

Product Maintenance Information



Quantum Electric Chain Hoist QCH Series (1/8 to 5 ton)



Save These Instructions



Form 16586737
Edition 4
April 2013
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Only allow **Ingersoll Rand** trained technicians to perform maintenance on this product. For additional information contact **Ingersoll Rand** factory or nearest Distributor.

For additional supporting documentation refer to Table 1 'Product Information Manuals' on page 2.

Manuals can be downloaded from <http://www.ingersollrandproducts.com>.

The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased performance and increased maintenance and will invalidate all warranties.

Original instructions are in English. Other languages are a translation of the original instructions.

Refer all communications to the nearest **Ingersoll Rand** Office or Distributor.

Table 1: Product Information Manuals

| Publication | Part/Document Number | Publication | Part/Document Number |
|-----------------------------------|----------------------|----------------------------|----------------------|
| Product Safety Information Manual | 16586075 | Product Information Manual | 04585147 |
| Product Parts Information Manual | 16586729 | | |

INSPECTION

■ Periodic Inspection

According to ASME B30.16, frequency of periodic inspection depends on the severity of usage:

| | | |
|--------|--------------|-----------|
| NORMAL | HEAVY | SEVERE |
| yearly | semiannually | quarterly |

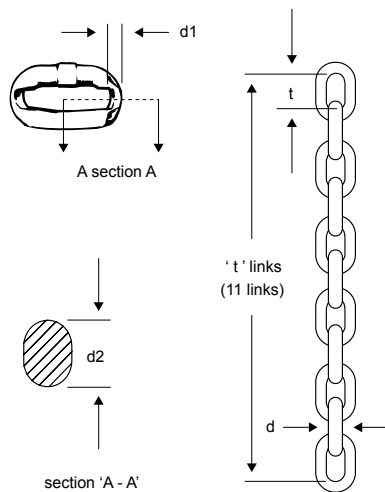
Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative written records of periodic inspections to provide a basis for continuing evaluation.

Inspect all the items in "Frequent Inspection". Also inspect the following:

- FASTENERS.** Check all rivets, split pins, capscrews and nuts. Replace if missing or tighten if loose.
- ALL COMPONENTS.** Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check shafts, bearings, and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
- HOOKS.** Inspect hooks carefully for cracks using magnetic particle or other suitable non-destructive method. Inspect hook retaining parts. Tighten or repair, if necessary.
- SUPPORTING STRUCTURE.** Check for distortion, wear and continued ability to support load. A visual inspection of connecting bolts and safety wire should be done periodically depending on frequency of use.
- TROLLEY (if equipped).** Check that the trolley wheels track the beam properly. Refer to trolley manufacturer's manual. Check that wheels are not excessively worn and inspect side plates for spreading due to bending. Ensure trolley wheels and beam are clean. Remove any oil, grease or buildup to avoid slipping and ensure unobstructed trolley operation. Do not operate the hoist until problems have been determined and corrected.
- LABELS AND TAGS.** Check for presence and legibility. Replace if necessary.
- LOAD CHAIN.** Measure the chain for stretching by measuring across eleven link sections all along the chain, paying particular attention to the most frequently reeved links. When any eleven links in the working length reaches or exceeds the discard length, replace the entire chain. Refer to Dwg. MHP0802 on page 2 and Table 2 'Load Chain' on page 3. Always use genuine Ingersoll Rand replacement load chain.

⚠ CAUTION

- The chain is to be replaced when the measurements exceed those specified in Table 2 'Load Chain' on page 3. The load sheave and chain must be checked for wear at the same time, and, where necessary be replaced. Do not weld on or to the chain.**
- CHAIN CONTAINER.** Check for damage or excessive wear and that chain container is securely attached to the hoist. Secure or replace if necessary.



(Dwg. MHP0802)

■ Records and Reports

Inspection records, listing all points requiring periodic inspection should be maintained for all load bearing equipment. Written reports, based on severity of service, should be made on the condition of critical parts as a method of documenting periodic inspections. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available for review.

■ Load Chain Reports

Records should be maintained documenting the condition of load chain removed from service as part of a long-range load chain inspection program. Accurate records will establish a relationship between visual observations noted during frequent inspections and the actual condition of the load chain as determined by periodic inspection methods.

■ Hoists Not in Regular Use

- A hoist which has been idle for a period of one month or more, but less than one year, should be given an inspection conforming with the requirements of "Frequent Inspection" prior to being placed into service.
- A hoist which has been idle for a period of more than one year should be given an inspection conforming with the requirements of "Periodic Inspection" prior to being placed into service.
- Standby hoists should be inspected at least semiannually in accordance with the requirements of "Frequent Inspection".

Table 2: Load Chain

| Hoist Model | Chain Size when new | | | | | | Discard Length | | | | | |
|-------------|---------------------|----|-----------------|------|-------------|-------|----------------|-------|-------------|-------|--------|-----|
| | 'd' | | Single 't' link | | 11 't' link | | * 'dm' | | 11 't' link | | * 'dm' | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| QCH50 | 0.197 | 5 | 0.602 | 15.3 | 6.626 | 168.3 | 0.63 | 16 | 6.756 | 171.6 | 0.177 | 4.5 |
| QCH100 | 0.275 | 7 | 0.866 | 220 | 9.527 | 242 | 0.909 | 23.1 | 9.717 | 246.8 | 0.248 | 6.3 |
| QCH200 | 0.354 | 9 | 1.063 | 27 | 11.693 | 297 | 1.116 | 28.35 | 11.925 | 302.9 | 0.319 | 8.1 |
| QCH300 | 0.394 | 10 | 1.102 | 28 | 12.126 | 308 | 1.157 | 29.4 | 12.37 | 314.2 | 0.354 | 9 |
| QCH500 | | | | | | | | | | | | |

Table 3: Periodic Inspection

| Term | Quarterly | Semi-annually | Yearly | Activity |
|-------------------------------------------------------------------|-----------|---------------|--------|---------------------------------------|
| Load chain | X | X | X | Oiling Measure abrasion |
| Brake system | --- | --- | X | Air gap check |
| Electrical fittings | --- | --- | X | Function check |
| Securing screws on suspended parts and load hook with accessories | X | --- | X | Check for cracks Check screw movement |
| Gearing | --- | --- | X | Visual check abrasion |
| Limit switch | --- | --- | X | Check switching elements |

INSPECTION REPORT

**Ingersoll Rand Quantum Electric Chain Hoist
QCH Series**

| | |
|-----------------------|----------------------|
| Model Number: | Date: |
| Serial Number: | Inspected by: |

| | | |
|--------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------|
| Reason for Inspection: (Check Applicable Box) | | Operating Environment: Normal ___ Heavy ___ Severe ___ |
| <input type="checkbox"/> 1. Scheduled Periodic Inspection (___ Quarterly ___ Semiannually ___ Yearly) | | |
| <input type="checkbox"/> 2. Discrepancy(s) noted during Frequent Inspection | | |
| <input type="checkbox"/> 3. Discrepancy(s) noted during maintenance | | |
| <input type="checkbox"/> 4. Other: _____ | | |

Refer to the Product Information and Parts Information Manual and "INSPECTION" section for the general inspection criteria. Also, refer to appropriate National Standards and Codes of Practice. If in doubt about an existing condition, contact the nearest **Ingersoll Rand** distributor or the factory for technical assistance.

| COMPONENT | CONDITION | | CORRECTIVE ACTION | | NOTES |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------|-------------------|---------|---------------|
| | Pass | Fail | Repair | Replace | |
| Fasteners | | | | | |
| Gears | | | | | |
| Shafts | | | | | |
| Bearings | | | --- | | |
| Load Bearing Wheel | | | | | |
| Hook Block/Double-Reeved Pocket Wheel | | | | | |
| Chain Guides | | | | | |
| Springs | | | --- | | |
| Covers, Housings | | | | | |
| Hooks | | | --- | | |
| Top | Actual Hook Throat Width: _____ inches / _____ mm (Refer to Table 2 'Load Chain' on page 3 for minimum/maximum acceptable widths.) | | | | |
| | Hook Twist | | | --- | (maximum 10%) |
| | Hook Crack Test Method Used: Dye Penetrant _____ Magnetic Particle _____ Other: _____ | | | | |
| Bottom | Actual Hook Throat Width: _____ inches / _____ mm (Refer to Table 2 'Load Chain' on page 3 for minimum/maximum acceptable widths.) | | | | |
| | Hook Twist | | | --- | (maximum 10%) |
| | Hook Crack Test Method Used: Dye Penetrant _____ Magnetic Particle _____ Other: _____ | | | | |
| Hook Latch | | | --- | | |
| Brake (100% Load Test) | | | --- | | |
| Brake (Visual Inspection) | | | | | |
| Tail Pin (End Anchor) | | | | | |
| Load Chain: | | | --- | | |
| Working length(s) maximum wear: _____ inches / _____ mm (Refer to Table 2 'Load Chain' on page 3.) | | | | | |
| Supporting Structure | | | | | |
| Labels and Tags | | | --- | | |
| Other Components (List in NOTES section) | | | | | |

| Testing: | Pass | Fail | NOTES |
|----------------------------------|------|------|-------|
| Operational (No Load) | | | |
| Operational (100% Load) | | | |
| Operational (Maximum Test Load*) | | | |

* Maximum test load should never exceed 125% of rated capacity.
This form may be photocopied and used as an inspection record.

TROUBLESHOOTING

This section provides basic troubleshooting information. Specific causes to problems are best identified by thorough inspections performed by personnel instructed in safety, operation and maintenance of this equipment. The chart below provides a brief guide to common hoist symptoms, probable causes and remedies.

| Symptom | Cause | Remedy |
|----------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Hoist will not operate. | No electrical supply to hoist. | Check electrical system connections, cords and fuses. |
| | Hoist is overloaded. | Reduce load to within rated capacity. |
| | Emergency Stop engaged. | Disengage Emergency Stop button. |
| | Transformer damaged. | Check power supply is within $\pm 10\%$ range. Replace transformer if damaged. |
| Load continues to move when hoist is stopped. | Brake is slipping. | Check brake has a gap of 0.7 mm. Check brake discs are clean. Refer to Dwg. MHP3333 on page 7. |
| | Hoist is overloaded. | Reduce load to within rated capacity. |
| Hoist does not lift load. | Motor may be damaged. | Remove motor. Examine all parts and replace any that are worn or damaged. |
| | Insufficient electrical supply. | Verify electrical voltage, phase, voltage drop and amperes under load/no load conditions |
| | Slip clutch incorrectly adjusted. | Replace or adjust slip clutch assembly. |
| Hoist runs in opposite direction of Control Pendant operation. | Power cables (L1 and L2) are incorrectly located (cross phased). | Reverse the two power cables (L1 and L2). |
| Control Pendant is operated but hoist does not operate. | Control Pendant may be damaged. | Check Control Pendant for signs of damage. Refer to section "INSPECTION" on page 2 . |
| | Motor may be damaged. | It is not recommended to disassemble the motor. Examine motor for external damage, Contact Factory or distributor for replacement. |
| | No electrical supply to hoist. | Check electrical system connections, cords, fuses and circuit breaker. |
| Hoist runs slowly. | Improper electrical supply. | Verify electrical voltage, phase, voltage drop and amperes under load/no-load conditions. |
| | Oily or sticking brake discs. | Disassemble, clean and dry discs. |
| | Motor may be damaged. | Remove and disassemble motor as described in the section "MAINTENANCE" on page 6 . Examine all parts and replace any that are worn or damaged. |
| Motor hums or lifting speed is slow. | Oily or sticking brake discs. | Disassemble, clean and dry brake discs. |
| | Brake disc tabs may be binding in brake cage. | Check brake discs slide freely in brake cage. |
| Electrical leak. | Poor grounding (earth). | Correctly ground (earth) power supply. Check wiring for broken wires. |
| | Foreign material or moisture on electrical connectors. | Dry or remove all foreign material accumulated on electrical parts. |
| | Short in power supply system. | Check all switches, connections and circuit breakers in power supply line for damaged insulation or contact with hoist frame. |
| Hoist lowers but will not lift. | Limit switch may be stuck. | Check limit switch movement. |
| | Contactors coil damages. | Replace contactor. |
| Hoist does not stop at the end of load chain travel. | Limit stop not working or being activated. | On multi reeved hoists, check load chain is not twisted or capsized. Check limit switch operation. |

MAINTENANCE

⚠ WARNING

- **Never perform maintenance on the hoist while it is supporting a load.**
- **Before performing maintenance, tag controls:**

WARNING - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.

- **Only allow personnel trained in service and repair of this hoist to perform maintenance.**
- **After performing any maintenance on the hoist, test hoist before returning hoist to service.**
- **Turn off and lockout/tag out electrical disconnect switch before performing any maintenance.**
- **The lower sheave block or hook assembly must be lying on the floor or a maintenance platform before beginning service.**

■ General Maintenance Instructions

NOTICE

- **It is recommend that maintenance work be performed by an Ingersoll Rand service repair center.**
- **If the operator performs maintenance work on an electric chain hoist on his own account, the type of maintenance performed must be entered together with the date of performance into the inspection pass.**

All maintenance work performed on the hoist must be recorded with the date in the inspection report.

Alterations to, as well as changes of and supplements to the electric chain hoists which may impair the safety must be authorized by **Ingersoll Rand** in advance. Constructional alterations to the chain hoists not authorized by the **Ingersoll Rand** lead to an exclusion of the manufacturer's liability in case of damage.

Material warranty claims will only be recognized if solely genuine spare parts by **Ingersoll Rand** have been employed.

We explicitly wish to point out that original parts and accessories not supplied on our behalf cannot be inspected or released by us.

Proper use, inspections and maintenance increase the life and usefulness of your **Ingersoll Rand** equipment. During assembly, lubricate gears, nuts, capscrews and all machined threads with applicable lubricants. Use of antiseize compound and/or thread lubricant on capscrew and nut threaded areas will help to prevent corrosion and allows for ease of disassembly of components.

It is recommended that all maintenance work on the hoist be performed on a bench in a clean dust free work area. During the process of disassembling the hoist, observe the following:

1. Turn off and lockout/tag out electrical disconnect switch before performing any maintenance. Disconnect electrical cable from hoist.
2. Never disassemble the hoist any further than is necessary to accomplish the needed repair. A good part can be damaged during the course of disassembly.
3. Never use excessive force when removing parts. Tapping gently around the perimeter of a cover or housing with a soft hammer, for example, is sufficient to break the seal.
4. Do not heat a part with a flame to free it for removal, unless the part being heated is already worn or damaged beyond repair and no additional damage will occur to other parts.

NOTICE

- **In general, the hoist is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be required.**
5. Keep the work area clean to prevent dirt and other foreign matter from getting into bearings and other moving parts.
 6. All seals and O-Rings should be discarded once they have been removed. New seals and O-Rings should be used when assembling the hoist.
 7. When grasping a part in a vise, always use leather or copper covered vice jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members, machined surfaces and housings.
 8. Do not remove any part which is press fit in or on a subassembly unless the removal of the part is necessary for repairs or replacement.
 9. To avoid damaging bearings during hoist assembly or disassembly always tap or press on the bearing inner race for shaft fit bearings or the outer race for bore fit bearings. When removing bearings from housings, drive out the bearing with a sleeve slightly smaller than the outside diameter of the bearing. The end of the sleeve or pipe that is used to contact the bearing must be square. Protect bearings from dirt by keeping them wrapped in clean cloths.
 10. If repair work can only be conducted above body height, suitable working platforms or ladders should be made available.
 11. Work on electrical equipment or machinery may only be conducted by licensed electricians or persons under the supervision and guidance of licensed electricians, in accordance with all appropriate electrical codes and regulations.

⚠ WARNING

- **All new, altered or modified equipment should be inspected and tested by personnel trained in safety, operation and maintenance of this equipment to ensure safe operation at rated specifications before placing equipment in service.**

Inspection procedures for hoist in regular service are divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the hoist and the degree of their exposure to wear, deterioration or malfunction. The two general classifications are herein designed as frequent and periodic. The inspection intervals recommended in this manual are based on intermittent operation of the hoist; that is, eight hours per day, and five days a week, in an environment relatively free of dust moisture and corrosive fumes. If the hoist is operated with a greater run time per shift or more than eight hours per day the inspection interval must be reduced. Refer to ASME B30.16 for specific time period.

Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.

Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel trained in safety, operation and maintenance of this equipment. A determination as to whether a condition constitutes a safety hazard must be decided, and the correction of noted safety hazards accomplished and documented by written report before placing the equipment in service.

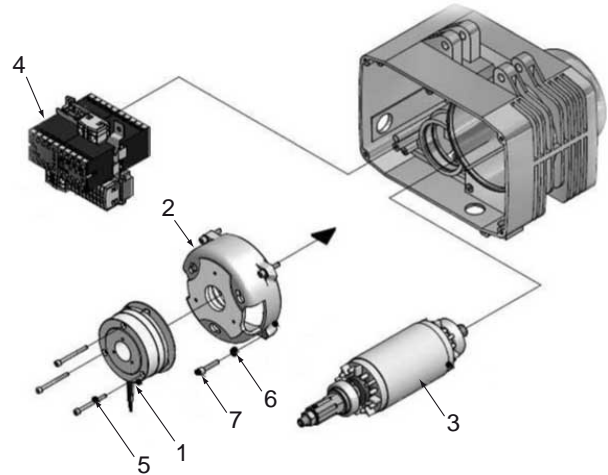
■ Cover Removal

Electrical side is indicated by Symbol.



(Dwg. MHP3349)

■ Brake System (AC Brake)



(Dwg. MHP3332)

■ Assembly

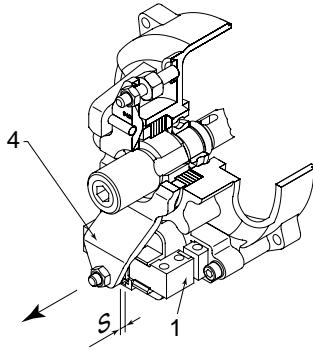
1. Install the rotor shaft (3) into the housing.
2. Install the motor cover (2) into the housing. (Preheat the Cover if necessary).
3. Insert the spring washer (6), and tighten the allen screw (7) and torque to 6-10 Nm.
4. Place the brake assembly on the motor cover.
5. Insert allen screw (5) and tighten to torque 3-10 Nm.

NOTICE

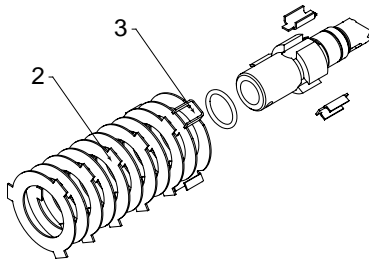
- **Play Check the brake assembly and adjust if necessary.**
6. Fit the adjusting screw (1).
 7. Install the control assembly (4). Refer to "WIRING DIAGRAM" on page 8 on pages 9 and 10.

■ Brake System (DC Brake)

In the power free mode, the brake must be able to hold the nominal load without any problems. It has been operationally adjusted before delivery.



(Dwg. MHP3333)



(Dwg. MHP3334)

CAUTION

- Should the brake magnet (1) hum, buzz or vibrate, then the air gap (S) must be reset in accordance with Table 4 'Brake Air Gap (DC Brake)' on page 7.
- If the lifting speed is only reached slowly or the load drops a little further after it has been lowered, this is a sign of oily or sticky brake discs (2) or the closing of the disc cage (3). Dismantle brake discs, clean and degrease. Disc cage to be replaced if damaged.

NOTICE

- By releasing the disc brake [carefully pull on the brake arm (4)] the load can be lowered in a manual mode.
 - Replace brake discs if they are distorted or severely discolored.
1. Turn nut (5) or (7) until the 'S' gap (refer to Table 4 'Brake Air Gap (DC Brake)' on page 7) is established.
 2. Push brake solenoid in and rotate cup disc (11) with fingers. Disc should rotate with a little drag. Loosen nut on capscrew (8). Adjust capscrew until disc rotates with a little drag. If cup disc is too loose the brake will chatter or hum during operation.
 3. Repeat steps 1 and until 'S' gap is correct and disc cup just rotates.

Brake Test

1. Use a test load that is 100% of hoist capacity.
2. With cover off, hoist load, in low speed mode, approximately 1 ft. (0.3 m).
3. Listen to brake while hoisting.
4. When hoisting stops, brake should hold load.

Table 4: Brake Air Gap (DC Brake)

| Brake type | Brake Air gap 'S' | | Number of discs | |
|----------------|-------------------|------|-----------------|----------|
| | (inch) | (mm) | internal | external |
| QCH50 | 0.080 | 2.00 | 5 | 5 |
| QCH100 | 0.080 | 2.00 | 7 | 7 |
| QCH200/300/500 | 0.080 | 2.00 | 8 | 8 |

Load Chain

WARNING

- Before conducting maintenance on the hoist, lower and remove suspended load. Disconnect electrical supply and remove hoist from overhead suspension.

CAUTION

- The chain is to be replaced when the measurements exceed those defined in the Table 2 'Load Chain' on page 3. The chain wheel and chain guide are to be checked for wear at the same time, and, where necessary are to be replaced.
- Only original chains are to be used. The chain links are not to be welded.

NOTICE

- For ease of installation, do not remove the old chain from the hoist. The old chain can be used to feed the new chain through the hoist by connecting them with a "C" link.

Limit Stop Assembly

CAUTION

- Defect spring elements and rubber buffers are to be replaced.

Screw connections at the limit stop and shims at lower sheaves are to be checked and, where necessary, tightened to the right torque. For torque values see Table 5.

Table 5: Torque Values

| Dimension | Torque | |
|-----------|--------|-----|
| | lbs-in | N-m |
| M5 | 53 | 6 |
| M6 | 88 | 10 |
| M8 | 212 | 24 |
| M10 | 425 | 48 |
| M12 | 732 | 83 |

Gears

CAUTION

- Use extreme care when removing gear end cover to avoid grease spillage.

The gear compartment is filled with grease at the factory to provide continual lubrication. Replacement of the grease for the life of the hoist should not be required.

Lubrication grease:

Strub N142 4

Compatible with Type DIN 51502 : GP OM-2

If it becomes necessary to remove the gear end cover, first ensure the hoist body is standing on end with the gear end cover up. Failure to observe this procedure will allow the grease to flow from the hoist. Whenever the gear end cover is removed, always replace the cover gasket. For quantity refer to Table 6.

Table 6: Gear Case Greasing Quantity

| Model | lbs | kg |
|----------------|------|------|
| QCH50 | 0.88 | 0.40 |
| QCH100 | 2.20 | 1.00 |
| QCH200/300/500 | 4.00 | 1.80 |

Slip Clutch

The slip clutch is pre-adjusted. The lining is wear resistant.

CAUTION

- An adjustment of the slip clutch may only be effected by qualified personnel and must be entered in the inspection pass.

General Overhaul

On reaching the theoretical service life (no later than 10 years for collection without BDE), a general overhaul is to be performed. Hereby the device is put into a condition allowing a safe operation within another period of utilization (service life).

For this, components according to Table 7 must be inspected and/or exchanged.

The inspection of as well as the approval for further utilization must be performed either by an expert company authorized by the manufacturer, or by the manufacturer personally.

The inspector determines:

- the new possible theoretical utilization
- the max. period until the next general overhaul

Such data is to be documented in the inspection report.

Table 7: General Overhaul

| Components of QCH Series | † Check of wear | Exchange |
|--------------------------------|-----------------|----------|
| Brake | X | --- |
| Motor shaft | X | --- |
| Gear teeth | X | --- |
| Antifriction bearing | --- | X |
| Washers | --- | X |
| Chain | ‡ X | --- |
| Chain wheel, chain guide | X | --- |
| Deflection wheels | X | --- |
| Suspension | X | --- |
| Load hook | --- | X |
| Travelling gear, running wheel | X | --- |
| Contactors, limit switch | X | --- |

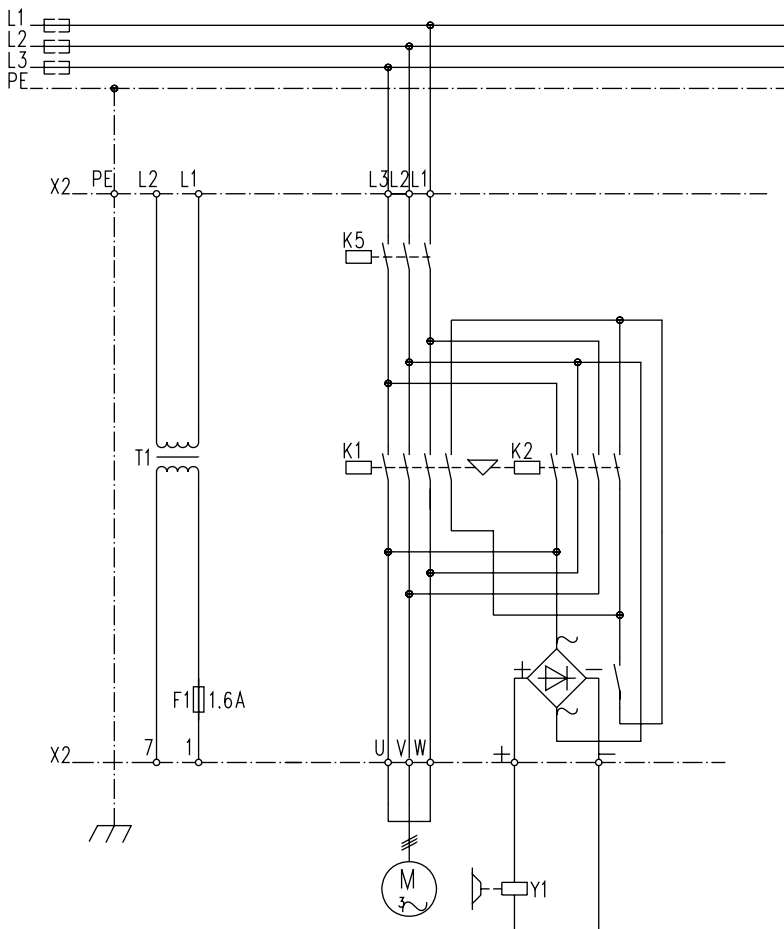
† Replace when worn
‡ Replace no later than at general overhaul

WIRING DIAGRAM

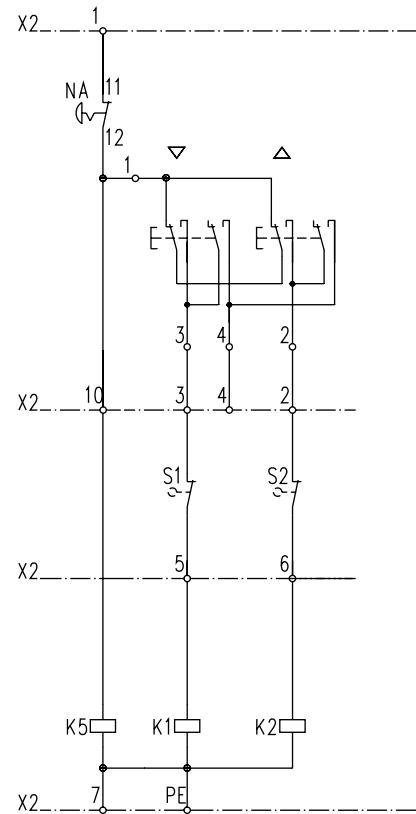
■ Electric Circuit

| | |
|----------------|----------------|
| F | Control fuse |
| K | Contactors |
| L | Power supply |
| N | Neutral |
| NA | Emergency stop |
| PE | Earth |
| S | Switch |
| T1 | Transformer |
| U, V, W | Motor |
| X | Terminal strip |
| Y | Brake |

■ 1 Speed with Emergency Stop - 3 Phase

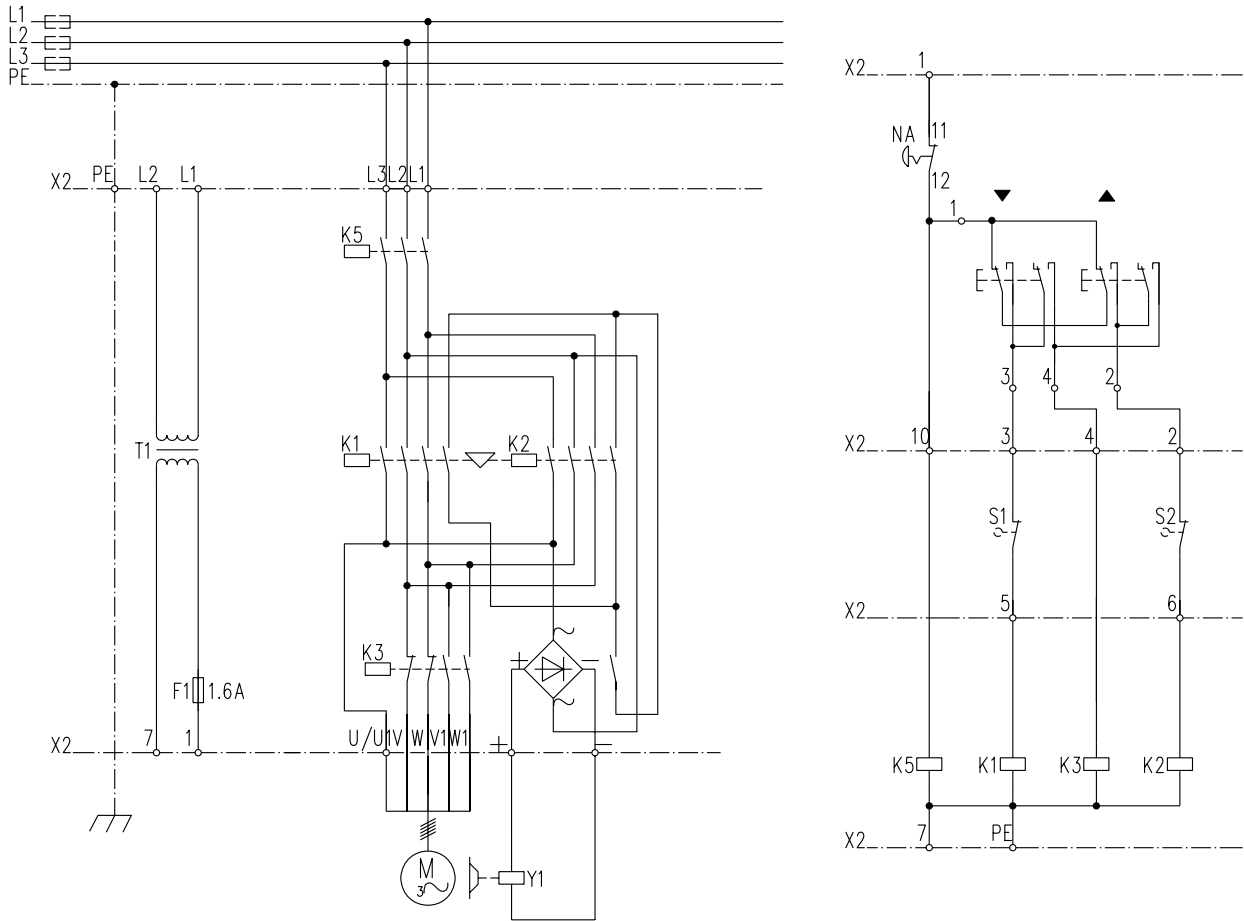


(Dwg. MHP3335)



| Voltage | U/U1 | V | W | CONNECT |
|---------|---------|---------|---------|---------------------------|
| 230V AC | U1 & U5 | V1 & V5 | W1 & W5 | U2 & V2 & W2 |
| 460V AC | U1 | V1 | W1 | U2 & U5, V2 & V5, W2 & W5 |

■ 2 Speed with Emergency Stop - 3 Phase



(Dwg. MHP3336)

| Voltage | U/U1 | V | W | CONNECT |
|---------|---------|---------|---------|---------------------------|
| 230V AC | U1 & U5 | V1 & V5 | W1 & W5 | U2 & V2 & W2 |
| 460V AC | U1 | V1 | W1 | U2 & U5, V2 & V5, W2 & W5 |

