

INTERFACING AN INTERFEROMETER ENCODER TO AN XPS CONTROLLER

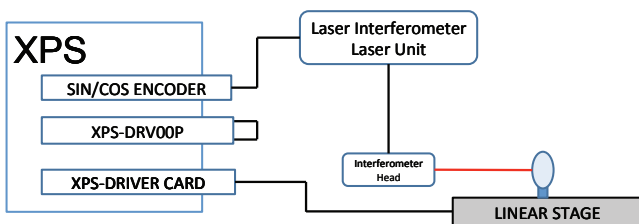
INTRODUCTION

The Newport XPS controller provides capabilities to interface with Interferometer Encoders. This position feedback is ideal for applications involving non-contact alignment, analysis, optical metrology, micro/nano lithography and many other applications. This tech note describes how to configure and setup a Renishaw Interferometer Encoder with an XPS controller. This can help with both diagnostics and measurement for an enhanced level of performance in both repeatability and accuracy.

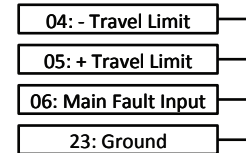
Hardware Overview

- Laser Interferometer Encoder with an analog signal output
- XPS controller
- XPS-DRV00P – pass through card
- SubD-type Connectors
 - (1) x Male SubD 25 pin
 - (1) x Male SubD 15 pin

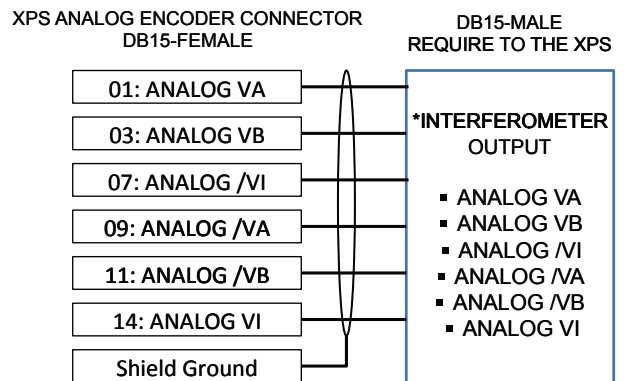
*Other connectors and components may be required for the interferometer device; this will be dependent on the interferometer manufacturer.



DB25-MALE Connector to the XPS-DRV00P



A custom cable is needed to provide an analog sin/cos signal output to the XPS encoder connector. This will require a Male Sub-D type 15 pin and requires 6 pins to be wire and soldered.



*Interferometer pinouts may vary, please check with manufacturer

Electrical Configuration

In order for the XPS to detect the Laser Interferometer as an encoder feedback without stage connected, an XPS-DRV00P must be used and configured. Below is a diagram for the hardware configuration for the XPS-DRV00P. A female Sub-D type 25 pin connector is required and 4 pins are required to be jumped and soldered.

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Software Configuration

The following configuration parameters are set on the stages.ini file of the XPS controller to configure the XPS-DRV00P module. This allows the XPS controller to accept the analog sin/cos signals from the interferometer.

The parameters that require modification are listed below.

- EncoderInterpolationFactor
 - The XPS analog encoder input is up to x32768 interpolation; user to set the interpolation factor.
- EncoderScalePitch
 - User must enter this value based on the interferometer; typically interferometer manufactures will provide a calibration file with the scale pitch value.

An Example of Parameters to be set in stages.ini file

```
[Laser-Interferometer]
SmartStageName=

; Position servo loop type
CorrectorType=PIPosition
ClosedLoopStatus=Opened
FatalFollowingError=1
KP=0
KI=0
IntegrationTime=1e99
DeadBandThreshold=0
NotchFrequency1=0
NotchBandwidth1=0
NotchGain1=0
NotchFrequency2=0
NotchBandwidth2=0
NotchGain2=0
MotionDoneMode=Theoretical
```

```
; Driver command interface
MotorDriverInterface=AnalogStepperPosition
ScalingCurrent=3
DisplacementPerFullStep=1
PeakCurrentPerPhase=0.2
StandbyPeakCurrentPerPhase=0.1
BaseVelocity=0

; Motor driver model
DriverName=XPS-DRV00P

; Position encoder interface
EncoderType=AnalogInterpolated
EncoderZMPlug=Encoder
EncoderInterpolationFactor=2000
EncoderScalePitch=0.000158
LinearEncoderCorrection=0
EncoderIndexOffset=0
EncoderSinusOffset=0
EncoderCosinusOffset=0
EncoderDifferentialGain=0
EncoderPhaseCompensation=0
EncoderHardInterpolatorErrorCheck=Disabled
Backlash=0
CurrentVelocityCutOffFrequency=100
CurrentAccelerationCutOffFrequency=100
PositionerMappingFileName=

; Limit sensors input plug
ServitudesType=StandardLimitAndLimitEncoderPlug
MinimumTargetPosition=-10000
MaximumTargetPosition=10000
```

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HomePreset=0

MaximumVelocity=100

MaximumAcceleration=10000

EmergencyDecelerationMultiplier=4

MinimumJerkTime=0.005

MaximumJerkTime=0.05

TrackingCutOffFrequency=25

; Home search process

HomeSearchSequenceType=CurrentPositionAsHome

HomeSearchMaximumVelocity=50

HomeSearchMaximumAcceleration=5000

HomeSearchTimeOut=100