

ELECTRIC LIFTING BARRIER

INTRODUCTION

It gives us great pleasure in presenting you the information relating to Electrical Lifting Barrier manufactured in S&T Workshop, Mettuguda.

The Electrical Lifting Barrier manufactured in this Workshop conforms to **RDSO/SPN/208/2012 Version 2**. Barrier is provided with a low voltage type of 24 **Volt D.C. Motor 90 W**, which drives All Gear Drive Mechanism with minimal effort through Clutch Assembly.

A Counter weight Bracket provided on the Shaft of All Gear Drive Mechanism which is connected to the Boom.

Lifting Barrier is operated through an Operating Control Panel , Barrier can be operated from 0⁰ to 85-90⁰ and vice versa. The boom can be held at any position just by releasing the corresponding push button switch UP/Down while in operation.

Lifting barrier is provided with motorized boom lock in the meeting post to lock the boom in horizontal position. Locking and unlocking of the boom is detected on activation of limit switches.

Vertical locking of the boom (0 to 90⁰) is achieved in All gear drive mechanism.

SPECIFICATIONS:

Working Voltage : 24 V D C

Rated Current : 4 Amps. (max 7 amps)

Operating Time : < 12 seconds for opening/closing at rated voltage
< 20 seconds at 75% of rated voltage.

Boom length : 9.76mtrs.

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SIGNAL & TELECOM WORKSHOP METTUGUDA, SECUNDERABAD

MAIN COMPONENTS OF ELECTRIC LIFTING BARRIER

1. Operating Control Panel
2. Pedestal assembly with covers.
3. All gear drive mechanism.
4. G.I Octagonal boom
5. Low voltage DC Motor
6. Circuit controller assembly
7. Meeting post with motorized boom lock.

FUNCTIONS OF EACH COMPONENT

1. Operating Control Panel:

The control Panel shall consist of the following switches and indications:

- A. Gate man Control Switch: Shall be wired in such a way that supply shall be disconnected for the operation of Barrier when key is extracted.
- B. Boom-A, Boom-B individual / simultaneous operation Push Button switches: Individually or together the booms can be operated.
- C. Indications of power ON, Gate open / close, Boom Lock / unlock are provided.
- D. Emergency Push Button switch: This switch shall be used only after physically ascertained by Gateman that boom is mechanically locked and indications fail .

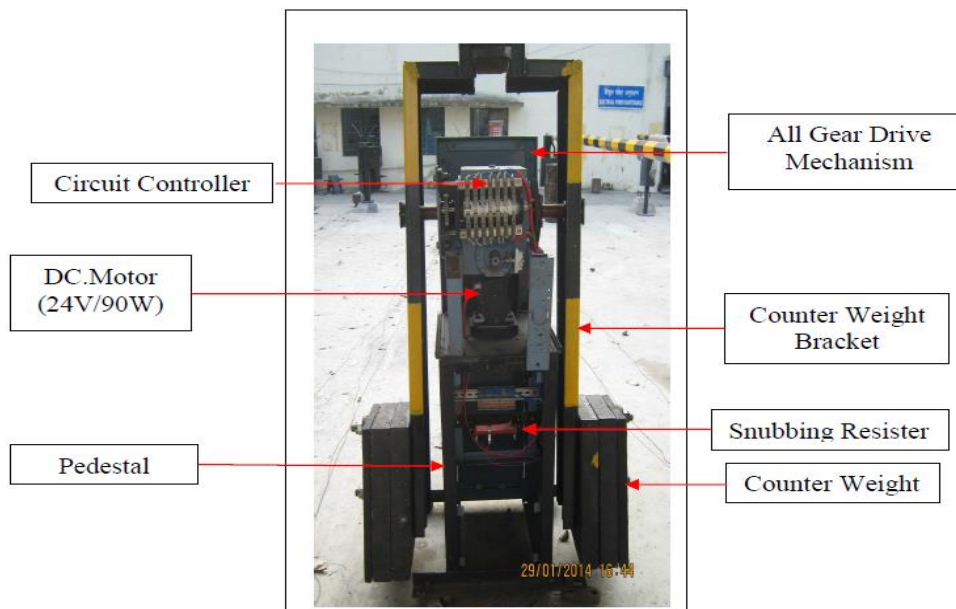


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PEDESTAL ASSEMBLY WITH COVERS:

Pedestal assembly consists:

1. All gear drive mechanism,
2. PMDC Motor
3. Circuit controller is mounted as shown under.
4. Crank Handle cut out switch
5. All the wiring terminations are provided in the lower portion of the pedestal.



All gear drive mechanism:

1. All Gear Drive Mechanism is designed that it can be stopped, reversed or its movement obstructed at any point during operation without damage.
2. Mechanism is designed to prevent movement of the Lifting Barrier due to any external force applied to the mechanical connection or Boom
3. The Mechanism is designed such that the Boom so balanced that in case of failure of power supply the Barrier shall remain in the last operated position.
4. The mechanism is designed that if the Boom is obstructed during operation, it shall stop and on removal of the obstruction shall assume the position corresponding to the control apparatus.

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Boom:

1. Lifting Barrier Boom is made of G.I. sheet of 20 SWG and 22SWG as per RDSO/ S11600.
2. The total length of the Boom will be in maximum four sections. Each section shall be 2.44m, joined by nuts and bolts for easy replacement. The length of the Boom shall be 8m, 9.76m and 12m as per the consignee requirement.
3. The Boom is painted alternately with 300mm bands of black and yellow bands with Yellow reflective Tape.
4. At the center of the Boom, 600mm dia Red disc Stop board provided.

Low Voltage DC Motor:

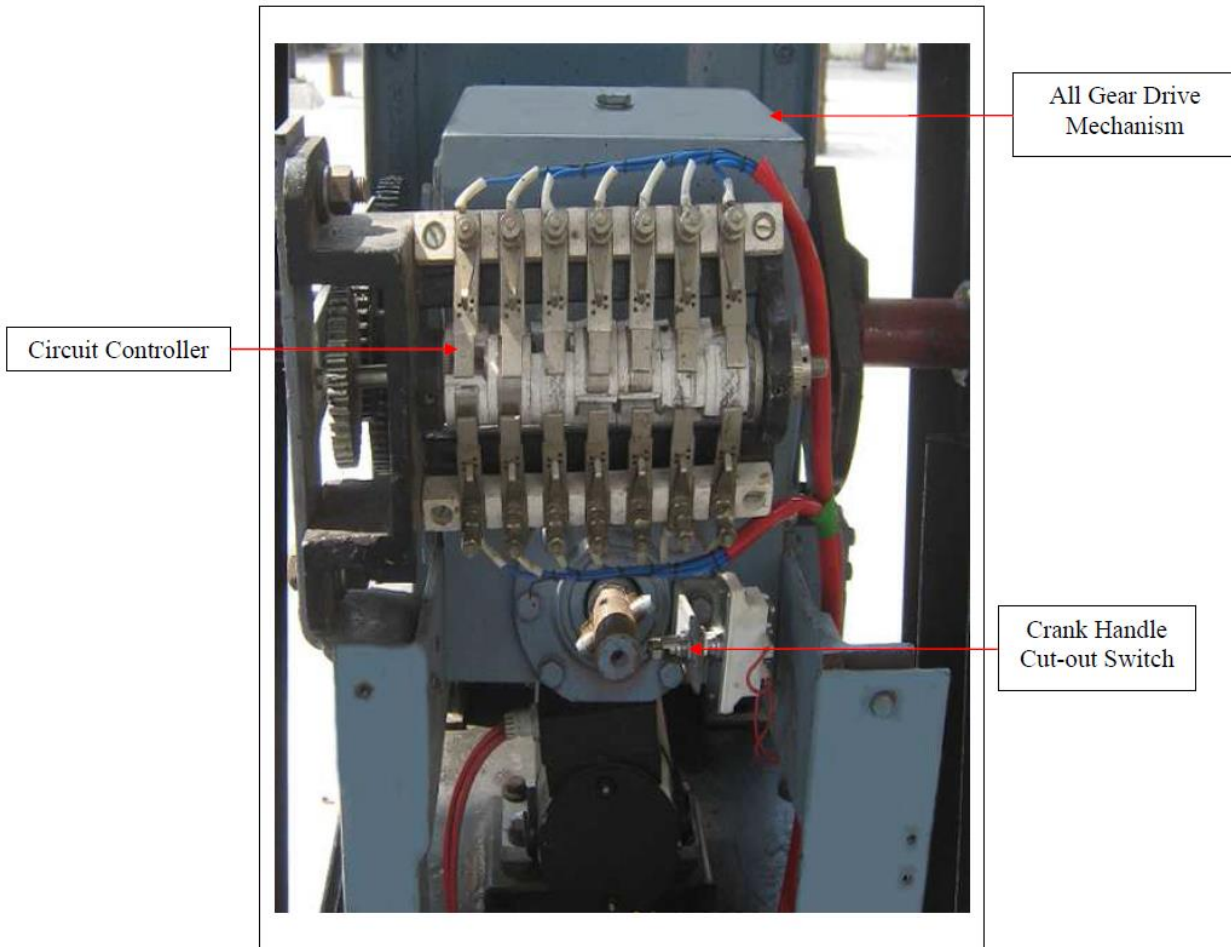
Motor is procured from RDSO approved source with RITES inspection. Motor is a totally enclosed type and comply with IRS: S 37, Class “B” Insulation with 10 Minute Rating for rotation in both the direction, the rated voltage is 24V DC, 4 Amps capacity with 90watts.



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Circuit controller assembly:

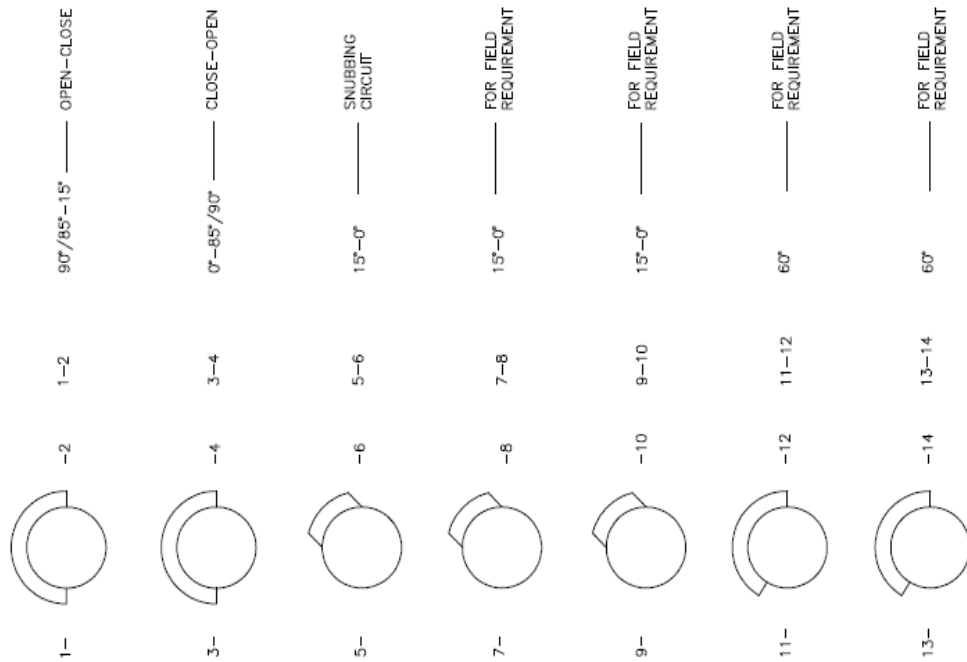
The Circuit Controller is mounted in alignment with the All Gear Drive Shaft Pinion, so that it will rotate along with the Pedestal Main Shaft. It is having seven bands for controlling the operation and signaling circuits. Details of the bands shown below:



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S&T Workshop, MFT Secunderabad, S.C.Rly. Quality Assurance Plan for Electric Lifting Barrier



S&T WORKSHOP, S.C. RLY., MFT.	
DRAWN	DRC.NO. S&T/MFT/4714
CHECKED	BZC
PE	SCALE
Dy.CSTE(S)/MFT	A4

WIRING DIAGRAM FOR
P.M.D.S.I.A. ASSEMBLY
(FOR FIELD REQUIREMENT SUPPLYING
LIFTING BRIBBET)

NOTE :

ELECTRIC LIFTING BARRIER

Motorized Boom lock:

1. Meeting Post is designed to hold the Lifting Barrier Boom in horizontal position.
2. The boom is locked in horizontal position by means of Rack driven through the slot provided in Boom end , controlled from Operating Panel.
3. The Boom is in locked position until the Boom unlock control knob is operated.
4. Once the Boom Lock/Unlock knob in the operating panel is reversed the boom gets unlocked and the indication is provided on the operating panel.



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SALIENT FEATURES:

1. Operating Control Panel is provided with knobs and push buttons with LED indications.
2. Booms can be operated individually or simultaneously.
3. Operation time is less than 12 seconds for opening / closing.
4. Provision for manual operation through cranking, in case of power failure / emergency.
5. The open position of the Lifting Barrier will be within 85° to 90 ° in vertical position and in the Horizontal position when lowered / closed shall be 0 to 5 ° can be adjusted as per field conditions.
6. The mechanism is designed to prevent movement of the Lifting Barrier on application of external force to the mechanical connections or Boom.
7. The Circuit Controller bands are easily assessable and independently adjustable for the Maintainer.
8. Motorized boom lock is provided for locking of the Boom when the boom is completely lowered to horizontal position.
9. In case of power failure, locking of the Boom can be released manually by a crank handle.
10. Limit switches are provided for detection of lock/unlock status of the boom lock.
11. One counter weight limit switch is provided for detecting that the boom is in horizontal position or boom is completely closed.

SEQUENCE OF ASSEMBLY

1. Mount the pedestal on the foundation (one meter cube) with 16mm bolts and nuts.
2. Operate manually with crank handle so that the counter weight brackets are in horizontal position without assembling the **boom and weights**.
3. First assemble the boom to the boom holding bracket which is fitted to counter weight bracket, by supporting the boom at the end.
4. Now assemble the weights to the counter weight bracket.
5. Fix Stop board on center of the Boom and boom locking plate (boom end) at the end.
6. Operate the boom manually to check the balance. Boom should move freely in both the directions with almost same pressure towards Up/Dn.
7. Now fix the meeting post and see that the **boom end** inserts into the Boom lock without obstruction, check mechanically for locking and unlocking with the help of crank handle provided for boom lock, it shall be operating freely.

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SEQUENCE OF OPERATION OF THE ELB

The operation of the lifting barrier shall take place in the following sequence.

1. Unlock the boom lock.
2. Operation of the boom
3. Lock the boom fully in horizontal / vertical position.
4. Close the contacts for detection.

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SAFETY FEATURES

1. The Boom cannot be lifted or brought down manually unless it is driven by Crank Handle in case of power failure or motor with power.
2. While operating the Boom manually by crank handle, the supply to the motor will cut off with the help of a **Limit Switch**. This arrangement isolates the motor even after the restoration of power supply, power cannot be extended until and unless Crank Handle is removed. Hence, it is recommended to give electric connections in this mode.
3. For any obstruction while operating the Boom, the Motor gets declutched due to the Clutch Assembly and Motor gets clutched only when the obstruction is taken out, thereby avoiding the damage to the Motor.
4. The Boom consists of 4 sections which can be easily fitted / removed at site with nuts and bolts. In case of accidents, only the broken portion of the Boom can be replaced.
5. Less maintenance due to low voltage operation of the Motor.

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INSTALLATION

1. Install the Pedestal on a firm concrete foundation base up to the rail level to maintain Height of the boom less than 1Meter.
2. Erect the meeting post on foundation base up to the rail level and align with the Pedestal and the Boom.
3. Tighten all the bolts and nuts of pedestal & meeting post for full strength of the Barrier.
4. Check for intactness of the Motor and Drive Gear Mechanisms alignment and its fixing.
5. While assembling the boom to the pedestal, bring the counter weight bracket to the horizontal position by manual cranking and connect the boom.
6. Add the balance weights equally both sides, keeping the boom in horizontal position.
7. Balance the Boom perfectly before operation duly adjusting the Counter Weights.
8. Connect the **Stop board** in the middle of the boom and the **Boom end** at the end of the boom for locking.
9. Operate the lifting barrier boom manually 0° and 90°, if required adjust the balance weights positions by moving forward and backward for which slot provision is made.
10. Connect the supply to the motor and check the working voltage (**Rated - 24 VOLTS**) & current in open & close position. If current consumption is not mean (average) adjust the balance weights again to achieve rated current i.e less than 4Amps in both the directions.
11. Carry out the wiring connections correctly for the operating control panel, circuit controller, motor and motorized boom lock i.e., fixed to the meeting post.
12. Energize the circuit fulfilling all the condition as per the circuit diagram and operate lifting barrier through the control panel to the 0° to 90° and 90° to 0°.
13. Operate the boom locked /unlocked switch @ 0° and check all the indications.
14. At least 10 sq. mm power cable is to be used for extending the feed to motor.
15. To get rid of the vehicles directly hitting the End Post which comprises Boom Lock, Erect Rails / Channels guarding it, as an additional physical safety measure.

ELECTRIC LIFTING BARRIER

Ensure the following before operation:

DO's

1. Check for output voltages at source of supply before operation.
2. Ensure safety feature No.2 while extending feed to the Motor.
3. Remove inserted Crank Handle, if any, for electrical operation.
4. Ensure full operation and locking of the Boom.
5. Connect Snubbing Resistors between 15⁰– 0⁰ movement of the Boom while coming down for smooth operation through Circuit Controller band.
6. No seal to be opened except by the authorized staff.

DONT'S

1. **Do not assemble counter weights unless the boom is fixed rigidly to the Pedestal.**
2. **Do not operate the boom without assembling the Counter Weights.**
3. Do not lift the Boom upwards / downwards by force as it may damage the Gear Mechanism / Boom.
4. Do not operate the boom without balancing the boom and the counter weights.
5. Do not fill oil above the level indicated in Oil indicator.

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MAINTENANCE SCHEDULE:

The following aspects should be checked for every month:

- a) Oil level to be checked and maintained up to oil level indicator.
- b) Circuit control bands shall be adjusted correctly and bands contact pressure shall be ensured.
- c) Check for the loosening of the Fasteners of Balance Weight adjustment.
- d) Measure the voltage & current accordingly adjust the clutch pressure.
- e) Observe smooth operation of gear mechanism and any abnormal sound, replace the All Gear Drive Mechanism or contact S&T workshop/MFT.
- f) Greasing should be done in between the All Gear Drive Gear and the Circuit controller and rack of the boom lock.

FAULT FINDING:

LIFTING BARRIER NOT OPERATING

- a. Check for physical obstruction
- b. Check up the input voltage and current
- c. Check up for the insertion of Crank Handle
- d. Check the contacts of the Circuit Controller bands (if required adjust the spring tension of the contacts).
- e. Lifting barrier not operating in one side – adjust the counter weights to achieve current & time of operation is almost same in both the directions.

MOTORIZED BOOM LOCK

- a. Operate the boom to horizontal position and Check the feed at the operating motor.
- b. Check the limit switch's contacts for high resistance and Pressure.
- c. Check the locking rack movement for any obstruction.
- d. Check the wiring connection for any slackness.
- e. Check required voltage at the motor terminal.

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OTHER PRODUCTS MANUFACTURED BY S&T WORKSHOP, METTUGUDA, SECUNDERABAD

1. Track Feed Battery Charger 10Amps (Approved by RDSO/LKO)
2. Double Line Block Instrument
3. Electric Key Transmitter (Approved by RDSO/LKO)
4. LED for Road Signal RED/YELLOW 24 V DC
5. LED for Road Signal RED/YELLOW 110 V AC
6. Track Lead Junction Box (FRP)
7. Apparatus Case Full & Half
8. Fencing for Apparatus Case
9. Sliding type Level Crossing Gate
10. Mechanical Lifting Barrier Gate (Complete)
11. Route Indicator (Junction type)
12. CLS – 3 Aspect
13. CLS – 2 Aspect
14. CLS – 4 Aspect (Fabricated)
15. CLS – 3 Aspect (Fabricated)
16. CLS – 2 Aspect (Fabricated)
17. CLS Ladder/Post/Surface Base - 3.5 Mtrs/4.5 Mtrs
18. Shunt Signal
19. Universal Point Rodding
20. Ground Lever Frame

Contact information:

Dy.CSTE (Shops)	Rly:070-89271 BSNL:040-27004244,040-27789271 Mob:9701370812 Fax: 040-27004244 mail : dycstesntmft@yahoo.com .
Production Engineer	Rly:070-89269 Mob:9701370824
Asst. Works Manager	Rly:070-89263 Mob:9701370839