



AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

TYPE CERTIFICATE DATA SHEET Nº EM-8215

Type Certificate Holder:

HONEYWELL INTERNATIONAL INC.
 111 South 34th Street
 Phoenix Arizona 85034
USA

EM-8215-02
 Sheet 01
 HONEYWELL
 LTS 101-600A-2
 LTS 101-600A-3
 LTS 101-600A-3A
 LTS 101-650C-2
 LTS 101-650C-3
 LTS 101-650C-3A
 LTS 101-750C-1
 LTS 101-700D-2
 January 2008

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 8215, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Brazilian Aeronautical Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other instructions.

MODEL LTS 101-600A-2; -600A-3, -600A-3A, -650C-2; -650C-3; -650C-3A; 750C-1; 700D-2.

TYPE Free turbine turbo shaft for rotorcraft application; single stage axial and centrifugal compressor; annular reverse flow combustion chamber. Single stage gas generator turbine. Single stage free power turbine.

RATINGS	Models	600A-2	600A-3	600A-3A	650C-2	650C-3	650C-3A
	<u>Standards conditions at sea level</u>						
	Output shaft power kw(shp)						
	Max. Continuous at sea level	440 (590)	--	466(625)	441 (592)	446 (598)	--
	Takeoff (5 min.) at sea level	459 (615)	--	485(650)	468 (628)	470 (630)	--

Legend: "#" = does not apply

"--" same as preceding model

Pavol

RATINGS

Models	750C-1	700D-2				
<u>Standards conditions at sea level</u>						
Output shaft power kw (shp):						
Max. Continuous at sea level	487 (653)	485 (650)				
Takeoff (5 min.) at sea level	510 (684)	546(732)				
	600A-2	600A-3	600A-3A	650C-2	650C-3	650C-3A
2,5 min. helicopter rating at sea level (1 engine inoperative)	#	#	#	519.3 (383)	--	--
30 min. helicopter rating at sea level (1 engine inoperative)	#	#	#	500.3 (369)	--	--
Transient	805.4 (594)			568.1 (419)	--	--
No load (autorotation)	0			--	--	--
*						
<u>Reduction gear ratio</u>						
Output shaft speed/power turbine speed	0.1612			0.2632	--	--
	750C-1	700D-2				
2,5 min. helicopter rating at sea level (1 engine inoperative)	565.4 (417)	#				
30 min. helicopter rating at sea level (1 engine inoperative)	538.3 (397)	#				
Transient	650.8 (480)	983.0 (725)				
No load (autorotation)	--	--				
*						
<u>Reduction gear ratio</u>						
Output shaft speed/power turbine speed	--	0.1654				

FUEL

Type ASTM D1655, Jet-A, -A1, -B, MIL-DTL-T 5624, grade JP-4, JP-5, JP-8 or equivalent.

	600A-2	600A-3	600A-3A	650C-2	650C-3	650C-3A
Control	Bendix DP-S1	--	--	--	--	--
Filter	10 M nom.	7 M abs.	--	--	--	--
	750C-1	700D-2				
Control	--	--				
Filter	--	--				

OIL, LUBRICATION

Type I (from ambient temperature to temperatures of -54 °C (-65 °F). MIL L-7808; NATO 0-148

Type II (from ambient temperature to temperatures of -45 °C (-40 °F). MIL PRF-23699; NATO 0-156

	600A-2	600A-3	600A-3A	650C-2	650C-3	650C-3A
IGNITION EXCITER UNIT (28 volts DC)						
Exciter box	1-300-363-01/02/03/04	--	--	--	--	--
Ignitor plus	1-300-363-01/02/03/04/05/06	--	--	--	--	--
BASIC DIMENSIONS						
Length	785.6 (31.56)	--	--	792.7 (31.21)	--	795.3 (31.31)
Width	466.6 (19.37)	--	--	574.0 (22.60)	--	--
Height	600.5 (24.80)	--	--	494.0 (19.45)	--	--
WEIGHT						
Dry N (lbf)	1 125.4 (253)	1178.8 (265)	1178.8 (265)	1 068.9 (240.3)	--	1 080.9 (243)
CENTER OF GRAVITY						
mm (in)	X= -142.5 (-5.61) Y= 3.81 (0.150) Z= 47.8 (1.88)	--	--	X= -206 (-8.11) Y= 6.1 (0.240) Z= 16.3 (0.641)	--	X= -200.8 (-7.906) Y= 7.97 (0.314) Z= 15.18 (0.598)

		750C-1	700D-2
IGNITION EXCITER UNIT (28 volts DC)	Exciter box	--	1-300-363-03/04
	Ignitor plugs	--	1-300-363-07
BASIC DIMENSIONS	Length	--	801.6 (31.56)
	Width	511.8 (20.15)	492.0 (19.37)
	Height	--	629.9 (24.80)
WEIGHT	Dry N (lbf)	1 085.4 (244)	1 205.5 (271)
CENTER OF GRAVITY	mm (in)	X= -197.2	X= -142.5
		(-7.767)	(-5.61)
		Y= 7.69	Y= 3.81
		(0.303)	(0.150)

The coordinates follow X-Y-Z configuration as per installation drawing 4-001-001-06 for engine models LTS 101 -600A-2, fig. 6.1 of "Installation instructions" Manual, 101.14.35 for models LTS -101-650C-2-650C-3, 650C-3A, installation drawing 4-001-001-19 for 600A-3 600A-3A 4-002-003-03 for the LTS 101-750C-1 engine, Installation Drawing 4-001-001-36 for the LTS 101-700D-2 engine.

OUTPUT SHAFT

The internal (female) spline of the output power shaft, pad location dimensions, and limit loads are given in the correspondent Installation drawing of each engine model.

IMPORT REQUIREMENTS

Each engine imported separately and/or spare parts must be accompanied by an Airworthiness Certificate for Export and/or an Airworthiness Approval Tag, respectively, issued by Federal Aviation Administration (FAA) attesting that the particular engine and/or parts were submitted to the governmental quality control before delivery and are in conformity with the ANAC approved type design.

CERTIFICATION BASIS	Brazilian Type Certificate No 8215 based on the RBHA 1510, which endorses the FAR 33 effective 01 February 1965 as amended by 33-1, 33-2, 33-3, 33-4, and 33-5.	<u>Model</u>	<u>Application</u>	<u>Issued TC</u>
		LTS 101-600A-2	28 May 1982	29 Dec. 1982
		LTS 101-650C-2	16 Jan. 1980	29 Dec. 1982
		LTS 101-650C-3	08 July 1986	30 June 1988
		LTS 101-650C-3A	08 July 1986	30 June 1988
		LTS 101-750C-1	08 July 1986	30 June 1988
		LTS 101-700D-2	12 Sep. 2006	07 Jan. 2008
		LTS 101-600A-3	01 Jun. 2007	07 Jan. 2008
		LTS 101-600A-3A	01 Jun. 2007	07 Jan. 2008

NOTES:

NOTE 1	<u>Maximum Temperature Limits °C (°F)</u>	600A-2	650C-2	650C-3	650C-3A	750C-1	700D-2
	Exhaust gas temperature:						
	Starting	899* (1 650*)	--	--	--	--***	944 (1 731)
	Transient	843* (1 550*)	--	--	--	847* (1 556)	944 (1 731)
	2,5 min. (1 engine off)	#	832 (1 530)	--	--	822 (1 511)	#
	30 min. (1 engine off)	#	796 (1 464)	--	--	799 (1 470)	#
	Takeoff	782 (1 440)	--	--	--	786 (1 446)	923 (1 694)
	Max. Continuous	763 (1 405)	--	--	--	765 (1 409)	890 (1 653)
	Partial power (5 min.)	#	763 (1 405)	--	--	--	

* Transient and starting temperatures shall not exceed 832 (1530) for more than 12 sec.

** Transient and starting temperatures shall not exceed max. temperature for take-off for more than 22 sec.

*** Transient and starting temperatures shall not exceed 822 (1511) for more than 12 sec.

(1) Aplicate service bulletin LT/01-7250-0126 and LT/01-72 50-0157 are incorporated for all other-600A-3 engines, the minimum MGT at the take off rating shallber 749°C (1 380°F) and 735°C (1 355°F)at the maximum continuos rating.

<u>Maximum Oil Inlet Temperature</u>	600A-2	650C-2	650C-3	650C-3A	750C-1	700D-2
For ambient temperature lower than 38 °C (100 °F)	99 (210)	105 (220)	--	--	--	99 (210)
For ambient temperature 38 °C (100 °F) or higher	110 (230)	--	--	-- ***	--***	--

Temperature limits are also applicable to one engine inoperative condition.

NOTE 2	<u>Pressure limits kPa (psi)</u>	600A-2	600A-3	600A-3A	650C-2	650C-3	650C-3A
	<u>Fuel pressure</u>						
	Max. pressure	310.26 (45)	--	--	448.16 (65)	--	--
	Min. pressure	103.42 (15)	--	*	*	*	*
	<u>Oil pressure</u>						
	At maximum continuous power or above:						
	Max. pressure	552-689 (80-100)	--	--	--	--	--
	At flight idle or below	138 (20)	#	#	#	#	#
	At flight idle, temperature oil inlet above 10°C (50 °F)	#	138 (20)	--	--	--	--
	At flight idle, temperature oil inlet at or below 10°C (50 °F)	#	344 (50)	--	--	--	--
				#			
	<u>Pressure limits kPa (psi)</u>	750C-1	700D-2				
	<u>Fuel pressure</u>						
	Max. pressure	--	--				
	Min. pressure	*	*				
	<u>Oil pressure</u>						
	At maximum continuous power or above						
	Max. pressure	--	--				
	At flight idle or below	#	#				
	At flight idle, temperature oil inlet above 10°C (50 °F)	--	--				
	At flight idle, temperature oil inlet at or below 10°C (50 °F)	--	--				

* The fuel system of these engines provides suction lift capability without any external assistance, except in conditions where the V/L ratio is higher than 0.45.

NOTE 3 Accessory drive provisions:

Accessory Drive	Gear Ratio	Max. Cont. Torque Nm (in.lb)	Max. Peak Torque During Starts Nm (in.lb)	Max. Transient Torque Nm (in.lb)	Rotation (Viewing) Drive Pad	Fixing on Pad
Start Generator Model -600A-2	0.2512 Ng ⁽¹⁾	5.197 (46) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model -650C-2	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model -650C-3	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model -650C-3A	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model -750C-1	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model -700D-2	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model 600A-3	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Start Generator Model 600A-3A	0.2512 Ng ⁽¹⁾	8.021 (71) ⁽²⁾	56.49 (500)	16.95 (150) ⁽⁴⁾	CW ⁽⁵⁾	AND 20001 Modified ⁽³⁾
Accessory control Model -600A-2	0.3406 Npt ⁽¹⁾	80.47 (75)	#	#	CW ⁽⁵⁾	AND 20002 Modified ⁽³⁾
Accessory control Model -650C-2	0.3406 Npt ⁽¹⁾	80.47 (75)	#	#	CW ⁽⁵⁾	AND 20002 Modified ⁽³⁾
Accessory control Model -650C-3	0.3406 Npt ⁽¹⁾	80.47 (75)	#	#	CW ⁽⁵⁾	AND 20002 Modified ⁽³⁾
Accessory control Model -650C-3A	0.3406 Npt ⁽¹⁾	80.47 (75)	#	#	CW ⁽⁵⁾	AND 20002 Modified ⁽³⁾
Accessory control Model -750C-1	0.3406 Npt ⁽¹⁾	80.47 (75)	#	#	CW ⁽⁵⁾	AND 20002 Modified ⁽³⁾
Spare Control Model -600A-2	0.5375 Npt ⁽¹⁾	2.26 (20)	#	#	CCW ⁽⁵⁾	AND 20000 Modified ⁽³⁾⁽⁶⁾
Spare Control Model -750D-2	0.5375 Npt ⁽¹⁾	2.26 (20)	#	#	CCW ⁽⁵⁾	AND 20000 Modified ⁽³⁾⁽⁶⁾

NOTE 3 (Cont.)	Accessory Drive	Gear Ratio	Max. Cont. Torque Nm (in.lb)	Max. Peak Torque During Starts Nm (in.lb)	Max. Transient Torque Nm (in.lb)	Rotation (Viewing) Drive Pad	Fixing on Pad
	Space Control Model -600A-3	0.5375 Npt ⁽¹⁾	2.26 (20)	#	#	CCW ⁽⁵⁾	AND 20000 Modified ^{(3) (6)}
	Space Control Model - 600A-3A	0.5375 Npt ⁽¹⁾	2.26 (20)	#	#	CCW ⁽⁵⁾	AND 20000 Modified ^{(3) (6)}

(1) Ng = Gas Generator Speed Npt= Power Turbine Speed

(2) If the starter/generator rating is more than 150 amps, the continuous electric load must be limited to 150 amps when the gas generator speed is less than 4 511.3 rad/s (43.100 rpm).

(3) Limit pad speed and maximum loads modified.

(4) To be used in generating mode only, with a time limit of 30 seconds.

(5) C.W. = Clockwise C.C.W.= counterclockwise.

(6) Pad pilot diameter modified to 41.2 mm (1.622 in). Pad spline pitch diameter modified to 11.64 mm (0.4583 in).

*The starter/generator must not be put on line until a minimum Ng speed of 50% is attained.

NOTE 4 Conditions to evaluate engine ratings

Engine ratings are based on calibrated stand performance under the following conditions: static sea level standard conditions at 15°C (59 °F) and 1 013 mb (29.92 in.Hg), no airbleed, no duct losses, no external power extraction. Exhaust configuration as specified in the applicable engine Installation Instructions.

NOTE 5 Model description:

LTS 101-600A-2 - Turboshaft engine of modular design, consisting of 3 modules: the Accessory/Reduction Gearbox, the Gas Generator and the Combustion chamber/Power Turbine Assembly. An axial and centrifugal compressor driven by a Gas Generator turbine; a gearbox case in aluminium.

LTS 101-650C-2/ 3/ 3A - Turboshaft engine of modular design, consisting of 3 modules: the Accessory/Reduction Gearbox, the Gas Generator composed of an axial and centrifugal compressor; and the gearbox case in magnesium. C-2 and C-3A Engines possess a modified gas generator turbine rotor Assembly.

LTS 101-750C-1 - Turboshaft engine of modular design, consisting of 3 modules: the Accessory/Reduction Gearbox, the Gas Generator composed of an axial and centrifugal compressor; and the gearbox case in magnesium.

NOTE 6 Engine accessories certified with aircraft:

The aircraft manufacturer shall utilize a starter/generator and voltage regulator that complies with specifications defined by Honeywell Document n^o 81-12, for models LTS 101-600A-2- 600A-3/3A, -650C-2/3/3A, -750C-1, and -700D-2
 The air intake of these engines is not protected against ice ingestion, sands or foreign objects. Protection against F.O.D. shall be provided by the aircraft manufacturer.

NOTE 7 Model cancellation: Not applicable.

NOTE 8 Rotation Standard Speed, Overspeed and Alternate Ratings rad/s (rpm):

100% of power turbine shaft speed corresponds on model 600A-2 600A-3/3A and 700D-2 to 3 872.7 (37 000), on model -650C-2/3/3A and on -750C-1 to 3 795.8 (36 265).
 100% rotation speed on gas generator turbine on all models corresponds to 5010.4 (47 870).

Ratings	Outputshaft Max. Rotation					Gás. Generator – Max. Rotation						
	-650A-2	600A-3	-650C-2/3/3A	-750C-1	-700D-2	600A-3A	600A-2	600A-	650C-2/3/3A	-750C-1	-700D2	600A-3
Transient	659.4 (6 300)	--	1 024.1 (9 784)	1 039.8 (9 930)	775.2 (7 404)	753.8 (7 200)	5 293 (50 548)	5 318 (50 787)*	5 293 (50 548)	5 318 (50 787)	5 372 (51 313)	5 318 (50 787)
2,5 min. (1 engine inop)	#	#	999.5 (9 545)	999.5 (9 545)	#	#	#	#	5 293 (50 548)	5 318 (50 787)	#	#
30 min. (1 engine inop)	#	#	999.5 (9 545)	999.5 (9 545)	#	#	#	#	5 253 (50 169)	5 253 (50 189)	#	#
Take-off	636.9 (6 085)	--	999.5 (9 545)	999.5 (9 545)	709.9 (6 780)	--	5 197.7 (49 638)	5 217.8 (49 830)	5 197.7 (49 638)	5 217.8 (49 830)	5 343 (51 026)	5 343 (51 026)
Max. continuous	636.9 (6 085)	--	999.5 (9 545)	999.5 (9 545)	709.9 (6 780)	--	5 147.5 (4 915)	5 157.6 (49 255)	5 147.5 (4 915)	5 157.6 (49 255)	5 253 (50 164)	5 253 (50 164)
5 min. partial power	#	#	1 039.8 (9 930)	1039.8 (9 930)	#	#	#	#	5 147.5 (4 915)	5 157.6 (49 255)	#	#
Auto-rotation No load	659.4 (6 300)	--	#	1 039.8 (9 930)	709.9 (6 780)	#	#	#	#	#	#	#

NOTE 9 Bleed air extraction:

The max. permissible compressor airbled extraction available for customer use is 5 percent of inlet airflow at static sea level standard conditions, provided that operational limits are not exceeded.

NOTE 10 Alternative Fuel (Emergency Usage)

- Automotive Diesel Fuel (Arctic Grade) to be used with an outside air temperature above - 15°C (+ 5°F)

Classification: ASTM D975 (n^o 1-D and Grade Low Sulphur n. 1-D)

- Automotive Diesel Fuel (Regular Grade) to be used with an outside air temperature above +5°C (+ 41°F)

Classification: ASTM D975 (n^o 2-D and Grade Low Sulphur n. 1-D)

A-A-52557 (Grade Low Sulphur N. 2-D)

MIL-F-46162, Type I (for development and verification testing only)

Water content of diesel fuels must not exceed 0.05 percent.

Hot section inspection must be performed after 400 hours of operation is accumulated on special usage fuels.

NOTE 11 Additives

Shell Petroleum ASA3 anti-static additive at concentration not in excess of 0.0001 percent by volume is approved for use in fuels for this engine. PRIST MIL-DTL-27686 (NATO S-748) or PHILIPS PFA-55MB anti-icing additive, or equivalent at concentration not in excess of 0.15% by volume is approved for use with fuels for this engine.

NOTE 12 Requirements for anti-icing and de-icing equipment

LTS 101-600A-2/650C-2/650C-3/650C-3A

Bleed air load for anti-icing protection amounts 1% of total mass of air operating satisfactorily as per FAA requirements against ice forming provided gas generator rotation is higher than 3 874.9 rad/s (37 080 rpm).

LTS 101-600A-2

If engine inlet is protected against the ingestion of foreign objects, ice-protection kit P/N 4-201-080-01 is to be used.

LTS 101-750C-1

Bleed air load for anti-icing protection amounts 1% of total mass of air, operating satisfactorily as per FAA requirements against ice formation provided gas generator rotation is higher than 4008 rad/s (38 294 rpm).

NOTE 13 Engine ratings for non-standard conditions

Not applicable.

NOTE 14 Rotor blade limits and disc integrity

The life limits of critical engine parts are listed in S.B. LTS 101-71-0002.

NOTE 15 Operating torque, power conditions and other special limitations Nm (lb.ft)

Ratings	-650A-2	600A-3	-650C-2/3/3A	-750C-1	-700D-2	600A-3A
Transient	805.4 (594)	--	568.1 (419)	650.8 (480)	983.0 (725)	(641)
2,5 min. (1 engine inop)	#	#	519.3 (383)	565.3 (417)		#
30 min. (1 engine inop)	#	#	500.3 (369)	538.2 (397)		#
Take-off	733.5 (541)	--	473.2 (357)	538.2 (397)	837.9 (618)	(583)
Max. continuous	703.7 (519)	--	454.2 (335)	497.6 (367)	768.7 (567)	(561)
5 min. partial power	#	#	454.2 (335)	465.0 (343)		#
(Auto-rotation) No load	0	0	0	0		

NOTE 16 Engine mounting system

LTS 101-600A-2 600A-3/3A and -700D-2 engine installation in the aircraft consists of 5 attaching points at the sides and at the inferior part of reduction and accessory gear box. There is also a flange for fixing a torque tube. Dimensions and load limits are shown on installation drawings.

LTS 101-650C-2/-650C-3/-650C-3A engine installation in the aircraft consists of 2 attaching points on the sides of the reduction and accessory gear box and two rear supports. Dimensions and load limits shown on Installations drawings.

LTS 101-750C-1 engine installation in the aircraft consists of 2 attaching points on the sides of the gear box extension, without rear supports and with a torque tube fixation. Dimensions and load limits shown on Installations drawings.

NOTE 17 Auxiliary power and injection

Not applicable.

NOTE 18 Special equipment

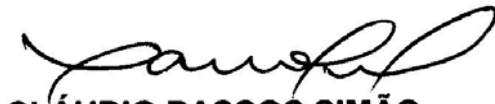
Engine control system is to be complemented by a stability battery. Battery dimensions have to be settled by determination of stability during development tests of the aircraft. Dimensions and project for battery accommodation have to be approved by Honeywell. Interface spots are shown on the Installation drawings.

NOTE 19 Maintenance programme

The options for this programme are defined in the S.B. 101-71-00-0001 issued by Honeywell. Overhaul Manual are to be obeyed with.

NOTE 20 Manuals required by FAR 33.5, FAA Approved and ANAC Accepted:

	<u>LTS 101-600A-2</u>	<u>-600A-3</u>	<u>-650C-2/-3/-3A</u>	<u>-750C-1</u>	<u>-700D-2</u>	<u>-600A-3A</u>
Installation Manual	101.14.24	IM - 8016	101.14.35	101.14-32	IM-8021	IM - 8015
Operating Instructions	21-110.45	--	--	--	--	--
Maintenance Manual	LTS 101-2.1	--	--	--	--	--
Overhaul Manual	LTS 101-3	--	--	--	--	--
Illustrated Parts Catalog	LTS 101-4.1	--	--	--	--	--



CLÁUDIO PASSOS SIMÃO
Gerente Geral, Certificação de Produtos Aeronáuticos
(Manager, Aeronautical Products Certification)