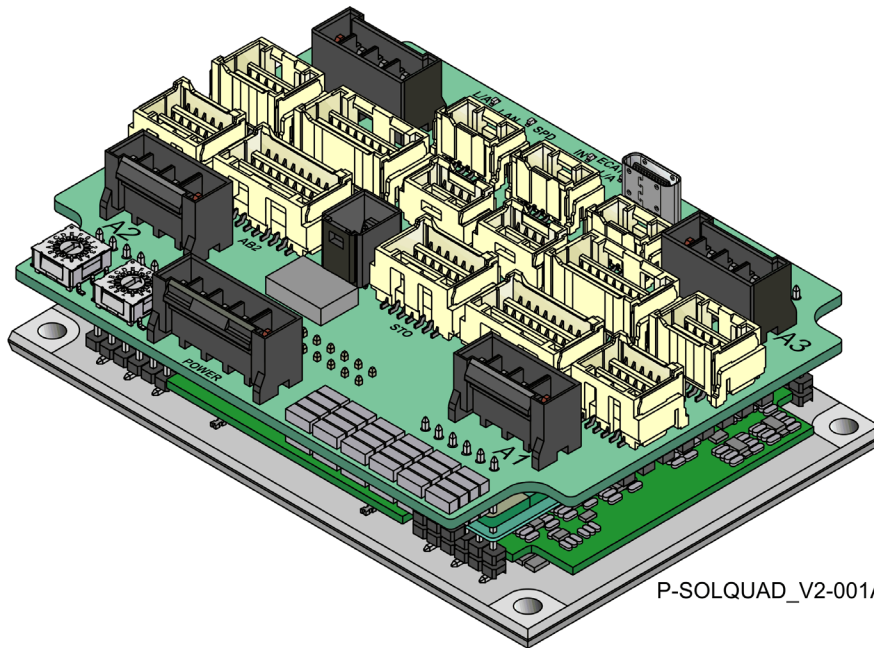


# Platinum Solo Quad Digital Servo Drive Installation Guide

## EtherCAT and CANopen



P-SOLQUAD\_V2-001A

December 2020 (Ver. 2.002)

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Ver. 2.002	Dec 2020

# Catalog Number

PQUA-zz-zXXX/YYYzzzQ

**Family Name:**  
Platinum Quartet, 4 drives  
motion & servo package

**Mounting Version:**  
S — SOLO

**Safety Capability :**  
O — Hardware STO only  
(SIL3,Plc,CAT3)

**Rated Current Mode:**  
Blank — STD Ic/ Ip  
R — Continuous Operation for Ti≤85C

**Rated Voltage**

**Rated Continuous Current**

**Dual Use:**  
Q — Dual Use Compliance 428/2009, ECCN3A225  
(Consult Factory)

**IO Style for Regular IO:**  
U — 5V Logic  
V — PLC SRC (High Side) or SINK (Low Side)

**Encoder Port B options:**  
E — Encoder, Absolute, Incremental,  
Digital Halls, Analog Halls,  
Analog Encoder (SIN/COS)

**Network:**  
F — EtherCAT with Switches or Ethernet  
USB  
RS-232 Serial Communication  
G — EtherCAT with Switches or Ethernet  
USB  
RS-422 (Differential RS-232) Serial Communication

# Cable Kit

- The following cable kit may be ordered  
Catalog number: CBL-PSOLQUAKIT02 EtherCAT Cable kit  
For further details, see the latest version of the MAN-P-SOLQUA-CBLKIT cable kit manual.

<b>Chapter 1:</b>	<b>This Installation Guide.....</b>	<b>7</b>
<b>Chapter 2:</b>	<b>Functional Safety.....</b>	<b>7</b>
<b>Chapter 3:</b>	<b>Safety Information .....</b>	<b>7</b>
3.1	Warnings.....	8
3.2	Cautions.....	8
3.3	CE Marking Conformance.....	8
3.4	Warranty Information .....	8
<b>Chapter 4:</b>	<b>Product Description.....</b>	<b>9</b>
4.1.1	Accessories.....	9
<b>Chapter 5:</b>	<b>Technical Information .....</b>	<b>10</b>
5.1	Physical Specification.....	10
5.2	Technical Data .....	10
5.2.1	Control Supply.....	11
5.2.2	Encoder Supply.....	11
5.2.3	Product Features.....	11
5.2.3.1	General Product Features.....	11
5.2.3.2	IO Features .....	11
5.3	Environmental Conditions .....	12
5.4	Platinum Line Standards.....	13
<b>Chapter 6:</b>	<b>Installation .....</b>	<b>14</b>
6.1	Unpacking the Drive Components.....	14
6.2	Mounting the Platinum Solo Quad.....	15
<b>Chapter 7:</b>	<b>Connector Types, Pinouts, and LEDs.....</b>	<b>16</b>
7.1	Mating Connector.....	17
7.2	Connector Locations.....	17
7.3	Solo Board Indicator Labelling.....	19
7.4	Motor Power Connector Pinouts (M11, M12, M13, M14).....	20
7.5	Main Power Connector Pinouts (P1) .....	20
7.6	Control Power Supply Connector Pinouts (P2).....	21
7.7	STO Connector Pinouts (J76) .....	22
7.8	Platinum Solo Quad Status Indicator.....	23
7.9	Port A and Port B Connector Pinouts (J11, J12, J13, J14) .....	24
7.9.1	Port A.....	24
7.9.2	Port B.....	24

7.10	Digital I/Os, & Analog Inputs Connector Pinouts (J31, J32, J33, J34).....	26
7.11	USB 2.0 Connector Pinouts (X3) .....	28
7.12	RS-232/RS-422 Serial Communication Main Connector Pinouts (X4) .....	29
7.13	RS-422 Serial Communication Auxiliary Connector Pinouts (X5) .....	29
7.14	EtherCAT IN Connector Pinouts (X1) .....	30
7.15	EtherCAT OUT/Ethernet Connector Pinouts (X2).....	30
7.16	LAN Connector Pinouts (X6) .....	31
<b>Chapter 8:</b>	<b>Wiring .....</b>	<b>32</b>
8.1	Wiring Legend.....	32
8.2	The Platinum Solo Quad Connection Diagrams.....	33
8.3	Wiring the Female CON CLIK-MATE Connectors .....	34
8.4	Motor Power (M11, M12, M13, M14) Per Axis .....	35
8.5	Main (P1) and Control Power (P2).....	36
8.5.1	Main Supply.....	36
8.5.2	Control Supply .....	36
8.5.3	Power Supply for 200V Power Rating .....	37
8.5.4	Power Supply for 100V Power Rating .....	38
8.5.4.1	Single Power Supply.....	38
8.5.4.2	Shared Supply .....	39
8.6	STO (Safe Torque Off) (J76) Per Axis.....	40
8.6.1	Source Mode – PLC Voltage Level .....	40
8.6.2	TTL Mode – TTL Voltage Level .....	41
8.7	Feedbacks (J11, J12, J13, J14) Per Axis .....	42
8.7.1	Feedback Port A .....	42
8.7.1.1	Incremental Encoder .....	42
8.7.1.2	Absolute Serial Encoder .....	43
8.7.1.3	Hiperface .....	43
8.7.2	Feedback Port B .....	44
8.7.2.1	Incremental Encoder .....	44
8.7.2.2	Interpolated Analog (Sine/Cosine) Encoder .....	44
8.7.3	Feedback - Hall Sensors.....	45
8.8	Digital I/Os (J31, J32, J33, J34) Per Axis .....	46
8.8.1	Digital IO PLC Source and Sink Mode (IO Type: V) .....	46
8.8.1.1	Digital Input and Output PLC Source Mode.....	46
8.8.1.2	Digital Input and Output PLC Sink Mode .....	47
8.8.2	Digital IO 5V Logic (IO Type: U) .....	48
8.9	Analog Input -Differential (J31, J32, J33, J34) Per Axis .....	48
8.10	Communication .....	49

8.10.1	USB 2.0 (X3) .....	49
8.10.2	RS-422 (X4 and X5)/RS-232 (X4) Serial Communication.....	49
8.10.2.1	RS-422 (Differential RS-232) Serial Communication for both X4 and X5 Connectors.....	49
8.10.2.2	X4 RS-422 (Differential RS-232) Serial Communication .....	50
8.10.2.3	X4 Main RS-232 Serial Communication .....	50
8.10.2.4	X5 RS-422 (Differential RS-232) Serial Communication .....	50
8.10.3	EtherCAT (X1 and X2) .....	51
8.10.3.1	EtherCAT Connection.....	51
8.10.3.2	EtherCAT Status Indicator.....	51
8.10.3.3	EtherCAT Link Indicators.....	52
8.10.3.4	EtherCAT Address Switches .....	52
8.10.4	LAN Connector Pinouts (X6) .....	53
8.10.4.1	LAN Activity Indicator .....	53
<b>Chapter 9:</b>	<b>Powering Up.....</b>	<b>54</b>
9.1	Initializing the System.....	54
9.2	Heat Dissipation.....	54
9.2.1	Thermal Data .....	54
9.2.2	Heat Dissipation Data Per Axis .....	54
9.2.3	How to Use the Charts .....	55
<b>Chapter 10:</b>	<b>Dimensions .....</b>	<b>56</b>

## Chapter 1: *This Installation Guide*

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

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

## Chapter 2: *Functional Safety*

The Platinum family of servo drives support Functional Safety. This will be implemented in the Platinum Solo Quad at a future time.

## Chapter 3: *Safety Information*

In order to achieve the optimum, safe operation of the Platinum Solo Quad, 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 Solo Quad 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 Solo Quad 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.

To avoid any potential hazards that may cause severe personal injury or damage to the product during operation, keep all covers and cabinet doors shut.

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 Solo Quad 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.



#### Capacitance Discharge

After shutting off the power and removing the power source from your equipment, wait at least 2 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 Solo Quad to an approved isolated auxiliary 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 Solo Quad, 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 Solo Quad 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 Solo Quad 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 Solo Quad is an integrated solution delivering up to **2000 W of continuous power per axis** in a compact package (95.0 x 72.0 x 30.3 mm or 3.74" x 2.84" x 1.19"), and designed to simply and efficiently connect Elmo's Platinum Solo Quad servo drive directly to the application. The solution consists of the Platinum Solo Quad together with a convenient connection interface, which either eliminates or reduces development time and resources when designing an application's PCB board.

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.

The Platinum Solo Quad will be provided in three configurations, one of which is available now:

- **Servo drive with STO Only** (available now) – The servo drive configuration supports only STO.
- **Servo drive with Function Safety excluding Safe IO** (available in the future) - This configuration is appropriate for requirements for basic Functional Safety without the enhancements included in the Safe IO module. This configuration permits operation of safety functions only via FSOE (Fail Safe Over EtherCAT).
- **Servo drive with Function Safety and Safe IO** (available in the future) - In this configuration the Platinum Solo Quad is provided with the additional Safe IO module. The configuration supports Safe Digital Inputs and Outputs including Brakes. This configuration supports the operation of the safety function either via FSOE or via the Digital Inputs.

The Platinum Solo Quad is powered by a single 14 V – 95 V isolated DC power source (not included) and a "smart" control-supply algorithm enables the drive to operate up to 95 V with only one power supply for nonfunctional safety, with no need for a Control power supply for the logic. For functional safety the Control power supply is required for the logic.

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 Solo Quad drive is easily set up and tuned using Elmo Application Studio (EASII) software tools now available in both 32bit and 64bit versions. As part of the Platinum product line, it is fully programmable with the Elmo motion control language. For more about software tools refer to the Elmo Application Studio Inline-Help.

The Platinum Solo Quad is available in a variety of options. There are multiple power rating options, two different communications options, a variety of feedback selections and I/O configuration possibilities.

### 4.1.1 Accessories

Two types of cable kits may be ordered

Catalog number: CBL-GSOLQUAKIT02 - EtherCAT Cable kit

For further details, see the documentation for the Platinum Solo Quad cable kit.

## Chapter 5: Technical Information

### 5.1 Physical Specification

Feature	Units	All Types
Weight	g (oz.)	174g (6.14 oz)
Dimension	mm (in)	95 x 72 x 30.3 mm(3.74" x 2.84" x 1.19")
Mounting method		Panel Based
Interface Board LEDs		Drive Status, EtherCAT Status, EtherCAT Link In and Out, LAN Link, LAN Speed

### 5.2 Technical Data

The following table describes the technical data for the Platinum Solo Quad per axis.

Feature	Units	1/100	6/100	10/100	25/100	10/200
Minimum supply voltage	VDC	10				20
Nominal supply voltage	VDC	85				170
Maximum supply voltage	VDC	95				195
Maximum continuous power output	W	80	470	800	2000	1650
Efficiency at rated power (at nominal conditions)	%	> 99				
Maximum output voltage		> 95% of DC bus voltage at f = 22 kHz				
Control power supply	VDC	14 to 95 VDC (up to 6 VA inc. 5 V/2 x 200 mA for encoder)				
Amplitude sinusoidal/DC continuous current	A	1	6	10	25	10
Sinusoidal continuous RMS current limit (Ic)	A	0.7	4.2	7.1	17.7	7.1
Peak current limit	A	2 x Ic				

Table 1: Power Rating




**Note (on current ratings):**

The current ratings of the Platinum Solo Quad are given in units of DC amperes (ratings that are used for trapezoidal commutation or DC motors). The RMS (sinusoidal commutation) value is the DC value divided by 1.41.

### 5.2.1 Control Supply

Feature	Details
Control supply input voltage	<b>Isolated DC source:</b> 14 to 95 V, 85 V Nominal
Control supply input power	≤4 VA without external loading ≤6 VA with full external loading

### 5.2.2 Encoder Supply

Feature	Details
5V supply	5V ±5% 200mA ÷ 250mA   <b>Note:</b> When using two encoder supply pins, only 200mA is allowed for each pin.

### 5.2.3 Product Features

#### 5.2.3.1 General Product Features

Main Feature	Details	Presence and No.
<b>Feedback</b>	Standard Ports A and B feedbacks Supports Incremental encoder, Absolute serial encoders and analog encoder	<b>√ 4 Axes x Standard Ports A and B feedbacks</b>
<b>Communication Option</b>	USB	<b>√</b>
	EtherCAT with Address Switches	<b>√</b>
	LAN	<b>√</b>
	CAN (Available in the future)	<b>√</b>
	RS-232 TTL level	<b>√</b>
	RS-422 Main	<b>√</b>
	RS-422 Auxiliary	<b>√</b>
<b>Analog Input</b>	Differential ±10V or Single Ended	<b>√ 1 per axis</b>

#### 5.2.3.2 IO Features

Main Feature	Details	Presence and No.
<b>STO</b>	TTL or PLC SRC	<b>√ per axis</b>
<b>Digital Input</b>	5V Logic or PLC SRC or PLC SINK	<b>√ 4 per axis</b>
<b>Digital Output</b>	5V logic or PLC SRC or PLC SINK	<b>√ 2 per axis</b>

### 5.3 Environmental Conditions

You can guarantee the safe operation of the Platinum Solo Quad by ensuring that it is installed in an appropriate environment.



**Warning:**

During operation the Platinum Solo Quad becomes hot to the touch (the heatsink and wires may heat up to 85 °C). Care should be taken when handling it.

Feature	Details
<b>Operating ambient temperature according to IEC60068-2-2</b>	0 °C to 55 °C (32 °F to 131 °F)
<b>Storage temperature</b>	-20 °C to +85 °C ( -4 °F to +185 °F)
<b>Maximum non-condensing humidity according to IEC60068-2-78</b>	95%
<b>Maximum Operating Altitude</b>	2,000 m (6562 feet) It should be noted that servo drives capable of higher operating altitudes are available on request.
<b>Mechanical Shock according to IEC60068-2-27</b>	15g / 11ms Half Sine
<b>Vibration according to IEC60068-2-6</b>	5 Hz ≤ f ≤ 10 Hz: ±10mm 10 Hz ≤ f ≤ 57 Hz: 4G 57 Hz ≤ f ≤ 500 Hz:5G

Preliminary

## 5.4 Standards and Certifications

Main Standards	Item
The related standards below apply to the performance of the servo drives as stated in the environmental conditions in section 5.3 Environmental Conditions above.	
<b>IEC 61800-5-2:2016 for STO</b> Certification is pending	Adjustable speed electrical power drive systems – Safety requirements – Functional
<b>EN ISO 13849-1:2015 for STO</b> Certification is pending	Safety of machinery — Safety-related parts of control systems.
<b>IEC/EN 61800-5-1</b> Certification is pending	Adjustable speed electrical power drive systems Safety requirements – Electrical, thermal and energy
<b>In compliance with UL61800-5-1</b>	Adjustable speed electrical power drive systems Safety requirements – Electrical, thermal and energy
<b>In compliance with UL 508C</b>	Power Conversion Equipment
<b>In compliance with UL 840</b>	Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment
<b>Conformity with CE 2006/95/EC</b>	Low-voltage directive 2006/95/EC
<b>In compliance with CSA C22.2 NO. 14-13</b>	Industrial Control Equipment

### 5.4.1 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 Solo Quad must be installed in a suitable environment and properly connected to its voltage supplies and the motor. A serial fuse or circuit breaker should be installed Rated for drive's continuous RMS current rating.

### 6.1 Unpacking the Drive Components

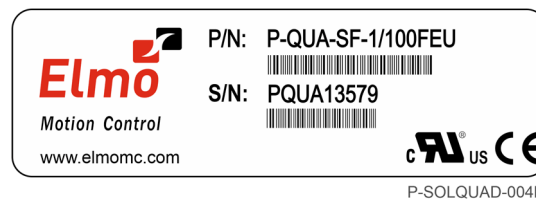
Before you begin working with the Platinum Solo Quad, verify that you have all of its components, as follows:

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

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

#### To unpack the Platinum Solo Quad:

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 Solo Quad you have unpacked is the appropriate type for your requirements, locate the part number sticker on the side of the Platinum Solo Quad. It looks like this:



4. Verify that the Platinum Solo Quad type is the one that you ordered, and ensure that the voltage meets your specific requirements.

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 Mounting the Platinum Solo Quad

The Platinum Solo Quad was designed for mounting on a surface. When integrating the Platinum Solo Quad into a device, be sure to leave about 1 cm (0.4") outward from the heat-sink to enable free air convection around the drive. If the Platinum Solo Quad is enclosed in a metal chassis, we recommend that the Platinum Solo Quad be screw-mounted to it to help with heat dissipation. The Platinum Solo Quad has screw-mount holes on each corner of the heat-sink for this purpose – see below. Use 4 x M3 x 8 mm screws to mount the Platinum Solo Quad onto a surface to a force of 0.4 Nm torque for each screw.

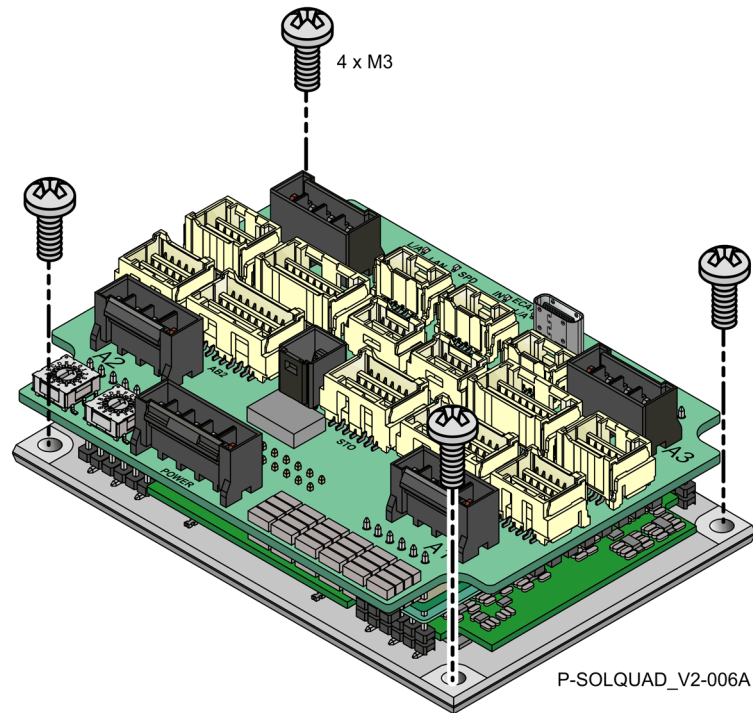


Figure 1: Mounting the Platinum Solo Quad

## Chapter 7: Connector Types, Pinouts, and LEDs

Throughout this document, all Ax connections refer to the specific axis “x”, numbered from 1...4.

The Platinum Solo Quad has nineteen connectors (connectors' version).

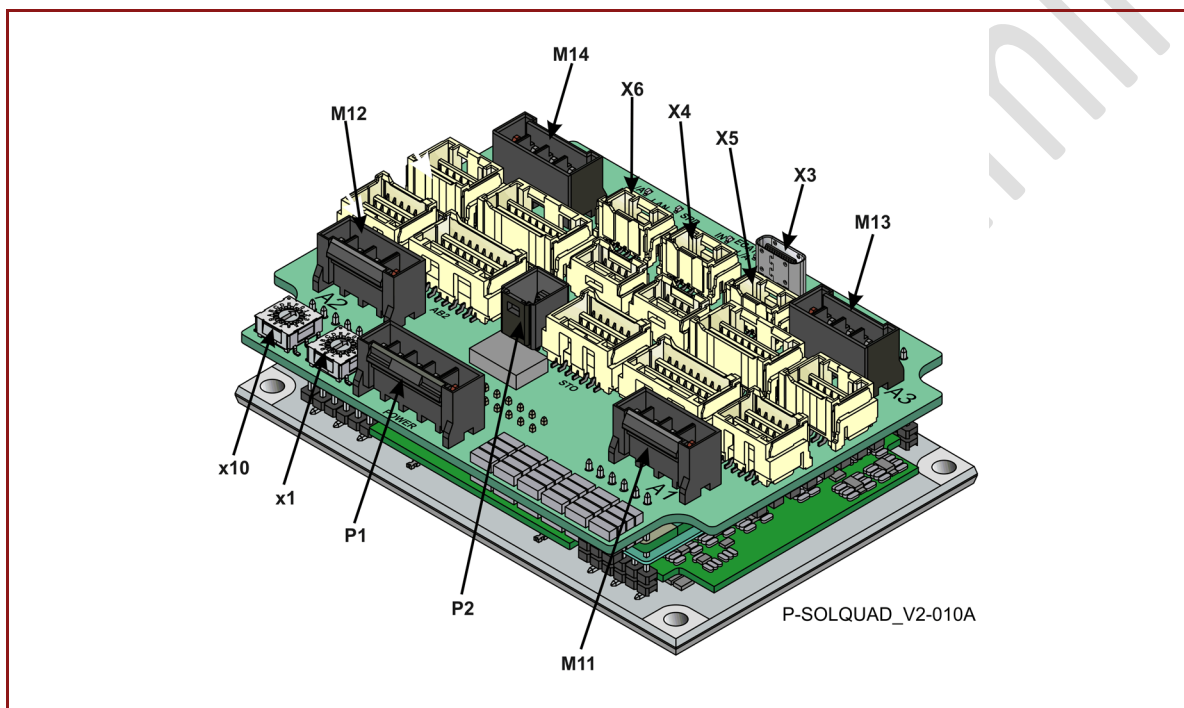
Port	No. Pins	Type	Function
<b>M1 (M11)</b> M1, M2, M3, PE	4	3.96 mm pitch	Motor A1 phases
<b>M2 (M12)</b> M1, M2, M3, PE	4	3.96 mm pitch	Motor A2 phases
<b>M3 (M13)</b> M1, M2, M3, PE	4	3.96 mm pitch	Motor A3 phases
<b>M4 (M14)</b> M1, M2, M3, PE	4	3.96 mm pitch	Motor A4 phases
<b>P1</b> VP+, VP+, PR, PR, PE	5	3.96 mm pitch	Power
<b>P2</b> PR, VL+, VDD	2x2	2.0 mm pitch	Control Power
<b>J76</b>	2x7	1.5 mm pitch	STO
<b>J11</b>	2x9	1.5 mm pitch	Feedback Port A/B1
<b>J12</b>	2x9	1.5 mm pitch	Feedback Port A/B2
<b>J13</b>	2x9	1.5 mm pitch	Feedback Port A/B3
<b>J14</b>	2x9	1.5 mm pitch	Feedback Port A/B4
<b>J31</b>	2x6	1.5 mm pitch	I/O1
<b>J32</b>	2x6	1.5 mm pitch	I/O2
<b>J33</b>	2x6	1.5 mm pitch	I/O3
<b>J34</b>	2x6	1.5 mm pitch	I/O4
<b>X3</b>	24	USB Device Type-C	USB
<b>X4</b>	5	1.5 mm pitch	RS-422/RS-232 Main communication
<b>X5</b>	5	1.5 mm pitch	RS-422 Auxiliary communication
<b>X6</b>	5	1.5 mm pitch	LAN Communication
<b>EtherCAT Version</b>			
<b>X1</b>	5	Molex, 505405-0560 CLIK-Mate, 1.5 mm pitch	EtherCAT in
<b>X2</b>	5	Molex, 505405-0560 CLIK-Mate, 1.5 mm pitch	EtherCAT out



## 7.1 Mating Connector

Connector	Mating Connector Type	Mating Crimping Pins
<b>J11, J12, J13, J14</b> Feedback Port A/B	CON CLIK-MATE HOUSING FE 18PIN (2X9) P=1.5 mm pitch plug	MOLEX CRIMP TERMINAL FE 24-28AWG FOR CLIK-MATE 1.5 mm
<b>J31, J32, J33, J34</b> I/O	CON CLIK-MATE HOUSING FE 12PIN (2X6) P=1.5 mm pitch plug	
<b>X4 RS-422/RS-232</b> Main communication	CON CLIK-MATE HOUSING FE 5PIN (1X5) P=1.5 mm pitch	
<b>X6 LAN</b> communication	CON CLIK-MATE HOUSING FE 5PIN (1X5) P=1.5 mm pitch	
<b>X1, X2 IN/OUT CAN/EtherCAT</b> Communication	CON CLIK-MATE HOUSING FE 5PIN (1X5) P=1.5 mm pitch	
<b>X5 RS-422</b> Auxiliary communication	CON CLIK-MATE HOUSING FE 5PIN (1X5) P=1.5 mm pitch	
<b>J76</b> STO	CON CLIK-MATE HOUSING FE 14PIN (2X7) P=1.5 mm pitch	
<b>M11, M12, M13, M14</b> Motor Phases	CON HOUSING HRS DF63 FE ST 4PIN (1X4) P=3.96MM	HRS CRIMP TERMINAL FE 16- 18AWG TIN FOR DF63 3.96mm SERIES
<b>P1</b> Power	CON HOUSING HRS DF63 FE ST 5PIN (1X5) P=3.96MM	
<b>P2</b> Control Power	CON HOUSING HRS DF51K FA ST 4PIN (2X2) P=2MM	HRS CRIMP TERMINAL FE 22AWG FOR DF51K 2mm SERIES

## 7.2 Connector Locations



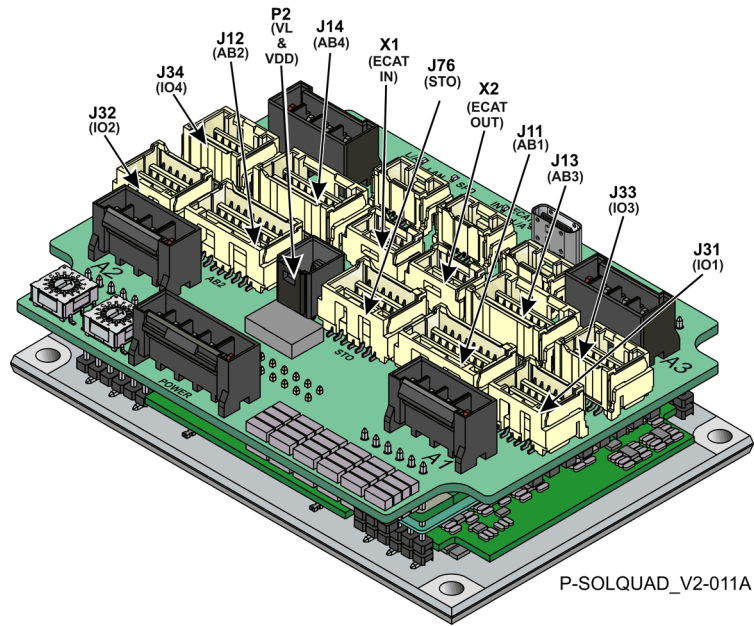
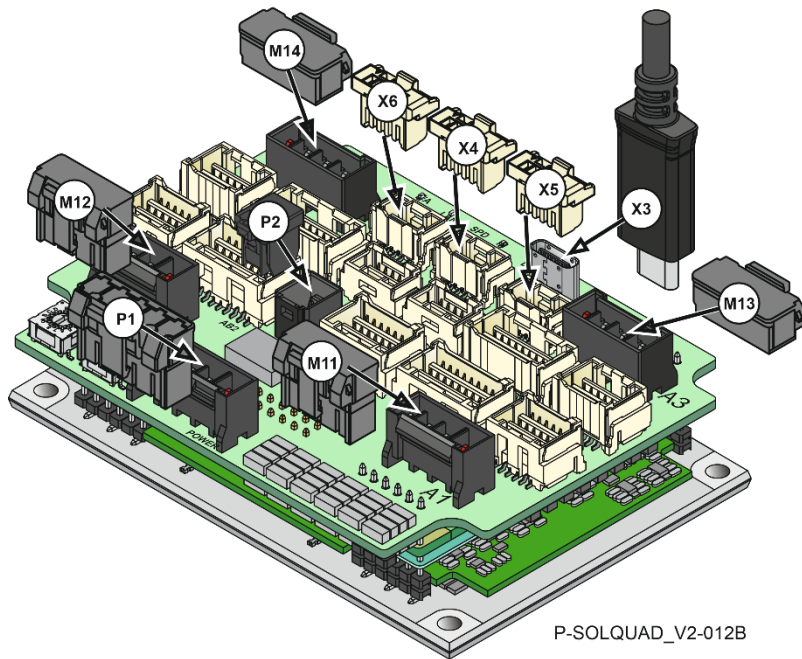


Figure 2: Connectors and Connector Locations



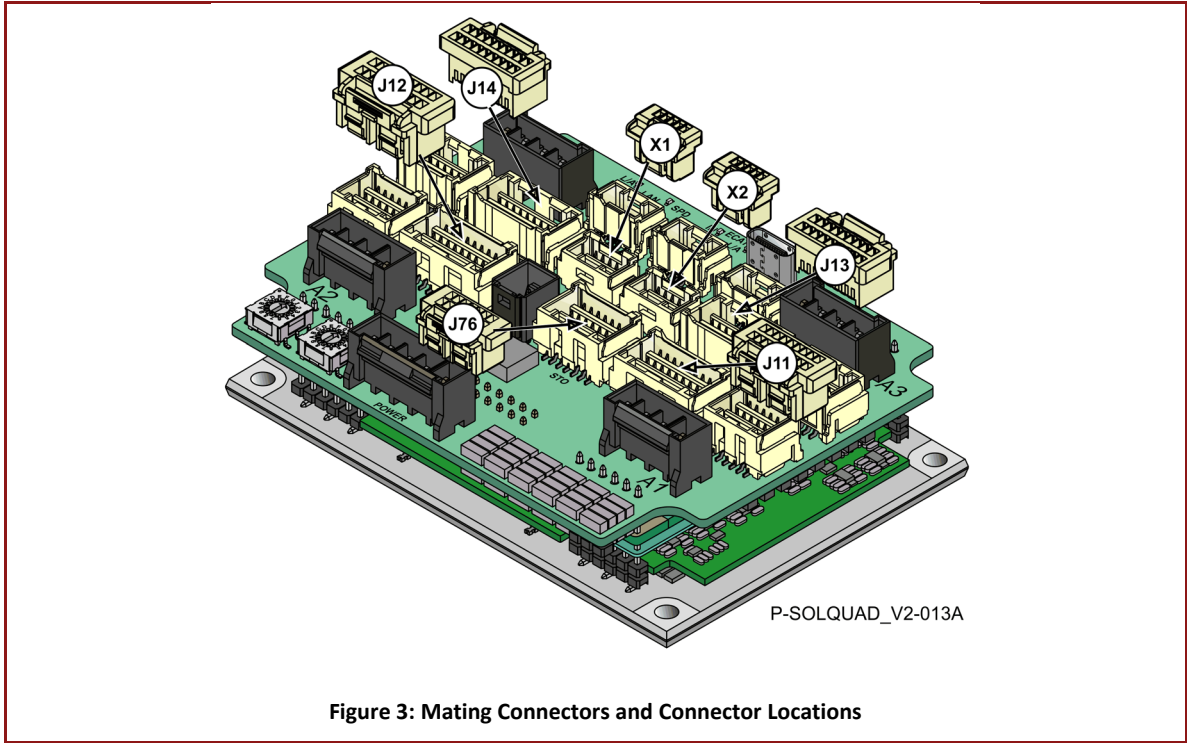


Figure 3: Mating Connectors and Connector Locations

Table 2: Connector Types

The pinouts in Chapter 8: Wiring describe the function of each pin in the Platinum Solo Quad connectors that are listed in Table 2.

### 7.3 Solo Board Indicator Labelling

The following diagram describes the board indicator labelling for the Platinum Solo Quad.

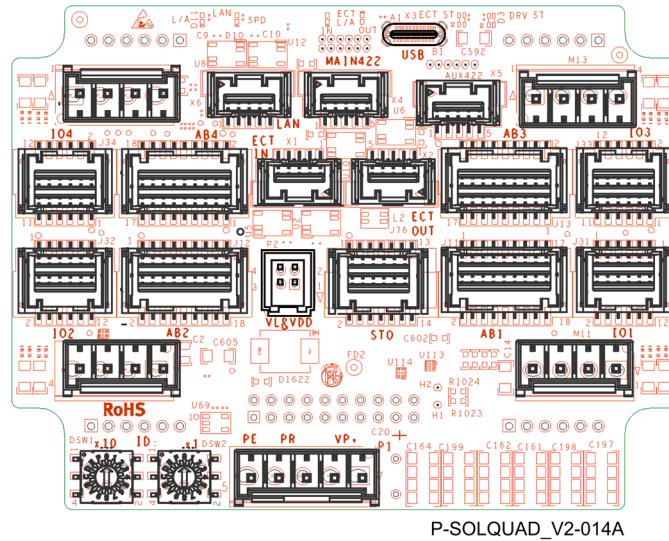


Figure 4: Platinum Solo Quad Board Indicator Labelling

## 7.4 Motor Power Connector Pinouts (M11, M12, M13, M14)

The following table describes the pinouts for the Motor Power connectors M11 (Motor M1), M12 (Motor M2), M13 (Motor M3), and M14 (Motor M4).

Pin No.	Pin Signal	Function	Cable – Wires	
			Brushless Motor	Brushed DC Motor
1	M3	Motor phase	Motor	Motor
2	M2	Motor phase	Motor	Motor
3	M1	Motor phase	Motor	No Connection
4	PE	Protective earth, Shield	Motor PE	Motor PE

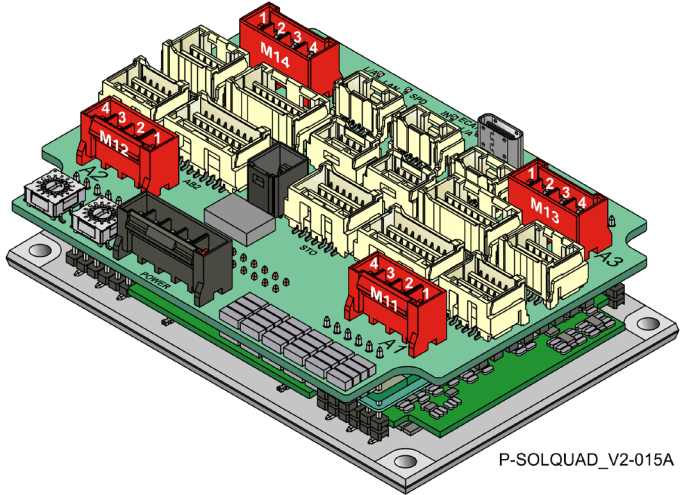
Pin Positions	
	

Table 3: Main Power and Motor Connections

## 7.5 Main Power Connector Pinouts (P1)

Pin (P1) No.	Signal	Function	Cable
1	VP+	Positive Power Input	DC Power
2	VP+	Positive Power Input	DC Power
3	PR	Power Return	DC Power
4	PR	Power Return	DC Power
5	PE	Protective Earth	DC Power

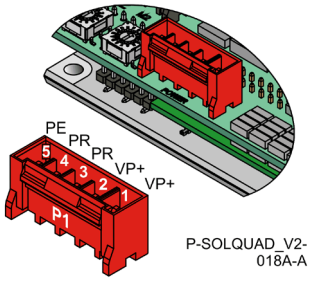
Pin Positions	
	

Table 4: Main Power and Motor Connections

## 7.6 Control Power Supply Connector Pinouts (P2)

Pin (P2)	Signal	Function
1	VL+	Control Supply Input 14V ÷ 95V, Typical 85V
2	VDD	VDD input (5V to 30V)
3	PR	Control Supply Return
4	VDD_RET	VDD return

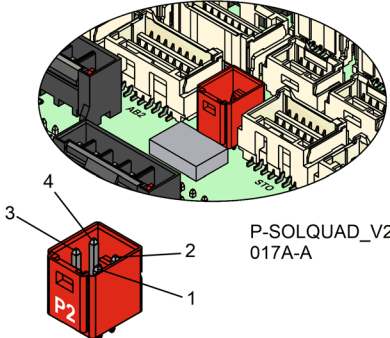
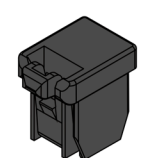
Pin Positions	Cable Connector
 <p>P-SOLQUAD_V2-017A-A</p>	 <p>P-SOLQUAD_V2-026A</p>

Table 5: Control Supply Pins

## 7.7 STO Connector Pinouts (J76)

Pin (J76)	Signal	Function
1	A1_STO1	A1 Isolated STO1 Input
2	A3_STO1	A3 Isolated STO1 Input
3	A1_STO2	A1 Isolated STO2 Input
4	A3_STO2	A3 Isolated STO2 Input
5	A1_STO_RET	A1 STO Return
6	A3_STO_RET	A3 STO Return
7	A2_STO1	A2 Isolated STO1 Input
8	A4_STO1	A4 Isolated STO1 Input
9	A2_STO2	A2 Isolated STO2 Input
10	A4_STO2	A4 Isolated STO2 Input
11	A2_STO_RET	A2 STO Return
12	A4_STO_RET	A4 STO Return
13	Not Connected	
14	Not Connected	

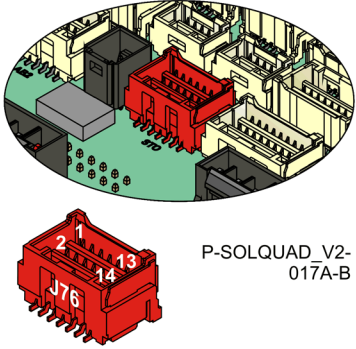
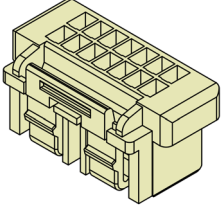
Pin Positions	Cable Connector
 <p>P-SOLQUAD_V2-017A-B</p>	 <p>P-SOLQUAD_V2-086A</p>

Table 6: STO Pins

## 7.8 Platinum Solo Quad Status Indicator

Figure 5 shows the position of the red/green dual LED, which is used for immediate indication of the Initiation and Working states.

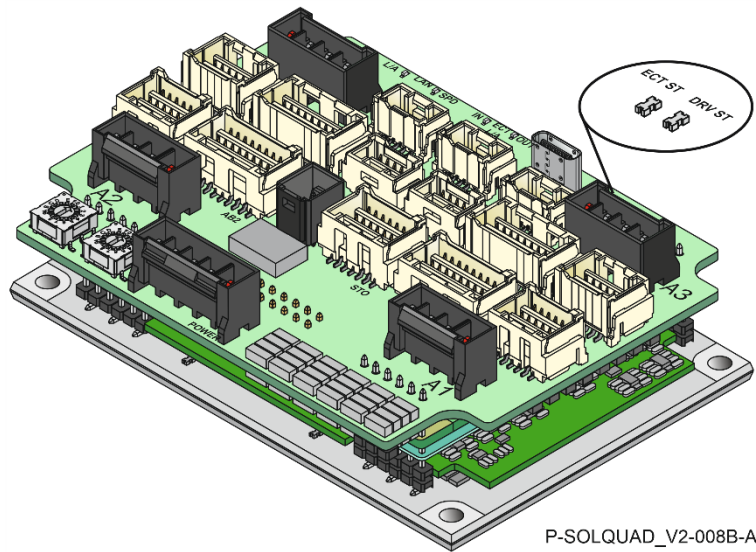


Figure 5: Drive Status Indicator


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

- **Initiation state:** In this state the LED indicates whether the drive is in the boot state (blinking red) or in the operational state (steady red).
- **Working state:** In this state the LED indicates whether the drive is in an amplifier failure state (red) or is ready to enable the motor (green).


## 7.9 Port A and Port B Connector Pinouts (J11, J12, J13, J14)

The following tables describe the pinouts for the Port A and B Feedbacks J11 (AB1), J12 (AB2), J13 (AB3), and J14 (AB4). The Port A and Port B signals are similar for each of the connector pinouts, and are labelled **J1x = J11, J12, J13, or J14, where x=1, 2, 3, 4 axis** in the connection diagrams in section 8.7 Feedbacks (J11, J12, J13, J14) Per Axis.

### 7.9.1 Port A

Pin Port A		Incremental Encoder	Absolute Serial Encoder
	Signal	Function	Function
1	COMRET	Common return (5V Return)	
2	PortA_A+	Channel A +	Absolute encoder clock+ (CLK+_Ax)
3	5VDC	Encoder +5V supply (5V ±5%, 200mA ÷ 250mA)  <b>Note:</b> When using two encoder supply pins, only 200mA is allowed for each pin.	
4	PortA_A-	Channel A -	Absolute encoder clock- (CLK-_Ax)
5	HA	Hall A Input	
6	PortA_B+	Channel B+	Absolute encoder data+ (DATA+_Ax)
7	HB	Hall B Input	
8	PortA_B-	Channel B -	Absolute encoder data - (DATA-_Ax)
9	HC	Hall C Input	

### 7.9.2 Port B

Pin Port B		Incremental Encoder	Interpolated Analog Encoder
	Signal	Function	Function
10	PortB_A+	Channel A+	Sine+_Ax
11	PortB_INDEX+_Ax	Channel_Index+	Analog_Index+
12	PortB_A-	Channel A -	Sine-_Ax
13	PortB_INDEX-_Ax	Channel_Index-	Analog_Index-
14	PortB_B+	Channel B+	Cosine+_Ax
15	5VDC	Encoder +5V supply (5V ±5%, 200mA ÷ 250mA)  <b>Note:</b> When using two encoder supply pins, only 200mA is allowed for each pin.	
16	PortB_B-	Channel B-	Cosine-_Ax
17	COMRET	Common return (5V Return)	
18	COMRET	Common return (5V Return)	



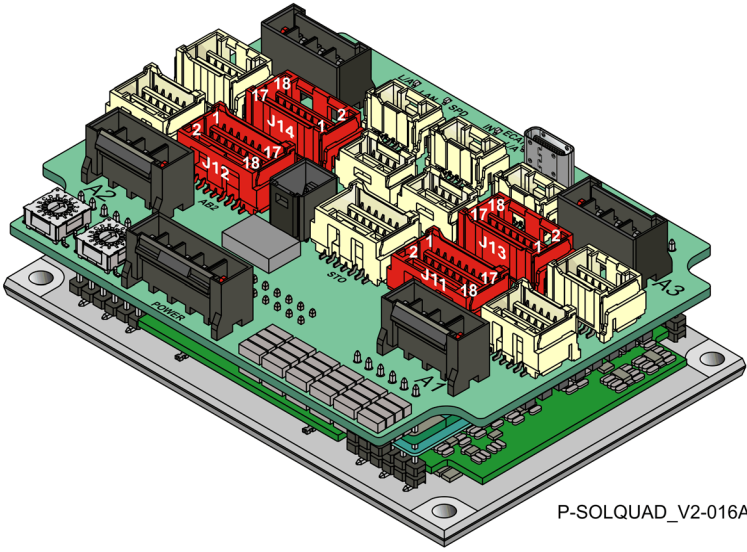
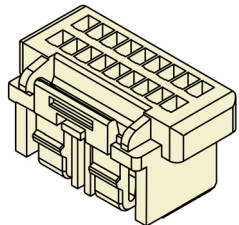
Pin Positions	Cable Connector
 <p>P-SOLQUAD_V2-016A</p>	 <p>P-SOLQUAD_V2-088A-A</p>

Table 7: Port A and Port B Pin Assignments

Preliminary

## 7.10 Digital I/Os, & Analog Inputs Connector Pinouts (J31, J32, J33, J34)

The Digital I/Os and Analog Inputs connector includes the following functions:

- I/O
- Analog input

In the following table x= 1 (IO1, J31), 2 (IO2, J32), 3 (IO3, J33), 4 (IO4, J34) axis.

The Digital I/O and Analog Input signals are similar for each of the connector pinouts, and are labelled **J3x = J31, J32, J33, or J34**, in the connection diagrams in section 8.8 Digital I/Os (J31, J32, J33, J34) Per Axis.

Pin	Signal	Function
1	ANALOG_RET	Analog return
2	VDD_RET	Output Return
3	ANALOG_Ax+	Differential Analog input for connector J3x $\pm 10V$
4	VDD_OUT	VDD, OUTPUT only up to 0.75A
5	ANALOG_Ax-	Differential Analog input complement for connector J3x $\pm 10V$
6	PCL_TYPE	VDD – Ax Inputs and Outputs PLC Sink VDD_RET – Ax Inputs and Outputs PLC Source Open – Ax Outputs PLC Source
7	IN1_Ax	Input 1 for connector J3x
8	IN2_Ax	Input 2 for connector J3x
9	IN3_Ax	Input 3 for connector J3x
10	IN4_Ax	Input 4 for connector J3x
11	OUT1_Ax	<b>IO Feature PLC</b> Output 1 for connector J3x with two options: Isolated, up to 250mA and OUT2_Ax Isolated, up to 500mA Or Isolated, up to 500mA and OUT2_Ax Isolated, up to 250mA <b>IO Feature 5V Logic</b> Up to 15mA
12	OUT2_Ax	<b>IO Feature PLC</b> Output 2 for connector J3x with two options: Isolated, up to 250mA and OUT1_Ax Isolated, up to 500mA Or Isolated, up to 500mA and OUT1_Ax Isolated, up to 250mA <b>IO Feature 5V Logic</b> Up to 15mA

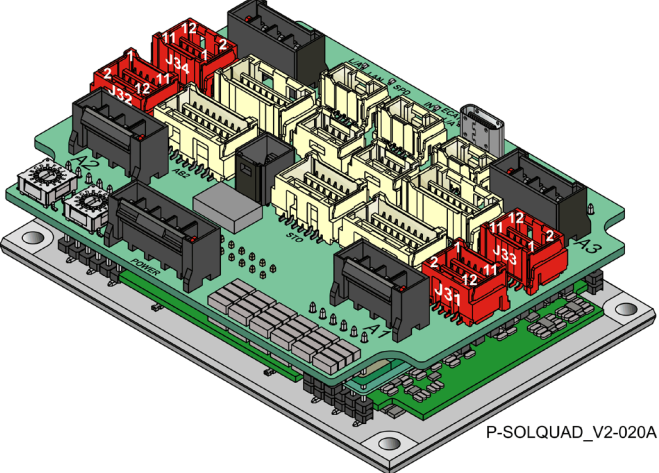
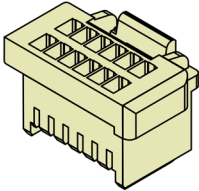
Pin Positions	Cable Connector
 <p>P-SOLQUAD_V2-020A</p>	 <p>P-SOLQUAD_V2-031A</p>

Table 8: Digital I/Os, and Analog Inputs Pin Assignments

Preliminary

### 7.11 USB 2.0 Connector Pinouts (X3)

Pin (X3)	Signal	Function
A1	COMRET	Common return
A2	Not Connected	
A3	Not Connected	
A4	USB_VBUS	USB VBUS 5 V
A5	Not Connected	
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	Not Connected	
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
Pin Positions		Cable Connector
 <p>P-SOLQUAD_V2-066A-A</p>		 <p>P-SOLQUAD-V2-087A USB TYPE C CABLE</p>

Table 9: USB Device Mini-B - Pin Assignments

## 7.12 RS-232/RS-422 Serial Communication Main Connector Pinouts (X4)

Pin (X4)	RS-232		RS-422	
	Signal	Function	Signal	Function
1	RS232_TX	RS232 Level Transmit	RS422_TX+	Differential RS-232 Transmit
2	NC		RS422_TX-	Differential RS-232 Transmit Complement
3	RS232_RX	RS232 Level Receive	RS422_RX+	Differential RS-232 Receive
4	NC		RS422_RX-	Differential RS-232 Receive Complement
5	COMRET	Common Return	COMRET	Common Return

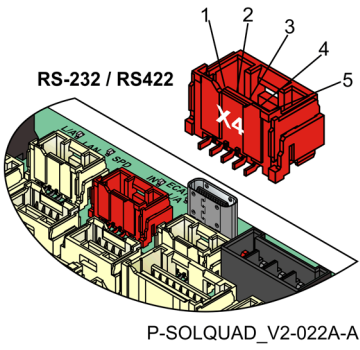
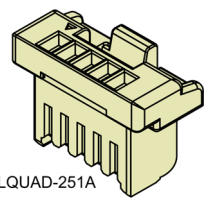
Pin Positions	Cable Connector
 <p>RS-232 / RS422</p> <p>P-SOLQUAD_V2-022A-A</p>	 <p>P-SOLQUAD-251A</p> <p>CLIK-MATE HOUSING FE 5PIN(1x5) P=1.5MM</p>

Table 10: RS-232/RS-422 Main Pin Assignments

## 7.13 RS-422 Serial Communication Auxiliary Connector Pinouts (X5)

The X5 connector is designed for RS-422 serial communication.

Pin (X5)	RS-422	
	Signal	Function
1	RS422_TX+	Differential RS-232 Transmit
2	RS422_TX-	Differential RS-232 Transmit Complement
3	RS422_RX+	Differential RS-232 Receive
4	RS422_RX-	Differential RS-232 Receive Complement
5	COMRET	Common Return

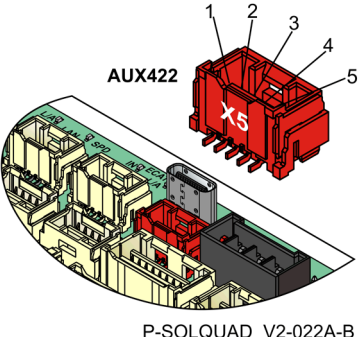
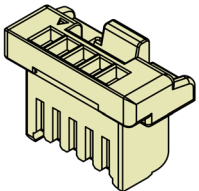
Pin Positions	Cable Connector
 <p>AUX422</p> <p>P-SOLQUAD_V2-022A-B</p>	 <p>P-SOLQUAD_V2-251A</p>

Table 11: RS-422 Auxiliary Pin Assignments

## 7.14 EtherCAT IN Connector Pinouts (X1)

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

Pin (X1)	Signal	Function
1	EtherCAT_IN_TX+	EtherCAT in
2	EtherCAT_IN_TX-	EtherCAT in
3	EtherCAT_IN_RX+	EtherCAT in
4	EtherCAT_IN_RX-	EtherCAT in
5	PE	Shield drain wire
Pin Positions		Cable Connector
		<p>P-SOLQUAD-251A</p> <p>CLIK-MATE HOUSING FE 5PIN(1x5) P=1.5MM</p>

Table 12: EtherCAT IN / Ethernet Pin Assignments

## 7.15 EtherCAT OUT/Ethernet Connector Pinouts (X2)

Pin (X2)	Signal	Function
1	EtherCAT_OUT_TX+	EtherCAT out transmit +
2	EtherCAT_OUT_TX-	EtherCAT out transmit -
3	EtherCAT_OUT_RX+	EtherCAT out receive +
4	EtherCAT_OUT_RX-	EtherCAT out receive -
5	PE	Shield drain wire
Pin Positions		Cable Connector
		<p>P-SOLQUAD-251A</p> <p>CLIK-MATE HOUSING FE 5PIN(1x5) P=1.5MM</p>

Table 13: EtherCAT OUT Pin Assignments

## 7.16 LAN Connector Pinouts (X6)

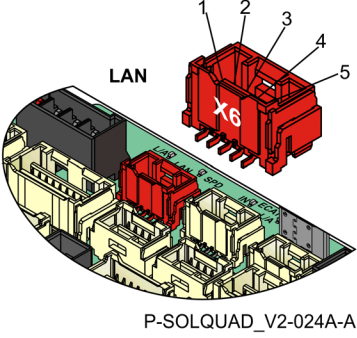
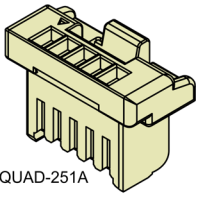
Pin (X6)	Signal	Function
1	LAN_TX+	Ethernet transmit +
2	LAN_TX-	Ethernet transmit -
3	LAN_RX+	Ethernet receive +
4	LAN_RX-	Ethernet receive -
5	PE	Shield drain wire
Pin Positions		Cable Connector
 <p>P-SOLQUAD_V2-024A-A</p>		 <p>P-SOLQUAD-251A</p> <p>CLIK-MATE HOUSING FE 5PIN(1x5) P=1.5MM</p>


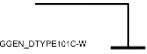
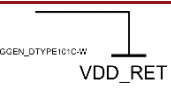
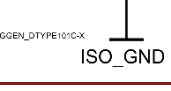


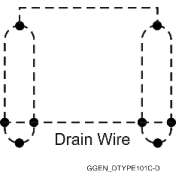
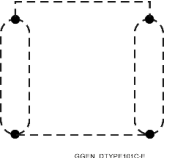
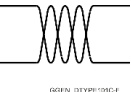
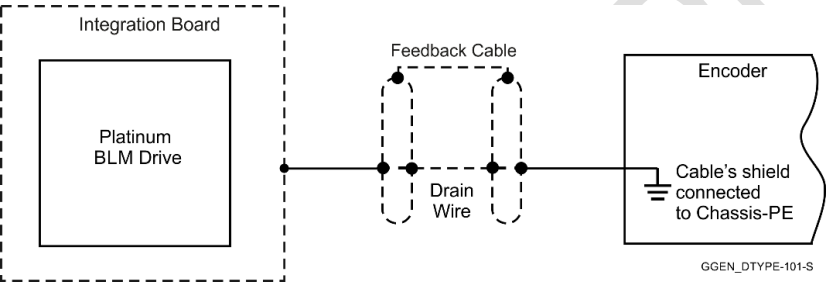
Table 14: LAN Pin Assignments

## 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)
 GGEN_DTYPE101C-W	<b>User Side:</b> This symbol signifies that any type of grounding may be used on the user side
 GGEN_DTYPE101C-W VDD_RET	VDD Return
 GGEN_DTYPE101C-X ISO_GND	Isolated Ground
 GGEN_DTYPE101C-C PR	Power Return
 GGEN_DTYPE101C-S	COMRET Common at the Drive
 GGEN_DTYPE101C-D Drain Wire	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.
 GGEN_DTYPE101C-E	Shielded cable braid only, without drain wire.
 GGEN_DTYPE101C-F	Twisted-pair wires
 GGEN_DTYPE-101-S Encoder Earthing. The cable's shield is connected to the chassis (PE) in the connector. The servo drive shield is connected to Earth.	



## 8.2 The Platinum Solo Quad Connection Diagrams

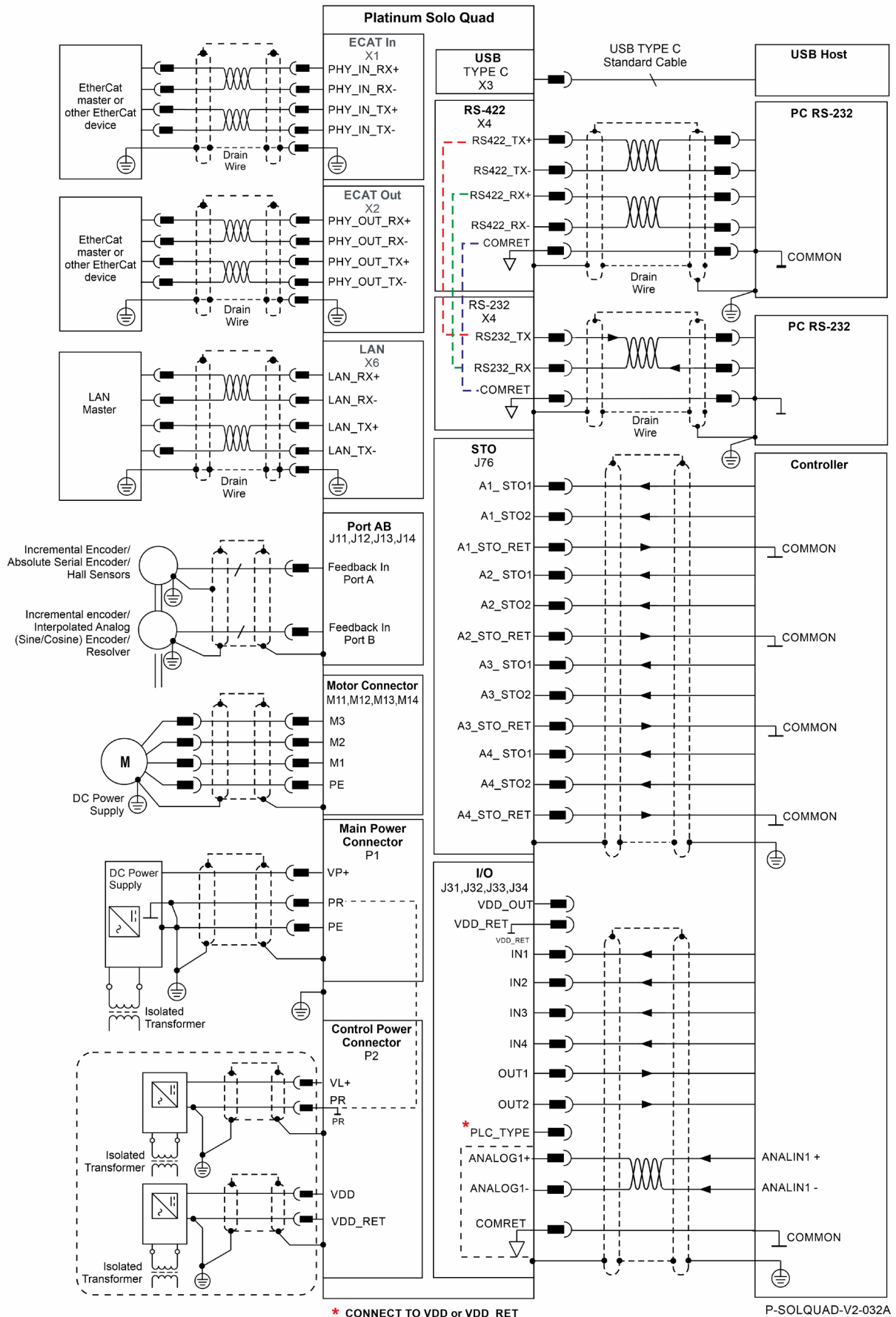


Figure 6: Platinum Solo Quad EtherCAT Connection Diagram

### 8.3 Wiring the Female CON CLIK-MATE Connectors

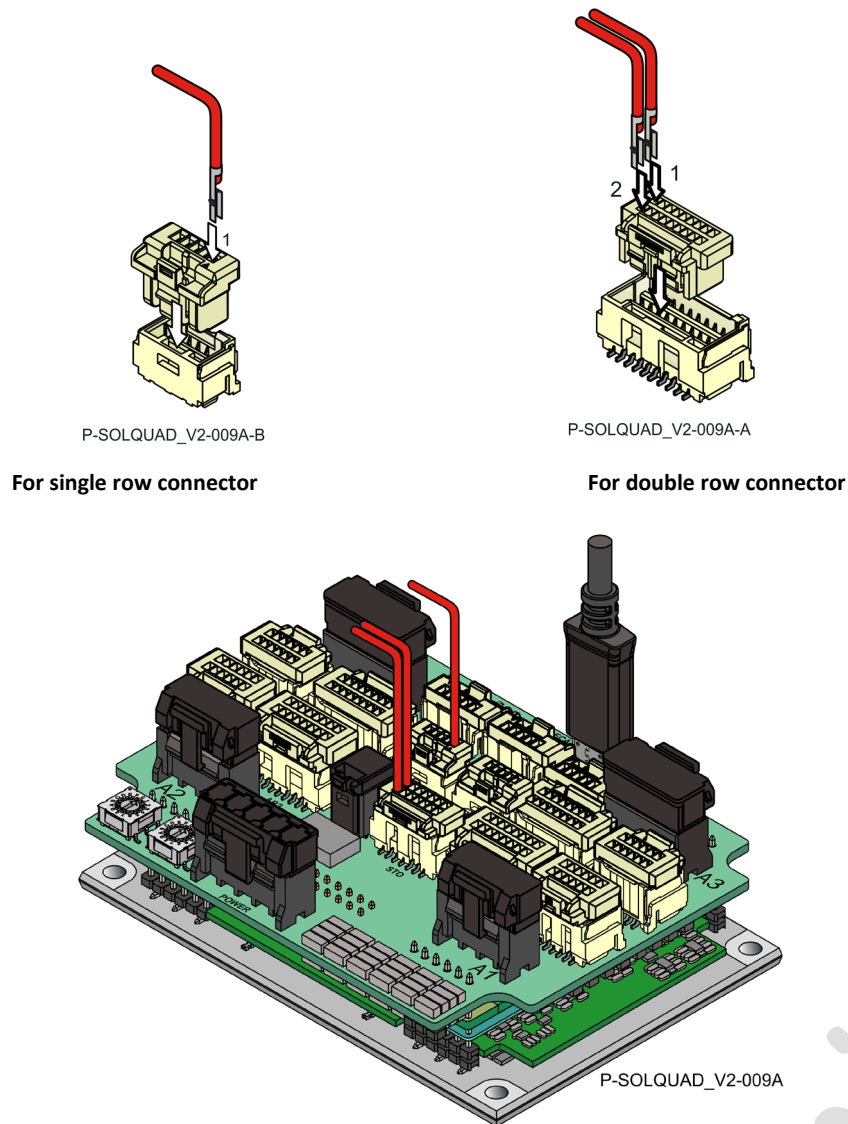


Figure 7: Inserting a wire/pin to the Female CON CLIK-MATE Connector

To insert a wire/pin to the female CON CLIK-MATE connectors 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 7. 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 7. Make sure that the connector protrusion is inserted to the bottom of the rectangular slot.  
When inserting the wire connector to a slot in the second row, make sure to orientate the wire pin in the direction shown in Figure 7.
5. Repeat the same procedure for all other wire connections.

## 8.4 Motor Power (M11, M12, M13, M14) Per Axis

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

For Motor connections to 4 axes, use the following connection diagrams and procedure per axis, depending on the motor type.

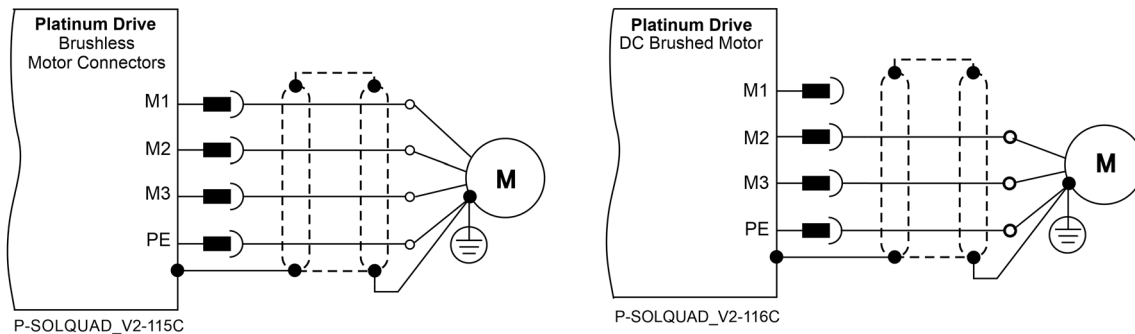


Figure 8: Brushless and Brushed Motor Power Connections Diagrams

### To connect the motor power per axis:

1. Ensure that the motor chassis is properly earthed.
2. Connect the appropriate wire from the Motor Power cables to the M1, M2, M3, M4 and PE terminals on the Platinum Solo Quad.  
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 5-wire shielded (not twisted) cable for the motor connection. The gauge is determined by the actual RMS current consumption of the motor.
5. Connect the cable shield to the closest ground connection at the motor end.  
For better EMI performance, the shield should be connected to Earth Connection (heat sink mounting holes).

## 8.5 Main (P1) and Control Power (P2)

The Platinum Solo Quad receives power from Main and Control supplies and delivers power to the motor.

### 8.5.1 Main Supply

There are two possible power ratings for the Platinum Solo Quad:

- 100V is for the 10 to 95 VDC
- 200V is for the 20 to 195 VDC

#### For power rating 200V

Two DC power sources are required, a DC power source of 20 to 195 VDC isolated from the Mains, and a control supply 14 to 95 VDC (isolated from the Mains) for the logic.

#### For power rating of 100V

Only a single DC Power source of 10 to 95 VDC isolated from the Mains, is required for the main power and also for the control power. However, a control power supply can be added for the logic.



**Note:** Both the 10 to 95 VDC and 20 to 195 VDC power sources must be isolated from the Mains.

*Connect the DC power source cable to the VP+ and PR terminals on the main power connector.*

#### To connect the main power:

1. The DC power supply source must be isolated from the Mains.
2. For best immunity, it is highly recommended to use twisted and shielded cables for the DC power source. A 3-wire shielded cable should be used. The gauge is determined by the actual current consumption of the motor.
3. Connect the cable shield to the closest earth connection near the power supply.
4. Connect the PE to the closest earth connection near the power supply.
5. Connect the PR to the closest earth connection near the power supply.
6. Before applying power, first verify the polarity of the connection.

### 8.5.2 Control Supply

#### For power rating 200V

The Control supply 14V to 95V is required.

#### For power rating 100V

The Control supply 14V to 95V can be added for the 100V power rating.



**Note:** The source of the Control Supply must be isolated from the Mains.

*Connect the VL+ and PR terminal to the control Connector.*

#### 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.

### 8.5.3 Power Supply for 200V Power Rating

For Power Rating 200V, two DC power sources are required; a main power 20 to 195 VDC power source isolated from the Mains, and a control supply 14V to 95V (isolated from the Mains) for the logic. The following figure describes the connection of main power and control.

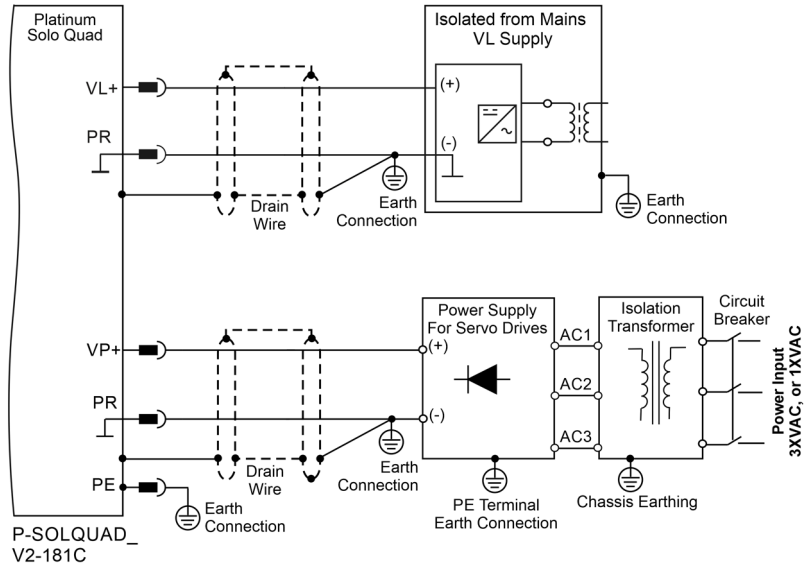


Figure 9: Power Supply Connection Diagram for Power Rating 200V



**Note:** Make sure to connect the PR to the closest earth connection near the power supply.

Preliminary

### 8.5.4 Power Supply for 100V Power Rating



**Important:**

**CAPACITANCE IN:** For Platinum Solo Quad modules 25/100 a DC Bus Capacitance of **900uF** must be connected between the VP+ and the PR as shown in the following figure. Alternative, the Elmo Tabla-200 (a DC Bus connection and capacitance bank) can be used. Please refer to the TABLA-200 Installation Guide.

#### 8.5.4.1 Single Power Supply

For power rating 100V, a single Power Supply is required which contains a “smart” control-supply algorithm, enabling the Platinum Solo Quad to operate with only one power supply with no need for an Control power supply for the logic.

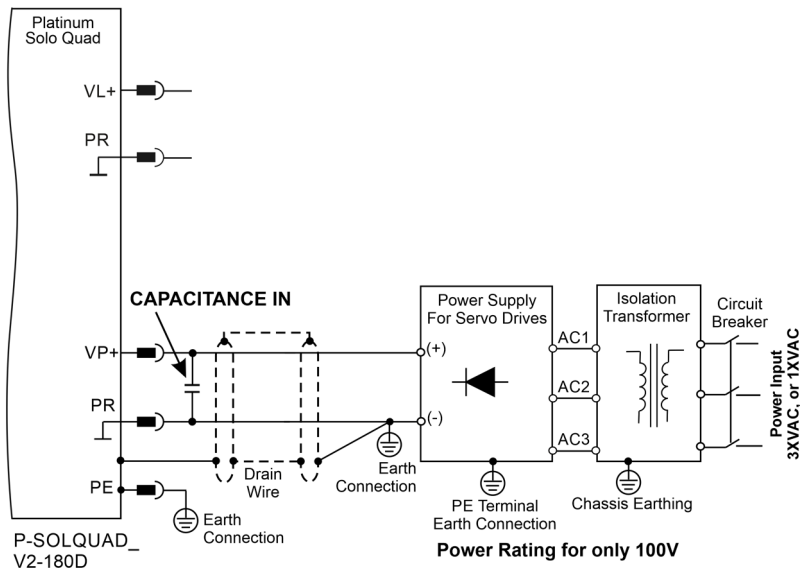


Figure 10: Main Power Supply Connection Diagram (No Control Supply)



**Note:**

Make sure to connect the PR to the closest earth connection near the power supply.

### 8.5.4.2 Shared Supply

A single DC Power Supply can supply the power for logic as well as the main power. If separation between the main DC power source and a control supply is required, then a control supply (isolated from the Mains) can be connected by implementing "diode coupling" (Figure 11).

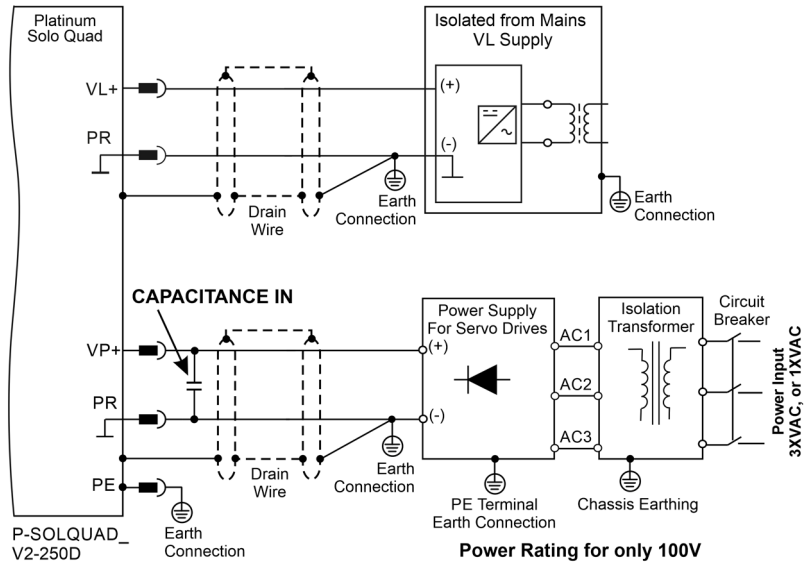


Figure 11: Shared Optional Power Supply Connection Diagram



**Note:** Make sure to connect the PR to the closest earth connection near the power supply.

Preliminary

## 8.6 STO (Safe Torque Off) (J76) Per Axis

### 8.6.1 Source Mode – PLC Voltage Level

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

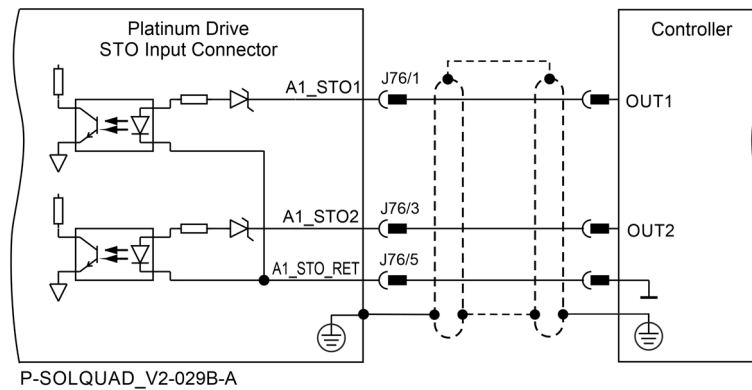


Figure 12: STO Shrouded Type Input Connection – PLC Source Option for Axis A1

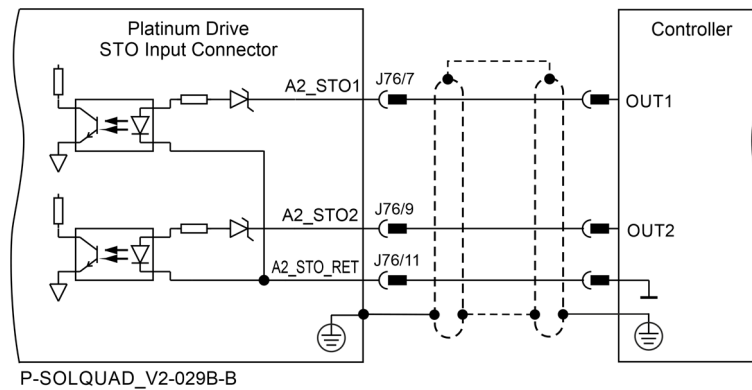


Figure 13: STO Shrouded Type Input Connection – PLC Source Option for Axis A2

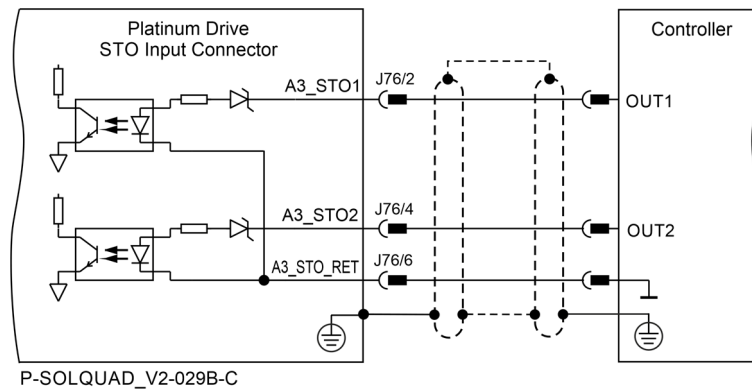


Figure 14: STO Shrouded Type Input Connection – PLC Source Option for Axis A3

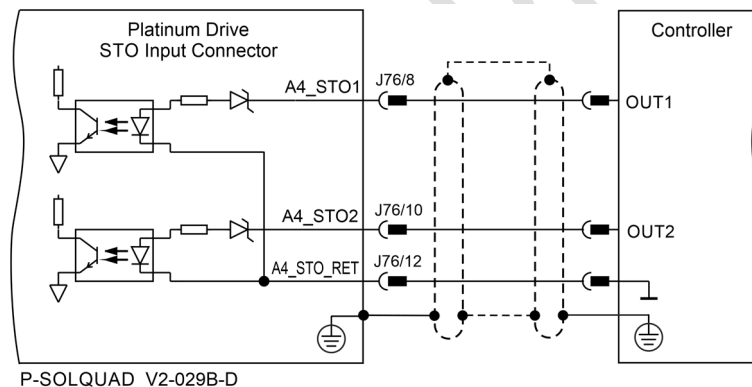
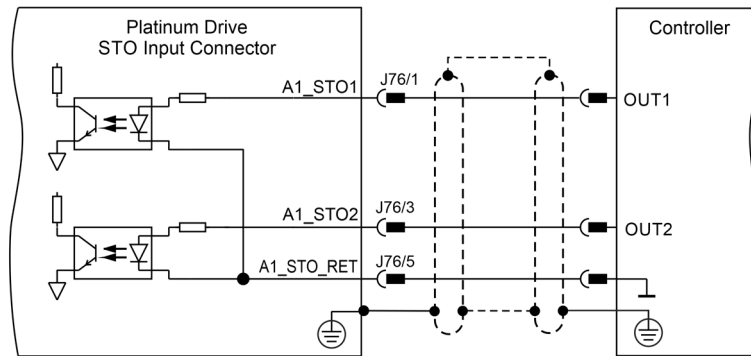


Figure 15: STO Shrouded Type Input Connection – PLC Source Option for Axis A4



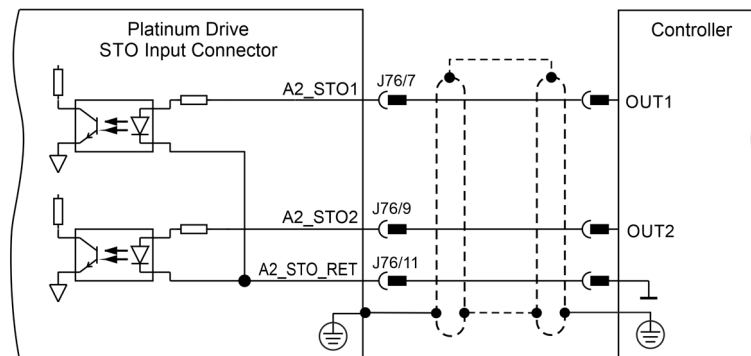
### 8.6.2 TTL Mode – TTL Voltage Level

Refer to the diagrams below for TTL option connection.



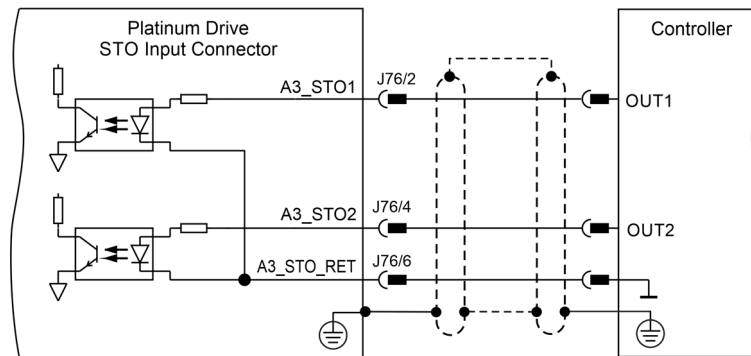
P-SOLQUAD-V2-030B-A

Figure 16: STO Input Connection – TTL Option for Axis 1



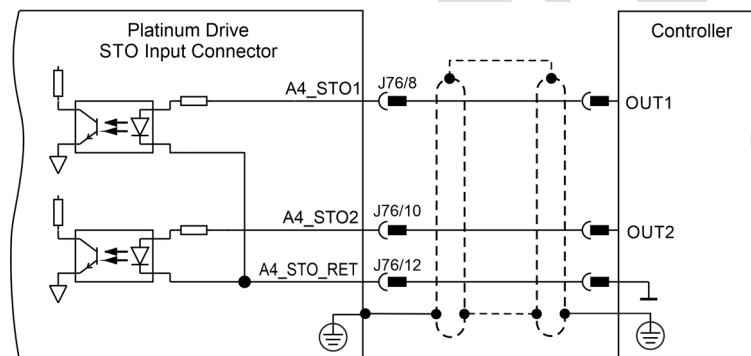
P-SOLQUAD-V2-030B-B

Figure 17: STO Input Connection – TTL Option for Axis 2



P-SOLQUAD-V2-030B-C

Figure 18: STO Input Connection – TTL Option for Axis 3



P-SOLQUAD-V2-030B-D

Figure 19: STO Input Connection – TTL Option for Axis 4

## 8.7 Feedbacks (J11, J12, J13, J14) Per Axis

For J1x = J11, J12, J13, or J14, where x=1, 2, 3, 4 axis, the following connection diagrams describe the Port A and Port B feedback connections per axis.



**Note:**

When using two encoder supply pins, only 200mA is allowed for each pin.

### 8.7.1 Feedback Port A

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

#### 8.7.1.1 Incremental Encoder

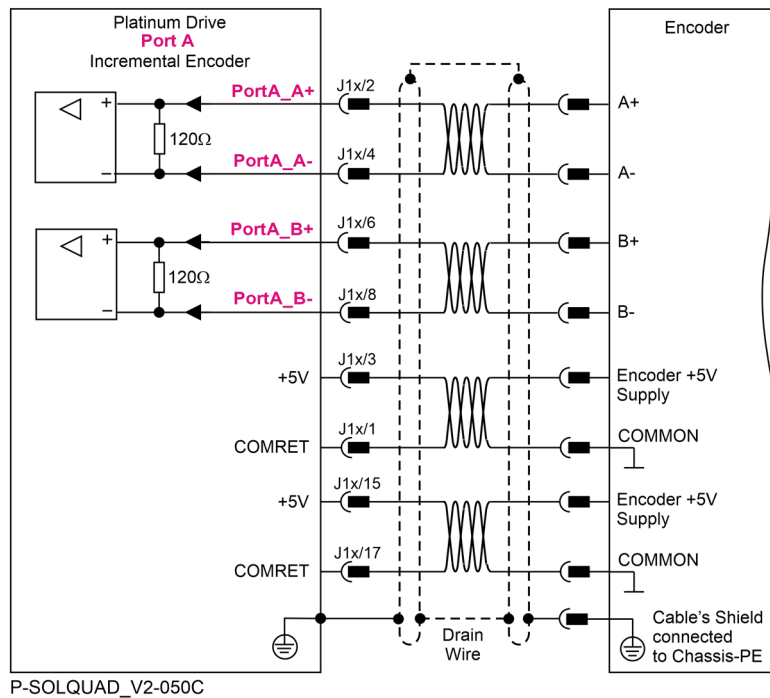


Figure 20: Port A Incremental Encoder Input – Recommended Connection Diagram

### 8.7.1.2 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:

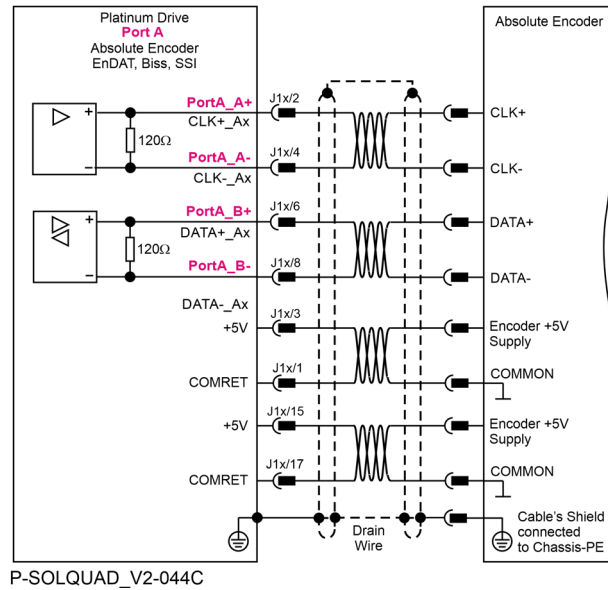


Figure 21: Absolute Serial Encoder – Recommended Connection Diagram for EnDat, Biss, SSI

### 8.7.1.3 Hiperface

The following figure describes the connection diagram.

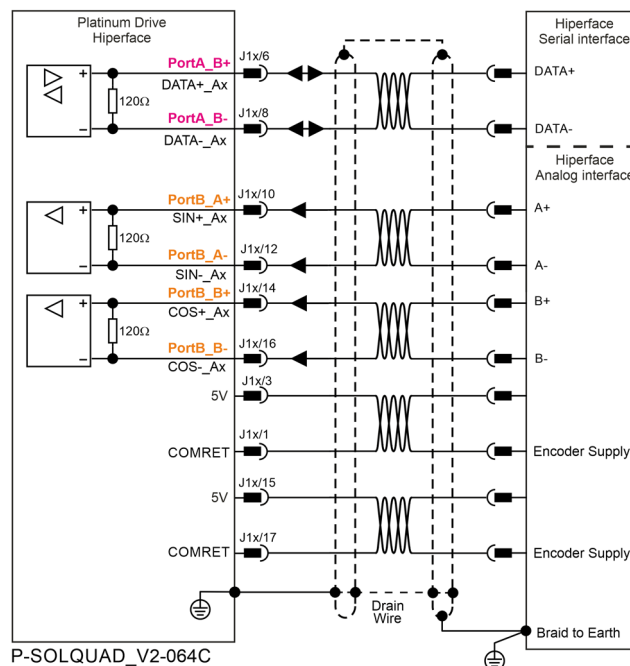


Figure 22: Absolute Serial Encoder – Recommended Connection Diagram for Stegmann Hiperface

### 8.7.2 Feedback Port B

Port B supports any of the following sensors:

- Incremental Encoder
- Interpolated analog Encoder
- Analog Hall sensors

Differential PWM signal input can be connected to port B

#### 8.7.2.1 Incremental Encoder

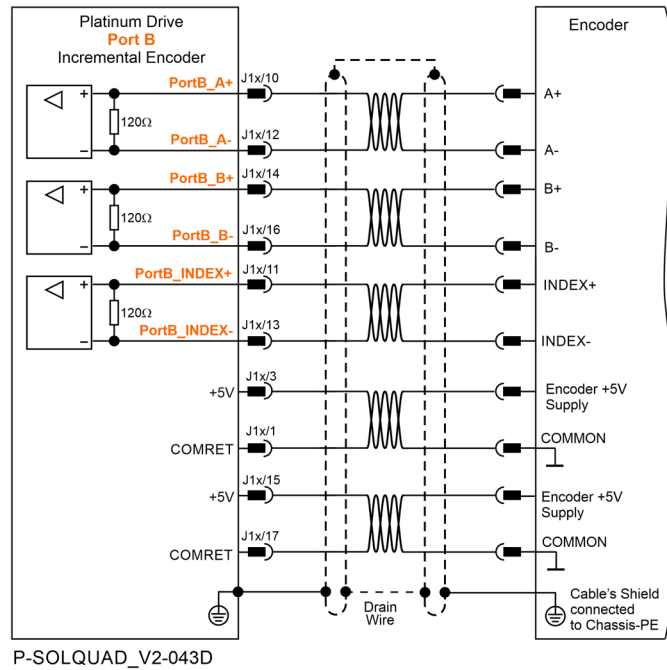


Figure 23: Port B Incremental Encoder Input – Recommended Connection Diagram

#### 8.7.2.2 Interpolated Analog (Sine/Cosine) Encoder

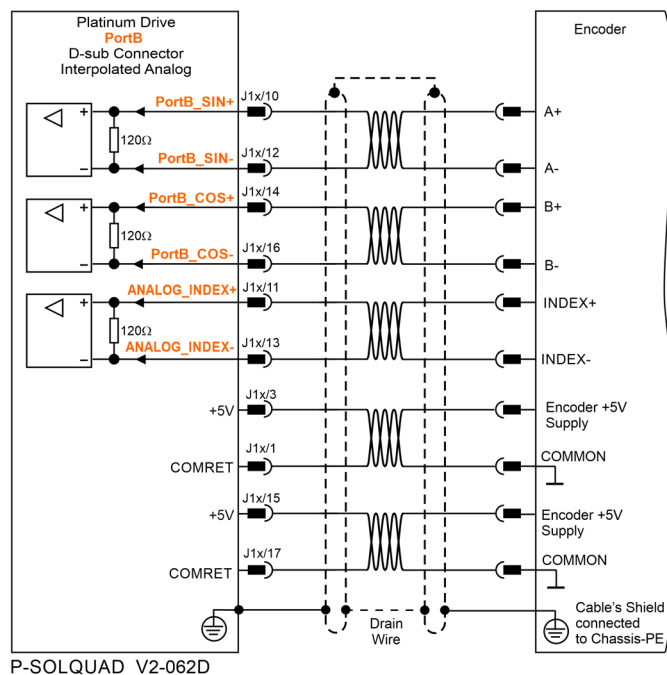


Figure 24: Port B - Interpolated Analog Encoder Connection Diagram

### 8.7.3 Feedback - Hall Sensors

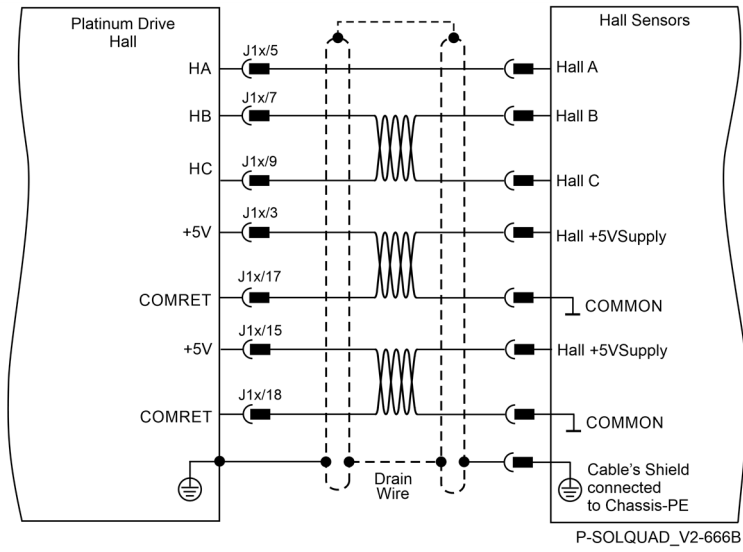


Figure 25: Hall Sensors Connection Diagram

Preliminary

## 8.8 Digital I/Os (J31, J32, J33, J34) Per Axis

For J3x = J31, J32, J33, or J34, where x=1, 2, 3, 4 axis, the following connection diagrams describe the Digital IO connections per axis.

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

#### 8.8.1.1 Digital Input and Output PLC Source Mode

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

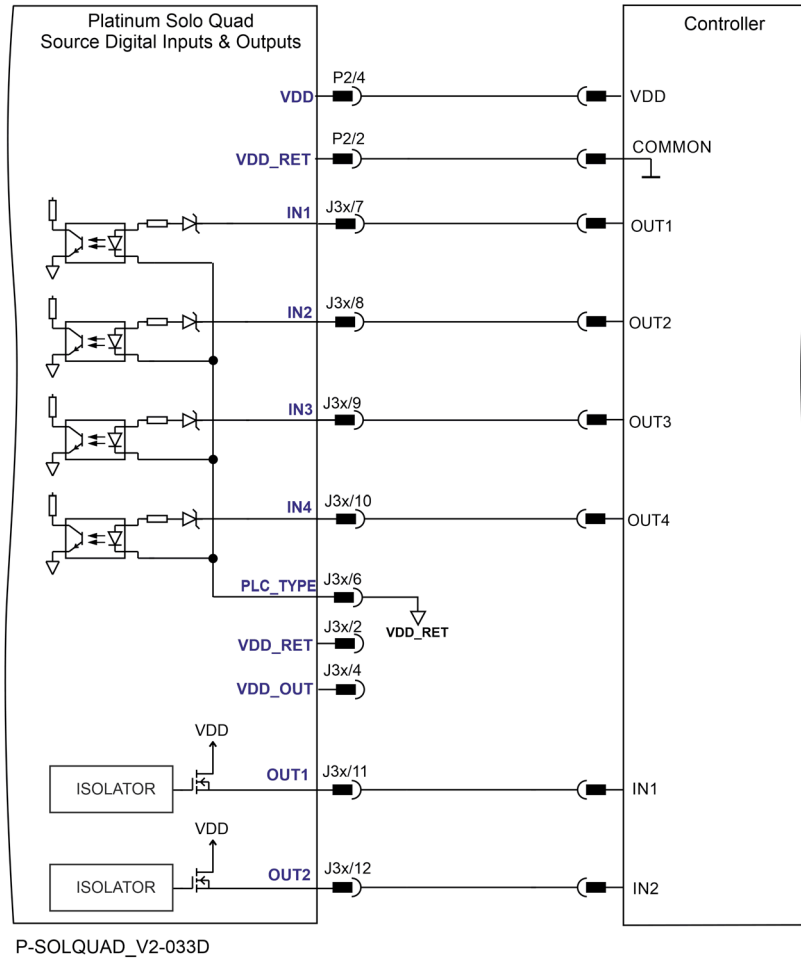


Figure 26: Digital Input and Output Connection Diagram – Source PLC Option

### 8.8.1.2 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.

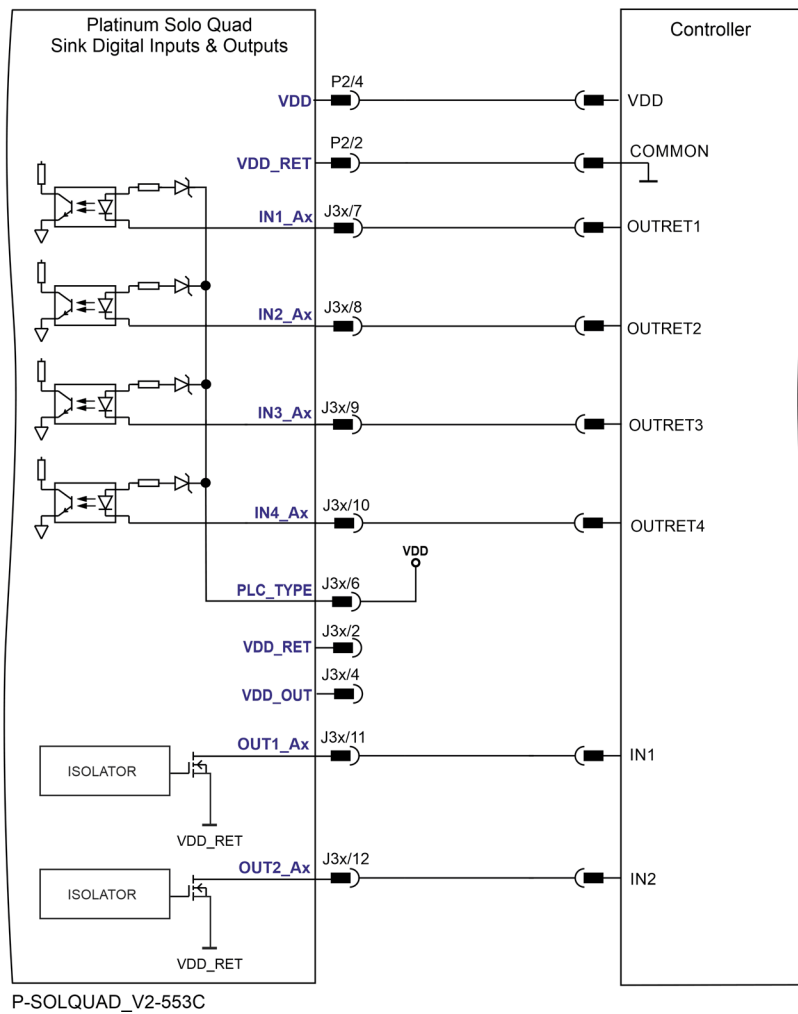


Figure 27: Digital Input and Output Connection Diagram – PLC Sink Option

### 8.8.2 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 Mode.

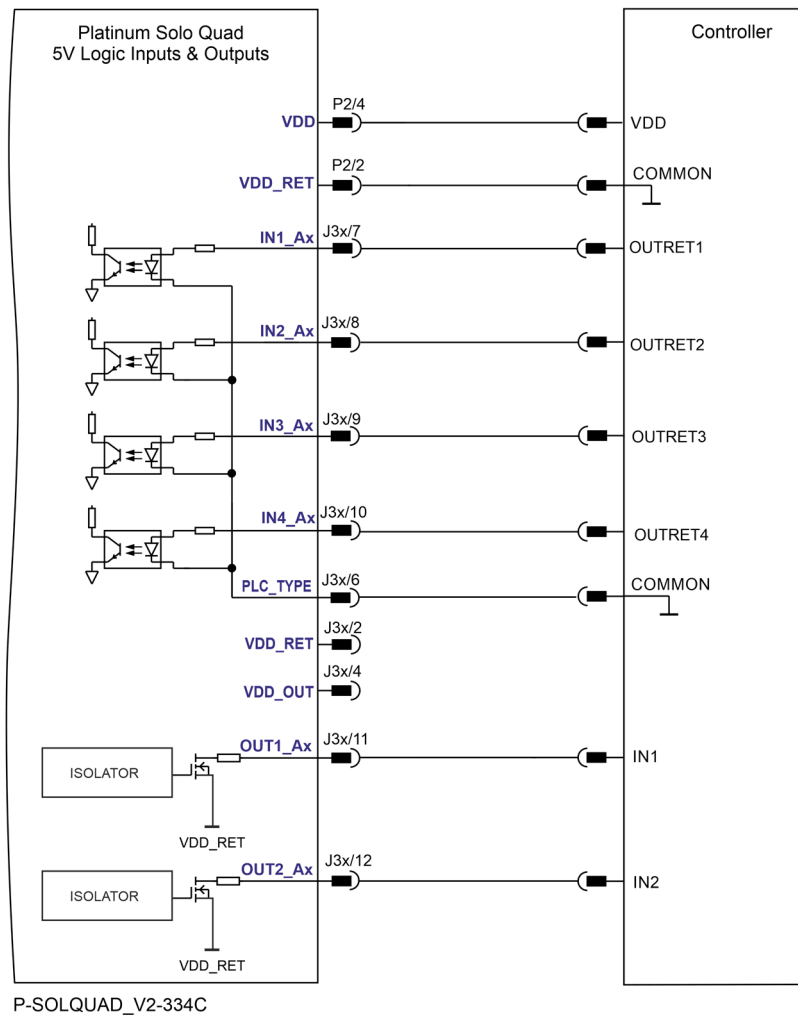


Figure 28: Regular Digital Input and Output 5V Logic Mode Connection Diagram

### 8.9 Analog Input -Differential (J31, J32, J33, J34) Per Axis

For  $J3x = J31, J32, J33, \text{ or } J34$ , where  $x=1, 2, 3, 4$  axis, the following connection diagram describes the Analog Input connections per axis.

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

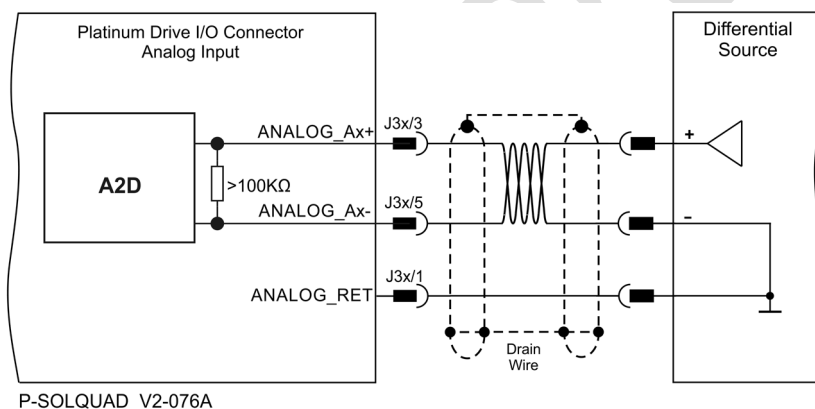


Figure 29: Differential Analog Input



## 8.10 Communication

### 8.10.1 USB 2.0 (X3)

Use a standard USB 2.0 Type C cable and connector to connect the USB.

### 8.10.2 RS-422 (X4 and X5)/RS-232 (X4) Serial Communication

The X4 Main connector is optionally for either RS-422 or RS-232 communication. However, the X5 Auxiliary connector is designed for only RS-422 (Differential RS-232) communication.

#### 8.10.2.1 RS-422 (Differential RS-232) Serial Communication for both X4 and X5 Connectors

The following describes the RS-422 specification for both X4 Main and X5 Auxiliary connectors.

Specification	Details
Physical layer	Differential RS-232 Full duplex, serial communication
Interface	RS-422
Termination	120 Ohm It is required to connect termination of 120 ohm in the end of the TX signals (refer to the figure below)
Speed	Baud Rate of 0.0048 to 3.60 Mbps
Protocols	For setup and control

The following is recommended when connecting the Differential RS-232 communication cable:

Connect the shield to the ground of the Controller.

Usually, this connection is soldered internally inside the connector at the PC end. You can use the drain wire to facilitate connection.

The following are RS-422 signals:

Signal	Function
RS-422_TX+	Differential RS-232 Transmit
RS-422_TX-	Differential RS-232 Transmit Complement
RS-422_RX+	Differential RS-232 Receive
RS-422_RX-	Differential RS-232 Receive Complement
COMRET	Common Return

### 8.10.2.2 X4 RS-422 (Differential RS-232) Serial Communication

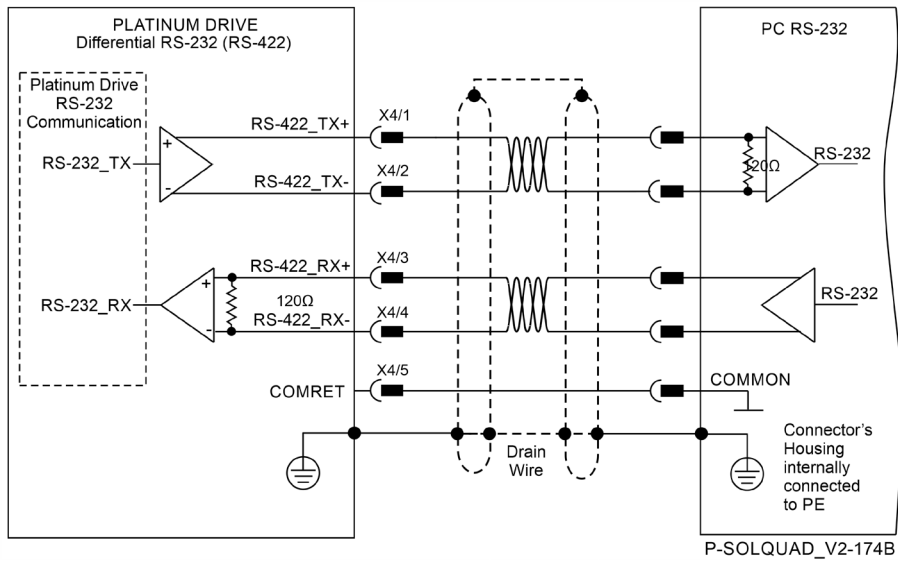


Figure 30: Differential RS-232 Communication Example for Connector X4

### 8.10.2.3 X4 Main RS-232 Serial Communication

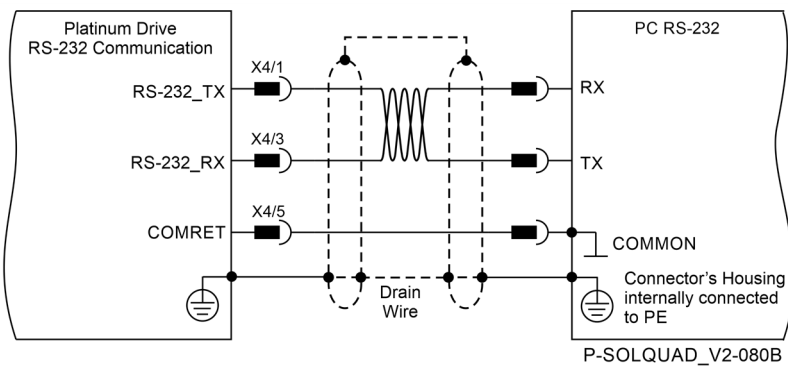


Figure 31: RS-232 Connection Diagram

### 8.10.2.4 X5 RS-422 (Differential RS-232) Serial Communication

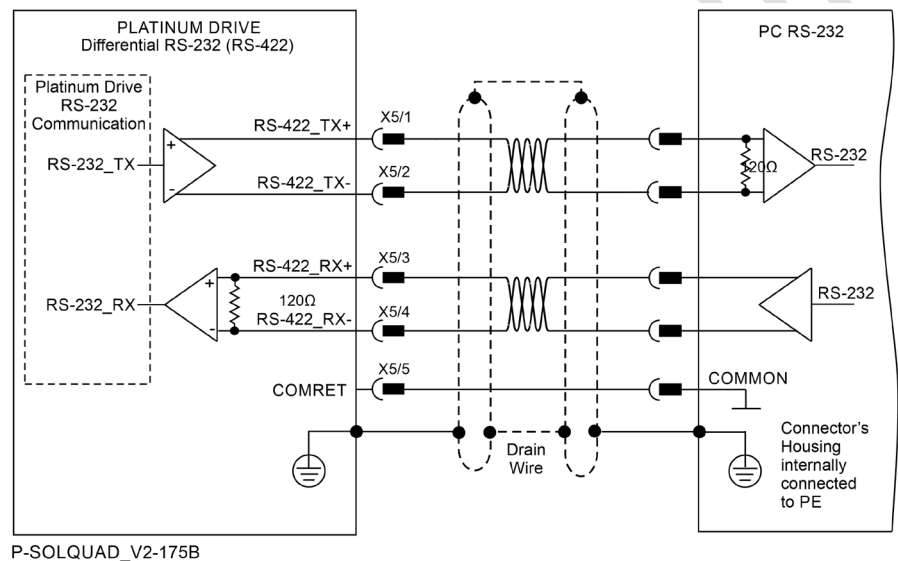


Figure 32: Differential RS-232 Communication Example for Connector X5

### 8.10.3 EtherCAT (X1 and X2)

#### 8.10.3.1 EtherCAT Connection

The Platinum Solo Quad 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.

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

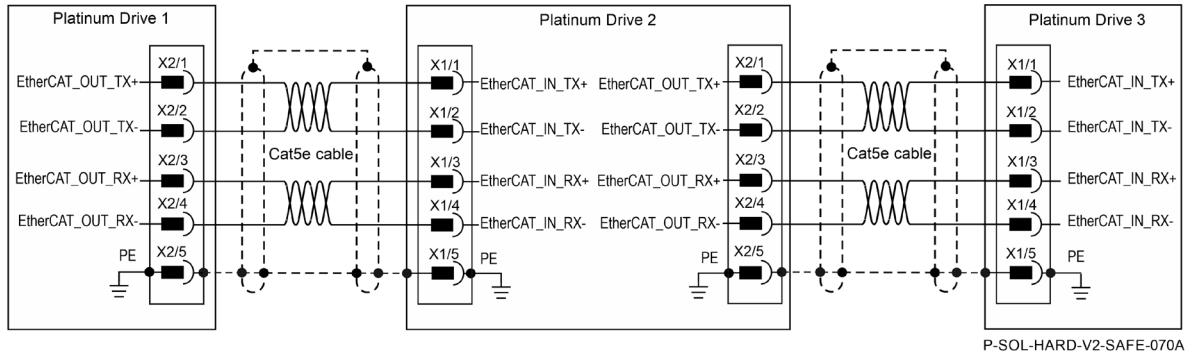


Figure 33: EtherCAT Schematic Diagram for Platinum to Platinum drive connections

#### 8.10.3.2 EtherCAT Status Indicator

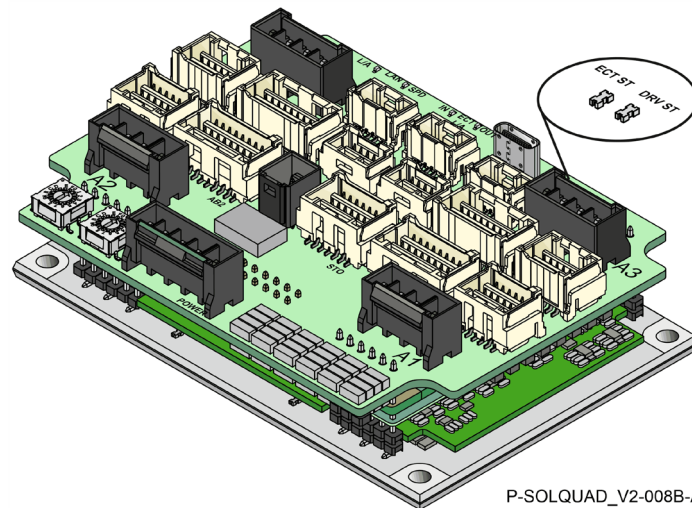


Figure 34: EtherCAT Status LED

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.

### 8.10.3.3 EtherCAT Link Indicators

Each of the EtherCAT Ports also has an EtherCAT Link In and EtherCAT Link Out LED, which are shown in Figure 35.

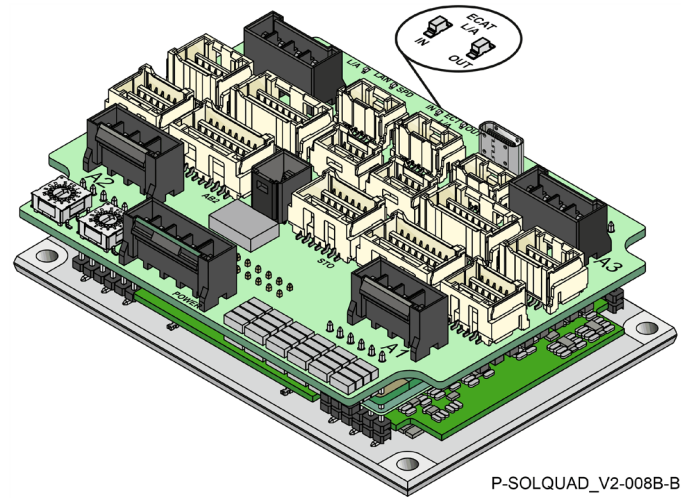


Figure 35: EtherCAT Link LEDs

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.

LED	State	Meaning
Link /Activity	Off	No link is established
	On	A link is established
	Blinking	There is data transmission activity

### 8.10.3.4 EtherCAT Address Switches

The Platinum Solo Quad 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 is ADD low, HIGH is ADD high). The two rotary switches offer up to 255 addresses, with the 0 setting referring to No alias address.

Figure 36 displays the switches available in the EtherCAT Version. Refer to the section 15.2.5 EtherCAT Switches in the MAN-P-Safety Drive Manual for full details.

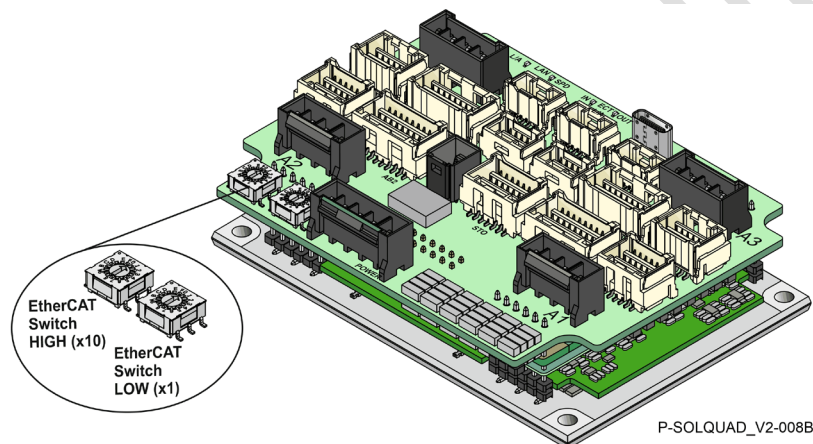


Figure 36: EtherCAT Address Switches

The positions of the switches on the drive are shown in Figure 36. Use a screwdriver to set the low and high bytes values of the drive EtherCAT address. This address is only retrieved after power-up.

### 8.10.4 LAN Connector Pinouts (X6)

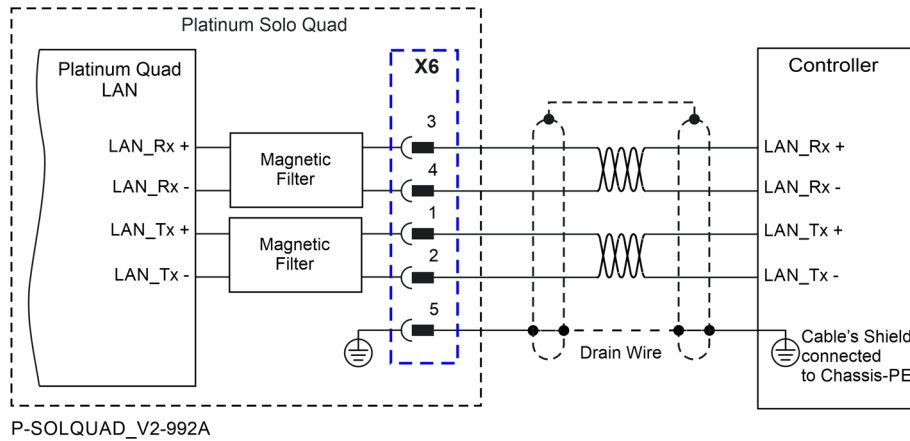


Figure 37: EtherCAT Connection Schematic Diagram

#### 8.10.4.1 LAN Activity Indicator

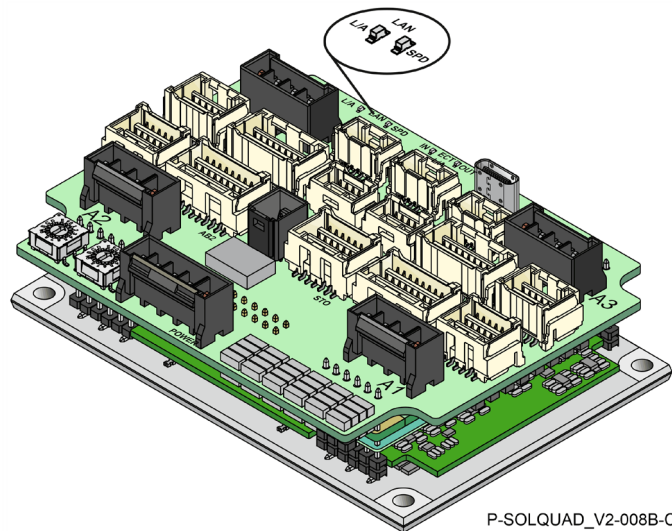


Figure 38: LAN Activity LED

The green LED is the link/activity indicator (Figure 38). It shows the state of the applicable physical link and the activity on that link.

The orange LED is the speed indicator (Figure 38). It shows the speed of the connection on the Ethernet line. The possible states of these LEDs are summarized in Table 15.

LED	State	Definition
Link /Activity	Off	No connection
	On	Connection established (Link)
	Blinking	Data transmission activity (Act)
Speed	On	100 Mbps Connection (default) Speed
	Off	10 Mbps Connection Speed

Table 15: LED States

## Chapter 9: Powering Up

After the Platinum Solo Quad 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 Solo Quad 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

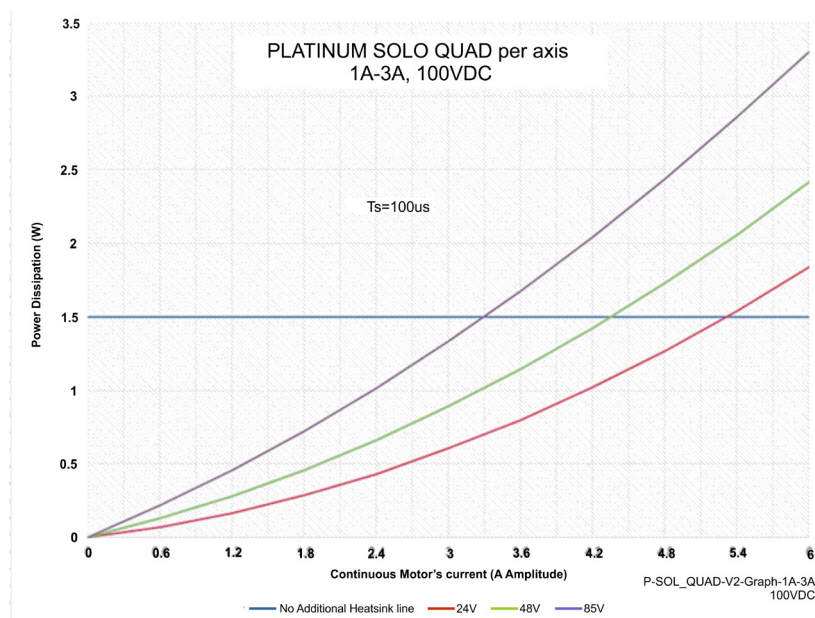
The best way to dissipate heat from the Platinum Solo Quad is to mount it so that its heat sink faces up. For best results leave approximately 10 mm of space between the Platinum Solo Quad's heat sink and any other assembly.

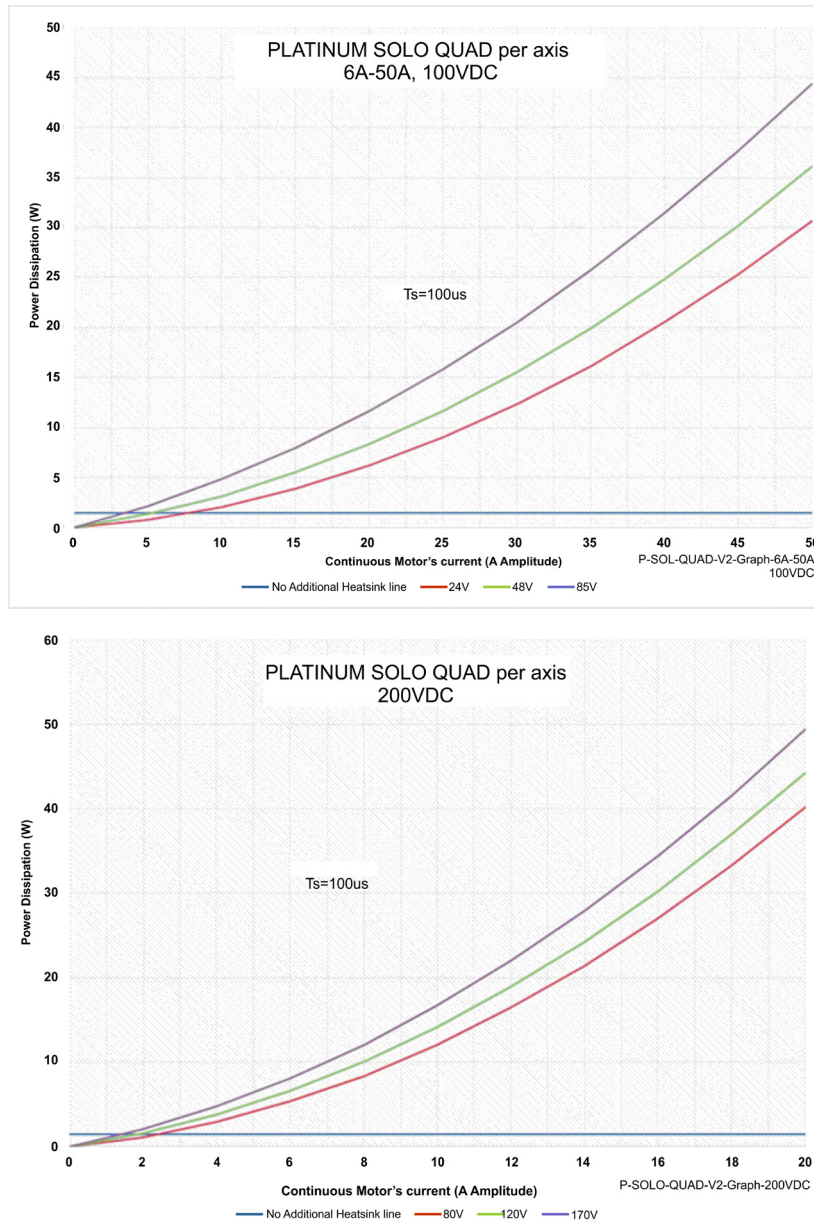
#### 9.2.1 Thermal Data

- Heat dissipation capability ( $\theta$ ): Approximately 10 °C/W
- Thermal time constant: Approximately 240 seconds (thermal time constant means that the Platinum Solo Quad will reach 2/3 of its final temperature after 4 minutes)
- Shut-off temperature: 86 °C to 88 °C (measured on the heat sink)

#### 9.2.2 Heat Dissipation Data Per Axis

Heat dissipation is shown in graphically below:





### 9.2.3 How to Use the Charts

The charts above are based upon theoretical worst-case conditions. Actual test results show 30% to 50% better power dissipation.

*To determine if your application needs a heat sink:*

1. Allow maximum heat sink temperature to be 80 °C or less.
2. Determine the ambient operating temperature of the Solo Whistle.
3. Calculate the allowable temperature increase as follows:  
For an ambient temperature of 40 °C ,  $\Delta T = 80^{\circ}\text{C} - 40^{\circ}\text{C} = 40^{\circ}\text{C}$
4. Use the chart to find the actual dissipation power of the drive. Follow the voltage curve to the desired output current and then find the dissipated power.
5. If the dissipated power is below 4 W the Solo Whistle will need no additional cooling.



**Note:**

The chart above shows that no heat sink is needed when the heat sink temperature is 80 °C, ambient temperature is 40 °C and heat dissipated is 4 Watts.

## Chapter 10: Dimensions

This chapter provides detailed technical dimensions regarding the Platinum Solo Quad.

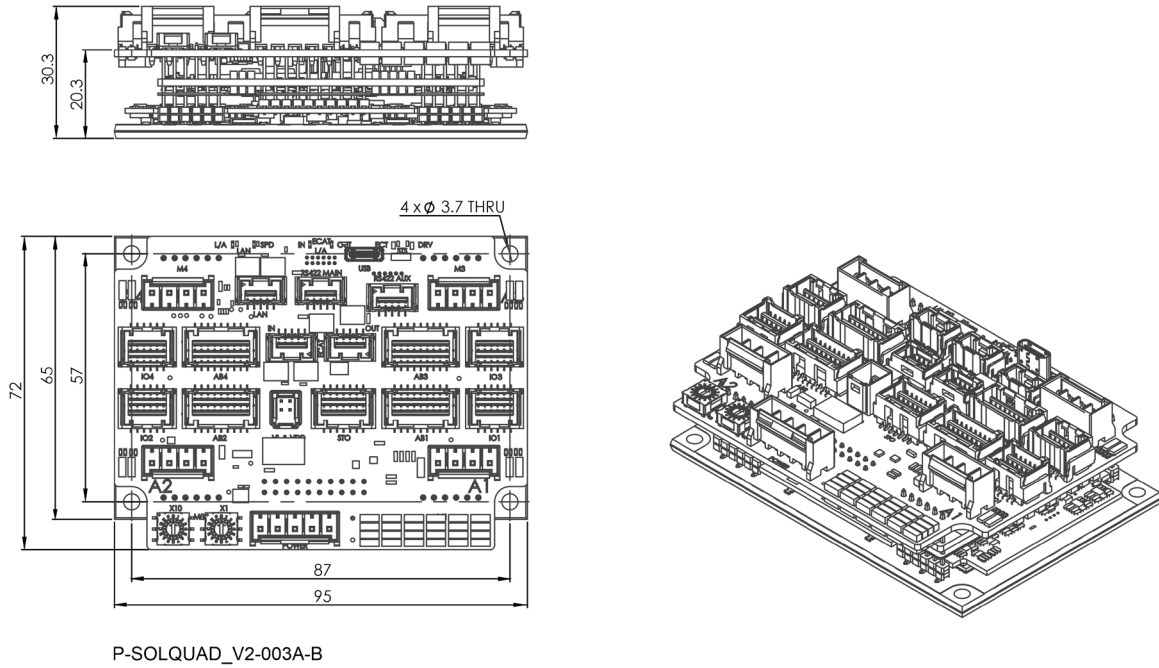


Figure 39: Platinum Solo Quad



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