

# ZETA6104

## Packaged Drive/Indexer System with L20 Perspective

Compumotor's ZETA6104 is a stand-alone, single-axis drive/indexer system. The ZETA6104 packs all the power and reliability of the 6000 family of controllers and ZETA drives into one convenient package. All of the I/O points, RS-232C/RS422/RS485 control, operator interface options and following capabilities for single-axis applications are included. The following package can perform phase shifts, electronic gearbox, and flying cutoff functionality with ease.

The ZETA6104 package was made for easy and reliable installation. The connections are on removable screw terminals and a standard 50-pin header allowing simple installation and cable routing without having to cut off and reattach a connector.

The ZETA6104 is designed to solve single-axis applications cleanly and completely. For multiple-axis applications, up to 99 ZETA6104s can be daisy chained (32 ZETA6104s can be multi-dropped using RS-422/RS-485) to work together.

In order to speed your application development, the ZETA6104 comes standard with Motion Architect, a Microsoft Windows-based development packages. Motion Architect contains many tools which allow you to easily create and implement motion programs. The ZETA6104 is also compatible with Motion Toolbox™, DDE6000 Server, and Motion Builder software packages.

The ZETA6104 uses the 6000 Series command language. This popular language is powerful enough to implement complex motion control applications and simple enough to not overwhelm the novice programmer. The ZETA6104 is your single-axis solution.

The ZETA's *Electronic Viscosity* (patent pending) complements the L20 linear step motor. The result is slow-speed smoothness and reduced end-of-move settling time.

### Features

#### Performance

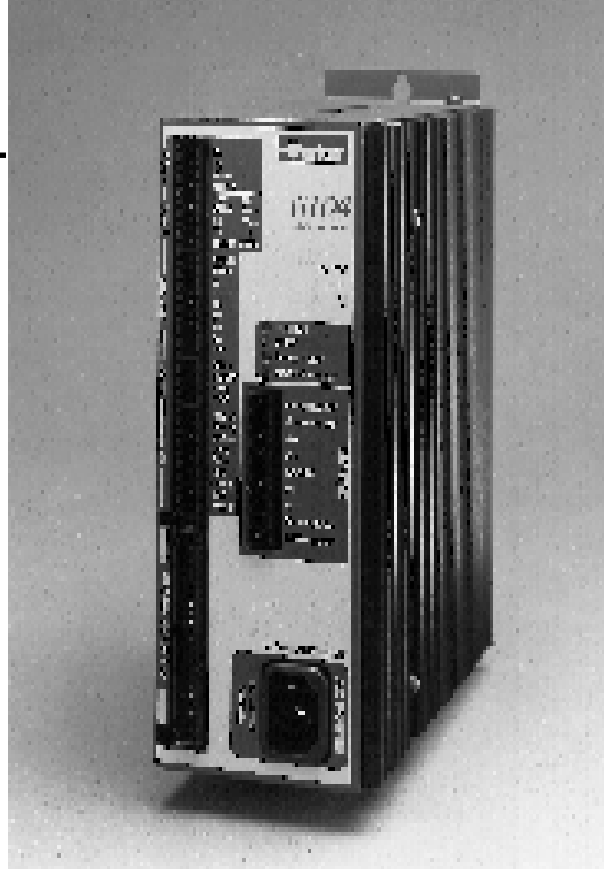
- One axis package drive/indexer
- Electronic Viscosity (patent pending) benefits:
  - Reduce settling time
  - Increase slower speed smoothness (reduce velocity ripple)
  - Reduce audible noise

#### Protection Circuit

- Motor short circuits (phase-to-phase and phase-to-ground)
- Overtemperature of internal drives and power supply
- Overvoltage (protects against overvoltage from regeneration)
- Power dump (dissipates excess voltage caused by load regeneration)

#### I/O

- Encoder channels configurable as hardware up/down counters
- Incremental encoder input
- POS (up) and NEG (down) end-of-travel limit inputs
- Home limit input
- Two fast (trigger) inputs for position capture, registration, etc.
- 16 programmable inputs (Opto-22 compatible)
- Eight programmable outputs (Opto-22 compatible)
- One auxiliary programmable output



#### Language

- 150 Kbytes of non-volatile memory for storing programs and paths
- Interrupts program execution on error conditions
- Encoder and motor position capture (using the trigger inputs)
- Registration (using the trigger inputs)
- Selectable damping (programmable) to optimize performance for changing loads
- Variable storage, conditional branching and math capability
- Program debug tools – single-step and trace modes, breakpoints, error messages and simulation of I/O

#### Software Provided

- Motion Architect, Microsoft Windows-based application development software
- DOS®-based program editor and terminal emulator software
- Dynamic Link Library (DLL) provided for use with Microsoft Windows and Microsoft Windows NT software development kits

#### Optional Software

- Motion Toolbox library of LabVIEW® virtual instruments (VIs) for icon-based programming of Compumotor's 6000 Series controllers
- Dynamic Data Exchange (DDE) server available allowing data exchange between different Windows software applications
- Motion Builder provides a visual-development environment for graphical icon-based programming of the 6000 Series product

#### Interface Capabilities

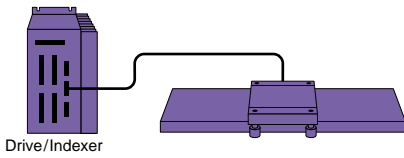
- Direct interface to RP240 Remote Operator Panel
- Operates stand-alone or interfaces to PCs, PLCs and thumbwheels
- Communication with PC or dumb terminal via 3-wire RS-232C interface
- One RS-232C communication port
- One RS232C/422/485 configurable port

#### Physical

- Stand-alone indexer/drive package
- Status/fault LEDs to confirm proper operation (four diagnostic LEDs)
- Removable connectors for easy installation
- 120VAC (170VDC bus voltage)



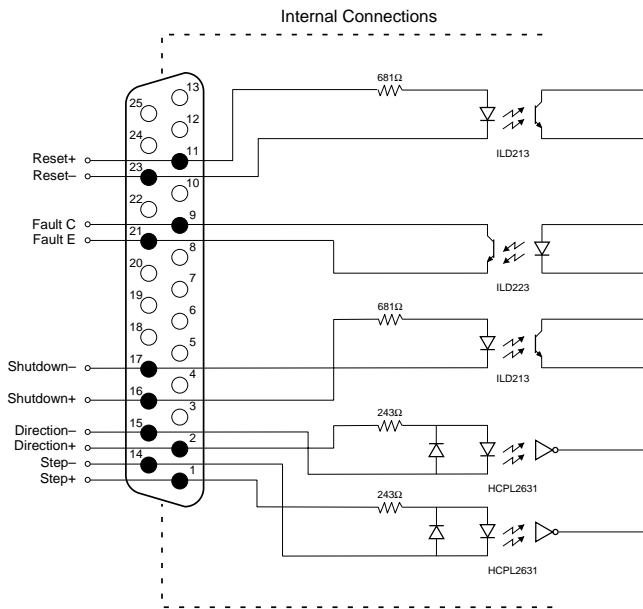
Software information is available on page C90.



## Specifications for ZETA6104 with L20 Perspective

| Parameter  | Value   |
|--|---|
| <b>Input Power</b><br>ZETA6104                               | 95-132VAC, 50/60Hz  |
| <b>Performance</b>   |   |
| Position range   | ±2,147,483,648 steps  |
| Velocity range   | 1 to 2,000,000 steps/sec  |
| Acceleration range   | 1 to 24,999,975 steps/sec <sup>2</sup>  |
| Motion Algorithm Update Rate                                 | 2 ms  |
| Force vs. Speed  | Refer to curves on page C78.  |
| <b>ZETA4 Drive Settings for L20 Motors</b>                   |   |
| Anti-resonance   | Disable   |
| Active Damping   | Disable   |
| Electronic Viscosity   | 0 to 7 (selectable to optimize performance)   |
| Current  | 2.76 Apk  |
| Waveform   | -10% third harmonic   |
| Resolution (steps/in)  | 16 selectable choices (steps per inch = drives steps per revolution + by 2)   |
|  | For linear resolution of Set ZETA4 drive resolution to:   |
|  | 100 200   |
|  | 200 400   |
|  | 500 1,000   |
|  | 1,000 2,000   |
|  | 2,500 5,000   |
|  | 5,000 10,000  |
|  | 6,400 12,800  |
|  | 9,000 18,000  |
|  | 10,000 20,000   |
|  | 12,500 25,000   |
|  | 12,700 25,400   |
|  | 12,800 25,600   |
|  | 18,000 36,000   |
|  | 25,000 50,000   |
|  | 25,400 50,800   |
| <b>RS-232C Interface</b>                                     |   |
| Connections  | 3-wire (Rx, Tx, and GND) connection to the COM1 and/or COM2 connectors.   |
| Max number of daisy chained ZETA6104s                        | Up to 99 units  |
| Address settings   | Selectable (see optional DIP switch & jumper setting and ADDR command).   |
| Communication parameters                                     | 9,600 baud (auto-band option)—see optional DIP switch & jumper settings); 8 data bits, 1 stop bit, no parity bit, full duplex.  |
| <b>RS-485 Interface</b>                                      |   |
| Connections  | 4-wire (Rx+, Rx-, Tx+, Tx-) connection to the COM2 connector (COM2 needs to be configured to RS-485 Interface).   |
| Max number of multi-dropped ZETA6104s                        | Up to 32 units  |
| Address settings   | Selectable (see optional DIP switch & jumper setting and ADDR command).   |
| Communication parameters                                     | 9,600 baud, 8 data bits, 1 stop bit, no parity bit, full duplex.  |
| <b>Protection</b>  |   |
| Short Circuit  | Phase-to-phase, phase-to-ground   |
| Brownout   | AC supply drops below 85VAC   |
| Over-temperature   | Over-temperature shutdown fault at 131°F (55°C)   |
| <b>Inputs (see also I/O pinouts)</b>                         |   |
| HOM, POS, NEG, TRG-A, TRG-B, P-CUT                           | Powered by voltage applied to V_I/O terminal (switching levels: ≤ one-third of V_I/O voltage = low, ≥ two-thirds of V_I/O voltage = high). V_I/O can handle 5-24V with max current of 100 mA. Internal 6.8 KΩ pull-ups to AUX-P terminal—connect AUX-P to power source (+5V terminal or an external 5-24V supply) to source current or connect AUX-P to GND to sink current; AUX-P can handle 0-24V with max current of 50 mA. Voltage range for these inputs is 0-24V. |
| Encoder  | Differential comparator accepts two-phase quadrature incremental encoders with differential (recommended) or single-ended outputs.<br>Max voltage = 5VDC. Switching levels (TTL-compatible); Low ≤0.4V, High ≥ 2.4V. Max frequency = 1.6 MHz.<br>Minimum time between transitions = 625 ns.   |
| 16 Programmable  | HCMOS compatible* with internal 6.8 KΩ pull-ups to IN-P terminal—connect IN-P to power source (+5V pin #49 or an external 5-24V supply) to source current or connect IN-P to GND to sink current; IN-P can handle 0-24V with max current of 100 mA. Voltage range = 0-24V.  |
| <b>Outputs</b>   |   |
| 9 programmable (includes OUT-A)                              | Open collector output with 4.7 kΩ pull ups. Can be pulled up by connecting OUT-P to power source (+5V terminal or an external 5-24V supply); OUT-P can handle 0-24V with max current of 50 mA. Outputs will sink up to 300 mA or source up to 5 mA at 5-24VDC. 8 general-purpose outputs on the programmable I/O connector, OUT-A on the I/O connector.   |
| +5V Output   | Internally supplied +5VDC. +5V terminals are available on the COM2, ENCODER and I/O connectors. Load limit (total load for all I/O connections) is 0.5A.  |
| <b>Environmental</b>   |   |
| Operating temperature  | 32° to 113°F (0° to 45°C)   |
| Storage temperature  | -22° to 185°F (-30° to 85°C)  |
| Humidity   | 0% to 95% noncondensing   |
| <b>Diagnostic LEDs</b>                                       | Power/drive on, step pulses, drive overtemperature, and motor short circuit   |
| * HCMOS-compatible voltage levels: low ≤ 1.00V, high ≥ 3.25V |   |
| TTL-compatible voltage levels: low ≤ 0.4V; high ≥ 2.4V       |   |

### ZETA4 Drive Connections

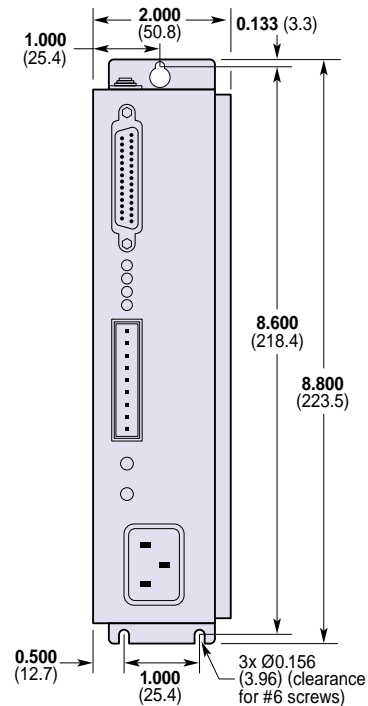
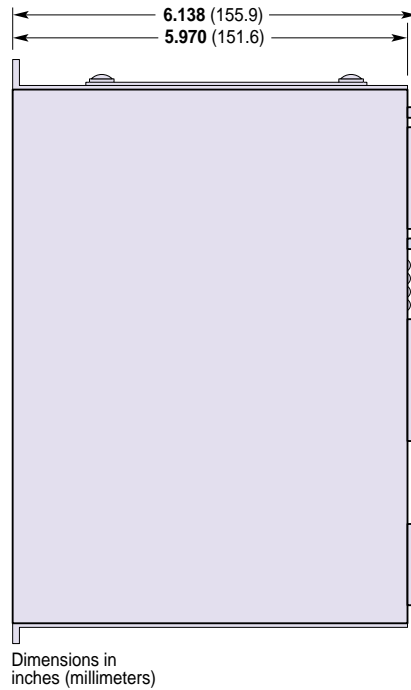


#### Motor – Screw Terminal Pin No. Signal

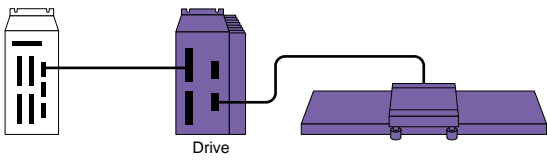
| Pin No. | Signal    |
|---------|-----------|
| 1       | Interlock |
| 2       | A-CT      |
| 3       | A+        |
| 4       | A-        |
| 5       | Gnd       |
| 6       | B+        |
| 7       | B-        |
| 8       | B-CT      |
| 9       | Interlock |

### ZETA4 Drive Dimensions

(—) denotes millimeters)



**C** Step Motor Systems



### ZETA6104 Connections Pin-Out Lists

#### COM1

4-Pin Screw Terminal

| Pin No | Signal |
|--------|--------|
| 1      | Rx     |
| 2      | Tx     |
| 3      | Ground |
| 4      | Shield |

#### COM2

5-Pin Screw Terminal

| Pin No | Signal          |
|--------|-----------------|
| 1      | +5VDC (out)/Rx+ |
| 2      | Ground/RX-      |
| 3      | Rx/Tx+          |
| 4      | Tx/Tx-          |
| 5      | Shield/Ground   |

#### Encoder

9-Pin Screw Terminal

| Pin No | Signal      |
|--------|-------------|
| 1      | Shield      |
| 2      | Ground      |
| 3      | Z-          |
| 4      | Z+          |
| 5      | B-          |
| 6      | B+          |
| 7      | A-          |
| 8      | A+          |
| 9      | +5VDC (out) |

#### Limits 1/2

4-Pin Screw Terminal

| Pin No | Signal |
|--------|--------|
| 1      | Ground |
| 2      | Home   |
| 3      | Neg    |
| 4      | Pos    |

#### I/O

10-Pin Screw Terminal

| Pin No | Signal                    |
|--------|---------------------------|
| 1      | Trigger A                 |
| 2      | Trigger B                 |
| 3      | Output A-                 |
| 4      | Ground                    |
| 5      | Pulse cut-off             |
| 6      | +5VDC (out)               |
| 7      | Output pull-up            |
| 8      | Input pull-up             |
| 8      | Input pull-up             |
| 9      | Auxiliary pull-up         |
| 10     | Voltage Reference (V_I/O) |

#### Programmable I/O Pin Outs

50-Pin Header

| Pin No | I/O Connector |
|--------|---------------|
| 1      | Input #16     |
| 3      | Input #15     |
| 5      | Input #14     |
| 7      | Input #13     |
| 9      | Input #12     |
| 11     | Input #11     |
| 13     | Input #10     |
| 14     | Input #9      |
| 17     | Output #8     |
| 19     | Output #7     |
| 21     | Output #6     |
| 23     | Output #5     |
| 25     | Input #8      |
| 27     | Input #7      |
| 29     | Input #6      |
| 31     | Input #5      |
| 33     | Output #4     |
| 35     | Output #3     |
| 37     | Output #2     |
| 39     | Output #1     |
| 41     | Input #4      |
| 43     | Input #3      |
| 45     | Input #2      |
| 47     | Input #1      |
| 49     | +5VDC         |

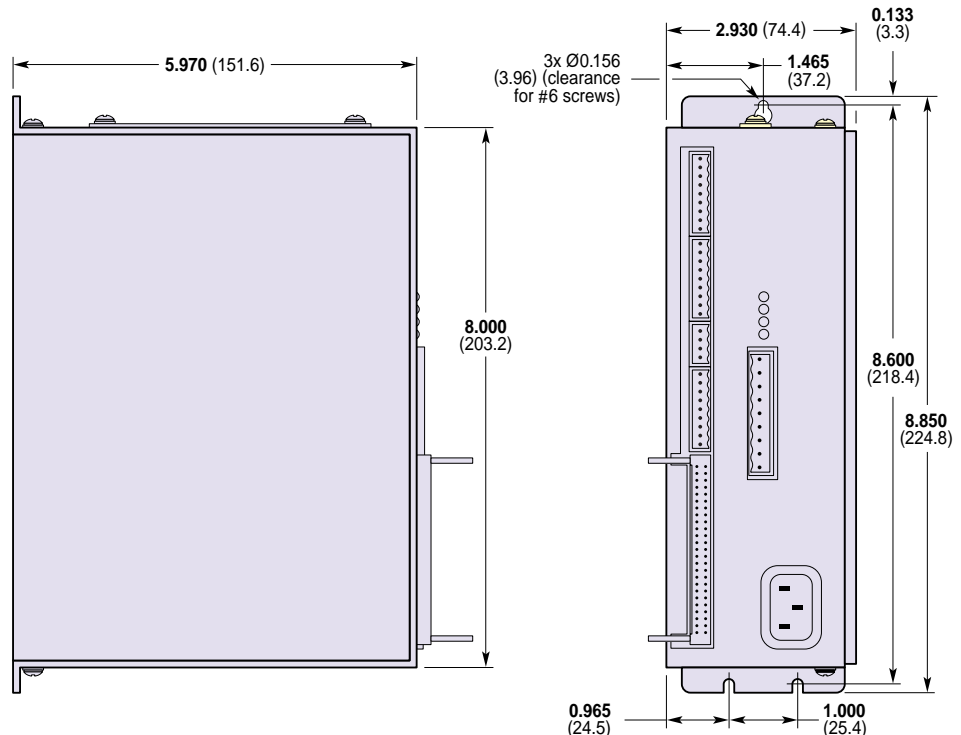
#### Motor

9-Pin Screw Terminal

| Pin No | Signal        |
|--------|---------------|
| 1      | Interlock     |
| 2      | A- Center tap |
| 3      | A+            |
| 4      | A-            |
| 5      | Earth         |
| 6      | B+            |
| 7      | B-            |
| 8      | B- Center tap |
| 9      | Interlock     |

### ZETA 6104 Dimensions

(—) denotes millimeters



## Ordering Information

### ZETA Drive

| Part No. | Description              | UL and CE (LVD) |
|----------|--------------------------|-----------------|
| ZETA4    | 4 amp, 120VAC ZETA drive |                 |

### ZETA Indexer/Drive

| Part No. | Description                      | UL and CE (LVD) |
|----------|----------------------------------|-----------------|
| ZETA6104 | 4 amp, 120VAC ZETA indexer/drive |                 |

## Accessories

| Part No.     | Description  |
|--------------|--|
| VM24         | 24V input/output module. See page C117 for details.                        |
| VM50         | 50-pin header-to-screw terminal breakout board. See page C118 for details. |
| RP240        | Operator interface. See page C119 for details.                             |
| RP240-NEMA 4 | NEMA 4 rated operator interface. See page C119 for details.                |

## Software Accessories

| Part No.       | Description                                |
|----------------|--|
| DDE6000        | DDE server for 6000 Series.                |
| Motion Toolbox | Library of LabVIEW VIs for Motion Control. |
| Motion Builder | Graphical icon-based software.             |

### L20 Series—Platens

| Model       | Description |
|-------------|-------------|
| PO-L20-P18  | 18" platen  |
| PO-L20-P36  | 36" platen  |
| PO-L20-P54  | 54" platen  |
| PO-L20-P72  | 72" platen  |
| PO-L20-P96  | 96" platen  |
| PO-L20-P144 | 144" platen |

### L20 Series—Forcer

| Model | Description |
|-------|-------------|
| L20   | L20 Forcer  |



Software information is available on page C90.