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Approved on Oct.19, 2012 Implemented from Oct.19, 2012

I.Purpose

This manual is formulated to help know product structure, understand part and component structure, standardize product installation method and ensure installation quality. This manual is an operational instruction offered for erectors of escalators and moving walks of SES-ESCALATOR

The manual includes a decomposition of the product, as well as a detailed description of assembly method and installation procedure.

II.Scope

It is applicable to installation of escalators and moving walks manufactured by STANDARD ELEVATOR SYSTEMS(SHANGHAI).CO.,LTD

It is distributed to erectors of SES-ESCALATOR and managers of agencies with installation qualifications of SES-ESCALATOR.

III.Responsibility

Technology/quality Department is in charge of formulation and modification.
Engineering Department is in charge of distribution and supervision over its implementation.

IV.Cited standard

GB16899-2011 "Safety code for manufacturing and installation of escalators and moving walks"
Similar as BS EN 115:2011 "Safety rules for the costruction and installation of escalators and passenger conveyors"
Q/SONPI-2000 "Safety code for manufacturing and installation of escalators and moving walks"

Additional remarks
This manual is compiled by Technology/quality Department.
It is implemented from October 19, 2012.

Approved by: Wu WenQing

V.Layout

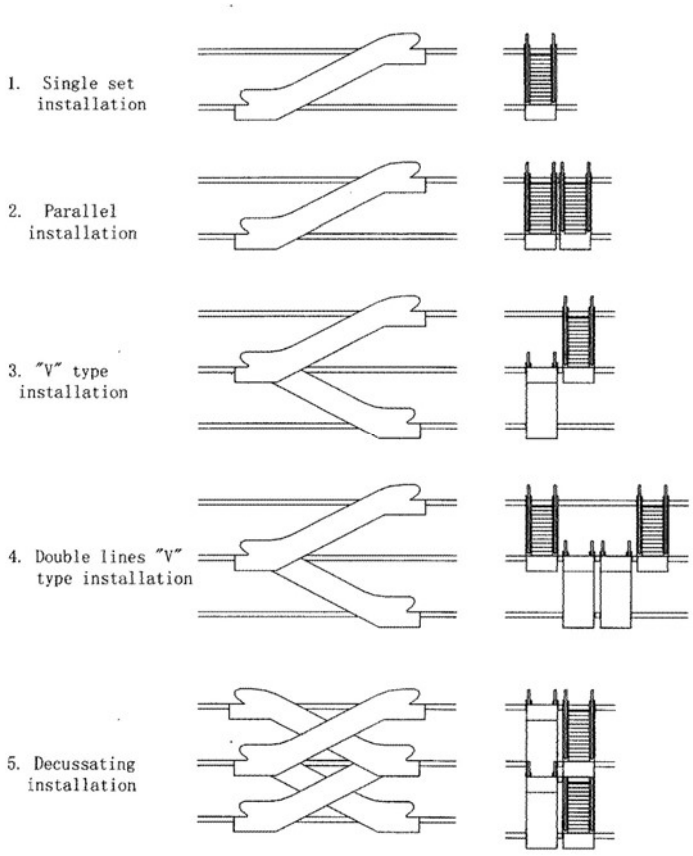
1. Layout

Escalator layout is the basic technical condition for its design and manufacturing, and one of the technical conditions for site installation and application as well. For this reason, when placing the order, the user should confirm the layout along with the escalator manufacturer. The user should proceed with design and construction of civil engineering strictly according to the layout, and correction should be made of non-conformities with the layout requirements in good time.

As the layout generally specifies application and technical conditions for a single escalator or two escalators, in the case of multiple escalators, the layout can be designed and constructed by reference to the layout for single or duplex layout.

Erectors must proceed in accordance with the layout. Prior to installation, they should measure and evaluate civil engineering, and make a conclusion as to whether the installation conditions are met or not. They should report non-conformities and suggestions for corrective actions to the customer in due time so that they can be solved before installation.

2. Basic arrangement of escalators,the clearance between two sets should >350mm in decussation arrangement;

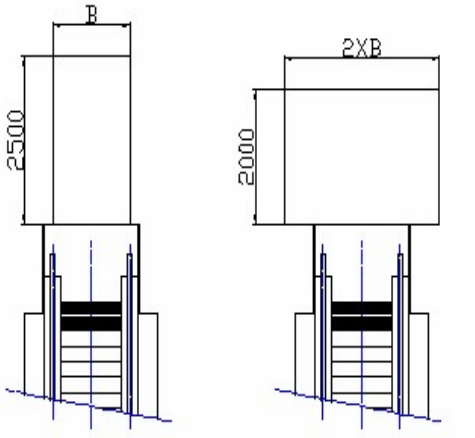


3. Basic requirements and related regulations about the layout

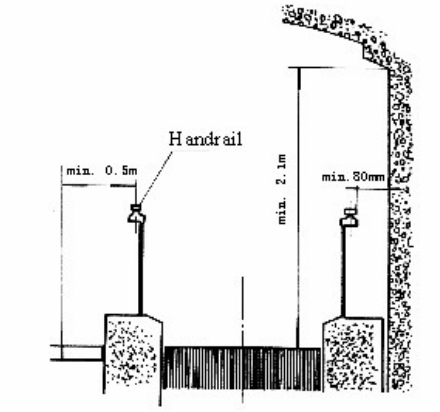
Installation and application environment for escalators must comply with safety requirements. Technical supervision authority will make inspection according to relevant state standards. Escalator layout should normally meet the following basic requirements:

a. The installation/application site must have sufficient space and channels for personnel evacuation;
b. Load-bearing beams of escalators must have sufficient load bearing capacity;
c. The machine room and pit should be dry, and running water and sewage should be prevented from coming into the machine room and pit;
d. The power supply for escalators must be under separate control. The mains power and lighting power should have separate control;
e. Installed escalators should have protective barriers of a sufficient height (above 0.9m) on both sides of the entrance and exit;

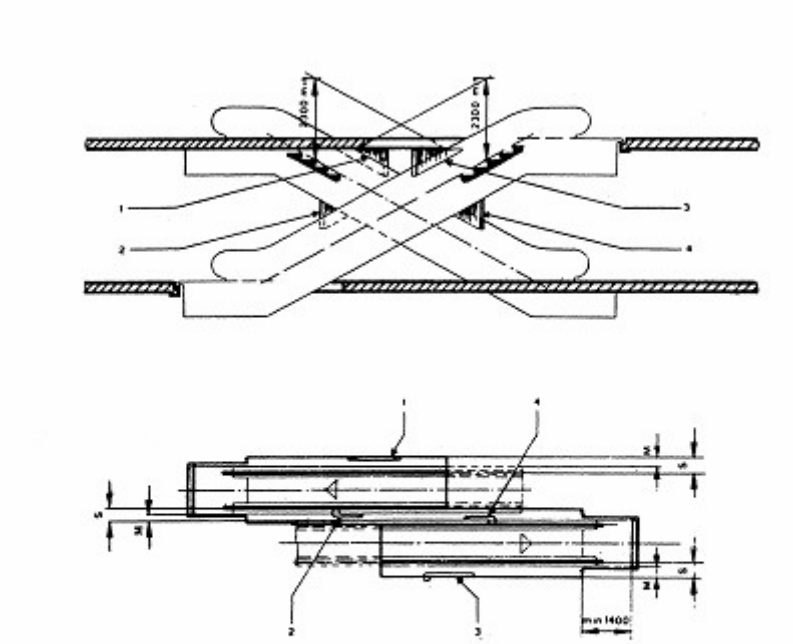
f. At the entrance/exit of an escalator, there must be reserved a sufficient space for personnel evacuation (as shown in the figure below). "B" is the distance between the centers of the left and right handrails.



g. Required distance between the handrail center and the building

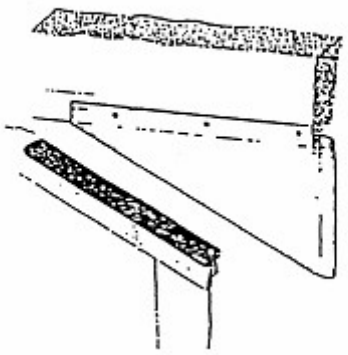


h. For escalators in a crossed arrangement, at the crossing there should be a triangle protection board, which also applies to the crossing between the escalator and the building.



S: 155~500mm, the size of the protection board
Mmin = 10mm
Positions !-4 are protection boards.

Detail:
protection board



VI.Packing and transportation

1. Packing of escalators

1.1 Packing of escalators is classified into one-piece packing and packing in segments, normally determined by product model, transportation way and customer's requirement.

1.2 Balustrade (glass) and cladding(by order) will be packed into one or more wooden case.

1.3 The hoisting ropes being exposed at both ends of equipment for convenient the installation job.

Attention:

A. The hoisting rope is secure when delivered from the factory. At the time of hoisting after its arrival at the site, the hoisting rope should be checked the link of the rope properly(in case that it is damaged or destroyed intentionally during transportation);

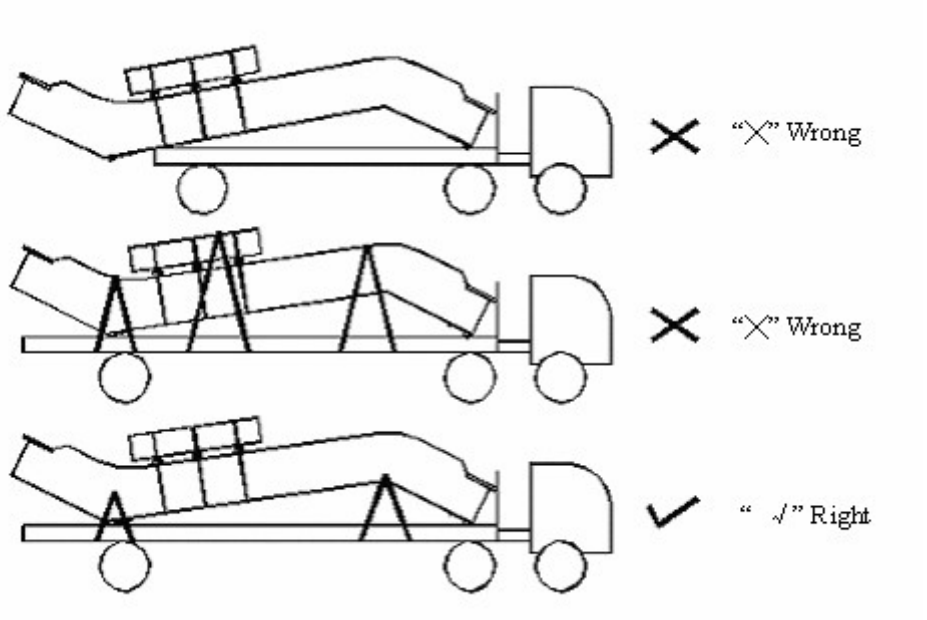
B. Normally, all the parts and components are installed on the escalator or contained in the wooden box.

2. Transport of escalators

2.1 Escalators are normally transported in trucks, ships, but it should be ensured in all cases that the four supporting struts should be under force and stay on the same plane.

2.2 During transportation, the escalator must be securely bound to ensure that it should not displace or incline in any direction. The rope should pass the reserved holes of the packing bag when the bag is used for packing and be bound on the large angle steels or profile steels of the truss. It is forbidden to cut holes on the packing bag or bind it to other escalator parts.

In truck:



In container:

Warning: During transportation by truck, the above mentioned two points must be observed, otherwise, the truss may have permanent deformation or the parts or components may be damaged.

VII.Notices in the process of installation

1. Notices in the process of escalator installation:

1.1 Fix the production conception "Safety first" in mind,keep alert inwardly;

1.2 The staffs should put on helmet,equipped with safety belt and tool packages when entering into the construction site;Having fun,tussling and alcohol drinking are strictly prohibited when they are at work.

1.3 When working on the false work,the staff must keep their feet and grasp the false work tightly.They must fastem their safety belt on the fixed object if the working plate was over 2 meters.When removing the false work,the nails on the wood board must be wiped offf or bended;

1.4 Keep clean in the working area and around to keep a safety checking surrounding;

1.5 There should be adequate lighting in the construction site.The personal lighting must be lower than 36V;

1.6 When using flammable,explosive substances and injurants,the vertilation on site must be guaranteed and the fire fighting equipments must be prepared.If the ventilation cannot be guaranteed,the staff must put on respirator or other exposure suits.Don't put the explosive substances together;

1.7 The electric instruments must be grounded reliably when they needed.The creepage protection device should be matched with them and they should not be used in humidity condition;

1.8 The gas cutting devices should be kept appropriately and the mark of "No firework" should be set.The distance among fire fighting instruments,oxygen bottle and acetylene bottle should not less than 7meters and at least 10 meters away from the fire source;

1.9 When taking electric welding or gas cutting work,the jockey should have certificate.The fire extinguisher should be equipped before the work;

1.10Avoid the unwholesome liquid spatters on work clothes;

1.11Unauthorized person cannot startup the unchecked escalators at random;

1.12After everyday work,the staff should make sure that all tools and useless objects were dealt with and all work was finished.They also should check all switched and make sure all fireproofing equipments are in good condition;

1.13The first-aid kits must be prepared on every construction site;

VIII.Preparation of the installation site

1.1 The person in charge of installation and customer representative should checkup all components,attached files and see if the packing was damaged in the precess of transportation.Please contact the after-sale service department promptly if such problems were found.

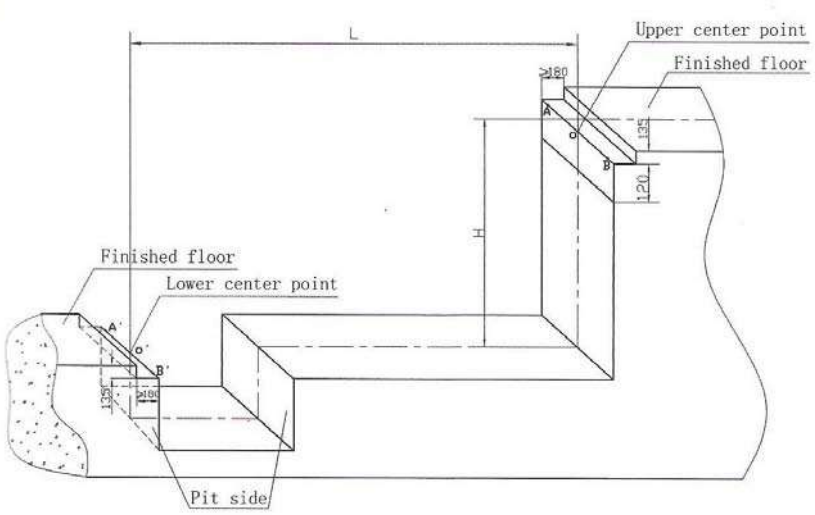
2.2Checking-up of hoistway

To guarantee the installation will be carried out smoothly, the technical parameters such as the width of escalator, rising height, inclination angle and others should be known according to the attached files. The construction dimension should be rechecked to see if it is accord with the requirements in escalator construction dimension drawing. No leakage in the bottom pit, the interior side of the pit should be even.The specific methods are as follows:

2.2.1 The recheck work for construction dimensions of escalator should be finished before shifting it into the installation place. The construction requirements and dimensions should be rechecked strictly in accordance with the escalator construction arrangement of our company;

2.2.2 The upper and lower horizontal supporting points should be rechecked of see if the correct horizontal supporting distance of escalator's angle of inclination are in accordance with the sample requirements and if the step size, fish plates and two supporting points are satisfying the installation requirements;

2.2.3 The vertical distance between the upper and lower horizontal support of escalator should be rechecked to see if it according with the drawing requirement H±5mm offered by the manufactory company. The vertical distance H is the distance between two finished floor levels. The inter-floor height should be measured practically. If the real inter-floor height H is not according with the requirements of construction drawing offered by the manufactory company, the measures should be taken by construction company;



2.2.4 Finding and marking the installation center of the whole escalator between the clear dimensions of upper and lower supporting beams, marking the centers of upper and lower supporting beams at the same time. Then the level distance L between it should be measured to see if it is according with the requirements and the permissible deviation should be within the requirements of escalator construction dimensions;

2.2.5 Within 120mm, the interior wall of upper and lower supporting beams which are close to escalator must be vertical and even;

2.2.6 The construction of escalator with pit should be accordance with the requirements of 2.2.3, 2.2.4 and 2.2.5. The length, width and depth of pit should be rechecked according to the construction drawing. The symmetry line of the pit should be consistent with that of the upper supporting beam. The pit should be even and without any leakage. The length, width and depth should be according with the requirements of construction drawing;

2.2.7 The steel panel should be checked if pre-buried on the step surface of upper and lower supporting beams. The distance between the upper level of pre-buried steel panel and the finished floor should be 135±5mm. The steel panel must not be buried slantwise, and the edge of it must not exceed the supporting beams;

2.3 Check the customer power supply, to see if its capacity satisfied the requirements, if it satisfied the "tree-phase-five-line" requirement, if it connected the ground reliably and if its power supply circuit connected into the machine room. Communicate with the customer promptly if the problems were found;

2.4 Check the power source of escalator to see if it was a temporary one, if yes, inform the customer unit to change into formal power supply source immediately;

2.5 Check the specification of power source conductor, cable line and other control lines of escalator to see if they accorded with the drawing requirements. The quality of neutral wire should meet the requirements;

2.6 The special brake box of construction power source should be set with warning sign. The short circuit and overload protection device must be set on all circuits. The leakage protector control must existed if handle appliance needed;

2.7 The power source of machine room must be controlled by switch, which should be set at convenience place. The fuse should be formal one, it cannot be replaces by steel wire and brass wire.

IX.Hoisting/positioning and level adjustment

1. Attention for Hoisting position

1.1The shift and position of escalator must be carried out by professional team, and the transport vehicles must be in accordance with the transport requirements. The general transport method should cater to transport a whole escalator. But it also can be manufactured and transported in sections after confirming with the manufacturer. The special hoisting steel cable should be located at four corners of the truss, and the escalator should be hoisted from this position.

1.2.Preparation of hoisting tools and hoisting scheme

1.3 As a heavy bulk, the escalator shall normally be hoisted and positioned by a specialized hoisting company, but an installation company with corresponding qualifications can do it by itself.

1.4 Before hoisting, a detailed operational scheme shall be made (including short-distance transport route, butt way and hoisting approach), and personnel and tools (such as hooks, rollers, wire ropes, winch, chain block) shall be provided accordingly. Before operation, it should be confirmed through calculation or empirical estimation that the hook block has sufficient safety coefficient, and the transport route has a sufficient turn-around space.

1.5Operators shall be on alert throughout the hoisting process under unified control of the assigned person.

1.6Problems encountered during hoisting shall be analyzed carefully and solved properly.

1.7Hoisting safety code shall be observed strictly.

1.8Wire ropes and chains shall be prevented from bending sharply to avoid reduction of the load bearing capacity.

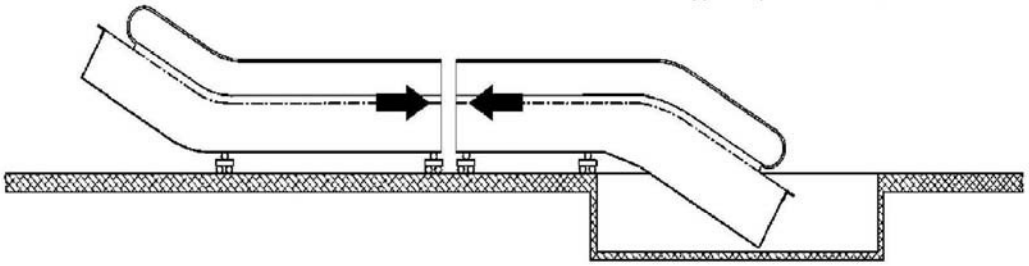
1.9As the escalator is of a frame structure with external decoration, any force can only be exerted on several hoisting points and not on any other locations in order that escalator deformation and damage may be avoided.

1.10Hoisting wire ropes as provided by the factory shall be used wherever possible, but make sure that they are in good shape and the hoisting pins are securely fixed.

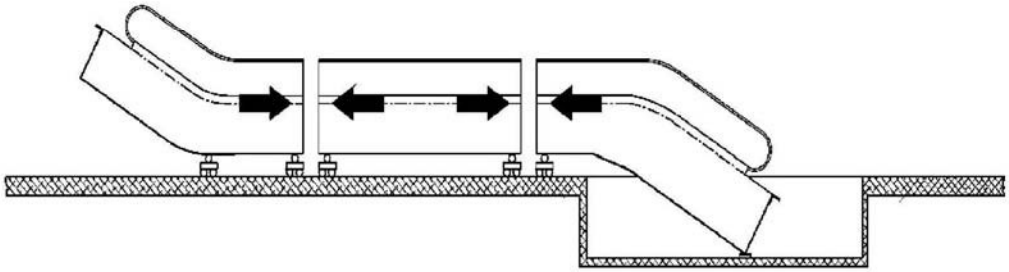
2.Butt of escalator segments

2.1Align the escalator segments properly to have supporting points at both ends touch the ground (or floor).

Supplied by two sections

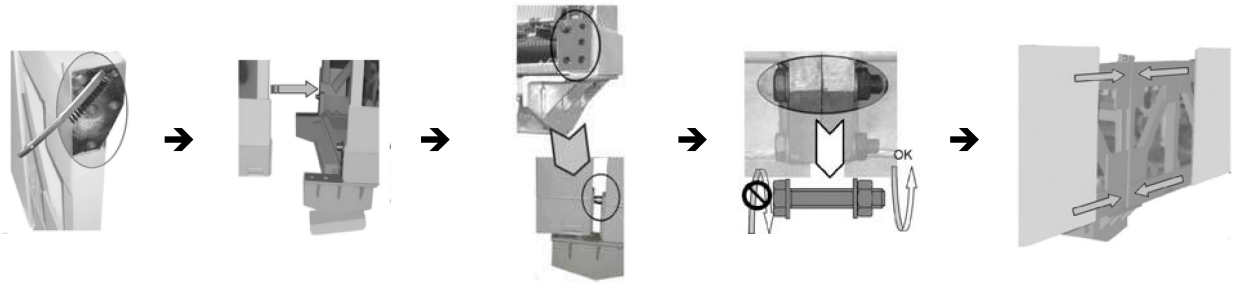


Supplied by three sections



2.2Use the wire ropes at the segments to hoist, move and align them.

2.3Clean the two delivered positioning pins as well as all high-strength bolts (grade 10.9), washers and nuts (grade 10), and smear them with a little oil or butter.
Insert the above pins and high-strength bolts, put the washers in place, and tighten the nuts (the bolts, nuts and washers must be completely new and suitable for steel structure).



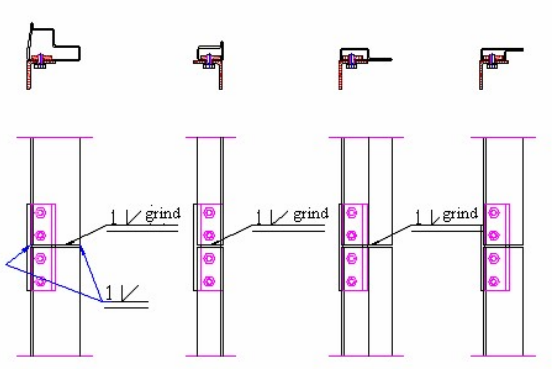
2.4Retighten all connecting nuts with a torque spanner according to the torque as specified in the following table.

Bolt specification	Rated torque Nm	Test torque Nm
M16	280	310
M20	490	540
M22	730	800

2.5Put the jam nuts in place and tighten them.

Warning: During butting of the escalator in segments, use of non-conforming bolts, nuts and washers, or failure to exert the specified torque might cause serious consequences.

2.6Remove the hoisting wire rope and traverse rod from the butt.
2.7Butt all step guide rails according to the figure below to ensure they are aligned, and connect them through welding. For the guide rail of the main roller, there shall be three seams for the upper surface and the two sides, while for other guide rails, only the upper surface need to be welded.

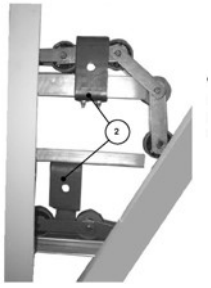


2.8Align balustrade glass clips at both sides and weld them at the two sides.

2.9 Use a angular abrasive wheel to grind the upper surface of all step guide rails, and polish them with abrasive paper suitable for iron.

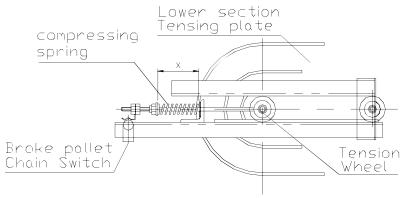
2.10 Use step chain links to connect the step chain (links should be inserted outwards), and install battles with a shaft battle pliers.

2.11Remove the chain positioning clip or tensioning wire.



2.12Install the skirting at the segment edge, ensuring a flat skirting butt without displacement and a gap over 1mm between the lower C-shaped piece and the main step roller.

2.13Press the step chain tensioning(compressing) spring to the measurement showing on the truss in the lower machine room.

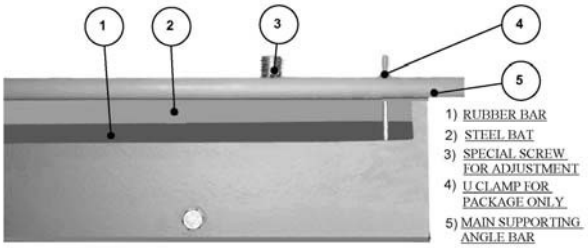



Measurement for compressing spring

3.Support assembly at both ends of the escalator

3.1 Delivery status

The support assembly consists of rubber pad 1, steel plate 2, 3, U-shaped suspension 4 and nut 5. Four height-adjusting screws 6 are on the support angles.

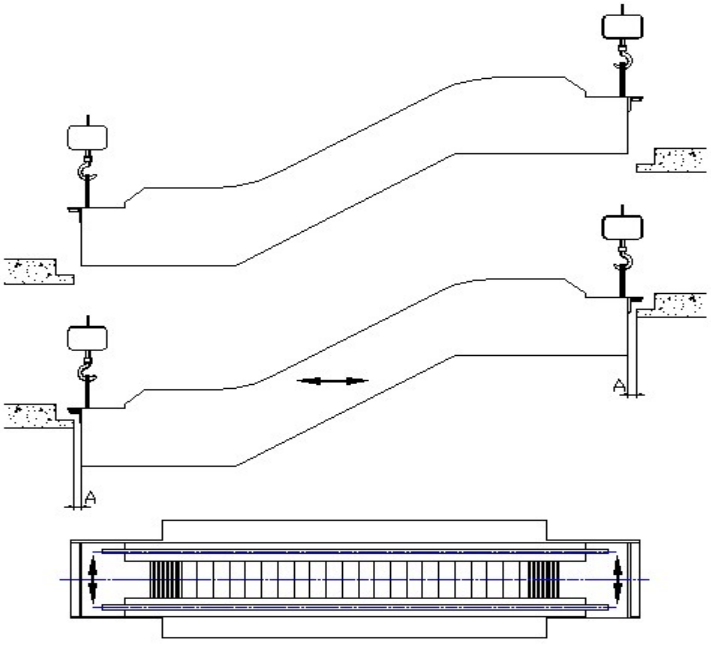


3.2 Hoisting/positioning and adjustment

3.2.1 Hoist the hook according to the prepared hoisting arrangement, and make sure that the hook can bear sufficient gravity.

3.2.2 Put the hoisting wire ropes at both sides of the escalator in the hook, and slowly hoist the escalator to the position shown in the figure below.

3.2.3 Align the escalator to the building opening and let it fall slowly after its longitudinal and traverse positions are so adjusted that A (distance between the escalator and the building) at both sides are equal (the theoretical dimension of A is 40mm), and the axle line of the escalator coincides with the building.

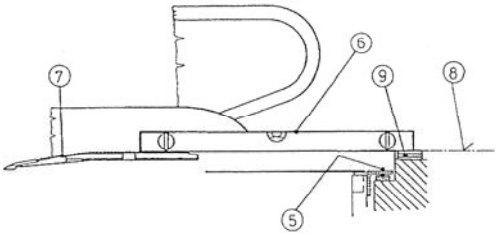


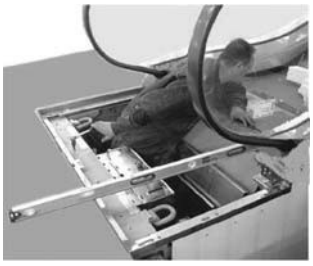
X.Adjustment of supporting height and level

1. Adjustment of supporting height of the escalator

1.1 Remove the nuts from the V-shaped suspension.

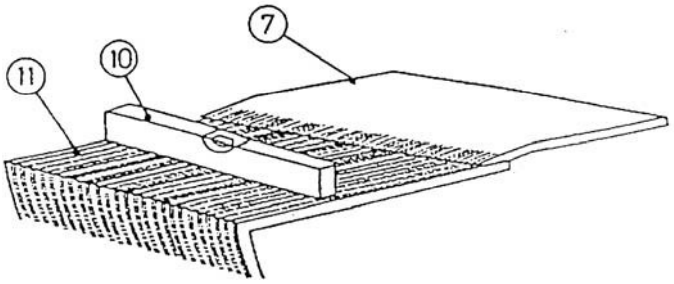
1.2 Put one end of level gauge (6) (or a ruler and a level gauge used in combination) on comb plate (7), and the other end on finished ground (8), (In case of the building ground being not finished yet, the user shall provide a reference point of the same height of the finished ground before the supporting steel angle of the escalator). Adjust the two regulation screws in the vicinity of both ends in such a way that the comb plate and the finished ground stay at the same height.





2. Adjustment of horizontal level of the escalator

2.1 Put a precision level gauge (10) (such as one for the mechanists) of at least 300mm length (12") on the first step (11) before the comb plate (7). Use the two height regulation screws in the vicinity of the two ends to adjust the step level.



2.2 Check again if the comb plate and the finished ground stay at the same height.

2.3 Tighten the two regulation screws in the middle.

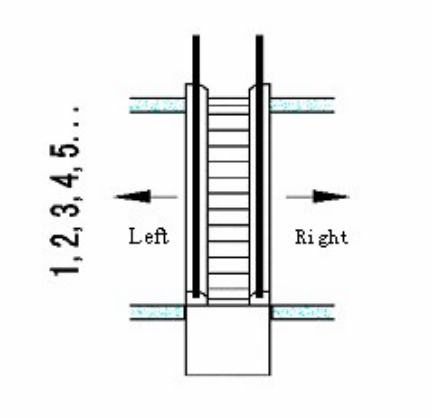
XI.Installation of handrail giude

1. Delivery condition

1.1 The handrail supports are fully pre-installed and commissioned in the factory. All the fixed parts need no adjustment (with exception of those that have been damaged or deformed in the course of transportation and hoisting).

1.2 The escalator is delivered ex works with glass clamping guide rails being positioned through welding at the lower end, and with the installation locations for upper and lower R balustrade glass being marked (with gluing paper at the glass clamping profile).

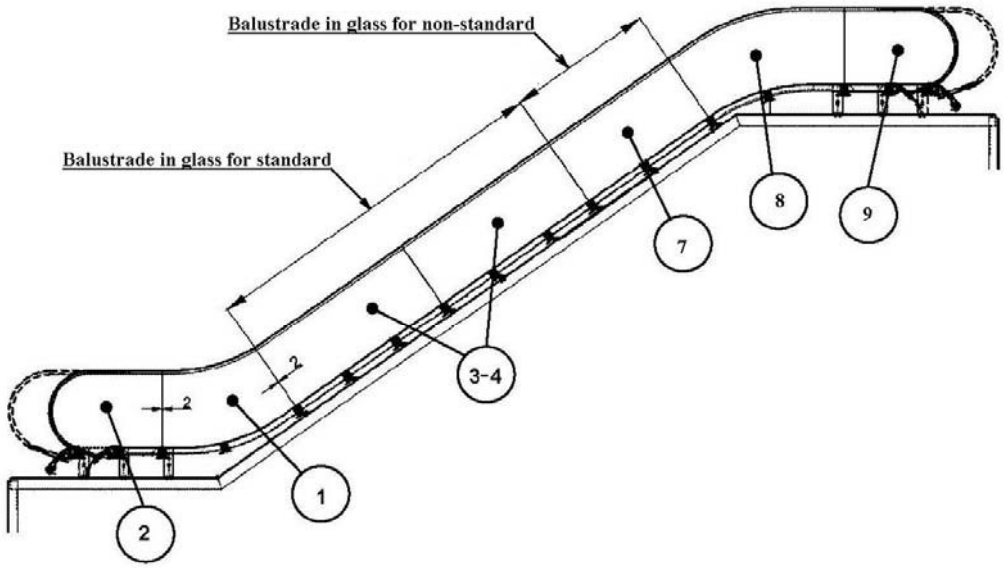
1.3 All dismantled parts are marked for the left side, right side, and installation sequence.



2. Preparation for the installation

2.1 Tempered glass is the supporting part for the whole handrail device.It is installed in the clamping frame and provided with pad.

2.2 The installation of glass should begin from the lower part;a piece of round glass can be installed first and being positioned for next glass.Other glass in the beeline section should be orderly installed;there must be provided with pad along every glass.

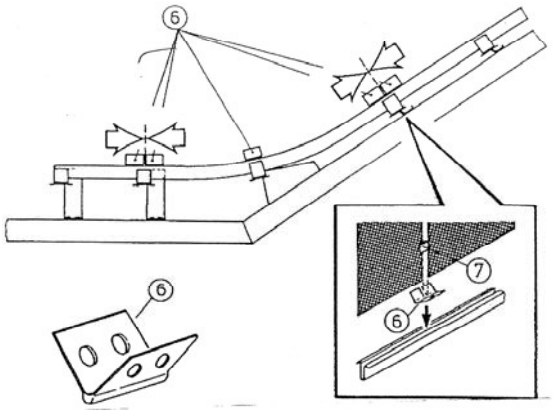


Glass installation steps from 1 to 9.

2.3 The clearance between glassed must not exceed 4 mm.The permissible deviation must not exceed 3mm.The center distance between glassed can decide the center distance of handrail.

2.4 Installation of balustrade glass shall proceed simultaneously on both sides in the sequence shown in the above figure.

2.5 Before installing each balustrade glass, insert pad (6) at each clamping location and have it in the "V" form. At each seam there shall be two pads in sequence, and each pad may not clamp two pieces of balustrade glass at the same time.



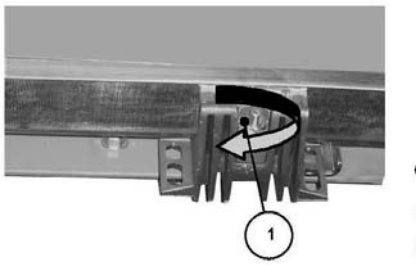
6.Pad
7.U-shaped rubber strip

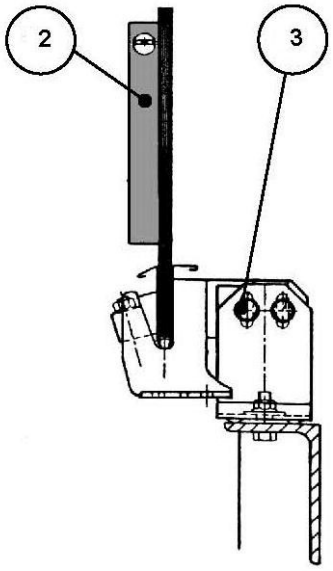
2.6Flap the balustrade glass with a rubber hammer to drive it into the right position completely, after it has been inserted into the clamping profile. Adjust the glass position properly to ensure a 2mm gap between glass. In the case of difference

between the upper and lower widths of the gap exceeding 1mm, pull out the balustrade glass, put some plastic slices at the end (may be made from the remaining pads), and insert the balustrade glass again to ensure that such difference should be below 1mm.

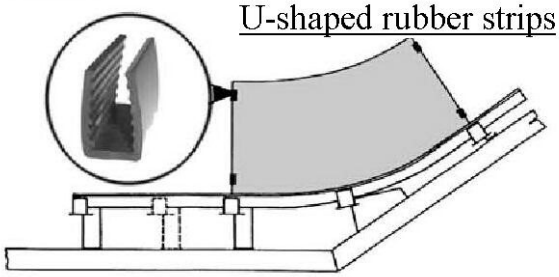
2.7 As shown in the figure below, tighten bolt 1 (with a torque of approx. 35Nm), and tighten jam nut 1.

2.8 Check to see if the balustrade glass is vertical or not by using a level gauge 2 or plumb line. In the case of deviation of verticality between the upper and lower ends exceeding 3mm, loosen bolt 3, adjust the verticality of the balustrade glass, and then tighten bolt 3. Make sure that the clamping profile should not fall off during the adjustment.





2.9 As shown in the figure below, put the 20mm long U-shaped rubber strip into the joint of the balustrade glass to prevent damage of balustrades due to impact between them during glass installation and ensure a gap of 2mm.

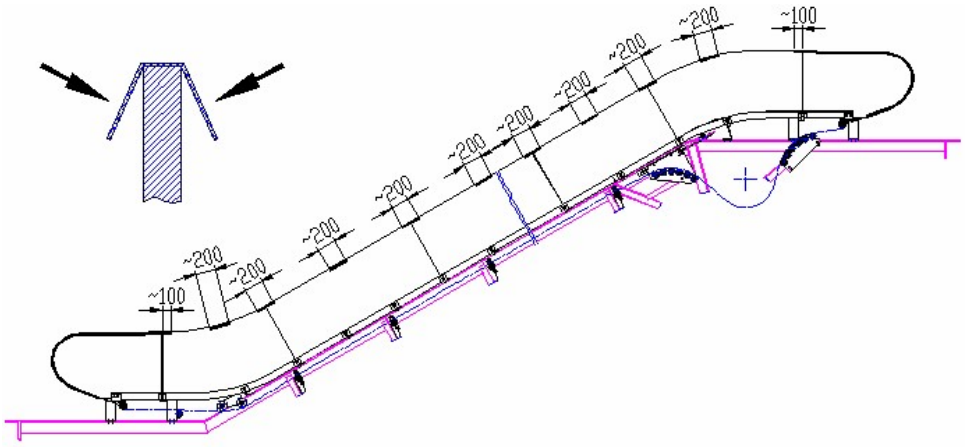


2.10Check the location of the fringe of the upper R balustrade glass. If it deviates from the mark on the clamping profile by more than 1mm, readjust the balustrade glass in the straight section again. Adjust the positions of the balustrade glass in the straight section and the upper R balustrade glass by increasing or decreasing each glass gap, but it must be ensured that the gap between the balustrade glass should remain between 1 and 3mm.

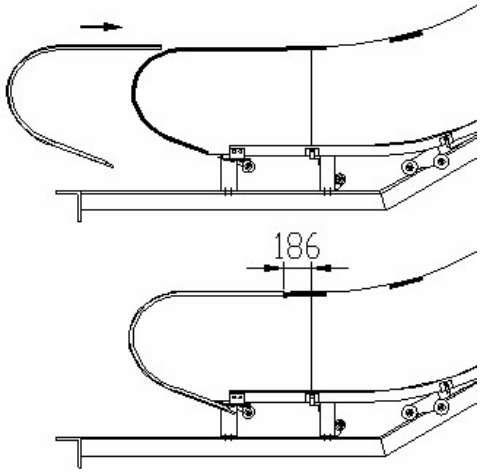
3 Installation of handrail support profiles

3.1 As shown in the figure below, glue the double-faced adhesive tape, with equal width on the two sides, and folding should be avoided wherever possible. Remove the protective film from the surface of the tape.

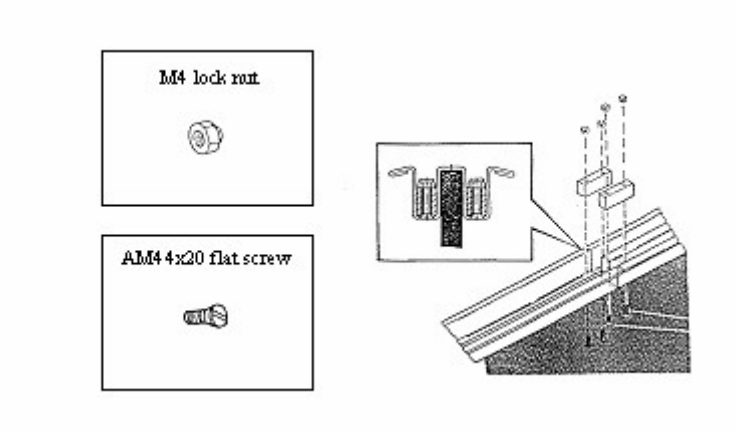
3.2 Coat the external surface of the tape with sufficient talcum powder and have it permeate into the tape (If there is not a sufficient amount of talcum powder, it would be difficult to move the profile once pressed in).



3.3 As shown in the figure below, put the handrail profile for the lower end around the balustrade glass and flap it with a rubber hammer to drive it into the right position completely first.



3.4 Install the handrail support profiles section by section in the left and right direction and the right sequence as shown in the configuration of the packing list, and connect the profiles in the sequence as shown below.

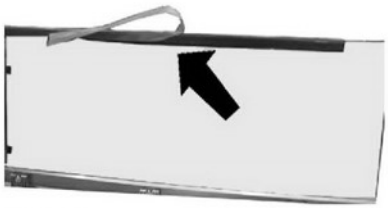


3.5 Install the handrail support at the upper end in the same way as described in 3.1, 3.2, 3.3 and 3.4

3.6 Check the joints of all handrail support profiles to make sure that the gap is smaller than 0.5mm, sequential displacement is smaller than 0.5mm, and the surface is clean and free of burr. Otherwise, correction should be made through use of adjustable spanner, steel pliers and files, or they should be installed over again (handrail support profiles may be displaced properly).

3.7 Check the spring connection at both sides of the roller guide chain on the handrail supports at the upper and lower ends to see if it is reliable. Make necessary adjustments.

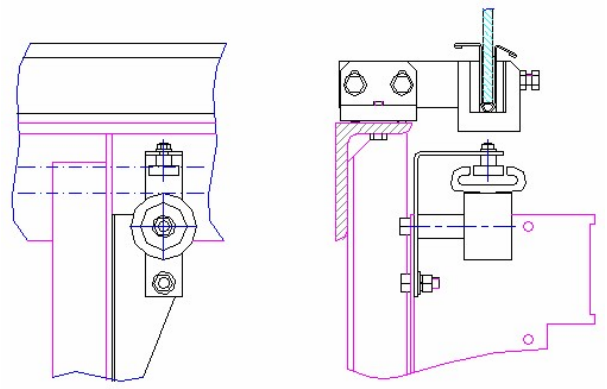
3.8 Use a sharp blade to cut off all adhesive tapes that are exposed from the handrail profile.



XII.Installation of handrails

1.0 Put hard paper or other materials on the steps and lay the handrail on the steps. Do not pull the handrail at will so as not to scratch it.

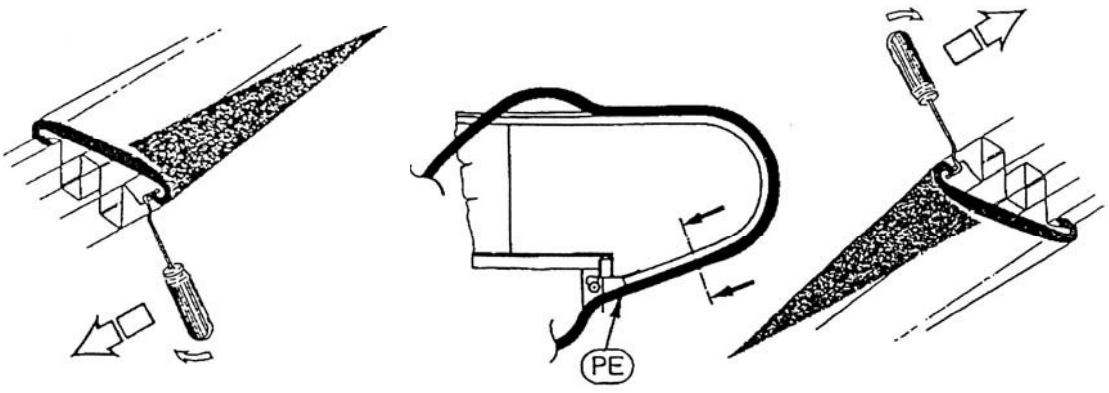
2.0 In the case of an escalator in segments, as shown below, put the handrail on the bracket wheel, and erect the anti-deflection pulley. In the case of one-piece escalator, make checks in accordance with the figure below.



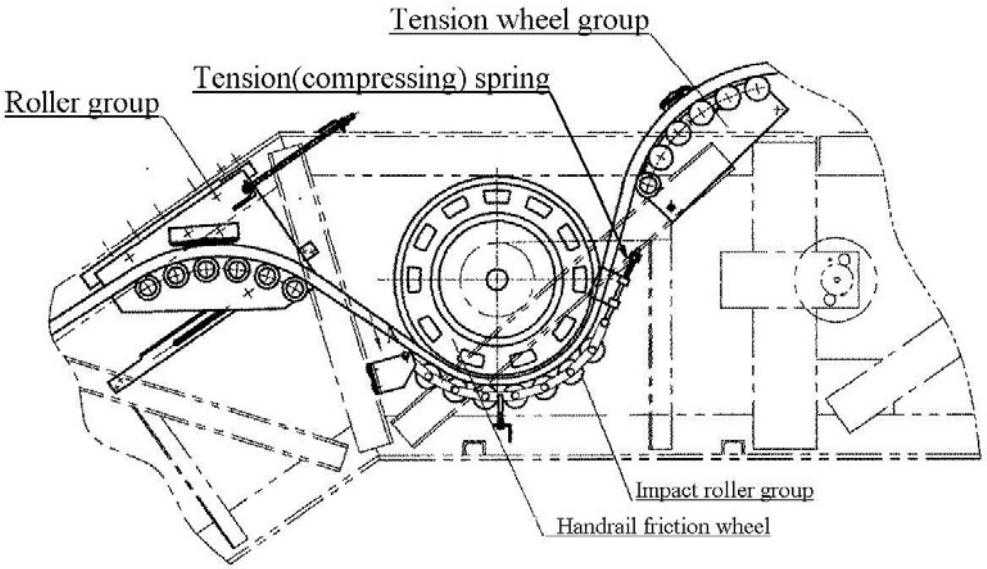
2.1 Remove the protective paper from the handrail entry, and put the handrail on the outer layer of the handrail support profile.

2.2 As shown below, put the handrail around the profile at the lower end of the upper end handrail support (PE).

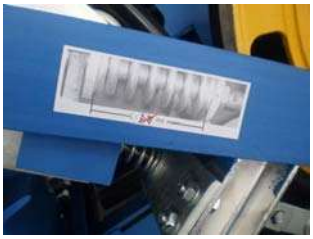
2.3 Use special handrail hooks to slowly place the handrail downward into the support profile. It may be flapped with a rubber hammer to facilitate the operation, but hard tools such as screw drivers and pliers may not be used to avoid damage to the handrail.



2.4 Tighten the impact roller group so that the spring is compressed to the measurement showing on the truss.



Handrail tension and press belt device



Tab indicate the measurement of tensioning spring for handrail drive.

XIII.Commissioning of the whole set

1. Delivery status

1.1 The escalator has undergone an accurate commissioning before ex-work delivery. With exception of the handrail, which is dismantled, other components do not need readjustment.

1.2 The skirting, as the guide for step operation, has been adjusted strictly before delivery from the factory. Do not dismantle or adjust it at will, unless required in special cases.

2. Remove all miscellaneous objects from the escalator, and dismantle the separating plate for the lower machine room.

3. By reference to Section XVI "Specifications of electrical commissioning on site" of this manual, connect the set to the power, make electrical check for the first operation, and keep the equipment in the inspection travel status (namely, with the inspection tableau inserted in the socket).

4. Slowly inch the escalator in both directions by using the inspection tableau (do not stand on the step for the operation), and adjust the handrail roller group so that spring 1 has a length of 50mm.

5. Check handrail operation to make sure that it runs in synchronization. If the requirement is not met, make adjustment in the following ways.

5.1 Synchronization check of handrail,specific operations are as follows:

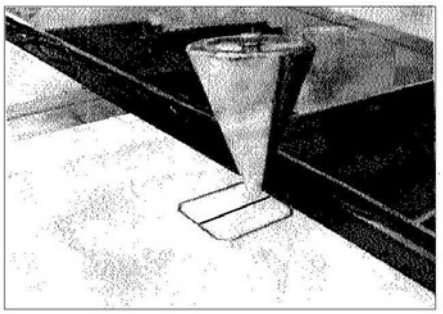


Fig1

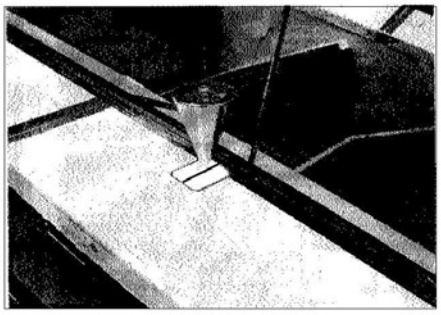


Fig 2

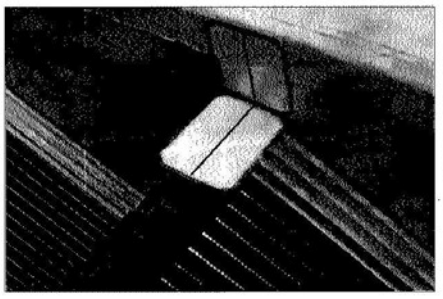


Fig 3

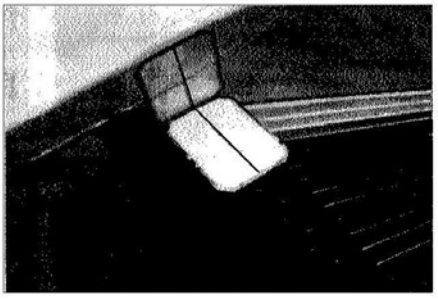


Fig 4

Approved on Oct.19, 2012 Implemented from Oct.19, 2012

5.1.1 Stick a marker on the surface of straight line section and then decide the corresponding position on the exterior covering plate by using the line regulator(See Fig1).At the same time,make a mark on the step and decide the corresponding position of skirt plate(See Fig 3);

5.1.2 Startup the escalator and let it run some distances upward or downward(Don't over the straight line section).Decide the corresponding position on exterior covering plate according to the mark on handrail(See Fig 2).Decide the corresponding position of skirt plate according to the mark on step(See Fig 4).

5.1.3 Measure the distance between two marks on exterior covering plate L1 and two marks on skirt plate L2,the synchronization rate of handrail can be calculated(L1-L2)/L2.The average value we can get from many of our measures are:L1=3824.5mm,L2=3788,then the synchronization rate=(3824.5-3787)/3787=99%,which in the normal range of 0~+2%.

5.2 In experience,if the handrail sag between two handrail supporting rollers in the straight section exceeds 20mm after a upward travel, further tension the handrail roller group to achieve the above sag between 10 and 20 mm. If the handrail still can not run in synchronization, make adjustment in the following steps.

5.3 Dismantle 2~3 steps in the lower machine room, and move the step opening to a position before the comb plate. Press the emergency stop button on the inspection tableau, cut off the mains switch, step into the step line to press properly the spring of the handrail press device, and after stepping out of the step line, make a trial run until the handrail synchronization requirement is satisfied (If the spring is pressed too much, the life cycle of the V-belt will be shortened although handrail synchronization is ensured. During downward operation, the handrail should be able to be brought to a stop by a pulling human force).

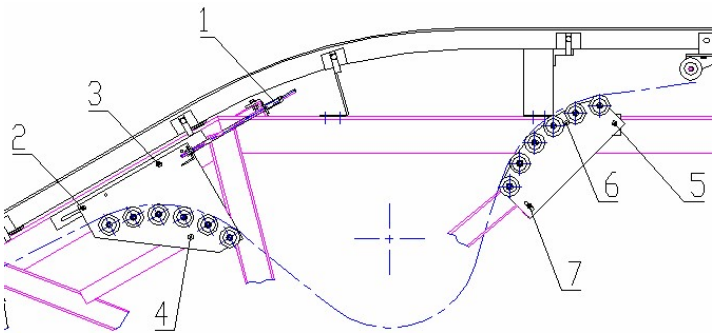
6. After a up and down travel of the escalator, the clearances at the internal and external sides of the friction sheave should be basically the same (the difference between them should be smaller than 2mm). If this requirement is not met, make adjustment in the following way (Fine adjustment should be made step by step. During up and down travel, observe the effect, otherwise, the ex-work delivery status might be lost).

6.1 If the clearance at the internal side of the friction sheave after an upward travel is too small, drive backward nut 7 as shown below to let the upper handrail roller group guide inwardly. Otherwise, drive in nut 7 to let the upper handrail roller group guide outwardly.

6.2 If the clearance at the internal side of the friction sheave after a downward travel

is too small, drive in nut 4 as shown below to let the handrail tensioning roller group guide inwardly. Otherwise, drive backward nut 4 to let the upper handrail roller group guide outwardly.

6.3 Tighten the adjusted nuts and bolts.



7. Adjust the tensioning spring of the step chain in the lower machine room. Press the tensioning spring of the step chain to a proper length. Empirical dimensions of the tensioning spring of the step chain:

H<4000	press the tensioning spring of the step chain to: 125mm
4000<H<6000	press the tensioning spring of the step chain to: 120mm
H>6000	press the tensioning spring of the step chain to: 115mm

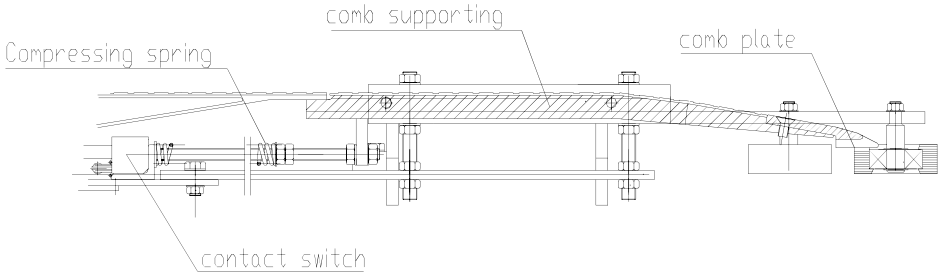
After more than one round upward and one round of downward inspection travels, check the step chain at the reversion point in the lower machine room and make sure that it should stay symmetric in the middle on the left and right reversion rails in steady transmission. Otherwise, the following inspection is necessary.

7.1 Check to see if the moving trolley of the step chain tensioning device is jammed or not;

7.2 Check to see if the intermediate transmission part of the step chain is normal or not.

8.Comb Safety switch

Behind each comb, on both sides, there is a contact switch. it will activated When there is something blocking the conveyor to bring the conveyor to a halt.(see Diagram as below)

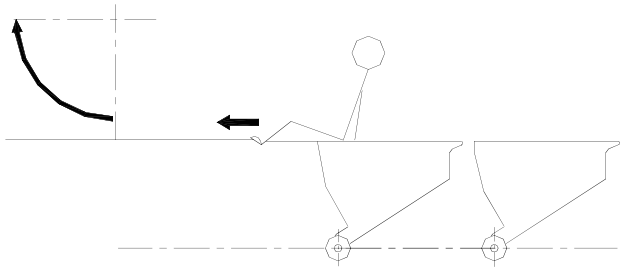


8.1Adjustment method 1:

a. Disassemble 2 comb plates and 3 steps.
b. Examiner may sit on one step, facing comb plate with feet pushing comb plate to move abound 5mm. Turn on the switch
c. Drawing back feet, comb plates shall restore its original position and the switch shall reset.

8.1.1Adjustment method 2:

a. Disassemble 2 comb plates and 3 steps.
b. Use 2 long sticks to withstand against the inner horizontal channel, push the pallet of comb plate to move and turn on the switch.
c. Draw back feet to let the pallet restore its original position, then reset switch.



8. 2During upward and downward travels of the escalator, check the adjustment result. In case of no abnormality, put the removed steps and separator board of the machine room into their original positions.

XIV.Installation of inner and outer decks

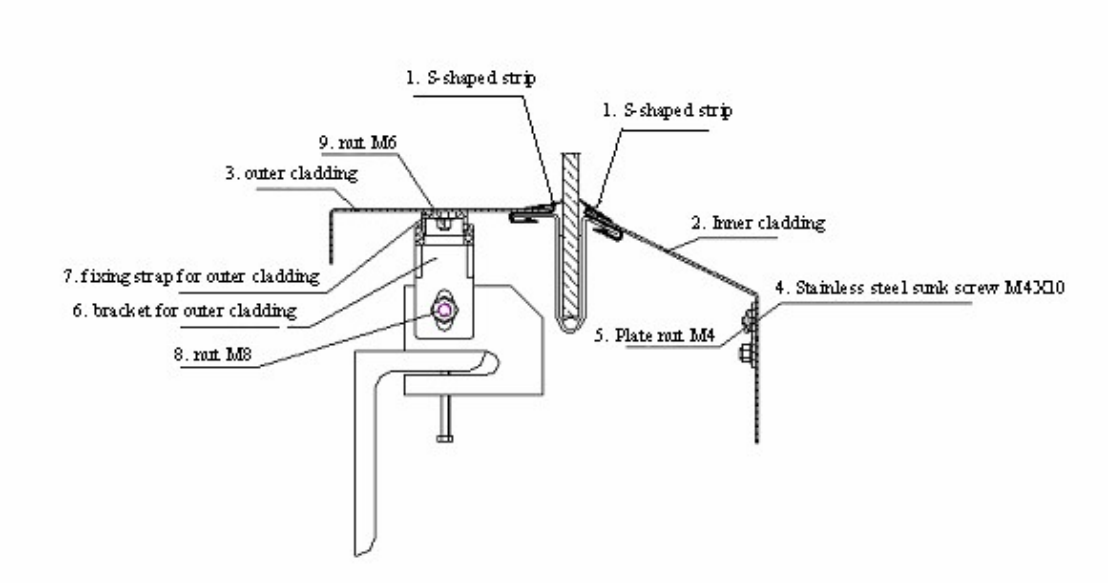
1. Delivery status

1.1 All the inner and outer decks are pre-installed in the factory.

1.2 All the dismantled inner and outer decks assemblies are numbered by the left and right direction and the sequential order.

2. Installation of S-shaped strips

On both sides of the balustrade clamping profile, insert S-shaped strip 1 in the downward direction. Use a file at the joint between segments. At the upper and lower ends, it should be longer than the clamping profile by more than 50mm.



3. Installation of inner deck

3.1 Check plate nut 5 on the skirting to see if it is intact or missing or damaged. If it is missing or damaged, replenish it.

3.2 Install the key switch tableau on the upper R and lower R inner decks (pay attention to the direction in words of the key switch and emergency stop button, and do not over tighten lock nut M6). Bind the cables to the skirting bracket or other parts by using binding tape or wires to ensure that escalator cables have no friction with the handrail.

3.3 Insert lower R inner deck in the S-shaped strip in such a way that the lower end is aligned with the skirting. Put M4 stainless steel screw 4 in all the sunk holes of the inner deck to clamp them against the plate nut (When tightening, press downward the inner deck so as to reduce the seam between the inner deck and the skirting).

3.4 Install the straight sections, non-standard section and upper R inner deck upward in the sequential order. In case of distinct gaps at the butt location, use a file for necessary trimming.

3.5 Check the upper end to see if it is aligned properly with the skirting. If it is longer than the skirting, adjust the length of the inner deck in the non-standard section. Conversely, displace all the inner decks properly so that deviations at the upper and lower ends are the same.

4. Installation of outer decks

4.1 Check fixing strap 7 of the outer deck to see if it is intact. If it is missing or damaged, replenish or restore it.

4.2 Install lower R, straight sections, non-standard section and upper R outer deck upward in the sequential order to ensure that the upper and lower ends are aligned with the inner decks.

4.3 In case of distinct gap at the butt locations, use a file to make necessary trimming.

4.4 In case of distinct displacement of outer deck at the butt joint, make adjustment by bending and deforming the bracket of the outer deck, or by using long holes with fixing straps after loosening M6 nut 9 on fixing strap 7 of the outer deck.

4.5 Check to see if the bracket of the outer deck has a suitable height. If necessary, loosen nut 8 to adjust the height to ensure the straightness of the outer deck.

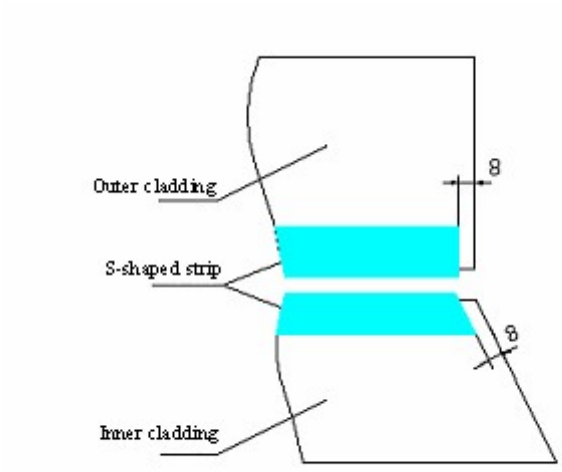
5. Special attentions should be paid in the process of interior covering plate installation:The head of countersunk bolt cannot over or below the surface of covering plate of 0.5mm;The clearance of sew after the installation should not over 0.2mm;Take order when installed the covering plate to avoid the installation mistakes.

XV.Installation of finger protection

1. Delivery status

1.1 The finger protection device is preinstalled before ex-work delivery, but there may be some changes in its matching with the skirting as well as inner and outer deck. Therefore, some adjustments are necessary.

1.2 As shown in the figure below, trim S-shapes strips at the ends of inner and outer deck.



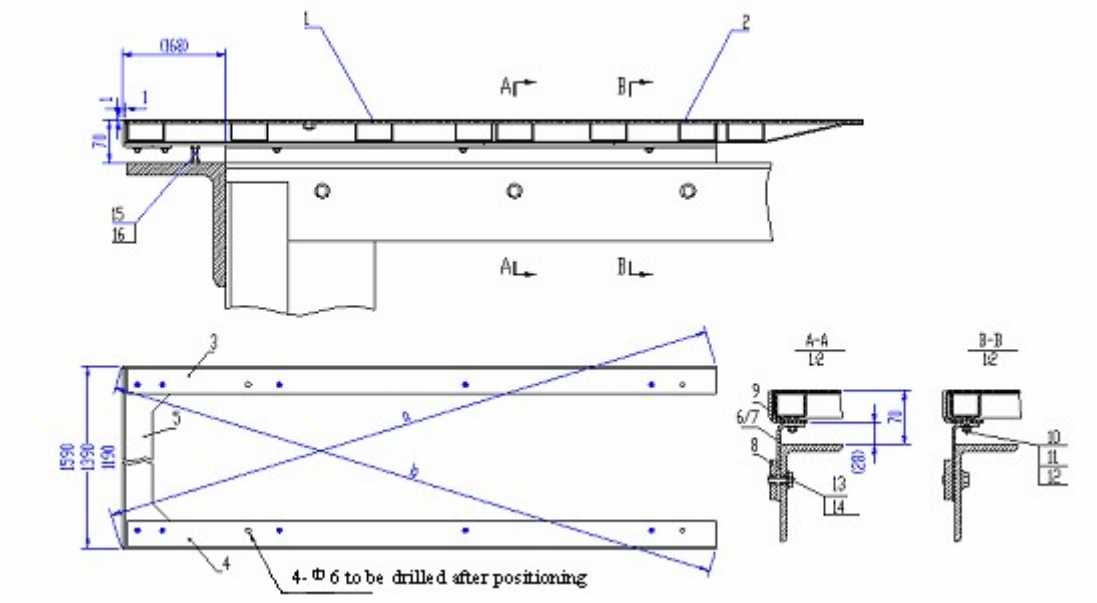
XVI.Installation of middle and back plate

1. Delivery status

1.1 As the middle and back plate has to be installed in combination with the building construction, this component is not pre-installed before ex-work delivery. Therefore, it must be positioned and adjusted carefully on site.

1.2 The length of the middle and back plate is defined in combination with the upper and lower machine rooms. If the upper and lower machines rooms have different lengths, they should have their respective middle and back plate (non-standard design).

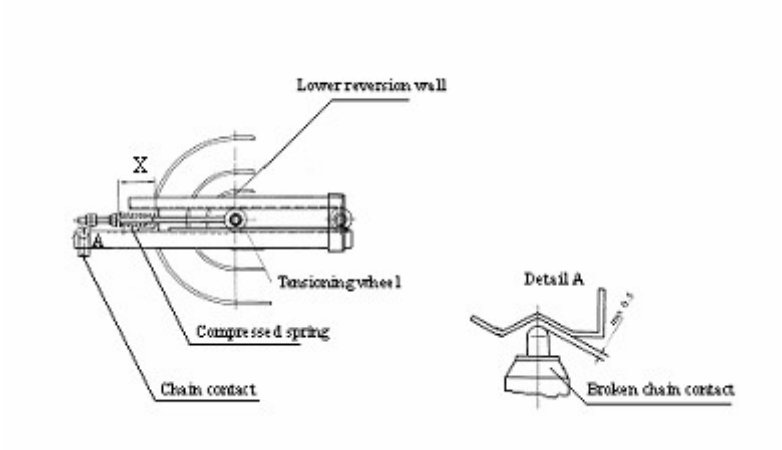
1.3 The middle and back plate support 6 and 7 and threaded board 8 are delivered installed on the truss.



1.4When installed on site,all you need to do is just fit them according to the original position.The most important thing is to adjust the height of middle and back plates,the method is as follows:Loose the bolt on the enclosure of middle and back plates and then tighten the bolt after it was adjusted to the appropriate position.The height of middle and back plates should be higher than the height of customer's final ground level to avoid the entering of foreign object into escala

XVII.Adjustment requirement for part of safety protection switches (device)

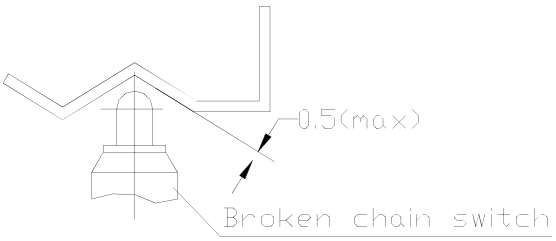
1. Broken step chain protection switch



1.1 In the lower machine room, adjust length "X" as shown in the figure, and tighten the lock nut. The tensioning spring of the step chain should be pressed to a proper length (empirical size) is shown on the truss next the tensioning spring.

H<4000	X: 125mm for reference only.
4000<H<6000	X: 120mm for reference only.
H>6000	X: 115mm for reference only.

1.2 Adjust the switch block to ensure that the switch is in the vertical position and can be actuated when the switch block is moved.



2. Broken drive chain protection switch

Adjust the distance between the broken drive chain protection switch and the drive chain to 30-40mm. In case of a too small distance, wrong actions might take place.

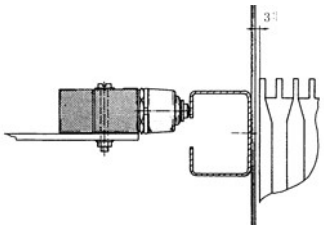
3. Comb protection switch

Adjust the position of the comb protection switch so that the switch may be actuated in case of 2-5mm horizontal movement or 2-4mm uplift of the comb.

Right side

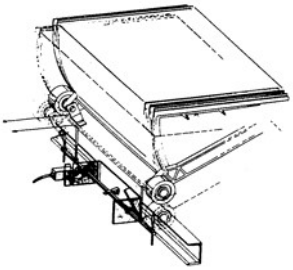
Left side

4. Skirting protection switch



Adjust the position of the skirting protection switch so that it may be actuated in case of the skirting being pressed over 2mm.

5. Sunk step protection switch



The distance between the actuation lever of the sunk step protection switch and the steps is 5-8mm.

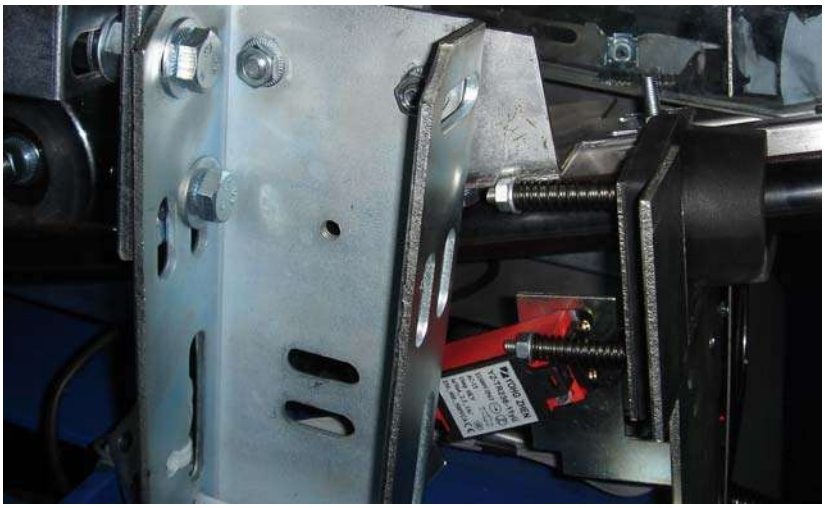
6. Operating brake protection switch

Adjust the switch position to ensure that it is fixed vertically. Manually open the brake to test the switch operation. It should be ensured that after brake release, the switch will not be cut off.

7. Over speed and anti-reversion protection device

At the upper and lower ends, there is an electro-optical or proximity switch each at the upper and lower end for checking step operational speed and direction, and checking if it is missing. Its location and distance have been fixed in the factory. When it is replaced as required, its position and distance shall remain unchanged.

8. Finger protection switch



Adjust the switch position to ensure that the switch is fixed appropriate position if it is loose during transportation or installation, and the switch should be actuated when the finger protection block is pressed with hand in excess of 3-5mm.

XVIII.Specifications of electrical commissioning on site

1. First inspection before power connection

1.1 Visual inspection:

1.1.1 Check the wire connection of electrical elements of wiring terminals, relays and contactors to see if it is secure (pull with hand, but do not pull them out). Check to see if there are wires not connected (particularly check if there is any free terminal.

1.1.2 Check to see if element labels and terminal numbers are complete or not. If not, make them complete.

1.1.3 Grounding wires should be yellow-green ones, securely connected, which should not be connected in series. Wire section $\geqslant 1.5mm^2$. Check to see if the grounding screws of the power tableau are welded.

1.2 Line check (check with the ohm position of the universal meter)

1.2.1 Check the through cable between the upper and lower control cabinets to make sure that all the cable numbers are correct.

1.2.2 Check safety loop switches to make sure that they are installed on the correct positions and securely fixed, and have correct actions. After completion of the check, switch on all the switches (check the upper and lower control cabinets respectively).

1.2.3 Measure all safety loops to make sure that they are through, and resistance between 1-24 is not more than 10 ohm.

1.2.4 Check PLC wiring to make sure that the common PLC input COM is connected to 24V+, and the common output end is 110V or 24V, which should not be confused. DC 24V may be either supplied independently within PLC or by the external switch , which shall be in accordance with the drawings. Power shall not be provided in parallel, otherwise, PLC may be damaged.

1.3 Insulation check (on 2M position of the universal meter. All the switches S1-S4 are switched on, with exception of main switch JHA and lighting switch JHL).

1.3.1 With the black bar connected to the ground, use the red bar to measure all the grounding terminals. All the resistance should be infinitely great (not through), with exception of 64, N1 and PE.

1.3.2 With the black bar being connected to 201, use the red bar to measure 43-50, MO, V+, 61-64, 101, 102, L51, L52 and L53, which should be infinitely great (not through).

2. First adjustment with power on

2.1 Switch off switches S1-S4 of the upper control cabinet.

2.2 Switch on mains switch JHA, and observe if there is any smoke, spark or noise in the upper control cabinet. In case of abnormality, switch off mains switch JHA immediately.

2.3 Switch on control switch S1, and observe (1) the power indicator should be lit. (2) phase sequence relay should be lit. If the phase sequence lamp does not lighten, switch off all power switches, interchange any two phases of the phase sequence relay, and switch on the switches for the test from the start.

2.4 Adjust the phase sequence of the brake motor: (1) switch on JHA and control power switch S1. (2) measure L51-L52, L51-L53, L52-L53 of S1 to make sure that they are 380V±10V. (3) Manually operate SB and SR-U relays to observe the direction of brake motor MB and observe if brake release is possible. In case of reverse direction, switch off all switches, exchange any two incoming wires of U1, V1 and W1, and try again.

2.5 Adjustment of brake clearance: Similarly as above, manually operate SB and SR-D to release the brake. Rotate the flywheel with hand to make sure if the brake is released. Observe if the clearance is proper and KB actuates. After manual release, rotate the wheel manually, and observe if it is blocked. After power off, based on observation and experience, adjust the brake clearance and KB switch. Then, make adjustments again according to the above steps.

2.6 Check of lighting loop:

2.6.1 Switch on lighting switch JHL and lighting control switch S4, and use the universal meter to check and make sure that the voltage of the 3-hole lighting socket should be 220V±7%, with the left wire being the null line and the right wire being the live line,

2.6.2 Switch on S4 (220V) and manually operate SLB relay, and the step lighting should be on.

2.7 Check of the safety loop and error indicators:

2.7.1 Switch on mains switch JHA and S1 (380V), S2 (110V) and S3 (12V). Make measurement to make sure that 201-202 should be AC 110V±7%, and 101-102 should be AC 12V±2V.

2.7.2 If safety loop 1-24 is closed, error indicator should display "24". If other digits are displayed, the buffer should sound, indicating that the safety loop is not closed. If there is no display, but the LED on the pcb is lit, that means that 201 has not entered the pcb.

2.7.3 When the safety loop is normal in all aspects, (1) pcb displays "24". (2) relay SU is closed.

2.8 PLC check:

2.8.1 Switch on JHA, A1 and S2, and switch off the emergency stop switch on the control cabinet.

2.8.2 Use 200V DC position of the universal meter to measure internal PLC power and make sure that it is 24V±2V. Attention: 24V+ is connected to PO and 24V- is

connected to MO.

2.8.3 Check of input signals: (To avoid wrong start and accidents, proceed strictly in the following steps). Set PLC operating status RUN→PROG:

a. Switch on emergency stop switch JH1-B, and observe XO on PLC should lighten;

b. Switch off the emergency stop switch, SU ↓ →XO lamp goes out;

c. Obstruct the upper photocell, X1 on PLC should lighten up. Remove the obstruction, and X1 should go out. Test the lower photocell in the same way, and X2 should lighten up (Attention: The photocell of NPN type will be actuated when it is blocked).

d. Test of X3-X5: Observe that X3 should lighten up. When the inspection plug is in position, X3 will go out. With up button being pressed, X4 will lighten up, and with down button being pressed, X5 will lighten up. With buttons released, all lamps are out. Test the inspection socket of the upper control cabinet in the same way.

e. Test of the key switch: With the inspection plug being off, X3 should lighten up. Observe X4 and X5 on PLC. Rule: When the key is turned clockwise, it is up direction and X4 will lighten up. When the key switch is turned counterclockwise, it is down direction, and X5 will should lighten up. Test the upper and lower key switches respectively, and make sure that they conform with the above regulation. In case of errors being found, exchange 44-45 wires.

f. Manually operate SB, and X6 should go out. Operate KB to actuate SB manually and X6 should lighten up.

g. Switch on monitoring switch JZM, and X7 should lighten up.

3. First inspection travel

3.1 Switch on switch JHA, S1, S2 and S3 in sequence, open the cover of the inspection socket, and insert the plug.

3.2 Set PLC operating mode PROG → RUN. Release the emergency stop switch to close the safety loop, and SU is actuated, JZM switch is cut off.

3.3 Observe PLC input: X0 and X6 should lighten up, X3 should go out, and there is no requirement on the other signals.

3.4 Check to see if there is any foreign objects on the steps, and if the step line is smooth. Inform other people of the coming start of the escalator.

3.5 Press the up inspection button. Attention: X4 lit →SB ↑ →SR-U ↑ →KB ↑ → SYA ↑ . Observe if the actual travel direction is the same as the direction shown in the control cabinet. In case of reverse direction, turn the power off. Exchange any two of incoming wires 1U1, 1V1 and 1W1 of the main motor. Observe if the phase sequence of the brake motor is correct. In case of reverse direction, switch off all switches, exchange any two of MB incoming wires U1, V1 and W1, and try again.

3.5.1 Test the down operation in the same way as above, and observe if there is any abnormal noise in all the steps and moving parts in the step line. Remove any problem whenever it appears.

3.5.2 Switch off the safety loop switches one by one, and check to see if the error codes conform with the requirement in the drawings.

3.5.3 Check of the electro-optical switches: During up travels, X1 is actuated before X2. Otherwise, exchange X1 and X2.

3.5.4 Measure the current, voltage and rpm during the inspection travel (Note: record the measurement results).

(1) Start current, star steady current;
(2) Static 3-phase voltage, steady 3-phase voltage;
(3) Steady rpm.

3.5.5 After handrail installation, measure the above current, voltage and rpm again and keep records.

4. Trial running with normal speed

4.1 After the inspection travel, adjust the mechanical and electrical installation dimensions of the components.

4.2 Before the normal travel, check if there are other people working in the upper/lower machine rooms, left and right step lines or on the step treads, and if any tools, material or foreign object are left there. The escalator can only be moved under the precondition that operational safety is assured.

4.3 Switch on JHA, JHL, S1-S4 and JZM in the sequence, and observe PLC input signals, and X0, X3 and X6 should lighten up.

4.4 The head of the commissioning operation dispatches the command to start the travel with normal speed.

4.5 Turn the start key switch clockwise, and observe the operating sequence of main electrical elements:
X4 lit →SB ↑ →SR-U ↑ →KB ↑ →SYA ↓ →SDA ↑

4.6 Measurement of parameters for travel with the normal speed (Note: record the measurement results)
(1) Start current;
(2) Star-delta conversion current;
(3) Delta steady current;
(4) Static operating voltage (L51-L52, L51-L53, L52-L53, 101-102, 201-202);
(5) Steady operating voltage (same as above);
(6) Steady rpm

4.7 After 2-hour continuous operation at the normal speed, make a hot operational measurement with the same measurement parameters as above. Keep records on that.

4.8 Switch off all the switches, and check all the main wiring terminals including the wiring terminal of the main contact of the contactor to see if there is any hot spot. If yes, it indicates poor contact.

4.9 Up to now, the commissioning is finished.