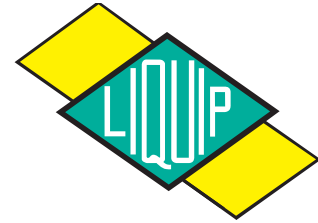


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AVIATION FUELLING EQUIPMENT
Issue 5



Aviation Fuelling Catalogue

In addition to Liquip-designed and manufactured products, Liquip International Pty Ltd also represents a number of internationally recognised aviation product suppliers, including Aljac Engineering, Carter Ground Fueling, Complete Environmental Products (CEP), Elaflex, Faudi filtration, Gammon Technical Products (GTP), Goodyear Hose, Hammonds Technical, Isoil Impianti & Sampi.

1. **FUELLING VEHICLES – HYDRANT-DISPENSERS**
2. **FUELLING VEHICLES – REFUELLER TANKERS**
3. **FUELLING VEHICLES – HYDRANT CARTS**
4. **FUELLING VEHICLES – MILITARY REFUELLING UNITS**
5. **FUELLING EQUIPMENT – OTHER**
6. **TANKER EQUIPMENT –**
Hatches, Manholes, Valves & Vents
7. **FUEL LOADING**
Bottom Loading & Hydrant Pits
8. **ELECTRONIC FUELLING CONTROLS & COMPONENTS**
LIQUIP DIPTRONIC MEASURING SYSTEM
LIQUIP ELECTRONIC FLUID MONITORING
MPP102 MINI MONITOR
LIQUIP OPTIC OVERFILL PROBES & MOUNTINGS
LC99 & LC95 Electronic Optic Overfill Probes
FOT100 FIBRE OPTIC PROBE
COMBINATION POWER FILTER / VOLTAGE REDUCER
SMARTWIRE PLC
REMOTE DEADMAN FUELLING CONTROLLER
DMH100 ALUMINIUM DEADMAN HANDLE
LCT100 CONTINUITY TESTER
METER REGISTERS AND DISPLAYS
OVERFILL PROTECTION - RACK MONITORS
9. **PUMPS, & RELATED EQUIPMENT**
10. **NOZZLES, UNDERWING & ACCESSORIES**
11. **HOSES, HOSE-REELS, FITTINGS**
12. **FUELLING METERS**
13. **VALVES, CAMLOCKS, COUPLINGS & SWIVELS**
14. **FUEL SAMPLING**
15. **FILTRATION – FAUDI FILTER VESSELS, ELEMENTS/CARTRIDGES ETC.**
16. **CARTER GROUND FUELLING**
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● HYDRANT DISPENSERS

The liquip hydrant dispenser is designed for the world market, incorporating innovative design and fuel-flow technology coupled with industry-standard components to give easy, efficient and safe aircraft refuelling using the airport underground hydrant fuel system.

The dispenser typically delivers aviation fuel from the hydrant into the aircraft at around 4,000 litres per minute (1,000 us gallons per minute) via a meter and filter vessel.

A typical dispenser has an elevating scissor lift platform with a reach of 4.2 Metres to accommodate all aircraft including A380, two underwing platform-deck hoses supported by hydraulic boom, plus a rear hose-reel also for underwing refuelling. The hydrant coupler and input hose hook onto a hose-lifting hoop which is raised with the vehicle's hydraulic stabilisers. Pneumatic systems are supplied by hydraulically powered air compressor.

Safety features include fuelling components interlocked to the vehicle immobilisation system, electric deadman handles, emergency interlock over-ride, emergency stop / fuel shutdown buttons and platform wand / emergency engine stops. Many more safety and efficiency-improving functions are also standard.

TYPICAL PERFORMANCE

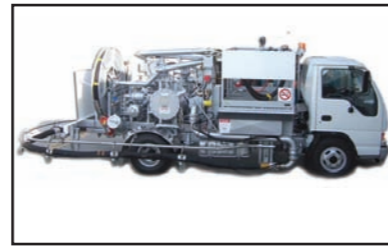
- Up to 4,000 litres per minute via two 63mm (2.5") platform deck hoses
- Up to 1,000 litres per minute via 50mm (2") reel hose (20metre length)

MAIN FEATURES

- Efficient fuel flow path with low pressure drop across the dispenser
- Elevating platform, scissor-lift with 4.2 metre height / reach
- Faudi 4000 lpm stainless steel filter monitor vessel
- Positive Displacement ISOIL BM-600 fuelling meter
- Hydraulic deck hose support boom
- Hydraulic stabilisers and input hose lifting boom
- Emergency hydraulic back-up systems
- Catherine-wheel hydraulic rewind hose reel with 20m of 50mm (2") hose fitted
- Automatic depressurisation after fueling
- Aljac closed-circuit fuel sampling
- 100 litre collector / recovery tank with evacuation system
- Stainless steel pipe-work and filter
- Hot-dip galvanised modular frame for maximum corrosion protection
- Intrinsically safe electrical wiring on refuelling module
- Cabin roof window and platform positioning light

EXAMPLES OF THE MANY OPTIONS AVAILABLE ...

- Independently operated (twin) deck-hose booms
- Input hose two metre swivelling extension boom
- Mini Dispensers for smaller aircraft (B737 etc)
- Cordless (electronic remote control) deadman
- Bonding reel interlocks
- Remote meter register on platform
- Digital pressure control
- Swivelling hose reel turntable
- Dual hose reels
- CCTV positioning camera
- Integrated data capture system
- Hose protection beads
- Left hand or right hand drive cab/chassis
- Automatic transmission
- Low cost alternatives are available



● REFUELLERS

The LIQUIP Refueller is a designed for efficient and safe aircraft fuelling from the refueller's tank at airports where underground hydrant systems are not available. It incorporates innovation plus proven design coupled with industry-standard components.

Typical Liquip refuelling tankers have single or dual compartment 10,000 litre to 18,000 litre product tank with an hydraulically driven pump supplying one underwing and one overwing hose and nozzle via the filter vessel and meter. Fuelling is possible at variable flow rates of 200+ lpm for overwing refuelling via 20m of 32mm (1 1/4 ") hose or 1,000 lpm for underwing refuelling via 20m of 50mm (2") hose.

Bottom loading can achieve a rate of up to 1,500 lpm & is linked to the Liquip Protector™, fail-safe overfill protection system. Re-circulation is via the underwing nozzle connected to the Bottom Load point.

The Liquip DIPTRONIC® electronic tank gauging system eliminates the need for manual dipsticks and uses radar transmitters bolted to the top of each compartment that indicate the compartment volume to within ± 2mm. Other safety features include fuelling components interlocked to the Vehicle Immobilisation System (with emergency override), electric Deadman handles, Emergency Stop / Fuel Shutdown buttons and Emergency Engine Stops. Many more safety and efficiency functions are also standard.

TYPICAL PERFORMANCE

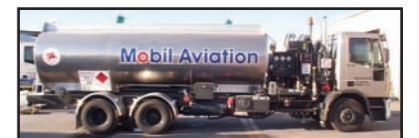
- Underwing 1,000 litres per minute via 50mm (2") reel hose (20m)
- Overwing 250 litres per minute via overwing nozzle
- Underwing 3,800 liters per minute via 2 x 2 1/2" deck hoses

TYPICAL STANDARD FEATURES

- Dual Catherine-wheel hydraulic rewind hose reels
- Stainless steel pipe-work and filter, hot-dip galvanised module frame for maximum corrosion protection, intrinsically safe electrical wiring and low pressure drop across the refueller

EXAMPLES OF SOME OF THE MANY OPTIONS AVAILABLE ...

- Flow rates up to 1,500 litres per minute
- Elevating Platform to 4.2 metre reach, fitted with dual deck hoses
- Tank capacities from 10,000 litres to 45,000 litres
- Dual underwing hose reels
- Tank-top pneumatically operated collapsible hand rail
- Overfill protection
- Diptronic tank gauging system
- Digital pressure control
- Integrated data capture system
- Bottom Loading on both sides
- Defuel facility
- Self-loading and outside source options
- Filter-Water Separator in place of Filter Monitors
- Tank contents gauge
- Hose protection beads
- Large digit (100mm) meter display
- Engine strangler
- Bonding reel interlocks
- Remote (cordless electronic) Deadman
- Left hand or right hand drive cab/chassis
- Automatic transmission



● HYDRANT CARTS

Liquip Hydrant Carts offer exceptional high performance in an extremely compact and highly manoeuvrable package to suit the confined space on the apron. The small footprint and low profile design combined with high flow rates, operational flexibility and the ability to operate under extremely harsh conditions make these carts highly sought after for commercial and military refuelling applications world-wide.

All carts are designed using a combination of long proven technology and innovative concepts for high performance and efficiency yet still provide simple, easy operation and servicing for your fuelling and maintenance personnel. The basic fuelling carts typically come in two distinctly different configurations while sharing numerous industry-standard interchangeable components for minimal inventory and low maintenance costs.

● NARROW BODY HYDRANT CART

The smaller cart, an 1800 litre/minute towed unit is commonly designated as a “narrow body cart”. This is by virtue of being designed to refuel narrow-bodied aircraft rather than its indeed small width. These unique carts are typically all-electric, powered by a simple, efficient fuel-flow driven generator and battery, a design which out-performs conventional systems.

BASIC FEATURES

- Low Profile, Towed model, 137cm (54”) high.
- 1800 lpm (475 USGPM) via single hose reel with 63mm (2½”) hose.
- All-electric system, no solar panels, pneumatics or hydraulics used

● WIDE BODY HYDRANT CART

The larger cart, a 2850 litre/minute self-propelled unit is typically described as a “wide body cart”, again by its function, refuelling wide-bodied aircraft. While having a low profile these carts are also a high-reach unit with a scissor-lift type elevating fuelling deck suitable for A380 and similar aircraft. The cart is powered by diesel engine coupled to an hydraulic pump supplying all the cart systems. Moving at a comfortable walking pace (up to 5kph / 3 mph) the cart can be easily steered and accurately positioned for fuelling via deck or reel hose.

BASIC FEATURES

- Low Profile, Self-propelled model, 137cm (54”) high when stowed.
- 3800 lpm (750 USGPM) via two 63mm (2½”) underwing deck hoses
- 1800 lpm (475 USGPM) via single hose reel with 63mm (2½”) hose.
- Elevating platform with 3.8m+ (150”) reach, incorporating Collapsible Handrails (pneumatically raised / stowed).

SOME OF THE NUMEROUS CART FEATURES AND OPTIONS

- Choice of nozzles & couplers (Carter, Whittaker/Thiem, Avery Hardoll etc)
- Interlock options to customer requirements
- All product pipe-work schedule 10 stainless steel with ANSI flanges.
- Steel framework, hot-dip galvanized and finished in two part epoxy paint.
- Stainless steel Filter vessels to API/IP codes with direct reading Differential Pressure gauge, automatic air eliminator and “Show-Flow”.
- Automatic depressurization and thermal relief control.
- LC (Liquid Controls) product meters
- State of the art pressure control options.
- Collector Tank evacuation
- Venturis to compensate for pressure loss



● MILITARY REFUELLING EQUIPMENT

LIQUIP build aviation refuelling units specifically for military applications. These rugged high-reliability units are custom-designed to military specifications and include mobile vehicle-mounted equipment such as refuellers and hydrant dispensers, transportable units for field deployment and skid-mounted modules such as helicopter refuelling units for ship-board installations. The refuellers and dispensers incorporate many of the design and operational features found in the commercial units for efficient and safe aircraft fuelling.



● REFUELLERS TYPICAL PERFORMANCE

- 1,000 lpm via 50mm (2”) reel hose (20m)
- 250 lpm via overwing nozzle
- 3,800 lpm

EXAMPLES OF SOME OF THE MANY OPTIONS AVAILABLE ...

- Flow rates up to 1,500 litres / minute
- Tank capacities from 10,000 litres to 45,000 litres
- Dual underwing hose reels
- Overfill protection & Diptronic tank gauging system
- Bottom loading on both sides
- Defuel facility
- Recirculation facility
- Self-loading and outside source options
- Filter-water separator in place of filter monitors
- Tank contents gauge
- Elevating platform to 4.2 metre reach, fitted with dual deck hoses



● DISPENSERS TYPICAL PERFORMANCE

- Up to 4,000 LPM via two 63mm (2.5”) platform deck hoses
- Up to 1,000 LPM via 50mm (2”) reel hose (20metre length)



● HELICOPTER REFUELLING SKID SYSTEMS

Typically designed for installation onboard ships, helicopter refuelling systems or modules feature separate pumping and fuelling stations. Designed for jp-5 fuel, the units enable personnel to refuel a helicopter, load the vessel’s storage tank, transfer fuel or self-fill the storage and service tanks.

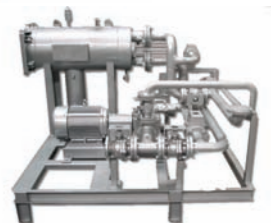
The pumping skid delivers product directly from the fuel tanks via a pump and filter-water separator up to the refuelling skid. The refuelling skid then allows fuel from the pumping skid to be dispensed via a filter monitor, meter and hosereel into the helicopter.

TYPICAL PERFORMANCE

Helicopter refuelling rate is typically 300 litres / minute (75 US gpm).

THE MODULES OFFER A NUMBER OF FUNCTIONS INCLUDING:

- Refuelling by pressure (pump)
- Refuelling by gravity
- Defuelling
- Self filling
- Transfer off ship
- Service tank filling
- Storage tank filling



● OTHER FIXED AND MOBILE SYSTEMS

Liquip are able to design and manufacture special units as required for military applications

● CUSTOMISED REFUELLING TRAILERS

Liquip will custom-design and manufacture refuelling trailers to comply with all Standards but more importantly, to suit your requirements. The options are endless, from pumping systems mounted on a box trailer through to twin axle refueller trailers with draw-bar. All Liquip portable and towable refuelling units are rugged, durable and reliable. As all the equipment is built to last, it can be transferred from site to site, ensuring efficient operation and return on investment over its life-span.

Liquip will gladly discuss the endless possibilities and features that could be incorporated into your trailer unit.



● SKID UNITS

Liquip custom-build Fuelling Skids for a variety of situations and applications.

Each skid is engineered with emphasis on strength, rugged durability, reliable performance and simplicity of maintenance. They are constructed with quality componentry and, typically, all stainless steel pipework to ensure a long working life. Operator-friendly design, minimum potential for leakage and easy access to frequently changed parts are prime design considerations.

Optional features include forklift pockets, galvanised roof, a metering system and custom paint scheme.

All units are fully tested and commissioned, ready to go to work at your site.

Consult Liquip on your skid requirements.



● ADDITIVE INJECTION UNITS

Additive injection is now a requirement for many of today's aircraft and offers a host of benefits in the marketing of your aviation product.

The range of Liquip additive injection systems are designed and manufactured to provide the flexibility of additive injection on demand.

Each system is purpose-designed for the application and injects a constant, accurate amount of additive. Systems can also be designed to inject multiple additives. A range of body materials and seals is available. These injection units can be incorporated into a packaged or portable system to suit your specific needs.

Speak to Liquip about any of your Additive Injection applications.



● PRESSURE AND VACUUM VENTS

Developed to suit the growing need for regular hydro-testing of road tankers.

The PVV104 vent is very easily blanked off to enable testing without removal. It is designed primarily for thermal relief, not as a high capacity vent for loading and unloading. Typically the PVV 104 is limited to 500 l/min in-flow and out-flow. The vent incorporates rollover protection such that locks shut at any angle greater than 60° from the vertical. If your tanker does not have vapour recovery, consult Liquip for the required vent capacity. The PVV104 is normally mounted directly to the manhole.

- Aluminium body and poppets and Stainless Steel springs
- Bonded Buna to metal seats
- Rubber coated lead ball
- Capacity 98m³/hr free air at 35kPa



The PVV 204 series vents are designed for use on tankers which load or discharge with fill caps closed. They provide more capacity than the standard PVV 104, which deals with thermal effects on the tank. Should a tanker overturn, the rollover poppet locks positively closed at any angle greater than 60° from the vertical. Mounting maybe on a Liquip manhole cover or on a separate weld flange. The vent may also be used on storage and blending tanks. It is important that the pressure/vacuum capability of the tank is known.. Different settings may be required. The Gas capacity 240m³/hr free air at 35kPa.

- Aluminium body and poppets
- Stainless steel housing shafts, springs
- Viton seals
- Max recommended liquid loading rate 1000 l/min



ORDERING INFORMATION:

Part No:	
PVV 104	Pressure Setting 15kPa, Vacuum Setting -2kPa
PVV 104U	Pressure Setting 10kPa, Vacuum Setting 2kPa
PVV 204	Pressure Setting 15kPa, Vacuum Setting 3kPa
PVV 204U	Pressure Setting 10kPa, Vacuum Setting 2kPa

(All settings comply with UK and USA codes)

● ATS100 TANK SUMP

Aluminium conical tank sump with sloping bottom and central 1" female BSP socket for drain. Large capacity volume. Removable bottom plate to facilitate cleaning.

Associated Equipment: ITV1-AO pneumatic sampling valve.

ORDERING INFORMATION:

Part No: ATS100



● * LIQUIP DIPTRONIC MEASURING SYSTEM

* Cross reference: [Electronic controls & products](#)

Diptronic® is a high tech measuring system using radar for tankers.

MANHOLES

EH9, EHV9

This unit is available in aluminium only, with the weld-in coaming available in aluminium, mild steel and stainless steel. Many tanks do not need to be entered regularly, however these tanks may still require a small quick access inspection / fill hatch. This can be achieved with the EH9 series of hatches. The V series of this hatch incorporates a pressure vacuum vent with rollover protection. The hatch incorporates:

- 2 stage cam opening, to protect against the lid flying open if there is internal pressure present.
- The 230mm lid acts as an emergency vent.
- The 150mm long coaming allows fitting for curved or flat surfaces.
- Approved for use on flammable liquid tankers.

ORDERING INFORMATION:

Part No:
 EH9 Hatch
 EHV9 Hatch incorporating pressure vacuum vent with rollover protection

VOH400

The VOH400 is a low profile, minimum weight unit designed specifically for modern lightweight road tankers. By incorporating all statutory and operational requirements in one assembly, tanker assembly is less costly, the walkway has no clutter, and maintenance accessibility is excellent. The manhole complies with UK and USA regulations and is approved by DROP TEST in Australia. The basic manhole incorporates emergency vent / inspection hatch, quick-release single bolt clamp band, and PVV104 pressure vacuum vent with rollover protection. With the growing requirements for regular hydro testing of road tankers, the pressure / vacuum vents on the VOH400 are very simple to block off so testing can be achieved without removing the PV vent. Mountings are provided for dip tube and adaptor, fill tube and adaptor, vapour vent and electronic overfill sensor.

Coaming incorporates a collar to automatically set the height for welding and to minimise distortion. Should any of the functions not be required, blanking plates are available for all mountings.

ORDERING INFORMATION:

Part No: VOH400

SH303

This swing-back hatch is supplied complete with weld ring and fasteners. This model includes an integral emergency vent and has a mounting boss for a pressure vacuum vent. It is ideal for tankers carrying dangerous goods and where frequent entry is required, such as for cleaning when changing loads. The cover and ring can be supplied in a combination of aluminium, mild steel and stainless steel. This manhole complies with UK and USA regulations

ORDERING INFORMATION:

SH303 - A - -	
Aluminium coaming	A
Mild steel coaming	M
Stainless steel coaming	S
↑ ↑	
Buna seals	B
Viton seals	V
Teflon seals	T

HATCH WEATHER COVERS - HWC304, HWC301

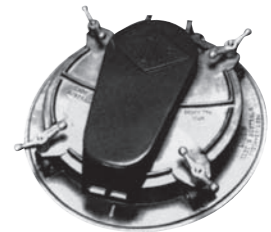
The HWC301 hatch cover mounts onto the VOH400 series manholes. The quick release rubber clamp allows quick opening and closing of the cover. The clamp is made of petrol resistant neoprene. Fibreglass green cover. Overall size is 495mm for round hatches.



The HWC304 model will fit Liquip SH301, SH303 and SH304 swing-back hatches only. It provides extra protection against ingress of dust and water through vents. Simple stainless steel spring clip allows for removal for maintenance, plus clip has built-in movement, providing ample venting should overfill occur through the emergency vent. Green fibreglass cover lifts at equivalent of 1kPa and weighs 0.43kg.

ORDERING INFORMATION:

Part No:
 HWC301 Green fibreglass cover, 495mm, suits VOH400 series manholes.
 HWC304 Green fibreglass cover suits SH301, SH303, SH304 hatches only.



VAPOUR VENTS - AVV075V SERIES

The AVV075V is a very light and simple air-actuated vent. When pressurised air supply is activated, main poppet opens and vapour is ducted out of the tank via a 90mm nominal diameter outlet. The actuator is a sliding piston type.

The poppet opens inwards to prevent leakage from product surge. A tapered seat is used for improved sealing. For security the unit is bolted from inside the tank and gauze in certain models in the body prevents access through the outlet spout.

OPTIONAL SEQUENCING VALVE

This valve does not allow the next vent to open until the main poppet is fully opened. The end signal is then used in the certainty that all the vapour vent poppets are open

TECHNICAL DATA:

- Operating air pressure 70kPa to 900kPa. (Normal 500kPa)
- Consumption/stroke 1 litre free air
- Main poppet opens @ 7kPa vacuum.

Mounting: Directly on to manhole covers VOH200, VOH700 and VOH400 or by aluminium or steel weld flanges.
 Material: Aluminium body, stainless steel trim with a viton seal as standard.

ORDERING INFORMATION:

Part No: AVV075V



PV401 EMERGENCY VENT

A simple and reliable emergency pressure relief vent. The flange welds directly onto the tank top. Standard setting vent opens at 30kpa. Capacity is 3250m³/hr free air at 45kpa. Available in aluminium, mild steel and stainless steel with various opening pressures to suit your requirements

ORDERING INFORMATION:

PV401 -	
Aluminium cover	A
Stainless steel cover	S
↑ ↑	
Aluminium flange	A
Mild steel flange	M
Stainless steel flange	S
↑ ↑	
Buna seals	B
Viton seals	V
Teflon seals	T

PV901 STORAGE TANK PRESSURE VENT

A pressure vent for large capacity storage tanks to limit excess pressure to 12kpa max. but to also allow external setting to 40kpa for annual hydro-test, then resettable to 12kpa for normal use after testing. When welded into a tank shell, a 230mm diameter opening is held closed by a spring within the tank. When the pressure reaches 12 kPa in the compartment a poppet opens and vents the excess pressure to atmosphere. The vent closes and seals at pressures lower than 12kpa. To set for hydro-test screw the upper nut out until it tops out on spacer tube. Reset by screwing down until flush.

ORDERING INFORMATION:

Part No: PV901



LIQUIP RETRO-FIT OVERFILL SYSTEMS FOR REFUELLERS

With the arrival of the Liquip range of on-board overfill monitors, we have developed a complete system in a kit form to solve the long time problem of failing pneumatic overfill sensor's fitted on aviation refuellers in the field. Most refueller operators would be aware of the in securities of the pneumatic sensors. Failures have been common over the years and intermittent.

The Liquip electronic MPP102 (for single or dual compartment units) or PPM330 overfill monitor linked to a Liquip LC99A overfill probe/s fitted to each compartment is a "fail safe", cheap and simple alternative.

FEATURES INCLUDE:

Self checking circuitry for fail safe operation.

- Both monitor and probe are SAA approved for hazardous area use.
- Probe can be removed easily from the top of the tank without having to access interior.

Many different options are available for probe mounting into top of tank, including blanking flanges to suit pneumatic overfill systems. Operation would be as liquid level reaches high level probe, an overfill warning light would come on and instantaneously shut down all internal foot valves at once in each compartment. Systems can be supplied in a kit form pre wired with everything required for a complete retro-fit. Kits are complete with wiring encased in conduit rated to IP65, a wiring and pneumatic schematic, along with operating instructions. No special tools nor maintenance is required

Also available are kits for "HIGH - HIGH" overfill protection.

ORDERING INFORMATION:

Part No: MPP102

LIQUIP ROLL-OVER SENSOR

The Roll-Over Sensor minimises the risk of electrically ignited fires occurring in tanker accidents involving roll-over. In the event of tanker tilting more than 45 degrees from horizontal for more than 2 seconds, output from the Roll-Over Sensor shuts off the vehicle battery isolation switch thus isolating electrical power to the batteries.

A hinged base is provided to allow testing of sensor - simply remove one of the humpback pins and tilt the sensor body until it reaches the stop.

ORDERING INFORMATION:

Part No:
 RS202 24v DC
 RS201 12v DC



IN-LINE SUCTION STRAINER

The ILS400 lightweight aluminium strainers suit 76mm to 102mm diameter flow protect down stream equipment such as meters and pumps from debris and foreign objects. Strainer baskets in various mesh sizes only fit in correct direction of flow.

FEATURES

- Cast aluminium body & lid.
- Nitrile seal
- Mounting - 4" TTMA flanges, with arrow in flow direction.
- Various Strainer basket materials and mesh sizes
- Weighs only 4.7kg
- Lid is easily removed by unscrewing two retaining nuts
- Maximum vacuum 90kPa
- Maximum working pressure 700kPa

ORDERING INFORMATION:

Part No: ILS400*

NON-RETURN VALVES

The new Liquip NRV80 sandwich type non return valve is made from aluminium. They can be fitted between standard pipeline flanges. The internal shape of the NRV80 is designed to provide for minimal pressure loss. The valve also features an in-built thermal relief which limits differential pressure to 200 kPa. Minimum pressure to open valve is 20 kPa.

ORDERING INFORMATION:

Part No: NRV80

INTERNAL EMERGENCY VALVE, PRESSURE BALANCED

The PBV200 is a multi-purpose 125mm (5") emergency valve that closes off against pressure for onboard overfill protection. It provides self-contained flow shut-off ability for aircraft refuellers or normal vehicles where it is preferred not to have sophisticated electronics on the gantry. The PBV200 is pneumatically controlled and signals can be direct pneumatic from any pneumatic overfill sensor or from Liquip on-board electronic systems. These pressure balanced valves can also be used to prevent loading on top of returns.

WARNING: NOT recommended for use in API Bottom Loading systems

TECHNICAL DATA

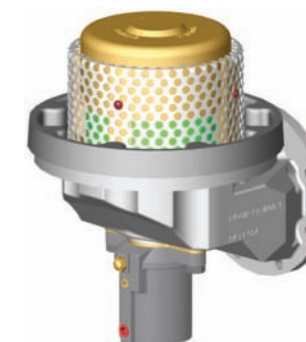
- Flow rate to 2,500 l/min
- Working pressure 1000 kPa (10 bar)
- Air pressure required: 400 to 900 kPa
- Air fitting: 1/8" BSP

MATERIALS

- Aluminium body, poppet, cover & air ram
- Stainless steel shaft, strainer, spring and fasteners
- Viton seal

ORDERING INFORMATION:

Part No: PBV200



● BOTTOM LOADING ADAPTOR VALVES

The Liquip API400 series valve is based on a proven design which has kept these valves in use with oil companies the world over. They are machined to API standard RP1004 for total interchangeability with all loading valves.

Aluminium components are heat-treated for strength and hardness (not anodised as this can prevent electrical continuity and cause premature wear). Internal construction provides full bore flow area throughout.

- Mounting: 100mm TTMA flange.
- Aluminium body, stainless steel shafts, replaceable Delrin bushes and Viton seals.

ORDERING INFORMATION:

Part No:	
API450	c/w sightglass & lever. *No drain valve, no sample port
API451	lever operated. *No sightglass, no drain valve, no sample port.
API455	No sightglass or handle.
API456	Sightglass, lever and sample port.
API457	Lever operated, with sample port. *No sightglass,
API458	Lever operated c/w sightglass, poppet indicator sightglass and complete stainless steel trim.

● API403 ADAPTOR VALVES - AVGAS & JET A1 SELECTIVE

Notches and pins are used to dedicate these API adaptor valves for use with Aviation Gasoline or Aviation Turbine Fuel, thus preventing the wrong product being loaded into the tank.

ORDERING INFORMATION:

Part No:	
API403G	AVGAS selective API c/w lever & sample port. *No sightglass.
API403J	JET A1 selective API c/w lever & sample port. *No sightglass.



● FLOATING SUCTIONS

Liquip's involvement in Terminals and Depots extends from the loading point, upstream to the storage tank and the collection point, specifically the Floating Suction. Our Floating Suctions are designed to ensure that clean product is taken from just below the surface of the liquid. The Liquip bell-mouth design is a conical configuration that ensures low velocity and provides a vortex-breaker, preventing the suction point being on the tank floor where dirt and water settles. Every Floating Suction needs to be custom-built to suit tank diameter, height and manhole position with a range of sizes and materials to suit specific products and suction rates. Different floats are used according to the length and diameter of the pipe required to be lifted. Arms are complete with lifting cable and optional sample lines. Liquip swivels, with their combination ball and needle roller bearings, provide the smooth pivot for the suction arm to work freely at the designed height. The Articulated Floating Suction is designed for use in a vertical tank in which the tank diameter is too small to allow a single arm unit to reach the top of the product. Articulated Multi-arm Floating Suctions are also available. Positive static bonding for continuity assurance is a standard feature.

FLOATING SUCTION ORDERING INFORMATION

Type of liquid		Tank Dimensions	Ht	mm
Pipe size required	mm	Dia		mm
Size and stud pattern of tank outlet	mm ANSI.....	Bell Mouth		Yes/No
Type of tank (see below)		Manhole size		mm
Sample lines and size	mm	Height of output to floor		mm
Float foam filled	Yes/No	For vertical pipes – dia 'A'		mm
Type of tank	Vertical - floating roof/ cone down floor/ cone up floor Horizontal - above ground/below ground			
Inspection cable	Yes/No	Material	Stainless/Aluminium	

Additional Information: Note any supports or guides inside tank.

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

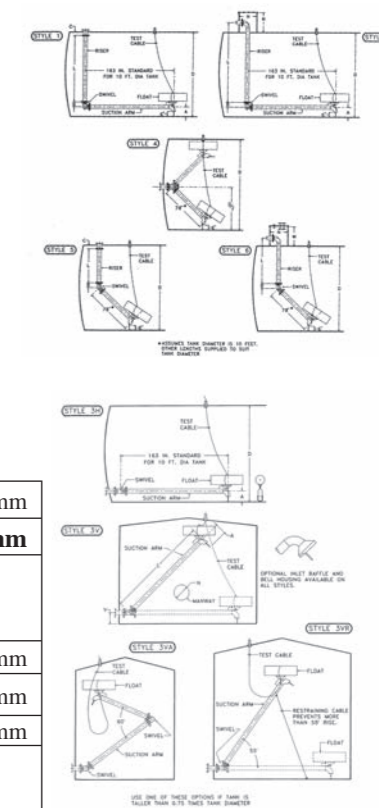
● BOTTOM LOADING ARMS

The Liquip-developed "Velvet Touch" loading arm is a breakthrough in balance systems for bottom loading. To make this arm the lightest to use of any currently available, we use gas struts to counter-balance the weight of the arm. This provides major advantages over the traditional torsion spring or heavy counter-balance weights. Secondly, the swivels run on needle roller bearings with much lower friction than the traditional double row ball bearings. Liquip offer complete assemblies for bottom loading including our own bottom loading coupler. All components show those design touches which make the difference between average and outstanding.

The gas strut employed by Liquip uses the same principle as those used on a car or hatchback. The prime characteristic is an almost constant force throughout the stroke. This means that having been designed for the average truck adaptor height, up or down movements from this position require very little force in contrast with the effort needed with old style balance systems - particularly when the arm is moved significantly up or down from its normal rest position.

INSTALLATION ADVANTAGES

The major advantage of the "Velvet Touch" system is compact size and light weight, making it much easier and safer to install. With the Liquip mechanism tucked neatly into the swivel area, it provides greater clearance all round - very useful when installing multiple cross-over arms in a tight gantry. Six arms in one bay is no problem. Contrast our system with old torsion-spring and counter-weight assemblies which need much more room for their mechanisms and being much heavier, are more difficult to install and have greater potential for handling injuries. Velvet Touch Mark II also has a built-in adjustable safety stop for up and down limits, so that if there is a component failure, the coupler will not drop to ground level.

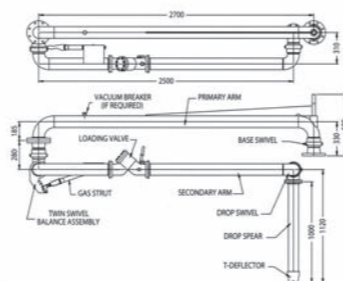




LONG REACH TOP LOADING

* custom-designed to suit individual applications.

With the advent of multiple purpose loading facilities for both vehicles and rail systems, Liquip designed the Long-Reach Top Loading Arm. This unique loading arm uses the Liquip gas strut technology to provide extended reach and finger-tip balance with all mechanisms and pipes safely above head-height. The set-up of these loading arms can give 360° rotation, providing product access on both sides of the loading gantry with any arm reaching all tanker fill points.



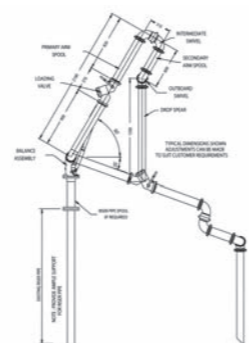
PANTOGRAPH TOP LOADING ARMS

* custom-designed to suit individual applications.

The range of pantograph-style top loading arms incorporates the inherent advantages of the Velvet Touch balance mechanism. The pantograph system has been adapted to include a range of sizes and material specifications.

Loading arm sizes are normally 75mm or 100mm (3" or 4") with material specification ranging from steel, aluminium to stainless steel. Typical installations include top loading of road tankers and rail cars.

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



LIQUIP POLYFLEX SUPER LIGHTWEIGHT HYDRANT PIT

The future of hydrant pit technology is the Liquip Polyflex Hydrant Pit complete with lightweight lid.

The Liquip Polyflex hydrant pit is one quarter the weight of conventional pits, and provides a non-conductive, seamless, advanced-sealing pit. It also offers easy maintenance and improved product retention in case of spills or drips.

The durable pit body is a high-tech polyethylene one-piece construction with cast aluminium rim fitted into the body to provide a liquid-tight bond. The Polyflex pit holds up to 100 litres of product with the valve in place and as the bellows is moulded to the body, there are no separate seals. The body is electrically non-conductive, consumes no cathodic protection power and the sloped bottom ensures fluid build-up in the pit is drained to one side so it is immediately noticeable and easier to clean..



SPECIFICATIONS

PIT BODY

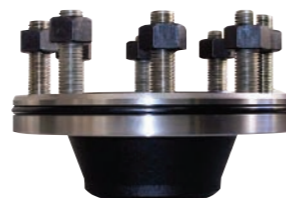
- High density polyethylene, non-conducting
- UV stabilised for outdoor storage
- Working temp range -40 degrees C to 200 degrees C
- Yield 18Mpa S.G. 0.94
- Elongation 450%
- Flex modules 690Mpa

PIT RIM & OUTER LID

Aluminium AA601 heat treated and aged T6

WELD NECK

100mm or 150mm ANSI 150 with fully sealed blind drilled and tapped stud holes, machine finish outside diameter and fastening point for bonding strap. The bonding strap runs from the pipe to the pit rim and is stainless steel.



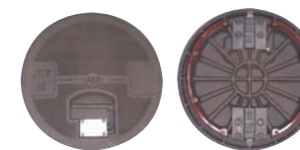
INTEGRAL BELLOWS

The integral moulded bellows provides seamless flexibility to accommodate the riser pipe. The 24" pit retains 45 litres before the liquid level reaches the top of the bellows. The bellows has an extended top, allowing variable installation height and the surplus can be trimmed back. Entry point is designed for 100mm ANSI 150 bolt pattern weld neck flange with thick flange for improved sealing.



LIGHTWEIGHT LID

The HLA100 is the lightest pit lid on the market today which can still withstand the high forces and weights exerted by aircraft as set out in some specifications. It has an automatic self latching feature with single latch mechanism and an anti-slip top. It fits both the 18" and 24" pit (the 24" pit has an "outer lid"). The outer lid on 24" pits can also easily be removed when a larger access area is required for maintenance purposes.



ORDERING INFORMATION:

Part No:	
HPA200	24" Polypit, Lightweight Aluminium Lid, 4" Bellows
HPA250	24" Polypit, Lightweight Aluminium Lid, 6" Bellows
HPA100	18" Polypit, Lightweight Aluminium Lid, 4" Bellows
HPA150	18" Polypit, Lightweight Aluminium Lid, 6" Bellows

**HPA pits without bellows are available to special order.

HLA100	Liquip Lightweight Aluminium Lid
HLA100L	Liquip Lightweight Aluminium Lid with locking device

ACCESSORIES

Part No:	
HLC200-11	Bonding Kit: Required to Provide electrical continuity b/w riser pipe/valve and Pit Lid
HLC200-12	Riser Flange Kit, 4", with fasteners, O-ring & Gaskets
HLC250-12	Riser Flange Kit, 6", with fasteners, O-ring & Gaskets



The riser flanges are based on ANSI 300lb RF flanges and are specially machined by Liquip to suit the bellows and the hydrant valves. Drill pattern is ANSI 150lb or ANSI 300LB, to suit drilling on hydrant valve. Holes are drilled and tapped blind. Riser flange has o-ring groove to provide sealing with bellows. Bottom of flange has drilled and tapped hole for bonding kit. (Pit rim also has drilled and tapped hole for other end of bonding wire)

WEIGHT COMPARISONS:

Conventional Steel Pit with Lid, 18"	± 115 kgs
Conventional Steel Pit with Lid, 24"	± 158 kgs
Conventional Aluminium Lid	± 25 kgs
Liquip Lightweight Aluminium Lid, HLA100	± 13 kgs
Total Weight of Liquip HPA200 (24" Pit, 4" Bellows)	± 75.5 kgs
Total Weight of Liquip HPA250 (24" Pit, 6" Bellows)	± 85.0 kgs
Total Weight of Liquip HPA100 (18" Pit, 4" Bellows)	± 32 kgs
Total Weight of Liquip HPA150 (18" Pit, 6" Bellows)	± 32 kgs

** Separate brochure available on this Product

LIQUIP DIPTRONIC MEASURING SYSTEM

Diptronic® is a high tech measuring system using radar for tankers.

With Weights and Measures Approval in several countries, Diptronic® is a commercially viable, technically superior alternative to mechanical dipsticks and other metering systems.

DIPTRONIC OFFERS THE FOLLOWING USER BENEFITS:

- Convenient automatic eye-level display of compartment volume continuously updated in real time keeps operators and delivery site attendants off the tank top to proactively provide a safer operating environment for drivers and delivery point attachments.
- Removes need for ladders, hand-rails and other safety devices on the tanker.
- Protects the integrity of the load with level measurement 240,000 times per second, and an optional level tracking program as part of Diptronic® LIPS (Load Integrity Protection System).
- Lighter than other metering systems, thus reduces tanker weight
- Maintenance-free with no moving parts, reducing the whole of life cost.
- Reduces vapour emissions by enabling delivery without opening the tank to check levels, preventing possibility of release of VOC's to atmosphere.
- Automates inventory control of fuel throughout delivery
- Diptronic® leaves no room for human error or misinterpretation of level readings. Diptronic® is permanently fixed in the compartment so you cannot measure using a non-dedicated stick.
- Enables temperature compensated deliveries
- Enables split deliveries to maximise fleet utilisation and efficiency
- Diptronic® overcomes "frustrated delivery" problems where the entire contents cannot fit into the receiving tank
- Diptronic® requires no special pipework, and keeps pipework simple and free of joins.
- Unlike conventional meters, with Diptronic® you don't have to empty the tank to know what was in it!
- Overfill protection can be enabled as an option.

TECHNICAL DETAILS

- RADAR transmitters and HART communications
- Approved for custody transfer of fuels including split drop deliveries in several countries
- Electrically approved for installation and operation in hazardous products

SPECIFICATIONS

- Length and range of the sensor determined by the height of the compartment: 0.6 - 2.5m
- Accuracy: 0.2% or better over the whole range.
- Repeatability: 0.05% or better over the range.
- Operating voltage: 12V - 30V
- Approvals - DIP200 Ex e m ib [ia] IIA T4 IP66 DIP100 Ex ia IIA T4 IP66
- CPU operates up to 9 sensors
- Weight DIP200 - 7.8kg DIP100 - 4.8kg
- Materials of construction – aluminium housing, poly-carbonate window. Wetted materials are Grade 316 Stainless Steel and Teflon

DIPTRONIC MK1 SYSTEM INCLUDES:

- DIP100 Diptronic Sensor (1 per compartment)
- DIP200 Diptronic CPU/Display (1 per tanker)
- DIP300 Diptronic sensor steady (aluminium weld-in)
- DIP310Z Diptronic single mount pad (aluminium weld-in)

Measurement and eye-level display of all compartment contents in litres (or mm if preferred) with temperature compensation optional. RS communications to a ticket printer provides printout of compartment volume whenever prompted.



DIPTRONIC® L.I.P.S.

MEASUREMENT AND LOAD INTEGRITY PROTECTION SYSTEM

Measurement and eye-level display of all compartment contents in litres, with temperature compensation option. Formidable level tracking systems guards the fuel, preventing theft and detecting fuel substitution. A liquid sensor in the API provides guarantee and verification of complete delivery. All footvalves must be open before a ticket can be printed, providing guarantee of compartment empty status, in conjunction with API liquid sensors.

Software incorporates level message alerts for Safe Fill level and overfill, giving permanent non-adjustable overfill level reference point.

FUTURE SOFTWARE UPGRADES FOR:

- Secondary overfill protection alarm in case of overfill probe height incorrect set.
- Volume tracking printed through ticket printer.

IMPLEMENTATION AND OPERATION EQUIPMENT

- Implementation: One Diptronic® sensor per compartment, one CPU display per tanker.
- Mounting: Sensor is permanently mounted on the compartment and calibrated to measure the contents of that compartment based on extrapolating volume from liquid height.
- CPU: Doubles as a display, mounted on the tanker at a convenient reading level. Processes all information sent from sensors and converts into volume. (volume of each compartment can be viewed or printed at any stage)
- Ticket printer: Can be fitted on tanker or in cab to provide delivery dockets at the discharge site, and/or for audit purposes

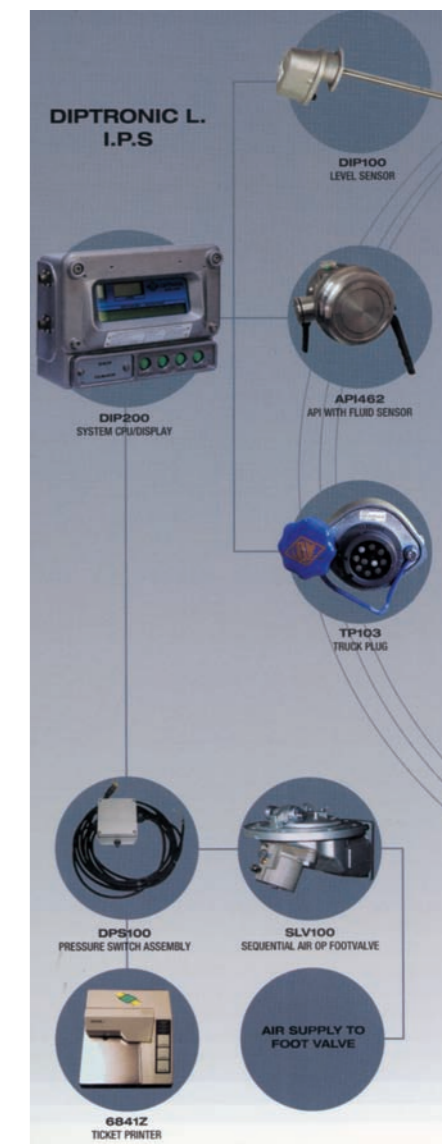
USER OPERATION BENEFITS

Diptronic® system can be realised with minimal changes to normal loading and delivery practices. All Liquip on-board monitoring systems, including Diptronic®, are stand-alone systems with transparent operation. A tanker fitted with Diptronic® L.I.P.S. loads as normal, and upon disconnection of the terminal rack overfill monitor, Diptronic® records the event, notes the liquid level, "seals" the load at that height and temperature and continuously monitors the load until it is completely discharged. Changes in liquid height are recorded in real time to provide a secure load.

Temperature and liquid level data is continuously fed into a CPU, which analyses the data and sends results to the display screen, which is the interface between the Diptronic® system and the user.

DISPLAY

Shows the liquid level or volume of each compartment. Displays error messages, calibration information and other informative messages on the bottom screen. Accurately compensates for wave effect inside the compartment and lets the driver know when wave effect has been calculated and averaged.





LIQUIP ELECTRONIC FLUID MONITORING

Liquip's range of on-board monitors is designed to operate with optic and fibre-optic sensors and probes to provide automatic fluid level detection of hazardous products. The on-board monitors operate by monitoring the status of the connected sensors and processing this information into useable Intrinsically Safe outputs for overfill protection, automatic re-ordering and retained product notification (to prevent contamination). They also provide an improved level of sensor diagnostics through the display, which will read sensor status.

In conjunction with the on-board monitor, the Liquip LIGHTGUARD system incorporates all the benefits that has made optic sensing an industry standard, such as fail safe instant sensing and added to this by removing the weakest feature in standard optic technology.

Two distinct on-board monitors are available; dual-channel Mini Monitor and the range of Protector monitors, both of which have current hazardous area approvals and are designed to Cenlec Safety Standard. Power supply is 12V to 30V DC.

COMMON APPLICATIONS

- Retained Product Monitoring for road tankers
- Self - loading and overfill protection in remote locations
- Aviation refueller / defueller loading
- Storage tank overfill protection

*PPM SERIES PROTECTOR MONITORS

The range of Protector monitors includes 3 variations on an 8 channel monitoring system. These units can be configured to monitor up to 8 compartments / storage tanks.

ORDERING INFORMATION:

Part No:	
PPM310	8 channel monitor incorporating LIGHTGUARD retained product sensors, with standard electronic optic overfill protection sensors.
PPM320	8 channel monitor incorporating LIGHTGUARD retained product sensors and fibre optic LIGHTGUARD overfill protection sensors.
PPM330	8 channel monitor with electronic overfill sensors only.

MPP102 MINI MONITOR

The Mini Monitor has been developed for sites or vehicles with one or two tanks or compartments only with the necessity for overfill protection and / or automatic re-order.

The MPP102 works with either:

- a single electronic probe
- a single fibre-optic probe
- one of each simultaneously
- via a truck plug connected to a standard gantry monitor
- directly to a pump, control valve, alarm etc.

All sensor outputs are intrinsically safe. Output signal is by an integral relay rated at 24V DC 5A or 12V DC 5A. This signal is used in the tank control system to either stop liquid flow or sound an alarm. LED indicators show the condition of the system at all times. Unit size is 146 x 119 x 62mm.

Mounting: 4 rear mounting holes M6. Conduit ports threaded M16
Materials: Cast aluminium housing, poly-carbonate cover

ORDERING INFORMATION:

Part No: MPP102



LIQUIP OPTIC OVERFILL PROBES AND PROBE MOUNTINGS

All Liquip probes are designed to all known world-wide standards for inter-changeability and compatibility with other approved probes and systems.

LC99 & LC95 ELECTRONIC OPTIC OVERFILL PROBES

The LC99 (2 wire) and LC95 (5 wire) series probes are of a standard construction, with a glass prism potted into a separate body and operating using internal potted electronics to provide overfill protection sensing.

CERTIFICATIONS

- Approved to Ex ia IIA T6 Class 1 Zone 0
- SAA
- FM
- CENELEC Certified

With approvals around the globe, Liquip's Terminal and Depot based Overfill Protection equipment is compatible with Industry recognised existing electronic overfill probes on vehicle fleets. Liquip manufacture three base models for different applications with variations such as voltages, earthing methods, probe types and numbers of probes easily accommodated in each model.

ORDERING INFORMATION:

Part No:
LC95
LC99

FOT100 FIBRE OPTIC PROBE

Liquip LIGHTGUARD monitoring systems represent a significant technological advance on common monitoring technology, by incorporating Fibre Optic Sensing, with many specific advantages over standard monitoring methods.

Used to protect against overfill by detecting the presence of liquid at the top of the tank with vastly improved reliability by removal of electronics and electrical wiring.

The FOT100 has no electrical components. The sensor tip consists of a glass tubular housing with an integral ground prism, holding dual fibre optic cables. These cables transmit light to and from the monitor using the prism to either reflect or refract the light signal according to whether the prism is wet or dry.

The glass is housed in the aluminium body with sealing against the product by o-rings and protection for the cables and internal surface of the prism by proprietary sealants. The overfill housing is dimensionally identical to that used in the LC99 and LC95 probes, having a threaded outboard connection to allow for extensions in length. Diameter is industry standard so that it will fit in any existing holder.

The sensor is supplied with 8 metres of integral fibre optic paired cable with prepared ends for connection to the terminals in the monitor. Because of the greater length of fibre optic cable in the run from sensor to monitor, it is permissible to split the cable in a junction box with a joiner if this aids installation.

To extend the cable, use a joiner as listed below with end preparation according to either PPM300 series, S.P.D.S. or MPP100 manual.

Note: the Liquip fibre optic system operates up to 60 metres without any joint and this reduces by an average of 20 metres for each double-cable joint (varies according to quality of end polishing). As a general rule, never use a join if not essential, never use more than one join in a cable run and limit the cable run to 40 metres maximum.

MOUNTING: Can be mounted in manhole covers or onto the walkway using VOH200-5 or PJB300 junction boxes.

MATERIALS OF CONSTRUCTION

Aluminium Body
Glass prism
Viton seals

ASSOCIATED EQUIPMENT

On board monitors; PPM310, PPM320, PPM330, MPP102
6808 Fibre optic cable, twin, teflon coated
5145 Fibre optic polishing kit
5137 fibre optic joiner
5144 fibre optic joiner retainer (2 per joiner) makes one cable joint

ORDERING INFORMATION:

Part No:
FOT100



LIQUIP PROBE DOCTOR PD100 SERIES

Liquip Probe Doctor is an Overfill Protection Monitor for use with electronic probes in road tankers and storage tanks. It provides a truly universal monitor for any common probe and has automatic switching between 2-wire and 5-wire Systems. Just connect 'Probe Doctor' to the tanker and it not only switches, it shows you the result. Automatic grounding of the vehicle is achieved at no extra cost when used with the Liquip "Ground Boss" truck plug. A diagnostic box on the monitor shows the driver the condition of each compartment, the output relay position and whether 2-wire or 5-wire.

A pad-lockable by-pass switch allows for emergency loading. When on by-pass both green and red lights are illuminated. The Probe Doctor ensures that earthing is carried through to electrical mains earth, not just the body of the monitor box and if this connection is not continuous, loading will not be possible.

FEATURES

- Explosion-proof housing for Class 1 Zone 1
- Weight 15kg
- Self-calibrating, no adjustments required
- Power supply may be 240v or 110v AC
- Shutdown response time approximately 0.5 seconds.
- Compatible with optic, thermistor & capacitive probes in 2 or 5 wire formats
- Two solid state boards with plug connectors for quick on-site changeover

ORDERING INFORMATION:

Part No: PD100

LIQUIP PD500 SERIES

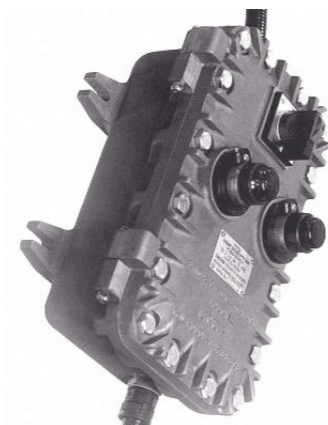
This has 3 modes of operation. It can be a 5-wire probe monitor for loading gantries or storage tank farm, for single compartment tanks with a two-wire system or simply used as a grounding monitor. It is compatible with all common overfill probes

FEATURES

- Unit is encased in a explosion-proof housing for Class 1-Zone 1
- Power supply may be 240v AC or 110v AC
- Output switching is triple-ganged relay for greater reliability
- Lockable by-pass switch to enable loading of tankers in an emergency
- Set for 5-wire or 2-wire (single channel only)
- Automatic grounding assurance built in

ORDERING INFORMATION:

Part No: PD500



SMARTWIRE PLC

The SMARTWIRE system is a 2-wire programmable control system designed to simplify implementation and installation. The system consists of input and output modules, a power filter and an interface board. With the SMARTWIRE system a majority of the operational functions of fuelling aircraft are transformed to electronic form. The system is extremely flexible, offering easy adaptation in the field, if required, without costly modifications. The SMARTWIRE PLC ensures that all fuelling operations cannot be over ridden by an operator and it features a time-out which ensures the "deadman" is present in the operators hand at all times. The same PLC also controls all interlock functions for nozzle stowages, deck lowering, P.T.O. and all bottom load gates.

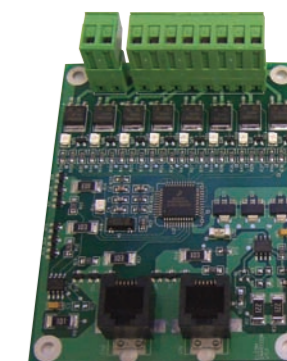
Liquip individually program each PLC to suit customer requirements. With Liquip's SMARTWIRE system the options are virtually unlimited.

ORDERING INFORMATION:

Part No:
LSW4 Smartwire PLC board

SPECIFICATIONS

1. Fully programmable system up to 5 Input and 5 output boards with 8 inputs or 8 outputs on each.
2. System operates from 6V to 30V DC
3. When powered from the Safe PSU (8843 – see below) the system conforms to IEC 60079.0 and IEC60079.11, which specify an International Intrinsic Safety standard. (Approval pending)
4. Communication between boards using a 2 wire digital signal protocol
5. Signal protocol includes redundancy and error checking to ensure proper operation
6. Long range 2-wire communication using the IEC RS485 communication standard
7. Low power CMOS electronics drawing less than 8mA per board
8. Microprocessor controlled with full failsafe monitoring to ensure correct operation
9. Programming achieved using a download/diagnostic unit connected to a PC serial port running windows
10. PC software running under Windows to provide a simple user interface for system programming and diagnostics
11. PC diagnostic indication in real time allowing the system to be fully tested
12. Inputs activated by low side switches when connected to ground
13. Output switches provide
14. Current limiting to 33A
 - a. Thermal shutdown with automatic restart
 - b. Short circuit protection
 - c. Avalanche energy specified enabling solenoid drive capability
 - d. Slew rate control for low noise switching
 - e. Over voltage clamp protection at 42V



DISPLAYS, LARGE DIGIT ELECTRO MAGNETIC

The Liquip Display uses large electromagnetically operated digits which are iridescent yellow on a black background. These displays provide the best visibility in all conditions and the standard 100mm high digit version is visible from over 50 metres away. These displays eliminate complaints from operators using old LED type units that readouts are not visible in bright sunlight and glare. The existing electrical connections are used when replacing old red LED displays with these electromagnetic units.

The rugged weatherproof steel enclosure has a durable powder coated finish to maintain its appearance and give years of trouble-free service, even when constantly exposed to the elements.

ORDERING INFORMATION:

Part No:
LD4TRDC4EM4 4 digit 100mm display DC 12-24V non isolated
LD4TRDC4EM4 5 digit 100mm display DC 12-24V non isolated
LD4TRDCN39M4 4 digit 39mm display DC 12-24V non isolated
LD4TRDCN39M6 6 digit 39mm display DC 12-24V non isolated
C4000 4 digit 39mm 240v. display to suit bowser
LDCB240100E4 4 digit 100mm 240v. display to suit bowser



REMOTE DEADMAN FUELLING CONTROLLER

The "Playmate" cordless deadman fuelling controller is a radio frequency control system specifically designed to perform aircraft fuelling operations. The system comprises of a remote control handle and an in-vehicle base unit. Fuelling operations are initiated by the operator using the remote control handle. Control signals are transmitted from the handle to the base. The system supports refuelling, hose-reel rewind and emergency shutdown operations. The base unit provides outputs for each of these operations for connection to existing vehicle circuitry. The system is also designed to interface to vehicle interlock circuitry. The interlock output is asserted on removing the handle from the base unit and deactivated on re-docking the handle.

The remote control handle is powered by a rechargeable nickel metal hydride battery which provides approximately 96 hours continuous use when fully charged. It is automatically recharged when docked in the base station. The handle is fully encapsulated in RTV fire retardant silicon and is protected from the ingress of water and harsh chemicals.

Each handle contains a unique identification number which is transferred to the base unit when the handle is re-docked. This scheme enables any handle to be used with a particular base unit while ensuring that the base unit will only respond to control signals from the handle that was most recently docked.

As a factory-supplied option, the remote control handles can be configured to enable them to operate in close proximity without interfering with the signals from each unit.

REMOTE CONTROL HANDLE

Controls

The main control trigger is activated by a push button switch and is used to initiate either a refuelling operation or hose-reel rewind according to whether or not the hosereel rewind selector is engaged.

The hose-reel rewind functionality selector is actuated by inserting the refuelling hose earthing pin into the hole opening on either side of the handle so as to obstruct an IR beam. If the selector is actuated, the function of the main control trigger is changed to allow rewind of the hose-reel.

The emergency shutdown control switch is actuated by pulling-out the red knob at the bottom of the handle. An emergency shutdown signal is transmitted continuously while the control switch is in this position.

Indicators

An IN-OPERATION LED indicator is incorporated into the top face of the remote control handle. This LED is illuminated whenever a fuelling or hose-reel operation is in progress or if the emergency shutdown control switch is actuated. The LED flashes if a low battery condition is detected during any of these operations.

Approvals: Pending Intrinsic Safety approval to IEC60079.0 & IEC60079.11.

IN-VEHICLE BASE UNIT

Installation

The base unit should be mounted in a convenient position inside the vehicle cabin allowing the remote handle to be easily docked and withdrawn as necessary. The base unit is interfaced to the existing vehicle circuitry. As the unit is capable of operation at supply voltages from 8 to 28V, it is suitable for use without modification at both of the standard vehicle battery voltages, 12 and 24V.

The base unit incorporates IEC RS485 interface for integral connection with the Liquip 'smartwire' PLC and an in-built antenna removing the requirement for fitting an external gutter-mounted or roof-mounted antenna.

Outputs

The base unit provides a number of outputs which must be connected to existing vehicle circuitry in order to implement the various control functions. They include fuelling (Pressure Control Valve), fuelling deadman (Roof-mounted beacon), hose-reel rewind, emergency shutdown and vehicle interlock.

Indicators

In addition to a POWER indication LED, the base unit also incorporates bi-coloured LED indicators which reflect the status of each of the five outputs listed above. The POWER LED will flash on placing the handle in the base unit. Normally, the LED will flash slowly indicating that the handle I.D. number has been successfully transferred to the base unit. If however, the LED flashes quickly, the handle I.D. number has not been received by the base unit. This may occur, for example, if the handle battery power is depleted or if the emergency shutdown control switch is actuated. On detecting that the handle has been docked, the base unit automatically commences recharging of the battery which is incorporated into the handle. The base unit features a 10-segment LED array indicator representing the handle battery charge level.

ORDERING INFORMATION:

Part No: LRC200 Base Station

Part No: LRC201 Handle



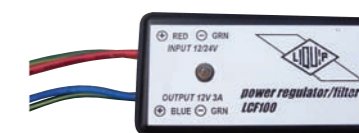
COMBINATION POWER FILTER / VOLTAGE REDUCER LCF100

SPECIFICATIONS

1. Regulated output to 10.8V
2. Input voltage range 12V to 30V
3. Input transient suppression to 30V
4. 80db noise reduction and filtering from 0 to 20kHz
5. Step down voltage at 94% efficiency
6. Up to 3A output current with less than 1.2V line drop out
7. Very compact design with minimum thermal heating
8. Fully encapsulated in fire retardant RTV silicon
9. Completely water proof
10. Ten second soft start up providing full protection from battery cranking spikes
11. Operational LED indication
12. Provides a clean, noise-free output

ORDERING INFORMATION:

Part No: LCF100



SAFE PSU

SPECIFICATION.

- Switch mode regulated power supply to 12V
- Solid state current limiting to 150mA for use with the Smartwire system
- Second level resistive current limiting
- Third level fuse protection in support of solid state and resistive limiting hardware
- Three level zener diode protection to prevent any dangerous voltages
- 12V to 30V input operation
- Provides intrinsically safe power to the Smartwire system, (Approval Pending)

ORDERING INFORMATION:

Part No: 8843



DMH100 ALUMINIUM DEADMAN HANDLE

The Liquip deadman handle design gives excellent operator comfort. A sealed microswitch is enclosed in the handle with a cable connection.

- Construction: Aluminium body, stainless steel trigger, spring & screws.
 Weight: 0.42 kg
 Size: 121mm high x 34mm wide x 70mm deep.
 Cable: The bright orange "curly cord" lead is 3.4 metres long and stretches to 19 metres. Longer leads available upon request.

ORDERING INFORMATION:

Part No:

DMH100 Aluminium Deadman - handle only

8693 Cable / Lead (curly cord), orange, 3.4m.

8422 Aluminium Deadman complete with cable / curly cord



● LCT100 CONTINUITY TESTER

The LCT100 is a "Go / No Go" testing device set to 10 ohms for static reels. High intensity bi-colour LED indicates Pass or Fail and the unit is robust enough to be placed in a tool box with general tools.



SPECIFICATIONS:

- Lithium battery with given shelf life of 8 years minimum at a storage temperature of below 40°. Above 40° the expected life reduces to a minimum of approx. 5 1/2 years
- Operation life of 5 years at 2 minutes per day usage
- Intrinsically safe approvals – complies with Australian Standard 2380.1 & 2380.7
- Approved to: IEC 600079-0: 1988-04 & IEC 600079-11: 1992-02
- Automatic Start when connected to a static reel or when the leads are touched together
- Automatic Shut-Off after 20 seconds use
- Non-Rechargeable battery
- Plugged connections
- Self-Test on startup

ORDERING INFORMATION:

Part No: LCT-100

● ELECTRONIC REGISTERS

Liquip's range of electronic registers currently includes two world-leading models, the EMH500 and EMH600, developed from 5 previous generations of electronic registers spanning 15 years, with many thousands in use on tank trucks around the world. Mounting kits are available for both models to suit mounting to Sampi, Gruppo, Isoil, LC (Liquid Controls), Smith, Avery Hardoll meters (and other meters on application). Liquip EMH Electronic Registers are ideal for new installations or can replace existing mechanical registers. Both the EMH500 & 600 are designed for use on vehicles and have solid state electronics housed in robust high-tech materials, ensuring protection from harsh operational and weather conditions.

COMMON FEATURES

- Non-counting if reversed.
- Back-lit for night time use.
- RS232 port (EMH500 has dual ports) for communications to a ticket printer or in-cab computer through a completely waterproof communications plug.
- Self diagnosis while in use with error message if a pick-up sensor fails.
- Operating Temperature Range: -40 to +70 degrees Celsius.
- Remote mount model available with separate pulser
- Data Retention: If power is lost, the register retains the information at that time for five years.
- Display: shows batch, non-resettable accumulative total and Rate of Flow.
- Auto Calibration: When calibrating, enter true volume delivered and the meter automatically calibrates itself.
- Temperature Compensation is built into the programme and is activated by connecting a temperature probe.
- 32 bit processor running at 16 Mhz
- 32k RAM data memory 128k EPROM program memory.
- Built-in clock to time stamp tickets and events in memory.
- Management print out is available on demand to show records of the number of deliveries and other events.
- Pulse Input will accept 3 channels of 60 degrees separation from the RP100 pulser or single pulse from a 3rd party pulser.
- Pulse Output is open drain type active - row outputable to be variably calibrated along with variable signal width.

● EMH600

The EMH600 supersedes the EMH400 unit and incorporates considerable technological upgrades. The EMH600 has an internal power filter and has dual voltage capability, 12v DC and 24v DC. It is NSC Australia approved with International approvals pending.



ORDERING INFORMATION:

Part No:
EMH600 Direct Mount to meter
EMH600R Remote Mount

● EMH500

The EMH500 includes a pre-set batch control and up to 50 other programmable functions, making it ideal for small quantity deliveries. The EMH500 is always used in conjunction with the EJB101 or EJB200 which provides a filtered power supply and houses input and output facilities. Power supply from EJB101 is 9 VDC, polarity protected. Programmable two stage solenoid outputs provide slow start and slow stop of batched deliveries



ORDERING INFORMATION:

Part No:
EMH500H Standard version with heated display
EMH500IS Intrinsically Safe certified version

APPROVALS

- UK Weights and Measures
- USA Weights and Measures
- Canada Weights and Measures
- NSC Australia

NOTE: Dismantling is NOT a recommended customer procedure, always return it to a Liquip Distributor for examination.

● EJB 101 JUNCTION POWER BOX

Liquip electronic system requires complete integrity of power supply to guarantee data communication is not corrupted. The EJB 101 has been produced to provide the complete power interface. The cast aluminium housing has a weather-proof seal and is Ex 'e' rated. Five ports are provided - one for the supply from the vehicle battery (9v to 30v), one output to supply power and communication to the register and the remaining ports are for the auxiliary devices (such a communication ports, temperature probe, remote pulser and solenoids). These ports may require approved glands and conduit to comply with regulations. The single electronic board is manufactured to Cenelec standard for the intrinsically safe barrier and also provides circuit protection and power conditioning for surge and ripple protection.



ORDERING INFORMATION:

Part No: EJB 101

● ELECTRONIC REMOTE PULSE TRANSMITTER ERP 100

In applications where it is more appropriate to mount the electronic register elsewhere other than directly on the meter, Liquip have produced the ERP 100 unit for remote positioning. In these cases the register is provided without the pulser and the drive point is blanked off.



The ERP 100 is a self contained pulser which can operate with the intrinsically safe power supply or directly from the vehicle battery. The body mounting is the same as other units available and completely interchangeable and can therefore be driven off a mechanical register. The unit has solid state electronics, intrinsically safe approval for class 1 zone 1, fully weather-proof seal to IP67 and Weights and Measures approved.

ORDERING INFORMATION:

Part No: ERP 100



GORMAN-RUPP SELF PRIMING CENTRIFUGAL PUMP

Without doubt the most economical and best quality pump for conveying aviation product, Gorman Rupp pumps are proven performers in reliability.

- Threaded / flange inlet and outlet connection.
- Type 2 mechanical self lubricated seal, rotary face is carbon, stationary face is Ni-Resist.
- Elastomers are Viton-A
- Cage, shaft sleeve and spring are Stainless Steel.

ORDERING INFORMATION

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



PORTABLE AVIATION DRUM PUMP

The Liquip Portable Drum Pump aviation refuelling assembly is a complete frame-mounted package, consisting of:-

- A hand pump capable of 1 litre per turn
- Velcon VF31 mini-filter and cartridge
- Static reel with cable and clamp
- Hose - 25mm (1") aviation hose (length to suit customer requirements)
- Nozzle - ZVF25.41 manual 25mm (1") bowser-style nozzle with built-in swivel, strainer, dust cap and earth clamp/pin
- Drum Spear suitable for 200 litre drums
- Ground / earth spike.

Hose and spear are detachable via camlock connections for easier handling. All framework, fittings and gear are aluminium where possible to keep the system lightweight.

OPTION:

Electric pump in place of hand pump

ORDERING INFORMATION

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



VENTURIS

Liquip 80 and 100mm Venturis are designed for use in fuelling systems where it is necessary to control pressure by remote sensing with complete accuracy. They are "inline and in-pipe" to allow easy installation and retrofits. They provide a wide compensation range with low pressure loss characteristics and when in use with a PCV, fuel pressure losses are simulated via the hose and nozzle and this pressure is relayed to the control valve to provide safe high fuelling rates. Various connections are available.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



200 LITRE (55 GALLON) DRUM SPEARS

Liquip have designed an aluminium Drum Spear complete with 1 1/2" BSP threaded inlet suitable for 200 litre drums. The nylon drum spear cap sits in the drum opening and flow through the spear is via 39mm diameter hole.

ORDERING INFORMATION

Part No: 9912



PRESSURE GAUGES

These dual scale (kPa & psi) Liquip pressure gauges are liquid filled and available in two ranges:

- Size: 100mm (4")
- Construction: All stainless steel
- Connection: 1/4" lower back entry
- Mounting: 3-hole panel mount flange

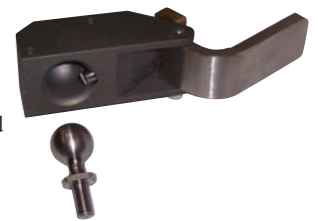
ORDERING INFORMATION:

- PG1000 0-1000 kPa / 0-145 psi
- PGS1600 0-1600 kPa / 0-230 psi



NOZZLE STOWAGE BALL & SOCKET ASSEMBLY

The Liquip ball and socket nozzle stowage assembly provides safe and sturdy nozzle storage as well as an interlocking mechanism. The interlocking mechanism can be connected to either an electrical interlock switch or a pneumatic interlock valve. Releasing a nozzle from the socket is made easy using a lever located directly under the socket. This assembly consists of an anodised aluminium alloy body and stainless steel ball to minimise the chance of sparking on contact.



ORDERING INFORMATION:

- Part No: 8564 Ball & Socket assembly
- 8568 Electrical Interlock switch
- 9000-13-105 Bar to mount 8564 assembly to 60427 underwing nozzle
- 9000-13-47 Bar to mount 8564 assembly to 64348 underwing nozzle
- 9974 Bar to mount 8564 assembly to AVN040 overwing nozzle

LIQUIP AVN040 OVERWING NOZZLE

The Liquip AVN040 has been designed as an easy to operate nozzle for delivery of all fuels and aviation fuels. Unlike normal nozzles, it is equipped with "power assist" dashpot operation to make it as light as a service station nozzle. The pressure-balance design allows a small, constant finger force on the trigger no matter what the pump pressure. In operation, the trigger action first opens a bullet-shaped internal seal to equalise internal nozzle pressure, making it easy to open the product seal. This ease of operation allows for fine, accurate top-up without any surging and splashing.



The body, handle and trigger are heavy duty but lightweight aluminium. Handle and trigger are easily replaceable and the body has wear ribs to protect it when dragged. The Spout Adaptor has two different mounting modes, allowing the choice of aviation spout or standard fuel spout. (Spouts must be ordered separately - see below). Inlet is 38mm (1 1/2") BSPP.

TECHNICAL DATA:

- Adjustment: None
- Trigger Force: constant 60N at midpoint.
- Flow-through: 38mm (1 1/2") diameter flow through.
- Pressure Drop: Only 50kPa pressure drop at 300lpm with 32mm spout.
- Weight: 2.5kg with 32mm spout.
- Mounting: 38mm (1 1/2") BSPP female thread) inlet.
- Construction: Body, handle, trigger and adaptor outlet are all Aluminium. Stainless steel shaft, pin and spring. Viton and polyurethane seals
- Dismantling: Remove capscrew. Unscrew outlet adaptor. This will give access to all internals.
- Accessories: Aviation spouts, dust caps, strainer and adaptors *see page 30

ORDERING INFORMATION:

- Part No: AVN040 Nozzle body only
- AVN-25 Nozzle c/w 25mm spout, strainer, splash guard, dust cap and EKG1200
- AVN-32 Nozzle c/w 32mm spout, strainer, splash guard, dust cap and EKG1200
- AVN-38 Nozzle c/w 38mm spout, strainer, splash guard, dust cap and EKG1200
- AVN-J Nozzle c/w jet selective spout, strainer, splash guard, dust cap and EKG1200



LIQUIP OVERWING NOZZLE ACCESSORIES

ORDERING INFORMATION:

Part No:

SPOUTS

- ER250 25mm (reduced) spout
- ER495 32mm aluminium spout
- ER583 38mm aluminium spout
- ER587 JET Jet-Selective aluminium spout

DUST CAPS

- GKG25 Buna-N dust cap & spring loaded chain suit 25mm spout
- GKG32 Buna-N dust cap & spring loaded chain suit 32mm spout
- GKG38 Buna-N dust cap & spring loaded chain suit 38mm spout
- GKG38-J Buna-N dust cap & spring loaded chain suit Jet Selective spout

ADAPTOR

- EK432 Brass adaptor to suit AVN040 o/w nozzle for fitting spouts.

STRAINER

- ES418 Poly / stainless steel 100 mesh strainer suit EK432 adaptor

SPLASH GUARD

- EK419 Buna-N guard suit EK432 adaptor

STATIC CLAMPS See page 52

AVIATION NOZZLE

BOWSER STYLE MANUAL SHUT-OFF

The ZVF25 1" refuelling nozzle has been the bench-mark nozzle for aviation refuelling for decades. With an internal check valve, 100 mesh strainer and integral inlet swivel the ZVF25 has a maximum flow rate of 140 litres/minute. It is ideal for fuels up to 50% aromatics, alcohols up to 15%, Jet fuels & Diesel (NOT suitable for viscous oils.)

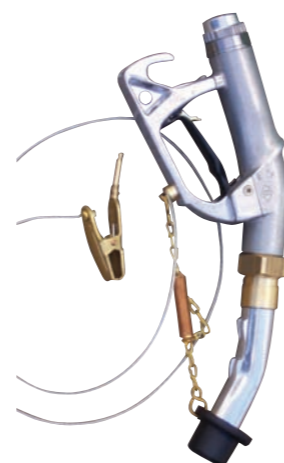
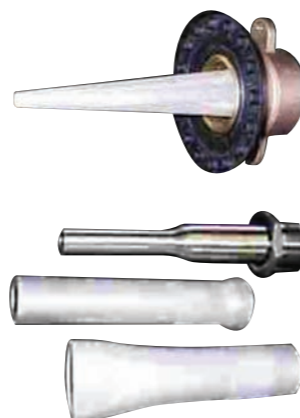
Construction: Aluminium body, guard and inlet swivel, stainless steel and acetal internals, Nitrile and Vulkollan seals.

Spout: 27 Ø - 1" BSP female inlet

ORDERING INFORMATION:

Part No:

- ZVF25.41 Includes dust cap & spring loaded chain, 1.2m bonding cable and clip (EKG1200)



AVIATION HOSE & FITTINGS

ELAFLEX

Elaflex standard type "HD-C" with two textile braids. Light weight, flexible hose for all pressure purposes.

NOTE: Not for suction. Burst pressure > 80 bar / 1200psi.

"Yellow band aircraft refueling hoses, suitable for all aviation gasolines and jet fuels, anti-icing and motor oils. Temperature range -30 degrees up to +70 degrees Celsius. Approved to EN1361 (European) , AS2683 (Australian) and API1529 (American) Standards.

Nitrile rubber (NBR) seamless tube, black, antistatic, no fuel solubility. Cover is electrically conductive with reinforcements of at least two textile braids without metallic strands.

ORDERING INFORMATION:

Part No:	Size ID		OD	Working Pressure	Max. Vacuum	Min. reel diameter	Approx Weight
	Inch	mm					
3343	1	25	37	20 bar	0.5 bar	300	0.9
3344	1 1/4	32	44	20 bar	0.4 bar	300	1.0
3345	1 1/2	38	51	20 bar	0.3 bar	400	1.2
3346	2	50	66	20 bar	0.2 bar	500	1.8
3347	2 1/2	63	79	20 bar	0.16 bar	550	2.3
3348	3	75	91	20 bar	-	600	2.7
3349	4	100	117	20 bar	-	-	3.7

ELAFLEX VHD HOSE

Special type Elaflex "VHD" with three textile braids and thicker wall for narrow bending radii and good suction rates. Burst pressure > 100 bar / 1500 psi. Suitable for reel into plane and hydrant inlet operations.

GOODYEAR JET RANGER

Used in the fuelling and defuelling of commercial and private aircraft. Resistant to jet fuel and higher aromatic aviation gasoline's. Also for use on hydrant service. Meets both API 1529 and EN1361 standards. Approved for use by Exxon Mobil Aviation, Shell Aviation and Air BP.

Construction: Synthetic rubber black tube. Cover is electrically conductive / static dissipating synthetic rubber. Reinforcement is spiral-ply (4) synthetic fabric and one nylon breaker.

Branding: Continuous spiral brand "Goodyear Jet Ranger EN1361/ C NFPA 407, API1529/1998 Grade 2, size 20 bar Max WP 'II series', Year".

ORDERING INFORMATION:

Part No:	Size: ID		OD	Working Pressure	Safety Factor	Approx Weight
	In.	mm				
543-742032	1	25	40.00	300 psi	4:1	0.85
543-742040	1 1/4	32	48.00	300 psi	4:1	1.11
543-742048	1 1/2	38	52.39	300 psi	4:1	1.28
543-742063	2	50	66.28	300 psi	4:1	1.74
v543-742080	2 1/2	63	80.17	300 psi	4:1	2.28
543-742107	3	75	92.47	300 psi	4:1	2.67
541-742123	4	100	117.00	300 psi	4:1	



HOSE-TAILS

Quick Clamp Type in either pin or bolt style to international standards. Male & female threaded couplings in brass nickel plated. Working pressure up to 25 bar. Supplied separately or part of complete tested hose assembly.

SWIVELS, M+F

Construction: Nickel Plated Brass. Available in the following sizes:

ORDERING INFORMATION:

Part No:	
TS57-0026	1"
TS57-0058	1 1/2"
TS57-0061	1" M - 1 1/4" F/M
TS57-0054	2"
TS57-0059	1 1/4"
TS57-0005	2 1/2"



INPUT HOSE TROLLEY

Situated at regular intervals along the input coupler hose, Liquip's input trolley enables the operator to easily wheel around the input coupler and hose assembly with minimal effort. A key feature of the input trolley is the ease in which the hose can be released from the trolley by means of a single bolt release system as shown in the figures below.

This assembly is designed against corrosion and is built to last. It consists of a stainless steel upper, supported by a 10mm aluminium base. The urethane castor wheels are proven to be longer lasting and more resilient than standard castor wheels.

ORDERING INFORMATION:

Part No: 9000-13-27

INPUT COUPLER DONKEY ASSEMBLY

The Liquip Donkey Assembly is a pneumatic coupling support trolley designed to eliminate operator strain when manoeuvring a 4" input hose to connect to a hydrant pit. Release from the stowage device allows the wheels to extend and thus fully support the coupling. Once wheeled to the hydrant pit, the coupling is then lowered pneumatically using the switch on the trolley. The same switch also raises the coupling.

FEATURES:

- BSP & NPT Connections
- Pneumatic Operation
- Lightweight yet sturdy construction
- Reduces coupling damage and abuse
- Easy to manoeuvre

ORDERING INFORMATION:

Part No:
9000-14-11 Donkey assembly



HOSE BEADS

INCREASE THE LIFE OF YOUR AVIATION HOSE !

Replacing aviation hose can be costly. Fitting Hose Beads saves the hose from rubbing along the tarmac, minimising wear and abrasion damage. The bead allows for relatively effortless manoeuvring of the hose and also acts as a hose marker at night. The 2-piece yellow plastic beads bolt together around the hose and Liquip suggest a bead is fitted every 500 mm run of hose.



ORDERING INFORMATION:

Part No:	
9650	Hose bead suit 32mm ID hose
9054	Hose bead suit 38mm ID hose
8494	Hose bead suit 50mm ID hose
9058	Hose bead suit 63mm ID hose

HOSE REELS

ELECTRIC REWIND HOSE-REEL

The Liquip AER-HPNP electric rewind drum-style hose reel unit has been engineered to make operation easy and safe. This unit is designed to electrically rewind aviation hose safely in hazardous environments while still allowing personnel to unwind the hose with significantly less effort than earlier chain-driven types. This significantly reduces the potential for back injury to the operator.

FEATURES

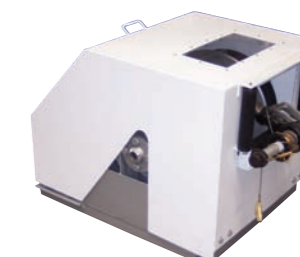
The frame is hot-dip galvanised steel and accommodates all components.

Drive is provided by a 3 Phase, 1.1kW, Class 1, Zone 1 explosion proof ex-d electric motor. It runs through a single-to-three phase variable speed inverter which provides greater flexibility in speed control.

The unit is "pre-set" by Liquip. The drive unit is capable of "ramping up" to operating frequency, and "ramping down" from operating frequency. These parameters are completely controllable via the keypad located on the front of the inverter.

Power is transmitted to the reel by an anti-static timing belt instead of chain drive. This belt is tensioned automatically by a spring-loaded tensioner, eliminating the need for constant adjustments and with no metal-to-metal contact, the possibility of sparking caused by chain lash etc. is removed. The anti-static belt also eliminates static caused by belt slippage or sideways float.

For operator safety, the unit may be purchased with either a hinged full cover or a belt guard to minimise the possibility of catching fingers in the belt drive. The cover features a polycarbonate window in the top and hose roller guides in the front and when lowered covers the entire unit. The belt guard is a removable profiled guard designed to sit over the driven sprockets and the timing belt, removing the likelihood of fingers being caught in the belt drive. The rest of the unit remains uncovered.



NICKEL-PLATED AVIATION DRUM STYLE HOSE-REEL

The HPNPZ series of hose reels are constructed from robust stiffened steel check plates, extremely sturdy thick-wall manifold with added strength from steel inner drum, steel base frame and self-aligning bearings. All wetted areas are nickel plated to ensure suitability with aviation products. Pressure rated to 2100kpa with stainless steel flanged inlet and 32mm male BSP outlet. Sealing is by lip seal and all models incorporate an optional lock. Available drum widths of 300mm, 450mm and 600mm

- Available in hydraulic, manual or electric rewind configurations.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

ORDERING INFORMATION:

	HPNPZ
	↑
Rewind type	
Front manual	FR
Side manual	R
Hydraulic	H
	↑
Drum width	
300mm	12
450mm	18
600mm	24



AVIATION CATHERINE WHEEL HOSE-REELS

The catherine wheel (also called a cartwheel) reel is ideal for narrow spaces and is available in hydraulic or electric motor drive. Optional features of the Cartwheel type hosereel include hose guide rollers and enclosed sides for stable storage of the hose. Standard features include non rusting aluminium, rolled edges for hose bead protection, roller bearing, variable length of hose to suit application.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

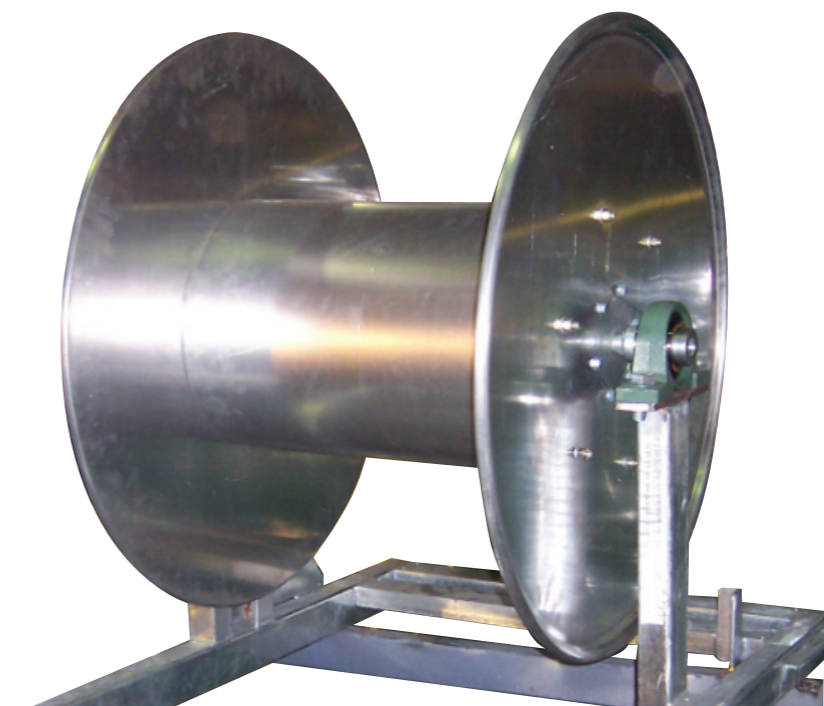


AVIATION DRUM-STYLE HOSEREEL

Liquip's sturdy aluminium AHR250D Drum style hose reel range adapts to a variety of drive mechanisms. Drum widths of 300mm, 450mm and 600mm with three gooseneck sizes accommodate numerous hose sizes and lengths. An optional A-Frame is available.

ORDERING INFORMATION:

	AHR250D-	-	-	-
		↑	↑	↑
Gooseneck (mm)				
1" BSP Gooseneck	38			
2" BSP Gooseneck	50			
2" BSP Gooseneck	65			
			M	H
Rewind Type				
Manual Rewind				
Hydraulic Rewind				
Electric Rewind				
			E	
Drum width (cm)				
300mm hose drum				30
450mm hose drum				45
600mm hose drum				60



SAMPI POSITIVE DISPLACEMENT METERS

The SAMPI positive displacement (PD) meters are ideal for tank truck or depot applications. For metering aviation gasolines and jet fuels the Class 2 meter has a non-ferrous construction and SAMPI is approved for use by NSC (Australia) and other major international weights and measures regulatory bodies.

Model	FLOW - lpm	PRESSURE
M5	25 - 250	1000kpa
M7	50 - 500	1000kpa
M15	100 - 1000	1000kpa
M30	170 - 1700	1000kpa
M50	250 - 2500	1000kpa

Superior Accuracy at constant flow:

With all other conditions being constant, the Sampi meter does not vary more than 0.05% in repeatability over the entire range.

Accuracy over the widest range of flow:

The Sampi Meter has an ideal combination of minimum seal or slippage area with lowest pressure differential across the seal. This results in better accuracy over a wide range of flow than available in other type of commercially produced positive displacement meters.

Accuracy regardless of pressure fluctuations:

With the Sampi meter's unique dual-case design, the bearing surfaces of the meter element are internally and externally subjected to the same system pressure. Therefore, the meter element cannot be stretched or distorted to cause changes in seal area that would adversely affect accuracy.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

ISOIL POSITIVE DISPLACEMENT METERS

SBM75 (50 mm), SBM150 (75 mm)

These compact and lightweight SBM units are specifically designed to incorporate an air eliminator and strainer for use on tank trucks and in smaller depots. Fuel flows through a strainer and air separator chamber into the measuring chamber and turns a rotor. The rotor spindle extends through a seal into a very precise, adjustable gear train in a separate housing and then to the register, which indicates litres. Isoil's meter range retains its accuracy over a very long time. Unlike most other PD meters, the rotor has four vanes to minimise any liquid 'slip' which causes inaccuracies. The gear train runs in an oil bath to minimise wear. Maximum pressure is 1,000 kPa.

FLOW RATES:

SBM75	50 to 500 litres/min
SBM150	100 to 1300 litres/min

OPTIONAL & RELATED EQUIPMENT:-

Preset mechanism and valve for batching, ticket printer, rate of flow indicator, electronic register. Inlet flange and register can be rotated to suit various pipe configurations.

- BM200 (75 mm)
- BM400 (100 mm)
- BM600 (150 mm)

The BM range of Isoil meters is exceptionally efficient for bulk loading and unloading of aviation product. This type of Bulk Meter, by virtue of excellent design and development over a number of years, is noted for exceptional accuracy over a very wide range and in service this accuracy is maintained over long periods of use. Simplicity is a key feature with the only moving parts, the rotor and rotor blades, constantly immersed in liquid.



The Counter head is a standard Veeder Root unit with a lever providing zero resetting. The smaller eight digit Total Quantity counter cannot be reset.

MATERIALS:

Manifold and flanges:	Epoxy coated steel
Body:	Ni-resist cast iron
Rotor:	Aluminium
Vanes:	Carbon
Seals:	Viton

OPTIONAL & RELATED EQUIPMENT:-

- Air separator
- Mechanical/electrical preset
- Ticket printer
- Rate of flow indicator
- Electric / pneumatic pulse transmitter
- Electronic register

Flow Rates:

BM200	150 to 1500 litres/min
BM400	200 to 2200 litres/min
BM600	300 to 4200 litres/min

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

GPI INLINE FUEL METERS

ECONOMICAL, CONVENIENT ELECTRONIC DIGITAL AVIATION FUEL METERS

The GPI range of compact, lightweight in-line fuel meters is available in either a stainless steel or aluminium housing and contains sealed electronic circuitry providing durability and years of use in almost any condition. Units are factory calibrated. Simply put the meter in-line at the nozzle and forget about straining to see a readout several feet away. Installation can be either vertically or horizontally, while the optional remote kit further expands potential applications to work well with extreme temperatures and awkward locations.



Two AAA batteries power the small microprocessor for a year and are very easy to replace.

- Works on any pump, pressure, or gravity feed system.
- Varying flow ranges available
- Available in 1" or 2" versions.
- FM Approved

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

STAINLESS STEEL FLANGED BALL VALVES

Our range of flanged ANSI150 Lb. stainless steel ball valves incorporate a fire safe design which features:

- Blow out-proof stem
- Secondary metal seat
- Metal to metal seal

ORDERING INFORMATION:

Part No:
 9657 1 1/2"
 9952 2"
 9656 3"
 9655 4"

* Pneumatic actuators to suit also available.

DEADMAN BALL VALVE, SPRING RETURN HANDLE

FEATURES

- Blow-out-proof stem design and an adjustable packing gland.
- All components of lever are Stainless Steel.
- Reinforced PTFE seats and stuffing box ring.
- Investment cast components.
- Operating torque is approximately three times standard valve torque.
- Spring Return to Open and Close.

Threaded 1/4" - 1" 2000 psig , 1 1/4" - 2" 1500 psig

BUTTERFLY VALVES

A quick acting valve for medium pressures where minimum size and weight are important and provide full flow through area.

Thick elastomer seat provides outstanding resilience – will still seal after minor damage from foreign objects.

- Locking handle supplied as standard.
- TTMA flange mount.
- Double O-ring seals and grease trap give long lasting lubrication with effective sealing and dirt exclusion.
- Aluminium body, handle and disc, viton seat with stainless steel shaft and high tensile drive bolts.

Max pres. 1500kpa in open position
 Max temp. 100 degrees C.

Also available with air actuation

ORDERING INFORMATION:

Part No:	Size mm	Thickness mm	Bore mm	PCD mm	Weight	Overall Height mm	Hole size mm
LBV3	76	28.6	86	124	1.8	203	11
LBV4	102	28.6	111	149	2.7	229	11



PNEUMATIC SAMPLING VALVE

The ITV1-AO 25mm internal valve with integral elbow, has been designed for use on aircraft refueller tankers which have small sample or drain lines. The normal fitting in the sump is a 25mm BSP socket. Flow is outwards only. The elbow incorporates a shear groove above the pipe attachment aperture to ensure a breakaway (in the event of damage) at that point. Valve poppet, spring and shaft are all attached above the shear point to ensure the continued containment of product in the tank. In the event of fire the air line will soften at 80 degrees C and release any air in the system and close the poppet.

ORDERING INFORMATION:

Part No: ITV1-AO

PRESSURE RELIEF VALVES

Liquip have a full range of pipe-ended adjustable relief valves. The compact one piece body has an adjusting screw which sets cracking pressure. A variety of construction materials, pipe-end connections and sizes are available and they are 100% tested for crack and reseal performance.

Cracking pressure range available

3 to 50psi, 50 to 150psi, 150 to 350psi, 350 to 600psi

ORDERING INFORMATION

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

"SHOW FLOW" VALVE

This unit has been developed to enable industry to standardise on a rugged and versatile visual flow indicator that will satisfy most requirements within 8mm to 40mm. pipe sizes. The units have screwed BSPP ports.

Operation: On a 'No-Flow' condition the PTFE ball remains hidden in the body socket. With flow the ball becomes visible in the socket at rates from 0.3 litres/minute. As the flow rate increases the ball leaves the socket and moves freely in the large glass dome (providing positive indication of flow). In addition to flow, this multi-purpose indicator allows observation of the colour and condition of liquids. The unit must be installed horizontally with the glass dome positioned upwards.

Application: The combination of stainless steel, PTFE and borosilicate glass enables this competitively priced flow indicator to be suitable for any aviation fuel requirements. Pressure up to 16 bar and temperature rating of 200 degreesC.

ORDERING INFORMATION:

Part No: 8475 1/2" female BSP ports



RUBBER EXPANSION JOINTS

ELECTRICALLY CONDUCTIVE FLEXIBLE CONNECTIONS FOR PRESSURE OR VACUUM

In fluid handling systems it is often necessary to make allowance for pipework expansion, vibration and slight misalignment. A multi-purpose solution to many of these problems is the Elaflex rubber expansion joint. It compensates for stresses arising from these thermal variations or misalignment, substantially dampening vibration from associated plant such as pumps, compressors, etc. preventing the transmission of objectionable noises. Available in a variety of synthetic rubber qualities and flange configurations, it has colour strips for identification to differentiate all commonly used fluids. If required, PTFE liners can be installed for aggressive chemicals.

Ancillary fittings include limiting stirrups for use with standard flanges, limit rods and custom-built flanges, flame protection covers, internal support rings for vacuum duty. Rubber expansion joints have been proved in service for many years and are approved by a number of Authorities. Liquip stock the TW YELLOW range which is commonly used on aircraft refuelling units (see below for related data).

ERV TW YELLOW DATA:

Recommended for: Hydro-carbon products with less than 50% aromatics.
 Tube: Seamless Nitrile NBR., oil resistant for temperatures up to + 100°C.
 Cover: Neoprene, electrical-conductive, oil resistant and weatherproof.
 Flanges: Forged aluminium.
 Electrical Resistance: Between 1k Ohms and 1Meg Ohms.
 Max. Working Pressure: 10 Bar.
 Test Pressure: 16 Bar

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

VNS-A4 100MM ALUMINIUM SWIVEL

The VNS-A4 is a 100mm straight through single plane cast aluminium swivel allowing 360 degree rotation, with cast TTMA flanged ends. A ball and needle bearing system provides optimum axial and radial load bearing with minimal friction. Dual o-rings for product seal and dust seal respectively.

ORDERING INFORMATION:

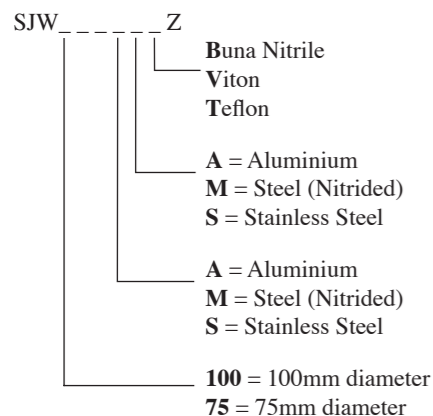
Part No: VNS-A4

SJW SERIES WELDABLE SWIVELS

The SJW series of swivels are available in either 75 or 100mm in steel, stainless steel and in aluminium (75mm only) with prepared ends for welding directly to pipe or tube. They incorporate the well-known high load /low wear principle of ball with needle bearing combination. Sealing is enhanced by the use of a "V" primary seal in Viton or Teflon, the bearing pack being isolated from product leaks by the use of secondary o-ring containment seals. Working pressure 1100kpa, test 1650kpa.

ORDERING INFORMATION:

Part No: See table



AVIATION SELECTIVE COUPLINGS

The aim of these units is to ensure that all dedicated aviation road tankers fitted with selective couplings are compatible and can be loaded ONLY with aviation fuels, and that all aviation receiving points can ONLY accept aviation fuels from the dedicated road tankers.

The Liquip range of dedicated couplings provide product selectivity between Avgas and Jet Fuel and are available in the following configurations:

- Top and bottom loading
- Gantry loading valve
- Road tanker API valve
- Road tanker API to camlock adapter
- Female camlock hose end fittings
- Male camlock receipt point fittings

The standard range of Camlocks are to NATO specification MIL-C-27487. Aluminium construction, all units confirm to Australian Code of Practice CP23.

Notches and pins are used to dedicate these couplings for use with Aviation Gasoline or Aviation Turbine Fuel, thus preventing the wrong product being loaded into the wrong tank.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

CAMLOCK COUPLINGS

The standard range of Camlocks are to NATO specification MIL-C-27487. Aluminium construction, all units confirm to Australian Code of Practice CP23.

Numerous models are available, including:

- Male Camlock Adaptor to Female BSP thread
- Camlock Adaptor to Male BSP thread
- Male Camlock Double Adaptor
- Camlock Adaptor to Square Flange
- Camlock Adaptor to Smooth Hosetail
- Camlock Coupling to Male BSP
- Camlock Coupling to Female BSP
- Camlock Coupling to 68° Smooth Bore Hose
- Camlock Coupling to Smooth Bore Hose
- Camlock Dust-cap with locking levers
- Camlock Dust-cap
- Camlock Dust-plug

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models, sizes and options available will best suit your needs.

AIR ELIMINATORS

The 11AV, 22AV and 13AV air eliminators are proven free floating mechanisms to handle pressures up to 570psi @ 100 degrees F. They combine the durability and corrosion resistance of stainless steel with a reliable vent valve. The simple design employs a float which actuates a guided free-floating valve. There are no pivots to wear or create friction that could interfere with the operation of the unit and the lever guide ensures positive closure under all conditions. The units are of such a universal design in that they can be used for a multitude of applications. Liquip stock the 11AV, predominantly supplying the unit to vent air from filter vessels.

Model No.	11AV	22AV	13AV
Pipe connection size	3/4"	3/4"	1"
Approx. Wt. lb	1 3/4	3 1/4	7 1/2
Max. Allow. Pressure (vessel Design)	500psig @100 deg. F 440psig @500 deg. F	555psig @100 deg. F 475psig @500 deg. F	570psig @100 deg. F 475psig @500 deg. F

ORDERING INFORMATION:

Part No:
 11AV
 22AV
 13AV



MILLIPORE ADAPTOR – FUEL SAMPLING

The chrome-plated dry break connection is available with a 3/8" BSPP and includes a dust cap. Mainly used for fuel sampling, they are also suitable for a variety of applications including pressure checking and gauge testing.

ORDERING INFORMATION:

Part No:	
MSA011	Adaptor 3/8" BSPP
MSF100	Mating female half to 3/8" hose tail
AT104	Adaptor probe assembly



ALJAC CLOSED CIRCUIT SAMPLER

ALJAC closed circuit samplers are in use world-wide on aviation fuelling vehicles, bridging vehicles and in fixed facilities. The Aljac sampler consists of a basic unit to which various accessories can be added. It comprises a glass tube with hinged, vented cover, an epoxy coated cast aluminium base, viton seals and a drain valve with an easily operated handle. Accessories permit all currently established methods of water detection together with density and temperature readings. Fuel enters through a tangential port to promote vortexing which concentrates any impurities. The Sampler should be installed at a convenient height and adjacent to a light source to facilitate sample examination in poor lighting conditions.

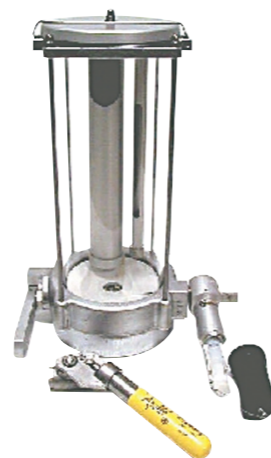
Operation: A fuel sample is taken by opening the inlet valve and filling the sampler. Visual examination can then be completed and the various checks carried out depending on the accessories fitted. When the checks are complete, the drain valve is opened and the sample released either to a dump tank or back to storage.

Features: Full visual examination; Elimination of spillage; Drain to dump/slop tank; Accessible for internal cleaning. Suits Density measurement; Suspended water checking; Temperature measurement.

ORDERING INFORMATION:

Part No	
ALJAC4	4 Litre. 3/8" Inlet, 1" Outlet connections.

20 Litre version also available



EPOXY-LINED SAMPLE SHIPPING CONTAINERS

These re-usable double-coated epoxy-lined containers have been tested in accordance with the approval procedure defined in ASTM Standard Practice D-4306. The container is made specifically for transporting samples of jet fuel for laboratory testing. The cap is epoxy coated and can be safety wire sealed while the new design reduces the amount of fuel and dirt particles trapped in the chine when pouring.

ORDERING INFORMATION

Part No:	
TL-2935B-1	1 gallon can.
TL-2935A-5	5 gallon can.
TL-2935-2A	Shipping box to suit 1 gallon can.
TL-2935-3	Shipping box to suit 5 gallon can.



AVIATION FUEL FILTRATION VESSELS

Filter Water Separators • Monitors • Microfilters • Clay Filters • Special Packages

Liquip build filter vessels in Victoria, Australia, under licence to Faudi. These vessels are built in either carbon steel or stainless steel to AS1210 and are supplied as a complete package of Vessel, Cartridges and ancillaries. Liquip's design team, using the most up to date technology, is able to design a system, tailor-made to your application.

Faudi products provide practical solutions to all filtration situations across a broad spectrum:- Refineries; Terminals; Airport Storage and JUHIs; Ship bunkering; Helicopter installations on oil rigs; Defence deployable equipment; Aircraft refuelling; ship to ship refuelling; Road and Rail Loading Gantries.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



ELEMENTS FOR AVIATION FUEL FILTRATION

Coalescer • Separator • Microfilter • Monitor

- Robust plastic end cap with O-ring seal
- High strength moulded plastic support tube
- Non woven support fabric
- Reinforced support mesh
- Fine filter paper
- Water absorbent media
- Water absorbent media
- Glass fibre matt
- Non woven support fabric
- Cotton sock

ELEMENT DESIGN FEATURES

Faudi Aviation is an International filtration specialist recognized and approved compliant to worldwide standards in both civilian and military specifications.

- API 1581 5th edition.
- API/IP 1583 4th edition.
- Cap 437.
- MIL-F-8901E.

Conversion and similarity data is available to update older vessels to the latest qualification. Liquip technical support is available to identify current equipment.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



21 & 22 SERIES FILTER HOUSINGS

The 21 and 22 Series filter housings can be used in a number of applications. Installed with one monitor cartridge, it can continually check the entire flow of fuel, not just mere samples, for water or solids contamination. By performing three jobs, this small, compact monitor assures clean, dry fuel. It absorbs free and emulsified water, removes ultra fine solids even when surfactants and fuel additives are present and shuts down the system flow when hit with a localized slug of water. Standard filter cartridges to remove solids only are also available.

STANDARD HOUSING DESIGN

The housing is designed for 150psi (1034kPa) maximum working pressure on jet fuel for 21 Series up to 36gpm (136 lpm), and 22 Series up to 48gpm (182 lpm). It is designed to flow from the outside to inside of the cartridge. The filter housing has an 1 1/2" NPT inlet and outlet connection.

Both the interior and exterior surfaces of the carbon steel body are epoxy coated to protect against corrosion. The easy to use stainless steel v-band closure securely holds the die cast aluminium head and Buna-N o-ring seal to the body. Vent and drain connections with brass petcocks provided. This sturdy, single cartridge housing is easy to maintain and requires only 2" (51 mm) base clearance for cartridge change out. The cartridge itself is made up of layered and pleated, multi media sections with inner support shells and an outer wrap.

OPTION

Built-in go /no-go gauge.

ORDERING INFORMATION:

Part No:	MAX. WORKING PRESSURE		REQD CARTRIDGES	NOMINAL LENGTH	OUTSIDE DIAMETER	MAX. MONITOR FLOW	
	psi	kPa				AVGAS	JET FUEL
21 Series	150	1034	1	406mm	165mm	136 lpm	136 lpm
22 Series	150	1034	1	508mm	165mm	182 lpm	227 lpm

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

LEVEL SWITCH – SINGLE POINT

This Series 651 unit accurately measures liquid levels such as hydrocarbons and viscous liquids using RF Admittance technology, proven in the oil, gas, petrochemical and process industries. When liquid (fuel) reaches the probe, the relay changes state. It is quick & easy to install without special tools and can be mounted vertically, horizontally or inclined.

TECHNICAL DATA

Ambient Temperature Limits:	-40 to 180°F
Output:	DPDT Relay
Contact Rating:	10 Amp 250 VAC
Response Time:	0.5 seconds
Enclosure:	Weathertight: NEMA 4, 4X, IP65
Explosionproof:	Class 1, Group C & D Class 2, Group E,F & G, Divs 1 & 2.
Weight	1.2kg

ORDERING INFORMATION:

Part No SOR651



U/W REFUELING NOZZLE, CARTER MODEL 64348

The lightweight, robust Carter 64348 Underwing nozzle operates with improved safety and tolerates more adapter wear. It includes a number of features that make the unit so popular including a true swivel disconnect to make connection to the aircraft much easier. It also provides better access to some aircraft that previously presented some difficulty. Self-adjusted pressure loaded nose seal. No mechanical adjustments are required nor any springs used. Leak free under extreme side loads, worn adapters and extreme temperatures. Nose seal can be replaced with minimum disassembly (optional). Improved positive mechanical interlock - nozzle can't be opened until connected to aircraft and can't be removed from aircraft in open position.

FEATURES

- Connects to 3-lug international standard aircraft adapter.
- Lead-in ramps in stainless steel for long life.
- Operating handle fully protected from damage.
- Low pressure drop.
- 35, 45 & 55 psi Hose End Regulators available
- Flow control handle of high strength zinc-aluminium.
- Replaceable bicycle-type handles and grips standard. Circular grip also available.
- Optional 40, 60 & 100-mesh screens retained with snap ring for ease of removal.
- 2", 2 1/2", 3" BSPP & NPT threaded quick disconnect inlets available.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



U/W REFUELLING NOZZLE, CARTER MODEL 64200

The 64200 features are common to the previous 64348 nozzle, such as it's lightweight and rugged modular construction, low pressure drop, 3-lug international standard aircraft connection and ease of swivelling. The 64200 has the following added features:

- A stainless steel wear ring in the swivel ball joint.
- Interlock mechanism internal to nozzle body – no pins to wear aircraft adapter slots.
- No collar or other moving parts on nozzle exterior with the exception of the operating lever.
- Fewer parts in nozzle will result in lower maintenance costs.
- Very rugged standard plastic installation handles do not include any metal to bend. This eliminates interference with some aircraft that are not designed to standards.
- Replaceable knob on operating handle to eliminate razor sharp wear patterns.
- Options include "U" bracket for nozzle stowage and one piece stirrup handle with stowage capability - no need to use the aircraft adapter or special type of stowage device.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



HOSE END CONTROL VALVES (HECV)

CARTER Models: 60129-1, 44646 & 47013

For line mounted applications, these lightweight Hose End Control Valves provide pressure limitation at the outlet to protect the aircraft while refuelling. 3 different pressure settings are available to tailor the control system to your requirements. Mechanical block out device, 61656, for system test and defueling now available - no connection to fuel pressure required. With the Carter HECV's fail-safe design, no other unit has been so widely utilised.

FEATURES

- Low pressure drop.
- Direct spring acting.
- 3 pressure settings – 35, 45 & 55psi available.
- Outlet fittings available to offer alternative installations away from nozzles.
- Mates directly to any Carter or Thiem nozzle.
- Seal kits available ex stock.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

HYDRANT COUPLER, 4". CARTER MODEL 64900

API1584 COMPLIANT

The 64900 is a new coupler designed to supersede the 60700-1. It is used for air reference pressure control systems. Three other versions, 64901, 64902 for digital pressure control systems and the 64903, which are electro-hydraulically controlled are also available. Many new features have been incorporated into the design of the 64800. Most of these features (changes) have been at the request of long time users of the 60700-1 Coupler, the standard of the industry for over 25 years.

The 64900 is a direct spring loaded pressure control unit that is controlled by the air reference pressure provided from the vehicle system. It is nearly identical in design to the 60700-1 with changes to improve operational handling and downsizing of the elbow to keep the weight the same. The slight increase in pressure drop, 3 psi at 600 US gpm, caused by this is insignificant. A sealed screw outside of the air hose fitting provides closing time adjustment. A sealed screw is also used to bleed the unit of air.

The 3rd edition of API/IP 1584 specifies testing and strength requirements for 4 inch hydrant valves and couplers. The new edition specifies that the coupler should breakaway if the coupler is pulled or hit in any direction at the centerline of the hose outlet at a force equal to 4000 lbs. The hydrant valve itself is required to withstand, without damage, a load of 8,000 lbs applied via a test fixture at the approximate centerline of the hose outlet of the coupler. This test including instantaneous shut off of the hydrant valve raises the working pressure to 2000 psi. The Carter unit completed and passed these test requirements in 2003.

FEATURES

- Air/fuel sense ports parallel to outlet.
- All ports with straight o-ring sealed threads.
- 2 1/2" – 4" NPT or BSPP outlet threads available.
- Closing time adjustment accessible without removal of air port fitting.
- Studs used for connecting lower half, reducing chance of over-tightening connecting fasteners.
- Existing 60700-1 Couplers can be retrofitted to gain most new features by changing only the elbow.
- Thumb latches on QD - easier to remove from hose with no tools.
- Optional carrying handles available.
- Port to connect to hydrant provided on coupler. No special hose assembly.
- Parts common to 3" in-line valves and 60700-1 used for less costly maintenance.
- Changes have been made without an increase in weight. Weight – 12.29kg
- 24 psi Pressure drop across mating 60554Hydrant Valve & 64900 Coupler @ 1000gpm.
- Suitable for 200 psig operating pressures and system proof pressure up to 450 psig.



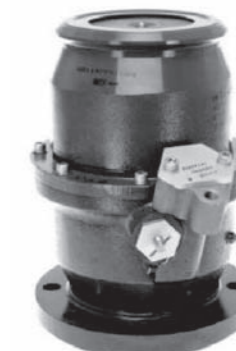
4X4 HYDRANT PIT VALVES - CARTER MODEL 60554

The Carter Model 60554 Hydrant Pit Valve is a family of valves that includes lanyard, air or dual air/lanyard operated pilot valves, with the latter available with a defueling option. The hydrant pit valve consists of three basic parts, lower valve assembly, upper valve assembly (or API outlet adapter) and the pilot valve. The lower valve assembly contains an isolation valve which will allow the removal and servicing of the upper valve assembly and the pilot valve assembly while the pit valve is under pressure.

The Model 60554 hydrant pit valve is API1584 3rd edition compliant and is designed to minimize the propagation of surge pressure shocks into the upstream piping system during closure of the valve.

FEATURES

- Two-piece upper half standard, replaceable API outlet adapter of stainless steel per API Bulletin 1584. Ductile iron and all stainless uppers optional.
- Standard inlet flange mates with 4-inch 150 lb. ANSI flange.
- Optional inlet flange mates with 6-inch, 300 lb. ANSI flange making valve conform to the IP Standard.
- Closing time is 2-5 seconds.
- Opening time is 5 to 10 seconds.
- Servicing valve standard to provide means to remove the upper valve assembly and pilot valve assembly with the unit under pressure.
- 10 or 20-mesh screen options available.
- All seals are field replaceable.
- Large pressure equalizing valve in the outlet is standard.
- Working pressure – 300psi
- Stone guard optional with 6-inch inlet flange option.
- Ductile iron epoxy coated for corrosion protection
- Main piston well guided to minimise piston seal wear.



DIGITAL PRESSURE CONTROL SYSTEMS

The Carter Digital Pressure Control System marries hydro-mechanical and micro-processor technology, eliminating the need for air reference pressure and the dependence upon springs to control pressure. There can be no fuel-to-air leakage prevalent in current technology systems.

Additional features are provided as standard on the Carter system, including maximum rate of flow control and timed dead-man. Adjustments for maximum rate of flow control, opening and closing times are accomplished on the main control panel with no adjustments to the valves or servo-controls. No Venturi(s) is needed, therefore, there is no confusing adjustments and the system pressure loss is lower, increasing the flow rate. Full pressure compensation is presented with up to eight different combinations of nozzles, no compromising as when venturis are used. Vehicle set up for all functions is simpler, the hook up time to the test rig takes more time than the actual calibration. When used for both the primary and secondary control systems (in-line and by-pass valves) both can be set-up at the same control pressure.

FEATURES

- No Venturi(s) needed - no complicated adjustments, greater flow rate.
- No air reference pressure required.
- No fuel to air leakage.
- Maximum rate of flow control standard - no additional servo or pilots needed.
- Rate of flow, opening & closing times adjustable on main control panel.
- Full pressure compensation for 8 nozzle combinations.
- Primary & secondary set at same pressure level.
- Displays on control panel to show flow rate & pressure.
- Remote displays available.
- Vehicle setup simpler.
- Control Panel contained in NEMA 4 enclosure. Can be mounted in weather location.
- Enclosures with capability for installing ancillary switches/lights available.
- Two pressure selections standard.
- Displays readout in either English or Metric units (two different) standard.





- Key lockout for setup standard - only authorized personnel can change settings.
- Adjustable timed deadman standard. (Can be turned off if not desired).
- Low current drain - operates off standard truck battery system. Small solar panel can be used to maintain charge.
- Convenient size control panel, 8 x 10 x 6" for the standard single system unit.
- Error messages assist in determining faults.
- Replaceable PC boards. Master control board and display board. Easy maintenance.
- Can be used with In-line or By-pass Carter Valves (64050, 64110 and 64060 and 64120) or Carter 64702 - 4" Hydrant Coupler.

● PRESSURE CONTROL VALVES (PCV)

Air Reference Pressure Control Valves are available in both 3 & 4" line size as both in-line type pressure control / deadman and By-pass pressure control valves.

The range includes the In-line 3" (64080), 4" (64124), the By-pass: 3" (64082) and 4" Bypass (64002). Options are available on each to tailor the valve to meet the system requirements. ANSI flanges are standard.

Accessories normally used in pressure control systems, including a Maximum Rate of Flow Control Pilot which can only be used with the 64080, 64110A2 or 64124 units are now available.

These valves are direct acting type valves, hence there are no complicated servos to adjust or maintain. There are also separate air-to-fuel interface seals that are vented to the atmosphere eliminating the typical fuel to air leakage of competing pilot operated valves. Due to the efficient flow path design, they offer less "wide-open" pressure drop, hence up to 16% greater flow rate than the competing Whittaker units allowing for the refuelling of aircraft in a shorter time.



	3" 64080, 64082	4" 64002, 64124	64067 Rate of Flow Pilot
Rated Flow	600gpm	1,200gpm	Adjustable
Pressure Drop (wide open)	600gpm, 4.9psi	1,200gpm, 6.2psi	Adjustable
Opening Time (90% of rated flow fixed*)	5 - 10 seconds	5 - 10 seconds	Adjustable
Bias (Air Reference Pressure)	In-line - 20-25psi	In-line - 20-25psi	Adjustable
Closing Time adjustable	2 - 5 seconds	2 - 5 seconds	Adjustable
Overshoot at rated flow	30 gallons (max)	60 gallons (max)	Adjustable

* Applies to 64080 and 64124 only

● BOTTOM LOADING ADAPTERS, 2.5"

CARTER Models 61528, 64040, 61409, 61272, 6958

Carter provides the 2 1/2 inch aircraft standard bayonet refuelling adapter, to mate underwing nozzles or hydrant couplers, with several choices of flanged or threaded inlet. It is also available as a stand alone module without a housing. These adapters are designed to be used for either bottom loading of a refueler, for connection to a hydrant system or tank farm pumping system on refuelers.

Carter offers a choice of either outlet flanges or TTMA flanges for the three and four inch styles. The 2.5" outlet styles are available only in threaded connections, either NPT or BSPP. The ANSI type flanged units are most suited for hydrant applications while the TTMA units are suited for bottom loading or recirculation systems. The 2.5" units are (by choosing the correct unit) usable in either application.

FEATURES

- Product Selection units available.
- Plastic or military metal sealing caps available.
- Convenient bosses to mount pressure gauges or sampling ports standard.
- Pressure equalisation valve offered in poppet for hydrant applications.

ORDERING INFORMATION:

Part No:	
6958	2 1/2" Outlet x 2.5" Bayonet (Bottom Loading or Recirculation only), Weight 1.33 kg
64040	3" 150 lb. ANSI Flat Faced Flange x 2.5" Bayonet (Bottom Loading only), Weight 2.04 kg
61409	4" 150 lb. ANSI Flat Faced Flange x 2.5" Bayonet (Bottom Loading only), Weight 3.3 kg
61272	4" TTMA Flange x 2.5" Bayonet (Bottom Loading only), Weight 1.8kg
61528	3" TTMA Flange x 2.5" Bayonet (Bottom Loading only), Weight 1.7kg



DIFFERENTIAL PRESSURE GAUGE

Direct-reading Differential Pressure Indicator, now with optional integral Test and Thermal Relief valve

- Accurate to within 1/2 psi Differential at Pressures up to 300 psi.
- No subtraction calculation required.
- Built-in Gauge Protection Filter.
- Built-in Thermal Relief Valve – Protects against pressure build up from sun heat.
- Positive or Negative Pressure Surges will not affect calibration.
- Multiple calibrations: Front face: psi and kPa, Back face: BAR and kg/cm
- Temperature range: -35 degrees C to 71 degrees C
- Rugged construction, suitable for vehicle or stationary use.
- Max. operating pressure: 300psi. Every cylinder tested to 1200psi.

ORDERING INFORMATION:

Part No:	
8735	calibrated 0 – 15 psi Aluminium housing /Viton
8736	calibrated 0 – 30 psi Aluminium housing /Viton
GTP-534PB30A	calibrated 0 – 30 psi Aluminium housing /Viton c/w push button test and relief valve



DRY BREAK QUICK DISCONNECT, GAMMON

Fast change from Overwing to Underwing nozzle with no spill

The ball-lock mechanism is the simplest, most reliable type in use, providing positive connection under constant or surge flow – even excessive shock. Ball bearing sleeve lock permits 360 degrees swivel action, preventing build-up of hose torque. Hardened stainless steel balls give extra long service; there are more of them and they are larger to spread the load. Ball race is stainless steel insert ring for longer life. Molded U-Packer seal provides contact over several times the normal o-ring sealing area. Its design embodies a self energizing feature that gives a positive seal at all pressures. This seal is capable of sealing under side loads.

Tight seal disconnected: The poppet has a metal-to-metal stop to control compression on the valve O-ring seal. Seal is recessed and wedged in coupler body to keep it in place. The stop also prevents poppet blow out.

Low pressure drop: 1 1/2" size: 2.6psi @ 50gpm

ORDERING INFORMATION:

Part No	
8732	Coupler 1 1/2" BSP, Buna seal
8733	Actuator 1 1/2" BSP, Buna seal
8734	Dust Cap to suit Actuator
*	*Other sizes to Special Order



PLATFORM WAND ASSEMBLY

Liquip's platform wand assembly is designed to prevent a hydrant dispenser's scissor-lift platform from colliding with an aircraft wing. The wand is mounted on top of the platform frame / handrail and if the wand is pushed down by contact with an aircraft wing, an activation plate trips a proximity switch which in turn halts any platform movement by shutting down the hydraulic system that elevates the platform. This simple concept also allows the wand to be operated by hand as an emergency stop for personnel on the platform.

The wand stem is made from galvanised mild steel and the ball on the end of the wand is plastic to prevent wing damage on contact.

ORDERING INFORMATION

Part No:	
9000-17-01	Platform Wand
8568	Proximity switch



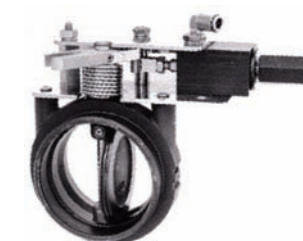
ENGINE STRANGLER

On it's own, the mechanical engine strangler is an emergency engine shutdown device. It typically is either pneumatically or manually actuated to starve and therefore stop the engine by shutting off (strangling) the air intake in cases of "engine runaway" or "dieseling". *The mechanical engine strangler can also be configured for actuation by the roll-over sensor (via a solenoid valve). This provides a complete system of emergency engine control, protection and electrical isolation for maximum vehicle safety. The unit is completely re-usable so once installed it never needs replacement.

- Minimum operating pressure – 400 kPa
- Maximum operating pressure – 900 kPa
- Air fittings - 1/8" BSP

ORDERING INFORMATION

Part No:	
MES3	75mm dia.
MES5	125mm dia.



SR100 STATIC EARTHING REEL

Electrostatic charges can be generated by a variety of circumstances including product flow and vehicle or aircraft movement. Ignition of flammable vapours is possible by discharge of static at a gap, e.g. as a hose or nozzle is connected or parted. The SR100 provides a ready means of bonding two components with a maximum assurance of continuity. Primary continuity is by a carbon brush bearing on the stainless steel shaft. Secondary paths are through the solid aluminium body to the shaft and also by spring-loaded stainless steel washers to the end face. Dust seals (o-rings) protect the assembly internals and graphite grease ensures easy rotation without electrical resistance and long component life. Various wire colours and clamp configurations available.

NOTE: Check continuity regularly according to your company standards. *See LCT100 Continuity Tester.

ORDERING INFORMATION:

Part No:	
SR100	Static Reel with 30 metres of standard cable and clamp.



SR200 STATIC REEL, LARGE DIAMETER

The new SR200 manual rewind static reel has a large diameter drum and comes complete with cable guide. It is designed to electrically bond two pieces of equipment to ensure the safe dissipation of static electricity charges, typically when fuelling aircraft or pumping between a tanker and storage tank. The large diameter drum means quicker rewinding and as the handle is free-spinning, it is comfortable to use. Manual Rewind is preferred as spring-rewind types have caused accidents when inadvertently released. For reliable operation, a graphite brush bearing on a stainless steel shaft is used, eliminating reliance only on body contact, as corrosion can create an insulating barrier.

NOTE: Check continuity regularly according to your company standards. *See LCT100 Continuity Tester.

TECHNICAL DATA:

- Maximum end-to-end resistance: 2 ohms.
- Carbon brush runs in sealed section, eliminating dirt and corrosion. Shaft has grease reservoir for all-of-life lubrication.
- Weight: 2.4kg
- Construction: Aluminium Body, stainless steel shaft, Cable Guide is zinc plated steel and Brush is carbon

ORDERING INFORMATION:

Part No:
SR200 Large diameter static reel body only (wire & clamp not included)



STATIC CABLE & CLAMPS

Liquip have a large range of static reel accessories available:

ORDERING INFORMATION:

- Part No:
- EKG1200: Static cable & aircraft clamp / clip - solid heavy duty brass clamp, complete with 1.2 metres of cable.
- KK100: Static clamp - heavy duty solid brass clamp
- 9170: Static clamp - standard plated steel with teeth jaws.
- SR100-5: Static clamp - standard plated steel clamp
- SR101-5: Static clamp - large heavy duty brass clamp
- GTP-1101: Static clamp - aluminium alloy clip to MIL-C-83413/7, jaw gap 2mm fully closed.
- SR100-9V: Static cable - galvanised wire 6x7 strand, blue PVC- coated. (300 metre roll or cut lengths)
- 9457: Static cable - stainless steel wire, reflective orange PVC-coated (300 metre roll or cut lengths)
- GTP-1097S-1: Aircraft grounding pin - Stainless Steel
- GTP-1097B: Aircraft grounding pin - Brass



STATIC REEL INTERLOCK

Interlocks for static reels are available to suit various units.

ORDERING INFORMATION:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.

IN-CAB FIRE EXTINGUISHER

There are required in all cabs by Commonwealth Regulation. The 1 kg fire extinguisher comes complete with quick-release bracket ready to mount in cab (10B rating).

ORDERING INFORMATION

Part No: 2708



FIRE EXTINGUISHER HOLDER

These new lightweight fire extinguisher holders are a strong, durable design. The flat back ensures easy installation and they can be mounted on either truck or trailer. An internal tension strap helps secure the extinguisher and minimise any movement inside the holder. Will accept Extinguishers 600mm in height
External Height: 750mm,
External Width: 300 mm.

ORDERING INFORMATION

Part No: JBWR70



INPUT HOSE REFLECTIVE COVERS & FLAGS

BE SEEN – BE SAFE! Liquip’s Input Hose Covers help prevent incidents occurring around dispenser inlet hoses, particularly during night refuelling. The “Flame Orange” reflective material with two yellow stripes ensure increased visibility. Installation and removal is easy as the covers are fastened using Velcro®.

- Flame Orange FLAGS are also available.



TRUCK & IN-CAB SAFETY EQUIPMENT

*EQUIPMENT REQUIRED WHEN CARRYING DANGEROUS GOODS

EYE WASH & BRACKET

ORDERING INFORMATION

- Part No:
- 0371 Bottle with the built in eye cup for efficient washing.
- EW5 Lightweight steel, ready to bolt or rivet inside cab.



EMERGENCY PROCEDURE GUIDES

Required in all cabs by Commonwealth regulation

ORDERING INFORMATION

- Part No:
- 2896 Holder, clear plastic ready to rivet to door.
- 2966 Card, Guide for “FIRE”
- 2967 Card, “PETROL AS CARGO”.



SPILL MANAGEMENT PRODUCTS

Contain any spill by having everything you need for fast, efficient response on-hand. In areas where spills are likely to occur, the Liquip range of Spill Kits takes the guesswork out of clean-up.

* REFILLS ARE AVAILABLE FOR ALL KITS

CUSTOM KITS

Liquip have spill kits for a wide variety of applications. If you have a special requirement, Liquip can design a kit to fit your needs and budget.

- “SELECT” absorbs oil / petroleum products while repelling water.

ALSO AVAILABLE:-

- Large Drum kits, Booms (various sizes), Folded Rolls, Absorbent Mats

ZIPPERED TRUCK KITS (15" X 18" X 6")

CONTENTS	SELECT
Socks	(3) 3" x 48"
Sheets	(30) 17" x 19"
Absorbs	28.4 litres



DUFFEL KITS (29" X 13" X 12")

CONTENTS	SELECT
Socks	(3) 3" x 96"
Dbl. Wt. Sheets	(30) 17" x 19"
Pillows	(3) 15" x 25"
Dispos. gloves	2 pair
Dispos. bags	4
Absorbs	64.35 litres

SMALL DRUM KITS (75 LITRE AND 113 LITRE)

CONTENTS	SELECT	
	75 litre	113 litre
Socks	(6) 3" x 48" (2) 3" x 96"	(6) 3" x 48" (3) 3" x 96"
Dbl. Wt. Sheets	(25) 17" x 19"	(30) 17" x 19"
Pillows		(2) 15" x 25"
Disposable gloves	2 pair	2 pair
Disposable bags	4	5
Pads	(2) 8" x 18"	(2) 8" x 18"
Spill guide	1	1
Absorbs - litres	68.14	106

SPILL CONTAINERS

These fully sealed Spill Containers are lightweight, strong and resistant to most chemicals.

Spill Containers feature:

- Quick release lid
- Meshed floor
- Drain point ball valve
- PVC construction

ORDERING INFORMATION

Part No: 8423



PLATFORM LADDERS

The Hills / Bailey range of aluminium platform ladders conform to Australian and New Zealand Standard 1892 and have an industrial load rate of 140kg. *Available with "Treadsafe" platform and optional safety-advice decal.

ORDERING INFORMATION

Part No:	
T/PP93611	0.85m 2 step + platform
8566	1.2m 3 step + platform
8567	1.8m 5 step + platform



STAINLESS STEEL BUCKETS

Stainless steel buckets complete with carry handle, pourer, static lead and clamp.

ORDERING INFORMATION

Part No: T/PP95483



DECALS & SIGNAGE

Liquip carry an extensive range of fuel handling decals and labels. All decals are printed on top quality decal stock for long life in all conditions.

- Engraved operational signage is laser cut.

AVGAS & JET A-1

Pipeline markers are available in 57mm & 100mm.

Other variations are also available to suit Oil Company requirements.

CLASS SIGNS

Type 1 to 9. Available in metal or adhesive vinyl.

ORDERING INFORMATION

Part No:	
2270	Class 3 sign
2272	Holders for class signs in pressed steel (zinc plated).



REAR VEHICLE MARKING PLATES

Mandatory for vehicles over 7.5 metres long or over 15 tonne G.V.M.

ORDERING INFORMATION

Part No: 3106 for L.H.S. 3103 for R.H.S.



HAZCHEM SIGNS

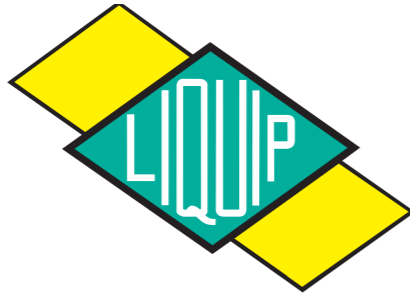
Available in adhesive vinyl, aluminium or Marvi-plate. Product titles and specialist advice can be printed to suit your needs.

HAZCHEM HOLDERS

ORDERING INFORMATION

Part No: 2451 Holder for Haz-Chem signs, pressed steel complete with locking clips. Talk to Liquip about all your signage and decal requirement.





LIQUIP INTERNATIONAL ... THE SPECIALISTS IN AVIATION FUELLING



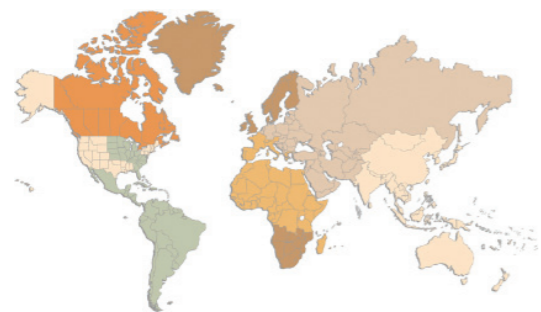
Liquip's involvement in the highly specialised field of aviation fuelling technology now covers more than thirty years. In that time the company has earned an enviable reputation not only in Australia but also internationally. Liquip's world-wide recognition has been achieved as a result of its long involvement in the industry, encompassing innovative design, development and production of aviation refuelling vehicles and pumping modules together with the manufacture and supply of components.

Liquip takes great pride in being able to use its knowledge and expertise in the aviation fuelling field to provide customers with the total solution for all applications from system design through to customer training.

Our Engineering Department is also actively involved with customers, not only answering all technical enquiries but working with customers ensuring Liquip products and technology keep our customers at the forefront of the industry. Our continuing success is built upon developing partnerships with our customers and distribution network

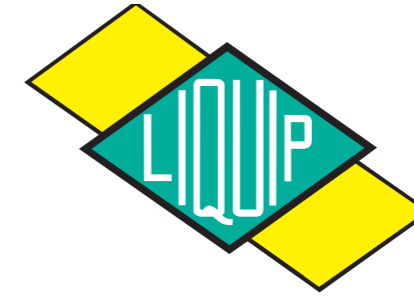
Today we have developed to the point of providing perhaps the world's most comprehensive and efficient product range for down-stream distribution of aviation products.

Liquip's mission is to always deliver value and performance without compromise on safety or quality.



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Liquip International Pty Limited is a world recognised manufacturer and supplier of components and systems for petrochemical industries.

Complete information is available in the following catalogues:

- Road Tanker Equipment
- Liquip corporate profile
- Terminal and Depot Equipment
- Overfill Protection
- Diptronic Radar Measuring Systems
- Electronic Fluid Monitoring

Individual brochures, data sheets or product catalogues are available for most Liquip products and many other brands.

Some, such as Faudi Filtration catalogues are available on CD or mini-disk