



Transponder Technologies Pty Ltd  
A C N 083 558 178

# T5 Register Electronics

## Service Manual

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		3.13	Added T5 SMKP+CLCD IFC TBus Card		
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		6.2.7	Added LPG price resolution parameter		
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				6.3.5	Added static LPG Density parameter
6.3.6	Added static LPG Temperature parameter				
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7.1.2	Added 'tEP' and 'dEn' non-fatal error codes				
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## 1. Introduction

This manual provides details for servicing and configuring T5 Register Electronic systems and components. Generic information is provided for all T5 components, and system information is provided in the appendices for specific applications.

## 2. WARNINGS

### 2.1 Safety Precautions

The T5 register, and its associated circuits and wiring, is certified electrical equipment approved for use in a hazardous area (Class 1 Zone 1, Group IIA T3). Only parts identical to those covered by the certification may be used where the integrity of the intrinsic safety may be affected. All circuit boards are only to be repaired by an approved service organisation.

### 2.2 Static Electricity Precautions

Electronic components used are sensitive to static. Please take anti-static precautions.

All circuit boards must be carried and transported in static-shielded bags. An anti-static wrist strap should be worn and connected correctly when working on any electronic equipment. If an anti-static wrist strap is unavailable, or in an emergency, hold onto an earthed part of the pump/dispenser frame whilst working on the equipment. This is not a recommended alternative to wearing an anti-static wrist strap.

**Note:** Transponder Technologies reserves the right to refuse to accept any circuit boards returned, if proper anti-static precautions have not been taken.



### 3. T5 Components

This section provides details of each of the T5 components. Details include diagnostic indicators, switch functions, connector functions and field replaceable parts.

#### 3.1 T5 Processor Card

Name	T5 Processor Card
TT Part Name	PCBassy T5 Processor Card
TT Part Number	080563

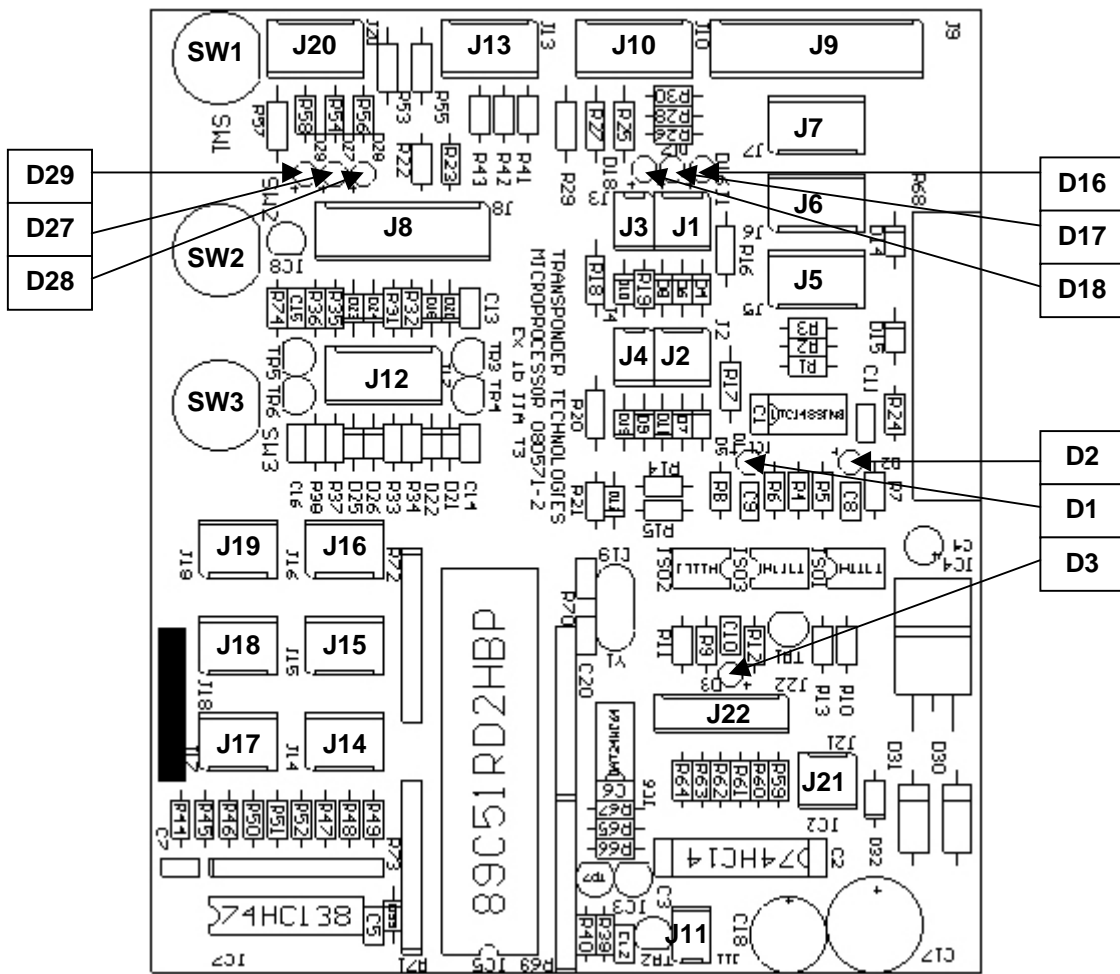


Figure 1 - T5 Processor Card Overlay

##### 3.1.1 Diagnostic LED functions

Diagnostic LED	Colour	Function
D1	Yellow	TBus Tx Enable LED. Flashes when Processor is sending data over the TBus network.
D2	Red	TBus Transmit LED. Flashes when Processor is sending data over the TBus network.
D3	Green	TBus Receive LED. Flashes when Processor is receiving data from the TBus network.

D16	Green	FCN Receive LED. Flashes when Processor is receiving data over the Forecourt Network.
D17	Red	FCN Transmit LED. Flashes when Processor is transmitting data over the Forecourt Network.
D18	Yellow	FCN Tx Enable LED. Flashes when Processor is transmitting data over the Forecourt Network.
D27	Red	Diagnostic LED 1. Turns on while switch SW1 is depressed.
D28	Red	Diagnostic LED 2. Flashes quickly when any nozzle is lifted. Flashes slowly when all nozzles are stowed. Turns on while SW2 is depressed.
D29	Red	Diagnostic LED 3. Turns on while switch SW3 is depressed.

### 3.1.2 Switch functions

Switch Designator	Function
SW1	Parameter Switch. See section 6.3 for details.
SW2	K-Factor Switch. See section 6.2 for details.
SW3	Advance Parameter Switch. See section 6.1 for details.

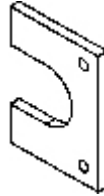
### 3.1.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	3x2	Card Reader – Side A
J2	3x2	Card Reader – Side B
J3	2x2	iButton Reader – Side A
J4	2x2	iButton Reader – Side B
J5	5x2	TBus – Power Channel 0
J6	5x2	TBus – Power Channel 1
J7	5x2	TBus – Power Channel 2
J8	9x2	Nozzle Switches
J9	11x2	Power In
J10	6x2	Email FCN Interface Card
J11	2x2	External Buzzer
J12	6x2	Electromechanical Totalisers
J13	5x2	Air/Sump Switches
J14	4x2	Pulser 1 – Side A
J15	4x2	Pulser 2 – Side A
J16	4x2	Pulser 3 – Side A
J17	4x2	Pulser 1 – Side B
J18	4x2	Pulser 2 – Side B
J19	4x2	Pulser 3 – Side B
J20	5x2	Unused IO
J21	3x2	Discrete Solenoid + Motor Control Outputs
J22	7x1	Processor Programming

### 3.1.4 Field replaceable parts

#### K-Factor switch seal

After calibration, switch SW2 is fitted with a seal that prevents the switch from being depressed. This button seal, as shown in the picture below, is TT Part No. 078061.



**Figure 2 – Button Seal**

### 3.2 T5 Pacesetter Retrofit PSU

Name	T5 Pacesetter Retrofit PSU
TT Part Name	PCBassy T5 Pacesetter Retrofit PSU
TT Part Number	077471

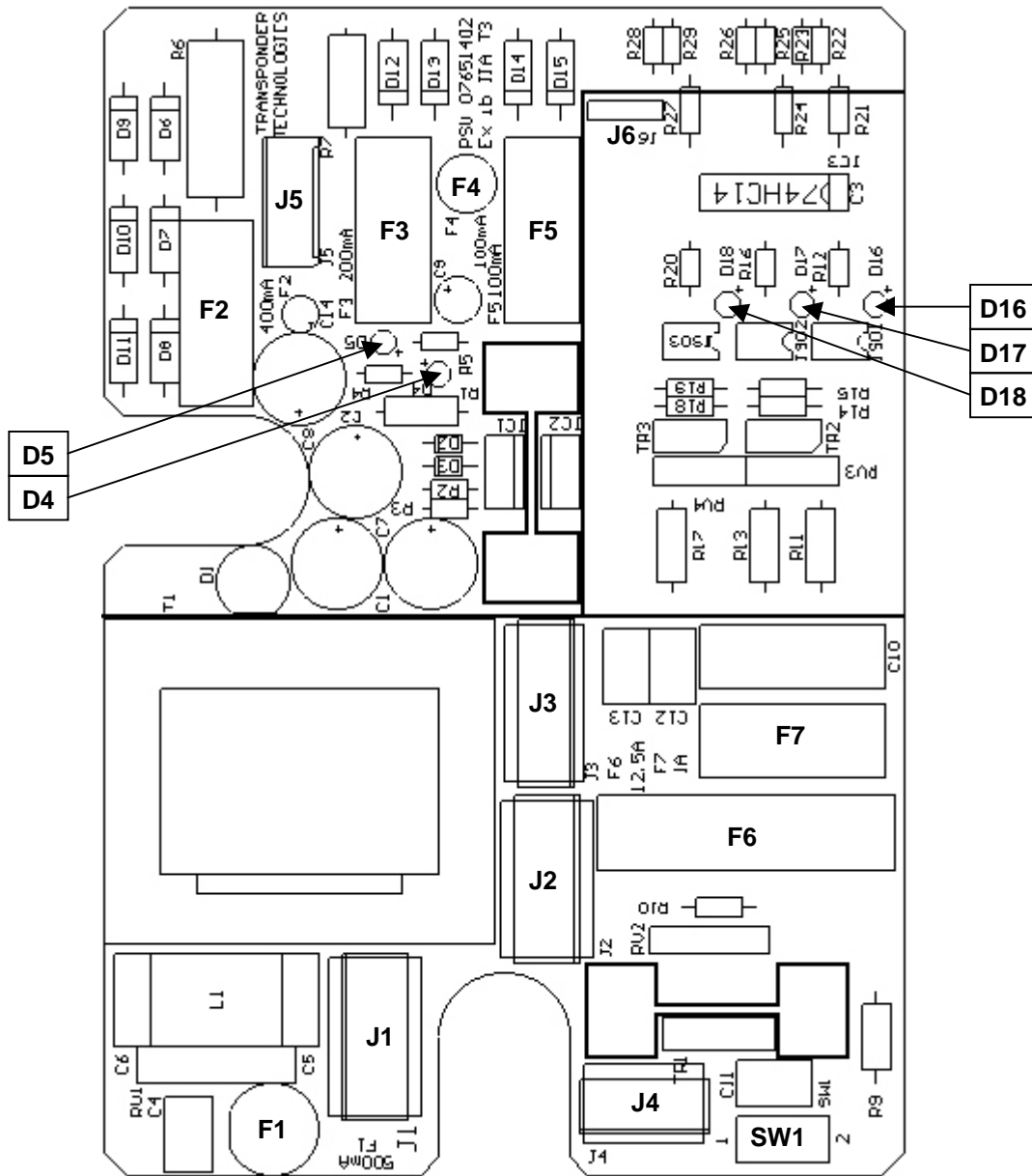


Figure 3 – T5 Pacesetter Retrofit PSU Overlay

#### 3.2.1 Diagnostic LED functions

Diagnostic LED	Colour	Function
D4	Red	Indicates 10VDC is being generated.
D5	Red	Indicates 5VDC is being generated.
D16	Red	Indicates pump motor control output is activated.
D17	Red	Indicates low flow solenoid control output is activated.
D18	Red	Indicates high flow solenoid control output is activated.

### 3.2.2 Switch functions

Switch Designator	Function
SW1	Pump motor control output high/low current switch. This switch should be in position 2 if J4 is connected to a motor, or position 1 if J4 is connected to a solenoid.

### 3.2.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	3x1	240VAC Mains input
J2	3x1	240VAC Output to secondary PSU
J3	4x1	240VAC Solenoid control outputs
J4	3x1	240VAC Pump motor control output
J5	7x2	Power outputs/Control inputs to/from T5 Processor
J6	4x1	Power/Comms to NZPP or Gilbarco FCN Interface card

### 3.2.4 240VAC connector pin-outs

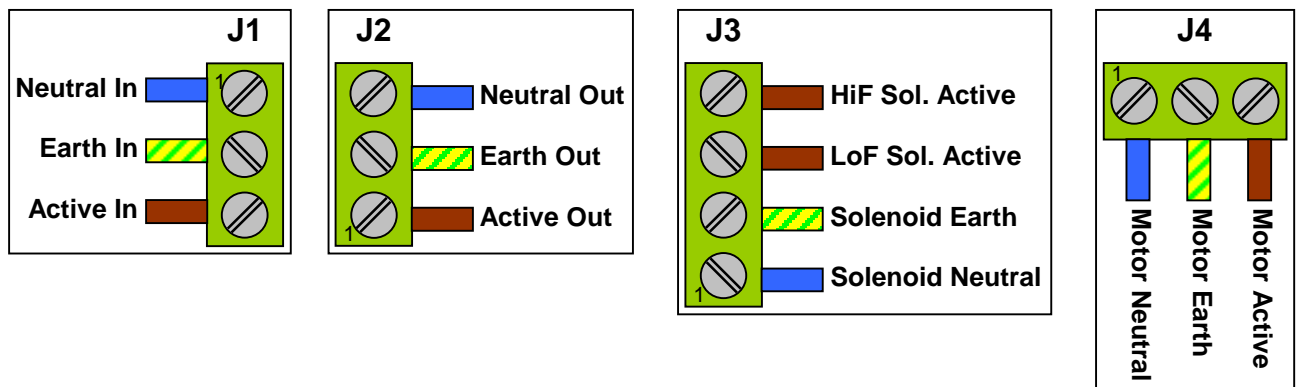


Figure 4 - PSU 240VAC connector pin-outs

### 3.2.5 Field replaceable parts

#### Fuse circuits

Designator	Circuit
F1	240VAC Mains input
F2	Intrinsically safe 10VDC output
F3	Intrinsically safe 5VDC output for TBus
F4*	Input side of 5VDC barrier for local triac switching
F5	Output side of 5VDC barrier for local triac switching
F6	240VAC Pump motor control output
F7	240VAC High/Low flow solenoid control outputs

Fuse type details

Designator	Current Rating	Material	Speed	Size	<u>Conquer Electronics</u> order code
F1	500mA	Ceramic	Antisurge	5x20mm	UDA .500
F2	400mA	Glass	Quick-blow	5x20mm	UFE .400
F3	200mA	Ceramic	Quick-blow	5x20mm	UBM .200
F4*	100mA	Plastic	Antisurge	Ø6.3mm	MET .100
F5	100mA	Ceramic	Quick-blow	5x20mm	UBM .100
F6	12.5A	Ceramic	Antisurge	1/4x1-1/4"	UCT 12.5
F7	1A	Ceramic	Quick-blow	5x20mm	UBM 001

\*Note: Details for F4 provided for reference only. F4 is NOT field replaceable.



### 3.3.1 Diagnostic LED functions

LED Designator	Colour	Function
D1*	Yellow	TBus Tx Enable LED. Flashes when Display is sending data over the TBus network.
D2*	Red	TBus Transmit LED. Flashes when Display is sending data over the TBus network.
D3*	Green	TBus Receive LED. Flashes when Display is receiving data from the TBus network.

\*Note: These LED's do not exist on the DD variant.

### 3.3.2 Switch functions

Switch Designator	Function
SW1*	<p>This switch sets the address of the Display on the TBus network. There are currently two permissible combinations of switch positions:</p> <ul style="list-style-type: none"> <li>For a Single hose system, or Side-A of a dual, the switch settings should be: positions 1,2,3,4 ON (up).</li> <li>For Side-B of a dual hose system, the switch settings should be: positions 1,3,4 ON (up) and position 2 OFF (down).</li> </ul>
SW2 <sup>†</sup>	<p>This is not a true switch but a set of pads on the solder-side of the PCB that can be bridged by soldering. These links set if the Display is a TBus or DD display as follows:</p> <ul style="list-style-type: none"> <li>For a TBus display positions 1 and 3 are linked and position 2 is left open.</li> <li>For a DD display position 2 is linked and positions 1 and 3 are left open.</li> </ul>

\*Note: SW1 does not exist on the DD variant.

<sup>†</sup>Note: SW2 is factory configured.

### 3.3.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	5x2	TBus Network – In
J2	5x2	TBus Network – Out
J3	7x2	Direct Drive connection between TBus and DD pair.

### 3.3.4 Field replaceable parts

#### Microcontroller – TBus variant only

IC3 is a microcontroller that, under normal circumstances, will not require changing. If a firmware change is required, then IC3 can be replaced with a new microcontroller preprogrammed with the updated firmware. When replacing this IC, normal antistatic procedures must be taken and power must not exist on any of the T5 components in the system.



### 3.4 T5 Litres Display TBus & DD

The T5 Litres Display card comes in two variants. The TBus variant and the DD (**D**irect **D**rive) variant. The DD variant uses the same base PCB but is a reduced build of the TBus variant and is designed to 'piggy-back' off of the TBus variant. The TBus variant connects to the Processor via the TBus network. In a typical pump configuration each TBus Display has a matching DD Display that displays identical information for the opposite physical side of the pump.

The information below will identify where the boards differ from a servicing and configuration view point.

Name	T5 Litres Only Display TBus
TT Part Name	PCBAssy T5 Litres Display TBus
TT Part Number	081153

Name	T5 Litres Only Display Direct Drive
TT Part Name	PCBAssy T5 Litres Display DD
TT Part Number	079561

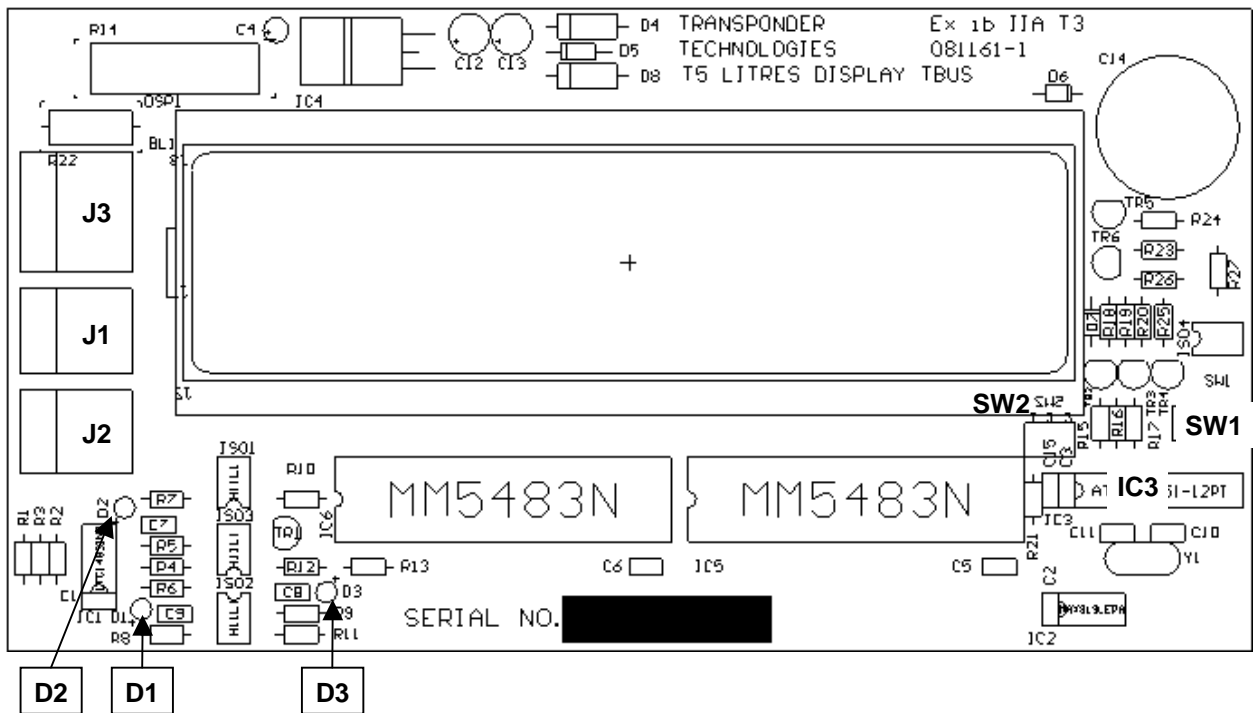


Figure 6 – T5 Litres Display TBus & DD Overlay

#### 3.4.1 Diagnostic LED functions

LED Designator	Colour	Function
D1*	Yellow	TBus Tx Enable LED. Flashes when Display is sending data over the TBus network.
D2*	Red	TBus Transmit LED. Flashes when Display is sending data over the TBus network.
D3*	Green	TBus Receive LED. Flashes when Display is receiving data from the TBus network.

\*Note: These LED's do not exist on the DD variant.

### 3.4.2 Switch functions

Switch Designator	Function
SW1*	This switch sets the address of the Display on the TBus network. There are currently two permissible combinations of switch positions: <ul style="list-style-type: none"> <li>• For a Single hose system, or Side-A of a dual, the switch settings should be: positions 1,2,3,4 ON (up).</li> <li>• For Side-B of a dual hose system, the switch settings should be: positions 1,3,4 ON (up) and position 2 OFF (down).</li> </ul>
SW2 <sup>†</sup>	This is not a true switch but a set of pads on the solder-side of the PCB that can be bridged by soldering. These links set if the Display is a TBus or DD display as follows: <ul style="list-style-type: none"> <li>• For a TBus display positions 1 and 3 are linked and position 2 is left open.</li> <li>• For a DD display position 2 is linked and positions 1 and 3 are left open.</li> </ul>

\*Note: SW1 does not exist on the DD variant.

<sup>†</sup>Note: SW2 is factory configured.

### 3.4.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	5x2	TBus Network – In
J2	5x2	TBus Network – Out
J3	7x2	Direct Drive connection between TBus and DD pair.

### 3.4.4 Field replaceable parts

#### Microcontroller – TBus variant only

IC3 is a microcontroller that, under normal circumstances, will not require changing. If a firmware change is required, then IC3 can be replaced with a new microcontroller preprogrammed with the updated firmware. When replacing this IC, normal antistatic procedures must be taken and power must not exist on any of the T5 components in the system.

### 3.5 T5 TTMRT86 Pulser Card

Name	T5 TTMRT86 Pulser Card
TT Part Name	PCBAssy T5 TTMRT86 Pulser Card
TT Part Number	080513

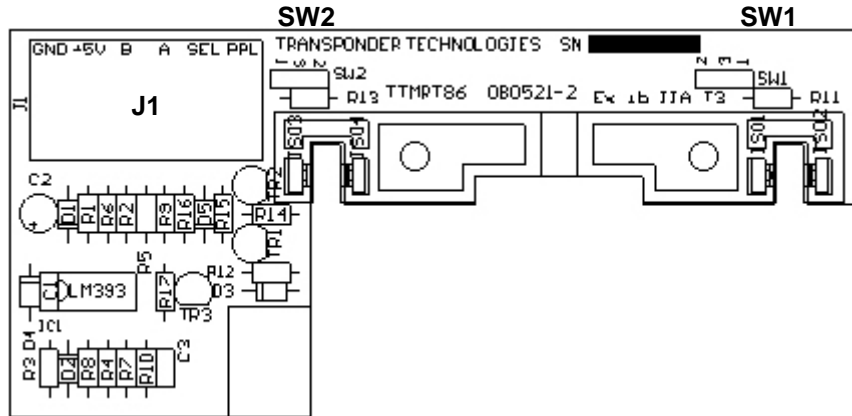


Figure 7 – T5 TTMRT86 Pulser Card Overlay

#### 3.5.1 Diagnostic LED functions

There are no diagnostic LED's on this card

#### 3.5.2 Switch functions

Switch Designator	Function
SW1* & SW2*	<p>These are not a true switches but are sets of pads on the component-side of the PCB that can be bridged by soldering. These links set the legal direction of rotation of the pulser as viewed from underneath the pulser:</p> <ul style="list-style-type: none"> <li>• For clockwise rotation positions 2 and 3 are linked on both SW1 and SW2.</li> <li>• For anticlockwise rotation positions 1 and 3 are linked on both SW1 and SW2.</li> </ul>

\*Note: SW1 & SW2 are factory configured.

#### 3.5.3 Connector functions

Connector Designator	Nr. Positions	Function
J1	6	Connection to T5 Processor

#### 3.5.4 Field replaceable parts

There are no field replaceable parts on this card.

### 3.6 T5 Email FCN Interface Card

Name	T5 Email FCN Interface Card
TT Part Name	PCBAssy T5 Email FCN Interface Card
TT Part Number	078778

FCN = Forecourt Network

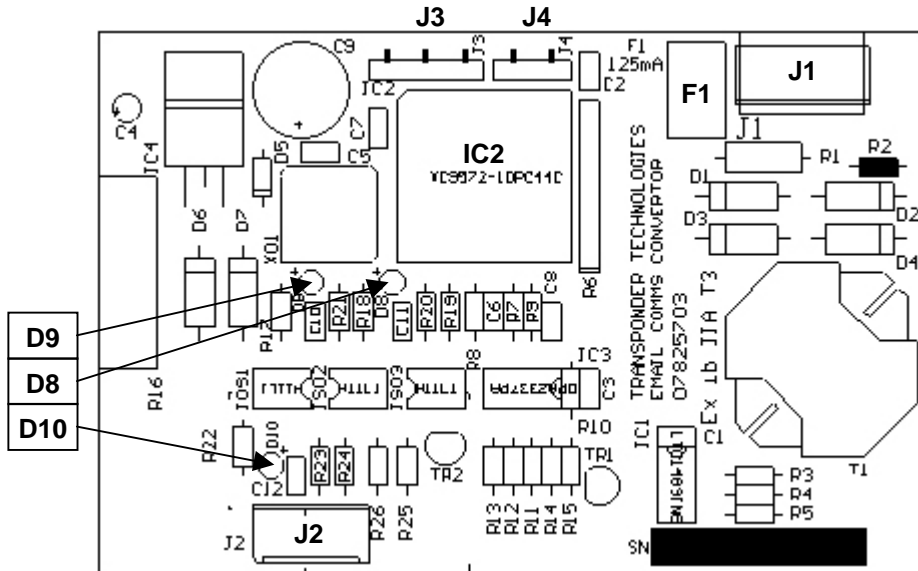


Figure 8 – T5 Email FCN Interface Card Overlay

#### 3.6.1 Diagnostic LED functions

LED Designator	Colour	Function
D8	Yellow	FCN Tx Enable LED. Flashes when the Interface Card is sending data over the Email FCN.
D9	Red	FCN Transmit LED. Flashes when the Interface Card is sending data over the Email FCN.
D10	Green	FCN Receive LED. Flashes when the Interface Card is receiving data from the Email FCN.

#### 3.6.2 Switch functions

There are no switches on this card.

#### 3.6.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	3x1	Isolated connection to Email Forecourt Network
J2	6x2	Power/Comms from T5 Processor
J3	6x1	JTAG Programming connections for IC2 PLD.
J4	4x1	Unused I/O from IC2 PLD.

### 3.6.4 Forecourt network connector pin-out

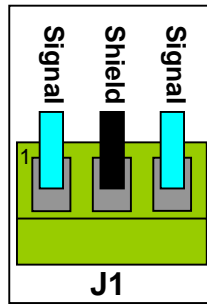


Figure 9 - Email Forecourt network connector pin-out

### 3.6.5 Field replaceable parts

#### Programmable Logic Device

IC2 is a programmable logic device that, under normal circumstances, will not require changing. If a firmware change is required, then IC3 can be replaced with a new preprogrammed PLD. When replacing this IC, normal antistatic procedures must be taken and power must not exist on any of the T5 components in the system.

#### Fuse circuits

Designator	Circuit
F1*	Isolated Email Forecourt Network connection

#### Fuse type details

Designator	Current Rating	Material	Speed	Size	<u>Littelfuse</u> order code
F1*	125mA	Plastic	Antisurge	Ø8x13mm	0259.125

\*Note: Details for F1 provided for reference only. F1 is NOT field replaceable.

### 3.7 T5 NZPP FCN Interface Card

Name	T5 NZPP FCN Interface Card
TT Part Name	PCBA Assy T5 NZPP FCN Interface Card
TT Part Number	078118

FCN = Forecourt Network, NZPP = New Zealand Pump Protocol (also known as PEC protocol)

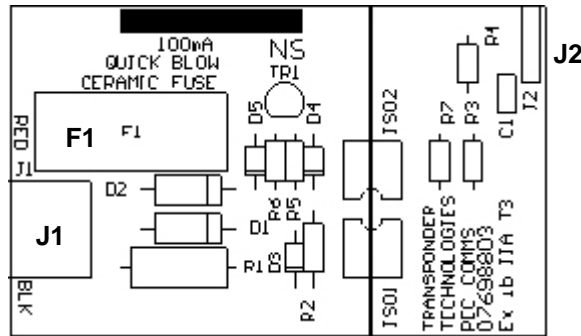


Figure 10 – T5 NZPP FCN Interface Card Overlay

#### 3.7.1 Diagnostic LED functions

There are no diagnostic LED's on this card.

#### 3.7.2 Switch functions

There are no switches on this card.

#### 3.7.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	2x1	Connection to NZPP current-loop forecourt network
J2	4x1	Power/Comms from T5 Pacesetter Retrofit PSU

#### 3.7.4 Forecourt network connector pin-out

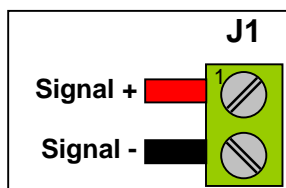


Figure 11 - NZPP forecourt network connector pin-out

#### 3.7.5 Field replaceable parts

##### Fuse circuits

Designator	Circuit
F1	NZPP current-loop forecourt network

##### Fuse type details

Designator	Current Rating	Material	Speed	Size	Conquer Electronics order code
F1	100mA	Ceramic	Quick-blow	5x20mm	UBM .100

### 3.8 T5 Gilbarco-AU FCN Interface Card

Name	T5 Gilbarco-AU FCN Interface Card
TT Part Name	PCBAssy Gilb-AU FCN Interf. Card
TT Part Number	079009

FCN = Forecourt Network, AU = Australia

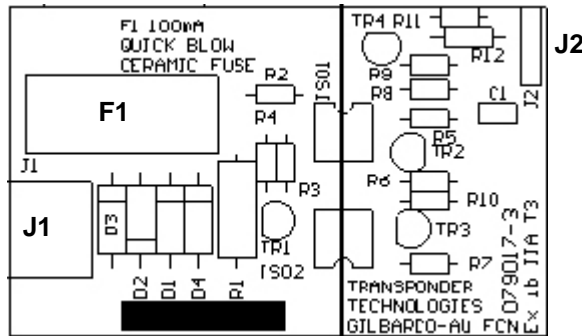


Figure 12 – T5 Gilbarco-AU FCN Interface Card Overlay

#### 3.8.1 Diagnostic LED functions

There are no diagnostic LED's on this card.

#### 3.8.2 Switch functions

There are no switches on this card.

#### 3.8.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	2x1	Connection to Gilbarco current-loop forecourt network
J2	4x1	Power/Comms from T5 Pacesetter Retrofit PSU

#### 3.8.4 Forecourt network connector pin-out

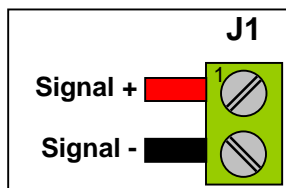


Figure 13 - Gilbarco forecourt network connector pin-out

#### 3.8.5 Field replaceable parts

##### Fuse circuits

Designator	Circuit
F1	Gilbarco current-loop forecourt network

##### Fuse type details

Designator	Current Rating	Material	Speed	Size	Conquer Electronics order code
F1	100mA	Ceramic	Quick-blow	5x20mm	UBM .100

### 3.9 Electromechanical Totaliser

There is only one type of electromechanical totaliser approved for use with the T5 electronics. This is a model P2G729A01 from ENM Company. It is supplied by Transponder Technologies, under the below description, with the appropriate connectors fitted.

Name	Electromechanical Totaliser with Bullet Connectors
TT Part Name	ASSY EM Totaliser with Bullet Conn
TT Part Number	082523

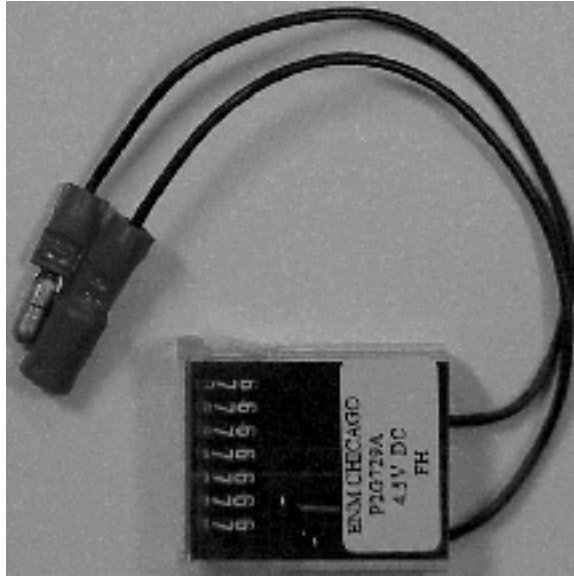


Figure 14 – Electromechanical Totaliser



### 3.10 T5 Dual H/LACM-ACS PSU

The T5 Dual H/LACM-ACS PSU (or T5 Dual PSU for short) comes in two variants. Both variants utilise the same base PCB but differ in the power rating of the triacs used to control the ‘motor’ switch output. The HACM build uses a triac to control the motor output which is rated at 600V 40A. The LACM build uses a triac to control the motor output which is rated at 600V 4A. The high current version is normally used when switching an electric pump motor in a suction pump whereas the low current version is normally used in dispensers where a remote motor starter is switched for a submersible pump or LPG pump equipment. Where differences occur between the two builds that are relevant to field service work they will be noted in the sections below.

Note: H/LACM stands for High/Low current AC Motor control output. ACS stands for AC solenoid control outputs.

Name	T5 Dual High current AC Motor - AC Solenoid PSU
TT Part Name	PCBA Assy T5 Dual HACM-ACS PSU
TT Part Number	080547

Name	T5 Dual Low current AC Motor - AC Solenoid PSU
TT Part Name	PCBA Assy T5 Dual LACM-ACS PSU
TT Part Number	081446

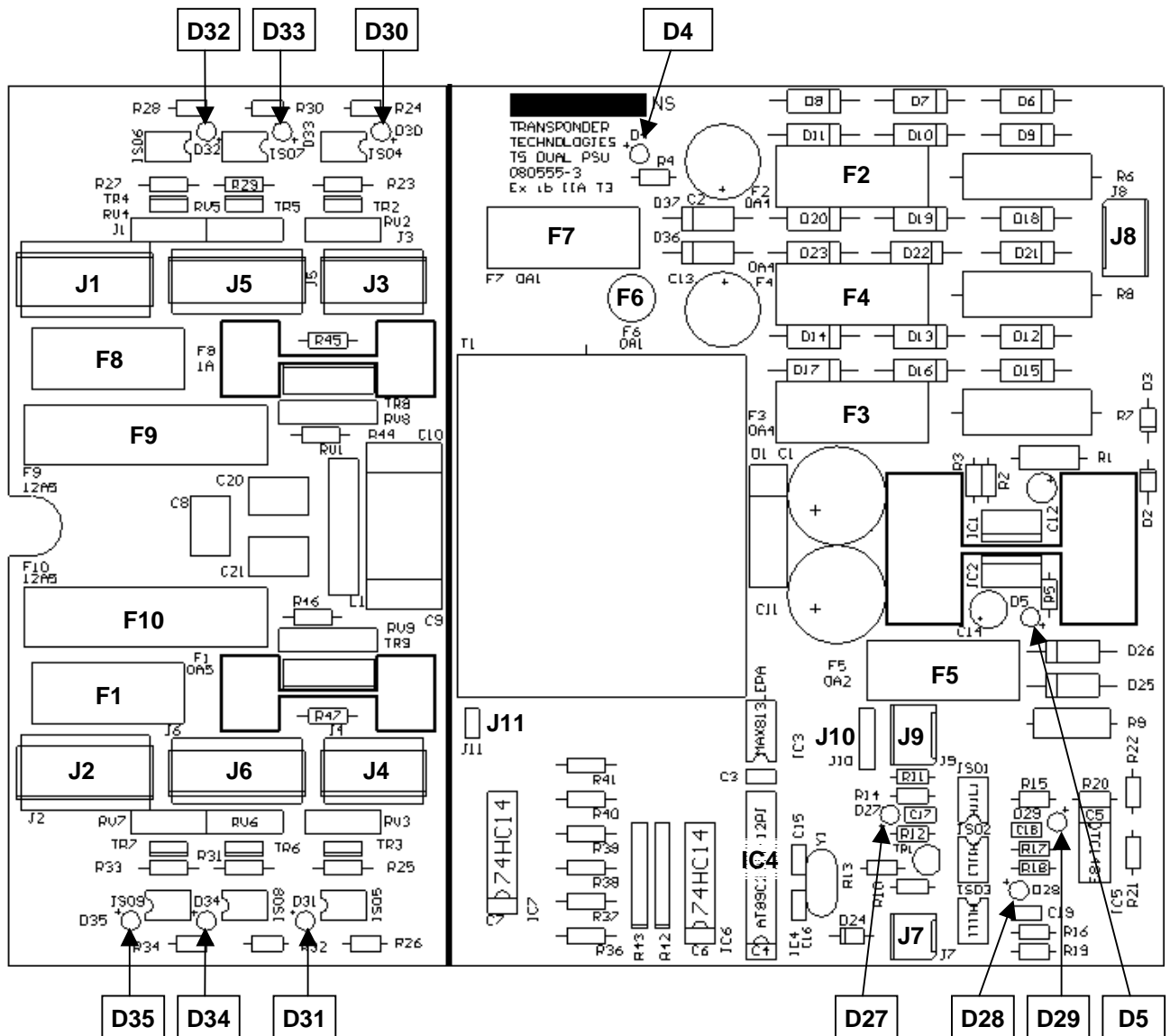


Figure 15 – T5 Dual H/LACM-ACS PSU Overlay

### 3.10.1 Diagnostic LED functions

Diagnostic LED	Colour	Function
D4	Red	Indicates 10VDC is being generated.
D5	Red	Indicates 5VDC is being generated.
D30	Red	Indicates Side-A pump motor control output is activated.
D32	Red	Indicates Side-A high flow solenoid control output is activated.
D33	Red	Indicates Side-A low flow solenoid control output is activated.
D31	Red	Indicates Side-B pump motor control output is activated.
D34	Red	Indicates Side-B high flow solenoid control output is activated.
D35	Red	Indicates Side-B low flow solenoid control output is activated.

### 3.10.2 Switch functions

There are no switches on this card.

### 3.10.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	3x1	240VAC Mains input
J2	3x1	240VAC Output to PSU Expansion Card
J3	3x1	240VAC Side-A Pump motor control output
J4	3x1	240VAC Side-B Pump motor control output
J5	4x1	240VAC Side-A Solenoid control outputs
J6	4x1	240VAC Side-B Solenoid control outputs
J7	3x2	DC power & comms to PSU Expansion Card
J8	5x2	I.S. Power outputs to T5 Processor Card
J9	4x2	I.S. TBus comms/FCN comms to T5 Processor Card
J10	4x1	I.S. Power & comms to NZPP/Gilbarco FCN Interface card
J11	2x1	Non-I.S. 5VDC auxiliary power output

### 3.10.4 240VAC connector pin-outs

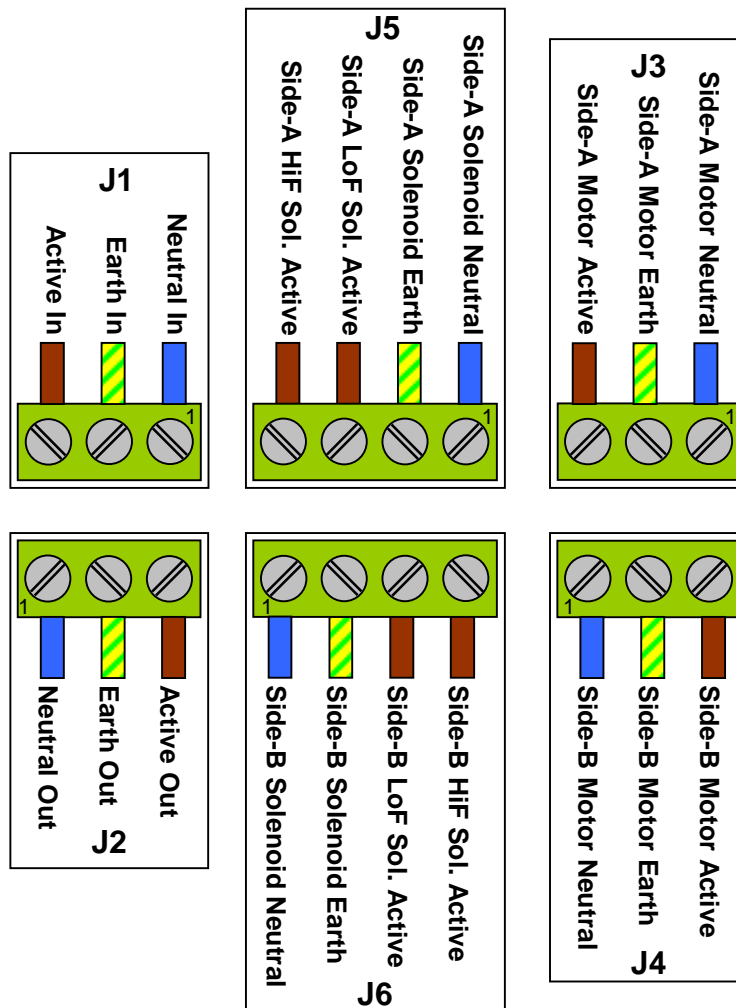


Figure 16 – Dual PSU 240VAC connector pin-outs

### 3.10.5 Field replaceable parts

#### Microcontroller

IC3 is a microcontroller that, under normal circumstances, will not require changing. If a firmware change is required, then IC3 can be replaced with a new microcontroller preprogrammed with the updated firmware. When replacing this IC, normal antistatic procedures must be taken and power must not exist on any of the T5 components in the system.

#### Fuse circuits

Designator	Circuit
F1	240VAC Mains input
F2	Intrinsically safe 10VDC output rail 0
F3	Intrinsically safe 10VDC output rail 1
F4	Intrinsically safe 10VDC output rail 2
F3	Intrinsically safe 5VDC output for TBus
F5	Input side of 5VDC barrier for TBus comms power

F6*	Input side of 5VDC barrier for local triac switching
F7	Output side of 5VDC barrier for local triac switching
F8	240VAC High/Low flow solenoid & low-current motor control outputs
F9	240VAC Side-A Pump motor control output (high-current)
F10	240VAC Side-B Pump motor control output (high-current)

#### Fuse type details

Designator	Current Rating	Material	Speed	Size	<u>Conquer Electronics</u> order code
F1	500mA	Ceramic	Antisurge	5x20mm	UDA .500
F2	400mA	Glass	Quick-blow	5x20mm	UFE .400
F3	400mA	Glass	Quick-blow	5x20mm	UFE .400
F4	400mA	Glass	Quick-blow	5x20mm	UFE .400
F5	200mA	Ceramic	Quick-blow	5x20mm	UBM .200
F6*	100mA	Plastic	Quick-blow	Ø6.3mm	MET .100
F7	100mA	Ceramic	Quick-blow	5x20mm	UBM .100
F8	1A	Ceramic	Quick-blow	5x20mm	UBM 001
F9	12.5A	Ceramic	Anti-surge	1/4x1-1/4"	UCT 12.5
F10	12.5A	Ceramic	Anti-surge	1/4x1-1/4"	UCT 12.5

\*Note: Details for F6 provided for reference only. F6 is NOT field replaceable.

### 3.11 T5 H/LACM-ACS PSU Expansion Card

The T5 H/LACM-ACS PSU Expansion Card (or T5 PSU Expansion Card for short) comes in two variants. Both variants utilise the same base PCB but differ in the power rating of the triacs used to control the ‘motor’ switch output. The HACM build uses a triac to control the motor output which is rated at 600V 40A. The LACM build uses a triac to control the motor output which is rated at 600V 4A. The high current version is normally used when switching an electric pump motor in a suction pump whereas the low current version is normally used in dispensers where a remote motor starter is switched for a submersible pump or LPG pump equipment. Where differences occur between the two builds that are relevant to field service work they will be noted in the sections below.

Note: H/LACM stands for High/Low current AC Motor control output. ACS stands for AC solenoid control outputs.

Name	T5 High current AC Motor - AC Solenoid PSU Expansion Card
TT Part Name	PCBAassy T5 HACM-ACS PSU Expan. Card
TT Part Number	080597

Name	T5 Low current AC Motor - AC Solenoid PSU Expansion Card
TT Part Name	PCBAassy T5 LACM-ACS PSU Expan. Card
TT Part Number	081454

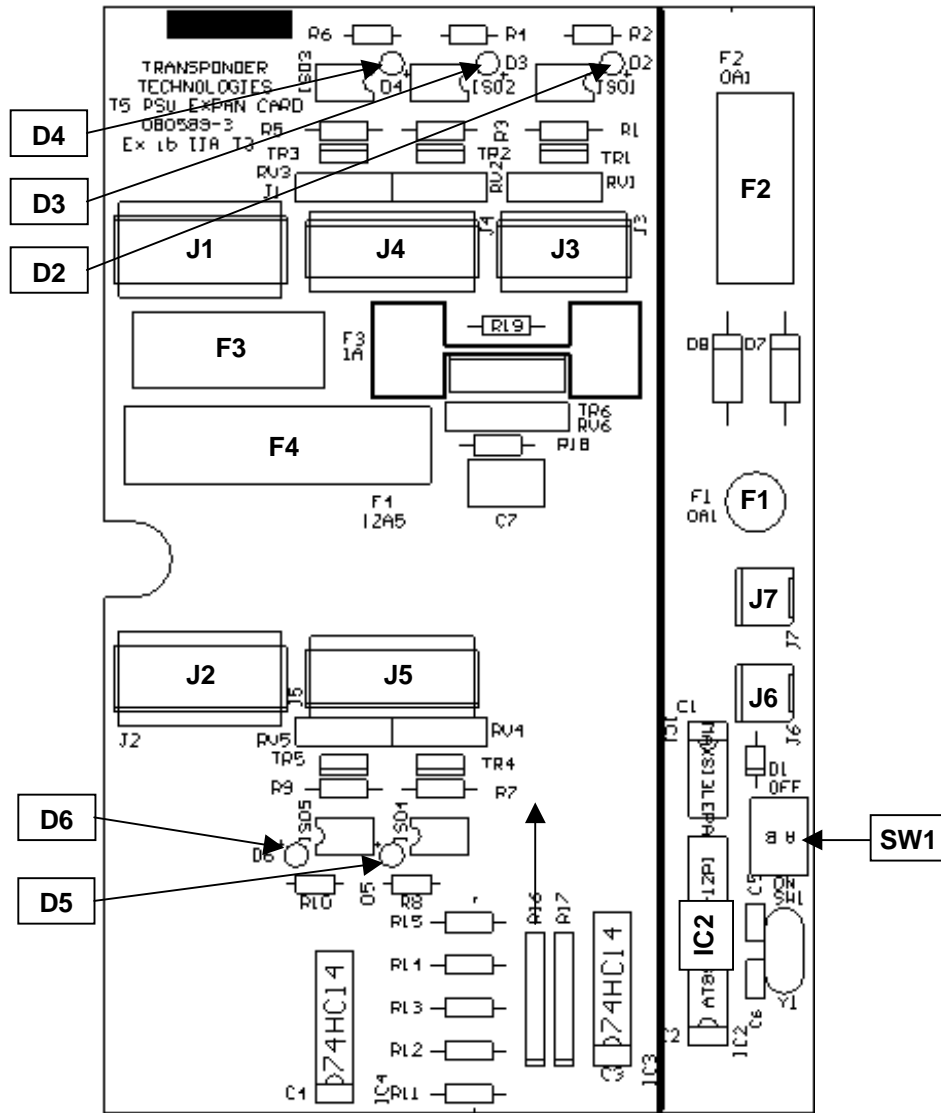


Figure 17 – T5 PSU Expansion Card Overlay

### 3.11.1 Diagnostic LED functions

Diagnostic LED	Colour	Function
D2	Red	Indicates pump motor control output is activated.
D3	Red	Indicates solenoid control output 1 is activated.
D4	Red	Indicates solenoid control output 2 is activated.
D5	Red	Indicates solenoid control output 3 is activated.
D6	Red	Indicates solenoid control output 4 is activated.

**3.11.2 Switch functions**

Switch Designator	Function
SW1	TBus Address Select. Selects address of this PSU Expansion card relative to other connected PSU Expansion cards as per table below.

Address	Position 1 (A)	Position 2 (B)
0	Off	Off
1	On	Off
2	Off	On
3	On	On

**3.11.3 Connector functions**

Connector Designator	Nr. Pins	Function
J1	3x1	240VAC Mains input from T5 Dual PSU
J2	3x1	240VAC Output to next PSU Expansion Card
J3	3x1	240VAC Pump motor control output
J4	4x1	240VAC Solenoid control output 1 & 2
J5	4x1	240VAC Solenoid control output 3 & 4
J6	3x2	DC power & comms from T5 Dual PSU
J7	3x2	DC power & comms to next PSU Expansion Card

**3.11.4 240VAC connector pin-outs**

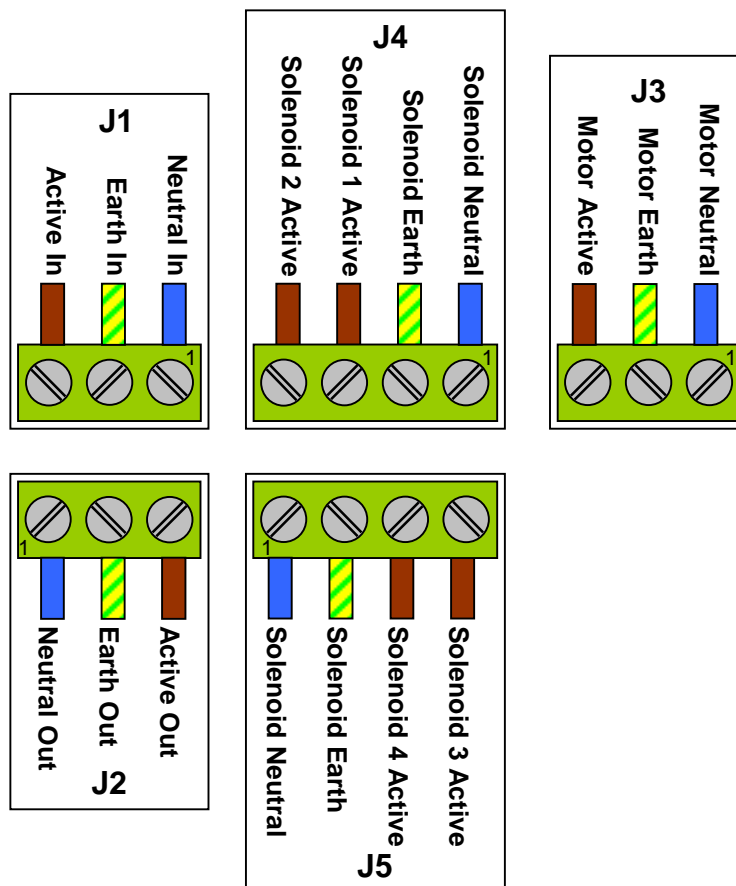


Figure 18 – PSU Expansion Card 240VAC connector pin-outs



### 3.11.5 Field replaceable parts

#### Microcontroller

IC2 is a microcontroller that, under normal circumstances, will not require changing. If a firmware change is required, then IC2 can be replaced with a new microcontroller preprogrammed with the updated firmware. When replacing this IC, normal antistatic procedures must be taken and power must not exist on any of the T5 components in the system.

#### Fuse circuits

Designator	Circuit
F1*	Input side of 5VDC barrier for local triac switching
F2	Output side of 5VDC barrier for local triac switching
F3	240VAC High/Low flow solenoid & low-current motor control outputs
F4	240VAC Pump motor control output (high-current)

#### Fuse type details

Designator	Current Rating	Material	Speed	Size	<u>Conquer Electronics</u> order code
F1*	100mA	Plastic	Quick-blow	Ø6.3mm	MET .100
F2	100mA	Ceramic	Quick-blow	5x20mm	UBM .100
F3	1A	Ceramic	Quick-blow	5x20mm	UBM 001
F4	12.5A	Ceramic	Anti-surge	1/4x1-1/4"	UCT 12.5

\*Note: Details for F1 provided for reference only. F1 is NOT field replaceable.

### 3.12 T5 Fibre Optic Interface

Name	T5 Fibre Optic Interface Card
TT Part Name	PCBassy T5 Fibre Optic Interface
TT Part Number	082109

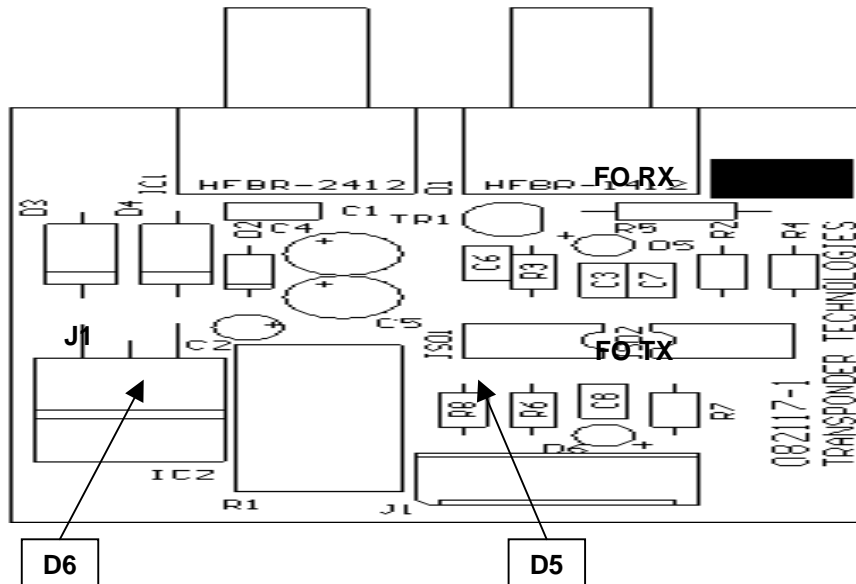


Figure 19 – T5 Fibre Optic Interface Card Overlay

#### 3.12.1 Diagnostic LED functions

Diagnostic LED	Colour	Function
D5	Red	Indicates Interface card is transmitting data out FO TX port
D6	Green	Indicates Interface card is receiving data from FO RX port

#### 3.12.2 Switch functions

There are no switches on this card.

#### 3.12.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	6x2	Power & comms from T5 Processor Card
FO RX	NA	ST <sup>®</sup> style fibre optic receive port
FO TX	NA	ST <sup>®</sup> style fibre optic transmit port

#### 3.12.4 Field replaceable parts

There are no field replaceable parts on this card.

### 3.13 T5 SMKB+CLCD IFC TBus

Name	T5 Switch-matrix KB + Character LCD Interface Card
TT Part Name	PCBAssy T5 SMKB+CLCD IFC TBus
TT Part Number	081991

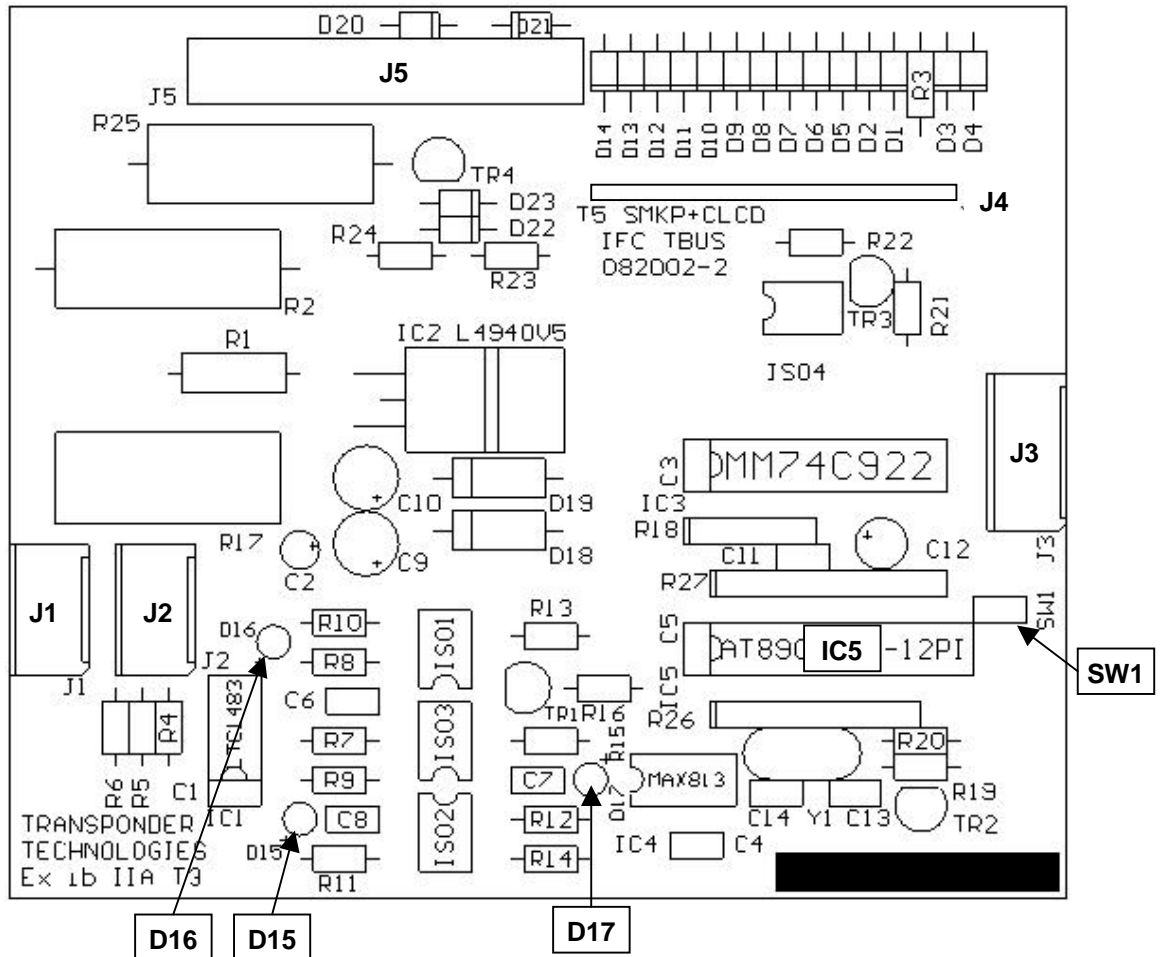


Figure 20 – T5 SMKB+CLCD IFC TBus Overlay

#### 3.13.1 Diagnostic LED functions

Diagnostic LED	Colour	Function
D15	Yellow	TBus TX Enable. Flashes when card is sending data to the T5 Processor.
D16	Red	TBus Transmit. Flashes when card is sending data to the T5 Processor.
D17	Green	TBus Receive. Flashes when card is receiving data from the T5 Processor.

### 3.13.2 Switch functions

Switch Designator	Function
SW1	TBus Address Select. Open by default. This is not a true switch but a set of pads on the component side of the PCB that can be bridged by soldering. In systems that have a two IFC's connected to the one T5 Processor then the second IFC's SW1 should be bridged by soldering.

### 3.13.3 Connector functions

Connector Designator	Nr. Pins	Function
J1	5x2	TBus Network – In
J2	5x2	TBus Network – Out
J3	6x2	Connects to switch-matrix keypad
J4	16x1	Connects to standard size 4x20 Character LCD module
J5	13x2	Connects to IEE Industrial Large-format 4x20 Character LCD module

### 3.13.4 Field replaceable parts

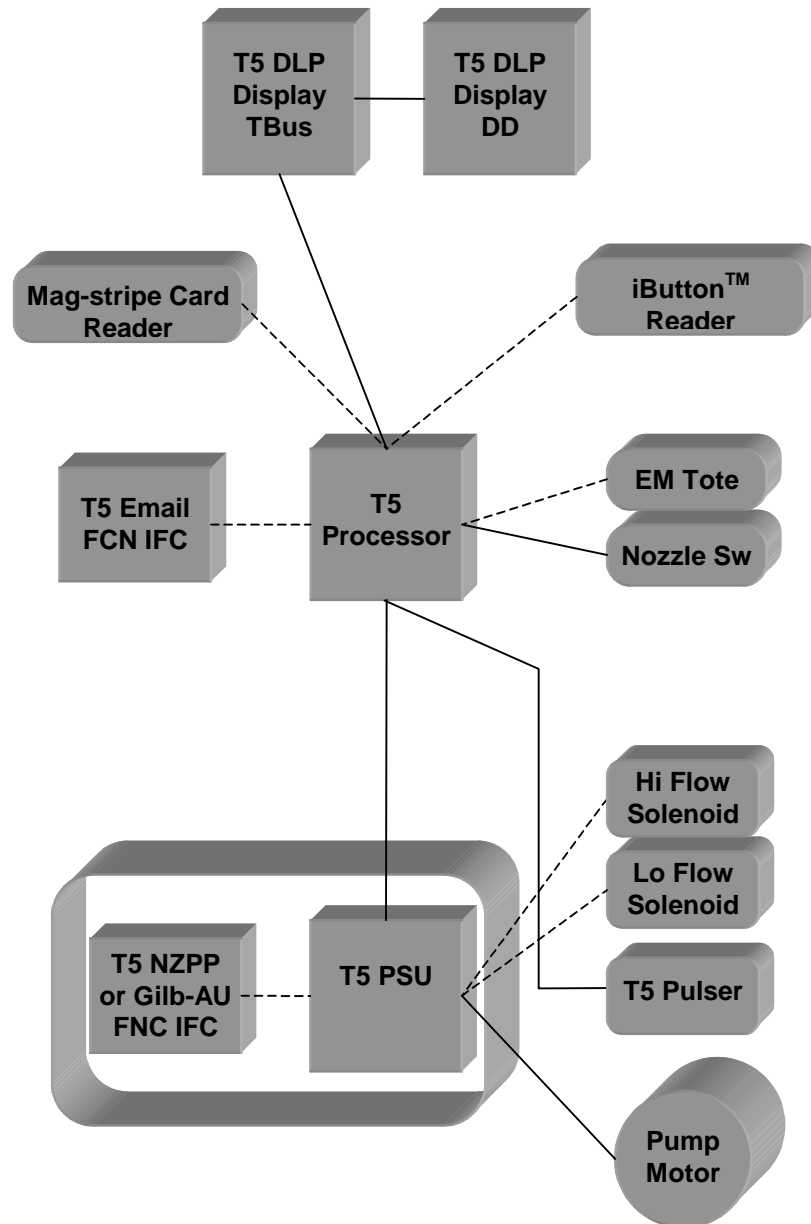
#### Microcontroller

IC5 is a microcontroller that, under normal circumstances, will not require changing. If a firmware change is required, then IC5 can be replaced with a new microcontroller preprogrammed with the updated firmware. When replacing this IC, normal antistatic procedures must be taken and power must not exist on any of the T5 components in the system.

## 4. System Configurations

This section shows some typical System Configurations using the T5 Register Electronics components. The configurations described in this section are generalised. Refer to the appendices for product specific implementations.

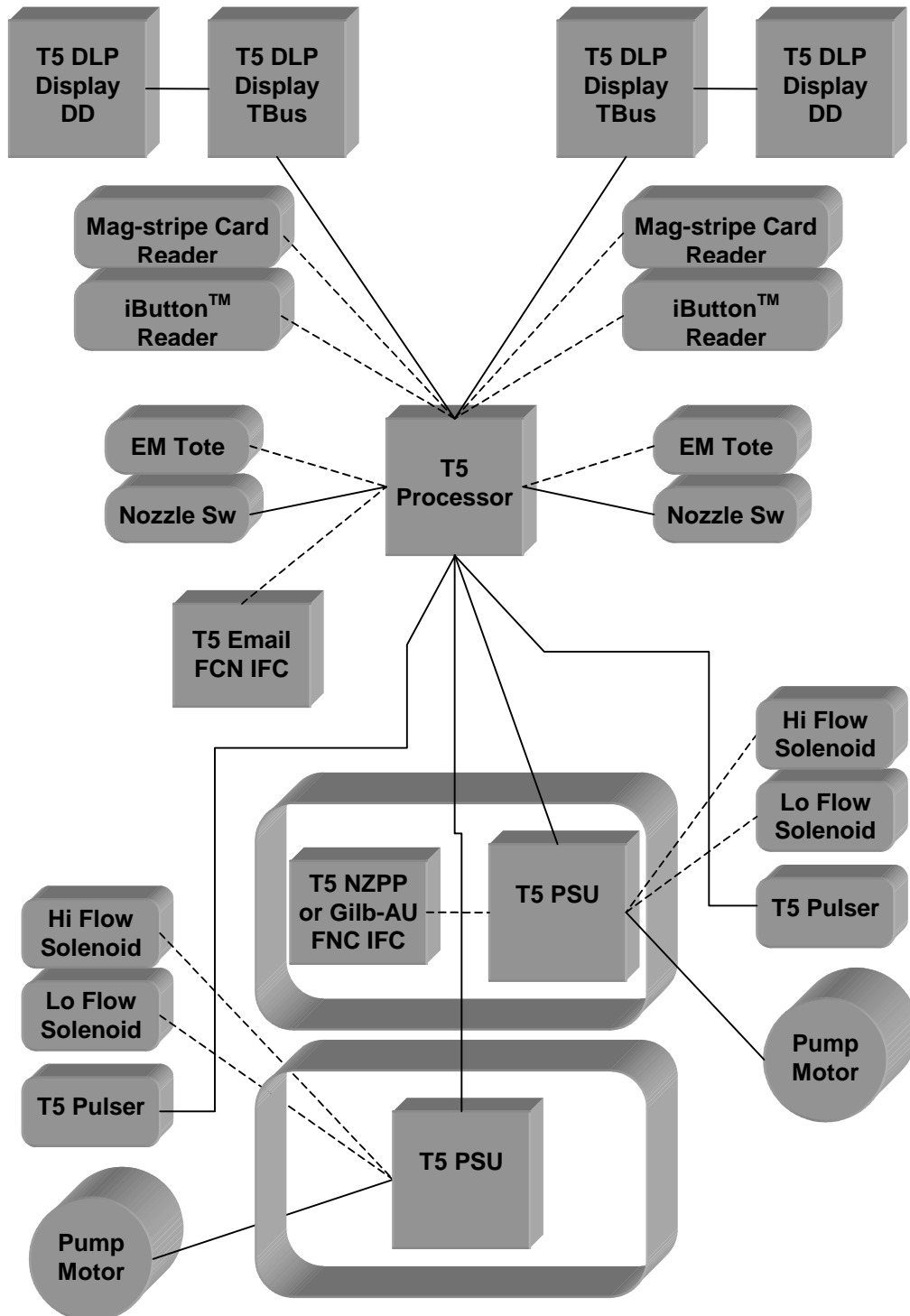
### 4.1 Single Hose Pump/Dispenser



**Figure 21 – Single Hose System Diagram**

Dashed lines show connections to, typically, optional components

## 4.2 Dual Hose Pump/Dispenser



**Figure 22 – Dual Hose System Diagram**

Dashed lines show connections to, typically, optional components

## 5. Operating Modes

The T5 Register Electronics can be configured to operate in several different modes. This section describes each mode of operation. For details on how to configure the system to operate in each mode, please see section 6. System Setup.

### 5.1 Standard Mode

In Standard Mode, the system behaves as a normal pump/dispenser without any ID reading ability.

### 5.2 Display Electronic Totals Mode

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

1. Lift the nozzle from the holder,
2. Hold down the nozzle switch for at least three seconds,
3. Then tap the 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.

### 5.3 CAS Mode

CAS stands for Card-Acceptor-Station. By adding a dot-matrix display, a numeric keypad, an optional receipt printer, and a magstripe card-reader or an iButton reader, the functionality of a DCA can be provided. When a customer presents an ID at the station he is prompted for a receipt, to enter a PIN, an odometer and other information, and to select a pump for authorisation. Subsequent transactions are stored in the forecourt controller for later processing.

The forecourt controller communicates with the CAS in the same way as it communicates with a pump. To configure the T5 as a CAS it should be set for a single hose, and for New Zealand standard protocol. The pump number setting identifies the device to the forecourt control system.

By configuring the T5 for multiple hose operation it can provide the combined functionality of a CAS and a register. Hence to configure as a dual register with CAS the T5 should be set for three hoses. The last hose allocated (in this case the third) is reserved for the CAS.

### 5.4 CRIP Mode

CRIP stands for Card-Reader-In-Pump. In this case the components associated with a CAS (keypad, card-reader, etc) are installed at each pump on the site. The authorisation procedure is identical except that the customer is not prompted to select a pump since implicitly the pump to be authorised is the one at which the identifier has been presented. A T5 operating as a CRIP is always configured for a single hose.

## 5.5 iTotes Mode

By simply adding a magstripe cardreader or an iButton reader the T5 may be converted into a simple, low cost, unattended card management system. In this mode of operation the pump can only be authorised by presenting an identifier (a card or iButton).

Identifiers are encoded with an access code (to identify the system) and an ID number (to identify the customer/person).

The system accumulates non-resetable totals for up to 500 identifiers. There are several methods of accessing ID totals. These are:

- Configure for scrolling totes mode. In this mode of operation when electronic totals are displayed (using the procedure described in section 5.2) the system will also display totals for all IDs that are either valid, or have a non-zero total. Each total is displayed for 10 seconds during which the total is flashed alternately with the id number.
- Where iButtons are used a special type of iButton may be issued which, when presented at the system, collects all current ID totals. When this iButton is subsequently presented at a PC running a special software application these totals are uploaded and stored in a database. Reports may then be generated, which compare previously uploaded totals to show fuel consumption using a variety of criteria.

When an ID is presented the current id totals are displayed on the dollar and litre displays until the nozzle is lifted.



## 6. System Setup

All configuration parameters and modes of operation are set using the two configuration switches mounted on the Processor board (see section 3.1.2).

The K-Factor switch is normally used only when the system is initially configured or when the meters are recalibrated. It should be accessed only by authorised service personnel. After use the K-Factor switch must be sealed from operation in an approved manner.

The Parameter switch is for setting parameters that may be altered by service station personnel. This switch is not required to be sealed.

The Advance Parameter switch can be used to quickly advance to the required parameter. This switch is not required to be sealed when used in this manner.

### 6.1 General Procedure

The procedure for operating either switch is as follows:

1. Ensure that filling has stopped and that all nozzles are stowed.
2. Press and release the appropriate configuration switch in quick succession until the desired parameter name is displayed. Alternatively, once a configuration switch (SW1 or SW2) has been pressed, SW3 can be used to advance quickly to a parameter without having to cycle through each digit. 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.
3. Continue pressing and releasing the switch until the desired digit of the parameter is selected. The selected digit will be momentarily replaced by a '-' character when the switch is first pressed.
4. Hold down the configuration switch and the selected digit will increment through all legal values. When the digit has reached its maximum legal value, the next value it will change to will be its minimum legal value ie. The digit values 'roll' over.
5. When the value is as desired, release the configuration switch.
6. Repeat steps 3 to 5 for each digit that is required to be changed.
7. Repeat step 2 to select the next required parameter.
8. 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.

Note that where a system is configured for multiple hose operation and the parameter being set relates to one particular hose in the system, the parameter will only be shown in the display corresponding to the hose being configured. All the other displays are blanked. In the two tables following, parameters for which this applies will be marked <sub>HSP</sub> (Hose Specific Parameter).

## 6.2 K-Factor Switch

The parameters that can be configured via the K-Factor switch are defined in the table below in the order that they can be accessed. Following the table, is further explanation of each parameter.

Parameter	Text shown on display	
	Price Display <sup>1</sup>	Litres Display
K-Factor <sub>HSP</sub>	FActr	XX.XXXX
Preset cut-off	Pcut	t X.XX
Start flow timeout	S Flo	S XXX
End flow timeout <sup>2</sup>	E Flo	E XXX
Minimum flow rate <sup>3</sup>	L Flo	L XXX
Solenoid delay <sup>2</sup>	Sd	d XX
Price resolution <sup>3</sup>	<i>See description</i>	r X
Configuration b	cFg b	b XX
Configuration a	cFg A	A XXXX

<sup>1</sup> Not available with 'litres only display' systems.

<sup>2</sup> Not available if in a LPG mode. See 'Configuration b' section 6.2.7.

<sup>3</sup> Only available if in a LPG mode. See 'Configuration b' section 6.2.7.

### 6.2.1 K-Factor

The Calibration ('K') Factor is used to calibrate the meter(s). The procedure for calibrating a meter is described in section 6.4.

The range of this parameter is 00.0000 to 99.9999 inclusive.

### 6.2.2 Preset cut-off

The Preset cut-off parameter only applies during preset deliveries. It is the amount off litres prior to attaining the preset at which the dispenser will switch from full flow to low flow.

The range of this parameter is 0.00-9.99 litres inclusive. A setting of 0.00 will result in a cut-off margin of 0.32 litres. The default setting is 0.00.

### **6.2.3 Start flow timeout**

The Start-flow timeout is the length of time that the dispenser will wait for flow to start after the nozzle has been lifted. If this time limit is exceeded then the delivery will finish and the nozzle must be stowed before another delivery can commence.

The range of this parameter is 000-999 seconds inclusive. A setting of 000 will result in a timeout of 4 minutes. The default setting is 000.

### **6.2.4 End flow timeout**

The End-flow timeout applies once delivery flow has commenced. When flow has stopped, the system will wait this long before ending the delivery.

The range of this parameter is 000-254 seconds inclusive. A setting of 000 will result in a timeout of 4 minutes. The default setting is 000. This parameter is not available if in a LPG mode.

### **6.2.5 Minimum flow rate**

The system will stop the delivery if three times during the delivery the flow rate drops below this value for at least 10 seconds. The display will also flash the 'no FLo' error message.

The range of this parameter is 000-999 litres/minute inclusive. The default setting is 000. This parameter is only available if in a LPG mode.

### **6.2.6 Solenoid delay**

The Solenoid delay parameter is used in dispenser installations with a submersible pump. A non-zero value in this parameter delays the activation of the solenoid outputs after the motor output has been activated. This allows pressurisation of the pipes to the dispenser to occur and for leak detection apparatus to operate.

The range of this parameter is 00-99 seconds inclusive. Setting the parameter to 0 means the solenoid and motor outputs will be activated at the same time. This parameter is not available if in a LPG mode.

### **6.2.7 Price resolution**

This parameter sets the number of decimal places for the Unit Price parameter. It can be set to 0, 1, 2 or 3. As the parameter is changed, the Unit Price (price per litre) display will show zeros with the decimal place in the appropriate location as will the Price display. The default value is 3. This parameter is only available if in a LPG mode.

### 6.2.8 Configuration b

Each individual digit in this configuration parameter controls an aspect of the systems operation as shown in the chart below. The default for each digit is underlined. In some cases the default is defined by the delivered configuration of the T5 System so a default value will not be indicated.

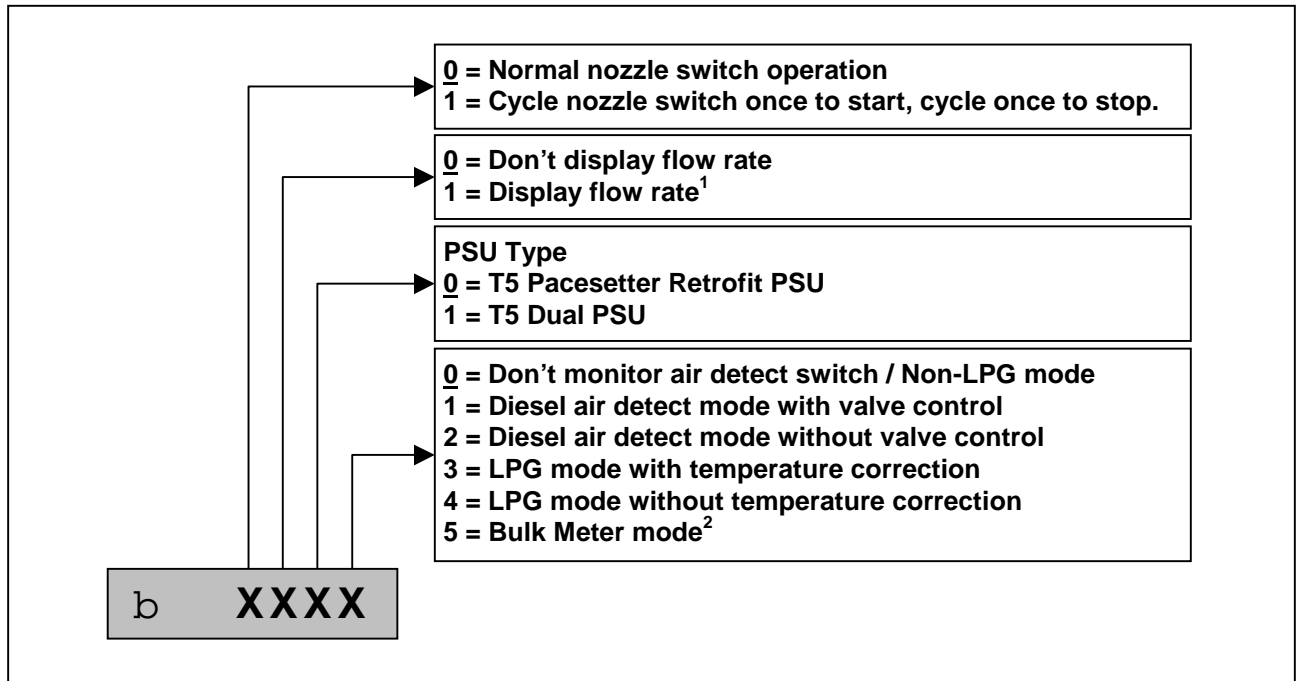


Figure 23 - Configuration b

NOTES:

1. “Display flow rate” option requires a system with a Litres-only Display card connected in addition to the primary display.
2. When “Bulk Meter mode” is enabled, the T5 will display volumes of greater than 10,000 litres with 1 decimal place instead of 2. The maximum single fill volume in Bulk Meter mode is 60,000 litres (instead of 10,000).

### 6.2.9 Configuration a

Each individual digit in this configuration parameter controls an aspect of the systems operation as shown in the chart below. The default for each digit is underlined. In some cases the default is defined by the delivered configuration of the T5 System so a default value will not be indicated.

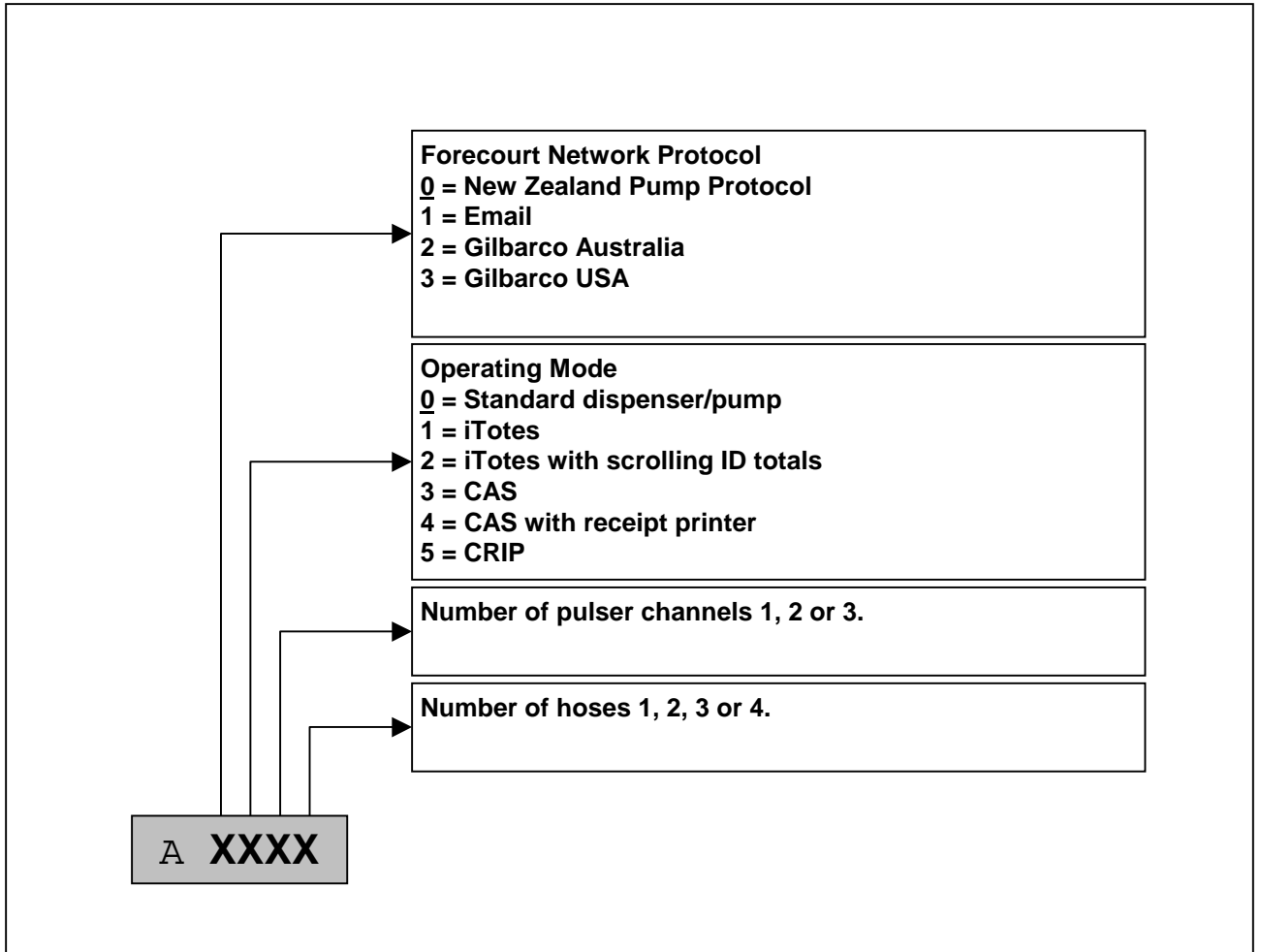


Figure 24 - Configuration a

## 6.3 Parameter Switch

The parameters that can be configured via the Parameter switch are defined in the table below in the order that they can be accessed. Following the table, is further explanation of each parameter.

Parameter	Text shown on display	
	Price Display <sup>1</sup>	Litres Display
Software version	Code	XXXXX
Unit price <sub>HSP</sub>	PriceE	P XXX.X
Cause of delivery end <sub>HSP</sub>	cdE	XXXXX
Pump number <sub>HSP</sub>	Pu nu	n XX
LPG density <sup>2</sup>	dEn	XXX.X
LPG temperature <sup>2</sup>	tEP	XX.X
Configuration p	cFg P	P XX
Identifier enable <sup>3</sup>	id En	X XX
Access code <sup>3</sup>	ACCESS	A XXXX

<sup>1</sup> Not available with 'litres only display' systems.

<sup>2</sup> Only available if in a LPG mode. See 'Configuration b' section 6.2.7.

<sup>3</sup> Only available if iTote enabled. See 'Configuration a' section 6.2.9.

### 6.3.1 Software version

When the Parameter switch is first pressed the system will display the software version number alternating with a LCD segment test sequence.

### 6.3.2 Unit price

Sets the price per litre for a particular hose. The range is 000.0 to 999.9 cents/litre.

### 6.3.3 Cause of delivery end

This parameter shows why the last delivery ended as per the table below:

Text Displayed	Explanation
nd	A delivery has not yet occurred since the system was powered on.
HOSE	Nozzle stowed.

Fcc	Forecourt controller stopped the delivery.
S Flo	Start flow timer expired.
E Flo	End flow timer expired.
PrESet	Stopped at preset amount.
toP	Delivery quantities reached maximum amount able to be displayed.
Error	An error occurred during delivery. See section 7.1.
Air	The air detect switch closed during the delivery.
Pd	Pulser disconnected.
dEn	LPG density outside of range.
tEP	LPG temperature outside of range.

### 6.3.4 Pump Number

The Pump Number parameter identifies the pump when it is interfaced to a forecourt control system. Pump Numbers must be unique on a particular forecourt network channel.

### 6.3.5 LPG Density

The LPG Density parameter is the static density which is used, together with temperature, to calculate the dispensed volume. The allowable range is 500.0 to 600.0 kg/m<sup>3</sup>. If the parameter is set to a value outside this range then, when a delivery starts, the system will stop the delivery and display the 'dEn' error. This parameter is only available if in a LPG mode.

### 6.3.6 LPG Temperature

The LPG Temperature parameter sets the static temperature which is used, together with density, to calculate the dispensed volume. The range is -25.0 to 55.5 °C. If the parameter is set to a value outside this range then, when a delivery starts, the system will stop the delivery and display the 'tEP' error. This parameter is only available if in a LPG mode.

### 6.3.7 Configuration p

Each individual digit in this configuration parameter controls an aspect of the systems operation as shown in the chart below. The default for each digit is underlined. In some cases the default is defined by the delivered configuration of the T5 System so a default value will not be indicated.

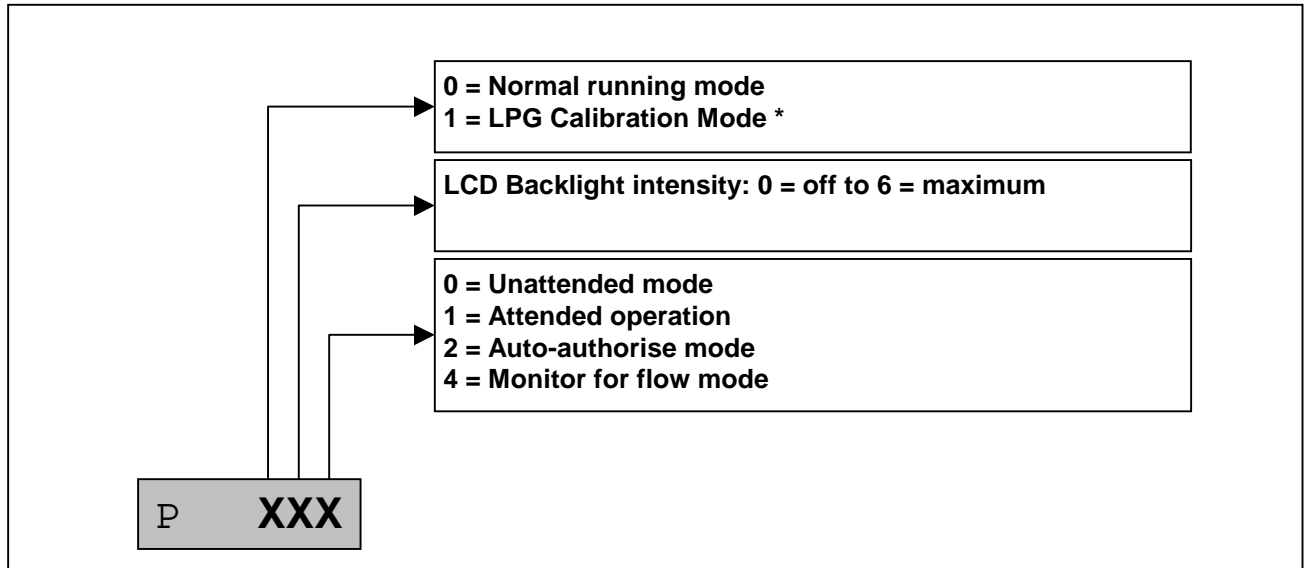


Figure 25 - Configuration p

\* When the system is in LPG Calibration Mode the Price display will show non-compensated litres and the Price per Litre display will show the temperature.

### 6.3.8 Identifier enable

This option only appears when the system is configured for iTotes mode. The identifier number appears in the right two digits of the litre display. The status of the identifier appears in the middle digit. A 'y' indicates that the identifier is valid. A 'n' indicates that it is invalid. When the status digit is selected it will toggle from 'y' to 'n' to 'y' while the switch is held.

### 6.3.9 Access Code

This option only appears when the system is configured for iTotes mode. The access code uniquely identifies the system so that identifiers issued for other systems will not be accepted. The access code should be set to match that encoded in the identifiers used.



## 6.4 Meter Calibration

The K-Factor is used to calibrate the meter. It is a ratio of litres dispensed per revolution of the meter. To calibrate the dispenser/pump, dispense fuel into a certified measuring container and compare the displayed value with the amount dispensed.

For example:

Displayed volume: 10.00 litres

Measured volume: 20.00 litres

Then, to calculate the correct K-Factor apply the formula below:

$$\begin{aligned} [\text{New K-Factor}] &= [\text{Existing K-Factor}] \times \frac{[\text{Measured volume}]}{[\text{Displayed volume}]} \\ &= [\text{Existing K-Factor}] \times \frac{20.00}{10.00} \\ &= [\text{Existing K-Factor}] \times 2 \end{aligned}$$

Change the existing K-Factor to this new value.

## 7. Diagnostics

### 7.1 Error Messages

#### 7.1.1 Fatal Error Codes

The following errors are classified as fatal and require that the system be repowered to be cleared:

Displayed Error Msg.	Fault	Action
Err 11	Excess pules detected on either pulser channel.	Pulse channel detector may have failed.
Err 12	Excess pulser reverse rotation.	Non-return valve may be faulty.
Err 16	Pulser disconnected.	Check pulser connections.
Err 17	Illegal pulser state or state transition.	Check pulser. Channel may have failed or excess rotation speed may have occurred.
Err 34	Processor Silicon Serial Number device not detected.	SSN IC is damaged or missing. Processor may require replacement.
Err 35	EEPROM data error.	Re-enter configuration data. If error reoccurs replace Processor board.
Err 36	EEPROM totals data error.	Re-power system. If error reoccurs replace Processor board.
Err 38	Flash memory error.	Replace Processor board.
Err 39	EEPROM failure.	EEPROM not responding. Replace processor board.
Err 80	PSU Expansion Card offline.	Check connections to PSU Expansion card.
Err 84	Temperature Probe Interface Card offline.	Check TBus power. Check connections to Temperature IFC.
Err 88	Data message response from Display board not detected.	Check TBus power. Check connections to Display board.
Err 89	Display board not detecting data message from processor.	Check TBus power. Check connections to Display board.

### 7.1.2 Non-Fatal Error Codes

The following errors are classified as non-fatal and either clear after a short timeout or do not prevent another delivery from starting:

Displayed Error Msg.	Fault	Action
AGain	ID was not correctly read.	Present ID again. If error keeps reoccurring then check the connections to the Reader and replace Reader if necessary.
---x---	ID rejected.	The x in the error message is a code indicating the reason the ID was rejected. Possible reasons are: <ol style="list-style-type: none"> <li>1. expired ID</li> <li>2. invalid ID</li> <li>3. wrong ISO and/or Access No</li> <li>4. Pre-allocated dollar limit reached.</li> <li>5. Limit reached</li> <li>6. ID already in use</li> <li>7. Expired timer</li> <li>8. Invalid function code</li> <li>9. System error</li> </ol>
Err 19	The air detect switch has closed during delivery*.	Check for possible sources of air introduction in pumping components.
dEn	LPG density is out of range	If there is a real-time density probe attached, check for faults or check LPG. If using static density parameter, check the value it is set to.
tEP	LPG temperature is out of range	If there is a real-time temp probe attached, check for faults or check LPG. If using a static temp parameter, check the value it is set to.

\*Note: The air detection switch is a normally-open pressure activated switch, which closes when the pressure of the air venting from the pumping unit exceeds a preset level. If this switch is detected closed during a delivery then the delivery is stopped. The switch is only monitored once the delivered amount exceeds one litre.

### 7.1.3 Passive State Indicators

- A colon ‘:’ character replacing the decimal point in the litres display indicates that the system has been power cycled. It disappears once the first delivery starts or once an ID is presented.

## 7.2 Fault Finding

Symptom	Actions
Colon appears on litres display without being repowered.	<ul style="list-style-type: none"> <li>• Mains power may be low.</li> <li>• Power cable connection may be faulty.</li> <li>• Processor board may be faulty causing a watchdog reset of the system.</li> </ul>
Diagnostic LED 2 not flashing	<ul style="list-style-type: none"> <li>• Is the power on?</li> <li>• Check fuses</li> <li>• Replace processor board</li> </ul>
Power LED off	<ul style="list-style-type: none"> <li>• Is the power on?</li> <li>• Check fuses</li> <li>• Replace PSU</li> </ul>
Diagnostic LED 2 does not flash fast when a nozzle is lifted.	Check the nozzle switch is connected and adjusted correctly.
Motor won't start or solenoids won't energise.	<ul style="list-style-type: none"> <li>• Are motor/solenoid LEDs on PSU on ?</li> <li>• Check motor and solenoid fuses</li> <li>• Check all motor connections</li> <li>• Check motor</li> <li>• Check wiring</li> <li>• Check connection between Processor and PSU</li> <li>• Check nozzle switch is working</li> </ul>

## 8. Glossary of Terms

Term	Description
Class 1 Zone 0	An area in which an explosive-gas atmosphere is present continuously or for long periods.
Class 1 Zone 1	An area in which an explosive-gas atmosphere is likely to occur in normal operation.
Class 1 Zone 2	An area in which an explosive-gas atmosphere is not likely to occur in normal operation, and if it does occur it will exist for short periods only.
TBUS	A special serial communications bus which links intelligent peripherals within the T5 system.
CAS	Card Acceptor Station
CRIP	Card Reader In Pump
DCA	Driveway Card Acceptor
Pulser	A device that translates rotary motion into electronic pulses.
Intrinsically safe circuit	A circuit in which any spark or any thermal effect produced in the test conditions prescribed in this standard (which include normal operation and specified fault conditions) is incapable of causing ignition of a given explosive atmosphere.
Intrinsically safe electrical equipment	Electrical equipment in which all the circuits are intrinsically safe. The equipment may be self-contained or may form part of an intrinsically safe electrical system.
Intrinsically safe electrical system	An assembly of interconnected items of electrical equipment in which the circuits or parts of circuits intended to be used in an explosive atmosphere are intrinsically safe circuits.
Watchdog	A circuit which checks that software is executing correctly, and which automatically restarts software execution if an error is detected.
LED	Light emitting diode.
EEPROM	Memory that stores parameters and totals.
FLASH	Memory that stores software program
CPU	Central Processing Unit.
PCB	Printed Circuit Board.

## Appendix A – TTPSR-D Connection Information

This appendix contains a Connection diagram for the TT Pacesetter Retrofit Dual Hose version. The TTPSR-D system is a specific implementation of the T5 Electronics. The purpose of the Connection Diagram is to show the interconnections between the components used in this system. In the diagram below each interconnection between components is a cable assembly (loom) and is marked with a number. This number refers to a specific cable assembly in the descriptions following the diagram which contain information on a cable assembly and where it connects at each end. If a connection is not numbered this means that the cable already exists in the pump being retrofitted. All currently available optional components are shown.

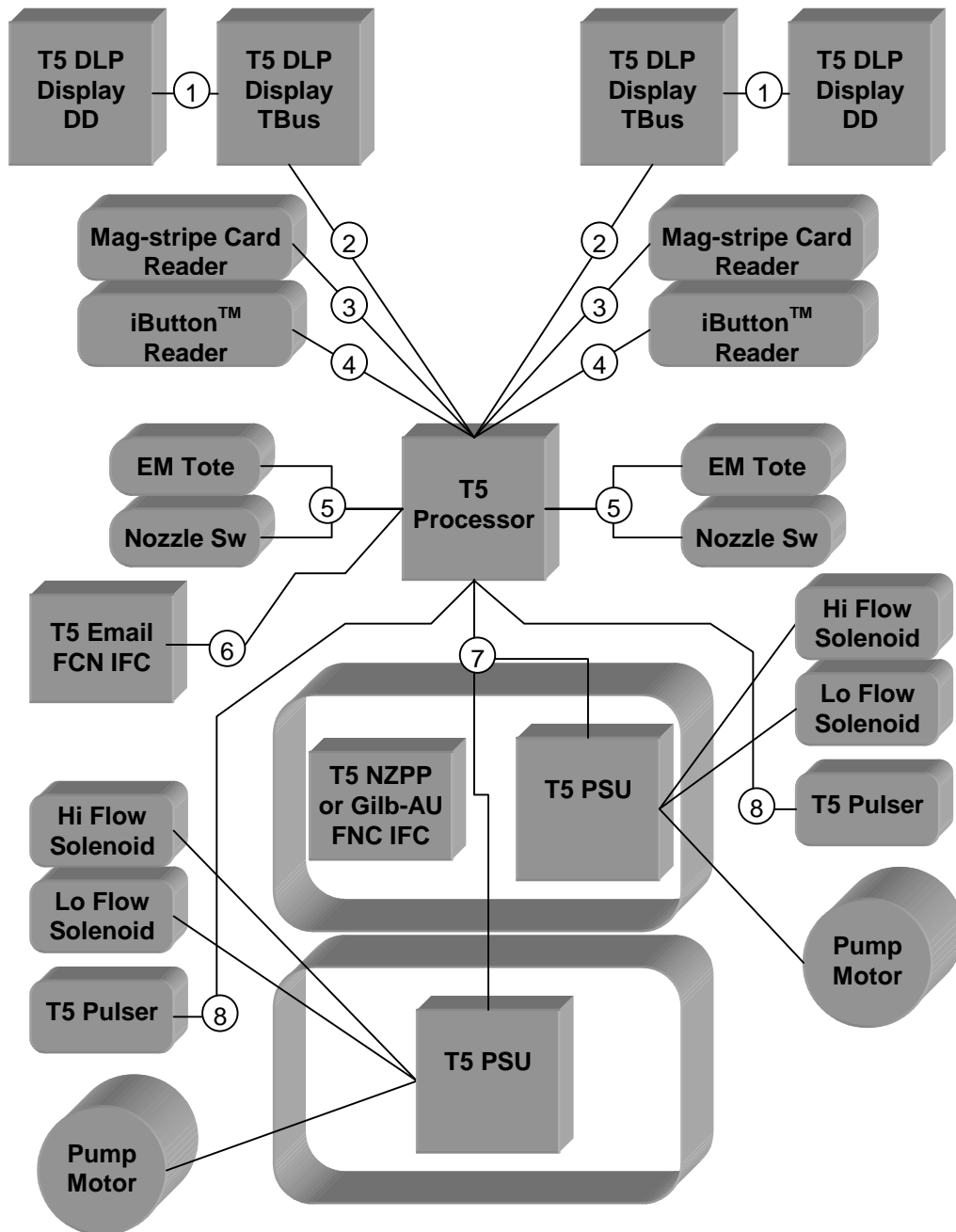


Figure 26 - TTPSR-D Connection Diagram

Cable No.	1	
TT Part No.	079300	
TT Name	CABAssy T5 DISP-to-DISP DD	
Connections	End A	Is defined as the end that has the screen drain wire connected. Connects to J3 on T5 DLP Display Form-B TBus.
	End B	Connects to J3 on T5 DLP Display Form-B DD.

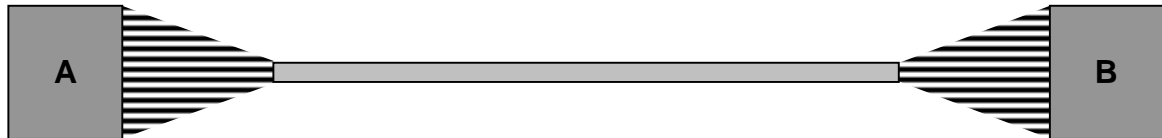


Figure 27 - 079300 CABAssy T5 DISP-to-DISP DD

Cable No.	2		
TT Part No.	079318		
TT Name	CABAssy T5 GP TBus 350mm		
Connections	End A	Is defined as the end that has the screen drain wire connected.	
		Side A	Connects to J5 on T5 Processor Card.
		Side B	Connects to J6 on T5 Processor Card.
	End B	Connects to J1 on T5 DLP Display Form-B TBus.	

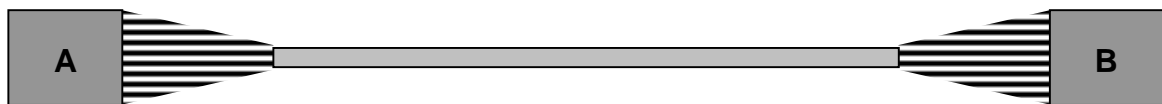


Figure 28 - 079318 CABAssy T5 GP TBus 350mm

Cable No.	3		
TT Part No.	Not assigned yet		
TT Name	Not assigned yet		
Connections	End A	Side A	Connects to J1 on T5 Processor Card.
		Side B	Connects to J2 on T5 Processor Card.
	End B	Connects to Magtek card reader	

No diagram available.

Cable No.	4		
TT Part No.	Not assigned yet		
TT Name	Not assigned yet		
Connections	End A	Side A	Connects to J3 on T5 Processor Card.
		Side B	Connects to J4 on T5 Processor Card.
	End B	Connects to iButton reader.	

No diagram available.

Cable No.	5.a – For systems with <u>no</u> EM Totalisers.		
TT Part No.	079326		
TT Name	CABAssy T5 PSRF NozzSw		
Connections	End A	Side A	Connects to J8 pins 1,3&5 on T5 Processor Card.
		Side B	Connects to J8 pins 2,4&6 on T5 Processor Card.
	End B	Connects to normally closed contacts on nozzle switch.	

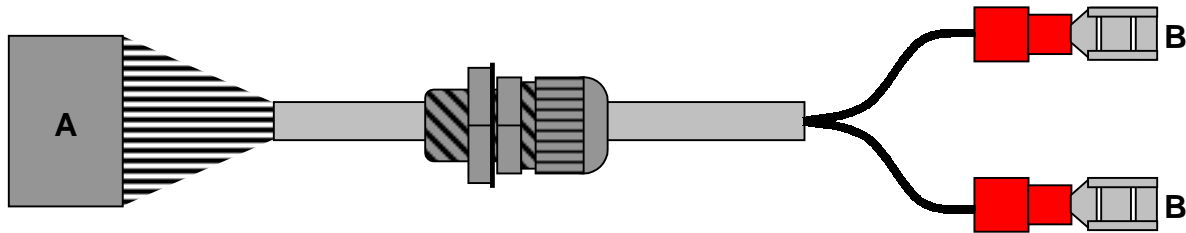


Figure 29 - 079326 CABAssy T5 PSRF NozzSw



Cable No.	5.b – For systems <u>with</u> EM Totalisers.		
TT Part No.	079342		
TT Name	CABAssy T5 PSRF NozzSw+Tote		
Connections	End A	Side A	Connects to J8 pins 1,3&5 on T5 Processor Card.
		Side B	Connects to J8 pins 2,4&6 on T5 Processor Card.
	End B	Side A	Connects to J12 pins 1,3&5 on T5 Processor Card.
		Side B	Connects to J12 pins 2,4&6 on T5 Processor Card.
	End C	Connects to normally closed contacts on nozzle switch.	
	End D	Connects to ENM electromechanical totaliser.	

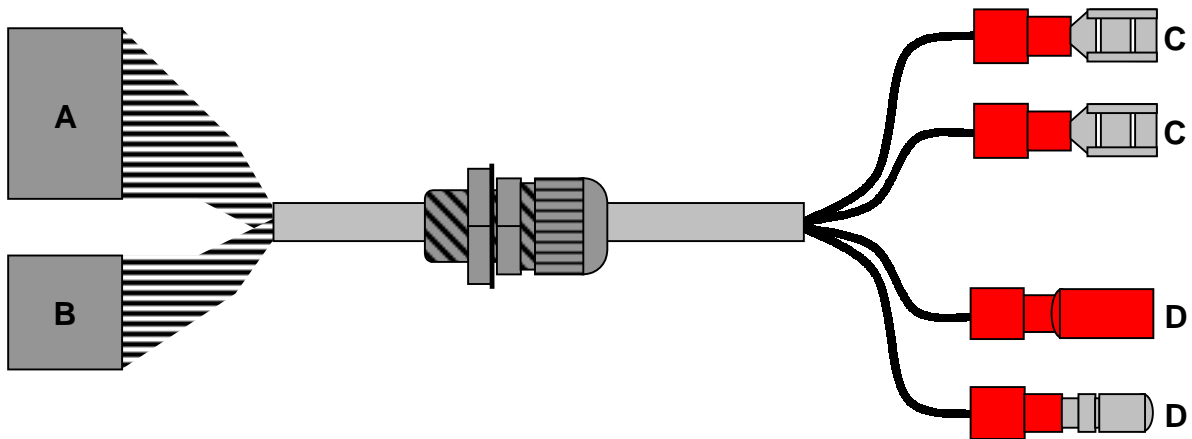


Figure 30 - 079342 CABAssy T5 PSRF NozzSw+Tote

Cable No.	6	
TT Part No.	079588	
TT Name	CABAssy T5 Proc-EmailPC	
Connections	End A	Is defined as the end that has the screen drain wire connected. Connects to J10 on T5 DLP Display Form-B TBus.
	End B	Connects to J2 on T5 Email FCN Interface Card.

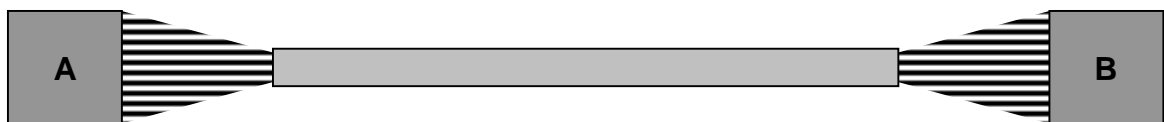


Figure 31 - 079588 CABAssy T5 Proc-EmailPC

Cable No.	7	
TT Part No.	079601	
TT Name	CABAssy T5 PSRF 2H Proc-2xPSU	
Connections	End A	Connects to J9 on the T5 Processor Card
	End B	Connects to J21 on the T5 Processor Card
	End C	Is defined as the end <u>without</u> the White wire terminated. Connects to J5 of the T5 Pacesetter Retrofit PSU installed on Side-A of the pump.
	End D	Is defined as the end <u>with</u> the White wire terminated. Connects to J5 of the T5 Pacesetter Retrofit PSU installed on Side-B of the pump.

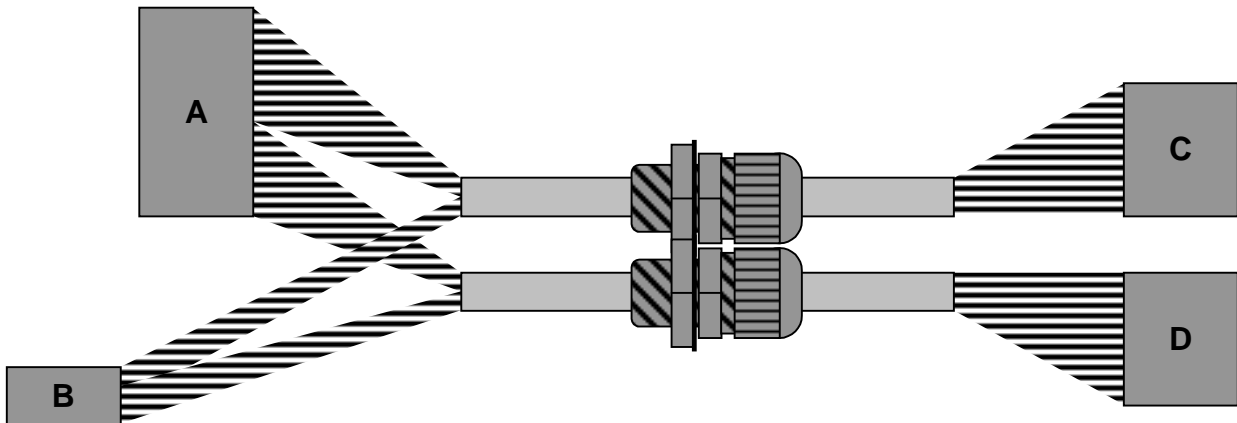


Figure 32 - 079601 CABAssy T5 PSRF 2H Proc-2xPSU

Cable No.	8		
TT Part No.	079677		
TT Name	CABAssy T5 Proc-TTMRT86 300mm		
Connections	End A	Side A	Connects to J14 on T5 Processor Card
		Side B	Connects to J17 on T5 Processor Card
	End B	Connects to J1 on T5 TTMRT86 Pulser Card	

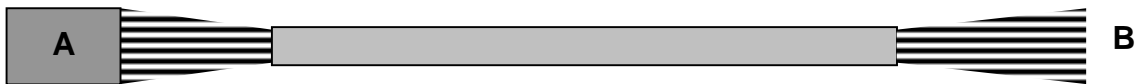
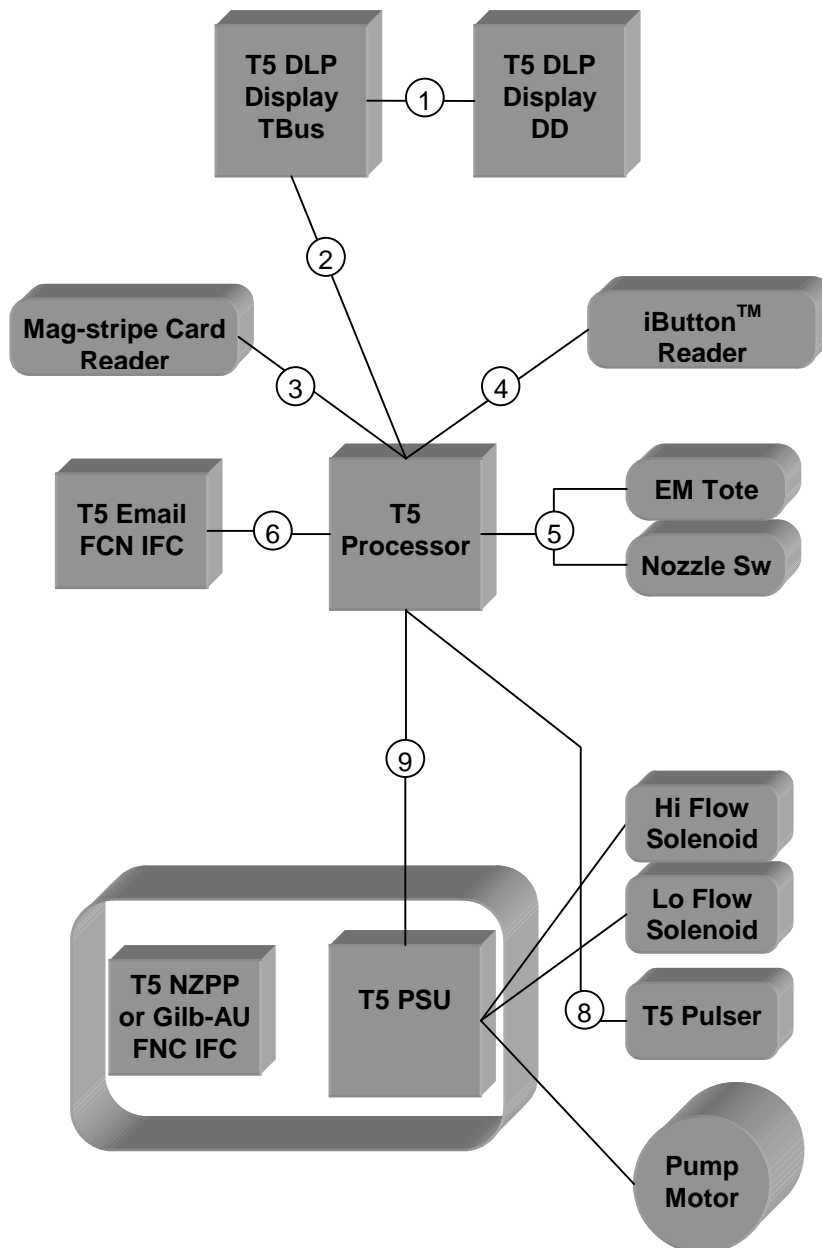


Figure 33 - 079677 CABAssy T5 Proc-TTMRT86 300mm

## Appendix B – TTPSR-S Connection Information

This appendix contains a Connection diagram for the TT Pacesetter Retrofit Single Hose version. The TTPSR-S system is a specific implementation of the T5 Electronics. The purpose of the Connection Diagram is to show the interconnections between the components used in this system. In the diagram below each interconnection between components is a cable assembly (loom) and is marked with a number. This number refers to a specific cable assembly in the descriptions following the diagram which contain information on a cable assembly and where it connects at each end. If a connection is not numbered this means that the cable already exists in the pump being retrofitted. All currently available optional components are shown. Please refer to Appendix A for descriptions of cable assemblies that also exist in the Dual Hose version.



Cable No.	9	
TT Part No.	079350	
TT Name	CABAssy T5 PSRF 1H Proc-PSU	
Connections	End A	Connects to J9 on the T5 Processor Card
	End B	Connects to J21 on the T5 Processor Card
	End C	Connects to J5 of the T5 Pacesetter Retrofit PSU.

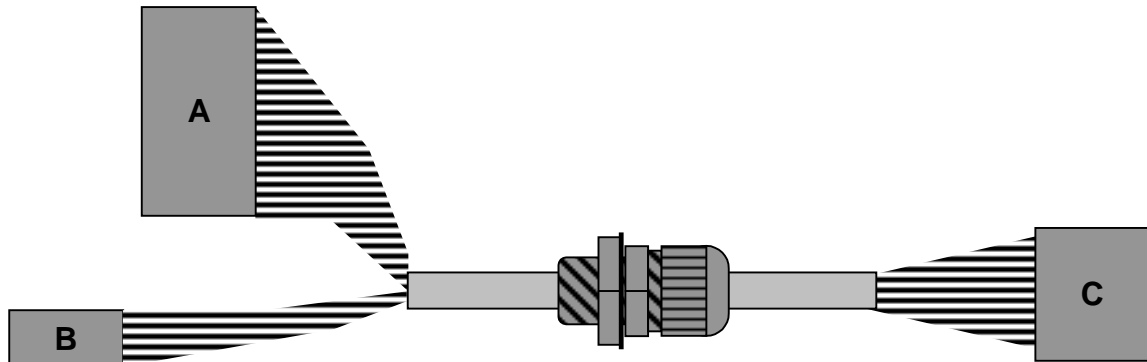


Figure 34 - 079350 CABAssy T5 PSRF 1H Proc-PSU