Installation Manual Of

KLF/ KLB Escalators

Canny Elevator Co. Lt

Table of Contents

1. General description

1.1 This manual applies to Canny Elevator Co., Ltd. production of "KONL" marks the company's installation of escalators.

1.2 The installation method described in this manual is a general-purpose installation method for the present time. Relevant installation requirements are described in detail in this manual. If the building dimensions for escalator are differ from the dimensions of the escalator required, please contact our technicians in time for discussion of possible solutions.

1.3 Figure 1 shows the basic procedure for escalator installation.

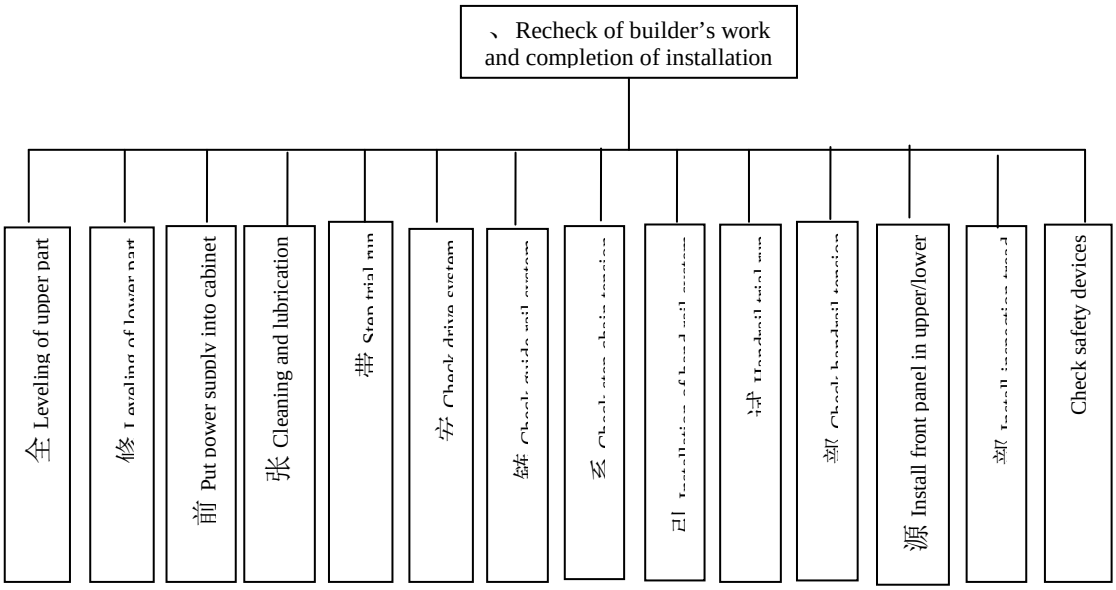


Figure 1 Sequence of escalator installation

1.4 Commissioning after escalator installation shall be conducted by experienced technicians.

1.5 All the electrical systems of the escalator are assembled and commissioned before delivery from the factory.

1.6 Preparations before installation

Assignment of staffs for installation:

Normally, there should be an installation group, including one experienced fitter and one experienced electrician in charge of installation.

1.7 Parts counting and check-up before installation: Before start of installation, the person in charge of installation shall, together with user's representative, count the parts against the packing list, check all parts and documents delivered together with the equipment, and get informed on the width, rise, inclination and other technical parameters of the escalator to be installed. Recheck the dimensions of builder's work against the general layout drawing escalator to see if the length, width and depth of the

pit (the lowest level), rise, distance between the upper and lower horizontal supporting points are consistent to the construction layout drawing. The pit on the lowest level shall have no water permeation. The internal side of the pit shall be straight and shall have no warp. Relevant departments of the user shall be informed on any errors found in the recheck for timely correction.

1.8 The erectors must abide by the safety regulations for installation.

1.9 Scaffolds shall be set on both sides of the escalator for the convenience of installation on both sides. During operation, have on the safety helmet, safety belt and tool kit. For work with electricity on, erectors must work in group of two or more and power switches should be watched by assigned persons. When it is necessary to make adjustments in the truss, the power plug must be in off position, and the assigned person on watch shall not leave the socket location to avoid any accident. During trial runs, irrelevant persons should stay away, and “no passage, no access” warning sign should be set up at upper and lower ends of the escalator. During trial runs, check if there is any tool or object left in the truss, and a trial run can only be made after it is confirmed that everything is ok. When lifting down and positioning the escalator, pay attention to its center, and avoid excessive sway and swing, then put the escalator into the required position smoothly. Furthermore, do not use improper lifting position as may cause truss deformation when lifting the escalator for positioning purpose.

1.10 Lighting for installation shall be provided by the user, and shall adopt safety voltage not higher than 36V. Each escalator shall have at least 3 lightings. The drive and lighting power supply shall be provided to the machine room and construction site to ensure normal use during installation.

1.11 Flame cut and electric welding, when needed during installation, shall be made by persons holding a qualification certificate, and fire extinguishing measures shall be provided accordingly.

2. Recheck of the dimensions of builder’s work

2.1 Recheck of the dimensions of builder’s work shall be completed before positioning of the escalator. The requirement and dimensions of builder’s work must be rechecked strictly in accordance with the requirement in the general layout drawing of escalators of Canny Elevator Co., Ltd.

2.2 The horizontal supporting points of the upper and lower ends for the escalator shall be rechecked. Check to see if the horizontal supporting distance needed by the escalator meets the requirement in the drawing, and if the stair size, embedded parts and levelness of the two horizontal supporting points meet the installation requirements.

2.3 Focus on rechecking if rise “H” meets the requirement in the installation drawing provided by the factory: H±5mm.

H (rise) is the distance between the finally decorated upper and lower floors. To measure H, hang a plumb line from the upper floor, find the measuring point for the vertical distance on the lower floor, and measure actual floor height H. If actual H does not meet the requirement for floor-to-floor height in the general layout drawing provided by the factory, the construction unit shall take steps for correction. Refer to Figure 2.

2.4 Over the distance dimension between the upper and lower supporting beams, find installation center for the whole escalator 0, 0′, mark it , and mark A. B and A′.B′ on the upper and lower supporting beams (escalator width/2). Measure horizontal distance L between the two ends and the center to make sure that all of them should meet the requirement. In addition, stair width 170mm for the upper and lower supporting beams shall also meet the dimensional requirement in the general layout drawing so as to ensure consistency in horizontal distance of the width during installation. The permissible tolerance shall be smaller than that in the layout drawing. Refer to Figure 2.

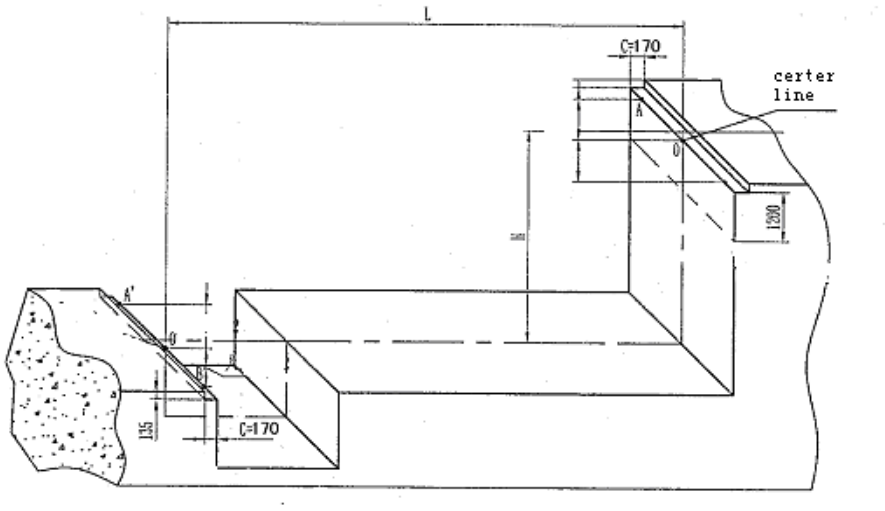


Figure 2 Recheck of builder's work for the escalator

2.5 An escalator with a pit shall have it builder's work conforming to the requirements in 3.3, 3.4 and 3.5, and recheck pit length, width and depth against the layout drawing. The symmetric center line of the pit shall be consistent to that of the upper supporting beam. The pit shall have no obvious inclination, warp or water permeation. Its length, width and depth shall meet the requirements in the layout drawing.

2.6 During the recheck, check if the surface of the upper and lower supporting beams have embedded steel plates as required in the layout drawing. The distance between the embedded steel plate and the finally decorated floor is 135±5mm. The steel plate shall be embedded horizontally, with its fringes being smooth with the pit and supporting beam. Extrusion over the external side of the supporting beam and embedding in a oblique position will not be permitted.

3. Hoisting, transportation and positioning of escalators

3.1 Escalator hoisting and positioning shall be accomplished by professional teams. Transportation tools shall also meet the requirement for escalators. Normally, they are transported in one piece. In special cases where the escalator has a such a high rise and the truss is so long that it can not enter the building in one piece, it may be manufactured and transported in split, subject to confirmation by the user and the manufacturer.

3.2 Escalators are delivered from the factory with special ropes and hook blocks located at the four corners of the upper and lower parts of the truss. These are the hoisting locations and no other places may be used for hoisting purpose. Refer to Figure 3.

3.3 If a split truss is used, during the transportation and lifting, one hoisting end remains at the same, while the other end is at the joint of the truss. Ensure that this location is securely connected for hoisting and that there should be no truss deformation during lifting.

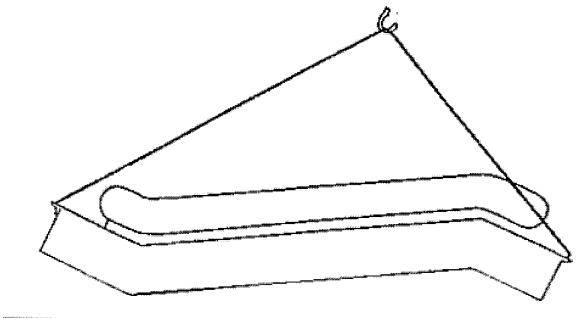


Figure 3-1 Right liftin

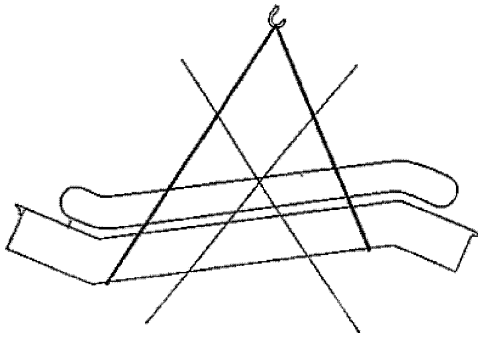


Figure 3-2 Wrong lifting

3.4 Transportation form will depend on the structure of the truss: in one piece or in sections. In the latter case, the lower part composes one section normally, while the intermediate segment and the upper part will compose the other section. The intermediate section will only be separated from the upper part when transportation is difficult in view of the length of the truss. If the intermediate segment is very long, it can be composed of a number of segments. No matter how it is split, it shall be subject to confirmation by the user. Refer to Figure 4.

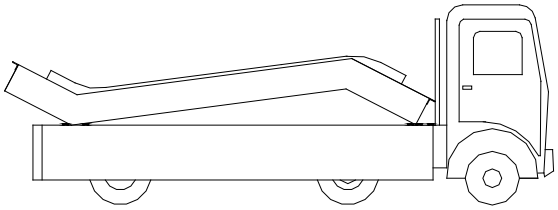


Figure 4-1 Transportation in one piece

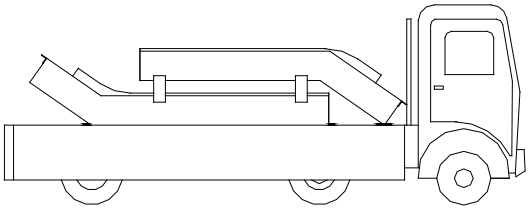


Figure 4-2 Transportation in sections

3.5 For transportation in stacked sections, there shall be auxiliary supports set securely on both sides of the truss, but their upper parts must have horizontal connecting beam to bear the total weight of the truss section. Wooden pieces shall be placed between the truss and supporting beams to prevent displacement during transportation. Refer to Figure 4-2.

3.5 Assembling

3.6.1 If split type used, so after arrival at the installation site, escalator sections shall be reassembled.

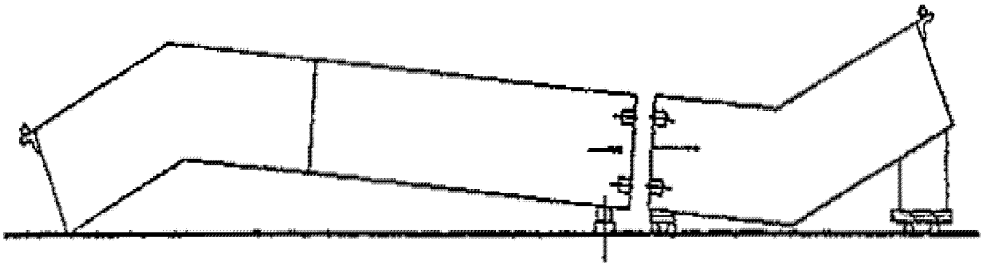


Figure 5 Assembling of the sections

For assembling of sections, first approach the positioning pin at one end toward the positioning hole of the other end, and then insert the positioning pin into the positioning hole slowly. Take care not to collide with the joints of step guide rails so as to avoid their bending, and then tighten the bolts for the joints.

3.6.2 During assembling of sections, check the vertical and horizontal accuracy at the truss connections. When necessary, make adjustments via the adjustment washer. The joints of step guide rails at connections should be compact, and partial gap shall not be over 0.05mm, and the joint step shall not be over 0.05mm.

3.6.3 After connection of step guide rails, link the step drive chain, and adjust the tension of the tension station (refer to 4.4 tension adjustment).

3.7 For horizontal movement of the entire escalator on the ground, put sleepers, roll or logs at the supporting points of the upper and lower parts of the escalator before moving them slowly. Refer to Figures 6, 7 and 8.

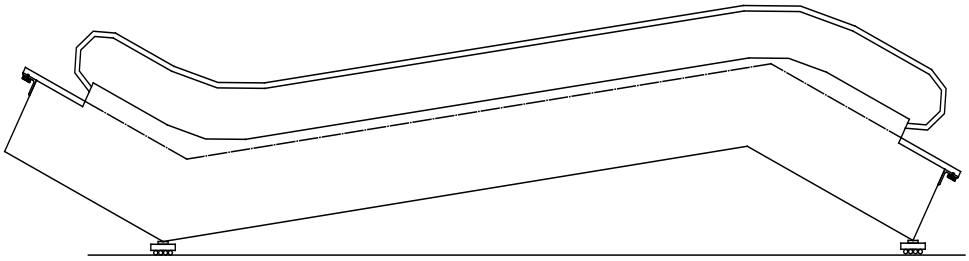


Figure 6 Method for horizontal movement of the escalator

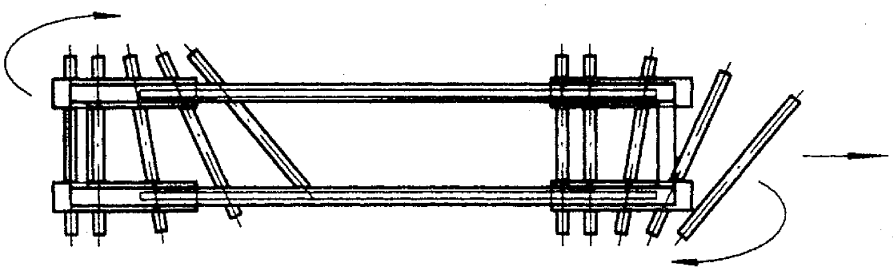


Figure 7 Horizontal turning of the escalator

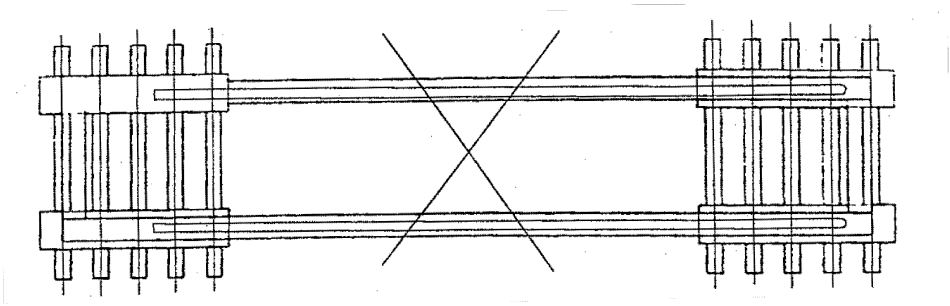


Figure 8 Incorrect turning method (prohibited)

3.8 Positioning of the escalator

3.8.1 Move the escalator horizontally to the installation position and hoist it onto the upper and low supporting beams. Refer to Figure 9.

The figure indicates the builder's work with a pit.

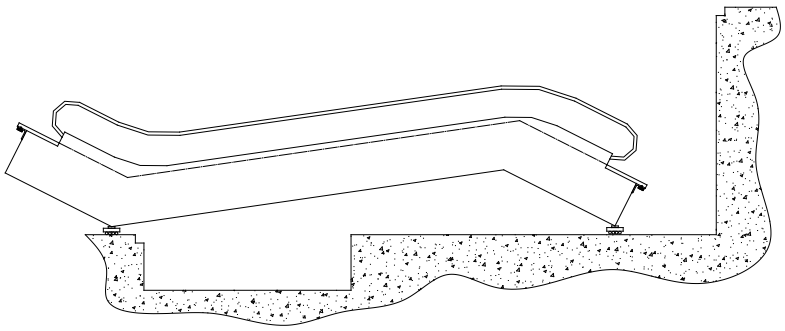


Figure 9 Positioning of the escalator

3.8.2 Before hoisting the whole escalator onto the supporting beams, first lift its upper part and put a safety rope around the lower part, which will be slowly loosed during the slow hoisting of the upper part. Thus, while the upper part is slowly hoisted, the lower part moves forward slowly. Refer to Figures 10 and 11.

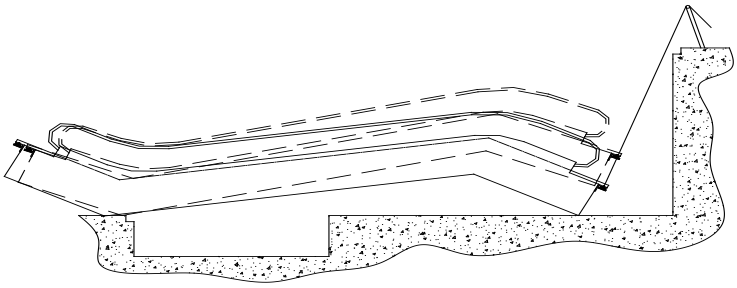


Figure 10 Hoisting of the upper part

3.8.3 Final positioning of the escalator

For the hoisting and positioning of the escalator, it must be kept higher than the upper and lower supporting beams, with its upper and lower parts being in horizontal status. Lower it slowly so that it

should rest on the upper and lower supporting beams, with its center being basically consistent to the center line of the builder's work. Refer to Figure 11. Parallel-positioned escalators shall have equal distance between them as well as equal distance between the upper/lower parts and the upper/lower supporting beams. For positioning the escalator, put installation pad and install adjusting bolts. The rubber pad shall be put under steel plates. Refer to Figures 12 and 31.

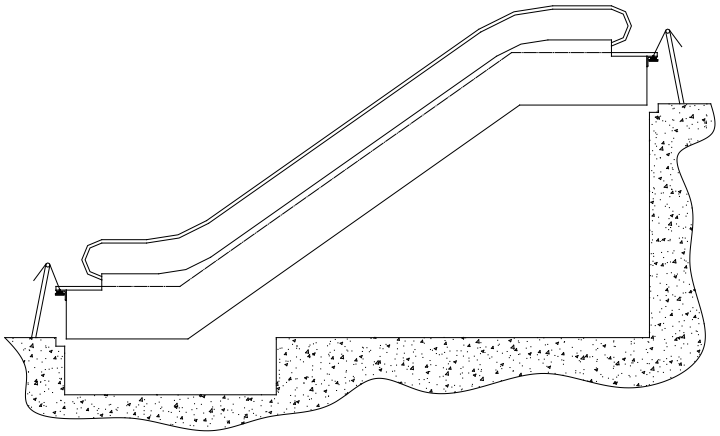


Figure 11 Height of the escalator before being positioned

3.9 Horizontal adjustment of the escalator

3.9.1 The surface of the comb plate of the upper/lower part shall be slightly higher than the final level of the upper/lower floor so as to prevent cleaning water from flowing into the truss. Adjustment steel plate can be put under supporting position in the upper/lower part for height adjustment purpose (when necessary), and they shall be welded to the embedded steel plates of the upper/lower supporting beams.

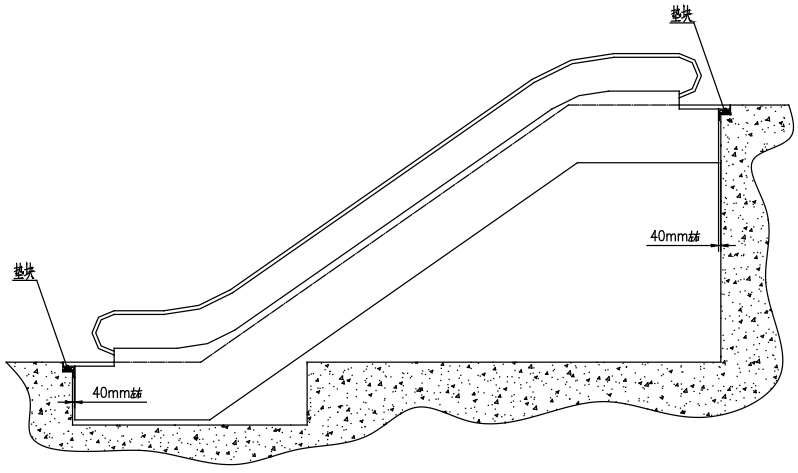


Figure 12 Final location of the positioned escalator

3.9.2 After adjusting the height of the upper/lower parts against the upper/lower floors, adjust the levelness of the upper/lower parts, which shall be measured on the 200X200 supporting angle bar of

the truss. Alternatively, you may measure the levelness of the horizontal surface of the steps at the upper/lower parts. The longitudinal levelness shall be measured at the main beam on both sides of the upper/lower parts of the truss (when the front panels of the upper/lower parts are not installed yet). Alternatively, you may measure the levelness of the longitudinal surfaces of the upper/intermediate/lower parts. The levelness tolerance of the escalator is not greater than 0.5mm.

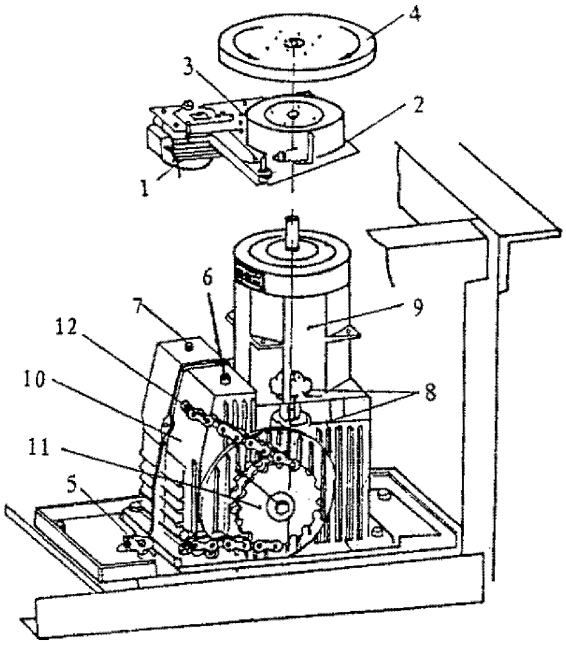
3.9.3 After adjusting the horizontal and longitudinal levelness of the escalator, tighten the adjustment bolts, and check if any of the fasteners is loose so as to ensure firm connection of fasteners.

4. Commissioning and adjustment of the escalator drive system

4.1 The complete escalator is delivered from the factory after it is assembled, commissioned, operated on a trial run, and has passed the inspection. Due to transportation, the handrail system will be dismantled and transported to the site separately in some cases. Therefore, all the parts can only undergo a trial run after inspection and adjustment when they have been installed on site.

4.2 Drive machine, refer to Figure 13

The drive machine is located in the upper machine room. Motor 9 drives via coupling 8 gear box 10, which drives the main drive shaft via sprocket 11 and drive chain 12, thus driving the steps. On top of the motor is an electromechanical belt brake. The gap between the braking wheel and the brake belt shall be in the range of 0.7-1.2mm when the brake is not applied. It shall be ensured that the actuating switch for the brake is effective, and the motor shall not work when the brake is applied. The brake shall have a sufficient torque, and the braking distance shall be adjusted to 0.20~0.8m for no load operation in downward direction (at speed 0.5m/s).



1. Braking motor
2. Braking strap
3. Braking spring
4. Flywheel
5. Eccentric clamp block
6. Oil gauging tape
7. Riser vent
8. Coupling
9. Motor
10. Reduction gear
11. Sprocket
12. Drive chain

Figure 13 Transmission system

4.3 The tensioning device of the tensioning station of the lower part should have a proper tensioning, and be equipped with a protective device for broken step chain and its over elongation.

4.4 Tensioning is adjusted through adjustment of the length of the compression tensing spring, depending on actual rise and the distance of the horizontally moving steps.
Refer to Figure 14-1 and 14-2.

Distance of horizontally moving steps	H≤6000mm	Length X of compressed tensioning spring
800mm	H≤4000mm	145mm
	4000＜H＜6000mm	140mm
	H＝6000mm	135mm
Distance of horizontally moving steps	H≤10000mm	Length X of compressed tensioning spring
1200mm	H≤4000mm	145mm
	4000＜H＜6000mm	140mm
	H＝6000mm	135mm
	6000＜H≤8000mm	130mm
	H＝8000mm	125mm
	8000＜H≤10000mm	120mm
	H＝10000mm	115mm

Figure 14—1

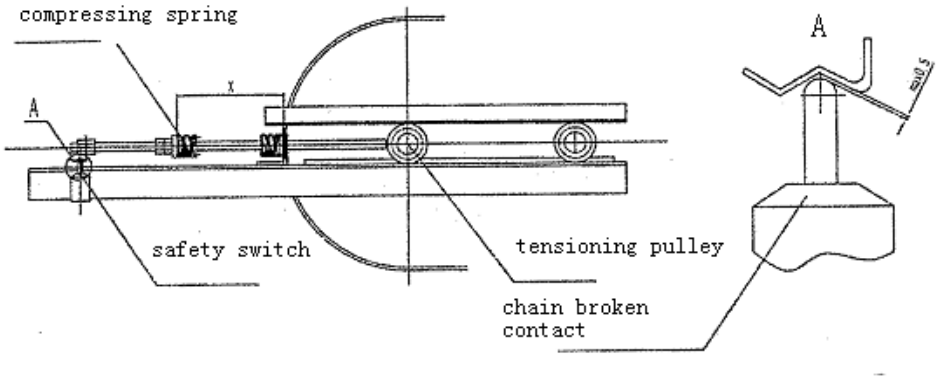
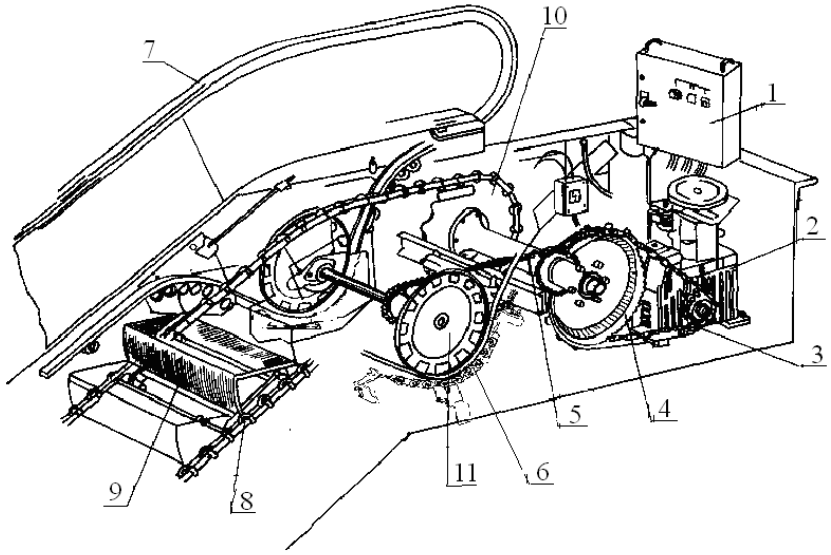


Figure14-2 Tensioning device

4.5 Drive system

4.5.1 The drive system consists of the drive machine, control cabinet, handrail drive, step drive chain and other components. To inspect this system, you have to dismantle the comb plate of the upper part. For the convenience of maintenance, the electric control cabinet can be dismantled and taken out of the machine room. Refer to Figure 15.



1.Control cabinet 2. Drive machine 3. drive chain 4. drive sprocket 5 handrail drive chain
6.handrail tension device 7. handrail 8. step chain 9. step 10. step sprocket 11. handrail drive sprocket

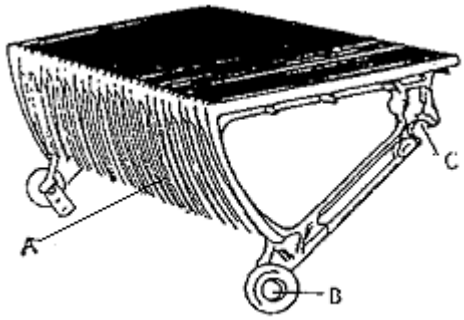
Figure 15 Drive system

4.5.2 Inspection of tension of chains of different specifications: For tension adjustment of the duplex chain of the output shaft of the drive machine, first loosen the anchor bolts, and the adjustment bolts at the base end can pull out the drive machine backwards. The adjustment bolts can adjust the tension of the duplex chains, and the tension of the duplex chain should not be too loose or tight. Adjust the sag to less than 15mm, and turn the protective switch for broken drive chain to the effective position. For adjustment of the tension of the handrail tension, adjust the adjustment bolts on the handrail side plate, and the chain sag is not greater than 10mm. For this purpose, remove 3 steps and cover of the handrail drive chain. While adjusting the tension of the chains, check the parallelism between the chain and the sprocket.

5. Step inspection and adjustment

5.1 The step is the moving component for the passenger to stand on. Refer to Figure 16.

5.1.1 Steps are connected through a specially manufactured roller chain. The outer ring of the roller is made of polyurethane, while the inner ring adopts roller bearing so as to avoid noise due to engagement between the roller and sprocket. Every three links have an extruding pin to connect step shafts. The step is fixed onto the step shaft via a nylon bush, while the lateral positioning is effected through a positioning clip.



A. step body
B. step roller
C. guide block

Figure 16 Step

5.1.2 As a component making cyclic movement, the step has nylon guide blocks on both sides. If the guide blocks are worn, there will be friction between the step and skirt. The wear of the guide blocks should be checked at a fixed interval. For this purpose, dismantle at least over 3 guide blocks for measurement, and their nominal thickness is $7^{-0.2}$ mm. Refer to Figure 17. If the wear of a guide block reaches 1.2mm, it must be replaced. Step guide blocks should be checked irregularly in the lower machine room. On each sides of the step, the gap between the skirt and the step guide block should not be greater than 0.4mm. When necessary, adjust the skirting or correct the displaced step.

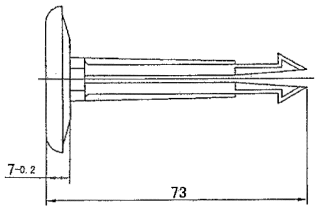


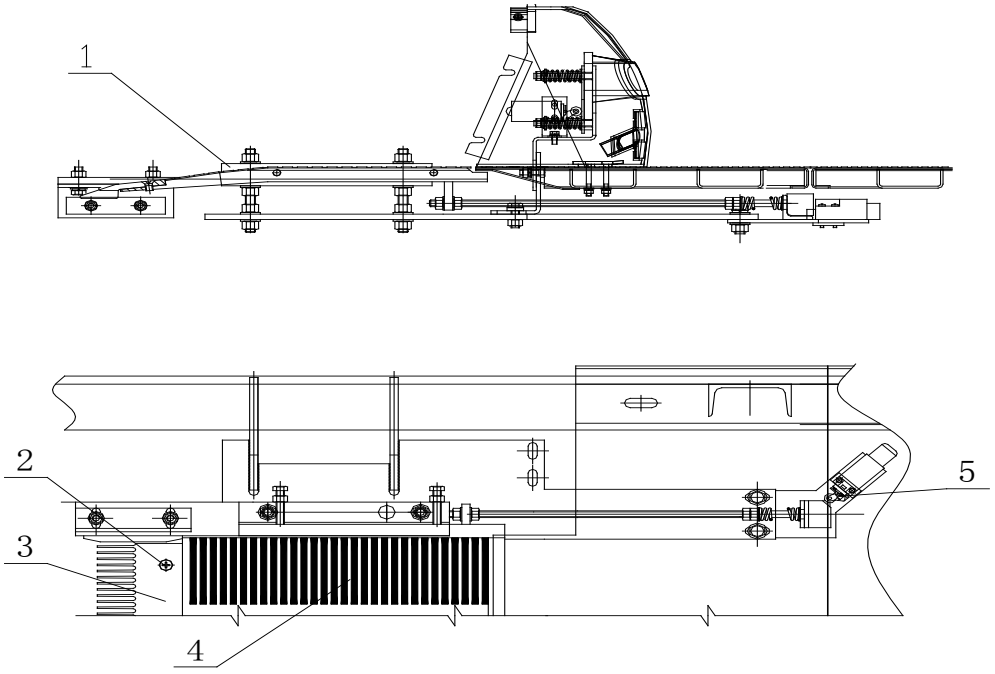
Figure 17 Step guide block

5.2 Positioning inspection and adjustment of steps and comb block devices. Refer to Figure 18.

5.2.1 The comb plate is located at the access of the escalator. The combblock, fixed on the front end of the comb plate, match with the tooth groove of the step. During escalator operation, each step should have good engagement with the comb teeth.

5.2.2 On both sides of the comb plate equip with guide piece, and on its rear end is a comb plate safety switch (protection against foreign objects). When a foreign object is jammed between the step and the comb teeth, the comb plate will move backward to cut off power from the comb teeth safety switch and the escalator will stop.

5.2.3 Check and adjust the match between the two ends of the comb plate and the guide piece. The gap on each side should not be greater than 0.4mm. During its backward movement, the comb plate should not encounter any obstruction. For gap adjustment, just adjust the adjustment bolts on both sides of the guide piece.

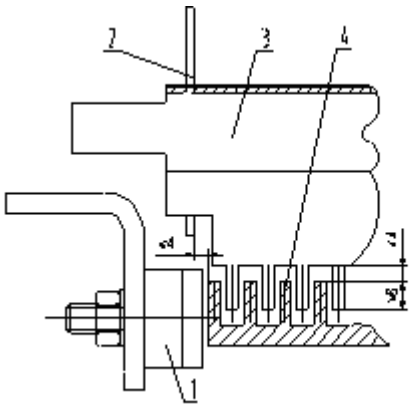


1．Diversion guide rail　2．Fastening bolt　3．Comb teeth　4．Cover plate 5. Comb plate safety switch

Figure 18　Positioning of steps and comb teeth device

5.2.4 Check the engagement between the step and the comb teeth. Refer to Figure 19.

The depth of engagement between the comb teeth and the step tread surface should not be less than 6mm. When the step teeth groove is engaged with the comb teeth, the vertical distance between the tread surface and the comb teeth root should not be greater than 4mm.



1. guide strip　2. skirting　3. comb plate　4.tread

Figure 19　Check of　step/comb teeth engagement and guide strip

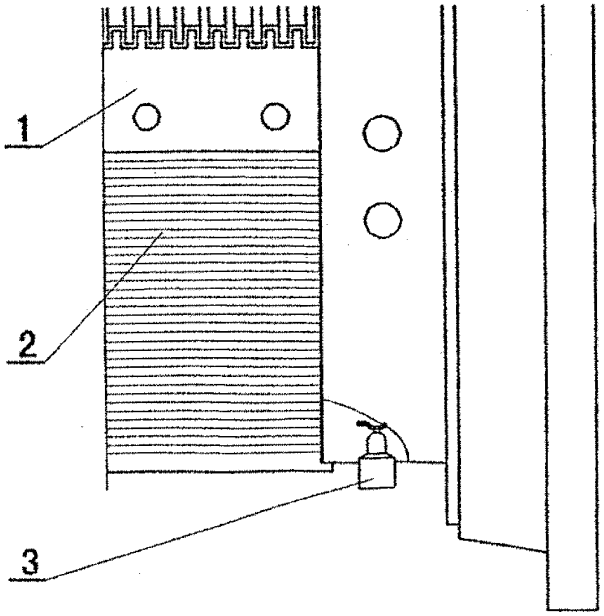
5.2.5 Comb teeth have their preset breaking point during design and manufacturing, so as to avoid damages of steps and other components in an accident. Once a defect is found with the comb teeth, the comb plate should be replaced in time.

5.2.6 During operation, check if each step can engage properly with the comb teeth, and if steps pass the step guide piece without any lateral thrust. If lateral thrust need to be adjusted in special cases and the guide piece does not function, the step lateral guide piece is worn out, or the position of the step

guide piece need to be adjusted.

6. Adjustment and operational test of the comb plate (Figure 20)

6.1 Before inspecting the upper and lower comb plates, dismantle the covering plates in the upper and lower parts. When a 45kg thrust load is applied to the center of the comb plate, the foreign object protection switch should be actuated to stop the escalator.



1. Comb plate
2. Comb plate
3. Covering plate

Figure 20 Adjustment of the comb plate and protection switch

6.2 In some cases where no spring-loaded thrust meter is available on installation site for measuring the adjusted force applied onto the comb plate, proceed with the inspection in the following way:

a. Dismantle the two comb plates;

b. Put a screwdriver in the left and right step gap in front of the comb plate;

c. Move the steps by turning the flywheel on the motor(loosen the brake hand wheel);

d. Through drag force, the comb plate should be able to move smoothly and actuate the safety switch;

e. Use the hand wheel to move the steps backwards, and the comb plate should return to its normal position. The safety switch should be reset in the manual way.

6.3 Inspection and adjustment of the foreign object protection switch of the comb plate:

Each comb plate (each for the upper and lower parts) has two safety switches. Check to make sure that the switch is against the adjustment strike block, with no gap between them. The closing distance of the switch is 2-3.5mm. whenever either of the switches is actuated, the escalator will stop.

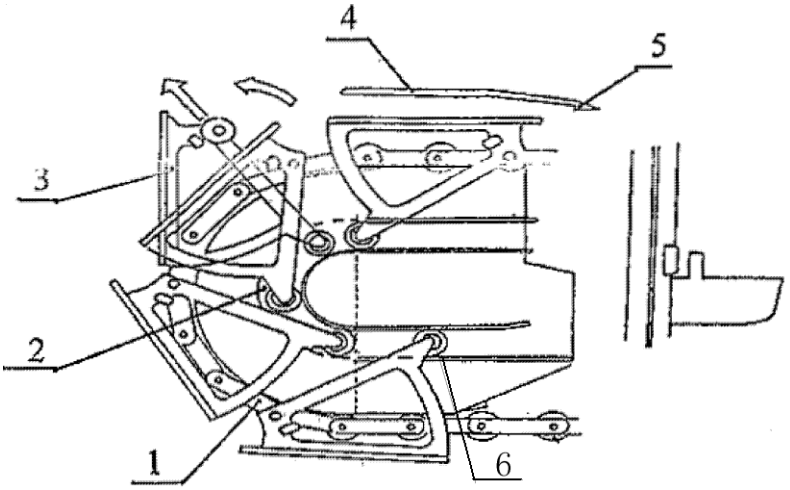
7. Step dismantling (Figure 21)

7.1 Steps should be dismantled in the lower machine room. Run the step to be dismantled to the

designated position. Make sure that the inspection switch is controlled by an assigned person. Dismantled steps (for inspection) should be marked with red paint.

7.2 Mark the position of the step shaft sleeve on the with a scratch awl, loosen the clamping screw, push the positioning clip and step shaft sleeve to the middle of the shaft . incline the step backwards and lift it up, and take the step out from the guide rail at the opening of the curve rail.

7.3 For re-installation of the dismantled step, just proceed in the reverse sequence. Before tightening screws, align the steps to the mark on the shaft, and tighten the clamping screws. After completing installation, check the engagement between the steps and comb teeth.



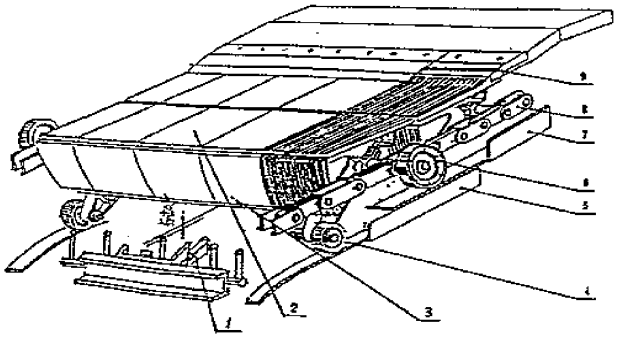
1. Step chain
2. Steering wall
3. Step
4. Comb plate
5. Comb teeth
6. Step secondary roller

Figure 21 Dismantling of steps

8. Step sagging guard

8.1 For the purpose of preventing step and rollers fatigue and break after long operation as well as damage of other components, the upper and lower parts have step sagging guards. Refer to Figure 22. Once a step or a roller sags or breaks, the protection switch will be actuated to cut off power from the safety loop, and bring the escalator to a stop.

8.2 The step sagging guard has four strike rods. The top of the switch strike rod of both sides of the step sagging guard, that is flush with the lowest point of the step. And the middles have an adjustable vertical height. During normal operation, the vertical distance between the arc pedal of the step and the top of the switch strike rod is 3±0.50mm.



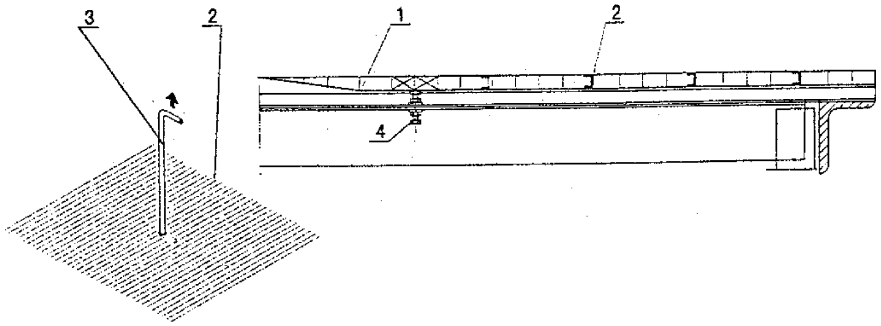
1．Sagging protection switch； 2．Step tread； 3．Arc pedal of the step； 4．Secondary step roller
5．Secondary step rail； 6．Primary step roller； 7．Primary step rail； 8．Step chain；
9．Comb plate；

Figure 22 Step sagging guard

9.Covering plate

9.1 The upper and lower machine rooms of the escalator are covered by pre-formed one-piece covering plate, using anti-glide surfaces (different patters being available for customer's selection). The covring plate is made of two parts for the sake of easy dismantling and handling during installation and maintenance.

9.2 To dismantle the covering plate, insert a special tool into the pre-processed hole, and lift and take out the covering plate. Refer to Figure 23.



1． Covering plate (small) 2． covering plate(big)
3． Cover hook 4． Adjustable supporting bolt

Figure 23 covering plate

10. Installation and adjustment of the handrail system

10.1 The handrail system is a combinational component for the passenger to lean their hands on, with the handrail moving in circulation.

10.2 Due to transportation limitation, the whole handrail system can not be delivered on the escalator from the factory (unless it is permitted by the conditions to do so). The systematic assembly of the handrail system is completed in two steps: assembly, commissioning, inspection, dismantling and

packing in the workshop for the first time, and final assembled on the installation site for the second time.

10.3 The handrail system is composed of handrail drive, balustrade, handrail, handrail inlet as well as the upper and lower newels.

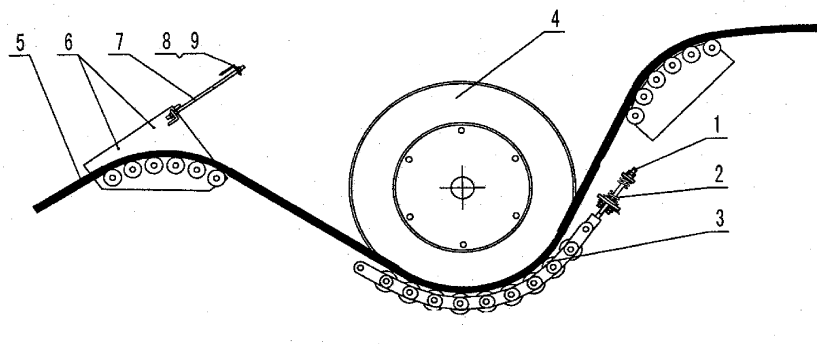
10.4 The handrail of the handrail system is a moving component for the passenger to lean their hands on, and is required to have the same speed as the steps. In addition, the handrail speed is required to be 0－+2.0％ of the step speed.

10.5 Refer to Figure 24 for the handrail drive system, a device to drive the handrail for its cyclic movement.

10.5.1 The handrail is driven by friction wheel 4 with rubber band. Tension of handrail 5 can be adjusted by regulating nut 8 of tensioning rod 7. To operate tensioning rod 7, loosen fastening bolt 6 on the supporting roller group, loosen locknut 8, and use nut 9 to adjust the position of the tensioning rod to move the supporting roller group to and fro to adjust the handrail tension. After completing the adjustment, reset and secure all fastening nuts.

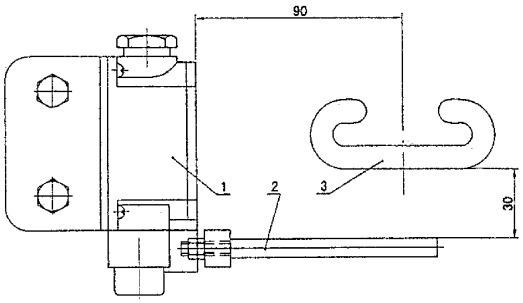
10.5.2 Tension of handrail drive can be adjusted through adjustment of the press of press band chain 3 on handrail 5. Tension of the press band chain is held through spring 2. Adjustment of spring length is effected through adjustment of the position of the nut on press band tensioning rod 1, so that handrail tension adjustment may be realized. If the handrail has a proper press band tension, then, the friction wheel will drive the handrail for normal operation. In this condition, a considerable manual force is needed to stop handrail movement.

10.5.3 The lower end of each handrail has a broken handrail protection switch. Refer to Figure 25. In case of excessive elongation or break of the handrail, the strike rod of the broken handrail switch is touched and the protection switch is actuated to bring the escalator to a stop. Whenever the protection switch on either side is actuated, the escalator will stop moving.



1. Tensioning bolt 2. Compression spring 3.Press band chain 4. Friction wheel 5. Handrail
6. Bolt 7. Tensioning rod 8.Lock nut 9. Nut

Figure 24 Handrail drive



1. Switch
2. Strike rod
3. Handrail

Figure 25 Broken handrail protection switch

10.5.4 The handrail inlet in the upper and lower parts are equipped with finger protective switches (refer to Figure 26). When a foreign object or a child's hand comes into the handrail entry, the protection switch will be actuated to bring the escalator to a stop. After the faults is removed, the handrail will resume its original position under the action of spring 3.

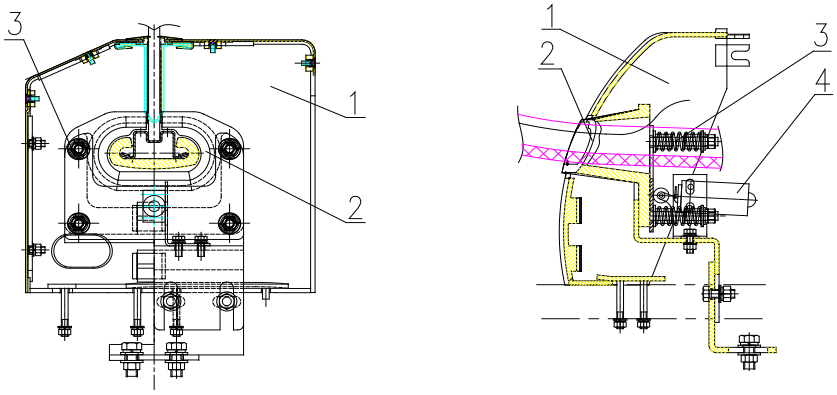


Figure 26 Finger protection switch

1. passageway mantle 2. Handrail guide 3. Spring 4. Switch

10.6 Handrail device, refer to Figure 27

10.6.1 Handrail balustrades, made of glass, are fixed on the supporting structure of the balustrade to the truss. Handrail guide rails and their supports are erected on the upper part of the balustrades.

10.6.2 The handrail device is erected on the truss after pre-installation in the factory.

10.6.3 Balustrade board with glass boards are installed on the upper part of the truss. The seams between the boards should be compact and flat, and no warp is permitted. The surface should have no scratch or other defect that affects its appearance.

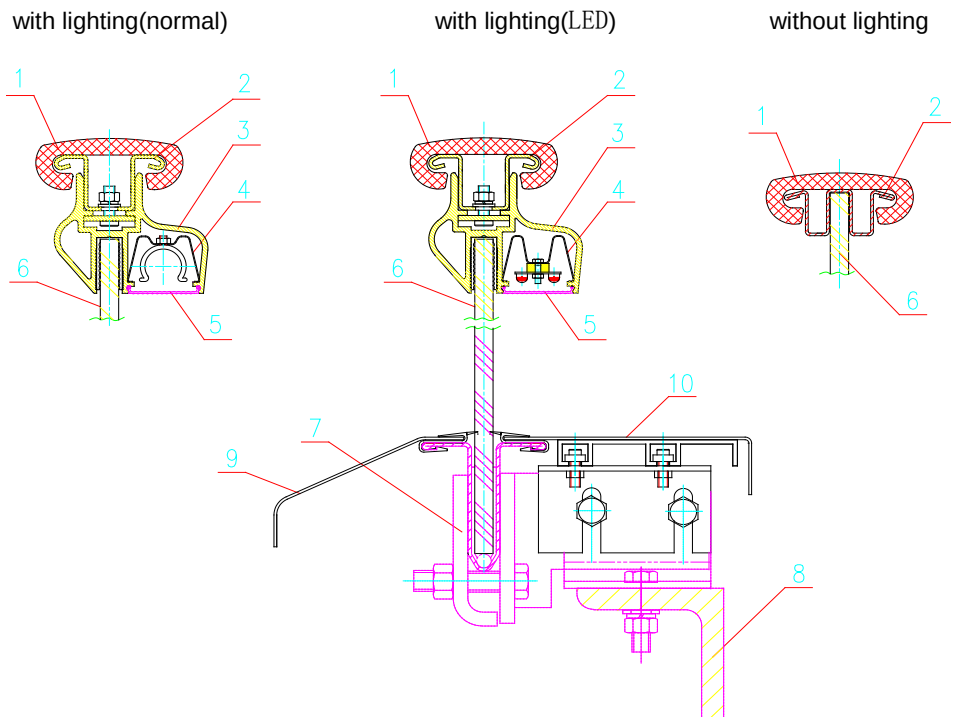
10.6.4 The handrail guide rail is the guide for handrail movement, and should be installed on the handrail bracket. Check the straightness of its installation, and make sure that the joints are compact and flat as well as chamfered, so as to ensure its smooth operation and avoid its damage.

10.6.5 Check relevant moving assemblies and parts of the handrail to make sure that they rotate flexibly and have a correct and reliable position, before installing the handrail into the guide rail and adjusting tension according to 10.5. Adjust the handrail speed in accordance with 10.4.

10.6.6 The handrail is driven through friction, and quite a number of rotating and guiding parts are used. Before normal operation of the handrail, carefully check each link so as to keep the two

handrails in normal operation.

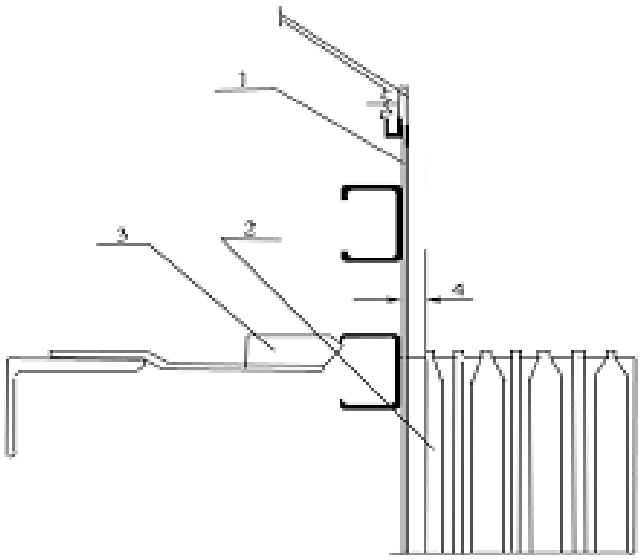
10.6.7 Glass balustrades should be installed from the lower end to the up end sequent. First to assemble the lower R section , then, proceed in the first standard section , then the other standard sections , then , the adjust section. Glass balustrades should keep a gap between 2~3mm. Then, install the upper R section .



1. Handrail 2. Handrail guide rail 3. Handrail bracket 4. Lighting bracket
5. Shade 6. Glass 7. Glass bracket Skirting
8. Chord member on the truss 9. Inner cladding 10. Outer cladding

Figure 27 Handrail device

10.7 Skirt



1. Skirt
2. Step
3. Micro switch

Figure 28

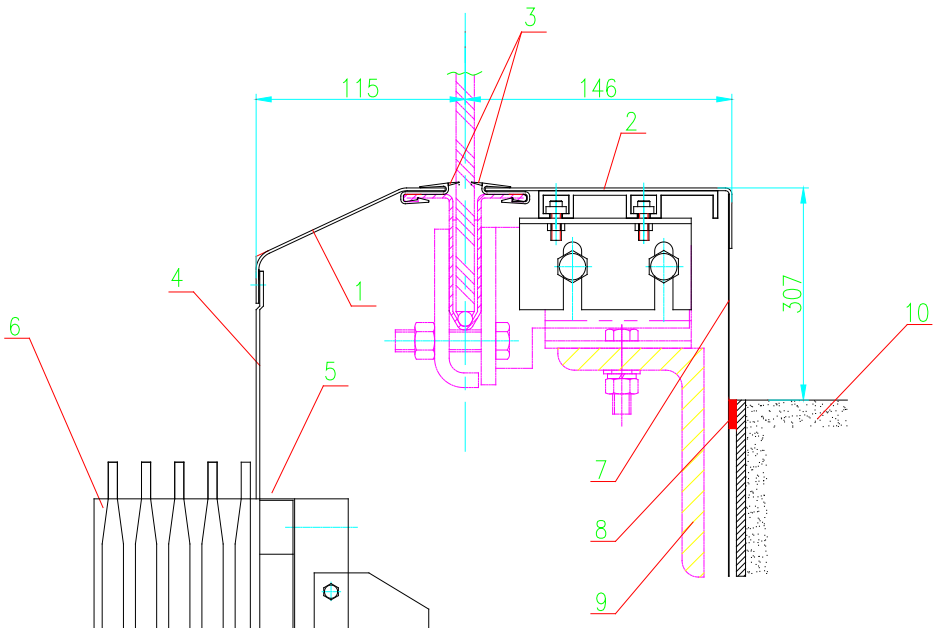
10.7.1 In the lower parts of the handrail device are skirtis on both sides, normally made of metals. The clearance between the skirt and step should not be greater than 4mm on each side, and the sum of the clearances on both sides shall not exceed 7mm.

10.7.2 To prevent foreign objects from being caught between the skirt to affect normal escalator operation, in particular to prevent passengers wearing rubber-soled shoes from having their foot clamped between the step and skirt, the skirt safety device has a skirt protection switch. Refer to Figure 28. In case of skirt deformation, micro switch will be actuated to bring the escalator to a stop.

10.8 Inner-outer deck

10.8.1 Handrails with the normal operation of installation before the installation of flat, and should be installed inside the cover, and finally outside the flat will be fitted with。

10.8.2 The installation and removal of both inside and outside the cover refer to figure 29. Before they are allowed to remove the inside cover, the inside cover fastening screws must be removed .Re-assembly steps according to the contrary can be fitted.



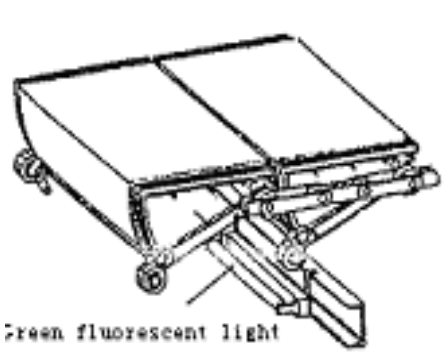
1．Inside cover 2．outside cover 3．夹紧条 4．S 5．C 型件 6．梯级
7．外装饰板 8．防震垫 9．桁架上弦杆 10．建筑物楼面

Figure 29 Inside and outside cover assembly

11. Step lighting and warning

11.1 In consideration of passenger safety, in the horizontal sections of the upper and lower parts of the escalator, there are green fluorescent lamps to avoid danger when passengers passing through seams between steps and comb plate, and to enable them to differentiate between moving steps and static comb plates. Refer to Figure 30-1.

11.2 The steps have yellow strips (optional) to remind the passenger of stepping in range 1 shown in Figure 30-2, instead of treading onto yellow frame 2. Once the yellow warning strip is damaged, it should be replaced in time.



Green fluorescent lamp

Figure 30-1 Step lighting

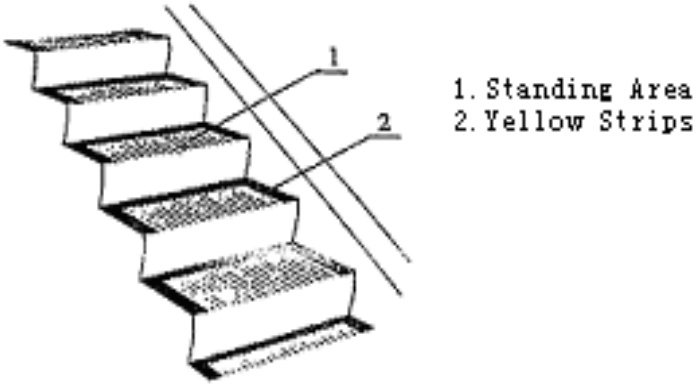
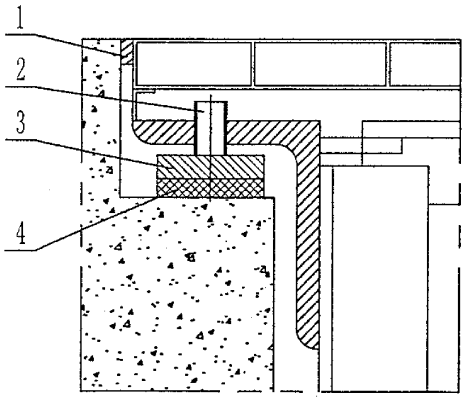


Figure30-2 Step warning

12. Support of the escalator

12.1 All escalator components are installed on the supporting truss, made of welded steel profiles, available either in one piece or in the split form. In case of limited height, it can be provided in one piece, while for a big height or in special cases, a split structure using bolt connection can be adopted.

12.2 To ensure normal escalator operation, the truss structure must be of a sufficient strength and rigidity. Its deflection is normally 1/750 or 1/1000 of its span, and the upper and lower ends of the escalator are supported by the concrete beams on the upper and lower floors. Refer to Figure 31.



1．Filling glue 2．Adjusting bolt
3．Steel plate 4．Rubber cushion

Figure 31 Support of the escalator

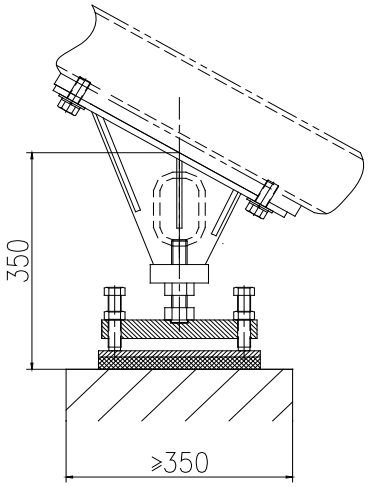


Figure 32 Intermediate support

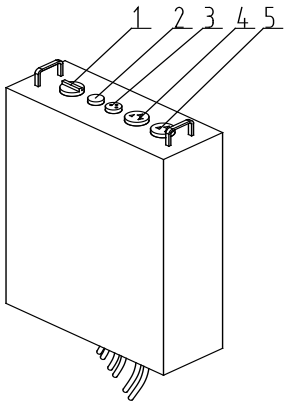
12.3 In case of the rise exceeding 6m, the deflection and span increase correspondingly, and an intermediate support containing adjustment bolts must be set up (refer to Figure 32). As it supports the truss, necessary adjustment must be made during installation.

12.4 When the truss expands or shrinks, there may appear glide between the escalator and building , supporting bearing may used in the supporting position (special design). The base of the support has robber boards for reducing vibration transmission. The gap between the escalator and building is sealed with adhesive filling material. The escalator shall adopt such flexible bearing at least at one of the ends.

13. Escalator control and electric elements

13.1 All escalator control elements are installed in one control cabinet, located in the upper machine room. Loosen the fixing bolts, and you can take the control cabinet out of the machine room, a feature facilitating operation. Refer to Figure 33. Operating handle 1 is connected to the mains switch. During inspection of the escalator, the control cabinet can only be opened for control element inspection after the operating handle is turned and power is cut off from the mains switch.

13.2 Traveling direction of the escalator is controlled through the operator by operating the power key to change the direction.



1. mains switch 2. emergency stop button 3. inspection socket 4. AC220V 5. AC36V

Figure 33 Control cabinet

On the upper and lower parts of the escalator near newel, there are key switches of the escalator, by which the traveling direction of the escalator can be manipulated as required. In addition, there is a red emergency stop button (Stop) shown in Figure 34. The emergency switch is installed at a distinct and easily accessible location. In case of emergencies, press the emergency stop button (Stop), and the escalator will come to an immediate stop.

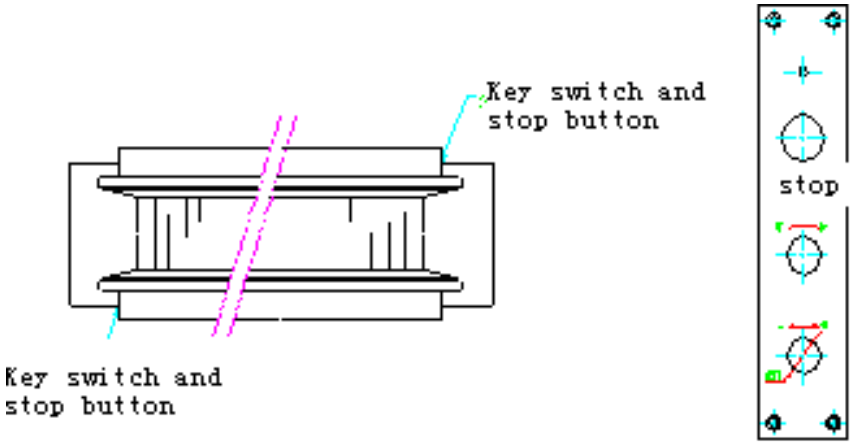


Figure 34 Traveling direction and emergency stop button

13. 3 As quite a number of safety devices are distributed in various parts of the escalator, in case of a failure, make sure to inspect it in time to resume normal operation of the escalator. As needed by the user, the electric control cabinet contains an error indicator for shortening inspection time and removing troubles as quickly as possible. The error indicator board contains 3 nixie tubes, and there is an error explanation table. When the nixie tubes display the same digits as those of the error explanation table, that means that there is a failure at that location, and the trouble can be removed quickly. After trouble shooting, if the nixie tubes display no error code, that means that the escalator

can operate normally.

14. Commissioning

14.1 Commissioning of the mechanical part

14.1.1 After completion of escalator installation, clear the site as well as the interior and exterior of the escalator. Put the escalator into operation only after making sure that all safety facilities are in normal operational status and that all moving and rotating components such as drive machine, drive, transmission system, step guide rail and chains have adequate lubrication. Move run the steps in one round, and check again if there is any abnormality, and then continue the operation. During continuous escalator operation, make necessary adjustments of the traveling performance, start acceleration, decoration, braking and operational stability of the escalator.

14.1.2 All the steps should be able to pass through comb teeth easily, and the clearance should conform to the specification stated in 6.2.4.

14.1.3 There should be no friction between any step and skirt, and the clearance should meet the specification stated in 11.7.1(with exception of step guide block).

14.1.4 There should be no friction throughout the engagement of two adjacent steps.

14.1.5 Under the rated frequency and voltage, the maximal permissible deviation between the speed of steps traveling under no load and the rated speed is ±5%. The operating speed is calculated by using the formula given below:

$$v=s/t$$

where: v — operating speed in the up/down travel, m/s

s — operating distance as measured, m;

t — operating time for the up/down travel corresponding to the distance, s.

14.1.6 The permissible speed tolerance of the handrail relative to step speed is 0～+2%. In the method stated in 14.1.5, measure the operating speed of the handrail under no load and that of the steps in up and down travel for the same time. Calculate the deviation of operating speed between the handrail and steps by using the formula given below:

$$\delta V=(Vl—V)/VXl00\%$$

where: δV — speed deviation between the handrail and the steps;

V1—handrail speed in the up or down travel, m/s:

V — step speed in the up or down travel, m/s;

14.1.6.1 Step speed is the rated speed. If the speed deviation between the handrail and the steps exceeds 0～+2%, proceed with adjustment in accordance with 11.5 handrail drive.

14.1.7 Braking distance of the escalator:

The braking distance of the escalator under no load and load in downward direction shall be in the following range:

rated speed	braking distance:
0.45m / s	0.2-1.00 m
0.5 m / s	0.2-1.00 m
0.65m / s	0.3-1.30 m
0.75m / s	0.35-1.50 m

Measurement of the braking distance should start when the electric braking device is actuated, and deviation in the braking distance can be adjusted through adjustment of the main compression spring of the brake on the drive machine.

14.1.8 All operational components of the escalator should have normal operation condition and have no touch or abnormal noise. In zero load operation, the operational noise measured 1m above the step and comb or covering plate not exceed 65dB (A).

14.2 Commissioning of the electric part

14.2.1 At least one of the erectors shall be able to read all the technical documents delivered together with the escalator.

14.2.2 Commissioning personnel shall be familiar with the structure, principle and operating methods of the escalator.

14.2.3 Commissioning personnel shall be familiar with the principle of the electric control and operational principles of safety switches of the escalator.

14.2.4 Highly competent for locating, analyzing and removing troubles.

14.2.5 Keep the commissioning site (upper and lower machine rooms, interior and exterior of the escalator) in clean status.

14.2.6 After completion of wires installation, inspect them carefully, in particular, the connections of safety circuits of switches.

14.2.7 The mechanical and electric equipment of the escalator have been installed and are ready for operation.

14.2.8 Necessary single-unit inspection, test and adjustment have been completed for the electric and mechanical parts.

14.2.9 Step movement has no blocking or touch.

14.2.10 During commissioning, the operators shall work seriously and carefully and stick to the safety regulations.

14.2.11 Instruments (in normal conditions) and measuring devices needed for commissioning：

a). universal meter；

b). tachometer；

c). megohmmeter；

d). clip-on ammeter;

e). decibelmeter;

f). stopwatch;

g). band tape, ruler, vernier calipers, depth vernier calipers, wire hammer, feeler, angle square, etc.

14.2.12 Good earthing.

14.2.13 Good insulation. Insulation resistance between conductors and between conductors and the ground shall be over 1000Ω / V and the insulation resistance shall not be smaller than:

a. 0.5MΩ for power circuits and electric safety device circuits

b. 0.25MΩ for other circuits (control, lighting and signaling)

Measurement shall be made while power is off from the electric elements.

14.2.14 The operational direction key switch should be consistent to the operational direction, and the emergency stop button should operate reliably.

14.2.15 There are quite a number of safety switches of the escalator, which must be commissioned one by one to make sure that each of them operates reliably and effectively.

14.2.15.1 There are following safety deices for the escalator:

a. Phase failure or wrong protection device for the power supply system;
b. Short circuit and over load protection device for the motor;
c. Drive chain protection device;
d. Broken or elongated step chain protection device;
e. Working brake;
f. Over speed governer device;
g. Non-operational reverse protection device;
h. Broken handrail protection device;
i. Handrail inlet safety device;
j. Foreign object protection device for the comb teeth;
k. Step sagging protection device;
l. Emergency stop button;
m. Skirt safety device;
n. Auxiliary brake (in the case of the rise exceeding 6m).

14.2.16 After completing above commissioning, make an all-round inspection to see if the requirements are met. Refer to corresponding descriptions of working principles. If there are still abnormalities after commissioning is made strictly in accordance with above mentioned methods and steps, please get in contact with related departments of our company. It is forbidden to dismantle or modify PLC program without permission, lest unnecessary losses will occur.

15. Trial run

After completing commissioning of the mechanical and electric parts, make a trial run. Before the trial run, clean and lubricate the equipment again to ensure a clean escalator and adequate lubrication for

various parts and components.

Check to make sure that all components are in normal conditions, and make a trial run (one hour up and one hour down travel under no load) and the escalator should operate in a normal and stable way without abnormal noise.

16. Self inspection and acceptance application

After completing the trial run, make a self inspection. After the self inspection is passed, prepare the inspection report and documents to be delivered together with the equipment, and apply for acceptance by local competent department.

17. Delivery for use

The escalator can only be delivered for use after it has passed the acceptance by the local competent department. In the meanwhile, the hand-over procedure shall be completed with the user. By then, installation of the escalator has been completed.

18. Installation schedule

4	leveling of the upper/lower parts							
5	positioning of power supply							
6	cleaning and lubrication							
7	step conmmissioning							
8	inspection and adjsutment							
9	installation of handrail system							
10	commissioning							
11	trial run							
12	inspection and acceptance application							
Note: 1. Working days to be calculated on the base of a rise below 6m.								
2. The schedule may be adjusted according to actual circumstances.								

19. List of installation tools

No.	Tool name	Specification	No.	Tool name	Specification
1	Spanner		24	Flat screw driver	4” 6” 8” 10”
2	Adjustable spanner	8” 10” 12”	25	Cross screw driver	
3	Hammer	1.5lb 2lb	26	Electrician’s knife	
4	Rubber hammer	2lb	27	Banjo pliers	
5	Steel saw		28	Diagonal cutting nippers	
6	Pliers	2”	29	Wire stripper	
7	File	8” 10”	30	Buzzer	
8	Flat file		31	Test pen	
9	C die	2” 4” 6”	32	Smoothing iron	
10	Ring clip	6”	33	Vertical collimator	
11	Hex spanner		34	Level gauge	
12	Flat chisel	8mm 10mm 12mm	35	Bevel gauge	
13	Grease injector		36	Depth vernier calipers	
14	Oil injector		37	Vernier calipers	
15	Thread chaser base	M3-M16	38	Schedule indicator	
16	Thread chaser	M3-M16	39	Band tape	
17	Drilling machine	¢2.5-¢14	40	Steel band	
18	Index	M3-M16	41	Decibelmeter	
19	Polishing machine	¢120	42	Stopwatch	
20	Hand drill	¢1.5-¢6	43	Clip-on ammeter	
21	Electric drill	¢3-¢13	44	Megohmmeter	
22	Torch		45	Tachometer	
23	Hand-held lamp	~36V	46	Universal meter	

20. Installation description for high-strength bolt joints

20.1 Technical requirement on high-strength bolts for butting the truss in sections：

20.1.1 When high-strength hex bolts and nuts are used on installation site, they have to be tightened with a torque spanner. Before tightening them, lubricate all bolts (threads and supporting surface) with Mosi graphite.

20.1.2 The high-strength bolts should be (GB／T128—1991)10.9 grade high-strength hex bolts of steel structure.

20.2 Requirement on pre-tensioning inspection：

20.2.1 After butt-joining sections of the truss, make a test according to Figure 35 to check if the specified pre-tensioning force is applied. Select typical bolts and check at least two bolts for each joint. (Note: there may be some deficiencies in doing so, therefore, the best way is to check all the bolts). Use a dynamometer-type spanner to check the pre-tensioning to see if it meets the requirement or not.

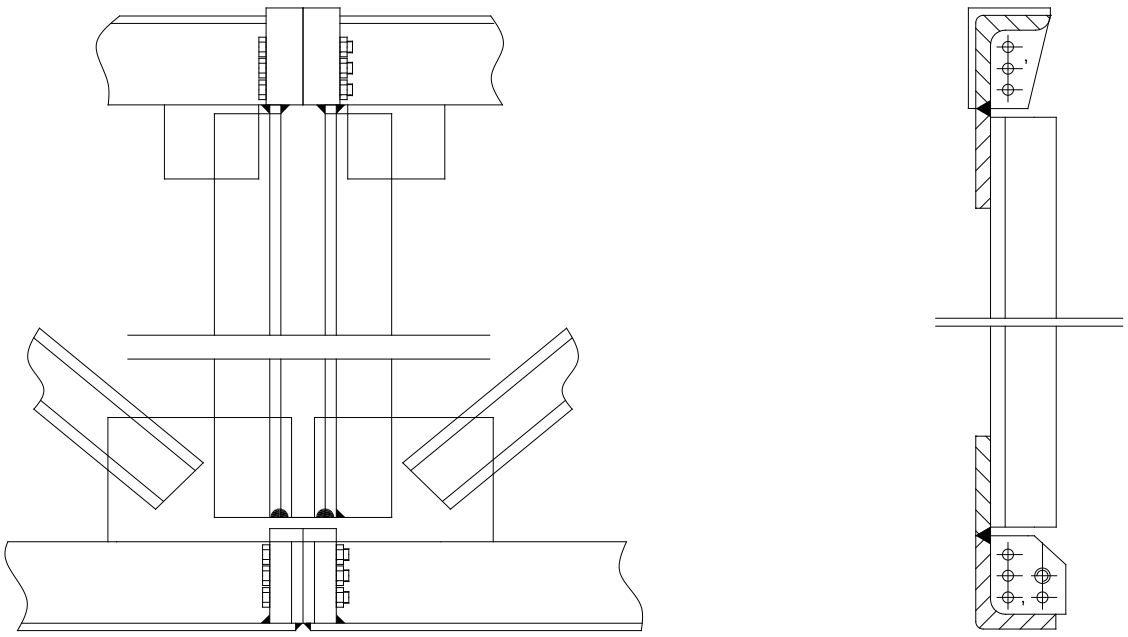


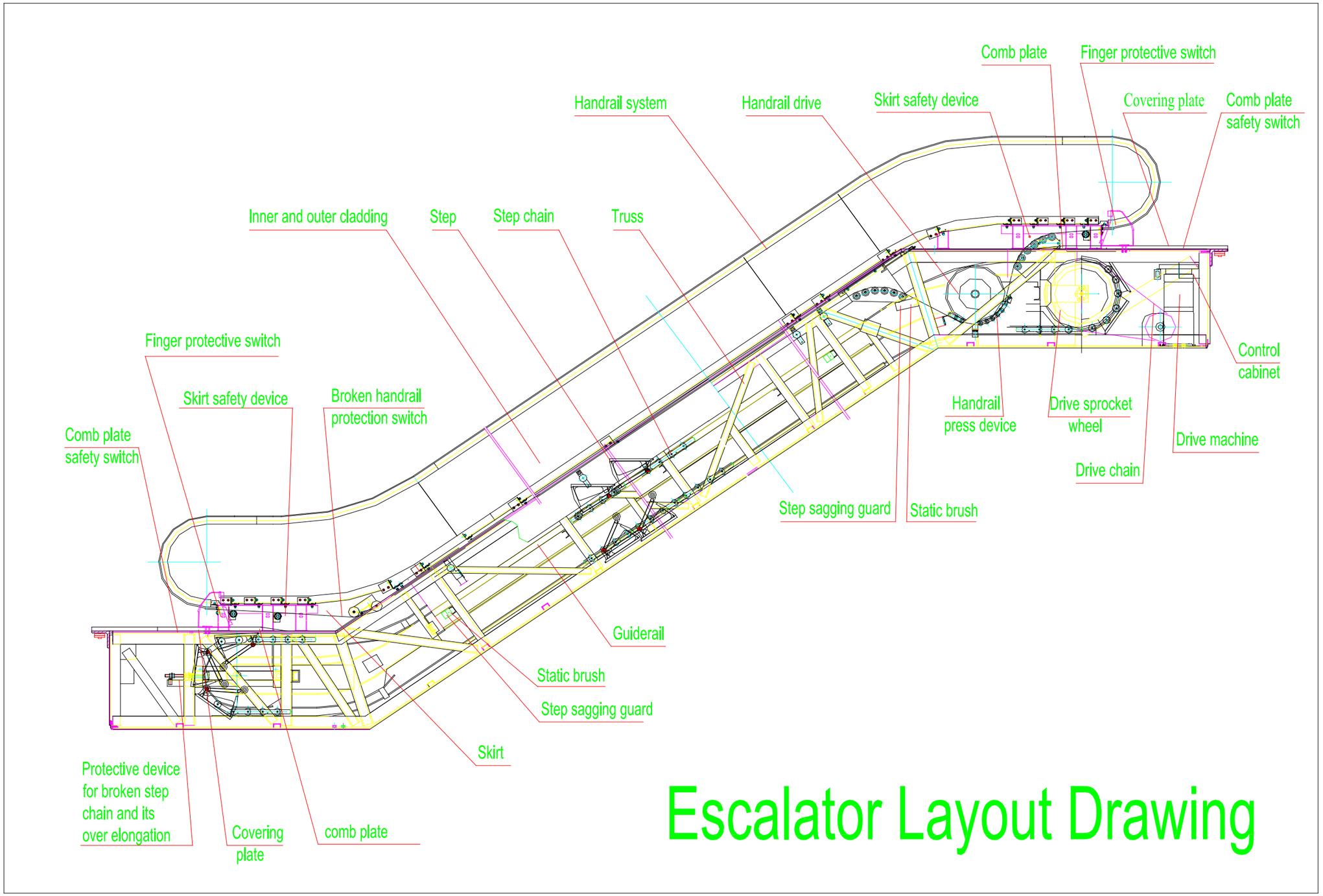
Figure 35 Joining of sections of the truss

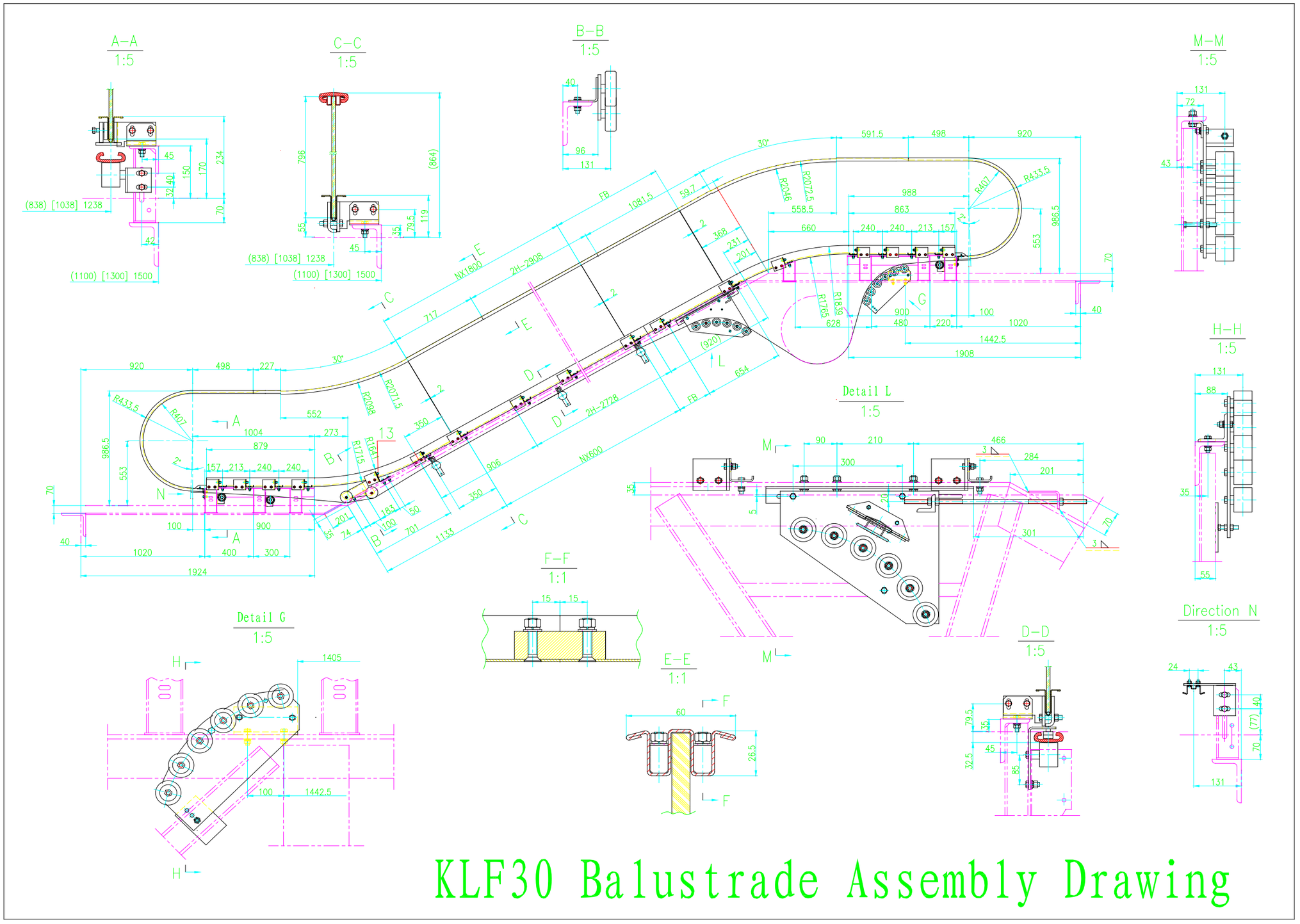
21.2.2 If the display on the dynamometer-type spanner reaches the torque and the nut can not be turned any further, it may be considered that the pre-tensioning force has been applied.

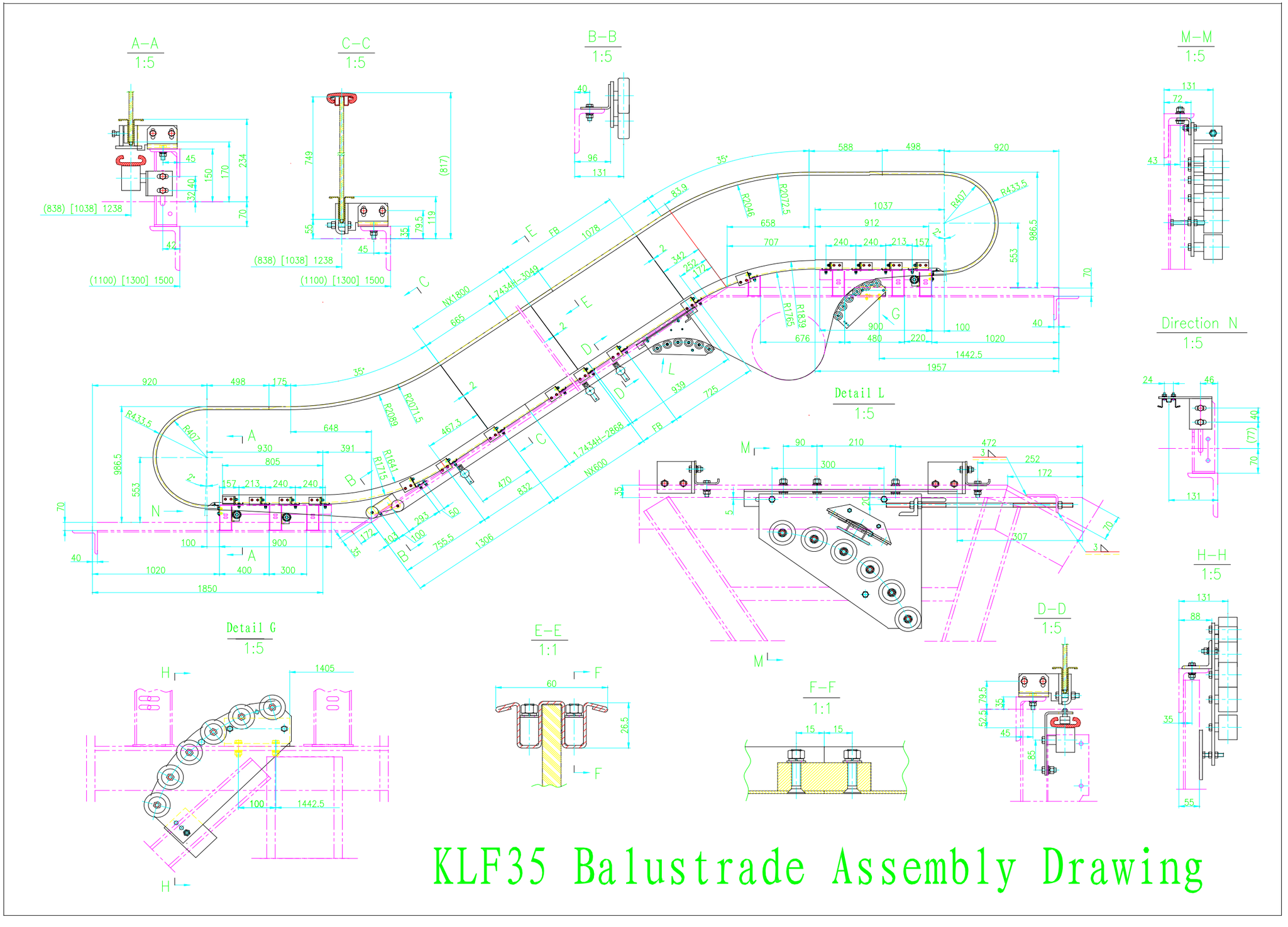
21.2.3 Rated torques and test torques of high-strength bolts are given below：

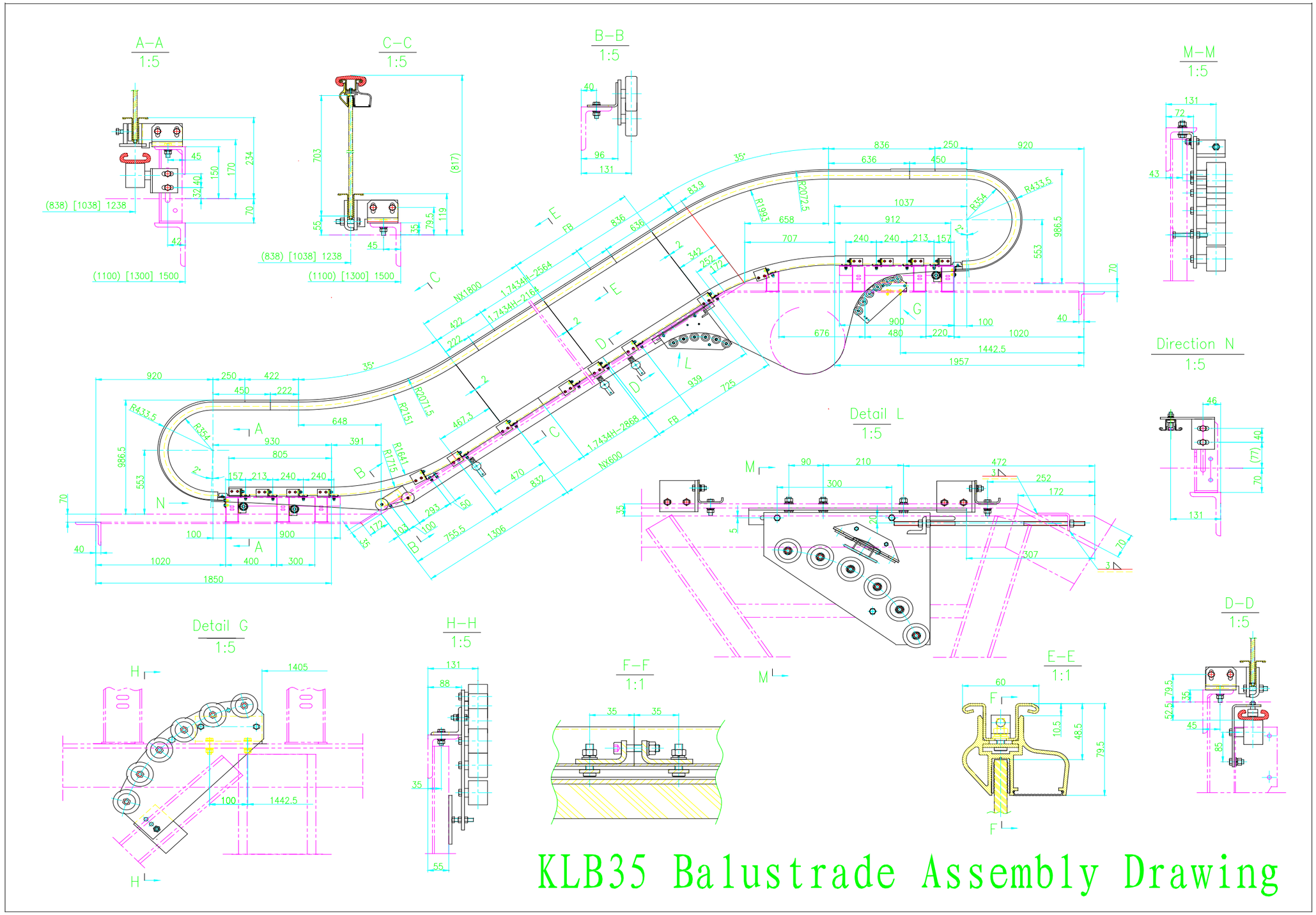
	rated torque	test torque
M16	280Nm	310Nm
M20	490Nm	540Nm
M22	730Nm	800Nm

21.Escalator layout drawing and balustrade installation drawing




A–A
1:5
C–C
1:5
B–B
1:5
M–M
1:5
H–H
1:5
Detail L
1:5
Detail G
1:5
F–F
1:1
E–E
1:1
D–D
1:5
Direction N
1:5
KLF30 Balustrade Assembly Drawing


A–A
1:5
C–C
1:5
B–B
1:5
M–M
1:5
Direction N
1:5
Detail L
1:5
Detail G
1:5
E–E
1:1
F–F
1:1
D–D
1:5
H–H
1:5
KLF35 Balustrade Assembly Drawing


A–A
1:5
C–C
1:5
B–B
1:5
M–M
1:5
Direction N
1:5
Detail L
1:5
Detail G
1:5
H–H
1:5
F–F
1:1
E–E
1:1
D–D
1:5
KLB35 Balustrade Assembly Drawing