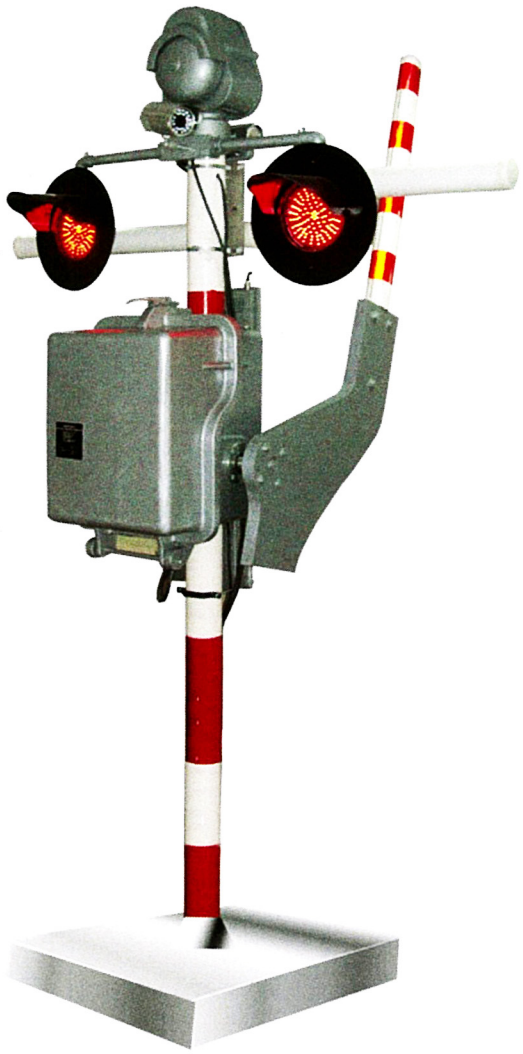
Teknoray

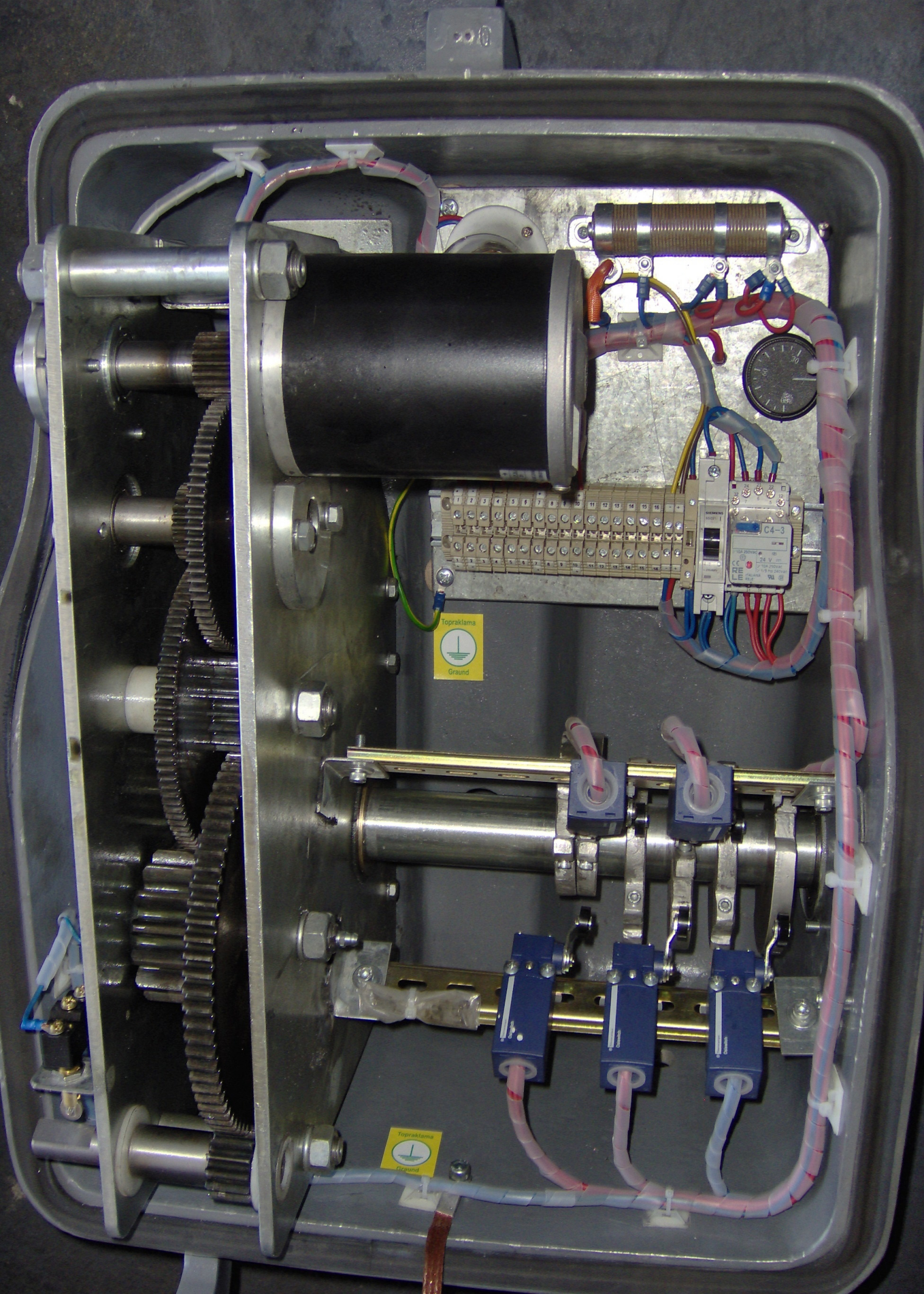
RAILWAY SIGNALING SYSTEMS



LEVEL CROSSING SYSTEMS

LEVEL CROSSING BARRIER USER AND INSTALLATION MANUAL FOR TLC-300 SERIES

TEKNORAY
Railway Signaling Systems Ltd.
www.teknoray.com.tr


Topraklama
Graund
C4-3
Topraklama
Graund

1. Characteristics

1.1. Level Crossing Gate Length (measured from the rotational center of the level crossing gate) Maximum length: 7 meters

1.2. Installation:

Vertical main pole installation: Equipments are installed on Φ 115 iron pipe by U bolts. Main pole requires the use of an appropriate gate arm locking bolt.

1.3. Power Supply

The characteristics of the power supply are defined below.

Characteristics of the power supply

	Proportional		Voltage Range
	Voltage	Current	
Motor	24 VDC	1 A (max 12A)	22 – 26 VDC
Control Relay	24 VDC	10 A	22 – 26 VDC
Brake	24 VDC	240 ma	22 – 26 VDC

Table – 1

1.4. Operation Period (24 VDC)

Upwards: max. 10 seconds (movement is provided by the motor)
Downwards: max. 10 seconds (movement is provided by gravity, it is of free descending)
Energy cut off: Descending by gravity (balance weight)

1.5. Gate arm:

Please check the below table-2

Characteristics of the gate arm:

	Quantity	Material	Shape
Arm Holder	One Two	Aluminum (Al) (specific weight: 2.7 g/cm^3)	Base width 210 mm x Plate thickness 10 – 12 mm
Gate Arm	One	Wood + Al (pine without snag) (specific weight: 0.6 g/cm^3)	Plate thickness 20 mm

Table – 2

The gate arm should be covered in such a way that it will be moisture resistant.

1.6. Weight

Main unit weight: 60 kg (for a gate system of a single arm holder and gate arm)
This value does not include the gate arm and its weight.

1.7. Color of the Arm Holder

Grey RAL 7000 electrostatic paint
Gate Arm
Red RAL 3020, White RAL 9016

2. Composition

2.1. Body and cover

Body and cover is cast aluminum. Cover is opened or closed in a vertical direction over the shaft located in the lower portion of the body. It is locked with a latch on the upper portion when it is closed.

2.2. Reduction gear set

Four staged reduction gear set mechanism is combined within the body. All the beddings that will be used are designed as non-lubricated beddings.

2.3. Motor and brake

Direct current induction motor with external brake is used as the motor. Brake is designed as induction brake without any contact and is located outside the body of motor.

2.4. Circuit control elements

Circuit control elements opens or closes the circuit of motor and brake control relays, and makes the descending lamps (on the gate arm) opened or put them in a flashing position.

It consists of three sets of switch, a main shaft that could rotate with the vertical movement of the transition gate and three open / closed cam switches.

Ascending final position, descending final position and flashing (operation) period of descending display lamps could be controlled in an appropriate way by adjusting the cam position of each contact used for these positions.

Switch contact capacity: 24 VDC 3 A (resistance charge)

2.5. Control circuit (board)

Control circuit checks the operation of the motor and the brake in consistent with the control signal and circuit control elements.

It consists of printed board circuit forming the control circuit, control relay, excess current protection element and a terminal box for internal connection.

2.6. Control relay

One plug in type direct current relay (number of contact: 3) is used.

Relay has the following functions;

R: Control of the motor driving direction. Opening / closing control of the motor and the brake.

2.7. Terminal box

Terminal box connects the control power supply with the brake control power supply, motor power supply, lamp (for flasher type) power supply and the display lamp connections.

2.8. Arm holder

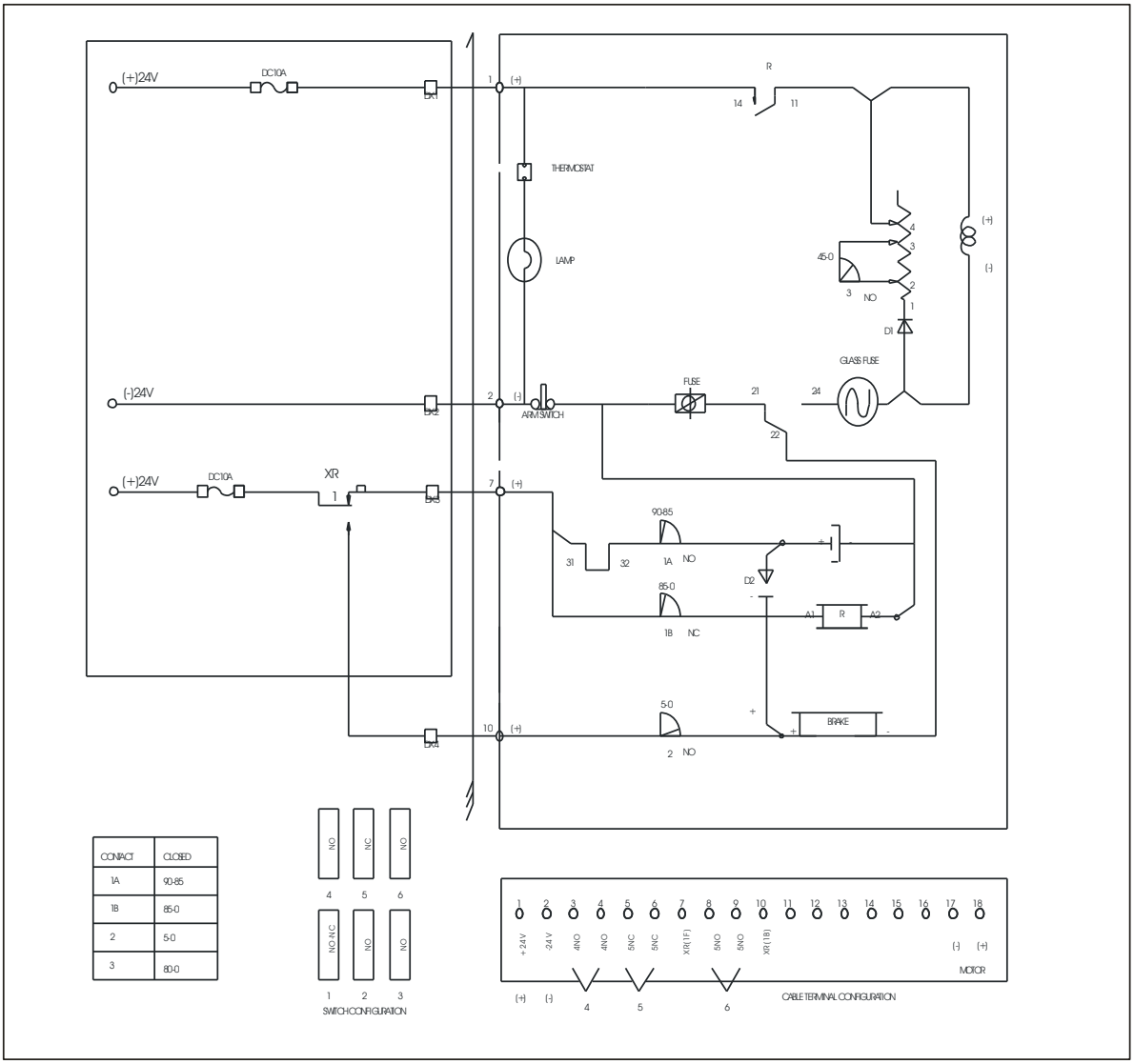
2.8.1. Double arm holder: One arm holder is located on each side of the body. The front arm is screwed at the end of the main arm and is fixed at this position.

2.8.2. Single arm holder: One arm holder is located on only one side of the body. The front arm is screwed at the end of the main arm and is fixed at this position.

3. Overview of Operation

3.1. Ascending movement (lifting)

When the gate arm is in the descended position and the R control relay is on, brake circuit is opened since XR relay is on, motor circuit is closed at the same time.
The rotational direction of the motor is controlled by R relay and the gate arm starts to move upwards.
Lifted position switch (1A) of the circuit control elements is closed when the gate arm is at approximately 85^0 (adjustable) position and the FR brake coil is active.
Motor circuit is opened since the 1B switch lowers the R relay and the gate arm remains in an upper position.
Circuit diagram for ascending movement is shown in Figure 1.



	DC 24V BRAKE COIL
	DC 24V 10A RELAY
	3A ECCENTRIC SWITCH (IT IS CLOSED BETWEEN 45 TO 0 DEGREE ON HORIZANTAL)
	1-5 OHM 50W RESISTANCE
	10000 MF/30V CONDANSATOR
	10A W AUTOMATIC FUSE
	RELAY CONTACT ON CONTROL TABLE
	FUSE ON CONTROL TABLE
	24V 200W DC MOTOR
	DIODES D1-(10A 220V DIOD) D2 -(1A 220V DIOD)
	MANUEL LIFTING ARM
	THERMOSTAT
	LAMP
	6A GLASS FUSE

LEVEL CROSSING SYSTEMS CIRCUIT DIAGRAM		
TEKNORAY Railway Signaling Systems Ltd www.teknoray.com.tr		
DRAWING	FATIH EMREM	
CONTROL	BİNNAZ ÇAKIR	
APROVEL	AHMET IZGI	
DATE	22/10/2007	MODEL : TLC-301

Figure - 1

3.2. Descending movement (lowering)

When the gate arm is in lifted position if XR relay is off, also brake relay will be off and the gate arm will start to rotate downwards. Contact gate arm numbered as 3 will be closed when it is at 45^0 and it will provide a slow descending by reducing the rotational speed of the electricity motor through the resistance.
Descended position contact (2) of the circuit control elements is closed when the gate arm is at a position approximately 5^0 (adjustable) and FR relay is on.
Circuit diagram for descending movement is shown in Figure 1.

3.3. Operation of lamps

When the gate arm is at a position other than the lifted position and when it is out of the lifting process (when the arm descends and when it is at descended position) descending display lamp lights through the substitute connections at the terminals.

3.4. Operation during the power off

When the motor and brake power is off then gate arm descends by balance weight.

4. Installation of Level Crossing Barrier

4.1. Installation of the level crossing gate

Install the level crossing according to the following procedure and see Figure 2 for the proper installation.

4.1.1. Install the 115 Φ pipe on the foundation for providing the installation of the level crossing barrier.

4.1.2. After the level crossing barrier is fixed over the notch piece, center of the gate arm is held over the post of the main body such that its height will be 800 mm above the ground.
Adjust the position of the post such that the gate arm will be parallel to the road by means of the installation slots during the installation of the post.

4.1.3. Carry out this operation before the installation of the arm holders and weight bearings.

4.1.4. Fix the arm holders to the flange by means of hexagonal bolts (M20 x 65, four at each).

4.1.5. Install the weight bearings to the arm holders numbered as (1) and (2) by means of hexagonal bolts (M20 x 50, four at each).

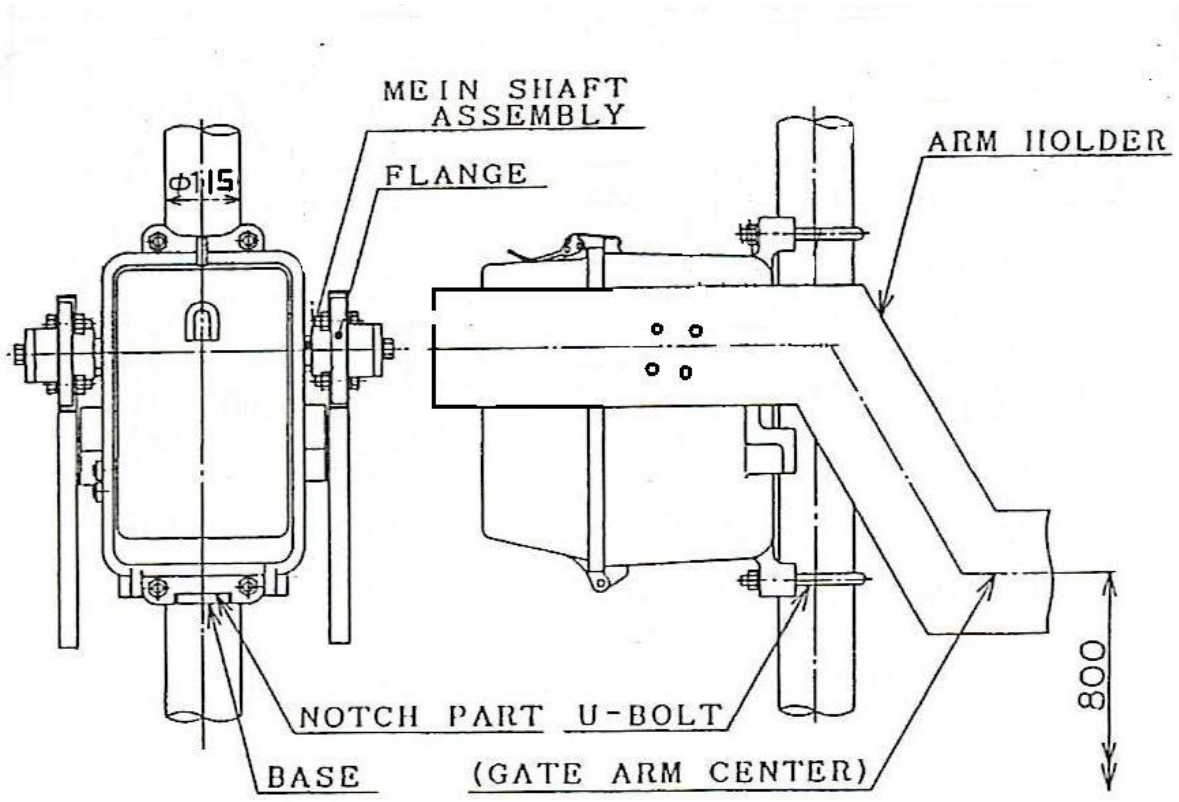


Figure - 2

4.2. Installation of the level crossing arm

Installation method of the level crossing is defined below. See Figure 3 for the connection view. (double holder level crossing connection view)

4.2.1. Install (A) and (B) gate arms on the arm holders by means of hexagonal bolts (M16 x 60, four at each one) (Section A).

4.2.2. Install support (A) between the arm holders by means of hexagonal bolts (M16 x 60, four at each one) (Section B).

4.2.3. Install support (B) between the gate arms (A) and (B) by means of hexagonal bolts (M12 x 50, four at each one) (Section@@ C).

4.2.4. Install support (C) between the gate arms (A) and (B) by means of hexagonal bolts (M12 x 50, four at each one) (Section C').

4.2.5. Install gate arm (C) between the gate arms (A) and (B) by means of hexagonal bolts (M12 x 90, five in number) (Section D). While installing the bolts, fix and tighten in such a way that the headed parts will be aside the road.

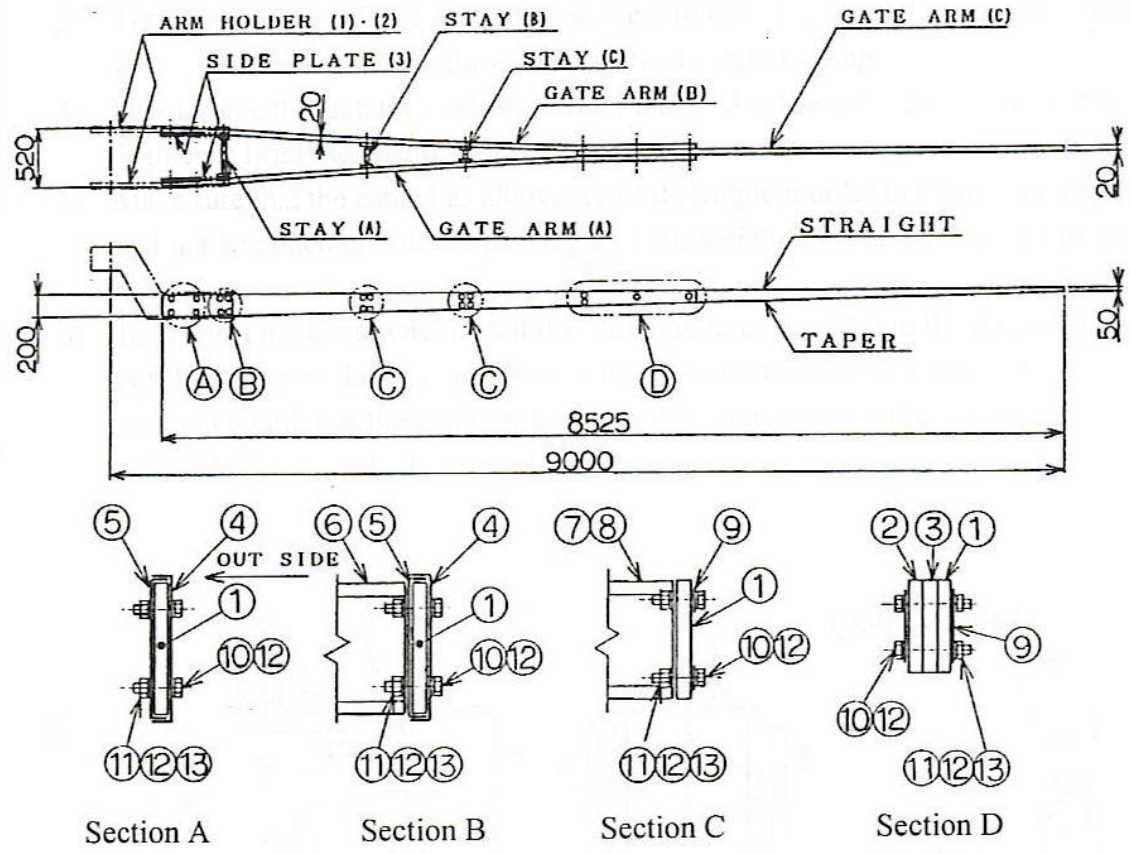


Figure - 3

Figure - 3 Component Table

No.	COMPONENT	TITLE	No.	COMPONENT	TITLE
1	Gate arm (A)	Gate arm (A)	8	Stay (C)	Stay (C)
2	Gate arm (B)	Gate arm (B)	9	Plate	Plate
3	Gate arm (C)	Gate arm (C)	10	Bolt	Bolt
4	Arm holder (1)		11	Nut	Nut
5	Side plate		12	Washer (falt washer)	Washer (falt washer)
6	Stay (A)	Stay (A)	13	Spring washer	Spring washer
7	Stay (B)	Stay (B)			

4.3. Installation of the lamp

Install the lamps according to the following procedure. Installation positions are shown in Figure 4.

4.3.1. Open a hole on the gate arm at the lamp installation position by means of a brace and bit. Install the lamp element on the gate arm by using bolt and nut.

4.3.2. Fix the cables on the gate arm by means of cable tie, in this way they will not decline.

4.3.3. Open three 4 mm holder holes on the gate arm. Fix the cables through these holes by means of the cable tie

4.3.4. Connect the cable by getting through the cable connector at the lower part of the transition gate. Tighten it intensely so that no water entrance into the transition gate is allowed.

4.3.5. Make sure that the cable is located in an appropriate way along the weight bearing so that the cable does not hook with the weight bearing during descending and ascending position.

4.3.6. Join the lamp connections to the terminal M4 which is curly at its ends. Use the terminal ends numbered as 7 and 8 in the terminal box for lamps of flange type. Use terminals numbered as 6 and 10 for the descending display lamp.

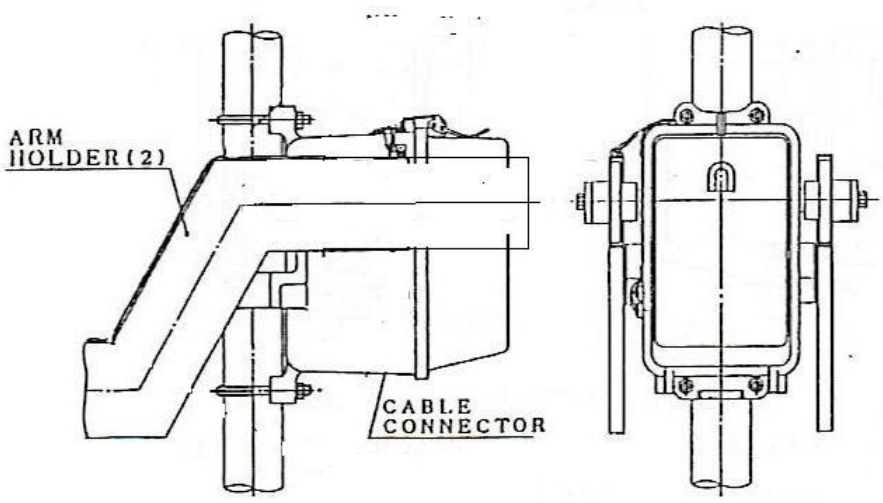


Figure - 4

5. Installation and adjustment of balance weight

5.1. Installation of balance weight

5.1.1. Put the weight over the arm holder and attach it temporarily by using hexagonal bolts (M20 x 50).

5.2. Adjustment of the balance weight

Weight adjustment should provide the descending of the arm in case of a power off and the performance of the operation periods in a specific time duration. This could be performed by utilizing appropriate adjustment.
The installation position of the balance weight varies according to the length and weight of the gate arm. Adjust the balance weight according to the balance logic and procedure.

5.2.1. Adjustment logic of balance weight
Torque = weight (m, M) x distance of center of gravity to the rotational center (l, L)
For descending of the arm in case of an energy cut off
Descending torque > Ascending torque

(1) Adjustment at horizontal position
Make adjustment on the arm holder through moments (between left and right)

Descending force increases (high speed) **……** Descending force decreases (low speed)
Change in the center of gravity of the balance weight

5.2.2. Adjustment procedure of the balance weight
Adjustment of the balance weight should be carried out at a horizontal position as specified in 5.2.1.
Carry out the adjustment operation according to the following procedure.

5.2.3. Close the brake control circuit and the motor energy circuit and bring the gate arm to a horizontal position.

5.2.4. Lift the gate arm such that it will make an angle of approximately 5^0 with the horizontal position by lowering the level of weight bearing. Provide a slow descending of the gate arm from this position by moving the weight to the right and to the left. If the installation position could not be adjusted by a weight then increase the number of weights.

5.2.5. After the position has been determined, tighten it at this position by means of a bolt.
Press the arm holder downwards after the adjustment and lift the gate arm to vertical position and hold it at this situation. Measure the descending time period from this position to the horizontal position by its own weight. This period should be 10 – 15 sec. If the descending time period is not within the 10 – 15 sec then perform the adjustment of the horizontal position again.

6. Operation and adjustments

6.1. Adjustment of the circuit control elements

Adjust the stay position of the gate arm and the closing position of the descending display lamps according to the following procedure by calibrating the closing angles of the circuit control elements.

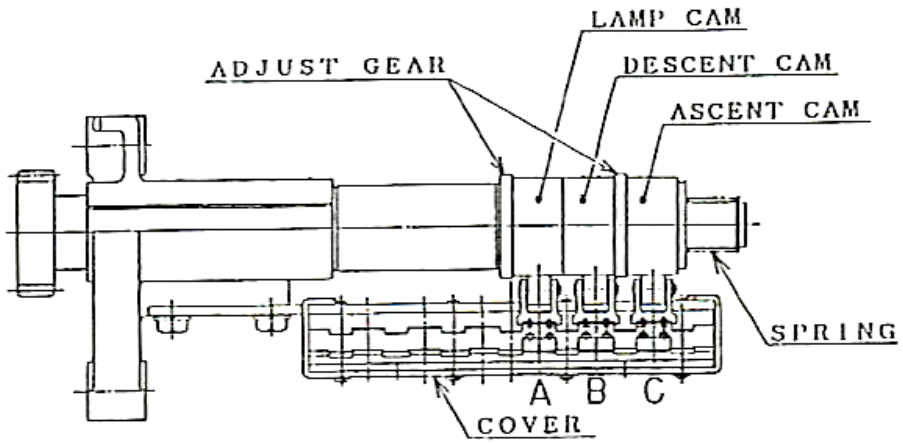


Figure - 5

6.2. Measurement of the ascending current

6.2.1. Switch of the external power switch.

6.2.2. Get out the cable end at the terminal numbered as 1 from the terminal box. Connect a DC ammeter in series between the cable end got out and the terminal numbered as 1.

6.2.3. Turn on the power switch and lift the gate arm.
Take care that the motor current should be maximum 8 A. If it turns out to be more than this value then it means that there occurs a balancing problem in the gear system or a short circuit in the motor.

7. Maintenance

7.1. Control and lubrication

See the following table for control and lubrication.
The greasers in the gear group within the gate driver and bronze bearings of the main shaft should be lubricated with a fine oil.

7.2. Lubrication method for gear

Lubrication method of the gear has been explained below. Lithium based grease should be applied for lubrication.

7.2.1. Apply the grease while the shaft of the motor rotates manually as in the procedure for coupling adjustment.

7.2.2. Apply the grease to the 1. Group major gear (Motor gear will be lubricated together with the gear mechanism).

7.2.3. Apply the grease to the 2. Group major gear (1. Group minor gear will be lubricated together with the gear mechanism).

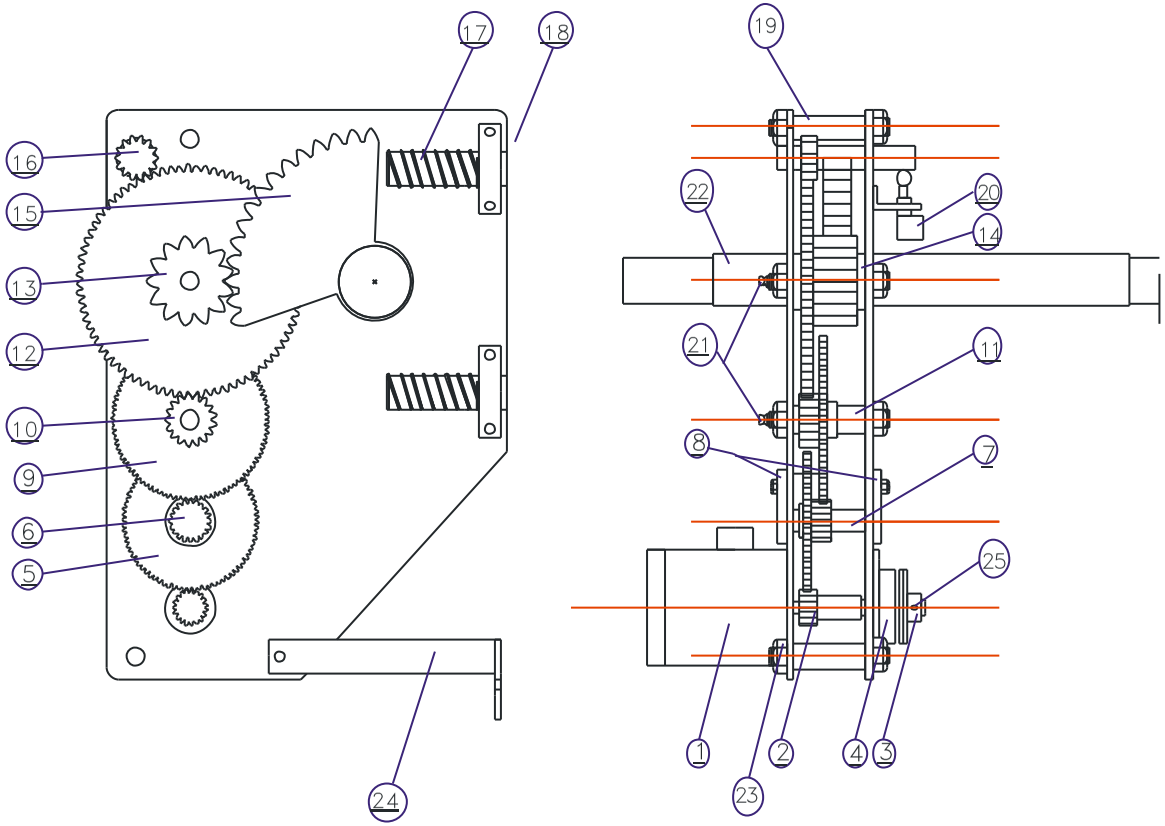
7.2.4. Apply the grease to the 3. Group major gear (2. Group minor gear will be lubricated together with the gear mechanism).

7.2.5. Apply the grease to the main shaft crescent gear (3. Group minor gear will be lubricated together with the gear mechanism).

7.2.6. Take care to avoid excessive and non uniform lubrication during the lubrication process

7.2.7. The cables smeared by oil should be cleaned by wiping off.

Figure - 6

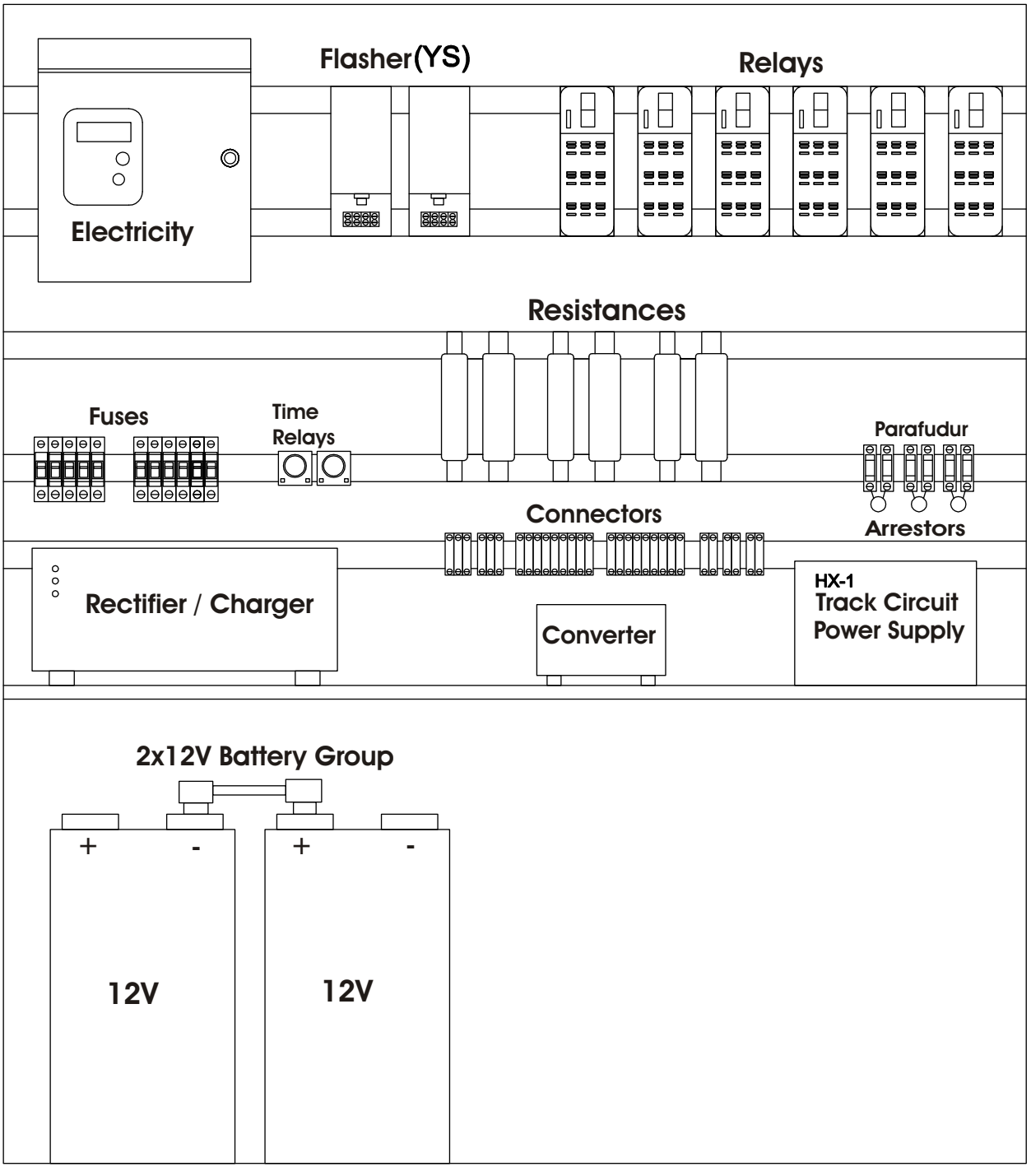


NO	COMPONENT NAME	NO	COMPONENT NAME
1	DC-MOTOR COMPLETE	14	3. GROUP GEARED SHAFT
2	MOTOR DRIVING GEAR	15	CRESCENT EXIT GEAR
3	BRAKE MECHANISM	16	MANUAL DRIVING GEAR
4	BRAKE COIL	17	SPRING RESTRAINT BOLT
5	1. GROUP MAJOR GEAR	18	SPRING RESTRAINT TEMPLATE
6	1. GROUP MINOR GEAR	19	CHASSIS CONNECTION BOLT
7	1. GROUP GEARED SHAFT	20	MANUAL SAFETY SWITCH
8	1. GROUP GEAR BEARING COVER	21	GREASER
9	2. GROUP MAJOR GEAR	22	MAIN SHAFT
10	2. GROUP MINOR GEAR	23	CHASSIS CONNECTION NUT
11	2. GROUP GEARED SHAFT	24	GEAR BOX FIXING U-SHEET
12	3. GROUP MAJOR GEAR	25	FIXING SCREW
13	3. GROUP MINOR GEAR		

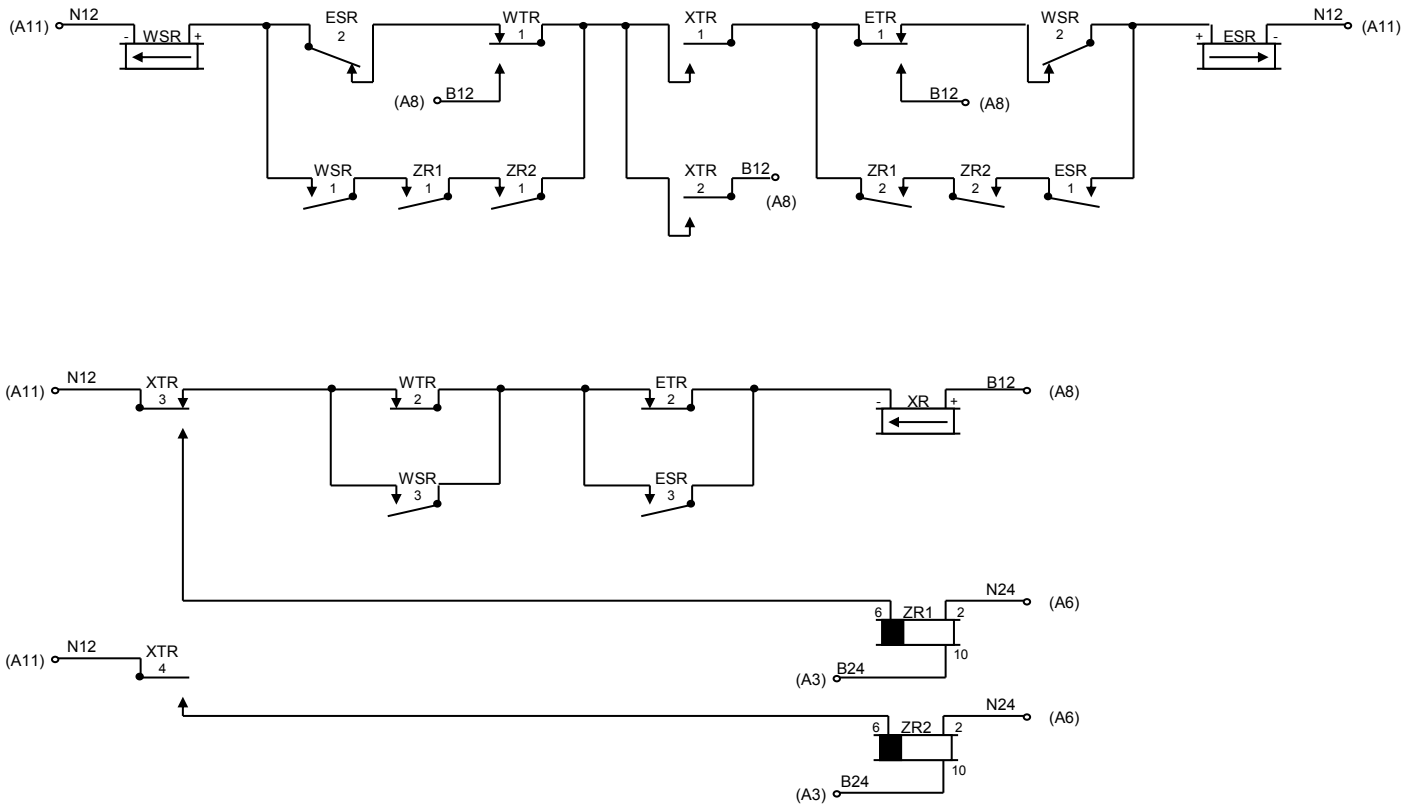
LEVEL CROSSING SYSTEMS GEAR BOX

TEKNORAY Railway Signaling Systems Ltd www.teknoray.com.tr

DRAWING	FATIH EMREM	
CONTROL	BİNNAZ ÇAKIR	
APROVEL	AHMET IZGI	
DATE	22/10/2007	MODEL : TLC -301

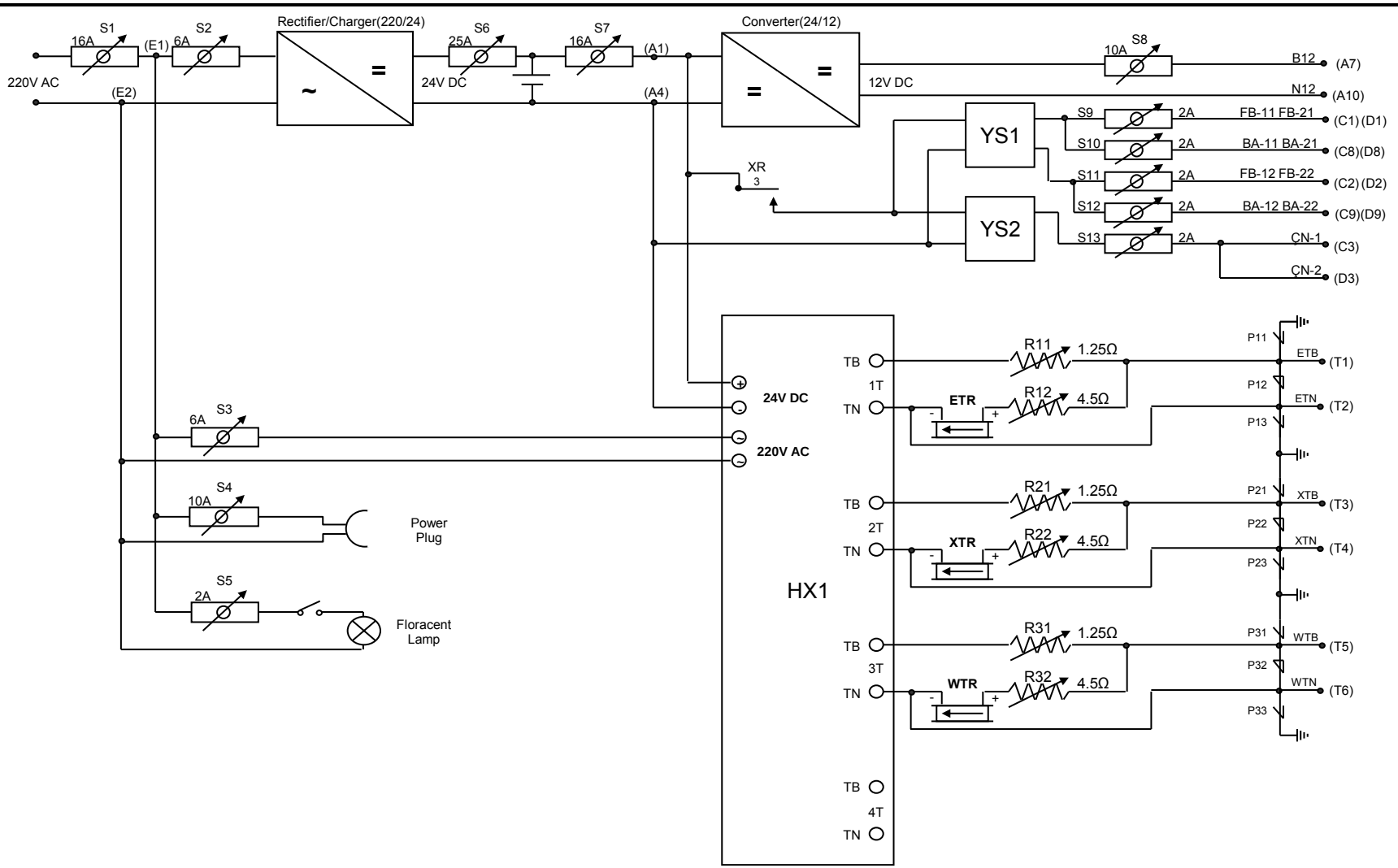


LEVEL CROSSING BARRIER CONTROL RACK		
TEKNORAY Railway Signaling Systems Ltd www.teknoray.com.tr		
DRAWING	FATIH EMREM	
CONTROL	BİNNAZ ÇAKIR	
APROVEL	AHMET IZGI	
DATE	22/10/2007	MODEL :



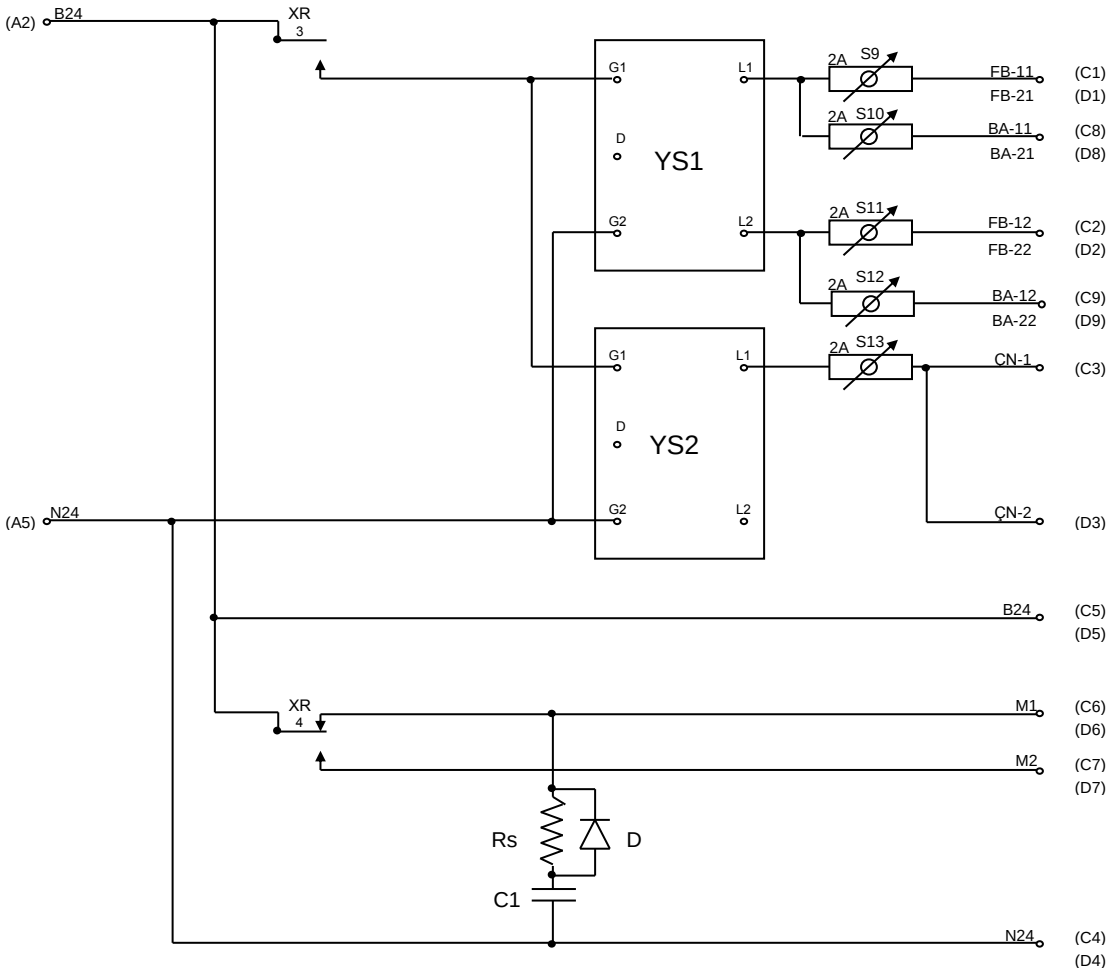
INTERLOCKING PLAN

OPEN LINE LEVEL CROSSING PROJECT



GENERAL POWER CONNECTION PLAN

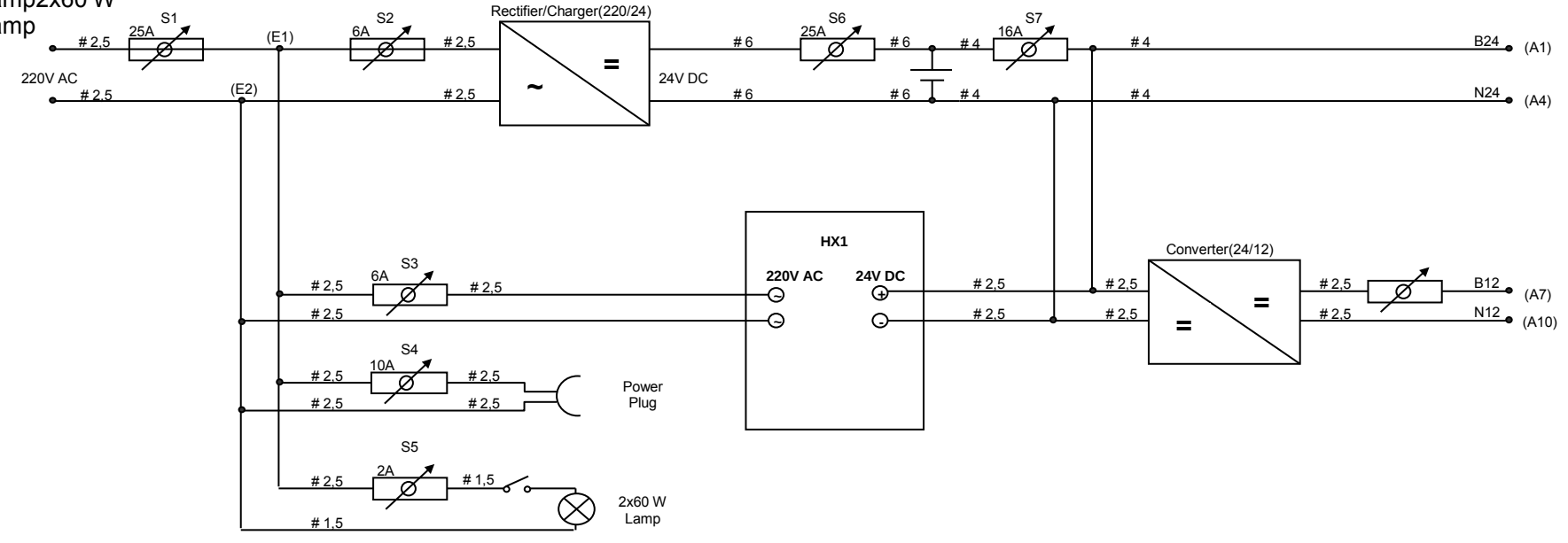
OPEN LINE LEVEL CROSSING
PROJECT



FLASHER/BARRIER CONNECTION CIRCUIT

OPEN LINE LEVEL CROSSING PROJECT

2x60 W
Lamp2x60 W
Lamp



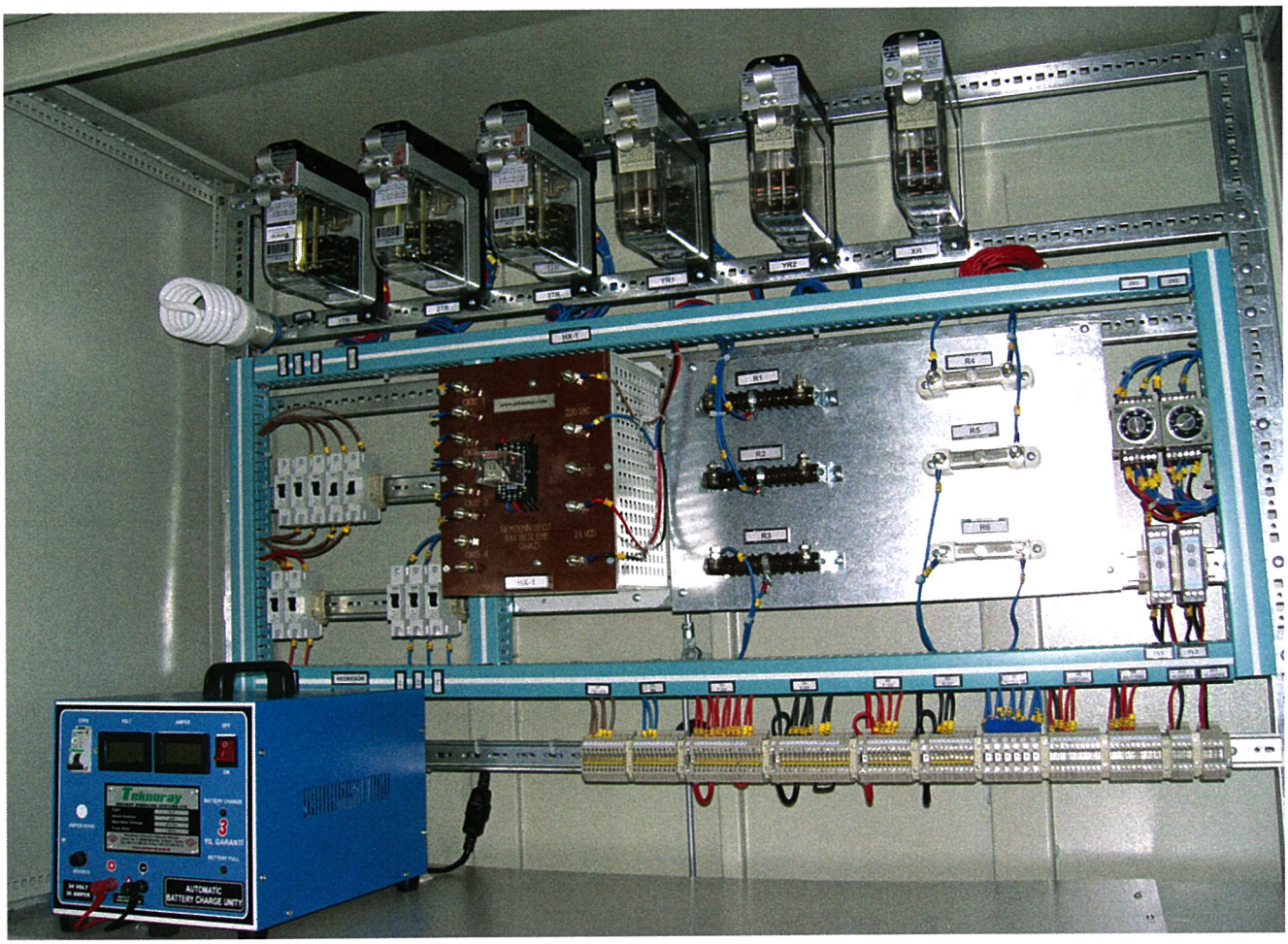
Note: # sign on the cables shows cable diameter

DETAILED POWER CONNECTION PLAN

OPEN LINE LEVEL CROSSING PROJECT

Teknoray

RAILWAY SIGNALING SYSTEMS



AUTOMATIC VITAL RELAY BASED LEVEL CROSSING BARRIER SYSTEMS in NON SIGNALING RAILWAYS by ISOLATED RAIL JOINT

TEKNORAY

Railway Signaling Systems Ltd.

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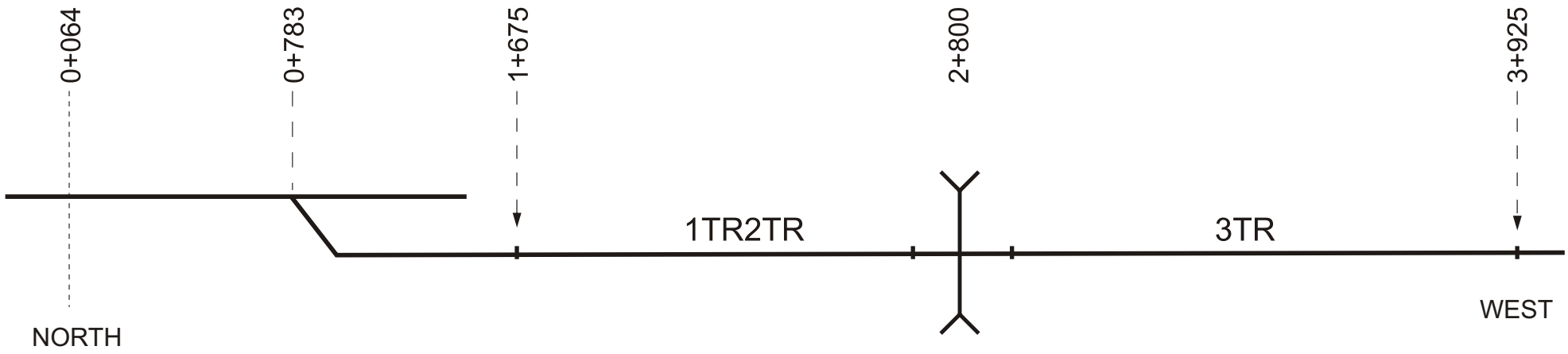
MEVCUT YÜKSEK HIZ 70 Km/h

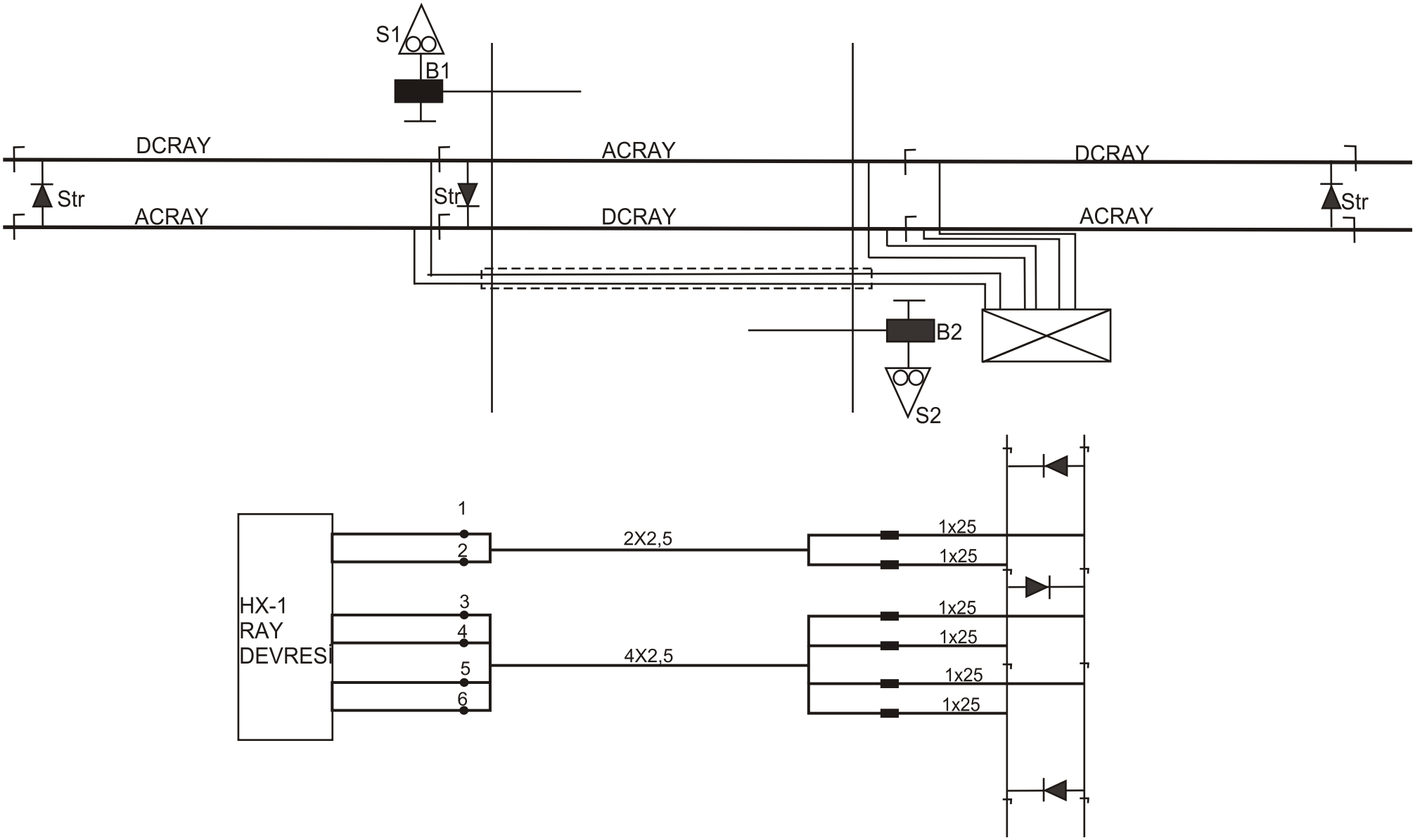
START MESAFESİ 1125 Mt



1 ohm röle 3 adet
400 ohm röle 3 adet

:Start noktası

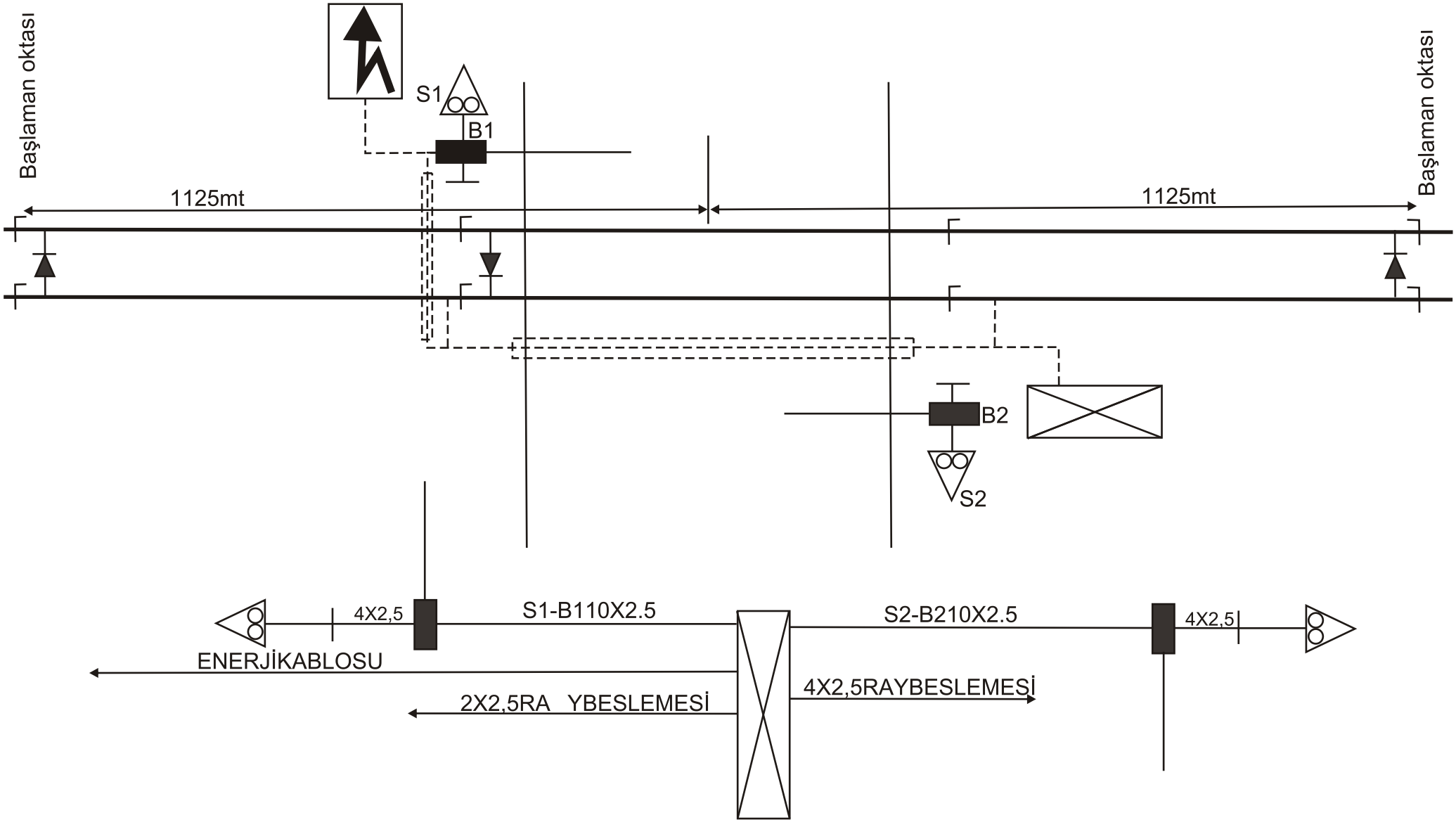
Teknoray Railway Signaling Systems	SAMPLE PROJECT		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	01



Teknoray
Railway Signaling Systems

HX-1 RAY DEVRESİ BAĞLANTISI

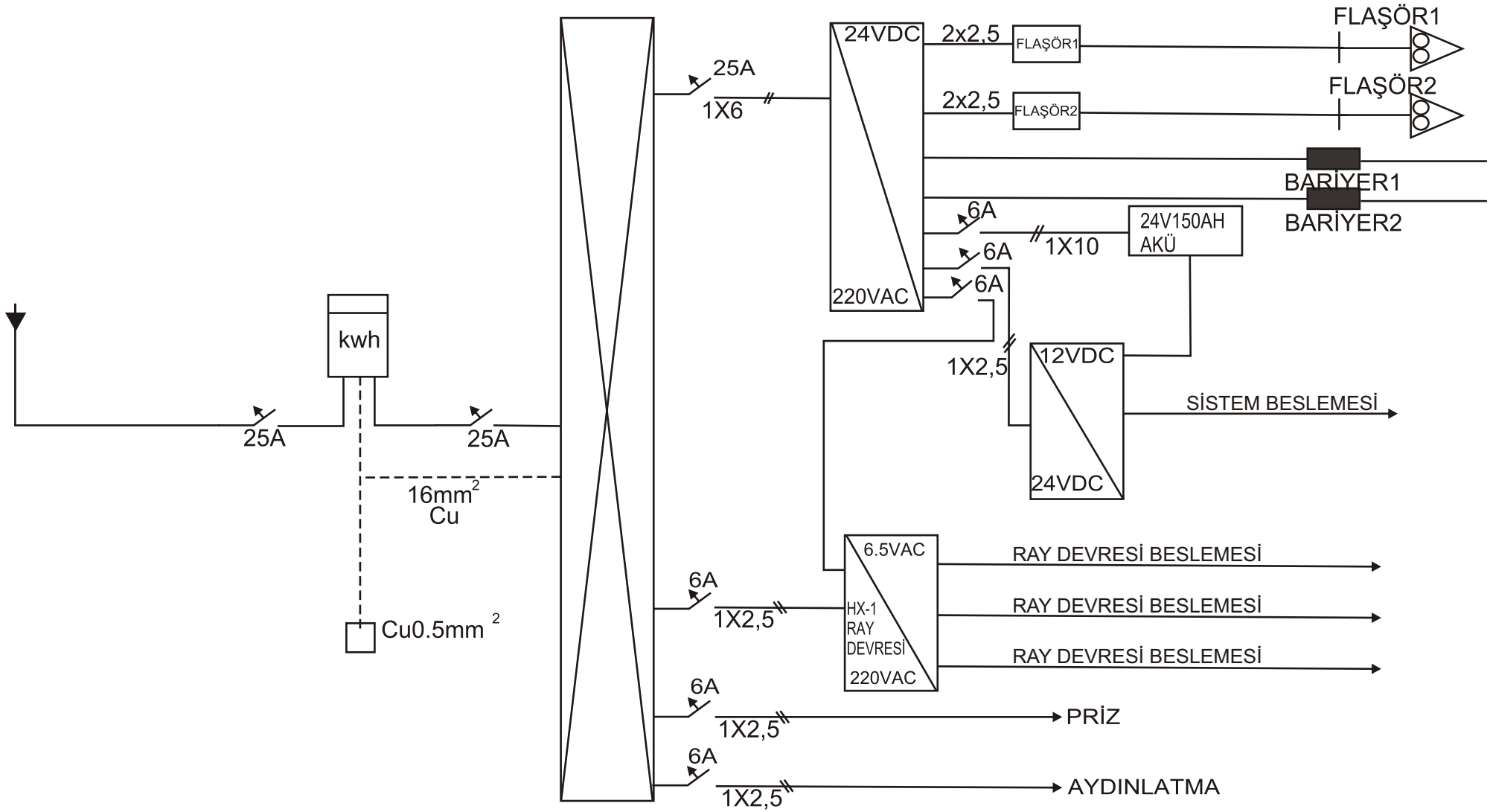
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	02



Teknoray
Railway Signaling Systems

HEMZEMİN GEÇİT PRENSİP ŞEMASI

Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	03

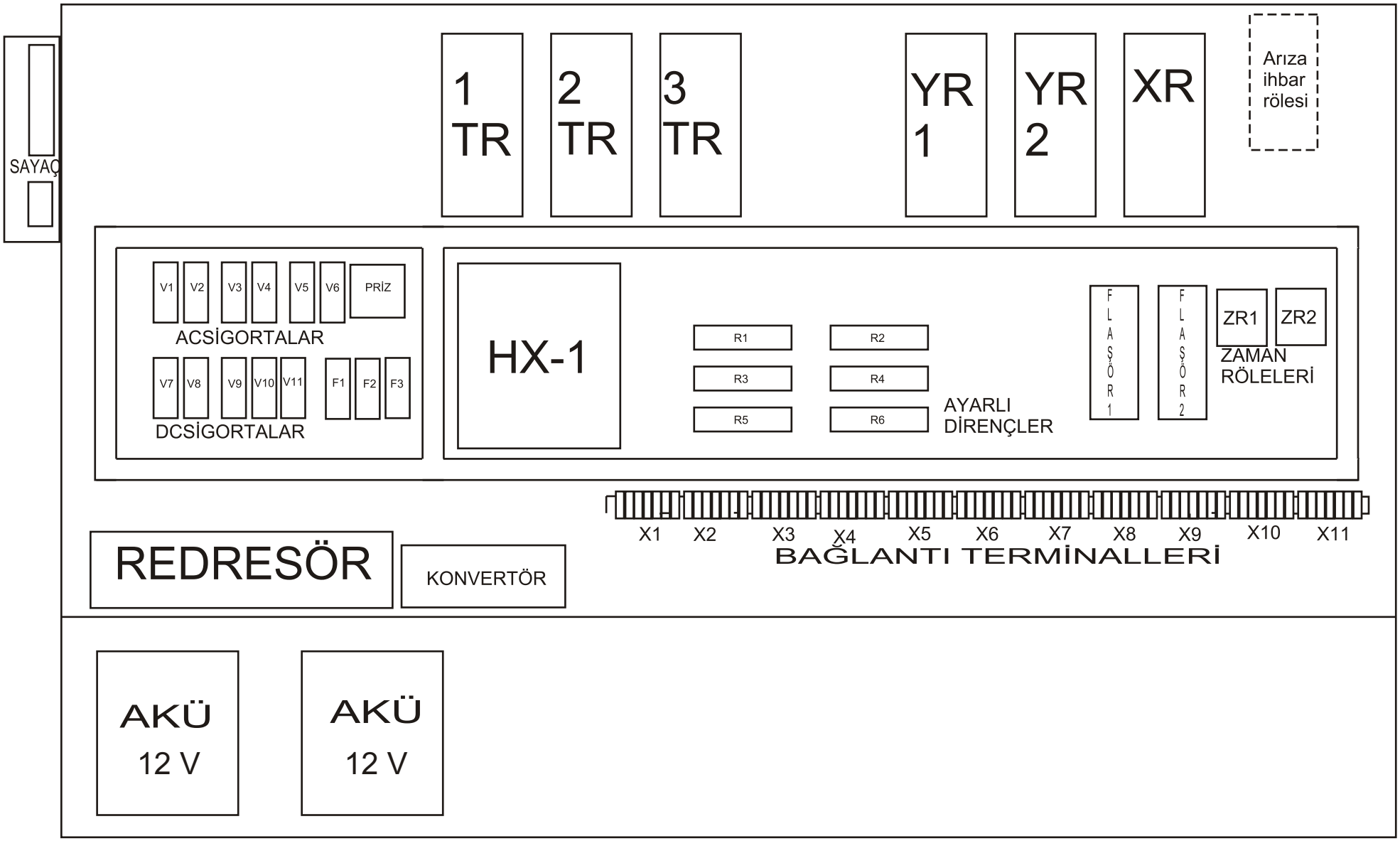


5000 Watt KURULU GÜÇ

Teknoray Railway Signaling Systems

HEMZEMİN GEÇİT KOLON ŞEMASI

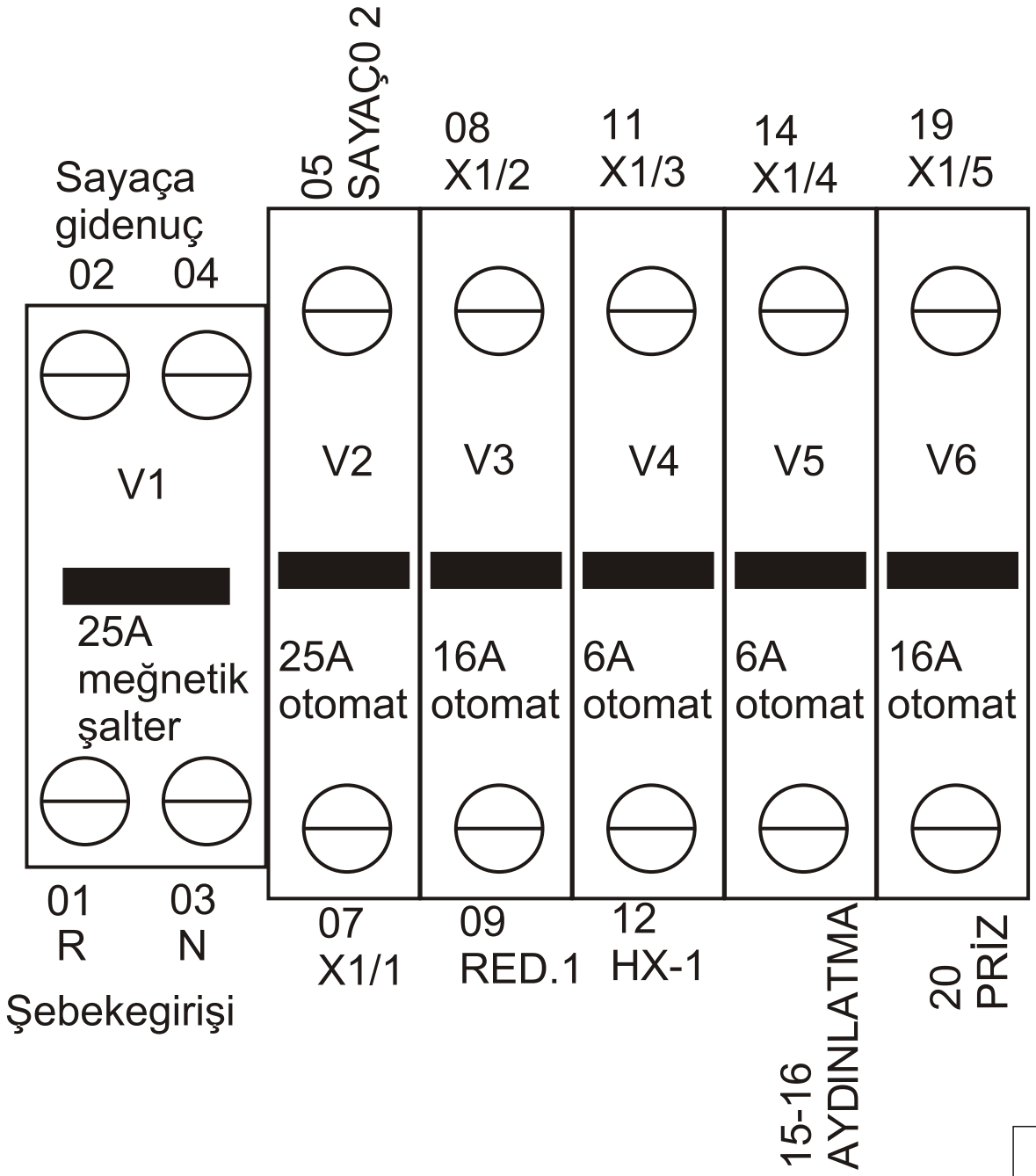
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	04



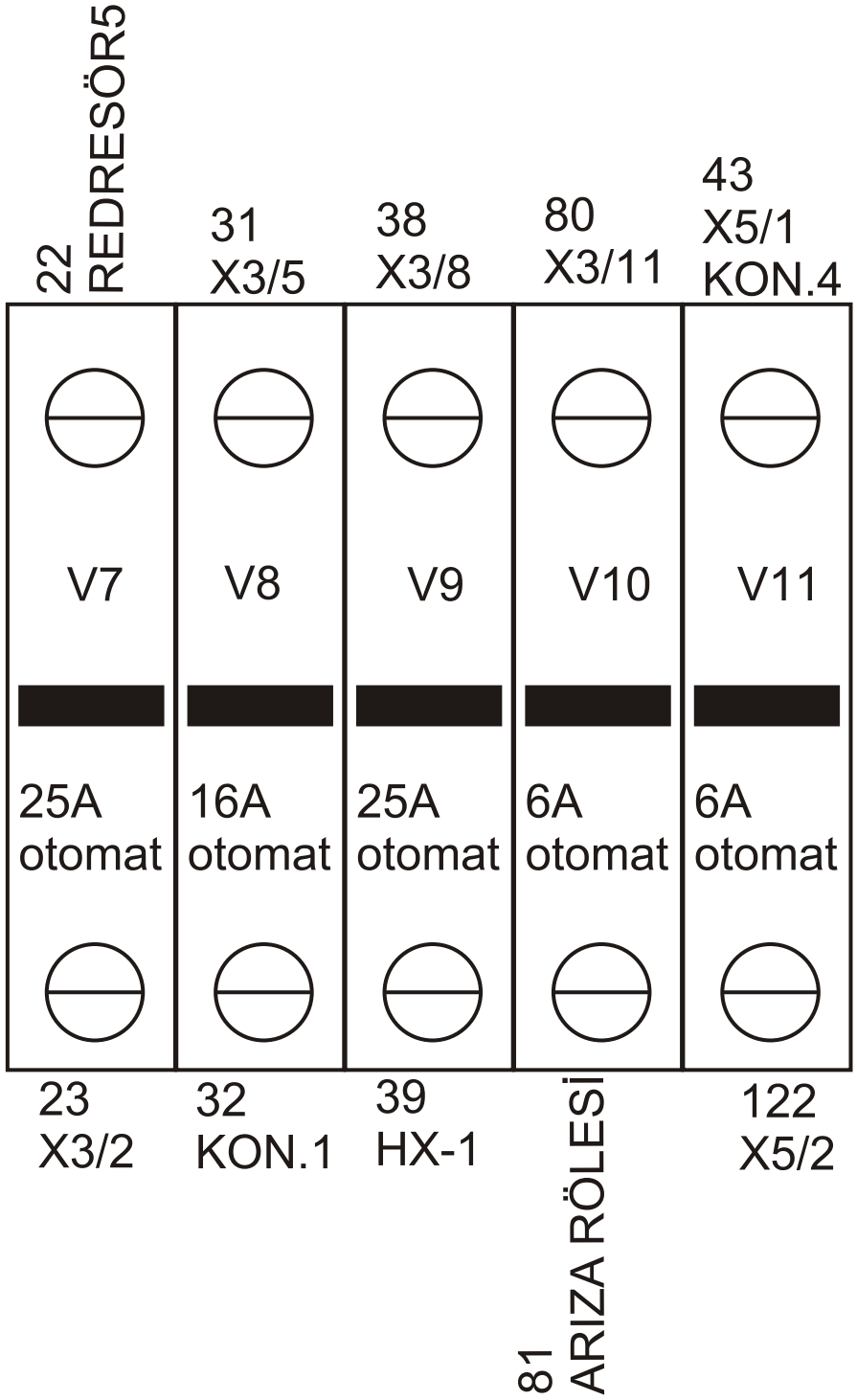
Teknoray Railway Signaling Systems

HEMZEMİN GEÇİT KABİN YERLEŞİM ŞEMASI

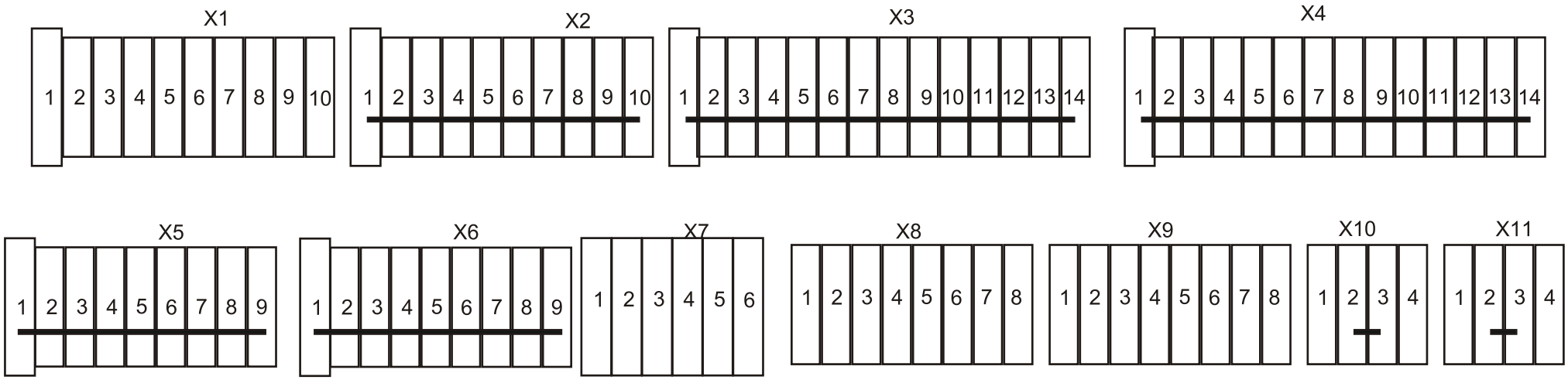
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	05



Teknoray Railway Signaling Systems	HEMZEMİN GEÇİT AC SİGORTALIRI BAĞLANTI ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	06



Teknoray Railway Signaling Systems	DC SİGORTA BAĞLANTILARI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	07



X1 : 220V KABİN İÇİ FAZ DAĞILIM KLEMENSLERİ

X2 : 220V KABİN İÇİ NÖTR DAĞILIM KLEMENSLERİ

X3 : 24 V + DC KABİN İÇİ DAĞILIM KLEMENSLERİ

X4 : 24 V - DC KABİN İÇİ DAĞILIM KLEMENSLERİ

X5 : 12 V + DC KABİN İÇİ DAĞILIM KLEMENSLERİ

X6 : 12 V - DC KABİN İÇİ DAĞILIM KLEMENSLERİ

X7 : HX-1 RAY BAĞLANTI TERMİNALLERİ

X8 :1 NOLU BARİYER BAĞLINTI TERMİNALLERİ

X9 :2 NOLU BARİYER BAĞLANTI TERMİNALLERİ

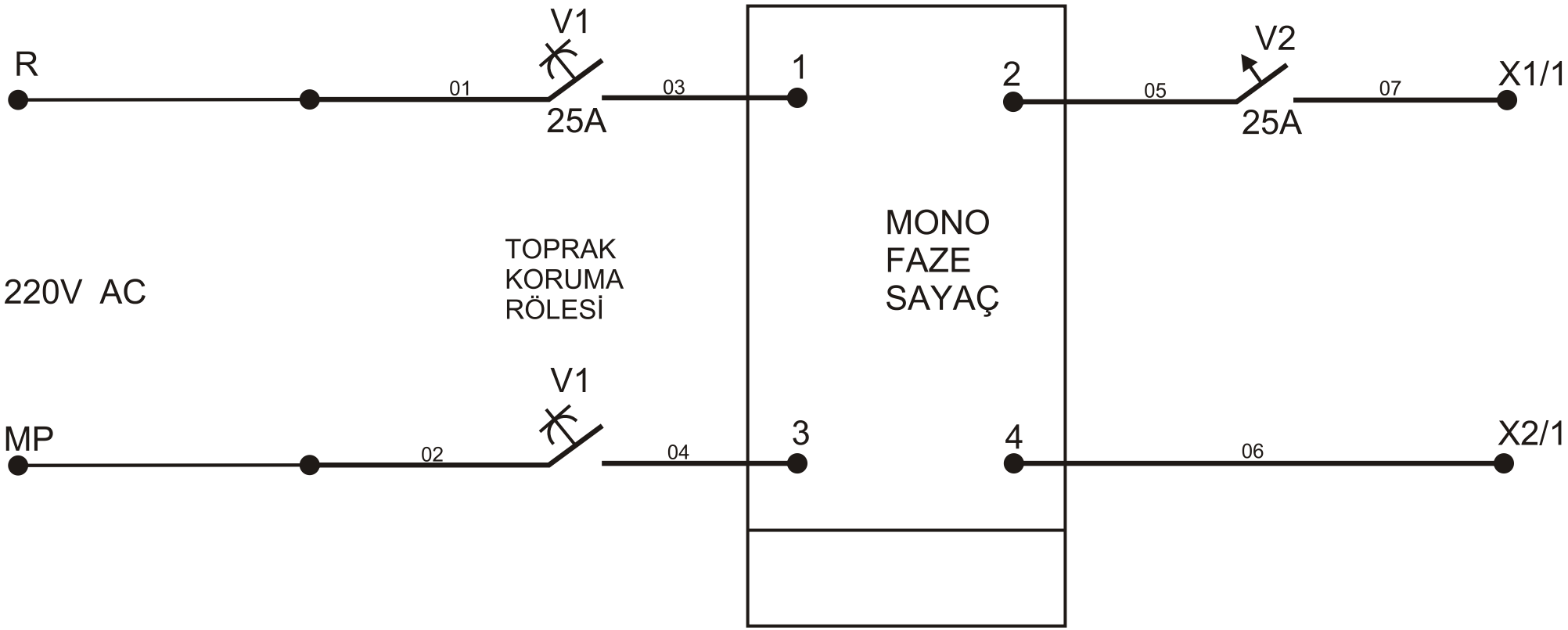
X10 :1 NOLU FLAŞÖR BAĞLANTI TERMİNALLERİ

X11 : 2 NOLU FLAŞÖR BAĞLANTI TERMİNALLERİ

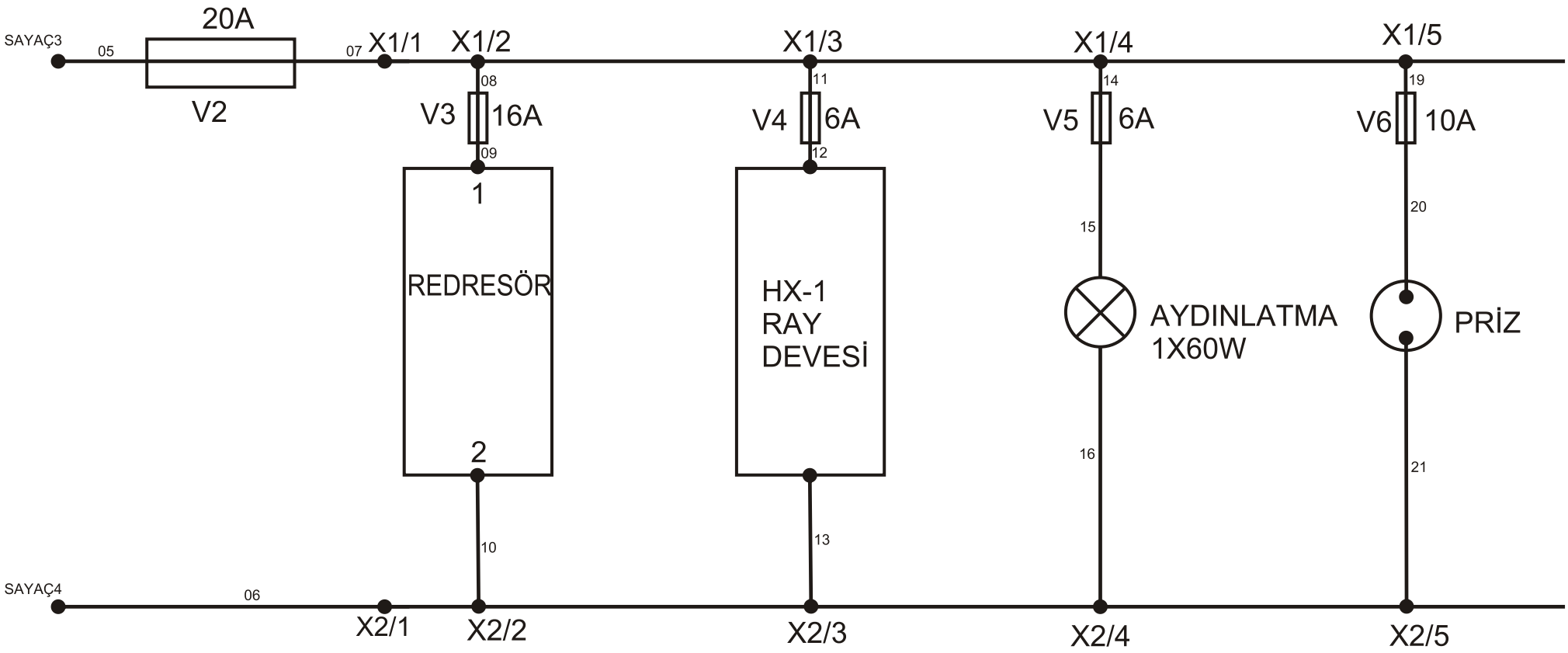
Teknoray Railway Signaling Systems

HEMZEMİN GEÇİT BAĞLANTI TERMİNALLERİ

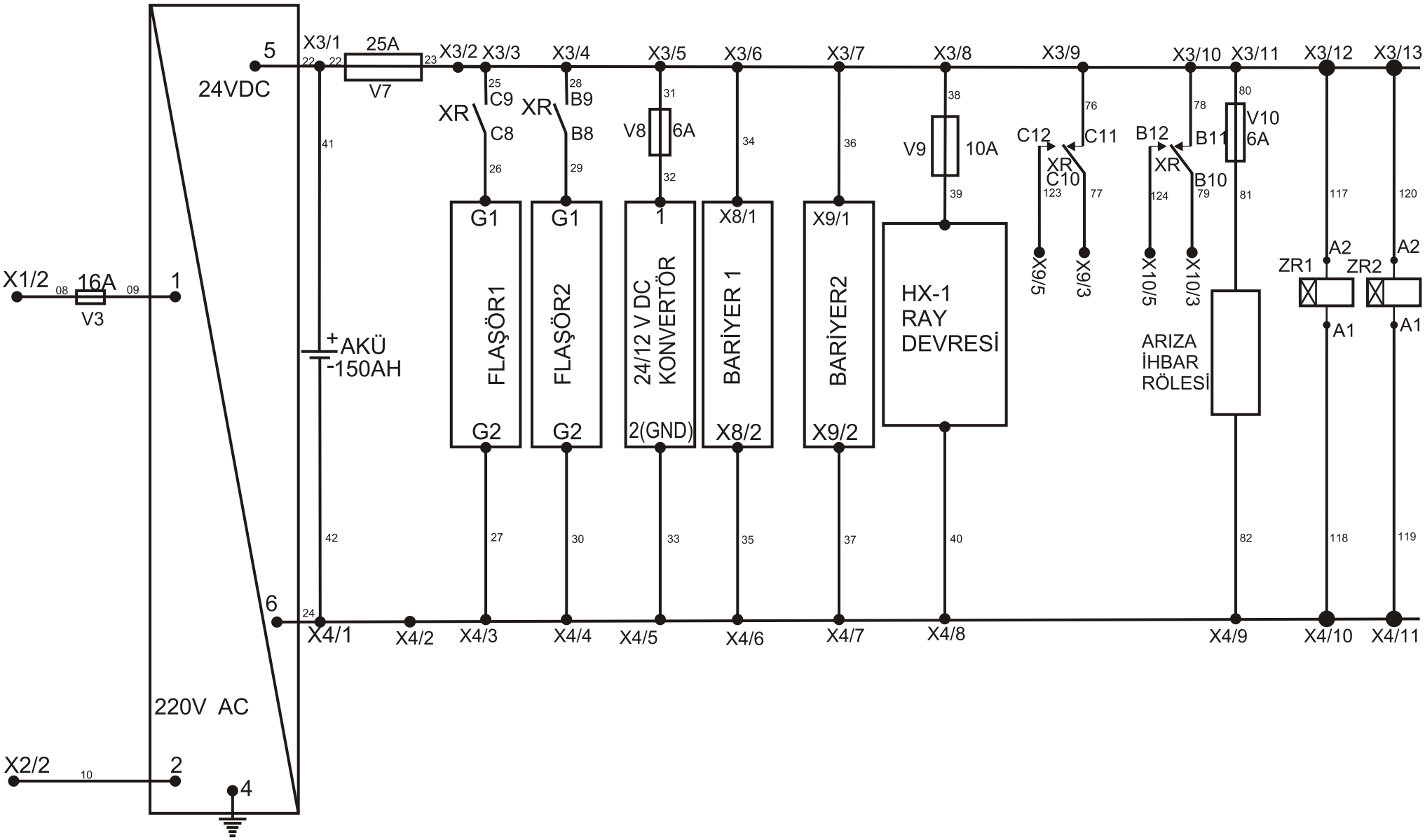
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	08



Teknoray Railway Signaling Systems	HEMZEMİN GEÇİT ELEKTRİK SAYAÇ BAĞLANTISI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	09



Teknoray Railway Signaling Systems	220 V AC ŞEBEKE BAĞLANTISI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	10



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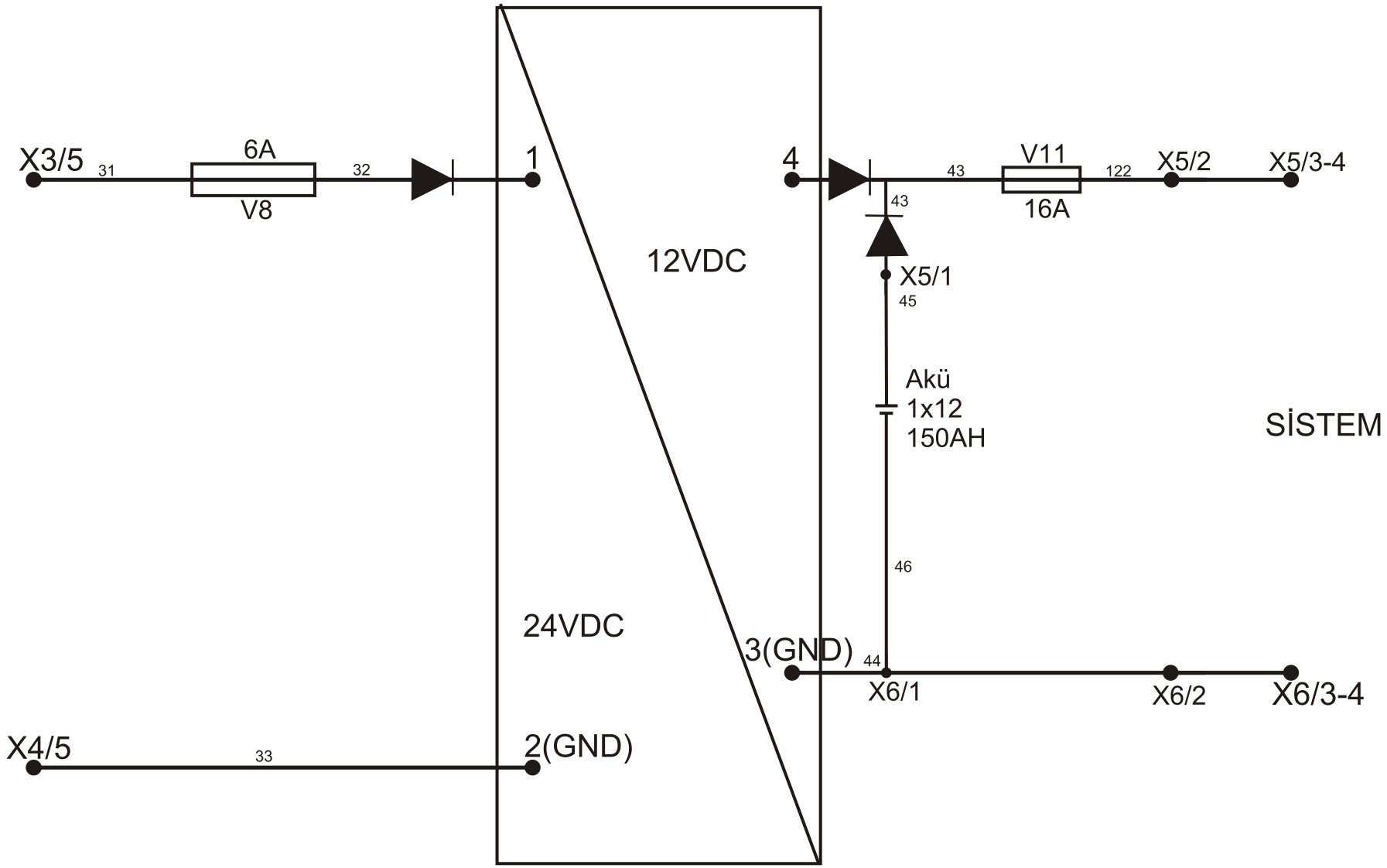
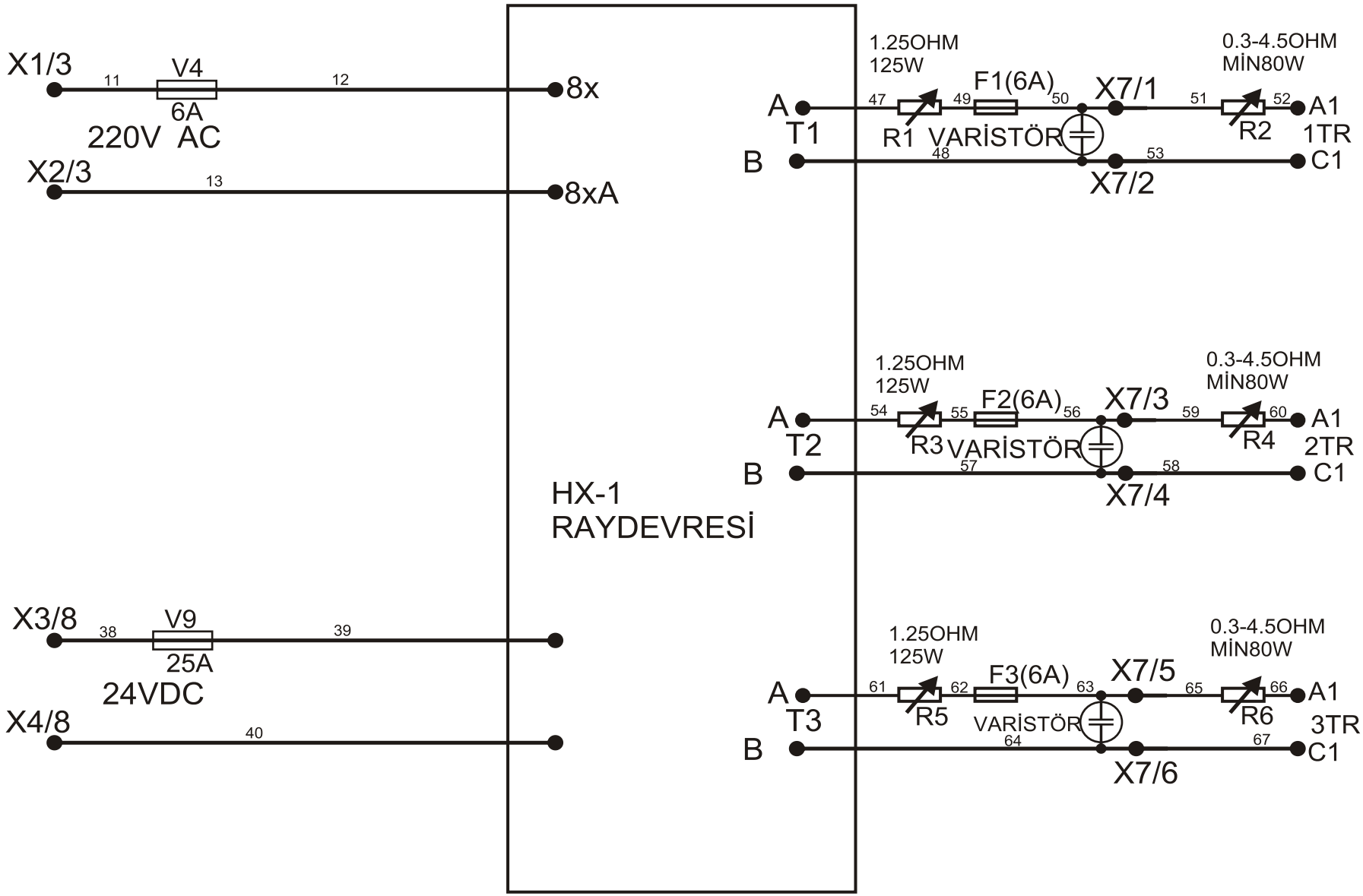
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	11



Teknoray Railway Signaling Systems	24 V DC - 12 V DC KONVERTÖR ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	12



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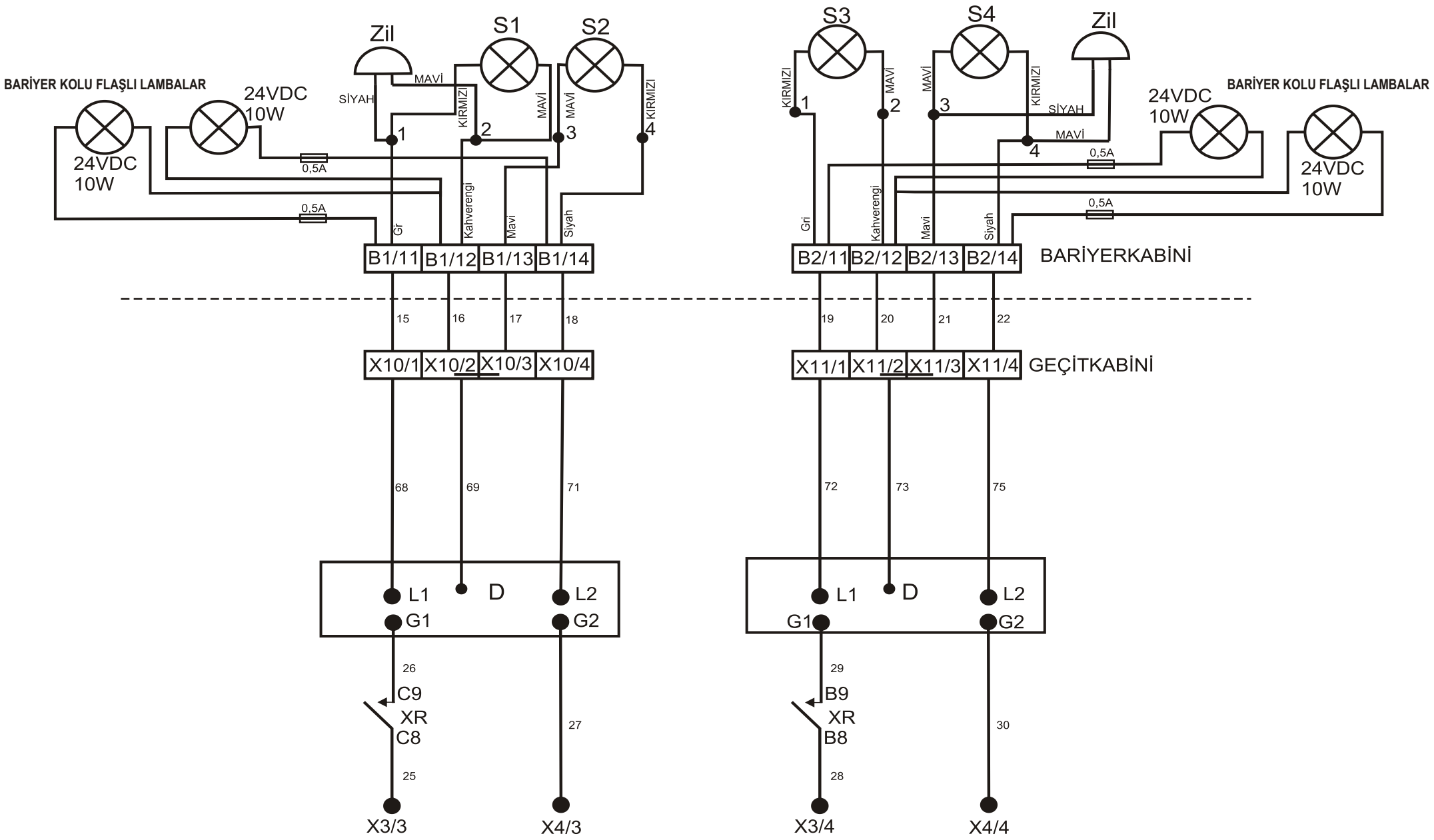
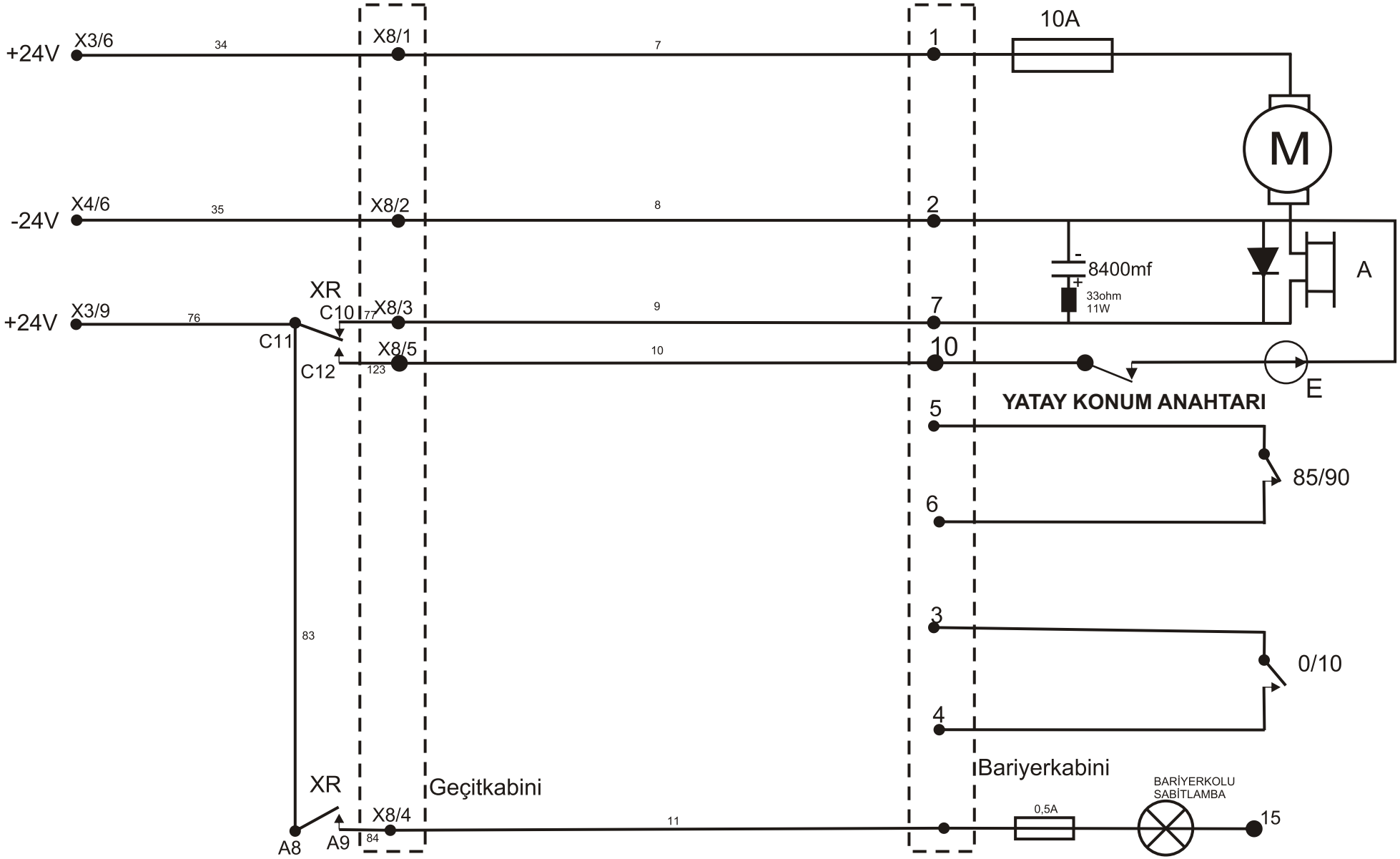
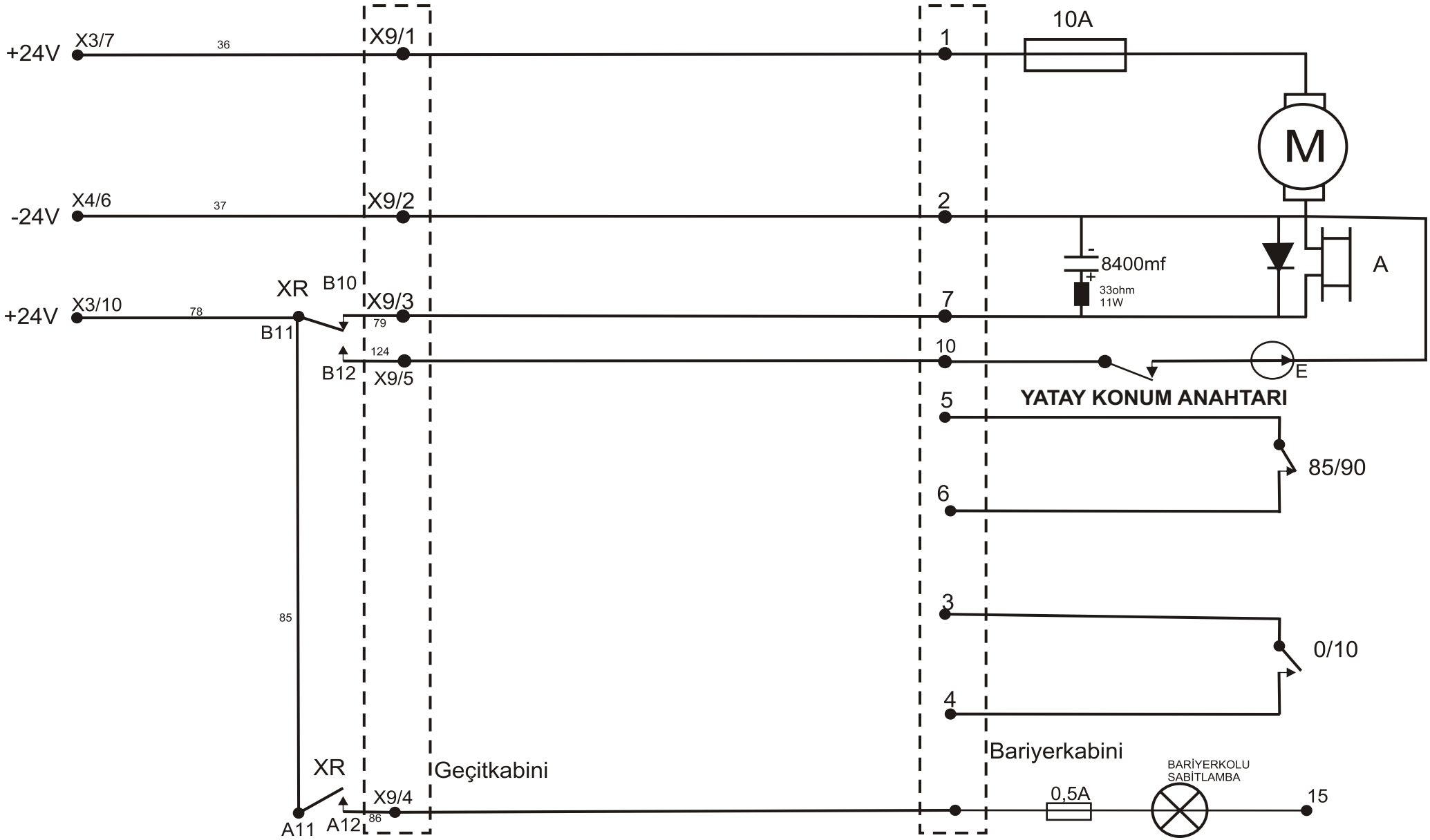
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	13



Teknoray Railway Signaling Systems	HEMZEMİN GEÇİT FLAŞÖR BAĞLANTI ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	14



Teknoray Railway Signaling Systems	BARİYER 1 MOTORU BAĞLANTI ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	15



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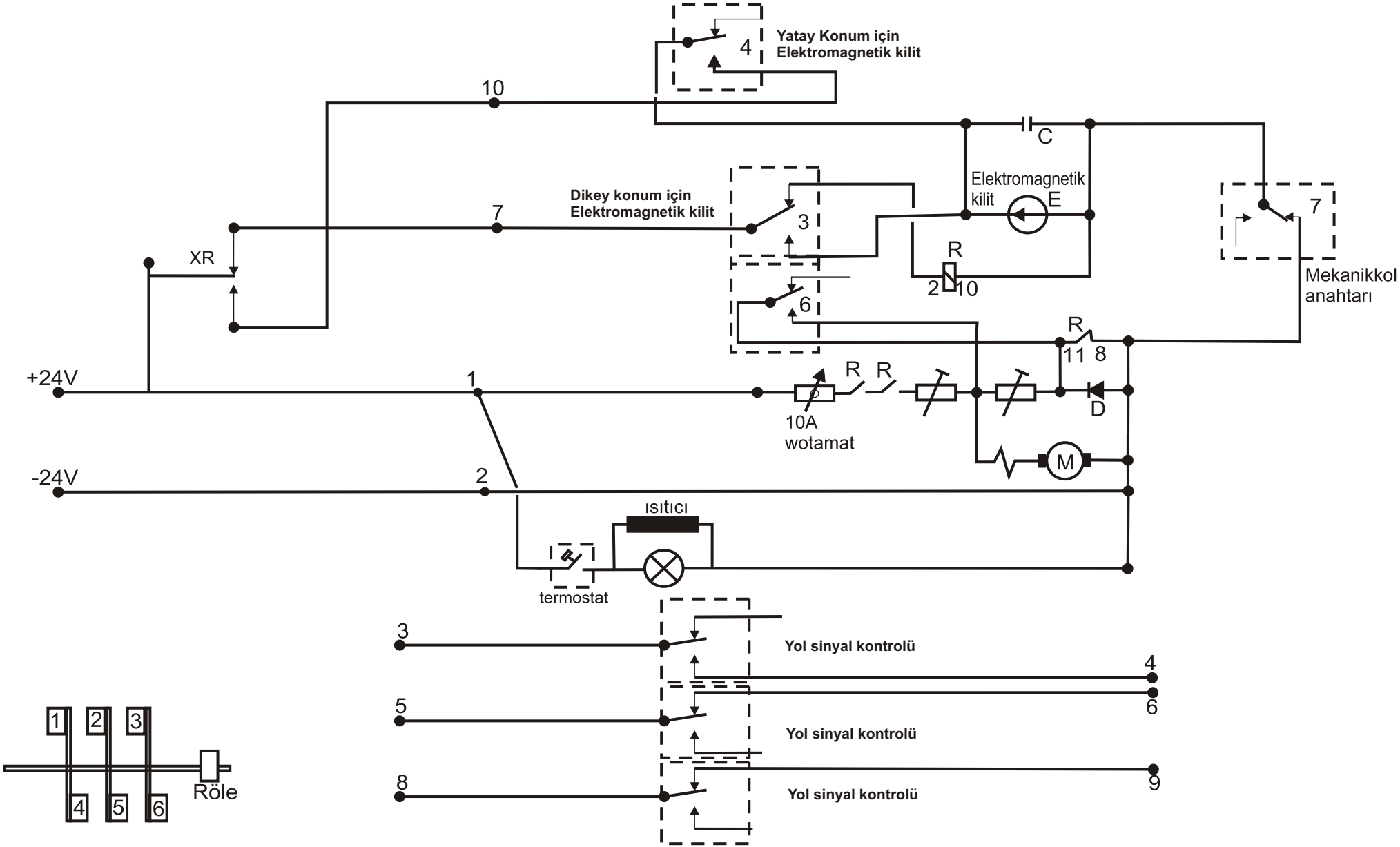
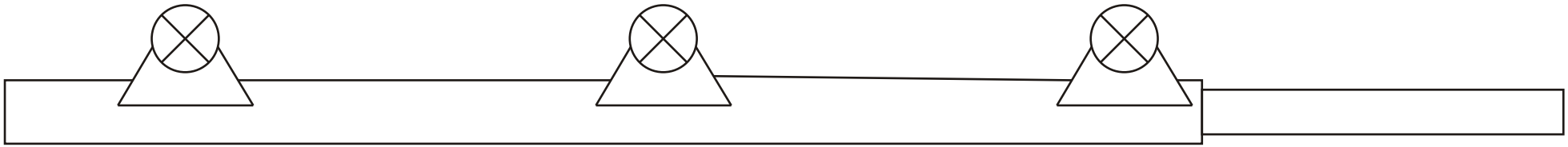
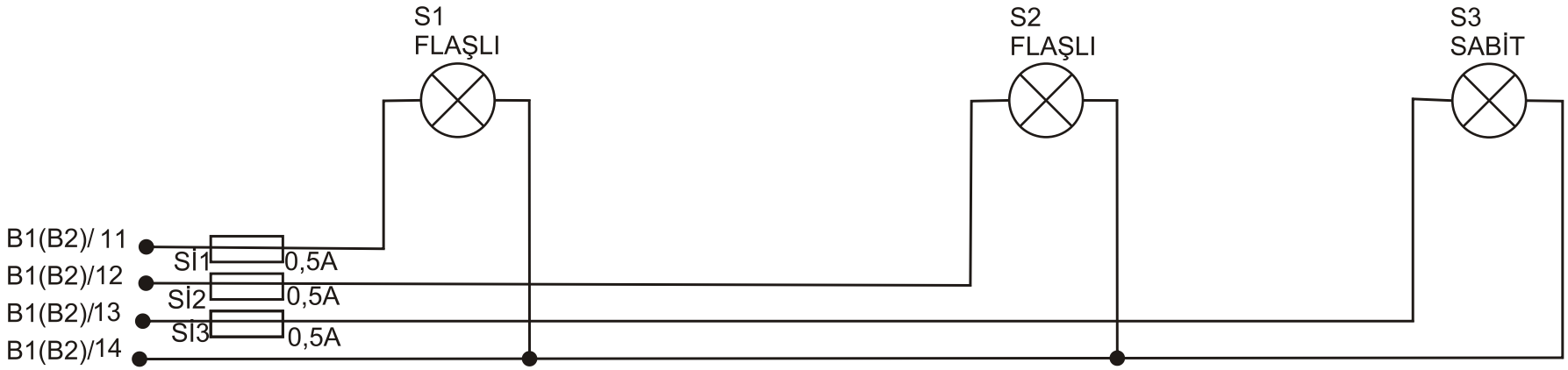
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	16



Teknoray Railway Signaling Systems	HEMZİMİN GEÇİT BARİYER KABİNİ BAĞLANTISI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	17

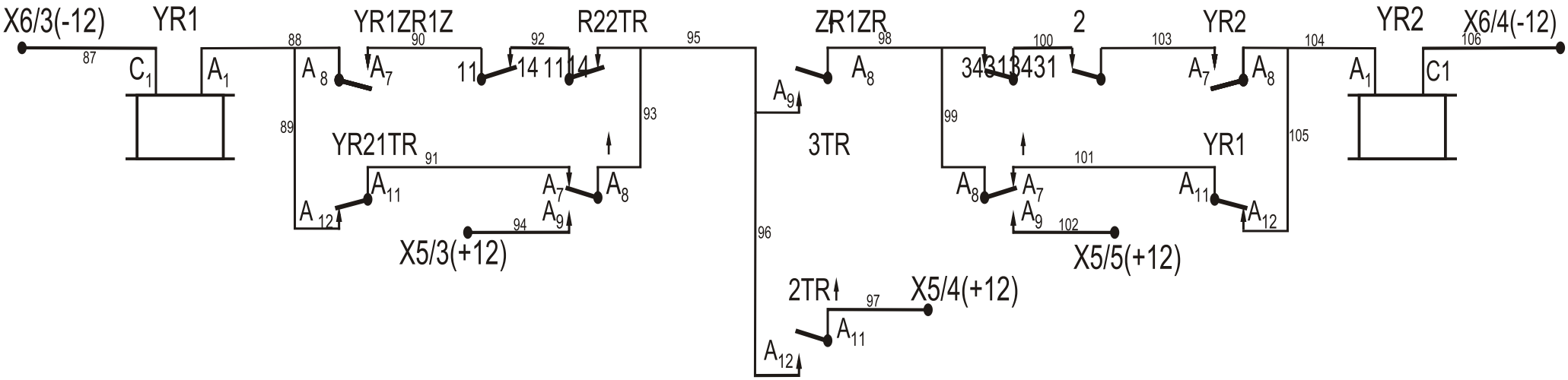




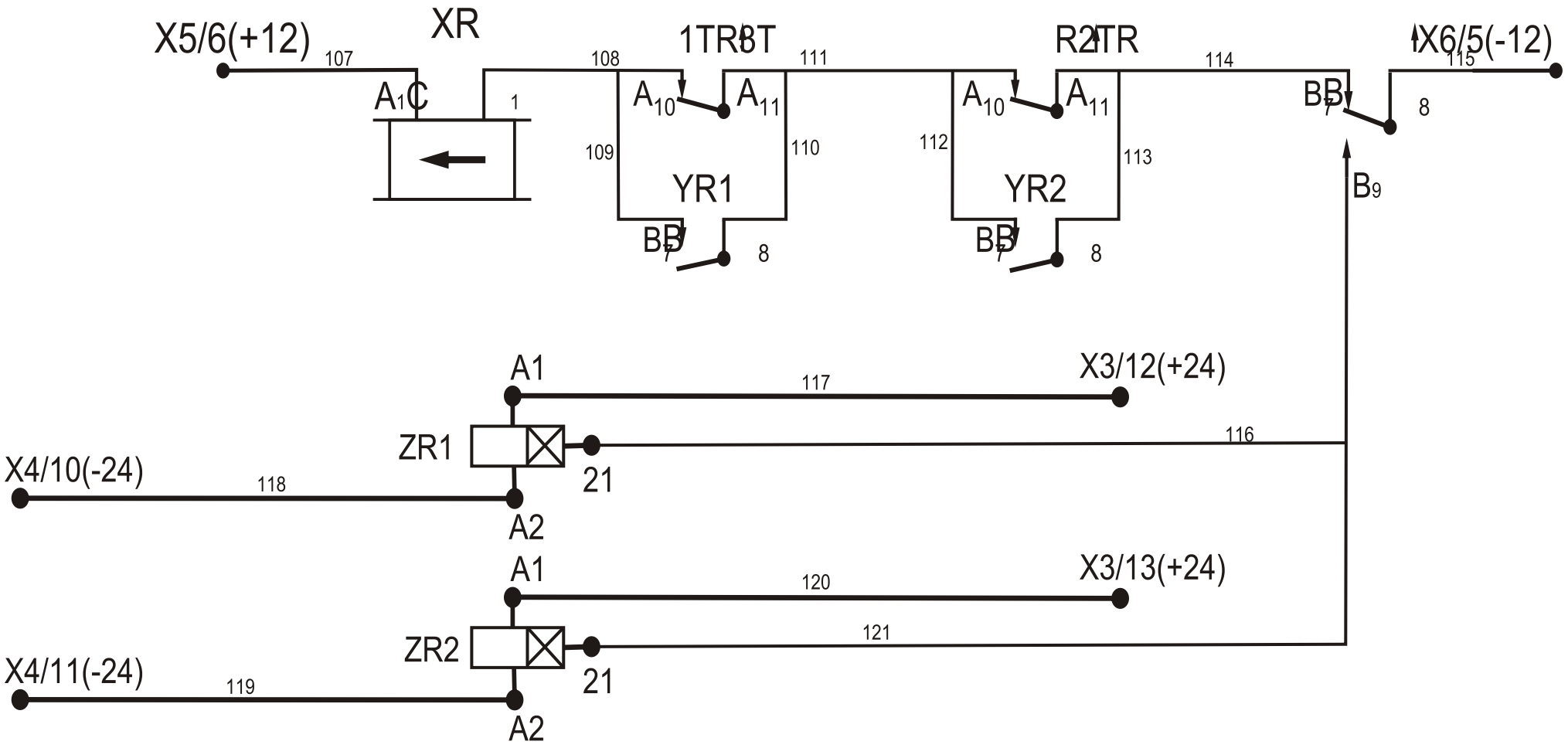
Teknoray
Railway Signaling Systems

BARİYER KOLU ÜZERİNDEKİ LAMBALARIN BAĞLANTISI

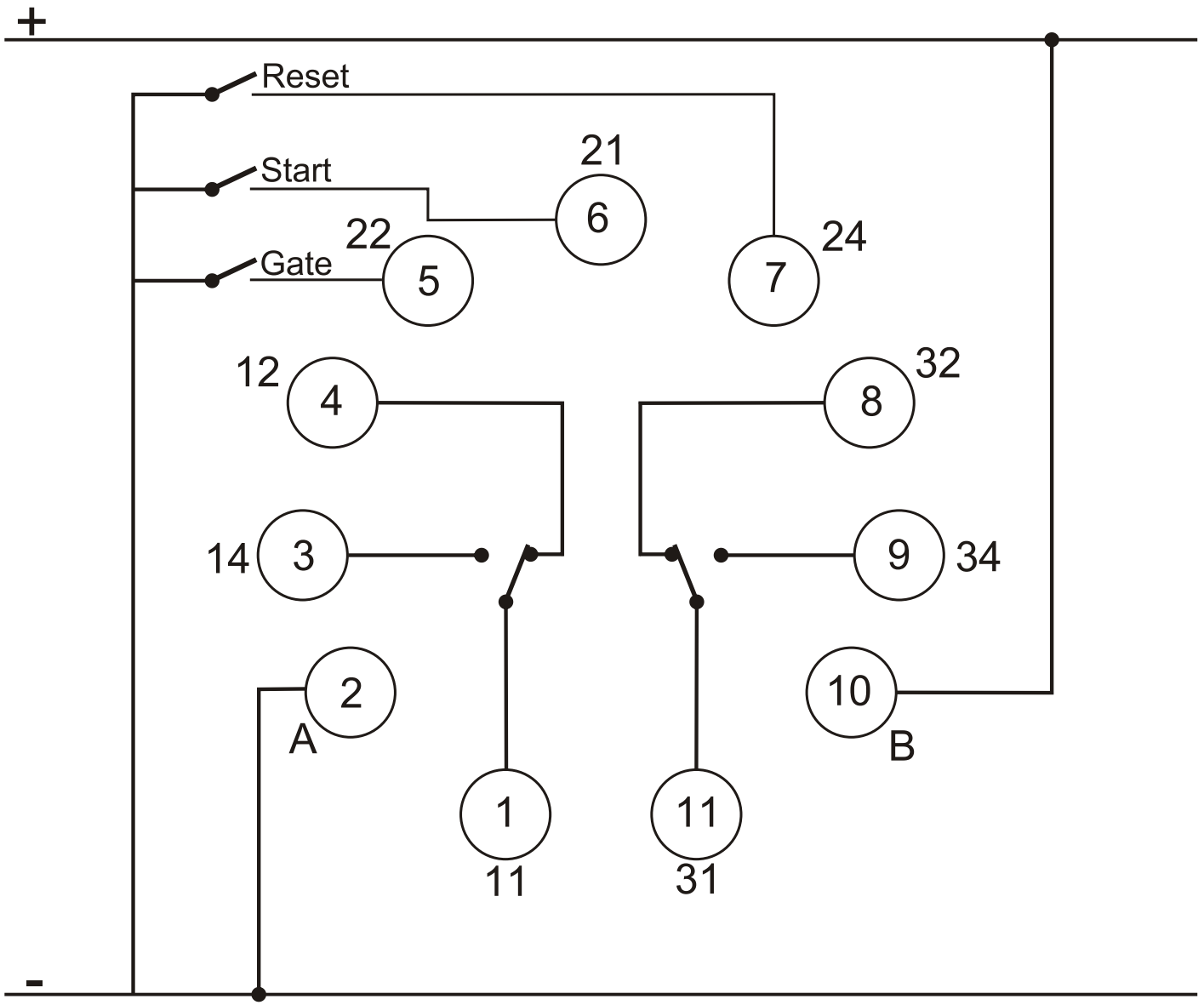
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	18



Teknoray Railway Signaling Systems	HEMZEMİN GEÇİT ÇİFT YÖN RÖLE DEVRE ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	19



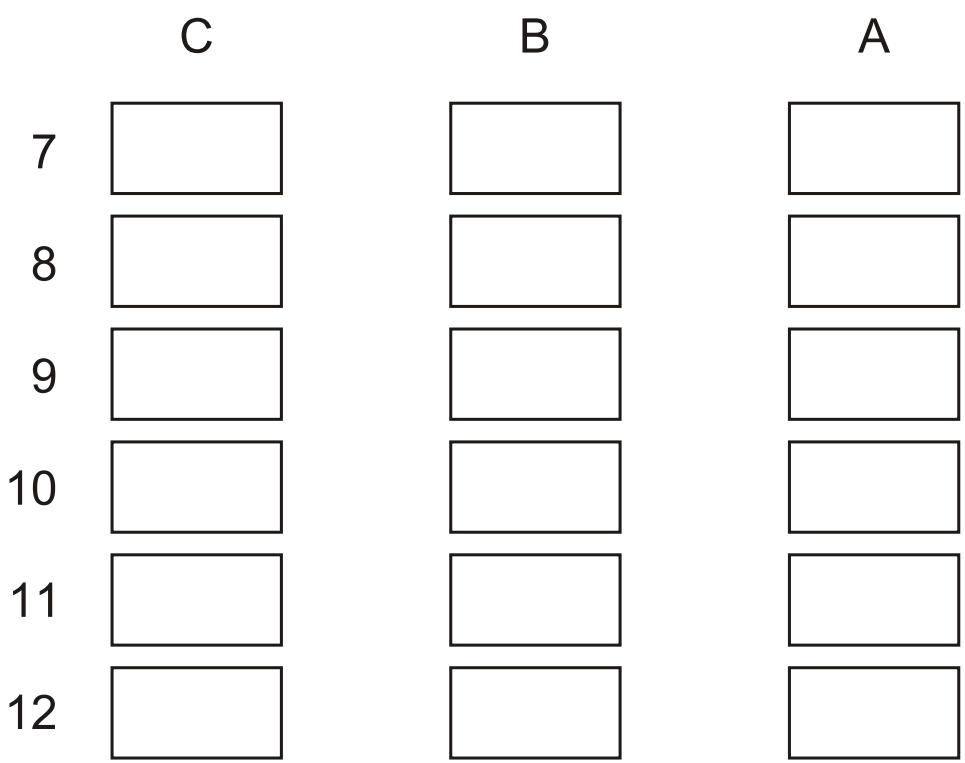
Teknoray Railway Signaling Systems	AÇIK HAT HEMZEMİN GEÇİTLER İÇİN BAŞLANGIÇ DEVRESİ		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	20

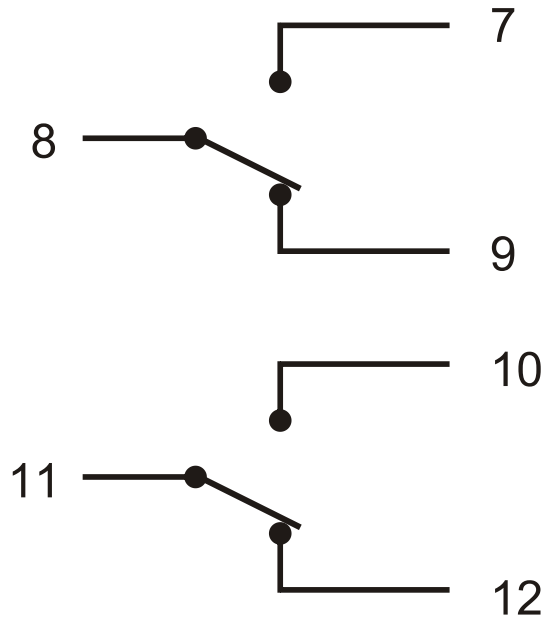


Not: Daire içirisinde bulunan rakamlar röle uçlarını,
Daire dışında bulunun rakamlar konnektör uçlarını ifade etmektedir.

Teknoray Railway Signaling Systems	HEMZEMİN GEÇİT ZAMAN RÖLESİ BAĞLANTI ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
Approval		Page	21

1 ve 400 ohm RÖLELERİN KONTAK ŞEMASI





Teknoray Railway Signaling Systems	HEMZEMİN GEÇİT RÖLELERİ KONTAK ŞEMASI		
Drawing	Binnaz ÇAKIR	Date	
Control eng.	Ahmet İZGİ	Project N.	
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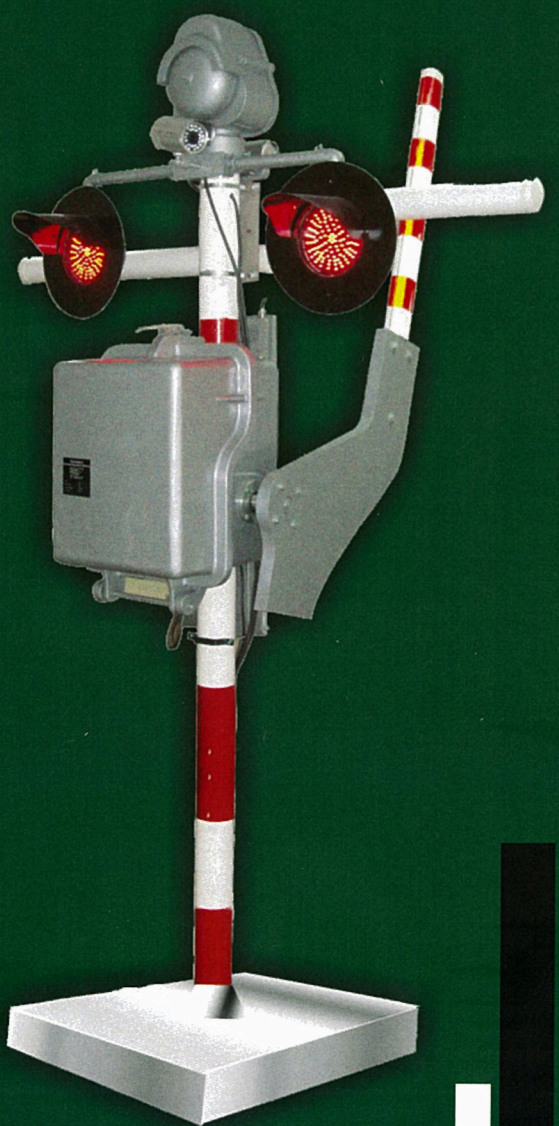
Teknoray

RAILWAY SIGNALING SYSTEMS



TEKNORAY TECHNOLOGIC RAIL SIGNALLING SYSTEMS, COMPUTER, ELECTRONICS, ELECTRIC, TELECOMMUNICATION, SOFTWARE and CONSTRUCTION CO. LTD.

ADDRESS:

TEKNORAY Railway Signaling Systems Ltd.

İvedik Organize Sanayi Bölgesi
Dericiler Sanayi Sitesi 1385 Sokak No:12
Yenimahalle / ANKARA / TURKEY
Tel: +90 312 394 73 20 - 21
Fax: +90 312 394 73 75

E-mail: info@teknoray.com.tr
E-mail: teknoray@teknoray.com.tr

Web: www.teknoray.com.tr

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