C H A P T E R ⑥

Troubleshooting

Section Objectives

The information in this section will enable you to:

❏ Maintain the system to ensure smooth, efficient operation
❏ Isolate and resolve system problems

Reducing Electrical Noise

For detailed information on reducing electrical noise in your system, refer to the current Compumotor Catalog.

Problem Isolation

When your system does not function properly (or as you expect it to operate), the first thing that you must do is identify and isolate the problem. When you accomplish this, you can effectively begin to resolve and eradicate the problem.

The first step is to isolate each system component and ensure that each component functions properly when it is run independently. You may have to dismantle your system and put it back together piece by piece to detect the problem. If you have additional units available, you may want to use them to replace existing components in your system to help identify the source of the problem.

Determine if the problem is mechanical, electrical, or software-related. Can you repeat or re-create the problem? Random events may appear to be related, but they may not be contributing factors to your problem. Investigate the events that occur before the subsequent system problem.

Symptoms	Possible Causes	Solutions	Useful Commands
No motion	Limits active	Check hard wiring Disable limits	R,RA,LD
	Exceeded maximum distance range	Reset absolute counter with PZ command	PZ, D, MPI, PR
	Position error	CPE command too small Check encoder wiring	R,RSE,CPE,DPE
	Already executing a command	Check status commands	R,RB
	Servo gains too small	Increase gains	CPG,CDG,CIL,CIG
	Stop, kill, trigger inputs active	Check wiring to inputs Check input setup	R,RB,IN,IS
	Loop, pause active	Check status commands	R,RB
	Incorrect unit address	Verify unit address Re-issue unit address	R,#
	In absolute mode (already at position)	Issue new or different absolute distance Issue MPI command	R,MPI,MPA
	Unit shutdown	Enable controller	ST, ON R
No communications	RS-232 miswired	Check wiring for RS-232	
	Wrong RS232 settings	9600 Baud, 8 data bits, 1 stop bit, no parity	
	F command enabled	Issue an E command	E,F
Motor runs away	Encoder miswired	Check encoder wiring Verify power to encoder	
	Controller not receiving encoder pulses	With drive disabled turn shaft clockwise (front of motor) PX should read positive counts	ST0,OFF,ST1,ON,DPA,PX
Enable Output Inactive	Position error	Increase allowable position error Decrease move parameters	CPE,DPE, RSE A,V
	Unit disabled	Enable unit	ST0,ON
Unit not responding to commands	Defined a sequence and didn't close with an XT	Issue an XT at the end of a sequence	XD,XT
	Communications disabled	Enable communications	E,F

You may be experiencing more than one problem. You must solve one problem at a time. Document all testing and problem isolation procedures. You may need to review and consult these notes later. This will also prevent you from duplicating your testing efforts.

Once you isolate the problem, take the necessary steps to resolve it. Use the solutions in this chapter. If your system's problem persists, call Compumotor at 800-358-9070.

RS-232C Problems

Use the following procedure to troubleshoot communication problems that you may have with the OEM070.

1. Be sure the host computer's transmit (Tx) wire is wired to the controller's receive (Rx) connection, and the host computer's receive (Rx) wire is wired to the controller's transmit (Tx) connection. Switch the receive and transmit wires on either the host or controller if the problem persists.

CAUTION
OEM070 Rx, Tx, and GND pin outs are not 2, 3, and 7 like most devices.

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2. Confirm that the host and peripheral are configured for the same baud rate, 8 data bits, 1 stop bit, and no parity.
3. Use DC common or signal ground as a reference, not earth ground.
4. Cable lengths should not exceed 50 ft. unless you are using some form of line driver, optical coupler, or shield. As with any control signal, be sure to shield the cable-to-earth ground at one end only.
5. To test the terminal or terminal emulation software and the RS-232C cable for proper three-wire communication, unhook the OEM070 and enter a character. You should not receive an echoed character. If you do, you are in half duplex mode. Connect the host's transmit and receive lines together and send another character. You should receive the echoed character. If not, consult the manufacturer of the host's serial interface for proper pinouts.
6. *The following applies only to firmware 92-016637-01 or higher.* If the OEM070 echoes back **&** for each byte sent to

it, a data communication error has occured. To re-establish communication, see the % command.

7. *The following applies only to firmware 92-016637-01 or higher.* To extend cable length and/or improve noise immunity, an RS-485 option is available as a custom product. Contact Compumotor's Custom Products department for details.

Software Debugging Tips

This section offers helpful tips for debugging programs and understanding errors and fault conditions. The OEM070 has several tools that you can use to debug a problem in the system. The software tools are listed below:

R—Report Status
RA—Limit Switch Status Report
RB—Loop, Pause, Shutdown, Trigger Status report
RSE—Report Servo Errors
IS—Input Status Report
BS—Buffer Status Report
B—Buffer Status Report

The troubleshooting table also offers possible causes for typical symptoms.

Encoder Problems

Since the OEM070 relies on feedback information, the encoder connections are critical for the unit to operate properly. If you suspect the controller is not receiving good position data, use the following procedure to verify.

1. Disable the drive (**ST1** or **OFF**)
2. Enter a **PZ** command
3. Rotate the motor CW by hand approximately one revolution
4. Enter a PX. It should read approximately 4000 (for a 1000 line encoder)
5. Rotate CCW one revolution.
6. Enter PX command. It should read approximately 0

If your controller did not respond with similar values, the controller is not receiving encoder information. Either the encoder is mis-wired or in need of repair.

Homing Diagrams

The following diagrams are examples of the many possible homing set-ups. Your parameters may vary and the results may vary slightly depending on your settings.

The CW side of the home pulse is the side closest to the CW limit. The CCW side of the home pulse is the side closest to the CCW limit.

The long pulse diagrams are indicative of situations where the motor decelerates while remaining inside the home pulse width due to the rapid homing deceleration or a very wide home pulse. The short pulse diagrams are indicative of situations where the motor decelerates through the home pulse width due to slow deceleration or a very narrow pulse width.

If an end-of-travel limit is hit during the initial homing, refer to the homing diagram for the opposite direction of travel.

The diagrams are drawn as a general guide. Velocity levels and slopes are drawn to indicate the general move profile the motor will make during the go home move. The vertical axis

is velocity and the horizontal axis the position in relation to
the home input transitions. Some lines are drawn as closely
as possible together to indicate identical velocities, yet remain
discernible.
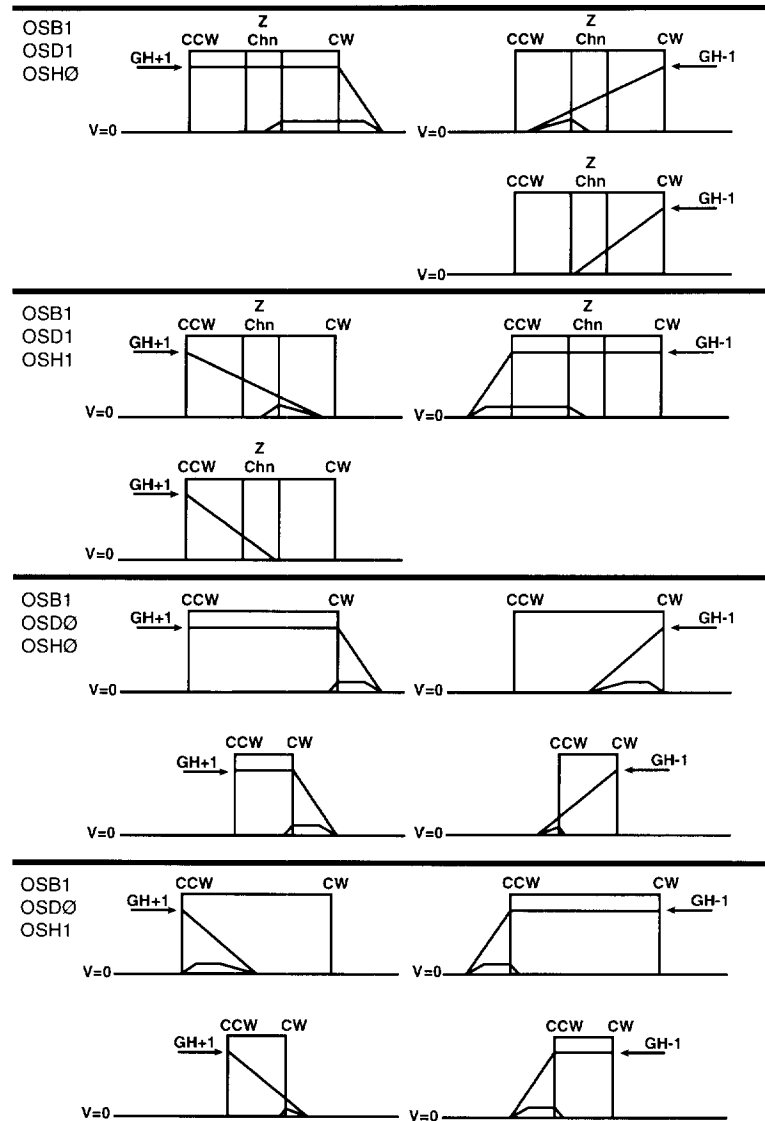
Homing Diagrams

Returning your System

If you must return the OEM070 for repairs, use the following steps:

1. Get the serial number and the model number of the defective unit, and a purchase order number to cover repair costs in the event the unit is determined to be out of warranty.

2. In the USA, call your Automation Technology Center (ATC) for a Return Material Authorization (RMA) number. Returned products cannot be accepted without an RMA number. If you cannot obtain an RMA number from your ATC, call Parker Compumotor's Customer Service Department at (800) 722-2282.

Ship the unit to:

> Parker Hannifin Corporation
> Compumotor Division
> 5500 Business Park Drive, Suite D
> Rohnert Park, CA 94928
> Attn: RMA # xxxxxxxxx

3. In the UK, call Parker Digiplan for a GRA (Goods Returned Authorization) number. Returned products cannot be accepted without a GRA number. The phone number for Parker Digiplan Repair Department is 0202-690911. The phone number for Parker Digiplan Service/Applications Department is 0202-699000.

Ship the unit to:

> Parker Digiplan Ltd.
> 21, Balena Close,
> Poole, Dorset,
> England. BH17 7DX

4. Elsewhere: Contact the distributor who supplied the equipment.