





















3850 Litre/minute Hydrant Dispenser Specification

	APTUS	OPTIMAS
1. GENERAL INFORMATION		
The Hydrant Dispenser described in this specification is a truck mounted unit designed to pick up fuel from a hydrant pit. The basic vehicle configuration is with the elevating fuelling deck mounted immediately behind the driver's cab, the filter monitor over the rear axle and the hosereel transversely mounted at the rear of the vehicle. The control station is located on the driver's side of the vehicle.		
All pipework in the main system is constructed in Grade 304 stainless steel and is sized to reduce pressure loss to a minimum. Pipe joints are flanged, bends are smooth radiused type and all pipes are inert gas purged internally during welding.		
Pipework and components have minimum working pressures of 10.2 bar (150 p.s.i.) and are pressure tested to 15.3 bar (225 p.s.i.).		
The dispenser is fitted as standard with two pressure control systems, primary control being achieved at the delivery couplings via hose end pressure control valves, secondary control being achieved at the intake coupling via a pressure control valve actuated by signal pressures received from venturis mounted in the delivery pipework.		
The Ø100mm API type intake coupling is also fitted with a deadman shutdown valve actuated by a hand held electric deadman switch attached to a wanderlead.		
The intake hose is stowed around the outside of the vehicle and is fitted with hose trolleys which enable the hose to be positioned easily over the ground. The intake coupling is stowed on the same side of the vehicle as the control station.		
Filtration is via an IP/API approved filter monitor manufactured in stainless steel.		
Twin high flow deck hoses are provided and stowed on an elevating fuelling deck. These can be used on large aircraft where it is possible to park the vehicle below the underwing mounted fuelling couplings.		
28 Litre capacity shock alleviator can be fitted downstream of the meter.		











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A single hosereel is provided and is fitted with a 30m long fuelling hose for stand-off fuelling duties. The hosereel is single volute (Catherine wheel) type mounted transversely across the back of the vehicle. It is fitted with guide roller box which enables easy hose pull-out and rewind.		
The rewind system for the hosereel is hydraulically powered and is operated by a lever operated control valve. The control valve incorporates 3 positions; 'free wheel, reel out', 'power rewind, reel in' and 'hosereel lock'. With the operator in the locked position the hosereel rewind motor is hydraulically locked preventing the hosereel from rotating and therefore negating the requirement for an independent brake mechanism.		
A single meter system is provided and records the volume of fuel delivered through the deck hoses and the reel hose. It is fitted with a mechanical register / counter and rate of flow indicator.		
All main structural members of the superstructure are constructed in box section steel which is shot blasted and etch primed, prior to the undercoating and finish painting process.		
The dispenser is as standard, fitted with a pneumatic interlock system acting on the chassis braking system.		

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2. FEATURES		
2-off high flow deck hoses 3.1m long x Ø63mm bore.		
1-off reel mounted hose 30m long x Ø50mm bore.		
1-off reel mounted hose 30m long x Ø63mm bore		
Isolating valves are fitted at the delivery end of each hose to enable strainer inspection. The valves are rated at 20 bar for in-situ hose pressure testing.		
1-off intake hose 10m x Ø100mm bore.		
Fitment of an intake pipe assembly consisting of a 2m long swivelling rigid type inlet boom connected directly to the vehicle.		
40 mesh intake strainer fitted between intake hose and pipework to filter monitor.		
Filtration via an approved IP/API filter monitor.		
Single meter system – meter equipped with rate of flow indicator, mechanical resettable register and non-resettable totaliser.		
Fitment of an electronic metering system.		
Primary pressure control via hose end pressure control couplings (nozzles) fitted with stick handles, surge regulator, quick disconnect, 100 mesh strainer and dust cap.		
Fully compensating secondary in-line pressure control system using separate fully compensating venturis in the deck hose and reel hose circuits.		
Ball valves (stainless steel ball) for intake hose isolation and delivery hose flow control.		
Single volute type hosereel with hydraulically powered rewind system, heavy duty ball race bearings, easily replaceable liquid seal and hose guide roller box.		



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Elevating fuelling deck – heavy duty maintenance free scissor lift adjustable in height between 1500mm and 4100mm with oil filled displacement cylinders and anti collapse valves. Fuelling deck is full vehicle width, 1100mm long and is fitted with an aluminium open mesh strip type walkway which does not cause damage to the fuelling hoses.		
Fuelling deck bounded by 1000mm high stainless steel guard rails with kick-strip, intermediate rail and self closing gate. Deck access via an inclined ‘walk-up’ and ‘walk-down’ stairway and access landing area bounded by 1000mm high stainless steel guard rails, kick strip and intermediate rail. All access steps are constructed / covered in a non-slip material. All control lines, hydraulic hoses etc. connecting the deck to the lower frame are protected from damage.		
A ladder is fitted to allow descent from the deck when in the raised position.		
The fuelling deck gate is mechanically locked in the closed position when the deck is in the elevated position.		
The control valve for raising / lowering the deck is mounted in a shielded location on the guard rails. Two emergency lowering valves are fitted, one adjacent to the above valve and one at ramp level. These valves can lower the deck without hydraulic power.		
An engine stop control valve (lock on type) is provided on the deck guard rails.		
A bifurcated manifold attached to the rigid pipework via a swivel joint feeds deck hoses. Design of the manifold ensures good hose support and easy hose handling. The deck can be fully lowered whilst the deck hoses remain connected to the aircraft.		
Fitment of a deck hose ‘Pantograph’ – this device enables shorter deck hoses to be fitted and raises automatically with the fuelling deck. When a nozzle is unstowed the ‘Pantograph’ locks in the elevated position and will remain elevated even if the deck is lowered. The locking device is automatically released when the nozzle is stowed and the ‘Pantograph’ will then retract with the deck as the deck is lowered.		





















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Intake coupling with integral pressure control and deadman valve and dust cap.		
Intake and deck hose swivels are of the maintenance free (non-lubricated) type.		
Intake hose fitted with robust hose trolleys and stowed around the perimeter of the vehicle.		
Manually operated mechanical 'easi-lift' type stowages lift and stow the intake hose. The input coupler is stowed in bucket type manual 'easi-lift' stowage located on the operating side of the vehicle.		
Hydraulically powered lifting rail for the intake hose and intake coupling.		
Sense and air reference pressure hoses are routed along the intake hose and are clipped to the hose trolleys and strapped to the intake hose.		
Main pipework constructed in Grade 304 schedule 5 stainless steel with stainless steel flanges.		
Gauge lines are constructed in stainless steel with sense lines, depressurising lines and drain lines constructed in aluminium alloy.		
Deadman system controlled by a hand held electrical switch operating at intrinsically safe levels attached to a coiled wanderlead via a Fluid Transfer deadman current limiting relay unit. A deadman override valve located underneath a hinged cover with wire seal is fitted on the control station panel. This valve by-passes the electrically actuated deadman system and applies air directly to the deadman valve via the air pressure regulator.		
Deadman timer system requiring timed reset by the operator preventing illicit override of the system.		
140 litres capacity fully draining fuel recovery tank with manual drain valve inward / outward vent valve, sight glass / observation window, large diameter lockable fill point with removable strainer and hinged lid with latch. The tank, located on the operating side of the vehicle for easy access and visibility, is constructed in stainless steel.		

















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An automatic hydraulically powered recovery tank emptying system is fitted to the vehicle. The system pumps the contents of the recovery tank into the dispenser pipework upstream from the filter during the refuelling operation using a hydraulically driven high pressure/low flow fuel pump. The system is automatically controlled via a high / low level float switch and always leaves a deadstock in the recovery tank which should be regularly drained off. A pressure relief valve gives circuit protection. A high – high level alarm is provided which automatically stops the flow of fuel into the vehicle if the fuel level in the recovery tank rises above a pre-determined level. This reduces the chances of a fuel spillage. The alarm also triggers a flashing red warning lamp and an audible alarm.		
Filter monitor is fitted with an air separator and return line to the recovery tank, which incorporates a 'visi-flow' indicator.		
Spring close 'Conbrako' type manual depressurising valve.		
Thermal system relief valve air actuated by the PTO selector and also by the deadman system.		
'Back-up' system pressure relief valve fitted to the filter and set to relieve at 11.2 bar (165 p.s.i.).		
Manual and thermal pressure relief return line fitted with a 1.0 bar (14.7 p.s.i.) pressure maintaining valve.		
Drain panel with drain / sample lines from upstream and downstream of the filter. Drain lines terminate with 19mm (3/4") ball valves with Kamlok adaptors and drip caps.		
Pipework low points fitted with 3/4" BSPPF sockets and drain plugs.		



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3. CONTROL STATION		
All main controls and gauges are grouped together at a control station situated on the operating side of the vehicle. The control station instrument panel is constructed in stainless steel and as standard is fitted with the following:-		
Intake pressure gauge – Ø100mm.		
Filter differential pressure gauge – linear piston type. Fitted with test valve for free piston movement.		
Fuel control (venturi) pressure gauge Ø100mm.		
Air reservoir pressure gauge – Ø63mm.		
Air reference pressure gauge – Ø100mm.		
Hydraulic system pressure gauge – Ø63mm.		
Engine stop control (lock-on type).		
Deadman override valve.		
Gauge test points for intake and fuel control pressure gauges.		
All gauges are stainless steel and are glycerine filled.		
Intake pressure, filter differential and fuel control gauges are fitted with isolating valve.		
Meter register and rate of flow indicator.		
Deck and reel hose flow control valves.		
‘Visi-flow’ indicator.		
Deadman cable and handswitch c/w stowage tray.		














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Hand rewind bonding reel c/w 30m of insulated, braided copper cable and bonding clip.		
Spring rewind bonding reel in lieu of manual rewind unit.		
System depressurising valve.		
Closed Circuit Fuel Sampling System comprising of a Fluid Transfer series, VCFS (Visual Check Fuel Sampler) with backlight for night operations. The VCFS is piped to draw fuel samples from both upstream and downstream sides of the filter via 'Combrako' type spring close ball valves. The VCFS is drained under gravity into the recovery tank.		
Closed Circuit Fuel Sampling System Accessories:-		
A self sealing valve into which the Shell Water Detector syringe or Exxon Hydrokit test tube can be inserted.		
Housing for accepting a thermometer and hydrometer.		
Fitment of a fuelling deck mounted control station allowing the vehicle to be operated from the fuelling deck. A control panel is provided and includes the following duplicated equipment: Meter readout. Fuel control pressure gauge – Ø63mm. Deadman switch and wanderlead. Engine stop control. (Other gauges can be duplicated if specifically required by the customer.)		

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4. SAFETY SYSTEM AND EQUIPMENT		
The hydrant dispenser is as standard equipped with a pneumatically actuated interlock system configured to act on the chassis brake system. The following items will be interlocked:-		
Nozzle stowages (refuelling deck).		
Nozzle stowages (hosereel).		
Elevating fuelling deck.		
Intake coupling stowage.		
Bonding reel.		
Power take-off (only if interlock is not provided by chassis manufacturer).		
Intake hose lifting rail.		
Electrical interlock system in lieu of pneumatic system.		
An interlock emergency release control is provided in the driver's cab and is fitted underneath a hinged cover with wire seal.		
Warning lamps are provided for:-		
Interlock actuated – flashing amber (mounted in the cab).		
Interlock overridden – flashing red (mounted in the cab).		
Low air pressure – flashing red (mounted in the cab). See pneumatic section.		
Deadman timer system actuated – green (mounted on instrument panel).		







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Audible alarms are provided for:-		
Elevating fuelling deck descending.		
Vehicle reversing.		
Fitment of a brake interlock monitoring system. Consists of a display unit located in the driver's cab, which indicates the status of each individual interlocked item. If the brake interlock system is activated the display unit identified which interlocked item or items is incorrectly stowed.		













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5. ILLUMINATION		
Illumination is by a fibre optical system and provides lighting for:-		
Meter head.		
Control panel.		
Elevating fuelling deck access stairway.		
A swivelling floodlamp is provided on the deck for illuminating the aircraft panel.		
Switches for the above are provided in the cab and is enabled by the chassis side light system.		



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6. HYDRAULIC SYSTEM		
Hydraulic power for the hydrant dispenser elevating fuelling deck and hose reel rewind system will be provided by a gearbox mounted power take-off unit (PTO). (When fitted it also powers the lifting rail and automatic dump tank emptying system.)		
Hydraulic system will comprise of the following:-		
Hydraulic pump (long or close coupled to the vehicle PTO).		
Oil reservoir c/w suction strainer, return line filter, level / temperature indicator and vented fill cap c/w fill strainer.		
Adjustable constant flow and pressure relief valve.		
Hydraulic motor for driving the air compressor. This item fitted only if chassis is not equipped with air brake system (see pneumatic system).		
Pressure gauge.		
Directional valve for hose reel rewind (power reel in, free wheel out, lock).		
Hydraulic motor for hose reel rewind.		
Speed control valves for hose reel rewind with tamper-proof caps.		
Directional valve with pilot operated check valve for elevating fuelling deck.		
Emergency release valves for lowering the fuelling deck without hydraulic power – one on the deck and one at ramp level.		
Speed control valves for the elevating fuelling deck (2) with tamper-proof caps.		
A pneumatically actuated directional valve controls the automatic recovery tank emptying system and is activated via signals transmitted from a high level/low level float switch in the recovery tank. The directional valve is also fitted with a hand operated lever so that the recovery tank emptying system can be manually activated.		















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7. PNEUMATIC SYSTEM		
Compressed air for the hydrant dispenser pneumatic systems will be taken from the chassis air system at a safe designated point.*		
Pneumatic system will comprise of the following:-		
Pressure protection valve (if not already fitted).		
Air reservoir with automatic drain valve, pressure protection valve and pressure gauge.		
Air service unit.		
Adjustable, lockable air pressure regulator (in-line pressure control adjustment) with pressure gauge.		
Solenoid operated valve for deadman actuation.		
Various spool valve (roller operated, pilot operated and lever operated), shuttle valves and pressure switches for actuation of the deadman, brake interlock and warning lamp systems.		
* On hydrant dispenser utilising chassis not equipped with air brake systems the air supply will be provided via a hydraulically driven, air compressor and unloader valve. The compressor assembly will be mounted to the hydrant dispenser superstructure and will operate only when the vehicle power take-off is engaged. A warning light indicating low air pressure when the power take-off is not engaged will be mounted in the vehicle cab.		

















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8. ELECTRICAL SYSTEM		
Power for the hydrant dispenser electrical systems will be provided by the existing chassis electrical system. Superstructure electrical components will be positioned and mounted in accordance with accepted standards and practices applicable to the nature of the vehicle.		
Electrical system will comprise of the following:-		
Deadman unit.		
Deadman handswitch and cable.		
Various warning lamps, audible alarms, pressure switches etc.		
A flashing amber beacon is provided on the cab roof.		
Operating lamps and floodlamp.		
Fuse box with each circuit individually fused.		
All wiring is routed in vapour and water-proof flexible conduit with sealed junction boxes and with an insulated return wiring system.		
For electrical modifications to the chassis – see chassis section.		


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9. MISCELLANEOUS		
A cabinet is provided for stowage of sample jars.		
All gauges and controls are clearly labelled in engraved, laminated plastic in English.		
An engraved, laminated plastic fuelling circuit diagram is provided at the control station.		
Scabbard type fire extinguisher stowages (2) are provided, each fitted with a 9 kg dry powder fire extinguisher.		
A single 2 kg BCF extinguisher is fitted in the cab.		
A robust rear bumper is provided giving protection to the rear lights.		
Painting and labelling in accordance with customers requirements.		
The hydrant dispenser is painted in a single pack polyurethane paint system.		
Twin pack and other paint systems can be applied as an option if required.		
Hollow steel sections are injected with a 'Waxoil' compound.		
Additional corrosion protection. Steel structures to be hot zinc sprayed prior to priming and finish painting.		
Logo panels on the sides of the elevating deck.		
Logo panel on rear of vehicle, behind hosereel.		
Isolating ball valves are provided in the:-		
Pressure control lines.		
Air eliminator return line.		
Depressurising return line.		
These valves are normally left open and closed only for tests or in emergencies.		













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Blanked sockets are provided for the retro fitment of self sealing couplings for the purpose of in-situ hose pressure testing and for retro fitment of millipore sample couplings.		
Bonding lugs are provided adjacent to the recovery tank drain valve and drain / sample valve panel.		
The deck hose nozzles are stowed on the guard rails in an interlock stowage c/w hinged rain cover.		
The reel hose nozzles are stowed in interlocked 'bucket' type stowages.		
Pneumatic lines are constructed in UV resistant, colour coded and numbered nylon tubing. All pneumatic valve exhaust ports are fitted with mufflers which help prevent ingress of moisture.		
Electrical continuity is maintained throughout all components in the fuelling system.		























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10. TESTING		
The superstructure will be flow and pressure tested in FTi Test House using Jet A1 fuel to verify pre-qualification performance.		
Tests include:-		
Static pressure test 15.3 bar (225 p.s.i.).		
Maximum flow rate.		
Venturi correlation.		
Primary pressure control systems.		
Secondary (in line) pressure control system.		
Deadman opening / closing times.		
Deadman fuel volume overshoot.		
Functioning of all controls, warning devices, etc.		
Electrical continuity test.		
The vehicle is designed to permit 'in-situ' hose pressure testing of the intake and delivery hoses to 20 bar (300 p.s.i.) without the need to remove hoses from the vehicle.		















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11. PERFORMANCE		
Based on a hydrant pressure of 8.6 bar (125 p.s.i.) at the pit coupler and a test rig back pressure of 2.1 bar (30 p.s.i.).		
Deck hoses (Ø63mm) – up to 3850 LPM (850 IGPM).		
Reel hose (Ø50mm) – up to 1000 LPM (220 IGPM).		
Reel hose (Ø63mm) – up to 1370 LPM (300 IGPM).		
Primary pressure control system (hose end pressure control) limits pressure into the aircraft manifold to 3.4 bar (50 p.s.i.) under flow conditions and normal shutdown conditions and to 8.2 bar (120 p.s.i.) under rapid shutdown (surge conditions).		
The secondary (in line) pressure control system limits pressure into the aircraft manifold to 3.74 bar (55 p.s.i.) adjustable under flow conditions.		
The deadman system will shut down flow completely within 5 seconds of releasing the deadman switch. Flow will be restored to 90% within 10 seconds of re-gripping the switch. Valve opening and closing times are pre-set and not adjustable.		







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12. PUBLICATIONS		
Each vehicle will be supplied with:-		
Operating, maintenance and parts manuals for the hydrant dispenser refuelling module in English		
Recommended spare parts list.		
Relevant Test Certificates and Certificates of Conformity will be provided in accordance with Fluid Transfer International Quality Assurance Certification to ISO 9001:2000.		

























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13. FUELLING CIRCUIT COMPONENT INDEX		
(Refer to attached circuit diagram)		
1. Intake coupling with integral secondary pressure control and deadman valve c/w retractable carriage.		
2. Intake hose – aviation type conforming to BS3158 Type C, HD Ø100mm bore x 10m long with reusable end fittings.		
3. Intake swivel – FTi Ø100mm.		
4. Intake valve – FTi Ø100mm stainless steel ball valve.		
5. Filter monitor, horizontal type in stainless steel, meeting the requirements of I.P. specification at a maximum flow rate of 4087 LPM (900 IGPM) when fitted with 34/36 off monitor elements. Designed and constructed to A.S.M.E. VIII. Cover fitted with swing bolts and ‘O’ ring seal.		
5a. Monitor interlock plate to ensure correct number of elements fitted.		
6. 28 litre capacity surge suppressor.		
7. Meter, rotary valve, positive displacement meter fitted with a mechanical register with resettable register, non-resettable totaliser, mechanical rate of flow indicator.		
8. Sampling point 3/8" BSPPF socket c/w blanking plug.		
9. Deck hose flow control valve – FTi Ø100mm stainless steel ball valve.		
10. Venturi – FTi Ø100mm fully compensating type.		
11. Deck hose swivel – FTi Ø100mm.		






























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12. Deck hose feed manifold.		
13. Deck hose – aviation type conforming to BSEN1361 type C, HD Ø63mm bore with reusable end fittings.		
14. Recovery tank emptying pump (hydraulically driven).		
15. Hose end pressure control coupling complete with 100 mesh strainer, vacuum breaker, 3.1 bar (45 p.s.i.) regulator, quick disconnect, stick handles, 2 1/2" BSPP inlet.		
16. Reel hose flow control valve – FTi Ø80mm stainless steel ball.		
17. Venturi – FTi Ø80mm fully compensating type.		
18. Hosereel – FTi series single volute type with heavy duty pre-lubricated ball race bearings, power rewind system and hose guide roller box assembly.		
19. Reel hose – aviation type conforming to BSEN1361 type C, HD Ø50mm bore x 30m long with reusable end fittings.		
20. Air separator.		
21. Visi-flow indicator.		
22. Isolating valve – FTi Ø15mm ball valve.		
23. Recovery tank assembly – FTi 140 litres capacity stainless steel, fully draining design with Ø150mm fill lid, fill lid strainer and level indicating window.		
24. Visual check fuel sampler – FTi 11432 series.		
25. Shell water detector self sealing valve assembly FTi 11416 series.		
26. Visual check fuel sampler fill valve – Ø15mm type with spring close handle.		



































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27. Pressure maintaining valve (set at 1 bar) – FTi.		
28. Manual depressurising valve – Ø15mm type with spring close handle.		
29. Thermal pressure relief valve – FTi pneumatically actuated type.		
30. Isolating valve FTi Ø15mm ball valve.		
31. Non-return valve.		
32. Drain / sample valve – FTi Ø19mm ball valve.		
33. Drip cap – Ø19mm type.		
34. Safety thermal pressure relief valve adjusted to relieve at 15.3 bar (225 p.s.i.) – FTi.		
35. One way flow restrictor – FTi Ø15mm type DB4956.		
36. Restrictor valve – FTi.		
37. Isolating valve (closed only during ‘in-situ’ pressure testing of the hoses) – FTi Ø15mm ball valve.		
38. Isolating valve – FTi Ø15mm ball valve.		
39. Isolating valve (closed during in ‘in-situ’ hose pressure testing – FTi Ø15mm ball valve.		
40. Non return valve (hose depressurising system) – FTi.		
41. Filter differential pressure gauge – linear piston type 0-2 bar (0-30 p.s.i.).		
42. Venturi sense pressure gauge – Ø100mm glycerine filled type 0-13 bar (0-200 p.s.i.).		
43. Inlet pressure gauge – Ø100mm glycerine filled type 0-13 bar (0-200 p.s.i.).		



























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44. Test valve (differential pressure gauge)		
45. Gauge isolating valve – FTi Ø6mm ball valve.		
46. Gauge test point – self sealing coupling.		
47. 3/8" BSPPF socket c/w blanking plug.		
48. Control pressure signal hose – Ø10mm bore.		
49. Air reference pressure hose – Ø6mm bore.		
50. Deadman handswitch c/w coiled wanderlead and plug – FTi type DAA11115.		
51. Deadman timer unit and current limiting relay – FTi DBA10826 integrated series.		
52. Deadman actuating valve (solenoid operated).		
53. Deadman override valve.		
54. Deadman timer prompt lamp.		
55. Air pressure regulator – Self relieving type.		
56. Air reference pressure gauge – 100mm glycerine filled type 0-13 bar (0-200 psi).		

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	APTUS	OPTIMAS
14. CHASSIS AND CHASSIS MODIFICATIONS		
The hydrant dispenser superstructure will be configured to be mounted to the following typical chassis:-		
Mercedes Benz Vario – 612D/3700. – 614D/3700	<input type="radio"/>	<input type="radio"/>
Isuzu NPR65L-RPV or Mitsubishi equivalent.	<input type="radio"/>	<input type="radio"/>
DAF FA45-130.	<input type="radio"/>	<input type="radio"/>
The chassis will, where applicable, have the following basic specification:-		
5500 / 6500 kgs GVW.		
Diesel engine.		
Manual gearbox.		
12 / 24 volt electrical system.		
4 x 2 wheel configuration.		
Gearbox mounted power take-off.		
Approximate chassis wheelbases will be:-		
Fixed cab chassis @ 3700mm.		
Tilt cab chassis @ 3365mm.		
Chassis specifications will be adjusted where necessary to meet specific customer requirements and to suit local regulations.		
Alternative chassis can be offered if requested (further details on request).		











Nailsworth Mills Estate • Avening Road • Nailsworth • Gloucestershire • GL6 0BS • UK

T +44 (0)1453 833 381

F +44 (0)1453 833 529

KEY:  - Standard  - Option

3850 Litre/minute Hydrant Dispenser Specification

	APTUS	OPTIMAS
The chassis will, where applicable, be modified to conform to the following specification:-		
a) Modification of chassis exhaust system to discharge forward of the front axle, discharging to the opposite side from the control station. On chassis where routing of the exhaust forward of the front axle is not possible, the exhaust will be mounted transversely across the chassis as close to the rear of the front axle as possible with exposed parts shielded as required. Internal silencer/spark arrestor can be installed, as an option, if required.		
b) All electrical wiring behind the driver's cab will be routed in a fire retardant and flexible protective casing.		
c) Electrical components behind the driver's cab will be wired in accordance with current 'CEN' Requirements (unless otherwise specified by the customer).		
d) Single or double pole battery isolating switch (subject to wiring specification).		
e) Firescreen behind the driver's cab and enclosed batteries vehicles with tilt type cabs.		
All superstructure mounting methods and system interfaces will, where applicable, be in accordance with chassis manufacturer's body builder recommendations.	