QS TECHNOLOGY

F86

Milling Controller

INSTALLATION MANUAL

By: QS Technology Co., LTD

Date: 25-04-2024

CONTENT

PART 1 – OVERVIEW OF CONTROLLER 3

1.1 INSTALLATION DIAGRAM 3

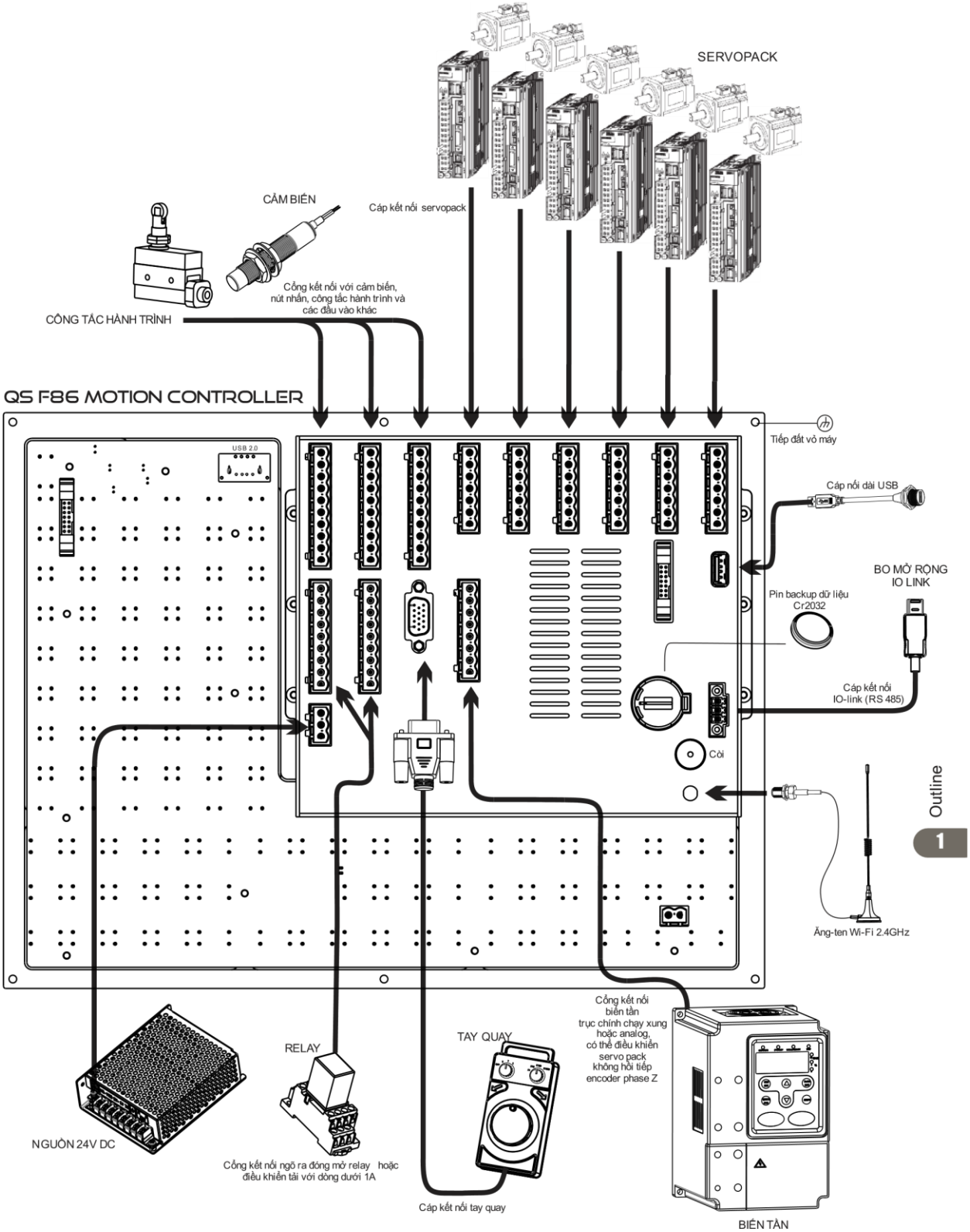
PART 2 – OVERVIEW CONNECTION 5

2.1 CONNECTION DIAGRAM 6
2.2 INPUT LOW DIAGRAM 12
2.3 HIGH INPUT DIAGRAM 13
2.4 LOW OUTPUT DIAGRAM 14
2.5 CONNECTION DIAGRAM PULSE CONTROL, DIRECTION Z PHASE FROM SERVO 15
2.6 INVERTER WIRING DIAGRAM FOR PULSE, ANALOG INPUT 19
2.6 HANDWHEEL WIRING DIAGRAM 20
2.6.1 USE FOR DIFFERENTIAL OUTPUT SIGNAL OF 4 AXIS HANDWHEEL 20
2.6.2 USE FOR NPN OUTPUT SIGNAL OF 4 AXIS HANDWHEEL 21
2.6.3 USE FOR PNP OUTPUT SIGNAL OF 4 AXIS HANDWHEEL 22
2.6.4 USE FOR DIFFERENTIAL OUPUT SIGNAL OF 6 AXIS HANDWHEEL 23
2.6.5 USE FOR NPN OUTPUT SIGNAL OF 6 AXIS HANDWHEEL 24
2.6.6 USE FOR PNP OUTPUT SIGNAL OF 6 AXIS HANDWHEEL 25
2.7 RS485, I/O-LINK 26
2.8 POWER CONNECTION 26

PART 1

Overview of controller

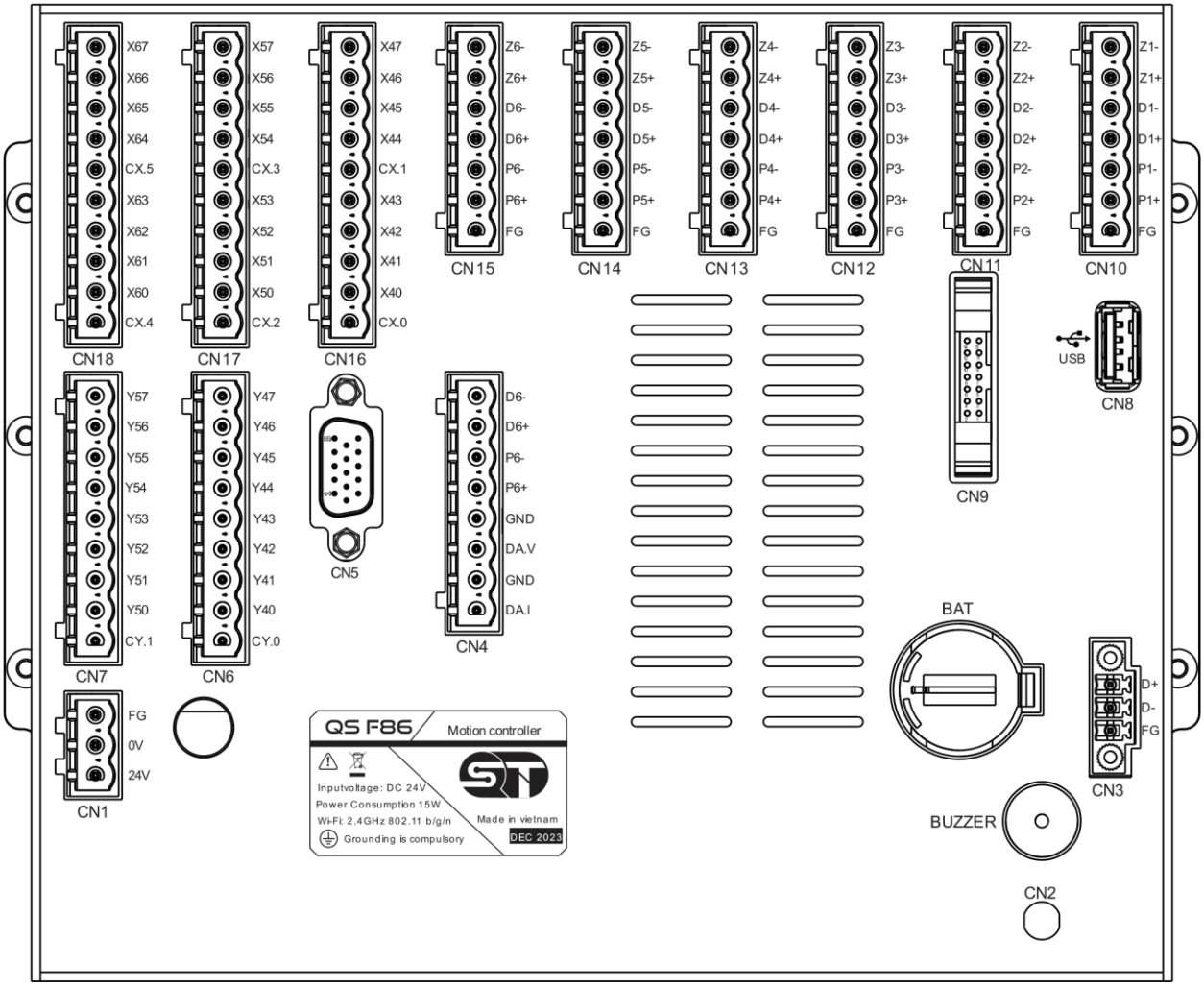
1.1 INSTALLATION DIAGRAM



PART 2

Overview connection

2.1 CONNECTION DIAGRAM



PORT TABLE

PORT	PINS	DESCRIPTION
BAT		CR2032 battery for data backup. When the battery is out, the controller will not able to save the data of RAM: User parameter, OFFSET value, Position and on the screen will display “Battery Alarm”.
ANT		Connect Wi-Fi antenna (Wi-Fi Optional)
CN1	- FG - 0V - +24V	Power supply pins

CN2	- D+ - D- - FG	Included: - D+ : Differential non-reversible signal - D- : Reverse differential signal - FG : Connect to shield wire
CN3	- D7- - D7+ - P7- - P7+ - GND - DA.V - GND - DA.I	Included: - (P7-) và (P7+) is a pair of differental signal. - (P7-) reverse differential signal pin (PUL-) of axis 7 combie with (PUL+) to broadcast pulse signal to control Driver and Servo - (P7+) is a reverse differential signal output pin (PUL+) of axis 7 combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - (DA.V) Control ANALOG spindle with voltage range : 0 – 10V. - DA.I Control ANALOG spindle with current range : 420mA
CN4		Connect to Handwheel: - 4 axis handwheel has emergency button. - 6 axis handwheel without emergency button.
CN5	- C.Y0 - Y40 - Y41 - Y42 - Y43 - Y44 - Y45 - Y46 - Y47	Output port: - C.Y0 : COM port for output singal pins from (Y40 - Y47). This pin was supplied low voltage, Maximum current for this pin is 6A - Y40 – Y47 : Output pin Y, positive low level, recommendation maximum current for each pin is 1A for single pin use. When use all pin at the same time, the maximum current on each pin is not higher than 0,7A - Control voltage is DC 5 – 48V (Recommendation 24VDC)
CN6	- C.Y1 - Y50 - Y51 - Y52 - Y53 - Y54 - Y55 - Y56 - Y57	Output port: - C.Y1 : COM port for output singal pins from (Y50 – Y57). This pin was supplied low voltage, Maximum current for this pin is 6A - Y50 – Y57 : Output pin Y, positive low level, recommendation maximum current for each pin is 1A for single pin use. When use all pin at the same time, the maximum current on each pin is not higher than 0,7A - Control voltage is DC 5 – 48V (Recommendation 24VDC)

CN7		USB 2.0 port
CN8		Connect with operation keyboard
CN9	- Z1- - Z1+ - D1- - D1+ - P1- - P1+ - FG	Control Servo Motor of axis 1: - Z1- : Input pins of reverse differential signal from Z phase encoder. - Z1+ : Input pins of differential non-reversible signal from Z phase. - D1- : Output pins of reverse differential signal (DIR-) of axis 1 , combie with (D1+) to control the direction. - D1+ : Output pins of differential non-reversible signal (DIR+) of axis 1, combie with (D1-) to control the direction. - P1- : Output pins of reverse differential signal (PUL-) of axis 1, combie with (PUL+) to broadcast pulse signal to control Driver and Servo motor. - P1+ : Output pin of differential non-reversible signal of axis 1, combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - FG : Connect with shield wire.
CN10	- Z2- - Z2+ - D2- - D2+ - P2- - P2+ - FG	Control Servo Motor of axis 2: - Z2- : Input pins of reverse differential signal from Z phase encoder. - Z2+ : Input pins of differential non-reversible signal from Z phase. - D2- : Output pins of reverse differential signal (DIR-) of axis 2 , combie with (D2+) to control the direction. - D2+ : Output pins of differential non-reversible signal (DIR+) of axis 1, combie with (D1-) to control the direction. - P2- : Output pins of reverse differential signal (PUL-) of axis 2, combie with (PUL+)

		to broadcast pulse signal to control Driver and Servo motor. - P2+ : Output pin of differential non-reversible signal of axis 2, combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - FG : Connect with shield wire.
CN11	- Z3- - Z3+ - D3- - D3+ - P3- - P3+ - FG	Control Servo Motor of axis 3: - Z3- : Input pins of reverse differential signal from Z phase encoder. - Z3+ : Input pins of differential non-reversible signal from Z phase. - D3- : Output pins of reverse differential signal (DIR-) of axis 3 , combie with (D3+) to control the direction. - D3+ : Output pins of differential non-reversible signal (DIR+) of axis 3, combie with (D3-) to control the direction. - P3- : Output pins of reverse differential signal (PUL-) of axis 3, combie with (PUL+) to broadcast pulse signal to control Driver and Servo motor. - P3+ : Output pin of differential non-reversible signal of axis 3, combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - FG : Connect with shield wire.
CN12	- Z4- - Z4+ - D4- - D4+ - P4- - P4+ - FG	Control Servo Motor of axis 4: - Z4- : Input pins of reverse differential signal from Z phase encoder. - Z4+ : Input pins of differential non-reversible signal from Z phase. - D4- : Output pins of reverse differential signal (DIR-) of axis 4 , combie with (D4+) to control the direction. - D4+ : Output pins of differential non-reversible signal (DIR+) of axis 4, combie with (D4-) to control the direction.

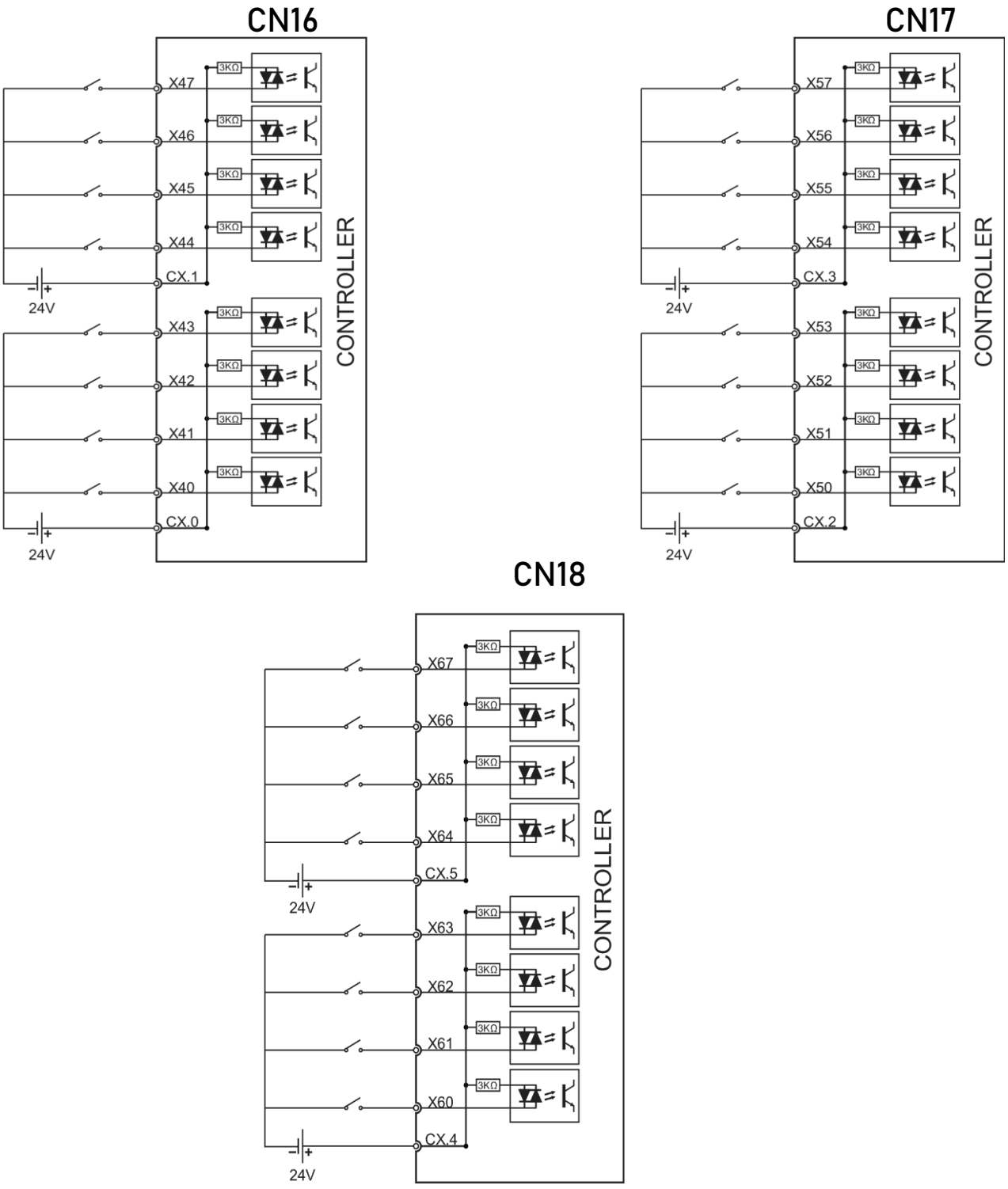
		- P4- : Output pins of reverse differential signal (PUL-) of axis 4, combie with (PUL+) to broadcast pulse signal to control Driver and Servo motor. - P4+ : Output pin of differential non-reversible signal of axis 4, combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - FG : Connect with shield wire.
CN13	- Z5- - Z5+ - D5- - D5+ - P5- - P5+ - FG	Control Servo Motor of axis 5: - Z5- : Input pins of reverse differential signal from Z phase encoder. - Z5+ : Input pins of differential non-reversible signal from Z phase. - D5- : Output pins of reverse differential signal (DIR-) of axis 5 , combie with (D3+) to control the direction. - D5+ : Output pins of differential non-reversible signal (DIR+) of axis 5, combie with (D5-) to control the direction. - P5- : Output pins of reverse differential signal (PUL-) of axis 5, combie with (PUL+) to broadcast pulse signal to control Driver and Servo motor. - P5+ : Output pin of differential non-reversible signal of axis 5, combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - FG : Connect with shield wire. -
CN14	- Z6- - Z6+ - D6- - D6+ - P6- - P6+ - FG	Control Servo Motor of axis 6: - Z6- : Input pins of reverse differential signal from Z phase encoder. - Z6+ : Input pins of differential non-reversible signal from Z phase. - D6- : Output pins of reverse differential signal (DIR-) of axis 6 , combie with (D6+) to control the direction. - D6+ : Output pins of differential non-reversible signal (DIR+) of axis 6, combie with (D6-) to control the direction.

		- P6- : Output pins of reverse differential signal (PUL-) of axis 6, combie with (PUL+) to broadcast pulse signal to control Driver and Servo motor. - P6+ : Output pin of differential non-reversible signal of axis 6, combie with (PUL-) to broadcast pulse signal to control Driver and Servo motor. - FG : Connect with shield wire.
CN15	- C.X0 - X40 - X41 - X42 - X43 - C.X1 - X44 - X45 - X46 - X47	Input port for sensor, limit switch and another external device: - C.X0 : COM port of input signal from X40 – X43 - C.X1 : COM port of input signal from X44 – X47 - X40 – X47: Input pins
CN16	- C.X2 - X50 - X51 - X52 - X53 - C.X3 - X54 - X55 - X56 - X57	Input port for sensor, limit switch and another external device: - C.X2 : COM port of input signal from X50 – X53 - C.X3 : COM port of input signal from X54 – X57 - X50 – X57: Input pins
CN17	- C.X4 - X60 - X61 - X62 - X63 - C.X5 - X64 - X65 - X66 - X67	Input port for sensor, limit switch and another external device: - C.X4 : COM port of input signal from X60 – X63 - C.X5 : COM port of input signal from X64 – X67 - X40 – X47: Input pins

Note:

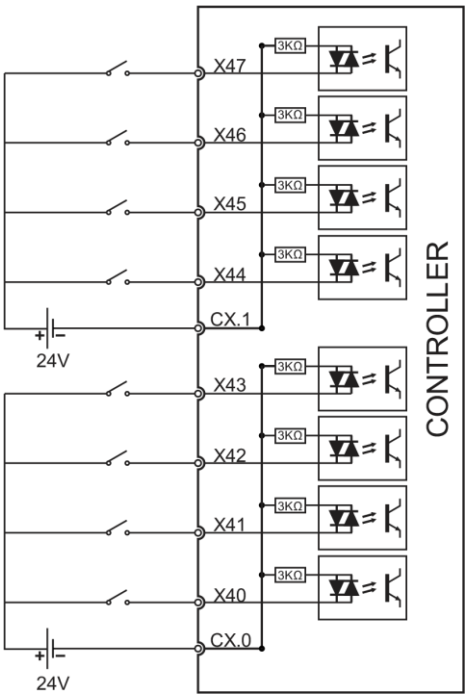
Port CN10 – CN15 are located in positions corresponding to the control axes (X, Y, Z, A, B, C). The operator can customize the axis position settings.

2.2 INPUT LOW DIAGRAM

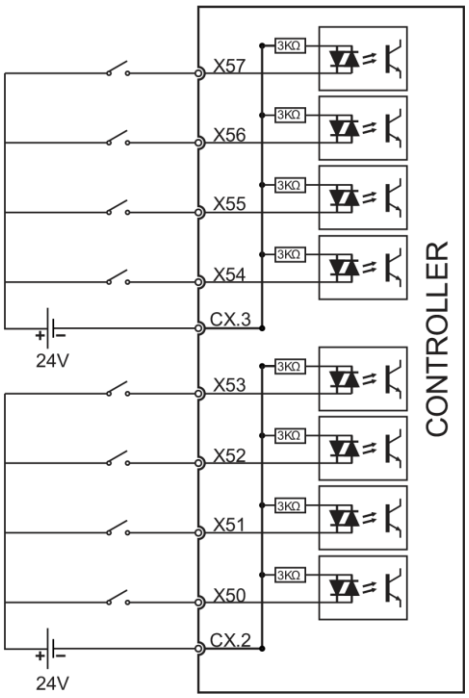


2.3 HIGH INPUT DIAGRAM

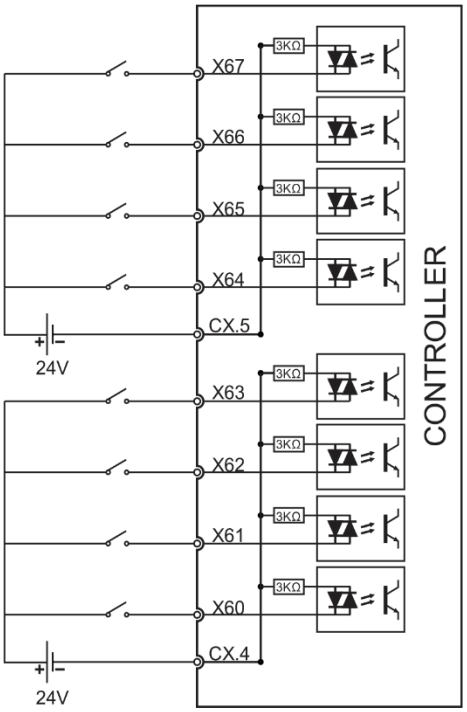
CN16



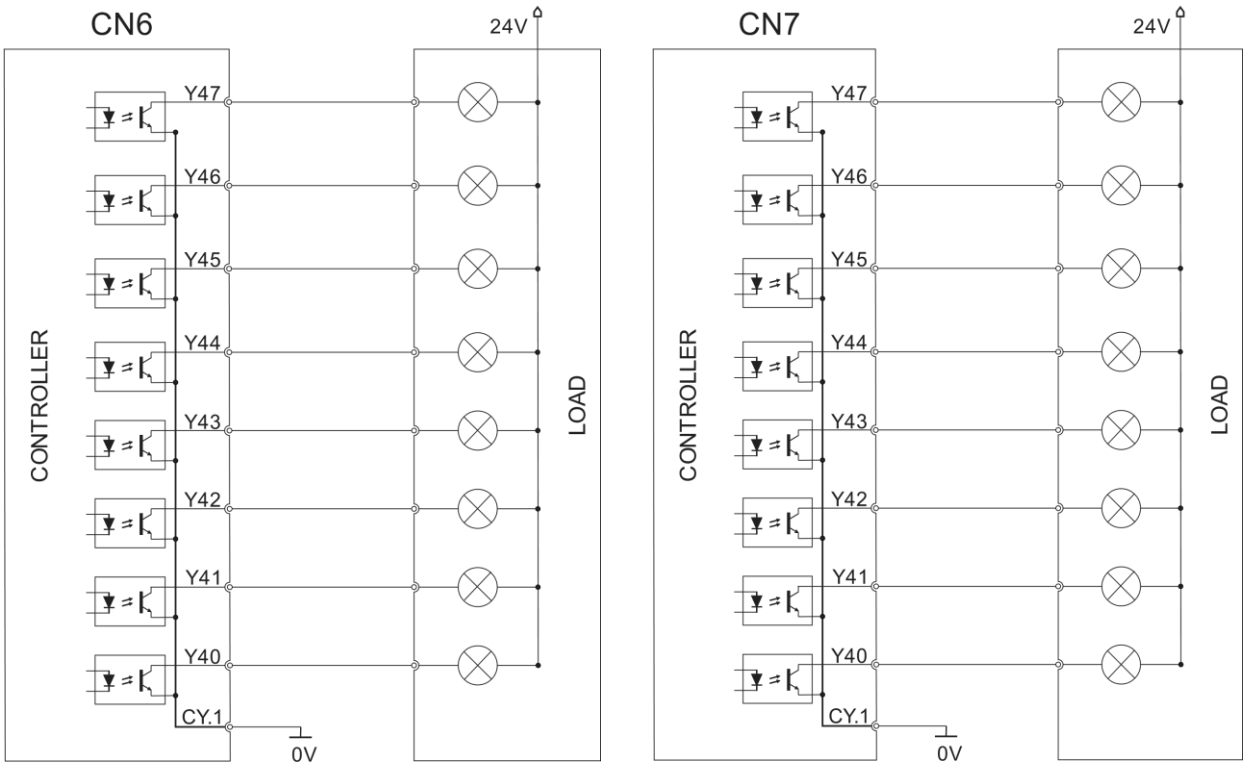
CN17



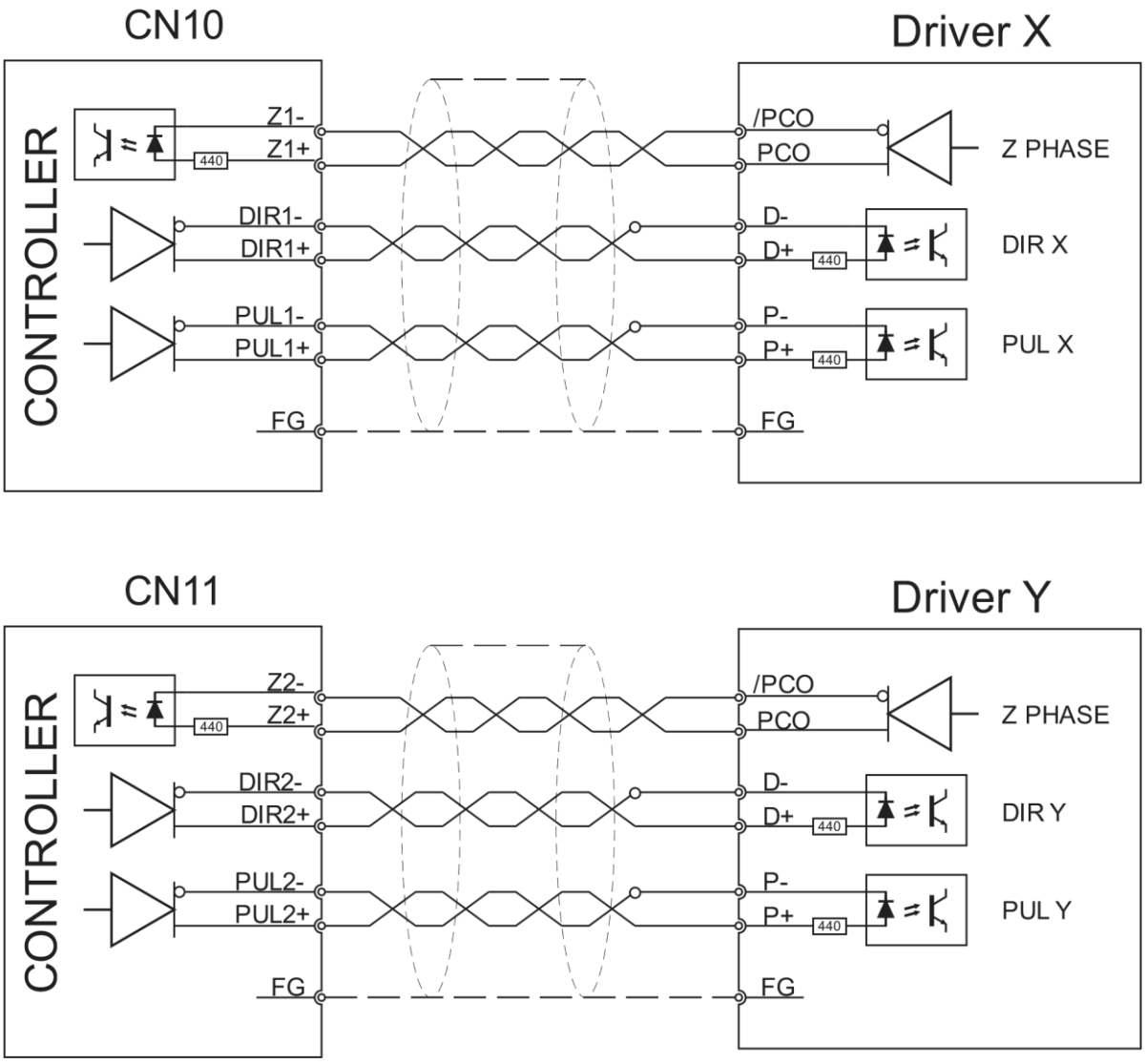
CN18

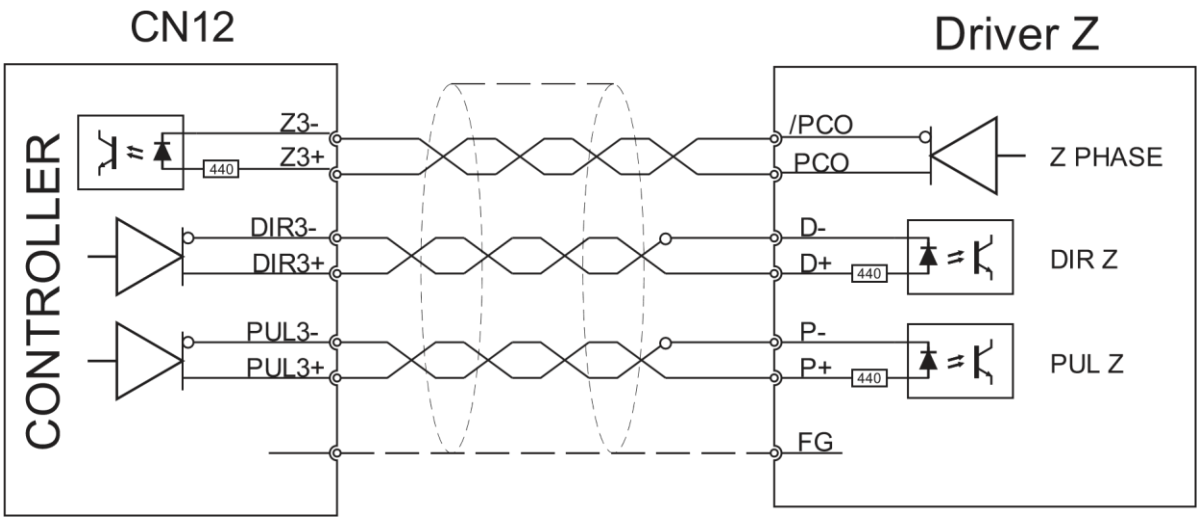


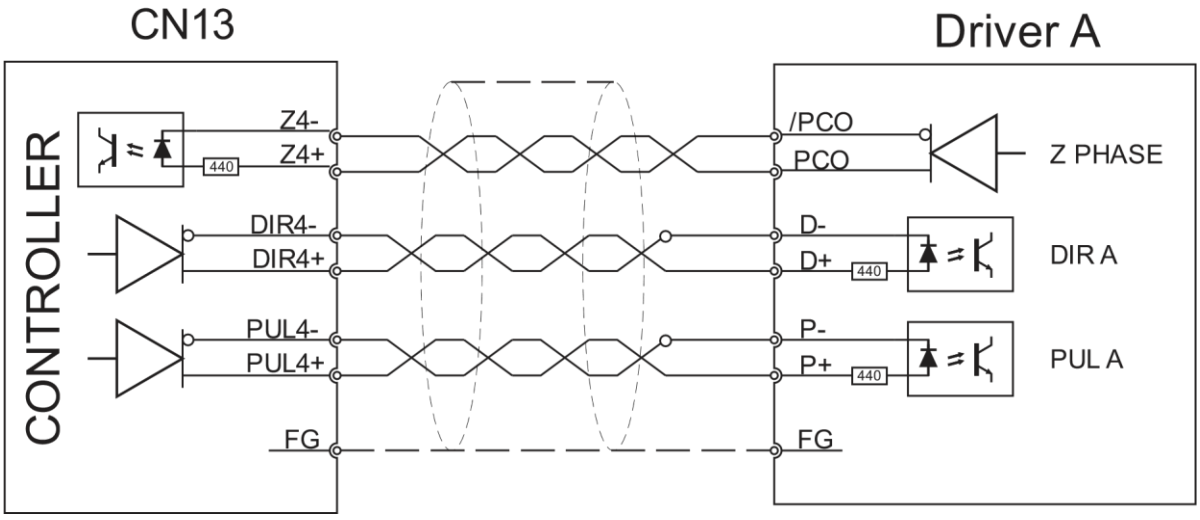
2.4 LOW OUTPUT DIAGRAM

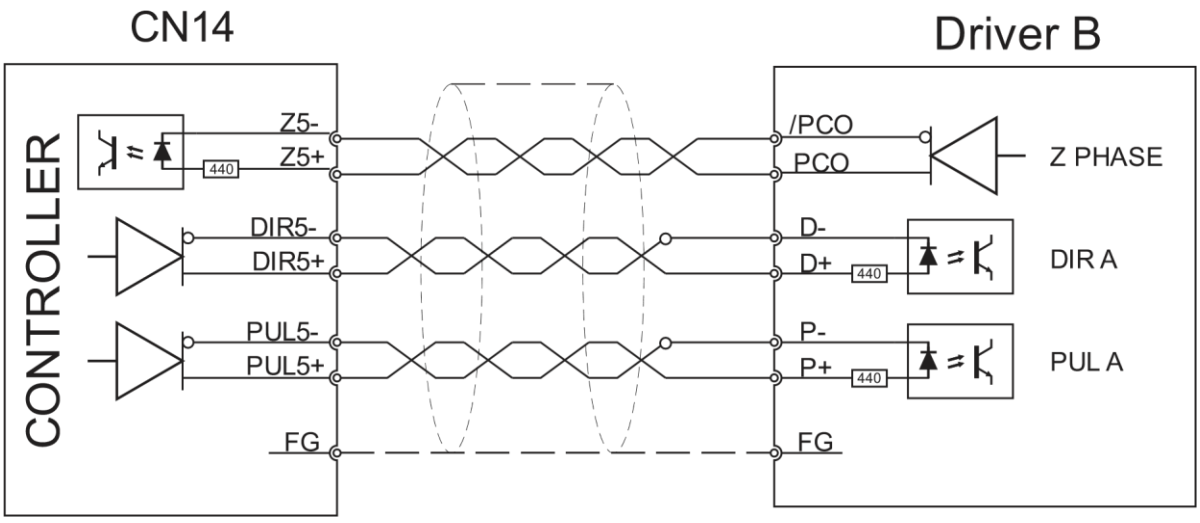


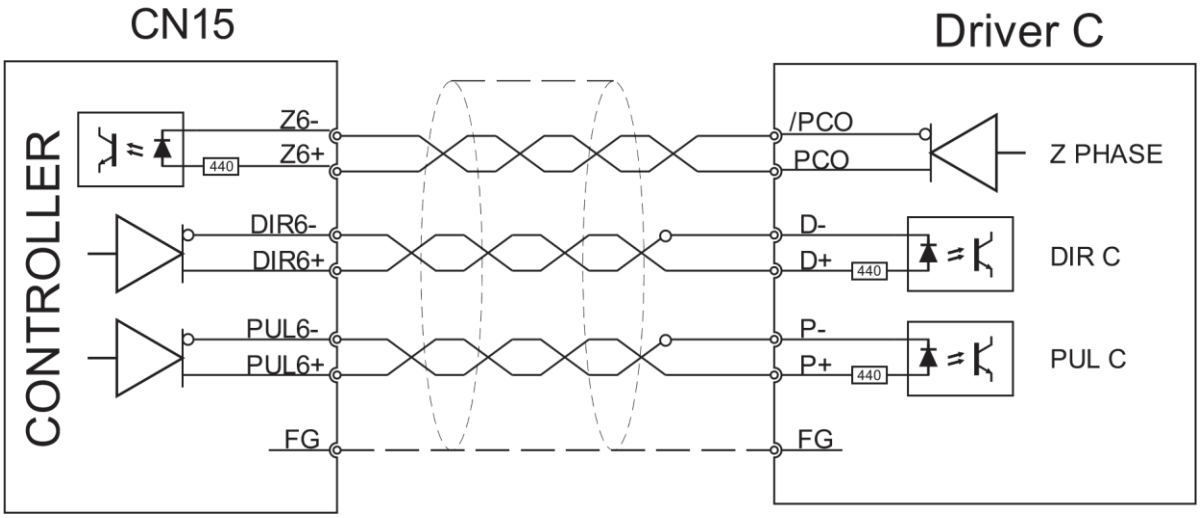
2.5 CONNECTION DIAGRAM PULSE CONTROL, DIRECTION Z PHASE FROM SERVO




CN12
Driver Z
CONTROLLER
Z3-
Z3+
440
DIR3-
DIR3+
PUL3-
PUL3+
/PCO
PCO
Z PHASE
D-
D+
440
DIR Z
P-
P+
440
PUL Z
FG

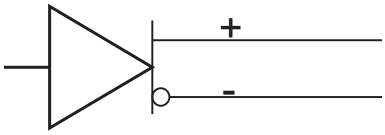

CN13
Driver A
CONTROLLER
Z4-
Z4+
440
DIR4-
DIR4+
PUL4-
PUL4+
FG
/PCO
PCO
Z PHASE
D-
D+
440
DIR A
P-
P+
440
PUL A
FG


CN14
Driver B
CONTROLLER
Z5-
Z5+
440
/PCO
PCO
Z PHASE
DIR5-
DIR5+
D-
D+
440
DIR A
PUL5-
PUL5+
P-
P+
440
PUL A
FG
FG

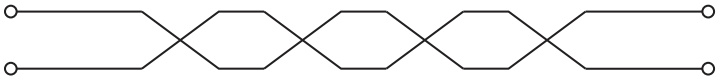

CN15
Driver C
CONTROLLER
Z6-
Z6+
440
/PCO
PCO
Z PHASE
DIR6-
DIR6+
D-
D+
440
DIR C
PUL6-
PUL6+
P-
P+
440
PUL C
FG
FG

NOTE:

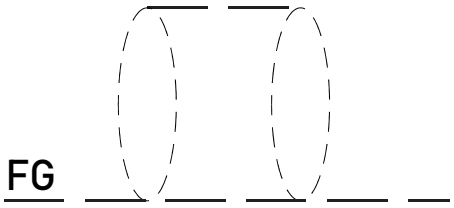
Symbol of differential: The circle is correspond to the reversal signal and were specified by " – " symbol. The straight line is correspond to the non-reversible singal and were spedified by " + " symbol.



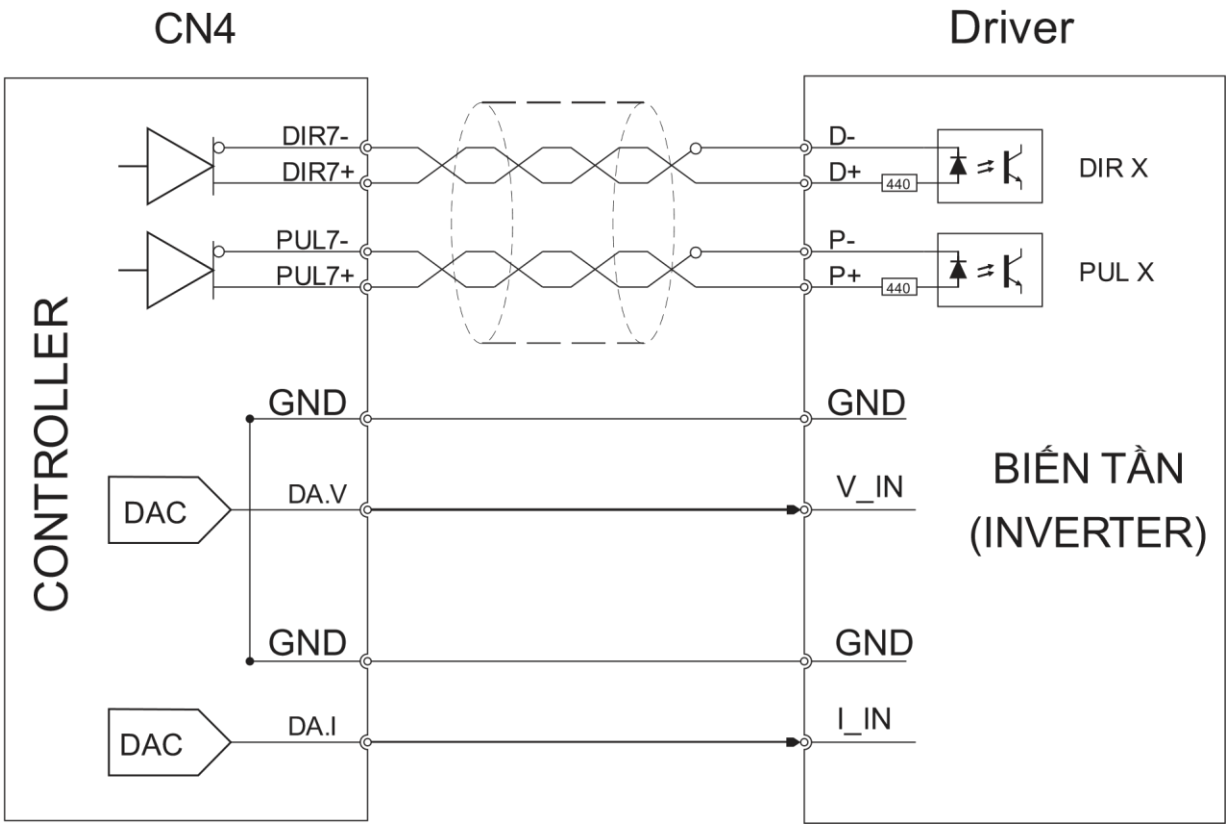
Twister wire: With the differential pair signal, recommendation use twister wire at " + " , " – " pins. Do not use single wire to connect these pairs of wires seperately.



Frame Ground: Use the multi-core signal wire contains shield wire, connect the shield wire to FG pin of controller, machine cover.



2.6 INVERTER WIRING DIAGRAM FOR PULSE, ANALOG INPUT

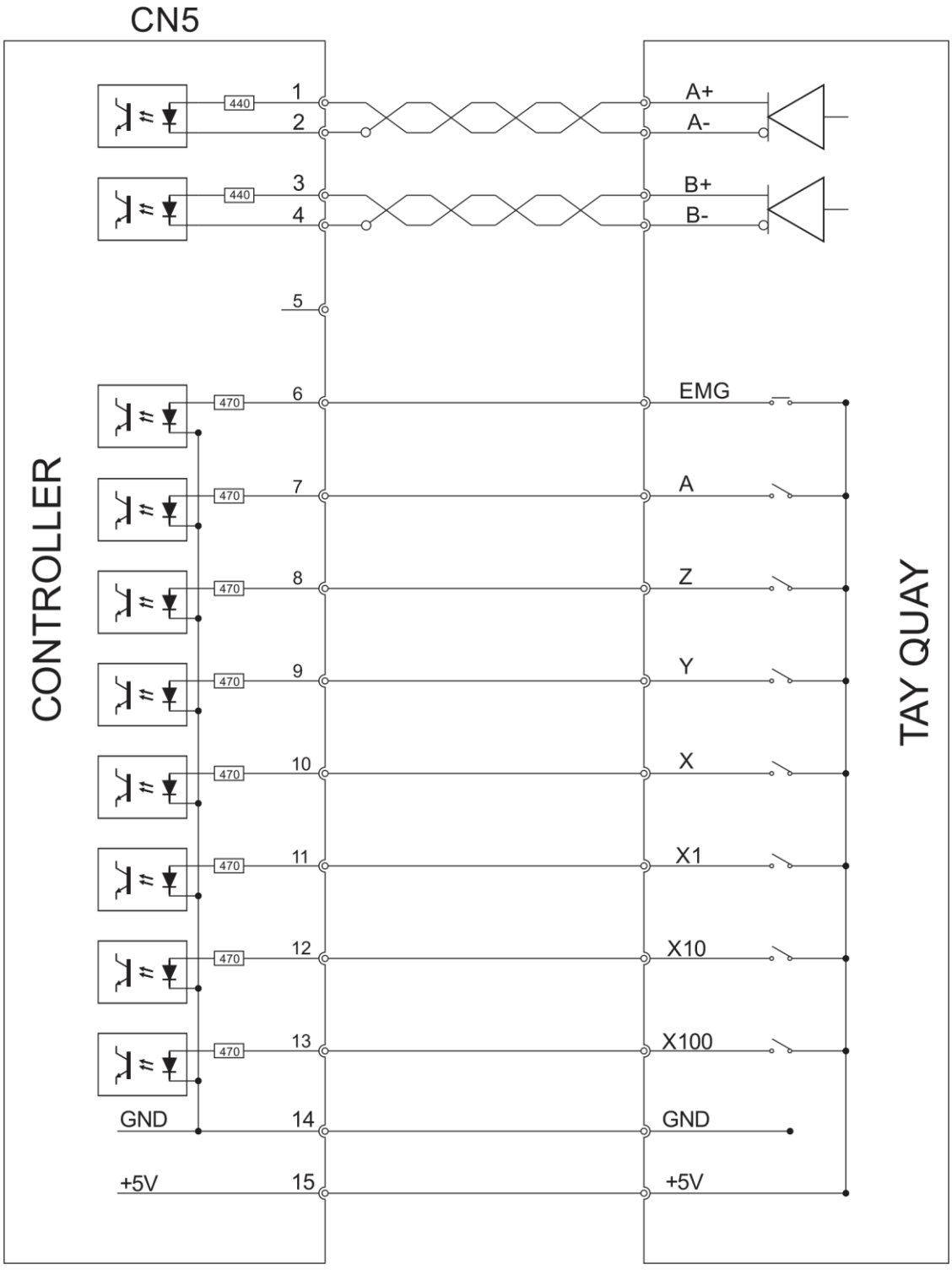


NOTE:

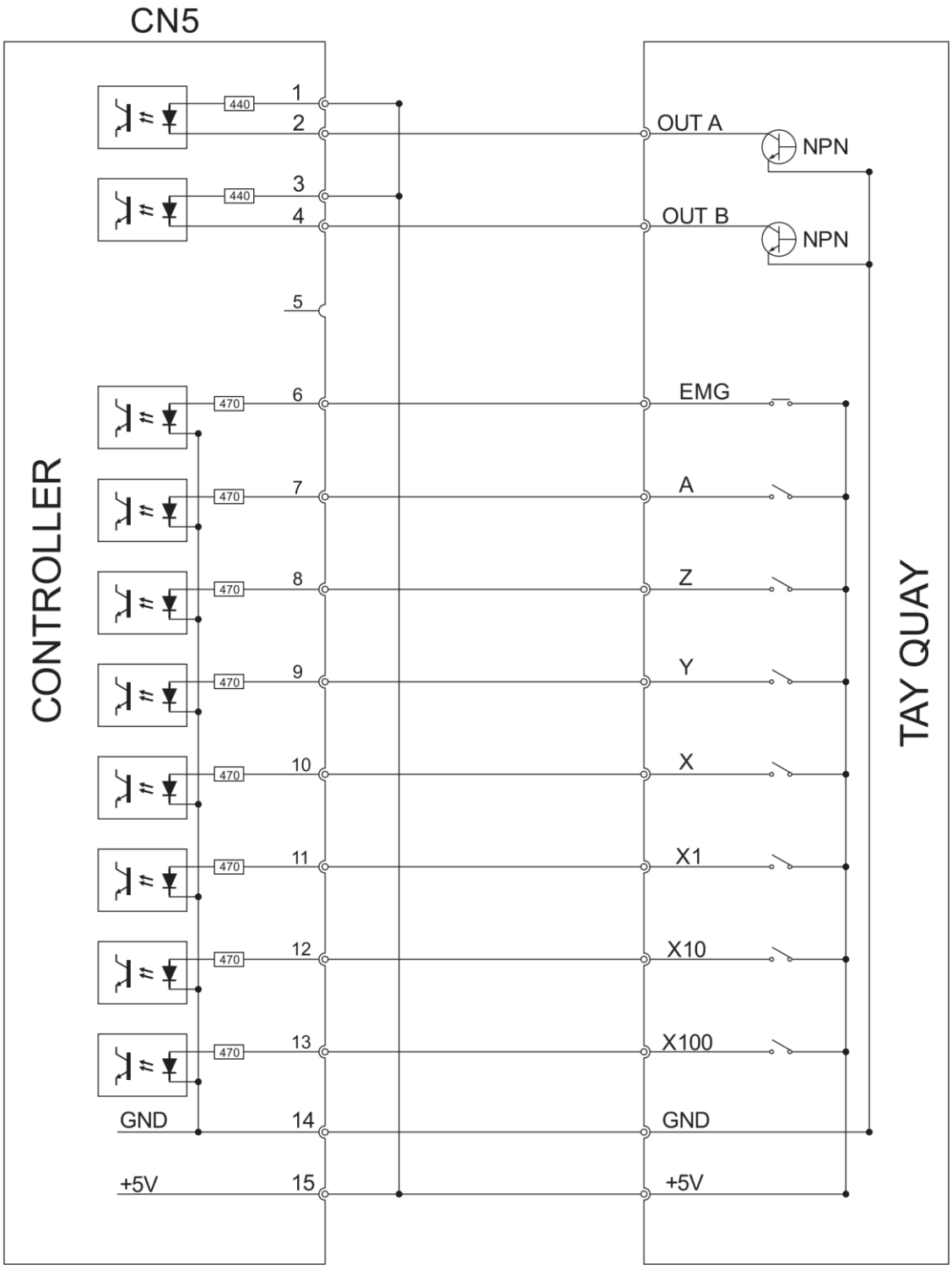
The pulse output for the inverter is independent of the analog output. Analog output (0-10V) and (4-20mA) was controlled simultaneously and not seperated.

2.6 HANDWHEEL WIRING DIAGRAM

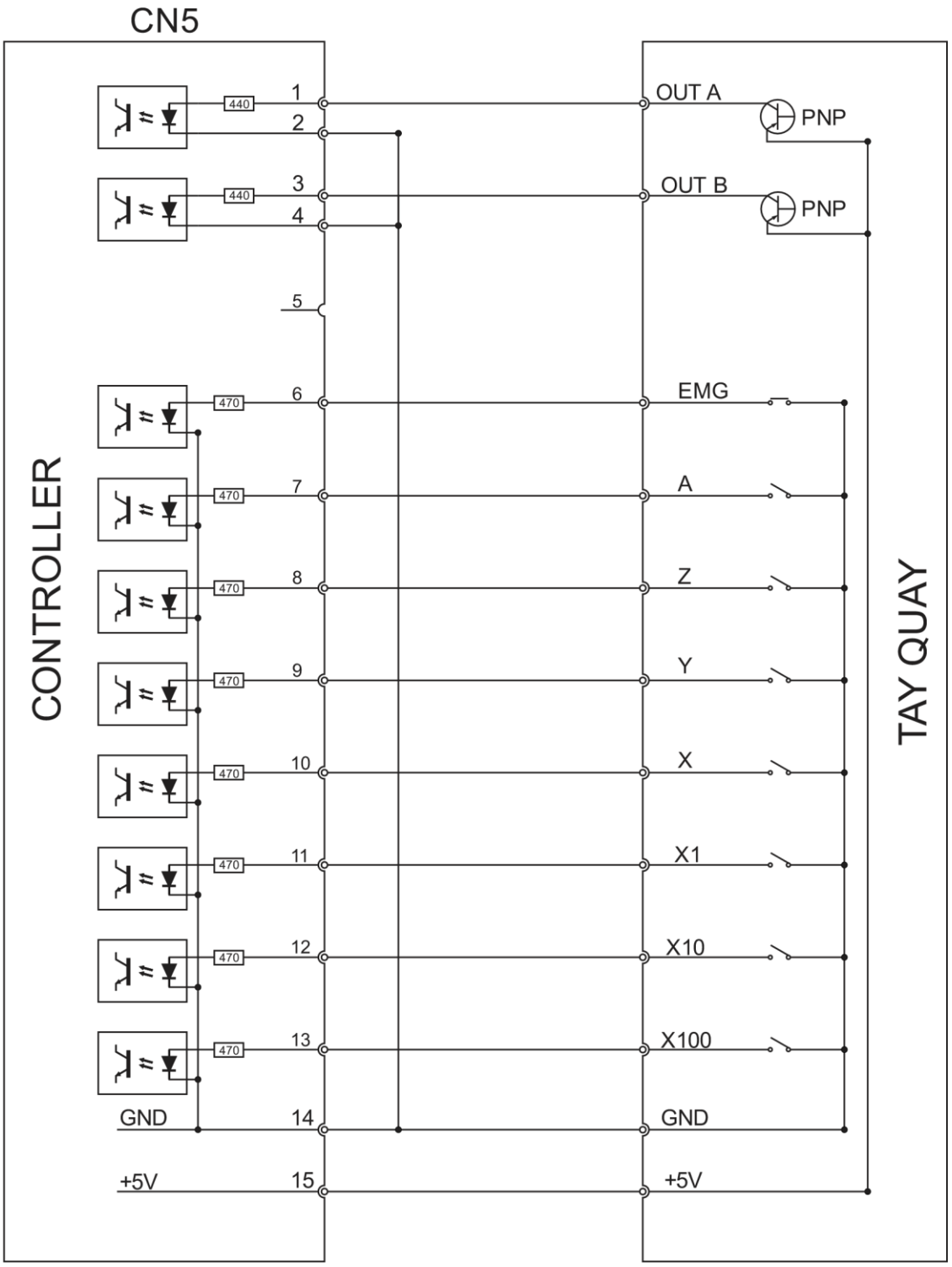
2.6.1 USE FOR DIFFERENTIAL OUTPUT SIGNAL OF 4 AXIS HANDWHEEL



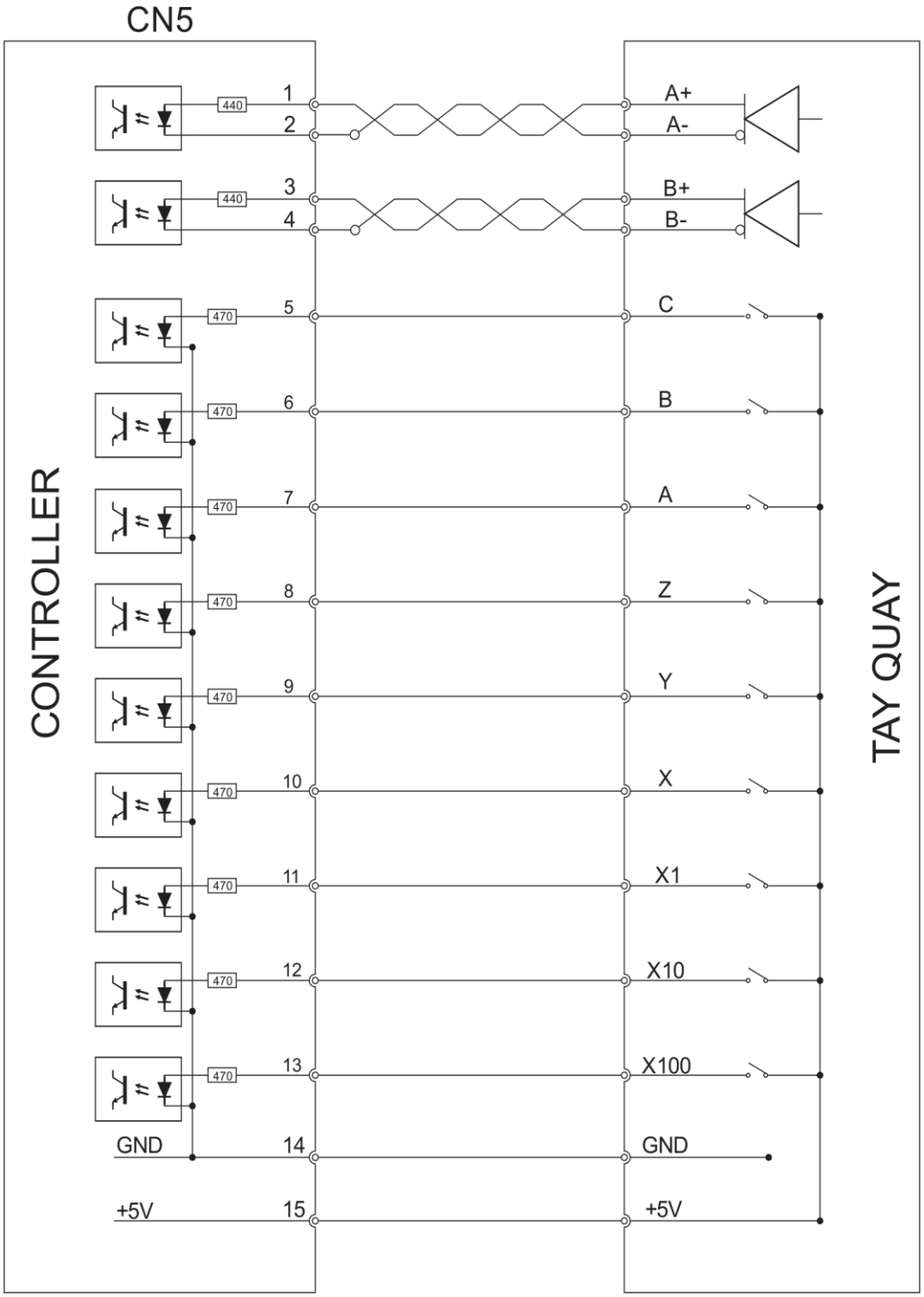
2.6.2 USE FOR NPN OUTPUT SIGNAL OF 4 AXIS HANDWHEEL



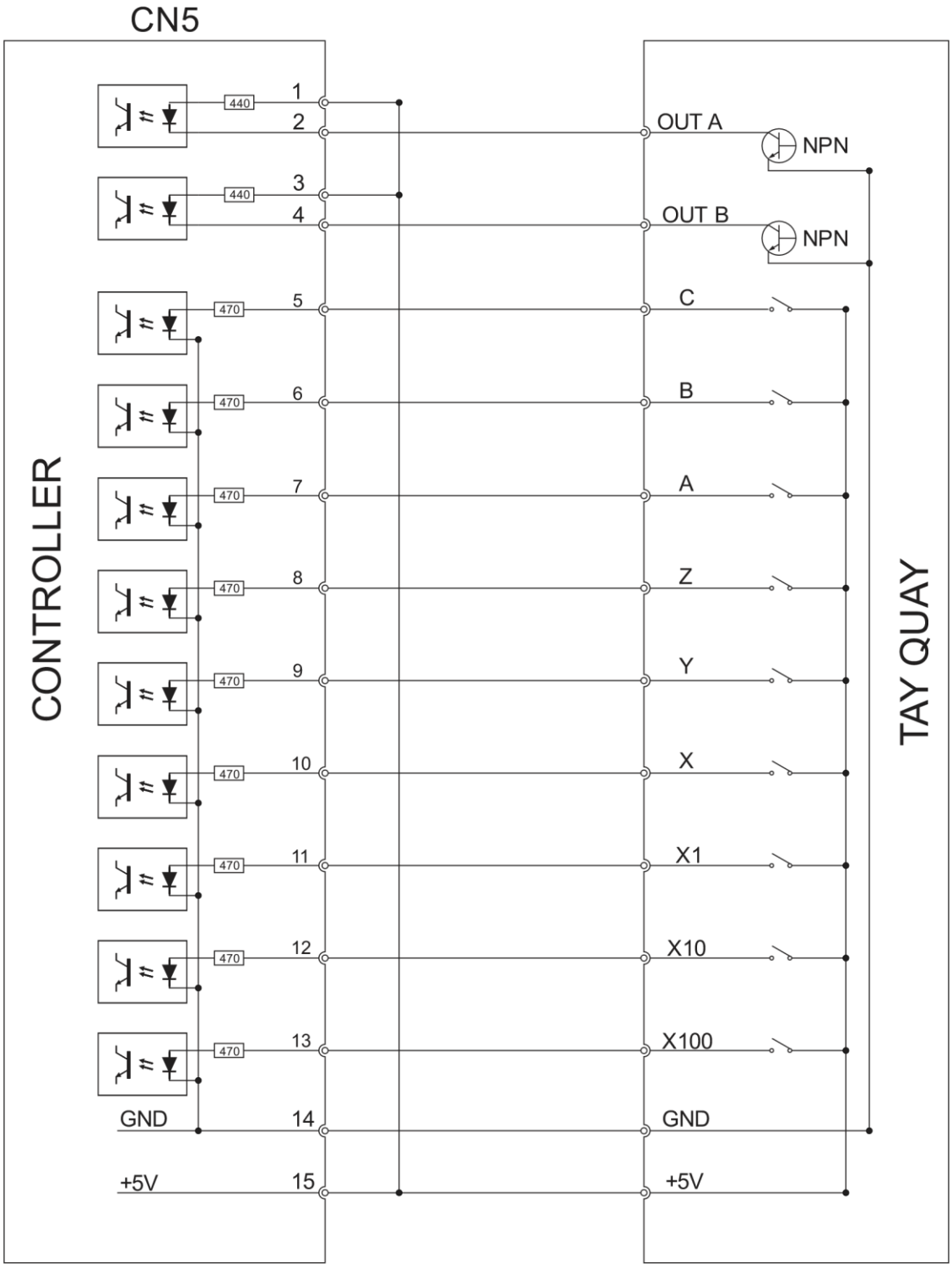
2.6.3 USE FOR PNP OUTPUT SIGNAL OF 4 AXIS HANDWHEEL



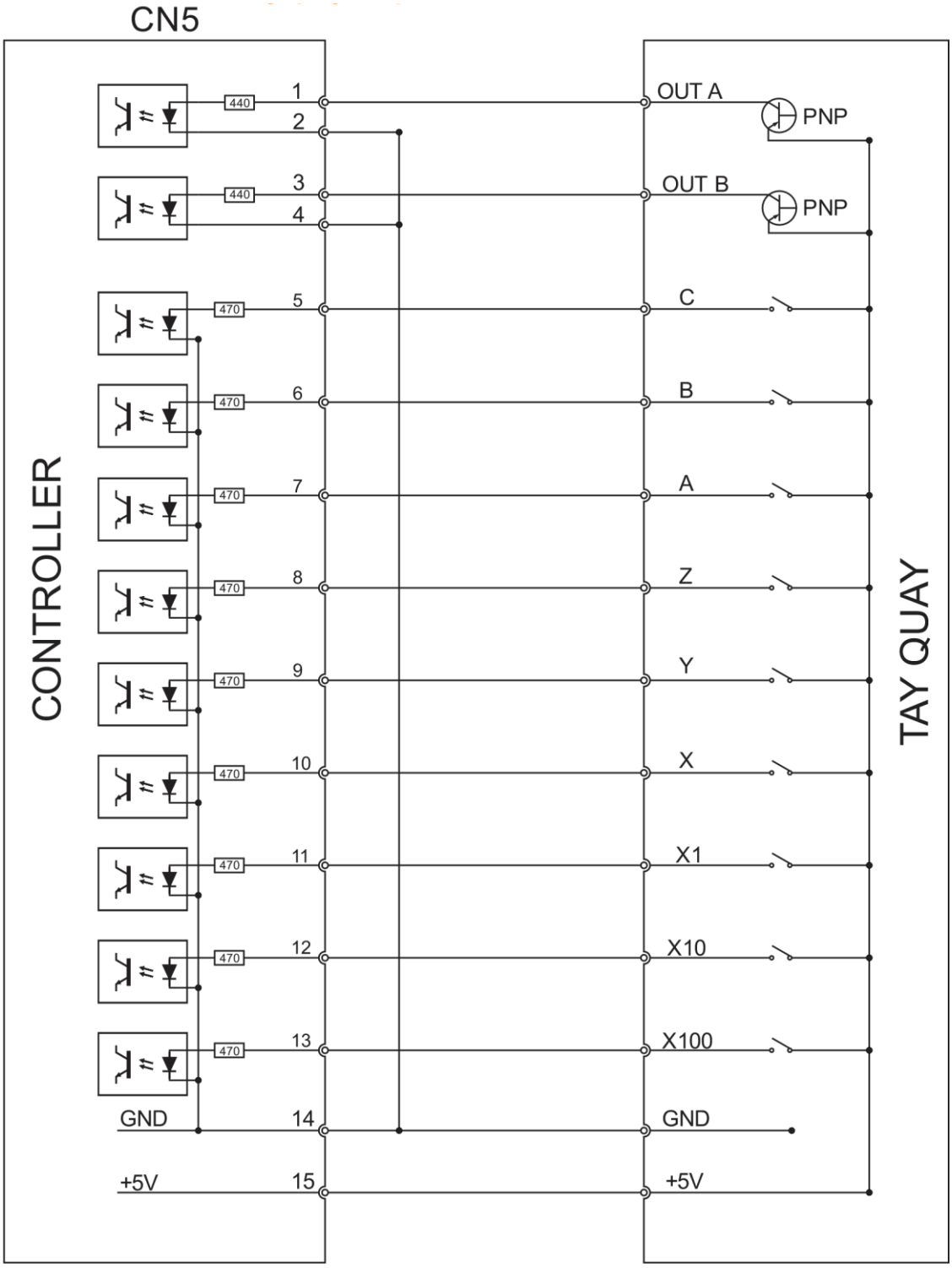
2.6.4 USE FOR DIFFERENTIAL OUPUT SIGNAL OF 6 AXIS HANDWHEEL



2.6.5 USE FOR NPN OUTPUT SIGNAL OF 6 AXIS HANDWHEEL

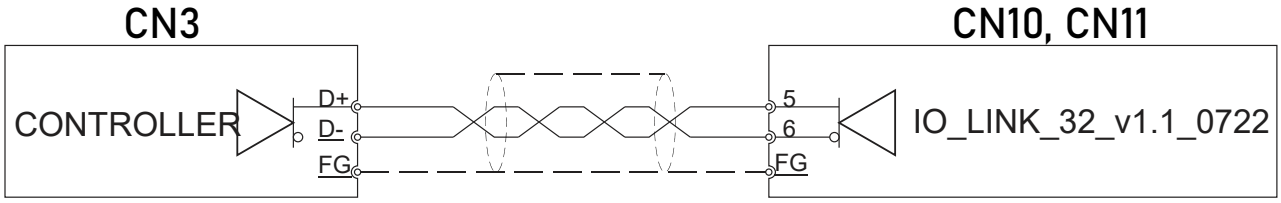


2.6.6 USE FOR PNP OUTPUT SIGNAL OF 6 AXIS HANDWHEEL

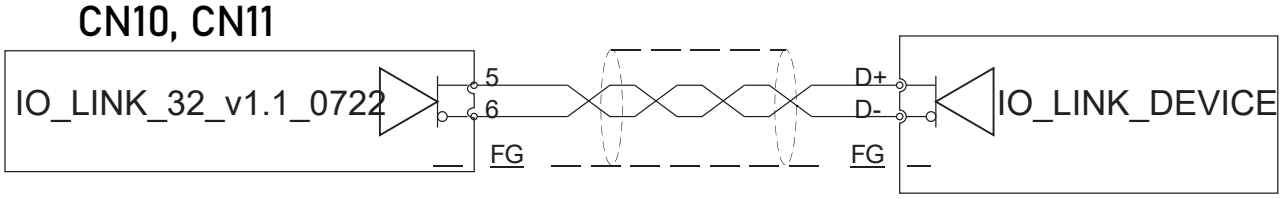


2.7 RS485, I/O-LINK

Connection diagram from the controller to I/O_LINK_32_V1.1_0722 board.



Serial connection diagram from I/O_LINK_32_V1.1_0722 board to another board.



2.8 POWER CONNECTION