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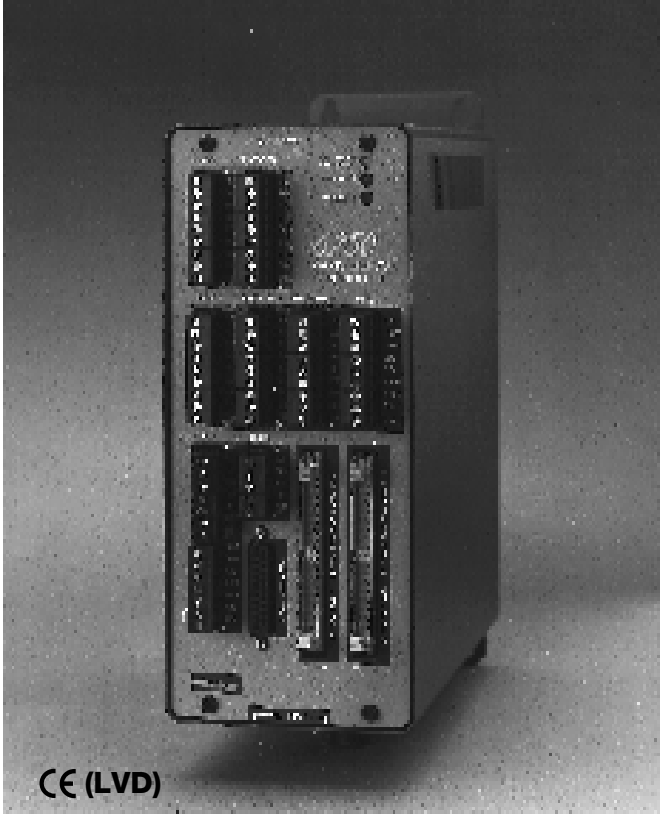
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6250

2-Axis Servo Controller

Compumotor's 6250 is a stand-alone two-axis servo controller. The 6250 provides sophisticated control for any standard ±10V analog input servo drive system and is perfect for the synchronization of two axes of motion. A Digital Signal Processor (DSP) is used for high-speed servo control. A separate microprocessor is used for executing high-level motion programs. The 6250 uses a dual processor approach for industry leading servo control and motion command execution.

As with all 6000 Series products, the 6250 uses the 6000 command language. This language is powerful enough to implement complex motion control applications, and simple enough not to overwhelm the novice programmer. Many useful features are incorporated into the command language, including subroutine definition, conditional programming, unit scaling, programmable I/O, contouring, and mathematical functions.

The 6250 comes standard with Motion Architect, a comprehensive software package for creating and executing motion control programs under Microsoft Windows. Within Motion Architect, a user is able to automatically generate setup code, edit and execute motion control programs and create a custom test panel. On-line help is available throughout Motion Architect, including interactive access to the complete contents of the 6250's Software Reference Guide. This powerful tool allows the user to save valuable setup and development time.

An additional benefit of using Motion Architect with the 6250 is its optional Servo Tuner module. Real-time move information, such as commanded velocity, actual position, etc., is gathered and used to graphically display move data. The user can see the results of changing tuning values to optimize motion profiles. Multiple graphs can be saved providing a history of the system's performance.

The 6250 programming language allows the user to display text and numeric information on the RP240. Other RP240 features include programmable function keys, numeric data entry, user program selection, LED control, and jogging.

Features

Motion

- 2 axes of optically isolated servo control (± 10V-12 bit analog interface) with incremental encoder feedback
- Controls servo drives in velocity or torque mode
- Update rates for servo loop as fast as 205 microsecs for one axis
- Digital Signal Processor (DSP) for servo control (PIV with velocity and acceleration feed-forward)
- 1.2 MHz post-quadrature position feedback frequency

I/O

- Home limit, Pos and Neg end-of-travel limits
- 48 programmable inputs (24) and outputs (24)
- Auxiliary high-speed programmable inputs and outputs providing position capture or output on position to ± 1 count at maximum encoder frequency
- Drive Enable outputs, Drive Fault inputs
- 3 8-bit analog inputs that can be used for joystick or variable input (temperature, tension, etc.)
- 6250 ANI option offers two ±10V, 14-bit analog inputs (one per axis) with anti-aliasing filter; can also be used for position feedback

Language

- Capability to interrupt program execution on error conditions
- Position-based following
- Linear interpolation
- Variable storage, conditional branching, and math capability
- Program debug tools—trace mode, break points, and simulation of I/O
- Scaling of distance, velocity and acceleration
- S curve or trapezoidal motion profiling
- 150,000 bytes of non-volatile memory for storage of programs and paths

Software Provided:

- Motion Architect—Microsoft Windows-based application development software
- DOS support software program editor and terminal emulator software
- Dynamic Link Library (DLL) provided for use with Microsoft Windows software development kit

Optional Software:

- Servo Tuner provides graphical feedback of real-time motion information to make determining tuning gains simple
- CompuCAM™ Computer Aided Motion Software imports geometry from CAD programs, plotter files, or NC programs and generates 6000 Series code
- Motion Toolbox library of LabVIEW® virtual instruments (VIs) for icon-based programming of Compumotor's 6000 Series controllers
- Dynamic Data Exchange server available allowing data exchange with other Windows software applications
- Motion Builder provides a visual development environment for graphical icon-based programming of the 6000 Series products

Interface Capability

- Operates stand-alone or interfaces to computers, programmable logic controllers
- Compatible with RP240 operator interface panel
- Two RS-232C Communications Ports

Physical

- Stand-alone package
- 120-240VAC

Software information is available on page B109.

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Command Language (partial list)

The 6250 is easily programmed with the 6000 Series language. Each command is an ASCII character mnemonic with numeric parameters for both axes following the command. The following command example sets velocity on axis 1 and axis 2 to 10 and 15 revolutions per second respectively: V10, 15.

Conditionals

Command	Description
IF( )	If Statement
REPEAT	Repeat Statement
WAIT( )	Wait for a Specific Condition
WHILE( )	While a Condition is True

Display [RP240]

Command	Description
DCLEAR	Clear Display
DPCUR	Position Cursor
DREAD	Read Display Entry
DVAR	Display Variable
DWRITE" "	Write String to Display

Homing

Command	Description
HOM	Go Home
HOMA	Home Acceleration
HOMAD	Home Deceleration
HOMBAC	Home Backup Enable
HOMDF	Home Direction Final
HOMEDG	Home Reference Edge
HOMFV	Home Final Velocity
HOMLVL	Home Active Level
HOMV	Home Velocity
HOMZ	Home to Z-channel Enable

I/O

Command	Description
INFEN	Enable Input Functions
INFNC	Input Function
OUTFNC	Output Function
OUT	Turn On/Off Outputs

Joystick

Command	Description
JOY	Joystick Mode Enable
JOYA	Joystick Acceleration
JOYAD	Joystick Deceleration
JOYCDB	Joystick Center Deadband
JOYVH	Joystick Velocity High
JOYVL	Joystick Velocity Low

Limits

Command	Description
LH	Hard Limit Enable
LHAD	Hard Limit Deceleration
LHLVL	Hard Limit Active Level
LS	Soft Limit Enable
LSAD	Soft Limit Decelration
LSPOS	Soft Limit POS Range
LSNEG	Soft Limit NEG Range

Software information is available on page B109.

Miscellaneous

Command	Description
;	Comment
DRIVE	Drive Enable
ERRORP	Error Program
L	Loop
MA	Absolute / Incremental Mode Enable
MC	Preset / Continuous Mode Enable
PSET	Define Position Counter
READ	Read a Value from Terminal
TIMST	Reset and Start Timer
STEP	Single Step Mode Enable
WRITE" "	Transmit a String to Terminal

Motion

Command	Description
A	Acceleration
AA	Acceleration Average (for S curves)
AD	Deceleration
ADA	Deceleration Average (for S curves)
D	Distance
GO	Initiate Motion
GOL	Initiate Linear Interpolated Motion
S	Stop
V	Velocity

Scaling

Command	Description
SCLA	Accel / Decel Scale Factor
SCLD	Distance Scale Factor
SCLV	Velocity Scale Factor

Servo Tuning

Command	Description
SGAF	Acceleration Feedforward Gain
SGI	Integral Feedback Gain
SGP	Proportional Feedback Gain
SGSET	Save a Set of Servo Gains
SGV	Velocity Feedback Gain
SGVF	Velocity Feedforward Gain
SOFFS	Servo Command Offset

Subroutines

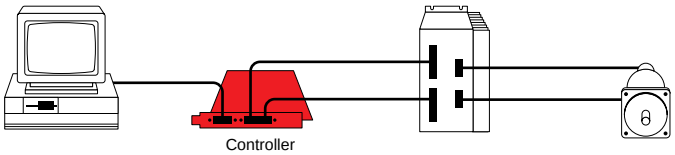
Command	Description
DEF	Define a Subroutine
GOSUB	Execute a Subroutine with Return
GOTO	Execute a Subroutine without Return

Transfer Information

Command	Description
TAS	Transfer Axis Status
TANV	Transfer Analog Input Value
TIN	Transfer Input Status
TLIM	Transfer Limit Status
TOUT	Transfer Output State
TPER	Transfer Position Error
TPE	Transfer Position of Encoder

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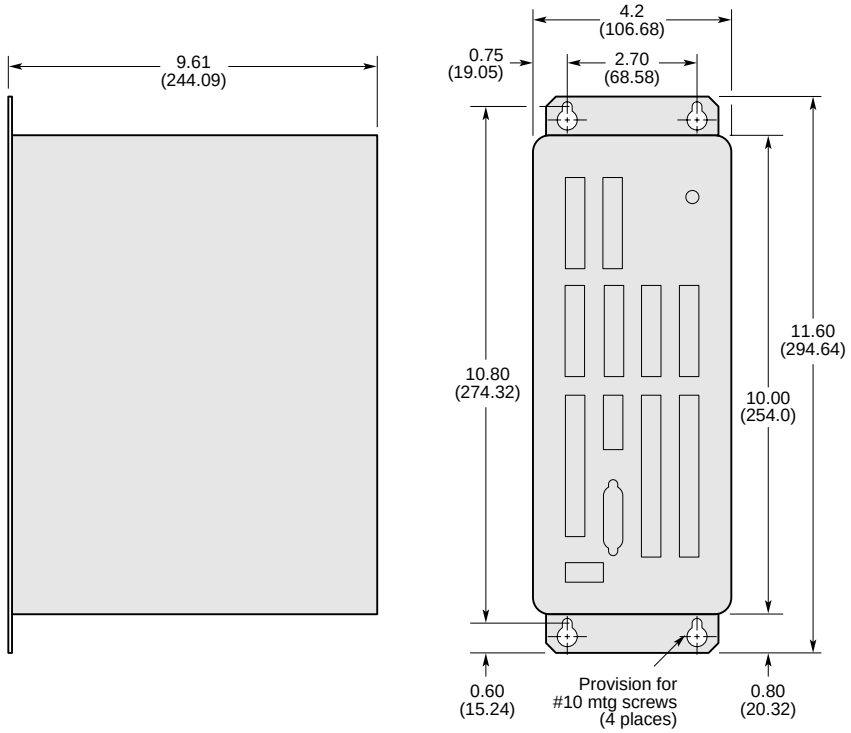


Specifications

Parameter	Value
Power	
Input	100-120/200-240VAC, 50-60 Hz, or 110-340VDC
Servo Performance	
Processor	32-bit CPU/24 bit DSP
Servo update	As fast as 205 µsec per axis, user selectable
Encoder	Two phase quadrature incremental encoders with differential (recommended) or single ended outputs (+5VDC TTL compatible). Max frequency = 1.2 MHz, post-quadrature. Minimum time between transitions = 833 ns. Optically isolated
Position	±2,147,483,648 encoder counts
Velocity	1 to 1,200,000 encoder counts/sec.
Acceleration	1 to 50,000,000 encoder counts/sec^2
Inputs	
24 Programmable	Plug compatible with OPTO-22™ signal conditioning equipment (50 pin DIN header). TTL compatible, voltage range 0-24VDC.
2 Interrupt	TTL compatible, voltage range 0-24VDC.
3 Analog	Voltage range 0-2.5VDC, 8-bit A/D converter.
Enable	Hardware analog command output enable. TTL compatible, voltage range 0-24VDC.
Home; Pos and Neg Limits; Drive Fault; Trigger; Release; Axis Select, & Velocity Select	TTL compatible, voltage range 0-24VDC.
Outputs	
24 Programmable	Plug compatible with OPTO-22™ signal conditioning equipment (50 pin DIN header). Open collector output will sink up to 30 mA, and allow up to 24VDC.
2 Auxiliary	Open collector output will sink up to 30 mA, and allow up to 24VDC.
Command signal	±10V Analog output. 12 bit resolution DAC.
Enable drive	Relay output will sink up to 30 mA and allow up to 24VDC. (Normally open and normally closed available)

Dimensions

(–) denotes millimeters



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Model 6250 Connections

Drive 1–2
9-Pin Screw Terminal

Pin No.	Signal
1	Shield
2	Common
3	Shutdown NC
4	Shutdown NO
5	Drive Fault
6	Analog Ground
7	Analog Input
8	Command –
9	Command +

Encoder 1, 2, 3
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)

Joystick
25-Pin "D"

Pin No.	Signal
1	Analog Ch. 1
2	Analog Ch. 2
3	Analog Ch. 3
8	Shield
14	Ground
15	Axes Select
16	Velocity Select
17	Joystick Release
18	Joystick Trigger
19	Joystick Auxiliary
23	+5VDC (out)

Limits 1–2
9-Pin Screw Terminal

Pin No.	Signal
1	Shield
2	Ground
3	Home 2
4	Neg 2
5	Pos 2
6	Ground
7	Home 1
8	Neg 1
9	Pos 1

Auxiliary
14-Pin Screw Terminal

Pin No.	Signal
1	Rx (RS-232C)
2	Tx (RS-232C)
3	Ground
4	Shield
5	+5VDC (out)
6	Output Pull-Up
7	Input Pull-Up
8	Trigger A
9	Trigger B
10	Ground
11	Output A
12	Output B
13	Ground
14	Enable

RP240
5-Pin Screw Terminal

Pin No.	Signal
1	+5VDC (out)
2	Ground
3	Rx
4	Tx
5	Shield

Programmable Inputs
50-Pin Header

Pin No.	Signal
1	Input #24 (MSB)
...	...
47	Input #1 (LSB)
49	+5VDC (out)
Even #s	Ground

Programmable Outputs
50-Pin Header

Pin No.	Signal
1	Output #24 (MSB)
...	...
47	Output #1 (LSB)
49	+5VDC (out)
Even #s	Ground

Ordering Information

Part No.	Description
6250	6250 with user guides and software support disks and power cable.
6250–ANI	Same as 6250 including 2 14 bit analog inputs.
-M	Expanded memory option
-AM	Analog input—expanded memory option

Software Accessories

Part No.	Description
DDE6000	DDE server for 6000 Series. Includes software disk with instructions.
Servo Tuner	Motion Architect Servo tuning module.
CompuCAM	CompuCAM is available in three versions: DXF, HPGL and G-Code
Motion Builder	Graphical icon-based software.
Motion Toolbox	Library of LabVIEW FIs for Motion Control.

Accessories

Part No.	Description
VM24	Family of external I/O modules. See page B138.
VM50	50-pin header to screw terminal breakout board for connecting I/O. See page B139 for details.
RP240	Operator interface. See page B140 for details.
RP240-NEMA4	NEMA rated operator interface. Flat panel mounted. See page B140 for details.
JS6000	Two-axis joystick. See page B141 for details.



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