

# NOVAROSSIR61F-Speed/13

## A classic pattern powerhouse in a tuxedo

In the world of competition model engines, the name Rossi is synonymous with stellar performance. During the 1970's, the Italian Rossi brothers, Cesare and Ugo, developed the venerable Rossi 60 which was widely used in competition circles during the golden era of pattern, better known today as classic pattern. In the mid 80's, the Rossi brothers parted ways and Cesare, the elder brother, started a new company – Novarossi (NR). Cesare and Novarossi eventually developed a more modern and powerful version of the classic pattern Rossi 60 named the NR R60F. This side exhaust (SE) engine was and continues to be an excellent performer. As the 1980's progressed, classic pattern model designs began to use a rear exhaust (RE) engine configuration which allowed the tuned pipe exhaust to be integrated into the model's design. This led to the birth of the NR R61F – the RE sibling to the R60F. Recently, NR has reworked this engine to allow it to produce even more power and turn higher rpm's than its predecessor. This engine, the NR R61F-Speed/13, is the subject of this review.

The R61F-Speed/13 comes in an attractive azzurri blue box which, when opened, reveals an impressive yet refined dark gray and metallic purple engine. The high contrast colors of the outer finish along with the brawny, stout appearance immediately leads one to believe that this is no ordinary rear exhaust specimen. Overall, the engine has a distinctly Italian look to it in the tradition of Ferrari engines, displaying boldness and muscle as well as design finesse and contemporary engineering. Having grown up as a young man during the 80's when the rear exhaust 60-size pattern engine was king, I was very curious to see how this newly engineered Italian brute compared to the powerhouses of yesterday.

### CONSTRUCTION

The crankcase is a heavily finned pressure die-cast aluminum unit with a front end stiffened by four flanges per side. It is relatively short compared to its vintage counterparts and on par with the length of some earlier design 45-size Italian engines. A circular exhaust flange faces rearward from the cylinder, bridging the lower and upper cooling fin sections. The interior of the case is CNC-machined and makes use of typical Schnuerle scavenging with a total of four intake ports; the two required lateral transfer ports and an additional two boost ports in the front of the cylinder.



The single-piece crankshaft is machined from bar stock steel, hardened and finish-ground on all bearing surfaces. The asymmetric counterbalance adopts Novarossi's new turbo flow design concept aimed at maximizing the air/fuel mixture intake. This is the first time I have seen such a forward-thinking asymmetric crankshaft design in a classic pattern engine. Two high-quality stainless steel ball bearings support the crankshaft. The counterbalance design exposes a fair

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amount of the rear bearing assisting in its lubrication.

The engine is of ABC-type construction with a high silicone aluminum piston and a true chrome-plated brass sleeve. The port design on the sleeve is reminiscent of the high performance work typically done on custom competition engines to yield maximum power output. The machined anodized aluminum cylinder head uses a separate glow plug button which provides a true hemispherical squish band-type combustion chamber. A single 0.20mm copper compression gasket seals the head to the cylinder. Additional gaskets are available in various thicknesses to increase or decrease

the compression ratio according to the percentage of nitromethane used. The entire unit is assembled without paper-type sealing gaskets, which are prone to tearing and degradation. Given the single block design, other than the head compression gasket, the only components that need to be sealed to the engine are the back plate and carburetor. Both use silicon O-ring type seals which are easy to maintain and replace.

The Speed/13 is available with two different carburetors having intake bores of 9mm (10401) and 10mm (10405), respectively. They are both of typical rotating barrel design with standard two



### SPECS

**ENGINE:** R61F-Speed/13  
**TYPE:** Single cylinder, front intake, rear exhaust, true ABC piston and sleeve glow engine  
**DISPLACEMENT:** 9.98cc (0.61 cu. in.)  
**BORE X STROKE:** 23mm x 24mm  
**SLEEVE INTAKE PORTS:** 4  
**CRANKSHAFT:** 18mm-M8  
**CARBURETOR:** Aluminum 9mm rotary with in-flight adjustment  
**GLOW PLUG:** NR Standard Special C6S  
**REAR BALL BEARING:** Steel  
**FRONT BALL BEARING:** Steel  
**MAX POWER:** 2.45 bhp @ 18,000 RPM  
**PRACTICAL RANGE:** 2,000-20,500 RPM  
**WEIGHT WITHOUT EXHAUST:** 21.2 oz. (measured)  
**WEIGHT WITH EXHAUST:** 29.2 oz. (measured as tested)  
**FUEL TYPE:** 10% Nitromethane  
**STREET PRICE:** \$219.00

### DIMENSIONS

**OVERALL LENGTH:** 130mm  
**OVERALL HEIGHT:** 115mm  
**OVERALL WIDTH:** 60mm (mount lugs included)  
**HEAD DIAMETER:** 50mm  
**CYLINDER CENTER TO PROP HUB:** 65mm  
**BACK PLATE TO PROP HUB:** 91mm (engine) + 3mm (bolts) = 94mm  
**CRANKCASE WIDTH:** 42mm (at mounting lugs)  
**MOUNTING BOLT SPACING ON LUG:** 25mm  
**LUG LENGTH:** 40mm

### Pros

- > Exceptional performance and power
- > Easy to start and tune
- > Excellent manufacturing quality
- > Rear exhaust configuration

### Cons

- > Operators manual could use improvement

needle mixture adjustments. The review engine was supplied with the 9mm carburetor which features an in-flight servo-controlled high-speed adjustment – a nice classic feature reintroduced in a current production engine.

PERFORMANCE

The engine was initially broken in by running five 8 oz. tanks through it at full throttle (approximately 6 minute runs) keeping the high speed mixture on the rich side. It was easily hand started on all occasions including a first flip start on its first run – impressive! Novarossi recommends the use of 10 percent nitromethane fuel with 20 percent 50/50 castor/synthetic oil content. Morgan Fuels 10 percent Omega was used which has 17 percent oil content and a 30/70 castor/synthetic blend. In order to better meet the manufacturers’ recommendations, the first gallon of fuel had 4 oz. of pure castor oil added, bringing the total oil content close to 20 percent. During the break-in, the engine was fitted with an APC 11x7 prop and we used the recommended standard NR C6S plug which is factory-supplied with the engine.

We also fitted the engine with the supplied, uncut Novarossi fuse top header (40401) and 16-inch-long tuned pipe (50400). This put the total exhaust length at 23 inches from glow plug to stinger or 13.5 inches from the glow plug to the start of the maximum diameter section of the pipe. Considering the Speed/13 is technically a long stroke engine (23mm bore, 24mm stroke), these exhaust lengths are quite aggressive. However, given its high timing design, the shorter tuned exhaust is well-suited to higher revving smaller props. The header was left uncut for all tests which offered a benchmark exhaust length for all performance figures sought.

Since the carburetor has an in-flight high speed adjustment, we were able to meter the fuel mixture remotely via a pushrod. This is extremely convenient and makes for a safe and simple way to adjust the needle valve using the transmitter when the engine is installed in the aircraft. It can also prevent a lean running condition as the fuel level in the tank drops during flight. A series of propellers were mounted to the engine and peak, and idle rpm figures were obtained for each propeller. Testing was done on a sunny early fall day with a temperature of 77°F (25°C), 42 percent relative humidity, barometric pressure of 29.8 inches of mercury and at around 100 ft. (30m) above sea level. The table below summarizes the results.

Test no.	Propeller	Prop Weight	Idle RPM	Max RPM
1	APC 11x7	40 g (1.41 oz.)	2,300	13,380
2	APC 11x9	41 g (1.45 oz.)	2,200	11,900
3	APC 11x10	40 g (1.41 oz.)	2,200	11,490
4	Graupner 11x8	38 g (1.34 oz.)	2,100	13,380
5	Rev-Up 11x7.25	19 g (0.67 oz.)	2,400	14,480*
6	Rev-Up 11x7.50	18 g (0.63 oz.)	2,400	14,460
7	Falcon 11x8	19 g (0.67 oz.)	2,400	14,000
8	Falcon 12x6	23 g (0.81 oz.)	2,350	12,750
9	Xoar 12x8	27 g (0.95 oz.)	2,000	10,950

The weight of each prop was also recorded since their inertial mass (in addition to geometry and design) seemingly affected both the idle speed as well as the top end rpm. After its initial break-in phase of about 40 oz. of fuel, the engine idled very reliably and was capable of ticking over at less than 2,000 rpm with the longer 12x8 Xoar wood



prop. The lighter Rev-Up and Falcon props required a slightly higher idle in order to prevent the engine from sagging and running erratically. Idle speeds of 2,200 to 2,400 rpm were easily sustained with these smaller wood props.

The same lightweight wood props also produced the highest rpm figures with a maximum tachometer reading of 14,480 rpm with the discontinued

Rev-Up 11x7.25. The current production Falcon 11x8 prop was not far behind turning at 14,000 rpm. While we had high expectations from this modern rear exhaust powerhouse, the figures reveal an exceptionally well-performing engine even with a stock, unmodified tuned exhaust system. In fact, the long stroke geometry left us with some doubts as to its ability to turn classic pattern props at such high rpm. Nevertheless, the high-timed Speed redesign of the R61F has produced an extremely flexible engine. The Falcon 11x8 was our preferred prop and we feel this geometry would yield the best overall performance in classic pattern applications.

In the absence of torque measurements, we referred to George Abbott’s excellent discussion on propellers (REF: Model Aviation, October 1986) to compute the engine power. As a function of engine rpm and propeller geometry, it can be expressed as:

hp=PD^4 \* rpm^3 / 1.4 x 10^17

where hp represents brake horsepower (crankshaft power) and P, D and rpm represent the prop pitch, diameter (in inches) and revolutions per minute, respectively.

Using our 11x7.25 Rev-Up performance figure, computed power is 2.30hp (1715W) at 14,480 rpm. This figure is rather impressive and consistent with NR’s stated 2.45hp (1828W) at 18,000 rpm. Such output could in principle be achieved with a 9.5x7.25 prop but would only be useful in pure speed events and not with classic pattern models. More power yet can be expected from the Speed/13 once the exhaust length is fine-tuned to the propeller selected. Higher percentage nitromethane fuel content would also result in an expected higher power output.

THE LAST WORD

The Novarossi R61F-Speed/13 is an exceptional 60-class two-stroke engine. We couldn’t be more impressed with its performance and feel it is one of the best rear exhaust pattern engines to have been brought to market. Its power output and top end rpm puts it into a league of its own and, to our knowledge, there are no vintage stock 60-size RE classic pattern engines that can rival its performance.

It is clear that Mr. Rossi’s insight and expertise with model engines continues growing after more than 40 years in the business. We can only hope that Novarossi continues to innovate and bring their excellent engines to our hobby. If you have a CPA (Classic Pattern Association) pattern design in your build queue this winter which calls for a RE engine, the Speed/13 should be at the top of your list. Upon maiden take-off, you’ll find yourself smiling broadly! 🌟

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