

SPECIALTY MODULES SPECIFICATIONS



CHAPTER 4

In This Chapter...

Specialty Modules Overview.....	4-2
P1-02HSC High-Speed Isolated Sinking/Sourcing Input.....	4-3
Wiring Diagrams.....	4-5
Wiring Example for Koyo Totem Pole Output Encoder.....	4-7
Module Configuration.....	4-8
P1-04PWM Module	4-9
Wiring Diagrams.....	4-11
Module Configuration.....	4-12
High-Speed Module Tester Utility.....	4-13

Specialty Modules Overview

Two specialty I/O modules are available for use with the Productivity® 1000 system, the P1-02HSC High-Speed Input Module and the P1-04PWM Pulse Width Modulation module.

Each I/O module is identified as either an “Input” or “Output” module on its front panel using the color coding scheme listed below. The specifications and wiring diagrams, along with configuration and signal information, are in this chapter.

The P1-02HSC High-Speed Counter module provides two independent single-ended 5–24 V inputs that accept up to 100kHz of pulse/direction and quadrature signals. Additionally, two 5–24 VDC general purpose high-speed inputs are included for use with the Productivity® 1000 system.

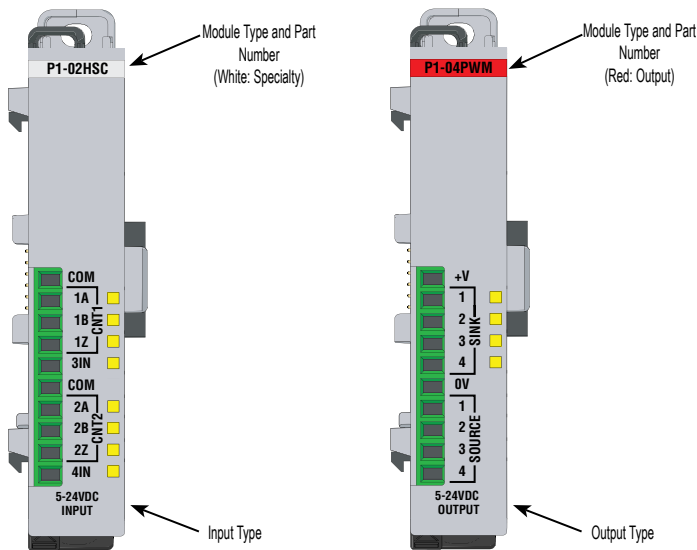
The P1-04PWM pulse Width Modulation module provides four channels of sinking or sourcing 0–20 kHz, 0–100% duty cycle outputs.

Use the hardware configuration tool in the Productivity Suite programming software to set up the specialty I/O modules. See the Productivity Suite software help file for in-depth configuration and programming concepts.

For applications that require specialized motion control, consider including a PS-AMC module.

High-Speed Input Modules

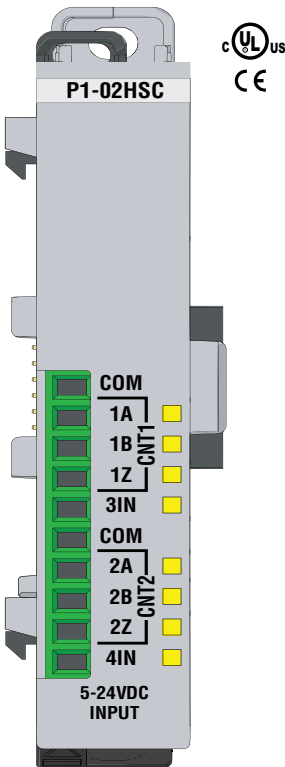
Pulse Width Modulation



Productivity1000 Specialty I/O Modules			
Part Number	Number of Channels	Description	See Page
P1-02HSC	2	High-Speed Input (Current)	4–3
P1-04PWM	4	Pulse-Width Modulation Input (Voltage)	4–9

P1-02HSC High-Speed Isolated Sinking/Sourcing Input

The P1-02HSC High-Speed Counter Module provides two independent single-ended 5–24 VDC inputs that accept up to 100kHz of pulse/direction and quadrature signals. Additionally, two 5–24 VDC general-purpose high-speed inputs are included for use with the Productivity® 1000 system.



Input Specifications	
Inputs per Module	Single ended Counter Inputs (6pts: 1A, 1B, 1Z, 2A, 2B, 2Z) General-purpose Inputs (3IN, 4IN)
Input Voltage Range	5–24 VDC
Operating Voltage Range	4.25–27.6 VDC
Input Current	1.5 mA typical @ 4.25 VDC 11mA maximum @ 27.6 VDC
Input Impedance	2.5 kΩ
Minimum ON Current	1mA
Maximum OFF Current	0.4 mA
Minimum ON Voltage	4.5 VDC
Maximum OFF Voltage	2.2 VDC
OFF to ON, ON to OFF Response	2μs
Maximum Input Frequency	100kHz
Module Range	Target position range ±2.147 billion (32-bit signed integer)
Status Indicators Logic Side	8 points
Commons	2 (4 points/common)

* Meets EMC and Safety requirements. See the D.O.C. for details.



NOTE: For complete system limits, please refer to the "Hardware and Communication Limits" table in the Productivity Suite online "Help" file "Hardware Configuration", topic P050.

Terminal Block sold separately.

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-02HSC High-Speed Isolated Sinking/Sourcing Input (continued)

General Specifications	
Operating Temperature	0°C–60°C (32°F–140°F)
I/O Points Used	None, mapped directly to tags in CPU
Storage Temperature	-20°C–70°C (-4°F–158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Altitude	2,000 meters max.
Pollution Degree	2
Vibration	IEC 60068-2-6 (Test Fc)
Shock	IEC 60068-2-27 (Test Ea)
Overvoltage Category	II
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1300mW
Field Wiring	Use ZIPLink wiring system. See "Wiring Options" in Chapter 5.
Terminal Type (sold separately)	10-position Removable Terminal Block
Weight	54g (2oz)
Agency Approvals	UL 61010-1 and UL 61010-2-201 File E139594, Canada and USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)**

**Note: For complete system limits, please refer to the "Hardware and Communication Limits" table in the Productivity Suite Help File, "Hardware Configuration" topic (P050).*

***Meets EMC and Safety Requirements. See the D.O.C. for details.*

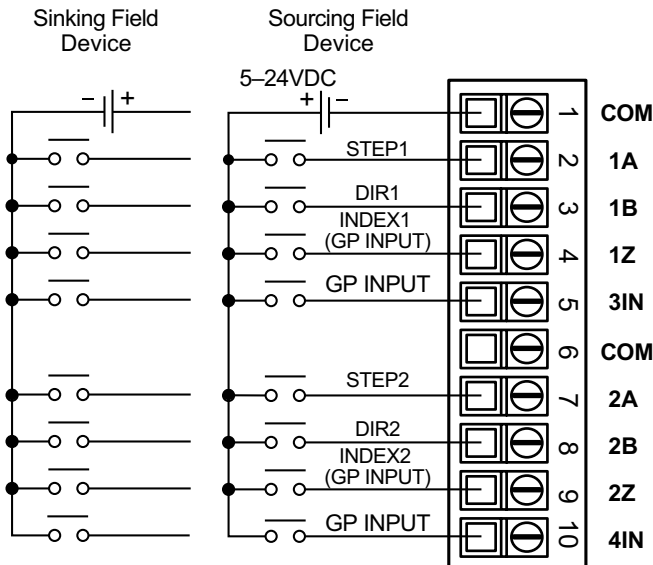
Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 screw terminals	10 spring clamp terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid/stranded conductor 3/64 in. (1.2 mm) insulation max. 1/4 in (6– 7 mm) strip length	28–16 AWG (0.081–1.31 mm ²) Solid/stranded conductor 3/64 in (1.2 mm) insulation max. 19/64 in (7–8 mm) strip length
Conductors	USE COPPER CONDUCTORS, 75°C or equivalent.	
Screw Driver	0.1 in (2.5 mm) maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

* Recommended screw driver P/N: TW-SD-MSL-1.

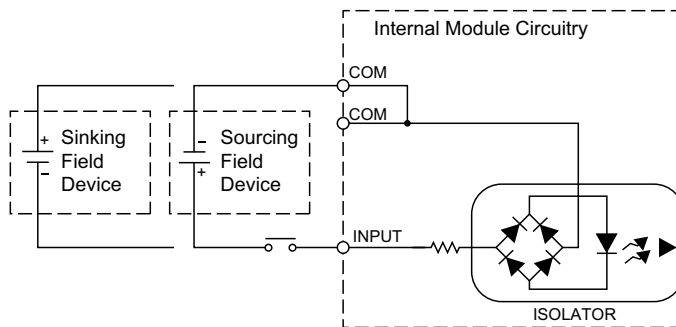
P1-02HSC High-Speed Isolated Sinking/Sourcing Input (continued)

Wiring Diagrams

High Speed General Purpose Inputs

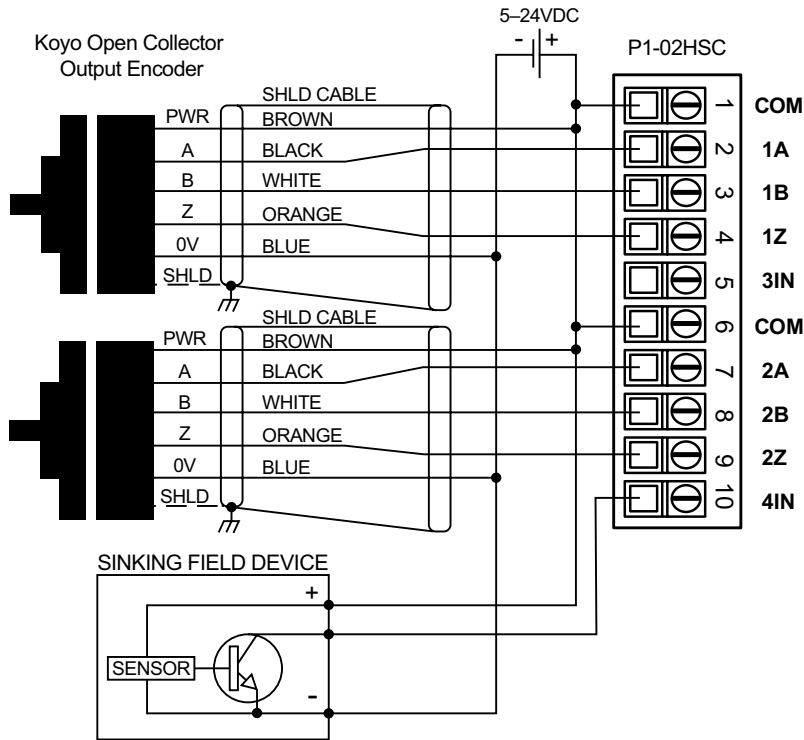


Equivalent Input Circuit



P1-02HSC High-Speed Isolated Sinking/Sourcing Input (continued)

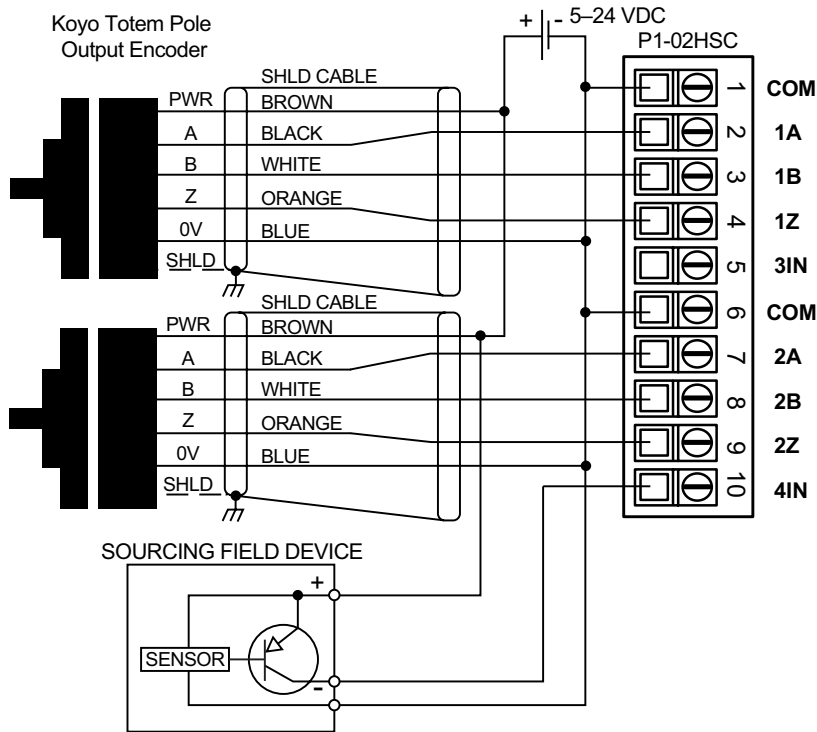
Wiring Example for Koyo Open Collector Output Encoder



Line Driver Output Encoders Not Recommended for P1-02HSC

P1-02HSC High-Speed Isolated Sinking/Sourcing Input (continued)

Wiring Example for Koyo Totem Pole Output Encoder



P1-02HSC High-Speed Isolated Sinking/ Sourcing Input (continued)

Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-02HSC module into the base configuration.

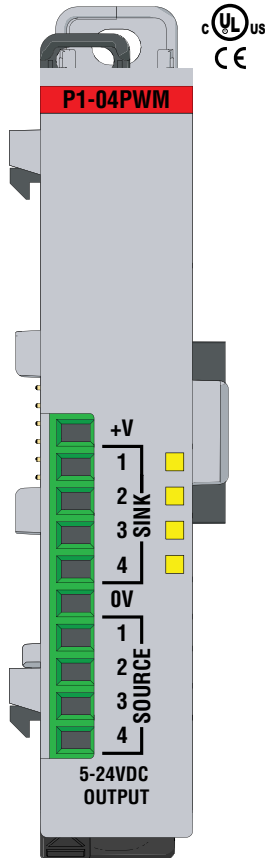
If desired, assign a *User Tagname* to each output point channel selected. A *Stop Mode Value* may also be assigned.

The screenshot displays the 'P1-02HSC' configuration window. On the left is a vertical rack of modules, with the 'P1-02HSC' module highlighted. The main window has tabs for 'Module Setup' and 'Channel'. The 'Module Setup' tab is active, showing the 'Module Name' as 'P1-HSC-0.1.1'. Below this is a table titled 'Input Points' with two columns: 'Point Description' and 'Status Tag'. The table lists the following points: Ch 1A, Ch 1B, Ch 1Z, GP Input 3, Ch 2A, Ch 2B, Ch 2Z, and GP Input 4. At the bottom of the window, there is a 'Status Feedback' section with dropdown menus for 'Module Error Code' and 'Module Ready'. At the very bottom are buttons for 'Module Info', 'Monitor', 'OK', 'Cancel', and 'Help'.

Point Description	Status Tag
Ch 1A	
Ch 1B	
Ch 1Z	
GP Input 3	
Ch 2A	
Ch 2B	
Ch 2Z	
GP Input 4	

P1-04PWM Module

The P1-04PWM pulse width modulation module provides four channels of sinking or sourcing 0–20 kHz, 0–100% duty cycle outputs for use with the Productivity® 1000 system.



Terminal Block sold separately.

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



Output Specifications		
Outputs per Module	4 PWM outputs	
Output Type	Open drain N-CH MOSFET (sinking)	Open drain P-CH MOSFET (sourcing)
Rated Voltage	5–24 V	
Operating Voltage Range	4.75–28.8 VDC	
Maximum Output Current Only Sinking Load Only Sourcing Load Both Sinking and Sourcing Loads	200mA 0mA 100mA	0mA 200mA 100mA
Minimum Load Current	5mA @ 5V	
Maximum Leakage Current	0.1 mA @ 28.8	
On Voltage Drop	0.8 VDC @ 200mA	1.2 V @ 200mA
Maximum Inrush Current	500mA for 50ms	
Maximum Frequency Inaccuracy	0.5% of range	
Maximum Duty Cycle Inaccuracy	0.6% of range below 10kHz 1.2% of range 10–20 kHz	
Maximum Load Resistance for Stated Accuracy	1kΩ	
Accuracy vs. Temperature	±50PPM max.	
Start/Stop PWM Response	0.5 ms	
PWM Frequency	0–20 kHz	
PWM Duty Cycle	0–100% below 10kHz 5–95% 10–20 kHz	
Status Indicators	Logic Side 4 points	
Commons	1 non-isolated	
Maximum Applicable Fuses	1A	
External Power Supply Required	5–24 VDC @ 40mA, Class 2	

Power Specifications	
Maximum Voltage	28.8 V
Minimum Voltage	4.75 V
Current Consumption Excluding Outputs	40mA
Maximum Current Consumption Total for 4 sink or 4 source Outputs	800mA

Warranty: Thirty-day money-back guarantee. Two-year limited replacement.
(See www.productivity1000.com for details.)

P1-04PWM Module Overview (continued)

General Specifications	
Operating Temperature	0°C–60°C (32°F–140°F)
Storage Temperature	-20°C–70°C (-4°F–158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC 60068-2-6 (Test Fc)
Shock	IEC 60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1400mW
Enclosure Type	Open equipment
Module Location	Any I/O location in a Productivity®1000 system
Field Wiring	Removable terminal block (sold separately). Use ZIPLink wiring system. See "Wiring Options" in Chapter 5.
Terminal Type (Sold Separately)	10-position removable terminal block
Weight	56g (2oz)
Agency Approvals	UL 61010-1 and UL 61010-2-201 File E139594, Canada and USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)*

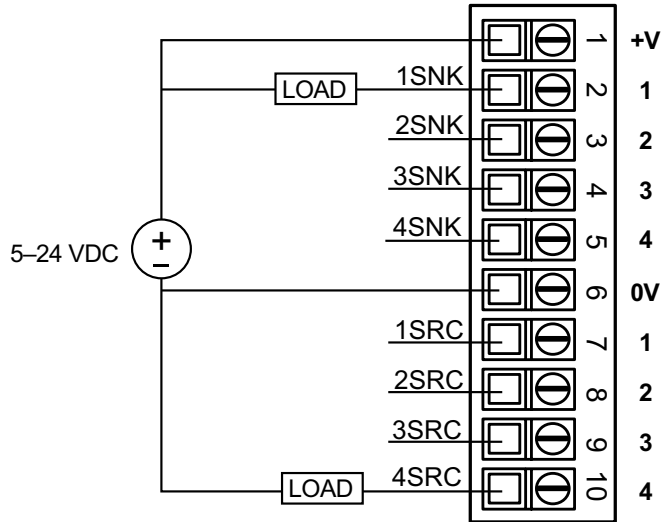
* See CE Declaration of Conformance for details.

Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 screw terminals	10 spring clamp terminals
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid/stranded conductor 3/64 in. (1.2 mm) insulation max. 1/4 in (6– 7 mm) strip length	28–16 AWG (0.081–1.31 mm²) Solid/stranded conductor 3/64 in (1.2 mm) insulation max. 19/64 in (7–8 mm) strip length
Conductors	USE COPPER CONDUCTORS, 75°C or equivalent.	
Screw Driver	0.1 in (2.5 mm) maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

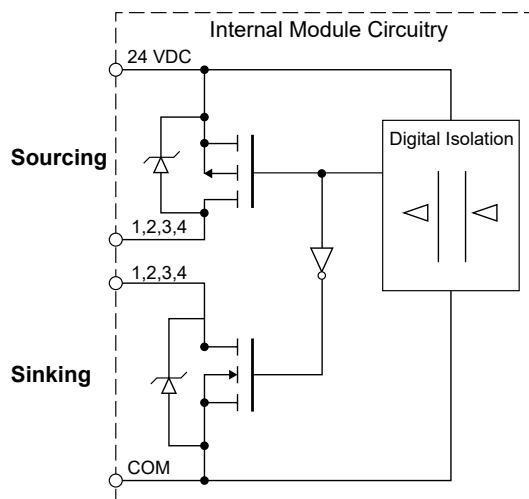
* Recommended screw driver P/N: TW-SD-MSL-1.

P1-04PWM Module Overview (continued)

Wiring Diagrams



NOTE: Both channels (sinking/sourcing) output the same frequency and duty cycle that is assigned to the tag in Hardware Configuration window.



P1-04PWM Module Overview (continued)

Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04PWM module into the base configuration.

If desired, assign a *User Tagname* to each output point channel selected. A *Stop Mode Value* may also be assigned.

The screenshot shows the P1-04PWM module configuration window. On the left is a physical module diagram with terminals labeled +V, Sink, COM, and Source. The main area is titled '4CH, Pulse Width Modulation' and includes an 'Add Default Tags' button. Below this is a table with 8 columns: Point, Duty Cycle(%) Tagname, Carrier Freq.(Hz) Tagname, Output Type, Duty Cycle Implied Decimal, Duty Cycle Stop Mode Value, and Carrier Freq.(Hz) Stop Mode Value. The table contains 4 rows of data for points 1 through 4. Below the table is a 'Status Bit' section with a 'Module Failed' indicator and a 'User Tagname' field with the value 'MST-0.1.1.25'. At the bottom are buttons for 'Module Info', 'Monitor', 'OK', 'Cancel', and 'Help'.

Point	Duty Cycle(%) Tagname	Carrier Freq.(Hz) Tagname	Output Type	Duty Cycle Implied Decimal	Duty Cycle Stop Mode Value	Carrier Freq.(Hz) Stop Mode Value
1	AOS32-0.1.1.1	AOS32-0.1.1.2	PWM	x 1	0	0
2	AOS32-0.1.1.3	AOS32-0.1.1.4	PWM	x 1	0	0
3	AOS32-0.1.1.5	AOS32-0.1.1.6	PWM	x 1	0	0
4	AOS32-0.1.1.7	AOS32-0.1.1.8	PWM	x 1	0	0

Status Bit: Module Failed

User Tagname: MST-0.1.1.25

Buttons: Module Info, Monitor, OK, Cancel, Help

High-Speed Module Tester Utility

The High-Speed Module Tester software utility allows a user to test the PS-AMC module's inputs and outputs. It is highly recommended that you simulate your PS-AMC functions before attempting to control the module from your CPU program. This software utility, seen below, can be useful with debugging, confirming field wiring and verifying external device operation.

High Speed Module Testing - HS Testing Ready

AMC-1

AMC-1-AXIS-1 | AMC-1-AXIS-2 | AMC-1-AXIS-3 | **AMC-1-AXIS-4**

Axis: **4**

Velocity: pulses/sec

Acceleration: pulses/sec²

Deceleration: pulses/sec²

Output Direction: ☒ Positive ☐ Negative

Input Status

	State
IN1 DRV RDY	☐
IN2 POS CAP	☐
IN3 HOME	☐
IN4 LIMIT 1	☐
IN5 LIMIT 2	☐
IN6 GPIN	☐

Output Status / Control

	State	Edit
OUT1 GP	☐	☐
OUT2 EN	☐	☐
OUT3 ATR	☐	☐

	Position (pulses)	Velocity (pulses/sec)	Enc Position (pulses)
Axis 1	10998	500	0
Axis 2	150708	10000	0
Axis 3	-163978	-18724	0
Axis 4	1434	100	0

Refer to the Productivity Suite Help file for more information on the High-Speed Module Tester Utility.