

Aircrew Ground Conditioning Unit (AGCU) for the Eurofighter Typhoon

The crew members of the latest military aircraft face increasing demands on their performance. To help meet these demands, it is essential that the crew members can regulate their body temperatures.

The AMETEK Aircontrol Technologies system designed for the Eurofighter Typhoon improves the crew's thermal comfort by supplying conditioned fluid at the temperature selected by each crew member to their Liquid Conditioning Garments (LCG).

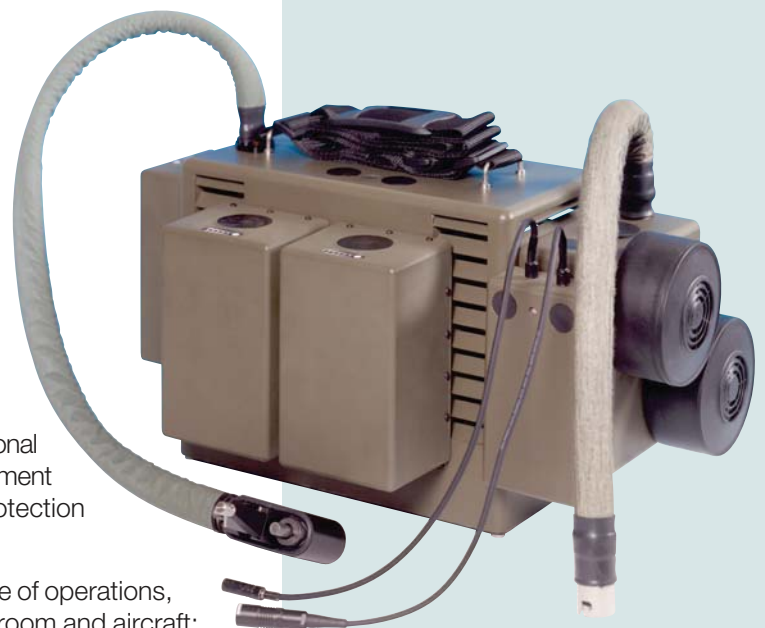
DESCRIPTION

The Aircrew Ground Conditioning Unit (AGCU) provides personal cooling when aircrew are wearing a Liquid Conditioning Garment (LCG); and breathing gas, visor de-misting and ocular protection when wearing NBC equipment.

The AGCU is used by the aircrew during the ground phase of operations, when in the crew room; during transit between the crew room and aircraft; for periods outside the aircraft between sorties and for periods in-cockpit prior to APU start. It is an individual, one-person portable unit that is self contained, using up to three rechargeable and replaceable Lithium-Ion battery modules as its power source. The cooling module uses vapor cycle refrigeration technology to provide a continuous supply of cooled conditioning liquid, under extreme conditions, for a period of at least three hours without replenishment or replacement. The refrigeration system employs a lightweight miniature rotary vane compressor. Coolant temperature is selectable by the crew member, a proportional, integral control varies the compressor speed to achieve and maintain the selected coolant temperature under varying load and ambient conditions.

The cooling module mimics the characteristics of the aircraft Liquid Conditioning System (LCS), sub systems of which are also supplied by AMETEK Aircontrol Technologies, by supplying coolant at the same flow and temperature range. An internal relief valve limits the pressure at the LCG and provides for coolant pre-conditioning with the LCG disconnected. Battery management means only one battery is in use at any one time, even if two or three are actually fitted. It incorporates safety features, which enables batteries to be replaced while in use.

The respirator and de-misting module provides filtered pressurized air that can be used for both respiratory (breathing gas) and visor de-misting purposes when the crew is wearing NBC clothing. Air supply is varied to suit demand. The module incorporates an intercom, enabling the aircrew to transmit and receive speech communication with other aircrew and ground crew.



FEATURES

- ✓ Maintains body temperature within acceptable limits for pre/post flight operations
- ✓ Mimics on aircraft system
- ✓ Integrated NBC and Ocular protection
- ✓ NBC Hardened
- ✓ Advanced Battery Management

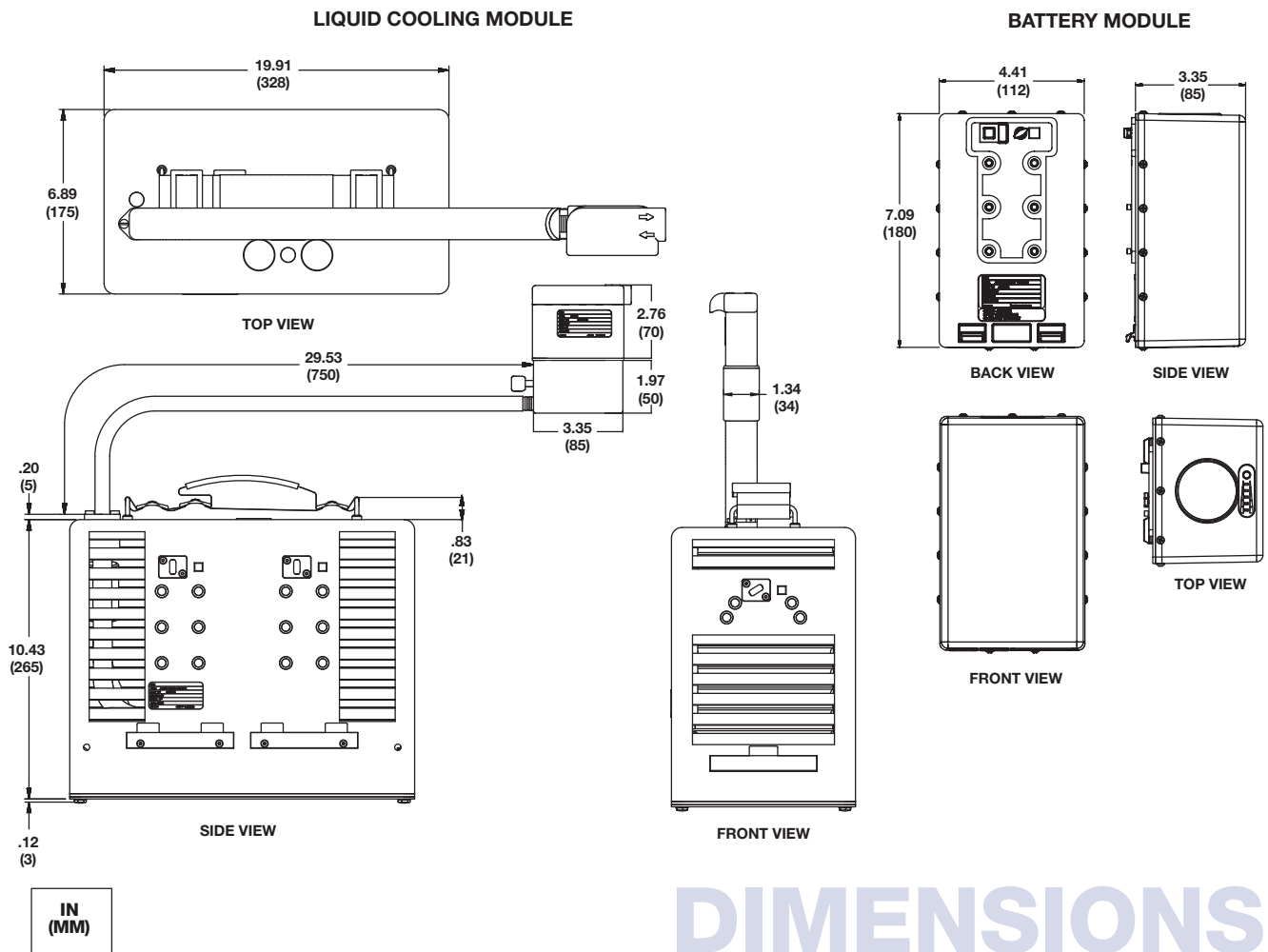


Aircrew Ground Conditioning Unit (AGCU) for the Eurofighter Typhoon

SPECIFICATIONS

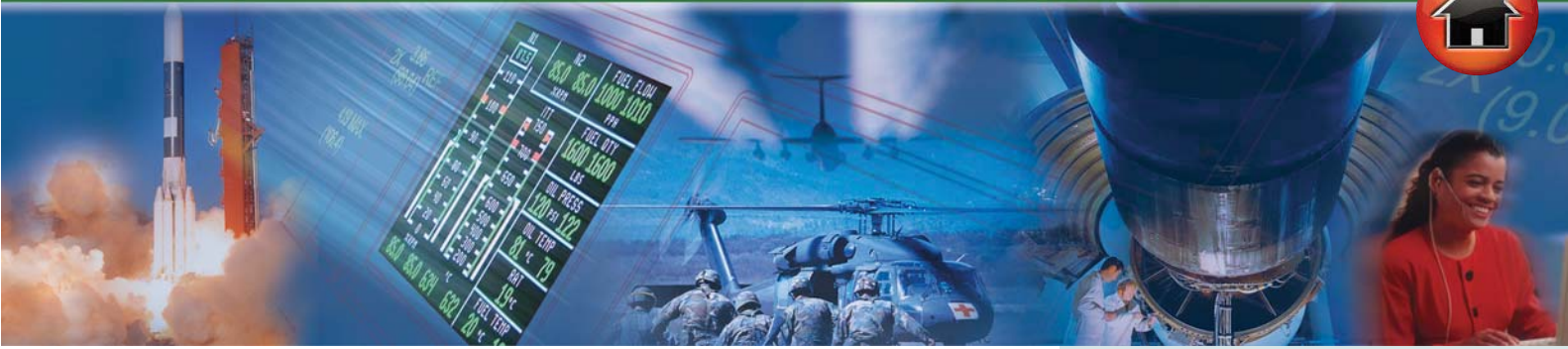
Conditioning Liquid: Ethylene Glycol/de-ionised water
 Liquid Mass Flowrate: 0.077 lbs./s (0.035 kg/s)
 Cooling Capacity: 200 W
 Liquid Supply Temperature: 75° to 54°F (24° to 12°C)
 Ventilation Airflow: 1.77 cfm (50 l/min mean)
 5.65 cfm peak (160 l/min peak)

De-mist Airflow: 0.88 cfm (25 l/min)
 Maximum Operating Temperature: 122°F (50°C)
 Battery Voltage: 24 VDC nominal
 Mass – Cooling Module: 13.23 lbs. (6.0 kg)
 Battery Module: 5.51 lbs. (2.5 kg)



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AEROSPACE & DEFENSE
www.ametekaerodefense.com
HEADQUARTERS
 50 Fordham Road • Wilmington, MA 01887 U.S.A.
 E-mail: aerosales@ametek.com

SALES:
North America
 Tel: 978-988-4771 • Fax: 215-293-8995
Europe
 Tel: +(49) 8145 951767 • Fax: +(49) 8145 951768
Asia Pacific
 Tel: +(65) 6484 2388 (ext 118) • Fax: +(65) 6481 6588



Crew Temperature Control System for the Eurofighter Typhoon

The crew members of the latest military aircraft face increasing demands on their performance. To help meet these demands, it is essential that the crew members can regulate their body temperatures.

The AMETEK Aircontrol Technologies system designed for the Eurofighter Typhoon improves the crew's thermal comfort by supplying conditioned fluid at the temperature selected by each crew member to their Liquid Conditioning Garments (LCG).

LIQUID CONDITIONING GENERATION UNIT

The Liquid Conditioning Generation Unit (LCGU) houses the main components of the system, providing the fluid flow and temperature regulation.

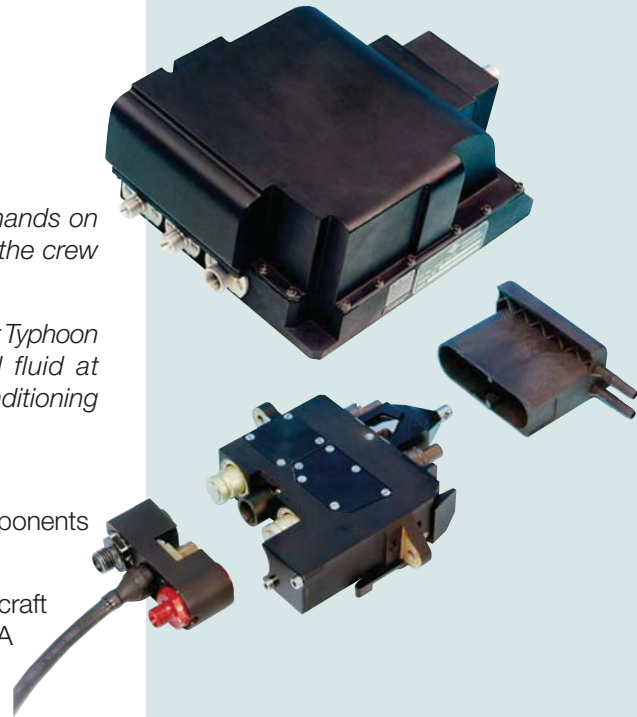
Cooling is derived from a liquid/air heat exchanger located within the aircraft environmental control system. An integral heater supplies heating. A temperature regulating valve mixes the hot and cold fluids to control the conditioning fluid's temperature to that selected on each crew member's Garment Temperature Selector (GTS). The system monitors the fluid to ensure that it is circulated to the crew members within safe limits. A motorized, positive displacement pump provides the motive power to push the conditioned fluid through the system. Conditioning fluid temperature stabilization, plus compensation for fluid pressure loss and fluid loss, is achieved by the use of an 'in-line' reservoir, which maintains a positive pressure on the pump.

LIQUID SUIT CONNECTOR ASSEMBLY

The interface between the LCGU and the crew member is the Liquid Suit Connector Assembly (LSCA). This is mounted on the seat and enables the separation of the crew member from the seat on ejection.

The LSCA comprises a Man Portion, a Seat Portion and an Aircraft Portion. The Man Portion is a self-sealing plug with hose attachments connected to the LCG. It allows single-handed connection to the Seat Portion and locks on correct engagement. It can be detached manually or remotely as part of the aircrew ejection sequence. The Seat Portion accepts the mating section of the Man Portion and is mounted on each crew members seat. It embodies a solenoid-operated, flow directing valve and fluid filter. It also incorporates twin temperature sensors and the Man Portion engagement mechanism and sensor.

The Aircraft Portion connects the LCGU to the Seat Portion and permits the separation of the liquid hoses and electrical receptacle from it as part of the aircrew ejection sequence. Self-sealing connectors are used throughout the LSCA to minimize fluid loss and air ingress during connection and disconnection.



FEATURES

- ✓ Maintains body temperature within acceptable limits, reducing crew stress
- ✓ Integrated with Aircraft ECS
- ✓ Single-handed connection and disconnection
- ✓ Remote disconnection on ejection and emergency egress
- ✓ Fully qualified



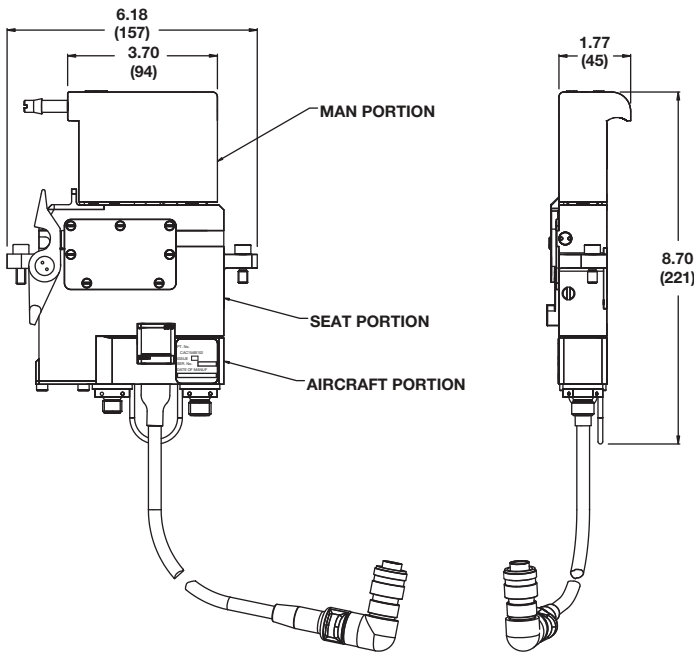
Crew Temperature Control System for the Eurofighter Typhoon

SPECIFICATIONS

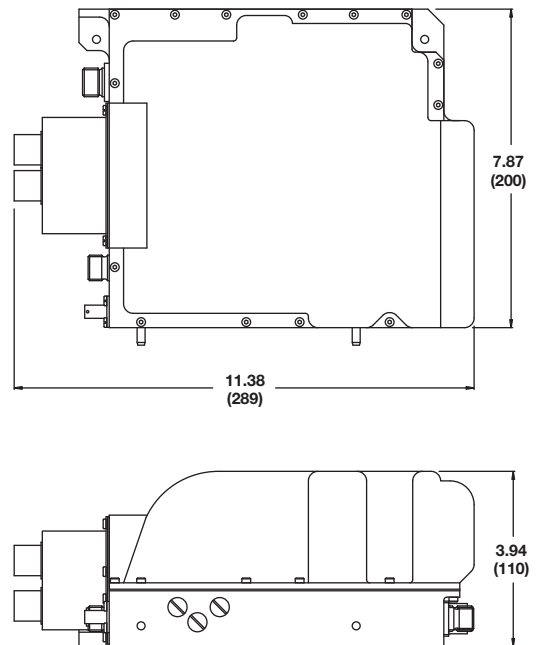
Conditioning Liquid: Ethylene Glycol/de-ionized water
 Liquid Mass: Flow rate 0.077 lbs./s (0.035 kg/s)
 Cooling Capacity: 300W
 Heating Capacity: 960W

Power Supply: 200 V, 400 Hz, 3-phase;
 28 VDC (Control)
 Mass LCGU: 12.34 lbs. (5.6 kg)
 Mass LSCA: 3.75 lbs. (1.7 kg)

LSCA



LCGU



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(MM)

DIMENSIONS

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 50 Fordham Road • Wilmington, MA 01887 U.S.A.
 E-mail: aerosales@ametek.com

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North America
 Tel: 978-988-4771 • Fax: 215-293-8995

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