

Thank you for purchasing this high quality Banlaw product. Please read through and understand the information in this Product Data Sheet (PDS) BEFORE installation or operation of the product to avoid accidental personal injury or property damage.

1 PRODUCT DESCRIPTION

Banlaw introduced their first dry-break diesel refuelling Nozzles and Receivers into the market in the 1980's in response to a requirement for more ergonomic and robust "industry standard" refuelling couplings rated for higher diesel flowrates.



Figure 1 - Examples of Banlaw Receivers

Figure 1 shows examples of current Banlaw 23 and 43 series Receivers. The "23" series are rated to a maximum rated diesel flowrate of 800LPM (211GPM), and the "43" series are rated to a maximum rated diesel flowrate of 1000LPM (264GPM).

Banlaw Receivers are available in a variety of models (variants) within each series, including the Banlaw FuelTrack™ Receivers incorporating the Banlaw proprietary automatic (vehicle) identification – i.e. "auto ID" – feature.

The 23 series "Mining" Receivers are compatible with the industry standard refuelling "nozzles", commonly used as the means of refuelling plant equipment and smaller bulk diesel storage tanks in the mining and construction industries. Other 23 series models – e.g. "Rail" – and Banlaw 43 series Receivers are only compatible with a matching Banlaw Nozzle.

This document specifically covers the principal specifications, installation, commissioning, operation, maintenance and servicing requirements and guidelines of Banlaw 2" (DN50) Diesel Refuelling and Fluid Transfer Receivers. End-users requiring additional information should refer to the Banlaw website, contact Banlaw or your nearest authorised Banlaw distributor. Similarly, persons wanting information other Banlaw refuelling products and Receiver accessories should also refer to the website or same contacts.

CAUTION



*The content of this document is **not** meant to override or substitute any applicable Statutory, Regulatory, Customer/Site, etc. Health Safety (WHS) & Environment (HS&E) requirements.*

All works should only be performed by trained, qualified and competent personnel who are aware of the hazards associated with the constituent components of this installation in addition to the “system” as a whole. Failure to comply with these practices may result in death, serious bodily injury, loss of equipment and environmental damage.

*A risk assessment (job hazard analysis - JHA) should be conducted **PRIOR** to the start of any works or actions within this document. Whilst every effort has been made to ensure the execution of this document represents no HS&E hazard, Banlaw takes neither responsibility nor liability for the consequences and damages that may occur in the execution of works within this document.*

Persons conducting or otherwise involved with the execution of the works within this document and project have an obligation to ensure that all HS&E requirements are known and understood, and subsequently followed at all times.



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1.1 Glossary of Terms

The following glossary defines key terms used within this document.

Dry-Break	An industry term used to describe a fluid coupling which is of the “normally closed” or liquid tight state whilst ever this coupling remains disconnected from its mating coupling. Fluid (fuel) pressure may exist within the coupling, although no fluid discharge may occur whilst the coupling remains in the normally closed (dry-break) state.
Nozzle	A female refuelling coupling (coupler), normally attached to the end of the dispensing (supply) line (e.g. dispensing hose). A Nozzle engages with a Receiver to form a sealed (liquid-tight) connection for the pressurised transfer of a liquid (e.g. diesel).
Receiver	A male refuelling coupling (coupler), normally attached to the inlet of the vessel to be filled via the Nozzle.
Tank Vent	For the purposes (scope) of this document, a Tank Vent (or Vent) shall refer to a Banlaw Vent (or Vent of same kind) specifically designed to be compatible with the Banlaw quick-fill refuelling system.
Quick-Fill	An industry term used to describe a complete dry-break diesel refuelling system, consisting of a Nozzle, Receiver and Tank Vent(s). This system is the same kind as the Banlaw refuelling system, specifically a system which relies on the closure of the Tank Vent(s) once the Tank(s) is refilled, the short-term pressurisation of the Tank(s), and the automatic shut-off (i.e. closure) of the Nozzle.
Overfill Protection (OFP)	Refers to a system designed to supplement (complement) a Quick-Fill System, but where the OFP system acts as the primary (first) means of terminating the inflow of liquid into the tank without the need for pressurisation of the tank(s).
Flash Point (FP)	“The lowest temperature, corrected to a barometric pressure of 101.3kPa(a) (i.e. 1 atm), at which application of a test flame causes the vapour of the test portion to ignite under the specified conditions of the test.” [AS1940-2004].
Combustible Substance (Liquid)	“Any liquid, other than a Flammable Liquid, that has a Flash Point, and has a Fire Point that is less than its Boiling Point.” [AS1940-2004]. Other definitions denote a combustible liquid as having a Flash Point of >60.5°C (>140.9°F). In addition; “Combustible liquids that are stored, handled or processed at a temperature $T \geq (FP-6^{\circ}C)$ should be considered as flammable liquids. Zonal (hazardous area) distances for such liquids should be determined accordingly in accordance with this Standard unless a detailed classification indicates otherwise.” [AS/NZS 60079.10.1-2009 ZA.5].
Flammable Substance (Liquid)	“Liquids, or mixtures of liquids, or liquids containing solids in solution or suspension which give off a flammable vapour at temperatures of not more than 60.5°C (140.9°F), closed cup test, or not more than 65.6°C (150.1°F), open cup test, normally referred to as the Flash Point.” [AS1940-2004]. In addition; “Combustible liquids that are stored, handled or processed at a temperature $T \geq (FP-6^{\circ}C)$ should be considered as flammable liquids.
Diesel Fuel	Clean (filtered) automotive grade diesel fuels, including summer and winter blends. Excludes heavy distillates, e.g. bunker oils, heavy fuel oils (HFO), etc.
Explosive Atmosphere	“Mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapour, dust, fibres, or flyings which, after ignition, permits self-sustaining flame propagation.” [AS/NZS 60079.10.1-2009].
Hazardous Zone	“An area in which an Explosive Atmosphere is or may expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment.” [AS/NZS 60079.10.1-2009]. The classification of a Hazardous Zone is conducted in accordance with the governing Standards – typically specific to regions/countries, in the absence of universal (harmonised) Standards.
Spring Setting	Within this document “spring setting” applies to the setting of the automatic shut-off (closure) feature of a Nozzle. This feature is responsive to liquid (i.e. diesel) pressure within the Nozzle and can be adjusted by changing the specification of the Piston Spring within the Nozzle and/or the specification of the Poppet Spring within the Receiver. In simple terms, <i>increasing</i> the spring setting will <i>increase</i> the liquid pressure at which the Nozzle will automatically shut-off, and decreasing the spring setting will decrease the pressure required for shut-off.

1.2 System Overview

Banlaw Dry-Break Diesel Refuelling Receivers are a key component used in “quick-fill” diesel refuelling and other liquid (oils, coolants, etc.) transfer systems.

Banlaw Receivers are available in a variety of configurations to suit certain applications, including fluid asset management systems (i.e. Banlaw FuelTrack™, Banlaw ResTrack™). Receivers may be a unitary assembly, or the “front end” sub-assembly (kit) of a product. Figure 2 to Figure 6 illustrate examples of unitary Receivers, a Receiver (front end) Kit, and a Receiver front end on a Banlaw FillSafe™ Zero Flow Control Valve (BFCV50).



Figure 2 - AUS23KR Receiver



Figure 3 - BFCV50 Flow Control Valve



Figure 4 - BFT23KCAT Receiver



Figure 5 - BRM23KF Receiver Kit



Figure 6 - Examples of Unitary Receivers (Dust Caps not shown)

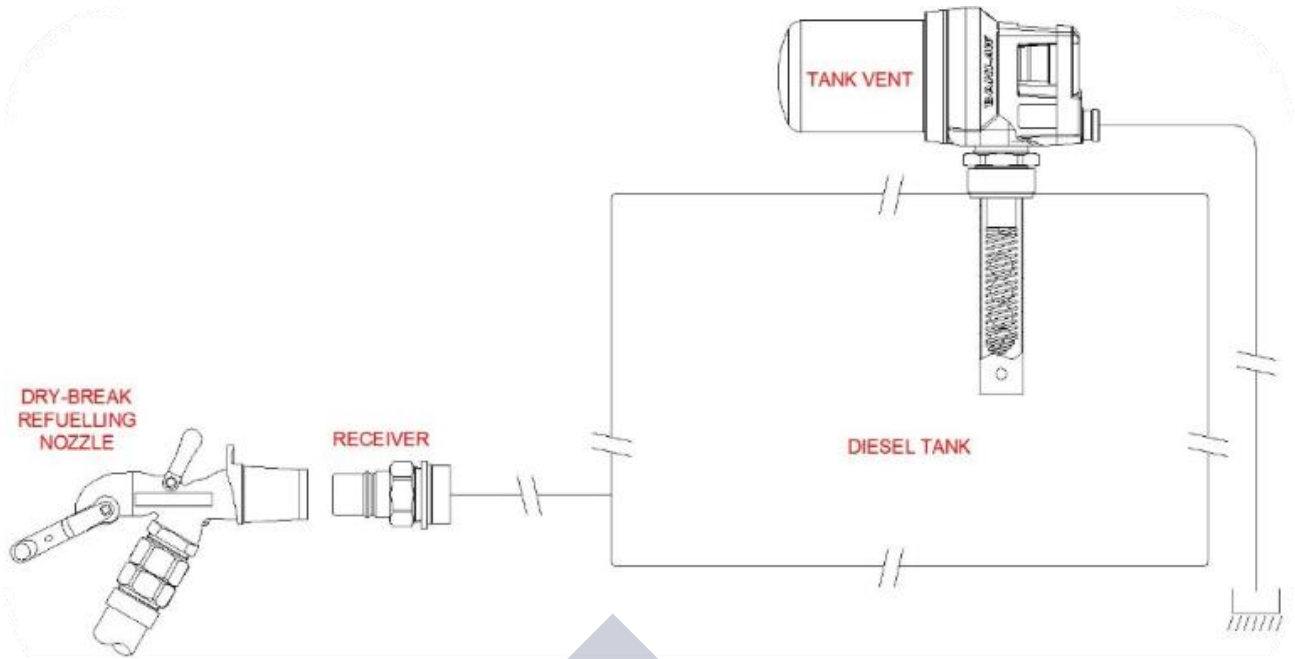


Figure 7 – Example of a “Pressurised Tank” Refuelling System

The example shown in Figure 7 is a basic “quick-fill” tank refuelling system incorporating a Banlaw Nozzle, Receiver, and Tank Vent. The means of fuel flow shut-off in such systems is by closure of the Vent, (internal) **pressurisation** of the tank, and automatic shut-off (closure) of the Nozzle.

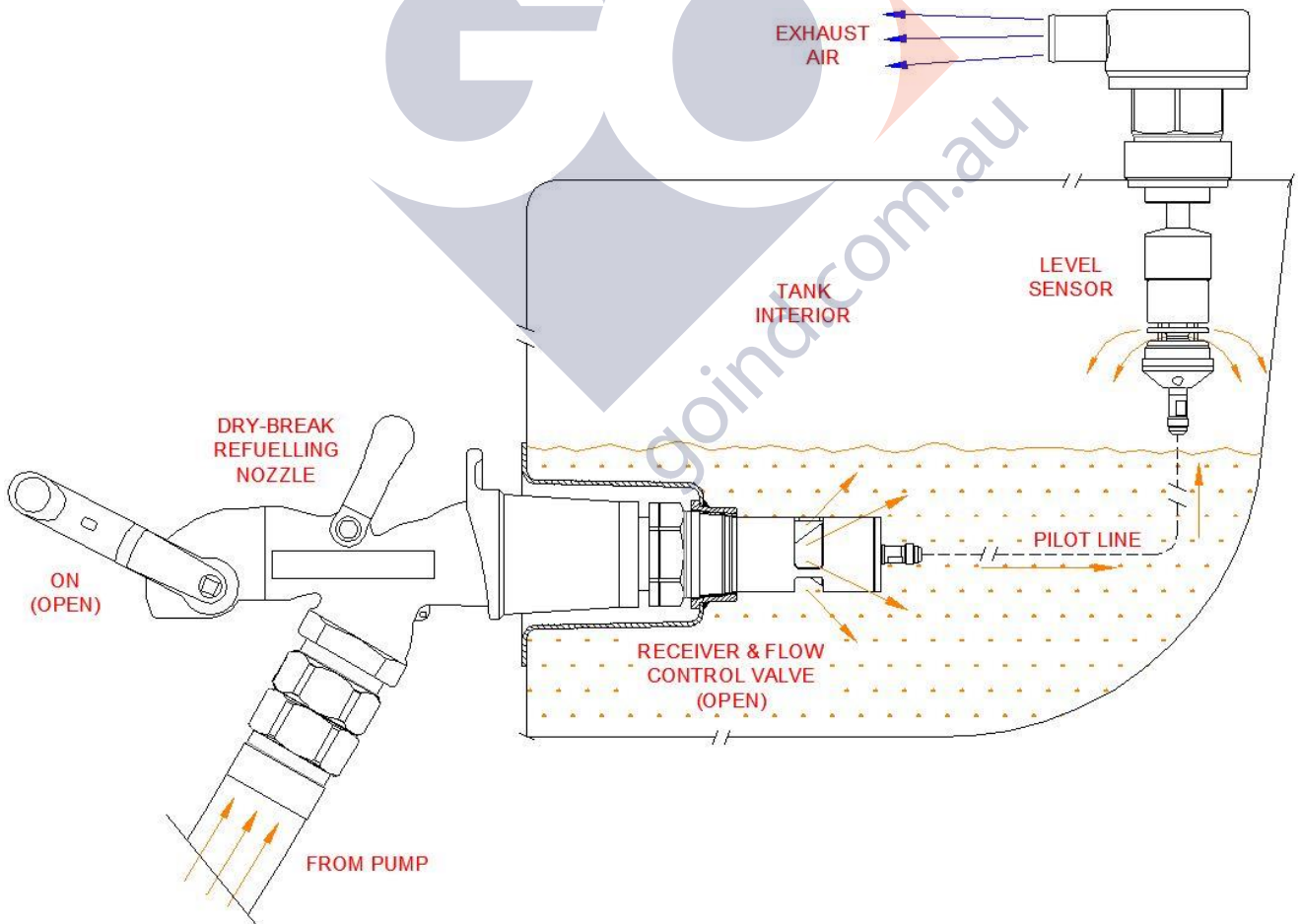


Figure 8 – Example of a “Pressurised Tank” Refuelling System with Separate OFF

The example shown in Figure 8 is a refuelling system using a separate means of tank OFP – specifically a Banlaw FillSafe Zero system which requires **no (internal) tank pressurisation**. In this example, the Banlaw Receiver forms the front sub-assembly of the Flow Control Valve.

Incorporating a Banlaw FuelTrack Receiver in either example (Figure 7 or Figure 8) provides a means of identifying the unique asset “tag” (code) of the tank within the FuelTrack or ResTrack system, with each refuelling as a fuel transfer “transaction”.

1.3 Key Features

Since their inception, Banlaw Receivers have evolved as a key part of Banlaw’s commitment to innovation and continuous improvement. Considered a market leader, Banlaw Receivers provide industry-leading standards of safety, reliability, durability and versatility.

Figure 9 illustrates the key external features of a Banlaw Receiver.



Figure 9 - Key External Features of Banlaw Receiver

Key advantages of Banlaw Receivers include;

- Banlaw 23 model “Mining” series Receivers (e.g. BRM23K series) suit Banlaw 800 model Nozzles and all industry standard Nozzles, e.g. Wiggins ZZ9A1 and ZZ9A2, FloMAX FN600 and FNBL, etc.
- Wearing and structural parts manufactured from stainless steel, **not** aluminium or plastic.
- Banlaw 43 model Receivers (e.g. BRM43K series) suit only the Banlaw 1000 model Nozzles, allowing the higher flowrate capability (1,000LPM, 264GPM) of the 43 and 1000 combination to be assigned to dedicated high flowrate dispensing lines, avoiding the risk of a high flowrate line dispensing into a tank(s) with a lower flowrate capability.
- Supplied with Dust Cap – either engineering plastic or anodised aluminium.
- “Arctic” (cold temperature) models available for safe and reliable operation in extreme cold climates.
- Lip style piston seal used on Poppet, providing superior sealing and extended service life.
- Manufactured, assembled and factory **tested** in accordance with Banlaw’s ISO9001 certification.
- Banlaw FuelTrack™/ResTrack™ Receiver models available to support the **automatic identification (auto ID)** functionality of the Banlaw ResTrack™ system – arguably the most **secure** fuels and resource management system of its kind available in the market.
- Available in pre-set spring settings (refer section 1.4) to achieve set variations in the shut-off pressure of a Nozzle used with the Receiver, e.g.;
 - “Light” (L); *increases* the liquid pressure at which a Nozzle automatically closes.
 - “Medium” (M); the industry standard Receiver setting.
 - “Medium-Heavy” (MH); *decreases* the liquid pressure at which a Nozzle automatically closes.

- “Heavy” (H); further *decreases* the liquid pressure at which a Nozzle automatically closes.

1.4 Receiver Spring Settings

Each Receiver is available with a **pre-set** spring setting, specifically the setting (specification) of the poppet spring. Banlaw documents BPA-30 and EBL-33 provide detailed information on the safe and proper selection of Nozzle and Receiver spring setting **combinations**. Please contact Banlaw for information on Receiver (and Nozzle) Spring Settings.



Selection of the required Spring Setting should be performed prior to purchase of a Receiver. **The adjustment of the Spring Setting within a Receiver is not possible once the Receiver is purchased. The use of a Receiver with an inappropriate Spring Setting is potentially unsafe, and likely to increase the risk level of hazards such as:**

- Overfilling of the tank(s).
- Internal over-pressurisation of the tank(s).
- Fuel spillage.
- Personal injury, fire, or explosion.

Please contact Banlaw for information on Receiver Spring Settings.

“IF IN DOUBT, ASK!”

The use of a Receiver with a pre-set (poppet) spring setting allows the combination of a Nozzle and Receiver – each with pre-set spring settings – to best suit a *specific* refuelling application. For example, applications with lower system (i.e. dynamic + static) fluid head pressures and/or tank(s) with lower safe (design) working pressure ratings may benefit from a Receiver with a higher (i.e. heavier) spring setting to decrease the fluid pressure – and internal tank pressure – at which the Nozzle will automatically close, terminating the flow of fuel into the tank(s). Conversely, applications with higher system fluid head pressures may benefit from a Receiver with a lower (i.e. lighter) spring setting to increase the fluid pressure at which the Nozzle will automatically close. In the absence of a “zero tank pressure” overfill protection (OFP) system, effectively managing the “balance” between mitigating premature nozzle shut-off and over-pressurisation of a tank is an important requirement for the variety of possible refuelling applications.

Figure 10 is a simplified diagram illustrating the interface between the nozzle and receiver during refuelling and the **forces** involved in opening or closing the nozzle.

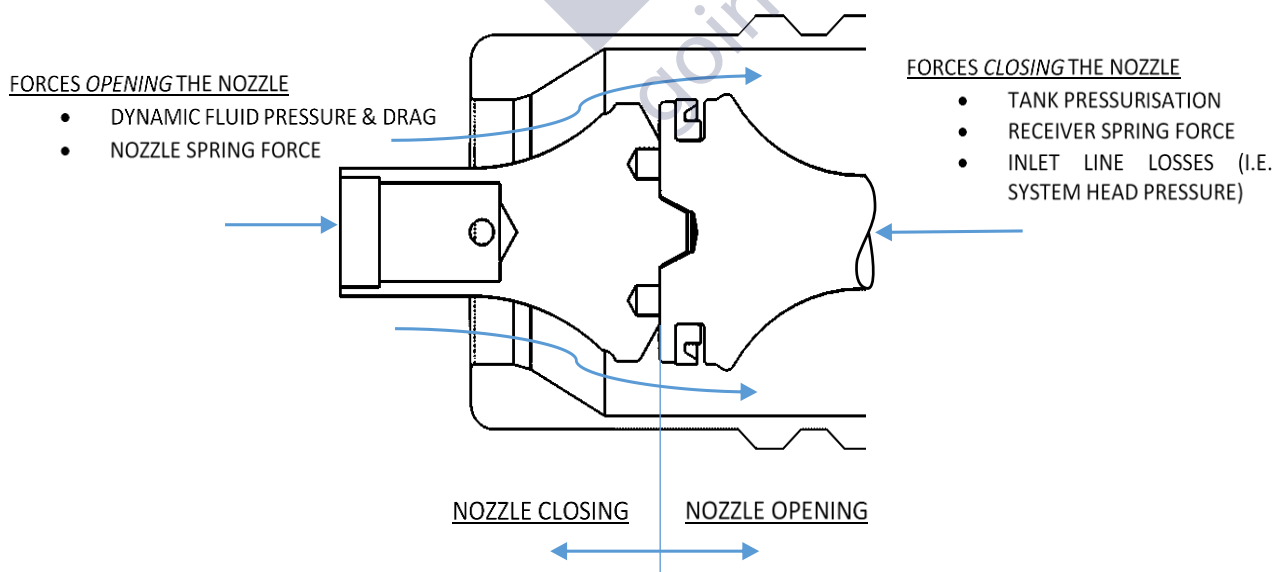


Figure 10 - Simplified General Arrangement of Nozzle and Receiver Interface

Figure 11 provides a basic illustration of the relationship between Nozzle and Receiver spring settings.

LOWER NOZZLE SHUT-OFF PRESSURE

LIGHTER NOZZLE SETTING



HEAVIER RECEIVER SETTING

HIGHER NOZZLE SHUT-OFF PRESSURE

HEAVIER NOZZLE SETTING



LIGHTER RECEIVER SETTING

Figure 11 - Relationship Between Nozzle and Receiver Spring Settings

The (poppet) spring setting of a Banlaw fuel receiver is marked onto each receiver assembly – refer example in Figure 12. Settings may be marked with a punch or laser etching. Receivers with the Medium or “Standard” spring setting do not incorporate the Alpha Character within their part number, e.g. “BRM23K – Medium Mining Receiver to suit 800LPM Nozzles”.

Receiver Spring Setting	Alpha Character	Nozzle Shut-Off Pressure Offset (± 5 kPa)
Light	L	+15 kPa (2.2psi)
Medium (Standard)	M	0 kPa
Medium-Heavy	MH	-15 kPa (2.2psi)
Heavy	H	-25 kPa (3.6psi)

Table 1 - Receiver (Poppet) Spring Settings

The shut-off pressure offset in Table 1 is the difference in Nozzle shut-off pressure experienced by selecting a Receiver setting as compared to a Medium Receiver (Standard).

Examples;

- Replacing a Medium (standard) receiver with a Light receiver will **increase** the shut-off pressure by 15 kPa.
- Replacing a Light receiver with a Heavy receiver will **reduce** the shut-off pressure by 40 kPa.

Please refer to the Product Data Sheet (PRH-REF-70) for information on Nozzle spring settings.



Figure 12 - Examples of Spring Setting Markings

Note:

Most refuelling applications utilising a Banlaw or similar Nozzle and Receiver combination are accommodated using **“Medium” (M) Receiver** spring settings; however, growing use of larger plant equipment and higher refuelling flowrates is creating a requirement for **Lighter Receiver** spring settings. In addition, the use of non-metal (i.e. plastic, resin) fuel tanks are often best served using a **Heavier Receiver** spring setting.

To provide the highest practicable level of protection, Banlaw recommends a suitable “zero tank pressure” overfill protection (OFP) system – e.g. Banlaw FillSafe™ - is considered for all tanks.

1.5 Part Numbering and Receivers Available

Please refer to Banlaw brochures or the Banlaw Product Catalogue for a full inventory of Receivers available. Table 2 details the key aspects of Receiver part numbers, with examples.

CHARACTER	DESCRIPTION	EXAMPLES
“AUS”	Generic Prefix (1) – Standard Receivers	AUS23
“BRM”	Generic Prefix (2) – Standard Receivers	BRM23K
“BFT”	Generic Prefix (3) – FuelTrack (Auto ID) Receivers	BFT43K
“23”	23 Series – max. diesel flowrate of 800LPM (211GPM)	BRM23K
“43”	43 Series – max. diesel flowrate of 1,000LPM (264GPM)	BRM43K
“R”	Banlaw “Rail” series Receiver	AUS23KR
“B”	Banlaw “Hydraulic” series Receiver	AUS23KB
“K”	Receiver supplied with a Dust Cap	(Applies to Most Receivers)
“CT”	Banlaw “Arctic” (Cold Temperature) rated Receiver	BRM23K-CT
“CAT”	With Caterpillar (Cat) split-flanged outlet connection	BFT23KCAT

Table 2 - Key Part Number Details

1.6 FuelTrack (Auto ID) Receivers

Banlaw FuelTrack Receivers are easily identified by the design of the Poppet. Standard Receivers use a stainless-steel poppet, whereas FuelTrack Receivers use a composite Poppet – refer



Figure 13.



Figure 13 - Standard Receiver (left) and FuelTrack Receiver (right)

1.7 Nozzle and Receiver Compatibility

Table 3 details the cross-compatibility of Banlaw Nozzles and Receivers.

BANLAW NOZZLE & RECEIVER COMPATIBILITY	
Nozzles Series	Receivers Series
Banlaw 800 “Mining” Banlaw BAMS5 “Bulk Transfer”	Banlaw 23 “Mining” Wiggins ZN2, JNC2, JNX, etc. Caterpillar FloMAX International FR, FRA, FRS, etc. Fast Fill Systems R150, R150CV, etc. # See also Note 1 (below)
Banlaw FuelTrack 800 “Mining”	Banlaw FuelTrack 23 “Mining” # See also Note 2 (below)
Banlaw 800 “Rail” Banlaw BARS5 “Bulk Transfer”	Banlaw 23 “Rail”
Banlaw FuelTrack 800 “Rail”	Banlaw FuelTrack 23 “Rail”
Banlaw 800 “Hydraulic” Banlaw BAH55 “Bulk Transfer”	Banlaw 23 “Hydraulic”
Banlaw FuelTrack 800 “Hydraulic”	Banlaw FuelTrack 23 “Hydraulic”

Banlaw 1000 Banlaw BAMS6 “Bulk Transfer”	Banlaw 43
Banlaw FuelTrack 1000	Banlaw FuelTrack 43

Table 3 - Banlaw Nozzle and Receiver Compatibility

- NOTES:**
1. Receiver OEM’s and Part Numbers subject to change. Banlaw 800 “Mining” series Nozzles will also suit compatible Receivers of the same type (basic design) manufactured by OEM’s not listed.
 2. Banlaw FuelTrack 800 “Mining” series Nozzles will suit Receivers compatible with the Banlaw 800 “Mining” series Nozzles, however the automatic identification (auto ID) feature of the FuelTrack (or Banlaw ResTrack) system will be **inoperable**.
 3. The use of a Nozzle and Receiver combination deemed as incompatible is not condoned by Banlaw and will create potentially serious safety and environmental hazards.
 4. Applications where a Banlaw product is used with a non-Banlaw (i.e. third party) product will consider the specifications of **each** product as a **combination**. In **all** such cases;
 - a. **Minimum** specification (lower threshold or limit); the **highest** specification nominated by Banlaw or the Receiver OEM shall apply;
 - i. Example 1; when a Receiver with no minimum flowrate limit is used with a Nozzle rated to a minimum of 90LPM (24GPM), the minimum permissible flowrate of this combination shall be 90LPM (25GPM).
 - ii. Example 2; when a Banlaw “arctic” series Nozzle rated to -51°C (-60°F) is used with a Receiver rated to -10°C (14°F), the minimum recommended operating temperature shall be -10°C (14°F).
 - b. **Maximum** specification (upper threshold or limit); the **lowest** specification nominated by Banlaw or the Receiver OEM;
 - i. Example; when a Nozzle rated to 800LPM (211GPM) is used with a Receiver rated to 570LPM (150GPM), the maximum permissible flowrate of this combination shall be 570LPM (150GPM).

2 IMPORTANT RESTRICTIONS ON THE USE OF THIS PRODUCT



1. The safe installation and subsequent operation of a Banlaw product relies on the completion of all necessary **“due diligences”** for the assessment of the Banlaw product(s) being suitable for the intended application(s). Such an assessment is best achieved through the cooperation of the supplier/OEM (Banlaw) and the customer or end-user. Once such an assessment deems the Banlaw product(s) to be suitable, the customer or end-user shall ensure effective **“change management”** applies should any prominent or influential aspect of the application (upon which the initial assessment was based) be subject to change and may affect the ongoing suitability (i.e. safety and proper function) of the Banlaw product.
2. Some Banlaw products incorporate external and internal components manufactured from **aluminium**. Products containing **external (exposed) aluminium** are typically unsuitable for use within an underground coal mine, or otherwise within an area where the use of external aluminium components (or other materials within the product) are prohibited for use in such areas in accordance with applicable governances.



1. During October 2010 Banlaw conducted a self-assessment (Banlaw document EBL-19) of the Banlaw dry-break diesel refuelling Receivers (and mating Banlaw Nozzles) under the requirements of the European Union (EU) Pressure Equipment Directive (PED) 97/23/EC. The outcome of this assessment was that these products do not require the CE mark when used in accordance with the Banlaw product specifications. Unless noted otherwise by Banlaw, this product has *not* been assessed under any other Regulatory or Industry Standard, Code, Directive, Guideline or other governance which may apply to the use of this product in applications where a governance applies. Please consult Banlaw *prior* to installation if in doubt.
2. Please refer to Table 3 for details of **compatibility** of Banlaw Nozzles with Banlaw and non-Banlaw Receivers. The use of a Nozzle and Receiver combination deemed as incompatible is not condoned by Banlaw and will create potentially serious safety and environmental hazards.
3. Banlaw Dry-Break Refuelling products are designed and tested for use with **clean** (i.e. filtered) automotive grade diesel fuels, including commercial bio-diesel blends. This Banlaw product is *not* recommended for use with waste diesel fuel, or with diesel fuel containing contamination levels beyond those stipulated by governances and guidelines such as the current Worldwide Fuel Charter (WWFC) and fuel quality requirements of modern diesel engine manufacturers. *The use of this product with fuel of higher contamination levels may cause the improper operation (failure) of the product and other detrimental effects.* Banlaw recommends adequate fuel contamination controls (e.g. filtration) for all fuels passing through a Banlaw Nozzle;
 - a. The use of a Banlaw Nozzle with an alternate liquid type – e.g. a light oil – may be conditionally acceptable **after** consultation with Banlaw.
 - b. Banlaw “Hydraulic” Nozzles (i.e. BNH800 series) and Receivers have traditionally been used with solcenic oils without incident.
4. Banlaw products are *not* recommended for use with AdBlue, corrosive, oxidizing, acids, alkaline, solvents, flammable, explosive or gaseous (compressible) fluids or with an alternative fluid (or substance) whose properties may affect the safety, function or reliability of the product.
5. Specifically, for Banlaw **“Arctic”** series products, noticeable physical changes (e.g. clouding, additive drop-out, agglomeration, thickening, etc.) in the diesel fuel passing through the product may cause reduced functionality of the product.

3 PRODUCT SPECIFICATIONS

BANLAW 23 MODEL RECEIVERS	
Max. Diesel Flow Rate LPM (GPM)	800LPM (211GPM)
Min. Flow Rate LPM (GPM)	Not Applicable
Operating Temp. Range °C (°F)	-10°C (14 °F) to 55°C (131°F) <i>“Arctic”</i> (-CT) series; -51°C (-60°F) to 55°C (131°F)
Max. Internal SWP kPa (psi)	2,000kPa (290psi)
Compatible Fluid Types	Clean (filtered) Automotive Diesel Fuels, incl. Bio-Diesel Blends Refer also section 2.
Principal Material Composition	Stainless Steel, Zinc Plated Steel, Viton®, Acetal, Fluorosilicone, Nylon, Aluminium, Brass
Process Connection (Outlet)	Varies – please consult Banlaw Product Data Sheet (PDS)

Nom. Mass of Receiver	Varies – please consult Banlaw Product Data Sheet (PDS)
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BANLAW 43 MODEL RECEIVERS	
Max. Diesel Flow Rate LPM (GPM)	1,000LPM (264GPM)
Min. Flow Rate LPM (GPM)	Not Applicable
Operating Temp. Range °C (°F)	-10°C (14 °F) to 55°C (131°F) <i>“Arctic”</i> (-CT) series; -51°C (-60°F) to 55°C (131°F)
Max. Internal SWP kPa (psi)	2,000kPa (290psi)
Compatible Fluid Types	<i>Clean</i> (filtered) Automotive Diesel Fuels, incl. Bio-Diesel Blends Refer also section 2.
Principal Material Composition	Stainless Steel, Zinc Plated Steel, Viton®, Nitrile (NBR), Acetal, Fluorosilicone, Nylon, Aluminium, Brass
Process Connection (Outlet)	2” NPT (M)
Nom. Mass of Receiver & Dust Cap	≈ 1.4kg (3.2lb)

- Legend:**
- “SWP”;** Maximum recommended Safe Working Pressure
 - “LPM”;** Litres per minute (volumetric flowrate)
 - “GPM”;** US Gallons per minute (volumetric flowrate)
 - “Max.”;** Maximum (upper limit)
 - “Min.”;** Minimum (lower limit)

- Notes:**
1. All pressure data refers to the *internal* fluid pressure, where each product is in “as new” condition.
 2. The core functionality of *“Arctic”* (CT) series Receivers (and Banlaw Nozzles) has been tested in an independent laboratory at -51°C (-60°F). These products are fitted with fluid seals rated for operation below -60°C (-76°F).

4 INSTALLATION & COMMISSIONING GUIDELINES

This Installation & Commissioning Guide is general and is not meant to replace or override installation guidelines that arise out of a *due diligence* assessment of a Banlaw product for a specific (intended) application.

The scope of this section applies to this Receiver, e.g. BRM23K, etc. Where other products are mentioned – e.g. Nozzles and Swivels – end-users must refer to *separate* Banlaw documentation covering each product *prior* to their installation.

Note:



General Installation Notes;

1. Conduct a **Job Hazard Analysis** (JHA) *prior* to install to mitigate health, environmental and equipment hazards.
2. Do **NOT** install any parts that are damaged or are otherwise faulty.
3. Do **NOT** install parts which are not compatible with mating parts or parts which do not satisfy the specifications of the system.
4. Conduct all necessary measures to **prevent the ingress of contamination** into the Banlaw Receiver and other components.
5. Only engage threads of the same thread type. Ensure all threaded connections are clean and in good condition. Avoid over-tightening.
6. An appropriate thread sealant is recommended on threaded process connections (i.e. outlet) of the Receiver. Use **sparingly** and avoid excess use of Loctite and related products.
7. Apply a grease or suitable lubricant to O’rings and other seals prior to install.
8. Use consumables (e.g. Loctite products) strictly in accordance with the OEM Safety Data Sheet (SDS) and operating guidelines. Do not use consumables beyond their expiry date.

4.1 Pre-Installation Guidelines



- Any proposed installation/application/operation of the Banlaw Receiver shall satisfy the Specifications detailed in section 3, and other requirements within this document. As diesel refuelling is typically conducted at elevated pressure and flowrates, the specifications for any other parts & equipment included within this install must also comply with the parameters (e.g. pressure, temperature, flowrate, etc.) of the application. **Failure to ensure the Receiver and other equipment are used strictly in accordance with their applicable specifications will introduce potentially serious safety hazards.**
- Ensure a Receiver with the correct Spring Setting (refer section 1.4) is being installed. Failure to select the proper Receiver setting will increase the risk of hazards such as;
 - Overfilling and the likely internal over-pressurisation of the tank(s).
 - Spillage of fuel, environmental damage, or fire.
 - Premature shut-off of the Nozzle, i.e. automatic shut-off of the Nozzle before the tank is filled.
- This Product shall only be used by **competent persons**, trained and/or directly supervised in their safe and proper operation.

4.2 Installation Procedure



In preparation for the installation of a new Receiver, *the fuel level within the tank must be below the tank fill point*. This will prevent the discharge (spillage) of fuel from the tank once the existing Receiver or other tank refuelling coupler is removed. Drainage may not be necessary if there is a valve or similar means of positively isolating the tank from the Receiver connection.

1. Complete all necessary hazard mitigation, monitoring and control actions as per the JHA.
2. Once the tank is ready to accept this new Receiver, remove the Receiver from its packaging (leave within packaging until just prior to install). Remove any dust caps, plugs etc. from ports.
3. Check that the Receiver and Dust Cap are in good condition and free of damage. A defective product should not be installed.
4. Ensure the Receiver Dust Cap lanyard is secured by installing the supplied spring-loaded clip around the **top** (major diameter) of the 2" NPT (M) thread – refer Figure 16. If this is impractical the spring clip may instead be removed, and the lanyard loop secured adjacent the tank fill point using a secure fastener. Banlaw recommends the Dust Cap lanyard is properly secured to help prevent discarding of the Dust Cap.
5. For Receivers with threaded process connections (outlets), apply thread sealant – e.g. Loctite 567 – **sparingly** to the thread. Ensure the mating threaded port on the tank inlet is in good condition, clean, dry and free from any debris and contamination. Align the Receiver concentrically with the port and carefully install the Receiver into the tank port. Using a 63.5mm AF hex long socket – e.g. Banlaw AUSRSOCKET – tighten the Receiver into the port by the required torque or threaded engagement. Figure 16 shows an example of a Banlaw Receiver and Dust Cap installed.

Note:



- Avoid overtightening. With appropriate thread sealant, **a 2" NPT threaded connection should be tightened to approximately 1.5 to 2 turns (i.e. 5mm, 13/64") past hand-tight engagement**. I.e. NPT threads are tightened according to the length of thread engagement, not a torque.
- Do **NOT** use power tools, i.e. impact wrenches etc.
- Do **NOT** grip the front cylindrical section of the Receiver for tightening or untightening purposes (refer Figure 15) – use only the **full** hex of the Receiver body (refer Figure 14).

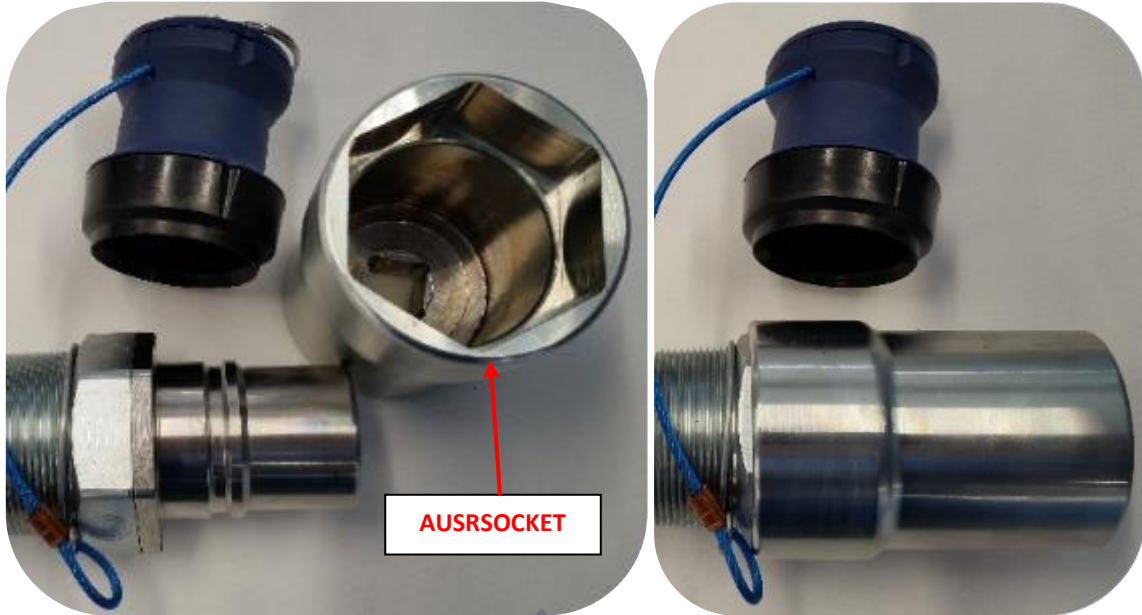


Figure 14 - Banlaw AUSRsocket



Figure 15 - Improper Use of Hand Tool



Figure 16 - Banlaw Receiver Installed with Dust Cap

4.2.1 Banlaw FuelTrack Receivers

Banlaw FuelTrack™ “auto ID” Receivers – e.g. **BFT23KS** and **BFT43KS** – incorporate a unique serial ID tag device, whose ID tag (code) is assigned to the tank or plant equipment (asset) onto which it is installed. Once the tag is assigned, the onsite Banlaw FuelTrack or ResTrack management system automatically identifies the code and assigns any fuel dispensed into the tank/equipment to its asset number. FuelTrack incorporates several security features which include the prohibition of fuel dispensing into a tank/equipment which does not have a Banlaw BFT receiver fitted, or whose ID tag is not registered within the FMS database. It is therefore important that **the installation process of a BFT series Receiver includes the entry of the unique receiver tag into the FMS database** – please liaise with your site FMS manager (e.g. fuel champion) for assistance. Figure 17 illustrates an example (only) of a BFT ID tag, clearly marked on the FuelTrack receiver. The ID tag is also recorded on a leaflet included within the Receiver packaging.



Figure 17 - Example of Unique BFT Receiver ID Tag

4.3 Commissioning Guidelines

There are no specific commissioning requirements for a Banlaw Receiver. Banlaw do however recommend witnessing tank pressures and system performance during the initial refuelling process of each unique refuelling configuration. It is especially beneficial to confirm system performance when a new Receiver (or Nozzle) is installed, or other refuelling system components are modified. These checks provide confirmation that the system is configured correctly and operating within safe working parameters.

Confirmation of initial system performance will help prevent premature nozzle shut off and tank overflow. Additionally, these checks ensure that operators do not need to manually override the shut-off mechanism of the nozzle or are conducting other improper operating practices,

The incidence of operators who manually override the automatic tank pressure shut off function of Banlaw Nozzles by holding the nozzle in the open position is a principal indication that the system is not configured properly or being maintained sufficiently.

5 PRINCIPLES OF OPERATION



- **A Banlaw product should only be used by trained personnel, deemed competent in its proper operation.** For example, the operation of a Dry-Break Refuelling system by untrained persons introduces potentially serious health and safety risks.
- Any incidents or problems involving the operation of the Receiver – and the dry-break refuelling system – should be promptly reported and investigated.
- Equipment that is damaged, leaking or otherwise unfit for operation must not be used, but must instead be replaced or repaired prior to use of a diesel refuelling system.
- **It is recommended the refuelling event is monitored (supervised).** In the event of a system malfunction or other incident, this will allow personnel to react promptly to avoid further escalation of the hazards.
- **No attempt shall be made to modify a Banlaw Receiver, unless any such modification is endorsed by Banlaw.** For example (only), no attempt shall be made to attach a pipe, hose or other “fitting” to the Receiver to allow it to be used for purposes for which it is not designed – i.e. the “splash-filling” of a tank (refer Banlaw BPA-27).

Refuelling couplings, e.g. nozzle and receiver, that are contaminated with dust and other build-up ***must be cleaned prior to use***. This will help prevent;

- Contamination entering the system, subsequently increasing the probability of system failure.
- Contamination from entering the fuel stream, increasing the probability of engine fuel system problems.
- Accelerated wear & tear of mating parts.
- Damage to fluid seals, creating fuel leakage.
- Difficulty in properly engaging/connecting the nozzle and receiver.

Note:



This document does not include specific information on the procedure for the safe and proper operation of a Banlaw Receiver within a fuel transfer (e.g. refuelling) system. Users are instead asked to refer to alternate Banlaw documents such as PRH-REF-70 for such information.

6 MAINTENANCE & SPARE PARTS

Banlaw Receivers are not field serviceable items. Replacement Banlaw Receivers are available from Banlaw or your nearest authorised Banlaw agent.



To maintain the safety, performance and reliability of Banlaw products;

- Only genuine Banlaw spare parts are to be used.
- Products should not be tampered with or modified in any manner not endorsed by Banlaw.

The following genuine Banlaw spare parts are available to suit Banlaw Receivers.

BANLAW PART No.		DESCRIPTION
Standard	"Arctic"	
AUS23C	AUS23C-CT	Receiver Dust Cap to suit 23 series Receivers
AUS43C	AUS43C-CT	Receiver Dust Cap to suit 43 series Receivers

Table 4 - Receiver Spare Parts

6.1 Preventative Maintenance

The integrity (sound working condition) of refuelling couplings and the system as a whole is critical to ensure all equipment can be operated in a safe and proper manner.

The working life of equipment depends on many factors, including the environment in which it operates. Dusty and dirty environments more prone to contamination build-up in equipment such as refuelling couplings cause accelerated wear & tear, as does excessive contamination within the fuel stream. Due to the many varied operating environments in which Banlaw equipment is used, any preventative maintenance information provided within this document shall be used a guide – unless noted otherwise.

This Receiver contains relative moving parts and fluid seals which will wear after a period of use. Such wear will be accelerated by contamination within refuelling couplings and within the fuel stream itself. Excessive contamination within the fuel stream may even cause malfunction of the dry-break refuelling equipment and the system.

The following preventative maintenance guidelines apply to Banlaw Receivers;

1. Ensure adequate controls and condition monitoring are in place to ensure the contamination levels (and other specifications) of your fuel supply are maintained – **PREVENT** poor quality fuel entering your site’s fuel infrastructure and plant equipment.
2. Install inline (bulk) filtration on all diesel dispensing lines – contact Banlaw for advice.
3. Maintain the use of the Receiver Dust Cap and Nozzle Anchors, Holsters, or Dust Caps.
4. Remove any contamination from the dry-break Receiver (front end) **prior** to connecting a Nozzle – refer contaminated Receiver in Figure 18.
5. Visually inspect the Receiver for excessive wear & tear or damage **prior** to connecting a Nozzle.
6. Replace a Receiver;
 - a. When the Receiver is excessively damaged – refer examples in



- b. Figure 19 and Figure 20.
- c. When fuel leakage occurs from the front (Poppet seal) of the Receiver.

d. Otherwise, no later than every 3 years (mining) and 5 years (rail).



Figure 18 - Example of a Contaminated Receiver - No Dust Cap Fitted

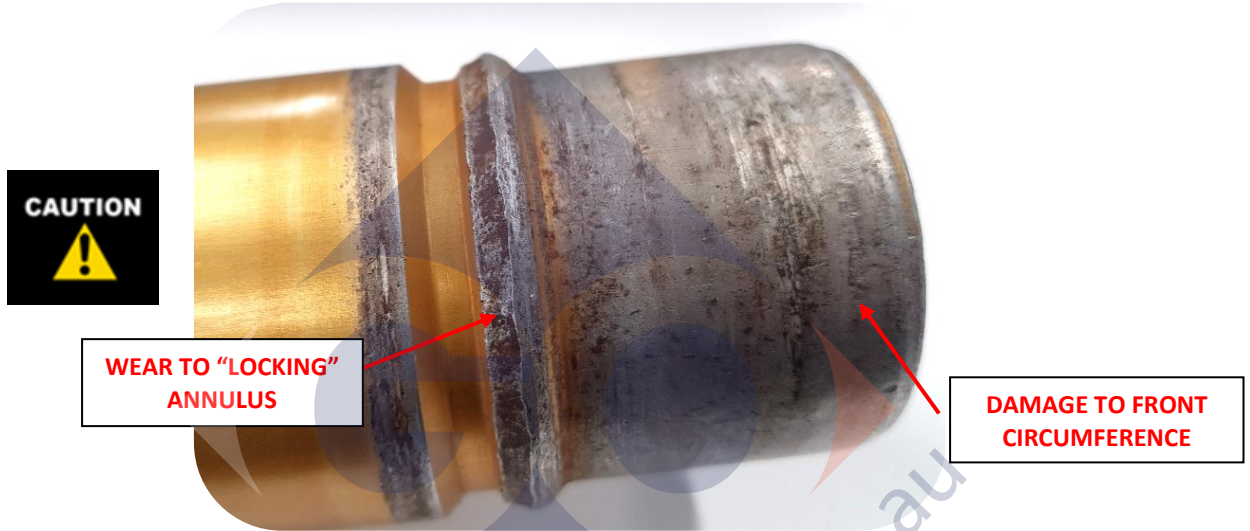


Figure 19 – Excessive Wear to Ball Lock Annulus



Figure 20 - Wear to Front of a non-Banlaw Aluminium Receiver

Please contact Banlaw or your nearest Banlaw agent for more detailed preventative maintenance information on a specific product application.

6.2 Banlaw Onsite Maintenance

Clients can benefit from a **Banlaw Service Level Agreement (SLA)** to assist in the preventative and corrective maintenance of refuelling systems onsite, in addition to other diesel, fuels, oils and coolant infrastructure. This support is provided for Banlaw *and* third-party products. Clients with an SLA can *focus on their core business activities* and allow experienced Banlaw technicians and engineers to help keep such infrastructure operating at optimum *safety, performance and reliability*.

7 TROUBLESHOOTING

This section provides troubleshooting recommendations for the range of Banlaw dry-break Receivers (and Nozzles) when installed, operated and maintained in accordance with Banlaw guidelines.

PROBLEM	PROBABLE CAUSE AND SOLUTION
Premature nozzle shut-off during refuelling.	<ul style="list-style-type: none"> • Increased system head pressure downstream of (after) the Receiver. Potential causes include; <ul style="list-style-type: none"> ○ Excessive restriction to airflow from the tank vent(s) – check air filters for condition and breather hoses for obstructions (e.g. mud). ○ The flow control valve within the OFP system is throttling the flow or faulty – investigate. ○ Premature operation of the OFP system – wait for fuel in the tank(s) to settle and restart refuelling. • <u>Nozzle</u> spring setting too “low” (light) for application. Contact Banlaw or your nearest Banlaw agent for advice (refer also section 1.4). • <u>Receiver</u> spring setting to high (heavy) for application. Contact Banlaw or your nearest Banlaw agent for advice (refer also section 1.4). • Nozzle flow rate above recommended maximum. Reduce delivery flow rate. • Excessive free-play (mechanical wear) in the Nozzles operating mechanism - replace Nozzle and have faulty Nozzle serviced by an authorised Banlaw repair agent. • A component in the system has been replaced with a component which causes increased flow restriction – investigate and return system to the previous state. • Nozzle flow rate below recommended minimum. Increase delivery flow rate. • Faulty tank overfill protection (OFP) system. • Faulty Nozzle - replace Nozzle and have faulty Nozzle serviced by an authorised Banlaw repair agent. • A foreign object is caught within the Nozzle and/or Receiver – investigate.
Refuelling operators manually overriding the automatic shut-off function of the Nozzle	<ul style="list-style-type: none"> • Consult with operators to locate the specific offending refuelling applications - investigate root cause(s) and rectify. • Confirm appropriate design and configuration of refuelling systems on site – standardise as far as practicable the refuelling equipment on plant equipment of similar configurations. • Provide training to refuelling operators stressing importance of not “jamming” nozzles open.

PROBLEM	PROBABLE CAUSE AND SOLUTION
Tank overfilling	<ul style="list-style-type: none"> • If fitted, the primary “zero tank pressure” OFP system is faulty – investigate and rectify. • If using the “pressurised tank” feature of the dry-break refuelling system as a means of OFP; <ul style="list-style-type: none"> ○ Faulty (i.e. leaking) tank vent(s) – replace vent(s). ○ Fuel and/or air leakage from tank(s) <i>after</i> closure of the vent(s) – identify source of leakage and effectively seal (e.g. leaking manual filler point cap). • Nozzle or OFP system flow rate outside the recommended range. Maintain flowrate within the recommended minimum and maximum range. • Nozzle operating handle being forcibly held in the ON (open) position during refuelling – assess root cause(s) and rectify. • Nozzle is reopened after the tank is filled – train operator(s) on correct nozzle operation. • <u>Nozzle</u> spring setting too “high” (heavy) for application. Contact Banlaw or your nearest Banlaw agent for advice. • Tank Vent pressure relief valve setting <i>below</i> tank pressure required for Nozzle shut-off. Contact Banlaw or your nearest Banlaw agent for advice.
Fluid Leakage from Receiver	<ul style="list-style-type: none"> • Faulty fluid seal(s) within Receiver – replace Receiver. • Over-pressurisation of Receiver – maintain fluid pressure under the SWP. • Temperature below minimum operating temperature of the Receiver – replace Receiver with a Banlaw “arctic” series Receiver. • A foreign object is caught within the Receiver – investigate. • Fuel overly contaminated – investigate and rectify.
Fluid Leakage between Nozzle and Receiver during Refuelling	<ul style="list-style-type: none"> • Faulty fluid seal(s) within Nozzle – replace Nozzle and have faulty Nozzle serviced. • Sealing surfaces on Receiver are damaged – replace Receiver. • Contamination (dirt, mud etc.) build-up within Nozzle – clean Nozzle and Receiver or replace Nozzle and have faulty Nozzle serviced. Ensure Receiver Dust Caps and a Nozzle Holster or Anchor are used. • Fuel overly contaminated – investigate and rectify. • Temperature below minimum operating temperature of the Nozzle – replace Nozzle with a Banlaw “arctic” series Nozzle.
Nozzle Uncouples from Receiver During Refuelling	<ul style="list-style-type: none"> • Incorrect combination of Nozzle and Receiver. Confirm compatibility. Only use the correct combination of Nozzle and Receiver. • Worn ball lock mechanism on Nozzle and/or Receiver. Inspect both equipment and replace if necessary. • Contamination within ball lock groove on receiver body. Clean thoroughly and reconnect nozzle. • Nozzle improperly coupled to Receiver. Try again.

PROBLEM	PROBABLE CAUSE AND SOLUTION
No fuel flow through Receiver	<ul style="list-style-type: none"> • Valve upstream or downstream within system is closed – investigate. • Banlaw FuelTrack receiver ID tag (code) has not been entered into the onsite FMS database and/or properly configured within the database. • FuelTrack receiver ID tag has not been “accepted” by local FMS depot; <ul style="list-style-type: none"> ○ Receiver ID “tag” has not been entered into FMS database. ○ Existing fault with auto ID dry-break system, e.g. short circuit or under-voltage – investigate and rectify. ○ Faulty auto ID chip in receiver – install new Banlaw FuelTrack Receiver. ○ Turn Nozzle on (open) and verify ID code is read. ○ Contact your onsite FMS “champion” or Banlaw Helpdesk.
Nozzle cannot be connected or disconnected from Receiver	<ul style="list-style-type: none"> • Nozzle operating (“T”) Handle not latched in “OFF” (closed) position. Only attempt to connect or disconnect a Nozzle with its operating Handle latched in the “OFF” position. • Incorrect combination of Nozzle and Receiver. Confirm compatibility. Only use the correct combination of Nozzle and Receiver. • Worn ball lock mechanism on Nozzle and/or Receiver. Inspect both equipment and replace if necessary. • Contamination within ball lock groove on receiver body. Clean thoroughly and reconnect nozzle.

8 PRODUCT RECYCLING & DISPOSAL

Banlaw values and supports the sustainable use of resources, and the safe, responsible and proper disposal or recycling of all materials within its products. For a description of the principal materials within a Banlaw Receiver, please refer to section 3.

9 PRODUCT WARRANTY

Banlaw is committed to providing quality products and services. To provide further assurance, our products and services are backed by generous warranties.

A copy of the Banlaw product warranty terms and conditions is available from Banlaw, the Banlaw website, or your nearest authorised Banlaw agent.

END OF DOCUMENT



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