



Allen-Bradley IMC 121, 123 Dual Resolver Alignment Procedure

(cat. no. 1326AB-MOD-Vxxxxx)

Instructions

Introduction

This publication provides the steps needed to align the Master and Vernier resolvers for an IMC 121 or 123 dual resolver system during initial installation or as a maintenance procedure.

IMPORTANT: IMC 121 firmware must be: system 1.01 or above, and servo 1.15 or above. IMC 123 firmware must be: system 1.03 or above, and servo 1.06 or above. Servo firmware revision 1.10 will not work with this procedure.

IMC 120 alignment can be found in Chapter 9 of the IMC 120 Instruction Manual, publication 1771-6.5.45

Alignment Procedure

Prior to performing the following procedure, assure that all wiring has been performed correctly as stated in the IMC 121 or 123 Instruction Manual (publication 1771-6.2.4 or 1771-6.2.3, respectively).

This procedure requires the use of a handheld pendant to align the resolvers using the Distance to Null display. Refer to the IMC 121 or 123 Handheld Pendant manuals (publications 1771-6.5.65 or 1771-6.5.60, respectively) as required.



WARNING: The following steps may cause the motor to rotate. In case of improper movement, an operator must be prepared to initiate an emergency stop. Personal injury may also result if accidental contact is made with moving components. Do Not perform any other maintenance or installation procedures at this time.

1. Assure that the AMP parameter “Invert Feedback Signals” (parameter numbers 14003, 24003 & 34003) is set to “NO” prior to any further action. The master/vernier resolver information is accessed prior to the software inversion of the feedback.

2. Move the axis/axes to the center of travel. Assure that the master axis (axis 1) is moving in the positive direction for a Jog Plus command. If the axis is moving in a positive direction, proceed to step 3. If the direction is reversed and indicates negative travel, reverse the SINE and SINE RETURN connections at the termination panel.
3. Switch the connectors for resolver 1 and resolver 2. The vernier resolver will now be connected as the master, and the master will be connected as the vernier. Move the axis in the positive direction by moving it manually or by using the Open Loop Jog capability (debug function for the pendant). The position display on the handheld pendant should be counting in the positive direction for a Jog Plus command. If not, there is a possibility that the resolver package has an internal reversing gear. This can be accounted for by reversing the SINE and SINE RETURN signals for the vernier resolver at the termination panel. Switch the connectors back, so that the master resolver is now connected to axis 1 and the vernier is connected to axis 2, then continue with the alignment procedure.
4. Edit the AMP file and make the dual resolver travel limit parameter equal to 1 count (parameter 14020, 24020, 34020 – default is 4000 counts). Save and download this AMP file to the controller. Setting the AMP parameter to 1 count will provide maximum axis travel.
5. Jog the axis or manually position it to the minimum point of travel. This will be at one extreme end of the axis travel. By performing the following steps you will establish the machines minimum travel by alignment of the drive controller and mechanical system.
6. When minimum axis travel is established, disable the drive controllers by putting the IMC control into Estop.
7. Assure that the axis does not move and that it is positioned exactly as required.
8. Align the master resolver (see [Figure 1](#)) null at this position by performing the following:
 - a) Select the DISTANCE_TO_NULL display on the Integration menu of the pendant.
 - b) Loosen the mounting cleats that hold the master resolver to the backplate in the resolver package.
 - c) Slowly rotate (in either direction) the master resolver until the distance to null displayed is zero.

IMPORTANT: This adjustment must be made precisely – the position must be accurate to 1/4000th of a revolution.
 - d) Tighten the master resolver mounting cleats and recheck the display.

Instructions

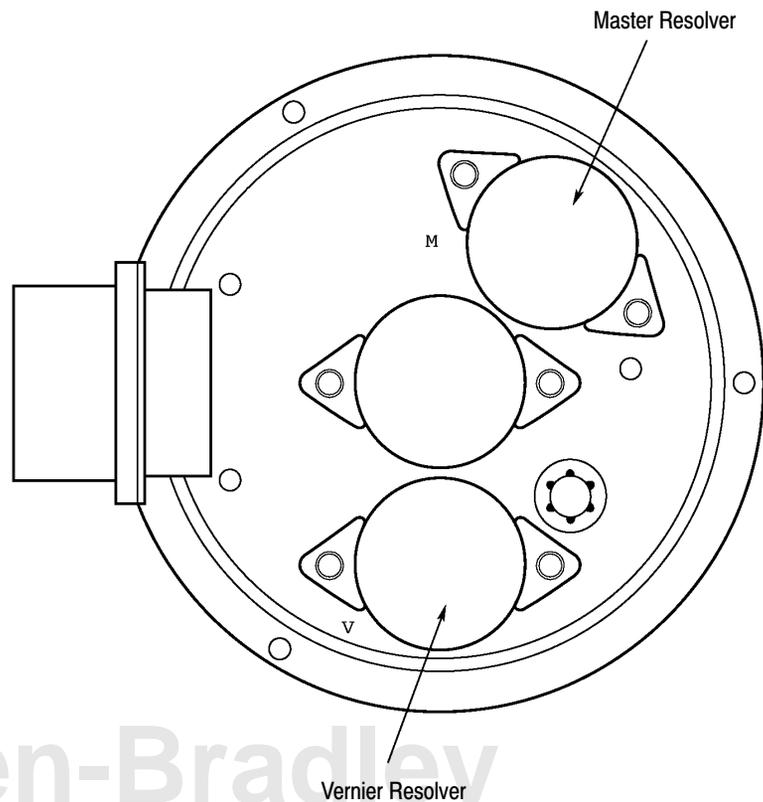
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9. Align the vernier resolver (see Figure 1) by performing the following:
 - a) Switch the master (resolver 1) and vernier (resolver 2) plugs at the termination panel to view the distance to null position for the vernier resolver. When the resolvers are switched, select the DISTANCE_TO_NULL display on the Integration menu, under the Debug menu on the pendant.
 - b) Loosen the mounting cleats on the vernier resolver.
 - c) Rotate the vernier resolver until the distance to null display is equal to one count. Accuracy must be $1/4000^{\text{th}}$ of a revolution.
 - d) Tighten resolver cleats and recheck the display.
10. Manually move the axis off minimum position.
11. Reset Estop.

IMPORTANT: If an Estop reset is attempted within the “minimum counts from the travel limits” (master equal to zero counts, vernier equal to zero counts, etc. – see [Figure 2](#)), the IMC will not come out of Estop and will generate the following error messages:

- Servo Module Estop Set
- Servo Module Servo Cmd Inv.
- Servo Module Ax. Neg Ot Limit.

Figure 1
Resolver Location

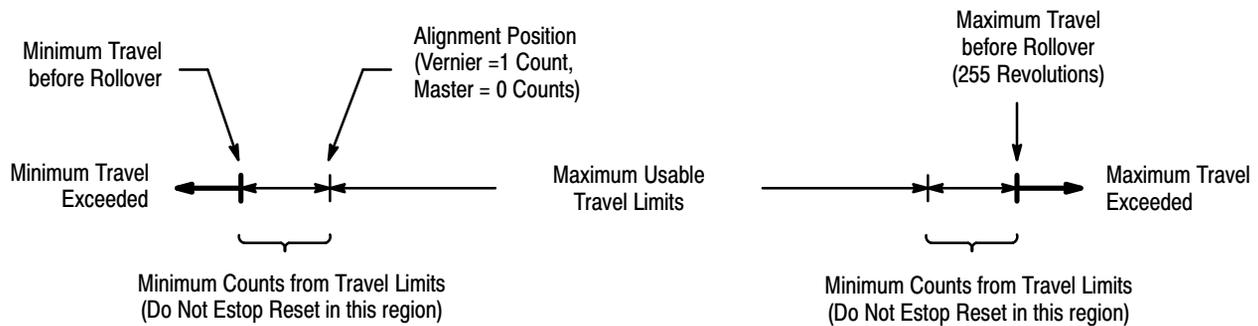


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12. Homing the Axis – After resetting Estop, the axis can be homed to any null (including alignment null), or a limit switch. Once the axis is homed, it should not require homing again, unless the master vernier resolver package is mechanically disconnected from the machine mechanics or there is suspicion of the integrity of the mechanical coupling.
13. Re-edit the AMP file (parameter numbers 14020, 24020, 34020) as previously set. Save and download.
14. Run the axis and check for proper operation.

Figure 2
255/256 Dual Resolver Example



IMPORTANT: If erroneous values are displayed on the pendant after a power cycle, assure that each resolver is tracking in the same direction as witnessed on the pendant position display.



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