215.9<br>(8.50) | 290.0<br>(11.42) | 160.0<br>(6.30) | 185.2<br>(7.29) | 275.0<br>(10.83) | 15.35<br>(0.60) | 7.5<br>(0.30) | 130.0<br>(5.12) | 76.2<br>(3.00)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

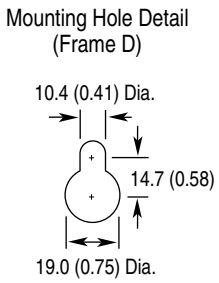
[1] *Refer to the Derating Guidelines on Pages 56-60 for derating information.*

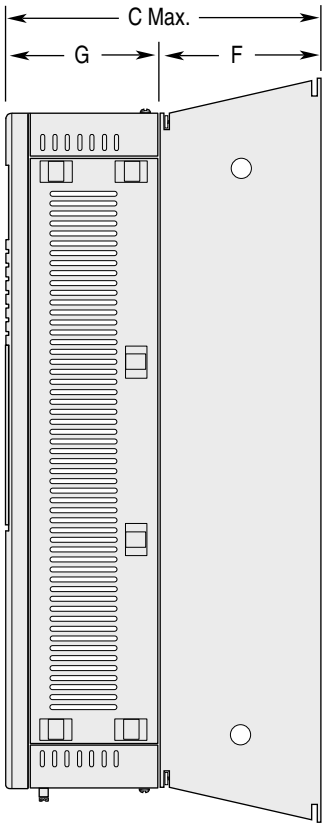
[2] *kW/HP are constant torque (CT) ratings.*

## IP 20 (NEMA Type 1) Dimensions – Frames B, C, D

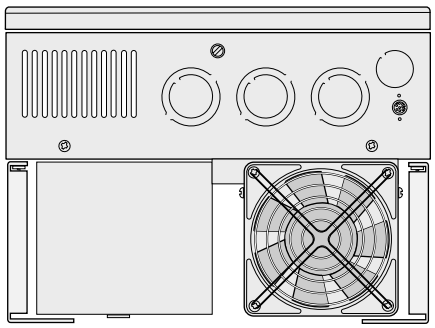


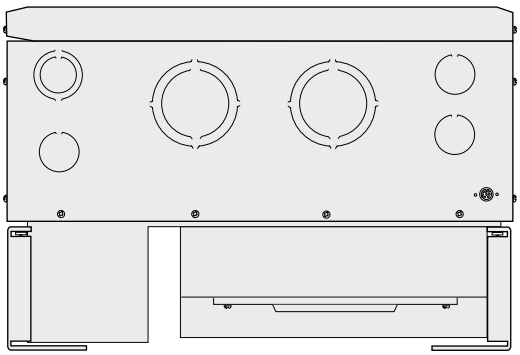




**Frames B & C**



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

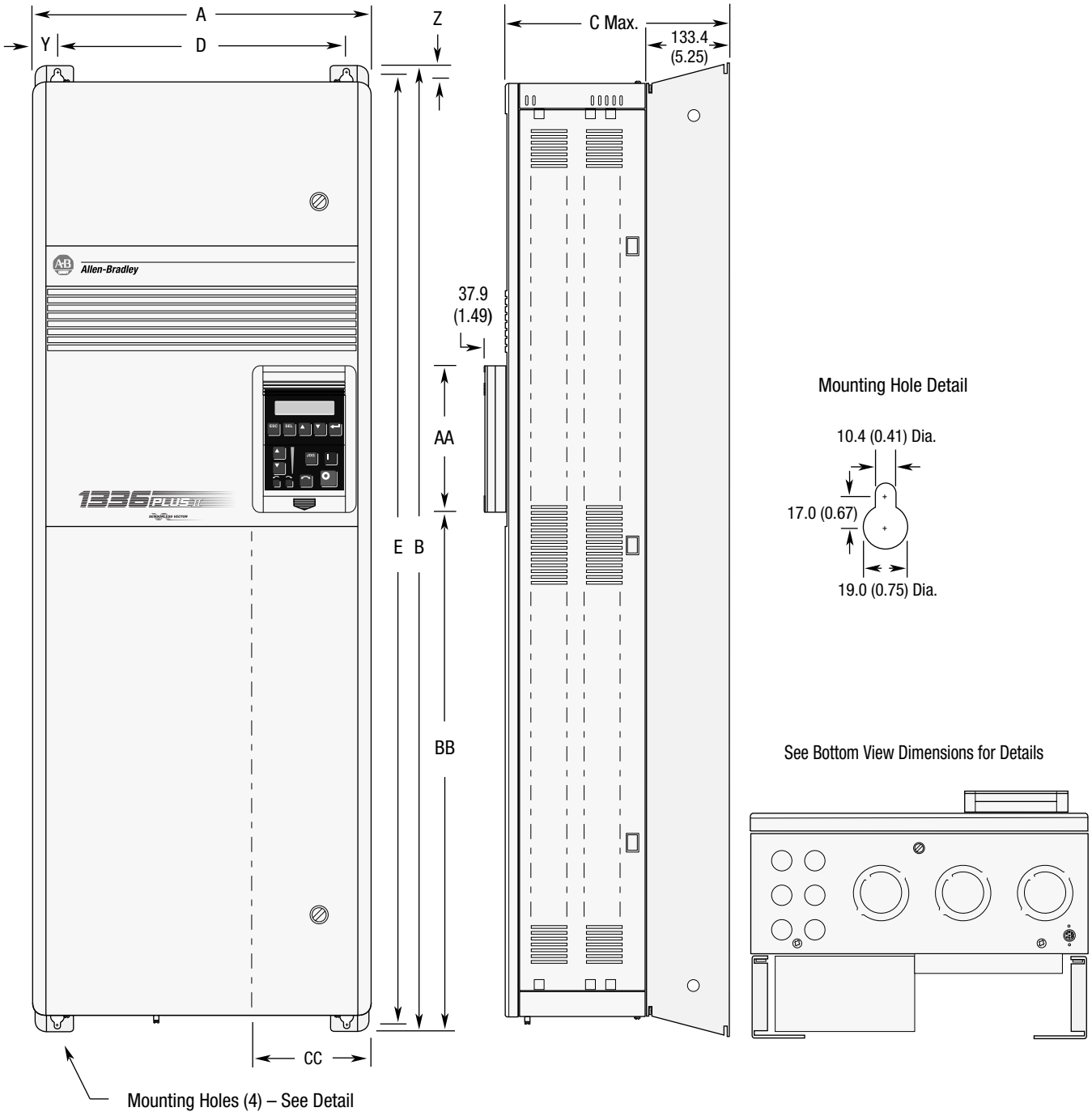
**Frame D**



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

| Frame Reference | A | B | C Max. | D | E | F | G Encl. | G Open | Y | Z | AA | BB | CC | Shipping Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **B1/B2** | 276.4 (10.88) | 476.3 (18.75) | 225.0 (8.86) | 212.6 (8.37) | 461.0 (18.15) | 131.6 (5.18) | 93.5 (3.68) | 88.9 (3.50) | 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) | 131.6 (5.18) | 93.5 (3.68) | 88.9 (3.50) | 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) | 81.3 (3.20) | 189.5 (7.46) | 184.9 (7.28) | 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.) |

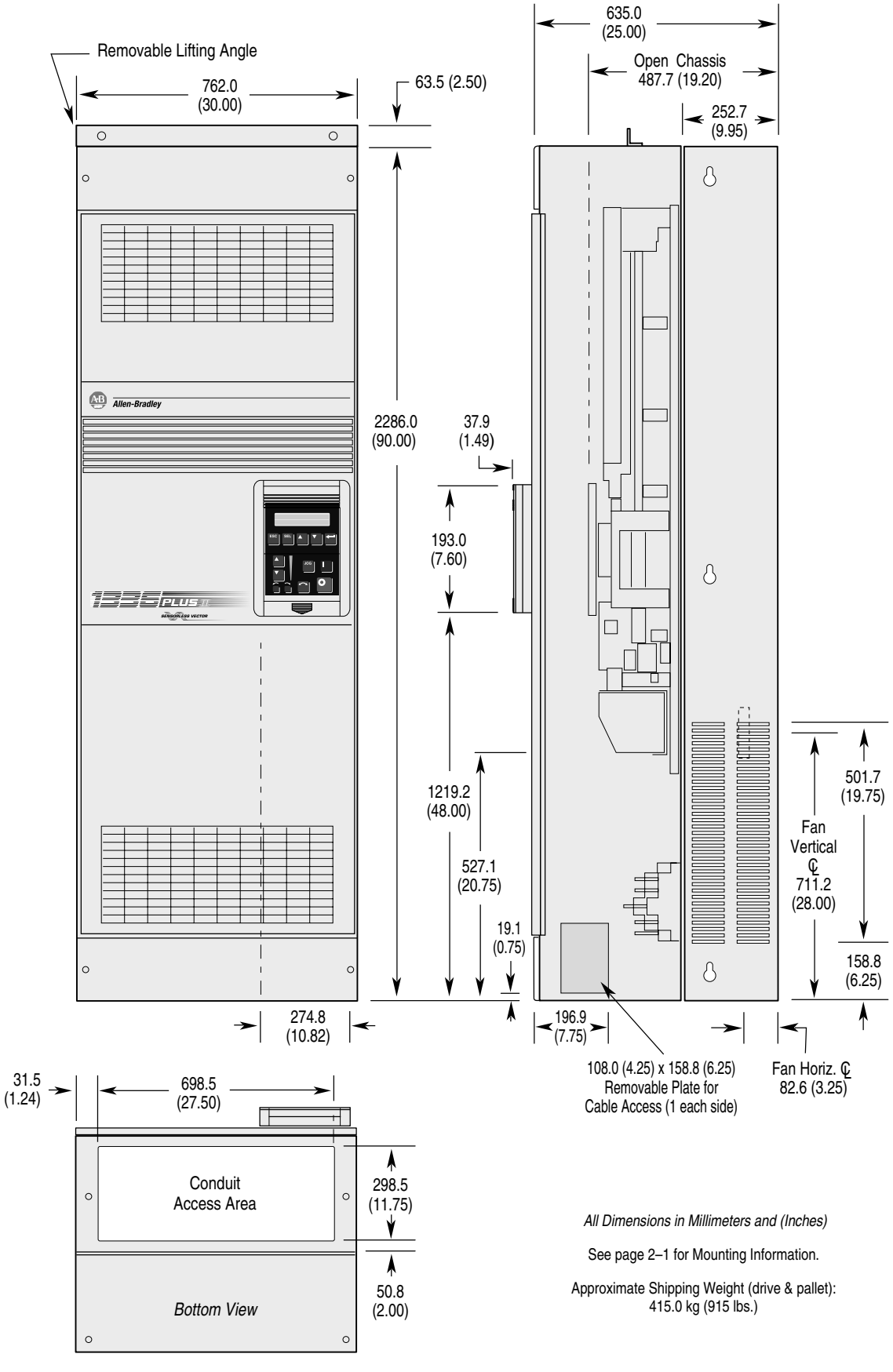
## IP 20 (NEMA Type 1) & Open Dimensions – Frame E




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

| Frame 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 (410) |
| **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 (360) |

## IP 20 (NEMA Type 1) & Open Dimensions – Frame F



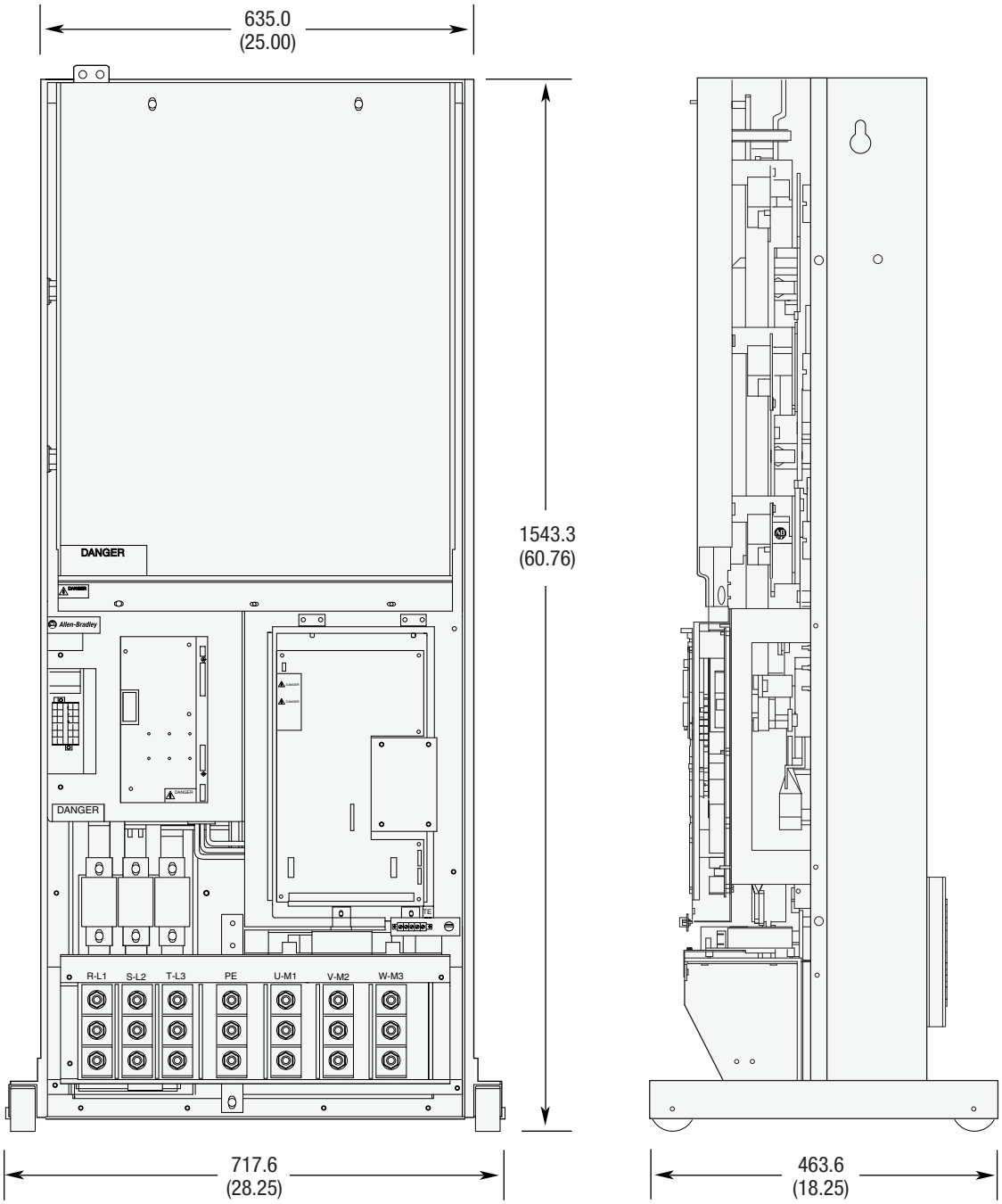

*All Dimensions in Millimeters and (Inches)*

See page 2–1 for Mounting Information.

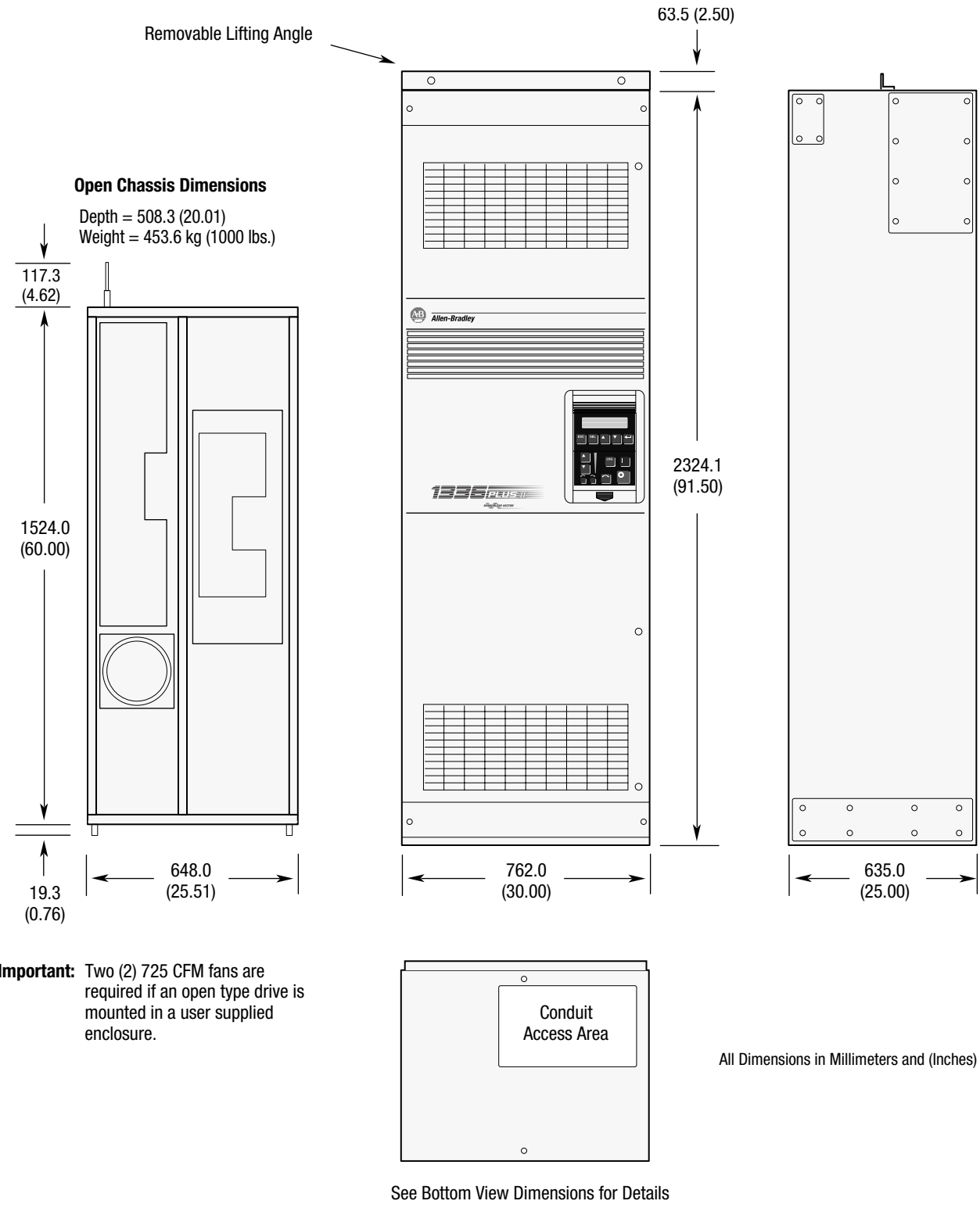
Approximate Shipping Weight (drive & pallet):
415.0 kg (915 lbs.)

## Open Dimensions – Frame F "Roll-In" Chassis

All Dimensions in Millimeters and (Inches)



## IP 20 (NEMA Type 1) & Open Dimensions – Frame G

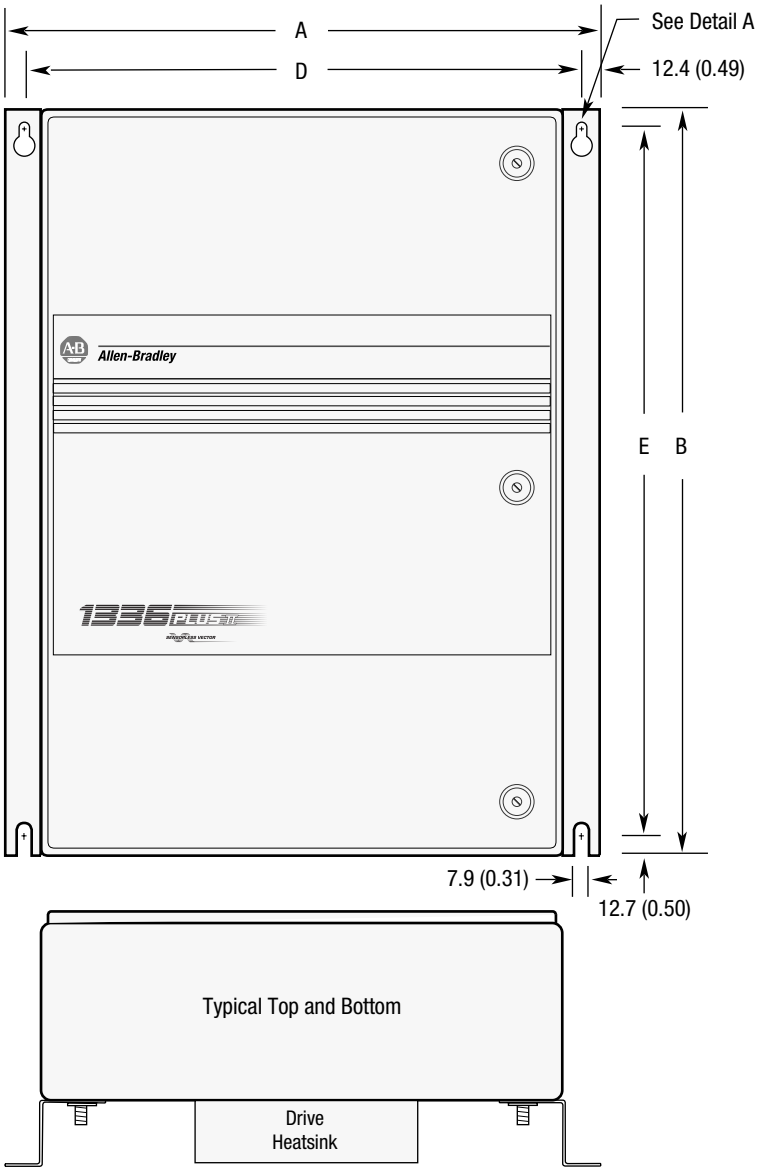


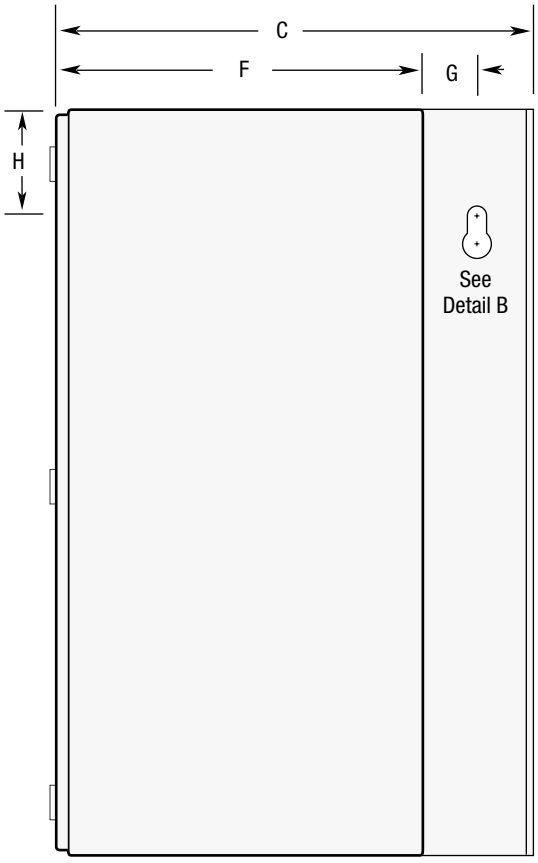

**Important:** Two (2) 725 CFM fans are required if an open type drive is mounted in a user supplied enclosure.

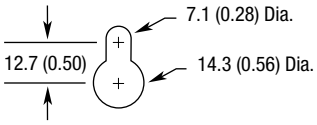
See Bottom View Dimensions for Details

All Dimensions in Millimeters and (Inches)

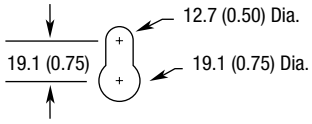
## IP 65/54 (NEMA Type 4/12) Dimensions




**Detail A**




**Detail B**

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

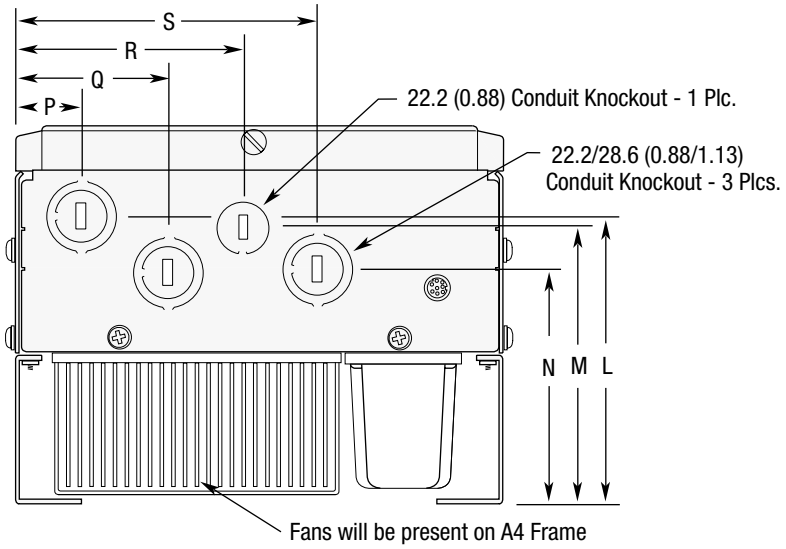
| Frame Reference | A | B | C | D | E | F | G | H | Approx. Ship Weight |
|---|---|---|---|---|---|---|---|---|---|
| **A1** | 430.0 (16.93) | 525.0 (20.67) | 350.0 (13.78) | 404.9 (15.94) | 500.1 (19.69) | 250.0 (9.84) | N/A | N/A | 16.8 (37.0) |
| **A2** | 430.0 (16.93) | 525.0 (20.67) | 350.0 (13.78) | 404.9 (15.94) | 500.1 (19.69) | 250.0 (9.84) | N/A | N/A | 17.9 (39.4) |
| **A3** | 430.0 (16.93) | 525.0 (20.67) | 350.0 (13.78) | 404.9 (15.94) | 500.1 (19.69) | 250.0 (9.84) | N/A | N/A | 18.6 (41.0) |
| **A4** | 655.0 (25.79) | 650.0 (25.59) | 425.0 (16.74) | 629.9 (24.80) | 625.1 (24.61) | 293.0 (11.54) | 63.5 (2.50) | 76.2 (3.00) | 39.5 (87.0) |
| **B1** 5.5 kW (7.5 HP) at 200-240V AC<br>11 kW (15 HP) at 380-480V AC | 655.0 (25.79) | 650.0 (25.59) | 425.0 (16.74) | 629.9 (24.80) | 625.1 (24.61) | 293.0 (11.54) | 63.5 (2.50) | 76.2 (3.00) | 44.7 (98.5) |
| **B2** 7.5-11 kW (10-15 HP) at 200-240V AC<br>15-22 kW (20-30 HP) at 380-480V AC | 655.0 (25.79) | 900.0 (35.43) | 425.0 (16.74) | 629.9 (24.80) | 875.0 (34.45) | 293.0 (11.54) | 63.5 (2.50) | 76.2 (3.00) | 56.5 (124.5) |
| **C** | 655.0 (25.79) | 1200.0 (47.24) | 425.0 (16.74) | 629.9 (24.80) | 1174.5 (46.22) | 293.0 (11.54) | 63.5 (2.50) | 76.2 (3.00) | 80.7 (178.0) |

## IP 20 (NEMA Type 1) Bottom View Dimensions – Frames A-C

### Frames A1 through A4

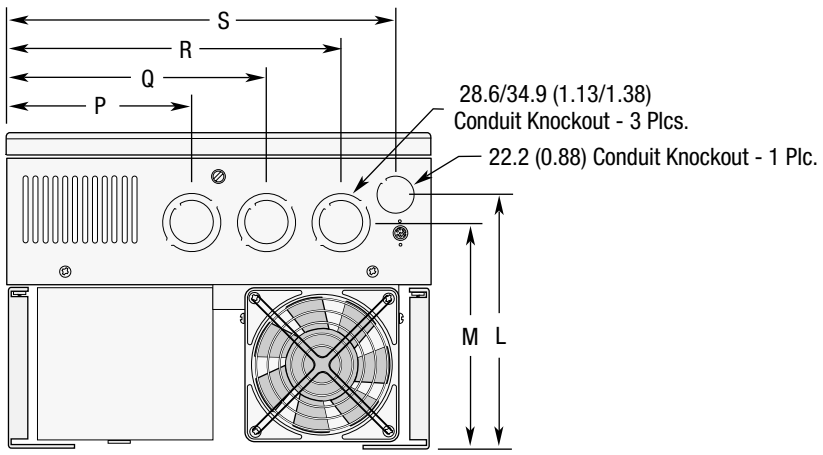
Fans are present on these drives

| Input Voltage | Frame | Catalog Number | kW/HP Rating |
|---|---|---|---|
| 230 | A4 | F75 | 5.5 (7.5) |
| 460 | A4 | F75 | 5.5 (7.5) |
| | | F100 | 7.5 (10) |
| | | F150 | 11 (15) |
| | | F200 | 15 (20) |
| 575 | A4 | F30 | 2.2 (3) |
| | | F50 | 3.7 (5) |
| | | F75 | 5.5 (7.5) |
| | | F100 | 7.5 (10) |
| | | F150 | 11 (15) |
| | | F200 | 15 (20) |




| Frame Reference | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|
| **A1** | 111.8 (4.40) | 105.4 (4.15) | 86.3 (3.40) | 31.0 (1.22) | 69.1 (2.72) | 102.1 (4.02) | 135.4 (5.33) |
| **A2** | 132.3 (5.21) | 126.0 (4.96) | 106.9 (4.21) | 31.0 (1.22) | 69.1 (2.72) | 102.1 (4.02) | 135.4 (5.33) |
| **A3** | 158.8 (6.25) | 152.4 (6.00) | 133.4 (5.25) | 31.0 (1.22) | 69.1 (2.72) | 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 (2.56) | 97.0 (3.82) | 128.7 (5.07) |

### Frames B and C



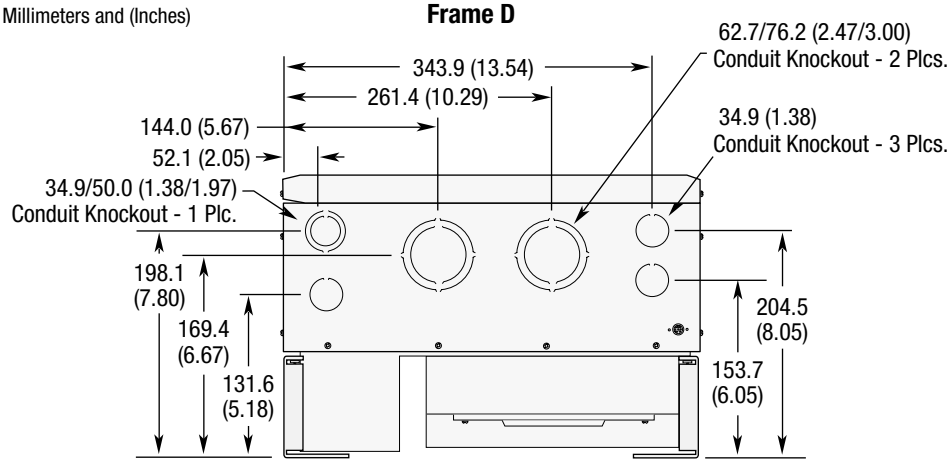

All Dimensions in Millimeters and (Inches)

| Frame Reference | L | M | P | Q | R | S |
|---|---|---|---|---|---|---|
| **B1/B2** | 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) | 233.4 (9.19) | 275.3 (10.84) |

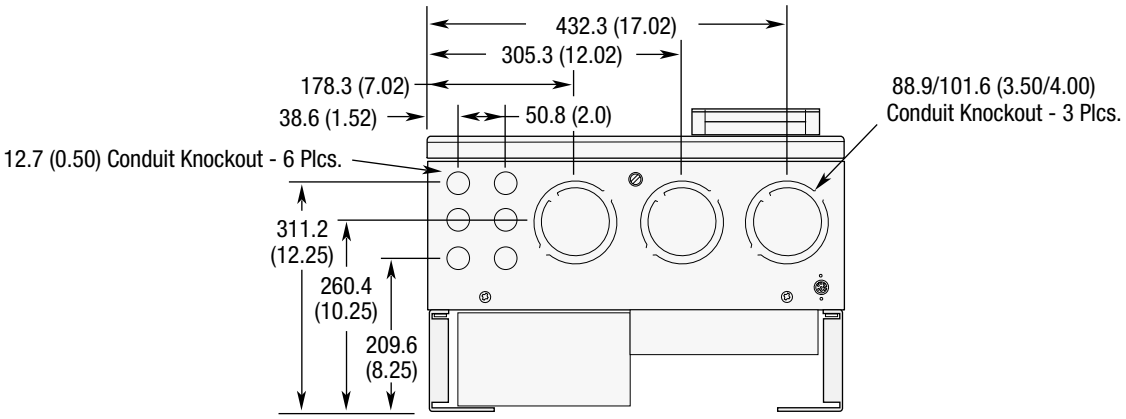
## IP 20 (NEMA Type 1) Bottom View Dimensions – Frames D-G

All Dimensions in Millimeters and (Inches)

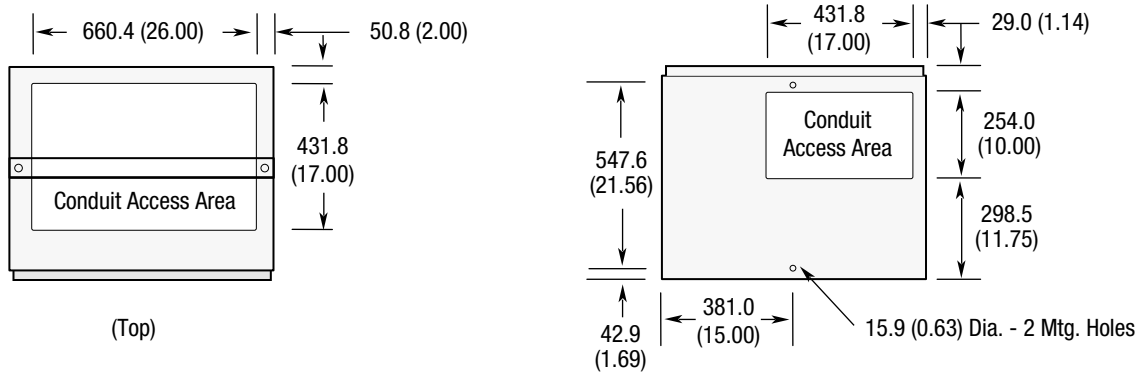
### Frame D



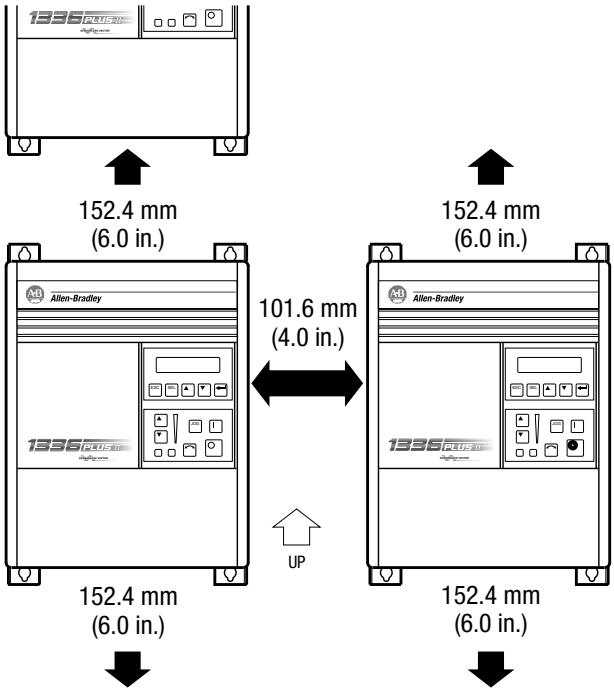

### Frame E




### Frame G



## Mounting Requirements




**NOTE:** F Frame drives require 152.4 mm (6.0 in.) on the sides and/or back for proper air flow.

## Input Power Conditioning

In general, the 1336 PLUS II 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, overvoltage faults and may cause damage to the drive power structure.

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

1. If the AC input power system does not have a neutral or one phase referenced to ground (see Unbalanced Distribution Systems on next page), 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 **highly recommended**.
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 drive and capacitors. If the capacitors are permanently connected and not switched, the general rules for impedance mismatch (see above) apply.
3. If the AC line frequently experiences transient power interruptions or significant voltage spikes, an isolation transformer or 5% reactors are recommended.

Refer to *Unbalanced Distribution Systems* on next page.

# Pre-Installation

## AC Supply Source

1336 PLUS II 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 **37**.

**ATTENTION:** To guard against personal injury and/or equipment damage caused by improper fusing, use only the recommended line fuses specified on Page **37**.

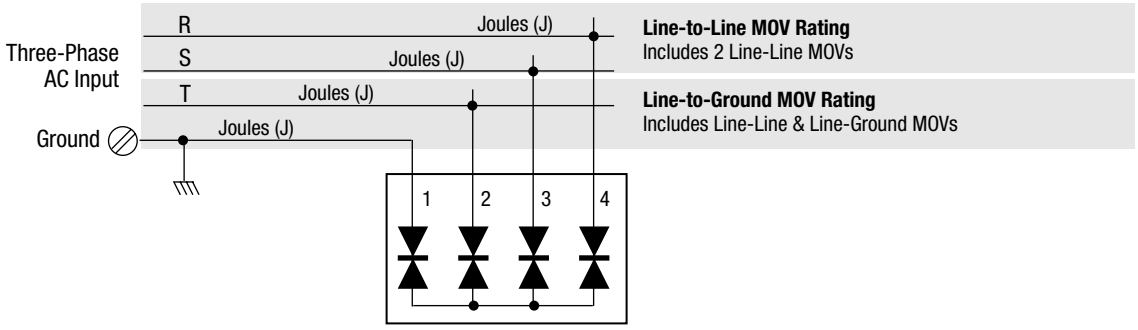
### Unbalanced Distribution Systems

This drive is designed to operate on three-phase supply systems whose line voltages are symmetrical. Surge suppression devices are included to protect the drive from lightning induced overvoltages between line and ground. Where the potential exists for abnormally high phase-to-ground voltages (in excess of 125% of nominal), or where the supply ground is tied to another system or equipment that could cause the ground potential to vary with operation, suitable isolation is required for the drive. Where this potential exists, an isolation transformer is strongly recommended.

### Ungrounded Distribution Systems

All 1336 PLUS II drives are equipped with an MOV (Metal Oxide Varistor) that provides voltage surge protection and phase-to-phase plus phase-to-ground protection which is designed to meet IEEE 587. The MOV circuit is designed for surge suppression only (transient line protection), not continuous operation.

With ungrounded distribution systems, the phase-to-ground MOV connection could become a continuous current path to ground. Energy ratings are listed below. Exceeding published line-to-line and line-to-ground energy ratings may cause physical damage to the MOV.




| Frame Reference | A | | B-C | | D-G | |
|---|---|---|---|---|---|---|
| Device Rating (V AC) | 240 | 480/600 | 240/480 | 600 | 240/480 | 600 |
| **Line-Line Total** | 160J | 320J | 280J | 320J | 280J | 300J |
| **Line-Ground Total** | 220J | 380J | 360J | 410J | 360J | 370J |

## Input Fuses and Circuit Breakers

1336 PLUS II 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 sutiable 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 **37**.

### Circuit Breakers

The Westinghouse HMCP breakers specified in the table on pages **34-35** 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 circuit. 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 sutiable 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 **37**.

### 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 PLUS II 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.

# Pre-Installation

## Recommended Protection Devices (user supplied)

**240 Volt Input**

| Frame | Drive Catalog Number | | Input Rating | Output Rating | Dual-Element Time Delay Fuse | | Non-Time Delay Fuse | | Circuit Breaker[3] | Motor Circuit Protector[4] | 140M Motor Starter with Adjustable Current Range[5,6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1336F-* | ***HP*** | *Amps* | *Amps* | *Min.[1]* | *Max.[2]* | *Min.[1]* | *Max.[2]* | *Amps* | *Amps* | *Available Catalog Numbers[7]* | | | |
| A1 | F05 | 0.5 | 2.8 | 2.3 | 4 | 5 | 4 | 6 | 15 | 3 | 140M-C2E-B40 | 140M-D8E-B40 | – | – |
| | F07 | 0.75 | 3.5 | 3.0 | 4 | 6 | 4 | 9 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | – | – |
| | F10 | 1 | 5.4 | 4.5 | 6 | 9 | 6 | 12 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | – |
| A2 | F15 | 1.5 | 7.3 | 6.0 | 8 | 12.5 | 8 | 15 | 20 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | – |
| | F20 | 2 | 9.7 | 8.0 | 10 | 15 | 10 | 20 | 25 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | – |
| A3 | F30 | 3 | 14.3 | 12.0 | 15 | 20 | 15 | 25 | 35 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | – |
| | F50 | 5 | 21.3 | 18.0 | 25 | 30 | 25 | 45 | 60 | 30 | 140M-C2E-C25 | 140M-D8E-C25 | 140M-F8E-C25 | 140M-CMN-2500 |
| | F75 | 7.5 | 22.6 | 22.0 | 30 | 45 | 30 | 60 | 80 | 50 | 140M-C2E-C25 | 140M-D8E-C25 | 140M-F8E-C25 | 140M-CMN-2500 |
| B | 007 | 7.5 | 28.0 | 27.0 | 40 | 45 | 40 | 60 | 80 | 50 | – | – | 140M-F8E-C32 | 140M-CMN-4000 |
| | 010 | 10 | 35.0 | 34.0 | 50 | 60 | 50 | 80 | 100 | 50 | – | – | – | 140M-CMN-4000 |
| | 015 | 15 | 49.0 | 48.0 | 70 | 90 | 70 | 110 | 150 | 70 | – | – | – | 140M-CMN-6300 |
| C | 020 | 20 | 63.0 | 65.0 | 100 | 110 | 100 | 125 | 200 | 100 | – | – | – | 140M-CMN-9000 |
| | 025 | 25 | 75.0 | 77.0 | 100 | 150 | 100 | 200 | 250 | 100 | – | – | – | 140M-CMN-9000 |
| | 030 | 30 | 79.0 | 80.0 | 125 | 175 | 125 | 225 | 300 | 150 | – | – | – | 140M-CMN-9000 |
| D | 040 | 40 | 119.0 | 120.0 | 120 | 225 | 120 | 300 | 300 | 150 | – | – | – | – |
| | 050 | 50 | 149.0 | 150.0 | 200 | 250 | 200 | 350 | 350 | 250 | – | – | – | – |
| | 060 | 60 | 178.0 | 180.0 | 250 | 300 | 250 | 450 | 450 | 250 | – | – | – | – |
| E | 075 | 75 | 238.0 | 240.0 | 300 | 400 | 300 | 500 | 500 | 250 | – | – | – | – |
| | 100 | 100 | 289.0 | 291.0 | 400 | 500 | 400 | 700 | 700 | 400 | – | – | – | – |
| | 125 | 125 | 322.0 | 325.0 | 450 | 700 | 450 | 800 | 800 | 600 | – | – | – | – |

**480 Volt Input**

| Frame | Drive Catalog Number | CT Ratings | | | VT Ratings | | | Dual Element Time Delay Fuse | | Non-Time Delay Fuse | | Circuit Breaker 3 | Circuit Protector 4 | 140M Motor Starter with Adjustable Current Range[5,6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1336F- | HP | Input *Amps* | Ouput *Amps* | HP | Input *Amps* | Ouput *Amps* | *Min.[1]* | *Max.[2]* | *Min.[1]* | *Max.[2]* | *Amps* | *Amps* | *Available Catalog Numbers - 140 . . .7* | | | |
| A1 | F05 | 0.5 | 1.3 | 1.1 | 0.5 | 1.4 | 1.2 | 3 | 2.5 | 3 | 3 | 15 | 3 | M-C2E-B16 | – | – | – |
| | F07 | 0.75 | 2.0 | 1.6 | 0.75 | 2.1 | 1.7 | 3 | 3 | 3 | 6 | 15 | 3 | M-C2E-B25 | – | – | – |
| | F10 | 1 | 2.6 | 2.1 | 1 | 2.8 | 2.3 | 3 | 4.5 | 3 | 8 | 15 | 3 | M-C2E-B40 | M-D8E-B40 | – | – |
| | F15 | 1.5 | 3.3 | 2.8 | 1.5 | 3.5 | 3.0 | 4 | 6 | 4 | 12 | 15 | 7 | M-C2E-B40 | M-D8E-B40 | – | – |
| A2 | F20 | 2 | 4.6 | 3.8 | 2 | 4.8 | 4.0 | 5 | 6 | 5 | 12 | 15 | 7 | M-C2E-C63 | M-D8E-C63 | – | – |
| | F30 | 3 | 6.4 | 5.3 | 3 | 7.2 | 6.0 | 8 | 10 | 8 | 15 | 25 | 7 | M-C2E-C10 | M-D8E-C10 | M-F8E-C10 | – |
| A3 | F50 | 5 | 10.0 | 8.4 | 5 | 10.7 | 9.0 | 12 | 15 | 12 | 30 | 35 | 15 | M-C2E-C16 | M-D8E-C16 | M-F8E-C16 | – |
| A4 | F75 | 7.5 | 13.6 | 13.3 | 10 | 15.7 | 15.4 | 20 | 30 | 20 | 50 | 50 | 30 | M-C2E-C16 | M-D8E-C16 | M-F8E-C16 | – |
| | F100 | 10 | 16.4 | 16.1 | 15 | 22.4 | 22.0 | 30 | 40 | 30 | 80 | 80 | 30 | M-C2E-C25 | M-D8E-C25 | M-F8E-C25 | -CMN-2500 |
| | F150 | 15 | 24.5 | 24.0 | 20 | 24.5 | 24.0 | 35 | 60 | 35 | 100 | 100 | 50 | M-C2E-C25 | M-D8E-C25 | M-F8E-C25 | -CMN-2500 |
| | F200 | 20 | 28.0 | 27.0 | 20 | 28.0 | 27.0 | 35 | 60 | 35 | 100 | 100 | 50 | – | – | M-F8E-C32 | -CMN-4000 |
| B | 015 | 15 | 25.0 | 24.2 | 20 | 28.0 | 27.0 | 35 | 60 | 35 | 100 | 100 | 50 | – | – | M-F8E-C32 | -CMN-4000 |
| | 020 | 20 | 32.0 | 31.0 | 25 | 35.0 | 34.0 | 45 | 70 | 45 | 125 | 125 | 50 | – | – | M-F8E-C45 | -CMN-4000 |
| | 025 | 25 | 40.0 | 39.0 | 30 | 43.0 | 42.0 | 60 | 90 | 60 | 150 | 150 | 70 | – | – | M-F8E-C45 | -CMN-6300 |
| | 030 | 30 | 46.0 | 45.0 | 30 | 49.0 | 48.0 | 70 | 90 | 70 | 150 | 150 | 70 | – | – | – | -CMN-6300 |
| C | X040 | 40 | 61.0 | 59.0 | 40 | 61.0 | 59.0 | 80 | 110 | 80 | 200 | 200 | 70 | – | – | – | -CMN-6300 |
| | 040 | 40 | 58.0 | 60.0 | 50 | 63.0 | 65.0 | 80 | 125 | 80 | 250 | 250 | 100 | – | – | – | -CMN-6300 |
| | 050 | 50 | 73.0 | 75.0 | 60 | 75.0 | 77.0 | 100 | 150 | 100 | 300 | 300 | 100 | – | – | – | -CMN-9000 |
| | X060 | 60 | 75.0 | 77.0 | 60 | 75.0 | 77.0 | 100 | 150 | 100 | 300 | 300 | 100 | – | – | – | -CMN-9000 |
| D | 060 | 60 | 82.0 | 85.0 | 75 | 93.0 | 96.0 | 125 | 200 | 125 | 350 | 350 | 150 | – | – | – | – |
| | 075 | 75 | 105.0 | 106.0 | 100 | 119.0 | 120.0 | 150 | 250 | 150 | 450 | 350 | 250 | – | – | – | – |
| | 100 | 100 | 137.0 | 138.0 | 125 | 149.0 | 150.0 | 200 | 350 | 200 | 600 | 450 | 250 | – | – | – | – |
| | 125 | 125 | 172.0 | 173.0 | 150 | 178.0 | 180.0 | 250 | 400 | 250 | 600 | 500 | 250 | – | – | – | – |
| | X150 | 150 | 178.0 | 180.0 | 150 | 178.0 | 180.0 | 250 | 400 | 250 | 600 | 500 | 250 | – | – | – | – |
| E | 150 | 150 | 197.0 | 199.0 | 200 | 238.0 | 240.0 | 300 | 500 | 300 | 700 | 700 | 400 | – | – | – | – |
| | 200 | 200 | 261.0 | 263.0 | 250 | 290.0 | 292.0 | 400 | 600 | 400 | 800 | 800 | 400 | – | – | – | – |
| | 250 | 250 | 322.0 | 325.0 | 250 | 322.0 | 325.0 | 450 | 600 | 450 | 800 | 800 | 400 | – | – | – | – |
| F | P250 | 250 | 322.0 | 325.0 | 300 | 357.0 | 360.0 | 450 | – | Semiconductor fuse supplied with drive. Refer to the 1336 Spare Parts list (publication 1336-6.5) for replacement information. | | | | | | | |
| | P300 | 300 | 357.0 | 360.0 | 350 | 421.0 | 425.0 | 500 | – | | | | | | | | |
| | P350 | 350 | 421.0 | 425.0 | 400 | 471.0 | 475.0 | 600 | – | | | | | | | | |
| | P400 | 400 | 471.0 | 475.0 | 450 | 527.0 | 532.0 | 600 | – | | | | | | | | |
| | P450 | 450 | 527.0 | 532.0 | | | | 700 | – | | | | | | | | |
| G | X250 | 250 | 322.0 | 325.0 | 300 | 357.0 | 360.0 | 450 | – | Bussmann Type FWP, SPP, or 170M Series Ferraz Shawmut Type A-70Q, A-70QS or A070URD Series | | | | | | | |
| | 300 | 300 | 357.0 | 360.0 | 350 | 421.0 | 425.0 | 450 | – | | | | | | | | |
| | 350 | 350 | 421.0 | 425.0 | 400 | 471.0 | 475.0 | 500 | – | | | | | | | | |
| | 400 | 400 | 471.0 | 475.0 | 450 | 521.0 | 525.0 | 600/630 | - | | | | | | | | |
| | 450 | 450 | 521.0 | 525.0 | 500 | 585.0 | 590.0 | 800 | – | | | | | | | | |
| | 500 | 500 | 585.0 | 590.0 | 600 | 664.0 | 670.0 | 800 | – | | | | | | | | |
| | 600 | 600 | 664.0 | 670.0 | 600 | 664.0 | 670.0 | 900 | – | | | | | | | | |

## Recommended Protection Devices (user supplied)

**575 Volt Input**

| Frame | Drive Catalog Number | CT Ratings | | | Dual Element Time Delay Fuse | | Non-Time Delay Fuse | | Circuit Breaker 3 | Circuit Protector 4 | 140M Motor Starter with Adjustable Current Range[5,6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1336F-* | **HP** | *Input Amps* | *Ouput Amps* | *Min.[1]* | *Max.[2]* | *Min.[1]* | *Max.[2]* | *Amps* | *Amps* | *Available Catalog Numbers[7]* | | | |
| A4 | F10 | 1 | 2.4 | 2.0 | 3 | 3 | 3 | 6 | 15 | 3 | 140M-C2E-B25 | – | – | – |
| | F20 | 2 | 4.8 | 4.0 | 6 | 6 | 6 | 10 | 15 | 7 | 140M-C2E-C63 | 140M-D8E-C63 | – | – |
| | F30 | 3 | 7.2 | 6.0 | 10 | 12 | 10 | 15 | 15 | 7 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | – |
| | F50 | 5 | 9.6 | 8.0 | 15 | 20 | 15 | 20 | 20 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | – |
| | F75 | 7.5 | 10.0 | 10.0 | 15 | 20 | 15 | 30 | 35 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | – |
| | F100 | 10 | 12.0 | 12.0 | 20 | 25 | 20 | 40 | 40 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | – |
| | F150 | 15 | 19.0 | 19.0 | 25 | 35 | 25 | 60 | 60 | 30 | 140M-C2E-C20 | 140M-D8E-C20 | 140M-F8E-C20 | 140-CMN-2500 |
| | F200 | 20 | 25.0 | 24.0 | 30 | 45 | 30 | 80 | 80 | 30 | 140M-C2E-C25 | 140M-D8E-C25 | 140M-F8E-C25 | 140-CMN-2500 |
| C | 025 | 25 | 31.0 | 30.0 | 40 | 60 | 40 | 100 | 100 | 50 | – | – | 140M-F8E-C32 | 140-CMN-4000 |
| | 030 | 30 | 36.0 | 35.0 | 50 | 70 | 50 | 125 | 125 | 50 | – | – | 140M-F8E-C45 | 140-CMN-4000 |
| | 040 | 40 | 44.0 | 45.0 | 60 | 90 | 60 | 150 | 150 | 70 | – | – | 140M-F8E-C45 | 140-CMN-6300 |
| | 050 | 50 | 55.0 | 57.0 | 80 | 110 | 80 | 200 | 200 | 70 | – | – | – | 140M-CMN-6300 |
| | 060 | 60 | 60.0 | 62.0 | 90 | 125 | 90 | 225 | 225 | 100 | – | – | – | 140M-CMN-6300 |
| D | 075 | 75 | 84.0 | 85.0 | 110 | 150 | 110 | 300 | 300 | 100 | – | – | – | 140M-CMN-9000 |
| | 100 | 100 | 108.0 | 109.0 | 150 | 200 | 150 | 350 | 350 | 150 | – | – | – | – |
| | 125 | 125 | 137.0 | 138.0 | 175 | 250 | 175 | 500 | 350 | 250 | – | – | – | – |
| E | 150 | 150 | 167.0 | 168.0 | 225 | 300 | 225 | 500 | 400 | 250 | – | – | – | – |
| | 200 | 200 | 251.0 | 252.0 | 350 | 400 | 350 | 600 | 500 | 250 | – | – | – | – |
| | 250 | 250 | 282.0 | 284.0 | 400 | 500 | 400 | 700 | 700 | 400 | – | – | – | – |
| | X300 | 300 | 295.0 | 298.0 | 400 | 600 | 400 | 800 | 800 | 400 | – | – | – | – |
| F | P350 | 350 | 347.0 | 350.0 | 450 | | Semiconductor fuse supplied with drive. Refer to the 1336 Spare Parts list (publication 1336-6.5) for replacement information. | | | | | | | |
| | P400 | 400 | 397.0 | 400.0 | 500 | | | | | | | | | |
| G | 300 | 300 | 297.0 | 300.0 | 400 | | Bussmann Type FWP, SPP, or 170M Series<br>Ferraz Shawmut Type A-70Q, A-70QS or A070URD Series | | | | | | | |
| | 350 | 350 | 347.0 | 350.0 | 450 | | | | | | | | | |
| | 400 | 400 | 397.0 | 400.0 | 500 | | | | | | | | | |
| | 450 | 450 | 446.0 | 450.0 | 600/630 | | | | | | | | | |
| | 500 | 500 | 496.0 | 500.0 | 800 | | | | | | | | | |
| | 600 | 600 | 595.0 | 600.0 | 800 | | | | | | | | | |

1 Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.
2 Maximum protection device size is the highest rated device that supplies drive protection.
3 Circuit Breaker - inverse time breaker.
4 Motor Circuit Protector - instantaneous trip circuit breaker.
5 Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.
6 Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/ 347. Not UL listed for use on 480V or 600V Delta/Delta systems.
7 The AIC ratings of the Bulletin 140M Motor Protector may vary. See publication 140M-SG001B-EN-P.

## Power Wiring – TB1

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:** An incorrectly applied or installed bypass 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.
- Improper bypass or output circuits not approved by Allen-Bradley.
- Output circuits which do not connect directly to the motor.

Contact Allen-Bradley for assistance with application or wiring.

### TB1 SIGNALS

| Terminal | Description |
|---|---|
| PE ⏚ | Potential Earth Ground |
| TE ⏚ | Shield Termination - True Earth |
| 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.) |
|---|---|---|
| A1-A4 (Page 50) | 5.3/0.8 (10/18) | 1.81 (16) |
| B1 (Page 50) | 8.4/0.8 (8/18) | 1.81 (16) |
| B2 (Page 50) | 13.3/0.5 (6/20) | 1.70 (15) |
| C (Page 50) | 26.7/0.8 (3/18) | 5.65 (50) |
| D (Page 51)[3] | 127.0/2.1 (250 MCM / 14)<br>67.4/2.1 (00/14)[2] | 6.00 (52)<br>6.00 (52) |
| E (Page 51)[3] | 253.0/2.1 (500 MCM/14) | 10.00 (87) |
| F (Page 52)[3] | 303.6/2.1 (600 MCM/14) | 23.00 (200) |
| G (Page 52)[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.*

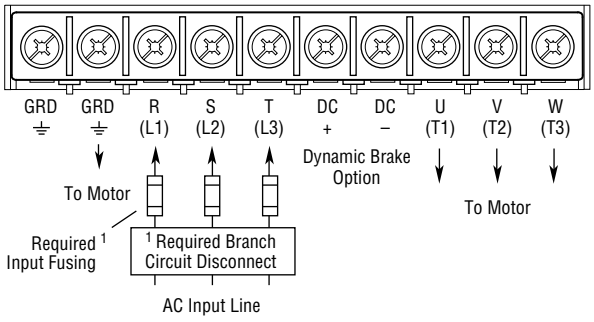
[2] *Applies to 30 kW (40 HP) 200-240V, 45 & 56 kW (60 & 75 HP) 380-480V, 56 kW (75 HP) 500-600V drives only.*

[3] *These configurations of TB1 are stud type terminations and require the use of lug type connectors to terminate the field installed conductors.*

## Power Wiring – TB1

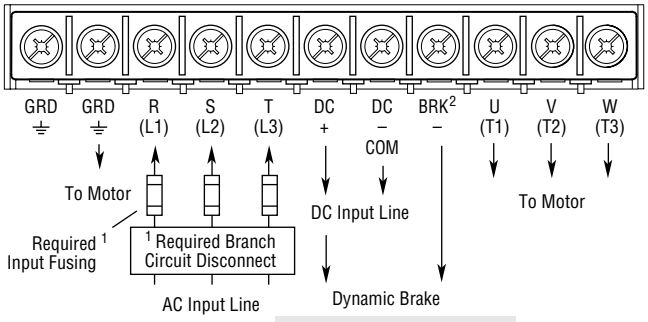
### A1-A3 Frame

**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

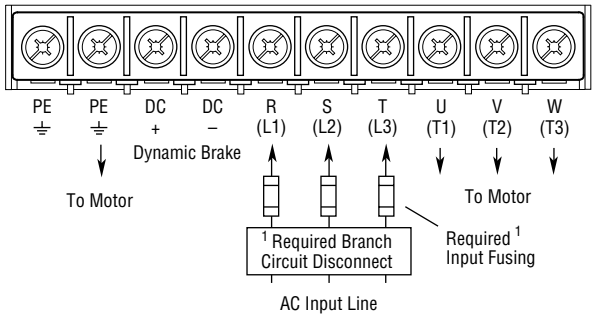
**380-480V, 5.5-15 kW (7.5-20 HP) Terminal Designations**
**500-600V, 0.75-15 kW (1-20 HP) Terminal Designations**




**Important:** A brake malfunction will occur if the Dynamic Brake is connected to "**DC – COM**"

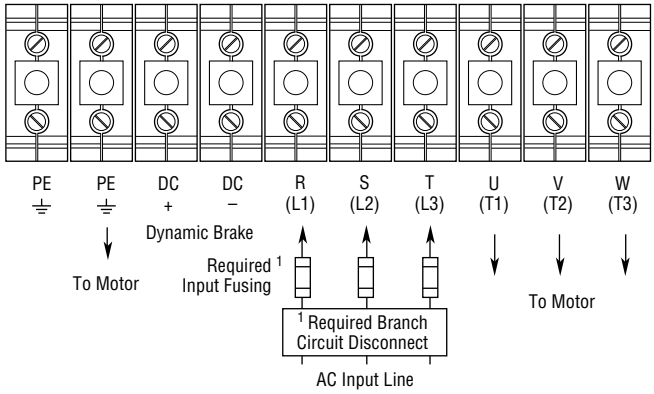
### B1 Frame

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



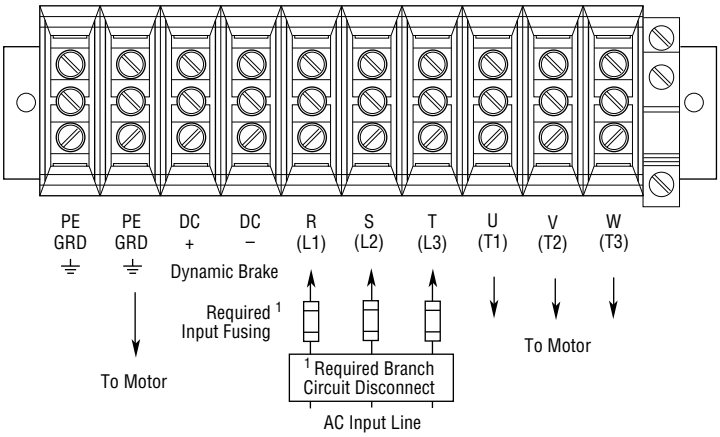

### B2 Frame

**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**

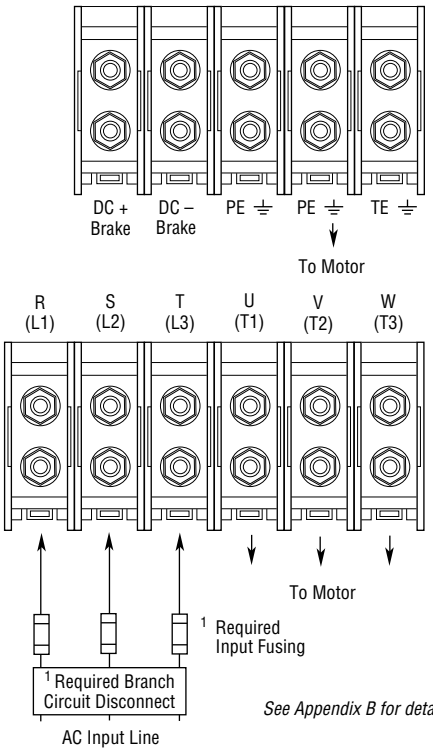



[1] User supplied.
[2] Terminal located separately on Series A Drives.

## Power Wiring – TB1

### D Frame

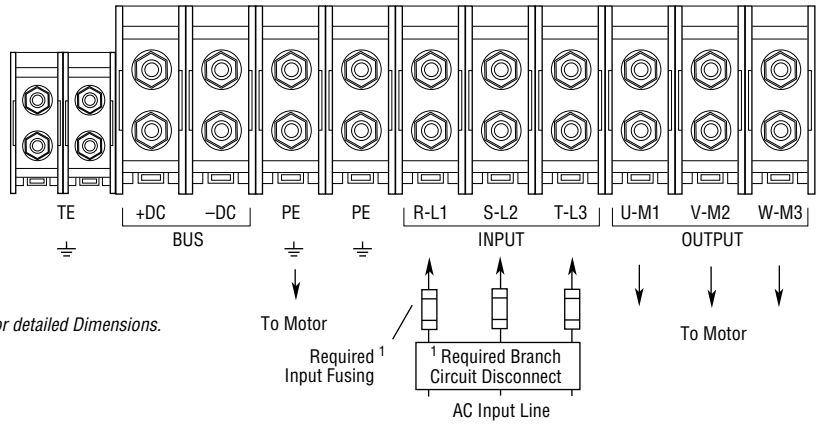
**200-240V, 30-45 kW (40-60 HP) Terminal Designations**
**380-480V, 45-112 kW (60-150 HP) Terminal Designations**
**500-600V, 56-112 kW (75-150 HP) Terminal Designations**




*See Appendix B for detailed Dimensions.*

### E Frame

**200-240V, 56-75 kW (75-100 HP) Terminal Designations**
**380-480V, 112-187 kW (150-250 HP) Terminal Designations**
**500-600V, 112-224 kW (150-300 HP) Terminal Designations**



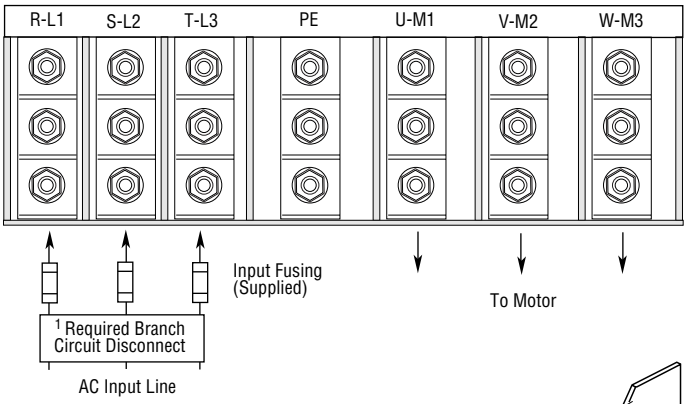

*See Appendix B for detailed Dimensions.*

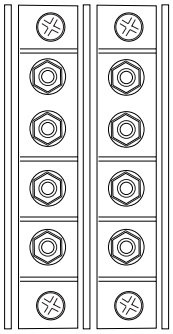
[1] User supplied.

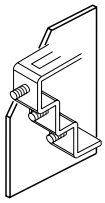
## Power Wiring – TB1

### F Frame

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



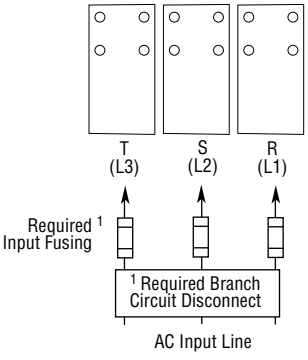



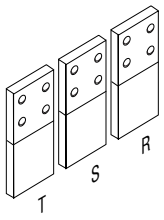



*typical terminal*

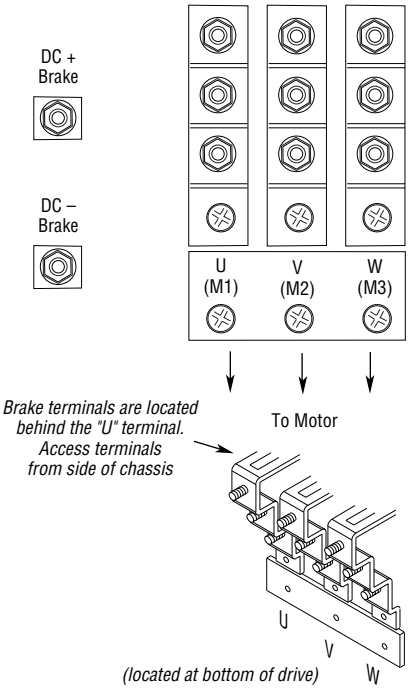
### G Frame

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




*typical terminal layout (located at top of drive)*




*(located at bottom of drive)*

[1] User supplied.

## Control and Signal Wiring

### General Wiring Information

General requirements for analog signal wire include: stranded copper 0.750-0.283 $mm^2$ (18-22 AWG), twisted-pair, 100% shield with drain wire, 300V minimum insulation rating and a temperature rating suitable for the application (not less than 60 degrees C). The recommended signal (analog I/O) wire is:

- Belden 8760/9460 (or equiv.) – 0.750 $mm^2$ (18 AWG), twisted pair, shielded.
- Belden 8770 (or equiv.) – 0.750 $mm^2$ (18 AWG), 3 conductor, shielded for remote pot only.

The recommended wire for encoder inputs/outputs is:

- Lengths less than or equal to 30 meters (98 feet) Belden 9730 (or equiv.) – 0.196 $mm^2$ (24 AWG), individually shielded
- Lengths greater than 30 meters (98 feet) Belden 9773 (or equiv.) – 0.750 $mm^2$ (18 AWG), twisted pair, shielded

### Signal Connections

If the drive control connections are to be linked to an electronic circuit or device, the common or 0V line should, if possible, be grounded at the device (source) end only.

**Important:** Signal Common – User speed reference signals are terminated to logic common at TB2, terminal 5. This puts the negative (or common) side of these signals at earth ground potential. Control schemes must be examined for possible conflicts with this type of grounding scheme.

### Shield Termination – TE (True Earth)

The TE terminal block (not available on 0.37-7.5 kW (0.5-10 HP) A Frame drives) provides a terminating point for signal wiring shields.

The maximum and minimum wire size accepted by this block is 2.1 and 0.30 $mm^2$ (14 and 22 AWG). Maximum torque is 1.36 N-m (12 lb.-in.). Use Copper wire only and always separate control and power cabling.

### Cable Routing

If unshielded cable is used, control signal circuits should not run parallel to motor cables or unfiltered supply cables with a spacing less than 0.3 meters (1 foot). Cable tray metal dividers or separate conduit should be used.

**Important:** When user-installed control and signal wiring with an insulation rating of less than 600V is used, this wiring must be routed inside the drive enclosure and separated from any other wiring and/or uninsulated live parts.

## Terminal Block – TB2

TB2 is located at the bottom of the Main Control Board. 0.37-7.5 kW (0.5-10 HP) A Frame drives have 18 positions. Remaining frame sizes from 5.5 kW (7.5 HP) and up have 22 positions. The maximum and minimum wire size accepted by TB2 is 2.1 and 0.30 mm2 (14 and 22 AWG). Maximum torque for all terminals is 1.36 N-m (12 lb.-in.). Use Copper wire only.

## Terminal Block – TB3

The Control Interface Option provides a means of interfacing various signals and commands to the 1336 PLUS II by using contact closures. Six different versions of the option are available:

- L4 Contact Closure Interface1
- L4E/L7E2 Contact Closure Interface1 with Encoder Feedback Inputs
- L5 +24V AC/DC Interface
- L5E/L8E2 +24V AC/DC Interface with Encoder Feedback Inputs
- L6 115V AC Interface
- L6E/L9E2 115V AC Interface with Encoder Feedback Inputs

The user inputs are connected to the option board through TB3 (see Figure 2.1 for location). The L4, L5 and L6 options each have nine control inputs. The function of each input must be selected through programming as explained later in this section. The L4E/L7E, L5E/L8E and L6E/L9E2 options are similar to L4, L5 and L6 with the addition of encoder feedback inputs. Refer to Appendix A in Pub. 1336 PLUS – 5.3 for input impedance values.

The maximum and minimum wire size accepted by TB3 is 2.1 and 0.30mm$^2$ (14 and 22 AWG). Recommended torque for all terminals is 0.90-1.13 N-m (8-10 lb.-in.). Use Copper wire only.

### Digital Inputs

Digital inputs are connected at TB3.

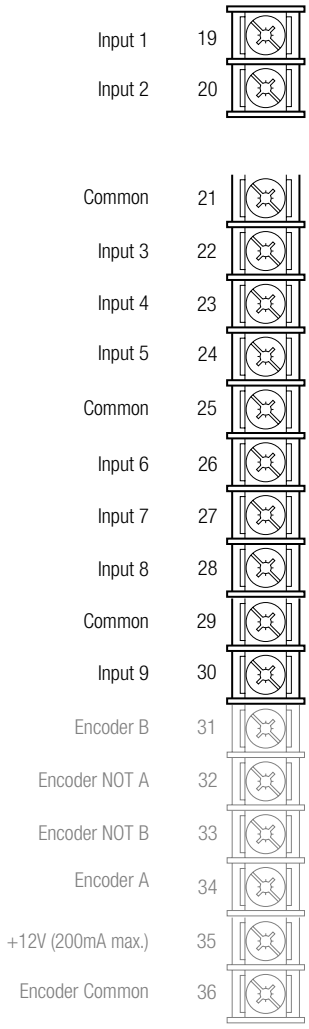
### Input Mode Select

A number of combinations are available by first programming [Input Mode] to the desired control scheme (i.e. 2-wire, 3-wire or Status). The remaining inputs can then be configured by programming [TB3 Term 22 Sel] through [TB3 term 28 Sel]. Refer to the Digital I/O parameter group in Chapter 6 of Pub. 1336 PLUS – 5.3 for programming information.

[1] *Uses internal +5V DC supply.*

[2] *The encoder loss detection feature of the 1336 PLUS II requires the use of L7E, L8E or L9E.*

## Digital I/O Default Settings – TB3




**Input Mode (Start/Stop Functions Only)**

| **Status**[2] (Factory Default) | **2-Wire Control** Single-Source Control | **3-Wire Control** Single-Source Reversing |
|---|---|---|
| Status | Run Forward | Start |
| Stop/Fault Reset[3] | Stop/Fault Reset[3] | Stop/Fault Reset[3] |

**Status Only**

Default Mode shown at right is not active when [Input Mode] is set to "Status"

**Individually Programmable Inputs**

| | |
|---|---|
| Common | |
| Rev/For[4] (Factory Default) | (programmable) |
| Jog (Factory Default) | (programmable) |
| Auxiliary[3] (Factory Default) | (programmable) |
| Common | |
| Speed Select 3[1] (Factory Default) | (programmable) |
| Speed Select 2[1] (Factory Default) | (programmable) |
| Speed Select 1[1] (Factory Default) | (programmable) |
| Common | |
| Enable[3] | (not programmable) |

Included on L4E/L7E, L5E/L8E & L6E/L9E[5]

[1] See Speed Select Table.

[2] If this mode is selected, the status of all inputs can be read at the [Input Status] parameter. However, only "Stop/Fault Reset" and "Enable" will have control function.

[3] These inputs must be present before drive will start.

[4] Bit 0 of [Direction Mask] must = 1 to allow TB3 direction change.

[5] The encoder loss detection feature of the 1336 PLUS II requires the use of L7E, L8E or L9E.

**ATTENTION:** Two-wire control uses maintained Run contacts that act as both Run (closed) and Stop (open) devices. Opening the Stop contact (terminal 20) will stop the drive. If this contact is reclosed, any fault will be reset. If a valid Start command is still present, the drive will restart.

If a three-wire device (i.e. HIM) is also used, pressing the HIM Stop key will also stop the drive. Releasing the Stop key will clear any faults that are present, but the drive will not restart without cycling the Start contact.

## Digital I/O Default Settings – TB3

**Available Functions for Inputs 3 through 8**

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

| Input | Description |
|---|---|
| 1st/2nd Accel<br>1st/2nd Decel | Closing these inputs (1st or 2nd Accel, 1st or 2nd Decel) commands the corresponding rate. If both inputs are open or both are closed, the current rate is maintained. |
| 1st/2nd Accel/Decel | Allows selection of the accel or decel time used by the drive. 1=2nd, 0=1st |
| Auxiliary | Faults the drive via external devices (i.e. motor thermoswitch, O.L. relays, etc.). Opening this contact will fault (F02 - Aux Fault) the drive and shut the output off, ignoring the programmed stop mode. |
| Clear Fault | If drive has faulted, closing this input will clear the fault. |
| Digital Pot (MOP) Up/Down | These inputs increase (up) or decrease (down) the drive commanded frequency when MOP (Motor Operated Potentiometer) is chosen as the frequency command source. The rate of increase/decrease is programmable. |
| Forward | Closing these inputs (Forward or Reverse) commands the corresponding direction. If both inputs are open or both are closed, the current direction is maintained. |
| Forward/Reverse | Available only with three-wire control - Closing this input commands reverse direction and opening this input commands forward direction. |
| Jog | Closing this input starts the drive and causes it to run at programmed jog frequency. Opening this input stops the drive using the programmed stop mode. |
| Line Loss | Closing this input gives exclusive control of drive logic to the inputs at terminal blockTB3. No other devices may issue logic commands (excluding Stop) to the drive. |
| Output Contactor Closed | Output contactor auxiliary contact indicates that the output contactor is closed. |
| Reverse | See "Forward" above. |
| PI Enable | Enables the output of the process PI loop. |
| PI Reset | Opening this input clamps the process PI integrator value at zero. Closing this input allows the integrator to continue to operate. |
| Run Reverse | Available only with two-wire control - Closing this input issues both a start command and a reverse command to the drive. Opening the input issues a stop command to the drive. |
| Speed Select 1, 2, 3 | These inputs choose the frequency command source for the drive. See following pages for details. |
| Stop Type | Closing this input selects the stop mode in [Stop Select 2] as the method of stopping when a stop command is issued. Opening this input selects the stop mode in [Stop Select 1] as the method of stopping. |
| Sync | Normally wired to multiple drives – When the Sync input is low, the drive operates normally. When the input is high, the speed of the drive will be held constant and the speed command will have no effect. During this period the speed input of the drive will normally be changed to a different source and/or value. Allows synchronized change of frequency command to multiple drives. |
| Traverse | Setting this input low disables the traverse function. When the input is high, the traverse function will be active. [Speed Control] must also be set to "P Jump" for the function to be active. |

**Important:** If a Control Interface Option is not installed, the [Input Mode] parameter must be set to “Status” (default) and jumpers must be installed. If the drive was shipped from the factory without the option, these jumpers will have been installed.

**Important:** The [Input Mode] and [TB3 Term 22-28 Sel] parameters can be changed at any time, but the change will not affect drive operation until power to the drive has been removed and bus voltage has decayed completely. When changing either parameter, it is important to note that the functions of the Start and Stop inputs will change when power is reapplied to the drive.

## Digital I/O Default Settings – TB3

The programming options of the Control Interface Option allow the user to select an input combination to meet the needs of a specific installation. The firmware will verify programming, to assure an appropriate combination has been selected.

### Speed Select/Frequency Reference

The drive speed command can be obtained from a number of different sources. The source is determined by drive programming and the condition of the Speed Select Inputs on TB3 (or reference select bits of command word if PLC controlled - Refer to Appendix A in Publication 1336 PLUS - 5.3).

The default source for a command reference (all speed select inputs open) is the selection programmed in [Freq Select 1]. If any of the speed select inputs are closed, the drive will use other parameters as the speed command source. Refer to the table below and the examples that follow.

**Speed Select Input State vs. Frequency Source**

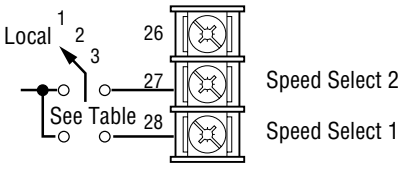
| Speed Select 3 | Speed Select 2 | Speed Select 1 | Frequency Source |
|---|---|---|---|
| Open | Open | Open | [Freq Select 1] |
| Open | Open | Closed | [Freq Select 2] |
| Accessed through [Freq Select 2] parameter | | | [Preset Freq 1] |
| Open | Closed | Open | [Preset Freq 2] |
| Open | Closed | Closed | [Preset Freq 3] |
| Closed | Open | Open | [Preset Freq 4] |
| Closed | Open | Closed | [Preset Freq 5] |
| Closed | Closed | Open | [Preset Freq 6] |
| Closed | Closed | Closed | [Preset Freq 7] |

**Important:** The final speed command may be affected by the type of modulation selected with [Speed Control], parameter 77.

### Example

Application is to follow a local HIM unless a preset speed is selected. The drive is programmed as follows:

- [Freq Select 1] = Adapter 1
- [Freq Select 2] = Preset Freq 1
- [Preset Freq 1] = 10 Hz.
- [Preset Freq 2] = 20 Hz.
- [Preset Freq 3] = 30 Hz.




Contact operation for the speed select switch is described in the table below. If the user does not select an input as Speed Select 3, [Preset Freq 4-7] would not be available.

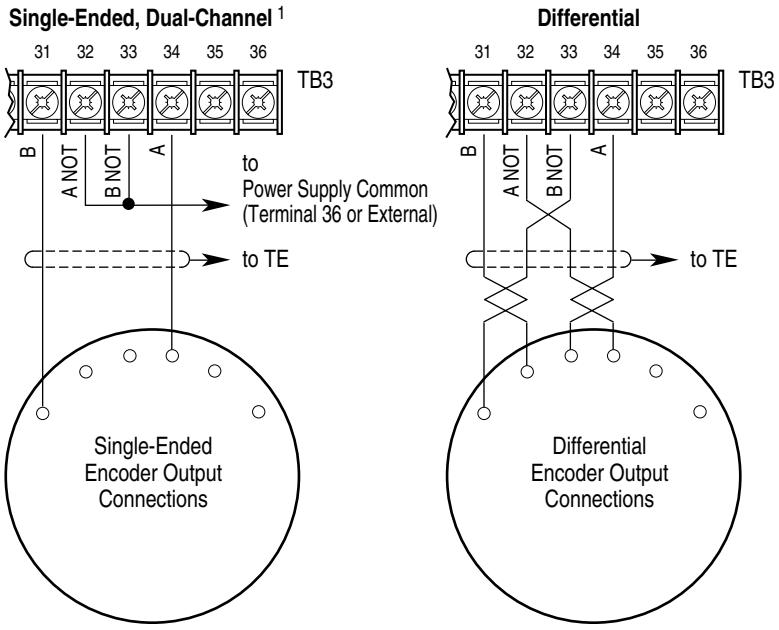
| Switch Position | Speed Select Input | | Parameter Used for Speed Ref. | Programmed Setting |
|---|---|---|---|---|
| | 1 (#28) | 2 (#27) | | |
| Local | Open | Open | [Freq Select 1] | Adapter 1 |
| 1 | Closed | Open | [Freq Select 2] | Preset Freq 1 |
| 2 | Open | Closed | [Preset Freq 2] | 20 Hz. |
| 3 | Closed | Closed | [Preset Freq 3] | 30 Hz. |

## Encoder Inputs

Encoders must be line driver type, quadrature or pulse, 5V DC or 8-15V DC output, single-ended or differential and capable of supplying a minimum of 10mA per channel. Maximum input frequency is 250 kHz.

Encoder inputs are available at TB3. The interface board is jumper selectable to accept a 5V TTL or 12V DC square-wave with a minimum high state voltage of 3.0V DC (TTL) or 7.0V DC (12 volt encoder). Maximum low state voltage is 0.4V DC.

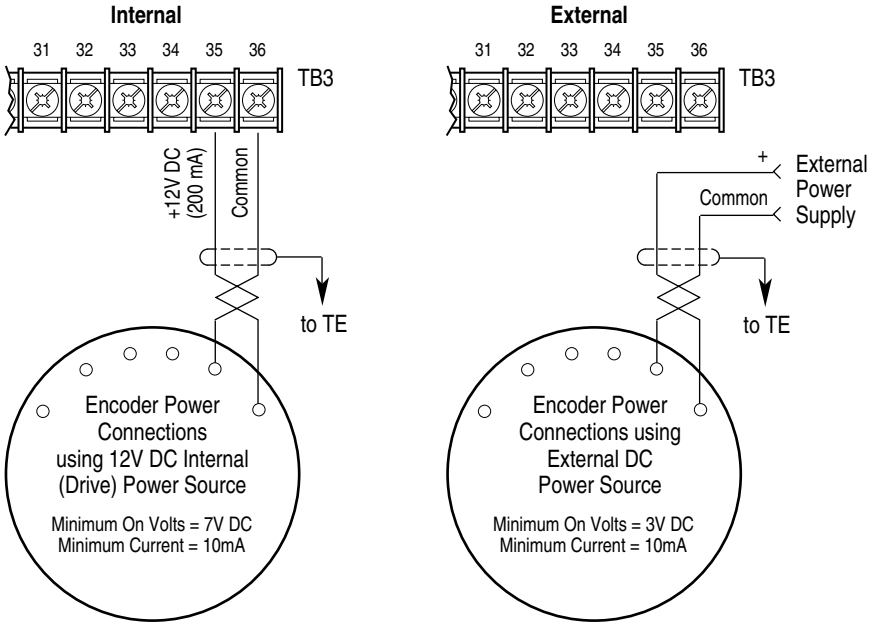
### Encoder Signal Wiring




1 For Single-Ended, Single-Channel (pulse) applications, eliminate the B and B (NOT) connections. Some encoders may label the "A" connection as "Signal."

**Important:** Correct direction of motor rotation as determined during start-up may require that the A **or** B channel wiring be reversed.

### Encoder Power Wiring




**Important:** Control Interface Board jumpers JP3 & JP4 must be set for the voltage level of the encoder output.

## Pulse Input/Output Option

### Pulse Input

The pulse input signal must be an externally powered square-wave pulse at a 5V TTL logic level. As measured at the terminal block, circuits in the high state must generate a voltage between 3.6 and 5.5V DC at 8 mA. Circuits in the low state must generate a voltage between 0.0 and 0.8V DC. Maximum input frequency is 250kHz. Scale factor [Pulse/Enc Scale] must be set.

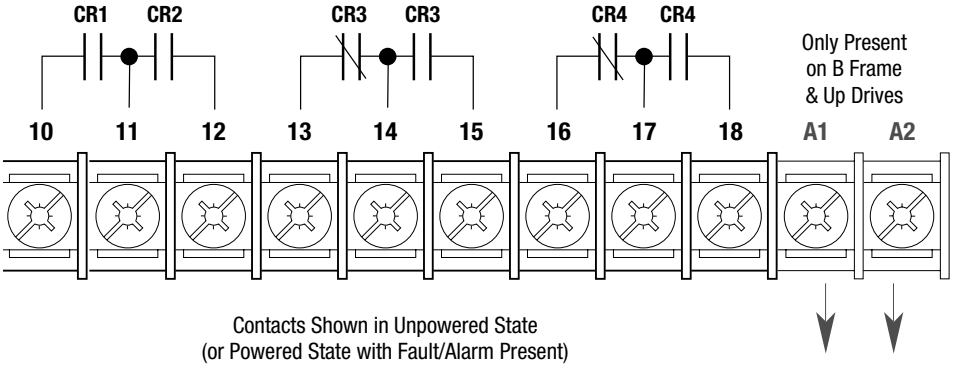
**ATTENTION:** If input voltages are maintained at levels above ±12V DC, signals may be degraded and component damage may result.

### Pulse Output

Provides a TTL pulse train suitable for driving up to three 1336 PLUS II pulse inputs or a separate 125-ohm load at TTL levels (4V at 32 mA source, 0.8V at 3.2 mA sink).

The digital outputs are at terminals 10 through 18 of TB2.

## Digital Outputs – TB2

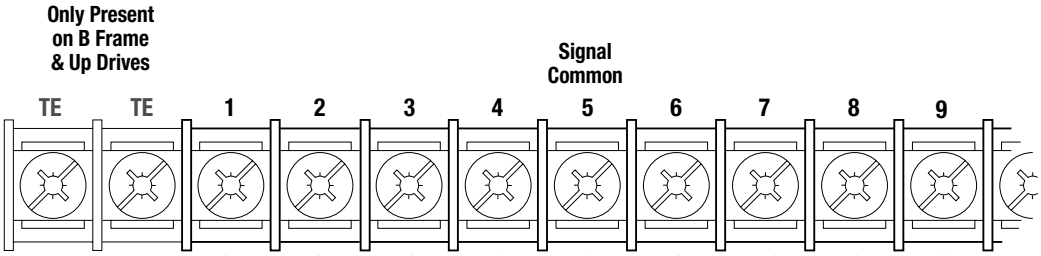



| Terminal | Signal | |
|---|---|---|
| TE | True Earth - Shield Termination | |
| 10, 11 | CR1 Programmable Contact | |
| 11, 12 | CR2 Programmable Contact | |
| 13, 14<br>14, 15 | CR3 Programmable Contact | Resistive Rating = 115V AC/30V DC, 5.0A<br>Inductive Rating = 115V AC/30V DC, 2.0A |
| 16, 17<br>17, 18 | CR4 Programmable Contact | |
| A1, A2 | Reserved for Future Use | |

## Analog Inputs/Outputs

The 1336 PLUS II analog I/O configuration provides a standard set of inputs and outputs with the capability to install up to 2 option boards, thus replacing the standard I/O with a variety of options. All connections are performed at TB2. Installing an option board in the slot A or B location will change the function of those terminals on TB2 from standard. Only one option board can be installed in each slot. The standard and optional I/O configurations are shown below.

Analog I/O – TB2




| | TE | TE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Std.** | Pot. Reference +5V [1] | | Single-Ended Input 0 Pot., 10V or 20mA | | Single-Ended Input 1 Pot., 10V or 20mA | | Signal Common | | | | |
| | **or (select 1)** | | | | | | | | | | |
| **LA2** | Isolated Input 0 (+) 10V or 20mA | | Isolated Input 0 (±) 10V or 20mA | | Isolated Input 1 (+) 10V or 20mA | | Isolated Input 1 (±) 10V or 20mA | | | | |
| **LA6** | Isolated Input 0 (+) ±10V, ±20mA | | Isolated Input 0 (±) ±10V, ±20mA | | Thermistor Isolated Input (+) | | Thermistor Isolated Input (±) | | | | |
| **LA7** | Isolated Input 0 (+) ±10V, ±20mA | | Isolated Input 0 (±) ±10V, ±20mA | | Isolated Input 1 (+) 10V or 20mA | | Isolated Input 1 (±) 10V or 20mA | | | | |

**Analog I/O Option Slot A**

SIGNAL COMMON

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **Std.** | Single-Ended Input 2 Pot., 10V or 20mA | | Single Ended Output 0 0-10V Only | | Single Ended Output 1 0-10V Only | | Signal Common | | |
| | **or (select 1)** | | | | | | | | |
| **LA1** | Single-Ended Input 2 [2] Pot., 10V or 20mA | | Single-Ended Output 0 10V or 20mA | | Single-Ended Output 1 20mA Only | | 0-20mA Output Return | | |
| **LA3** | Isolated Output 0 (+) 10V or 20mA | | Isolated Output 0 (±) 10V or 20mA | | Isolated Output 1 (+) 10V or 20mA | | Isolated Output 1 (±) 10V or 20mA | | |
| **LA4** | Isolated Input 2 (+) 10V or 20mA | | Isolated Input 2 (±) 10V or 20mA | | Isolated Output 1 (+) 10V or 20mA | | Isolated Output 1 (±) 10V or 20mA | | |
| **LA5** | Single-Ended Output 0 10V or 20mA | | Non-Isolated 250 kHz Pulse Output | | Isolated 250 kHz Pulse In (+) | | Isolated 250 kHz Pulse In (±) | | |

**Analog I/O Option Slot B**

1 If an Option Board is installed in Slot A, the +5V pot. reference will not be available. If a 5V source is required, it must be user supplied.

2 Standard Analog Input 2 is maintained at this terminal ± configure with J11.

## Analog Inputs/Outputs

All isolated I/O is designed with full galvanic (greater than 10 meg ohms, less than 50 pf) isolation. This results in an insulation withstand capability of 200V AC from each channel to True Earth (TE) ground and between channels. The Analog I/O Option Boards are summarized below.

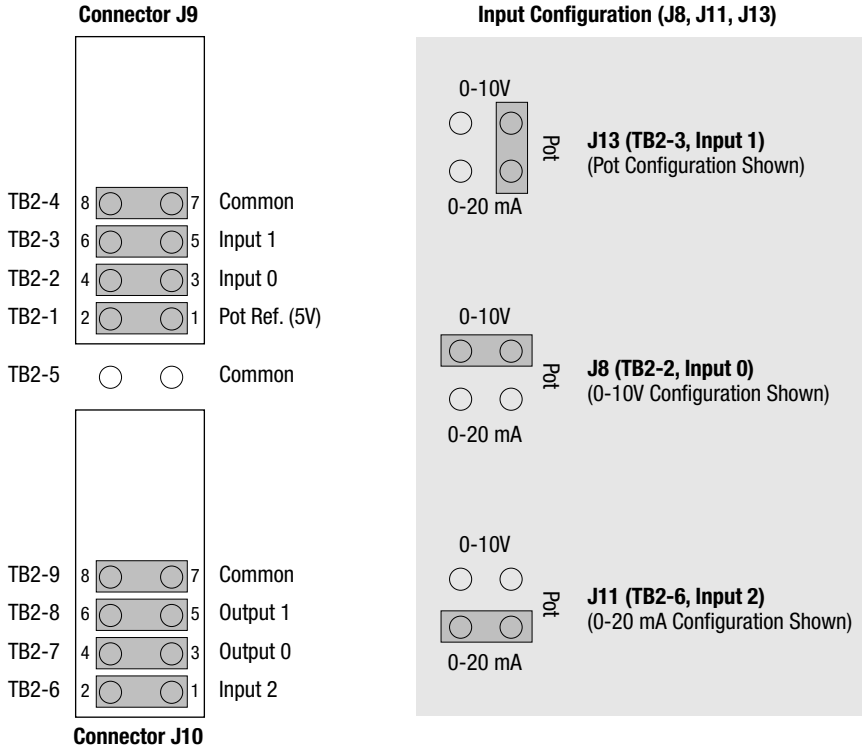
| Option | Board Type | Slot | Description |
|---|---|---|---|
| **LA1 (LA1C)**[2] | Dual Analog Output | B | This option replaces both standard analog outputs with two single-ended high resolution analog outputs. Analog Output 0 is configurable to 0-10V or 0-20 mA operation while Analog Output 1 is for 0-20 mA operation only. This option maintains access to the standard (non-isolated) Analog Input 2 through TB2-6 – Configuration remains with jumper J11. |
| **LA2 (LA2C)**[2] | Dual Isolated Input | A | This option replaces the two standard analog inputs with two galvanically isolated analog inputs. Both analog input channels are configurable for 0-10V or 0-20 mA operation. |
| **LA3 (LA3C)**[2] | Dual Isolated Output | B | Replaces Analog Input 2 and both standard analog outputs with two galvanically isolated high resolution analog outputs. Both analog output channels are configurable for 0-10V or 0-20 mA operation. |
| **LA4 (LA4C)**[2] | Isolated Input/ Isolated Output | B | This option replaces Analog Input 2 and both standard analog outputs with a galvanically isolated analog input and a galvanically isolated high resolution analog output. Both analog channels are configurable for 0-10V or 0-20 mA operation. |
| **LA5 (LA5C)**[2] | Analog Output/Pulse Output/Pulse Input | B | This option replaces Analog Input 2 and both standard analog outputs with a single-ended high resolution analog output, a single-ended 5V pulse output, and galvanically isolated 5V pulse input. The analog output channel is configurable for 0-10V or 0-20 mA operation. |
| **LA6**[1] **(LA6C)**[2] | Isolated Bipolar/ Isolated Thermistor Input | A | This option replaces the two standard analog inputs with agalvanically isolated analog input and a galvanically isolated thermistor input. Analog Input 0 is configurable for ±10V or ±20 mA operation, with polarity determining forward or reverse operation. Analog Input 0 is suitable for use with PTC sensor chains with a maximum total resistance at normal operating temperature of 1.8k ohms. An indication occurs in short circuit or over-temperature conditions. A short circuit condition is when the total resistance of the sensor chain is less than 60 ohms with reset from the short circuit condition occurring when the resistance exceeds 70 ohms. An over-temperature condition is when the total resistance of the sensor chain exceeds 3.3k ohms with reset from the over-temperature condition occurring when the resistance is less than 2.2k ohms. |
| **LA7**[1] **(LA7C)**[2] | Isolated Bipolar Input/Isolated Input | A | This option replaces the two standard analog inputs with two galvanically isolated analog inputs. Analog Input 0 is configurable for ±10V or ±20 mA operation, with polarity determining forward or reverse operation, while Analog Input 1 is configurable for 0-10V or 0-20 mA operation. |

[1] *If a bi-polar input option (LA6 or LA7) is installed, the signal is designated "Analog Input 0." Note the following:*
*3-Wire Control – If [Input Mode] is set to "3 Wire" and the bi-polar input is selected as the active frequency reference [Freq Select 1 or 2], it is assumed that direction control is desired via analog polarity. If another source has control of direction, a "Bipolar Direction" fault (F16) will occur. If direction control via polarity is not required, bit 7 of [Direction Mask] should be set to "0". This causes the input to be treated as a 0-10V frequency reference only. Negative analog signals are treated as zero and direction control must come from another source.*
*2-Wire Control – If [Input Mode] is set to "2 Wire," it is assumed that direction control is provided via the 2 wire inputs (Run Forward and Run Reverse). Bit 7 of [Direction Mask] must be set to "0". This causes the input to be treated as a 0-10V frequency reference only. Negative analog signals are treated as zero. Failure to set the Mask will generate a "Bipolar Direction" (F16) fault.*

[2] *Packaged Drives Program options which are typical of North America. Other locations should contact their local Rockwell Automation office for availability of similar poroduct.*

## Standard Analog I/O Setup

The 1336 PLUS II has a series of jumpers to connect the standard I/O to TB2 when no analog options (LA1, LA2, etc.) are present. Connectors J9 and J10 (see below) each have four jumpers connecting pins 1-2, 3-4, 5-6 and 7-8. These jumpers must be in place for the inputs and outputs to be active at TB2.




In addition, each input can be configured (see figure above) for 0-10V, 0-20 mA or potentiometer. Placing a jumper across the top of the connector configures that input for 0-10V operation. The bottom provides 0-20 mA and the right-side provides potentiometer operation.

### Analog Option Board Installation and Removal

If the drive is not factory configured with Analog Options (LA1, LA2, etc.), the desired option boards can be user installed. Prior to installation, the jumpers at J9 and/or J10 must be removed. If a board is removed at a later time, the jumpers must be reinstalled. Refer to the detailed instructions supplied with the option boards.

## 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 meters (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 less than or equal to 15 mils (0.4mm/0.015 in.).

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 both the drive ground (drive end) and motor frame ground (motor end). The connection must 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 end.

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 is grounded at the cabinet entrance, shielded cable should be used within the cabinet if power leads will be run close to control signals.

In some hazardous environments it is not permissible to ground both ends of the cable armor because of the possibility of high current circulating at the input frequency if the ground loop is cut by a strong magnetic field. This only applies in the proximity of powerful electrical machines. In such cases, consult factory for specific guidelines.

### Conduit

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

- 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 ground (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.
- 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 previously described 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 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 IN METERS (FEET) - 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 | 1600V or 1329R/L (1850V) | 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* [6] | 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) | 91.4 (300) | 91.4 (300) | | | | 30.5 (100) | 61.0 (200) | 30.5 (100) | 61.0 (200) | 91.4 (300) | 22.9 (75) | 182.9 (600) |
| | 0.75 (1) | 0.75 (1) | 12.2 (40) | 33.5 (110) | 91.4 (300) | 91.4 (300) | | | | 30.5 (100) | 30.5 (100) | 30.5 (100) | 30.5 (100) | 91.4 (300) | 22.9 (75) | 182.9 (600) |
| | | 0.37 (0.5) | 12.2 (40) | 33.5 (110) | 91.4 (300) | 91.4 (300) | | | | 30.5 (100) | 61.0 (200) | 30.5 (100) | 61.0 (200) | 91.4 (300) | 22.9 (75) | 182.9 (600) |
| | 1.2 (1.5) | 1.2 (1.5) | 12.2 (40) | 33.5 (110) | 91.4 (300) | 91.4 (300) | | | | 30.5 (100) | 30.5 (100) | 61.0 (200) | 61.0 (200) | 91.4 (300) | 22.9 (75) | 182.9 (600) |
| | | 0.75 (1) | 12.2 (40) | 33.5 (110) | 91.4 (300) | 91.4 (300) | | | | 30.5 (100) | 30.5 (100) | 61.0 (200) | 61.0 (200) | 91.4 (300) | 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) | 121.9 (400) | 22.9 (75) | 182.9 (600) |
| A2 | 1.5 (2) | 1.5 (2) | 7.6 (25) | 12.2 (40) | 91.4 (300) | 91.4 (300) | 91.4 (300) | 91.4 (300) | 91.4 (300) | 30.5 (100) | 30.5 (100) | 91.4 (300) | 61.0 (200) | 91.4 (300) | 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) | 91.4 (300) | 91.4 (300) | 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) | 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) | | 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 | 5.5-15 (7.5-20) | 5.5-15 (7.5-20) | 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 | 11-22 (15-30) | 11-22 (15-30) | 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 | 187-336 (250-450) | 187-336 (250-450) | 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 | 187-448 (X250-600) | 187-448 (250-600) | 18.3 (60) | 53.3 (175) | 114.3 (375) | | 182.9 (600) | 182.9 (600) | 182.9 (600) | | | | | | 182.9 (600) | 182.9 (600) |

**Use 1204-TFA1** (spans the A or B and 1329 Cable Type columns)

**Use 1204-TFB2** (spans the Cable Type columns)

**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.

**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/L Motors:** These AC Variable Speed motors are "Control-Matched" for use with Allen-Bradley Drives. Each motor is designed to meet or exceed the requirements of the Federal Energy Act of 1992. All 1329R/L 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 IN METERS (FEET) - 500V-600V DRIVES [4]**

| | | | No External Devices | | | w/1204-TFB2 Terminator | | | w/1204-TFA1 Terminator | | | Reactor at Drive [2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Motor | | | Motor | | | Motor | | | Motor | | |
| | | | A | B | 1329R/L[5] | A | B | 1600V or 1329R/L[5] (1850V) | A | B | 1600V or 1329R/L[5] (1850V) | A | B | 1600V or 1329R/L[5] (1850V) |
| **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 | NA | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | NA | | | |
| | | 0.37 (0.5) | NR | NR | NA | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | 1.5 (2) | 1.5 (2) | NR | NR | NA | NR | NA | 335.3 (1100) | NR | 61.0 (200) | NA | | | |
| | | 1.2 (1.5) | NR | NR | NA | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | | 0.75 (1) | NR | NR | 182.9 (600) | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | | 0.37 (0.5) | NR | NR | 182.9 (600) | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | 2.2 (3) | 2.2 (3) | NR | NR | NA | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | NA | | | |
| | | 1.5 (2) | NR | NR | NA | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | NA | | | |
| | | 0.75 (1) | NR | NR | 182.9 (600) | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | | 0.37 (0.5) | NR | NR | 182.9 (600) | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | 3.7 (5) | 3.7 (5) | NR | NR | NA | NR | 182.9 (600) | NA | NR | 61.0 (200) | NA | | | |
| | | 2.2 (3) | NR | NR | NA | NR | 182.9 (600) | NA | NR | 61.0 (200) | NA | | | |
| | | 1.5 (2) | NR | NR | 182.9 (600) | NR | 182.9 (600) | NA | NR | 61.0 (200) | NA | | | |
| | | 0.75 (1) | NR | NR | 182.9 (600) | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | | 0.37 (0.5) | NR | NR | 182.9 (600) | NR | 182.9 (600) | 335.3 (1100) | NR | 61.0 (200) | 182.9 (600) | | | |
| | 5.5-15 (7.5-20) | 5.5-15 (7.5-20) | NR | 9.1 (30) | 182.9 (600) | 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) | 182.9 (600) | 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) | 182.9 (600) | 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) | 182.9 (600) | 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** | 261-298 (350-400) | 261-298 (350-400) | NR | 9.1 (30) | 182.9 (600) | 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) | 182.9 (600) | 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) |

**Not Recommended**

NR = *Not Recommended*
NA = *Not Available at time of printing*

[1] *Values shown are for 480V nominal input voltage, drive carrier frequency of 2 kHz and ambient temperature at the motor of 40°C. 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] *When used on 600V systems, 1329R or 1329L motors have a corona inception voltage rating of approximately 1850V.*

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

## Output Devices

### Drive Output Disconnection

**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.

### Common Mode Cores

Common Mode Cores will help reduce the common mode noise at the drive output and guard against interference with other electrical equipment (programmable controllers, sensors, analog circuits, etc.). In addition, reducing the PWM carrier frequency will reduce the effects and lower the risk of common mode noise interference. Refer to the table below.

**1336 PLUS Common Mode Chokes**

| Catalog Number | Used with . . . | Description |
|---|---|---|
| 1321-M001 | Communications Cables, Analog Signal Cables, etc. | Open Style - Signal Level |
| 1321-M009 | All 1336 PLUS Drives Rated:<br>480V, 0.37-3.7 kW (0.5-5 HP) | Open Style with Terminal Block, 9A |
| 1321-M048 | All 1336 PLUS Drives Rated:<br>480V, 5.5-22 kW (7.5-30 HP)<br>600V, 5.5-30 kW (7.5-40 HP) | Open Style, 48A |
| 1321-M180 | All 1336 PLUS Drives Rated:<br>480V, 30-112 kW (40-X150 HP)<br>600V, 37-93 kW (50-125 HP) | Open Style, 180A |
| 1321-M670 | All 1336 PLUS Drives Rated:<br>480V, 112-448 kW (150-600 HP)<br>600V, 149-448 kW (200-600 HP) | Open Style, 670A |

## Cable Termination

### 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-inverter duty motors or any motor with exceptionally long leads may require an output filter or cable terminator. A filter or terminator will help limit reflection to the motor, to levels which are less than the motor insulation rating.

The tables on pages **52** and **53** list the maximum recommended cable length for unterminated cables, since the voltage doubling phenomenon occurs at different lengths for different drive ratings. If your installation requires longer motor cable lengths, a reactor or cable terminator is recommended. Also, refer to these tables for frequency, cable length and voltage restrictions of 1204-TFA1 or 1204-TFB2 terminators.

### Optional Output Reactor

Bulletin 1321 Reactors listed in the 1336 PLUS-3.0 Price Sheet 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.

## User Supplied Enclosures

1336 PLUS II drives installed in user supplied enclosures may be mounted within an enclosure or may be mounted to allow the heatsink to extend outside the enclosure. Use the following information in combination with the enclosure manufacturer's guidelines for sizing.

## User Supplied Enclosures

| Cat No. | Base Derate Amps [1] | Derate Curve [2, 3] | Heat Dissipation Drive Watts [2, 3, 4] | Heatsink Watts [2] | Total Watts [2] |
|---|---|---|---|---|---|
| **200-240V DRIVES** | | | | | |
| AQF05 | 2.3 | Figure A | 13 (9) | 15 (11) | 28 (20) |
| AQF07 | 3.0 | Figure A | 15 (11) | 21 (15) | 36 (26) |
| AQF10 | 4.5 | Figure A | 17 (12) | 32 (23) | 49 (35) |
| AQF15 | 6.0 | Figure A | 21 (15) | 42 (30) | 63 (46) |
| AQF20 | 8.0 | Figure A | 25 (18) | 56 (40) | 81 (59) |
| AQF30 | 12 | Figure A | 33 (24) | 72 (52) | 105 (76) |
| AQF50 | 18 | Figure A | 42 (30) | 116 (84) | 158 (114) |
| AQF75 | 22 | Figure A | 58 | 186 | 244 |
| A007 | 27 | No Derate | 156 | 486 | 642 |
| A010 | 34 | Figure B | 200 | 721 | 921 |
| A015 | 48 | Figure D | 205 | 819 | 1024 |
| A020 | 65 | No Derate | 210 | 933 | 1143 |
| A025 | 77 | No Derate | 215 | 1110 | 1325 |
| A030 | 80 | No Derate | 220 | 1110 | 1330 |
| A040 | 120 | Figure G | 361 | 1708 | 2069 |
| A050 | 150 | Figure H | 426 | 1944 | 2370 |
| A060 | 180 | Figure J | 522 | 2664 | 3186 |
| A075 | 240 | Figure L | 606 | 2769 | 3375 |
| A100 | 291 | Figure M | 755 | 3700 | 4455 |
| A125 | 325 | Figure N | 902 | 4100 | 5002 |
| **380-480V DRIVES** | | | | | |
| BRF05 | 1.2 | Figure A | 12 | 9 | 21 |
| BRF07 | 1.7 | Figure A | 13 | 15 | 28 |
| BRF10 | 2.3 | Figure A | 15 | 20 | 35 |
| BRF15 | 3.0 | Figure A | 16 (12) | 27 (21) | 43 (33) |
| BRF20 | 4.0 | Figure A | 19 (15) | 36 (28) | 55 (43) |
| BRF30 | 6.0 | Figure A | 23 (18) | 54 (42) | 77 (60) |
| BRF50 | 9.0 | Figure A | 29 (23) | 84 (65) | 113 (88) |
| BRF75 | 15.4 | Figure A | 58 | 186 | 244 |
| BRF100 | 22.0 | Figure A | 68 | 232 | 300 |
| BRF150 | 24.0 | Figure A | 88 | 332 | 420 |
| BRF200 | 27.0 | Figure A | 96 | 356 | 452 |
| B015 | 27 | No Derate | 117 | 486 | 603 |
| B020 | 34 | Figure B | 140 | 628 | 768 |
| B025 | 42 | Figure C | 141 | 720 | 861 |
| B030 | 48 | Figure D | 141 | 820 | 961 |
| BX040 | 59 | Figure E | 175 | 933 | 1108 |
| B040 | 65 | Figure E | 175 | 933 | 1108 |
| B050 | 77 | Figure F | 193 | 1110 | 1303 |
| BX060 | 77 | Figure F | 193 | 1110 | 1303 |
| B060 | 96 | No Derate | 361 | 1708 | 2069 |
| B075 | 120 | Figure G | 361 | 1708 | 2069 |
| B100 | 150 | Figure H | 426 | 1944 | 2370 |
| B125 | 180 | Figure J | 522 | 2664 | 3186 |
| BX150 | 180 | Figure J | 606 | 2769 | 3375 |
| B150 | 240 | Figure L | 606 | 2769 | 3375 |
| B200 | 292 | Figure M | 755 | 3700 | 4455 |
| B250 | 325 | Figure N | 902 | 4100 | 5002 |
| BP/BPR250 [6] | 322 | Figure O | 491 | 4658 | 5149 |
| BX250 | 360 | No Derate | 902 | 4100 | 5002 |
| B300 [5] | 425 | No Derate | 1005 | 4805 | 5810 |
| BP/BPR300 [6] | 357 | Figure P | 619 | 5342 | 5961 |
| B350 [5] | 475 | No Derate | 1055 | 5455 | 6510 |
| BP/BPR350 [6] | 421 | Figure Q | 733 | 6039 | 6772 |
| B400 [5] | 525 | No Derate | 1295 | 6175 | 7470 |
| BP/BPR400 [6] | 471 | Figure R | 793 | 6329 | 7122 |
| B450 [5] | 590 | No Derate | 1335 | 6875 | 8210 |
| BPBPR450 [6] | 527 | Figure S | 931 | 7000 | 7931 |
| B500 [5] | 670 | Figure T | 1395 | 7525 | 8920 |
| B600 [5] | 670 | Figure T | 1485 | 8767 | 10252 |
| **500-600V DRIVES** | | | | | |
| CWF10 | 2.4 | Figure U | 25 | 29 | 54 |
| CWF20 | 4.8 | Figure U | 29 | 57 | 86 |
| CWF30 | 7.2 | Figure U | 32 | 87 | 119 |
| CWF50 | 9.6 | Figure U | 35 | 117 | 152 |
| CWF75 | 10 | Figure U | 38 | 148 | 186 |
| CWF100 | 12 | Figure U | 41 | 177 | 218 |
| CWF150 | 19 | Figure U | 52 | 286 | 338 |
| CWF200 | 24 | Figure U | 60 | 358 | 418 |
| C025 | 30 | No Derate | 141 | 492 | 633 |
| C030 | 35 | No Derate | 141 | 526 | 667 |
| C040 | 45 | No Derate | 175 | 678 | 853 |
| C050 | 57 | No Derate | 193 | 899 | 1092 |
| C060 | 62 | No Derate | 193 | 981 | 1174 |
| C075 | 85 | Figure G | 361 | 1533 | 1894 |
| C100 | 109 | Figure I | 426 | 1978 | 2404 |
| C125 | 138 | Figure K | 522 | 2162 | 2683 |
| C150 | 168 | Figure V | 606 | 2315 | 2921 |
| C200 | 252 | Figure W | 755 | 3065 | 3820 |
| C250 | 284 | Figure X | 890 | 3625 | 4515 |
| CX300 | 300 | Figure Y | 940 | 3990 | 4930 |
| C300 [5] | 300 | Figure AB & AC | 926 | 5015 | 5941 |
| C350 [5] | 350 | Figure AB & AC | 1000 | 5935 | 6935 |
| CP/CPR350 | 350 | Figure Z | 580 | 6125 | 6705 |
| C400 [5] | 400 | Figure AB & AC | 1430 | 7120 | 8550 |
| CP/CPR400 | 400 | Figure AA | 711 | 7000 | 7711 |
| C450 [5] | 450 | Figure AB & AC | 1465 | 8020 | 9485 |
| C500 [5] | 500 | Figure AB & AC | 1500 | 8925 | 10425 |
| C600 [5] | 600 | Figure AB & AC | 1610 | 10767 | 12377 |

(parenthesis) in table indicates Series C drive ratings.

[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 AE.**

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

[3] Drive Ambient Temperature Rating is 40° C. If ambient exceeds 40° C, the drive must be derated. **Refer to Figure A-AC.**

[4] 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 AD.**

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

[6] **Important:** 1336F-BPRxxx drives require two (2) fans capable of producing greater than 450 CFM, if an open type drive is mounted in a user supplied enclosure.

## Derating Guidelines

Drive ratings can be affected by a number of factors. If more than one factor exists, derating percentages must be multiplied. For example, if a 14 Amp drive (B007) is installed at a 2,000 m (6,600 ft.) altitude **and** has a 2% high input line voltage, the actual amp rating will be:

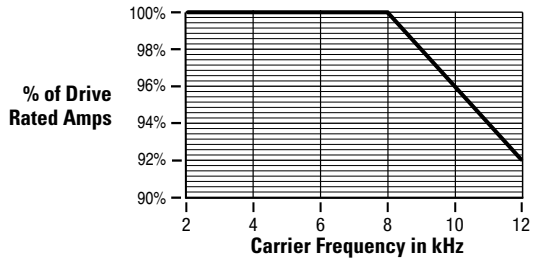
14 X 94% **Altitude Derate** X 96% **High Line Derate** = 12.6 Amps.

## Ambient Temperature/Carrier Frequency

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.

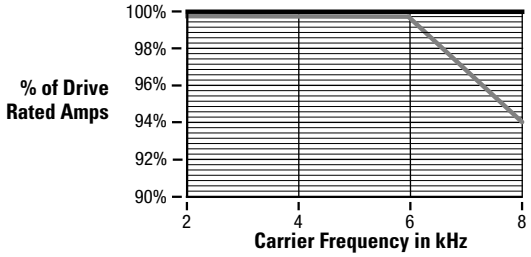
### Figure A

**1336F-AQF05-AQF75 and BRF05-BRF200**



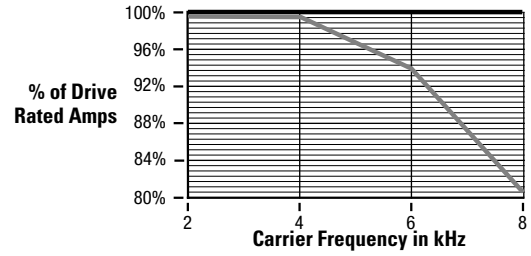

### Figure B

**1336F-A010 and B020**



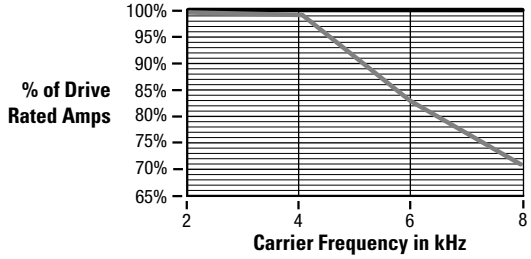

### Figure C

**1336F-B025**



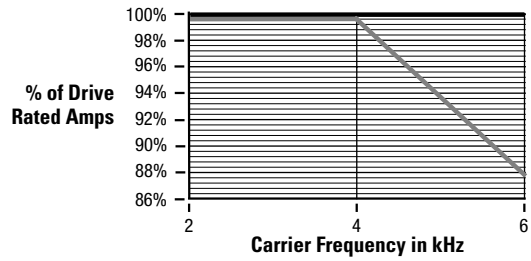

### Figure D

**1336F-A015 and B030**




### Figure E

**1336F-B040 and BX040**

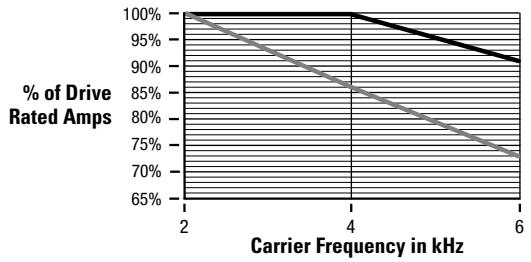


## Derating Guidelines

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.

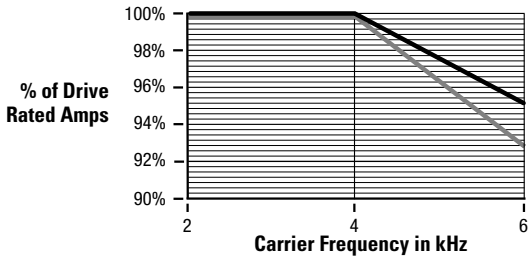
### Figure F

**1336F-B050 and BX060**



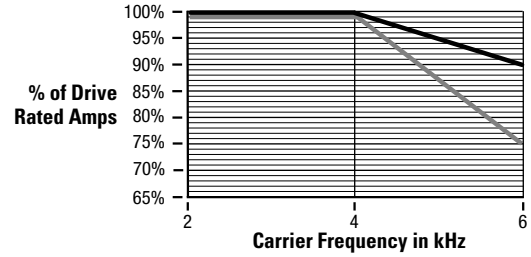

### Figure G

**1336F-A040, B075, C075**



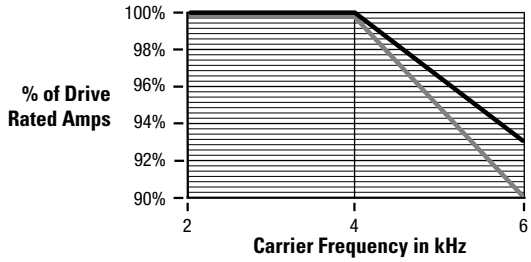

### Figure H

**1336F-A050, B100**



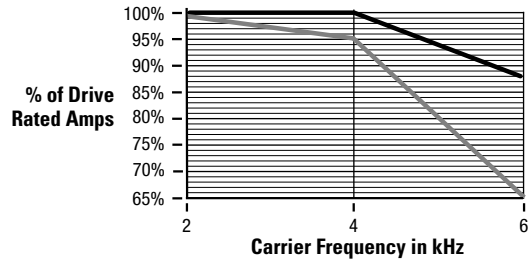

### Figure I

**1336F-C100**



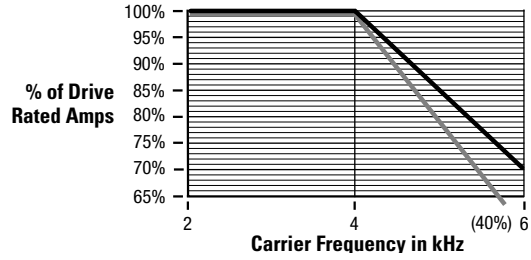

### Figure J

**1336F-A060, B125, BX150**




### Figure K

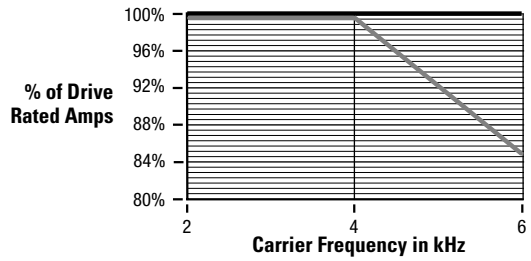
**1336F-C125**



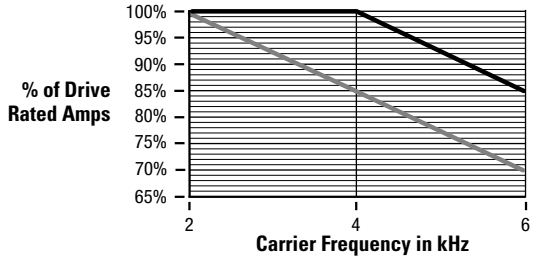
## Derating Guidelines

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.

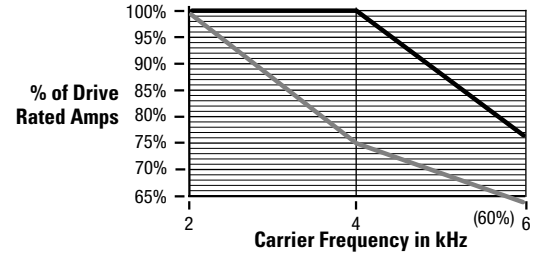
### Figure L
**1336F-A075, B150**



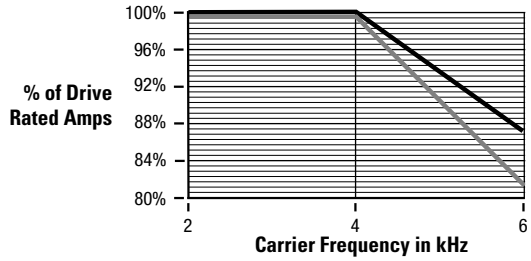

### Figure M
**1336F-A100, B200**



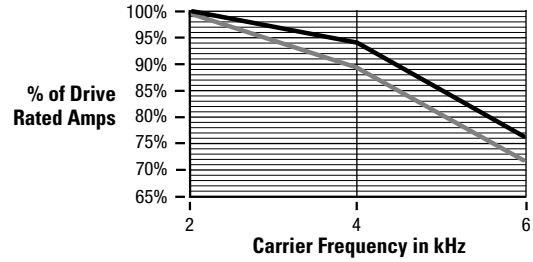

### Figure N
**1336F-A125, B250**



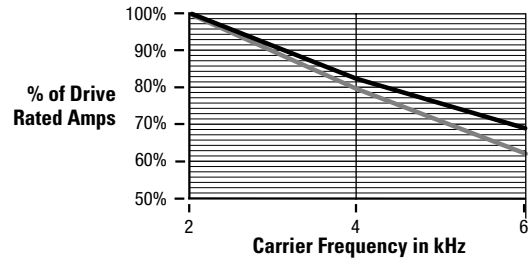

### Figure O
**1336F-BP250, BPR250**




### Figure P
**1336F-BP300, BPR300**




### Figure Q
**1336F-BP350, BPR350**

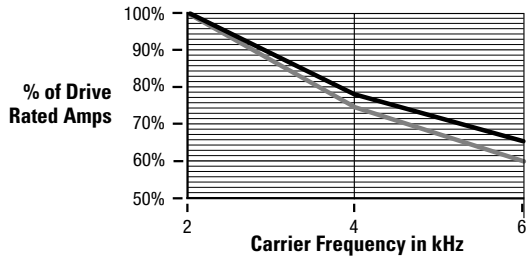


## Derating Guidelines

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.

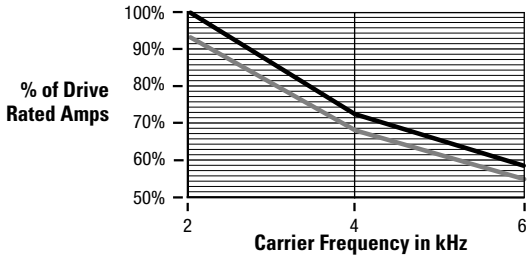
### Figure R

**1336F-BP400, BPR400**




### Figure S

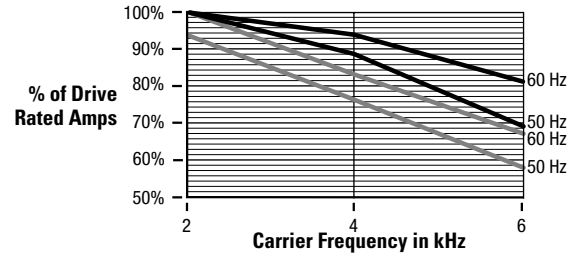
**1336F-BP450, BP450**




### Figure T

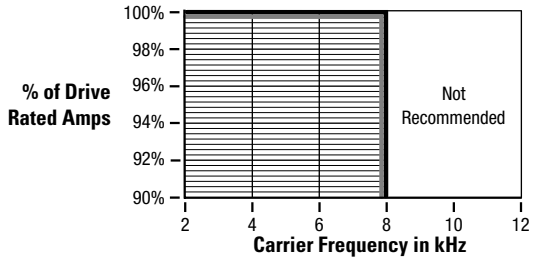
**1336F-B500 and B600**

*Assumes two (2) 725 CFM cooling fans for IP 20 (NEMA Type 1) enclosure*



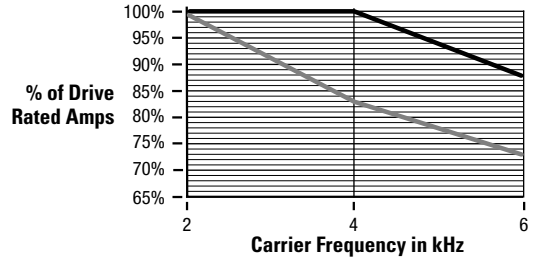

### Figure U

**1336F-CWF10 through CWF200**



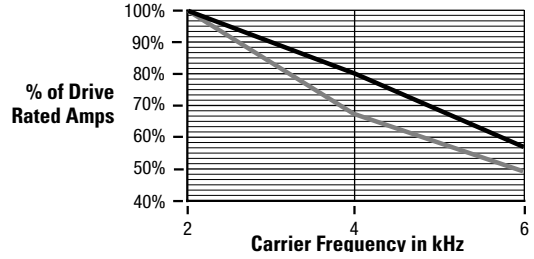

### Figure V

**1336F-C150**




### Figure W

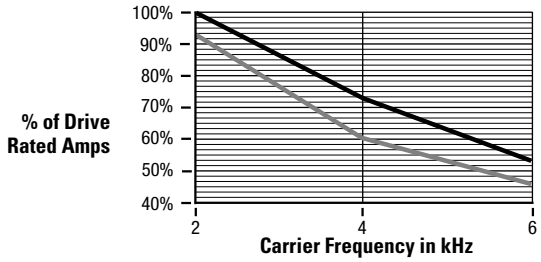
**1336F-C200**



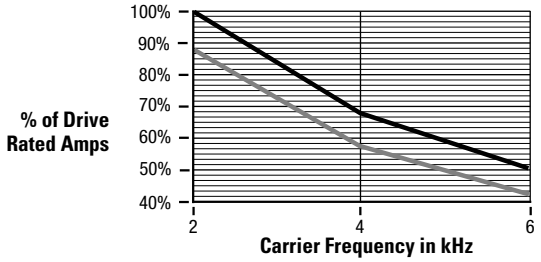
## Derating Guidelines

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.

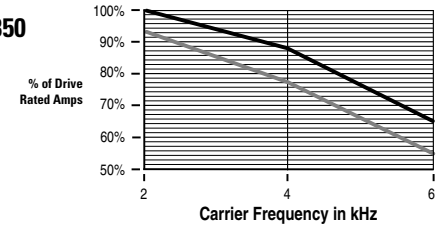
### Figure X
**1336F-C250**



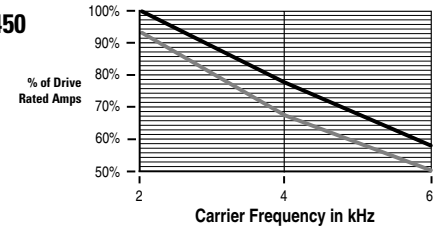

### Figure Y
**1336F-CX300**



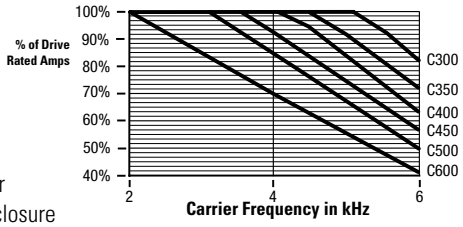

### Figure Z
**1336F-CP350, CPR350**



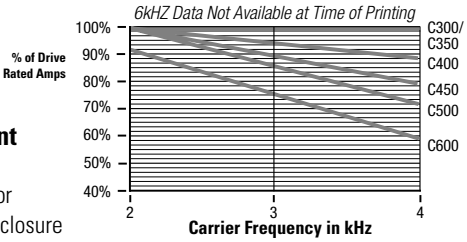

### Figure AA
**1336F-CP400, CPR450**




### Figure AB
**1336F-C300 through C600 Enclosed Drive in 40˚ C Ambient**
Assumes two (2) 725 CFM cooling fans for IP 20 (NEMA Type 1) enclosure

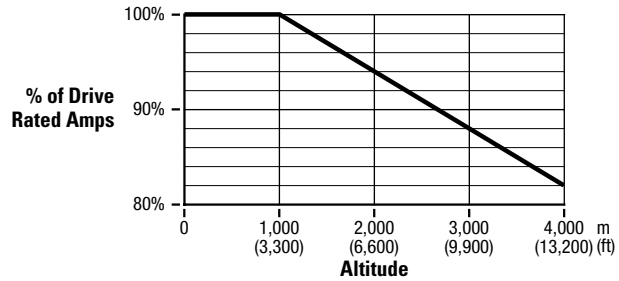



### Figure AC
**1336F-C300 through C600 Enclosed Drive in 41˚- 50˚ C Ambient**
Assumes two (2) 725 CFM cooling fans for IP 20 (NEMA Type 1) enclosure

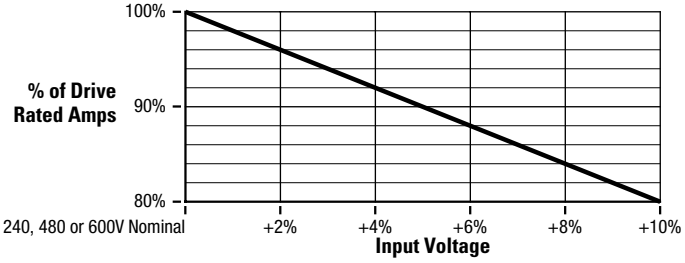



## Altitude/High Input Voltage

### Figure AD
**Altitude – All Drive Ratings**

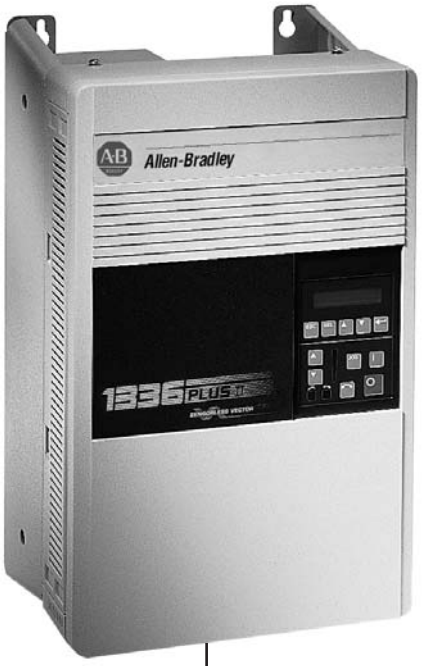



### Figure AE
**High Input Voltage Required Only for the following drives:**
1336F-x025 – 18.5 kW (25 HP) at 8 kHz
1336F-x030 – 22 kW (30 HP) at 6 or 8 kHz
1336F-x060 – 45 kW (60 HP) at 6 kHz

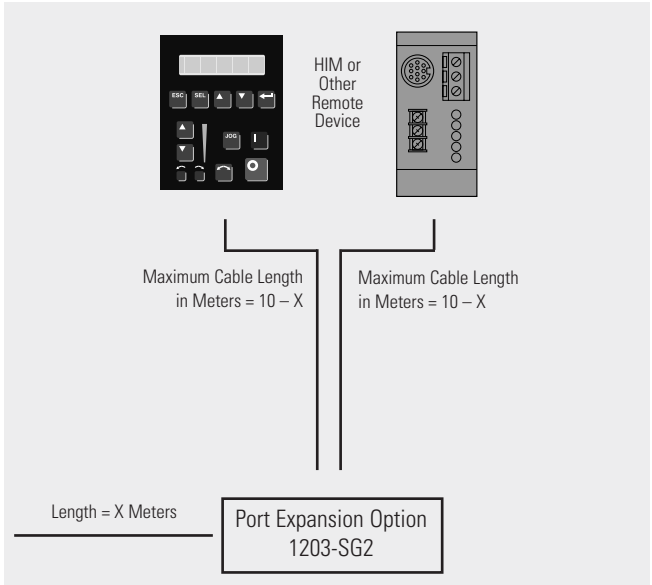


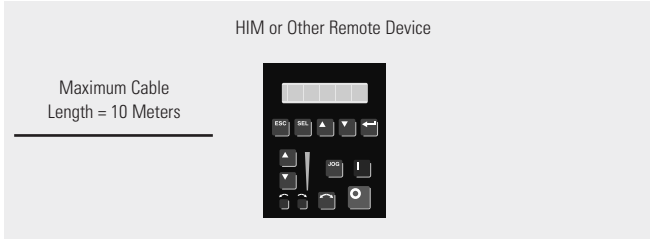
## 1336 PLUS II Remote Device Distances

Total cable length between each device and the drive must be 10 meters (33 feet) or less.




Total cable distance between each device & drive must be 10 meters (33 feet) or less.



## Notes

# 1336 PLUS II Selection Guide

## Catalog Number Explanation

| 1336F | – | A007 | – | AA | – | EN | – | LA6 | – | HAS1 | – | GM1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BULLETIN NO.** | | **VOLTAGE/RATING** | | **ENCLOSURE** (MUST BE SPECIFIED) | | **LANGUAGE** (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.*

## Constant/Variable Torque Drives and Enclosures

### 200-240V

| Drive Rating [1] Constant Torque | | | | Open IP00 | NEMA Type 1 IP20 | NEMA Type 4 IP65 | NEMA Type 12 IP54 |
|---|---|---|---|---|---|---|---|
| Amps | kW | CT HP | VT HP [2] | No Enclosure | General Purpose | Resist Water, Dust | Industrial Use |
| 2.3 | 0.37 | 0.5 | 0.5 | AQF05 – AN | AQF05 – AA | AQF05 – AF | AQF05 – AJ |
| 3.0 | 0.56 | 0.75 | 0.75 | AQF07 – AN | AQF07 – AA | AQF07 – AF | AQF07 – AJ |
| 4.5 | 0.75 | 1 | 1 | AQF10 – AN | AQF10 – AA | AQF10 – AF | AQF10 – AJ |
| 6.0 | 1.2 | 1.5 | 1.5 | AQF15 – AN | AQF15 – AA | AQF15 – AF | AQF15 – AJ |
| 8.0 | 1.5 | 2 | 2 | AQF20 – AN | AQF20 – AA | AQF20 – AF | AQF20 – AJ |
| 12 | 2.2 | 3 | 3 | AQF30 – AN | AQF30 – AA | AQF30 – AF | AQF30 – AJ |
| 18 | 4.0 | 5 | 5 | AQF50 – AN | AQF50 – AA | AQF50 – AF | AQF50 – AJ |
| 22 | 5.5 | 7.5 | 7.5 | AQF75 – AN | AQF75 – AA | AQF75 – AF | AQF75 – AJ |
| 22 | 5.5 | 7.5 | 7.5 | A007 – AN | A007 – AA | A007 – AF | A007 – AJ |
| 34 | 7.5 | 10 | 10 | A010 – AN | A010 – AA | A010 – AF | A010 – AJ |
| 48 | 11 | 15 | 15 | A015 – AN | A015 – AA | A015 – AF | A015 – AJ |
| 65 | 15 | 20 | 20 | A020 – AN | A020 – AA | A020 – AF | A020 – AJ |
| 77 | 18.5 | 25 | 25 | A025 – AN | A025 – AA | A025 – AF | A025 – AJ |
| 80 | 22 | 30 | 30 | A030 – AN | A030 – AA | A030 – AF | A030 – AJ |
| 120 | 30 | 40 | 40 | A040 – AN | A040 – AA | [3] | [3] |
| 150 | 37 | 50 | 50 | A050 – AN | A050 – AA | [3] | [3] |
| 180 | 45 | 60 | 60 | A060 – AN | A060 – AA | [3] | [3] |
| 240 | 56 | 75 | 75 | A075 – AN | A075 – AA [9] | [3] | [3] |
| 291 | 75 | 100 | 100 | A100 – AN | A100 – AA [9] | [3] | [3] |
| 325 | 93 | 125 | 125 | A125 – AN | A125 – AA [9] | [3] | [3] |

### 380-480V

| Drive Rating [1] Constant Torque | | Variable Torque | | Drive Rating [1] Constant Torque | | Variable Torque | | Open IP00 | NEMA Type 1 IP20 | NEMA Type 1 IP20 | NEMA Type 4 IIP65 | NEMA Type 12 IP54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amps | HP | Amps | HP [2] | Amps | kW | Amps | kW | No Enclosure | General Purpose | CE/C-tick Conformance | Resist Water, Dust | Industrial Use |
| 1.1 | 0.5 | 1.2 | 0.5 | 1.1 | 0.37 | 1.2 | 0.37 | BRF05 – AN | BRF05 – AA | BRF05 – AE | BRF05 – AF | BRF05 – AJ |
| 1.6 | 0.75 | 1.7 | 0.75 | 1.6 | 0.56 | 1.7 | 0.56 | BRF07 – AN | BRF07 – AA | BRF07 – AE | BRF07 – AF | BRF07 – AJ |
| 2.1 | 1 | 2.3 | 1 | 2.1 | 0.75 | 2.3 | 0.75 | BRF10 – AN | BRF10 – AA | BRF10 – AE | BRF10 – AF | BRF10 – AJ |
| 2.8 | 1.5 | 3.0 | 1.5 | 2.8 | 1.2 | 3.0 | 1.2 | BRF15 – AN | BRF15 – AA | BRF15 – AE | BRF15 – AF | BRF15 – AJ |
| 3.8 | 2 | 4.0 | 2 | 3.8 | 1.5 | 4.0 | 1.5 | BRF20 – AN | BRF20 – AA | BRF20 – AE | BRF20 – AF | BRF20 – AJ |
| 5.3 | 3 | 6.0 | 3 | 5.3 | 2.2 | 6.0 | 2.2 | BRF30 – AN | BRF30 – AA | BRF30 – AE | BRF30 – AF | BRF30 – AJ |
| 8.4 | 5 | 9.0 | 5 | 8.4 | 3.7 | 9.0 | 3.7 | BRF50 – AN | BRF50 – AA | BRF50 – AE | BRF50 – AF | BRF50 – AJ |
| 13.3 | 7.5 | 15.4 | 10 | 13.3 | 5.5 | 15.4 | 7.5 | BRF75 – AN | BRF75 – AA | BRF75 – AE | BRF75 – AF | BRF75 – AJ |
| 16.1 | 10 | 22.0 | 15 | 16.1 | 7.5 | 22.0 | 11 | BRF100 – AN | BRF100 – AA | BRF100 – AE | BRF100 – AF | BRF100 – AJ |
| 24.0 | 15 | 24.0 | 15 | 24.0 | 11 | 24.0 | 11 | BRF150 – AN | BRF150 – AA | BRF150 – AE | BRF150 – AF | BRF150 – AJ |
| 27.0 | 20 | 27.0 | 20 | 27.0 | 15 | 27.0 | 15 | BRF200 – AN | BRF200 – AA | BRF200 – AE | BRF200 – AF | BRF200 – AJ |
| 24.2 | 15 | 27 | 20 | 24.2 | 11 | 27 | 15 | B015 – AN | B015 – AA | B015 – AE | B015 – AF | B015 – AJ |
| 31 | 20 | 34 | 25 | 31 | 15 | 34 | 18.5 | B020 – AN | B020 – AA | B020 – AE | B020 – AF | B020 – AJ |
| 39 | 25 | 42 | 30 | 39 | 18.5 | 42 | 22 | B025 – AN | B025 – AA | B025 – AE | B025 – AF | B025 – AJ |
| 45 | 30 | 48 | 30 | 45 | 22 | 48 | 22 | B030 – AN | B030 – AA | B030 – AE | B030 – AF | B030 – AJ |
| 59 | 40 | 59 | 40 | 59 | 30 | 59 | 30 | BX040 – AN | BX040 – AA | BX040 – AE | BX040 – AF | BX040 – AJ |
| 60 | 40 | 65 | 50 | 60 | 30 | 65 | 37 | B040 – AN | B040 – AA | B040 – AE | B040 – AF | B040 – AJ |
| 75 | 50 | 75 | 60 | 75 | 37 | 75 | 45 | B050 – AN | B050 – AA | B050 – AE | B050 – AF | B050 – AJ |
| 77 | 60 | 77 | 60 | 77 | 45 | 77 | 45 | BX060 – AN [4] | BX060 – AA [4] | BX060 – AE [4] | BX060 – AF [4] | BX060 – AJ [4] |
| 85 | 60 | 96 | 75 | 85 | 45 | 96 | 56 | B060 – AN | B060 – AA | B060 – AE | [3] | [3] |
| 106 | 75 | 120 | 100 | 106 | 56 | 120 | 75 | B075 – AN | B075 – AA | B075 – AE | [3] | [3] |
| 138 | 100 | 150 | 125 | 138 | 75 | 150 | 93 | B100 – AN | B100 – AA | B100 – AE | [3] | [3] |
| 173 | 125 | 180 | 150 | 173 | 93 | 180 | 112 | B125 – AN | B125 – AA | B125 – AE | [3] | [3] |
| 180 | 150 | 180 | 150 | 180 | 112 | 180 | 112 | BX150 – AN | BX150 – AA | BX150 – AE | [3] | [3] |
| 199 | 150 | 240 | 200 | 199 | 112 | 240 | 149 | B150 – AN | B150 – AA [9] | B150 – AE [9] | [3] | [3] |
| 263 | 200 | 292 | 250 | 263 | 149 | 292 | 187 | B200 – AN | B200 – AA [9] | B200 – AE [9] | [3] | [3] |
| 325 | 250 | 325 | 250 | 325 | 187 | 325 | 187 | B250 – AN | B250 – AA [9] | B250 – AE [9] | [3] | [3] |
| 325 | 250 | 360 | 300 | 325 | 187 | 360 | 224 | BP250 – AN [7] | BP250 – AA [7, 9] | – | [3] | [3] |
| | | | | | | | | BPR250 – AN [7] | – | BPR250A – AE [7, 8 9] | | |
| 325 | 250 | 360 | 300 | 325 | 187 | 360 | 224 | BX250 – AN | BX250A – AA [9] | BX250A – AE [8, 9] | [3] | [3] |
| 360 | 300 | 425 | 350 | 360 | 224 | 425 | 261 | B300 – AN | B300A – AA [9] | B300A – AE [8, 9] | [3] | [3] |
| 360 | 300 | 425 | 350 | 360 | 224 | 425 | 261 | BP300 – AN [7] | BP300 – AA [7, 9] | – | [3] | [3] |
| | | | | | | | | BPR300 – AN [7] | – | BPR300A – AE [7, 8, 9] | | |
| 425 | 350 | 475 | 400 | 425 | 261 | 475 | 298 | B350 – AN | B350A – AA [9] | B350A – AE [8, 9] | [3] | [3] |
| 425 | 350 | 475 | 400 | 425 | 261 | 475 | 298 | BP350 – AN [7] | BP350 – AA [7, 9] | – | [3] | [3] |
| | | | | | | | | BPR350 – AN [7] | – | BPR350A – AE [7, 8, 9] | | |
| 475 | 400 | 525 | 450 | 475 | 298 | 525 | 336 | B400 – AN | B400A – AA [9] | B400A – AE [8, 9] | [3] | [3] |
| 475 | 400 | 532 | 450 | 475 | 298 | 532 | 336 | BP400 – AN [7] | BP400 – AA [7, 9] | – | [3] | [3] |
| | | | | | | | | BPR400 – AN [7] | – | BPR400A – AE [7, 8, 9] | | |
| 525 | 450 | 590 | 500 | 525 | 336 | 590 | 373 | B450 – AN | B450A – AA [9] | B450A – AE [8, 9] | [3] | [3] |
| 532 | 450 | 532 | 450 | 532 | 336 | 532 | 336 | BP450 – AN [7] | BP450 – AA [7, 9] | – | [3] | [3] |
| | | | | | | | | BPR450 – AN [7] | – | BPR450A – AE [7, 8, 9] | | |
| 590 | 500 | 670 | 600 | 590 | 373 | 670 | 448 | B500 – AN | B500A – AA [9] | B500A – AE [8, 9] | [3] | [3] |
| 670 | 600 | 670 | 600 | 670 | 448 | 670 | 448 | B600 – AN | B600A – AA [9] | B600A – AE [8, 9] | [3] | [3] |



See page 65 for footnotes.

## Constant/Variable Torque Drives and Enclosures

### 500-600V

| Drive Rating [1] | | | | Open IP00 | NEMA Type 1 IP20 | NEMA Type 4 IP65 | NEMA Type 12 IP54 |
|---|---|---|---|---|---|---|---|
| Amps | kW | CT HP | VT HP | No Enclosure | General Purpose | Resist Water, Dust | Industrial Use |
| 2.0 | 0.75 | 1 | 1 | CWF10 – AN | CWF10 – AA | CWF10 – AF | CWF10 – AJ |
| 4.0 | 1.5 | 2 | 2 | CWF20 – AN | CWF20 – AA | CWF20 – AF | CWF20 – AJ |
| 6.0 | 2.2 | 3 | 3 | CWF30 – AN | CWF30 – AA | CWF30 – AF | CWF30 – AJ |
| 8.0 | 3.7 | 5 | 5 | CWF50 – AN | CWF50 – AA | CWF50 – AF | CWF50 – AJ |
| 10 | 5.5 | 7.5 | 7.5 | CWF75 – AN | CWF75 – AA | CWF75 – AF | CWF75 – AJ |
| 12 | 7.5 | 10 | 10 | CWF100 – AN | CWF100 – AA | CWF100 – AF | CWF100 – AJ |
| 19 | 11 | 15 | 15 | CWF150 – AN | CWF150 – AA | CWF150 – AF | CWF150 – AJ |
| 24 | 15 | 20 | 20 | CWF200 – AN | CWF200 – AA | CWF200 – AF | CWF200 – AJ |
| 30 | 18.5 | 25 | 25 | C025 – AN | C025 – AA | C025 – AF | C025 – AJ |
| 35 | 22 | 30 | 30 | C030 – AN | C030 – AA | C030 – AF | C030 – AJ |
| 45 | 30 | 40 | 40 | C040 – AN | C040 – AA | C040 – AF | C040 – AJ |
| 57 | 37 | 50 | 50 | C050 – AN | C050 – AA | C050 – AF | C050 – AJ |
| 62 | 45 | 60 | 60 | C060 – AN | C060 – AA | CO60 – AF | CO60 – AJ |
| 85 | 56 | 75 | 75 | C075 – AN | C075 – AA | [3] | [3] |
| 109 | 75 | 100 | 100 | C100 – AN | C100 – AA | [3] | [3] |
| 138 | 93 | 125 | 125 | C125 – AN | C125 – AA | [3] | [3] |
| 158 | 112 | 150 | 150 | C150 – AN | C150 – AA[9] | [3] | [3] |
| 252 | 149 | 200 | 200 | C200 – AN | C200 – AA[9] | [3] | [3] |
| 284 | 187 | 250 | 250 | C250 – AN | C250 – AA[9] | [3] | [3] |
| 300 | 224 | 300 | 300 | CX300 – AN | CX300 – AA[9] | [3] | [3] |
| 350 | 261 | 350 | 350 | CP350 – AN [7] | CP350 – AA [7, 9] | [3] | [3] |
| | | | | CPR350 – AN [7] | – | [3] | [3] |
| 400 | 298 | 400 | 400 | CP400 – AN [7] | CP400 – AA [7, 9] | [3] | [3] |
| | | | | CPR400 – AN [7] | – | [3] | [3] |
| 300 | 224 | 300 | 300 | C300 – AN | C300A – AA[9] | [3] | [3] |
| 350 | 261 | 350 | 350 | C350 – AN | C350A – AA[9] | [3] | [3] |
| 400 | 298 | 400 | 400 | C400 – AN | C400A – AA[9] | [3] | [3] |
| 450 | 336 | 450 | 450 | C450 – AN | C450A – AA[9] | [3] | [3] |
| 500 | 373 | 500 | 500 | C500 – AN | C500A – AA[9] | [3] | [3] |
| 600 | 448 | 600 | 600 | C600 – AN | C600A – AA[9] | [3] | [3] |

## Language Group

| Description | Used With . . . | Option Code |
|---|---|---|
| Language [5] | All Drives | |
| English | | -EN |
| French | | -FR |
| German | | -DE |
| Italian | | -IT |
| Japanese | | -JP |
| Spanish | | -ES |

## Dynamic Brake Kits

| Description | Used With . . . | Catalog Number Complete Brake | Catalog Number Brake Chopper |
|---|---|---|---|
| for 200-240V AC Drives | 0.37-3.7 kW (0.5-5 HP) [6] | -KA005 | -WA018 |
| | 5.5-7.5 kW (7.5-10 HP) [6] | -KA010 | -WA018 |
| | 11-22 kW (15-30 HP) [6] | NA | -WA070 |
| | 30-56 kW (40-75 HP) [6] | NA | -WA115 |
| for 380-480V AC Drives | 0.37-3.7 kW (0.5-5 HP) [6] | -KB005 | -WB009 |
| | 5.5-7.5 kW (7.5-10 HP) [6] | -KB010 | -WB009 |
| | 11-37 kW (15-50 HP) [6] | -KB050 | -WB035 |
| | 45-149 kW (60-200 HP) [6] | NA | -WB110 |
| for 500-600V AC Drives | 0.37-3.7 kW (0.5-5 HP) [6] | -KC005 | -WC009 |
| | 5.5-7.5 kW (7.5-10 HP) [6] | -KC010 | -WC009 |
| | 11-30 kW (15-40 HP) [6] | -KC050 | -WC035 |
| | 37-149 kW (50-200 HP) [6] | NA | -WC085 |

[1] *Drive rating is based on nominal voltage and carrier frequency at altitudes of 1000 meters or less. Refer to the Derating Guidelines on Pages 57-61.*
[2] *VT /HP ratings are valid for 240V or 480V only.*
[3] *Not available in this rating.*
[4] *480 Volts only.*
[5] *A Language Group must be specified with each drive for User Manual.*
[6] *Multiple kits may be utilized together to obtain higher ratings. Refer to the appropriate brake publication (1336-5.64 or 5.65) for further information.*
[7] *A "Common Mode Choke" option (-CM) or "No Common Mode Choke" option (-NCM) must be specified with each F Frame Drive.*
[8] *These units include as standard an integral EMC filter.*
[9] *This drive will not accept a "Snap-In" HIM (HASP, HAS1, HAS2, HCSP, HCS1, HCS2).*

## Factory Installed Options

| Description | Used With . . . | Option Code (Installed) |
|---|---|---|
| Communication Options | Frames B & Up | |
| Single Point RIO | (Adapter 6 Only) | -GM1[3] |
| RS232/422/485, DF1 & DH485 Protocol | | -GM2[3] |
| DeviceNet | | -GM5[3] |
| Enhanced DeviceNet | | -GM6[3] |
| Communication Options | All Frames | |
| Single Point RIO with Snap-In Cradle | (Adapter 1 Only) | -GMS1[3] |
| RS232/422/485, DF1 & DH485 Protocol w/Snap-In Cradle | | -GMS2[3] |
| DeviceNet | | -GMS5[3] |
| Enhanced DeviceNet | | -GMS6[3] |
| Snap-In Cradle/Blank Plate | | -HASB[3] |
| Control Interface | All Drives | |
| Contact Closure | | -L4 |
| +24V AC/DC | | -L5 |
| 115V AC | | -L6 |
| Control Interface with Encoder Feedback | All Drives | |
| Contact Closure | | -L4E |
| +24V AC/DC | | -L5E |
| 115V AC | | -L6E |
| Control Interface with Encoder Feedback[5] | All Drives | |
| Contact Closure | | -L7E |
| +24V AC/DC | | -L8E |
| 115V AC | | -L9E |
| Analog Interface – Port A (Choose One) | All Drives | |
| Two Isolated Configurable Inputs | | -LA2 |
| One Isolated Bi-Polar Input (±10V) and One Isolated Themistor Input | | -LA6 |
| One Isolated Bi-polar Input (±10V) and One Isolated Configurable Input | | -LA7 |
| Analog Interface – Port B (Choose One) | All Drives | |
| Single-ended, Non-isolated Input Configurable or Pot & 2 Single-ended, Non-isolated 0-20mA Outputs | | -LA1 |
| Two Isolated Configurable Outputs | | -LA3 |
| One Isolated Configurable Input & Output | | -LA4 |
| One Isolated Pulse Input & Non-isolated Output and One Single-ended, Non-isolated 0-10V Output | | -LA5 |
| Human Interface Module, Snap-In IP20 (NEMA Type 1) | IP00 (Open) A-G Frame & IP20 (NEMA Type 1) A-D Frame Drives | |
| Snap-In Cradle/Blank Plate | | -HASB |
| Programmer Only | | -HASP |
| Programmer Only & Upload/Download Capability | | -HCSP |
| Programmer/Controller with Analog Pot | | -HAS1 |
| Programmer/Controller with Analog Pot & Upload/Download Capability | | -HCS1 |
| Programmer/Controller with Digital Pot | | -HAS2 |
| Programmer/Controller with Digital Pot & Upload/Download Capability | | -HCS2 |
| Human Interface Module, IP20 (NEMA Type 1) | IP20 (NEMA Type 1) | |
| Programmer Only | E-G Frame Enclosures | -HAP[2] |
| Programmer/Controller with Analog Pot | | -HA1[2] |
| Programmer/Controller with Digital Pot | | -HA2[2] |
| Human Interface Module, IP66[1] | IP66 or IP54 | |
| Programmer/Display Only | (NEMA Type 12) Drives | -HJP |
| Programmer/Controller with Digital Pot | | -HJ2 |

[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-Cxx) to be functional.*
[3] *A maximum of one Communication Option may be ordered factory installed on A Frame drives (2 for B Frame drives and up, limited to 1-Snap-in and 1-Main Control Board mount).*
[4] *Each Flex I/O SCANport Module requires (1) 1203-FB1 and (1) 1203-FM1.*
[5] *The encoder loss detection feature of the 1336 PLUS II requires the use of L7E, L8E or L9E.*

## Field Installed Options

| Description | Used With . . . | Catalog No. (Loose Kit) |
|---|---|---|
| Remote Mounted w/Integral 115V AC Power Supply | All Drives | |
| Single Point RIO | | 1203-GD1 [2] |
| RS 232/422/485, DF1, DH485 | | 1203-GD2 [2] |
| Remote Mounted for use with 24V DC Power Supply | All Drives | |
| Single Point RIO | | 1203-GK1 [2] |
| RS232/422/485, DF1, DH485 | | 1203-GK2 [2] |
| DeviceNet | | 1203-GK5 [2] |
| Enhanced DeviceNet | | 1203-GU6 [2] |
| Drive Mounted and Drive Powered (with loose snap-in cradle/blank plate) | A Frame Drives – Adapter 1 w/Snap-in Cradle/Blank Plate | |
| Single Point RIO | | 1336-GM1 [3] |
| RS232/422/485, DF1, DH485 Protocol | B Frame & Up – Adapter 6 (or Adapter 1 w/Snap-in Cradle/Blank Plate) | 1336-GM2 [3] |
| DeviceNet | | 1336-GM5 [3] |
| Enhanced DeviceNet | | 1336-GM6 [3,5] |
| Firmware Download Module | All Drives | 1336F-FDM |
| Module allows firmware upgrade | | |
| ControlNet™ to SCANport Adapter | All Drives | 1203-CN1 [3,5] |
| Remote Mounted (DIN Rail) - 24V DC | | |
| Requires 24V DC power supply | | |
| Smart Serial to SCANport Adapter | All Drives | 1203-SSS |
| Includes 1203-SFC & 1202-C10 Cables | | |
| SCANport Expander Module | All Drives | |
| One to Two | | 1203-SG2 |
| One to Four | | 1203-SG4 |
| Flex I/O SCANport Module [4] | All Drives | |
| Flex I/O Terminal Base | | 1336-FB1 |
| Flex I/O Module | | 1336-FM1 |
| HIM, Snap-In, IP20 (NEMA Type 1) | IP00 (Open) A-G Frame & IP20 (NEMA Type 1) A-D Frame Drives | |
| Snap-In Cradle/Blank Plate | | 1201-HASB |
| Programmer Only | | 1201-HASP |
| Programmer Only & Upload/Download Capability | | 1201-HCSP |
| Programmer/Controller with Analog Pot | | 1201-HAS1 |
| Programmer/Controller with Analog Pot & Upload/Download Capability | | 1201-HCS1 |
| Programmer/Controller with Digital Pot | | 1201-HAS2 |
| Programmer/Controller with Digital Pot & Upload/Download Capability | | 1201-HCS2 |
| HIM, Hand-Held, IP20 (NEMA Type 1) Requires Cable Below | IP20 (NEMA Type 1) E-G Frame Enclosures | |
| Programmer Only | | 1201-HAP |
| Programmer/Controller w/Analog Speed Pot | | 1201-HA1 |
| Programmer/Controller w/Digital Speed Pot | | 1201-HA2 |
| HIM IP66 (NEMA Type 12/UL Type 4X-Indoor) | IP66 (NEMA Type 12/UL Type 4X Indoor) Enclosures | |
| Programmer Only | | 1201-HJP [2] |
| Programmer/Controller w/Digital Speed Pot | | 1201-HJ2 [2] |
| Option Cable Kit - Connect to Comm. Port | All HIMs not mounted on the drive chassis | |
| 0.33 Meters (1.1 Feet) | | 1202-CO3 |
| 1 Meter (3.3 Feet) | | 1202-C10 |
| 3 Meter (9.8 Feet) | | 1202-C30 |
| 9 Meter (29.5 Feet) | | 1202-C90 |
| Door Mount Bezel Kit, IP20 (NEMA Type 1) | User Supplied IP20 (NEMA Type 1) Enclosures and HIM | 1201-DMA |

[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-Cxx) to be functional.*
[3] *A maximum of one Communication Option may be drive mounted.*
[4] *Each Flex I/O SCANport Module requires (1) 1203-FB1 and (1) 1203-FM1.*
[5] *Adapter is programmed/configured with Windows™ HyperTerminal via RS-232 using the 1203-SFC cable (purchased separately), or using a compatible network specific software tool.*

## Notes

# 1336 PLUS II Standard Packaged Drives Table of Contents

*30 HP NEMA TYPE 1 Packaged Drive with Option Enclosure*

**PRODUCT DESCRIPTION** . . . . . 70

**DRIVE SPECIFICATIONS**
Input and Output Ratings . . . . . 71
Standard AC Line Fusing . . . . . 72

**OPTIONS**
Suggested Power Distribution Schemes . . . . . 73
Disconnects, Control Transformers, Overload Relays . . . . . 74
Bypass- Auto, Manual, SMC, Options . . . . . 75
Multi-pulse Front Ends, Motor Interface . . . . . 76
Power Conditioning, Control and Feedback, Communication . . . . . 77
PLC and SLC, Control Interface . . . . . 78
Human Interface Modules . . . . . 79
Door Mounted Operator Devices . . . . . 80
Operator Device Functionality, Meter Options, Enclosure Options . . . 81
Codes and Standards, Drawing and Test Options, Firmware . . . . . 82

**ENCLOSURE SPECIFICATIONS**
Installation Guidelines, Enclosure Types (NEMA/IEC) . . . . . 83
Material Specifications . . . . . 84
Mounting and Spacing Requirements . . . . . 85

**DIMENSIONS**
NEMA Type 1 (IP20), A-C Frame Drives . . . . . 86
NEMA Type 4 & 12 (IP65 & IP54), A-C Frame Drives . . . . . 87
NEMA Type 1 & 12 (IP20 & IP54), D-E Frame Drives . . . . . 88
NEMA Type 1 & 12 (IP20 & IP54), F Frame Drives . . . . . 89
NEMA Type 1 & 12 (IP20 & IP54), G Frame Drives . . . . . 91

**PANEL LAYOUTS**
Drive Frame A . . . . . 93
Drive Frame B . . . . . 95
Drive Frame C . . . . . 96
Drive Frame D . . . . . 98
Drive Frame E . . . . . 99
Drive Frame F . . . . . 100
Drive Frame G . . . . . 101

**WIRE TERMINATIONS**
Power Terminal Block TB1 . . . . . 102
Control and Signal Wiring Terminal Block TB2 . . . . . 103
Control Interface Wiring Terminal Block TB3 . . . . . 104

**SELECTION GUIDE**
Catalog Number Definition . . . . . 105
Thermal Overload Relay Data . . . . . 109
Heater Element Selection . . . . . 110
Option Selection Rules . . . . . 111

**DRAWING SAMPLES** . . . . . 112

# Product Description

## The 1336 PLUS II Standard Packaged Drive Package

**The heart of every standard packaged drive is a 1336 PLUS II variable frequency controller.**

The packaged drives program provides 1336 PLUS II drives assembled with a much larger offering of factory mounted options than what is normally available with a standard product.

Ratings are provides for 0.37-93 kW (0.5-125 HP) at 230V, 0.37-448 kW (0.5-600 HP) at 460V, or 0.75-448 kW (1-600 HP) at 575V. Separate constant torque and variable torque ratings are available for 460V applications.

## Packaging

**Removable 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.

**Modular enclosure.**
Design to accommodate a wide variety of drive ratings and option combinations.

**IP 20, IP65 & IP54 (NEMA Type 1, 4 & 12) configurations.**
Accommodated with "heat sink through the back" design wherever possible.

## Standardization

**Pre-defined to reduce cost and time.**

By using pre-defined, and in most cases pre-engineered, options standardization provides consistency of product offering, resulting in reduced costs, shorter delivery time, and ease of product installation. Even in the case of custom designed drive packages, generally 80% of the engineering already exists.

# Drive Specifications

## General Specifications

In most cases the general specifications of a standard packaged drive will match those of a stand-alone drive, refer to pages 18 and 19. Some items such as Agency Certification and Maximum Short Circuit Protection will be specific to the options chosen.

| | |
|---|---|
| **Agency Certification** | Refer to the Codes and Standards in the Options section |
| **Maximum Short Circuit Drive Package (Current Rating)** | The short circuit interrupt capability of any standard packaged drive will be based upon the specific combination of power options chosen |

## Input and Output Ratings

Each 1336 PLUS II Drive has constant and variable torque capabilities. In the case of 230V and 575V ratings, the constant torque and variable torque ratings will be the same.The listings on this page provide input and output current.[1]

### 230V

| | | Constant Torque | | | |
|---|---|---|---|---|---|
| HP | Cat No. | Input kVA | Input Amps | Output kVA | Output Amps |
| 0.5 | AF05C | 1.1 | 2.8 | 0.9 | 2.3 |
| 0.75 | AF07C | 1.4 | 3.5 | 1.2 | 3.0 |
| 1 | AF10C | 2.2 | 5.4 | 1.8 | 4.5 |
| 1.5 | AF15C | 2.9 | 7.3 | 2.4 | 6.0 |
| 2 | AF20C | 3.9 | 9.7 | 3.2 | 8.0 |
| 3 | AF30C | 5.7 | 14.3 | 4.8 | 12 |
| 5 | AF50C | 8.5 | 21.3 | 7.2 | 18 |
| 7.5 | A007C | 10-12 | 28 | 11 | 27 |
| 10 | A010C | 12-14 | 35 | 14 | 34 |
| 15 | A015C | 17-20 | 49 | 19 | 48 |
| 20 | A020C | 22-26 | 63 | 26 | 65 |
| 25 | A025C | 26-31 | 75 | 31 | 77 |
| 30 | A030C | 27-33 | 79 | 32 | 80 |
| 40 | A040C | 41-49 | 119 | 48 | 120 |
| 50 | A050C | 52-62 | 149 | 60 | 150 |
| 60 | A060C | 62-74 | 178 | 72 | 180 |
| 75 | A075C | 82-99 | 238 | 96 | 240 |
| 100 | A100C | 100-120 | 289 | 116 | 291 |
| 125 | A125C | 112-134 | 322 | 129 | 325 |

### 460V

| | | Constant Torque | | | | | | Variable Torque | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HP | Cat No. | Input kVA | Input Amps | Output kVA | Output Amps | HP | Cat No. | Input kVA | Input Amps | Output kVA | Output Amps |
| 0.5 | BF05C | 0.9-1 | 1.3 | 0.9 | 1.1 | 0.5 | BF05V | 0.9-1.1 | 1.4 | 1 | 1.2 |
| 0.75 | BF07C | 1.3-1.6 | 2 | 1.3 | 1.6 | 0.75 | BF07V | 1.4-1.7 | 2.1 | 1.4 | 1.7 |
| 1 | BF10C | 1.6-2 | 2.8 | 1.6 | 2.1 | 1 | BF10V | 1.8-2.2 | 2.8 | 1.8 | 2.3 |
| 1.5 | BF15C | 2.2-2.6 | 3.3 | 2.2 | 2.8 | 1.5 | BF15V | 2.3-2.8 | 3.5 | 2.4 | 3 |
| 2 | BF20C | 3.0-3.7 | 4.6 | 3 | 3.8 | 2 | BF20V | 3.2-3.8 | 4.8 | 3.2 | 4 |
| 3 | BF30C | 4.2-5.1 | 6.4 | 4.2 | 5.3 | 3 | BF30V | 4.7-5.7 | 7.2 | 4.8 | 6 |
| 5 | BF50C | 6.6-8 | 10 | 6.7 | 8.4 | 5 | BF50V | 7.0-8.5 | 10.7 | 7.2 | 9 |
| 7.5 | B007C | 8-11 | 13 | 10 | 12.5 | 7.5 | BX007V | 8-11 | 13 | 10 | 12.5 |
| 7.5 | BF75C | 9.5-11.6 | 14.5 | 11.2 | 14 | 7.5 | BF75V | 12.2-14.7 | 18.5 | 13.9 | 17.5 |
| 10 | B010C | 11-14 | 17 | 13 | 16.1 | 10 | B007V | 9-12 | 14 | 11 | 14 |
| 10 | BF100C | 12.2-14.7 | 18.5 | 13.9 | 17.5 | 10 | BF100V | 17.1-20.7 | 26 | 19.9 | 25 |
| 15 | B015C | 16-21 | 25 | 19 | 24.2 | 15 | B010V | 14-18 | 22 | 17 | 21 |
| 20 | B020C | 21-26 | 32 | 25 | 31 | 20 | B015V | 18-23 | 28 | 22 | 27 |
| 25 | B025C | 26-33 | 40 | 31 | 39 | 25 | B020V | 23-29 | 35 | 27 | 34 |
| 30 | B030C | 30-38 | 46 | 36 | 45 | 30 | B030V | 32-41 | 49 | 38 | 48 |
| 40 | BX040C | 40-50 | 61 | 47 | 59 | 40 | BX040V | 40-50 | 61 | 47 | 59 |
| 50 | B050C | 48-60 | 73 | 60 | 75 | 50 | B040V | 41-52 | 63 | 52 | 65 |
| 60 [2] | BX060C | 62 | 75 | 61 | 77 | 60 | BX060V | 62 | 75 | 61 | 77 |
| 60 | B060C | 54-68 | 82 | 68 | 85 | | | | | | |
| 75 | B075C | 69-87 | 105 | 84 | 106 | 75 | B060V | 61-77 | 93 | 76 | 96 |
| 100 | B100C | 90-114 | 137 | 110 | 138 | 100 | B075V | 78-99 | 119 | 96 | 120 |
| 125 | B125C | 113-143 | 172 | 138 | 173 | 125 | B100V | 98-124 | 149 | 120 | 150 |
| 150 | BX150C | 148 | 178 | 143 | 180 | 150 | B125V | 117-148 | 178 | 143 | 180 |
| 150 | B150C | 130-164 | 197 | 159 | 199 | | | | | | |
| 200 | B200C | 172-217 | 261 | 210 | 263 | 200 | B150V | 157-198 | 238 | 191 | 240 |
| 250 | B250C | 212-268 | 322 | 259 | 325 | 250 | B200V | 191-241 | 290 | 233 | 292 |
| — | — | — | — | — | — | 250 | B250V | 212-268 | 322 | 259 | 325 |
| 250 | BP250C | 212-268 | 322 | 259 | 325 | — | — | — | — | — | — |
| 300 | B300C | 228-288 | 347 | 279 | 360 | 300 | BX250V | 228-288 | 347 | 279 | 360 |
| 300 | BP300C | 235-297 | 357 | 287 | 360 | 300 | BP250V | 235-297 | 357 | 287 | 360 |
| 350 | B350C | 261-330 | 397 | 319 | 425 | 350 | B300V | 261-330 | 397 | 319 | 425 |
| 350 | BP350C | 277-350 | 421 | 339 | 425 | 350 | BP300V | 277-350 | 421 | 339 | 425 |
| 400 | B400C | 294-371 | 446 | 359 | 475 | 400 | B350V | 294-371 | 446 | 359 | 475 |
| 400 | BP400C | 310-392 | 471 | 378 | 475 | 400 | BP350V | 310-392 | 471 | 378 | 475 |
| 450 | B450C | 326-412 | 496 | 398 | 525 | 450 | B400V | 326-412 | 496 | 398 | 525 |
| 450 | BP450C | 347-438 | 527 | 424 | 532 | 450 | BP400V | 347-438 | 527 | 424 | 532 |
| 500 | B500C | 372-470 | 565 | 454 | 590 | 500 | B450V | 372-470 | 565 | 454 | 590 |
| 600 | B600C | 437-552 | 664 | 534 | 670 | 600 | B500V | 437-552 | 664 | 534 | 670 |

### 575V

| | | Constant Torque | | | |
|---|---|---|---|---|---|
| HP | Cat No. | Input kVA | Input Amps | Output kVA | Output Amps |
| 1 | CF10C | 2.1-2.5 | 2.4 | 2.1 | 2 |
| 2 | CF20C | 4.2-5 | 4.8 | 4.2 | 4 |
| 3 | CF30C | 6.2-7.5 | 7.2 | 6.2 | 6 |
| 5 | CF50C | 8.3-10 | 9.6 | 8.3 | 8 |
| 7.5 | C007C | 9-11 | 10 | 10 | 10 |
| 10 | C010C | 11-13 | 12 | 12 | 12 |
| 15 | C015C | 17-20 | 19 | 19 | 19 |
| 20 | C020C | 21-26 | 25 | 24 | 24 |
| 25 | C025C | 27-32 | 31 | 30 | 30 |
| 30 | C030C | 31-37 | 36 | 35 | 35 |
| 40 | C040C | 38-45 | 44 | 45 | 45 |
| 50 | C050C | 48-57 | 55 | 57 | 57 |
| 60 | C060C | 52-62 | 60 | 62 | 62 |
| 75 | C075C | 73-88 | 84 | 85 | 85 |
| 100 | C100C | 94-112 | 108 | 109 | 109 |
| 125 | C125C | 118-142 | 137 | 137 | 138 |
| 150 | C150C | 144-173 | 167 | 167 | 168 |
| 200 | C200C | 216-260 | 250 | 252 | 252 |
| 250 | C250C | 244-293 | 282 | 283 | 384 |
| 300 | CX300C | 256-307 | 295 | 297 | 300 |
| 300 | C300C | 258-309 | 297 | 299 | 300 |
| 350 | C350C | 301-361 | 347 | 349 | 350 |
| 400 | C400C | 343-412 | 397 | 398 | 400 |
| 450 | C450C | 386-464 | 446 | 448 | 450 |
| 500 | C500C | 429-515 | 496 | 498 | 500 |
| 600 | C600C | 515-618 | 595 | 598 | 600 |

[1] *Drive ratings are at nominal values. Refer to the Drive Derating Guidelines in the Standard Drives section.*

[2] *480V only.*

# Drive Specifications

## Standard AC Line Fusing

**Drive input fuses are supplied as standard when required** [1]**.** The fuses provide branch circuit protection for the drive. Generally fuses and fuse blocks are supplied. F frame drives will have the fuses mounted internally to the drive itself. If a Drive Disconnect Switch option is supplied, the fuses will be resident on that switch (except F frame drives). Packaged drives may have different input fuse ratings than those recommended for equivalent standard 1336 PLUS II drives. This is because packaged drives are rated for a single input voltage as opposed to the voltage range of a standard product.

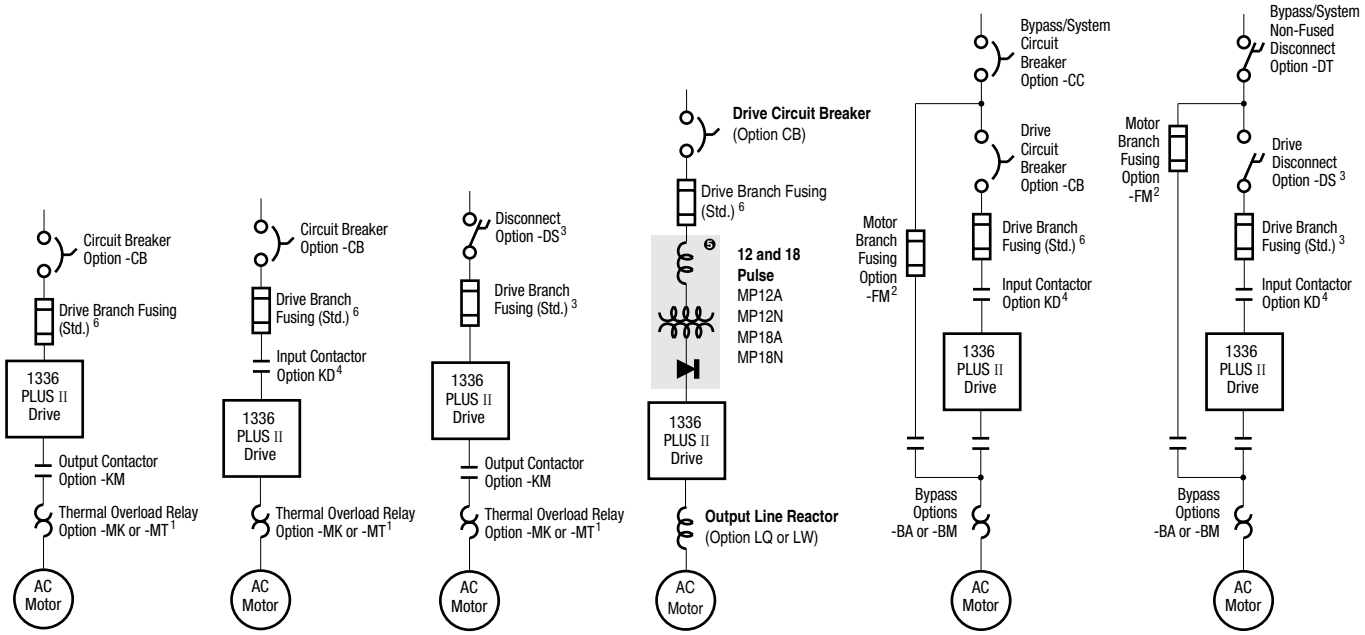
## Drive Rating and Catalog Number

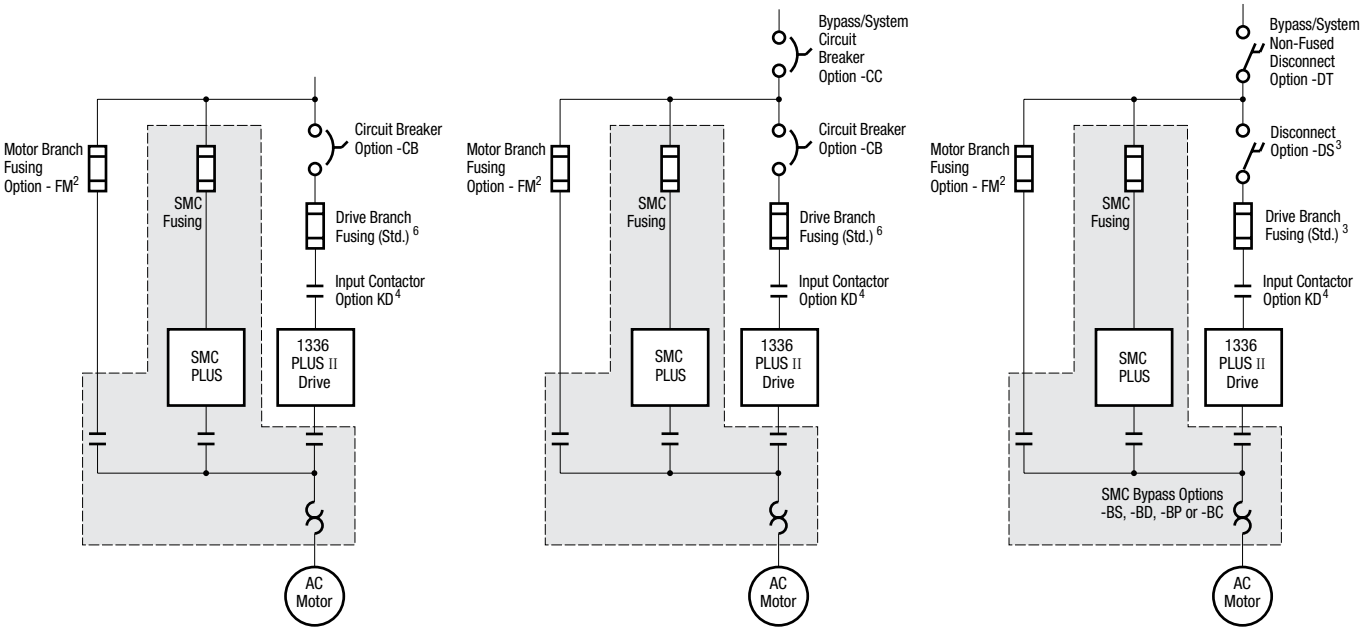
| 230V AC HP | 230V AC Cat No. | 460V AC-CT HP | 460V AC-CT Cat No. | 460V AC-VT HP | 460V AC-VT Cat No. | 575V AC HP | 575V AC Cat No. | Fuse Description | Quantity Required | Vendor Part Number |
|---|---|---|---|---|---|---|---|---|---|---|
| __ | — | 0.5-0.75 | BF05C, BF07C | 0.5-0.75 | BF05V, BF07V | 1 | CF10C | 3A | 3 | Bussmann LPJ-3 |
| 0.5-0.75 | AF05C-AF07C | 1-1.5 | BF10C, BF15C | 1-1.5 | BF10V, BF15V | 2 | CF20C | 6A | 3 | Bussmann LPJ-6 |
| 1 | AF10C | 2 | BF20C | 2 | BF20V | 3 | CF30C | 10A | 3 | Bussmann LPJ-10 |
| 1.5-2 | AF15C-AF20C | 3 | BF30C | 3 | BF30V | 5-7.5 | CF50C, CF75C | 15A | 3 | Bussmann LPJ-15 |
| — | — | 5-7.5 (14A) | BF50C, BF75C | 5, 10 (17.5A) | BF50V, BF75V | 10 | CF100C | 20A | 3 | Bussmann LPJ-20 |
| 3 | AF30C | — | — | — | — | 15 | CF150C | 25A | 3 | Bussmann LPJ-25 |
| — | — | 10 (17.5A) | BF100C | 15 (25A) | BF100V | 20 | CF200C | 30A | 3 | Bussmann LPJ-30 |
| — | — | 15 | BF150C(24A), BF200C | 20 | BF200V | — | — | 35A | 3 | Bussmann LPJ-35 |
| 5 | AF50C | — | — | — | — | — | — | 40A | 3 | Bussmann LPJ-40 |
| — | — | 15 | B015C | — | — | — | — | 35A | 3 | Bussmann JKS-35 |
| 7.5 | A007C | — | — | — | — | 25 | C025C | 40A | 3 | Bussmann JKS-40 |
| — | — | 20 | B020C | 25 | B020V | — | — | 45A | 3 | Bussmann JKS-45 |
| 10 | A010C | — | — | — | — | 30 | C030C | 50A | 3 | Bussmann JKS-50 |
| — | — | 25 | B025C | — | — | 40 | C040C | 60A | 3 | Bussmann JKS-60 |
| 15 | A015C | 30 | B030C | 30 | B030V | — | — | 70A | 3 | Bussmann JKS-70 |
| — | — | 40 | BX040C | 40-50 | BX040V, B040V | 50 | C050C | 80A | 3 | Bussmann JKS-80 |
| — | — | — | — | — | — | 60 | C060C | 90A | 3 | Bussmann JKS-90 |
| 20-25 | A020C-A025C | 50-60 | B050C, BX060C | 60 | BX060V | — | — | 100A | 3 | Bussmann JKS-100 |
| — | — | — | — | — | — | 75 | C075C | 110A | 3 | Bussmann JKS-110 |
| 30 | A030C | 60 | B060C | 75 | B060V | __ | — | 125A | 3 | Bussmann JKS-125 |
| 40 | A040C | 75 | B075C | 100 | B075V | 100 | C100C | 150A | 3 | Bussmann JKS-150 |
| — | — | — | — | — | — | 125 | C125C | 175A | 3 | Bussmann JKS-175 |
| 50 | A050C | 100 | B100C | 125 | B100V | — | — | 200A | 3 | Bussmann JKS-200 |
| — | — | — | — | — | — | 150 | C150C | 225A | 3 | Bussmann JKS-225 |
| 60 | A060C | 125-150 | B125C, B150C | 150 | B125V | — | — | 250A | 3 | Bussmann JKS-250 |
| 75 | A075C | 150 | B150C | 200 | B150V | — | — | 300A | 3 | Bussmann JKS-300 |
| — | — | — | — | — | — | 200 | C200C | 350A | 3 | Bussmann JKS-350 |
| 100 | A100C | 200 | B200C | 250 | B200V | 250-300 | C250C, CX300C | 400A | 3 | Bussmann JKS-400 |
| — | — | — | — | — | — | 300 | C300C | 400A | 3 | Gould A2-70C400AT |
| 125 | A125C | 250 | B250C | 250 | B250V | — | — | 450A | 3 | Bussmann JKS-450 |
| — | — | 300 | B300C | 300-350 | BX250V, B300V | 350 | C350C | 450A | 3 | Gould A3-70C450AT |
| — | __ | 250 | BP250C | 300 | BP250V | — | — | 450A | 3 | Gould A70QS-450 |
| — | — | 350 | B350C | 400 | B350V | 400 | C400C | 500A | 3 | Gould A3-70C500AT |
| — | __ | 300 | BP300C | 350 | BP300V | — | __ | 500A | 3 | Gould A70QS-500 |
| — | — | 400 | B400C | 450 | B400V | 450 | C450C | 600A | 3 | Gould A3-70C600AT |
| — | __ | 350-400 | BP350C, BP400C | 400 | BP350V | — | — | 600A | 3 | Gould A70QS-600 |
| — | __ | 450 | BP450C | 450 | BP400V | — | __ | 700A | 3 | Gould A70QS-700 |
| — | — | 450-500 | B450C, B500C | 500-600 | B450V, B500V | 500-600 | C500C, C600C | 800A | 3 | Gould A3-70C800AT |
| — | — | 600 | B600C | — | — | — | — | 900A | 3 | Gould A3-70C900AT |

[1] *Drive input fuses are not supplied with the circuit breaker option (-CB) for Frames A-E.*

## Suggested Power Distribution Schemes

The power distribution schemes shown below are for typical configurations and offered as suggestions only. Actual specified configurations may vary with accepted design practices or code restrictions.




1 *This option is redundant to the existing electronic overload protection supplied by the drive as standard.*

2 *If the motor branch fusing option (-FM) or the bypass/system circuit breaker option (-CC) are not specified, the user must supply motor branch circuit protection.*

3 *Standard drive branch fusing will be located on the optional drive disconnect switch, if supplied (except F and G Frame drives).*

4 *For F Frame drive ratings – the input contactor option will be located ahead of the internal drive branch fusing.*

5 *Line reactor is standard on -MP12A and -MP18A only.*

6 *Drive branch fusing is standard for Frames F, G and H only.*

# Options

## Power Disconnect Options

| | |
|---|---|
| **Drive Input Fuses**<br>(Standard) | This is a standard feature of all packaged drive assemblies except for frames A-E with the circuit breaker option (-CB). These fuses provide branch circuit protection in the drive mode of operation. If a bypass option is included, then separate branch circuit protection may be supplied by the customer or by specifying option -FM. Refer to AC Line Fusing in the Drive Specifications section for specific fuse rating information. |
| **Drive Circuit Breaker**<br>(Option CB) | This option provides branch circuit protection for frames A-E and is for disconnecting power only for frames F, G & H. Standard drive input fuses (see above) supply branch circuit protection for frames F, G & H. Most ratings will utilize a motor circuit protector (MCP) type breaker. Where MCP's are not available a molded case switch will be provided. All switches include handle operators, door interlocking and are padlockable. Thermal magnetic type breakers are not required since this type of protection is already supplied in the drive. |
| **Drive Disconnect Switch**<br>(Option DS) | An Allen-Bradley Bulletin 194R rotary switch is provided on A-C frame drives. A flange mount or rotary style switch (1494 F where possible) is provided on D frame drives and larger. With the exception of the F frame drive, the drive input fuses will be resident on the switch, allowing it to meet the requirements for branch circuit protection. All disconnect switches are door interlocked and padlockable. |
| **Drive Input Contactor**<br>(Option KD) | An Allen-Bradley Bulletin 100 contactor (where available) is provided between the AC line and the drive. The contactor will close on power up using A-B circuitry, or may be alternately controlled by customer supplied remote contact closure logic. |
| **Drive Output Contactor**<br>(Option KM) | An Allen-Bradley Bulletin 100 contactor (where available) is provided between the drive output and the motor. The contactor will close on power up, and open after a drive fault or loss of power. |

## Control Power Options

| | |
|---|---|
| **Drive Only Control Power**<br>(Option CF) | Provides a control power transformer mounted and wired inside the drive enclosure. The transformer is rated for drive and options power only. **There is no additional capacity for customer use.** |
| **Drive Plus 250VA Control Power**<br>(Option CP) | This option provides a control power transformer mounted and wired inside the drive enclosure. The transformer is rated for drive power plus an additional 250VA at 120V AC for customer use. |
| **Drive Plus 500VA Control Power**<br>(Option CT) | This option provides a control power transformer mounted and wired inside the drive enclosure. The transformer is rated for drive power plus an additional 500VA at 120V AC for customer use. |

## Thermal Overload Relay Options

| | |
|---|---|
| **Class 10 Motor Thermal Overload Relay**<br>(Option MT) | This option provides an Allen-Bradley Bulletin 193 bi-metallic thermal overload relay. The 193 contains an integral heater element with an adjustable trip setting – refer to Motor Thermal Overload Relay Selection in the Selection Guide section. No additional heater elements are required. A Class 10 overload relay will trip in 10 seconds or less at 600% of motor current setting. The motor overload protection provided by this option is redundant to the electronic overload protection provided by the drive itself. |
| **Class 20 Motor Thermal Overload Relay**<br>(Option MK) | This option provides an Allen-Bradley Bulletin 592 thermal overload relay. The Bulletin 592 contains a manual reset and requires a eutectic alloy heater element – refer to Heater Element Selection in the Selection Guide section. The heater element is not supplied with this option because specific motor data generally is not known. A Class 20 overload relay will trip in 20 seconds or less at 600% of motor current setting. The motor overload protection provided by this option is redundant to the electronic overload protection provided by the drive itself. |

## Bypass Options

Where system downtime cannot be tolerated, a bypass option can be provided to allow the motor to run at base speed by operating across the line.

| | |
|---|---|
| **Manual Bypass 1, 2, 3**<br>(Option BM) | This option provides a means to manually switch a single motor from drive control to bypass (across the line) operation. Separate Bulletin 100 (where available) contactors are provided for drive output and bypass operation, and are electrically interlocked. A Bulletin 193 Class 10 overload is also provided for motor protection while operating in the bypass mode – refer to Motor Thermal Overload Data in the Selection Guide section. A door-mounted "Drive/Off/Bypass" selector switch is provided. Optional "Drive Mode" and "Bypass Mode" pilot lights are available (option D41). |

## Bypass Options (continued)

| | |
|---|---|
| **Automatic Bypass** [1, 2, 3]<br>(Option BA) | This option provides a means to manually or automatically (upon a drive fault) switch a single motor from drive control to bypass (across the line) operation. Separate Bulletin 100 (where available) contactors are provided for drive output and bypass operation, and are electrically interlocked. A Bulletin 193 Class 10 overload is also provided for motor protection while operating in the bypass mode – refer to Motor Thermal Overload Data in the Selection Guide section. Door-mounted "Drive/Off/Bypass" and "Auto Bypass Off/On" selector switches are provided. Optional "Bypass Mode" and "Auto Bypass Enable On" pilot lights are available (option D42). |
| **Manual Bypass with SMC Plus** [1, 2, 3]<br>(Option BS) | This option provides a means to manually switch a single motor from drive control to bypass (across the line) operation. An SMC Plus™ solid state controller provides soft start capability when first switching to bypass operation. Separate Bulletin 100 (where available) contactors are provided for drive output, SMC output and total bypass. All contactors are electrically interlocked. A door-mounted "Drive/Off/Bypass" selector switch is provided. Optional "Drive Mode" and "Bypass Mode" pilot lights are available (option D41). |
| **Automatic Bypass with SMC Plus** [1, 2, 3]<br>(Option BD) | This option provides a means to manually or automatically (upon a drive fault) switch a single motor from drive control to bypass (across the line) operation. An SMC Plus solid state controller provides soft start capability when first switching to bypass operation. Separate Bulletin 100 (where available) contactors are provided for drive output, SMC output and total bypass. All contactors are electrically interlocked. Door-mounted "Drive/Off/Bypass" and "Auto Bypass Off/On" selector switches are provided. Optional "Bypass Mode" and "Auto Bypass Enable On" pilot lights are available (option D42). |
| **Manual Bypass with SMC Plus / Pump Option** [1, 2, 3]<br>(Option BP) | This option provides a means to manually switch a single motor from drive control to bypass (across the line) operation. An SMC Plus (with the pump control option) solid state controller provides soft start and smooth acceleration capability when first switching to bypass operation and smooth deceleration when stopping in bypass. Separate Bulletin 100 (where available) contactors are provided for drive output, SMC output and total bypass. All contactors are electrically interlocked. A door-mounted "Drive/Off/Bypass" selector switch is provided. Optional "Drive Mode" and "Bypass Mode" pilot lights are available (option D41). |
| **Automatic Bypass with SMC Plus/ Pump Option** [1, 2, 3]<br>(Option BC) | This option provides a means to manually or automatically (upon a drive fault) switch a single motor from drive control to bypass (across the line) operation. An SMC Plus (with the pump control option) solid state controller provides soft start and smooth acceleration capability when first switching to bypass operation and smooth deceleration when stopping in bypass. Separate Bulletin 100 (where available) contactors are provided for drive output, SMC output and total bypass. All contactors are electrically interlocked. Door-mounted "Drive/Off/Bypass" and "Auto Bypass Off/On" selector switches are provided. Optional "Bypass Mode" and "Auto Bypass Enable On" pilot lights are available (option D42). |
| **Bypass Mode Circuit Breaker**<br>(Option CC) | This option is for disconnecting power only, and is not intended for branch circuit protection. Branch circuit protection is provided by the bypass fusing option -FM. Most ratings will utilize a motor circuit protector (MCP) type breaker. Where MCP's are not available a circuit breaker will be provided. All switches include handle operators, door interlocking and are padlockable. |
| **Bypass Mode Non-Fused Disconnect Switch**<br>(Option DT) | This option is for disconnecting power only, and is not intended for branch circuit protection. Branch circuit protection is provided by the bypass fusing option -FM. An Allen-Bradley Bulletin 194R rotary switch is provided on A-C frame drives. A flange mount or rotary style switch (1494 F where possible) is provided on D frame drives and larger. All disconnect switches are non-fusible, door interlocked and padlockable. |
| **Bypass Mode Motor Fuse Block**<br>(Option FM) | This option provides a fuse block only. Fuses must be customer supplied and installed. This option is used in conjunction with any bypass option for motor branch circuit protection. |

[1] *The Bypass Operation capability provided by this option is **not** intended for maintenance of the drive or entry into the enclosure with power applied while operating in the bypass mode. Maintenance Bypass (positive lockout) is available as a custom option.*

[2] *Bypass Options do not include the required 120V AC control power. Control power may be supplied remotely by the user, or as part of the drive package by ordering a Control Power option CF, CP or CT – see Options section.*

[3] *SMC style bypass options will include short circuit fusing for the SMC. Once the motor is up to speed it is transferred from the SMC control to total across-the-line operation, which required option FM to have branch circuit protection.*

# Options

## Multi-Pulse Harmonic Mitigation Option

This 1336 PLUS II drive may be quoted with a multi-pulse front end option for use in harmonic mitigation. This feature reduces drive harmonics at the drive input that could be reflected back to the power distribution system. Excessive harmonics can cause component overheating, nuisance tripping and noise transfer to other load surfaces. The hardware supplied with this option will include line fusing, phase shifting input transformer and an AC to DC diode type converter bridge. The traditional AC fed 1336 PLUS II drive will be replaced by a DC common bus equivalent.

**Guidelines for Harmonic Specification IEEE519-1992**
This is a North American standard developed from input provided by utilities, electrical equipment manufacturers and power consumers. Total harmonic distortion limits are recommended based upon the type of installation. **Important: For compliance to this standard refer to the description in the specific option detailed below. For more information on harmonic mitigation and the IEEE519-1992 standard refer to publication Drives-BR007A-EN-P.**

| | |
|---|---|
| **12 Pulse Front End with Auto Transformer**<br>(Option MP12A) | This option provides a 12 pulse drive front end fed by a 12 pulse auto transformer. It does not guarantee meeting the guidelines of harmonic specification IEEE519-1992 without a detailed harmonic analysis. |
| **12 Pulse Front End with Isolation Transformer**<br>(Option MP12N) | This option provides a 12 pulse drive front end fed by a 12 pulse isolation transformer. It does not guarantee meeting the guidelines of harmonic specification IEEE519-1992 without a detailed harmonic analysis. |
| **18 Pulse Front End with Auto Transformer**<br>(Option MP18A) | This option provides an 18 pulse drive front end fed by an 18 pulse auto transformer. It will meet the guidelines of IEEE519-1992 at the drive input terminals provided the input power phases are balanced to within 1%. |
| **18 Pulse Front End with Isolation Transformer**<br>(Option MP18N) | This option provides an 18 pulse drive front end fed by an 18 pulse isolation transformer. It will meet the guidelines of IEEE519-1992 at the drive input terminals provided the input power phases are balanced to within 2%. |

## Motor Interface Options

| | |
|---|---|
| **Blower Motor Starter**<br>(Option MB) | This option provides blower motor fusing, an Allen-Bradley Bulletin 100 contactor and an Allen-Bradley Bulletin 193 Class 10 thermal overload relay. The blower starter is electrically interlocked with the drive enable function or the bypass contactor (if bypass is provided and selected). The blower motor will be assumed to be 1 HP unless motor data is supplied with the order. |
| **Motor Heater Control**<br>(Option MH)<br>(Option MH2) [4] | This option provides the drive control circuitry for an existing motor heater. The heater is interlocked with the drive run relay and will be energized whenever the motor is not running. Option includes a white Motor Heater On pilot light mounted on the enclosure door.<br>(Option MH) Customer supplied remote 120VAC/360W power<br>(Option MH2) 120VAC supplied from drive package |
| **RTD Protection Module** | This option provides a door-mounted RTD sensing module for over temperature and under temperature protection. Each unit will monitor up to (8) motor mounted RTD's and has (3) output relays for alarm, trip and fault. Customer contacts are rated 5A-250V AC res.<br>(Option N6A) 120 Ohm Nickel RTD<br>(Option N7A) 10 Ohm Copper RTD<br>(Option N8A) 100 Ohm Platinum RTD |

## Power Conditioning Options

| | |
|---|---|
| **NEMA Type 1 Line Reactor** [5]<br>(Option LR) Input<br>(Option LQ) Output | This option provides an open core line reactor which mounts inside the NEMA Type 1 drive enclosure. This option may require a larger enclosure than the standard.<br>Reactor Specifications: Iron core, 3% impedance, Class H insulation, 115°C rise, copper wound, 50/60 Hz. |
| **NEMA Type 4/12 Line Reactor** [5]<br>(Option LT) Input<br>(Option LW) Output | This option provides an open core line reactor which mounts inside NEMA Type 4 or 12 drive enclosures. This non-ventilated construction will often require a larger enclosure than the same option in a NEMA-type 1 box.<br>Reactor Specifications: Iron core, 3% impedance, Class H insulation, 115°C rise, copper wound, 50/60 Hz. |
| **Common Mode Choke** [5]<br>(Option CM) | This option will help reduce the common mode noise at the drive output, and help guard against nuisance tripping of the drive caused by capacitive leakage effects. Capacitive currents are larger at higher PWM frequencies. |

## Control and Feedback Options

**Auxiliary Contacts**
(Option JM) Alarm
(Option JT) At Speed
(Option JC) Control Power On
(Option JF) Drive Fault
(Option JR) Drive Run

| Contacts Available | 230V AC | 460V AC-CT | 460V AC-VT | 575V AC |
|---|---|---|---|---|
| **Figure 1** | 0.5-125 HP | 0.5-200 HP | 0.5-250 (292A) HP | 1-300 HP |
| **Figure 2** | — | 250-600 HP | 250 (325A)-600 HP | 350-600 HP |

**Isolated Analog Input**
(Option N3)

This option provides an isolator for the analog input speed reference to the drive and is mounted and wired in the drive enclosure. The default (as shipped) setting will be to accept a remote 4-20mA input. The isolator may be reconfigured by the user to accept any input signal in the range of 0-256V DC or 0-100mA, with or without offset and optional inverse operation. **This option is generally required when both a local speed pot and a remote speed input are utilized.**

**Analog Inputs/Outputs** [7]

All isolated I/O are designed with full galvanic isolation. This results in an isolation withstand capability of 200V AC from each channel to True Earth (TE) ground and between channels.

**Analog Interface – Port A** *(Choose One)*
LA2C Two Isolated Configurable Inputs
LA6C One Isolated Bi-polar Input (±10V or ± 20mA) and one Isolated Thermistor Input
LA7C One Isolated Bi-polar Input (±10V) and One Isolated Configurable Input

**Analog Interface – Port B** *(Choose One)*
LA1C Single-ended, Non-isolated Configurable or Pot & 2 Single-ended, Non-isolated Outputs (1-Configurable, 1-20mA)
LA3C Two Isolated Configurable Outputs
LA4C One Isolated Configurable Input & Output
LA5C One Isolated Pulse Input & Output and One Single-ended, Non-isolated Configurable Output

**3-15 PSI Transducer (Local) Feedback**
(Option N4C) Speed Command
(Option N4T) Speed Trim

This option provides a 4-wire, 3-15 PSI transducer mounted inside the enclosure. The transducer accepts air pressure only with a 1/4" NPT fitting and generates an isolated output of 4-20mA proportional to the input pressure. The 4-20mA signal is fed to the drive as either a speed command or speed trim.

**3-15 PSI Transducer (Remote) Feedback**
(Option N5C) Speed Command
(Option N5T) Speed Trim

This option provides a 2-wire, 3-15 PSI transducer as a loose item for remote mounting. The transducer accepts air or fluid pressure with a 1/4" NPT fitting and generates an isolated output of 4-20mA proportional to the input pressure. The 4-20mA signal is fed to the drive as either a speed command or speed trim.

## Communication Options

**Single Point RIO** [6, 7]
(Option GM1C, GD1C or GMS1C)

RIO communication options provide a single point remote I/O interface board. The board can be configured for 1/4, 1/2, 3/4 or full rack with a baud rate of 57.6, 115, or 230 kBaud. The remote I/O Board may be set up by the user to control drive logic, control speed reference commands, monitor drive status and monitor drive logic.

**RS232/422/485, DF1 or DH485 Protocol** [6, 7]
(Option GM2C, GD2C or GMS2C)

Communication interface module

**DeviceNet** [6, 7]
(Option GM5C, GMS5C, GM6C, GMS6C or GU6C)

DeviceNet to scanport module

[1] *The Bypass Operation capability provided by this option does not allow for maintenance of the drive or entry into the enclosure with power applied while operating in the bypass mode.*

[2] *Bypass Options do not include the required 120V AC control power. Control power may be supplied remotely by the user, or as part of the drive package by ordering a Control Power option CF, CP or CT – see Options section.*

[3] *Where branch circuit protection is required in the drive, option FM should be specified – see Options section.*

[4] *Requires a control power transformer option CF, CP or CT.*

[5] *Contact Allen-Bradley for possible drive enclosure size changes when selecting this option.*

[6] *GM Series Options are drive mounted (maximum of one). GD Series Options are panel mounted, and require 120V AC power. GU Series Options are panel mounted and require 24V DC power.*

[7] *For more information refer to the Standard Drives section.*

# Options

## PLC and SLC Control Options

**PLC Hardware and Mounting** [1, 2]
(Option JL)

This options provides PLC hardware mounted in the drive or option enclosure.
Option includes a maximum of: 4 Position Rack (1771-A1B)
16 Amp Power Supply (1771-P1)
(no programming included)

**SLC 500™ Hardware and Mounting** [1, 2]
(Option JS)

This options provides SLC 500 hardware mounted in the drive or option enclosure.
Option includes a maximum of: 4 Position Rack (1746-A4)
Power Supply (1746-P1)
(No programming included)

## Control Interface Options

**All 1336 PLUS II Packaged Drives come with a 115V AC Control Interface Card (Option L6) as standard unless otherwise specified. 24V AC/DC control and Contact Closure control are available as options. Encoder feedback is also available as an option with any of the three control methods.**

All control interface cards provide input terminals for access to fixed drive functions that include start, stop, auxiliary fault, line loss, output contactor close, speed select, sync, traverse, reset, and enable. Additional inputs are programmed for functions such as reverse, preset speed access, jog, second accel/decel time access and local control selection. The function of each input is defined through programming. For Packaged Drives, functions are pre-programmed at the factory for a specific application and configuration and should not require field programming.

Operator control devices provided as part of the drive package will be interfaced to these same input terminals. All control input terminals are optically isolated from the drive internal control logic.

Optional encoder feedback is available for use with single-ended or differential type encoders. When using a single ended encoder there is a 12V DC power supply available for customer use. Differential encoders will require a user supplied power supply.

**Contact Closure Control Interface** [3]
(Option L4C) Without Encoder Feedback
(Option L7EC) With Encoder Feedback

Circuits used with Option L4C or L7EC must be capable of operating with **low = true logic.**
In the low state,external circuits must be capable of a sinking current of approximately 10 mA to pull the terminal voltage low to 3.0V DC or less.

In the high state, external circuits must allow the terminal voltage to rise to a voltage of 4.0-5.0V DC.

**Note:** Reed type input devices are recommended.

The L4C/L7EC option is compatible with the following Allen-Bradley PLC modules:
- 1771-OYL
- 1771-OZL

**+24V AC/DC Control Interface** [3]
(Option L5C) Without Encoder Feedback
(Option L8EC) With Encoder Feedback

Circuits used with Option L5C or L8EC 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 AC. 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 L5C/L8EC option is compatible with the following Allen-Bradley PLC modules:
- 1771-OB
- 1771-OBN
- 1771-OQ16
- 1771-OZL
- 1771-OB16
- 1771-OBD
- 1771-OQ
- 1771-OYL
- 1771-OBB

**115V AC Control Interface** [3]
(Standard L6 Interface) Without Encoder Feedback
(Option L9EC) With Encoder Feedback

Circuits used with the standard L6 interface or Option L9EC 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 L6C/L9EC option is compatible with the following Allen-Bradley PLC modules:
- 1771-OW
- 1771-OWN
- 1771-OA
- 1771-OAD (Contact Factory for Recommended Series/Rev. Level)

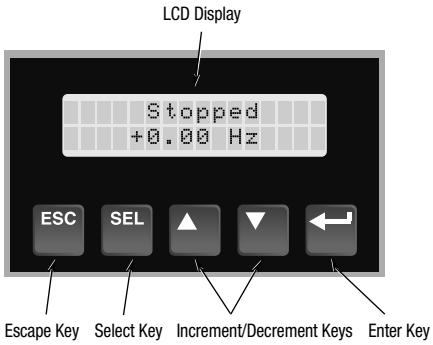
[1] *Rack size will impact enclosure size. Contact Allen-Bradley for possible enclosure size changes.*

[2] *Actual hardware list will be determined at time of order entry.*

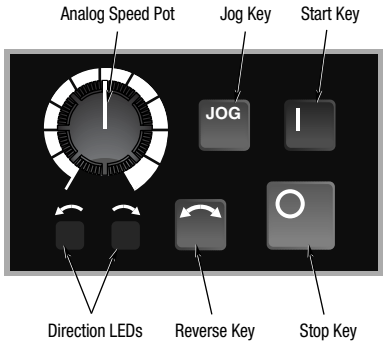
[3] *For more information refer to the Standard Drives section.*

## Human Interface Modules – NEMA Type 1 and 12 Door Mounted HIMS

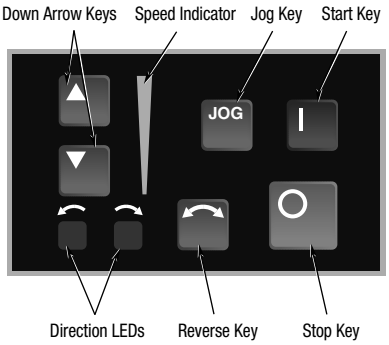
**Programming Panel**
(Standard on all Human Interface modules)




**Control Panel with Analog Speed Pot**
(Option HA1C)




**Control Panel with Digital Speed Pot**
(Option HA2C and HJ2C)

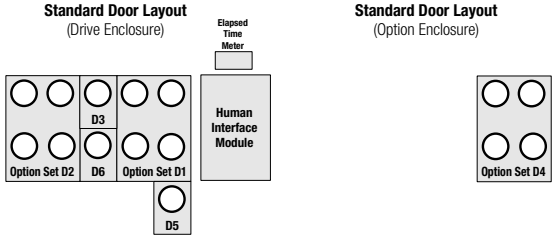



| | |
|---|---|
| **NEMA Type 1 Drive Mounted HIMS** | |
| (Option HNSBC) | Blank – No Functionality |
| (Option HNSPC) | Program Only |
| (Option HNS1C) | Program/Control with Analog Speed Pot |
| (Option HNS2C) | Program/Control with Digital Speed Pot |
| **NEMA Type 1 Door Mounted HIMS** | |
| (Option HABC) | Blank – No Functionality |
| (Option HAPC) | Program Only |
| (Option HA1C) | Program/Control with Analog Speed Pot |
| (Option HA2C) | Program/Control with Digital Speed Pot |
| **NEMA Type 12 Door Mounted HIMS**[1] | |
| (Option HJPC) | Program Only |
| (Option HJ2C) | Program/Control with Digital Speed Pot |
| **Handheld** | A separate handheld module may be connected to the drive. Maximum cable length is 33 feet (10 meters) |

[1] *Not removable from the door as with NEMA Type 1 HIMS.*

# Options

## Door-Mounted Operator Devices

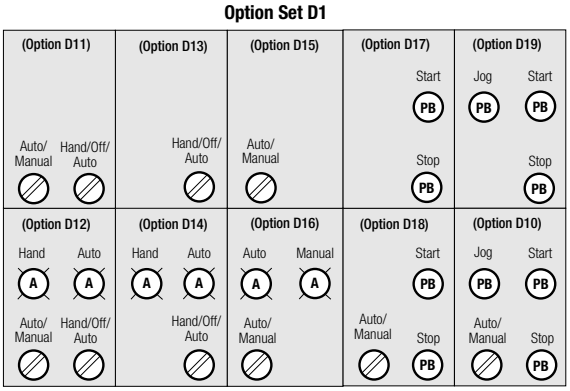



Operator devices specified in the drive catalog number are supplied mounted and wired on the enclosure door. The Standard Door Layouts shown indicate the mounting locations of door mounted options or option groups.

The operator device options listed below are logically grouped into sets. Only one option code selection may be made from each set. Where possible, Allen-Bradley Bulletin 800E style operator devices will be supplied.

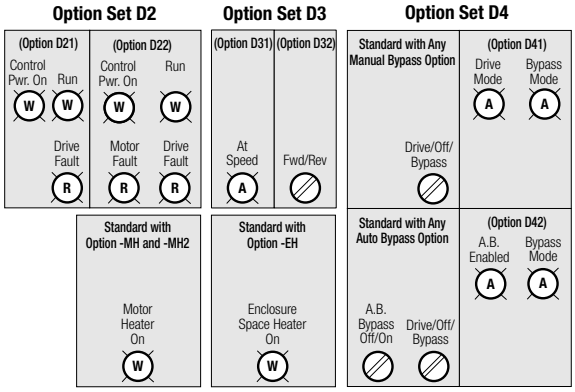
Description Code: **PB** = Pushbutton **SS** = Selector Switch
**PL** = Pilot Light **POT** = Potentiometer
**MHPB** = Mushroom Head Pushbutton

Legend plates will be 30 mm x 50 mm, black with white lettering.




**Option Set D1**

| | |
|---|---|
| (Option D10) | Start **PB**, Stop **PB**, Jog **PB**, & Auto/Manual **SS** |
| (Option D11) [1] | Hand/Off/Auto (start/stop only) **SS** & Auto/ Manual (speed reference only) **SS** |
| (Option D12) [1] | D11 Options plus Hand **PL** & Auto **PL** |
| (Option D13) [1] | Hand/Off/Auto (start/stop/speed ref.) **SS** |
| (Option D14) [1] | D13 Option plus Hand **PL** & Auto **PL** |
| (Option D15) [1] | Auto/Manual (speed reference only) **SS** |
| (Option D16) [1] | D15 Option plus Auto **PL** & Manual **PL** |
| (Option D17) | Start **PB** & Stop **PB** |
| (Option D18) | Start **PB**, Stop **PB** & Auto/Manual **SS** |
| (Option D19) | Start **PB**, Stop **PB** & Jog **PB** |




**Option Set D2**

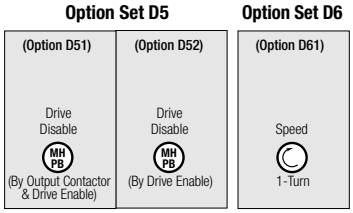
| | |
|---|---|
| (Option D21) | Control Power On **PL**, Run **PL** & Drive Fault **PL** |
| (Option D22) [2] | D21 Options plus Motor Fault **PL** |

**Option Set D3**

| | |
|---|---|
| (Option D31) | At Speed **PL** |
| (Option D32) | Forward/Reverse **SS** |

**Option Set D4**

| | |
|---|---|
| (Option D41) [3] | Drive Mode **PL** & Bypass Mode **PL** |
| (Option D42) [4] | Auto Bypass Enabled On **PL** & Bypass Mode **PL** |




**Option Set D5** Drive Disable (push-pull) **MHPB**

| | |
|---|---|
| (Option D51) [5] | For Use with Drive Output Contactor & Drive Enable |
| (Option D52) [6] | For Use with Drive Enable Only |

**Option Set D6**

| | |
|---|---|
| (Option D61) | Speed **POT**, 1-Turn, NEMA Type 1/4/12 |

**Option Set D9**

| | |
|---|---|
| (Option D91) | Convert the normally supplied A-B Bulletin 800E Style Operator Devices to A-B Bulletin 800T Style |

[1] *Refer to Operator Device Function Guide in the Options section.*

[2] *D22 must be used in conjunction with a Thermal Overload or Bypass Option.*

[3] *D41 must be used with a Manual Bypass Option.*

[4] *D42 must be used with an Auto Bypass Option.*

[5] *D51 must be used in conjunction with an Output Contactor or Bypass Option.*

[6] *D52 cannot be used with a Bypass Option.*

## Operator Device Function Guide

| | | Drive Start Control | | | | Drive Stop Control | | | | Drive Speed Reference | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Option | Device Mode | Pushbutton or Selector Switch | H.I.M. With Control | Remote Contact | None | Pushbutton or Selector Switch | H.I.M. With Control | Remote Contact | None | H.I.M. Options With Control Parameter #5 = Adapter 1 | Defined by Drive Parameter [1] | None |
| D10 | Start/ Stop/ Jog | • • | | | | • • | | | | | | • • |
| | Auto/ Manual | | | | • • | | | | • • | • | • | |
| D11 & D12 | Hand/ Off/ Auto | • | • | • | | • | • • | • | | | | • • • |
| | Auto/ Manual | | | | • • | | | | • • | • | • | |
| D13 & D14 | Hand/ Off/ Auto | • | • | • | | • | • • | • | | • | • | • |
| D15 & D16 | Auto/ Manual | | | | • • | | | | • • | • | • | |

[1] *The function of the "Auto Mode" speed reference is dependent upon the programming of [Freq Select 2], parameter 6 in the drive. The use of an Analog Input Card is recommended for any analog signal being fed to the drive. The function of the "Jog" mode is dependent upon the programming of [Jog Freq], parameter 24 in the drive.*

## Meter Options

**Motor Run Time Meter**
(Option ET)

Elapsed Time Meter

This option provides a digital, non-resettable, door-mounted elapsed time meter. The meter is electrically interlocked with the Drive Run relay and Bypass contactor (if supplied) to indicate actual motor operating hours.
(**Note:** The standard internal drive elapsed time meter requires a HIM for viewing and is not operable in the bypass mode.)

**Line Metering System, Deluxe**
(Option MQ2)

This option provides a Powermonitor II unit at the point of incoming power to the drive package. Option includes a powermonitor and a single display. Current transformers are supplied as necessary.

**Line Metering System, Basic**
(Option MQ3)

This option provides a Powermonitor 3000 unit at the point of incoming power to the drive package. Option includes a powermonitor and a single display. Current transformers are supplied as necessary.

## Enclosure Options

**Voltage Barriers**
(Option EB)

Protective covers for line side of disconnect switch, door-mounted devices above 50V (except for devices with finger safe terminals), and any foreign voltage sources.

**Floor Stand**
(Option EF1) 12" High
(Option EF2) 24" High

This option converts a wall-mounted enclosure to a floor-mounted enclosure and adds 12" or 24" to the height of the enclosure. Special consideration should be given to the final height of the drive package and corresponding operator devices.

**Nameplate**
(Option ET)

Pin or screw-mounted 6.25" x 2" door-mounted white lamacoid nameplate with black letters. The message is defined by the customer at order entry – if no definition is supplied, the nameplate is shipped blank for customer engraving.

**Special Paint** (Option EP1) 1-color, (Option EP2) 2-color, (Option EP3) 3-color

Special color(s) and/or type of paint. A manufacturer's specification number and/or paint chip will be required at order entry. (**Note**: A special primer specification is considered as one color.)

**Space Heater, Remote Powered**
(Option EH)

Provides (1) enclosure space heater to help prevent condensation inside the enclosure during periods of drive inactivity. Space heater is energized whenever drive power is removed (requires a remote 120V AC power source). Option includes a 180W fin strip type heater and a white Enclosure Space Heater On pilot light mounted on the enclosure door. If remote power is not available, refer to option EH2.

**Space Heater, Locally Powered**
(Option EH2) Requires a control power transformer option CF, CP or CT

Provides (1) enclosure space heater to help prevent condensation inside the enclosure during periods of drive inactivity. Space heater is energized whenever the drive is not in Run status. If the space heater is required to run when drive power is removed refer to option EH

**Filtered Door Openings Only**
(Option EC)

This option provides washable metal mesh filters on the outside of the enclosure door and over all other vented openings. This option applies only to NEMA Type 1 drives.

**Gasketed with Filtered Door Openings**
(Option EG)

This option provides filtering as described in option EC. In addition all doors and wall panels will be gasketed as necessary to prevent unfiltered air from entering the enclosure.

# Options

## Codes and Standards

| Code/Standard | Action |
|---|---|
| **CE** (European Conference Standard) | Consult the factory with requirements to meet the separate Low Voltage and/or EMC directives. In most cases Packaged Drives qualify for "Restricted Industrial" applications and will only require meeting the Low Voltage directive. |
| **IEEE519** (Harmonic Distortion Levels) | Provide a one-line plant power distribution drawing, and the associated harmonic specification to the factory, for review. A software-based harmonic analysis will be performed to determine actual harmonic mitigation requirements. |
| **UL, C-UL (CSA)** | Add a "-UL" option to the catalog string at no charge. This option provides UL panel recognition from the factory. |

## Drawing and Test Options

| | |
|---|---|
| **Approval Drawings**<br>Cat. No. 1301-APPDWG (Black & Whites)<br>Cat. No. 1301-APPRV (Velumes) | One set 11" x 17" electrical schematics and enclosure outlines – see sample drawings at the back of this publication.<br>**Further engineering and manufacture of drive held until drawings are returned approved by the customer and any changes are approved by the manufacturer.** |
| **Manufacturing Drawings**<br>Cat. No. 1301-MFDWG (Black & Whites)<br>Cat. No. 1301-MFRV (Velumes) | One set 11" x 17" electrical schematics and enclosure outlines – see sample drawings at the back of this publication.<br>**Information Only – Does not affect drive manufacturing. Availability is typically 2-3 weeks prior to shipment of the drive(s).** |
| **Final Drawings**<br>Cat. No. 1301-FINDWG (Black & Whites)<br>Cat. No. 1301-FINRV (Velumes)<br>Cat. No. 1301-FINRM (Mylar) | One set 11" x 17" electrical schematics and enclosure outlines – see sample drawings at the back of this publication.<br>**Same drawings as shipped with the configured drive instruction book** |
| **Special Drawings and Reports** | |
| Cat. No. 1301-TESTR | Test Report, Configured Drive Only – Certifies that the configured drive has gone through test. |
| Cat. No. 1301-CERMTR | Certified Motor Dimension Drawing. |
| Cat. No. 1301-CERXFR | Certified Transformer Dimension Drawing. |
| Cat. No. 1301-CERLR | Certified Line Reactor Dimension Drawing – Not available if mounted in the drive enclosure. |
| Cat. No. 1301-DISK | AutoCAD™ Disk copy of order schematics after order has shipped. |
| Cat. No. 1301-HARM1 | Basic Harmonic Analysis – Pre-order review of customer's one-line power distribution diagram. |
| Cat. No. 1301-HARM2 | Complete Harmonic Analysis – Post order detailed Harmonic Spectrum Analysis followed up with a written report. |
| Cat. No. 1301-HARM3 | Deluxe Harmonic Analysis – Post order site verification of actual harmonics, detailed Spectrum Analysis and written report. |
| Cat. No. 1301-WT | Witness Test – Customer viewing of A-B standard test procedures only. Additional tests and documentation per customer requirements are also available. |

## Custom Drive Firmware Options

| | |
|---|---|
| **2 Second Power Loss Fault Delay** [1]<br>(Option EN910) | Implementation of a 2 second power loss fault delay time. The timer is engaged when the [Line Loss Fault] parameter is enabled and bus voltage drops below 85%, but above minimum bus voltage. |
| **MOP Reset On Stop**<br>(Option EN935) | MOP frequency source is programmed to reset to zero following a stop. |
| **60 Hertz Maximum Frequency**<br>(Option EN945) | Maximum frequency of the drive is limited to 60 Hz. |

[1] *This option should not be used with other packaged drive options that do not have power fault delay capability.*

## Installation Guidelines

The information in the remaining sections of this document is very useful in making pre-installation decisions. Consideration should be given to enclosure type (environment), enclosure size (mounting area available and mounting convention), panel layouts (customer wiring connection locations and extra customer mounting area), terminal block descriptions (what connections land where) and catalog number definition (how do I order exactly what I need?). **Pay special attention to all footnotes and carefully read all warnings.**

**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.

**ATTENTION:** The drive disable circuitry only shuts off the power transistors or opens an output contactor. Both functions disable inherent or optional dynamic braking effects.

If hazards of injury due to contact with moving machinery or unintentional flow of liquid, gas or solids exist, it is the user's responsibility to provide an additional hardwired stop circuit in accordance with applicable codes and standards.

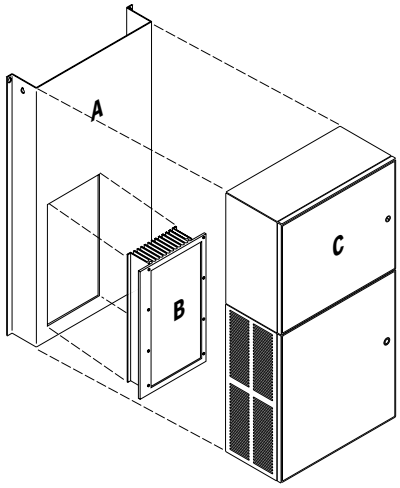
## Enclosure Types

Packaged Drives are assembled in NEMA Type 1, 4 or 12 enclosures with the heatsinks mounted out the back wherever possible. G frame drives and certain special NEMA ratings will require internally-mounted heatsinks. Each enclosure type lends itself to a particular type of protection and environment. The enclosures detailed below do not normally protect electrical equipment from condensation, corrosion or contamination which may occur within the enclosure or enter via the conduit or unsealed openings. Users must make adequate provisions to safeguard against such conditions, and satisfy themselves that the equipment is properly protected. Other enclosure types are available by custom quotation. For further information on criteria associated with NEMA enclosure ratings, refer to NEMA Standards **Publication NO. 250-1991.**

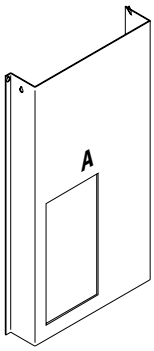
| | |
|---|---|
| **IP20 NEMA Type 1** | Type 1 enclosures are intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment in locations where unusual service conditions do not exist. The enclosures are designed to meet the rod entry and rust resistance design tests. Slotted openings in the enclosure sides or door(s) allow for free exchange of inside and outside air. |
| **IP54 NEMA Type 12** | Type 12 enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt and dripping non-corrosive liquids. They are designed to meet drip, dust and rust resistance tests. There are no ventilation openings within the enclosure to allow free exchange of inside and outside air. Closed loop auxiliary cooling may be required for higher HP ratings. Specifications calling for NEMA-12 ventilated enclosures should be reviewed with the factory. |
| **IP65 NEMA Type 4** | Type 4 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, and hose directed water, and to be undamaged by the formation of ice on the enclosure. They are designed to meet hose-down, dust, external icing and rust resistance design tests. Doors and openings will be gasket sealed. There are no ventilation openings within the enclosure to allow for free exchange of inside and outside air. Closed loop auxiliary cooling may be required for higher HP ratings. |

# Enclosures Specifications

## Material Specifications

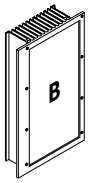



### A Back Plate Chassis for Heatsink



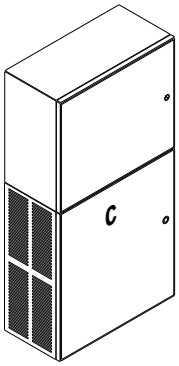

| Frame | Material | Finish | Finish Spec. |
|---|---|---|---|
| A1-C | 12 GA. Sheet Steel | A-B Standard Light Gray Paint (Low Gloss)<br>A-B Standard Light Gray Paint (Powder Coat Low Gloss) | (NEMA Type 1) 40001-109-08 ASA 61 GRAY<br>(NEMA Type 4/12) 40001-108-04 |
| D-E | 12 GA. Sheet Steel | A-B Standard Gray Paint | (NEMA Type 1/12) 40001-109-02 ASA 49 GRAY |
| F-G | 12 GA. Sheet Steel | A-B Standard Gray Paint | (NEMA Type 1/12) 40001-109-02 ASA 49 GRAY |

### B Heatsink




| Frame | Material | Finish | Finish Spec. |
|---|---|---|---|
| A-G | Aluminum | Bronze Chromate | 40001-058 |

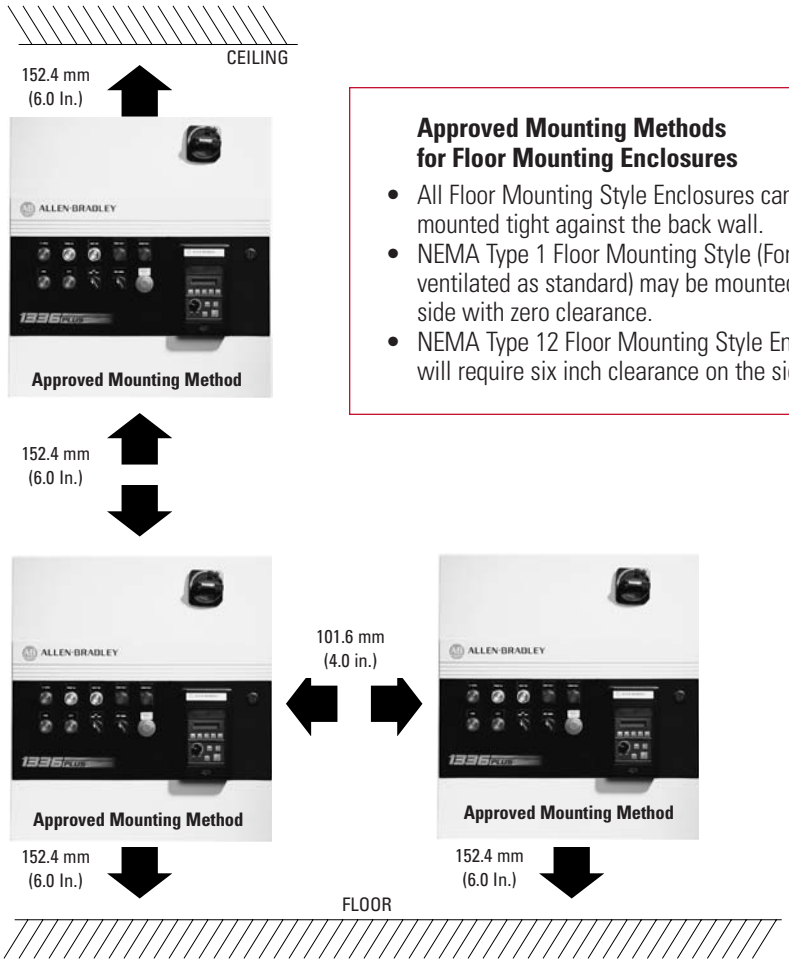
### C Enclosure




| Frame | Material | Finish | Finish Spec. |
|---|---|---|---|
| A1-C | 14 GA. Sheet Steel | A-B Standard Light Gray Paint | (NEMA Type 1) 40001-109-08 ANSI 49 GRAY<br>(NEMA Type 4/12) 40001-108-04 |
| D-G | 12 GA. Sheet Steel | A-B Standard Light Gray Paint | (NEMA Type 1/12) 40001-109-02 ASA 49 GRAY |

## Mounting and Spacing Requirements

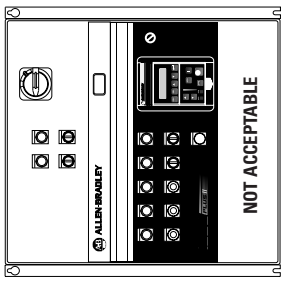
### Approved Mounting Methods for Wall Mounting Enclosures

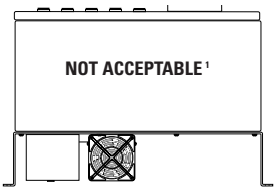



**Approved Mounting Methods for Floor Mounting Enclosures**

- 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 PLUS II 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.

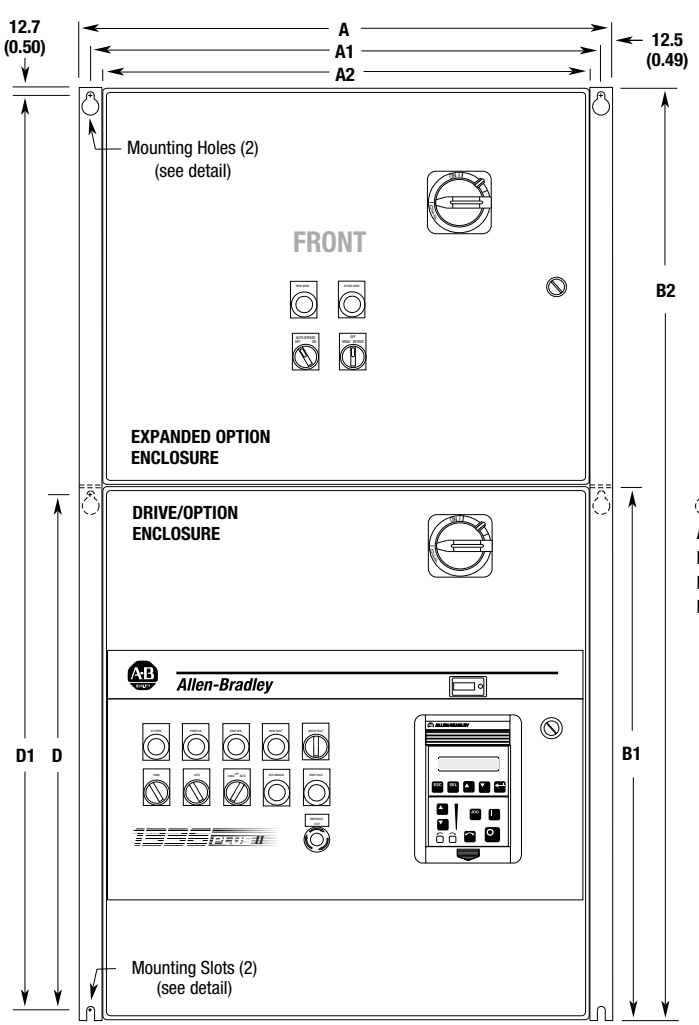
The basic rules for determining if a line reactor or isolation type transformer is required are as follows:

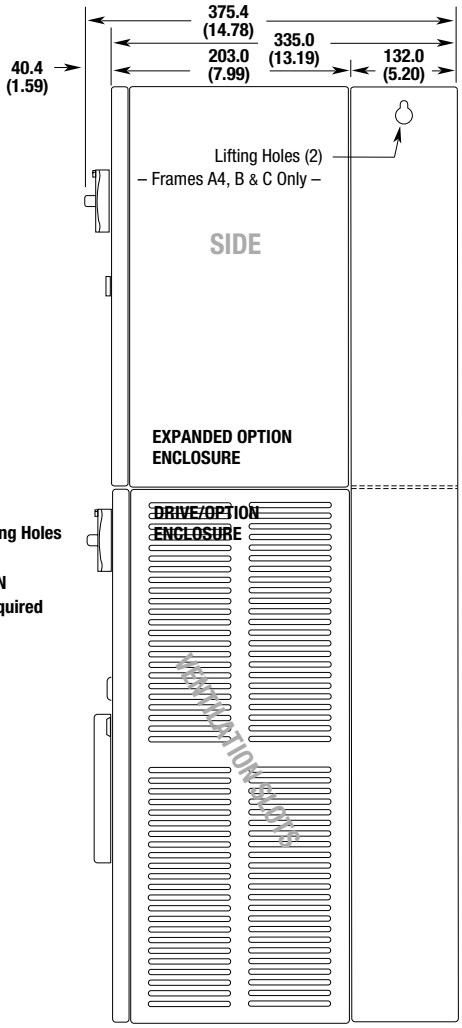
1. If the AC input power system does not have a neutral or one phase referenced to ground (Refer to **Ungrounded Distribution Systems**), an isolation transformer with the neutral of the secondary grounded is highly recommended. If the line-to-ground voltages on any phase can exceed 125% of the nominal 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.

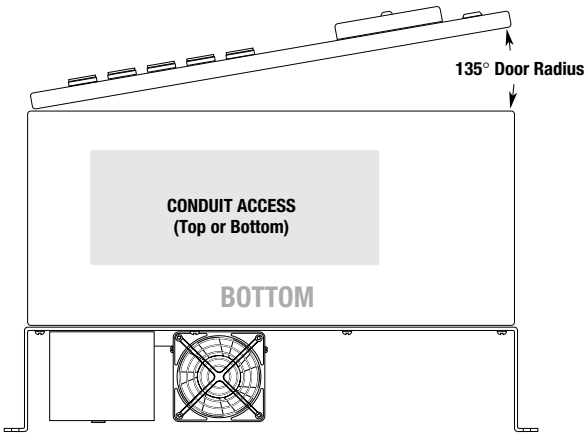
# Dimensions

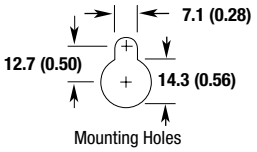
## IP20 (NEMA Type 1) Dimensions For A-C Frame Drives

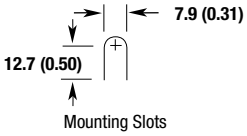



**Additional Mounting Holes Not Present When EXPANDED OPTION ENCLOSURE Is Required**



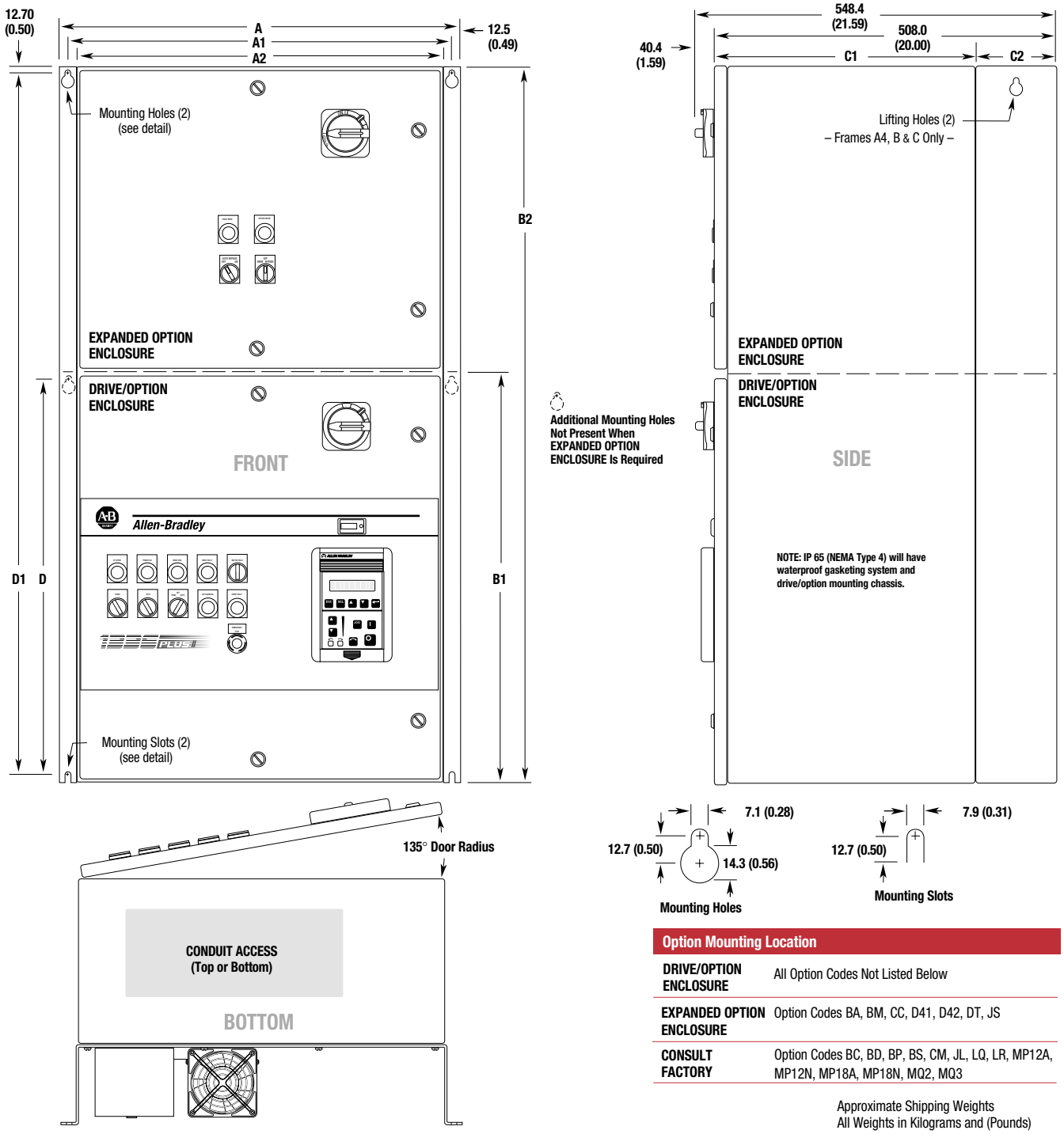




| Option Mounting Location | |
|---|---|
| **DRIVE/OPTION ENCLOSURE** | All Option Codes Not Listed Below |
| **EXPANDED OPTION ENCLOSURE** | Option Codes BA, BM, CC, D41, D42, DT, JS |
| **CONSULT FACTORY** | Option Codes BC, BD, BP, BS, CM, JL, LQ, LR, MP12A, MP12N, MP18A, MP18N, MQ2, MQ3 |

Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

| Three-Phase Ratings | | | | All Dimensions in Millimeters and (Inches) | | | | | | | Drive/Option Enclosure Only | Drive/Option and Expanded Option Enclosures |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Frame** | **230V** | **460V** | **575V** | **A** | **A1** | **A2** | **B1** | **B2** | **D** | **D1** | | |
| **A1-A3** | 0.37-3.7 kW<br>0.5-5 HP | 0.37-3.7 kW<br>0.5-5 HP | —<br>— | 655.0<br>(25.79) | 630.0<br>(24.80) | 600.0<br>(23.62) | 500.0<br>(19.69) | 1000.0<br>(39.37) | 475.0<br>(18.70) | 975.0<br>(38.39) | 35<br>(75) | 65<br>(140) |
| **A4 or B** | 5.5-11 kW<br>7.5-15 HP | 5.5-22 kW<br>7.5-30 HP | 0.75-15 kW<br>1-20 HP | 655.0<br>(25.79) | 630.0<br>(24.80) | 600.0<br>(23.62) | 650.0<br>(25.59) | 1150.0<br>(45.28) | 625.0<br>(24.61) | 1125.0<br>(44.29) | 60<br>(130) | 110<br>(243) |
| **C** | 15-22 kW<br>20-30 HP | 30-45 kW<br>40-60 HP | 19-45 kW<br>25-60 HP | 855.0<br>(33.66) | 830.0<br>(32.68) | 800.0<br>(31.50) | 900.0<br>(35.43) | 1550.0<br>(61.02) | 875.0<br>(34.45) | 1525.0<br>(60.04) | 95<br>(210) | 145<br>(320) |

## IP54 (NEMA Type 12) and IP 65 (NEMA TYPE 4) Dimensions For A-C Frame Drives



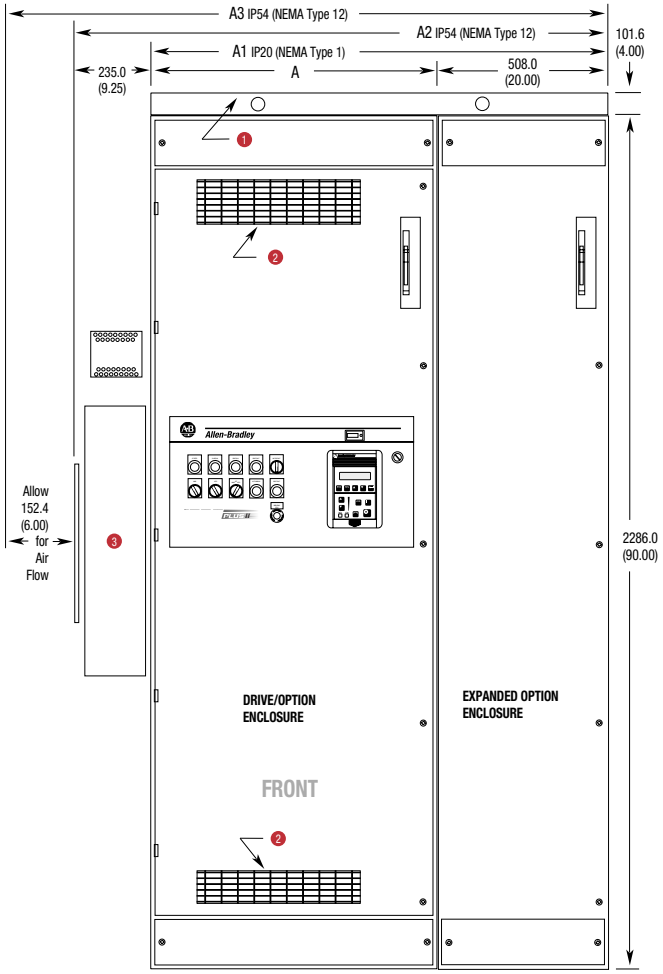

| Option Mounting Location | |
|---|---|
| DRIVE/OPTION ENCLOSURE | All Option Codes Not Listed Below |
| EXPANDED OPTION ENCLOSURE | Option Codes BA, BM, CC, D41, D42, DT, JS |
| CONSULT FACTORY | Option Codes BC, BD, BP, BS, CM, JL, LQ, LR, MP12A, MP12N, MP18A, MP18N, MQ2, MQ3 |

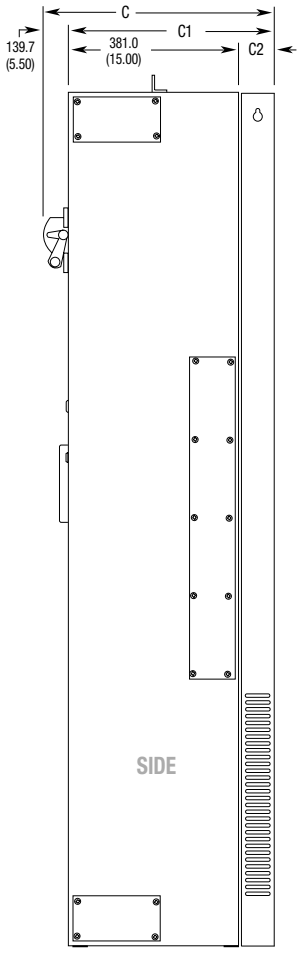
Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

| Frame | Three-Phase Ratings 230V | 460V | 575V | All Dimensions in Millimeters and (Inches) A | A1 | A2 | B1 | B2 | C1 | C2 | D | D1 | Drive/Option Enclosure Only | Drive/Option and Expanded Option Enclosures |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1-A3 | 0.37-3.7 kW 0.5-5 HP | 0.37-3.7 kW 0.5-5 HP | — — | 664.7 (26.17) | 639.8 (25.19) | 609.6 (24.00) | 685.8 (27.00) | 1193.8 (47.00) | 407.9 (16.06) | 100.1 (3.94) | 660.9 (26.02) | 1168.9 (46.02) | 50 (110) | 79 (175) |
| A4 or B | 5.5-11 kW 7.5-15 HP | 5.5-22 kW 7.5-30 HP | 0.75-15 kW 1-20 HP | 918.7 (36.17) | 893.8 (35.19) | 863.6 (34.00) | 939.8 (37.00) | 1549.4 (61.00) | 375.9 (14.80) | 132.0 (5.20) | 914.9 (36.02) | 1524.5 (60.02) | 77 (170) | 129 (285) |
| C | 15-22 kW 20-30 HP | 30-45 kW 40-60 HP | 19-45 kW 25-60 HP | 918.7 (36.17) | 893.8 (35.19) | 863.6 (34.00) | 1320.8 (52.0) | 1930.4 (76.0) | 375.9 (14.80) | 132.0 (5.20) | 1295.9 (51.02) | 1905.5 (75.02) | 116 (255) | 166 (365) |

# Dimensions

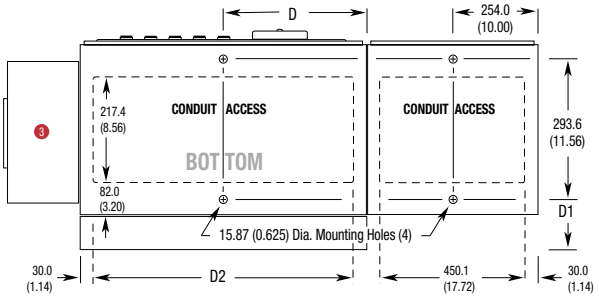
## IP20 (NEMA Type 1) and IP54 (NEMA Type 12) For D-E Frame Drives

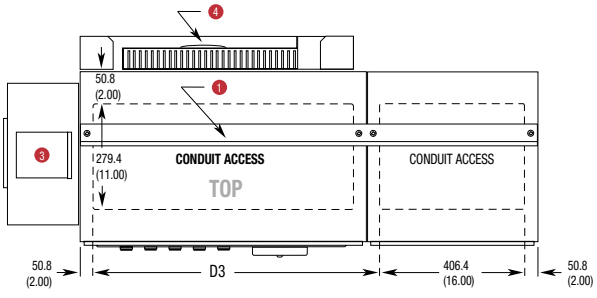



| Option Mounting Location | |
|---|---|
| **DRIVE/OPTION ENCLOSURE** | All Option Codes Not Listed Below |
| **EXPANDED OPTION ENCLOSURE** | Option Codes BA, BM, CC, D41, D42, DT and JS |
| **CONSULT FACTORY** | Option Codes BC, BD, BP, BS, CM, JL, LQ, LR, LT, LW, MP12A, MP12N, MP18A, MP18N, MQ2 and MQ3 |

1. Removable Lifting Angle
2. Vented Areas — IP20 (NEMA Type 1) Only
3. Air Conditioner — IP54 (NEMA Type 12) Only
4. Heatsink (Fan Accessible from Inside of Enclosure)

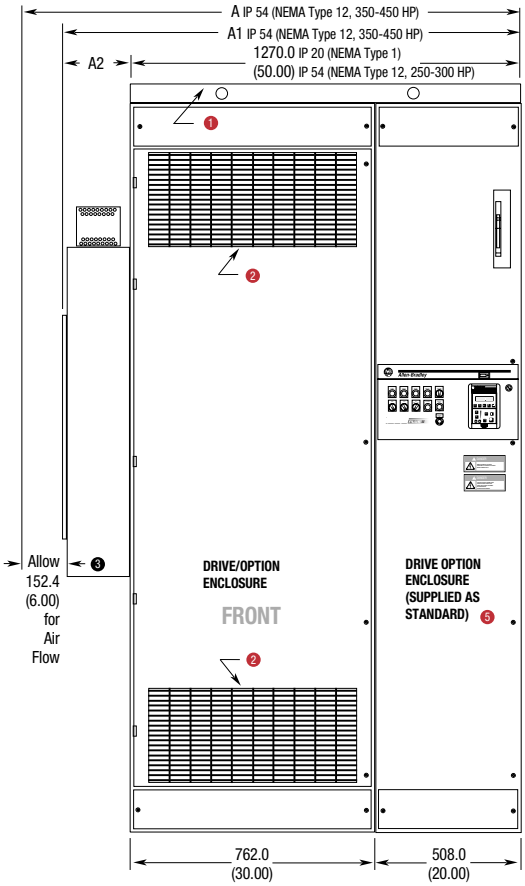


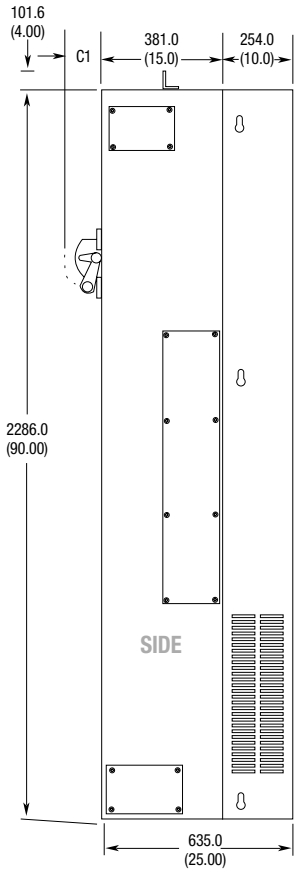



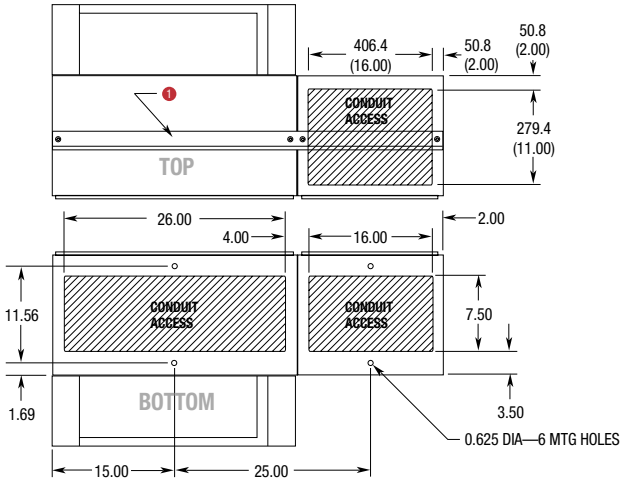

Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

| Frame | Three-Phase Ratings 230V | 460V-CT | 460V-VT | 575V | All Dimensions in Millimeters and (Inches) A | A1 | A2 | A3 | C | C1 | C2 | D | D1 | D2 | D3 | Drive/Option Enclosure Only IP20 (NEMA Type 1) | IP 54 (NEMA Type 12) | Drive/Option & Expanded Option Enclosures IP 20 (NEMA Type 1) | IP54 (NEMA Type 12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **D** | 30-45 kW<br>40-60 HP<br>(120-180 A) | 45-112 kW<br>60-150 HP<br>(85-180 A) | 56-112 kW<br>75-150 HP<br>(96-180 A) | 56-93 kW<br>75-125 HP<br>(85-138 A) | 635.0<br>(25.00) | 1143.0<br>(45.00) | 1378.0<br>(54.25) | 1530.4<br>(60.25) | 607.1<br>(25.75) | 466.1<br>(20.21) | 85.1<br>(5.21) | 317.5<br>(12.50) | 128.0<br>(6.90) | 576.6<br>(22.70) | 533.4<br>(21.00) | 386<br>(850) | 436<br>(960) | 522<br>(1150) | 572<br>(1260) |
| **E** | 56-93 kW<br>75-125 HP<br>(240-325 A) | 112-187 kW<br>150-250 HP<br>(199-325 A) | 149-187 kW<br>200-250 HP<br>(240-325 A) | 112-149 kW<br>150-300 HP<br>(158-300 A) | 889.0<br>(35.00) | 1397.0<br>(55.00) | 1632.0<br>(64.25) | 1784.4<br>(70.25) | 654.1<br>(25.75) | 513.3<br>(20.21) | 132.3<br>(5.21) | 444.5<br>(17.50) | 175.3<br>(6.90) | 830.6<br>(32.70) | 787.4<br>(31.00) | 408<br>(900) | 458<br>(1010) | 544<br>(1200) | 594<br>(1310) |

## IP20 (NEMA Type 1) and IP54 (NEMA Type 12) Dimensions for F Frame Drives without Bypass




| Option Mounting Location | |
|---|---|
| **Mountable Option List** | CB, CF, CP, CT, DS, D1__, D2_, D3_, D5_, E__, D61, D91, GM_C, GD_C, GMS_C, HA__, HJ__, HN__, JC, JF, JM, JR, JT, K_, L__, L___, M_, M__, N3_, N__, UL |
| **Consult Factory Option List** | JL, JS, LQ, LT, LR, LW, MP12N, MP18A, MP12A, MP18N, MQ2, MQ3 |

1. Removable Lifting Angle
2. Vented Areas — IP20 (NEMA Type 1) Only
3. Air Conditioner — IP54 (NEMA Type 12) 350-450 HP Only
4. 350 HP Dimension is actually 139.7 (5.50)
5. **Special Smaller Enclosure**

   A single 762 mm (30 In.) wide enclosure may be used if the option list requirements below are met. Consult factory for custom quotation in all cases.

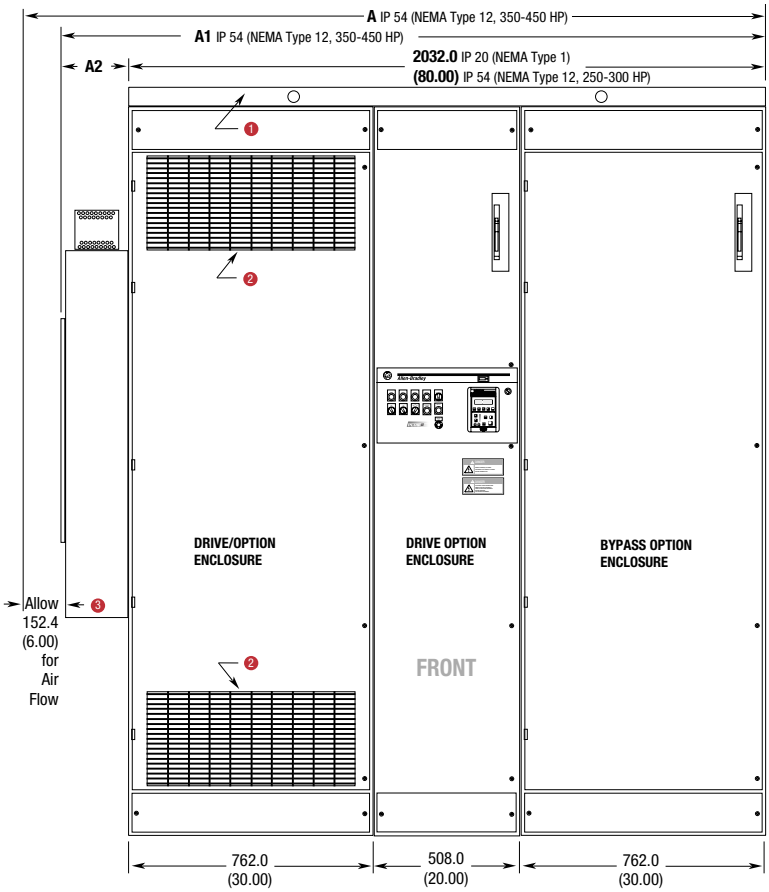
   Any combination of:
   CM, D10-D91, EC, EP, ET, GD1C, GD2C, GM1C, GM2C, GM5C, JC, JF, JM, JR, JT, L4C, L5C, L4EC, L5EC, L6EC, LA_C, ME, all HIMs and a max. of (1) CF, EB EH, N3, N4C, N4T, N5C, N5T or N9.

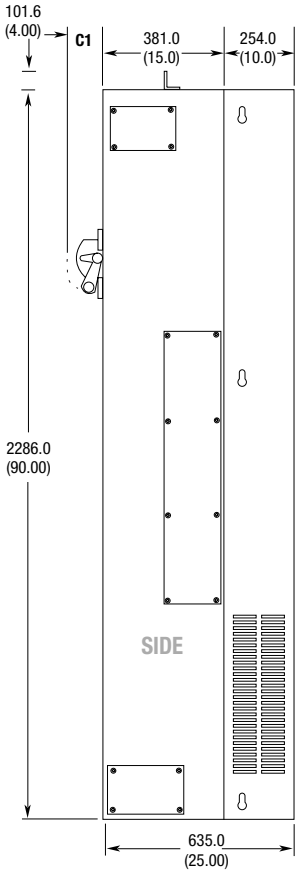
Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

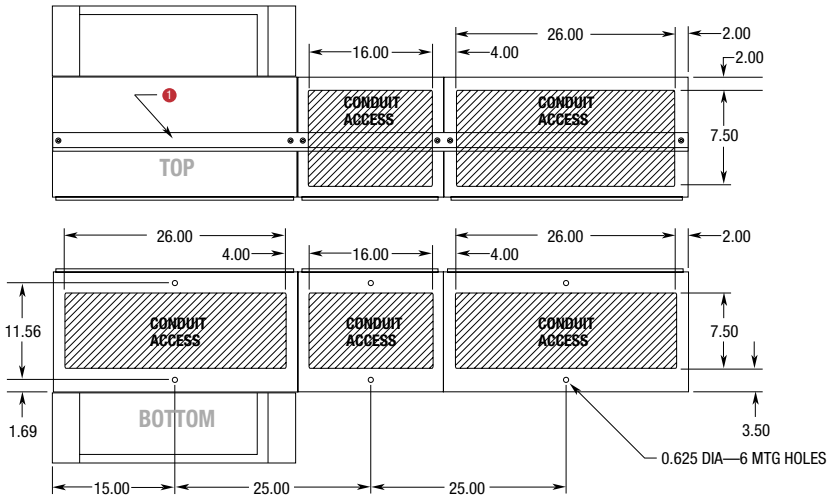
| Frame | Three-Phase Ratings 460V-CT | 460V-VT | 575V | All Dimensions in Millimeters and (Inches) A | A1 | A2 | C1 | Drive and Drive Option Enclosures IP 20 (NEMA Type 1) | IP54 (NEMA Type 12) |
|---|---|---|---|---|---|---|---|---|---|
| F | 187-224 kW<br>250-300 HP<br>(325-360 A) | 224 kW<br>300 HP<br>(360 A) | —<br>—<br>— | NOT APPLICABLE – NO AIR CONDITIONER REQUIRED | | | 139.7<br>(5.50) | 624<br>(1375) | 624<br>(1375) |
| | 261-336 kW<br>350-450 HP<br>(425-525 A) | 261-336 kW<br>350-450 HP<br>(425-525 A) | 261-298 kW<br>350-400 HP<br>(425-475 A) | 1657.4<br>(65.25) | 1422.4<br>(56.0) | 234.9<br>(9.25) | 215.9 [4]<br>(8.50) [4] | 624<br>(1375) | 805<br>(1775) |

# Dimensions

## IP20 (NEMA Type 1) and IP54 (NEMA Type 12) Dimensions for F Frame Drives with Bypass




### Option Mounting Location

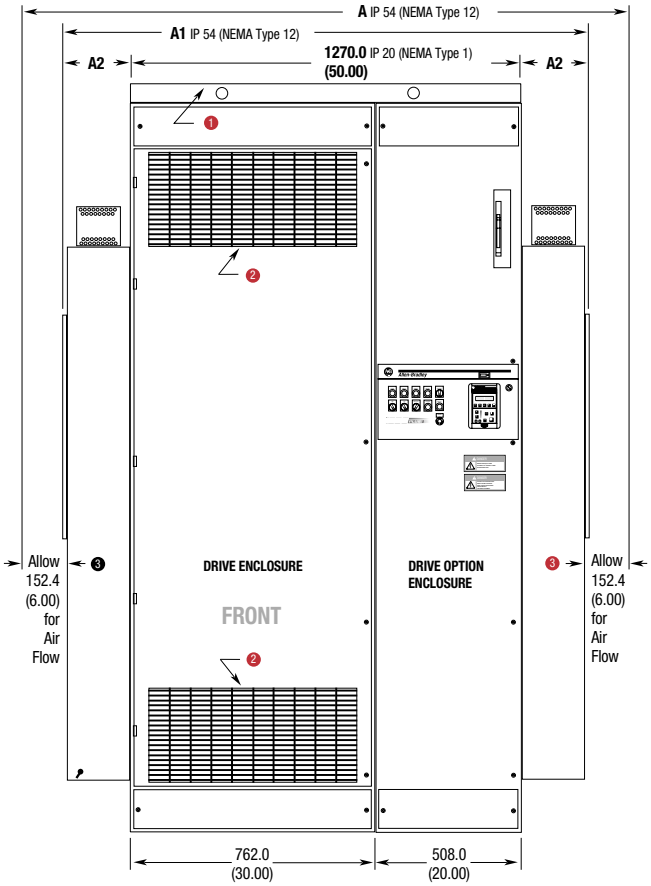
| | |
|---|---|
| **Mountable Option List** | Option Codes From Previous Page Plus BA, BM, CC, D41, D42, DT, FM |
| **Consult Factory Option List** | Option Codes From Previous Page Plus BC, BD, BP, BS, MP12A, MP12N, MP18A, MP18N, MQ2, MQ3 |

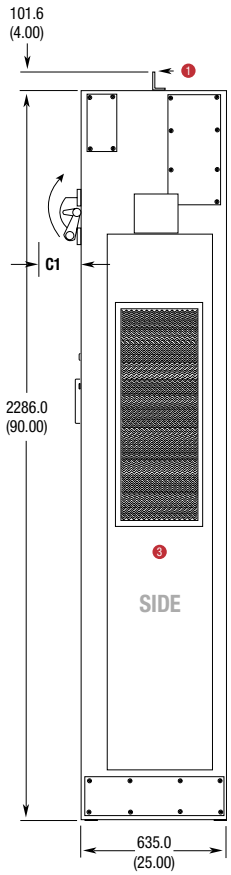
1. Removable Lifting Angle
2. Vented Areas — IP20 (NEMA Type 1) Only
3. Air Conditioner — IP54 (NEMA Type 12) 350-450 HP Only
4. 350 HP Dimension is actually 139.7 (5.50)

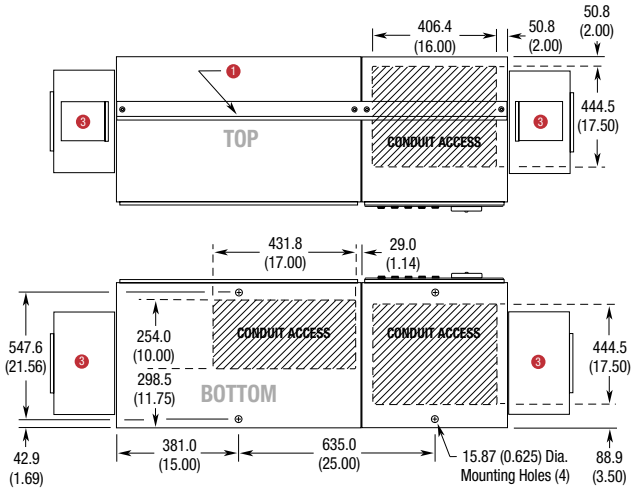
Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

| Three-Phase Ratings | | | | All Dimensions in Millimeters and (Inches) | | | | Drive, Drive Option and Bypass Option Enclosures | |
|---|---|---|---|---|---|---|---|---|---|
| Frame | 460V-CT | 460V-VT | 575V | A | A1 | A2 | C1 | IP 20 (NEMA Type 1) | IP54 (NEMA Type 12) |
| F | 187-224 kW<br>250-300 HP<br>(325-360 A) | 224 kW<br>300 HP<br>(360 A) | —<br>—<br>— | | NOT APPLICABLE – NO AIR CONDITIONER REQUIRED | | 139.7<br>(5.50) | 1066<br>(2350) | 1066<br>(2350) |
| | 261-336 kW<br>350-450 HP<br>(425-525 A) | 261-336 kW<br>350-450 HP<br>(425-525 A) | 261-298 kW<br>350-400 HP<br>(425-475 A) | 2419.4<br>(95.25) | 2267.0<br>(89.25) | 235.0<br>(9.25) | 215.9 4<br>(8.50) 4 | 1066<br>(2350) | 1247<br>(2750) |

## IP20 (NEMA Type 1) and IP54 (NEMA Type 12) Dimensions for G Frame Drives without Bypass




### Option Mounting Location

| | |
|---|---|
| **Mountable Option List** | CB, CF, CP, CT, DEC, DS, D1_, D2_, D3_, D5_,E_, D61, D91, GM_C, GD_C, GMS_C, HA__, HJ__, HN__, ITC, JC, JF, JM, JR, JT, K_, L__, L___, M_, M__, N3, N__, UL |
| **Consult Factory Option List** | JA, JL, JS, LQ, LT, LR, LW, MP12A, MP12N, MP18A, MP18N, MQ2, MQ3 |

**Special Smaller Enclosure**

A single 762 mm (30 In.) wide enclosure may be used if the option list requirements below are met. Consult factory for custom quotation in all cases.

Any combination of:
CM, D10-D91, EC, EP, ET, GD1C, GD2C, GM1C, GM2C, GM5C, JC, JF, JM, JR, JT, L4C, L5C, L4EC, L5EC, L6EC, LA_C, all HIMs and a max. of (1) CF, EB, EH, N2, N3, N4C, N4T, N5C, N5T or N9.

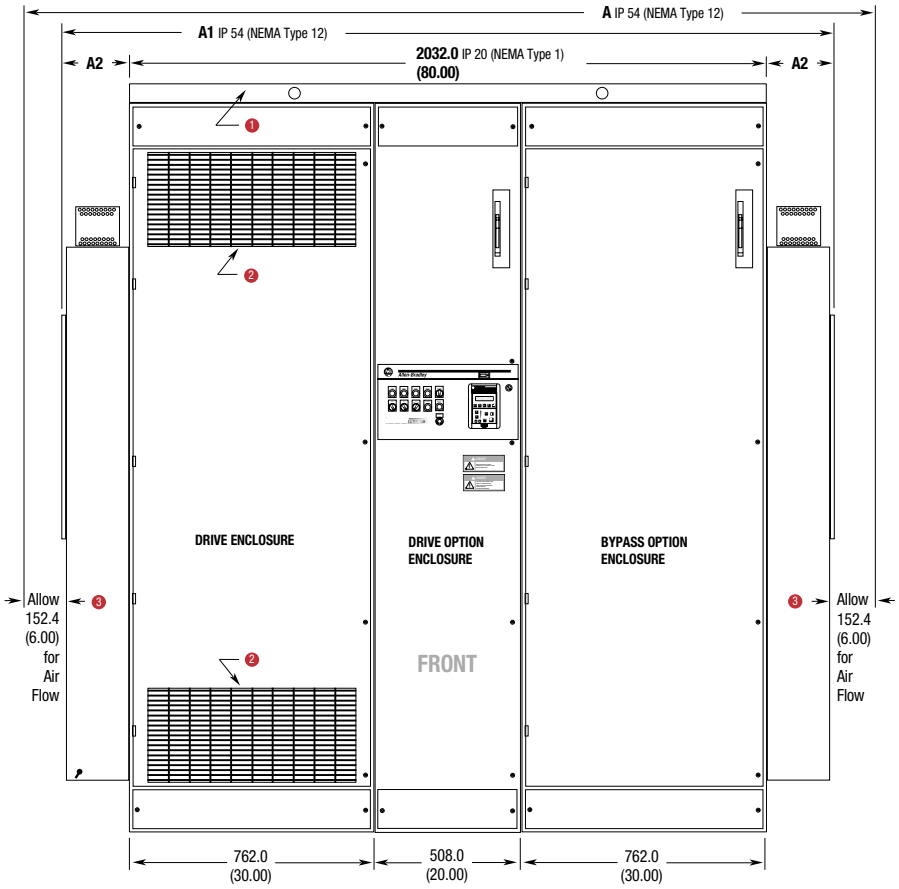
1. Removable Lifting Angle
2. Vented Areas — IP20 (NEMA Type 1) Only
3. Air Conditioner — IP54 (NEMA Type 12) Only

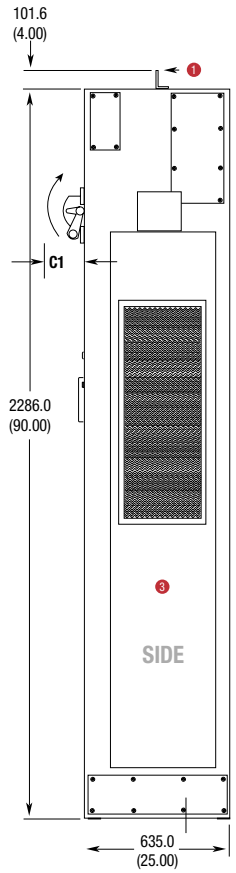
Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

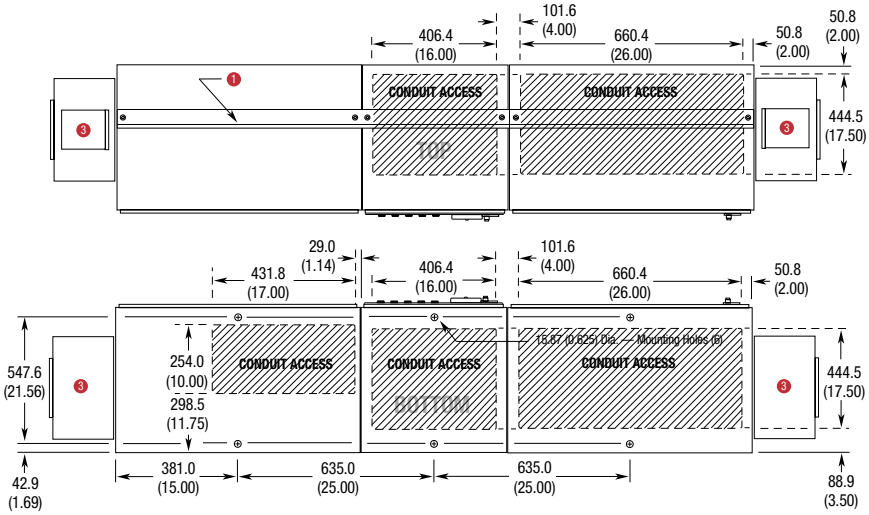
| Frame | Three-Phase Ratings 460V-CT | 460V-VT | 575V | All Dimensions in Millimeters and (Inches) A | A1 | A2 | C1 | Drive and Drive Option Enclosures IP 20 (NEMA Type 1) | IP54 (NEMA Type 12) |
|---|---|---|---|---|---|---|---|---|---|
| G | 224-261 kW<br>300-350 HP<br>(360-425 A) | 224-261 kW<br>300-350 HP<br>(360-425 A) | 224-261 kW<br>300-350 HP<br>(360-425 A) | 2103.1<br>(82.80) | 1798.3<br>(70.80) | 264.2<br>(10.40) | 139.7<br>(5.50) | 624<br>(1375) | 805<br>(1775) |
| | 298-448 kW<br>400-600 HP<br>(475-670 A) | 298-448 kW<br>400-600 HP<br>(475-670 A) | 298-448 kW<br>400-600 HP<br>(400-600 A) | 2230.1<br>(87.80) | 1925.3<br>(75.8) | 327.7<br>(12.9) | 215.9<br>(8.50) | 624<br>(1375) | 832<br>(1885) |

# Dimensions

## IP20 (NEMA Type 1) and IP54 (NEMA Type 12) Dimensions for G Frame Drives with Bypass




### Option Mounting Location

| | |
|---|---|
| **Mountable Option List** | Option Codes From Previous Page Plus BA, BM, CC, D41, D42, DT, FM |
| **Consult Factory Option List** | Option Codes From Previous Page Plus BC, BD, BP, BS, MP12A, MP12N, MP18A, MP18N, MQ2, MQ3 |

1. Removable Lifting Angle
2. Vented Areas — IP20 (NEMA Type 1) Only
3. Air Conditioner — IP54 (NEMA Type 12) Only

Approximate Shipping Weights
All Weights in Kilograms and (Pounds)

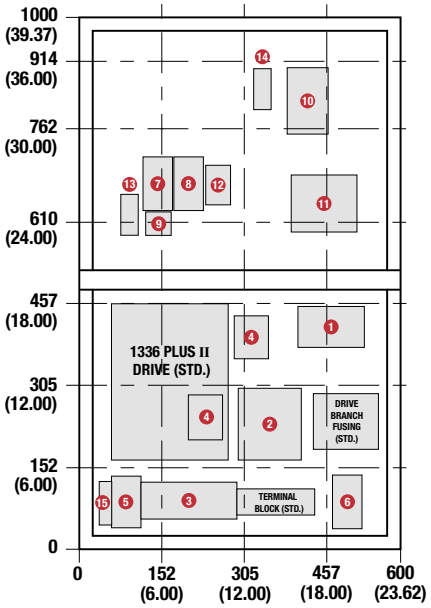
| Three-Phase Ratings | | | All Dimensions in Millimeters and (Inches) | | | | Drive, Drive Option and Bypass Option Enclosures | |
|---|---|---|---|---|---|---|---|---|
| Frame | 460V-CT | 460V-VT | 575V | A | A1 | A2 | C1 | IP 20 (NEMA Type 1) | IP54 (NEMA Type 12) |
| G | 224-261 kW 300-350 HP (360-425 A) | 224-261 kW 300-350 HP (360-425 A) | 224-261 kW 300-350 HP (360-425 A) | 2865.1 (112.80) | 2560.3 (100.80) | 264.2 (10.40) | 139.7 (5.50) | 1066 (2350) | 1247 (2750) |
| | 298-448 kW 400-600 HP (475-670 A) | 298-448 kW 400-600 HP (475-670 A) | 298-448 kW 400-600 HP (400-600 A) | 2992.1 (117.80) | 2687.3 (105.80) | 327.7 (12.90) | 215.9 (8.50) | 1066 (2350) | 1275 (2810) |

The panel layouts shown on the following pages are typical for the drive ratings listed. The layouts include a worst case **Pre-Engineered (P) Options Only** scenario (See Option List on the next page). The dimension grid can be used to determine available panel space by taking into account which of the components shown will actually be included in an individual drive package.

## A1-A3 Frame Drives – 230/460V 0.37-3.7 kW (0.5-5 HP)

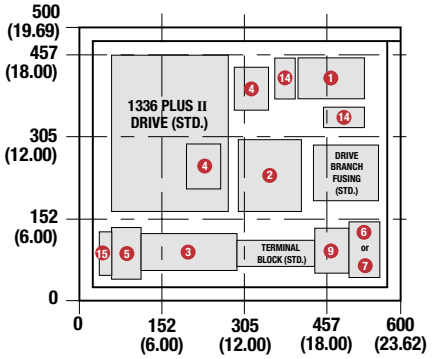
### IP20 (NEMA Type 1)

**WITH OPTION BAY**




All dimensions in millimeters and (inches)

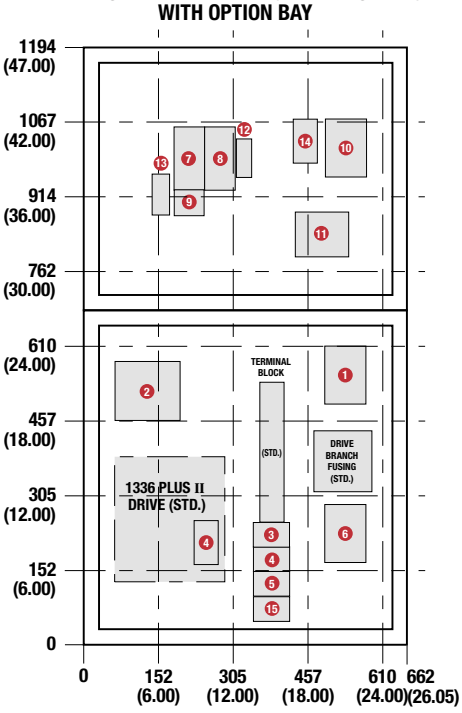
**WITHOUT OPTION BAY**




### IP54 (NEMA Type 12) – IP65 (NEMA Type 4)

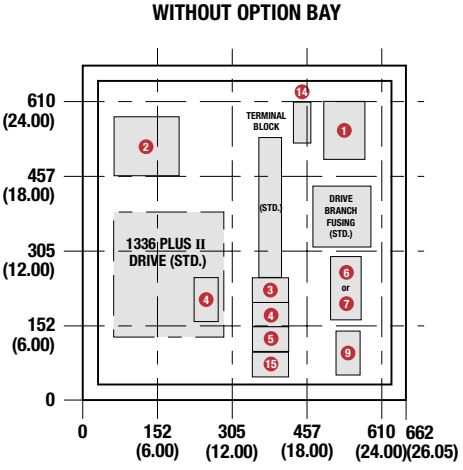
Consult Allen-Bradley when adding additional heat producing components to existing NEMA Type 4 or 12 rated drives.

**WITH OPTION BAY**




All dimensions in millimeters and (inches)

**WITHOUT OPTION BAY**




1. DRIVE CIRCUIT BREAKER OR DISCONNECT SWITCH
2. CONTROL TRANSFORMER
3. RELAY LOGIC (VARIES)
4. COMMUNICATION OPTION CARD (DRIVE OR PANEL MOUNTED)
5. INPUT ISOLATOR
6. DRIVE INPUT CONTACTOR
7. DRIVE OUTPUT CONTACTOR
8. BYPASS CONTACTOR
9. OVERLOAD RELAY
10. BYPASS CIRCUIT BREAKER OR DISCONNECT SWITCH
11. BYPASS MOTOR FUSES
12. AUTO BYPASS LOGIC
13. MOTOR GROUND TERMINAL
14. LINE GROUND TERMINAL
15. SIGNAL GROUND TERMINAL

# Panel Layouts

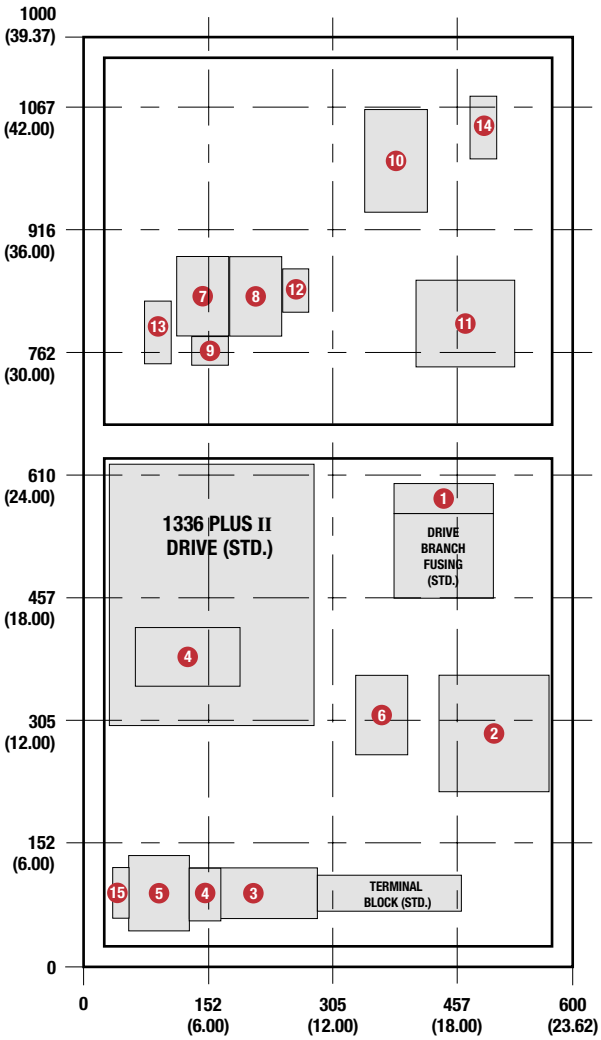
**Pre-engineered (P) options include the following catalog numbers**

| | | | | | |
|---|---|---|---|---|---|
| -AA | -D10 | -D31 | -GM5C | -HNSBC | -LA2C |
| -AF | -D11 | -D32 | -GM6C | -HNSPC | -LA3C |
| -AJ | -D12 | -D41 | -GMS1C | -HNS1C | -LA4C |
| -BA | -D13 | -D42 | -GMS2C | -HNS2C | -LA5C |
| -BM | -D14 | -D51 | -GMS5C | -JC | -LA6C |
| -CB | -D15 | -D52 | -GMS6C | -JF | -LA7C |
| -CC | -D16 | -D61 | -HABC | -JM | -L9EC |
| -CF | -D17 | -FM | -HAPC | -JR | -ME |
| -CP | -D18 | -GD1C | -HA1C | -JT | -MK |
| -CT | -D19 | -GD2C | -HA2C | -KD | -MT |
| -DS | -D21 | -GM1C | -HJPC | -KM | -N3 |
| -DT | -D22 | -GM2C | -HJ2C | -LA1C | |

## A4 Frame Drives – 460V 5.5-15 kW (7.5-20 HP)

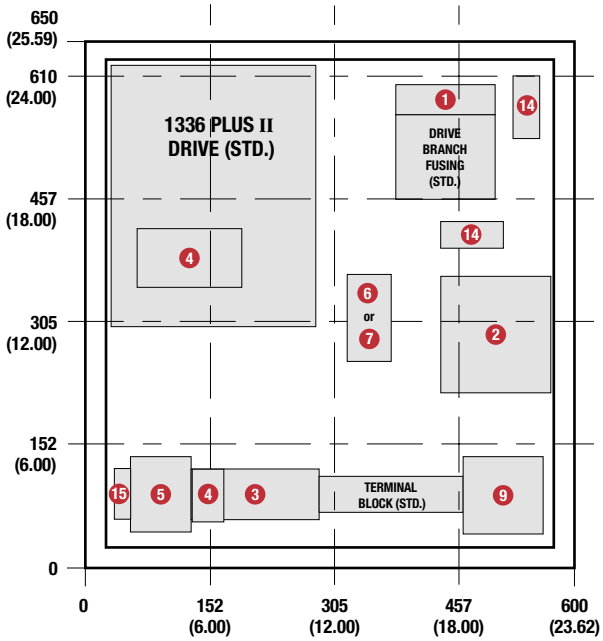
## IP20 (NEMA Type 1)

**WITH OPTION BAY**




All dimensions in millimeters and (inches)

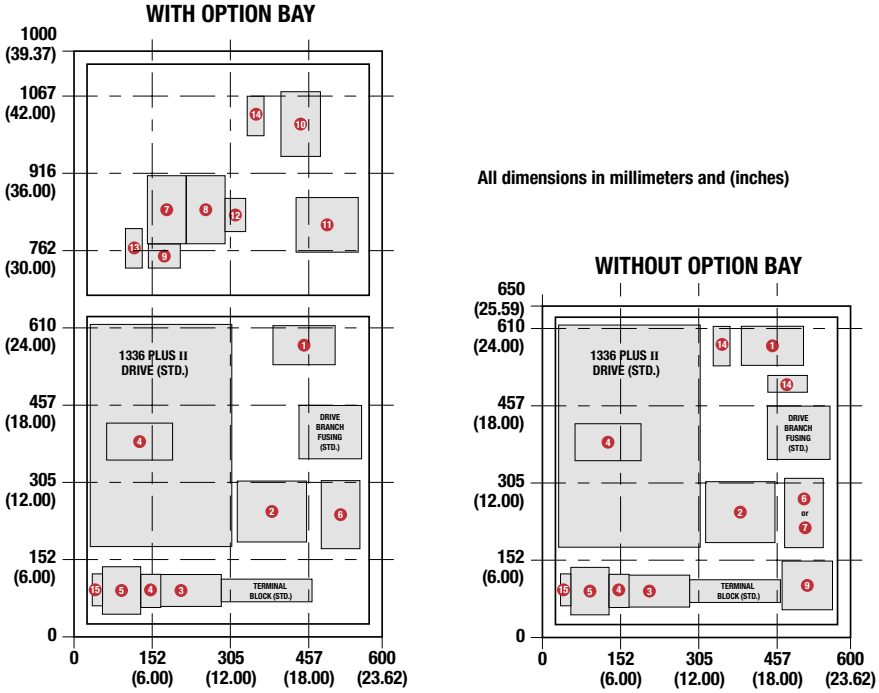
**WITHOUT OPTION BAY**




1. DRIVE CIRCUIT BREAKER OR DISCONNECT SWITCH
2. CONTROL TRANSFORMER
3. RELAY LOGIC (VARIES)
4. COMMUNICATION OPTION CARD (DRIVE OR PANEL MOUNTED)
5. INPUT ISOLATOR
6. DRIVE INPUT CONTACTOR
7. DRIVE OUTPUT CONTACTOR
8. BYPASS CONTACTOR
9. - 15 NEXT PAGE

## B1-B2 Frame Drives – 230V 5.5-11 kW (7.5-15 HP) – 460V 11-22 kW (15-30 HP)

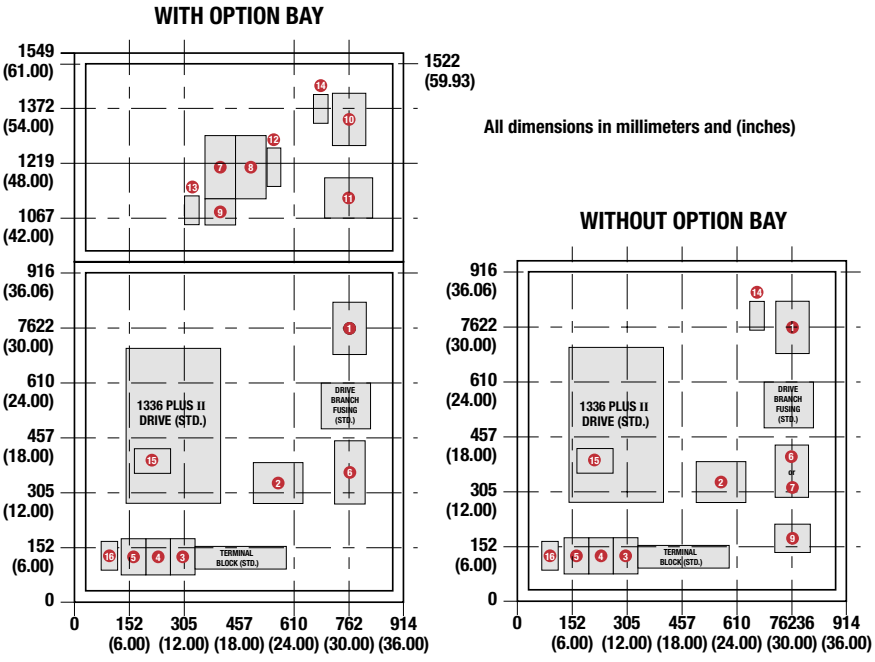
## IP20 (NEMA Type 1)




## A4, B1 And B2 Frame Drives – 230V 5.5-11 kW (7.5-15 HP) – 460V 5.5-22 kW (7.5-30 HP) – 575V .75-15 kW (1-20 HP)

## IP54 (NEMA Type 12) – IP65 (NEMA Type 4)

Consult Allen-Bradley when adding additional heat producing components to existing NEMA Type 12 rated drives.



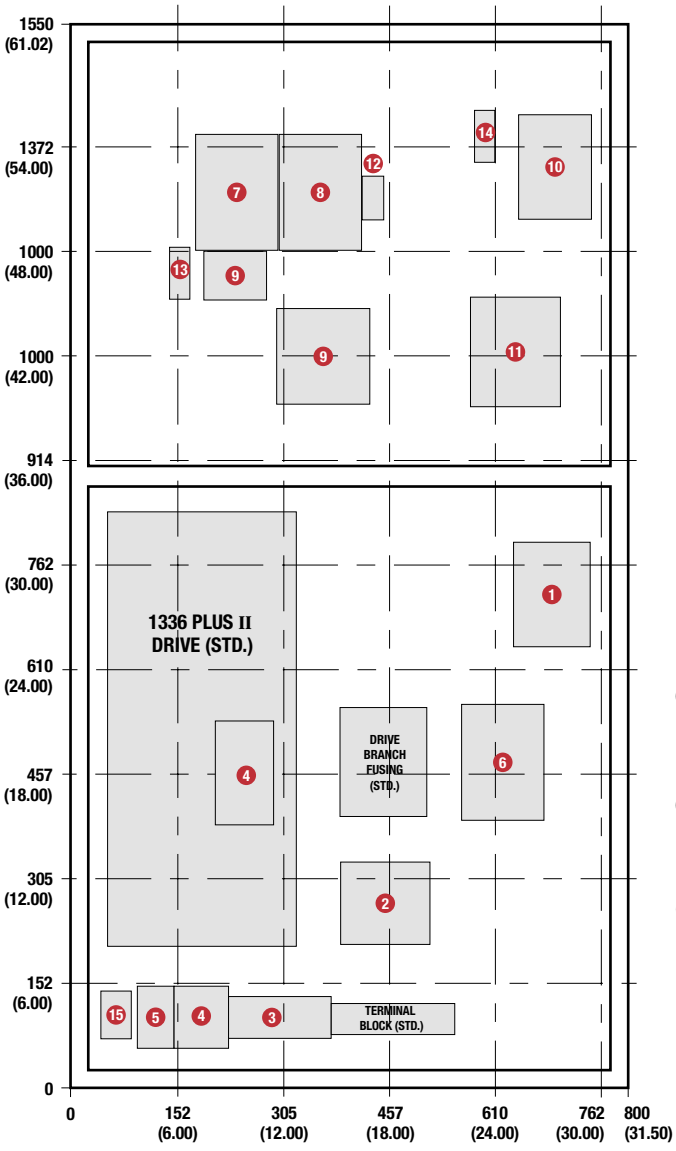

- 1 - 8 PREVIOUS PAGE
- 9 OVERLOAD RELAY
- 10 BYPASS CIRCUIT BREAKER OR DISCONNECT SWITCH
- 11 BYPASS MOTOR FUSES
- 12 AUTO BYPASS LOGIC
- 13 MOTOR GROUND TERMINAL
- 14 LINE GROUND TERMINAL
- 15 SIGNAL GROUND TERMINAL

# Panel Layouts

## C Frame Drives – 230V 15-22 kW (20-30 HP) – 460V 30-45 kW (40-60 HP) – 575V 18.5-45 kW (25-60 HP)

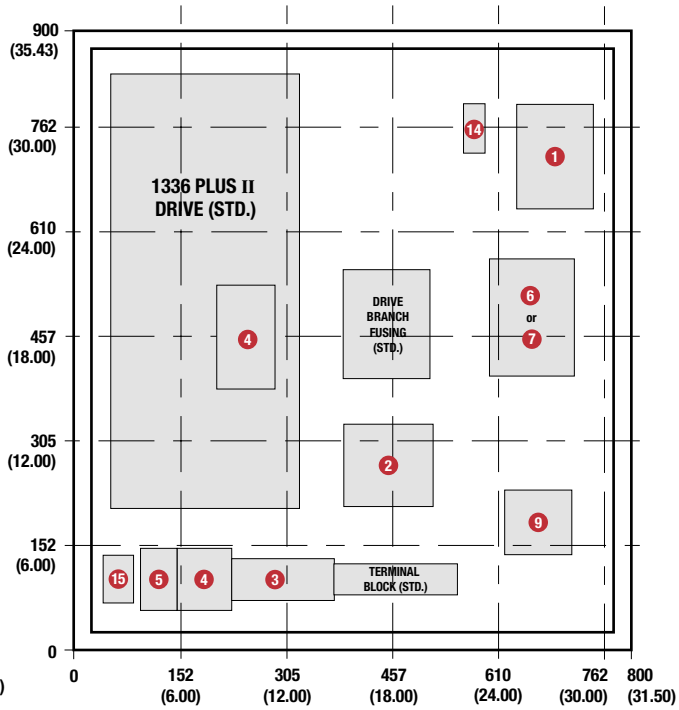
## IP20 (NEMA Type 1)

**WITH OPTION BAY**




All dimensions in millimeters and (inches)

**WITHOUT OPTION BAY**



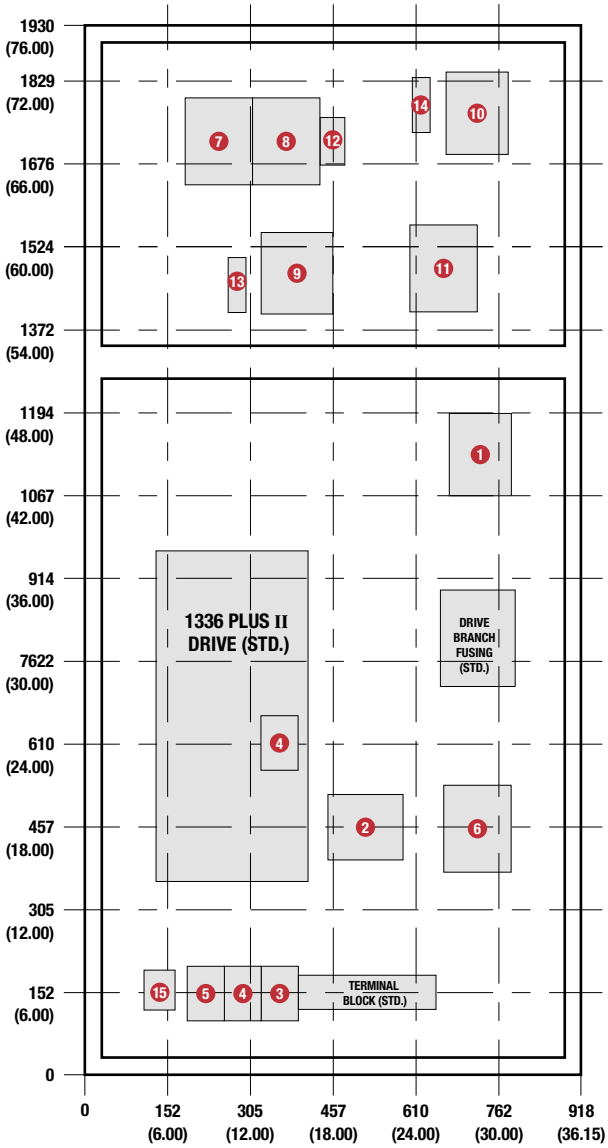

1. DRIVE CIRCUIT BREAKER OR DISCONNECT SWITCH
2. CONTROL TRANSFORMER
3. RELAY LOGIC (VARIES)
4. COMMUNICATION OPTION CARD (DRIVE OR PANEL MOUNTED)
5. INPUT ISOLATOR
6. DRIVE INPUT CONTACTOR
7. DRIVE OUTPUT CONTACTOR
8. BYPASS CONTACTOR
9. - 15 NEXT PAGE

## C Frame Drives – 230V 15-22 kW (20-30 HP) – 460V 30-45 kW (40-60 HP) – 575V 18.5-45 kW (25-60 HP)

## IP54 (NEMA Type 12) – IP65 (NEMA Type 4)

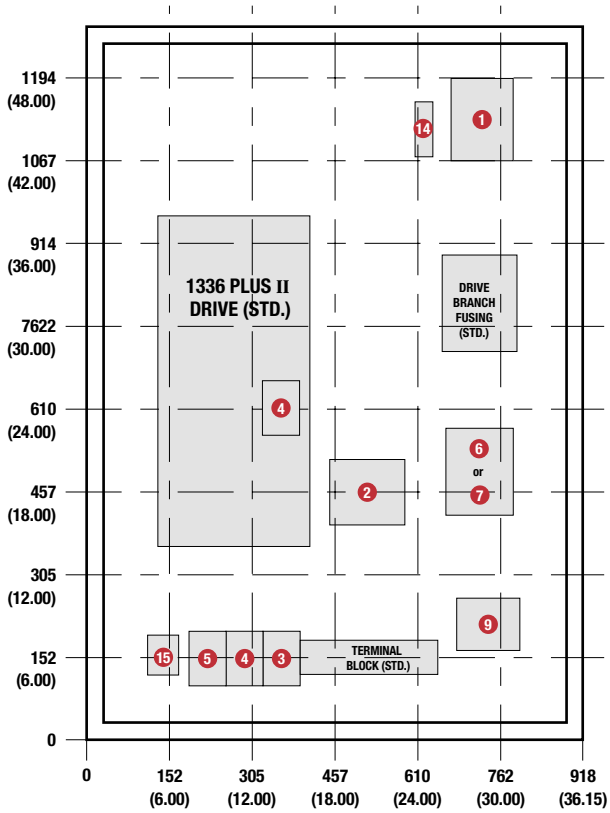
Consult Allen-Bradley when adding additional heat producing components to existing NEMA Type 4 or 12 rated drives.

**WITH OPTION BAY**




All dimensions in millimeters and (inches)

**WITHOUT OPTION BAY**




**1 - 8 PREVIOUS PAGE**
**9 OVERLOAD RELAY**
**10 BYPASS CIRCUIT BREAKER OR DISCONNECT SWITCH**
**11 BYPASS MOTOR FUSES**
**12 AUTO BYPASS LOGIC**
**13 MOTOR GROUND TERMINAL**
**14 LINE GROUND TERMINAL**
**15 SIGNAL GROUND TERMINAL**

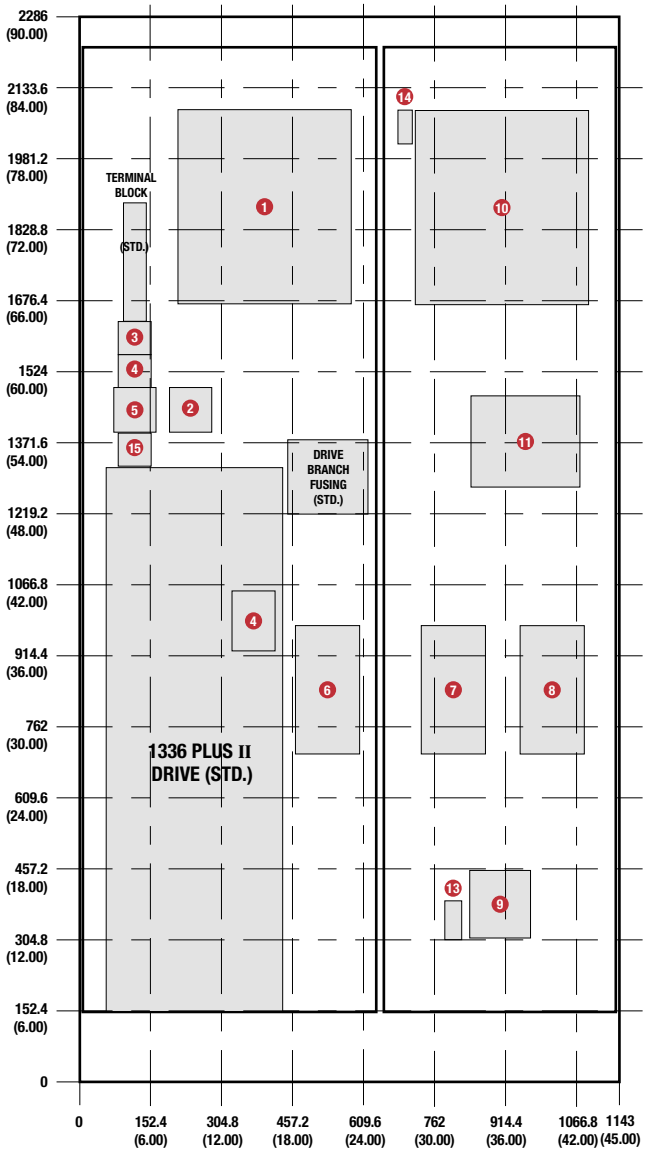
# Panel Layouts

## D Frame Drives – 230V 30-45 kW (40-60 HP) – 460V 45-112 kW (60-150 HP @ 180A) – 575V 56-93 kW (75-125 HP)

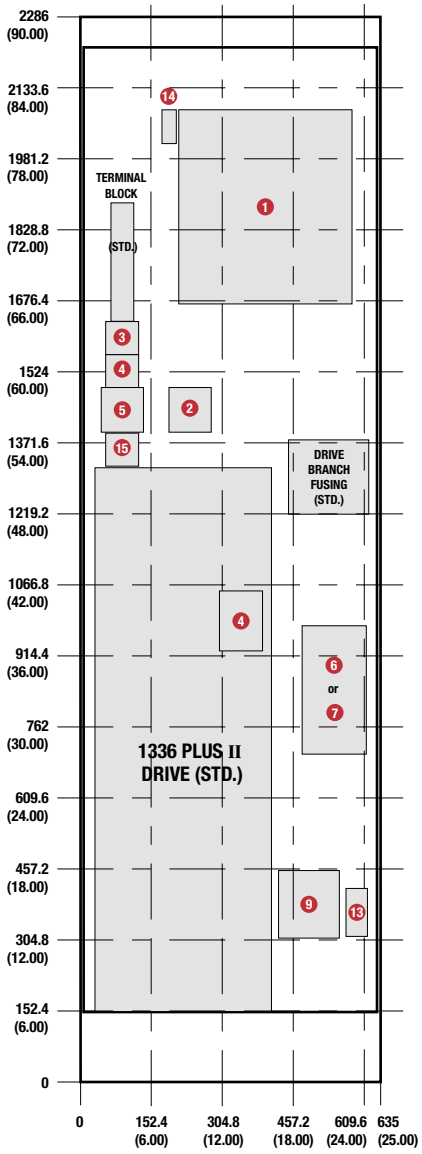
## IP20 or IP54 (NEMA Type 1 or NEMA Type 12)

Consult Allen-Bradley when adding additional heat producing components to existing NEMA Type 12 rated drives.

**WITH OPTION BAY**




**WITHOUT OPTION BAY**




All dimensions in millimeters and (inches)

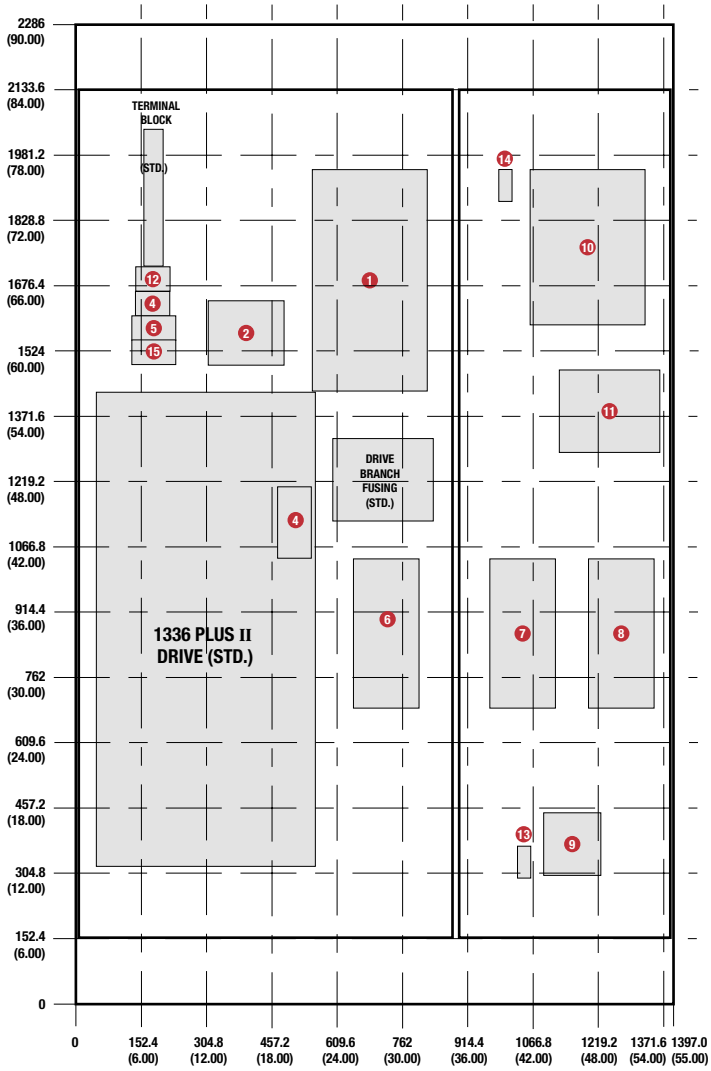
1. DRIVE CIRCUIT BREAKER OR DISCONNECT SWITCH
2. CONTROL TRANSFORMER
3. RELAY LOGIC (VARIES)
4. COMMUNICATION OPTION CARD (DRIVE OR PANEL MOUNTED)
5. INPUT ISOLATOR
6. DRIVE INPUT CONTACTOR
7. DRIVE OUTPUT CONTACTOR
8. BYPASS CONTACTOR
9. - 15 NEXT PAGE

## E Frame Drives – 230V 56-93 kW (75-125 HP) – 460V 112-187 kW (150 @ 199A-250 HP) – 575V 112-224 kW (150-300 HP)

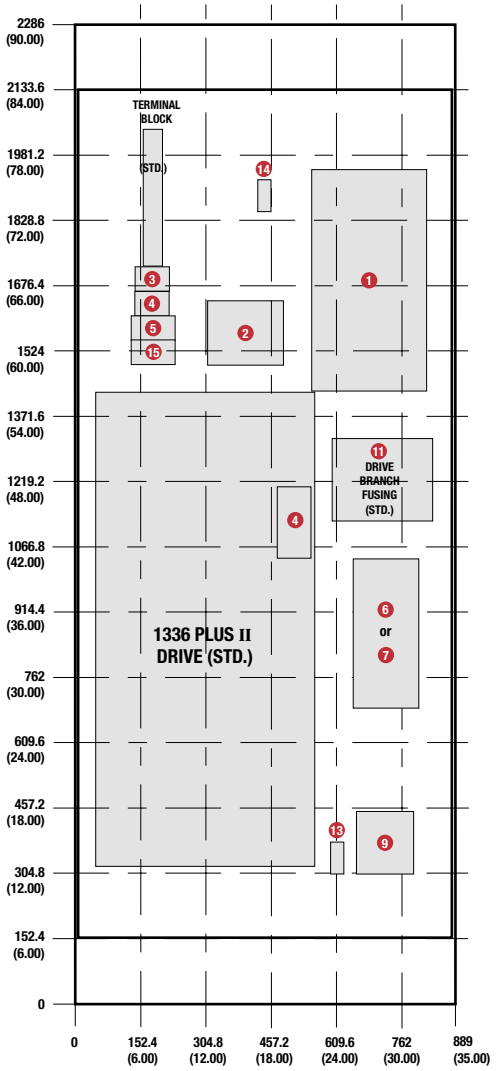
## IP20 or IP54 (NEMA Type 1 or NEMA Type 12)

Consult Allen-Bradley when adding additional heat producing components to existing NEMA Type 12 rated drives.

**WITH OPTION BAY**




**WITHOUT OPTION BAY**




**All dimensions in millimeters and (inches)**

- 1 - 8 PREVIOUS PAGE
- 9 OVERLOAD RELAY
- 10 BYPASS CIRCUIT BREAKER OR DISCONNECT SWITCH
- 11 BYPASS MOTOR FUSES
- 12 AUTO BYPASS LOGIC
- 13 MOTOR GROUND TERMINAL
- 14 LINE GROUND TERMINAL
- 15 SIGNAL GROUND TERMINAL

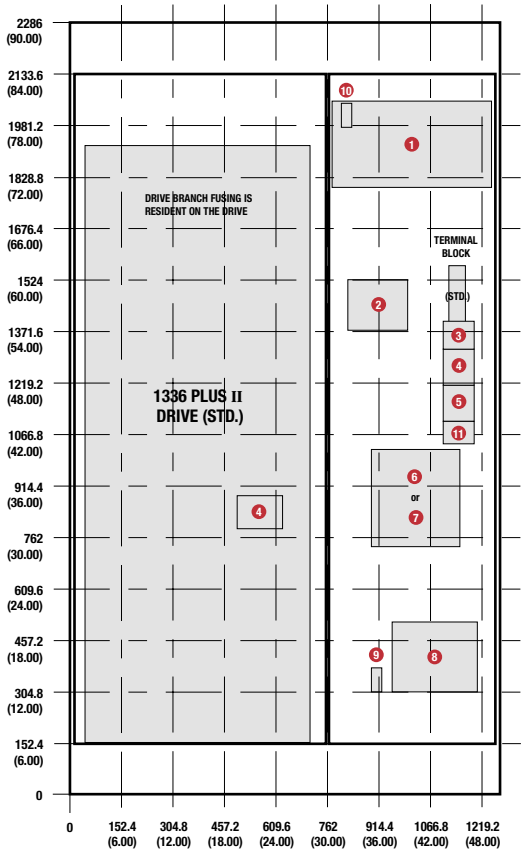
# Panel Layouts

## F Frame Drives– 460V 187-336 kW (250-450 HP) – 575V 261-298 kW (350-400 HP)

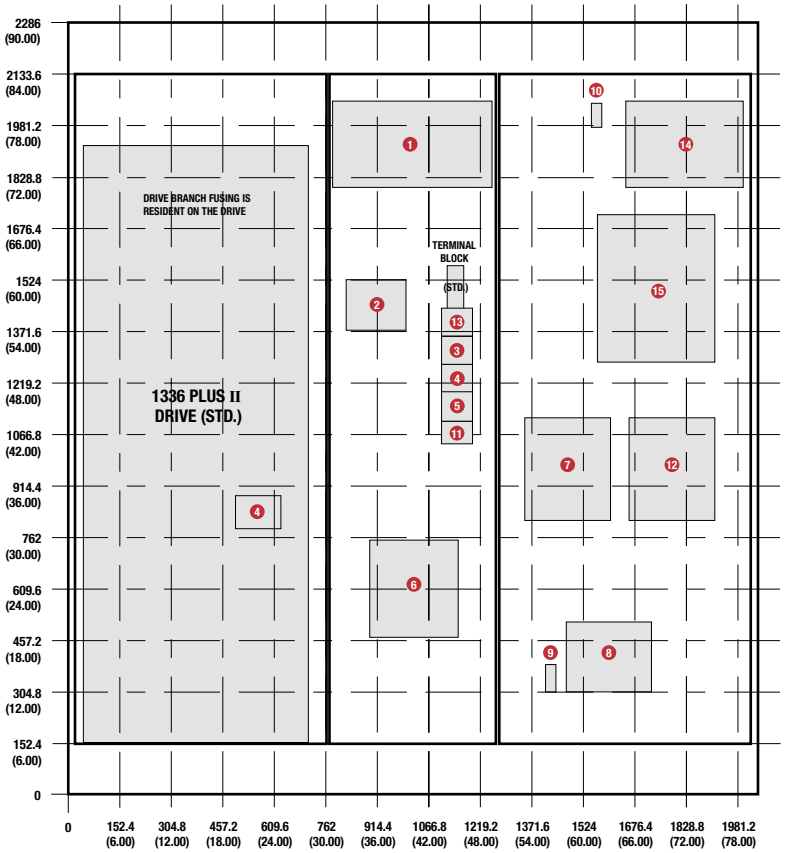
## IP20 or IP54 (NEMA Type 1 or NEMA Type 12)

Consult Allen-Bradley when adding additional heat producing components to existing IP 54 (NEMA Type 12) rated drives.

**F FRAME 2-BAY WITHOUT BYPASS**




**F FRAME 3-BAY WITH BYPASS**




All dimensions in millimeters and (inches)

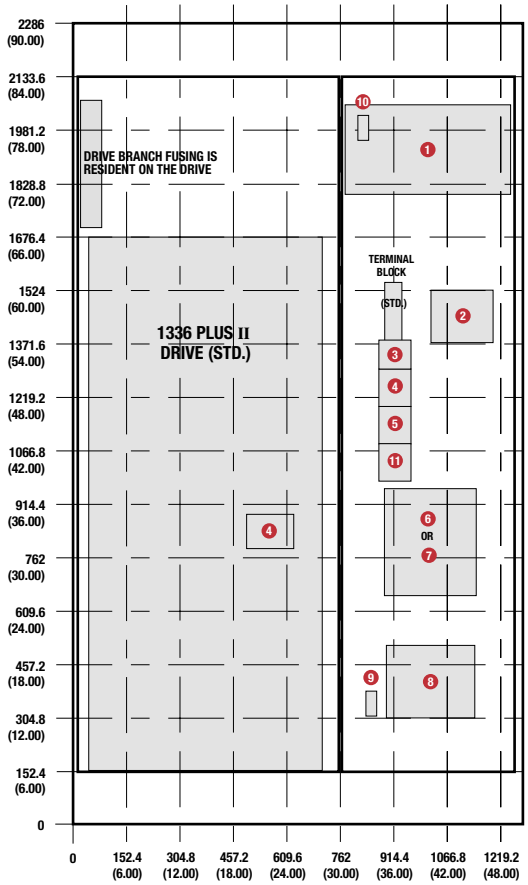
1. DRIVE CIRCUIT BREAKER OR DISCONNECT SWITCH
2. CONTROL TRANSFORMER
3. RELAY LOGIC (VARIES)
4. COMMUNICATION OPTION CARD (DRIVE OR PANEL MOUNTED
5. INPUT ISOLATOR
6. DRIVE INPUT CONTACTOR
7. DRIVE OUTPUT CONTACTOR
8. OVERLOAD RELAY

## G Frame Drives – 460V 224-448 kW (300-600 HP) – 575V 224-448 kW (300-600 HP)

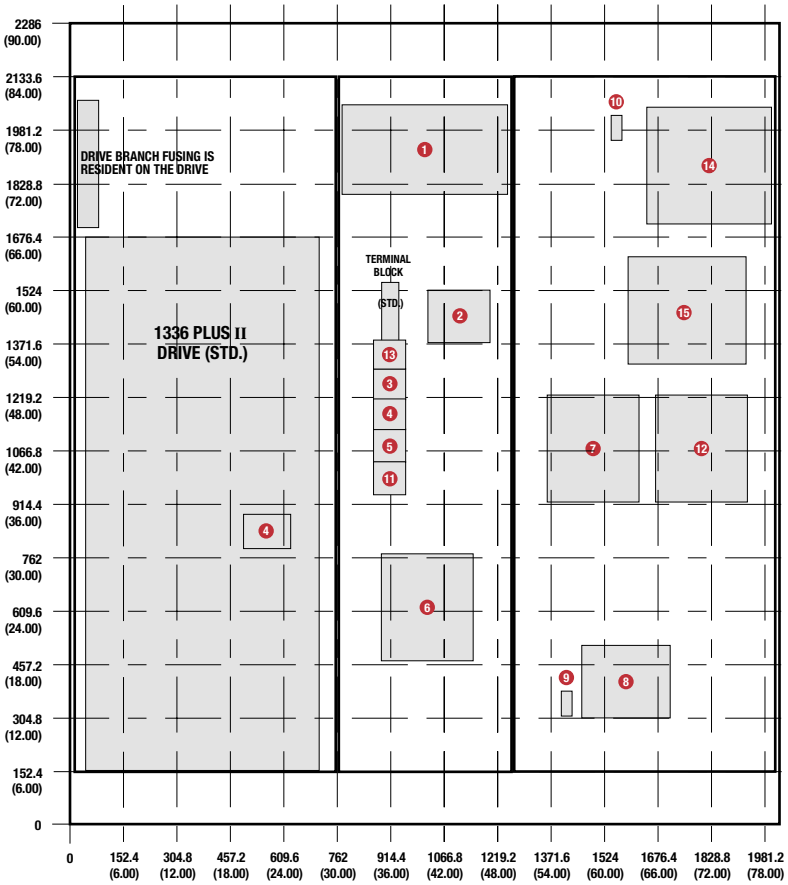
## IP20 or IP54 (NEMA Type 1 or NEMA Type 12)

Consult Allen-Bradley when adding additional heat producing components to existing NEMA Type 12 rated drives.

### 2-BAY WITHOUT BYPASS




### 3-BAY WITH BYPASS




All dimensions in millimeters and (inches)

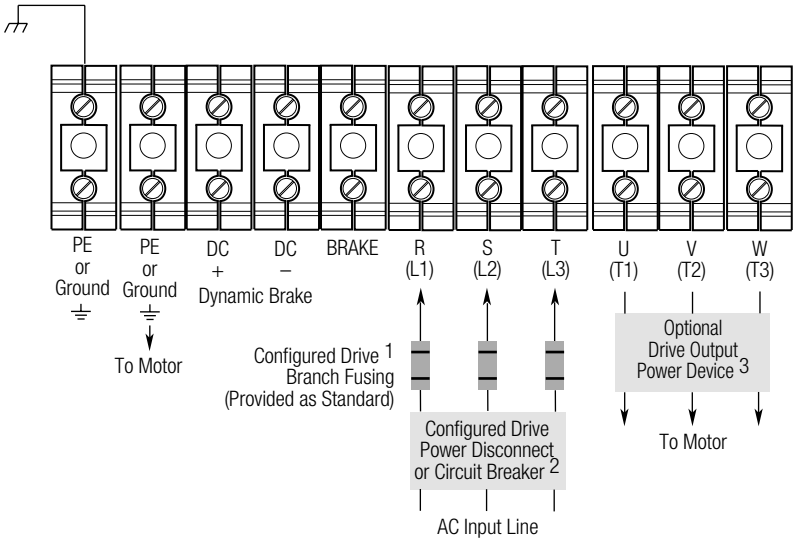
- 1 - 8 PREVIOUS PAGE
- 9 MOTOR PE
- 10 LINE GROUND TERMINAL
- 11 SIGNAL GROUND TERMINAL
- 12 BYPASS CONTACTOR
- 13 AUTO BYPASS LOGIC
- 14 BYPASS CIRCUIT BREAKER OR DISCONNECT SWITCH
- 15 BYPASS MOTOR FUSES

# Wire Terminations

## Power Wiring – Drive Terminal Block TB1

The TB1 Terminal Block connections shown below are a generic representation intended to show the interface of internal or remote power devices to the power terminal block. Specific TB1 terminal locations may vary by standard drive rating. For more information refer to the Standard Drives section.

The location of user cable connections to a packaged drive will vary with the particular power options chosen. After an order is entered, Approval Drawings or Manufacturing Drawings may be ordered prior to shipment, and specific customer interconnection information is supplied.




### User-supplied remote power disconnect

**ATTENTION:** Any user-supplied disconnecting means wired to drive output terminals U, V and W must be capable of disabling the drive if opened during drive operation. If opened during drive operation, the drive will continue to produce output voltage between U, V and W. An auxiliary contact must be used to simultaneously disable the drive or output component damage may occur.

### User-supplied remote drive bypass system

**ATTENTION:** An incorrectly customer applied or installed bypass 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.
- Improper bypass or output circuits.
- Output circuits which do not connect directly to the motor.

Contact Allen-Bradley for assistance with application or wiring.

[1] *Packaged drives may have different input fuse ratings than those recommended for equivalent standard 1336 PLUS II drives. Packaged drives are rated for a single input voltage (not a voltage range) and may have fuses resident on the drive (F Frame) or an optional disconnect switch.*

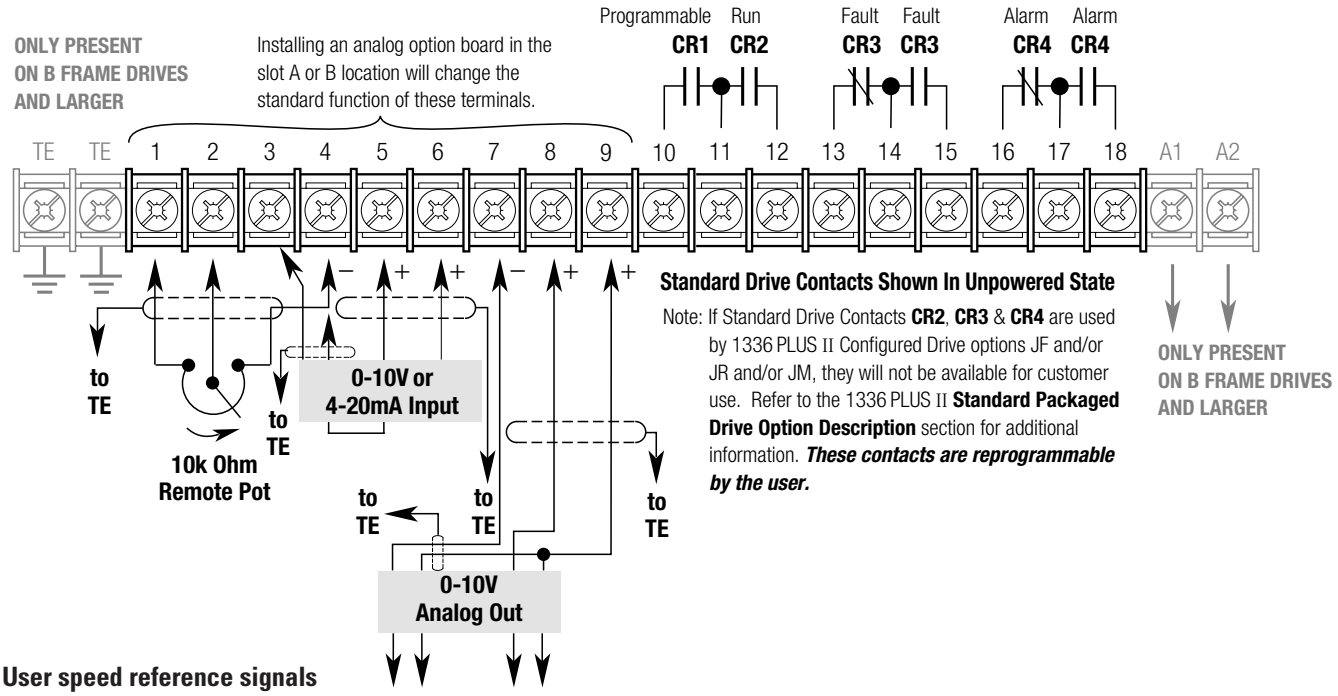
[2] *If a drive input power option is not supplied, incoming power connections are made directly to the drive branch fusing (except F or G Frame drives or any drive with bypass).*

[3] *If a drive output power option is not supplied, motor connections are made directly to drive terminals U, V and W.*

## Control and Signal Wiring – Drive Terminal Block TB2

The TB2 Terminal Block connections shown below are a generic representation intended to show the interface of internal or remote signal and control devices to the terminal block. This terminal block is located on the bottom of the main control board. Specific TB2 terminal locations may vary by standard drive rating. For more information refer to the Standard Drives section.

The location of user control wire connections to a packaged drive will vary with the particular control options chosen. After an order is entered, Approval Drawings or Manufacturing Drawings may be ordered prior to shipment, and specific customer interconnection information is supplied.




**User speed reference signals**

**ATTENTION:** Signal Common – User reference signals are terminated to logic common at TB2, terminal 3, 4 or 5. This puts the negative (or common) side of these signals at earth ground potential. Control schemes must be examined for possible conflicts with this type of grounding scheme.

# Wire Terminations

## Control Interface Wiring – Drive Terminal Block TB3

Control interface inputs are connected to terminal Block TB3. TB3 is located on the Control Interface Board installed in the drive. All 1336 PLUS II Packaged Drives come with a 115V AC Control Interface Card (Option L6) unless otherwise specified. 24V AC/DC control and Contact Closure control are available as options. Encoder feedback is available as an option with any of the three control methods.

All control interface cards provide input terminals for access to fixed drive functions that include start, stop, and enable. Four additional inputs are programmed for functions such as reverse, preset speed access, jog, second accel/decel time access and local control selection. The function of each input is defined through programming. For Packaged Drives, functions are pre-programmed at the factory for a specific application and configuration and should not require field re-programming.

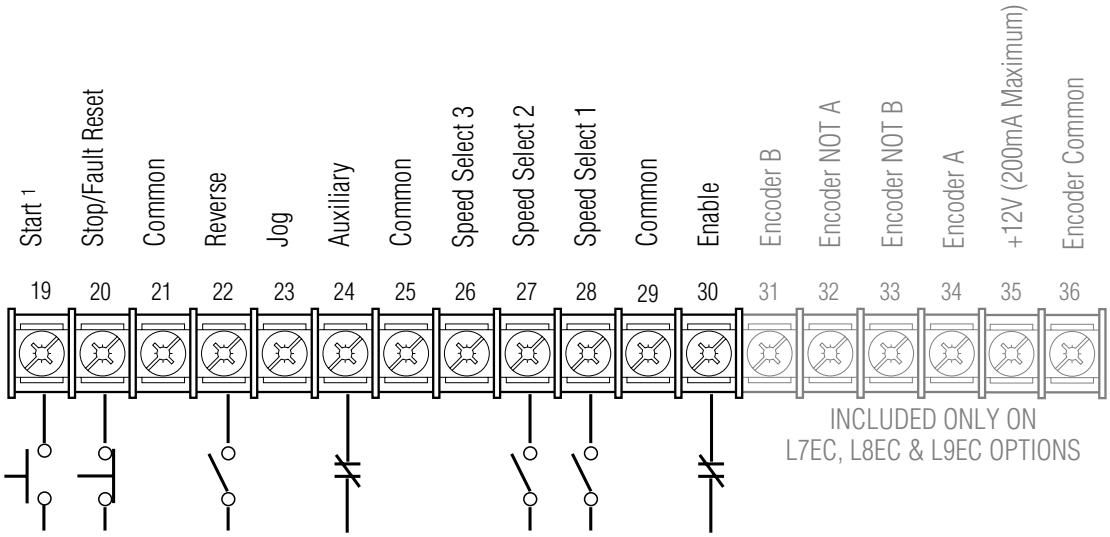
A variety of combinations made up of the following inputs are available.

- Start
- Stop/Clear Fault
- Reverse
- Digital Potentiometer (MOP)
- 2 Accel/Decel Rates
- 3 Speed Selects
- Enable
- Auxiliary
- 2 Stop Mode Selects
- Run Forward
- Run Reverse
- Local Control

| | Control Interface Options | | |
|---|---|---|---|
| | 115V AC | 24V AC/DC | TTL Contact |
| Without Encoder Feedback | Std. | -L5C | -L4C |
| With Encoder Feedback | -L9EC | -L8EC | -L7EC |

**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.

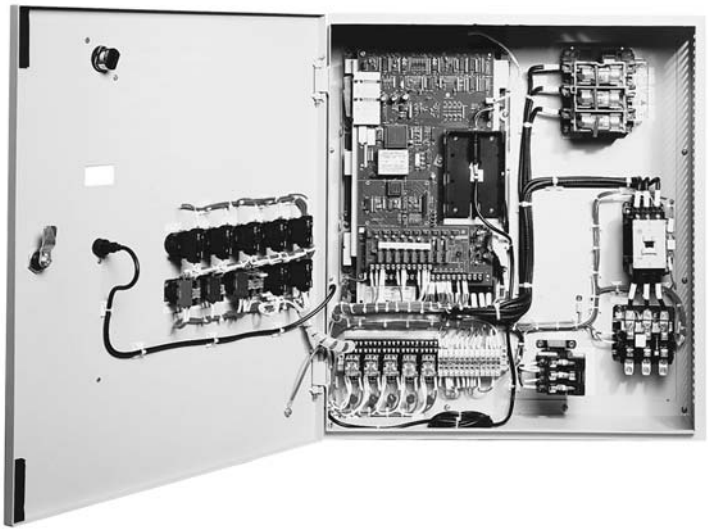
**ATTENTION:** User remote speed reference signals are terminated to logic common at TB2 terminals 3 & 4. This puts the negative or common side of these signals at earth ground potential. Control schemes should be examined for possible conflict with this grounding scheme and possible equipment damage.




*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).*

[1] *Packaged drives will generally be factory programmed for the control scheme shown (Parameter 241 set to 2, which is a 3-wire control), and all other inputs set to default. Refer to publication 1336 PLUS-5.3 for further information.*

## Catalog Number Definition



### Base Drive

**1336F – B 020 C – AA**

Product Bulletin No.

| VOLTAGE | HORSEPOWER CODE | DUTY | ENCLOSURE |
|---|---|---|---|

### Options as Required

**– BM – GM1C – HA1C – . . .**

| CODE | DESCRIPTION | CODE | DESCRIPTION | CODE | DESCRIPTION |
|---|---|---|---|---|---|

The chart shown on the next page details the segments that make up a Standard Packaged Drive Catalog Number. This chart should be used to understand the scope of the overall product offering and assembling a specific catalog number. Care should be taken to verify that the assembled catalog number qualifies as an available configuration (option combination) by referring to all pages of this section.

# Selection Guide

| VOLTAGE | HORSEPOWER CODE | CT HP | VT HP | DUTY | ENCLOSURE |
|---|---|---|---|---|---|
| A = 230V AC | F05 | 0.5 | | C = Constant Torque | AA = NEMA Type 1 |
| | F07 | 0.7 | | | |
| | F10 | 1 | | | AF = NEMA Type 4 |
| | F15 | 1.5 | | | |
| | F20 | 2 | | | AJ = NEMA Type 12 |
| | F30 | 3 | | | |
| | F50 | 5 | | | |
| | 007 | 7.5 | | | |
| | 010 | 10 | | | |
| | 015 | 15 | | | |
| | 020 | 20 | | | |
| | 025 | 25 | | | |
| | 030 | 30 | | | |
| | 040 | 40 | | | |
| | 050 | 50 | | | |
| | 060 | 60 | | | |
| | 075 | 75 | | | |
| | 100 | 100 | | | |
| | 125 | 125 | | | |
| B = 460V AC | F05 | 0.5 | 0.5 | C = Constant Torque | AA = NEMA Type 1 |
| | F07 | 0.75 | 0.75 | | |
| | F10 | 1 | 1 | | AF = NEMA Type 4 |
| | F15 | 1.5 | 1.5 | V = Variable Torque | |
| | F20 | 2 | 2 | | AJ = NEMA Type 12 |
| | F30 | 3 | 3 | | |
| | F50 | 5 | 5 | | |
| | F75 | 7.5 | 10 | | |
| | F100 | 10 | 15 | | |
| | F150 | 15 | — | | |
| | F200 | 20 | 20 | | |
| | 015 | 15 | — | | |
| | 020 | 20 | 25 | | |
| | 025 | 25 | — | | |
| | 030 | 30 | 30 | | |
| | X040 | 40 | 40 | | |
| | 040 | — | 50 | | |
| | 050 | 50 | — | | |
| | X060 | 60 | 60 | | |
| | 060 | 60 | 75 | | |
| | 075 | 75 | 100 | | |
| | 100 | 100 | 125 | | |
| | 125 | 125 | 150 | | |
| | X150 | 150 | — | | |
| | 150 | 150 | 200 | | |
| | 200 | 200 | 250 | | |
| | 250 | 250 | 250 | | |
| | P250 | 250 | 300 | | |
| | X250 | — | 300 | | |
| | 300 | 300 | 350 | | |
| | P300 | 300 | 350 | | |
| | 350 | 350 | 400 | | |
| | P350 | 350 | 400 | | |
| | 400 | 400 | 450 | | |
| | P400 | 400 | 450 | | |
| | 450 | 450 | 500 | | |
| | P450 | 450 | — | | |
| | 500 | 500 | 600 | | |
| | 600 | 600 | — | | |
| C = 575V AC | F10 | 1 | | C = Constant Torque | AA = NEMA Type 1 |
| | F20 | 2 | | | |
| | F30 | 3 | | | AF = NEMA Type 4 |
| | F50 | 5 | | | |
| | F75 | 7.5 | | | AJ = NEMA Type 12 |
| | F100 | 10 | | | |
| | F150 | 15 | | | |
| | F200 | 20 | | | |
| | 025 | 25 | | | |
| | 030 | 30 | | | |
| | 040 | 40 | | | |
| | 050 | 50 | | | |
| | 060 | 60 | | | |
| | 075 | 75 | | | |
| | 100 | 100 | | | |
| | 125 | 125 | | | |
| | 150 | 150 | | | |
| | 200 | 200 | | | |
| | 250 | 250 | | | |
| | 300 | 300 | | | |
| | X300 | 300 | | | |
| | 350 | 350 | | | |
| | 400 | 400 | | | |
| | 450 | 450 | | | |
| | 500 | 500 | | | |
| | 600 | 600 | | | |

| CODE | DESCRIPTION |
|---|---|
| -A208 | 208V AC Input |
| -BA | Bypass, Auto |
| -BC | Bypass, Auto, SMC-Pump |
| -BD | Bypass, Auto, SMC |
| -BM | Bypass, Manual |
| -BP | Bypass, Manual, SMC-Pump |
| -BS | Bypass, Manual, SMC |
| -CB | Circuit Breaker, Drive |
| -CC | Circuit Breaker, Bypass |
| -CF | Control Power - Drive Only |
| -CM | Common Mode Core |
| -CP | Control Power Plus 250VA |
| -CT | Control Power. Plus 500VA |
| -DS | Disconnect Switch, Drive |
| -DT | Disconnect Switch, Bypass |
| -D10 | Start, Stop, Jog, A/M |
| -D11 | H/O/A and A/M Switches |
| -D12 | D11 Plus Pilot Lights |
| -D13 | H/O/A Selector Switch |
| -D14 | D13 Plus Pllot Lights |
| -D15 | A/M Selector Switch |
| -D16 | D15 Plus Pilot Lights |
| -D17 | Start & Stop PBs |
| -D18 | Start, Stop A/M |
| -D19 | Start, Stop, Jog |
| -D21 | Pilot Light Package |
| -D22 | Pilot Light Package |
| -D31 | At Speed Pilot Light |
| -D32 | Fwd/Rev Selector Switch |
| -D41 | Drive & Bypass Lights |
| -D42 | Auto Bypass Enable Off/On S.S. and Bypass P.L. |
| -D51 | Drive Disable PB (Contactor) |
| -D52 | Drive Disable PB (Enable) |
| -D61 | Speed Pot |
| -D91 | 800T Conversion |
| -EB | Voltage Barrier |
| -EC | Enclosure Filtered Door Openings |
| -EF1 | Enclosure Floor Stand, 12" |
| -EF2 | Enclosure Floor Stand, 24" |
| -EG | Enclosure Filters and Gasketing |
| -EH | Enclosure Heater, Remote Power |
| -EH2 | Enclosure Heater, Local Power |
| -EP1 | Enclosure Paint - Special, One-Color |
| -EP2 | Enclosure Paint - Special, Two-Color |
| -EP3 | Encl. Paint - Special, Three-Color |
| -ET | Enclosure Nameplate |
| -FM | Fuse Block, Motor |
| -GD1C | Single Point RIO |
| -GD2C | RS232/422/485, DF1 |
| -GM1C | Single Point RIO |
| -GM2C | RS232/422/485, DFI |
| -GM5C | DeviceNet |
| -GM6C | Enhanced DeviceNet |
| -GMS1C | Single Point RIO |
| -GMS2C | RS232/422/485, DFI |
| -GMS5C | DeviceNet |
| -GMS6C | Enhanced DeviceNet |
| -HABC | HIM, Blank, NEMA Type 1 |
| -HAPC | HIM, Programmer, NEMA Type 1 |
| -HA1C | HIM, Analog, NEMA Type 1 |
| -HA2C | HIM, Digital, NEMA Type 1 |
| -HJPC | HIM, Programmer, NEMA Type 12 |
| -HJ2C | HIM, Digital, NEMA Type 1 |
| -HNSBC | HIM, Blank, Open |
| -HNSPC | HIM, Programmer, Open |
| -HNS1C | HIM, Analog, Open |
| -HNS2C | HIM, Digital, Open |
| -JC | Contacts, Control Power On |
| -JF | Contacts, Fault |
| -JL | PLC Hardware & Mounting |
| -JM | Contacts, Alarm |
| -JR | Contacts, Run |
| -JS | SLC Hardware & Mounting |
| -JT | Contacts, At Speed |
| -KD | Contactor, Drive Input |
| -KM | Contactor, Drive Output |
| -LA1C | Two Analog Outputs, One Input |
| -LA2C | Two Analog Inputs |
| -LA3C | Two Analog Outputs |
| -LA4C | One Analog Input and Output |
| -LA5C | Two Analog Outputs, One Input |
| -LA6C | Two Analog Inputs |
| -LA7C | Two Analog Inputs |
| -L4C | Control Interface, TTL |
| -L5C | Control Interface, 24V |
| -L6C | Control Interface, 115V AC (Std.) |
| -L7EC | Control Int, TTL, Encoder |
| -L7EC | Control Int, TTL, Encoder |
| -L8EC | Control Int, 24V, Encoder |
| -L9EC | Control Int, 115V, Encoder |
| -LQ | Output Reactor, NEMA 1 |
| -LR | Input Reactor, NEMA 1 |
| -LT | Input Reactor, NEMA 4/12 |
| -LW | Output Reactor, NEMA 4/12 |
| -MB | Blower Motor Starter |
| -ME | Motor Time Run Meter |
| -MH | Motor Heater Control, Remote Power |
| -MH2 | Motor Heater Control, Local Power |
| -MK | Thermal Overload-Class 20 |
| -MP12A | 12 Pulse Front End with Auto Transformer |
| -MP12N | 12 Pulse Front End with Isolation Transformer |
| -MP18A | 18 Pulse Front End with Auto Transformer |
| -MP18N | 18 Pulse Front End with Isolation Transformer |
| -MQ2 | Line Metering System, Deluxe |
| -MQ3 | Line Metering System, Basic |
| -MT | Thermal Overload-Class 10 |
| -MX3 | Conformal Coating |
| -N3 | Analog Input Isolator |
| -N4C | Transducer, Local Command |
| -N4T | Transducer, Local Trim |
| -N5C | Transducer, Remote Command |
| -N5T | Transducer, Remote Trim |
| -N6A | RTD Protection, 120 Ohm NIckel |
| -N7A | RTD Protection 10 Ohm Copper |
| -N8A | RTD Protection, 100 Ohm Platinum |
| -UL | UL Panel Recognition |

**NOTE:** *Not all options are available with all ratings.*

# Selection Guide

**All Base Drive Catalog Numbers listed on the following pages include:**

- A Standard Drive
- Drive Branch Fusing
- A 115V AC Control Interface Card (Option -L6)
- Enclosure of Choice

## 230V Constant Torque Drives and Enclosures [1, 2]

| Frame | Drive Rating Nominal HP | Amps | NEMA Type 1 (IP20) General Purpose Code | NEMA Type 4 (IP65) Resists Water and Dust Code | NEMA Type 12 (IP54) Industrial Use, Dust Tight Code |
|---|---|---|---|---|---|
| A1 | 1/2 | 2.3 | AF05C-AA | AF05C-AF | AF05C-AJ |
| | 3/4 | 3.0 | AF07C-AA | AF07C-AF | AF07C-AJ |
| | 1 | 4.5 | AF10C-AA | AF10C-AF | AF10C-AJ |
| A2 | 1 1/2 | 6.0 | AF15C-AA | AF15C-AF | AF15C-AJ |
| | 2 | 8.0 | AF20C-AA | AF20C-AF | AF20C-AJ |
| A3 | 3 | 12.0 | AF30C-AA | AF30C-AF | AF30C-AJ |
| | 5 | 18.0 | AF50C-AA | AF50C-AF | AF50C-AJ |
| B1 | 7 1/2 | 27.0 | A007C-AA | A007C-AF | A007C-AJ |
| B2 | 10 | 34.0 | A010C-AA | A010C-AF | A010C-AJ |
| | 15 | 48.0 | A015C-AA | A015C-AF | A015C-AJ |
| C | 20 | 65.0 | A020C-AA | A020C-AF | A020C-AJ |
| | 25 | 77.0 | A025C-AA | A025C-AF | A025C-AJ |
| | 30 | 80.0 | A030C-AA | A030C-AF | A030C-AJ |
| D | 40 | 120.0 | A040C-AA | A040C-AF | A040C-AJ |
| | 50 | 150.0 | A050C-AA | A050C-AF | A050C-AJ |
| | 60 | 180.0 | A060C-AA | A060C-AF | A060C-AJ |
| E | 75 | 240.0 | A075C-AA | A075C-AF | A075C-AJ |
| | 100 | 292.0 | A100C-AA | A100C-AF | A100C-AJ |
| | 125 | 325.0 | A125C-AA | A125C-AF | A125C-AJ |

## 460V Constant Torque Drives and Enclosures [1, 3]

| Frame | Drive Rating Nominal HP | Amps | NEMA Type 1 (IP20) General Purpose Code | NEMA Type 4 (IP65) Resists Water and Dust Code | NEMA Type 12 (IP54) Industrial Use, Dust Tight Code |
|---|---|---|---|---|---|
| A1 | 1/2 | 1.1 | BF05C-AA | BF05C-AF | BF05C-AJ |
| | 3/4 | 1.6 | BF07C-AA | BF07C-AF | BF07C-AJ |
| | 1 | 2.1 | BF10C-AA | BF10C-AF | BF10C-AJ |
| | 1 1/2 | 2.8 | BF15C-AA | BF15C-AF | BF15C-AJ |
| A2 | 2 | 3.8 | BF20C-AA | BF20C-AF | BF20C-AJ |
| | 3 | 5.3 | BF30C-AA | BF30C-AF | BF30C-AJ |
| A3 | 5 | 8.4 | BF50C-AA | BF50C-AF | BF50C-AJ |
| A4 | 7 1/2 | 14.0 | BF75C-AA | BF75C-AF | BF75C-AJ |
| | 10 | 17.5 | BF100C-AA | BF100C-AF | BF100C-AJ |
| | 15 | 24.0 | BF150C-AA | BF150C-AF | BF150C-AJ |
| | 20 | 27.0 | BF200C-AA | BF200C-AF | BF200C-AJ |
| B1 | 15 | 24.2 | B015C-AA | B015C-AF | B015C-AJ |
| B2 | 20 | 31.0 | B020C-AA | B020C-AF | B020C-AJ |
| | 25 | 39.0 | B025C-AA | B025C-AF | B025C-AJ |
| | 30 | 45.0 | B030C-AA | B030C-AF | B030C-AJ |
| C | 40 | 59.0 | B040C-AA | B040C-AF | B040C-AJ |
| | 50 | 75.0 | B050C-AA | B050C-AF | B050C-AJ |
| | 60 | 77.0 | BX060C-AA | BX060C-AF | BX060C-AJ |
| D | 60 | 85.0 | B060C-AA | B060C-AF | B060C-AJ |
| | 75 | 106.0 | B075C-AA | — | B075C-AJ |
| | 100 | 138.0 | B100C-AA | — | B100C-AJ |
| | 125 | 173.0 | B125C-AA | — | B125C-AJ |
| | 150 | 180.0 | BX150C-AA | — | BX150C-AJ |
| E | 150 | 199.0 | B150C-AA | — | B150C-AJ |
| | 200 | 263.0 | B200C-AA | — | B200C-AJ |
| | 250 | 325.0 | B250C-AA | — | B250C-AJ |
| F | 250 | 325.0 | BP250C-AA | — | BP250C-AJ |
| | 300 | 360.0 | BP300C-AA | — | BP300C-AJ |
| | 350 | 425.0 | BP350C-AA | — | BP350C-AJ |
| | 400 | 475.0 | BP400C-AA | — | BP400C-AJ |
| | 450 | 527.0 | BP450C-AA | — | — |
| G | 300 | 360.0 | B300C-AA | — | B300C-AJ |
| | 350 | 425.0 | B350C-AA | — | B350C-AJ |
| | 400 | 475.0 | B400C-AA | — | B400C-AJ |
| | 450 | 525.0 | B450C-AA | — | B450C-AJ |
| | 500 | 590.0 | B500C-AA | — | B500C-AJ |
| | 600 | 670.0 | B600C-AA | — | B600C-AJ |

[1] *The basic drive does not include a Control Power Transformer. If local 115V AC power is not available, refer to options* ***CF, CP*** *and* ***CT****.*

[2] *The drive rating is based on a nominal voltage of 240 volts and a carrier frequency of 4kHz at altitudes of 1,000 meters or less. Refer to the Drive Derating Guidelines in the Standard Drives section.*

[3] *The drive rating is based on a nominal voltage of 480 volts and a carrier frequency of 4kHz at altitudes of 1,000 meters or less. Refer to the Drive Derating Guidelines in the Standard Drives section.*

## 460V Variable Torque Drives and Enclosures [1, 2, 4]

| Frame | Drive Rating Nominal HP | Amps | NEMA Type 1 (IP20) General Purpose Code | NEMA Type 4 (IP65) Resists Water and Dust Code | NEMA Type 12 (IP54) Industrial Use, Dust Tight Code |
|---|---|---|---|---|---|
| A1 | 1/2 | 1.2 | BF05V-AA | BF05V-AF | BF05V-AJ |
| | 3/4 | 1.7 | BF07V-AA | BF07V-AF | BF07V-AJ |
| | 1 | 2.3 | BF10V-AA | BF10V-AF | BF10V-AJ |
| | 1 1/2 | 3.0 | BF15V-AA | BF15V-AF | BF15V-AJ |
| A2 | 2 | 4.0 | BF20V-AA | BF20V-AF | BF20V-AJ |
| | 3 | 6.0 | BF30V-AA | BF30V-AF | BF30V-AJ |
| A3 | 5 | 9.0 | BF50V-AA | BF50V-AF | BF50V-AJ |
| A4 | 10 | 17.5 | BF75V-AA | BF75V-AF | BF75V-AJ |
| | 15 | 25.0 | BF100V-AA | BF100V-AF | BF100V-AJ |
| | 20 | 24.0 | BF200V-AA | BF200V-AF | BF200V-AJ |
| B2 | 25 | 34.0 | B020V-AA | B020V-AF | B020V-AJ |
| | 30 | 48.0 | B030V-AA | B030V-AF | B030V-AJ |
| C | 40 | 59.0 | BX040V-AA | BX040V-AF | BX040V-AJ |
| | 50 | 65.0 | B050V-AA | B050V-AF | B050V-AJ |
| | 60 | 77.0 | BX060C-AA | BX060V-AF | BX060V-AJ |
| D | 75 | 96.0 | B060V-AA | — | B060V-AJ |
| | 100 | 120 | B075V-AA | — | B075V-AJ |
| | 125 | 150 | B100V-AA | — | B100V-AJ |
| | 150 | 180 | BX125V-AA | — | BX125V-AJ |
| E | 200 | 240 | B150V-AA | — | B150V-AJ |
| | 250 | 292 | B200V-AA | — | B200V-AJ |
| | 250 | 325 | B250V-AA | — | B250V-AJ |
| F | 300 | 360 | BP250V-AA | — | BP250V-AJ |
| | 350 | 425 | BP300V-AA | — | BP300V-AJ |
| | 400 | 475 | BP350V-AA | — | BP350V-AJ |
| | 450 | 532 | BP400V-AA | — | BP400V-AJ |
| G | 300 | 360 | BX250V-AA | — | BX250V-AJ |
| | 350 | 425 | B300V-AA | — | B300V-AJ |
| | 400 | 475 | B350V-AA | — | B350V-AJ |
| | 450 | 525 | B400V-AA | — | B400V-AJ |
| | 500 | 590 | B450V-AA | — | B450V-AJ |
| | 600 | 670 | B500V-AA | — | B500V-AJ |

## 575V Constant and Variable Torque Drives and Enclosures [1, 3]

| Frame | Drive Rating Nominal HP | Amps | NEMA Type 1 (IP20) General Purpose Code | NEMA Type 4 (IP65) Resists Water and Dust Code | NEMA Type 12 (IP54) Industrial Use, Dust Tight Code |
|---|---|---|---|---|---|
| A4 | 1 | 2.0 | CF10C-AA | CF10C-AF | CF10C-AJ |
| | 2 | 4.0 | CF20C-AA | CF20C-AF | CF20C-AJ |
| | 3 | 6.0 | CF30C-AA | CF30C-AF | CF30C-AJ |
| | 5 | 8.0 | CF50C-AA | CF50C-AF | CF50C-AJ |
| | 7 1/2 | 10.0 | CF75C-AA | CF75C-AF | CF75C-AJ |
| | 10 | 12.0 | CF100C-AA | CF100C-AF | CF100C-AJ |
| | 15 | 19.0 | CF150CAA | CF150C-AF | CF150C-AJ |
| | 20 | 24.0 | CF200C-AA | CF200C-AF | CF200C-AJ |
| C | 25 | 30.0 | C025C-AA | C025C-AF | C025C-AJ |
| | 30 | 35.0 | C030C-AA | C030C-AF | C030C-AJ |
| | 40 | 45.0 | C040C-AA | C040C-AF | C040C-AJ |
| | 50 | 57.0 | C050C-AA | C050C-AF | C050C-AJ |
| | 60 | 62.0 | C060C-AA | C060C-AF | C060C-AJ |
| D | 75 | 85.0 | C075C-AA | — | C075C-AJ |
| | 100 | 109 | C100C-AA | — | C100C-AJ |
| | 125 | 138 | C125C-AA | — | C125C-AJ |
| E | 150 | 168 | C150C-AA | — | C150C-AJ |
| | 200 | 252 | C200C-AA | — | C200C-AJ |
| | 250 | 284 | C250C-AA | — | C250C-AJ |
| | 300 | 300 | CX300C-AA | — | CX300C-AJ |
| G | 300 | 300 | C300C-AA | — | C300C-AJ |
| | 350 | 350 | C350C-AA | — | C350C-AJ |
| | 400 | 400 | C400C-AA | — | C400C-AJ |
| | 450 | 450 | C450C-AA | — | C450C-AJ |
| | 500 | 500 | C500C-AA | — | C500C-AJ |
| | 600 | 600 | C600C-AA | — | C600C-AJ |

[1] *The basic drive does not include a Control Power Transformer. If local 115V AC power is not available, refer to options **CF**, **CP** and **CT**.*

[2] *The drive rating is based on a nominal voltage of 480 volts and a carrier frequency of 4kHz at altitudes of 1,000 meters or less. Refer to the Drive Derating Guidelines in the Standard Drives section.*

[3] *The drive rating is based on a nominal voltage of 600 volts and a carrier frequency of 4kHz at altitudes of 1,000 meters or less. Refer to the Drive Derating Guidelines in the Standard Drives section.*

[4] *When choosing horsepower related options for variable torque drives, match the option to the actual variable torque horsepower rating, not to the base catalog number. **Example:** A 15 HP VT Drive requires a 15 HP Circuit Breaker, not a 10 HP Circuit Breaker.*

## Motor Thermal Overload Relay Data

The **Thermal Overload Relay** (Option MT) will have the following characteristics:

**Class 10 (Bulletin 193) Relays:**

- Trip in 10 seconds or less at 600% of device current rating.
- Have integral heater elements – Additional heater elements are not required.
- Have auto or manual reset.
- Have trip settings per the range chart shown below
- If a motor outside the published adjustability range is to be used, complete motor data must be supplied at order entry.

| DRIVE RATING kW (HP) | CLASS 10 ADJUSTABLE THERMAL OVERLOAD RELAY (OPTION CODE -MT) ADJUSTABLE RANGE | | | |
|---|---|---|---|---|
| | 230V | 460V-CT | 460V-VT | 575V |
| 0.37 (0.5) | 1.6-2.4 A | 1-1.6 A | 1-1.6 A | — |
| 0.56 (0.75) | 2.4-4 A | 1-1.6 A | 1-1.6 A | — |
| 0.75 (1) | 4-6 A | 1.6-2.4 A | 1.6-2.4 A | 1.6-2.4 A |
| 1.2 (1.5) | 4-6 A | 2.4-4 A | 2.4-4 A | — |
| 1.5 (2) | 6-10 A | 2.4-4 A | 2.4-4 A | 2.4-4 A |
| 2.2 (3) | 10-16 A | 4-6 A | 4-6 A | 4-6 A |
| 3.7 (5) | 16-24 A | 10-16 A | 6-10 A | 6-10 A |
| 5.5 (7.5) | 18-30 A | 10-16 A | 10-16 A | 6-10 A |
| 7.5 (10) | 30-45 A | 10-16 A | 10-16 A | 10-16 A |
| 11 (15) | 45-60 A | 16-24 A | 16-24 A | 16-24 A |
| 15 (20) | 60-75 A | 18-30 A | 18-30 A | 16-24 A |
| 18.5 (25) | 70-90 A | 30-45 A | 30-45 A | 18-30 A |
| 22 (30) | 70-90 A | 30-45 A | 45-60 A | 30-45 A |
| 30 (40) | 80-120 A | 45-60 A | 45-60 A | 30-45 A |
| 37 (50) | 120-200 A | 60-75 A | 60-75 A | 45-60 A |
| 45 (60) | 120-200 A | 70-90 A | 70-90 A | 60-75 A |
| 56 (75) | 180-300 A | 66-110 A | 66-110 A | 66-110 A |
| 75 (100) | 180-300 A | 120-200 A | 80-120 A | 80-120 A |
| 93 (125) | 240-400 A | 120-200 A | 120-200 A | 120-200 A |
| 112 (150) D Frame | — | 120-200 A | 120-200 A | — |
| 112 (150) E Frame | — | 180-300 A | — | 120-200 A |
| 149 (200) | — | 180-300 A | 180-300 A | 180-300 A |
| 187 (250) 292 A | — | 240-400 A | 180-300 A | 180-300 A |
| 187 (250) 325 A | — | — | 240-400 A | 180-300 A |
| 224 (300) | — | 240-400 A | 240-400 A | 180-300 A |
| 261 (350) | — | 378-630 A | 378-630 A | 240-400 A |
| 298 (400) | — | 378-630 A | 378-630 A | 240-400 A |
| 336 (450) | — | 378-630 A | 378-630 A | 378-630 A |
| 373 (500) | — | 378-630 A | 378-630 A | 378-630 A |
| 448 (600) | — | 645-975 A | 645-975 A | 378-630 A |

**Class 20 (Bulletin 592) Relays:**

- Trip in 20 seconds or less at 600% of device current rating.
- Must be manually reset.
- Can be programmed for Class 20 operation by choosing the appropriate heater elements from the A-B Industrial Control Catalog – Publication A113, or the chart on the next page.
- Can also be programmed for Class 10 and 30 operation by choosing the appropriate heater elements from the A-B Industrial Control Catalog – Publication A113.

## Heater Element Selection

The **Thermal Overload Relay** (Option MK) will require the addition of thermal overload heater elements. These elements are not available as part of the Packaged Drives Program. The Class 20 chart shown below is supplied for reference purposes only. If Class 10 or 30 operation is required, refer to the A-B Industrial Control Catalog – **Publication A112** for selection guidance.

| Rating | Motor Full Load Amperes for Sizing of Class 20 Heater Elements for Various Options Drive Ratings in kW (HP) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 230V<br>460V-CT<br>460V-VT<br>575V | 0.37-3.7 (0.5-5)<br>0.37-3.7 (0.5-5)<br>0.37-3.7 (0.5-5)<br>0.37-3.7 (0.5-5) | 5.5-7.5 (7.5-10)<br>5.5-18.5 (7.5-25)<br>5.5-18.5 (7.5-25)<br>5.5-22 (7.5-30) | 11-18.5 (15-25)<br>22-30 (30-40)<br>22-30 (30-40)<br>30-45 (40-60) | 22-37 (30-50)<br>37-75 (50-100)<br>37-75 (50-100)<br>56-93 (75-125) | 45 (60)<br>93-112 (125-150)<br>93-112 (125-150)<br>112 (150) | 56-75 (75-100)<br>149-187 (200-250)<br>149-187 (200-250)<br>149-224 (200-300) | 93 (125)<br>224 (300)<br>224 (300)<br>261-336 (350-450) | —<br>261-373 (350-500)<br>261-373 (350-500)<br>373 (500) | Heater<br>Type W<br>Number |
| W20 | 0.49 | … | … | … | … | … | … | … | W20 |
| W21 | 0.54 | … | … | … | … | … | … | … | W21 |
| W22 | 0.60 | … | … | … | … | … | … | … | W22 |
| W23 | 0.67 | … | … | … | … | 70 | … | … | W23 |
| W24 | 0.74 | … | … | … | … | 75 | 127 | … | W24 |
| W25 | 0.84 | … | … | … | … | … | … | … | W25 |
| W26 | 0.90 | … | … | … | … | … | … | 115 | W26 |
| W27 | 1.00 | … | … | … | 43 | … | 78 | 125 | W27 |
| W28 | 1.10 | … | … | … | 45 | … | 85 | 135 | W28 |
| W29 | 1.22 | … | … | … | 50 | … | 94 | 147 | W29 |
| W30 | 1.31 | … | … | … | 54 | … | 104 | 165 | W30 |
| W31 | 1.43 | … | … | … | 59 | … | 114 | 179 | W31 |
| W32 | 1.55 | … | … | … | 65 | … | 125 | 196 | W32 |
| W33 | 1.66 | … | … | … | 70 | … | 139 | 216 | W33 |
| W34 | 1.80 | … | … | … | 75 | 127 | 150 | 232 | W34 |
| W35 | 1.97 | … | … | … | 81 | 138 | 160 | 260 | W35 |
| W36 | 2.12 | … | … | … | 89 | 151 | 175 | 287 | W36 |
| W37 | 2.33 | … | … | … | 98 | 166 | 195 | 315 | W37 |
| W38 | 2.59 | … | … | … | 110 | 183 | 215 | 350 | W38 |
| W39 | 2.84 | … | … | … | 120 | 198 | 235 | 385 | W39 |
| W40 | 3.15 | … | … | … | 132 | 218 | 260 | 420 | W40 |
| W41 | 3.46 | … | … | … | 143 | 239 | 298 | 465 | W41 |
| W42 | 3.84 | … | … | … | 155 | 260 | 320 | 515 | W42 |
| W43 | 4.27 | … | … | … | 170 | 285 | 350 | 570 | W43 |
| W44 | 4.73 | … | … | … | 193 | 310 | 380 | 630 | W44 |
| W45 | 5.36 | … | … | … | … | … | 415 | … | W45 |
| W46 | 5.82 | … | … | … | … | … | 455 | … | W46 |
| W47 | 6.33 | … | … | … | … | … | 500 | … | W46 |
| W48 | 6.97 | … | … | … | … | … | 550 | … | W48 |
| W49 | 7.63 | … | … | … | … | … | … | … | W49 |
| W50 | 8.49 | 8.45 | … | … | … | … | … | … | W50 |
| W51 | 9.24 | 9.29 | … | … | … | … | … | … | W51 |
| W52 | 10.1 | 10.3 | … | … | … | … | … | … | W52 |
| W53 | 11.1 | 11.4 | … | … | … | … | … | … | W53 |
| W54 | 12.2 | 12.5 | … | … | … | … | … | … | W54 |
| W55 | 13.6 | 13.7 | … | … | … | … | … | … | W55 |
| W56 | 14.6 | 15.0 | … | … | … | … | … | … | W56 |
| W57 | 15.7 | 16.3 | … | … | … | … | … | … | W57 |
| W58 | 17.2 | 17.6 | … | … | … | … | … | … | W58 |
| W59 | 18.9 | 18.9 | … | … | … | … | … | … | W59 |
| W60 | 20.5 | 20.9 | 21.1 | … | … | … | … | … | W60 |
| W61 | 22.2 | 22.9 | 23.2 | 25.1 | … | … | … | … | W61 |
| W62 | 24.3 | 25.0 | 25.7 | 27.5 | … | … | … | … | W62 |
| W63 | … | 27.6 | 28.5 | 30.5 | … | … | … | … | W63 |
| W64 | … | 30.0 | 30.5 | 33.5 | … | … | … | … | W64 |
| W65 | … | 32.0 | 33.0 | 36.5 | … | … | … | … | W65 |
| W66 | … | 34.0 | 35.5 | 40.0 | 43.0 | … | … | … | W66 |
| W67 | … | 37.0 | 38.5 | 44.0 | 47.0 | … | … | … | W67 |
| W68 | … | 39.0 | 41.5 | 48.5 | 51 | … | … | … | W68 |
| W69 | … | 41.0 | 45.0 | 53 | 56 | … | … | … | W69 |
| W70 | … | … | 48.5 | 58 | 61 | … | … | … | W70 |
| W71 | … | … | 53 | 62 | 66 | … | … | … | W71 |
| W72 | … | … | 56 | 67 | 72 | … | … | … | W72 |
| W73 | … | … | 58 | 72 | 77 | … | … | … | W73 |
| W74 | … | … | 60 | 77 | 83 | … | … | … | W74 |
| W75 | … | … | 62 | 82 | 89 | … | … | … | W75 |
| W76 | … | … | … | 88 | 95 | … | … | … | W76 |
| W77 | … | … | … | 94 | 102 | … | … | … | W77 |
| W78 | … | … | … | 98 | 108 | … | … | … | W78 |
| W79 | … | … | … | 102 | 116 | … | … | … | W79 |
| W80 | … | … | … | 108 | 123 | … | … | … | W80 |
| W81 | … | … | … | 117 | 130 | … | … | … | W81 |
| W82 | … | … | … | 125 | 137 | … | … | … | W82 |
| W83 | … | … | … | … | 150 | … | … | … | W83 |
| W84 | … | … | … | … | 160 | … | … | … | W84 |
| W85 | … | … | … | … | 165 | … | … | … | W85 |
| | | Table 181 [1] | | | | Table 195 [1] | | | |

[1] *Heater element selection tables taken from A-B Industrial Control Catalog – **Publication A113.***

Listed in the chart below are possible option combination conflicts that may occur when selecting 1336 PLUS II Packaged Drive Options.

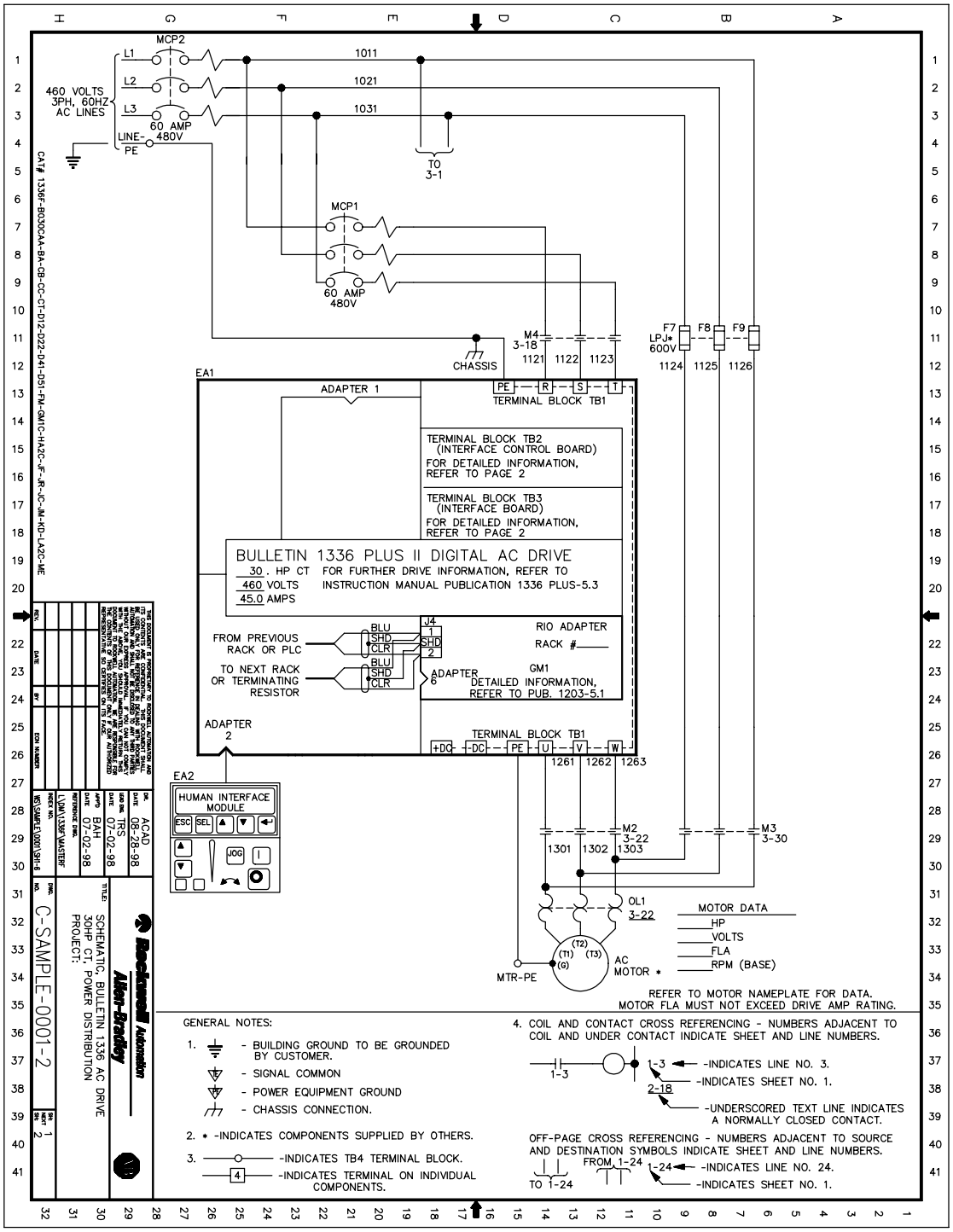
## Option Selection Rules

| Option | Must Be Used With… | Cannot Be Used With… |
|---|---|---|
| A208 | 230V Base Drives | 460 or 575V Base Drives |
| AA | | AF, AJ, HJPC, HJ2C |
| AF | | AA, AJ, HABC, HAPC, HA1C, HA2C |
| AJ | | AA, AF, HABC, HAPC, HA1C, HA2C |
| BA | JF | BC, BD, BM, BP, BS, KM, MK, MT |
| BC | JF | BA, BD, BM, BP, BS, KM, MK, MT |
| BD | JF | BA, BC, BM, BP, BS, KM, MK, MT |
| BM | JF | BA, BC, BD, BP, BS, KM, MK, MT |
| BP | JF | BA, BC, BD, BM, BS, KM, MK, MT |
| BS | JF | BA, BC, BD, BM, BP, KM, MK, MT |
| CB | | DS |
| CC | one BA, BC, BD, BM, BP or BS | DT |
| CF | | CP, CT |
| CM | | |
| CP | | CF, CT |
| CT | | CF, CP |
| DS | | CB |
| DT | one BA, BC, BD, BM BP or BS | CC |
| D10 | | D11-D19, HA1C, HA2C, HJ2C |
| D11 | | D10, D12-D19 |
| D12 | | D10, D11, D13-D19, L4C, L7EC |
| D13 | | D10-D12, D14-D19 |
| D14 | | D10-D13, D15-D19, L4C, L7EC |
| D15 | | D10-D14, D16-D19 |
| D16 | | D10-D15, D17-D19, L4C, L7EC |
| D17 | | D10-D16, D18, D19, HA1C, HA2C, HJ2C |
| D18 | | D10-D17, D19, HA1C, HA2C, HJ2C |
| D19 | | D10-D18, HA1C, HA2C, HJ2C |
| D21 | | D22 |
| D22 | one BA, BC, BD, BM, BP, BS, MK or MT | D21 |
| D31 | | D32 |
| D32 | | D31, BA, BC, BD, BM, BP, BS, CC, DT, FM, HA1C, HA2C, HJ2C |
| D41 | one BA, BC, BD, BM, BP or BS | D42 |
| D42 | one BA, BC, BD | D41, BM, BP, BS |
| D51 | one BA, BC, BD, BM, BP, BS or KM | D52 |
| D52 | | D51, BA, BC, BD, BM, BP, BS |
| D61 | | HA1C, HA2C, HJ2C, LA2C, LA6C, LA7C |
| D91 | At least one: D10-19, D21-22, D31-32, D41-42, D51 or D52 | |
| EB | | |
| EC | AA | AF, AJ, EG |
| EF1 | Wall Mounting Enclosures (Frames A-C) | B060C-B600C, B060V-B500V, C075C-C600C, EF2 (Frames D-G) |
| EF2 | Wall Mounting Enclosures (Frames A-C) | B060C-B600C, B060V-B500V, C075C-C600C, EF1 (Frames D-G) |
| EG | AA | AF, AJ, EC |
| EH | JR | EH2 |
| EH2 | JR, one of CF, CP, CT | EH |
| EN910C | | EN935C, EN945C |
| EN935C | | EN910C, EN945C |
| EN945C | | EN910C, EN935C |
| EP1 | | EP2, EP3 |
| EP2 | | EP1, EP3 |
| EP3 | | EP1, EP2 |
| ET | | |
| FM | one BA, BC, BD, BM, BP or BS | |
| GD1C | | GM1C, GMS1C, GD2C, GU6C, HABC, HAPC, HA1C, HA2C, HJBC, HJPC, HJ2C |
| GD2C | | GM2C, GMS2C, GD1C, GU6C, HABC, HAPC, HA1C, HA2C, HJBC, HJPC, HJ2C |
| GM1C | | GD1C, GM2C, GM5C, GMS1C Frame A Drives |
| GM2C | | GD2C, GM1C, GM5C, GMS2C Frame A Drives |
| GM5C | | GM1C. GM2C, GMS5C Frame A Drives |
| GM6C | | GM1C, GM2C, GM5C, GU6C, GMS6C Frame A Drv |
| GMS1C | | GD1C, GM1C, GMS2C, GMS5C, HNSBC, HNSPC, HNS1C, HNS2C |
| GMS2C | | GD2C, GM2C, GMS1C, GMS5C, HNSBC, HNSPC, HNS1C, HNS2C |
| GMS5C | | GM5C, GMS1C, GMS2C, HNSBC, HNSPC, HNS1C, HNS2C |
| GMS6C | | GM6C, GMS1C, GMS2C, GMS5C, HNSBC, GU6C, HNSPC, HNS1C, HNS2C |
| GU6C | 24V DC user supplied power | GM6C, GMS6C, GD1C, GD2C, HABC, HAPC, HA1C, HA2C, HJBC, HJPC, HJ2C |
| HABC | AA | AF, AJ, GD1C, GD2C, GU6C, HAPC, HA1C, HA2C, HJPC, HJ2C |
| HAPC | AA | AF, AJ, GD1C, GD2C, GU6C, HABC, HA1C, HA2C, HJPC, HJ2C |
| HA1C | AA | AF, AJ, D10, D17, D18, D19, GD1C, GD2C, GU6C, HABC, HAPC, HA2C, HJPC, HJ2C |
| HA2C | AA | AF, AJ, D10, D17, D18, D19, GD1C, GD2C, GU6C, HABC, HAPC, HA1C, HJPC, HJ2C |
| HNSBC | | HNSPC, HNS1C, HNS2C, GMS1C, GMS2C, GMS5C |
| HNSPC | | HNSBC, HNS1C, HNS2C, GMS1C, GMS2C, GMS5C |
| HNS1C | | HNSBC, HNSPC, HNS2C, GMS1C, GMS2C, GMS5C |
| HNS2C | | HNSBC, HNSPC, HNS1C, GMS1C, GMS2C, GMS5C |
| HJPC | AF or AJ | AA, GD1C, GD2C, GU6C, HABC, HAPC, HA1C, HA2C, HJ2C |
| HJ2C | AF or AJ | AA, D10, D17, D18, D19, GD1C, GD2C, GU6C, HABC, HAPC, HA1C, HA2C, HJ2C, |
| JC | | |
| JF | | |
| JL | | JS |
| JM | | |
| JR | | |
| JS | | JL |
| JT | | |
| KD | | KM |
| KM | JF | BA, BC, BD, BM, BP, BS, KD |
| LA1C | — | LA3C, LA4C, LA5C |
| LA2C | — | D61, LA6C, LA7C, N3, N4C, N4T, N5C, N5T |
| LA3C | — | LA1C, LA4C, LA5C |
| LA4C | — | LA1C, LA3C, LA5C |
| LA5C | — | LA1C, LA3C, LA4C |
| LA6C | — | D61, LA2C, LA7C, N3, N4C, N4T, N5C, N5T |
| LA7C | — | D61, LA2C, LA6C, N3, N4C, N4T, N5C, N5T |
| L4C | | D12, D14, D16, L5C, L7EC, L8EC, L9EC |
| L5C | | L4C, L7EC, L8EC, L9EC |
| L7EC | | D12, D14, D16, L4C, L5C, L8EC, L9EC |
| L8EC | | L4C, L5C, L7EC, L9EC |
| L9EC | | L4C, L5C, L7EC, L8EC |
| LQ | AA | AF, AJ, LT, LW |
| LR | AA | AF, AJ, LT, LW |
| LT | AF or AJ | AA, LR, LQ |
| LW | AF or AJ | AA, LR, LQ |
| MB | 7.5 HP or larger | 5 HP or smaller |
| ME | JR | |
| MH | JR | MH2 |
| MH2 | JR, one of CF, CP, CT | MH |
| MK | | BA, BC, BD, BM, BP, BS, MT |
| MT | | BA, BC, BD, BM, BP, BS, MK |
| MP12A | | LR, LT, MP12N, MP18A, MP18N |
| MP12N | | MP12A, MP18A, MP18N |
| MP18A | | LR, LT, MP12A, MP12N, MP18N |
| MP18N | | MP12A, MP12N, MP18A |
| MQ2 | | MQ3 |
| MQ3 | | MQ2 |
| MX3C | | |
| N3 | | LA2C, LA6C, LA7C, N4C, N4T, N5C, N5T |
| N4C | | LA2C, LA6C, LA7C, N3, N4T, N5C, N5T |
| N4T | | LA2C, LA6C, LA7C, N3, N4C, N5C, N5T |
| N5C | | LA2C, LA6C, LA7C, N3, N4C, N4T, N5T |
| N5T | | LA2C, LA6C, LA7C, N3, N4C, N4T, N5C |
| N6A | | N7A, N8A |
| N7A | | N6A, N8A |
| N8A | | N6A, N7A |
| UL | | |

# Drawing Sample

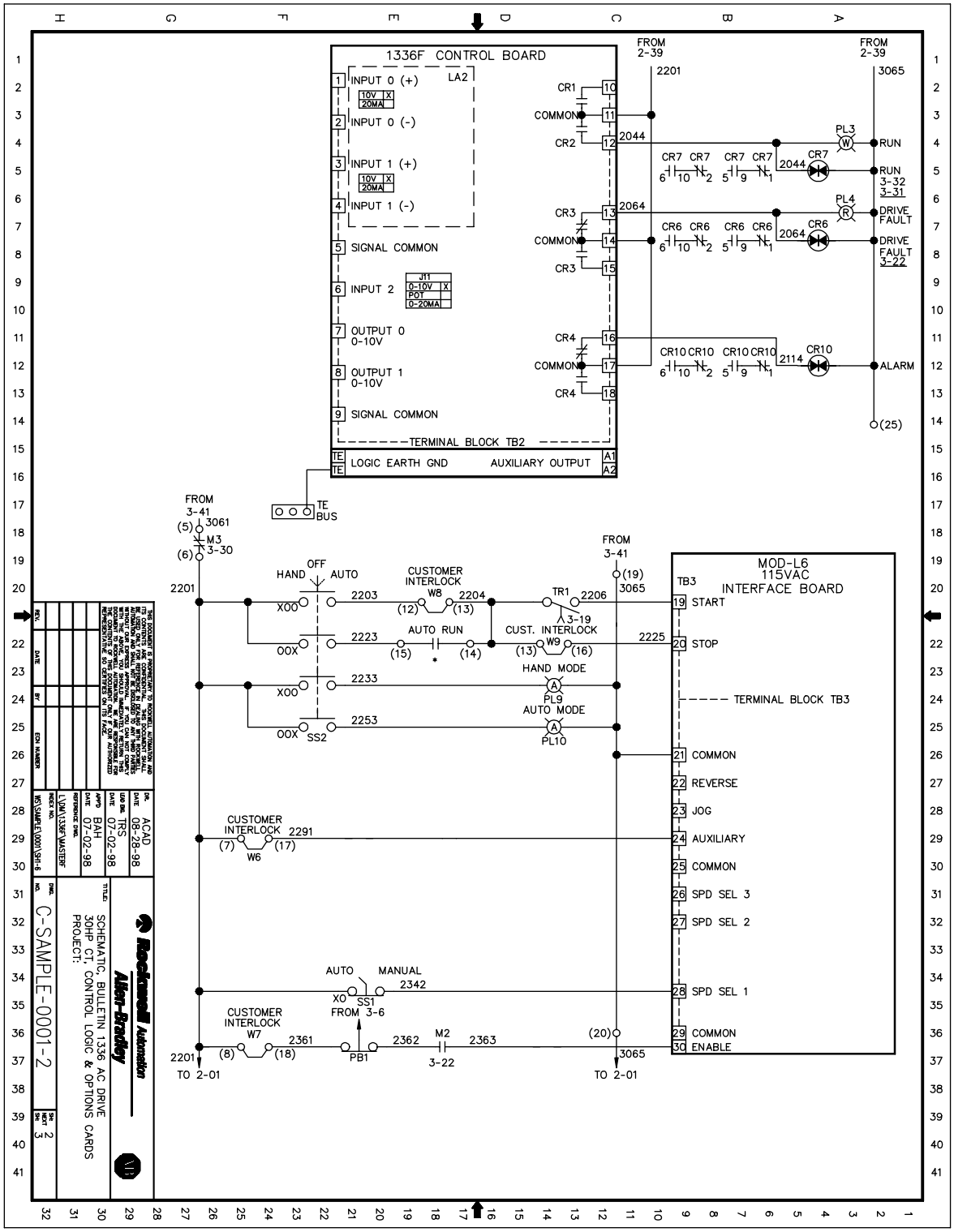
## Page 1 – Drive and Power Distribution

Each Packaged Drive ships with a set of order specific computer generated schematics. Though a given drive package may be configured and ordered as desired by the customer, the drawing information remains consistent. This is especially helpful when multiple drive ratings and/or different configurations are ordered. The following pages illustrate a typical set of 1336 PLUS II Standard Packaged Drive schematics.




The Drive and Power Distribution page of the drawings contains the 1336 PLUS II drive, the heart and brains of the system, and all the power related components. The power distribution scheme is determined by the catalog number options chosen. Any Human Interface Modules or drive mounted options located within the drive package will also be shown on this page. Motor data will be shown if supplied with the order or if an Allen-Bradley motor is ordered.

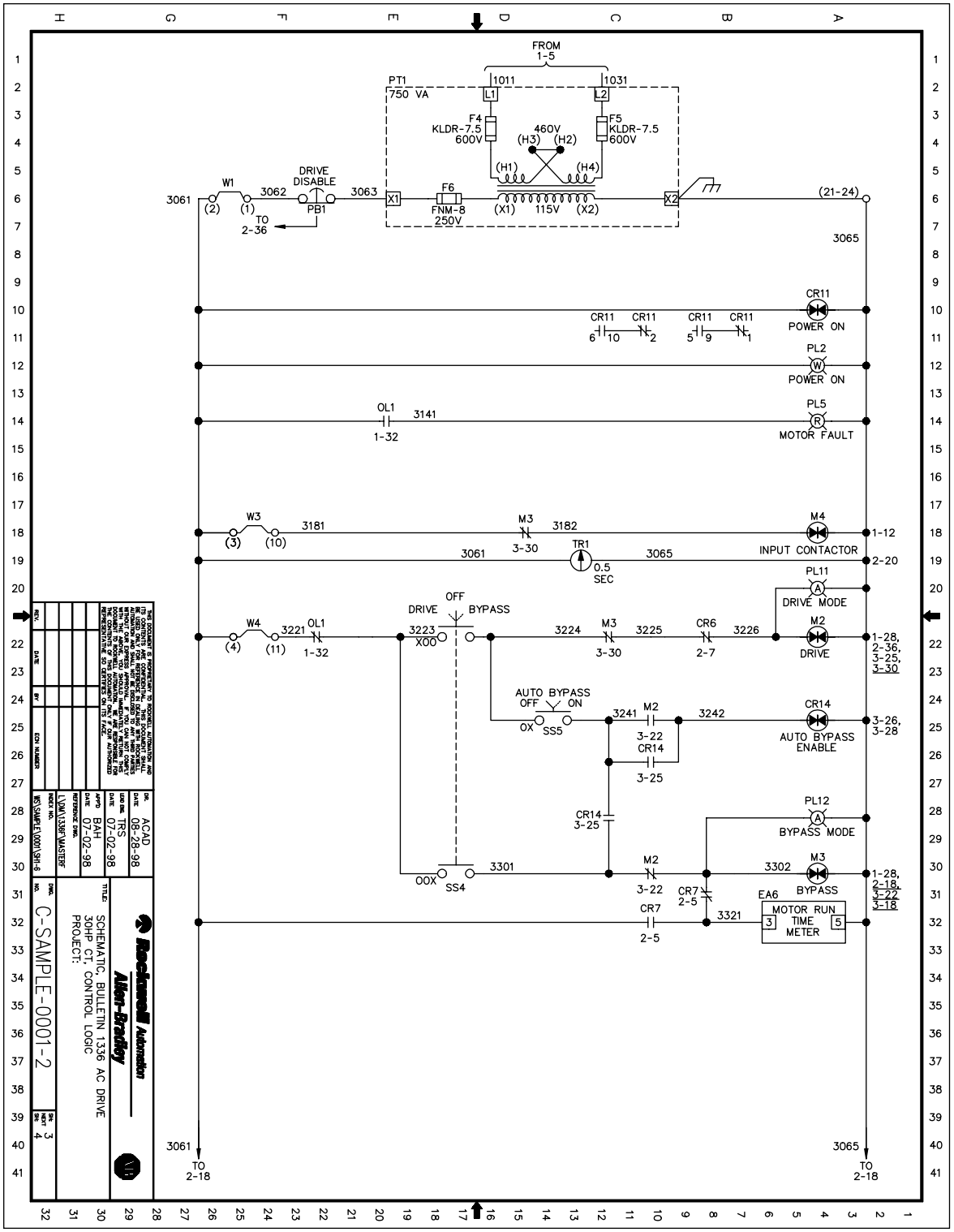
## Page 2 – Control Interface




The Control Interface page of the drawings contains the drive Main Control Board and the standard Control Interface Board, as well as all the control logic that interfaces to these two boards. Several customer interlock locations are included in the logic to allow interfacing of extraneous control devices to the existing drive logic.

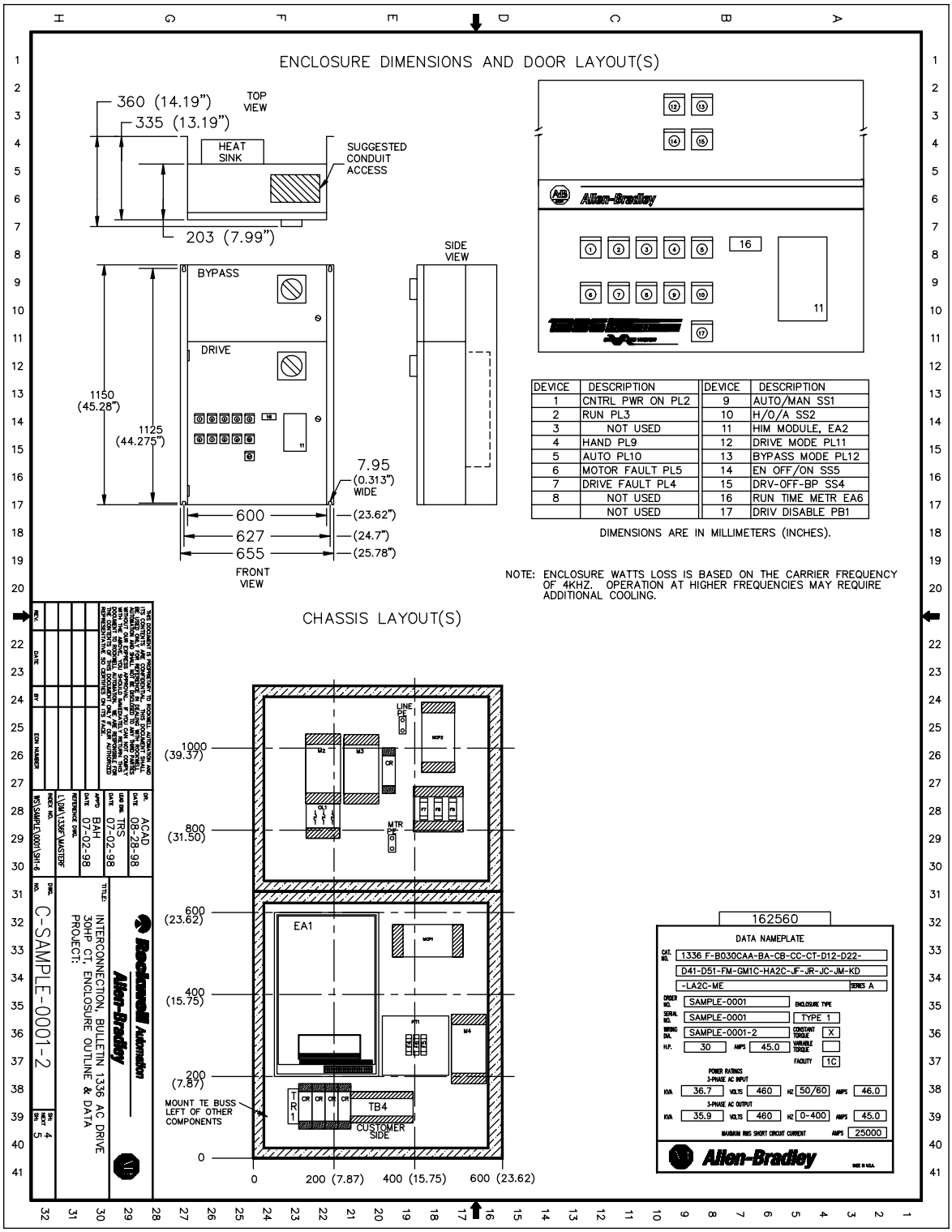
# Drawing Sample

## Page 3 – Control Logic




The Control Logic page of the drawings contains the control power supply and all associated control ladder logic not found on the previous page. The complexity of this page changes dramatically with the number of options chosen. Notice the customer interlock locations in the logic to allow remote interfacing.

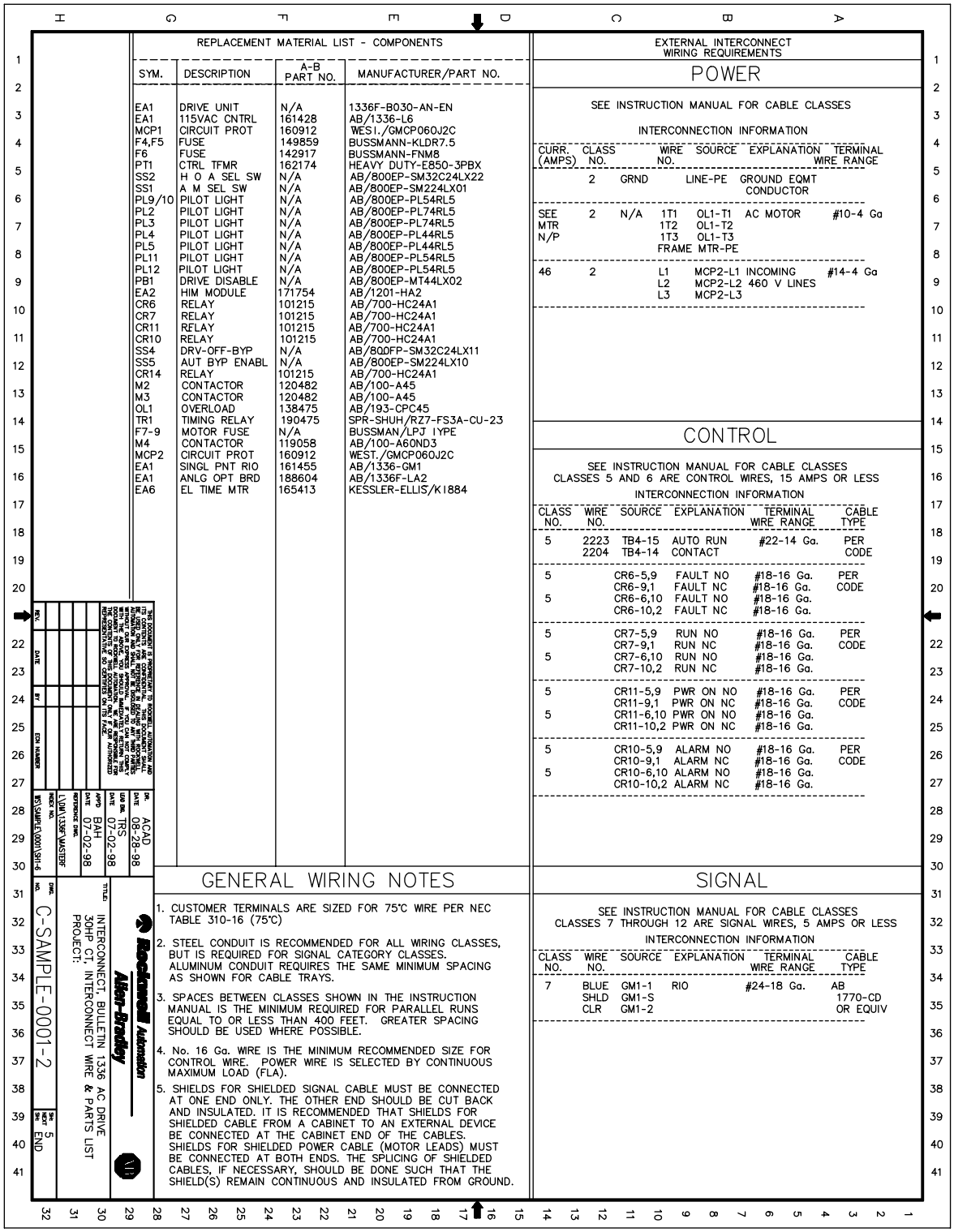
## Page 4 – Enclosure, Panel Layout and Data Nameplate




This page of the drawing package provides all the necessary enclosure information including: dimensions, conduit access, operator devices and location, and panel layout. The actual drive system data nameplate is also shown on this sheet – this is helpful for customers who might have multiple drives in one location and need to quickly match up the correct documentation for each actual drive by comparing nameplates.

# Drawing Sample

## Page 5 – Parts List and Interconnection Wiring



REPLACEMENT MATERIAL LIST - COMPONENTS

| SYM. | DESCRIPTION | A-B PART NO. | MANUFACTURER/PART NO. |
|---|---|---|---|
| EA1 | DRIVE UNIT | N/A | 1336F-B030-AN-EN |
| EA1 | 115VAC CNTRL | 161428 | AB/1336-L6 |
| MCP1 | CIRCUIT PROT | 160912 | WEST./GMCP060J2C |
| F4,F5 | FUSE | 149859 | BUSSMANN-KLDR7.5 |
| F6 | FUSE | 142917 | BUSSMANN-FNM8 |
| PT1 | CTRL TFMR | 162174 | HEAVY DUTY-E650-3PBX |
| SS2 | H O A SEL SW | N/A | AB/800EP-SM32C24LX22 |
| SS1 | A M SEL SW | N/A | AB/800EP-SM224LX01 |
| PL9/10 | PILOT LIGHT | N/A | AB/800EP-PL54RL5 |
| PL2 | PILOT LIGHT | N/A | AB/800EP-PL74RL5 |
| PL3 | PILOT LIGHT | N/A | AB/800EP-PL74RL5 |
| PL4 | PILOT LIGHT | N/A | AB/800EP-PL44RL5 |
| PL5 | PILOT LIGHT | N/A | AB/800EP-PL44RL5 |
| PL11 | PILOT LIGHT | N/A | AB/800EP-PL54RL5 |
| PL12 | PILOT LIGHT | N/A | AB/800EP-PL54RL5 |
| PB1 | DRIVE DISABLE | N/A | AB/800EP-MT44LX02 |
| EA2 | HIM MODULE | 171754 | AB/1201-HA2 |
| CR6 | RELAY | 101215 | AB/700-HC24A1 |
| CR7 | RELAY | 101215 | AB/700-HC24A1 |
| CR11 | RELAY | 101215 | AB/700-HC24A1 |
| CR10 | RELAY | 101215 | AB/700-HC24A1 |
| SS4 | DRV-OFF-BYP | N/A | AB/800FP-SM32C24LX11 |
| SS5 | AUT BYP ENABL | N/A | AB/800EP-SM224LX10 |
| CR14 | RELAY | 101215 | AB/700-HC24A1 |
| M2 | CONTACTOR | 120482 | AB/100-A45 |
| M3 | CONTACTOR | 120482 | AB/100-A45 |
| OL1 | OVERLOAD | 138475 | AB/193-CPC45 |
| TR1 | TIMING RELAY | 190475 | SPR-SHUH/RZ7-FS3A-CU-23 |
| F7-9 | MOTOR FUSE | N/A | BUSSMAN/LPJ TYPE |
| M4 | CONTACTOR | 119058 | AB/100-A60ND3 |
| MCP2 | CIRCUIT PROT | 160912 | WEST./GMCP060J2C |
| EA1 | SINGL PNT RIO | 161455 | AB/1336-GM1 |
| EA1 | ANLG OPT BRD | 188604 | AB/1336F-LA2 |
| EA6 | EL TIME MTR | 165413 | KESSLER-ELLIS/K1884 |

EXTERNAL INTERCONNECT WIRING REQUIREMENTS

POWER

SEE INSTRUCTION MANUAL FOR CABLE CLASSES

INTERCONNECTION INFORMATION

| CURR. (AMPS) | CLASS NO. | WIRE NO. | SOURCE | EXPLANATION | TERMINAL WIRE RANGE |
|---|---|---|---|---|---|
| | 2 | GRND | LINE-PE | GROUND EQMT CONDUCTOR | |
| SEE MTR N/P | 2 | N/A | 1T1<br>1T2<br>1T3<br>FRAME | OL1-T1 AC MOTOR<br>OL1-T2<br>OL1-T3<br>MTR-PE | #10-4 Ga |
| 46 | 2 | | L1<br>L2<br>L3 | MCP2-L1 INCOMING<br>MCP2-L2 460 V LINES<br>MCP2-L3 | #14-4 Ga |

CONTROL

SEE INSTRUCTION MANUAL FOR CABLE CLASSES
CLASSES 5 AND 6 ARE CONTROL WIRES, 15 AMPS OR LESS

INTERCONNECTION INFORMATION

| CLASS NO. | WIRE NO. | SOURCE | EXPLANATION | TERMINAL WIRE RANGE | CABLE TYPE |
|---|---|---|---|---|---|
| 5 | 2223<br>2204 | TB4-15<br>TB4-14 | AUTO RUN<br>CONTACT | #22-14 Ga. | PER CODE |
| 5<br>5 | | CR6-5,9<br>CR6-9,1<br>CR6-6,10<br>CR6-10,2 | FAULT NO<br>FAULT NC<br>FAULT NO<br>FAULT NC | #18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga. | PER CODE |
| 5<br>5 | | CR7-5,9<br>CR7-9,1<br>CR7-6,10<br>CR7-10,2 | RUN NO<br>RUN NC<br>RUN NO<br>RUN NC | #18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga. | PER CODE |
| 5<br>5 | | CR11-5,9<br>CR11-9,1<br>CR11-6,10<br>CR11-10,2 | PWR ON NO<br>PWR ON NC<br>PWR ON NO<br>PWR ON NC | #18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga. | PER CODE |
| 5<br>5 | | CR10-5,9<br>CR10-9,1<br>CR10-6,10<br>CR10-10,2 | ALARM NO<br>ALARM NC<br>ALARM NO<br>ALARM NC | #18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga.<br>#18-16 Ga. | PER CODE |

GENERAL WIRING NOTES

1. CUSTOMER TERMINALS ARE SIZED FOR 75°C WIRE PER NEC TABLE 310-16 (75°C)
2. STEEL CONDUIT IS RECOMMENDED FOR ALL WIRING CLASSES, BUT IS REQUIRED FOR SIGNAL CATEGORY CLASSES. ALUMINUM CONDUIT REQUIRES THE SAME MINIMUM SPACING AS SHOWN FOR CABLE TRAYS.
3. SPACES BETWEEN CLASSES SHOWN IN THE INSTRUCTION MANUAL IS THE MINIMUM REQUIRED FOR PARALLEL RUNS EQUAL TO OR LESS THAN 400 FEET. GREATER SPACING SHOULD BE USED WHERE POSSIBLE.
4. No. 16 Ga. WIRE IS THE MINIMUM RECOMMENDED SIZE FOR CONTROL WIRE. POWER WIRE IS SELECTED BY CONTINUOUS MAXIMUM LOAD (FLA).
5. SHIELDS FOR SHIELDED SIGNAL CABLE MUST BE CONNECTED AT ONE END ONLY. THE OTHER END SHOULD BE CUT BACK AND INSULATED. IT IS RECOMMENDED THAT SHIELDS FOR SHIELDED CABLE FROM A CABINET TO AN EXTERNAL DEVICE BE CONNECTED AT THE CABINET END OF THE CABLES. SHIELDS FOR SHIELDED POWER CABLE (MOTOR LEADS) MUST BE CONNECTED AT BOTH ENDS. THE SPLICING OF SHIELDED CABLES, IF NECESSARY, SHOULD BE DONE SUCH THAT THE SHIELD(S) REMAIN CONTINUOUS AND INSULATED FROM GROUND.

SIGNAL

SEE INSTRUCTION MANUAL FOR CABLE CLASSES
CLASSES 7 THROUGH 12 ARE SIGNAL WIRES, 5 AMPS OR LESS

INTERCONNECTION INFORMATION

| CLASS NO. | WIRE NO. | SOURCE | EXPLANATION | TERMINAL WIRE RANGE | CABLE TYPE |
|---|---|---|---|---|---|
| 7 | BLUE<br>SHLD<br>CLR | GM1-1<br>GM1-S<br>GM1-2 | RIO | #24-18 Ga. | AB 1770-CD OR EQUIV |

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| REV. | DATE | BY | ECN NUMBER |
|---|---|---|---|
| | | | |

WES\SAMPLE\0001\SH1-6 — INDEX NO.
L\0M\1336F\MASTERF — REFERENCE DWG.
BAH 07-02-98 — APPD DATE
TRS 07-02-98 — ORIGINAL DATE
ACAD 08-28-98 — DR. DATE

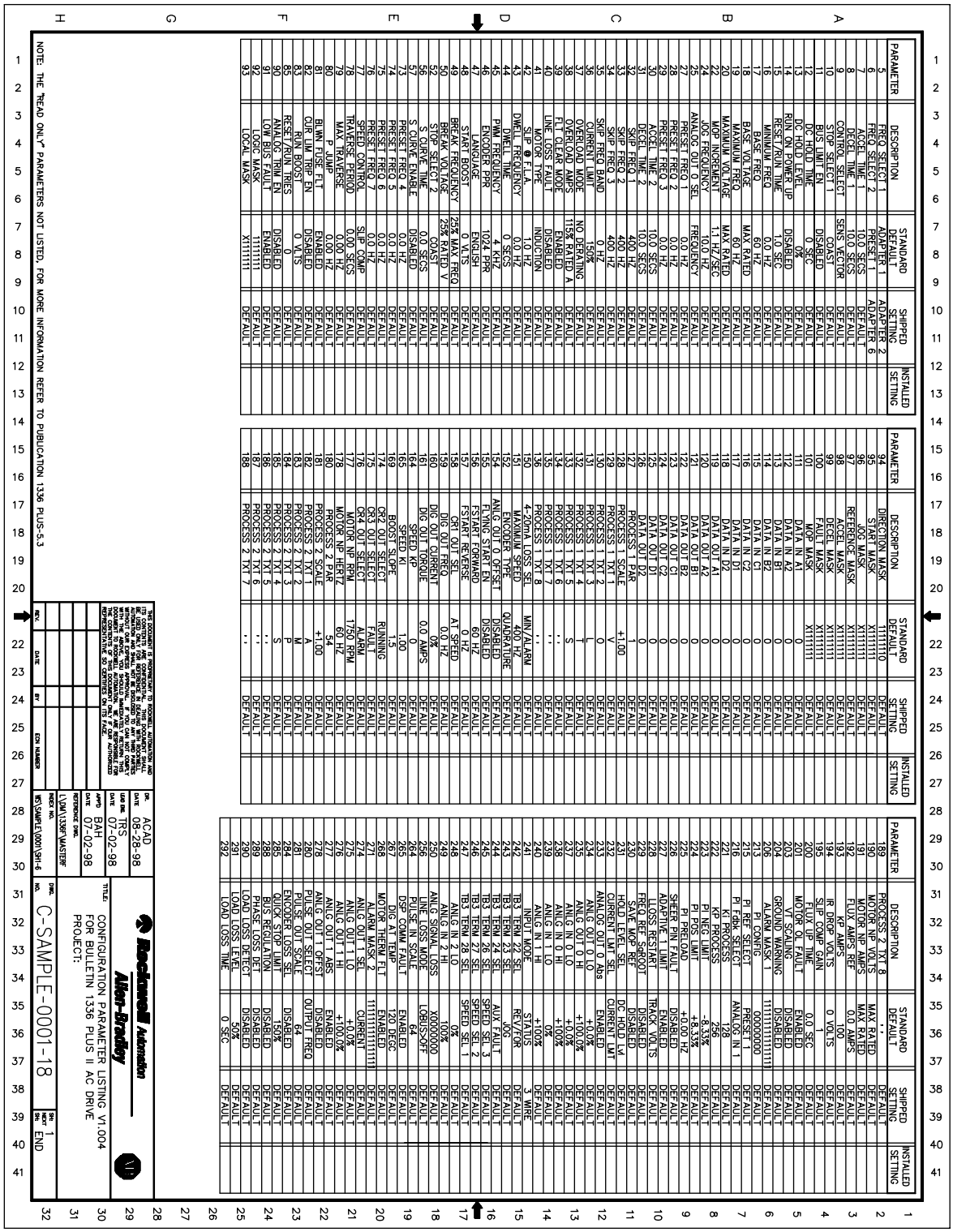
DWG. NO. C-SAMPLE-0001-2 — SHT. NO. 5 — SHT. SIZE END

TITLE: INTERCONNECT, BULLETIN 1336 AC DRIVE 30HP CT, INTERCONNECT WIRE & PARTS LIST
PROJECT:

Rockwell Automation
Allen-Bradley

This page provides a list of the non-drive peripheral components contained in the system package. The A-B part number, vendor and vendor's part number are included. Also provided is a list of remote wiring interconnections required and the acceptable wire gauges; for power, control and signal wiring. This page has a lot of useful contractor/installer type information.

## Page 6 – Parameter Settings



| PARAMETER | DESCRIPTION | STANDARD DEFAULT | SHIPPED SETTING | INSTALLED SETTING |
|---|---|---|---|---|
| 5 | FREQ SELECT 1 | ADAPTER 1 | ADAPTER 2 | |
| 7 | FREQ SELECT 2 | ADAPTER 2 | ADAPTER 6 | |
| 8 | ACCEL TIME 1 | 10.0 SECS | | |
| 9 | DECEL TIME 1 | 10.0 SECS | | |
| 10 | CONTROL SELECT | SENS VECTOR | | |
| 11 | STOP SELECT 1 | COAST | | |
| 12 | BUS LIMIT EN | DISABLED | | |
| 13 | DC HOLD TIME | 0 SEC | | |
| 14 | DC HOLD LEVEL | 0% | | |
| 15 | RUN ON POWER UP | DISABLED | | |
| 16 | RESET/RUN TIME | 1.0 SEC | | |
| 17 | MINIMUM FREQ | 0.0 HZ | | |
| 18 | BASE FREQ | 60 HZ | | |
| 19 | BASE VOLTAGE | MAX RATED | | |
| 20 | MAXIMUM VOLTAGE | MAX RATED | | |
| 22 | MOP INCREMENT | 1.1 HZ/SEC | | |
| 24 | JOG FREQUENCY | 10.0 HZ | | |
| 25 | ANALOG OUT 0 SEL | FREQUENCY | | |
| 27 | PRESET FREQ 1 | 0.0 HZ | | |
| 28 | PRESET FREQ 2 | 0.0 HZ | | |
| 29 | PRESET FREQ 3 | 0.0 HZ | | |
| 30 | ACCEL TIME 2 | 10.0 SECS | | |
| 31 | DECEL TIME 2 | 10.0 SECS | | |
| 32 | SKIP FREQ 1 | 400 HZ | | |
| 33 | SKIP FREQ 2 | 400 HZ | | |
| 34 | SKIP FREQ BAND | 400 HZ | | |
| 36 | CURRENT LIMIT | 150% | | |
| 37 | OVERLOAD MODE | NO DERATING | | |
| 38 | OVERLOAD AMPS | 115% RATED A | | |
| 39 | FLT CLEAR MODE | ENABLED | | |
| 40 | LINE LOSS FAULT | DISABLED | | |
| 41 | MOTOR TYPE | INDUCTION | | |
| 42 | SLIP @ F.L.A. | 1.0 HZ | | |
| 43 | DWELL FREQUENCY | 0.0 HZ | | |
| 44 | DWELL TIME | 0 SECS | | |
| 45 | PWM FREQUENCY | 4 KHZ | | |
| 46 | ENCODER FACE | 1024 PULSE | | |
| 47 | START BOOST | 0 VOLTS | | |
| 48 | BREAK FREQUENCY | 25% MAX FREQ | | |
| 49 | BREAK VOLTAGE | 25% RATED V | | |
| 50 | STOP SELECT 2 | COAST | | |
| 52 | S CURVE TIME | 0.0 SECS | | |
| 56 | S CURVE ENABLE | DISABLED | | |
| 73 | PRESET FREQ 4 | 0.0 HZ | | |
| 74 | PRESET FREQ 5 | 0.0 HZ | | |
| 75 | PRESET FREQ 6 | 0.0 HZ | | |
| 76 | PRESET FREQ 7 | 0.0 HZ | | |
| 77 | TRAVERSE PERIOD | SLOW COMP | | |
| 78 | MAX TRAVERSE | 0.00 HZ | | |
| 80 | P JUMP | 0.00 HZ | | |
| 81 | BLWN FUSE FLT | ENABLED | | |
| 82 | CUR LIM TRIP EN | DISABLED | | |
| 83 | RUN BOOST | 0 VLTS | | |
| 85 | RESET/RUN TRIES | 0 | | |
| 90 | ANALOG TRIM EN | DISABLED | | |
| 91 | LOW BUS FAULT | ENABLED | | |
| 92 | LOGIC MASK | 11111111 | | |
| 93 | LOCAL MASK | X1111111 | | |

| PARAMETER | DESCRIPTION | STANDARD DEFAULT | SHIPPED SETTING | INSTALLED SETTING |
|---|---|---|---|---|
| 94 | DIRECTION MASK | 11111110 | DEFAULT | |
| 95 | START MASK | X1111111 | DEFAULT | |
| 96 | STOP MASK | X1111111 | DEFAULT | |
| 97 | REFERENCE MASK | X1111111 | DEFAULT | |
| 98 | ACCEL MASK | X1111111 | DEFAULT | |
| 99 | DECEL MASK | X1111111 | DEFAULT | |
| 100 | FAULT MASK | X1111111 | DEFAULT | |
| 101 | MOP MASK | X1111111 | DEFAULT | |
| 111 | DATA IN A1 | 0 | DEFAULT | |
| 112 | DATA IN A2 | | DEFAULT | |
| 113 | DATA IN B1 | | DEFAULT | |
| 114 | DATA IN B2 | | DEFAULT | |
| 115 | DATA IN C1 | | DEFAULT | |
| 116 | DATA IN C2 | | DEFAULT | |
| 118 | DATA IN D2 | | DEFAULT | |
| 119 | DATA OUT A1 | | DEFAULT | |
| 120 | DATA OUT A2 | | DEFAULT | |
| 121 | DATA OUT B1 | | DEFAULT | |
| 122 | DATA OUT B2 | | DEFAULT | |
| 123 | DATA OUT C1 | | DEFAULT | |
| 124 | DATA OUT C2 | | DEFAULT | |
| 125 | DATA OUT D1 | | DEFAULT | |
| 126 | DATA OUT D2 | | DEFAULT | |
| 127 | PROCESS 1 PAR | 1 | DEFAULT | |
| 128 | PROCESS 1 SCALE | +1.00 | DEFAULT | |
| 129 | PROCESS 1 TXT 1 | V | DEFAULT | |
| 130 | PROCESS 1 TXT 2 | O | DEFAULT | |
| 131 | PROCESS 1 TXT 3 | L | DEFAULT | |
| 132 | PROCESS 1 TXT 4 | T | DEFAULT | |
| 133 | PROCESS 1 TXT 5 | S | DEFAULT | |
| 134 | PROCESS 1 TXT 6 | | DEFAULT | |
| 135 | PROCESS 1 TXT 7 | | DEFAULT | |
| 136 | PROCESS 1 TXT 8 | | DEFAULT | |
| 150 | 4-20mA LOSS SEL | MIN/ALARM | DEFAULT | |
| 151 | MAXIMUM SPEED | 400 HZ | DEFAULT | |
| 152 | ENCODER TYPE | QUADRATURE | DEFAULT | |
| 153 | ANLG OUT 0 OFFSET | DISABLED | DEFAULT | |
| 154 | PSTN/ STARTMAN | DISABLED | DEFAULT | |
| 155 | PSTART REVERSE | 0 HZ | DEFAULT | |
| 157 | PSTART REVERSE | 0 HZ | DEFAULT | |
| 158 | CRT OUT SEL | AT SPEED | DEFAULT | |
| 159 | DIG OUT FREQ | 0.0 HZ | DEFAULT | |
| 160 | DIG OUT CURRENT | 0% | DEFAULT | |
| 161 | DIG OUT TORQUE | 0.0 AMPS | DEFAULT | |
| 164 | SPEED KP | 0 | DEFAULT | |
| 165 | SPEED KI | 1.00 | DEFAULT | |
| 169 | BOOST SLOPE | 1.5 | DEFAULT | |
| 174 | CR2 OUT SELECT | RUNNING | DEFAULT | |
| 175 | CR3 OUT SELECT | A | DEFAULT | |
| 176 | CR4 OUT SELECT | ALARM | DEFAULT | |
| 177 | CR4 OUT NP TRIM | 174 TRIM | DEFAULT | |
| 178 | MOTOR NP HERTZ | 60 HZ | DEFAULT | |
| 180 | PROCESS 2 PAR | 54 | DEFAULT | |
| 181 | PROCESS 2 SCALE | +1.00 | DEFAULT | |
| 182 | PROCESS 2 TXT 1 | A | DEFAULT | |
| 183 | PROCESS 2 TXT 2 | M | DEFAULT | |
| 184 | PROCESS 2 TXT 3 | P | DEFAULT | |
| 185 | PROCESS 2 TXT 4 | S | DEFAULT | |
| 186 | PROCESS 2 TXT 5 | | DEFAULT | |
| 187 | PROCESS 2 TXT 6 | | DEFAULT | |
| 188 | PROCESS 2 TXT 7 | | DEFAULT | |

| PARAMETER | DESCRIPTION | STANDARD DEFAULT | SHIPPED SETTING | INSTALLED SETTING |
|---|---|---|---|---|
| 189 | PROCESS 2 TXT 8 | | DEFAULT | |
| 190 | MAX MOTOR VOLTS | MAX RATED | DEFAULT | |
| 192 | FLUX AMPS REF | 0.0 AMPS | DEFAULT | |
| 193 | KP AMPS | 100 | DEFAULT | |
| 194 | IR DROP VOLTS | 0 VOLTS | DEFAULT | |
| 195 | SLIP COMP GAIN | 1 | DEFAULT | |
| 200 | FLUX UP TIME | 0.0 SEC | DEFAULT | |
| 201 | MOTOR OL FAULT | ENABLED | DEFAULT | |
| 203 | V/f SCALING | DISABLED | DEFAULT | |
| 204 | GROUND WARNING | DISABLED | DEFAULT | |
| 206 | ALARM MASK 1 | 11111111111111 | DEFAULT | |
| 213 | PI CONFIG | 00000000 | DEFAULT | |
| 215 | PI REF SELECT | PRESET 1 | DEFAULT | |
| 216 | PI FBK SELECT | ANALOG IN 1 | DEFAULT | |
| 220 | KP PROCESS | 1.128 | DEFAULT | |
| 222 | KP PROCESS | 256 | DEFAULT | |
| 223 | PI NEG LIMIT | -8.33% | DEFAULT | |
| 224 | PI POS LIMIT | +8.33% | DEFAULT | |
| 225 | PI PRELOAD | +0.00 HZ | DEFAULT | |
| 226 | SHEER PIN FAULT | DISABLED | DEFAULT | |
| 227 | ADAPTIVE 1 LIMIT | ENABLED | DEFAULT | |
| 228 | LOSS RESTART | TRACK VOLTS | DEFAULT | |
| 229 | FREQ REF SqROOT | DISABLED | DEFAULT | |
| 230 | SAVE MOP REF | DISABLED | DEFAULT | |
| 231 | HOLD LEVEL SEL | DC HOLD LVL | DEFAULT | |
| 232 | ANALOG OUT 0 SEL | CURRENT LMT | DEFAULT | |
| 234 | ANLG OUT 0 LO | +100.0% | DEFAULT | |
| 235 | ANLG OUT 0 HI | +100.0% | DEFAULT | |
| 237 | ANLG IN 0 LO | +0.0% | DEFAULT | |
| 238 | ANLG IN 0 HI | +100% | DEFAULT | |
| 239 | ANLG IN 1 LO | 0% | DEFAULT | |
| 240 | ANLG IN 1 HI | +100% | DEFAULT | |
| 241 | INPUT MODE | 3 WIRE | DEFAULT | |
| 242 | TB3 TERM 22 SEL | REV/FOR | DEFAULT | |
| 243 | TB3 TERM 23 SEL | OL | DEFAULT | |
| 244 | TB3 TERM 24 SEL | AUX FAULT | DEFAULT | |
| 245 | TB3 TERM 25 SEL | SPEED SEL 2 | DEFAULT | |
| 246 | TB3 TERM 27 SEL | SPEED SEL 3 | DEFAULT | |
| 247 | TB3 TERM 28 SEL | SPEED SEL 1 | DEFAULT | |
| 248 | ANLG IN 2 LO | 0% | DEFAULT | |
| 249 | ANLG IN 2 HI | 100% | DEFAULT | |
| 250 | ANLG SIGNAL LOSS | X0000000 | DEFAULT | |
| 256 | LINE LOSS MODE | LOBUS-XOFF | DEFAULT | |
| 264 | PULSE IN SCALE | 64 | DEFAULT | |
| 265 | DSP COMM FAULT | ENABLED | DEFAULT | |
| 267 | DIG AT TEMP | 120 DEGC | DEFAULT | |
| 268 | MOTOR THERM FLT | 11111111111111 | DEFAULT | |
| 271 | ALARM MASK 2 | CURRENT | DEFAULT | |
| 274 | ANLG OUT 1 SEL | +100.0% | DEFAULT | |
| 275 | ANLG OUT 1 HI | +100.0% | DEFAULT | |
| 276 | ANLG OUT 1 ABS | ENABLED | DEFAULT | |
| 277 | ANLG OUT 1 OFFST | ENABLED | DEFAULT | |
| 278 | PULSE OUT SELECT | OUTPUT FREQ | DEFAULT | |
| 280 | PULSE OUT SCALE | 64 | DEFAULT | |
| 281 | ENCODER LOSS SEL | DISABLED | DEFAULT | |
| 284 | QUICK STOP LIMIT | 150% | DEFAULT | |
| 285 | BUS REGULATION | DISABLED | DEFAULT | |
| 288 | PHASE LOSS DET | DISABLED | DEFAULT | |
| 289 | LOAD LOSS LEVEL | 50% | DEFAULT | |
| 290 | LOAD LOSS DETECT | DISABLED | DEFAULT | |
| 291 | LOAD LOSS TIME | 0 SEC | DEFAULT | |
| 292 | | | | |

NOTE: THE "READ ONLY" PARAMETERS NOT LISTED. FOR MORE INFORMATION REFER TO PUBLICATION 1336 PLUS-5.3

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| REV. | DATE | BY | ECN NUMBER |
|---|---|---|---|
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| | | | |

DR. ACAD DATE 08-28-98
MFR. ENG. TRS DATE 07-02-98
APPD BAH DATE 07-02-98
REFERENCE DWG. LVDM\1336F\MASTER
INDEX NO. WS\SAMPLE\0001\SH1-6

Rockwell Automation
Allen-Bradley

TITLE: CONFIGURATION PARAMETER LISTING V1.004
FOR BULLETIN 1336 PLUS II AC DRIVE
PROJECT:

DWG. NO. C-SAMPLE-0001-18
REV. SHT. 1
REV. SHT. END

The Parameter Settings page provides a list of the parameters, the normal "Standard Drive" factory default values, and the special "Standard Packaged Drive" factory default values. Extra room is provided for the user to enter his own "as installed" parameter settings.

# When Allen-Bradley Manufactures Your Drive Package… You Can Count On:

## Enclosure Sizing

Designed to meet NEMA standards

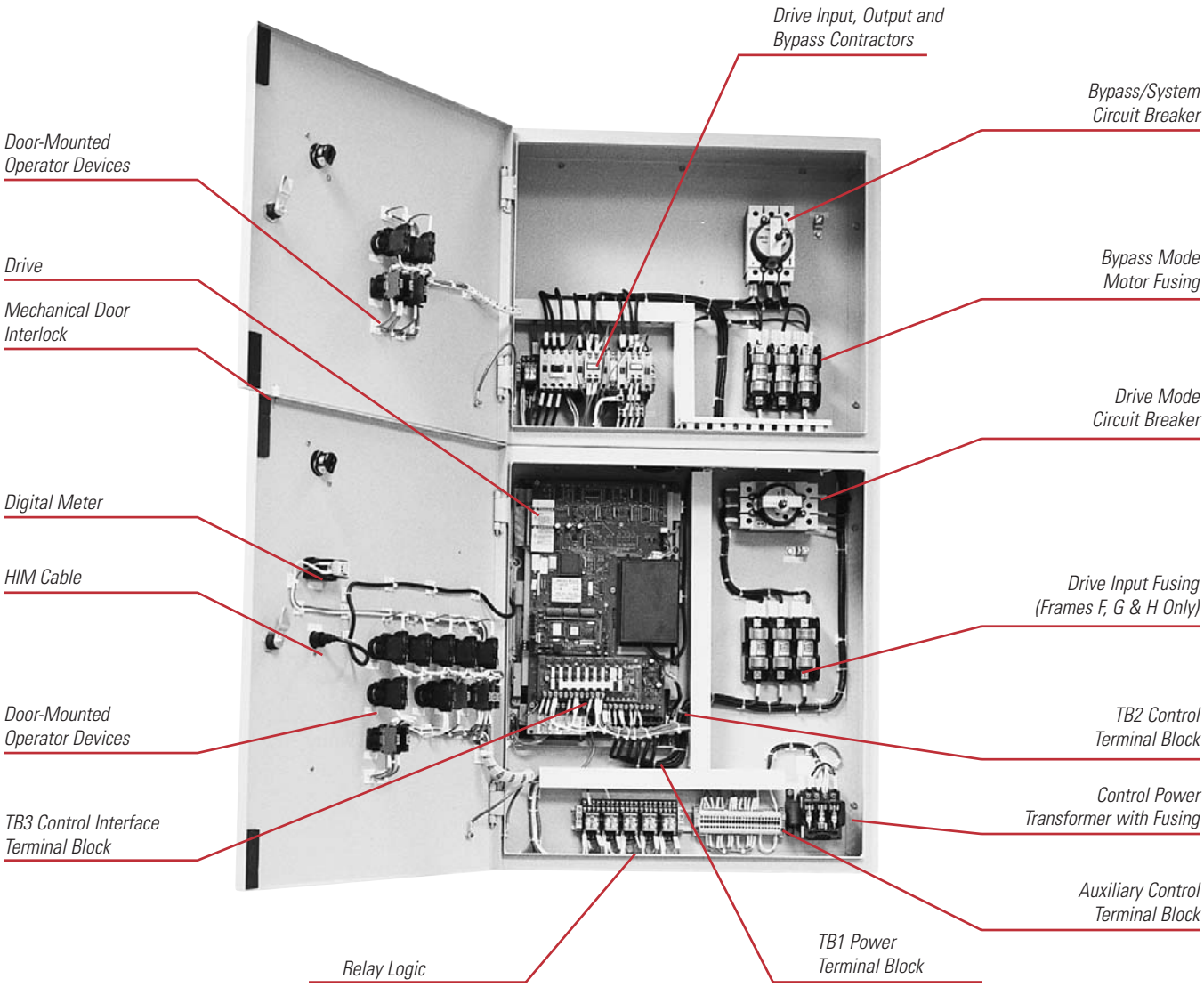
Sufficient heat dissipation

## Factory Wired Options

Proper wire type and size

Neatly bundled and routed

Separated power, control and signal




**60 HP 6 Pulse 460V AC NEMA Type 1, 4 or 12 Wall Mounted Packaged Drive with Bypass**

## Consistent Panel Component Layouts

Proper electrical/ mechanical clearances

Lower cost customer interface wiring

Faster troubleshooting

## Provision for Mounting

Slotted tabs on small drives

Floorplate holes on larger drives

## Consistent Door Layouts

Easier operator training

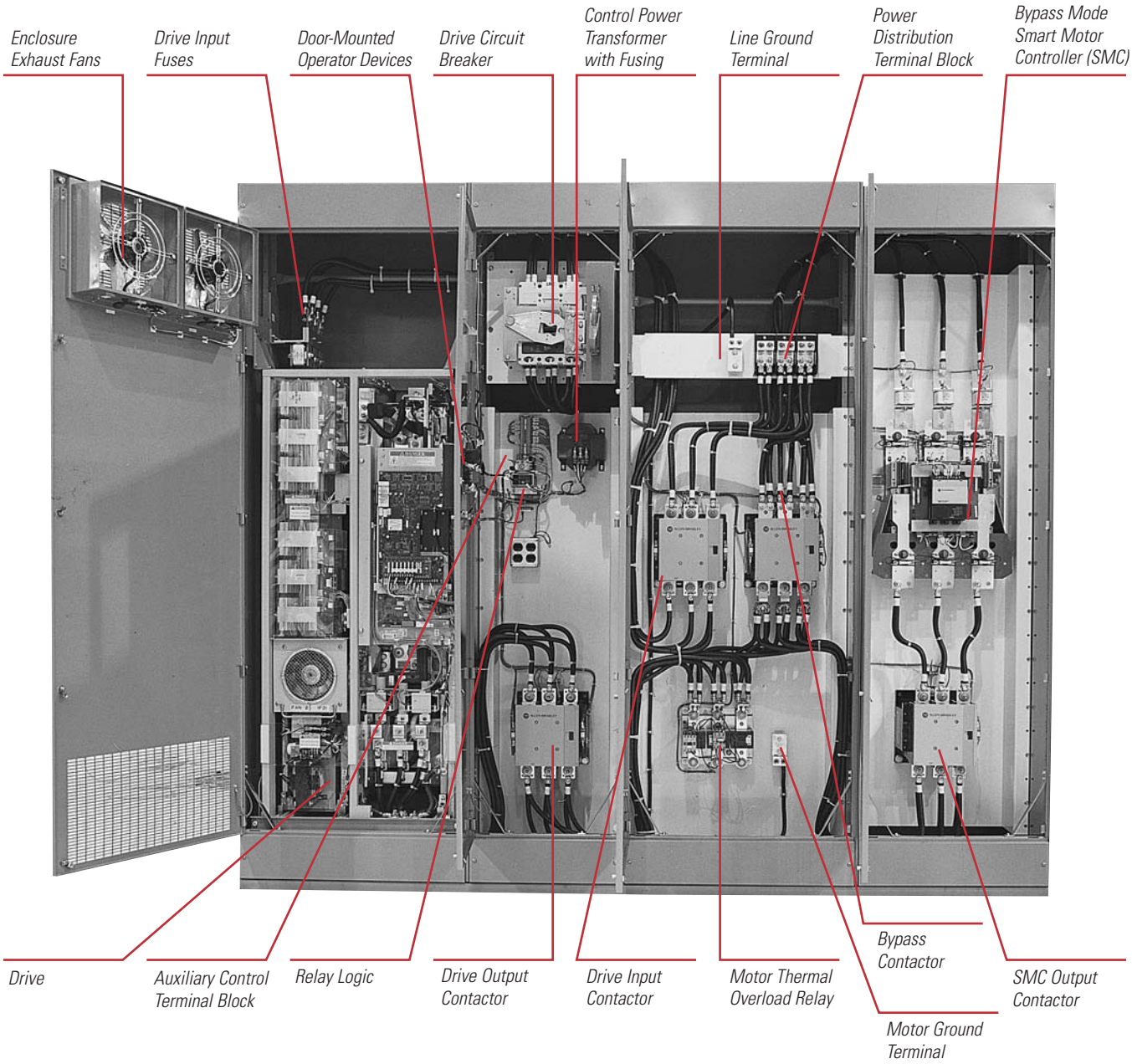
Functionality is consistent

Aesthetically/ergonomically pleasing

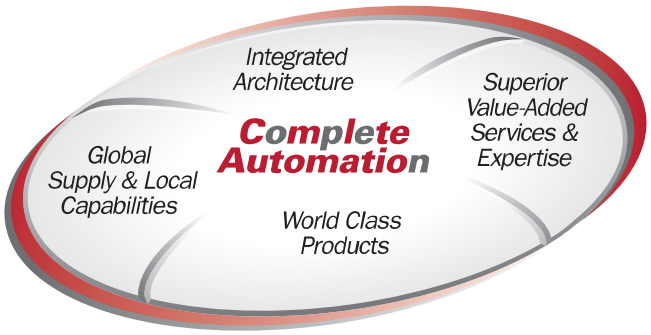
## Provision for Lifting

Slotted chassis holes on small drives

Removable lifting bar on large drives




**500 HP 6 Pulse 460V AC NEMA Type 1 Floor Mounted Packaged Drive with SMC Style Bypass**




The 1336 PLUS II 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.

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