

# *SONATA Series Hardware Reference Manual*



**Stand-alone Motor Control System**



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

This motion control system is stand-alone, easy-to-use, plug-and-play and cost effective solution for motion control applications.

Each system includes the power supplies, the motion controller, and the micro-stepper and/or servo motor drivers. The operator interface terminal makes the system totally stand-alone and allows the operator to interact with the motion controller without needing an additional PC.

This series supports up to 3 axes of motion.

The system can also be operated using an analog joystick or a trackball. The speed of the motor is proportional to the tilt angle of the joystick or the rotational speed of the trackball.

## INSTALLATION

- 1) Turn-off the motion controller.
- 2) The HOME switch(s), if any, should be connected to at the negative side of the end of travel.
- 3) The normally closed or normally low limit switches must be connected to LIMITS connectors.
- 4) Connect the motor(s).
- 5) Connect the OUTPUT port of the motion controller to the INPUT port of the terminal using the supplied cable.
- 6) Connect the INPUT port of the motion controller to the OUTPUT port of the terminal using the supplied cable.
- 7) Connect the LCD port of the motion controller to the LCD port of the terminal using the supplied cable.
- 8) Turn on the system. After initialization, press  or  keys the X motor should jog in negative or positive directions.
- 9) Always turn off the system before connecting or disconnecting any component.

## **PIN ASSIGNMENT AND DESCRIPTION**

### **X-MOTOR**

8-pin Circular Connector

The X-axis motor should be connected to this connector.

| <b>PIN</b> | <b>NAME</b>  | <b>STEPPING MOTOR</b>    | <b>DC MOTOR</b>          | <b>BRUSHLESS DC MOTOR</b> |
|------------|--------------|--------------------------|--------------------------|---------------------------|
| <b>1</b>   | <b>PHAX+</b> | Phase A+                 | Arm+                     | Phase A                   |
| <b>2</b>   | <b>PHBX+</b> | Phase B+                 | Not Connected            | Phase B                   |
| <b>3</b>   | <b>PHBX-</b> | Phase B-                 | Not Connected            | Not Connected             |
| <b>4</b>   | <b>PHAX-</b> | Phase A-                 | Arm-                     | Phase C                   |
| <b>5</b>   | <b>CHSIS</b> | Connected to the Chassis | Connected to the Chassis | Connected to the Chassis  |
| <b>6</b>   |              | Not Connected            | Not Connected            | Not Connected             |
| <b>7</b>   |              | Not Connected            | Not Connected            | Not Connected             |
| <b>8</b>   |              | Not Connected            | Not Connected            | Not Connected             |

### **Y-MOTOR**

8-pin Circular Connector

The Y-axis motor should be connected to this connector.

| <b>PIN</b> | <b>NAME</b>  | <b>STEPPING MOTOR</b>    | <b>DC MOTOR</b>          | <b>BRUSHLESS DC MOTOR</b> |
|------------|--------------|--------------------------|--------------------------|---------------------------|
| <b>1</b>   | <b>PHAY+</b> | Phase A+                 | Arm+                     | Phase A                   |
| <b>2</b>   | <b>PHBY+</b> | Phase B+                 | Not Connected            | Phase B                   |
| <b>3</b>   | <b>PHBY-</b> | Phase B-                 | Not Connected            | Not Connected             |
| <b>4</b>   | <b>PHAY-</b> | Phase A-                 | Arm-                     | Phase C                   |
| <b>5</b>   | <b>CHSIS</b> | Connected to the Chassis | Connected to the Chassis | Connected to the Chassis  |
| <b>6</b>   |              | Not Connected            | Not Connected            | Not Connected             |
| <b>7</b>   |              | Not Connected            | Not Connected            | Not Connected             |
| <b>8</b>   |              | Not Connected            | Not Connected            | Not Connected             |

## Z-MOTOR

8-pin Circular Connector

The Z-axis motor should be connected to this connector.

| PIN | NAME         | STEPPING MOTOR           | DC MOTOR                 | BRUSHLESS DC MOTOR       |
|-----|--------------|--------------------------|--------------------------|--------------------------|
| 1   | <b>PHAZ+</b> | Phase A+                 | Arm+                     | Phase A                  |
| 2   | <b>PHBZ+</b> | Phase B+                 | Not Connected            | Phase B                  |
| 3   | <b>PHBZ-</b> | Phase B-                 | Not Connected            | Not Connected            |
| 4   | <b>PHAZ-</b> | Phase A-                 | Arm-                     | Phase C                  |
| 5   | <b>CHSIS</b> | Connected to the Chassis | Connected to the Chassis | Connected to the Chassis |
| 6   |              | Not Connected            | Not Connected            | Not Connected            |
| 7   |              | Not Connected            | Not Connected            | Not Connected            |
| 8   |              | Not Connected            | Not Connected            | Not Connected            |

## JOYSTICK

25-pin DB-25, Female Connector

This port is used to connect an analog joystick. If a joystick is not used, three analog signals may be connected to this port.

Related commands are RSTSX, RSTSY and RSTSZ. Please refer to Operating and Programming Reference Manual

| <b>PIN</b> | <b>NAME</b>         | <b>DESCRIPTION</b>           |
|------------|---------------------|------------------------------|
| <b>1</b>   | <b>ANALOG-X</b>     | Analog-X Input               |
| <b>2</b>   | <b>ANALOG-Y</b>     | Analog-Y Input               |
| <b>3</b>   | <b>HIGH-SPEED</b>   | High Speed Selection Input   |
| <b>4</b>   | <b>MEDIUM-SPEED</b> | Medium Speed Selection Input |
| <b>5</b>   | <b>LOW-SPEED</b>    | Low Speed Selection Input    |
| <b>6</b>   | <b>W-SELECT</b>     | W-axis Selection Key         |
| <b>15</b>  | <b>ANALOG-Z</b>     | Analog-Z Input               |
| <b>16</b>  | <b>GND</b>          | System Ground                |
| <b>17</b>  | <b>GND</b>          | System Ground                |
| <b>18</b>  | <b>GND</b>          | System Ground                |
| <b>19</b>  | <b>+5 VDC</b>       | +5 VDC                       |
| <b>20</b>  | <b>+5 VDC</b>       | +5 VDC                       |
| <b>21</b>  | <b>+5 VDC</b>       | +5 VDC                       |

## X-LIMITS

9-pin DB-9, Male Connector

The X-axis positive, negative and home switches should be connected to this port.

| PIN | NAME          | DESCRIPTION                        |
|-----|---------------|------------------------------------|
| 1   | POS-LIMIT-X * | X-Axis Positive Limit Switch Input |
| 2   | GND           | System Ground                      |
| 3   | +5 VDC        | +5 VDC                             |
| 4   | NEG-LIMIT-X * | X-Axis Negative Limit Switch Input |
| 5   | GND           | System Ground                      |
| 6   | +5 VDC        | +5 VDC                             |
| 7   | HOME-X **     | X-Axis Home Switch Input           |
| 8   | GND           | System Ground                      |
| 9   | +5 VDC        | +5 VDC                             |

## Y-LIMITS

9-pin DB-9, Male Connector

The Y-axis positive, negative and home switches should be connected to this port.

| PIN | NAME          | DESCRIPTION                        |
|-----|---------------|------------------------------------|
| 1   | POS-LIMIT-Y * | Y-Axis Positive Limit Switch Input |
| 2   | GND           | System Ground                      |
| 3   | +5 VDC        | +5 VDC                             |
| 4   | NEG-LIMIT-Y * | Y-Axis Negative Limit Switch Input |
| 5   | GND           | System Ground                      |
| 6   | +5 VDC        | +5 VDC                             |
| 7   | HOME-Y **     | Y-Axis Home Switch Input           |
| 8   | GND           | System Ground                      |
| 9   | +5 VDC        | +5 VDC                             |

\* A normally closed or normally low switch should be placed between this pin and GND.

\*\* A normally closed or normally low switch should be placed between this pin and GND, if homing operation is required.

A 10 KOHM pull-up resistor is placed between all inputs and +5 VDC.

## Z-LIMITS

9-pin DB-9, Male Connector

The Z-axis positive, negative and home switches should be connected to this port.

| PIN | NAME          | DESCRIPTION                        |
|-----|---------------|------------------------------------|
| 1   | POS-LIMIT-Z * | Z-Axis Positive Limit Switch Input |
| 2   | GND           | System Ground                      |
| 3   | +5 VDC        | +5 VDC                             |
| 4   | NEG-LIMIT-Z * | Z-Axis Negative Limit Switch Input |
| 5   | GND           | System Ground                      |
| 6   | +5 VDC        | +5 VDC                             |
| 7   | HOME-Z **     | Z-Axis Home Switch Input           |
| 8   | GND           | System Ground                      |
| 9   | +5 VDC        | +5 VDC                             |

## X-ENCODER

9-pin DB-9, Male Connector

The X-axis motor encoder and Hall Effect sensors, if available, should be connected to this port.

| PIN | NAME    | DESCRIPTION                        |
|-----|---------|------------------------------------|
| 1   | +5 VDC  | +5 VDC                             |
| 2   | CHSIS   | Connected to the Chassis           |
| 3   | XCHB    | X-Motor Channel-B Quadrature Input |
| 4   | XCHA    | X-Motor Channel-A Quadrature Input |
| 5   | GND     | System Ground                      |
| 6   | XHALL-B | X-Motor HALL-B Sensor Input        |
| 7   | XHALL-C | X-Motor HALL-C Sensor Input        |
| 8   | XHALL-A | X-Motor HALL-A Sensor Input        |
| 9   |         | Not Connected                      |

## Y-ENCODER

9-pin DB-9, Male Connector

The Y-axis motor encoder and Hall Effect sensors, if available, should be connected to this port.

| PIN | NAME    | DESCRIPTION                        |
|-----|---------|------------------------------------|
| 1   | +5 VDC  | +5 VDC                             |
| 2   | CHSIS   | Connected to the Chassis           |
| 3   | YCHB    | Y-Motor Channel-B Quadrature Input |
| 4   | YCHA    | Y-Motor Channel-A Quadrature Input |
| 5   | GND     | System Ground                      |
| 6   | YHALL-B | Y-Motor HALL-B Sensor Input        |
| 7   | YHALL-C | Y-Motor HALL-C Sensor Input        |
| 8   | YHALL-A | Y-Motor HALL-A Sensor Input        |
| 9   |         | Not Connected                      |



## Z-ENCODER

9-pin DB-9, Male Connector

The Z-axis motor encoder and Hall Effect sensors, if available, should be connected to this port.

| PIN | NAME    | DESCRIPTION                        |
|-----|---------|------------------------------------|
| 1   | +5 VDC  | +5 VDC                             |
| 2   | CHSIS   | Connected to the Chassis           |
| 3   | ZCHB    | Z-Motor Channel-B Quadrature Input |
| 4   | ZCHA    | Z-Motor Channel-A Quadrature Input |
| 5   | GND     | System Ground                      |
| 6   | ZHALL-B | Z-Motor HALL-B Sensor Input        |
| 7   | ZHALL-C | Z-Motor HALL-C Sensor Input        |
| 8   | ZHALL-A | Z-Motor HALL-A Sensor Input        |
| 9   |         | Not Connected                      |

## RS-232

9-pin DB-9, Female Connector

This port should be connected to the RS-232 port of the host computer or PLC using the supplied cable.

| PIN | NAME     | DESCRIPTION                                 |
|-----|----------|---|
| 1   |          | Not Connected                               |
| 2   | DATA-XMT | Data Transmit to PC                         |
| 3   | DATA-RCV | Data Receive from PC                        |
| 4   |          | Not Connected                               |
| 5   | GND      | System Ground                               |
| 6   |          | Not Connected                               |
| 7   | RESET    | RESET to Controller, Should Be Set to Clear |
| 8   |          | Not Connected                               |
| 9   |          | Not Connected                               |

## DISPLAY

9-pin DB-9, Female Connector

This port should be connected to the DISPLAY port of the terminal using the supplied cable.

| PIN | NAME      | DESCRIPTION     |
|-----|-----------|-----------------|
| 1   | LCD CLOCK | LCD CLOCK       |
| 2   | LCD DATA  | LCD DATA        |
| 3   | LCD CS    | LCD CHIP SELECT |
| 4   | +5 VDC    | +5 VDC          |
| 5   | GND       | System Ground   |
| 6   |           | Not Connected   |
| 7   |           | Not Connected   |
| 8   |           | Not Connected   |
| 9   | +5 VDC    | +5 VDC          |

Specifications are subject to change without notice.