AIRCRAFT SERVICE EQUIPMENT | Established 1943

Juniper news

The newsletter of **A.T.Juniper (Liverpool) Limited** | WINTER 2011

INSIDE

- Training and Commissioning
- Thai Airways pay us a visit
- **NEW** 2x25 wash rig training video
- British Airways try the Juniper containment mat
- Full customer list and world map
- Nayak try Juniper rig in Italy
- New tooling for the Airbus A400M
- Latest wash probe list
- Long probes- they make sense

Thai Airways engineers and support staff welcome their new Juniper equipment.

COVER STORY >

More photos on page 2

THAI Airways choose Juniper for first engine wash

The recession has hit most businesses hard and the aviation industry is no exception. With the present economic climate it's important to keep maintenance and operating costs under tight control, and like many airlines before them Thai Airways are discovering that the Juniper engine wash system is probably the most cost effective around. GE also recognise this and recommend Juniper equipment in their Aircraft Maintenance Manuals.

In July of this year Thai Airways took delivery of one of our 2x50 gallon wash rigs **(JMP/LUFT/D/4972/C500)** together with five sets of wash probes including a set of GE90-115B long engine probes **(JMP/GE90-115B/D/4948)**. Steve Marshall flew out there at the beginning of August to commission the rig, give on-the-job training to over 30 technicians and engineers, and perform the first on wing engine wash on the GE90-115B engines fitted to one of their Boeing 777-300 aircraft. This was a great success and the benefits of the Juniper engine wash system were obvious to everyone present.

▲▲ *The top two photos show engineering staff coming to grips with the equipment during on the job training.*

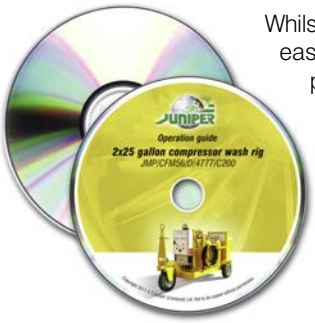
▲ *Bottom left: Fitting the long engine probes.*
Centre: The water sample on the left was taken after the first wash and the one on the right after the second wash. Clear evidence of the Juniper system's effectiveness.
Bottom right: Steve Marshall introduces the Thai Airways team to their new rig.

Thai Airways pay us a visit

▲ *Somkid Punpanich of Thai Airways checks on progress of the new rig with a visit to our Ash House manufacturing facility accompanied by Chris Marshall (left) and Andy Marshall (right).*

Thai Airways took such an interest in the progress of their recently ordered 2x50 gallon wash rig (see cover story), that in May of this year, we were happy to welcome Somkid Punpanich, Manager of their Aircraft Tooling and Store Division, who paid us a visit to assess the quality contol on their new rig before despatch and also take a look at our manufacturing facilities. Chris and Andy Marshall gave him the full tour and introduced him to the Juniper range.

New training video



Whilst the Juniper 2x25 wash rig is easy to use, there are certain procedures in setting up that have to be followed in the right order to achieve optimum results. To supplement the training given at the commissioning of the rig, Juniper have produced a comprehensive operation guide video to talk you through the rig's set up step by step, from the initial charging of the onboard nitrogen cylinders, through the heating of the tanks, performing an engine wash, clearing the bleed lines of excess water and re-stowing of equipment on the rig.

Owners of our 2x25 rig will find this an invaluable resource. To obtain your copy of this CD, please contact us direct.

British Airways on the mat...

The situation at Gatwick is that no engine wash can take place unless all the waste water is collected, and as Steve Marshall had already been in discussions with British Airways, this was seen as the ideal opportunity to try out Juniper's new trailer mounted Kyoto Containment mat **(JMP/KYOTO/D/6777/C200)** and a date in May 2010 was agreed.

As this was to be their first engine wash, there was a brief presentation before hand which included the official GE Core Wash Procedure video, with Juniper equipment featuring prominently, then it was on to the wash proper.

Once the Boeing 777-200 was in position, the day started with a look at the water collection mat, demonstrating it's deployment and features with the assembled personnel declaring themselves impressed with the systems' flexibility and ease of use. Full advantage was taken of this opportunity and Ken Moore of British Airways shot plenty of detailed video footage which has now been edited and is available to view online (contact us for the details). The engine wash proceeded without a hitch and the collection mat did its job beautifully.

Training & Commissioning

▲ *Aegean Airlines maintenance staff with their new Juniper 2x25 gallon wash rig.*

Aegean Airlines June 2010

In June last year Aegean Airlines bought the 2x25 gallon wash rig and a set of V2500 short probes **(JMP/V25OO/D/4040)** to service the V2500 engines fitted to their Airbus A320 aircraft, and at the same time took delivery of their new Juniper trailer mounted Kyoto containment mat **(JMP/KYOTO/D/6777/C200)**

Steve and Chris Marshall travelled to Athens International Airport to commission the equipment and give staff training in its operation.

After a day's training in the hangar with the engineering and maintenance team, everyone reassembled later that evening to put the equipment through it's paces with an engine wash on the A320. The wash went smoothly and everyone was impressed with their first experience of the new water collection system which performed beautifully.

Training & Commissioning

Mikael Svensson, Quality Manager and Robert Berglund Molguard, Licensed Engineer with Juniper's 2x25 gallon wash rig.

GoT²echnics April 2010

GoT²echnics are a small and dynamic independent repair and maintenance operation based at Landvetter Airport in Gothenburg, Sweden. In May last year they bought a 2x25 gallon rig together with a set of CFM56-7 engine probes **(JMP/CFM56/D/4462)** and Steve Marshall travelled to Sweden to commission the rig and give staff training with an engine wash on a CFM56-7 fitted to a Primera Boeing 737-800. Training and wash went well and a follow up report on the wash revealed a 10° margin of recovery, which was extremely satisfactory.

Emirates Airlines April 2010

One of Emirates Airlines Boeing 777-300 aircraft takes to the air.

Training and commissioning of Emirates Airlines new 2x25 gallon wash rig **(JMP/CFM56/D/4777/C200)**, and GE90-115B long engine probes **(JMP/GE90-115B/D/4948)**, was to be carried out in April of last year with demonstration washes planned for the GE90-115B and CFM56-5C engines fitted to their Boeing 777-300ER and Airbus A340-310 aircraft. Due to unavoidable circumstances, Steve was unable to carry out an engine wash in the allotted timescale, but full staff training was completed with the assembled engineering staff very enthusiastic and complimentary about the Juniper equipment. A successful wash was carried out the following evening by the trained staff and everyone was happy with the result.

Whilst in Dubai, Steve paid a visit to Fly Dubai to follow up on an enquiry for the 2x25 gallon rig and tooling for the CFM56-7 engine. This proved to be a productive visit and, after a few questions were answered, the order was placed.

Air Asia engineering staff get to grips with the 2x25 gallon wash rig.

Air Asia August 2011

Steve Marshall flew to Jakarta, Indonesia in August of this year to commission a 2x25 gallon wash rig **(JMP/CFM56/D/4777/C200)** and CFM56-5B long engine probes **(JMP/CFM56/D/6527).** Staff training was given with an engine wash on the CFM56-5B engines fitted to an A320-200 aircraft using the CFM56-5B long probes originally designed for use on the A321.

This was the first time these probes had been demonstrated on the A320 and they fitted perfectly. Due to the very dirty condition of the engines three washes were performed, and everyone present was very impressed with the results and ease of use of the Juniper equipment.

Training & Commissioning

Ethiopian Airlines September 2011

▲ *Steve Marshall introduces the team to their new Juniper equipment.*

▲ *Hands-on experience for Ethiopian Airlines engineering staff as they fit Juniper's GE90-115B long probes*

▲ *I know there is a rig in here somewhere..... Engineering staff gather round for training*

▲ *A warm welcome for Steve Marshall before training begins.*

GE advocate regular washing for all their engines and specifically recommend the Juniper compressor wash system, so Ethiopian Airlines have bought one of Juniper's 2x25 gallon rigs **(JMP/GE90/D/4038/C200)** together with long **(JMP/GE90-115B/D/4948)** and short **(JMP/GE90-115B/D/4949)** probes for the GE90-115B engines fitted to their Boeing 777-200 aircraft. Steve and Andy Marshall flew out in September of this year to give training to their maintenance and engineering staff and commission the rig. Both sets of probes were demonstrated, with the short probes being used in the first wash and the long probes in the second.

The washes went well, and even though the engines were still fairly new and had only been operational for a few months, positive results were expected and achieved.

Note: The rig is the standard 2x25 gallon wash rig but is so numbered because it is supplied as a package with the GE90 probes

Boeing Shared Services June 2011

Boeing Shared Services Group at the Naval Air Station, Patuxent River, Maryland, USA, where they test and evaluate new aviation equipment for the United States Navy, purchased one of Juniper's 2x25 gallon wash rigs together with short **(JMP/CFM56/D/4462)** and long **(JMP/CFM56/D/6645)** probes for washing the CFM56-7 engines fitted to their P-8A Poseidon Aircraft. The P-8A Poseidon, modified from the Boeing 737-800, is a replacement for the P3 Orion and will feature the latest ASW weapons technology and electronics. Over 115 of these aircraft will be delivered to the US Navy over the next 10 years.

Steve Marshall flew out there in late June to train engineering staff in the use and maintenance of the rig and wash probes.

▲ *The US Navy's replacement for the P3 Orion, the new P-8A Poseidon aircraft.*

Juniper worldwide

Juniper now deals with over **400** customers worldwide

A.W. Developments
ACTS Aero Technical Support & Services
Aegean Airlines
Aer Lingus
Aerocontractors Company of Nigeria Ltd.
Aeromexico
Aeromexico Connect (Aeroliteral)
Aerosafe Products
Aerosvit-Ukranian Airlines
Aerotechnik Anhalt
AGSE
Air Algerie
Air Arabia
Air Astana
Air Atlanta Aero Engineering Ireland
Air Atlantique
Air Berlin
Air Bridge Carriers Ltd.
Air Canada
Air Caraibes
Air Deccan (India)
Air Europa (Mallorca)
Air France
Air Hansen
Air India
Air Italy S.p.A.
Air Jamaica
Air Luxor (now Hifly)
Air Madrid
Air New Zealand
Air One
Air Pacific Ltd.
Air Philippines
Air Transat
Air Transport International
Air UK Engineering
Air Works India Engineering Private Ltd.
AirAsia
Airlogic Ltd.
Airnorth Engineering
Airwork limited
AJ Walter Aviation
Aker-Stord (Norway)
Al Fahim Trading L.L.C.
Al Jaber Aviation
Alenia Aeronautica (Italy)
Alitalia
All Nippon Airways
All Nippon Airways Trading Co. Ltd.
Alstom Gas Turbines
AMAC Aerospace
American Airlines
American General Supplies
Amiri Flight
AmSafe Bridport
Angola Airlines
API Asia Pacific Inc.
Aramco Overseas Company BV
Ariana Afghan Airlines
ATC Lasham
Atlas Air
Atlas Jet (Turkey)
Austral Lineas Aéreas
Australian High Commission
Austrian Airforce
Austrian Airlines
Aviation Display
Aviation Spares
Avient Ltd.
Aviquipo Holland B.V.
Avtrade
Aylward Engineering & Pneumatics Ltd.
Babcock Aerospace
BAE Chester
BAE Dunsford
BAE Manchester
BAE Systems (Operations) Ltd.
BAE Systems Surface Ships
BAE Warton
BAE Yorkshire
Bangkok Airways
BASCO
Belgium Airforce
Beta Glass Plc.
BH Air (Bulgaria)
Bjorge/EGT
Blackpool Transport
BMW - Rolls Royce
BNFL (Magnox Generation Dungeness 'A' Power Station)
BNFL (Sellafield,Cumbria)
Boeing (US Army)
Brammer
Brazilian Navy
Bristow Helicopters Ltd
Britannia Airways
Britannia Airways (Sweden)
British Aerospace
British Airways
British Airways (Glasgow)
British Airways (Heathrow Airport)
British Hovercraft
British Hovercraft (Saudi Arabian Frontier Force)
British Midland International
Brunei Shell
Canadian Airforce
Cargolux
Caribbean Airlines
Carnival Airlines (USA)
CCM Airlines
Cenco Inc.
Certified Components Group
Charles Kendall Freight
CHC Ireland Ltd.
China Airlines
China Southern Airlines
Chip-Tech Ltd.
Comair Ltd.
Compass Airlines
Connex South Eastern
ConocoPhillips UK Ltd.
ContactServe (Pty) Ltd.
Continental Airlines
Copa Airlines Panama
Corendon Airlines
CPG Logistics Ltd.
Cyprus Airlines
Cyprus Airways
Czech Airlines
Daimler Chrysler
Danish Air Force
Dasic International
DC Aviation GmbH
Deeside College
Defence Support international Ltd.
Delta Air Transport
Derichebourg Atis Aéronautique
DHL Air Ltd.
Direct Rail
Dresser Rand (UK) Ltd.
Dresser Rand Co. (USA)
Dutch Royal Air Force
Dutch Royal Navy
Eastern Generation
EgyptAir
Egyptair M&E
El Al Israel Airlines
Embraer Brasileira
Emerald Airways
Emirates Airline
Engine Alliance (GP7200 & GE's GEnx)
Enterprise Oil
Ethiopian Airlines
Euralair Industries
Eurocypria Airlines
Europe Aviation
European Air Transport
European Gas Turbines
Eurowings (Germany)
Eva Air
Evergreen Aviation tech Corp. Taiwan
F.B.S. Ltd.
F.R. Aviation
Far East Aviation Equipment Ltd.
FB Heliservices Ltd.
FedEx
FEL Avionics
Felix Airways
Ferguson Enterprises Inc.
FFV Aerotech
Field International Ltd. (Malabar)
Fields Aviation
FLS Aerospace
FLS Aerospace (Ireland)
flydubai
FMV Sweden
Fonseca Matos & Ferreira Lda (Portuguese Air Force)
FPM Technology
Froude Consine Ltd.
FSL Aerospace Ltd.
Fuji Dream Airlines
Futura Internac (Mallorca)
G.O.T. Ltd.
GAMCO - UAE
Garuda Indonesia
GE Aircraft Engine Services South Wales
GE Aviation Customer Tooling Solutions
GE Aviation USA
GE Engine Services International Inc.
GE Engine Services Malaysia
GE Greenwich Caledonian
GE Pacific Pte Ltd.
GE Peebles Test Facility
GE Structured Services
Globalia Mantenimiento Aeronautico
GOL Transportes Aeroes S.A.
Goldtech Technologies (Israel)
GoTÇechnics
Gowrings Continental
Greenwich Caledonian
Grove Park Maintenance (London)
Gulf Air
Gulf Helicopters Company
Hapag Lloyd
Hi Fly
Homac Aviation Group
Hong Kong Aircraft Engineering Company Ltd.
Hunting Aviation
I.C.S.
I.E.M.A. (Portugal)
Iberia Lineas Aereas De Espana
Iberworld Airlines (Mallorca)
Iddon Hydraulic Ltd.
IHI Heavy Industries (Japan)

IMP Aerospace
Inflite Engineering Services Ltd.
Inter Airlines (Turkey)
Inter Appro (France)
Interjet
Inter-Nett Plain Sailing Cleaning Services
IQA Industrias Quimicas
Isle of Scilly Skybus Ltd.
Italian Army
iTech Consultants
Jacobs
JAL (Japan)
JAL Aeroparts S.A.S.
Jalux Europe Ltd.
Japan Airlines
Japan Transocean Air
JEA
Jeju Air
Jet Airways (India) Ltd.
Jet Blue
Jet2.com
JIT Aviation USA
JorAMCo
Jordan Aviation
JVYS
Kellogg Brown & Root Ltd.
Kenya Airways
Keyford Precision Engineering (Frome) Ltd
Kingfisher Airlines
KLM
KLM UK Engineering
Korean Air
Kuwait Airways
LAM Mozambique Airlines
Lan Airlines S.A.
Lauda Air
Libyan Airlines
Lincoln Turbine Ltd.
Lintech
London Underground (Hammersmith)
London Underground (Jubilee Line)
London Underground (Stonebridge Park)
LOT Polish Airlines
Lufthansa (Frankfurt)
Lufthansa (Stuttgart)
Lufthansa Cityline GMBH
Lufthansa Technik Airmotive Ireland
Lufthansa Technik Budapest
Lufthansa Technik Philippines
Luxair
MacLean Electrical
Magnox Electric Ltd.
Malaysian Air Force
Malaysian Navy
Mandarin Airlines
Mazoon International (Oman)
Mekong Aviation
Merpati Nusantara Airlines
MESA (Portugal)
Mexicana Airlines
Middle East Airlines AirLiban (MEA)
Ministry of Defence
Ministry of Interior (State of Bahrain)
MNG Airlines Turkey
Monarch Aircraft Engineering
Monarch Airlines
Montenegro Airlines
MST Ltd. (Azerbaijan)
MTU Maintenance (Berlin)
Munasib Sanaye Techizat (MST)
My Technic
MyTravel
N.V. Sabena Technics BRU S.A.
Naganari Corporation (Malaysia)
National Air Service (NAS)
Nayak
Niki Luftfahrt GmbH
North West Airlines (Snecma)
North West Airlines (Snecma) Mineapolis
North West Airlines (Snecma) Tampa
Norwegian Rail
Nova Airlines
Oman Air
Onur Air
Owl Aerospace
P & W America
Pacific Dynamics (Australia)
Pakistan International Airways
Pegasus Hava
Pequipmar
Pinnacle Airlines
Power Ring Technology (Hong Kong) Ltd.
Prime Aerospace PTE Ltd.
PX Group
Qantas Airways
Qatar Airways
Qatar Petroleum Development Co. Ltd.
Qualitair
R.A.N. Australia
RAAF
RAF
RAF Benson
Ramp Industries Ltd.
Ramp Industries Ltd.
R-Contrade Trading & Services
Regional Compagnie Aerienne Europeen
Regional Railways
Regional Railways (Leeds)
Regional Railways (Norwich)
Repaircraft plc.
Rhinestahl Corporation
RNLAF
Rolls Royce (Derby,England)
Rolls Royce (North America)
Rossiya Russian Airlines
Royal Air Force of Oman
Royal Air Maroc
Royal Jordanian
Royal Navy (Prestwick)
Royal Navy (UK)
Royal Netherlands Navy
Royal Norwegian Air Force
Ryanair
S7 Engineering
Saab Aerotech
Sabena
Safair (Pty) Ltd
Safi Airways
Saga Airlines
Sahara Airlines
Saudi Airlines
Saudi Arabian Airlines
Schreiner & Co. (AD-S & Co. b.v.)
Schreiner Airways
Scott Aerospace Ltd.
Senegal Airlines
Serck Intertruck
Shannon Aerospace
Shannonside Aviation Ltd.
Shenzhen Airlines
Sichuan Snecma China
Siemens
Singapore Airlines
Skymark Airlines Inc. (Japan)
Slovak Airlines
Snecma Moteurs
Snecma Services (CFMI Factory)
Snecma Services (Transavia)
Snecma Services France
Snecma Services North America
South African Airways
South West Trains (Fratton Traincare)
South West Trains (Salisbury)
Southern Air
Specialist Technologies Ltd.
SR Technics Ireland Ltd.
Sri Lanka Air Force
ST Aerospace (Singapore)
ST Aviation Services Co. Pte Ltd.
Standard Aero Ltd.
Sun Country Airlines
Sunstate Airlines
T&E Co. Ltd. (Japan)
Tam Linhas Aereas SA
TAP M&E Brazil
TAP Portugal
Thai Airways
Trafficair
Transavia
TUI Airlines
Tunisair
Turkish Air Force
Turkish Airlines
UAE
United Arab Emirates Air Force
United Corporation Ltd.
US Airways
US Army
USAF (Tinker AFB)
Varig Airlines (Brasil)
Vernair
Vietnam Airlines
Virgin Atlantic Airways
VivaAerobus
VT Aerospace
VT Shipbuilding International
Vulcan Operating Company
Wencor West Inc.
West Coast Train Care
West Jet (Calgary Canada)
Westland Helicopters
Westland Transmission
Westley Aircraft
Wideroe
Wizz Air Hungary KFT
WM Airline Services
Wood Group Gas Turbines
Yemen Airways (Yemenia)

If you have Juniper equipment, and don't see your name in this list, please get in touch!

Juniper Worldwide Sales

Between January of 2010 and October 2011, 215 new machines have been delivered to customers all over the world.

Compressor Washing Rigs	**164**
Industrial Compressor Washing Rigs	**25**
Foaming Rigs	**6**
Oil Replenishment Rigs	**9**
Oleo Charging Rigs	**2**
Inhibiting Rigs	**4**
Flushing Rigs	**1**
Containment Mat Systems	**4**

Juniper proves a cost effective solution for Nayak

Aircraft maintenance company, Nayak Aircraft Services, were contracted to perform an 'A' check on a Belle Air (Albania) A319 Aircraft at Malpensa Airport, Milan in June of last year and had neither the wash rig or tooling to carry out the required engine washes on the V2500 engines as part of the check. Nayak were keen to find out more about Juniper's engine washing system and reckoned this to be a good chance to see the system in action and receive training in the use of the wash rig and tooling.

When they asked for our help we readily agreed and saw this as a good opportunity to show what Juniper equipment can do and demonstrate how cost effective our engine washing system was in comparison to most of the alternatives.

Air Italy, a Juniper customer also based in Malpensa, were kind enough to loan us their recently acquired 2x25 wash rig **(JMP/CFM56/D/4777/C200)** for the engine wash, and we took along a set of the V2500 short probes **(JMP/V2500/D/4040)** to complete the tooling.

Both the training and engine wash went well and Nayak personnel declared themselves impressed with the versatility and ease of use of the Juniper system.

New tooling for the Airbus A400M

Recently, Europrop International had used the Juniper Universal rig **(JMP/HER/D/1144/C600)** to wash the new TP400-D6 engine for the Airbus Military A400M aircraft and only managed disappointing results using their own tooling.

After asking our advice and reviewing the positive results we'd achieved washing the Hercules T56 engine using our own spray ring tooling, ITP, who are responsible for developing tooling for the TP400-D6, suggested we design a similar spray ring to fit their engine. So in May of this year Steve and Chris Marshall flew to Moron Air Force Base near Seville, Spain, where the engine was on it's METS test frame, to measure up and take dimensions. Detailed drawings of the new design are now in the final development stage.

▲ *Top: Steve and Chris Marshall prepare to measure up.*
Bottom: The new design takes shape.

Juniper rigs just keep on going...

Rolls Royce asked us to replace a twin hose assembly on one of their Adour compressor washing rigs **(JMP/ADOUR/D/0760/C500)** at RAF Valley in North Wales. Unusually, the hose had a faulty end fitting and the complete unit was replaced under the terms of their warranty.

Whilst he was there, Steve Marshall was shown one of the early Juniper MK2 fluid replenishment rigs that had given many years of faithful service and had now been modified and pressed into service as part of a hydraulic testing rig - it just goes to show….old Juniper rigs never die..!

Checking probe fit on the Challenger 604

In September 2010, an engine wash was planned on a CF34-3B engine fitted to a Challenger 604 aircraft. The purpose of the wash was to see if our CF34-3A1 **(JMP/CF34-3A1/D/6850)** long engine probes would fit without any modifications.

Steve Marshall had already had assurances from GE that both engines were physically identical, so he travelled to Ataturk Airport in Turkey accompanied by Juniper's Turkish agent, Zeki Koroglu of Millennium Aerospace who had organised the loan of a 2x25 rig from Onur Air, another Juniper customer also based at Ataturk Airport, for the purposes of this wash.

Steve took a set of CF34-3A1 long probes with him, and although due to unforeseen circumstances the wash didn't take place, it was established that the probes fitted as hoped.

▲ *Photo by Adrian Pingstone: Royal Danish Air Force Bombardier Challenger 604 at the Royal International Air Tattoo, Fairford, England.*

The Juniper range of short engine probes are available to fit most engine types. We also produce long probes for those occasions when it's more convenient to engine wash with the thrust reverser doors closed. Below is a full list of probes (the long probes are on the shaded background) together with part numbers, engines covered and a generic fitment guide. Each Juniper part number refers to a set of two probes.

Aircraft Type	Engine Probes	Juniper Part Number
Boeing 737-300-400	CFM56-3	JMP/CFM56/D/4538
Airbus A320 RE-Engined DC8, AWACS	CFM56-2 & 5A	JMP/CFM56/D/4435
Airbus A321	CFM56-5B (Long Probes Thrust Reversers closed) 89"	JMP/CFM56/D/6527
Airbus A320, A340	CFM56-5B/C	JMP/CFM56/D/4605
Boeing 737-700/800	CFM56-7	JMP/CFM56/D/4462
Boeing 737-700/800	CFM56-7B (Long Probes Thrust Reversers closed)	JMP/CFM56/D/6645
Sukhoi Superjet 100	SaM 146	JMP/SaM146/D/6797
(MDC)DC-10-30	CF6-50	JMP/CF6/D/4966
(MDC)DC-10-10/DC-10-30	CF6-6D/6K/-50	JMP/CF6/D/4510
Boeing 747/767	CF6-80C2	JMP/CF6/D/4037
(MDC)MD-11, Airbus A300, A310	CF6-80C2 D1F/A5F/A5/A3	JMP/CF6/D/6418
Airbus A310	CF6-80A2/A3	JMP/CF6/D/4247
Boeing 747/767 Airbus A330-200 (MDC)MD-11 Airbus A300-600F Airbus A310-200F	CF6-80C2 CF6-80E1 CF6-80C2 D1F CF6-80C2 A5F CF6-80C2 A3 (Long Probes Thrust Reversers closed) 98"	JMP/CF6/D/6511
Airbus A330	CF6-80E1	JMP/CF6/D/4947
Boeing 777	GE90 (Short Probes)	JMP/GE90/D/4081
Boeing 777	GE90 (Long Probes Thrust Reversers closed) 127½"	JMP/GE90/D/4599
Boeing 777-300ER	GE90-115B (Short Probes)	JMP/GE90-115B/D/4949
Boeing 777-300ER	GE90-115B (Long Probes Thrust Reversers closed)135"	JMP/GE90-115B/D/4948
Airbus A380	GP7200 (Long Probes Thrust Reversers closed)	JMP/GP7200/D/6836
Boeing 787	GEnx	JMP/GEnx/D/6783 (11C4308P01)
Boeing 787	GEnx (Long and Short Probes Combination Set)	JMP/GEnx/D/6698 (11C4308P02)
Bombardier CRJ100	CF34-3A1 (Long Probes Thrust Reversers closed)	JMP/CF34-3A1/D/6850
Bombardier CRJ700, 900	CF34-8C5 (Long Probes Thrust Reversers closed)	JMP/CF34-8C5/D/6844
Embraer 170 & 175 Bombardier CRJ700, CRJ900, CRJ1000 Bombardier Challenger, 870, 890	CF34-8C/E	JMP/CF34/D/6553
Embraer 190 & 195	CF34-10E	JMP/CF34/D/6000
Embraer 190 & 195	CF34-10E (Long Probes Thrust Reversers closed)	JMP/CF34/D/6932
Fokker 100	TAY 650-15	JMP/TAY/D/6800
Boeing 757	RB211-535E4	JMP/RB211/D/4153
Boeing 747-100B	RB211-524C2	JMP/RB211/D/6889
Boeing 747-400	RB211-524 G&H Long Probes Thrust Reversers closed)178"	JMP/RB211/D/4249
Airbus A320	V2500	JMP/V2500/D/4040
Airbus A320	V2500 (Long Probes Thrust Reversers closed)160"	JMP/V2500/D/6561
(MDC)MD-90	V2525 D5	JMP/V2500/D/4703/MD

(MDC)MD-90	V2525 D5 (Long Probes Thrust Reversers closed)	JMP/V2500/D/6562/MD
Airbus A340-600	TRENT 500	JMP/TRENT/D/6188
Airbus A340-600	TRENT 500 (Long Probes Thrust Reversers closed)	JMP/TRENT/D/6615
Airbus A330	TRENT 772	JMP/TRENT/D/4702
Airbus A330	TRENT 772 (Long Probes Thrust Reversers closed)185”	JMP/TRENT/D/6592
* Boeing 777-200ER	TRENT 800	JMP/TRENT/D/6328
Boeing 777-200ER	TRENT 800 (Long Probes Thrust Reversers closed)	JMP/TRENT/D/6935
Airbus A380-800/900	TRENT 900 (Long Probes Thrust Reversers closed)133”	JMP/TRENT/D/6776
Boeing 787	TRENT 1000 (Long Probes Thrust Reversers closed)	JMP/TRENT/D/6754
Airbus A350	TRENT XWB (Long Probes Thrust Reversers closed)	JMP/TRENT-XWB/D/6834
Airbus A350	TRENT XWB/900 (Long Probes, hook only)	JMP/TRENT-XWB/D/6834/01A
Boeing 757	P & W 2000 (Long Probes Thrust Reversers closed)	JMP/PW2000/D/6846
Boeing 767-200/300 Airbus A300/A310,(MDC)MD-11	P & W 4000-94” Fan (PW 4152/4158/4462)	JMP/PW4000/D/4856
Boeing 767-300 Airbus A300/A310,(MDC)MD-11 Boeing 747-400	P & W 4000-94”Fan (Long Probes Thrust Reversers closed) 85”	JMP/PW4000/D/6601
Airbus A330/200/300	P & W 4000-100”Fan	JMP/PW4000/D/6216
Boeing 777-200	P & W 4077-112”Fan (Long Probes Thrust Reversers closed)	JMP/PW4000/D/6728
(MDC)MD-83	P & W JT8D-219 (Long Probes Thrust Reversers closed) 201”	JMP/JT8D/D/6627
Boeing 747-200	P & W JT9D	JMP/JT9D/D/4154
BAE 146, RJ70/100	Allied Signal LF507	JMP/LF507/D/4809
Ilyushin IL96	PERM PS-90A 185”	JMP/PERM/D/6581

* Denotes probes in development

Juniper short probes - generic fitting instructions

Engine Preparation - Refer to appropriate Aircraft Maintenance Manual.

Open left and right thrust reversers on the engine to be washed in accordance with the instructions detailed in the appropriate AMM.

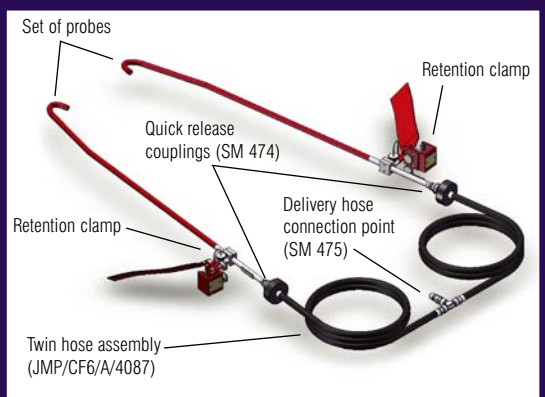
CAUTION: Ensure the engine fan is held securely during the fitting of the engine probes.

Attach the engine probe retention clamps to the fan reverser inner or outer support ring. Generally, for smaller fan engines (such as the CFM) this will be in the 10.00 and 2.00 o’clock positions, and for larger fan engines (such as the CF6) in the 8.00 and 4.00 positions, aft looking forward. Guide the probes through the fan outlet guide vanes (OGV’s) from the aft end at locations adjacent to the retention clamps, locating them over the booster/fan splitter so that the nozzles point between the booster inlet guide vanes into the booster.

Put each probe aft mount on the probe retention clamp screw and fit the retention knobs.

Adjust each probe aft mount to hold the probes safely in place using the allen key provided. Connect the twin hose assembly (provided) to both of the engine probes whilst holding the probes securely to avoid movement, making sure that the probes are attached securely to the engine with the hoses attached. Connect delivery hose from the wash rig to the twin hose assembly. Probe installation is now complete.

CAUTION: Check that probe nozzles are clear of the back of the fan.



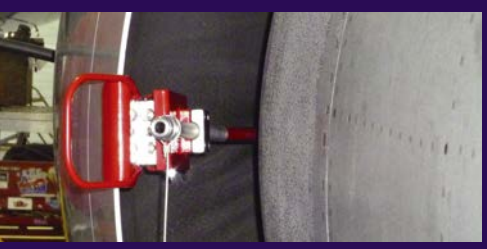
The twin hose assembly connected to the probes.

Juniper continues to thrive in Industrial Offshore and Power Industries.

Since the Early 1980s, Juniper has been supplying industrial compressor washing rigs to Siemens (formerly known as Ruston Gas Turbines and then European Gas Turbines). These rigs have both on and offshore applications, with many rigs offshore being supplied for use on North Sea oil platforms, while the onshore business is mainly in the heat, light and power industries. To date, over 450 rigs have been supplied to customers worldwide through Siemens. We still supply spares for this family of rigs, and the newer models have been developed for use with their latest range of gas turbines, the SGT-100, SGT-200 and SGT-300.

▲ *Oil Rig photo: A Creative Commons image by Nandu Chitnis*

▲ *Juniper's versatile and maneuverable Industrial compressor wash rig (JMP/AGT/D/6004)*



Juniper long wash probes cutting time and making sense.

Back in the 1980s Juniper started spreading the word about the benefits of engine washing to commercial airlines. In those days, if a wash was performed at all it was usually done after an engine 'check. Thrust reverser doors would be open with all areas of the engine accessible, and our short wash probes were developed to work within these conditions.

These days, the benefits of regular engine washes are more clearly understood and acknowledged, and engines are being washed without waiting for scheduled service intervals so a speedy turnaround is essential. Our range of long probes have been developed for washes were no engine disconnections are required and the thrust reversers can remain closed, cutting approximately an hour from the time needed to complete a full wash.

The latest addition to our range of long probes is the CF34-10E **(JMP/CF34/D/6932)** and these have just completed a trial fit on an Embraer 195 for Flybe at Exeter International Airport. For a full list of long and short probes available see pages 10 and 11.

▲ *The new CF34-10E long probe in position.*

▲ *Embraer 195 photo courtesy of Flybe.*

Steve Marshall *Managing Director*

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