Small Roofing Lifting Equipment

Operational Manual

Shenxi Machinery Co.,Ltd

Catalog

1 Overview

Small roof lifting equipment is suitable for all kinds of working environments with lifting weight less than 2000 kg, especially for vertical handling of construction materials in high-rise buildings. It has more unique advantages for the length and width materials such as wooden boards and woodworking boards which are inconvenient to carry along the corridor, as well as the construction materials which are heavy and frequently transported. The utility model has the advantages of simple and compact structure, small volume, light weight, convenient installation, compact and exquisite portability and transportation, and can be used for single-phase and three-phase power supply, etc.as for power supply.

2. Product characteristics

The product uses AC motor to drive the reel to retrieve and release the steel wire rope to realize the vertical lifting of the required materials, and realizes the horizontal transportation of the materials through its own rotation at a certain angle. At the same time, it can also realize the horizontal transportation of the materials.

Structural combination and optimization are carried out according to the needs of the actual operating environment to maximize the operational capability.

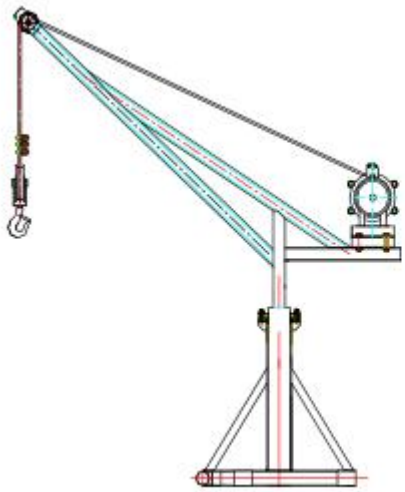
After partitioning the equipment components, it is convenient for people to transport to the roof, and easy to install. It can adjust the maximum lifting weight and lifting speed by changing the ratio to achieve an economical and reasonable operation process. The equipment is easy to operate, and the operation of professionals can effectively reduce safety problems.

3 Main uses and application scope

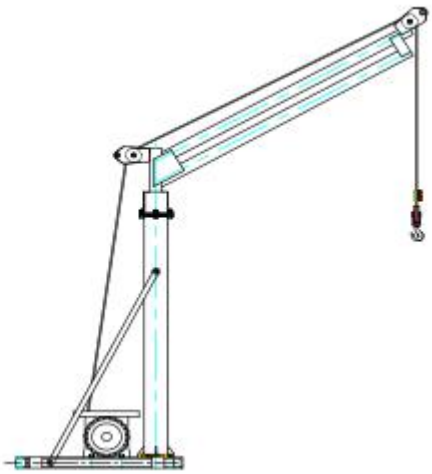
It is used in vertical lifting operation environment with lifting weight less than 2000 kg and lifting height less than 60 meters. It is commonly used in construction process such as transportation of construction materials, installation of equipment such as billboards, roof waterproofing construction, tall chimneys or underground maintenance. In the selection, it is necessary to consider the installation of working space for the stacking of counterweight or the fixing and installation of the bottom of the crane frame.

Type / Parameter	Lifting height	Slewing radius	Lifting speed	Self weight	Working voltage(optional)
500/1000kg	60/30m	1-1.8m	14m/min 7m/min	160kg	220v 380v
300/600kg	60/30m	1-1.5m	14m/min 7m/min	160kg	220v 380v

4 Model Classification and Composition



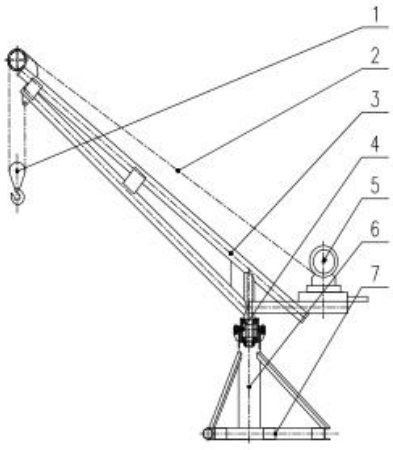
A Type



B Type

The main difference between different types of the equipment is whether the installation position of the hoisting equipment is at the back or at the bottom of the equipment. The structure of the chassis includes the setting method of the counterweight and the selection of the connection form among the components.

Choose bolt connection or welding. The equipment consists of hook, wire rope, hoist, upper arm frame, main pillar, rotary mechanism, chassis and counterweight. Some structures are composed of reinforced connecting rods, as shown in the figure below indicated:



1 hook, 2 wire rope, 3 upper boom, 4 rotary mechanism, 5 winch, 6 main pillars, 7 chassis

Weight and size of main components:

Component	Component max weight (kg)	Component main dimension (m)
Chassis mech.	76	0.7x0.95
Jib section mech.	43	1.8x1.9
Hoisting mech.	40	0.6x0.4
Slewing mech.	9	0.23x0.18
Accessories and others	10	non
Total self weight	About 160	

Stereogram and Partial Simulated Size

5 working conditions

Installation and debugging: Equipment installation mainly considers the force produced in the process of hoisting. The key installation parts are the end connection of wire rope, top pulley connecting shaft and bearing, hoist frame fixing, rotary fastening nut relaxation treatment, rotary flange bolt connection. Finally, the whole machine is designed to fix the weight reliably. The installation reliability of these parts directly affects the equipment operation safety.

Installation procedures, methods and precautions

1. Fixed the chassis under conditions, that is, put on the counterweight pipe and press the counterweight well. If it can't be put in place directly, this step can be carried out at last.

2. Fix the hoist firmly on the upper boom, wear the wire rope according to the lifting weight requirement, hang the standard hook and fix the wire rope head to ensure the connection safety.

3. Inspect the fastening condition of the rotary nuts at the bottom of the upper arm, lift the upper cantilever and put the bottom of the upper arm vertically into the connecting flange of the underframe, connect the upper and lower rotary flanges, and check whether the turning process is smooth.

4. Inspect the eccentricity of the center of the whole machine, fix the rotary position, move the whole machine to the working position, pay attention to the safety of the edge operation, fix the chassis, wear the counterweight pipe, and press the designed counterweight well.

Debugging procedures, methods and matters needing attention

1. Check the voltage of the hoist, connect the appropriate reliable power supply, electrify the hoist, and check all the equation of the wire rope. When the hook is placed in the lowest position, check the safety ring reserved by the wire rope on the drum and the reliability of the fixing of the wire rope.

2. 20% rated lifting test to check the stability of the whole machine and the reliability of the counterweight pressing method.

3. Check whether the length of the left and right piercing rods is appropriate, determine the direction of the rotating weight, whether the position of the falling objects is adequate, and easy to access; Test the rated load, check the reliability of the connection of the key connecting positions comprehensively, and check the qualified put into normal use.

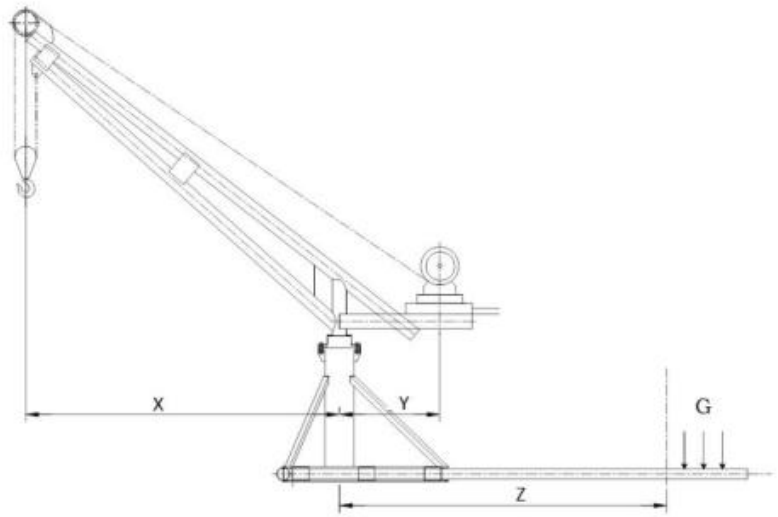
Acceptance test items, methods and principle after installation and commissioning

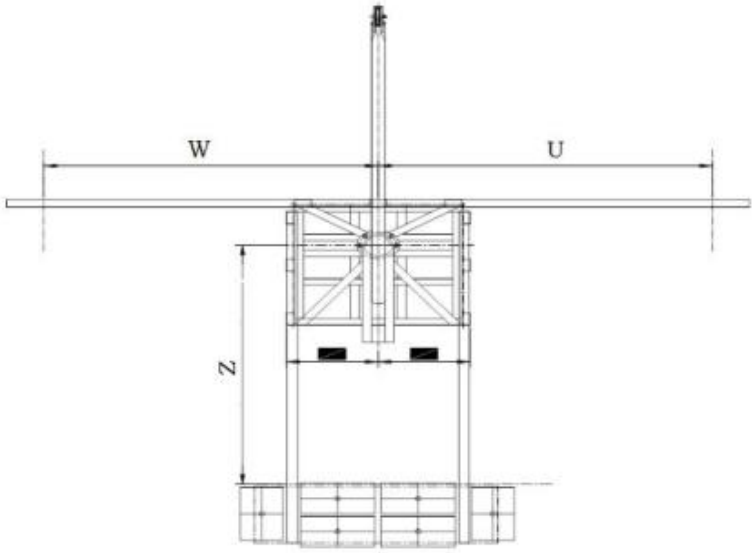
Inspection position	Inspection content	Judgement basis	Inspection result
Counter weight	According to the given counterweight position Balance weight check with quantity Horizontal tube penetration examination	The counterweight is reliable, and there is no possibility of overturning. The quantity of counterweight meets the requirement. Lifting without hoisting is prohibited. The diameter and wall thickness of counterweight piercing pipe meet the requirements, and the extension length meets the design requirements.	
winch	Reliable installation Reasonable power	Installation of underframe bolts is reliable. According to the name plate power supply is	

	supply	reasonable	
Wire rope	Wire rope connection Two ends of wire rope	The hook meets the important requirements of the crane. The diameter of wire rope meets the design requirement and does not meet the scrap standard. The fixed connection of the two ends of the wire rope is reliable.	
Slewing mech.	Slewing space Slewing motion	The rotary connection is reliable. The rotation is smooth and there is no Carton phenomenon. Rotary operators have safe space and reasonable landing space.	
Issue Record			Inspection result

6. operation environment

Setting and calculation of counterweight: The required counterweight pressure pipes are 57 mm in diameter, 2.5 mm in wall thickness and 2500 mm in length.three pcs





Formula for calculating crane stability:

$2 \times W_{II} \times X \leq G \times Z$ (Lifting direction)

$1.25 \times X \leq U\,(or W)$ (direction of rotation)

W_{II} - Lifting limit working load in kilograms (kg);

G - Balance weight in kilograms (kg);

X - The length from the outside of the upper boom to the center of rotation, in meters (m);

Z - The distance from the center of gravity of the counterweight to the center of rotation in meters (m);

U/W - The horizontal distance between the two sides of discharge pipe and the center of rotation in meters (m).

Counter jib table :

	WII (kg)	X(m)	Y(m)	Z (m)	G (kg)	U/W (m)
data	500	1.8	0.5	2.5	750	2.25
data	1000	1.8	0.5	2.5	1500	2.25

Fault Phenomenon, Cause Analysis and Removal Method

1. Winch wire rope disorder: the possible reason is that the wire rope is not tightened by heavy weight in the process of rope-taking, and the small weight weight weight is used to tighten the wire rope in the process of rope-taking.

2. Winch can not start: the power supply may not match, need to replace the winch;

3. Unable to turn: It may be that the rotary locking mechanism is not opened or the rotary mechanism is not

reliably connected. Check the installation of the rotary mechanism.

7 **Security**

Safety issues and precautions

1. During the lifting process, it is forbidden to stand under the boom, and any lifting action is forbidden without the allocation of counterweight.
2. The setting of counterweight does not meet the requirements. Lifting restrictions are needed to avoid overlooking the restrictions in replacement operation.
3. Attention should be paid to the layout of power supply cables to avoid the electric shock hazard caused by heavy objects rolling the cables.
4. When the rated load is lifted, the counterweight fluctuates, and the counterweight does not meet the pressure requirement. Therefore, it is necessary to check the counterweight configuration immediately.
5. When setting the equivalent counterweight, the strength of the counterweight itself should be considered to avoid overturning danger.
6. Balance weight and horizontal pipe piercing need to ensure that pipe diameter and wall thickness meet the design requirements.
7. When the weight is unloaded by rotation, the frame overturns slightly. It is necessary to check whether the length of the crossbar meets the requirements.

Processing procedures in case of failure

1. If the non-counterweight loosening occurs, the power supply should be disconnected at the first time, and the heavy objects should be released back to the ground manually, so the lifting can not be completed before shutdown.
2. In case of loosening of the counterweight, it is necessary to quickly drop the weight back to the ground in the first time and make up the counterweight after power failure.
3. When releasing heavy objects back to the ground, pay attention to the personal danger caused by overturning the crane.
4. Judging the location of the fault, replacing the fault components, or replenishing the counterweight.

8 Maintenance

Daily maintenance

1. Pay attention to the waterproofing of pulleys, winches and rotary mechanisms in daily use.
2. Supplementing lubricating oil to pulley and rotary mechanism regularly;
3. Check regularly whether the main stress position is cracked and whether the bolt is loose.
4. Attention should be paid to the number of counterweights so as to avoid the danger of personnel moving counterweights privately.
5. Attention should be paid to protecting the power supply cables and placing them on the rolled cables of goods to cause electric shock.

6. Replace the worn steel wire rope in time and check the wear of hooks and fixtures of steel wire rope regularly.
7. Check the position of counterweight pipe and pay attention to possible movement.

- 9 Operation and maintenance

1. Attention should be paid to installing safety zones at lifting locations, avoiding cross-operation and prohibiting station personnel under lifting heavy objects.
2. During the lifting process, attention should be paid to the stability of the weight at any time. If the weight loosens, it will quickly drop the weight back to the ground at the first time.

9 Other

Attentions and contact methods for after-sales service

1. When replacing parts, it is necessary to meet the original design strength requirements or contact suppliers.
2. The standard counterweight with certain strength is needed to avoid overturning danger.
3. When the power supply of the hoister is not matched, it is necessary to contact the supplier for replacement.