

Platinum Bassoon Digital Servo Drive Installation Guide

Functional Safety
Safety Capability: F, S, O
EtherCAT & CANopen



April 2025 (Ver. 1.010)

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Catalog Number

PBAS-zz-zXXX/YYYzzzQ

Family Name:
Platinum BASsoon

Mounting Version:
B — Fins & Fan
L — L-Shape

Safety Capability :

F — Functional Safety with SafeIO
S — Functional Safety with Regular IO
O — Hardware STO only
(SIL3, Ple, CAT3)

Rated Current Mode:

Blank — STD Ic/ Ip
R — Continuous Operation
for $T_i \leq 85^\circ \text{C}$

**Rated Continuous
Current**

**Rated
Voltage**

Dual Use:

Q — Not subjected to export control according to
ECCN-3A225 (US) or
428/2009 - 3A225 (EU Dual Use)
Commutation frequency limited to 599Hz
Blank - Standard. No Commutation frequency limitation

IO Style for Regular IO:

U — 5V Logic
V — PLC SRC (High Side) or SINK (Low Side)

IO Style for SafeIO:

W — VDD=19.6V to 60V, All Outputs

Encoder Options For Safety Capability F, S, and O:

E — Port A: Standard
Incremental, Endat2.2 BISS, SSI, Safe Endat2.2, Safe BISS
Port B: Standard
Incremental, SINCOS
Port C: Standard (4-Wire)
Incremental, all regular ABS Encoder, Safe Endat2.2, Safe BISS
R — Standard Port A & C
Port B: Resolver

Encoder Options for Safety Capability F Only:

H — Standard Port A
Port B: Not available
Port C: 2-Wire Safe Endat3
1 — Standard Port A
Port B: Not available
Port C: 4-Wire Acuro
2 — Standard Port A
Port B: Not available
Port C: 4-Wire SCS
3 — Standard Port A
Port B: Not available
Port C: 2-Wire SCS
4 — Standard Port A
Port B: Not available
Port C: 2-Wire DSL

Network for Safety Capability F, S, or O:

F — EtherCAT with Switches or Ethernet
USB
S — CAN
USB

Revision History

Version	Date	Details
Ver. 1.000	Jul 2023	Initial Release
Ver. 1.001	Sept 2023	Added info to Heat Dissipation chapter and updated Technical Data
Ver. 1.002	Sept 2023	Updated various sections
Ver. 1.003	Dec 2023	Updated sections 5.4.6 and 5.4.7 to “Digital Input” and “Digital Output”. Removed note in section 8.13.2.1
Ver. 1.004	Apr 2024	Updated Chapter 4: Product Description and section 5.2 Technical Data. Small update to headings in section 8.9.1.3 Hiperface. Addition of CAN sections in 7.14, 8.2.3, 8.2.4, 8.13.3 Corrections to Chapter 4 Product Description, 5.6 Standards and Certification, 6.2 Over-Current and Short -Circuit Protection
Ver. 1.005	June 2024	Updated PN to include optional temperature variation and updated section 5.5 Environmental Standards
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Ver. 1.010	Apr 2025	Updated sections 7.1 and 7.2

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Chapter 1: This Installation Guide

This installation Guide details the technical data, pinouts, and power connectivity of the Platinum Bassoon.

For a comprehensive specification and detailed description of the functions, refer to the Platinum Safety Drive.

Chapter 2: Functional Safety

The Platinum family of servo drives support Functional Safety. It is necessary to implement the instructions in the [Platinum Safety Drive Manual](#) regarding using STO, Feedbacks, IOs and Power supplies with Functional Safety.

Chapter 3: Safety Information

In order to achieve the optimum, safe operation of the Platinum Bassoon, it is imperative that you implement the safety procedures included in this installation guide. This information is provided to protect you and to keep your work area safe when operating the Platinum Bassoon and accompanying equipment.

Please read this chapter carefully before you begin the installation process.

Before you start, ensure that all system components are connected to earth ground. Electrical safety is provided through a low-resistance earth connection.

Only qualified personnel may install, adjust, maintain and repair the servo drive. A qualified person has the knowledge and authorization to perform tasks such as transporting, assembling, installing, commissioning and operating motors.

The Platinum Bassoon contains electrostatic-sensitive components that can be damaged if handled incorrectly. To prevent any electrostatic damage, avoid contact with highly insulating materials, such as plastic film and synthetic fabrics. Place the product on a conductive surface and ground yourself in order to discharge any possible static electricity build-up.

The following safety symbols are used in this and all Elmo Motion Control manuals:



Warning: This information is needed to avoid a safety hazard, which might cause bodily injury or death as a result of incorrect operation.



Hot Surface Warning: To alert against surfaces that may reach high temperatures. The heatsink and wires may reach high temperatures.



Caution: This information is necessary to prevent bodily injury, damage to the product or to other equipment.



Important: Identifies information that is critical for successful application and understanding of the product.

The following symbols are used in this document:



Note: Information critical to the understanding and/or operating the feature.



Tip: Information that helps understanding a feature, is good practice or a possible different way of action.

3.1 Warnings

- To avoid electric arcing and hazards to personnel and electrical contacts, never connect/disconnect the servo drive while the power source is on.
- Power cables can carry a high voltage, even when the motor is not in motion. Disconnect the Platinum Bassoon from all voltage sources before servicing.
- The high voltage products within the Platinum Line range contain grounding conduits for electric current protection. Any disruption to these conduits may cause the instrument to become hot (live) and dangerous.
- STO, Safe I/O (Safety Capability "F") and EtherCAT (Safety Capability "F", "S") circuits are separated from power circuits by reinforced insulation and can be supplied by SELV power supply. Other Control and communication level circuits are separated from power circuits by functional insulation. These circuits shall have insulation to their surroundings and other control or communication circuits based on the Working Voltage and requirements of the end use application.



Capacitance Discharge

After shutting off the power and removing the power source from your equipment, wait at least 352 seconds before touching or disconnecting parts of the equipment that are normally loaded with electrical charges (such as capacitors or contacts). Measuring the electrical contact points with a meter, before touching the equipment, is recommended.

3.2 Cautions

- The maximum DC power supply connected to the instrument must comply with the parameters outlined in this guide.
- When connecting the Platinum Bassoon to an approved isolated control power supply, connect it through a line that is separated from hazardous live voltages using reinforced or double insulation in accordance with approved safety standards.
- Before switching on the Platinum Bassoon, verify that all safety precautions have been observed and that the installation procedures in this manual have been followed.
- Make sure that the Safe Torque Off is operational.

3.3 CE Marking Conformance

The Platinum Bassoon is intended for incorporation in a machine or end product. The actual end product must comply with all safety aspects of the relevant requirements of the European Safety of Machinery Directive 2006/42/EC as amended, and with those of the most recent versions of standards EN 60204-1 and EN ISO 12100 at the least, and in accordance with 2006/95/EC.

Concerning electrical equipment designed for use within certain voltage limits, the Platinum Bassoon meets the provisions outlined in 2006/95/EC. The party responsible for ensuring that the equipment meets the limits required by EMC regulations is the manufacturer of the end product.

3.4 Warranty Information

The products covered in this manual are warranted to be free of defects in material and workmanship and conform to the specifications stated either within this document or in the product catalog description. All Elmo drives are warranted for a period of 12 months from the time of installation, or 12 months from time of shipment, whichever comes first. No other warranties expressed or implied — and including a warranty of merchantability and fitness for a particular purpose — extend beyond this warranty.

Chapter 4: Product Description

The Platinum Bassoon is an integrated solution delivering up to **3.25 kW of continuous power** (overall continuous output power based on duty cycle limits) in a compact package (120 x 78 x 64 mm or 4.72 " x 3.07 " x 2.52").

The Platinum Bassoon series are part of Elmo's advanced Platinum Line. It designed to simply and efficiently connect Elmo's Platinum Bassoon servo drive directly to the application.

This advanced, high power density servo drive provides top performance, Functional Safety, advanced networking, as well as a fully featured motion controller and local intelligence.

For continuous duty (100%) operation, the Platinum Bassoon Servo drive is suitable for motors up to 750W.

The Platinum Bassoon is provided in three configurations:

- **Functional Safety with Safe IO (PBAS-zF):** Servo drive with Function Safety and Safe IO – This configuration of Servo drives includes safe Digital IO which support Safe Digital Inputs and Outputs including Brakes. This configuration supports the operation of the safety function either via FSOE (Fail Safe Over EtherCAT) or via the Safe I/O.
- **Functional Safety with Regular IO (PBAS-zS):** Servo drive with Function Safety excluding Safe IO – This configuration of Servo drives includes regular Digital IO. This configuration permits operation of safety functions only via FSOE.
- **STO Only (PBAS-zO):** Servo drive with STO – The servo drive supports only STO.

Power to the drives is provided by an AC power source, either directly from the mains or via a transformer.

A control 24 VDC power supply is required for the drive logic functions. In addition, the control of 24 VDC is used to power the heat cooling fan where the drive is the Fins+Fan model. The Fan is activated only "when required", significantly prolonging the fan's lifetime.

The drive can operate as a stand-alone device or as part of a multi-axis system in a distributed configuration on a real-time network.

The Platinum Bassoon drive is easily set up and tuned, using the Elmo Application Studio (EASII) software tools. As part of the Platinum product line, it is fully programmable with the Elmo motion control languages. For more information about the software tools refer to the Elmo Application Studio (EASII) User Guide.

4.1 Accessories

The following Platinum Bassoon cable kits may be ordered:

- Catalog number: CBL-PHARKIT01 – (EtherCAT) Cable kit
- Catalog number: CBL-PBASKIT01 – (CAN) Cable kit

For further details, see the documentation for Platinum Bassoon cable kit (MAN-P-BAS-CBLKIT).

Chapter 5: Technical Information

5.1 Physical Specification

Feature	Units	Heatsink	All Types
Weight	g (oz.)	L-Shape:	430 g (15.18 oz.)
		Fins+Fans:	700 g (24.69 oz.)
Dimensions	mm (in)	L-Shape:	120 x 81.5 x 44 mm (4.72" x 3.21" x 1.73")
		Fins+Fans:	120 x 81.5 x 64 mm (4.72" x 3.21" x 2.52")
General Mounting method		L-Shape:	<ul style="list-style-type: none"> Narrow back-side panel mounted. Wide-side panel mounted (preferred).
		Fins+Fans:	Narrow back-side panel mounted
Degrees of protection		L-Shape:	IP=20
		Fins+Fans:	IP=20

Table 1: Physical Specifications

5.2 Technical Data

Feature	Units	3/230	6/230	10/230
Minimum supply voltage	VAC DC-500 Hz	80		
Nominal supply voltage	VAC DC-500 Hz	230		
Maximum supply voltage	VAC DC-500 Hz	270		
Maximum continuous power output ⁽¹⁾	kW	0.95	1.9	3.25
Efficiency at rated power (at nominal conditions)	%	> 98		
Continuous current limit (Ic) Amplitude sinusoidal/DC trapezoidal commutation	A	3	6	10
Continuous RMS sinusoidal commutation current limit (Ic)	A	2.1	4.2	7.1
Peak Current	A	6	12	20
Built In Shunt (peak Power) ⁽²⁾	W	400		

Regarding the above table, the following should be noted:

- (1) The overall continuous output power is based on the following duty cycle limits:

Product Type	Duty Cycle
6/230	65%
10/230	40%

For continuous duty (100%) operation, the P-BAS Servo drive is suitable for motors up to 750W.

- (2) Continuous operation depends on the power dissipation capability.



Note (on current ratings):

The current ratings of the Platinum Bassoon are given in units of DC amperes. The RMS (sinusoidal commutation) value is the DC value divided by 1.41.

5.3 Control Supply

Feature		Units	Details	
			L-Shape	Fins+Fan
Control supply input voltage Safety		V	Isolated DC source: 18 to 30	Isolated DC source: 24 ± 10%
24V Control supply input power consumption	Without Encoder (VL Only)	W	≤4	≤4
	With encoder up to 400mA@5V	W	≤8	≤11
	For Safety Capability F only With encoder up to 300mA@11V	W	≤9	≤13

5.4 Product Features

5.4.1 Feedback

Feature	Details	Presence and No.
Feedback	Standard Port A, B, & C	√

5.4.2 Encoder Supply

Feature	Details
5V supply	5V Nominal, 4.75V÷5.25V, up to 400mA
11V supply only with Safety Capability: F	11V Nominal, 10.6V÷11.5V, up to 300mA

5.4.3 Communication

Feature	Details	Presence and No.
Communication Options	USB	√
	EtherCAT <i>or</i>	√
	CAN	√

5.4.4 Analog Input

Feature	Details	Resolution	Presence and No.
Analog Input	Differential ±10V	12-bits	√

5.4.5 STO

Feature	Details	Presence and No.
STO	5V Logic, Opto Isolated, for IO TYPE = U	√
	PLC source, Opto Isolated, for IO TYPE = W, V	

5.4.6 Digital Input

I/O Style	Safe Input	U	V
Safety/Regular	Safe IO PLC Source, Isolated	Regular IO 5V Logic	Regular IO PLC Source or Sink
Input	IN1, IN2, IN3, IN4, IN5, IN6	IN1, IN2, IN3, IN4, IN5, IN6	

5.4.7 Digital Output

Refer to the Safety Capability in the P/N for the relevant IO capability.

I/O Style	W	U	V
Safety/Regular	Safe IO PLC	Regular IO 5V Logic	Regular IO PLC
Absolute Maximum Voltage	60V	30V	60V
Nominal Recommended VDD	19.6V ÷ 53V	4 ÷ 30V	19.6V ÷ 53V
OUT1	250mA	15mA	1000mA
OUT2	250mA	15mA	1000mA
OUT3	250mA	N/A	N/A
OUT4	250mA	N/A	N/A
OUT7	1000mA	15mA	1000mA
OUT8 (PLC SINK)	1000mA	15mA	1000mA
Total Current ¹	1500mA		1250mA

- 1 NOTE: The total output current of the six digital outputs must not exceed the values shown in this table.

5.5 Environmental Conditions

You can guarantee the safe operation of the Platinum Bassoon by ensuring that it is installed in an appropriate environment. The Functional Safety of the servo drive is certified according to the environmental conditions in the following table.



Warning:

During operation the Platinum Bassoon becomes hot to the touch (the heatsink and wires may heat up to 92 °C). Care should be taken when handling it.



Remark:

Functional Safety is applicable to the operating ambient temperatures detailed below.

Feature	Details
Operating Ambient Temperature -Standard	0 °C to 55 °C (32 °F to 131 °F)
Operating Ambient Temperature -Option C in Part Number	-40 °C to 55 °C (-40 °F to 131 °F)
Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)
Maximum non-condensing humidity according to IEC60068-2-78	95%
Maximum Operating Altitude	2,000 m (6562 feet) It should be noted that servo drives capable of higher operating altitudes are available on request.
Mechanical Shock according to IEC60068-2-27	15g / 11ms Half Sine
Vibration according to IEC60068-2-6	5 Hz ≤ f ≤ 10 Hz: ±10mm 10 Hz ≤ f ≤ 57 Hz: 4G 57 Hz ≤ f ≤ 500 Hz:5G
Pollution Degree	Pollution Degree 3

5.6 Standards and Certifications

The following tables describe the Main Standards of the Platinum Bassoon servo drive. For further details, refer to Chapter 23 in the [Platinum Safety Drive Manual](#).

5.6.1 Functional Safety

Standard	Item
IEC 61800-5-2:2017	Adjustable speed electrical power drive systems – Safety requirements – Functional
EN ISO 13849-1:2015	Safety of machinery — Safety-related parts of control systems.
EN 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems
IEC 61784-3:2016	Functional Safety Field Bus - FSOE

5.6.2 Electrical Safety

Specification	Details
UL 61800-5-1	Adjustable speed electrical power drive systems: Safety requirements – Electrical, thermal and energy
CSA C22.2 NO. 274-17	Adjustable speed drives

5.6.3 Electromagnetic Compatibility

Specification	Details
EN 61800-3:2004/A1:2011	Adjustable speed electrical power drive systems Part 3: EMC requirements and specific test methods
EN 61800-5-2: 2017 Annex E	Adjustable speed electrical power drive systems Part 5-2: Safety requirements – Functional

5.6.4 Environmental

Specification	Details
IEC60068-2-78	Damp heat, steady state
IEC60068-2-6	Vibration (sinusoidal)
IEC60068-2-2	Dry heat
IEC60068-2-27	Shock
IEC60068-2-1	Cold Test

5.6.5 Other Compliant Standards

For other compliant standards refer to the

[Platinum Safety Drive Manual Section 23.5](#) or refer to the Elmo website:

<https://www.elmomc.com/capabilities/standards-compliance/platinum-family/>

5.6.6 Dual Use

No export license is required for the Platinum Line products signified with the suffix Q in the Part Number.

The operating frequency of the Platinum Line products is “factory limited” to ≤ 599 Hz, and therefore complies with the EU Dual Use Regulation 428/2009, 3A225, and the US Dual Use regulation EAR ECCN# 3A225.

This statement applies to all identical specimens and will become invalid if a change is made in the firmware.

Chapter 6: Installation

The Platinum Bassoon must be installed in a suitable environment and be properly connected to its voltage supplies and the motor.

6.1 Unpacking the Drive Components

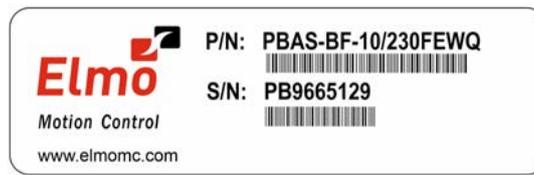
Before you begin working with the Platinum Bassoon, verify that you have all of its components, as follows:

- The Platinum Bassoon servo drive
- The Elmo Application Studio (EASII) software

The Platinum Bassoon is shipped in a cardboard box with Styrofoam protection.

To unpack the Platinum Bassoon:

1. Carefully remove the servo drive from the box and the Styrofoam.
2. Check the drive to ensure that there is no visible damage to the instrument. If any damage has occurred, report it immediately to the carrier that delivered your drive.
3. To ensure that the Platinum Bassoon you have unpacked is the appropriate type for your requirements, locate the part number sticker on the side of the Platinum Bassoon. It looks like this:



P-BAS-095A

4. Verify that the Platinum Bassoon type is the one that you ordered and ensure that the voltage meets your specific requirements.
5. The part number at the top provides the type designation. Refer to the appropriate part number in the section Catalog Number at the beginning of the installation guide.

6.2 Over-Current and Short-Circuit Protection

A serial fuse or circuit breaker should be installed Rated for drive's continuous current rating.

P-BAS-Bz-XXX/YYYzzzQ P-BAS-Lz-XXX/YYYzzzQ XXX = rated continues current [A]	Fuse	Circuit Breaker
3, 6, 10 / 230V	Any class of fuse per rated current of P-BAS	Any class of circuit breaker per rated current of P-BAS
Use the Fuse and Circuit Breaker as per their specific manufacture recommended specifications		

PL/CL protection: Peak and Continues Limitation

The peak current of servo drive limit for a given application is programmed to the parameter **PL[1]** amperes.

PL[1]: Value for peak current limit protection. Please refer to the "Platinum Administrative Guide".

6.3 Motor Overload Protection

The Platinum Bassoon supports Electronic Motor Overload protection as required by **UL 61800-5-1** with the exception of thermal memory retention and speed sensitivity.

6.4 Mounting the Platinum Bassoon

The Platinum Bassoon can be mounted as follows:

- For the L-shape model, wall-mounted or table mounted
- For the Fins+Fan model, wall-mounted

Each method of mounting will affect the heat dissipation capability of the drive as described in section 9.2 Heat Dissipation.

6.4.1 Mounting the L-Shape Platinum Bassoon

The Platinum Bassoon mounting dimensional guidelines are shown in Figure 50: Platinum Bassoon, L-Shape – Dimensions.

To mount the L-Shaped Platinum Bassoon:

- For wall mounting the Platinum Bassoon, use four M4 screws, as shown in Figure 1 below.
- For table mounting the Platinum Bassoon, use four M4 screws, as shown in Figure 1 below. This is the recommended way to mount the L-shaped Platinum Bassoon.

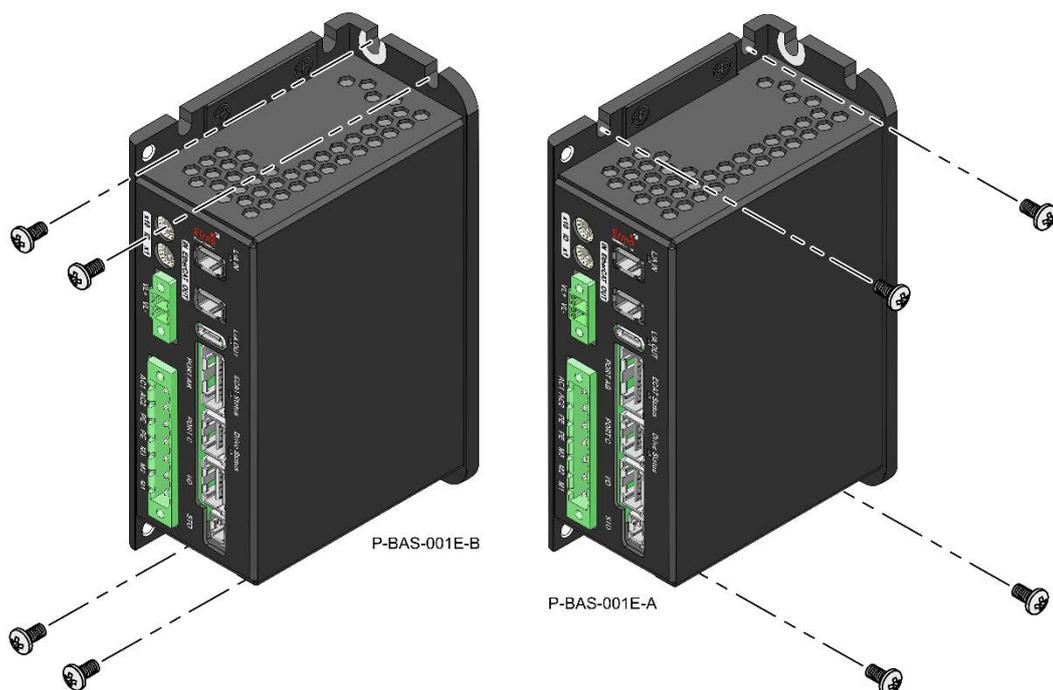


Figure 1: Wall-mounting (left) and table-mounting (right) the Platinum Bassoon

6.4.2 Mounting the Fins+Fan Platinum Bassoon

The Platinum Bassoon table mounting dimensional guidelines are shown in Figure 50: Platinum Bassoon, L-Shape – Dimensions.

To wall-mount the Fins+Fans Platinum Bassoon:

Wall-mount the Fins+Fan Platinum Bassoon with three M4 screws, as shown in the following figure:

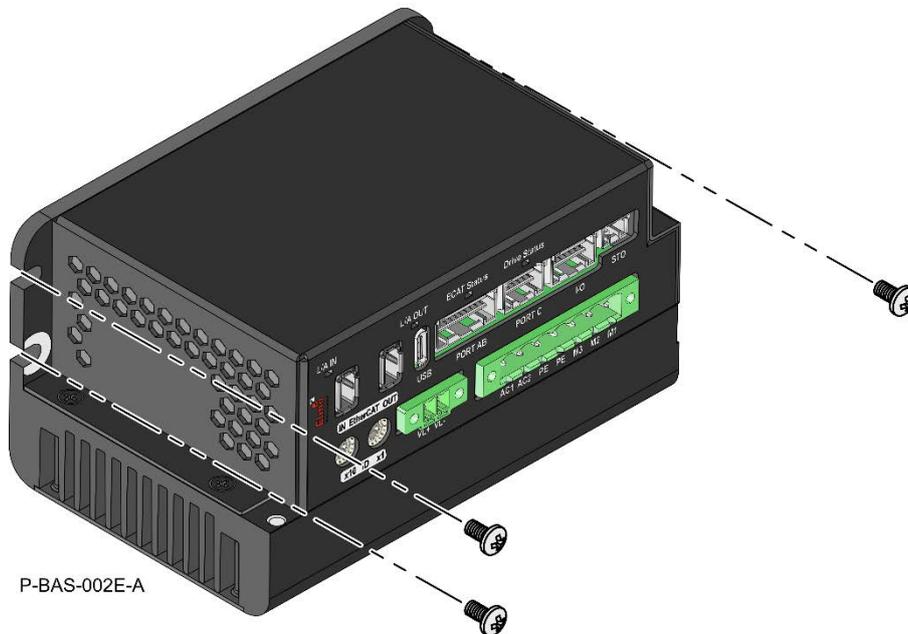
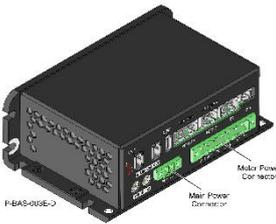


Figure 2: Wall Mounting of Platinum Bassoon with three M4 Screws

Chapter 7: Connector Types Pinouts, and LEDs

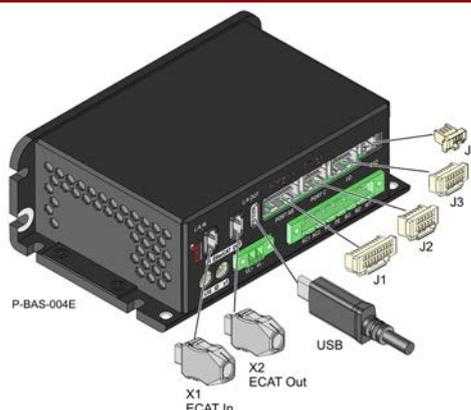
7.1 Connectors

Port	No. Pins	Type	Function
Power Connector			
P1 M1, M2, M3, PE, PE, AC2, AC1	7		Phoenix: CON TH TB 5.08mm pitch. Conductor cross-section is 24 up to 12 AWG
P2 VL-, VL+	3		Phoenix: CON TH TB 3.81mm pitch. Conductor cross-section is 24 up to 16 AWG with closing
All other connectors			
J1	2x10	Molex CLIK-Mate, 20 pins, 1.5 mm pitch	Feedback Port A/B
J2	2x6	Molex CLIK-Mate, 12 pins, 1.5 mm pitch	Feedback Port C
J3	2x7	Molex CLIK-Mate, 14 pins, 1.5 mm pitch	I/O
X3	24	USB Type C	USB
J4	1x3	Molex CLIK-Mate, 3 pins, 1.5 mm pitch	STO
EtherCAT Version			
X1	10	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	EtherCAT IN
X2	10	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	EtherCAT OUT
CAN Version			
X1	10	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	CAN
X2	10	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	CAN

7.2 Mating Connectors

Connector	Type	P/N	Mating Crimp Terminal
Power and Motor			
P1 Motor phases + Power	CON TB FE 7PIN(1X7) P=5.08MM PUSH-IN WIRE 14-24#	PHOENIX 1754843 7-pin	N/A
Control Supply			
P2 VL Power	CON TB FE 2PIN(1X2) P=3.81MM CLAMP WIRE 16-24AWG	PHOENIX 1748354 2-pin	
CLIK Mate			
J1 Port A/B	CON CLIK-MATE HOUSING FE 20 PIN (2X10) P=1.5MM	Molex 503149-2000 20-pin	213029-1100
J2 Port C	J3: CON CLIK-MATE HOUSING FE 12 PIN (2X6) P=1.5MM	Molex 503149-1200 12-pin	
J3 Port I/O	CON CLIK-MATE HOUSING FE 14 PIN (2X7) P=1.5MM.	Molex 503149-1400 14-pin	
J4 STO	CON CLIK-MATE HOUSING FE 3 PIN (1X3) P=1.5MM	Molex 502578-0300 3-pin	
X3 USB	Standard USB type C cable		
EtherCAT Version			
X1 EtherCAT IN	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	Amphenol ND9-AP74-00	N/A
X2 EtherCAT OUT	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	Amphenol ND9-AP74-00	
CAN Version			
X1 CAN	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	Amphenol ND9-AP74-00	
X2 CAN	Amphenol: CON SMT IX FE RA 10PIN P=0.5MM H=10MM TYPE A, Conductor cross-section is 28 up to 26 AWG	Amphenol ND9-AP74-00	

Pin Positions and Cable Connectors



7.3 Connector Locations

The Platinum Bassoon connector locations are shown in the following drawings.

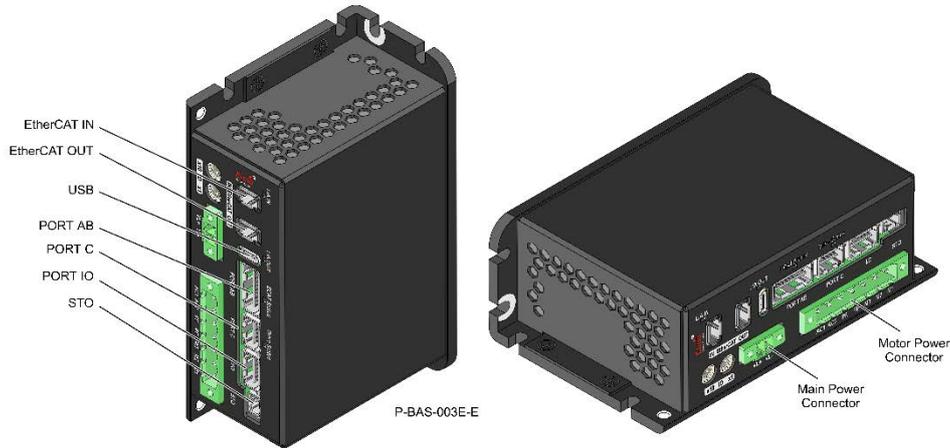


Figure 3: Connector and Power Locations

7.4 Motor & Main Power Connector Pinouts

The following sections describe the motor pinouts in the Platinum Bassoon connectors.

For further details, refer to [Chapter 10 Input Power Supply](#) in the [Platinum Safety Drive Manual](#).

7.4.1 Motor & Main Power Connectors and Phases (P1)

Pin #	Signal	Function
1	M1	Phase
2	M2	Phase
3	M3	Phase
4	PE	Protective Earth
5	PE	Protective Earth
6	AC2	Mains AC Input Phase 2
7	AC1	Mains AC Input Phase 1

Pin Positions



Figure 4: Main AC Input Pin Positions



Figure 5: Motor Power Pin Positions

Table 2: Motor Type Supported: T, Main Power and Motor Connections

7.5 Control Power Supply Connector (P2)

Pin #	Signal	Function
1	VL+	Supply, Power
2	VL-	Supply, Power Return

Pin Positions



P-BAS-006F-B

Figure 6: Control Power Pin Position

Table 3: Control Supply Pins

7.6 Drive Status Indicator

Figure 7 shows the position of the red/green dual LED, which is used for immediate indication of the Initiation, Working and Firmware Download states.



Figure 7: Drive Status Indicator

The red/green dual LED is used for immediate indication of the following states:

STATES	LED \ Time [msec]	Explanation
INITIATION STATE	Blinking: Red 200, Off: 200	If flashing RED ON/OFF then drive error Parameter process failed during power up (CD command)
	Blinking: Red 600, Off 200	If slow flashing RED ON/OFF then drive Safety error Drive in Safety error (BZ[2]\BZ[3])
WORKING STATE	Steady Green	Power stage ready to enable the motor
	Steady Red	Drive is in an amplifier failure state Power state error: over\under voltage, over temperature etc.
FIRMWARE DOWNLOAD STATE	Blinking: Red 200, Green 200 Red 600, Green 200	Flashing RED/GREEN during burn Slow flashing RED/GREEN indicates stages of Firmware burn-in or validation. Frequency depends on the stage of burning/validation and the CPLD/FPGA that is been burned

7.7 STO (Safe Torque Off) Connector (J4)

For further details, refer to the Chapter 12 STO in the [MAN-P Safety Drive Manual](#).

Pin (J4)	Signal	Function
1	STO1	Input, Isolated
2	STO2	Input, Isolated
3	STO_RET	Supply, Power Return

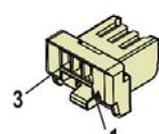
Pin Positions	Cable Connector
 <p>P-BAS-004E-O</p>	 <p>P-HAR-CK-052A CON CLIK-MATE HOUSING FE 3 PIN (1 x 3)</p>

Table 4: STO Input Pin Assignments

7.8 Feedback Port A and Port B and Power Connector (J1)

For full details, refer to [Chapter 13 Feedback](#) in the [Platinum Safety Drive Manual](#).

7.8.1 J1 Port A

Pin (J1) Port A		Incremental Encoder	Absolute Serial Encoder
	Signal	Function	Function
5	PortA_A+	Channel A +	Absolute encoder clock+
7	PortA_A-	Channel A -	Absolute encoder clock-
9	PortA_B+	Channel B+	Absolute encoder data+
11	PortA_B-	Channel B -	Absolute encoder data -
13	PortA_Index+	Channel_Index+	Reserved
15	PortA_Index-	Channel_Index-	Reserved

Table 5: J1 Port A Pin Assignments

7.8.2 J1 Port B

Pin (J1) Port B		Incremental Encoder	Interpolated Analog Encoder	Resolver
	Signal	Function	Function	Function
		PBAS-zz-zXXX/YYYzEzQ		PBAS-zz-zXXX/YYYzRzQ
6	PortB_A+/SIN+	Channel A+	Sine+	Sine+
8	PortB_A-/SIN-	Channel A -	Sine-	Sine-
10	PortB_B+/COS+	Channel B+	Cosine+	Cosine+
12	PortB_B-/COS-	Channel B-	Cosine-	Cosine-
14	PortB_INDEX+	Channel_Index+	Analog_Index+	RESOLVER_OUT+
16	PortB_INDEX-	Channel_Index-	Analog_Index-	RESOLVER_OUT-

Table 6: J1 Port B Pin Assignments

7.8.3 J1 Hall Sensors

Pin J1	Pin Name	Function
17	HA	Input, Hall sensor A
18	HB	Input, Hall sensor B
19	HC	Input, Hall sensor C

Table 7: J1 Hall Sensors

7.8.4 J1 Power Pins

J1 Power Pin	Signal	Function
1	+11V	Encoder +11V supply Note: +11V is only available for Safety Capability F
2	+5VE	Encoder +5V supply
3	COMRET	Common Return
4	COMRET	Common Return
20	COMRET	Common Return

7.8.5 Pin Positions

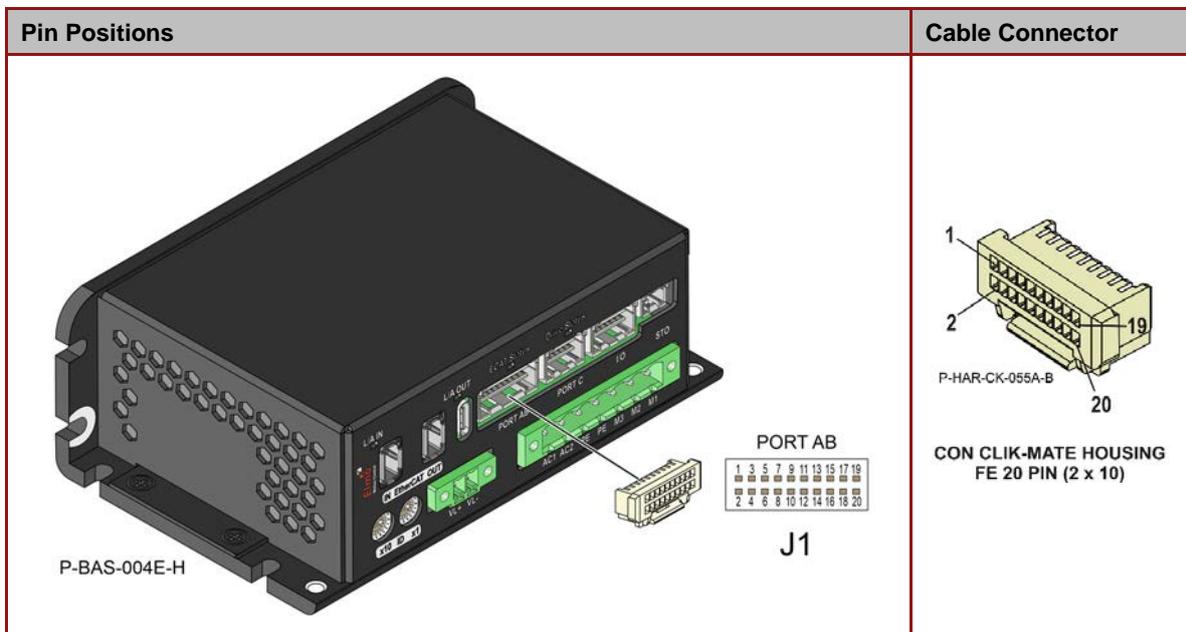


Table 8: J1 Power Pin Assignments

7.9 Feedback Port C and Analog Inputs Connector Pinouts (J2)

The Feedback Port C and Analog Inputs connector includes the following functions:

- **Feedback Port C:** Refer to [section 13.2.6 Port C Encoder](#) in the [Platinum Safety Drive Manual](#) for full details.
- **Analog input:** Refer to [section 17 Analog Input](#) in the [Platinum Safety Drive Manual](#) for full details.

Pin (J2)		Incremental Encoder	Absolute Serial Encoder	General Outputs
Signal		Function	Function	Function
1	COMRET	Common return		
2	PortC_A+	Channel A +	Absolute encoder clock+	General Output A+
3	+5VE	Encoder +5V supply		
4	PortC_A-	Channel A -	Absolute encoder clock-	General Output A-
5	+11V	Encoder 11V Supply (for Safety Capability: F)		
6	PortC_B+	Channel B+	Absolute encoder data+	General Output B+
7	ANALOG1+	Analog Input		
8	PortC_B-	Channel B –	Absolute encoder data -	General Output B-
9	ANALOG1-	Analog Input complement		
10	PortC_Index+	Index+	Reserved	General Output Index+
11	COMRET	Common Return		
12	PortC_Index-	Index-	Reserved	General Output Index-

Pin Positions	Cable Connector
<p>P-BAS-004E-J</p> <p>PORT C J2</p>	<p>P-HAR-CK-054A</p> <p>CON CLIK-MATE HOUSING FE 12 PIN (2 x 6)</p>

Table 9 Port C Pin Assignments

7.10 Digital I/Os, Connector Pinouts (J3)

Refer to [Chapters 15 Safe Digital IO](#) and [16 Regular Digital IO](#) in the [Platinum Safety Drive Manual](#) for full details.

7.10.1 Safe IO: IO TYPE = W

The Digital I/Os connector includes the following functions:

Pin (J3)	Signal	IO TYPE W
1	VDD_RET	VDD Return
2	IN1	Input
3	VDD	Refer to section 5.4.7 Digital Output
4	IN2	Input
5	OUT4	Output
6	IN3	Input
7	IN5	Input
8	IN4	Input
9	OUT7	Output
10	OUT1	Output
11	OUT8	Output
12	OUT2	Output
13	IN6	Input
14	OUT3	Output

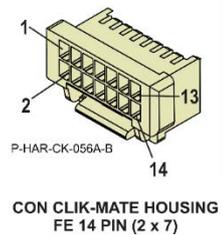
Pin Positions	Cable Connector
 <p>P-BAS-004E-L</p> <p>PORT I/O</p> <p>J3</p>	 <p>P-HAR-CK-056A-B</p> <p>CON CLIK-MATE HOUSING FE 14 PIN (2 x 7)</p>

Table 10: Digital I/O for Safe IO: IO Types W

7.10.2 Regular IO: IO TYPE = U, V

The Digital I/Os connector includes the following functions:

Pin (J3)	Signal	TYPE U	TYPE V
1	VDD_RET	VDD Return	
2	IN1	Input	
3	VDD	Refer to section 5.4.7 Digital Output	
4	IN2	Input	
5	IN6	Input	
6	IN3	Input	
7	SRC or SINK CONTROL	Not Used	For Source: 0 - Source Control For Sink: VDD
8	IN4	Input	
9	OUT7	Output	
10	OUT1	Output	
11	OUT8	Output	
12	OUT2	Output	
13	IN_COM	Digital Input Return	For Source: Digital Input Return For Sink: Digital Input Power
14	IN5	Input	

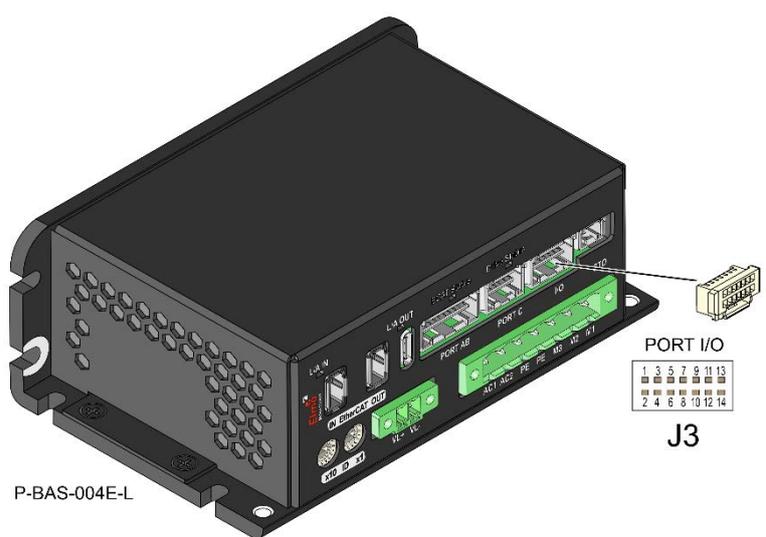
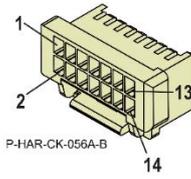
Pin Positions	Cable Connector
 <p>P-BAS-004E-L</p> <p>PORT I/O</p> <p>J3</p>	 <p>P-HAR-CK-056A-B</p> <p>CON CLIK-MATE HOUSING FE 14 PIN (2 x 7)</p>

Table 11: Digital I/O for Regular IO: IO Types U, V

7.11 USB 2.0 Connector Type C (X3)

Refer to section 18.1 USB in the [Platinum Safety Drive Manual](#) for full details.

Pin (X3)	Signal	Function
A1	COMRET	Common return
A2	Not Connected	
A3	Not Connected	
A4	USB_VBUS	USB VBUS 5 V
A5	Reserved	
A6	USBD+	USB _P line
A7	USBD-	USB _N line
A8	Not Connected	
A9	USB_VBUS	USB VBUS 5 V
A10	Not Connected	
A11	Not Connected	
A12	COMRET	Common return
B1	COMRET	Common return
B2	Not Connected	
B3	Not Connected	
B4	USB_VBUS	USB VBUS 5 V
B5	Reserved	
B6	USBD+	USB _P line
B7	USBD-	USB _N line
B8	Not Connected	
B9	USB_VBUS	USB VBUS 5 V
B10	Not Connected	
B11	Not Connected	
B12	COMRET	Common return
	COMRET	Supply, Connector body

Pin Positions	Cable Connector
 <p>P-BAS-004E-N</p>	 <p>P-BAS-004A-B</p>

Table 12: USB Device Type C Pin Assignments

7.12 EtherCAT IN Connector Pinouts (X1)

Fieldbus communications are industrial network protocols for real-time distributed control that allows connection of servo drives. The Platinum Bassoon supports the following EtherCAT fieldbus type industrial network protocol:

Fieldbus Type	Product Number
EtherCAT	PBAS-zz-zXXX/YYYFzzQ

Refer to section [18.2 EtherCAT/Ethernet](#) in the [Platinum Safety Drive Manual](#) for full details.

Pin (X1)	Signal	Function
1	ECAT_IN_TX+	Output, ECAT levels
2	ECAT_IN_TX-	Output, ECAT levels
3	Not Connected	
4	Not Connected	
5	Not Connected	
6	ECAT_IN_RX+	Input, ECAT levels
7	ECAT_IN_RX-	Input, ECAT levels
8	Not Connected	
9	Not Connected	
10	Not Connected	
	PE	Protective Earth

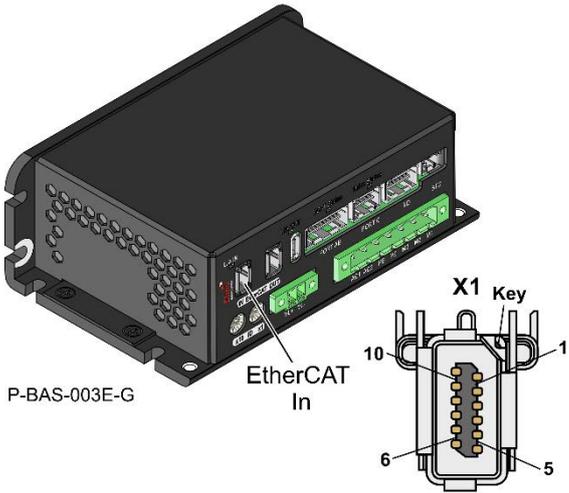
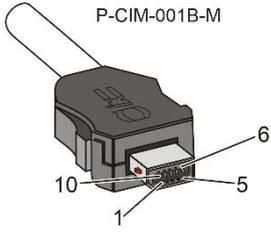
Pin Positions	Cable Connector
 <p>P-BAS-003E-G</p> <p>EtherCAT In</p> <p>X1 Key</p> <p>10 1 6 5</p>	 <p>P-CIM-001B-M</p> <p>10 6 5 1</p>

Table 13: EtherCAT IN Pin Assignments

7.13 EtherCAT OUT/Ethernet Connector Pinouts (X2)

Refer to section 18.2 EtherCAT/Ethernet in the Platinum Safety Drive Manual for full details.

Pin (X2)	Signal	Function
1	ECAT_OUT_TX+ / Ethernet_TX+	Output, ECAT levels / Ethernet transmit +
2	ECAT_OUT_TX- / Ethernet_TX-	Output, ECAT levels / Ethernet transmit -
3	Not Connected	
4	Not Connected	
5	Not Connected	
6	ECAT_OUT_RX+ / Ethernet_RX+	Input, ECAT levels / Ethernet receive +
7	ECAT_OUT_RX- / Ethernet_RX-	Input, ECAT levels / Ethernet receive -
8	Not Connected	
9	Not Connected	
10	Not Connected	
	PE	Protective Earth

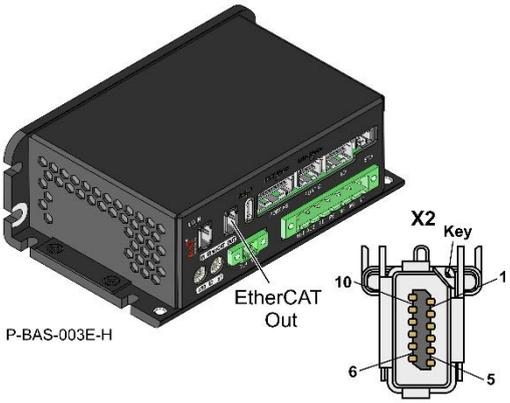
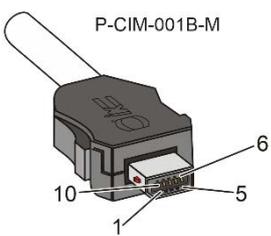
Pin Positions	Cable Connector
 <p>P-BAS-003E-H</p> <p>EtherCAT Out</p> <p>X2 Key</p> <p>10, 1, 6, 5</p>	 <p>P-CIM-001B-M</p> <p>10, 1, 6, 5</p>

Table 14: EtherCAT OUT/Ethernet Pin Assignments

7.14 CAN Connector Pinouts (X1, X2)

Fieldbus communications are industrial network protocols for real-time distributed control that allows connection of servo drives. The Platinum Bassoon supports the following CAN fieldbus type industrial network protocol:

Fieldbus Type	Product Number
CAN	PBAS-zz-zXXX/YYYSzzQ



Note: It should be noted that all signals are isolated and the Grounding denoted ISO_GND throughout CAN connections.

The CAN Connector Pinouts are as follows:

Pin (X1, X2)	Signal	Function
1	Not Connected	
2	Not Connected	
3	Not Connected	
4	CAN_H	Bidirectional, CAN BUS
5	CAN_L	Bidirectional, CAN BUS
6	Not Connected	
7	Not Connected	
8	Not Connected	
9	ISO_RET	Isolation GND for CAN
10	ISO_RET	Isolation GND for CAN
	PE	Protective Earth

Pin Positions	Cable Connector
<p>P-BAS-300B CAN X1 CAN in Key 10 9 4 5</p>	<p>P-BAS-300B-A CAN X2 CAN out Key 10 9 4 5</p>
<p>P-BAS-300A-B 10 9 4 5</p>	

Table 15: CAN Connector Pin Assignments

7.15 Connecting Mating Connectors to Connectors X1 and X2

Proper connecting of the mating EtherCAT or CAN connectors to the Platinum Bassoon X1 and X2 connectors is shown in the following drawing.

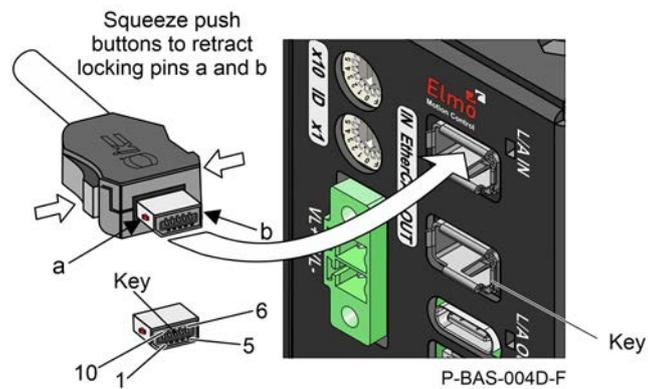


Figure 8: Connecting EtherCAT or CAN Mating Connectors to Platinum Bassoon X1 and X2 Connectors

Chapter 8: Wiring

8.1 Wiring Legend

Once the product is mounted, you are ready to wire the device. Proper wiring, grounding and shielding are essential for ensuring safe, immune and optimal servo performance of the drive.

The following table legend describes the wiring symbols detailed in all installation guides.

Wiring Symbol	Description
	Earth connection (PE)
	User Side: This symbol signifies that any type of grounding may be used on the user side
	VDD Return
	Isolated Ground
	Power Return
	COMRET Common at the Drive
	Shielded cable with drain wire. The drain wire is a non-insulated wire that is in direct contact with the braid (shielding). Shielded cable with drain wire significantly simplifies the wiring and earthing.
	Shielded cable braid only, without drain wire.
	Twisted-pair wires
<p>Encoder Earthing. The cable's shield is connected to the chassis (PE) in the connector. The servo drive shield is connected to Earth.</p>	

8.2 The Platinum Bassoon Connection Diagrams

8.2.1 EtherCAT Connection Diagram with Safe IO (Safety Capability: F)

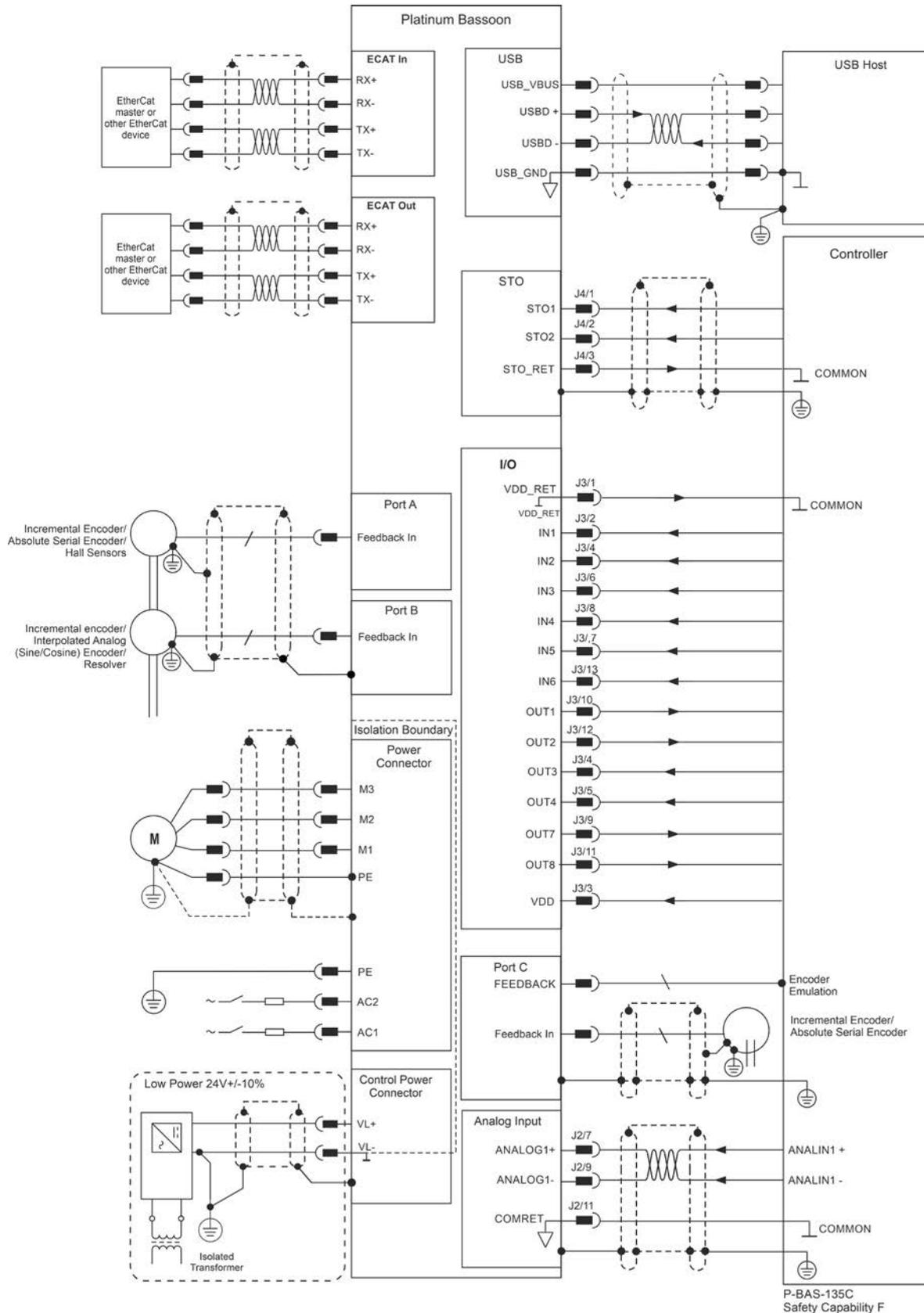


Figure 9: Platinum Bassoon EtherCAT Safe IO Connection Diagram

8.2.2 EtherCAT Connection Diagram with Regular IO (Safety Capability: S, O)

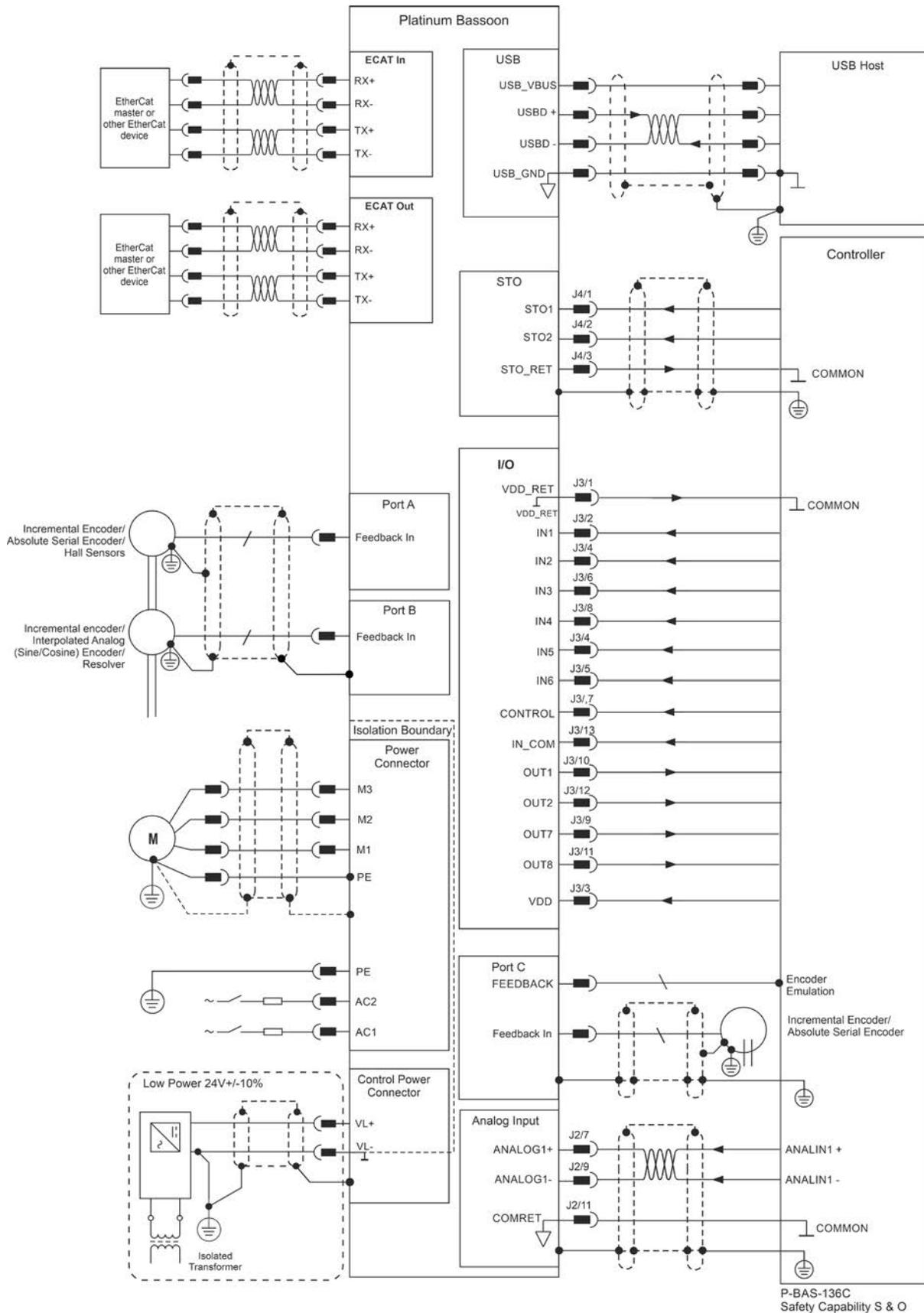


Figure 10: Platinum Bassoon EtherCAT Regular IO Connection Diagram

8.2.3 CAN Connection Diagram with Safe IO (Safety Capability: F)

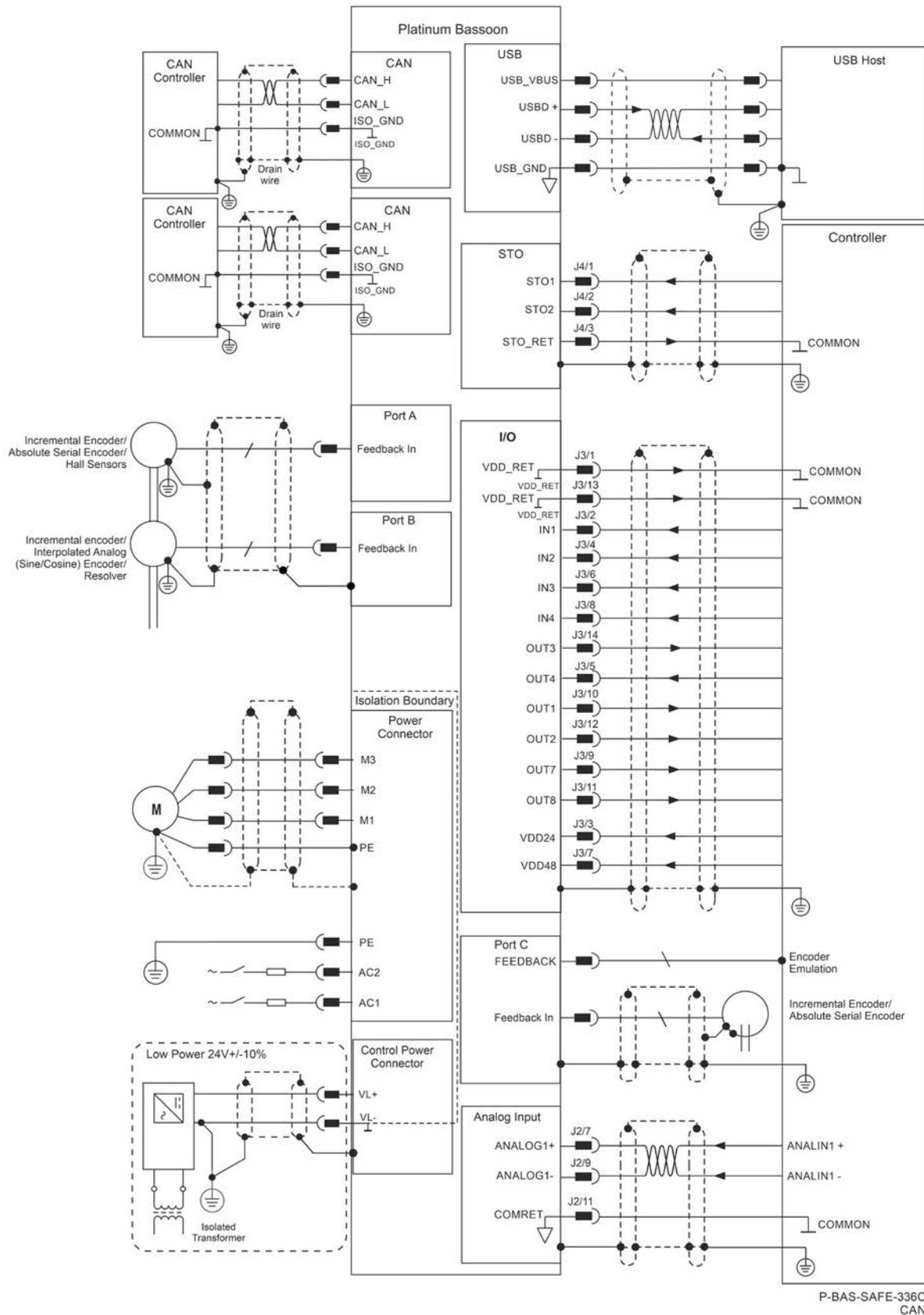


Figure 11: Platinum Bassoon CAN Safe IO Connection Diagram

8.2.4 CAN Connection Diagram with Regular IO (Safety Capability: S, O)

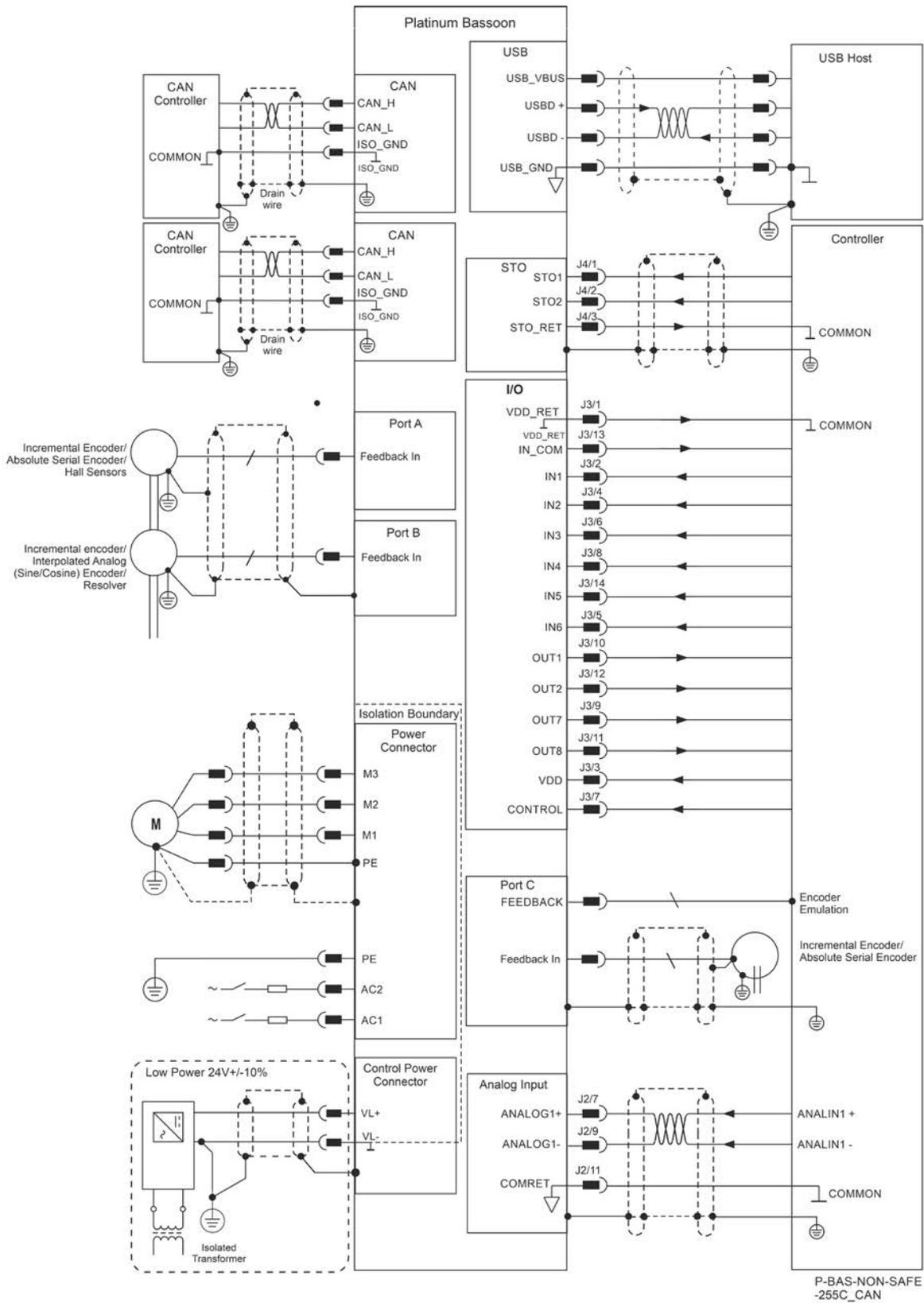


Figure 12: Platinum Bassoon CAN Regular IO Connection Diagram

8.3 Wiring the Female Connectors

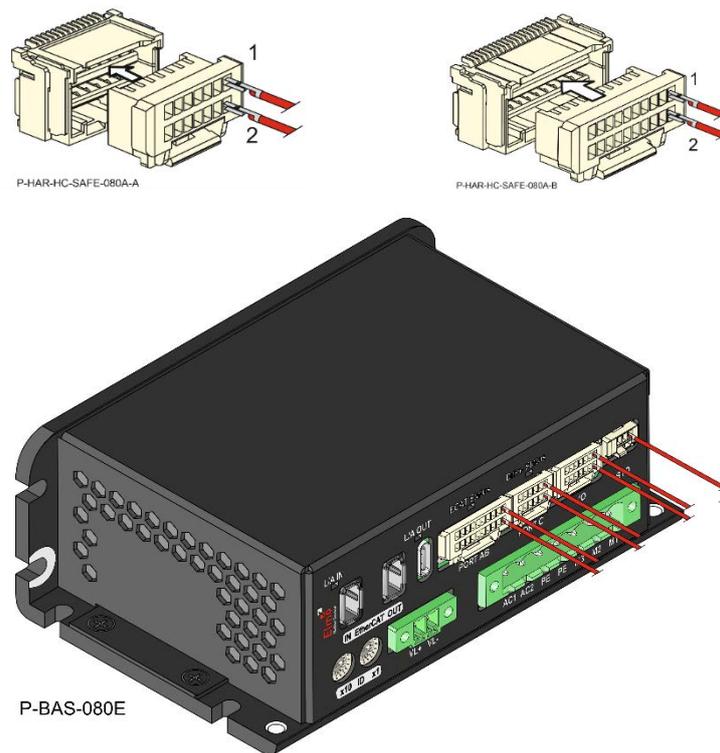
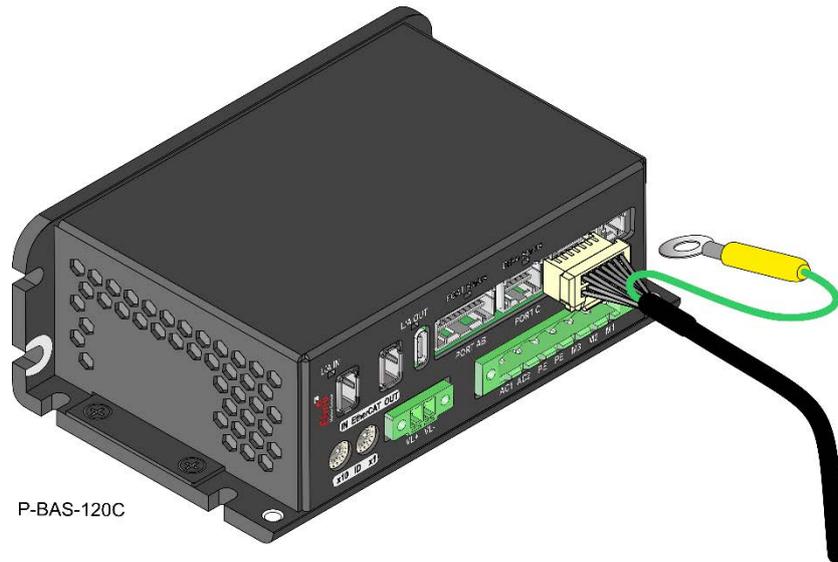


Figure 13: Inserting a wire/pin to the Female Connector

To insert a wire/pin into any of the female connectors J1, J2, J3, and J4, do the following:

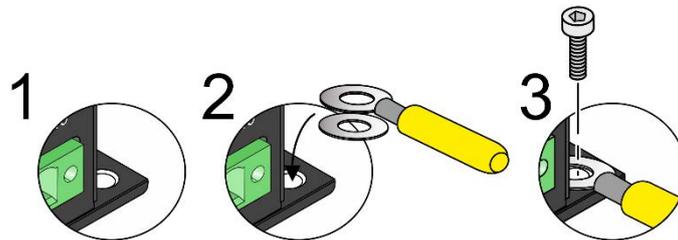
1. Select the relevantly colored wire to insert to a specific rectangular compartment on the female connector.
2. Use the appropriate Molex crimping plier (Molex P/N 63819-4600) to fasten a pin connector to the end of the wire.
3. Place the connector on a flat surface, in the orientation as shown in Figure 13. Notice that the rectangular slot has a niche at the bottom of the slot.
4. Insert the wire connector to the slot as shown in Figure 13. Make sure that the connector protrusion is inserted to the bottom of the rectangular slot.
5. Repeat the same procedure for any other wire connections.

8.4 Wiring the Grounding Wires



The grounding wires are 10 cm green wires with yellow terminal rings. Use an M4 screw and a serrated washer to mount the grounding wire. During the drive installation, to connect the grounding wire to ground, do the following:

1. For each connector with an attached grounding wire, select the nearest and most appropriate grounding hole, preferably mounting holes that are not anodized, to which to connect the wire.
2. Mount the screw, terminal ring, and washer, to the ground hole as shown below.



P-BAS-120B-A

3. Carefully tighten the screw, to secure the terminal ring.



Note: There may be a need for more than four grounding wires. The grounding holes on the frame of the Bassoon are dedicated for Elmo's wires, but when more grounding wires are necessary, the grounding rings can be attached directly to the product.

8.5 Motor Power (P1)

When connecting several drives to several similar motors, all should be wired in an identical manner. This will enable the same settings to run on all drives.

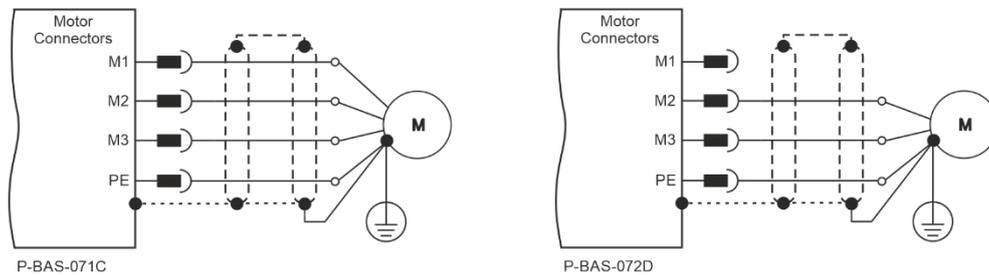


Figure 14: Brushless Motor Power and DC Brushed Motor Power Connection Diagrams



Note: In accordance with IEC/EN 618005-1 clause 4.3.5.4, it is recommended to use at least 2.5mm² wires (14 AWG) for the PE wire.

1. Ensure that the motor chassis is properly earthed.
2. Connect the appropriate wire from the Motor Power cables to the terminals on the Platinum Bassoon.
Connect the wires to M1, M2, M3, and PE terminals.
Make sure not to bundle the wires.
3. The phase connection is arbitrary as Elmo Application Studio (EAS II) will establish the proper commutation automatically during setup. When tuning a number of drives, you can copy the setup file to the other drives and thus avoid tuning each drive separately. In this case the motor-phase order must be the same as on the first drive.
4. For high EMI environment, it is highly recommended to use a 4-wire shielded (not twisted) cable for the motor connection.
The gauge is determined by the actual RMS current consumption of the motor.
Connect the cable shield to the closest ground connection at the motor end.
5. For better EMI performance, the shield should be connected to Earth Connection (heat sink mounting holes).



Figure 15: Non-anodized heat sink mounting holes

8.6 Main AC Power (P1)

The AC power for the Platinum Bassoon can be delivered from either directly from the mains or from a single-phase isolated transformer. The following sections contain topology recommendations for implementing a single-phase supply chain.

The power stage of the Platinum Bassoon is fully isolated from the other sections of the Platinum Bassoon, such as the control-stage and the heat sink. **This isolation allows the user to connect the common of the control section to the PE, a connection which significantly contributes to proper functionality, safety and EMI immunity, leading to better performance of the Platinum Bassoon.**

This isolation allows the Platinum Bassoon to operate with a non-isolated source (a direct-to-mains connection) which eliminates the need for a bulky and expensive isolation transformer.

As well as operating from a non-isolated/direct-to-mains AC supply, the Platinum Bassoon can also operate from an isolated transformer.

The AC voltage level must be limited to 270 VAC so as not to exceed the maximum allowed supply voltage to the drive.



Figure 16: Main AC Power

8.6.1 Direct-to-Mains Power Source (Non-Isolated)

This section relates to the configuration of the drive, which is connected directly to the mains.

To connect the non-isolated AC power supply:

1. For best noise immunity, a 3-wire shielded (not twisted) cable is recommended (not mandatory) for the AC input cable.
2. Connect the two power wires (Neutral and Phase) to the AC Power leads of the source.
3. For safety requirements, the third wire must be connected to the protective earth (PE terminal). It's recommended the wire should be green/yellow.
Connect the Protective Earth wire to the PE terminal on the main AC connector.
4. The gauge of the cable strands is determined by the actual current of the drive.

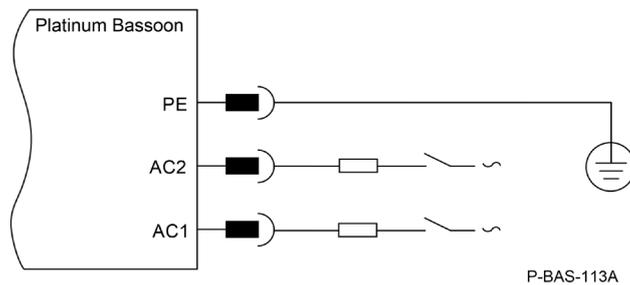


Figure 17: Non-isolated AC power supply

8.6.2 Single-Phase Direct-to-Mains Connection Topology



Caution For the following Topologies:

Take care and note that in a direct-to-mains connection the Neutral point is *not* the most negative voltage level. It is the mid-point level of the rectified DC bus.

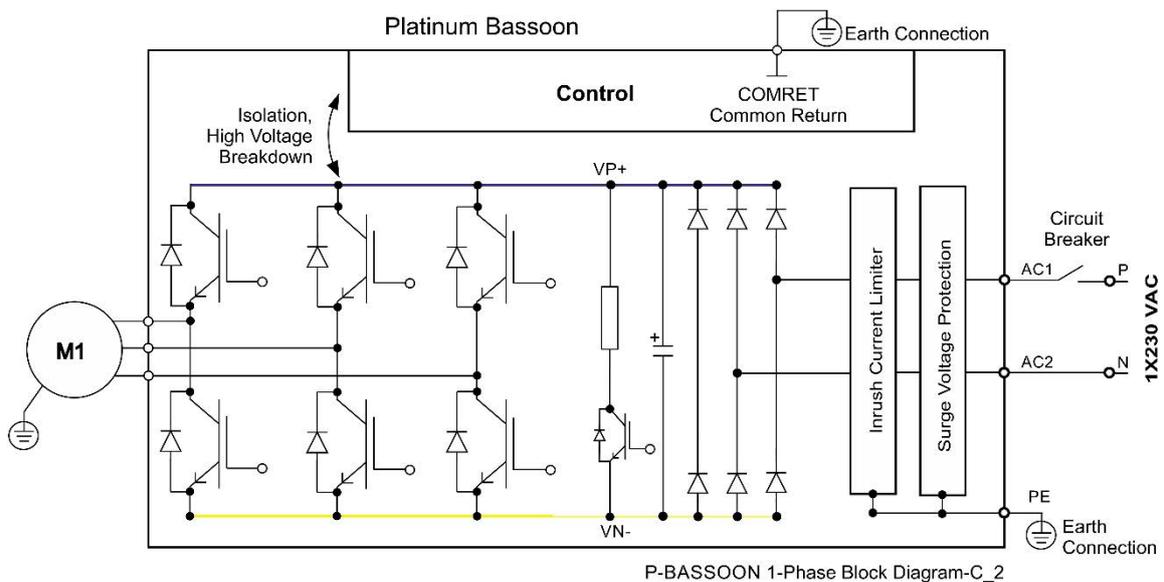


Figure 18: Non-Isolated Single-Phase Source - Connection Topology

8.6.3 Shunt Regulator

A shunt regulator is included in the Platinum Bassoon. The shunt regulator is a switching type, wherein the dissipative element (power resistor) is switched across the DC bus, whenever the voltage reaches a predetermined level. The function of the shunt regulator is to regulate the voltage of the DC bus during the period of motor deceleration, when there is a net energy outflow from the motor to the servo drive, to prevent the servo drive from disabling itself as a result of an “over-voltage” type reason.

When the capacitor’s charge-up reaches the predetermined shunt threshold level, the shunt regulator begins its regulating action. The bus is regulated to 385 VDC, until the regeneration-energy is dissipated.

8.6.4 Shunt Protection

The shunt system of the Platinum Bassoon includes a duty cycle limiter. This feature protects the shunt regulator when high-inertia loads are driven by the servo drive(s) or when too high AC voltage is applied to the power supply (i.e. DC output is already above the threshold of the shunt).

The Shunt power resistor peak power is 420W for all model types.

The Shunt resistor continuous power is adjusted by the duty cycle limiter as follows:

- 75W for the Mounting Version L (L-Shaped model).
- 115W for the Mounting Version B (Fins and Fans model).

8.7 Control Supply (P2)

Refer to the Chapter 10 Input Power Supply, in the Platinum Safety Drive Manual for details, specification, and connections of the Main and Control Power for safety.

The Control Power (VL) for Safety configuration must be

- 24V \pm 10% for the Mounting Version B (Fins and Fans model).
- 18 to 30V For the Mounting Version L (L-Shaped model).

Refer to the Safety Power Configuration and to [Chapter 10 Input Power Supply](#) in the [Platinum Safety Drive Manual](#).

To connect your integration board to the control supply:

1. The source of the control supply must be isolated from the Mains.
2. For safety reasons, connect the return (common) of the control supply source to the closest earth connection near the control supply source.
3. Connect the cable shield to the closest earth connection near the control supply source.
4. Before applying power, verify the polarity of the connection.

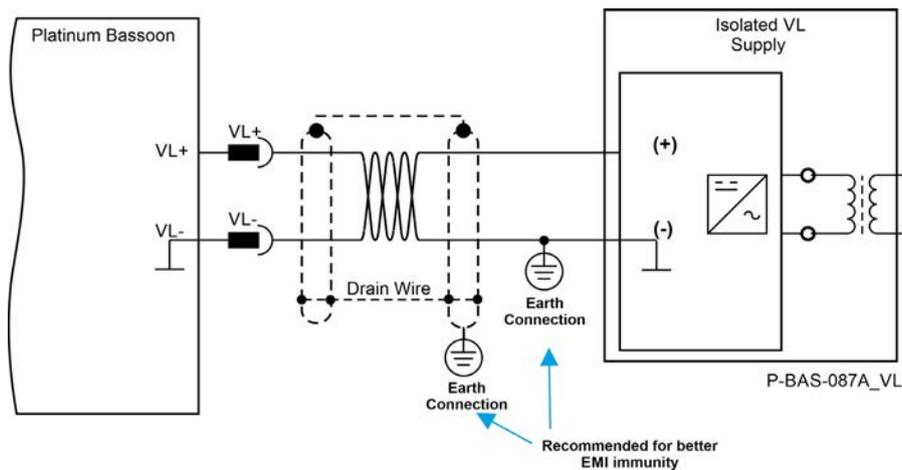


Figure 19: Control Supply Schema

8.8 STO (Safe Torque Off) (J4)

Refer to the Chapter 12 Safe Torque Off (STO) section, in the Platinum Safety Drive Manual for details, specification and connection of the STO.

8.8.1 Source Mode – PLC Voltage Level

Refer to the diagrams below for the PLC Source option connection.

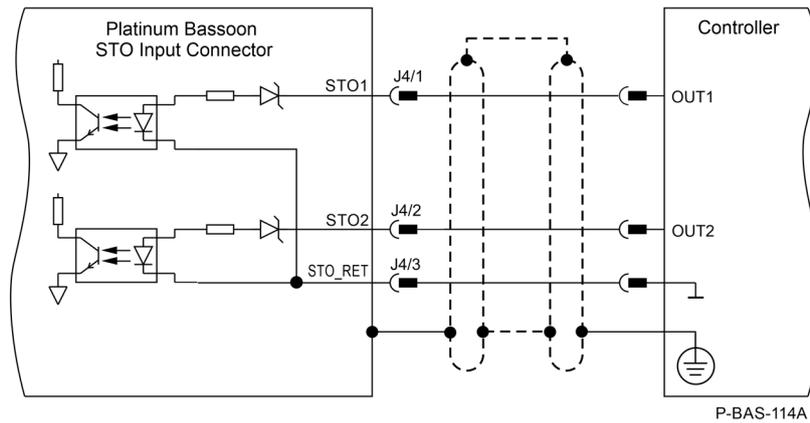


Figure 20: STO CLIK-Mate Type Connection – PLC Source Option

8.8.2 Source Mode – 5V Logic

Refer to the diagrams below for 5V Logic option connection.

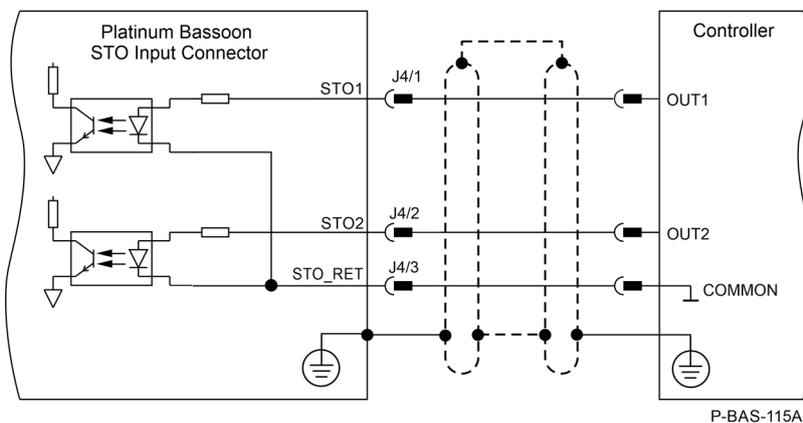


Figure 21: STO Input Connection – 5V Logic Option

8.9 Feedbacks (J1, J2)

Refer to the Chapter 13 Feedback, in the Platinum Safety Drive Manual for details, specification, and connections of the Feedback for safety.

8.9.1 Feedback Port A (J1)

Port A supports the following sensor inputs:

- Incremental Encoder or absolute serial Encoder
- Differential pulse-width modulation (PWM) signal input
- Differential Pulse & Direction signal inputs

8.9.1.1 Incremental Encoder

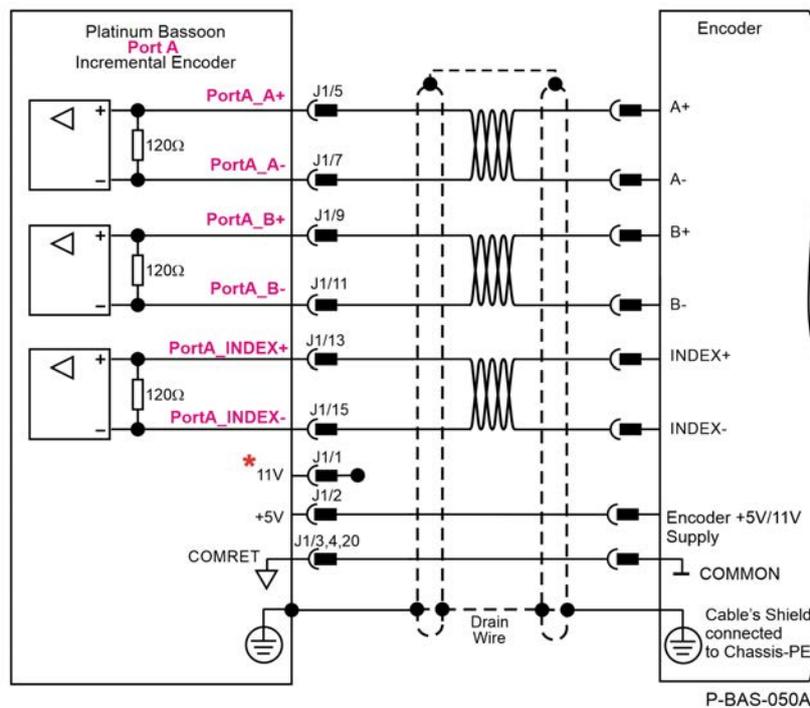


Figure 22: Port A Incremental Encoder Input – Recommended Connection Diagram



* Note: If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.1.2 Absolute Serial Encoder

The following Absolute Encoder types are supported:

- EnDat 2.2
- Biss C and Biss B
- SSI
- Hiperface

The following is the diagram connection of the EnDat, Biss, SSI:

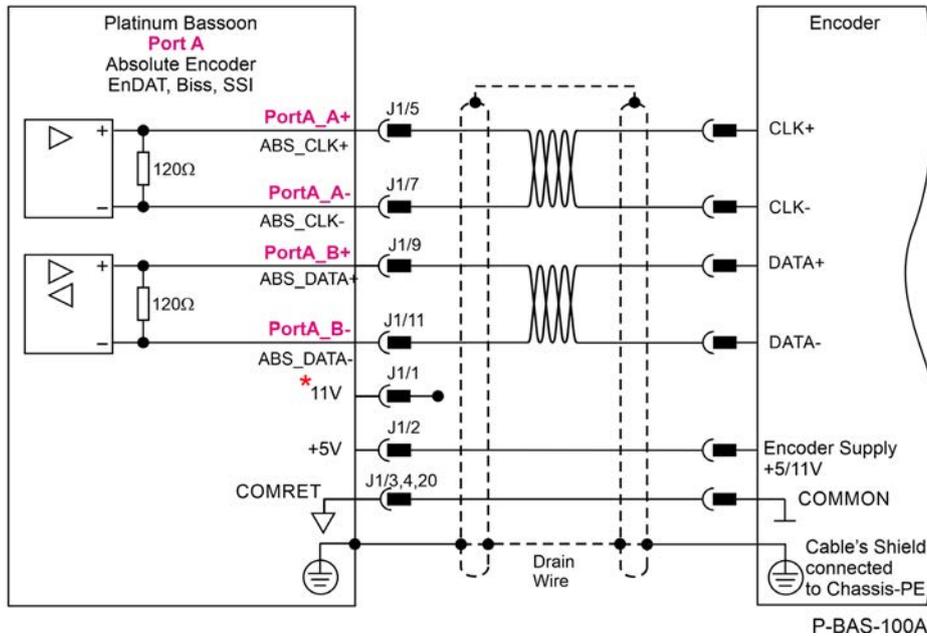


Figure 23: Absolute Serial Encoder – Recommended Connection Diagram for EnDat, Biss, SSI



* Note: If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.1.3 Hiperface

8.9.1.3.1 Hiperface for Safety Application(Safety Capability F)

Hiperface with Safety Capability “F” - for Safe IO which includes a power supply of 11V.
The following figure describes the connection diagram.

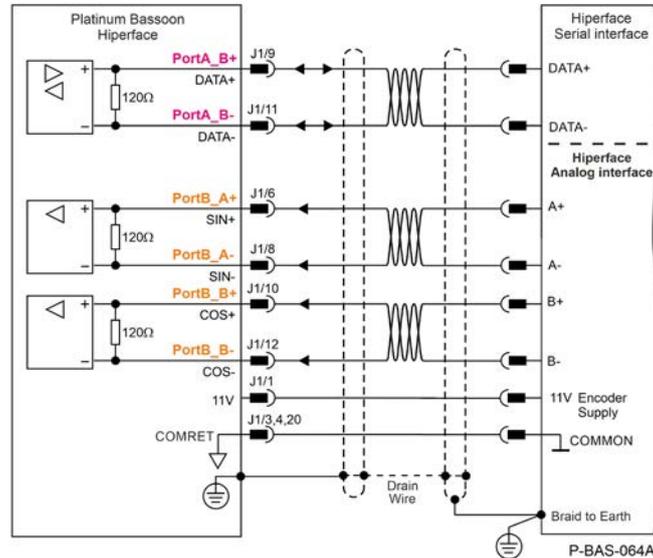


Figure 24: Absolute Serial Encoder – Recommended Connection Diagram for Hiperface – Safe IO

8.9.1.3.2 Hiperface for Non-Safety Application

Hiperface that requires a 7 – 12V power supply can be used with an external power supply for non-safety application.

The following figure describes the connection diagram.

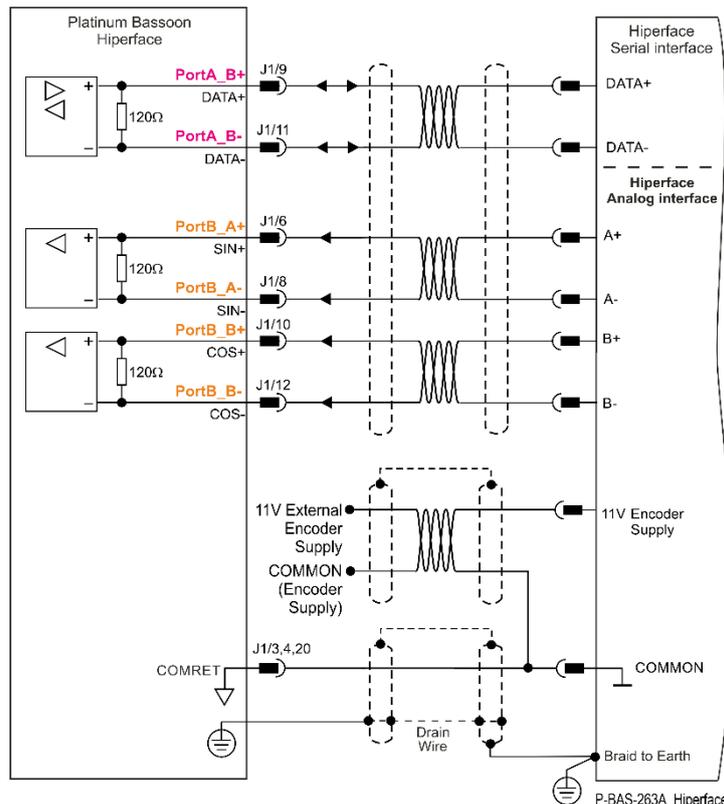


Figure 25: Absolute Serial Encoder – Recommended Connection Diagram for Hiperface – Regular IO

8.9.2 Feedback Port B (J1)

Port B supports any of the following sensors:

- Incremental Encoder, interpolated analog Encoder or analog Hall sensors

Or

- Resolver (separate hardware option)

8.9.2.1 Incremental Encoder

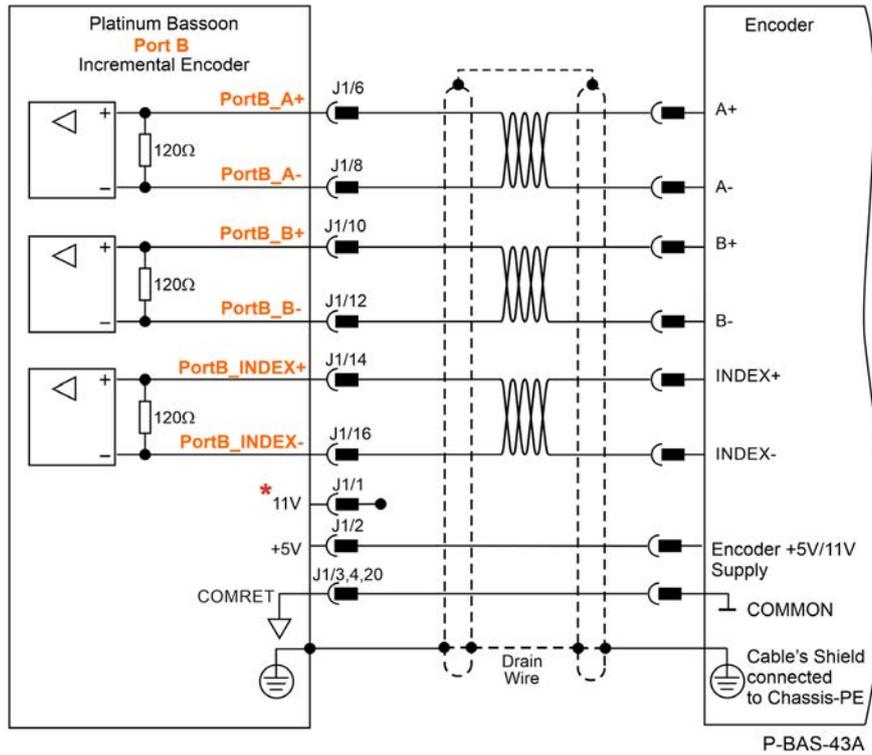


Figure 26: Port B Incremental Encoder Input – Recommended Connection Diagram



* Note: If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.2.2 Interpolated Analog (Sine/Cosine) Encoder

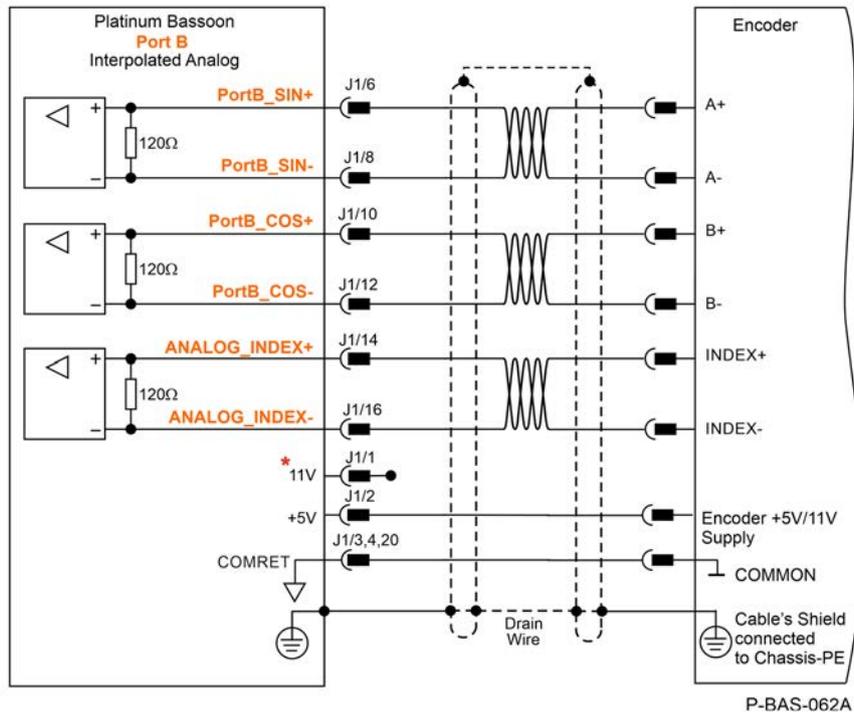


Figure 27: Port B - Interpolated Analog Encoder Connection Diagram



* Note: If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.2.3 Resolver

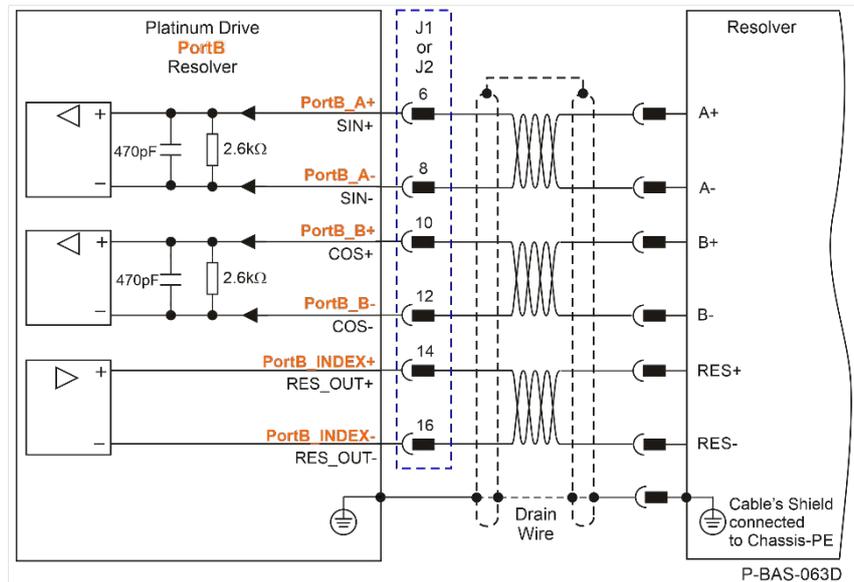


Figure 28: Port B – Resolver Connection Diagram

8.9.3 Feedback Port C (J2)

Port C provides:

- Incremental Encoder feedbacks
- Absolute Serial Encoder feedbacks
- Emulated Encoder output derived from port A, port B feedback inputs, or from internal variables

8.9.3.1 Incremental Encoder

The following Incremental Encoder types are supported:

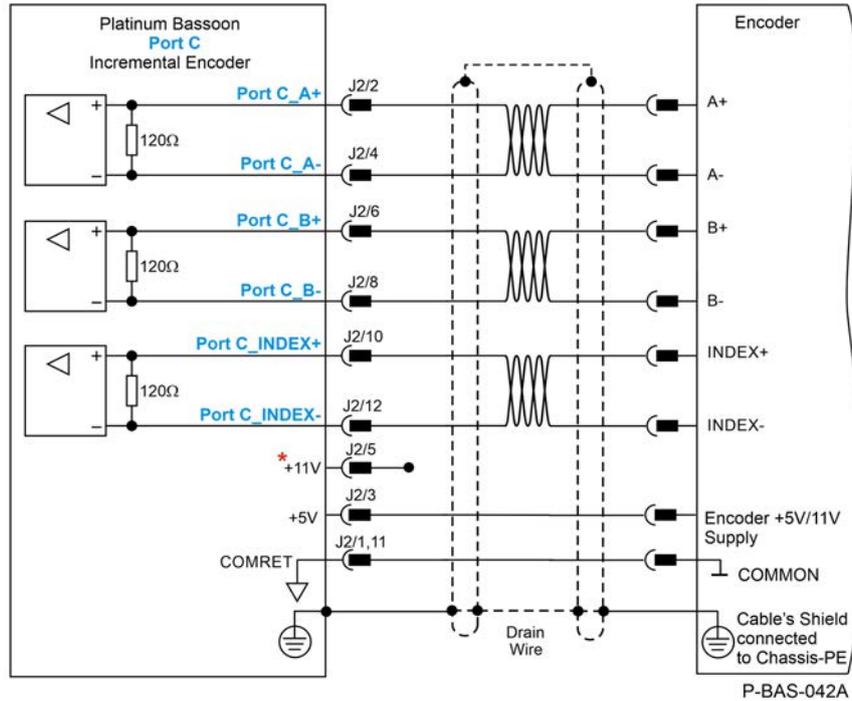


Figure 29: Port C Incremental Encoder Input – Recommended Connection Diagram



***Note:**

If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.3.2 Absolute Serial Encoder

Port C supports three types of encoder wire connections:

- Encoder 6-Wires
- Encoder 4-Wires
- Encoder 2-Wires

8.9.3.2.1 Encoder 6-Wires

The following encoders are supported (Encoder Option E):

- EnDat 2.2, Safe EnDat 2.2
- Biss C and Biss B, Safe BISS
- SSI

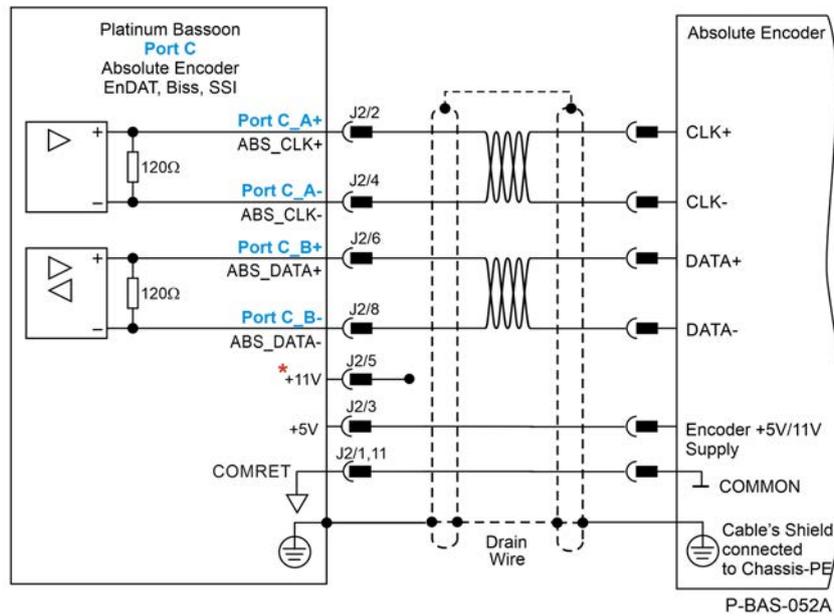


Figure 30: Absolute Serial Encoder – Recommended Connection Diagram for EnDat, Biss, SSI



***Note:** If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.3.2.2 Encoder 4-Wires

The following encoders are supported:

- Panasonic (Encoder Option E)
- Tamagawa (Encoder Option E)
- Sanyo-Danki (Encoder Option E)
- Acuro Link (Safety Capability F and Encoder Option 1)
- SCS (Safety Capability F and Encoder Option 2)

The following is the feedback diagram connection:

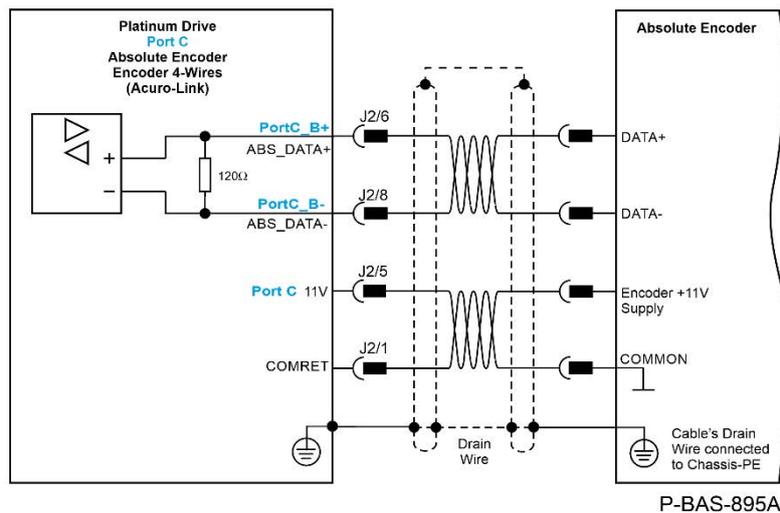


Figure 31: Absolute Serial Encoder – 4-Wires Connection Diagram Example



***Note:** If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.9.3.2.3 Encoder 2-Wires

The following encoders are supported:

- Endat3, Safe Endat3 (Safety Capability F and Encoder Option H)
- SCS Open link (Safety Capability F and Encoder Option 3)
- Hiperface DSL (Safety Capability F and Encoder Option 4)

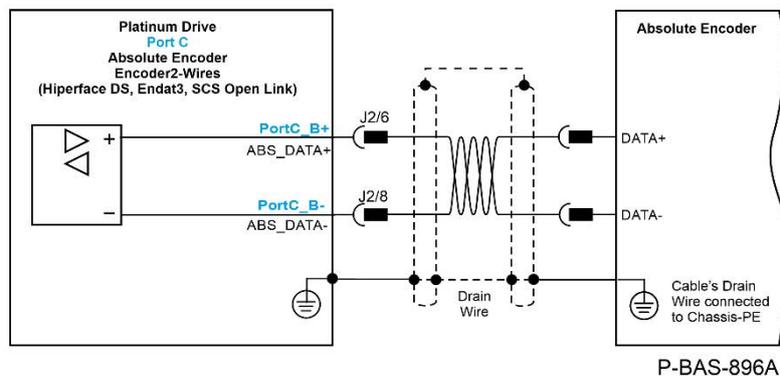


Figure 32: Absolute Serial Encoder – 2-Wires Connection Diagram Example

8.9.3.3 Emulated Encoder Output

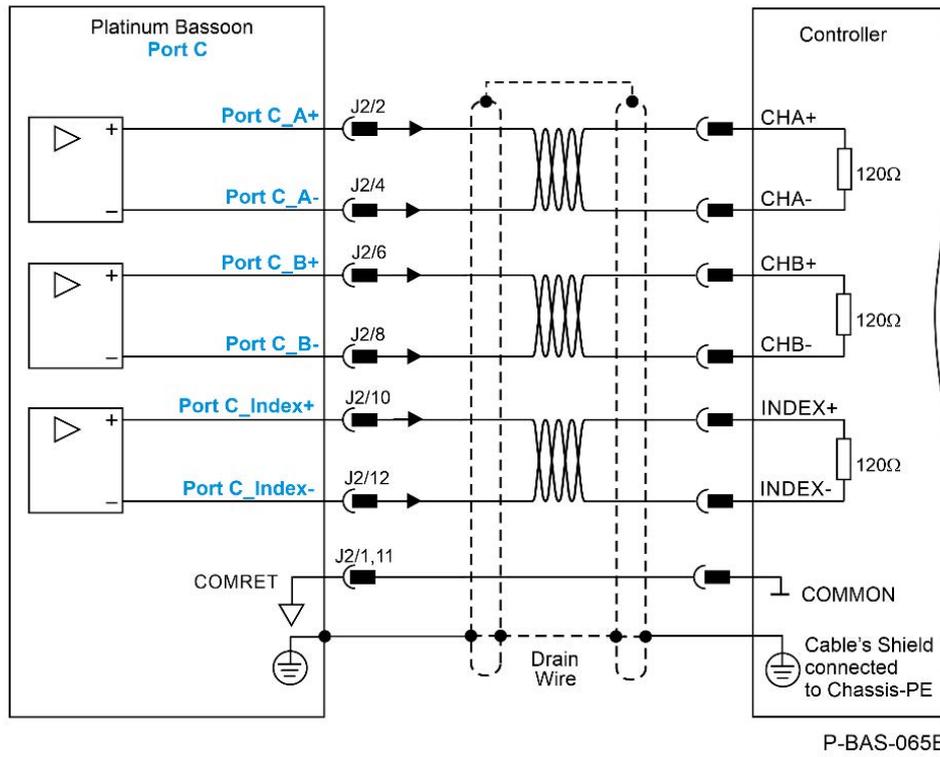


Figure 33: Emulated Encoder Differential Output – Recommended Connection Diagram

8.9.4 Feedback - Hall Sensors (J1)

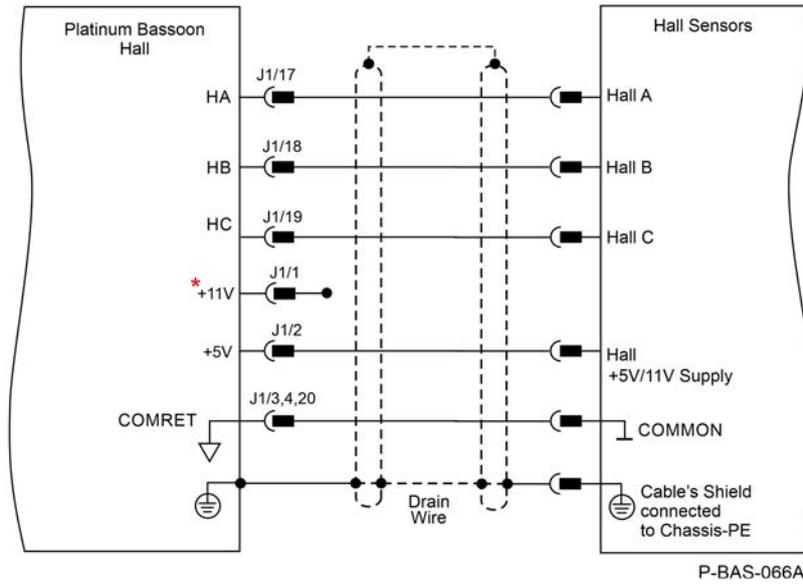


Figure 34: Hall Sensors Connection Diagram



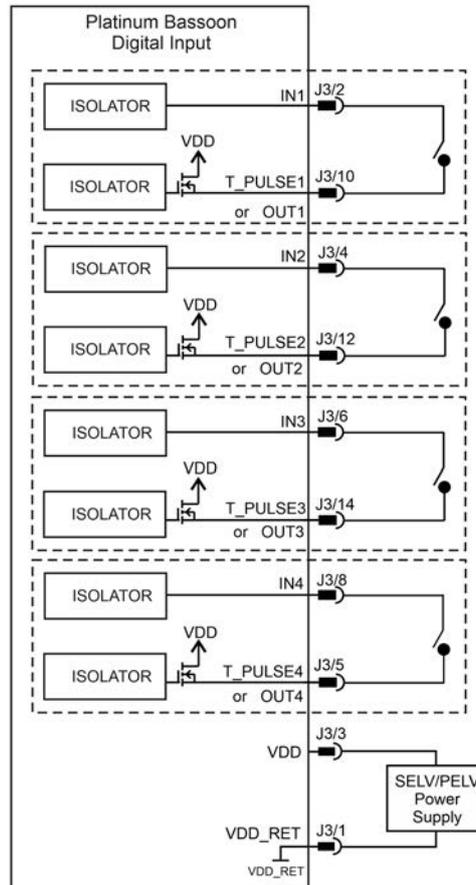
*Note:

If the Encoder supports 11V, then for Safety Capability F, 11V is available.

8.10 Safe Digital I/Os (J3) – IO Type: W

Refer to the Chapter 15 Safe Digital IO section, in the Platinum Safety Drive Manual for details, specification and connection of IO for Safety.

8.10.1 Digital Input with Test Pulse



P-BAS-079A

Figure 35: Digital input with Test Pulse

8.10.2 OSSD Digital Input

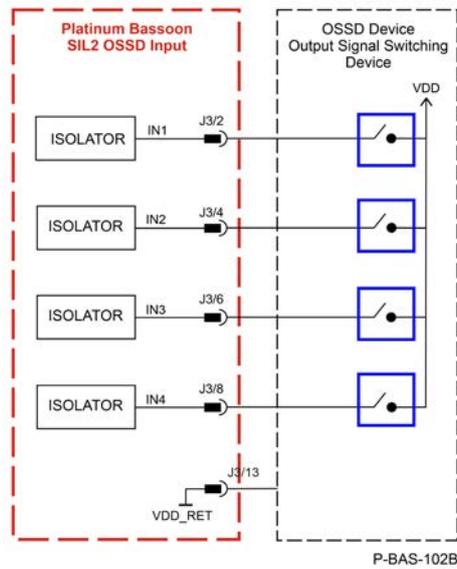


Figure 36: OSSD Digital Input

8.10.3 Digital Output



Important:

When the OUT3 is used as Safe OUTPUT, the user must connect the IN5 to OUT3 externally.
When the OUT4 is used as Safe OUTPUT, The user must connect the IN6 to OUT4 externally.

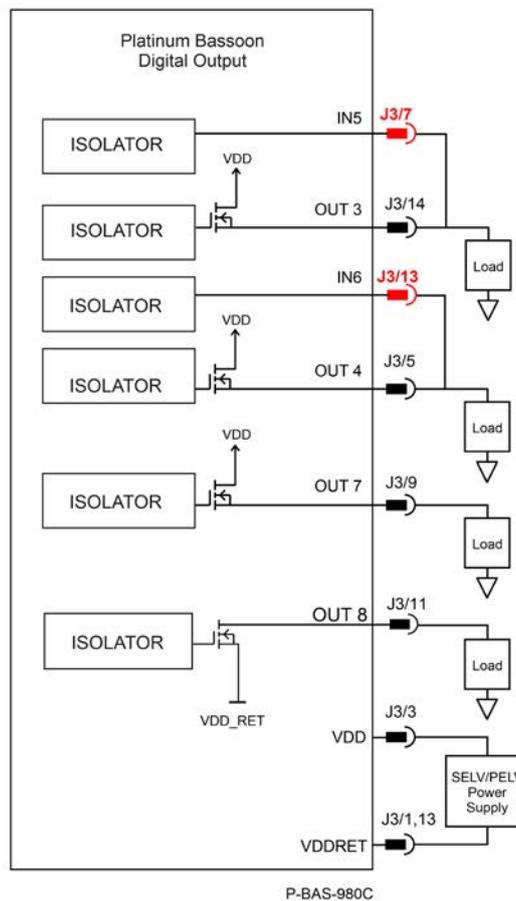


Figure 37: Digital Outputs for Option W Configuration

8.11 Regular Digital I/Os (J3)

Refer to the Chapter 16 Regular Digital IO section, in the Platinum Safety Drive Manual for specification details of the Regular IO connections.

8.11.1 Digital IO 5V Logic (IO Type: U)

The following figures describes the connections at the I/O Port for the Digital Input and Output 5V Logic.

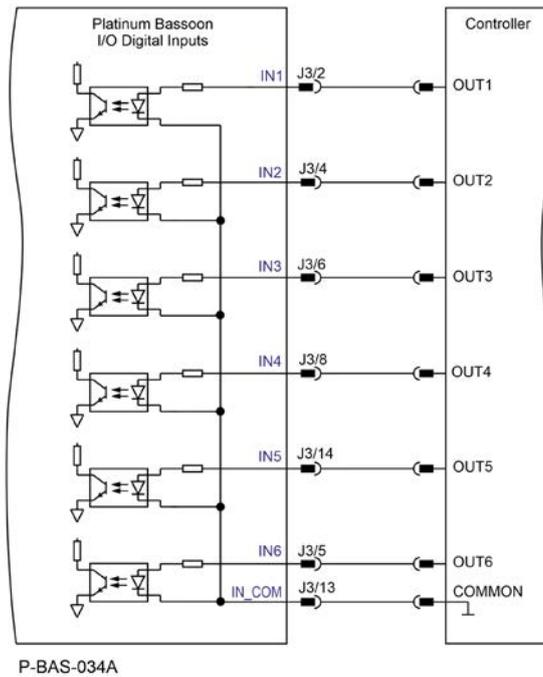


Figure 38: Regular Digital Input 5V Logic Connection Diagram

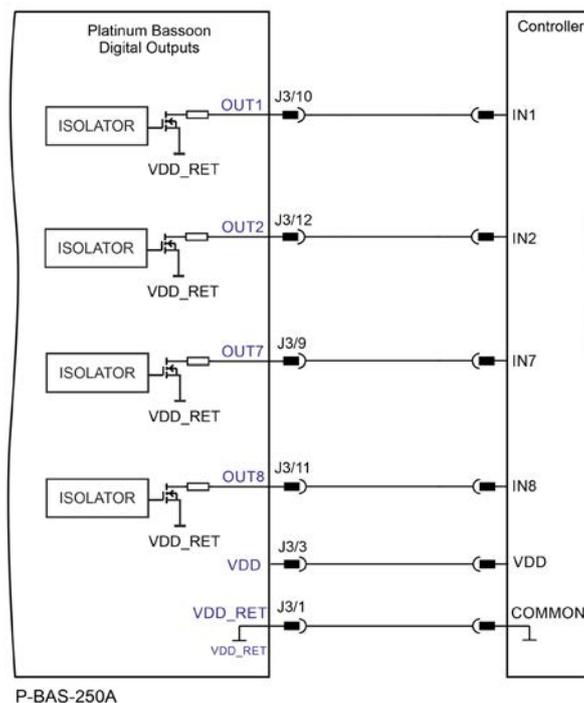


Figure 39: Regular Digital Output Connection Diagram – 5V Logic Option

8.11.2 Digital IO PLC Source and Sink Mode (IO Type: V)

8.11.2.1 Digital Input and Output PLC Source Mode

The following figures describes the connections at the I/O Port for the Digital Input and Output PLC Mode.

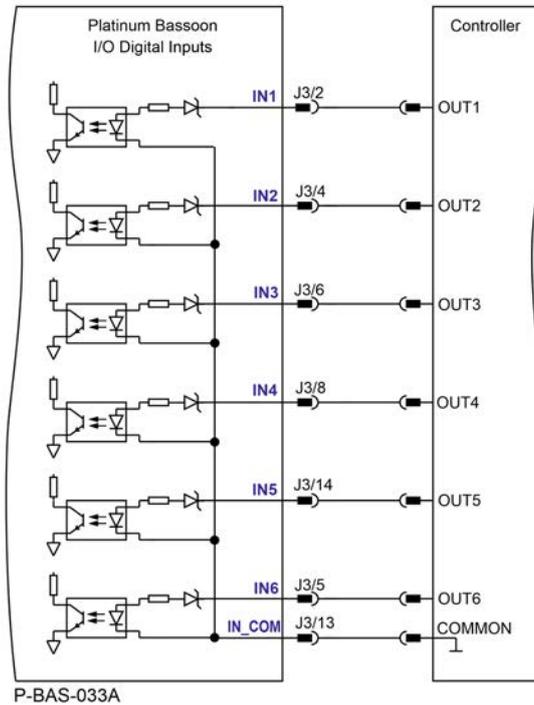


Figure 40: Regular Digital Input Connection Diagram – PLC Source Option

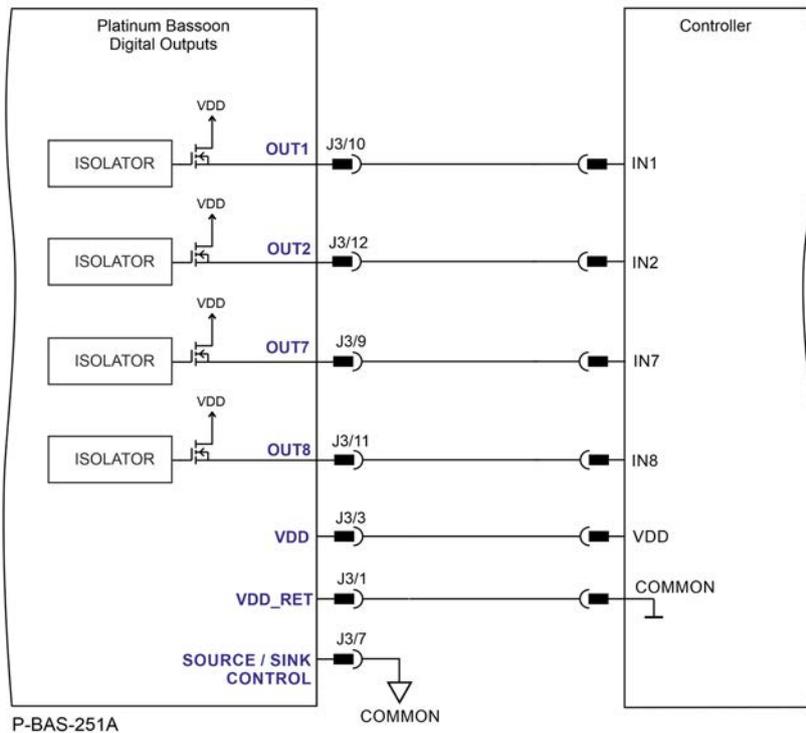


Figure 41: Regular Digital Output Connection Diagram – PLC Source Option

8.11.2.2 Digital Input and Output PLC Sink Mode

The following figures describes the connections at the I/O Port for the Digital Input and Output PLC Sink Mode.

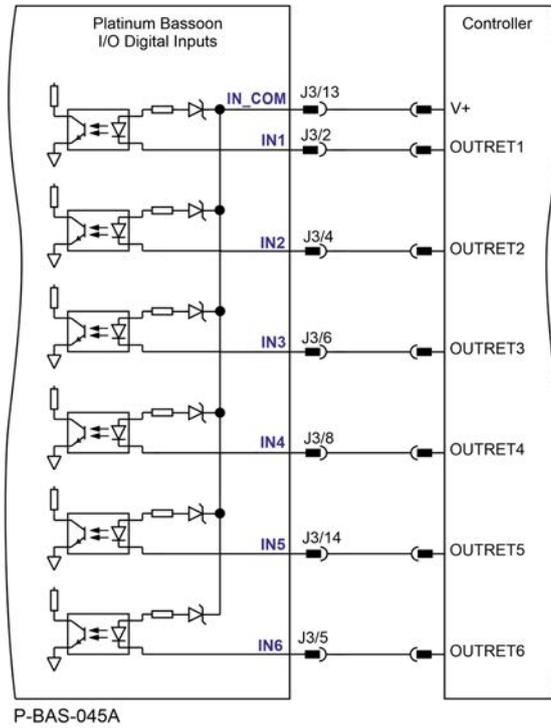


Figure 42: Regular Digital Input Connection Diagram – PLC Sink Option

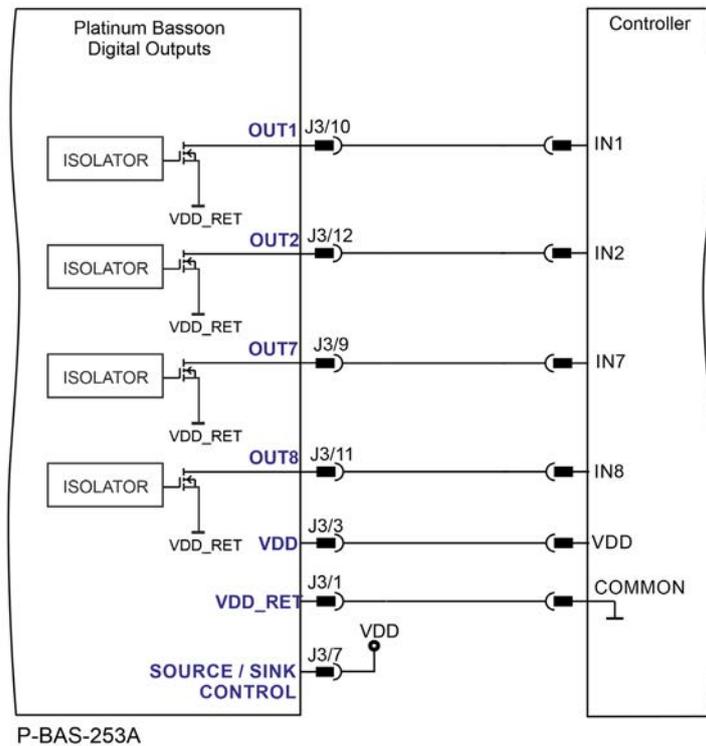


Figure 43: Regular Digital Output Connection Diagram – PLC Sink Option

8.12 Analog Input (J2)

There is one possible type of Analog Input in the Platinum Bassoon:

- Analog Input 1 – Differential ± 10 V

Refer to the Chapter 17 Analog Input section, in the Platinum Safety Drive Manual for specification details of the Analog Input.

8.12.1 Analog Input1 –Differential (J2)

The following circuit describes the internal interface of the Analog input.

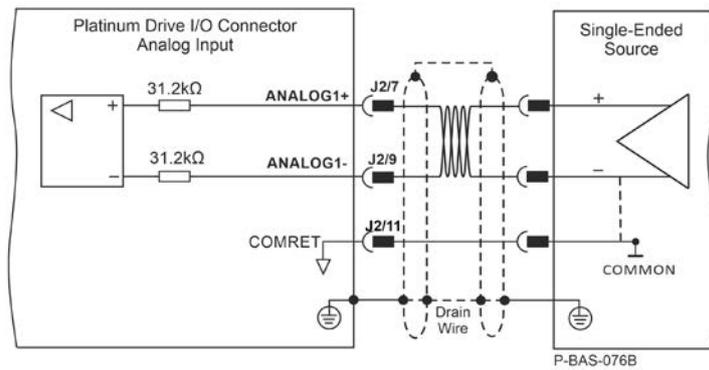


Figure 44: Differential Analog Input

8.13 Communication (X1, X2, and X3)

8.13.1 USB 2.0 (X3)

Use a standard USB 2.0 Type C cable and connector to connect the USB. Refer to section 18.1 in the [Platinum Safety Drive Manual](#).

8.13.2 EtherCAT (X1 and X2)



Note: The EtherCAT OUT port can be configured to an Ethernet Port

8.13.2.1 EtherCAT Connection

The following drawing describes the EtherCAT communication, and the pinout drawing of the connector.

The Platinum Bassoon can serve as an EtherCAT slave device. For this purpose it has two Ports X1 and X2, which are designated as EtherCAT In and EtherCAT Out.

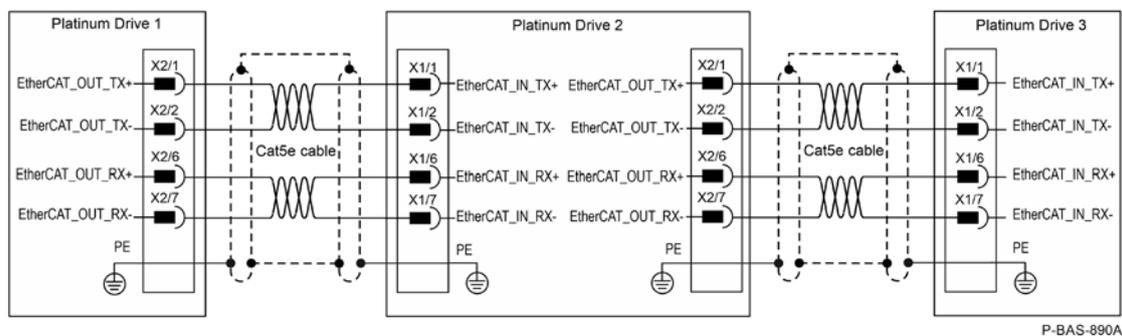


Figure 45: EtherCAT Connection Schematic Diagram

8.13.2.2 EtherCAT Status Indicator



Figure 46: EtherCAT Status LED

The EtherCAT Ports have a status LED. The EtherCAT status indicator is a single red/green dual bi-colored LED that combines the green RUN indicator and the red ERROR indicator of the EtherCAT state machine. For further details, see the EtherCAT Application Manual.

8.13.2.3 EtherCAT Link Indicators

Each Port has a LED; EtherCAT IN and EtherCAT OUT, which are shown in Figure 47.



Figure 47: Ethernet Connector LEDs

The green LEDs are the link/activity indicators. They show the state of the applicable physical link and the activity on that link; blinking green, both for the Link Act IN, and Link Act OUT.

8.13.2.4 EtherCAT Address Switches

The Platinum Bassoon has two rotary switches that allow the user to define a unique node ID to the slave. EtherCAT address switches set the ECAT address (LOW (x1) is ADD low, HIGH (x10) is ADD high). The two rotary switches offer up to 255 addresses, with the 0 setting referring to No alias address.

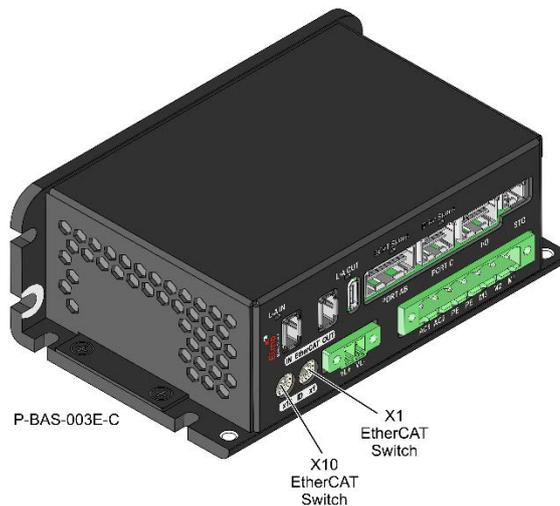


Figure 48: EtherCAT Address Switches

Figure 48 displays the switches available in the EtherCAT Version. Refer to section 18.2.5 EtherCAT Switches in the [Platinum Safety Drive Manual](#) for full details.

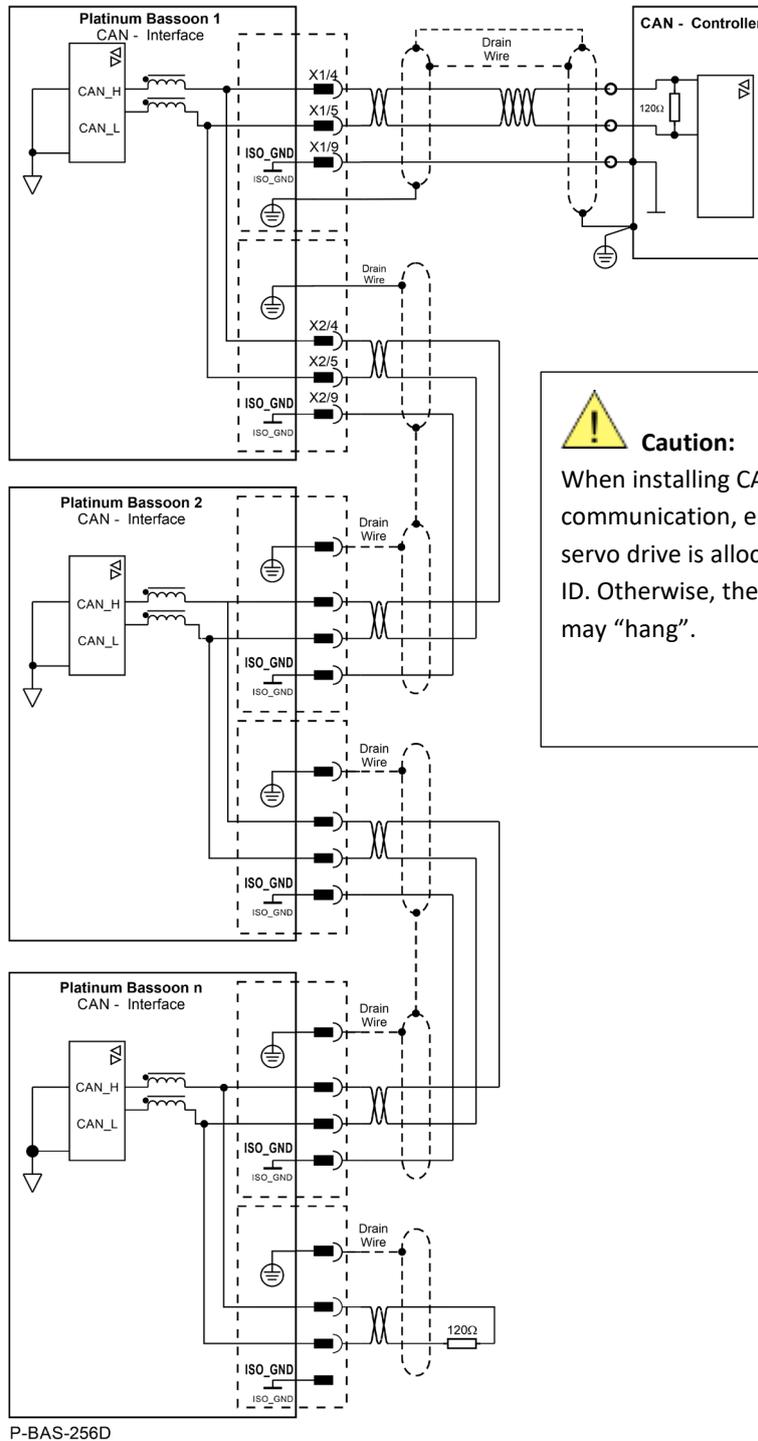
The positions of the switches on the drive are shown in Figure 48. Use a screwdriver to set the low and high bytes values of the drive EtherCAT address. This address is only retrieved after power-up.

8.13.3 CANopen (X1 and X2)



Note: It should be noted that all signals are isolated and the Grounding denoted ISO_GND throughout CAN connections.

CAN Wiring:



Caution:
When installing CAN communication, ensure that each servo drive is allocated a unique ID. Otherwise, the CAN network may “hang”.

Figure 49: CAN Network Diagram – Drop Off Topology

Chapter 9: Powering Up

After the Platinum Bassoon is connected to its device, it is ready to be powered up.



Caution:

Before applying power, ensure that the DC supply is within the specified range and that the proper plus-minus connections are in order.

9.1 Initializing the System

After the Platinum Bassoon has been connected and mounted, the system must be set up and initialized. This is accomplished using the *EASII*, Elmo’s Windows-based software application. Install the application and then perform setup and initialization according to the directions in the *EASII User Manual*.

9.2 Heat Dissipation

The best way to dissipate heat from the Platinum Bassoon is to mount it so that its heat-sink is attached to the machine chassis.

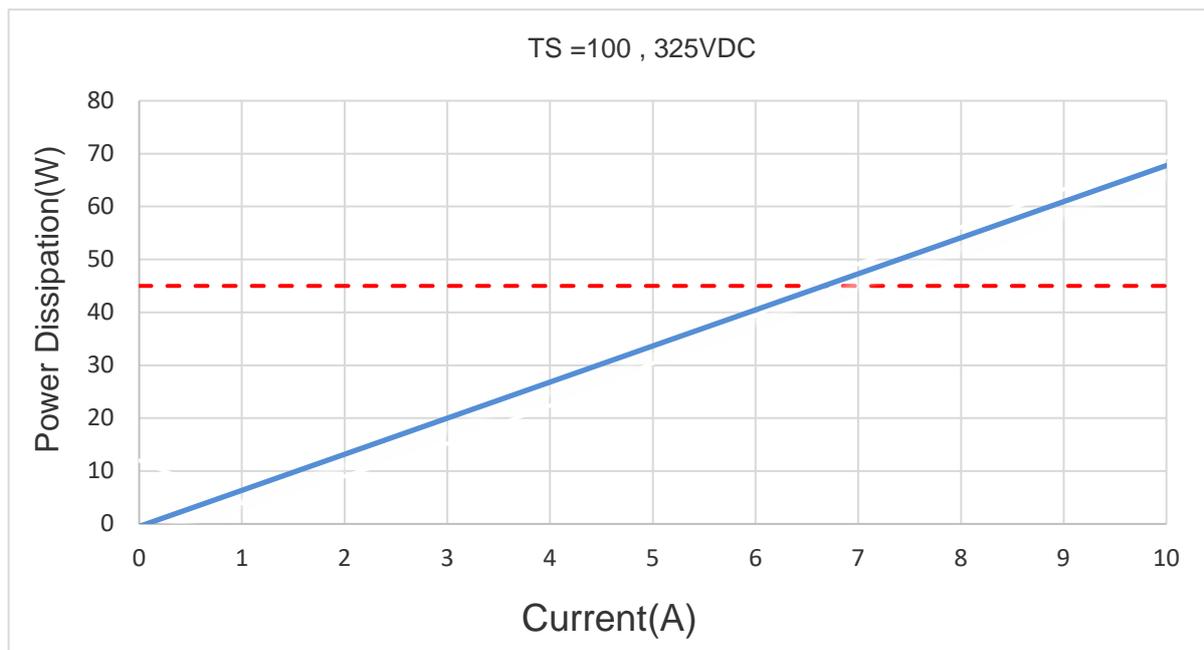
If the Platinum Bassoon is to be mounted with its heat-sink suspended, then for best results, mount the unit faced upwards and leave approximately 10 mm space between the Platinum Bassoon heat sink and any other assembly.

9.2.1 Heat Dissipation Data

The heat dissipation shown graphically below is applicable for an ambient of 25°C.

It should be noted that:

- The Heat Sink of the PN model PBAS-Lz-zXX/230-zzzQ can dissipate up to 45W.
- The Heat Sink of the PN model PBAS-Bz-zXX/230-zzzQ can dissipate without an additional heat sink.



9.2.2 How to Use the Chart

The above chart is based upon the theoretical worst-case scenario. The actual test results display a 20% - 30% lower power dissipation.

The chart indicates the net power conversion losses and excludes the power control losses.

To determine if your application heat dissipation requires an additional heat sink:

1. Determine the power dissipation according to the motor type support, Continuous Current, and the DC bus voltage curve.
If the DC bus is not as the curve above, estimate the dissipation by interpolation. The estimation error is not critical.
2. The chart is calculated for continuous current operation. If the actual operation is pulsed current, add 25% to 30% to the power dissipation of the average (RMS) current.
3. When the Heat-Sink temperature reaches $\approx 85^\circ\text{C}$, the Platinum Bassoon will shut down.
Design the system for continuous operation so that the maximum Heat Sink temperature does not exceed between 80°C and 82°C .
4. When an external Heat-Sink is required, calculate the thermal resistance of the heat sink according to:

$$\Phi_{c/W} = \frac{80^\circ\text{C} - T_{Ambient}}{\text{Heat Dissipation}}$$

Chapter 10: Dimensions

This chapter provides the Platinum Bassoon device dimensions.

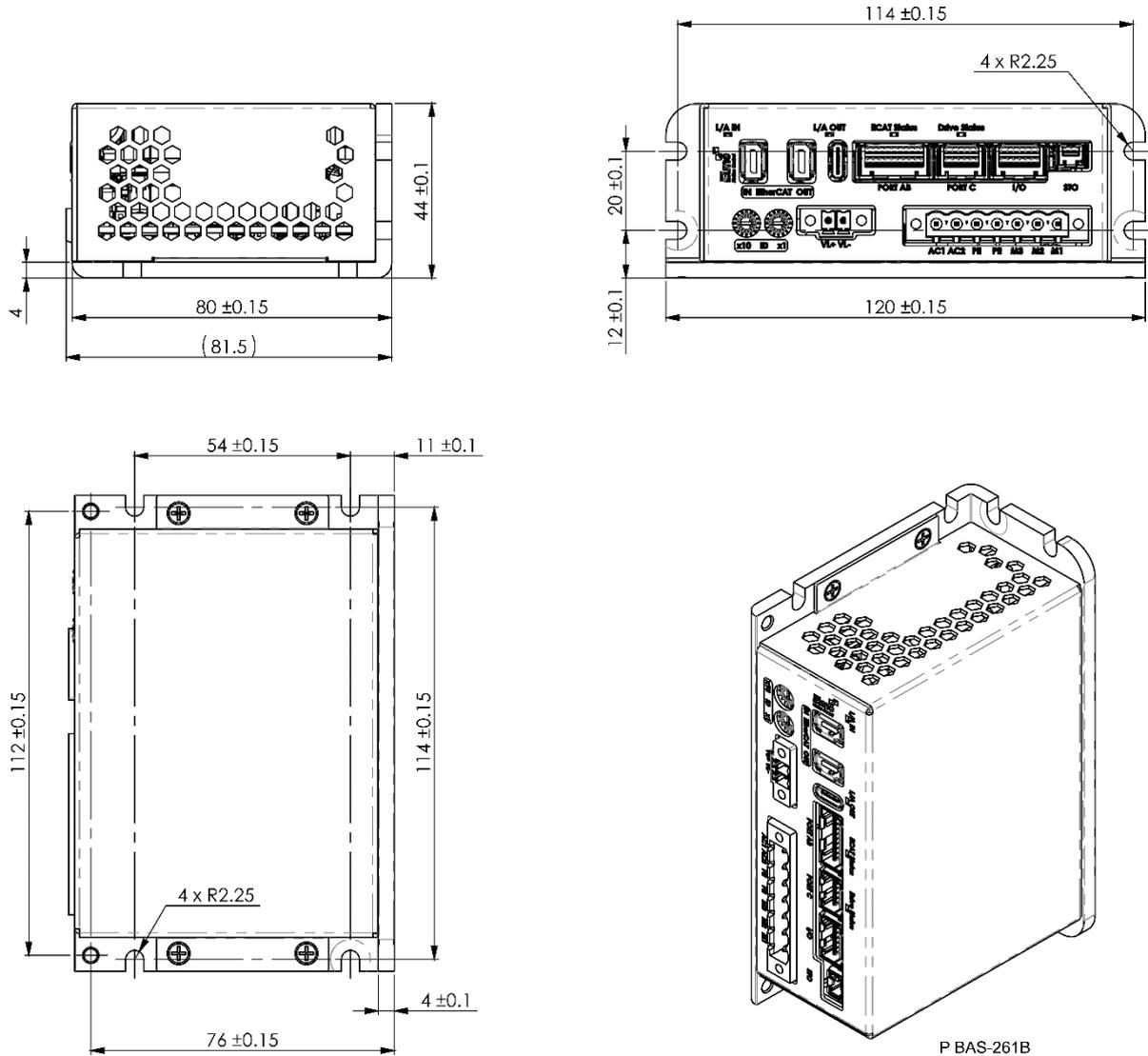
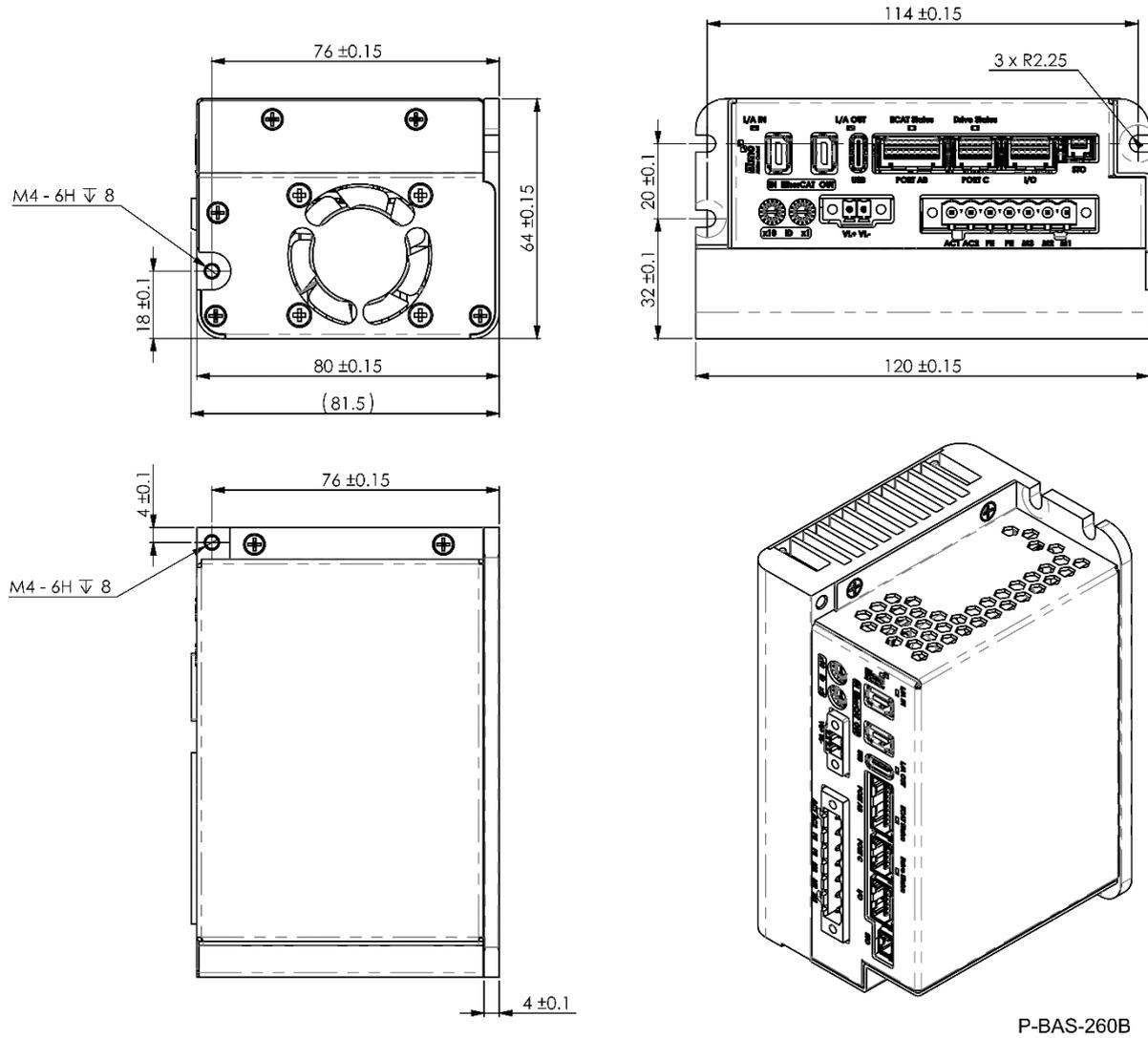


Figure 50: Platinum Bassoon, L-Shape – Dimensions



P-BAS-260B

Figure 51: Platinum Bassoon, Fins+Fan – Dimensions

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