

Yale®

EN – Operating, Maintenance & Parts Manual (Also applicable for special versions)

Ratchet lever hoist

Yale*ERGO 360*

Ident-No: 85005206AC/2019.05

COLUMBUS McKINNON CORPORATION

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INTRODUCTION

Products of CMCO Industrial Products GmbH have been built in accordance with the state-of-the-art and generally accepted engineering standards. Nonetheless, incorrect handling when using the products may cause dangers to life and limb of the user or third parties and/or damage to the hoist or other property.
The operating company is responsible for the proper and professional instruction of the operating personnel. For this purpose, all operators must read these operating instructions carefully prior to the initial operation.
These operating instructions are intended to acquaint the user with the product and enable him to use it to the full extent of its intended capabilities. The operating instructions contain important information on how to operate the product in a safe, correct and economic way. Acting in accordance with these instructions helps to avoid dangers, reduce repair costs and downtimes and to increase the reliability and lifetime of the product. The operating instructions must always be available at the place where the product is operated. Apart from the operating instructions and the accident prevention act valid for the respective country and area where the product is used, the commonly accepted regulations for safe and professional work must also be adhered to.
The personnel responsible for operation, maintenance or repair of the product must read, understand and follow these operating instructions.
The indicated protective measures will only provide the necessary safety, if the product is operated correctly and installed and/or maintained according to the instructions. The operating company is committed to ensure safe and trouble-free operation of the product.

CORRECT OPERATION

The unit is used for lifting, lowering, pulling and tensioning of loads.
The unit is also suitable for lashing of loads on trucks etc. on public roads according to EN 12195. Tensioning force STF and hand force SHF, which are indicated on the identity plate, must be taken into account.(→ Tab. 1).

ATTENTION: The unit may be used only in situations in which the load carrying capacity of the device and/or the supporting structure does not change with the load position.

Any different or exceeding use is considered incorrect. Columbus McKinnon Industrial Products GmbH will not accept any liability for damage resulting from such use. The risk is borne by the user or operating company alone.
The load capacity indicated on the unit is the maximum working load limit (WLL) that may be attached.
If the hoist is to be used for frequent lowering from large heights or in indexed operation, first consult the manufacturer for advice because of possible overheating.
The top hook and the load hook of the unit must be in a vertical line above the load centre of gravity (S) when the load is lifted, in order to avoid load sway during the lifting process.



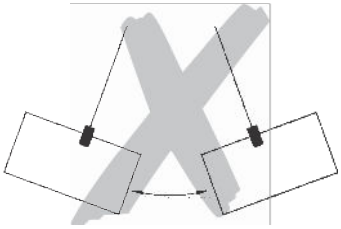
The selection and calculation of the appropriate supporting structure are the responsibility of the operating company.
The attachment point and its supporting structure must be designed for the maximum loads to be expected (deadweight of the unit + load capacity).
The operator must ensure that the hoist is suspended in a manner that makes it possible to operate the unit without exposing himself or other personnel to danger by the unit itself, the suspension or the load.
The operator may start moving the load only after it has been attached correctly and all persons are clear of the danger zone.
Do not allow personnel to stay or pass under a suspended load.
A lifted or clamped load must not be left unattended or remain lifted or clamped for a longer period of time.
The hoist may be used at ambient temperatures between –10° and +50°C. Consult the manufacturer in the case of extreme working conditions.

ATTENTION: Before use at ambient temperatures of less than 0°C, check the brake for freezing by lifting and lowering a small load 2 - 3 times.

Prior to operation of the hoist in special atmospheres (high humidity, salty, caustic, alkaline) or handling hazardous goods (e.g. molten compounds, radioactive materials), consult the manufacturer for advice.
For attaching a load, only approved and certified lifting tackle must be used.
Correct operation involves compliance with the operating instructions and in addition also compliance with the maintenance instructions.
In case of functional defects or abnormal operating noise, stop using the hoist immediately.

INCORRECT OPERATION

(List not complete)
Do not exceed the rated load capacity (WLL) of the unit and/or the suspension and the supporting structure.
The unit must not be used for pulling free fixed loads. It is also prohibited to allow loads to drop when the chain is in a slack condition (danger of chain breakage).
Removing or covering labels (e.g. by adhesive labels), warning information signs or the identity plate is prohibited.
When transporting loads ensure that the load does not swing or come into contact with other objects.

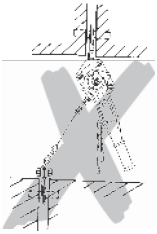


The load must not be moved into areas which are not visible to the operator. If necessary, he must ensure he is given help.
Driving the unit with a motor is not allowed.

The lever must not be extended. Only original hand levers must be used.



The unit must never be operated with more than the power of a person.
Welding on hook and load chain is strictly forbidden. The load chain must never be used as a ground connection during welding.
Side pull, i. e. side loading of either the housing or the bottom block is forbidden.



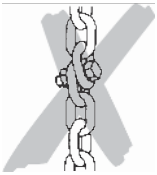
The load chain must not be used as a chain sling.



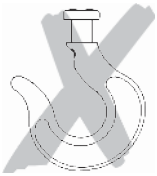
A unit changed without consulting the manufacturer must not be used.
Do not use the hoist for the transportation of people.



Do not knot the load chain or connect it by using pins, bolts, screw drivers or similar.
Do not repair load chains installed in the hoist.



Removing the safety latches from top and/or load hooks is forbidden.



Never attach the load to the tip of the hook. The lifting tackle must always be seated in the saddle of the hook.



Do not use the chain stop as an operational limit device.
Turning of loads under normal operating conditions is not allowed, as the bottom blocks of the hoists are not designed for this purpose. If loads must be turned in normal operation, an anti-twist swivel must be used or the manufacturer must be consulted.
Only one load lifting attachment may be suspended in the load hook of the hoist.
Never reach into moving parts.
Do not allow the unit to fall from a large height. Always place it properly on the ground.
The unit must not be used in potentially explosive atmospheres.

ASSEMBLY

Inspection of the attachment point
The attachment point for the hoist must be selected so that the supporting structure to which it is to be fitted has sufficient stability and to ensure that the expected forces can be safely absorbed.
The unit must align freely also under load in order to avoid impermissible additional loading.
The selection and calculation of the appropriate supporting structure are the responsibility of the operating company.

INSPECTION BEFORE INITIAL OPERATION

Prior to initial operation, before it is put into operation again and after substantial changes, the product including the supporting structure must be inspected by a competent person*. The inspection mainly consists of a visual inspection and a function check. These inspections are intended to establish that the hoist is in a safe condition, has been set up appropriately and is ready for operation and that any defects or damage are detected and eliminated, as required.
*Competent persons may be, for example, the maintenance engineers of the manufacturer or the supplier. However, the company may also assign performance of the inspection to its own appropriately trained specialist personnel.
Before putting the unit into operation, check functioning of the chain drive in unloaded condition.

INSPECTION BEFORE STARTING WORK

Before starting work, inspect the unit including the suspension, equipment and supporting structure for visual defects, e. g. deformations, superficial cracks, wear and corrosion marks. In addition also test the brake and check that the hoist and the load are correctly attached.
Checking the brake function
Before starting work, always check operation of the brake:
To do this, lift, pull or tension and lower or release a load over a short distance with the unit. When the hand lever is released, the load must be held in any position.
This check is intended to ensure that even at temperatures below 0°C, the brake disks are not frozen. Repeat it at least twice, before starting further work.

ATTENTION: If the brake does not function properly, the unit must be immediately taken out of service and the manufacturer must be contacted!

Inspection of the attachment point
The attachment point for the hoist must be selected so that the supporting structure to which it is to be fitted has sufficient stability and to ensure that the expected forces can be safely absorbed.
The unit must align freely also under load in order to avoid impermissible additional loading. The selection and calculation of the appropriate supporting structure are the responsibility of the operating company.

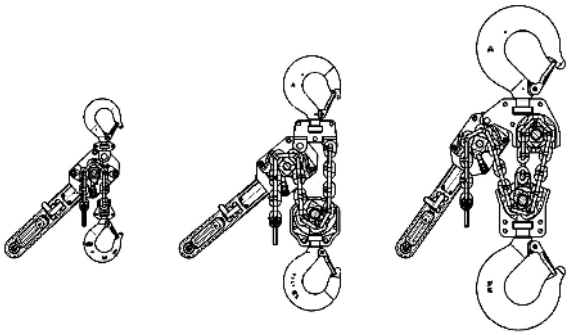
Inspection of the load chain
Inspect the load chain for sufficient lubrication and check for external defects, deformations, superficial cracks, wear and corrosion marks.

Inspection of the chain stop
The chain stop must always be fitted to the loose chain end. There must be no wear or incorrect alignment.

Inspection of the top hook and load hook
The top resp. load hooks must be checked for cracks, deformations, damage, wear and corrosion marks. The safety latch must move freely and be fully functioning.

Inspection of chain reeving in the bottom block
All units with two or more chain falls must be inspected before initial operation to ensure that the load chain is not twisted or kinked. The chains of hoists with two or more falls may become twisted if the bottom block is rolled over, for example.
When replacing the chain, make sure that the chain is reeved correctly. The chain weld must face outwards.





800kg - 3200kg 6000kg 9000kg

Only fit load chains which have been approved by the manufacturer. Non-compliance with this specification will render the legal warranty or guarantee void with immediate effect.

Function check
Before start-up, check that the chain drive is working in the unloaded condition.

OPERATION

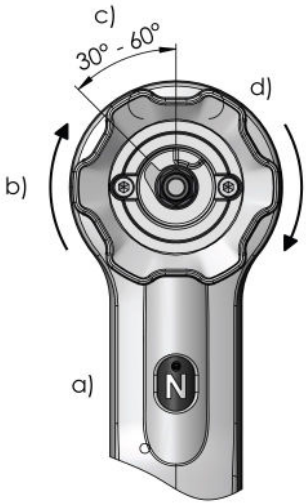
Installation, service, operation
Operators delegated to install, service or independently operate the hoist must have had suitable training and be competent. Operators are to be specifically nominated by the company and must be familiar with all relevant safety regulations of the country of use.

Free chain assembly

Attention: To ensure proper function of the hoist brake and free chain systems, perform the following steps.

a. Set direction lever to 'N' position
b. Turn the handwheel clockwise to ensure the Change Over Gear has engaged the brake disc. Complete this step while holding the chain strand with lower hook attached. A 'clicking' sound will be heard if the load side of the chain is not held with sufficient force.
c. After tightening the brake, push the check washer onto the drive shaft. Make sure the serration has engaged at an angel between approx. 30° to 60° degrees at last.
d. Next, put the flat washer onto the shaft. Finally tighten the hex nut firmly while holding the handwheel in place.

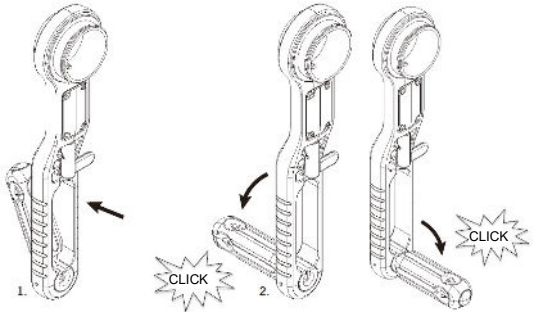
(Doing so, the check washer will rotate along with the drive shaft till it hits the little cam inside the handwheel.)
Please check now that the handwheel turns easily in each direction within the given angel.
Put on the center cap when done.



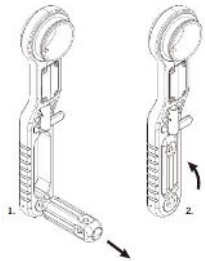
Releasing the chain
Turn pawl rod lever to neutral (central) position. The chain can now be pulled in both directions and the load chain fall will be quickly tensioned.

Attention: The minimum load to engage the automatic brake lies between 30 and 45 kg.

Usage of the ERGO-Lever
If the integrated handle at the lever should be used, it can be folded into the forward or backward position. The handle will click into place with a clearly audible snapping sound. The conical seating of the handle shall be free of dirt at all times. If necessary the seating has to be cleaned just as well as the associated parts.

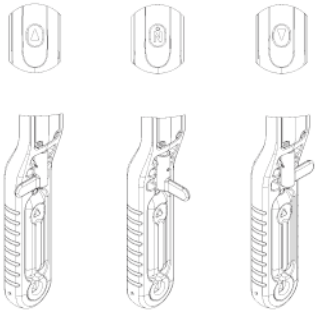


To move the handle back into its starting position the handle has to be pulled forwards out of its conical seating and simultaneously tilted back inside the lever. To do so the gripping surfaces of the handle should stay parallel to the slot inside the handle. The handle will be held in its position by spring load.



Lifting the load
Pull the rerwardpawl rod lever along its axis backwards and tilt to position "↑". Make sure that the lever will click exactly into place.
Operate hand lever with pumping action. If work is stopped while the hoist is still under load, the pawl rod lever must remain in the lifting position "↑".

Lowering the load
Pull the rerwardpawl rod lever along its axis backwards and tilt to position "↓". Make sure that the lever will click exactly into place.
Operate hand lever with pumping action.



Brake jamming
If a hoist, which is under load, is suddenly relieved of load pressure, e.g. by lifting off the load or when pulling down walls, and lowering has not been initiated first, the brake will remain locked. The brake will also lock if the load hook with the bottom block is pulled too tightly against the housing.

Releasing the jammed brake
Turn pawl rod lever to the lowering position "↓" and operate hand lever with a vigorous stroke. If the brake is jammed on extremely tight, it can be released by striking the hand lever.

Yale overload protection device (optional)
The overload protection device is set to approx. 25% (±15%) overload. Its adjustment must only be carried out by a competent person.
When the load limit is exceeded, the overload protection device is activated and prevents further lifting of the load, lowering is still possible.

INSPECTION, SERVICE & REPAIR

According to national and international accident prevention and safety regulations hoisting equipment must be inspected:
• in accordance with the risk assessment of the operating company
• prior to initial operation
• before the unit is put into service again following a shut down
• after substantial changes
• however, at least once per year, by a competent person.

ATTENTION: Actual operating conditions (e.g. operation in galvanizing facilities) can dictate shorter inspection intervals.

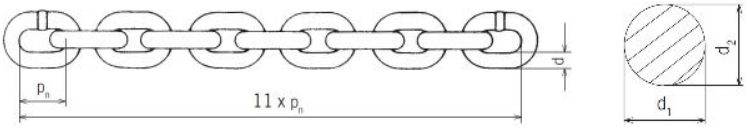
Repair work may only be carried out by a specialist workshop that uses original Yale spare parts. The inspection (mainly consisting of a visual inspection and a function check) must determine that all safety devices are complete and fully operational and cover the condition of the unit, suspension, equipment and supporting structure with regard to damage, wear, corrosion or any other alterations.
Initial operation and recurring inspections must be documented (e.g. in the CMCO works certificate of compliance).

If required, the results of inspections and appropriate repairs must be verified. If the hoist (from 1 t lifting weight) is fitted on or in a trolley and if the hoist is used to move a lifted load in one or several directions, the installation is considered to be a crane and the further inspections must be carried out, as required.
Paint damage should be touched up in order to avoid corrosion. All joints and sliding surfaces should be slightly greased. In the case of heavy contamination, the unit must be cleaned.
The unit must be given a general overhaul after 10 years, at the latest.
In particular, check the dimensions of the load chain, the load hook and the top hook.

ATTENTION: After the replacement of components, a subsequent inspection by a competent person is obligatory!

Inspection of the load chain (acc. to DIN 685-5)
Load chains must be inspected for mechanical damage at annular intervals, however after 50 operating hours, at the latest. Inspect the load chain for sufficient lubrication and check for external defects, deformations, superficial cracks, wear and corrosion marks.

Round-section steel chains must be replaced when the original nominal thickness ´d´ on the chain link with the worst wear has been reduced by more than 10% or when the chain has elongated over one pitch ´pn´ by 5% or over 11 pitches (11 x pn) by 3%.
Nominal dimensions and wear limits are shown in table 2. If one of the limit values is reached, the load chain must be replaced.



d = Nominal thickness of chain
d_1,d_2 = Actual value

$$d_{min.} = \frac{d_1 + d_2}{2} \leq 0{,}9d$$

Nominal values and wear limitation

Yale*ERGO 360*			800	1600	3200	6000	9000
Round link chain		[mm]	5,6 x 17	7,1 x 21	10 x 28	10 x 28	10 x 28
Grade			T	T	V	V	V
Diameter	d_{nom}	[mm]	5,6	7,1	10,0	10,0	10,0
	d_{min}	[mm]	5,0	6,4	9,0	9,0	9,0
Pitch	$p_{n\ nom}$	[mm]	17,0	21,0	28,0	28,0	28,0
	$p_{n\ max}$	[mm]	17,9	22,1	29,4	29,4	29,4
Length	11 x $p_{n\ nom}$	[mm]	187,0	231,0	308,0	308,0	308,0
	11 x $p_{n\ max}$	[mm]	192,6	237,9	317,2	317,2	317,2

Maintenance of the load chain

In most cases, chain wear in the link points is caused by insufficient care of the chain. In order to ensure optimal lubrication of the link contact points, lubricate the chain at regular intervals adapted to the application with creep-type lubricant (e.g. gear oil). A dry film lubricant, e.g. PTFE spray, should be used in environments where abrasives like sand, etc., occur. The service life of the load chain can be increased by careful lubrication to 20 - 30 times compared with a chain that is not serviced.

• When lubricating the chain, make sure the chain is in no-load condition so that the oil can reach the contact points of the chain links which are subject to wear. Chain link parts contacting each other must always be coated with lubricant, otherwise increased wear on the chain results.

• It is not sufficient to lubricate the chains on the outside as this does not ensure that a lubricant film can build up in the contact points.

• With a constant lifting path of the chain, the change-over area from lifting to lowering movement must be checked in particular.

• Make sure that the load chain is lubricated over its entire length, also including the part of the chain in the housing of the hoist.

• Clean dirty chains with petroleum or a similar cleaning agent, never heat the chain.

• When lubricating the chain, also check the chain for wear.

ATTENTION: It must be ensured that no lubricant can penetrate into the brake enclosure. This may result in failure of the brake.

Replacing the load chain
The load chain must be replaced by a new chain of the same dimensions and quality in the event of visible damage or deformations, however, when the discarding status has been reached, at the latest. A load chain to be discarded must only be replaced by an authorized specialist workshop. Only fit load chains which have been approved by the manufacturer. Non-compliance with this specification will render the legal warranty or guarantee void with immediate effect.

NOTE: Replacement of a load chain must be documented!

Hoist with single fall
• Only pull in the new chain in no-load condition
• An open load chain link is required as a tool. It can be obtained by using an abrasive wheel to cut a section from an existing link with the same dimension. The length of the cut section must at least correspond to the thickness of the link.
• Remove load hook from the old load chain and suspend open load chain link in the loose end of the load chain.
• Suspend the new, lubricated load chain also in the open link and pull it through the hoist unit (turn hand wheel clockwise).
• Do not fit a twisted chain. The welds must face outwards from the chain wheel.
• When the old load chain has passed through the hoist unit it can be detached together with the open chain link and the load hook can be fitted on the new load chain just pulled in.
• Detach the chain stop from the loose end of the old, replaced load chain and fit it to the loose end of the new load chain just pulled in.

ATTENTION: The chain stop must always be fitted to the loose end of the chain (idle fall).

Hoist with several falls

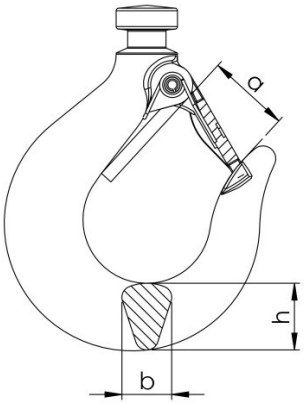
ATTENTION: Only pull in the new chain when the bottom block is unloaded, otherwise the bottom block may drop when the load chain is detached. Danger of injury!

• An open load chain link is required as a tool. It can be obtained by using an abrasive wheel to cut a section from an existing link with the same dimension. The length of the cut section must at least correspond to the thickness of the link.
• Detach the loaded-fall end of the load chain from the housing of the hoist unit or the bottom block (depending on model).
• Suspend prepared, open load chain link in the now free load chain end.
• Suspend the new, lubricated load chain also in the open link and pull it through the bottom block and the hoist unit (turn hand wheel clockwise).
• Do not fit a twisted chain. The welds must face outwards from the chain wheel.
• When the old chain has passed through the hoist unit it can be detached together with the open chain link.
• Fix the loaded-fall end of the new load chain on the housing/frame or on the bottom block (depending on model) of the hoist.
• Attach the chain stop to the loose end of the new load chain.

ATTENTION: The loose end of the idle fall must always be fitted to the chain stop (Fig. 1).

Inspection of the load hook and top hook
Inspect the hook for deformation, damage, surface cracks, wear and signs of corrosion, as required, but at least once a year. Actual operating conditions may also dictate shorter inspection intervals.

Hooks that do not fulfil all requirements must be replaced immediately. Welding on hooks, e.g. to compensate for wear or damage is not permissible. Top and/or load hooks must be replaced when the mouth of the hook has opened more than 10% or when the nominal dimensions have reduced by 5% as a result of wear. Nominal dimensions and wear limits are shown in table 3. If a limit value is reached, replace the components.



Nominal values and wear limitation

Yale*ERGO 360*			800	1600	3200	6000	9000
Hook opening	a_{nom}	[mm]	27,0	31,0	40,0	44,0	68,0
	a_{min}	[mm]	29,7	35,2	44,0	48,4	74,8
Hook width	b_{nom}	[mm]	15,0	19,5	20,0	32,0	50,0
	b_{min}	[mm]	14,3	18,5	19,0	30,4	47,5
Hook height	h_{nom}	[mm]	20,0	26,0	37,0	45,0	68,0
	h_{min}	[mm]	19,0	24,9	34,8	42,6	64,6

Inspection of the brake
Immediately contact the manufacturer, if irregularities are found (e.g. defective friction disks). All components of the brake must be checked for wear, damage, discoloration caused by overheating and for functioning.
Friction disks must always be kept free from grease, oil, water or dirt. Check the bonding of the friction disks.

The inspections have to be initiated by the operating company.

Troubleshooting chart

Symptom	Possible cause(s)	Corrective action
Hoist is hard to operate in either direction.	1. Load chain worn long to gauge, thus binding between liftwheel and chain guide.	1. Check chain, and replace if worn excessively.
	2. Load chain rusty, corroded or clogged with foreign matter such as cement or mud.	2. Clean chain by tumble polishing or using a non-acid or non-caustic type solvent. Check chain for gouges, damaged or bent links. Lubricate with Lubriplate® Bar and Chain Oil 10-R (Fiske Bros. Refning Co.) or equal lubricant.
	3. Bushings clogged with matter such as cement or dust.	3. Disassemble and clean liftwheel bushings and bushings in gear cover and side plate (gear side). Any parts worn excessively should be replaced.
	4. Lever binding.	4. Clean by removing any foreign matter which may be between the lever and the brake cover.
	5. Brake parts corroded or clogged with foreign matter.	5. Disassemble brake and clean thoroughly (by wiping with a cloth - not by washing in a solvent). Replace ratchet assembly if too gummy, worn or scored. Keep brake surfaces clean and dry.
	6. Liftwheel pockets clogged with foreign matter or worn excessively causing chain to bind between liftwheel and chain guide.	6. Clean out pockets and use if not worn excessively. Replace liftwheel if pockets are worn.
	7. Liftwheel twisted or bent - gear teeth bent.	7. Excessive overload had been applied. Replace damaged parts.
Hoist is hard to operate in down direction.	1. Brake parts corroded or clogged with foreign matter.	1. Disassemble brake and clean thoroughly (by wiping with a cloth - not by washing in a solvent). Replace ratchet assembly if too gummy, worn or scored. Keep brake surfaces clean and dry.
	2. Chain binding.	2. Check chain, and replace if worn excessively. Clean chain by tumble polishing or using a non-acid or non-caustic type solvent. Check chain for gouges, damaged or bent links. Lubricate with Lubriplate® Bar and Chain Oil 10-R (Fiske Bros. Refning Co.) or equal lubricant.
Hoist is hard to operate in up direction.	1. Chain binding.	1. Check chain, and replace if worn excessively. Clean chain by tumble polishing or using a non-acid or non-caustic type solvent. Check chain for gouges, damaged or bent links. Lubricate with Lubriplate® Bar and Chain Oil 10-R (Fiske Bros. Refning Co.) or equal lubricant.
	2. Overload.	2. Reduce load or use correct capacity unit.

TRANSPORT, STORAGE, DECOMMISSIONING AND DISPOSAL

Observe the following for transporting the unit:
• Do not drop or throw the unit, always deposit it carefully.
• Load chains must be transported in a way to avoid knotting and formation of loops.
• Use suitable transport means. These depend on the local conditions.

Observe the following for storing or temporarily taking the unit out of service:
• Store the unit at a clean and dry place.
• Protect the unit incl. all accessories against contamination, humidity and damage by means of a suitable cover.
• Protect hooks against corrosion.
• A light lubricant film should be applied to the chain.

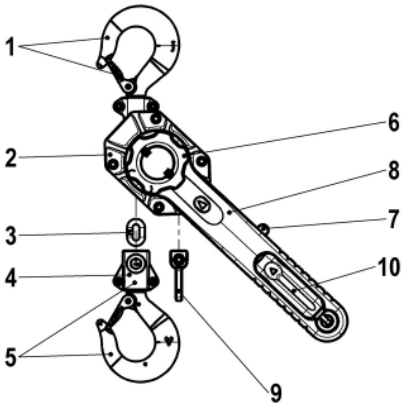
ATTENTION: It must be ensured that no lubricant can penetrate into the brake enclosure. This may result in failure of the brake.

• Since the brake disks may freeze at temperature below 0 °C, the unit should be stored with closed brake. For this purpose, move the change-over lever to lifting (↑) and operate the hand lever with a pumping action, while holding the load fall.
• If the unit is to be used again after it has been taken out of service, it must first be inspected again by a competent person.

Disposal
After taking the unit out of service, recycle or dispose of the parts of the unit in accordance with the legal regulations.

Description

1 Top hook
with safety latch
2 Housing
3 Load chain
4 Bottom block
5 Load hook
with safety latch
6 Handwheel
7 Pawl rod lever
8 Hand lever
9 Chain stop
10 Handle, tiltable



Yale*ERGO 360*		**800**	**1600**	**3200**	**6000**	**9000**
Capacity	[kg]	800	1600	3200	6000	9000
Number of chain falls		1	1	1	2	3
Chain dimension d x p_n	[mm]	5,6 x 17	7,1 x 21	10 x 28	10 x 28	10 x 28
Min. Headroom	[mm]	320	375	445	563	695
Hand lever length	[mm]	327	327	377	377	377
Hand pull at rated load	[daN]	22	34	47	47	51
Net weight at standard lift	[kg]	6,7	9,6	17,2	28,9	49,5
Tensioning force S_{TF}	[daN]	800	1600	3200	6000	9000
Tensioning force S_{HF}	[daN]	22	34	47	47	51

PARTS ORDERING INFORMATION

Only allow trained technicians to perform maintenance on this product.
For additional information contact COLUMBUS McKINNON or nearest distributor.

These products are designed and constructed to provide long, trouble- free service. In time it may be necessary to order and install new parts to replace those that have been subjected to wear.
For your convenience and future reference it is recommended that the following information be recorded:

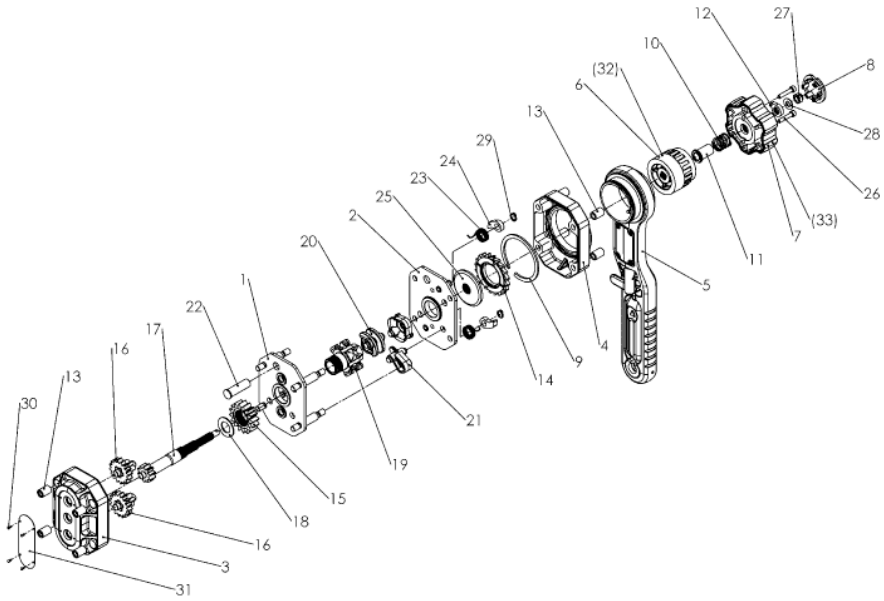
Model number_____
Serial number _____
Date purchased____

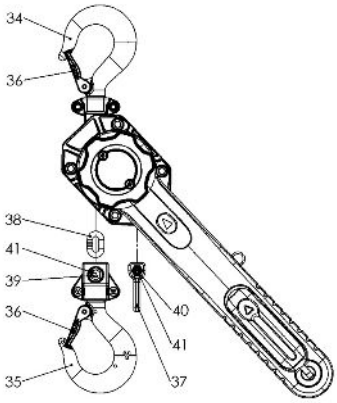
When ordering replacement parts, please specify the following:
1. Model number and serial number as it appears on the name plate.
2. Part number(s) and part description as shown in this manual.
3. Quantity required.

NOTICE

When ordering replacement parts, it is recommended that consideration be given to the need for also ordering such items as nuts, bolts, cotter pins, etc. These items may be damaged or lost during disassembly or just unfit for future use because of deterioration from age or service.

EXPLOSION DRAWING *YaleERGO 360 0,8t/1*

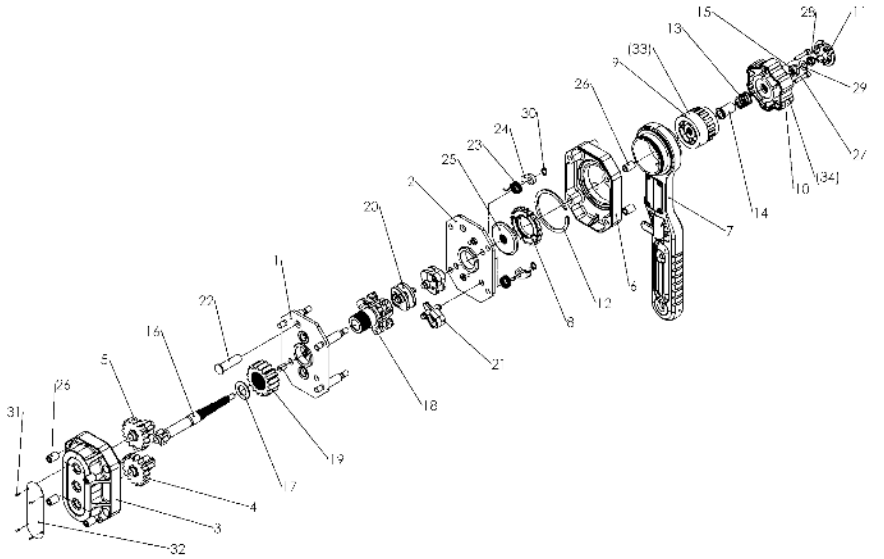


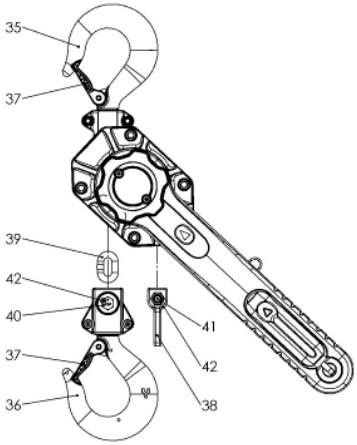


SPARE PARTS LIST *YaleERGO 360 0,8t/1*

Pos.	Description	Model YaleERGO 360 0,8t /1	Quantity
1	Gear side plate, assy.	192021100	1
2	Lever side plate, assy.	192021101	1
3	Gear case, assy.	192021096	1
4	Housing cover	192021160	1
5	Lever handle, assy.	192021109	1
6	Change over gear	192022609	1
7	Hand wheel	192021055	1
8	Cap	192021092	1
9	Snap ring	192021097	1
10	Pressure spring	192021106	1
11	Collar bushing	192021089	1
12	Check washer	192021088	1
13	Cylinder nut	192021083	8
14	Ratchet disc, assy.	192038558	1
15	Load gear	00002009	1
16	Spur gear, assy.	00002005	2
17	Drive shaft	00002008	1
18	Drive shaft washer	00002239	1
19	Lead sheave	00002016	1
20	Guide	00002017	2
21	Stripper	00002018	1
22	Top hook shaft	00002034	1
23	Pawl spring	00002201	2
24	Pawl	00002202	2
25	Disc hub	00002203	1
26	Cylinder screw	09102063	2
27	Lock nut	09115098	1
28	Washer	09121001	1
29	Snap ring	09129055	2
30	Round head grooved pin	09128001	4
31	Name plate	85005200	1
32	Overload limiter, assy.	192028885	1
33	Hand wheel, black	192028323	1
34	Top hook, assy.	85004325	1
35	Lower hook, assy.	85005401	1
36	Latch kit, assy.	53820	2
37	Lock ring	80175060	1
38	5.6 x 17 mm load chain	FT05617	–
39	Lower hook chain bolt	00002036	1
40	Lock ring screw	80175061	1
41	Lock nut	09115135	2

EXPLOSION DRAWING *YaleERGO 360 1,6t/1*

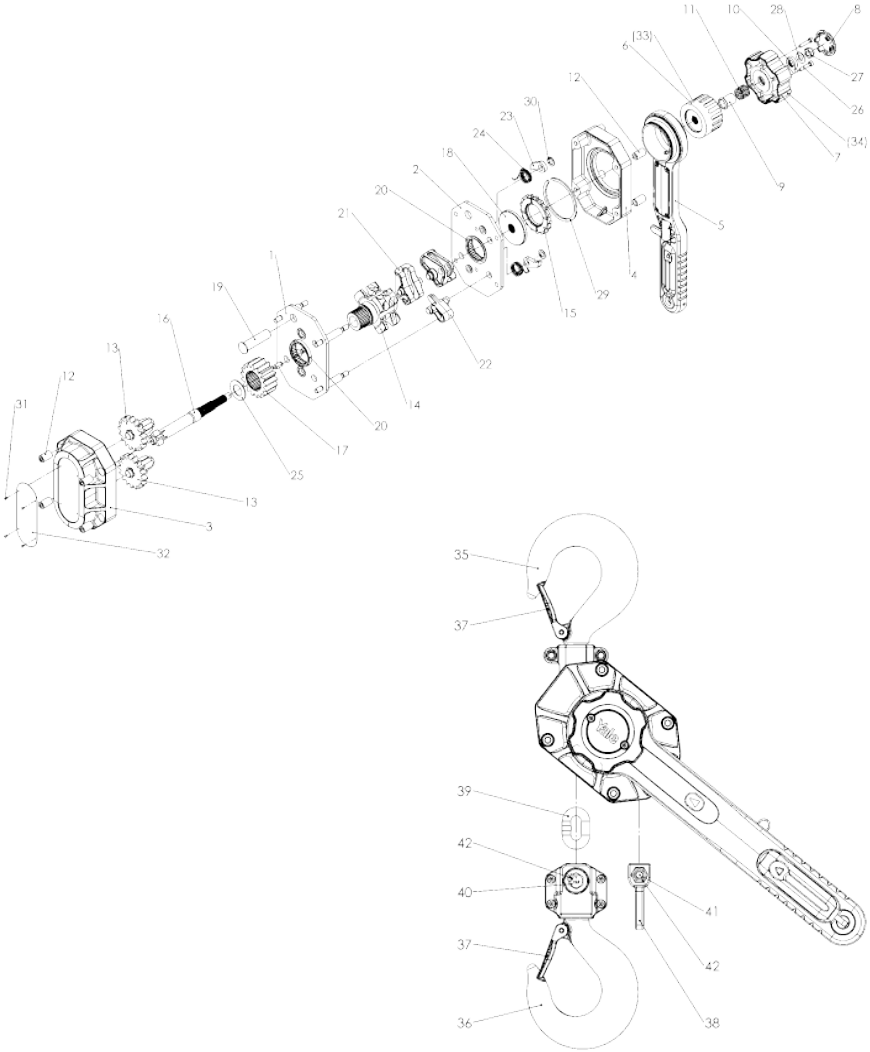




SPARE PARTS LIST *YaleERGO 360 1,6t/1*

Pos.	Description	Model YaleERGO 360 1,6t /1	Quantity
1	Gear side plate, assy.	192021063	1
2	Lever side plate, assy.	192021062	1
3	Gear case, assy.	192021059	1
4	Spur gear, assy. ‚B‘	00002105B	1
5	Spur gear, assy. ‚A‘	00002105A	1
6	Housing cover	192021056	1
7	Lever handle, assy.	192021109	1
8	Ratchet disc, assy.	192038558	1
9	Change over gear	192022609	1
10	Hand wheel	192021055	1
11	Cap	192021092	1
12	Snap ring	192021097	1
13	Pressure spring	192021106	1
14	Collar bushing	192021089	1
15	Check washer	192021088	1
16	Drive shaft	00002108	1
17	Drive shaft washer	00002239	1
18	Load sheave	00002117	1
19	Load gear	00002109	1
20	Guide	00002120	2
21	Stripper	00002121	1
22	Top hook shaft	00002137	1
23	Pawl spring	00002201	2
24	Pawl	00002202	2
25	Disc hub	00002203	1
26	Cylinder nut	192021083	8
27	Cylinder screw	09102063	2
28	Lock nut	09115098	1
29	Washer	09121001	1
30	Snap ring	09129055	2
31	Round head grooved pin	09128001	4
32	Name plate	85005201	1
33	Overload limiter, assy.	192028885	1
34	Hand wheel, black	192028323	1
35	Top hook, assy.	85004327	1
36	Lower hook, assy.	85005402	1
37	Latch kit	53821	2
38	Lock ring	80115060	1
39	7.1 x 21 mm load chain	FT07121	–
40	Lower hook chain bolt	80115062	1
41	Lock ring screw	80115061	1
42	Lock nut	09115098	2

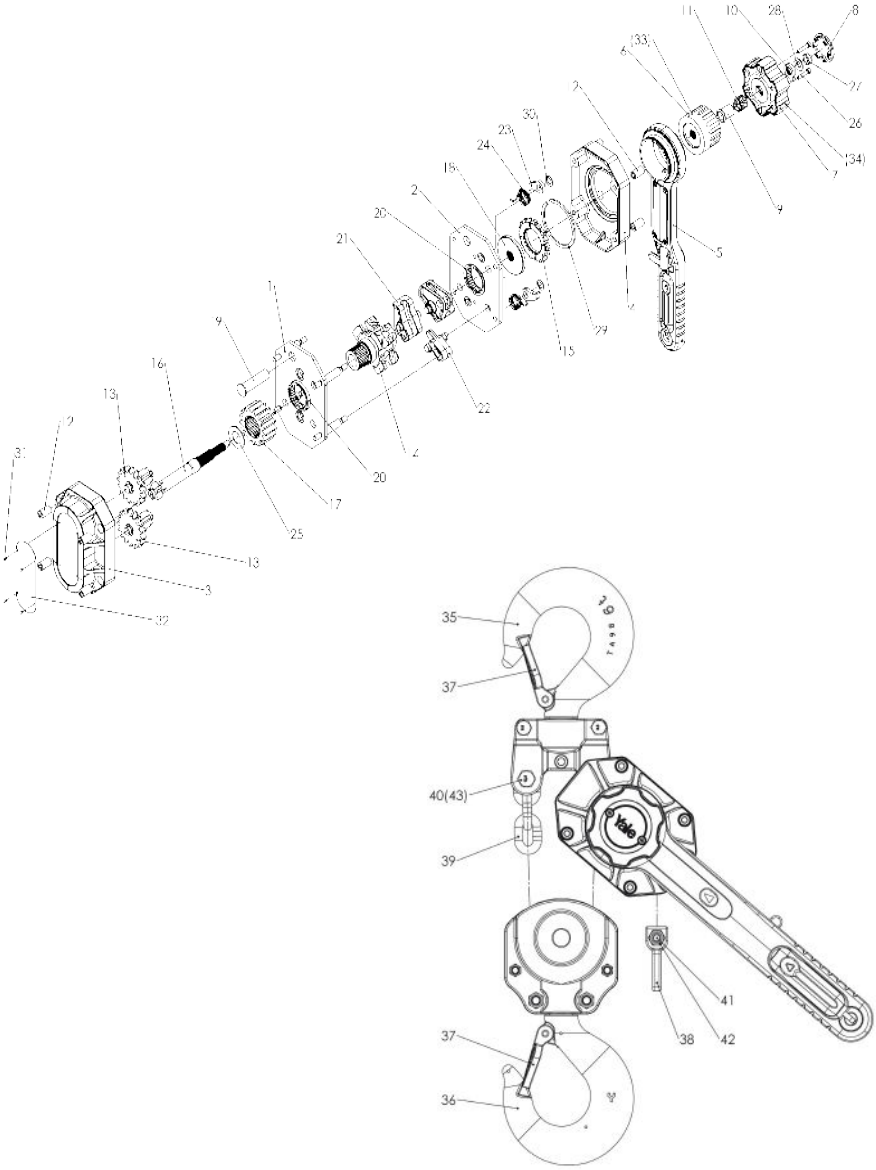
EXPLOSION DRAWING *YaleERGO 360 3,2t/1*



SPARE PARTS LIST *YaleERGO 360 3,2t/1*

Pos.	Description	Model YaleERGO 360 3,2t /1	Quantity
1	Gear side plate, assy.	00230506	1
2	Lever side plate, assy. (w/o Pos. 20)	00230507	1
3	Gear case, assy.	192021136	1
4	Housing cover	192021161	1
5	Lever handle assy.	192021120	1
6	Change over gear	192041216	1
7	Hand wheel	192021138	1
8	Cap	192021122	1
9	Collar bushing	192021142	1
10	Check washer	192021144	1
11	Pressure spring	192021128	1
12	Cylinder nut	00230444	8
13	Spur gear assy.	00002305	2
14	Load sheave assy.	00002374	1
15	Ratchet disc assy.	192037609	1
16	Drive shaft	00002308	1
17	Load gear	00002309	1
18	Disc hub	00002337	1
19	Top hook shaft	00002331	1
20	Liftwheel bearing (outer ring + rollers)	00002312	2
21	Guide	192036791	2
22	Stripper	00002315	1
23	Pawl	00002336	2
24	Pawl spring	192040786	2
25	Drive shaft washer	00002361	1
26	Cylinder screw	09102063	2
27	Lock nut	09115036	1
28	Washer	09121006	1
29	Snap ring	192021123	1
30	Snap ring	09129005	2
31	Round head grooved pin	09128001	4
32	Name plate	85005202	1
33	Overload limiter, assy.	192021147	1
34	Hand wheel, black	192028378	1
35	Top hook, assy.	85005543	1
36	Lower hook, assy.	85005544	1
37	Latch kit	53822	2
38	Lock ring	80130060	1
39	10 x 28 mm load chain	192046315	–
40	Lower hook chain bolt	80130062	1
41	Lock ring screw	80130061	1
42	Lock nut	09115036	2

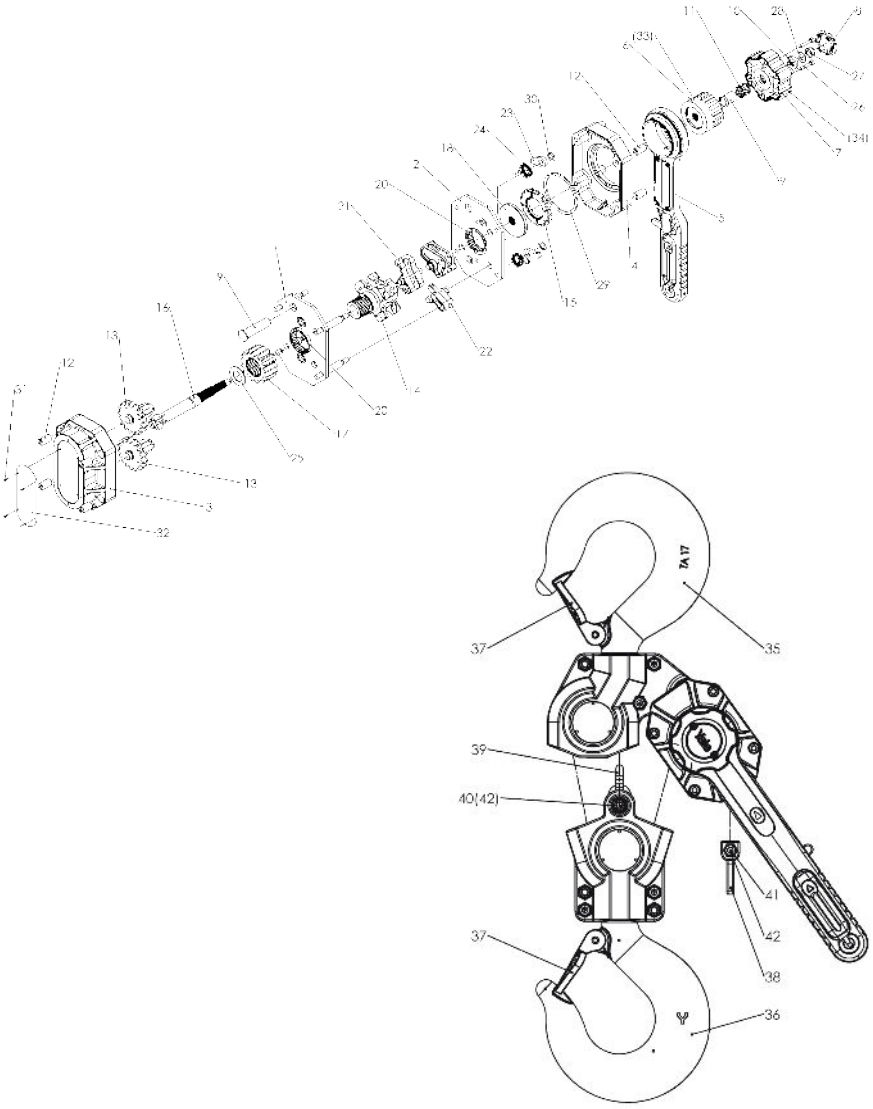
EXPLOSION DRAWING *YaleERGO 360 6,0t/2*



SPARE PARTS LIST *YaleERGO 360 6,0t/2*

Pos.	Description	Model YaleERGO 360 6,0t /2	Quantity
1	Gear side plate, assy.	00230506	1
2	Lever side plate, assy. (w/o Pos. 20)	00230507	1
3	Gear case, assy.	192021136	1
4	Housing cover	192021161	1
5	Lever handle assy.	192021120	1
6	Change over gear	192041216	1
7	Hand wheel	192021138	1
8	Cap	192021122	1
9	Collar bushing	192021142	1
10	Check washer	192021144	1
11	Pressure spring	192021128	1
12	Cylinder nut	00230444	8
13	Spur gear assy.	00002305	2
14	Load sheave assy.	00002374	1
15	Ratchet disc assy.	192037609	1
16	Drive shaft	00002308	1
17	Load gear	00002309	1
18	Disc hub	00002337	1
19	Top hook shaft	00002331	1
20	Liftwheel bearing (outer ring + rollers)	00002312	2
21	Guide	192036791	2
22	Stripper	00002315	1
23	Pawl	00002336	2
24	Pawl spring	192040786	2
25	Drive shaft washer	00002361	1
26	Cylinder screw	09102063	2
27	Lock nut	09115036	1
28	Washer	09121006	1
29	Snap ring	192021123	1
30	Snap ring	09129005	2
31	Round head grooved pin	09128001	4
32	Name plate	192035453	1
33	Overload limiter, assy.	192045572	1
34	Hand wheel, black	192028378	1
35	Top hook, assy.	00002381	1
36	Lower hook, assy.	00002377	1
37	Latch kit	53940	2
38	Lock ring	80130060	1
39	10 x 28 mm load chain	192046315	–
40	Lower hook chain bolt	80160068	1
41	Lock ring screw	80130061	1
42	Lock nut	09115036	1
43	Lock nut	09115115	1

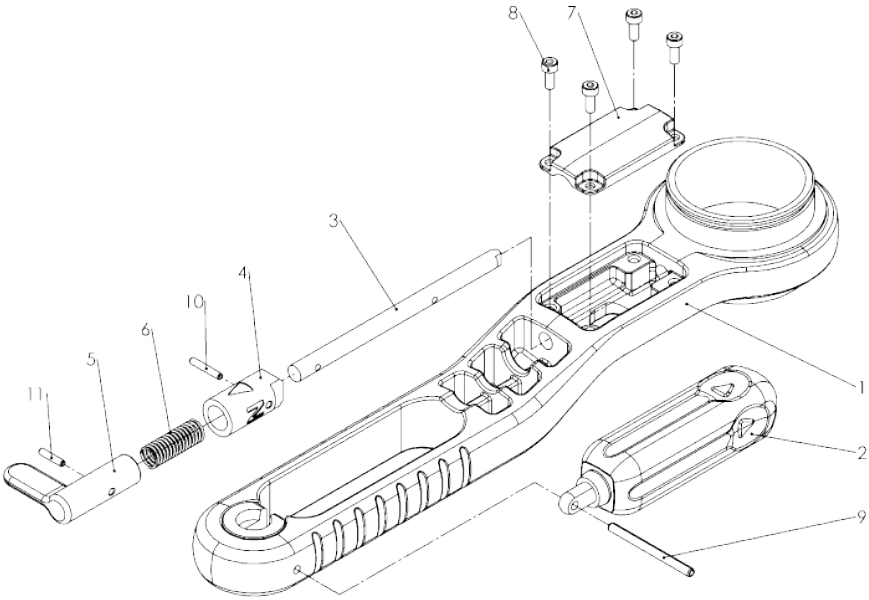
EXPLOSION DRAWING *YaleERGO 360 9,0t/3*



SPARE PARTS LIST *YaleERGO 360 9,0t/3*

Pos.	Description	Model YaleERGO 360 9,0t / 3	Quantity
1	Gear side plate, assy.	00230506	1
2	Lever side plate, assy. (w/o Pos. 20)	00230507	1
3	Gear case, assy.	192021136	1
4	Housing cover	192021161	1
5	Lever handle assy.	192021120	1
6	Change over gear	192041216	1
7	Hand wheel	192021138	1
8	Cap	192021122	1
9	Collar bushing	192021142	1
10	Check washer	192021144	1
11	Pressure spring	192021128	1
12	Cylinder nut	00230444	8
13	Spur gear assy.	00002305	2
14	Load sheave assy.	00002374	1
15	Ratchet disc assy.	192037609	1
16	Drive shaft	00002308	1
17	Load gear	00002309	1
18	Disc hub	00002337	1
19	Top hook shaft	00002331	1
20	Liftwheel bearing (outer ring + rollers)	00002312	2
21	Guide	192036791	2
22	Stripper	00002315	1
23	Pawl	00002336	2
24	Pawl spring	192040786	2
25	Drive shaft washer	00002361	1
26	Cylinder screw	09102063	2
27	Lock nut	09115036	1
28	Washer	09121006	1
29	Snap ring	192021123	1
30	Snap ring	09129005	2
31	Round head grooved pin	09128001	4
32	Name plate	192039576	1
33	Overload limiter, assy.	192045572	1
34	Hand wheel, black	192028378	1
35	Top hook, assy.	192039358	1
36	Lower hook, assy.	192039357	1
37	Latch kit	65600005	2
38	Lock ring	80130060	1
39	10 x 28 mm load chain	192046315	–
40	Lower hook chain bolt	192039547	1
41	Lock ring screw	80130061	1
42	Lock nut	09115036	1

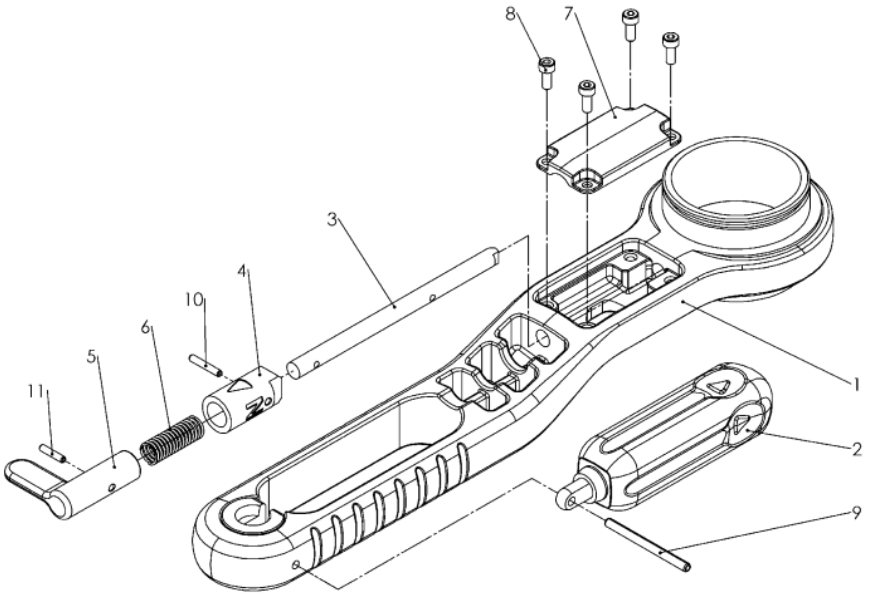
EXPLOSION DRAWING – LEVER *YaleERGO 360 0,8t & 1,6t*



SPARE PARTS LIST – LEVER *YaleERGO 360 0,8t & 1,6t*

Pos.	Description	**Model** **Yale*ERGO 360* 0,8t /1** **Yale*ERGO 360* 1,6t /1**	Quantity
1	Lever	192021108	1
2	Retractable handle, assy.	192022617	1
3	Ratchet rod	192021090	1
4	Selector	192022619	1
5	Switch lever	192022608	1
6	Pressure spring	00205708	1
7	Cover	192021105	1
8	Cylinder screw	09105028	4
9	Slotted spring pin	09134070	1
10	Slotted spring pin	09124017	1
11	Slotted spring pin	09134071	1

EXPLOSION DRAWING–LEVER *YaleERGO 360 3,2t & 6,0t & 9,0t*



SPARE PARTS LIST–LEVER *YaleERGO 360 3,2t & 6,0t & 9,0t*

Pos.	Description	Model Yale*ERGO 360* 3,2t / 1 Yale*ERGO 360* 6,0t / 2 Yale*ERGO 360* 9,0t / 3	Quantity
1	Lever	192021126	1
2	Retractable handle, assy.	192022617	1
3	Ratchet rod	192021139	1
4	Selector	192022619	1
5	Switch lever	192022608	1
6	Pressure spring	00205708	1
7	Cover	192021133	1
8	Cylinder screw	09105028	4
9	Slotted spring pin	09134070	1
10	Slotted spring pin	09134017	1
11	Slotted spring pin	09134071	1

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according to EN ISO



Yale®

中文操作使用说明书及配件手册（对特殊规格同样适用）

Yale*ERGO 360*

零件代码： 85005206AC/2019.05

COLUMBUS McKINNON
CORPORATION

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介绍

CMCO Industrial Products GmbH 始终按照公认的一流工程标准制造产品。然而，使用我们的产品时，如果处理错误，则可能会对使用人员或第三方的生命与肢体造成危险，和/或对葫芦或其它财产造成危险。
作业公司应负责向作业人员提供正确、专业的指导。为此，所有操作人员在首次作业之前，均必须认真阅读本说明书。本使用说明书旨在令用户熟悉本产品，在产品预定能力范围内，充分使用产品。本使用说明书包含如何安全、正确、经济地使用本产品的重要信息。遵循本说明书的规定行事，不仅有助于避免危险，减少维修成本和停机时间，而且可以提高产品可靠性，延长产品使用寿命。应将本使用说明书放置于产品作业的地方。除本使用说明书以及本产品使用地所在国家和地区的有效
事故预防法案之外，还必须遵守公认的规定，实现安全、专业作业。负责本产品操作、保养与维修的人员必须阅读、理解和遵循本使用说明书。本使用说明书所提出的保护措施仅提供必要的安全，而且前提是正确使用本产品，按照说明书的要求安装和/或保养本产品。作业公司承诺确保本产品安全、无故障运行。

正确操作

本设备可用于提升、下降、拉起、拉紧负载。
本产品也适用于EN12195在公共道路上卡车运输用锁紧负载。必须符合铭牌上标注的张紧力STF和手扳力 SHF。

注意：只有在装置和/或支撑结构承载力未随载荷位置的变化而改变时，方可使用本设备。

凡将本产品用于其它用途或超出其用途的，均视为错误使用。凡因此等而导致损害的，Columbus McKinnon Industrial Products GmbH 概不担责。风险由用户或作业公司自行承担。设备上所注明的承载力是指设备可以悬挂的最大极限载荷（WLL）。如果葫芦需要频繁从高空落降或频繁进行定向作业，则首先应咨询制造商的意见，因为可能会出现过热现象。当提升负载时，本产品的上吊钩和负载吊钩必须位于负载重心（S）所在的垂直线上，以免提升过程中负载晃动。



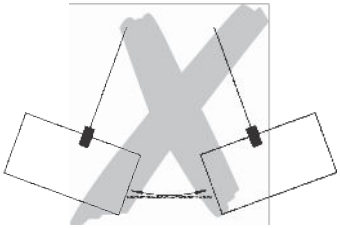
作业公司负责选择适当的支撑结构，同时负责相关计算工作。
吊点及其支撑结构设计必须适用于预计出现的最大载荷(设备自重+载荷)。
操作员必须确保葫芦悬空之后，可以对其进行操作，而且不会令操作员自己或其他人接触到设备自身、悬空或载荷所带来的危险。
只有待载荷正确悬挂，危险区没有人员存在之后，操作员方可开始移动载荷。
任何人不得在悬挂载荷的下方停留或经过。
载荷吊装或夹紧之后，必须始终有人看管，而且不得长时间吊装或夹紧。
使用葫芦的环境温度范围是 -10℃至 +50℃。若出现极限作业条件，则请咨询制造商。

注意：环境温度低于 0°C 时，使用葫芦之前，应吊装和降落小荷载 2-3 次，检查制动器是否被冻住。

葫芦在特殊环境下（湿度大、酸碱盐）作业之前，或者处理危险品之前（例如熔融化合物、放射性物质），应咨询制造商，寻求制造商意见。悬挂载荷时，必须使用经批准且通过认证的起重设备。正确的操作包括遵守使用说明，此外，还包括遵守保养说明。功能出现缺陷或者产生异常噪音时，立即停止使用葫芦。

错误操作

（未全部列出）
不得超过设备和/或悬挂部以及支撑结构的额定承重力（WLL）。
设备不得用于拉动自由的固定荷载。此外，链条处于松垮状态时，严禁载荷降落（链条有断裂危风险）。严禁清除或遮盖标签（例如，不干胶标签）、警告标志或识别牌。 运送载荷时，确保载荷不会摇摆，不会接触其他物体。

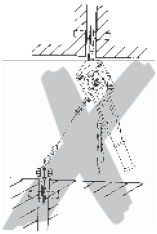


不得将载荷移到操作员视野之外的区域。如有必要，操作员必须确保获得他人帮助。
严禁使用电机驱动本设备。

手柄不能加长，只能用设备出厂时所配的手柄。



严禁超出个人权限范围操作本设备。严禁在吊钩和起重链条上焊接，起重链条决不能用做焊接时的接地线。避免侧拉，避免负载偏向于机体或下吊钩的一侧。



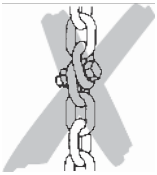
起重链条严禁用作吊链。



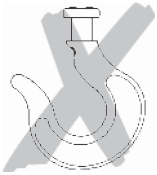
设备未经咨询制造商而擅自改动的，严禁使用。人不能用葫芦进行运输。



起重链条切勿打结，切勿使用销子、螺栓、螺丝刀或类似工具连接起重链条。切勿维修安装在葫芦内部的起重链条。



严禁将保险片组件从上吊钩和/或下吊钩拆下。



载荷切勿悬挂于吊钩尖部。起重滑条必须始终位于吊钩鞍部。



切勿将止锁环用作限位装置。正常工况下，严禁转动荷载，因为本款葫芦的下吊钩座并未设计用于此用途。正常作业过程中，若必须转动荷载，则必须使用防扭旋转接头，或咨询制造商。葫芦的吊钩中只能悬空一个载荷吊装带。
切勿触及可动件。
设备不得从高空下坠，应始终正确放置于地上。
在具有爆炸可能的气体中，禁止使用本产品。

组装

检查吊点
选择葫芦吊点时，应确保葫芦准备固定在其上的支撑结构具有充分稳定性，确保能够安全吸收预计出现的作用力。
设备必须在载荷自由对准，以免出现禁止的其它荷载。
作业公司负责选择适当的支撑结构，同时负责相关计算工作。

首次运行之前的检查

首次运行之前，停机后再次投运之前以及出现重大改动之后，必须由称职人员对本产品进行检查查，包括支撑结构。此项检查主要包括目视检查和功能检查。这些检查旨在确定葫芦处于安全状态，已经完成适当设置，可以投入运行，并且确定已经按要求检测和消除缺陷或损伤。
*称职人员可以是制造商或供应商保养工程师等等。但是，公司也可以安排经过适当培训的公司内部专业人员来完成检查。
投运之前，检查传动装置在无载荷状态下的功能。

开始作业之前的检查

开始作业之前，对设备进行检查，包括悬挂部、设备以及支撑结构，确认是否存在肉眼可见的缺陷，例如变形、表面裂缝、磨损以及腐蚀现象。此外，还应对制动器进行测试，确认葫芦与载荷均正确悬挂。
检查制动器功能。
在开始工作前，始终要检查刹车性能：
为了检查刹车，使用本产品提升或拉紧并且下降或松开负载一段短距离。当手柄松开时，负载必须可以在任何位置停住。
此项检查旨在确保即使在 0℃以下，制动片仍然不会受冻。至少重复两次，然后才可以开始正常作业。

注意：若制动器无法正常工作，则葫芦必须立即退出工作，并联系制造商！

检查吊点
选择葫芦吊点时，应确保葫芦准备固定在其上的支撑结构具有充分稳定性，确保能够安全吸收预计出现的作用力。
本产品必须自由地对齐在负载下方,不允许额外加载。
作业公司负责选择适当的支撑结构，同时负责相关计算工作。

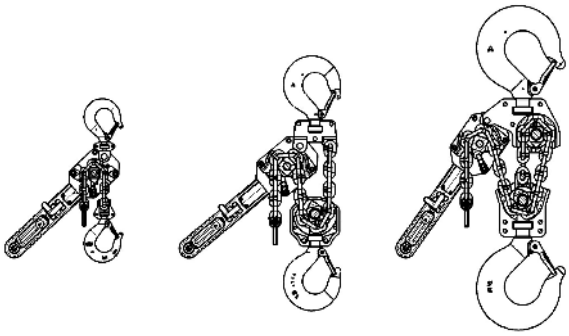
检查起重链条
检查起重链条是否充分润滑，检查是否存在外部缺陷、变形、表面裂缝、磨损以及腐蚀现象。

检查挡链板
挡链板必须始终贴合松动的链端。不得出现磨损，必须正确对准。

检查上吊钩和下吊钩
必须检查上吊钩和下吊钩是否存在裂纹、变形、损坏、磨损和腐蚀斑点。保险片必须能够自由移动，并且能够完全起作用。

检查链条是否穿入下吊钩座中
对于带两行或多行链条的葫芦，首次运行之前，必须对其进行检查，确保起重链条没有扭结和打结。对于带两行或多行链条的葫芦，如果翻过下吊钩座等，则链条可能会扭结。
更换链条时，确定链条正确穿过。链条焊缝必须朝外。





800kg - 3200kg　　6000kg　　9000kg

只能安装经过制造商批准的起重链条。未遵守本规范会立即导致法律保证或质保无效。

功能检查
使用前，确定链条传动装置在无载荷时正常工作。

操作

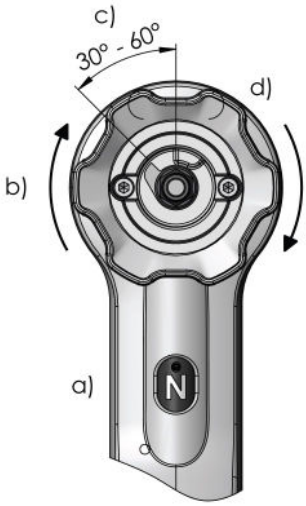
安装、检修、操作
负责安装、检修或独立操作葫芦的操作员必须接受过适当培训，能力能够胜任。应由公司专门指定操作员，操作员必须熟悉使用地所在国家的相关安全规定。

自由链装配

注意：为保证葫芦制动和自由链系统正常运行，请按照以下步骤操作。

a. 将换向手柄调至 'N' 位置
b. 顺时针旋转手轮，确保制动螺母已与制动盘贴合，完成这一步的同时保持链条与下吊钩连接。如果链条的负载侧没有足够的拉力，就会听到“咔哒”声。
c. 拧紧制动器后，将止回凸轮套进传动轴，确保花键啮合后图中的夹角在 30° 到 60° 。
d. 然后把平垫圈套在轴上，握住手轮的同时拧紧六角螺母。

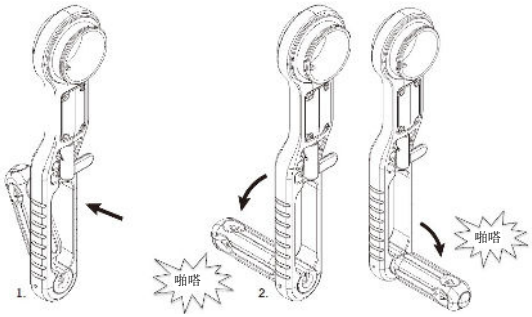
（完成上述操作后，止回凸轮就会随着传动轴旋转，直到它碰到手轮内的小凸台为止。）
请检查手轮在给定的角度内是否可以轻松地向各个方向转动，完成后将手轮盖盖紧。



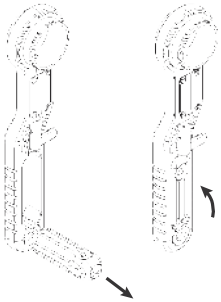
松开链条
转动换向手柄至中性（中间）位置，两个方向均可拉动链条，快速拉动起重链条，链条会被锁紧

注意：使刹车起作用的最低负载为 30-45 千克。

ERGO 可伸缩手柄的使用方法
如果需要使用可伸缩手柄，则需将它从驱动手柄中向前或向后推出到图示位置，当可伸缩手柄到达图示位置时，可以听到啪哒的声音。固定凹槽内必须保持干净，不能有灰尘。如果有需要，把其它相关零件一并清洁。

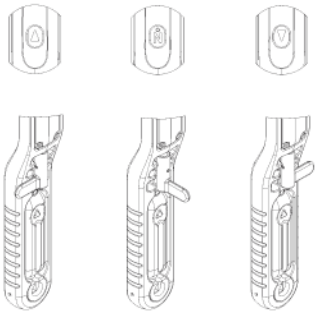


为了将可伸缩手柄恢复到初始位置，需将其向外拉出固定凹槽，同时将其推回驱动手柄内，外表面须与驱动手柄平行。弹簧力会将可伸缩手柄保持在驱动手柄内。



吊装载荷
向下拉出换向手柄并转动至提升位置“↑”，确保手柄转动到位，且能听到咔哒声。
反复摇动操作手柄。如果葫芦上带有负载时停止动作，换向手柄必须保持在提升位置“↑”。

降低载荷
向下拉出换向手柄并转动至下降位置“↓”，确保手柄转动到位，且能听到咔哒声。
反复摇动操作手柄。



刹车卡住
如果葫芦在带有负载时突然解除负载压力，例如搬走负载或者在拉倒墙壁时，开始并不下降，刹车将继续保持锁定。如果带有吊钩座的下吊钩抵着外壳被拉得太紧，刹车也会被锁住。
松开卡住的刹车
转动换向手柄至下降位置“↓”，然后用力地操作手柄。如果刹车卡牢，可以通过击打手柄使之松开。

Yale 过载保护装置（可选）
过载保护装置按照 25%(±15%)左右进行过载设置。其调整只能由称职人员来完成。
超出限载数值后，过载保护装置便会启动，阻止进一步提升载荷，但下降载荷仍然可以。

检查、检修与维修

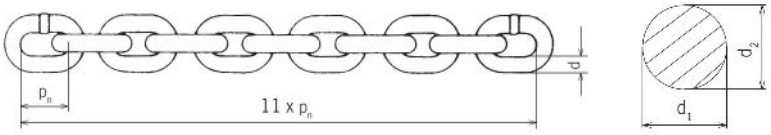
下列情况下，必须根据国家和国际事故预防与安全规定检查起重设备：
- 作业公司的风险评估确定需要检查
- 首次运行之前
- 葫芦停机后再次投运之前
- 重大改动之后
- 但是，每年至少一次，由称职人员来完成。

注意：若实际运行状况（例如在镀锌设施中作业）允许，则可以缩短检查周期。

维修作业只能由专业车间完成，维修应采用 Yale 原装备品备件。检查(主要包括目视检查和功能检查）必须确定安全装置完整，可以充分运行，涵盖葫芦、悬挂部、设备以及支撑结构的损坏、磨损腐蚀或其它改动的条件。首次运行和周期性检查均必须形成书面文件(例如，CMCO 作业合规性证明) 如要求的话，必须对检查和相关维修的结果予以确认。若葫芦（吊装重量至少 1 吨）安装在行走小车上或安装在其中，如果葫芦用于沿一个或多方向移动所提升的载荷，则应将此装置视为起重机，必须按要求进行其它检查。油漆面发生损坏的，必须补漆，以免腐蚀。所有接缝与滑动面均应稍稍润滑。若出现重度污染，则必须对葫芦进行清洁。
最晚应在 10 年后对葫芦进行大检修。
特别是，检查起重链条、下吊钩以及上吊钩尺寸。

注意：更换部件之后，必须安排称职人员进行后续检查！

检查起重链条（根据 DIN 685-5）
每年检查一次起重链条是否存在机械损伤，最晚是工作 50 小时之后。检查承重链条是否充分润滑，检查是否存在外部缺陷、变形、表面裂缝、磨损以及腐蚀现象。
对于磨损最严重的链节，如果链节原标称厚度“d”减少 10%以上，或者链条被拉长超过一个节距“pn”5%，或 11 个节距（11xpn）超过 3%，则必须更换起重链条。
公称尺寸与磨损范围见下表。若达到其中一个极限值，则必须更换起重链条。



d = 链条理论直径
d_1,d_2 = 实际数值

$$d_{min.} = \frac{d_1 + d_2}{2} \leq 0{,}9d$$

公称尺寸与磨损极限：

Yale*ERGO 360*			800	1600	3200	6000	9000
链条规格		[mm]	5,6 x 17	7,1 x 21	10 x 28	10 x 28	10 x 28
链条等级			T	T	V	V	V
直径	d_{nom}	[mm]	5,6	7,1	10,0	10,0	10,0
	d_{min}	[mm]	5,0	6,4	9,0	9,0	9,0
节距	$p_{n\ nom}$	[mm]	17,0	21,0	28,0	28,0	28,0
	$p_{n\ max}$	[mm]	17,9	22,1	29,4	29,4	29,4
长度	11 x $p_{n\ nom}$	[mm]	187,0	231,0	308,0	308,0	308,0
	11 x $p_{n\ max}$	[mm]	192,6	237,9	317,2	317,2	317,2

保养起重链条

多数情况下，链节位置处的链条磨损都是因为链条保养不足造成的。为了确保链节接触点获得最佳润滑，应对链条定期进行润滑，润滑周期以适合蠕爬型润滑剂为准（例如齿轮油）。对于存在沙等研磨材的环境，应使用 PTFE 喷剂等干膜润滑剂。同未接受检修的链条相比，经过周到的润滑之后，承重链条使用寿命可以延长 20-30 倍。

- 润滑链条时，确定链条处于无载荷状态，这样润滑油才可以到达发生磨损的链节接触点。相互接触的链节零部件应始终涂覆润滑剂，否则链条磨损会加重。
- 链条只在外部润滑是不够的，因为这样无法确保接触点能够形成润滑剂膜。
- 链条提升路径恒定的，必须特别检查升降过渡区。
- 确定承重链条整个长度均得到润滑，包括葫芦罩壳中的链条零部件。
- 链条变脏后，应使用石油或类似清洁剂清洗，切勿加热链条。
- 润滑链条时，还应检查链条是否出现磨损。
- 确定承重链条整个长度均得到润滑，包括葫芦罩壳中的链条零部件。
- 链条变脏后，应使用石油或类似清洁剂清洗，切勿加热链条。
- 润滑链条时，还应检查链条是否出现磨损。

注意：必须确保润滑剂不会穿透制动器外壳。这样可能会导致制动器失效。

更换起重链条

起重链条出现肉眼可见损伤或变形的，必须使用尺寸与质量均相同的新链条予以更换，但是，最晚更换时间不得晚于链条达到弃用状态时。链条弃用后，必须由授权专业车间予以更换。只能安装经过制造商批准的承重链条。未遵守本规范会立即导致法律保证或质保无效。

注意：承重链条更换的，必须记录在册！

单链葫芦

- 只能在无载荷状态下拉新链条。
- 需要使用一个开口的链条接头作为工具，链条接头可以从相同尺寸的链条上用砂轮切割得到，切割开口的长度至少大于链条直径。
- 从旧起重链条上取下吊钩，在起重链条松动时拿走起重链条。
- 挂上新的、经过润滑的起重链，然后拉动，使其穿过葫芦（顺时针转动手轮）。
- 链条出现扭结的，不得安装。从链轮看，焊缝必须朝外。
- 当旧起重链条穿过葫芦机体时可以同链条接头一起拆卸下来，起重吊钩可以与新穿入的起重链条匹配。

• 将起重吊钩装在新起重链条上。
• 从替换下的旧承重链条上卸下止链装置,然后将其装到新链条的松弛末端。

注意：止链装置必须安装在链条的松弛末端（惰轮）（图 12）。

多链葫芦

注意：只有在下部吊钩限位块无荷载情况下才可以拉新链条，否则拆下承重链条时，可能会导 致下部吊钩限位块下坠。受伤危险！

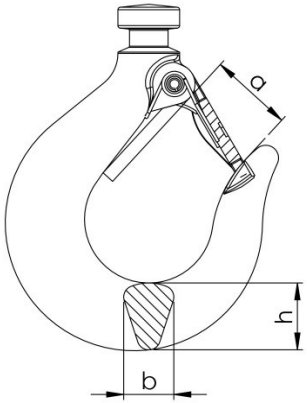
• 需要使用一个开口的链条接头作为工具，链条接头可以从相同尺寸的链条上用砂轮切割得到，切割开口的长度至少大于链条直径。
• 将起重链条承受载荷的链绳端从葫芦罩壳或下吊钩限位块（随型号而定）上拆走。
• 将新的、经过润滑的起重链穿过下吊钩和葫芦组（顺时针转动手轮）
• 链条出现扭结的，不得安装。从链轮看，焊缝必须朝外。

• 当旧起重链条穿过葫芦机体时可以同链条接头一起拆卸下来。
• 将新起重链条承受载荷的链绳端固定葫芦罩壳/墙板或下部吊钩座上（随型号而定）。
• 将挡链块装到新链条的松弛末端。

注意：闲置链绳松动端必须始终安装在链条挡块之上（图 1）。

检查上吊钩与下吊钩

按要求检查吊钩是否变形、损坏、表面开裂、磨损以及是否存在腐蚀迹象，每年至少一次。实际运行状况可能表明需要缩短检查周期。吊钩无法满足所有要求的，必须及时更换。严禁在吊钩上进行焊接，用以补偿磨损或损坏等等。
吊钩口打开超过 10%，或者由于磨损原因导致标称尺寸减少 5%的，必须更换上吊钩和/或下吊钩。标称尺寸与磨损范围见表。若达到极限值，则应更换部件。



吊钩公称尺寸和磨损限度

Yale*ERGO 360*			800	1600	3200	6000	9000
开口尺寸	a_{nom}	[mm]	27,0	31,0	40,0	44,0	68,0
	a_{min}	[mm]	29,7	35,2	44,0	48,4	74,8
截面厚度	b_{nom}	[mm]	15,0	19,5	20,0	32,0	50,0
	b_{min}	[mm]	14,3	18,5	19,0	30,4	47,5
截面高度	h_{nom}	[mm]	20,0	26,0	37,0	45,0	68,0
	h_{min}	[mm]	19,0	24,9	34,8	42,6	64,6

检查制动器

若发现存在不规则（例如摩擦片出现缺陷），则应立即联系制造商。对制动器所有部件进行检查，确认是否存在磨损、损害、过热引起的褪色以及是否正常运行。摩擦片必须始终无润滑脂、润滑油、水或脏污。检查摩擦片的烧结。

检查必须由作业公司完成。

故障排查表

故障类型	潜在原因	校正措施
葫芦在任意方向均难操作	1.起重链条磨损超过允许长度，导致在起重链轮和导链块之间卡滞。	1.检查链条，如果过度磨损则需要更换。
	2.起重链条生锈、腐蚀或被水泥或泥浆等异物堵塞。	2.用滚抛机或非酸性或非腐蚀性溶剂清洗链条。检查链条是否有沟槽、损坏或弯曲。使用 Lubriplate® 10-R (Fiske Bros. Refning Co.)或同等润滑油润滑。
	3.衬套被水泥或灰尘等物质堵塞。	3.拆卸并清洗起重链轮衬套和齿轮侧墙板中的衬套。任何过度磨损的零件都应更换。
	4.手柄过紧。	4.清除手柄和制动罩之间可能存在的异物。
	5.制动部件被腐蚀或被异物堵塞。	5.拆卸制动组件并彻底清洗(用抹布擦拭-不要用溶剂清洗)。如果棘轮总成出现粘合，磨损或有划痕，请及时更换。保持摩擦片表面清洁干燥。
	6. guide.起重链轮链窝被异物堵塞或过度磨损导致链条在链轮和导链块之间卡滞。	6.如果链窝没有过度磨损，请清理后继续使用；如果链窝磨损严重请及时更换起重链轮。
	7.起重链轮扭曲或弯曲-齿轮齿弯曲。	7.发生了严重超载，请更换损坏部件。
葫芦在下降操作困难	1.制动部件被腐蚀或被异物堵塞。	1.拆卸制动组件并彻底清洗(用抹布擦拭-不要用溶剂清洗)。如果棘轮总成出现粘合，磨损或有划痕，请及时更换。保持摩擦片表面清洁干燥。
	2.链条过紧。	2.检查链条，如果过度磨损则需要更换。用滚抛机或非酸性或非腐蚀性溶剂清洗链条。检查链条是否有沟槽、损坏或弯曲。使用 Lubriplate® 10-R (Fiske Bros. Refning Co.)或同等润滑油润滑。
葫芦在上升操作苦难	1.链条过紧。	1.检查链条，如果过度磨损则需要更换。用滚抛机或非酸性或非腐蚀性溶剂清洗链条。检查链条是否有沟槽、损坏或弯曲。使用 Lubriplate® 10-R (Fiske Bros. Refning Co.)或同等润滑油润滑。
	2.超载。	2.减轻负载或使用正确的额定载荷。

运输、储存、退役与处置

按下列规定完成葫芦的运输：
- 切勿让葫芦坠落，切勿扔掉葫芦，应始终小心存放。
- 起重链的运输方式必须能够避免打结和环的形成。
- 使用适当的运输工具。这些取决于当地条件。

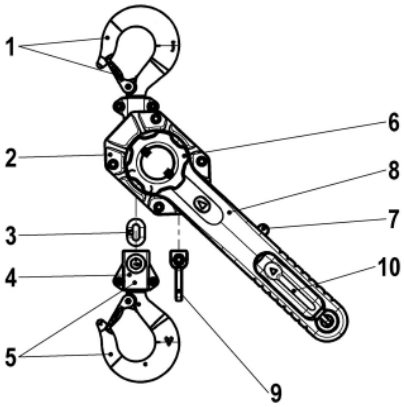
储存以及临时退出使用的，应遵守下列规定：
- 将葫芦存放在干净、干燥的地方。
- 使用适当的覆盖物保护葫芦，包括附件，防止污染、受潮以及损害。
- 保护吊钩，防止受到腐蚀。
- 添加润滑脂或油保护螺纹轴，避免腐蚀。

注意：必须保证润滑剂不会渗入刹车附件。否则，可能导致刹车故障。

- 因为在温度低于 0℃时，刹车盘可能会冻住，因此在保存本产品时，需要将刹车关闭。为了这 目的，将转换杆移动到提升位置“↑”，然后反复摇动操作手柄，保持负载不坠落。
- 若葫芦在停用之后重新使用，则首先必须安排称职人员对其进行检查。

处置
葫芦退役后，按照法律规定回收或处置其零部件。

1. 上吊钩组件
2. 外壳
3. 链条
4. 下吊钩座
5. 下吊钩组件
6. 手轮
7. 换向手柄
8. 驱动手柄
9. 止锁环
10. 可伸缩手柄



Yale*ERGO 360*		800	1600	3200	6000	9000
额定起重量	[kg]	800	1600	3200	6000	9000
链条行数		1	1	1	2	3
链条规格	[mm]	5,6 x 17	7,1 x 21	10 x 28	10 x 28	10 x 28
净空尺寸	[mm]	320	375	445	563	695
手柄长度	[mm]	327	327	377	377	377
额定手扳力	[daN]	22	34	47	47	51
净重	[kg]	6,7	9,6	17,2	28,9	49,5
负载拉紧力	[daN]	800	1600	3200	6000	9000
手扳拉紧力	[daN]	22	34	47	47	51

零件订货资料

只有经过培训的技术人员才能对本产品进行维护。更多信息，请联系 COLUMBUS McKINNON 或离您最近的经销商。

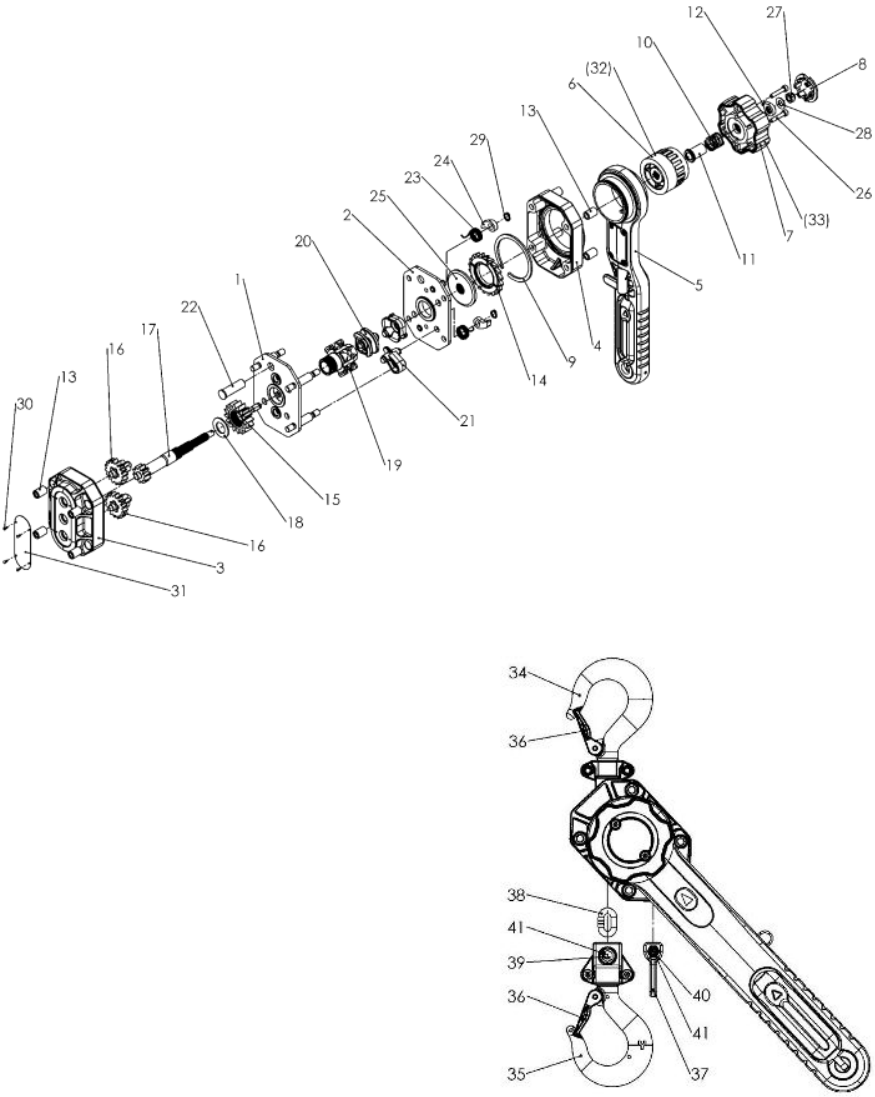
这些产品的设计和构造用于提供长期无故障服务。当某些部件磨损严重时，可能需要订购和安装新部件以替换磨损件。 为了您的方便及未来作参考，建议记录以下信息：

型号 _____
序号 _____
购买日期 _____

订购替换件时，请注明以下内容：
1. 铭牌上注明的型号和序号。
2. 本手册中所示的部件号和部件描述。
3. 所需数量。

注意：订购替换零件时，建议根据需要同时考虑订购螺母、螺栓、开口销等。这些零件可能在拆卸过程中损坏或丢失，或者由于清洁剂的原因不适合继续使用。

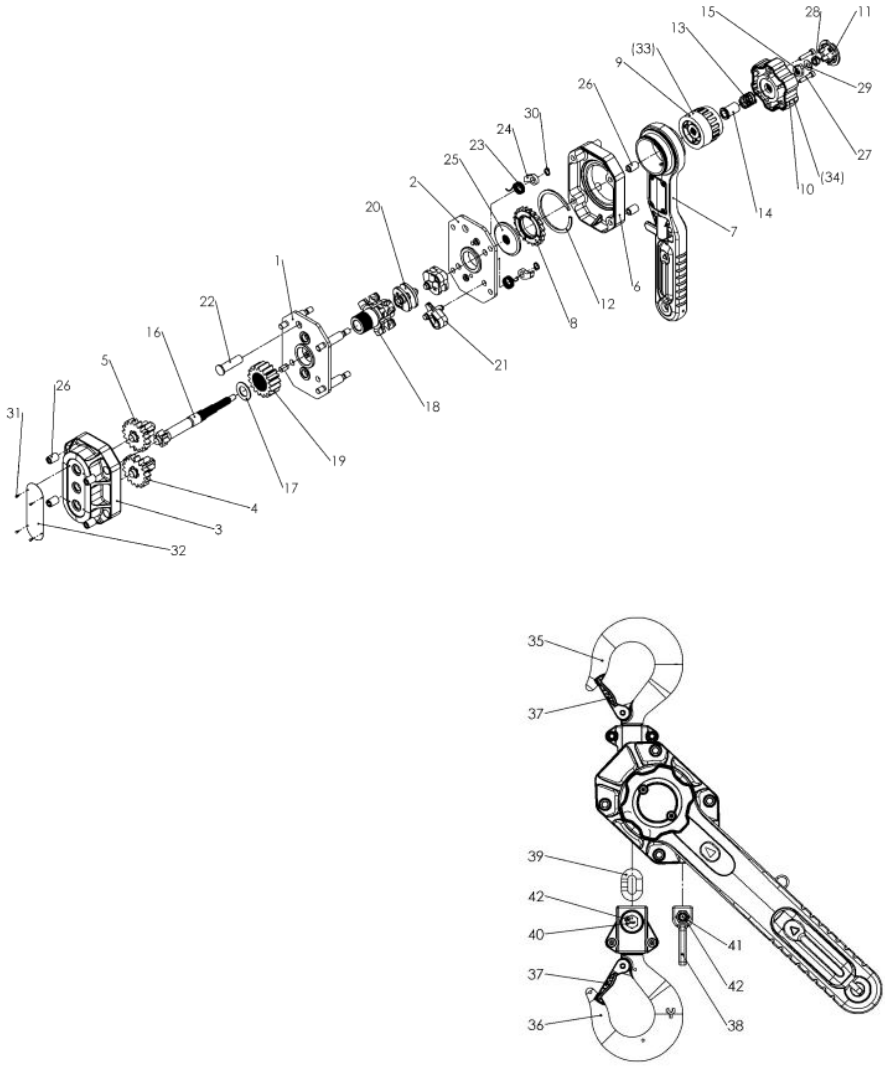
爆炸图 *YaleERGO 360 0,8t/1*



配件清单 *YaleERGO 360 0,8t/1*

序号	描述	型号 Yale*ERGO 360* 0,8t / 1	数量
1	齿轮侧墙板组件	192021100	1
2	驱动侧墙板组件	192021101	1
3	齿轮侧外壳组件	192021096	1
4	驱动侧外壳	192021160	1
5	手柄组件	192021109	1
6	制动螺母	192022609	1
7	手轮	192021055	1
8	手轮盖	192021092	1
9	挡圈	192021097	1
10	换向用压缩弹簧	192021106	1
11	轴环套	192021089	1
12	凸轮	192021088	1
13	圆柱螺母	192021083	8
14	棘轮组件	192038558	1
15	花孔齿轮	00002009	1
16	片齿轮组件	00002005	2
17	长轴	00002008	1
18	垫片	00002239	1
19	起重链轮	00002016	1
20	导链板	00002017	2
21	拨叉	00002018	1
22	上吊钩钩架	00002034	1
23	棘爪扭簧	00002201	2
24	棘爪	00002202	2
25	制动器座	00002203	1
26	螺钉	09102063	2
27	螺母	09115098	1
28	倒角垫片	09121001	1
29	挡圈	09129055	2
30	圆头槽销	09128001	4
31	铭牌	85005200	1
32	超载限制器，组件	192028885	1
33	手轮，黑色	192028323	1
34	上吊钩组件	85004325	1
35	下吊钩组件	85005401	1
36	保险片组件	53820	2
37	止锁环	80175060	1
38	5.6 x 17 mm 起重链	FT05617	–
39	下吊钩销	00002036	1
40	止锁环螺丝	80175061	1
41	螺母	09115135	2

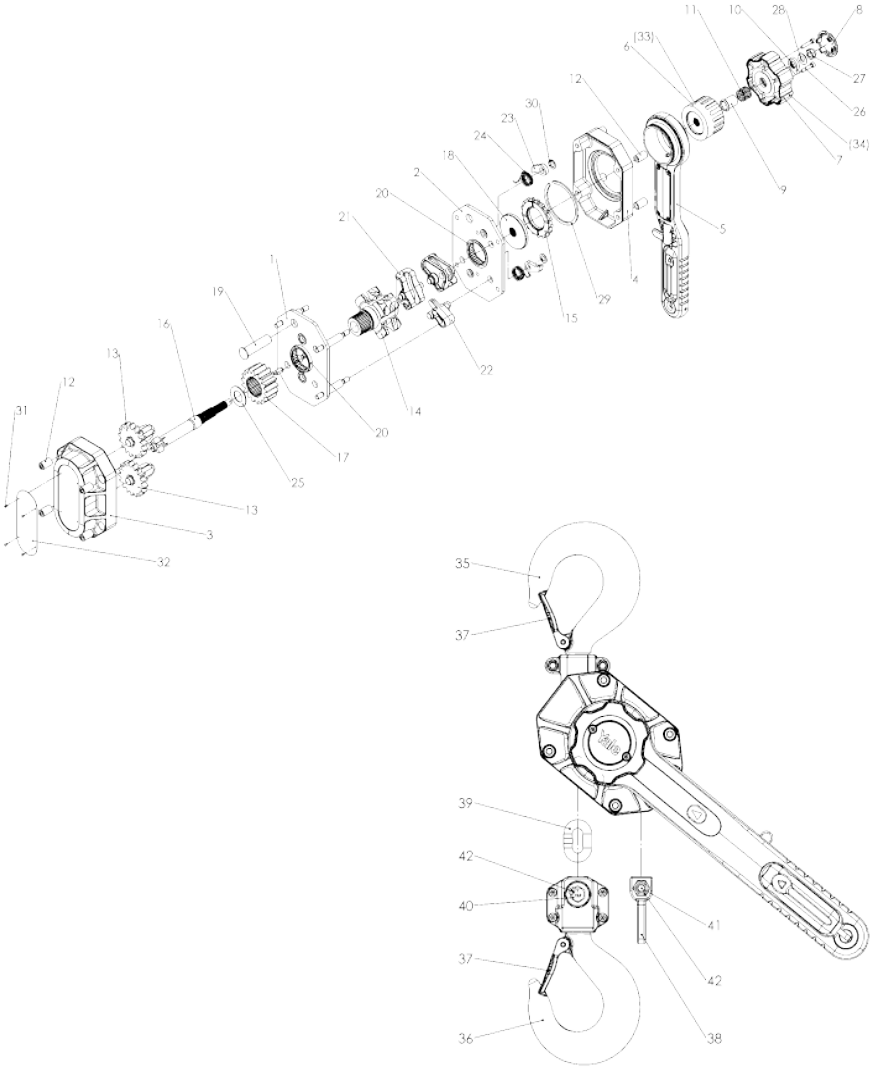
爆炸图 *YaleERGO 360 1,6t/1*



配件清单 *YaleERGO 360 1,6t/1*

序号	描述	型号 Yale*ERGO 360* 1,6t / 1	数量
1	齿轮侧墙板组件	192021063	1
2	驱动侧墙板组件	192021062	1
3	齿轮侧外壳组件	192021059	1
4	片齿轮组件 B	00002105B	1
5	片齿轮组件 A	00002105A	1
6	驱动侧外壳	192021056	1
7	手柄组件	192021109	1
8	棘轮组件	192038558	1
9	制动螺母	192022609	1
10	手轮	192021055	1
11	手轮盖	192021092	1
12	挡圈	192021097	1
13	换向用压缩弹簧	192021106	1
14	轴环套	192021089	1
15	凸轮	192021088	1
16	驱动轴	00002108	1
17	驱动轴倒角垫片	00002239	1
18	吊货滑车	00002117	1
19	花孔齿轮	00002109	1
20	导链板	00002120	2
21	拨叉	00002121	1
22	上吊钩钩架	00002137	1
23	棘爪扭簧	00002201	2
24	棘爪	00002202	2
25	制动器座	00002203	1
26	圆柱螺母	192021083	8
27	螺钉	09102063	2
28	螺母	09115098	1
29	倒角垫片	09121001	1
30	挡圈	09129055	2
31	圆头槽销	09128001	4
32	铭牌	85005201	1
33	超载限制器，组件	192028885	1
34	手轮，黑色	192028323	1
35	上吊钩组件	85004327	1
36	下吊钩组件	85005402	1
37	保险片组件	53821	2
38	止锁环	80115060	1
39	7.1 x 21 mm 起重链	FT07121	–
40	下吊钩销	80115062	1
41	止锁环螺丝	80115061	1
42	螺母	09115098	2

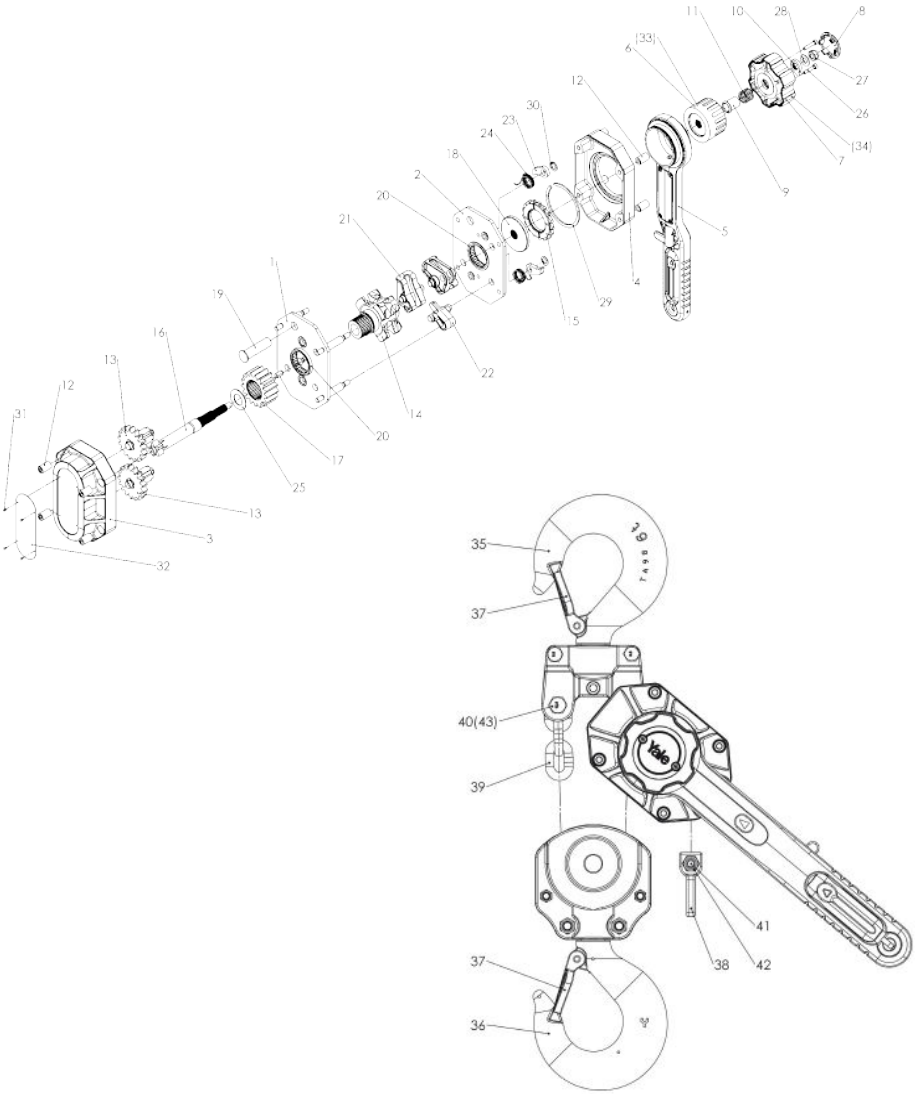
爆炸图 *YaleERGO 360 3,2t/1*



配件清单 *YaleERGO 360 3,2t/1*

序号	描述	型号 Yale*ERGO 360* 3,2t / 1	数量
1	齿轮侧墙板组件	N00230506	1
2	杆侧板,组件(w/oPos.20)	N00230507	1
3	齿轮侧外壳组件	192021136	1
4	驱动侧外壳	192021161	1
5	手柄组件	192021120	1
6	制动螺母	192041216	1
7	手轮	192021138	1
8	手轮盖	192021122	1
9	轴环套	192021142	1
10	凸轮	192021144	1
11	换向用压缩弹簧	192021128	1
12	圆柱螺母	00230444	8
13	直齿轮 组件	00002305	2
14	吊货滑车 组件	00002374	1
15	棘轮盘 组件	192037609	1
16	驱动轴	00002308	1
17	花孔齿轮	00002309	1
18	制动器座	00002337	1
19	上吊钩钩架	00002331	1
20	提升轮轴承（外环+滚子）	00002312	2
21	导链板	192036791	2
22	拨叉	00002315	1
23	棘爪	00002336	2
24	棘爪扭簧	192040786	2
25	驱动轴倒角垫片	00002361	1
26	螺钉	09102063	2
27	螺母	09115036	1
28	倒角垫片	09121006	1
29	挡圈	192021123	1
30	挡圈	09129005	2
31	圆头槽销	09128001	4
32	铭牌	85005202	1
33	超载限制器，组件	192021147	1
34	手轮，黑色	192028378	1
35	上吊钩组件	85005543	1
36	下吊钩组件	85005544	1
37	保险片组件	53822	2
38	止锁环	80130060	1
39	10 x 28 mm 起重链	192046315	–
40	下吊钩销	80130062	1
41	止锁环螺钉	80130061	1
42	螺母	09115036	2

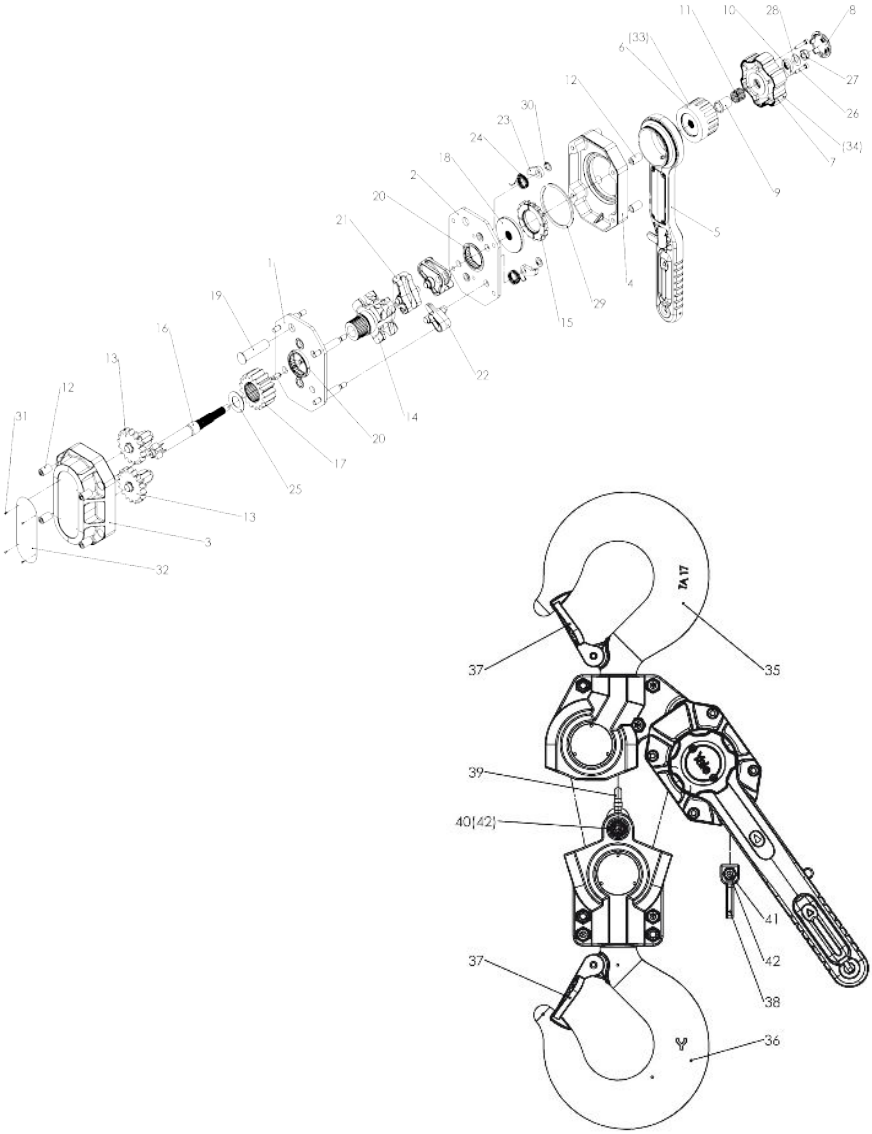
爆炸图 *YaleERGO 360 6,0t/2*



配件清单 *YaleERGO 360 6,0t/2*

序号	描述	型号 Yale*ERGO 360* 6,0t / 2	数量
1	齿轮侧墙板组件	00230506	1
2	杆侧板,组件(w/oPos.20)	00230507	1
3	齿轮侧外壳组件	192021136	1
4	驱动侧外壳	192021161	1
5	手柄组件	192021120	1
6	制动螺母	192041216	1
7	手轮	192021138	1
8	手轮盖	192021122	1
9	轴环套	192021142	1
10	凸轮	192021144	1
11	换向用压缩弹簧	192021128	1
12	圆柱螺母	00230444	8
13	直齿轮 组件	00002305	2
14	吊货滑车 组件	00002374	1
15	棘轮盘 组件	192037609	1
16	驱动轴	00002308	1
17	花孔齿轮	00002309	1
18	制动器座	00002337	1
19	上吊钩钩架	00002331	1
20	提升轮轴承（外环+滚子）	00002312	2
21	导链板	192036791	2
22	拨叉	00002315	1
23	棘爪	00002336	2
24	棘爪扭簧	192040786	2
25	驱动轴倒角垫片	00002361	1
26	螺钉	09102063	2
27	螺母	09115036	1
28	倒角垫片	09121006	1
29	挡圈	192021123	1
30	挡圈	09129005	2
31	圆头槽销	09128001	4
32	铭牌	192035453	1
33	超载限制器，组件	192045572	1
34	手轮，黑色	192028378	1
35	上吊钩组件	00002381	1
36	下吊钩组件	00002377	1
37	保险片组件	53940	2
38	止锁环	80130060	1
39	10 x 28 mm 起重链	192046315	–
40	上吊钩座螺钉	80160068	1
41	止锁环螺钉	80130061	1
42	螺母	09115036	1
43	螺母	09115115	1

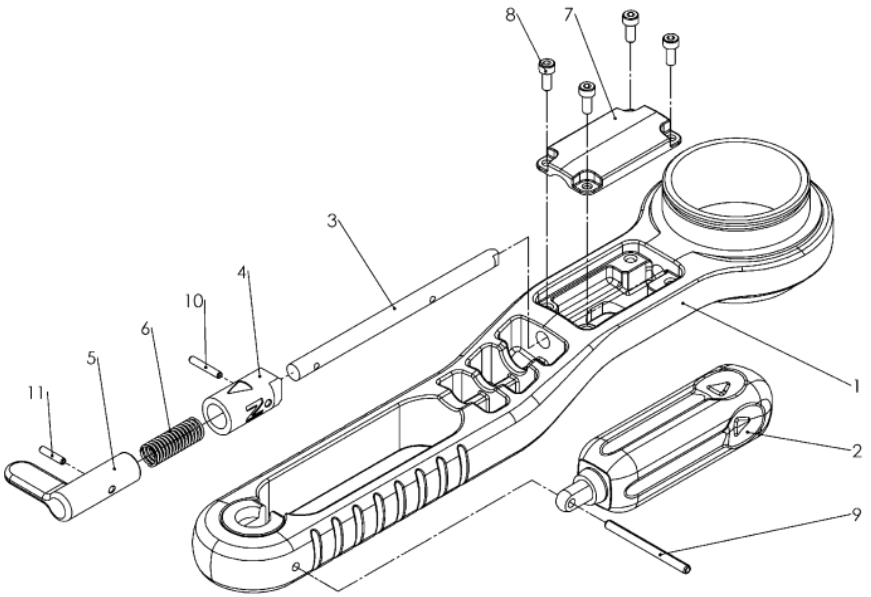
爆炸图 *YaleERGO 360 9,0t/3*



配件清单 *YaleERGO 360 9,0t/3*

序号	描述	型号 Yale*ERGO 360* 9,0t / 3	数量
1	齿轮侧墙板组件	00230506	1
2	杆侧板,组件(w/oPos.20)	00230507	1
3	齿轮侧外壳组件	192021136	1
4	驱动侧外壳	192021161	1
5	手柄组件	192021120	1
6	制动螺母	192041216	1
7	手轮	192021138	1
8	手轮盖	192021122	1
9	轴环套	192021142	1
10	凸轮	192021144	1
11	换向用压缩弹簧	192021128	1
12	圆柱螺母	00230444	8
13	直齿轮 组件	00002305	2
14	吊货滑车 组件	00002374	1
15	棘轮盘 组件	192037609	1
16	驱动轴	00002308	1
17	花孔齿轮	00002309	1
18	制动器座	00002337	1
19	上吊钩钩架	00002331	1
20	提升轮轴承（外环+滚子）	00002312	2
21	导链板	192036791	2
22	拨叉	00002315	1
23	棘爪	00002336	2
24	棘爪扭簧	192040786	2
25	驱动轴倒角垫片	00002361	1
26	螺钉	09102063	2
27	螺母	09115036	1
28	倒角垫片	09121006	1
29	挡圈	192021123	1
30	挡圈	09129005	2
31	圆头槽销	09128001	4
32	铭牌	192039576	1
33	超载限制器，组件	192045572	1
34	手轮，黑色	192028378	1
35	上吊钩组件	192039358	1
36	下吊钩组件	192039357	1
37	保险片组件	65600005	2
38	止锁环	80130060	1
39	10 x 28 mm 起重链	192046315	–
40	上吊钩座螺钉	192039547	1
41	止锁环螺钉	80130061	1
42	螺母	09115036	1

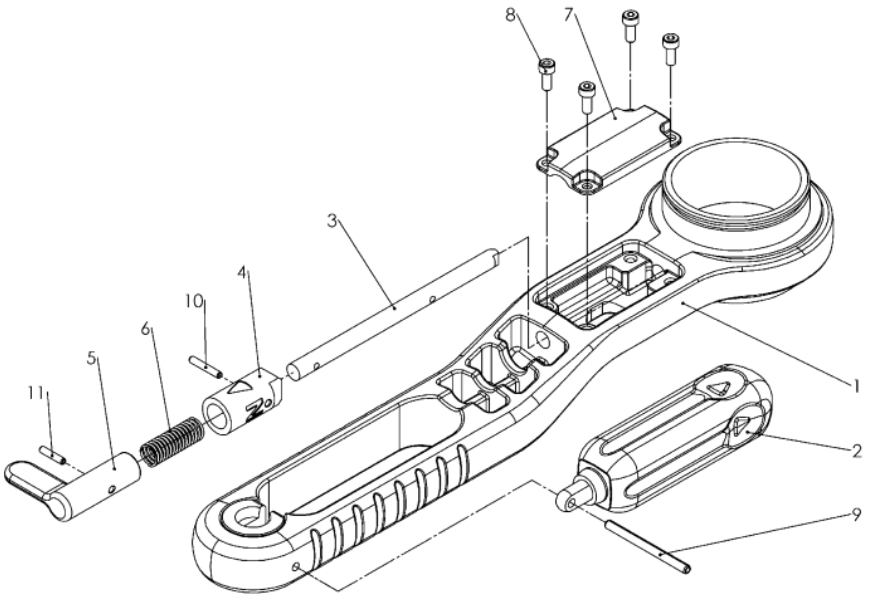
手柄爆炸图 *YaleERGO 360 0,8t & 1,6t*



手柄配件清单 *YaleERGO 360 0,8t & 1,6t*

序号	描述	型号 Yale*ERGO 360* 0,8t / 1 Yale*ERGO 360* 1,6t / 1	数量
1	驱动手柄	192021108	1
2	可伸缩手柄组件	192022617	1
3	棘爪杆	192021090	1
4	换向标识块	192022619	1
5	换向手柄	192022608	1
6	换向用压缩弹簧	00205708	1
7	手柄后盖	192021105	1
8	螺钉	09105028	4
9	弹性圆柱销	09134070	1
10	弹性圆柱销	09124017	1
11	弹性圆柱销	09134071	1

手柄爆炸图 *YaleERGO 360 3,2t & 6,0t & 9,0t*



手柄配件清单 *YaleERGO 360 3,2t & 6,0t & 9,0t*

序号	描述	型号 YaleERGO 360 3,2t / 1 YaleERGO 360 6,0t / 2 YaleERGO 360 9,0t / 3	数量
1	驱动手柄	192021126	1
2	可伸缩手柄组件	192022617	1
3	棘爪杆	192021139	1
4	换向标识块	192022619	1
5	换向手柄	192022608	1
6	换向用压缩弹簧	00205708	1
7	手柄后盖	192021133	1
8	螺钉	09105028	4
9	弹性圆柱销	09134070	1
10	弹性圆柱销	09124017	1
11	弹性圆柱销	09134071	1

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