

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

4A22 Revision 13 LOCKHEED 188A 188C October 25, 2001

TYPE CERTIFICATE DATA SHEET NO. 4A22

This data sheet which is a part of type certificate No. 4A22 prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the Civil Air Regulations.

Type Certificate Holder Lockheed Martin Corporation
Lockheed Martin Aeronautics Company
86 South Cobb Drive
Marietta, Georgia 30063-0655

I. - Model 188A (Transport Category), Approved August 22, 1958 (See NOTE 6)

- Engines 4 Allison 501-D13 or 501-D13A (used with Ham. Std. prop)
Turboprop with 13.54:1 reduction gear ratio (See NOTE 6.)
- Fuel Kerosene (Allison Spec EMS 64C) or JP4 (MIL-F-5624C) See NOTE 1(e)(4).
- Lubricating Oil Allison Spec EMS-35E or EMS-53
- Engine Limits Takeoff (5 minutes) at Sea Level, Equivalent shaft hp, shaft hp., jet thrust,
rpm: 3750-3460-726-13820
Maximum continuous at Sea Level, Equivalent Shaft hp, shaft hp., jet thrust,
rpm: 3420-3138-705-13820
The above ratings are based on static Sea Level conditions, compressor inlet
air (dry) 59°F, 29.92 in. Hg., no external accessory loads and no air bleed.
Maximum permissible temperatures:
Turbine Inlet Gas Temperature, Takeoff: 1780°F (971°C)
Max. Cont: 1710°F (932°C)
Maximum Transient (not to exceed 2 sec.) 2040°F (1116°C)
Oil Inlet Temperature, minus 25°F (-32° C) minimum, 185°F (85°C) maximum except
for 212°F (100°C) maximum at Flight Idle and below and for 5 minutes above
Flight Idle.
The maximum allowable power as measured by the torquemeter for below standard inlet
air temperature and/or ram conditions is 4000 hp for takeoff and 3400 hp for maximum
continuous.

- Propeller and Propeller Limits (1) 4 Aero Products A6441 FN-606 Hydromechanical
Diameter: 13 feet 6 inches. No reduction in diameter permitted.
Single rotation four blade assembly with gov. speed setting of 1020 p.r.p.m.
(13,820 e.r.p.m.) Propeller assembly is complete with spinner, feathering and
reversing provisions, selective pitch control, negative torque control,
synchronizer, blade phase control and electrical ice control.
Hyd. low pitch stop (min. Flight Idle) +20.0°, start +7.0°, reverse -4.0°, feather
+94.9° +0.1° -0.2°, beta follow-up +32.0°, mech. low pitch stop +18.25°, ground
idle + 1.5°.
Blade station at which angles are measured is 42°R.
Ground Limitation:
"Avoid continuous operation of propellers on the ground below 9,900 engine
RPM for low RPM idle and above 14,530 engine RPM for overspeed fuel governor
checks."
(2) 4 Hamilton Standard, hubs 54H60, blades A-7109B-2 or A-7121B-2,
electro-hydromatic

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Diameter: 13 feet 6 inches
 Single rotation four blade assembly with gov. speed setting of 1020 p.r.p.m.
 (13,820 e.r.p.m.)
 Propeller assembly is complete with spinner, feathering and reversing provisions, selective pitch control and negative torque control, synchronizer and blade phase control, and electrical ice control.
 Hyd. low pitch stop (min. Flight Idle) +11.0°, start 0°, reverse 15.0°, feather 86.65° ± .10°, beta follow-up 22.5°, mechanical low pitch stop 12.0° ground idle -6.0°.
 Blade station at which angles are measured is 54°R.

Propeller Hydraulic Oil

- (1) Aeroproducts Propeller -AMS/1-40002
 (2) Hamilton Standard, Propeller -HIL-H-6083B
 Type 1 Hyd. Fluid

Airspeed Limits
(Calibrated)

Vno (normal operation)	373 mph (324 knots)
S.L. to 12000 ft. Above 12,000 ft. M = .615	
Vne (never exceed)	418 mph (364 knots)
S.L. to 8000 ft. Above 8000 ft. M = .640	
Va (maneuvering)	234 mph (203 knots)
Vf (takeoff position 78%)	218 mph (190 knots)
Vf (landing position 100%)	196 mph (170 knots)
Vlo (landing gear operation)	218 mph (190 knots)
Vle (landing gear extended)	250 mph (217 knots)
Vmc (minimum control)	127 mph (110 knots)
Landing light extension	300 mph (261 knots)
Mach no. - never exceed, M = .64	

C. G. Range

See NOTE 1(b) for required loading and gear retraction moment.

Condition	Weight lb.	Landing Gear	Fwd		Limit	
			.Sta.	% MAC	Aft. Sta.	% MAC
Takeoff	113,000*	Down	583.2	22.1	599.9	32.0
	77,410* or less	Down	571.2	15.0	599.9	32.0
Landing	95,650*	Down	577.3	18.6	599.9	32.0
	77,410* or less	Down	571.2	15.0	599.9	32.0
Cruising	113,000*	Up	579.0	19.6	601.6	33.0
Flight	77,410* or less	Up	566.1	12.0	601.6	33.0

* Straight line variation between these values

Weight Limits

Landing: 95,650 lb.
 Takeoff: 113,000 lb. (dump valves are required)
 Maximum zero fuel weight:
 Serial Nos. 1001 through 1034 82,500 lb.
 Serial Nos. 1035 and up 86,000 lb.
 See NOTE 1(e) for fuel loading.
 3 engine ferry weight 95,000 lb.

Minimum Crew

3: Pilot, Copilot and Flight Engineer.

Maximum Passengers

99 (CAR 4b.362 as amended to 12-31-53 and supplemented by CAA letter dated January 22, 1957.) See Approved Weight and Balance Report for actual number and location.

Maximum Baggage

Maximum capacity of internal baggage and storage compartments:

	Vol. (cu. ft.)	Max. floor Loading psf	Capacity (lb.)	Compt. C.G.
(A) Fwd. Cargo Compt. F.S., 201 to 417	254	45	3810	313
(B) Aft. Cargo Compt. F.S., 768 to 1005	270	45	4050	885
Carry-on baggage L.H. (entrance)	54	30		386

Carry-on baggage R.H. (entrance)	54	30	352
Wash water			375.0
			569.9

Galley area between Stations 805.5 and 908.5 and 10" from airplane centerline R.H. side is structurally satisfactory for a maximum total load of 1600 pounds, with a maximum unit floor loading of 45 pounds per square foot.

Maximum Fuel Quantity See NOTE 1(c) regarding "Unusable fuel and system oil" and fuel density accounting.

	<u>Usable Fuel</u>		<u>Total Fuel</u>		
	<u>Quantity</u>		<u>Quantity</u>		
Tanks 2 & 3 (Inb'd)	7370 lb. ea.	(1100 gal. ea.)	7404 lb.	(1105 gal. ea.)	(+628.4)
Tanks 1 & 4 (Outb'd)	<u>11122 lb. ea.</u>	<u>(1660 gal. ea.)</u>	<u>11135 lb.</u>	<u>(1662 gal. ea.)</u>	<u>(+605.7)</u>
Total	36984	5520	37078	5534	

For aircraft with extended inboard tank capacity (optional)

	<u>Usable Fuel</u>		<u>Total Fuel</u>		
	<u>Quantity</u>		<u>Quantity</u>		
Tanks 2 & 3 (Inb'd)	10720 lb. ea.	(1600 gal. ea.)	10754 lb.	(1605 gal. ea.)	(+625.1)
Tanks 1 & 4 (Outb'd)	<u>11122 lb. ea.</u>	<u>(1660 gal. ea.)</u>	<u>11135 lb.</u>	<u>(1662 gal. ea.)</u>	<u>(+605.7)</u>
Total	43684	6520	43778	6534	

Oil Capacity See NOTE 1(c) regarding "Unusable fuel and system oil."

	<u>Usable Oil</u>		
2 Inboard tanks	7.6 gal. ea.	60.8 lb.	(+477.0)
2 Outboard tanks	<u>7.6 gal. ea.</u>	<u>60.8 lb.</u>	<u>(+486.0)</u>
Totals	30.4	243.2	

Maximum Operating Altitude 30,000 ft. and 25,000 ft.

See NOTE 5 for requirement relative to operation above 25,000 ft.

Other Operating Limitations Aircraft shall be operated in compliance with the operating limitation specified in the FAA approved Airplane Flight Manual.

<u>Control Surface Movements</u>	Main surfaces (boost on)	Elevator	30°	Up	15°	Down
		Aileron	25°	Up	15°	Down
		Rudder	30°	Right	24°	Left
	Tabs (Main surfaces in neutral)	Elevator	5°	Up	25°	Down
		Aileron	20°	Up	20°	Down
		Rudder	25°	Right	25°	Left
	Flaps	40° total angular travel				

Serial Nos. Eligible 188A/1001, 188A/1002, 188A/1004 through 188A/1070, 188A/1072 through 188A/1074, 188A/1076, 188A/1079, 188A/1081, 188A/1083, 188A/1084, 188A/1086, 188A/1087, 188A/1089, 188A/1090, 188A/1092 through 188A/1097, 188A/1099, 188A/1100, 188A/1102, 188A/1104, 188A/1106, 188A/1107, 188A/1114 through 188A/1129, 188A/1140, 188A/1143, 188A/1145, 188A/1146, 188A/1148

II. - Model 188C (Transport Category), approved July 10, 1959. (Same as Model 188A except that wings, fuselage and nose landing gear have been reinforced to provide for a takeoff weight increase from 113,000 to 116,000 lb.)

(See NOTE 6.)

Engines

4 Allison 501-D13 or 501-D13A (used with Ham. Std. prop)
Turboprop with 13.54:1 reduction gear ratio (See NOTE 6).

Fuel

Kerosene (Allison Spec EMS 64C) or JP4 (MIL-F-5624C)
See NOTE 1e)(4).

Lubricating Oil

Allison Spec EMS-35E or EMS-53

Engine Limits

Takeoff (5 minutes) at Sea Level, Equivalent shaft hp., shaft hp., jet thrust,
rpm 3750-3460-726-13820

Maximum continuous at Sea Level, Equivalent shaft hp., shaft hp., jet thrust,
rpm 3420-3138-705-13820

The above ratings are based on static Sea Level conditions, compressor inlet air
(dry) 59°F, 29.92 in.Hg., no external accessory loads and no air bleed.

Maximum permissible temperatures:

Turbine inlet Gas Temperature, Takeoff: 1780°F (971°C)

Max. Cont: 1710°F (932°C)

Maximum Transient (not to exceed 2 sec.) 2040°F (1116°C)

Oil Inlet Temperature, minus 25°F (-32°C) minimum, 185°F (85°C) maximum
except for 212°F (100°C) maximum at Flight Idle and below and for 5 minutes
above Flight Idle.

The maximum allowable power as measured by the torquemeter for below standard
inlet air temperature and/or ram conditions is 4000 hp for takeoff and 3400 hp for
maximum continuous.

Propeller and Propeller Limits

(1) 4 Aero Products A6441 FN-606 Hydromechanical
Diameter: 13 feet 6 inches. No reduction in diameter permitted.
Single rotation four blade assembly with gov. speed setting of 1020 p.r.p.m.
(13,820 e.r.p.m.) Propeller assembly is complete with spinner, feathering and
reversing provisions, selective pitch control and negative torque control,
synchronizer and blade phase control, and electrical ice control.
Hyd. low pitch stop (min Flight Idle) +20.0°, start + 7.0°, reverse -4.0°, feather
+ 94.9° -0.1°, -0.2°, beta follow-up +32.0°, mech. low pitch stop +18.25°, ground
idle +1.5°.
Blade station at which angles are measured in 42"R.
Ground limitation:
"Avoid continuous operation of propellers on the ground below 9,900 engine RPM
for low RPM idle and above 14,530 engine RPM for overspeed fuel governor
checks."

(2) 4 Hamilton Standard, hubs 54H60, blades A-7109B-2 or A-7121B-2,
electrohydromatic
Diameter: 13 feet 6 inches
Single rotation four blade assembly with gov. speed setting of 1020 p.r.p.m.
(13,820 e.r.p.m.)
Propeller assembly is complete with spinner, feathering and reversing provisions,
selective pitch control and negative torque control, synchronizer and blade phase
control, and electrical ice control.
Hyd. low pitch stop (min. Flight Idle) +11.0°, start 0°, reverse -13.0°, feather
86.65° ± .10°, beta follow-up 22.5°, mechanical low pitch stop 12.0° ground
idle -6.0°.
Blade station at which angles are measured is 54"R.

Propeller Hydraulic Oil

(1) Aeroproducts Propeller -AMS/1-40002
(2) Hamilton Standard, Propeller -MIL-H-6083B
Type 1 Hyd. Fluid

<u>Airspeed Limits</u> (Calibrated)	Vno (normal operation)	373 mph (324 knots)
	S.L. to 12000 ft. Above 12,000 ft. M = .615	
	Vne (never exceed)	418 mph (364 knots)
	S.L. to 8000 ft. Above 8000 ft. M = .640	
	Va (maneuvering)	237 mph (206 knots)
	Vf (takeoff position 78%)	218 mph (190 knots)
	Vf ((landing position 100%))	196 mph (170 knots)
	Vlo (landing gear operation)	218 mph (190 knots)
	Vle (landing gear extended)	250 mph (217 knots)
	Vmc (minimum control)	127 mph (110 knots)
Landing light extension	300 mph (261 knots)	
Mach no. - never exceed, M = .64		

C. G. Range

(See NOTE 1(b) for required loading and gear retraction moment.)

Condition	Weight lb.	Landing Gear	Fwd Sta.	Limit % MAC	Aft. Sta.	Limit % MAC
Takeoff	116,000*	Down	584.2	22.7	598.2	31.0
	115,500*	Down			599.9	32.0
	77,410*	Down	571.2	15.0	599.9	32.0
	or less					
Landing	95,650*	Down	577.3	18.6	599.9	32.0
	77,410*	Down	571.2	15.0	599.9	32.0
	or less					
Cruising	116,000*	Up	580.0	20.2	601.6	33.0
Flight	77,410*	Up	566.1	12.0	601.6	33.0
	or less					

* Straight line variation between these values

Weight Limits

Landing 95,650 lb.

Takeoff 116,000 lb. (Dump valves are required)

Maximum zero fuel weight 86,000 lb. See NOTE 1(e) for fuel loading. 3 engine ferry weight 95,000 lb.

Minimum Crew

3. Pilot, Copilot and Flight Engineer.

Maximum Passengers

99 (CAR 4b.362 as amended to 12-31-53 and supplemented by CAA letter dated January 22, 1957.) See Approved Weight and Balance Report for actual number and location.

Maximum Baggage

Maximum capacity of internal baggage and storage compartments:

	Vol. (cu. ft.)	Max. floor Loading psf	Capacity (lb.)	Compt. C.G.
(A) Fwd. Cargo Compt. F.S., 201 to 417	254	45	3810	313
(B) Aft. Cargo Compt. F.S., 788 to 1005	270	45	4050	885
Carry-on baggage L.H. (entrance)	54	30		386
Carry-on baggage R.H. (entrance)	54	30		352
Wash water			375.0	569.9

Galley area between Stations 805.5 and 908.5 and 10" from airplane centerline R.H. side is structurally satisfactory for a maximum total load of 1600 pounds, with a maximum unit floor loading of 45 pounds per square foot.

Maximum Fuel Quantity See NOTE 1(c) regarding "Unusable fuel and system oil" and fuel density accounting.

	<u>Usable Fuel Quantity</u>		<u>Total Fuel Quantity</u>		
Tanks 2 & 3 (Inb'd)	7370 lb. ea.	(1100 gal. ea.)	7404 lb.	(1105 gal. ea.)	(+628.4)
Tanks 1 & 4 (Outb'd)	<u>11122 lb. ea.</u>	<u>(1660 gal. ea.)</u>	<u>11135 lb.</u>	<u>(1662 gal. ea.)</u>	<u>(+605.7)</u>
Total	36984	5520	37078	5534	

For aircraft with extended inboard tank capacity (optional)

	<u>Usable Fuel Quantity</u>		<u>Total Fuel Quantity</u>		
Tanks 2 & 3 (Inb'd)	10720 lb. ea.	(1600 gal. ea.)	10754 lb.	(1605 gal. ea.)	(+625.1)
Tanks 1 & 4 (Outb'd)	<u>11122 lb. ea.</u>	<u>(1660 gal. ea.)</u>	<u>11135 lb.</u>	<u>(1662 gal. ea.)</u>	<u>(+605.7)</u>
Total	43684	6520	43778	6534	

Oil Capacity See NOTE 1(c) regarding "Unusable fuel and system oil."

	<u>Usable Oil</u>	
2 Inboard tanks	7.6 gal. ea.	60.8 lb. (+477.0)
2 Outboard tanks	<u>7.6 gal. ea.</u>	<u>60.8 lb. (+486.0)</u>
Totals	30.4	243.2

Maximum Operating Altitude 30,000 ft. and 25,000 ft.
See NOTE 5 for requirement relative to operation above 25,000 ft.

Other Operating Limitations Aircraft shall be operated in compliance with the operating limitation specified in the FAA approved Airplane Flight Manual.

Serial Nos. Eligible 188C/1071, 188C/1075, 188C/1077, 188C/1078, 188C/1080
188C/1082, 188C/1085, 188C/1088, 188C/1091, 188C/1098,
188C/1101, 188C/1103, 188C/1105, 188C/1108 through 188C/1113,
188C/1130 through 188C/1139, 188C/1141, 188C/1142,
188C/1144, 188C/1147, 188C/2001 and up

Data Pertinent to All Models

Datum 571.89 in. forward of jig point. (Screwhead on bottom surface of wing at W.S. 59 L. and R.)

MAC 168.7 in. leading edge of MAC at Sta. 545.9

Leveling Means Leveling plate under fuselage floor at ref. Sta. 832.0

Control Surface Movements

Main surfaces (boost on)	Elevator	30°	Up	15°	Down
	Aileron	25°	Up	15°	Down
	Rudder	30°	Right	24°	Left
Tabs (Main surfaces in neutral)	Elevator	5°	Up	25°	Down
	Aileron	20°	Up	20°	Down
	Rudder	25°	Right	25°	Left

Flaps 40° total angular travel

Certification Basis CAR 4b dated December, 1953, Amendments 4b-1 and 4b-2 thereto; the special conditions and provisions of Amendments 4b-3, 4b-4 and 4b-6 listed in Attachment A to CAA letter of October 21, 1957, and the provisions of Item 2 of Special Civil Air Regulation No. SR-422. CA letters to Lockheed Aircraft Corporation dated January 22, 1957 and January 22, 1958, relative to emergency exits and oxygen requirements respectively provide the basis in regard to these items.

Type Certificate No. 4A22 issued August 22, 1958.
Application for Type Certificate dated November 11, 1955.
Compliance with the ditching requirements has been demonstrated.

Production Basis Production Certificate No. 600

<u>Equipment</u>	The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft for certification. Approved equipment is shown in the Master Equipment list, Lockheed Report No. 12897.
<u>Service information</u>	Lockheed "Electra" Structural Repair Manual, is FAA approved. Service Bulletins and other service information, when FAA approved, will carry a statement to that effect.

- NOTE 1.
- Current weight and balance report including list of equipment included in certificated empty weight, and loading instructions, must be provided for each aircraft at the time of original certification. See Approved "Weight and Balance Data" (Lockheed Report No. 12944) for list of approved items of equipment.
 - The airplane must be loaded so that the C.G. is within the specified limits at all times, with the effects of fuel use, gear retraction, and movement of crew and passengers from their assigned positions being considered (retraction of the main and nose gears causes the C. G. to move forward; a value of 175,000 in. lb. is a satisfactory approximation of the change in moment for all approved wheel items). At takeoff, the airplane shall be loaded so that, due to fuel use, the C.G. cannot move forward of 15% MAC. A 33% aft C.G. limit (gear retracted) for cruising flight may be used when the effect of passenger and crew movements from their assigned positions has been taken into account.
 - "Unusable Fuel and System Oil" and all-hydraulic fluid must be included in the certificated empty weight. Unusable Fuel is that quantity of fuel in the system and in the tanks which is unavailable to the engines under critical flight conditions as defined in CAR 4b.416. This unusable fuel includes the "system fuel" which is defined as the quantity required to fill the system and tanks to the tank outlet level when the airplane is in the ground level attitude. The total amount of fuel is as follows:

Model No.	*Usable Fuel	Unusable Fuel (lb.)
188A or 188C	36,985 lb. (5520 gal.)	266
188A or 188C with extended inner tank	43,684 lb. (6520 gal.)	266

- * The volume (gallons) of the fuel tank is the size required to contain the weight of fuel shown only when the fuel density is 6.7 #/gallon. Variations of the fuel density must be accounted for when loading fuel so that the minimum fuel weight versus takeoff weight is properly provided. Also, the maximum permissible quantity of fuel for full tank takeoff is the weight of fuel shown in the "maximum fuel quantity" tables of this Data Sheet.

System Oil is that amount of oil required to fill the oil system and tanks to the tank outlets to the engines. The oil tank capacities shown in this specification include only the usable oil for which the tanks are placarded. Dipstick readings indicate the amount of usable oil.

Model No.	Usable Oil (lb.)	System Oil (lb.)
188A or 188C	243.2	97.4

- Fuel dumping. When fuel dump valves are installed per NOTE 3, the amount of usable fuel, over and above the unusable fuel remaining after dumping, is as follows:

Model	Gallons Remaining in Tanks		Total
	1 & 4	2 & 3	
188A or 188C	135 each	112 each	494 gallons

- Fuel loading and usage.
 - Fuel must be distributed and used in a manner that will permit compliance with the lateral balance limitations in the FAA Approved Airplane Flight Manual.
 - For minimum fuel at any takeoff weight, refer to the minimum fuel required chart in the pertinent

FAA Approved Airplane Flight Manual.

(3) For landing, the fuel quantities must not exceed the following:

Tanks 1 and 4: 6,700 lb. each

Total fuel in tanks 1 and 2: 13,400 lb.

Total fuel in tanks 3 and 4: 13,400 lb.

(4) Phillips PFA-55MB or anti-icing additive to Specification MIL-I-27686E may be used if concentration to airplane does not exceed 0.1% by volume. No fuel system anti-icing credit is allowed.

NOTE 2. Deleted.

NOTE 3. Fuel dump valves must be installed for operation of the airplane at weights in excess of maximum landing weight. Refer to FAA Approved Airplane Flight Manual for limitations and cautionary procedure to be observed during the dumping of fuel.

NOTE 4. Radio Restriction:
Due to coupling effects between the VHF navigation system and the No. 1 VHF communications system, resulting interference may adversely affect the VHF navigation system whenever transmitting on so called spurious response frequencies. * VHF navigation information is satisfactory only when the No. 1 VHF communications transmissions do not adversely interfere with the VHF navigation output to indicating instruments and coupled autopilot.

* Any superheterodyne type receiver will have some spurious response frequencies. In the Wilcox type 706A VHF navigation receiver an offending response appears at seven (7) megacycles above the selected frequency. This means, for example, that when 111.0 mc has been selected on the NAV receiver, transmissions on 118 mc with VHF No. 1 will result in interference. Any model receiver with less than approximately 90 decibels spurious response rejection characteristic may be similarly affected if a response frequency appears within the navigation band (108-118 mc).

NOTE 5. For Air Carrier operations above 25,000 ft. the aircraft must be equipped with the following:
(1) Approved oxygen masks and installation. The stowage of the masks must be such that a mask is immediately available to each occupant and the stowage location is to be indicated by a placard. (Lockheed Drawing No. 8933121 shows a typical approved installation.)
(2) Deleted.

NOTE 6. Issuance of Airworthiness Directive Note 60-9-3 on March 25, 1960, imposed speed restrictions and other limitations on all 188 aircraft. These limitations are removed with the incorporation of changes to the airplane per Lockheed Service Bulletins Nos. 88/SB-500 and 88/SB-453 and Airworthiness Directive Note 60-21-1 as indicated in revision to Airworthiness Directive Note 60-9-3 made effective December 31, 1960. Engines modified to incorporate the six mount installations per NOTE 15c of Engine Specification No. E-282 are required by Service Bulletin No. 88/SB-500.

NOTE 7. The approved manufacturer's model number is 188A. In Revision 10 of this data sheet, all reference to Model 188A-08 has been revised to read 188A.

NOTE 8. The following serial numbers are eligible for conversion from Model 188A to Model 188C when Lockheed Service Bulletin No. 88/SB-687A is incorporated:

188A/1070, 1072, 1073, 1074, 1076, 1079, 1081, 1083, 1084, 1086, 1087, 1089, 1092 through 1097, 1100, 1102, 1104, 1107, 1114 through 1116, 1118 through 1129, 1140, 1143, 1145, 1146 and 1148.

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