

## Application Note

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### Programming an IEC Application for Easy Absolute Encoder Reset or Replacement

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Applicable Product: Yaskawa MPiec Controllers

Subject: Absolute Encoder Replacement	Product: MPiec Controllers	Doc#: AN.MPIEC.03
Title: Programming an IEC Application for Easy Absolute Encoder Reset or Replacement		

**Introduction**

Yaskawa recommends that all applications be programmed for easy replacement of absolute encoder motors. A bit of additional programming must be included to allow the operator or maintenance personnel to re commission a machine as follows:

1. Y\_ResetAbsoluteEncoder: Clear the absolute encoder alarm (typically A.810, A.840, A.CC0)
2. Homing / calibrating the axis
3. MC\_SetPosition: Define the position

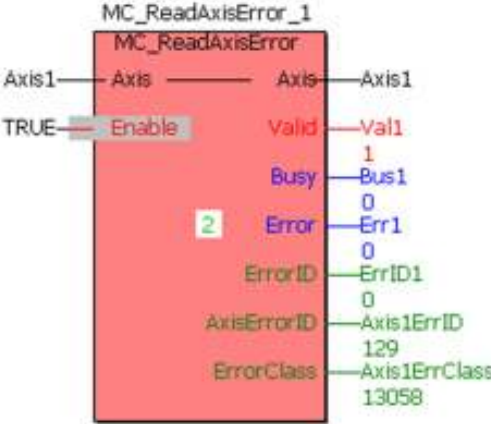
It is possible to create a maintenance routine that can take care of the above issues entirely from within the IEC application, meaning that the maintenance technician will not require a computer when resetting or replacing a servo with an absolute encoder.

**Procedure**

After the absolute encoder motor is reset or replaced, the amplifier will generate an A.810 alarm. Begin by providing a routine that the maintenance personnel can trigger externally from an input or HMI.

**Reading the axis alarm**

The MC\_ReadAxisError function block will show the following for a Sigma V amplifier/absolute encoder motor combination:

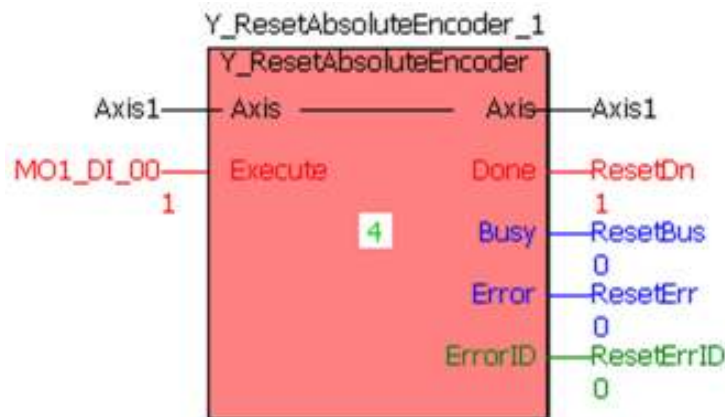


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The ErrorClass 13058 (0x3302) indicates a servopack alarm, and the AxisErrorID 129 (0x81) is the encoder backup error indicating that the encoder was without power and the absolute position is no longer valid.

### Clearing the alarm & cycling power

Execute the Y\_ResetAbsoluteEncoder block to reset the absolute encoder alarm. Additionally, power must be cycled for the alarm to clear. Alternatively, use the Y\_ResetMechatrolink function block to reset the Mechatrolink network, which initiates a soft reboot of the servo amplifiers. Special note: On an MP2600iec, use the Y\_RebootController function block instead of the Y\_ResetMechatrolink function block. (Software and firmware version 2.5.0 is required for Y\_RebootController.)

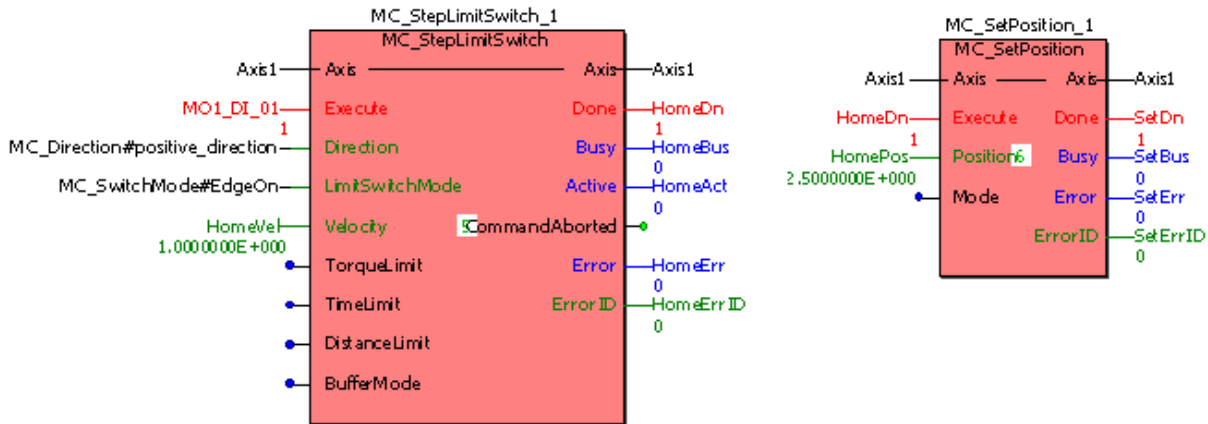


### Homing the axis & setting position

When power is restored, it is very important that the machine not be allowed to enter a production state until the position has been verified through some homing procedure.

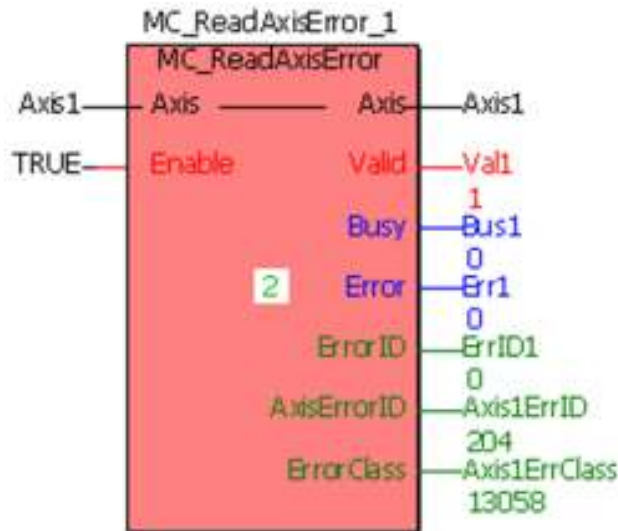
Provide a method to execute a homing / calibrate function. MC\_SetPosition is required as part of this procedure because it stores an offset in non volatile controller memory so that the axis will “remember” its true machine position when power is re applied.

In the following example, digital input 1 triggers MC\_StepLimitSwitch block, and when that completes, a MC\_SetPosition is executed. Check for the PLCopen toolbox on [www.yaskawa.com/iectb](http://www.yaskawa.com/iectb) for more homing functions.



Once the MC\_SetPosition block has been executed, the machine is ready to run provided that the multi turn limit (pn205) was not set in the original absolute encoder.

This can be determined by checking for additional axis alarms. If the axis error is displayed as shown in the following screen shot (AxisErrorID 204, 0xCC) then the multi turn limit must be set in the encoder. This alarm means that the value of Pn205 is different than the absolute encoder rollover value stored in the encoder.



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**Setting the Multi Turn Limit**

Starting with firmware version 1.2.2, the MPiec Series Controllers can reset a servopacks A.CC0 alarm automatically via Y\_ResetAbsoluteEncoder function block. The same procedure as described above using Y\_ResetAbsoluteEncoder and Y\_ResetMechatrolink applies here also.

**Conclusion**

A programmer can take advantage of existing function blocks to design replacement of absolute encoder motors directly into the application. This allows end users to perform maintenance on their machines without requiring use of any special programming software.