

A T JUNIPER (LIVERPOOL) Ltd

Juniper 2x25 Gallon Multi-Engine Compressor Washing Rig Part No. JMP/CFM56/D/4777/C400

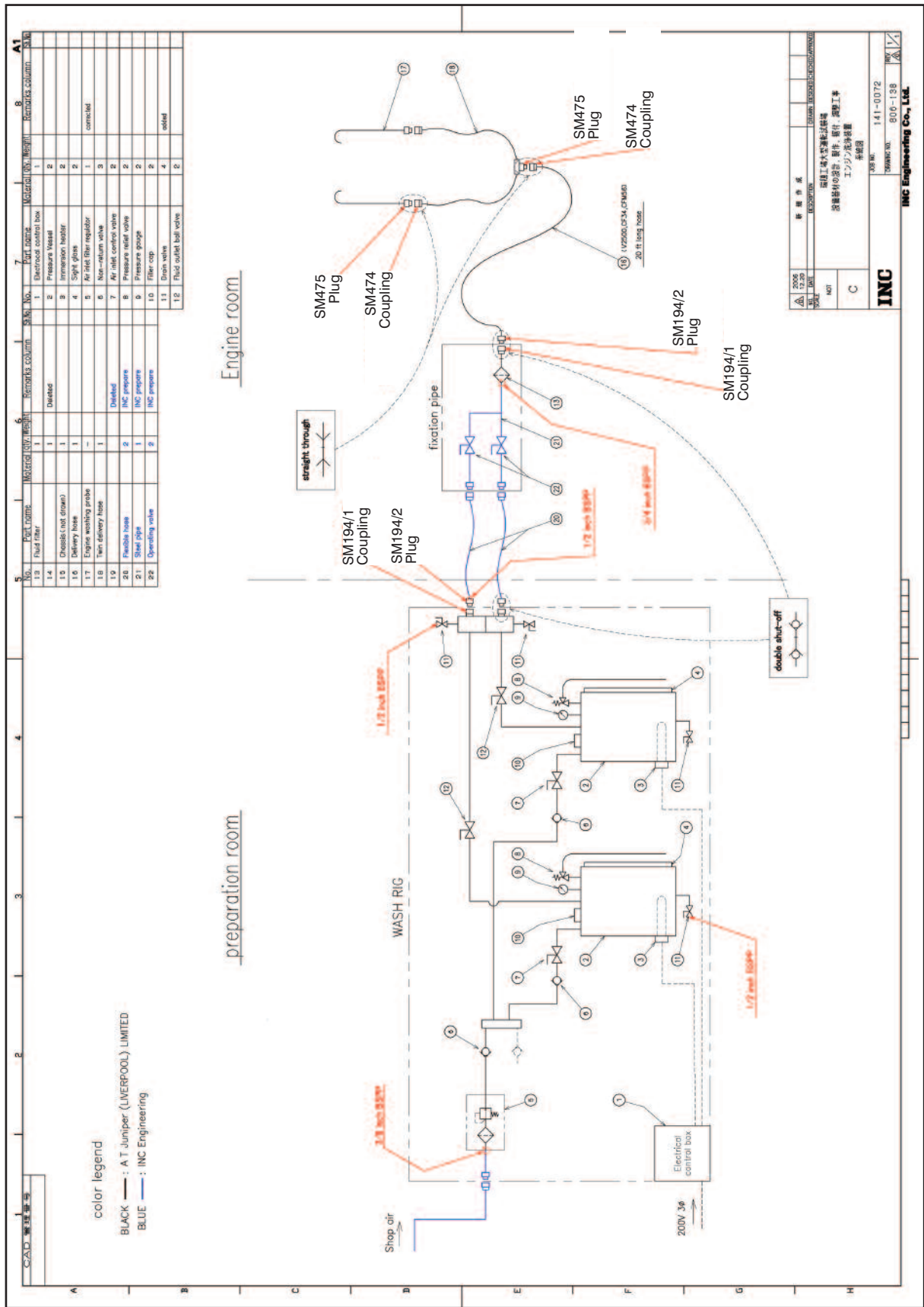
This rig is all as per our rig JMP/CFM56/D/4777/C200 but for the following modifications. The customised rig enables it to be used in IHI Ishikawajima Harima Heavy Industries Test Cell, Tokyo, Japan.



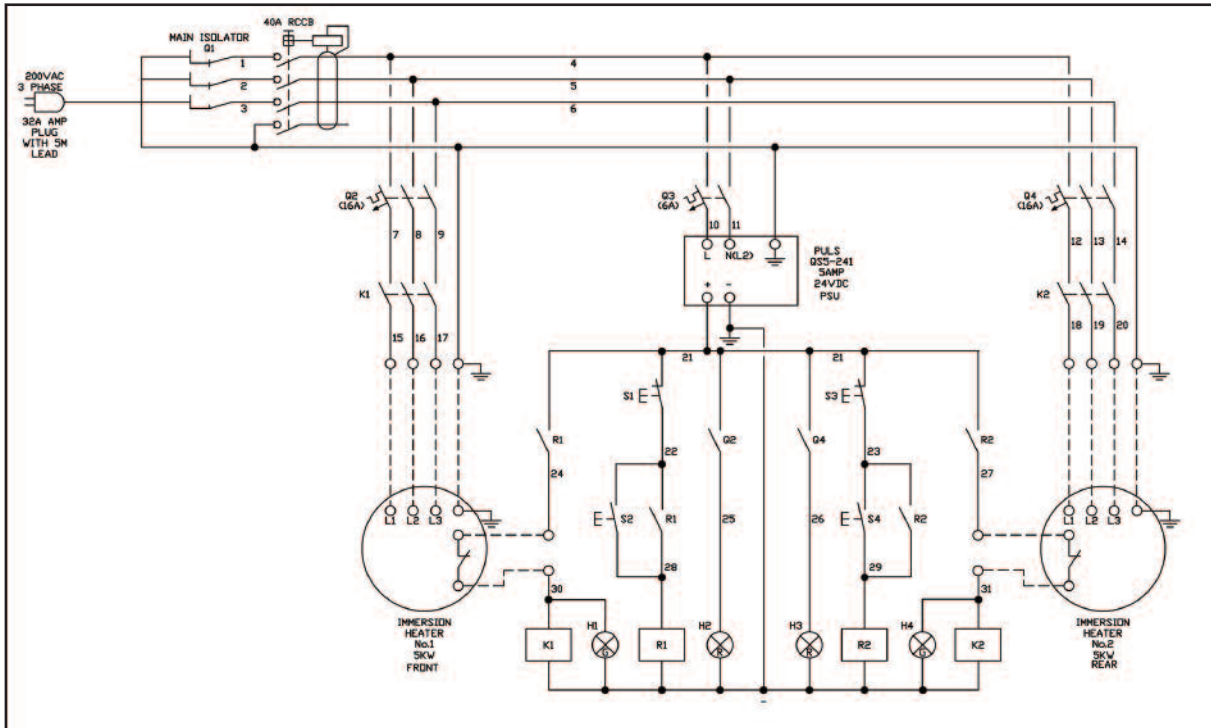
The modifications are as follows:

- The outlet filter and selection valve have been removed together with both delivery hoses and stowage arrangement.
- The filter will be supplied loose for connection to the customers pipe work. The inlet connection to this filter is a $\frac{3}{4}$ inch BSP female fitting and the outlet is fitted with a $\frac{1}{2}$ inch male quick disconnect fitting with shut off valve.
- A $\frac{1}{2}$ inch bore x 20 foot long delivery hose is supplied loose. One end is fitted with a female $\frac{1}{2}$ inch quick disconnect (with valve) for connection to the outlet of the filter and the other end is fitted with a female quick disconnect (without valve) for connection to the twin hose assembly which is supplied with the rig.
- The fluid outlets from the tanks are connected to a manifold mounted on the bulkhead frame. Two outlets from this manifold are connected with flexible hoses to another manifold conveniently mounted on the side of the frame. Each outlet line is separated and has its own drain ball valve fitted. The outlet from these drain valves is $\frac{1}{2}$ inch BSP for connection to the customers own drain outlet pipe-work.
- The nitrogen system has been removed and replaced with an air inlet filter and separate regulator. Maximum air inlet to this filter is 10 bar (147 PSI) The outlet from the regulator has been connected with a flexible pipe to the disconnected nitrogen inlet on the nitrogen/air inlet manifold.
- The probes stowage box has provision for storing tooling for washing the CFM56-3, V2500, V2500 D5 and CF34 type engines.
- The electrical system has been modified to maintain a constant temperature of 70°C.

Schematic diagram of the re-configured system.

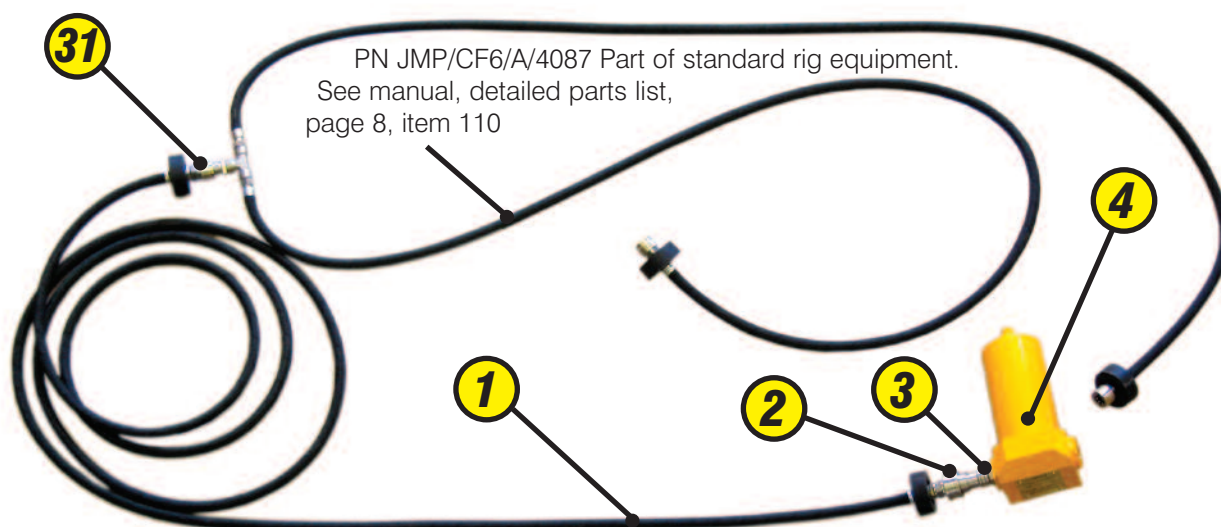


Electrical Schematic diagram and spare parts list.

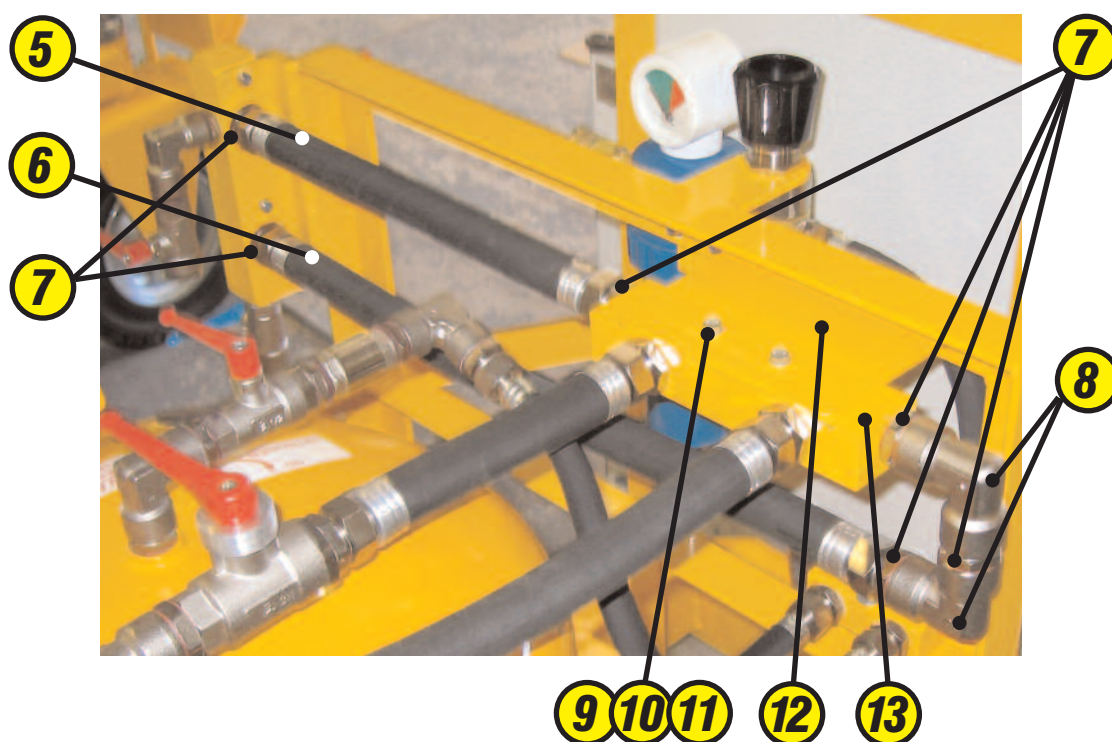


Item	Description	Part number	Qty
E1	Enclosure and Backplate	JMP/CFM56/D/6532/1	1
RCCB	40 Amp RCCB 30mA Trip	JMP/CFM56/D/6532/2	1
RCCB	RCCB Enclosure	JMP/CFM56/D/6532/3	1
Q1	Door Isolator 32 Amp	JMP/CFM56/D/6532/4	1
Q2	MCB 16 Amp 3 Pole	JMP/CFM56/D/6532/5	2
Q2	MCB Auxiliary	JMP/CFM56/D/6532/6	1
Q4	MCB 16 Amp 3 Pole	JMP/CFM56/D/6532/7	1
Q4	MCB Auxiliary	JMP/CFM56/D/6532/8	1
Q3	MCB 16 Amp 2 Pole	JMP/CFM56/D/6532/9	1
K1	Heater Contactor 18 Amp	JMP/CFM56/D/6532/10	1
K2	Heater Contactor 18 Amp	JMP/CFM56/D/6532/11	1
S1	Red PB/Contact block	JMP/CFM56/D/6532/12	1
S2	Green PB/Contact block	JMP/CFM56/D/6532/13	1
S3	Red PB/Contact block	JMP/CFM56/D/6532/14	1
S4	Green PB/Contact block	JMP/CFM56/D/6532/15	1
H1	Green Pilot Light	JMP/CFM56/D/6532/16	1
H2	Red Pilot Light	JMP/CFM56/D/6532/17	1
H3	Red Pilot Light	JMP/CFM56/D/6532/18	1
H4	Green Pilot Light	JMP/CFM56/D/6532/19	1
PSU	5A 200vac/24vdc Power Supply	JMP/CFM56/D/6532/20	1
	Outgoing Terminals	JMP/CFM56/D/6532/21	10
	Earth Brackets	JMP/CFM56/D/6532/22	2
	End Brackets	JMP/CFM56/D/6532/23	2
	Din 35 Rail	JMP/CFM56/D/6532/24	1
	8 Way Earth block	JMP/CFM56/D/6532/25	1
	40 x 40 Slotted trunking	JMP/CFM56/D/6532/26	1
	5 Core 4mm SY Cable	JMP/CFM56/D/6532/27	10m
	7 Core 4mm SY Cable	JMP/CFM56/D/6532/28	5m
	SY Cable glands	JMP/CFM56/D/6532/29	4
R1/R2	Double pole changeover relay	JMP/CFM56/D/6532/30	1

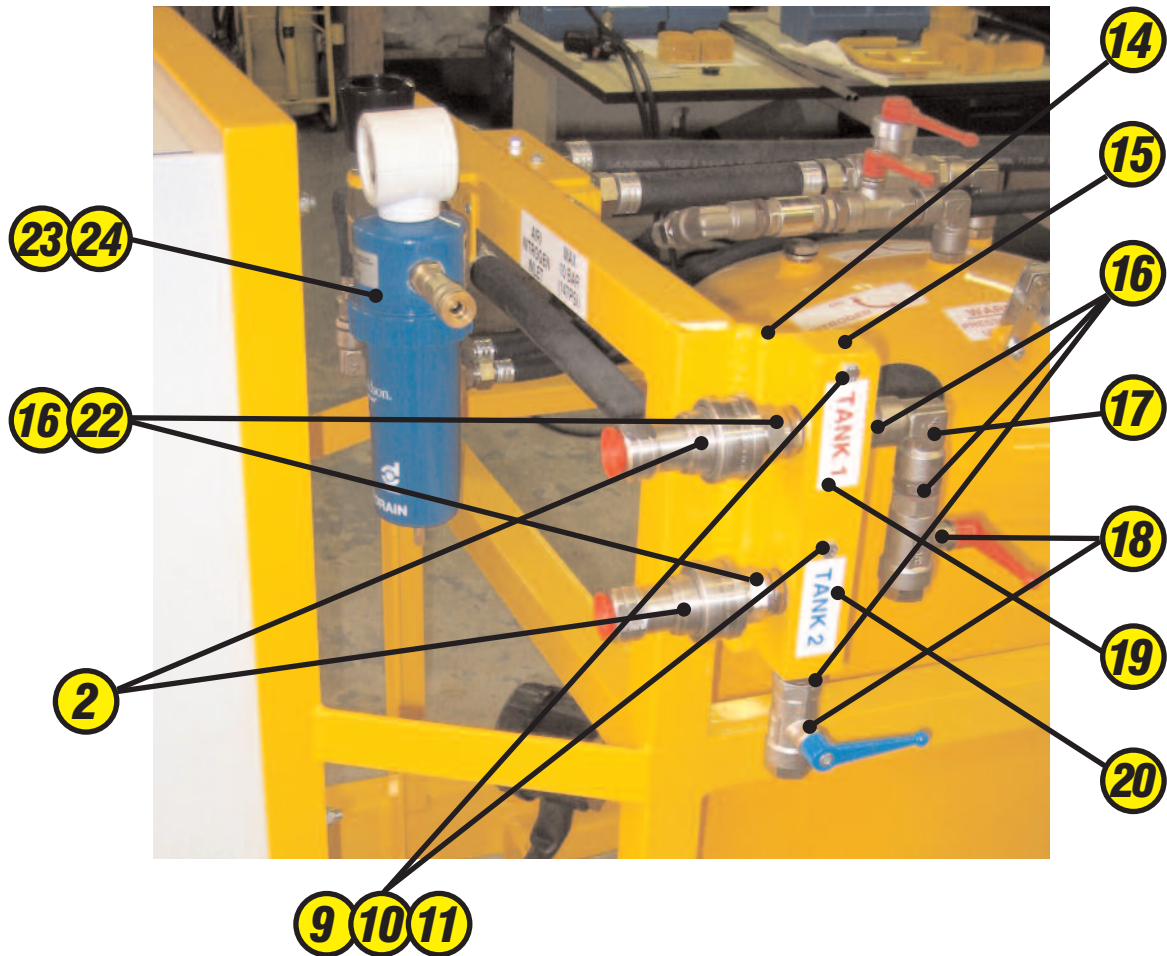
Modifications shown in detail together with Part Numbers.



Item	Description	Part number	Qty
1	Hose assy ½" bore, 20ft length	JMP/CFM56/HL/6540	1
2	Hansen coupling (female)	SM194/1	3
3	¾" x ½" BSP adaptor	JMP/PEG/A/0298	1
4	Fluid filter assy	JMP/STD/C/1793	1
5	Hose assy	JMP/CFM56/HL/6538	1
6	Hose assy	JMP/CFM56/HL/6539	1
7	¾" x ¾" Adaptors	JMP/STD/5349	6
8	¾" Elbows	SM054	2
9	M6 x 45 Hex.hd. bolt	-	4
10	M6 BZP Washer	-	12
11	M6 BZP Nyloc nut	-	6
12	Bracket fluid outlet manifold	JMP/IHI/B/6541	1
13	Fluid manifold outlet	JMP/IHI/B/6533	1

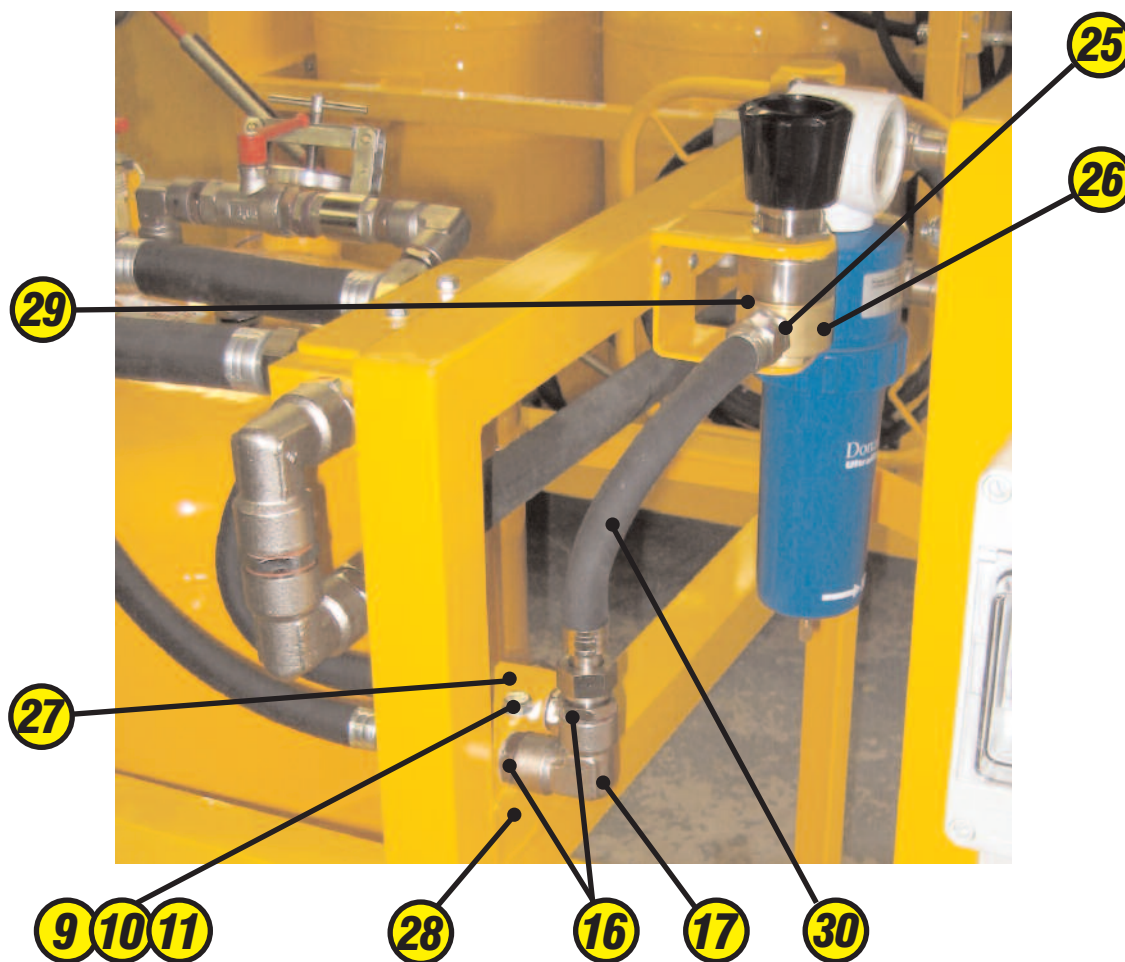


Modifications shown in detail together with Part Numbers.



Item	Description	Part number	Qty
14	Bracket fluid outlet manifold	JMP/IHI/B/6541	1
15	Fluid manifold outlet	JMP/IHI/B/6534	1
16	½" x ½" BSP adaptor	JMP/STD/A/5289	5
17	½" BSP Elbow	SM052	1
18	½" Ball valve	SM028	1
19	Tank label (red)	-	1
20	Tank label (blue)	-	1
21	M6 x 50 Hex.hd. BZP bolt	-	2
22	Hansen coupling (male)	SM194/2	2
23	Pre-filter element	SM749/1	1
24	Filter ⅜" ports	SM749	1

Modifications shown in detail together with Part Numbers.



Item	Description	Part number	Qty
25	1/2" x 1/4" BSP adaptor	JMP/STD/A/4790	1
26	Nitrogen inlet regulator valve	SM647	1
27	Air manifold	JMP/STD/A/5289	1
28	Manifold mount angle	JMP/IHI/B/6542	1
29	3/8" x 1/4" Adaptor	JMP/STD/A/5352	1
30	Hose assy	JMP/CFM56/HL/6543	1
31	Coupling (female)	SM474	1

Juniper, 2 x 25 Gallon Rig, Part No. JMP/CFM56/D/4777/C400, Serial No. S 2368

Functional Test, 8 March 2007 (see photo overleaf)

Both tanks were filled with water up to the maximum level of 115 Litre.

A 6 metre long x $\frac{3}{4}$ inch bore delivery hose was fitted with the Quick disconnect coupling Part No. SM194/1. This hose was connected to the Tank 1 outlet from the rig and the other end was connected to the $\frac{3}{4}$ inch BSP inlet to the filter.

The $\frac{1}{2}$ bore x 20 foot long delivery hose was attached to the filter outlet using the quick disconnect SM194/1 and the other end of the hose was connected to the twin hose assembly.

A set of CFM56 washing probes were fitted to the twin hose assembly and elevated to a height of approx 3.3 metres (11 feet) The outlet of both probes was hooked into a calibrated plastic drum.

An air supply of 6 bar was connected to the air inlet connection on the rig.

Test 1, Tank 1

Regulated pressure 80 PSI (maximum), Recorded flow rate 33 Litres per minute

Test 2, Tank 2

Regulated pressure 60 PSI, Recorded flow rate 28 litre per minute.

Test 3, Tank 2

Regulated pressure 50 PSI, Recorded flow rate 26 litre per minute

Test 4, Tank 2

Regulated pressure 40 PSI, Recorded flow rate 22 litre per minute

Test 4, Tank 1

Regulated pressure 40 PSI, Recorded Flow rate 23 litres per minute.

Conclusion:

The maximum flow rate obtainable with this system using a set of CFM56 engine probes is 33 litres per minute, 10 litres per minute in excess of the requirement for CFM56 and V2500 engines.

To maintain the existing 10 litre margin over the required flow rate, the connecting hoses and valves to be supplied by INC should have a bore no less than $\frac{3}{4}$ inch (20mm).

Note: Quick Disconnecting fittings with double shut off valves can restrict the flow.

Functional testing of the Juniper 2x25 gallon rig, 8 March 2007

* The bottom packing case shown in the photo will actually be used to transport the rig and the 'Heat Treated Timber' stamp is clearly visible.

