EUROPEAN AVIATION SAFETY AGENCY

Operational Evaluation Board Report

Final Report dated : 18 10 2010

Manufacturer : Agusta

A 109S

European Aviation Safety Agency
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A 109S

Revision Record

Revision No.	Section	Pages No.	Date

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Operational Evaluation Board – OPS / FCL Subgroup

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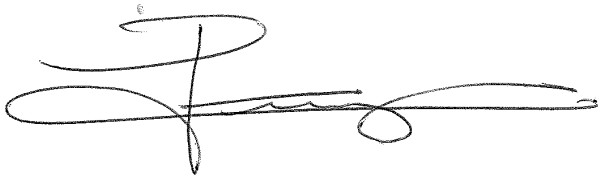

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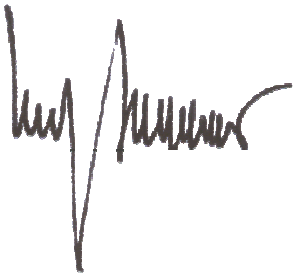

Agusta Experts involved in the catch up process

Name	Position	Office / Branch	Remarks
Gianluigi GINO	Head of Airworthiness Office	DOA	Focal Point
Leonardo MECCA	Chief Pilot	AW Training Academy	-
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Executive Summary

1. Manufacturer Application

Agusta has made a formal application to EASA, Certification Directorate - Flight Standards to an OEB catch up process for the evaluation of the A 109S helicopter Pilot Initial Type Rating Training syllabus, refresh courses and compliance check List with JAR-OPS 3 Subpart K & L.

2. OEB recommendations

EASA /OEB Section Rotorcraft Manager and Helicopter Flight Standards Director from Helicopter Flight Inspector ENAC – ITALY and Agusta experts have participated to evaluate Initial Pilot Training Syllabus of the A 109S helicopter.

The OEB recommends for approval by NAAs

- Pilot Initial Type Rating Training minimum syllabus for A 109S for VFR and IR extension
- Type Rating List & Licence Endorsement List including A 109S
- The standard offered which is in compliance with JAR-OPS 3 Subpart K& L. (See Appendix 4).

3. Procedures, requirements and associated AMC references

EASA was conducted this catch up process in accordance with JAR-OPS 3, JAR-FCL 2 and JAR-FSTDs' requirements. This evaluation was based on JOEB Handbook and Common procedures Document (CPD) and the processes detailed in the JAA Administrative and Guidance Material, Section One, Part Two, Chapter 5 and JAR-FCL 2 including associated appendices, AMC and IEM.

Note on references and reference texts:

Where references are made to requirements and where extracts of reference texts are provided, these are at the amendment state at the date of publication of the report. Readers should take note that it is impractical to update these references to take account of subsequent amendments to the source documents.

Evan Nielsen
EASA, Certification Directorate
Flight Standards Manager

Acronyms

AMC	Acceptable Means of Compliance
AOC	Air Operator Certificate
ASU	Ancillary System Unit
ATPL	Airline Transport Pilot Licence
ATO	Approved Training Organisation
ATR	Additional Type Rating
CPL	Commercial Pilot Licence
DC	Direct Curent (electrical)
DGAC	Direction Générale de l'Aviation Civile (French Civil Aviation Authority)
EASA	European Aviation Safety Agency
EPU	External Power Unit
EU-OPS	EU-Commercial Air Transportation (Aeroplane)
FADEC	Full Authority digital Engine Control
FTD	Flight Training Device
FNPT	Flight and Navigation and Procedure Trainer
FSTD	Flight Simulation Training Device
FTO	Flight Training Organisation
GPU	Ground Power Unit
IEM	Interpretative and Explanatory Material
IFR	Instrument Flight Rules
IR	Instrument Rating
ITR	Initial Type Rating
JAA	Joint Aviation Authorities
JAR-FCL 1	Joint Aviation Requirements Flight Crew Licensing (Aeroplane)
JAR-OPS 3	Joint Aviation Requirements Operations 3 (Commercial Air Transportation) (H)
LDP	Landing Decision Point
MDR	Master Difference Requirements
MEL	Minimum Equipment List
MET-H	Multi Engine Turbine (Helicopter)
MMEL	Master Minimum Equipment List
NCAA	National Civil Aviation Authority
N/A	Not Applicable
ODR	Operator Differences Requirements
OEI	One Engine Inoperative
OEB	Operational Evaluation Board
PPL (H)	Private Pilot Licence (Helicopter)
RFM	Rotorcraft Flight Manual
SET - H	Single Engine Turbine (Helicopter)
TDP	Take-off Decision Point
TRI	Type Rating Instructor
T/R	Tail Rotor
TRTC	Type Rating Training Course
TRTO	Type Rating Training Organisation

I. Purpose and applicability

This report is the result of a catch up process evaluation which has been made by analysis and comparison, based on **A 109S Pilot Initial Type Rating Training syllabus** provided by the TRTO of Agusta Training Academy already approved by ENAC-ITALY, and Pilot Initial Type Rating Training syllabus approved by other NAA.

The evaluation of the A 109S helicopter has also shown that the standard offered is in compliance with JAR-OPS 3 Subparts K & L.
However the A 109S does not comply with the additional requirements for helicopters operating to or from helidecks located in a hostile sea area as defined in JAR-OPS 3, and it is not certified for amphibious operation. (See Appendix 4).

Note:
The OEB recommends, depending on helicopter configuration, if physical separation between cockpit and passenger cabin is existing an additional fire extinguisher should be installed into the passenger cabin (See AMC OPS 3.790 -Hand Fire Extinguishers).

This document:

- Provides a general description of A 109S helicopter
- Updates the Type Rating List and Licence Endorsement List including A 109S
- Makes recommendations for :
  - A 109S Pilot Initial Type Rating Training (ITR) syllabus
  - Instrument Rating (IR) Extension to the A 109S VFR Initial Type Rating Training
  - Refresh course when A 109S Type rating has expired by more than 2 years

Note:
A 109S is listed in the Type Certificate Data Sheet delivered by EASA under Type Certificate Data Sheet EASA TCDS.R.005 (See Appendix 1).

2. General Description of A 109S

General

The A109S is a light Twin Engine helicopter (MET-H), with 8 seats (pilot included).

The helicopter is a high-speed, high performance, multipurpose helicopter powered by two Pratt & Whitney Canada PW207C engines.

It received its first Type Certification in 2005 as Small Rotorcraft based on FAR/JAR 27.
It is basically approved for VFR/IFR day and night, in non-icing conditions, “Category A” operations.
Minimum crew is one pilot, who shall operate the helicopter from the right crew seat.

The helicopter has:
– A four-bladed, fully articulated main rotor
– A low drag titanium and composite main rotor head with elastomeric bearings
– A two-bladed tail rotor
– A retractable tricycle-type landing gear
– A fuselage forward section and an aft section (tail boom).

Airframe

The airframe consists of two major assemblies: the fuselage and the tail boom.
The fuselage comprises the forward fuselage, the center fuselage and the aft fuselage.
The forward fuselage includes a nose bay for the installation of electric and avionic equipment and a bottom bay that accommodates the nose landing gear, the hydraulic accumulators and other hydraulic components. The forward fuselage also includes the cockpit. A hinged door on each side of the forward fuselage provides access to the cockpit.
The center fuselage includes the passenger compartment (cabin), the fuel tank bay, the landing gear bays. A sliding door is located on each side of the center fuselage for access to the passenger compartment.

Landing Gear

The helicopter is equipped with tricycle landing gear. The landing gear permits take-off, landing, taxiing and towing from prepared and semi prepared surfaces with a maximum gross weight of 3175 kg.

Seating

The cabin is generally rigged to carry six passengers in two three-seater benches. Other configurations can be arranged for mission specific requirements.

Main Rotor

The main rotor system includes: the main rotor blades, the main rotor head, the rotating controls, the main rotor indicating system.

The main rotor blades are of composite material.
Each blade consists of:
– A fiberglass spar
– A trailing edge made of a graphite-fiber skin and a Nomex core
– A stainless steel abrasion strip attached to the leading edge
– A fiberglass tip cap with a nickel anti-abrasive strip.
The blades are statically balanced during construction by means of weights fitted to the blade end and trailing edge. The blade retention bolts are hollow and allow the addition of weights during hub balancing. A trim tab is bonded to the trailing edge to permit rotor tracking.
The Main Rotor Head (MRH) consists of the hub, levers, grips, dampers, flapping and droop restrain mechanisms and elastomeric bearings.

Tail Rotor

The tail rotor system includes: the tail rotor hub and blade assembly and the pitch mechanism.
The hub and blade assembly comprises an internally splined trunnion installed on the 90-degree gearbox output shaft, a hub mounted on the trunnion, two blades linked to the hub with two tension-torsion straps and two retaining bolts.

Drive System

The drive system transmits engine power to the Main Rotor and to the Tail Rotor drive shaft.
The main transmission is mounted on the cabin upper deck forward of the two engines.
The main transmission reduces the speed of 6000 RPM from the main drive shafts to a speed of 380 RPM (100% NR) in the main rotor mast, with three stages of RPM reduction:
– The first stage of reduction includes two freewheels and associated input gear shafts which drive two symmetrical idler gears, and one gear installed on the external splines of a main input pinion.
– The second stage of reduction includes a pinion which drives a bevel gear shaft.
– The third stage of reduction includes a planetary gear train. The planetary gear train drives in turn the main rotor mast installed in the internal splines of the hub of the planetary gear-train
The tail rotor drive system transmits power from a drive on the main transmission to the tail rotor through three drive shafts and the 90-degree gearbox. The tail rotor drive system includes: the tail rotor drive shafts and the 90-degree gearbox.
The tail rotor has three drive shafts (Number 1 drive shaft, Number 2 drive shaft and Number 3 drive shaft).
The Number 1 drive shaft transmits the torque from the main gearbox to the Number 2 drive shaft. The Number 2 and Number 3 drive shafts transmits the torque to the 90-degree gearbox.
The 90-degree gearbox provides a 90° change in the direction of drive and 2.8 to 1 speed reduction between the input shaft and the output shaft on which the tail rotor is mounted.
The 90-degree gearbox consists mainly of the case assembly, input pinion assembly and output shaft assembly.
The 90-degree gearbox is attached to the structure through a mounting sleeve.

Flight controls

The rotor flight control system gives positive control of attitude, speed and altitude of the helicopter.
The system includes: the main rotor control system, the tail rotor control system, the servo control system.

The main rotor control system controls the helicopter in pitch and roll, climb and descent.
The main rotor control system includes: the collective control system, the cyclic control system, the magnetic-brake artificial-feel and trim units, the stabilization actuators, the mixing control system.
The collective control system is a conventional rigid control tube type, and is controlled by the pilot and copilot through the collective control levers installed on the left side of the pilot's and copilot's seats.
The cyclic control system is a conventional rigid control tube type and is controlled by the pilot's and copilot's through the cyclic control sticks. The system transmits the control movements to the mixing group.
The mixing control system is a conventional rigid type and comprises a mixing group, control tubes.
The mixing group is installed on the upper deck of the helicopter. It receives the movements from the cyclic and collective control systems and transmits them to actuate the servo-actuators.

The tail rotor control system controls the direction (yaw axis) of the helicopter. The tail rotor control system is controlled by two sets of adjustable tail rotor pedals that are connected by a series of levers, push-pull tubes and bellcranks to the tail rotor hydraulic servo-actuator. The system incorporates a control tube provided with a stabilization actuator and magnetic brake artificial feel unit

Rotor brake

The rotor brake system is used to stop the rotation of the rotor during engine power-off. The rotor brake system includes a hydraulically operated caliper acting on a disc secured to the tail rotor drive pinion.
Hydraulic fluid supplied from the utility hydraulic system operates the caliper. The brake is applied by actuating the control lever located on the overhead console. The control lever is connected to the nose wheel centering lock and the brake selector valve by means of a metal cable.

Engine

The engine installation consists of the two Pratt & Whitney Canada 207C engines.
The PW207C is a lightweight, free-turbine, turboshaft engine incorporating a single stage centrifugal compressor driven by a single stage turbine.
The engine consists of two main modules:
– MODULE 01 : Reduction gearbox
– MODULE 02 : Gas generator and power turbine
Metered fuel from the Fuel Management Module (FMM) is sprayed into a reverse flow annular combustion-chamber through twelve fuel nozzles mounted around the gas generator case.
A high ignition unit and fuel spark igniters are used to start combustion.
A single-channel Full Authority Digital Electronic Control (FADEC) system with a mechanical back up FMM ensures accurate control of the engine output speed and fast response to changes in power demand. An electrical torque motor located whiting the FMM works in conjunction with the electronic Engine Control Unit (ECU).
The engine oil supply comes from an integral oil tank.

Fuel system

This system has the primary function to store and deliver fuel to the engines. The fuel system includes: the storage system, the distribution system, the indicating system.

The fuel tank installation has two main bottom tanks and one main top tank. The tanks are refueled via a filler cap on the right side of the main top tank. Each main bottom tank supplies fuel to its associated engine (right tank to the No 2 engine, left tank to the No 1 engine).
The bottom tanks are gravity-fed from the top tank.
The main tanks are of the bladder type and made of rubberized fabric.
Each tank compartment is sealed to prevent fuel from leaking into other parts of the helicopter in the event of leaks. All fuel tank compartments have drain and venting holes.

The distribution system allows the flow of fuel from the booster pumps to the fuel pump and filter group of each engine. The distribution system consists of two independent circuits each of which supplies the associated engine. When activated, a cross-feed valve allows the fuel from one circuit to supply both engines.
A fuel control panel, located on the interseat console provides the primary interface between the pilots and the fuel system. The panel controls the booster pumps, the shut-off valves and the cross-feed valve

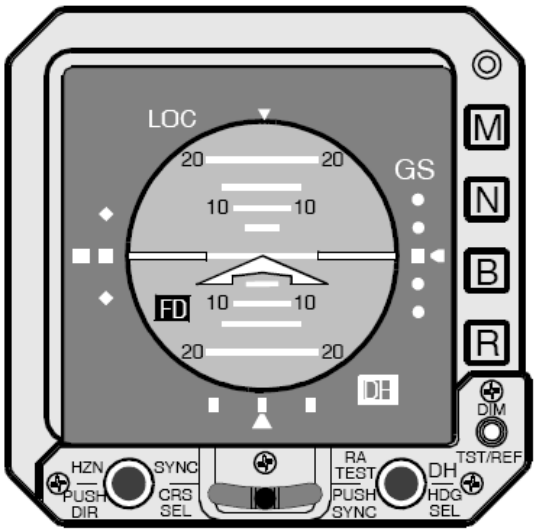
Instrument panel and console

The standard flight instrument panel and console include:

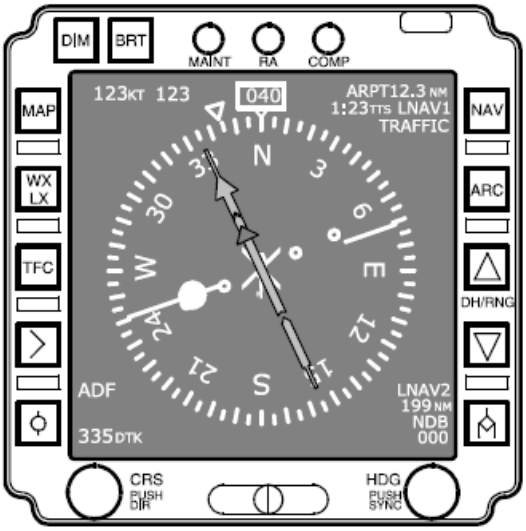
- ADF receiver
- COMM/NAV/GPS unit
- Moving map display (optional)
- COMM/NAV/GPS unit
- Airspeed indicator
- Electronic Attitude Director Indicator (EADI)
- Altimeter
- Marker Beacon (MB) control panel
- Distance Measuring Equipment (DME) control panel and indicator
- Standby attitude indicator
- Flight Director (FD) control panel
- Encoder altimeter
- Vertical velocity indicator
- Digital chronometer
- Air Traffic Control Transponder (ATC XPDR) control panel
- Audio control panel
- Electronic Horizontal Situation Indicator (EHSI)
- Electronic Display Unit (EDU)
- Intercommunication control panel
- Emergency Localizer Transmitter (ELT) switch
- Alternate static port switch

System integration and display

The Electronic Flight Instrument System - EFIS (four displays) is interfaced with the helicopter systems in order to receive the flight data.
The four EFIS displays are powered by 28 VDC and they are directly controlled by the “Radio Master” system, hence they are supplied only when the “RADIO MSTR” switch is set to ON.
The two upper displays are called EADI (Electronic Attitude Direction Indicators) the two lower are called EHSI (Electronic Horizontal Situation Indicators).



EADI

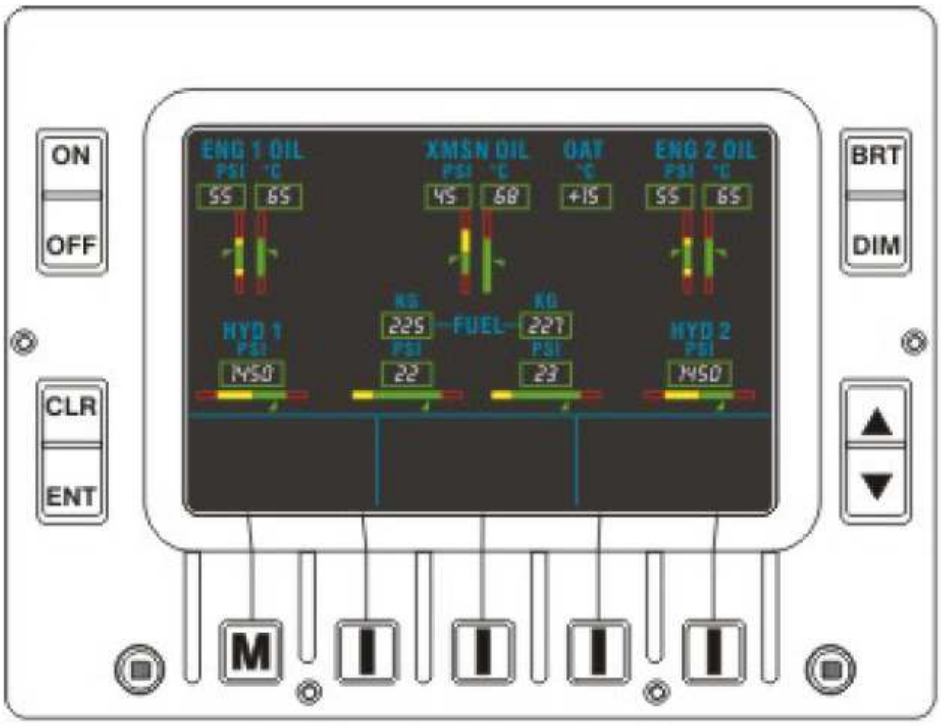


EHSI

Indicating/recording System

On the Helicopter the indicating/recording system is identified as IDS (Integrated Display System) which mainly consist of:

- One remotely mounted Data Acquisition Unit (DAU), capable to accept, condition and process all the engine and aircraft sensors.
- Two identical panel mounted Electronic Display Units (EDU), capable to display all the engine and aircraft information.
- Two single channel Electronic Engine Control Units ECU, that transmits through a digital bus the primary data to the IDS. The ECUs are also connected to both the EDUs. This permit to present all the essential engine data, as well as the rotor speed parameter, even in the unlikely event of complete DAU failure.
- One Aural Warning Generator which provide vocal messages to the Pilot's and Copilot's headsets
- One Fuel Computing Unit in order to interface fuel quantity data with the DAU.
- Two Master Warning Lights (MWLs), one at each pilot's station.
- Two Master Caution Lights (MCLs), one at each pilot's station.
- Two engine fire detectors, one per engine.



EDU

Hydraulic system

The hydraulic power system includes: the main hydraulic system, the utility hydraulic system, the indicating system.
The main hydraulic system includes two independent sub-system:
– The No 1 main hydraulic system
– The No 2 main hydraulic system.
Both systems (No 1 and No 2) supply the hydraulic power for operation of the flight controls. Each system, operating at a pressure of 1500 psi, includes a suction circuit, a pressure circuit, a return circuit and a bypass circuit.
The utility hydraulic system includes two sub-systems:
– The main system
– The emergency system.
The main system supplies hydraulic power for operation of the landing gear (through the landing gear control panel), the wheel brakes (through the brake pedals installed on the pilot's rudder pedals), the rotor brake (through the rotor brake control lever) and the nose wheel centering-lock (through the nose wheel lock control lever on the front console).
The emergency system supplies hydraulic power for operation of the landing gear, the nose wheel-centering lock and the wheel brakes.

Electrical system

The main sources of electrical power are the engine-driven generators and the 24 V battery.
The electrical power system includes:
– The Alternating Current (AC) generation system
– The Direct Current (DC) generation system
– The External power system
– The AC electrical load distribution system
– The DC electrical load distribution system.

A/C electrical system

The main components of the AC generation system are as follows:
– The two inverters
– The two sensing relays.
The inverters are of the single-phase static-type and require a 28 V dc power supply.
Each inverter provides a 115 V ac and a 26 V ac output.

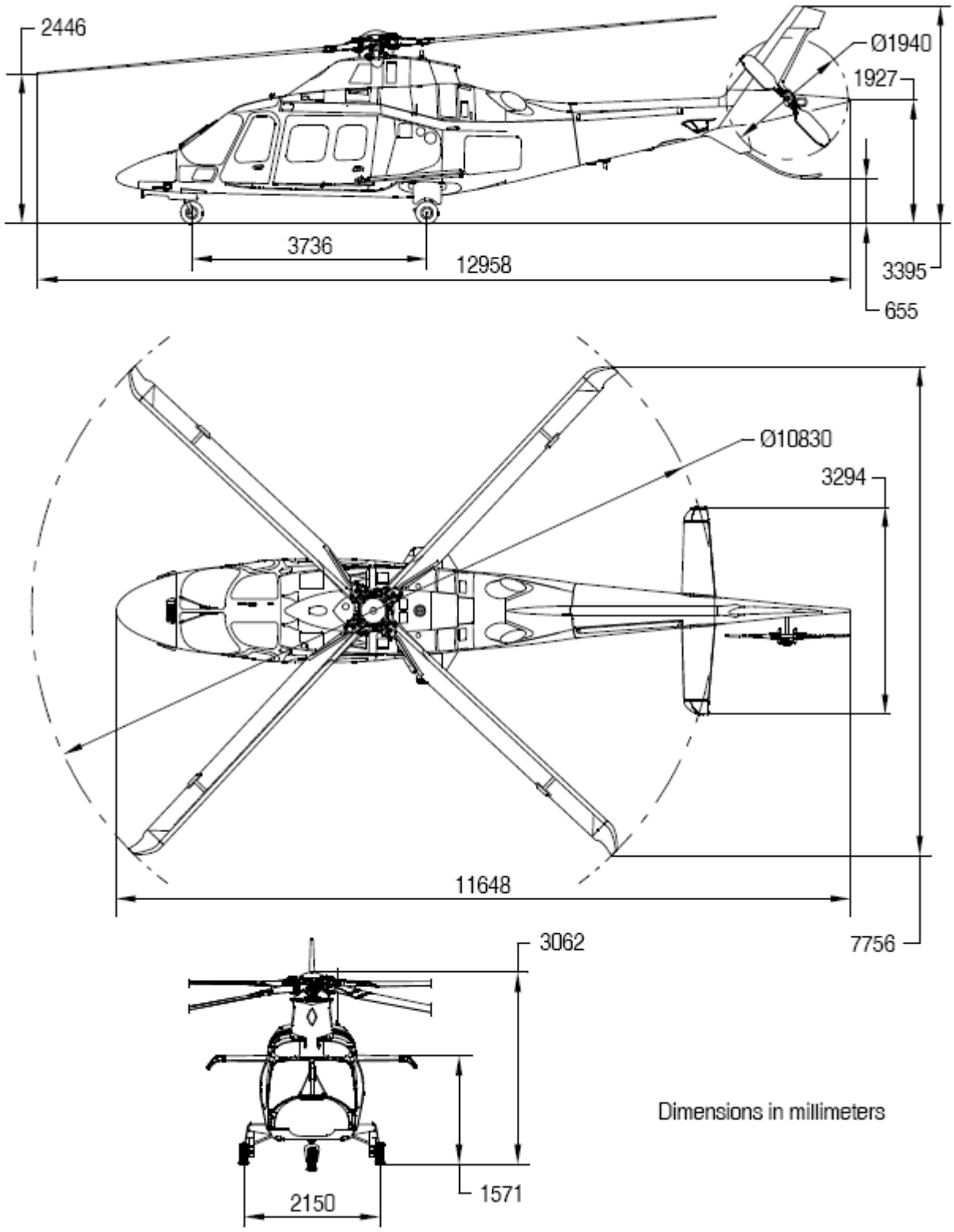
The maximum output power available from a combination of 115 V ac and 26 V ac output power is 250 VA.
Each sensing relay sends a failure signal to the DAU which causes the display of the INV 1 or INV 2 caution message on the EDU1, when the related inverter is inoperative, and provides switching of the failed inverter loads to the operative inverter.
The system is powered through the circuit breakers that follow:
– INV 1 (28 V DC EMER BUS #1)
– INV 2 (28 V DC BUS #2).

3. Aircraft main characteristics:

3.1 Sum up of main characteristics of A 109S

A 109S			
Dimensions	Fuselage	Length	11,648 m
		Width	3,294 m
		Height	3,395 m
	Main rotor	Diameter	10,830 m
	Tail rotor		1,940 m
Number of Main Rotor Blades			4
Minimum Flight Crew	VFR		1
	IFR		1
Minimum Seating Capacity	Including Pilot Seats		8
Engines			2 Pratt & Whitney PW207C
Fuel tanks	Total		563 l
Air Speed	Power ON	Absolute VNE	168 kt
	Power OFF		128 kt
Rotor Speed	Power ON	AOE	101% 99%
	Power OFF		110% 95%
Maximum Operating	Pressure Altitude		20 000ft
MTOW with Internal load			3175 Kg
MTOW with External load			3200 Kg
Category A (“see RFM Supplement 7”)	Density Altitude	Clear Heliport	12.000 ft
		VTOL operations	12.000 ft

3.2 Exterior Dimensions



4. Operator Difference Requirement (ODR) Tables

No Operator Difference Requirement tables have been produced. Agusta has applied for an OEB Catch up for A109S based on Pilot Initial Type Training Syllabus only.

5. Optional specific equipment

No optional specific equipment is provided requiring specific training.

6. Master Difference Requirement (MDR) Tables

No Master Difference Requirement tables have been produced. Agusta has applied for an OEB Catch up for A109S based on Pilot Initial Training Syllabus.

7. Type Rating List and Licence Endorsement List

7.1 Type Rating List

The proposal of this OEB is to up dated Class & Type Rating List as following:

- Table 9 / Type Rating List (Helicopters)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
Agusta			
- ME Turbine -	A 109 S		A 109

This table 9 matrix contains only Helicopters that have been evaluated through a JOEB, an OEB or a Catch-Up process. Associated reports are published on the EASA -Flight Standards Website and Pilot Training courses are available from the Manufacturers

7.2 Licence Endorsement List

- Table 18 / Licence Endorsement List – Type Ratings (Helicopters)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
Agusta			
- ME Turbine -	A 109 A A 109 A II A 109 C	(D)	A 109
	A 109 K2		
	A 109 E		
	A 109 LUH		
	A 109 S		

This Licence Endorsement List – Type Ratings (Helicopters) will remain unchanged

8. Specification for Training

8.1 Training Courses

The assessment is based on the **A 109S** Pilot Initial Type Rating Training syllabus proposed by ***Agusta Training Academy*** approved by ENAC ITALY and to other Pilot Initial Type Rating Training syllabus from other European TRTOs' already approved by their national Authorities.

OEB recommend Initial pilot training syllabus divided into the following phases for approval in Approved Training Organisations, like FTO and TRTO and also for operator specific training, provided the operator specific documentation is used throughout the course.

:

- Theoretical knowledge instruction syllabus and test summary
- Helicopter Flight training courses
- Refresh training course
- Skill test

Note:
The TRTC is recommended for approval in FTO, TRTO and for operator specific training provided the operator specific documentation is used throughout the course.

8.2 Course pre-entry requirements

All students must fulfil the pre-entry requirements in JAR-FCL 2 for an initial multi-engine, single Pilot helicopter training course.

8.3 Licensing requirements

All students must fulfil the requirements of JAR-FCL 2.261 Type Ratings – Knowledge and Flight instruction and of Appendix 1 to JAR-FCL 2.261 (a) Theoretical knowledge instruction requirements for skill test/proficiency checking for type ratings & Appendix 1 to JAR-FCL 2.261 (b) Flight Instruction and Skill Test.

Appendix 1 to JAR FCL 2.261(b) require for an initial type rating on a Single Pilot Helicopter(SPH), Multi Engine Turbine {MET (H) JAR/FAR 27 and 29 , an approved flight instruction of **8** flight hours in the helicopter. (Excluding skill test)

Note:
These requirements have to be considered as the bare minimum, additional training could be necessary depending on :

- *complexity of the aircraft type, handling caracteristics, level of technology*
- *previous experience of the applicant*
- *The availability of FSTDs.*

8.4 Initial Type rating training minimum syllabus summary

Initial Type Rating (**ITR),** for Single pilot / Multi-Engine Turbine helicopter (VFR),

Candidates for the Initial A 109S Type Rating must:

- Hold a valid Helicopter Pilot license,
- Comply with the requirements set out in JAR-FCL 2.261 and 2.262.

QUALIFICATION HOLD	ITR
Single Engine Piston **-------- >>>**	√
Single Engine Turbine **------- >>>**	√
Multi Engine Turbine **-------- >>>**	
Total of theoretical knowledge instruction + Theoretical Exam	**38h00**
Flight Training	**8h00**

8.5 Theoretical knowledge syllabus and test summary

Theoretical instruction should be provided in accordance with Appendix 1 to JAR-FCL 2.261 (a). The following sections present a summary of the material for an Initial Type Rating training program should consider. Whilst based on the Agusta program. Training providers should ensure their type specific courses cover the pertinent material.

Initial Type Rating theoretical knowledge syllabus	ITR
1. Helicopter structure, transmissions, rotors and equipment, normal and abnormal operation of the systems **(*)**	24h00
2. Limitations (**)	02h00
3. Performance, flight planning and monitoring (**)	03h00
4. Weight and balance, servicing	01h00
5. Emergency procedures (**)	03h00
6. Special requirements for helicopters fitted with electronic flight instrument systems or equivalent equipment; when applicable *(If Cockpit trainer or Computed Trainer is not available the amount of aided instruction will be 03h00 instead of 02h00).*	02h00
7. Optional equipment	In addition
TOTAL THEORETICAL KNOWLEDGE SYLLABUS	**35h00**
Theoretical exam	03h00
TOTAL	**38h00**

(*) If an initial type rating for a turbine powered aircraft is required, the candidate must first undergo a turbine engine course (see AMC JAR-FCL 2.470(b)).

(**) *theoretical knowledge elements can be covered either during the ground training course or during flight training briefing phase or both.*

On completion of the theoretical phase, the trainee is assessed via a multiple-choice questionnaire (*a minimum of 50 questions is recommended*) covering the entire program. To obtain the type rating, the threshold for passing is 75% of correct answers in the written examination on a range of multiple-choice or computerized questions.

8.6 Flight training course summary

8.6.1 Initial VFR Type Rating training

Flight Training course for Initial VFR Type Rating	ITR
1. Pre-flight, cockpit, engine start, Basic air work, General Handling	1h15
2. Circuits and Various touch-downs	1h15
3. Systems and Emergency Procedures,	1h15
4. Abnormal and Emergency Procedures /	1h15
5. CAT A : Clear Area and Short-Field take-off and landing AEO and OEI profiles	1h30
7. CAT A : Ground and Elevated Helipad take-off and landing AEO and OEI profiles	1h30
Total Flight Training	**8h00**
Skill Test *In accordance with Appendix 3 of FCL 2.240.*	Required

Notes:

During the flight "1", the Type Rating Instructor will evaluate the trainee level.

The flight training course corresponds to the basic aircraft certification and satisfies the conditions of JAR-FCL 2.220, taking into account the type of license held and the experience of the candidate.

Each flight session could be extended or reduced by 15 minutes at the discretion of the instructor; but the total time will remain 08h00 minimum.

Additional flight could be necessary at the discretion of the instructor if the trainee has not successfully demonstrated the ability to perform all manoeuvres with a high degree of proficiency.

Depending on the configuration of the aircraft used and on customer's request, additional flights may also be performed to enhance basic initial type rating training (minimum syllabus).

8.6.2 Instrument Rating Extension to the Initial VFR Type Rating training

Flight Training course for Instrument Rating Extension	ITR
1. Pre-flight and cockpit checks. Take-Off, transition to instrument flight, control the helicopter by reference solely to instruments. Straight and level Flight, climbing and descending, turns at different rates (with and without Auto Pilot)	1h15
2.; Simulated IMC autorotation and power recovery, recovery from unusual attitude, holding procedures.	1h00
3. SID, Route, STAR. Precision and non precision Approaches :ILS, VOR / NDB, manually and with coupled automation.	1h30
4. Simulated engine failure after Take-off Decision Point ; Go Around with One Engine Inoperative	1h15
Total Flight Training	**5h00**
Skill Test *In accordance with Section 5 of Appendix 3 of FCL 2.240 .*	Required

8.7 Refresh training course

The OEB also recommends as it is already proposed by the manufacturer a refreshing training course, as soon as the A 109S Type rating has expired by more than 2 years. A minimum of 8 hours of theoretical knowledge, including:

- Review of helicopter systems, with particular reference to their malfunctions
- Explanation of latest changes
- Limitations
- Emergency procedures
- Cockpit Familiarisation

9. Specification for Testing, Checking & Recent Experience

9.1 Skill test

As required by JAR-FCL 2.240, JAR-FCL 2.262 and Appendix 3 to JAR FCL 2.240

9.2 Proficiency Checks

As required by JAR-FCL 2.245 and Appendix 3 to JAR FCL 2.240

9. 3 Recent experience

As required by JAR-FCL 2 and JAR-OPS 3

10. Specification for Flight Simulation Training Devices

When this report has been finalized neither Flight Simulator neither Flight Training Device qualified in accordance with JAR-FSTD (H) and compliant with EASA requirements were available for A 109S.

11. Application of OEB report

This OEB report applies to commercial operations. However, the OEB also recommends private or corporate operations to follow the findings of this report.

12. Appendices

- Appendix 0 : Cover
- Appendix 1 : EASA TCDS.R005
- Appendix 2 : JAR-FCL2 Type rating requirements
- Appendix 3 : A 109S Pilot Training Syllabus From Agusta Training Academy
- Appendix 4 : A 109S Compliance with JAR-OPS 3 Subpart K& L Requirements

Notes:
Appendices are available for NAA's by request to EASA Flight Standards / Certification Directorate or to Agusta Manufacturer.