# Electric Chain Hoist

## Operation Manual
## &
## Parts List

Series:

☐ YSTU(D)-300

☐ YSTU(D)-500

CHENG DAY MACHINERY WORKS CO., LTD.

# SAFETY-IMPORTANT

**The use of any hoist and trolley presents some risk of personal injury or property damage.**
**That risk is greatly increased if proper instructions and warnings are not followed. Before using this hoist, each user should become thoroughly familiar with all warnings, instructions and recommendations herein.**

**This symbol points out important safety instructions which if not followed could endanger the personal safety and or property of yourself and others.**
**Read and follow all instructions in this manual and any provided with the equipment before attempting to operate your electric chain hoist.**

# Contents

# 1. Foreword

This manual contains important information to help you properly install, operate and maintain the electric chain hoist for maximum performance, economy and safety.

Please study its contents thoroughly before putting the electric chain hoist into operation. By practicing correct operation, procedures and by carrying out the preventative maintenance recommendations, you will be assured of dependable service. In order to help us to supply correct spare parts quickly, please always specify,

(1) Hoist model

(2) Serial number

(3) Part number, plus the description.

We will have your trust of Cheng Day's long term satisfactory service as our belief.

Should you have any queries, please contact:

(Please ask for a company's stamp from your local agent.)

# 2. MAIN SPECIFICATION

## 2.1 Specification

The following specifications are common to all electric chain hoists.

### Table 2-1 Specifications

| Item | | Detail | |
|---|---|---|---|
| Working temperature range(℃) | | -5 to +40 | |
| Working humidity range (%) | | 85 or less | |
| Protection(Option) | Hoist | IP 42 | |
| | Push button | IP 65 | |
| Electric power supply | | Three Phase, 220V~600V,50Hz,60Hz | |
| Noise Level (dB) | Single speed hoist | 81 | |
| | Dual Speed hoist | 81 | |
| Chain size | WLL (working load limit)(t) | Nominal diameter (mm) | Pitch (mm) |
| | 3T | 10.0 | 30.2 |
| | 5T | 11.2 | 34 |

Remarks：

(1)Contact an authorized dealer for information on using the hoist over the working temperature or humidity range.

(2)For dimensions and other details, refer to the latest catalogue.

(3)Noise levels were measured at a distance of 1m horizontally from the hoists during normal operation.

## 2.2 Mechanical Classification (Grade) and Life

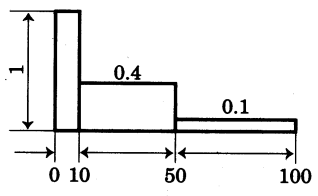
Safety and life for electric chain hoists are guaranteed only when the said equipment is operated in accordance with the prescribed grade.

Electric chain hoists have been designed for grade 2m except YSF-series 1Dm in the FEM regulations (FEM 9.511). Details are provided in Table 2-2.

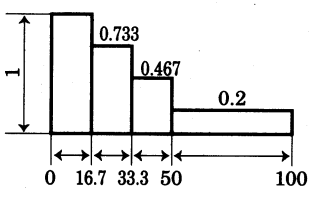
Average daily operating time and total operating time are determined by load distribution.

### Table 2-2 Mechanical classifications

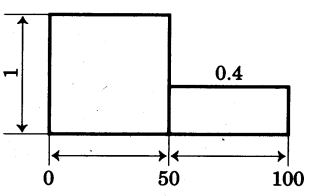
| Load Spectrum (Load distribution) | Definitions | Cubic mean value | 1Dm | 2m |
|---|---|---|---|---|
| | | | Average daily operating time (h) | Average daily operating time (h) |
| | | | Total operating time (h) | Total operating time (h) |
| 1 (light) | Mechanisms or parts thereof, usually subject to very small loads and in exceptional cases only to maximum loads. | k ≦ 0.50 | 0.25-0.5 | 4-8 |
| | | | 800 | 12500 |
| 2 (medium) | Mechanisms or parts thereof, usually subject to small loads but rather often to maximum loads. | 0.50 < k ≦ 0.63 | 0.12-0.25 | 2-4 |
| | | | 400 | 6300 |
| 3 (heavy) | Mechanisms or parts thereof, usually subject to medium loads but frequently to maximum loads. | 0.63 < k ≦ 0.80 | ≦0.12 | 1-2 |
| | | | 200 | 3200 |
| 4 (very heavy) | Mechanisms or parts thereof, usually subject to maximum or almost maximum loads. | 0.80 < k ≦ 1.00 | - | 0.5-1 |
| | | | - | 1600 |



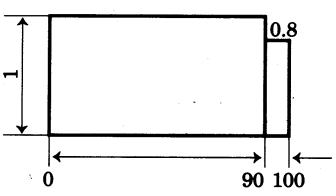

% operating time
Load spectrum 1




% operating time
Load spectrum 2




% operating time
Load spectrum 3




% operating time
Load spectrum 4

## 2.3 Safety Devices

### (1) Motor brake

"Electro-Magnetic Brake" is of a unique design in its field. It features simultaneous motor braking upon switching off power even under full load condition.

### (2) Mechanical load brake

The mechanical load brake can hold a full capacity load independent of motor brake.

This brake assures that load does not accelerate while being lowered.

### (3) Hook and hook latch

The hook is drop-forged from high tensile steel and heat treated for strength and Toughness. The bottom hook is capable of 360◦ swivel and fitted with safety latch to ensure safe lifting.

### (4) Phase error relay

The Phase error relay circuit has been exclusively developed to prevent motor from running when the phase are incorrectly connected.

### (5) Limit Switches

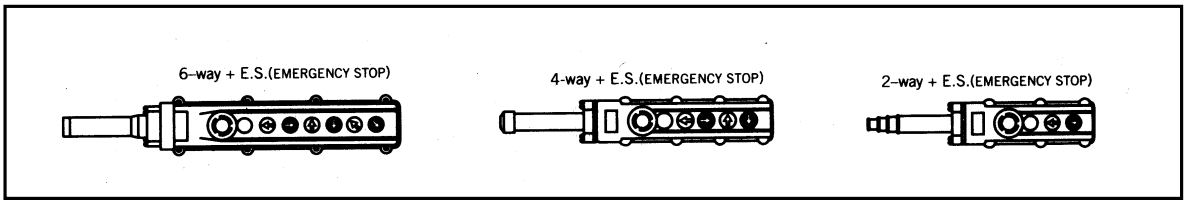
Upper and lower limit switches are fitted for switching off power automatically in case of over lifting or over lowering.

### (6) Emergency stop device (optional)

This button is used to stop the hoist in an emergency situation. It is a red, Mushroom type button, located at the uppermost position of the pendant. When pressed, power to the equipment is switched off and the button locks automatically.

Turning it to the right will release the lock and enable re-starting.

(Illust.1)




Illust.1

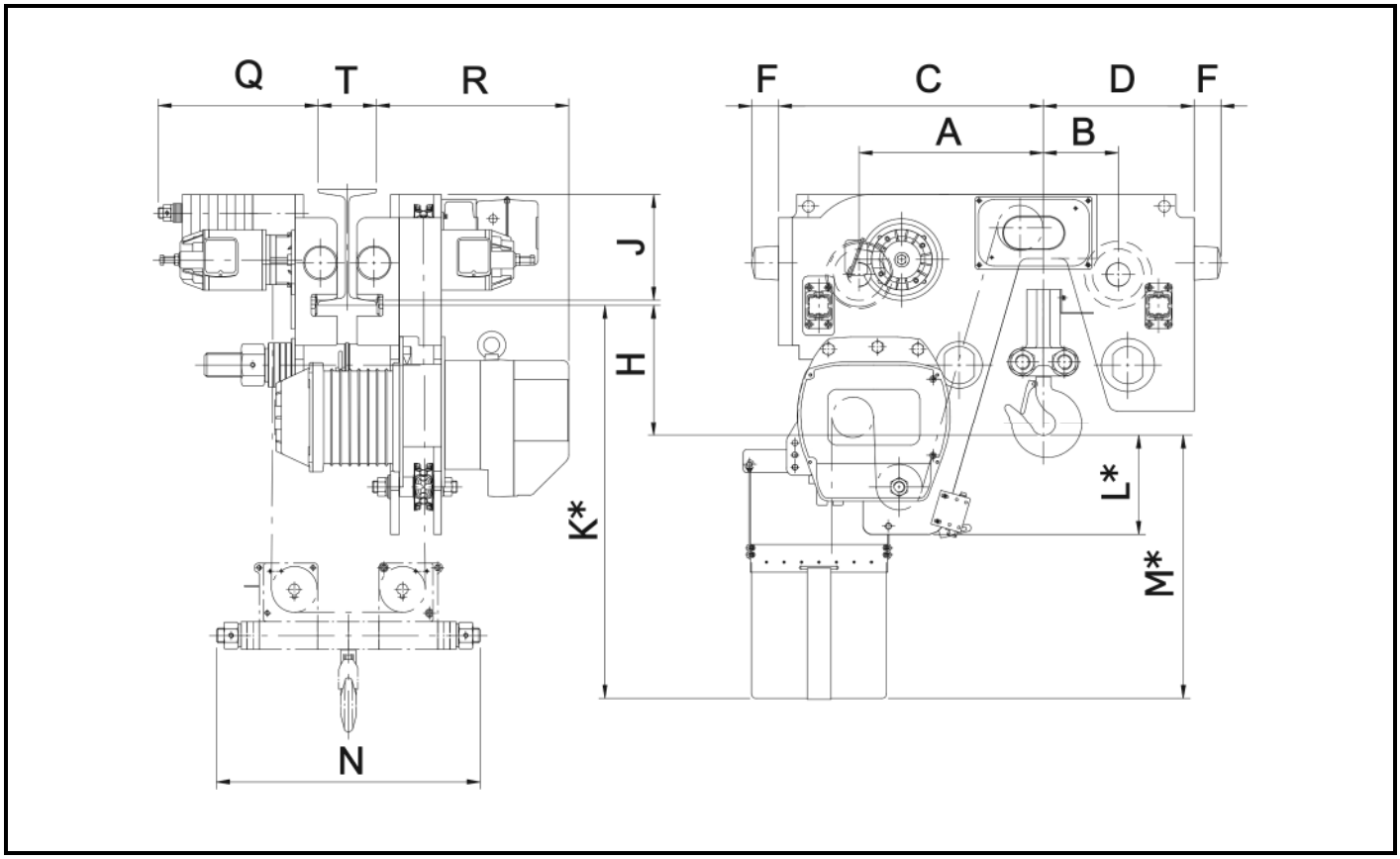
## 2.4 Main Specification and Dimensions

### ■ Main Specification

| Model | Capacity (ton) | Fall No. | Hoisting | | | Traversing | | | Flange Width (mm) T | N.W (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Speed (m/min) | | Motor kw pole | Speed (m/min) | | Motor kw pole | | |
| | | | 50Hz | 60Hz | | 50Hz | 60Hz | | | |
| YSTU-300 | 3 | 2 | 4.3 | 5.2 | 3.7 4P | 20 | 24 | 0.4x2 4P | 125~ 175 | 593 |
| YSTUD-300 | | | 4.3/1.4 | 5.2/1.7 | 3.7/1.2 4/12P | 20/6.7 | 24/8 | 0.4/0.13x2 4/12P | | |
| YSTU-500 | 5 | 2 | 2.7 | 3.2 | 3.7 4P | 20 | 24 | 0.4x2 4P | 125~ 175 | 627 |
| YSTUD-500 | | | 2.7/0.9 | 3.2/1.1 | 3.7/1.2 4/12P | 20/6.7 | 24/8 | 0.4/0.13x2 4/12P | | |

### ■ Dimensions

| Model | Capacity (ton) | Fall No. | Dimension(mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | H | A | B | C | D | F | J | K* | L* | M* | N | Q | R |
| YSTU-300 | 3 | 2 | 280 | 395 | 160 | 569 | 324 | 57 | 227 | 925 | 240 | 645 | 565 | 352 | 416 |
| YSTUD-300 | | | | | | | | | | | | | | | |
| YSTU-500 | 5 | 2 | 330 | 395 | 160 | 569 | 324 | 57 | 227 | 864 | 123 | 534 | 580 | 366 | 430 |
| YSTUD-500 | | | | | | | | | | | | | | | |



# 3. SAFETY RULES

**⚠ DANGER**

He hoist herein is not designed for, and should not be used for, lifting, supporting, or transporting personnel. Any modifications to upgrade , re-rate, or otherwise alter the hoist equipment must be authorized by either the original manufacturer or a qualified professional engineer.

(1) Only the trained personnel are allowed to operate the hoist.

(2)

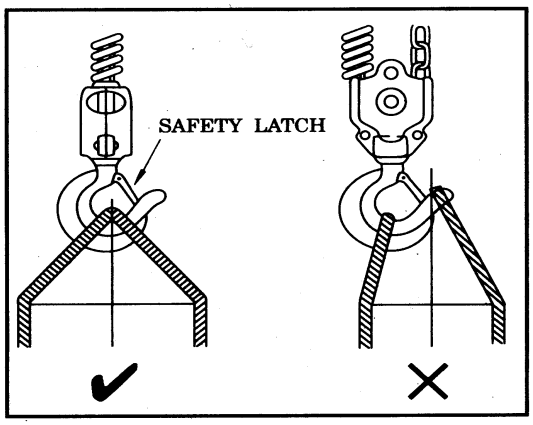
**⚠ DANGER**

Do not use the hoist in explosive atmosphere.

(3) Prior to each lifting operation, it is essential to make sure that:

(a) The correct lifting sling is being used.

(b) The lifting sling is located in the hook as shown below (Illus. 2) and that a safety latch has been fitted.




Illus. 2

(c) The object to be hoisted is well secured for direct lifting (a proper lifting frame or apparatus is strongly recommended for direct lifting.)

(4) Firm and steady button operation is required, never push the button switch intermittently.

(5) Always avoid excessive inching operation.

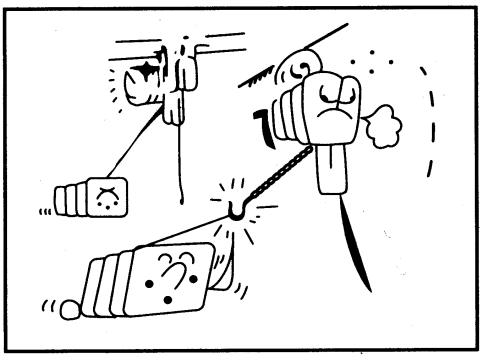
(6) Always make sure the hoist motor completely stops before reversing.

(7) Always leave the push button switch cable and bottom hook vertically static after completion of operation, never leave them at any position which may cause swing or slip.

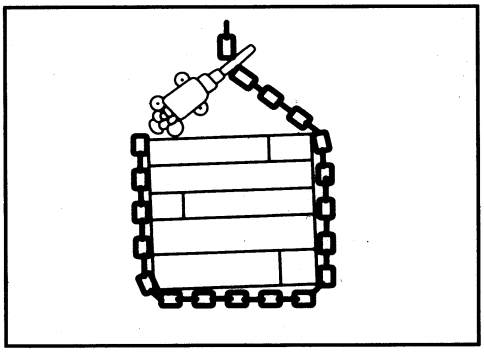
(8) Sling must be applied to load evenly and centrally to ensure correct balance. Never lift any object which is insecure or out of balance.

(9) Never use hoist to end or side pull a load. (Illus. 3)

(10) Never wrap around and hook back the load chain as a sling to lift a load. (Illus. 4)



Illus. 3



Illus. 4

(11)

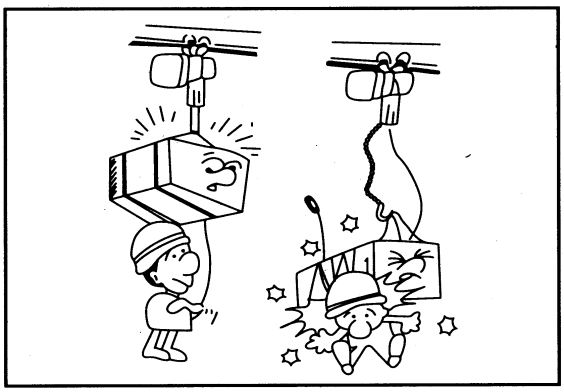
**⚠WARNING**

Do not use the hoist chain as a welding electrode.

(12)

**⚠ DANGER**

Never stand under a raised load (Illus. 5)



Illus. 5

(13) Lifting must always be personally attended, never leave a raised load unattended.

(14) Over-capacity-load lifting is hazardous and should not be undertaken.

(15) Never lift a load when the load chain is twisted.

(16) Regularly inspect and check the condition of load chain. Do not operate with damaged chain.

# 4. INSTALLATION

## 4.1 Unpacking Information

After removing the hoist from its packing box, carefully inspect the external condition of the electrical cables, contactor, gearbox and motor casing for damage.

Check and ensure that these items are present.

Each hoist is supplied as standard with the following accessories:

| | |
|---|---|
| 1.Chain bucket | 1 set |
| 2.Power cable | 3 meters |
| 3.Push button control switch | 1 piece |

Table 4-1

## 4.2 Voltage

**⚠CAUTION**

If power supply deviates from standard by more than ±10% abnormal operation or damage to the motor may result. It is imperative to ensure correct voltage supply before commencing operation.

## 4.3 Installation

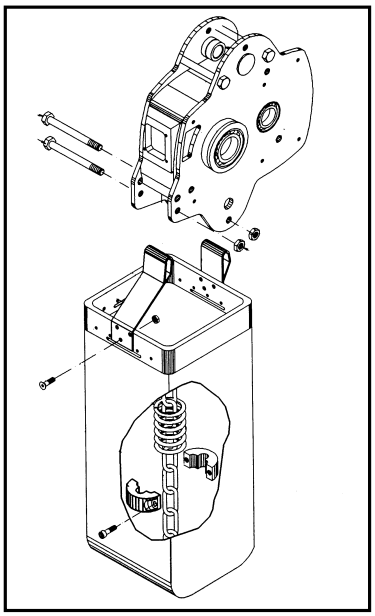
**⚠WARNING**

Connection to power supply before installation procedures having been completed is strictly prohibited.

(1)Prior to installation check and ensure that the top hook assembly is securely attached to the hoist by means of the connecting pin (page 35, item 13)

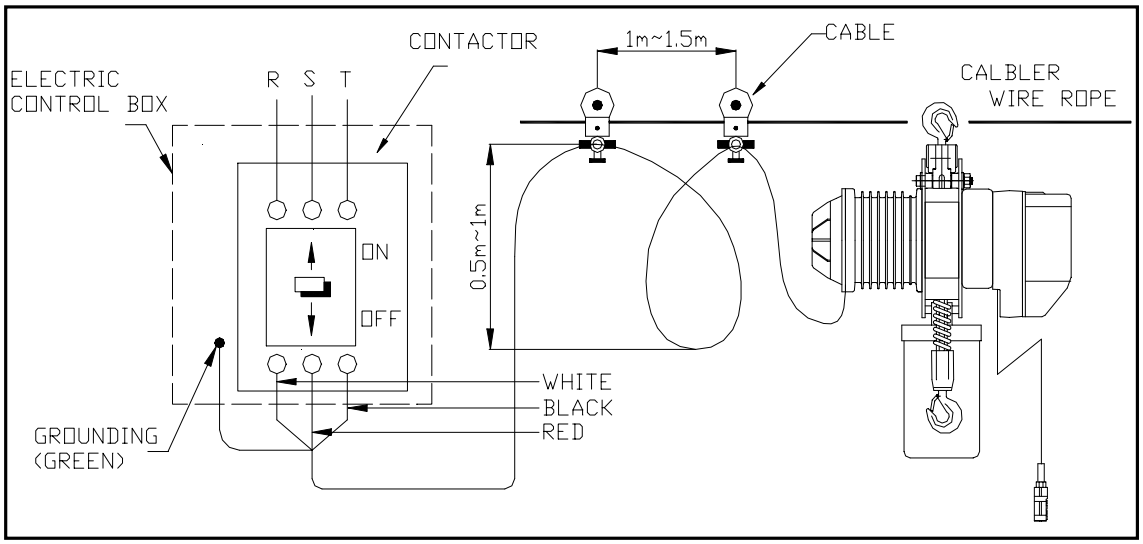
NOTE： If the hoist is to be suspended from an electric trolley, assembly may be eased by firstly removing the top hook, just attaching hoist top hook to the trolley load plate.

(2)Assemble chain bucket.



Illus. 6

(3)Connect power supply to hoist and operate the push button switch. This operation must be carried out by a trained person .




Illus. 7

(4) Operation Test

(A) Firmly push ⬇ switch button to lower load chain until the limit spring touches the limit switch. Power should be cut off automatically.

(B) Firmly push ⬆ switch button to check the collection of load chain into chain bucket.

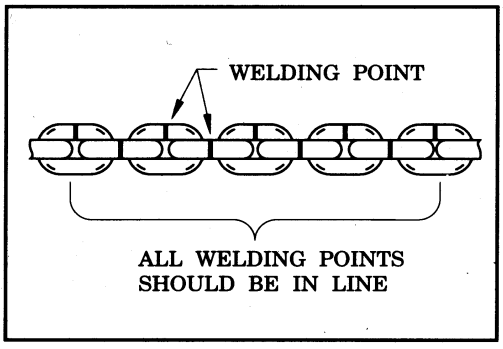
(C) Check the emergency stop device function (if fitted):
While holding down either ⬆ or ⬇ button on the push button switch, push the emergency stop button. Check that the hook stops when the emergency stop button is pushed. Also, check the hoist does not move in response to the push button switch. Finally, check that the emergency stop device pops out when turned to the right and that operation can be resumed thereafter. If the equipment fails to pass another above checks, check the wiring and automatic locking function of the emergency stop device.

(D) Check load chain lubrication (It has been lubricated at our works, but the lubricant may dry out during transportation). Any readily available lubricant is recommended. It is further advisable to keep a small amount of lubricant in chain bucket to allow chain in oil bath.

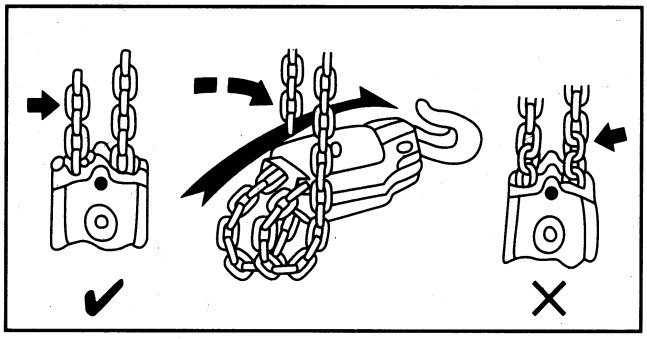
(E) Check chain position. Weld joints on links must face the same direction (Illus. 8), correct chain operation can only be achieved when all joints are vertically in line.

**⚠CAUTION**

The bottom hook on multi-fall hoist must never be rotated as shown below (Illus. 9).




Illus. 8



Illus. 9

# 5. OPERATION

After running test and checks have been completed, the hoist will be ready for normal operation.

**⚠WARNING**

Since dealing with heavy loads may involve unexpected danger, all of the "SAFETY RULES" (Ref 3.) must be followed and the operator must be aware of the following points while using the hoist.

(1) The operator must have a clear and unobstructed view of the entire working area before operating the hoist.
(2) The operator must check that the entire working area is safe and secure before operating the hoist.
(3) When using the hoist with a motorized trolley, the operator must take care to prevent excessive load swinging by sympathetic use of the trolley controls.

# 6. MAINTENANCE AND INSPECTION

**⚠ DANGER**

Do not perform maintenance on the hoist while it is carrying a load except monthly checking for the brake or limit switch.

**⚠ DANGER**

Before performing maintenance do not forget to affix tags to the power source and the push button switch reading: "DANGER", "EQUIPMENT BEING REPAIRED".

6.1 Maintenance

(1) Check the level of gear box lubricant after the first 500 hours operation, thereafter check every 3 months and lubricate accordingly.
NOTE: WE RECOMMEND USING A LUBRICANT OIL EQUIVALENT TO ISO VG460.
(2) Always keep the hoist unit dry and never misuse it in a manner likely to reduce its durability.
(3) When it is necessary to keep the unit outdoors, a protective covering should be fitted.

6.2 Inspection

(1) Daily inspection: Before starting daily operation, check the following

(a) Correct power supply.

(b) "Up", "Down" and "Emergency stop" (where fitted) test runs under no load.

(c) Correct motor performance.

(d) No abnormal or excessive noise.

(e) No malfunction of the bottom hook safety latch.

(f) Proper function of moving/turning parts, limit switches and brake.

(g) Well lubricated load chain.

(2) Monthly inspection

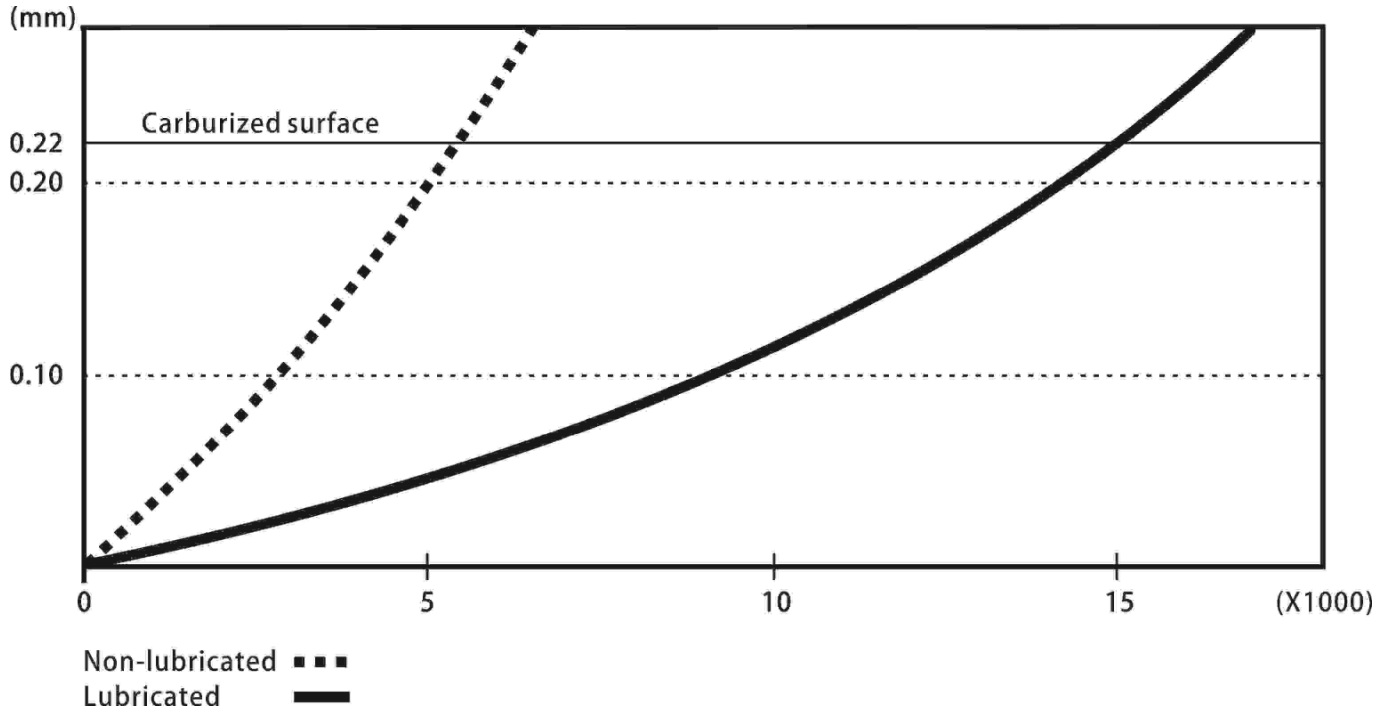
(a) Load chain：

Chain Wearing Test

| Load Spectrum | Cubic mean Value | Using times | |
|---|---|---|---|
| | | Non-lubricated | Lubricated |
| 1 (Light) | 50% | 44000 | 120000 |
| 2 (Medium) | 63% | 22000 | 60000 |
| 3 (Heavy) | 80% | 11000 | 30000 |
| 4 (Very heavy) | 100% | 5500 | 15000 |

Above testing data under lifting height 1M

1M pinpoint wearing test(100%Capactity)

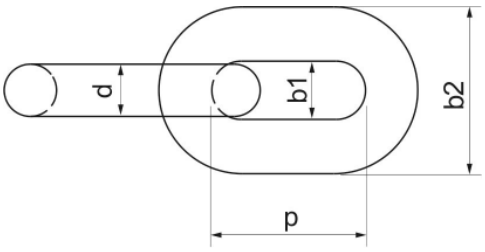



Number of cycles ( Lifting + lowering)

**⚠WARNING**

Always use the hoist manufacture's recommended parts when repairing a hoist.

Distorted, elongated or worn chain link will not sit properly on the load sprocket wheel and may cause chain breakage and/or damage to the hoist unit. To ensure safe and efficient operation, the chain links must be checked for their pitch (inside length),inside width and outside width monthly according to following table.



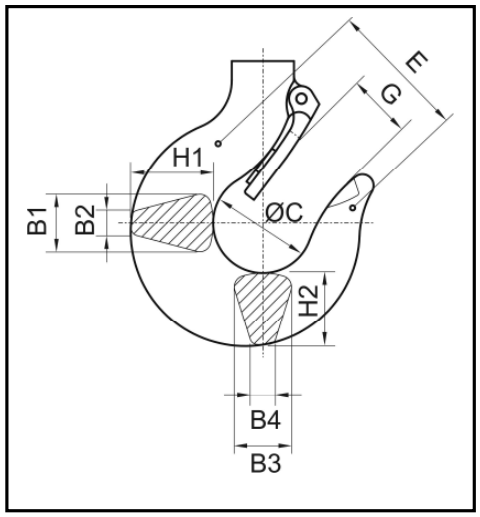

CHAIN LINK

| Dia-Meter (m/m) (d) | Load (ton) | Inside Length (m/m) (p) | Inside Width (m/m) (b1) | Outside Width (m/m) (b2) | Breaking Load (kN) |
|---|---|---|---|---|---|
| 10.0 | 3T | 30.2 | 12.5 | 33.2 | 128 |
| 11.2 | 5T | 34 | 14 | 37.5 | 160 |

Table 6-2-a

(b) Load hook:

Check hook with care. If hook shows crack deformation or wear in excess of 5% of its original size, it should be replaced (Ref. following table)




| Capacity | Dimensions (mm) | | | | | | | | | Allow Stress |
|---|---|---|---|---|---|---|---|---|---|---|
| (ton) | H1 | B1 | B2 | H2 | B3 | B4 | C | G | E | ( kg/mm$^2$) |
| 3 | 55 | 34 | 19 | 48 | 34 | 19 | 52 | 40 | 90 | 70 |
| 5 | 66 | 44 | 23 | 60 | 44 | 23 | 62 | 45 | 100 | 70 |

Table 6-2-b

(c) Limit Switches：

**⚠WARNING**

A qualified electrician should perform this inspection.

Check correct operation of the limit switches. Clean thoroughly and apply a thin lubrication to ensure correct operation.

(3) Annual inspection

**⚠WARNING**

Your dealer should be asked to perform this inspection.

(a) Check gearing for any excessive wear or damage.
(b) Replace gearbox lubricant completely (1400 C.C~1500C.C ±10%), as following table for your reference Table 6-2-c.
(c) Check brake lining and ratchet pawl for any wear or damage.
(d) Check operation of pawl spring.
(e) After reassembly of above check, lifting a load several times to ensure good performance of the hoist before starting duty operation.

※Oil Quality Table

| For Load Chain / All Model | | | | | | |
|---|---|---|---|---|---|---|
| Model | Lubricate Method | Lubricant Adding | | Lubricant Changing | | Recommended oils |
| | | Period | Q'ty / c.c. | Period | Q'ty / c.c. | |
| All Model | Smear oil on load chain surface | Weekly | - | - | - | ISO VG460 |
| All Gear Box | Soak in oil | Monthly | Suitable | Annual | 1400 ~ 1500 | ISO VG460 |

※Table of recommended oils

| ISO-VGDIN 51519 viscosity At 40°C $mm^2/s$ (cST) | Approximate viscosity of the VG Categories 50°C $mm^2/s$ (cST) | ARAL | BP | ESSO | MOBIL OIL |
|---|---|---|---|---|---|
| VG460 | 251 | Aral Degol BG 460-BMB 460 | BP Energol GR-XP 460 | Spartan EP-460 | Mobilgear 634 |

| ISO-VGDIN 51519 viscosity At 40°C $mm^2/s$ (cST) | Approximate viscosity of the VG Categories 50°C $mm^2/s$ (cST) | SHELL | TEXACO | I.P. | AGIP | TOTAL |
|---|---|---|---|---|---|---|
| VG460 | 251 | Omala oil 460 | Meropa 460 | Mellana 460 | Blasia 460 | Carter EP 460 |

Table 6-2-c

## Chain Gauge — Wear and Stretch Measuring

(1) The chain gauge is useful and convenience for measuring.

(2) Please use a chain gauge to measure the chain pitch and diameter, such as illustrations (1) and (2).

(3) Every chain ring must be measured , and the chain must be replaced when one of chain rings is wear or stretch.

(4) It will be a cutting-out possibility if you use a chain fall either wear or stretch during operation.

(5) Do not replace a chain fall by yourself and do please contact specific either service centers or contractors to help you out.

(6) The chain fall must be replaced whole instead of a partial part.

(7) The load sheave, regulator, and chain compressing wheel must be replaced the same time as you do a second time replacement.

## Remark

(1) Chain must be perfect condition without any defects and attachments.

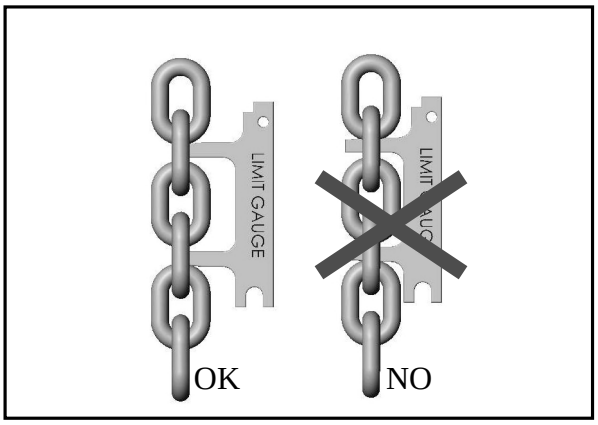



Illustration (1)
Chain pitch measure

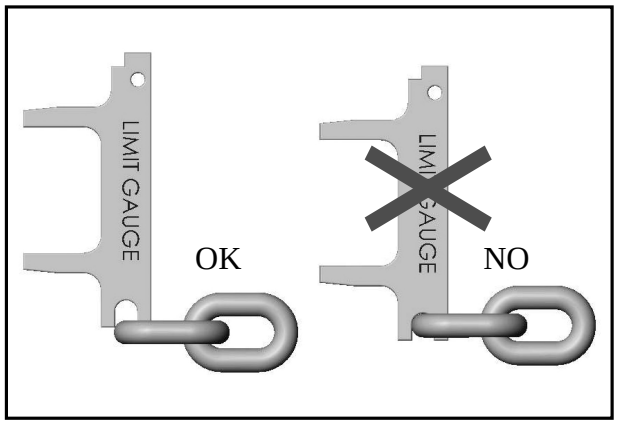



Illustration (2)
Diameter measure

# 7. TROUBLESHOOTING

## 7.1 Wiring Diagrams



The above models are available in the following specification：

(a) 3-Phase

(b) 50 or 60 Hertz

(c) Single and dual voltage

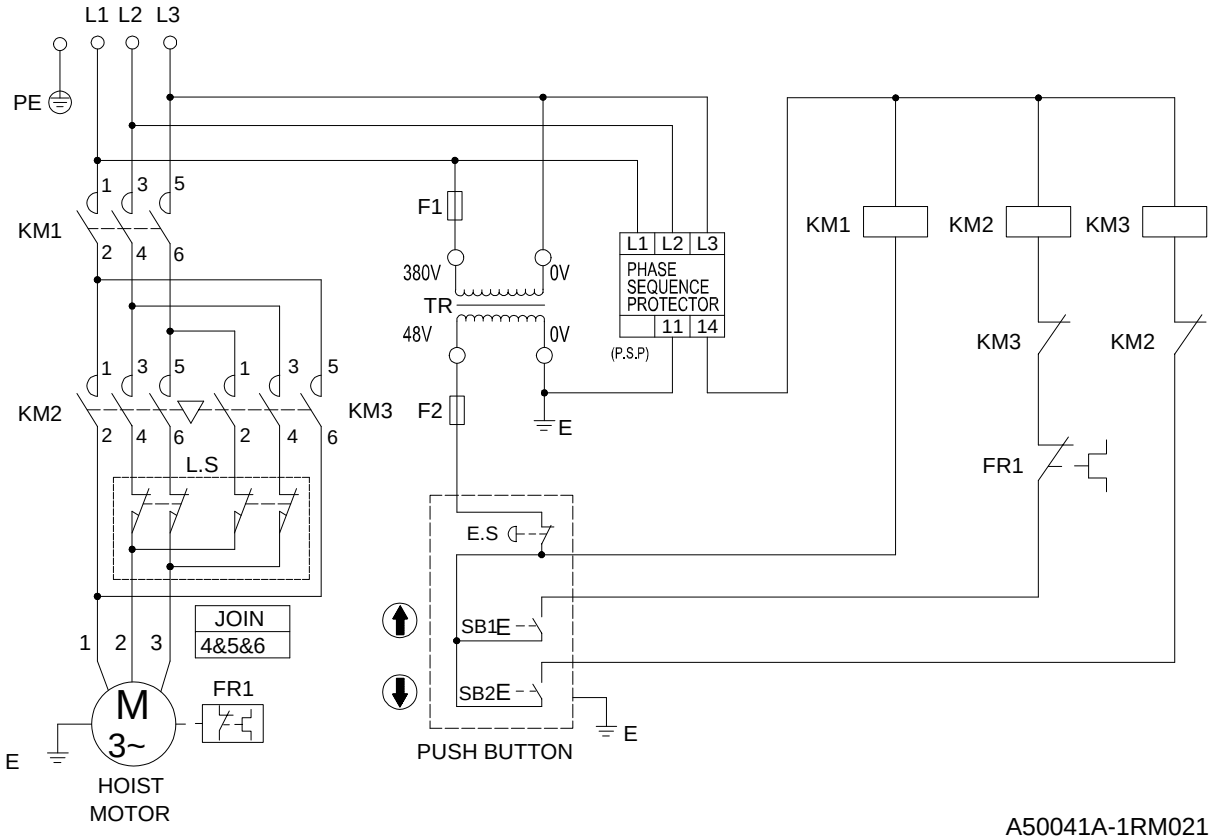
| Voltage / Hertz | Dual Voltage | Single Voltage |
|---|---|---|
| 50 Hz | 220V/380V<br>220V/440V<br>230V/460V | 220V<br>to<br>600V |
| 60 Hz | | |

Table 7-1

## Warranty Details

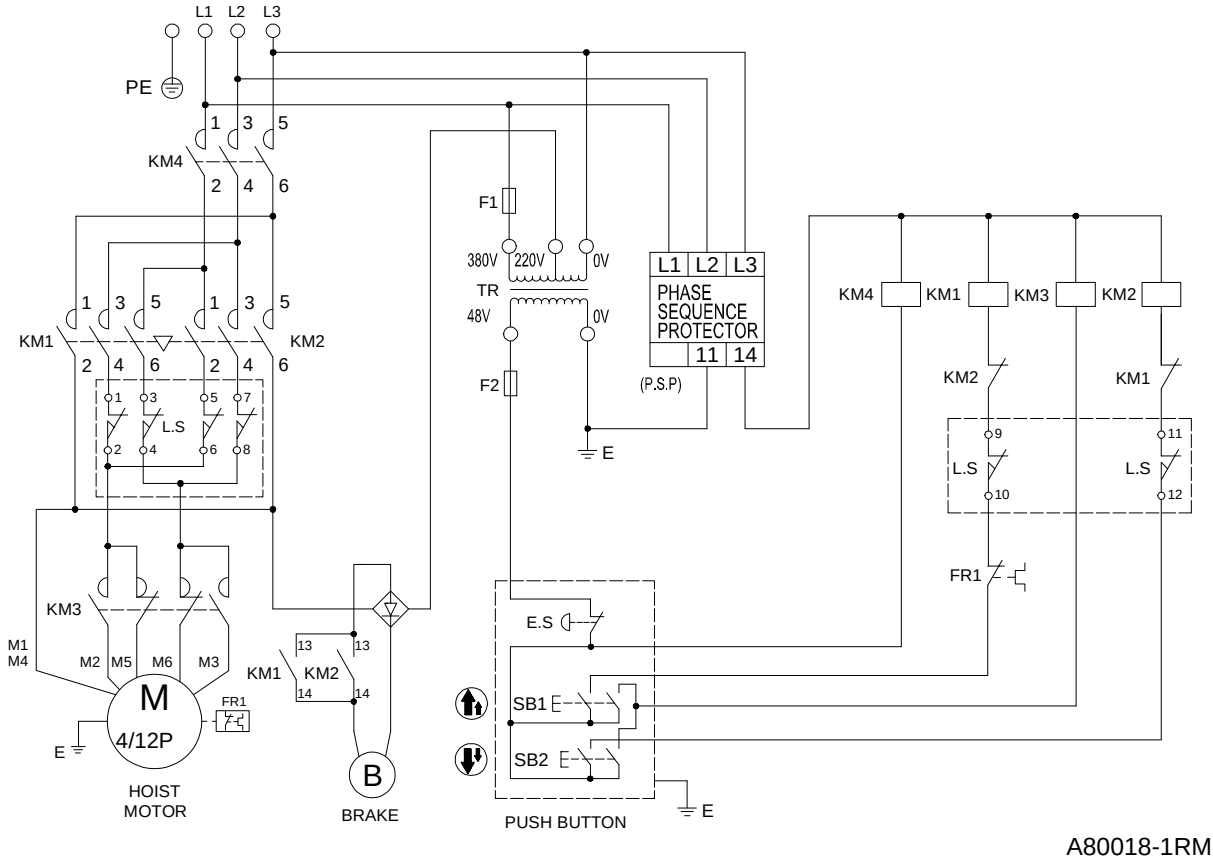
1. Warranty Period：One year for Mechanical Spare Parts after purchase the product.
2. Non-Warranty Scope：
   a. Electrical Spare Parts (ex. Contactor, Pendant, Phase Error Relay, etc.)
   b. Expense Spare Parts (ex. Chain Bucket, Brake Lining, etc.)
   c. Damage caused by unsuitable operation.
      (ex. Galvanize plant, Chemical Plant, Dye-work, etc.)
   d. Damage caused by operating on the wrong electric voltage.
   e. Damage caused by user amend the product.
   f. Damage caused by natural disaster.
3. Warranty Scope shall be permitted by Cheng Day Machinery and Within One Year of damaged Mechanical Spare Parts Repair and Replacement.
   (circumstance stated in detail No. 2 are not included.)

## CHAIN HOIST FOR SINGLE SPEED 380V- 48V




A50041A-1RM021

## CHAIN HOIST FOR DUAL SPEED 380V- 48V



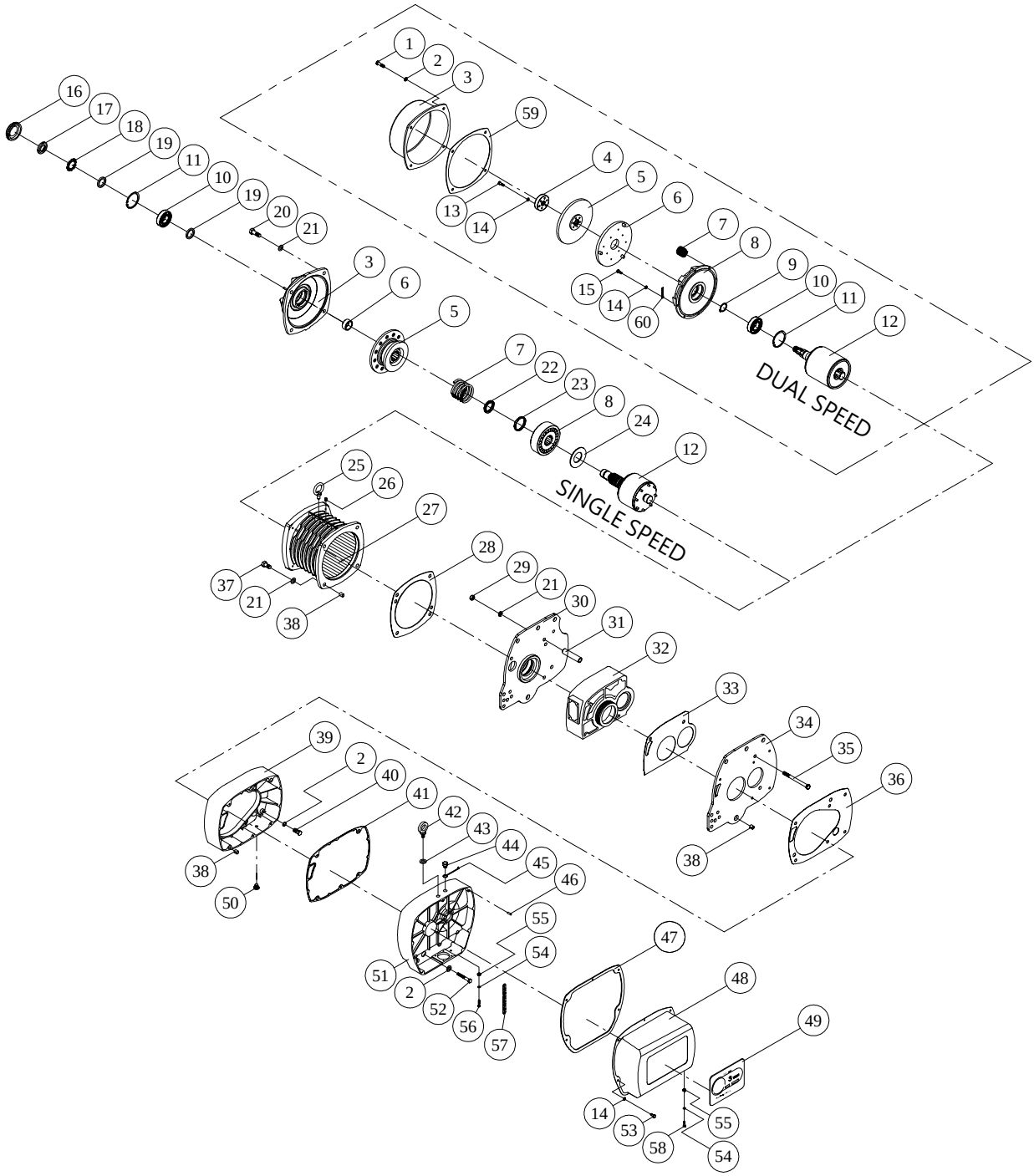

A80018-1RM

## 7.2 Troubleshooting and Remedial action

| SITUATION | CAUSE | REMEDY |
|---|---|---|
| Hoist will not operate | (1)Phase error relay operated due to incorrect phase connections | Reverse any two phase connections. |
| | (2) Blown power fuse or tripped power circuit breaker | Check supply requirements and replace the fuse/reset breaker to meet requirements. |
| | (3) Blown control circuit fuse | Check fuse for correct rating and replace |
| | (4) Broken/disconnected power or control circuit wire | Locate and repair/reconnect |
| | (5) Low supply voltage | Check if 10% reduction of voltage, have mains supply checked. |
| | (6) Motor hums but does not rotate | Check phases of motor - insulate and repair. |
| | (7) Emergency stop button release pushed (if fitted) | Check the cause as necessary |
| | (8) Faulty contactor | Operate manually if hoist runs then control circuit/coil is faulty - locate fault and repair. If hoist does not run then check main supply. If input supply is correct but there is a faulty output supply then replace the contactor |
| Hoist will not stop | Welded contacts in contactor | Replace contactor |
| Brake slips | Abrasion of motor brake | Replace |
| Abnormal sound. on load chain/ chain sprocket | (1)Chain dry | Lubricate |
| | (2) Worn chain sprocket | Replace load chain and chain sprocket |
| Electric shock | (1)Poor earth connection | Provide correct earth connection |
| | (2) Accumulated foreign matter/moisture on electrical parts | Remove foreign matter/dry electrical parts |
| Oil leak | (1) No oil plug | Attach the normal oil plug |
| | (2) Oil plug loosen | Fasten the plug tightly |
| | (3) No plug packing | Attach normal packing |
| | (4) Worn or deteriorated oil packing | Attach the new packing |

# 8. Drawings and parts list

# Motor Assembly & Housing Drawing



# Motor Assembly & Housing B.O.M

S：Single Speed D：Dual Speed

| Key No. | Parts Code | Description | Q'ty Req'd 3T;5T | |
|---|---|---|---|---|
| | | | S | D |
| 1 | 400014 | Hex. Recess Bolt <M8×1.25×30L> | | 4 |
| 2 | 400095 | Spring Washer <M8> | 14 | 18 |
| 3 | 106022 | Motor End Cover | 1 | |
| | 100424 | | | 1 |
| 4 | 100495 | Brake Gap Adjuster | - | 1 |
| 5 | 100395 | Brake Drum | 1 | |
| | 100409 | Bauer Disc Spring | | 1 |
| 6 | 100490 | Spacer Sleeve | 1 | |
| | 100406 | Brake Lining | | 1 |
| 7 | 400237 | Brake Spring | 1 | |
| | 400239 | | | 6 |
| 8 | 105981 | Magnet Producer | 1 | |
| | 100498 | Magnet Coil Ass'y | | 1 |
| 9 | 400193 | Retaining Ring <S-30> | - | 1 |
| 10 | 400113 | Bearing <6206 2RU> | 1 | |
| 11 | 400200 | Retaining Ring <R-62> | 1 | |
| 12 | 100325 | Motor Rotor | 1 | |
| | 100375 | | | 1 |
| 13 | 400006 | Hex. Recess Bolt<M6×1.0×16L> | - | 3 |
| 14 | 400094 | Spring Washer <M6> | 4 | 15 |
| 15 | 400006 | Hex. Recess Bolt <M6×1.0×16L> | - | 8 |
| 16 | 400264 | Rubber Cap | 1 | - |
| 17 | 400220 | Castle Nut <AN06> | 1 | - |
| 18 | 400221 | External Tooth Washer <AW06> | 1 | - |
| 19 | 100430 | Bearing Stop Ring | 2 | - |
| 20 | 400023 | Hex. Recess Bolt <M12×1.75×35L> | 4 | - |
| 21 | 400097 | Spring Washer <M12> | 12 | |
| 22 | 100363 | Motor Shaft Spacer | 2 | - |
| 23 | 100365 | Motor Retaining Ring | 1 | - |
| 24 | 100410 | Cone Spring | 1 | - |
| 25 | 400218 | Eye Bolt <M10×1.5> | | |
| 26 | 400585 | Bolt <M8×1.25×16L> | 2 | |
| 27 | A | Motor Stator Ass'y | 1 | |
| | B | | | 1 |

#27Ref. Page30

# Motor Assembly & Housing B.O.M

S：Single Speed D：Dual Speed

| Key No. | Parts Code | Description | Q'ty Req'd 3T;5T | |
|---|---|---|---|---|
| | | | S | D |
| 28 | 402507 | Gasket 7# | 1 | |
| 29 | 400084 | Nut <M12×1.75> | 4 | |
| 30 | 207448 | Motor Front Plate Ass'y | 1 | |
| 31 | 209510 | Connecting Screws Sleeve | 4 | |
| 32 | 200698 | Load Sheave Housing | 1 | |
| 33 | 210139 | Gasket 55# | 1 | |
| 34 | 207504 | Gear End Plate | 1 | |
| 35 | 400032 | Hex. Bolt <M12×1.75×120L> | 4 | |
| 36 | 402510 | Gasket 10# | 1 | |
| 37 | 400021 | Hex. Recess Bolt <M12×1.25×25L> | 4 | |
| 38 | 400215 | Spring Pin <Ø12×14L> | 4 | |
| 39 | 200245 | Gear Box A | 1 | |
| 40 | 400025 | Hex. Recess Bolt <M8×1.25×30 L> | 6 | |
| 41 | 402511 | Gasket 11# | 1 | |
| 42 | 400219 | Eye Bolt <M16×1.5> | 1 | |
| 43 | 400227 | Gasket Ring | 1 | |
| 44 | 200926 | Hex. Oil Plug | 1 | |
| 45 | 200927 | Air Plug | 1 | |
| 46 | 400212 | Spring Pin < Ø5×16L> | 1 | |
| 47 | 402522 | Gasket 22# | 1 | |
| 48 | 300764 | Electric Housing | 1 | |
| 49 | | Name Plate | 1 | |
| 50 | 300523 | Lubricant Drain Bolt | 1 | |
| 51 | 265666 | Gear Box B | 1 | |
| 52 | 400460 | Hex. Recess Bolt <M8×1.25×65L> | 8 | |
| 53 | 400005 | Hex. Recess Bolt <M6×1.0×12L> | 8 | |
| 54 | 400661 | Flat Washer <M4> | 2 | |
| 55 | 406412 | Lock Nut <M4×0.7> | 2 | |
| 56 | 408449 | Hex. Recess Bolt <M4×0.7×20L> | 1 | |
| 57 | 400559 | Bucket Chain <Ø2.6×23.2×9.5-7> | 1 | |
| 58 | 405026 | Hex. Recess Bolt <M4×0.7×14L> | 1 | |
| 59 | 402582 | Gasket 67# | - | 1 |
| 60 | 300801 | Cable Fixing Plate | - | 1 |

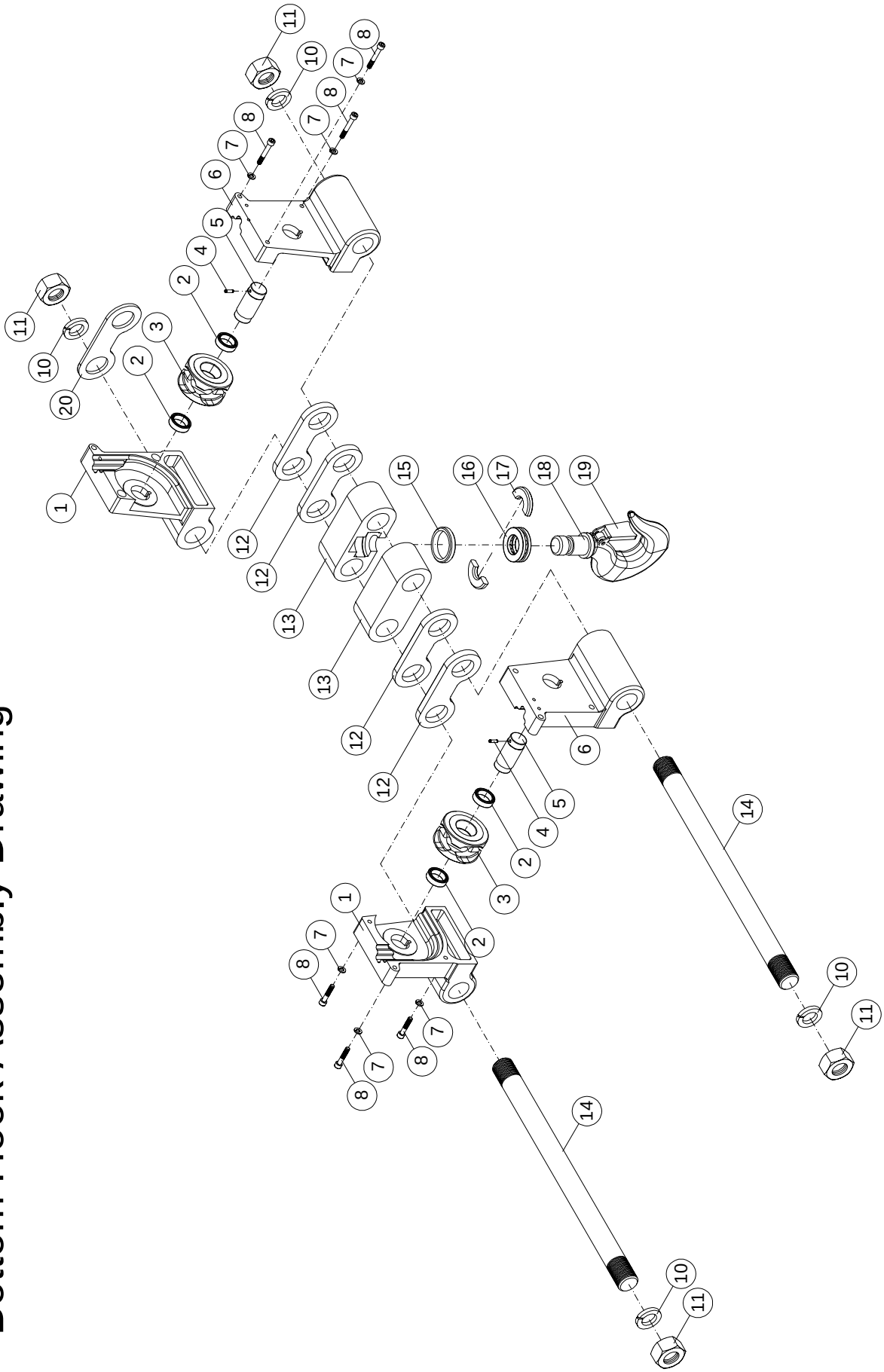
# Motor Assembly & Housing B.O.M

S：Single Speed D：Dual Speed

| Key No. | Parts Code | | Description | Ø - HZ - V | |
|---|---|---|---|---|---|
| 27 | A | 132701 | Motor Stator Ass 'y (S) | 3Ø 60HZ | 220 / 380V |
| | | 132702 | | | 220 / 440V |
| | | 132707 | | | 230 /460V |
| | | 132708 | | | 400V |
| | | 132706 | | | 600V |
| | | 132711 | | 3Ø 50HZ | 220 / 380V |
| | | 132712 | | | 400V |
| | | 132713 | | | 415V |
| | | 132714 | | | 525V |
| | B | 132801 | Motor Stator Ass 'y (D) | 3Ø 60HZ | 220V |
| | | 132802 | | | 230V |
| | | 132803 | | | 380V |
| | | 132804 | | | 460V |
| | | 132805 | | | 600V |
| | | 132811 | | 3Ø 50HZ | 220V |
| | | 132812 | | | 380V |
| | | 132813 | | | 415V |
| | | 132814 | | | 525V |

※For others voltage please contact with dealer for correct part no.

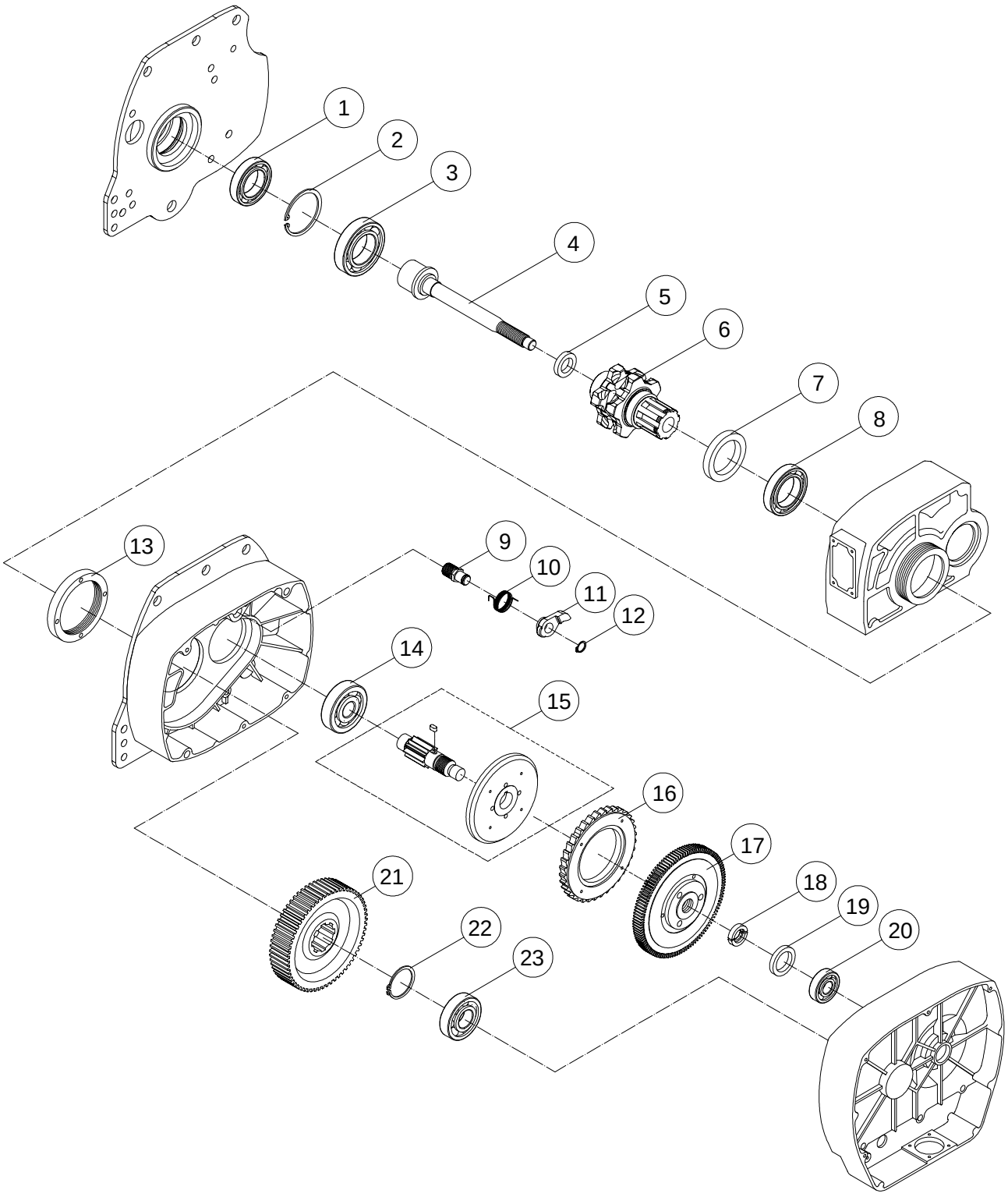
# Bottom Hook Assembly Drawing



# Bottom Hook Assembly B.O.M

| Key No. | Parts Code | Description | Q'ty Req'd | |
|---|---|---|---|---|
| | | | 3T | 5T |
| 1 | 207373 | Bottom Hook Housing B | 2 | |
| | 207495 | Bottom Hook Housing B | | 2 |
| 2 | 408052 | Needle Bearing < TA 3020Z > | 4 | |
| | 400174 | Needle Bearing <TA 4025 Z> | | 4 |
| 3 | 200170 | Sprocket <Ø40×42L> | 2 | |
| | 200111 | Sprocket <Ø50×51L> | | 2 |
| 4 | 400212 | Spring Pin <Ø5×16L> | 2 | 2 |
| 5 | 200813 | Idle Wheel Axle | 2 | |
| | 200116 | | | 2 |
| 6 | 207372 | Bottom Hook Housing A | 2 | |
| | 207494 | | | 2 |
| 7 | 400096 | Spring Washer <M10> | 6 | 6 |
| 8 | 400432 | Hex. Recess Bolt <M10×1.5×65> | 4 | |
| | 400020 | Hex. Recess Bolt <M10×1.5×50> | | 4 |
| 9 | 400019 | Hex. Recess Bolt <M10×1.5×45> | 2 | |
| | 400020 | Hex. Recess Bolt <M10×1.5×50> | | 2 |
| 10 | 400105 | Spring Washer <1 1/4" > | 4 | |
| | 400654 | Spring Washer <M42> | | 4 |
| 11 | 202011 | Nut < 1 1/4"×7UNC > | 4 | |
| | 406430 | Nut <M42×4.5> | | 4 |
| 12 | 207378 | Stay Bolt <1 1/4"×7UNC×565> | 2 | |
| | 207555 | Stay Bolt <M42×4.5×580> | | 2 |
| 13 | 207376 | Washer <t13×60×150> | 6 | |
| | 207502 | Washer <t13×76×210> | | 4 |
| 14 | 207374 | Bottom Hook Housing C | 2 | |
| | 207496 | | | 2 |
| 15 | 200133 | Bottom Hook Retaining Ring | 1 | |
| | 200134 | | | 1 |
| 16 | 400159 | Thrust Bearing <51106> | 1 | |
| | 400160 | Thrust Bearing <51207> | | 1 |
| 17 | 200129 | Bottom Hook Half Spacer | 2 | |
| | 200130 | | | 2 |
| 18 | 209355 | Bottom Hook | 1 | |
| | 209358 | | | 1 |
| 19 | 400489 | Safety Latch Ass'y | 2 | 2 |
| 20 | 207379 | Limit Plate | 1 | 1 |
| 21 | 400094 | Spring Washer <M6> | 2 | 2 |
| 22 | 400005 | Hex. Recess Bolt <M6×1.0×12> | 2 | 2 |

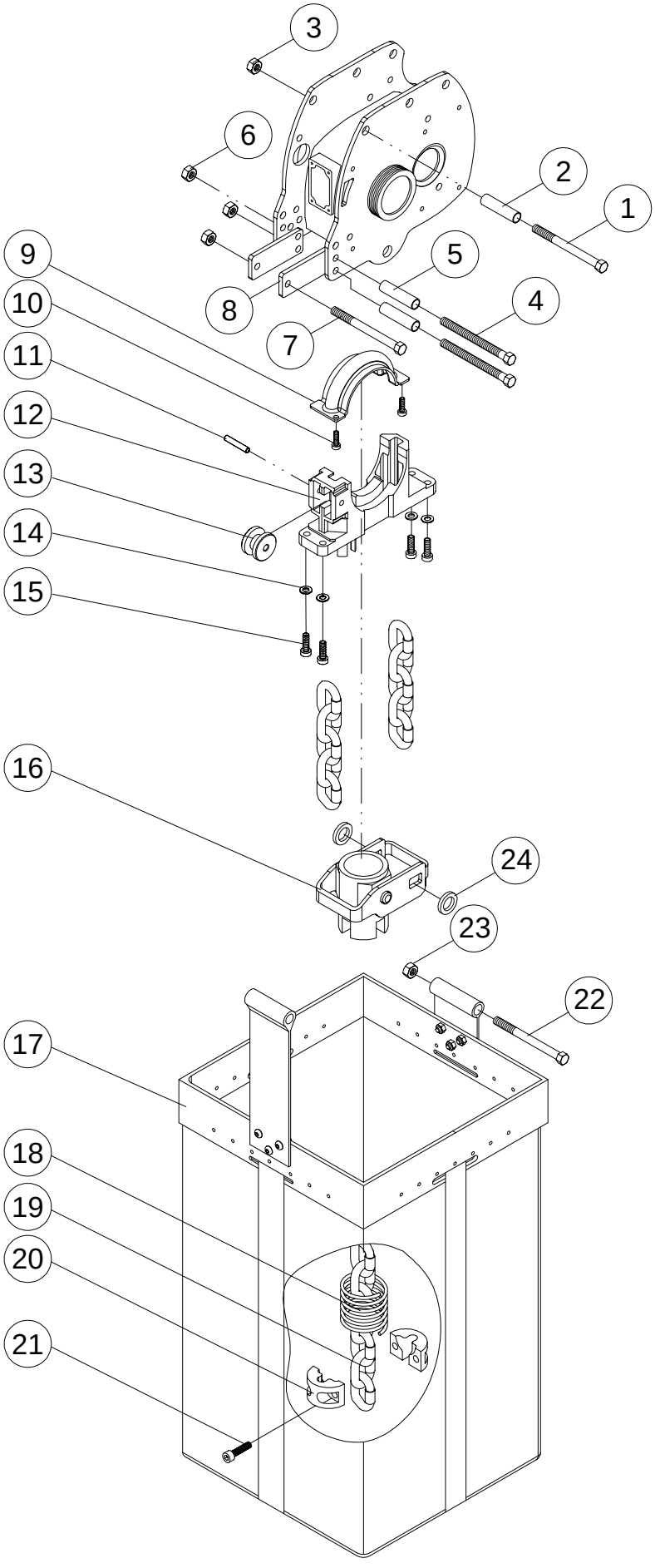
# Reducing Gear Box Drawing



# Reducing Gear Box B.O.M

| Key No. | Parts Code | Description | Q'ty Req'd | |
|---|---|---|---|---|
| | | | 3T | 5T |
| 1 | 400140 | Bearing <6009ZZ> | 1 | 1 |
| 2 | 400201 | Retaining Ring <R-75> | 1 | 1 |
| 3 | 407841 | Bearing <6210Z> | 1 | 1 |
| 4 | 200695 | Front Motor Axle Ass'y | 1 | 1 |
| 5 | 404488 | Oil Seal <Ø25×Ø40×8> | 1 | 1 |
| 6 | 200198 | Load Sheave | 1 | |
| | 200199 | | | 1 |
| 7 | 400185 | Oil Seal < Ø58×Ø80×12> | 1 | 1 |
| 8 | 405567 | Bearing <6010> | 1 | 1 |
| 9 | 200286 | Ratchet Pawl Shaft | 1 | 1 |
| 10 | 400241 | Ratchet Spring | 1 | 1 |
| 11 | 200288 | Ratchet Pawl | 1 | 1 |
| 12 | 400190 | Retaining Ring <S-16> | 1 | 1 |
| 13 | 200699 | Compress Retaining Sleeve | 1 | 1 |
| 14 | 407772 | Bearing <6405> | 1 | 1 |
| 15 | 200734 | 3rd Gear Ass'y | 1 | |
| | 200735 | | | 1 |
| 16 | 200741 | Ratchet Wheel Ass'y | 1 | 1 |
| 17 | 200665 | 2nd Gear | 1 | 1 |
| 18 | 200274 | Half Spacer | 2 | 2 |
| 19 | 200277 | Bearing Spacer | 1 | 1 |
| 20 | 407746 | Bearing <6304> | 1 | 1 |
| 21 | 200265 | 4th Gear | 1 | |
| | 200267 | | | 1 |
| 22 | 400197 | Retaining Ring <S-50> | 1 | 1 |
| 23 | 400135 | Bearing <6303> | 1 | 1 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

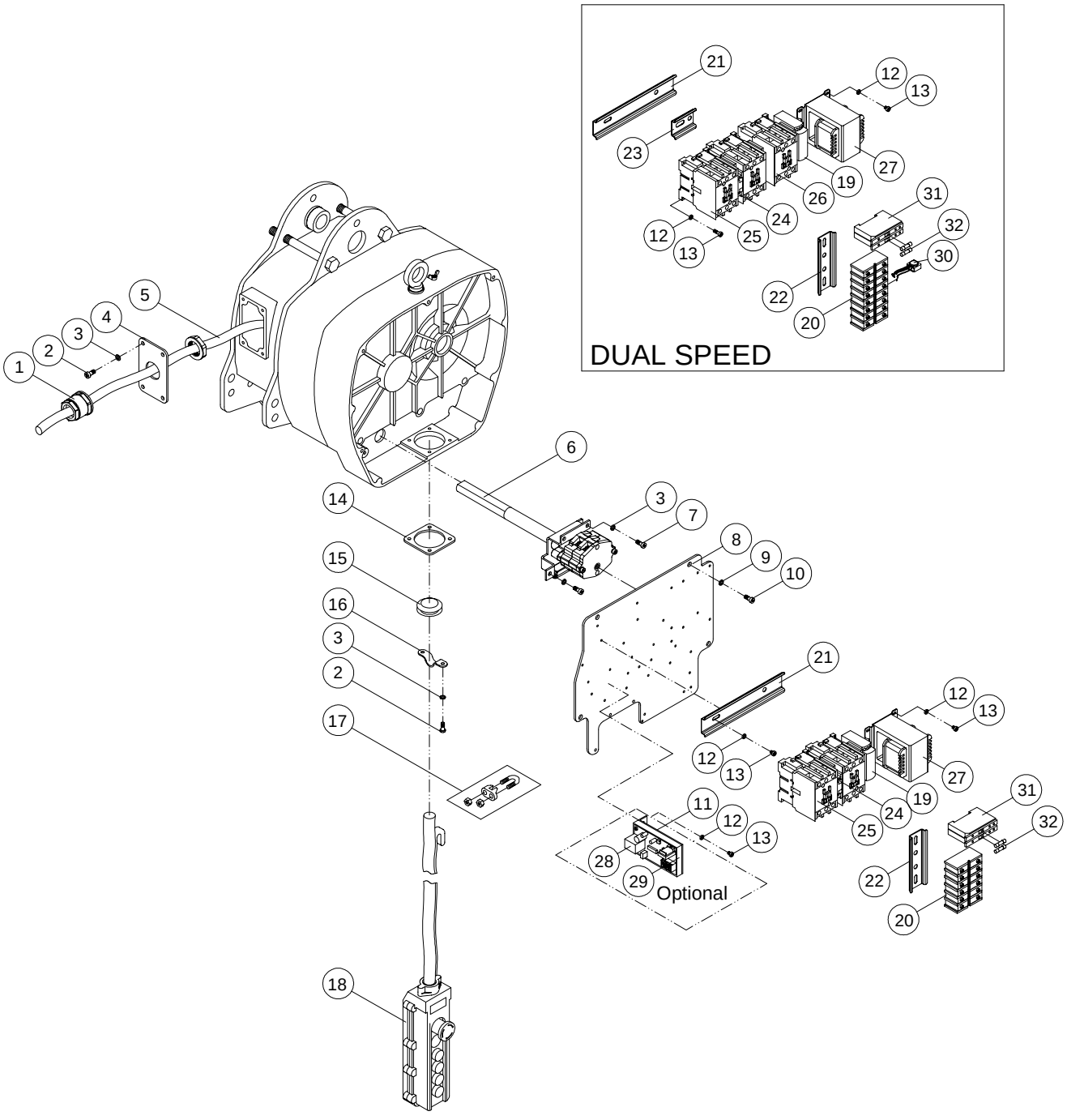
# Load Chain Section Drawing



# Load Chain Section B.O.M

| Key No. | Parts Code | Description | Q'ty Req'd | |
|---|---|---|---|---|
| | | | 3T | 5T |
| 1 | 408576 | Hex. Bolt <M16×2.0×140L> | 3 | 3 |
| 2 | 207451 | Sleeve A < Ø19×Ø27×63L> | 3 | 3 |
| 3 | 400648 | Lock Nut <M16×2.0> | 3 | 3 |
| 4 | 400029 | Hex. Bolt <M10×1.5×120L> | 2 | 2 |
| 5 | 207452 | Sleeve B < Ø12×Ø17×64.5L> | 2 | 2 |
| 6 | 400089 | Lock Nut <M10×1.5> | 3 | 3 |
| 7 | 404630 | Hex. Bolt <M10×1.5×100L> | 1 | 1 |
| 8 | 207453 | Connecting Plate | 2 | 2 |
| 9 | 200203 | Chain Regulating Plate <t2.0×50×160L> | 1 | 1 |
| 10 | 400005 | Hex. Recess Bolt <M6×1.0×12L> | 2 | 2 |
| 11 | 400273 | Compressing Wheel Axle < Ø8×55L> | 1 | 1 |
| 12 | 200194 | Chain Regulator <Ø10> | 1 | |
| | 200195 | Chain Regulator < Ø11.2> | | 1 |
| 13 | 200191 | Chain Regulating Wheel < Ø39×25L > | 1 | |
| | 200192 | Chain Regulating Wheel < Ø40×28L> | | 1 |
| 14 | 400095 | Spring Washer <M8> | 6 | 6 |
| 15 | 400013 | Hex. Recess Bolt <M8×1.25×25L> | 4 | 4 |
| 16 | 207455 | Chain Guide Ass'y | 1 | |
| | 207498 | | | 1 |
| 17 | 207459 | Chain Bucket <18#> | 1 | 1 |
| 18 | 400233 | Limit Spring <Ø10> | 1 | |
| | 400234 | Limit Spring <Ø11.2> | | 1 |
| 19 | 400543 | Load Chain <Ø10> | 9M | |
| | 400544 | Load Chain <Ø11.2> | | 9M |
| 20 | 200201 | Chain Stopper <Ø10> | 2 | |
| | 200202 | Chain Stopper <Ø11.2> | | 2 |
| 21 | 400014 | Hex. Recess Bolt <M8×1.25×30L> | 4 | 4 |
| 22 | 408351 | Hex. Bolt <M12×1.75×135L> | 1 | 1 |
| 23 | 400091 | Lock Nut <M12×1.75> | 1 | 1 |
| 24 | 207458 | Washer <t5×Ø21×Ø31> | 2 | 2 |
| | | | | |

# Electric Parts Drawing

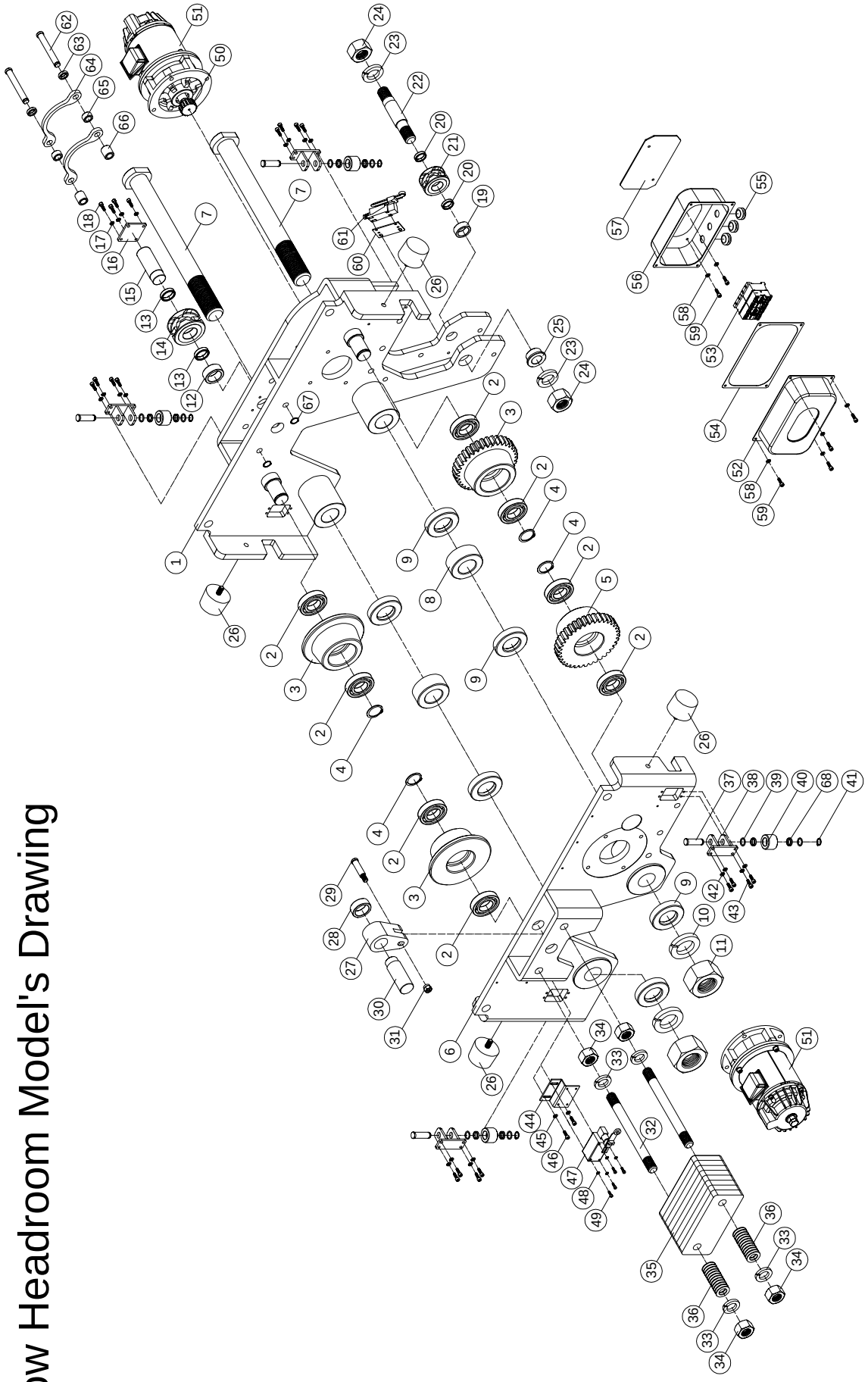


# Electric Parts B.O.M

S：Single Speed　D：Dual Speed

| Key No. | Parts Code | Description | Q'ty Req'd | | | |
|---|---|---|---|---|---|---|
| | | | 3T | | 5T | |
| | | | S | D | S | D |
| 1 | 400222 | Cable Gland(M20) | 1 | | 1 | |
| | 400941 | Cable Gland(M25) | 1 | | 1 | |
| 2 | 400053 | Cross Headed Screw<M5×0.8×12L> | 4 | | 4 | |
| 3 | 400093 | Spring Washer<M5> | 7 | | 7 | |
| 4 | 300343 | Power Cable Holding Plate | 1 | | 1 | |
| 5 | | Power Cable Ass'y | 1 | | 1 | |
| 6 | 208668 | Limit Switch Ass'y | 1 | | 1 | |
| | 208677 | | | 1 | | 1 |
| | 208669 | Limit Switch Ass'y (THA) | 1 | 1 | 1 | 1 |
| 7 | 400620 | Cross Headed Screw<M5×0.8×8L> | 3 | | 3 | |
| 8 | 300337 | Electric Components Plate | 1 | | 1 | |
| 9 | 400094 | Spring Washer<M6> | 4 | | 4 | |
| 10 | 400005 | Hex. Recess Bolt<M6×1.0×12L> | 4 | | 4 | |
| 11 | 300340 | P.E.R Holding Plate | 1 | | 1 | |
| 12 | 400092 | Spring Washer<M4> | 14 | | 14 | |
| 13 | 400048 | Cross Headed Screw<M4×0.7×6L> | 13 | | 13 | |
| 14 | 300332 | Control Cable Holding Plate | 1 | | 1 | |
| 15 | 400271 | Rubber Cap | 1 | | 1 | |
| 16 | 300342 | Wire Holder Clamp | 1 | | 1 | |
| 17 | 400297 | Wire Clip(3/16″) | 1 | | 1 | |
| 18 | 301742 | Single Speed Pbs | 1 | | 1 | |
| | 301981 | Dual Speed Pbs | | 1 | | 1 |
| 19 | 302376 | Negative Phase Protector (N.P.P) | 1 | | 1 | |
| 20 | 302339 | Terminal Block | 6 | 8 | 6 | 8 |
| 21 | 300091 | Contactor Rail | 1 | | 1 | |
| 22 | 300079 | Contactor Rail | 1 | | 1 | |
| 23 | 300078 | Contactor Rail | - | 1 | - | 1 |
| 24 | 300800 | Contactor Interlock | 1 | | 1 | |
| 25 | 301111 | Magnetic Contactor <3A1a1b LC1-D18-E7> | 2 | 3 | 2 | 3 |
| 26 | 300041 | Magnetic Contactor <2A2B LC1-D258-E7> | | 1 | | 1 |
| 27 | 301003 | Transformer <PS-3L> | 1 | | 1 | |
| | 301015 | Transformer <PS-10BR> | | 1 | | 1 |
| 28 | 300726 | Electric Overload(E.O) | 1 | 2 | 1 | 2 |
| 29 | 300363 | N.P.P/E.O Box | 1 | | 1 | |
| 30 | 300143 | Rectifier | | 1 | | 1 |
| 31 | 300995 | Fuse Holder | 2 | 2 | 2 | 2 |
| 32 | 300999 | Fuse (3A) | 2 | 2 | 2 | 2 |

# Low Headroom Model's Drawing



# Low Headroom Model's B.O.M

| Key No. | Parts Code | Description | Q'ty Req'd | |
|---|---|---|---|---|
| | | | 3T | 5T |
| 1 | 207389 | Drive Frame Ass'y | 1 | |
| | 207478 | | | 1 |
| 2 | 407808 | Bearing <6207 Z > | 8 | |
| | 400147 | Bearing <6209 Z> | | 8 |
| 3 | 203134 | Plain Wheel <Ø143.5×59> | 2 | |
| | 207474 | Plain Wheel <Ø176×60> | | 2 |
| 4 | 400194 | Retaining Ring <S-35> | 4 | |
| | 400196 | Retaining Ring <S-45> | | 4 |
| 5 | 203114 | Gear Wheel <M3.5×49T×67> | 2 | |
| | 207475 | Gear Wheel <M3.5×49T×76> | | 2 |
| 6 | 207383 | Drive Frame Ass'y A | 1 | |
| | 207469 | | | 1 |
| 7 | 207438 | Stay Bolt <2"×4 1/2UNC×422> | 2 | |
| | 207487 | Stay Bolt <2"×4 1/2UNC×450> | | 2 |
| 8 | 207446 | Spacer Sleeve <Ø95×Ø52×8> | 2 | 2 |
| 9 | 207488 | Spacer Sleeve <Ø95×Ø52×12.5> | 8 | 8 |
| 10 | 400107 | Spring Washer <2 "> | 2 | 2 |
| 11 | 202018 | Nut <2"-4 1/2UNC> | 2 | 2 |
| 12 | 207445 | Spacer Sleeve <Ø42×Ø31.5×29.5> | 1 | |
| | 207476 | Spacer Sleeve <Ø60×Ø41×21> | | 1 |
| 13 | 408052 | Needle Bearing <TA 3020Z> | 2 | |
| | 400174 | Needle Bearing <TA 4025> | | 2 |
| 14 | 200170 | Sprocket < Ø40×42L> | 1 | |
| | 200111 | Sprocket < Ø50×51L> | | 1 |
| 15 | 207444 | Sprocket Axle <Ø30×108> | 1 | |
| | 207477 | Sprocket Axle <Ø40×108> | | 1 |
| 16 | 207437 | Shaft Stopper <t5×66×66> | 1 | 1 |
| 17 | 400094 | Spring Washer <M6> | 4 | 4 |
| 18 | 400006 | Hex. Headed Bolt <M6×1.0×16> | 4 | 4 |
| 19 | 207445 | Spacer Sleeve <Ø42×Ø31.5×29.5> | 1 | |
| | 207492 | Spacer Sleeve <Ø51×Ø35.5×21> | | 1 |

# Low Headroom Model's B.O.M

| Key No. | Parts Code | Description | Q'ty Req'd | |
|---|---|---|---|---|
| | | | 3T | 5T |
| 20 | 408052 | Needle Bearing <TA 3020Z> | 2 | |
| | 400836 | Needle Bearing <HK 3520> | | 2 |
| 21 | 200170 | Sprocket | 1 | |
| | 207490 | | | 1 |
| 22 | 207439 | Sprocket Axle <Ø30×182> | 1 | |
| | 207489 | Sprocket Axle<Ø35×195> | | 1 |
| 23 | 400101 | Spring Washer < M24> | 2 | |
| | 400652 | Spring Washer < M30> | | 2 |
| 24 | 400076 | Nut <M24×3.0> | 2 | |
| | 400635 | Nut <M30×3.5> | | 2 |
| 25 | 207440 | Bushing <Ø51×24> | 1 | |
| | 207491 | Bushing <Ø55×24> | | 1 |
| 26 | 400313 | Bumper | 4 | 4 |
| 27 | 207428 | Chain Connector <t52×131.5> | 1 | |
| | 207467 | Chain Connector <t52×131.5> | | 1 |
| 28 | 207441 | Spacer Sleeve <Ø55×Ø41×20> | 1 | 1 |
| 29 | 207447 | Chain Connecting Pin <Ø19×77> | 1 | |
| | 207486 | Chain Connecting Pin <Ø19×79> | | 1 |
| 30 | 207443 | Chain Connector Axle <Ø40×108> | 1 | 1 |
| 31 | 400091 | Lock Nut <M12×1.75 | 1 | 1 |
| 32 | 207427 | Stay Bolt <7/8"×9UNC×260> | 2 | 2 |
| 33 | 400102 | Spring Washer <7/8"> | 4 | 4 |
| 34 | 202016 | Nut <7/8"×9UNC> | 4 | 4 |
| 35 | 207425 | Counter Weight Block | 8 | 8 |
| 36 | 203221 | Spacer Washer <Ø40×Ø24×1/8"> | 12 | 12 |
| 37 | 207434 | Lock Pin <Ø20×60> | 4 | 4 |
| 38 | 207432 | Bracket | 4 | |
| | 207485 | | | 4 |
| 39 | 207314 | Shaft Stopper <t2×Ø22×Ø17> | 8 | 8 |
| 40 | 207435 | Guide Wheel <Ø40×37.5> | 4 | 4 |
| 41 | 400190 | Retaining Ring <S-16> | 4 | 4 |

# Low Headroom Model's B.O.M

| Key No. | Parts Code | Description | Q'ty Req'd | |
|---|---|---|---|---|
| | | | 3T | 5T |
| 42 | 400095 | Spring Washer <M8> | 16 | 16 |
| 43 | 400013 | Hex. Headed Bolt <M8×1.25×25> | 16 | 16 |
| 44 | 207430 | Limit Steady | 1 | 1 |
| 45 | 400662 | Flat Washer <M6> | 4 | 4 |
| 46 | 400006 | Hex. Headed Bolt <M6×1.0×16> | 4 | 4 |
| 47 | 301478 | Limit Switch <TZ-5108-2> | 1 | 1 |
| 48 | 400093 | Spring Washer <M5> | 4 | 4 |
| 49 | 405021 | Hex. Headed Bolt <M5×0.8×35> | 4 | 4 |
| 50 | 210330 | Pinion <M3.5×16T> | 2 | 2 |
| 51 | 101545 | Motor Ass'y -B <0.4KW 50HZ 380V 4P> | 2 | 2 |
| 52 | 300394 | Electric Housing Cover | 1 | 1 |
| 53 | 301102 | Contactor <3A1a1b LC1-D09-E7 > | 2 | 2 |
| 54 | 402583 | Gasket 68# | 1 | 1 |
| 55 | 400339 | Rubber Cap | 1 | 1 |
| | 400270 | | 2 | 2 |
| 56 | 300395 | Electric Housing | 1 | 1 |
| 57 | 402516 | Gasket 16# | 1 | 1 |
| 58 | 400094 | Spring Washer <M6> | 6 | 6 |
| 59 | 400006 | Hex. Recess Bolt <M6×1.0×16L> | 6 | 6 |
| 60 | 207872 | Limit Steady | 1 | 1 |
| 61 | 300535 | Limit Switch <ME-8108> | 1 | 1 |
| 62 | 207951 | Axle < Ø20×123> | 2 | 2 |
| 63 | 207945 | Spacer Sleeve C <Ø27×Ø17×4> | 2 | |
| | 207946 | Spacer Sleeve C <Ø27×Ø17×8> | | 2 |
| 64 | 207947 | Chain Guide Plate | 2 | |
| | 207949 | | | 2 |
| 65 | 207943 | Spacer Sleeve B <Ø27×Ø17×15> | 2 | 2 |
| 66 | 207941 | Spacer Sleeve A<Ø27×Ø17×33> | 2 | |
| | 207942 | Spacer Sleeve A<Ø27×Ø17×29> | | 2 |
| 67 | 400190 | Retaining Ring <S-16> | 2 | 2 |
| 68 | 408055 | Needle Bearing <HK 1612> | | 8 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# The Standard Instruction and Inspection for Chain Block

## The additional remarks quote from the standard regulations.

## I Instructions: Please pay attention to the followings while using

1・Ensure the conditions of the hoists and the ISO approval.

2・The capacity should be within the normal capacity.

3・Never use the load chain over standard. (above ISO 80)

4・Always use the hoist when the lift height is standard.

5・Keep daily inspection before using.

6・Inspect the load chain and chain ring are free. Never lift a load when the chain is twisted.

7・Never use the loose bottom hook.

8・Never use the load chain without "Up" and "Down" device.

9・Never use the chain to wrap the load.

10・Never lift a load with the front of the hook.

11・Never push the button switch

12・Never lift a load over the limit lift height.

13・Never stand under the raised load.

14・Never slant a load over 15°C.

15・Always avoid the hoist fall.

16・Replace the load chain every year when the hoist is used frequently.

17・Replace the load chain half a year and the bottom hook twice a year if the working environment temperature is above 100°C or below -40°C and the environment is corrosive and fracture.

Inspect the bottom hook and replace regularly when it's used frequently.

18・Inspect the load chain monthly by electroplate or heat treatment manufacturers and replace it yearly.

19・Never weld the load chain after broken.

20・The load chain should be lubricated before using.

21・Apply lubricant on the gear, bearing and other parts regularly.

22・Prevent the hoist from rusting after infrequent use.

23・Never modify the hoist by yourself. Please contact the original manufacturer to help you out.

24・Never lift the same object with two hoists. If necessary, make sure the lifting should be operated within normal capacity.

# Electric Chain Hoist Daily Inspection Checklist

Series No.:
Hoist Model:
Date of Purchasing: / / (D/M/Y)

Unit: Date: / /

| No | Part | Item | Standard | V X | Y N |
|---|---|---|---|---|---|
| 1 | Motor | Outlook | The temperate controls within E level insulating temperate(135℃) | | |
| 2 | Hook | Hook Throat<br>Distortion<br>Motion<br>Others | The hook opening widens.<br>The hook distorts.<br>The hook spins smoothly.<br>The hook breaks or dents. | | |
| 3 | Load Chain | Elongate<br>Wear<br>Distort<br>Corrode<br>Break<br>Lubricate<br>Rotate | The elongation is over.<br>The chain diameter is overused.<br>The distortion is visible<br>The chain corrodes.<br>The load chain cracks.<br>Apply lubricant (except grease).<br>The weld joints face the same direction. | | |
| 4 | Brake | The brake slips | The brake slips or creaks. | | |
| 5 | Push Bottom Switch | Operation<br>Outlook | The motion is as standard.<br>The cover is broken or deformed. | | |
| 6 | Limit Switch | Operation | The motion is correct. | | |
| 7 | Wiring | Wiring<br>Outlook | The wiring is loose.<br>The wiring is broken or hard. | | |

# Electric Chain Hoist Monthly Inspection Checklist

Series No.:
Hoist Model:
Date of Purchasing: / / (D/M/Y)

Unit: Date: / /

| No | Part | Item | Standard | V Y<br>X N |
|---|---|---|---|---|
| 1 | Limit Switch | Operate | Motion correct | |
| 2 | Hook | Hook Throat<br>Distortion<br>Motion<br>Others | Opening Widens.<br>Distorts.<br>Spins Smoothly.<br>Breaks or Dents. | |
| 3 | Load Chain | Elongate<br>Wear<br>Distort<br>Corrode<br>Break<br>Lubricate | The elongation is over.<br>The chain diameter is overused.<br>The distortion is visible<br>Corrodes.<br>Cracks.<br>Apply lubricant (except grease). | |
| 4 | Hex. Bolt | Everywhere | unwind | |
| 5 | Pendant Cable | outlook | Distortion | |
| 6 | Gear Box | | Apply lubricant | |

Yearly inspection

# Electric Chain Hoist Yearly Inspection Checklist

Series No.:

Hoist Model:

Date of Purchasing: / / (D/M/Y)

Unit: Date: / /

| No | Part | Item | Standard | V X | Y N |
|---|---|---|---|---|---|
| 1 | Bearing | Outlook | Leak or breaks | | |
| 2 | Gear | Outlook | Leak or breaks | | |
| 3 | Oil seal | Outlook | Harden or leak of oil | | |
| 4 | Ratch | Wear<br>Distortion | Wear away over limit<br>The distortion is visible | | |
| 5 | Load Sheave | Wear<br>Distortion | Wear away over limit<br>The distortion is visible | | |
| 6 | Guide Tube | Wear<br>Distortion | Wear away over limit<br>The distortion is visible | | |
| 7 | brake | Action<br>Wear<br>Distort<br>Other | Voice<br>Wear away over limit<br>The distortion is visible<br>Leak or defects | | |
| 8 | Hex. Bolt | Everywhere | unwind | | |
| 9 | Lubricate | change | Add new oil | | |
| 10 | Load test | Normal rated weight | Replay hang products up and down | | |