



安装说明 / INSTALLATION INSTRUCTIONS

G、D、E系列旋转器 G & D & E-Series Rotators



官方微信号



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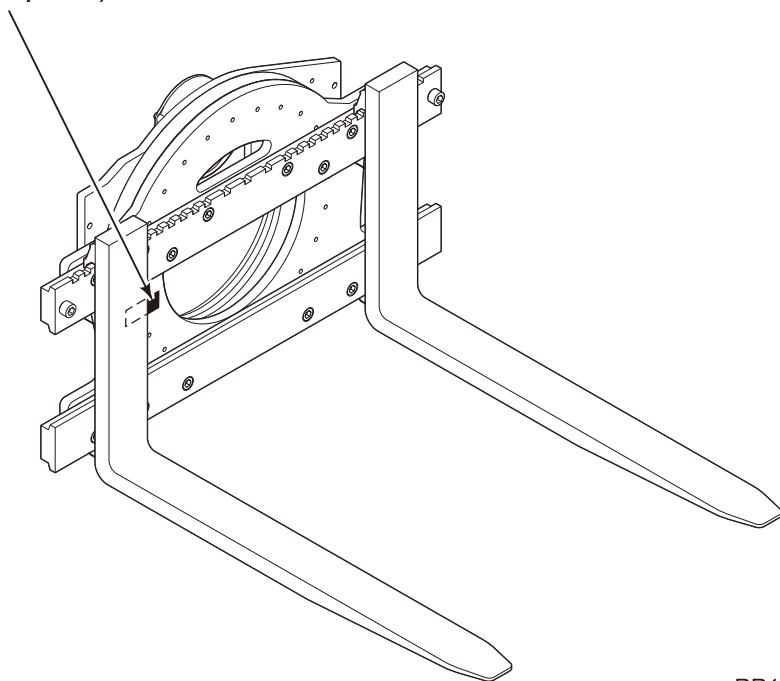
介绍 / INTRODUCTION

本手册包含卡斯卡特旋转器的安装和操作前的检查。在探讨任何有关属具的问题时，请提供铭牌上（如下图示）的属具型号和产品编号等信息。如果铭牌丢失，可在铭牌下方的面板上找到产品编号。

备注：所有紧固件的扭矩值介于设定值的 $\pm 10\%$ 范围内。

铭牌（位于面板前方）

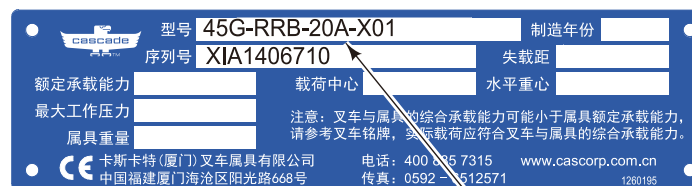
Nameplate
(frontside
of faceplate)



RR1037.eps

This manual provides installation instructions and prior to operation requirements for Cascade Rotators. In any communication about the attachment refer to the product catalog and serial numbers stamped on the nameplate, as shown. If the nameplate is missing, the numbers can be found stamped on the surface of the faceplate below the nameplate.

NOTE: All fasteners have a torque value range of $\pm 10\%$ of stated value.



45G-RRB-20A-X01
XIA1406710



警告：货叉尺寸对属具的承载能力有影响，请参考安装章节的步骤13.核对叉车铭牌上的承载能力。

WARNING: Fork size affects attachment capacity. Refer to Installation Section, Step 13. Verify capacity for truck nameplate.

特别说明 SPECIAL DEFINITIONS

本手册含有一些特别提示。操作前务必仔细阅读所有的“警告”和“注意”“重要提示”和“备注”则作为具有特定意义或简化工作的信息提供。



警告: 所示内容必须切实牢记、以免造成人身伤害。警告说明始终位于一个规定的方框内。

注意: 此类标识的内容必须遵守，以免造成设备损坏。

重要提示: 这种提示包含特定信息。

备注: 这种标识所含信息便于理解并可简化您的工作。

The statements shown below appear throughout this manual where special emphasis is required. Read all WARNINGS and CAUTIONS before proceeding with any work.

Statements labeled IMPORTANT and NOTE are special information that is useful when servicing the attachment.



WARNING - A statement preceded by a WARNING is information that should be acted upon to prevent **bodily injury**. A WARNING is always inside a ruled box.

CAUTION - A statement preceded by CAUTION is information that should be acted upon to prevent machine damage.

IMPORTANT - A statement preceded by IMPORTANT is information that possesses special significance.

NOTE - A statement preceded by NOTE is information that is handy to know and may make the job easier,

推荐液压管路参数

RECOMMENDED HYDRAULIC SUPPLY

旋转器若按照如下推荐的软管和管接头参数进行配置，将发挥出最佳性能。为门架和叉车选择正确的卷管器，请参考卡斯卡特《卷管器和带电缆卷管器选择指南》。推荐软管和管接头通径如下：

旋转功能回路：

30E

#6 软管，内通径 $\geq \Phi 10\text{mm}$

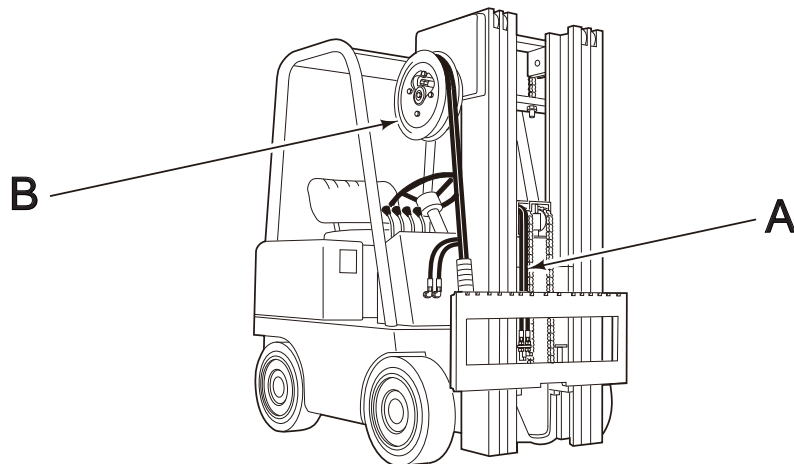
45G-100G, 100D, X100D, 120D和150D

#8 软管，通径 $\geq \Phi 12\text{mm}$

注意：旋转功能液压回路所产生的背压如果超过35bar将导致液压油过热，降低属具性能并缩短液压系统的寿命。请核实管接头和软管内通径的限制，是否满足

#6 管接头，内通径 $\geq \Phi 10\text{mm}$ (30E)

#8 管接头，内通径 $\geq \Phi 12\text{mm}$ (45G-100G, 100D, X100D, 120D和150D)



GA0026.eps

A 内系油路
或
B 左右两侧2管式细管卷管器

A RH or LH Single Internal Hose Reeving Group.
OR
B RH or LH THINLINE™ 2-Port Hose Reel Group.

Rotators provide the best performance with the recommended hydraulic supply arrangements shown. Refer to Cascade Hose and Cable Reel Selection Guide, Part No.212199, to select the correct hose reel for the mast and truck. The hose and fitting requirements are(Recommended);

ROTATE Function:

30E

No.6 with 10 mm(9/32 in.) minimum ID

45G-100G, 100D, X100D, 120D & 150D

No.8 with 12 mm(13/32 in.) minimum ID

CAUTION: Rotate function supply circuit back pressure exceeding 35 bar(500 psi) can result in excessive oil heating, reduced attachment performance and shortened hydraulic system life. Check for restrictions such as numerous fitting and fitting/hose sizes less than No.6(30E) or No. 8. (45G-100G,100D, X100D, 120D & 150D).

安装前对叉车的要求 **T** RUCK REQUIREMENTS

叉车供油压力 Truck Relief Setting

推荐压力值 (Recommended) : 140 bar (2000 psi)

最大压力值 (Maximum) : 160 bar (2300 psi)

叉车供油流量 Truck Flow Volume ①

| | 最小值 Min. ② | 推荐值 Recommended | 最大值 Max. ③ |
|--|-----------------------|-----------------------|-----------------------|
| 30E | 19 L/min (5 GPM.) | 26 L/min (7 GPM.) | 38 L/min (10 GPM.) |
| 45G, 55G, 65G 80G, 100G, 100D, X100D | 19 L/min (5 GPM.) | 38 L/min (10 GPM.) | 57 L/min (15 GPM.) |
| 120D | 26 L/min (7 GPM.) | 45 L/min (12 GPM.) | 57 L/min (15 GPM.) |
| 150D | 37 L/min (10 GPM.) | 76 L/min (20 GPM.) | 95 L/min (24 GPM.) |

① 卡斯卡特旋转器兼容 SAE 10W的油基液压油标准参见 Mil.Spec.MIL-0-5606或者MIL-0-2104B.不推荐使用合成或水基液压油.如果需要使用阻燃液压油,则必须采用特殊密封件.详细请联系卡斯卡特(厦门)。

② 如果流量低于推荐值,会造成旋转器的转速偏低。

③ 如果流量超过最大值,会造成过热,降低系统性能同时缩短液压系统的寿命。

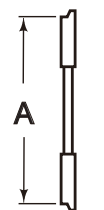
① Cascade Rotators are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. Mil -0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade Xiamen.

② Flow less than recommended will result in a rotate speed less than 2 RPM.

③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

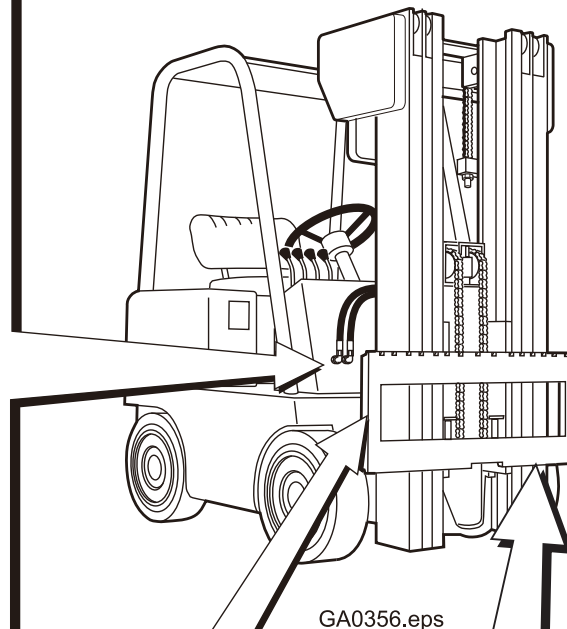
货叉架安装尺寸 (A) ITA (ISO)

Carriage Mount Dimension (A) ITA (ISO)



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| | 最小值 Minimum | 最大值 Maximum |
|--------|----------------------|----------------------|
| ISO 2A | 380.0 mm (14.94 in.) | 381.0 mm (15.00 in.) |
| ISO 3A | 474.5 mm (18.68 in.) | 476.0 mm (18.74 in.) |
| ISO 4A | 595.5 mm (23.44 in.) | 597.0 mm (23.50 in.) |
| ISO 5A | 676.5 mm (26.64 in.) | 678.0 mm (26.70 in.) |

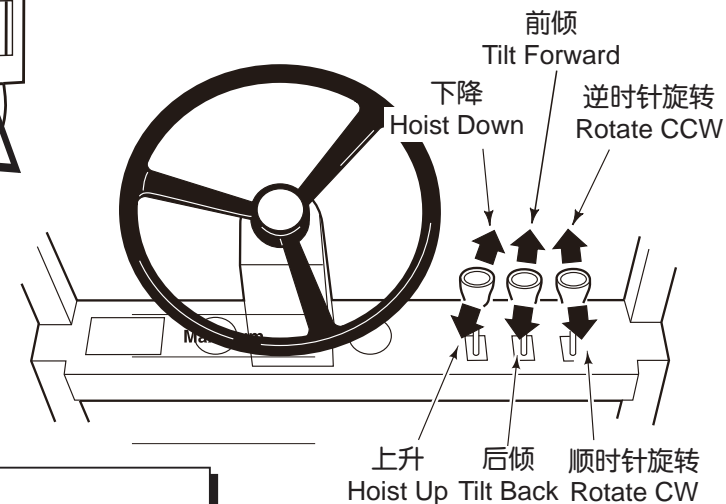


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警告: 叉车/属具的综合承载能力由叉车制造商决定, 它可能低于铭牌所标注的数值. 详细属具请查阅叉车铭牌。

WARNING: Rated capacity of the truck/attachment/fork combination is a responsibility of the original truck manufacturer and may be less than that shown on the attachment nameplate. Consult the truck nameplate.



货叉架

清理并检查货叉架横梁的破损情况和平滑度. 须对焊接突出部位或磨损的槽口进行修补。

Carriage

Clean and inspect carriage bars for damage and smoothness. Repair any protruding welds or damaged notches.

按以下步骤将属具安装到叉车上。仔细阅读并理解所有的警告说明。如果您对任何步骤有不理解之处，请向您的主管或离您最近的卡斯卡特服务人员寻求帮助。

Follow the steps shown to install the attachment on the truck. Read and understand all WARNING statements. If you don't understand a procedure, ask your supervisor or call the nearest Cascade Service Department for assistance.

1 吊起属具，拆除下钩

- A 拆下打包带，将属具至于托盘上翻转到朝上的位置。
- B 拆除下钩。

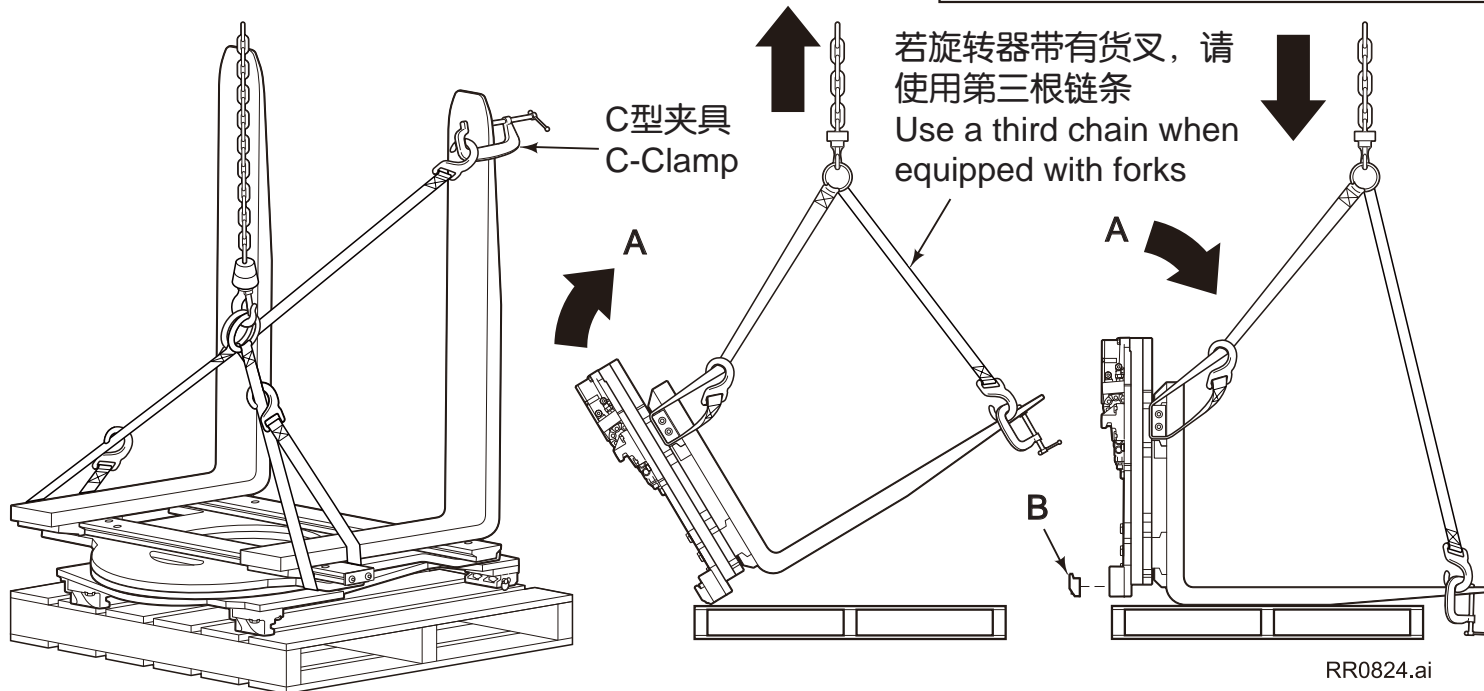
Attach overhead hoist, remove bolt-on lower hooks

- A Remove banding, set attachment upright on pallet.
- B Remove bolt-on lower mounting hooks(if equipped).



警告：核实用于起吊的链条或绳索的额定承载能力应不低于属具自重。请核对铭牌上的属具自重。

WARNING: Verify that the overhead hoist and chains or straps are rated for the weight of the attachment. Refer to nameplate for attachment weight.

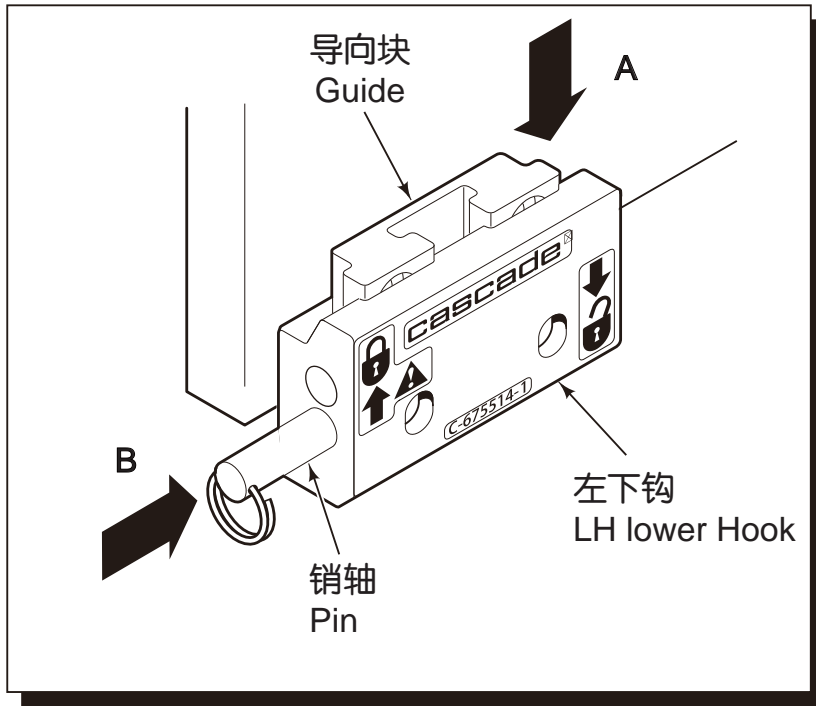


2 松开快换式下钩（如果需要）

- A 松开快换式下钩。
- B 将销轴重新插入下钩的孔中。

Unlock Quick-Change lower mounting hooks (if equipped)

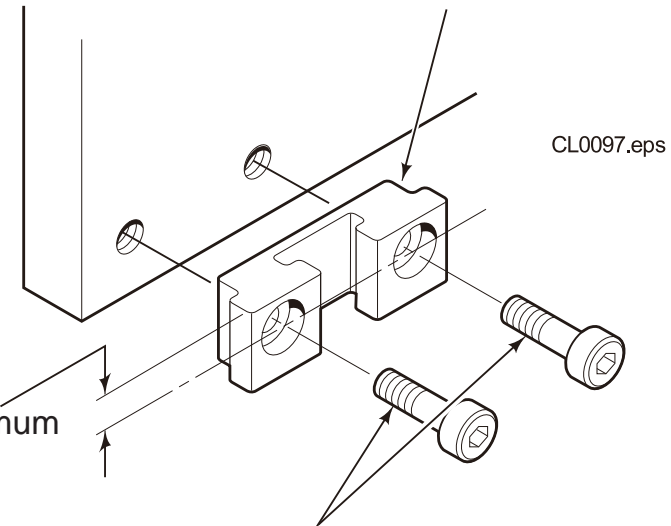
- A Move hooks into unlocked position.
- B Reinstall pin in lower hole.



备注：导向块翻转过来可改变下钩和货叉架之间的间隙。详细参考安装步骤7。

Note: Guides can be reversed to change hook to carriage clearance. Refer to Step 7.

导向块螺栓孔中心距离导向块顶部的偏移量最大值可达16mm。
16mm (5/8 in,) offset on top provides maximum clearance.



使用乐泰 Loctite #242防松剂并按照以下扭矩锁紧螺栓：
ISO 2A/3A (45G-100G) - 165Nm (120 ft.-lbs.)
ISO 2A/3A (30E, 100D, X100D) - 150Nm (110 ft.-lbs.)
ISO 4A(100D, X100D, 120D, 150D) - 270Nm (200 ft.-lbs.)

Apply Loctite 242 (blue) and tighten capscrews:
ISO 2A/3A (45G-100G) - 165Nm (120 ft.-lbs.)
ISO 2A/3A (30E, 100D, X100D) - 150Nm (110 ft.-lbs.)
ISO 4A (100D, X100D, 120D, 150D) - 270Nm (200 ft.-lbs.)

3

准备管路组件

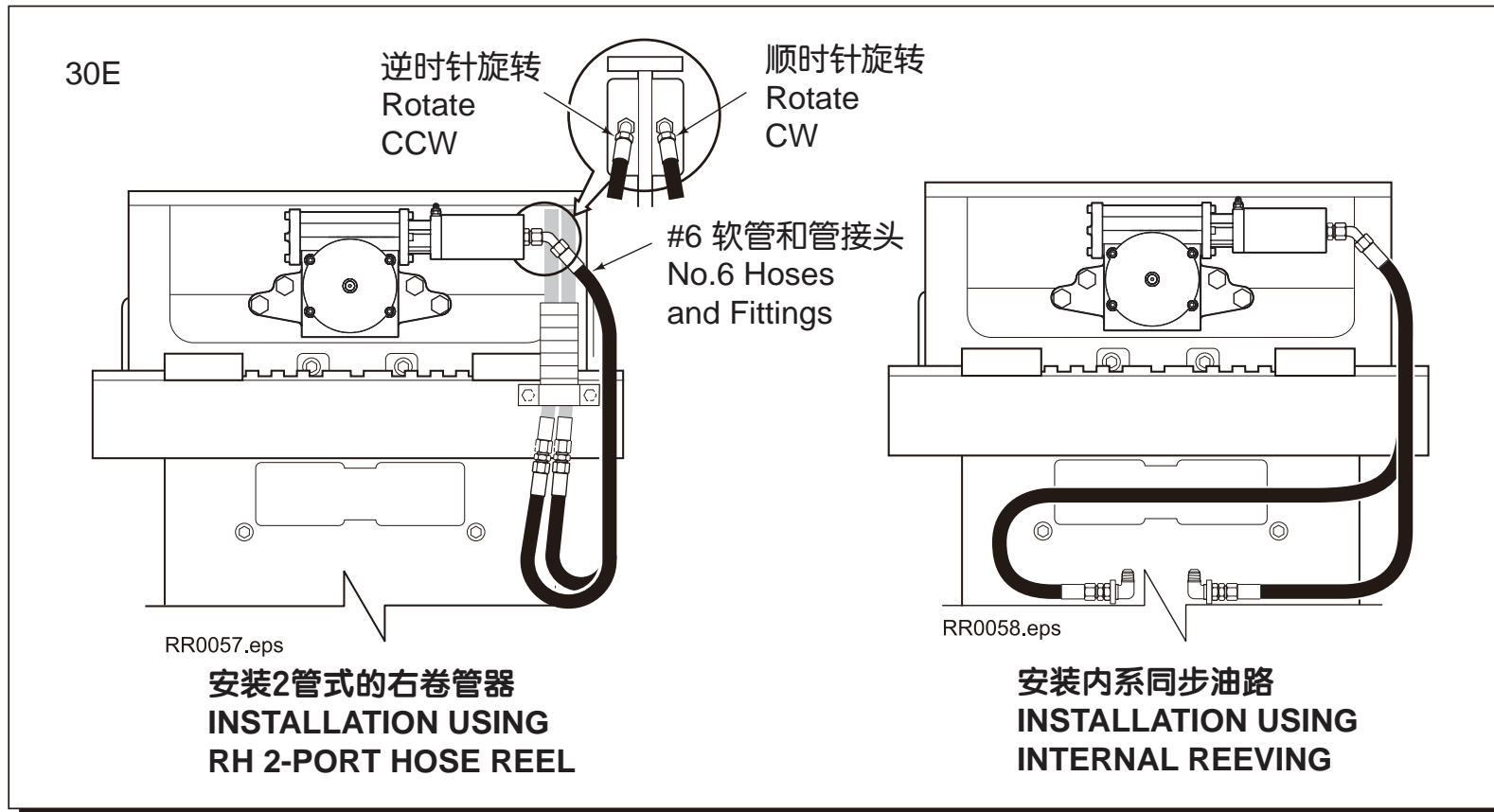
- A 属具挂装到叉车货叉架上并定位好。
- B 按实际需要确定所需的软管长度。
- C 将软管多余的长度切除，并扣上管接头。

重要提示：在操作属具前（按照安装步骤4的要求）先冲洗软管。

Prepare Hoses

- A Position truck carriage behind attachment.
- B Determine hose lengths required.
- C Cut hoses to length and install end fittings.

IMPORTANT: Flush hoses (Step 4) before operating attachment.



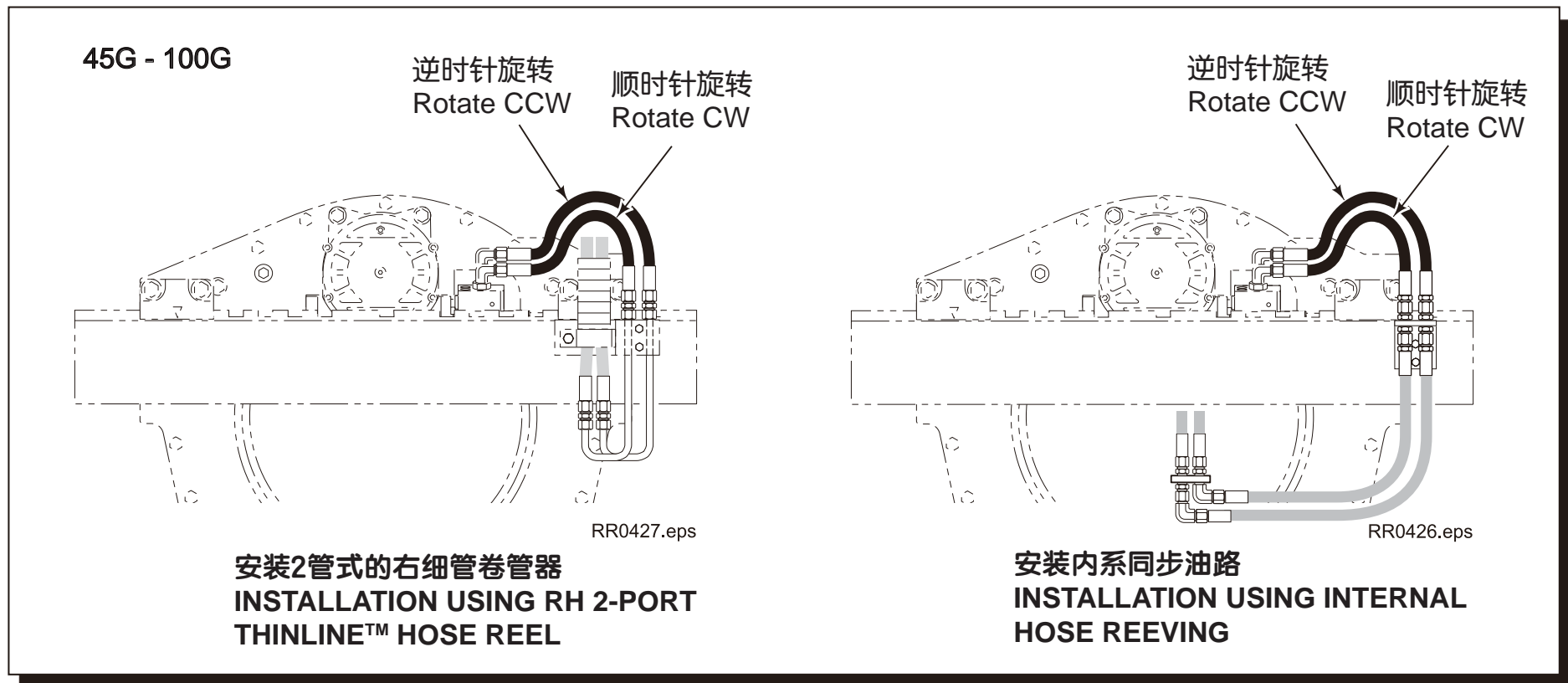
安装 / INSTALLATION

注意：旋转功能液压回路所产生的背压如果超过35bar将导致液压油过热，降低属具的性能并缩短液压系统的寿命。请核实对管接头和软管通径的限制，是否满足#6 软管，内通径 $\geq \Phi 10\text{mm}$ (30E)，#8 软管，内通径 $\geq \Phi 12\text{mm}$ (45G-100G, 100D, X100D, 120D和150D)。

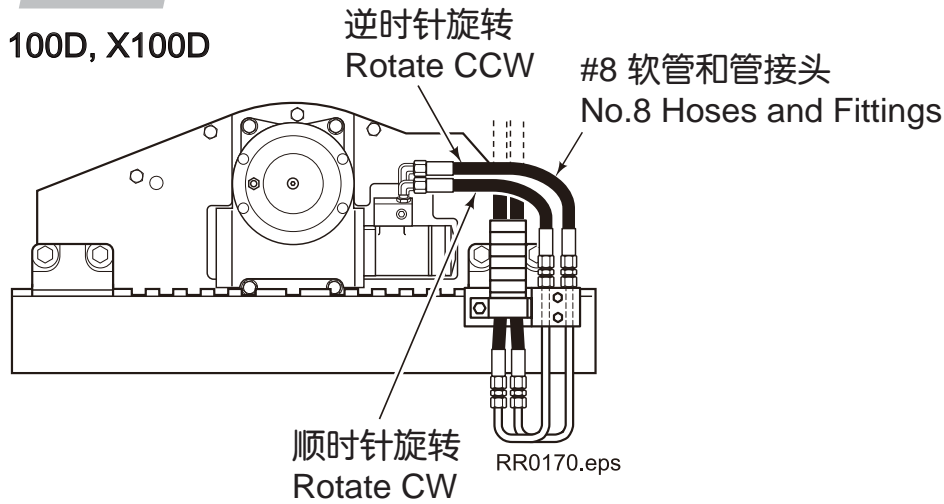
注意：属具所有功能的额定工作压力不超过160bar。

CAUTION: Rotate function supply circuit back pressure exceeding 35 bar (500 psi) can result in excessive oil heating, reduced attachment performance and shortened hydraulic system life. Check for restrictions such as numerous fittings and fitting/hose sizes less than No.6 (30E) or No. 8.(45G-100G, 100D, X100D, 120D, 150D).

CAUTION: Hoses should be 160 bar (2300 psi) working pressure rated for all attachment functions.



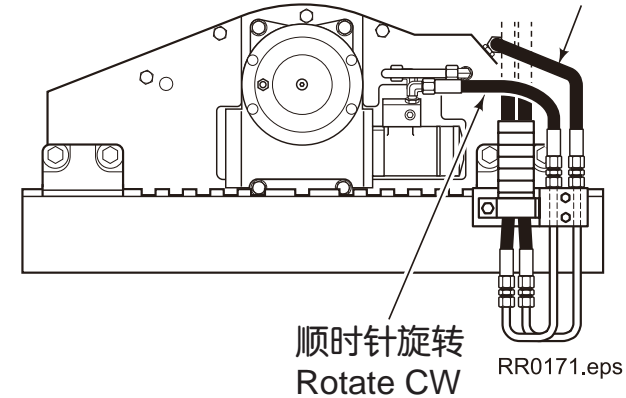
100D, X100D



安装2管式的右卷管器

INSTALLATION USING RH 2-PORT HOSE REEL

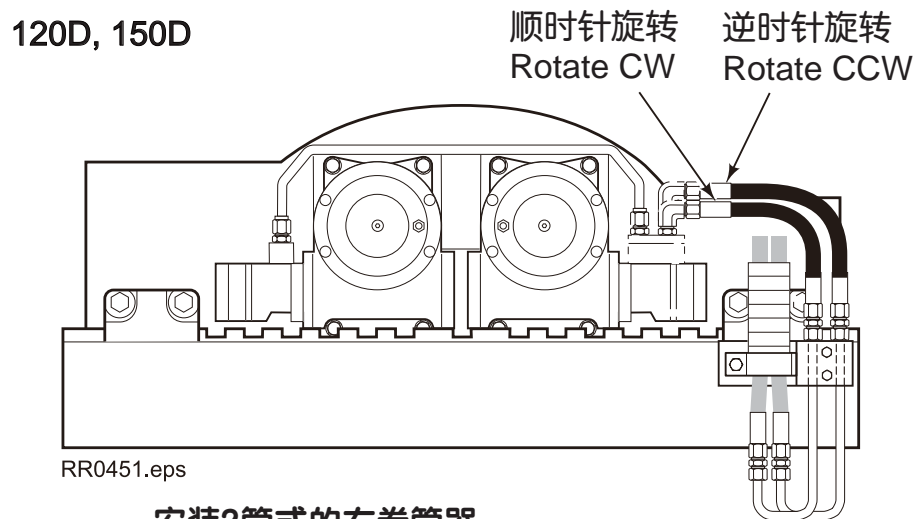
逆时针旋转
Rotate CCW



装配180° 止动机构组件

Hydraulic 180° Stop Group Equipped

120D, 150D



安装2管式的右卷管器

INSTALLATION USING RH 2-PORT HOSE REEL

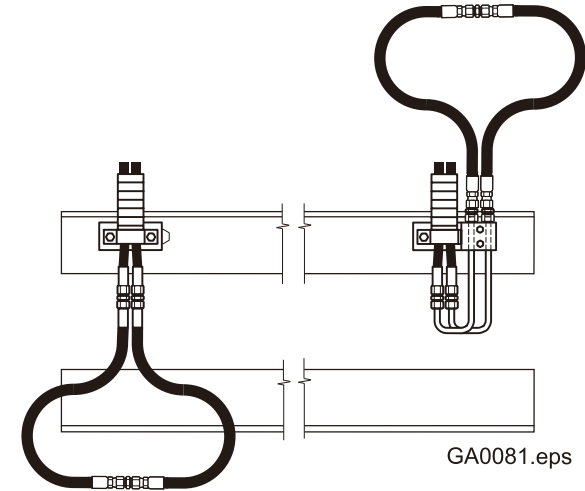
4

冲洗软管

- A 按图示将软管联接好。
- B 操纵叉车多路阀30秒。
- C 松开联接的管路。

Flush hydraulic supply hoses

- A Install hoses as shown below.
- B Operate auxiliary valves for 30 sec.
- C Remove union fittings.



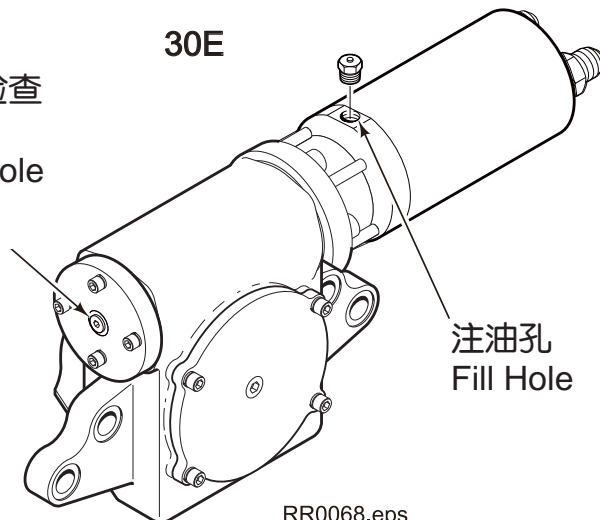
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5

拆下减速箱体上的堵头并检查齿轮油油位

Remove gearbox end cover level hole Check lubricant level

端盖堵头 (检查油位)
End Cover Hole (level hole)



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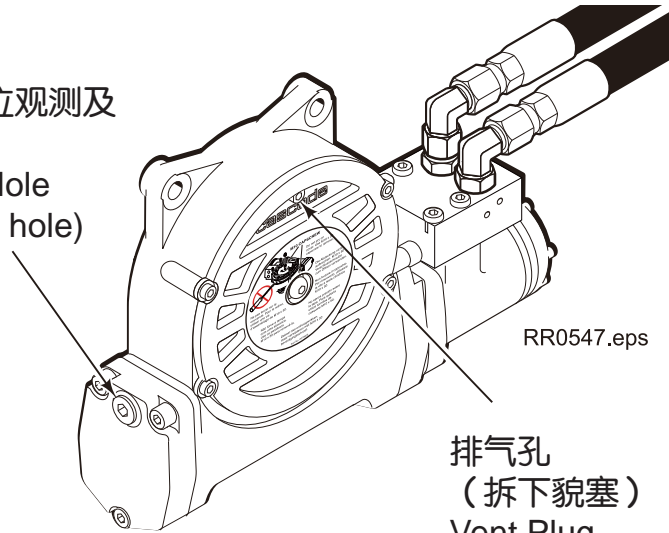
需要的话，注入卡斯卡特齿轮润滑油656300或性能相当的SAE90 wt 润滑油 (AGMA “中性” 6EP齿轮油)。

If necessary, fill gearbox with Cascade Gear Lube 656300 or equivalent SAE 90 wt.gear lube(AGMA ' mild' 6EP Gear Oil).

需要的话，注入卡斯卡特齿轮润滑油656300或性能相当的SAE90 wt 润滑油 (AGMA “中性”6EP齿轮油)。
 If necessary, fill gearbox with Cascade Gear Lube 656300 or equivalent SAE 90 wt.gear lube(AGMA 'mild' 6EP Gear Oil).

45G - 100G, 100D, X100D, 120D

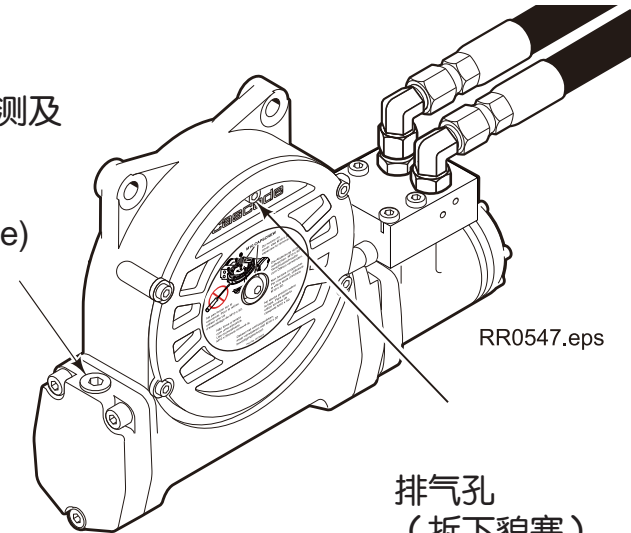
注油孔（油位观测及注油用）
 End Cover Hole
 (level and fill hole)



排气孔
 （拆下貌塞）
 Vent Plug
 (remove vent cover)

150D

注油孔（油位观测及注油用）
 End Cover Hole
 (level and fill hole)



排气孔
 （拆下貌塞）
 Vent Plug
 (remove vent cover)

6

将属具挂装到叉车货叉架上。

A 将属具与叉车货叉架对中。

B 将门架前倾并将货叉架上升到指定位置。

C 把上钩挂靠到货叉架上横梁上。

30E - 确保中间定位块嵌入到上横梁凹槽内。

45G-100G, 100D, X100D, 120D, 150D - 确保

左上钩下方的定位块嵌入到上横梁最近的凹槽中。

D 将属具提升到距离托盘5cm高的位置。

Mount attachment on truck carriage

A Center truck behind attachment.

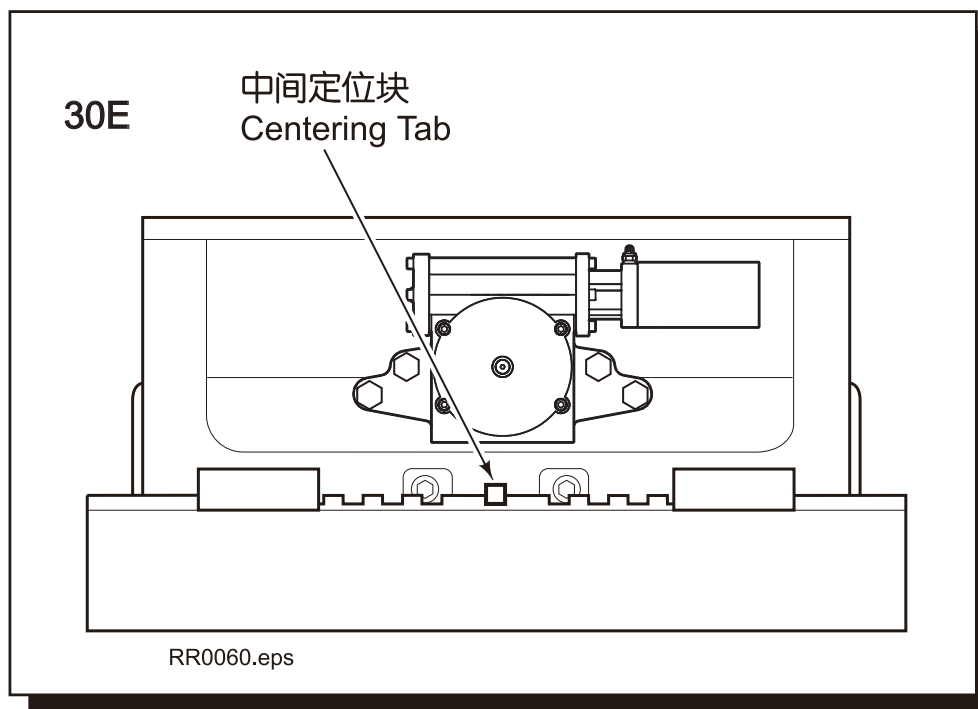
B Tilt forward and raise carriage into position.

C Engage top mounting hooks with carriage.

30E - Make sure the centering tab engages the center notch on top carriage bar.

45G - 100G, 100D, X100D, 120D, 150D - Make sure locator tab in left hook engages closest notch on top carriage bar.

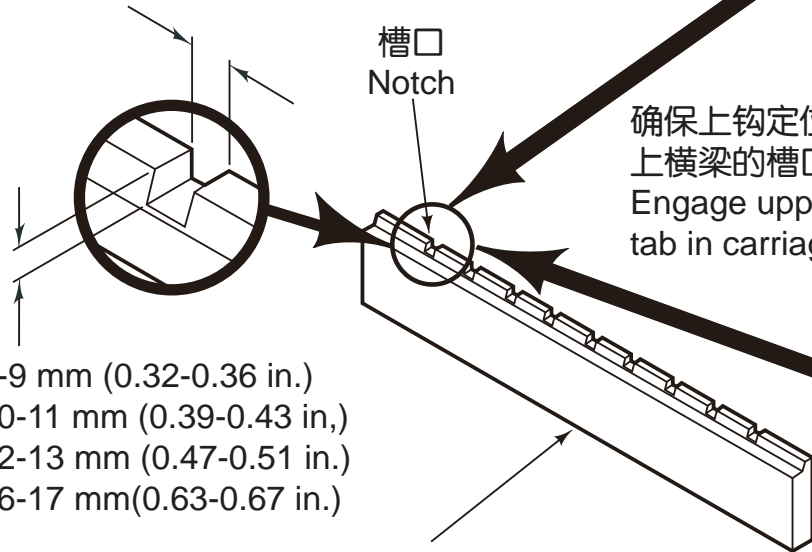
D Lift attachment 5 cm(2 in.) off pallet,



重要提示: 对于配装整体式货叉架的型号, 与叉车门架的挂装需依照叉车制造商提供的参数和流程进行。

IMPORTANT: For integral carriages, install in mast per OEM specifications and procedures.

- ISO 2A - 15-17 mm (0.60-0.66 in.)
- ISO 3A - 18-20 mm (0.72-0.78 in.)
- ISO 4A - 18-20 mm (0.72-0.78 in.)
- ISO 5A - 24.2-25.8 mm(0.95-1.01 in.)



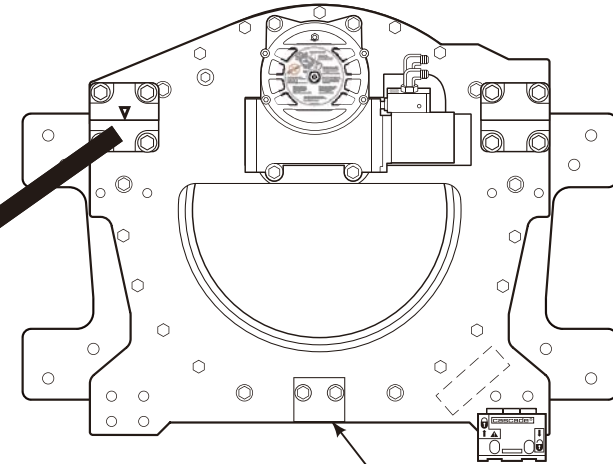
- ISO 2A - 8-9 mm (0.32-0.36 in.)
- ISO 3A - 10-11 mm (0.39-0.43 in.)
- ISO 4A - 12-13 mm (0.47-0.51 in.)
- ISO 5A - 16-17 mm(0.63-0.67 in.)

货叉架上横梁
Upper Carriage Bar

确保上钩定位块能嵌入上横梁的槽口中
Engage upper hook locator tab in carriage notch

如图所示ISO 2A 货叉架上横梁和上钩挂装
ISO 2A carriage bars and upper mounting hooks shown.

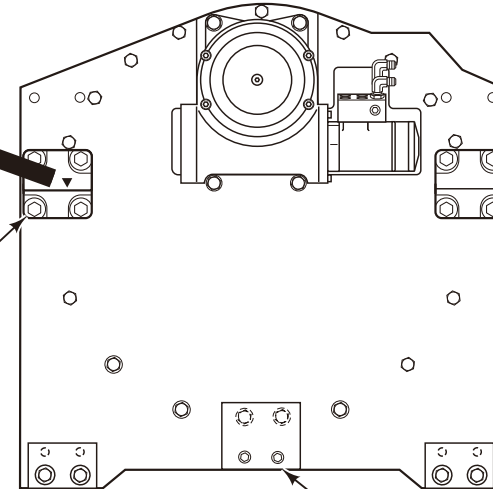
45G -100G



(示意图为 ISO 3A级挂装)
(ISO 3A mounting shown)

中央垫块
Center Spacer

100D, X100D, 120D, 150D

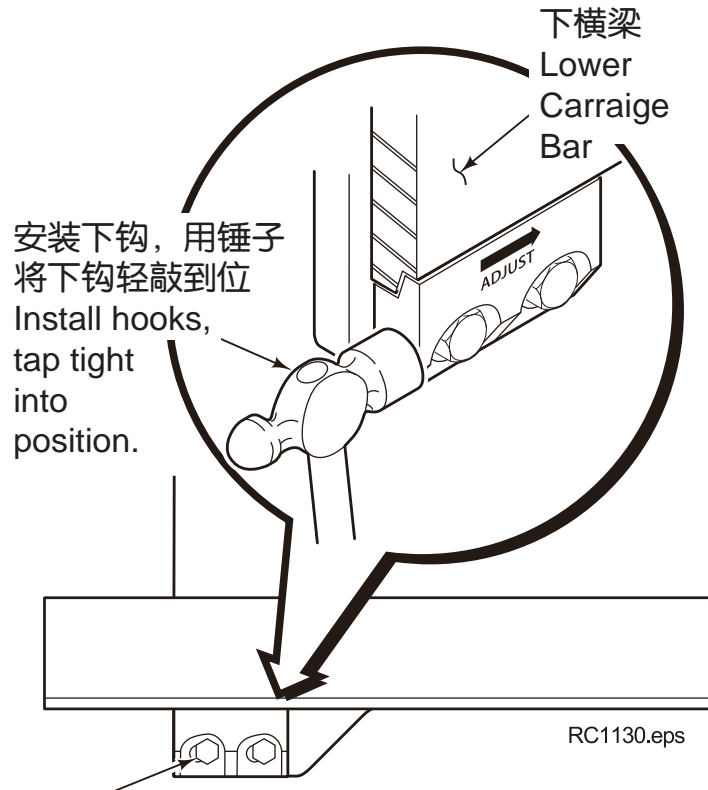


(示意图为 ISO 2A级挂装)
(ISO 2A mounting shown)

中央垫块
Center Spacer

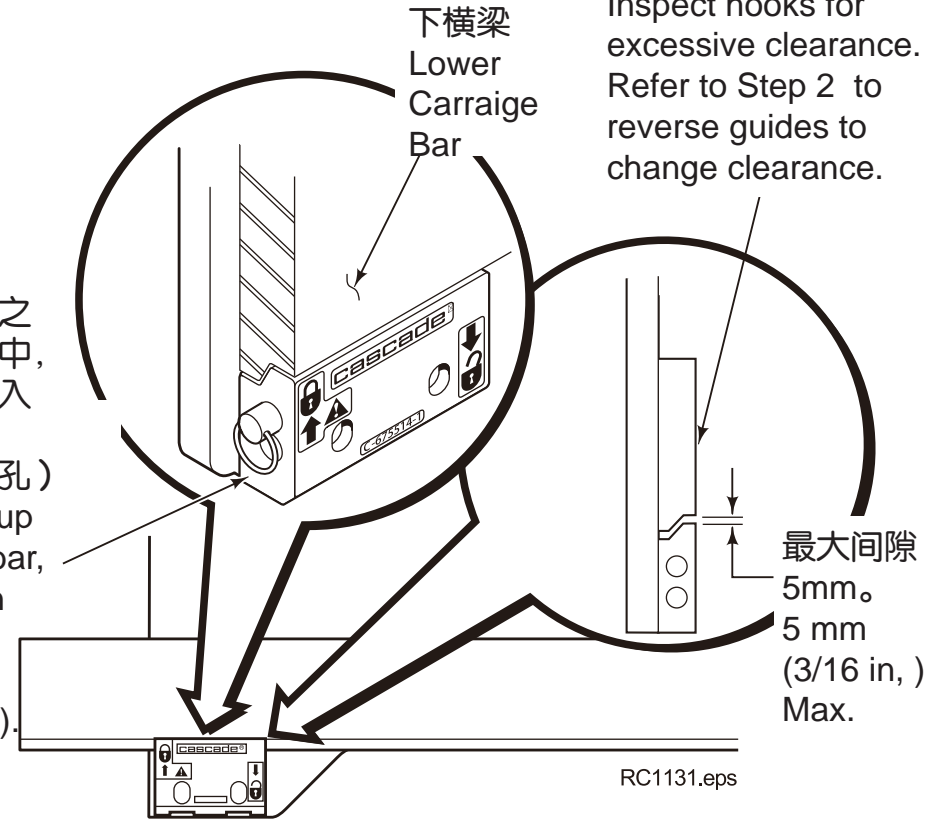
7 安装并嵌入下钩 Install and engage lower hooks

螺栓紧固式
BOLT-ON TYPE



平移下钩使之嵌入下横梁中，并将销轴插入孔内锁紧。
(靠上方的孔)
Slide hook up to engage bar, install pin in locked position (upper hole).

快换式
QUICK-CHANGE TYPE



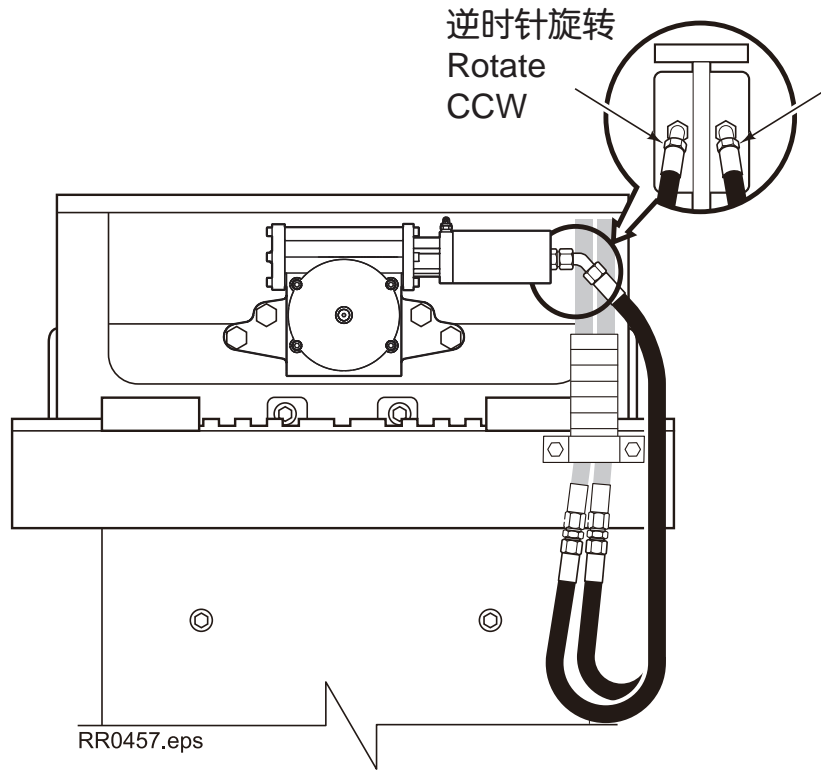
检查下钩与下横梁之间的间隙是否过大。如果需要请参照步骤2调整导向块改变间隙。
Inspect hooks for excessive clearance. Refer to Step 2 to reverse guides to change clearance.

Tighten Capscrews:
30E, 45G-100G - 165 Nm(120 ft.-lbs.)
100D, X100D - 225 Nm(165 ft.-lbs)
120D, 150D -265 Nm(195 ft.-lbs.)

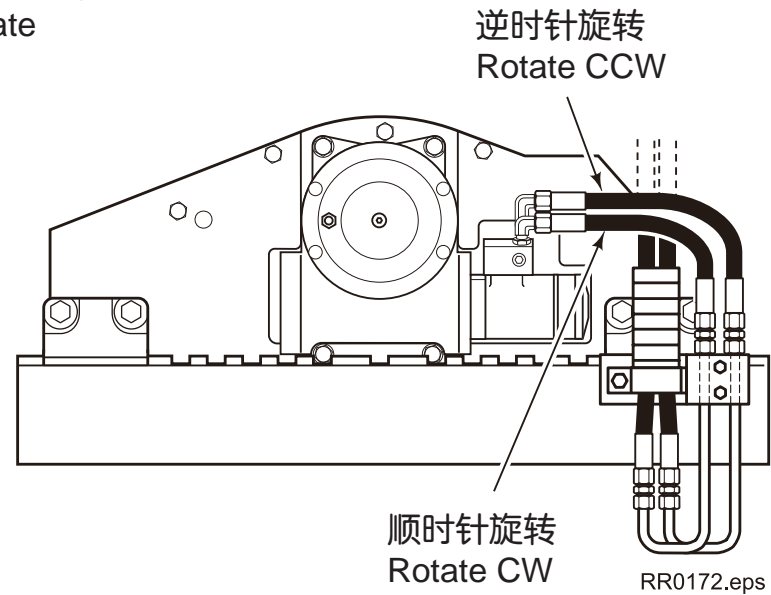
8

如图所示按步骤3的要求将软管与液压马达油口接头联接。
Connect hoses to hose terminal fittings as shown in Step 3

30E



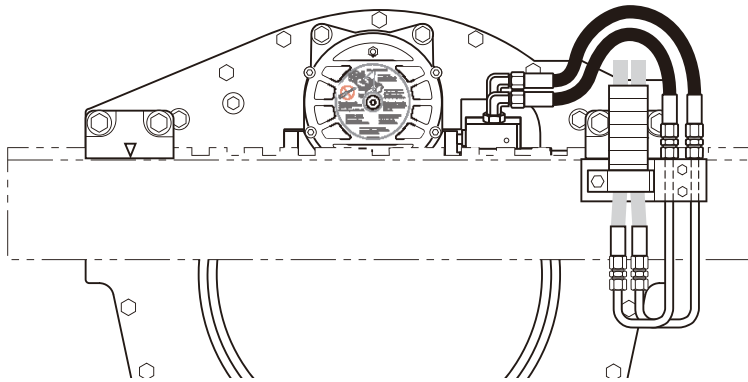
100D, X100D, 120D, 150D



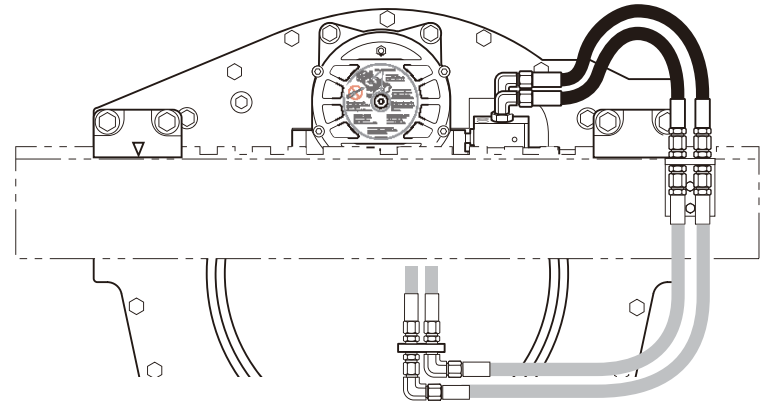
安装2管式的右细管卷管器
INSTALLATION USING RH 2-PORT
THINLINE™ HOSE REEL

安装内系同步油路
INSTALLATION USING INTERNAL
HOSE REEVING

45G-100G



RR0456.eps



RR0463.eps

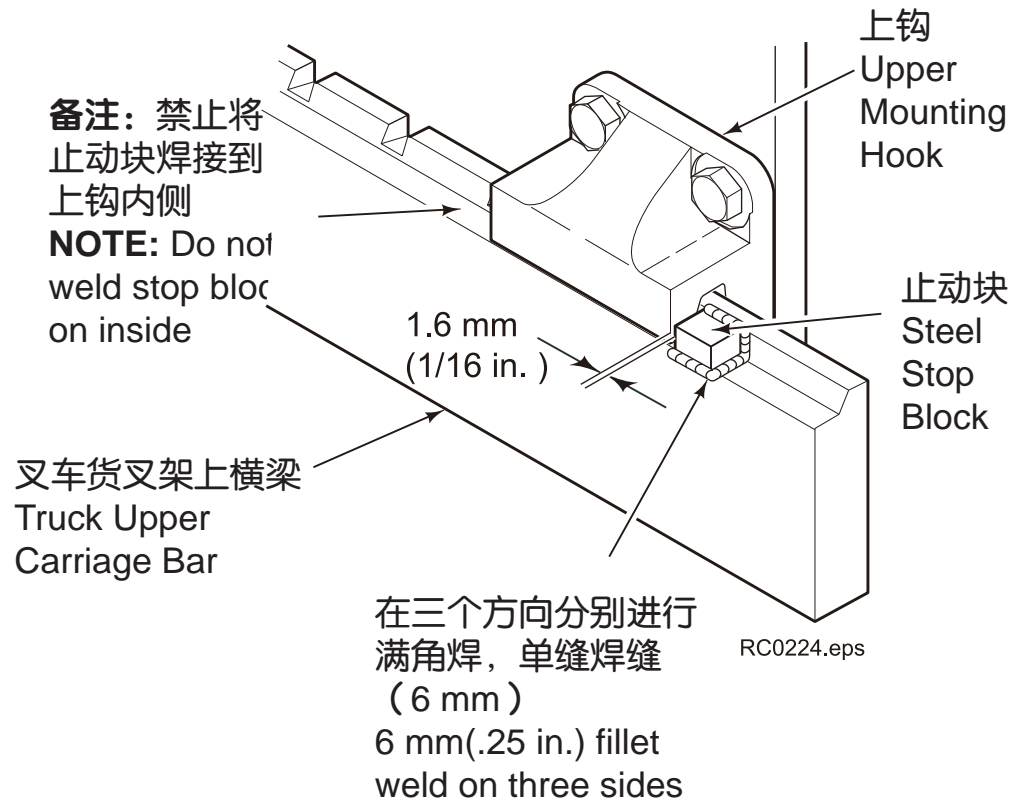
9

安装上钩止动块

- 将上钩止动块分别置两个上钩外侧。
- 将止动块于上横梁焊接区预热到180℃。
- 采用AWS E7018低氢焊条，在止动块的三个方向（如图示）分别进行满角焊，单侧焊缝（6mm）。

Install stop block kit

- Locate a stop block on the outside of each upper hook. Preheat stop block and carriage bar weld area to 180°C (325°F)
- Use AWS E7018 low hydrogen rod and weld a 6 mm (.25 in.) fillet full length on three sides of each stop block.



10

连续旋转测试



警告： 确保所有人员与属具保持安全距离。

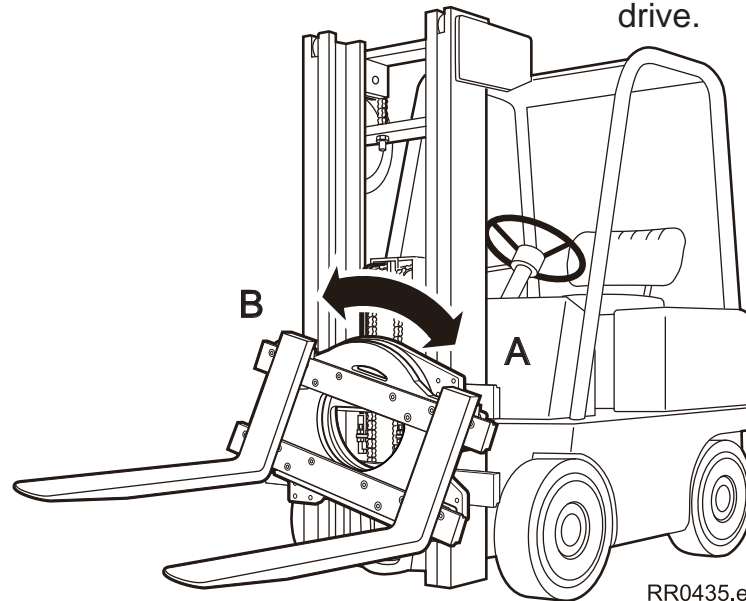
- 在空载状态下，将旋转功能测试数次。
- 依据ISO的标准对各功能进行检测。
- 在属具上施加一个所能承受的最大载荷并进行旋转。检查旋转是否顺畅，功能是否正常。
- 检查软管，管接头以及减速器总成等是否泄漏。

Cycle Rotation Function



WARNING: Make sure all personnel are clear of the attachment during testing.

- With no load, cycle rotation function several times.
- Check functions for operation in accordance with ANSI (ISO) standards.
- Pick up a maximum load and rotate. Check for smoothness and normal rotation.
- Check for leaks at hoses, fittings and rotator drive.



RR0435.eps



警告： 叉车手柄动作方向和属具功能对应分布（如下图示）符合美国机械工程师学会ASME/美国国家标准学会ANSI B56.1的行业推荐操作规范。违反该操作规程可能会造成严重的身体伤害或财产损失。为安全起见，最终用户，代理商和主机厂需仔细观察、辨别任何异常并加以排查。



WARNING: Truck contro; handle and attachment function activation shown here conforms to ASME/ANSI B56.1 recommended practices. Failure to follow these practices may lead to serious bodily injurt or property damage. End user, dealer and OMEs should review any deviation from the practices for safe operation.

旋转
(从驾驶员方向看)

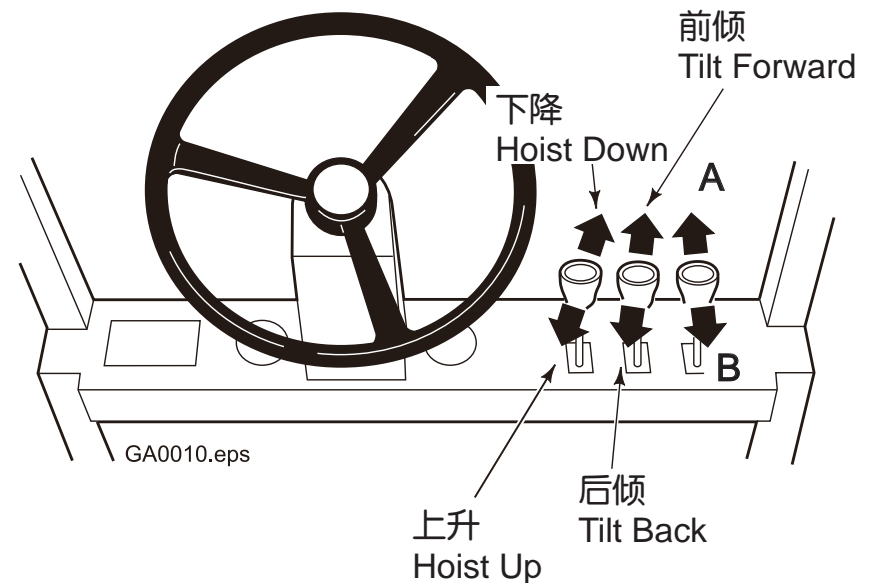
- A 逆时针
- B 顺时针

ROTATE

(Drive's view)

- A Counterclockwise(CCW)
- B Clockwise(CW)

多路阀功能 Auxiliary Valve Functions



11

货叉焊接预热（货叉中钩还未安装）

- A 在焊接前，先清理货叉表面。去除油漆，油污，润滑剂以及其他污渍。
- B 按图示的尺寸将中钩定位好。并将其位置在货叉上做好标记。
- C 按中钩的位置沿着四个方向焊接，焊缝为6mm。之后，再核对位置尺寸。



警告：每一根货叉必须有三个钩，即上钩、中钩和下钩。卡斯卡特带货叉的旋转器已带有中钩。如果旋转器不带货叉，则卡斯卡特将会把中钩随旋转器提供给用户，用户按以下流程焊接中钩。

Fork Welding Preparation

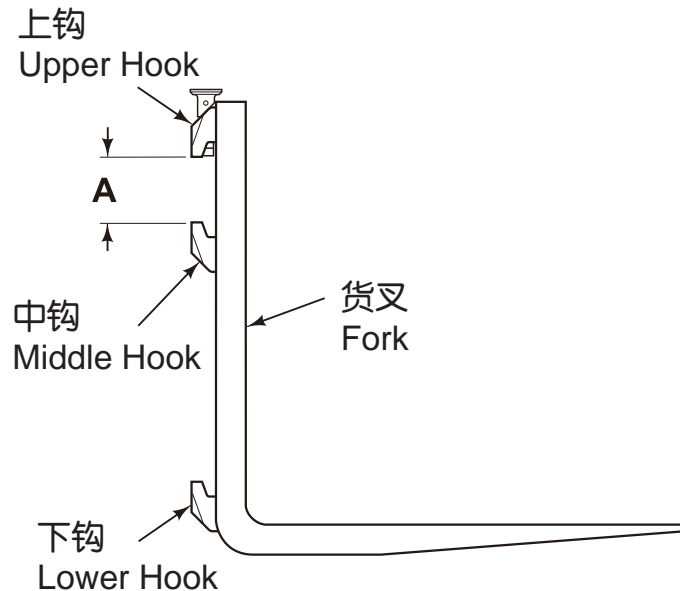
(forks without middle hook installed)

- A Clean all surfaces to be welded. Remove paint, oil, grease and other contaminants.
- B Position the middle hook using the dimensions shown. Mark the hook position on the fork.
- C Tack the hook in four places with 6 mm (.25 in.) long welds. Recheck dimensions.



WARNING: Each fork must have three hooks. Cascade forks for rotators are equipped with a middle hook. If the attachment is supplied without forks, middle hooks are provided. They must be welded using the following procedures.

| 旋转器型号 Rotator Model | 上钩与中钩间距尺寸‘A’ Hook Spacing Dimension ‘A’ |
|------------------------|--|
| 30E | 128.5 +0.7 mm (5.06 +.03 in.) |
| 45G,55G | 77.5 +1.5 -0 mm (3.05 +.06 -0 in.) |
| 65G | 91.5 +1.5 -0 mm (3.60 +.06 -0 in.) |
| 80G | 119.5 +1.5 -0 mm (4.70 +.06 -0 in.) |
| 100G | 148.6 +1.5 -0 mm (5.85 +.06 -0 in.) |
| 100D, X100D | 148.6 +0.7 mm (5.85 +.03 in.) |
| 120D,150D | 216.0 +0.7 mm (8.50 +.03 in.) |



12

中钩焊接

- A 在焊接前，将焊接区域（包括货叉全横向宽度以及中钩上下152mm（6 in.）的区域内）的温度预热到260℃（最低）-315℃（最高）范围内。层间温度最大不超过370℃。
- B 在货叉指定范围内按照相关要求施焊，具体可参照下钩焊接要求。图中标注的'B'为禁止焊接的尺寸。按照以下的方法进行焊接：
将属具沿货叉竖直方向置于地面。采用药芯焊丝电弧焊FCAW。符合美国焊接标准AWS，使用E100T1-K3焊丝（或同类规格焊丝），焊丝直径为1.5mm（0.06in.），采用100%二氧化碳保护气体或75%氩气/25%的二氧化碳混合气体（气体流量为14-21L/min）。采用窄焊道工艺进行角焊和坡口焊。焊缝宽度最小值为6.3mm（0.25in.），焊缝厚度最大值为12.5mm（0.50in.）。直流正极性弧焊，电流230-300安，电压29-31伏。焊接速度为3-5mm/sec。将焊缝之间的焊渣完全清除干净。焊接表面盖上保温棉使其缓慢冷却到65℃。
- C 检查焊缝。无咬边，焊瘤和任何裂纹（包括弧坑裂纹）或孔隙。
- D 清理焊接区域并重新喷漆。

Fork Middle Hook Welding

- A Preheat weld area(full fork width and 6 in.) above and below hook) to 260℃ (500°F) minimum, 315℃ (600°F) maximum before welding. Maximum interpass temperature should not exceed 370℃ (700°F) .
- B Finish weld middle hook to fork. Apply welds in the hook weld prep areas using the lower hook as an example of the welds required. Note the 'B' no weld area. Use the following weld method:
Attach ground clamp to the fork upright. Weld using FCAW(Flux Core Arc Welding). AWS E100T1-K3 electrode, 1.5 mm(.06 in.) diameter with 100% CO₂ or 75% Ar/ 25% CO₂ @30-45 CFH. Apply fillet and groove welds using stringer bead technique. Minimum weld pass width 6.3 mm(.25 in.), maximum weld pass thickness 12.5 mm(.50 in.). DCRP welding current, 230-300 amps, 29-31 volts. Travel speed 8-12 IPM. Completely remove slag between passes. Slow cool, by covering with insulating blanket, to 65 CO₂(150°F).
- C Inspect welds. No undercut, overlap, cracks of any kind(including crater crackers) or porosity.
- D Clean weld area and repaint.

安装 / INSTALLATION



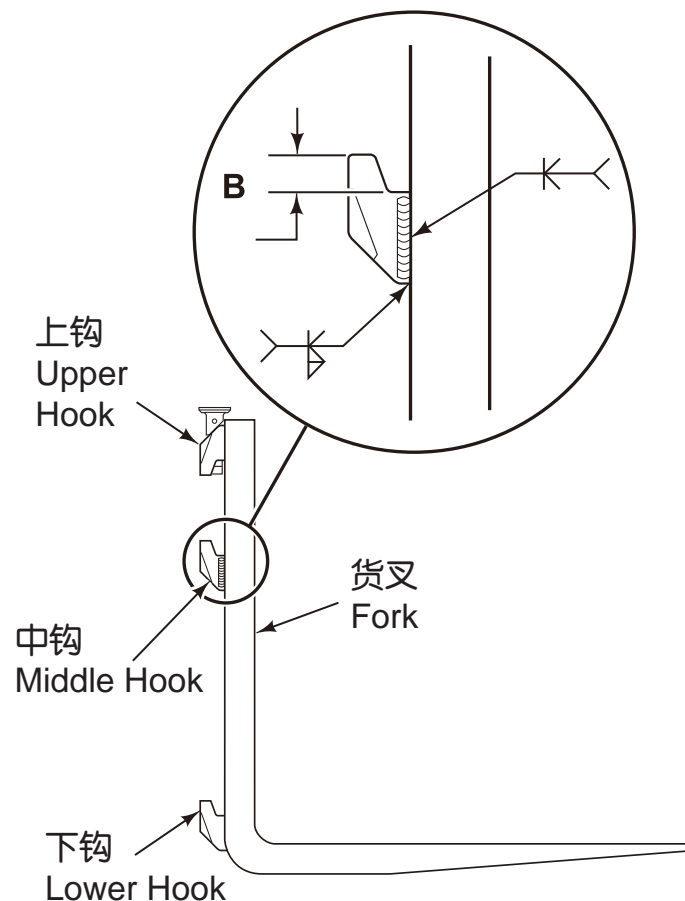
警告：若在实际使用过程中，将货叉底部旋转至朝上位置，并用其搬运货物（重量达到额定载荷的50%或更大），则必须使用卡斯卡特旋转器适配货叉。若需要将属具从垂直方向旋转到45度方向倾倒货物，则可以在货叉上安装中钩后，用其叉持托盘并旋转得以实现。



WARNING: Applications that hold a load interted with a 50% or more capacity, must use Cascade rotator forks. Applications that dump a load when the attachment is rotated at 45° from vertical, can use pallet forks with the installed middle hook.

| 旋转器型号 Rotator Model | 禁止焊接尺寸‘B’ No-Weld Dimension ‘B’ |
|----------------------------------|------------------------------------|
| 30E | 14 mm(0.56 in.) |
| 45G, 55G, 100D, X100D, 120D , | 16 mm(0.62 in.) |
| 65G, 80G, 100G | 19 mm(0.75 in.) |
| 150D | 22 mm(0.87 in.) |

参考：S-22588, S-22566, S-22567, S-22927, S-23847, CWS69.27
Reference: S-22588, S-22566, S-22567, S-22927, S-23847, CWS69.27



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13

安装货叉

确保搬运的货物重量在货叉的额定承载能力范围内。货叉尺寸规格将会影响属具的额定承载能力（参加第25页）。



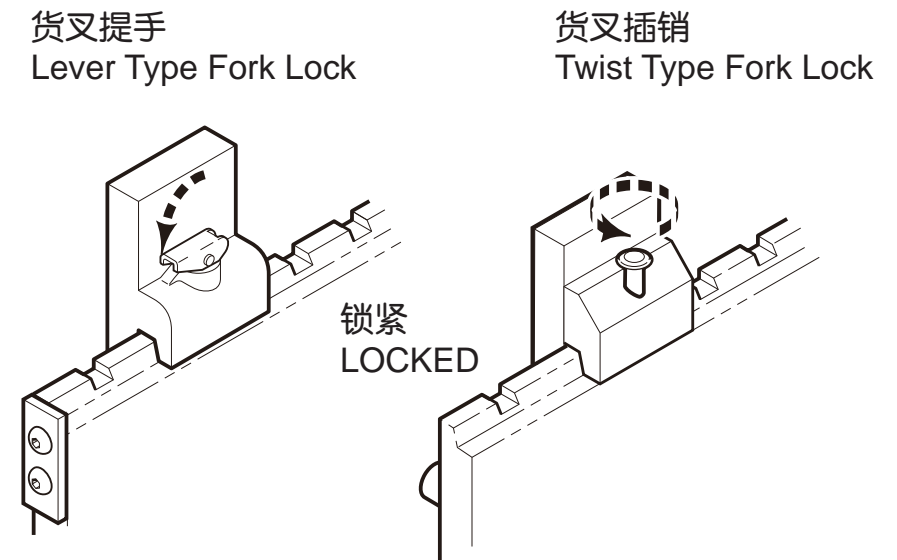
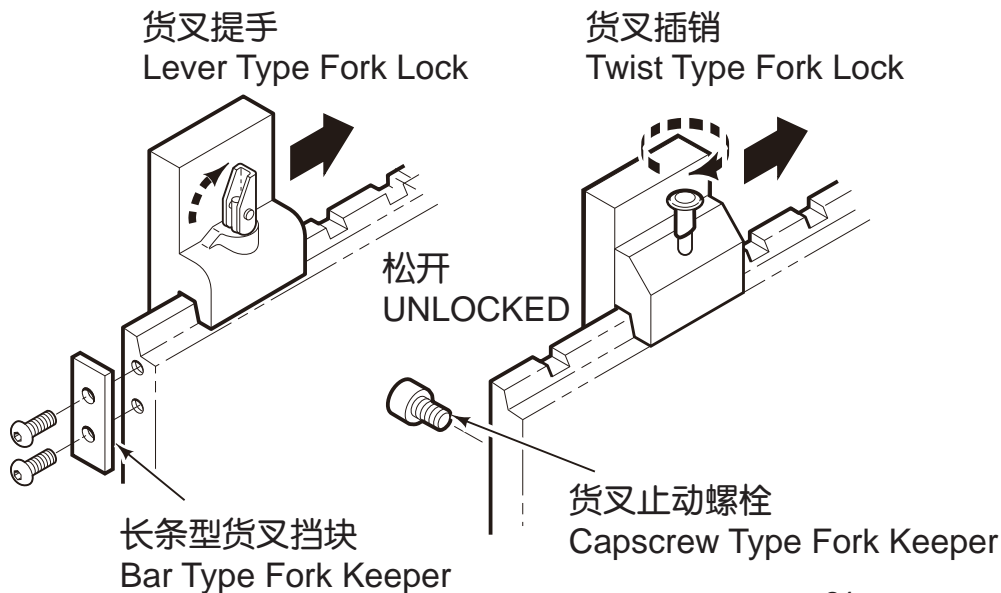
警告： 货叉必须有三个挂钩。卡斯卡特旋转器专用货叉已经配有中钩。如果属具没有配货叉，则中钩必须随旋转器整机配备。中钩焊接流程请参见步骤11。



WARNING: Forks must have three hooks. Cascade forks for rotators are already equipped with a middle hook. If the attachment is supplied without forks, middle hooks are provided. See Step 11 for middle hook installation procedure.

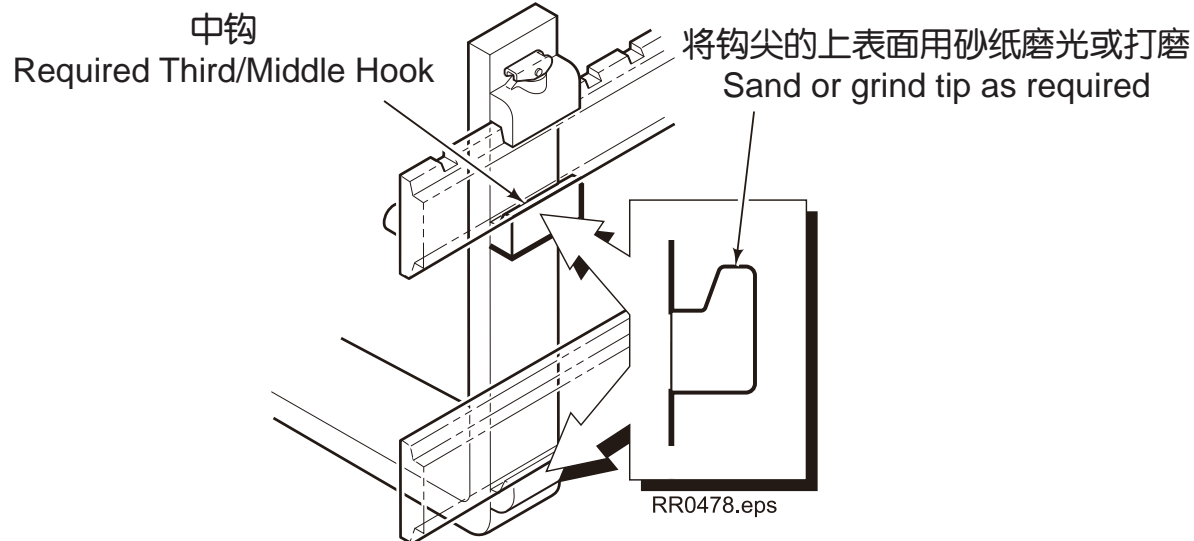
- A 将旋转器的上横梁旋转到水平位置。将上横梁两侧的挡块拆下。
- B 将货叉顶部的提手或插销松开。

- A Rotate the carriage to the horizontal position. Remove the fork keepers from the upper fork carriage bar.
- B Release the spring locks on top of the forks.



- C** 滑动货叉使之在货叉上横梁定位好。
 备注：如果货叉的中钩或下钩与横梁装配时过紧，可将钩尖的上表面用砂纸磨光或打磨，但上钩与中钩的间距不能小于第19页标注的尺寸‘A’。
- D** 下压货叉提手或将货叉插销向下旋转以锁紧两侧的货叉。
 晃动货叉以确保定位销将货叉完全固定在横梁的凹槽内。
- E** 重新安装货叉挡块或放脱落螺栓，用以下扭矩锁紧螺栓：
 货叉止动螺栓型：
 45G - 100G - 270 Nm (200 ft.-lbs.)
 货叉挡块型：
 30E, 100D, X100D, 120D, 150D - 82 Nm (60 ft.-lbs.)
 45G - 100G - 90 Nm (65 ft.-lbs.)
 用乐泰 Loctite #242防松剂涂抹在货叉挡块的紧固螺栓上（仅针对货叉挡块型）。在重新安装前，必须将螺纹孔内清理干净并保持干燥。

- C** Slide the forks into position on the fork carriage bars.
NOTE: If the fork middle hook or lower hook fit up is too tight, sand or grind the tip, but do not exceed dimension ‘A’ as shown in chart on page 19.
- D** Lock each fork in place by pushing the spring lock lever down or twisting the button down. Shake forks to make sure the pin is fully engaged in a fork bar notch.
- E** Reinstall the keepers. Tighten the capscrews to a torque of:
Capscrew Type:
 45G - 100G - 270 Nm (200 ft.-lbs.)
Bar Type:
 45G - 100G - 90 Nm (65 ft.-lbs.)
 Apply Loctite 242 (blue) to Bar Type capscrews. Threaded holes must be clean and dry before reassembly.



安装 / INSTALLATION

F 拆除货叉可按以上步骤的反向顺序进行。

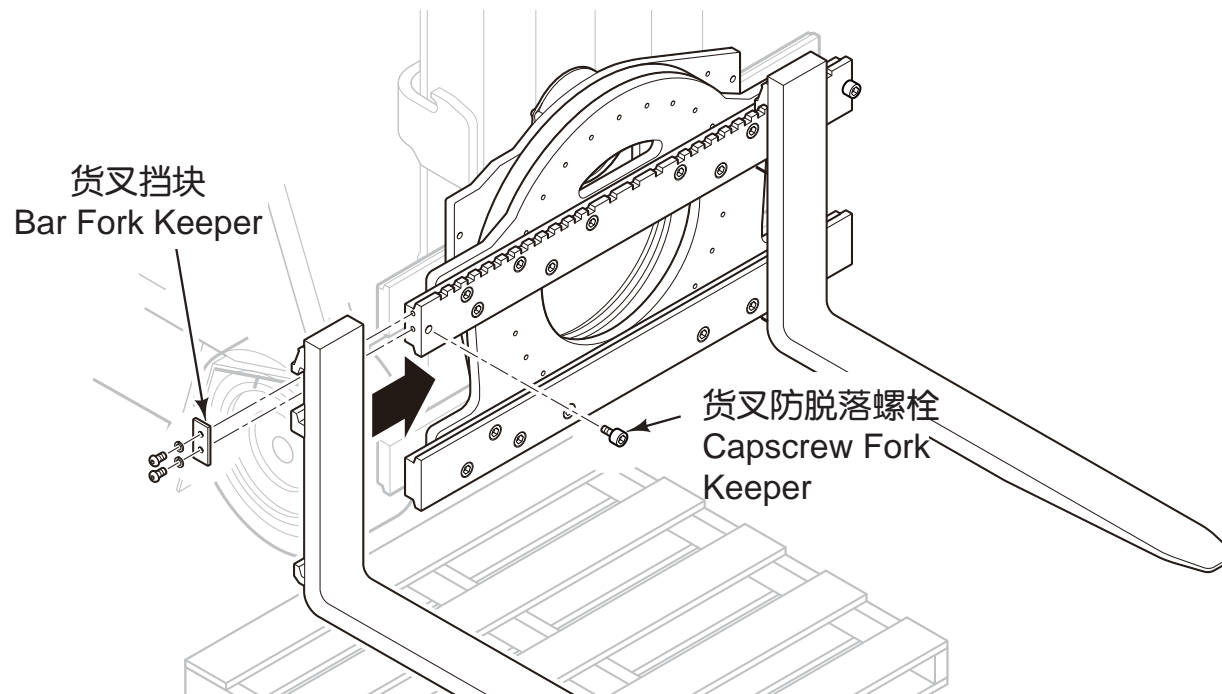
F Reverse the above procedures for removal.



警告：当安装或拆除货叉时，必须先将旋转器的横梁旋转到水平方向。用托盘或垫块垫高货叉的安装高度。在安装时，须保持货叉肘部的整洁。当属具在作业过程中，必须保证货叉挡块随时安装到位。



WARNING: When installing or removing forks, rotate carriage to horizontal position. Use pallets or blocks to raise forks to installation height. Keep feet clear of forks when installing. Fork keepers must be in place at all times during attachment operation.



RR0430.eps

安装 / INSTALLATION

警告：属具（带货叉）承载能力同所适配货叉规格而异。

灰色区域表示的是最大额定货叉尺寸。

CAUTION: Attachment and fork capacity are dependant on fork size.

Shaded area indicates maximum rating fork size.

| 旋转器（带货叉）的承载能力@载荷中心500mm ROTATOR & FORK CAPACITY at 500 mm Load Center (20 in.) | | | | | | | | | |
|---|-----------------------------|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 型号 Model | 货叉安 装等级 Fork Class | 货叉尺寸（宽×厚） Fork Size (W×T) | | | | | | | |
| | | 100 × 35 mm | 100 × 40 mm | 125 × 40 mm | 125 × 45 mm | 125 × 50 mm | 150 × 50 mm | 150 × 65 mm | 180 × 50 mm |
| 30E | ISO 2A | 1600 kg | 1600 kg | 1600 kg | 1600 kg | - | - | - | - |
| 45G | ISO 2A | 1950 kg | 2500 kg | 2500 kg | 2500 kg | - | - | - | - |
| 55G | ISO 2A | 1950 kg | 2500 kg | 2700 kg | 2700 kg | - | - | - | - |
| 65G | ISO 3A | - | - | 2800 kg | 3200 kg | 3200 kg | - | - | - |
| 80G | ISO 3A | - | - | - | 4000 kg | 4000 kg | 4000 kg | 4000 kg | 4000 kg |
| 100G | ISO 3A | - | - | - | 4000 kg | 4930 kg | 5000 kg | 5000 kg | 5000 kg |
| 100D, X100D | ISO 3A | - | - | - | - | 4930 kg | 5000 kg | 5000 kg | 5000 kg |
| 旋转器（带货叉）的承载能力@载荷中心600mm ROTATOR & FORK CAPACITY at 600 mm Load Center (24 in.) | | | | | | | | | |
| 型号 Model | 货叉安 装等级 Fork Class | 货叉尺寸（宽×厚） Fork Size (W×T) | | | | | | | |
| | | 125 × 45 mm | 125 × 50 mm | 150 × 50 mm | 150 × 65 mm | 180 × 50 mm | | | |
| 120D | ISO 2A | 2930 kg | 3663 kg | 4626 kg | 5443 kg | 5443 kg | | | |
| 150D | ISO 2A | 2930 kg | 3663 kg | 4626 kg | 6804 kg | 6214 kg | | | |

安装 / INSTALLATION

- 1、止动块安装目的是将货叉固定，避免旋转过程中货叉左右摆动、货叉上钩滑动而造成旋转器上横梁的过渡磨损。

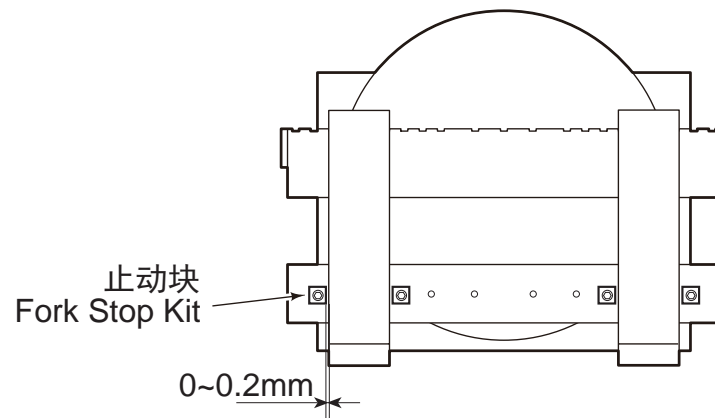
The purpose of installing a fork stop is to fix the forks on carriage and prevent them from swinging during rotation, so as to eliminate the excessive wear caused by the upper hook of fork sliding back and forth along the upper carriage bar of rotator.

- 2、止动块用螺栓固定于下横梁上，止动块孔与周边有不同偏心距，可以选择合适配合面。

The stop kit is bolted on the lower carriage bar. Different offset on its different side, please choose the correct side while installing the kit.

- 3、止动块安装后应紧贴货叉侧面，最大间隙不超过下图所示要求，由于货叉宽度尺寸的差异，应适当修焊、调整止动块的接触面来保证合理安装要求。

The stop should be tightly attached to the side surface of fork shank. The maximum clearance must be within requirement listed in the following chart. Due to the difference of fork widths, Certain adjustment or welding on the stop kit may be necessary.





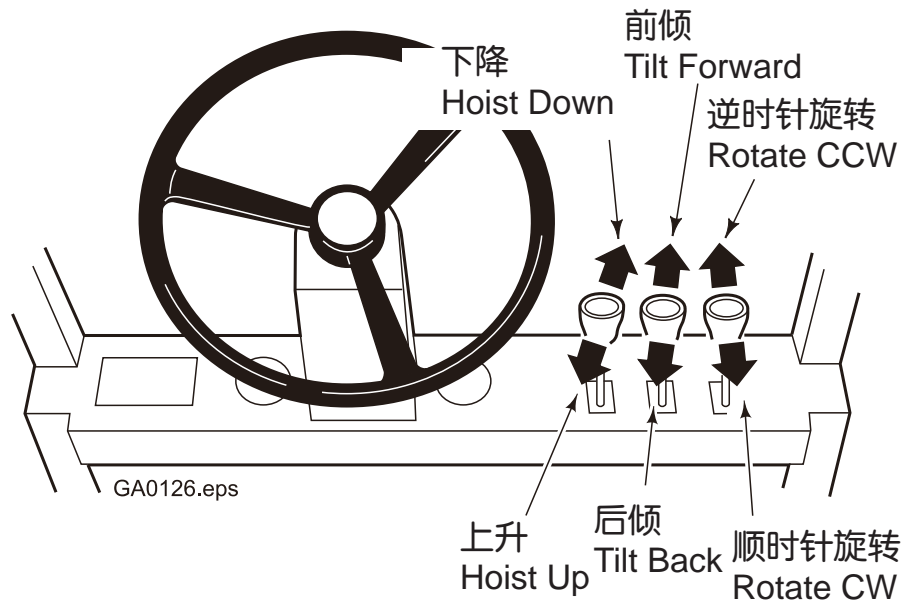
警告：叉车手柄动作方向和属具功能对应分布（如下图示）符合美国机械工程师学会ASME/美国国家标准学会ANSI B56.1的行业推荐操作规范。违反该操作规程可能会造成严重的身体伤害或财产损失。为安全起见，最终用户，代理商和主机厂需仔细观察、辨别任何异常并加以排查。



WARNING: Truck control handle and attachment function activation shown here conforms to ASME/ANSI B56.1 recommended practices. Failure to follow these practices may lead to serious bodily injury or property damage. End user, dealer and OEMs should review any deviation from the practices for safe operation.

- 1 在作业前，操纵属具使其沿顺时针和逆时针两个方向旋转360度以便将管路中的空气清除到叉车油箱中。叉车多路阀功能如图所示。
- 2 检查软管和管接头是否外泄漏。

- 1 Before picking up a load, operate the attachment through 360° in both directions to force air in the system to the truck hydraulic tank. The auxiliary valve functions should operate as shown.
- 2 Check for external leaks at the hoses and fittings.



操作前的检查

PRIOR TO OPERATION



警告： 确保所有人员与属具保持安全距离。

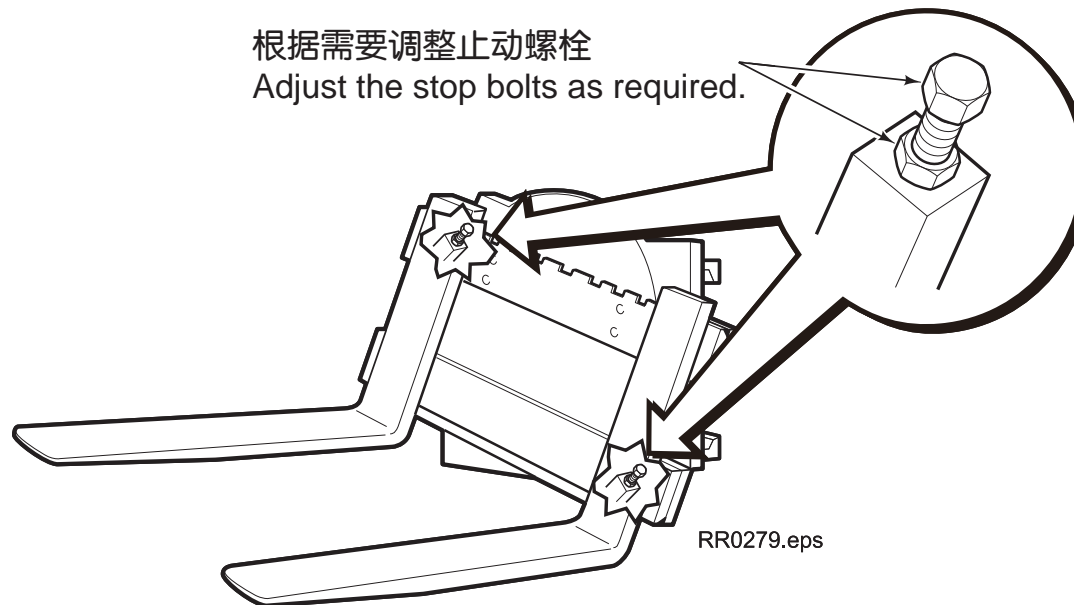
- 3 叉起所能承载的最大重量货物并分别沿顺时针和逆时针方向旋转。若旋转动作缓慢或不顺畅，请重新检查液压管路。如果属具仍然无法正常操作，请按照本手册封底的联系方式联系卡斯卡特（厦门）售后服务部门。
- 4 若需要，安装180度旋转角度控制装置 - 旋转器旋转到止动螺栓位置时将停止动作。若要改变止动位置，请松开止动螺母，调整止动螺栓位置，完成后重新锁紧止动螺母。



WARNING: Make sure all personnel are clear of the attachment during testing.

- 3 Pick up a maximum load and rotate in both directions. If the attachment is sluggish or does not rotate smoothly, recheck the plumbing. If the attachment still operates incorrectly, contact the Cascade Xiamen Service Department listed on the back cover.
- 4 **180° Stop Group, if equipped** - Rotate in each direction to the stop positions. If the stop positions need to be changed, loosen the stop bolt locknuts and adjust the stop bolts as required. Retighten the locknuts after adjusting.

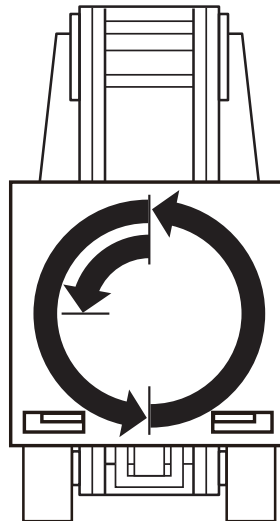
根据需要调整止动螺栓
Adjust the stop bolts as required.



- 5 如果需要，安装电子式旋转控制装置 - 可实现如下功能。当属具在旋转时，它可在垂直方向和水平方向停止动作。并在停止3秒后重新旋转或按下旋转重启按钮继续旋转。
- 如果属具能够在垂直方向和水平方向停止动作，则功能正常。
 - 如果属具无法在垂直方向或水平方向实现停止则：
 - A 检查线路安装是否正常。查看联接部位或线夹是否松动。

- 5 **Electronic Rotational Control, if equipped** - When rotating, attachment travel should stop at the vertical and horizontal handling positions. Wait 3 seconds to rotate after stopping OR press the rotate override button to continue rotating.
- if rotation stops at vertical and horizontal positions, stop positions are correct.
 - if rotation does not stop at the vertical or horizontal positions:
 - A Inspect the wiring installation. Look for loose connections or pinched cables.

旋转到垂直方向和水平方向停止动作。
Rotation stops at both vertical positions and horizontal position.



AC1189.eps

按下重启按钮后继续旋转。
Pressing the override switch allows continuous rotation.

等待3秒钟后或按下重启按钮继续旋转。
Wait 3 seconds or press override button to continue rotating.

B 当属具旋转到垂直方向或水平方向时，限位开关的触轮未完全接触到减速坡台和止动螺栓。调整限位开关的触轮，使其与坡台和止动螺栓完全接触。可根据止动的精确位置对坡台进行调整。同时还可对止动螺栓高度进行调整。

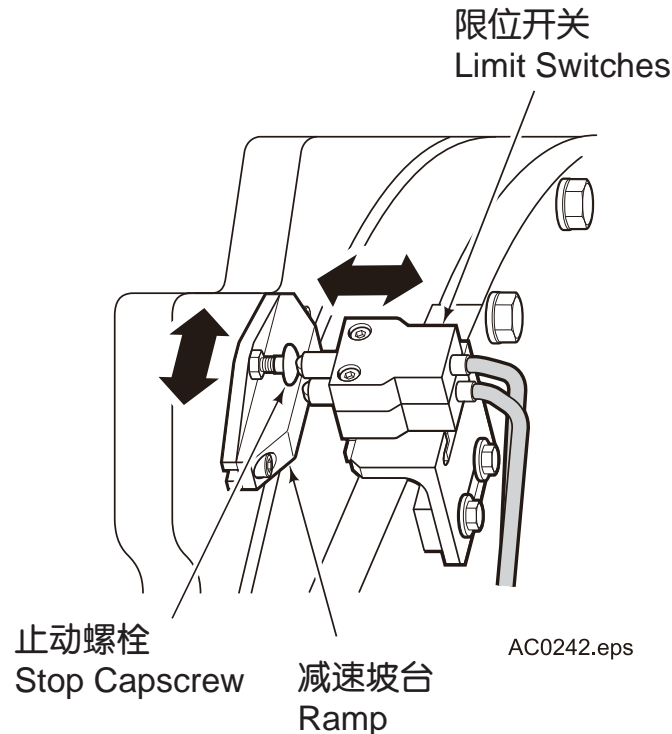
如果需要继续旋转，可在止动等待3秒钟后按下重启按钮便可实现。

如果想持续旋转而不暂停，按下重启按钮即可。

B The limit switch end rollers are not fully engaging the deceleration ramp and stop capscrew at the vertical or horizontal position. Adjust the limit switch actuators to engage the ramp and stop capscrew. The ramp and stop can also be adjusted for precision of the stop position. The stop capscrew height is also adjustable.

To continue rotation, wait 3 seconds after stopping or the rotate override button must be pressed to continue rotation.

To rotate without stopping, press the override button.



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