DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E6NE
Revision 16

CFS AEROPRODUCTS INC.

ALF502L	ALF502L-3	ALF502R-5
ALF502L-2	ALF502R-3	ALF502R-6
ALF502L-2A	ALF502R-3A	LF507-1H
ALF502L-2C	ALF502R-4	LF507-1F

Date: JANUARY 6, 2021

TYPE CERTIFICATE DATA SHEET NO. E6NE

Engines of models described herein conforming with this data sheet (which is part of Type Certificate No. E6NE) and other approved data on file with the Federal Aviation Administration (FAA), meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: CFS AEROPRODUCTS INC.
2323 East Magnolia Street, Suite 107B
Phoenix, Arizona 85034

TYPE CERTIFICATE OWNERSHIP RECORD: Honeywell International Inc. reissued December 15, 1990
111 South 14th Street
Phoenix, AZ 85034

AlliedSignal reissued December 14, 1999

Textron Lycoming issued January 31, 1995

TYPE

ALF502R-3 High bypass turbofan, geared fan, single-stage supercharger, axial-centrifugal flow high pressure compressor, reverse flow annular combustor, two-stage high pressure turbine, two-stage low pressure turbine.

ALF502R-4 Same as ALF502R-3, but operated at higher thrust.

ALF502R-5 Same as ALF502R-4, with improved first-stage and second-stage turbine nozzle assemblies.

ALF502R-3A Same as ALF502R-3, with gas producer turbine improvements, but operated at higher thrust.

ALF502L High bypass turbofan, geared fan, two-stage supercharger, axial-centrifugal flow high pressure compressor, reverse flow annular combustor, two-stage high pressure turbine, two-stage low pressure turbine.

ALF502L-2 Same as ALF502L with fan blade modification for increased altitude performance.

ALF502L-3 Same as ALF502L-2 with turbine improvements and automatic power reserve features.

ALF502L-2A Same as ALF502L-2 with gas producer turbine improvements and automatic power reserve features.

ALF502L-2C Mechanically identical to ALF502L-2A, but does not include automatic power reserve .

ALF502R-6 Similar to ALF502L-2C, but incorporates ALF502R-5 accessory gearbox.

LF507-1H Mechanically identical to ALF502R-6, but operated at lower, flat-rated thrust.

LF507-1F Mechanically identical to LF-507-1H, but equipped with a single-channel FADEC with hydromechanical backup.

RATINGS (SEE NOTE 1)

I. MODELS:	**ALF502R-3**	**ALF502R-4**	**ALF502R-5**	**ALF502R-3A**	**ALF502L**	**ALF502L-2**	**ALF502L-3**
Sea level static thrust, lbs							
Maximum Continuous	6,300	6,550	- -	- -	7,100	- -	- -
Normal Takeoff (5 min) (Note 19)	6,700	6,970	- -	- -	7,500	- -	- -
Maximum Takeoff (5 min) (Note 19)	6,700	6,970	- -	- -	7,500	- -	- -
II. MODELS:	**ALF502L-2A**	**ALF502L-2C**	**ALF502R-6**	**LF507-1H**	**LF507-1F**		
Sea level static thrust, lbs							
Maximum Continuous	7,100	- -	- -	6,545	- -		
Normal Takeoff (5 min) (Note 19)	7,500	- -	- -	7,000	- -		
Maximum Takeoff (5 min) (Note 19)	7,500	- -	- -	7,000	- -		

COMPONENTS	DESCRIPTION
Fuel control	
Models ALF502R-3/R-4/R-5/R-3A/R-6 / LF507-1H	Hamilton Sundstrand FC 31-23
Models ALF502L/L-2/L-3/L-2A/L-2C	Hamilton Sundstrand FC 31-19
Model LF507-1F	Triumph Engine Control Systems EMC-32R FADEC
High pressure fuel pump	Hamilton Sundstrand 025028-110 or Triumph Engine Control Systems 774959-1
Low pressure fuel pump	2-160-790-08 or equivalent
Ignition system (28-volts DC)	Ignition exciter units (Unison or Champion), completely redundant ignition systems with additional "continuous-on-demand" ignition compatibility
Ignitor plugs	Champion spark plug P/N CH34084 or equivalent
FUEL (See NOTE 2)	ASTMD1655 Jet A, Jet A-1, Jet B, MIL-T-5624J Grades JP-4, JP-5, and JP-8 or equivalent
OIL (See NOTE 3)	MIL-L-7808 and MIL-L-23699 or equivalent

PRINCIPAL DIMENSIONS (nominal, inches)	LENGTH	HEIGHT	WIDTH
Length, nominal, inches			
Models ALF502R-3/R-4/R-5/R-3A	63.657	55.5	47.8
Models ALF502L/L-2/L-3/L-2A/L-2C/R-6/ LF507-1H/1F	65.57	54.5	48.6

WEIGHT (dry pounds, maximum)	Weight includes essential engine accessories but excludes starter, hydraulic pump, integrated drive generator and exhaust nozzle.
Models ALF502L-2A/L2C/L-3	1,375
Models ALF502R-3/R-4/R-5/R-3A	1,336
Models ALF502L/L-2	1,375
Model LF507-1H/ALF502R-6	1,375
Model LF507-1F	1,385

C.G. LOCATION (refer to Engine Installation Instructions)	STA	B.L.	W.L.
Model ALF502R-3/R-4/R-5/R-3A	105.200	100.000	98.250
Models ALF502L/L-2/L-3/L-2A/L-2C/R-6/ LF507-1H/-1F	104.8	100.29	98.6

CERTIFICATION BASIS 14 CFR part 33 effective February 1, 1965, as amended by 33-1/-2/-3A/-4 and Special Condition Number 33-66-NE-1.

MODEL	APPLICATION DATE	TYPE CERTIFICATE ISSUED/AMENDED	TYPE CERTIFICATE CANCELED
ALF502H	10/09/73	06/11/76	01/16/81
ALF502R	06/03/76	06/11/76	01/16/81
ALF502L	02/01/77	02/29/80	
ALF502L-2	02/11/80	02/29/80	
ALF502R-3	10/15/78	01/16/81	
ALF502R-4	10/06/81	04/14/82	
ALF502R-5	10/06/81	07/02/82	
ALF502L-3	10/15/81	11/30/82	
ALF502L-2A	10/14/82	01/07/83	
ALF502R-3A	10/14/82	01/07/83	
ALF502L-2C	07/20/83	08/24/83	
ALF502R-6	06/22/84	12/12/84	
LF507-1H	03/25/91	10/15/91	
LF507-1F	03/25/91	03/20/92	

PRODUCTION BASIS None

NOTES

NOTE 1. Engine ratings are based on calibrated static test stand performance under the following conditions:
Static sea level standard condition at 59°F and 29.92 in. Hg.
No airbleed, no duct losses, no external power extraction.
Engine primary exhaust and fan bypass exhaust system as specified in Figures 3 and 4 of the applicable engine installation instructions.

NOTE 2. Engines will operate satisfactorily with fuel contaminated to the levels specified in Paragraph 4.4.1 of the installation instructions for the LF507-1F engine models, and Paragraph 4.4.3 of the installation instructions for the ALF502R, ALF502L and LF507-1H engine models provided the fuel is introduced to the engine through a filter satisfying the requirements of the subject paragraph.

NOTE 3. Mixing of these oils (MIL-L-7808 and MIL-L-23699) is prohibited.

NOTE 4. Maximum permissible operating speeds for the engine rotors are as follows:

Low Pressure Rotor (N_1) RPM	ALF502 R-3	ALF502 R-4	ALF502 R-5	ALF502 R-3A	ALF502 L	ALF502 L-2	ALF502 L-3	ALF502 L-2A	ALF502 L-2C
Maximum takeoff	7,300	7,350	7,374	- -	7,300	- -	7,374	- -	- -
Normal takeoff	7,300	7,350	7,374	- -	7,300	- -	7,184	- -	7,374
Maximum continuous	7,300	7,350	7,374	- -	7,300	- -	7,374	- -	- -

Low Pressure Rotor (N_1) RPM	ALF502 R-6	LF507-1H	LF507-1F						
Maximum takeoff	- -	- -	- -						
Normal takeoff	- -	- -	- -						
Maximum continuous	- -	- -	- -						

High Pressure Rotor (N_2) RPM	ALF502R -3	ALF502R-4	ALF502R-5	ALF502R-3A	ALF502L	ALF502L -2	ALF502L-3	ALF502L-2A	ALF502L-2C
Maximum takeoff	19,640	- -	19,760	- -	19,640	- -	19,700	- -	19,640
Normal takeoff	19,640	- -	19,760	- -	19,640	- -	19,420	- -	19,640
Maximum continuous	19,380	- -	- -	- -	19,280	- -	- -	- -	- -

High Pressure Rotor (N_2) RPM	ALF502R-6	LF507-1H	LF507-1F						
Maximum takeoff	19,760	- -	- -						
Normal takeoff	19,760	- -	- -						
Maximum continuous	19,380	- -	- -						

NOTE 5. MAXIMUM PERMISSIBLE TEMPERATURES

GAS TEMPERATURE (DEGREES FAHRENHEIT) AS MEASURED BY 10 THERMOCOUPLES MOUNTED BETWEEN THE THIRD TURBINE NOZZLE VANES									
	ALF502 R-3	ALF502 R-4	ALF502 R-5	ALF502 R-3A	ALF502 L	ALF502 L-2	ALF502 L-3	ALF502 L-2A	ALF502 L-2C
Starting maximum (*)	1590	- -	- -	- -	1515	- -	- -	- -	- -
Maximum takeoff (5 min)	1620	1660	- -	- -	1660	- -	1668	- -	1620
Normal takeoff (5 min)	1620	1660	1620	- -	1660	- -	1593	- -	1620
Maximum continuous	1574	1610	1574	- -	1610	- -	1574	- -	- -
Transient for acceleration									
Maximum takeoff (**)	1620	1660	- -	- -	1660	- -	1668	- -	1620
Normal takeoff (**)	1620	1660	1620	- -	1660	- -	1593	- -	1620
(*) Time limit 10 seconds above 1560°F for ALF502R and LF507-1H and 1460°F for ALF502L series									
(**) Time limit 15 seconds above takeoff limit									

GAS TEMPERATURE (DEGREES FAHRENHEIT) AS MEASURED BY 10 THERMOCOUPLES MOUNTED BETWEEN THE THIRD TURBINE NOZZLE VANES								
ALF502R-6	LF507-1H							
Starting maximum (*)	1590	- -							
Maximum takeoff (5 min)	1660	1660							
Normal takeoff (5 min)	- -	- -							
Maximum continuous	1574	- -							
Transient for acceleration									
Maximum takeoff (**)	1660	1660							
Normal takeoff (**)	- -	- -							
(*) Time limit 10 seconds above 1560°F for ALF502R and LF507-1H and 1460°F for ALF502L series									
(**) Time limit 15 seconds above takeoff limit									

EXHAUST GAS TEMPERATURE (DEGREES FAHRENHEIT) AS MEASURED BY 16 THERMOCOUPLE PROBES								
LF507-1F								
Starting maximum (*)	1,360							
Maximum takeoff (5 min)	1,169							
Normal takeoff (5 min)	1,169							
Maximum continuous	1,136							
Transient for acceleration								
Maximum takeoff (**)	1,169							
Normal takeoff (**)	1,169							
(*) For LF507-1F time limit 10 seconds above 1315°F								
(**) For LF507-1F time limit 15 seconds above takeoff limit								

NOTE 5. MAXIMUM PERMISSIBLE TEMPERATURES (continued)

OIL TEMPERATURES / MAXIMUM / DEGREES FAHRENHEIT

ALF502 R-3	ALF502 R-4	ALF502 R-5	ALF502 R-3A	ALF502 L	ALF502 L-2	ALF502 L-3	ALF502 L-2A	ALF502 L-2C
271**	- -	- -	- -	290*	- -	- -	- -	- -

* Transient oil temperatures as high as 340°F can be experienced when undergoing a power reduction. Recovery to acceptable oil inlet temperature should occur after two minutes steady-state operation.

** Transient oil temperatures as high as 320°F can be experienced when undergoing a power reduction. Recovery to acceptable oil inlet temperature should occur after two minutes steady-state operation.

OIL TEMPERATURES / MAXIMUM / DEGREES FAHRENHEIT								
ALF502 R-6	LF507-1H	LF507-1F						
271**	- -	- -						

* Transient oil temperatures as high as 340°F can be experienced when undergoing a power reduction. Recovery to acceptable oil inlet temperature should occur after two minutes steady-state operation.

** Transient oil temperatures as high as 320°F can be experienced when undergoing a power reduction. Recovery to acceptable oil inlet temperature should occur after two minutes steady-state operation.

ACCESSORY TEMPERATURE LIMITS / ALL MODELS

Additional accessory temperature data are specified in Table III of the LF507-1H engine model installation instructions, and Table IV of the applicable installation instructions for other ALF502/LF507 engine models.

	AMBIENT OR SURFACE TEMPERATURE	DEGREES FAHRENHEIT
Fuel control assembly	Ambient	260
Overspeed fuel shut-off valve	Ambient	200
Ignition unit	Ambient	250
Overspeed control	Surface	212
Fuel manifold	Surface	390
Interstage bleed actuator	Ambient	350
Anti-icing valve	Ambient	350
Fan speed sensor	Surface	400
Electronic control unit	Ambient	185 (*)

(*) The electronic control unit (ECU) can operate continuously in an ambient temperature range of minus 65°F to plus 185°F. In addition, the ECU can operate for up to 5 minutes at a maximum transient temperature of 212°F.

NOTE 6. FUEL AND OIL PRESSURE LIMITS / ALL MODELS

	ALF502 R-3	ALF502 R-4	ALF502 R-5	ALF502 R-3A	ALF502 L	ALF502 L-2	ALF502 L-3	ALF502 L-2A	ALF502 L-2C
Fuel									
Maximum (psig)	35	- -	- -	- -	- -	- -	- -	- -	- -
Minimum (*)		- -	- -	- -	- -	- -	- -	- -	- -
	(*) True fuel vapor pressure plus 5 psi								
Oil (psig)									
Sea level (*)	97±10	- -	- -						
Ground idle	25	- -	- -						
	(*) At maximum continuous power and above plus 5 psi								
	ALF502 R-6	LF507 1H	LF507 1F						
Fuel									
Maximum (psig)	- -	- -	- -						
Minimum (*)	- -	- -	- -						
	(*) True fuel vapor pressure plus 5 psi								
Oil (psig)									
Sea level (*)	- -	- -	- -						
Ground idle	- -	- -	- -						
	(*) At maximum continuous power and above plus 5 psi								

NOTE 7.

ACCESSORY DRIVE PROVISIONS

ALF502L, L-2 / L-3 / L-2A / L-2C / R-3 / R-3A/ R-4 / R-5 / R-6 models
ALF507-1H / -1F models.
Maximum accessory power extraction (shp) is shown in installation instructions paragraph 4.1.2., Figures 12.

ACCESSORY DRIVES FOR ALF502R-3 / R-4 / R5- / R-3A / R-6 / LF507-1H / -1F

DRIVE	TYPE	ROTATION FACING ENGINE PAD	SPEED	T_c	T_s	T_o	T_{st}	T_{mt}	MAXIMUM OVERHANG MOMENT (lb-in)
Starter	Special (1)	CW	0.8621(2)	---	855	---	246	---	200
Hydraulic Pump	AND2000-1X1B (MOD)	CCW	0.253(2)	300	---	855	234	590	150
IDG/CSD (3)	AS970A-13V (MOD)	CW	0.458(2)	---	---	1596	505		1200

(1) Details of pad type and design are available in Table III and in the installation drawings of the applicable engine installation instructions.
(2) Speed of the drive – is equal to the constant provided multiplied by the engine high pressure rotor (N_2) speed.
(3) IDG/CSD pad rating is 96 shp at any engine speed

CW = clockwise
CCW = counterclockwise
T_c = continuous torque rating (lb-in)
T_s = static torque rating (lb-in)
T_o = overload torque rating (5 minutes lb-in)
T_{st} = shock torque rating (lb-ft)
T_{mt} = normal maximum torque (20 seconds lb-in)

NOTE 7. (CONTINUED)

ACCESSORY DRIVES FOR ALF502L / L-2 / L-3 / L-2A / L-2C

DRIVE	SPECIFICATION (8)	TYPE	ROTATION FACING ENGINE PAD	GEAR RATIO (6)	CONT (1)	EMERGENCY	IMPACT (5)
Starter	AND20002-XII-D	MODIFIED	CCW	0.458	1200 (4)	- -	4000
Boost Pump	SPECIAL		CCW	0.214	70	- -	1000
Power Takeoff	AS970A-13V	MODIFIED	CW	0.458	(9)	1120 (2) 1541 (3)	4000
Hydraulic Pump	AND20001-X1-B	MODIFIED	CCW	0.253	(9)	227 (7)	1250

(1) Max permissible continuous torque at any engine speed (lb-in)
(2) Max permissible torque for 10 minutes, (in-lb)
(3) Max permissible torque for 7 seconds, (in-lb)
(4) Max peak torque during starting cycle
(5) Max impact torque (in-lb)
(6) Relative to N_2 speed
(7) Maximum permissible torque for 10 minutes (lb-in). Power takeoff pad not to exceed 560 in-lb at this condition.
(8) See specification for overhang moment
(9) Continuous power extraction capability under all operating conditions is as follows:
Power takeoff: 60 shp
Hydraulic pump pad: 5 shp
(10) See Installation Drawing

NOTE 8. For in-flight operation in icing conditions, the minimum permissible N_2 rpm is 67%. However, momentary N_2 excursions down to 60%, not exceeding 60 seconds duration, are permissible within 300 feet above ground level (AGL) during final approach to landing.

NOTE 9. Engine starting torque and speed requirements are shown in Figure 7 of the applicable engine installation instructions.

NOTE 10. These engines meet the fire prevention requirements of Special Condition No. 33-66-NE-1 providing the compartment ventilation design requirements of Paragraph 4.6.2, 4.6.2.1, and 4.6.2.2 of the applicable engine installation instructions are met.

NOTE 11. Customer bleed air extraction limits are shown in Paragraph 4.9 of the ALF502L/L-2/L-3/ L-2A/L-2C installation instructions and Paragraph 3.1.1 of the ALF502R-3/R-4/R-5/R-3A/ R-6/LF507-1H/-1F installation instructions.

NOTE 12. Fuel venting; emission control is not included on these engines and therefore airframe compliance must be provided in accordance with SFAR-27 (superceded by part 34).

NOTE 13. These engines may use approved type fuels separately or mixed in any proportion. Fuel control adjustments are not required when switching fuel types. Fuel additives and concentrations by volume approved for use in fuels for these engines are provided in the applicable engine manual.

NOTE 14. Certain engine parts are life limited. For ALF502R-3/R-4/R-5/R-3A and R-6, these limits are listed in the manufacturer's Service Bulletin No. ALF502-72-0002. For the ALF502L/L-2/L-3/L-2A and L-2C, they are listed in Service Bulletin No. ALF502-72-0004. For model LF507-1H, they are listed in Service Bulletin No. LF507-1H-72-2. For model LF507-1F, they are listed in Service Bulletin No. LF507-1F-72-2.

NOTE 15. Overhaul and hot end inspection intervals for models ALF502R-3/R-4/R-5/R-3A and R-6 are specified in the manufacturer's Service Bulletin No. ALF502-72-0001. For models ALF502L/L-2/L-3/L-2A and L-2C, they are specified in Service Bulletin No. ALF502-72-0005. For model LF507-1H, they are specified in Service Bulletin LF507-1H-72-1. For model LF507-1F, they are specified in Service Bulletin LF507-1F-72-1.

These Time Between Inspection/Time Between Overhaul Service Bulletin Nos. ALF502-72-0001/LF507-1F-72-1/LF507-1H-72-1 do not apply to FAA approved continuous airworthiness maintenance programs developed in accordance with FAA Maintenance Review Board procedures; e.g. Maintenance Steering Group III Analysis.

NOTE 16. Deleted.

NOTE 17. The ALF502L, L-2, L-3, L-2A, L-2C, R-3, R-4, R-5, R-3A, R-6 and LF507-1H and -1F models comply with the windmill test requirement of part 33.92, Amendment 9, up to a N_1 of 2,000 rpm and a N_2 of 3,420 rpm.

NOTE 18. ALF502L, L-2, L-3, L-2A, L-2C, R-3, R-4, R-5, R-3A, R-6, and LF507-1H and 1F models comply with the instrument connection requirement of part 33.29, Amendment 5.

NOTE 19. A thrust setting limited to 7,800 lbs. (ALF502L-3 and ALF502L-2A) static thrust at sea level, has been established as maximum takeoff thrust rating. A thrust setting limited to 7,500 lbs. (ALF502L-3, ALF502L-2A, and ALF502L-2C) static thrust at sea level, has been established as normal takeoff thrust rating for normal takeoff operation.

When the automatic reset mechanism in the fuel control is utilized, operation to the normal takeoff rating operating limits will insure the maximum takeoff rating operating limits are not exceeded when the reset mechanism is actuated.

The time limit at the maximum takeoff rating is five minutes and shall include any time accumulated above the normal takeoff rating.

NOTE 20. For the ALF502R-5 and ALF502R-3A: A thrust setting limited to 6,970 lbs. static thrust at sea level flat rated to 71°F with a maximum MGT of 1660°F has been established as a maximum takeoff thrust rating. A thrust setting limited to 6,970 lbs. static thrust as sea level flat rated to 59°F with a maximum MGT of 1620°F has been established as the normal takeoff rating for normal operation of this model.

For the LF507-1H: A thrust setting limited to 7,000 pounds static thrust at sea level flat rated to 85°F with a maximum MGT of 1660°F has been established as the maximum takeoff thrust rating. A thrust setting limited to 7,000 pounds static thrust at sea level flat rated to 74°F with a maximum MGT of 1620°F has been established as the normal takeoff rating for normal operation of this model.

For the LF507-1F: A thrust setting limited to 7,000 pounds static thrust at sea level flat rated to 74°F with a maximum EGT of 1169°F has been established as the normal takeoff rating for normal operation of this model.

NOTE 21. The LF507-1F in the manual backup control mode operating configuration is in compliance with the Certification Basis defined herein, when operated in accordance with the instructions contained in the approved manufacturers operating instructions for Part Number 2-003-040-15.

….END….