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**GENERAL DESCRIPTION.**

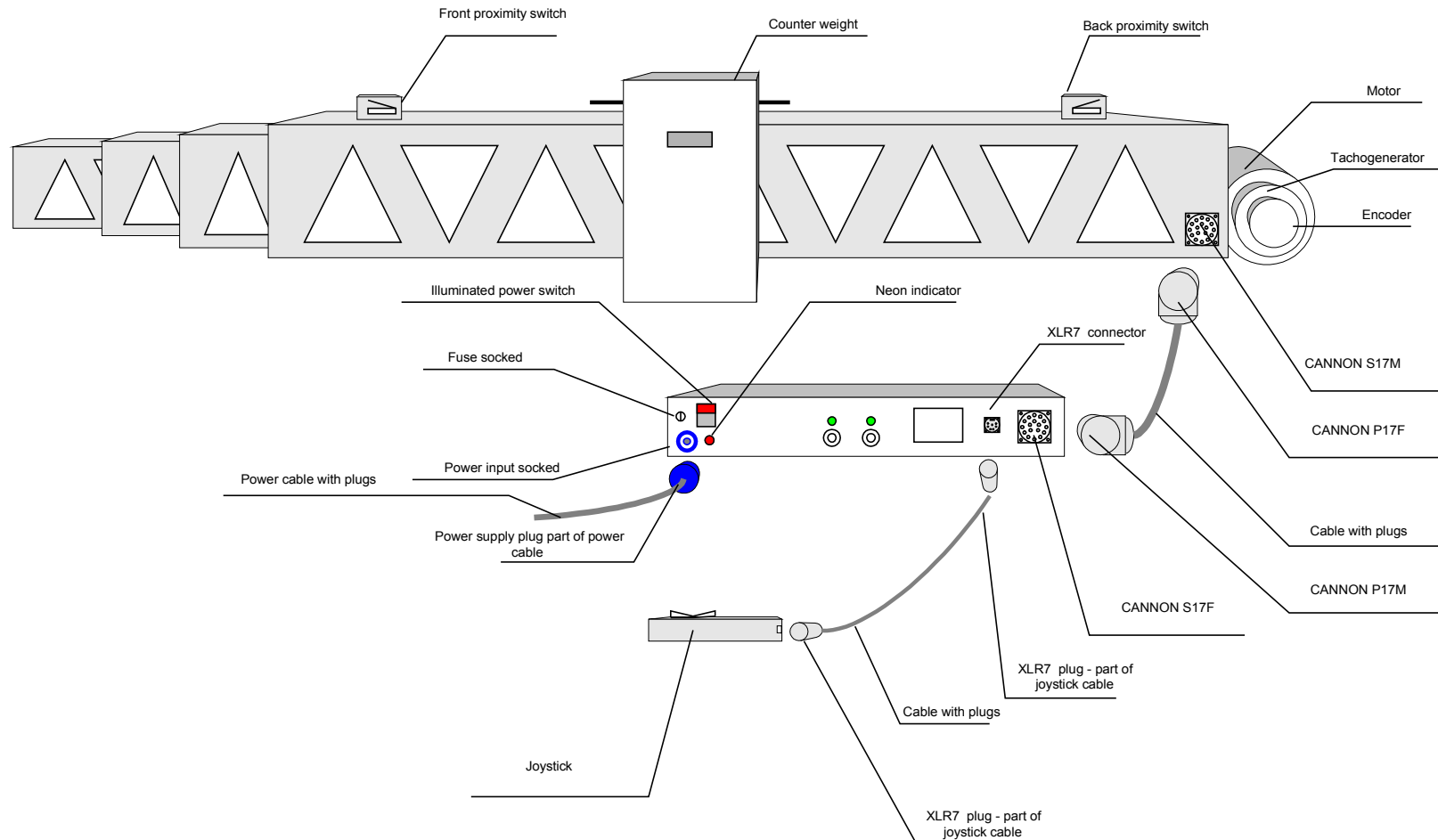


FIGURE1. *Telescope electronic system*

The figure 1 shows electronic system for camera cranes. The main part of system is electronic box. Current velocity is set by joystick. The signal from joystick is profiled by electronic driver inside box and current velocity signal moving an arm by motor with servoamplifier. The system have two proximity switches, witch secure crane before mechanically damage. The maximum speed when the joystick is fully deflected can be set by BCD switch in joystick. The servoamplifier have feedback, witch stabilise velocity.

THE SYSTEM CONTENTS:

- Joystick – the part witch user can set current velocity and maximum velocity ratio
- Joystick cable with plugs
- Electronic box
- Motor cable with plugs
- Motor with tachometer and encoder
- Two proximity switches
- Cable on a crane

FUNCTIONAL DESCRIPTION.

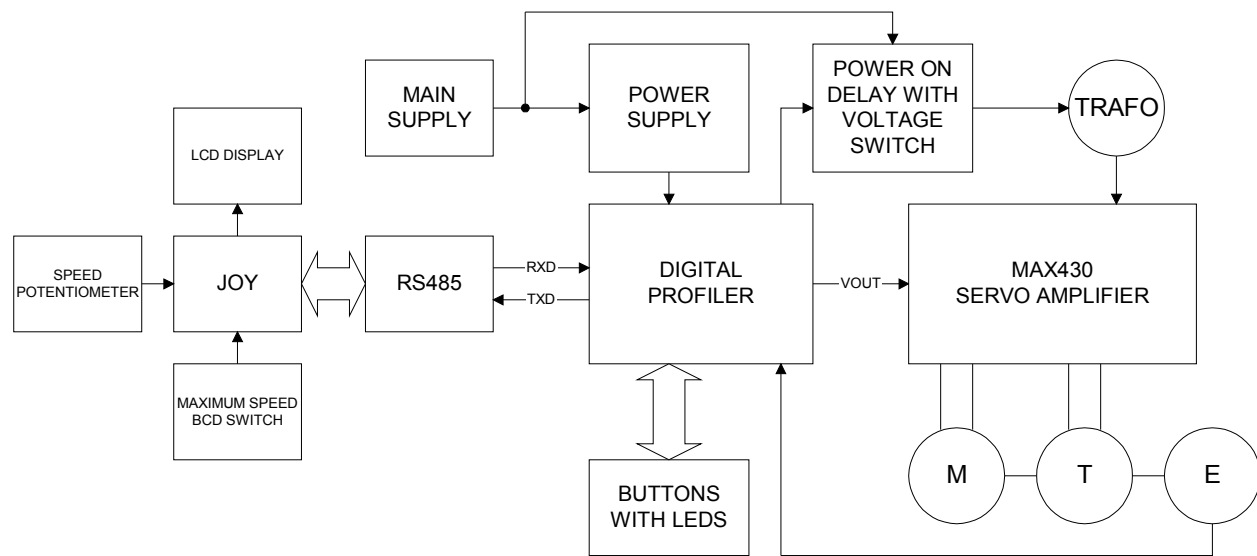


FIGURE 2. Funcional diagram.

## **Specifications.**

### PREFORMANCE SPECIFICATIONS

- Operation temperature -20°C to +60°C,
- Maximum speed 1.5 m/s,
- Maximum speed BCD Switch ratio 1/100,

### ELECTRICAL SPECIFICATIONS

- Voltage power supply 110V, 230V (switched by internal voltage power supply switch),
- SERVOAMPLIFIER frequency – aprox. 16kHz,
- SERVOAMPLIFIER power supply voltage aprox. 80V.

## Maintenance.

### *Servoamplifier regulation.*

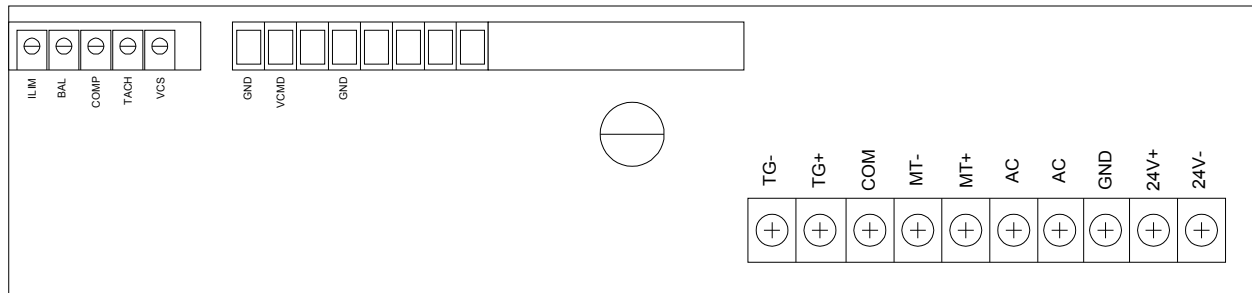


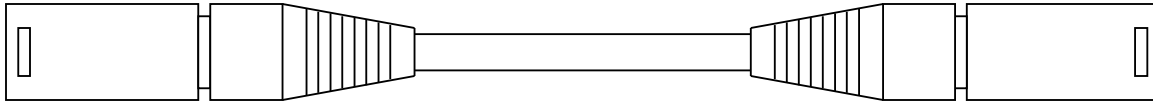
FIGURE 4. Servoamplifier MAX430.

Algorithm for servoamplifier regulation:

1. Turn ILIM clockwise to max.
2. Turn VCS clockwise to max.
3. Set BAL to 0mV DC measured on VCMD in.
4. Set TACH gain to 10V DC on VCMD in (when joystick is fully deflected and maximum BCD switch is set to 9 position and SERVICE SWITCH is set to SUPERTECHNO).
5. Turn COMP clockwise until motor starts oscillating then turn back 5 full turns.

## Diagrams.

### *Joystick cable.*



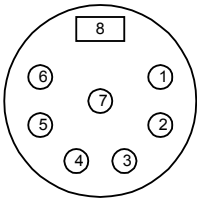
#### XLR7 CONNECTOR

1. BLUE+GREY - GROUND
2. GREEN - Y-OUT
3. YELLOW - Z-OUT
4. WHITE - B-IN
5. BROWN - A-IN
6. RED - +Vcc
7. PINK - VOLTAGE  
REGULATOR SIGNAL
8. SCREEN - COVER

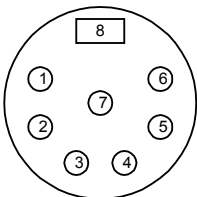
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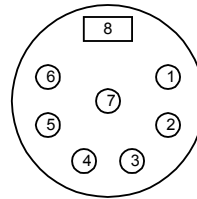
#### XLR7 SOLDER SIDE



#### XLR7 FRONT VIEW



#### XLR7 SOLDER SIDE



#### XLR7 FRONT VIEW

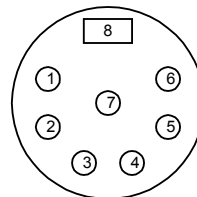
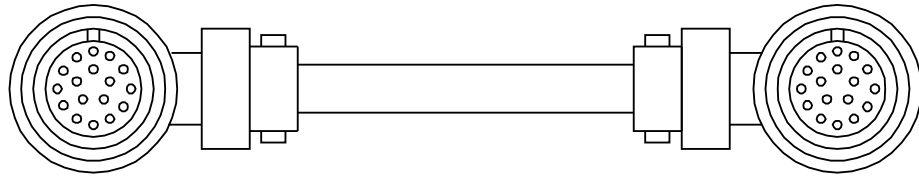


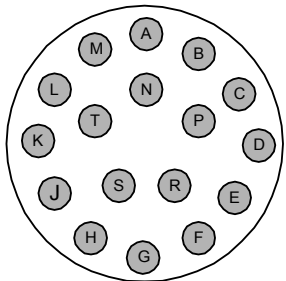
FIGURE 5. Joystick cable diagram.

*Motor cable diagram.*

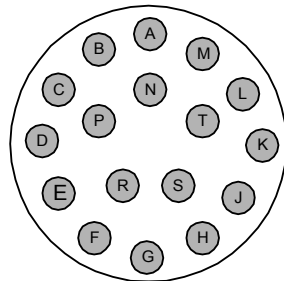


- Cannon CA3108E20-29P-B pole**
- A - Tacho +
  - B - Tacho -
  - C - Front proximity switch
  - D - Common wire for proximity switch
  - E - Back proximity switch
  - F - Security bridge
  - G - Security bridge
  - H - Encoder channel A
  - J - Encoder channel B
  - K - +5V
  - L - GND
  - M,N,P - Motor +
  - R,S,T - Motor -

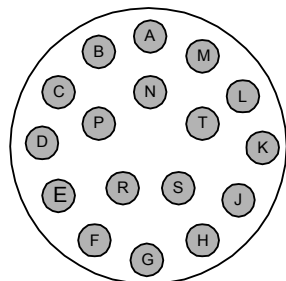
- Cannon CA3108E20-29S-B pole**
- A - Tacho +
  - B - Tacho -
  - C - Front proximity switch
  - D - Common wire for proximity switch
  - E - Back proximity switch
  - F - Security bridge
  - G - Security bridge
  - H - Encoder channel A
  - J - Encoder channel B
  - K - +5V
  - L - GND
  - M,N,P - Motor +
  - R,S,T - Motor -



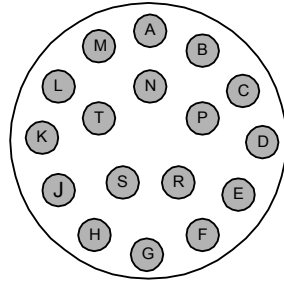
CANNON CA3108E20-29P  
PLUG FRONT VIEW



CANNON CA3108E20-29P  
PLUG FRONT VIEW



CANNON CA3108E20-29P  
PLUG SOLDER SIDE

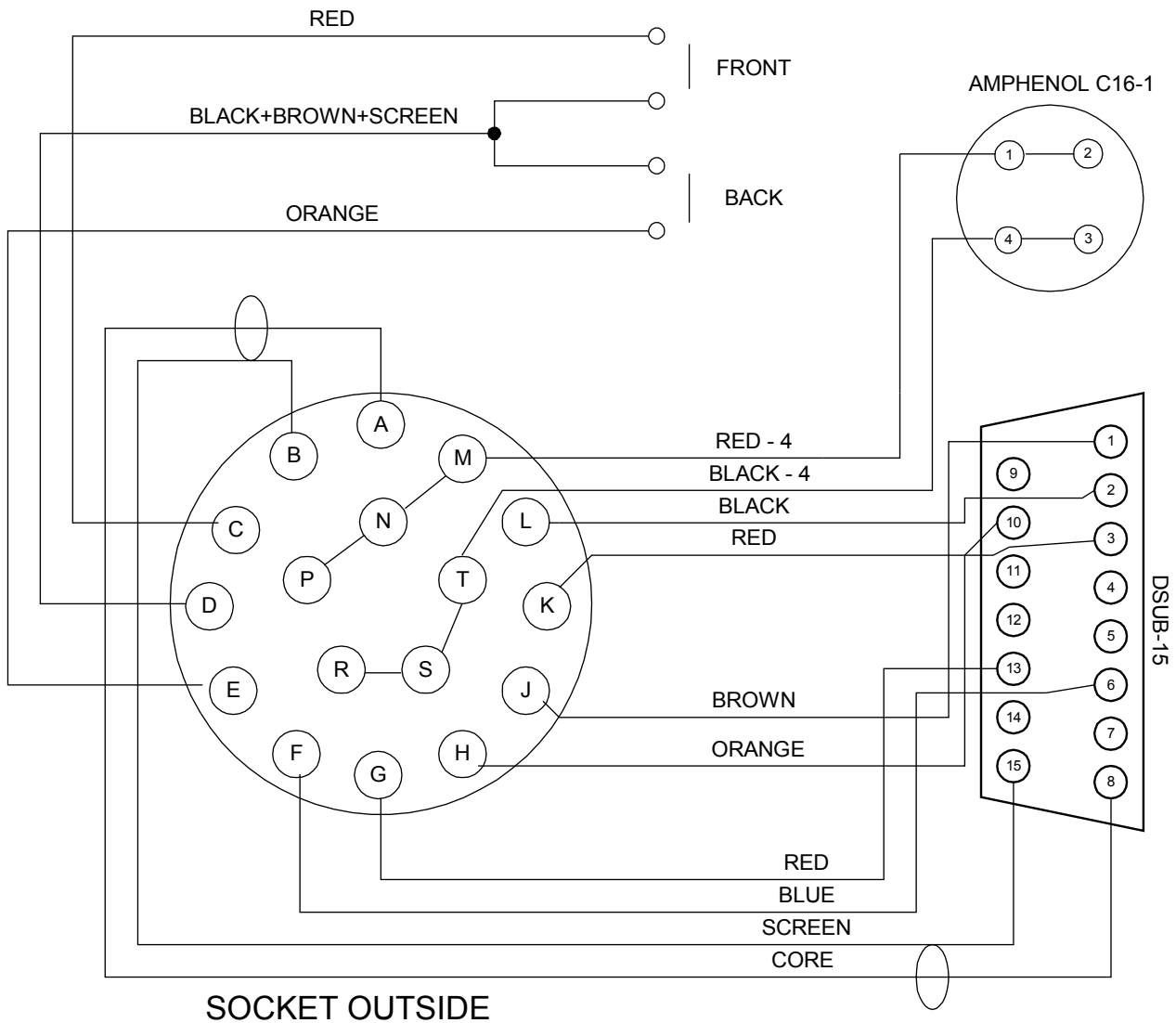


CANNON CA3108E20-29P  
PLUG SOLDER SIDE

FIGURE 6. Motor cable diagram.



*Crane cable diagram.*



**SOCKET OUTSIDE**

- CANNON CA3102E20-29P-B pole**
- A - Tacho +
  - B - Tacho -
  - C - Front proximity switch
  - D - Common wire for proximity switch
  - E - Back proximity switch
  - F - Security bridge
  - G - Security bridge
  - H - Encoder channel A
  - J - Encoder channel B
  - K - +5V
  - L - GND
  - M,N,P - Motor +
  - R,S,T - Motor -

FIGURE 7. Crane cable diagram.

*Motor plugs connection.*

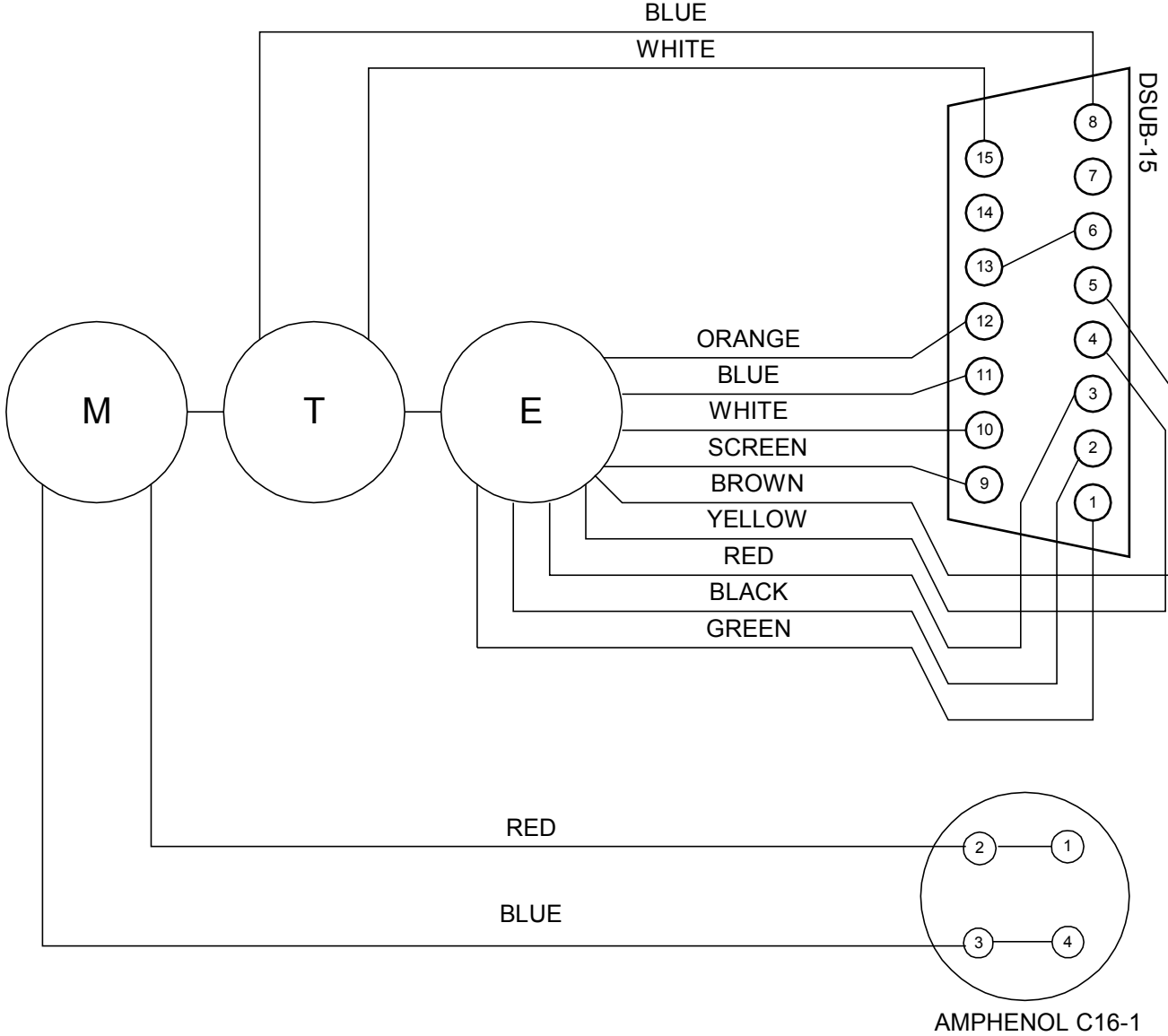


FIGURE 8. Motor plugs connection.

*Electronic box wiring diagram.*

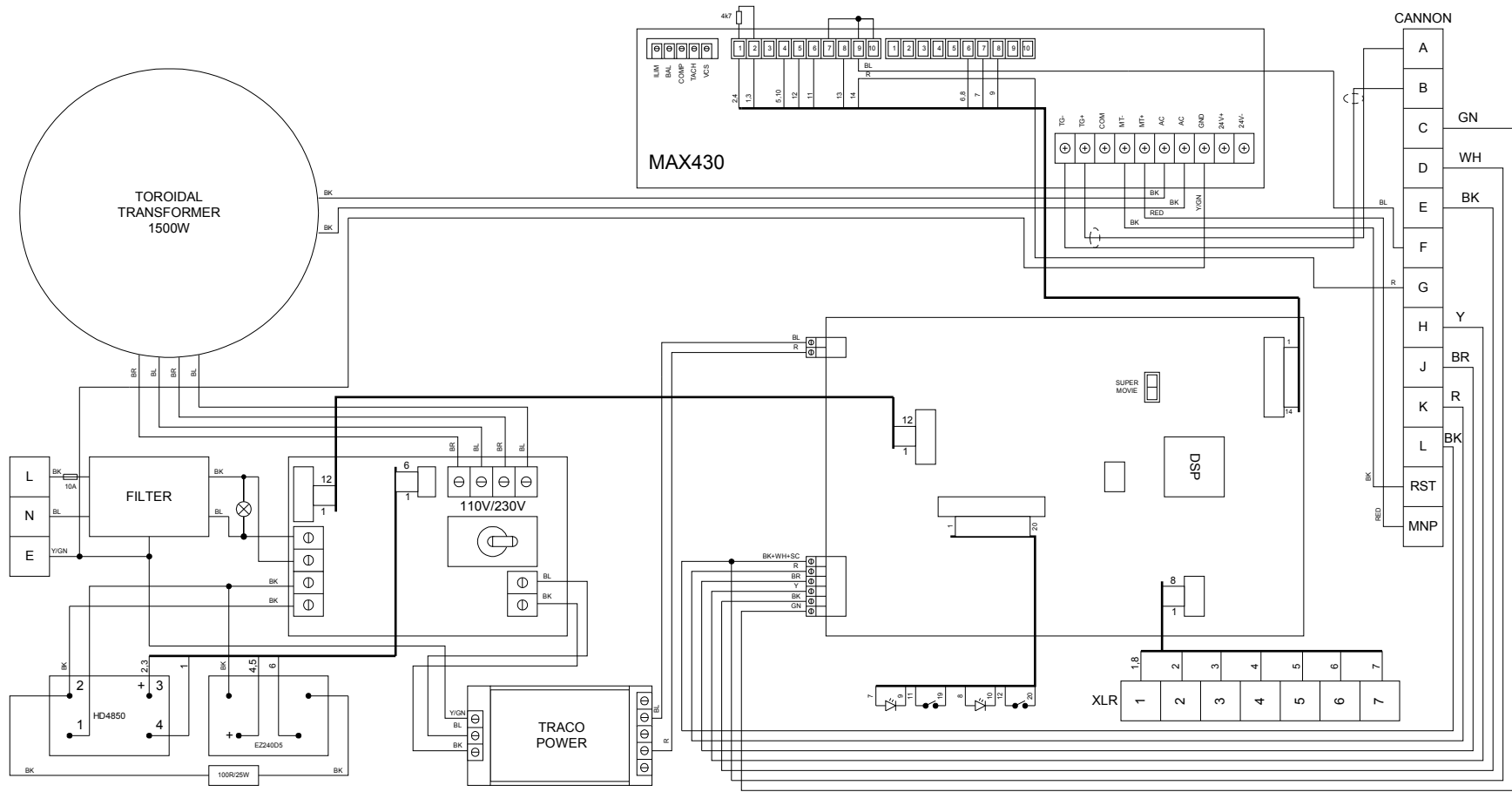


FIGURE 9. Electronic box wiring diagram.

1.1. Joystick wiring diagram.

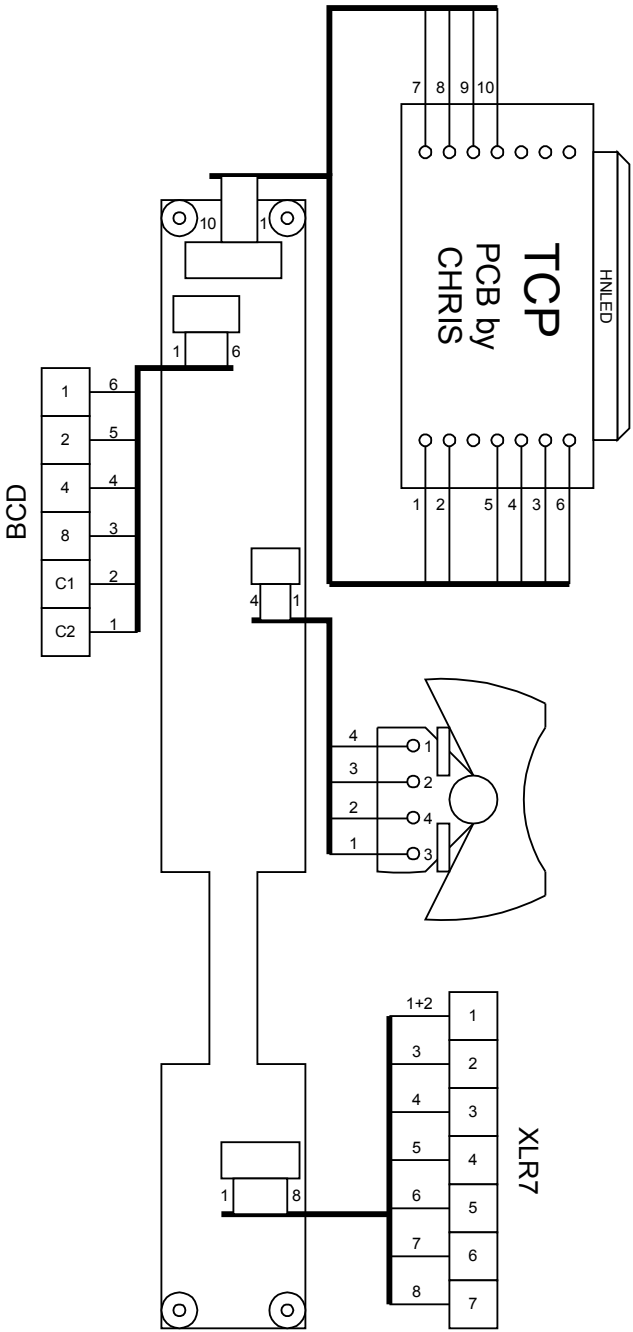
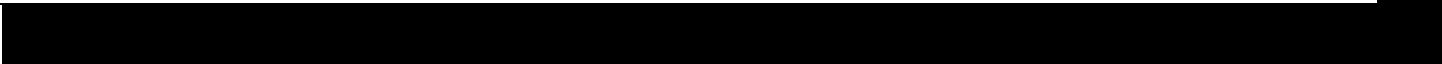
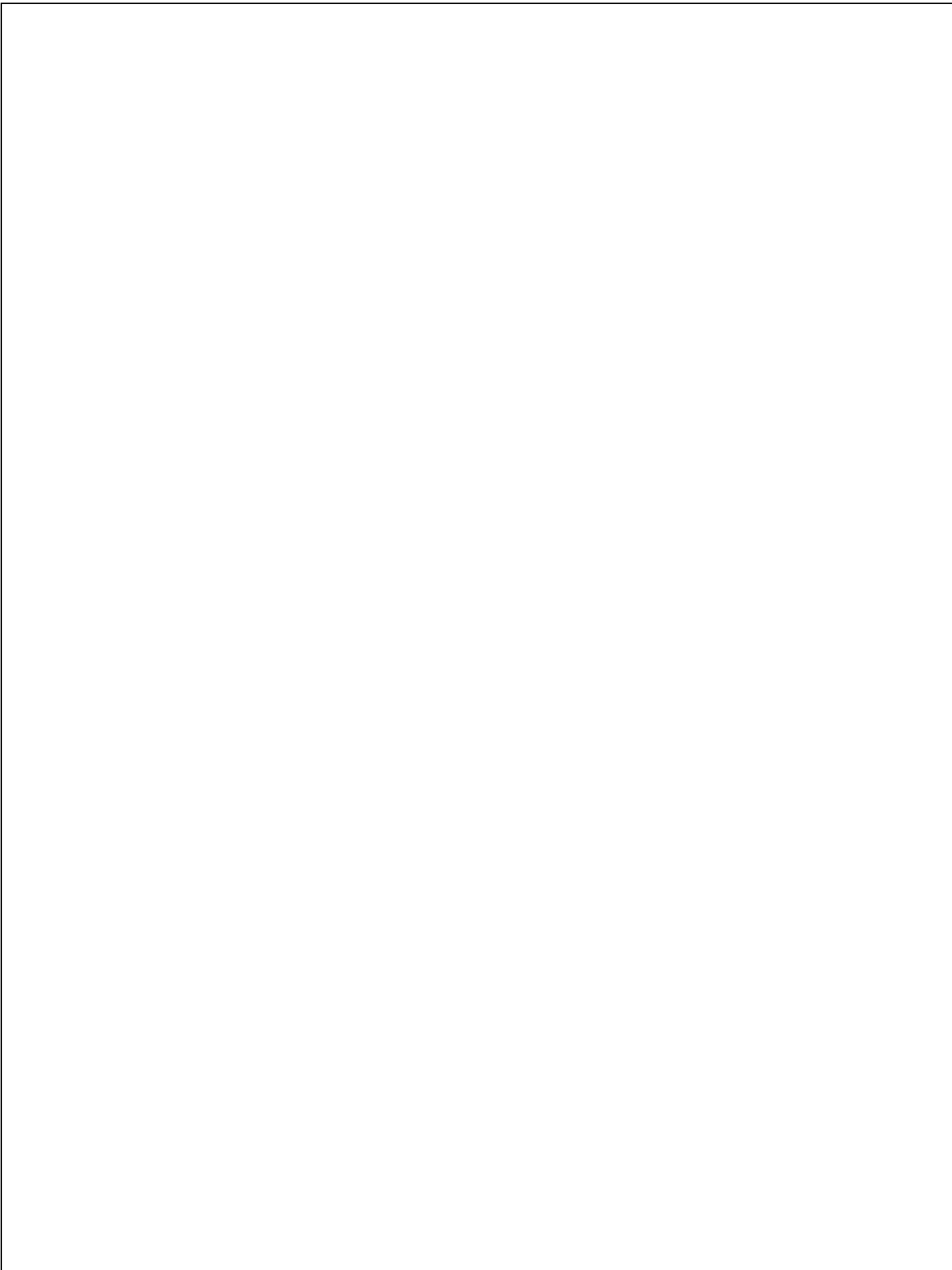


FIGURE 10. Joystick wiring diagram.

Joystick circuit diagram.





Power on delay circuit diagram.

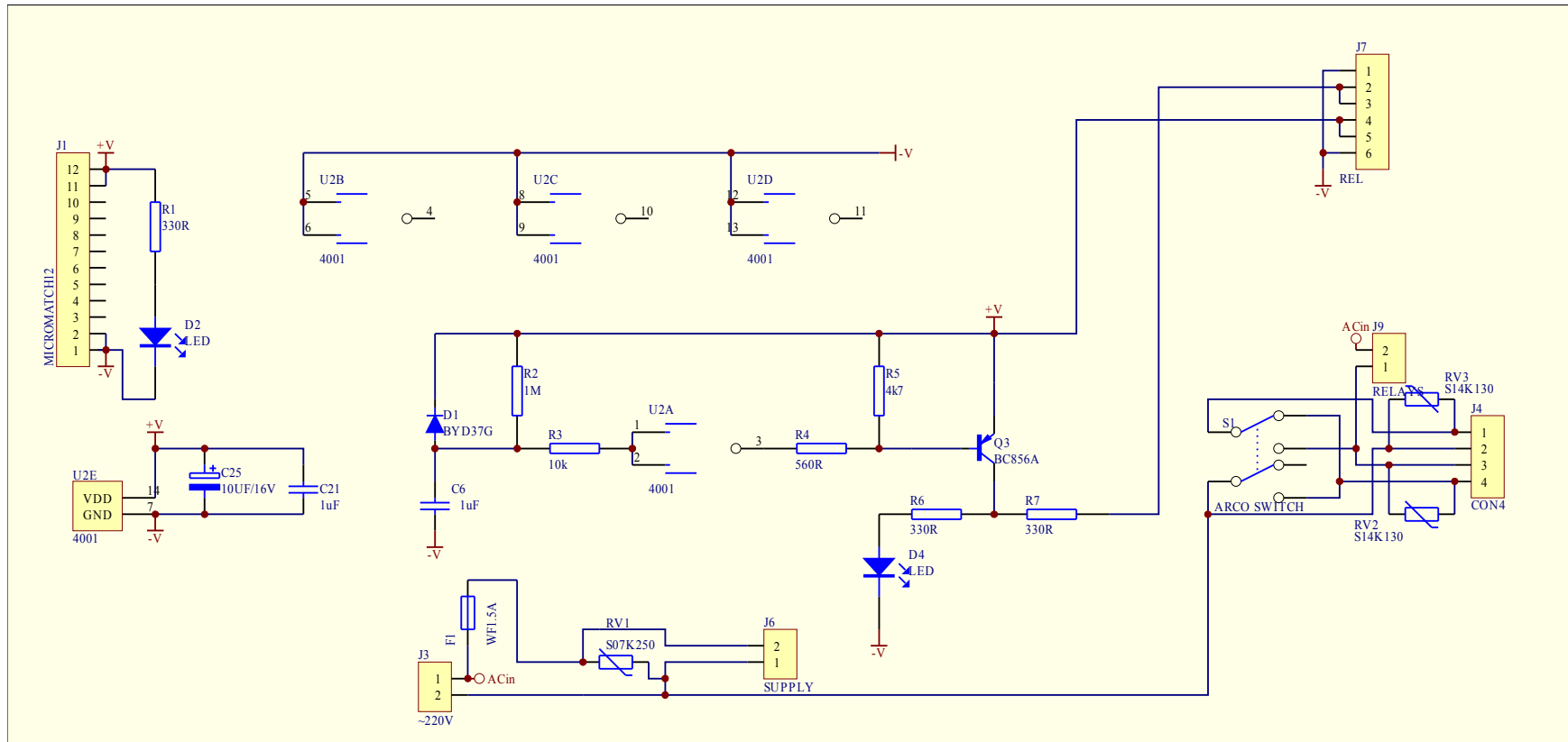


FIGURE 12. Power on delay circuit diagram.

*Main board circuit diagram*





## 2. Troubleshooting.

Symptom	Cause	Solution
After turn on power switch neon indicator not light and system not respond	Fuse blow up	Check fuse and power supply switches
After five seconds from turn on system shows word 'Terminal' on LCD display in up line	Joystick cable fault or interface electronics in joystick or main board id damaged	First check joystick cable, if cable is good you have to check internal communication interface in joystick or main board
When on the display is word 'Ready' motor is not stabile and change very fast direction of move	Tachogenerator cable is damaged	First check crane cable, motor cable, brushes and if cable is good you have to check connection in internal connection between cannon connector and servo amplifier
When on the display is word 'Ready' moving joystick doesn't move the crane, but you can move the crane manually	Motor cable fault, security bridge is open, start up electronics is damaged	Check motor cable first, if is good you have to check motor connections and security bridge connection and start up electronics
When on the display is word 'Ready' moving joystick doesn't move the crane but you cannot move the crane manually	Proximity switches connection fault	First check motor cable, if is good you must check connections on the crane and internal electronics (both proximity switches are normally close)
Crane doesn't stop on proximity switch	Proximity switches connection fault	First check motor cable, if is good you must check both proximity switch, if you push them they are opened, if push doesn't have any effect probably cable have short circuit or proximity switch is broken
Joystick LCD display shows 'Error 01'	2.5V cable is fault on joystick	Check connection between speed potentiometer and joystick PCB
Joystick LCD display shows 'Error 02'	GND cable is fault on joystick	Check connection between speed potentiometer and joystick PCB
Joystick LCD display shows 'Error 03'	1.25V cable is fault on joystick	Check connection between speed potentiometer and joystick PCB
Joystick LCD display shows 'Error 04'	SPEED cable is fault on joystick	Check connection between speed potentiometer and joystick PCB
Joystick LCD display shows 'Error 05'	DAC range error	Check connection between security voltage check, if is good you have to check internal DAC module
Joystick LCD display shows 'Error 06'	DAC check wire fault	Check connection between security voltage check, if is good you have to check internal DAC module
Joystick LCD display shows 'Error 07'	DAC feed error	Check connection between security voltage check, if is good you have to check internal DAC module
Joystick LCD display shows 'Error 08'	Encoder ADCQAF	Check encoder QAF connection, check motor cable, crane cable and encoder
Joystick LCD display shows 'Error 09'	Encoder ADCQBF	Check encoder QBF connection, check motor cable, crane cable and encoder

<b>Symptom</b>	<b>Cause</b>	<b>Solution</b>
Joystick LCD display shows 'Error 10'	Encoder XINT	Check encoder connection, check motor cable, crane cable and encoder
Joystick LCD display shows 'Error 11'	Joystick stop	First turn off and turn on BOX. If this doesn't any effect check joystick cable, if is good then check internal electronics
Joystick LCD display shows 'Error 12'	Servo inhibit fault	Check connections between main board and servo, if is good you have to check internal electronics on main board and check servo
Joystick LCD display shows 'Error 14'	DAC Init error	Check connection between security voltage check, if is good you have to check internal DAC module
Box give a six or seven beeps	Voltage error	Check all power supplies