

## USER GUIDE



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## TECHNICAL DATA

Engine size	.28 (4.59ccm)
Exhaust	Rear
Bore	18.5mm
Stroke	17.0mm
Liner	ABC
Number of ports	8+1 (8x transfer-, 1x exhaust-port)
Crankshaft	13.0mm / SG-Shaft
Crankcase	LRP VTEC.28 Heavy Duty, black coloured
Piston	Fully CNC-machined, high-silicium alloy
Connecting Rod	Fork shaped aluminium using double bushings
Glowplug	LRP Standard style R5 (No. 35050) included
Carburetor	VTEC Competition slide carburetor, 9.0mm venturi, improved design
Power Output*	3.89 PS
Max. RPM*	33.500
Weight	450g

\*Figures may vary depending on used fuel, muffler and tuning.



## WARNING NOTES

- Never leave your RC model unattended when the engine is running. If a fault should occur the result could be a fire in the model which could destroy anything else in the vicinity.
- All nitro engines produce gases which are very dangerous for your health; one of them is carbonium monoxide which can lead to death! Always use your engine outdoors or in well ventilated areas only.
- Nitro engines and their surroundings get very hot. You can seriously burn yourself when you touch them.
- Never try to stop a running engine with your fingers. Pinch the fuel line or close the top of the carburetor.
- Not suitable for children under 14 years, this engine is not a toy.

## FUEL

Never use regular gasoline or airplane fuel. Use fresh 2-stroke model car fuel only! We recommend using our line of LRP high-quality fuels (No. 35710: 25% 1L / No. 35730: 25% 3,5L). For the LRP Z.28R Spec.3 Pullstart engine we recommend a fuel with 25% nitro. A higher nitro content decreases your engine's lifetime. Therefore do never exceed 36% nitro.

## AIRFILTER

A good airfilter is very important for the life of your engine. Never run without an airfilter, as quick and permanent damage will result! Don't forget to impregnate the airfilter with a suitable oil before usage. Carefully clean the airfilter at least after every tenth tank. Replace the airfilter every 3 litres (~1 gallon) of usage. We recommend the use of our LRP Hi-Flow 2-stage airfilter (No. 36560) together with our LRP Hi-Flow airfilter oil (No. 36590).

## GLOWPLUG

Use only standard style glow-plugs for this engine. We recommend using our line of high-quality LRP Platinum / Iridium glowplugs (No. 35030 - No. 35060, available as R3 to R6). Check them frequently and never run with worn-out or old glow-plugs since they could damage your engine. They turn dull when your engine was too lean and should be replaced. They should stay bright like chrome. If the glowplugs wear out too fast, an additional 0.1mm shim between burnroom and liner is recommended. Whenever you have trouble with the engine stalling for no reason, replace the glow-plug first!

**TIP:** Our LRP Team normally uses a LRP Platinum / Iridium R5 (No. 35050) plug for the LRP Z.28R Spec.3 Pullstart engine. Under race conditions, a LRP Platinum / Iridium R6 (No. 35060) plug is used.

Dear Customer,

thank you for your trust in this LRP product. By purchasing a LRP nitro engine, you have chosen a high-performance and highly sophisticated product, which doesn't make any compromise between maximum performance and easy tuneability. We hope you enjoy your new engine.

Please read the following instructions to ensure, that your LRP Z.28R Spec.3 Pullstart engine always works up to your full satisfaction.

**Please read and understand these instructions completely before you use this product! With operating this product, you accept the LRP warranty terms.**

## EXHAUST SYSTEM

Never run without a pipe since this will cause excessive overheating and may damage your engine. A good pipe has a very huge effect on the performance of a 2-stroke engine. For the LRP Z.28R Spec.3 Pullstart, we recommend using our LRP Monstertruck Hi-Performance pipe (No. 36261) for maximum performance.

## HEAD CLEARANCE

We recommend a real head clearance between piston and burnroom of about 0.75mm (0.029") or more, when the piston is at Top Dead Center. The real head clearance can be calculated as follows:

**Real head clearance = Thickness of head shims + 0.65mm (that's due to the internal construction of the engine and the compression of the head shims, when the cooling head is mounted)**

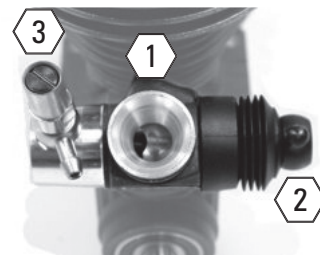
We suggest to start with 0.20mm (0.008") shims underneath the combustion chamber. You may want to adjust the shims depending on nitro-content (see table) or track layout. Large tracks may require an extra 0.10mm (0.004") shim to reach higher topspeed and improved fuel consumption, but this will decrease acceleration slightly.

Nitro content	16%	25%	30%
Real head clearance	0.65 / 0.025"	0.75mm / 0.029"	0.80mm / 0.031"
Head shims	0.00mm / 0.000"	0.10mm / 0.004"	0.15mm / 0.006"

## CARBURETOR

The factory settings of the engine are as following and are a good starting point for you, if you are not satisfied with your carburetor settings. Turn in the needles completely (Caution: Do not overtighten them!) and loosen them the required number of turns again:

- Mid range: **3,75 turns**
- Main: **3,75 turns**

**Idle screw (No.1):**

Adjusts the air flow when carburetor is fully closed. Turn CW for higher idle-speed and CCW for lower idle-speed. Should be open 0.5-1.0mm.

**Mid range needle (No.2):**

Adjusts the mid/low-speed flow rate of the fuel. Turn CW for leaner and CCW for richer setting.

**Main speed needle (No.3):**

Adjusts the main flow rate of the fuel (when the throttle is opened significantly). Turn CW for leaner and CCW for richer setting.

## RUN-IN

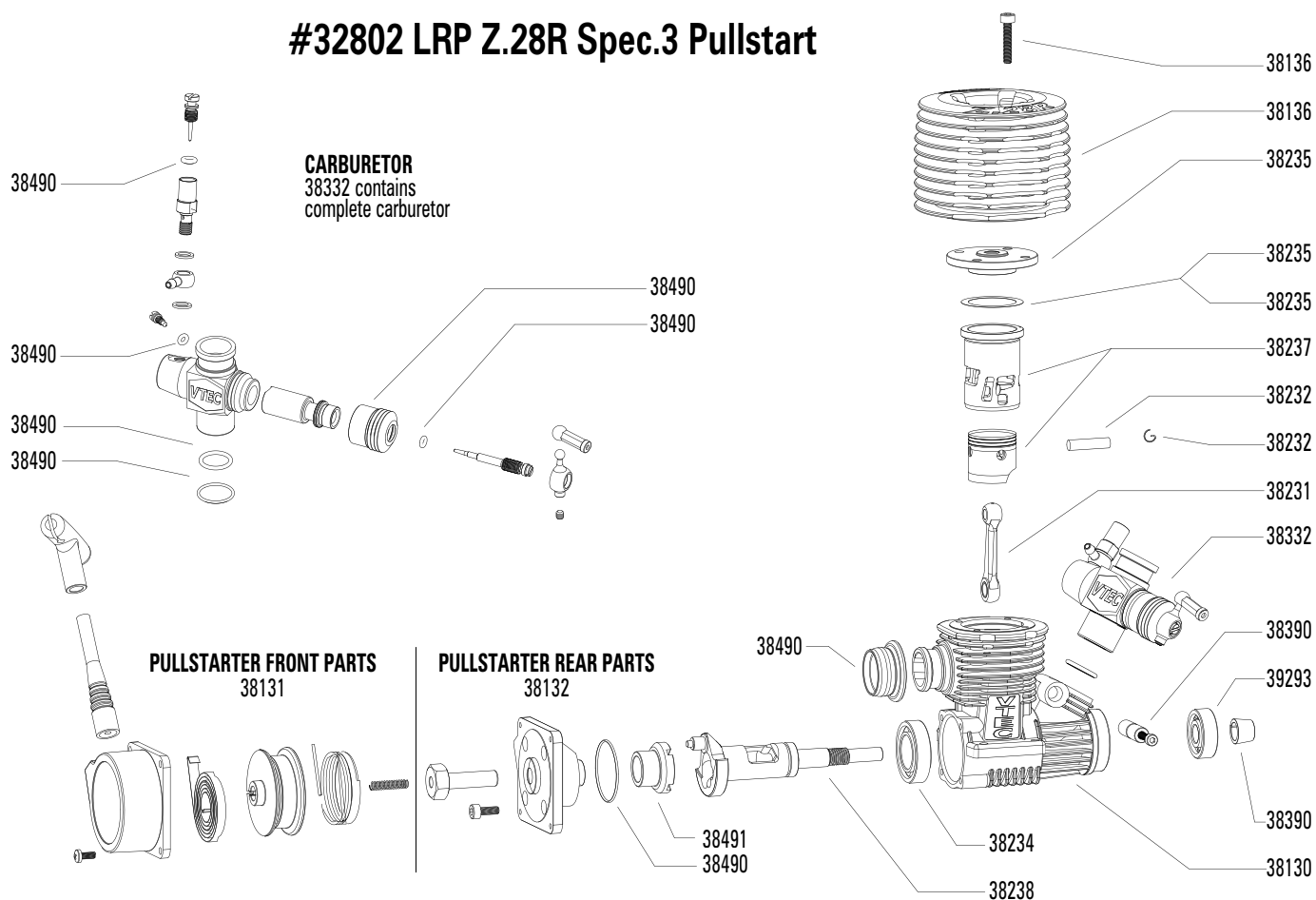
Proper run-in of the engine is a very important step in ensuring that you get the highest performance and lifetime of your engine. Take your time for proper run-in. **Do not use run-in benches, but use your car for run-in.** Use the same fuel as you will be using for the life of the engine. Special run-in fuel is not needed. If your engine doesn't start easily you may try loosen the glow-plug by 1/2-turn to decompress the engine and try again. Don't forget to tighten the glow-plug again once the engine started!

**Procedure:**

- Start the engine and set the main-needle very rich, i.e. excessive smoke coming from the muffler.
- Let the engine idle for 2mins first to warm it up.
- Now start driving your car, it will be slow and sluggish, but this is an important step.
- Do not allow the engine to rev-up too high, run the engine at half speed on the straightaway.
- The engine should not be too cold and not too hot during run-in, 70-90°C (160-195°F) is perfect.
- Let the engine cool down for 15mins after each tank during the run-in period.
- We recommend doing so for 4 tanks of fuel before you start tuning your engine.

# EXPLOSIONSZEICHNUNG / EXPLOSION DRAWING

## #32802 LRP Z.28R Spec.3 Pullstart



# ERSATZTEILE / SPARE PARTS

BEST. NR. ORDER NO.	Artikelbezeichnung spare part description	BEST. NR. ORDER NO.	Artikelbezeichnung spare part description
39293	Z.28R - Front Ball Bearing	38238	Z.28R Spec.3 Pullstart - Crankshaft
38130	Z.28R - Crankcase	38234	Z.28R - Rear Ball Bearing
38237	Z.28R Spec.3 Pullstart - Piston & Sleeve Set	38235	Z.28R - Burn Room & Head Shim Set
38231	Z.28R - Conrod	38390	Z.28R - Various Parts Bag
38232	Z.28R - Wrist Pin & Clips	38490	Z.28R - O-Ring Set
38131	Z.28R - Pullstarter Front Parts	38332	Z.28R Spec.3 Pullstart - Slide Carburetor Set
38132	Z.28R - Pullstarter Rear Parts	38136	Z.28R Spec.3 Pullstart - Cylinder Head Set
38491	Z.28R - Freilauflager Seilzugstarter		

# TUNINGTEILE / OPTION PARTS

BEST. NR. ORDER NO.	Artikelbezeichnung spare part description	BEST. NR. ORDER NO.	Artikelbezeichnung spare part description
36261	Monstertruck Hi-Performance Resorohr	35030	LRP Platinum / Iridium Glowplug R3 - standard style
38134	Z.28R - Rotostart Backplate	35040	LRP Platinum / Iridium Glowplug R4 - standard style
38136	Z.28R - Rotostartaufnahme inkl. Getriebe	35050	LRP Platinum / Iridium Glowplug R5 - standard style
		35060	LRP Platinum / Iridium Glowplug R6 - standard style

## TUNING

It never hurts to have the mixture too rich, but NEVER let the mixture get too lean. Always tune from rich to lean. If in doubt, richen it up first! Never try to tune a cold engine, run 3-5 minutes to get the engine up to running temperature before doing any adjustments!

### Basic tuning procedure is as follows:

1. Set the engine's idle speed up slightly higher than normal.
2. Start tuning your engine with the settings too rich.
3. Always tune main-speed needle (top-end) first.
4. Tune mid-range needle next.
5. Reset idle speed screw.

### Procedure:

1. Set the idle speed so your engine doesn't stall (slightly higher than normal).
2. Go to the track with the main-needle set too rich, there should be heavy smoke coming from the muffler now.
3. Tune the engine by leaning the main-needle 1/8 turn at a time (turn clockwise).
  - Your goal will be that the engine will just reach maximum RPM on the straightaway.
  - Open the main-needle again by an 1/8 turn (turn counter-clockwise) when you have reached that point. This should be the perfect setting for the main-needle (temperature of 110-130°C / 230-266°F).
  - If the main-needle is set too lean, the engine will overheat and will not accelerate smoothly. **If this happens, immediately stop the engine and richen the main-needle (counterclockwise) 1/4 turn before a new attempt.**
4. Adjust the mid-range needle now. Run 3 full laps, stop the car near you and let it idle for 5secs. „Push off“. It should have slightly richened up (idle rpm gets lower), but still accelerate quickly. If it died before the 5secs, check the following:
  - If the rpm constantly decreases and finally the engine stops, the mid-range needle is too rich.
  - If the idle-speed increases during idle, the mid-range needle is too lean.
5. You may have to re-adjust the idle-speed now. If it idles too high, the clutch may not release completely and you will lose „snap“ off the corners. If it idles too low, it may stall at the start, or at the end of the straightaway when you release the throttle.

### Ways to measure the engine temperature:

- Temperature gauge method (recommended): Pull in quickly and immediately take a temperature reading. Place the gauge directly over the engine pointed at the glow plug.
- Spit method: Pull in quickly and immediately put some spit on the engine's head. The spittle should just slowly boil off (2-3secs). It should not dance around as if it were on a hot griddle, nor should it lay there and steam.

## AFTER RUN

Use after-run oil to keep everything lubricated after you have finished your day. After-run oil helps for an easy start the next time and protects your internals against rust. Use only „after-run oil“ specially formulated for R/C engines. Do not use silicone shock oil or similar as they will seriously harm your engine. We recommend to use our LRP After-Run oil (No. 37910), which you should use regularly after using your engine.

### Procedure:

First let the tank run completely empty at idle until it runs out of fuel (try re-starting it several times), next put a few drops down the open carburetor and a few drops down the glow plug hole. Spin it over with the Pullstart at least 5 times and you are done.

## MAINTENANCE

Treat your engine with care and check it frequently. This engine will rev up to 33.500 RPM and any fault at such high RPM can cause serious damage. All moving parts inside the engine are subject to wear, you must know if a piston/liner/conrod has worn out and if they need to be replaced. If you replace one part, please check if everything else is still in good shape at the same time. If you only change one part and other parts are in bad shape, there's the possibility that there will be a new failure soon!

### Some important matters:

- Clean the outside of the engine properly before you open it. Any dust or dirt which gets into the engine could make considerable damage.
- Check the conrod frequently. If you want to replace the conrod, be sure the big end of your crankshaft is still round and at a good size. If not, also replace the crankshaft.
- When you start putting your engine back together, make sure that each part is totally clean before installation and please use some oil (after-run is suited well) to lubricate everything.
- Be careful that each part has its correct direction, especially piston/liner/conrod. Both the lower part of the piston and the lubrication hole in the conrod should be facing to the front (direction to the carburetor).
- Before you install the combustion chamber, please doublecheck that you installed all head shims.
- Use a hex wrench to install the screws. When you start to feel resistance, stop turning the screw. Repeat this for each screw, use the star-technique to tighten all the screws completely. Do not overtighten them!

## TROUBLE SHOOTING GUIDE

PROBLEM	REASON	SOLUTION
Engine does not start	Glow plug defective	- replace glow plug
	Glow plug does not work properly	- check the condition of the glow plug - check the glow plug igniter
	Engine is set too rich (too much fuel, hits back)	- check carburetor settings, repeat tuning procedure - unscrew the glow plug completely and pull the Pullstart 5 times
	Engine is too lean (too little fuel, does not start)	- check carburetor setting, repeat tuning procedure
Engine stops after a short time after glow plug igniter has been disconnected	Engine doesn't suck in the fuel	- check the fuel line for possible damage - check the carburetor setting
	Glow plug defective	- replace glow plug
	Bad fuel	- replace fuel by fresh and correct type of fuel
	Bad carburetor setting	- check the carburetor setting, repeat tuning procedure
	Dirt in fuel line or carburetor	- clean fuel line, clean & check carburetor
Performance decreases after reaching operating temperature or engine stalls from time to time	Fuel line damaged	- replace fuel line
	Loose glow plug or cooling head	- tighten glow plug and/or cooling head
	Air filter old or dirty	- clean or replace air filter
	Engine is set too lean	- check the carburetor setting, repeat tuning procedure
Engine still keeps running at high RPM for a moment when you release the throttle	Glow plug defective or wrong type	- replace the glow plug by a correct type
	Engine runs too hot	- run-in process is not completed
	Shims under comb. chamber wrong	- check number of shims
Engine still keeps running at high RPM for a moment when you release the throttle	Bad carburetor setting	- open mid-range needle ¼ turn at a time and re-adjust idle-speed - set idle speed lower
	Glow plug, wrong type (too hot)	- use glow plug with higher number (e.g. go from 5 to 6)
	Shims under comb. chamber wrong	- check number of shims

## REPAIR PROCEDURES / LIMITED WARRANTY

All products from LRP electronic (hereinafter called "LRP") are manufactured according to the highest quality standards. LRP guarantees this product to be free from defects in materials or workmanship for 90 days from the original date of purchase verified by sales receipt. This limited warranty doesn't cover defects, which are a result of normal wear, misuse or improper maintenance. This applies among other things on:

- Engine disassembly by customer
- Any modification of the engine done by the customer
- Rust inside the engine
- Dust or dirt inside the engine
- Damaged engine due to glow plug failure
- Overheating
- Scratches inside the engine caused by dirt or dust
- Water in fuel
- Wrong break-in procedure
- Damaged piston due to piston stop devices
- Damaged cylinder exhaust port due to piston stop devices
- Breakages at high rpm without engine load

To eliminate all other possibilities or improper handling, first check all other components and the trouble shooting guide before you send in this product for repair or warranty. Products sent in for repair, that operate perfect have to be charged with a service fee.

By sending in this product, you assign LRP to repair the product, if it is no warranty case. The original sales receipt including date of purchase needs to be included. Otherwise, no warranty can be granted. For quick repair- and return service, add your address and detailed description of the malfunction.

Our limited warranty liability shall be limited to repairing the unit to our original specifications. In no case shall our liability exceed the original cost of this unit. Because we don't have control over the installation or use of this product, we can't accept any liability for any damages resulting from using this product. By installing or operating this product, the user accepts all resulting liability.

The specifications like weight, size and others should be seen as guide values. Due to ongoing technical improvements, which are done in the interest of the product, LRP does not take any responsibility for the accuracy of these specs.

### LRP-Distributor-Service:

- Package your product carefully and include sales receipt and detailed description of malfunction.
- Send parcel to your national LRP distributor.
- Distributor repairs or exchanges the product.
- Shipment back to you usually by COD (cash on delivery), but this is subject to your national LRP distributor's general policy.