



Engine

DLE200

使用说明书 USER MANUAL

该发动机并非玩具，请特别注意安全，由此引起的所有安全问题我们将不予负责；为了您更好地使用该产品，请您在使用前仔细阅读说明书。

This engine is not toy. For your own safety, please read the manual carefully before operation. DLE is not responsible for all injuries result from the use.

● 简介 INTRODUCTION

感谢您选购DLE引擎。DLE200是定位于无人动力伞和无人机而设计的双缸对置两冲程发动机，独特的结构设计使该引擎具有重量轻、寿命长、马力大、振动小的特点，取消了常规的谐振排气管设计，进一步延长引擎寿命，油门响应和线性极佳。全新理念设计的DLE200将带给你前所未有的飞行体验。

Thank you for purchasing the DLE engine. DLE200 is a opposed cylinder 2-stroke engine designed for paramotor and UAV. It has unique feature with light weight, long life, high power and low vibration. The design of DLE200 does not use the tuned pipe by routine. It improves the engine's power limit and extends the life of the engine with excellent throttle respond and curve. DLE200, with its new design, will offer you unexpected flight experience.

● 警告 WARNING

该引擎不是玩具！如果你是第一次购买该类引擎，并想通过自己一个人的努力完成飞行，请立即停止你危险的行为，去寻求有经验人士的帮助。

使用和维护不当可能会导致引擎损坏，亦可能造成人员伤亡。安装调试和维修引擎需要委托有经验的人员来操作。DLE 不承担由于操作和维护不当造成的任何损失！

该类引擎用于不需取得适航证的飞行器，在使用过程中有可能出现意外停车，使用者需有应对空中停车的应急措施。DLE 不承担空中意外停车造成的任何损失！

该引擎是没有产品责任保险的，我们不能保证不发生设备故障，使用它是存在危险的，意外事故有可能造成财产损失、身体受伤甚至死亡，如果你不愿意承担使用中的所有风险，请不要启动引擎！

This engine is not a toy! Therefore, all users who are not specifically skilled or trained to perform the operation or flight should stop the dangerous action and be performed following the help of the experienced.

Misuse or inaccurate maintenance may result in damage of engine, injury or death. Installation, trial run and maintain of the engine must be carried out by experienced. DLE will not be liable for any damage or death caused by misuse or inaccurate maintenance.

This is not a certified aircraft engine. User assumes all risk of use and acknowledges by his use that he knows the engine is subject to sudden stoppage. DLE will not be liable for any damage or death caused through the sudden stoppage in the air.

This engine does not have product liability insurance. We cannot assure the nonoccurrence of the engine failure. Using the engine can be dangerous and accidents can result in serious property loss, injuries or death! Never start the engine if you don't want to take the risks.

● 组装 INSTALLATION

所有的安装螺丝需要涂抹螺纹胶（乐泰 243），同一平面超过 4 颗螺丝时需要对角交叉均匀拧紧，扭矩参考主要螺丝力矩附表。

将发动机座安装孔套上减振橡胶垫，两面加上金属垫片，螺丝从中心孔穿过固定在动力伞框上。

如果要延长发动机安装点的距离，进一步降低螺旋桨反扭产生的振动，需要由经验丰富的人员进行安装改进设计，不恰当的减振设计有可能造成发动机脱落导致严重事故。

排气管可选配标准排气管或加强型排气管，加强型排气管可增加发动机约 3HP 的输出功率。自行改装或使用谐振排气管视为放弃引擎一年的质保期。

排气管与气缸连接的端面涂抹 300℃ 以上耐高温密封胶。安装标准排气管时使用耐高温弹簧防止螺丝松动。

请选用优质的经过校验过平衡的螺旋桨。劣质的螺旋桨会加大振动对引擎造成严重损害，影响飞行安全。

螺旋桨安装孔与安装螺丝的间隙 $\leq 0.1\text{mm}$ ，过大的间隙容易造成螺丝松动，螺旋桨的剪切力会切断所有固定螺丝。

Loctite (243) is necessary on all screws. Tightening the screws cross the opposite angle when there are more than four screws on a surface. Refer to the torque reference table for the torque.

Shock absorption rubber mat can be installed on the engine mount and add metal spacer on both sides. Screws go through centre hole and install on the paramotor frame.

If distances of mounting point of propeller should be extended and reduce the vibration caused by propeller twist, this should be carried out by experienced people. Improper design of the vibration absorbing will result to serious accidents.

Two mufflers are optional to the engine, the standard muffler or the premium muffler. premium muffler can increase about 3HP output power. Alternation to the engine not approved by DLE or use tuned pipe will give up the one year warranty of the engine.

The end face between muffler and cylinder will paint 300℃ high temperature resistance sealant. User the heat resistant spring when install the standard muffler to prevent bolts loose.

Please choose the high-quality propeller with checked balance. Propellers with poor quality may shorten the life of the engine and affect flight safety.

The gap between mounting hole and screw should be no more than 0.1mm. Large gap will easily lead to loosed screws. Shear force from the propeller will cut off all fixed screws.

● 燃油配比 FUEL RATIO

请选用优质的93#或97#无铅汽油或乙醇汽油。

润滑油建议使用FD级别的优质二冲程全合成机油。

劣质的机油会造成引擎性能下降甚至损坏。

燃油配比为40 : 1至50 : 1之间，磨合期间40 : 1，正常使用为50:1.夏季高温为45 : 1。

注意——是体积比而不是重量比。

根据气温与发动机温度适当调整混合比与油针，温度高时请适当增加机油的比例和增加高速油针开度。

- 禁止不同厂家、牌号的机油混合使用，否则会引起化油器严重阻塞。更换机油时需要对化油器进行清洗。
- 不要使用混合时间超过1周的燃油。
- 不要轻易使用别人配的燃油。
- 配好的混合燃油在冬季会出现机油沉淀现象，使用前请混合均匀。

Please use the high-quality unleaded gasoline or ethanol gasoline 93# or 97#.

It is suggested to use a high-quality 2-stroke FD synthetic oil as the lubricant.

The oil with poor-quality will result in performance degradation or failure of the engine.

The fuel ratio is between 40:1 to 50:1 in which 40:1 when running-in, 50:1 when back to normal and 45:1 when in high temperature.

Notice: it is the volume ratio not the weight ratio.

Adjust the fuel ratio and oil needle according to air and engine temperature. Please increase the engine oil ratio and increase the valve opening of high-speed oil needle in high temperature.

- **Do not mix up different brands of engine oil, otherwise carburetor could be seriously blocked. Clean the carburetor when changing the engine oil.**
- **Never use the fuel mixed for more than 1 week.**
- **Don't use the fuel mixed by others.**
- **Please shake the mixture before use in winter as the low temperature may lead to sediment.**

● 启动 START

每次启动前请依次检查发动机、螺旋桨、框架、座袋及其他附属各部件没有异常。关闭阻风门，油门加到最大，按下启动钮，起动电机带动引擎运转吸油（首次启动或长时间不用可能会延长泵油时间），化油器进油后发动机启动并富油熄火，打开风门，油门减小至接近怠速位置，按下启动钮，发动机启动后进入正常工作状态。冬季启动后请暖车2—5分钟，夏季启动后请暖车1—2分钟，以检查校验引擎的怠速稳定性和加减油门的调速性。

为了防止意外启动，可以在启动按钮上串联一个开关，或者在发动机暂停使用时拔掉启动电源插头。

Before starting, please verify the engine, propeller, frame, seat bag and other accessory parts. Close the choke and turn on the ignition power. Turn on the starter switch to drive the operation of the engine for oil absorption. It may take longer time for oil pumping if this is the first time to start the engine or the engine is stored for a long period. The fuel reaches the carburetor and start the engine then flooded engine may impossible to start. Open the choke and increase the throttle to the idle, turn on the starter switch and the engine should start and run smoothly. In winter warm-up for 2-5 minutes while in summer warm-up for 1-2 minutes.

To avoid the unintentional start, add a tandem switch on the start button. As an option, start power plug can be unplugged when the engine stops using.

● 磨合 RUNNING-IN

磨合初期油针设定 L: 1圈 H: 1圈

DLE200引擎在出厂时已经检验磨合。用户对引擎进一步磨合可以了解并延长发动机的

设计寿命。

禁止把发动机固定在没有减振装置的支架上进行磨合。禁止在没有安装标准螺旋桨的情况下启动引擎。

磨合引擎须安装在动力伞框上或安装在专用的试车台架上，在没有尘土杂物，不影响他人的安全环境中进行。建议在有经验的人员指导下进行。

Initial stage for running-in: L 1 turn, H:1 turn

DLE200, before being delivered, are subject to a severe quality check, in order to verify if all the components respect the fixed parameters, but a further running-in is necessary. A good running-in will prolong the life of your engine.

Don't running-in without the vibration damper stand. Never start engine without installation of a standard propeller.

The running-in engine should be installed in the paramotor frame or a customized stand. Find a suitable location away from obstructions, people. Carry out running-in with the help of the experienced people.

怠速低速磨合：燃油配比40 : 1。

启动引擎，保持转速在2500—3000转间断运行30分钟。期间可停车几次冷却并检查引擎与螺旋桨工况使之在稳定状态。

启动引擎，保持转速在3500至4000转间断运行30分钟。期间可停车几次冷却并检查引擎与螺旋桨工况使之在稳定状态。

Idle-low speed running-in: fuel ratio 40:1

Start the engine, increase the RPMs to 2500/3000 for 30 minutes. Switch off the engine and check the condition of engine and propeller.

Start the engine, increase the RPMs to 3500/4000 for 30 minutes. Switch off the engine and check the condition of engine and propeller.

低速中速磨合：燃油配比50 : 1。

启动引擎预热后，保持转速在4000至4500运行30分钟，期间可停车几次冷却并检查引擎与螺旋桨工况使之在稳定状态。

磨合即将结束时请在指标范围内调整高速油针与低速油针的开度，

磨合后正常状态的引擎应该怠速稳定、加减速顺畅、高速略微富油状态。

磨合后正常状态的火花塞中心电极为深褐色，螺纹部位有微湿的油渍为好。

地面磨合超过90分钟时，检查所有部件正常，引擎运行良好，可挂伞投入使用。

开始使用的10小时内引擎在油门全开状态请勿超过5分钟，引擎长时间工作在极限状态会缩短使用寿命。

Low-middle speed running-in: fuel ratio 50:1

Start the engine and let it warm up. Increase the RPMs to 4000/4500 for 30 minutes. Switch off the engine and check the condition of the engine and the propeller.

At the end of the running-in, the opening between high speed needle and low speed needle should be adjusted.

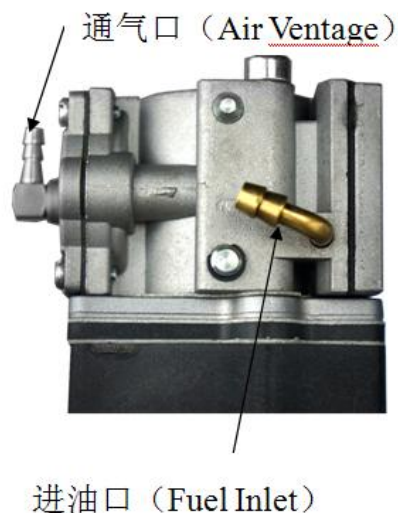
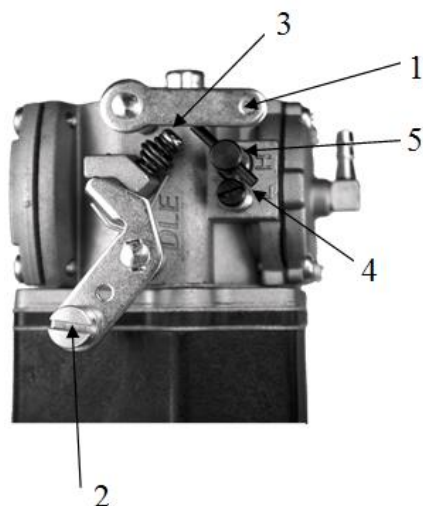
After the running-in, the engine in the normal condition should be in stable idle, smooth acceleration and deceleration and slightly oil-rich state when in high speed.

After the running-in, the insulator of the spark plug should be coffee brown with slightly oil in the thread parts.

Ground running-in exceeds 90 minutes with every component in regular and running well of engine, then it can be put into use with parachutes.

Do not exceed 5 minutes in the first 10 hours use with full throttle. Keep engine at peak RPM will resulting in life reduction.

● 化油器的调整 CARBURETOR ADJUSTMENT



- (1)、阻风门 (Choke Control)
- (2)、油门 (Throttle Control)
- (3)、怠速调节螺丝 (Idle Adjustment)
- (4)、低速油针 (Low Speed Needle)
- (5)、高速油针 (High Speed Needle)

出厂设置：L（低速）油针逆时针转动1圈，H（高速）油针逆时针转动1圈。

“L”油针用于调节低速供油，“H”油针用于调节高速供油。油针螺丝是很精细的部件，用力过大可能会造成化油器损坏。

化油器的出厂设置可以使引擎正常启动并满足大部分地区的工况需要，但海拔、温度的变化需要对化油器进行细微调整。

低速至高速加速不畅，可微小的逆时针开大“L”油针增加低速油量；低速富油会引起怠速容易熄火，可顺时针减小“L”油针。

建议使用转速表配合调整高速油针。微调“H”油针使发动机达到最高转速后再逆时针开大0.2—0.3圈保持略微富油为标准状态。

通过火花塞颜色判断油气混合状态：

启动引擎，全油门运转20秒在高速状态下熄火，卸下火花塞，正常是黄褐色，发黑说明富油，发白表示贫油。

引擎在贫油状态下运行会烧坏活塞和气缸，导致发动机严重损坏。

调整油针的工作需要交给有经验的人员进行。（发动机贫油状态下运行导致的发动机损坏不在保修范围）

Your DLE engine comes tuned with the factory default carburetor setting: L(Low speed) needle 1turn counterclockwise open and H(High speed) needle 1turn counterclockwise open.

Use L needle for the low oil supply while H needle for high oil supply. Oil needle screw is a delicate part and excessive force may result in carburetor failure.

The factory default carburetor setting meets the needs of most areas. Adjust the

carburetor with the change of the altitude and temperature.

Acceleration problem from low to high speed can slightly tune the L needle counterclockwise to increase the low speed oil. A lower RPM with rich oil can cause stalling or rough idle and reduce L needle by turning clockwise.

When tuning your engine, we recommend using a tachometer. Fine tuning H needle will make the engine reach to the maximum RPM. Then turn the needle 0.2-0.3 turn counterclockwise and keep rich mix condition.

Judging by the color of spark plug:

The ideal mixture is reached when the insulator of the spark plug is coffee brown without carbon deposits. A black sooty plug means the engine is too rich, and white/grey plug means the engine is too lean. You can see better the color of the spark plug by keeping the engine for 20 seconds at maximum speed.

The piston and cylinder will burnout when the engine is running in a lean condition, that will lead to serious failure of the engine.

Turning the needle should be carried by experienced people. (Warranty is void when engine failure caused by the lean condition)

● 使用中的注意事项 **IMPORTANT NOTES**

- 请使用推荐规格的螺旋桨，未安装螺旋桨时禁止启动引擎，禁止使用破损的螺旋桨。螺旋桨不匹配会缩短引擎的寿命。
- 在螺旋桨两侧有人或周围人员较多的情况下请勿启动引擎。
- 每次起飞前降落后请检查油路、电路、螺旋桨与机器各部分固定螺栓接口是否松动。
- 每次飞行在启动并预热引擎后请检查引擎的怠速、加减速性能正常后方可起飞。
- 在使用过程中有异常的声音或振动，要马上降落检查，排除故障后才能继续使用。
- 在正常飞行中请不要熄火滑翔，长时间停车可能造成在阻风门打开的状态下难以启动。
- 空中启动时继电器可能会发生短路，造成起动电机损坏，甚至引起火灾。
- 遇到空中停车，请尽快寻找能安全降落的地点，不要花太多时间尝试二次以上的启动。
- 保持发动机表面清洁，保证散热良好。
- 服药、饮酒或身体不适时，严禁对引擎进行保养和使用。

- Please use the recommended propeller. Do not try to start the engine without the propeller. Avoid to use the damaged propeller. Improper propeller may shorten the life of the engine.
- Never start the engine with people near the propeller.
- Check the loose bolt joints within oil circuit, wiring, propeller and other parts of the engine before taking off and after landing.
- Check the idle and ACC/DEC performance after starting and warming up the engine. Take off when in normal.
- Immediate landing and checking should be carried out when hearing abnormal sound or vibration during flight. Using after trouble shooting.
- Don't shut down and glide in the normal flight as long time stop will lead to the start of the choke when it is open.
- The relay may be short out when starting in the air and result in the failure of starter motor or fire.

- Looking for a safe place to land when occurring sudden stoppage in the air. Don't spend too much time on additional starting.
- Keep the engine surface clean and ensure good cooling.
- Avoid to maintain or use the engine when taking medicine, drinking or in poor health.

● 维护保养 MAINTENANCE

应避免在灰尘较大的环境中使用。飞行几十小时后可视情况把空滤拆下用汽油、水或压缩空气对其进行清理。

在一定周期内清洁化油器里面的燃油滤网及针阀，否则将引起油针调节失灵，发动机工作不稳等情况。

每使用10个小时：

检查所有螺丝是否松动，检查油管、线路是否磨损，检查火花塞情况。

如需更换火花塞请选用原厂配件，不恰当的火花塞型号可能会导致发动机过热损坏。

每使用100个小时：

检查清理气缸积炭，复装汽缸时端面涂抹耐高温密封胶。

拆下化油器固定螺丝检查簧片阀。

注：有必要把每次维修都记录在维修保养记录里。

Avoid to use the engine in heavy dusty environment. Remove and wash the air filter with gasoline, water or compressed air after dozens of hours flying.

Clean fuel filter and needle valve in the carburetor in a certain period otherwise the oil needle may fail which cause the unstable of the engine.

Every 10 hours:

Check the bolts condition (loose), fuel pipe, wiring and the spark plug condition.

Use the genuine parts when changing the spark plugs. Inaccurate spark plugs may lead to overheating and damage of the engine.

Every 100 hours:

Check and clean the carburetor. Paint high temperature sealant on end face when assembling the cylinder.

Check the reed valve by removing the carburetor set screws.

Note: It is advisable to keep records of all maintenance in an engine maintenance record.

● 传动皮带的松紧调节 BELT ADJUSTMENT

如果传动皮带设置过紧，将会损坏曲轴轴承和从动轮轮毂上的轴承。

引擎在使用一段时间后，传动皮带会有拉伸打滑现象，这时需要调整偏心轴，使皮带张紧。在开始调整之前，请事先用记号笔在偏心轴和支架上画一道小记号，这道记号就是后续调整参考用的起始点。调整或更换皮带时，先拧松从动轮偏心轴背后和侧面的锁紧螺丝，螺丝松开后就可以用开口扳手来转动偏心轴，同时小心观察每次转动1mm。调节完成后先拧紧从动轮背后的螺丝，再拧侧面的锁紧螺丝。

A belt which is “over tensioned” can do permanent damage to the bearings inside of the pulley hubs and drive shaft.

All belt driven engines need a belt readjustment after a few hours. If the belt slips, cam

shaft should be adjust to maintain proper belt tension. Before adjusting the belt take a felt pen or marker and make a small mark on the cam shaft and on the front of the reduction plate. This will be your starting point for reference. Loosen the safety bolt located high up behind the reduction mounting plate and the side bolt. Once these are loose, you can turn the cam with wrench - careful to observe the 1 mm increments. Once you have finished turning the cam re-tighten the safety bolts. First tighten the back bolt by keeping firm hold on the cam with the wrench, and then the side bolt.

● 故障排除 TROUBLESHOOTING

无法启动：首先检查电路，确保火花塞安装到位，取下火花塞，启动电机转动，观看火花塞上是否有电。无电，检查磁电机到高压包之间的线路，有电，检查油路的问题。

取下火花塞时，如果火花塞上全是油渍，可能是供油量太大，或者油泵得太多，擦干净火花塞重新启动。如果火花塞是干的，说明供油有问题，再重新泵油，如果泵不进去，检查从油箱到化油器之间的油路是否堵塞，包括为化油器提供泵油条件的单向进气阀。

The engine cannot start: check the circuit and make sure the spark plug installed properly. Take off the spark plug and start the motor rotation to see if there are electricity on the spark plug. Without electricity, check the circuit between the magneto and ignition coil. With electricity, check the fuel circuit.

To determine if the engine is flooded remove the spark plug and inspect for a wet plug. The plug should have some fuel, but will not be saturated. Dry the wet plug and start the engine. The dry plug means something wrong with the fuel supply. Pump the fuel again and if failed, check supply lines to ensure fuel is making it t the carburetor intake. Make sure the fuel arrives correctly from the tank to the carburetor

● 保修条款 WARRENTY

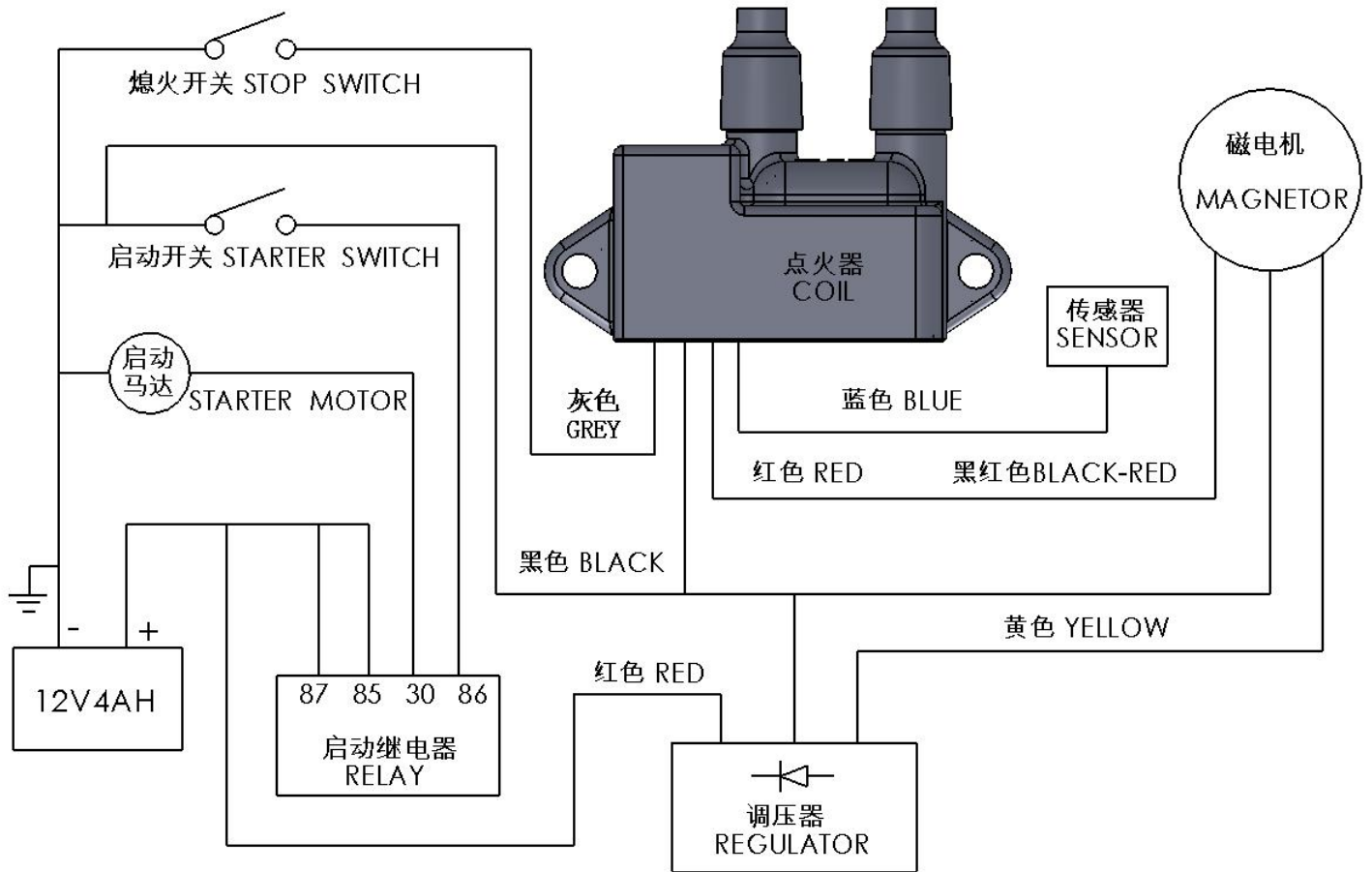
- 本产品自购买之日起提供1年的质保期。
- 传动皮带、火花塞、空滤等消耗品不在保修范围内。
- 改装、安装了非DLE原厂部件或不按要求使用等人为因素造成的损坏不享受免费保修。
- 不按要求往汽油里添加机油或使用了劣质机油，造成发动机损坏的不属保修。
- 保险期间寄送产品的费用，国内用户自购买之日起三个月内往返运费由厂方负责，超过三个月的往返运费由买家承担。
- 请妥善保存好说明书及填写客户信息，以作为保修时的凭证。

- 1Year warranty beginning from the date of purchase.
- Warranty do not apply to consumable components of the engine like transmission belt, spark plug and air filter.
- Warranty do not apply to engine modification and installation not authorized and approved by DLE.
- Warranty do not apply to damages caused by the misuse of gasoline with oil or poor quality of oil.
- Please keep the user manual in good condition and fill in customer information as a warranty certificate.

技术参数 TECHNICAL FEATURES

类型 Type		两冲程 2 stroke
缸径 Bore		55mm
行程 Stroke		42mm
排气量 Displacement		200CC
功率 Power	(加强型排气管 Premium Muffler)	23HP/8000rpm
	(标准排气管 Standard Muffler)	20HP/7500rpm
压缩比 Compression Ratio		10:1
减速比 Reduction ratio		1:2.7
传动方式 Transmission Type		皮带 Belt
启动方式 Starting Type		电启动 Electrical Start
净重 (除排气管) Net Weight (without muffler)		10.3 Kg
简易排气管重量 Standard Muffler Weight		1.1 Kg
加强型排气管重量 Premium Muffler Weight		2.2 Kg
火花塞 Spark Plug		DLE-8A
汽油 Petrol		93# 、 97#
发电输出 Alternator Output		14V 1A
发选配输出 Premium Alternator Output		14V 4A
螺旋桨 Propeller		1220mm

主要紧固件安装扭矩 Main Torques		Kg.m	n.m
火花塞 Spark Plug	M14	2.4	24
螺旋桨紧固螺丝 Propeller fastening bolts	M8	2.5	25
汽缸紧固螺丝 Cylinder fastening bolts	M6	1	10
曲轴箱紧固螺丝 Crankcase fastening bolts	M6	1.5	15
	M8	2	20
排气口螺丝 Exhaust bolts	M6	1.5	15
偏心轴轴向拉紧螺丝 Eccentric shaft axial tighten bolts	M8	2	20
偏心轴径向固定螺丝 Eccentric shaft radical fixed bolts	M8	2.3	23
化油器紧固螺丝 Carburetor fastening bolts	M5	0.5	5
曲轴前端螺母 Nuts to fix the front part of the crankshaft	M12	4	40
曲轴后端螺母 Nuts to fix the back part of the crankshaft	M10	3.2	32



维修保养记录 MAINTENANCE RECORD:

发动机型号 **Engine Type: DLE200**

发动机编号 **Engine Serial No.:**

购机日期 **Date of Purchase:**

用户姓名 **Customer Name:**

联系电话 **Contact Number:**

通讯地址 **Address:**

经销商 **Distributor:**

联系我们: **Contact us**

电话(Tel): **4001006090**

传真(Fax): **086—0873—6131518**

销售(Sale): **13529826090**

网址(Web): **www.dlpower.net**

电邮(E-mail): **dle@dlengine.com**

地址: 中国云南省红河州弥勒市弥阳工业园区

**Address: Miyang Industry Zone Mile City Honghe Prefecture, Yunnan Province
China.**

弥勒浩翔科技有限公司
Mile HaoXiang Technology Co., Ltd