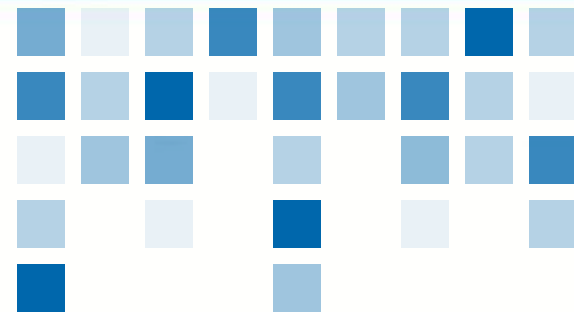
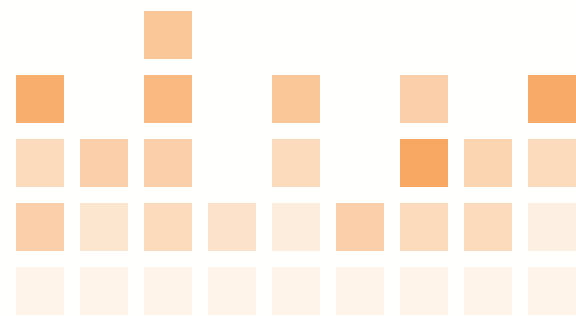


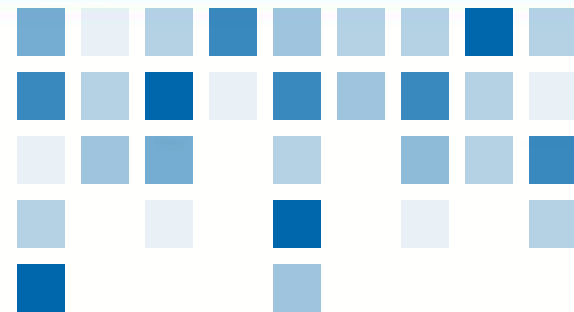


SHACMAN 汽车电器知识培训

F2000-F3000

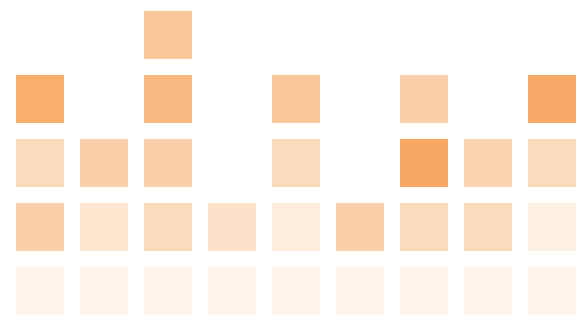
陕汽进出口公司服务部培训科





SHACMAN Electrical Training

F2000-F3000



第三课 电器部件:翘板开关

Lesson 3 Electrical Components: Rocker Switch

2. 德龙 F2000/F3000 翘板开关

Front and rear fog
light switches

Front and rear fog
light switches

名称	灯光总开关 Light main switch	灯光总开关 Light main switch	(前、后) 雾灯 开关	(前、后) 雾灯 开关
外形图				
插接器	S111	S111	S555	S555
零件号	81. 25505. 6255	DZ93189582501	81. 25505. 6607	DZ93189582502
备注		CBCU		CBCU



名称	灯光亮度调整 旋钮	后雾灯开关	危急报警开关	喇叭转换开关	Horn conversion switch
外形图					
插接器	R106	S555	S109	S226	
零件号	81. 25907. 0225	81. 25503. 6302	81. 25505. 6291	DZ9200581021	
备注					

Cruise on/off switch

名称	工作灯开关 Work light switch	巡航（关断/恢 复）开关	巡航设置开关 Cruise setting switch	怠速调整开关 Idle speed adjustment switch
外形图				
插接器	S225	S163	S68	S67/S162
零件号	DZ9200581022	DZ9100586227	DZ9100586058	DZ9100586057
备注		WP	康明斯	康明斯/WP



	Diagnostic switch	Diagnostic switch	Polymorphic switch	Electric sunroof switch
名称	诊断开关	诊断开关	多态开关	电动天窗开关
外形图				
插接器	S73	S160/S305	S167	S170
零件号	DZ9100586059	DZ9100586223	DZ93189582510	81.25503.6131
备注	康明斯	WP/CBCU, 点动式	WP	
名称	发动机制动开关 Engine brake switch	排气制动开关 Exhaust brake switch	油门转换开关 Throttle switch	油门转换开关 Throttle switch
外形图				
插接器	S71	S72	S69	S166
零件号	DZ9100586056	DZ9100586055	DZ9100586054	DZ9100586226
备注	康明斯 (JACOB, 3 档位)	康明斯, 2 档位	康明斯	WP



	Auxiliary high beam switch	Auxiliary high beam switch	Wheel differential lock switch	Axle differential lock switch
名称	(辅助)远光灯开 关	(辅助) 远光灯 开关	轮差开关	轴差开关
外形图				
插接器	S202	S202	S187	S212
零件号	DZ9200581023	DZ95189582511	81. 25505. 6267	81. 25505. 6280
备注		CBCU		
名称	取力器开关 PTO switch	取力器选择开关 PTO selection switch	取力器选择开关 PTO selection switch	警告灯开关 Warning light switch
外形图				
插接器	S222	S275	S275	S2/8
零件号	DZ9200581025	DZ9200581026	DZ93189582514	DZ95189582516
备注			CBCU	



名称	挂车负载开关 Trailer load switch	翻页开关 Flip switch	确认开关 Confirm switch	车速信号设置器 Vehicle speed signal setter
外形图				
插接器	S301	S163	S165	X700
零件号	DZ95189582518	DZ93189583410	DZ93189583411	DZ91189585010
备注	CBCU	CBCU	CBCU	

名称	后视镜加热开关 Mirror heating switch	中控门锁开关 Central lock switch	ABS 诊断开关 ABS diagnostic switch	ASR 关断开关 ASR shutdown switch
外形图				
插接器	S106	S146	S170	S240
零件号	81. 25505. 6262	DZ93189582509	DZ93189583041	DZ93189582516
备注				

名称	作业/行驶开关 Work/driving switch	燃油表转换开关 Fuel gauge conversion switch		
外形图				
插接器	S236	S267		
零件号	DZ93189582504	81. 25505. 6266		
备注	混凝土泵车			



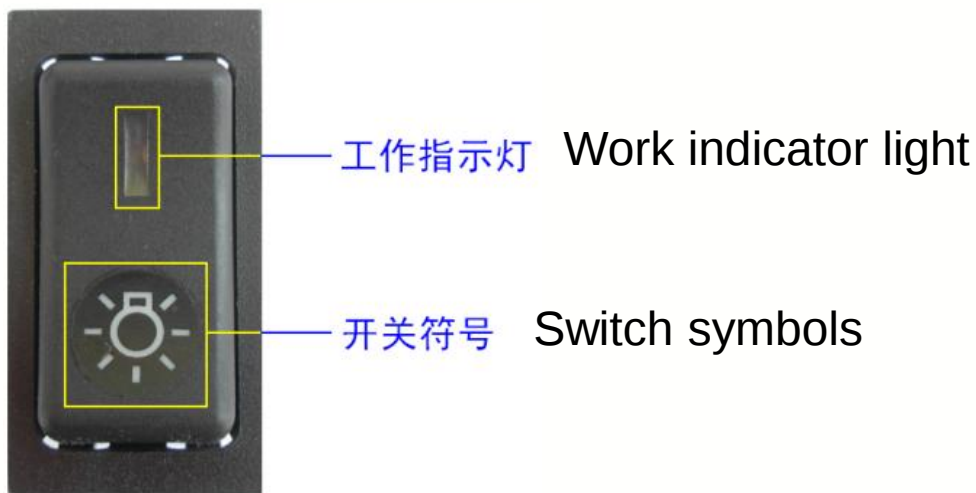
●**F3000**翘板开关外形及结构特征：F3000的翘板开关通体黑色，翘板上部为工作指示灯，用来指示开关的工作状态（当开关工作时点亮，有绿色、红色两种颜色表明操作的危险等级）。翘板下部为开关符号，表明开关的功能（参见上表），符号下是开关照明灯，当灯光开关置**1**档时，开关照明灯点亮，开关的符号透光显示。

The appearance and structural characteristics of the F3000 rocker switch: The entire body of the F3000 rocker switch is black, and the upper part of the rocker is a work indicator light, which is used to indicate the working status of the switch (lit up when the switch is in operation, with green and red colors indicating the danger level of operation). The lower part of the rocker panel is a switch symbol, indicating the function of the switch (see table above). Below the symbol is the switch lighting. When the light switch is set to position 1, the switch lighting will light up, and the symbol of the switch will be displayed in a transparent manner.



F3000翘板开关照明灯为发光二极管，接线端子为翘板开关后的1、2端子，端子2接58000号线（翘板开关照明，正极电源，24V），端子1接棕线（原理图编号31000，负极）

The F3000 rocker switch illumination light is a light-emitting diode, and the wiring terminals are terminals 1 and 2 behind the rocker switch. Terminal 2 is connected to wire 58000 (rocker switch illumination, positive power supply, 24V), and terminal 1 is connected to brown wire (schematic number 31000, negative)



德龙翘板开关正面



在翘板上方顶侧有表示开关档位的条形符号，方便驾驶员快速观察开关的档位

On the top of the rocker switch, there is a bar symbol indicating the gear position of the switch, which helps the driver to quickly observe the gear position of the switch



翘板开关上部有显示档位的符号



不同车型对翘板开关的选用特点:

The selection characteristics of rocker switches for different vehicle models:

1.CBCU车型对翘板开关的选用特点: CBCU是CAN总线车身控制器，主要用于F3000车型（多见于牵引车或水泥搅拌车），其选用的灯光开关（）、雾灯开关（）、辅助远光灯开关（）、取力器选择开关（）虽然符号与其他车型相同，但其零件号是不同的，这一点需要注意，如果错装了普通的开关，会出现开关的工作指示灯在开关未打开时暗亮的故障。

1. The selection characteristics of the rocker switch for CBCU models: CBCU is a CAN bus body controller, mainly used for F3000 models (mostly seen in tractors or cement mixers). The selected light switch () , fog light switch () , auxiliary high beam switch () , and power take-off selection switch () have the same symbol as other models, but their part numbers are different. This should be noted that if a common switch is installed incorrectly, the working indicator light of the switch will dim when the switch is not turned on.



2.灯光亮度调整旋钮：主要用于除CBCU车型以外的车型，其作用是调整仪表背光亮度（可调的照明线编号为58300，CBCU车型仪表自身带有背光调节按钮）。

2. Light brightness adjustment knob: mainly used for vehicles other than CBCU models, its function is to adjust the instrument backlight brightness (the adjustable lighting line number is 58300, and the CBCU model instrument has a backlight adjustment button).



3.雾灯 () 与后雾灯 () 开关: 雾灯开关用于对前后雾灯进行控制, 为3档开关, 1档位置固定, 控制前雾灯; 2档为自动复位 (点动式), 控制后雾灯。翘板上 方有两个工作指示灯, 左边的是前雾灯工作指示灯, 绿色, 右边为后雾灯工作指示灯, 橙色, 开关每点动一下, 开关状态切换一次, 后雾灯打开时其橙色指示灯点亮。

3. Fog Lamp () and Rear Fog Lamp () Switch: The fog lamp switch is used to control the front and rear fog lamps, and is a 3-speed switch. The first speed position is fixed to control the front fog lamps; 2nd gear is automatic reset (jog type), controlling the rear fog lights. There are two working indicator lights above the rocker panel. The left one is the front fog light working indicator light, green, and the right one is the rear fog light working indicator light, orange. The switch status switches once every time the switch is pressed, and the orange indicator light lights up when the rear fog light is turned on.



4.喇叭转换开关 () : 标准配置, 用于切换电喇叭和气喇叭, 开关置0档时 (符号端弹起) 为电喇叭状态, 开关置1档时 (符号端按下) 为气喇叭状态。

4. Horn conversion switch (): Standard configuration, used to switch between electric and air horns. When the switch is set to 0 (the symbol end pops up), it is in the electric horn state, and when the switch is set to 1 (the symbol end is pressed), it is in the air horn state.

5.巡航 (关断/恢复) 开关 () 和**怠速调整开关** () : 用于潍柴WP国三 (电控发动机) 车型对巡航的控制或PTO的控制, 均为3档双向点动式开关 (静位置为0档, 向上向下为点动式)。

5. Cruise (off/resume) switch () and **idle adjustment switch** (): used for cruise control or PTO control of the Weichai WP Euro 3 (electronic control engine) model, both of which are 3-speed bidirectional jog switches (stationary position is 0 gear, up and down is jog).



巡航又称定速巡航，主要用于部分牵引车，其作用是保持稳定的车速，减轻驾驶员的负担，其工作条件为：

最小档位：4档

发动机工作范围：700rpm~2500rpm（rpm：round per minute，转每分钟，转速）

最小启动车速：25km/h（km/h：kilometer/hour，千米/小时，车速）

最大启动车速：100km/h；

巡航工作车速范围：20 km/h ~ 120 km/h

Cruise, also known as cruise control, is mainly used for some tractors. Its function is to maintain a stable speed and reduce the burden on the driver. Its working conditions are:

Minimum gear: 4th gear

Engine operating range: 700rpm~2500rpm (rpm: round per minute, RPM)

Minimum starting speed: 25km/h

Maximum starting speed: 100km/h

Cruise operating speed range: 20 km/h~120 km/h



巡航的激活：当条件满足开启巡航时，向上或向下点动怠速调整开关即可进入巡航状态，车速保持稳定，此时再次点动或长按怠速调整开关可以调节巡航车速（向上按为加速，向下按为减速）。

Cruise activation: When the conditions are met to activate the cruise, press the idle adjustment switch up or down to enter the cruise state, and the vehicle speed remains stable. At this time, press or hold the idle adjustment switch again to adjust the cruise speed (press up to accelerate, press down to decelerate).



巡航的退出：将巡航（关断/恢复）开关向“OFF”位置按下即可完全退出巡航（不可恢复）。另外踩下离合、制动、排气制动也可退出巡航，当用此种方式退出巡航后当条件满足巡航时将巡航（关断/恢复）开关向“RES”位置按下可恢复到前次的巡航状态。在巡航过程中可以用油门踏板加速完成超车等动作，当踏板恢复后仍保持原先的巡航状态。

Cruise exit: Press the cruise (off/resume) switch to the "OFF" position to completely exit the cruise (non recoverable). In addition, pressing the clutch, brake, and exhaust brake can also exit cruise control. When exiting cruise control in this way and the conditions are met, pressing the cruise control (off/resume) switch to the "RES" position can restore the previous cruise control state. During the cruising process, you can use the accelerator pedal to accelerate and complete overtaking and other actions. When the pedal is restored, it still maintains its original cruising state



巡航功能需要多种信号保证，例如离合、制动、排气制动有任一信号出故障时均可能导致无法进入巡航，另外为保证安全性，凡带有巡航的车型均增加一个冗余制动信号，其信号与（主）制动信号是互补的（当制动信号有0变为24V时，冗余制动信号有24V变为0），时间上稍稍滞后（主）制动信号，当制动信号出现问题时EDC灯会点亮，按诊断开关会报故障码：223

The cruise control function requires multiple signal guarantees. For example, if any signal of the clutch, brake, or exhaust brake fails, it may result in the inability to enter cruise control. In addition, to ensure safety, all models with cruise control will add a redundant brake signal, which is complementary to the (main) brake signal (when the brake signal changes from 0 to 24V, the redundant brake signal changes from 24V to 0). The time is slightly delayed in the (main) brake signal. When the brake signal is faulty, the EDC light will light up, and pressing the diagnostic switch will report fault code: 223



PTO(Power Take Off), 主要用于搅拌车（混凝土装入搅拌罐后需不停的搅拌，否则混凝土凝固会导致搅拌罐的报废，取力形式为发动机取力），PTO主要用于低速或停车状态（车速范围：0~3km/h）时对搅拌罐转速的控制。

PTO (Power Take Off) is mainly used for mixing trucks (the concrete needs to be continuously mixed after being loaded into the mixing tank, otherwise the concrete will solidify and cause the mixing tank to be scrapped, and the power is taken from the engine). PTO is mainly used to control the speed of the mixing tank at low speeds or in parking conditions (speed range: 0-3km/h).



PTO的激活: 在条件满足的情况下将巡航（关断/恢复）开关向“RES”位置按下即可激活PTO。此时发动机转速会提升至800rpm~1000 rpm，此时点动或长按怠速调整开关可以调节发动机转速（向上按为加速，向下按为减速）。

PTO activation: When the conditions are met, press the cruise (off/resume) switch to the "RES" position to activate the PTO. At this time, the engine speed will increase to 800rpm~1000rpm. Jogging or long pressing the idle adjustment switch can adjust the engine speed (pressing up for acceleration, pressing down for deceleration).

PTO的退出: 将巡航（关断/恢复）开关向“OFF”位置按下或踩下制动踏板即可退出PTO。与巡航不同，离合、排气制动、油门信号均不能退出PTO

PTO exit: Press the cruise (off/resume) switch to the "OFF" position or press the brake pedal to exit the PTO. Unlike cruise control, the clutch, exhaust brake, and throttle signals cannot exit the PTO



6.巡航设置开关



和怠速调整开关



：用于康明斯ISM国三（电控发动机）车型对巡航的控制，巡航开关为锁定式两档开关，怠速调整开关为3档双向点动式开关（固定位置为0为，向上向下为点动式）。

6. Cruise setting switch



and idle adjustment switch



: Used for the cruise control of Cummins ISM Euro III (electronic control engine) models. The cruise switch is a locked two gears switch, and the idle adjustment switch is a three gears bidirectional jog switch (fixed position is 0, up and down is jog).

康明斯车型巡航的激活：当时速 ≥ 48 km/h时，打开巡航设置开关，向上点动怠速调整开关即可进入巡航状态，车辆会保持当前车速。此时点动或长按怠速调整开关可以调节巡航车速（向上按为加速，向下按为减速）。

Activation of cruise control for Cummins models: When the speed is ≥ 48 km/h, turn on the cruise control switch, press the idle adjustment switch upwards to enter the cruise control mode, and the vehicle will maintain the current speed. At this point, jogging or long pressing the idle speed adjustment switch can adjust the cruise speed (pressing upwards for acceleration, pressing downwards for deceleration).



康明斯车型巡航的退出： 关闭巡航设置开关、踩下离合器踏板或制动踏板即可退出巡航。

Exit the cruise control of Cummins models: Turn off the cruise control switch, press the clutch pedal or brake pedal to exit the cruise control.

7.诊断开关 ()：用于电控发动机故障诊断，康明斯ISM电控发动机用的故障诊断开关为锁定式，潍柴WP电控发动机用的诊断开关为点动式。

7. Diagnostic switch ()：used for fault diagnosis of electronic control engines. The fault diagnosis switch used for Cummins ISM electronic control engines is a locking type, while the diagnostic switch used for Weichai WP electronic control engines is a jog type.



康明斯ISM发动机故障诊断: 当康明斯ISM发动机出故障时, 其红色 () 或黄色 () 发动机报警灯会点亮, 此时打开诊断开关其红色报警灯会闪出故障码, 此时点动怠速调整开关可以翻看前一条或后一条故障, 故障会循环显示。当发动机无故障时打开诊断开关红色、黄色报警灯会同时点亮, 不闪码。

Cummins ISM engine fault diagnosis: When the Cummins ISM engine malfunctions, its red () or yellow () engine alarm light will light up. When the diagnostic switch is turned on, the red alarm light will flash a fault code. At this time, pressing the idle speed adjustment switch can view the previous or next fault, and the fault will be displayed repeatedly. When there is no engine malfunction, turning on the diagnostic switch will light up both the red and yellow alarm lights simultaneously without flashing the code.



潍柴WP发动机故障诊断：当潍柴WP发动机出故障时其EDC报警灯（  ）会点亮，此时点动诊断开关EDC报警灯会闪出故障码，再次点动诊断开关会显示下一条故障，故障会循环显示。当无故障时EDC报警灯会故障诊断开关的按下而点亮。

Weichai WP engine fault diagnosis: When the Weichai WP engine malfunctions, its EDC alarm light () will light up. At this time, press the diagnostic switch, EDC alarm light will flash a fault code. If the diagnostic switch is pressed again, the next fault will be displayed, and the fault will cycle through. When there is no fault, the EDC alarm light will light up when the fault diagnosis switch is pressed.

8.电动天窗开关（  ）：用于控制电动天窗（部分高顶驾驶室）的开启和关闭，为3档双向点动式开关。

8. Electric sunroof switch (): Used to control the opening and closing of the electric sunroof (some high roof cabins), it is a 3-speed bidirectional jog switch.



9. 发动机制动开关和排气制动开关 () : 两开关符号相同, 但结构不同, 发动机制动开关为**3档**锁定式开关, 排气制动开关为**2档**锁定式开关, 两开关不能同时选用。

9. Engine brake switch and exhaust brake switch (): The two switches have the same symbol but different structures. The engine brake switch is a 3-speed locking switch, and the exhaust brake switch is a 2-speed locking switch. The two switches cannot be selected at the same time.

康明斯的发动机制动器 又称**JACOB**制动器, 制动强度分为两档, **1档**为**3缸**制动, **2档**为**6缸**制动。

Cummins engine brake, also known as **JACOB brake**, has two levels of braking intensity: first level for 3-cylinder braking and second level for 6-cylinder braking.



康明斯发动机制动或排气制动的工作条件:

- a. 发动机制动开关打开或排气制动开关打开
- b. 发动机转速 $>1000\text{rpm}$
- c. 油门踏板在怠速位置
- d. 离合器踏板未踩下
- e. 当发动机制动或排气制动工作期间，后尾灯内的制动灯会点亮

Working conditions for Cummins engine braking or exhaust braking:

- a. Engine brake switch on or exhaust brake switch on
- b. Engine speed $>1000\text{rpm}$
- c. The accelerator pedal is in the idle position
- d. The clutch pedal is not pressed
- e. During the operation of engine braking or exhaust braking, the brake light inside the tail light will light up



10.油门转换开关 () 和 () : 又称远程油门开关或手油门开关。油门转换开关主要用于搅拌车, 转换开关打开时油门将切换到底盘处的油门(远程油门), 这时驾驶室内的油门将失效, 可以通过远程油门控制发动机转速。康明斯车型和潍柴WP电控发动机车型的油门转换开关操作功能相同, 但开关结构不同, 两者不可互换。康明斯发动机的油门转换开关符号片上字样为“手油门”, 潍柴WP国三车型的油门转换开关符号片上的字样为“远程油门”。

10. Accelerator switch () and (): also known as remote throttle switch or manual throttle switch. The throttle switch is mainly used for mixer trucks. When the switch is turned on, the throttle will switch to the throttle at the bottom plate (remote throttle). At this time, the throttle inside the driver's cab will fail, and the engine speed can be controlled through remote throttle. The throttle switch operation function of the Cummins and Weichai WP electronic control engine models is the same, but the switch structure is different, and the two are not interchangeable. The symbol on the throttle switch of the Cummins engine is labeled as "manual throttle", while the symbol on the throttle switch of the Weichai WP Euro III model is labeled as "remote throttle".



当选装远程油门的车型出现油门踏板失灵时请检查是否打开了油门转换开关。

When the vehicle model equipped with remote throttle malfunctions, please check if the throttle switch is turned on.

11.辅助远光灯开关 () : 简称为远光开关。当灯光开关 () 置2档, 且组合开关切换为远光时, 可以通过此开关打开辅助远光灯, 一般用于牵引车。

11. Auxiliary high beam switch(): abbreviated as high beam switch. When the light switch() is set to 2nd gear and the combination switch is switched to high beam, the auxiliary high beam can be turned on through this switch, which is generally used for tractors.



12.轮差开关 () **和轴差开关** () : 在道路泥泞, 出现轮胎打滑时使用。一般是单驱动桥 (斯太尔桥和MAN铸造桥) 有一个轮差开关, 双联驱动桥有一个轮差开关, 一个轴差开关。

12. Wheel differential lock switch () **and axle differential lock switch** (): Used when the road is muddy and there is tire slippage. Generally, a single drive axle has one wheel differential lock switch, a dual drive axle has one wheel differential lock switch, and one axle differential lock switch.

13.取力器开关 () **和取力器选择开关** () : 主要用于自卸车, 两开关配合可以实现停车取力与行车取力。

13. Power take-off switch () **and power take-off selection switch** (): mainly used for dump trucks, the combination of the two switches can achieve parking and driving power extraction.



停车取力操作： 起动发动机 ->打开取力器开关 ->踩下离合器 ->将变速杆挂到低档区的档位 ->松开离合器。

Parking power take-off operation: Start the engine ->turn on the power take-off switch ->press the clutch ->shift the gear lever to a lower gear range ->release the clutch.

行车取力操作： 起动发动机 ->打开取力器开关 ->打开取力器选择开关 ->踩下离合器 ->将变速杆挂到低档区档位 ->松开手刹阀，松开离合器。

Driving power take-off operation: Start the engine ->turn on the power take-off switch ->turn on the power take-off selection switch ->press the clutch ->shift the gear lever to a low gear range ->release the handbrake valve and release the clutch.

14.警告灯开关 () : 特种车辆驾驶室顶部警报器的开关。

14. Warning light switch(): The switch for the top alarm of the cab of a special vehicle.



15.挂车负载开关 () : 用于装配CBCU的牵引车, 连接挂车后需打开此开关, 否则挂车尾灯不亮。当未连接挂车插座但打开此开关会导致系统报挂车灯的故障。

15. Trailer load switch (): Used for tractors equipped with CBCU. After connecting the trailer, this switch must be turned on, otherwise the tail lights of the trailer will not light up. When the trailer socket is not connected but this switch is turned on, it will cause the system to report a malfunction of the trailer lights.

16.翻页开关 () **和确认开关** () : 用于装配CBCU的车型对组合仪表上方多功能显示屏的操作, 翻页开关用来翻页, 当显示故障时确认开关用来快速显示下一条故障。

16. Page turning switch () **and confirmation switch** (): Used for the operation of the multifunctional display screen above the combination instrument panel of CBCU models. The page turning switch is used to turn pages, and when a fault is displayed, the confirmation switch is used to quickly display the next fault.



17.车速信号设置器：用于除装配CBCU以外的车型，其作用一是对车速信号整形，二是调整速比。当速比调整错误时会导致车速表指示不准。

17. Vehicle speed signal setter: used for vehicles other than those equipped with CBCU, its function is to shape the vehicle speed signal and adjust the speed ratio. When the speed ratio is adjusted incorrectly, it can cause inaccurate readings on the speedometer.

18.后视镜加热开关 ()：用于对后视镜表面的除雾。

18. Mirror heating switch (): used for defogging the surface of the rearview mirror.

19.中控门锁开关 ()：用于在驾驶室内控制门锁的开、关。

19. Central door lock switch (): used to control the opening and closing of the door.



20.ABS诊断开关 (): 为点动式开关, 当ABS (制动防抱死系统) 系统有故障时, 按下此开关再松开, ABS故障灯 (或ASR故障灯) 会闪故障码。

20. ABS diagnostic switch (): It is a point action switch. When there is a malfunction in the ABS system, press and release this switch, and the ABS fault light (or ASR fault light) will flash the fault code.

21.ASR关断开关 (): 用来关闭ASR (驱动防打滑系统) 功能。

21. ASR shutdown switch (): used to turn off the ASR (Drive anti slip system) function.



22. 作业/行驶开关 () : 用来控制混凝土泵车动力输出, 当开关未按下时为行驶档, 车辆可以正常行驶, 当开关按下时为作业状态, 此时系统会切断发动机至驱动轮的动力输出, 同时阻断车速表的指示。

22. Operation/Driving Switch (): Used to control the power output of the concrete pump truck. When the switch is not pressed, it is in driving gear and the vehicle can drive normally. When the switch is pressed, it is in operation mode. At this time, the system will cut off the power output from the engine to the drive wheels and block the indication on the speedometer.

23. 燃油表转换开关 () : 当装配各自独立的双燃油箱时加装此开关 (串联式双油箱不在此列), 用来切换显示不同油箱的油位。

23. Fuel gauge conversion switch (): This switch is added when assembling independent dual fuel tanks (not included in series dual fuel tanks) to switch and display the oil levels of different tanks.

