



Shanghai KOMMAN Vehicle Component Systems Co., Ltd

*Leading Commercial Vehicle Air-suspension System Supplier*

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# KOMMAN 半挂车空气悬架系统 Air Suspension System for Semi-trailer

## 装配与维护手册

Assembling and Repairing Instruction

上海科曼车辆部件系统有限公司

Shanghai Komman Vehicle Component Systems Co.,Ltd



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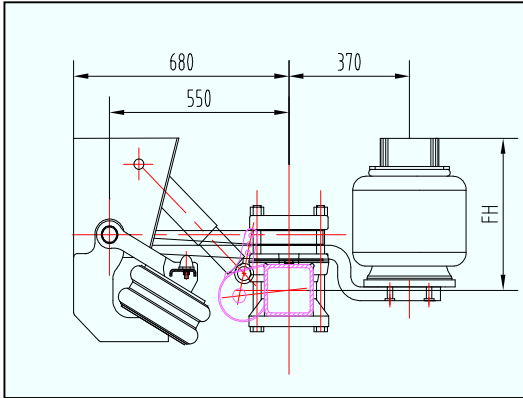
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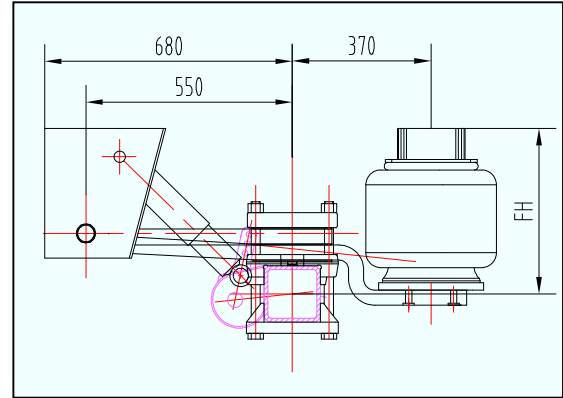
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## 空气悬架基本结构 Basic Structure of Air Suspension



标准平台系列提升桥空气悬架

Standard Platform (with lift function)



标准平台系列非提升桥空气悬架

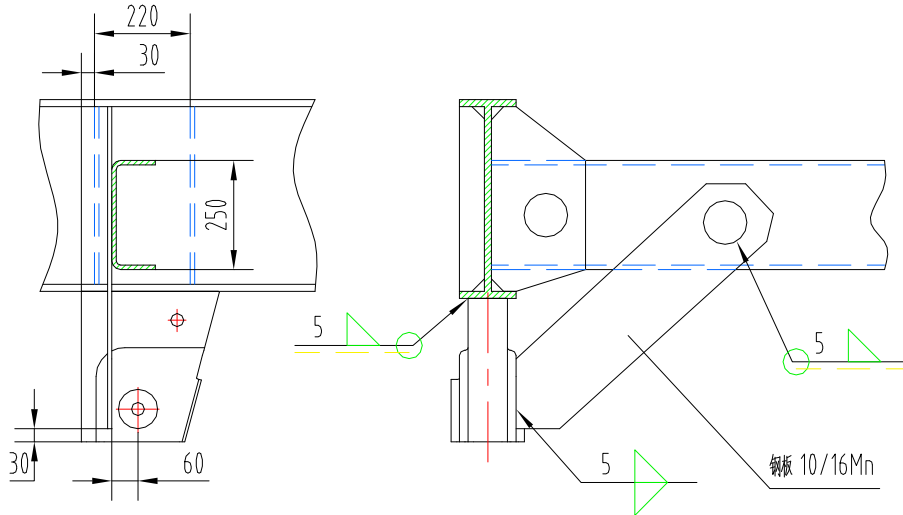
Standard Platform (without lift function)

### 基本技术参数 Basic Technical Parameters

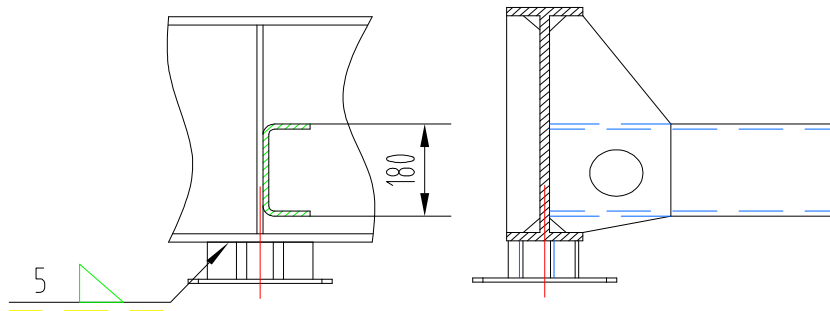
	FH 值 (mm)	单轴最 大载荷 Peak Load of Single Axle	气囊 规格 Air Chamber Type	气囊 总行程 Dynamic Stroke of Air Chamber	推荐 轴 距 Recommend Axle Distance
标准平台 Standard platform	350 ~ 550	13T	φ 350	180mm	1250~1350

## 空气悬架的装配调整 Assembling of Air Suspension

- 1、 板簧支架、气囊支架与车架的焊装 Welding of Leaf Spring Bracket, Air Bag Bracket and Frame



- 2、 图 1 板簧支架与车架的焊装 Welding of Leaf Spring Bracket and Frame



- 3、 图 2 气囊支架与车架的焊装 Welding of Air Bag Bracket and Frame

- 建议采用直流焊机，低氢型焊条。DC welder and low hydrogen electrode are preferred
- 焊接前无需预加热。No Pre-heating before welding

- 将支架与工字梁下翼面连接处进行焊接，焊缝应平直，不得有焊接缺陷，焊缝高 5mm。Welding between the bracket and I-beam (under the wing); the welding seam must be straight; no fault in welding seam; the welding seam should be 5mm high.
- 工字梁与支架之间的连接可参考图示进行加强。The link between the I-beam and bracket should be strength according to the picture direction

## 2、板托与车桥的焊装 Welding of Panel and Axle

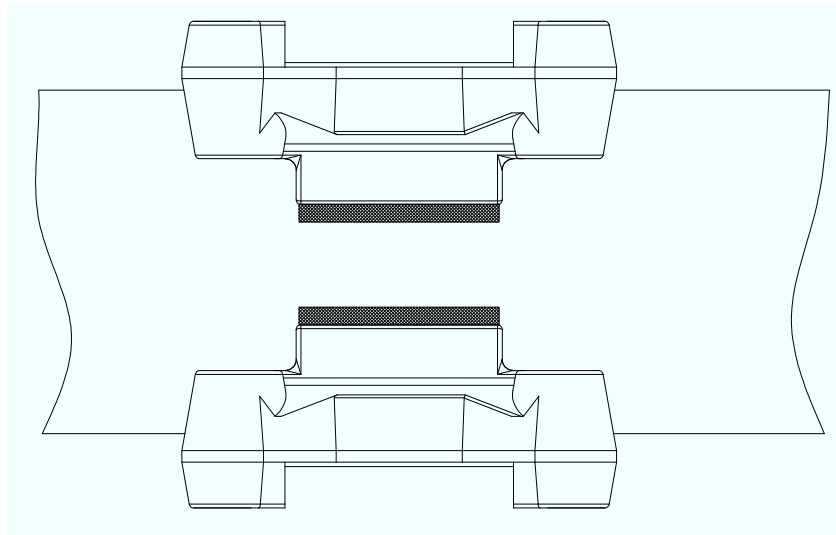


图 3

- 建议采用直流焊机或气体保护焊机，低氢焊接填料。Suggesting to use DC welder or Air protect welder, and low hydrogen electrode are preferred
  - 焊接前无需对车轴上的焊接部位进行预加热。No Pre-heating on axle before welding
  - 必须在允许焊接区内进行焊接，焊缝应平直，不得有焊接缺陷，焊缝高 5mm。welding must be located on welding area, the welding seam must be straight; no fault in welding seam; the welding seam should be 5mm high
- 车轴上下表面、应力较集中的区域及转圆弧处不允许有任何焊接。No welding on axle surface, Force and Arc areas.

## 3、轴距的调整 Adjusting of Axle Distance

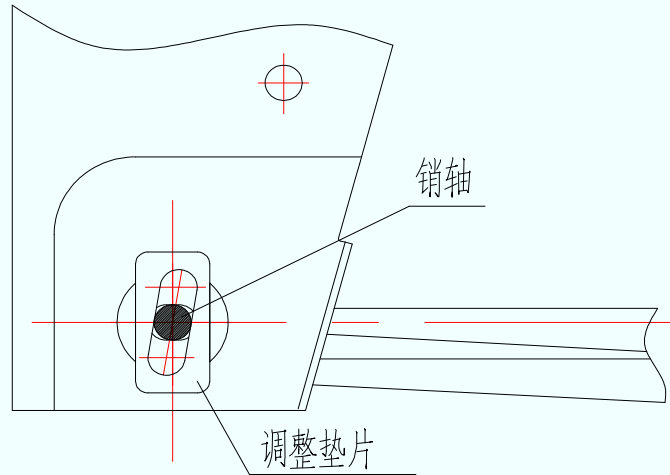


图 3 右侧板簧支架局部示意图 Picture 3.Instruction of Left Leaf Spring Bracket

- 右侧板簧支架为长孔，在安装板簧时左右侧各嵌入一块调整垫片，通过对调整垫片的上下移动，来调整右侧轴距； Oblong hole on the left leaf spring bracket. Add two adjusting blocks on each sides of leaf spring when assembling it. To adjust the axle distance by moving the blocks
  - 调整轴距的范围为正负 5mm； The adjusting range of axle distance is  $\pm 5\text{mm}$
  - 左右侧相对轴距偏差应小于 2mm； The deviation between axle relative distances should no more than 2mm
- 轴距调整完后再将销轴按规定力矩锁紧。 After adjusting the axle distance, locking the kingpin according the Provides Torque

#### 4、安装限位钢丝绳 Installation of Limiting Steel Wire Rope

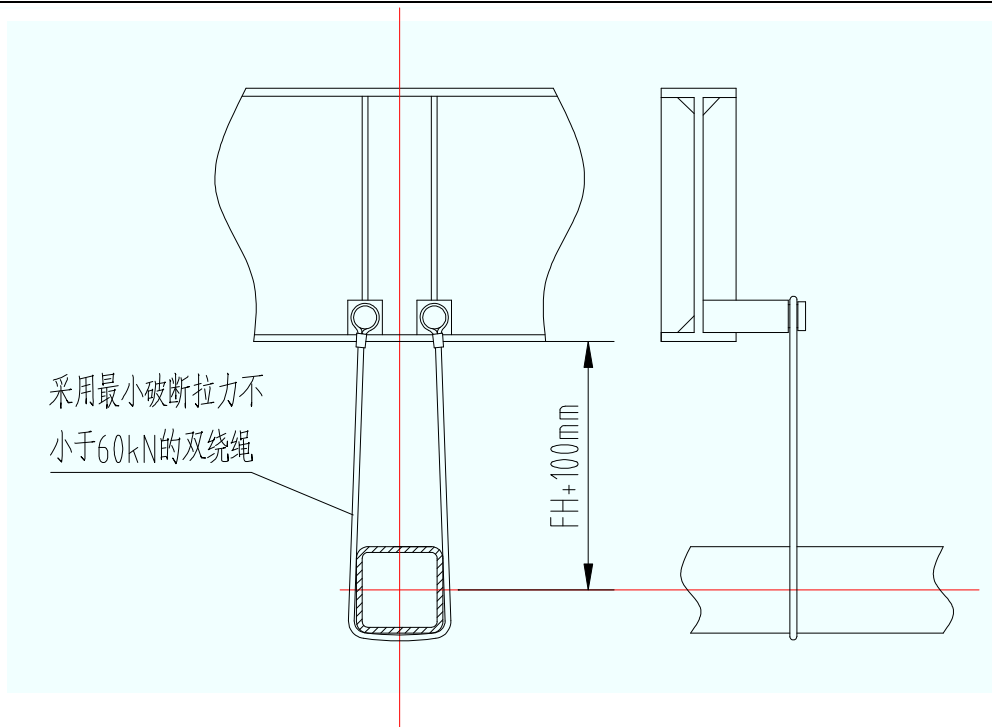


图 4

- 建议选用最小破断拉力不小于 60kN 的双绕绳； The collapsing force of Dual rope must exceed 60KN
- 位置布置在车轴的正上方； The rope located upon the axle
- 长度的确定：钢丝绳拉升到极限时，车轴中心至车架下平面距离为设计高度 FH 值加上 100mm。 The length conformed by: when the steel rope rises limitedly, the distance between the axle center and low surface of frame should be FH plus 100mm

## 5、空气悬架高度控制阀的安装 Assembling of Height-Control Valve

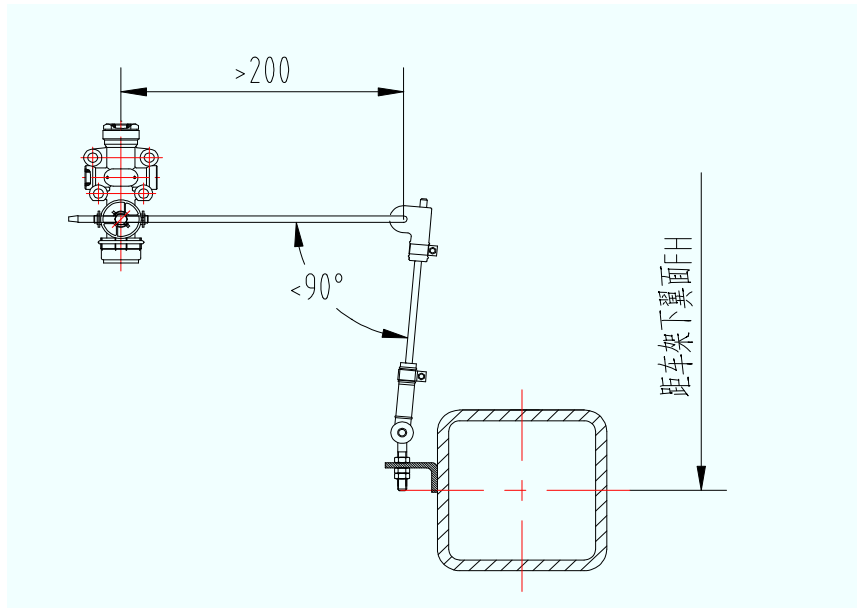


图 5

高度阀摆杆有效长度应大于 200mm Effective length of rocker lever must exceed 200mm

- 在高度阀摆杆水平位置时，其与直杆的夹角需略小于  $90^\circ$  ; When the rocker-lever reach the horizontal position, the angle between rocker-lever and straight-lever should slightly less than  $90^\circ$
- FH 值通过高度控制阀进行调整，在高度阀摆杆处于水平位置时，FH 值等于理论设计值。The FH was adjusted by height-control valve. When the rocker-lever reaches the horizontal position, the FH is the same as theoretical design value.

#### 6、空气悬架安装锁紧力矩表 Tighten Torque of Fixing Components

序号 No.	名称 Name	螺纹规格 Screw Type	锁紧力矩 Tighten moment	备注 Remark
1	U 型螺栓 U type bolt	M24	650Nm	
2	板簧卷耳连接 leaf spring roll connecting	M24	650 Nm	
3	减震器连接 shock absorber connecting	M20	350 Nm	





4	承载气囊连接 bearing air bags connecting	UNC1/2	50 Nm	
		UNC3/8	30 Nm	
		UNF3/4	120 Nm	
5	气囊下垫板连接 air bag lower plate connecting	M16	300 Nm	

## 空气悬架的维护与保养 Maintenance of Air Suspension

### 1、 气囊 Air bags

- 建议经常检查，特别是在夏天行驶柏油路面、雨后行驶泥泞路面等较恶劣环境行驶后，应注意保持气囊及其活塞的清洁。

Checking regularly, especially after driving on harsh road; must keep the air bags and pistons cleanness.

- 检查气囊表面有无损坏（表面裂痕、磨损、起皱、表面异物）。

Checking the air bag surface to eliminate rifts, wear, wrinkling, and unusual things.

- 如发现气囊损坏或漏气，请立即更换气囊。

Changing the air bags immediately if the air bags was broken or leaked.

- 检查气囊连接螺栓的紧固情况，如有松动请按力矩锁紧。

Checking the fastening situation of air bags' connecting bolt; If it becomes loosening, pls. lock it according to the torpue.

### 2、 减震器 shock absorber.

- 建议每季度检查一次。Checking quarterly.

- 检查减震器上、下连接处的紧固情况，利用力矩扳手检查是否达到锁紧力矩。

Checking the fastening situation of shock absorber's connecting by torque wrench;

- 检查减震器的密封性，如有渗油现象则应更换。

Checking the tightness of shock absorber; changing those ones which have permeability phenomenon.



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- 检查减震器是否正常工作，可在行驶一段路后触摸减震器表面是否发热，若发热则表明减震器正常工作。（注：触摸时请注意减震器有可能烫手）。否则，表明减震器已失效，须进行更换。

The way to check the shock absorber's working condition: After driving, touch shock absorber's surface and check whether it fever or not. The fever means it works well (noted: the shock absorber will scald you hand). Otherwise, the shock absorber must be changed.

### 3、 钢板弹簧连接螺栓及 U 型螺栓 Spring Plate Bolt and U Type Bolt

- 建议在新车行驶 1000 公里以后，用扭矩扳手进行复紧，之后每季度检查一次。

Screwing down the bolt by torque wrench after 1000 kilometers' driving, and then checking quarterly.

- 如若发现松动，请**对角交替锁紧螺母**。

Finding any loosening of bolts, pls. relock them timely

### 4、 车轴提升装置 Axle lift equipment

- 建议每季度检查一次。Checking quarterly.
- 检查提升支架上的橡胶缓冲块的磨损情况，若磨损严重请进行更换。
- Checking the rubber buffer located upon lift bracket. If it wears out seriously, pls. change it immediately.
- 检查提升气囊上下连接的螺栓是否松动。需要用扳手锁紧。

Checking the bolts located on air bag connecting, if it comes loose, pls. lock it.

- 举升气囊检查方式可参见 1

The checking way of lift air bags, pls. refer to 1.

### 5、 空气管路系统 control system

- 建议每季度检查一次。Checking quarterly.
- 检查阀体和管路接口的气密性及其安装是否紧固、有无损环。（注：



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可用肥皂水涂抹于阀体和管路接口上，若有气泡产生，这说明漏气，须重新锁紧密封。)

- Checking the air tightness of valve body and system connecting; their fixing situation; whether it is damage or not (noted: daubing the suds on connecting of valve and control system. If the bubbles are produced, you should lock the seal again).

- 检查高度阀调节杆有无损坏以及是否锁紧，阀体摆杆与直杆在平衡时的夹角可参见“空气悬架高度控制阀的安装”

Checking the height-control valve regulating stem to see if they are damage or unlocked. The angle between rocker- lever and straight-lever can be referred as Assembling of Height-control Valve

## 6、 限位钢丝绳 Spacing Steel Rope

- 建议每季度检查一次。Checking quarterly
- 检查限位钢丝绳及其附件，如有必要则进行更换。Check the Spacing steel rope and its accessories and change those if it is necessary.

## 7、 FH 值的检查 FH Checking

- 建议每季度检查一次。Checking quarterly
- FH 值在挂车出厂时已设定，用户必须按照挂车厂规定的 FH 值进行定期校验，使其与挂车出厂时保持一致。

The FH was conformed when the Semi-trailer was finished. You must verify it regularly.

- 可通过对高度阀调节杆的调整来调节 FH 值。Changing the FH by adjusting the height-control valve regulating stem.

## 常见故障现象、分析与排除 Analysis and Obviate of Common Malfunction

序号 No.	故障现象 Malfunction Phenomena	故障原因分析 Malfunction Analysis	排除方法 Obviate Ways
1	◆ 气囊无法充气 Unable to inflate	◆ 气囊损坏、漏气 The air bag damage or	◆ 更换气囊 ◆ Change the air bag



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	<ul style="list-style-type: none"> <li>◆ 车辆停放不超 24h, 气囊没气</li> <li>No air preserved within 24 hours</li> </ul>	<p>leak</p> <ul style="list-style-type: none"> <li>◆ 空气管路系统不正常工作</li> <li>Control system did not work well</li> <li>◆ 高度阀损坏或安装不当</li> <li>Assembling the height-valve with the wrong way</li> </ul>	<ul style="list-style-type: none"> <li>◆ 检修空气管路系统</li> <li>◆ Check and repair the control system</li> <li>◆ 调整或更换受损阀体</li> <li>◆ Adjust or change the valve</li> </ul>
2	<ul style="list-style-type: none"> <li>◆ 气囊损坏</li> <li>◆ Damage of air bag</li> <li>◆ 底座破裂</li> <li>◆ Break of base</li> </ul>	<ul style="list-style-type: none"> <li>◆ 有坚硬异物卷入气囊与底座之间磨擦</li> <li>◆ Hard tings involve in air bag and attrite with base</li> <li>◆ 坚硬外物刺穿气囊</li> <li>◆ Hard tings impale the air bag</li> <li>◆ FH 值调整不当</li> <li>◆ Adjust the wrong FH</li> <li>◆ 严重超载</li> <li>◆ Over-load seriously</li> </ul>	<ul style="list-style-type: none"> <li>◆ 经常清洁气囊</li> <li>◆ Clean the air bag regularly</li> <li>◆ 更换气囊</li> <li>◆ Change the air bag</li> <li>◆ 调整 FH 值</li> <li>◆ Adjust the FH</li> <li>◆ 按额定载荷承载</li> <li>◆ Do not overload</li> </ul>
3	<ul style="list-style-type: none"> <li>◆ 板簧支架开裂</li> <li>◆ The leaf spring broke</li> <li>◆ 板簧卷耳处连接螺栓磨损</li> <li>◆ Wear and tear of leaf spring roll connecting</li> </ul>	<ul style="list-style-type: none"> <li>◆ 加强梁未按规定安装</li> <li>◆ Reinforced beam fixed with wrong way</li> <li>◆ 严重超载</li> <li>◆ Overload seriously</li> <li>◆ 道路情况及其恶劣</li> <li>◆ Driving on harsh road</li> <li>◆ 连接螺栓松动时未及时发现并紧固</li> <li>◆ The loosing connecting bolt did not relock timely</li> </ul>	<ul style="list-style-type: none"> <li>◆ 更换支架, 连接螺栓。</li> <li>◆ Change the bracket and connecting bolt</li> <li>◆ 按额定载荷承载</li> <li>◆ Do not overload</li> <li>◆ 路况恶劣时, 请视情况降低车速, 慢速行驶</li> <li>◆ Slowdown on harsh road</li> <li>◆ 按规定安装加强梁</li> <li>◆ Fix the reinforced beam correctly</li> </ul>
4	<ul style="list-style-type: none"> <li>◆ 钢板弹簧断裂</li> <li>◆ Leaf spring broke</li> </ul>	<ul style="list-style-type: none"> <li>◆ 严重超载</li> <li>◆ Overload seriously</li> <li>◆ 道路情况及其恶劣</li> <li>◆ Driving on harsh</li> </ul>	<ul style="list-style-type: none"> <li>◆ 按额定载荷承载</li> <li>◆ Do not overload</li> <li>◆ 路况恶劣时, 请视情况降低车速, 慢速行驶</li> </ul>



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		<ul style="list-style-type: none"> <li>◆ road</li> <li>◆ FH 值调整不当</li> <li>◆ Adjust the wrong FH</li> </ul>	<ul style="list-style-type: none"> <li>◆ Slowdown on harsh road</li> <li>◆ 调整 FH 值</li> <li>◆ Adjust the FH</li> <li>◆ 更换钢板弹簧</li> <li>◆ Change the leaf spring</li> </ul>
5	<ul style="list-style-type: none"> <li>◆ 车轴移位</li> <li>◆ Removing of axle</li> </ul>	<ul style="list-style-type: none"> <li>◆ 道路情况及其恶劣</li> <li>◆ Driving on harsh road</li> <li>◆ U 型螺栓松动时未及时发现并紧固</li> <li>◆ The loosening U type bolt did not relock timely</li> <li>◆ 严重超载</li> <li>◆ Overload seriously</li> </ul>	<ul style="list-style-type: none"> <li>◆ 路况恶劣时, 请视情况降低车速, 慢速行驶</li> <li>◆ Slowdown on harsh road</li> <li>◆ 按规定对 U 型螺栓进行检测、紧固</li> <li>◆ Check and relock the U type bolt</li> <li>◆ 按额定载荷承载</li> <li>◆ Do not overload</li> </ul>
6	<ul style="list-style-type: none"> <li>◆ 管路漏气或无法充气</li> <li>◆ Leak on control system or can not inflate</li> </ul>	<ul style="list-style-type: none"> <li>◆ 管路接口受损漏气</li> <li>◆ Break on pipe line connecting</li> <li>◆ 管路折叠, 不能正常供气</li> <li>◆ Pucker of pipe line, and it can not work</li> <li>◆ 阀体受损或堵塞</li> <li>◆ Break or plug of valve</li> </ul>	<ul style="list-style-type: none"> <li>◆ 检查所有气管接口, 找出漏气点, 并进行调试或更换</li> <li>◆ Check all pipe line connecting, find the leak point, and adjust or change them</li> <li>◆ 更换受损阀体</li> <li>◆ Change the break valve</li> </ul>
7	<ul style="list-style-type: none"> <li>◆ 减震器损坏或失效</li> <li>◆ Break or failure of shock absorber</li> </ul>	<ul style="list-style-type: none"> <li>◆ 严重超载</li> <li>◆ Overload seriously</li> <li>◆ 道路情况及其恶劣</li> <li>◆ Driving on harsh road</li> <li>◆ FH 值调整不当</li> <li>◆ Adjust the wrong FH</li> </ul>	<ul style="list-style-type: none"> <li>◆ 更换减震器</li> <li>◆ Change the shock absorber</li> </ul>



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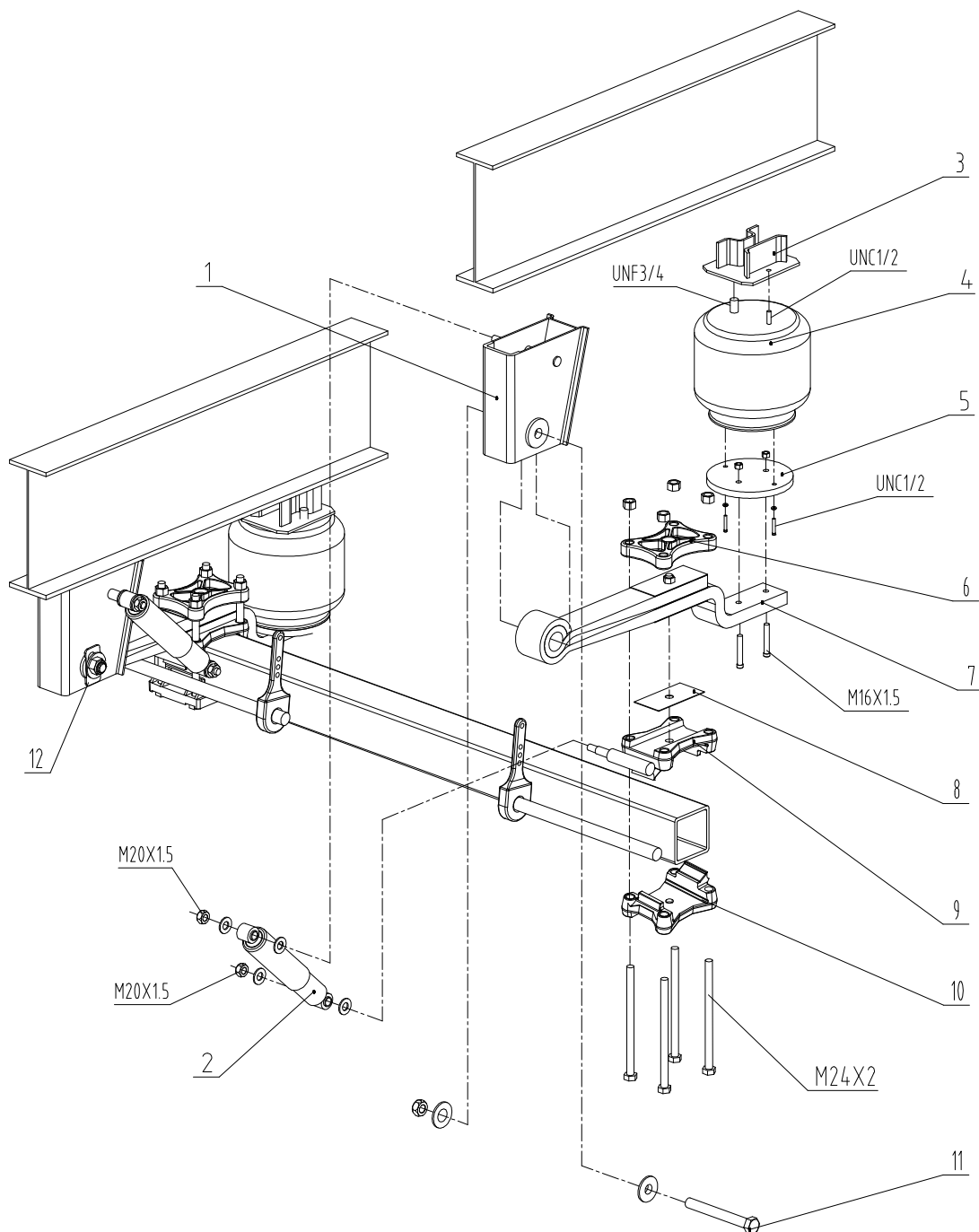
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## 空气悬架装配爆炸图 Spare Parts of Air Suspension

### 1、标准平台非提升桥装配爆炸图 Spare Parts of Standard Platform ( non-lift function)





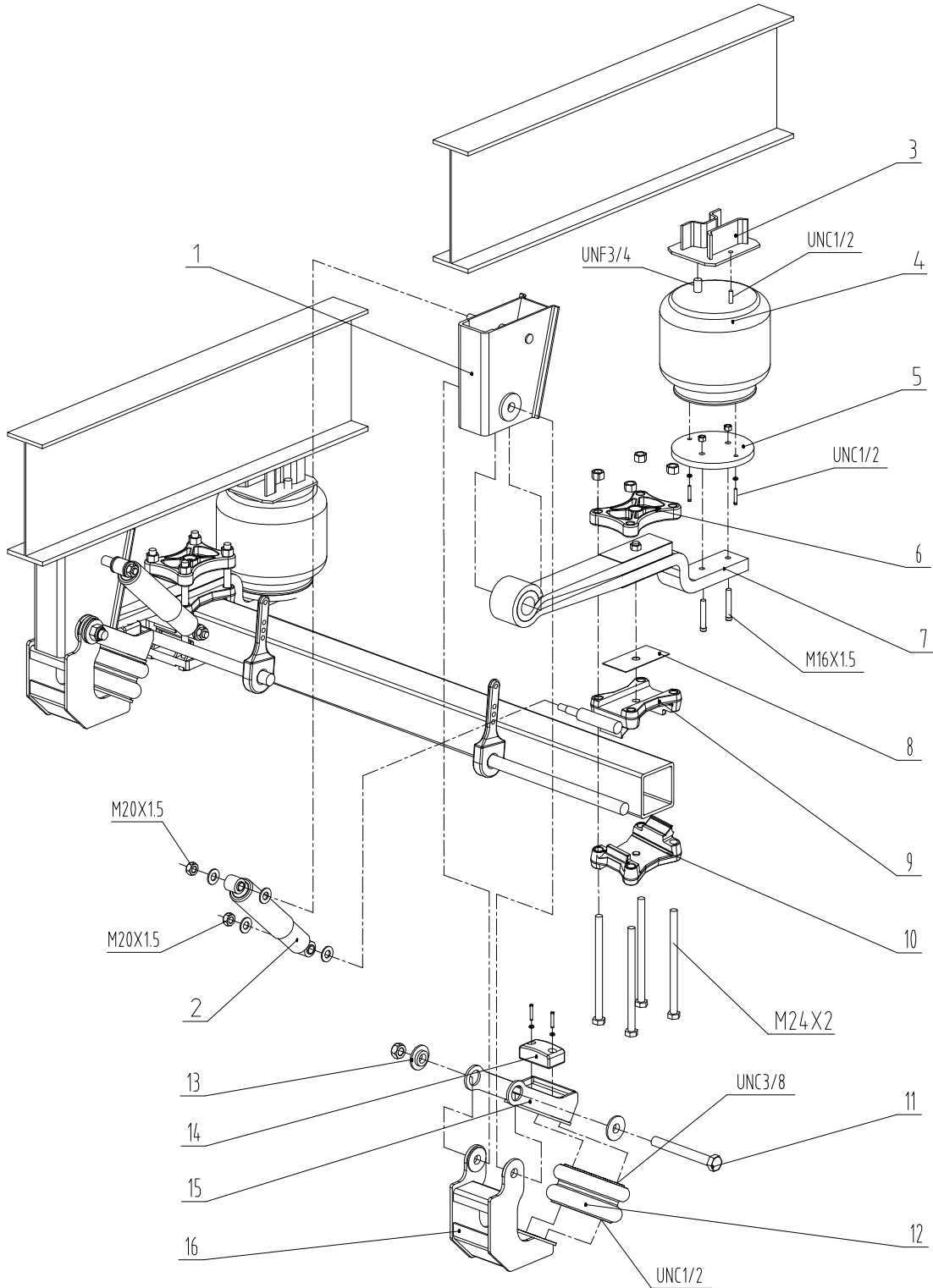
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## 2、 标准平台提升桥装配爆炸图 Spare Parts of Standard Platform (lift function)





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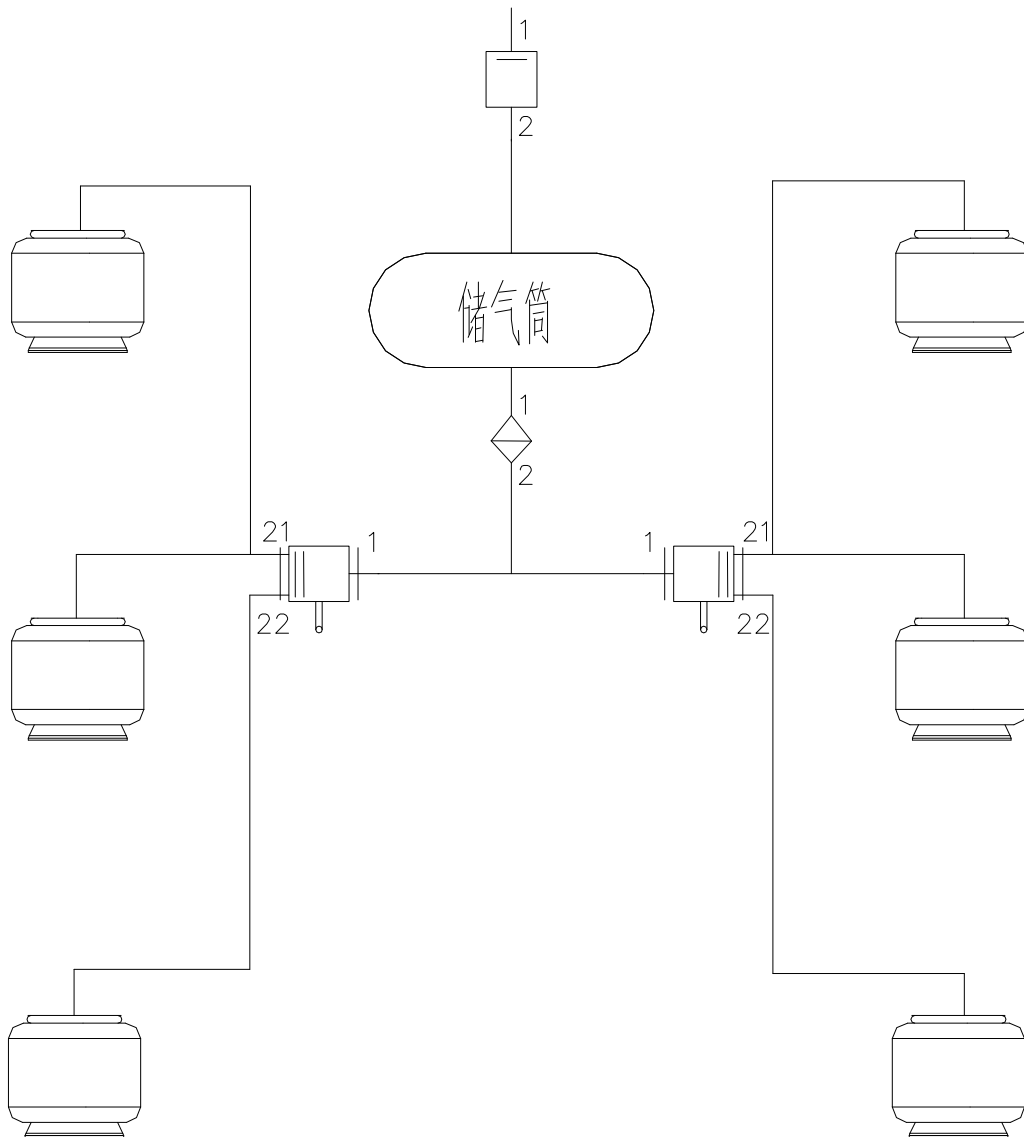
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## 空气悬架气路图 Control System of Air Suspension

### 1、标准三轴半挂车气路图 Standard Semi-trailer Control System(three axle)







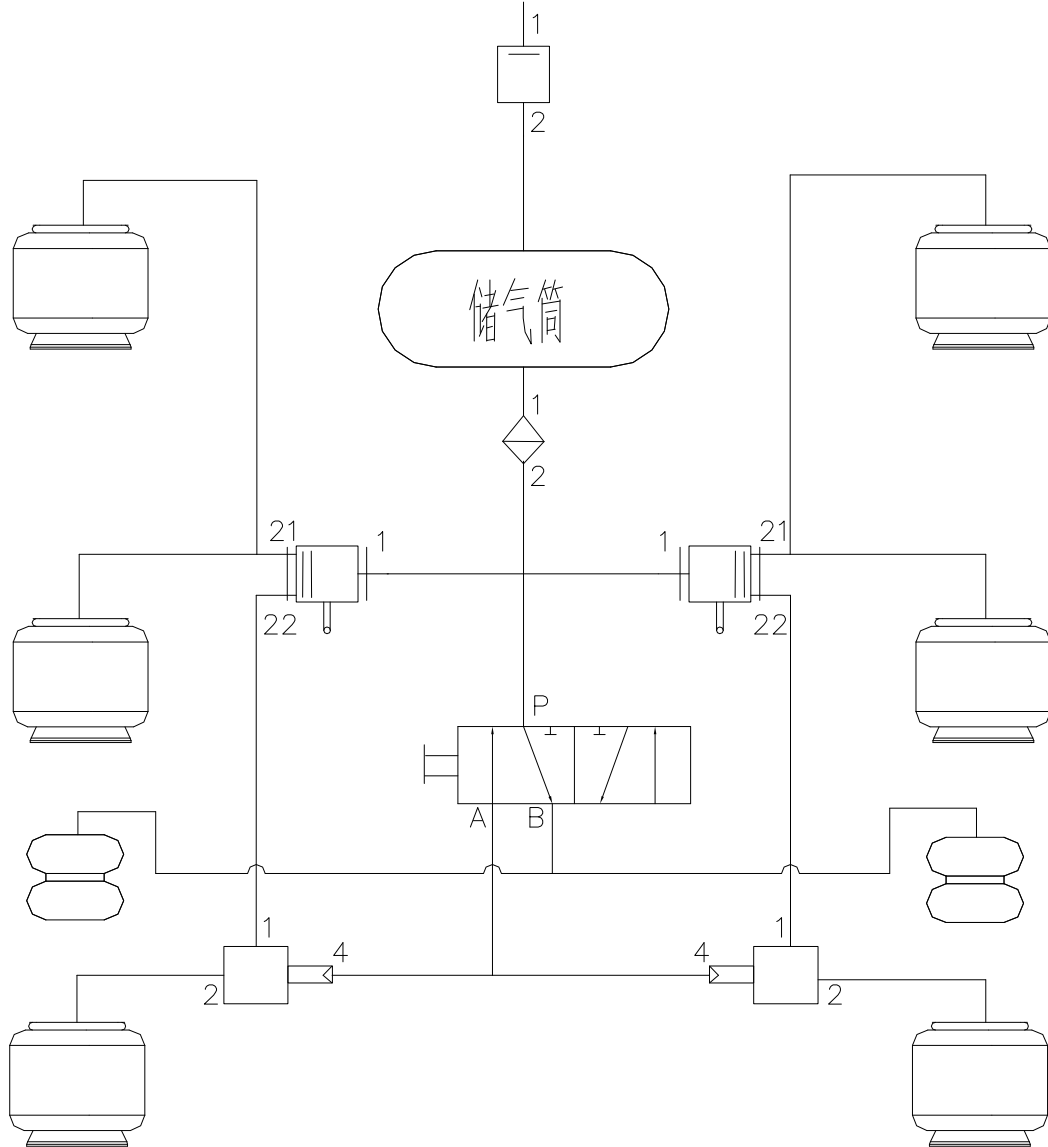
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2、三轴半挂一轴提升气路图 standard semi-trailer Control system(single axle)





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3、三轴半挂带升降功能气路图 standard semi-trailer Control system(lift function)

