

# TOSHIBA

ADJUSTABLE SPEED DRIVES

## AS3<sup>®</sup>

LOW  
VOLTAGE



# HARNESSING THE POWER OF BUILT-IN COMMUNICATIONS

Toshiba's AS3 adjustable speed drive is designed for demanding industrial systems. With an emphasis on built-in communications, end-users can access real-time data and refined controls without the expense of a micro PLC, maximizing system efficiency. The AS3 provides the flexibility of working with permanent magnet motors. In addition, multi-PID control allows a greater level of precise control of difficult dynamic systems, by controlling booster pumps based on system demand.



|                                           |                                                                                                                                                                                |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Industry 4.0/IoT<br>(Internet of Things)  | Industry 4.0 is the evolution of manufacturing, empowering businesses to learn and adjust from data available through connected manufacturing.                                 |
| Dual Port Ethernet IP                     | Enables simple connection of multiple AS3s together on one network while simplifying cable management.                                                                         |
| Embedded Web Server                       | Allows for quick access to Ethernet/IP® setup, parameters and real-time monitoring for diagnostics. Accessible through standard web browsers on PC, tablets, and smart phones. |
| Built-in LCD Display<br>& Advanced Keypad | Multi-language LCD display, remote mounting, IP65 rated, transfer/save parameters, real-time clock for fault logging, and calendar functionality.                              |
| QR Codes                                  | Displayed when troubleshooting faults or alarms, providing immediate access to a dedicated web link for maintenance and support.                                               |
| STO Terminal                              | Detachable terminal strip meets IEC directives for safety with full implementation of Safe Torque Off, which quickly shuts down the system in the event of an emergency stop.  |
| Permanent Magnet<br>Motor Control         | For control of permanent magnet (PM) motors with higher torque and efficiency values.                                                                                          |
| Pump Control                              | Multi-PID control with sleep function and the ability to autonomously control booster pumps based on system demands or operating a secondary PID control loop.                 |
| ASD Pro Software                          | Toshiba's programming software, which allows the user to utilize logic-type programming without the expense of a micro PLC.                                                    |

## COMMUNICATION OPTIONS

In addition to the built-in dual port Ethernet, the AS3 can make use of a wide array of easily installed option boards. These boards allow the user to communicate with a wide variety of systems when installed cassette style. Options include:

- EtherNet/IP® (Embedded)
- Modbus TCP (Embedded)
- Modbus RTU (Embedded)
- PROFINET®
- EtherCAT®
- PROFIBUS-DP
- DeviceNet®
- CAN Open®

## ADDITIONAL OPTIONS

The AS3 can be supplied with additional options to expand control, allow greater flexibility, and provide better protection for a user's application. Options include:

- AC Line Reactors
- DV/DT Long-Lead Filters
- Extended Terminal Cards
- Encoder Feedback Cards
- Harmonic Filters
- Remote-Mountable Keypads
- Dynamic Braking Resistor
- Flange Kit
- Conduit Boxes
- Replaceable Terminal Board for 120VAC I/O

## OTHER SPECIAL FEATURES

- Broad Range of Compliances
- NEC® 2005 Motor Overload Retention (No External Motor Overloads Required)
- NEMA 1 Enclosure
- UL Listed & Labeled
- Optional IP55 Enclosure

### INDUSTRIES SERVED

- Chemical
- Mining & Minerals
- Oil & Gas
- Water & Wastewater

### APPLICATIONS

- Centrifuges
- Compressors
- Conveyors
- Cranes
- Crushers
- Fans
- Hoists
- Mixers
- Pumps
- Pump Jacks



1. Dual Port EtherNet/IP®
2. RS485 Communication Port
3. Up to 3 Embedded Option Card Slots
4. Safe Torque Off Terminals
5. 3 Digital Output Relays
6. 3 Analog Inputs
7. 2 Analog Outputs
8. 8 Digital Inputs

**TOSHIBA**

**APPLICABLE MOTOR (HP)**

|                  |     |   |   |   |     |     |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
|------------------|-----|---|---|---|-----|-----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Heavy Duty (HD)  | 0.5 | 1 | 2 | 3 | 5   | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75  | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 450 |
| Normal Duty (ND) | 1   | 2 | 3 | 5 | 7.5 | 10  | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 125 | 150 | 200 | 250 | 350 | 400 | 450 | 500 |

**RATED OUTPUT CURRENT (A)**

|                |     |     |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     |
|----------------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 200 V Class HD | 3.3 | 4.6 | 8    | 11.2 | 18.7 | 25.4 | 32.7 | 46.8 | 63.4 | 78.4 | 92.6 | 123  | 149  | 176 | 211 | -   | -   | -   | -   | -   | -   | -   | -   |
| 200 V Class ND | 4.6 | 8   | 11.2 | 18.7 | 25.4 | 32.7 | 46.8 | 63.4 | 78.4 | 92.6 | 123  | 149  | 176  | 211 | 282 | -   | -   | -   | -   | -   | -   | -   | -   |
| 400 V Class HD | 1.5 | 2.2 | 4    | 5.6  | 9.3  | 12.7 | 16.5 | 23.5 | 31.7 | 39.2 | 46.3 | 61.5 | 74.5 | 88  | 106 | 145 | 173 | 211 | 250 | 314 | 387 | 427 | 550 |
| 400 V Class ND | 2.2 | 4   | 5.6  | 9.3  | 12.7 | 16.5 | 23.5 | 31.7 | 39.2 | 46.3 | 61.5 | 74.5 | 88   | 106 | 145 | 173 | 211 | 250 | 302 | 427 | 481 | 550 | 616 |
| 600 V Class HD | -   | -   | 3.1  | 4.2  | 7.2  | 9.5  | 13.5 | 18   | 24   | 29   | 34   | 45   | 55   | 66  | 83  | -   | -   | -   | -   | -   | -   | -   | -   |
| 600 V Class ND | -   | -   | 4.2  | 5.4  | 9.5  | 13.5 | 18   | 24   | 29   | 34   | 45   | 55   | 66   | 83  | 108 | -   | -   | -   | -   | -   | -   | -   | -   |

**VOLTAGE/FREQUENCY**

|             |                                                                               |
|-------------|-------------------------------------------------------------------------------|
| 200 V Class | Three-Phase 200 to 240 V, 50/60 Hz (Voltage +10%, -15%, Frequency $\pm 5\%$ ) |
| 400 V Class | Three-Phase 380 to 480 V, 50/60 Hz (Voltage +10%, -15%, Frequency $\pm 5\%$ ) |
| 600 V Class | Three Phase 575 to 690 V, 50/60 Hz (Voltage +10%, -15%, Frequency $\pm 5\%$ ) |

**OUTPUT VOLTAGE**

|             |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| 200 V Class | Three-Phase 200 to 240 V (Maximum Output Voltage is Equal to the Input Supply Voltage) |
| 400 V Class | Three-Phase 380 to 480 V (Maximum Output Voltage is Equal to the Input Supply Voltage) |
| 600 V Class | Three Phase 575 to 690 V (Maximum Output Voltage is Equal to the Input Supply Voltage) |

**OVERLOAD CURRENT RATING**

|    |                                           |
|----|-------------------------------------------|
| HD | 150% for One Minute, 180% for Two Seconds |
| ND | 120% for One Minute, 135% for Two Seconds |

**OUTPUT FREQUENCY RANGE**

Setting Between 0.01 to 590 Hz; Adjustable at 0.01 Hz Increments; Default Maximum Frequency is Set to 0.01 to 80 Hz; Maximum Frequency Adjustment (30 to 590 Hz)

**DC REACTOR**

200/400 V Class 0.5 to 200 HP (HD) Built-in; 400 V Class 250 to 450 HP (HD) Attached; 600 V Class 2 to 75 Hp (HD) Built-in

**ENCLOSURE**

200 V Class 0.5 to 50 HP (HD) & 400 V Class 0.5 to 100 HP (HD) NEMA 1/IP20 Built-in; 200 V Class 60 to 75 HP (HD), 400 V Class 125 to 450 HP (HD) NEMA 1/IP20 with Optional Conduit Box & 600 V Class all ratings NEMA 1/IP20 with Optional Conduit Box

**AMBIENT TEMPERATURE**

-10° to +60° C (Remove the Upper Cover if 50° C or More; Max 60° C)

**TERMINAL STRIP I/O**

Eight DI, Three DO (One Form C, Two Form A Relays), Three AI (0 to 10 VDC, -10 to +10 VDC, 0 to 20 mADC), Two AO (0 to 10 VDC or 0 to 20 mADC), STO (Safe Torque Off)

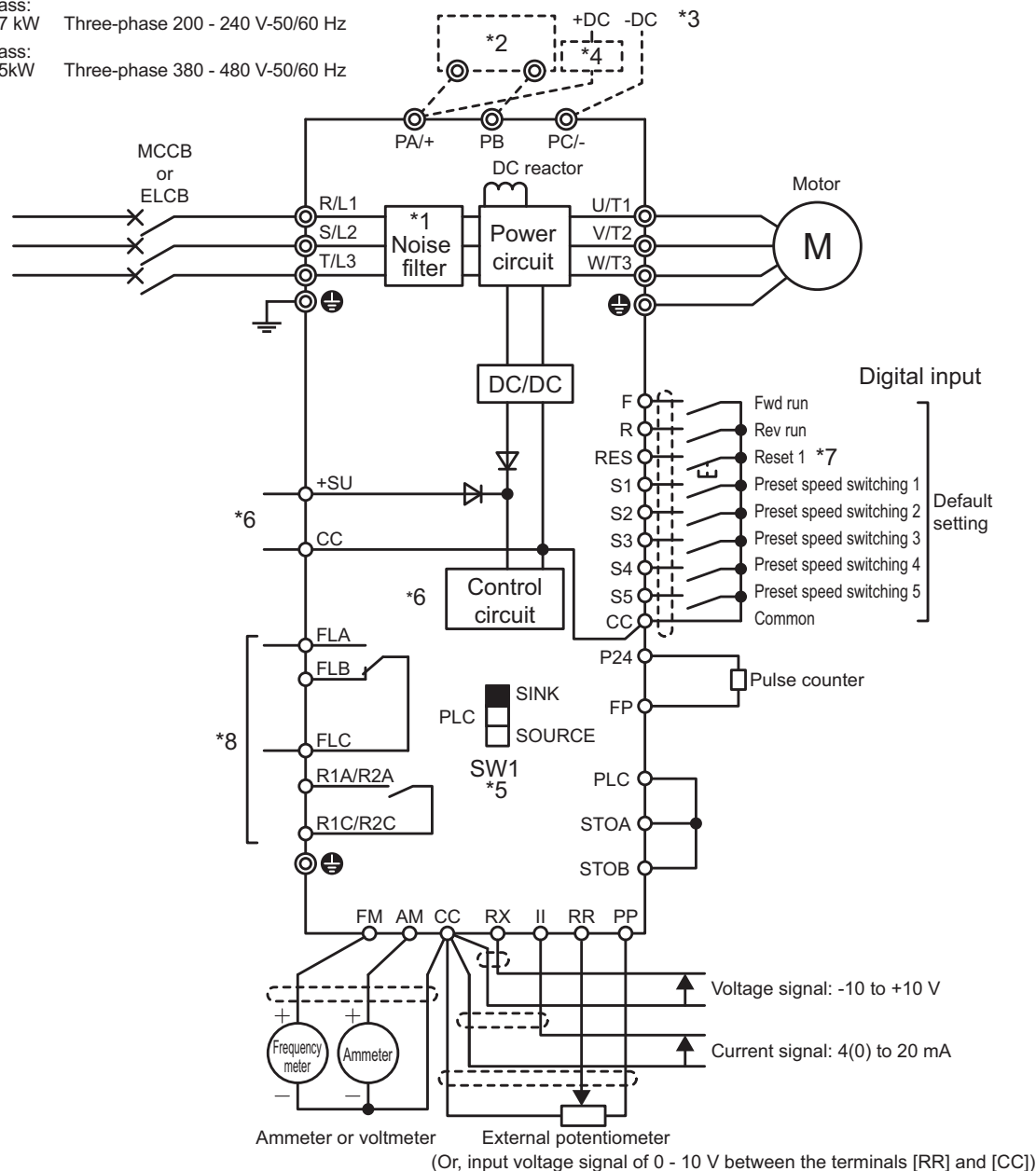


## [Standard connection diagram - Sink]

This diagram shows an example of a standard connection for 240 V class, 0.4 to 37kW and 480 V class, 0.4 to 75kW (frame size A1 to A5).

## Power supply

|              |                                  |
|--------------|----------------------------------|
| 240 V class: |                                  |
| 0.4 - 37 kW  | Three-phase 200 - 240 V-50/60 Hz |
| 480 V class: |                                  |
| 0.4 - 75kW   | Three-phase 380 - 480 V-50/60 Hz |



\*1 EMC filter is built in 480 V class.

\*2 External braking resistor (option).

\*3 To supply DC power, connect it to the terminals [PA/+] and [PC/-].

\*4 When your inverter is VFAS3-2110P to VFAS3-2370P or VFAS3-4220PC to VFAS3-4750PC with DC power supply, a circuit to suppress an inrush current is required. For detail, refer to application manual "DC power supply connect to inverter" (E6582156).

\*5 For the switch function, refer to [2. 3. 5].

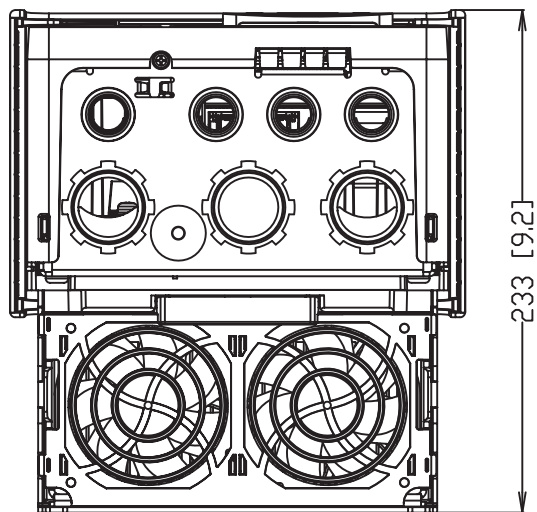
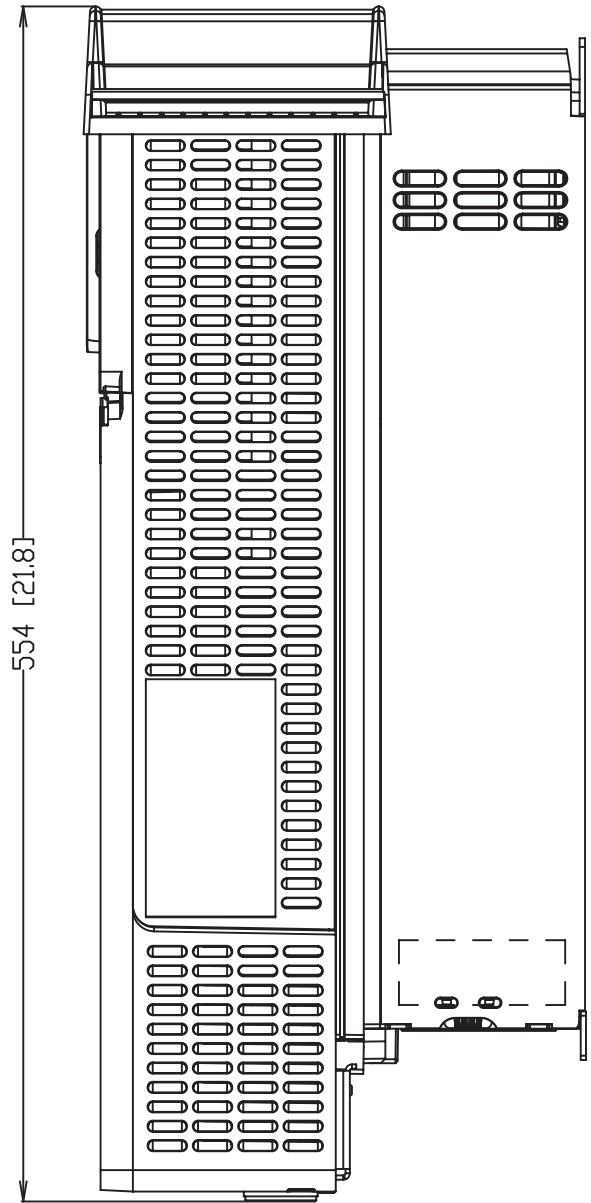
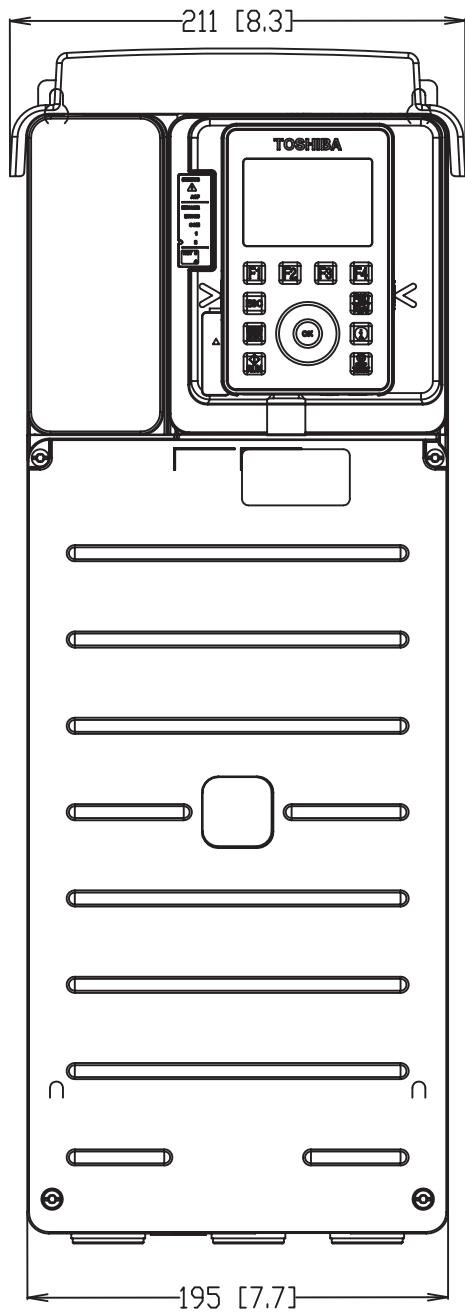
\*6 To supply control power from an external power supply for backing up the control power supplied from the inverter, an optional control power supply unit (CPS002Z) is required. In this case, it is used in conjunction with the inverter internal power supply.

Set <F647: Control power option failure detection> to back up the control power supply.

For details, refer to [6. 30. 20].

\*7 The reset signal is activated by ON→OFF trigger input.

\*8 Connect to power to comply with OVC2 (Over Voltage Category 2). Isolation transformer is necessary when connecting to power supply (OVC3).



| AS3 Frame A3 |              |              |                         |
|--------------|--------------|--------------|-------------------------|
| Model Number | HP Rating HD | HP Rating ND | Estimated Weight (lbs.) |
| VFAS3-2055P  | 7.5          | 10           | 30.4                    |
| VFAS3-2075P  | 10           | 15           | 30.4                    |
| VFAS3-4110PC | 15           | 20           | 30.0                    |
| VFAS3-4150PC | 20           | 25           | 31.3                    |
| VFAS3-4185PC | 25           | 30           | 31.5                    |