805-B Series
Fuel Dispensers

Product Manual

November 2020

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1. Introduction

1.1 Purpose

This document provides instructions for the safe installation, operation, maintenance and servicing of the Transponder Technologies 805-B Series of Fuel Dispensers (hereafter also referred to as simply "dispensers").

1.2 Intended Audience

The document is intended to be read by installation and service personnel and the owner/operators of the dispensers, covering the following 805-B dispenser related topics:

- Product Overview
- Installation
- Operation
- Maintenance & Servicing

1.3 Referenced Documents

The 805-B Series Fuel Dispenser Product Manual should be read in conjunction with the following referenced documents:

Document Ref	Document Title	Document Source
D79384-10	T5 Electronics Service Manual	Transponder Technologies
D89169-6	T5 Processor Configuration Manual	Transponder Technologies
AS1940 (2017)	Storage and Handling of Flammable and Combustible Liquids	SAI Global
AS/NZS2229 (2004)	Fuel dispensing equipment for explosive atmospheres	SAI Global
AS/NZS3000 (2016)	Electrical installations	SAI Global
NMI R 117	Measuring Systems for Liquids Other than Water	National Measurement Institute

1.4 Abbreviations & Acronyms

The following abbreviations and acronyms are used in this document:

Term	Meaning
A	Ampere
AC	Alternating Current (electrical)
AS	Australian Standard

AS/NZS	Australian & New Zealand Standard
ATEX	Appareils destinés à être utilisés en Atmosphères Explosibles (European)
C	Degrees Celsius
CPU	Central Processing Unit
dB	deciBel (unit of noise level)
DC	Direct Current (electrical)
DLP	Dollars Litres Price
Ex-d	Hazardous area explosion-proof rating (flame-proof)
HACM-ACS	High AC current Motor control output – AC Solenoid control outputs
Hz	Hertz (unit of frequency)
IEC	International Electrotechnical Commission
IFSF	International Forecourt Standards Forum
kPa	Kilo-Pascal (unit of pressure)
L	Litre (unit of volume)
LACM-ACS	Low AC current Motor control output – AC Solenoid control outputs
LPM	Litres-Per-Minute (measure of flow rate of a liquid)
m	metre (unit of length)
mA	milli-Ampere (unit of electrical current)
mm	millimetre (unit of length – 1000th of a metre)
mPa.s	milli-Pascal second (unit of viscosity)
NMI	National Measurement Institute (Australia)
NZPP	New Zealand Pump Protocol
OIML	International Organisation of Legal Metrology (European)
PSU	Power Supply Unit
STP	Submersible Turbine Pump
TBus	Transponder Technologies' proprietary T5 serial communications bus
TT	Transponder Technologies
V	Volt (unit of electrical potential – voltage)

2. Safety Information

This chapter introduces the safety information associated with installing, inspecting, maintaining or servicing a Transponder Technologies 805-B Series Fuel Dispenser. Before performing any work on a dispenser, read this safety information and the applicable chapters in this manual. Fire, explosion, electrical shock or pressure release could occur and cause death or serious injury, if these safe service procedures are not properly followed.

Important: The safety information presented herein is not intended to be a comprehensive knowledge-base of all applicable safety information nor regulatory prerequisites, rather it is only an introduction to the relevant facts and obligations. It is the responsibility of all personnel to identify and understand all relevant information prior to performing any work on this product.

2.1 Authorised Personnel

This product is designed to operate in potentially dangerous environments of flammable liquids and gases, high electrical voltages and high liquid pressures. Only appropriately trained and authorised personnel, experienced in the regulations and safety processes of the fuel industry, should install, inspect, maintain or service this equipment.

2.2 Emergency Electrical Isolation

Prior to performing any work on the equipment, it is critical to know in the case of an emergency how to quickly stop all fuel flow to the dispenser and fuel system infrastructure. As such, initially locate the switch or circuit breakers that shut off all power to all fuelling equipment, dispensing devices and submersible turbine pumps (STPs).

Total electrical isolation of the dispenser is required before accessing the electrical components or the electronics of the dispenser. Understand the function and location of this switch or circuit breaker before installation, inspection, maintenance or service work is performed.

2.3 Applicable Regulations

Applicable information is available in International Standards, such as:

- AS1940-2017: Storage and Handling of Flammable and Combustible Liquids (Australia);
- AS/NZS3000-2016: Electrical installations (Australia and New Zealand);
- Occupational Safety and Health Administration (OSHA) regulations;
- Relevant National and Local regulations and codes.

All such regulations must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may affect the safe use and operation of the equipment, which may lead to legal citations with penalties.

2.4 Replacement Parts

Use only genuine replacement parts, sourced from Transponder Technologies. Using parts other than genuine replacement parts could create a safety hazard and violate product certifications.

3. Product Overview

3.1 General Information

3.1.1 Intended Use

A fuel dispenser is a liquid volume measuring system for transferring fuel into vehicles and is one of the major pieces of equipment used in retail service stations and commercial fuel facilities, performing the critical roles of fuel transferring and metering, and ensuring that this is done in a safe and compliant manner.

The 805-B fuel dispensers can be used as independent systems or connected to a fuel management system or forecourt control system for pre-authorised operation. They comprise of a combination of high-quality mechanical, electrical and hydraulic components, which have a proven track record in many applications throughout the world. Incorporated is the latest technology in electronic control systems for fuel dispensing equipment that complies with the strictest international standards and provides the highest level of sophistication in the market.

3.1.2 Liquids

The liquids that are suitable for this fuel dispenser include petrol (gasoline), diesel, kerosene and E10 (petrol with 10% ethanol).

The metrology certification for the dispenser defines fuels with viscosities in the range from 0.5 to 20 mPa.s @ 20C as approved for use.

3.1.3 Product Configurations

The 805-B Series Fuel Dispensers are available in the following configurations:

- Remote dispenser models, which are pressure-fed from an external pumping device, such as a submersible turbine pump.
- Suction pump models, which are fitted with an internal suction pump unit.
- One or two product (fuel) configurations.
- One, two and four hose configurations.
- Nominal 40 litres-per-minute or 80 litres-per-minute flow rates.
- Fitted with backlit retail (price, litres and price per litre) or commercial (litres-only) display options.
- Support for major international forecourt communications protocols.
- Support for pre-set and prepaid functionality.
- Front or side panels nozzle placement.
- Integrated with the Transponder Technologies' range of fuel management, forecourt control, outdoor payment terminal and point-of-sale systems.

3.1.4 Models & Model Numbers

The 805-B Series Fuel Dispensers are available in a range of models with varying product configurations as defined in chapter 3.1.3 Product Configurations.

The various model configurations are defined by a model numbering scheme, which provides an abbreviated method for adequately describing a specific model. The model numbers are made up of a series of fields representing the various configuration options and features, as follows:

Having, for example the model **805-B-P11-P40-RR-N-P**, the numbering scheme breaks up as follows:).

- Instrument series field – always present: 805 representing the 805 series.
- Meter field – always present: B representing the Bennett SB100 meter.
- Hydraulic system field – either:
    - P – representing the 'Pump' version with internal pump/s.
    - D – representing the 'Dispenser' version with one or more approved submersible turbine pump (STP) hydraulic systems. These hydraulic systems replace the equivalent components (i.e. motor, pump/strainer/gas separator, and associated pipework) in any fuel dispenser model.
- Inlet/outlet field – either 11, 12, 22 or 24, comprised of:
    - 1 or 2 as the first digit – representing the number of inlets.
    - 1, 2 or 4 as the second digit – representing the number of outlets.
- End configuration field/s, one field for a single dispenser (e.g. the pattern, *-P40*) and two fields for dispensers with 2 or 4 outlets (e.g. *-P40*-P40*-*, refer Figure 8), representing the product/s and maximum flow rate/s.
    - D – representing distillate.
    - K – representing kerosene.
    - P – representing petrol.
- Maximum flow rate, Qmax – either:
    - 40 – representing 40 L/min.
    - 80 – representing 80 L/min (Qmin = 8 L/min and Vmin = 5 L) and suitable for diesel or kerosene only.
- Display field – comprised of two characters representing the type of display fitted to each side of the dispenser (e.g. *-RR-*), either:
    - R representing a retail display (price-computing).
    - C representing a commercial display (volume only.
    - B representing no display fitted, to 2nd side only.
- Various forecourt communications protocols can be used and are defined by a field in the model number – either:
    - G – representing that Gilbarco FCN protocol is fitted.
    - N – representing that New Zealand FCN protocol is fitted.
    - X – representing that no FCN protocol is fitted.
- Pre-set field – either:
    - P – representing that the pre-set facility is fitted.

X – representing that no pre-set facility is fitted.

3.1.5 Technical Specifications

The technical specifications of the dispenser are as follows:

Accuracy of the meter	± 0.25% (Accuracy Class 0.5)
Minimum delivery volume @ 40LPM	2 L
Maximum delivery volume @ 80LPM	5 L
Maximum flowrate	100 LPM
Minimum flowrate	4 LPM
Maximum pressure of liquid	350 kPa
Minimum pressure of liquid	70 kPa
Ambient operating temperature range	-10C to +55C
Maximum temperature of the liquid	+50C
Minimum temperature of the liquid	-10C
Viscosity range of liquids	0.5 to 20 mPa @ 20C
Operating relative humidity	20% to 95%
Communication options	RS485 or 4-20mA current loop
Single phase power supply option	240VAC: (-15% to +10%); (50/60 ± 1 Hz)
Sale display	6 digits (decimal point can be adjusted)
Volume display	6 digits (decimal point can be adjusted)
Unit price display	4 digits (decimal point can be adjusted)
Volume totaliser counter	0 to 9999999

3.1.6 Product Compliancy

The following international certifications have been issued to individual components of the dispenser:

Organisation	Component	Certificate of Compliance
ITACS	805 Range of Fuel Dispensers	ANZEx 04.4056X
ITACS	T5 Electronics	IECEx MSC 14.0007U
ITACS	T5 Electronics	IECEx MSC 14.0008U
NMI	805-B Series Fuel Dispensers	5-6A-237
NMI	T5 Electronics	S414
Cesky Metrologicky Institut	Bennett T75 Pumping Unit	ZR 141/13 – 0092
Cesky Metrologicky Institut	Bennett SB100 Meter	ZR 141/13 – 0094
LCIE Bureau Veritas	Elnor Motor BA (V/X) 3xy***	IECEx LCI 05.0002X

SIRA Certification Service	Elaflex Nozzles	SIRA 03ATEX9487U
SIRA Certification Service	Elaflex Safety Breaks	SIRA 03ATEX9488U
SIRA Certification Service	CMP Products A2F and A2E Cable Glands	IECEx SIR 06.0039X
Test Safe Australia	ASCO Solenoid Coils series PA	IECEx TSA 13.0020X
Test Safe Australia	GOVAN FW Range of Junction Boxes	IECEx TSA 07.0005X

3.2 Product Architecture

3.2.1 Mechanical Structure

The mechanical structure of the dispenser consists of an internal metal frame which provides the support for mounting the internal components and external panels, which provide protection for the internal components for safety, security and environmental protection purposes.

The dispenser is roughly segmented into three internal chapters; the bottom, middle and top chapters. The bottom chapter of the dispenser contains the hydraulic filtering, metering and control components, along with the electrical junction box. The middle chapter is an “air-gap” that separates the bottom and top chapters. The top chapter contains the electrical/electronic control system components.

The dimensions of the 805-B dispensers are illustrated below in Figures 1 and 2.

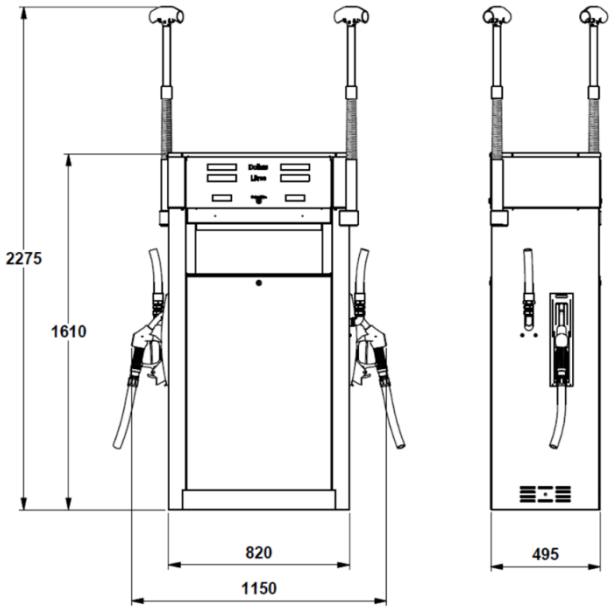

Figure 1 – 805-B Dimensions (in millimetres)

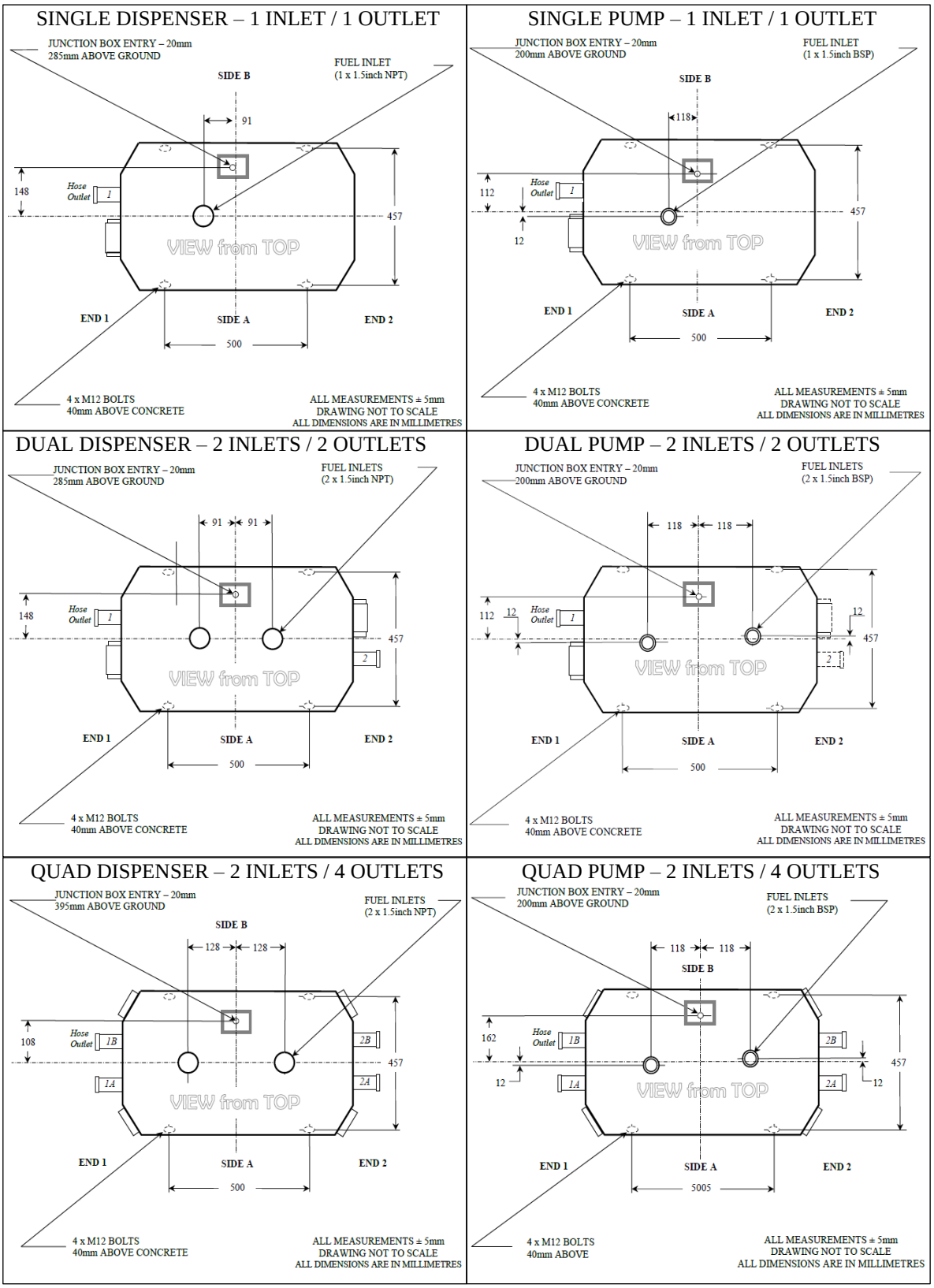

Figure 2 – 805-B Model Footprints

3.2.2 Specific Model Architectures

Figures 3 and 4 below illustrate the architectures of 805-B Dispenser and 805-B Pump models, respectively. They show the electrical/electronic and hydraulic modules, the interconnections between the modules and the relevant chapters where the modules are located. Also shown are the external connections to the 805-B models.

The following table provides further definition of the 805-B product architecture on a model by model basis. The individual modules are described in more detail in figures 3 and 4 below.

Module Label	Module Description	End	Side	Single Disp	Dual Disp	Quad Disp	Single Pump	Dual Pump	Quad Pump
PROC1	T5 Processor Card	X	X	√	√	√	√	√	√
DPSU1	T5 Dual PSU	X	X	√	√	√	√	√	√
PSUX1	T5 Expansion PSU	X	X	X	X	√	X	X	√
DFCN1	T5 FCN Interface	X	X	√	√	√	√	√	√
TDSP1A	T5 TBus Display	1	A	√	√	√	√	√	√
TDSP2A	T5 TBus Display	2	A	X	√	√	X	√	√
TDSP1B	T5 TBus Display	1	B	X	X	√	X	X	√
TDSP2B	T5 TBus Display	2	B	X	X	√	X	X	√
DDSP1B	T5 Direct Drive Display	1	B	√	√	X	√	√	X
DDSP2B	T5 Direct Drive Display	2	B	X	√	X	X	√	X
PRST1A	Pre-set Keypad	1	A	√	√	√	√	√	√
PRST2A	Pre-set Keypad	2	A	X	√	√	X	√	√
PRST1B	Pre-set Keypad	1	B	√	√	√	√	√	√
PRST2B	Pre-set Keypad	2	B	X	√	√	X	√	√
JBOX1	Ex Junction Box	X	X	√	√	√	√	√	√

Module Label	Module Description	End	Side	Single Disp	Dual Disp	Quad Disp	Single Pump	Dual Pump	Quad Pump
FILT1	Fuel Filter	1	X	√	√	√	X	X	X
FILT2	Fuel Filter	2	X	X	√	√	X	X	X
MOTR1	Electric Motor	1	X	X	X	X	√	√	√
MOTR2	Electric Motor	2	X	X	X	X	X	√	√
PUMP1	Suction Pumping Unit	1	X	X	X	X	√	√	√
PUMP2	Suction Pumping Unit	2	X	X	X	X	X	√	√
METR1A	Flow Meter	1	A	√	√	√	√	√	√
METR2A	Flow Meter	2	A	X	√	√	X		√
METR1B	Flow Meter	1	B	X	X	√	X	X	√
METR2B	Flow Meter	2	B	X	X	√	X	X	√
PULS1A	Pulser	1	A	√	√	√	√	√	√
PULS2A	Pulser	2	A	X	√	√	X	√	√
PULS1B	Pulser	1	B	X	X	√	X	X	√
PULS2B	Pulser	2	B	X	X	√	X	X	√
VALV1A	Valve	1	A	√	√	√	√	√	√
VALV2A	Valve	2	A	X	√	√	X	√	√
VALV1B	Valve	1	B	X	X	√	X	X	√
VALV2B	Valve	2	B	X	X	√	X	X	√
COIL1A	Solenoid Coil	1	A	√	√	√	√	√	√
COIL2A	Solenoid Coil	2	A	X	√	√	X	√	√
COIL1B	Solenoid Coil	1	B	X	X	√	X	X	√
COIL2B	Solenoid Coil	2	B	X	X	√	X	X	√
NZSW1A	Nozzle Boot Switch	1	A	√	√	√	√	√	√
NZSW2A	Nozzle Boot Switch	2	A	X	√	√	X	√	√
NZSW1B	Nozzle Boot Switch	1	B	X	X	√	X	X	√

Module Label	Module Description	End	Side	Single Disp	Dual Disp	Quad Disp	Single Pump	Dual Pump	Quad Pump
NZSW2B	Nozzle Boot Switch	2	B	X	X	√	X	X	√
HOSE1A	Fuel Hose	1	A	√	√	√	√	√	√
HOSE2A	Fuel Hose	2	A	X	√	√	X	√	√
HOSE1B	Fuel Hose	1	B	X	X	√	X	X	√
HOSE2B	Fuel Hose	2	B	X	X	√	X	X	√
NOZZ1A	Fuel Nozzle	1	A	√	√	√	√	√	√
NOZZ2A	Fuel Nozzle	2	A	X	√	√	X	√	√
NOZZ1B	Fuel Nozzle	1	B	X	X	√	X	X	√
NOZZ2B	Fuel Nozzle	2	B	X	X	√	X	X	√

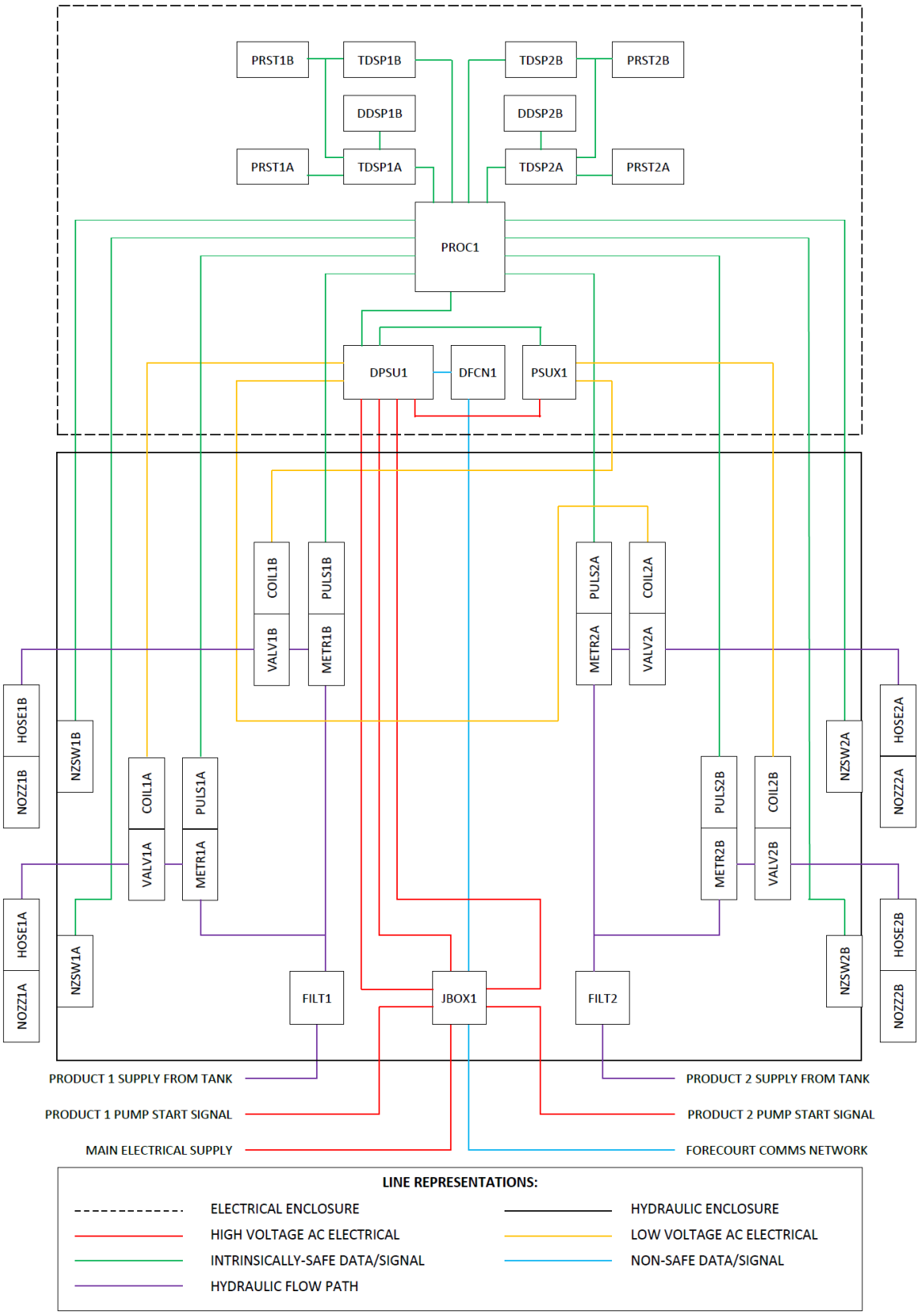

Figure 3 – 805-B Dispenser Model Architecture

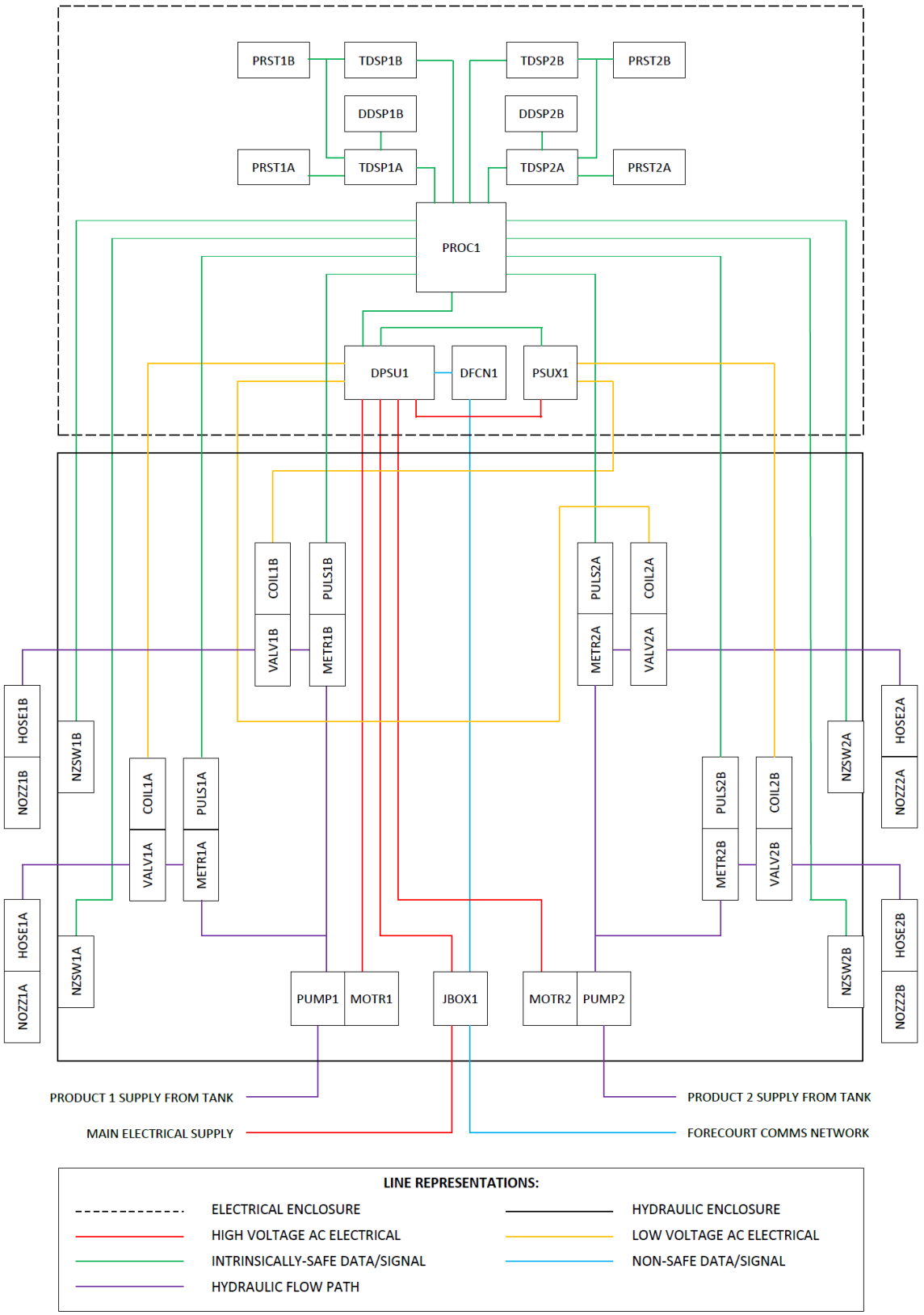

Figure 4 – 805-B Pump Model Architecture

3.3 Main Components

The main components of the 805-B series are defined below.

3.3.1 T5 Processor

The T5 Processor is the main component of the electronic control system, which provides control of the operation of the 805-B series dispensers and monitoring of the amount of fuel delivered.

This is shown in Figures 3 and 4 as “PROC1”.

The T5 Processor is a component of Transponder Technologies’ T5 Electronic Control System for fuel dispensers. More detailed information is provided in the referenced document “T5 Electronics Service Manual”.

The image below shows the T5 Processor.

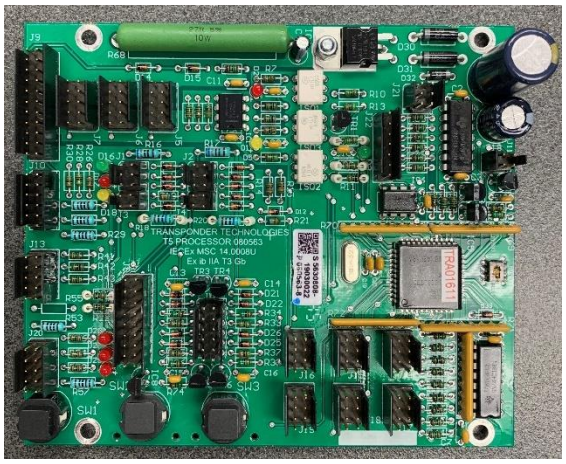

Figure 5 – T5 Processor

The T5 Processor is also fitted with a “piggy-back” board that provides connection points for the pulsers. The board, which is called the “T5 Pulser IFC”, is shown in the image below.

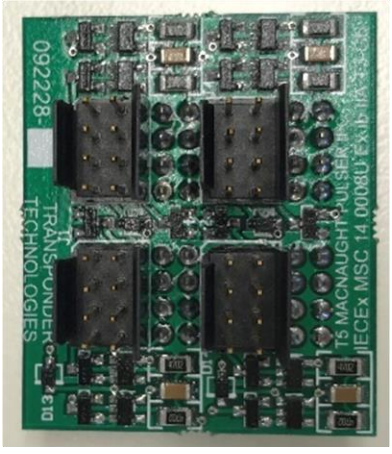

Figure 6 – T5 Pulser IFC

3.3.2 T5 Dual Power Supply Unit

The T5 Dual Power Supply Unit (T5 Dual PSU) is the main electrical device of the 805-B series dispensers. It provides termination points for electrical connections, AC to DC electrical power supply conversion and control circuits for external electrical devices.

This is shown in Figures 3 and 4 as “DPSU1”.

The T5 Dual PSU also provides electrical and physical separation between the non-safe and intrinsically safe electrical circuits of the dispensers.

The DC electrical supply, which is produced from the main AC electrical supply, is used to power other electrical devices in the dispensers, including the T5 Processor and display units.

There are two types of T5 Dual PSU used:

- A low AC current version, which is used in the remote dispenser 805-B models where external pumping units, such as STPs, are controlled.
- A high AC current version, which is used in 805-B suction pump models, where internal suction pumps are fitted. The solenoid coils on the valves within the dispenser are also controlled by the T5 Dual PSU.

The T5 Dual PSU can control two pumps and two valves. In 805-B quad models, the additional two valves are controlled by a T5 Expansion Power Supply Unit (refer below to chapter 3.3.3).

The T5 Dual PSU is a component of Transponder Technologies’ T5 Electronic Control System for fuel dispensers. More detailed information is provided in the referenced document “T5 Electronics Service Manual”.

The image below shows the T5 Dual Power Supply Unit.

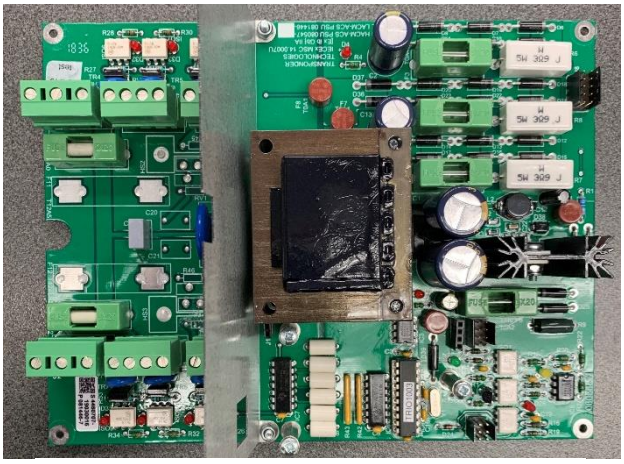

Figure 7 – The T5 Dual Power Supply Unit

3.3.3 T5 Expansion Power Supply Unit

The T5 Expansion Power Supply Unit (T5 Expansion PSU) is the secondary electrical device of the 805-B series dispensers. It provides termination points for additional control circuits for external electrical devices in quad (4-hose) models of the 805-B series.

This is shown in Figures 3 and 4 as “PSUX1”.

The T5 Expansion PSU also provides electrical and physical separation between the non-safe and intrinsically safe electrical circuits of the dispensers.

There are two types of T5 Expansion PSU used:

- A low AC current version, which is used in the remote dispenser 805-B models where external pumping units, such as STPs, are controlled
- A high AC current version, which is used in 805-B suction pump models, where internal suction pumps are fitted. The solenoid coils on the valves within the dispenser are also controlled by the T5 Expansion PSU.

The T5 Expansion PSU can control an additional two pumps and two valves.

The T5 Expansion PSU is a component of Transponder Technologies' T5 Electronic Control System for fuel dispensers. More detailed information is provided in the referenced document "T5 Electronics Service Manual".

The image below shows the T5 Expansion Power Supply Unit.

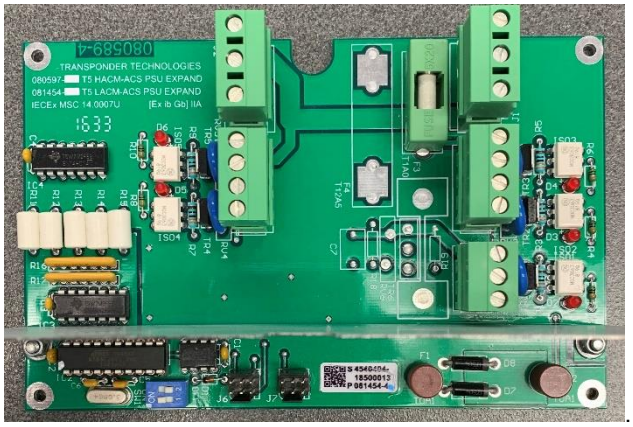

Figure 8 – The T5 Expansion PSU

3.3.4 T5 Forecourt Communications Network Interface Card

The T5 Forecourt Communications Network Interface Cards (T5 FCN IFC) provide data communications between the 805-B dispensers (ie. from the Processor Card) and external systems, such as a Forecourt Controllers and Fuel Management Systems.

This is shown in Figures 3 and 4 as "DFCN1".

The T5 FCN IFC are fitted to T5 Dual PSU (refer above to chapter 3.3.2) and provide electrical and physical separation between the non-safe and intrinsically safe electrical circuits of the dispensers.

The T5 FCN IFC are available in various models, each dedicated to a specific forecourt communications protocol (sometimes referred to as "pump protocol"). The two most common models are New Zealand Pump Protocol (NZPP) and Gilbarco Australian protocol (Gilb-AU).

The image below shows the T5 NZPP FCN IFC and the T5 Gilb-AU FCN IFC.

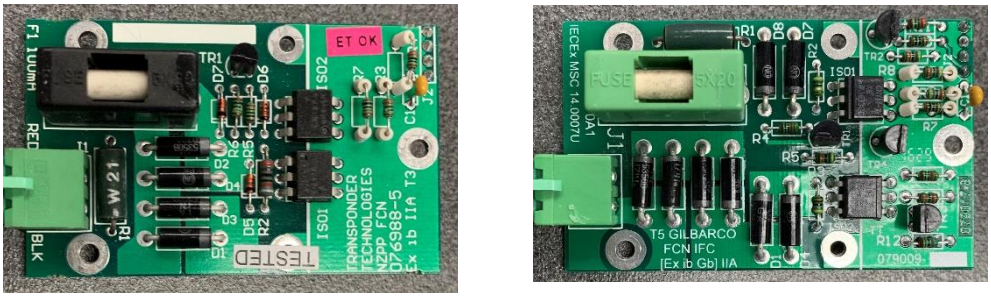

Figure 9 – T5 NZPP FCN IFC (left) & T5 Gilb-AU FCN IFC (right)

3.3.5 T5 DLP Display

The T5 Dollars-Litres-Price (DLP) Display units are used in retail models of the 805-B series dispensers and provide a visual indication of the following:

- The sale amount of the fuel issued in the current dispensing transaction (Dollars);
- The volume amount of the fuel issued in the current dispensing transaction (Litres);
- The unit price of the fuel (Price).

There are two models of T5 DLP Displays, the TBus and the Direct-Drive (DD). The T5 DLP TBus Displays connect to the T5 Processor and are the primary displays, which are each dedicated to a specific hose. The T5 DLP DD Displays each connect to a T5 DLP TBus Display and emulates the values displayed on the T5 DLP TBus Display, which enables the delivery to be viewed from either side of the dispenser.

The T5 DLP Displays are shown in Figures 3 and 4. The T5 DLP TBus Displays are labelled “TDSP” and the T5 DLP DD Displays are labelled “DDSP”. The table in chapter 3.2.2 Specific Model Architectures defines which displays are fitted to which 805-B models.

The T5 DLP Displays each include three separate LCD panels. The “Dollars” LCD and “Litres” LCD are each 6-digits and the “Price” LCD is 4-digits. The decimal points can be adjusted to any position on the LCDs.

At the end of a dispensing transaction (ie. sale) the sale amount and volume amount remain displayed until the start of the next transaction.

The T5 DLP TBus Display is a component of Transponder Technologies’ T5 Electronic Control System for fuel dispensers. More detailed information is provided in the referenced document “T5 Electronics Service Manual”.

An image of the T5 DLP Display is shown below.

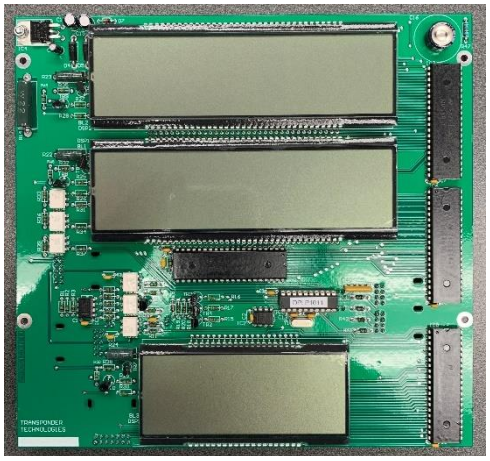

Figure 10 – T5 DLP Display

3.3.6 T5 Litres Display

The T5 Litres Display units are used in commercial models of the 805-B series dispensers and provide a visual indication of the volume dispensed measured in Litres units.

There are two models of T5 Litres Displays, the TBus and the Direct-Drive (DD). The T5 Litres TBus Displays connect to the T5 Processor and are the primary displays, which are each dedicated to a specific hose. The T5 Litres DD Displays each connect to a T5 Litres TBus Display and emulates the values displayed on the T5 Litres TBus Display, which enables the delivery to be viewed from either side of the dispenser.

The T5 Litres Displays are shown in Figures 3 and 4. The T5 Litres TBus Displays are labelled "TDSP" and the T5 Litres DD Displays are labelled "DDSP". The table in chapter 3.2.2 Specific Model Architectures defines which displays are fitted to which 805-B models.

The T5 Litres Displays are fitted with a 6-digit LCD, which display the volume dispensed in Litres. The decimal points can be adjusted to any position on the LCD.

The T5 Litres TBus Display is a component of Transponder Technologies' T5 Electronic Control System for fuel dispensers. More detailed information is provided in the referenced document "T5 Electronics Service Manual".

An image of the T5 Litres Display is shown below.

Figure 11 – T5 Litres Display

3.3.7 Pre-set Keypads

The pre-set keypads allow the operator to select a pre-defined amount of fuel to be dispensed prior to the transaction commencing. This can either be based on a pre-set sale amount or volume amount.

A 4-key keypad in a 1x4 configuration is used with each key corresponding to a function, which are configurable and typically are set up for sale amount pre-sets as follows:

- 10-unit increment in currency amount (eg. 10 dollars).
- 1-unit increment in currency amount.
- "Clear" function – clears the pre-set amount.
- "Recall" function – allows the pre-set amount to be briefly displayed while fuel is being dispensed.

Individual pre-set keypads are dedicated to each hose of a dispenser and these are shown in Figures 3 and 4 as "PRST1A", "PRST2A", "PRST1B" and "PRST2B". The table in chapter 3.2.2 Specific Model Architectures defines which pre-set keypads are fitted to which 805-B models.

The pre-set keypads are customised versions of the Storm model 2K041103 1x4 keypad as shown below.

Figure 12 – Storm 2K0401103 Keypad

3.3.8 Electrical Junction Box

An Ex-d rated flameproof junction box is fitted at the base of the hydraulic module of the 805-B series dispensers to provide a safe termination point for electrical and data connections that come and go externally to the dispensers.

The connections include the following:

- The main electrical supply to the dispenser (all models);
- Forecourt communications network data connections (all models);
- 2 x pump start signals (remote dispenser models only).

The junction box is shown is Figures 3 and 4 as “JBOX1”and is a Pepperl+Fuchs model FW24M as shown below.

Figure 13 – Pepperl+Fuchs Model FW24M Ex-d Junction Box

3.3.9 Filters

The filters provides a means of cleaning the fuel as it flows into the dispenser from the tank. This is to ensure that particles that could potentially harm the dispenser’s sensitive hydraulic components, in particular the meters, are protected.

In a single product dispenser (ie. one that dispenses one grade of fuel) there is a single supply line to the dispenser and a single filter is fitted. In a dual product dispenser (ie. two grades of fuel) there are two filters fitted, one for each product.

Filters are only fitted to 805-B remote dispenser models and are shown in Figure 3 as “FILT1” and “FILT2”. The table in chapter 3.2.2 Specific Model Architectures defines which filters are fitted to which 805-B models.

The filters are a Bennett Pump Co model A270501 10-micron filter as shown in the image below.

Figure 14 – Bennett Pump Co Model A270501 Filter

3.3.10 Electric Motors

Single-phase 240VAC 750W electric motors are fitted to 805-B suction pump models and provide the power to drive the suction pumping units, which are described in chapter 3.3.11 Suction Pumping Units below.

The rotating shaft of the motor is connected to the shaft of the pumping unit via a V-belt and pulley attached to each shaft.

The motors are controlled by a dedicated electrical signal from the T5 Dual PSU, which is described in the chapter 3.3.2 T5 Dual Power Supply Unit above.

In a single product suction pump (ie. one that dispenses one grade of fuel) there is a single supply line to the dispenser therefore a single motor is fitted. In a dual product pump (ie. two grades of fuel) there are two motors fitted, one for each product.

Motors are shown in Figure 4 as "MOTR1" and "MOTR2". The table in chapter 3.2.2 Specific Model Architectures defines which motors are fitted to which 805-B models.

The motors are an Elnor model BAV370CP-AR motor as shown in the image below.

Figure 15 – Elnor Model BAV370CP-AR Motor

3.3.11 Suction Pumping Units

Suction pumping units are fitted to 805-B suction pump models to draw fuel from the on-site fuel tanks and deliver the fuel under pressure through the hoses and nozzles.

The model of suction pump used in the 805-B series is the Bennett T75, which is capable of delivering at a maximum pressure of 350kPa and a nominal maximum flowrate of 80 LPM through a single hose/nozzle pair or at flowrates of 40 LPM simultaneously through two hose/nozzle pairs.

The pumping units are driven by a dedicated electric motor, which is described in the chapter 3.3.11 Suction Pumping Units above.

In a single product suction pump (ie. one that dispenses one grade of fuel) there is a single supply line to the dispenser therefore a single pumping unit is fitted. In a dual product pump (ie. two grades of fuel) there are two pumping units fitted, one for each product.

Pumping units are shown in Figure 4 as "PUMP1" and "PUMP2". The table in chapter 3.2.2 Specific Model Architectures defines which motors are fitted to which 805-B models.

The pumping unit is shown in the image below.

Figure 16 – Bennett Model T75 Suction Pumping Unit

3.3.12 Meters

The meters are used to measure the volume of fuel passing through the dispenser in conjunction with the pulsers, which are described in chapter 3.3.13 Pulsers (Encoders).

The model of meter used in the 805-B series is the Bennett SB100, which is a four-piston positive displacement meter that is capable of measuring flow rates of 4 LPM to 100 LPM. The principle of operation of the meter is described in chapter 3.5 Principle of Operation below.

There is a dedicated meter for each outlet (ie. hose/nozzle pair) of the dispenser and these are shown in Figures 3 and 4 as “METR1A”, “METR2A”, “METR1B” and “METR2B”. The table in chapter 3.2.2 Specific Model Architectures defines which meters are fitted to which 805-B models.

The Bennett SB100 is shown in the image below.

Figure 17 – Bennett SB100 Meter

3.3.13 Pulsers (Encoders)

The pulsers, or encoders as they are sometimes referred to, are connected to the meters and are used to measure the volume of fuel passing through the meters.

They are connected to a shaft on the meters that rotates at a rate proportional to the volume of fuel passing through the meter, which enables the dispenser to calculate the total volume of fuel dispensed as described in chapter 3.5 Principle of Operation below.

There is a dedicated meter for each outlet (ie. hose/nozzle pair) of the dispenser and these are shown in Figures 3 and 4 as “PULS1A”, “PULS2A”, “PULS1B” and “PULS2B”. The table in chapter 3.2.2 Specific Model Architectures defines which meters are fitted to which 805-B models.

The pulser is a TT Model ZDM, which is shown in the image below.

Figure 18 – TT Model ZDM Pulser

3.3.14 Valves

The valves are the hydraulic components of the solenoid valves used to control the flow of fuel individually from each of the dispenser hoses.

The valves used are twin flow valves, which include a valve body, a lead valve, a small flow control valve and a large flow control valve.

Both control valves are opened and closed by a dedicated steel plunger, which are controlled by the twin solenoid coils described in chapter 3.3.15 below.

The small flow control valve allows fuel to flow at a low flow rate, whereas the large flow control valve allows fuel to flow at the maximum flow rate. This enables the dispenser to control the amount of fuel dispensed accurately, which is critical to the operation of the Pre-set Mode, as described in chapter 5.3.2 Filling Process.

There is a dedicated valve for each outlet (ie. hose/nozzle pair) of the dispenser and these are shown in Figures 3 and 4 as “VALV1A”, “VALV2A”, “VALV1B” and “VALV2B”. The table in chapter 3.2.2 Specific Model Architectures defines which valves are fitted to which 805-B models.

The valves are the ASCO model PAXT29227 twin valves as shown in the image below.

Figure 19 – ASCO Model PAXT29227 Twin Valve

3.3.15 Solenoid Coils

The solenoid coils are the electrical components of the solenoid valves used to control the flow of fuel individually from each of the dispenser hoses.

In its inactive state, a coil forces the valve to close. When a voltage is applied to the coil by the PCSU, the coil opens the valve.

Furthermore, the coils used are twin solenoids, which have two separate activation inputs that enable the valve to be opened in two states; partially-open and fully-open. In the partially-open state the flow of fuel through the valve is limited to a low flow-rate, whilst in the fully-open state the flow is at the maximum flow-rate. This enables the dispenser to control the amount of fuel dispensed accurately, which is critical to the operation of the Pre-set Mode, as described in chapter 5.3.2 Filling Process.

There is a dedicated coil for each outlet (ie. hose/nozzle pair) of the dispenser and these are shown in Figures 3 and 4 as “COIL1A”, “COIL2A”, “COIL1B” and “COIL2B”. The table in chapter 3.2.2 Specific Model Architectures defines which coil are fitted to which 805-B models.

The coils are the ASCO series PA twin coils as shown in the image below.

Figure 20 – ASCO PA Series Twin Solenoid Coil

3.3.16 Nozzle Switches

The nozzle switches are magnetic switches connected to the nozzle-boots (ie. holsters), which provide a method of detecting when a nozzle is lifted from or returned to its nozzle boot.

The nozzle switch cable is connected to the Processor, which detects the state of the switch and enables the Processor to control the dispenser as described in chapter 5.3.1 Authorisation & Completion.

There is a dedicated nozzle switch for each outlet (ie. hose/nozzle pair) of the dispenser and these are shown in Figures 3 and 4 as “NZSW1A”, “NZSW2A”, “NZSWB” and “NZSW2B”. The table in chapter 3.2.2 Specific Model Architectures defines which coil are fitted to which 805-B models.

The image below shows the nozzle switch positioned on the back of the nozzle boot.

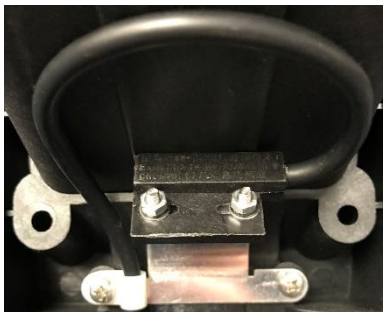

Figure 21 – Nozzle Switch

3.3.17 Fuel Hoses

The dispenser is fitted with hoses that are made from synthetic rubber tube with fine wire reinforcement and electrical conductivity to provide durability and prevent static build-up.

They are manufactured in assemblies with fittings at each end to attach the hose to the outlet from the dispenser and the nozzle.

There is a dedicated hose for each outlet of the dispenser and these are shown in Figures 3 and 4 as “HOSE1A”, “HOSE2A”, “HOSE1B” and “HOSE2B”. The table in chapter 3.2.2 Specific Model Architectures defines which coil are fitted to which 805-B models.

The image below shows a typical hose assembly, which are as standard 5.5 metres in length in the 805-B series.

Figure 22 – Hose Assembly

3.3.18 Fuel Nozzles

The dispenser is supplied with OPW 11B nozzles, which are designed not to open until the dispenser system is pressurised and close automatically when the pressure is removed. They have a 16mm spout, which is suitable for unleaded petrol (gasoline) vehicles.

There is a dedicated nozzle for each outlet of the dispenser and these are shown in Figures 3 and 4 as “NOZZ1A”, “NOZZ2A”, “NOZZ1B” and “NOZZ2B”. The table in chapter 3.2.2 Specific Model Architectures defines which coil are fitted to which 805-B models.

The image below shows a ZVA Slimline Nozzle, which is the standard nozzle supplied with the 805-B series.

Figure 23 – ZVA Slimline Nozzle

3.3.19 Breakaway Coupling (Optional)

A breakaway coupling, which is sometimes referred to as a safety swivel, is a coupling that fits between the hose and the nozzle.

They are designed to protect dispensers and limit fuel spillage by separating when the hose is subjected to a designated pull force. When separated, dual valves seat automatically to stop the flow of fuel and limit fuel spillage.

Breakaway couplings are available as single-use breakaways, which must be discarded after they have been separated, or reconnectable breakaways, which can be put back into service immediately by reconnecting the separated halves.

The choice of a suitable breakaway coupling is determined by the flowrate of the dispenser, the size of the hose fitting and the make of nozzle used.

A typical coupling, the Elaflex SSB25 Safety Swivel (reusable), is shown in the image below:

Figure 24 – Elaflex Model SSB25 Safety Swivel

3.4 Cables & Connections

This chapter describes the various electrical cables in the dispenser and the connections to the T5 electronic modules and peripheral components.

It defines the cable part numbers, where applicable, and the connector designators on the various T5 modules that the cables connect to. It also defines the pins numbers of the connectors that the individual conductors connect to.

The following should be noted:

- Some cables are directly connected to certain peripheral components and in such cases the cables are not given a part number, rather they are referred to in name by the component they are connected to (eg. “TT ZDM Pulser”).
- The pins of the T5 electronic module connectors are labelled as per the images below:

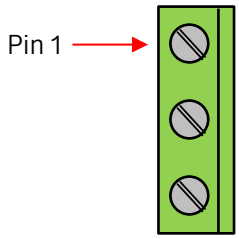

Figure 25 – Electrical Power Connector Pin Orientation

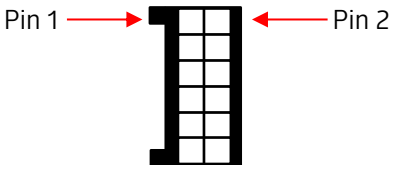

Figure 26 – Electronic Signal Connector Pin Orientation (viewed from cable entry)

3.4.1 T5 Processor to T5 Dual PSU Cable

The table below defines the pin connections for the cable that connects the T5 Processor to the T5 Dual PSU, including definition of the colour of the individual cable conductors.

Part Number	091909-1	
Description	CABAssy 805 T5 Processor to T5 Dual PSU	
T5 Processor	**T5 Dual PSU**	**Colour**
J9 – Pin 1	J8 – Pin 1	Black
J9 – Pin 2	J8 – Pin 2	Brown
J9 – Pin 3	J8 – Pin 9	Blue
J9 – Pin 5	J8 – Pin 4	Orange
J9 – Pin 6	J8 – Pin 6	Dark Green
J9 – Pin 9	J8 – Pin 5	Yellow
J9 – Pin 10	J8 – Pin 3	Red
No Connection	J8 – Pin 8	Screen
J9 – Pin 13	J9 – Pin 7	Brown-White
J9 – Pin 14	J9 – Pin 1	Purple
J9 – Pin 15	J9 – Pin 5	Light Green
J9 – Pin 16	J9 – Pin 3	White
J9 – Pin 19	J9 – Pin 6	Black-White
J9 – Pin 20	J9 – Pin 2	Grey
J9 – Pin 21	J9 – Pin 4	Pink
J9 – Pin 22	J9 – Pin 8	Red-White

3.4.2 T5 Dual PSU to T5 Expansion PSU

The table below defines the pin connections for the cable that connects the T5 Dual PSU to the T5 Expansion PSU, including definition of the colour of the individual cable conductors.

Part Number	089313-1	
Description	CABAssy 805 T5 Dual PSU to T5 Exp PSU 255mm	
T5 Dual PSU	**T5 Expansion PSU**	**Colour**
J7 – Pin 1	No connection	Shield
J7 – Pin 2	J6 – Pin 2	Black
J7 – Pin 3	J6 – Pin 3	Red

J7 – Pin 4	J6 – Pin 4	Yellow
J7 – Pin 5	J6 – Pin 5	Green
J7 – Pin 6	J6 – Pin 6	Blue

3.4.3 T5 Processor to T5 TBus Display

The table below defines the pin connections for the cable that connects the T5 Processor to a T5 TBus Display, including definition of the colour of the individual cable conductors.

Note: This table is applicable to both T5 DLP and Litres TBus Displays. There are two cables lengths shown in the table, which are display dependent.

Part Number	091911-2	092588-2
Description	CABAssy T5 GP TBus 1280mm	CABAssy T5 GP TBus 660mm

T5 Processor	T5 TBus Display	Colour
Pin 1	J1 – Pin 1	Black
Pin 2	J1 – Pin 2	Brown
Pin 3	J1 – Pin 3	Red
Pin 4	J1 – Pin 4	Yellow
Pin 7	J1 – Pin 7	Green
Pin 8	J1 – Pin 8	Blue
Pin 9	J1 – Pin 9	Purple
No Connection	J1 – Pin 10	Screen

The specific length of cable used is dependent on the particular display that is being connected, which is defined in the tables below with reference to the display definitions as presented in chapter 3.2.2 Specific Model Architectures.

In 805-B single and dual models the cable lengths and the connections to the T5 Processor are as defined in the table below:

T5 TBus Display	End	Side	Cable	Connects To
TDSP1A – J1	1	A	091911-2 CABAssy T5 GP TBus 1280mm	T5 Processor – J5
TDSP2A – J1	2	A	091911-2 CABAssy T5 GP TBus 1280mm	T5 Processor – J6

In 805-B quad models, only two of the T5 TBus Displays connect directly to the T5 Processor. The other two T5 TBus Displays connect to the T5 Processor via the adjacent T5 TBus Displays, as defined in the table below:

In 805-B quad models, the cable lengths and the connections are as defined in the table below:

T5 TBus Display	End	Side	Cable	Connects To
TDSP1A – J1	1	A	091911-2 CABAssy T5 GP TBus 1280mm	T5 Processor – J5
TDSP1B – J1	1	B	092588-1 CABAssy T5 GP TBus 660mm	TDSP2B – J2
TDSP2A – J1	2	A	092588-1 CABAssy T5 GP TBus 660mm	TDSP1A – J2
TDSP2B – J1	2	B	091911-2 CABAssy T5 GP TBus 1280mm	T5 Processor – J6

In addition to the specific connections between the T5 TBus Displays and the T5 Processor, the displays must be configured with specific address settings in order to associate the displays with the appropriate dispensing positions (ie. the appropriate hoses and nozzles). This is done using the single-in-line switch (SW1) on the back of the displays.

In 805-B single and dual models the SW1 switch is set to the following positions:

T5 TBus Display	End	Side	SW1 Pole 1	SW1 Pole 2
TDSP1A – J1	1	A	ON	ON
TDSP2A – J1	2	A	ON	OFF

In 805-B quad models the SW1 switch is set to the following positions:

T5 TBus Display	End	Side	SW1 Pole 1	SW1 Pole 2
TDSP1A – J1	1	A	ON	ON
TDSP1B – J1	1	B	ON	OFF
TDSP2A – J1	2	A	OFF	OFF
TDSP2B – J1	2	B	OFF	ON

3.4.4 T5 TBus Display to T5 DD Display

The table below defines the pin connections for the cable that connects a T5 TBus Display to a T5 DD Display, including definition of the colour of the individual cable conductors.

Note: This is applicable to both T5 DLP and Litres TBus Displays.

Part Number	091912-2
Description	CABAssy T5 TBus Display to T5 DD Display 1470mm

T5 TBus Display	T5 DD Display	Colour
J3 – Pin 1	J3 – Pin 1	Black
J3 – Pin 2	J3 – Pin 2	Brown
J3 – Pin 3	J3 – Pin 3	Red
J3 – Pin 4	J3 – Pin 4	Orange
J3 – Pin 7	J3 – Pin 7	Dark Green
J3 – Pin 8	J3 – Pin 8	Blue
J3 – Pin 9	J3 – Pin 9	Purple
J3 – Pin 10	J3 – Pin 10	Grey
J3 – Pin 11	J3 – Pin 11	White
J3 – Pin 12	J3 – Pin 12	Pink
J3 – Pin 13	J3 – Pin 13	Light Green
J3 – Pin 14	No connection	Screen

In 805-B single and dual models the connections between the T5 TBus Displays and T5 DD Display are as defined in the table below with reference to the display definitions as presented in chapter 3.2.2 Specific Model Architectures:

T5 TBus Display	End	Side	T5 DD Display	End	Side
TDSP1A – J3	1	A	TDSP1B – J3	1	B
TDSP2A – J3	2	A	TDSP2B – J3	2	B

3.4.5 T5 TBus Display to Pre-set Keypad

The table below defines the pin connections for the cable that connects the T5 TBus Display to a Pre-set Keypad (Storm model 2K041103), including definition of the colour of the individual cable conductors.

Part Number	092773-1	
Description	CABAssy T5 DISP-Pre-set 4Key 185mm	
T5 TBus Display	**Pre-set Keypad**	**Colour**
Pin 1	Pin 1	Black
Pin 3	Pin 2	Red
Pin 5	Pin 3	Yellow
Pin 6	Pin 5	Green
Pin 7	Pin 4	Blue

Pin 8	No Connection	Screen

The tables below define the connections between the T5 TBus Displays and the Pre-set Keypads with reference to the display and keypad definitions as presented in chapter 3.2.2 Specific Model Architectures.

In 805-B single and dual models the T5 TBus Displays are connected to the Pre-set Keypads as defined in the table below:

T5 TBus Display	Pre-set Keypad
TDSP1A – J4	PRST1A
TDSP1A – J5	PRST1B
TDSP2A – J4	PRST2A
TDSP2A – J5	PRST2B

In 805-B quad models the T5 TBus Displays are connected to the Pre-set Keypads as defined in the table below:

T5 TBus Display	Pre-set Keypad
TDSP1A – J4	PRST1A
TDSP1B – J4	PRST1B
TDSP2A – J4	PRST2A
TDSP2B – J4	PRST2B

3.4.6 T5 Processor to T5 Pulser IFC

The table below defines the connections between the T5 Processor and the T5 Pulser IFC. Note that the two boards connect directly without a cable.

T5 Processor	T5 Pulser IFC
J14	J5
J15	J6
J17	J7
J18	J8

3.4.7 T5 Pulser IFC to TT ZDM Pulsers

The table below defines the pin connections for the cables that connects the T5 Pulser IFC to the TT ZDM Pulsers, including definition of the colour of the individual cable conductors.

Part Number	095908-1	
Description	CABAssy T5 Pulser IFC to TT ZDM Pulser 1700mm	
T5 Pulser IFC	**TT ZDM Pulser**	**Colour**
Pin 1	Pin 2	Black
Pin 2	Pin 1	Red
Pin 3	Pin 3	Yellow
Pin 6	Pin 4	Blue
Pin 8	Pin 5	Shield
Pin 5 & Pin 7	No connection	Loop Back

The tables below defines the connections between the T5 Pulser IFC and the TT ZDM Pulsers with reference to the pulser definitions as presented in chapter 3.2.2 Specific Model Architectures.

In 805-B single and dual models the TT ZDM Pulsers are connected to the T5 Pulser IFC as defined in the table below:

T5 Pulser IFC	T5 ZDM Pulser
J5	PULS1A
J6	PULS2A

In 805-B quad models the TT ZDM Pulsers are connected to the T5 Pulser IFC as defined in the table below:

T5 Pulser IFC	T5 ZDM Pulser
J5	PULS1A
J6	PULS1B
J7	PULS2B
J8	PULS2A

3.4.8 T5 Processor to Nozzle Switches

The tables below define the pin connections for the cables that connects the T5 Processor to the nozzle switches, including definition of the colour of the individual cable conductors. the connections between the T5 Processor and the nozzle switches with reference to the nozzle switch definitions as presented in chapter 3.2.2 Specific Model Architectures.

In 805-B single and dual models the T5 Processor is connected to the nozzle switches as defined in the table below:

T5 Processor	Nozzle Switch	Colour
Pin 1	NZSW1A	Black
Pin 2	NZSW2A	Black
Pin 3	NZSW1A	Blue
Pin 4	NZSW2A	Blue

In 805-B quad models the T5 Processor is connected to the nozzle switches as defined in the table below:

T5 Processor	Nozzle Switch	Colour
Pin 1	NZSW1A	Black
Pin 2	NZSW1B	Black
Pin 3	NZSW1A	Blue
Pin 4	NZSW1B	Blue
Pin 7	NZSW2B	Black
Pin 8	NZSW2A	Black
Pin 9	NZSW2B	Blue
Pin 10	NZSW2A	Blue

3.4.9 T5 Dual PSU to Motors

The table below defines the pin connections for the cable that connects the T5 Dual PSU to the motors (Elnor Model BAV370CP-AR), including definition of the colour of the individual cable conductors.

T5 Dual PSU	Solenoid Coil	Colour
Pin 1	Neutral	Blue
Pin 2	Earth	Green-Yellow
Pin 3	Active	Brown

The tables below define the connections between the T5 Dual PSU and the motors with reference to the motor definitions as presented in chapter 3.2.2 Specific Model Architectures.

T5 Dual PSU	Solenoid Coil
J3	MOTR1A
J4	MOTR2A

3.4.10 T5 Dual PSU to Solenoid Coils

The table below defines the pin connections for the cable that connects the T5 Dual PSU to the Solenoid Coils (ASCO Series PA), including definition of the colour of the individual cable conductors.

T5 Dual PSU	Solenoid Coil	Colour
Pin 1	Neutral	Grey
Pin 2	Earth	Green-Yellow
Pin 3	Active – Low Flow	Black
Pin 4	Active – High Flow	Brown

The tables below define the connections between the T5 Dual PSU and the Solenoid Coils with reference to the coil definitions as presented in chapter 3.2.2 Specific Model Architectures.

In 805-B single and dual models the T5 Dual PSU is connected to the Solenoid Coils as defined in the table below:

T5 Dual PSU	Solenoid Coil
J5	COIL1A
J6	COIL2A

In 805-B quad models the T5 Dual PSU is connected to the Solenoid Coils as defined in the table below:

T5 Dual PSU	Solenoid Coil
J5	COIL1A
J6	COIL1B

3.4.11 T5 Expansion PSU to Solenoid Coils

The table below defines the pin connections for the cable that connects the T5 Expansion PSU to the Solenoid Coils (ASCO Series PA), including definition of the colour of the individual cable conductors.

T5 Expansion PSU	Solenoid Coil	Colour
Pin 1	Neutral	Grey
Pin 2	Earth	Green-Yellow
Pin 3	Active – Low Flow	Black
Pin 4	Active – High Flow	Brown

The T5 Expansion PSU is only used in 805-B quad models and the table below define the connections between the T5 Expansion PSU and the Solenoid Coils with reference to the coil definitions as presented in chapter 3.2.2 Specific Model Architectures.

T5 Expansion PSU	Solenoid Coil
J4	COIL2B
J5	COIL2A

3.4.12 T5 Dual PSU to Electrical Junction Box

The table below defines the pin connections for the cable that connects the T5 Dual PSU to the Electrical Junction Box. Note that this cable also includes connections from the T5 FCN IFC, which is mounted on the T5 Dual PSU.

Part Number	091910-1	
Description	CABAssy 805 T5 Dual PSU to JBox 240VAC	
T5 Dual PSU & T5 FCN IFC	**Junction Box**	**Colour**
T5 Dual PSU – J1 - Pin 1	Pin 2	Blue
T5 Dual PSU – J1 - Pin 2	Earth Stud	Green-Yellow
T5 Dual PSU – J1 - Pin 3	Pin 1	Brown
T5 FCN IFC – J1 - Pin 1	Pin 3	Red
T5 FCN IFC – J1 - Pin 2	Pin 4	White

In 805-B remote dispenser models an additional cable is connected between the T5 Dual PSU and the Electrical Junction Box to provide electrical start signals for external pumps, such as STP. The table below defines the pin connections for the cable that connects the T5 Dual PSU to the Electrical Junction Box.

Part Number	093107-1	
Description	CABAssy 805 T5 Dual PSU to JBox 240VAC	
T5 Dual PSU & T5 FCN IFC	**Junction Box**	**Colour**
T5 Dual PSU – J3 - Pin 3	Pin 5	Black 1
T5 Dual PSU – J4 - Pin 3	Pin 6	Black 2

3.5 Principle of Operation

The 805-B series dispensers use two separate methods to deliver fuel:

- in the remote dispenser models, submersible turbine pumps (STP) which are installed in the fuel tanks and controlled by the dispenser, deliver fuel from the tank to the dispenser under pressure.
- in suction pump models, internal suction pumping units create a vacuum in the fuel pipes from the tank, which draws fuel from the tank.

The dispensers are also fitted with two-stage solenoid valves, which provide dedicated control of the supply of fuel to each of the dispenser's hose/nozzle pairs. Activation of the STP or internal suction pump occurs first following the authorisation of the dispenser to dispense fuel, then after a few seconds (to allow fuel to reach delivery pressure), the relevant solenoid valve is opened to allow fuel to be dispensed from the required hose.

Each hose/nozzle pair also has a dedicated meter to measure the fuel volume that is dispensed through the nozzle. In remote dispenser models the meters are installed between the solenoid valves and the inlet filter. In suction pump models the meters are installed between the solenoid valve and the suction pump.

Fuel enters the dispenser through the filter or suction pump, then flows through the meter, the valve, the hose and exits via the nozzle. As fuel passes through the meter, it forces the meter's pistons to move back and forth, which causes a camshaft connected to the internal meter piston rods to rotate. The camshaft is connected to an electronic pulser fitted to the meter. As the camshaft rotates the pulser emits a low-voltage electrical signal in the form of pulses, which is connected to the T5 Processor. The pulses of the electrical signal are "counted" by the processor, which calculates the volume of fuel dispensed based on the number of pulses.

4. Installation

4.1 Site Preparation

This document assumes the site is ready for the dispenser to be installed and it has been prepared in accordance with all relevant international and local standards and regulations, such as:

- NFPA 30A (2018): Code for Motor Fuel Dispensing Facilities and Repair Garages.
- NFPA 70 (2017): National Electrical Code.
- AS1940 (2017): Storage and Handling of Flammable and Combustible Liquids.
- AS/NZS2229 (2004): Fuel dispensing equipment for explosive atmospheres.
- AS/NZS3000 (2016): Electrical installations.

In preparing the site, consideration must be given to all appropriate environmental, safety, access and functional requirements.

This document also assumes that a suitable base has been provided for the dispenser, which includes the provision of a sump with appropriate fastening holes and bolts to fasten the housing to the base, and that all fuel lines and electrical mains supply have been provided to the location where the pump will be installed. It is essential that the mains supply has been isolated at the main switchboard prior to commencing any installation work on the dispenser.

Provision of all fuel lines, electrical wiring and conduits to pump housing must be in accordance with the all relevant international and local standards and regulations.

All installation work must be completed by appropriately skilled, experienced and qualified personnel.

4.2 Preliminary Inspection & Planning

4.2.1 Inspection After Unpacking

Immediately after the dispenser is unpacked, confirm, with reference to the packing list, that the dispenser is supplied complete and consistent with the original purchase order.

Check that the following items are packed with the dispenser:

- High hose masts.
- Hoses.
- Nozzles.
- Junction box Allen-key (hex-socket key).
- 2 x panel lock keys.

Check if any damage has occurred during transport to the internal structure and components of the fuel dispenser or any loosening to the components.

Any issues that are identified after unpacking must be reported to Transponder Technologies immediately.

4.2.2 Verifying Requirements for the Installation

The following should be verified prior to the installation:

- The site and proposed install work must comply with the relevant international standards and local regulations.
- Wherever possible, the dispenser should be installed under a canopy or some form of shelter to provide as much protection from the climatic conditions as possible.
- Ensure that between the dispenser and the buildings in the vicinity there is sufficient distance for safe and unimpeded traffic flow with adequate protection for pedestrians.
- Ensure that there is sufficient space for a fuel tanker to park during deliveries into the fuel tank(s).
- The dispenser should be installed on a raised island, which prevents vehicles from colliding with the fuel dispenser.
- Some form of mechanical protection, such as bollards, should be installed around the dispenser to provide additional protection.
- The dispenser should be installed on a sump that is designed to match the dimensions of the dispenser and supported by a concrete foundation.

4.3 Physical Installation

The dispenser base is fixed to the sump with 4 x M12 bolts. If the dispenser is to be installed directly on the concrete foundation, then 4 x M12 anchor bolts or expansion bolts will be used.

The dimensions of the bases of the various 805-B models are shown in chapter 3.2.1 Mechanical Structure.

4.4 Hydraulic Connections

The installation of an 805-B dispenser involves multiple hydraulic connections, as follows:

Connect the fuel supply line(s) from the tank to the inlet(s) provided at the base of the dispenser, which are shown in chapter 3.2.1 Mechanical Structure.

- A DN40 shear valve (1.5 inch) is usually installed at the base of the dispenser for each inlet (note: these are not supplied with the dispenser and must be sourced separately).
- Fit the high hose mast(s) to the mounting block(s) provided on the end(s) of the dispenser.
- Connect the hose(s) to the fuel outlet(s) at the end(s) of the dispenser.
- Connect the nozzle(s) to the end of the hose(s) using breakaway coupling(s) if required, otherwise directly to the hose(s).

4.5 Electrical Connections

The installation of an 805-B dispenser involves electrical connections that are made within the Electrical Junction Box. The following connections are made with reference to the image below:

- Main electrical supply earth wire to the earth stud.
- Main electrical supply active to screw terminal 1.
- Main electrical supply neutral to screw terminal 2.
- Forecourt communications network positive signal to screw terminal 3.
- Forecourt communications network negative signal to screw terminal 4.
- Motor 1 start signal to screw terminal 5.
- Motor 2 start signal to screw terminal 6.

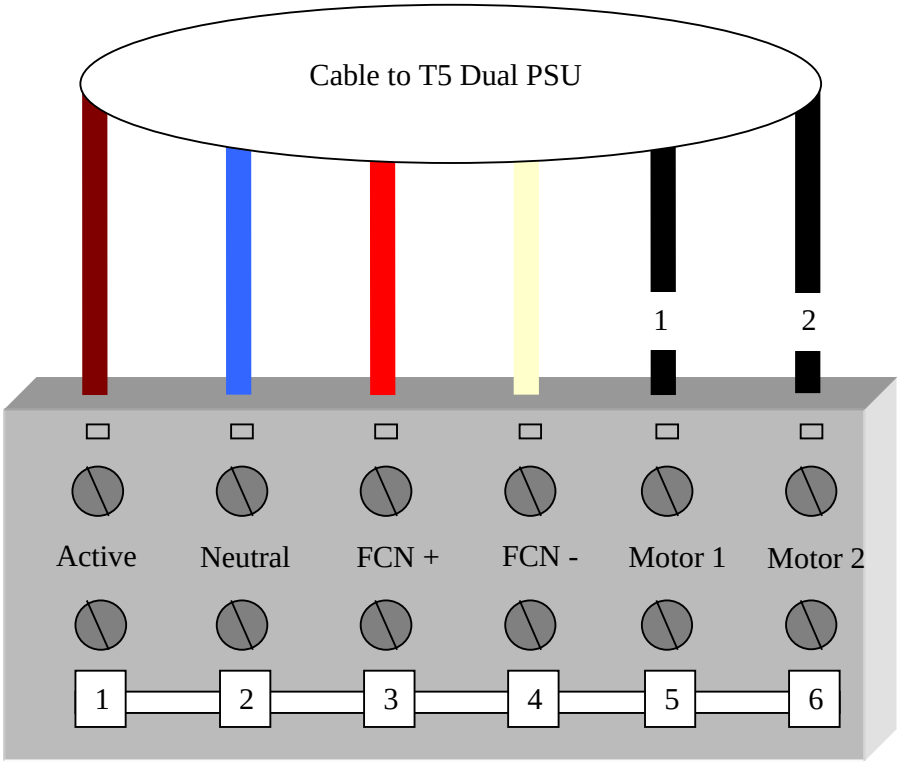

Figure 27 – Connections in the Electrical Junction Box

It is important to note the following prior to commencing the electrical connections:

- Ensure that the circuit breaker of the main electrical supply to the dispenser in the site electrical distribution box is switched off and that the dispenser is electrically isolated.
- Use bootlace ferrule connectors on all connections.
- Use a ring lug connector on the earth stud connection.

It is critical that the connection of the earth wire to the earth stud is adequately made. When the connection is complete, measure the resistances of the fuel dispenser and the nozzles to earth. The resistance of the fuel dispenser to earth should not be greater than 4Ω and the resistance of the nozzles to earth should not be greater than 10Ω.

4.6 Configuration & Calibration

4.6.1 Configuration

The dispenser must be configured to function as required before it is put into operation, which is performed using the configuration three switches on the T5 Processor. The switches are shown in the image below.

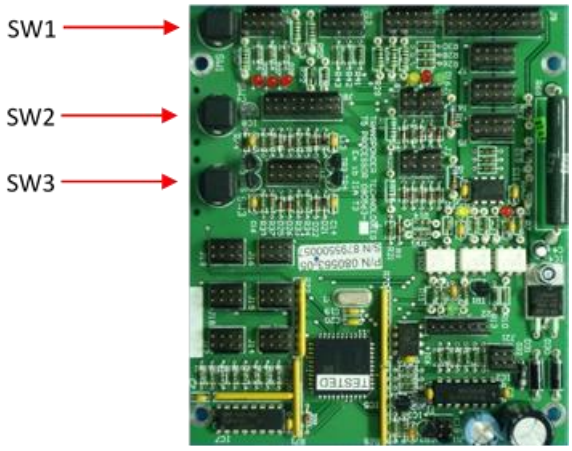

Figure 28 – Parameter Switches on the T5 Processor

The functions of the configuration switches are as follows:

- SW1: This is the “parameter switch”.
- SW2: This is the “k-factor switch”.
- SW3: This is the “advance parameter switch”.

The parameter switch and the k-factor switch allow various functional parameters to be accessed and changed, which enables the dispenser to operate in a required manner. The lists of the parameters that can be accessed by each switch are provided in the document “T5 Processor Configuration Manual”.

The procedure for using the switches is as follows:

1. Ensure that filling has stopped and that all nozzles are stowed.
2. Press and release the appropriate configuration switch (SW1 or SW2).
3. Press SW3 to advance to the required parameter. The price display will contain the name of the parameter and the litres display will show an abbreviated name and the current value of the parameter.
4. Once the required parameter is displayed, press the configuration switch (SW1 or SW2) until the required digit of the parameter is selected. The selected digit will be momentarily replaced by a “-” character when the switch is first pressed.
5. Hold down the configuration switch and the selected digit will increment through all permissible values. When the digit has reached the maximum permissible value, then the next value it will change to will be the minimum permissible value again (i.e. the digit values “roll” over).
6. When the value is as required, release the configuration switch.
7. Repeat steps 4 to 6 for each digit that is required to be changed.

8. Repeat step 3 to select the next required parameter to be changed.

When no switch presses have been detected for 10 seconds, the display will revert back to showing the last fill amount and the system will adopt the new parameter values.

4.6.2 Calibration

A fuel dispenser is an accurately calibrated metering instrument. During installation and prior to operation, the dispenser should be calibrated to ensure optimum accuracy and compliance with metrology regulations. Furthermore, periodic recalibration should be performed to maintain accuracy and compliance. The dispenser accuracy should never be allowed to exceed a maximum error of ±0.25%.

Prior to delivery from the factory, the accuracy of the dispenser's flow meter is adjusted in order to meet the accuracy requirement. However, once the dispenser is installed, it is possible for the accuracy to deviate due to factors such as fuel pressure, fuel quality and temperature, requiring calibration to be performed.

The calibration process involves dispensing fuel from the dispenser into a certified measuring container that has an accurately known volume, which is typically 20L, and noting the volume of fuel that was recorded by and displayed by the dispenser.

If the difference between the measuring container's volume and the dispenser's displays volume is greater than ±0.25%, then the dispenser can be adjusted by making an adjustment to the dispenser's "K-factor", which is the ratio of litres dispensed per revolution of the meter.

The K-Factor calibration procedure is as follows:

- Fill the certified measuring container and note the volume displayed on the dispenser.
- Calculate the correct K-Factor to be applied per the following example:
    - Displayed volume = 10.00 litres.
    - Measured volume = 20.00 litres.
    - Calculate the correct K-Factor by applying the formula below:
    - [New K-Factor] = [Existing K-Factor] x [Measured volume] ÷ [Displayed volume].

      = [Existing K-Factor] x 20.00 ÷ 10.00.

      = [Existing K-Factor] x 2.
    - Change the K-Factor to the new value.

The method for changing the K-Factor is described in the document "T5 Processor Configuration Manual".

4.6.3 Specific Configurations

The various models of 805-B dispensers require specific configurations to operate as needed. The configurations are based on the model construction and the required functions of the particular application that the dispenser will used for.

Certain specific configurations are defined in individual documents that are provided as addendums to this manual and are made available to customers as required.

5. Operation

5.1 Startup

5.1.1 Pre-Startup Checks

The following checks are recommended to be performed prior to powering the dispenser and allowing access to customers:

- Check pipe connections under the dispenser to make sure that they are well sealed, with no fuel leakage.
- Check that fire extinguishers and other safety equipment are placed in appropriate locations.
- Check that all required signage is in place.
- Check that there is adequate fuel in the storage tank.
- Check that neither the hoses nor the nozzles have any leaks.
- Check that the dispenser earth cable is securely connected to the external earthing-point.
- Check that the dispenser is rigidly fixed in place.
- Check that the area around the dispenser is free from obstacles and trip-hazards.

5.1.2 Power-up & Initialisation

The dispenser is powered-up by switching on the circuit breaker in the main electrical distribution box.

Once power is on, the dispenser will go through its automatic power-up initialisation and the back-lights on the displays will light-up.

5.2 Modes of Operation

5.2.1 Standalone & Self-Serve Modes

The 805-B dispensers have two main modes of operation; **standalone mode** and **self-serve mode**.

In both modes, authorisation of the dispenser, activation of the pump (internal or external) and activation of the solenoid valve corresponding to the nozzle, occurs when a nozzle is removed from its nozzle-boot (holster). Similarly, the dispenser deauthorises immediately when the nozzle is returned to its nozzle-boot and the pump is shut-down.

In **self-serve mode**, additional authorisation is required from a separate forecourt control device or fuel management system following the lifting of a nozzle.

It is important to note that when both nozzles are lifted, both solenoid valves and the pump are activated and fuel can be dispensed from both hoses simultaneously. In this situation, when the first nozzle is returned to its nozzle-boot only the corresponding solenoid valve is shut-down,

while the pump and other valve remain activated to allow fuel dispensing to continue from the other hose and nozzle.

5.2.2 Pre-set Operation

4-Key Pre-Set Keypad Operation

Prior to lifting a nozzle and authorising the dispenser to commence filling, a pre-set amount can be entered by the operator using the pre-set keypad corresponding to the nozzle to be used. The pre-set is a sale amount.

The process for entering a sale pre-set is as follows:

- Press the two currency keys, which are typically $10 and $1 keys, until the pre-set amount is reached.
- If an error is made in entering the pre-set amount, then the “CLEAR” key can be pressed, which cancels the pre-set.

When the desired pre-set amount is reached, lift the nozzle and commence filling.

16-Key Pre-Set Keypad Operation

Prior to lifting a nozzle and authorising the dispenser to commence filling, a pre-set amount can be entered by the operator using the pre-set keypad corresponding to the nozzle to be used. The pre-set can be either a sale or volume amount.

The process for entering a sale pre-set is as follows:

- Press the “currency” key (eg. “$”) on the keypad.
- In response, the Sale LCD will display a single “0” character.
- The numeric keys can then be pressed to select the pre-set amount (note: local currency values may limit the maximum pre-set amount).
- If an error is made in entering the pre-set amount, then the “CLR” key can be pressed, which cancels the pre-set.

The process for entering a volume pre-set is as follows:

- Press the “volume” key (eg. “L”) on the keypad.
- In response, the Volume LCD will display a single “0” character.
- The numeric keys can then be pressed to select the pre-set amount (note: practical limits may be set for the pre-set amount).

If an error is made in entering the pre-set amount, then the “CLR” key can be pressed, which cancels the pre-set.

5.2.3 Display Electronic Totals Mode

This is a temporary mode of operation where the system displays the dollar and litre totals stored in the non-volatile memory. To enter this mode, follow these steps:

1. Lift the nozzle from the holder.
2. Hold down the nozzle switch for at least three seconds.
3. Tap the nozzle switch up and down five times or more in quick succession.

The dollar and litres totals for the selected hose will appear on the display for 10 seconds.

Note: : Totals amounts can be reset by holding down the [**K-Factor**] switch while powering ON the dispenser controller. Keep in mind that in most scenarios, the K-Factor switch is protected by an anti-tamper seal.

5.3 During Operation

5.3.1 Authorisation & Completion

In **standalone mode**, the dispenser is authorised as soon as a nozzle is lifted. Following this the Sale and Volume LCDs, corresponding to the nozzle that was lifted, will momentarily display all "8" characters, then will reset to all "0" characters. At this point the nozzle can be placed into the vehicle fuel inlet and fuelling can commence.

In **self-serve mode**, the Sale, Volume and Price LCDs will start flashing, indicating to the operator that the dispenser has been authorised. The operator can then lift the nozzle and the Sale and Volume LCDs will momentarily display all "8" characters, then will reset to all "0" characters. At this point the nozzle can be placed into the vehicle fuel inlet and fuelling can commence.

At the completion of filling the nozzle must be returned to the nozzle boot.

The Sale and Volume LCDs will continue to display the values of the last sale until the next sale is authorised.

5.3.2 Filling Process

During filling, all effort should be made to ensure safety, including the following:

- Before lifting the nozzle, ensure that it is shut-off (ie. the nozzle trigger is not pressed).
- Avoid spilling fuel on a high temperature engine or exhaust pipe.
- If fuel is spilt, then it should be cleaned up.
- Fuel must not be dispensed into any container that is not designed to carry fuel.
- Smoking must not be permitted in close proximity to the dispenser.
- Filling must not occur when the potential for lightning exists.
- Ensure that the nozzle spout is completely in the vehicle fuel inlet to prevent spillage.
- During and after filling, hoses must not lay on the ground.

After filling is complete, the nozzle must be immediately returned to the nozzle boot.

5.3.3 Error Conditions & Codes

The dispenser displays error messages on the litres displays in response to an event or fault condition.

The messages are in the format "Err NN", where "NN" is a two-digit number that defines the type of error message.

A full list of the messages is provided in the document "T5 Processor Configuration Manual".

5.3.4 In an Emergency

In an emergency situation, the refuelling area should be completely evacuated, and the relevant emergency response personnel contacted.

6. Maintenance & Servicing

6.1 Routine Inspections

The following routine inspections should be done on a regular basis:

- Check if there is any fuel leaking inside the fuel dispenser.
- Check that the hoses and nozzles are in good condition with no leaks.
- Switch on the dispenser and ensure that the displays go through the correct start-up sequence as covered in chapter 5.1.2 Power-up & Initialisation.
- Clean the dispenser with warm soapy water.
- Inspect the dispenser for any sign of physical damage.

If there are any issues identified during inspections, then the dispenser must be switched-off and taken out of service until the issues are rectified.

6.2 Periodic Maintenance

The following period maintenance should be done by a qualified and authorised service technician:

- Measure the resistance of the fuel dispenser to earth and ensure that it is not greater than 4Ω.
- Measure the resistances of each nozzle to earth and ensure that they are not greater than 10Ω.
- Test the metering accuracy of the fuel dispenser and re-calibrate as required.

Any issues identified during periodic maintenance must be rectified immediately by the technician. If this is not possible for any reason, then the dispenser must be switched-off and taken out of service until the issues are rectified.

6.3 Service Work

In the event of a fault with or damage to the dispenser, an authorised TT distributor or service agent must be used to perform the required service work.

TT maintains a large network of distributors and service agents throughout regions where the 805-B series dispensers are sold and installed. Regular service training sessions are provided to service personnel and up to date technical documentation distributed to them to ensure that the highest quality of service is available.

6.4 Replacement Parts

The following table lists the main parts in the 805-B. The fields in the table are defined as follows:

- Part #: This is the part number (or order number) of the part, which is required for ordering replacement parts.
- Part Name: This is the description of the part.

Part #	Part Name
080563	T5 Processor Card
092228	T5 Pulser IFC
080602	T5 DLP TBus Display
081462	T5 DLP DD Display
081153	T5 Litres TBus Display
079651	T5 Litres DD Display
080547	T5 Dual HACM-ACS PSU
081446	T5 Dual LACM-ACS PSU
081454	T5 LACM-ACS Expansion PSU
078118	T5 NZPP FCN IFC
079009	T5 Gilbarco-AU FCN IFC
092397	KEYPAD Storm2000 4Key
095907	PULSER TT ZDM Pulser
095706	METER Bennett SB100
095898	VALVE Solenoid ASCO PAXT29227
095710	PUMP Bennett T75
095704	FILTER Bennett A270501 Spin On
805785	MOTOR Elnor Single phase 0.75kW BAV370CP AR
806579	NOZZLE Boot Slimline
806634	SWITCH Nozzle Boot Slimline
802787	NOZZLE ZVA 4.1R (16mm)
802795	NOZZLE ZVA 4.1 (19mm)
802800	NOZZLE ZVA 25.41 (25mm)

Note: Only genuine TT replacement parts should be used to make repairs to the dispenser. These can be either sourced directly from TT or from an authorised distributor or service agent. Using parts other than genuine replacement parts could create a safety hazard and violate product certifications and warranties.

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TT FUEL

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We have global experience supporting companies with fuel management systems, outdoor payment terminals, forecourt controllers, point of sale terminals, bulk fuel loading systems, management software services and specialised fuel storage & dispensing solutions.

We are a data rich business that delivers meaningful reporting and information to our customers to help them overcome challenges and manage risk.

Our excellence in technical listening and our focus on outcomes have allowed us to become proven innovative problem solvers.

We strive for durability, simplicity and exceptional performance when designing our products and solutions.

Our flexible solution architecture allows us to help customers manage change in their business and industry.

We are customer and outcome focused, understanding that we will be judged by our actions and performance.

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