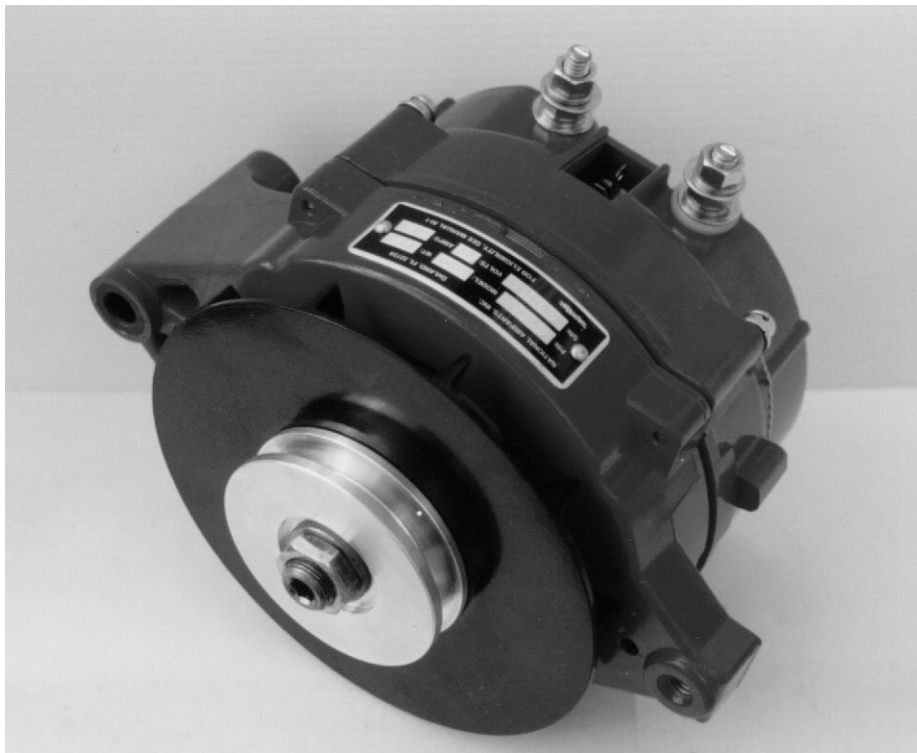


National AirParts

N400 Alternator General Information Manual



Belt and Gear Drive Models 100-200 Amps, 12 and 24 Volt

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1335 Saratoga Street
DeLand, FL 32724

National AirParts, Inc. N400 Alternator Descriptive Data

National AirParts F412/F424-Series N400 alternators utilize the same external case dimensions and mounting configuration as the large-case Ford and Teledyne aircraft alternators. They will directly replace these alternators, as well as most 60-amp Ford/Cessna D0FF10300-series alternators, used on Cessna, Beech, Piper and other general aviation aircraft. National N400 alternators are compatible with standard airframe OEM and aftermarket alternator control units and voltage regulators.

The F412/F424-series alternators are high-reliability, heavy-duty alternators. When installed in place of alternators with a lower output rating capability, their maximum continuous output is limited by the OEM aircraft wiring and output circuit breaker size. They are ideally suited for use as heavy-duty upgrades for Cessna, Beech and Piper aircraft employing the 85-130 amp Electrosystems, Ford or Teledyne alternators, and require no airframe wiring upgrades for such applications. Subject to upgrading of output wiring, output load protection, and driving power parameters, however, they may employed up to their full rated capacities.

National N400 Alternators are produced in the following regular production models:

12-15 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F412R	100		3 x 3/8 inch pulley	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation.	
F412R	100		2.5 x 3/8 inch pulley.	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation.	1

12-15 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F412R	100		3 inch serpentine pulley.	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation.	2
F412R	100		2.5 inch serpentine pulley.	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation	3
F412R	150	HB	3 x 3/8 inch pulley.	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube.	4
F412R	150	HB	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternator. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	5
F412R	150	HB	3 inch serpentine pulley	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternator. Standard for Lycoming installation, optional for TCM installation.	6
F412R	150	HB	2.5 inch serpentine pulley	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	7

12-15 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F412R	200	H3	3 x 3/8 inch pulley.	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube.	8
F412R	200	H3	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	9
F412R	200	H3	3 inch serpentine pulley	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube.	10
F412R	200	H3	2.5 inch serpentine pulley	Large case high-output alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	11

24-28 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424R	100		3 x 3/8 inch pulley	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation.	12

24-28 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424R	100		2.5 x 3/8 inch pulley.	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation.	13
F424R	100		3 inch serpentine pulley.	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation.	14
F424R	100		2.5 inch serpentine pulley.	Large case alternator. Direct replacement for 95-100 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation	15
F424R	130	H	3 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. No cooling blast tube.	16
F424R	130	H	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. No cooling blast tube.	17
F424R	130	H	3 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. No cooling blast tube.	18
F424R	130	H	2.5 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. No cooling blast tube.	19

24-28 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424R	140	HB	3 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	20
F424R	140	HB	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	21
F424R	140	HB	3 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	22
F424R	140	HB	2.5 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	23

24-28 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424R	140	HB	3 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube. Optimized for maximum output at low engine speeds. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	24
F424R	140	HB	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube. Optimized for maximum output at low engine speeds. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	25
F424R	140	HB	3 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube. Optimized for maximum output at low engine speeds. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	26

24-28 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424R	140	HB	2.5 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube. Optimized for maximum output at low engine speeds. Applicable to O&N Aircraft STC # SA01437NY, Cessna 210-Series aircraft.	27
F424R	180	H2	3 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube	28
F424R	180	H2	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	29
F424R	180	H2	3 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube.	30
F424R	180	H2	2.5 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	31

24-28 Volt

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424R	200	H3	3 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube.	32
F424R	200	H3	2.5 x 3/8 inch pulley	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	33
F424R	200	H3	3 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for Lycoming installation, optional for TCM installation. Equipped with cooling blast tube.	34
F424R	200	H3	2.5 inch serpentine pulley.	Large case high-output alternator. Direct replacement for 95-130 amp Cessna/Electrosystems/Ford/Teledyne alternators. Standard for TCM installation, optional for Lycoming installation. Equipped with cooling blast tube.	35

Gear Drive Models, 12-15 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F412G	100		N/A	Large case alternator. Direct replacement for 100 amp Cessna/Electrosystems/Ford/Teledyne gear drive alternator. Retain OEM clutch assembly for use.	36
F412G	150	H	N/A	Large case high-output gear drive alternator. Direct replacement for 100 amp Cessna, Electrosystems, Ford, or Teledyne gear drive alternator. Retain OEM clutch assembly for use. Operation at full alternator output is regulated by clutch and engine drive power capability.	37
F412G	200	H3	N/A	Large case high-output gear drive alternator. Direct replacement for 100 amp Cessna, Electrosystems, /Ford, or Teledyne gear drive alternator. Retain OEM clutch assembly for use. Operation at full alternator output is regulated by clutch and engine drive power capability.	38

Gear Drive Models, 24-28 Volts

P/N	RATING AMPS	MODEL	PULLEY	DESCRIPTION	OPT
F424G	100		N/A	Large case alternator. Direct replacement for 100 amp Cessna/Electrosystems/Ford/Teledyne gear drive alternator. Retain OEM clutch assembly for use.	39
F424G	140	H	N/A	Large case high-output gear drive alternator. Direct replacement for 100 amp Cessna, Electrosystems, Ford, or Teledyne gear drive alternator. Retain OEM clutch assembly for use. Operation at full alternator output is regulated by clutch and engine drive power capability.	40

Note 1: Alternator P/N and Model are for general reference, only. For specific build equipment and normal application, specify the alternator P/N and Option Number.

Note 2: Custom High Altitude variations of all above models are produced as Limited Production Options. These alternators are produced with special brushes rated for operation in excess of 60,000 feet. Alternators with these brushes are indicated by the letter “S” after the Option Number.

Note 3: Letter “M” in place of the Option Number indicates a CUSTOM BUILD APPLICATION. Such units are to be used **ONLY for the intended special application of the original procuring agency.**

Note 4: Alternators are normally clocked in the 3 o'clock position (Alternator viewed from the back, mounting foot at bottom position). For any other clocking, specify requirements when ordering alternator.

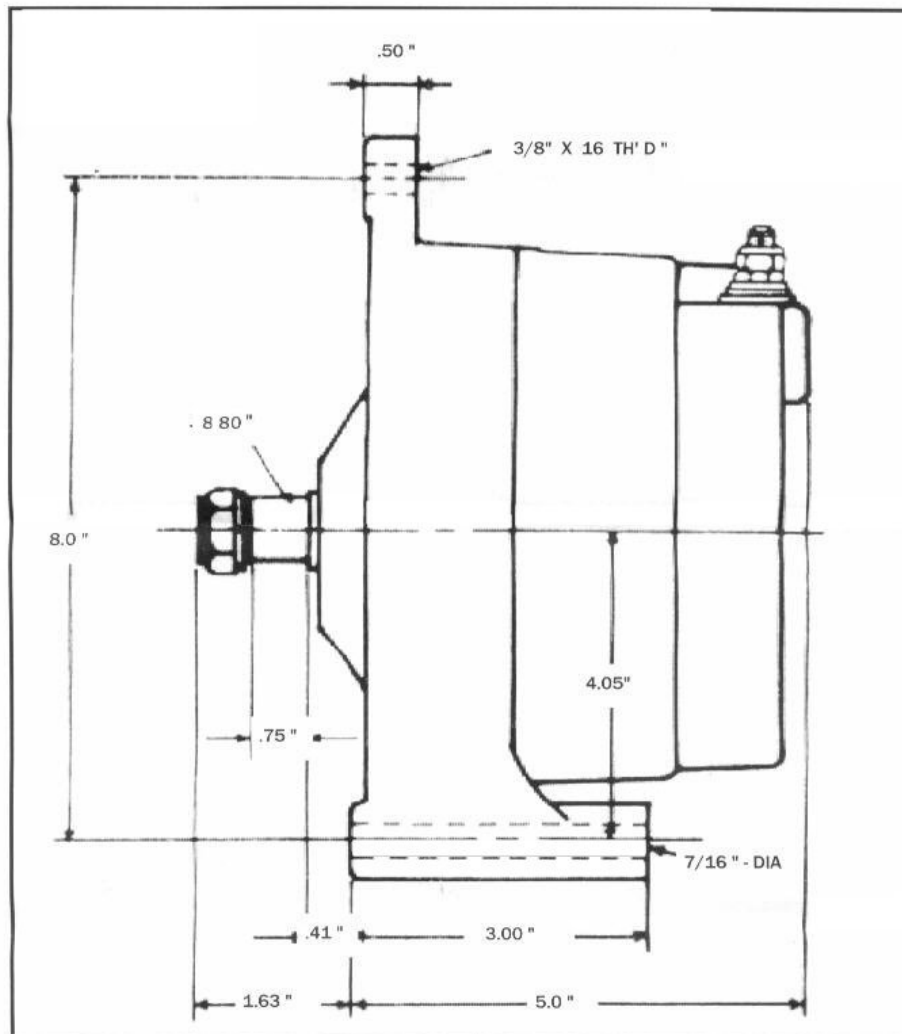
Note 5: Gear drive models produced are identified as Model suffix “G” instead of “R”, i.e. F424G, etc. Gear driven models are supplied **WITHOUT the clutch; OEM clutch, or equivalent, should be retained and used, as required. It should be understood that the rating of the engine alternator drive mechanism, as well as the alternator clutch, should match the alternator rating and power output requirements.**

Note 6: Alternator warranty for both PMA'd and experimental alternators is 2 years or 600 operating hours.

N400 Alternator General Dimensions (Belt-Drive model shown w/o cooling blast tube)

N400 Dimensions

12 VOLT 100 & 150 AMP : 24 VOLT 100 & 140 AMP



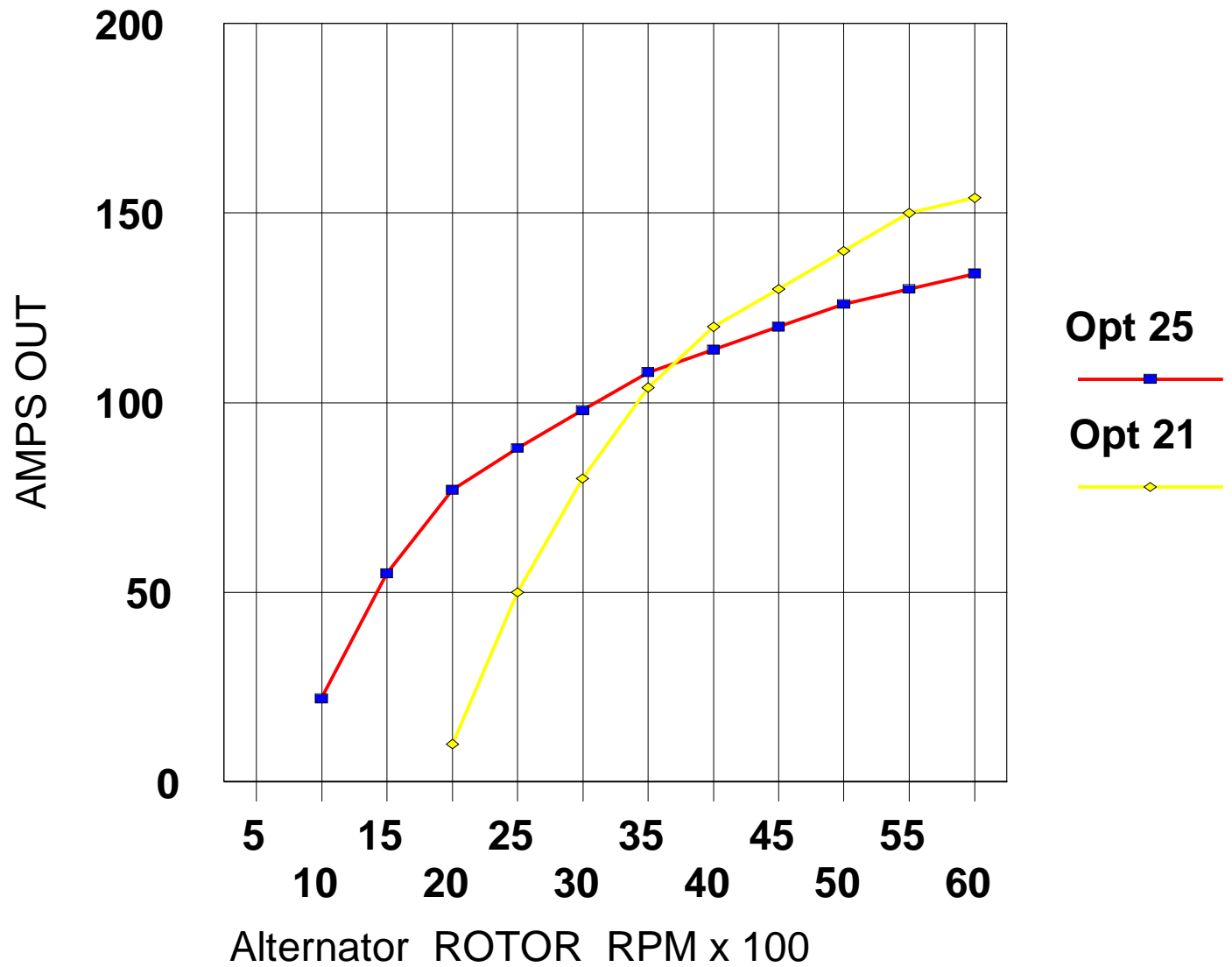
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National AirParts, Inc. N400 General Specifications
(Typical for P/N F424R Option 25 , 24 volt 140 amp
heavy-duty alternator)

FAA-PMA		YES
Rated Voltage		24-28 Volts
Rated Continuous Current Capability		140 Amps
Rated DO NOT EXCEED Current		160 Amps
Operating Speed Range (Rotor Speed)		1,000 – 11,000 RPM
Rotor Speed for Rated Output		5,000 RPM
Pulley O.D.		2.4"
Belt Width		3/8" (preferred) or 25/64"
Recommended Belt Type		Gates 3VX series or equiv.
Field Resistance (Typical)		4.8 to 5.5 Ohms
Recommended ACU		Zeftronics R25400
Drive Type & Rotational Direction		Belt, Bi-Directional
Design Operating Altitude		35,000 ft.
Blast Tube Duct Size		1.5 Inch
Weight		15.9 pounds
Maximum Operating Temperatures:		
	Stator Slot	360 degrees F.
	Stator End Turns	360 degrees F.
	Heat Sink	350 degrees F.
	Bearings (Range)	-50 to + 364 degrees F.
Output Stud Sizes & Type		5/16 – 18 SS
Warranty		2 Years/600 Operating Hours
Parts Available for Field Service		Yes

Typical Power Curves For N400 Alternators, Options 21 and 25

National N400 F424R 28 Volt 140 Amp Alternators



National N400 Installation Notes

1. N400 alternators are normally produced with a “single wire” FIELD connection, suitable for use with a “Type B” alternator control unit.
2. Alternators are compatible with standard ACU’s, although heavy-duty ACU’s such as the Zeftronics items are recommended. The high-output varieties of the N400 will show FIELD currents of 5 to 6 amps at maximum alternator output.
3. In installation, insure that a separate alternator ground wire is connected from the alternator ground terminal to the aircraft engine case/airframe ground. Wire size should be determined by the alternator output current.
4. Insure that the alternator FIELD current is removed during any extended periods of time when the aircraft MASTER switch is ON but the alternator is not operating, such as during aircraft preflight. Unless a “soft start” ACU is utilized, the alternator would needlessly draw excessive current during these conditions. This produces undue wear on alternator brushes, slip rings and the aircraft battery.
5. In general, for use with TCM engines incorporating belt driven alternators, the 2.5” diameter alternator drive pulley is recommended in order to produce additional output at the low engine RPM. If additional output at low engine speeds is required, specify the alternator option maximized for low speed operation. Different pulley configurations are available from the factory for serpentine, dual-belt and other custom installations.
6. For continued airworthiness, the alternator should be inspected and serviced IAW the aircraft OEM 100-Hour Inspection requirements as applicable to an alternator-equipped aircraft. Each 500 hours of operation, or at each Annual Inspection, whichever comes first, alternator maintenance should be performed IAW the National AirParts N400 Inspection and Maintenance Manual.
7. All components for the N400 alternators are available for field service or repair. Parts may be ordered either directly from the factory or from any National AirParts Dealer or FBO. Call (800) 713-1111 for parts requests.

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