patience.

NAVAIR 01-250HDB-1B

NATOPS
PILOT'S
POCKET CHECKLIST

CH-46D/CH-46F
UH-46D
HELICOPTER

THIS PUBLICATION SUPERSEDES NAVAIR 01-250HDB-1B DATED 1 FEBRUARY 1969 CHANGED 1 MAY 1969 WHICH SHOULD BE REMOVED FROM THE FILES AND DESTROYED

NOTE

THIS SHEET IS FOR STOCKING AND DISTRIBUTION PURPOSES ONLY AND SHOULD BE REMOVED AND DISCARDED BY THE FLIGHT CREWMEMBER UPON RECEIPT

15 JUNE 1970

PRACTICE EMERGENCY THROTTLE OPERATION Per NATOPS Advance Info.

Simulated engine malfunctions, requiring the use of emergency throttle, should be performed to gain proficiency in operating the emergency throttle system. Dual engine operation, with the No. 1 engine operating in the emergency throttle mode, is described in the paragraphs to follow.

CAUTION

The probability of multiple failures occurring which would require the use of dual engine emergency throttle operation is remote. Therefore, practice operations with both engines operating in the emergency throttle mode are discouraged. Simulated single engine operations on emergency throttle are also discouraged for the same reason.

At a comfortable cruise condition, with PMS ON, proceed as follows:

1. Emergency throttle - ARM

Observe the following:
a. Both EMER THROT caution lights illuminate.
b. PMS drops OFF the line
c. Nf/Nr increase to maximum on both engines (about 106 % Nf/Nr)

2. No. 2 emergency throttle (normal operating engine) - RESET
a. The EMER THROT NO.2 caution light extinguishes.
b. PMS operation restored on the No.2 engine.
c. No. 2 Nf decreases to approximately 100 %

3. No. 1 emergency throttle (malfunctioning engine) INCREASE BEEP. Hold collective pitch lever steady and use CAUTIOUS, momentary beep until a slight increase in Ng and T-5 is observed, then stop beeping.

CAUTION

No. 1 engine is already operating in the high range of Nf, so observe engine limits.

This ensures that power supplied by the emergency throttle exceeds that delivered by the fuel controller. (No. 1 engine is now operat. on emergency throttle)

4. No. 1 engine condition lever - POSITION SLOWLY TO START.

NOTE

Once engine operation on emergency throttle is established beep trim adjustments should be of very short duration since emergency throttle actuator response is very fast compared to normal beep trim response. The mergency throtte actuator travels from the ground idle position to the full open position in approximately 4 to 6 seconds.

5. No. 1 beep - ACTUATE to set No. 1 torque about 10 % below No. 2 Q.

NOTE

Prior to executing step 5., No. 1 engine is operating at about 106 % Nf/Nr and No. 2 engine is operating at about 100 % Nf/Nr (PMS ON). It will be necessary to decrease No. 1 beep or increase collective pitch to set torques. With a 10 % torque split at about 100 % Nr ,No.2 engine will provide Nf governing within its capability.

Try some climbs and descents. The No. 1 engine, while operating on emergency throttle, delivers a fixed power output as established by the emergency throttle. The No. 2 engine will increase or decrease power, within its limits, to maintain approximately 100 % Nr.

NOTE

It is not necessary to maintain a precise Nr during maneuvers or power changes. It is more desirable to accept Nr excursion of ± 3 % than to be continually beeping the emergency throttle in an attempt to maintain an exact Nr .

During large collective pitch lever changes, the lever must be moved slowly and deliberately and coordinated with emergency throtte. inputs to keep the torque of the engine operating on emergency throttle 10 percent below the normally functioning engine. Emergency throttle inputs should be applied in anticipation of collective pitch lever changes to prevent large Nr excursions and torque splits.

Re-establish normal engine operation: No. 1 eng.cond.lever FLY RESET No. 1 emergency throttle reset SWITCH'til light is OUT . Nf/Nr will return to normal 100 % operation, PMS restored.

To establish emergency throttle operation on NO. 2 engine, use the same procedure substituting No. 2 for No. 1 and vice-versa.

For additional info contact: J.Morgenstern 640-6590
HMX-1 Boeing Rep.

EMERGENCY PROCEDURE TABS

NAVAIR 01-250HDB-1B

NATOPS PILOT'S

POCKET CHECKLIST

CH-46D/CH-46F
UH-46D
HELICOPTER

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ISSUED BY AUTHORITY OF
THE CHIEF OF NAVAL OPERATIONS
AND UNDER THE DIRECTION
OF COMMANDER, NAVAL AIR
SYSTEMS COMMAND

PERFORMANCE DATA INDEX

LIST OF EFFECTIVE PAGES

Total number of pages in this manual is 97, consisting of the following:

Page No.	*Issue*	*Page No.*	*Issue*
Cover	Original		
A/B	Original		
C	Original		
D	Original		
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INTERIM CHANGE SUMMARY			
NUMBER	DATE	PAGES AFFECTED	PURPOSE
1 thru 3	—	(INCORPORATED)	—

MODEL: H-46D
ENGINE(s): (2) T58-GE-10
DATA BASIS: FLIGHT TEST VERTOL REPORT A02AD005 DATED 3 MARCH 1967

CONFIGURATION: CLEAN
ROTOR RPM: 100 PERCENT
FUEL GRADE: JP-4/JP-5

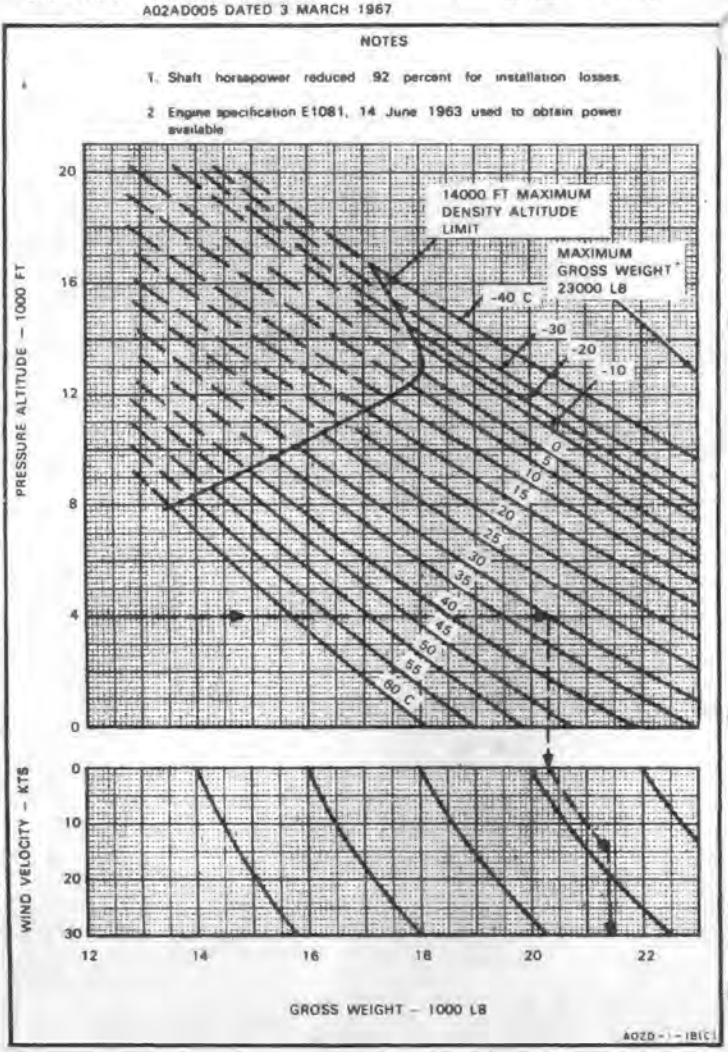


Figure 1-1. Maximum Gross Weight for HIGE

D

ENGINE COMPARTMENT FIRE IN FLIGHT — FIRE

1. Engine condition lever (malfunctioning engine) — STOP
2. Illuminated fire handle — PULL
3. Fire extinguishing agent discharge selector — AGENT DISCH #1 or #2
4. Engine fuel boost pump (dead engine) — OFF
5. PMS — OFF
6. Landing — EXECUTE as soon as possible

ELECTRICAL FIRE

1. Electrical power to burning equipment — SECURE
2. Hand portable fire extinguisher — USE if fire persists after securing affected electrical equipment
3. PREPARE TO LAND if necessary

FUSELAGE FIRE

If fire occurs in the cabin section:

1. Cockpit windows — CLOSE
2. Hatches and doors — CLOSE
3. Cabin vents — CLOSE
4. Heater switch — OFF
5. Hand portable fire extinguisher — USE as required
6. Landing — EXECUTE as soon as possible

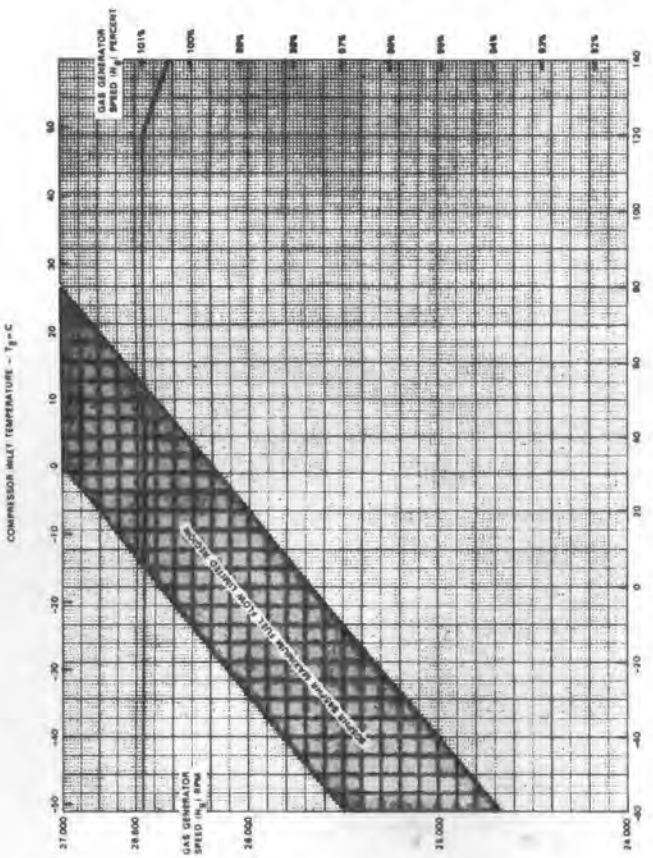


Figure 1-2. Topping Limits

HOT START/ENGINE FIRE ON GROUND

HOT START

A hot start is indicated by a rapid rise of T_5 to 765°C. Proceed as follows:

1. **Engine condition lever (affected engine) — STOP**

If a residual fire persists on shutdown, proceed as follows:

1. **Appropriate fire handle — PULL**
2. **Ignition switch — OFF**
3. **Engine condition lever — CRANK (to motor engine)**
4. **Engine fuel boost pump switch — OFF**

ENGINE COMPARTMENT FIRE

1. **Engine condition lever (malfunctioning engine) — STOP**
2. **Illuminated fire handle — PULL**
3. **Fire extinguishing agent discharge selector — AGENT DISCH #1 and/or #2**
4. **Engine fuel boost pump (dead engine) — OFF**

SMOKE AND FUME ELIMINATION

After fire is extinguished:

1. **Cockpit windows — OPEN fully**
2. **Heater switch — VENT**
3. **Cabin air vents — OPEN**
4. **Loading ramp and/or cargo door — OPEN**

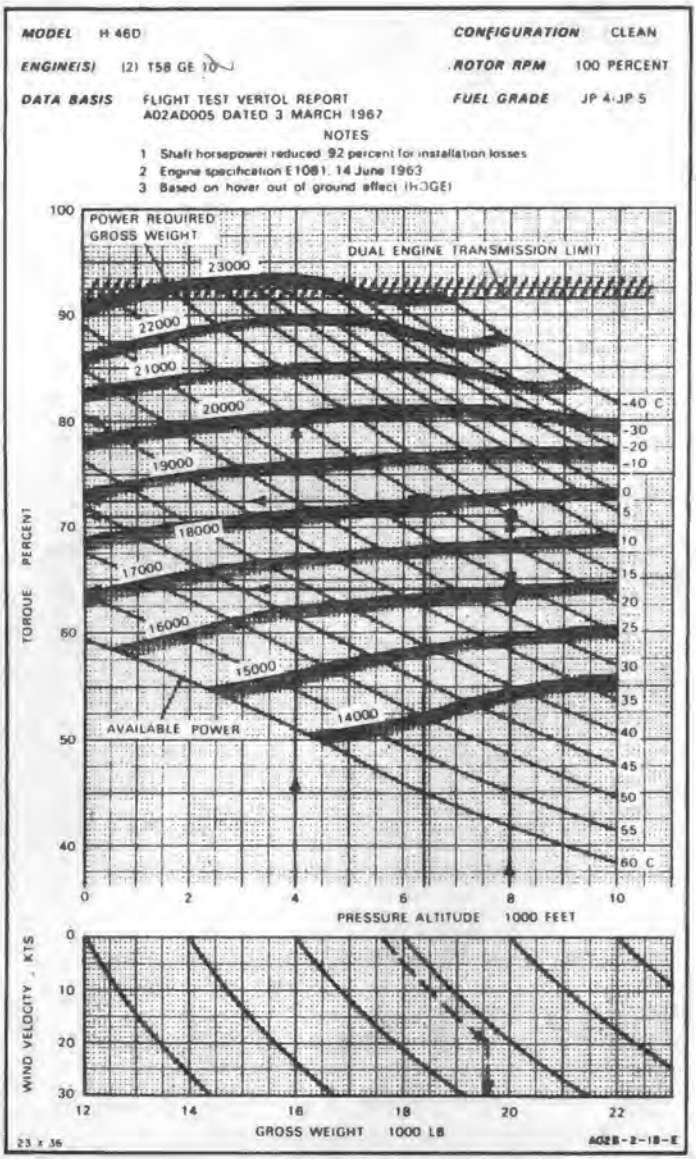


Figure 1-3. Power Required/Power Available (HOGE)

SINGLE ENGINE FAILURE IN FLIGHT — ENGINE FAIL

1. PMS — OFF
2. Collective pitch lever — ADJUST to maintain a minimum of 94 percent rotor rpm; BEEP N_f of operating engine to maximum
3. Airspeed — BEST CLIMB SPEED
4. Engine and flight instruments — CHECK; determine single engine capability
5. Emergency throttle — ACTIVATE if required
6. If unable to maintain level or climbing flight — POSITION flight controls to establish 15° RIGHT YAW
7. Fuel — JETTISON as required
8. If level or climbing flight is not possible — SELECT landing area

EMERGENCY THROTTLE OPERATION

The following procedure is recommended for emergency throttle activation:

1. Emergency throttle arming switch — DEPRESS
2. Beep trim switches — INCREASE until an increase in torque/rotor speed is observed

CONTINUED

MODEL: CH-46D
ENGINES: (2) T58-GE-
DATA BASIS: FLIGHT TEST
VERTOL REPORT A03AD005 5 MARCH 1963

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	TEMPERATURE (°C)	PRESSURE ALTITUDE (FT)	GROSS WEIGHT ~ LB											
			14000				16000				18000			
			I.A.S. (KTS)	RATE OF CLIMB (FPM)	TIME (MINS)	FUEL (LB)	I.A.S. (KTS)	RATE OF CLIMB (FPM)	TIME (MINS)	FUEL (LB)	I.A.S. (KTS)	RATE OF CLIMB (FPM)	TIME (MINS)	FUEL (LB)
STD. TEMP. +40°C	55	S. L.	72	1181	0	39	73	848	0	39	72	569	0	39
	51	2000	72	1138	1.7	73	70	799	2.4	87	69	508	3.7	111
	47	4000	70	1078	3.5	106	69	736	5.0	135	66	405	8.1	193
	43	6000	69	1003	5.5	141	66	649	7.9	187	65	295	13.9	297
	39	8000	67	905	7.6	176	64	512	11.4	245	63	145	23.4	458
	35	10000	64	787	9.9	214	62	372	16.0	319				
	31	12000	61	619	12.8	257	60	183	23.5	432				
	27	14000	58	441	16.6	312								
STD. TEMP. +20°C	55	S. L.	76	2192	0	45	80	1702	0	45	80	1337	0	45
	51	2000	76	2053	1.0	67	78	1612	1.2	73	77	1249	1.6	80
	47	4000	75	1949	2.0	88	77	1509	2.5	100	75	1141	3.3	117
	43	6000	74	1831	3.0	110	75	1395	3.9	129	73	994	5.1	155
	39	8000	73	1698	4.1	132	73	1260	5.4	158	69	819	7.3	198
	35	10000	72	1558	5.4	155	69	1087	7.1	190	67	658	10.0	247
	31	12000	69	1396	6.7	179	66	906	9.1	225	66	428	13.7	313
	7	14000	66	1175	8.3	204	64	673	11.6	267	64	173	25.8	433
STD. TEMP.	15	S. L.	75	3203	0	51	80	3626	0	51	83	3171	0	51
	11	2000	76	3032	.6	68	80	3472	.8	72	82	3023	1.0	76
	7	4000	76	2861	1.3	85	79	2319	1.6	92	80	1878	2.0	101
	3	6000	76	2694	2.0	102	78	2162	2.5	113	78	1725	3.1	128
	-1	8000	75	2521	2.8	119	76	2000	3.5	135	77	1559	4.1	155
	-5	10000	74	2333	3.6	137	74	1818	4.5	158	73	1338	5.7	185
	-9	12000	73	2130	4.5	159	73	1595	5.7	181	71	1117	7.3	218
	-13	14000	71	1909	5.5	174	70	1360	7.1	207	70	840	9.4	257
STD. TEMP. -20°C	-5	S. L.	73	3423	0	52	80	3833	0	52	85	3367	0	52
	-9	2000	76	3477	.6	68	80	3868	.7	71	83	3387	.8	75
	-13	4000	75	3525	1.2	83	80	3905	1.4	90	81	3411	1.7	97
	-17	6000	76	3331	1.7	98	79	3732	2.1	108	80	3245	2.5	120
	-21	8000	76	3029	2.4	114	78	3459	2.9	127	79	1996	3.5	143
	-25	10000	75	2736	3.1	130	76	2190	3.7	147	77	1720	4.6	168
	-29	12000	74	2450	3.8	146	75	1927	4.7	168	75	1419	5.8	195
	-33	14000	73	2148	4.7	164	73	1624	5.8	190	72	1151	7.4	226
STD. TEMP. -40°C	-25	S. L.	71	3352	0	51	79	3770	0	51	85	3310	0	52
	-29	2000	73	3403	.6	67	80	3817	.7	70	84	3345	.9	74
	-33	4000	74	3456	1.2	82	80	3856	1.4	89	83	3377	1.7	96
	-37	6000	75	3506	1.8	97	80	3892	2.1	107	82	3403	2.5	118
	-41	8000	76	3322	2.3	113	79	3725	2.8	125	80	3264	3.4	140
	-45	10000	76	3075	3.0	127	78	3503	3.6	143	80	2039	4.2	162
	-49	12000	75	2833	3.6	142	77	3279	4.4	163	78	1818	5.4	184
	-53	14000	75	2598	4.4	158	76	3064	5.4	183	76	1588	6.6	211

Figure 1-4. Climb Chart Normal Power 0° Yaw (Sheet 1)

3. Beep trim switches — INTERMITTENTLY INCREASE until sufficient engine power is restored
4. If the malfunctioning engine has stalled, flamed out, or does not respond to emergency throttle, proceed as follows:
   a. Engine condition lever — STOP on malfunctioning engine
   b. Fuel boost pump switch — OFF
   c. Ignition switch — OFF
   d. Emergency throttle reset switch — RESET
5. If dual engine power has been restored and malfunctioning engine has been identified, proceed as follows:
   a. Emergency throttle reset switch — RESET on engine operating normally
   b. Beep trim switch — ADJUST on functioning engine to desired power level
6. After landing has been accomplished utilizing emergency throttle, engine shutdown is accomplished as follows:
   a. Emergency throttle reset switch(es) — RESET and OBSERVE EMER THROT caution light(s) extinguished
   b. Engine condition lever(s) — STOP
   c. Fuel boost pump switch(es) — OFF
   d. Ignition switch(es) — OFF

MODEL: CH-46D
ENGINES: (2) T58-GE-10
DATA BASIS: FLIGHT TEST
VERTOL REPORT 602AD003 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	TEMPERATURE (°C)	PRESSURE ALTITUDE (FT)	GROSS WEIGHT ~ LB: 20000 I.A.S. (KTS)	20000 RATE OF CLIMB (FPM)	20000 TIME (MIN)	20000 FUEL (LB)	22000 I.A.S. (KTS)	22000 RATE OF CLIMB (FPM)	22000 TIME (MIN)	22000 FUEL (LB)	23000 I.A.S. (KTS)	23000 RATE OF CLIMB (FPM)	23000 TIME (MIN)	23000 FUEL (LB)
STD. TEMP. +40°C	55	S. L.	70	296	0	39	70	35	0	39				
	51	2000	68	209	8.1	198								
	47	4000	66	98										
	43	6000												
	39	8000												
	35	10000												
	31	12000												
	27	14000												
STD. TEMP. +20°C	35	S. L.	78	1027	0	45	76	712	0	45	75	572	0	45
	31	2000	76	910	2.1	92	74	594	1.1	119	74	436	4.0	136
	27	4000	73	774	4.4	144	73	435	7.0	200	73	255	10.0	266
	23	6000	70	629	7.3	203	72	262	11.1	326	73	61		
	19	8000	69	450	11.3	277	71	38						
	15	10000	68	215	17.7	398								
	11	12000												
	7	14000												
STD. TEMP.	15	S. L.	83	1788	0	51	84	1454	0	51	83	1280	0	51
	11	2000	82	1648	1.2	81	82	1281	1.5	89	80	1115	1.7	95
	7	4000	80	1483	2.4	113	79	1116	3.1	131	78	941	3.6	143
	3	6000	78	1303	3.9	147	77	925	5.1	177	77	725	6.1	201
	-1	8000	74	1123	5.5	184	75	698	7.6	233	76	498	9.4	275
	-5	10000	73	889	7.5	227	74	458	11.1	309	76	265	14.9	393
	-9	12000	71	632	10.2	281	74	213	17.5	438	77	28		
	-13	14000	71	364	14.4	360								
STD. TEMP. −20°C	-5	S. L.	85	1968	0	52	86	1637	0	52	87	1485	0	52
	-9	2000	84	1985	1.0	80	85	1639	1.2	85	85	1463	1.4	89
	-13	4000	83	2000	2.0	107	84	1616	2.5	118	83	1427	2.7	126
	-17	6000	81	1827	3.1	134	81	1429	3.8	153	81	1248	4.2	165
	-21	8000	80	1553	4.2	163	80	1165	5.3	191	78	958	6.0	210
	-25	10000	77	1291	5.7	195	77	864	7.3	236	77	659	8.6	268
	-29	12000	74	999	7.4	233	75	561	10.2	298	76	365	12.6	335
	-33	14000	72	674	9.8	281	74	253	15.5	403	75	67		
STD. TEMP. −40°C	-25	S. L.	87	1934	0	51	89	1615	0	51	89	1471	0	51
	-29	2000	86	1960	1.0	79	87	1630	1.2	84	88	1485	1.4	87
	-33	4000	84	1980	2.0	105	85	1641	2.5	116	86	1475	2.7	123
	-37	6000	83	1996	3.1	132	84	1633	3.7	148	83	1440	4.1	159
	-41	8000	81	1836	4.1	158	83	1441	5.0	181	82	1269	5.5	196
	-45	10000	80	1609	5.3	186	79	1226	6.5	217	79	1029	7.3	238
	-49	12000	78	1382	6.6	216	76	970	8.3	259	78	764	9.5	289
	-53	14000	75	1145	8.2	250	76	701	10.7	310	77	500	12.8	358

Figure 1-4. Climb Chart Normal Power 0° Yaw (Sheet 2)

ENGINE SHUTDOWN IN FLIGHT

1. Engine condition lever — STOP
2. Engine fuel boost pump — OFF

ENGINE RESTART IN FLIGHT

ENG SHUT DOWN

If restart appears advisable, proceed as follows:

1. Engine condition lever — STOP
2. Engine fire handle — CHECK IN
3. Engine fuel boost pump switch — ON
4. Ignition switch — NORM
5. Engine — START
6. Engine instruments — OBSERVE within limits
7. Engine condition lever — FLY

TAKEOFF • ONE ENGINE INOPERATIVE

1. Strip list — COMPLETE
2. PMS — OFF to ensure 100 percent N_r

NOTE

With PMS off, droop anticipation is removed and operating rpm must be monitored by the pilot.

3. Operating engine — BEEP to maximum N_f
4. Collective pitch — RAISE to droop N_r to 100 percent. This will produce topping power from the operating engine and provide the single engine performance described in the performance charts
5. Emergency throttle — ACTIVATE if required
6. Single engine climbout speed — ATTAIN as quickly as possible

MODEL: H-46D

ENGINE(s): (1) T58-GE-10 ***ROTOR RPM:*** 94 PERCENT

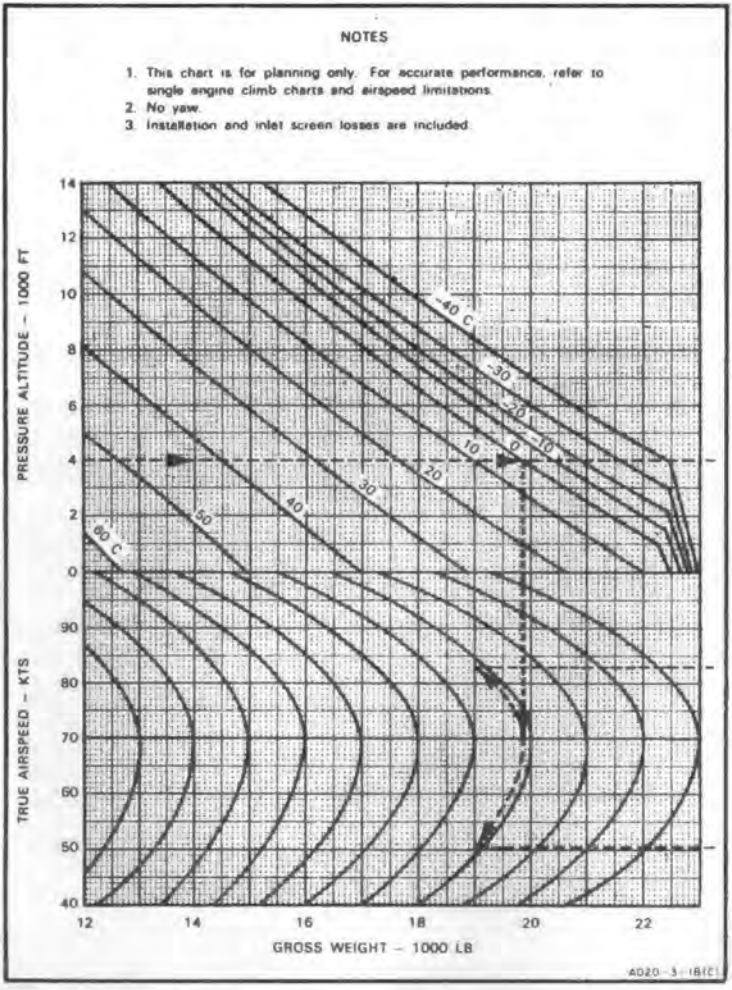


Figure 1-5. Single Engine Envelope (Sheet 1)

LANDING • ONE ENGINE INOPERATIVE

1. Crew — ALERTED
2. Parking brake handle — AS REQUIRED
3. Nose wheel locking lever — AS REQUIRED
4. Fuel — JETTISON as required
5. PMS — OFF
6. Rotor rpm — MAXIMUM BEEP
7. Collective pitch lever — USE AS NECESSARY to cushion landing
8. Wheel brakes — APPLY AS NECESSARY

SHIP LANDING • ONE ENGINE INOPERATIVE

1. Rotor rpm — MAXIMUM
2. Crew — ALERTED
3. Parking brake — AS DESIRED
4. Nose wheel — LOCKED
5. Fuel — JETTISON AS REQUIRED
6. Plan approach for a straight-in, no hover landing
7. Collective pitch — USE as necessary to cushion landing
8. Brakes — APPLY to minimize deck roll

MODEL: H-46D ***ROTOR RPM:*** 94 PERCENT

ENGINE(S): (1) T58-GE-10

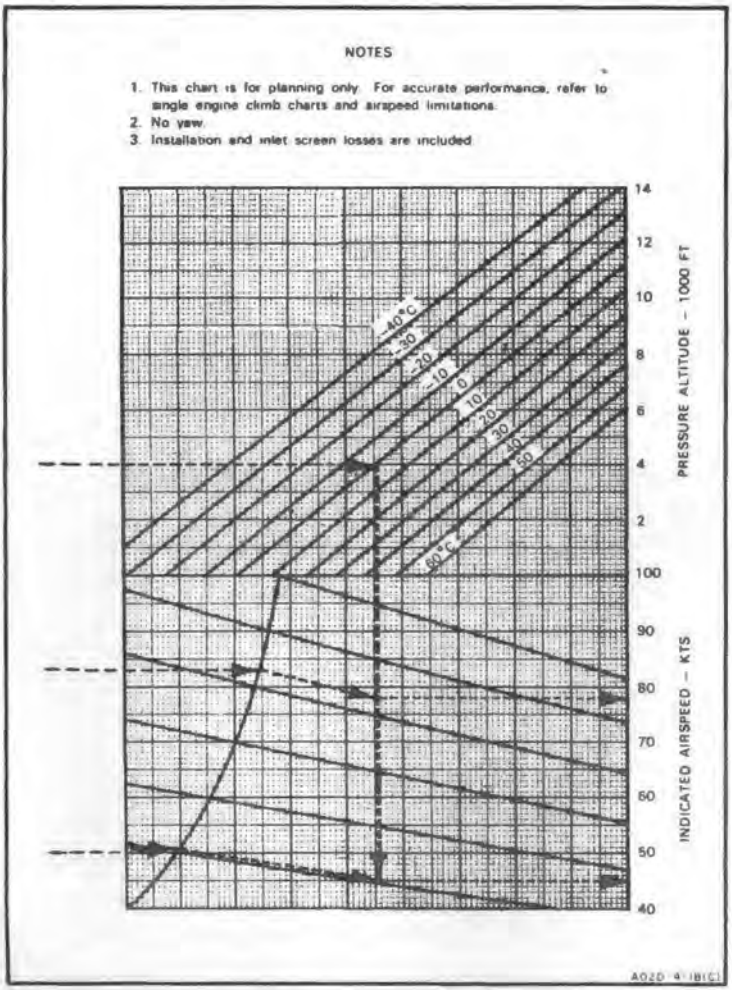


Figure 1-5. Single Engine Envelope (Sheet 2)

AUTOROTATIVE LANDING

1. Collective pitch lever — LOWER to obtain rotor rpm of 100 to 113 percent for best controllability
2. Cyclic stick — POSITION to establish 65 to 70 knots IAS, altitude permitting
3. Shoulder harness — LOCKED
4. Wheel brakes — AS REQUIRED
5. Crew — ALERTED
6. Engines and unnecessary electrical equipment — SECURE, time permitting
7. Cyclic stick — At approximately 100 to 125 FEET, begin a gradual cyclic FLARE
8. At an altitude of approximately 25 feet, collective pitch lever — INCREASE (to decrease rate of descent)
9. At an altitude of approximately 10 feet, collective pitch lever — INCREASE (to cushion landing)
10. Collective pitch lever — DECREASE to minimum after touchdown
11. Wheel brakes — APPLY as necessary to stop forward roll

AUTO LDG

MODEL: CH-46D
ENGINES: (2) T58-GE-16
DATA BASIS: FLIGHT TEST
VERTOL REPORT A03AD005 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	TEMPERATURE (°C)	PRESSURE ALTITUDE (FT)	GROSS WEIGHT ~ LB: 14000 I.A.S. (KTS)	14000 RATE OF CLIMB (FPM)	14000 TIME (MIN)	14000 FUEL (LB)	16000 I.A.S. (KTS)	16000 RATE OF CLIMB (FPM)	16000 TIME (MIN)	16000 FUEL (LB)	18000 I.A.S. (KTS)	18000 RATE OF CLIMB (FPM)	18000 TIME (MIN)	18000 FUEL (LB)
STD. TEMP. +40°C	55	S.L.	58	78	0	39	58	-156			63	-368		
	51	2000	53	-84			58	-309			63	-503		
	47	4000	52	-137			58	-362			63	-565		
	43	6000	53	-194			58	-427			66	-660		
	39	8000	53	-266			59	-510			68	-766		
	35	10000	53	-354			60	-605			71	-879		
	31	12000	54	-454			61	-733			73	-1039		
	27	14000	55	-572			63	-888						
STD. TEMP. +30°C	35	S.L.	58	574	0.0	45	58	393	0.0	45	59	56	0	45
	31	2000	57	497	3.0	92	57	319	7.9	143	59	-24		
	27	4000	56	421	8.5	148	56	58			60	-174		
	23	6000	54	336	15.7	230	55	-25			60	-264		
	19	8000	52	144	36.5	365	56	-124			61	-370		
	15	10000	51	63			56	-233			62	-509		
	11	12000	50	-75			57	-360			65	-659		
	7	14000	51	-203			58	-510			67	-831		
STD. TEMP.	15	S.L.	65	1096	0.0	51	63	756	0.0	51	64	478	0.0	51
	11	2000	62	950	3.0	79	62	632	3.9	93	62	351	4.9	120
	7	4000	60	811	6.2	109	60	495	6.5	140	60	225	12.6	214
	3	6000	58	675	8.9	143	58	364	11.3	199	58	94		
	-1	8000	57	675	10.6	186	56	187	19.3	295	59	-66		
	-5	10000	54	336	15.6	263	55	53			60	-207		
	-9	12000	53	186	33.6	337	56	-100			62	-377		
	-13	14000	50	38			56	-263			62	-567		
STD. TEMP. -30°C	-5	S.L.	66	1191	0.0	52	65	842	0.0	52	65	563	0.0	52
	-9	2000	65	1154	1.7	77	64	805	2.4	87	66	526	3.9	105
	-13	4000	63	982	3.6	103	62	651	5.2	125	62	379	8.1	167
	-17	6000	60	807	5.8	132	60	494	8.7	171	60	226	15.0	255
	-21	8000	58	640	8.5	165	58	337	13.5	230	59	74		
	-25	10000	56	488	12.7	213	57	171	23.9	347	59	-115		
	-29	12000	54	251	18.9	278	55	-19			60	-269		
	-33	14000	51	95			56	-180			62	-438		
STD. TEMP. -60°C	-25	S.L.	68	1171	0.0	51	67	839	0.0	51	66	556	0.0	51
	-29	2000	67	1135	1.7	75	66	839	2.4	85	65	562	3.6	102
	-33	4000	65	1104	3.4	100	64	763	4.8	120	64	491	7.3	154
	-37	6000	63	960	5.4	126	62	616	7.8	159	62	353	12.1	218
	-41	8000	60	801	7.7	154	60	491	11.4	204	60	229	19.1	306
	-45	10000	59	647	10.4	186	58	383	16.0	258	59	120	31.3	448
	-49	12000	58	512	13.7	223	57	226	23.6	332	59	-22		
	-53	14000	56	419	18.0	270	56	134	34.1	459	59	-120		

Figure 1-6. Climb Chart Military Power 15° Yaw Single Engine (Sheet 1)

EMERGENCY LANDING ON WATER

1. Crew — ALERTED
2. Watertight integrity — CHECK
3. Emergency equipment — READY
4. Shoulder harness — LOCKED
5. Speed trim switch — AUTO (HOVER AFT installed — AS DESIRED)
6. Landing — EXECUTE (from hover when possible)
7. UHF antenna switch — EMER
8. After landing, if abandonment is necessary:
   a. Crew chief — JETTISON rafts before abandoning helicopter
   b. Crew and passengers — EXIT through closest emergency hatch

   If armored seats are installed:
   c. Pilot's jettisonable hatches — RELEASE
   d. D-ring — PULL to release wing
   e. Lever — PULL to release lower panel
9. After landing, if abandonment is not necessary:
   a. APP — START
   b. GP /APP power control — APP

LDG ON WATER

WARNING In any forced landing situation ensure rotors are stopped before passengers and crew abandon the aircraft. Do not exit the helicopter until all motion has stopped.

MODEL: CH-46D
ENGINES: (1) T58-GE-16
DATA BASIS: FLIGHT TEST
VERTOL REPORT ASE-D001 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	TEMPERATURE (°C)	PRESSURE ALTITUDE (FT)	GROSS WEIGHT ~ LB: 20000				22000				23000			
			I.A.S. (KTAS)	RATE OF CLIMB (FPM)	TIME (MIN)	FUEL (LB)	I.A.S. (KTAS)	RATE OF CLIMB (FPM)	TIME (MIN)	FUEL (LB)	I.A.S. (KTAS)	RATE OF CLIMB (FPM)	TIME (MIN)	FUEL (LB)
STD. TEMP. +40°C	55	S. L.	67	-575			72	-801			76	-890		
	51	2000	68	-662			73	-876			76	-980		
	47	4000	68	-766			75	-987						
	43	6000	69	-873										
	39	8000	73	-1004										
	35	10000												
	31	12000												
	27	14000												
STD. TEMP. +20°C	35	S. L.	64	-164			69	-411			72	-500		
	31	2000	64	-263			70	-494			73	-596		
	27	4000	65	-386			71	-603			74	-719		
	23	6000	66	-494			72	-738			76	-857		
	19	8000	68	-628			75	-885			79	-1008		
	15	10000	70	-781			78	-1045						
	11	12000	73	-969										
	7	14000	76	-1134										
STD. TEMP.	15	S. L.	64	237	0.0	53	67	-26			69	-122		
	11	2000	63	112	12.2	233	67	-132			69	-252		
	7	4000	62	-25			68	-255			70	-366		
	3	6000	63	-184			69	-397			72	-520		
	-1	8000	64	-310			71	-567			75	-692		
	-5	10000	66	-476			74	-744			78	-872		
	-9	12000	69	-666			77	-937			79	-1064		
	-13	14000	72	-861			80	-1134						
STD. TEMP. -20°C	-5	S. L.	66	338	0.0	53	68	153	0.0	53	69	68		
	-9	2000	65	287	6.4	145	66	39			69	-67		
	-13	4000	62	140	18.4	304	66	-105			69	-204		
	-17	6000	62	-16			68	-249			70	-355		
	-21	8000	64	-192			69	-410			72	-527		
	-25	10000	65	-347			71	-592			75	-716		
	-29	12000	66	-520			74	-780			78	-904		
	-33	14000	67	-712			77	-975			81	-1079		
STD. TEMP. -40°C	-25	S. L.	67	351	0.0	53	69	152	0.0	53	70	66		
	-29	2000	66	330	4.0	138	68	122	13.9	261	69	35		
	-33	4000	65	256	12.6	230	67	-3			69	-91		
	-37	6000	64	120	24.0	302	67	-128			69	-223		
	-41	8000	63	-9			68	-267			70	-367		
	-45	10000	63	-136			69	-388			71	-477		
	-49	12000	64	-251			70	-493			74	-616		
	-53	14000	65	-372			73	-634			76	-761		

Figure 1-6. Climb Chart Military Power
15° Yaw Single Engine
(Sheet 2)

SINGLE ENGINE TAKEOFF FROM WATER

1. Aircraft — TURN into the wind
2. PMS — OFF
3. Operating engine — BEEP to maximum N_r
4. Emergency throttle — ACTIVATE if required
5. Speed trim switch — SELECT MAN FWD
6. Collective pitch — INCREASE until N_r begins to droop and HOLD
7. Cyclic stick — POSITION forward to accelerate to maximum forward speed obtainable
8. Collective pitch — INCREASE to droop N_f to 94% and fly aircraft clear of water
9. Cyclic stick — MAINTAIN POSITION (fuselage at a level attitude) and avoid abrupt nose low attitudes

T/O FROM WATER

MODEL: H-46D
ENGINE(s): (1)T58-GE-10
DATA BASIS: FLIGHT TEST VERTOL REPORT A02AD005 DATED 3 MARCH 1967

CONFIGURATION: CLEAN
ROTOR RPM: 100 PERCENT
FUEL GRADE: JP-4/JP-5

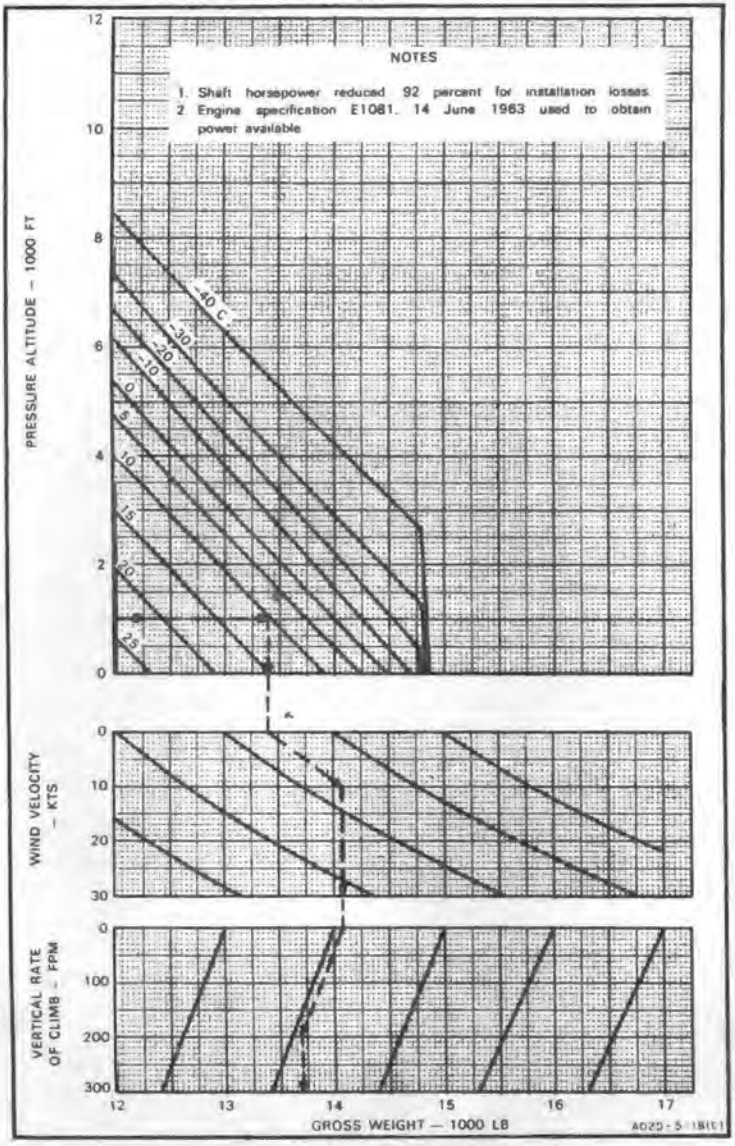


Figure 1-7. Maximum Gross Weight for VTO Single Engine

DITCHING, BAILOUT

1. Crew — ALERTED
2. Hatches — SECURE
3. Cabin Emergency Door — IN PLACE
4. Lower portion Main Door — LOCKED
5. Rear loading ramp — CLOSED
6. Survival emergency equipment — READY
7. Seat belt and shoulder harness — LOCKED
8. Landing — EXECUTE (from hover when possible)
9. UHF antenna switch — EMER

NOTE

If water integrity maintained — REMAIN WITH HELICOPTER

10. APP — START
11. GP/APP Power control — APP

NOTE

If water integrity not maintained

12. Hatches — JETTISON

If armored seats are installed:

a. D-ring — PULL to release wing
b. Lever — PULL to release lower panel

13. Rafts — JETTISON
14. Crewmembers and passengers — EXIT via closest emergency hatch

MODEL: H-46D
ENGINE(s): (1)T58-GE-10
DATA BASIS: FLIGHT TEST VERTOL REPORT A02AD005 DATED 3 MARCH 1967

CONFIGURATION: CLEAN
ROTOR RPM: 100 PERCENT
FUEL GRADE: JP-4/JP-5

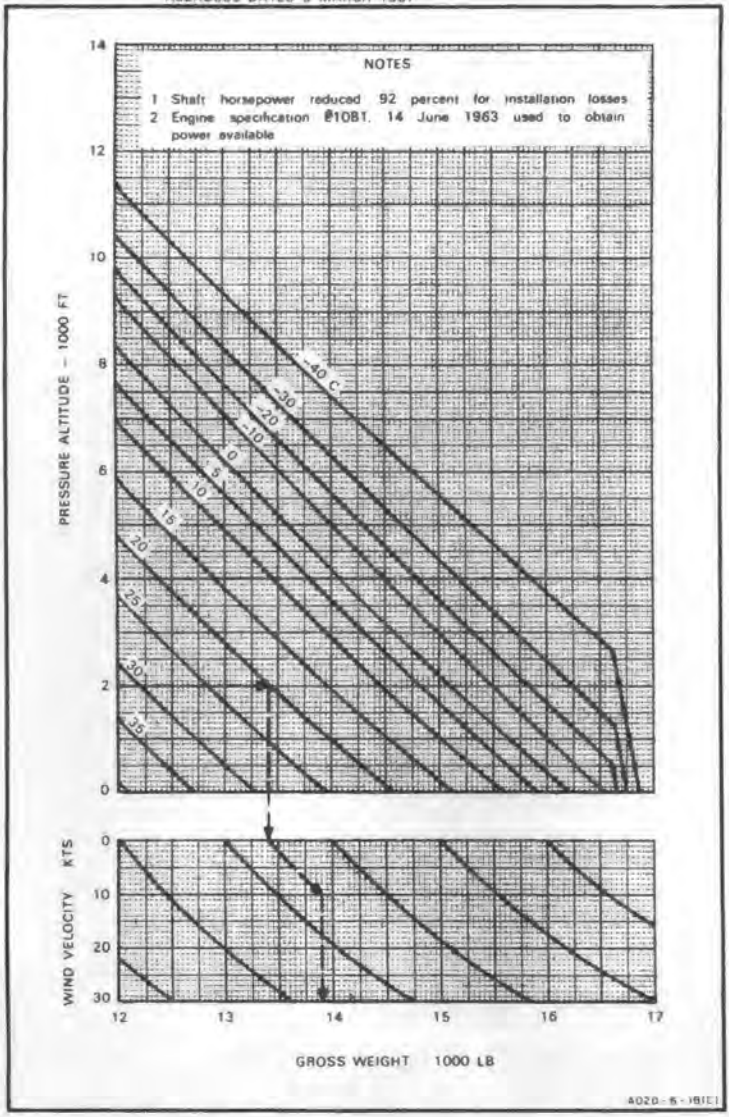


Figure 1-8. Maximum Gross Weight for HIGE Single Engine

BAILOUT

When bailout alert is sounded:

Cabin Occupants

1. **Rear loading ramp — LOWER (Primary means of escape)**
2. **Emergency hatches — JETTISON (Secondary means of escape)**
3. **Bailout order given — BAILOUT**
4. **After bailout — WAIT 3 SECS — PULL RIPCORD**

Pilots

1. **Helicopter — TRIM to desired attitude for bailout**
2. **Crew/passengers — ALERT**
3. **Pilot's and copilot's jettisonable hatches — JETTISON**
4. **Safety belt and shoulder harness — RELEASE (throw out to side and rearward)**
5. **Headset — DISCONNECT**
6. **In seat — FACE OUTBOARD (copilot avoid contact with collective pitch lever)**
7. **Both feet — EMER HATCH SILL**
8. **Hands — GRASP HATCH FRAME**
9. **Bailout — EFFECT (by forcefully leaving cockpit)**
10. **After bailout — WAIT 3 SECS — PULL RIPCORD**

MODEL: H-460 *ENGINE(s):* T-58-GE-10

DATA BASIS: FLIGHT TEST
VERTOL REPORT A02AD005
DATED 3 MARCH 1967

ROTOR RPM: 100 PERCENT

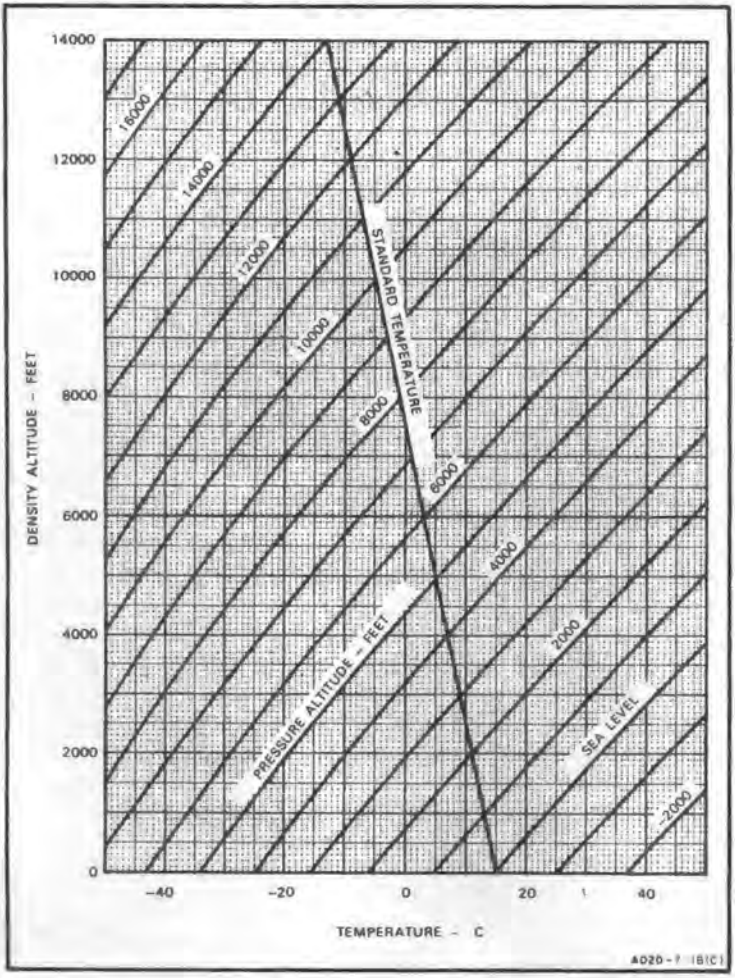


Figure 1-9. Indicated Never Exceed Speed vs Density Altitude (Sheet 1)

FUEL BOOST PUMP FAILURE

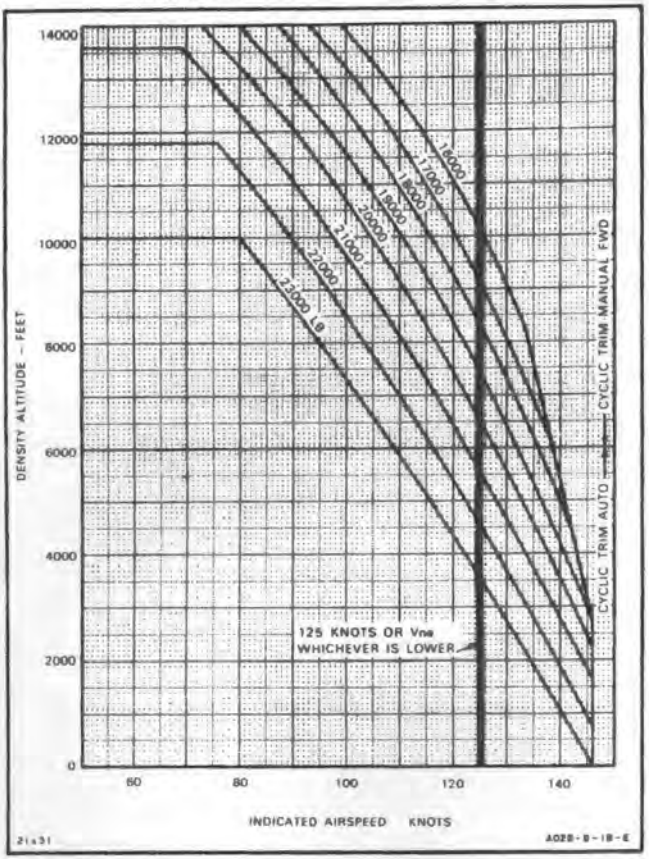
BOOST, E.D. PUMP, PMS

1. Failed fuel boost pump switch — OFF
2. Master caution lights — RESET

ENGINE-DRIVEN FUEL PUMP FAILURE

Failure of the engine-driven fuel pump will result in fuel starvation of the corresponding engine causing that engine to flame out

1. PMS — OFF
2. Collective pitch lever — ADJUST to maintain a minimum of 94 percent rotor rpm; BEEP N_f of operating engine to maximum
3. Airspeed — BEST CLIMB SPEED
4. Engine and flight instruments — CHECK; determine single engine capability
5. Emergency throttle — Activate if required
6. If unable to maintain level or climbing flight — POSITION flight controls to establish 15° RIGHT YAW
7. FUEL — JETTISON as required
8. If level or climbing flight is not possible — SELECT landing area



NOTES:

1. Observe engine and transmission limits.
2. When operating at N_r below 100%, reduce V_{ne} 6 knots for each 1% below 100% N_r.

Figure 1-9. Indicated Never Exceed Speed vs Density Altitude (Sheet 2)

POWER MANAGEMENT SYSTEM FAILURE

If the PMS malfunctions, it is possible to lose any one or a combination of the following features: T_5 limiting, PMS N_g governing, droop anticipation, and engine load sharing. If any of the above are lost the following procedure is recommended.

1. PMS — OFF

TRANSMISSION FAILURE

If excessively high transmission oil temperature, excessively high or low transmission oil pressure, or a chip detector warning is indicated, perform the following:

1. Collective pitch — REDUCE to minimum power
2. Airspeed — ADJUST to 80 KIAS
3. Speed trim — SELECT HOVER AFT on those aircraft so equipped
4. Directional control — NEUTRALIZE and HOLD
5. SAS — SELECT either #1 or #2
6. Helicopter — LAND as soon as possible using minimum power. If a drive system failure is known to exist, land without application of engine power

PMS FAIL

CRUISE CONDITION
BEST RANGE

MODEL: H-46D
ENGINES: (2) T58-GE-10
DATA BASIS: FLIGHT TEST
VERTOL REPORT A02AD005
DATED 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	PRESSURE ALTITUDE	TEMPERATURE	GROSS WEIGHT = 16000 LB.				
			TORQUE PER ENGINE	SPEED		RANGE	
				I.A.S.	T.A.S.	1000 LB FUEL	2000 LB FUEL
	FT	°C	%	KT	KT	N.MI.	N.MI.
STANDARD TEMPERATURE -40°C	0	-25	65	132	122	99	200
	2000	-29	63	129	123	104	210
	4000	-33	62	126	124	109	221
	6000	-37	59	121	123	114	232
	8000	-41	57	116	121	120	243
	10000	-45	55	113	122	125	255
STANDARD TEMPERATURE -20°C	0	-5	64	130	125	99	200
	2000	-9	64	128	127	103	210
	4000	-13	62	124	127	108	220
	6000	-17	60	119	126	114	231
	8000	-21	59	116	126	119	242
	10000	-25	56	111	125	124	253
STANDARD TEMPERATURE	0	15	62	125	125	99	200
	2000	11	63	124	128	103	209
	4000	7	63	123	130	108	219
	6000	3	62	119	131	113	229
	8000	-1	59	115	130	118	240
	10000	-5	58	111	130	124	251
STANDARD TEMPERATURE +20°C	0	35	61	121	126	99	200
	2000	31	61	120	128	103	209
	4000	27	63	120	132	108	219
	6000	23	62	118	134	112	228
	8000	19	60	113	133	118	239
	10000	15	57	107	131	123	250
STANDARD TEMPERATURE +40°C	0	55	53	110	118	100	202
	2000	51	52	106	117	104	211
	4000	47	50	102	117	108	220
	6000	43	49	97	115	113	229
	8000	39	47	91	112	117	238
	10000	35	45	84	108	119	245

REMARKS:
1. FULL FUEL = 2584 LB OF JP-5, 2470 LB OF JP-4.
2. FUEL DOES NOT INCLUDE THAT REQUIRED TO CLIMB TO ALTITUDE.

A

Figure 1-10. Range Chart (Sheet 1)

POWER TURBINE SPEED SIGNAL INTERRUPTION — N_f SIG

Flex shaft failure can be recognized by high torque, N_g, and T_5 indications, coupled with a zero N_f indication on the malfunctioning engine.

1. Collective Pitch — ADJUST to maintain rotor RPM within normal operating limits
2. Emergency Throttle System — ARM
3. Collective Pitch — ADJUST as necessary to obtain 70 percent N_g (or more) on the governed engine
4. #1 and #2 Beep Trim Switch — INCREASE simultaneously until a torque increase is observed on the governed engine
5. Governed Engine Emergency Throttle — RESET. Hold switch to RESET until appropriate light on caution panel extinguishes
6. Engine Condition Lever (ECL) on malfunctioning engine — MOVE SLOWLY FROM FLY TO START. (Move ECL as necessary to attempt a smooth transition from malfunctioning to functioning engine.)
7. Emergency Beep (MALFUNCTIONING ENGINE) — INCREASE to match torques

CONTINUED

CRUISE CONDITION
BEST RANGE

MODEL: H-46D
ENGINES: (2) T58-GE-10
DATA BASIS: FLIGHT TEST
VERTOL REPORT A02AD005
DATED 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	PRESSURE ALTITUDE	TEMPERATURE	GROSS WEIGHT = 18000 LB.				
			TORQUE PER ENGINE	SPEED		RANGE	
				I.A.S.	T.A.S.	1000 LB FUEL	2000 LB FUEL
	FT	°C	%	KT	KT	N.MI.	N.MI.
STANDARD TEMPERATURE -40°C	0	-25	70	135	124	95	193
	2000	-29	68	131	124	100	202
	4000	-33	65	126	123	104	212
	6000	-37	62	120	122	109	221
	8000	-41	61	117	122	114	231
	10000	-45	60	113	122	118	239
STANDARD TEMPERATURE -20°C	0	-5	71	133	128	95	192
	2000	-9	69	129	128	99	201
	4000	-13	67	124	127	104	210
	6000	-17	65	121	128	108	220
	8000	-21	62	115	126	113	229
	10000	-25	60	111	125	117	238
STANDARD TEMPERATURE	0	15	70	129	129	94	191
	2000	11	70	128	132	98	200
	4000	7	69	124	132	103	209
	6000	3	66	119	130	108	218
	8000	-1	64	115	130	112	228
	10000	-5	62	110	129	116	236
STANDARD TEMPERATURE +20°C	0	35	69	126	131	94	191
	2000	31	67	122	130	98	200
	4000	27	65	117	130	103	209
	6000	23	62	112	128	108	218
	8000	19	60	106	125	112	227
	10000	15	57	99	121	115	235
STANDARD TEMPERATURE +40°C	0	55	53	103	111	94	192
	2000	51	52	98	110	98	199
	4000	47	50	93	108	101	206
	6000	43	49	86	103	103	211
	8000	39	47	76	95	102	213
	10000	35					

REMARKS:
1. FULL FUEL = 2584 LB OF JP-5, 2470 LB OF JP-4.
2. FUEL DOES NOT INCLUDE THAT REQUIRED TO CLIMB TO ALTITUDE.

A

Figure 1-10. Range Chart (Sheet 2)

8. Adjust Power and Collective Pitch as necessary to reestablish cruise at 100 percent N_r

NOTE

Judicious use of collective pitch lever/emergency throttle must be exercised when making large power changes (i.e., when landing).

9. Land as soon as practicable/possible

NOTE

The engine operating under the emergency throttle system can only be shut down using the engine condition lever.

CRUISE CONDITION
BEST RANGE

MODEL: H-46D
ENGINES: (2) T58-GE-10
DATA BASIS: FLIGHT TEST
VERTOL REPORT A62AD005
DATED 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	PRESSURE ALTITUDE	TEMPERATURE	GROSS WEIGHT = 20000 LB. TORQUE PER ENGINE	SPEED I.A.S.	SPEED T.A.S.	RANGE 1000 LB FUEL	RANGE 2000 LB FUEL
	FT	°C	%	KT	KT	N.MI.	N.MI.
STANDARD TEMPERATURE -40°C	0	-25	74	135	125	92	185
	2000	-29	72	130	124	96	194
	4000	-33	69	125	123	100	102
	6000	-37	68	121	123	104	211
	8000	-41	67	118	124	107	218
	10000	-45	66	115	124	110	224
STANDARD TEMPERATURE -20°C	0	-5	76	134	129	91	184
	2000	-9	73	129	128	95	193
	4000	-13	72	126	129	99	201
	6000	-17	68	119	126	103	209
	8000	-21	67	115	126	106	217
	10000	-25	69	115	129	109	222
STANDARD TEMPERATURE	0	15	77	133	133	90	183
	2000	11	75	129	133	94	191
	4000	7	72	123	131	98	200
	6000	3	71	119	131	102	208
	8000	-1	70	115	130	105	214
	10000	-5	65	105	123	107	319
STANDARD TEMPERATURE +20°C	0	35	69	122	126	91	183
	2000	31	67	117	125	95	192
	4000	27	65	111	123	98	200
	6000	23	62	104	119	101	207
	8000	19	60	96	114	103	211
	10000	15	57	85	105	102	211
STANDARD TEMPERATURE +40°C	0	55	53	93	101	87	179
	2000	51	52	87	98	88	183
	4000	47	50	77	90	87	183
	6000	43					
	8000	39					
	10000	35					

REMARKS:
1. FULL FUEL = 2584 LB OF JP-5, 2470 LB OF JP-4.
2. FUEL DOES NOT INCLUDE THAT REQUIRED TO CLIMB TO ALTITUDE.

A

Figure 1-10. Range Chart (Sheet 3)

ENGINE CONDITION ACTUATOR FAILURE — ENG. COND. ACT. FAIL.

Failure of an engine condition actuator will result in one of three occurrences. The actuator will remain in position it was in when failure occurred, go to full increase beep trim position, or go to full decrease beep trim position (but never below low range of beep trim).

Actuator failure will become apparent through the inability to change engine rpm by use of beep trim.

Actuator failure with PMS ON

1. PMS — OFF

NOTE

When PMS is turned OFF, droop anticipation and T_5 limiting are removed. The pilot must monitor N_r and T_5.

The Emergency throttle should be used to restore normal engine power output.

2. Emergency throttle — ACTIVATE
3. Beep trim switch — INCREASE on failed actuator/engine until an increase in torque/rotor speed is observed.
4. Emergency throttle reset switch — RESET on engine operating normally.
5. Beep trim switch — ADJUST on the malfunctioning actuator/engine to desired power.

CRUISE CONDITION
BEST RANGE

MODEL: H-46D
ENGINES: (2) T58-GE-10
DATA BASIS: FLIGHT TEST
VERTOL REPORT A02AD005
DATED 3 MARCH 1967

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	PRESSURE ALTITUDE	TEMPERATURE	GROSS WEIGHT = 22000 LB. TORQUE PER ENGINE	SPEED I.A.S.	SPEED T.A.S.	RANGE 1000 LB FUEL	RANGE 2000 LB FUEL
	FT	°C	%	KT	KT	N.MI.	N.MI.
STANDARD TEMPERATURE -40°C	0	-25	79	135	125	88	178
	2000	-29	75	129	123	92	186
	4000	-33	74	126	124	95	193
	6000	-37	74	124	125	98	199
	8000	-41	73	120	125	100	205
	10000	-45	75	119	129	102	209
STANDARD TEMPERATURE -30°C	0	-5	80	134	129	87	177
	2000	-9	79	130	129	91	185
	4000	-13	75	124	127	94	191
	6000	-17	74	120	127	97	198
	8000	-21	75	119	128	99	203
	10000	-25	69	106	119	101	206
STANDARD TEMPERATURE	0	15	83	134	134	87	176
	2000	11	79	128	131	90	183
	4000	7	78	124	132	93	190
	6000	3	73	115	126	95	194
	8000	-1	69	104	117	97	198
	10000	-5	64	91	106	96	197
STANDARD TEMPERATURE +20°C	0	35	69	116	120	87	176
	2000	31	67	109	117	89	182
	4000	27	65	101	113	91	187
	6000	23	62	91	106	91	188
	8000	19	60	77	92	87	184
	10000	15					
STANDARD TEMPERATURE +40°C	0	55	53	76	83	74	157
	2000	51					
	4000	47					
	6000	43					
	8000	39					
	10000	35					

REMARKS:
1. FULL FUEL = 2584 LB OF JP-5, 2470 LB OF JP-4.
2. FUEL DOES NOT INCLUDE THAT REQUIRED TO CLIMB TO ALTITUDE.

B

Figure 1-10. Range Chart (Sheet 4)

ENGINE CONDITION ACTUATOR MALFUNCTION WITH THE ROTOR BRAKE ON

The primary indication of this malfunction will be a rapid rise of gas generator speed above its limits, an immediate increase of torque to its maximum, and a fast, possibly high, rise of T_5.

1. **Rotor brake blade fold lever — OFF**
2. **Engine condition lever — STOP**
3. **Fire handle — PULL (affected engine)**
4. **Rotor System — COAST TO STOP**

CAUTION

Do not apply rotor brake to stop rotors except in extreme emergency. Fire may result if applied prior to shutdown. (A possibility of fire exists in the rotor brake/forward pylon area.)

5. **Shutdown — COMPLETE and inspect aircraft**

MODEL: H-46D
ENGINES: (2) T58-GE-10
DATA BASIS: FLIGHT TEST
VERTOL REPORT A02AD005
DATED 3 MARCH 1967

CRUISE CONDITION
BEST RANGE

CONFIGURATION: CLEAN
FUEL GRADE: JP-4/JP-5
ROTOR RPM: 100 PERCENT

	PRESSURE ALTITUDE	TEMPERATURE	GROSS WEIGHT = 23000 LB.				
			TORQUE PER ENGINE	SPEED		RANGE	
				I.A.S.	T.A.S.	1000 LB FUEL	2000 LB FUEL
	FT	°C	%	KT	KT	N.MI.	N.MI.
STANDARD TEMPERATURE -40°C	0	-25	80	135	125	86	175
	2000	-29	77	130	124	90	182
	4000	-33	77	127	125	93	188
	6000	-37	76	124	126	95	193
	8000	-41	77	122	127	97	198
	10000	-45	76	116	124	98	201
STANDARD TEMPERATURE -20°C	0	-5	82	135	129	86	174
	2000	-9	81	130	129	89	180
	4000	-13	77	124	127	92	187
	6000	-17	80	123	130	94	191
	8000	-21	74	112	121	96	195
	10000	-25	68	97	110	94	196
STANDARD TEMPERATURE	0	15	84	133	133	85	172
	2000	11	82	128	132	88	179
	4000	7	80	121	129	90	184
	6000	3	72	109	119	92	187
	8000	-1	68	96	108	93	190
	10000	-5	65	80	94	87	185
STANDARD TEMPERATURE +20°C	0	35	69	112	116	84	171
	2000	31	67	104	112	86	176
	4000	27	65	94	105	86	178
	6000	23	62	81	94	83	175
	8000	19					
	10000	15					
STANDARD TEMPERATURE +40°C	0	55					
	2000	51					
	4000	47					
	6000	43					
	8000	39					
	10000	35					

REMARKS: 1. FULL FUEL = 2584 LB OF JP-5, 2470 LB OF JP-4.
2. FUEL DOES NOT INCLUDE THAT REQUIRED TO CLIMB TO ALTITUDE.

Figure 1-10. Range Chart (Sheet 5)

LOW FUEL STATE PROCEDURE

LOW FUEL STATE • HYDRAULIC

1. Crossfeed valve — OPEN
2. No. 1 and No. 2 fuel boost pumps — ON
3. Land as soon as practical

HYDRAULIC FLIGHT CONTROL SYSTEM FAILURE

1. Utility hydraulic isolation switch — ISOLATE
2. Control boost pressure switch — SELECT functioning system
3. Radio report — BROADCAST failure and intentions
4. Land as soon as possible
5. To preclude the possibility of fire after engine shutdown, do not apply rotor brake if hydraulic fluid is evident in the forward transmission area

UTILITY HYDRAULIC SYSTEM FAILURE

1. Utility hydraulic isolation switch — ISOLATE
2. Land as soon as practicable and investigate

UTILITY HYDRAULIC SYSTEM OVERHEATING

1. Utility hydraulic system blower circuit breaker — CHECK
2. Utility hydraulic isolation switch — ISOLATE
3. Land as soon as practical
4. If APP is operating — STOP

UT. HYD. OVER-HEAT

SINGLE SAS FAILURE

SAS • CYC. TRIM ACT.

1. Airspeed — SLOW to 80 knots IAS or less
2. SAS selector switch — SAS #1 to SAS #2 to isolate malfunctioning system

NOTE

When switching from SAS #1 to SAS #2, or vice versa, stabilize momentarily in the BOTH position.

3. Master caution lights — RESET
4. Single SAS IAS maximum — 110 KNOTS IAS

DUAL SAS FAILURE

1. Airspeed — SLOW TO 80 KNOTS IAS OR LESS
2. SAS selector switch — OFF
3. SAS dc circuit breaker — PULL
4. Master caution lights — RESET
5. SAS OFF maximum recommended — 110 KNOTS IAS

LONGITUDINAL CYCLIC TRIM ACTUATOR FAILURE

1. DO NOT EXCEED 80 KNOTS IAS
2. Failure of automatic portion of speed trim system only:
   a. AIRSPEED 0 to 110 KIAS — TAXI
   b. AIRSPEED 110 KIAS to V_{ne} — FWD

If HOVER AFT system installed
DO NOT EXCEED 80 KNOTS IAS.

ACT
FAIL

LIFE RAFT PAULIN SIGNALS

NOTE--Solid lines – blue. Dotted lines – yellow.

The pilot of the rescue plane will answer your messages either by dropping a note or by dipping the nose of his plane for the affirmative (yes) and fishtailing his plane for the negative (no).

Have abandoned plane.
LAND--Walking this direction.
SEA--Drifting.

LAND--Need quinine or atabrine.
SEA--Need sun cover

LAND--Need warm clothing.
SEA--Need exposure suit or clothing shown.

LAND and SEA
Plane is flyable. Need tools.

SEA--Need equipment as indicated. Signals follow.

LAND--Need gas and oil.
Plane is flyable.

LAND and SEA
Need medical attention.

LAND and SEA
Need first aid supplies.

LAND and SEA
Need food and water.

LAND--Indicate direction nearest habitation.
SEA--Indicate direction of rescue craft.

LAND--Should we wait for rescue plane?
SEA--Notify rescue agency of my position.

LAND and SEA
O.K. to land. Arrow shows landing direction.

LAND and SEA
Do not attempt landing.

BODY SIGNALS

Need medical assistance--Urgent. Lie prone.

Do not attempt to land here.

Land here. (Point in direction of landing.)

All O.K. Do not wait.

Can proceed shortly--Wait if practicable.

Our receiver is operating.

Use drop message

Need mechanical help or parts--Long delay.

Pick us up--Plane abandoned.

Affirmative (Yes)

Negative (No)

A020-10-1B

GROUND/AIR EMERGENCY CODE

To Be Used to Amplify Distress Signals

INSTRUCTIONS

1. Lay out these symbols by using strips of fabric or parachutes, pieces of wood, stones, or any other available material.
2. Endeavor to provide as big a color contrast as possible between the material used for the symbols and the background against which the symbols are exposed.
3. Symbols should be at least 8 ft. in height or larger, if possible. Care should be taken to lay out symbols exactly as depicted to avoid confusion with other symbols.
4. In addition to using these symbols, every effort is to be made to attract attention by means of radio, flares, smoke, or other available means.

No.	Meaning	Symbol
1.	Require doctor. Serious injuries	
2.	Require medical supplies	
3.	Unable to proceed	
4.	Require food and water	
5.	Require firearms and ammunition	
6.	Require map and compass	
7.	Require signal lamp with battery and radio	
8.	Indicate direction to proceed	
9.	Am proceeding in this direction	
10.	Will attempt take-off	
11.	Aircraft seriously damaged	
12.	Probably safe to land here	
13.	Require fuel and oil	
14.	All well	
15.	NO	
16.	YES	
17.	Not Understood	
18.	Require Engineer	

AIRCRAFT ACKNOWLEDGMENTS

Message Received and Understood.--An aircraft will indicate that ground signals have been seen and understood by--

1. Rocking from side to side, or
2. Making green flashes on signalling lamp.

Message NOT Understood.--An aircraft will indicate that ground signals are not understood by--

1. Making a complete right-hand circuit, or
2. Making red flashes on signalling lamp.

A020-9-1B

LOST PLANE PROCEDURE LOST PLANE

1. Confess
2. Communicate
3. Climb
4. Conserve
5. Conform

SECTION II

NORMAL PROCEDURES

TABLE OF CONTENTS

PRE-FLIGHT INSPECTION (H-46D/CH-46F)

The pilots' pre-flight aircraft inspections during the first two FAM flights shall be conducted in accordance with the Daily Maintenance Requirement Cards.

EXTERIOR INSPECTION (H-46D/CH-46F)

General Inspection

1. Protective covers — REMOVED
2. Wheels — CHOCKED
3. Indication of fuel, oil, hydraulic leaks — CHECK
4. Aircraft cleanliness — CHECK
5. Area — CHECK CLEAR OF OBSTRUCTIONS.

Entrance Door

1. Operation and condition — CHECK

Fuselage (Right Side)

1. Fuselage — INSPECT FOR DENTS, WRINKLES, LOOSE OR MISSING RIVETS
2. Emergency escape panels — CHECK CLOSED AND SECURE
3. Fuel cap security — CHECK
4. Shock strut — CHECK FOR CLEANLINESS AND PROPER INFLATION
5. Tires and brake disks — CHECK CONDITION
6. Stubwing tiedowns — REMOVED
7. Engine No. 2 power turbine — CHECK FOR CORROSION AND FOD

Pylon (Right Side)

1. Aft pylon — INSPECT FOR DAMAGE, CRACKS, WRINKLES, LOOSE OR MISSING RIVETS
2. Engine fire extinguisher blowout plug — CHECK
3. Access hatches and work platforms — CHECK IN PLACE AND SECURE
4. Rear loading ramp — CHECK FOR DAMAGE
5. APP inlet and tailpipe — CHECK CLEAR

Pylon (Left Side)

1. Aft pylon — INSPECT FOR DAMAGE, CRACKS, WRINKLES, LOOSE OR MISSING RIVETS.
2. Engine fire extinguisher blowout and pressure relief plugs — CHECK
3. No. 1 and No. 2 engine oil level — CHECK SIGHT GAGES
4. Aft rotor hub and blades — INSPECT FOR DAMAGE AND SECURITY. If blades are spread, check pitch locking pins fully withdrawn.
5. Aft rotor hub sight gage fluid levels — CHECK
6. Access hatches and work platforms — CHECK IN PLACE AND SECURE
7. Fuselage crown and synchronization shafting tunnel — CHECK FOR DAMAGE AND SECURITY

Forward Rotor

1. Rotor hub and blades — INSPECT FOR DAMAGE AND SECURITY. If blades are spread, check pitch locking pins fully withdrawn
2. Forward rotor hub sight gage fluid levels — CHECK
3. Rotor brake disk and housing — INSPECT for discoloration and warpage
4. Forward transmission oil level — CHECK DIPSTICK
5. No. 1 flight control boost system reservoir — CHECK SIGHT GAGE
6. Access panels and work platforms — CHECK IN PLACE AND SECURE

Fuselage (Left Side)

1. Engine No. 1 power turbine — CHECK FOR CORROSION AND FOD
2. Tires and brake disks — CHECK CONDITION
3. Stubwing tiedowns — REMOVED
4. Shock strut — CHECK FOR CLEANLINESS AND PROPER INFLATION
5. Fuel caps — CHECK SECURITY
6. Refueling control panel tank selector switch — OFF
7. Fuselage — INSPECT FOR DENTS, WRINKLES, LOOSE OR MISSING RIVETS
8. Radio antennas — CHECK CONDITION

9. Rescue hatch — CHECK CLOSED AND SECURE
10. Emergency escape panels — CHECK CLOSED AND SECURE

Nose Section

1. Shock strut — CHECK FOR CLEANLINESS AND PROPER INFLATION
2. Tires — CHECK CONDITION
3. Electronic compartment access hatch — SECURE
4. Nose enclosure — INSPECT FOR CLEANLINESS, CRACKS, SECURITY, AND HYDRAULIC LEAKS
5. Yaw and static ports — UNOBSTRUCTED

INTERIOR INSPECTION (H-46D/CH-46F)

1. No. 1 and No. 2 flight control boost system accumulators — CHECK 500 psi
2. Rotor brake accumulator — CHECK PRESSURE
3. Rescue hoist and hatch — CHECK hoist switch OFF, hatch SECURE
4. Hydraulic accumulator pressure — CHECK 3000 psi
5. EAPS failure indicators — CHECK
6. Hydraulic start lines — CHECK for leakage and proper security
7. Engine compartment — GENERAL INSPECTION for security and leakage
   a. Fuel control actuators — CHECK in shutoff position

b. Fuel control and fuel flow divider — AS REQ

c. Secondary airflow shutoff valve — CHECK POSITION according to environment

8. Fuel crossfeed and shutoff valves — CHECK manual override levers in CLSD position
9. First aid kits — CHECK stowage
10. Interior of helicopter — INSPECT
11. Ramp and hatch control levers — CHECK position
12. Aft transmission oil level — CHECK sight gage
13. Junction box circuit breakers — IN
14. Emergency exits — CHECK security
15. Fire extinguisher — CHECK security
16. Main distribution panel circuit breakers — IN
17. Rotor brake/blade fold lever — ARM
18. Armored seats — CHECK lower panel and wing pins locked; Seat inertia reel — CHECK at AUTO

H-46D CHECKLIST

PRE-START (H-46D)

1. Overhead C/B's — IN
2. Anti-ice panel — AS REQ
3. Generators — ON
4. BATT — ON
5. Rotor brake — ON/Rotor brake light — ILLUMINATED
6. FM ANT — RETRACT
7. Lights — AS REQ
8. Fire detection #5 position — TEST
9. Eng fire handles — IN
10. Eng fire extinguisher agent switches — NORM
11. Utility hyd — NORM
12. Master caution panel — TEST
13. System select — APP
14. Radios/RAD ALT/IFF — OFF
15. Attitude indicator — NORM
16. Fuel boost pumps — ON
17. Crossfeed — CLOSE
18. Fuel jettison — NORM
19. Hyd boost — BOOST #1
20. Parking brakes — ON, Parking brake light illuminated
21. ATS — OFF

22. ALT HOLD — OFF

CAUTION Rotor engagement with ATS or ALT HOLD switch ON may cause inadvertent helicopter response.

23. Speed trim — TAXI (If hover aft system is installed — AUTO)
24. SAS — OFF
25. Stick position trim — OFF
26. Ramp/cargo door arming — NORM
27. Nose wheel — AS REQ
28. Eng condition levers — STOP
29. Ignitions — NORM
30. Power management system — ON
31. Beep switches — MAXIMUM
32. If PMS not desired or inoperative, beep switches — MINIMUM
33. APP — START
34. GP/APP PWR — APP PWR
35. Power control master — GP/APP
36. Radios/IFF — ON
37. Hyd boost — BOTH
38. Utility and #2 hyd boost press — CHECK (If blades are folded, continue with blocked items)

1. Blade fold switch — UNFOLD
2. Rotor blade position and pitch locking pins — VISUALLY INSPECT

3. Rotor unlock button and unfold switch — DEPRESS
   Release the rotor unlock button BEFORE releasing the blade fold switch from UNFOLD position

39. Cruise guide indicator — TEST
40. Flight controls — CHECK
41. Stick position trim — ON
42. Long stick trim — ZERO
43. MA-1 compass — SET

STARTING ENGINES (H-46D)

CAUTION

During any portion of the START cycle, an engine condition actuator malfunction may occur, programming that engine to its FLY condition. The primary danger is overheating the rotor brake, causing a fire in the forward pylon. IMMEDIATELY release the rotor brake and secure the engines.

1. Aircraft clear — CHECK.
2. Rotor lock light — PRESS TO TEST — OUT
3. System select switch — ENG #1
4. Engine fire detectors — TEST
5. T_5 transfer switch — AS DESIRED
6. Engine inlet blower switches — AUTO
7. #1 Eng — START

8. #2 Eng — START
   (Either engine may be started first)

CAUTION **If the engine fails to light-off after the engine condition lever has been in the START position for 15 seconds, abort the start and investigate. Before attempting another start, allow the engine to stop rotating and wait a minimum of 3 minutes to allow proper fuel drainage from the manifold and combustion chamber.**

9. Boost pumps — CHECK/ON

STARTING ROTORS (H-46D)

1. Controls — POSITION/Collective pitch lever in 3° DETENT
2. Aircraft clear — CHECK
3. Harness — LOCKED
4. Rotor brake — OFF; Light — OUT (20 seconds)
5. No. 1 boost pressure — CHECK 1500 psi
6. Forward and aft trans oil press — CHECK for pressure indication
7. Rotor brake/blade fold lever — RELEASE
8. Eng condition levers — FLY
9. Power control master — #1 & #2 GEN
10. Generators — TEST
11. Power off switch — OFF
12. APP — STOP
13. Hyd boost — #1/#2/#1/BOTH
14. Eng inst & caution panel — CHECK
15. Flight inst — SET
16. Rotor RPM — 100%

17. Engine overspeed test switch — TEST momentarily then RELEASE
18. Emergency throttle arming switch — DEPRESS and note the following:
    a. EMER THROT caution lights — ILLUMINATED
    b. Rotor rpm — INCREASES above 100 percent
19. EMER THROT-NORM-RESET switches — RESET and note the following:
    a. EMER THROT caution lights — EXTINGUISHED
    b. Rotor rpm — DECREASES to 100 percent
20. SAS — CHECK
21. Speed trim system — AUTO then TAXI (If hover aft system is installed HOVER AFT then AUTO)
22. Ramp position — CHECK

PRE-TAXI (H-46D)

1. Chocks and tiedowns — REMOVED
2. Parking brakes — OFF
3. Nose wheel — AS REQ
4. RAD ALT — ON

PRE-TAKEOFF (H-46D)

1. Takeoff checklist — CHECK
2. SAS — ON
3. ATS — AS DESIRED

4. Shoulder harness — LOCKED
5. Crew — CHECK
6. Speed trim — AUTO (If hover aft system is installed — HOVER AFT)

PRE-LANDING (H-46D)

1. Landing checklist — CHECK
2. Cargo ramp — CHECK
3. Shoulder harness — LOCKED
4. Crew — CHECK
5. Speed trim switch — AUTO (If hover aft system installed — AUTO or HOVER AFT)
6. ALT HOLD — OFF

POST LANDING (CH-46D)

1. Speed trim switch — TAXI for all ground operations (If hover aft system is installed — AUTO)
2. ATS — OFF
3. SAS — OFF

SHUTDOWN (H-46D)

1. Parking brakes — SET
2. Nose wheel — AS DESIRED
3. System select — APP
4. APP — START
5. GP/APP — APP PWR
6. Power control master — GP/APP
7. System select — #1 ENG

8. Flight controls — NEUTRAL; Collective pitch lever — 3° DETENT
9. Engine condition levers — START after engines have operated at low power for 2 to 3 minutes; Engine condition levers — STOP after N_g is less than 60 percent
10. Engine T_5 and N_g — CHECK for engine fire or actuator malfunction
11. Rotor brake/blade fold lever — ARM
12. Rotor brake — ON
13. Fuel boost pumps — OFF
14. Ignition switches — OFF
    (To fold blades continue with blocked items)

1. Speed trim switch — TAXI (If hover aft system is installed — AUTO)
2. Rotor tip lights — OFF
3. Blade fold control panel lights — PRESS TO TEST
4. Blade fold — FOLD
5. Rotor lock light — CHECK ON
6. Flight controls — POSITION/ CHECK LIGHTS
7. Blade fold — FOLD

15. Lights — OFF
16. Engine T_5 and N_g — CHECK

17. Engine inlet blower switches — OFF
18. Radios/RAD ALT/IFF — OFF
19. Power off switch — OFF
20. Power control master switch — OFF
21. APP — STOP
22. BATT — OFF

CH-46F CHECKLIST

PRE-START (CH-46F)

1. Overhead C/B's — IN
2. Utility hyd isolation switch — NORM
3. Antenna switch — NORM
4. Lights — AS REQ
5. Generators — ON
6. BATT — ON
7. Rotor brake — ON. Rotor brake light illuminated
8. Master caution panel — TEST
9. Attitude indicator — NORM
10. Fuel boost pumps — ON
11. Crossfeed — CLOSE
12. Fuel jettison — NORM
13. Formation and blade tip lights — OFF
14. Anti-ice panel — OFF
15. Fire detectors — TEST
16. ENG fire handles — IN
17. Eng fire extinguisher agent switches — NORM
18. Radios/RAD ALT/IFF/IHAS — OFF
19. Control boost — BOOST #1
20. ATS — OFF
21. ALT HOLD — OFF

CAUTION **Rotor engagement with ATS or ALT HOLD switch ON may cause inadvertent helicopter response.**

22. Speed trim — TAXI
23. Ramp/cargo door arming switch — NORM
24. SAS — OFF
25. Stick position trim — OFF
26. Long stick trim — ZERO
27. Parking brake — ON/parking brake light — ILLUMINATED
28. Nose wheel — AS DESIRED
29. Eng condition levers — STOP
30. Ignitions — NORM
31. Power management system — ON
    a. PMS ON — MAX. BEEP
    b. PMS OFF/INOPERATIVE — MIN. BEEP
32. Crew chief — POSITIONED/aircraft — CLEAR
33. APU — START
34. GP/APU PWR — APU PWR
35. Power control master — GP/APU
36. Radios/RAD ALT/IFF — ON
37. Control boost — BOTH
38. Utility pressure — 2500 to 3500 psi
39. No. 2 boost pressure — 1050 to 1750 psi (If blades are folded, continue with blocked items)

1. Blade fold switch — UNFOLD

2. Rotor blade position and pitch locking pins — VISUALLY INSPECT

3. Rotor unlock button and unfold switch — DEPRESS
   Release the rotor unlock button BEFORE releasing the blade fold switch from unfold position

40. Cruise guide indicator — TEST
41. Flight controls — CHECK
42. Stick position trim — ON
43. AHRS compass — SET

STARTING ENGINES (CH-46F)

CAUTION During any portion of the START cycle, an engine condition actuator malfunction may occur, programming that engine to its FLY condition. The primary danger is overheating the rotor brake, causing a fire in the forward pylon. IMMEDIATELY release the rotor brake and secure the engines.

1. Aircraft clear — CHECK
2. Rotor lock light — PRESS TO TEST — OUT
3. Emergency throttle lights — OUT
4. Engine inlet blower switches — AUTO
5. #1 Eng — START

CAUTION If the engine fails to light-off after the engine condition lever has been in the START position for 15 seconds, abort the start and investigate. Before attempting another start, allow the engine to stop rotating and wait a minimum of 3 minutes to allow proper fuel drainage from the manifold and combustion chamber.

6. #2 Eng — START
   (Either engine may be started first)
7. Boost pumps — CHECK/ON

STARTING ROTORS (CH-46F)

1. Aircraft clear — CHECK
2. Harness — LOCKED
3. Rotor brake — OFF/Light — OUT (20 seconds)
4. No. 1 boost pressure — CHECK 1500 psi
5. Forward and aft trans oil press — CHECK for pressure indication
6. Rotor brake/blade fold lever — RELEASE
7. Eng condition levers — FLY
8. Power control master — #1 & #2 GEN
9. Generators — TEST
10. Power off switch — OFF
11. APU — STOP
12. Hyd boost interlock — CHECK #1/#2/#1/BOTH
13. Speed trim operation — CHECK
14. SAS switch — OFF/NO. 1/BOTH/NO. 2/OFF
15. Flight inst — SET
16. Rotor RPM — 100%
17. Engine overspeed test switch — TEST momentarily then RELEASE
18. Emergency throttle arming h — DEPRESS and note the follo
    a. EMER THROT c... IL-LUMINATED

b. Rotor rpm — INCREASES above 100 percent

19. EMER THROT-NORM-RESET switches — RESET and note the following:
    a. EMER THROT caution lights — EXTINGUISHED
    b. Rotor rpm — DECREASES to 100 percent
20. Ramp position — UP

PRE-TAXI (CH-46F)

1. Chocks and tiedowns — REMOVED
2. Nose wheel — CHECK UNLOCKED
3. Parking brakes — OFF/Parking brake light — OUT

PRE-TAKEOFF (CH-46F)

1. Takeoff checklist — CHECK
2. SAS — ON
3. ATS — AS DESIRED
4. Shoulder harness — LOCKED
5. Crew — CHECK
6. Speed trim — AUTO

PRE-LANDING (CH-46F)

1. Landing checklist — CHECK
2. Cargo ramp — CHECK
3. Shoulder harness — LOCKED
4. Crew — CHECK

5. Speed trim switch — AUTO
6. ALT HOLD — OFF

POST LANDING (CH-46F)

1. Speed trim switch — TAXI for all ground operations
2. ATS — OFF
3. SAS — OFF

SHUTDOWN (CH-46F)

1. Parking brakes — SET
2. Nose wheel — AS DESIRED
3. APU — START
4. GP/APU — APU PWR
5. Power control master — GP/APU
6. Flight controls — NEUTRAL; Collective pitch lever — 3° DETENT
7. Engine condition levers — START after engines have operated at low power for 2 to 3 minutes; Engine condition levers — STOP after N_g is less than 60 percent.
8. Engine T_5 and N_g — CHECK for engine fire or actuator malfunction
9. Rotor brake/blade fold lever — ARM
10. Rotor brake — ON
11. Fuel boost pumps — OFF
12. Ignition switches — OFF
    (To fold blades continue with blocked items)

1. Speed trim switch —TAXI
2. Rotor tip lights — OFF
3. Blade fold control panel lights — PRESS TO TEST
4. Blade fold — FOLD
5. Rotor lock light — CHECK ON
6. Flight controls — POSITION/ CHECK LIGHTS
7. Blade fold — FOLD

13. Lights — OFF
14. Engine T_5 and N_g — CHECK
15. Engine inlet blower switches — OFF
16. Radios/RAD ALT/IFF/IHAS — OFF
17. Power off switch — OFF
18. Power control master switch — OFF
19. APU — STOP
20. BATT — OFF

INSTRUMENT FLIGHT CHECKLIST

After Rotor Engagement

1. Pitot heater — ON
2. Standby magnetic compass — CHECK
3. Vertical speed indicator — CHECK
4. Altimeter — SET
5. Clock — SET
6. Radios — CHECK operation
7. RAD ALT — CHECK
8. Anti-icing, ventilation and defrosting equipment — CHECK operation and utilize as necessary

Taxiing

1. Directional gyro — CHECK
2. Turn and slip indicator — CHECK
3. Attitude indicator — CHECK
4. Standby magnetic compass — CHECK

Before Takeoff

1. Exterior lights — AS REQ
2. Attitude indicator — SET
3. ATS — AS REQUIRED

NOTE

The ATS shall be operable for all night and instrument flights.

SECTION III

SPECIAL PROCEDURES

TABLE OF CONTENTS

SINGLE POINT PRESSURE REFUELING SYSTEM

1. The single point pressure refueling system expeditiously fuels the helicopter in 4 minutes (both tanks simultaneously or each tank separately).
2. The single point fueling station and fuel control panel are located on the left side of the fuselage, immediately forward of the stubwing.
3. Two fuel quantity indicators are installed, one on each side of the fuselage.

Refueling

1. Valve test switches (Left Tank and Right Tank) — P or S (fuel flow should stop)

If full fuel load desired:

2. Tank selector switch — OFF

If partial fuel load desired:

3. Tank selector switch — ARM
4. Fuel quantity selector switch — LFT READ or RT READ
5. When desired fuel level reached fuel quantity selector switch — OFF

NOTE

Battery switch must be ON when using the selective refueling feature or when testing the high-fuel-level shutoff valves.

HOT REFUELING (ENGINES OPERATING)

Use the following procedure with the engines operating, rotors engaged, and battery on:

NOTE

All personnel not necessary to refueling operation shall be disembarked; at least 50 feet from helicopter.

1. All electrical and electronic equipment not necessary for refueling — OFF

NOTE

Pilot must maintain UHF communication with tower to report any emergency.

2. SAS and ATS — OFF
3. Weapons — DISARM
4. Helicopter — GROUND with a suitable ground lead
5. Fuel quantity and S-Point PRESS FUELING CONT circuit breakers — CHECK IN
6. Pressure fueling access door — OPEN
7. Tank selector switch — ARM
8. Fueling nozzle — GROUND AND ATTACH to the pressure fueling receptacle
9. Nozzle adapter cap — REMOVE and insert the fueling nozzle
10. Fueling unit — START
11. Shutoff valve tests — CONDUCT
12. Fuel cell vent outlets — CHECK for airflow

13. Fueling operation — COMMENCE as follows:
    a. Full load — FUEL FLOWMETER STOPS
    b. Partial load — READ right and left tanks at desired amounts
14. FUELING UNIT — OFF and remove nozzle
15. Nozzle adapter — REPLACE Cap
16. Tank selector switch (if used) — OFF
17. Ground — REMOVE
18. Access door — CLOSE
19. Battery switch — OFF

EXTENDED RANGE FUEL SYSTEM

NOTE

Tank selector switch (port side refueling station) must be OFF.

To transfer fuel from the extended range tanks, proceed as follows:

1. System selector valve — TRANSFER
2. Fuel quantity gages—READ approximately one-half full
3. Utility receptacle switch (primary pump) — ON
4. Pump start switch — PRESS and HOLD; when the low level warning light goes out—RELEASE
5. Fuel quantity gages — MONITOR One tank may fill prior to the other. If imbalance exists proceed as follows:

a. Crossfeed valve — OPEN
b. Fuel boost pump in main tank not receiving fuel — OFF When balance is achieved: Fuel boost pump—ON; Crossfeed valve — CLOSED

6. Utility receptacle switch (primary pump) — OFF when main tanks are full to prolong pump life. The pump will shut off automatically only when the extended range tanks are empty or the output fuel pressure drops below the pressure warning switch setting.

7. If, while monitoring fuel gages, no increase in main tank fuel is observed, proceed as folflows:
   a. Utility receptacle switch (primary pump) — OFF
   b. Utility receptacle switch (secondary pump) — ON and execute steps 4 through 6 above.

HELICOPTER IN-FLIGHT REFUELING (HIFR)

1. Helicopter — HOVER over ship's fantail
2. Rescue hook — LOWER. Crewman on ship will allow hook to contact deck thereby discharging static charge. Crewman will then make hookup to refueling hose saddle.
3. Rescue hook — HOIST refueling hose into helicopter
4. Refueling strap — CONNECT to refueling hose saddle

5. Rescue hook — LOWER to relieve tension on cable. The load is then taken by the refueling strap.
6. Helicopter — FLY 25 to 30 feet from the fantail. Actual location will be determined by sea state and pilot preference.
7. Dust cap on filler — REMOVE
8. Refueling hose — ATTACH ground wire; ATTACH hose to filler
9. Ship — INFORM that connection is made and DIRECT to commence refueling operation
10. Copilot — MONITOR refueling rate and fuel quantity gage. Ship's personnel should also monitor refueling rate to report low refueling rate or a sudden drop in refueling rate to the helicopter.

If an emergency occurs:

11. Refueling hose emergency release T-handle — PULL

When sufficient fuel is on board proceed as follows:

12. Ship — INFORM to stop refueling operation
13. Refueling hose — DISCONNECT hose from filler; DISCONNECT ground wire.
14. Dust cap — REPLACE on filler
15. Helicopter — HOVER over fantail
16. Rescue hook — HOIST to relieve load on refueling strap
17. Refueling strap — DISCONNECT from refueling hose saddle

18. Rescue hook — LOWER refueling hose to fantail. Ship's crew will disconnect hook from refueling hose saddle
19. Rescue hook — HOIST into helicopter

PRACTICE AUTOROTATION

1. Approach landing site into the wind in stabilized level flight at 70 knots IAS, 100 percent N_r.
2. Lower collective pitch lever to establish 100 to 113 percent N_r (N_f and N_r needles should split). Position cyclic stick to maintain 65 to 70 knots IAS
3. At approximately 100 to 125 feet, begin a gradual cyclic flare. A 5° increase in pitch from the established autorotative attitude should be sufficient under most conditions. Extreme nose high attitudes should be avoided when close to the ground. The flare should be limited to a maximum of 20° nose up to preclude the possibility of ground contact with the aft ramp. Forward visibility is also reduced considerably in this attitude.
4. At an altitude of approximately 25 feet (depending upon rate of descent) gradually increase collective pitch to reduce rate of descent. At approximately 10 feet, increase rate of collective pitch application to cushion the landing. Normal touchdown ground speed should be 15 to 20 knots.

CAUTION **Maximum ground speed at touchdown should not exceed 40 knots.**

5. Upon touchdown, slowly decrease collective pitch and apply aft stick as necessary to cushion nose wheel contact. Apply wheel brakes to stop forward roll.

SECTION IV

REFERENCE DATA

TABLE OF CONTENTS

HELICOPTER WEIGHT

Basic ..... 12,886 pounds (approximate)
Normal Gross ..... 20,800 pounds
Maximum Gross ..... 23,000 pounds

HELICOPTER DIMENSIONS (APPROX)

Length
  Maximum
    (blades turning) ..... 84 feet 4 inches
  Minimum
    (blades folded ..... 45 feet 8 inches

Width
  Maximum
    (blades turning) ..... 51 feet
  Minimum
    (blades folded) ..... 14 feet 9 inches

Height
  Maximum
    (blades turning) ..... 17 feet
  Maximum
    (blades folded) ..... 16 feet 9 inches

Rotor Blade Ground Clearance
  Blades turning (flight idle, flat pitch)
    Forward ..... 11 feet 8 inches
    Aft ..... 16 feet 8 inches
  Blades static
    Forward ..... 11 feet 2 inches
    Aft ..... 16 feet 2 inches

Miscellaneous

Rotor disc diameter . . . . . 51 feet
Wheel base . . . . . 24 feet 10 inches
Tread . . . . . 14 feet 9 inches
Fuel cell capacity . . . 190 gal. each cell, 188.7 gal. usable each cell

HELICOPTER SERVICING

(NATO equivalents are shown in parentheses.)

Fuel . . . . . JP-4 or JP-5 (F-40 or F-44)

Oil

Engine MIL-L-23699 (0-156)
Transmission MIL-L-23699 (0-156)

Rotary-Wing Head Bearing Reservoirs:
WITHOUT AFC 136
MIL-L-7808 (0-148)
WITH AFC 136
MIL-L-21260
GRADE 2 (C-642)
(Do not mix with 7808)

Hydraulic Fluid

No. 1 Hydraulic Boost System . . . MIL-H-5606 (H-515)
Utility Hydraulic System MIL-H-5606 (H-515)
Rotor Blade Shock Absorber . . . MIL-H-5606 (H-515)

Tire Pressure

Without AFC 243 — 150 to 155 psi
With AFC 243 — 180 to 185 psi

EXTERNAL POWER REQUIREMENTS

10 to 20 KVA, 3-phase, 400-cycle, 208-volt ac

NATO SYMBOL AND CIVILIAN FUEL BRANDS APPROVED FOR H-46D/F HELICOPTER

CIVILIAN COMPANY	PRODUCT	API & ASTM DESIGNATION	EQUIVALENT NATO SYMBOL
Atlantic	Aerojet-B	Jet B	F-40
BP Trading	BP A.T.G.	Jet B	F-40
California Texas	Caltex B	Jet B	F-40
Continental	Conoco JP-4	Jet B	F-40
ESSO Int'l	ESSO Turbo Fuel 4	Jet B	F-40
Gulf	Gulf Jet B	Jet B	F-40
Humble	ESSO Turbo Fuel 4	Jet B	F-40
	ENCO Turbo Fuel 4	Jet B	F-40
Mobil	Mobil Jet B	Jet B	F-40
Phillips	Philjet JP-4	Jet B	F-40
Shell	Aeroshell Superjet Fuel	Jet B	F-40
Standard (Calif.)	Chevron Jet B	Jet B	F-40
Standard (Ky.)	Standard JF-B	Jet B	F-40
Texaco	Texaco Avjet JP-4	Jet B	F-40
Union	Union JP-4	Jet B	F-40

*The NATO symbols denote general types of fuels as manufactured under several national military and commercial specifications, and can be applied to products meeting a general category. Fuels having the same NATO symbol are interchangeable for use by military aircraft.

NATO SYMBOL	U.S. MILITARY SPEC MIL-J-5624 GRADES	U.S. COMMERCIAL SPEC ASTM D-1655-62T GRADES	U.K. GRADES
F-44	***JP-5	None	AVCAT/48
F-40	JP-4	**Jet B	AVTAG

**Equivalent to JP-4 except that freezing point is -60°F vice -76°F
***F-44 approved fuel afloat — F-44 and F-40 approved fuel ashore

INFORMATION REQUIRED FOR ACCIDENT REPORTING

1. Date and time of mishap.
2. Location of mishap.
3. Location of helicopter relative to an easily found landmark (town, airfield, highway, intersection, etc.).
4. Name and rank of injured or deceased personnel.
5. Name (and rank where applicable) of injured or deceased personnel not passengers of the helicopter.
6. Name, Rank, and Serial number of pilots.
7. Brief description of damage to helicopter.
8. Damage to other property.
9. Material failure — if involved.
10. Can helicopter be repaired and or flown out.
11. What spare parts and service are required.
12. Location of nearest airport or safe landing area.
13. Location and number of telephone where you can be reached.
14. Other information that will aid in expediting salvage or rescue operations.

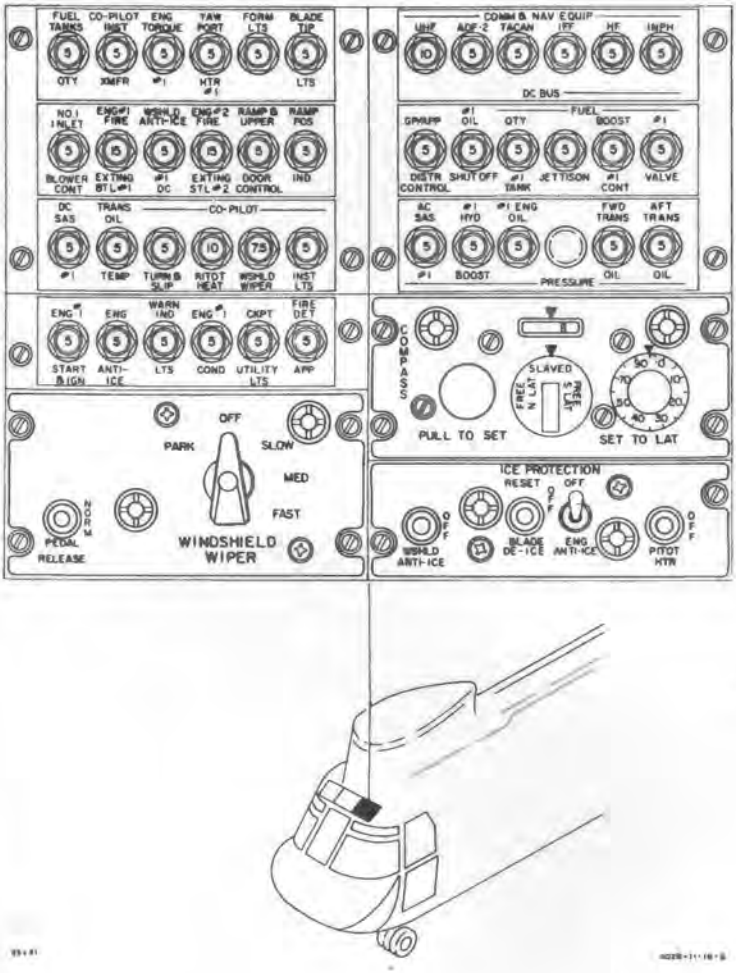
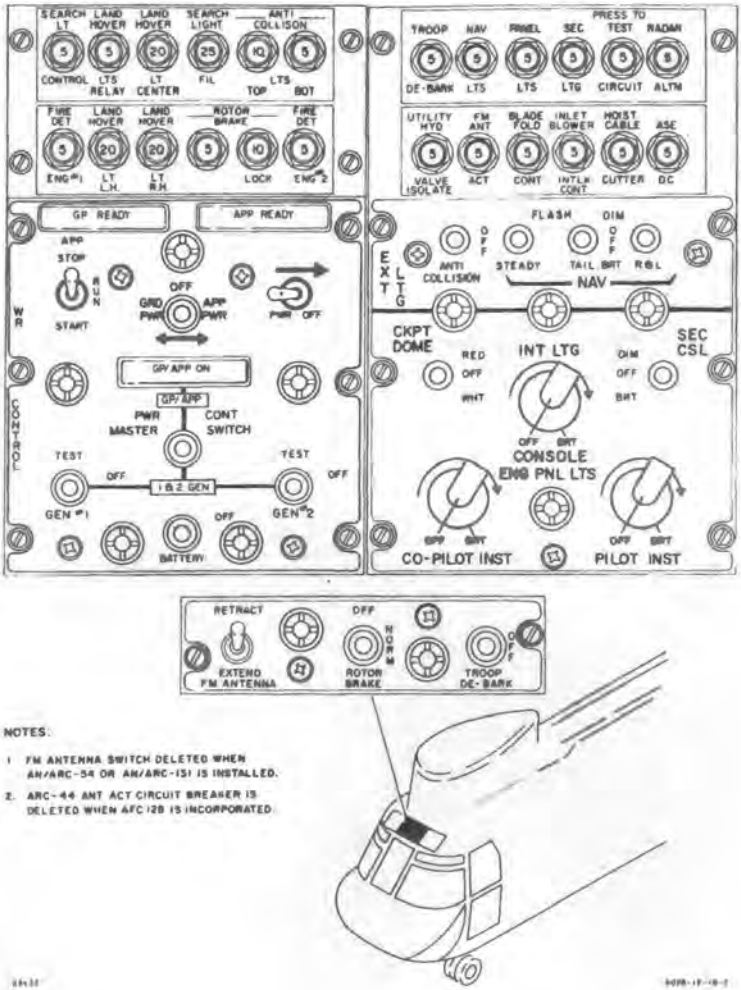


Figure 4-1. Circuit Breaker Diagrams (H-46D) (Sheet 1)



NOTES:

1. FM ANTENNA SWITCH DELETED WHEN AN/ARC-54 OR AN/ARC-131 IS INSTALLED.
2. ARC-44 ANT ACT CIRCUIT BREAKER IS DELETED WHEN AFC 128 IS INCORPORATED.

Figure 4-1. Circuit Breaker Diagrams (H-46D) (Sheet 2)

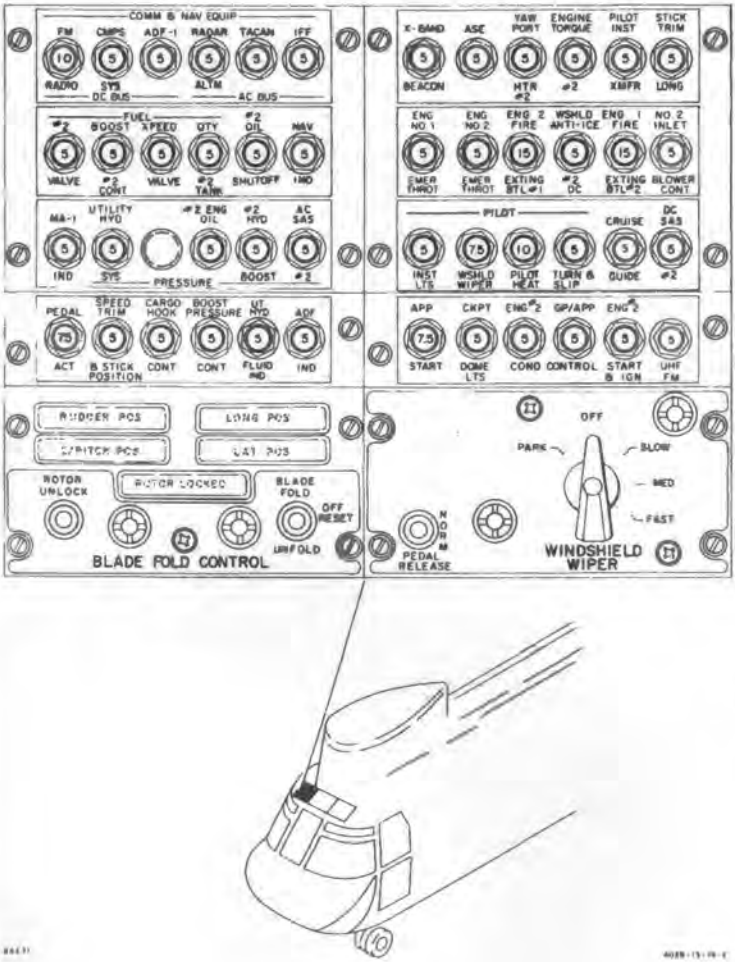


Figure 4-1. Circuit Breaker Diagrams (H-46D) (Sheet 3)

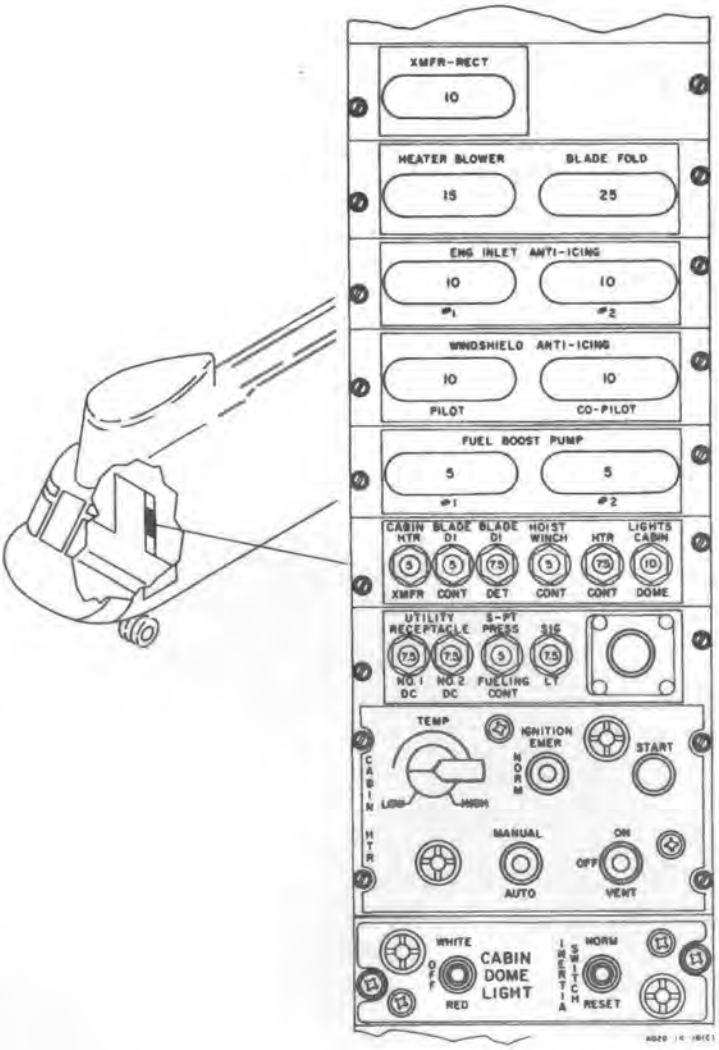


Figure 4-1. Circuit Breaker Diagrams (H-46D) (Sheet 4)

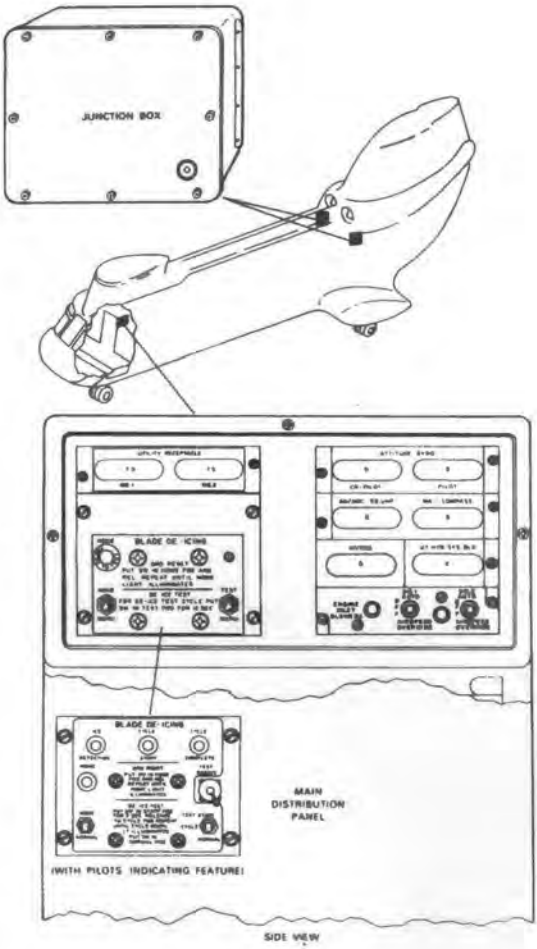


Figure 4-1. Circuit Breaker Diagrams (H-46D) (Sheet 5)

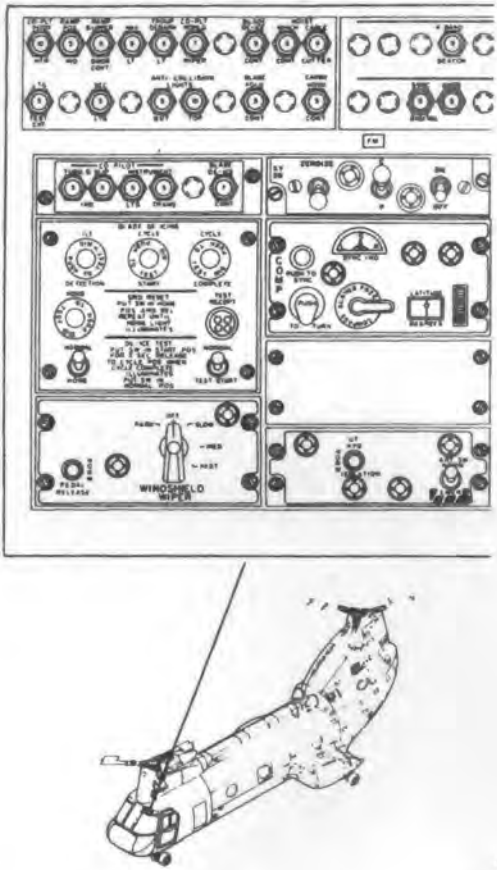


Figure 4-2. Circuit Breaker Diagrams (CH-46F) (Sheet 1)

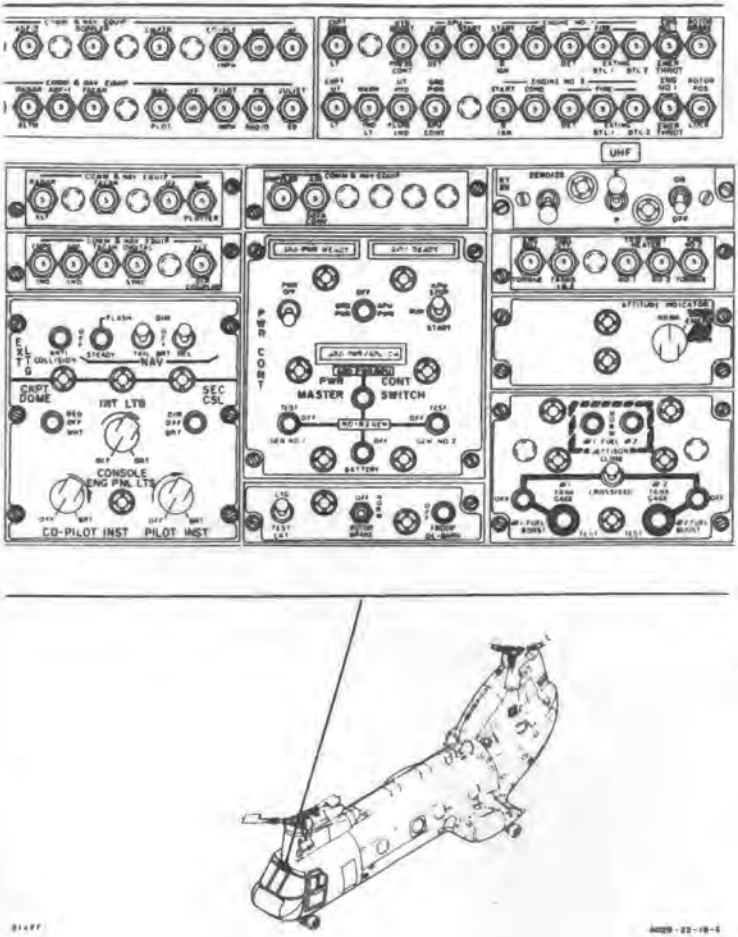


Figure 4-2. Circuit Breaker Diagrams (CH-46F) (Sheet 2)

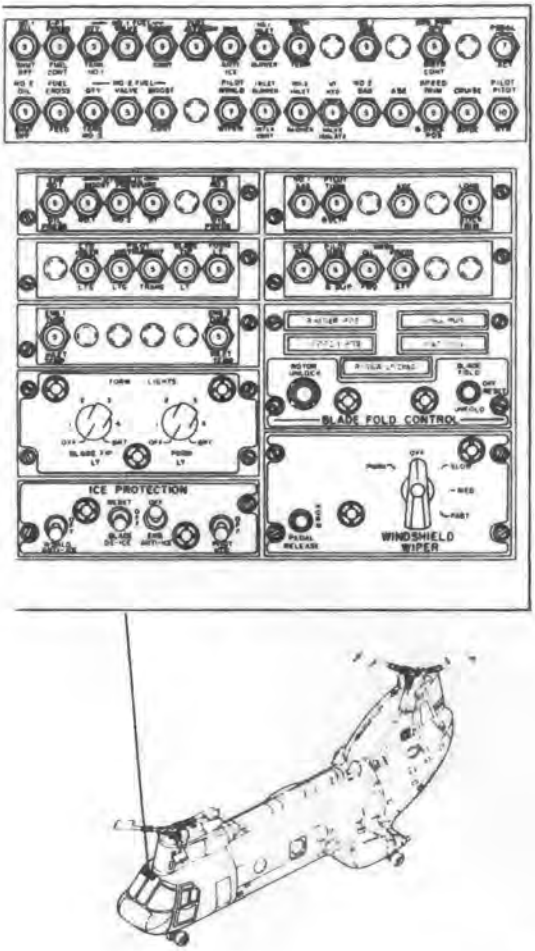


Figure 4-2. Circuit Breaker Diagrams (CH-46F) (Sheet 3)

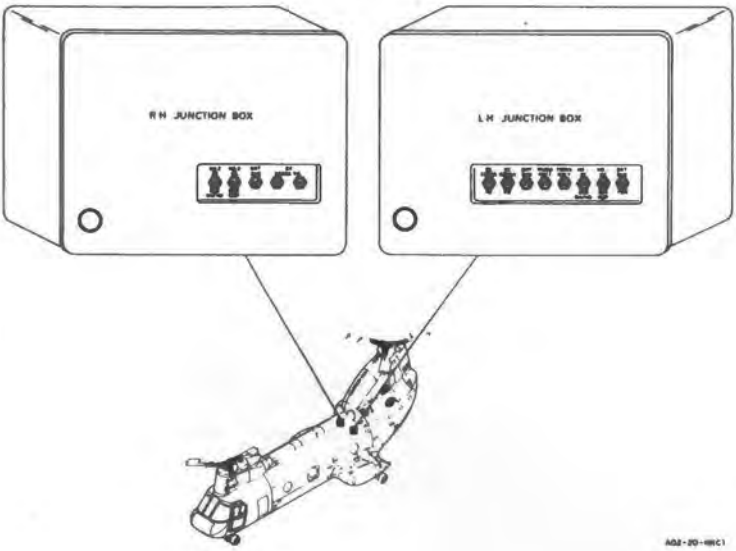


Figure 4-2. Circuit Breaker Diagrams (CH-46F) (Sheet 4)

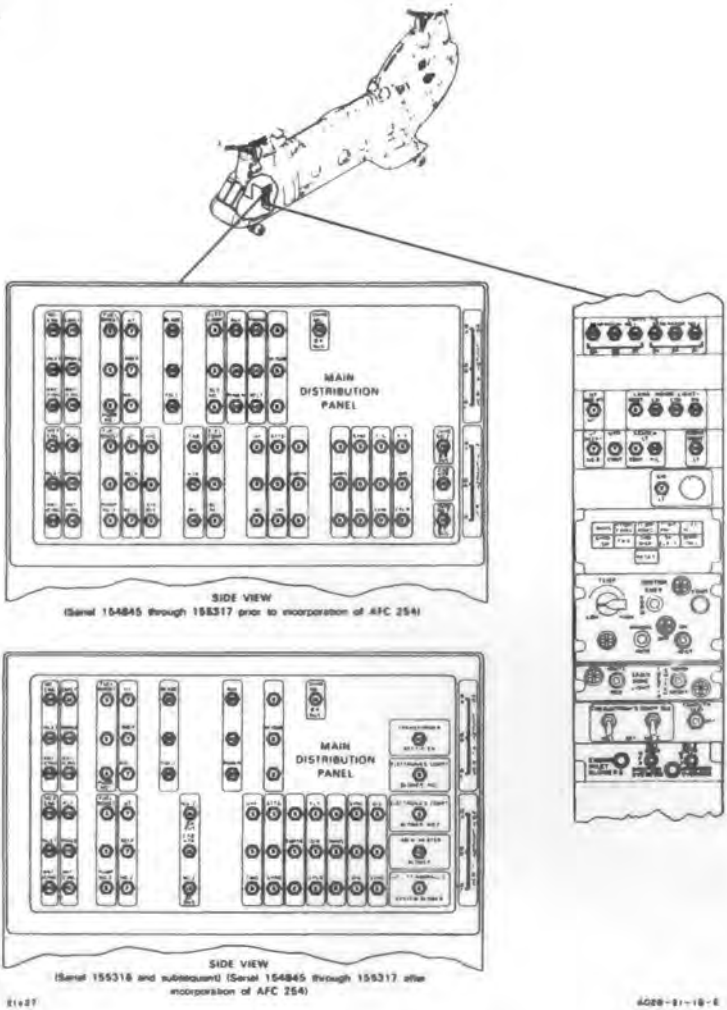
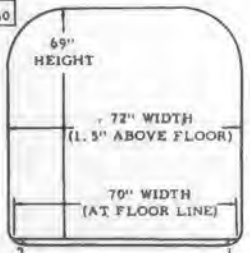


Figure 4-2. Circuit Breaker Diagrams (CH-46F) (Sheet 5)

MAXIMUM PACKAGE SIZE TABLE
RAMP DOOR

WIDTH IN INCHES	HEIGHT IN INCHES: 51 & Under	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
42 & Under	MAXIMUM LENGTH IN INCHES																	
	290	290	290	290	290	290	290	290	285	266	251	234	220	161	129	107	90	61
43	290	290	290	290	290	290	290	290	275	255	242	222	188	146	120	100	87	
44	290	290	290	290	290	290	290	288	266	247	237	220	173	137	115	93		
45	290	290	290	290	290	290	290	277	255	240	225	203	158	131	111			
46	290	290	290	290	290	290	290	268	247	233	220	184	149	126	108			
47	290	290	290	290	290	290	280	259	239	227	215	173	137	121	105			
48	281	281	281	281	281	281	269	250	231	222	204	162	133	118				
49	281	281	281	281	281	281	260	241	229	217	192	152	130	113				
50	281	281	281	281	281	281	252	234	226	214	178	144	127					
51	281	281	281	281	281	273	246	229	215	208	171	140	123					
52	281	281	281	281	281	266	243	225	212	196	160	136						
53	281	281	281	281	281	260	240	222	211	187	151	131						
54	281	281	281	281	281	253	233	221	209	183	145							
55	281	281	281	281	280	246	226	220	200	166	140							
56	281	281	281	281	278	240	222	219	190	160								
57	281	281	281	281	276	236	218	204	181	154								
58	281	281	281	281	273	233	217	184	161									
59	281	281	281	281	269	230	205	175										
60	281	281	281	281	262	228	196	171										
61	281	281	281	281	256	225	194											
62	281	281	281	281	245	215	192											
63	281	281	281	269	233	198												
64	281	281	281	250	220	184												
65	281	281	281	236	204													
66	281	281	277	220	194													
67	281	281	255	210														
68*	281	281	240	200														
69**	281	268	228															



NOTES:

290/288 - Plane Captain's Seat must be removed for 290" PKG.
* - Either R or L Troop Seats must be removed for 68" width.
** - Both R & L Troop Seats must be removed for 69" width.

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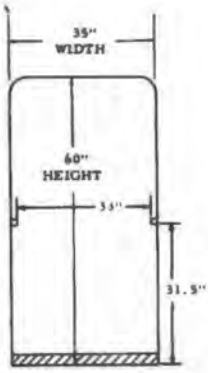
Figure 4-3. Maximum Package Size — Ramp Door

MAXIMUM PACKAGE SIZE TABLE FORWARD DOOR - RIGHT SIDE								
WIDTH IN INCHES	HEIGHT IN INCHES							
	19 & Under	20 to 26	27 to 29	30 to 37	38 to 45	46 to 50	51 to 55	56 to 57
	MAXIMUM LENGTH IN INCHES							
9	174	174	174	174	174	174	174	165
10	165	165	165	165	165	165	165	158
11	158	158	158	158	158	158	158	150
12	149	149	149	149	149	149	149	142
13	143	143	143	143	143	143	143	137
14	137	137	137	137	137	137	137	132
15	132	132	132	132	132	132	132	128
16	125	125	125	125	125	125	125	122
17	122	122	122	122	122	122	122	118
18	117	117	117	117	117	117	117	114
19	113	113	113	113	113	113	113	110
20	108	108	108	108	108	108	108	107
21	106	106	106	106	106	106	106	104
22	102	102	102	102	102	102	102	101
23	100	100	100	100	100	100	100	98
24	97	97	97	97	97	97	97	96
25	94	94	94	94	94	94	94	93
26	92	92	92	92	92	92	92	91
27	89	89	89	89	89	89	89	88
28	87	87	87	87	87	87	87	86
29	86	85	85	85	85	85	85	84
30	83	82	82	82	82	82	82	82
31	81	81	81	81	81	81	81	80
32	79	78	78	78	78	78	78	78
33	77	77	77	77	77	77	77	76



NOTE:

SHADED PART SHOWS APPROXIMATE AREA OBSTRUCTING PACKAGE LOADING

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Figure 4-4. Maximum Package Size — Forward Door

MAXIMUM PACKAGE SIZE TABLE
RESCUE HATCH

1. Aircraft in static ground position - normal gross weight

WIDTH IN INCHES	HEIGHT IN INCHES							
	9	12	15	18	21	24	27	30
	MAXIMUM LENGTH IN INCHES							
30 & UNDER	20	20	20	20	20	20	20	20

2. Aircraft in hovering position

PACKAGES LOADED IN FORWARD DIRECTION								
WIDTH IN INCHES	HEIGHT IN INCHES							
	9	12	15	18	21	24	27	30
	*MAXIMUM LENGTH IN INCHES							
30 & UNDER	44	44	44	44	44	44	44	44
PACKAGES LOADED IN AFT DIRECTION								
	*MAXIMUM LENGTH IN INCHES							
30 & UNDER	49	49	49	49	49	49	49	49

NOTE: *Maximum length of package includes cable slack for swing free clearance, permitting one man operation.

CAUTION: WHEN USING HOIST TO WINCH IN PACKAGE THROUGH RESCUE HATCH MAXIMUM WEIGHT AT END OF CABLE IS NOT TO EXCEED 600 POUNDS.

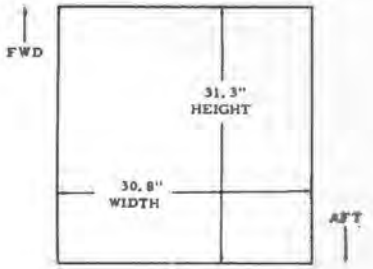

Figure 4-5. Maximum Package Size — Rescue Hatch

COMPUTATION CARD

(1) Takeoff pressure alt _____ ft — Wind _____ kts

(2) Takeoff temp: _____ °C

(3) No wind HOGE max gross — _____ lb

(4) Wind correction — (+) _____ lb

(5) HOGE max gross w/wind (23,000 lb max) — _____ lb

(6) Operating weight (basic wt plus crew, oil, and tools) — (−) _____ lb

(7) Payload plus fuel — _____ lb

(8) Range out _____ NM

(9) Time/fuel out ..... _____ min/ _____ lb

(10) Range in _____ NM

(11) Time/fuel in ..... _____ min/ _____ lb

(12) Fuel for warm-up, pick-up and reserve (+) _____ lb

(13) Total fuel required — _____ lb

(14) Total fuel aboard (gauge reading) — (−) _____ lb

(15) Payload out — _____ lb

(16) Landing pressure alt _____ ft — Landing wind _____ kts

(17) Landing temp: _____ °C

(18) Landing no wind HOGE max gross — _____ lb

(19) Wind correction (landing) — (+) _____ lb

(20) Landing HOGE max gross w/wind — _____ lb

(21) Fuel out — (+) _____ lb

(22) *Max. gross permitted at takeoff because of landing conditions _____ lb

*If this weight is less than line (5) above, substitute this weight in line (5) and recompute payload.

Note: This form may be abbreviated for daily local area operation.

Figure 4-6. Computation Card

CENTIGRADE	FAHRENHEIT
-50	-58
-45	-49
-40	-40
-35	-31
-30	-22
-25	-13
-20	-4
-15	5
-10	14
-5	23
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113
50	122

Conversion Formula

$°F = (9/5°C) + 32°$

$°C = 5/9\ (°F - 32°)$

Figure 4-7. Temperature Conversion Table

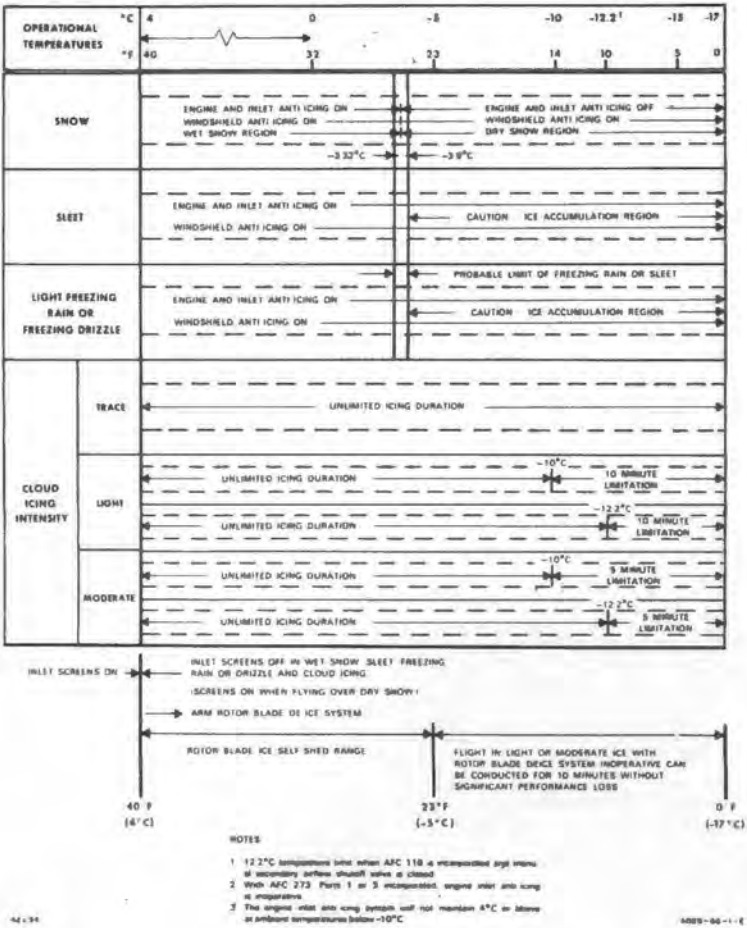

Figure 4-8. H-46D/F Cold Weather Operation

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