



Type 1 Appliance

Appliance training

Numbers 118 - 195



Status of this document

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Overview

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Overview

This reference guide covers the operation of the Type 1 Appliance, and is intended for:

- all crew
- officers
- drivers
- pump operators

It outlines the features and layout of this appliance and with additional training, will prepare all Fire and Emergency New Zealand (FENZ) personnel to operate this appliance.

Your appliance arrives with copies of the manuals from the builders and the equipment suppliers.

FENZ responsibilities

It is FENZ's responsibility to:

- use competent operators
- follow the operating instructions
- inspect the appliance regularly
- repair and maintain it properly
- service and test it regularly
- keep the documentation and records up to date.

FENZ personnel responsibilities

FENZ personnel must ensure:

- the appliance is operated by competent operators
- the appliance is used in accordance with the operating instructions
- appropriate documentation and records are maintained
- the appliance is inspected regularly, and repaired and maintained by dedicated suppliers
- servicing and regular testing is carried out.

Note

We advise you to read all relevant sections of this guide, as it applies to all personnel.

Note

This guide does not fulfil the training requirements of Emergency Response Driver (ERD), pump operators, firefighters and officers.

Additional reference guides

Each appliance is issued with the following guides.

Fraser fire and rescue

This guide includes the manufacturer's information regarding operator use and servicing details for the major components of the appliance.

Iveco

Iveco provides information specific to the factory cab, chassis and driveline components of the appliance.

Darley

Darley provides the pump for this appliance and the reference guide covers maintenance and performance. The pump is installed in New Zealand and connected to pipework and other equipment suited to FENZ specifications.



Identifying the appliance

To access the correct training material for all recent FENZ appliances, a manufacturer's label on the inside of the driver's door, shows the serial number.

The serial number is the best way to identify your appliance, as designs change when the cab and chassis manufacturer or other suppliers change their equipment.



To ride the appliance, you need to:

- familiarise yourself with the appliance on-station using this guide
- undertake practical training.

Regional fleet and training staff will work with your brigade to identify what practical training is required.

Operational differences

The difference between this appliance and other Type 1 appliances is:

- the pump control system
- the Foam Pro unit
- the make and model of this appliance may differ from your current appliance.

Features and performance

Engine

This appliance has a Cummins Tector 6 cylinder, 5.9l, turbo charged diesel engine producing 164kW (220 BHp).

Transmission

The Type 1 has an Allison 5 speed automatic transmission.

The interlock between the Power Take Off (PTO) and transmission prevents the appliance being driven while the PTO is engaged. If 'Drive' is selected while the pump is engaged, 'D' and the broken gear symbols will appear on the dashboard indicator.

Emissions

This appliance meets the Euro 5 emissions control standard. The engine management programme has been altered to produce the best performance for emergency response driving.

AdBlue - nitrous oxide reduction

Part of exhaust emissions control is the use of an additive to reduce Nitrous Oxide (NOx) production. The additive is called Ad Blue: it is a solution of urea and water and is injected into the exhaust system.

AdBlue is carried in a separate tank mounted on the offside behind and below the cab. A small AdBlue tank lasts a long time because it is used at only a few percent of the rate diesel is used.

The AdBlue system is automatic and only requires the tank to be topped up. The tank level is checked using the maintenance screens in the cab display - this is covered in the Driver's checks section.



Appliance size

Length	7.m
Weight	Gross weight: 12,000kg
Height	3m
Width	2.24m
Fuel tank capacity	120ltr
AdBlue tank capacity	25ltr



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All crew

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Locker layout

Off-side locker layout

Off-side stowage includes

- the multi-purpose ladder,
- coiled hose
- charging point for equipment with electric start engines.

The long-tools tray and flaked delivery hose trays are accessible from this side as well.

The off-side rear locker should be used to separate contaminated equipment from clean equipment.

- forestry packs,
- waterway equipment,
- salvage sheets
- petrol-powered equipment
- any other equipment that requires cleaning

The rear lockers on both sides are available for station needs usage, but you need to be aware of safe loading requirements.

The hose ramps are stowed one on each side of the appliance in brackets under the bodywork and behind the rear wheels.



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Near-side locker layout

The locker layout is designed to accommodate fixed stowage and additional equipment.

The centre and rear lockers on both sides are separated and vented so that fuel vapour, water, dirt and other contaminants cannot spread between them.

Fixed stowage

BA sets in brackets

Fire extinguisher stowage in tubes for two 4.5 kg dry powder and one 3.5 kg CO₂

The transverse lockers include the:

- long tools tray
- flaked delivery hose trays

The centre locker is referred to as the clean locker.

It is used for BA sets, the co-response kit and AED. Ideally equipment that stays relatively clean or is disposable is stowed in this locker.

The locker next to the pump panel is specifically for the driver's structural firefighting uniform.

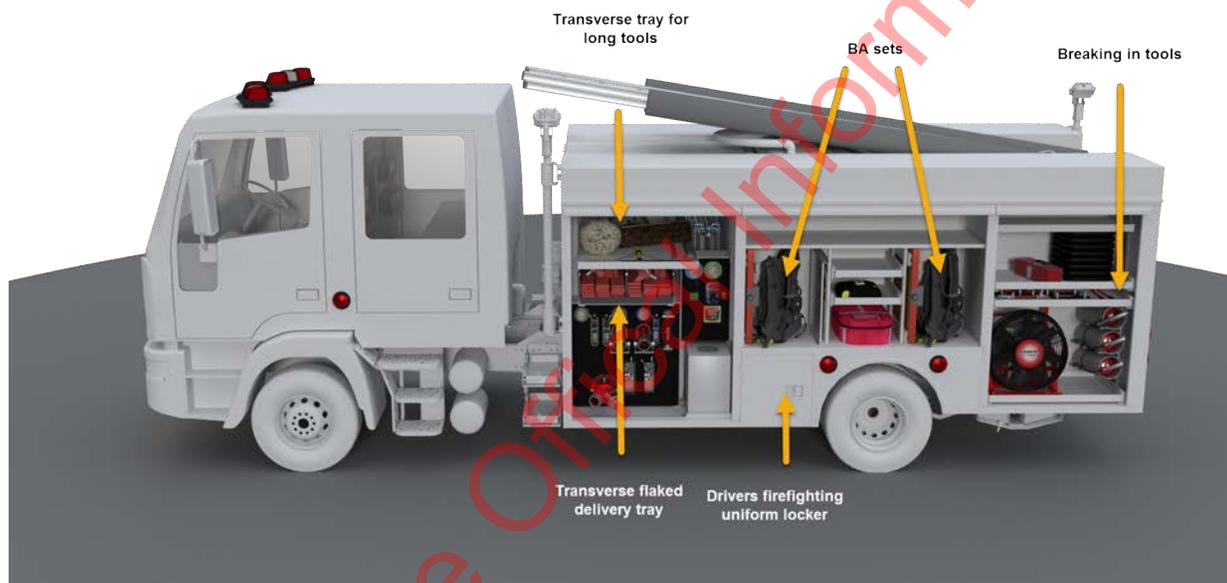
Safe loading of appliances

In addition to the fixed stowage, personnel need to consider the legal weight requirements of loading additional equipment onto the appliance.

Video

To find out more on safe loading of appliances, log on to Learning Station and watch the video:

Safe loading and driver checks.



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Breathing apparatus (BA)

The diagram below shows where the BA sets are stowed on the appliance.

To access the BA sets pull the front sets directly from the brackets. The back sets are accessed by pressing the button to unlock the slider board and pulling this out.



Additional BA cylinder stowage

Behind the rear wheels there are small lockers with brackets suitable for two BA cylinders. To provide restraint for pressurised cylinders, the straps must be looped over the valve.



Lockers

The tray latch bar will open each of the lockers. When fully extended, each locker will lock into place.



Shelf adjustment

Most of the locker shelves are mounted on vertical channels and are adjustable for height. The clamps that are used for this are shown in the image below.



Hoses

Hose reel

A 60 metre length of hose reel is mounted in the rear locker. To guide the hose from the locker, the fence must be lifted and locked into place.

The hose reel is fitted with a friction brake which is adjusted using the yellow lever on the right hand side of the hose reel drum. This can be adjusted to create drag to allow more control when rewinding the hose back onto the reel.

Dropping the fence back into its stowed position pushes the friction brake lever down to lock it, which prevents the hose from unwinding while driving.

To rewind the hose reel you usually use the powered system. The rewinding system includes an electric brake that quickly stops the drum turning when the rewind switch is released. There is also a crank handle to manually wind the drum if the motor fails.

The circuit breaker for the electric brake is in the rear locker. The rewind motor circuit breaker is on the pump panel.

Hose reel nozzle

Your hose reel is fitted with a 500 kPa TFT G-Force nozzle. The red markings on the nozzle indicate it is optimised for 500 kPa.

The nozzle has four selectable flow rates from 60 to 230l/min.

After use, flush the nozzles by rotating the pattern ring. This fully opens the nozzle and allows debris to pass through. If the debris is too large to be cleared in this way, the branch must be removed from the hose and the strainer cleaned out.

Feeder hose

The flaked hose trays hold four lengths of 70mm hose. The rear lockers have been designed for dual purpose stowage. When flaked into these trays a 70mm hose can be used as a feeder or a delivery, as required.

By flaking the hose from front to back in the tray, either coupling can be grabbed and attached to the standpipe or towards the fire as appropriate.

Note

The hose must be full of water before it is wound onto the drum.

This helps the hose to keep its correct shape and prevents distortion and damage to the drum.

Multimedia

If you want to know more about the G-Force nozzle

Log on to Learning Station and watch the video:

- **G-Force 1 inch hose reel nozzle**

Flaked delivery hose

The transverse tray is located above the pump panel and runs across the appliance through the front lockers. This allows access to the flaked delivery hose from both sides of the appliance.

Stowing the flaked hose trays

Suggested stowage for these trays is to flake three lengths of 70 mm hose from bottom to top, rather than side to side. A length of 45 mm hose and nozzle, is placed on top and is used as the working length.

Place the nozzle in one tray on the off side and the other on the near side, to enable delivery from each side.

The flaked lengths of hose can be draped over your shoulder for carrying. The next crew member can run out the rest of the 70mm hose.

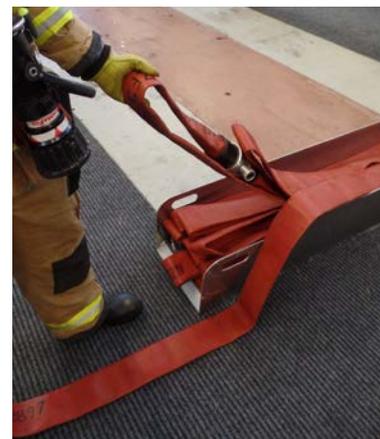
Transverse flake tray stowage

Flake the three lengths of 70mm hose from bottom to top, leaving a longer loop at the first two folds after each coupling. The longer loops should stick out past the rest of the hose to make them easy to see and grasp.

Loops of hose placed in the ends of the first and second lengths of 70 mm hose - so that they are easy to find.



Grabbing the top-most long loop to find the coupling between the first and second lengths.



First layer of flake in the tray, continue this pattern for the rest of the 70mm hose.



All three lengths of 70mm flaked in the tray with the last coupling ready to be connected to a working length.



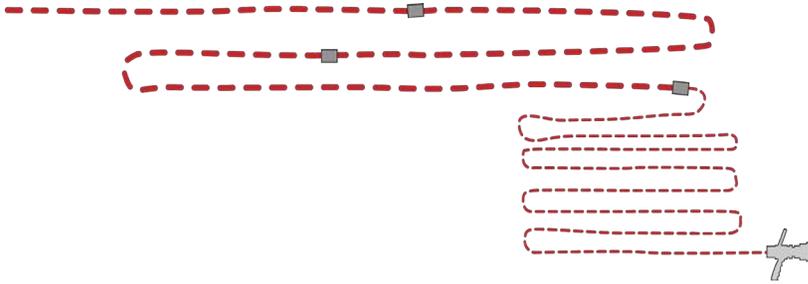
A complete transverse flaked hose tray with three lengths of 70mm and one 45mm.



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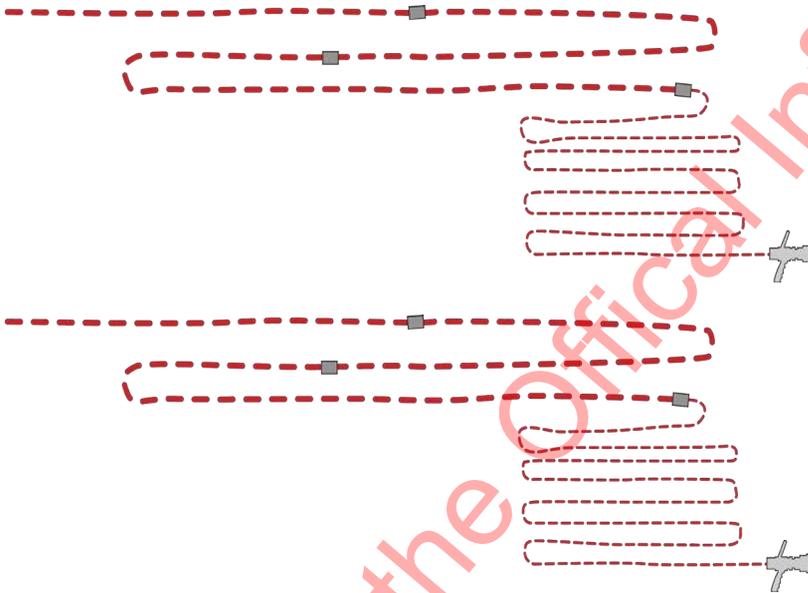
Delivery options

Single delivery from either side



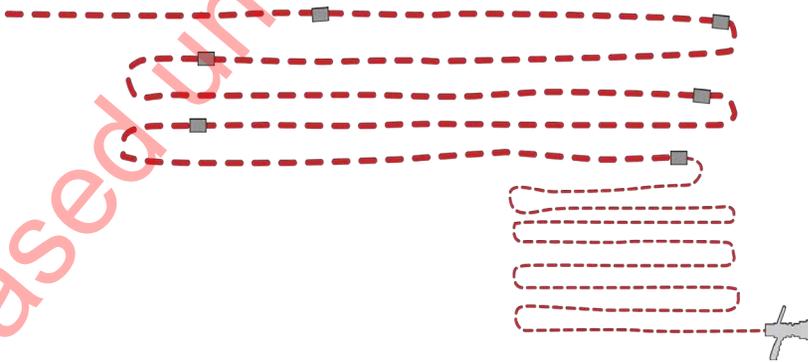
A single delivery from one transverse flake tray: three lengths of 70 mm hose and a working length of one 45 mm hose.

Two deliveries, from either side or opposite sides



Two deliveries, each from one transverse flake tray: each with three lengths of 70 mm hose and a working length of one length of 45 mm hose.

A single delivery, of twice the length, from either side



A single delivery of six lengths using the 70 mm hose from both transverse flake trays: six lengths of 70 mm hose and a working length of one length of 45 mm hose.

Using a bandolier

Drape the flaked 45mm hose over your shoulder and carry it to the fire attack position. You may also leave the bandolier connected to the 70mm hose and deploy this as well.



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Storz couplings

Storz couplings are symmetric and aren't divided into male or female connections. This allows you to attach either end of a hose to any others. These are a quarter turn fitting to tighten or loosen, which cannot be over-tightened.

Use the fold-out handles on the suction hose couplings to tighten and loosen the couplings. The locking tab engages when the couplings are properly connected and tightened. To break the couplings press the locking tab before twisting each half.

Suction hose joined with Storz couplings.



Storz to round thread adapters



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Storz spanners

Spanners are supplied with the appliance to assist in the removal and replacement of the collector head that is attached to the pump with a Storz coupling.



Checking Storz couplings

To ensure the Storz couplings are working properly check that:

- the seals are in place, undamaged and don't have any debris stuck in them
- the fold-out handles and the locking tab move freely.

Multi function ladder

A multi function ladder is stored in the off side transverse locker.



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Rescue ladder

The Type 1 appliance is supplied with a Topdog 7.5m rescue ladder that sits on the top of the appliance.

The panel above the rear locker and the locking tab on the right-hand side of the ladder gantry retain the ladder, as shown in the images below.



Multimedia

If you want to know more about the rescue ladder, log on to Learning Station, refer to quick reference and watch the video:

- **Topdog rescue ladder**



Cab layout

When travelling in the appliance you should only carry your uniform with you. All heavy equipment needs to be secured so that it does not either interfere with driving or cause injury in an accident.

Helmets

Either wear your helmet or use the clips on the frames behind the driver's and officers' seats.

Rear cab bin

The bin between the driver and officer front seats is for stowing lightweight, bulkier equipment.

Front seats bin

The bin between the front seats is intended for maps, risk plans and other items that can be accessed by the officer.

Small and light items

The pockets hanging over the rear of the front seats are for storing jerkins, ear defenders, maps and similar items.

IGC radios

IGC radios must be stored in the pouches or their chargers so that they are secure in the event of an accident.

Rear seat storage

There is room under the rear seat for equipment. This is a suitable for items that need to stay dry and clean.

Electrical equipment is installed under the rear seat as well, protected by a guard. Ensure you don't crowd the electrical equipment as this may restrict airflow required for cooling.

Headlights and locker lights

The locker lights come on automatically when the lockers are opened as long as the park lights are on. The pump panel lights always come on when the locker is opened.

White and red interior lights

In addition to the standard rear cab interior lights mounted above the passenger doors, there are light strips in the roof. These light strips provide both white and red light. The red light option is less distracting to the driver and won't affect night vision as much as white light.

White and red strip lights are located in the rear cab and above the officers' seat for use as a map-reading light. These give both white and red light.



Spotlight

This is a 12v light. This socket is labelled as 12v.



Back seat storage

In the back of the cab there are dedicated spaces to store equipment, including:

- seat-back pockets for small and lightweight equipment
- storage bin behind the driver's and officer's seats.
- helmet hooks.



12v outlets

The cab has 12v outlets in several places:

1. centre console between the driver's and officer's seats
2. base of the B-pillar, one each side
3. outside of the base on the driver's and officer's seats
4. dashboard.

12v circuit breakers

Circuit breakers for the cabs rear 12v outlets are mounted at the base of the nearside B-pillar.



Mast lights

Mast lights are located on the front near side and the rear off-side corners of the chassis.

The mast height and direction is adjusted and turned 270 degrees by hand. The lights are tilted using the switch at the base of each mast.

The on/off switch for each mast is at the mast base. The master switch is located on the Land Mobile Radio (LMR) console, this must be switched on for the mast lights to work.



Class A foam

Two low-pressure deliveries and the hose reel are Class A foam capable. The foam concentrate is added to the water at the pump.

The amount of foam solution to be used will usually be decided by your officer.

The appliance can supply 0.2% to 1% solutions. Unless you have an aerating nozzle, foam solution will be a 'wetting agent' and 'wet-foam' solutions at between 0.2% and 0.3%.

Environmental impacts

The approved Class A foam supplied to your station is biodegradable. The normal firefighting quantities of foam left on the ground is not a concern.

Contamination of waterways should be avoided by:

1. keeping the foam mixing and loading areas at least 50m away from any water supply
2. avoiding spills at mixing, loading and application areas, especially near live streams
3. avoiding spraying foam directly into water supplies
4. notifying authorities promptly of any spill into a water supply.

Using the hose reel

You can select four flow rates of up to 230lpm from the hose reel when running at 1,750 kPa.

Because all the deliveries receive the same pressure, full performance for the hose reel is only available when it is used by itself.

The hose reel has the same pressure as the low-pressure deliveries when low pressure deliveries are used. Your pump operator can't safely supply the hose reel with the higher pressure it needs for full performance when they are also supplying low pressure deliveries.

When your crew is using low-pressure deliveries the hose reel becomes a secondary tool for low-risk tasks.

For example at a car fire, the hose reel could be used as the primary tool. As 200+ l/m and Class A foam capability are enough for the job.

Multimedia

If you want to know more about using Class A foam,

log on to Learning Station.

Locate the Qualified Firefighter programme and the Guide to fire suppression. Available on the Portal, both can give you more information on using Class A foam.

Alert

Wash off spills of foam with clean water.

Alert

The hose reel will not provide sufficient water for structural fire suppression and is not to be used for internal fire attack.

Note

A delivery deployed for internal fire attack should be able to flow sufficient water, a minimum of 440lpm, to manage the fire should it flashover

Maintenance

There are a few things you should know about maintenance. First up: the electrical system.

Electrical system

The electrical system on the appliance can be seriously affected by incorrect wiring.

No one can make changes to the electrical systems on the appliance without approval from the Regional Fleet Coordinator.

Care of locker doors

The locker doors protect equipment from the elements. They are not intended to restrain loads, so it is important to ensure that all equipment is secured correctly.

The doors should be cleaned with;

- soap and water only. Never use industrial grade cleaner.

The tracks should be lubricated with:

- silicon spray only, Never use oil or grease.

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Officer

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Be prepared

Why?

This appliance is equipped with technology that may be new to many drivers. In extreme circumstances when driving limits are exceeded, the Electronic Vehicle Control (EVC) will assist in the control of the appliance. However the driver is ultimately responsible for understanding these features and not driving the appliance beyond the limits of these features.

The driving systems monitor wheel slip, lateral acceleration (felt when cornering) and yaw rate (how fast the appliance is turning). Occasionally a minor mistake by the driver, for example clipping a kerb with a tyre, may trigger one or more systems.

If the different systems are activating while under normal conditions, including emergency response, the driver is driving beyond the road conditions or their own ability.



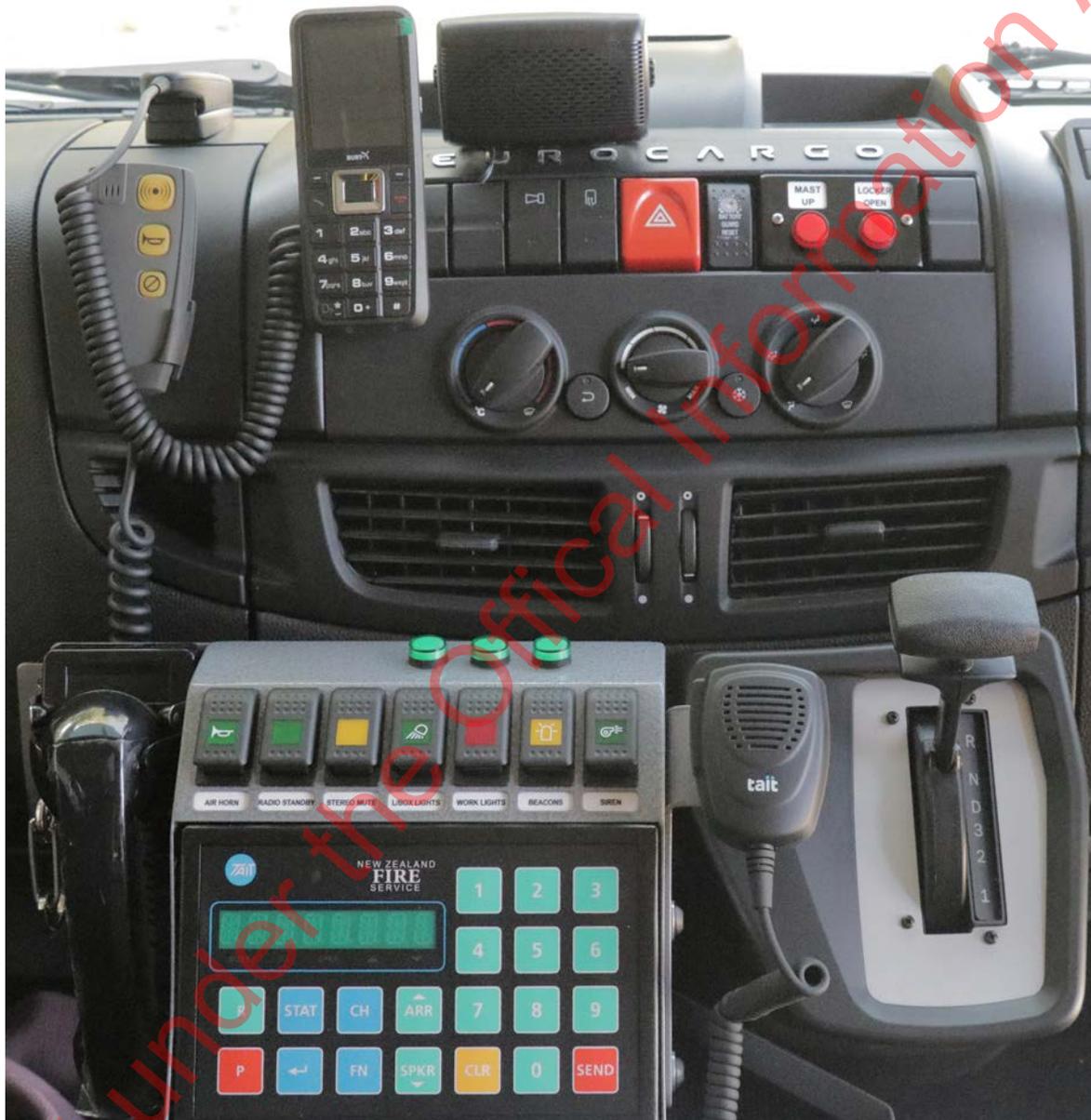
Housekeeping

Go through the following recommendations

1. Drivers are given instruction on the basic operation of the ASR/ESP and ABS systems and the interaction between these systems. This will give them a better understanding of the vehicle's handling and responses to conditions.
2. Give the drivers sufficient time to drive this appliance model to ensure they are familiar with the operating system and that they are aware of the handling and operational differences.
3. Where possible, drivers operate the appliance on hills, inclines, narrow, winding and flat roads to familiarise themselves with the ASR/ESP responses to road conditions.

Cab layout

The following images show the LMR console controls, switches and warning lights. Full details of the cab layout can be found in either the Iveco Driver's Instructions or the Iveco Owner's Manual.



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Dashboard



LMR Console



Headlights, beacons, siren and public address (PA)

Headlights

The headlights are those fitted as standard to the cab/chassis. They are linked to the beacons and locker lights. The headlights are controlled by a rotary switch on the dashboard to the right of the steering wheel.

Beacons and emergency response lighting

The emergency response lighting is operated from a button marked, 'Beacons' on the LMR console and can be operated without the siren. The two white pod beacons make the appliance more visible in bright sunlight.

When the headlights are switched on the white beacons are switched off to prevent them distracting the driver in dark areas.

Beacon patterns

The beacons operate in two modes; all beacons or the outer pod beacons and hazard lights.:

Park brake off

Engages all beacons and calls right of way while driving.

Park brake on

Engages the outer pod beacons and hazard lights. Used to block right of way while parked at an incident as it is less of a distraction to emergency personnel and other drivers.

PA

The siren control handset on the officer's side of the LMR console has a microphone for the PA system. The PA can only be used when the beacons are switched on.

Action

When you carry out driver's checks you will need another person to check the beacons. To check all the patterns you will need to sit in the driver's seat and use the service brakes while you release the parking brake.

Siren

The siren will only work if the beacons are on. The siren control handset on the officer's side of the LMR console allows you to:

- change the siren tones -this can help to alert drivers that haven't noticed the appliance
- use the electronic horn
- use the PA - turn the siren on and then use the handset like a radio mic., there is a push-to-talk button on the side.



Scene and letterbox lights

The three working lights on either side of the locker body are used to illuminate the immediate area around the appliance when needed.

All of the scene lights can be operated from the pump panel, but the working lights master switch on the LMR console must be on. The scene lights will be turned off when the park brake is released, regardless of the position of the master switch.

A letterbox light on each side of the cab roof is aimed to illuminate the roadside.

The switch for the letterbox lights is on the LMR console in the cab.





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Drivers

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Driver responsibilities

Driving safely

The following are general safety notes related to this appliance.

Note that this training module does not fulfil the requirements of Emergency Response Driver training.

Checks before driving

The appliance checks must be carried out at least weekly by Emergency Response Drivers to make sure the appliance is in a fit state to respond to emergency calls.

The appliance maintenance section provides further details for maintenance checks.

Drivers need to consider traffic and weather conditions, drive with restraint, and drive to their ability.

Vehicle braking warning

Fire appliances are heavy vehicles that have to be driven according to their weight and the limits on their brakes, as well as road conditions and weather conditions.

Speed limit

When responding to emergency incidents drivers of this vehicle must adhere to the policy FL1 SCa, which states the maximum permitted speed is 25km/h above the posted speed limit up to a maximum of 105 km/h, if conditions allow.

In restricted speed zones, for example around road works, the maximum speed is the posted temporary speed limit.

Drivers must drive safely and courteously at all times and consider weather, road and traffic conditions.

Video

To find out more on safe loading of appliances, log on to Learning Station and watch the video:

Safe loading and driver checks.

Alert

This manual and training on this appliance does not equal emergency response driver training.

Drivers must have completed the Emergency Response Driver programme to drive 'emergency response'.

Alert

This appliance has a mid-mounted pump. Park to ensure the pump operator is protected from traffic.

Park at an angle that positions the appliance between the pump operator/ crew and oncoming traffic.

Driving controls

Electrical systems isolation switch (battery guard)

The battery guard system prevents the batteries from going flat, and maintains enough charge to ensure the engine will start.

Using the isolation switch is only necessary when the appliance will be left unattended over a couple of nights or longer, and the appliance cannot be plugged in. Isolating the electrical system will stop other functions, including the battery charging for Incident Ground Communications (IGC) radios.

If the electrics are isolated, the battery guard switch will be flashing, and you will need to activate the electrics again before starting the appliance.

How to manually isolate the electrics

To turn electrics on,

press top of the switch.

To turn electrics off,

press and hold bottom of switch, until the light on the switch flashes.



Starting

When starting the appliance it is important to pause with the ignition key in the on position before turning it all the way to start the engine. The computer controlling the engine and other systems takes a few seconds to check everything is working properly. If you turn the key straight away to start the engine, it can create errors that may affect performance.

When starting:

Turn the key to 'ON'

A buzzer will sound and all the warning lights on the dashboard will come on for a few seconds.

When the buzzer has stopped and the warning lights go out turn the key to start the engine.

Ignition over ride inhibitor

The appliance has an ignition over ride inhibitor, which ensures the appliance won't start while it is connected to the 230v station supply.

If the appliance still won't start after the 230v supply is disconnected press and hold down the inhibit override button and try to start the appliance again.



Transmission

Selection controls

Make sure the appliance is stationary before selecting reverse or drive gear as this ensures a smooth transition between gears.

Transmission response

The transmission response can be delayed. This response is due to the computer systems controlling and monitoring speed, power, ASR and ESP that keep the vehicle safe and stable.

Differential lock

The differential lock assists driving where traction may be a problem. Both sets of wheels on the rear axle keep turning at the same speed regardless of traction.

The differential lock must only be activated when traction is likely to be lost at the rear axle, for example, when travelling over muddy or slippery ground.

The vehicle must be stationary to engage the differential lock.

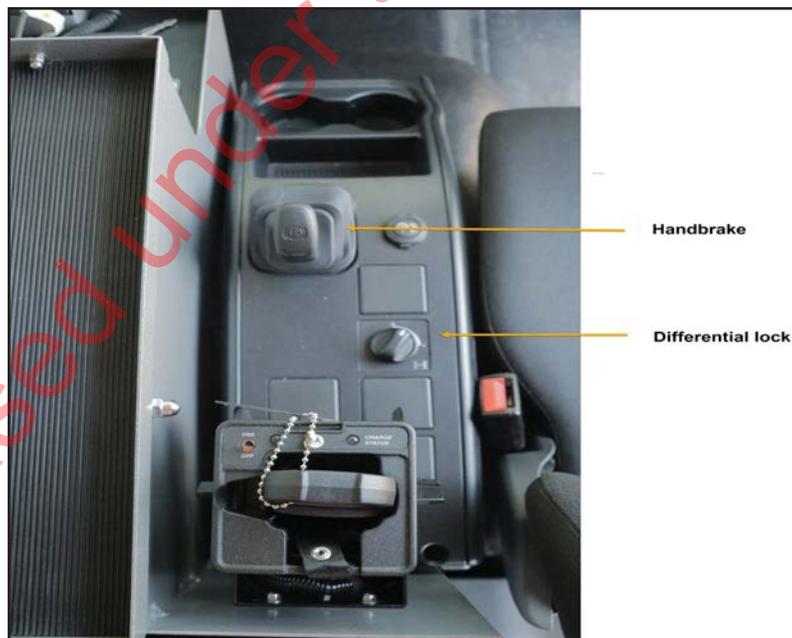
To disengage the differential lock:

1. maintain a steady speed
2. disengage the differential lock switch.
3. briefly lift the throttle.

If the differential lock fails to disengage immediately, turn the steering wheel slightly to change direction. This will help remove the stress in the rear axle that will prevent the mechanism from operating.

Alert

Damage can occur to the drive axles if the differential lock is left engaged and driven on a normal road surface (refer Iveco Manual for detailed information).



Braking

There are disk brakes on all wheels, and a mechanical parking brake system that works on the rear wheels. Braking while driving is controlled through the driver assistance systems described in the next section, Electronic Stability Programme.

Driving with assistance systems

If you see the warning symbols for ABS, ESP or ASR coming on regularly while driving, including emergency response driving you are driving beyond the road conditions and/or your driving ability.

Braking

Always press the brake pedal with a steady pressure.

Pressure on the brake pedal tells the vehicle how fast to slow the vehicle. Let ABS and the other assistance systems take care of avoiding skids and other issues.

Pulse braking and other techniques used with manual brakes will reduce the effectiveness of braking.

Emergency manoeuvres

If you are faced with no other choice than an extreme manoeuvre to avoid an accident:

- press the brake pedal hard and with steady pressure, and
- steer to avoid a collision / leaving the road

The driving assistance systems are designed to keep the appliance under control. Even if you turn the steering wheel quickly and press the brake pedal to the floor, the appliance will do everything it can to maintain traction and positive control.

Driving controls

Speed

The Type 1 Appliance is speed limited to 120 km/h. The driver can also set a temporary lower limit to assist driving on long, steep grades.

Remember that drivers must adhere to the policy FL1 SCa when emergency response driving. When not responding to emergencies, the open road speed limit for a heavy vehicle is 90 km/h

Exhaust brake

This brake assists braking and reduces the stress on the normal braking system.

The exhaust brake is most effective at high engine speeds (RPM). When the exhaust brake is engaged, the transmission will change down through the gears automatically.

The driver can choose between two automatic modes or manual activation of the exhaust brake. The automatic modes are selected using the right steering column control stalk.

Air suspension control

The Iveco chassis is fitted with airbag rear suspension. This system automatically adjusts for the vehicle's weight to maintain a consistent ride height.

The control unit for the air suspension is located at floor level to the right of the driver's seat. This control allows the ride height to be adjusted. However height should not be adjusted unless the suspension has deflated due to a lack of compressed air or navigating an obstacle, such as a severe hump in the road

Alert

If the suspension is not set to the factory preset height the vehicle's stability will be affected.

Electric window and mirror controls

Controls for adjusting the mirrors are on the driver's door.

Both of the front electric windows can be controlled by switches on the driver's door.

Electronic vehicle control system controls

ESP and ASR use some of the same electronic and mechanical systems, and cannot be controlled separately. Consider disabling the ASR/ESP when the reduction of power by the ASR system could affect the vehicle's ability to be driven or manoeuvred in certain conditions.

Driver assistance

The response of the brakes is controlled by the computer system that monitors the Anti lock Braking System (ABS), Anti Skid Regulation (ASR), and Electronic Stability Programme (ESP).

These systems ensure the vehicle slows at a rate that enhances stability.

Anti lock Brake System (ABS)

This appliance has ABS, which monitors speed and controls braking to prevent the wheels from locking up. ABS braking requires the driver to apply a steady pressure to the brake pedal while skid control is left to the ABS

The advantages of ABS include::

- the ability to stop quickly without loss of steering and directional stability
- a reduced risk of accidents on slippery roads
- less tyre wear

Alert

Pulse braking will greatly minimise the effect of ABS.

ESP

ESP is designed to keep the vehicle stable during cornering, when taking evasive action, or if there is oversteer or understeer.

ESP operation

During normal driving ESP works in the background and continuously monitors steering and vehicle direction. It compares where the driver is intending to steer with the vehicle's actual direction.

ESP intervenes only when it detects loss of steering control, for example during emergency evasive swerves, under- or over-steering, poorly judged turns on slippery roads, or when hydroplaning.

ESP estimates the direction of the skid, and then applies the brakes to individual wheels to bring the vehicle back in line with where the driver wants to go.

ESP may reduce engine power or change gears to slow the vehicle down.

Alert

Do not switch off ESP unless it is making it difficult for the driver to control the appliance.

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Anti Skid Regulation

Anti Skid regulation (ASR) is sometimes referred to as Traction Control System (TCS).

ASR is designed to prevent loss of traction and maintain control of the vehicle when the appliance is accelerating, cornering on slippery or icy roads or when driving off road.

Although similar to ESP systems, traction control systems do not have the same effect.

ASR can do one or more of the following:

- reduce fuel supply
- brake one or more wheels
- close the throttle
- reduce turbocharger boost.

Disabling ASR / ESP

ASR and ESP use some of the same electronic and mechanical components.

Consider disabling the ASR/ESP when the reduction of power by the ASR system, could affect the vehicles ability to be driven or manoeuvred in certain conditions.

Situations when you should consider disabling ASR include:

- negotiating undulating rural metal driveway
- run up to sloping drive/track/roadway
- manoeuvring in open paddock/wet area
- if the ASR system develops a fault.

Alert

ASR should only be disabled when manoeuvring at low speed. It should never be used under normal driving conditions.

Extra driver care is needed when ASR is disengaged.



Driver experience

Under difficult conditions or during more assertive driving ASR, ESP and ABS may all have noticeable effects.

For example:

- when cornering at speed, ESP will feel like a wheel is losing traction while it is instead applying the brakes on individual wheels to keep the vehicle stable
- when driving uphill with limited traction, ASR can reduce power, and the driver can change down through gears to maintain speed.

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Cruise control

Cruise control is useful for:

- long downhill stretches because it will help to limit speed increases
- long stretches of non-emergency open road driving

To engage:

- lift control arm up to engage/resume.
- lift again to disengage/off or touch foot brake to disengage.

To disengage:

Any of the following will disengage cruise control:

- pull the control lever up (towards you)
- press the brake pedal
- press the accelerator for more than 30 seconds.

Note

Do not use the cruise control function for emergency response driving.



Driver's checks

Several items in the driver checklist can be covered by scrolling through the maintenance and diagnostic menu on the dashboard.



Vehicle information menu

You can get information from the various systems using the two arrow buttons on the dashboard to the left of the steering wheel.

Menu includes:

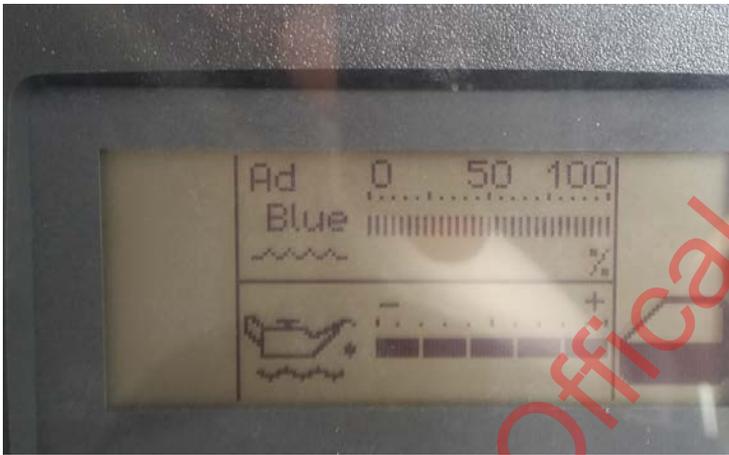
- engine oil level
- engine oil pressure
- battery voltage
- cooling water level
- AdBlue level
- cab and chassis lights check

Alert

The lights check in the menu will identify any original cab and chassis malfunctions.

This check does not replace the drivers checks of turning on and viewing all the standard and emergency response lighting.

Examples of scrolling the menu



✓ Action

When you carry out driver's checks you will need another person to check the beacons. To check all the patterns you will need to sit in the driver's seat and use the service brakes while you release the parking brake.

Wheel nut indicators

All Fire and Emergency appliances have wheel nut indicators.

Yellow indicates normal operation.

Red indicates that the wheel has been removed, and the wheel nuts will need to be re-torqued (checked) between 50 and 100 kms of driving by the authorised tyre service provider. The service provider will then remove the red indicator and replace it with a yellow one.



Alert

Fire and Emergency personnel are NOT authorised to change wheels or alter wheel nut indicators on any Fire and Emergency appliance.

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Pump operator

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Basic specifications

Water tank

The on-board water tank holds 2000lts

Foam system

The Foam Pro 1600- is manufactured by Fire Research Corp. The foam tank holds 60lts of Class A foam.

Note

This appliance has a mid-mounted pump.

Park it so it protects the pump operator from traffic. Usually this means parking on an angle that places the appliance between the pump operator / crew and oncoming traffic.

Pump specifications

The pump fitted to this appliance is a Darley HM 500.

It is driven by a Power Take Off (PTO) drive via a shaft from the transmission. The maximum output is approximately 1900l/pm at 1,050 kPa.

The output is measured from draughting at 3m. When you use a pressurised supply the output will increase.

Panel colour coding

The valves, controls and gauges on the pump panel are colour coded for easy identification.

- Blue: main pressure
- Yellow: foam
- Green: incoming pressure, suction (negative) or pressurised (positive)



Hose reel circuit breakers

The hose reel winding motor has an electric brake that stops the drum quickly when the rewind button is released. There is a circuit breaker for the brake in the locker.

A circuit breaker for the hose reel drum motor is mounted on the pump panel.

Hose reel performance

You can select four flow rates of up to 230lpm from the hose reel when running at 1,750 kPa.

Because all the deliveries receive the same pressure, full performance for the hose reel is only available when it is used by itself.

High risk fire attacks should always use low-pressure deliveries because you can always add another delivery or increase flow. If you commit to using just the hose reel at full flow you cannot safely introduce a low-pressure delivery without withdrawing the crew using it.

At 900kPa, the hose reel will provide up to 118lpm and is still useful for dampening down, overhaul, limited vegetation firefighting and limited exposure protection.

The hose reel nozzle is designed to run at 500kPa. The lower operating pressure allows the pump pressure to be lower to achieve the desired flow.

Hose inlet air bleed valve

The pressure control system can be confused by air going past the delivery pressure sensor, reading a lower pressure than it would with water.

Air is usually introduced as a water supply is being established as trapped air in the standpipe, hose and pipe work is pushed through the pump.

An automatic air bleed valve is installed between the inlet valve and the pump. The valve is set to open at 300kPa, and it stays open for 20 seconds. Air and water are vented to the ground under the front corner of the pump panel. The vent is here so that you can see the change when all the air has been vented from the pump.

The valve can open during pumping if the inlet pressure drops below 300kPa and then rises again. Very little water is vented through the valve so any loss during pumping won't be noticeable.

Alert

The hose reel will not provide sufficient water for structural fire suppression and is not to be used for internal fire attack.

Note

A delivery deployed for internal fire attack should be able to flow sufficient water, a minimum of 440lpm, to manage the fire should it flashover

Relief valves and overflow

Overflow

You can see the overflow from the tank under the appliance, at the rear of the water tank.

Tank pressure relief valve

There is a pressure relief valve on top of the tank. This opens when the pressure in the tank is too high and discharges to the roof.

Inlet relief valve

The inlet relief valve is located between the suction coupling and the inlet valve. It protects the feeder hose coming into the pump and the inlet side of the pump from high incoming pressure. It discharges to the ground.

The inlet relief valve is set to 1,150kPa. You can't adjust it on-station. It dumps water on the ground.

High-pressure relief valve

The high-pressure relief valve is set at 1,850 kPa to stop extremely high-pressure water going to the deliveries. The entire output of the pump can be dumped if the pressure is dangerously high.

To reset the relief valve, the pressure needs to be reduced and then reset once relief has closed.

Managing high incoming pressure

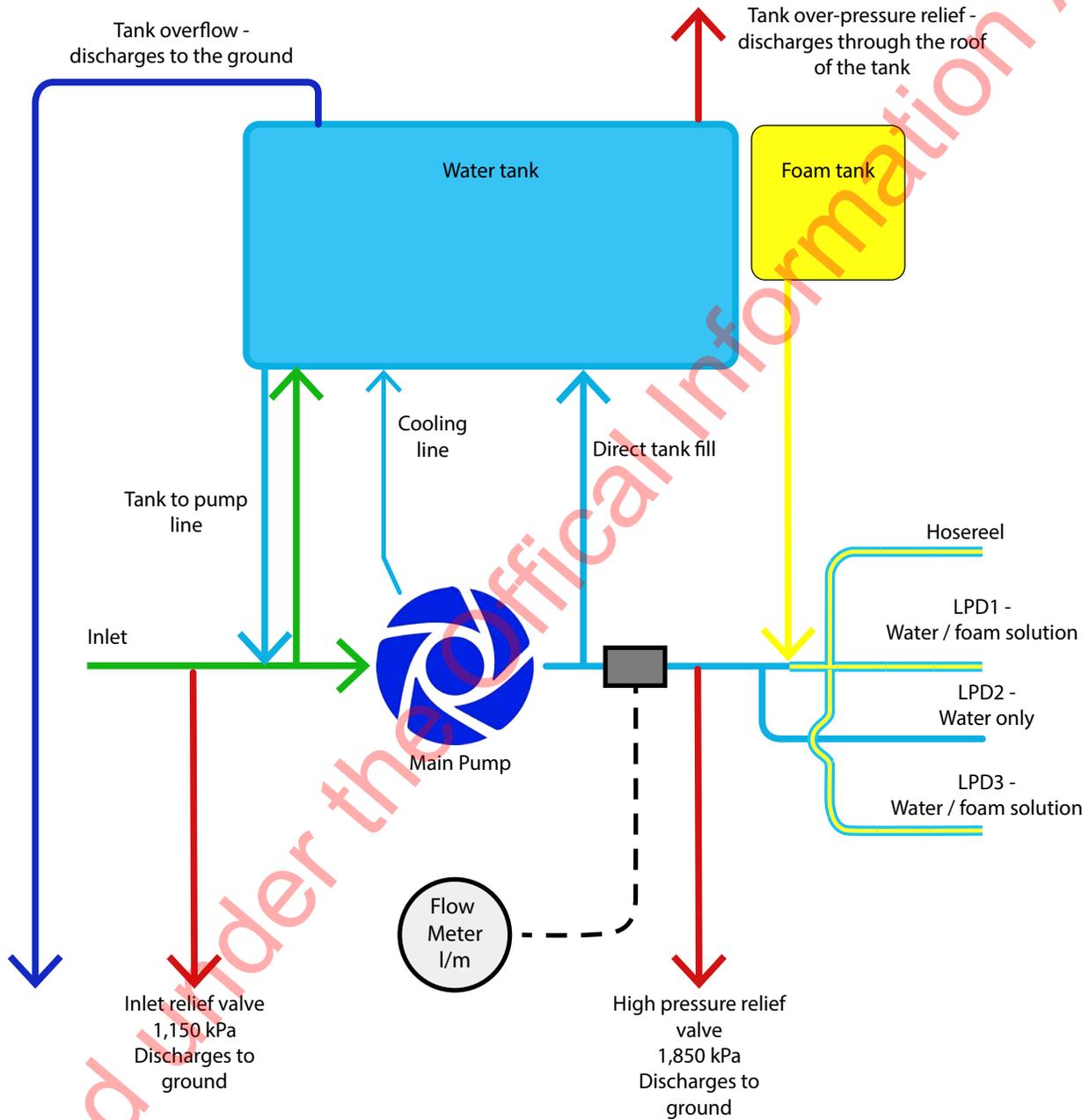
If the incoming pressure is too high, you will have trouble keeping low pressure deliveries at less than 1,050kPa.

To overcome this, you can either:

- gate the inlet valve
- open the tank to pump valve, and gate it to balance the pressure relief.

Pump schematic

The diagram below shows how water and foam solution move through the pump.



Pressure control system

The Pump Boss pressure control system automatically adjusts the engine throttle and will maintain pressure set by the operator.

This control system has sensors in the pump pipework on the inlet side and the discharge side of the pump. Depending on the mode the pump operator sets, it will adjust the throttle to help maintain safe pressures and stable continuous water supply to deliveries.

The controller only affects the throttle. The pump operator still has to do all the things they normally do to establish a water supply and decide on the right pressure to supply. Once this is done, the controller will maintain the set pressure and adjust the throttle to maintain it.

You can set the pump to **RPM** or **Pressure** modes.

RPM mode

RPM is the default mode. The pressure control system always starts in this mode.

The throttle knob sets the engine speed (RPM). The pressure control system maintains this and only makes adjustments if the main pump pressure rises too much (more than 200kPa) above the last pressure the operator set.

Pressure mode

In Pressure mode the throttle knob sets the pressure and the pressure control system maintains it. It does this by making automatic adjustments to the engine speed to keep the main pump pressure constant.

Pump Boss controls and indicators

MENU button

Provides access to stored data and programme features.

Oil pressure

Indicates green when engine oil pressure is normal pressure. Indicates red when it is not.

CHECK ENGINE and STOP ENGINE

These are copies of the warnings from the dashboard.

Engine temperature

Indicates green when the engine temperature is normal. Indicates red when it is not.

Transmission temperature

Indicates green when in normal temperature.

RPM display

Shows the engines' RPM. It also shows error codes, stored data, and programme features.

Battery voltage

Green when the appliance batteries are at a normal voltage; red when they are not.

SILENCE Button

Press to silence audible alarms.

Message display

The message display shows the pressure or RPM setting during normal operations and warning alarms when they occur. It shows the time and date when the throttle ready light is off, as well as stored data and programme features.

THROTTLE READY

This light shows when the pressure control system is ready for you to begin pumping.

PRESET button

Press to change/select a pre-programmed value for RPM setting, which will alter the pressure.

IDLE button

Sets the engine RPM to idle.

Throttle knob

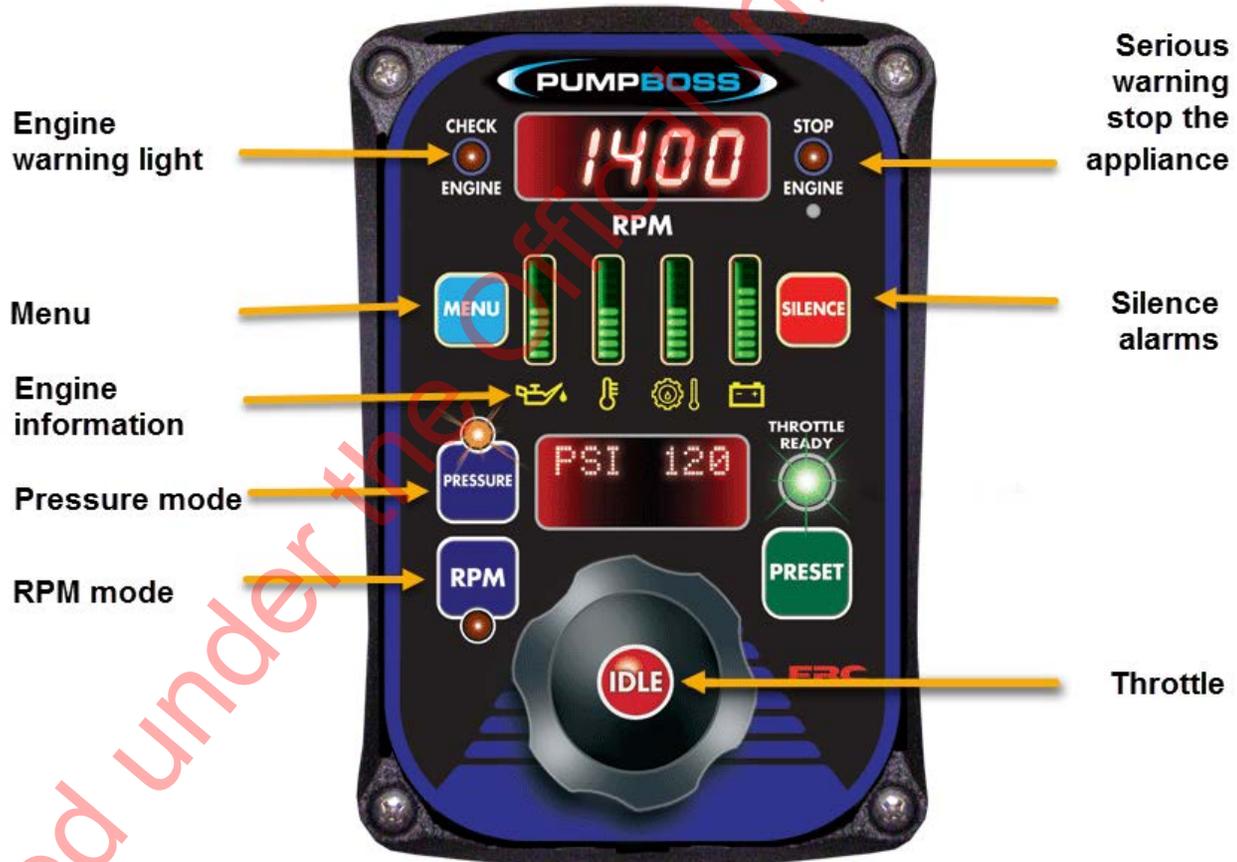
Changes the pressure or RPM setting when you rotate it. The setting changes in larger steps when the throttle is turned fast.

RPM button

Press to select RPM mode. The light comes on to show you are in RPM mode.

Pressure button

Used to select Pressure mode. A light indicates when you are in Pressure mode.



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Engaging the pump

The pump engagement switch is on the pump panel and the appliance pumps with the transmission in neutral.

To engage the pump:

- bring the appliance to a complete stop
- apply the park brake
- put the transmission in neutral
- go to the pump panel
- turn on the pump engagement switch

Check that the pump **engaged light** in the switch and the **throttle ready light** on the pressure control system come on.

To disengage the pump:

1. return the engine to idle.
2. turn off the pump engagement switch on the pump panel.

Note

The engine should be at idle before the PTO is engaged.

Note

If you disengage the parking brake the pump will also disengage.

RPM mode

RPM is the default mode. The pressure control system will be in RPM when you engage the pump.

In RPM mode the pressure control system works like a manual throttle. The pump operator can change the engine speed using the throttle and the controller will maintain it.

The pump delivery pressure varies with changes in the water coming in or the flow going out of the pump.

The system is designed to keep firefighters safe. It will limit any increase in pressure to 200kPa above the last pressure you selected.

If the delivery pressure approaches this limit the system automatically lowers the engine speed. The RPM light blinks if a lower RPM has been set.

In RPM mode the pressure control system will only react to high delivery pressure. It does not automatically increase the engine speed or react when the water supply is exceeded.

Note

As you set up the RPM mode keep the engine at idle or a constant rpm until you have a stable water supply.

Then set the pressure you want.

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Open and close deliveries in RPM mode

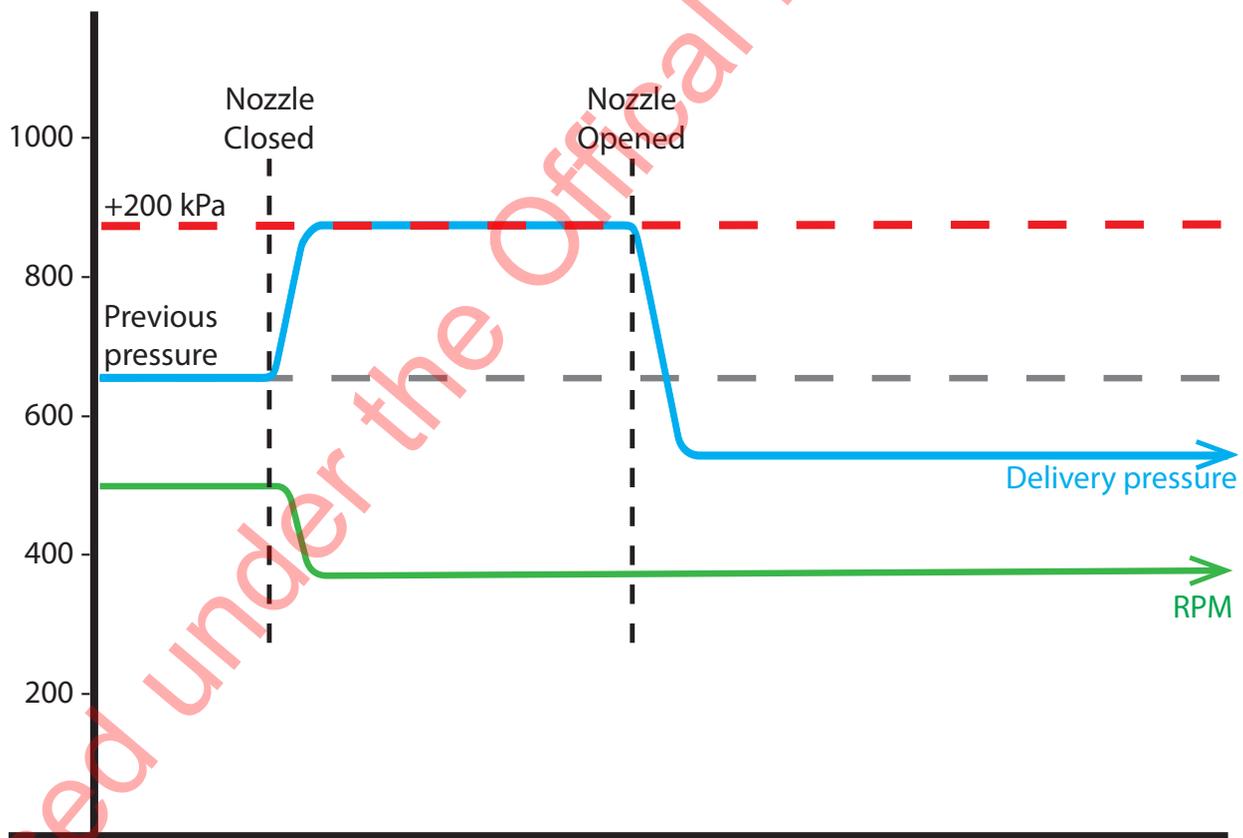
In RPM mode, the pressure control system maintains the RPM setting regardless of the number of deliveries that are opened or closed, as long as there is enough water.

If one delivery is closed and the delivery pressure increases more than 200 kPa above the previous pressure, the pressure control system reduces the engine speed to limit the rise.

The new lower engine speed is the new setting the system will maintain.

If the delivery is opened again, the delivery pressure will drop. The engine speed won't change and the delivery pressure will be lower than it was before the change.

Open and close delivery - Diagram



Pressure mode

When you are working in Pressure mode, the pressure light will be on. The system maintains a constant delivery pressure within the limits of pressure and flows into and out of the pump.

Switching to Pressure mode

Switch to Pressure mode by pressing and holding the pressure button for three seconds. The Pressure mode light will turn on when Pressure mode is set.

You will see and hear the automatic adjustments to the engine RPM when the delivery pressure changes.

Selecting a pressure

Turn the throttle to change the pressure you want the system to maintain.

The selected pressure shows in the message display window.

Maximum RPM

In Pressure mode, a maximum engine RPM is programmed into the system. If the engine reaches the maximum the message display flashes MAX RPM / OPERATOR and the engine RPM is prevented from going any higher.

If the delivery pressure is below 100kPa, the display shows PRESS LOW.

Limits

Dropping the delivery pressure to less than the incoming pressure, is not possible. You need to manage high pressures by gating the inlet or opening the tank to pump valve.

The Pump Boss is also limited by the available water supply. If there isn't enough water for all the deliveries you are running, you will not get the flow and/or pressure you want.

Open and close deliveries in Pressure mode

In Pressure mode, the pressure control system maintains the pressure setting regardless of the number of deliveries that are opened or closed, as long as there is enough water being supplied.

As deliveries are opened, the delivery pressure starts to drop and the pressure control system raises the engine RPM to maintain the set pressure.

As deliveries are closed and the delivery pressure starts to increase, the pressure control system lowers the engine RPM to maintain the required pressure.

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Changing between RPM and Pressure modes

Change from RPM to Pressure

To change from RPM to Pressure mode, hold down the pressure button for **three seconds**.

The indicator light will come on when the change is set.

Changing mode does not change settings. When you change to Pressure mode, the pressure setting stays the same as it was in RPM mode, and will remain in this mode until something changes.

Change from Pressure to RPM

To change from Pressure to RPM mode, hold down the RPM button for **three seconds**.

The indicator light will come on when the change is set.

If you change from Pressure to RPM the engine RPM will not change until you turn the throttle.

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Automatic pressure control

If your water supply isn't enough to keep up with the outgoing flow and pressure the system will reduce the engine speed until the flow matches the supply.

The advantage of the automatic pressure control is that:

- during a brief interruption to the supply firefighters will continue to get as much water as can be supplied
- the full pressure they need will be restored as soon as the supply returns.

Brief lack of supply

If there are fluctuations in the supply, such as problems with a portable pump, the pump control system (Pump Boss) automatically reduces the engine speed until the pump output matches the incoming supply.

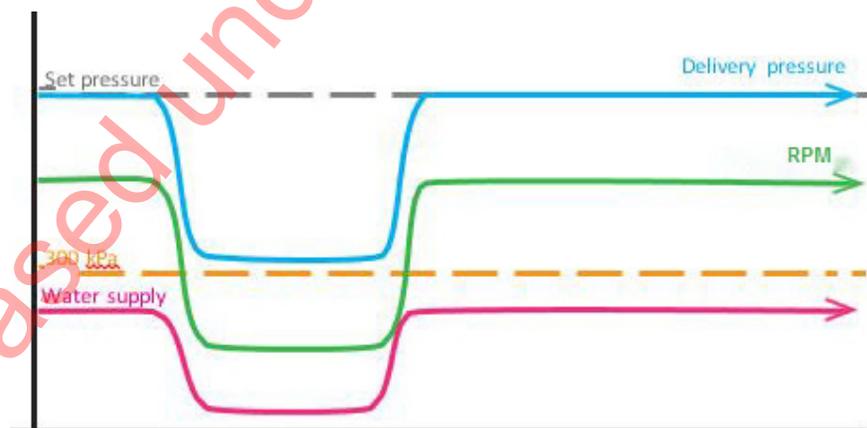
While this is happening the:

- pressure mode light stays on
- RPM display and mode light will flash
- message display shows OPERATOR / RPM LIMIT
- preset function is disabled

When the supply increases and the pressure control system brings the delivery pressure back to the selected figure the system returns to normal operation.

When you notice the drop in supply take action to restore a full supply and alert your OIC/Sector Commander to the problem.

Brief lack of supply - Diagram



Limited water supply

When the water feed supply is running out, two delivery pressure levels trigger the pressure control system to take action:

- Low water warning triggers at 300kPa delivery pressure.
- No water warning triggers at 100kPa delivery pressure.

Low water and no water messages show in the window when the control system goes into these modes.

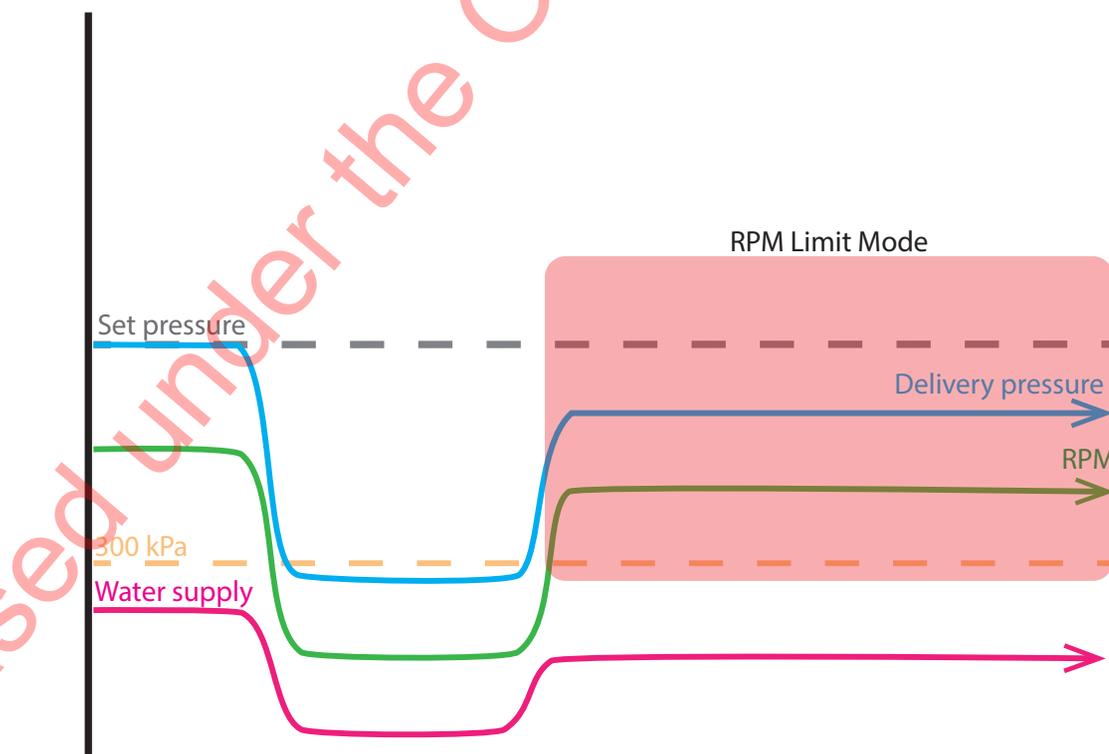
Reduced water supply

If your water supply is restricted and the system can't maintain the selected delivery pressure but stays above 300kPa it will stay in RPM LIMIT mode. The throttle will work only as a manual control and the pressure preset will be cancelled.

If you manually adjust the engine speed and find a point where the water supply will keep up and the delivery pressure is stable above 300kPa, the RPM LIMIT mode will cancel. The pressure controller will stay in Pressure mode and the stable pressure will be the new setting it maintains.

If you return the engine to idle the RPM LIMIT mode cancels and the previous pressure setting will be cancelled.

Reduced water supply - Diagram



Complete loss of supply

In Pressure mode, the pressure controller will attempt to maintain the set pressure as the incoming and outgoing flow to deliveries fluctuate.

If the supply fails and the delivery pressure falls below 300kPa the system will drop engine speed to 1,100 RPM. It will hold this for a maximum of seven seconds - as marked in the diagram below.

If within seven seconds, the supply is restored enough for the delivery pressure to rise above 300kPa the controller will increase engine speed aiming to restore the set pressure.

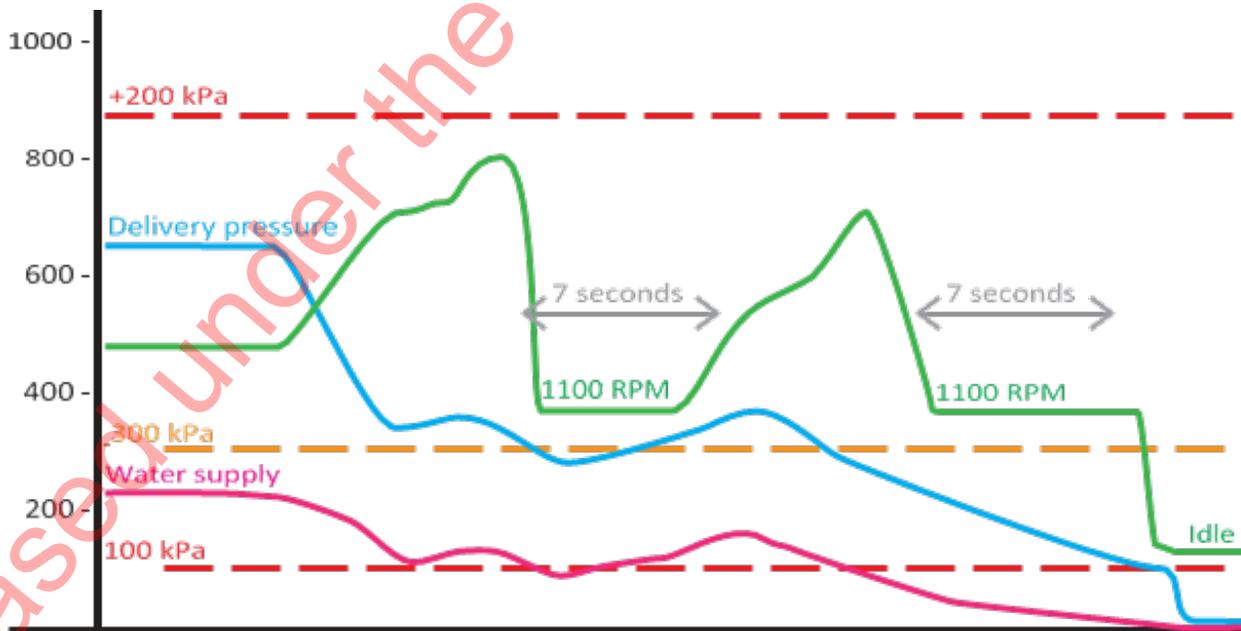
At a delivery pressure of less than 100kPa the controller will immediately set the engine to idle.

If the water supply is restored within that time and the delivery pressure rises above 300kPa, the system increases the engine speed again. It will try to return to the selected pressure.

After three minutes in the No Water state the controller will set the engine to idle and also cancel the pressure setting. To start pumping again the pump operator will have to use the throttle or preset button to set a new operating pressure.

If the delivery pressure doesn't rise above 300kPa within seven seconds, the engine will be set to idle.

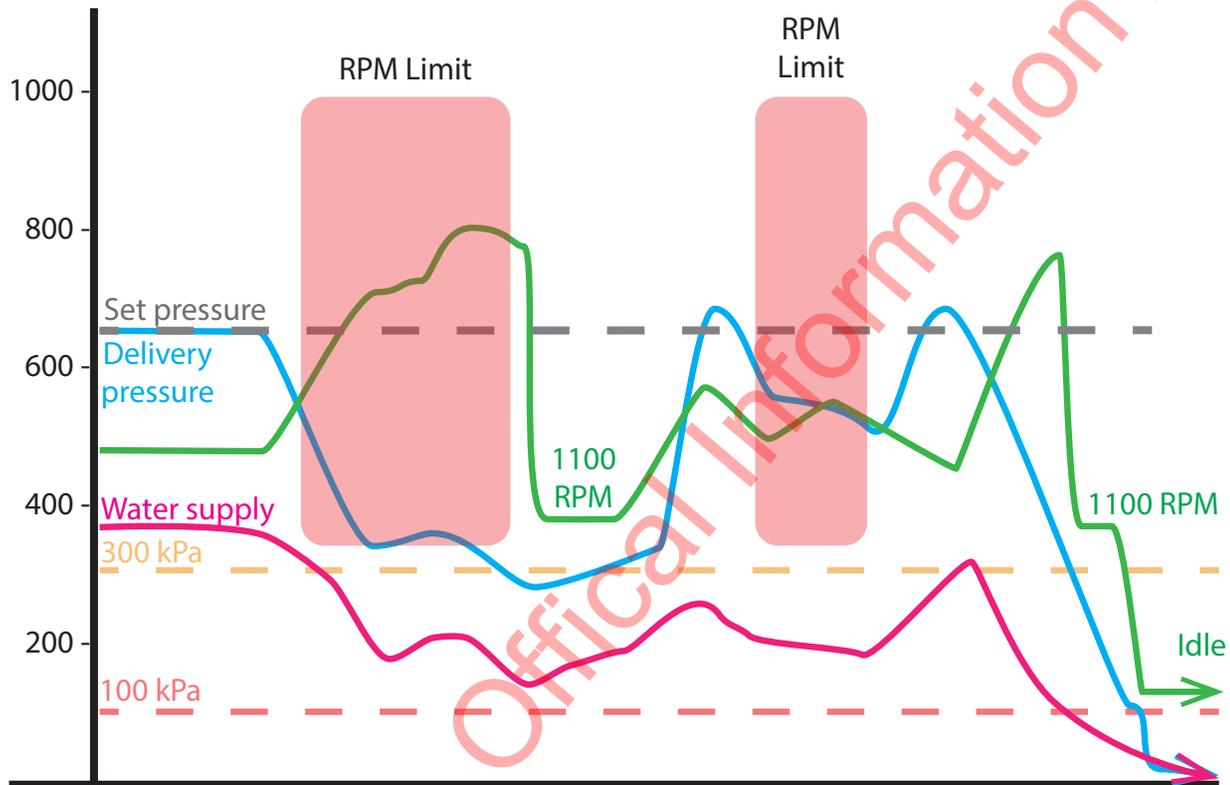
Complete loss of supply - Diagram



Chasing water

When there is a fluctuating water supply the controller's continual adjustment can lead to surging in engine speed and delivery pressure as it chases large changes in water supply.

Chasing water - Diagram



Continued surging will usually only occur when the pump is approaching the limit of a water supply—for example, a water main reaching its limit. Increases in engine speed cause the pump to suck the supply dry and the controller will react by dropping engine speed, letting the supply recover.

Surging doesn't occur to the same extent when draughting.

If you hear or see surging, you need to identify the cause and make adjustments using normal pump operation procedures.

Managing your supply

When the compound gauge is showing 300kPa or less you should be working on increasing the supply or balancing pump output with the available supply.

At 300kPa on the compound gauge you are unlikely to be able to supply any more water and you should alert your OIC / Sector Commander to this.

Changing the RPM preset

1. Press IDLE button.
The engine has to be at idle and the small display showing IDLE ENGINE before the presets can be changed.
2. Press and hold RPM button to select the setting to be changed.
3. Press and hold PRESET button during the next steps:
The message display shows PRESET. After five seconds the current setting flashes.
4. Rotate throttle to change the preset setting.
5. Release PRESET button.

Default setting

If your presets have changed the default setting is:

- RPM: 1400 which is approximately equal to 800kPa
1400 RPM will give approximately 800kPa from tank supply.

800kPa is a safe pressure within the likely range of what you will need for low pressure deliveries.

When to use preset

The preset quickly raises the pump pressure to a usable level. This allows you to get to work from tank supply quickly. Adjustments can be made from here once all deliveries are established and a water supply has been connected to the pump.

Alert

You should only use the preset button when running off the tank supply.

Note

If running off a pressure fed supply, using the preset button may over pressurise your deliveries.

Flow meter

Checking the amount of water you are pumping is easier than with other appliances, as you have access to a dedicated flowmeter.

The flowmeter only shows the flow rate and the volume of water:

- The flow rate measures the water leaving the pump through deliveries (between 40 and 5,000l/min).
- The total volume measures the water that has been pumped through deliveries.

When you are looking at the flow rate, the meter always shows the total flow of:

- all the low-pressure deliveries, and
- the hose reel

The flow through the draughting tank fill line isn't measured.

If you have more than one delivery open, you will have to estimate how much water is flowing through each one. This can be done by checking what the flow rate of the delivery nozzles is set to.

Note

The flowmeter on the pump panel is not linked to the foam system.



Operating the flow meter

Start-up sequence

The flowmeter starts up when it receives power. The display will cycle through several states. When it shows 0 l/min the self-check has been completed and it is ready for use.

Note

The flowmeter uses l/min which is the abbreviation for litres per minute.

Changing modes

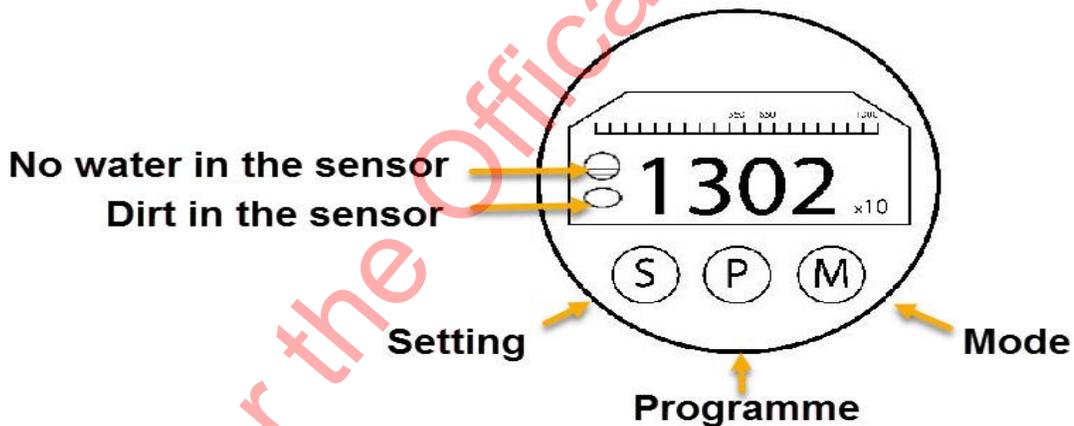
Press the MODE (M) button to change between displaying the current rate of flow and the total water pumped.

Resetting the total water measurement

The total amount of water used resets to 0 when the flowmeter is switched off. If you need to reset the total water pumped display press and hold both the S and P buttons at the same time.

Faults

Two fault symbols can show up on the flowmeter display.



No water in the sensor

The sensor is a short piece of pipe with electrodes in its walls. This symbol will show if the pump pipework is empty of water. This can occur for a number of reasons during normal pump operation. When the pump is filled and deliveries opened, water has to pass through the flowmeter and this symbol should disappear.

This symbol can show when the sensor is empty of water. If this is the case, you can ignore the fault. The symbol should disappear when you begin pumping.

Dirt in the sensor

A build-up of dirt or other debris in the sensor could affect the functioning of the flowmeter. If it shows while you are pumping, the flow meter may not be as accurate or may not display a flow rate.

Accuracy

Between 50 and 750l/min the reading will be accurate within 15l/min. Above 750l/min the error is around 2%. At full capacity that would be a maximum of 40l/min.

Display

The display has two ways of showing the flow rate, a large digital display and a bar style across the top of the window that shows flows up to 1,000l/min.

In total water use mode, the digital display changes scale as the total gets bigger. If the total can't fit on the display, a multiplier will appear on the right-hand side.

4753 $\times 10$ = 47,530 litres

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Class A foam system

Foam system (FoamPro 1600)

You can deliver a Class A foam solution to firefighters using the FoamPro system. It is an electrically driven system that injects a proportional amount of foam concentrate into the discharge pipe work.

Foam output

Foam solution is available through:

1. low pressure deliveries 1 and 3
2. the hose reel

Foam concentrate tank

The foam tank is plastic and has a capacity of 60 litres. The level of concentrate remaining can be seen through the semi transparent tank.

A sensor is fitted to the tank to warn you when the level is low and to stop the foam concentrate pump when there is no concentrate left.

Foam concentration and flow

At a frequently used rate of 0.1% the system can supply enough concentrate out of the 60ltr tank to treat 60,000 ltr of water.

At 0.3% (maximum for use without aerating nozzle) the system can supply enough foam concentrate to treat 20,000ltr of water.

All foam-capable outlets are marked with a yellow border.

Note

The foam system is for use with Class A foam only.

Class A Foam delivery

Your officer will advise on the foam solution strength to be used.

More about foam

You can get more information about how Class A foam works and how it is applied from:

- the FENZ Guide to Fire Suppression, which you can find on the Portal by going to Bookshelf > At Incident > Firefighter Operations
- the volunteer Qualified Firefighter programme.

Foam capability

You can supply your firefighters with Class A foam through the hose reel and deliveries 1 and 3. The table below tells you approximately how long the foam supplies on the appliance will last.

 **Link**

Find on the Portal by going to Bookshelf > At Incident > Firefighter Operations

- FENZ Guide to Fire Suppression
- Volunteer Qualified Firefighter programme.

Induction rate and application	Hose reel at 220l/m	Light delivery at 470 l/m	Two light deliveries / one heavy delivery at 940 l/m
Wetting agent 0.2% (range 0.1%-0.2%) Induction rate used for vegetation fires and overhaul. Use normal nozzles.	Uses 0.4 l/m The appliance 60lt tank will last more than 120 minutes (2 hours) A 20ltr foam container will last 45 minutes	Uses 0.8 l/m. The appliance 60lt tank will last more than 60 minutes (1 hour+) A 20ltr foam container will last 22.5 minutes.	Uses 1.7 l/m. The appliance 60lt tank will last 30 minutes A 20ltr foam container will last 10 minutes
Wet foam 0.5% (range 0.3%-0.5%) Induction rate used for fires in trees, structures and transport. Normal nozzles OK - aspiration nozzles produce superior foam.	Uses 1.1 l/m The appliance 60lt tank will last 54 minutes A 20lt foam container will last 18 minutes.	Uses 2.3 l/m The appliance 60lt tank will last 25 minutes A 20lt foam container will last 8 minutes	Uses 4.7 l/m The appliance 60lt tank will last 13 minutes A 20lt foam container will last 4 minutes
Dry foam 1% (range 0.6%-1%) Induction rate used for exposure protection. Use aspiration nozzles.	Uses 2.2 l/m The appliance 60lt tank will last 27 minutes A 20lt foam container will last 9 minutes.	Uses 4.7 l/m The appliance 60lt tank will last 13.5 minutes A 20lt foam container will last 4.5 minutes.	Uses 9.4 l/m The appliance 60lt tank will last 6 minutes A 20lt foam container will last 2 minutes

Delivering foam

Start injecting foam by, turning the switch on the foam control panel.

Turn the percentage (%) knob to select the concentration you need. The default setting is 0.2%.

When you switch the system on, the small red system status light on the foam panel will come on briefly and then turn off. This red light is primarily for alerting you to problems, and doesn't stay on when the system is running properly.

The large green 'FOAM ON' light will come on when the foam concentrate pump is running. This confirms that foam is being supplied.

If the red light comes on during operation it is warning you that there is either a:

- low concentrate level - flashing -
- no concentrate left - steady on -

Note

On the Foam control panel there are instructions for "SIM Flow", you can ignore this. SIM Flow is a manual operation mode that cannot be turned on from the panel.



CLASS A FOAM APPLICATION GUIDE			
Percentage	Description	Nozzle Type	Application
0.2%	Wetting Agent	Normal Nozzles	Deep Seated Fires Overhaul
0.5%	Wet Foam	Normal Nozzles and Aspiration Nozzles	Direct Attack, Bush, Structures & Transport
1.0%	Dry Foam	Aspiration Nozzles	Exposure Protection

CAUTION
 USE CLASS A FOAM ONLY IN FOAM PRO UNIT
 Foam Spilled into waterways may cause Environmental Damage,
 Care should be taken to prevent this.

When using / handling Class A Foam appropriate PPE shall be worn
 (Gloves, Safety Glasses / Goggles)

Note

This Class A foam application guide is located on the pump panel

Water only delivery

Delivery two is water only. This is connected to the pump and pipe, and it will never have foam concentrate sent to it, even when other deliveries are getting foam solution.

You should always use number two delivery if you want to avoid contamination with foam concentrate. This includes:

- cooling burns
- running an ejector pump - so that foam can't get into a water supply
- supplying a delivery near a sensitive waterway
- filling another appliance or tanker
- draining suction (there is no check valve to stop air or water entering the pump).

Note

Delivery two has no check valve and must be shut while priming.

Refilling

Refill the foam tank by pouring foam concentrate directly into the tank below the pump panel. There is a large screw cap for the tank to make filling easier.

The foam tank can be refilled while the foam system is in use.

For detailed instruction on the operation of the foam system, refer to the FRC Foam Pro 1600 operation manuals.



Draughting from open water

Draughting from an open water source is done in the same way as for any appliance with an electric primer.

As for all other get-to-work procedures with the automatic pressure control, leave the controller in RPM mode until you have a stable delivery pressure.

If the pump loses prime, put the pressure controller back into RPM mode to re-prime.

Tank refill

Refill the tank from a pressurised supply using the tank-to-pump valve.

If you are **draughting** you can fill the tank using the **draft-to-tank valve** which takes water from the discharge side of the pump. It replaces the need to run a delivery back into the tank to refill it.

Open the direct tank fill valve by pulling the tank refill lever while you are pumping.

The direct fill lowers the main pump pressure as water flows to the tank. If you can't increase the engine RPM to make up the difference you may be able to gate the direct fill valve and fill the tank slowly.

The direct tank fill means you don't need to fill the tank with a hose.

There is no access to the tank from the roof.

Note

Air drawn into the pump from suction can interfere with the pressure controller if you use PRESSURE mode while establishing a prime.

Suction hose

Three lengths of 100 mm suction hose are accessed from the rear of the appliance. Two lengths are stowed in tubes on either side of the appliance, with access from the rear. The third length is stowed in another tube alongside the ladder.

The three lengths are each 3.6 m long giving you about 10m of usable suction hose.

The hose is lightweight and semi-transparent and is fitted with 100mm Storz couplings.



Maintenance

To avoid damage to the pump do not run:

- dry, except momentarily and at low revs
- at high speed, unless it is discharging water.

A pump cooling line circulates water between the discharge side of the pump and the water tank. When either the tank-to-pump or inlet valves are open and water is available the pump is being cooled. There is no need to open deliveries for cooling.

Draining the water tank

The 2000lt water tank can be drained by one of the following methods:

1. Pump the water to waste:
 - Close the inlet valve.
 - Open the tank to pump valve and pump the water from the tank via a delivery.
2. Remove the collector head (without using the pump) and open the tank to pump valve, and drain to ground.
3. Through the sump gate valve:
 - Remove the cap attached to the 40mm gate valve that is fitted to the sump of the tank (accessible from underneath the appliance) and connect a length of 41mm forestry hose if required.
 - Open the valve fully and drain the tank.

Flushing the pump system

If pumping with water that is possibly contaminated or could be harmful to the pump, i.e. seawater or water with a high mineral content, the pump must be flushed with clean hydrant water after the incident.

Cleaning the flow meter

Regularly pumping a lot of very dirty water may cause a dirt-in-sensor fault. Oil in the water being pumped is most likely to cause faults. The sensor must be cleaned when the pump is serviced.

A fault in the flowmeter will not affect the pump's operation.

Air tank drains

Drain moisture from air tanks every time you complete a check of the appliance. The drains are opened by pulling on the lanyards that are clipped to the near side rear of the cab and below the feeder locker.



Air tank drain



Air tank drain

Notes

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