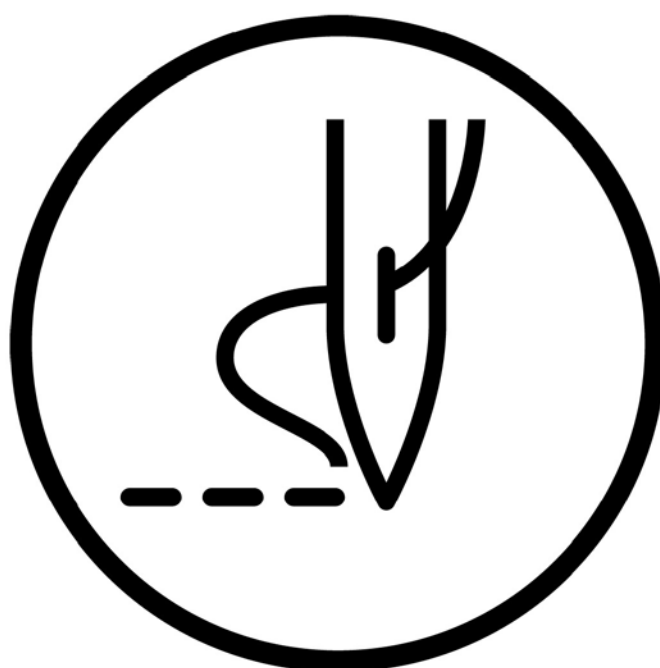


LS-1310G LS-2210G

使用说明书

在使用缝纫机之前请阅读本使用说明书。
请将本使用说明书放在便于查阅的地方保管。

直接驱动式
程序电脑花式机



非常感谢您购买本公司工业缝纫机。在使用缝纫机之前，请仔细阅读<为了您的安全使用>和使用说明书。



工业缝纫机的特性之一，因为要在机针和挑线杆等运动另部件附近进行作业，而这些另部件很容易引起受伤的危险，所以请在受过培训的人或熟练人员的安全操作知识的指导下，正确地使用本缝纫机。

为了您的安全使用

[1] 安全使用的标记及其意义

本使用说明书及产品所使用的标记和图案记号是为了您的安全而正确地使用产品,防止您及其他人受到危害和损害。表示方法及含意如下。

说明

 危险	该表示内容为如果忽视此标记而进行了错误的操作，必将导致死亡或重伤。
 注意	如果忽视此标记而进行了错误的操作，有可能会引起人员受伤及造成设备损坏。

图案和符号



.....该符号 (△) 表示 “应注意事项” 。
三角中的图案表示必须要注意的实质内容。
(例如，左边的符号表示 “当心受伤”。)



.....该符号 (⊘) 表示 “禁止” 。



.....该符号 (●) 表示 “必须” 。
圆圈中的图案表示必须要做的事情的实质内容。
(例如，左边的符号表示 “必须接地”。)

[2] 安全注意事项








危险














在关闭电源开关并将电源插头从插座上拔下后,至少等待 5 分钟,再打开控制箱盖。触摸带有高电压的区域将会造成人员伤亡。

注意

使用环境










-  请不要在有电源线干扰及静电干扰等有强电气干扰源影响的环境下使用。
强电气干扰源可能会影响缝纫机的正确操作。
-  电源电压的波动应该在额定电压的 $\pm 10\%$ 以内的环境下使用。
电压大幅度的波动会影响缝纫机的正确操作。
-  电源容量应大于设备的消耗电量。
电源容量不足会影响缝纫机的正确操作。
-  压缩空气的供气量应大于设备所要求的总耗气量。压缩空气的供气量不足可能会导致缝纫机的操作不正常。
-  环境温度应在 $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$ 的范围内使用。
低温或高温会影响缝纫机的正确操作。
-  相对湿度应在 $45\% \sim 85\%$ 的范围内,并且设备内不会形成结露的环境下使用。干燥或多湿的环境和结露会影响缝纫机的正确操作。
-  万一发生雷电暴风雨时,关闭电源开关,并将电源插头从插座上拔下。
雷电可能会影响缝纫机的正确操作。

安 装



-  请让受过培训的技术人员来安装缝纫机。
-  请委托购买商店或电气专业人员进行电气配线。
-  缝纫机重约 88Kg, 安装工作必须由两人以上来完成。
-  在安装完成前,请不要连接电源,如果误踩脚开关,缝纫机动作会导致受伤。
-  缝纫机头倒下或竖起时,请用双手进行操作。
另外在缝纫机头倒下的状态下,请不要用力压缝纫机。如缝纫机失去平衡,滑落到地上是造成受伤或缝纫机损坏的原因。
-  必须接地。接驳地线不牢固,是造成触电或误动作的原因。
-  所有电缆应固定在离活动部件至少 25mm 以外处。
另外,不要过度弯曲电缆或用卡钉固定得过紧,会引起火灾或触电的危险。
-   请在机头及马达上安装安全罩壳。
-  如果使用带小脚轮的工作台,则应该固定小脚轮,使其不能移动。
-  使用润滑油和黄油时,务必戴好保护眼镜和保护手套等,以防润滑油落入眼中或沾在皮肤上,这是引起发炎的原因。
另外,润滑油或黄油不能饮用,否则会引起呕吐和腹泻。
将油放在小孩拿不到的地方。

⚠ 注意










缝 纫

-  本缝纫机仅限于接受过安全操作培训的人员使用。
-  本缝纫机不能用于除缝纫外的任何其他用途。
-  使用本缝纫机时必须戴上保护眼镜。如果不戴保护眼镜，断针时就会有危险，机针的折断部分可能会弹入眼睛并造成伤害。
-  发生下列情况时，请切断电源。当误踩脚开关时，缝纫机动作会导致受伤。
 - 机针穿线时
 - 更换机针或梭芯时
 - 缝纫机不使用，或人离开缝纫机时。
-  如果使用带小脚轮的工作台，则应该固定小脚轮，使其不能移动。
-  为了安全起见，在使用本缝纫机之前，请安装保护装置。如果未安装这些安全装置就使用缝纫机，会造成人身伤害及缝纫机损坏。
-  缝纫过程中不要触摸任何活动部件或将物件靠在运动部件上，因为这会导致受伤或缝纫机损坏。
-  如果缝纫机操作中发生误动作，或者如果听到异常的噪声或闻到异常的气味，应立即切断电源。然后请与购买商店或受过培训的技术人员联系。
-  如果缝纫机出现故障时，请与购买商店或受过培训的技术人员联系。

清 洁

-  在开始清洁作业前，请切断电源。如果误踩了脚开关，缝纫机动作会导致人员受伤。
-  使用润滑油和黄油时，务必戴好保护眼镜和保护手套等，以防润滑油落入眼中或沾在皮肤上，这是引起发炎的原因。另外，润滑油或黄油不能饮用，否则会引起呕吐和腹泻。将油放在小孩拿不到的地方。

维 护 和 检 查

-  只有经过训练的技术人员才能进行缝纫机的维修、保养和检查。
-  与电气有关的维修、保养和检查请委托购买商店或电气专业人员进行。
-  发生下列情况时，请关闭电源。并拔下电源线插座。否则误踩下脚开关时，缝纫机动作会导致受伤。
 - 检查、调整和维修
 - 更换旋梭等消耗零部件
-  在检查、调整和修理任何使用气动装备的部件前，请断开气源，并等压力表指针下降到“0”为止。
-  缝纫机头倒下或竖起时，请用双手进行操作。另外在缝纫机头倒下的状态下，请不要用力压缝纫机。如缝纫机失去平衡，滑落到地上是造成受伤或缝纫机损坏的原因。
-  在必须接上电源开关进行调整时，务必十分小心遵守所有的安全注意事项。
-  请使用本公司指定的更换零部件。
-  取下的安全保护装置，再次安装时，请务必安装在原位上，并检查能否正确地操作。
-  未经授权而对缝纫机进行改装而引起的缝纫机损坏不在保修范围内。

[3] 警告标签

缝纫机上有列警告标签。


当使用缝纫机时，请遵守标签上的说明。如果标签脱落或模糊不清，请和购买商店联系。

1


⚠ 危险			
			
触摸高压电部分，会导致受伤。 在切断电源5分钟后，再开启盖罩。			
⚠ DANGER	⚠ GEFAHR	⚠ DANGER	⚠ PELIGRO
Hazardous voltage will cause injury. Turn off main switch and wait 5minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung öffnen.	Un voltage non adapte provoque des blessures. Eteindre l'interrupteur et attendre 5 minutes avant d'ouvrir le capot.	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.

2


⚠ 注意	
	
触摸运动部分，易造成受伤。所以在装上安全保护装置后，再进行缝纫操作。在切断电源后，进行穿线，更换梭芯，机针和做清扫，调整工作。	
⚠ CAUTION	
Moving parts may cause injury. Operate with safety devices. Turn off main switch before threading, changing bobbin and needle, cleaning etc.	

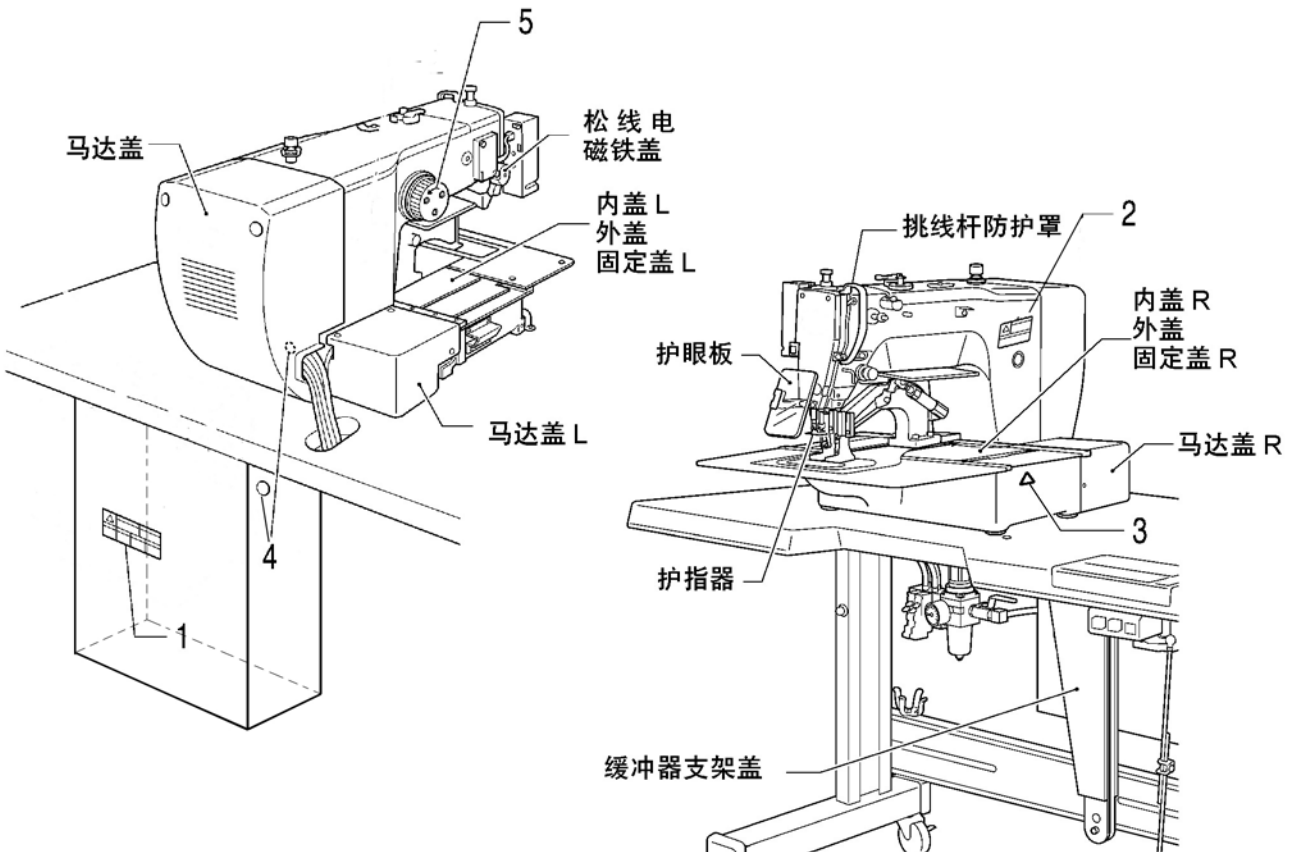
3  缝纫机头倒下或竖起时，请小心别夹住您的手指。

安全保护装置
 护眼板，护指器，
 挑线杆防护罩，马达盖，
 松线电磁铁盖，内盖，外盖，
 固定盖，缓冲器支架盖等

4  必须保证接地。如果接地不可靠，很有可能受到严重电击，操作也可能出现问题。



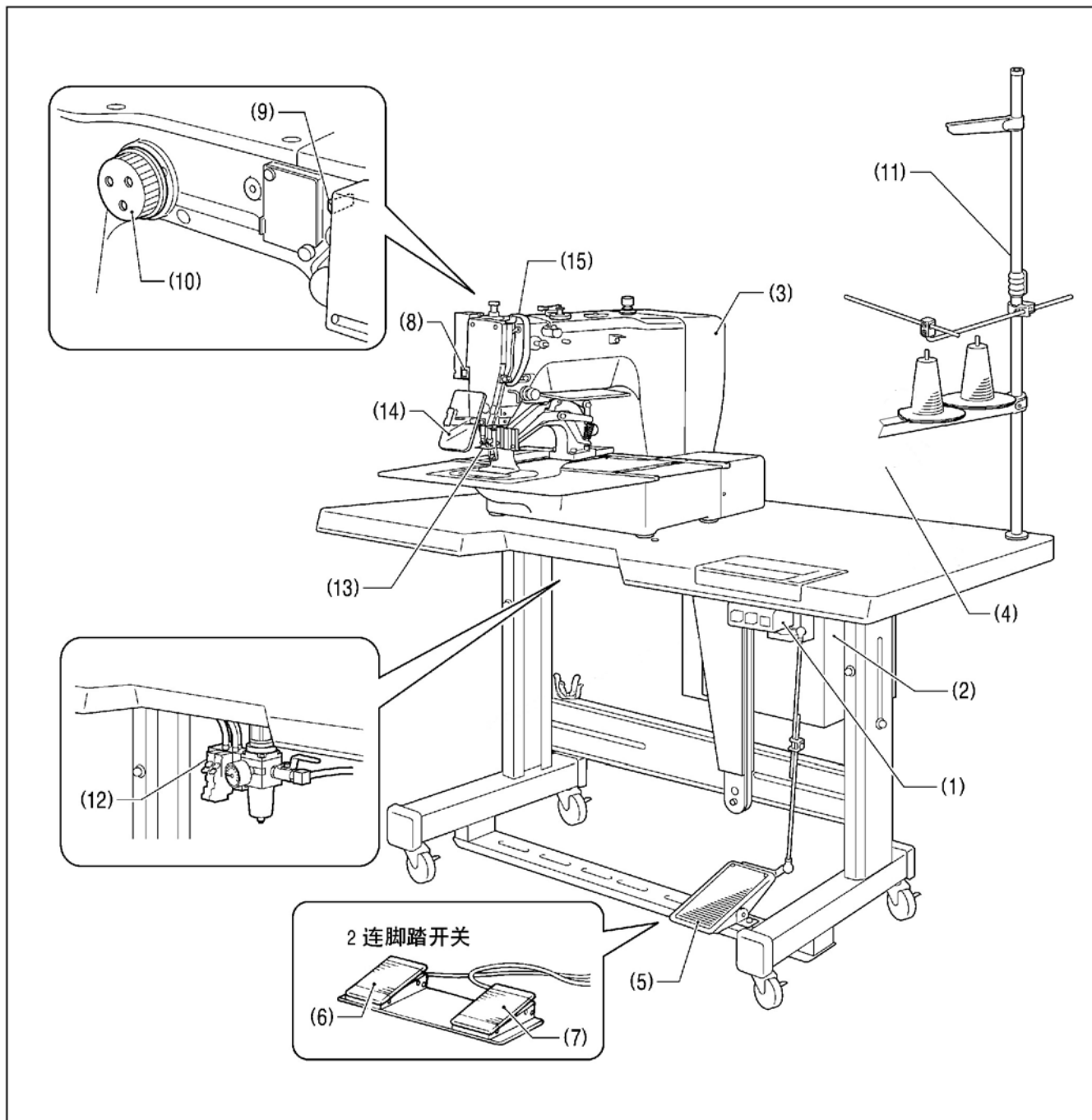
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1. 各部件名称

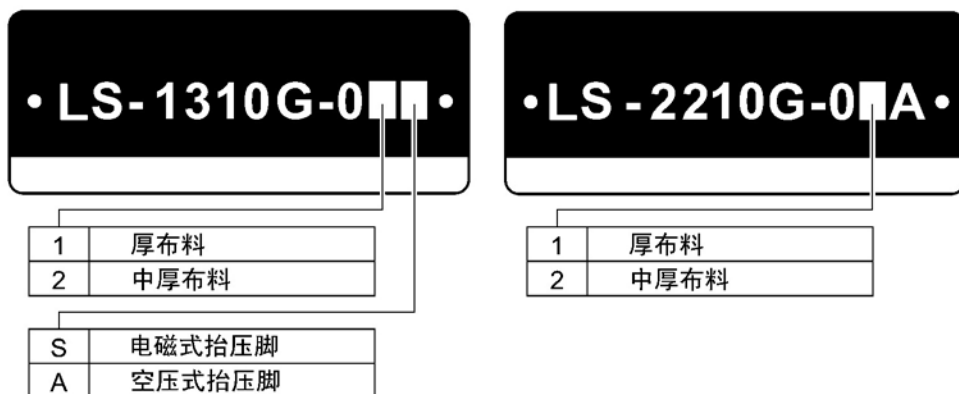


- (1) 电源开关
- (2) 控制箱
- (3) 马达罩
- (4) 操作盘
- (5) 脚踏开关（电磁规格）
- (6) 启动开关（空压规格）
- (7) 压脚开关（空压规格）
- (8) 暂停开关
- (9) 扫线用开关
- (10) 手轮
- (11) 线架
- (12) 电磁阀（空压规格）

安全保护装置

- (13) 护指器
- (14) 护眼板
- (15) 挑线杆防护罩

2. 规格



使用的缝纫机	平缝花样缝缝纫机（带大旋梭）
线迹形式	单针平缝
最高缝纫速度	2,700rpm
缝纫尺寸（X×Y）	LS-1310G: 最大 130×100 mm, LS-2210G: 最大 220×100 mm
送布驱动方式	间歇送布（脉冲马达驱动）
针距	0.1~12.7mm
针数	内存 400,000 针（※）
最大针数	20,000 针（1 个程序）
抬压脚驱动方式	电磁规格：脉冲马达驱动，空压规格：空压式
压脚上升量	电磁规格：最大 25mm，空压规格：最大 30mm
2 段压脚	电磁规格：左右一体式压脚，空压规格：左右分离式压脚
间歇压脚上升量	20mm
间歇压脚行程	可调范围：0 ~ 8 mm
使用的旋梭	半回转 2 倍旋梭（标准旋梭另买）
扫线装置	标准装备
切线装置	标准装备
数据存储方式	内存 / U盘
最多花样存储数量	1000
马达	AC 伺服马达 750W
重量	头部：约 88kg，操作盘：约 0.6kg
电源	单相 100V / 220V、3 相 200V / 220V / 380V / 400V 400VA
空气压力	0.5 Mpa 1.8 l/min

※ 根据各个程序的针数的不同，能够存储的缝纫数据和针数也不同的。

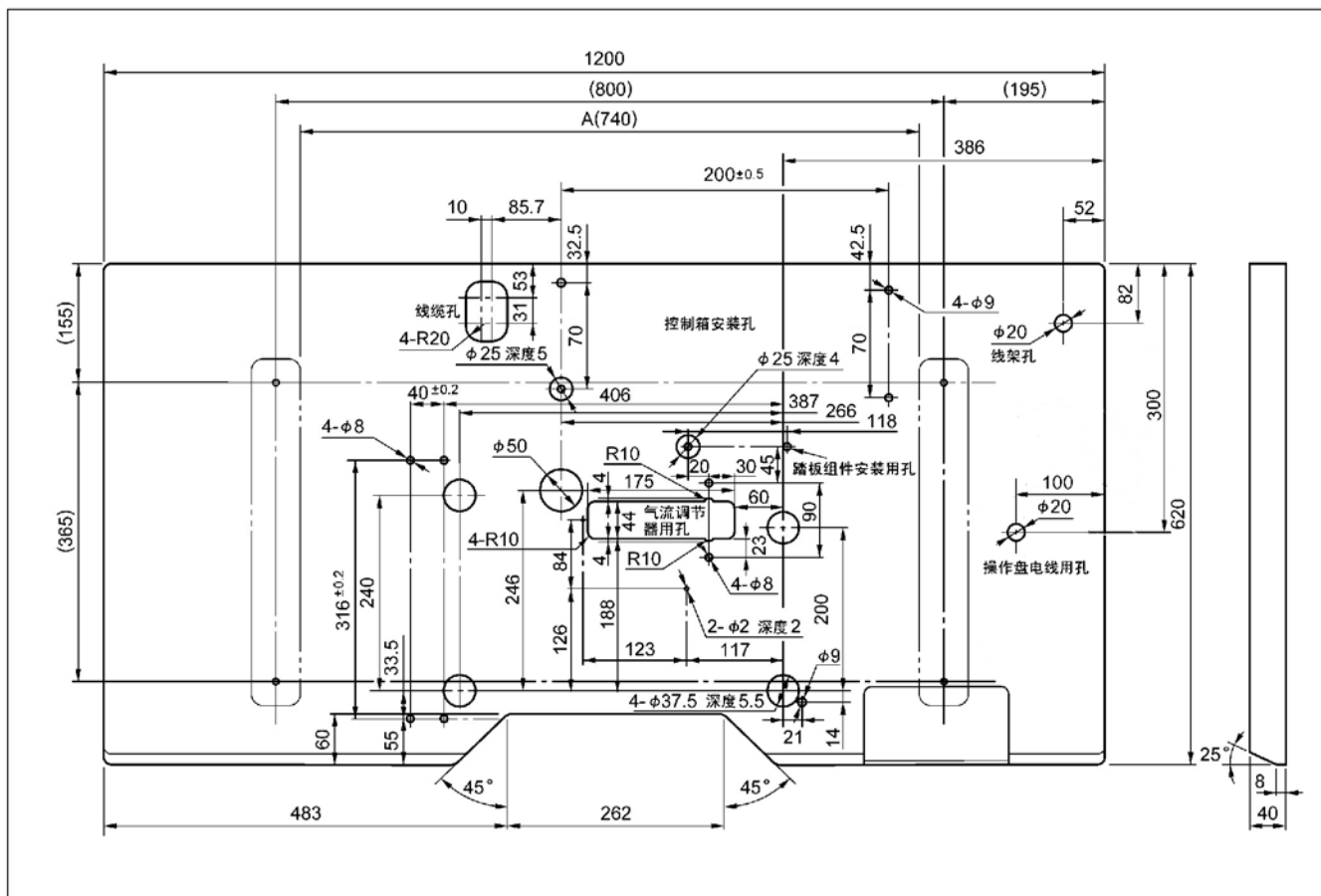
3. 安装方法

注意

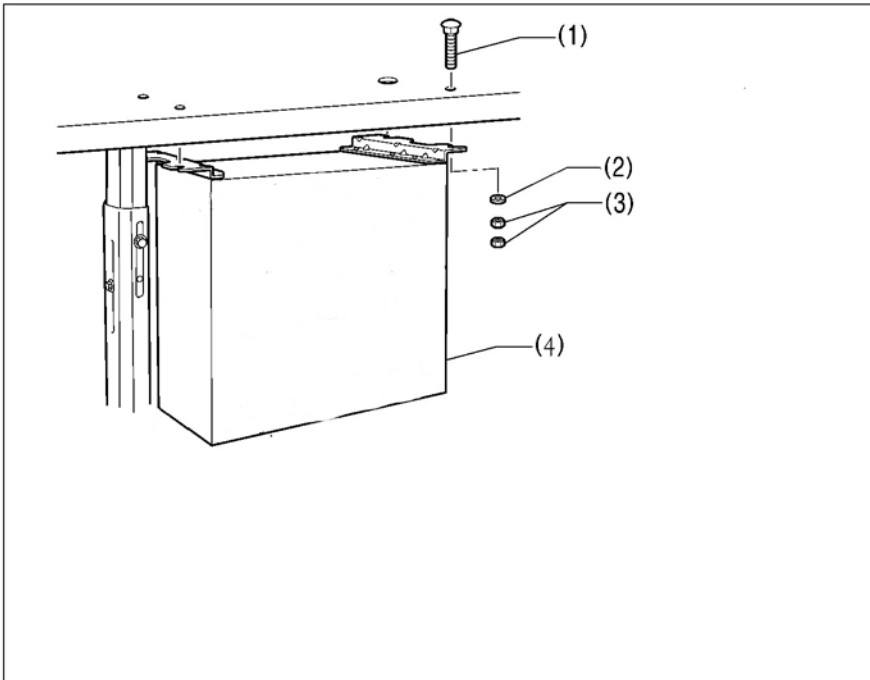
- ⊘ 请让受过培训的技术人员来安装缝纫机。
- ⚠ 请委托购买商店或电气专业人员进行电气配线。
- ⚠ 缝纫机重约 88Kg, 安装工作必须由两人以上来完成。
- ⊘ 在安装完成前, 请不要连接电源, 如果误踩脚开关, 缝纫机动作会导致受伤。
- ⚠ 缝纫机头倒下或竖起时, 请用双手进行操作。
另外在缝纫机头倒下的状态下, 请不要用力压缝纫机。如缝纫机失去平衡, 滑落到地上是造成受伤或缝纫机损坏的原因。
- ⚠ 所有电缆应固定在离活动部件至少 25mm 以外处。另外, 不要过度弯曲电缆或用卡钉固定得过紧, 会引起火灾或触电的危险。
- ⚠ 必须接地。接驳地线不牢固, 是造成触电或误动作的原因。
- ⚠ 请在机头及马达上安装安全罩壳。

3-1. 台板加工图

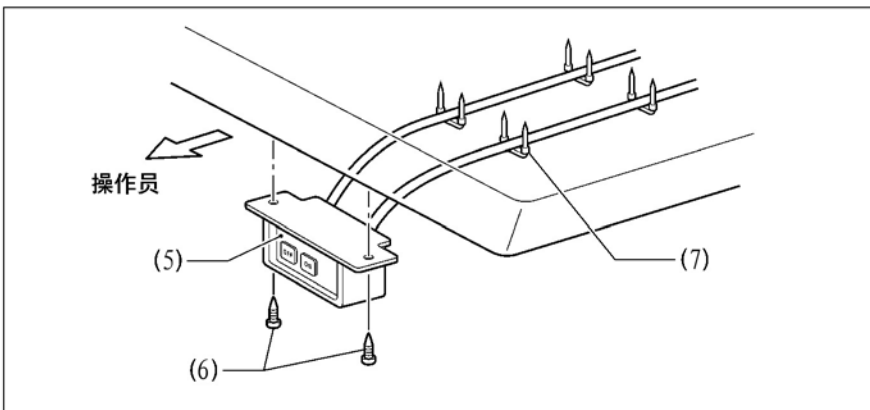
- 台板的厚度应达 40mm, 能够承受缝纫机的重量, 并经的起缝纫机的震动。
- 请确认控制箱应离开机脚 10mm 以上。如果控制箱过于靠近机脚, 则可能会引起缝纫机的误动作。



3-2. 控制箱的安装方法

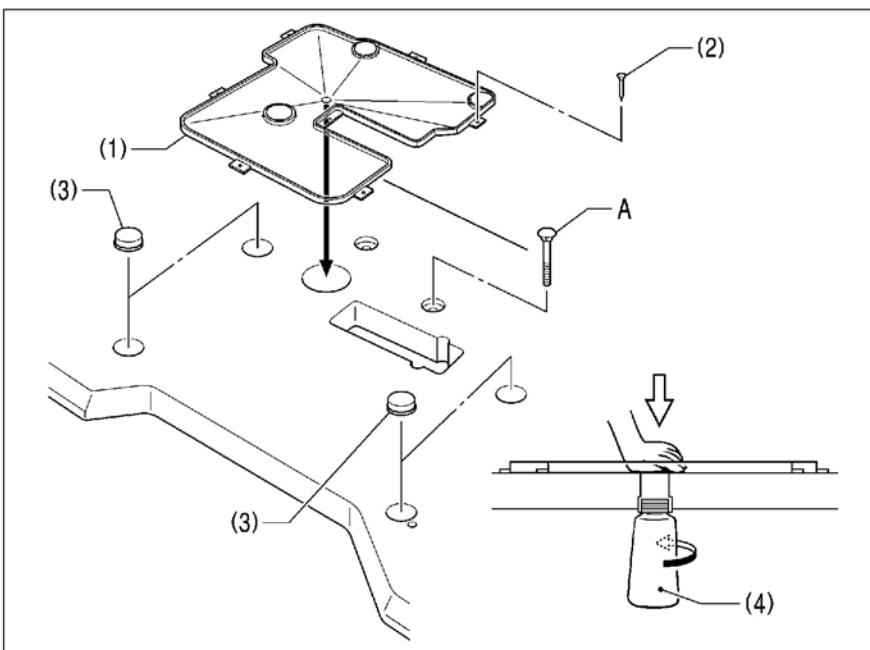


- (1) 螺栓 [4个]
- (2) 垫圈 [4片]
- (3) 螺母 [8个]
- (4) 控制箱



- (5) 电源开关
- (6) 螺钉 [2个]
- (7) U形卡钉 [4个]

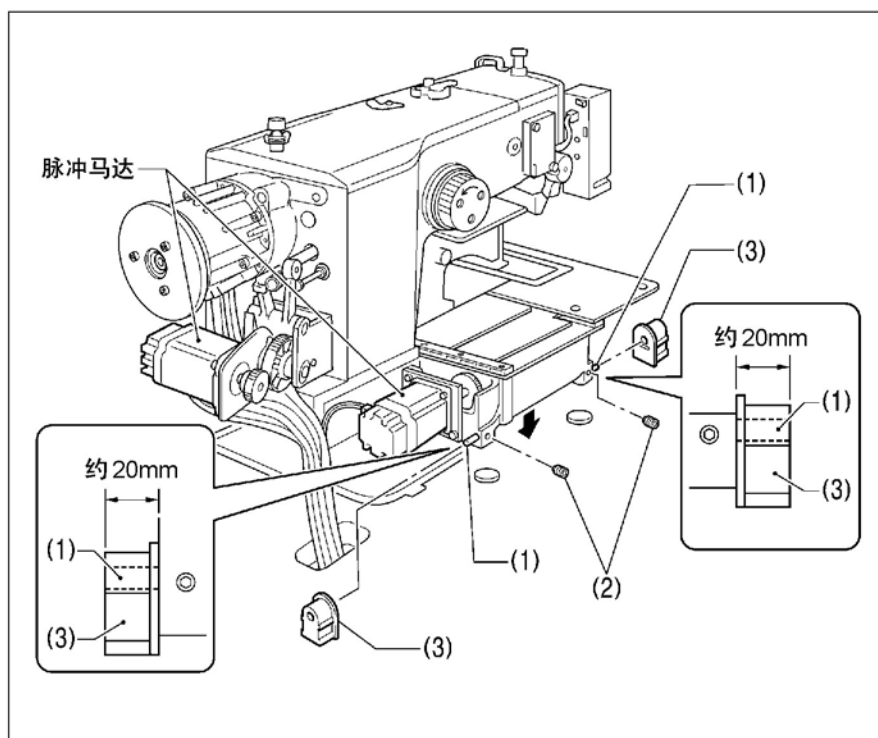
3-3. 油盘的安装方法



当使用电磁规格时，在安装油盘前，请先装上用于踏脚用复合件的螺栓（A）。
（参考[3-7. 踏脚用复合件的安装方法（电磁规格）]）

- (1) 油盘
- (2) 钉 [7个]
- (3) 防震橡皮 [4个]
- (4) 注油罐

3-4. 缝纫机头部的安装方法

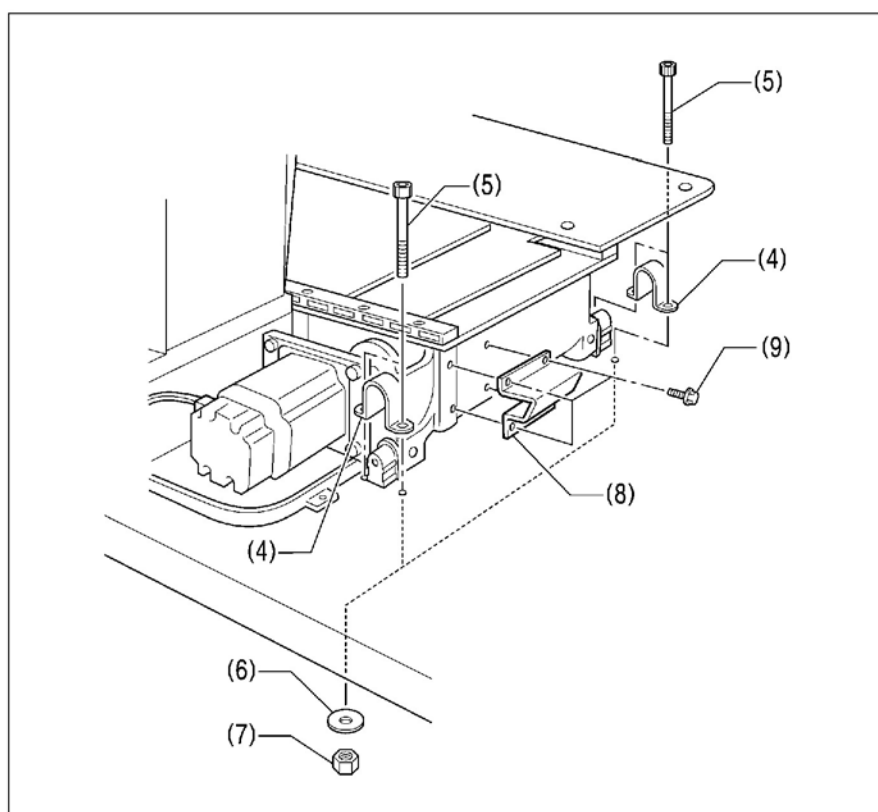


- (1) 机头支撑销 [2 个]
- (2) 螺钉 [2 个]
- (3) 机头铰链橡皮组 [2 个]

将机头轻轻地放在油盘、防震橡皮上。

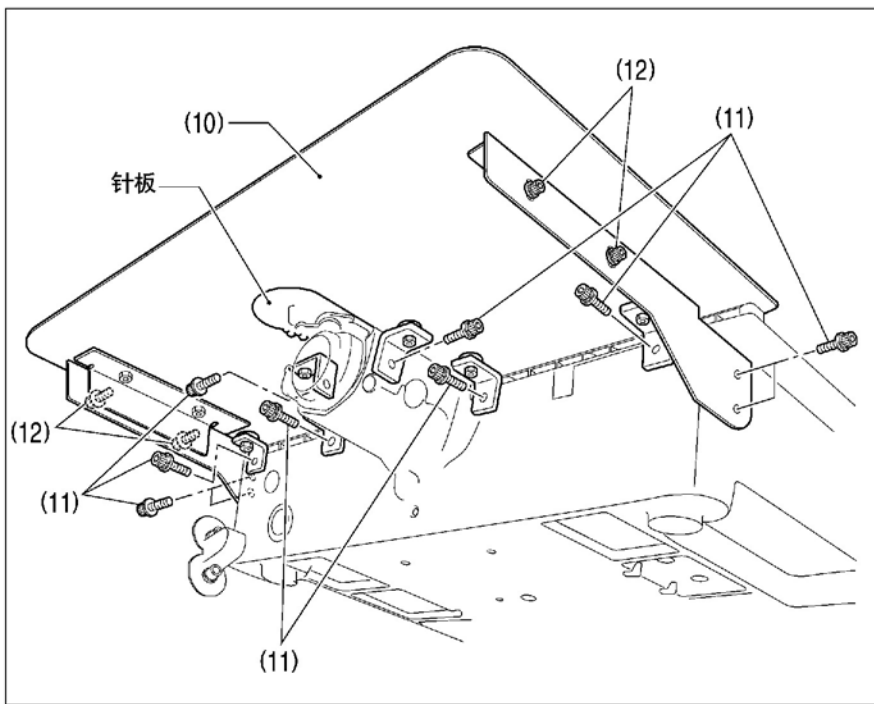
注意:

- 请注意不要让电线夹在机头和油盘之间。
- 在拿机头时, 请不要握住脉冲马达。否则可能会引起脉冲马达的故障。



- (4) 机头铰链套 [2 个]
- (5) 螺栓 [4 个]
- (6) 垫圈 [4 片]
- (7) 螺母 [4 个]
- (8) 机头撑杆
- (9) 螺栓带垫圈 [4 个]

3. 安装方法



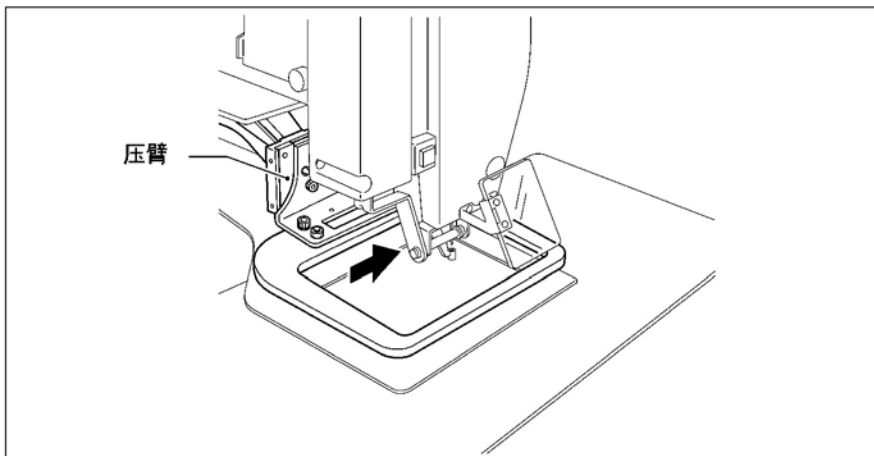
(10) 针板辅助板

(11) 螺栓带垫圈 [10个]

为了使针板辅助板(10)和针板在同一高度平面, 旋松螺栓带垫圈(12)进行调整。

注意:

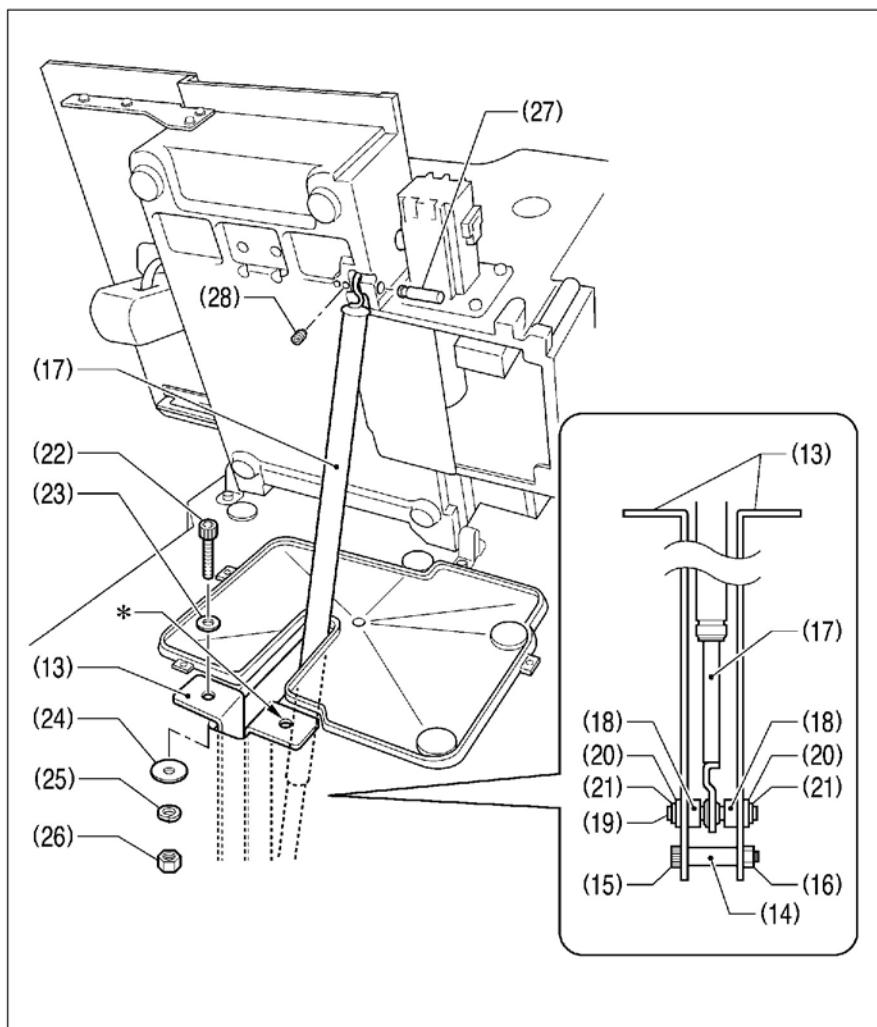
请将针板辅助板水平安装。



从缝纫机正面将压臂移动到最右侧(图中箭头方向)之后, 慢慢地将缝纫机头部倒下。

注意:

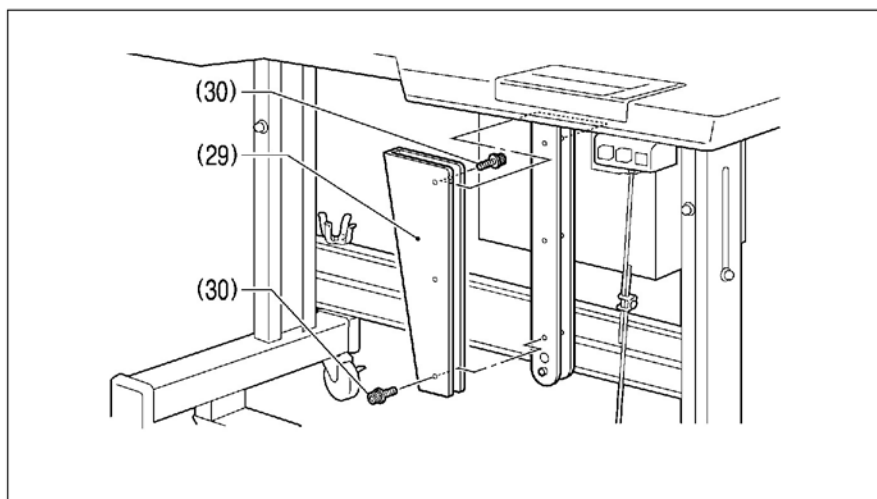
缝纫机头部的操作请2个人以上, 使用双手慢慢地将缝纫机头部倒下。



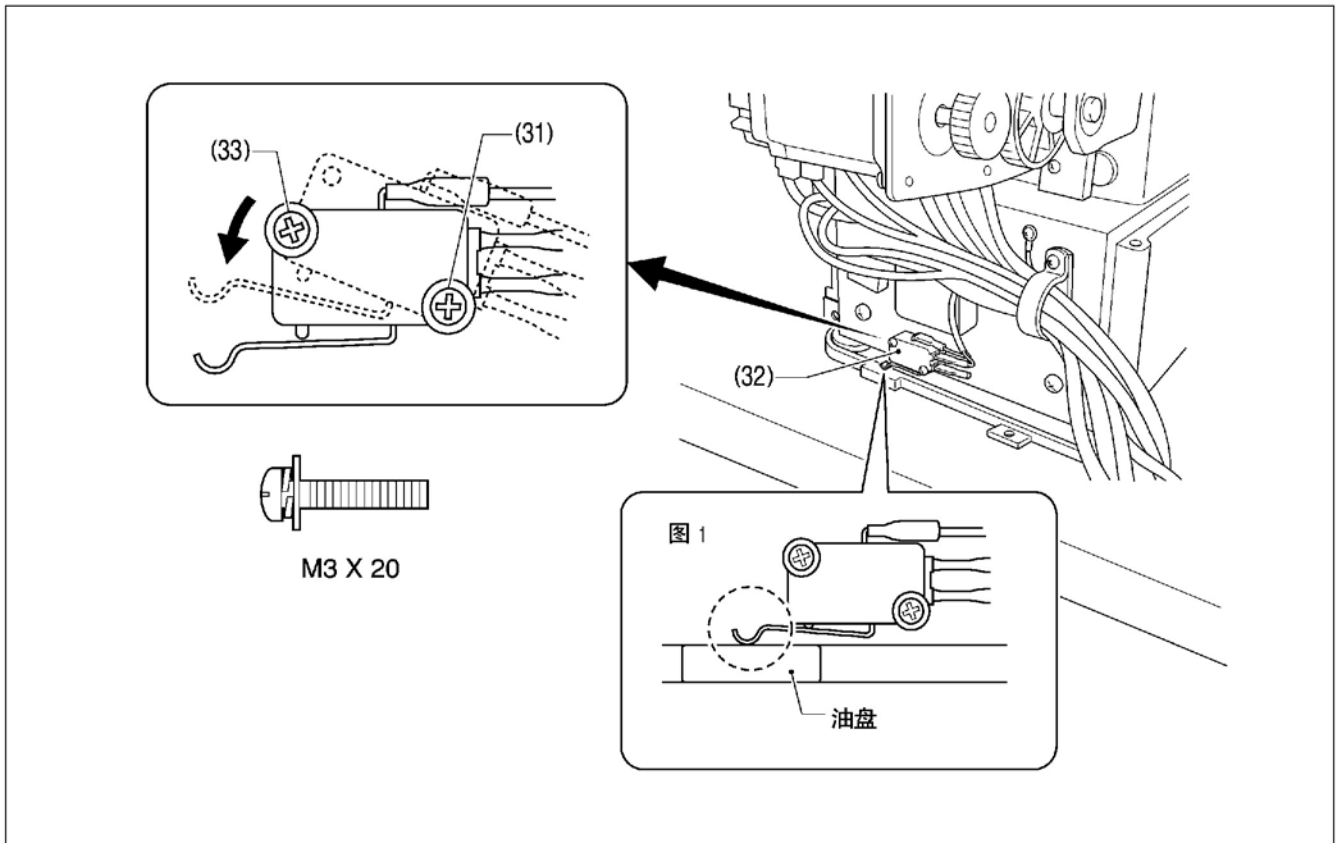
- (13) 缓冲器支架 [2 片]
- (14) 垫片
- (15) 螺栓
- (16) 螺母
- (17) 缓冲器
- (18) 轴套 [2 个]
- (19) 缓冲器轴 D
- (20) 垫圈 [2 片]
- (21) 制动轮 E [2 个]
- (22) 螺栓 [2 个]
- (23) 垫圈 (中) [2 片]
- (24) 垫圈 (大) [2 片]
- (25) 弹簧垫圈 [2 片]
- (26) 螺母 [2 个]
- (27) 缓冲器轴 U
- (28) 螺钉

注意:

如果是电磁规格时，印有*的请使用螺栓(22)、垫圈(23)、垫圈(24)、弹簧垫圈(25)、螺母(26)，将踏脚用复合件一起拴住。(参考「3-6. 踏脚用复合件的安装方法(电磁规格)」)



- (29) 缓冲器支架盖
- (30) 螺栓带垫圈 [6 个]

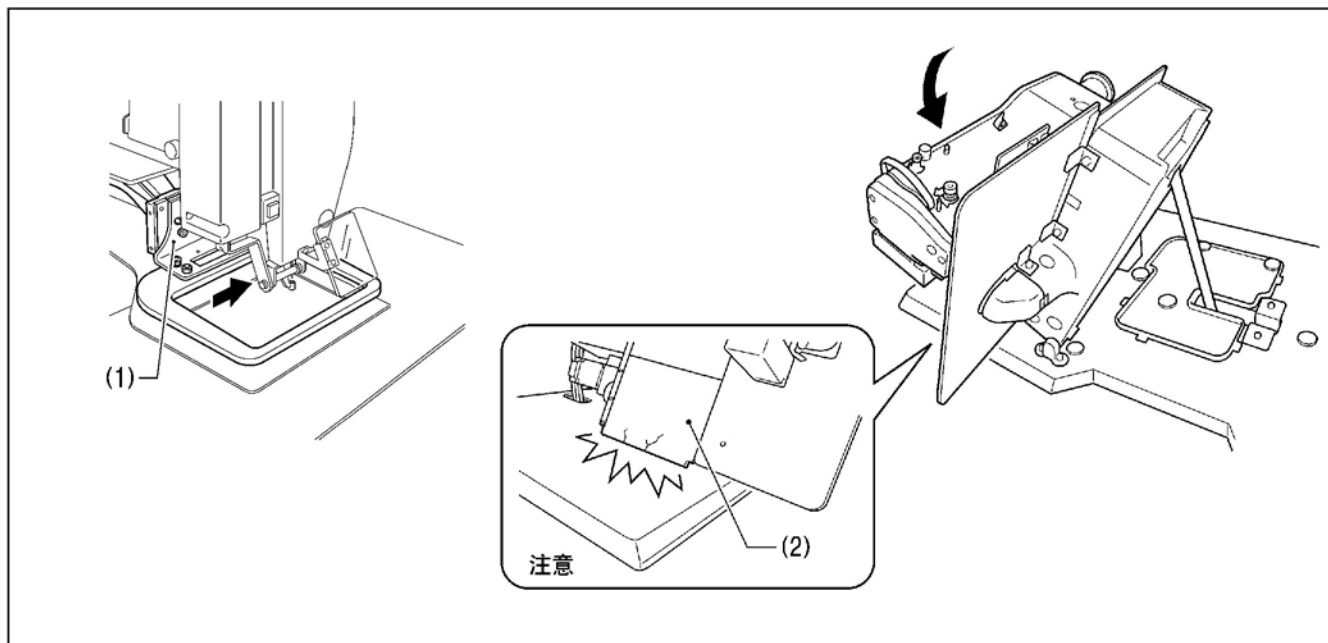


- 慢慢地将机头返回到原位。
- 松开螺钉(31)，在如图所示的位置上安装头部开关(32)，使用螺钉(31)和附属螺钉 M3X20(33)将头部开关(32)固定。
- 如图 1 所示，确认接通头部开关(32)。

注意：

如未接通头部开关，则会有错误提示。

3-5. 缝纫机头部的倒下

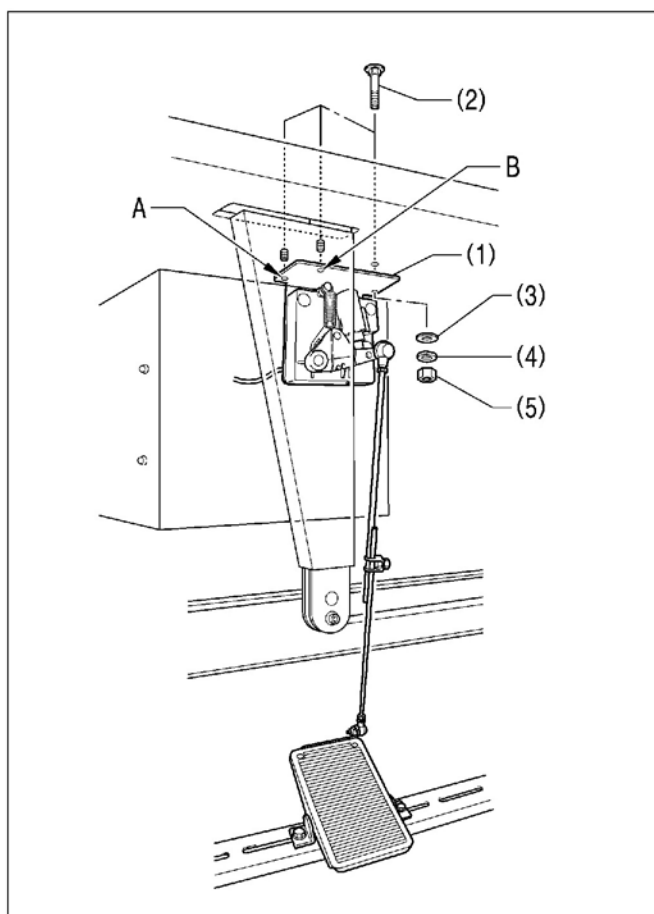


1. 从缝纫机正面将压臂(1)移动到最右侧(图中箭头方向)。
2. 使用双手慢慢地将缝纫机头部向工作台的左侧倒下。

注意:

倒下缝纫机头部时,请一定将压臂移动到最右侧之后再倒下缝纫机头。如果压臂留在左侧倒下缝纫机头部时,外盖 L (2) 有可能会破损。

3-6. 踏脚用复合体的安装方法(电磁规格)



- (1) 踏脚用复合件
- (2) 螺栓 [3 个]
- (3) 垫圈 [3 片]
- (4) 弹簧垫圈 [3 片]
- (5) 螺母 [3 个]

注意:

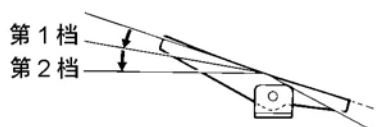
- 安装孔 A 的螺栓,请在装油盘前安装。(参考「3-3. 油盘的安装方法」)
- 安装孔 B 是为了安装缓冲器支架用的螺栓,垫圈,弹簧垫圈和螺母用的。(参考「3-4. 缝纫机头部的安装方法」)

※ 脚踏开关和连杆请使用市售商品。

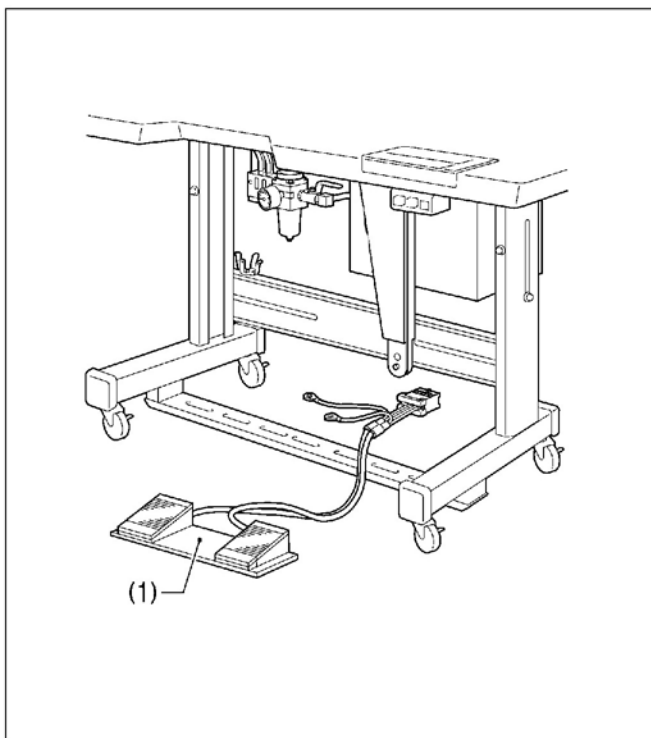
※ 当踏脚用复合体的位置要更改时,请使用附属的螺栓,垫圈,弹簧垫圈和螺母。

<脚踏开关的操作法>

踩下脚踏开关到第 1 挡为止时压脚会放下,在踩到第 2 挡为止时缝纫机将启动。



3-7. 2 连脚踏开关的安装方法（空压规格）

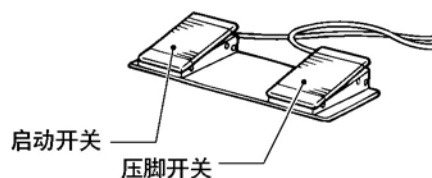


(1) 脚踏开关

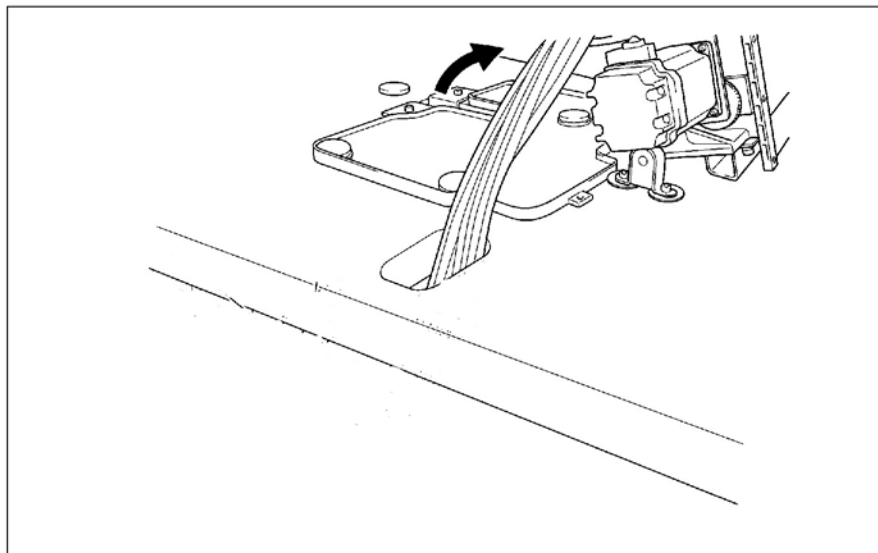
将脚踏开关(1)的插头插入电控箱的X8端口处。

<脚踏开关的操作法>

当踩下压脚开关（右侧）时外压脚会放下，当踩下启动开关时（左侧）时缝纫机将启动。



3-8. 线缆的连接

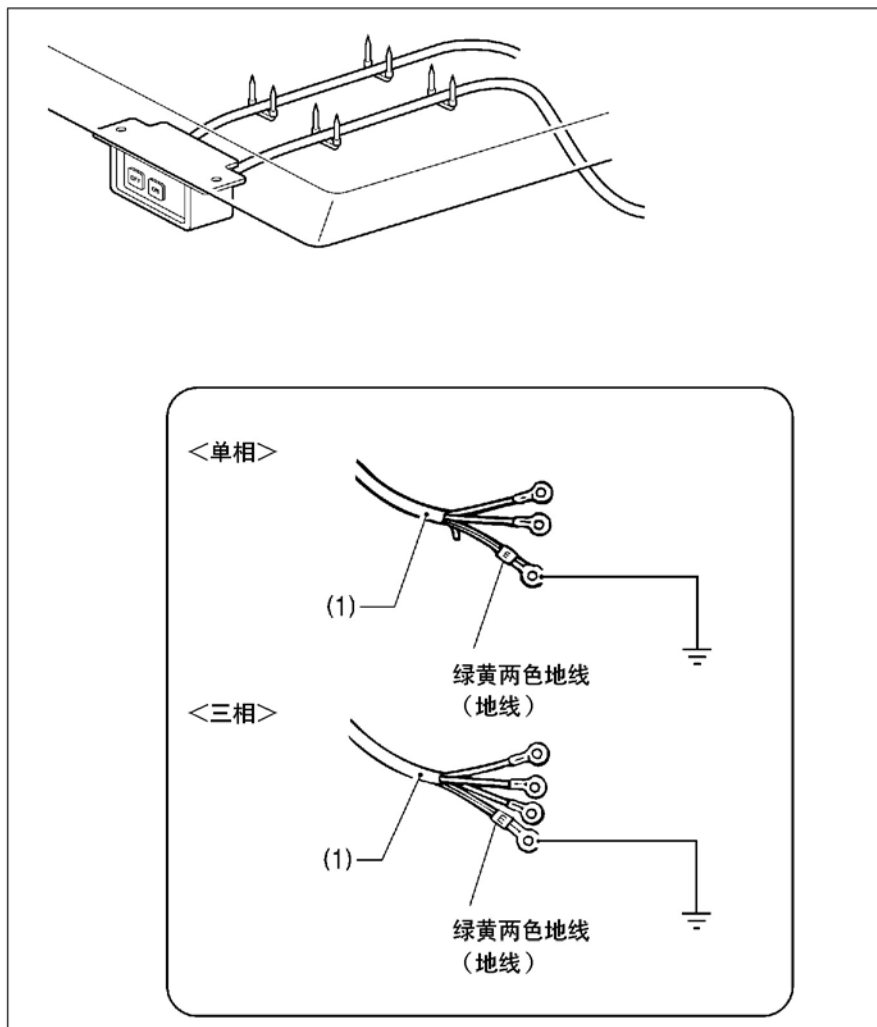


1. 慢慢地将缝纫机头部倒下。
2. 将电线束穿过台板上的孔。
3. 按照插头和电控箱接口处的编号将插头插入。

注意：

- 请注意插头的插入方向，要一直插到确实锁定为止。
- 用捆线箍带、线夹固定电线，在固定时应注意不要拉伸插头。

3-9 . 电源线的连接

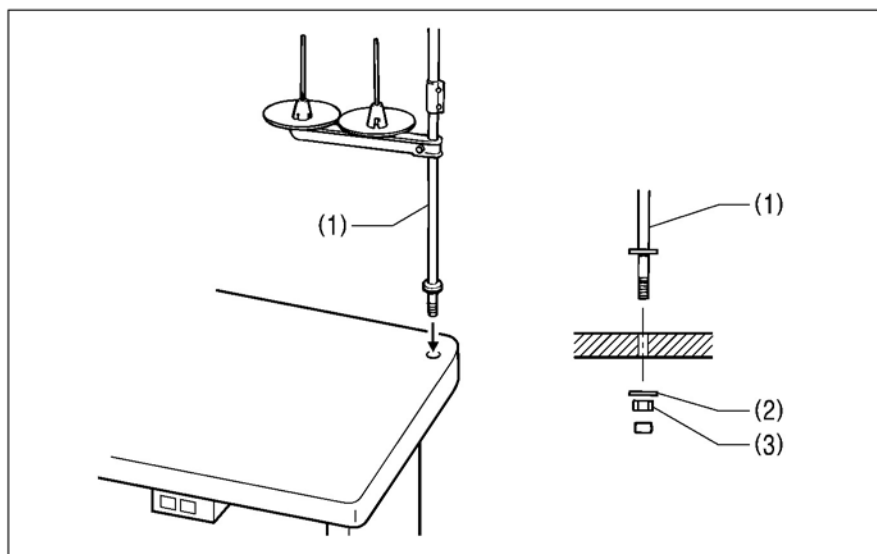


1. 在电源线(1)上加装适当的插头。
(绿黄两色线为地线。)
2. 将插头正确地插入 AC 电源插座。

注意:

勿使用延长线缆, 否则会导致缝纫机故障。

3-10. 线架的安装方法

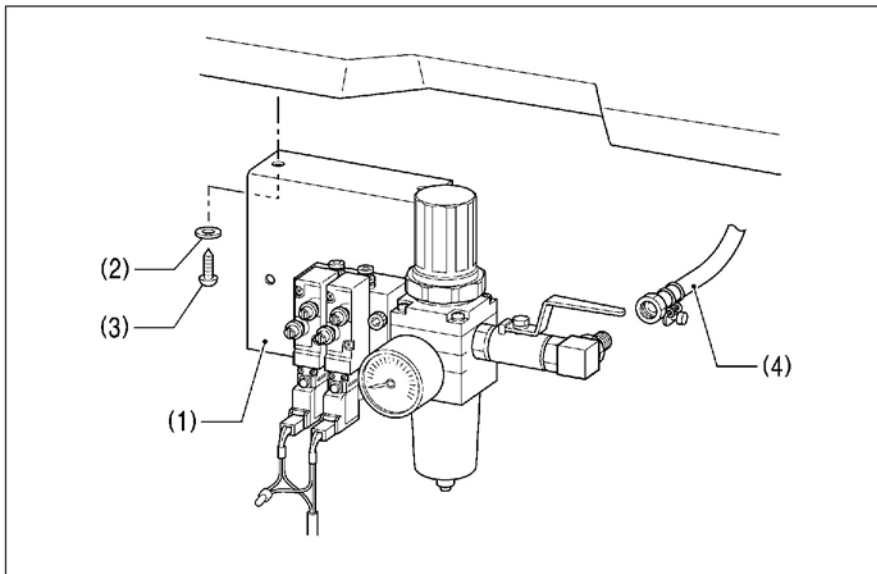


- (1) 线架

注意:

按装上垫圈 (2), 请拧紧螺母 (3)
使线架完全不能移动。

3-11. 空压用复合件的安装方法（空压规格）



安装在工作台的下面。

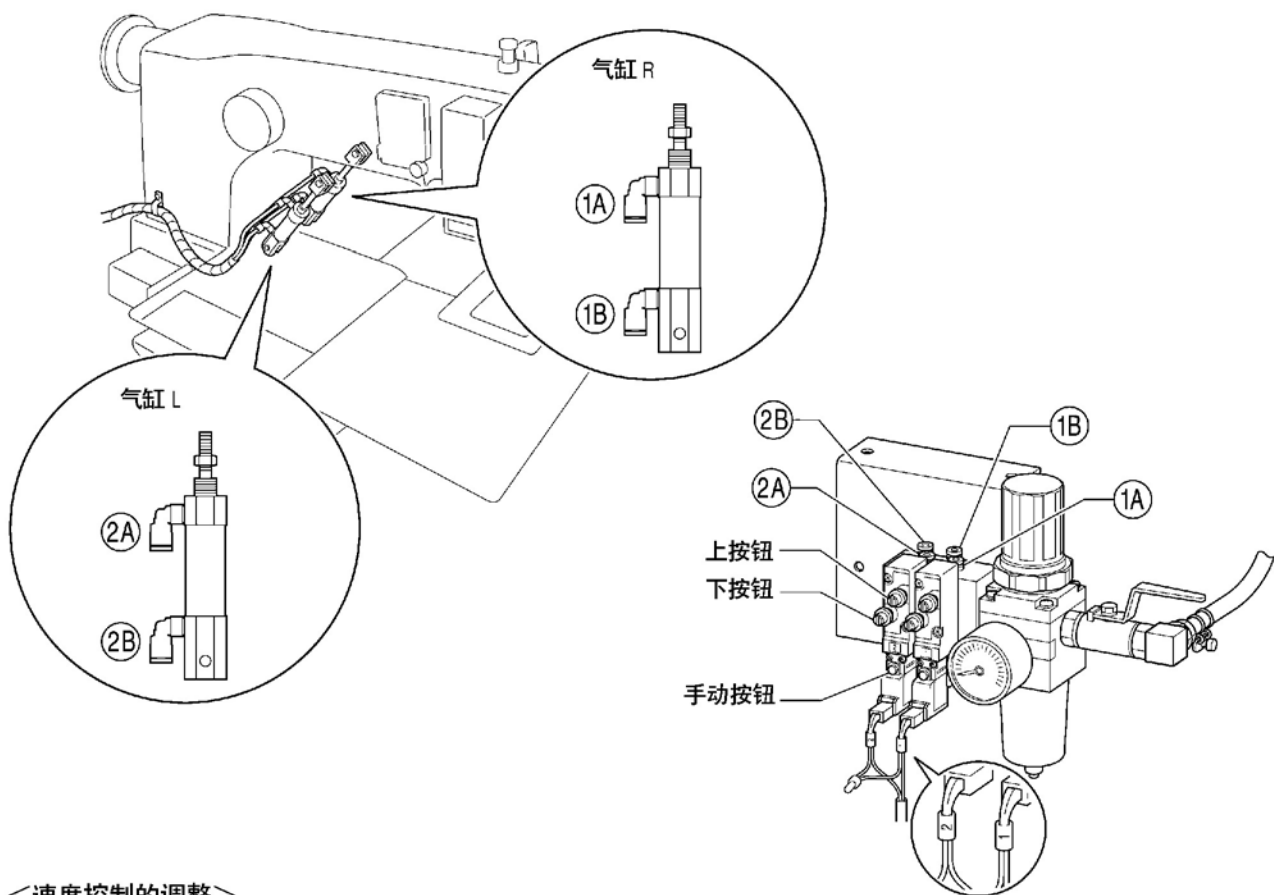
- (1) 电磁阀组
- (2) 垫圈 [2 片]
- (3) 螺钉 [2 个]
- (4) 皮管

安装好空压用复合件后, 请进行空气压力的调整。(参考「7-16. 空气压力的调整」)

注意:

安装空压用复合件时, 请不要碰到控制箱和工作台脚。

将各空气管的同样号码连接在一起。



<速度控制的调整>

使用阀门的按钮可以调整压脚的上升和下降的速度。

请使用调节按钮, 让左右的压脚以同样的速度进行作动。

- 旋紧上按钮, 压脚的上升速度会变缓慢。反之, 如旋松上按钮, 压脚的上升速度会变快。
- 旋紧下按钮, 压脚的下降速度会变缓慢。反之, 如旋松下按钮, 压脚的下降速度会变快。

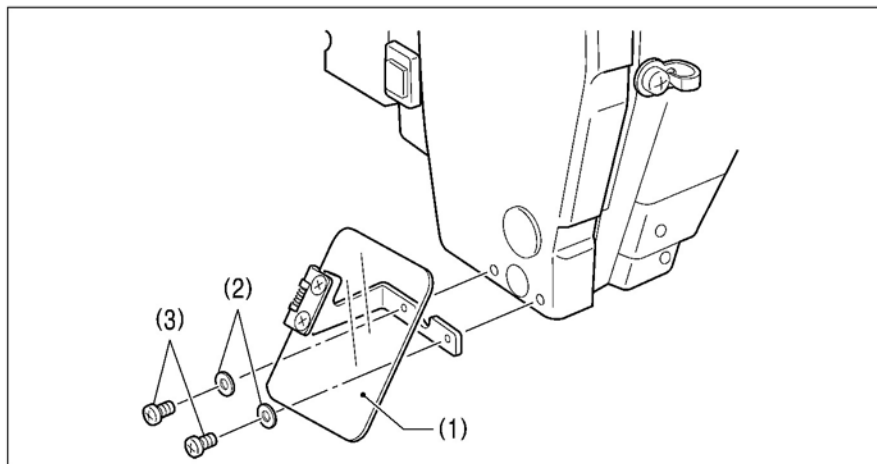
在切断电源的状态下, 如使用手动按钮能使压脚运动。

3-12. 护眼板的安装方法

注意

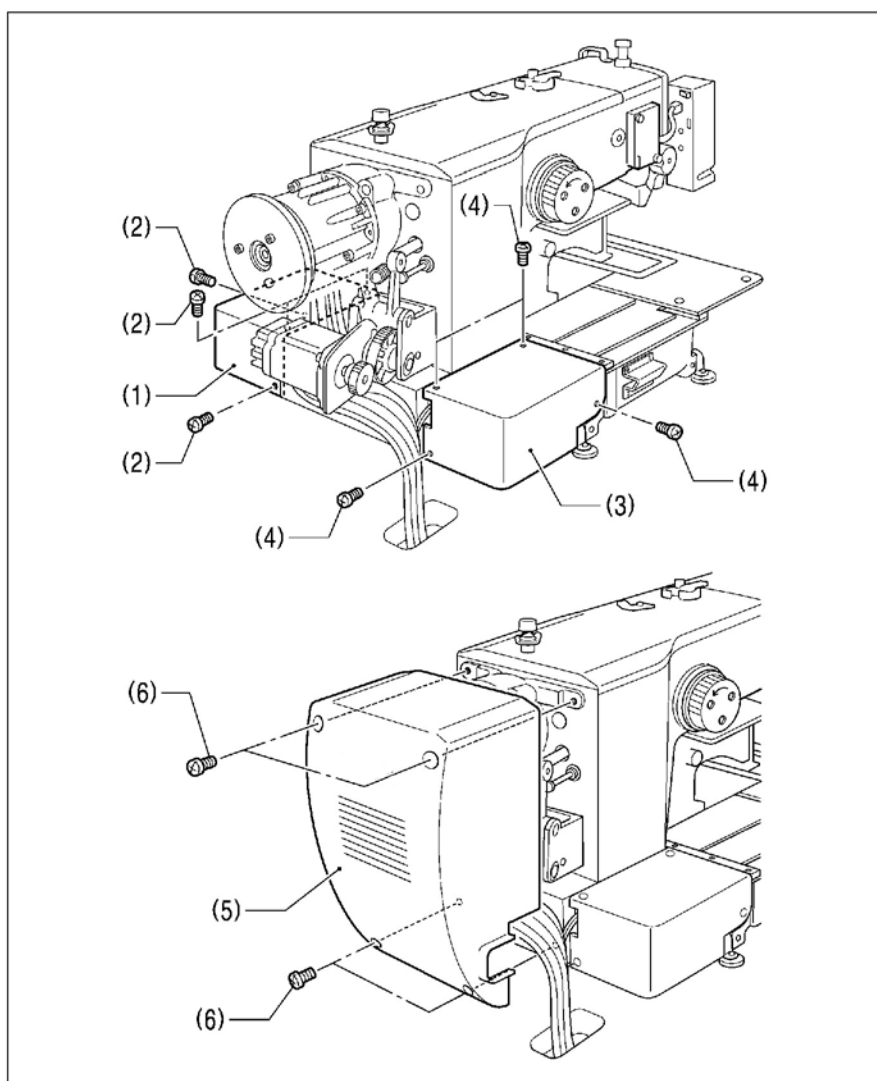
为了安全起见, 在使用本缝纫机之前, 请安装保护装置。

如果未安装这些安全装置就使用缝纫机, 会造成人身伤害及缝纫机损坏。



- (1) 护眼板组件
- (2) 垫圈 [2 片]
- (3) 螺钉 [2 个]

3-13. 马达盖的安装方法



- (1) 马达盖 R
- (2) 螺钉 [4 个]
- (3) 马达盖 L
- (4) 螺钉 [4 个]
- (5) 马达盖
- (6) 螺钉 [4 个]

注意:

在安装马达盖 (1) 时, 请注意不要夹住电线等。

3-14. 加油

⚠ 注意



在加油未完成前，请勿插上电源。
如果误踩脚踏开关，缝纫机动作会导致受伤。

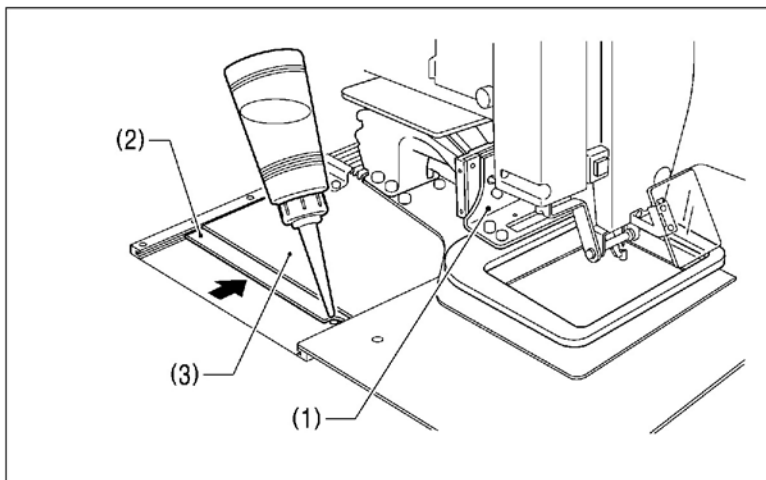


使用润滑油和黄油时，务必戴好保护眼镜和保护手套等，以防润滑油落入眼中或沾在皮肤上，这是引起发炎的原因。

另外，润滑油或黄油不能饮用，否则会引起呕吐和腹泻。
将油放在小孩拿不到的地方。

必须经常润滑缝纫机，第一次使用缝纫机或长时间未使用缝纫机时，要补充机油。
请使用本公司指定的缝纫机润滑油。

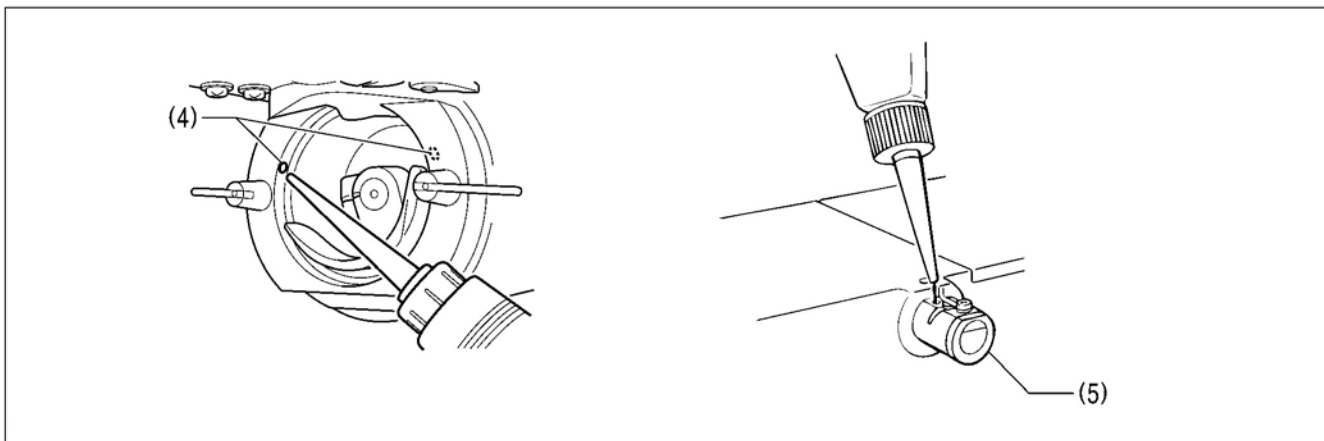
* 如果难于买到，作为推荐机油请使用〈Exxon Mobil 公司的 ESSOTEX SM10; VG10〉。



从缝纫机正面将压臂(1) 移动到最右侧，将外盖 L (2) 滑动到内盖 L(3) 的中间，使底板的油孔能看见，从该油孔向底板侧面的油箱注油。

注意：

当油面下降到油面指示窗的 1 / 3 左右时，请务必加注机油。如果油面下降到油面指示窗的 1 / 3 以下，则可能会成为机器烧伤等故障的原因。



3. 给大旋梭本体组件的 2 个孔 (4) 注入机油，使毛毡上含有微量的机油。

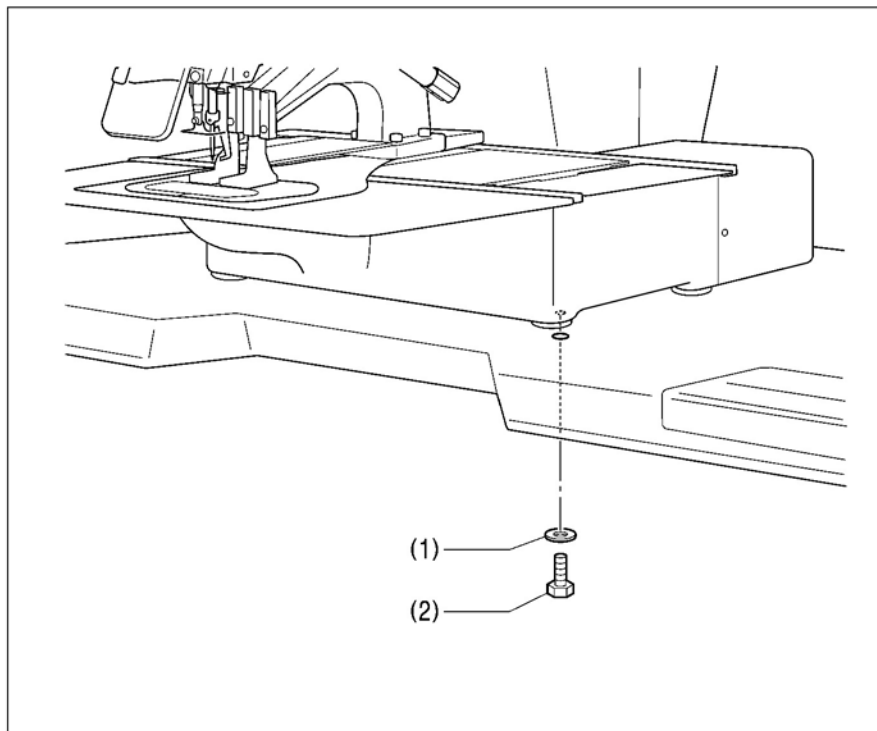
注意：

如果大旋梭本体组件的毛毡上没有机油，则可能会成为缝纫故障的原因。

4. 如果使用冷却液槽(5)时，请在槽中注入硅油 (100mm²/s)。

3-15. 机头部固定螺栓的安装法

在搬运缝纫机时，请使用机头部固定螺栓将头部和工作台固定。



(1) 垫圈

(2) 机头部固定螺栓

注意：

缝纫机运转时，请将机头部固定螺栓拆除。

4. 缝纫前的准备

4-1. 机针的安装方法

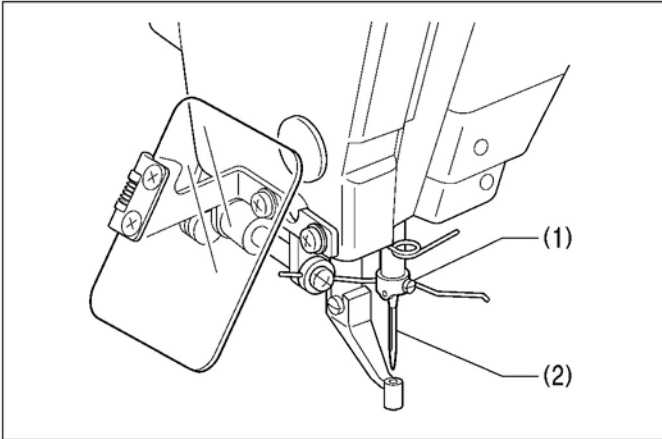


注意



安装机针时，请切断电源。

当误踩下脚开关时，缝纫机动作会导致人员受伤。

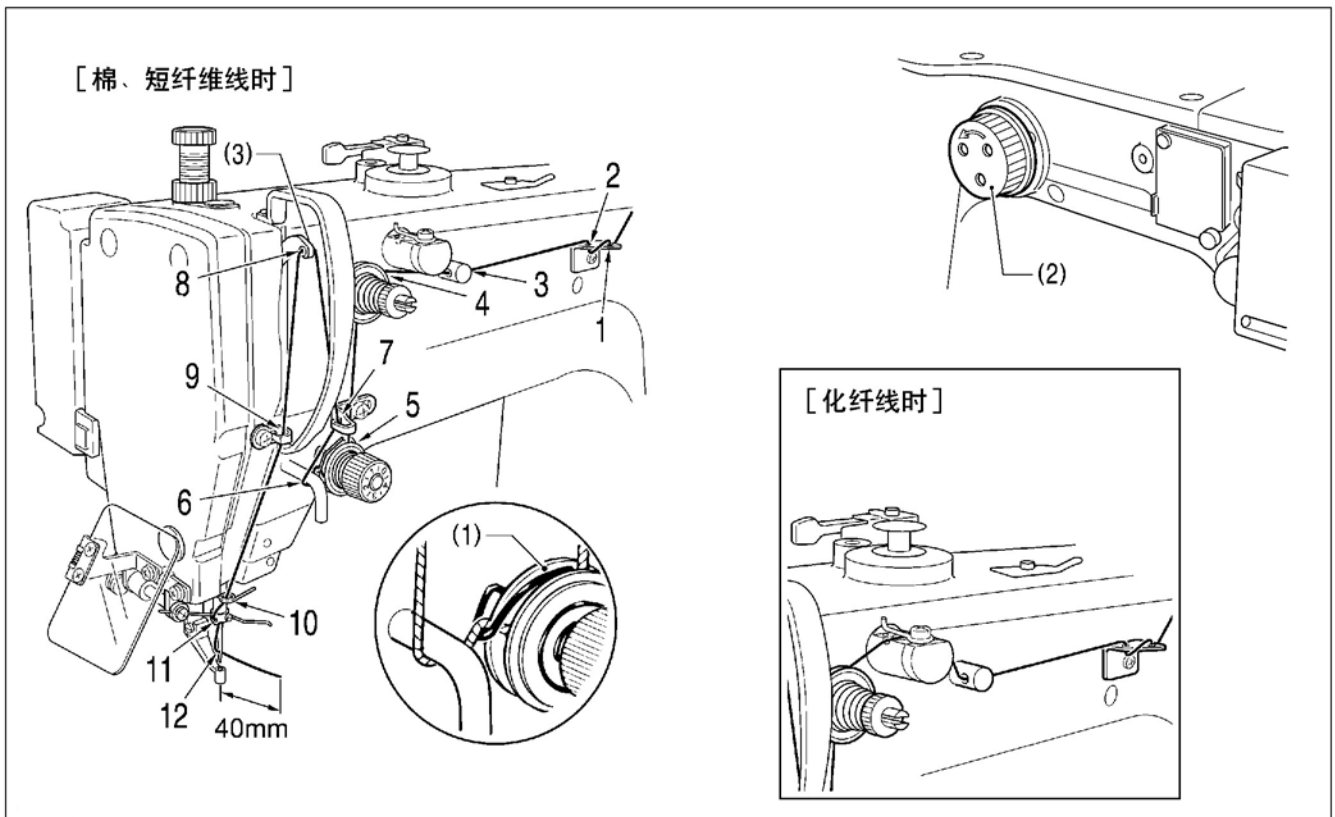


1. 松开螺钉 (1)。
2. 正面朝着机针 (2) 的长槽，笔直插到底并用用力拧紧止动螺钉 (1)。

4-2. 面线的穿法

请按照下图所示正确地穿面线。

※ 在操作面板主界面P1中按下中压脚下降按键，夹线盘 (1) 将变成打开状态，机线就更加便于穿过。

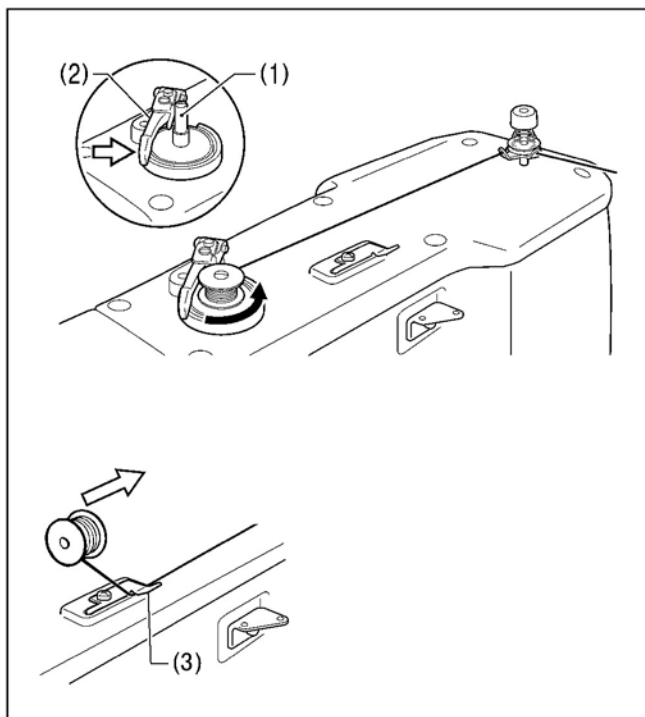


- 请回转缝纫机手轮(2)，将挑线杆(3)调到最高点后，进行穿线。
(容易穿线，且可防止开始缝纫时的脱线。)
- 在线穿过机针后，从机针孔残留的线的长度为40mm左右。
如残留的线过长有可能会打结。

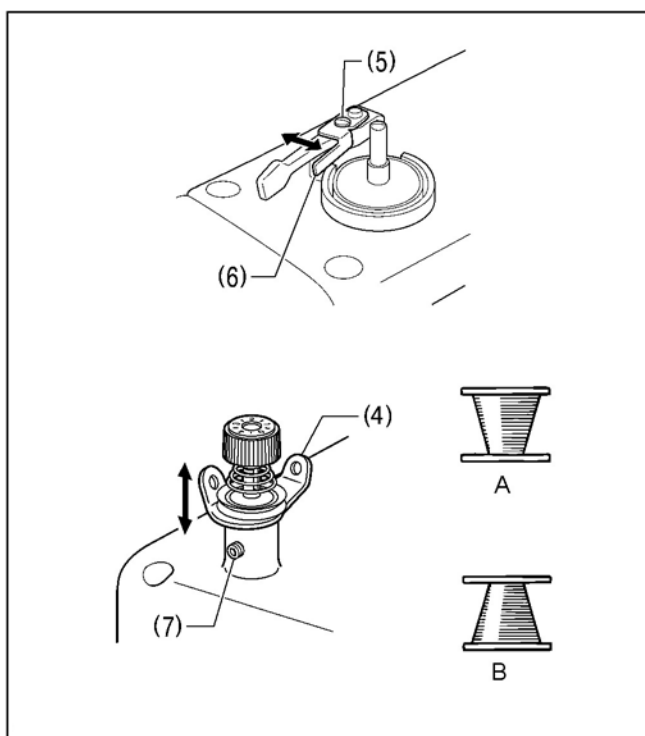
4-3. 底线的绕线方法

注意

在卷线过程中，不要触摸任何运动部件或将物件靠在运动部件上，因为这会导致人员受伤或缝纫机损坏。



1. 将梭芯置于梭芯卷线轴 (1) 上。
2. 按照图示那样穿线，将线在梭芯内绕几圈，然后推梭芯压臂柄 (2)。
3. 打开电源。
(具体操作方法请参照电控操作手册 P17。)
4. 当绕线量达到规定的数量 (梭芯外径的 80~90%) 时应停止绕线，梭芯压臂柄 (2) 将自动返回。
5. 拆下梭芯，将线钩在切刀 (3) 上，朝箭头方向拉梭芯将线切断。

**调节梭芯绕线量**

拧松螺钉 (5)，调节梭芯压杆 (6)。

如果梭芯上的线不均匀

拧松止动螺钉 (7)，上下移动卷线用夹线器 (4) 进行调节。

- ※在 A 的情况下，将卷线用夹线器 (4) 向下移动；
在 B 的情况下，将卷线用夹线器 (4) 向上移动。

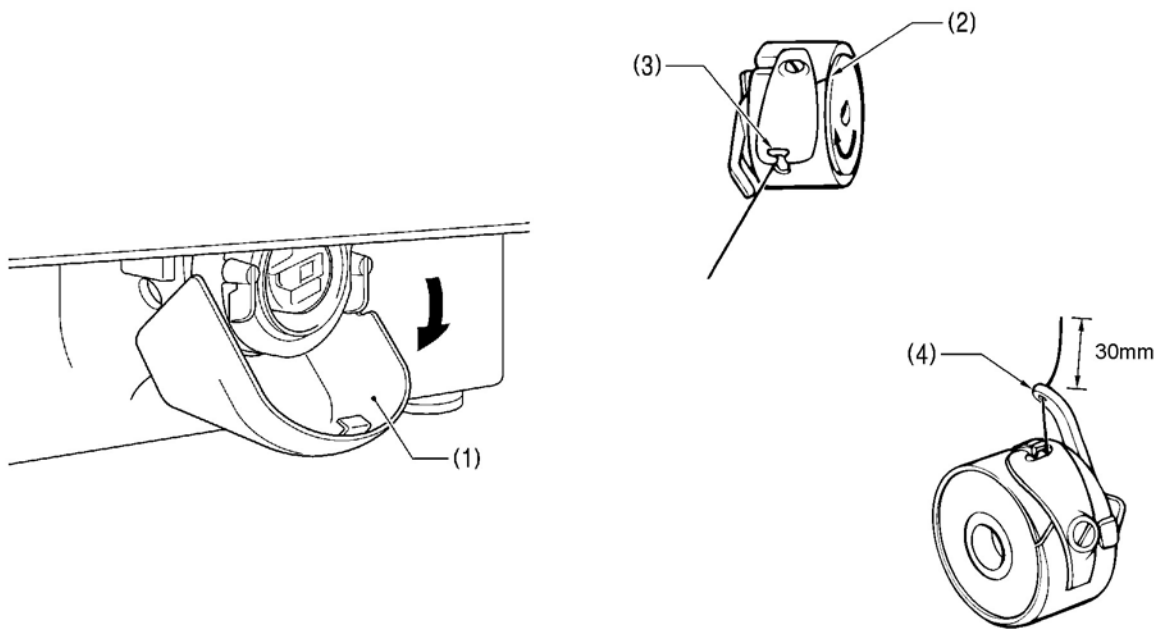
4-4. 梭芯套的装取方法

⚠ 注意



在安装梭芯套时，请切断电源。
当误踩下脚开关时，缝纫机动作会导致人员受伤。

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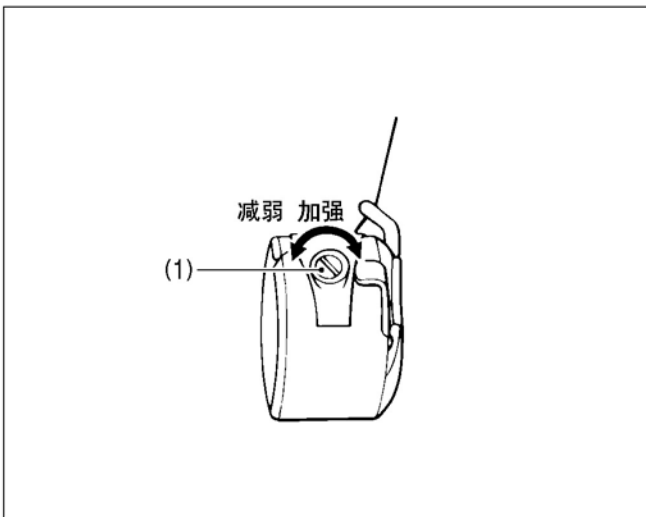
1. 向下拉大旋梭盖（1）将其打开。
2. 握住梭芯以便向右卷绕底线，将梭芯插入梭芯套。
3. 将底线穿过线槽（2），然后从导线器（3）中拉出。
4. 当拉出底线时，检查梭芯是否按顺时针方向转动。
5. 将线穿过套柄上的线孔（4），使线端伸出约 30mm。
6. 将插销装在梭芯套上，再将梭芯套插入旋梭。

4-5. 缝纫张力

[参考线张力]

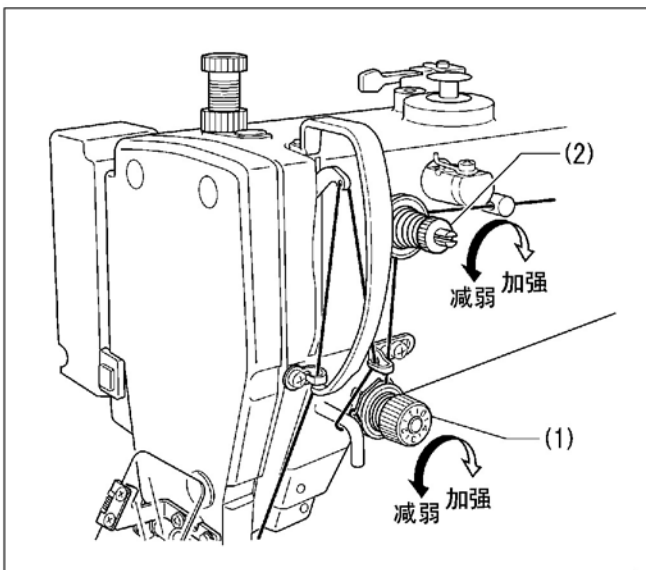
规格	厚布料 (-01)	中厚布料 (-02)
面线	相当 20 号	相当 50 号
底线	相当 20 号	相当 50 号
面线的张力 (N)	1.4~1.8	0.8~1.2
底线的张力 (N)	0.2~0.3	
预张力 (N)	0.1~0.6	0.1~0.3
机针	DP×17#19	DP×5#16
常用回转数	2,000 rpm	2,000 rpm

4-5-1. 底线的张力



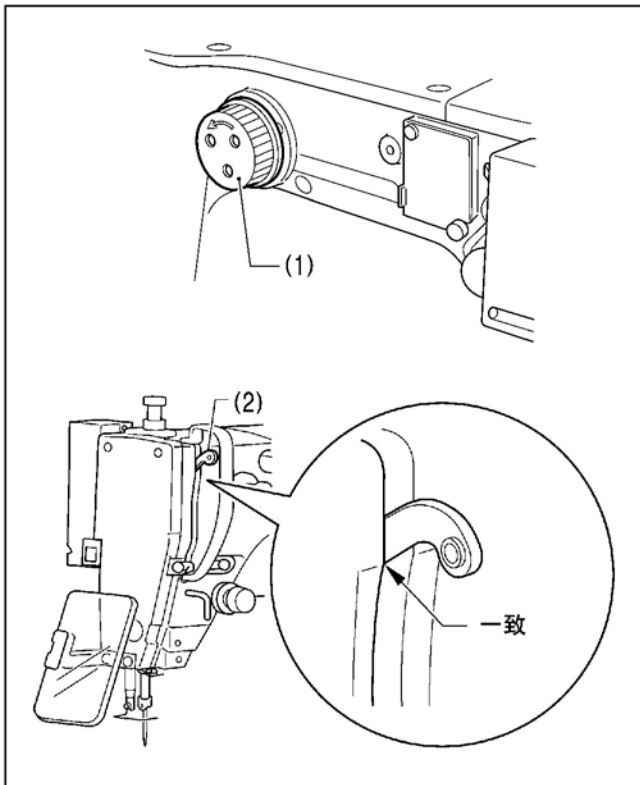
转动调节螺钉 (1) 来调节底线的张力，将张力调节到当用手握住线端时梭芯套靠它的自重不会滑落的程度，应尽可能减弱张力。

4-5-2. 面线的张力

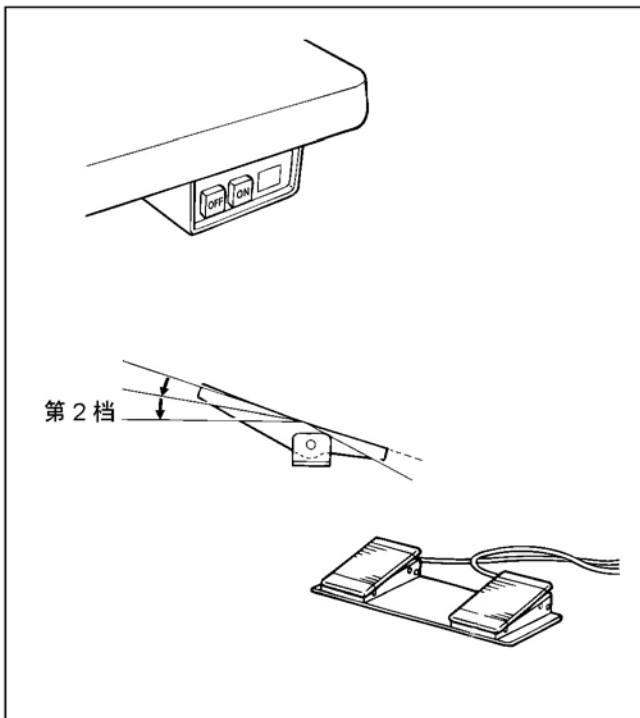


1. 转动夹线螺母 (1)，根据缝制品进行夹线的调节 (主夹线)。
2. 用夹线螺母 (2) (副夹线器) 进行调节，使面线残留量在 40mm 左右的范围内。

4-6. 原点检测



在开始原点设定前，请确认机针是否处于针上停止位置。
回转手轮(1)，使挑线杆(2)的下侧的棱线和缝纫机壳的加工线为一致。



1. 打开电源。
2. 将脚踏开关踩到第2档位置。
(如果是2连脚踏开关时，先踩放下压脚后再踩下启动开关。)
进行原点检测，压脚抬起。

注意：

如果在踩下脚踏开关后出现了错误[E016]时，请将手轮(1)向回转方向回转，可解除错误表示。

5. 缝纫

注意



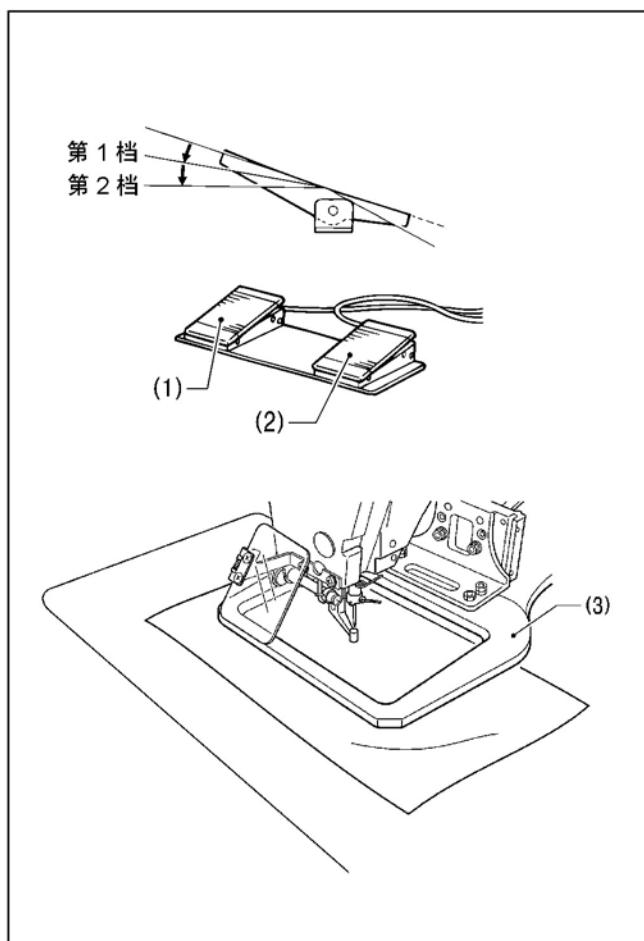
发生下列情况时, 请切断电源。
当误踩脚踏开关时, 缝纫机动作会导致受伤。

- 机针穿线时
- 更换机针或梭芯时
- 缝纫机不使用, 或人离开缝纫机时。



缝纫过程中不要触摸任何活动部件或将物件靠在运动部件上, 因为这会导致受伤或缝纫机损坏。

5-1. 缝纫的方法



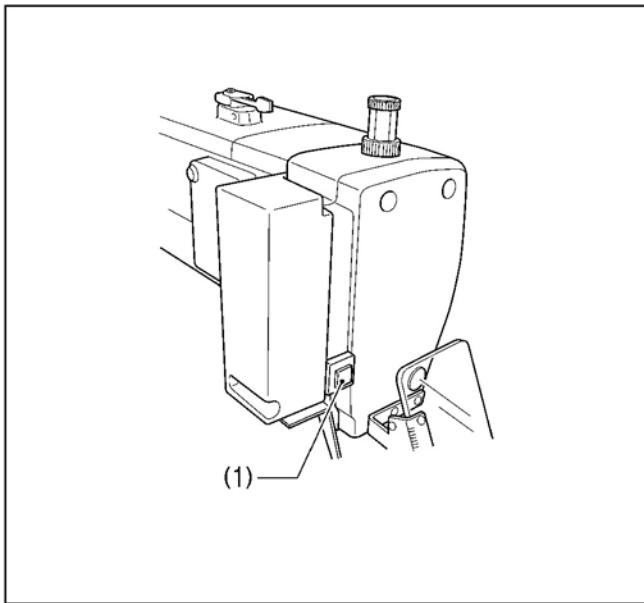
1. 打开电源。
2. 花样读取方法详见电控操作手册P20。
3. 将脚踏开关踩到第2档位置。
(2 连脚踏开关时, 先踩到放下压脚后再踩下启动开关(1)。)
· 进行原点检测。
4. 将布料放在压脚(3)的下面
5. 将脚踏开关踩到第1档。
(2 连脚踏开关时, 先踩放下压脚(1)。)
· 压脚(3)下降。
6. 将脚踏开关踩到第2档位置。
(2 连脚踏开关时, 踩下启动开关(1)。)
· 缝纫机起动。
7. 缝纫一结束就剪线, 然后压脚(3)上升。

请使用能确保缝制布料不偏移的压脚。

如使用标准的压脚和送料板而缝制布料偏移时, 请使用压脚和送料板不能滑动的措施。

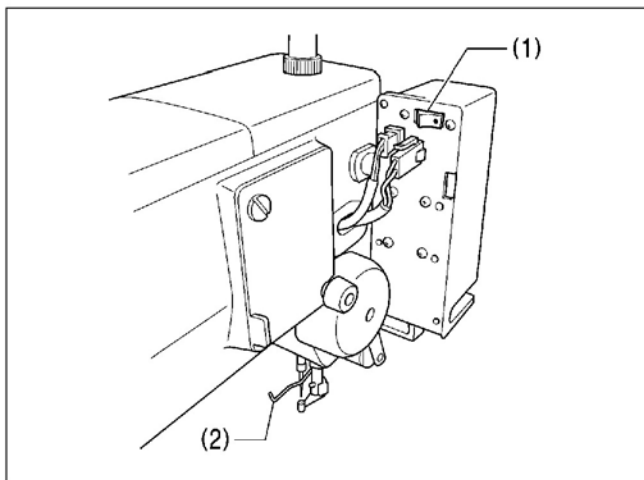
5 - 2. 暂停开关的使用方法

在缝制中或是试送布中，如果按了暂停开关(1)，缝纫机立即会停止。



※ 暂停解除方法及继续缝制的方法详见电控使用手册P7。

5 - 3. 扫线用开关的使用方法



使用扫线用开关(1)、可以扫线杆(2)的开和关(ON、OFF)。

6. 保养

⚠ 注意



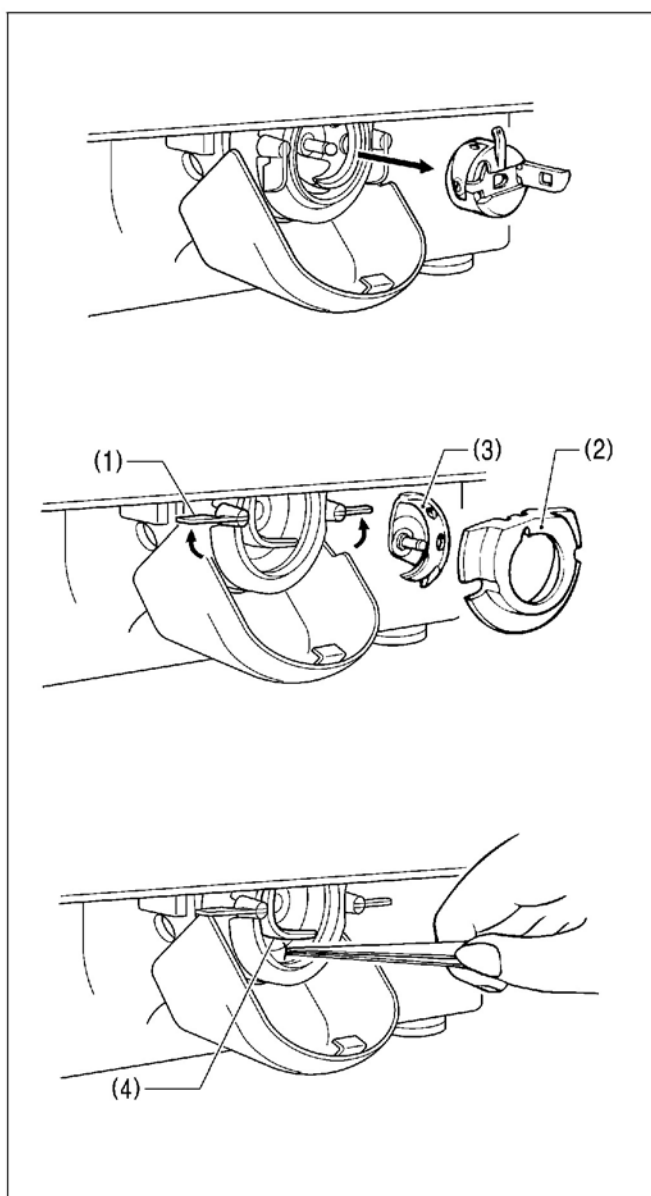
在开始清洁作业前，请切断电源。
如果误踩了脚开关，缝纫机动作会导致人员受伤。



使用润滑油和黄油时，务必戴好保护眼镜和保护手套等，以防润滑油落入眼中或沾在皮肤上，这是引起发炎的原因。

另外，润滑油或黄油不能饮用，否则会引起呕吐和腹泻。
将油放在小孩拿不到的地方。

6-1. 旋梭的清洁

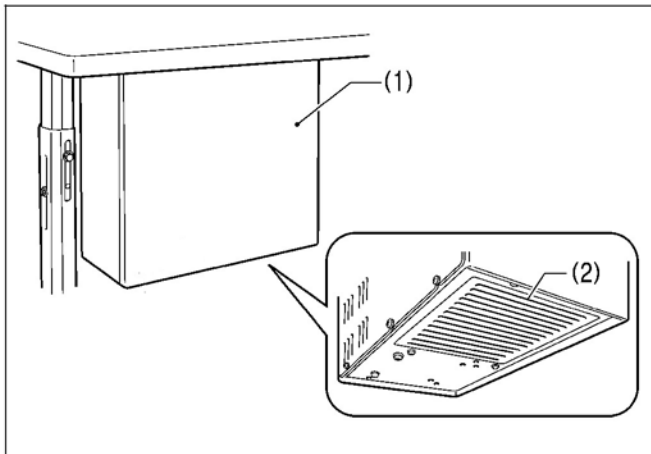


1. 将大旋梭盖向下拉开，取出梭芯盒。

2. 将大旋梭固定柄（1）朝箭头方向打开，取出大旋梭（2）和中旋梭（3）。

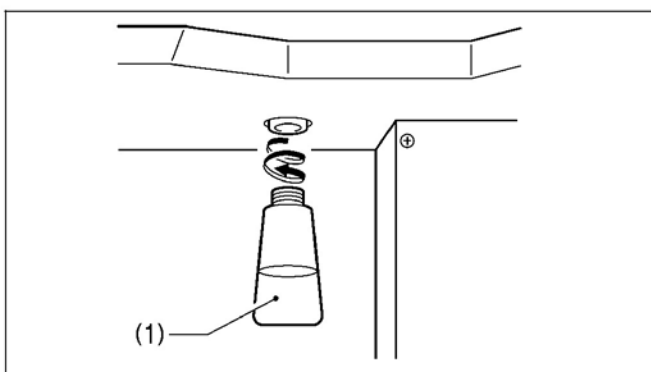
3. 将梭托（4）四周、旋梭线导向上部及旋梭边缘的棉尘和线屑等擦干净。

6 - 2. 控制箱进气口的清洁



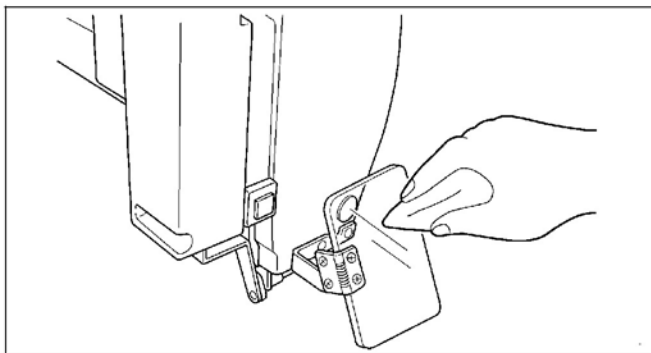
请每月一次左右用吸尘器清洁控制箱(1)的进气口(2)处的滤网。

6 - 3. 更换润滑油



1. 如果注油器瓶(1)内积满了油, 则请拆下瓶将油倒掉。
2. 油倒掉后, 再将注油器瓶(1)拧入到原来位置。

6 - 4. 护眼板的清洁

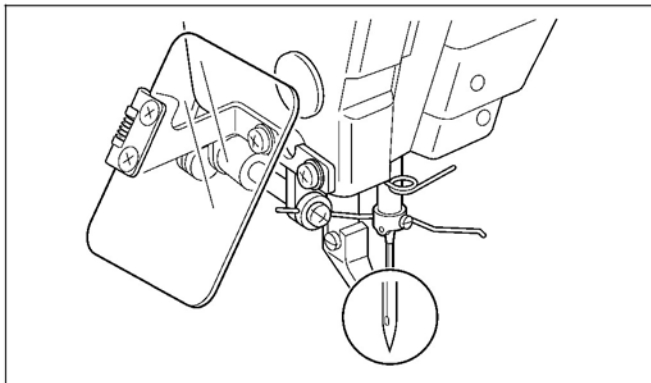


护眼板污秽时, 请用软布将其擦拭干净。

注意:

请勿使用有机溶液如汽油或稀释剂清洁护眼板。

6 - 5. 机针的检查









缝纫开始前先确认针头有否断裂, 机针有否弯曲。

6 - 6. 加油

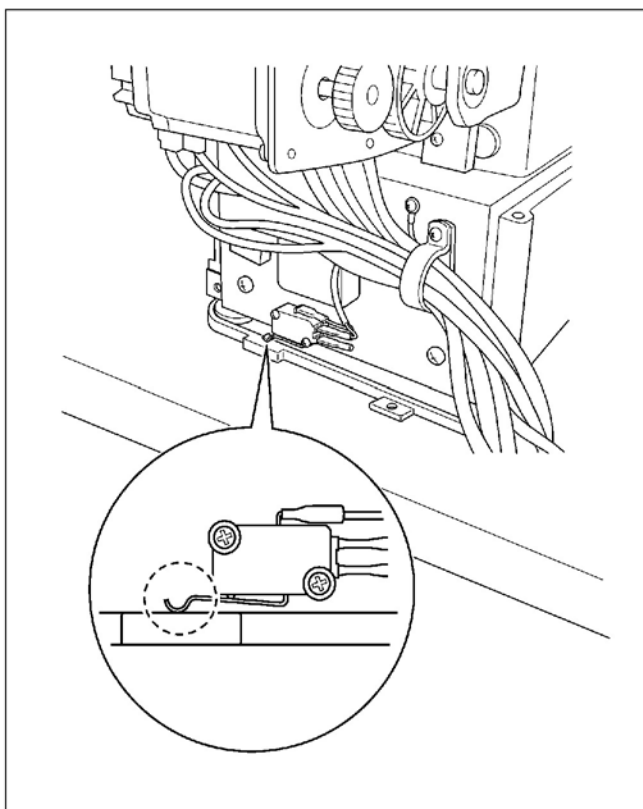
参照“3-14. 加油”所述, 添加机油。

7. 标准调整

! 注意

-  只有经过训练的技术人员才能进行缝纫机的维修、保养和检查。
-  与电气有关的维修、保养和检查请委托购买商店或电气专业人员进行。
-  发生下列情况时，请关闭电源。并拔下电源线插座。否则误踩下脚开关时，缝纫机动作会导致受伤。
 - 检查、调整和维修
 - 更换旋梭等消耗零部件
-  缝纫机头倒下或竖起时，请用双手进行操作。另外在缝纫机头倒下的状态下，请不要用力压缝纫机。如缝纫机失去平衡，滑落到地上是造成受伤或缝纫机损坏的原因。
-  在必须接上电源开关进行调整时，务必十分小心遵守所有的安全注意事项。
-  取下的安全保护装置，再次安装时，请务必安装在原位上，并检查能否正确地操作。

7-1. 头部开关的确认



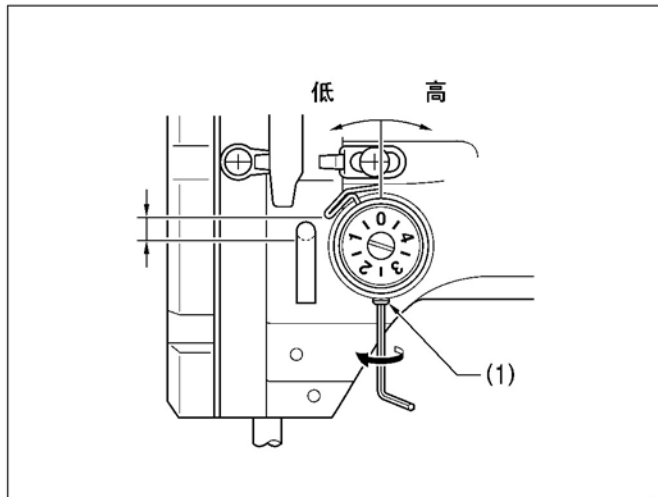
如图所示，确认接通头部开关。

注意：

如未接通头部开关，则会有错误提示。

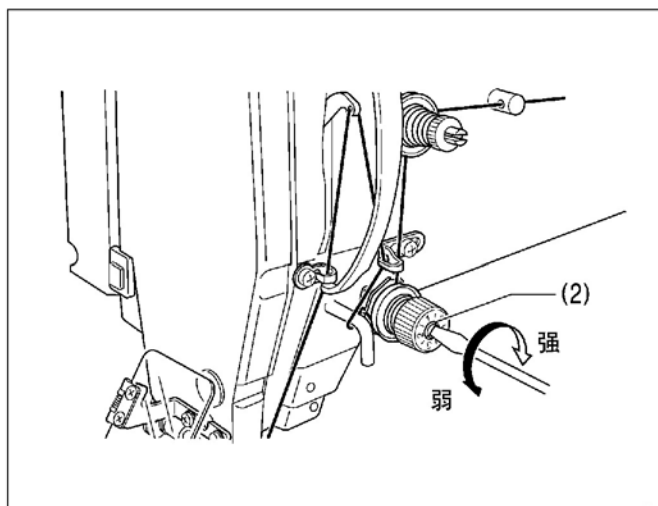
7-2. 挑线簧

规格	厚布料 (-01)	中厚布料 (-02)
挑线簧高度 (mm)	7~10	
挑线簧强度 (N)	0.6~1.2	0.2~0.5



<挑线簧的高度>

拧松固定螺钉(1)，转动调节器全体进行调节。



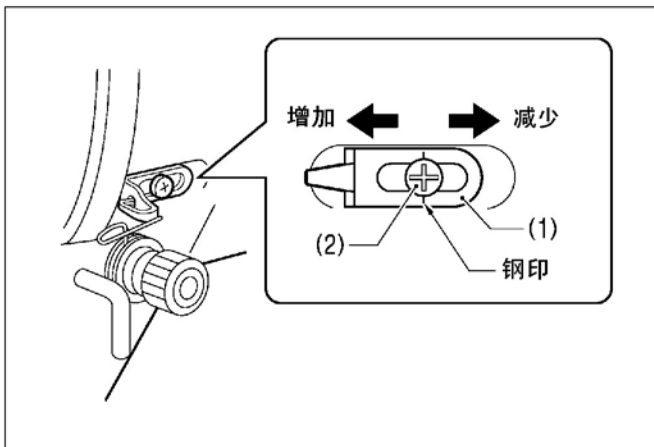
<挑线簧的强度>

用螺丝刀转动夹线杆(2)进行调节。

注意：

如果对挑线簧不能正确地进行调整，那么每次切线后面线的残留量有可能会长短不一。

7-3. 机壳线导向R

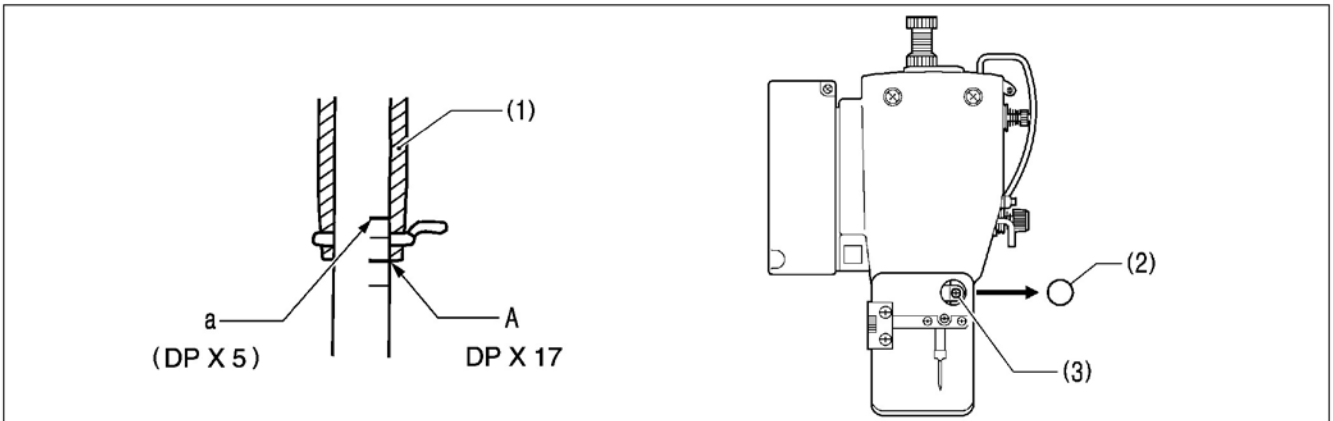


机壳线导向R(1)的位置，当螺钉(2)被固定在钢印的为止时为标准位置。

旋松螺钉(2)，移动机壳线导向R(1)进行位置的调节。

- ※ 当缝纫厚料时，向左移动机壳线导向R(1)。(挑线量增加。)
- ※ 当缝纫薄料时，向右移动机壳线导向R(1)。(挑线量减少。)

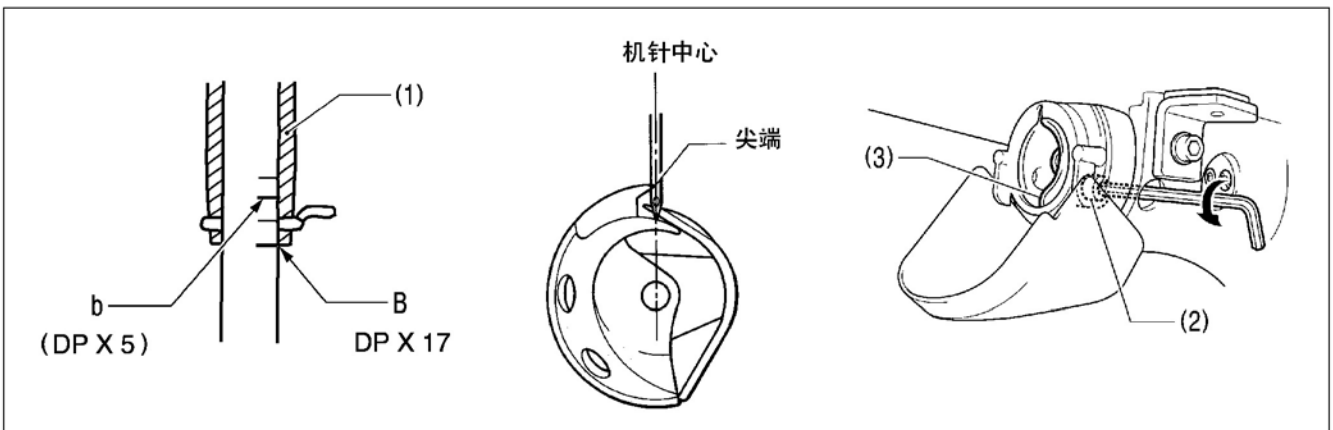
7-4. 针杆高度的调整



转动手轮使针杆降至最低点时,将针棒下方的第二根基线 A 与针棒金属(1)下端对齐,卸下橡皮栓(2)并松开螺钉(3),上下移动针杆以进行调整。

※ 使用 DP× 5 的机针时,应与最上方的基线 a 对齐。

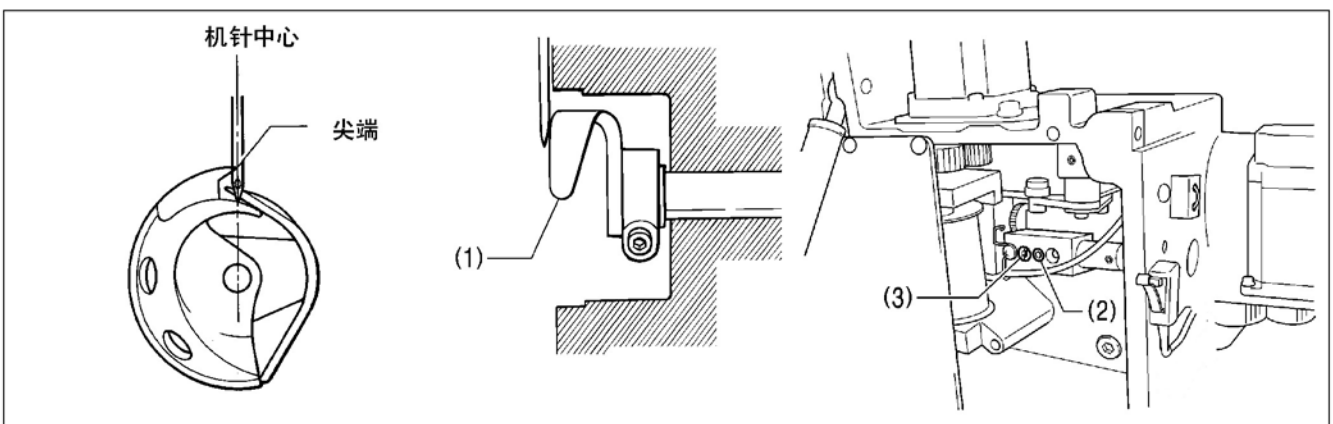
7-5. 针杆上升量的调整



转动手轮使针杆从最低点开始上升,当针棒最下方的基线 B 与针棒金属(1)下端对齐时,将旋梭尖端与机针中心对齐,并拧松插孔螺栓(2),移动梭托(3)进行调整。

※ 使用 DP × 5 的机针时,应与从上方开始的第二根基线 b 对齐。

7-6. 梭托导针部的调整

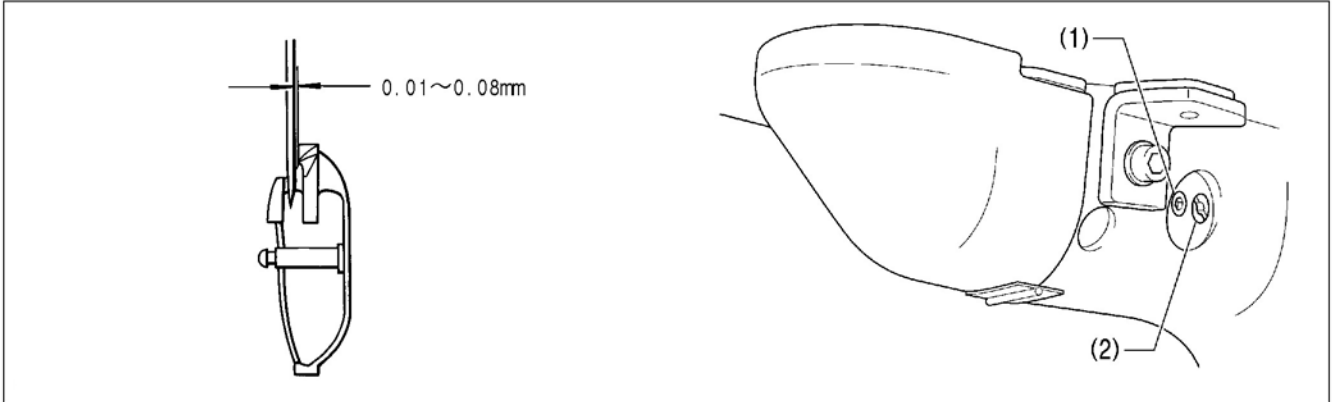


转动手轮使旋梭尖端与机针中心对齐时,梭托导针部(1)好象要与机针接触似的,松开固定螺钉(2),转动偏心轴(3)进行调整。

注意：

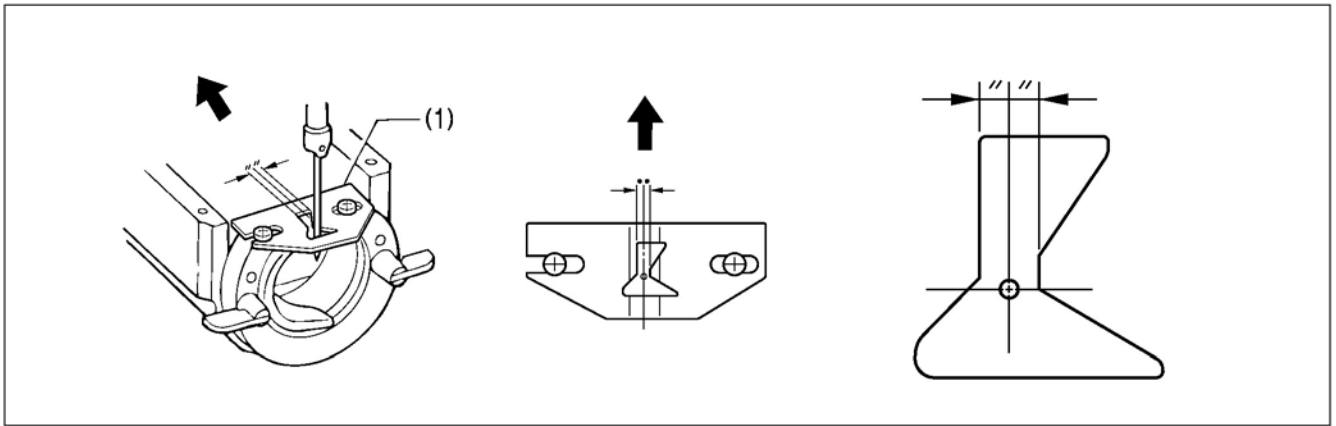
如果护针器的过度导入会使机针的负担加重,还会引起夹线不良。此外,如果护针器不导入,则中旋梭的梭尖端会和机针相接触,会产生跳针的原因。

7 - 7 . 针隙的调整



转动手轮使旋梭尖端与机针中心对齐时，使机针和旋梭尖端之间的间距为 0.01~0.08mm，并松开固定螺钉(1)，转动偏心轴(2)进行调整。

7 - 8 . 旋梭导线器的调整

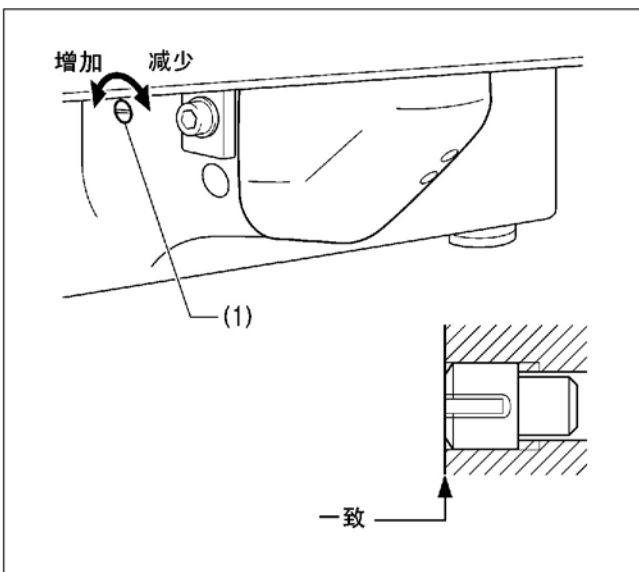


左右位置是将旋梭导线器(1)的针槽作为机针中心的分配位置,前后位置是将旋梭导线器(1)按箭头方向压上并安装。

注意：

如果旋梭导线器的位置不佳，则会导致切线、缝线受污或者缠绕。
旋梭导线器的位置在出厂时已作调整。请尽量不作改动。

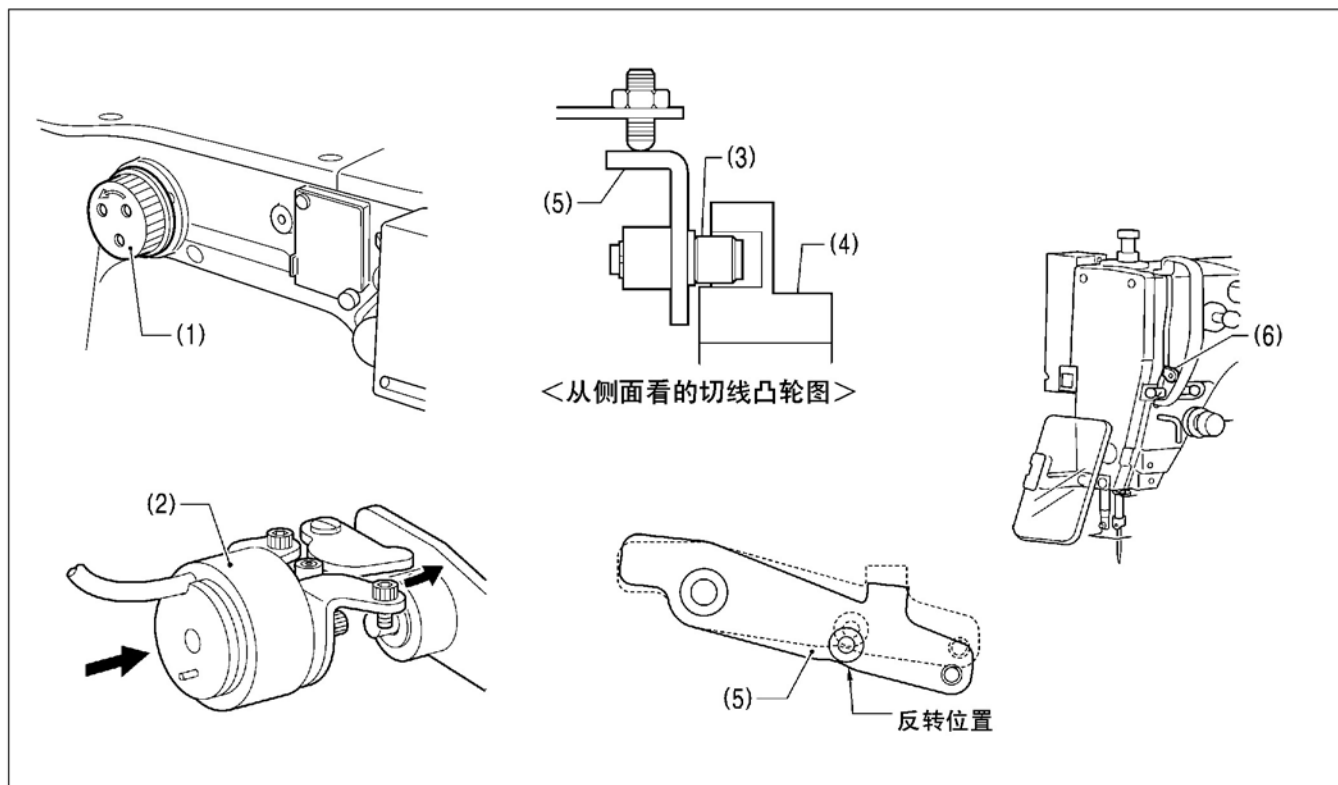
7 - 9 . 旋梭供油量



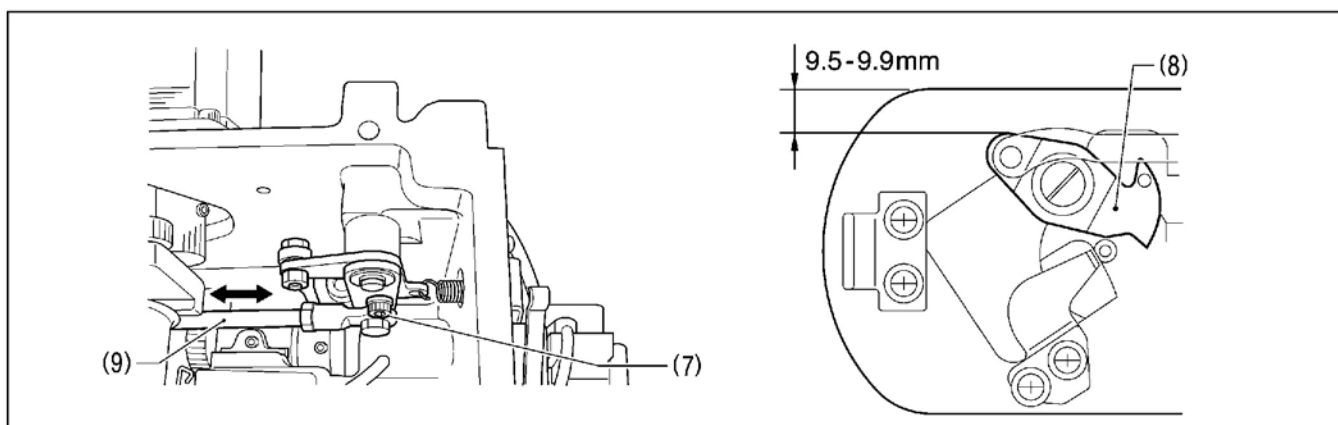
螺钉(1)的头部和底板的端面呈一致状态时为适量的位置。供油量的调节，可从该位置起向右旋转 3 周的范围内进行调节。

- 螺钉(1)向右旋转时供油量减少。
- 螺钉(1)向左旋转时供油量增加。

7-10. 动刀的位置调整

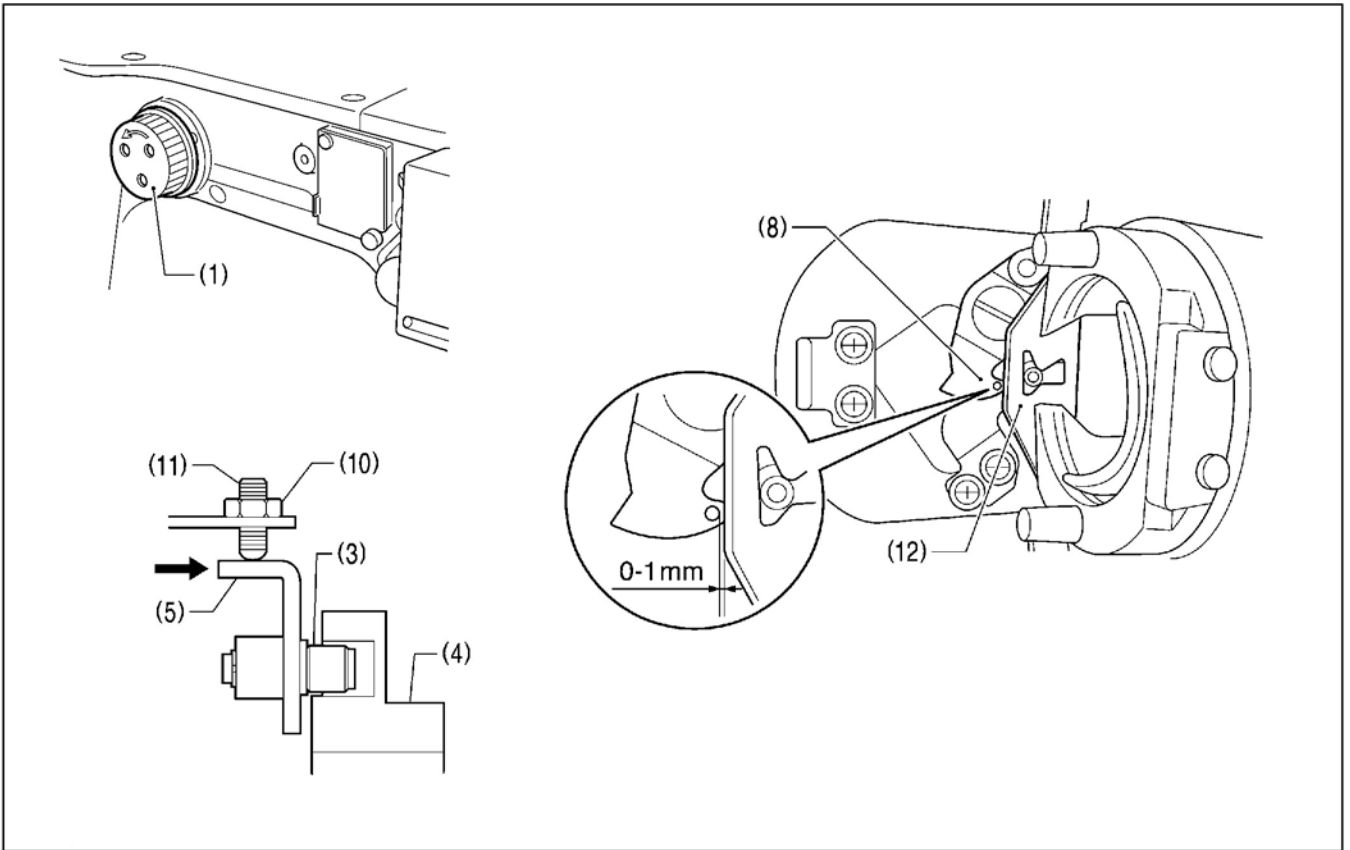


1. 取下顶盖，将机头放倒。
2. 用手转动手轮(1)使针杆在最低位置后，将切线电磁铁(2)完全推到底。
3. 在切线滚轮(3)嵌入切线凸轮(4)的槽中的状态下，用手回转手轮(1)，使切线驱动杆(5)在反转位置（挑线杆(6)处于最低位置附近）。



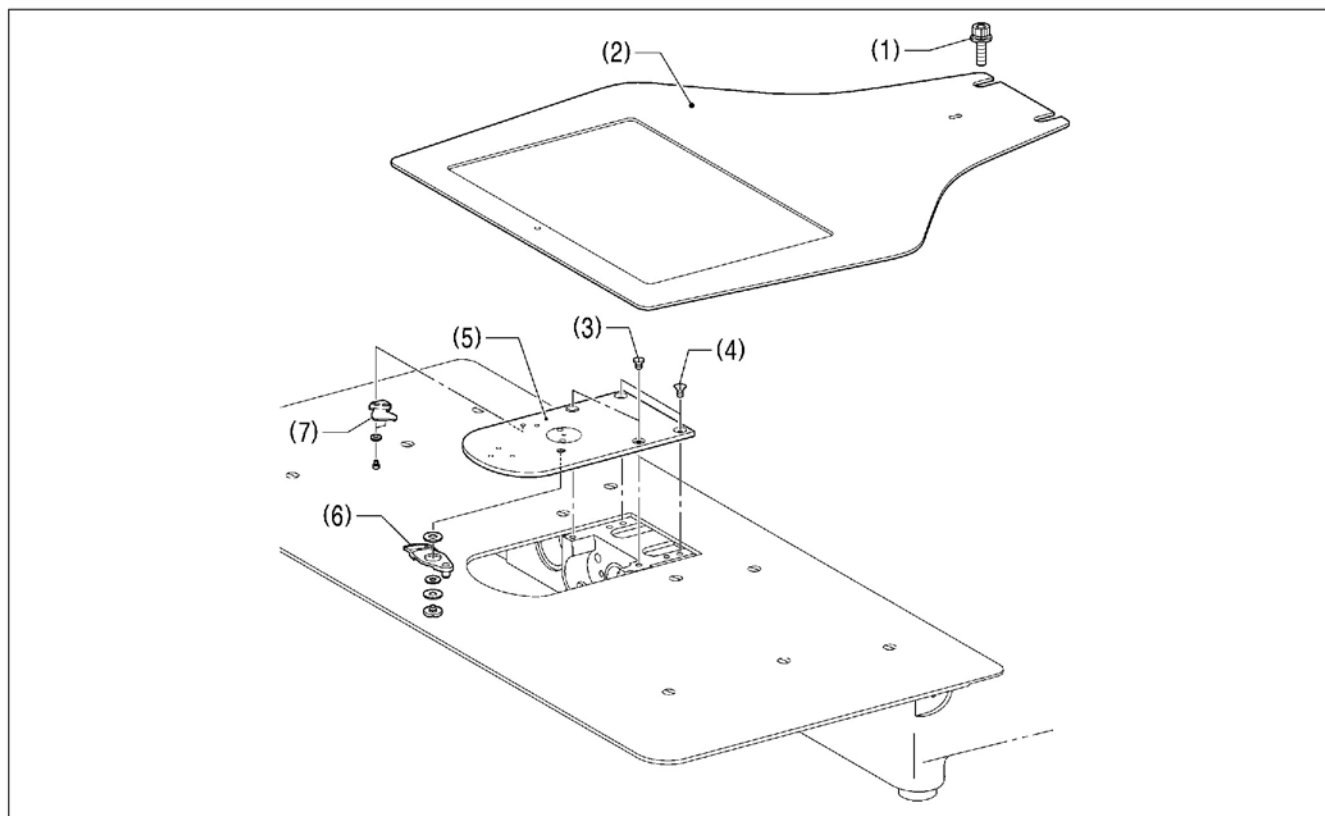
4. 松开插孔螺栓(7)。
5. 将针板右侧的棱线到动刀(8)的棱线距离保持在9.5~9.9 mm，前后移动切线杆H(9)来进行调整。
6. 拧紧插孔螺栓(7)后，再次确认上述的位置。

7. 标准调整

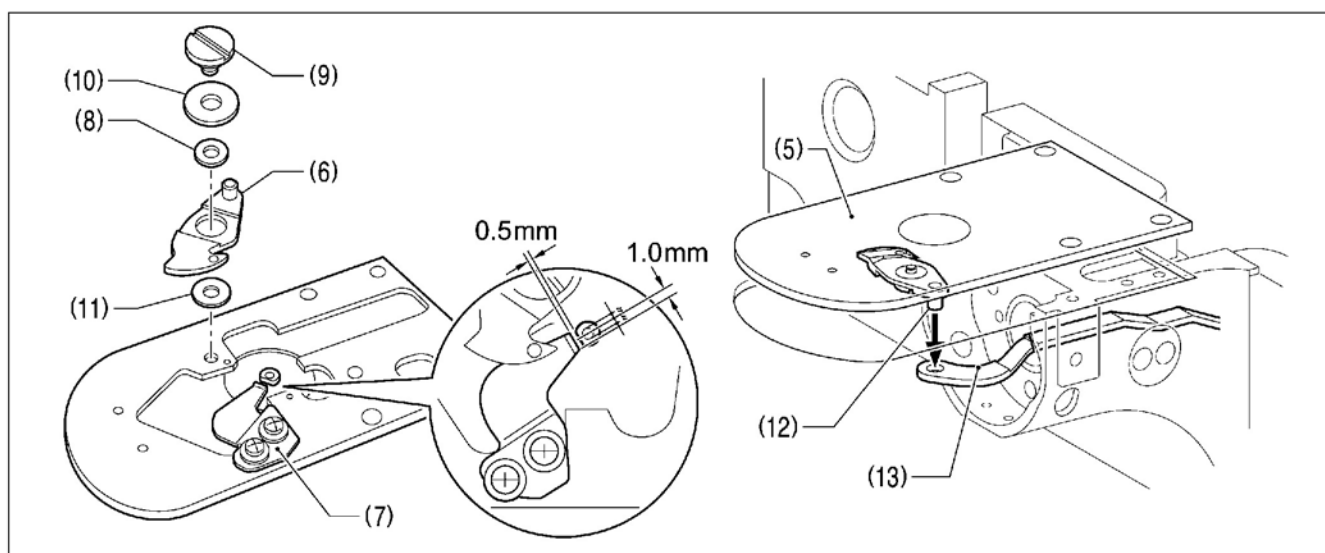


7. 用手转动手轮(1)使针杆置于最低位置。
8. 松开螺母(10)，将切线滚轮(3)嵌入切线凸轮(4)的槽中并碰到其内侧为止后旋紧螺钉(11)，再从此开始将其按逆时针方向回转约1/4转。
9. 旋紧螺母(10)，确认切线滚轮(3)不能接触到切线凸轮(4)的内侧。还有，用手将切线驱动杆(5)推向切线凸轮侧，切线滚轮(3)嵌入到切线凸轮(4)的槽中后，当松开手后确认切线驱动杆(5)应能顺利复位。
10. 动刀(8)的孔的外周和旋梭线导向(12)的棱线，在留有一定的间隙状态下确认其间隙范围在0~1mm之间。

7 - 1 1. 动刀和定刀的更换方法

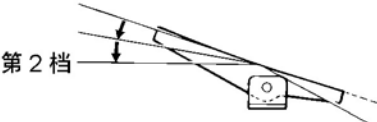
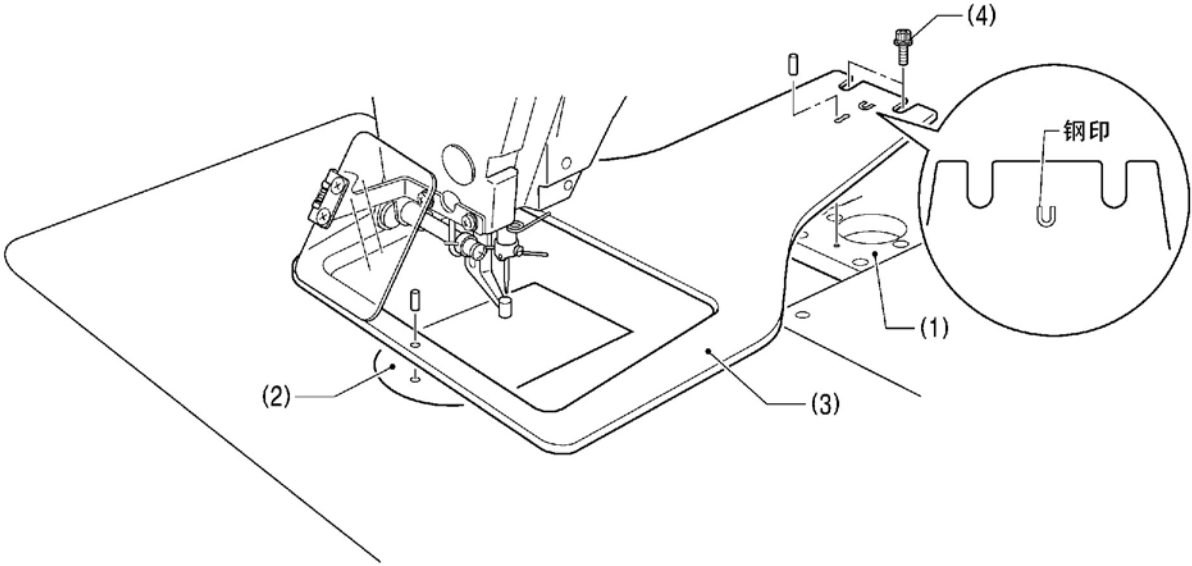


1. 松开螺栓(1) [2个], 拆下送料板(2)。
2. 打开大旋梭盖, 取下螺钉(3) [2个]和螺钉(4) [2个], 拆下针板(5)。
3. 拆下动刀(6)和定刀(7)。

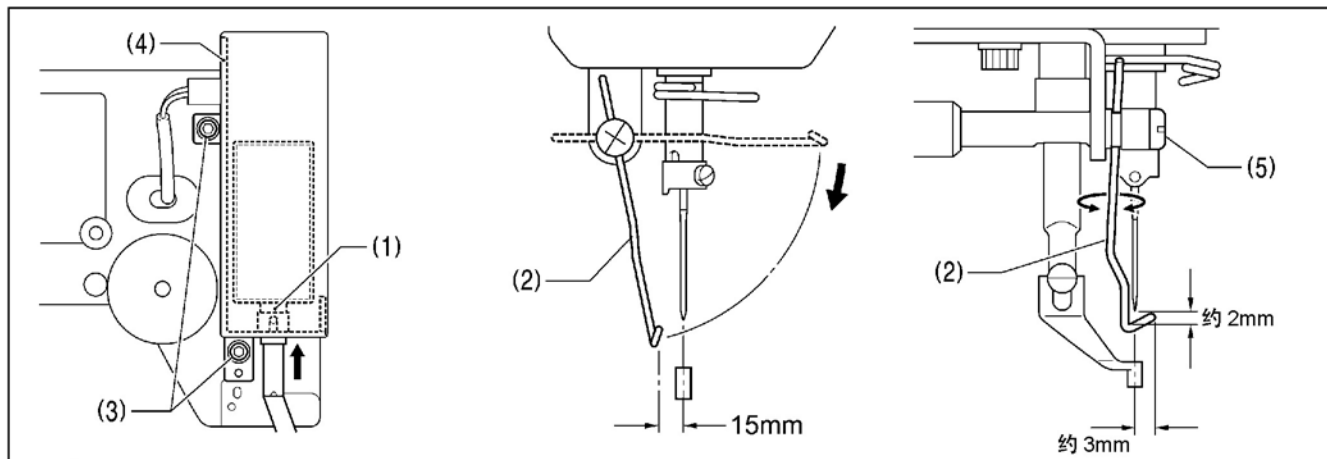


4. 在如图所示位置安装新的定刀(7)。
5. 在动刀轴套(8)的外周部和段螺钉(9)处涂上润滑脂, 和轴向垫圈(10)及动刀之间的垫圈(11)再加上新的动刀(6)一起安装。
6. 确认动刀(6)和定刀(7)在切线时的锋利度。为了能很好的切线使用附属的动刀垫片($t=0.2, 0.3, 0.4$)进行调整。
 ※ 当切刀的压力很低, 不能完全切断线时, 请使用薄的动刀垫片。
 ※ 当切刀的压力很高, 动刀(1)的回转很重时, 请使用厚的动刀垫片。
7. 在动刀的销(12)处涂上润滑脂嵌入动刀连杆(13)的孔中, 然后安装针板(5)。
8. 确认针孔中心和机针对齐。

7 - 1 1 - 1. 送料板的安装方法

<p>1</p>	 <p>第2档</p> <p>将脚踏开关踩到第2档位置。 (2连脚踏开关时，先踩到放下压脚后再踩下启动开关。) • 原点检出后，放下压脚，送料台将移动到送料板安装位置处后，压脚上升。</p>
<p>2</p>	 <p>将X送料台(1)和针板(2)上的孔，与送料板(3)的2处的直径$\phi 2$的孔用销(或机针的针柄)使其一致后，再使用螺栓(4) [2个] 将其拧紧。 注意：安装送料板时，请将其有钢印的面向上。</p>
<p>3</p>	<p>送料板安装模式终了</p> <p>切断电源开关。</p>

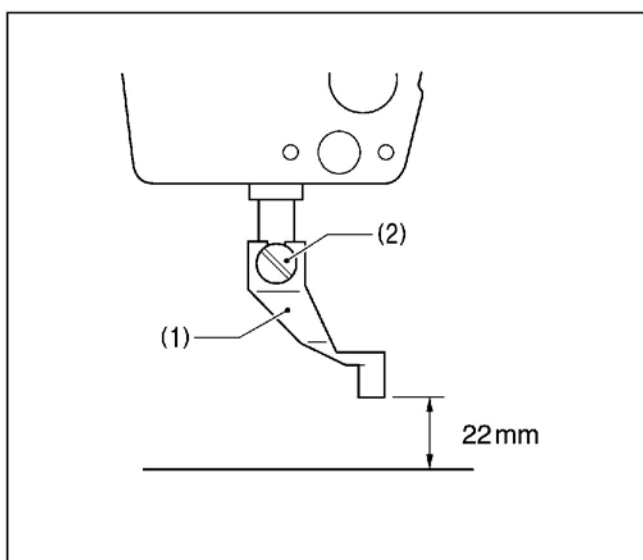
7 - 1 2 . 扫线器的调整



1. 扫线器的电磁铁插棒(1) 被拉到最大时, 扫线杆(2)从机针中心向前出 15mm 处将螺钉(3) [2 个] 松开, 电磁铁安装板(4)整体上下移动来进行调整。
2. 操作扫线杆(2)使其在通过机针的下面时, 扫线杆(2)和机针的尖端之间的间隙约为 2mm 左右, 扫线杆(2)的尖端到机针中心约为 3mm 左右, 松开螺钉(5)调整扫线杆(2)的位置。

注意：请确认扫线杆(2)不可碰到护指器。

7 - 1 3 . 间歇压脚的安装位置

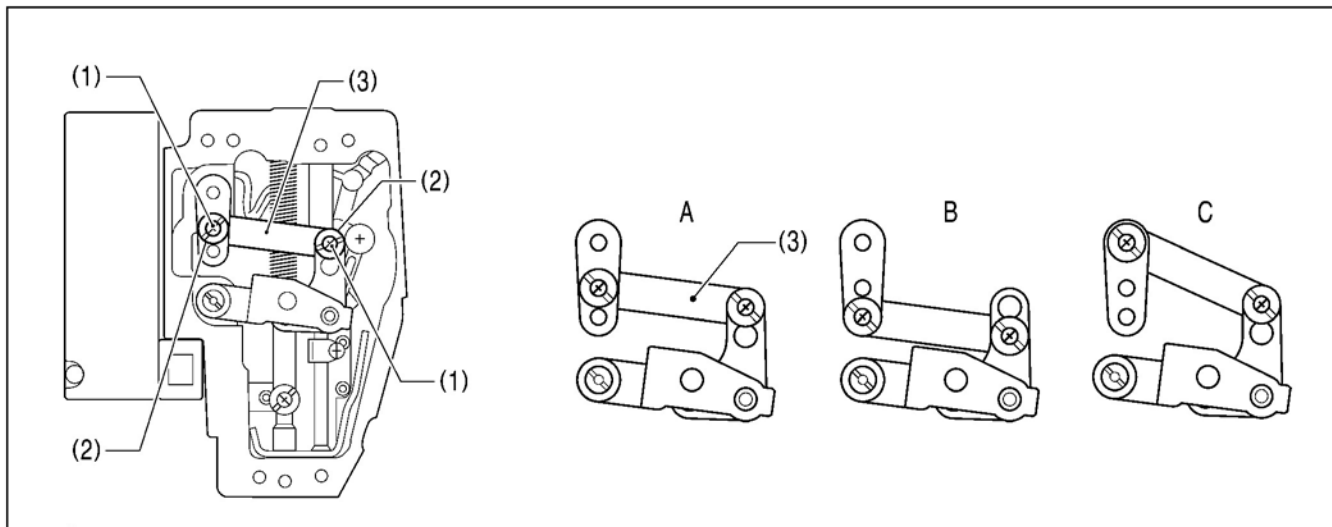


缝纫机在停止位置处间歇压脚(1)呈上升状态时, 从间歇压脚(1)的底部到针板表面的距离为 22mm 时将螺钉(2)装上拧紧。

7 - 1 4 . 间歇压脚行程的变换

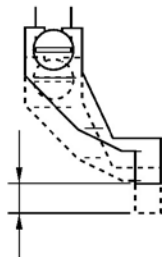
根据间歇压脚连杆的位置调整，及间歇连杆 A 的安装位置的更改，可以在 2~10mm 之间更改间歇压脚的行程。

<间歇连杆 A 的安装位置的更改>

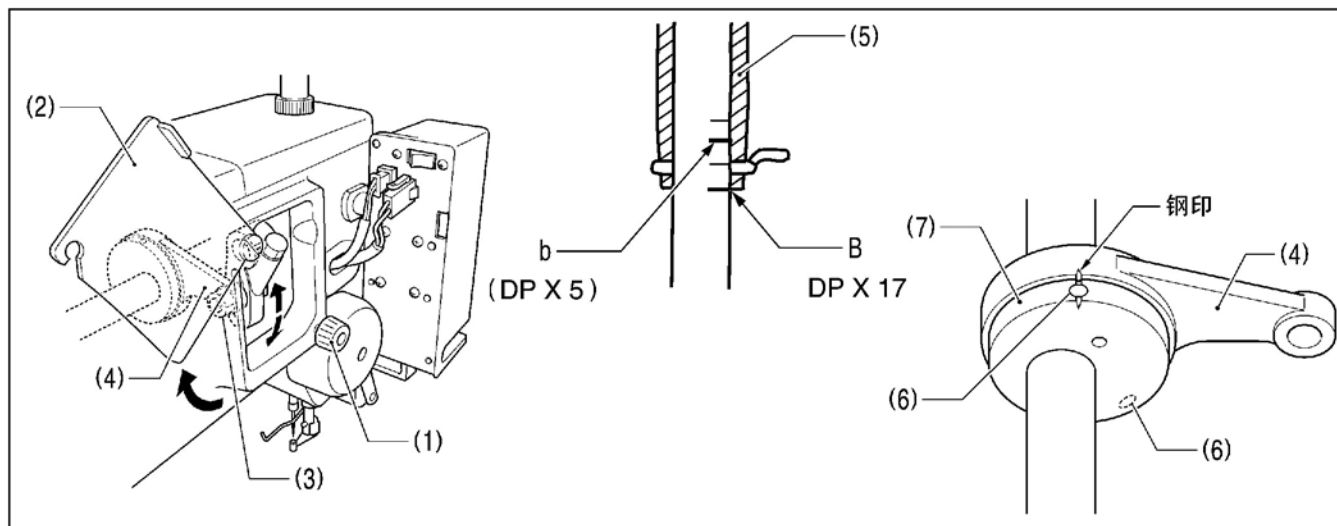


1. 拆下面板。
2. 取出螺钉(1) [2 个] 和段螺钉(2) [2 个]，拆下间歇连杆 A(3)。
3. 间歇连杆 A(3)的安装位置可更改成在上述的 A~C 中的任何位置中。
 在各个安装位置处，如下表所示，当对间歇连杆的位置进行调整时，间歇压脚的行程在下表所示的范围内可进行调整。

安装位置	间歇压脚行程的范围
A	2~4.5mm
B	4.5~10mm
C	0mm (间歇压脚不能上下移动)



< 间歇压脚连杆的位置调整 >

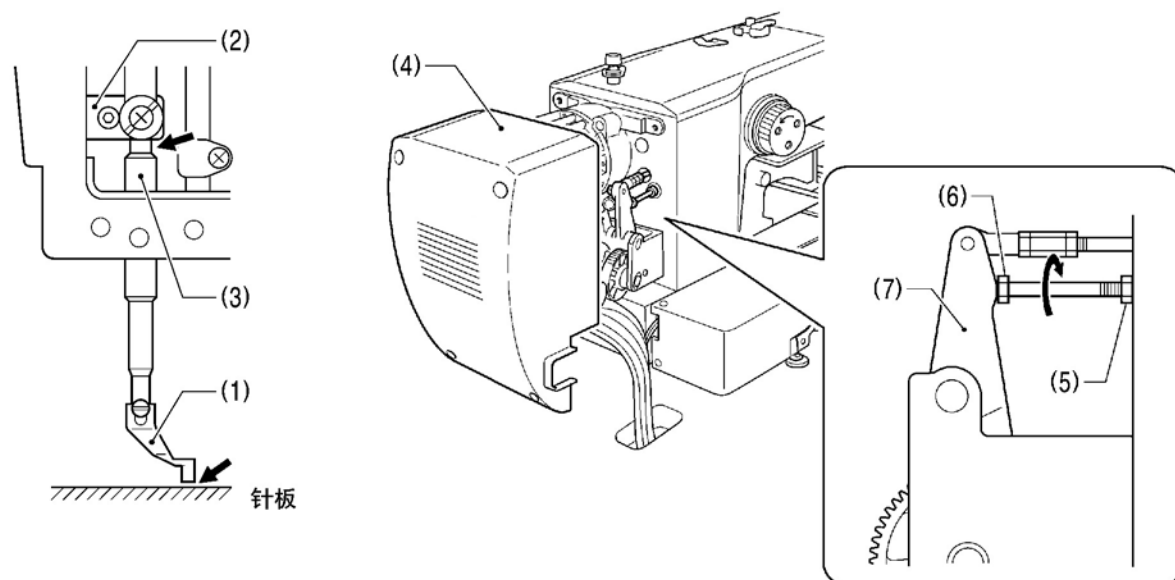


1. 松开手柄螺钉(1)，打开间歇盖(2)。
2. 旋松螺母(3)，调整间歇压脚连杆(4)的位置。
 - 间歇压脚连杆(4)向上去的位置时，间歇压脚行程变大。
 - 间歇压脚连杆(4)向下去的位置时，间歇压脚行程变小。

下面是针杆和间歇压脚操作时相互之间的同步。

3. 回转手轮让针杆从最下点向上升，使针杆的最下面的基线和针杆轴套(5)的下端面对齐。(如果是使用 DP × 5 的机针时，请与从上往下数第二条的基线 b 对齐。)
4. 拆下上盖，旋松螺钉(6) [2 个]。
5. 使间歇压脚凸轮(7)和间歇压脚连杆(4)的钢印一致后，旋紧螺钉(6)。

间歇压脚的行程更改之后，请进行以下的确认。



1. 在间歇压脚(1)呈下降状态，回转手轮使间歇压脚(1)降到最下点。
2. 确认间歇压脚(1)是否没碰到针板，还有压杆抱箍(2)是否也没碰到压杆轴套(3)。

< 如果有碰到时 >

拆下马达盖(4)。

请旋松螺母(5)，使用回转螺栓(6)使其推动间歇驱动杆(7)来调整，直到上述 2 处不被碰到为止。

7 - 1 5 . 压脚上升量的调整

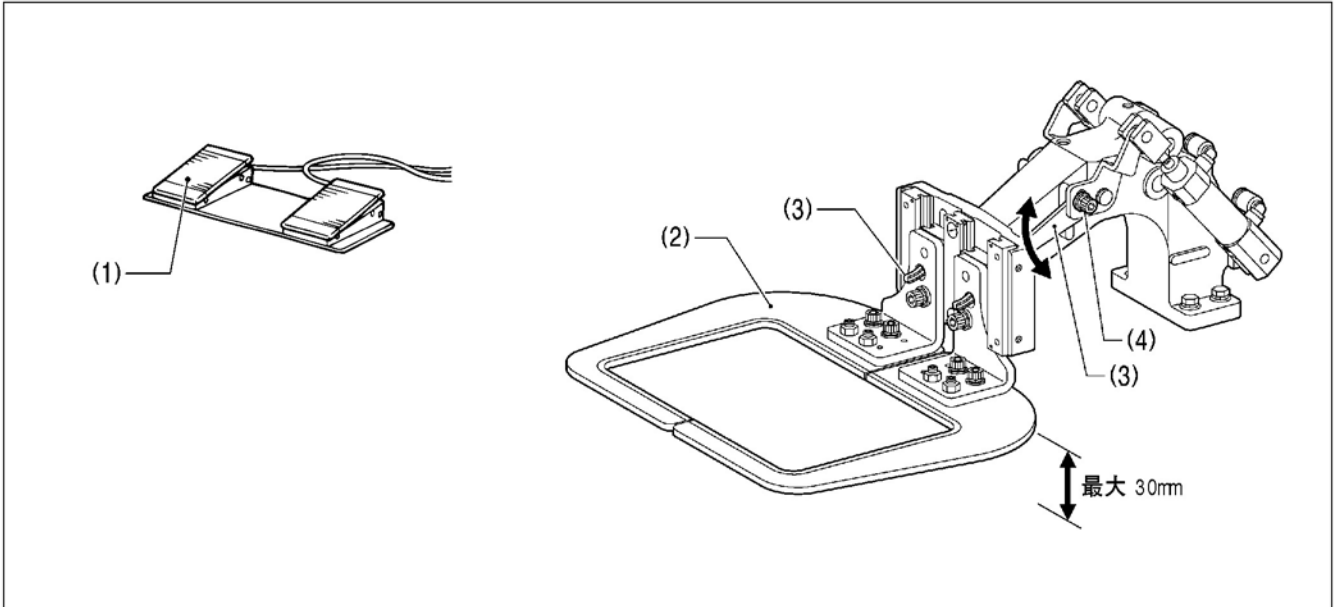
<电磁规格>

可以使用操作盘在 15mm~25mm 之间进行设定。

菜单 — 操作设定 — 压板 — 压板行程设定

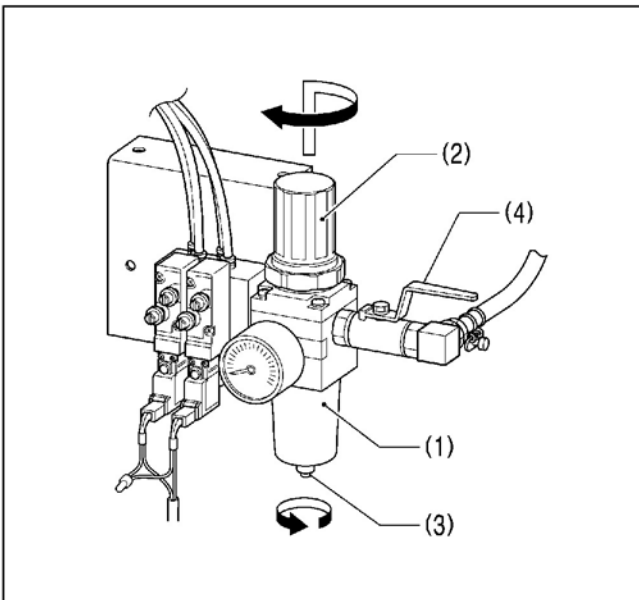
<气压规格>

压脚的最大上升量为从针板向上 30mm。



1. 送入气压，踩下脚踏开关(1)，压脚(2)向上升起。
2. 旋松压脚臂杆 (3)的螺栓(4) [2个]，上下移动来调整压脚臂杆(3)。

7 - 1 6 . 空气压力的调整（空压规格）



将调节器(1)的舵轮(2)向上拔起后再回转，使空气压力调整到 0.5Mpa。

调整完了后，将舵轮(2)往下按锁住。

如果调节器(1)内的瓶中积有水时，按箭头方向回转排水旋栓(3)，将水放掉。

注意：

请慢慢打开气压栓(4)。

8. 故障检修

- 请您在要求维修或服务前，先检查以下各项。
- 如果以下方法仍然不能解决问题，关闭电源开关，向受过训练的技术人员或经销商咨询。

注意



在作业之前，请先关闭电源开关。

并将电源插头从插座上拔下，如果误踩脚踏开关，缝纫机动作会导致受伤。

现象	原因	措施	参照
压脚不能上升	压脚操作很重	在压脚的运动部分涂敷适当的润滑脂	
	抬压脚汽缸的空气接管的弯曲，破损（空压规格）	修正弯曲了的接管或更换新的	
压脚不能下降	压脚操作很重	在压脚的运动部分涂敷适当的润滑脂	
	抬压脚汽缸的空气接管的弯曲，破损（空压规格）	修正弯曲了的接管或更换新的	
压脚上升量不正确	操作盘上的压脚设定值不正确（电磁规格）	更改压脚设定值	本手册 P. 36
	压脚臂杆的位置不对（空压规格）	调整压脚臂杆的位置	
压脚不能上升到最高点	压脚臂组件的定位器的位置不对（电磁规格）	调整定位器的位置	
	汽缸接头的位置不对（空压规格）	调整汽缸接头的位置	
扫线器操作不好	扫线器和机针有干扰	调整扫线器的高度	本手册 P. 33
		调整扫线器的操作量	本手册 P. 33
	扫线器的位置不对	调整扫线器的操作量	本手册 P. 33
底线被卷在一边	卷线夹线器组的高度不对	调整卷线夹线器组的高度	本手册 P. 17
底线被卷的量不恰当	梭芯压杆的位置不对	调整梭芯压杆的位置	本手册 P. 17
脱线	在缝纫开始时有脱线	请参考「跳针」一览	本手册 P. 38
	机针处线的残余量不稳定，偏差很大	调整副夹线器	本手册 P. 19
	旋梭导线器的位置不对	调整旋梭导线器的位置	本手册 P. 28

现象	原因	措施	参照
面线断线	面线张力太强	调整面线张力	本手册 P. 19
	机针的安装方法不正确	正确的方向按装机针	本手册 P. 16
	和机针相比线太粗	选择使用符合机针的线	本手册 P. 19
	挑线簧的强度和高度不正确	调整挑线簧的强度和高度	本手册 P. 26
	旋梭、针孔板和机针等有缺陷和毛刺	分别将这些零部件磨光或更换	
	因发热断线（化纤线）	使用冷却液槽	本手册 P. 16
	穿线不正确	在道上正确穿线	本手册 P. 16
底线断线	底线张力太强	调整底线张力	本手册 P. 19
	针孔板、和梭芯盒的角部有缺陷	分别将这些零部件磨光或更换	
跳针	机针和旋梭尖端的间隙过大	调整机针的间隙	本手册 P. 28
	机针和旋梭的相遇不正确	调整针杆的上升量	本手册 P. 27
	梭托如果在必要以上的过度导入机针	调整梭托导针部	本手册 P. 27
	机针弯曲	更换机针	
	机针的安装方法不正确	正确的方向按装机针	本手册 P. 16
断针	机针和旋梭尖端的间隙过大	调整机针的间隙	本手册 P. 28
		调整针杆的上升量	本手册 P. 27
	机针弯曲	更换机针	
	进针时机针被拉偏	选择符合缝纫条件的机针 降低回转数	本手册 P. 19
	机针太细	选择符合缝纫条件的机针	本手册 P. 19
咬线	挑线簧的强度和高度不正确	调整挑线簧的强度和高度	本手册 P. 26
	机针和旋梭的相遇不正确	调整针杆的上升量	本手册 P. 27
	旋梭导线器没能分线	调整旋梭导线器的位置	本手册 P. 28

现象	原因	措施	参照
面线未切断	动刀的刀锋不利	更换新的动刀	本手册 P. 31
	定刀的刀锋不利	磨快定刀或是 更换新的动刀	本手册 P. 31
	动刀勾不住面线	调整旋梭导线器的位置	本手册 P. 28
		调整针杆的上升量	本手册 P. 27
	最后一针因跳针，动刀勾不住面线	请参考「跳针」一览	本手册 P. 38
	动刀的位置不正确	调整动刀的位置	本手册 P. 29
副夹线器的张力太弱	回转夹线螺母进行调整	本手册 P. 19	
布料的背面缝纫针迹不良	旋梭导线器不能完全分线	调整旋梭导线器的位置	本手册 P. 28
	面线不够紧密	调整面线张力	本手册 P. 19
	机针处线的残余量不稳定，偏差很大	调整副夹线器	本手册 P. 19
线不够紧密	面线张力太弱	调整面线张力	本手册 P. 19
	底线张力太弱	调整底线张力	本手册 P. 19
	挑线簧的强度和高度不正确	调整挑线簧的强度和高度	本手册 P. 26
	机壳线导向 R 的位置不正确	调整机壳线导向 R 的位置	本手册 P. 26
机针处线的残余量不稳定，偏差很大	挑线簧的强度和高度不正确	调整挑线簧的强度和高度	本手册 P. 26
	副夹线器的张力太弱	回转线调整螺母进行调整	本手册 P. 19
	定刀的刀锋不利	磨快定刀或是 更换新的动刀	本手册 P. 31
接通电源，即使踩下脚踏开关缝纫机也不启动	头部开关不起作用	确认头部开关的电源线是否脱开着	
		调整头部开关的位置	本手册 P. 8
		如果头部开关有故障的话 更换新的开关	

MAQI

使用说明书

美机缝纫机

MAQI SEWING MACHINE

OPERATION MANUAL

LS-1310G LS-2210G

使用说明书 INSTRUCTION MANUAL

在使用缝纫机之前请阅读本使用说明书。

请将本使用说明书放在便于查阅的地方保管。

Please read this manual before using the machine.

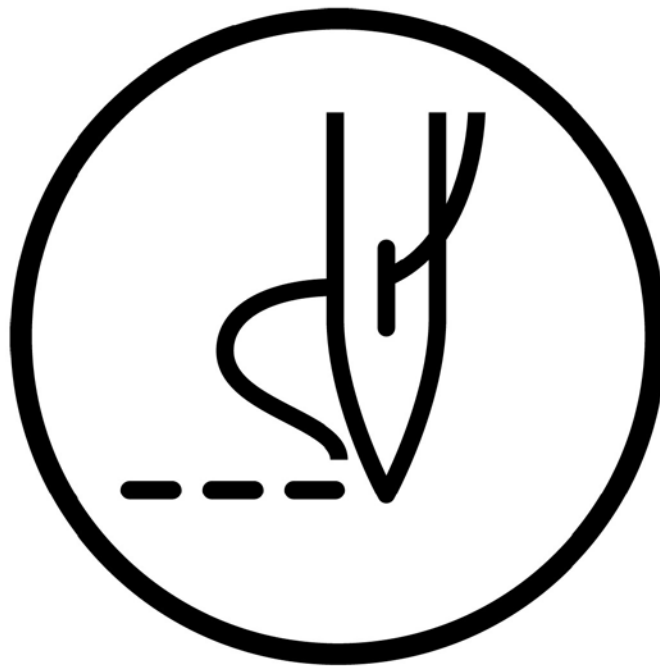
Please keep this manual within ease reach for quick reference.

直接驱动式

程序电脑花式机

DIRECT DRIVE

PROGRAMMABLE ELECTRONIC PATTERN SEWER



Thank you very much for buying a sewing machine. Before using your new machine, please read the safety instructions below and the explanations given in the instruction manual.

With industrial sewing machines, it is normal to carry out work while positioned directly in front of moving parts such as the needle and thread take-up lever, and consequently there is a danger of injury that can be caused by these parts. Follow the instructions from training personnel and instructors regarding safe and correct operation before operating the machine so that you will know how to use it correctly.



SAFETY INSTRUCTIONS

[1] Safety indications and their meanings




This instruction manual and the indications and symbols that are used on the machine itself are provided in order to ensure safe operation of this machine and to prevent accidents and injury to yourself or other people.

The meanings of these indications and symbols are given below.

Indications

 DANGER	The instructions which follow this term indicate situations where failure to follow the instructions may result in death or serious injury.
 CAUTION	The instructions which follow this term indicate situations where failure to follow the instructions could cause injury when using the machine or physical damage to equipment and surroundings.

Symbols

-  This symbol (\triangle) indicates something that you should be careful of. The picture inside the triangle indicates the nature of the caution that must be taken.
(For example, the symbol at left means "beware of injury")
-  This symbol (\otimes) indicates something that you must not do.
-  This symbol (\bullet) indicates something that you must do. The picture inside the circle indicates the nature of the thing that must be done.
(For example, the symbol at left means "you must make the ground connection".

[2] Notes on safety



DANGER



What at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the cover of the control box. Touching areas where high voltages are present can result in severe injury.



CAUTION

Environmental requirements



Use the sewing machine in an area which is free from sources of strong electrical noise such as electrical line noise or static electric noise. Sources of strong electrical noise may cause problems with correct operation.



Any fluctuations in the power supply voltage should be within $\pm 10\%$ of the rated voltage for the machine. Voltage fluctuations which are greater than this may cause problems with correct operation.



The power supply capacity should be greater than the requirements for the sewing machine's power consumption. Insufficient power supply capacity may cause problems with correct operation.



The pneumatic delivery capability should be greater than the requirements for the sewing machine's total air consumption. Insufficient pneumatic delivery capability may cause problems with correct operation.



The ambient temperature should be within the range of 5°C to 35°C during use. Temperatures which are lower or higher than this may cause problems with correct operation.



The relative humidity should be within the range of 45% to 85% during use, and no dew formation should occur in any devices. Excessively dry or humid environments and dew formation.



In the event of an electrical storm, turn off the power and disconnect the the power cord from the wall outlet. Lightning may cause problems with correct operation.

Installation



Machine installation should only be carried out by a qualified technician.



Contact your dealer or a qualified electrician for any electrical work that may need to be done.



The sewing machine weighs approximately 88 kg. The installation should be carried out by two or more people.



Do not connect the power cord until installation is complete. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



Hold the machine head with both hands when tilting it back or returning it to its original position. Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.



All cords should be secured at least 25mm away from any moving parts. Furthermore, do not excessively bend the cords or secure them too firmly with staples, otherwise there is the danger that fire or electric shocks could occur.



Install the safety covers to the machine head and motor.













If using a work table which has casters, the casters should be secured in such a way so that they cannot move.





Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

CAUTION










Sewing

-  The sewing machine should only be used by operators who have received the necessary training in safe use beforehand.
-  The sewing machine should not be used for any applications other than sewing.
-  Be sure to wear protective goggles when using the machine.
-  If goggles are not worn, there is the danger that if a needle breaks, parts of the broken needle may enter your eyes and injury may result.
-  Turn off the power switch at the following times. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - When threading the needle
 - When replacing the bobbin and needle
 - When not using the machine and when leaving the machine unattended
-  If using a work table which has casters, the casters should be secured in such a way so that they cannot move.
-  Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
-  Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.
-  If an error occurs in machine operation, or if abnormal noises or smells are noticed, immediately turn off the power switch. Then contact your nearest dealer or qualified technician.
-  If the machine develops a problem, contact your nearest dealer or a qualified technician.

Cleaning

-  Turn off power switch before carrying out cleaning. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
-  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

Maintenance and inspection

-  Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
-  Ask your dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
-  Turn off the power switch and disconnect the power cord before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
-  Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.
-  Hold the machine head with both hands when tilting it back or returning it to its original position. Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
-  Use only the proper replacement parts as specified.
-  If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.
-  Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

[3] Warning labels

The following warning labels appear on the sewing machine. Please follow the instructions on the labels at all times when using the machine. If the labels have been removed or are difficult to read, please contact your nearest dealer.


1

	⚠ 危险			
	触摸高压电部分, 会导致受伤。 在切断电源5分钟后, 再开启盖罩。			
⚠ DANGER	⚠ GEFAHR	⚠ DANGER	⚠ PELIGRO	
Hazardous voltage will cause injury. Turn off main switch and wait 5 minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung öffnen.	Un voltage non adapte provoque des blessures. Eteindre l'interrupteur et attendre 5 minutes avant d'ouvrir le capot.	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.	

2

	⚠ 注意	
	触摸运动部分, 易造成受伤。所以在装上安全保护装置后, 再进行缝纫操作。在切断电源后, 进行穿线, 更换梭芯, 机针和做清扫, 调整工作。	
⚠ CAUTION		
Moving parts may cause injury. Operate with safety devices. Turn off main switch before threading, changing bobbin and needle, cleaning etc.		


3



Be careful not to get your hand caught when tilting back the machine head and returning it to its original position.

Safety devices
 Devices such as eye guard, finger guard, thread take-up cover, motor cover, tension release solenoid cover, inner cover, outer cover, fixed cover and gas spring support cover


4



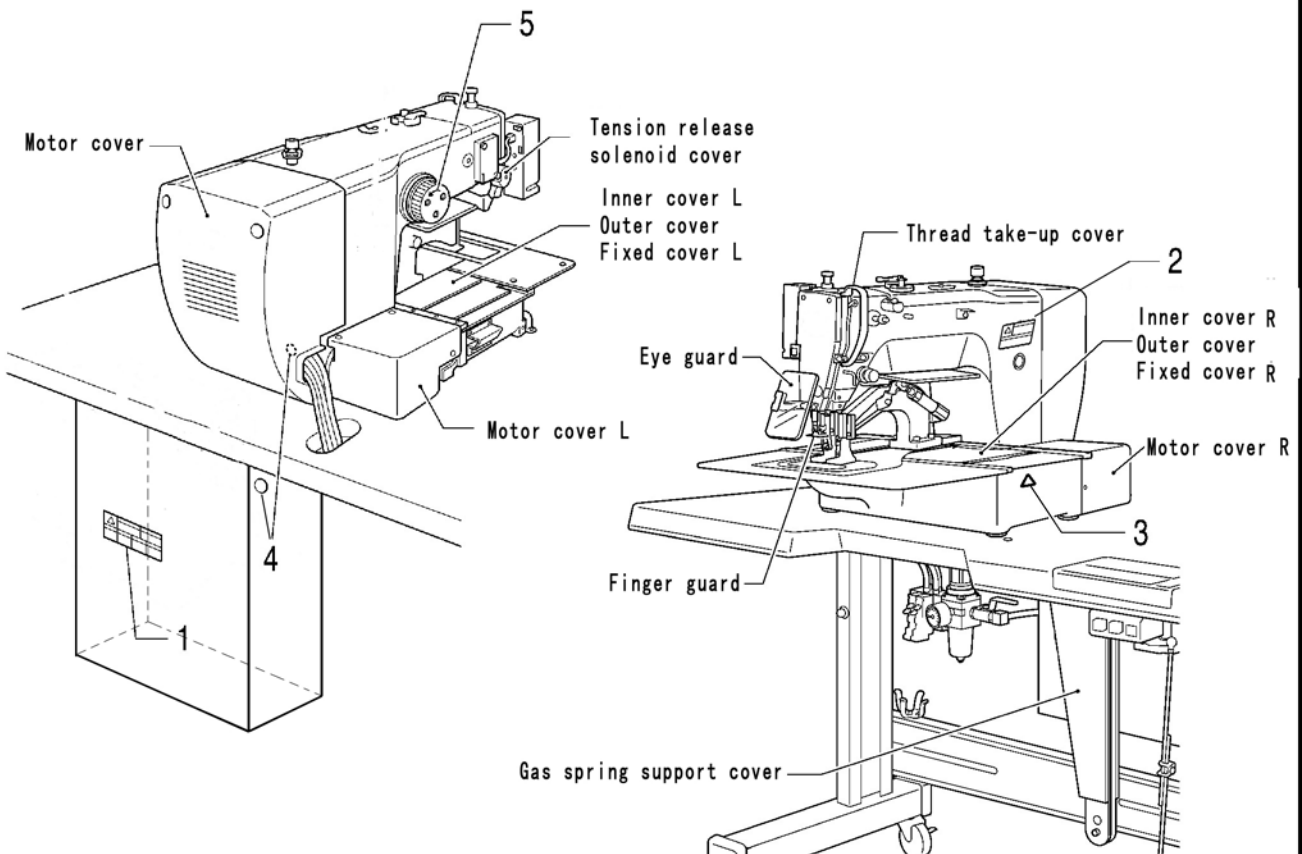
Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.



5



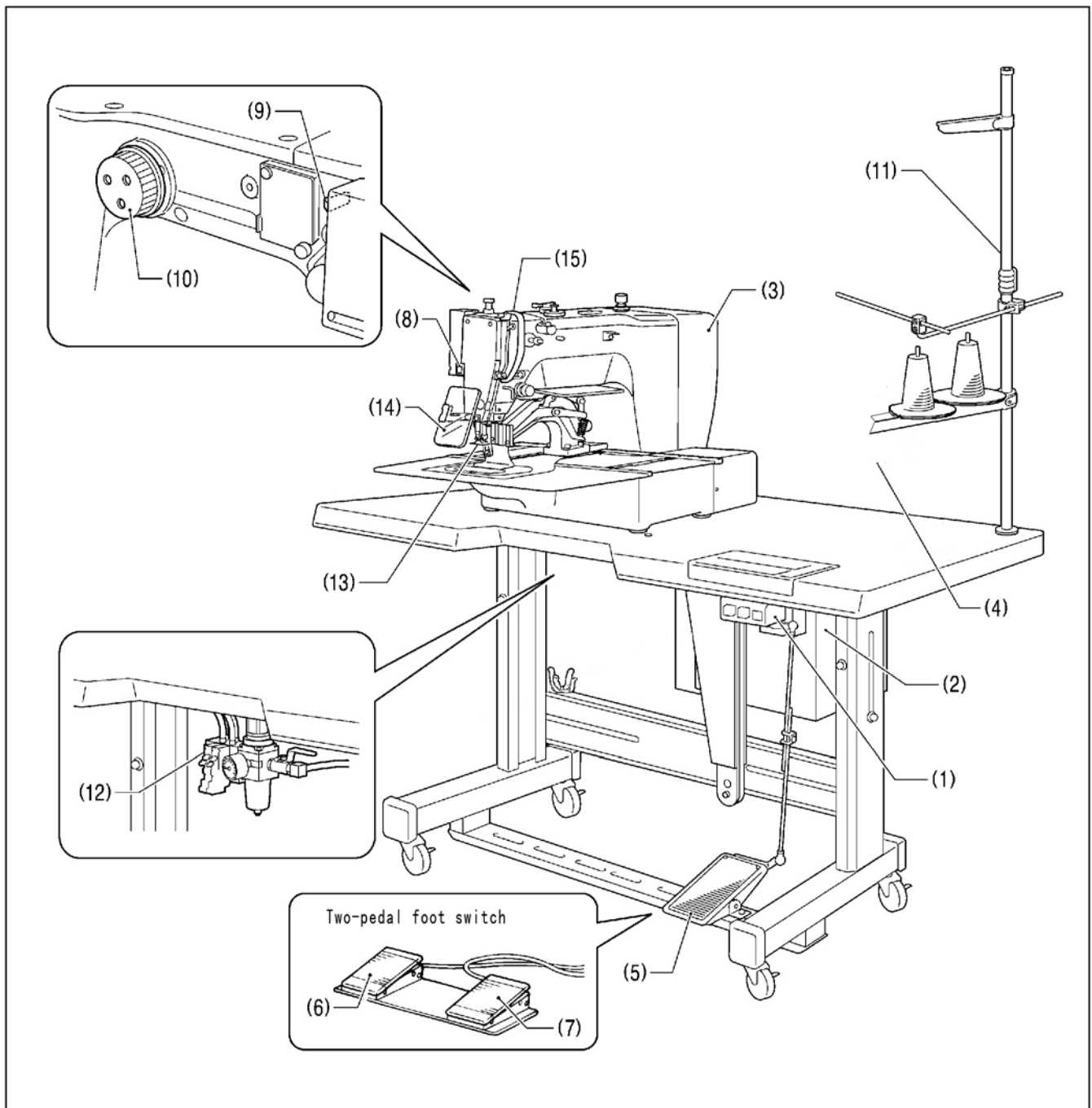
Direction of operation



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1. NAMES OF MAJOR PARTS

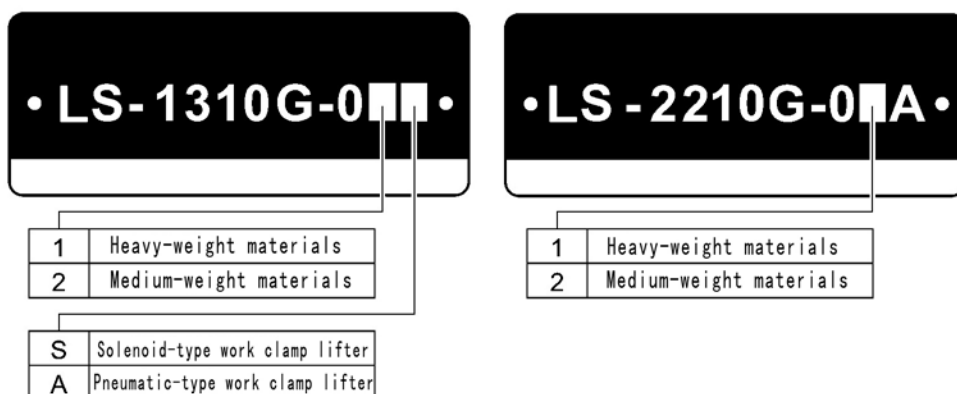


- (1) Power switch
- (2) Control box
- (3) Motor cover
- (4) Operation panel
- (5) Foot switch(solenoid specifications)
- (6) Start switch(pneumatic specifications)
- (7) Work clamp switch(pneumatic specifications)
- (8) STOP switch
- (9) Thread wiper switch
- (10) Pulley
- (11) Cotton stand
- (12) Solenoid valve(pneumatic specifications)

Safety devices:

- (13) Finger guard
- (14) Eye guard
- (15) Thread take-up cover

2. SPECIFICATIONS











Sewing machine	Lock stitch, pattern tacking sewing machine (with large shuttle hook)
Stitch formation	Single needle lock stitch
Max. sewing speed	2,700rpm
Sewing area (X×Y)	LS-1310G: Max. 130×100 mm, LS-2210G: Max. 220×100 mm
Feed mechanism	Intermittent feed, pulse motor drive
Stitch length	0.1 ~ 12.7mm
No. of stitches	400,000-stitch internal memory(*)
Maximum no. of stitches	20,000 stitches (per program)
Work clamp lift method	Solenoid specifications: Pulse motor drive method, Pneumatic specifications: Pneumatic method
Work clamp height	Solenoid specifications: Max. 25mm, pneumatic specifications: Max. 30mm
2-step work clamp	Solenoid specifications: Integrated-type work clamp Pneumatic specifications: Separate-type work clamp
Intermittent presser foot lift amount	20mm
Intermittent stroke	Adjustable range : 0 ~ 8 mm
Rotary hook	Double-capacity shuttle hook (standard shuttle hook sold separately)
Wiper device	Standard equipment
Thread trimmer	Standard equipment
Data storage method	Internal / U Disk
The maximum quantity of pattern stocking	1 0 0 0
Motor	750 W AC servo motor
Weights	Machine head approx. 88kg, operation panel approx. 0.6kg
Power supply	Single-phase 100V / 220V, Three-phase 200V / 220V / 380V / 400V 400VA
Air pressure	0.5 Mpa 1.8 l/min

※ The number of data items and stitches that can be stored will vary depending on the number of stitches in each program.

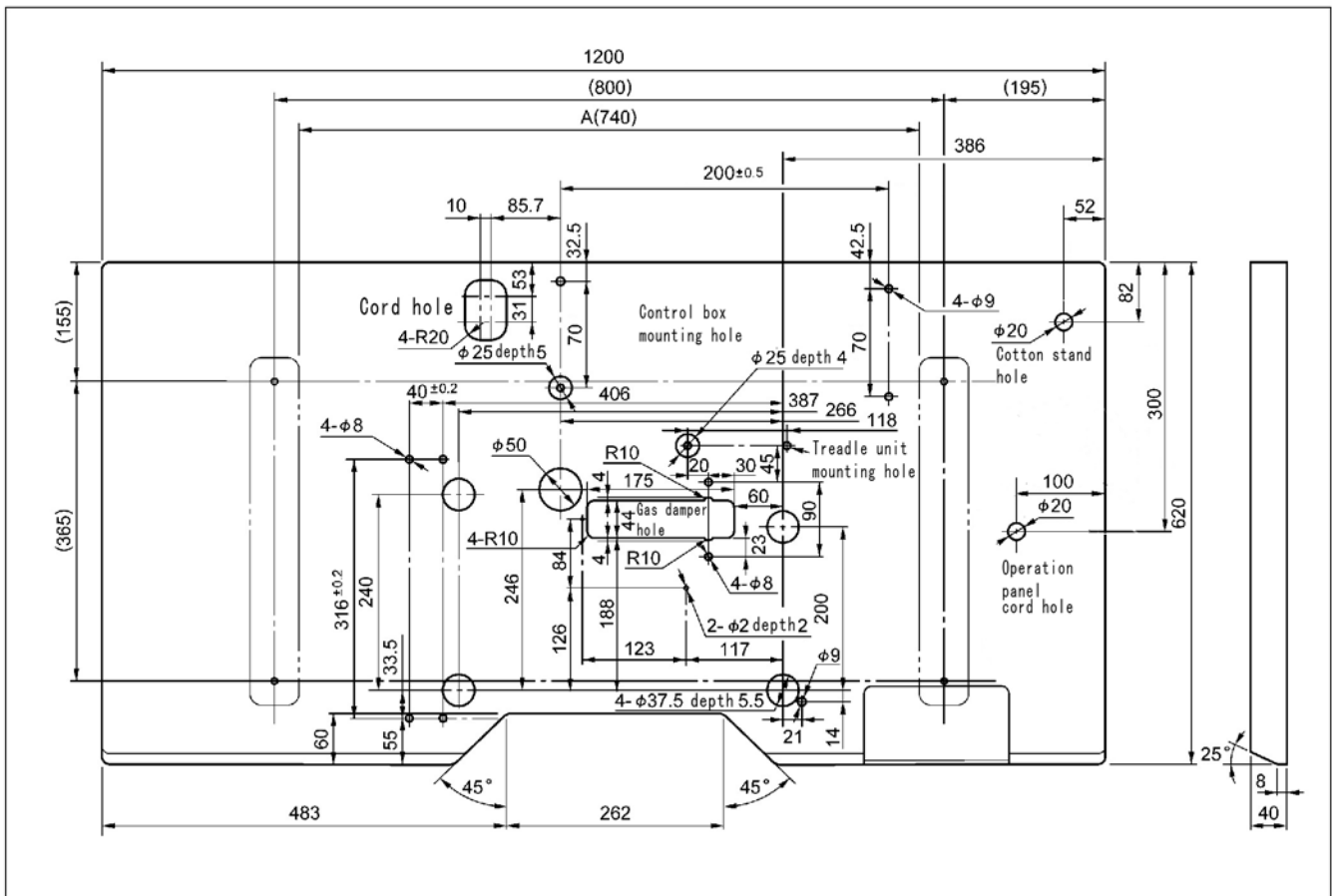
3. INSTALLATION

⚠ CAUTION

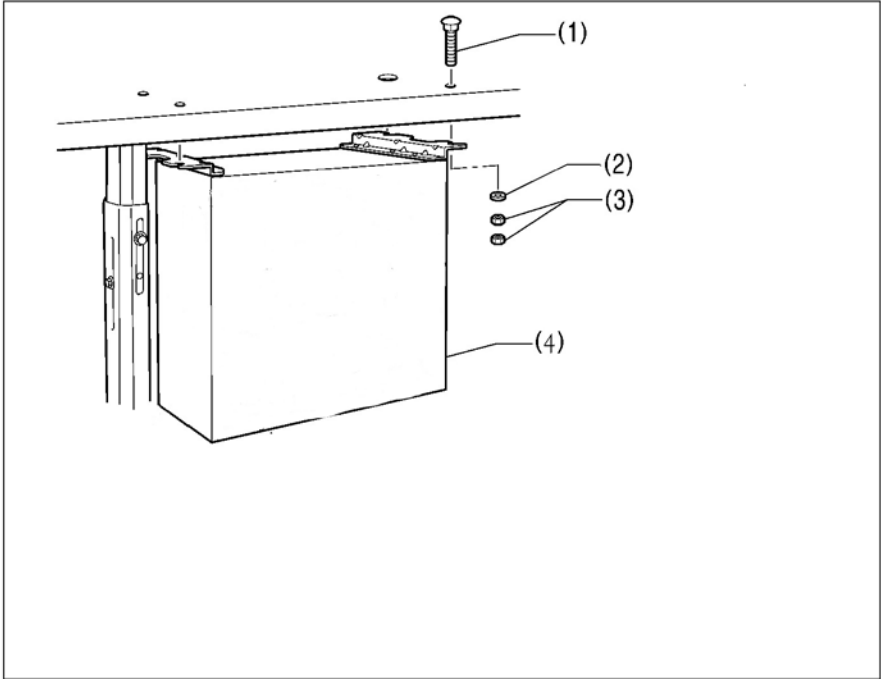
-  Machine installation should only be carried out by a qualified technician.
-  Contact your dealer or a qualified electrician for any electrical work that may need to be done.
-  The sewing machine head weighs approximately 88kg. The installation should be carried out by two or more people.
-  Do not connect the power cord until installation is complete. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
-  Hold the machine head with both hands when tilting it back or returning it to its original position. Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  All cords should be secured at least 25mm away from any moving parts. Furthermore, do not excessively bend the cords or secure them too firmly with staples, otherwise there is the danger that fire or electric shocks could occur.
-  Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.
-  Install the safety covers to the machine head and motor.

3-1. Table processing diagram

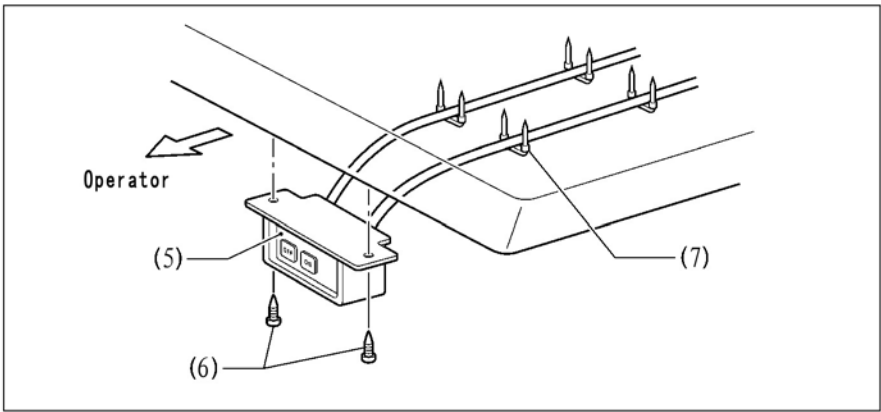
- The thickness of the table should be at least 40mm, and it should be strong enough to bear the weight and vibration of the sewing machine.
- Check that the control box is at least 10mm away from the leg. If the control box and the leg are too close together, it may result in incorrect sewing machine operation.



3-2. Installing the control box

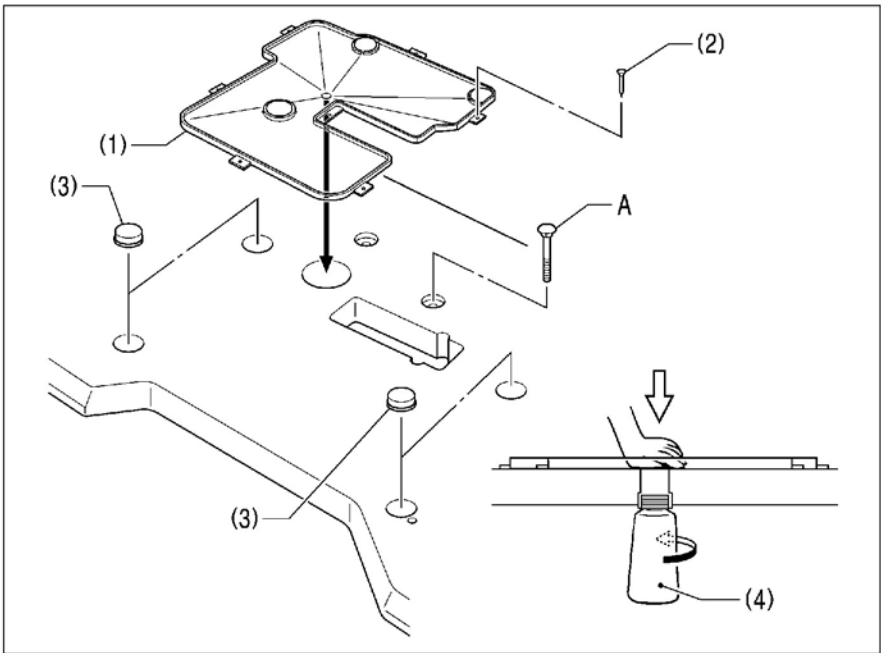


- (1) Bolts[4pcs.]
- (2) Plain washers[4pcs.]
- (3) Nuts[8pcs.]
- (4) Control box



- (5) Power switch
- (6) Wood screws[2pcs.]
- (7) Staples[4pcs.]

3-3. Installing the oil pan

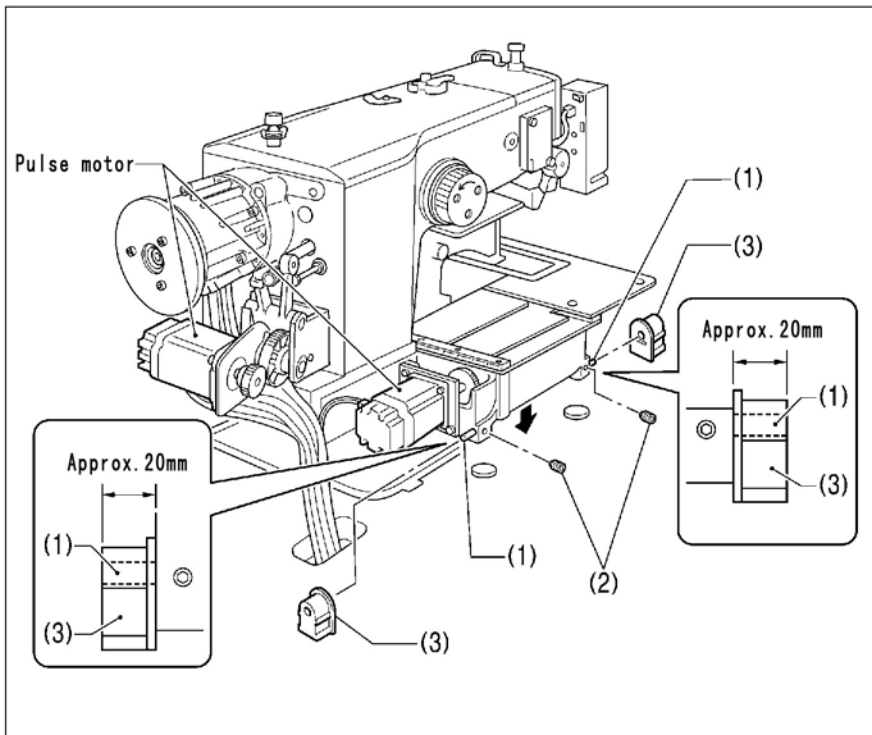


For solenoid specifications, install the treadle unit mounting bolt (A) before installing the oil pan.

(Refer to "3-6. Installing the treadle unit <solenoid specifications>")

- (1) Oil pan
- (2) Nails[7pcs.]
- (3) Rubber oushions[4pcs.]
- (4) Waste oil tank

3-4. Installing the machine head

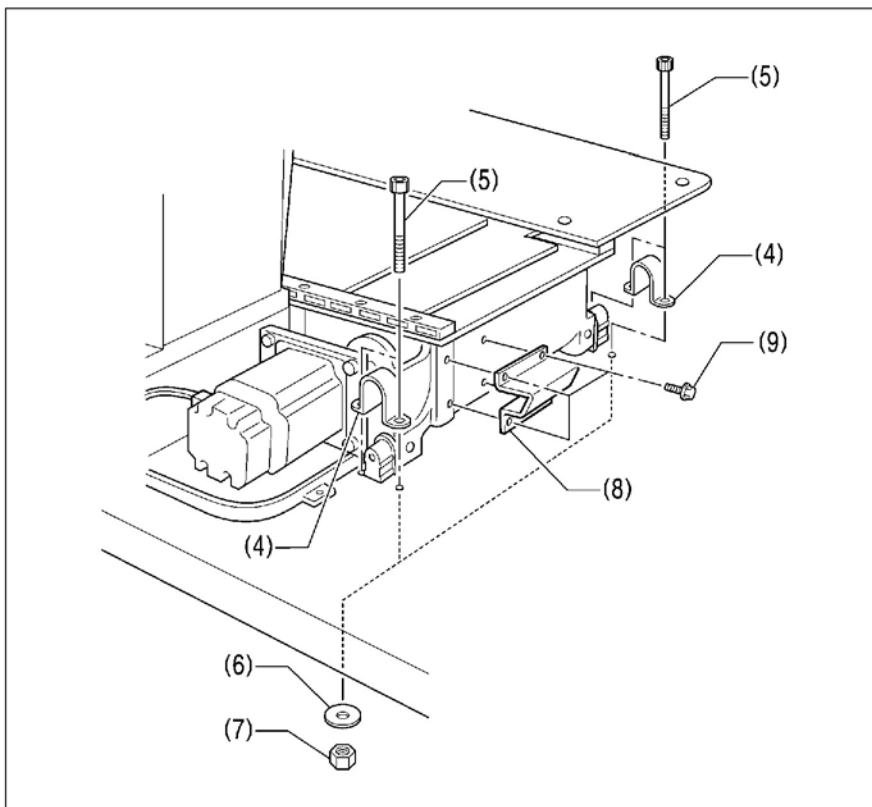


- (1) Pins[2pcs.]
- (2) Set screws[2pcs.]
- (3) Hinge rubber assemblies[2pcs.]

Place the machine head gently on top of the oil pan and the rubber cushions.

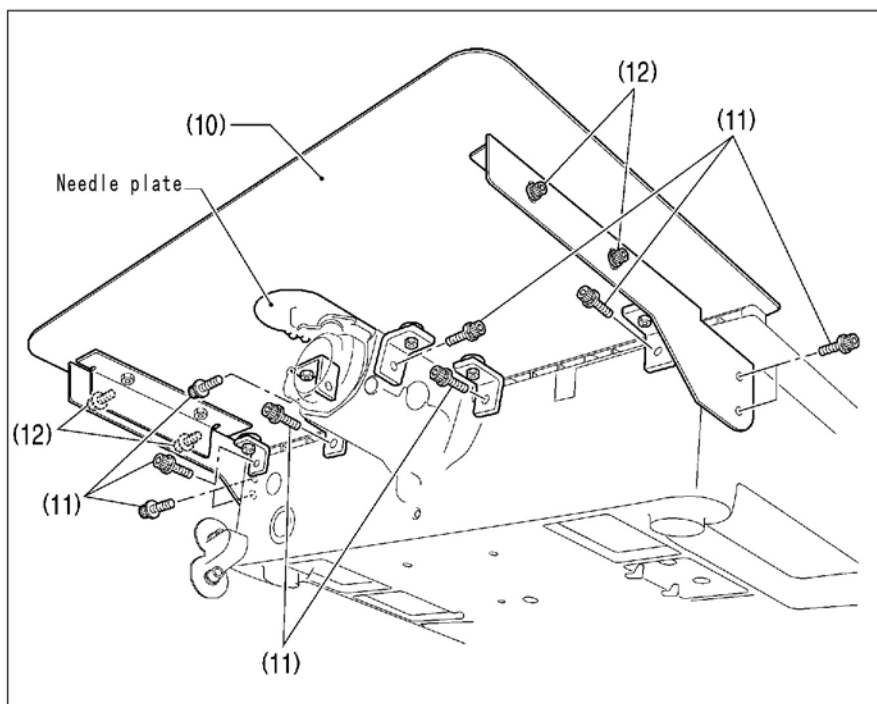
NOTE:

- Be careful not to get the cords clamped between the machine head and the oil pan.
- When holding the machine head, do not hold it by the pulse motor. This may cause problems with operation of the pulse motor.



- (4) Hinge holders[2pcs.]
- (5) Bolts[4pcs.]
- (6) Plain washers[4pcs.]
- (7) Nuts[4pcs.]
- (8) Head rest
- (9) Bolts with washer[4pcs.]

3. INSTALLATION



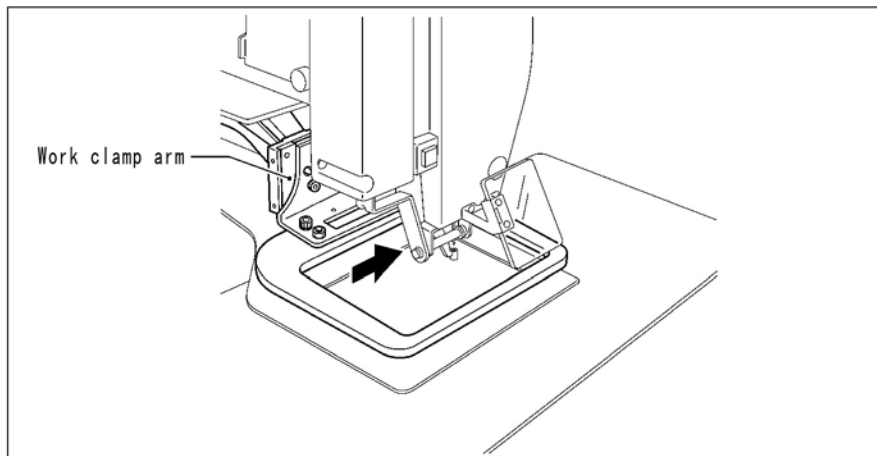
(10) Auxiliary plate

(11) Bolts with washer[10pcs.]

Loosen the bolts with washer (12) and adjust so that the auxiliary plate(10) and the needle plate are at the same height.

NOTE:

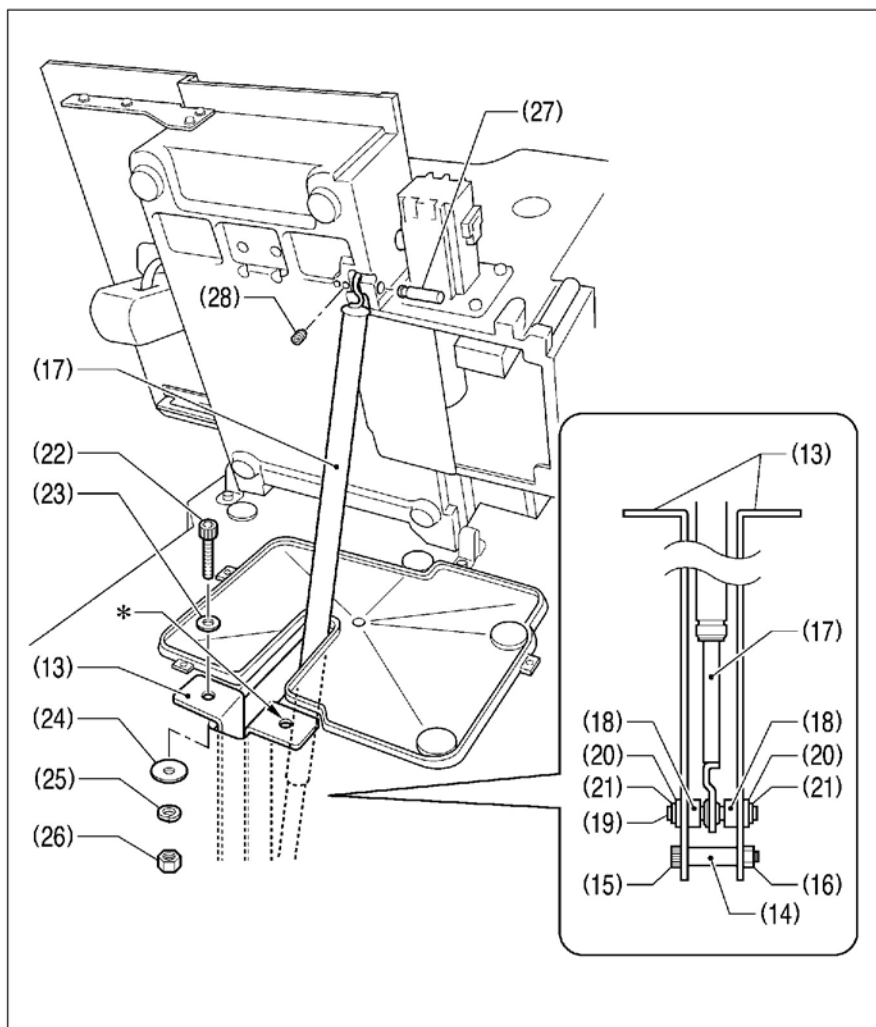
Install the auxiliary plate so that it is horizontal.



Move the work clamp arm all the way to the right when looking from the front of the sewing machine(the direction of the arrow in the illustration),and then gently tilt back the machine head.

NOTE:

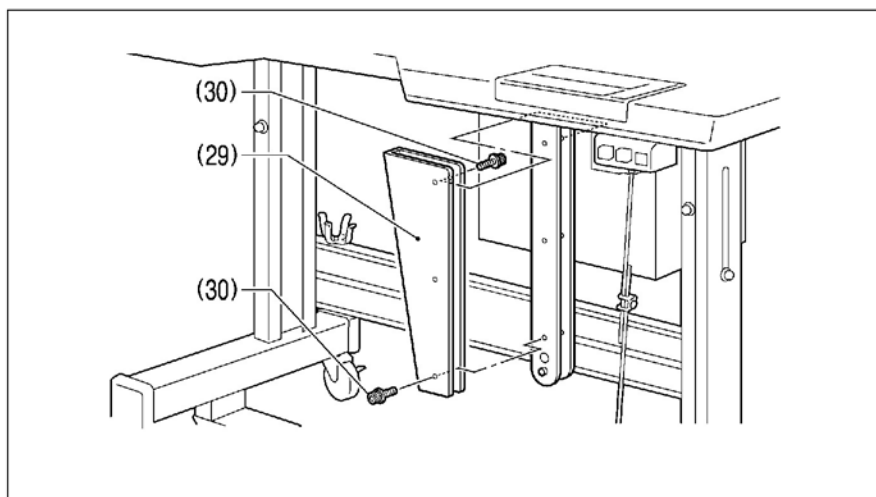
Two or more people should tilt back the machine head, and it should be tilted gently while being held with both hands.



- (13) Gas spring holders[2pcs.]
- (14) Spacer
- (15) Bolt
- (16) Nut
- (17) Gas spring
- (18) Shaft collars[2pcs.]
- (19) Gas spring shaft D
- (20) Plain washers[2pcs.]
- (21) Retaining rings E[2pcs.]
- (22) Bolts[2pcs.]
- (23) Plain washers(medium)[2pcs.]
- (24) Plain washers(large)[2pcs.]
- (25) Spring washers[2pcs.]
- (26) Nut[2pcs.]
- (27) Gas spring shaft U
- (28) Set screw

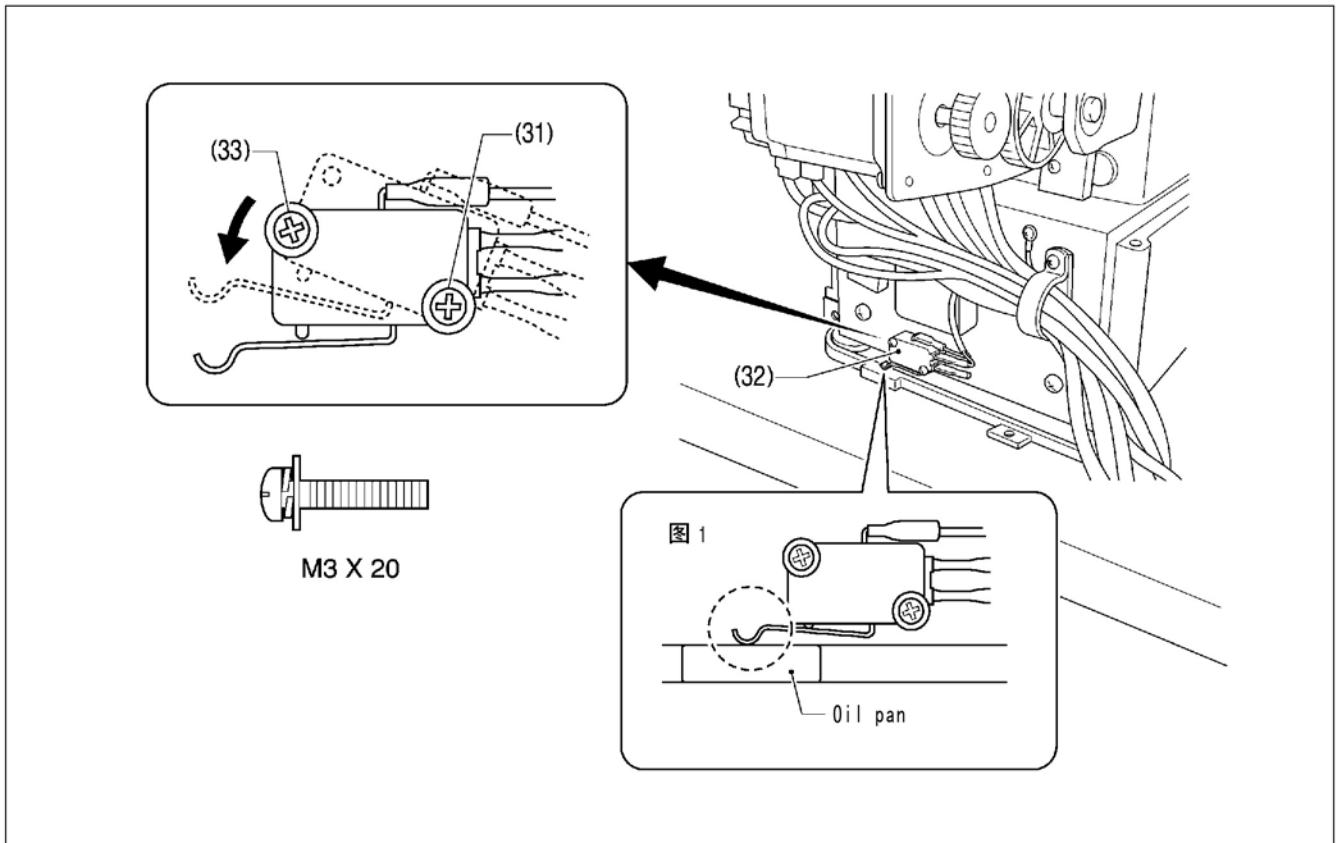
NOTE:

For solenoid specifications, the bolts (22), plain washers(23), plain washers (24), spring washers (25) and nuts (26) in the places marked with * are also used to install the treadle unit. (refer to "3-6. Installing the treadle unit <solenoid specifications>")



- (29) Gas spring support cover
- (30) Bolts with washer[6pcs.]

3. INSTALLATION

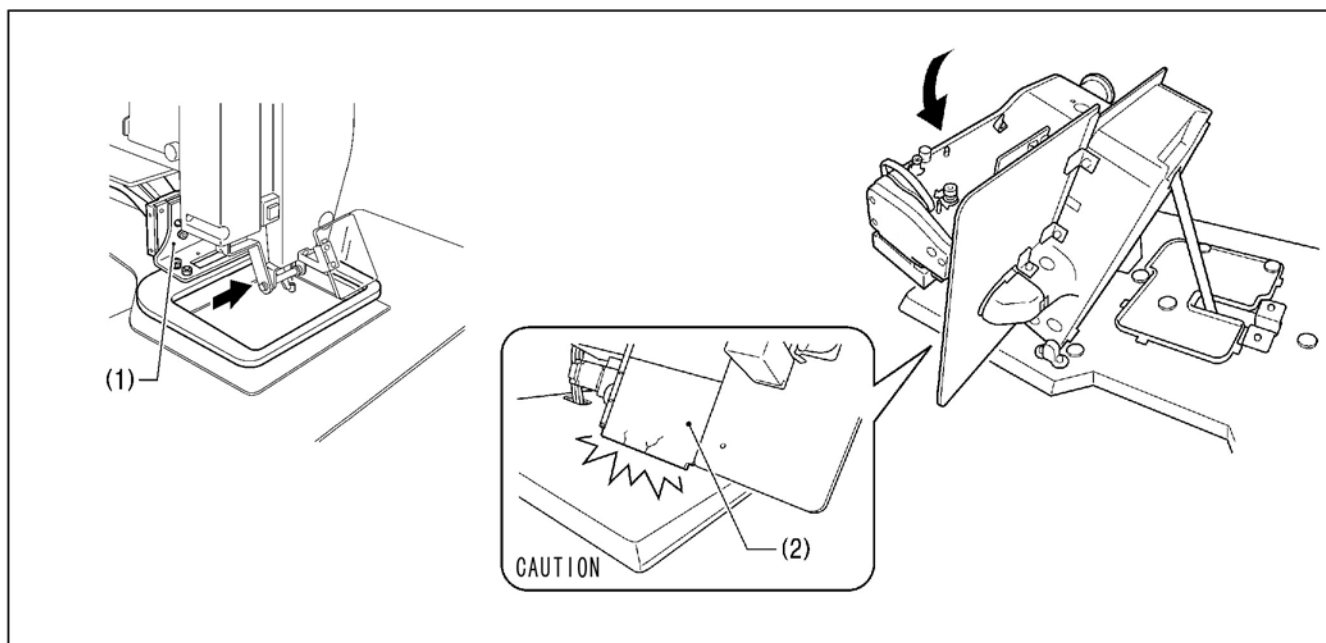


- Gently return the machine head to its original position.
- Loosen the screw(31). Move the machine head switch(32) to the illustration, and then secure the machine head switch(32) with the screw(31) and the accessory M3×20 screw(33).
- Check that the machine head switch(32) is turned on as shown in figure 1.

NOTE:

If not turn on the head switch, there will be an error message.

3-5. Tilting the sewing machine head

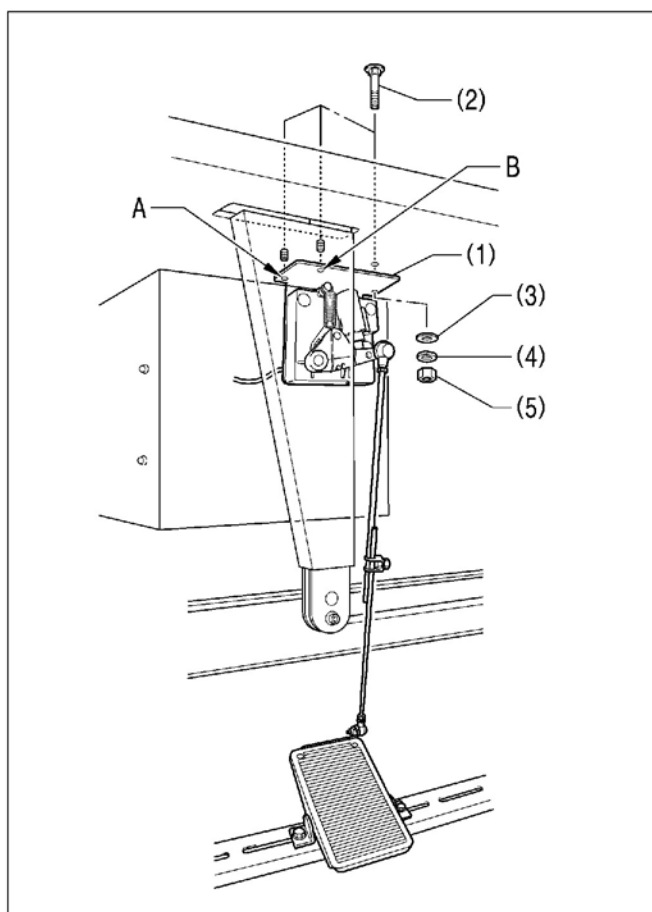


1. Move the presser arm assembly(1) as it will go in the direction of the arrow in the illustration to the right when looking from the front of the sewing machine).
2. Stand at the left side of the table, and gently tilt the machine head towards you.

NOTE:

Always be sure to move the work clamp arm all the way to the right before tilting back the machine head. If you try to tilt back the machine head while the work clamp arm is still on the left side, it may damage the outer cover L(2).

3-6. Installing the treadle unit(solenoid specifications)



- (1) Treadle unit
- (2) Bolts[3pcs.]
- (3) Plain washers[3pcs.]
- (4) Spring washers[3pcs.]
- (5) Nuts[3pcs.]

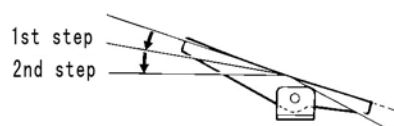
NOTE:

- Install the bolt for mounting hole A before installing the oil pan. (Refer to "3-3. Installing the oil pan.")
- Mounting hole B is used to install the gas spring supports with the bolt, plain washer, spring washer and nut. (Refer to "3-4. Installing the machine head".)

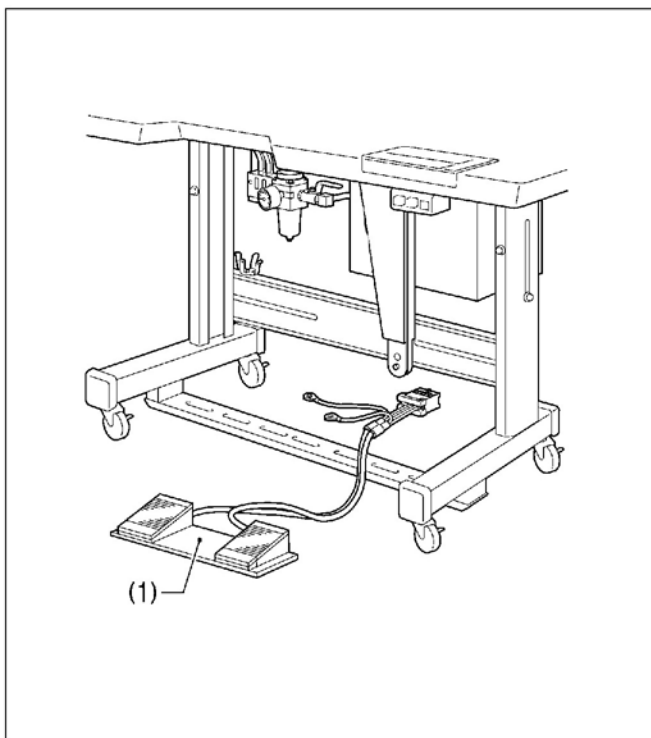
- ※ Use a commercially-available foot switch and connecting rod.
- ※ If changing the mounting position for the treadle unit, use the accessory bolts, plain washers, spring washers and nuts.

<Foot switch operating method>

When the foot switch is depressed to the 1st step, the work clamp is lowered, and when it is depressed to the 2nd step, the sewing machine starts sewing.



3-7. Installing the two-pedal foot switch(pneumatic specifications)

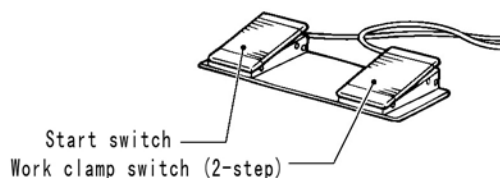


(1) Foot switch

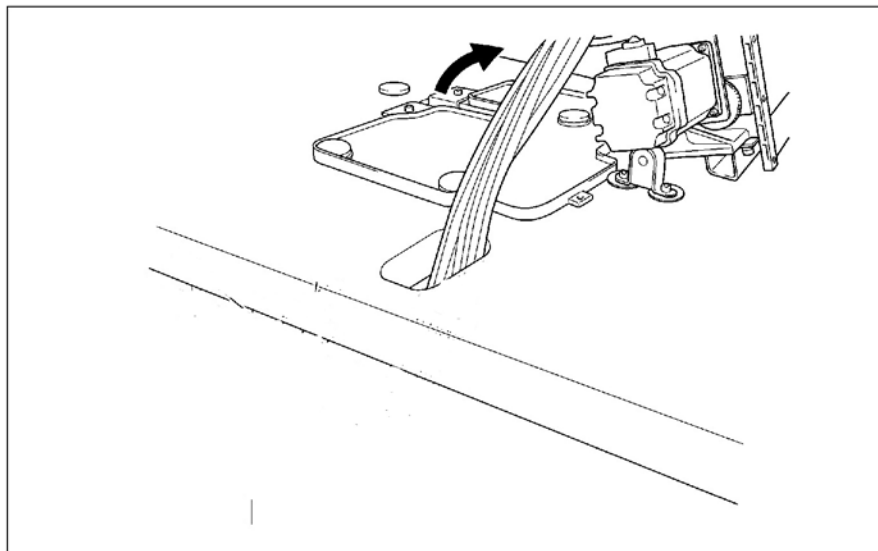
Please put the pedal switch (1) plug into the port place X8 of the electronic control box.

<Foot switch operating method>

When the work clamp switch (right) is depressed, both work clamp are lowered, and when the start switch (left) is depressed, the sewing machine starts sewing.



3-8. Connecting the cords

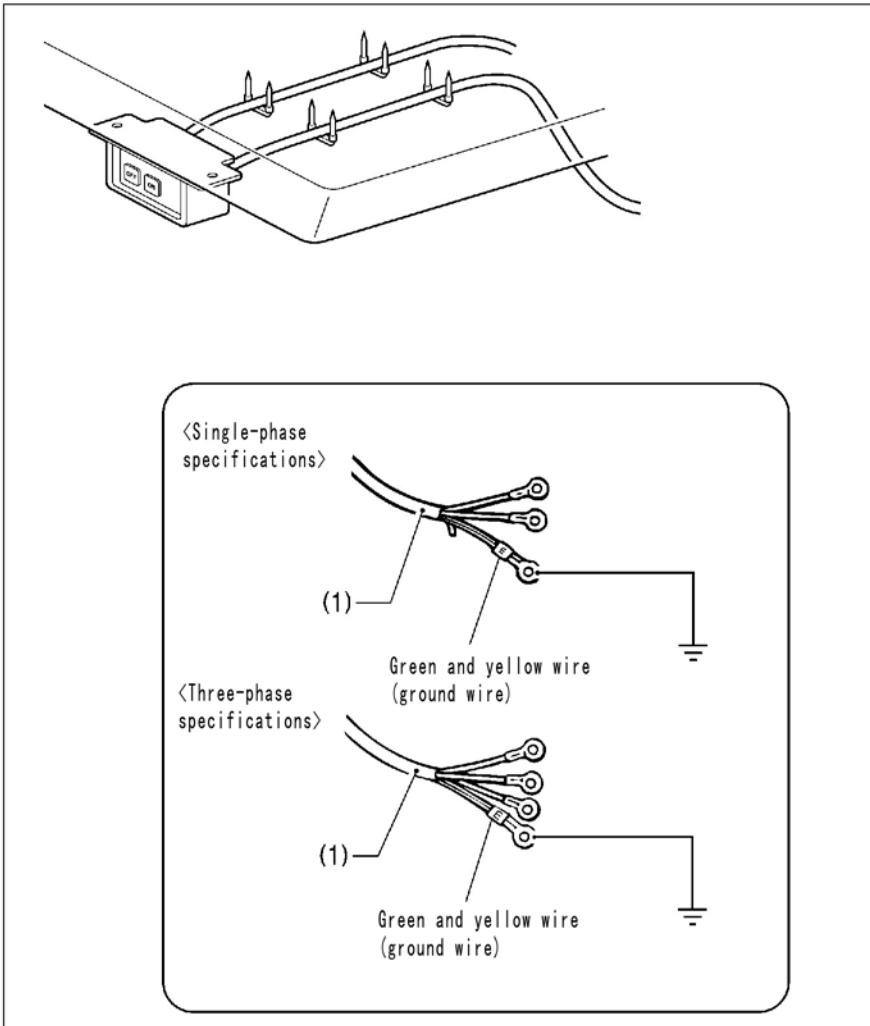


1. Gently tilt back the machine head.
2. Pass the cord bundle through the hole in the work table.
3. Put the plug in according to the number of plugs and electronic control box interface.

NOTE:

- Check that the connector is facing the correct way, and then insert it firmly until it locks into place.
- Secure the cables with cable ties and cord clamps, while being careful not pull on the connector.

3-9 . Connecting the power cord

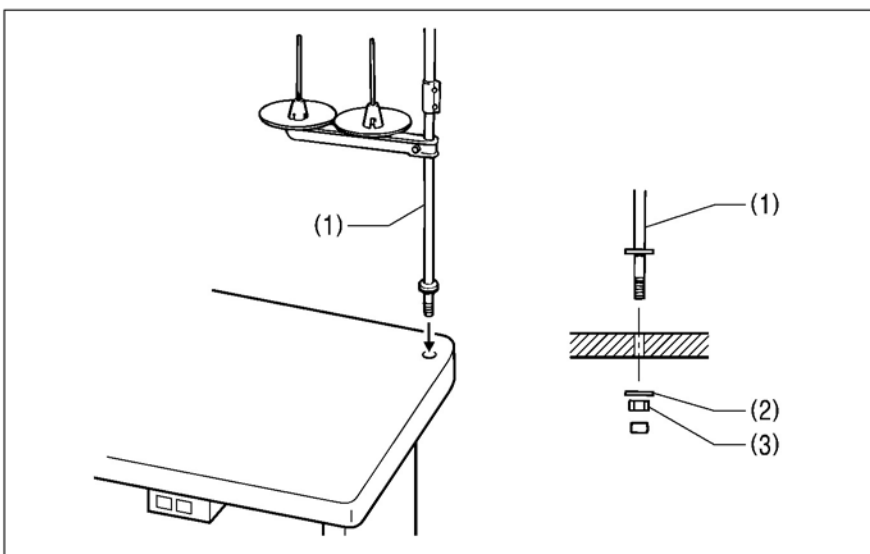


1. Attach an appropriate plug to the power cord (1). (The green and yellow wire is the ground wire.)
2. Insert the plug into a property-grounded AC power supply.

NOTE:

Do not use an extension cord. If this is not observed, it may cause problems with correct operation.

3-10. Installing the cotton stand

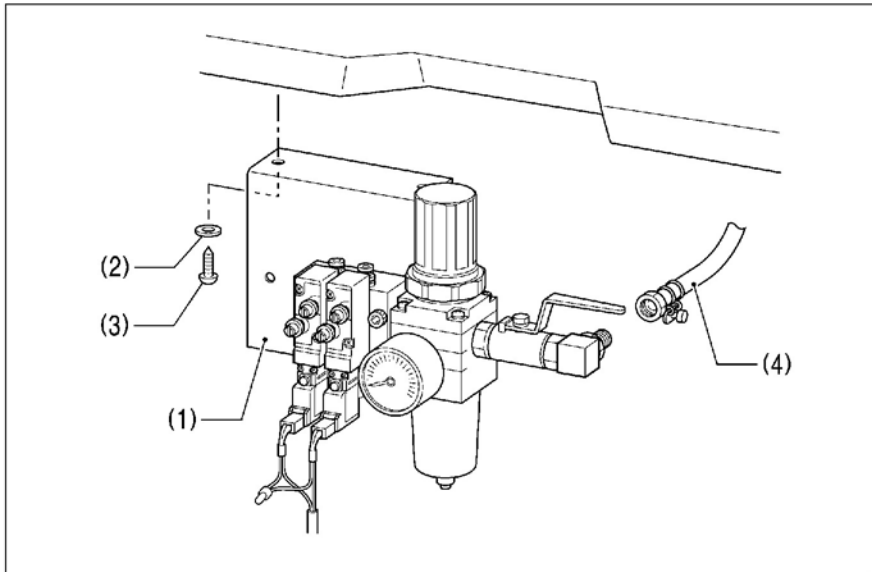


(1) Cotton stand

Note:

Fit the washer (2), and then securely tighten the nut (3) so that the cotton stand dose not move.

3-11. Installing the pneumatic unit (pneumatic specifications)



Install underneath the work table.

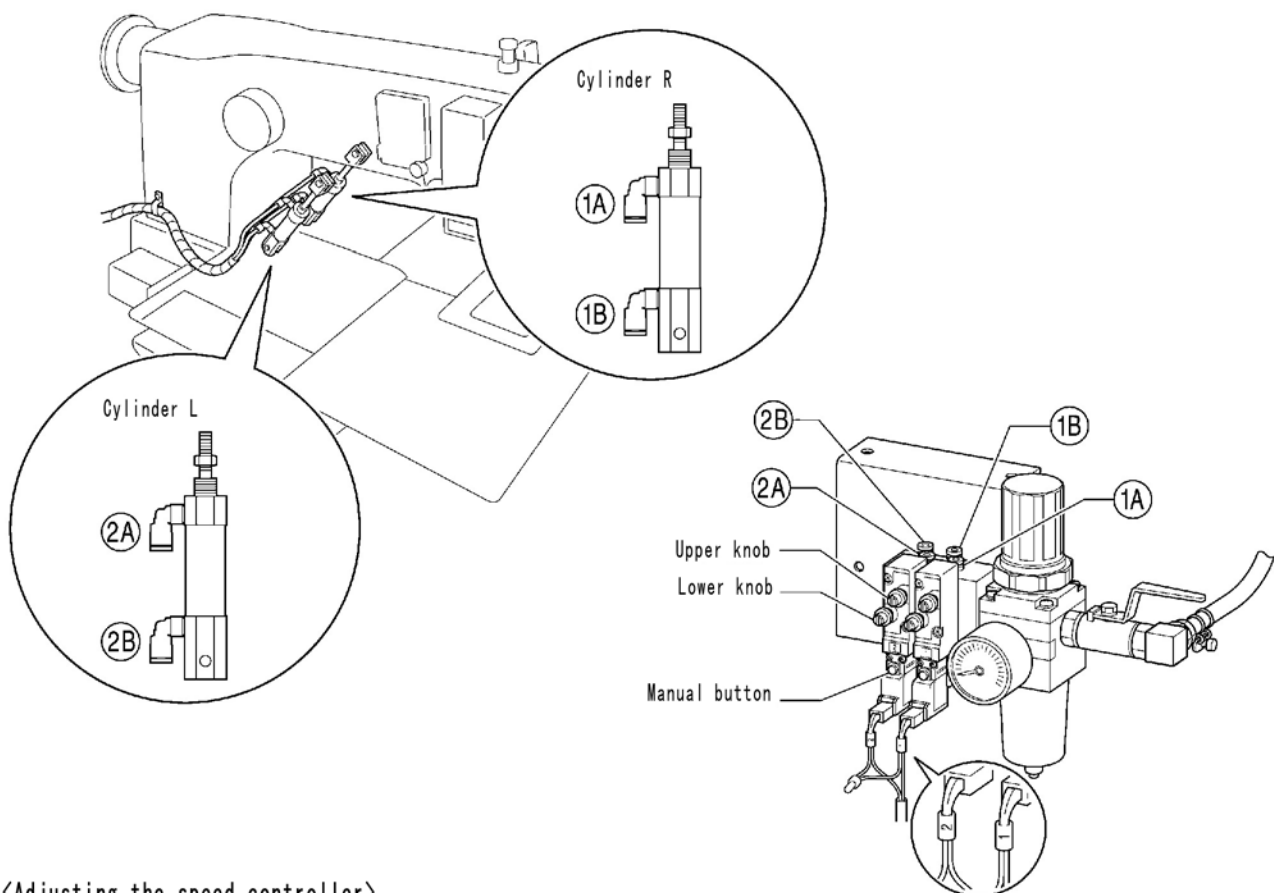
- (1) Solenoid valve assembly
- (2) Washers [2pcs.]
- (3) Wood screws [2pcs.]
- (4) Rubber hose

After installing the pneumatic unit, adjust the air pressure.
(Refer to "7-16. Adjusting the air pressure".)

NOTE:

Make sure that the pneumatic unit does not touch the control box or the work table leg.

Connect each air tube to the position with the corresponding number.



<Adjusting the speed controller>

You can use the valve knobs to adjust the lifting and lowering speeds.

The valve knobs should be adjusted so that the left and right sides of the work clamp operate at the same speed.

- When the upper knob is tightened, the lifting speed becomes slower. When it is loosened, the lifting speed becomes faster.
- When the lower knob is tightened, the lowering speed becomes slower. When it is loosened, the lowering speed becomes faster.

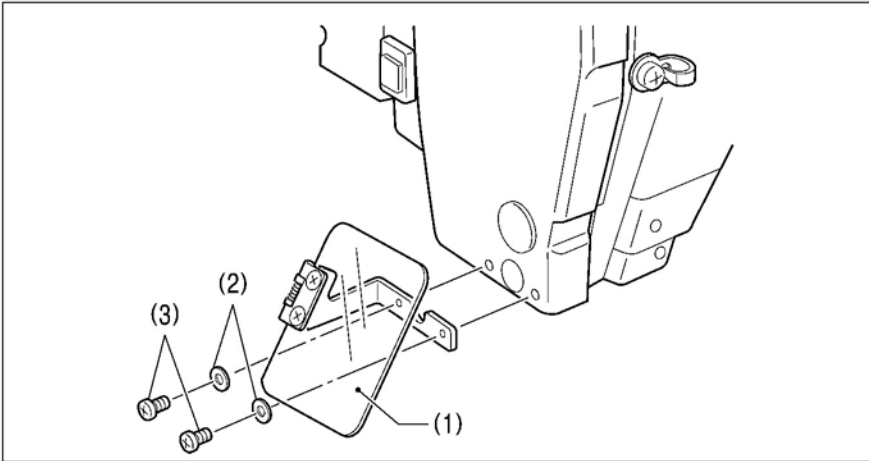
You can operate the work clamp while the power is turned off by pressing the manual button.

3-12. Installing the eye guard

! CAUTION

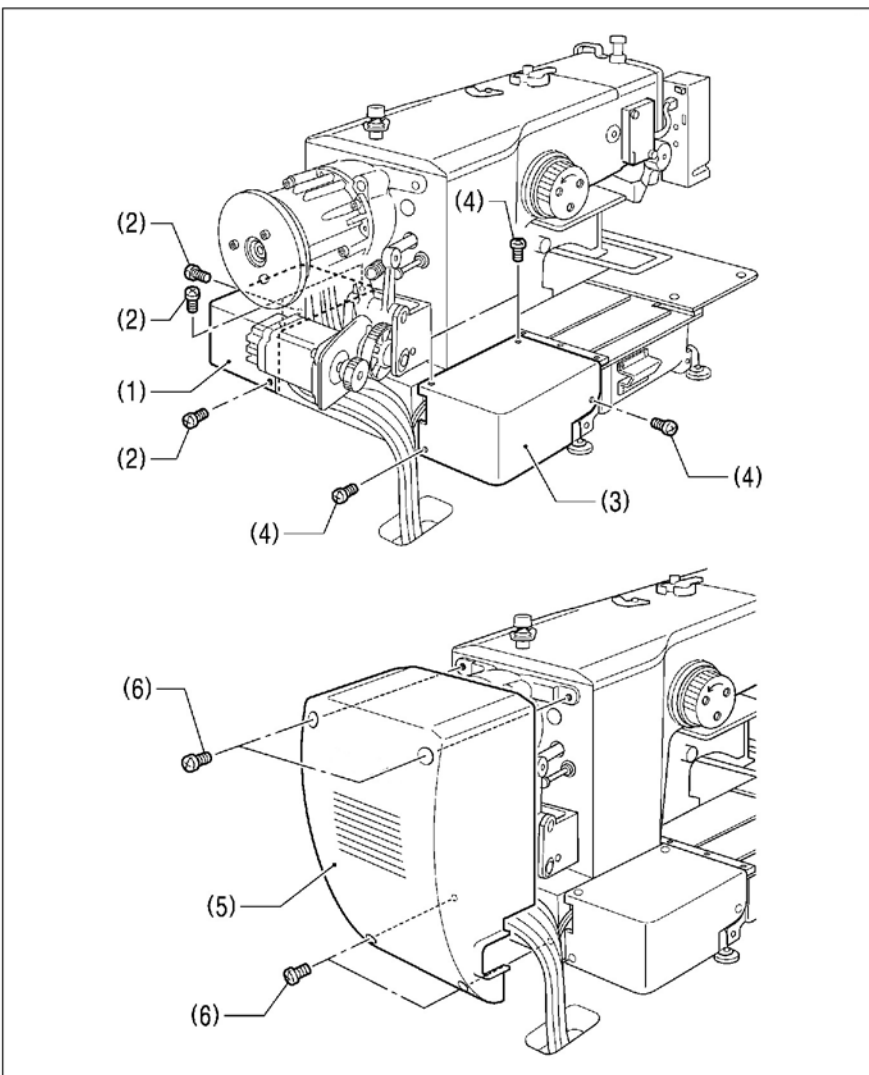
Attach all safety devices before using the sewing machine.

If the machine is used without these devices attached, injury may result.



- (1) Eye guard assembly
- (2) Plain washers [2pcs.]
- (3) Screws [2pcs.]

3-13. Installing the motor cover



- (1) Motor cover R
- (2) Screws [4pcs.]
- (3) Motor cover L
- (4) Screws [4pcs.]
- (5) Motor cover
- (6) Screws [4pcs.]

NOTE:

Be careful not to clamp the cords when installing the motor cover.

3-14. Lubrication

CAUTION



Do not connect the power cord until lubrication is complete.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.

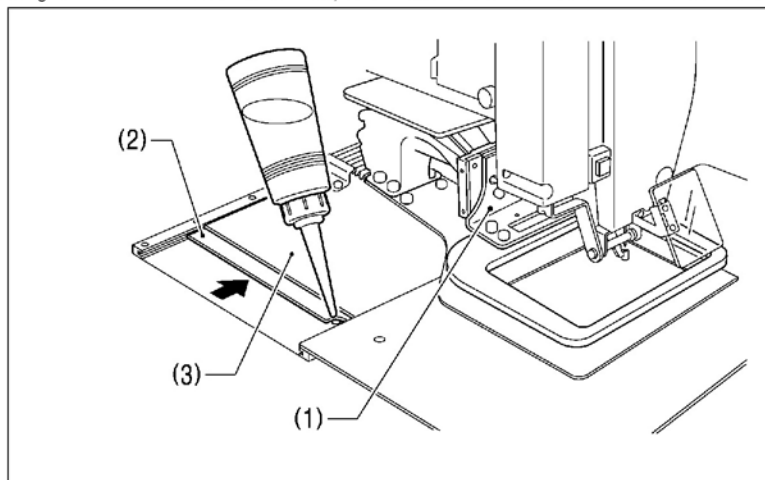
Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.

Keep the oil out of the reach of children.

The sewing machine should always be lubricated and the oil supply replenished before it is used for the first time, and also after long periods of non-use.

Please use the sewing machine lubricant specified by our company.

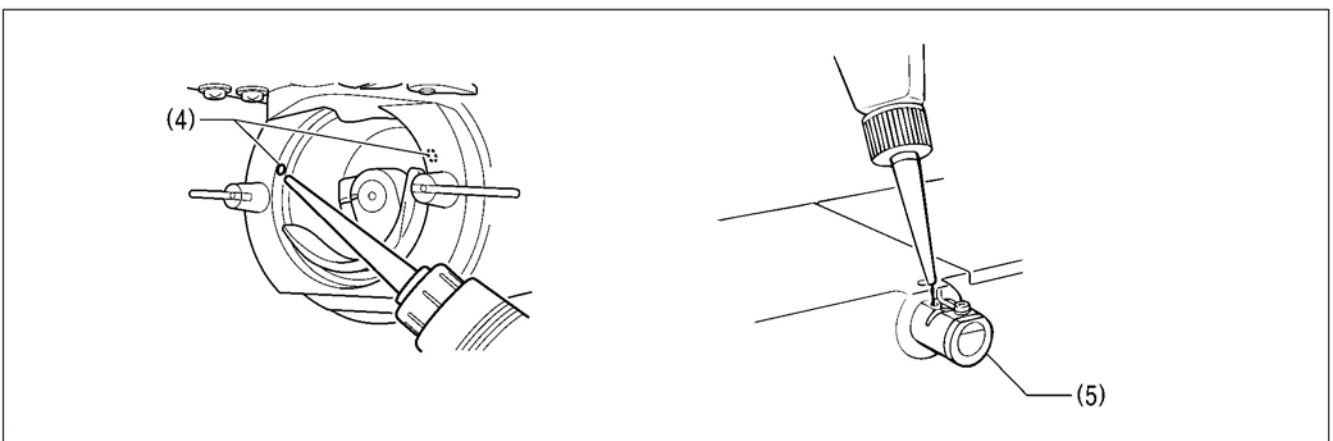
* If this type of lubricating oil is difficult to obtain, the recommended oil to use is <Exxon Mobil EssoTex SM10;VG10>.



Move the work clamp arm (1) as it will go to the right when looking from the front of the sewing machine, and then slide the outer cover L (2) into the inner cover L (3) so that the lubrication hole in the bed is visible. Pour oil into the bed side oil tank through this hole.

NOTE:

Be sure to fill the machine with oil when the oil level is down to about one-third full in the oil sight glass. If the oil drops below the one-third level, there is the danger that the machine may seize during operation.



3. Pour oil in through the two holes (4) of the shuttle race base assembly so that the felt is lightly moistened.

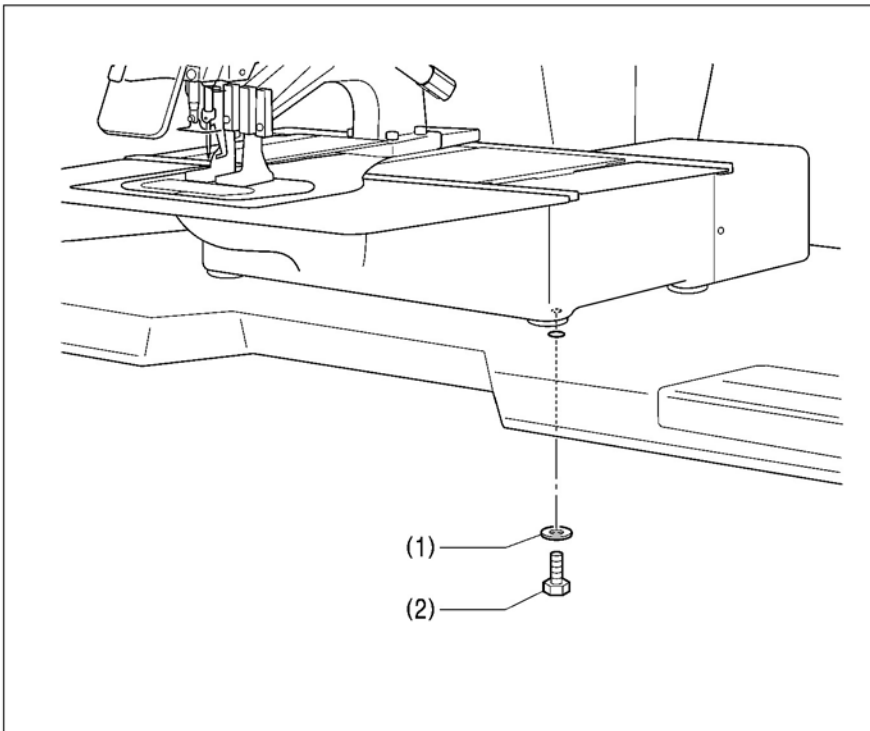
NOTE:

If there is no more oil on the felt of the shuttle race base assembly, problems with sewing may result.

4. If the liquid cooling tank (5), fill it with silicon oil (100mm²/s).

3-15. Installing the machine head fixing bolt

When transporting the sewing machine, secure the machine head to the table with the machine head fixing bolt.



- (1) Plain washer
- (2) Machine head fixing bolt

NOTE:

When operating the sewing machine, remove the machine head fixing bolt.

4. PREPARATION BEFORE SEWING

4-1. Installing the needle

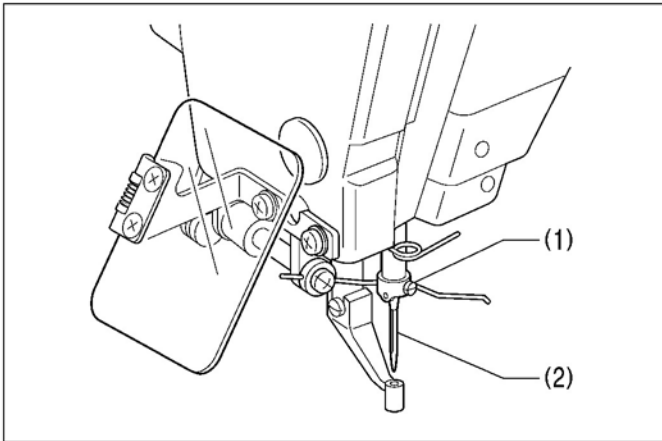


CAUTION



Turn off power switch before installing the needle.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

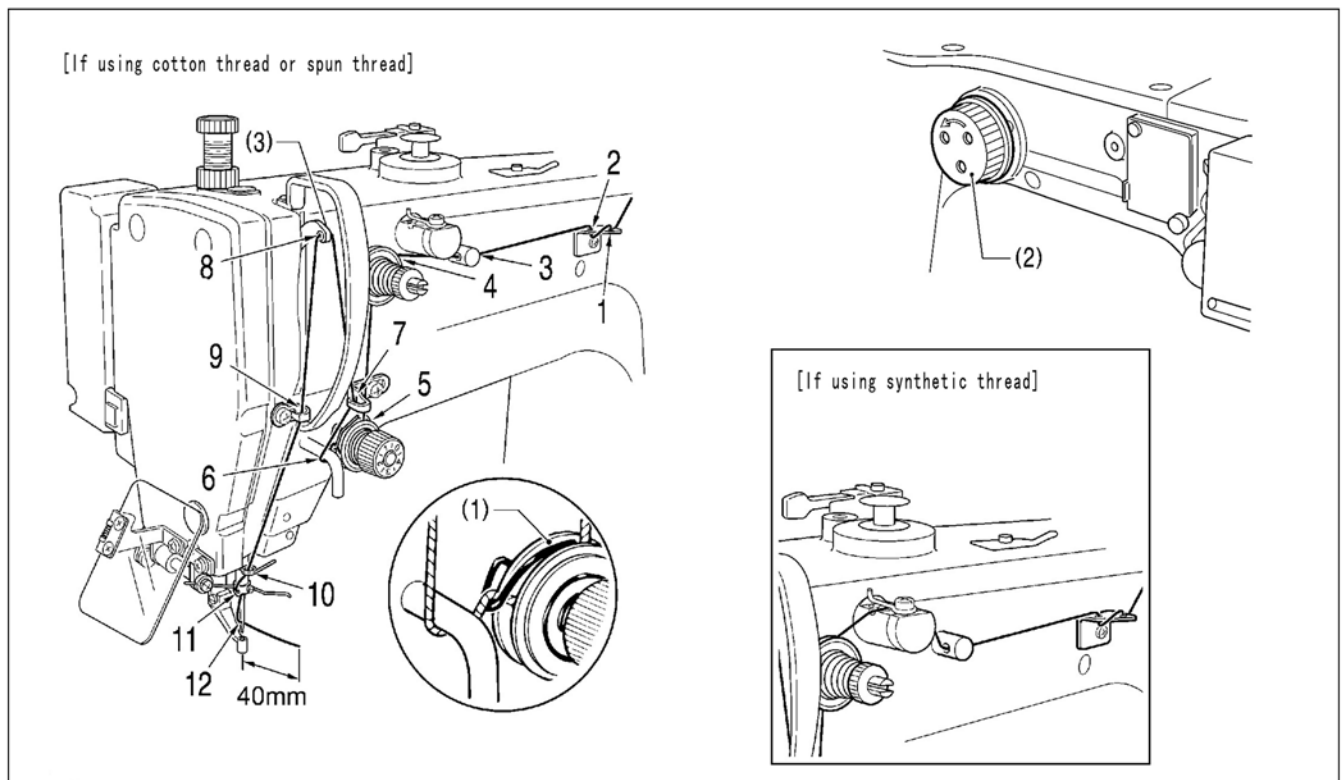


1. Loosen the set screw (1).
2. Insert the needle (2) in a straight line as it will go, making sure that the long groove on the needle is at the front, and then securely tighten the set screw (1).

4-2. Threading the upper thread

Thread the upper thread correctly as shown in the illustration below.

※ In panel of the main interface P1 please press the presser foot down key, thread tension (1) will be open, so that the machine line is more easy to pass through.

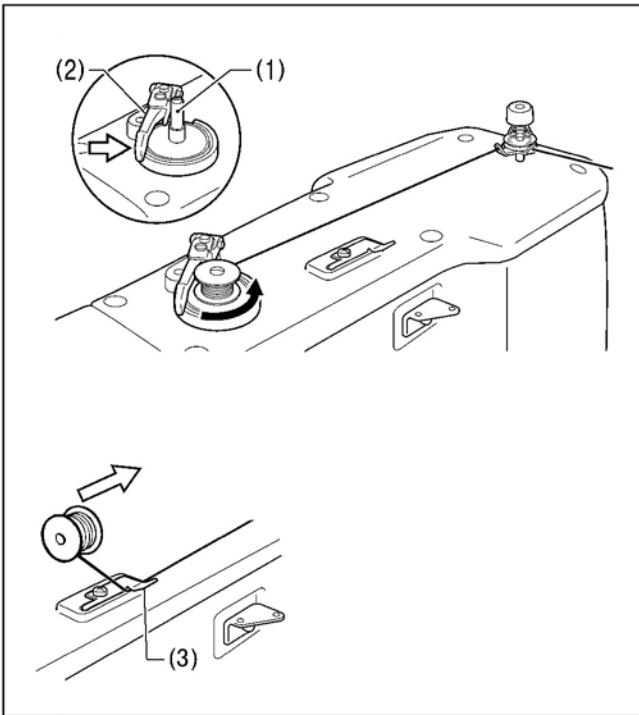


- Turn the machine pulley (2) and raise the thread take-up (3) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.)
- When threading the thread through the needle, allow a distance of approximately 40mm between the needle hole and the end of the thread. If the trailing length of the thread is too long, it may cause the thread to become tangled.

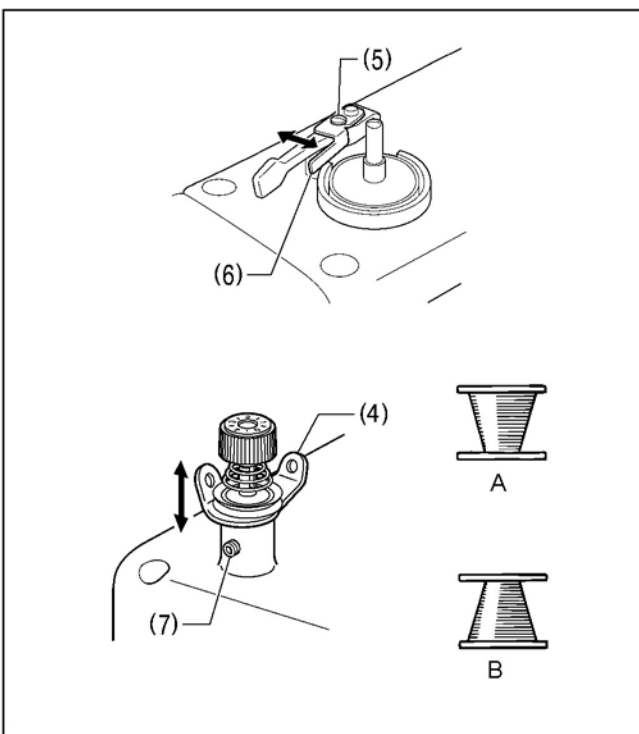
4-3. Winding the lower thread

CAUTION

Do not touch any of the moving parts or press any objects against the machine while winding the lower thread. Injury or damage to the sewing machine may result.



1. Place the bobbin onto the bobbin winder shaft (1).
2. Thread the thread as shown in the illustration, wind the thread around the bobbin several times, and then press the bobbin presser arm (2).
3. Turn on the power switch.
(For specific operation method, please refer to P17 of the electronic control operate manual.)
4. Once winding of the set amount of lower thread (80-90% of the bobbin capacity) is completed, the bobbin presser arm (2) will return automatically.
5. Remove the bobbin, hook the thread onto the knife (4), and then pull the bobbin in direction of the arrow to cut the thread.

**Adjusting the bobbin winding amount**

Loosen the screw (5) and move the bobbin presser (6) to adjust.

If the thread winds onto the bobbin unevenly

Loosen the set screw (7) and move the bobbin winder tension assembly (4) up and down to adjust.

※ For case A, move the bobbin winder tension assembly (8) down, and for case B, move it upward.

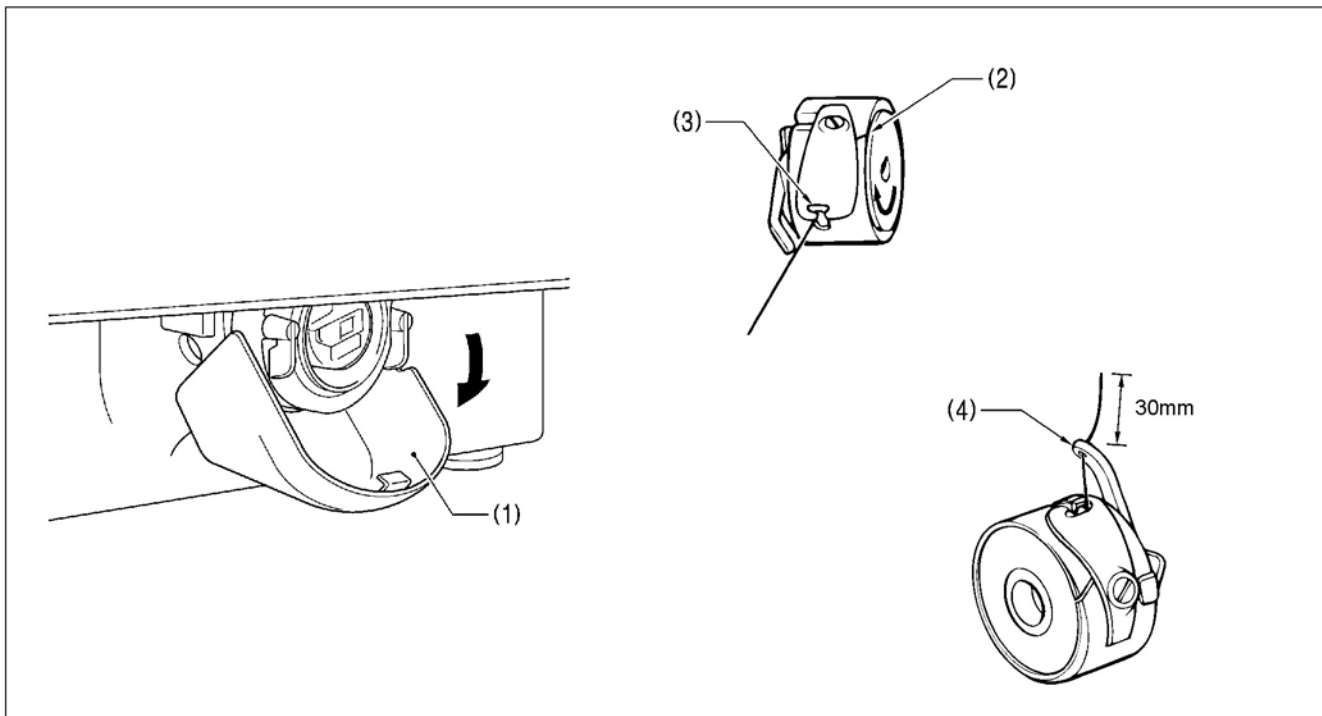
4-4. Installing the bobbin case

CAUTION



Turn off the power switch before installing the bobbin case.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



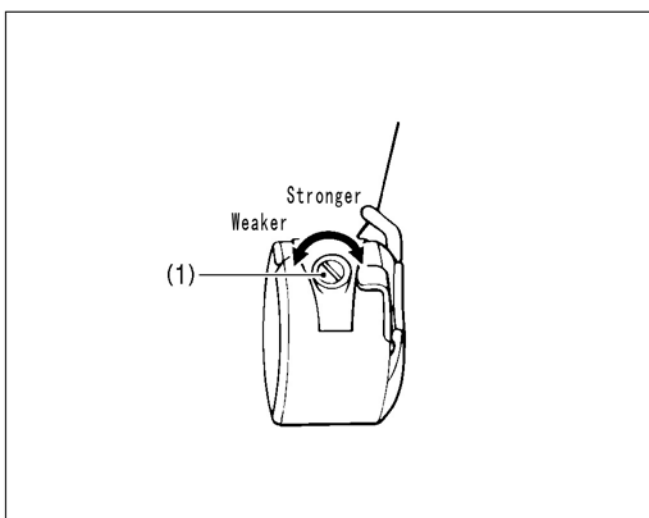
1. Pull the shuttle race cover (1) downward to open it.
2. While holding the bobbin so that the thread winds to the right, insert the bobbin into the bobbin case.
3. Pass the thread through the slot (2) and pull it out from the thread hole (3).
4. Check that the bobbin turns in the direction of the arrow when the thread is pulled.
5. Pass the thread through the lever thread hole (4), and then pull out approximately 30mm of thread.
6. Hold the latch on the bobbin case and insert the bobbin case into the rotary hook.

4-5. Thread tension

[Thread tension reference]

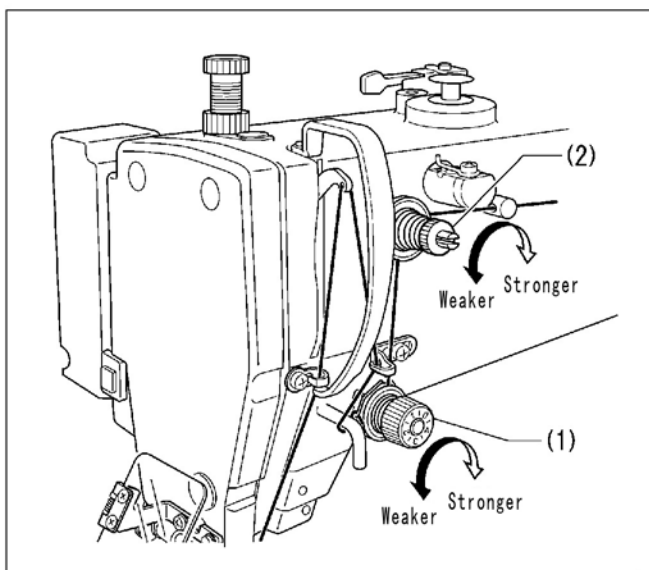
Specifications	Heavy-weight materials(-01)	Medium-weight materials(-02)
Upper thread	#20 or similar	#50 or similar
Lower thread	#20 or similar	#50 or similar
Upper thread tension (N)	1.4~1.8	0.8~1.2
Lower thread tension (N)	0.2~0.3	
Pre-tension (N)	0.1~0.6	0.1~0.3
Needle	DP×17#19	DP×5#16
Normal sewing speed	2,000 rpm	2,000 rpm

4-5-1. Lower thread tension



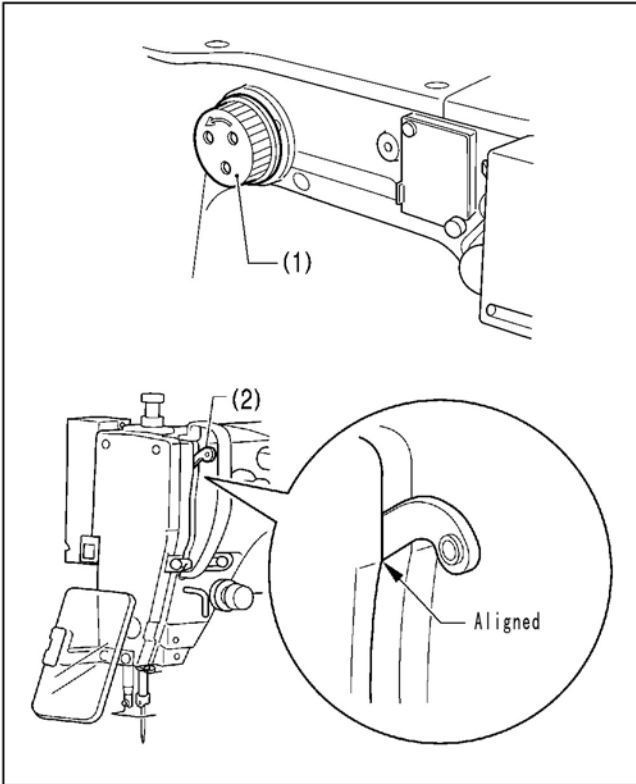
Adjust the thread tension to the weakest possible tension by turning the thread tension nut (1) until the bobbin case will not drop by its own weight while the thread end coming out of the bobbin case is held.

4-5-2. Upper thread tension



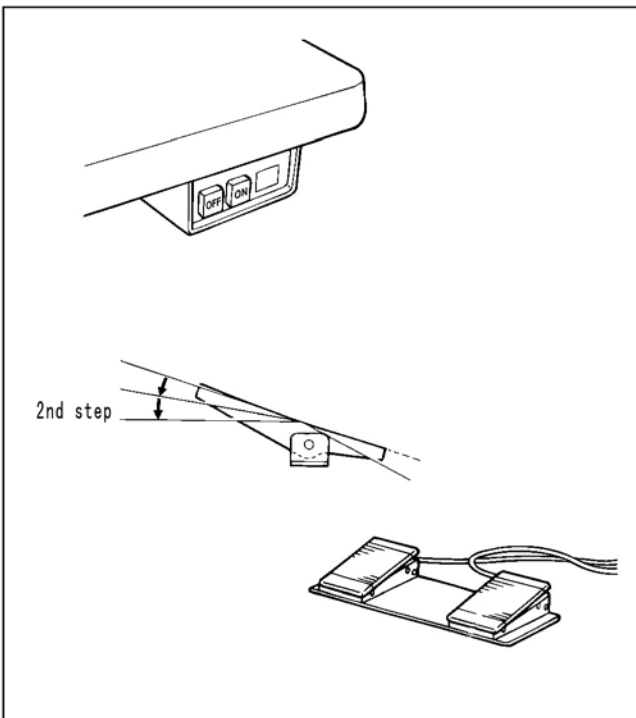
1. Turn the tension nut (1) (main tension) to adjust the tension as appropriate for the material being sewn.
2. Use the tension nut (2) (sub tension) to adjust the upper thread trailing length to about 40mm.

4-6. Home position detection



Before starting home position detection, check that the needle bar is at its highest position.

Turn the pulley (1) until the ridge at the bottom of the thread take-up (2) is aligned with the processed line on the arm.



1. Turn on the power switch.

2. Depress the foot switch to the 2nd step.

(If using a two-pedal foot switch, lower the work clamp before depressing the start switch (6).)

The sewing machine will move to the home position and the work clamp will rise.

NOTE:

If error "E016" appears when the foot switch is depressed, turn the pulley (1) in the direction of operation to clear the error.

5. SEWING

! CAUTION



Turn off the power switch at the following times.

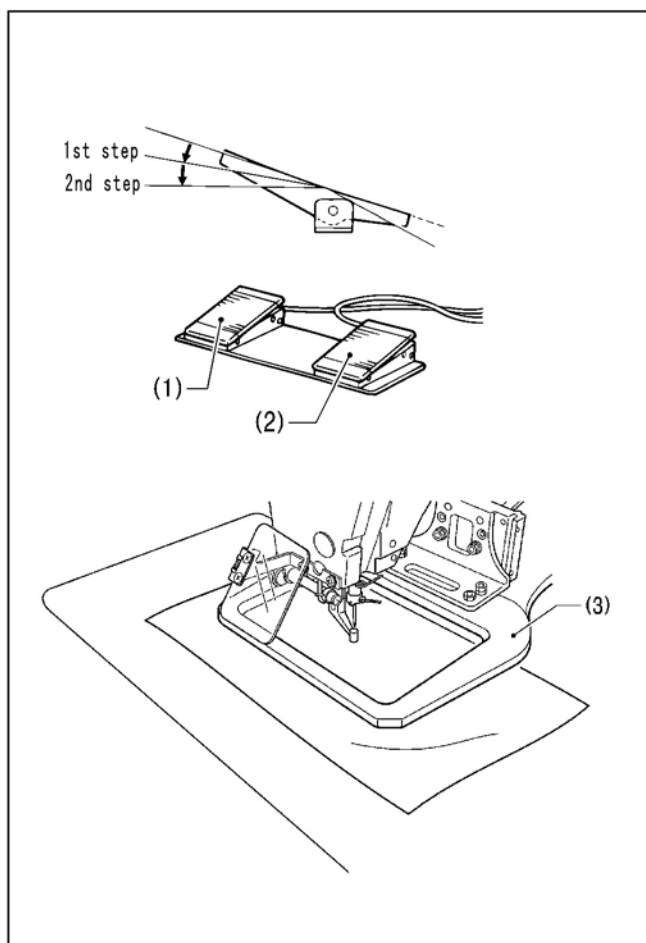
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

- When threading the needle
- When replacing the bobbin and needle
- When not using the machine and when leaving the machine unattended



Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.

5-1. Sewing



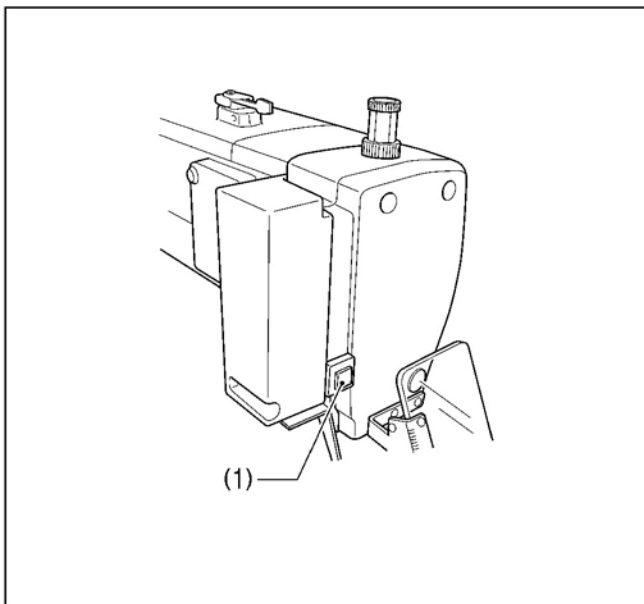
1. Turn on the power switch.
2. Please refer to P20 of the electronic control operate manual for reading the pattern.
3. Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch (2).)
• The feed mechanism will move to the home position.
4. Place the article to be sewn underneath the work clamp (3).
5. Depress the foot switch to the 1st step.
(If using a two-pedal foot switch, depress the work clamp switch (1).)
• The work clamp (3) will drop.
6. Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, depress the start switch (2).)
• The sewing machine will start sewing.
7. When sewing is complete, the thread will be trimmed and the work clamp (3) will rise.

Use a work clamp that hold the article being sewn firmly, without allowing it to slip.

If using the standard work clamp and feed plate and the article being sewn is slipping, take measures to stop the work clamp and feed plate from being slippery.

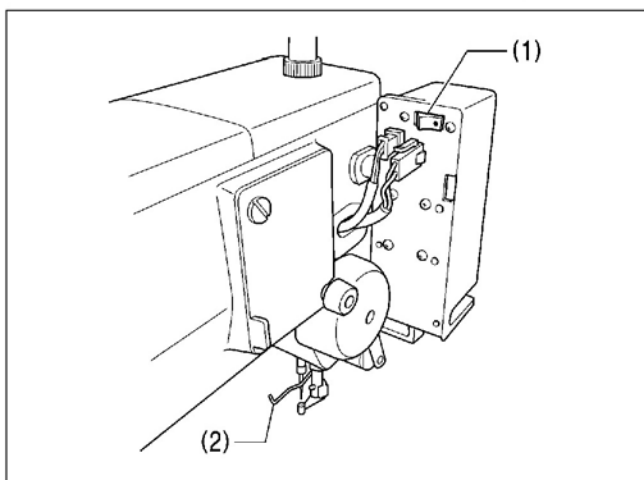
5-2. Using the STOP switch

If you press the STOP switch (1) while sewing or test feeding is in progress, the sewing machine will stop immediately.



※ For the method of pause release and continue sewing, please refer to P7 of the electronic control operate manual.

5-3. Using the thread wiper switch



The thread wiper switch (1) can be used to turn the thread wiper (2) on and off.

6 . CLEANING

! CAUTION



Turn off the power switch before carrying out cleaning.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

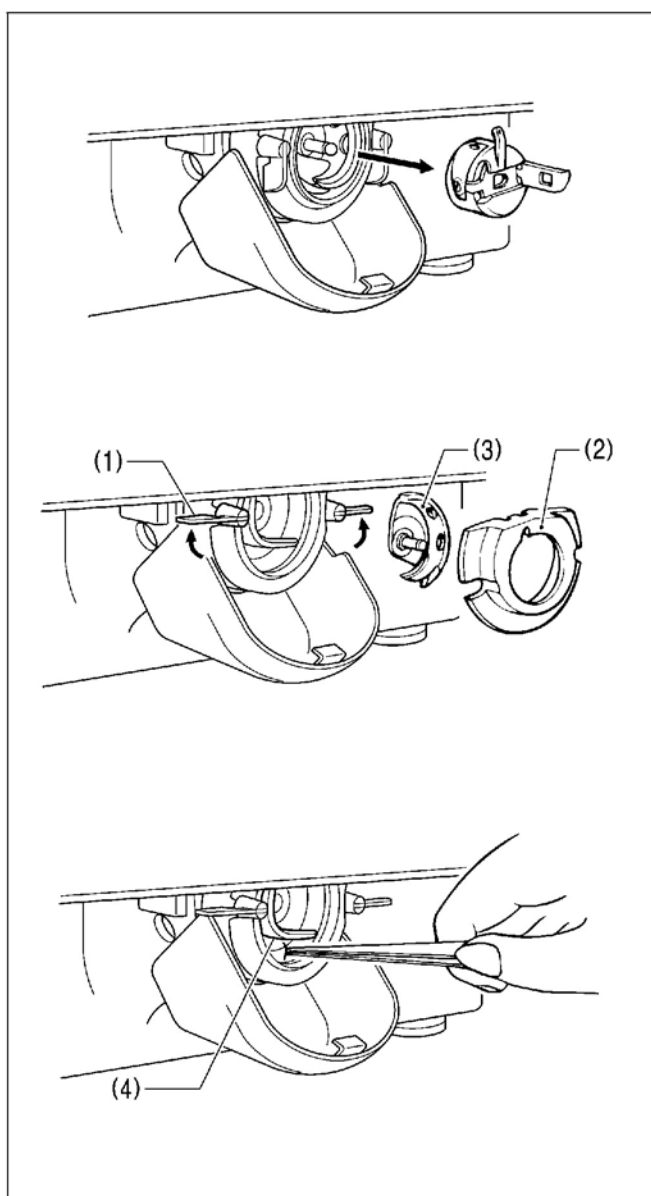


Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.

Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.

Keep the oil out of the reach of children.

6-1 . Cleaning the rotary hook

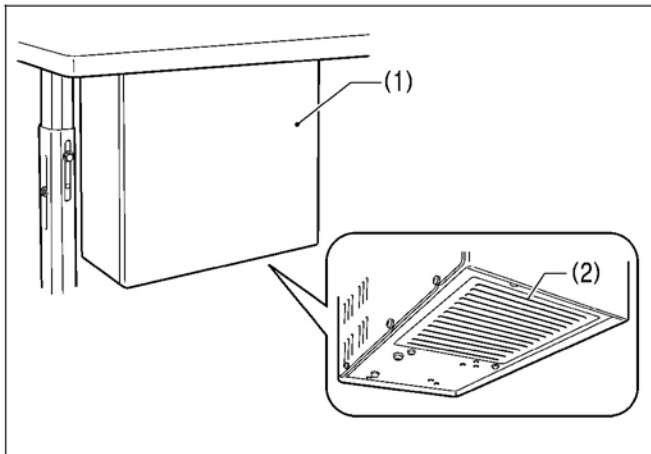


1. Pull the shuttle race cover downward to open it, and then remove the bobbin case.

2. Open the setting claw (1) in the direction indicated by the arrow, and then remove the shuttle race base (2) and the shuttle hook (3).

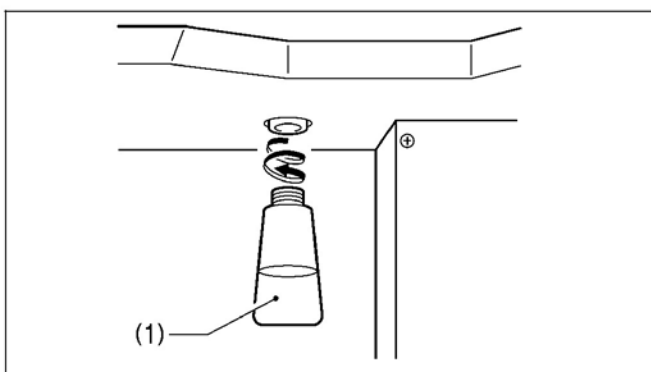
3. Clean all the dust and thread ends from around the driver (4), the top of the rotary hook thread guide and the shuttle race.

6-2. Cleaning the control box air inlet ports



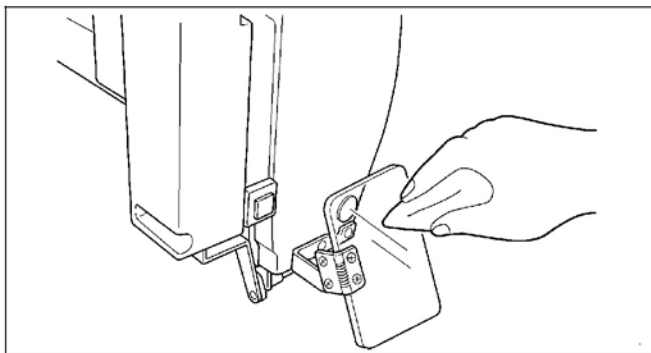
Use a vacuum cleaner to clean the filter in the air inlet ports (2) of the control box (1) at least once a month.

6-3. Draining the oil



1. Remove and empty the waste oil tank (1) whenever it is full.
2. After emptying the waste oil tank (1), screw it back into its original position.

6-4. Cleaning the eye guard

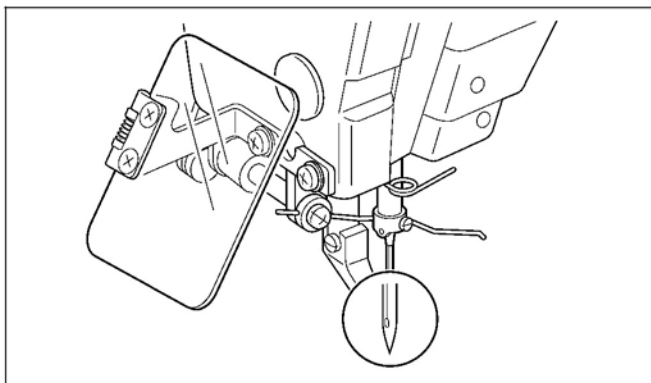


Wipe the eye guard clean with a soft cloth.

NOTE:

Do not use solvents such as kerosene or thinner to clean the eye guard.

6-5. Checking the needle









Always check that the tip of the needle is not broken and also that needle is not bent before starting sewing.

6-6. Lubrication

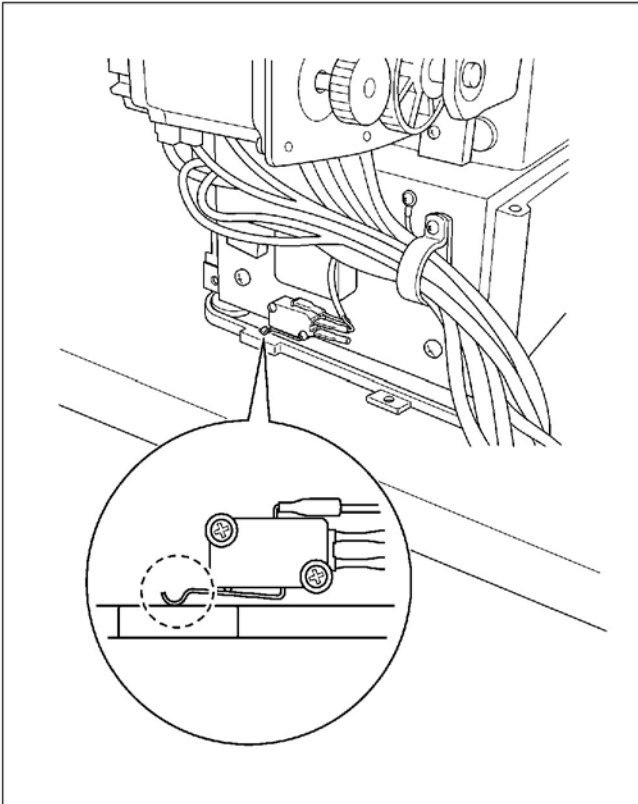
Lubricate the sewing machine while referring to "3-14.Lubrication".

7 . STANDARD ADJUSTMENTS

! CAUTION

-  Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
-  Ask your dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
-  Turn off the power switch and disconnect the power cord before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
-  Hold the machine head with both hands when tilting it back or returning it to its original position. In addition, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
-  If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.

7 - 1 . Checking the machine head switch



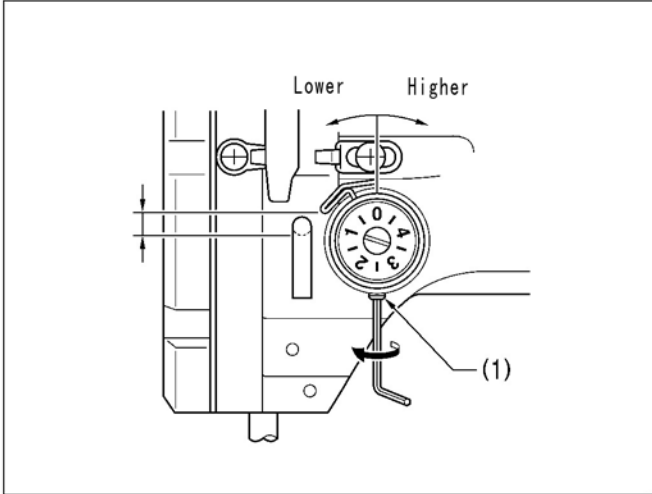
Check that the machine head switch is turned on as shown in the illustration.

NOTE :

If not turn on the head switch, there will be an error message.

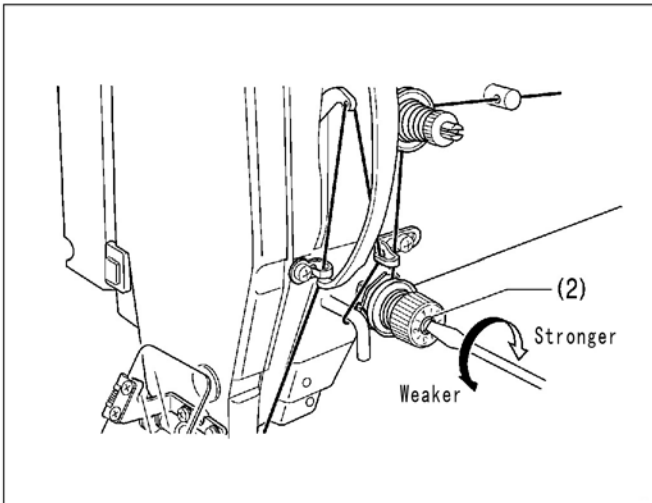
7-2. Thread take-up spring

Specifications	Heave-weight materials (-01)	Medium-weight materials (-02)
Thread take-up spring height (mm)	7~10	
Thread take-up spring tension (N)	0.6~1.2	0.2~0.5



<Thread take-up spring height>

Loosen the set screw (1) and turn the adjuster to adjust.



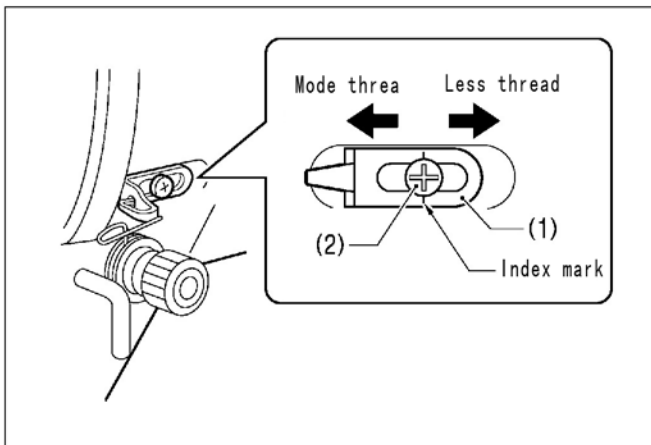
<Thread take-up spring tension>

Turn the tension stud (2) with a screwdriver to adjust the tension.

NOTE:

If the thread tension spring is not adjusted correctly, the upper thread trailing length will be uneven after thread trimming.

7-3. Arm thread guide R

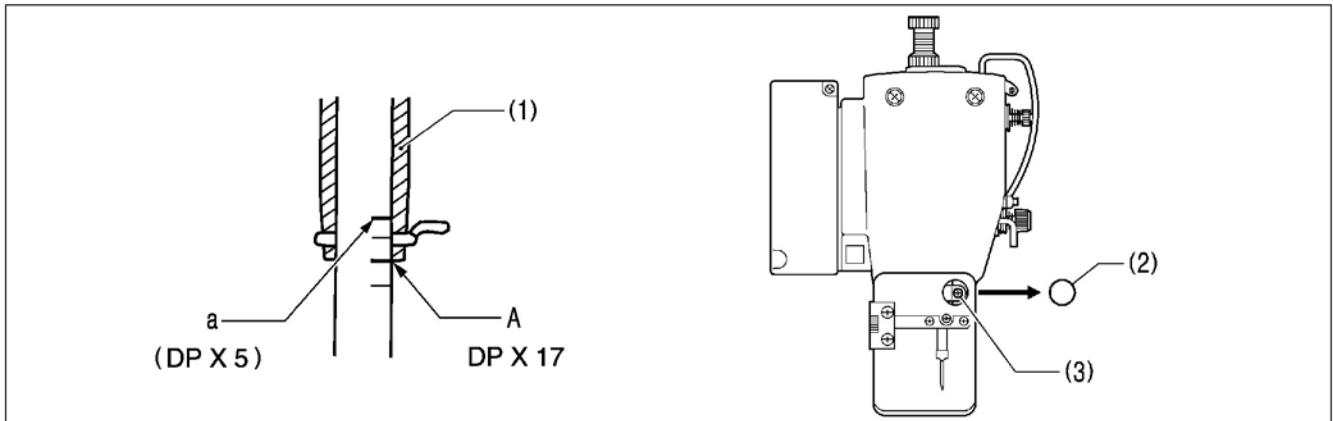


The standard position of arm thread guide R (1) is when the screw (2) is aligned with the index mark.

Loosen the screw (2) and move arm thread guide R (1) to adjust.

- ※ When sewing heavy material, move arm thread guide R (1) to the left. (The thread take-up amount will become greater.)
- ※ When sewing light material, move arm thread guide R (1) to the right. (The thread take-up amount will become less.)

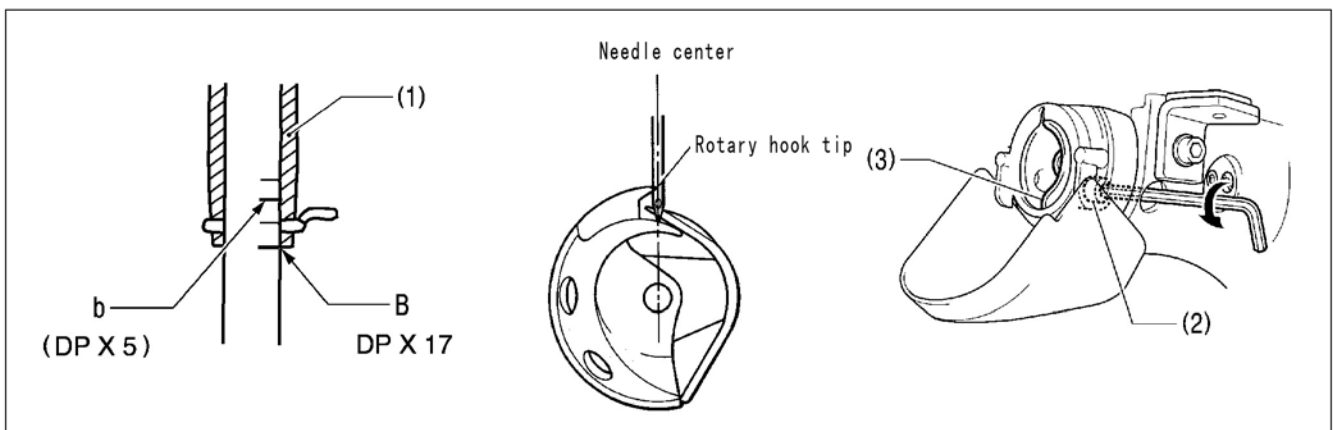
7-4. Adjusting the needle bar height



Turn the machine pulley to move the needle bar to the lowest position. Then remove the rubber plug (2), loosen the screw (3) and then move the needle bar up or down to adjust so that the second reference line from the bottom of the needle bar (reference line A) is aligned with the lower edge of the needle bar bush (1).

※ If using a DP×5 needle, use the highest reference line (reference line a)

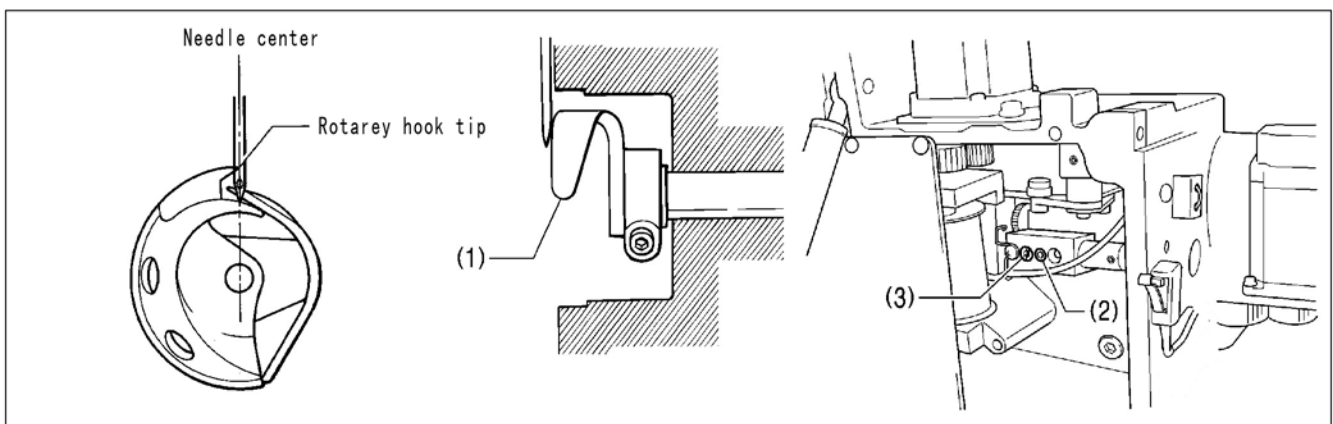
7-5. Adjusting the needle bar lift amount



Turn the machine pulley to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (1), and then loosen then bolt (2) and move the driver (3) so that the tip of the rotary hook is aligned with the center of the needle.

※ If using a DP×5 needle, use the second reference line from the top of the needle bar (reference line b).

7-6. Adjusting the driver needle guard

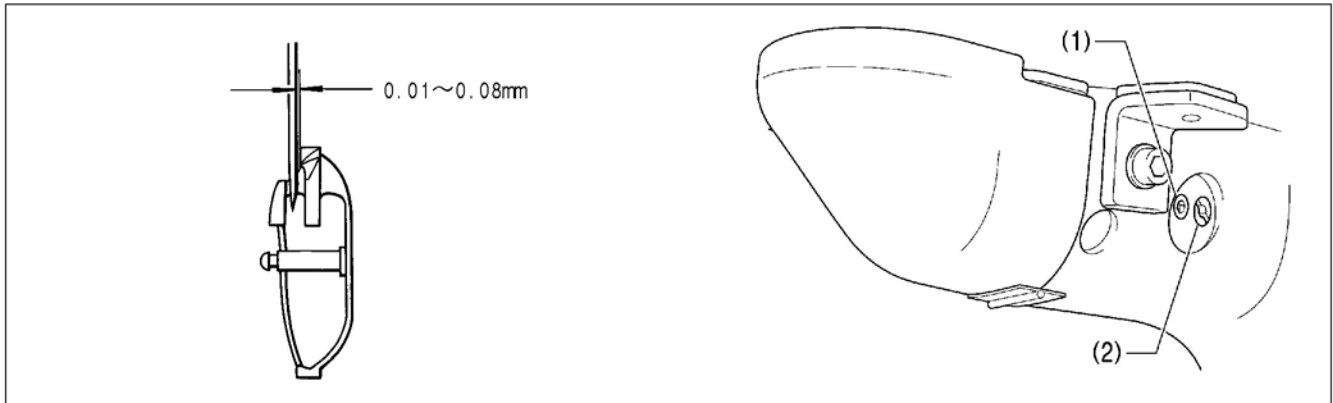


Turn the machine pulley to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (2) and turn the eccentric shaft (3) to adjust so that the driver needle guard (1) is touching the needle.

NOTE:

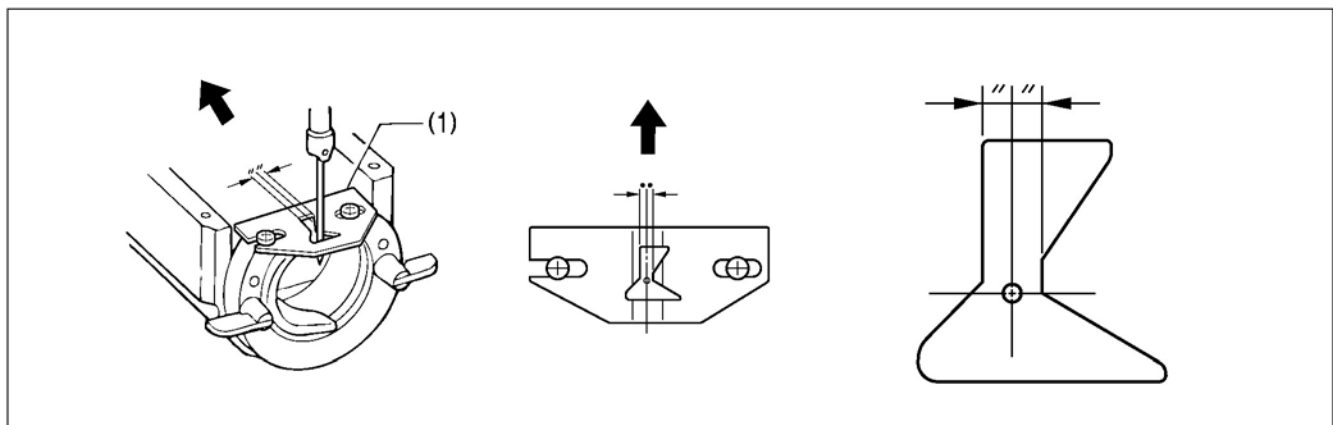
If it crosses the needle more than necessary, it will place a load on the needle, or may cause poor thread tension. Furthermore, if it does not cross the needle at all, the tip of the rotary hook will interfere with the needle and skipped stitches may occur.

7 - 7. Adjusting the needle clearance



Turn the machine pulley to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (1) and turn the eccentric shaft (2) to adjust so that the clearance between the needle and the rotary hook is 0.01-0.08mm.

7 - 8. Adjusting the shuttle race thread guide

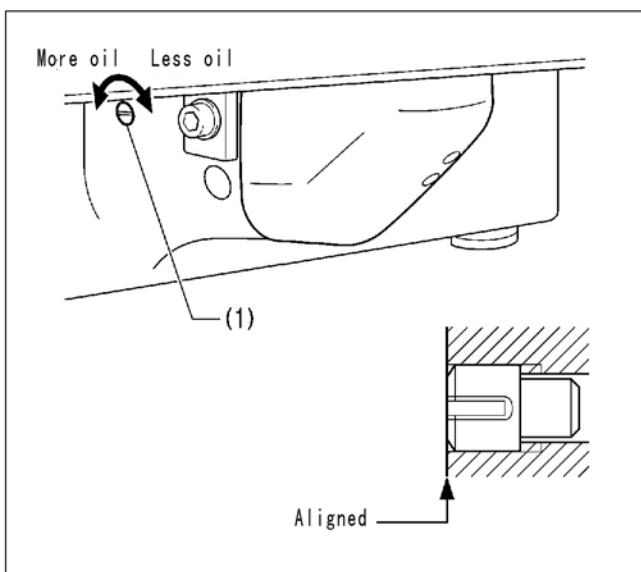


Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

NOTE:

If the shuttle race thread guide is in the wrong position, thread breakages, soiled thread or tangling of the thread may occur. The position of the shuttle race thread guide is adjusted at the time of shipment from the factory. It should not be changed if possible.

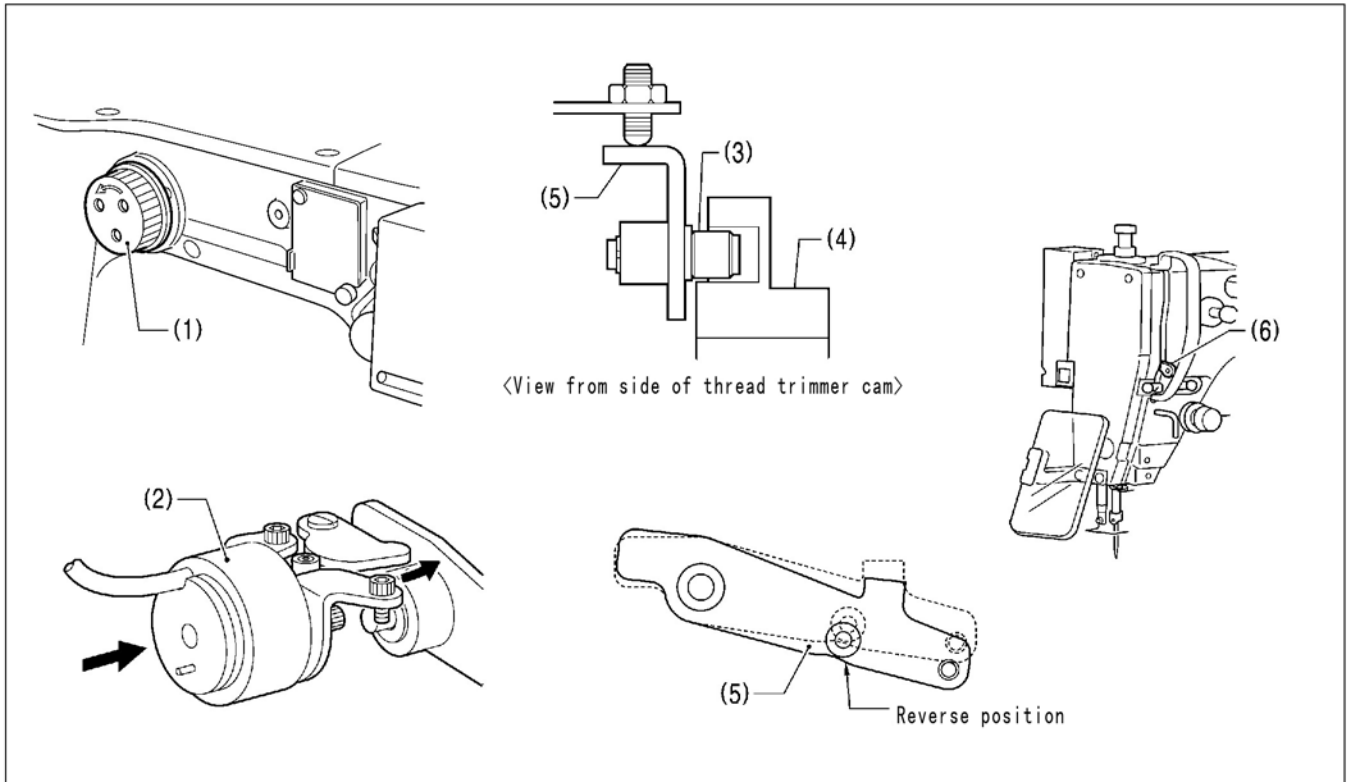
7 - 9. Rotary hook lubrication amount



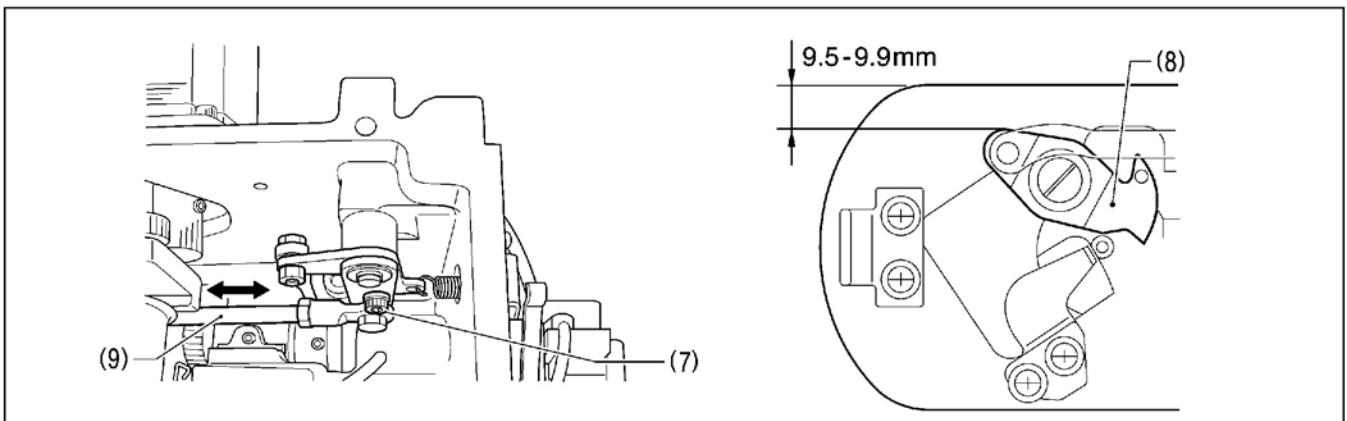
The optimum position is when the head of the set screw (1) is aligned with the edge of the bed. The rotary hook lubrication amount can be adjusted within three turns to the right from that position.

- If the set screw (1) is turned clockwise, the lubrication amount becomes smaller.
- If the set screw (1) is turned counterclockwise, the lubrication amount becomes greater.

7 - 1 0 . Adjusting the position of the movable knife

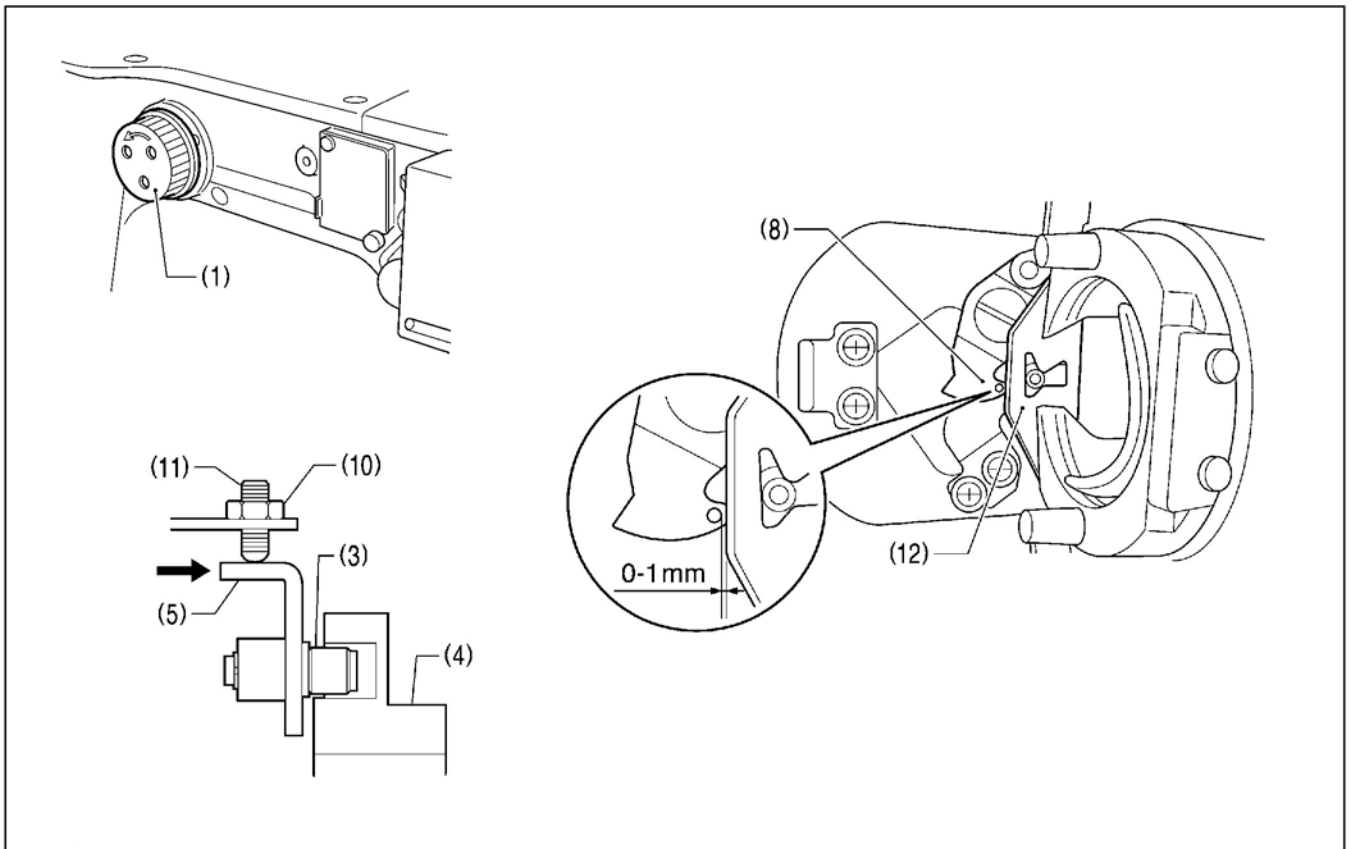


1. Open the cover and tilt back the machine head.
2. Turn the pulley (1) by hand to lower the needle bar to its lowest position, and push the thread trimmer solenoid (2) as far as it will go.
3. With the collar (3) inserted into the groove of the thread trimmer cam (4), turn the pulley (1) by hand to set the driving lever (5) to the reverse position (when the thread take-up (6) is close to its lowest position).



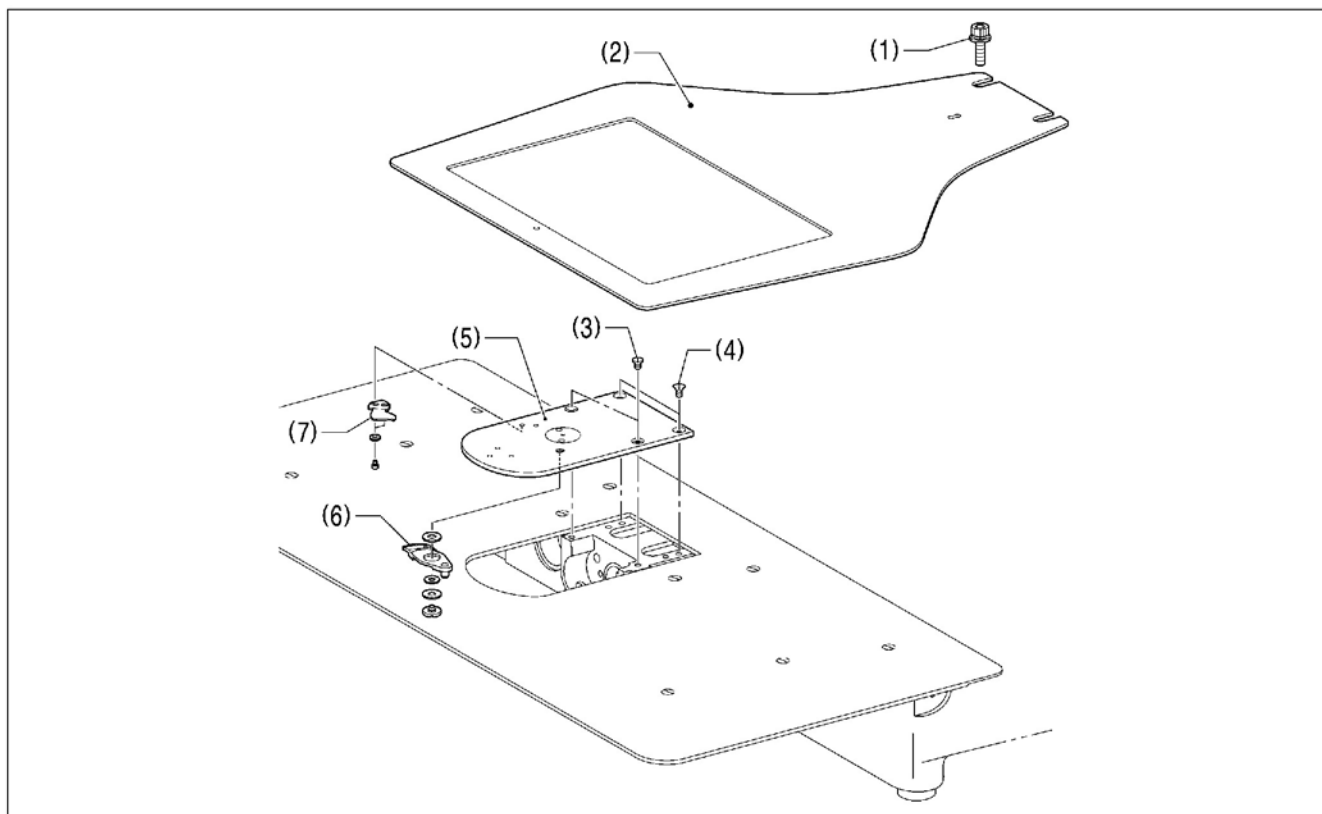
4. Loosen the bolt (7).
5. Move the thread trimming rod H (9) forward or back to adjust so that the distance from the ridge line on the right side of the needle plate to the ridge line on the movable knife (8) is 9.5-9.9mm.
6. After tightening the bolt (7), check the above position once more.

7. STANDARD ADJUSTMENTS

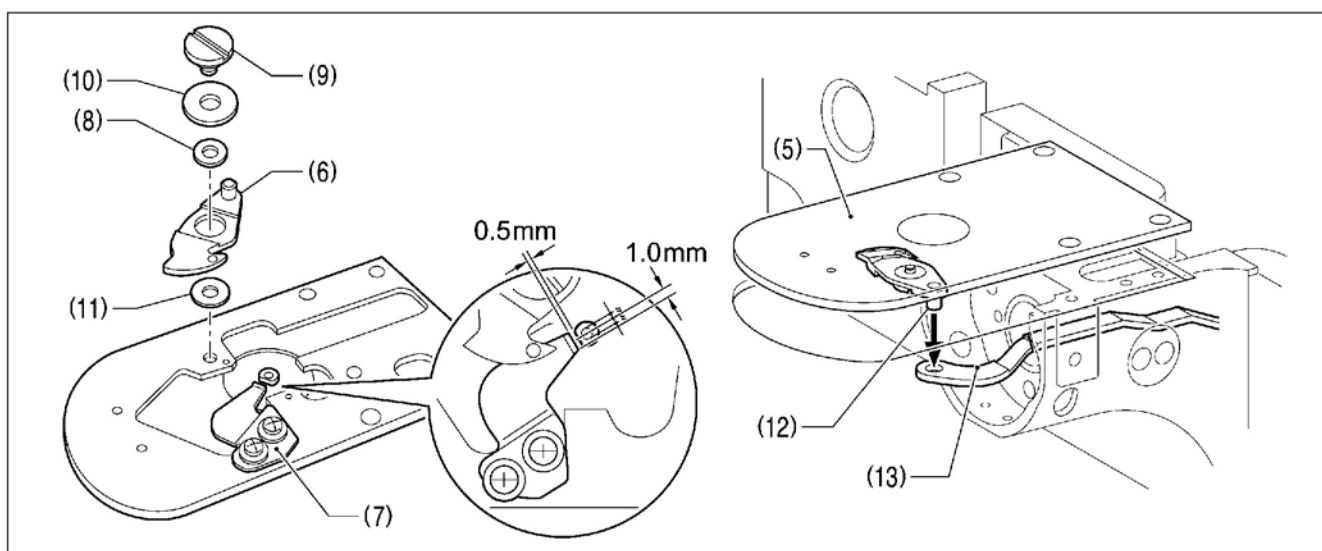


7. Turn the pulley (1) by hand to move the needle bar to its lowest position.
8. Loosen the nut (10), tighten the set screw (11) until the collar (3) is touching the inside of the groove in the thread trimmer cam (4), and then turn it back in the counter clockwise direction by approximately 1/4 of a turn.
9. Tighten the nut (10), and then check that the collar (3) is not touching the inside of the groove in the thread trimmer cam (4). In addition, push the driving lever (5) by hand toward the thread trimmer cam until the collar (3) touches the groove of the thread trimmer cam (4), and then check that the driving lever (5) returns smoothly to its original position when it is released.
10. Check that there is a gap of about 0-1mm between the outside of the hole in the movable knife (8) and the ridge line on the shuttle race thread guide (12) when there is still play between the parts.

7 - 1 1 . Replacing the movable and fixed knives

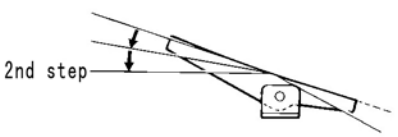
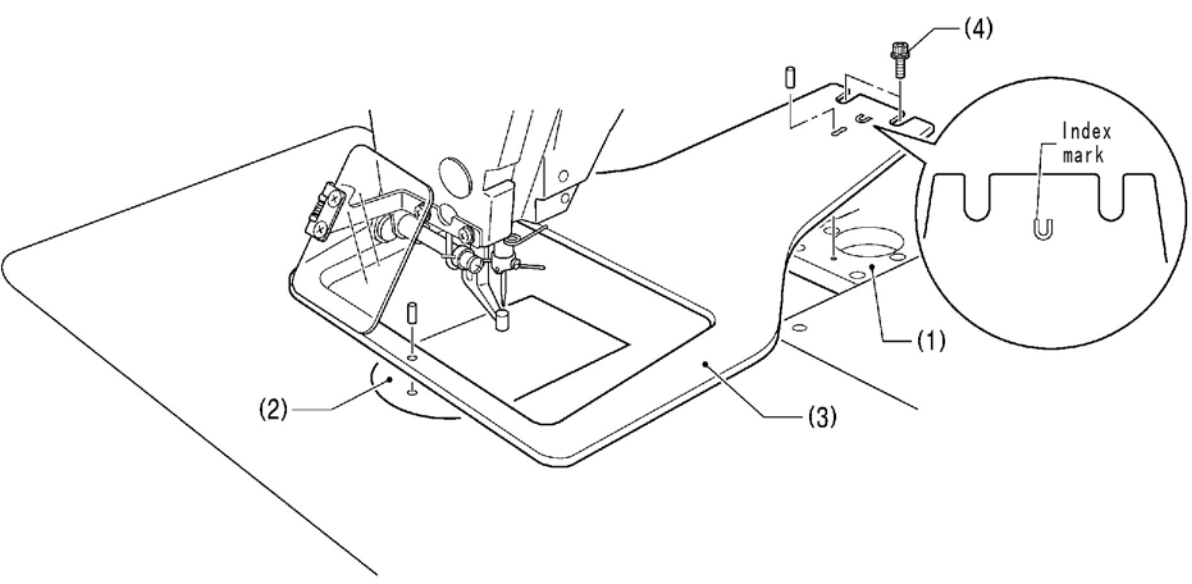


1. Loosen the two bolts (1) and then remove the feed plate (2).
2. Open the shuttle race cover, remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).
3. Remove the movable knife (6) and the fixed knife (7).

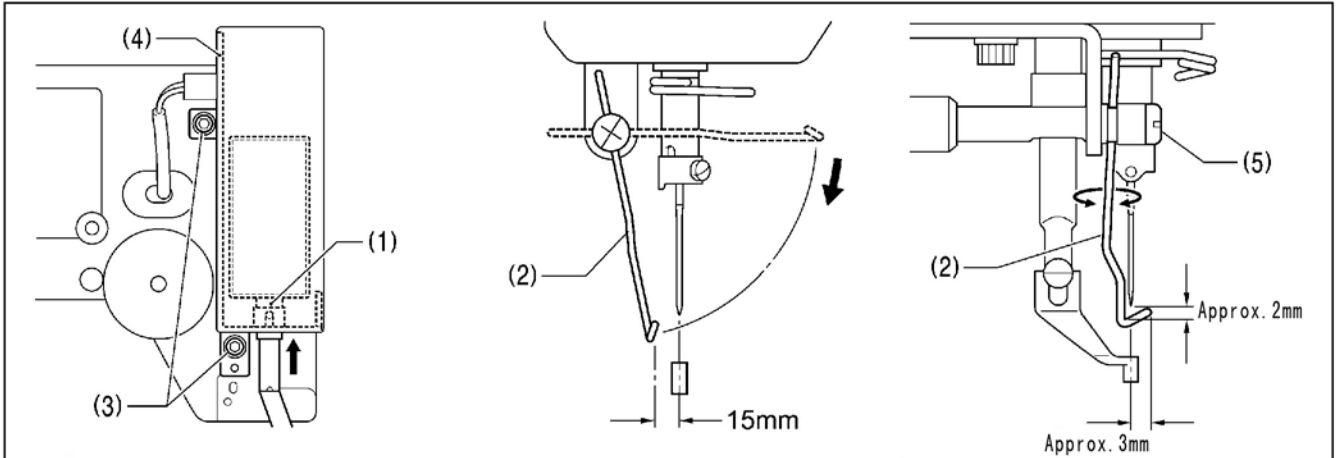


4. Install the new fixed knife (7) in the position shown in the illustration.
5. Apply grease to the outside of the collar (8) and to the shoulder screw (9), and then install the new movable knife (6) together with the thrust washer (10) and the movable knife spacer (11).
6. Check that the movable knife (6) and fixed knife (7) cut the thread cleanly. Replace the movable knife spacer with accessory spacers ($t=0.2, 0.3, 0.4$) so that the knives trim the thread accurately.
 - ※ If the knife pressure is too weak and the thread is not completely cut, use a thinner movable knife spacer.
 - ※ If the knife pressure is too strong and the movable knife connecting plate (13), and install it to the needle plate (5).
7. Apply grease to the pin (12), place it into the movable knife connecting plate (13), and install it to the needle plate (5).
8. Check that the needle is aligned with the center of the needle hole.

7 - 1 1 - 1. Installing the feed plate

<p>1</p>	 <p>2nd step</p> <p>Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)</p> <ul style="list-style-type: none"> • After the home position is detected and the work clamp drops, the feed mechanism will move to the feed plate installation position and then the work clamp will rise.
<p>2</p>	 <p>(2) (3) (4)</p> <p>Index mark</p> <p>Use a 2mm diameter pin to align the holes in the X feed bracket (1) and the needle plate (2) with the two holes in the feed plate (3), and then tighten the two bolts (4).</p> <p>NOTE: Install the feed plate so that the surface with the index mark is facing upward.</p>
<p>3</p>	<p>End feed plate installation mode</p> <p>Turn off the power.</p>

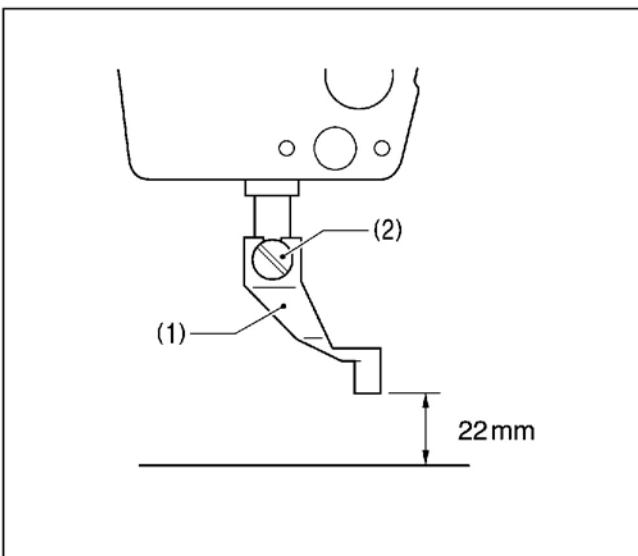
7 - 1 2. Adjusting the thread wiper



1. Loosen the two screws (3) and shift the entire solenoid setting plate (4) up or down to adjust so that the thread wiper (2) is 15mm in front of the needle center when the plunger (1) of the thread wiper solenoid is driven to the full stroke.
2. Loosen the screw (5) and adjust the position of the thread wiper (2) so that the distance from the thread wiper to the tip of the needle is approximately 2mm and the tip of the thread wiper (2) is approximately 3mm from the center of the needle when the thread wiper (2) passes below the needle during operation.

NOTE: Check that the thread wiper (2) does not touch the finger guard.

7 - 1 3. Presser foot installation position

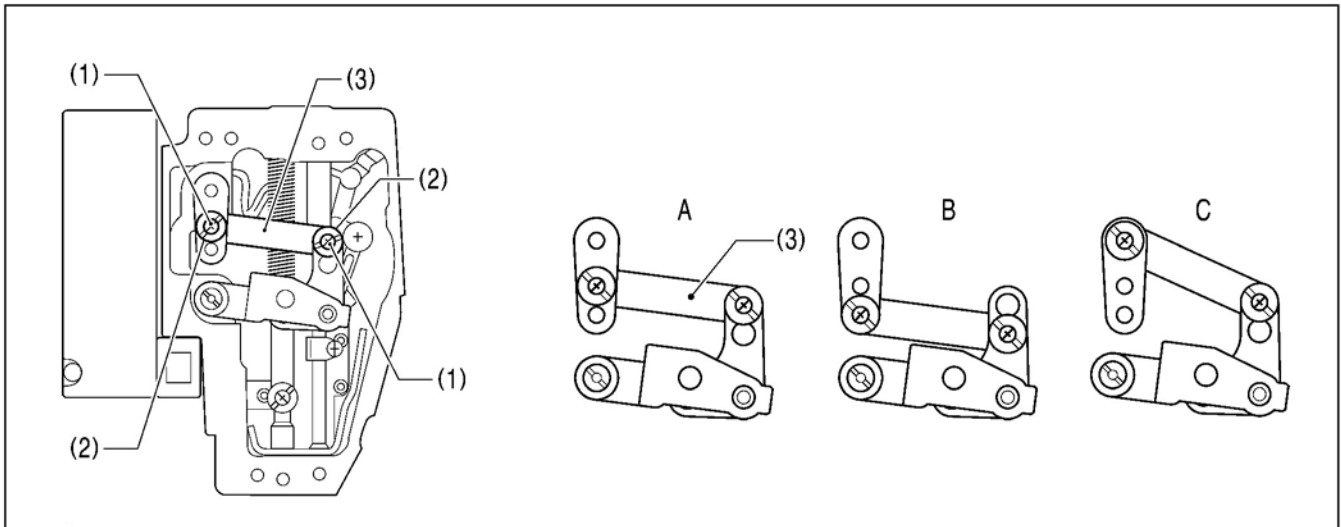


Install the presser foot (1) with the screw (2) so that the distance from the bottom of the presser foot to the top of the needle plate is 22 mm when the sewing machine is stopped and the presser foot (1) is raised.

7 - 1 4 . Changing the intermittent stroke

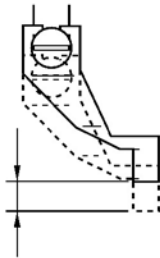
The intermittent stroke can adjusted to within 2-10mm by adjusting the position of the stepping clamp connecting rod and changing the installation position of stepping clamp link A.

<Changing the installation position of stepping clamp link A>

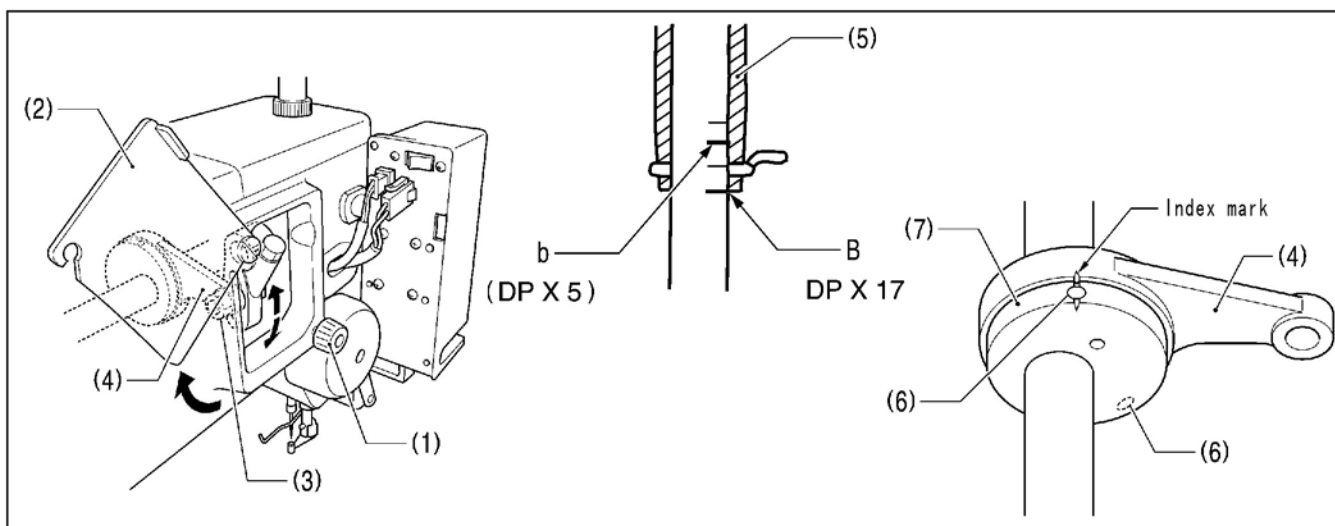


1. Remove the face plate.
2. Remove the two screws (1) and the two shoulder screws (2), and then remove stepping clamp link A(3).
3. Change the installation position for stepping clamp link A (3) to either A, B or C above.
If the position of the stepping clamp connecting rod is adjusted as described in the following at any one of the installation positions, the adjustment range for the intermittent stroke will as given in the following table.

Installation position	Intermittent stroke range
A	2 ~ 4.5mm
B	4.5 ~ 10mm
C	0mm (Presser foot does not move up and down)



<Stepping clamp connecting rod position adjustment>

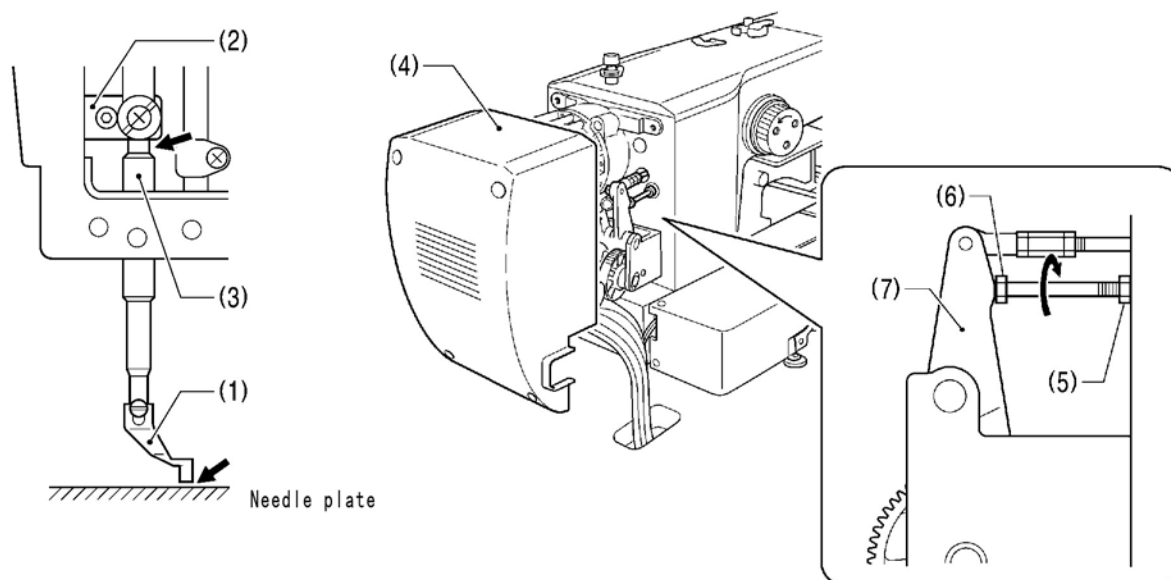


1. Loosen the screw (1), and then open the cover (2).
2. Loosen the nut (3), and then adjust the position of the stepping clamp connecting rod (4).
 - When the stepping clamp connecting rod (4) is raised, the intermittent stroke will increase.
 - When the stepping clamp connecting rod (4) is lowered, the intermittent stroke will decrease.

Next, adjust the needle bar and presser foot timing.

3. Turn the machine pulley to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (5).
(If using a DP×5 needle, align with the second reference line from the top (reference line b).)
4. Open the top cover and loosen the two set screws (6).
5. Align the index marks on the stepping clamp cam (7) and the stepping clamp connecting rod (4), and then tighten the set screws (6).

Check the following after changing the intermittent stroke.



1. With the intermittent presser foot (1) lowered, turn the pulley to move the intermittent presser foot (1) to its lowest position.
2. Check that the presser foot (1) does not touch the needle plate and that the presser bar clamp (2) does not touch the presser bar bush (3).

<If they are touching>

Remove the motor cover (4).

Loosen the nut (5), and turn the bolt (6) until it is pressing against the intermittent drive lever (7), and then adjust until the two points mentioned above are not touching.

7 - 1 5 . Adjusting the work clamp lift amount

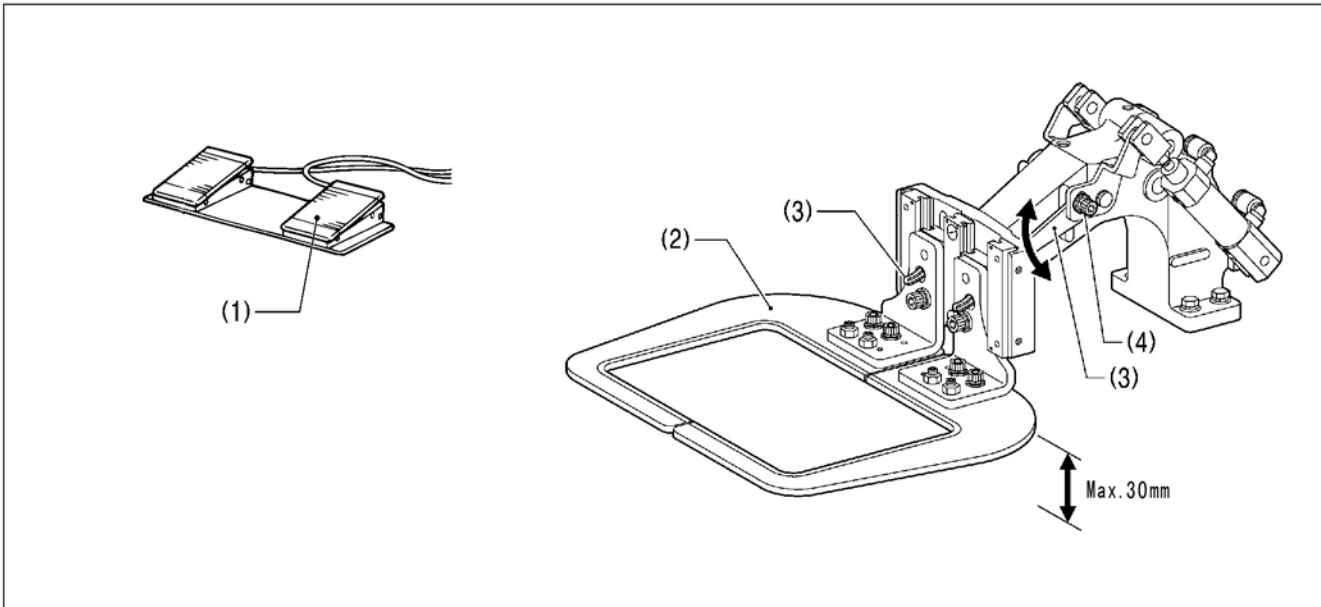
<Solenoid specifications>

The operation panel settings can be used to adjust the height to within 15-25mm.

MENU-Program-Clamp-Setup Presser Range

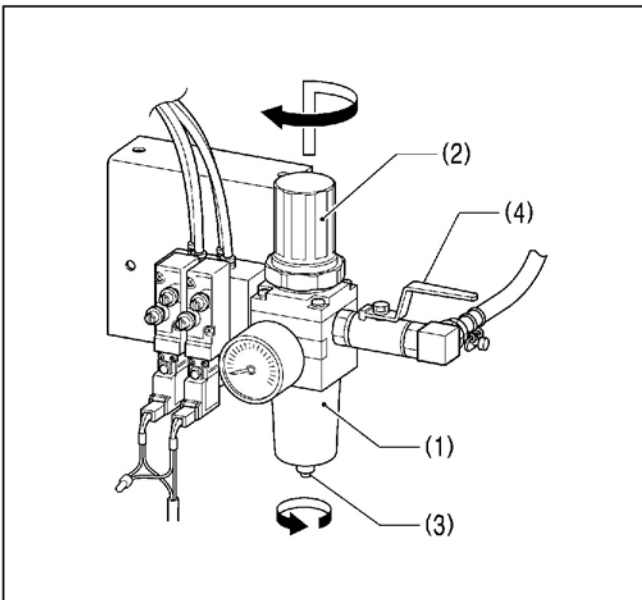
<Pneumatic specifications>

The maximum lift amount for the work clamp is 30mm above the top of the needle plate.



1. Turn on the air, and depress the work clamp switch (1) to raise the work clamp (2).
2. Loosen the two bolts (4) of the work clamp arm lever (3), and move the work clamp arm lever (3) up or down to adjust.

7 - 1 6 . Adjusting the air pressure (pneumatic specifications)



Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa.

After adjustment is complete, push the handle (2) downward to lock it.

If water has collected in the bottle of the regulator (1), turn the drain cock (3) in the direction indicated by an arrow to drain the water.

NOTE:

Open the air cock (4) slowly.

8 . TROUBLESHOOTING

- Please check the following points before calling for repairs or service.
- If the following remedies do not fix the problem, turn off the power switch and consult a qualified technician or the place of purchase.

CAUTION



Turn off the power switch and disconnect the power cord before carrying out troubleshooting.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

Problem	Cause	Remedy	Reference
Work clamp does not lift.	Work clamp moves stiffly.	Apply a suitable amount of grease to the sliding parts of the work clamp.	
	Air tube of presser lifter cylinder is bent or damaged(Pneumatic specifications).	Straighten the bend in the tube or replace the tube.	
Work clamp does not drop.	Work clamp moves stiffly.	Apply a suitable amount of grease to the sliding parts of the work clamp.	
	Air tube of presser lifter cylinder is bent or damaged(Pneumatic specifications).	Straighten the bend in the tube or replace the tube.	
Work clamp lift amount is incorrect.	Work clamp lift amount setting at operation panel is incorrect(Solenoid specifications).	Change the work clamp lift amount setting.	The manual P. 36
	Work clamp arm lever position is incorrect(Pneumatic specifications).	Adjust the position of the work clamp arm lever.	
Work clamp does not lift to the maximum height.	Work clamp arm stopper position is incorrect(Solenoid specifications).	Adjust the position of the stopper.	
	Cylinder joint position is incorrect. (Pneumatic specifications)	Adjust the position of the cylinder joint.	
Thread wiper does not operate correctly.	The thread wiper is obstructing the needle.	Adjust the height of the thread wiper.	The manual P. 33
		Adjust the stroke of the thread wiper.	The manual P. 33
	Thread wiper position is incorrect.	Adjust the stroke of the thread wiper.	The manual P. 33
Lower thread winds to one side.	Bobbin winder tension assembly height is incorrect.	Adjust the height of the bobbin winder tension assembly.	The manual P. 17
Lower thread winding amount is incorrect.	Bobbin presser position is incorrect.	Adjust the position of the bobbin presser.	The manual P. 17
Thread slips out of the needle.	Stitches being skipped at the sewing start.	Refer to "Skipped stitches occur".	The manual P. 38
	Upper thread length is irregular.	Adjust the sub-tension.	The manual P. 19
	Position of shuttle race thread guide is incorrect.	Adjust the position of the shuttle race thread guide.	The manual P. 28

8. TROUBLESHOOTING

Problem	Cause	Remedy	Reference
Upper thread breaks.	Upper thread tension is too strong.	Adjust the upper thread tension.	The manual P. 19
	Needle is incorrectly installed.	Install the needle correctly.	The manual P. 16
	Thread is too thick for the needle.	Select a thread that matches the needle.	The manual P. 19
	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	The manual P. 26
	Damage or burring of the rotary hook, needle hole plate or needle.	Repair or replace the problem part.	/
	Thread breaking from heat (Synthetic thread).	Use a cooling tank.	The manual P. 16
	Thread is threaded incorrectly.	Thread the thread correctly.	The manual P. 16
Lower thread breaks.	Lower thread tension is too strong.	Adjust the lower thread tension.	The manual P. 19
	Damage to corners of needle hole plate or bobbin case.	Repair or replace the problem part	/
Skipped stitches occur.	Clearance between needle and rotary hook tip is too great.	Adjust the needle clearance.	The manual P. 28
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	The manual P. 27
	The driver is covering the needle more than necessary.	Adjust the driver needle guard.	The manual P. 27
	Needle is bent.	Replace the needle.	/
	Needle is incorrectly installed.	Install the needle correctly.	The manual P. 16
Needle is broken.	Clearance between needle and rotary hook tip is too great.	Adjust the needle clearance.	The manual P. 28
		Adjust the needle bar lift amount.	The manual P. 27
	Needle is bent.	Replace the needle.	/
	Needle deflection.	Select a needle that is suitable for the sewing conditions. Reduce the sewing speed.	The manual P. 19
	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	The manual P. 19
Thread jamming.	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	The manual P. 26
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	The manual P. 27
	Shuttle race thread guide is not separating the threads.	Adjust the position of the shuttle race thread guide.	The manual P. 28

Problem	Cause	Remedy	Reference
Upper thread is not trimmed.	Movable knife is not cutting cleanly.	Replace with a new one.	The manual P. 31
	Fixed knife is not cutting cleanly.	Sharpen the fixed knife or replace it with a new one.	The manual P. 31
	Movable knife is not picking up the upper thread.	Adjust the position of the shuttle race thread guide.	The manual P. 28
		Adjust the needle bar lift amount.	The manual P. 27
	Movable knife is not picking up the upper thread because the last stitch is being skipped.	Refer to "Skipped stitches occur".	The manual P. 38
	Movable knife position is incorrect.	Adjust the position of the movable knife.	The manual P. 29
Poor stitch finish on underside of material.	Shuttle race thread guide is not separating the threads enough.	Adjust the position of the shuttle race thread guide.	The manual P. 28
	Incorrect tightening of the upper thread	Adjust the upper thread tension.	The manual P. 19
	Upper thread length is irregular.	Adjust the sub-tension.	The manual P. 19
Incorrect tightening of the thread.	Upper thread tension is too weak.	Adjust the upper thread tension.	The manual P. 19
	Lower thread tension is too weak.	Adjust the lower thread tension.	The manual P. 19
	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	The manual P. 26
	Position of arm thread guide R is incorrect.	Adjust the position of arm thread guide R.	The manual P. 26
Upper thread length is irregular.	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	The manual P. 26
	Sub-tension is too weak.	Turn the sub-tension nut to adjust the tension.	The manual P. 19
	Fixed knife is not cutting cleanly.	Sharpen the fixed knife or replace it with a new one.	The manual P. 31
Sewing machine does not operate when the power is turned on and the foot switch is depressed.	Machine head switch does not work.	Check if the machine head switch cord is disconnected.	
		Adjust the position of the machine head switch.	The manual P. 8
		If the machine head switch is malfunctioning, replace it with a new one.	