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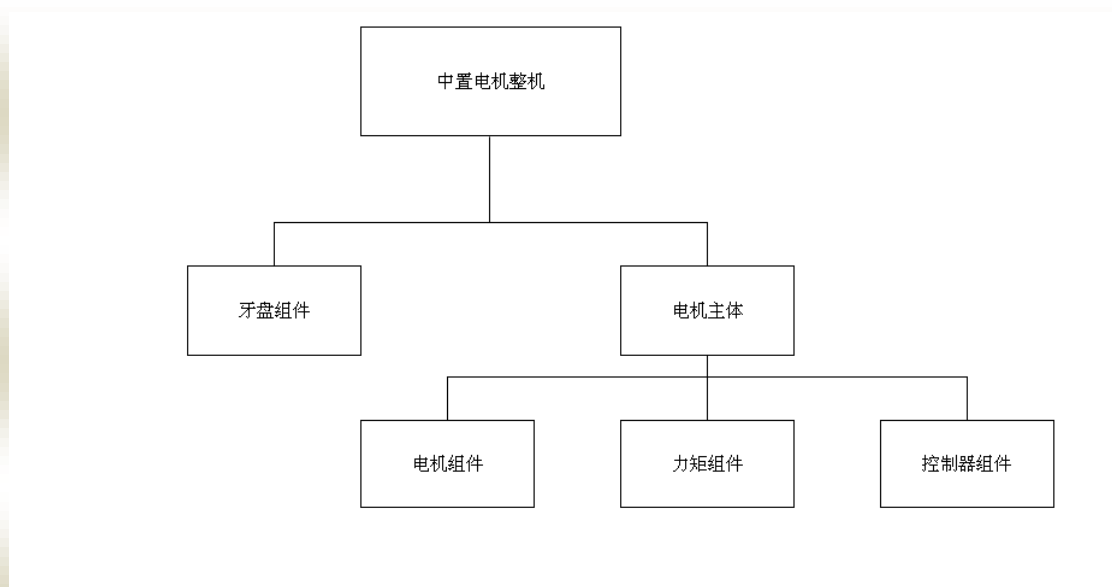
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一. 中置电机系统组成

Central Motor Composition

本机外观结构由牙盘及电机主体组成，主体主要分为 3 大部分：电机组件、力矩组件、控制器组件，如图 1-1 所示。

The central motor is composed of chain wheel and motor main body. The main body is divided into 3 parts: motor unit, torque sensor unit, controller unit. As shown in Figure 1-1.



图示 1-1
Figure 1-1

1.1 整机如图 1-2 所示：

Complete motor as shown in Figure 1-2:



图示 1-2 整机
Figure 1-2 complete motor

1.2 整机包括主体及牙盘组件如图 1-3 所示：

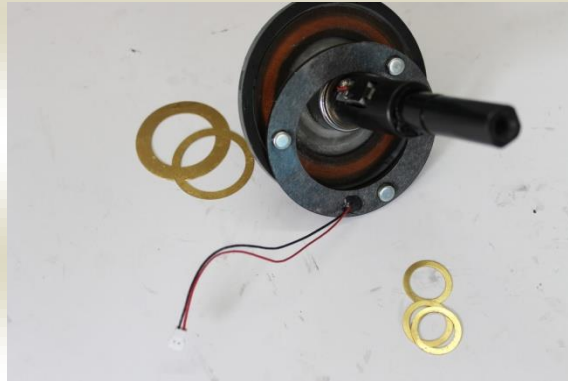
1.2 Complete motor includes main body and chain wheel, as shown in Figure 1-3:



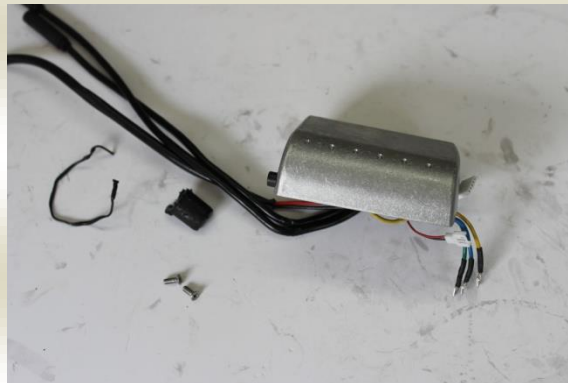
图示 1-3 主体及牙盘组件
Figure 1-3 Main body and Chain wheel

1.3 主体三大部件如图 2-4 所示：

1.3 Three main parts as shown in figure 2-4:



力矩传感器组件
Torque sensor unit



控制器组件
Controller unit



电机组件
Motor unit

图示 1-4
Figure 1-4

1.4 主体其余部件如图示 1-5:

1.4 The remaining parts as shown in figure 1-5:



盖组件防尘盖组件
Rear cover



Dust cover

后



大齿轮组件盖板组件
Gear wheel



Cover

图示 1-5
Figure 1-5

二. 中置电机系统部件拆卸流程

Central motor disassembly process

2.1 中置电机维修工具

2.1 Central motor repair tool

在本产品的维修过程中,需要用到以下辅助工具:内六角扳手一套、卡簧钳一副、十字螺丝刀、一字螺丝刀、榔头级专用工装齿轮拉码,如图 2-1 所示。

In the process of the maintenance of this product, will need to use the following tools: Allen wrench, circlip pliers, vice, phillips screwdriver, screwdriver, and hammer. Shown as 2-1:



辅助工具
Auxiliary tool

Gear pulling tool

图 2-1
Figure 2-1

2.2 牙盘、盖板、防尘盖组件拆卸

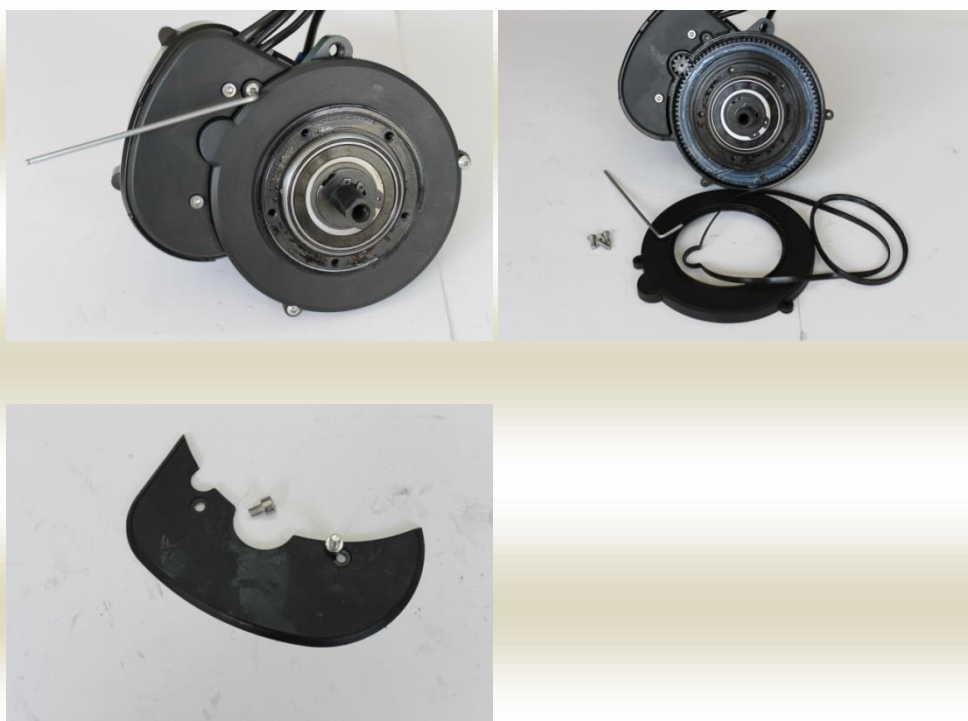
Chain wheel、cover、dust cover disassembly process

使用内六角扳手, 拆除牙盘上 5 个 M5×14 内六角圆柱体螺钉, 随后取下防水盖, 然后分别拆除盖板组件的 3 个 M4×10 螺钉及防尘盖组件的 2 个螺钉, 取下盖板及防尘盖, 如图 2-2 所示。

With an Allen wrench, tooth plate to remove 5 x 14 M5 inner hexangular set screw cylinder, then remove the waterproof cover, then remove the cover plate, then remove 3 M4 x 10 screws respectively and the 2 screws on dust cover, and then remove the cover plate and dust cover. Shown as 2-2:



防水盖(Waterproof cover)



图示 2-2
Figure 2-2

2.3 电机后盖拆卸

2.3 Motor rear cover disassembly process

使用内六角扳手，拆除 4 个 M4×14 半圆头内六角螺丝，如图 2-3 所示。

With an Allen wrench, to remove four M4 x 14 round head hex socket screws. Shown from Figure 2-3:



图示 2-3
Figure 2-3

2.4 拆除大齿轮组件

2.4 Gear wheel disassembly process

使用卡簧钳拆除 $\Phi 30$ 轴用卡簧，使用齿轮拉码将大齿轮取出，如图 2-4 所示。
Use the circlip pliers to remove $\Phi 30$ axis with the spring, remove wheel gear with gear pulling tool.





将拉码上 5 个螺钉固定在齿轮螺钉孔位，并使用内六角扳手顺时针旋转中间的螺钉，取下大齿轮。

Pull out the five screws in gear screw hole, and use the Allen wrench clockwise rotation of the screw and remove the big gear.

图示 2-4

Figure 2-4

2.5 拆除力矩组件

2.5 Torque components disassembly

拆除力矩组件的油封，并用卡簧钳拆除油封下的 $\Phi 15$ 卡簧，取出垫片。拔出与控制器相连的数据线如下图 2-5 所示。

Remove the torque oil seal and use circlip pliers to remove $\Phi 15$ circlip under oil seal, take out gasket. Pull out the cable connected to the controller, shown as Figure 2-5:

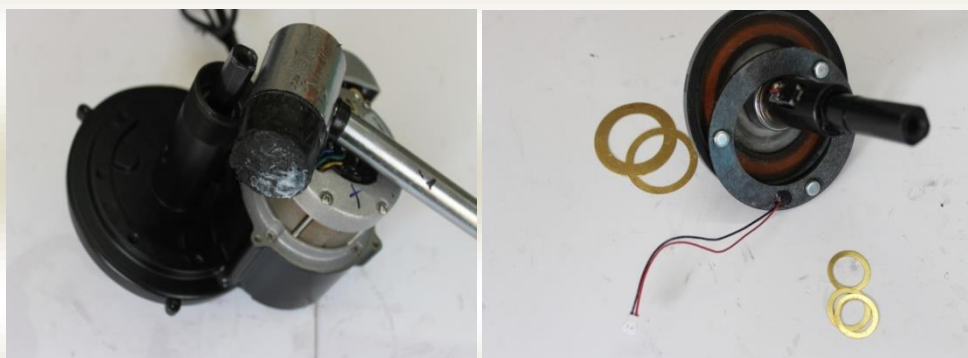


油封

Oil seal 卡簧及垫片 Spring and gasket



数据线 connect cable



轻敲中轴，取出力矩传感器组件。

Tapping axis, torque sensor module

图示 2-5

Figure 2-5

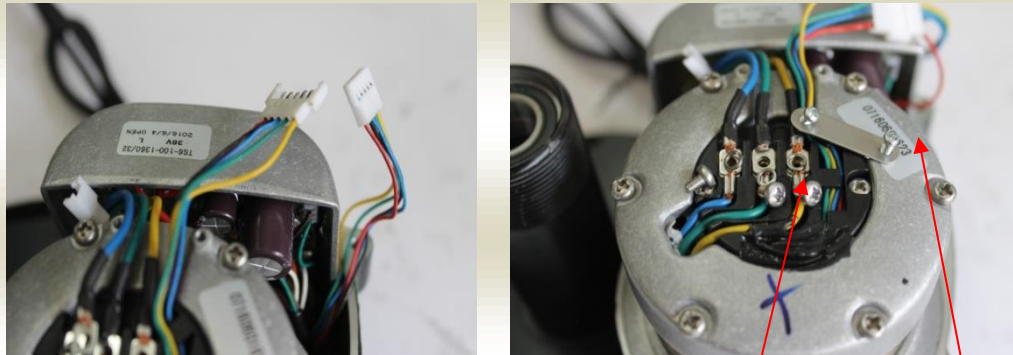
2.6 拆除控制器组件及电机组件

Remove the controller components and electrical components

2.6.1 拆除电机组件与控制器组件连接线，拆除压线板螺钉，铆接焊片螺钉。注意位于铆接焊片上的弹性垫圈，如图 2-6-1.

Removing the controller component connections with electrical components, remove line pressing board screw, rivet welding pieces

of screw. Pay attention to on the riveting welding pieces of elastic washer, see figure 2-6-1.



铆接焊片 Riveting weld piece 压线板 Line pressing board

图示 2-6-1
Figure 2-6-1

2.6.2 拆除电机组件 4 个 M4×12 十字沉头螺钉，取出电机组件，如图 2-6-2。

2.6.2 Remove motor components four M4 x 12 cross countersunk head screw, remove the motor components, shown from 2-6-2.



12 螺钉位置 M4*12 screw place

电机组件 Motor component

4 处 M4×



取下尼龙齿轮组件 take off nylon gear assembly

图示 2-6-2

2.6.3 拆除控制器底部 2 个 M3×6 十字沉头螺钉，用一字螺丝刀向下挤压线卡，取出控制器组件，拔出控制器线束，如图 2-6-3 所示。Remove the two screws M3×6 from the bottom of the controller, use the screw driver to press the line card, take off the controller assembly, pull out the controller wiring harness



M3×6 螺钉孔位拆除线卡取出控制器及线卡 the position of M3×6, pull out the controller wiring harness

三. 中置电机系统部件安装流程 **central motor installation process**

3.1 控制器组件的安装 **controller installation**

如图 3-1 将控制器安装入主体，并将 2 个 M3×6 十字沉头螺钉安装至控制器底部。Put the controller into the main body, and put the two M3×6 screws to the bottom of the controller



图示三根黑色线由此孔穿入 the three black wires entrance this hole



M3×6 螺钉孔位

M3×6 screw position

图示 3-1

3.2 电机组件的安装 **motor assembly installation**

3.2.1 于尼龙齿轮位置均匀涂抹适量 FT-EM50L 润滑脂,如图示 3-2-1。Paint the

grease FT-EM50L to the nylon gear balance, like below picture



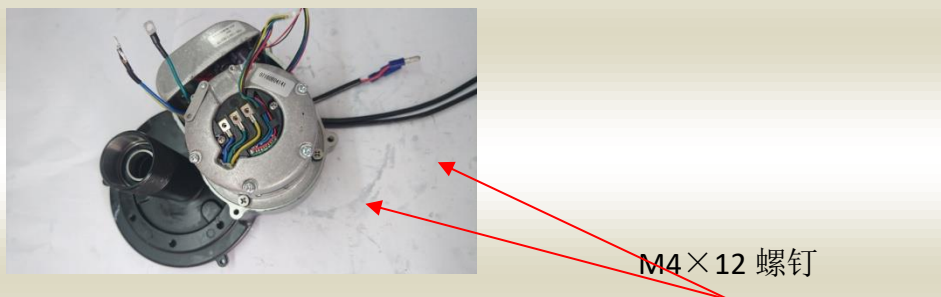
图示 3-2-1

3.2.2 将尼龙齿轮组件如图示 3-2-2 安装如主体中。Put the nylon gear to the main body like below



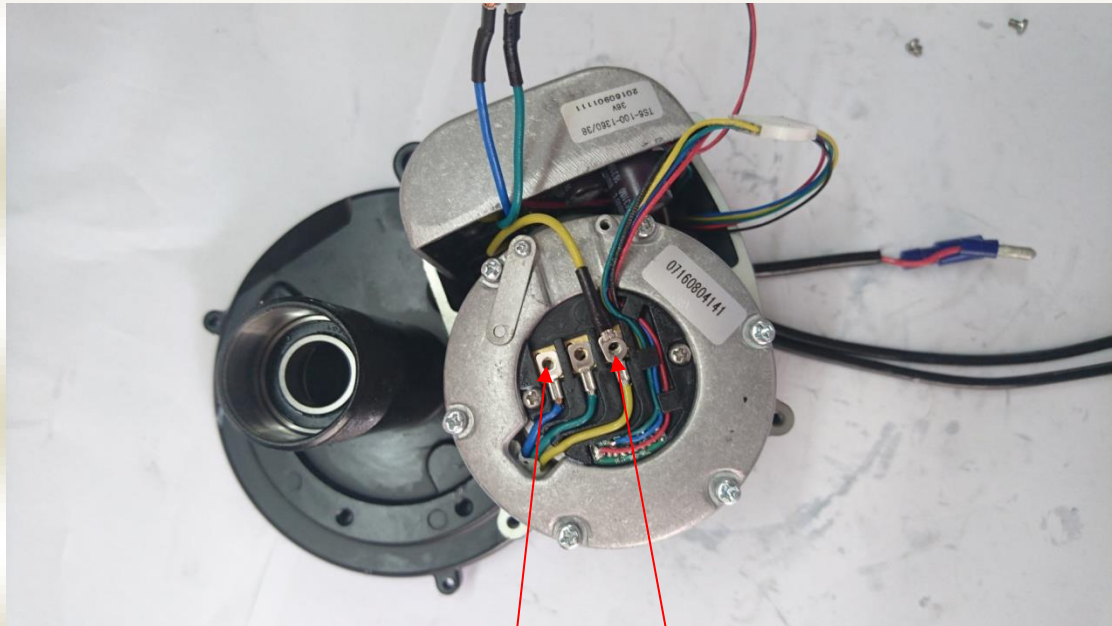
图示 3-2-2

3.2.3 将电机安装至主体，如图示 3-2-3 位置安装，并固定 4 处 M4×12 螺钉。Put the motor to the position of below main body, like below picture and fix the four M4×12 screws



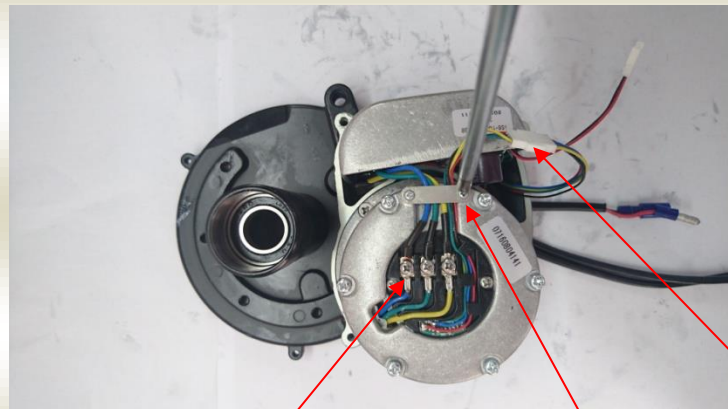
图示 3-2-3

3.2.4 将 3 个弹性垫片分别置于 3 个铆接焊片上。Put the three spring washers to the three riveting-welding chips



铆接焊片弹性垫片 riveting-welding chips

将铆接焊片以及弹性垫片用 3 个 M2.5×4 十字盘头螺钉锁紧，并用 2 个 M2.5×4 十字扁头螺钉固定压线板，最后连接控制器与电机连接线，如图 3-2-4 所示。Use the three M2.5×4 screws to locking the riveting-welding chips and spring washers



connect line

铆接焊片盘头螺钉压线板螺钉 riveting-welding chips screws

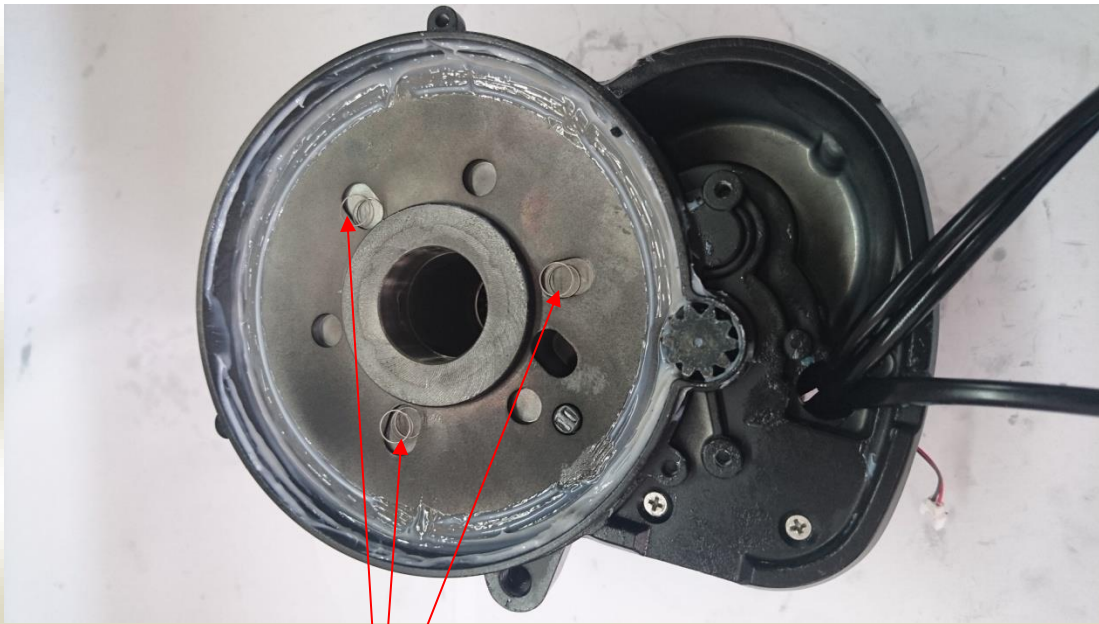
连接板

图示 3-2-4

3.3 力矩组件安装 Torque sensor installation

3.3.1 将 3 个压簧依次安装至主体图示位置,并将磁芯上的连接线穿过主体孔位,然后确认磁芯上的定位片安置在压簧上,如图 3-3-1 所示。Install the three compressed springs to below picture position of the main body, and entrance the connect line of magnetic core to the main body hole, then make sure the locating plate of magnetic

core install to compressed spring



compressed spring

3 处压簧位置 the three position of



连接线及穿过主体的孔位 the hole of connect line and through main body



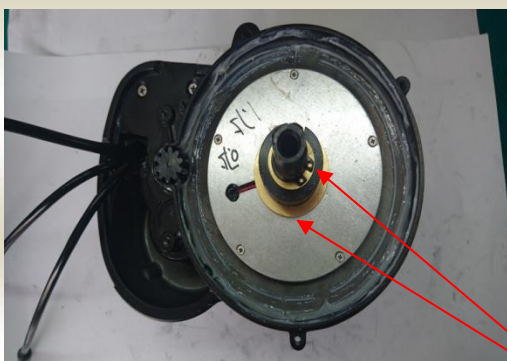
3 个定位片 图示 3-3-1 three position plates shown as Figure 3-3-1

3.3.2 将力矩压入主体，并确认连接线已连接，随后在力矩处安装铜垫片及卡簧，如图 3-3-2。

3.3.2 press the torque sensor into the main body and confirm the connect cable connecting well .afterwards install the copper gasket and circlip



力矩与控制器连接线 torque sensor and connecting cable from controller



铜垫片及卡簧 copper gasket and circlip

图示 3-3-2

3.3.3 将 HK2212 滚珠轴承如图示安装,并装入垫片及卡簧,如图 3-3-3。

Install the HK2212 ball bearing as shown picture and put the copper gasket and circlip as shown Figure 3-3-2



图示 3-3-3

3.3.4 将定位销安装至力矩组件上，并将大齿轮压至主体，注意大齿轮上定位销所在位置，如图 3-3-4 所示。

3.3.4 put the locating pin onto the torque sensor unit and press the big bearing into the main body .Take notice of position of locating pin on big bearing as shown Figure 3-3-4



定位销 locating pin



图示 3-3-4

3.4.5 确认安装无问题，安装卡簧，并将线卡装入线束，用 703 密封胶密封线卡
Confirm the installation without problem .Install the circlip and put line card into the wiring harness and then seal up the line card and wiring harness with 703 sealing

glue as shown Figure 3-4-5.
及线束，如图 3-4-5。



卡簧(circlip)

3-4-5

3.4.6 安装盖板组件密封圈，而后安装防尘盖及盖板并锁紧图示 5 处螺钉，如图 3-4-6 所示。

3.4.6 install the waterproof cover and sealing ring and then install the dust cover as well as cover and locked them as shown picture 5 .As shown Figure 3-4-6



图示 3-4-6

3.4.7 将牙盘以 5 个 M5×14 螺钉固定在主体上，并安装防水盖如图 3-4-7 所示。

3.4.7 The chain wheel is fixed on the main body by 5 PCS M5*14 screws and install the waterproof cover as shown Figure 3-4-7



图示 3-4-7