

# ENGINES

**General Electric GE90-115B**

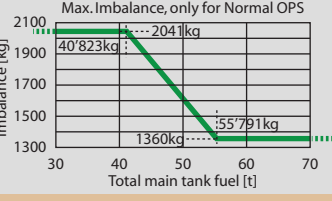
- 27 million US\$
- T/O Thrust max 115'540lbs / 513KN / ~110'000hp
- MCT Thrust 110'000lbs
- 1 FAN, 4 LP + 9 HP comp, 2 HP + 6 LP turbine
- 22 carbon fiber fan blades
- bypass ratio 9:1
- pressure ratio 42:1
- Thrust to weight ratio 6:1
- weight 8762kg
- fan diameter 330 cm, engine length 728cm
- N1 100% = 2355 RPM, limit 110.5% = 2602 RPM
- N2 100% = 9332 RPM, limit 121% = 11292 RPM
- EGT max 1090°C, 30 sec. 1095°C, MCT max 1050°C
- Oil temperature, max 132°C, 15min 143°C
- 2 Fire Ext bottles shared for both engines

# B777-300ER

Price 375 million \$

MZFW 239'950 kg  
MTW 352'441 kg  
MTOW 351'535 kg  
MLW 251'290 kg

# FUEL



# APU

- 3 Starts in 60min for each starter, electrical and air driven
- auto start if both AC XFR BUS lost
- 200kg/h APU GEN on GND
- 20kg/h per Pack on GND
- 150kg/h at FL380
- APU BLEED available <22000ft
- 1 Fire Ext bottle for APU
- on GND & ENG OFF => Auto Fire Ext

**Tanks**

- Main Tanks 31'300kg each
- Center tank 82'900kg
- Total 145'500kg usable

**Preflight:**

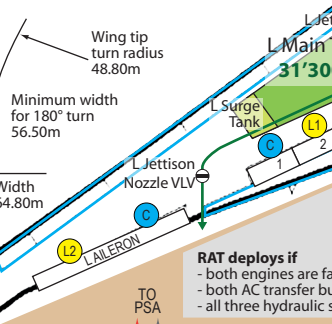
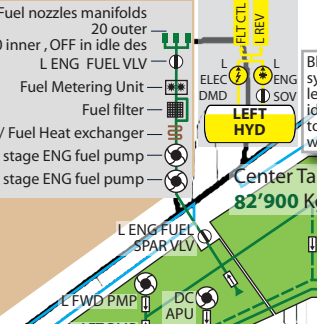
- Center Pumps ON if **FUEL IN CENTER** and more than 4800kg in center

**Inflight:**

- **FUEL LOW CENTER** -> switch OFF pumps - after 45min, scavenge of the 1200kg fuel remaining in center tank in around 90min with the main jettison pumps.

**Jettison:**

- rate 2500 kg/min with center tank
- rate 1400kg/min without center tank
- at least 3800kg remain in each main tank

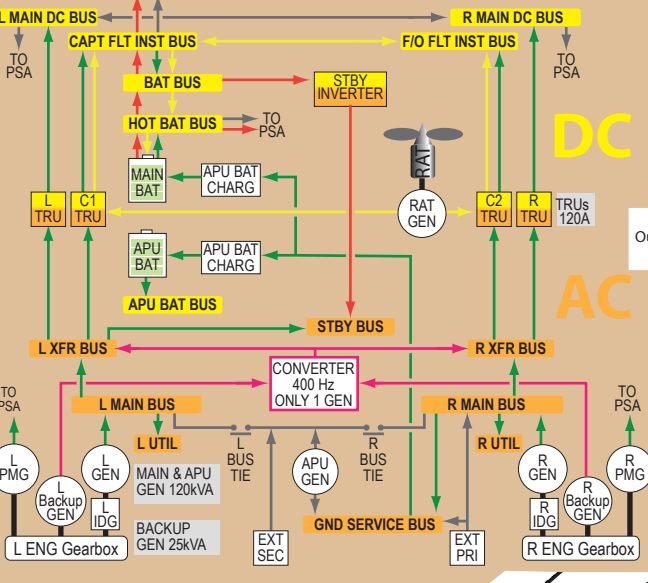


**BACKUP Power when:**

- only 1 main AC GEN available, or
- one or both main AC buses is lost, or
- APP mode is selected for autoland

**RAT deploys if:**

- both engines are failed and center system pressure is low, or
- both AC transfer buses are unpowered, or
- all three hydraulic system pressures are low



# ELECTRICAL

# LEGEND

**ELECTRICAL LEGEND**

- AC Busses
- DC Busses
- Normal In-flight feed
- Alternate feeds
- Backup AC PWR
- Standby Battery only
- Standby with RAT

**OTHER SYSTEMS**

- Left HYD (Lemon)
- Center HYD (Cyan)
- Right HYD (Orange)
- Fuel Manifold
- APU Fuel Manifold
- Electrical
- Bleed Air Hot
- Air Conditioning
- Mechanical/other ACes (Color of HYD sys)
- Non return Valve
- Pump
- Valve
- HYD motor
- Mechanical HYD Pump
- Electrical HYD Pump
- Pneumatical HYD Pump
- Ventilation Fan
- Smoke Detector
- Fire extinguisher bottle

# NOT FOR OPERATIONAL USE !!!

20.2.2020, Pierre-Michel Gasser, www.pmgasser.ch

↑ Length to elevator: 73.86m  
to tail: 73.08m

# EQUIPMENT COOLING

Equipment Cooling, normal mode

- Supply fan runs, R primary, L backup
- Override valve open to supply and close to the skin exhaust
- Vent fan runs
- Vent valve opens if TAT >12.8°C
- Cargo valve opens if the Vent valve closes (mechanically linked)

**VERRIDE mode EQUIP COOLING OVRD**

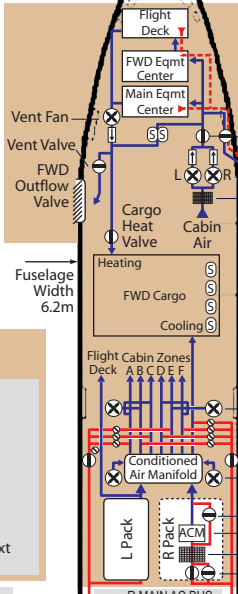
- Supply fans stop
- Override valve close to supply and opens the skin exhaust
- Vent fan stops
- Cargo Heat Valve close, Vent Valve opens
- Smoke is evacuated outboard per differential pressure

# AIR CONDITIONING

**Packs**

- CACTS (Cabin Air Conditioning and Temperature Control System)
- Each pack has fully redundant dual channel
- Flow Control & Shut Off Valves operate pneumatically, are springloaded close without pressure. Without control from ASCPC, valve opens with pressure.
- Pack can operate in standby cooling mode PACK MODE L/R

- Loss of trim air, CACTS will provide average temp

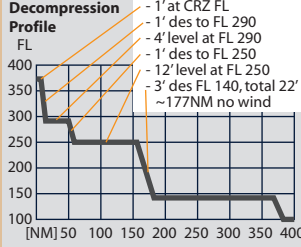


# ENG BLEED SYSTEM

- 4th, Low Press Bleed
- 7th, Anti Ice Valve
- 9th, High Press Valve
- PRSOV Pressure Regulating and Shut Off Valve
- Fan Air Precooler
- ENG Starter Valve

# PRESSURIZATION

- FWD and AFT outflow valves
- CAC, Cabin Altitude Controller
- 2 positive relief valves, opens at 9.1 psi
- 4 negative relief valves



# FLAPS & SLATS

**PRIMARY**

- Center Hydraulic
- Flap load relief, Autolast
- Asymetry/uncommanded motion
- Electric, L and R AC BUS via FSEU
- Slat load relief >256kts
- Asymetry/uncommanded motion

**SECONDARY**

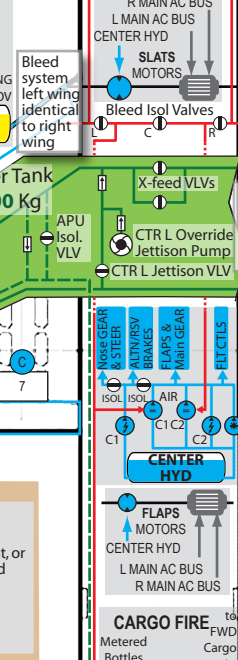
- Electric, L and R AC BUS, direct

**ALTERNATE**

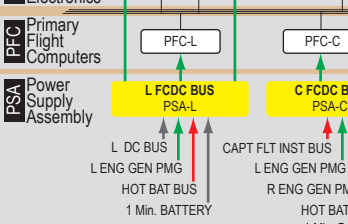
- Electric, L and R AC BUS, direct

**FLAPS PRIMARY FAIL**

**FLAP/SLAT CONTROL**



# CARGO FIRE



# NORMAL MODE

- Stall protection
- Overspeed protection
- Elevator variable feel
- Tailstrike protection
- Trim reference speed with **automatic pitch compensation** for thrust, gear, flaps and speedbrakes changes, turbulence and turns to 30° bank
- Bank protection 35° -> 30°
- Yaw Damper
- Thrust Asymmetry Comp.
- Wheel to rudder x-tie
- Gust suppression
- Rudder trim
- Rudder trim cancel switch
- automatic speedbrakes

**SECONDARY MODE**

- Proportional elevator command
- Elevator feel with 2 feel forces
- Both trim switch move directly the stabilizer
- no automatic speedbrakes
- Spoilers 4,5,10,11 locked out
- Degraded yaw damping
- Rudder trim
- Rudder trim cancel switch
- automatic speedbrakes

**FLIGHT CONTROL MODE**

# DIRECT MODE

- pitch control same as secondary mode
- only Rudder trim, no cancel switch

**PRI LIGHT COMPUTERS**

# MECHANICAL BACKUP



# FLIGHT CONTROLS

↑ Height: 18.85m