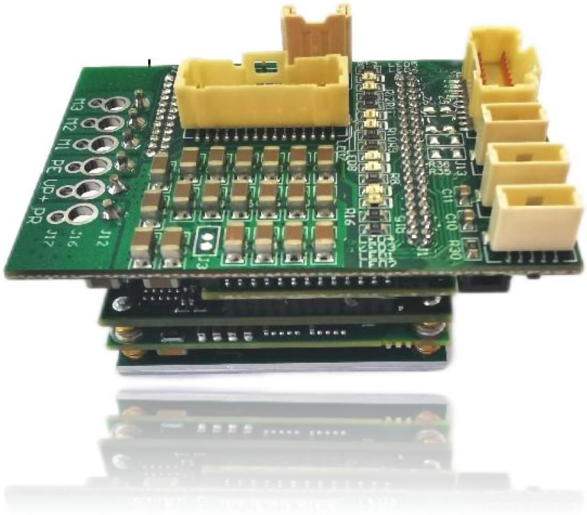
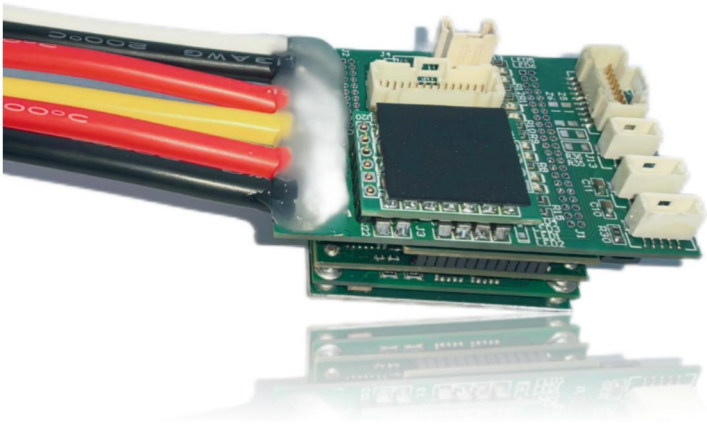
Inspiring Motion
Since 1988

Gold Mol Twitter Digital Servo Drive Installation Guide









Ver:Feb.2025

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Elmo
Motion Control

Catalog Number

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- The text and graphics included in this manual are for the purpose of illustration and reference only. The specifications on which they are based are subject to change without notice.
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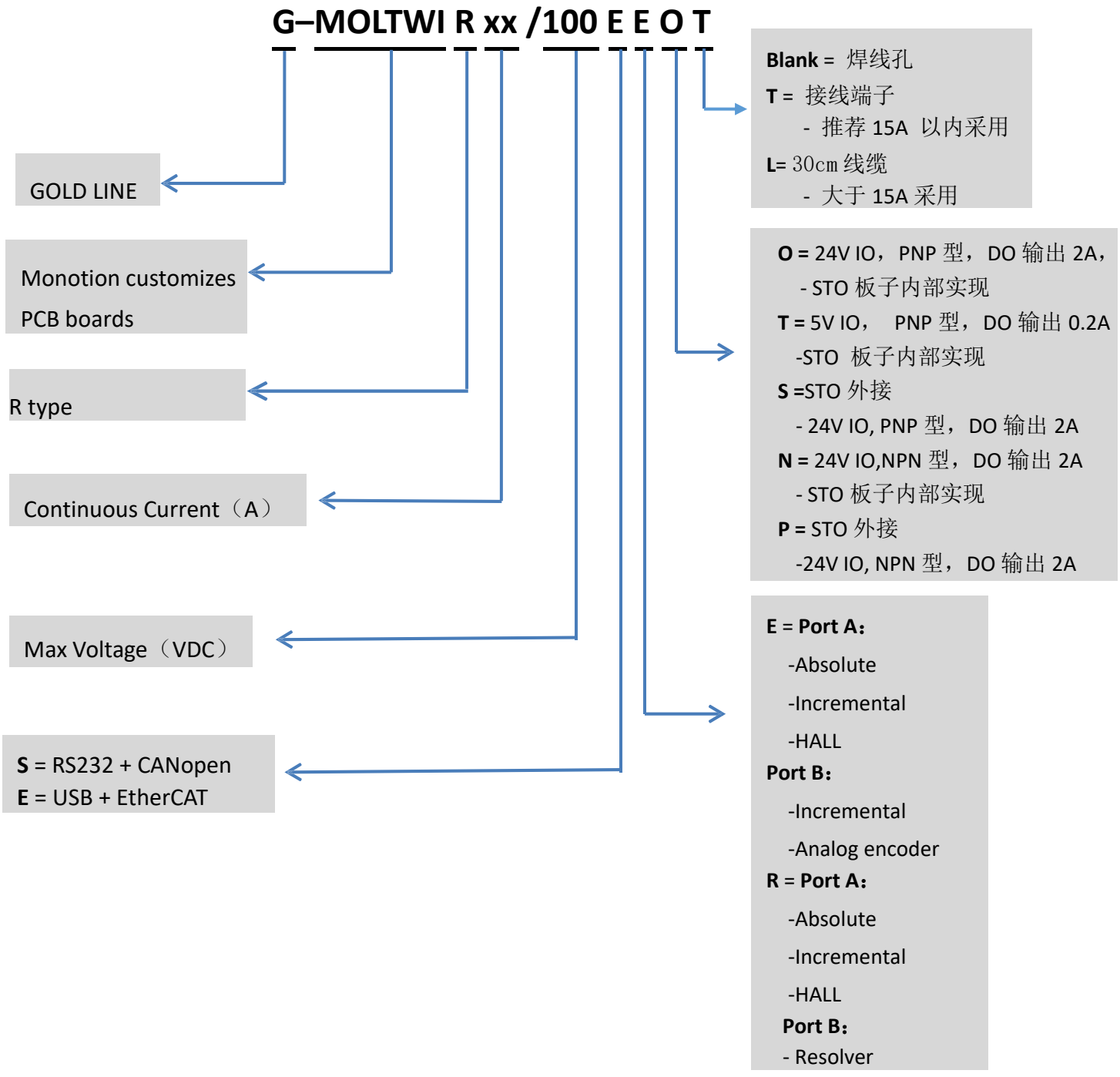


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Chapter 1 :This Installation Guide

This installation Guide details the technical data, pinouts, and power connectivity of the Gold Mol Twitter . For a comprehensive detailed description of the functions and connections of the drive, refer to the Gold Board Level Module Hardware Manual.

Chapter 2 :Safety Information

In order to achieve the optimum, safe operation of the Gold Mol Twitter , 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 Gold Mol Twitter 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 Gold Mol Twitter 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.



2.1 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 Gold Mol Twitter from all voltage sources before servicing.
- The high voltage products within the Gold Line range contain grounding conduits for electric current protection. Any disruption to these conduits may cause the instrument to become hot (live) and dangerous.
- After shutting off the power and removing the power source from your equipment, wait at least 1 minute 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.



2.2 Cautions

- The maximum DC power supply connected to the instrument must comply with the parameters outlined in this guide.
- When connecting the Gold Mol Twitter to an approved control 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 Gold Mol Twitter , 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.

2.3 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 date of shipment. No other warranties, expressed or implied — and including a warranty of merchantability and fitness for a particular purpose — extend beyond this warranty.

Chapter 3 :Product Description

The Gold Mol Twitter is a “ready to use Gold Twitter”, advanced high power density, highly intelligent servo drive operational within a few minutes, delivering up to 5.6 kW power in an average 30.59 cm3 (1.87 in^3) compact package . A cable kit and optional heat sinks are available for easy and fast operation of the Gold Mol Twitter .

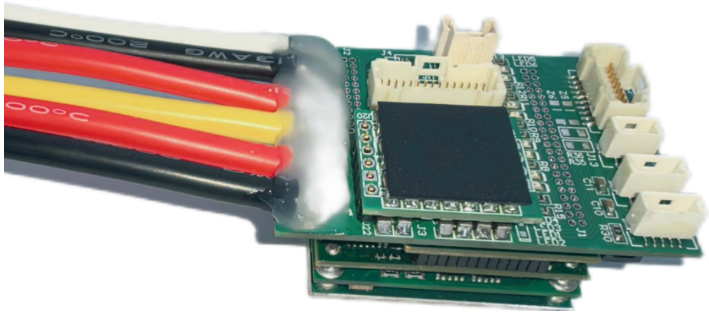
The Gold Mol Twitter which is provided in the optional forms shown in Figure 1, provides top performance, advanced networking and built-in certified safety, as well as a fully featured motion controller and local intelligence.



≤ 10APower Connector for Output Current



Power Connection (recommended for⩾15A Output Current)



Power Connection (recommended for >⩾50A Output Current)

Figure 1: Gold Mol Twitter with Power Connectors Options

Power to the Gold Mol Twitter is provided by a DC power source which is isolated from the Mains. The Gold Mol Twitter can operate with single or dual power supplies. If separation between the main DC power source and a control supply is required, then a control supply (also isolated from the Mains) is required.

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

Chapter 4 :Technical Information

Note: It should be noted that for all models, the Max Output current is guaranteed for THeat-Sink <85°C

4.1 Physical Specifications

Throughout the feature column, for each product, there is a blue hyperlink to the relevant section in the Dimensions chapter.

Feature	Units	All Types
Weight without Heatsink	g (oz)	EtherCAT Version: 22.2 g (0.78 oz) CAN Version: 18.6 g (0.66 oz)
Weight with Heatsink	g (oz)	EtherCAT Version: 43.2 g (1.52 oz) CAN Version: 39.6 g (1.40 oz)
EtherCAT Version Dimension without Heatsink	mm (in)	51 x 34 x 18 mm
CAN Version Dimension without Heatsink	mm (in)	51 x 34 x 14 mm
EtherCAT Version Dimension with Heatsink	mm (in)	55x46.5x33mm or 51.5x41.3x33mm
CAN Version Dimension with Heatsink	mm (in)	55x46.5x33mm or 51.5x41.3x33mm
Mounting method		PCB mount
IP		IP00

4.2 100V Models Technical Data

Feature	Units	1/100	3/100	6/100	10/100	15/100	25/100
Minimum supply voltage	VDC	10					
Nominal supply voltage	VDC	85					
Maximum supply voltage	VDC	95					
Maximum continuous power output	W	80	235	470	800	1125	2000
Efficiency at rated power (at nominal conditions)	%	>99					
Maximum output voltage		Up to 96% of DC bus voltage					
Ic,Amplitude sinusoidal /DC continuous current	A	1	3	6	10	15	25
Sinusoidal continuous RMS current limit (Ic)	A	0.7	2.1	4.2	7.1	10	17.7
Peak current limit	A	2xIC					

Table 1: 100V Models Technical Data

4.3 200V Models Technical Data

Feature	Units	10/200
Minimum supply voltage	VDC	20
Nominal supply voltage	VDC	170
Maximum supply voltage	VDC	195
Maximum continuous power output	W	1620
Efficiency at rated power (at nominal conditions)	%	> 99
Maximum output voltage		Up to 96% of DC bus voltage
Ic, Amplitude sinusoidal/DC continuous current	A	10
Sinusoidal continuous RMS current limit (Ic)	A	7.1
Peak current limit	A	2 x Ic

Table 2: 200V Models Technical Data

4.4 R Type Technical Data

Feature	Units	R80/80	R50/100	R70/100
Minimum supply voltage	VDC	10	10	10
Nominal supply voltage	VDC	65	85	85
Maximum supply voltage	VDC	75	95	95
Maximum continuous Electrical power output	kW	5	4.0	5.6
Efficiency at rated power (at nominal conditions)	%	> 99		
Maximum output voltage		Up to 96% of DC bus voltage		
Amplitude sinusoidal/DC continuous current	A	80	50	70
Sinusoidal continuous RMS current limit (Ic)	A	56.5	35.3	49.5

Table 3: R Type Models Technical Data

4.5 Control Supply Input Voltage (VL)

Feature	Unit	Details
Standard CAN		
Input range for Power Supply Option: (Blank)	V	12V – 30V
Power consumption (including 5 V/200 mA for encoder)	W	<2.5W
ETHERCAT		
Input range for Power Supply Option: (Blank)	V	14V – 30V
Power consumption (including 5 V/200 mA for encoder)	W	<4W

4.6 Product Features

Main Feature	Details	Presence / No.
STO	+5V Logic, Opto isolated from the Control section, or	√
	PLC Source, Opto isolated from the Control section	√
Digital Input	+5V Logic, Opto isolated from the Control section or	4
	PLC Source, Opto isolated from the Control section or	4
	PLC Sink Opto isolated from the Control section	4
Digital Output	+5V Logic, Opto isolated from the Control section or	2
	PLC Source, Opto isolated from the Control section or	2
	PLC Sink, Opto isolated from the Control section	2
Analog Input	Differential ±10V or Single Ended	1
Feedback	Standard Port A, B, & C	√
Communication Option	USB (only for EtherCAT version)	√
	EtherCAT or	√
	CAN	√
	Standard RS232	√

4.7 Environmental Conditions

You can guarantee the safe operation of the Gold Mol Twitter by ensuring that it is installed in an appropriate environment. The following table describes the certified environmental conditions for STO of the Gold series servo drives.



Warning: During operation the Gold Mol Twitter becomes hot to the touch (the heatsink and wires may heat up to 92 °C). Care should be taken when handling it.



Caution:
The Gold Mol Twitter dissipates its heat by convection or by conduction. The maximum ambient operating temperature of 50℃(122F) must not be exceeded.

Feature	Details
Operating ambient temperature	0 °C to +50 °C (32 °F to +122 °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

Chapter 5 :Standards and Certifications

5.1 Functional Safety

Standard	Item
IEC 61800-5-2:2017	Adjustable speed electrical power drive systems – Safety requirements – Functional
ENISO 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

5.2 Electrical Safety

Specification	Details
Recognized 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

5.3 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

5.4 Environmental

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

5.5 CE Declaration

Refer to the complete EC Declaration of Conformity available on the internet at:

https://www.elmomc.com/wp-content/uploads/dlm_uploads/2018/05/Gold-Line-CE-Declaration-of-Conformity.pdf.

5.6 Dual Use

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

The operating frequency of the Gold 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 Gold Mol Twitter must be installed in a suitable environment and properly connected to its voltage supplies and the motor.

6.1 Unpacking the Drive Components

Before you begin working with the Gold Mol Twitter , verify that you have all of its components, as follows:

- The Gold Mol Twitter servo drive
- The Elmo Application Studio (EASII) software and software manual

The Gold Mol Twitter is shipped in a cardboard box with Styrofoam protection.

To unpack the Gold Mol Twitter :

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 Gold Mol Twitter you have unpacked is the appropriate type for your requirements, locate the part number sticker on the top of the Gold Mol Twitter . It looks like this:



4. Verify that the Gold Mol Twitter 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 Catalog Number section at the beginning of the installation guide.

6.2 Mounting the Optional Accessories Heat Sinks

There are two optional heat sinks, available as accessory kits :



Flat Heat Sink (P/N:FIN-TWI)



Fins Heat Sink (P/N:Fin-GSOLTWI)

The optional heat sink must be screwed to the lower surface of the Gold Mol Twitter .

To mount the accessory heatsink

1. Mount the heat sink under the base of the Gold Mol Twitter .
2. Place the Thermal foil (enclosed in the heat sink accessories kit) between the lower surface of the servo drive, and the upper surface of the heatsink.
3. Use four M2 screws (enclosed in the heat sink accessories kit) to secure the heatsink under the servo drive.
4. Tighten the screws to the relevant torque force applicable to an M2 stainless steel A2 screw.

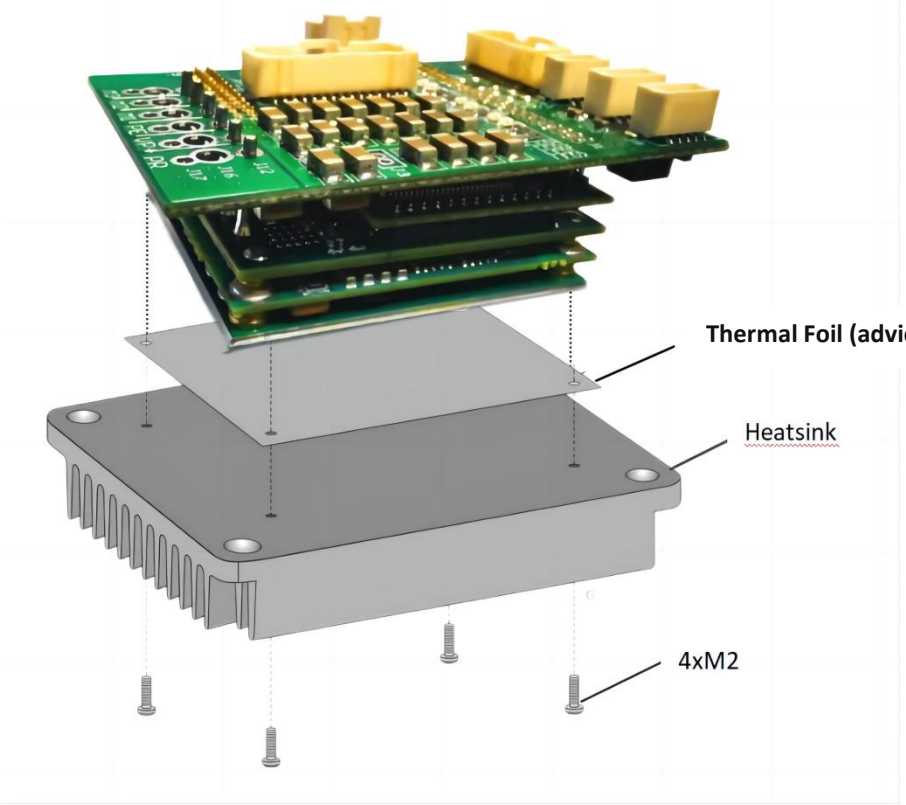


Figure 2: Mount the Heat Sink and Thermal Foil to the Gold Mol Twitter

6.3 Mounting Gold Mol Twitter to an External Heatsink

The selected heat sink must be screwed to the lower surface of the Gold Mol Twitter .

To mount the Gold Mol Twitter to an external heat sink:

1. Mount the heat sink under the base of the Gold Mol Twitter .
2. Place the Thermal foil between the lower surface of the servo drive, and the upper surface of the heatsink.
3. Use four M2.5 head cup Allen screws to secure the heat sink under the servo drive.
4. Tighten the screws to the relevant torque force applicable to an M2.5 stainless steel A2 screw.

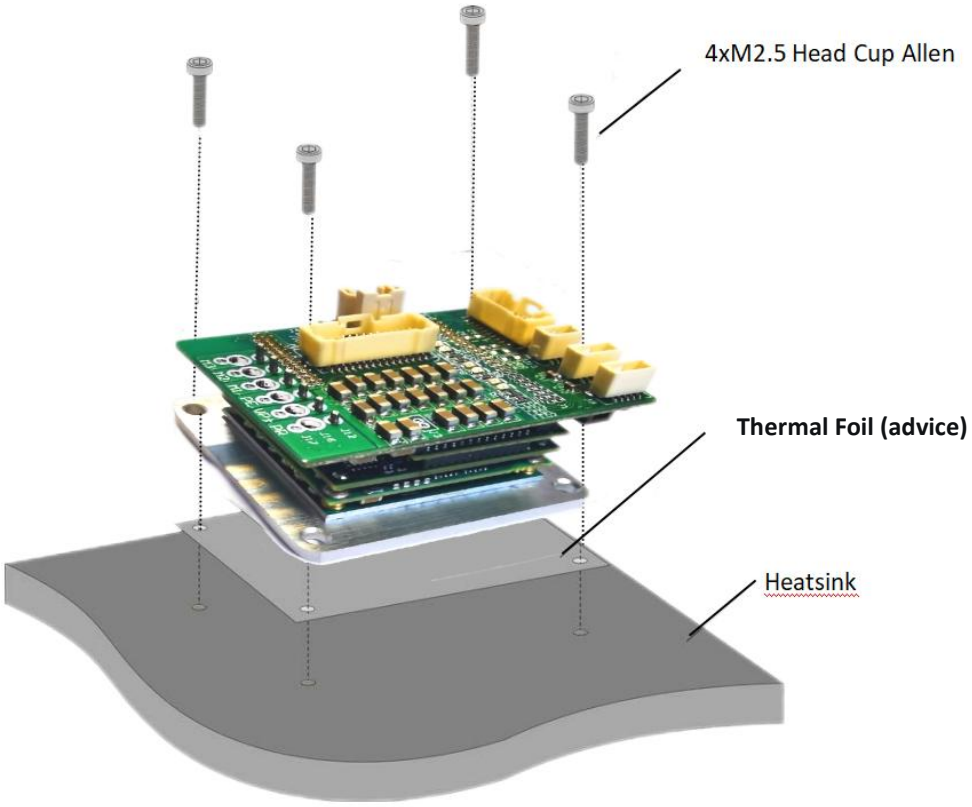


Figure 3: Mounting the Heat Sink and Thermal Foil to the Gold Mol Twitter

6.4 The Gold Mol Twitter Connection Diagrams

6.4.1 EtherCAT with Mini USB Connector Connection Diagram

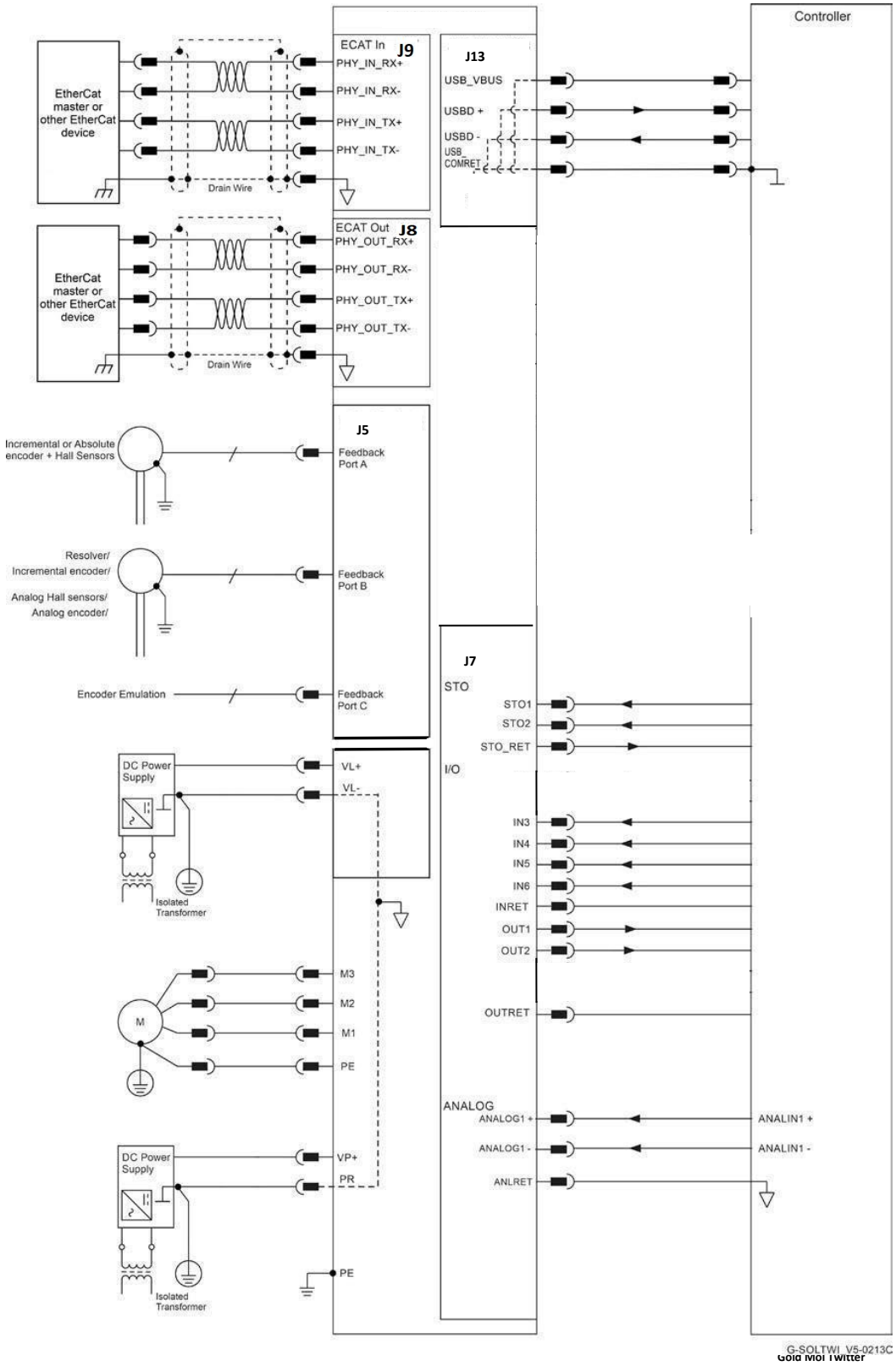
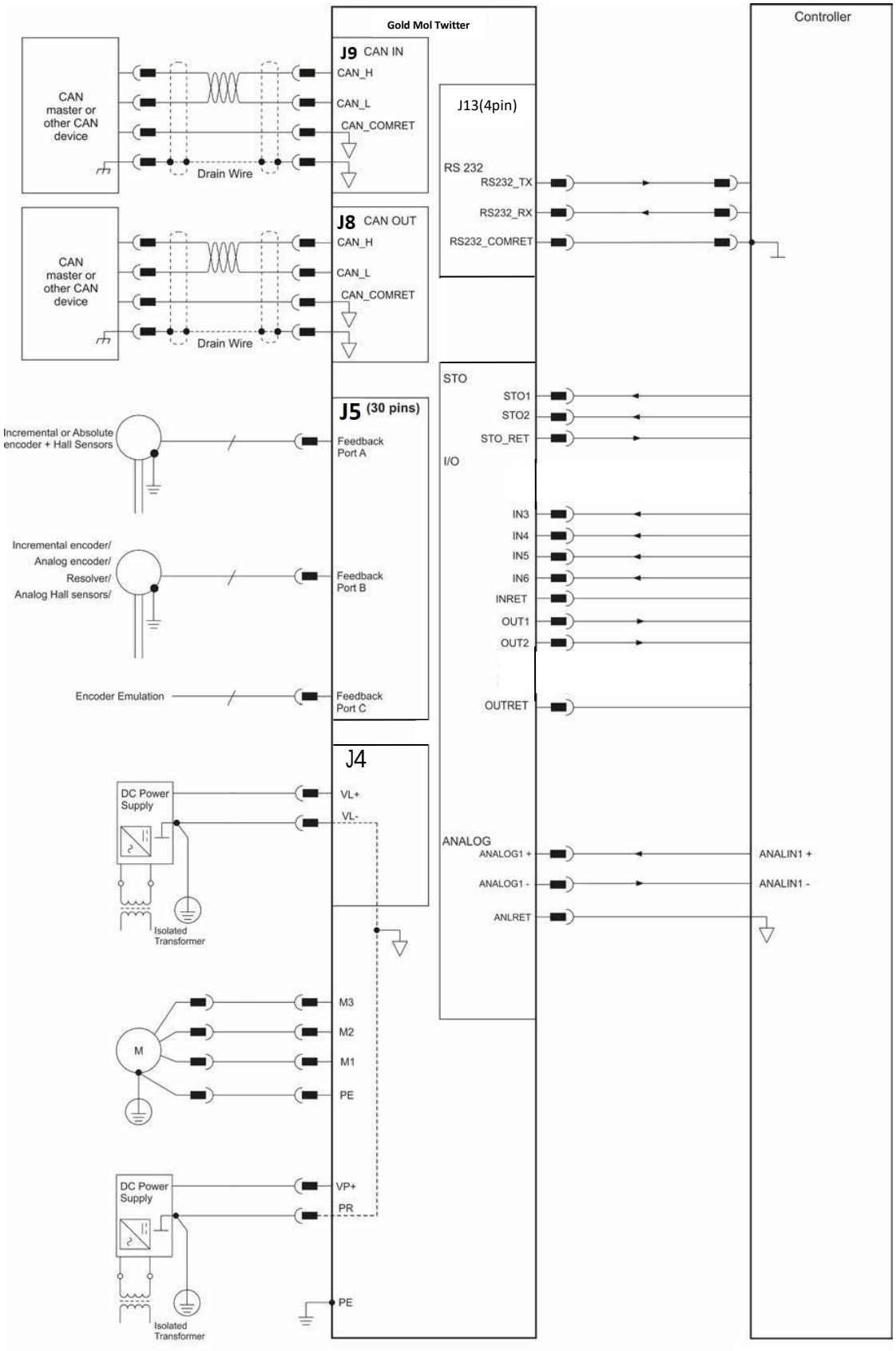


Figure 4: The Gold Mol Twitter EtherCAT Connection Diagram

6.4.2 CAN Connection Diagram

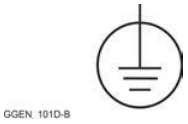
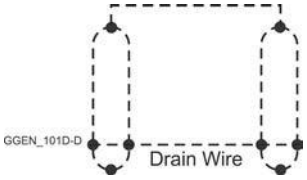
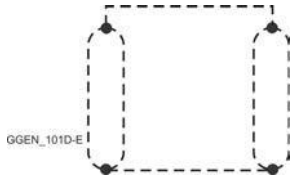
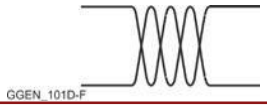
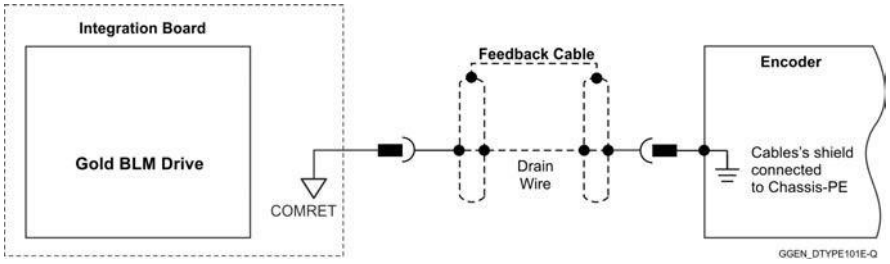


Gold Mol Twitter

Chapter 7 :Wiring

7.1 Wiring Legend

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

Wiring Symbol	Description
	Earth connection (PE)
	Earth Connection
	Common at the Controller
	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
	Encoder Earthing. The cable`s shield is connected to the chassis (PE) in the connector. Earthing the Encoder and connecting the Earth (PE) to the drive COMRET is mandatory to insure reliable operation, high noise immunity and rejection of voltage common mode interferences.

7.2 Mating Connectors

The Gold Mol Twitter has six connectors:

Connector	Mating Connector Type	Mating Crimping Pins
Power	PHEONIX 3.5 mm pitch terminal 6-pin plug	N/A
J4 VL Ports Connector	MOLEX 2 mm Pitch Molex 35507-0200	MOLEX 1.00mm crimp terminal Molex 50212-8000
J5 Feedback Ports Connector	MOLEX 1.00mm "Pico-Clasp" 501189-3010	MOLEX 1.00mm crimp terminal 5013340000
J7 IO Connector	MOLEX 1.00mm "Pico-Clasp" 501189-2010	MOLEX 1.00mm crimp terminal 5013340000
J13 Mini USB/RS232	MOLEX 1.00mm "Pico-Clasp" 501330-0400	MOLEX 1.00mm crimp terminal 5013340000
J8, J9 IN/OUT CAN/EtherCAT Communication	MOLEX 1.00mm "Pico-Clasp" 501330-0500	MOLEX 1.00mm crimp terminal 5013340000
Connectors Location		

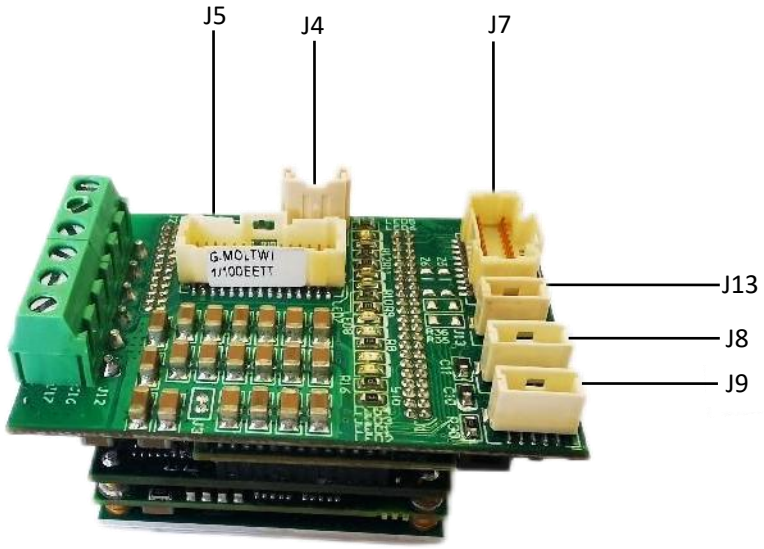


Table 4: Connector Types

7.3 Logic and Control Cabling and Wiring

7.3.1 J4, J5, J13 (Feedback ports, VL, RS232, USB)

For longer distances than 1.0 m and/or high EMI environment, shielded and twisted wires should be used. Drain wires should be connected to Elmo COMRET.

7.3.2 J7 (Digital Inputs/Outputs, STO)

Wires can always be used, no need for twisting, no need for shielding.

7.3.3 J8, J9 EtherCAT or CAN Communication

Always use CAT5e cables (see Elmo's Gold Mol Twitter Cable Kit (CBL-GMOLTWISEKIT)).

7.3.4 COMRET to PE Connection

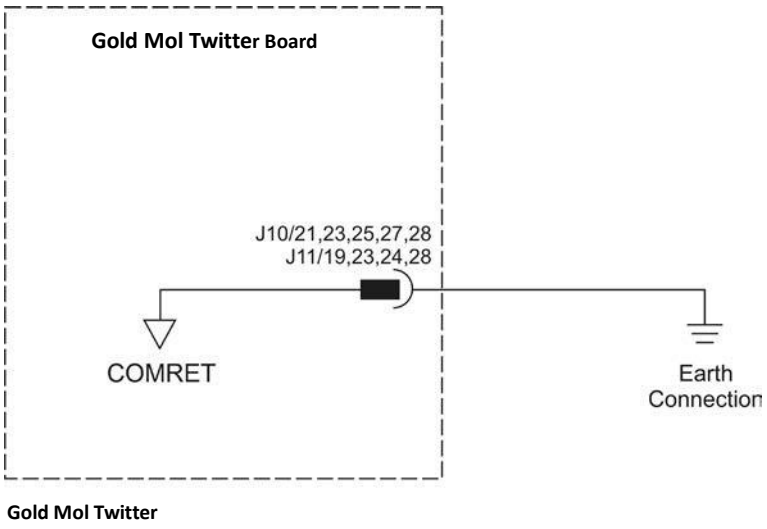


Figure 7: COMRET Connection to the PE

At least one COMRET pin (Figure 7) must be connected to the Protective Earth (PE).

Earthing the COMRET by connecting the Earth (PE) to the drive COMRET is mandatory to insure reliable operation, high noise immunity and rejection of voltage common mode interferences.

7.4 Wiring the Female Connectors

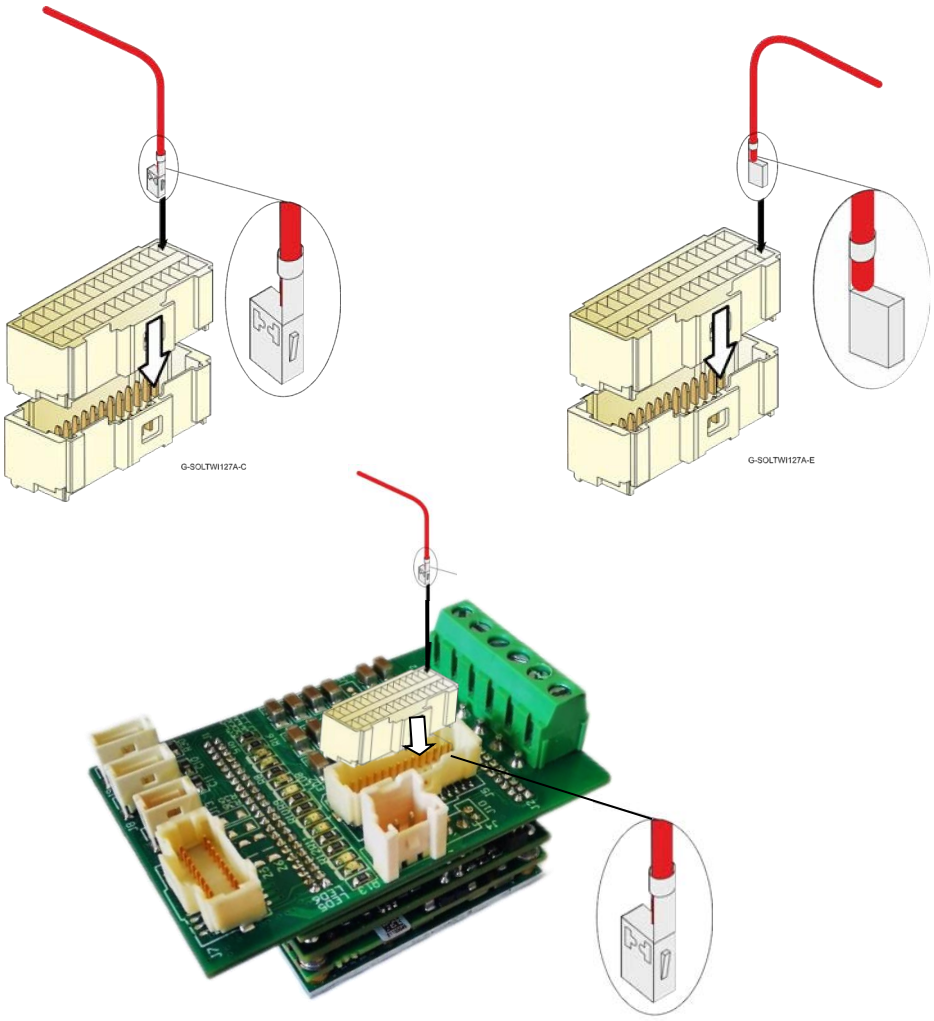


Figure 8: Inserting a pin to the Female Connector

To insert a pin to the female connectors of J5, J7, J13, and J8, J9 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 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 8. 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 8. 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 rotate the connector in the opposite orientation.
5. Repeat the same procedure for any other wire connections.

Chapter 8 :Connections

8.1 Main, Control, and Motor Power

This section describes the Main and Control supplies, and Motor Power connections. There are two optional Motor and Main Power interfaces:

- The current carrying capacity of the MOL board wires is up to 80A
- Pheonix horizontal connector on models have an output current of 10A or less

8.1.1 Motor Power

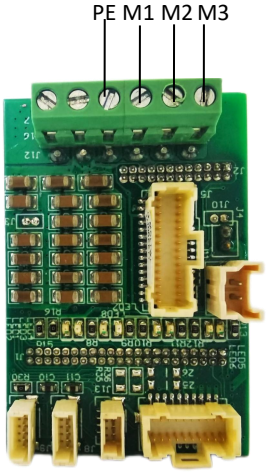
Pin	Function	Cable		Pin Positions
		Brushless Motor	Brushed DC Motor	
PE	Connection earth	Motor	Motor	
M1	Motor phase	Motor	N/C	
M2	Motor phase	Motor	Motor	
M3	Motor phase	Motor	Motor	
				

Table 5: Motor Wires or Connector

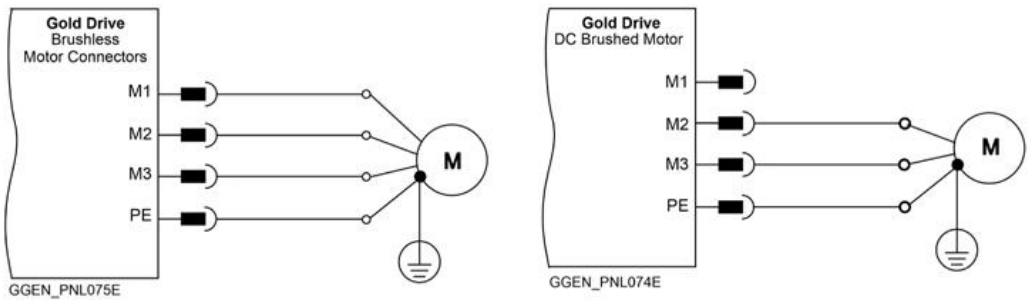


Figure 9: Brushless Motor Power and Brushed Motor Power Connection Diagrams

8.1.1.1 Motor Power Connections

1. Ensure that the motor chassis is properly earthed.
2. Connect the appropriate wire from the Motor Power cables to the M1, M2, M3, and PE terminals on the Gold Mol Twitter .
   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.
3. 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.
   For better EMI performance, the shield should be connected to Earth Connection (heat sink mounting holes).
4. Connect the motor power wires as shown in Figure 10. The Yellow wire is the Grounding wire.
   Make sure not to bundle the wires.

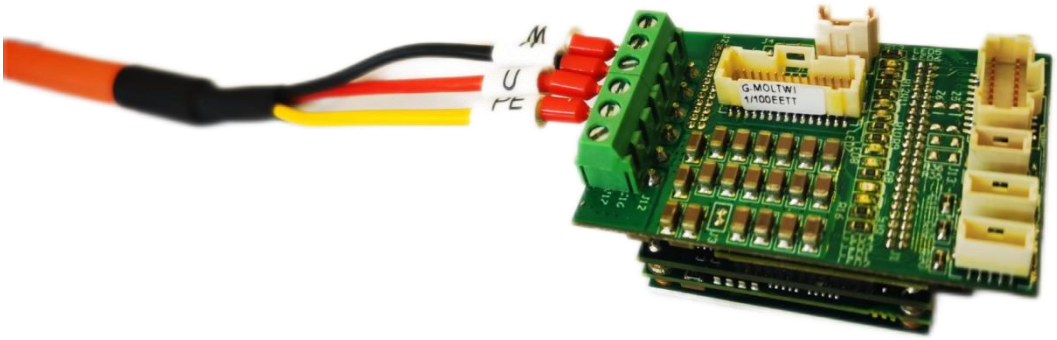


Figure 10: Connecting the Motor Power Wires

8.1.2 Main Power Wires & Connector

This section describes the Main Power and the Control supply connector.

8.1.2.1 Main Power

The isolated DC power source is not included with the Gold Mol Twitter .

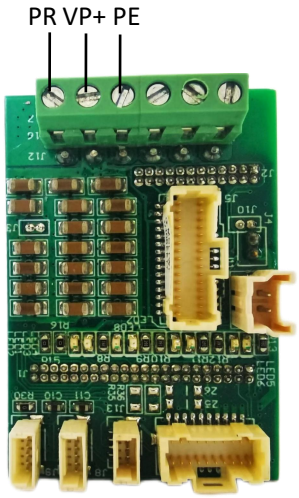
Pin	Function	Cable	Pin Positions
VP+	DC Pos. Power input	Power	
PR	Power return	Power	
PE	Connection earth	Power	
			

Table 6: Connector or Wires for Main Power

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

To connect the Gold Mol Twitter to the DC power source:

1. The source of the VDC power supply must be isolated from the Mains.
2. Verify that the rectified VDC is indeed within the range of the drive.
3. Connect the VP+ and PR wires to the terminals on the servo-drive as shown in Figure 11. It is highly recommended to twist the two DC main power cables at intervals of 10 cm.



Figure 11: Connecting the Main Power Wires

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.

8.1.2.2 Wiring Technical Details

The six 14-AWG, silicon insulated, 300mm length colored high quality, power connection wires are rated to operate up to 200°C:
The Gold Mol Twitter wire connection conforms to UL standards for operation up to 105°C (on thewires). Under extensive load conditions the wires temperature gradient is ≈50 °C above ambient.

8.1.3 Control Supply (J4)

Connect the VL+ and VL- pins on the Gold Mol Twitter in the manner described in the table and drawing below.

Pin	Signal	Function
1	VL+	Control Supply Input
2	VL-	Control Supply Return
Pin Positions		

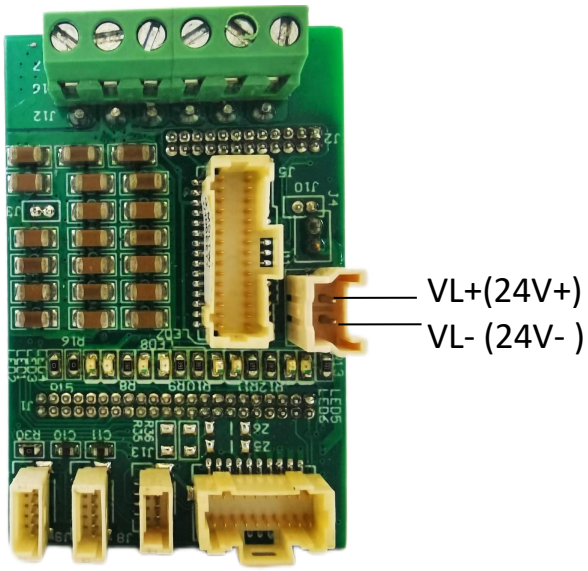


Table 7: Control Supply Pins

Connect the VL+ and VL- terminals to the power supply Control Connector.

To connect the VL+ and VL- to the control supply:

1. The source of the control supply must be isolated from the Mains.
2. Connect the return (common) of the control supply source to the closest earth connection near the control supply source.
3. Before applying power, first verify the polarity of the connection.

Note:

When the drive P/N is G-MOLTWI **/200EES or G-MOLTWI **/200SES, you must connect the control power supply (24VDC),For details see 8.1.4.1.

When the drive P/N is G-MOLTWI **/100EES or G-MOLTWI **/100SES, you don't need to connect the control Supply (24VDC),For details see 8.1.4.2.

8.1.4 Control Supply Connections for Power Supply

8.1.4.1 Dual Power Supply

Whenever the VP+ is >95VDC, a separate supply for the Logic is required. Both the Power and Logic supplies are required to be isolated-from-the-mains:

- A battery or main DC power source rectified from the Mains, according to specification

A control supply for the logic (VL+, VL-),the voltage range is **24VDC.**
The following figure describes an ordinary power supply for Servo drives with sufficient internal capacitance and shunt regulator to manage power flow in both directions to-and-from the motor.

Note: **The PR, COMRET, and VL- are connected internally in the Gold Mol Twitter .**

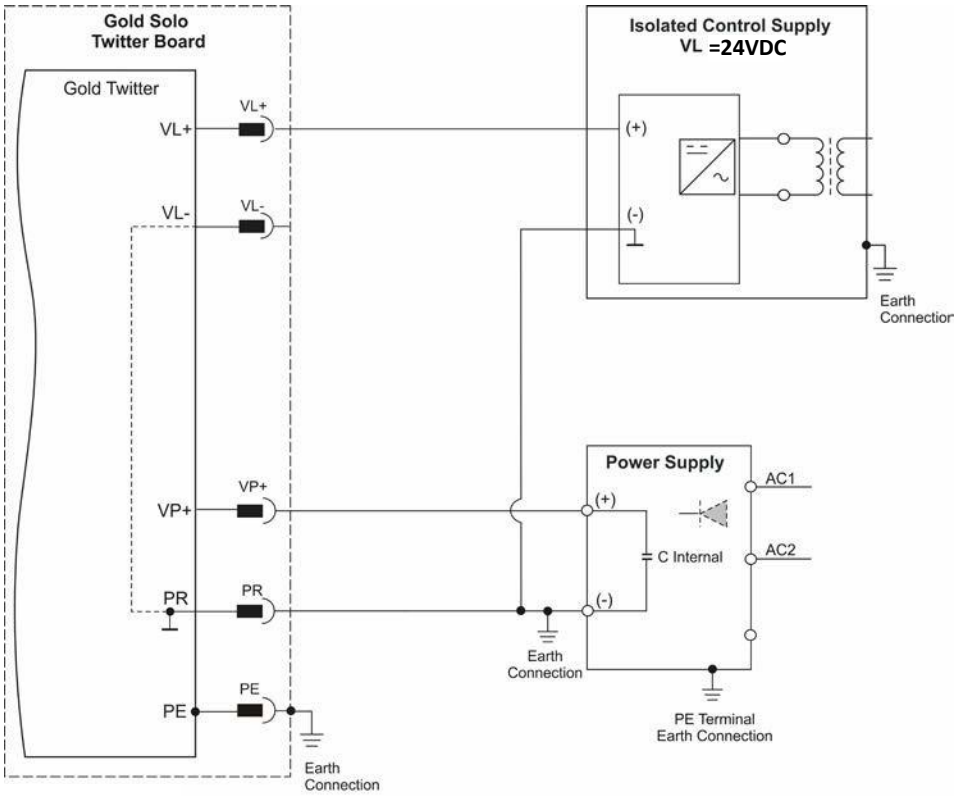


Figure 16: Separate VP and VL Power Supplies Connection Diagram –Highly Recommended

The (+) of the control power supply is connected to the VL+ terminal, while the (-) of the control power supply is connected directly to the (-) of the DC bus power supply. This connection avoids high current ground loops due to poor wiring (Figure 16).

8.1.4.2 Single Power Supply (VP+ < 95VDC)

When the driver P/N is G-MOLTWI/100EES or G-MOLTWI**/100SES, if no digital output, only need to connectthe main power supply VP+,the voltage range is 11VDC to 95VDC,If the digital output is used, a separate power supply is needed to connect the control power VL+(24VDC).**

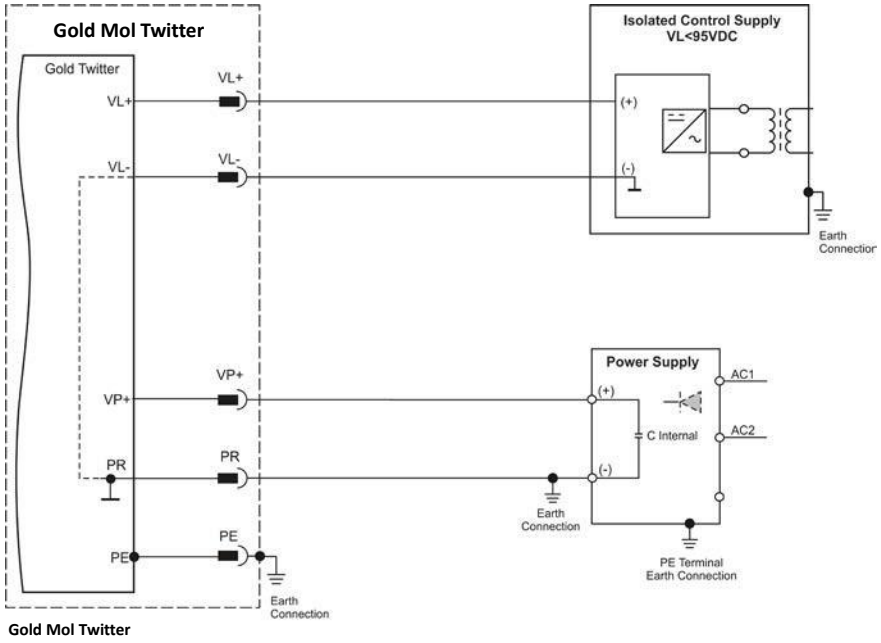


Figure 17: Separate VP and VL Power Supplies Connection Diagram - Alternative

The (-) of the control power supply is connected to the VL- of the Gold Mol Twitter (Figure 17).

8.2 Drive Status Indicator

Figure 20 shows the position of the red/green dual LED, which is used for immediate indication of the Initiation and Working states.

LED1 is the drive error indicator and is red

LED2 is the normal indicator of the drive, which is steady green

-CAN version：

LED3 is the CAN communication indicator

LED4 is the CAN communication error indicator

-EtherCAT version：

LED5,LED6 is the ETH OUT indicator

OP mode LED5 blinks green

LED7,LED8 is the ETH IN indicator

OP mode LED7 blinks green

PRO-OP mode LED3 blinks green.

OP mode Steady green

The ETH IN error, LED4 blinking red.

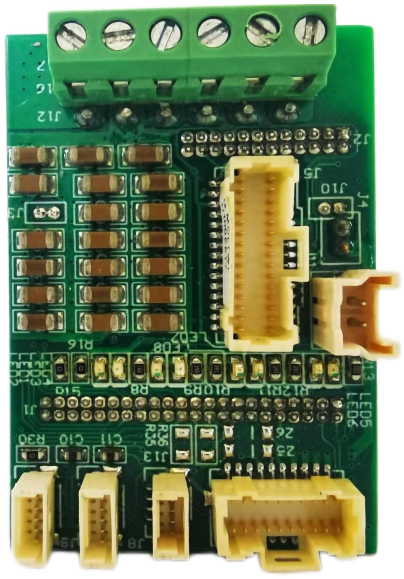
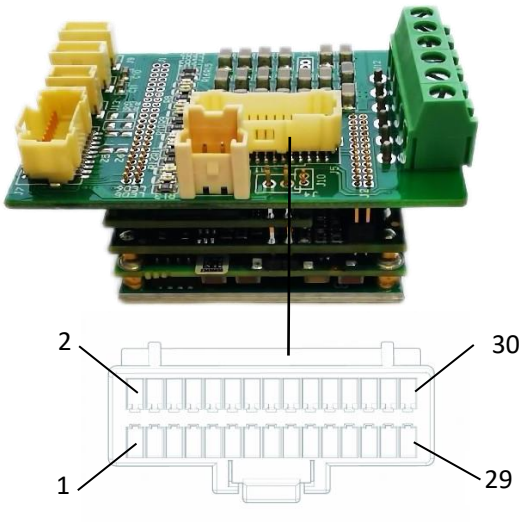


Figure 19:Drive Status Indicator

8.3 Feedback Connector



Feedback Connector

The following table describes the J5 Feedback connections to the 2 x 15 pins female connector.

Pin J5	Signal	Function
1	PortA_ENC_A+ / ABS_CLK+	Channel A+ / Abs encoder clock +
2	PortB_ENC_A-	Port B Channel A-
3	PortA_ENC_A- / ABS_CLK-	Channel A- / Abs encoder clock -
4	PortB_ENC_A+	Port B Channel A+
5	PortA_ENC_B+ / ABS_DATA+	Channel B+ / Abs encoder data +
6	PortB_ENC_B-	Port B Channel B-
7	PortA_ENC_B- / ABS_DATA-	Channel B- / Abs encoder data -
8	PortB_ENC_B+	Port B Channel B+
9	PortA_ENC_INDEX+	Index+
10	PortB_ENC_INDEX-	Port B Index-
11	PortA_ENC_INDEX-	Index-
12	PortB_ENC_INDEX+	Port B Index+
13	HA	Hall sensor A
14	PortC_ENCO_A-	Buffered Channel A- output / Pulse- / PWM-
15	HB	Hall sensor B
16	PortC_ENCO_A+	Buffered Channel A+ output/Pulse+/PWM+

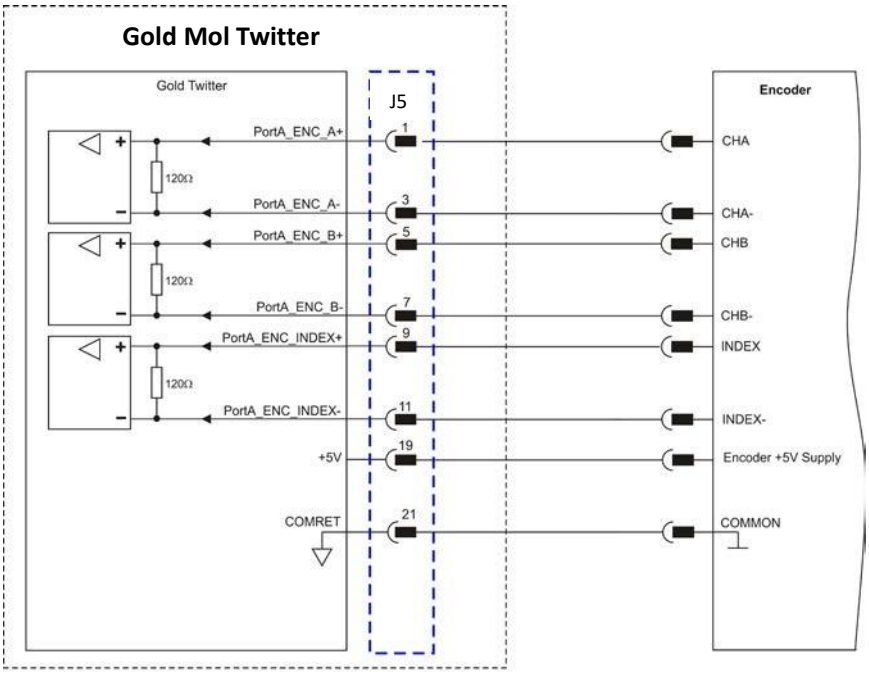
Pin J10	Signal	Function
17	HC	Hall sensor C
18	PortC_ENCO_B-	Buffered Channel B- output / Dir-
19	+5V	Encoder +5V supply with a total allowable maximum consumption of 200mA using Pins 19 or 26.
20	PortC_ENCO_B+	Buffered Channel B+ output / Dir+
21	COMRET	Common return
22	PortC_ENCO_Index-	Buffered Channel INDEX- output
23	COMRET	Common return
24	PortC_ENCO_Index+	Buffered Channel INDEX+ output
25	COMRET	Common return
26	+5V	Encoder +5V supply with a total allowable maximum consumption of 200mA using Pins 19 or 26.
27	COMRET	Common return
28	COMRET	Common return

Table 8: Connector J5 – Feedback

For longer distances than 1.0 m and/or high EMI environment, shielded and twisted wires should be used. Drain wires should be connected to Elmo COMRET.

8.3.1 Port A

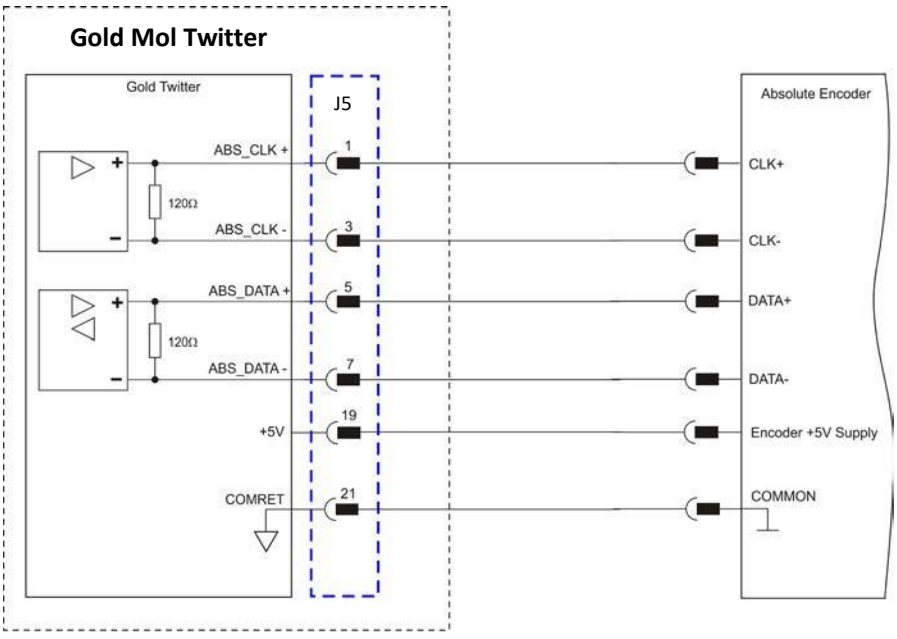
8.3.1.1 Incremental Encoder



Gold Mol Twitter

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

8.3.1.2 Absolute Serial Encoder



Gold Mol Twitter

Figure 23: Absolute Serial Encoder – Recommended Connection Diagram for Sensors Supporting Data/Clock (e.g., Biss / SSI / EnDAT, etc.)

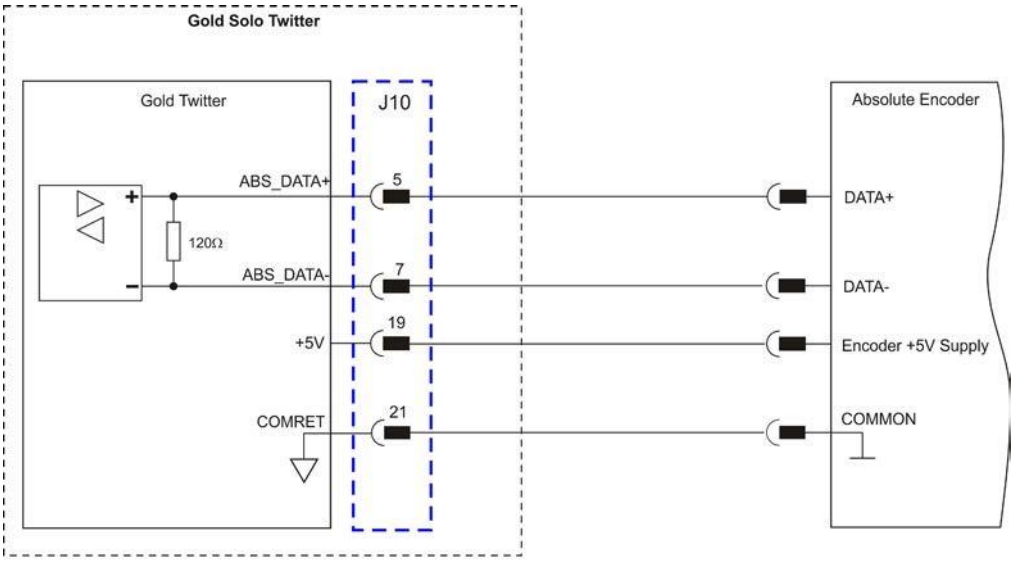


Figure 24: Absolute Serial Encoder – Recommended Connection Diagram for Sensors Supporting Data Line Only (Tamagawa,NRZ types, e.g., Panasonic / Mitutoyo / etc.)

8.3.1.3 Hall Sensors

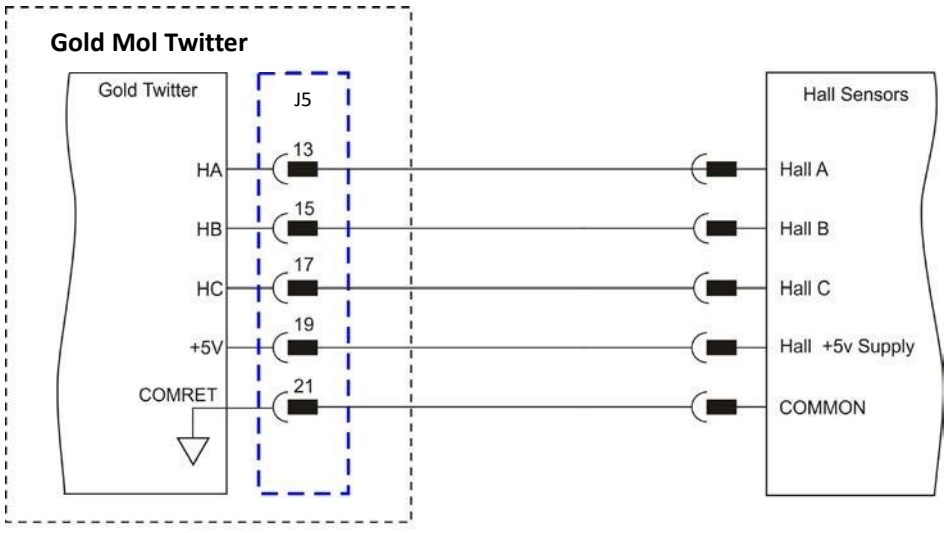


Figure 25: Hall Sensors Connection Diagram

8.3.2 Port B

8.3.2.1 Incremental Encoder

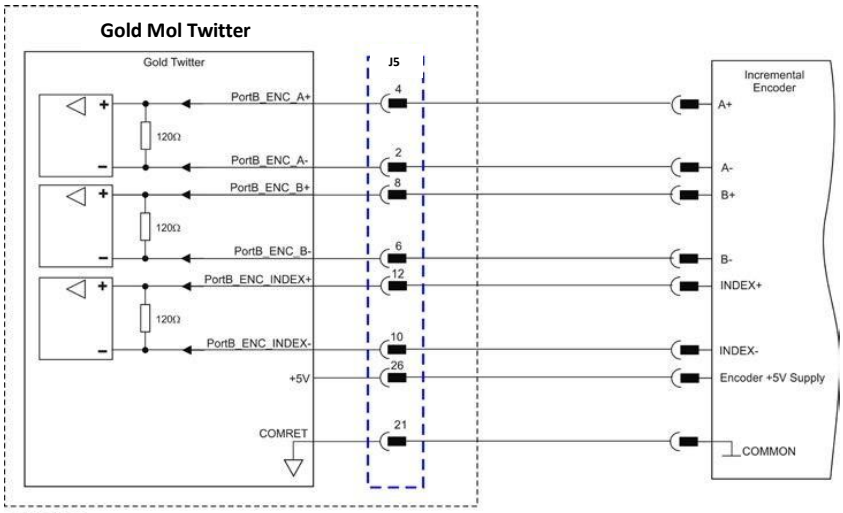


Figure 26: Port B Incremental Encoder Input – Recommended Connection Diagram

8.3.2.2 Interpolated Analog Encoder

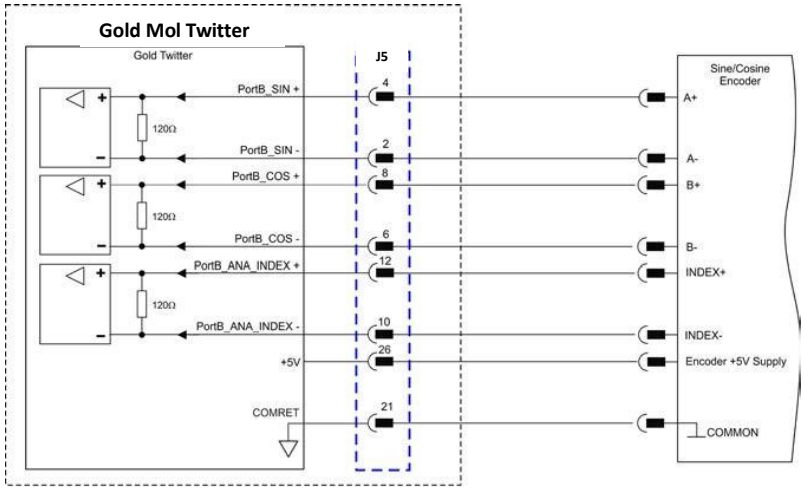


Figure 27: Port B - Interpolated Analog Encoder Connection Diagram

8.3.2.3 Resolver

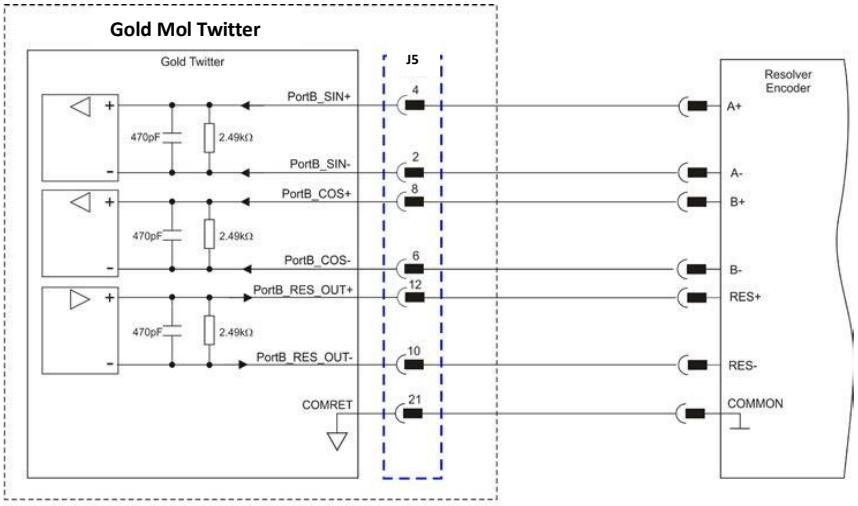


Figure 28: Port B – Resolver Connection Diagram

8.3.2.4 Port C – Emulated Encoder Output (J5)

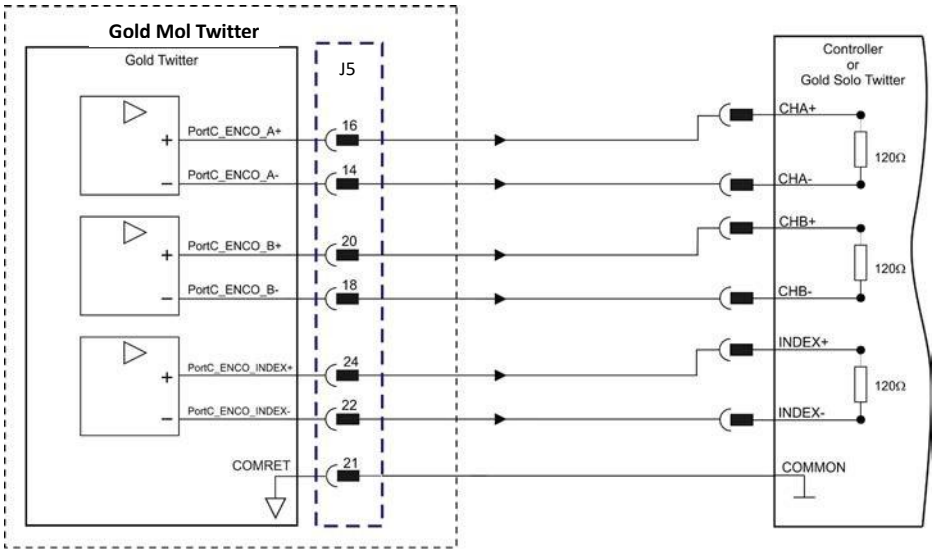
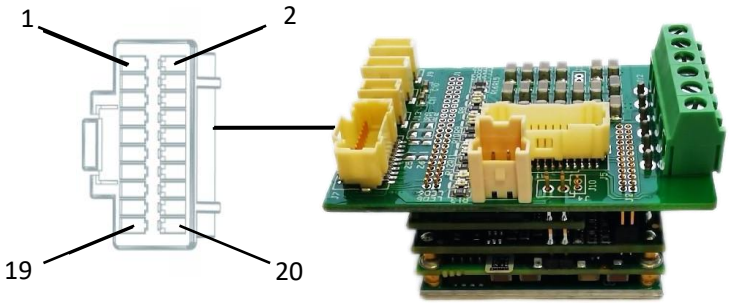


Figure 29: Emulated Encoder Differential Output – Recommended Connection Diagram

8.4 J7 I/O and STO Connector



J7 I/O and STO Communication Connector

Pin J7	Signal	Function
1	IN-RET	D_{in} return
3	INI-RET	D_{in} return
5	IN6	High speed programmable digital input 6 (opto isolated from control COMRET)
7	IN5	High speed programmable digital input 5 (opto isolated from control COMRET)
9	IN4	High speed programmable digital input 4 (opto isolated from control COMRET)
11	IN3	High speed programmable digital input 3 (opto isolated from control COMRET)
13&15	OUT1	Programmable output 1 (opto isolated from control COMRET)
17&19	OUT2	Programmable output 2 (opto isolated from control COMRET)
2	COMRET	Common return
4	ANALOG1-	Analog input complement
6	ANALOG1+	Analog input
8	STO_RET	STO signal return. The two digital STO inputs are optically isolated from the other parts of the drive, and share one return line.
10	STO2	STO 2 input opto isolated from control COMRET
12	STO1	STO 1 input opto isolated from control COMRET
14&16	OUT1-RET	OUT1-return
18&20	OUT2-RET	OUT2-return

Table 9: I/O, STO and Analog Connector

8.4.1 Digital Inputs

8.4.1.1 Source PLC Voltage Level Digital Input

The following are the connection diagram of Digital inputs:

Feature	Details
Standard	Isolated PLC source Conforming to IEC 61131-2
Input current	Iin = (Vin-7.4)/4.99 Kohm Iin = 920 uA @ Vin = 12 V Iin = 4.5 mA @ Vin = 30 V
High-level input voltage	12 V < Vin < 30 V
Low-level input voltage	0 V < Vin < 7 V
Minimum pulse width	>250 sec
Execution time (all inputs): the time from application of voltage on input until execution is complete	0 < T < 250 sec
High-speed inputs – 1–6 minimum pulse width, in high-speed mode	T > 5sec if the input functionality is set to latch/capture (index/strobe). Notes: ● Home mode is high-speed mode and can be used for fast capture and precise homing. ● Highest speed is achieved when turning on optocouplers.
Capture with differential input Port A, Port B Index	T > 0.1sec if the differential input functionality is set to touch probe/capture (index/strobe).

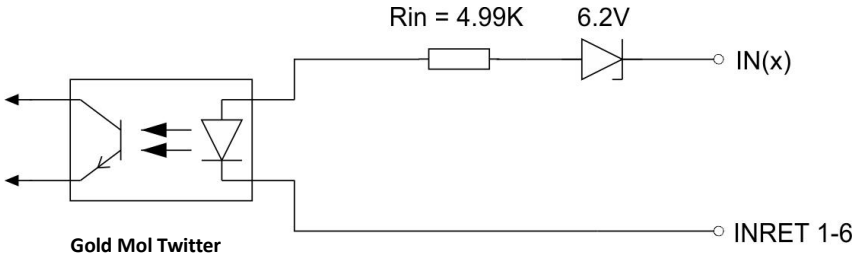


Figure 31: Digital Input PLC Source Schematic

NOTE:In the default state, when there is no current in the optocoupler diode of GOLD MOLTWI OPTO, the digital input is "1". It is possible to change the default state by the IL[] command.

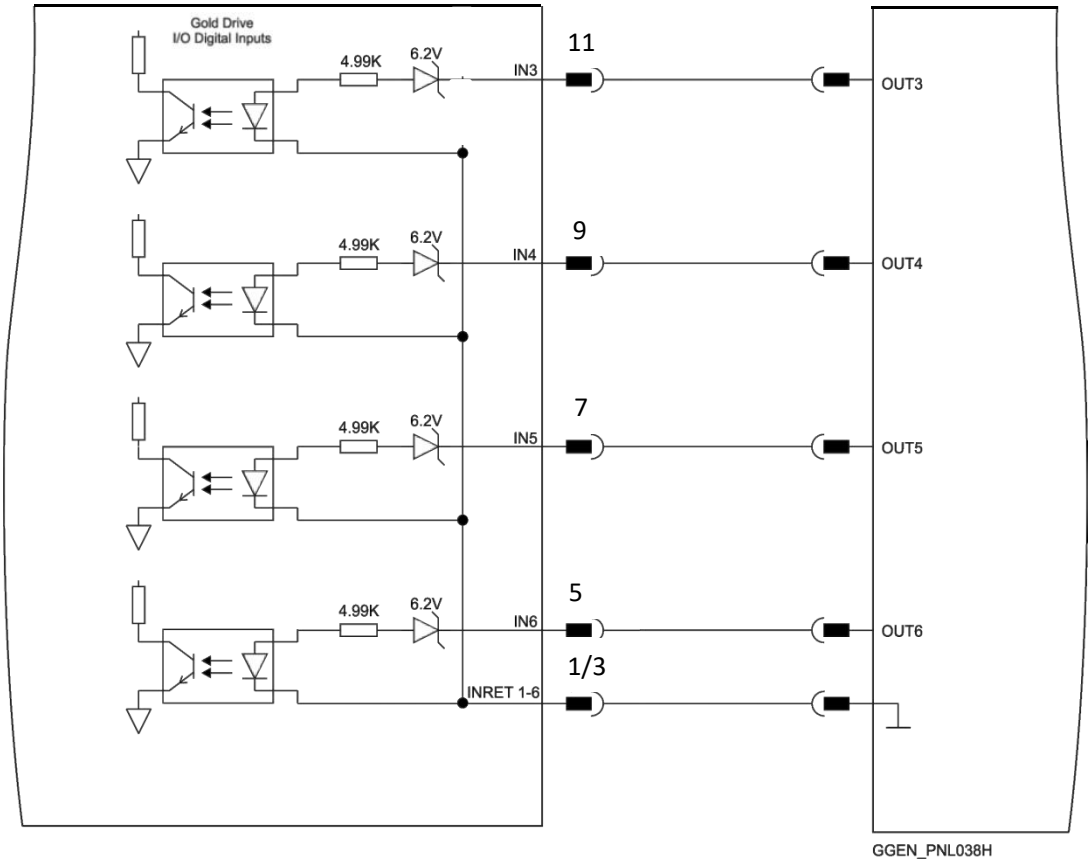


Figure 32: Digital Input Connection Diagram Example – Source PLC Option

8.4.1.2 Sink PLC Voltage Level Digital Input

Feature	Details
Standard	Isolated PLC Sink Conforming to IEC 61131-2
Input current	Iin = (Vin-7.4)/4.99 Kohm Iin = 920 uA @ Vin = 12 V Iin = 4.5 mA @ Vin = 30 V
High-level input voltage	12 V < Vin < 30 V
Low-level input voltage	0 V < Vin < 7 V
Minimum pulse width	>250 sec
Execution time (all inputs): the time from application of voltage on input until execution is complete	0 < T < 250 sec
High-speed inputs – 1–6 minimum pulse width, in high-speed mode	T > 5sec if the input functionality is set to latch/capture (index/strobe). Notes: ● Home mode is high-speed mode and can be used for fast capture and precise homing. ● Highest speed is achieved when turning on optocouplers.
Capture with differential input Port A, Port B Index	T > 0.1sec if the differential input functionality is set to touch probe/capture (index/strobe).

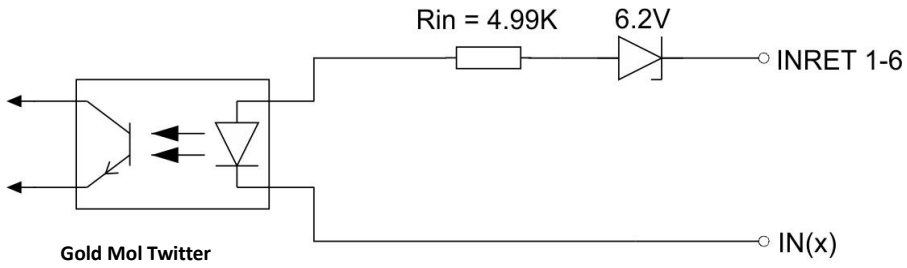


Figure 31: Digital Input PLC Sink Schematic

NOTE: In the default state, when there is no current in the optocoupler diode of GOLD MOLTWI OPTO, the digital input is "1". It is possible to change the default state by the IL[] command.

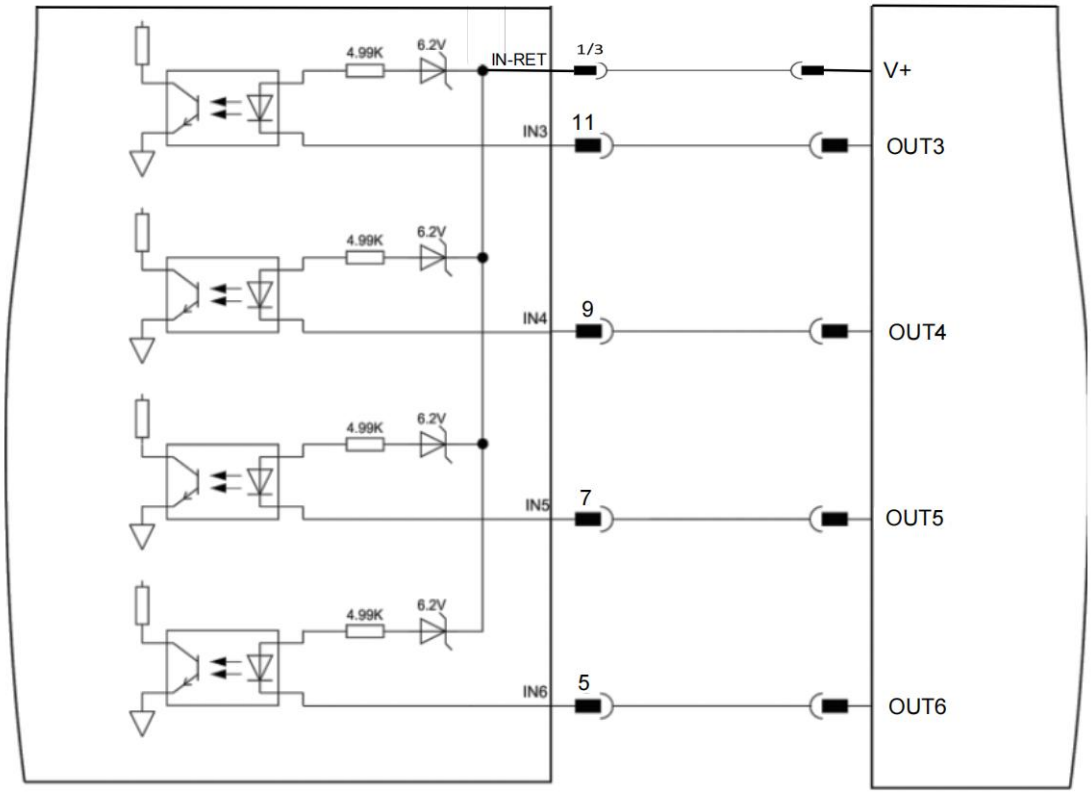


Figure 32: Digital Input Connection Diagram Example – Sink PLC Option

8.4.1.3 Source 5V Logic Level Digital Input

Feature	Details
Type of input	Optically isolated
Input current for all inputs	Iin = 3.8 mA @ Vin = 5 V
High-level input voltage	3.0 V < Vin < 10 V, 5 V typical
Low-level input voltage	0 V < Vin < 0.8 V
Minimum pulse width	> 250 sec
Execution time (all inputs): the time from application of voltage on input until execution is complete	0 < T < 250 sec
High-speed inputs – 1–6 minimum pulse width, in high-speed mode	T > 5 sec if the input functionality is set to latch/capture (index/strobe). Notes: Home mode is high-speed mode and can be used for fast capture and precise homing. Highest speed is achieved when turning on optocouplers.

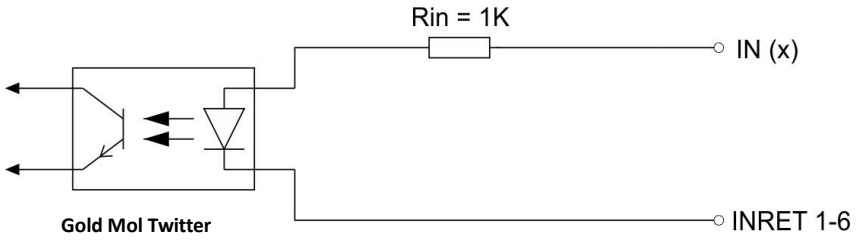


Figure 35: Digital Input 5V Logic Schematic

NOTE:In the default state, when there is no current in the optocoupler diode of GOLD MOLTWI OPTO, the digital input is "1". It is possible to change the default state by the IL[] command

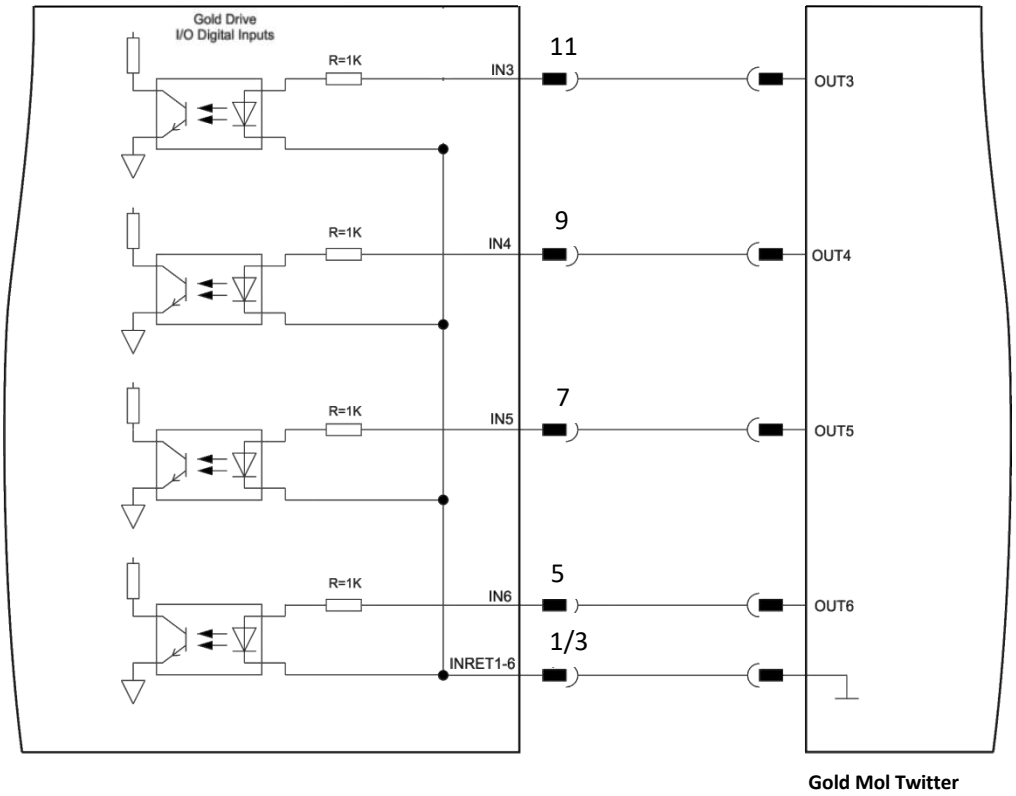


Figure 36: Digital Input Source 5V Logic Mode Connection Diagram

8.4.2 Digital Outputs

If you use digital output, you need to connect VL+ (24VDC).

8.4.2.1 Source PLC Voltage Level Digital Output

Feature	Details
Type of output	Optically isolated PLC source
Supply output (VDD)	12V to 30V (typically 24V)
Max. output current Iout (max) (Vout = High)	Iout (max) ≤ 30 mA
Collector Emitter saturation voltage	1V
Ton (Time from low to high) If Vdd= 24V	< 15usec
Toff (Time from high to Low)	< 250usec
RL	The external RL must be selected to limit output current to no more than 30 mA. $R_L = \frac{VDD-1}{I_{out\,(\max)}}$
Executable time	0 < T < 250 sec

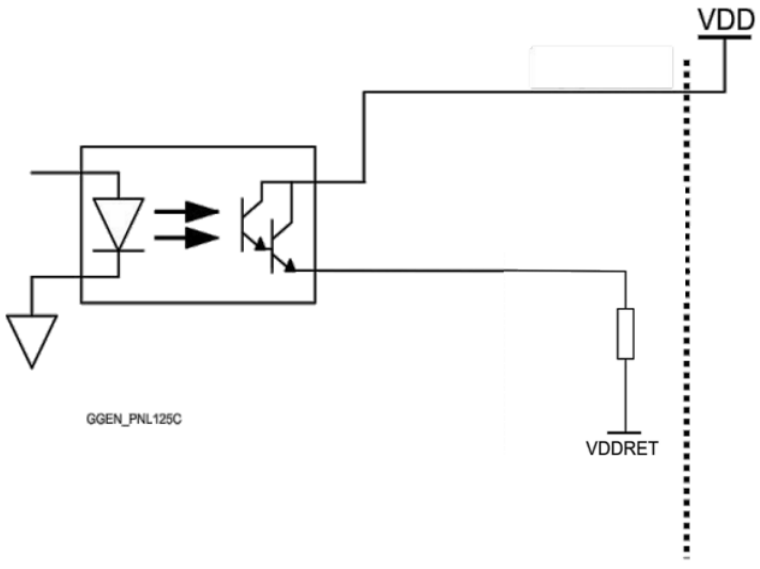


Figure 37: Digital Photodarlington Output Schematic – Source Mode PLC Level

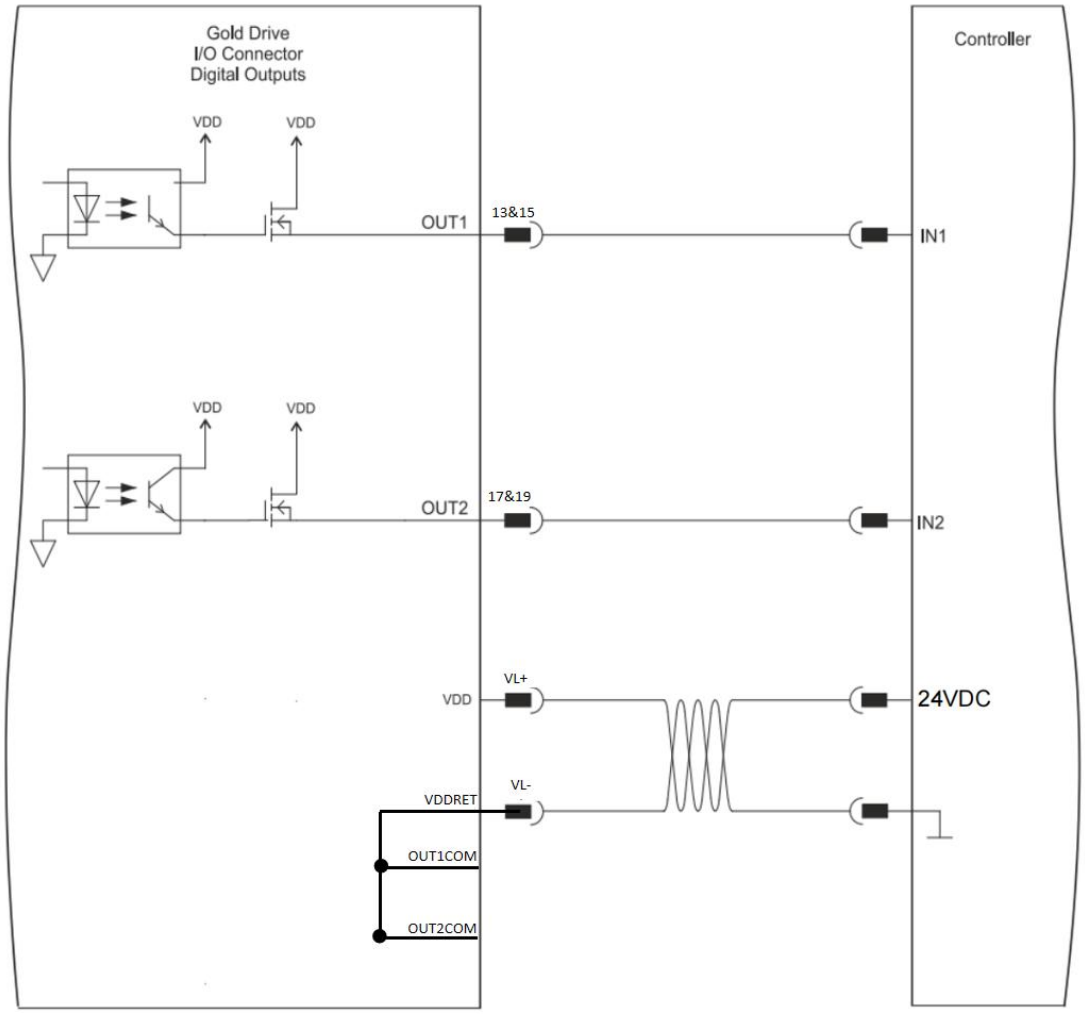


Figure 38: Digital Output Connection Diagram Example – Source PLC Option

8.4.2.2 Sink PLC Voltage Level Digital Output

Feature	Details
Type of output	Optically isolated PLC Sink
Supply output (VDD)	12V to 30V (typically 24V)
Max. output current Iout (max) (Vout = High)	Iout (max) ≤ 30 mA
Collector Emitter saturation voltage	1V
Ton (Time from low to high) If Vdd= 24V	< 15usec
Toff (Time from high to Low)	< 250usec
RL	The external RL must be selected to limit output current to no more than 30 mA. $R_L = \frac{VDD-1}{I_{out\,(\max)}}$
Executable time	0 < T < 250 sec

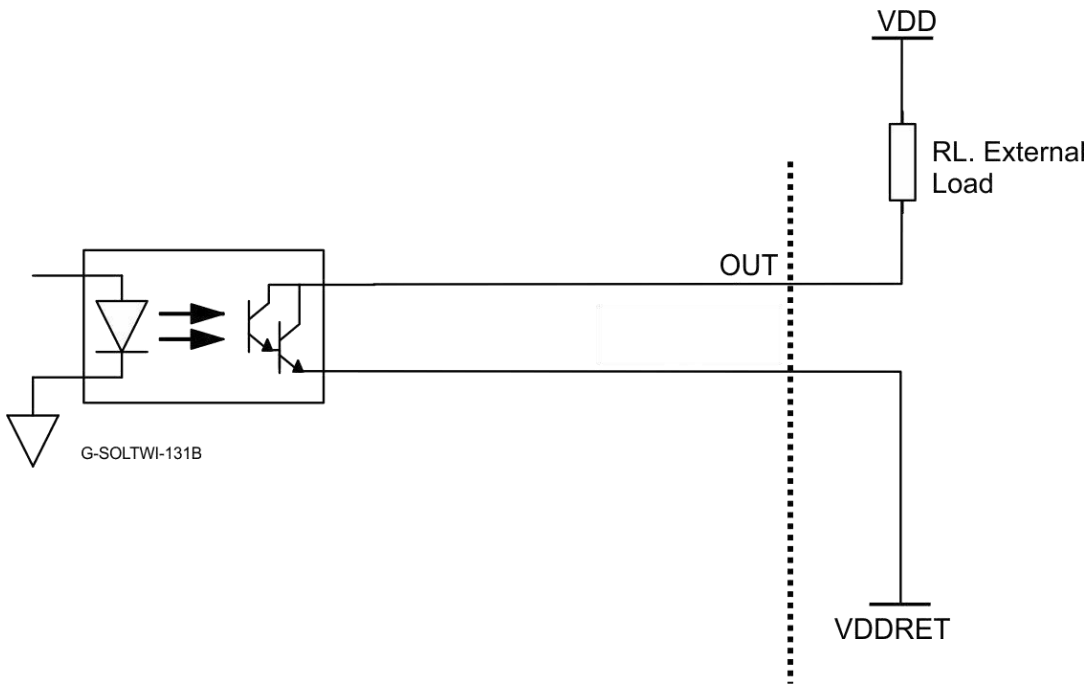


Figure 37: Digital Photo darlington Output Schematic – Sink Mode PLC Level

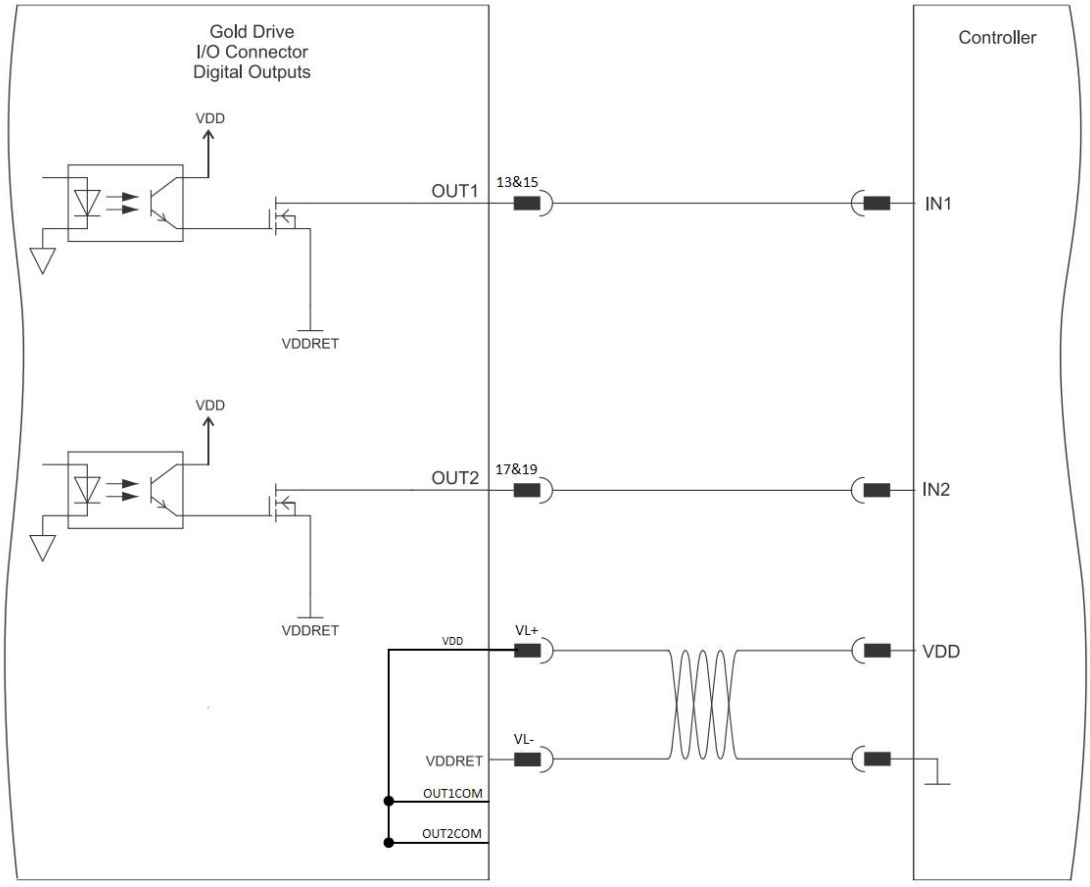


Figure 38: Digital Output Connection Diagram Example – Sink PLC Option

8.4.2.3 Digital Outputs Source 5V Logic Mode

Feature	Details
Type of output	Optically isolated 5V Logic source
Supply output (VDD)	< 30 V (Typically 5 V)
Max. output current Iout (max) (Vout = High)	Iout (max) ≤ 30 mA
Collector Emitter saturation voltage	1V
Ton (Time from low to high) If Vdd= 5V	< 10usec
Toff (Time from high to Low)	< 100usec
RL	The external RL must be selected to limit output current to no more than 30 mA. $R_L = \frac{VDD-1}{I_{out\,(\max)}}$
Executable time	0 < T < 250 sec

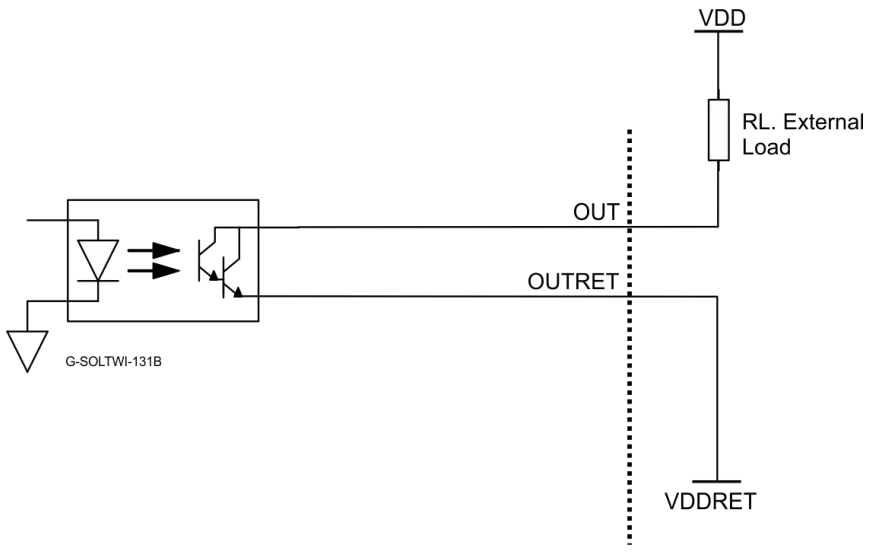


Figure 41: Digital Photodarlington Output Schematic – Source Mode 5V Logic Level

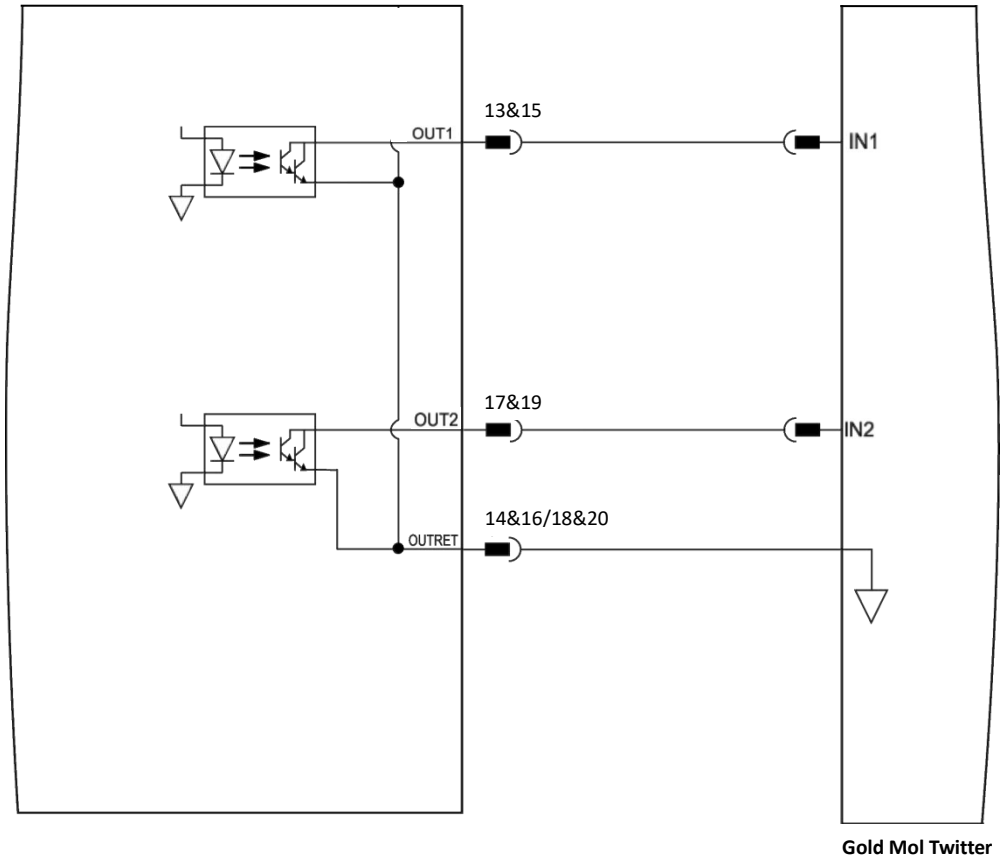


Figure 42: Digital Output Connection Diagram Example – Source 5V Logic Option

8.4.3 STO (Safe Torque Off)

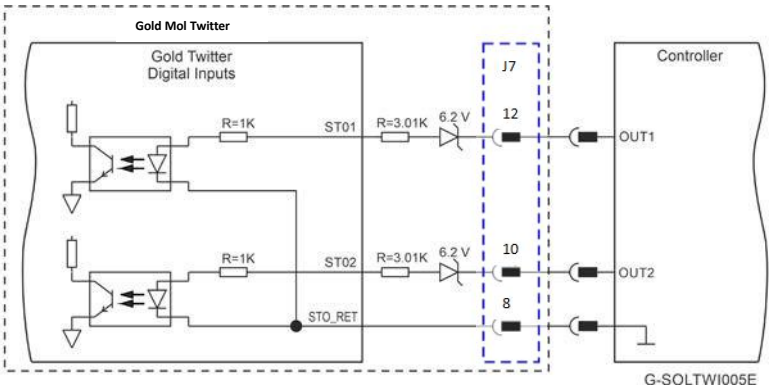


Figure 43: STO Input Connection – 5V Logic

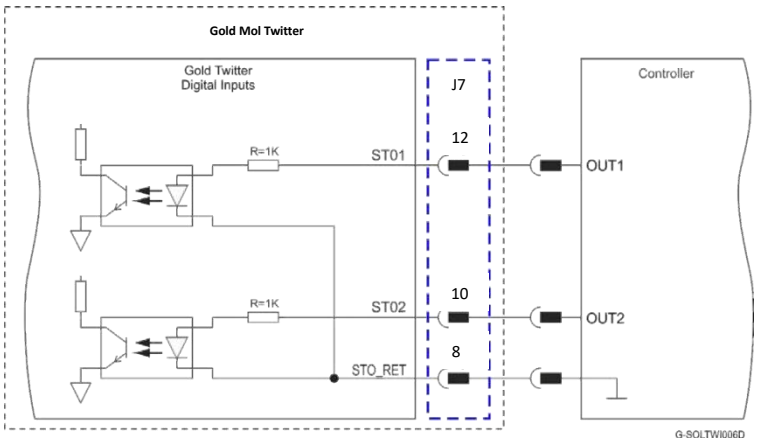


Figure 44: STO Input Connection – PLC (24V Logic)

8.4.4 Analog Input

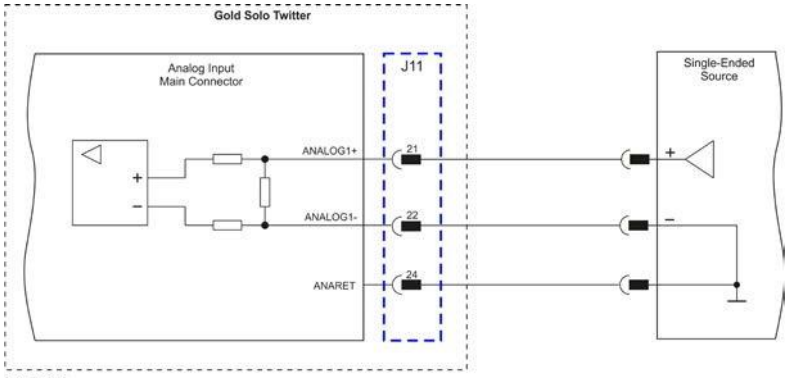


Figure 45: Analog Input

8.5 Communication Connector

8.5.1 Standard RS-232

Pin J13	Signal	Function
1	COMRET	Common return
2	RS-232_RX	RS-232 Receive
3	RS-232_TX	RS-232 Transmit
4	COMRET	Common return

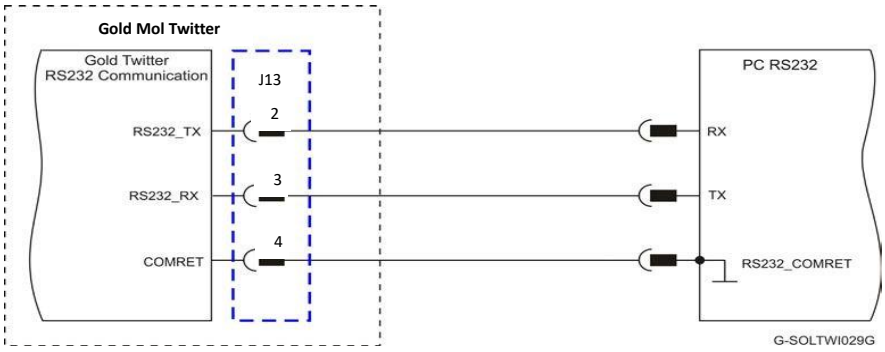


Figure 46: Standard RS-232 Connection Diagram

8.5.2 USB Communication (Only for EtherCAT version)

Pin J13	Signal	Function
1	USB COMRET	USB communication return
2	USBD+	USB _P line
3	USBD-	USB _N line
4	USB VBUS	USB VBUS 5V

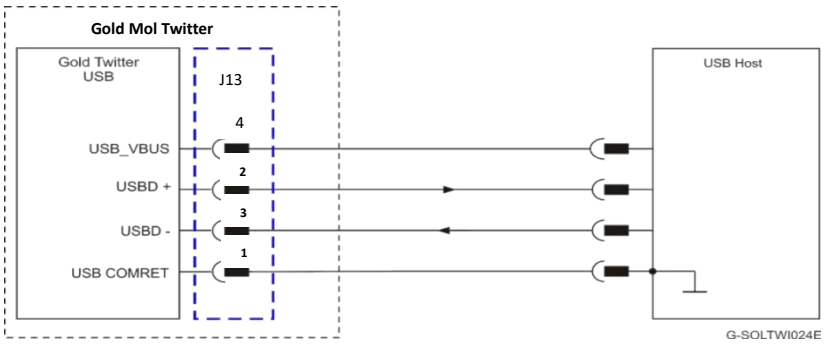


Figure 47: USB Network Diagram

8.6 EtherCAT Communications Version

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

Fieldbus Type	Product Number
EtherCAT	G-MOLTWIXX/YYYEXXX

8.6.1 EtherCAT IN/Ethernet Connector (J9)

Table 11: EtherCAT IN / Ethernet Pin Assignments Note: Always use CAT5e cables.

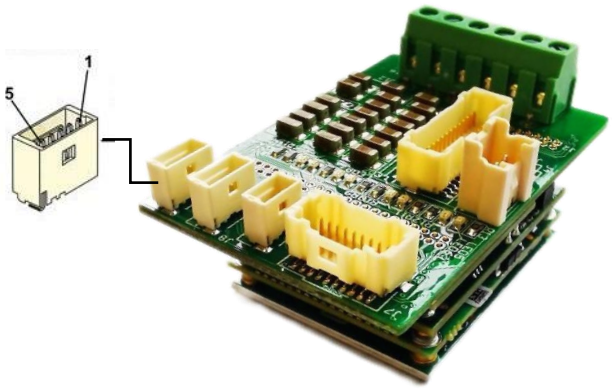
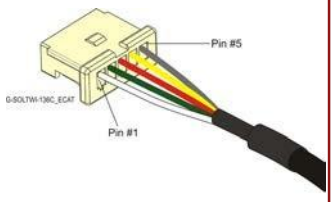
Pin (J9)	Signal	Function
1	EtherCAT_IN_TX+/Ethernet_TX+	EtherCAT in/Ethernet transmit +
2	EtherCAT_IN_TX-/Ethernet_TX-	EtherCAT in/Ethernet transmit -
3	EtherCAT_IN_RX+/Ethernet_RX+	EtherCAT in/Ethernet receive +
4	EtherCAT_IN_RX-/Ethernet_RX-	EtherCAT in/Ethernet receive -
5	COMRET	Shield drain wire
Pin Positions		Cable Connector
		 Ethernet Cable Connector

Table 11: EtherCAT IN / Ethernet Pin Assignments

8.6.2 EtherCAT OUT Connector (J8)

Pin (J8)	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	COMRET	Shield drain wire

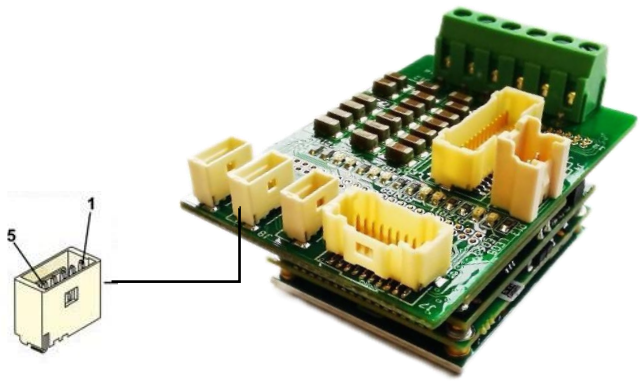
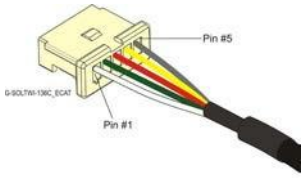
Pin Positions	Cable Connector
	 Ethernet Cable Connector

Table 12: EtherCAT OUT Pin Assignments

Note: **Always use CAT5e cables**.

8.6.3 EtherCAT Schematic Connections

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

8.6.3.1 EtherCAT Communication

This section only describes the EtherCAT communication, and the pinout drawing of the connector.

When the EtherCAT is connected and the FoE is in operation, the USB cable connection must be disconnected.

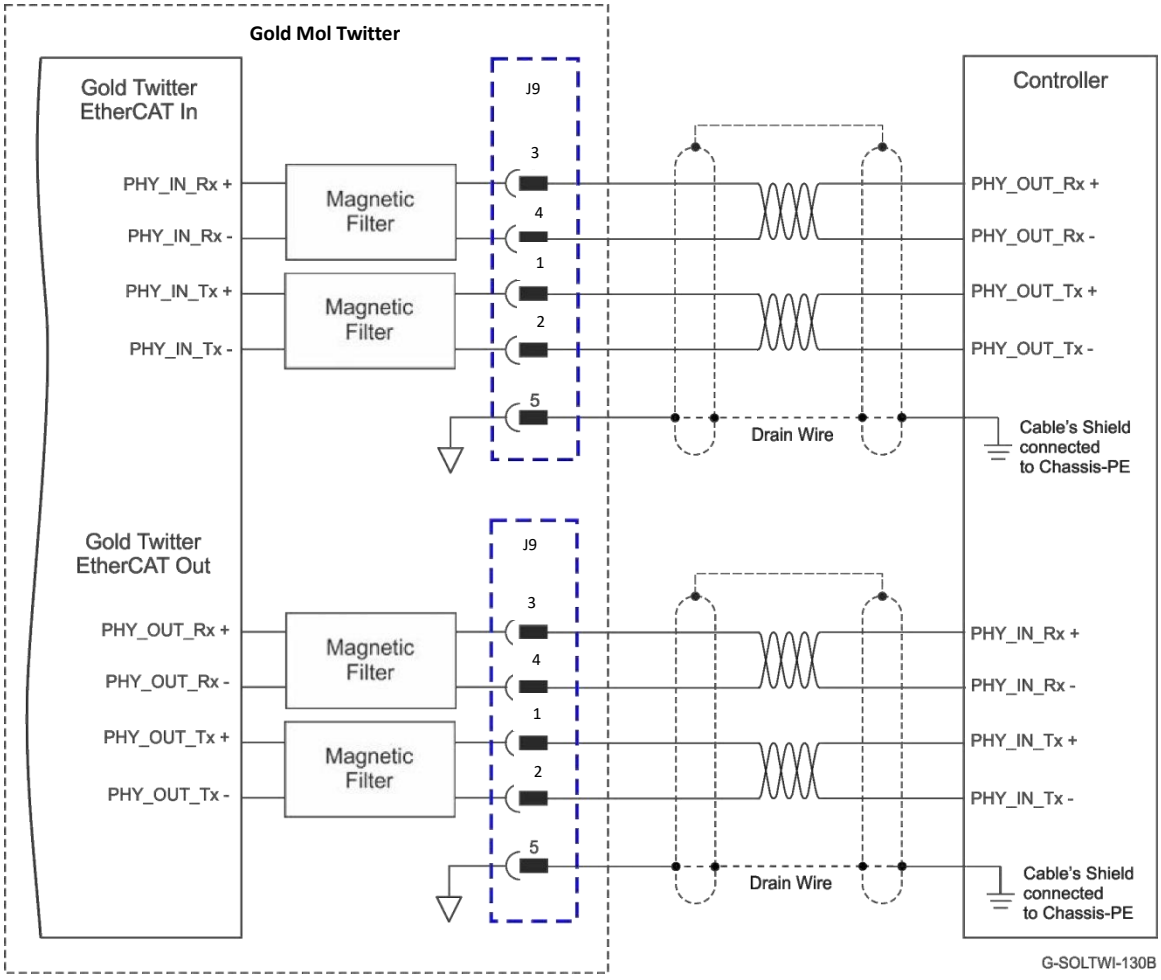


Figure 49: EtherCAT Connection Schematic Diagram Note: Always use CAT5e cables.

Note: Always use CAT5e cables

8.7 CAN Communications Version

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

Fieldbus Type	Product Number
CAN	G-MOLTWIXX/YYYSXXX

8.7.1 CAN IN Connector (J9)

Pin (J9)	Signal	Function
1	CAN_L	CAN_L bus line (dominant low)
2	CAN_RET	CAN Return
4	CAN_H	CAN_H bus line (dominant high)
5	COMRET	Shield drain wire

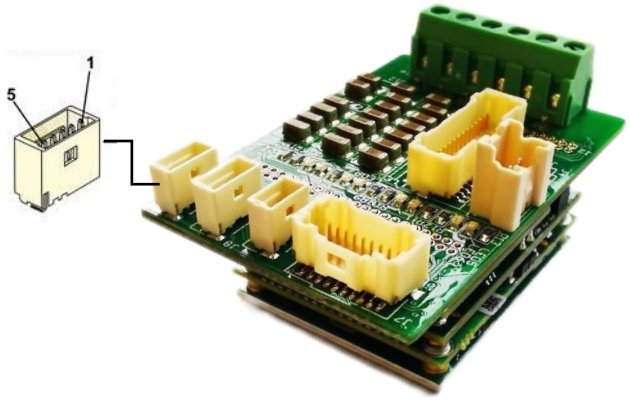
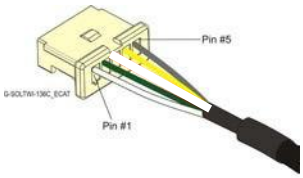
Pin Positions	Cable Connector
	 CAN Cable Connector

Table 13: CAN IN Connector Pin Assignments

Note: **Always use CAT5e cables**.

8.7. 2 CAN OUT Connector (J8)

Pin (J8)	Signal	Function
1	CAN_L	CAN_L bus line (dominant low)
2	CAN_RET	CAN Return
4	CAN_H	CAN_H bus line (dominant high)
5	COMRET	Shield drain wire

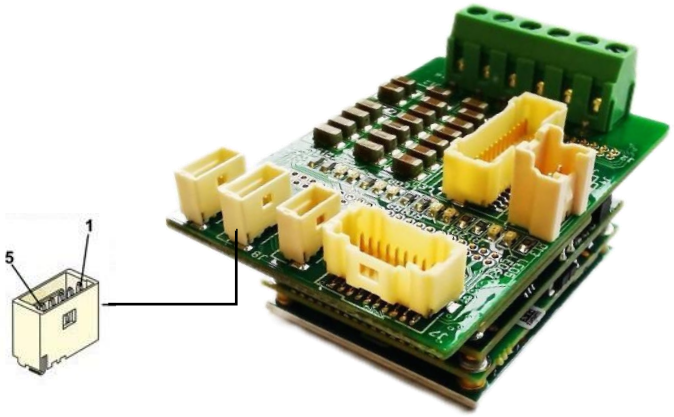
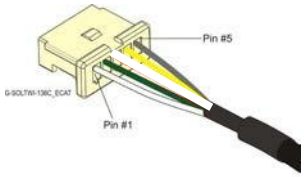
Pin Positions	Cable Connector
	 CAN Cable Connector

Table 14: CAN OUT Connectors Pin Assignments

Note: Always use CAT5e cables.

8.7.3 CAN Schematic Connections

8.7.3.1 Interface

The Gold Mol Twitter includes the CAN transceiver, common mode choke, and a CAN Bus Protector against ESD and other harmful transient voltage events.
The following signals describe how to connect CAN to the external connector.

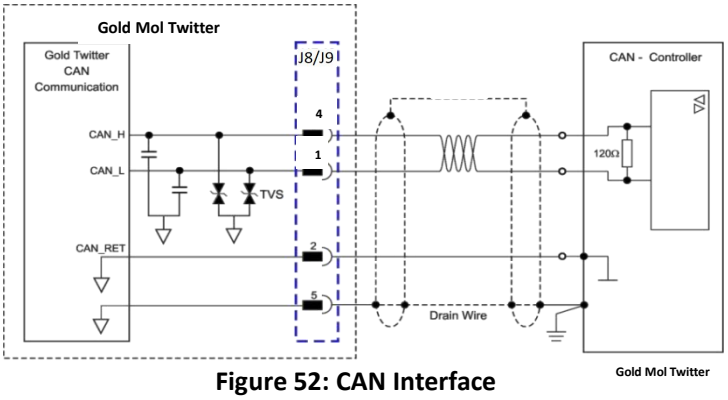


Figure 52: CAN Interface

8.7.3.2 CAN Network Topology

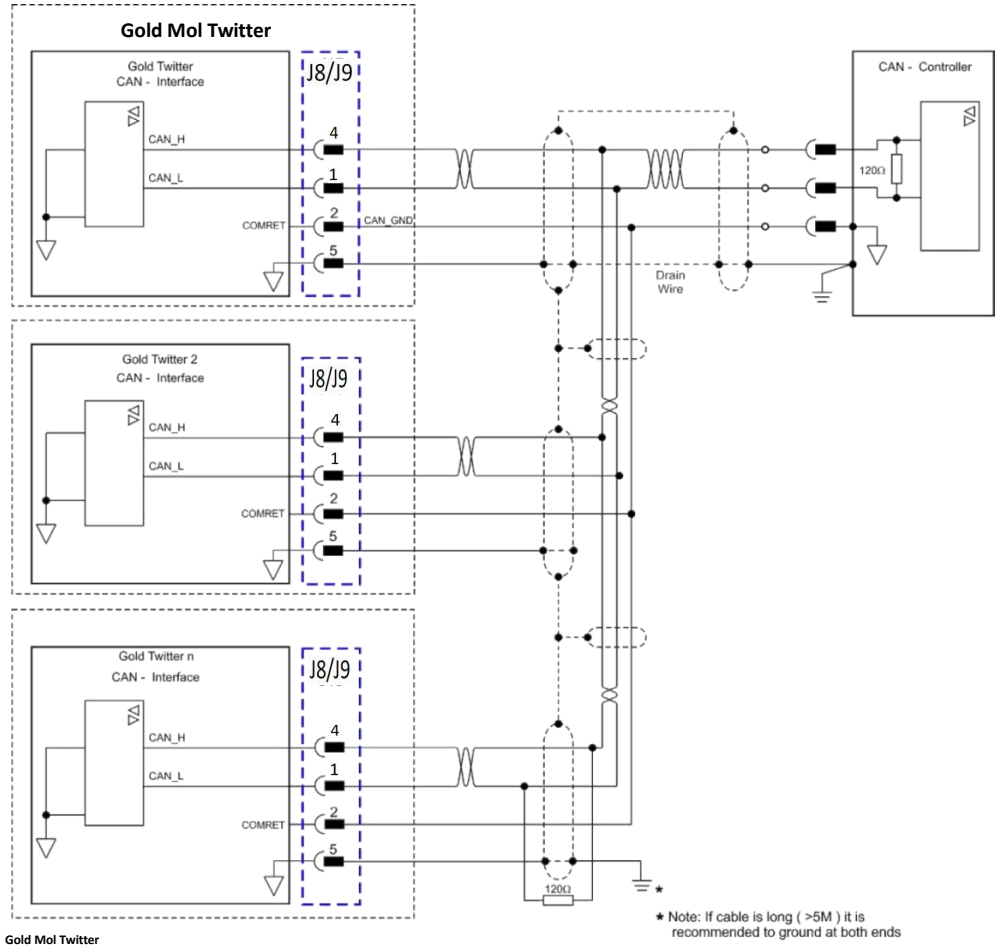


Figure 53: CAN Network Diagram – Drop Off Topology



Caution: When installing CAN communication, ensure that each servo drive is allocated a unique ID. Otherwise, the CAN network may “hang”.
Note: Daisy chain topology can also be accomplished using J18.

Note: **Always use CAT5e cables.**

Chapter 9 :Powering Up

After the Gold Mol Twitter 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

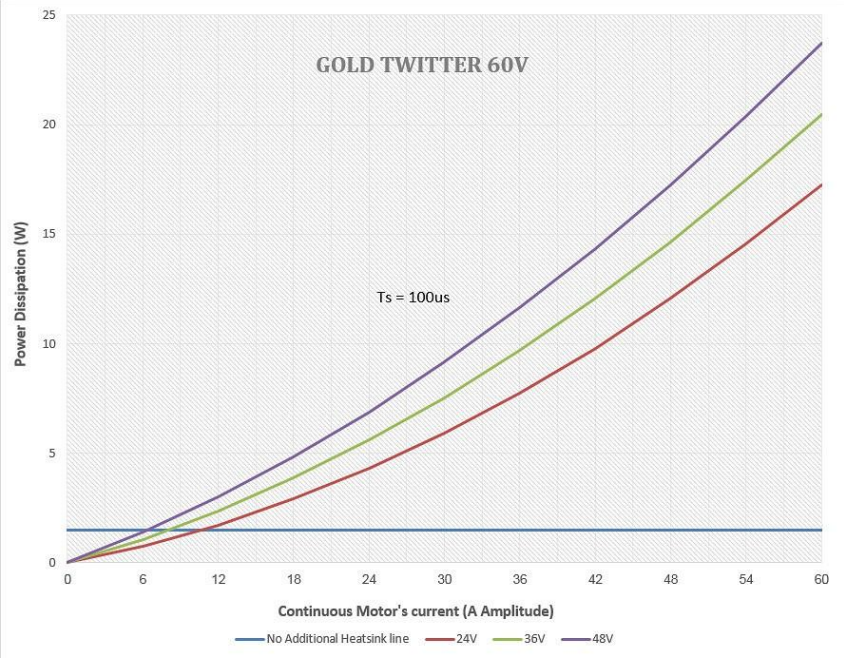
After the Gold Mol Twitter has been connected and mounted, the system must be set up and initialized. This is accomplished using the EASII, Elmo's Windows-based software application. Install the application and then perform setup and initialization according to the directions in the EASII User Manual.

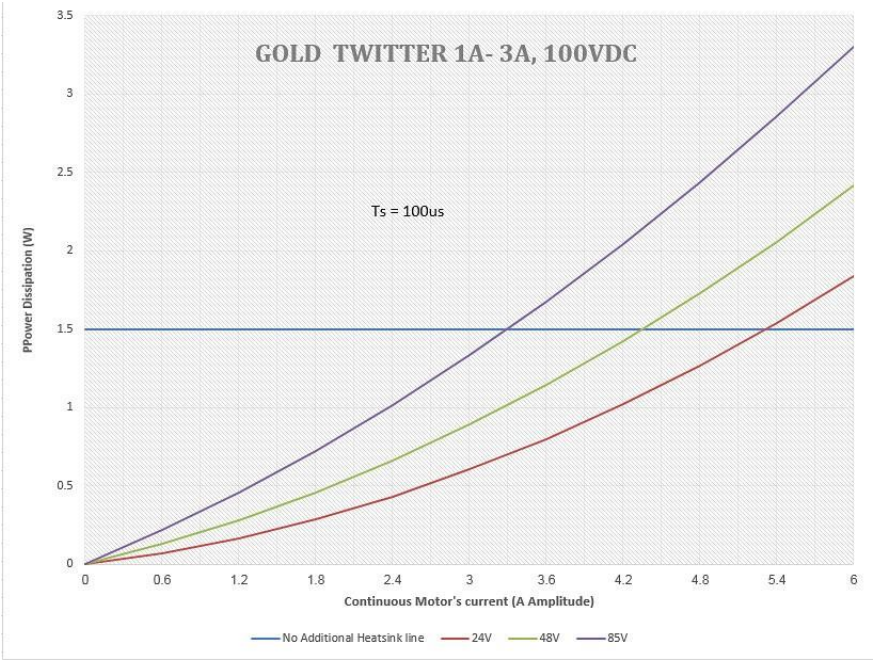
9.2 Heat Dissipation

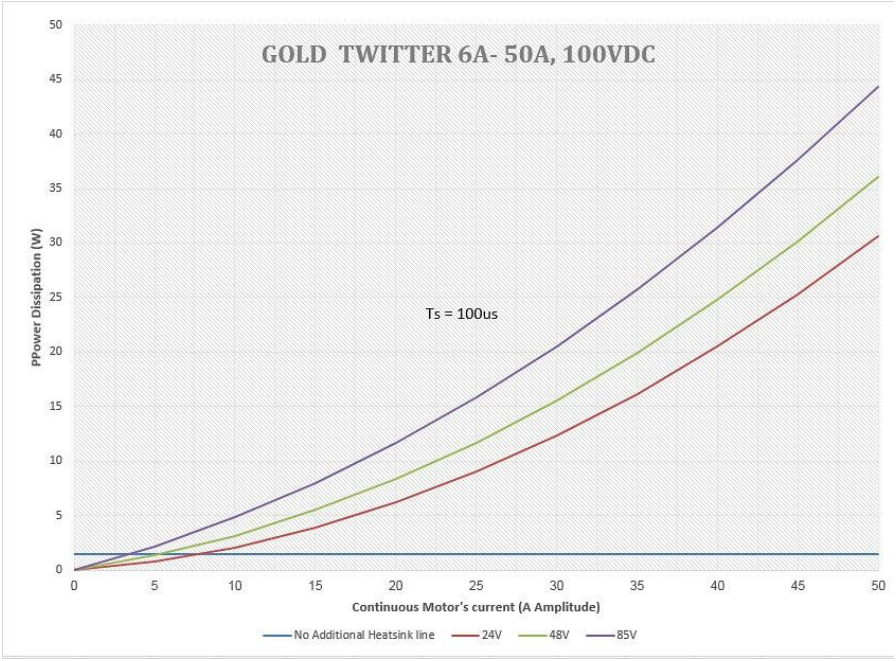
The best way to dissipate heat from the Gold Mol Twitter is to mount it so that its heat-sink is attached to the machine chassis. If mounted with its heat-sink suspended, then for best results mount the servo drive faced upwards and leave approximately 10 mm of space between the Gold Mol Twitter 's heat-sink and any other assembly.

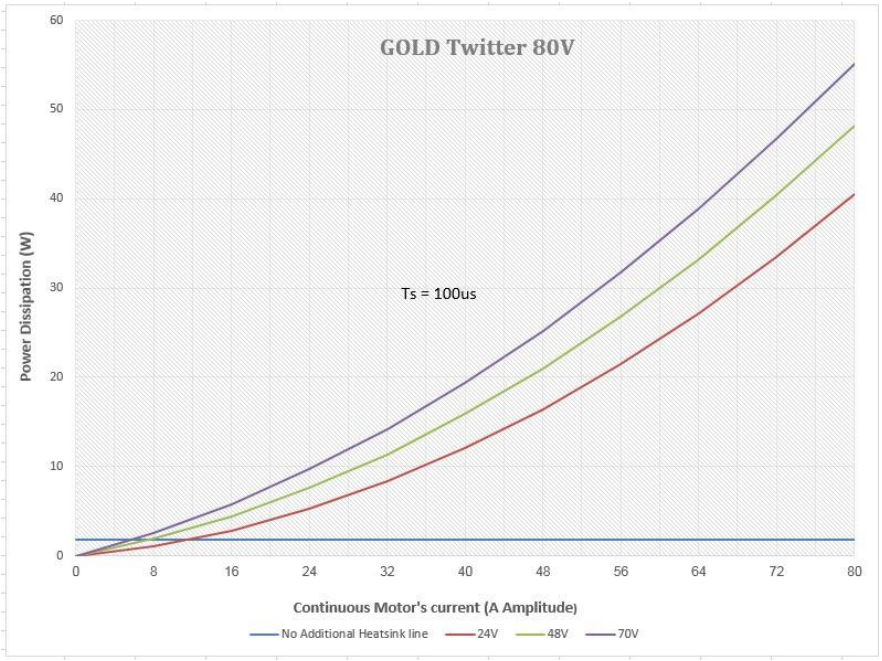
9.2.1 Heat Dissipation Data

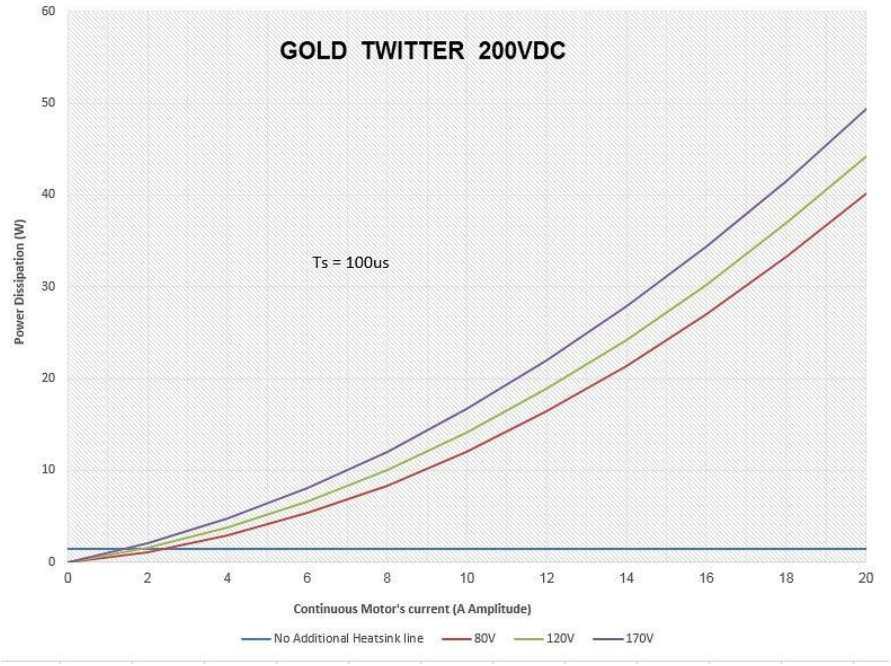
Heat Dissipation is shown graphically below. It should be noted in the graphs below that the Flat Heat Sink and Fins Heat Sink can dissipate up to 5.5W and 7.0W respectively:




GOLD TWITTER 1A- 3A, 100VDC
Ts = 100us
PPower Dissipation (W)
Continuous Motor's current (A Amplitude)
No Additional Heatsink line
24V
48V
85V


GOLD TWITTER 6A- 50A, 100VDC
Ts = 100us
PPower Dissipation (W)
Continuous Motor's current (A Amplitude)
No Additional Heatsink line
24V
48V
85V


GOLD Twitter 80V
Power Dissipation (W)
Ts = 100us
Continuous Motor's current (A Amplitude)
No Additional Heatsink line
24V
48V
70V


GOLD TWITTER 200VDC
Power Dissipation (W)
Ts = 100us
Continuous Motor's current (A Amplitude)
No Additional Heatsink line
80V
120V
170V

9.2.2 How to Use the Chart

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

The above charts indicate the net power conversion losses and exclude the control losses.

To determine if your application heat dissipation requires a heat sink:

1. Determine the power dissipation according to the "continuous current" and the DC bus voltage curve.

   If the DC bus is not one of the three curves 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 ≈ 85℃, the Gold Mol Twitter will shut down. Design the system for continuous operation so that the maximum Heat Sink temperature should be no higher than between 80℃to 82℃.
4. **For models Power Supply & Heatsink Option:**

   If the average heat dissipation is less than ≈1.5W (Average operating power of 100W to 200W) there will be no requirement for an external heat sink.

   If the average Heat dissipation is higher than 1.5W then an additional heat dissipation means is required, usually by connecting to an external heat-sink.

   For model Power Supply & Heatsink Option:
5. If the average heat dissipation is less than ≈4W to 5W (Average operating power of 300W to 600W) there will be no requirement for an additional external heat sink.

   If the average Heat dissipation is higher than 4W then an additional heat dissipation means is required, usually by connecting to an additional external heat-sink.
6. When an external Heat-Sink is required, calculate the thermal resistance of the heat sink according to:

$$Ø_{°C/W} = \frac{80°C - T_{Ambient}}{Heat\ Dissipation}$$

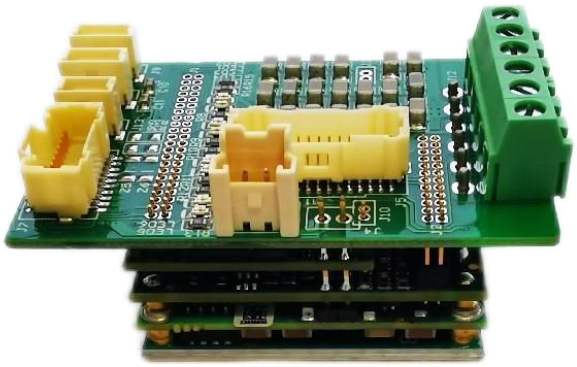
Chapter 10 :Accessories

The following describes the accessory kits available for the Gold Mol Twitter .

Part Number	Description
CBL-GMOLTWIEEKIT	Kit cable for EtherCAT model
CBL-GMOLTWISEKIT	Kit cable for CAN model
G-TWIHSFLAT01	Flat Heat-Sink Kit
G-TWIHSFINS01	FINs Heat-Sink Kit

10.1 Mounting the Optional Accessories Heat Sink

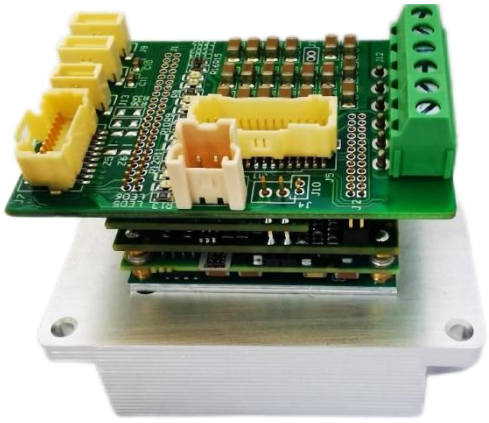
Optionally, the Gold Mol Twitter has two standard heat-sink configurations which are obtainable separately as kit accessories from Monotion:



Default Heat Sink



Flat Heat Sink (P/N FIN-TWI)



Fins Heat Sink (P/N Fin-GSOLTWI)

10.2. Accessories Heat Sink Dimensions

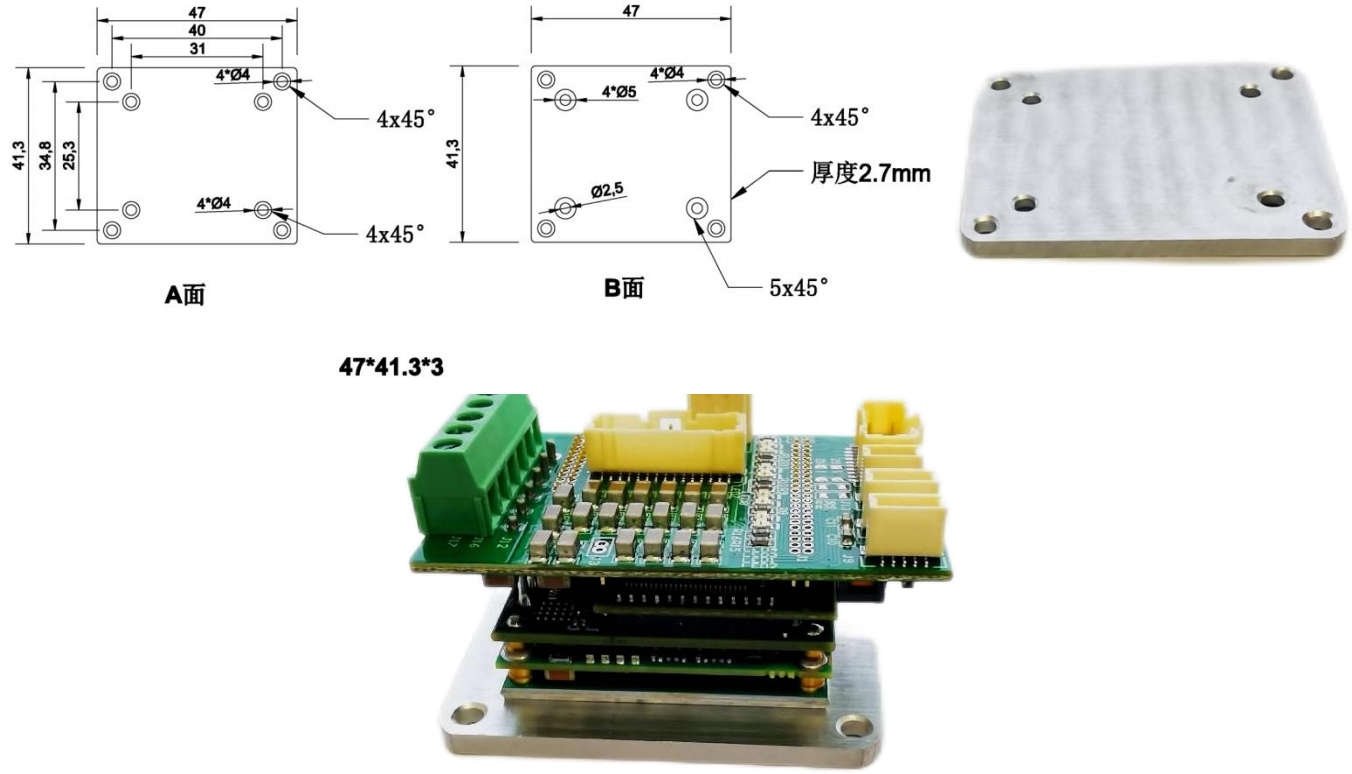


Figure 72: G-Molo Twitter – Flat Heat Sink (P/N FIN-TWI) Dimensions

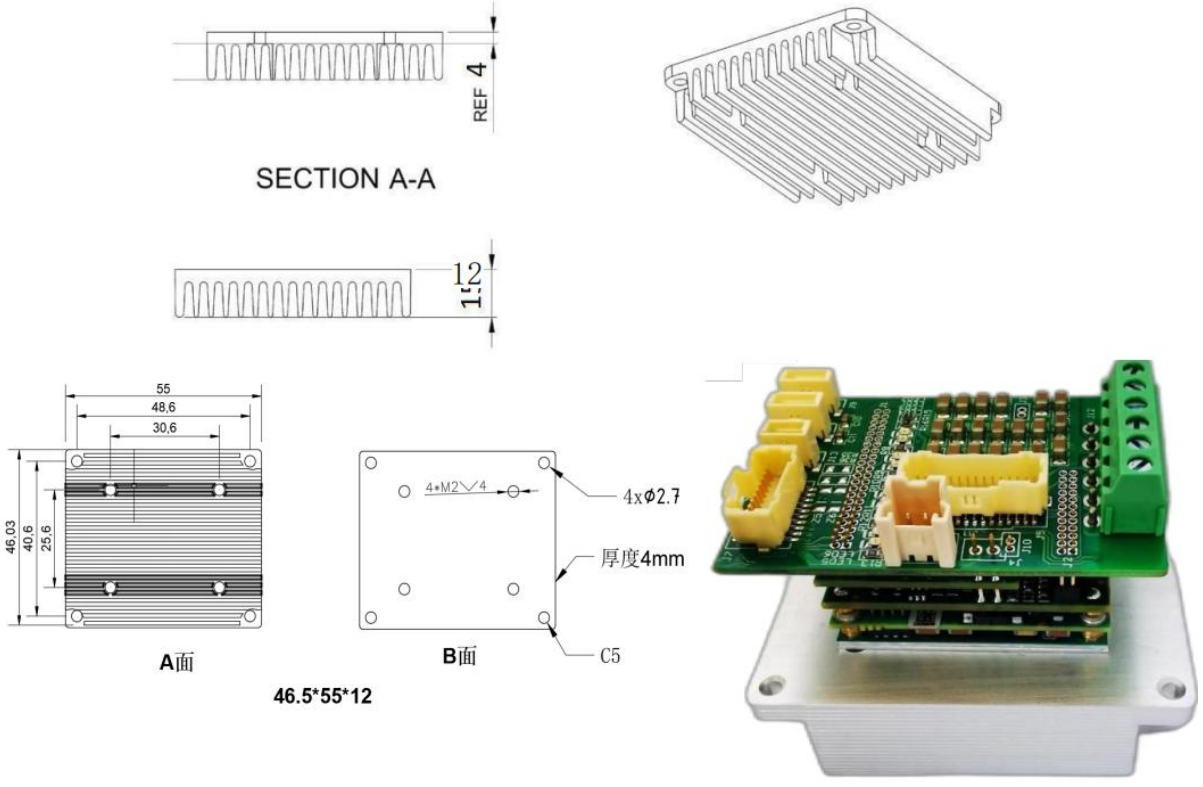
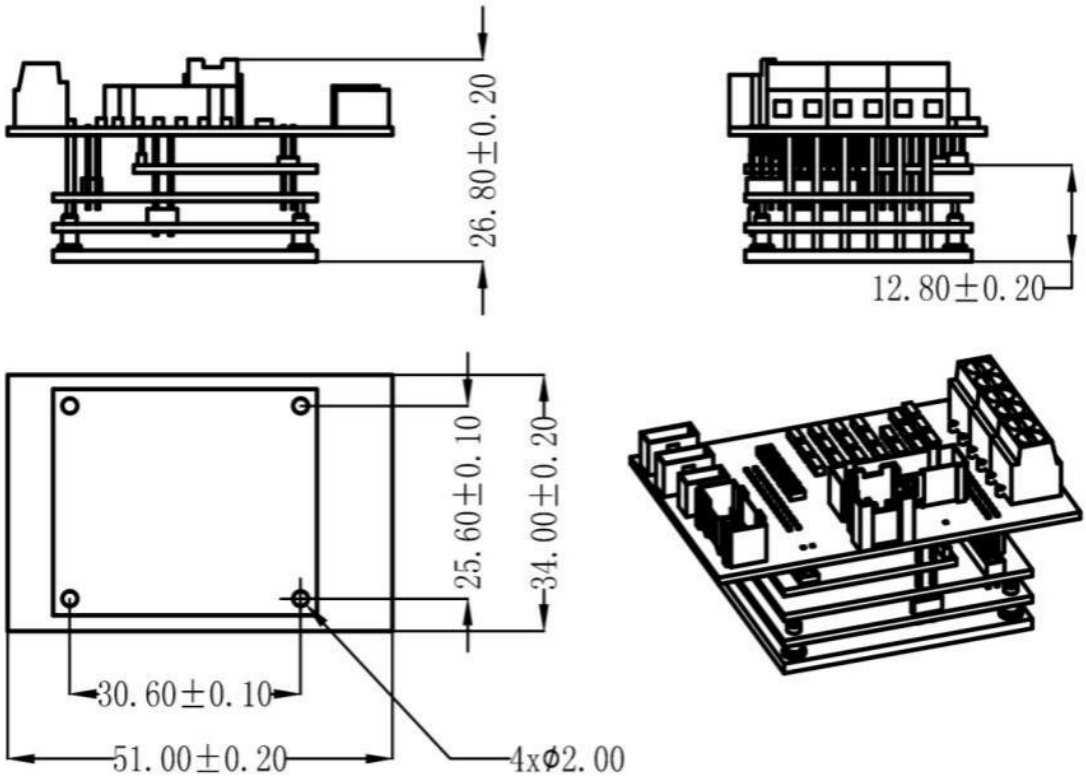
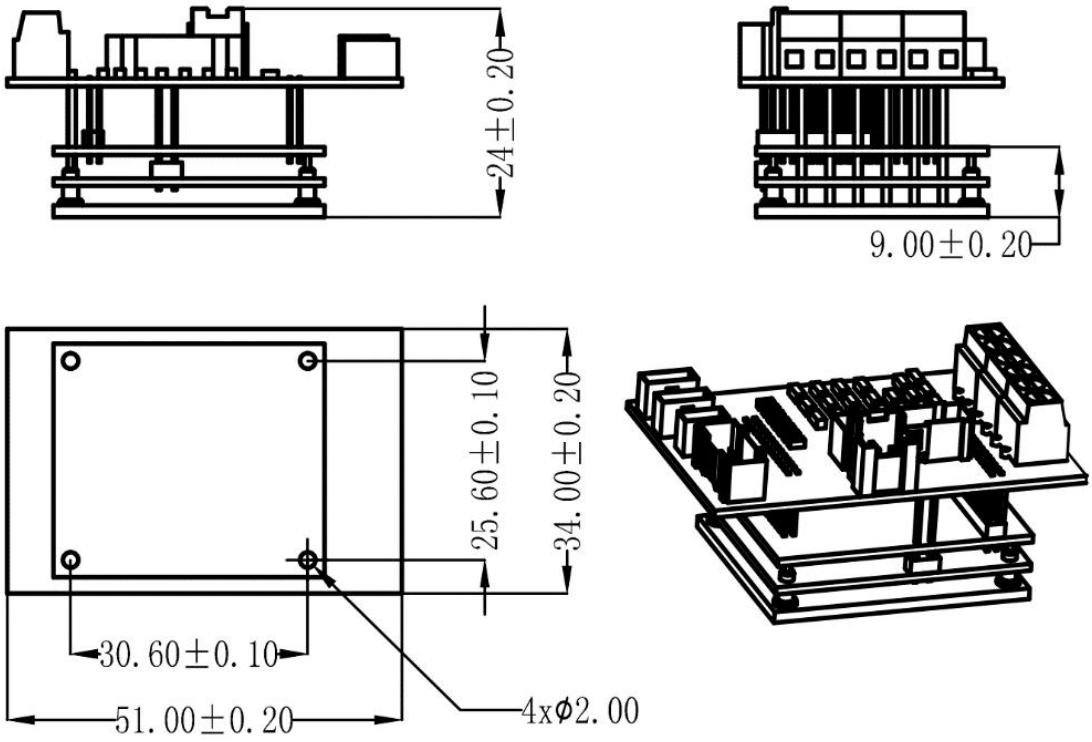


Figure 73: G-Solo Twitter – Fins Heat Sink (P/N G-TWIHSFINS01)

10.3. Accessories G-MOL TWI **/**EE Dimensions



10.4. Accessories G-MOL TWI **/**SE Dimensions



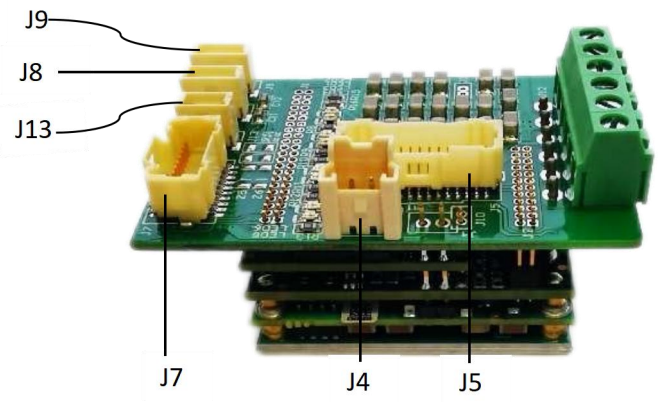
Chapter 11:Gold MOL TWI Cable Kit

CBL-GMOLTWISEKIT CBL-GMOLTWIEEKIT

11.1 G-MOL TWI Connectors

The table below presents the connector panel of the Gold MOL TWIe drive and specifies the cable connectors.

Port	No.Pins	Type	Connector Manufacturer and Part Number
J1	6	5.08 mm pitch	Wires
J4	2	2.0 mm pitch	Molex 35507-0200
J5	30	1.0 mm pitch	Molex 501189-3010
J7	20	1.0 mm pitch	Molex 501189-2010
J13	4	1.0 mm pitch	Molex 501330-0400
EtherCAT Version			
J8	5	1.0 mm pitch	Molex 501330-0500
J9	5	1.0 mm pitch	Molex 501330-0500
CAN Version			
J8	4	1.0 mm pitch	Molex 501330-0500
J9	4	1.0 mm pitch	Molex 501330-0500
Connector Locations			

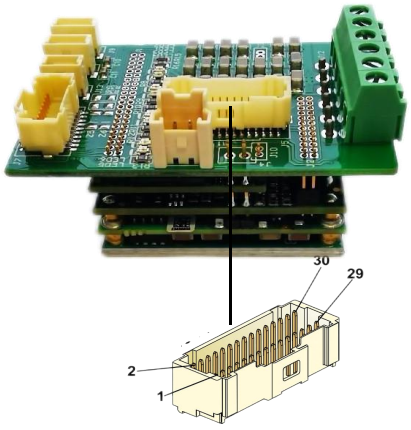


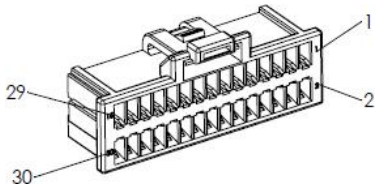
11.2 Main Feedback Cable (CBL-GMOLTWIFBK1M)

The Feedback Cable is a 30-AWG Teflon isolation set of wires of length 1m. It is connected using a 1.0 mm female housing 2x15 pins Molex connector and 1.0 mm single-pin crimp terminal at one end to the J5 connector on the Gold Mol Twitter, with the cable open at the other end so that it can be connected to the relevant controller interface connectors.

The general pinout of the VL and Feedback Cable is as follows:

J5	Signal	Color	Function
1	PortA_ENC_A+ / ABS_CLK+	green	Channel A+ / Abs encoder clock +
3	PortA_ENC_A- / ABS_CLK-	yellow	Channel A- / Abs encoder clock -
5	PortA_ENC_B+ / ABS_DATA+	blue	Channel B+ / Abs encoder data +
7	PortA_ENC_B- / ABS_DATA-	purple	Channel B- / Abs encoder data -
9	PortA_ENC_INDEX+	Red	Index+
11	PortA_ENC_INDEX-	orange	Index-
13	HA	pink	Hall sensor A
15	HB	gray	Hall sensor B
17	HC	white	Hall sensor C
19	+5V	brown	Encoder +5V supply with a total allowable maximum consumption of 200mA using Pins 19 or 26.
21	COMRET	Blank	Common return
28	Drain wire	Drain wire	Drain wire

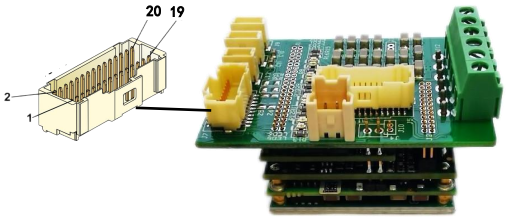


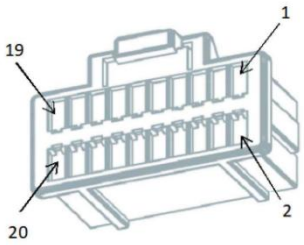


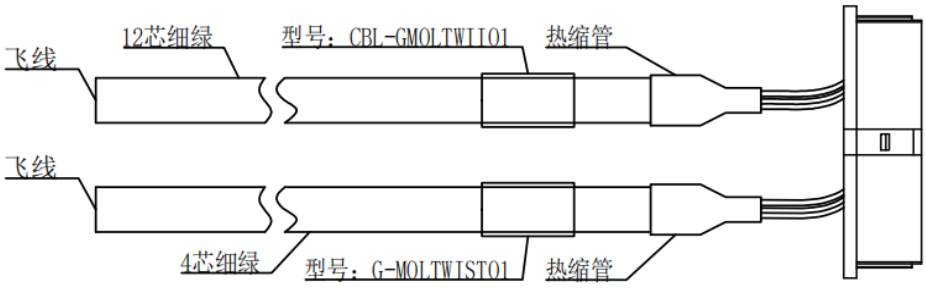
11.3 STO, and I/ O Cable (CBL-GMOLTWIDI+AI1,CBL-GMOLTWIDO1 , G-MOLSTO1T)

The STO, and I/O cable is a 30-AWG Teflon isolation set of wires of length 1m. It is connected using a 1.0 mm female housing 2x10 pins Molex connector and 1.0 mm single-pin crimp terminal at one end to the J7 connector on the Gold Mol Twitter, with the cable open at the other end so that it can be connected to the relevant controller interface connectors.The general pinout of the STO, and I/O cable is as follows:

Pin J7	Signal	Color	Function
1&3	DI-RET	Blank	Din return
5	IN6	gray	High speed programmable digital input 6 (opto isolated from control COMRET)
7	IN5	white	High speed programmable digital input 5 (opto isolated from control COMRET)
9	IN4	brown	High speed programmable digital input 4 (opto isolated from control COMRET)
11	IN3	Red	High speed programmable digital input 4 (opto isolated from control COMRET)
2	COMRET	Light green	Common return
4	ANALOG1-	pink	Analog input complement
6	ANALOG1+	Orange	yellow Analog input
13&15	OUT1	Green	Programmable output 2 (opto isolated from control COMRET)
17&19	OUT2	blue	Programmable output 2 (opto isolated from control COMRET)
14&16	DO1-RET	Yellow	DO1-return
18&20	DO2-RET	purple	DO2-return
8	STO_RET	Blank	STO signal return.The two digital STO inputs are optically isolated from the other parts of the drive, and share one return line.
10	STO2	orange	STO 2 input opto isolated from control COMRET
12	STO1	Red	STO 1 input opto isolated from control COMRET

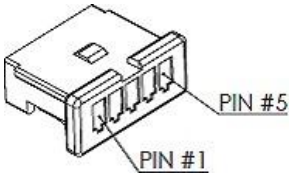




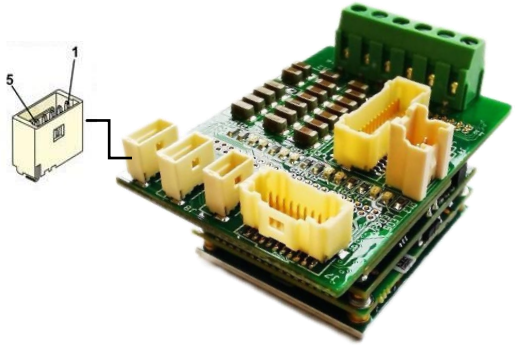


11.4 CAN Communication Cable (CBL-GMOLTWICAN1MR)

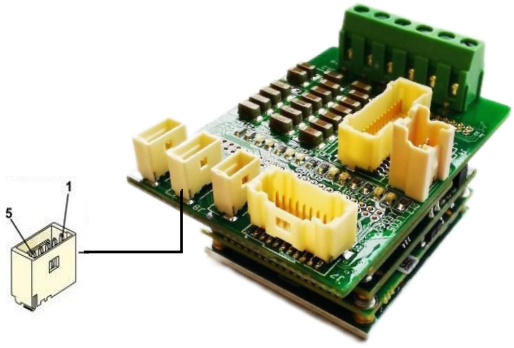
The standard CAN Ports Communication cable is supplied in 1.0 m lengths. The CAN port cable consists of a double-pair 30-AWG drain and braid cable. At one end of the cable is a wire to board 5-pin, 1 mm pitch, female Molex connector, and at the other end an RJ-45 standard communication connector.The general pinout of the CAN ports cable is as follows:

J8, J9 Pins From Molex Connector	To Pins RJ-45 Connector	Color	Function	Molex Plug
1	2	Red	CAN_L	
2	3	Blank	COMRET	
4	1	Orange	CAN_H	
5	RJ-45 shield	Drain wire	Shield drain wire	

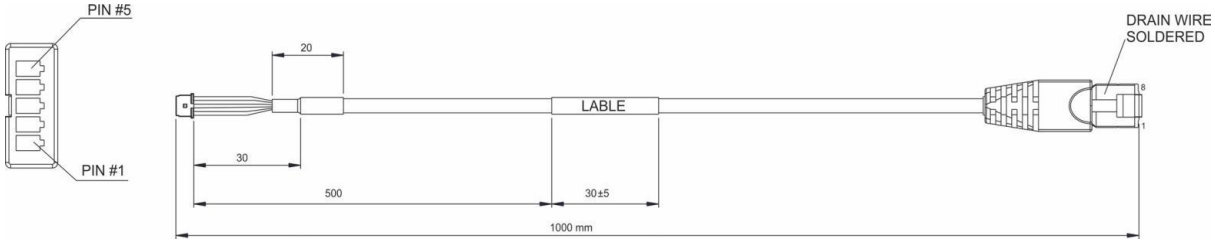
Pin Positions



J9 CAN Connector Pin Assignments

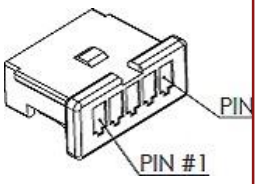


J8 CAN Connector Pin Assignments

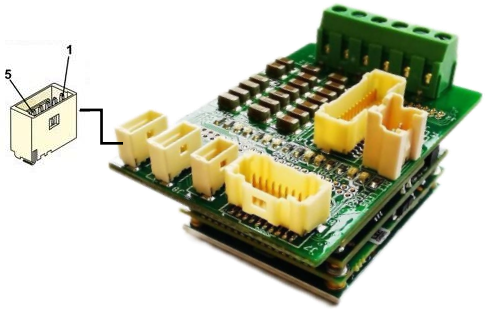


11.5 EtherCAT Communication Cable (CBL-GMOLTWIETH1MR)

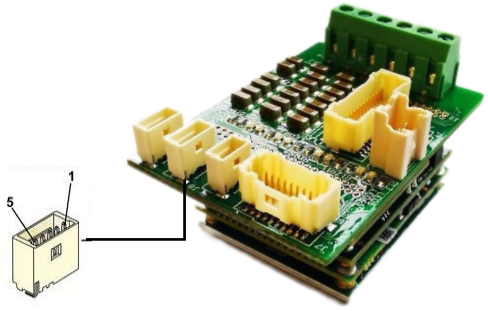
The standard EtherCAT Ports Communication cable is supplied in 1.0 m lengths. The EtherCAT ports cable consists of a double-pair 30-AWG drain and braid cable. At one end of the cable is a wire to board 5-pin, 1 mm pitch, female Molex connector, and at the other end an RJ-45 standard communication connector.The general pinout of the EtherCAT ports cable for either J8 or J9 connection is as follows:

J8, J9 Pins From Molex Connector	To Pins RJ-45 Connector	Color	Function	Molex Plug
1	1	Brown	ECAT TX+	
2	2	Blank	ECAT TX-	
3	3	RED	ECAT RX+	
4	6	Orange	ECAT RX-	
5	RJ-45 shield	Drain wire	Shield drain wire	

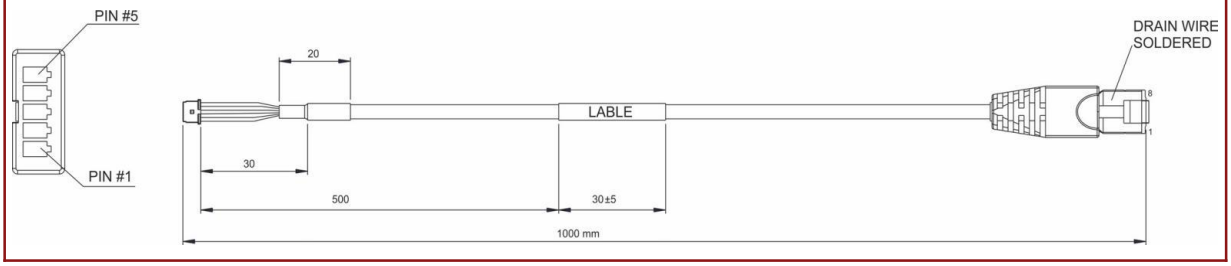
Pin Positions



J9 EtherCAT IN / Ethernet Pin Assignments



J8 EtherCAT OUT Pin Assignments



11.6 EtherCAT/ CAN LINK Cable

The EtherCAT/CAN LINK Cable is a double-pair 30-AWG drain and braid cable of 0.3m. It is connected at both ends with wire-to-board 5 Pins 1 mm Pitch female Molex connectors.

The general pinout of the EtherCAT/CAN LINK Cable as a daisy chain is as follows:

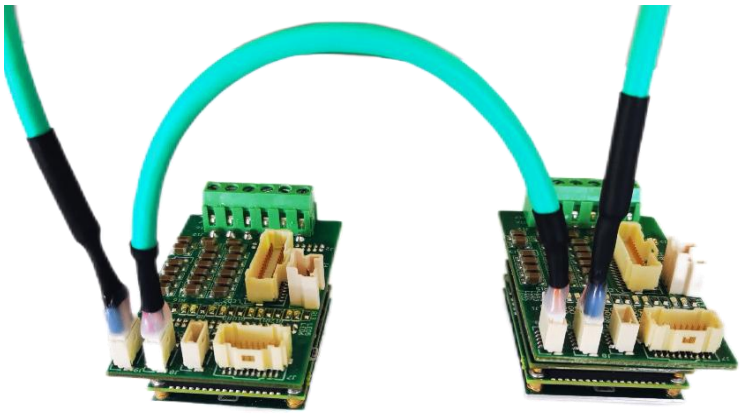
CBL-GMOLTWIETH0.3M

Molex 1	Molex 2	COLOR	Function for EtherCAT
1	1	Brown	ECAT TX+
2	2	Blank	ECAT TX-
3	3	RED	ECAT RX+
4	4	Orange	ECAT RX-
5	5	Drain wire	Shield drain wire

CBL-GMOLTWICAN0.3M

Molex 1	Molex 2	COLOR	Function for EtherCAT
1	1	Red	CAN_L
2	2	Blank	COMRET
4	4	Orange	CAN_H
5	5	Drain wire	Shield drain wire

Pin Positions



EtherCAT/CAN Link Cable

11.7 CAN Terminator Cable (CBL-GMOLTWICANT)

The CAN Terminator Cable is a 120Ω resistor as termination. It is connected at both ends with wire-to-board 5 Pins 1 mm Pitch female Molex connector.

The general pinout of the CAN Terminator Cable is as follows:

Molex 1	COLOR	Function
1	120Ω resistor	CAN_L
2		
4	120Ω resistor	CAN_H
5		
Pin Positions 120Ω resistor is connected between CAN_H and CAN_L internally in cable.		



CAN Terminator Cable


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