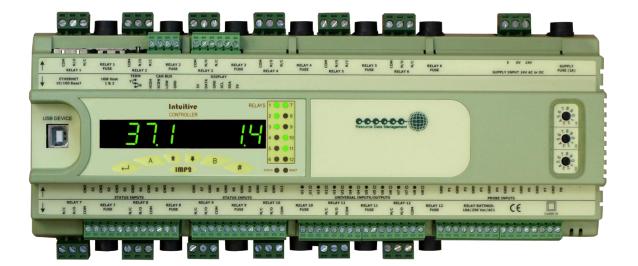


Intuitive TDB Commissioning & User Guide Revision V3.7.7



PR065X-TDB

Contents

Intuitive TDB Controller Description	6
Hardware Options	
Ordering Information	
Optional Network Enablers / Adapters	
Intuitive Expansion Boards Configuration	/ Q
Available Networks	
Connecting to the controller via USB	
Networked Devices	
Displays	9
TouchXL (PR0617-ID-X-X)	
Remote Plant Display (PR0620)	
Integral Display	
I/O Connections Intuitive Controller – PR0650	11 11
Intuitive Controller with Two Stepper Outputs - PR0652	11
Inputs & Outputs Descriptions	
Webpage Appearance	
TDB Controller View	14
TDB Menus view	
USB Devices	
Intuitive DIN mountable 4 port USB Hub (PR0624/ PR0624-DIN)	
USB Current Monitor (PR0626/ PR0626i/v-DIN) Intuitive Touchscreen Display (PR0615)	
8 Channel Pulse reader (PR0622/ PR0622-DIN)	10
RS485 Modbus Adapter (PR0623/ PR0623-DIN)	
USB Wireless Mesh adapter (PR0734)	
USB Memory Stick	
Intuitive TDB Controller Home Page	
Graph	
Control	
Control Summary	
Parameters Default Parameters	
Overrides	
Edit	
Send To Controller	
Get From Controller	
Delete	
Restore	
GP Timer	
GP Timer Report	
System	
System Log Visibility	
Alarm Log	
Mute All Alarms	
Export Data	
Auto Export	
Network	
Mail Setup	
Alarm Setup	
Mobile Network Setup Time	
Hardware	
Extension	
Broadcast Receive List	
Pulse Counter	38
Version	
Screen Setup	
Screen Layout	
Screen Alarms	
TouchXL Status Network	
List	
Add Device	
Remove Device	



Device values in a TDB program	44
Wireless Mesh Setup	
BACnet/ RDM-485 Setup Type Writer	
Users	
List	
Add	
Maintenance	47
Reset	
Save Config	
Restore Config	
Add Feature System Config	
Factory Settings	
Upgrade	
USB Display	
Reset	47
Calibrate	
Data Manager Type Files	
Getting started	
Data Builder for the Intuitive Controller Range Control Summary – Ordering	
Automatic	
Manual	
Designing the Application	
General editing principles	
Allowable Characters	
Program Settings	
Connecting an Expansion Board to an Intuitive Controller	
CANbus cable specification and wiring	51
Configuring an Expansion Board Input or Output	
Building an Application Example Configuring the Blocks	
Saving the completed TDB program.	
Toolbox Menu Items	
Selection Tool	
Building Blocks Static Text	
Zoom In/Out	
Shortcut	
Setting Block	
Online Mode	57
Run Simulation	
I/O Objects & Properties	
Analogue Input	
Analogue Output	
Stepper Output Digital Input	
Digital Output	
Analogue Sensor	
Analogue Device Input	
Network Analogue İn	
Network Digital In	65
Nw Param	
Drop List	
CT Monitor/ CT Monitor 2	
Pulse Input GP Timer block	
GP Timer 2 block	
GP Timer 3 Block	
Df Signal	
Pack/ Rack Optimisation	69
Control State	
Plant Display	
Intuitive Display	
Humidistat Display	
Humidistat 2 Display	
Coldroom Display Mercury Display	
Mercury Display	
Logic Blocks	



And blocks	79
OR Blocks	
Not Block & Exclusive OR Block	
Mathematical Blocks	
(+, - , x, ÷ blocks)	
Absolute (abs) Block X to the Power of Y (x ^y)	80
Min, Max, Equals blocks	
$<_i >_i \leq_i \geq$ blocks	
Average & Limit blocks	
Range	
Min, Max, Avg. Block	
Filter	
Accumulator Block	
Algebra	
Time Blocks	84
Delay On Timer	
Pulse Timer	
Heartbeat	
Run On	
Run Hours	
Change Over Pump Block	
Match Date	
Date Time Block	
Summer or winter	
Daylight Block.	
Time Block	
Schedule	
Day of Week Block	
Functional Blocks	89
Alarm block	89
Analogue Switch	
Two-Way Switch	
Analogue Store	
Pulse Counter	
D-Latch	
SR-Latch	
Digital Edge Block	
Analogue Edge Block Syslog	90
Push Text	
Reverse On/Off / Reverse On/Off 2	
Direct On/Off / Direct On/Off 2	
Direct PID / Direct PID 2	
Reverse PID / Reverse PID 2	93
Performance	94
Levels	94
Occupancy Optimisation	
Occupancy Optimisation 2	96
Pressure to Temperature / Pressure to Temperature 2	
Comfort Block	
Offline Block	
Display Cascade Block	.100
Display Override Block	
Display 3-Way Block Display Slide Block	
Display Slide block	
Analogue Display Block	
Digital Display Block	
Shortcut Block	
Split Wire	
Settings Block	
Units	
Show Names	
Find/Replace	
Finding an Item	
Replacing an Item	
Running a Simulation	
Peer to Peer Communication Receiving Analogue Values from a Data Manager TDB Program	
Neceiving Analogue values Itolii a Data Pahayet TDD FIOglall	0



Receiving Digital Values from a Data Manager TDB Program GP Timer (mapping from a Data Manager GP Timer)	110 111
Technical Specification	112
General	
Power Requirements	
Insulation and Fuse Requirements	
Relay Specification	
Stepper Outputs	
Status Inputs	
Analogue Inputs	
Communications	
Analogue Outputs Surge Protection	
Installation	
Mounting on to a DIN rail, Intuitive Controller	
Clearances	
Cleaning	
Terms of Use	
Web Services	
Controller Power Supply Unit: PR0625	116
Appendix 1: Comfort Index	117
Appendix 2: Supply & Status Input Wiring	118
Appendix 3: Stepper Rate (Frequency Hz)	119
Appendix 4: Typical 4-20mA Input Connection	119
Appendix 5: Wireless Mesh Technology	120
Appendix 6: Type Editor User Guide	121
Appendix 7: Mimic Details	128
Disclaimer	130
Revision History	130



Intuitive TDB Controller Description

This document relates to Software version 3.7.7

The Intuitive Plant Controller with Data Builder is a versatile device intended for user programming. Some example applications include HVAC, BMS and Refrigeration control. The Intuitive hardware consists of 8 probe inputs, 12 Digital Inputs, 8 Universal IO, 12 relay outputs (option to fuse), along with the options of integral display and 2 stepper outputs. There is no intrinsic program, but all of the inputs and outputs are available for use with the on-board Data Builder program.

An optional DIN rail mount, 24V 1.8A power supply unit (PR0625) is available for use with the controllers.

The controller can connect to IP networks by either its in-built Ethernet port using a standard Ethernet cable or by a USB Wi-Fi adapter (PR0657). It can then communicate by means of standard IP or BACnet protocols (PR0655-BAC). There is also direct PC access available via a USB cable.

In addition to IP, it can also communicate to a DMTouch by means of the RDM-485 protocol over RS485 with use of the RDM 485 Plant TDB Comms Module (PR0623 DIN TDB).

The controller can connect to a variety of peripheral devices via Modbus and Wireless Mesh using a USB network adapter. The Modbus devices are connected via a USB to RS485 interface (PR0623 / PR0623 DIN) whereas the Wireless Mesh connects devices wirelessly using the latest Zigbee technology (PR0734).

A USB Pulse Reader is available for use with the controller which allows pulsed outputs from 3rd party devices to be read, typical applications include energy monitoring or flow measurement. Up to ten RDM CT monitors (PR0626v/i-DIN), each with 5 CT's attached, can be connected via USB. The values of which can be used in the TDB application designed by the user.

Users have the added benefit of using the 'Type Writer' feature (PR0655-TYP) where Modbus templates can be written and saved within the TDB device. This enables 3rd party Modbus devices, where templates have not been previously developed for, to be logged on and monitored **Note: Read only. For templates where values can be written to please consult RDM Technical Support.**

Where RDM have been requested to develop a 'writable' template for 3^{rd} party Modbus devices, the 'Modbus Write' feature can be activated. Then, using the TDB blocks in the plc, the 3^{rd} party device can accept Modbus write commands.

The controller offers web-services support and has 40 general purpose timer channels available to configure. Logging of data and export of logged data is also available; if a memory stick is used, logged data sampling can be viewed at 15 second intervals.

Note 1: Wi-Fi and Wireless support is incorporated into software **version V2.08** and above. The kernel of the controller must not be older than January 2015 (the kernel upgrade is not an on-site or remote upgrade option). Therefore **Wi-Fi and Wireless are not supported on the PR0600 Plant Controller**. To confirm if the controller is capable of supporting Wi-Fi and Wireless, navigate to the controller's homepage, select "System" then "Version", this page will show if they are supported (see <u>Version</u> section).

The PR0657 (Wi-Fi adapter) is for use within the EU only. For more information about using outside the EU, please contact RDM technical support.

Note 2: The Modbus® template generation feature, Type Editor, requires the user to have a full and proficient understanding and working knowledge of the Modbus® protocol. RDM Technical Support cannot provide training or assistance in relation to the Modbus® protocol and the commands implemented therein. Support will only be provided to those conversant with Modbus® and in relation to the Type Editor functionality specifically. **RDM cannot accept any responsibility, or offer troubleshooting support, to clients who have created their own templates.**

For users unfamiliar with Modbus® RDM can provide on request a template creation service, allowing for a template to be generated for the third party device in question. A nominal fee will apply for each template created by RDM.

Note 3: Software version V3.0 and above is only compatible with Plant TDB Hardware version 6.1.

Note 4: The upgrade to V3.5.0 requires a two stage process, this allows for memory optimisation prior to installation.



Hardware Options

Depending on the requirements, a number of hardware options are available on the intuitive range. Options include; integral display, fused or non-fused relay outputs, stepper outputs and number of solid state relays (SSR's). See ordering information below, for details.

Ordering Information

To order the correct hardware options the following part number descriptions are followed;

Intuitive Plant TDB - PR0650 X Y TDB Z Intuitive Plant TDB with 2 stepper output - PR0652 X Y TDB Z

Y	Description	Х	Description	Z	Description
NF	Non Fused	D	Integral Display	E1	Relay 1 SSR
blank	Fused Relays and Supply	blank	No Display	E2	Relays 1-2 SSR's
				E3	Relays 1-3 SSR's
				▼	V
				E12	Relays 1-12 SSR's

Example:

To order an Intuitive TDB with integral display, non-fused with 3 SSR's the part number would be;

PR0650D NF TDB E3

Optional Network Enablers / Adapters

The Controller can communicate over Wi-Fi, Modbus RS485, Wireless Mesh and BACnet when the features are activated. The part numbers are as follows;

Description	Part Number	
Wi-Fi Adapter (enablement included)	PR0657	
Wi-Fi Enabler	PR0657-ENA	
BACnet Enabler	PR0655-BAC	
USB 3G Modem	PR0496-3G	
Modbus RS485 Dongle	PR0623	
Modbus RS485 Adapter DIN Rail Mount	PR0623-DIN	
RDM 485 Plant TDB Comms Module	PR0623-DIN TDB	
Modbus Type Editor (per type)	PR0655-TYP	
Modbus Writable Type Activation (per type)	PR0655-MOD	
For User created `writable' templates, please consult RDM Technical sales. The enablement is a `factory-fitted' option only.		

Intuitive Expansion Boards

The following Intuitive & Plant controller expansion boards can be used to expand the available inputs and outputs for either the Intuitive or Plant controller;

Description	Part Number
Intuitive Stepper, with 8 Probe Inputs, 8 Status Inputs, 8 Universal I/O, 4 Relay Outputs, 6	PR0660
Stepper Motor outputs and 4 PWM* outputs.	
Intuitive IO Expansion Board with 8 Probe Inputs, 8 Status Inputs, 8 Universal I/O, 12 Relay	PR0661
Outputs and 4 PWM* Outputs.	
Intuitive 48 Probe Input Expansion Board with 8 Universal I/Os and 48 Probe Inputs	PR0662
Intuitive mini IO expansion module with 4 Analogue Inputs (mA / V) and 5 Relay Outputs	PR0663
Intuitive mini IO expansion module with 4 Analogue I/O (mA/V) and 4 Relay Outputs	PR0663 4-4
Intuitive mini IO expansion board with 6 Probe Inputs, 4 Status Inputs, 4 Universal I/O, 5	PR0681
Relay Outputs and 2 PWM Outputs	
Intuitive mini IO expansion module with Stepper Output, 2 Probe Inputs, 1 Relay Output and	TBC
2 Analogue Inputs (mA/ V)	

*Note only available on the V2 Expansion boards.

This document outlines how to map the TDB software in a Plant controller to use any of the above expansion module inputs and outputs. For further hardware information on all of the expansion board variations please see RDM Intuitive & Plant Controller Expansion Board User Guide on RDM Web Site.



Configuration

The controller has no configuration until a Data Builder application has been developed and saved.

Available Networks

The controller has a built-in IP network interface that allows for connection to an RDM Data Manager system or an IP network without the need for an extra communications module. Simply set the 3 rotary switches to the desired network ID for the unit to receive an IP address from a DHCP server. If a static IP address is required then the network details must be entered via the web interface, either through connecting via the USB lead or once it has obtained an address from a DHCP server (See <u>Connecting to Controller</u>).

With the addition of the USB Wi-Fi network card (PR0657), the controller can communicate over Wi-Fi networks without the need of any cables. The SSID and the pass code of the Wi-Fi network must be entered within the <u>network setup</u> page, accessible through the web interface.

When enabled, the unit can support BACnet communications, via the Ethernet port, allowing it to be logged on to a BACnet Network. Within the <u>network setup</u> pages the communications protocol can be selected.

Connecting to the controller via USB

To communicate directly using a USB lead, the correct USB drivers need to be installed and configured. The necessary drivers can be obtained from the 'Download Software' section of the RDM website which is found under 'Support' on the homepage. Along with the driver, there will be a walk through guide of how to set it up.

The operating system of the PC used for direct USB connection must be known and the appropriate guide or software must be downloaded. Follow the instructions shown within the guide for the installation and Network Setup for your version of Operating System.

Power up the controller allowing at least 30 seconds to complete booting. Then, connect from the 'USB Device' port on the controller to a USB connection on the PC. As per the user guide it will be accessed using a standard internet browser (such as Internet explorer, Firefox or Chrome) and browsing to the address 10.255.255.254.

Networked Devices

The controller can communicate with up to 64 Modbus-equipped devices, 16 RDM wireless probes and 16 RDM wireless devices.

Modbus communications is active as default and only requires the USB to RS485 adapter (PR0623 / PR0623 DIN) connected. A list of available Modbus devices useable with the Intuitive Plant TDB controller can be found in the <u>Modbus section</u>.

The Wireless Mesh adapter (PR0734) allows the connection of wireless devices such as the RDM Wireless 2I2O, 4I (PR0731) and Temperature Probe (PR0733).

For setup details see the <u>Modbus</u> or <u>Wireless Mesh</u> sections.



Displays TouchXL (PR0617-ID-X-X)



The TouchXL, when connected to the Intuitive, is used as a display, mimicking the view of the standard web interface to the controller. It is used to interact with the application software and alarm indication (if programmed into the TDB).

The TouchXL has the benefit of being able to connect to the Intuitive Plant TDB via USB (USB host 1 or 2) to micro USB or standard Ethernet connections over IP.

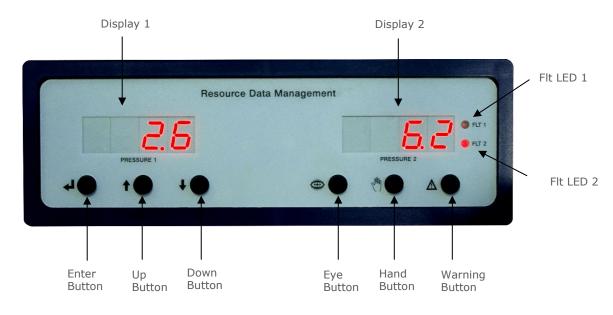
When connecting using the USB method, the communication of the two devices is automatic and the TouchXL will automatically configure itself for use.

Connecting over Ethernet comms requires the configuration of the TouchXL to be setup to 'look at' the Intuitive TDB device. This can be carried out in the 'Network Configuration' page within the TouchXL service menus (only accessible directly on the touch screen). Please consult the specific documentation for more details.

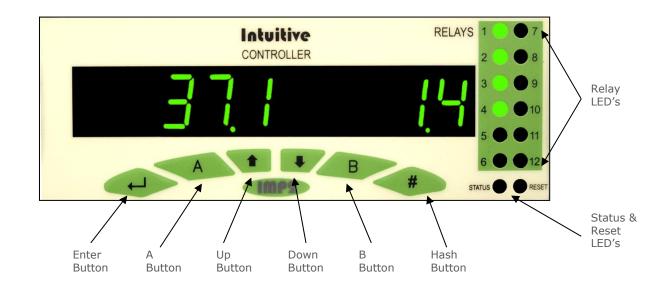
Note: The TouchXL display is only compatible with Intuitive Plant TDB software V3.2.0 and above.



Remote Plant Display (PR0620)

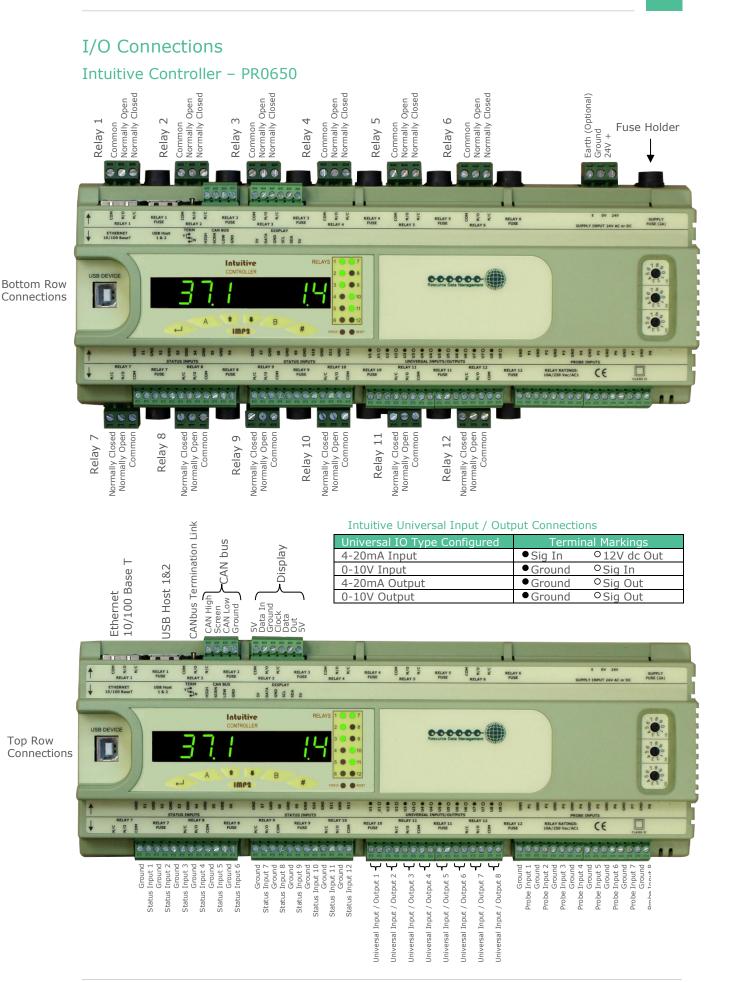


Integral Display



When using a remote or internal display if the number sent to the display is greater than 999.9 then the decimal part of the value is dropped and replaced with a thousand digit e.g. 999.8, 999.9, 1000, 1001, 1002 and so forth. When a remote or internal display is connected to the controller but not utilised in the TDB program it will show 'b 28' when the controller is powered on.

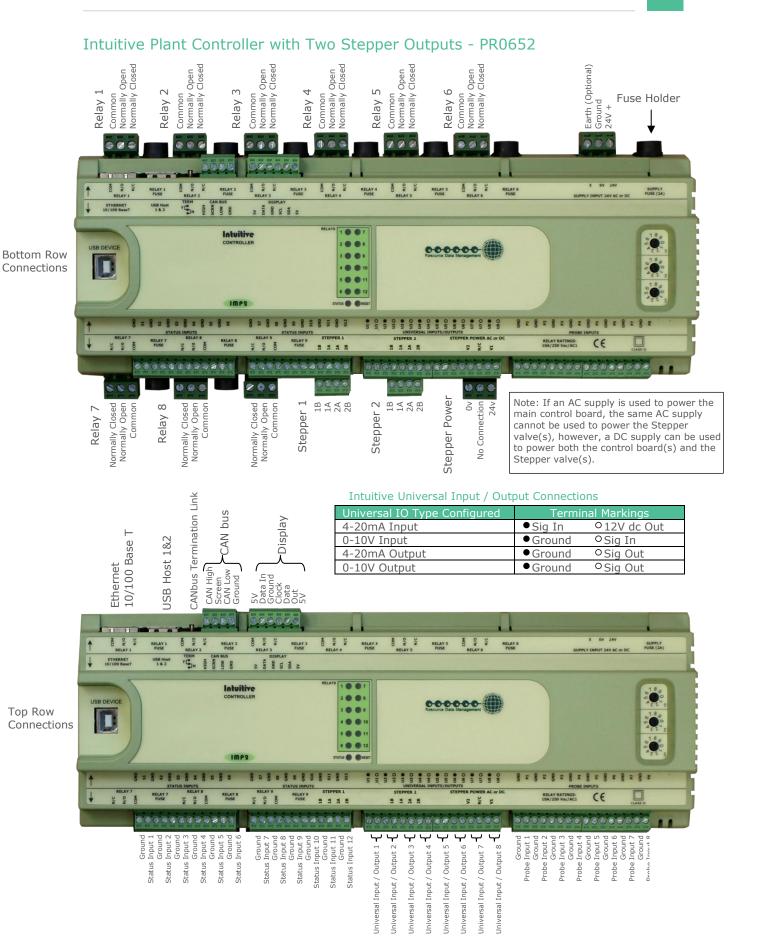






Please ensure all power is switched off before installing or maintaining this product.

alling www.resourcedm.com





Please ensure all power is switched off before installing ^{WV} or maintaining this product.

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Inputs & Outputs Descriptions

Intuitive Controller

All Types	Description	Comments
Status Input 1-12	0V return or 24 Vac	See note 1
Analogue Input 1-8	Probe input	See note 2
Universal Input / Output 1-8	Analogue Input or Output	4-20mA or 0-10V
Relay 1-12	N/O, N/C and Common	Volt Free
Status LED	Healthy LED	When powered up the LED will flash off/on every 0.5 seconds.

Intuitive Stepper Controller

All Types	Description	Comments
Status Input 1-12	0V return or 24 Vac	See note 1
Analogue Input 1-8	Probe input	See note 2
Universal Input / Output 1-8	Analogue Input or Output	4-20mA or 0-10V
Relay 1-9	N/O, N/C and Common	Volt Free
Stepper Outputs 1-2	Bi Polar Stepper Valve Driver	12-24vdc, 825mA / 8W maximum.
Status LED	Healthy LED	When powered up the LED will flash off/on every 0.5 seconds.
Stepper Power	Separate power supply for 2 stepper outputs	If an AC supply is used to power the main control board, the same AC supply cannot be used to power the Stepper valve(s), however, a DC supply can be used to power both the control board(s) and the Stepper valve(s).

Note 1: 24 Vac must have the same 24 Vac return as the supply voltage. If using the Intuitive/Plant controller 24V power supply only the 24Vac signal from the supply is required for the status input.

If using an external 24V power supply to signal a status change then both a common (0V) and status input signal (24V) is required for the appropriate status input. See <u>Appendix 2</u> for status input connection wiring (If the Status LED is present (Mercury only) then Appendix 3 is not relevant).

Note 2: A variety of probes can be used by the Data Builder Analogue block or a custom probe curve can be programmed.

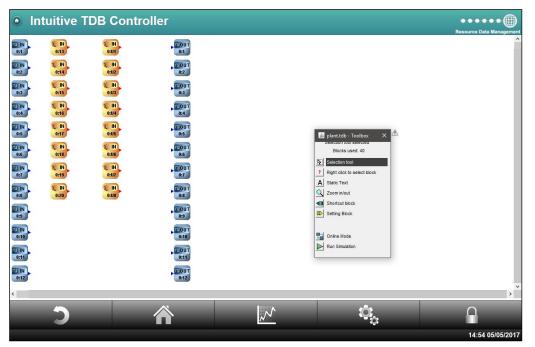
All inputs and outputs should be configured on the controller before connecting an external device. Failure to do so may result in damage to the controller and/or external device.



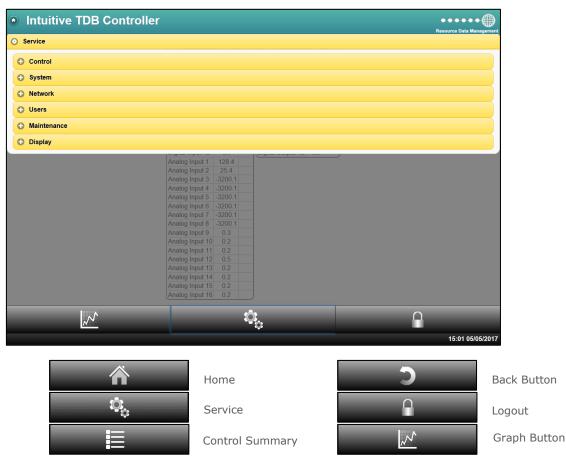
Webpage Appearance

Although the hardware of the devices differs slightly, the software functionality of both Intuitive and Dual Stepper TDB Controllers is identical, therefore the user interface, when viewing them through the web page, is identical.

TDB Controller View



TDB Menus view





Please ensure all power is switched off before installing WWW.re or maintaining this product.

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USB Devices

Intuitive DIN mountable 4 port USB Hub (PR0624/ PR0624-DIN)

The RDM USB 4 Port Hub can be used to expand the number of USB ports available. The RDM USB hub has a USB Device port which connects to one of the Intuitive controller's USB ports. This then allows for up to 4 USB devices to be connected to a single controller USB port. The RDM USB hub obtains its power supply from a 24Vac or dc supply. Please see the USB 4 Port user guide for further details.

If a third party USB hub is connected to the controller then the hub used **must be** self-powered and **should not** obtain its operating power supply from the controller USB ports. Failure to use a self-powered hub will result in damage to the controller and will invalidate the controller warranty.



USB Current Monitor (PR0626/ PR0626i/v-DIN)



The USB Current Monitor provides an interface for the RDM TDB Controller and allows 5 Current Transformers (CTs) to be connected.

The three types of current monitor are listed below:

Description	Part Number
5 Channel Current Monitor with USB Interface	PR0626
5 Channel Current Monitor with USB Interface, DIN rail mount, 5A Input	PR0626i-DIN
5 Channel Current Monitor with USB Interface, DIN rail mount, 0.33V Input	PR0626v-DIN

The two types of Current Monitor are designed to be used with two types of Current Transformers, either with 0.333V secondaries (RDM CT PR0675-xxxA) or with 5amp secondaries (Farnell part 1373206 for example). Scaling is carried out in the <u>CT block</u> within the editor.

Up to 10 Current Monitors can be connected to Controller, with each having a rotary switch ID to identify it. To accommodate multiple Current Monitors an RDM 4 Port USB Hub can be utilised (PR0624), this provides the controller with four additional USB ports.

The Current Monitor is powered via the host controller's USB port so no additional power supply is required, although the 4 Port USB hub, if used, requires a 24v AC or DC supply (the same as the TDB Controller).



Warning: Care should be taken when connecting and disconnecting the 5A current transformer secondaries. The secondary side should never be left open circuit when there is a load present the primary side.



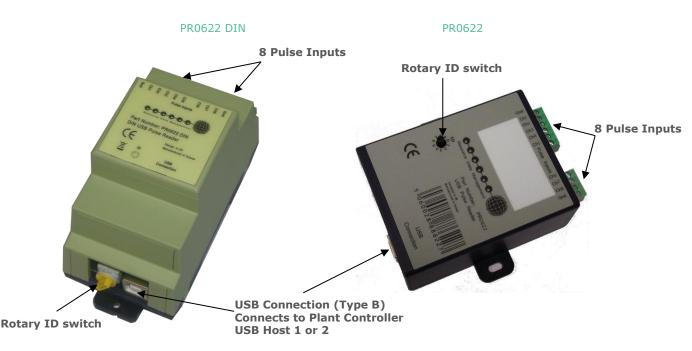
Intuitive Touchscreen Display (PR0615)

Intuitive Controllers with Data Builder support a number of displays, one of which is the USB Touchscreen Display. Data Builder contains a selection of blocks which allow user interaction with this display (please see Display Cascade, 3 way, Override and Slide blocks). As well as displaying selected input, output, parameter, state and customised graphics, the Touchscreen Display allows the user to change set points, override values and accept alarms. The Touchscreen Display connects to an Intuitive or Plant Controller via one of the controller's USB sockets and does not require an additional power supply.

See the Touchscreen Display users guide for further details.

Note: the Touchscreen Display is a plug and play item. The display will operate when connected to an Intuitive TDB controller and will show the Home page, if a Custom page is not configured by default.





8 Channel Pulse reader (PR0622/ PR0622-DIN)

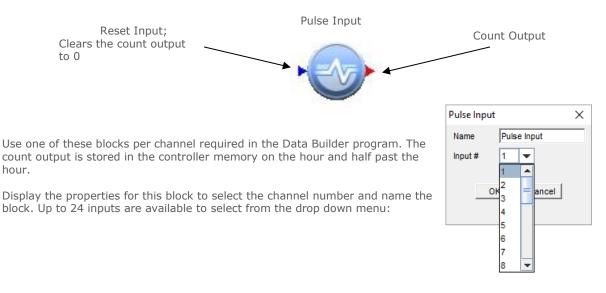
This device is available in two enclosure types, DIN rail mount (PR0622 DIN) and panel mount (PR0622), both of which connect to either USB Host 1 or 2. Up to three Pulse Readers can be connected to the system. Since there are only two USB host ports available then a USB hub must be used if more than two USB devices are required. The Pulse Reader has a rotary switch which allows the user to uniquely address each module. If the rotary switch is set to any of the following then the Pulse Reader channels will appear as highlighted.

Position 1:	Equates to device 1 and Channel 1 through to 8.
Position 2:	Equates to device 2 and Channel 9 through to 16.
Position 3:	Equates to device 3 and Channel 17 through to 24.

Note: If a USB hub is used then it must be self-powered and should not obtain its operating power supply from the controller USB ports. Failure to use a self-powered hub will result in damage to the controller and will invalidate the controller warranty. RDM recommend PR0624 DIN 4 Port USB Hub.



A single Pulse Reader has 8 channels to count pulses therefore a total of 24 channels can be monitored if three devices are used. A Pulse Reader input block/ channel must be used to incorporate the pulse counts from each channel into a data builder program. Each channel on the pulse reader requires a 0V return switching through e.g. a utility meter volt-free relay. **The maximum speed that the pulse reader can read is 10msec mark – 10mSec space per channel**. Below is the Data Builder Icon for pulse input:



The Pulse Reader counts can be checked in the controller by selecting the System tab then Pulse Counter. Channel counts can be read from this screen and channel counts can be cleared on an individual basis. "O" in a channel count indicates that channel has had zero counts and the Pulse Reader module is present for that range of channels. "---" shows that the Pulse Reader module isn't present for that range of channels.

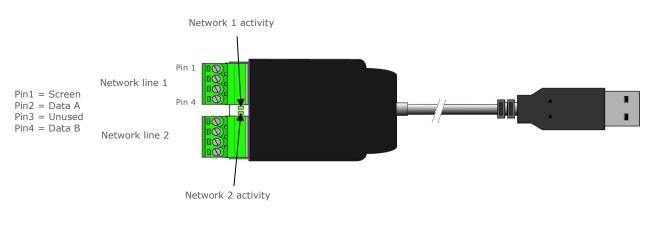




RS485 Modbus Adapter (PR0623/ PR0623-DIN)

This adapter connects to either USB Host 1 or 2, however only 1 adapter can be connected to an Intuitive TDB controller. Each adapter has 2 RS485 network lines and each network line allows up to 32 Modbus devices. This allows for Modbus based devices to be logged on to the controller provided the appropriate template is present.

PR0623



PR0623-DIN



The Modbus adaptor is also available in a DIN rail mounted enclosure, connections are the same as the PR0623 adapter shown above.

The adaptor is connected to the controller using a USB type A to type B cable (this is a standard cable commonly used with PC printers).

RS485 Modbus Configuration

Note: the RS485 configuration of the USB Adapters is fixed and uses the following:

Baud rate:	9600
Data bits:	8
Parity:	No
Stop Bits:	1



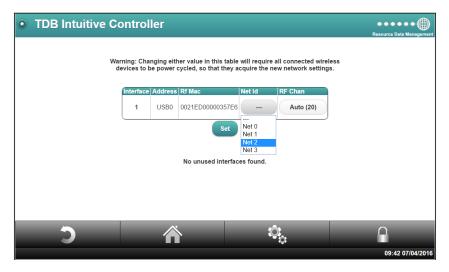
USB Wireless Mesh adapter (PR0734)

The Wireless Mesh interface allows data to be exchanged between the Intuitive TDB controller and the wireless mesh devices, the wireless mesh adapter is configured through the Wireless Mesh Setup section. USB Connection to Intuitive Plant TDB. Network Activity LED

The USB interface connects to one of the USB ports on the controller. There is a single status LED which indicates when the USB interface is operating. The advantage the USB interface has is that there is no external power supply required as it is USB powered. Once connected, navigate to the Wireless Mesh Setup menu:

No interfaces in use.	
Address Rf Mac Action USB0 0021ED00000357E6 Add as Nw 1	
ې ۲	09:41 07/04/2016

The interface must be added as a network by selecting 'Add it as Nw 1' (only one network is available). By clicking on 'Go' it adds the interface as a network line and results in the following screen:



The next step is to set the Network ID of the interface. On wireless devices, channels 0 to 3 can be selected so they can be logged on to different interfaces/ systems sharing a common location. Choose the Net ID you wish to use for these devices and click 'set'. Leaving the RF Channel set to auto will allow the interface to source the best frequency to communicate on (the channel will show once it is selected). Else, if a specific channel is necessary, choose it from the drop down menu and again click 'set'.

The next step is to add the devices on to the controller's network. Ensure the channel selection switches are correctly set to the Network ID set for the interface.

Please consult the individual documentation for the Wireless IO and probes for logging on to a wireless mesh network.



USB Memory Stick

Inserting a USB memory stick into USB Host 1 or 2 allows the controller to record data at 15 second intervals. Without the use of a memory stick, data is recorded at 15 minute intervals and the number of recorded days is limited. The USB stick used should be formatted as FAT32. The data saved to the memory stick is encrypted and therefore cannot be viewed directly from a PC or Laptop. The Graph function or Export Data option should be used to view or obtain data from the TDB controller.

Note: 15 second intervals can only be viewed via the graph function, exported data will remain in 15 minute intervals.

When inserting or removing a USB memory stick the controller should be restarted. There are no software configuration options for the memory stick and the controller will automatically start logging to the memory stick when inserted.

Note: Only one memory stick is supported. Using two memory sticks will cause logging issues.

Note: whenever a TDB program is edited and saved the log data relating to the program before it was edited, is removed.

Intuitive TDB Controller Home Page

Following the USB driver installation and network setup the IP address will be 10.255.255.254 via the USB cable. Else if you are accessing it through the Ethernet port it will be the address assigned to it (see <u>Network</u> setup).

Digital Input 1OffDigital Output 1OffDigital Input 2OffDigital Output 3OffDigital Input 3OffDigital Output 3OffDigital Input 4OffDigital Output 5OffDigital Input 5OffDigital Output 5OffDigital Input 6OffDigital Output 5OffDigital Input 7OffDigital Output 5OffDigital Input 9OffDigital Output 4OffDigital Input 9OffDigital Output 9OffDigital Input 10OffDigital Output 10OffDigital Input 12OffDigital Output 11OffDigital Input 13-3200.1Analog Input 4-3200.1Analog Input 4-3200.1Analog Input 6-3200.1Analog Input 6-3200.1Analog Input 8-3200.1Analog Input 8-3200.1Analog Input 100.2Analog Input 100.2Analog Input 130.2Analog Input 130.2Analog Input 130.2Analog Input 130.2Analog Input 160.2Analog Input 150.2Analog Input 160.2Analog Input 150.2Analog Input 160.2Analog Input 160.2Analog Input 160.2Analog Input 150.2Analog Input 160.2Analog Input 160.2Analog Input 160.2Analog Input 160.2Analog Input 160.2Analog Input 150.2Analog Input	Input	Value l	Unit	Output	Value L	Unit
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Analog Input 16 0.2	Analog Input 14	0.2				
	Analog Input 15	0.2				
Controller ID: BC360117	Analog Input 16	0.2				
	Controller ID: BC360	117				

The controller home page, when first displayed will indicate the status of all the I/O. This is because by default, a Data Builder input and output block has been allocated to each I/O.

To progress from this screen, a username and password is required. Clicking on the 'service' menu (cogs) at the bottom of the screen will prompt a log in screen;

The default username is "install" The default password is "1234"

This will result in the Service menu being displayed providing all the options for that user level.

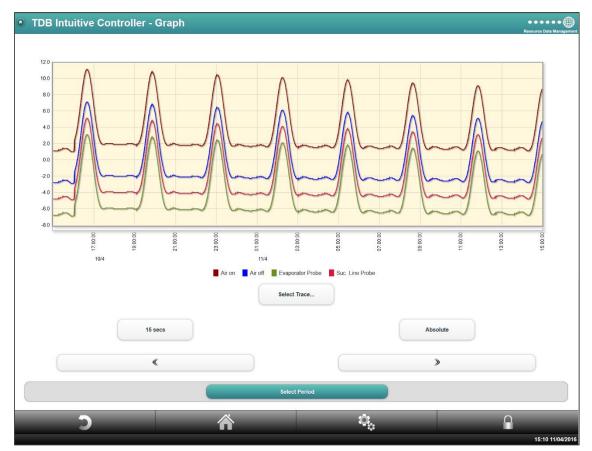
Note: If an analogue input or other item which does not have a device connected or it is out of range then the value shown will be -3200.1.



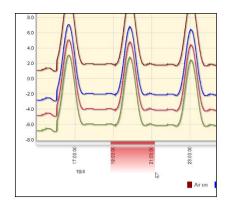
Graph

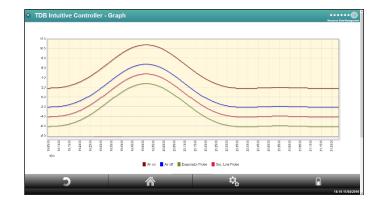
Current Graph

Clicking on the graph button will display the last 24 hours on the graph. From here the data can be interrogated further.



The user can interact with the graph area itself to 'zoom' into specific time periods. This can be done by clicking and dragging across the time scale (x axis) along the bottom of the graph as per the capture below. Furthermore, clicking on a point on the graph will indicate the time and associated reading at that time.







Select Trace

To add more traces to the graphing area, click 'Select Trace'. Here the user can add from any of the values that the TDB controller logs:

Select Trace(s)	
Page 1 of 2	
Previous	Next
Network input from Boller 2	Boiler Flow Temp
Heat Demand 1st Fir	Boiler return Temp
Outside Temp	Entrance Temp
Hall 1 Temp	Hall 2 Temp
Boiler Fault	Av. Hall Temp
HeatingOn	Heating Pump
Boiler	PID Output
Hall and Reception HD	DHW
Summer Run	Hall Heater 1a
Hall Heater 1b	Hall Heater 2
Draw Graph Cancel	

Use the 'Next' and 'Previous' buttons to navigate through the list. Clicking on the traces will highlight them accordingly and subsequently add them to the graph after the 'Draw Graph' has been selected.

Sample Frequency

If a USB memory stick is being used there will be an additional menu available to select the sample frequency. Without the memory stick, the sample frequency will be fixed at 15min. Else, the time period can be reduced to 15 seconds.

Absolute or Differential

The graph can also be used to show the 'Absolute' values taken from the controller's traces. Or if 'Differential' is selected then it will be the difference between values taken at the frequency selected.

Graph Period

To select specific periods of data to be viewed use the 'Select Period' button. The below will be shown;



By using the navigational buttons within the calendars, selecting a specific date for 'Start' and 'End' followed by 'Draw Graph', the graph from the period chosen will be represented.

Note: if you make significant changes to the TDB program e.g. introduce or remove Input/outputs, then any previously recorded graph data will not be shown. You will be able to access any 'old' data up until the point the TDB program was edited by using the Export Log Data function.



Control

Control Summary

The Control Summary will be the device's default homepage, when there are no mimics set up. The Home button at the bottom of the device's web interface will also take the user here from any other page. The control summary is also accessible from the device's menu by clicking on Control and 'Control Summary'.

• TD	B Intuitive Contro	oller						source Data Management
		Input	Value	Unit	Output	Value Unit		
		Boiler Flow Temp		Deg. C	Network Input from Boiler 2			
		Boiler return Temp			HeatingOn	Off		
		Outside Temp		Deg. C	Heating Pump	Off		
		Entrance Temp		Deg. C	Boiler	Off		
		Hall 1 Temp			PID Output	0.0		
		Hall 2 Temp			Hall and Reception HD	Off		
		Av. Hall Temp		Deg. C	DHW	Off		
		Heat Demand 1st Fir		Dog. O	Summer Run	Off		
		Boiler Fault	Off		Hall Heater 1a	Off		
		(Donor Fudit	011		Hall Heater 1b	Off		
					Hall Heater 2	Off		
					Hall Heater 1a HS	Off		
					Hall Heater 1b HS	Off		
					Hall Heater 2 HS	Off		
	és :						Ω	
	Ŷ							
								14:32 11/04/2016

Parameters

Parameter	Value	Unit	Parameter	Value	Unit	
Heating System	Off		Hall and Rec Override	Off		
Summer Run	Off		Boiler Flow Temp	60.0	Deg. C	
Hall SP	21.0	Deg. C	Entrance SP	21.0	Deg. C	
Frost Stat	2.0	Deg. C	Fan Delay	02:00	min:sec	
PID P SP	0.1)	PID I SP	0.1)	
PID D SP	0.1)	PID Max	100.0)	
Fast Speed Delay	05:00	min:sec	PID Min	99.0)	
Upper Diff	0.0	Deg. C	Lower Diff	8.0	Deg. C	
Heating Delay	15:00	min:sec	Pump RunOn	15:00	hrs:min	
Hall Occ	1.0	Deg./hr	Reception Occ	1.0	Deg./hr	
	,					
		Set P	arameters			

Clicking on Parameters shows a list of the current operating setting block values within the Data Builder (TDB) program. The user can change TDB program parameters from this page. Once the controller is logged onto a Data Manager any changes required to a setting block must be done from the "Parameters" option or from the Data Manager and not by editing TDB program as any changes made to a setting block here will have no effect. **Note:** if the parameter locking features is in use then all changes must be made from the Data manager.



Default Parameters

The option 'Default Parameters' is seen when a user changes a parameter in TDB program from the Data Manager or via the 'Parameters' option. When used, this option will revert the setting blocks back to the original values they had, before they were edited from the Data Manager or via 'Parameters'. If you remove the controller from a Data Manager network and wish to operate it stand-alone then it is advisable to default the parameters before trying to edit the Data Builder program.

Overrides

The controller offers a facility where the program, which has been written to the device, can be overridden. Therefor any Analogue Output, Digital Output or parameter can be forced to a specific value/ state. Looking at the below screen capture, it shows the general layout. All blocks within the PLC that are able to be overridden will be listed. They will all be as default, 'Automatic', where they will follow the TDB logic. By setting the override to 'Manual' and assigning the desired value, it will keep the override until 'Automatic' is chosen once more or the value is changed again.

Item	Automatic	Man	nual Value	Units	Out Of Service
HeatingOn	۲	۲	Off		
Heating Pump	۲	۲	Off		
Boiler	۲	۲	Off		
DHW	۲	۲	Off		
Summer Run	۲	۲	Off		
Hall Heater 1a	۲	۲	Off		
Hall Heater 1b	۲	۲	Off		
Hall Heater 2	۲	۲	Off		
Hall Heater 1a HS	۲	•	Off		
Hall Heater 1b HS	۲	۰	Off		
Hall Heater 2 HS	۲		Off		

Note: the overrides are available via the Data Manager's interface only when the unit is logged on as a BACnet device.



Edit

Note: In software V1.20 and above the analogue inputs (0:21 to 0:23) and analogue outputs (0:13 and 0:14) do not appear automatically in the TDB program, they can be easily added manually as required.

Send To Controller

Use this option to upload a previously created Data Builder application into the Controller.

Note: if there are block types, within the TDB that the Intuitive TDB controller does not support, the 'red warning' icon will appear at the bottom left corner of the CGI web interface. When this icon appears, please review your program and consult RDM technical support for assistance if required.

Get From Controller

Use this option to download the current Controller Data Builder file to a $\ensuremath{\mathsf{PC}}$.

Delete

Use this option to delete a Data Builder program from the Controller

Restore

Use this option to restore the last deleted Data Builder file.





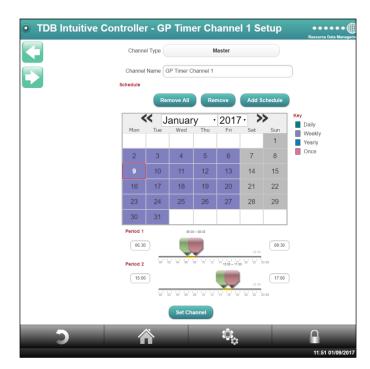




GP Timer

The controller has General Purpose Timer functions, with 40 available channels. To program a GP timer click on the channel you want to use.

Channel	Description	Status	
1	GP Timer Channel 1	Off	i
2	GP Timer Channel 2	Off	i
3	GP Timer Channel 3	Off	i i i
4	GP Timer Channel 4	Off	i
5	GP Timer Channel 5	Off	i
6	GP Timer Channel 6	Off	i i
7	GP Timer Channel 7	Off	i
8	GP Timer Channel 8	Off	i
9	GP Timer Channel 9	Off	i i
10	GP Timer Channel 10	Off	i
11	GP Timer Channel 11	Off	i i i
12	GP Timer Channel 12	Off	i
13	GP Timer Channel 13	Off	i
14	GP Timer Channel 14	Off	i i i
15	GP Timer Channel 15	Off	i
16	GP Timer Channel 16	Off	i
17	GP Timer Channel 17	Off	i
18	GP Timer Channel 18	Off	i
19	GP Timer Channel 19	Off	i
20	GP Timer Channel 20	Off	i i
21	GP Timer Channel 21	Off	i
22	GP Timer Channel 22	Off	i i i
23	GP Timer Channel 23	Off	i
24	GP Timer Channel 24	Off	i



There are 32 general purpose timer channels and 8 "Global" channels.

Use the "Add schedule" wizard to aid setting up the channel.

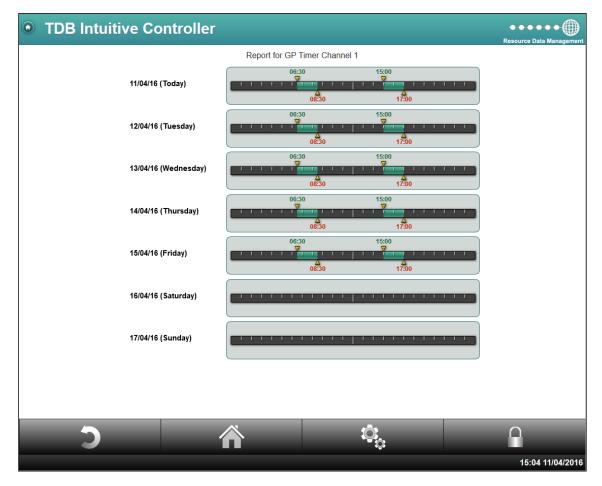
Note: Global channels cannot be re-named or be set to slave mode. This is particularly useful if web-services are going to be used to remotely change a channel time; as the channel name cannot be change inadvertently.

The arrows located at the top left of the GP Timer channel screen allows quick navigation to the next and previous channels.



GP Timer Report

Selecting this option allows you to view each GP timer channels programmed times.





System System Log

Time	Entry
15:44:52 11/04/2016	Restart PLC program with upload
15:44:50 11/04/2016	Done PLC file upload (plant.tdb)
15:44:32 11/04/2016	Deleted PLC file
15:44:32 11/04/2016	Deleted PLC program
15:44:27 11/04/2016	'install' Logged on from 10.2.2.75
15:43:39 11/04/2016	Setting test dialout frequency to 0
15:43:39 11/04/2016	Changing network setup ('eth0', '10.2.2.76', '255.255.255.0', "
15:42:37 11/04/2016	GP timer channel 1 settings changed
15:42:11 11/04/2016	Added user "site user"
15:41:48 11/04/2016	Change "Entrance SP" from "21.0" to "21.5"
15:41:48 11/04/2016	Change "PID P SP" from "0.1" to "0.2"
15:41:48 11/04/2016	Change "Hall SP" from "21.0" to "21.5"
15:25:28 11/04/2016	'install' Logged on from 10.2.2.75

Use this option to view the system log. The system log is a record of commands that have been performed on the Controller. The system log also shows how many blocks have been used in a PLC program as well as any error messages should the maximum number of blocks permitted in a PLC program be exceeded. If the maximum number of blocks is exceeded the system log will highlight the number of blocks which the TDB program is over. **Note:** The controller will save around 300 entries in the system log.

Visibility

Following the creation (or upload) of a TDB program, the levels of which a user can view specific items (inputs, outputs or parameters) can be set. **Note**: when used in conjunction with the Data Manager (software V2.3 and above), these visibility settings will be transferred.

ontroller					
Item Inputs	All	Site	Service	Install	Hide
Boiler Flow Temp	۲	0	0	0	0
Boiler return Temp	۲	0	0	0	0
Outside Temp	۲	0	0	0	0
Entrance Temp	۲	0	0	0	0
Hall 1 Temp	۲	0	0	0	0
Hall 2 Temp	۲	0	0	0	0
Av. Hall Temp	۲	0	0	0	0
Heat Demand 1st F	Ir 💿	0	0	0	0
Boiler Fault	۲	0	0	0	0
Outputs					
Network Input from Boiler 2	۲	0	0	0	0
HeatingOn	۲	0	0	0	0
Heating Pump	۲	0	0	0	0
	-	-	-		
				Ö.	



Within the '<u>Users</u>' setup page, levels of access can be set to limit access to configuration and settings for the specific log-ins. Those user levels are; Install, Service and Site.

When in the Visibility menu, it will list all inputs, outputs and parameters that are in the TDB app. By using the radio buttons, choose the level at which the item is visible to the user level. Or completely hide the item from altogether.

Alarm Log

Alarms created by any <u>alarm block</u> are recorded in the controller alarm log. Here current alarms are shown as well as older alarm history.

Current Ala	arms			
Serial	Alarm	Occurre	d	
14	Boiler Alarm	12/04/1	ð 08:56:46	
Old Alarms	3			
Serial	Alarm	Occurred	Cleared	
13	Boiler Alarm	12/04/16 08:18:15	12/04/16 08:56:45	
12	Boiler Alarm	11/04/16 16:26:06	12/04/16 08:18:15	
1	Boiler Alarm	11/04/16 16:18:55	11/04/16 16:26:05	
0	Boiler Alarm	11/04/16 16:13:19	11/04/16 16:18:55	
2	Boiler Alarm	11/04/16 16:11:03	11/04/16 16:13:18	
3	Boiler Alarm	11/04/16 16:10:05	11/04/16 16:11:03	
7	Boiler Alarm	11/04/16 16:07:17	11/04/16 16:10:05	
<u>6</u>	Boiler Alarm	11/04/16 16:04:45	11/04/16 16:07:17	
5	Boiler Alarm	11/04/16 15:52:25	11/04/16 16:04:45	
1	Boiler Alarm	11/04/16 15:52:21	11/04/16 15:52:23	
3	Boiler Alarm	11/04/16 15:52:18	11/04/16 15:52:20	
2	Boiler Alarm	11/04/16 15:51:41	11/04/16 15:52:14	
1	Boiler Alarm	11/04/16 15:50:33	11/04/16 15:50:43	

Serial:	Each alarm generates a unique serial number. Click on the serial number for more
	information.
Alarm:	Gives the description of the alarm (Description taken from alarm block which generated
	the alarm).

- **Occurred**: Shows the time at which the alarm was generated.
- **Cleared**: Shows the time at which the alarm has cleared.

Mute All Alarms

When multiple alarms have been generated from the plc, they will sound out on a display if connected to the intuitive TDB controller. This function will silence the audible alarm from any displays. **Note**: it will not clear any alarms or prevent them being sent to the modems if setup.



Export Data

Use this feature to extract data - select the Start Date then End Date and follow the on screen instructions. **Note: Log data will extract all external points in the controller at 15 minute intervals.**



Log data is written to the controller's internal memory or a USB memory stick (if used) every 30 minutes, on the hour and ½ past the hour. If a software restart is initiated the controller will save any log data to memory or a USB memory stick (if fitted), before restarting thus minimising any possible data loss. The extracted file is a compressed 'zip' file, use standard windows routines to extract the data you want from the file. **Note**: the graphical interface or export log feature must be used to view/extract data on a USB memory stick as the logged data is encrypted.

Auto Export



This feature allows for logged data to be sent to a remote destination periodically. On viewing this page a list of the current automatic export schedules will be shown. If no schedules have been configured then "No export jobs currently defined." will be displayed.

Click "Add New Job..." to create a new automatic export schedule. A screen similar to the one below will be shown.



TDB Intuitive Controller		Resource Data Management
Frequency	Method	
4 Hourly	Mail	Add
starting at 13 : 30 hrs on 11 / 04 / 2016	to support@resourcedm.com	Cancel
う ()	¢.	•
		15:57 11/04/2016

Frequency: Select either hourly, 4 hourly, 12 hourly, Daily or Weekly from the drop down list. Now enter a start time and date.

Method: Select Mail FTP HTTP P HTTPS	 - send the data as part of an email. The mail server must be configured. - send data using the File Transfer protocol. See format below. - send data using the post function of the HTTP protocol. Enter the URL/ IP address of the server that can accept such posts.

*Note: Prior knowledge of function is required and RDM cannot support setup of a receiving server.

The file format sent will be a compressed CSV file with split date/ time.

Format of FTP: username:password@host/path/ e.g. support:12345@10.1.2.10/receiver/log/ Note: username and password must not contain and non-alpha numeric characters (}[#>).

Note 1: Using this feature will export log data at a 15 minute sample frequency regardless of a USB memory stick being fitted or not.

Note 2: If the automatic export should fail, it will continue to retry, incrementing the period of time between retries each time.



Network

Within the Network tab, it allows the user to configure and view the current settings for IP over Ethernet and/ or Wi-Fi.

٢	TDB Intuitive Controller - Network S	Setup	Resource Data Management
	Settings for interface eth0: Current Address: Current Netmask:	10.2.2.80 255.255.255.0	
	Settings for interface wlan0: Current Address: Current Netmask:	: 172.20.10.4 255.255.255.240	
	Signal Level:	Scan	
	SSID Hidden:	No)
	SSID:	RDMInstall	
	Key:		
	Current Default Gateway:	172.20.10.1	
	Static Address:	10.1.0.76	
	Static Netmask:	255.255.252.0	
	Static Default Gateway:	10.1.0.254	
	Name servers:	172.20.10.1	
	Controller name:	TDB Intuitive Controller	
	Networks to support:	XML)
	Remote XML:	No)
	Web Service Enable:	Yes)
	CGI compression option:	Auto)
	Test dialout frequency (hrs) (0 - disable test dialout)	4	
		Set Network	
	7	<u>;</u>	Ω
		-9	11:40 22/11/2016

Ethernet

If the Controller is connected to a Data Manager IP network, or a network which has a DHCP server, use the 3 rotary switches on the controller to set a Network ID. The Data Manager or DHCP server will then issue an IP address to the controller. The IP details will show under the current address for eth0.

If the Controller is to be assigned a static IP address, this must be done via the device's web pages, therefore the device must be accessed via <u>USB</u> (or Ethernet port if IP address is known). Within the 'Network' settings there will be fields available to enter the static IP details (address, netmask and gateway). Once 'set', power the controller off and set the 3 rotary switches to "000". When powered on, the stated IP address will be associated to the Ethernet port.



Wi-Fi

Note: For the controller to communicate via Wi-Fi, along with the adapter, Wi-Fi support must be enabled on the controller. Please consult RDM Technical Support for activation.

The controller can log on to a Wi-Fi network either via DHCP or by issuing it a static IP address. To give it a static address set the rotary switches to "000". Once powered on, the 'Network' tab will show the options allowing the user to issue an IP address, subnet mask and default gateway address for Wi-Fi. To automatically receive an IP address from a DHCP server, the rotary switches must be set to anything but "000".

For the controller to log on to the desired Wi-Fi network, the SSID and the key to the network must be inserted in the fields within the Network setup pages. Alternatively, clicking on the 'Scan' button will list all available networks.

Note: For networks that do not broadcast their SSID, toggle the 'SSID Hidden' option, to show/ ignore them. Opting to scan for 'hidden' SSID's will lengthen the scan time.

Then, simply select the desired network, and enter the associated password*. The SSID and Key would be provided by the network administrator. Contact your IT support team should further assistance be required.

Once logged on, the Wi-Fi network signal level will indicate how strong/ weak the signal is.

*Note: WiFi does not support WEP security.

Name servers

Enter the IP address of the Primary and Secondary name server to enable DNS features. This is required when sending emails from the controller where the Mail Server does not have a static IP address and the use of a DNS Server is required.

Controller Name

The text entered in this field will appear at the top of the RDM Intuitive Plant controller's webpage. This name is required for use with the Peer to Peer feature or for uniquely identifying each controller on the network. The Controller Name must be entered before the user can setup <u>Alarms</u>.

Networks to Support

As default, the intuitive TDB controller is configured to 'XML', allowing communications over the IP network transferring XML data to, for example the Data Manager. This will allow the controller to log on to the DM's network as an IP device. To turn this function 'off', select 'none' instead.

When the 'BACnet' feature is enabled (PR0655), it will expand the options to include; BACnet/IP and RDM-485*. Please consult RDM Technical Support for activation.

Note: Access to the controller's web pages via Ethernet port/ USB is always possible regardless of selected network.

All options are listed;

XML:	The Ethernet port will utilise the IP network transferring XML, allowing the device to log on to a Data Manager as an IP device.		
BACnet/ IP:	The device will use the BACnet protocol via the Ethernet port to communicate over a BACnet network.		
XML and BACnet/ IP: RDM-485*:	Uses both XML and BACnet protocols, via the Ethernet port, simultaneously. Using the RDM 485 Plant TDB comms module (PR0623-DIN TDB), the device will communicate using RDM-485.		
XML and RDM-485*: None:	Uses both XML and RDM-485 protocols, simultaneously. XML, BACnet and RDM-485 are disabled.		

If either BACnet or the RDM-485* networks are selected, they must be configured in the <u>BACnet/ RDM-485</u> setup page.

*Note: RDM-485 network is compatible with DMTouch software V2.5 and above.

Remote XML

Remote XML can either be set to 'yes' or 'no'. When set to 'no', the device cannot be logged on to a remote Data Manager out with its own subnet. When set to 'yes' it will allow it.



Web Service Enable

Option to either enable the Web Services feature or disable it.

CGI Compression

CGI compression relates to data that is sent to the browser used to view the controller's web interface. Data from the device can be compressed/ zipped (reducing data size) before sending it to the browser. The field can be set for; Off, On or Auto. If unsure, always leave on 'Auto'.

- Off:Never compress any data sent to the browser.On:Always compress data sent to the browser.
- Auto: The device will detect automatically if the browser can handle compressed data.

Test Dialout Frequency

Where the device has been setup on a network, a 'test dialout' can be sent periodically to aid in highlighting communication issues. The value is set in hours and at these time intervals, a dialout notification is sent to the designated modems. For this feature to operate correctly the <u>alarm setup</u> must be configured.

Mail Setup

TDB Intuitive Controlle	er		Resource Data Management
Sender Setup	1		Resource Data management
Name	Intuitive Controller		
Address	Intuitive@RDMmonitoring.com		
Force TLS		No	
Send ema	il directly		
 Send ema Server Setup 	il through server		
Address	mail.resourcedm.com		
Port	25		
Authenticat	17	Yes	
Username	dougies		
Password			
	Sa	ve	
)	Â	÷.	\bigcirc
			08:08 12/04/2016

Sender Setup

Name: Address: Force TLS:	Name that is appended to the sent alarms. Email address that is appended to the sent alarms. If set to "No", then if TLS Authentication fails it will try Plain Authentication. If Force TLS is set to "Yes", it will only try TLS Authentication.
Send e-mail directly:	Sends the e-mails directly to the destination server, please note this may or may not work depending on the setting of firewalls and e-mail servers between the TDB controller and the remote system.
Send e-mail through server:	Sends the e-mails through an intermediate server. If enabled complete the fields required for Server Setup.
Server Setup	
Address: Port: Authenticate: Username:	Address of mail server used to send alarms e.g. office mail server. Defaults to "25" but may be changed if required. This option should be set to "Yes" if you need to authenticate when sending a mail. If authentication required enter a valid username for the mail server
Password:	account. If authentication required enter a valid password.



Alarm Setup

Any alarm generated from an <u>alarm block</u> can be sent to up to 6 modem destinations via the controller's IP network connection to a URL or email. The RDM software application Monitoring Remote Station (MaRS) can be used to receive and view the alarms generated by the TDB program. Selecting the 'Alarm Setup' tab will display the six modems (pictured on right).

Note: There must be a valid 'Controller Name' entered within the <u>Network Setup</u> page before modems can be setup.

Selecting between modem 1 through to modem 6 will show a page similar to the one below.

Note: Once configured, the user can then test the setup, by using the Modem/ Mail Alarm test buttons.

TDB Intuitive Controller				Resource Data Management
Address	Туре	Retries Period (mins)	Options	
1	Email	2 1	Send Clear	
2	URL	20 5	Send Clear	
3	URL	20 5	Send Clear	
4	URL	20 5	Send Clear	
5	URL	20 5	Send Clear	
Note: The dialout will sto	op on the Set		icceeds.	
)		÷.	2	0
				08:10 12/04/2016

Address:	Enter the destination URL/ IP or email address for the alarms to be sent. Note: If a domain name is entered, then the Name Server field(s) must be configured under the <u>Network</u> ' setup heading.
Туре:	Select from HTTP, HTTPS or Email. Note : HTTP and HTTPS use the post function and prior knowledge of setup is required. RDM cannot support setup of a receiving server.
Retries:	Number of retires before moving on to the next modem address should the alarm fail to dial out on the current modem address.
Period:	Time delay in between each retry.
Send Clear:	When an alarm is no longer present a `Clear' alarm can be sent. Tick to enable this feature.

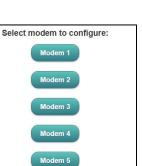
If alarms are to be sent to an e-mail address, the mail server setup must be completed. See: Mail setup

When a modem is set to use either the Http or Https protocol, the alarm is sent as an 'xml' packet. Within the packet there are different fields describing the specific alarm, two of which are 'Controller' and 'Alarm'. These fields relate to the Controller Name (set in <u>network menu</u>) and the alarm alias within the individual alarm blocks (set in TDB application). It is possible to override the Controller Name from within the individual <u>alarm</u> <u>block</u> by using the '#' symbol in the alias. Within the alarm block, alias it using the format; **controller name#alarm name.** Note no spaces before or after the # symbol.

Example; Alias the alarm block as "Device Number 23#Over Temperature Alarm" This will define the xml fields as; <controller>Device Number 23 <alarm>Over Temperature Alarm



Please ensure all power is switched off before installing or maintaining this product.



Mail Alarm Test

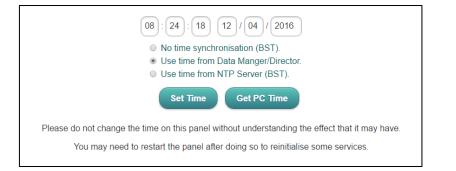
Modem Alarm Test

When enabled (part No PR0496-3G), this feature will allow alarms to be sent over a mobile data network in the form of an email or to a URL (depending on <u>alarm</u> <u>setup</u>). **Note**: it will not send SMS.

This page must be filled in for the GSM modem to operate correctly and the details required, can be found by contacting the service provider. Above is an example with Vodafone details entered (please note these details may be changed at any time by the service provider).

• TDB Intuitive C	ontroller		Resource Data Management
	Service Centre Address	+447785016005	
	APN	internet	
	The options below may r PIN Number	ot be needed, if not then leave them blar	
	Username)
	Password	Save Setup	
Note: Generally for Mobile Network blank.	k communications, the 'Sta	tic Default Gateway' field in the 'Netwo	ork' settings page should be set
2	Â	÷;,	•
			12:02 14/04/2016

Time



No time synchronisation:	Here the current time can be manually entered or if the "Get PC Time" is used the fields will be filled using the current time and date from the PC.
Use time from Data Manager:	If the controller is logged onto a front-end system its time clock can be synchronized with the Data Manger time clock. Check the tick box and press "Set Time" to enable this feature.
Use time from NTP server:	Here the IP address of an NTP time server can be entered. The controller will then synchronise with the NTP server time/date. Note : you must seek the permission from the owner of the NTP time server before directing the controller to it.

Note - If the time or date has been changed the user must restart the controller via the software feature "Reset" or by powering the unit off/on.

As default the controller operates in GMT and obeys BST when operating stand alone. If the controller is connected to a Data Manager then its time and date will be synchronised with it. If you wish to operate the controller stand alone in a time zone out with GMT then this can be achieved using a time zone upgrade file. Please contact RDM Technical Support for further details.



Hardware



As shown in the above screen shot viewing Hardware allows the user to check IO values for test purposes. It also provides a general overview of any other hardware setup, for example if the unit is logging to a memory stick or if there is a plant USB Touch screen attached.

Extension

TDB Intuitive Controller							Resource Data Management
	ID	Expected	Status	Present	Version		
	1	I/O	Normal	I/O	1.0		
	2	Stepper	Normal	Stepper	1.2		
	3	Invalid	Unused				
	4	Invalid	Unused				
	5	Invalid	Unused				
	6	Invalid	Unused				
	7	Invalid	Unused				
	8	Invalid	Unused				
	9	Invalid	Unused				
	10	Invalid	Unused	Invalid)		
5					Û	2	0
							09:02 12/04/2010

The Extension page will list the current expansion boards configured in the TDB program and their status. The "Expected" column indicates the expansion board configured in the TDB program for that module ID number. If "Invalid" is shown under "Expected" then no expansion board has been assigned in the TDB program for that module ID. The "Present" column shows confirmation of the type of expansion board detected by the controller.

With regards to the status column the following applies: -

Unused:	Board not defined in TDB program.
Normal:	Board defined in TDB program and is communicating.
Error:	Board assigned in TDB program but Intuitive/Plant controller is unable to
	communicate with it. Check comm's network.
Reset:	If this appears on a Stepper expansion module this indicates that a board reset command has been sent to overdrive the stepper outputs. If this appears on any other Expansion board it indicates the expansion board has had a software reset. This is expected behaviour, for example, if the Expansion board only has been powered off/on.



Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product. Clicking on any one of the present expansion boards from the list will result in a screen similar to the one below. Here the user can check input and output values for test purposes. If a board is not configured the message "Board Unused" is shown.

TDB Intui	itive	Contro	oller										Resource Data Managemer
					Board ID 2	: Step	per						
				Т	ue Apr 12 09	9:04:19	9 2016						
					Status Input	t Mode	- 0V						
					Status Inpu	i wioue							
	Probe	Resistance	Status Inp	ut State	Universal		Value	Unit	Relay	State	Stenner	r Counts	
	1	1195.0	1	Off	1	In	0.01	V	1	Off	1	0	
	2	1196.4	2	Off	2	In	0.04	V	2	Off	2	0	
	3	8216171.2	3	Off	3	In	0.01	V	3	Off	3	0	
	4	9390340.0	4	Off	4	In	0.01	V	4	Off	4	0	
	5	9860007.2	5	Off	5	In	0.01	V			5	0	
	6	10379113.6	6	Off	6	In	0.03	V			6	0	
	7	8216171.2	7	Off	7	In	0.01	V					
	8	8963369.6	8	Off	8	In	0.02	v					
	_			~		_	_	6	6	_		_	\cap
<u> </u>			1						ं				
													09:04 12/04/201

Note: if a Humidistat display is connected additional Values for S1 & S2 will appear under the Probe heading. These account for the built in Humidity and Temperature sensors present in the display connected.

Broadcast Receive List

Devices running TDB applications have the ability to broadcast values across an IP network. Those devices and subsequent blocks set to broadcast, can be viewed in the broadcast receive list. The page will show the TDB device's name, block, value and the last time the point updated. If new devices are added to a network (broadcasting), the table will automatically update. For more information regarding broadcasting, see the individual blocks and the peer to peer section.

First Floor Boiler Controller	Value	Last Update
Amb Temp Enable	On	8:38:51 AM
Back Office Temp	22.4	8:38:51 AM
Boil Run Sig 1CC	On	8:38:51 AM
Boiler Run Sig 2	Off	8:38:51 AM
Call Cen Valve	On	8:38:51 AM
Eng Valve	Off	8:38:51 AM
Engineering	24.3	8:38:51 AM
Lobby	21.2	8:38:51 AM
Lobby Valve	Off	8:38:51 AM
Main Call Centre	24.8	8:38:51 AM
Outside Air Temp	15.8	8:38:51 AM
Pos Soln Valve	Off	8:38:51 AM
Recreation Rm Valve	Off	8:38:51 AM
Recreation Room	21.6	8:38:51 AM
Sales	24.3	8:38:51 AM
Sales Valve	Off	8:38:51 AM
Toilet Valve	Off	8:38:51 AM
Toilets	23.8	8:38:51 AM
Ground Floor Boiler Controller Analog Display	Value 23.7	Last Update 8:38:54 AM
Boiler Run Sig	Off	8:38:54 AM
Kitchen	23.7	8:38:54 AM

Pulse Counter

If installed the Pulse Reader counts can be checked in the Intuitive controller by selecting the System tab then Pulse Counter. The channel's count can be read from this screen and also cleared on a channel by channel basis. Please see 8 Channel Pulse Reader (PR0622 / PR0622 DIN).

Version

Here, information relating to the current software version running in the controller is displayed. It will also show the software version of the display if there is one attached. Furthermore it states whether Wireless/ Wi-Fi can be activated.

Intuitive Stepper V3.7.4

Display V2.02

BACnet: 2.0.1 TouchXL Intuitive Display USB support available. Wireless support available. 3G Modem support available



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Screen Setup

Mimic Authorisation

When there have been mimics setup to view, either on the web interface or the TouchXL, restrictions can be enforced to prevent unauthorised users interacting with them. For instance pressing overrides or moving sliders. Select from the following;

Logged-In only:	Only permits interaction of mimics (from TouchXL or web interface) when user is
Panel:	logged in. Permits interaction of mimics without requirement of log in from the TouchXL interface.
Local:	Permits interaction of mimics without requirement of log in via local IP access i.e. remote access from within another subnet will require a log in.
Global:	Allows interactions from any interface without being logged in.

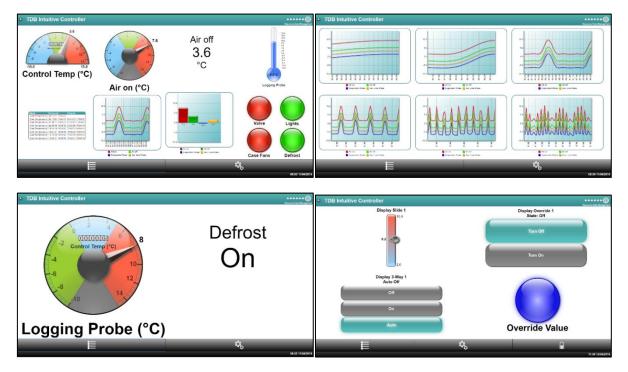
Force CGI Login

Upon viewing the Intuitive TDB Controller's web page, the 'Force CGI login' feature will dictate whether the user must be 'logged in' before they can view the device's home screen (IO list or mimics). The options will be either 'off' or 'Remote'.

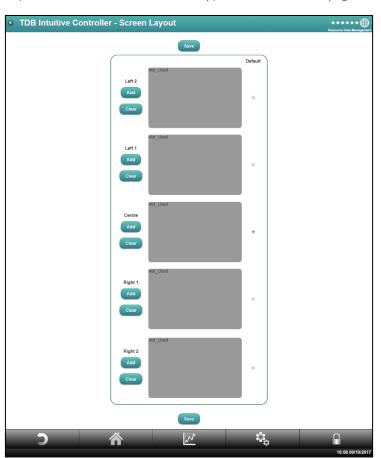
Note: Web Services will be disabled when Force CGI is set to 'Remote'.

Screen Layout

This menu allows the user to add and manage a Graphical User Interface for when the controller is accessed via its web pages or TouchXL. There is a library of mimics that can be added and setup to suit the user's preferences. When 'activated' (when one or more pages are set up), the screens will be set automatically as the 'Home' screen. Examples of some configurations are below;







Upon entering the menu, where there are no 'screens' setup, the user will view a page similar to the below;

There are five available screens to configure, they are labelled; Centre, Left 1, Left 2, Right 1 and Right 2. They're layout, once enabled, will be;



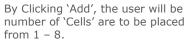
By default, the initial viewing of the interface will show the 'Centre' screen, however the user can select their preferred default by using the radio button to the right of the individual 'screens' in the setup page. By swiping (left click and drag with mouse on PC) either left or right will display the pages on either side.



To the left of each 'screen setup' there are two buttons; 'Add' and 'Clear'. 'Clear' will simply remove any previously setup section. 'Add' will initiate the setup.

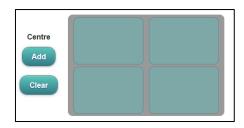
Cells
Number of cells 4
Set Cancel

prompted to select the within the layout. This can be





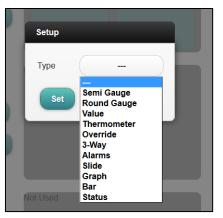
Please ensure all power is switched off before installing or maintaining this product.



Next, by clicking on one of the individual user to select what type of mimic to use.

The pre-set mimics to choose from are; Gauge, Value, Thermometer, Override, 3-Graph, Bar and Status. Once selected,

Depending on the selection made will generate the general outline of the cells and their positions on the page.



cells, it will prompt the

Semi Gauge, Round Way, Alarms, Slide, click on 'Set'.

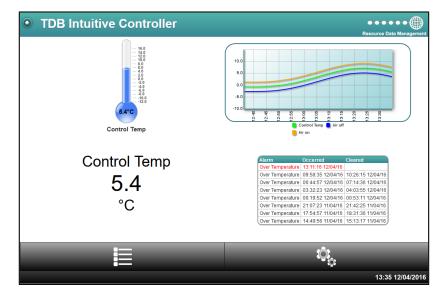
Thermon	neter Setup
Value	Control Temperature
Min	Min
Max	Мах
Alert	Temperature Alarm
	Set Cancel

Depending on the selection, it may lead to the setup section relating to the mimic. Fill in the fields, where necessary, outlining the main values, limits and colours. Please consult Appendix 7 for more details on individual mimics.

Once the mimics have been chosen for the individual cells, they will be shown within the boxes. Repeat the process for the other screens (Left 1, Right 1 etc.), where necessary. When all pages and their cells have been setup, click on 'Save' at the bottom of the screen.

Centre	Thermometer	Graph
Add	Control Temp	—
Clear	Value Control Temp	Alarms

Clicking on the Home button now will take the user back to the main screen of the controller. The example, taken from above is displayed;





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Screen Alarms

The 'Screen Alarms' menu is only for use with the TouchXL display and does not affect any other type of display attached to the Intuitive TDB Controller. From within the TDB editor, the user can utilise the Alarm Block to generate alarms under certain conditions. These 'alarms' (if any) will be listed in the Screen Alarms' menu offering the option of 'yes' or 'no':

O TD	B Intuitive (Controller			Resource Data Management
		Alarm	Enab	ole	
		Over	Temperature Y	'es	
		Under	Temperature Y	'es	
		Product Over	Temperature	No	
			Submit		
	5			¢;	
					15:58 26/08/2016

If the alarm is not enabled, when activated, it will not be 'pushed' to any of the TouchXL's screens. It will still follow all other alarm actions (e.g. log and send to any modems setup). If the alarm is enabled, it will be pushed to all TouchXL's screens attached to the controller and appear similar to below;

TDB Intuitive Controller - Alarm	Resource Data Management
Serial No: 13	
Reason: Over Temperature	
Occurred: 16:16:15 26/08/16	
Mute	
	16:16 26/08/2016

In addition to the alarm showing on the screen itself, the TouchXL's LED will show red and the sounder will alarm. It will remain in this state until the alarm has cleared or 'Muted' on the display.

TouchXL Status

When a TouchXL Display has been connected to the Intuitive, the status of the connection between them will be shown in this screen:

TDB Intuit	ive Controll	er - Tou	ıchXL S	tatus ••••••
IP Address	MAC Address	Identifier	Status	Last Seen
10.255.254.249	da-6d-0a-13-f5-bf	TouchXL	Connected	16:43:38 22/11/2016
1			Ô	Ω
				16:43 22/11/2016



Network

List

The TDB controller can log devices onto its own network interfaces, specifically via Modbus or Wireless Mesh. For the hardware options and basic setup see the <u>USB Devices</u> and <u>Add Device</u> sections. Selecting the 'List' option from the Network tab, will allow the user to browse the devices currently logged on to the Intuitive Plant controller. The Status will only show 'Normal' or 'Offline'. To view a device's IO values, simply click on the device.

AHU	r Description	Network	Status
ANU	User Created Type 1	Modbus	Normal
Meter1	Enviro ENV900	Modbus	Normal
RC00-1	Wireless Monitor I/O	Wireless	Normal
RC00-2	Wireless Monitor	Wireless	Normal
WPR000	Wireless Probe	Wless Probe	Normal
WPR001	Wireless Probe	Wless Probe	Normal
WPR002	Wireless Probe	Wless Probe	Normal
WPR003	Wireless Probe	Wless Probe	Normal

Wireless probes have a preconfigured offline delay of 32min. Wireless devices (i.e. Wireless monitors) have an offline delay dependant on the 'Refresh Time Out' setting within the TDB parameters (see <u>Program settings</u> to configure). Modbus devices will go offline immediately after loss of comms.

Note: No offline alarms will be generated. This can be setup using an <u>analogue device input</u> block.

Device values

The following screen is displayed when the 'Meter1' device is selected from the Device List:





Please ensure all power is switched off before installing WWW.rest or maintaining this product.

Add Device

The 'Add Device' page is available for the user to add Modbus devices to the List of Networked Devices. Entering the page, will show a page similar to below:

TDB Intuitive Controller		Resource Data Management
Device type:	Modbus Device	
Name:	Meter1	
Туре:	Enviro ENV900	
Modbus address:	03	
Network line:	2	
	Add Controller	
	Ô	Ω
	ţ,	09:31 07/04/2016

Device Type:	Leave as Modbus Device
Name:	Enter a 6 character name (Avoid using control characters in the name)
Туре:	Select from the drop-down list
Modbus Address:	Enter the Modbus Address (Decimal) that you have programmed in to the Modbus
	device.
Network Line:	Select the network line that is connected to the device (1 or 2)

Once this table is complete, click on Add Controller to bring the device on-line. Currently, the following Modbus devices are supported:

Device	Device
Flash D Power Mon (4 Wire)	Schneider PM710
VIP396 Energy Meter	Flash D Power Mon (3 Wire)
4MOD Pulse Counter	Sirio Energy Meter
Autometer IC970	VIP396 Energy Meter (IEEE)
Socomec Diris A20	Shark Energy Meter
AEM33 Power Monitor	Powerscout
Enviro ENV901	Enviro ENV900

Remove Device

To remove a device, click on the "Remove Device" tab, select the controller to remove and then click the "remove Controller(s)" button. With wireless mesh devices, as they log on automatically, they must be not be connected to the network at the time of removal. Else they will continue to re-log themselves on.

Device values in a TDB program

To use one of the device's values in a TDB program, an appropriate input block must be used (analogue or Digital). RDM recommend the <u>Analogue Device Input Block</u> as this has an associated 'Offline' function. See block description for more details.

Wireless Mesh Setup

Please consult the <u>USB Wireless Mesh Adapter</u> section for details on setting up the wireless mesh devices.



BACnet/ RDM-485 Setup

When the BACnet option (PR0655-BAC) is enabled, it will permit the TDB device to communicate over BACnet/ IP using the Ethernet ports. Additionally, it also allows the unit to communicate over RDM-485 using the RDM 485 Plant TDB comms module (PR0623-DIN TDB). Configuration of both BACnet and RDM-485 networks can be carried out within this menu. **Note:** for the Intuitive TDB to communicate using either BACnet or RDM-485 protocol ensure it is selected from within the <u>Network</u> setup pages.

tuitive TDB Contro	oller - BACnet Setup	Resource Data Mar
Device Instance	32	
Network Number	10280	
BACnet/IP Port	47808	
BACnet/IP BBMD Address		
BACnet/IP BBMD Port	47808	
BACnet/IP BBMD TTL (mins)	60	
RDM-485 Address	126	
RDM-485 Max Master	(127	
RDM-485 Max Info Frames	1	
RDM-485 Speed	9600	
COV Lifetime	120	
Save Priority	8	
Allow time synch from network	UTC / Local	
Do not change anything on this have an understanding of what Changes may stop the BACnet	the options mean.	
<u>う</u>		Ω
		09:35 15/0

Unique instance number of the TDB Controller. Default 280028. **Device Instance Network Number** Network number the Intuitive TDB Controller is to communicate on. Default 10280. **BACnet/ IP Port** Virtual port number for IP protocol to communicate on. Default 47808. **BACnet/ IP BBMD Address** BACnet Broadcast Management Device IP address **BACnet/ IP BBMD Port** BACnet Broadcast Management Device Port. Default 47808 BACnet/ IP BBMD TTL (min) BACnet Broadcast Management Device Time To Live setting. RDM-485* Address Unique address for the Intuitive TDB Controller while communicating over RDM-485. Default 126. RDM-485* Max Master MSTP Max Master. Default 127. **RDM-485* Max Info Frames** MSTP Max Info Frames. Default 1. RDM-485* Speed Select the MSTP network speed; 9600 or 38400. **COV** Lifetime Change of Value period in seconds. **Save Priority** The BACnet priority field is selectable between 1 and 16. It sets the priority level, at which an override with this priority number or above, is treated as a non-volatile parameter 'set' and so will be set and saved as that item's parameter value. So, when set to a value of 8, any override of priority 8-16 will be saved as a parameter. Allow time synch from network Select from; UTC/ Local; Local; UTC or None. Permits time

synchronisation from another networked device.

Please refer to the 3rd party BACnet client if you are looking for assistance logging the device on. Only users with a detailed knowledge of the BACnet protocol should amend these details as altering them can have detrimental effects on the communications.

***Note**: RDM-485 network is compatible with DMTouch software V2.5 and above.



BACnet Object IDs

When the TDB device is configured for a BACnet network, the IO list will automatically be assigned unique object ID's. In version V3.4.0 and above the method of enumeration for the object ID was enhanced allowing for minor changes in the plc, permitting additions and slight alterations without affecting the current ID's. **Note:** Any software upgrades made from devices with pre V3.4.0 software will affect the object ID numbers.

Type Writer

For Modbus devices that are not listed in the 'Add Device' section, the Type Editor feature allows a user to write their own 'typefile' (or template) to allow communications (read only) to a 3rd party device. For successful communications, the device must be compatible with RDM's USB RS485 dongle (please see the configuration section). The TDB controller can have multiple user-generated types enabled, activated one at a time with part number PR0655-TYP. The Type Editor User Guide can be found in <u>appendix 6</u>. The created user type will then be selectable in the '<u>Add Device'</u> Section.

The Modbus template generation feature, Type Editor, requires the user to have a full understanding and working knowledge of the Modbus protocol. RDM Technical Support cannot provide training or assistance in relation to the Modbus protocol and the commands implemented therein. Support will only be provided to those conversant with Modbus and in relation to the Type Editor functionality specifically.

For users unfamiliar with Modbus, RDM provide a template creation service allowing for a template to be generated for the 3rd party device in question. A nominal fee will apply for each template created by RDM

Note: the above process relates to creating "Read Only" templates. For Read/Write templates please contact RDM Technical Support.

Users

List

Allows for current user names and their passwords to be edited or deleted. By selecting 'Edit' it will allow the User name, Level and password to be amended.

Add

Generate usernames and passwords for new users. Select between Install and Service level. Install level can access all options. Service can access all options apart from; Edit; Send to controller; Get from controller; Delete; Restore and Factory defaults option.



Maintenance

Reset

This will allow for a manual software restart of the controller and should be used as an alternative to power cycling the unit to achieve a restart.

Save Config

This allows for the controller setup to be copied and saved to a file. If a Plant Touchscreen display is connected to the Controller when using the Save Config feature then any Custom page configured in the display will also be saved. **Note**: the TDB program currently operating within the controller is not copied by this feature.

Restore Config

This allows for a previously saved configuration, from another controller, to be uploaded. If a Custom page has been saved it will be uploaded to the Touchscreen display connected. **Note**: only configurations from controllers of the same type can be restored e.g. Plant to Plant & Intuitive to Intuitive. Saving the configuration from a Plant controller and trying to upload it to Intuitive controller is not supported.

Add Feature

When viewing the add feature page it will offer a 'System Key'. When having a feature activated this system key should be quoted. In return, RDM support will offer an activation number that can be entered to have the specified feature activated.

System Config

Outlines a list of all features active on the controller. **Note**: once a feature has been activated it will fill the tick box of that feature.

Factory Settings

Note: use with caution. This feature will configure the controller back to factory default settings. All current settings, data and TDB programs will be deleted. This process is irreversible.

Upgrade

Allows for the controller application software to be upgraded. Please contact RDM Technical support for further details.

USB Display

The 'Display' section refers to the USB Touch Screen (PR0615 only), when attached. For details, please refer to the <u>Touchscreen Display</u> section.

Reset

Allows the display to be reset without resetting the plant controller.

Calibrate

Forces the display into calibration mode, calibration can then be carried out on the display (see Plant Controller Touchscreen Display user guide). This function can be used if the display has been calibrated incorrectly and has become unusable as a result.

Data Manager Type Files

Once logged onto a Data Manager, if subsequent changes are made to the PLC program running in the controller, (e.g. an additional probe input is mapped) this will result in the generation of a new type file for the controller. If the Data Manager is running software version V1.50 and above, this process is automatic and no action is required. If this occurs in an older version of Data Manager Software then the user is advised to remove the controller from the Data Manager and log it back on to the front-end. This is done by the "Remove Controller" option in the Data Manager. After a short delay the controller will automatically re-log back onto the Data Manager and will appear in the Device list. **Note**: you may have to re-alias the controller description. If this manual process isn't followed then it will automatically occur when the controller offline delay expires in the Data Manager.

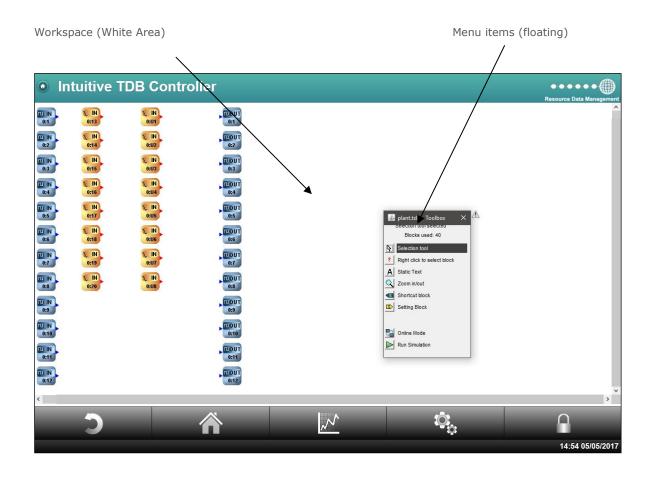


Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product.

Getting started

When logged in, from the menus, click on 'Edit'.

The Data Builder Work page will be displayed along with the current program. As default the IO list (Digital Inputs, Analogue Inputs etc.), will be shown.



Each of the Controller inputs and outputs has a corresponding Data Builder block allocated. These can be used to start developing your application.

Data Builder for the Intuitive Controller Range

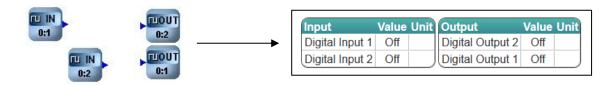
The Data Builder (TDB) is a user-friendly programming tool for developing applications to run on an Intuitive Plant Controller. The Data Builder has a vast library of functional parts that allow the user to build simple or sophisticated applications, which can be run on the Controller. There is a simulation option that allows for the completed application to be fully simulated and de-bugged before going "live". An "on-line" option allows the user to view the application and its' values in real-time during operation.



Control Summary – Ordering

Automatic

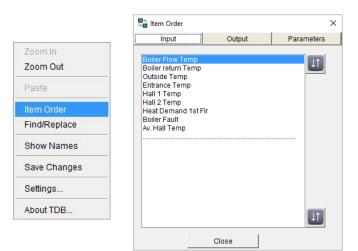
The inputs and outputs are listed, in the control summary list, as they appear in the actual PLC program. Priority is given to the blocks as they appear from left to right. If two blocks share the same 'X-axis coordinates' then priority is given to the block that appears first when viewed from top to bottom. An example is shown below.



As shown above "Digital Input 1" appears first in the control summary list as it is the first block to appear when viewing from left to right. "Digital Output 2" appears at the top of the control summary table as both blocks are equally placed from left to right but "Digital Output 2" appears first when viewed top to bottom.

Manual

The Inputs, Outputs and Parameter order listings can be changed manually if required. On an empty part of the Data Builder work page, right click to bring up a sub menu and select "Item Order". This will bring up the "Item Order" menu. This menu has tabs at the top for Inputs, Outputs and Parameters. Selecting the appropriate tab will give a list of current Inputs, Outputs or Parameters. Highlight the item to be moved and click on the up and down arrow boxes on the right to move the item up or down the list to confirm the desired order.





Designing the Application

General editing principles

Mouse Action	Result
Left double click on object	Opens object properties box
Left click and hold-drag-release	Moves object
Left click on canvas, hold-drag-release (with selection pointer)	Selects the objects under the selection area.
Left click hold-drag-release on wire connection points (nodes) Blue points to blue, or red to red Note: Red to blue and blue to red connections are not allowed	Wire objects point to point
Left click hold-drag-release on wire connection, then workspace (not a node)	Unwires object
Right click on object	Sub menu: Cut Copy Delete Properties
Right click on workspace (i.e. not on an object).	Sub menu: Zoom In Zoom Out Paste Item Order Find/Replace Show Names Save Changes Settings About TDB

Allowable Characters

IMPORTANT NOTE:

Any text used to name a block within TDB editor must be alphanumeric and cannot use non-standard English characters, for example, A b c D X y Z are allowable, - + : \$ Æ Ö are not. Blocks with non-alphanumeric characters contained in them may not operate correctly.

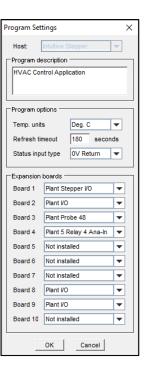
Text blocks used in a program do not have any functional use, so are not affected by non-alphanumeric characters.



Program Settings

Right click on the work space and select "Settings..." The following options will be shown.

Host	This is predefined and cannot be altered.
Program Description	Enter a suitable description for the TDB program created.
Temp. Units	Select between Degrees Celsius or Fahrenheit operation from the drop down list.
Refresh Timeout	Enter a time in seconds. This is used with certain TDB blocks such as Network Inputs.
Status Input Type	This is a global parameter. Define the operation of the Status inputs to detect either 0V Return or 24Vac. If set to 24V the controller will detect the presence or removal of 24Vac only and will ignore 0V return. If set to 0V the status inputs will trigger on either 0V return or 24V.



Connecting an Expansion Board to an Intuitive Controller

CANbus cable specification and wiring

CANbus communication cable **must** be of a standard to meet ISO11898 (PR0649) or equivalent and the screen cable **must** be connected.

Firstly wire the CANbus network from the controller to each Expansion board. **Note:** end of line termination resistors must be used on the CANbus network. The Intuitive Controller has a termination resistor built in which is selected by a jumper*. The termination jumper must be set on the first device and last device in the network chain.

***Note:** if using an older Plant Expansion/ Controller they require a resistor to be connected across the CANbus network connections. The resistor should be fitted to the CANbus network connector across the CAN High pin and the CAN Low pin. The termination resistor value required is a 120 Ohm and must have a tolerance of +/-1% or better.

The network should be wired in a daisy chain configuration where only one Intuitive controller should be connected to a single CANbus network. The maximum allowable network cable length is 500M in total from one end of the network to the other providing a CANbus network cable which meets ISO11898 or equivalent is used.

A maximum of 10 expansion boards can be connected to a single Intuitive controller. When connecting an expansion board to an Intuitive controller or another Expansion board the following should be observed.

The Association of the	/	Descud
Intuitive/	[/] Expansion	Board

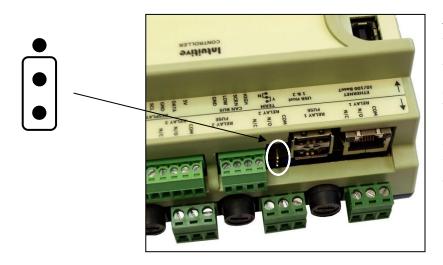
CAN High Screen CAN Low Ground Connects to Connects to Connects to

Expansion Board

CAN High Screen CAN Low Ground



End of Line Termination Resistor



The end of line termination resistor link should be fitted to the middle and bottom pins on the Main control board and on the last expansion board on the CANbus network. All other expansion boards should have the link removed or fitted to the middle and top pins.

Basic Setup

Set the Module ID rotary switch on each Expansion board to a unique number between 0 and 9.

Now connect to the Intuitive TDB controller. Login to the web interface, navigate to the "Control" heading and select "Edit". Right click on the Data Builder workspace and select "Settings..."

A screen similar to the one on the right will be shown.

Expansion Boards 1 through to 10 will be shown. Use the drop down box to define the Expansion boards currently connected to the Intuitive controller and their board positions. Select between Plant IO, Plant Stepper IO, Plant Probe 48, Plant 5 Relay/ 4 Analogue-In and Plant 4 Relay/ 4 Univ. **Board 1 equates to an Expansion board with a Module ID of 1. Board 10 Equates to an Expansion board which has a Module ID of 0.**

The Inputs/ Outputs for these boards will now be available to select in the TDB editor.

Note: if Expansion boards are not configured in the TDB program, as outlined above, then they will be reported as "Unused" on the <u>Extension</u> webpage, found under the "System" heading, even if they are powered and connected to the CANbus network.

To map a Remote Display connection to an expansion board, right click on any display block present in the TDB program and select the expansion board's number.

Expansion	boards
Board 1	Plant Stepper VO 💌
Board 2	Plant VO
Board 3	Plant Probe 48 💌
Board 4	Plant 5 Relay 4 Ana-In 💌
Board 5	Not installed 💌
Board 6	Not installed 💌
Board 7	Not installed 💌
Board 8	Plant VO
Board 9	Plant VO 💌
Board 10	Not installed 💌
	OK Cancel



Configuring an Expansion Board Input or Output

Firstly setup and connect the required Expansion boards to the controller as per the instructions above. Place the desired Analogue or Digital Input or Output block into the TDB program and view its properties. Shown is an Analogue Input block from an example TDB controller.

Note: Analogue Outputs, Digital Inputs and Digital Outputs are similarly configured.

Click on the Board option from the Analogue input and select the desired Expansion board from the drop down list. The description assigned to the board will update once a selection has been made. The Board menu is a list of the current configured Expansion boards. Board 0 is the TDB controller. Board 1 is the first Expansion board etc.

In the example opposite a number of boards have been configured for the TDB controller as per the <u>Program Settings</u>. Once all the Inputs and Outputs for a given Expansion board have been selected and mapped to TDB blocks the associated Expansion board will no longer appear in the board list.

Analog Input 1	×
Name Analog Input 1	Internal
Min -300000.0	Broadcast
Max 300000.0	
Scale 0.1 💌	
Units mA 🔻	
do not con 4 DM / DD se not being 5 snother IO	Probe 1 lectable if they ettings and are
Value 0.0	
ок	ancel

Analog Inpu	ut 1 X
Name An	alog Input 1 📃 Internal
Min -30	00000.0 🗆 Broadcast
Max 30	0000.0
Scale 0.1	•
Units mA	•
Type Board:	Fixed
Input:	Universal 1 Viversal 1
Note: Fixe do not con not being	Probe 6 Probe 7 Probe 7 Universal 1 Universal 2 Universal 3 Universal 4
Value	Universal 5
	OK Cancel

Once the desired Expansion board has been selected, use the Input option to select the required Input from the Expansion board.

Stepper, IO Expansion and 5 relay/ 4 analogue in boards have Universal IO available for use. Each Universal IO* can be set as the following:

- 0-10 Volts DC Input or 0-10 Volts DC Output or 4-20ma Output or
- 4-20mA Input

.

Analogue Input Block Analogue Output Block Analogue Output Block Analogue Input Block

*Note: the plant 5 relay/ 4 analogue input Universal IO can only be set to inputs.

Please refer to the appropriate Expansion board user document for further details

When using a Universal IO configured as an Input click on the "Define" option to configure the Universal IO. Use the Input Mode to select between 0-10V Input or 4-20mA Input. See the block for more specific details.

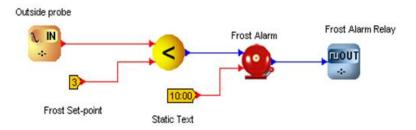
Analog Input 1 X	inpat Mapping C	onfiguration
Name Analog Input 1 Internal	Input Mode:	mA 🔻
Min -300000.0	Current (mA) Value
Max 300000.0 Scale 0.1	1. 4.0	0.0
	2. 5.6	10.0
Input Mapping	3. 7.2	20.0
Type Fixed	4. 8.8	30.0
Board: 1 V Plant I/O	5. 10.4	40.0
Input: Universal 1 Viversal 1	6. 12.0	50.0
Define	7. 13.6	60.0
Note: Fixed Inputs are only selectable if they do not conflict with DM / DD settings and are	8. 15.2	70.0
not being used by another IO block	9. 16.8	80.0
Simulation Settings	10. 18.4	90.0
Value 0.0	11. 20.0	100.0
OK Cancel	ок	Cancel



Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product. Using the tools provided in the toolbox, place, drag and drop blocks onto the workspace to form the application. Connect the objects' inputs and outputs using the wire connections (see <u>General Editing</u> <u>principles</u>). Using the properties box, set the appropriate values. Once complete, <u>run a simulation</u> to prove the design.

Once the design is complete, <u>save your application</u>.

Frost Alarm Example



The above diagram shows a simple Data Builder application for a frost alarm. An outside temperature probe is connected to an analogue input and this is compared to a frost set-point. If the temperature goes below this set point (using a less than block) the output of the less than block goes on. This goes to the alarm block that has a delay of 10 minutes. If the signal is still on after the 10 minutes, the relay will be energised.



Configuring the Blocks

Each type of block has an associated properties box, use this to configure the block.

Properties Box

An example of a properties box assigned to a fixed Input is shown opposite.

Name Fie	ld	Type in the name of the item or leave the default name.
Min		Minimum value that will be displayed on web page summary screen and Data Manager (DM) values column after which "????" will be shown.
Max		Maximum value that will be displayed on web page summary screen and DM values column after which "????" will be shown.
Scale	1 0.1 0.01	In the drop down box, select from the following; value displayed as whole numbers only value displayed to 1 decimal place value displayed to 2 decimal places

60 used for hrs:min to use scale of 60 seconds

These will appear in the DM and in the controller web page value columns

Air Temperature X
Name Air Temperature
Min -200.0 Broadcast
Max 400.0
Scale 0.1 👻
Units Deg. C 💌
Input Mapping
Type Fixed 💌
Board: 0 💌 Intuitive Stepper
Input: Probe 1 Probe 1
Probe: PT1000 💌
Note: Fixed Inputs are only selectable if they
do not conflict with DM / DD settings and are
not being used by another IO block
Simulation Settings
Value 0.0
OK

Example:	Set for 0.1	will appear as value like 23.4
	Set for 1.0	will appear as value like 23

Units Select the desired <u>units</u> from the drop-down menu if required.

- Internal Check this box to keep the item internal (Does not get displayed on the values page when networked to a Data Manager). Uncheck this box if you want the value to be displayed.
- Broadcast Tick Broadcast to make this value available to other TDB devices on the same IP Network. Please see <u>Peer to Peer Communication</u> section.
- Type Select between 'Fixed' or 'Network'. For all hard wired inputs use fixed. See individual block properties for details of when to use 'Network'.
- Board Depending on the configuration, select either the Intuitive or corresponding <u>expansion</u> <u>board</u> the input is attached.
- Input Select the corresponding input/ output available from the chosen board.
- Probe Select the probe type used in the input.

Simulation Settings Type in a value that will be used during simulations. **Note**: This value can be changed while running a simulation.

Click OK to save any changes or Cancel to exit without saving.

Saving the completed TDB program

Once the design is complete, it can be saved by right clicking on the workspace and choosing "save changes". The password dialogue box allows the user to enter a Read or Edit password. The password feature is unused by leaving all fields empty.

Read Password:	Prevents a user from viewing the TDB program within the controller unless a valid Read password is entered first.
Edit Password:	Allows a user to view the TDB program within the controller but not make changes to the program unless a valid Edit password is entered.

Note: The Read and Edit features can be used in conjunction with each other.



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실 plant.tdb - Toolbox

Selection tool

Static Text

Zoom in/out

Shortcut block

Setting Block

Online Mode

Run Simulation

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Blocks used: 42

Right click to select block

Selection tool Building blocks (right click for sub menu's) Static Text Zoom in/out

- Shortcut block
- Shortcut block
 Setting Block
- Setting Block
 Online Mode
- Online Mode
 Due Circulation
- Run Simulation

The floating Toolbox also shows the current number of blocks used in the PLC program.

Selection Tool

Left click on this icon to select the "selection tool", use this (left click and hold) to move items around on the workspace (release).

Building Blocks 🙎

Selection of building blocks is achieved by right clicking on the icon and rolling the mouse over one of the sub menu items and then left click on the item. Left clicking on the workspace will drop the item. Further left clicks will give more of the same item. To select another item, repeat the procedure. Initially this icon will show "?" until an item is selected.

The sub-menu choices are:

> IO

- Analogue In
- Analogue Out
- Stepper Output
- o Digital In
- Digital Out
- Analogue Sensor
- Analogue Device Input
- Network Analogue In
- Network Digital In
- o Nw Param
- Drop List
- CT Monitor/ CT Monitor 2
- Pulse Input
- o GP Timer Block
- o GP Timer 2 Block
- GP Timer 3 Block
- Defrost Signal
- Pack/ Rack Optimisation
- o State Block
- Plant Display Block
- Intuitive Display Block
- Humidistat Display Block
- Humidistat 2 Display Block
- Coldroom Display Block
- Mercury Display Block
- Mercury 2 Display Block

Logic

- 2-AND Block
- o 3-AND Block
- o 4-AND Block
- o 2-OR Block
- o 3-OR Block
- o 4-OR Block
- NOT Block
- XOR Block

> Mathematical

- o Add
- Subtract
- o Multiply
- o Divide
- o Absolute
- X Power Y
- Min Block
- Max Block
- Equals Block
- Less-Than Block
- Greater-Than Block
- Less-Than-Or-Equals Block
- o Greater-Than-Or-Equals Block
- 2-Average Block
- 3-Average Block
- 4-Average Block
- Limit Block
- In Range Block
- Min/Max/Avg Block
- Filter Block
- o Accumulator
- Algebra

> Time

- o Delay On Timer
- Pulse Timer
- o Heartbeat
- o Run On Block
- Run Hours Block
- Change Over Block
- Pump Block
- Match Date
- o Date Time Block
- o Summer Winter
- Daylight Block
- Time Block
- Schedule Block
- Day of Week



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> Functional

- Alarm Block
- Analogue Switch
- 2-Way Switch
- Analogue Store
- Pulse Counter
- D-Type Latch
- SR Latch
- Digital Edge
- Analogue Edge
- Syslog
- Push text
- \circ Reverse On/Off / Reverse On/Off 2
- Direct On/Off / Direct On/Off 2
- Direct PID / Direct PID 2
- \circ Reverse PID / Reverse PID 2
- Performance
- Levels Block
- Occupancy Optimisation
- Occupancy Optimisation 2
- $\circ~$ P to T / P to T 2 (Pressure to Temperature)
- Comfort Block
- o Offline Indicator
- Display Cascade Block
- Display Override Block
- Display 3-Way Block
 Display Slide Block

Static Text A

Left click on the item to use static text, left click on the workspace to drop a "static text" line. Further left clicks will continue to give this option.

Once the "static text block" is on the workspace, it can be edited with text of your choice.

Zoom In/Out

Left click on this icon to use the Zoom tool. Left click on the workspace zooms in, right click zooms out.

Shortcut <

Left click on this icon to use a shortcut, left click on the workspace to drop a "shortcut". Further left clicks will continue to give this option.

Once the "shortcut block" is on the workspace, it can be edited with links of your choice. See <u>configuring the</u> <u>shortcuts</u>

Setting Block S

Left click on this icon to use a setting, left click on the workspace to drop a "setting". Further left clicks will continue to give this option.

Once the "setting block" is on the workspace, it can be configured with a value of your choice. See <u>configuring</u> <u>Setting blocks</u>

Online Mode

Left click on this icon to use "online mode". This item will only function with "running" programs. Once online, rolling the mouse over start or end points will return the value at that point. (There is short delay as the value is retrieved from the controller before being displayed) When online, the Icon Online will change to "Disconnect". Left click on this to exit the online mode.

Run Simulation

Left click on this icon to run a simulation of the program. See Running a Simulation



> Diagnostic

- Analogue Display Block
- Digital Display Block

I/O Objects & Properties

Analogue Input

Icon	Properties	
N IN	 Name: Provide a unique alias for the inp Min/ Max: When 'units' is selected, the value populate, else they can be entered manually. If input the value goes these bounds, the value read on list will be '?????'. Scale: When 'units' is selected, the scale populates, else it can be altered the requirements. 	es self- ed Min 199999999.9 Broadcast s out with the IO scale 0.1 units None to suit High 19999999.9
	 Units: Depending on the measurement, the appropriate unit. See <u>Units</u> so more details. Low/ High: These are adjustable limits the u set and if the input's value goes them, the value will automatically 'Default' value. Default: Static value the input will display input goes out with the Low/ Hig Check the 'Internal' field if the in to be shown on the device's IO li Broadcast: Check the 'Broadcast' field to broc the input's value across the IP ne See Peer to Peer for more details 	ection for Input Mapping ser can Type out with Board: Intuitive Controller Input Probe 1 Probe 1 Probe: PT1000 Probe 1 Note: Fixed Inputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block Simulation Settings Value 0.0
	Simulation Settings: Value the input will have running a simulation. Note: this can be altered the running of the simulation. Input Mapping Type is Fixed or Network.	
	 Network inputs are those from Modbus or Wir Mesh devices. An example is shown above Device: Select from the drop down menu list available networked devices - "Meter example above. Value: Select from the drop down menu list device's items. "Phase 1 Voltage" from example above is an item from within "Meter1". 	Name A Phase Voltage Internal Min -300000.0 Broadcast ing the Max 300000.0 r1" from Scale 0.1 units V V ing the Low 0 bm High 500
	Note : On older versions the Device and Value must be manually typed. In these instances, i must match exactly with the field in the Modb Wireless Mesh device.	the field Device: Meter1
	Cont	



Air Temperature X	Fixed	
Min -200.0 Broadcast Max 400.0	Fixed inputs are the device's or Expinient in Inputs.	pansion board's built-
Scale 0.1 ▼ Units Deg. C ▼ Low -10.0 • High 30.0 • Default 99.9 • Input Mapping • • Type Fixed ▼ Board: 0 • Intuitive Controller Input: Probe 1 ● Probe 1 Probe: PT1000 ▼ • Note: Fixed Inputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block • Cimulation Settings • • •	 Board: Intuitive TDB controller is b drop down menu select from boards previously configures settings menu. Input: Select the available input fa menu. If a Probe Input has configure the probe type* i drop down. If a Universal In selected, a 'Define' button v where it can then also be confisioned where it can then also be confisioned select from the following; P 700R; 3K; 2K25; 100K; 5K Type2; Raw*; Custom**; L 	m the list of expansion ed in the program rom the drop-down been selected, n the subsequent nput has been will be displayed onfigured. igured as a probe, T1000; 2K; 470R; ; 6K; 10K; 10K
Value 0.0	*Raw: If Probe type "Raw" is selected then no resistance to temperature conversion will take place, value displayed will be the probe's resistance value in ohms.	Custom Probe Configuration X Resistance (Ω) Value 1. 800.0 -50.0 2. 840.0 -40.0 3. 880.0 -30.0
Custom profile then to select types e.g. PT1000, the analog reinserted into the program ***Light: Used in conjunction (PR0193). Note : It will not re computational blocks. Define : If selecting either a v Input, the user must configur resistance conversion table (f	but has been configured to use a and use one of the pre-set probe gue input must be deleted and h with the RDM Light Level Sensor equire any further resistors or "Custom' probe type or a Universal re the conversion table manually. A for custom probe type) is shown on	4. 920.0 -20.0 5. 960.0 -10.0 6. 1000.0 0.0 7. 1040.0 10.0 8. 1080.0 20.0 9. 1120.0 30.0 10. 1160.0 40.0 11. 1200.0 50.0 Auto Clear OK Cancel
the right. The first column's values (res corresponding value (right co	sistance/ mA/ V) must be entered in a lumn) must then be entered.	ascending order. The
Pressing 'Clear' will clear the	uto' and 'Clear' buttons to aid in the e complete table of all values. To utilise as must be entered. Then pressing 'Au , as per below example;	e the 'Auto' calculation
Input Mapping Configurat Input Mode: V Votage (V) Value 1. 0 0 2. 10 10 3. - - 4. - - 5. - - 6. - - 9. - - 10. - - 11. - - Auto Clear -	Input Mode: V voltage (V) Value 1. 0.0 2. 1.0 3. 2.0 4. 3.0 5. 4.0 6. 5.0 7. 6.0 8. 7.0 9. 8.0 10. 9.0 11. 10.0 10. 9.0 11. 10.0	



Analogue Output

Icon	Droportion
Icon	Properties
1 OUT	To use the Analogue Output with a stepper, please see the <u>Stepper Output</u> section.
Tool	 Name: Provide a unique alias for the output. Min/ Max: When 'units' is selected, the values self-populate, else they can be entered manually. If the output value goes out with these bounds, the value read on the IO list will be '??????'.
	Scale: When `units' is selected, the scale self-populates, else it can be altered to
	Suit the requirements.Units:Depending on the measurement, select the appropriate unit. See Units
	section for more details. Internal: Check the 'Internal' field if the output is not to be shown on the device's IO
	list. Broadcast : Check the 'Broadcast' field to broadcast the output's value across the IP network. See <u>Peer to Peer</u> for more details.
	Output Mapping
	Type is fixed.
	Board : Intuitive TDB controller is board 0. Or using the drop down menu select from the list of expansion boards previously configured in the <u>program settings</u> menu.
	Output: Select the desired output from the drop-down menu.
	Define: Click on 'Define' to configure the output.
	Analog Output 1 Name Name Analog Output 1 Min -300000.0 Scale 0.1 Units V Output Mapping Type Fixed Universal 1 Universal 1 Universal 1 Universal 1 Universal 1 Output to Dhid block 0.1 Output to Dhid block 0.1 <t< th=""></t<>
	Select "Output Mode" as either V or mA. There will be default values present. These values can be edited to match the requirements.
	There are 11 definable points, and between points there is a linear interpolation. The points must be ascending.
	Note1: Analogue outputs always need to be defined.
	Note2 : Analogue Outputs have a built in delay of 10 seconds upon startup.



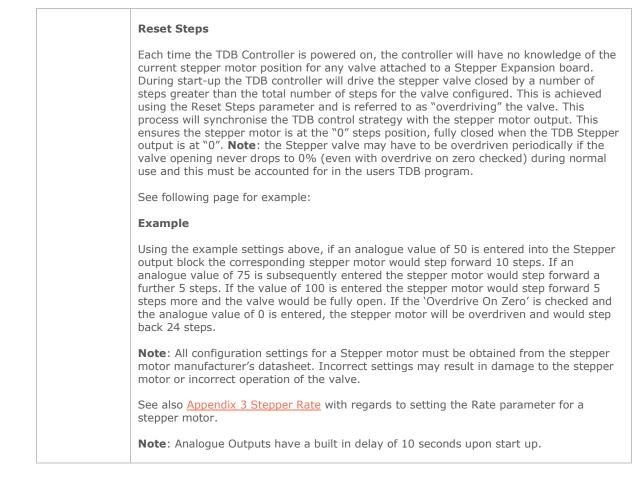
Stepper Output

Icon	Properties		
	roperties		
LOUT 	Name: Min/ Max:	Provide a unique alias for the output. When 'units' is selected, the values self- populate, else they can be entered manually. If the output value goes out with these bounds, the value read on the IO list will be '??????'.	Analog Output 1 × Name Analog Output 1 Internal Min 200.0 Broadcast Max 200.0 Scale 0.1 ▼ Units %
	Scale:	When 'units' is selected, the scale self- populates, else it can be altered to suit the requirements.	Units %
	Units:	Depending on the measurement, select the appropriate unit. See <u>Units</u> section for more details.	Board: 0 V Intuitive Stepper Output: Stepper 1 V Unused Define
	Internal:	Check the 'Internal' field if the output is not	Note: Fixed outputs are only selectable if they
	Broadcast:	to be shown on the device's IO list. Check the 'Broadcast' field to broadcast the output's value across the IP network. See <u>Peer to Peer</u> for more details.	do not conflict/with DM / DD settings and are not being used by another IO block
	Output Ma	pping	
	Type is fixed	1.	
	Board:	Using the drop down menu, select from the list, a Stepper expansion board (defined in <u>Program Settings</u>) or leave it as the main board (if it's an Intuitive Stepper host).	
	Output:	Select the desired Stepper output from the drop-down menu.	
	Define:	Click on 'Define' to configure the output.	
		Note: Stepper outputs always need to l	be defined.
	Stepper Co	nfiguration	*
 application (Range 1 to 25,000). Reset Steps Enter the number of reset steps if required. For example in a refrigeration stepper valve application the reset steps are used to overdrive the stepper motor and ensure that the valve is fully closed (Range 1 to 25,000). Step Current Enter the step current of the stepper motor in mA. Note: an incorrect value entered may damage the attached Stepper motor (Range 1 to 825mA). Hold Current: Enter the hold current of the stepper motor in mA if required. Rate: Enter the rate in Hz (Range 1Hz to 500Hz). Power Fail Steps*: In the event of a power loss, enter the number of steps for to take. Power Fail Rate*: In the event of a power loss, enter the rate in Hz (Range 1Hz to 500Hz) the valve should use. Half Step: Tick the 'Half Step' option to step the motor in half s Overdrive On Zero: Check the overdrive on zero box, to overdrive the valve steps get to zero. 		Reset Steps 24 Step Current (mA) 240 Hold Current (mA) 0 Rate (Hz) 50 Power Fail Steps 24 Power Fail Rate (Hz) 50 Image: Half Step 0 Image: Overdrive On Zero 0K Image: OK Cancel	
	the Intuitiv	to the relevant documentation .	
	Cont		



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Digital Input



Digital Input		
Icon	Properties	
	 Name: Provide a unique alias for the input. Internal: Check the 'Internal' field if the input is not to be shown on the device's IO list. Broadcast: Check the 'Broadcast' field to broadcast the input's value across the IP network. See Peer to Peer for more details. Simulation Settings: Value the input will have when running a simulation. Note: this can be altered during the running of the simulation. Input Mapping Type is Fixed or Network. 	Input Mapping
	Fixed inputs are the Controller's or Expansion's built-in In Board : The Intuitive controller is board 0. Or using the c of the expansion boards previously configured in the prog Input : Select which input is to be used from the drop-dom Cont	Irop down menu select from one <u>ram settings</u> menu.



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Network	inputs are those from Modbus or Wireless Mesh	n devices.
Value: Note: O must be must ma	Select from the drop down menu listing the available networked devices - "AirCon" from example to the right. Select from the drop down menu listing the device's items. "Fans State" from the example is an item from within device "AirCon". n older versions the Device and Value fields manually typed. In these instances, the field atch exactly with the field in the Modbus or Mesh device.	Digital Input 1 Name Digital Input 1 Internal Input Mapping Broadce Type Network ♥ Device: AirCon Value: Fans State Detrice: Fans State Note: Fixed inputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block Simulation Settings On OK Cancel

Digital Output

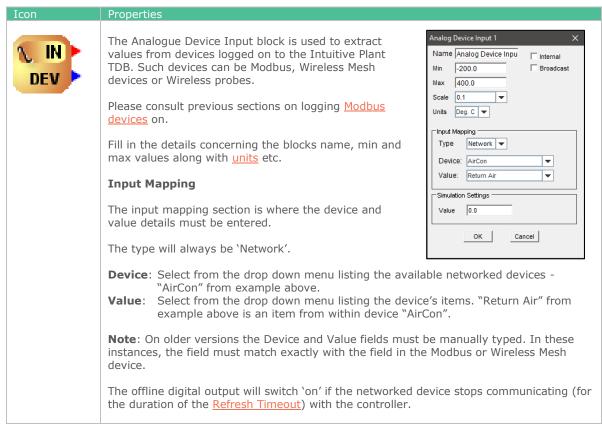
Icon	Properties
0:1	Name: Provide a unique alias for the input. Internal: Check the 'Internal' field if the input is not to be shown on the device's IO list. Broadcast: Check the 'Broadcast' field to broadcast the input's value across the IP network. See Peer to Peer for more details. Invert Output: Tick the invert output box to invert the relay operation.
	Output Mapping Ok Cancel
	Type is Fixed or Network
	Fixed
	Fixed outputs are the Controller's or Expansion's built-in outputs.
	Board: Select, from the drop down menu, the board to be used (0 being the main). Output : Select which output is to be used from the drop-down menu.
	Network
	Network outputs refer to relays on networked devices, for example the Wireless Mesh device 2I2O (PR0731). When selected as 'Network', enter the Device Name as it appears on the 'Network List'. Then the device's Value as it appears on the device's IO list.
	Note1 : when viewing the block through the IO section of the controller it will show the logical state of the block as opposed to the physical state of the relay it is linked to. All versions below V2.00 will show the physical relay state.
	Note2: Digital Outputs have a built in delay of 10 seconds upon start up.



Analogue Sensor

Icon	Properties		
CUN SENSOR	Hi Lin Low Lir Defa	Output ay Defaulted Hi Alarm	Analog Sensor 1 × Name Analog Sensor 1 Internal Min -199999999.9 Broadcast Max 199999999.9 Scale 0.1 v Units None v Input Mapping Type Fixed v Board: 0 v Intuitive Controller
		^f the Analogue Sensor is similar to the loque Input block.	Input Probe 1 Probe 1 Probe: PT1000 V
	Hi/ Lo Alarm:	High and Low limits for which if the analogue value goes above or below, the Hi/ Lo Alarm outputs go `on' (following delay time).	Note: Fixed Inputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block Simulation Settings
	Delay:	The time delay before the Hi/ Low Alarm outputs go 'on'.	Value 0.0
	Hi/ Low Limit:	High and Low limits for which if the analogue value goes above or below, the Analogue Output will adopt the	OK Cancel
	Default:	'Default' input value and the 'Defaulted' o Value adopted when analogue input value Low limits.	goes above/ below the Hi/
	Offset:	Allows for a positive or negative value to l input value.	be added to the analogue
	Defaulted: If va	ue value which will be affected by the offset alue goes above or below the Hi/ Low limits If value goes above or below the Hi/ Low a output (Hi/ Low Alarm) will go 'on'.	the output will go 'on'.

Analogue Device Input





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	-

Network Analogue In

Icon	Properties			
NET NET	values being broad Data Builder progra	Inputs can be used to map analogue cast from another device running a am on the same IP network. For anager running TDB or an Intuitive	Outside Temperature X Name Outside Temperature Min -200.0 Max 400.0 Scale 0.1	
	values to be broad option within their allows one TDB pro	within the TDB application allow their cast, these blocks will have a tick properties box to enable it. This ogram to share an analogue value with TDB devices using <u>peer to peer</u>	Units Deg. C Broadcast Settings Value: Floor Boiler Controller Value: Outside Air Temp	
	Image: Conceler in the properties box will allow details concerning the blocks name, min and max values along with units to be configured.			
	Output: Refresh Timeout Broadcast:	The current analogue value that is being picked up from the broadcasting device. This output will go 'on' when communications are lost from the network source and the refresh timeout has expired. Tick this box to configure the input to receive a value from another TDB. Select from the drop down lists, the broadcasting device's name and the item name in its IO list. For further details of broadcasting, please see <u>Peer to Peer Communication</u> section.		

Network Digital In

Icon	Properties		
NET	Network Digital Inpu being broadcast from Builder program on Data Manager runnin controller. A number of blocks their values to be br tick option within the allows one TDB prog		Sales Office Valve Name Sales Office Valve Broadcast Settings Image: Setting
	The properties box v	vill allow details concerning the blocks r	name to be configured.
	Output: Refresh Timeout: Broadcast:	network source and the refresh timeout has expired.	



Nw Param

Icon	Properties		
	The network parameter block is used to change parameters on Modbus devices connected to the controller.		
(Carace 1)	Max400.0Fill in the details concerning the blocks name, min and max values along with <u>units</u> etc.Scale0.1UnitsDeg. C		
	Output Mapping Type Netwo		
	Device: Select from the drop down menu listing the available networked devices - "AirCon" from the example.		
	Value: Select from the drop down menu listing the device's items. "Summer Setpoint" from the example is an item from within device "AirCon".		
	Note : On older versions the Device and Value fields must be manually typed. In these instances, the field must match exactly with the field in the Modbus or Wireless Mesh device.		
	Use the analogue input to send the desired value to the Modbus device. The network parameter block will attempt to change the parameter, once it receives an acknowledgment from the device.		
	Note 1: the ability to change parameters on Modbus devices attached to the controller may be subject to a charge to enable the feature. Contact technical support for further information. Also see the <u>Modbus Writable Templates</u> section.		
	Note 2: the Nw Param block is designed for occasional use and must be used with caution. RDM and third party products can accept a finite number of parameter chang Parameter information resides in the on-board non-volatile memory for a device. If th maximum number of memory writes are exceeded it will irreversibly damage the devi This type of failure is not covered under the RDM 5 Year warranty. For third party dev please refer to the respective manufacturer.		

Drop List





CT Monitor/ CT Monitor 2

Icon	Properties		
CT Monitor	For the hardware setup, please refer to the USB Ct Monitor X <u>Current Monitor</u> section. Ct Monitor		
Range Frror High Low CT Low	Up to 10 Current Monitors can be attached to the controller, they subsequently support 5 CT's on each. Therefore to correctly 'map' the CT block to the specific CT, double click on the block to show the properties (indicated on right).		
CT Monitor 2	4		
Range High Low Hold	The 10 CT monitors are addressed via the rotary dial on the front of its enclosure. Rotary ID 1 = CT's 1 - 5 Rotary ID 2 = CT's 6 - 10 : Rotary ID 9 = CT's 41 - 45 Rotary ID 0 = CT's 46 - 50		
	CT Monitor 1		
	 nge: The actual range of the CT in Amps. E.g. 40A gh: The value, in Amps, that will cause the 'High Output' to go 'ON' w: The value, in Amps, that will cause the 'Low Output' to go 'ON' ror: The 'Error' digital output will switch 'ON' when there is no CT present or is not being read. 		
	Hold: When the digital input receives an 'on' signal, the digital outputs will be held at their current values. Note : analogue value will continue to read.		
	Value: The reading, in Amps, from the connected CT.		

Pulse Input

Icon	Properties	
Icon	 Pulse input blocks are used to pick-up pulse counts from any one of the 3 <u>Pulse Reader USB module</u> inputs. Select 1 of the 24 channels and give the block a meaningful name. The red analogue output is the channel count value. The digital Input, when activated resets the channel count to 0. Note 1: The pulse value (also visible in 'Pulse Counter' web menu), is periodically saved in the Intuitive TDB's nonvolatile memory on the hour and half past the hour. 	Pulse Input X Name Pulse Input Input # 1 • OK 3 ancel 4 5 6
	Note 2 : If more than one counter is being used then they must each have unique aliases. I.e. Pulse Input 1, Pulse Input 2 etc.	7 8 💌



GP Timer block

Icon	Properties	
GPT	There are 32 General Purpose (GP) timer channels and 8 Global Channels. Set up the channels by clicking on the "Control" tab, then the GP Timer tab. Use the "Add schedule" wizard to aid setting up the channel. Note : Global channels cannot be re-named or be set to slave mode. This is particularly useful if web-services are going to	GP Timer Block × Name GP Timer Block Channel # 1 ▼ Simulation settings C On C Off
	be used to remotely change a channel time; as the channel name cannot be change inadvertently.	OK Cancel

GP Timer 2 block

Icon	Properties	
GPT	The analogue output provides the next 'on time' of the currently selected GP timer channel. This output is currently used with the <u>Occupancy Optimisation Block</u> only. Note : the time from the analogue output is not relevant for use by the end user. The digital output provides current status of the GP timer channel to which the block is mapped. Local Channel: There are 32 General Purpose (GP) timer channels and 8 Global Channels. Set up the channels by clicking on the "Control" tab, then the GP Timer tab. Use the "Add schedule" wizard to aid setting up the channel.	GP Timer 2 Block × Name GP Timer 2 Block Local Channel # 1 ▼ Nw Channel # 10 ▼ Simulation settings C On ⓒ Off OK Cancel
	 Note: Global channels cannot be re-named or be set to slave useful if web-services are going to be used to remotely change channel name cannot be change inadvertently. Network (Nw) Channel: allows the block to be mapped to a channel. Select the desired channel number from the drop do appropriate GP timer channel in the Data Manager. Use the "selected Data Manager GP Timer channel Software version V the Data manager. Note 1: If both the Local and Network channel are configured priority. If communication with the Data Manager is lost then be used once the refresh timeout expires. Note 2: Each GP timer channel can have up to 50 events in the set of the set o	ge a channel time; as the a Data Manager's GP timer own list. Configure the Transmit" feature for the '1.51.1 and above is required in d the network channel will get the Local channel status will
	Note 2: Each GP timer channel can have up to 50 events in t events, 7 yearly events and 3 weekly events for a given chan	



GP Timer 3 Block

Icon	Properties
Sun Off Mon On Mon Off Tue On Tue Off	The GP Timer 3 Block provides a single 'on' and 'off' per day. Use a setting block to define an 'on time' and 'off time' for each day. The block has a digital output to show the current timer state. This is on when the timer is in the on state and off when the timer is in the off state. Analogue output "Until" can be connected to the Occupation input on the Occupancy Optimisation block.

Df Signal

Icon	Properties
	The block allows for commands from the Defrost Timer schedules in a Data Manager to be mapped into the TDB program. Please consult the Data Manager's documentation for details on how to configure a DF Timer Channel. The output of this block will show the following. Note: the command sent to the output of this block is present momentarily:
	 0 = No defrost, defrost timer channel in the off period. 1 = Defrost, defrost timer channel in the on period. 3 = Defrost termination, used with Defrost Hold.
	It is advisable to configure a local schedule in the TDB program in the event of a communication loss between the controller and the Data Manager

Pack/ Rack Optimisation

Icon	Properties
Up Down Zero Stay	The Pack/ Rack Optimisation block will accept commands from the Suction Optimisation energy feature found in the Data Manager. Note : the optimisation feature has to be enabled in Data Manager and configured appropriately before this block will operate. A given digital output will be enabled based on commands received from the Data Manager (DM)
	 If the DM sends an "Opt Up" command the "Up" output will pulse on. If the DM sends an "Opt Down" command the "Down" output will pulse on. If the DM sends an "Opt Zero" command the "Zero" output will pulse on. If the DM sends an "Opt Stay" command the "Stay" output will go pulse on.
	When an "Up", "Down" or "Zero" is not being sent from the Data Manager a "Stay" command is sent. The block outputs will pulse on momentarily, therefore the use of an <u>SR-Latch</u> may be required. If there is a loss of communication the users TDB program must detect this and decide if/when to clear any offset added.
	See the Data Manager User Guide for Optimisation Setup.
	Note : A maximum of three Pack/ Rack optimisation blocks can be used per program from software version 3.6.0 and above.

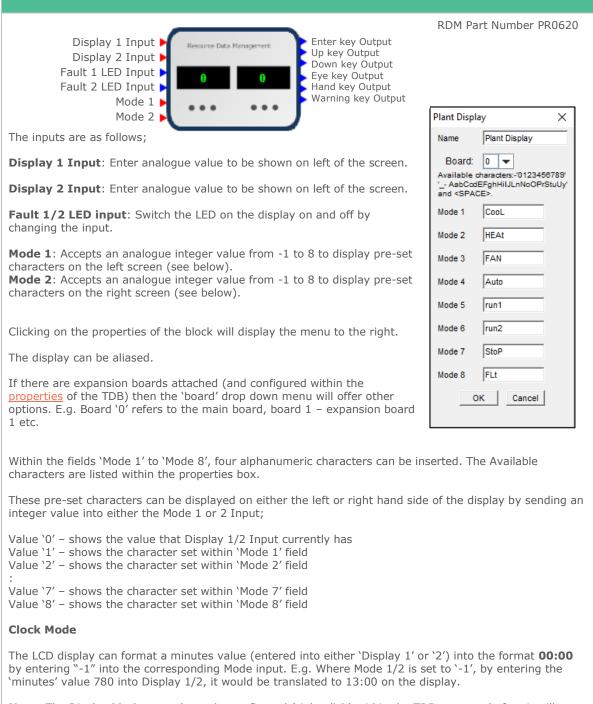


Control State

State	The Control State block allows the user to define the current status of a TDB program.	Control Sta	Control State		×
	The 'status' can be categorised into either a 'State', 'Input' or 'Output'. This will dictate the placement of it within the IO page of the device. Varying the analogue value fed into the	(• State 0 State 1 State 2	State C Input Normal Defrost OT Alarm	Tag 0 Tag 1 Tag 2	C Output
	block allows the user to select the current state.	State 3 State 4	UT Alarm Override	Tag 3 Tag 4	UT 💌 Inhibit 💌
	In the example to the right, Tag 4 is set to Inhibit, if the number "4" is fed into the control state block then the state would become Inhibit.	State 5 State 6 State 7		Tag 5 Tag 6 Tag 7	Normal V Normal V
	When viewing the controller details, "Override" would be shown in the value column next to control state. If "0" is fed in the state would show Normal and the value would be Normal.				
	The Tag option allows the user to define what is shown in the Status column, found on the Device List of a Data Manager, when in a given state. This allows the Status column to indicate when the TDB Controller is in "Defrost" or "Alarm" etc.				



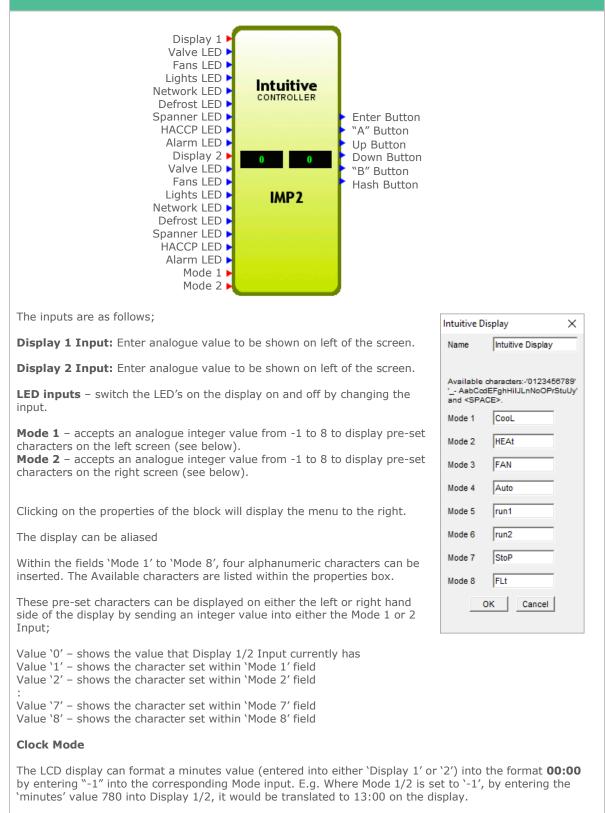
Plant Display



Note: The Display block must always be configured (right click) within the TDB program before it will activate.



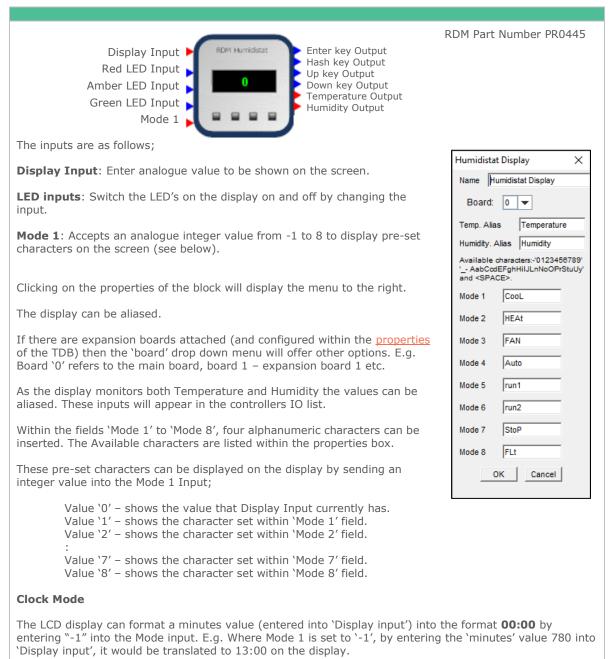
Intuitive Display



Note: The Display block must always be configured (right click) within the TDB program before it will activate.



Humidistat Display

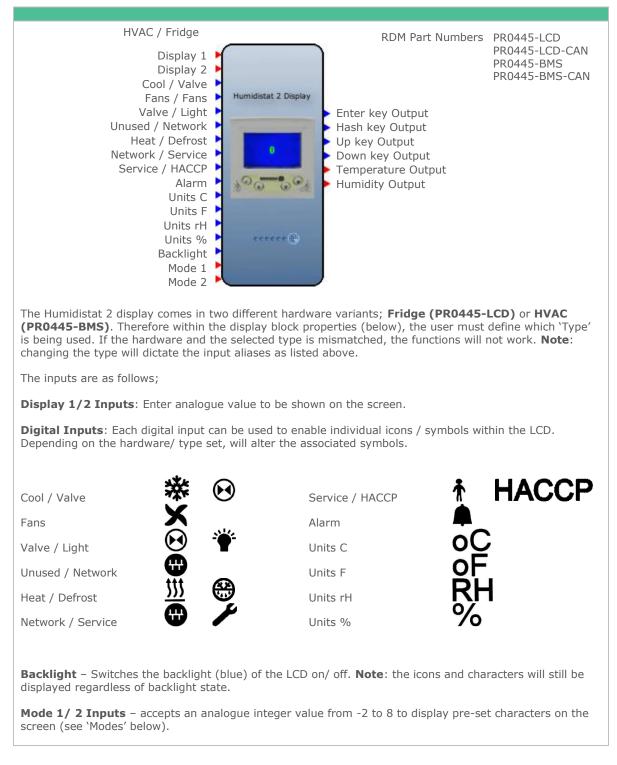


Note: The Display block must always be configured (right click) within the TDB program before it will activate.





Humidistat 2 Display





Name: The display block can be aliased.

Board: Set the board the Humidistat 2 display will be connected to. This can be set as either the main board (0) or if it is to be connected to the main controller via CANbus, select CAN-0 to CAN-15. For more information on the setup of the display, please see the Humidistat's documentation. **Note**: The maximum number of displays connected via CANbus is 15.

Type: Select Type as outlined above (HVAC / Fridge).

Aliases: The display monitors both Temperature and Humidity, these values can be aliased. These inputs will appear in the controllers IO list.

Modes: Two columns are shown; Line 1 and Line 2. Line 1 represents the characters that will be displayed on the top line on the display, Line 2 represents the bottom line on the display. Within the fields 'Mode 1' to 'Mode 8', four alphanumeric characters (three on display line 2) can be inserted. The Available characters are listed within the properties box.

These pre-set characters can be displayed on the display by sending an integer value into the Mode 1/ 2 Input;

Value '0' – shows the value that Display Input 1/2 currently has. Value '1' – shows the character set within 'Mode 1' field. Value '2' – shows the character set within 'Mode 2' field. : Value '7' – shows the character set within 'Mode 7' field.

Value 8' – shows the character set within 'Mode 8' field.

Example: In the example shown within the properties box above, entering an integer "2" and "3" into analogue mode inputs 1 and 2 respectively, will show "HEAt" on the top line of the display and "Lv3" on the lower line of the display.

Clock Mode – Mode 1 input only

The LCD can format a 'minutes' value (entered into 'Display 1 input') into the format **00:00** (hr:min) by entering "-1" into the Mode 1 input.

Example: Where Mode 1 is set to '-1', by entering the 'minutes' value 780 into 'Display 1 input', it would be translated to 13:00 on the display.

Left Justify Mode - Mode 2 input only

The lower line on the LCD can also be manipulated to left justify and remove the decimal point of the display 2 input.

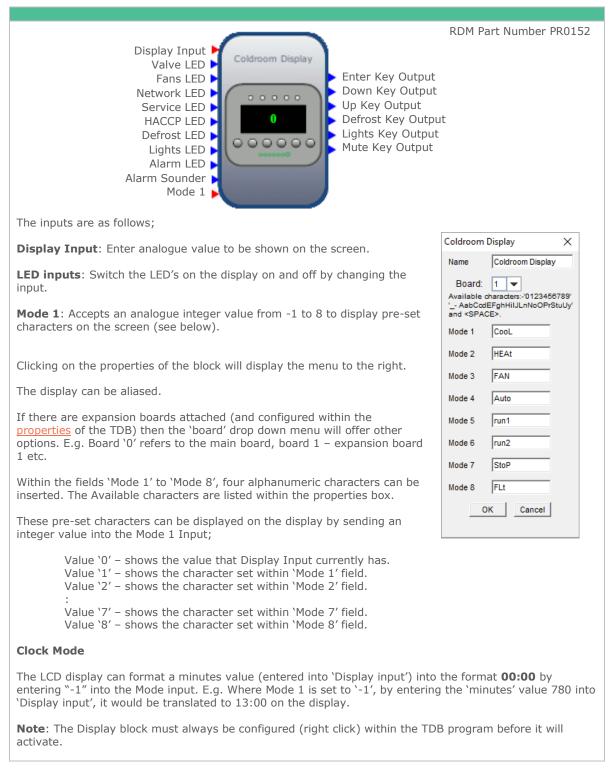
Example: Where Mode 2 is set to -2', by entering the analogue value " 6.0'' into the 'Display 2 input', it will be shown as "6'' on the left hand side of the display.

Note: The Display block must always be configured (right click) within the TDB program before it will activate.



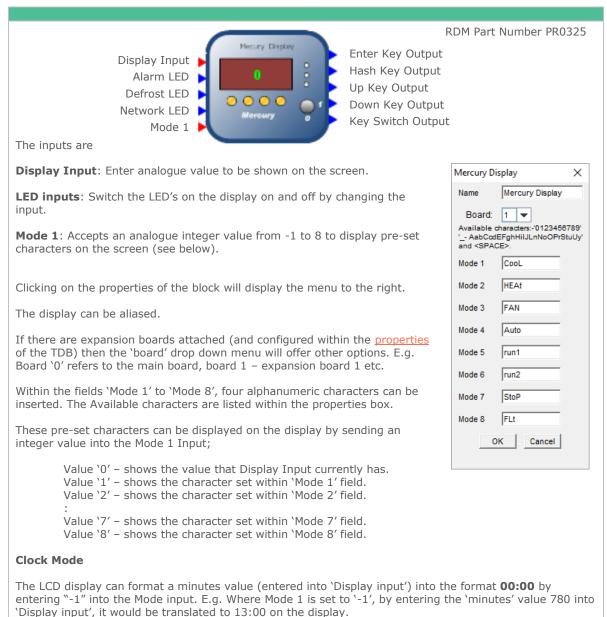
Humidista	at 2 Display		Х
Name H	lumidistat 2 Display		
Board:	0 🔻 Тур	e: HVAC 💌	
Temp. Alia	as Temperatur	e	
Humidity.	Alias Humidity		
	characters:-'012345 dEFghHilJLnNoOPr CE>.		
	Line 1	Line 2	
Mode 1	CooL	Lv1	
Mode 2	HEAt	Lv2	
Mode 3	FAN	Lv3	
Mode 4	Auto	OFF	
Mode 5	run1		
Mode 6	run2		
Mode 7	StoP		
Mode 8	FLt		
	ОК	Cancel	

Coldroom Display





Mercury Display

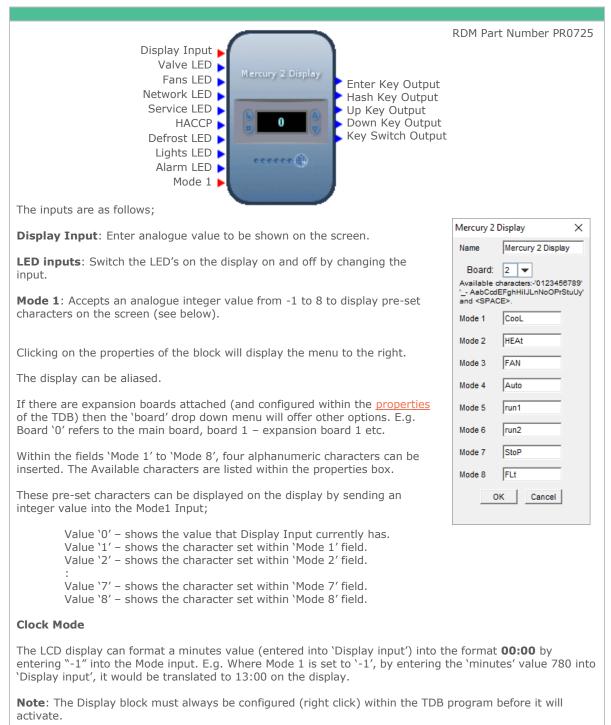


Note: The Display block must always be configured (right click) within the TDB program before it will activate.





Mercury 2 Display





Logic Blocks

And blocks

2 AND	A Off Off On On	B Off On Off On	Output Off Off Off On	<u>.</u>	4 AND	A Off Off Off Off	B Off Off Off	C Off Off On On	D Off On Off On	Output Off Off Off
3 AND	A Off Off Off On On On On	B Off On On Off On On	C Off On Off On Off On	Output Off Off Off Off Off Off Off On		Off Off Off On On On On On On On	On On On Off Off Off Off On On On	Off Off On Off On Off On Off On On	Off On Off On Off On Off On Off On	Off Off Off Off Off Off Off Off Off Off

OR Blocks

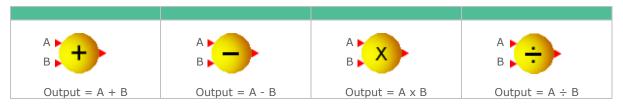
	Α	В	Outpu	ıt			в	с	D	Output
OR 🕨	Off	Off	Off		▶ 4	A			_	Output
	Off	On	On		► OR	Off	Off	Off	Off	Off
	On	Off	On			Off	Off	Off	On	On
	On	On	On			Off	Off	On	Off	On
		-	-			Off	Off	On	On	On
	Α	В	С	Output		Off	On	Off	Off	On
2	Off	Off	Off	Off		Off	On	Off	On	On
OR	Off	Off	On	On		Off	On	On	Off	On
	Off	On	Off	On		Off	On	On	On	On
	Off	On	On	On		On	Off	Off	Off	On
	On	Off	Off	On		On	Off	Off	On	On
	On	Off	On	On		On	Off	On	Off	On
	On	On	Off	On		On	Off	On	On	On
						On	On	Off	Off	On
	On	On	On	On		On	On	Off	On	On
						On	On	On	Off	On
						On				
						Un	On	On	On	On

Not Block & Exclusive OR Block



Mathematical Blocks

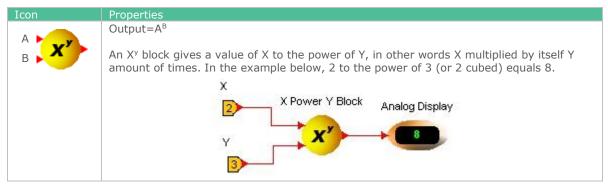
(+, - , x, ÷ blocks)



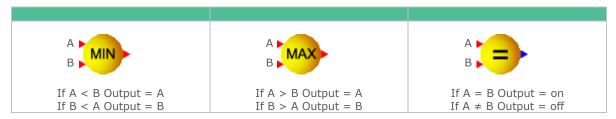
Absolute (abs) Block

Icon	Properties
A babs	Output = A absolute
	The absolute block converts a value entered at "A" to an absolute value, e.g. a negative value becomes a positive.

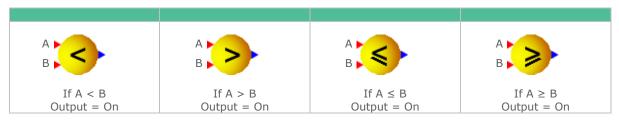
X to the Power of Y (x^{y})



Min, Max, Equals blocks

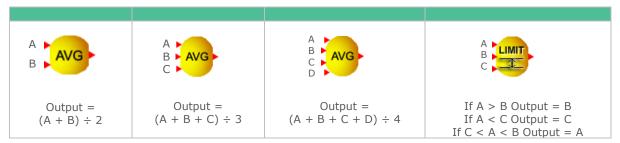


$<, >, \leq, \geq$ blocks





Average & Limit blocks



Range

Icon	Properties
A	Input A: Analogue Value
B	Input B: Max Limit
C	Input C: Min Limit
Range	Digital output goes off when the Analogue value is out with the Max and Min limits.

Min, Max, Avg. Block

Icon	Properties
Input 1 Valid 1 Input 2 Valid 2 Input 3 Valid 3 Input 4 Valid 4 Input 5 Valid 5 Input 6 Valid 6 Input 7 Valid 7 Input 8 Valid 8	Input 1-8: Analogue Values Valid 1-8: If the valid input is present the corresponding analogue input value will be used by the block. Min: The minimum value is outputted. Max: The maximum value is outputted Avg: The average value is outputted.



Filter

Icon	Properties		
	The filter l the analog	plock can be used to apply a dampening factor to ue input.	Filter Block 1 X
	Rate	How often the calculation occurs (in seconds).	Rate 10.0
PINCED	T Const.	The time constant used (in seconds).	t Const 2700.0 Min Value -3200.0
	Min Value	Minimum value expected.	Max Value 3200.0
	Max Valu	e Maximum value expected.	OK Cancel
	Operatio	n When an analogue value 'X' enters the block with a example 2700 (45min):	t-Const value of, for
		With an increasing input, it calculates the rate of ch reach 63.2% of its current value over the 2700 sec increased (from 2700), you are lengthening the tim 63.2% point. Thus increasing the dampening factor	onds. If the t-Const is ne for it to get to the
		With a decreasing input, it works the same as abov of change to reach 32.8% of its current value.	e, only calculates the rate
		The calculation is carried out every period set in the	e 'Rate' field.
		Depending on the input's rate of change will indicat set to. Additionally, depending on the environment the t-Const will need to be adjusted.	

Accumulator Block

Icon	Properties
Input Reset	 Input: The accumulator block samples the value at the input and adds it to the running total count, this sample/calculation is fixed and is carried out every second. Total: This is the running total. The accumulation process will start as soon as the TDB program is running. Time: The time output is in seconds and provides the total elapsed time from last power on or reset. Reset: The total value count and time elapsed will be set to zero when the reset input is activated. In the example below, a flow meter with a litres per second analogue output is connected to the input of the accumulator block. Every second, the instantaneous litres per second value is added to the total. The total litres used and the total time, in seconds, is displayed on the right.
	Flowmeter
	Total Litres NET Reset COTF Time Time Time Time Total Litres Time Time Total Litres Time Time Total Litres Time Total Litres Time Total Litres Note: The accumulator output, is periodically saved in the TDB Controller's non-volatile memory on the hour and half past the hour.



Please ensure all power is switched off before installing or maintaining this product.

Algebra

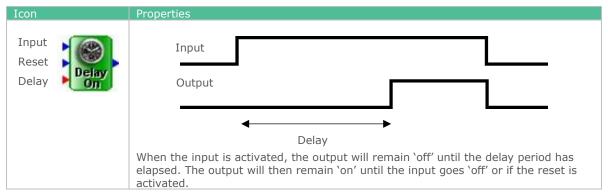
Icon	Properties
\$1	This block has 5 variable analogue inputs and will perform advanced calculations.
\$2 \$3 \$4 \$4 Result A Result B	The digital 'Hold' input, when on, will hold the result regardless of the values updating on the analogue inputs.
\$5 ► Hold ►	Calculation can be up to 255 characters long. Useable symbols within the equations;
Digital Output 'Result B' will go 'high' for a non 0 result.	 + Addition - Subtraction * Multiplication / Division ^ Raised to the power of.
	Precedence : ^ , * , / , + , -
	Brackets can be used to control execution order.
	Rounding;
	 round (x): Value is rounded up or down to the nearest whole number. ceil (x): Value is rounded up to the nearest whole number. floor (x): Value is rounded down to the nearest whole number.
	The block will also perform trigonometric and log equations;
	 sin (x): Sine of x (Argument in radians) cos (x): Cosine of x (Argument in radians) tan (x): Tangent of x (Argument in radians) asin (x): Arc sine of x (Argument in radians) acos (x): Arc cosine of x (Argument in radians) atan (x): Arc tangent of x (Argument in radians) sqtt (x): Square root of x abs (x): Absolute value of x exp (x): E raised to the power of x ln (x): Natural (base e) log of x log (x): Base 10 log of x rad (x): Convert x radians to degrees
	Note 1: Spaces in a formula are ignored
	Note 2 : The floating point calculation used in the Algebra block, within the TDB platform, supports 16 significant digits.
	In the simple example below:
	Input \$1=8, \$2=3, \$3=10 and \$4=5. The equation is (\$1 x \$2) - (\$3 + \$4) or (8 x 3) - (10 + 5)
	So the analogue result 'A' will be 9. Digital result 'B' will be ON as there is a non-zero result.
	Algebra X Name Algebra Algebra (\$1*\$2)-(\$3+\$4) OK Cancel



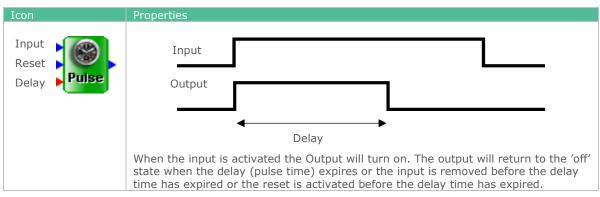
Please ensure all power is switched off before installing or maintaining this product.

Time Blocks

Delay On Timer



Pulse Timer



Heartbeat

Icon	Properties
Period Sync Heart	A momentary on pulse is generated on the output at the beginning of every time period as determined by the value set in period. The period value is in seconds. The sync input will reset the period timer back to zero when activated allowing the pulse to become synchronised with another timed function.
	The Heartbeat Block would typically be used to trigger an event at a regular interval, for example, it could be used to activate an Analogue Store to store a temperature every minute.
	The shortest "Period Value" that can be entered is 0.2 of a second.
	Note: The use of an SR latch block may be required.

Run On

Icon	Properties
Input	Input
S TRUISIN	Output
	Length
	When the input is activated the output will turn 'on' and remain 'on' until the length time period has elapsed.



Run Hours

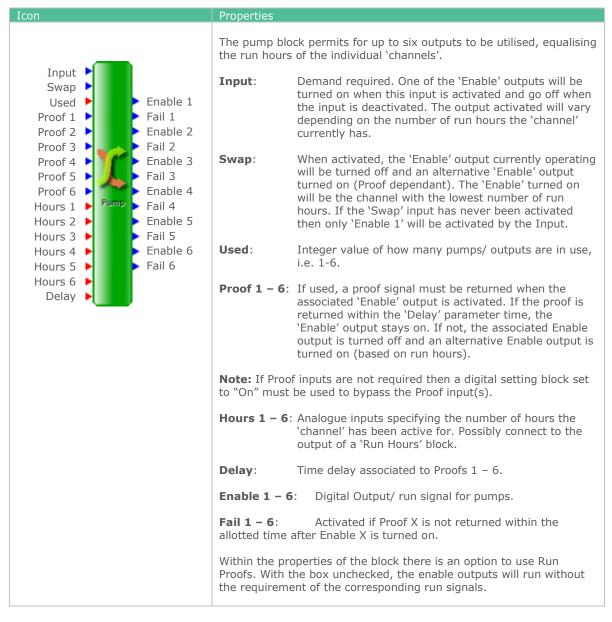
Icon	Properties
Input Reset	The output displays the total number of hours that the input is active. The output is shown to one decimal place. The output will go to zero when the reset input is active (On). The maximum hour count is 596,680 (which equates to 68 years).
	Note : The Hour Count is periodically saved in the TDB's non-volatile memory on the hour and half past the hour.

Change Over

Icon	Properties	
Input Enable 1	Input:	Demand required. Either Enable 1 or 2 will be turned on when this input is activated and will go off when the input is deactivated. The output activated will vary depending on whether or not the Swap input has been enabled.
Swap Proof 1 Proof 2 Delay Change	Swap:	When activated the Enable output current operating will be turned off and the alternative Enable output turned on (Proof dependant). If the Swap input has never been activated then only Enable 1 will be activated by the Input.
	Proof 1 & 2:	If used a proof signal must be returned when the associated Enable output is activated. If the proof is returned within the Delay parameter time the Enable output stays on, if not the associated Enable output is turned off and the alternative Enable output is turned on.
	Note:	If Proof inputs are not required then a digital setting block set to "On" must be used to bypass the Proof input('s).
	Delay:	Time delay associated to Proof 1&2
	Enable 1:	Digital Output.
	Fail 1:	Activated if Proof 1 is not returned within the 'Delay' time after Enable 1 is turned on.
	Enable 2:	Digital Output.
	Fail 2:	Activated if Proof 2 is not returned within the 'Delay' time after Enable 2 is turned on.



Pump Block



Match Date

Icon	Properties
_	Match Date output goes high when the date in the controller hardware RTC matches the day, month and year defined.
Day Month Year	Output stays on for 24 hours until the date changes. Not defining the year field allows the block to match the day & month regardless of the year. Not defining the month and year fields allows the block to match the day regardless of the month & year.
	Uses the controllers current time and date.



Date Time Block

Icon		Properties	
Mir	conds nutes	This block uses the TDB device's Time and date. It separates the Time & Date segments and outputs them as analogue outputs.	
Ho Da	urs y	Time:	Splits it into Seconds, Minutes and Hours.
Mo Yea	onth ar	Date:	Splits it into Day, Month and Year.
Date DS	T nce Midnight	DST:	Output will come on when daylight saving time is on
	Since Midnight	Since Midnight:	Output counts up the seconds from midnight. Resets back to 0 at midnight and starts counting up again.

Summer or winter

Icon	Properties	
	This block performs an automatic summer/ winter (BST/GMT) time change. Block Name can be changed if required.	Summer or Winter X Name Summer or Winter Simulation Setting © Auto © On © Off OK Cancel

Daylight Block

Icon	Properties		
Latitude Daytime	The Daylight block can be used to provide an indication of daylight and twilight hours for a given geographical location. Note the information provided by this block should be used as a guide only.		
Morning Offset	Latitude:	Enter the current Latitude coordinate of the TDB device e.g. 55.856742.	
	Longitude:	Enter the current Longitude coordinate of the TDB device e.g4.353971.	
	Morning Offset:	Allows for a positive or negative offset to be added to the morning on time for the Daytime and Twilight outputs. A positive offset will advance the Daytime and Twilight on time. A negative offset will delay the Daytime and Twilight on time.	
	Evening Offset:	Allows for a positive or negative offset to be added to the evening off time for the Daytime and Twilight outputs. A positive offset will delay the Daytime and Twilight off time. A negative offset will advance the Daytime and Twilight off time.	
	Daytime:	The Daytime output will turn on at sunrise and off at sunset based on the Latitude and Longitude settings entered.	
	Twilight:	The Twilight output will turn on when Twilight begins shortly before sunrise and off when Twilight ends shortly after sunset.	
		be added in Seconds, use the unit type "secs". tive offset enter a negative number, for example e to 15 minutes.	



Icon	Properties		
Start Time	Block Name can be changed.Output turns on at the "start time" and turns off at the "stop time".Both time inputs can work to a 'second' resolution.	Time Block Name Time Block OK Cancel	×

Schedule

Icon	Properties	
Start		ock can be used to signal a number of events every r of days. The TDB Controller's real time clock is used to urrent time.
Start End No. per day Days Sched	Start:	Enter the initial start time. The Output will activate when this time is reached. Note the output is only active for 1 second.
	End:	Enter the last scheduled start time. The Output will activate when this time is reached. Note the output is only active for 1 second.
	No. Per Day:	Enter the number of events required per day. If more than two events occur in a single day then the total number of events will be evenly spaced including the Start and End times. Please see example below.
		Start 13:00 End 16:00 No. Per Day 4
		In the above example the output would be active at 13:00, 14:00, 15:00 and 16:00 hours. Note if only 1 event per day is entered then the output will trigger on the "Start" parameter
	Days:	Enter the frequency of the events in days. For example if the "Number Per Day" is set to 2 and the "Days" parameter is set to 3 then every 3 days the output will be active twice. Once at the entered Start time and again at the End time. Note the schedule takes effect from the last TDB program save. Set to 1 if you wish the schedule to occur every day.
	Start and End ti	me can span midnight e.g. Start 22:00 End 03:00

Day of Week Block

Icon	Properties	
Day No.	Output = 0 = Sunday Output = 1 = Monday Output = 2 = Tuesday Output = 3 = Wednesday Output = 4 = Thursday Output = 5 = Friday Output = 6 = Saturday	Day Of Week X Name Day Of Week OK Cancel



Functional Blocks

Alarm block

Switch	The alarm block is used to indicate an alarm; it's activated by the switch input and can have an alarm delay assigned by using a setting block on the delay input. The alarm can have an "index" type assigned by editing the properties
Delay Setting	Note : An index of '1' will only alarm locally and not be sent over the network if setup.

Analogue Switch

Analogue Input	An analogue value can be switched off using the switch input.

Two-Way Switch

Analogue Input 1 Analogue Input 2 Switch	If digital Input Switch is off the output will follow Analogue Input 1 value If digital input Switch is on the output will follow Analogue Input 2 value
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Analogue Store

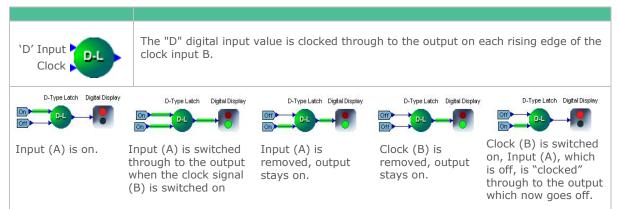
Value Switch Start-up Value STORE	Initially the output is at the start-up value. Analogue values can be stored by turning the switch on then off, the output retains the input value at the time the switch is turned off. Click the "Non-Volatile" option to save the output value of the analogue store on the hour or half past the hour or during a software restart.
	Note : If more than one Analogue Store is being used then they must each have unique aliases. I.e. Analogue Store 1, Analogue Store 2 etc.

Pulse Counter

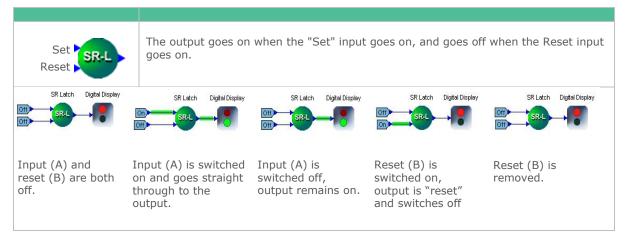
Count Up Count Down Reset	The output increments and decrements in accordance with the up and down inputs. The output will go to zero when the reset input is active (On). Note 1 : The current count is periodically saved in the TDB's non-volatile
	Note 2 : If more than one counter is being used then they must each have unique aliases. I.e. Pulse Counter 1, Pulse Counter 2 etc.



D-Latch



SR-Latch



Digital Edge Block

Signal Edge Rising Falling	For each Rising Edge of the input signal the Edge and Rising Outputs will pulse high for 0.1 seconds For each Falling Edge of the Input signal the Edge and Falling Outputs will pulse high for 0.1 seconds.

Analogue Edge Block

S	ignal Edge	Edge Rising Falling	For each Rising Edge of the input signal the Edge and Rising Outputs will pulse high for 0.1 seconds. For each Falling Edge of the Input signal the Edge and Falling Outputs will pulse high for 0.1 seconds.



Syslog

Input \$1 \$2 Log	When the digital input is activated the text defined in the "Entry" field will appear in the controller system log. The entry will be time/date stamped with the controller's current time and date. The use of \$1 & \$2 in the entry field allow for analogue values to be included in the system log entry. In the example to the right, when the digital input is activated the values currently fed into \$1 & \$2 will be included in the system log entry. e.g. If the values "10.1" and "5.6" were connected to \$1 & \$2 respectively, The system log entry (from example to the right) would be; Test 10.1, Test 5.6.
	Note : the controller will save a maximum of 300 entries in the system log.

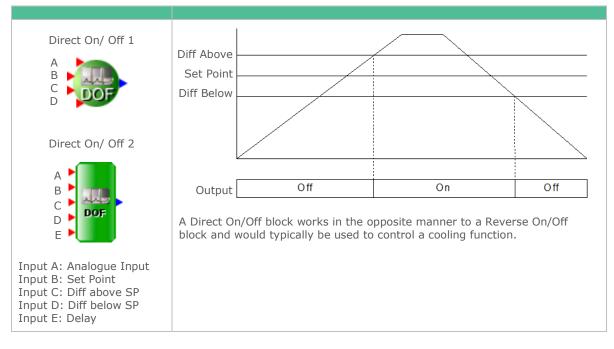
Push Text

Input \$1 \$2 Push	both on the we (if fitted). When the Input the Entry field web page. If the within the text connected to the	ws a scrolling text message to appear be interface and the TouchXL's display at is activated, the text message in will appear on the TDB controller's be strings "\$1" and "\$2" are included message then the analogue values be \$1 and \$2 inputs will also be e text message.	Push Teo Name Entry	At 1 × Push Text 1 Energy usage is \$1 kWh © Cgi Broadcast © Time Stamp OK Cancel		
	CGI:	Check this for the message to be displayed on the computer generated interface, such as a PC.				
	Broadcast:	Broadcasts to another TDB device on the network. See peer to peer <u>Communications</u> .				
	Time Stamp:	e Stamp: The message will appear with the date and time shown first.				
	In the example shown above, if an analogue value of "4615" is connected to \$1, then the Push Text output on the device will be;					
	Energ	y usage is 4615 kWh				



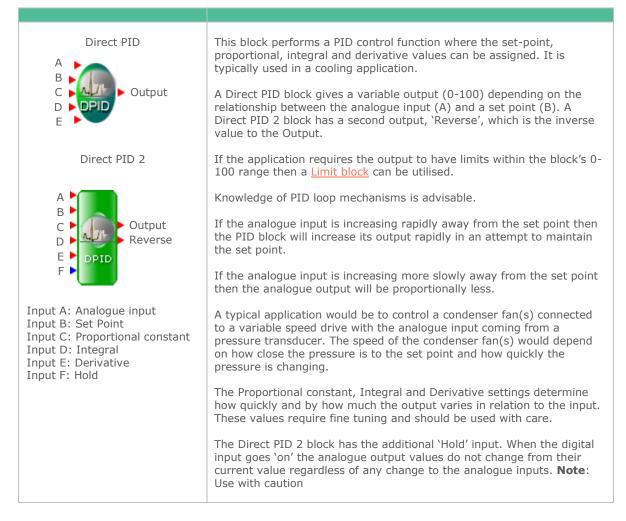
Reverse On/ Off 1 A B C D	Diff Above Set Point Diff Below		
Reverse On/ Off 2			
A B C B ROF	Output On	Off	On
E	Reverse On/Off blocks are typ	ically used to control a heating	function.
Input A: Analogue Input Input B: Set Point Input C: Diff above SP Input D: Diff below SP Input E: Delay	(B) would be the temperature above setpoint (C) and different the setpoint at which the heat differentials (C & D set to zero	Id be from a temperature probe you want to maintain the room intial below setpoint (D) are ba ting is turned on and off. If ther o or not used) then the heating set point and cause relay "chatt	n at. Differential nds either side of re were no would constantly
	temperature is below the set output (heating) to be switcher rises above the set point, whe the diff above the output (heat	when the system is initially sw point minus the diff below, this ed on. As the room heats up, th en the temperature reaches the uting) is switched off. The room ture falls to the set point minus ed on again.	would cause the ne temperature set point plus will gradually
		has the additional 'Delay' input. e output from coming on or goin n.	

Direct On/Off / Direct On/Off 2

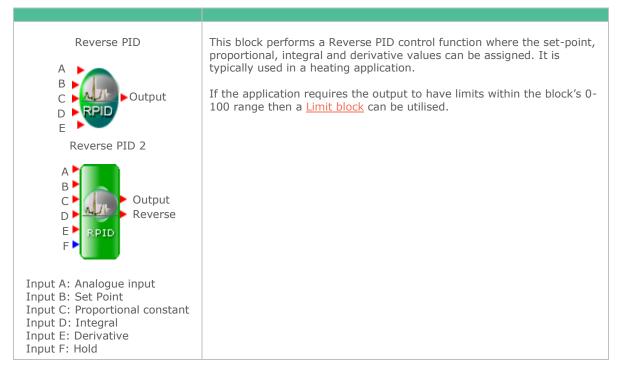




Direct PID / Direct PID 2



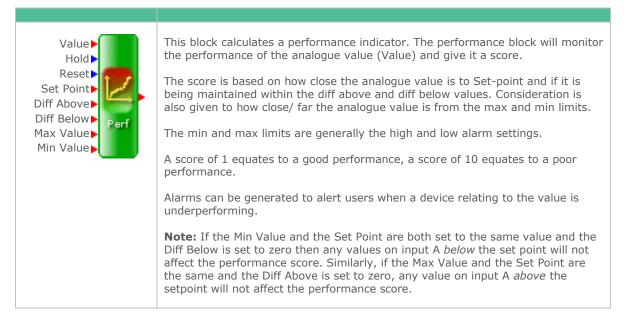
Reverse PID / Reverse PID 2





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Performance

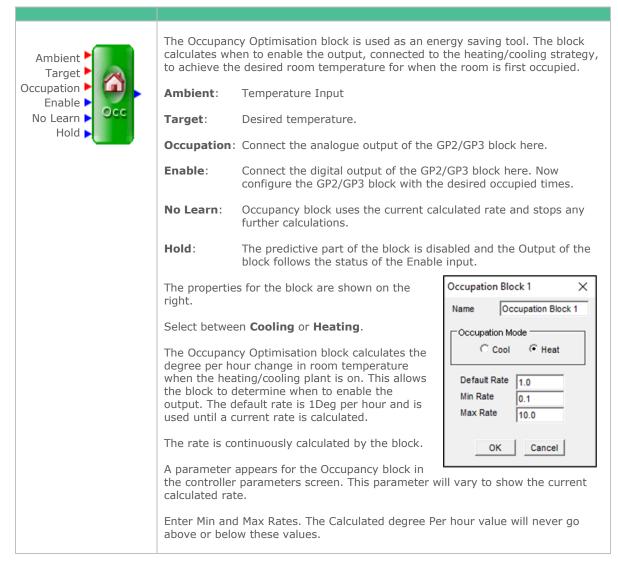


Levels

Input Enable High Level	is within pre-	is used to monitor an analogue input and check that it set parameters. e, if the input was a temperature probe then the High
Low Level Max Valid Min Valid Delay	temperature Valid and Min probe scale, a	v Levels would be set to initiate an alarm if the went too hot or too cold (subject to the delay). The Max Valid parameters could be set to the limits of the an error output would be generated if these limits were bject to the delay) which would indicate a probe fault.
	Input: Enable:	Analogue Signal When the input is activated it enables the checking features of the block. Note if disabled the analogue value is still fed through to the "Value" output.
	High level, Lo	w Level, Max Valid and Min Valid are settable values.
	Delay:	Delay associated to the Error, High and Low alarm digital outputs.
	Low Alarm: Note: For t	Value passed from the Input The output is active whilst the Input signal is within the Max Valid and Min Valid parameters. The output is activated when the Input signal is out with the Max/Min Valid parameters. The output is activated when the Input signal is above the parameter High Level. The output is activated when the Input signal is below the parameter Low Level.
		ned. When the Enable is activated the controller checks put", "High Level", "Low Level", "Max Valid", "Min elay".

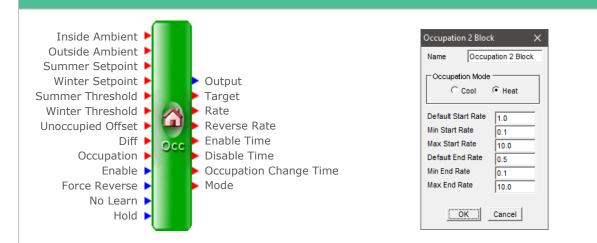


Occupancy Optimisation





Occupancy Optimisation 2



The Occupancy Optimisation 2 block is used as an energy saving tool. The block calculates when to enable the output, connected to the heating/cooling strategy, to achieve the desired room temperature for when the room is first occupied.

Input	Values
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Inside Ambient: Outside Ambient: Summer Setpoint: Winter Setpoint: Summer Threshold:	Temperature input of space to be cooled or heated. Temperature input of outside air. Target temperature in 'summer' state, used to calculate actual Setpoint. Target temperature in 'winter' state, used to calculate actual Setpoint. Temperature setting, of which above, deems a 'summer' state. Used to calculate actual Setpoint.
Winter Threshold:	Temperature setting, of which below, deems a 'winter' state. Used to
Unoccupied Offset: Diff:	calculate actual Setpoint. Time offset subtracted from the end of when the GP Timer switches off. Temperature diff from the current setpoint used in the reverse rate calculation. See Reverse End Rate calculation.
Occupation: Enable:	Connect the analogue output (until) of the GP2/GP3 Timer block here. Connect the digital output (state) of the GP2/GP3 block here. The GP Timer blocks must be configured, as per their setup, with the desired occupied times.
Force Reverse: No Learn:	This input can be used to stop learning the reverse rate calculation. The Occupancy Optimisation 2 block uses the current calculated rate and stops any further calculations.
Hold:	The predictive part of the block is disabled and the Output of the block follows the status of the Enable input.
Output Values	
Output: Target:	Output signal from the block to enable the heating/ cooling plant. Calculated setpoint for the heating/ cooling application. See Calculated target below.
Rate: Reverse Rate: Enable Time:	Current heating/ cooling rate (Deg./hr) for when the plant is switched on. Current heating/ cooling rate (Deg./hr) for when the plant is switched off. Time the occupancy block is due to bring on the digital (heating/ cooling enable) output.
Disable Time:	Time the occupancy block is due to switch off the digital (heating/ cooling enable) output.
Occupation Change Time:	Formatted 'until' time taken from the GP2/GP3 Time block. This is the time the next change will take place from the GP Timer (on or off).
Mode:	Range of value from 0 - 6 representing the block's current mode/ state. The modes are as follows;0:Initial State1:Outwith time bands from GP Timer. i.e off state.2:Inside of 'Enable' window3:Enabled, but not learning
	 Enabled and learning Reached target/ occupation time, finished learning Reached target/ occupation time, not learning

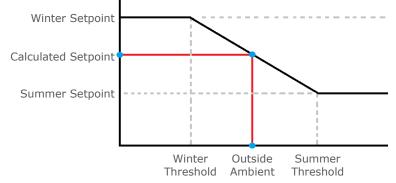


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Calculated Target

The initial step for the Occupancy Optimisation 2 block is to calculate the actual Target Setpoint for the occupied space to heat/ cool to. For this it utilises the following inputs; Outside Ambient; Summer SP; Winter SP; Winter Threshold; Summer Threshold.

Using the above inputs, the below graph can be created. If the outside ambient temperature goes above or below the Summer or Winter thresholds, the calculated setpoint will take the respective Summer or Winter Setpoint. When the Outside ambient temperature is between the two thresholds, the block uses the plotted graph to generate a Calculated Setpoint. This Setpoint will vary according to how near/ far it is from the winter/ summer thresholds. Closer to the Winter threshold, it will use a SP closer to the Winter Setpoint and vice versa.



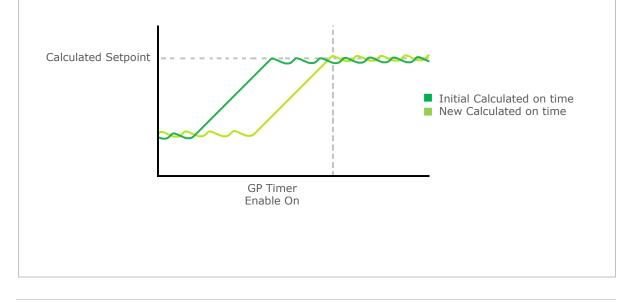
Start Rate

The Occupancy Optimisation 2 block calculates the degree per hour (Deg./hr) change in room temperature when the heating/cooling plant is on. This allows the block to determine when to enable the output so that the room temperature is at the target setpoint for when the room is occupied.

From the properties box, shown above, the default start rate is 1 Deg./hr (adjustable) and is used until a new start rate is calculated by the block. This start rate is then continuously calculated. In addition to the default, the min and max start rates can be set limiting the Start rate calculation, if necessary, to these values.

A parameter appears for the Occupancy Optimisation block in the controller parameters screen. This parameter will vary to show the current calculated rate.

In the heating example below, it shows two temperature lines. The block uses the initial 'default' start rate of change to calculate when to switch the heating plant on. Using the newly calculated rate of change, it then adapts to switch on the heating plant later, thus raising the room temperature to the setpoint for when space is occupied, saving energy.





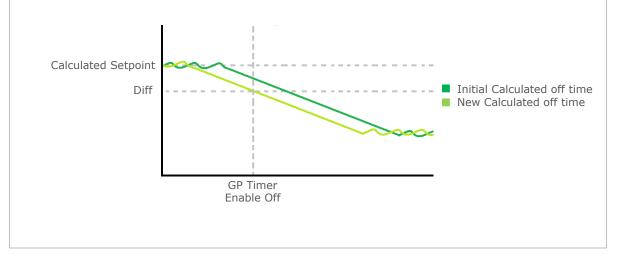
Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product.

Reverse (End) Rate

Similar to the Start Rate, the Occupancy Optimisation 2 block calculates the Deg./hr change in room temperature when the heating/ cooling plant turns off. It then uses this End rate to determine when to disable the output so that the room temperature is at the target temperature minus/ plus (depending on heat/ cool) at the point of when the room is unoccupied.

From the properties box, shown above, the default start rate is 0.5 Deg./hr (adjustable) and is used until a new end rate is calculated by the block. This end rate is then continuously calculated. In addition to the default, the min and max end rates can be set limiting the end rate calculation, if necessary, to these values.

In the heating example below, it again shows two temperature lines. The block uses the initial 'default' end rate of change to calculate when to switch the heating plant off. The target temperature for the 'GP Timer Off' (or the end of occupied time) will be the current target setpoint minus the dif. Using the newly calculated rate of change, it then adapts to switch the heating plant off earlier, thus allowing the room temperature to drop to the acceptable level at the point the room is unoccupied.





Pressure to Temperature / Pressure to Temperature 2

Pressure to Temperature 1	The pressure to temperature block is used to convert a pressure reading to a temperature based on the refrigerant gas type in use.					
Pressure 🕨 📷	Pressure:	Pressure Input.	P to T Block 1 X			
Glide Figure 9	Glide:	Allows for a linear offset, in degrees Celsius or Fahrenheit, to be subtracted from the output temperature.	Name P to T Block 1 Refrigerant None Absolute Use Psi			
Pressure Glide Ref. Weight Current Supported	Ref. Weight:	ht: P2T2 block only. For blended refrigerants, the weighting (%) can be inputted for a non-linear conversion. When the refrigerant weight parameter is set to 0% then the liquid pressure is used (bubble), when set to 100% vapour pressure is used (dew).				
Refrigerants;	Output:	Calculated temperature.				
R12*, R13*, R13b1*, R22, R23, R32, R114*, R134a, R142B, R227, R401, R401A*, R401B, R401C	Absolute:	Tick to use Absolute pressure, leave un pressure.	-ticked for Gauge			
R401A ⁺ , R401B, R401C R402, R402A, R402B, R404A, R407A, R407B, R407C, R500, R502, R503,	Use PSI:	Pressure input defaults to BAR. Tick if the pressure input to the block is in PSI.				
R407C, R500, R502, R503, R507, R717, R290, R744, R407F, R410A, R449A, R513A.	Internal:	Tick to prevent the refrigerant selection parameter page.	appearing in the			
*Not available in P2T2.						

Comfort Block



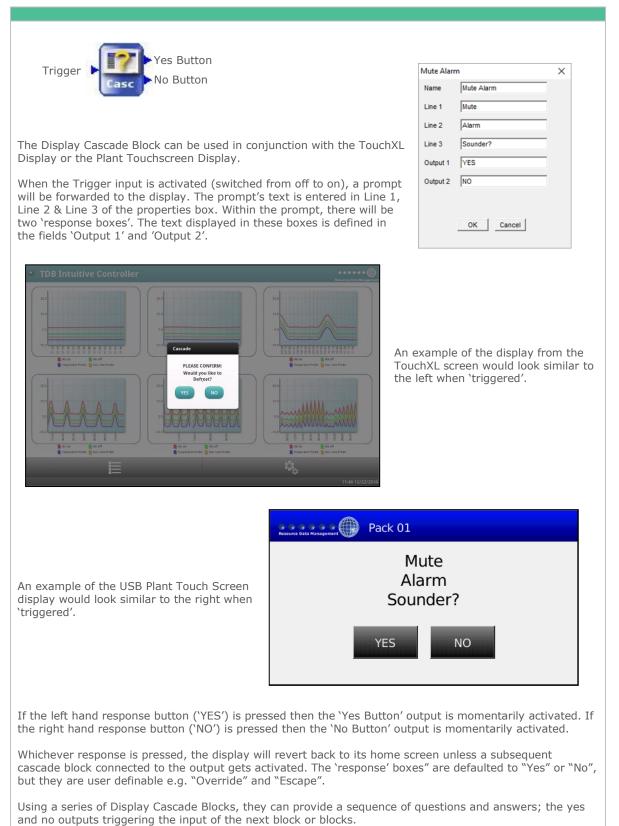
Offline Block

	Used to monitor comms to and from the TDB	Offline Indicator			×
Timeout	Controller and those devices it is connected.		Offline Indicat	tor	
Offline	Block Name can be changed.		Host	-	
	Host: When communications are lost between the TDB controller and the front-end the Output will go 'on' after the input "Time" has elapsed.		Host Expansion 1 Expansion 2 Expansion 3 Expansion 4 Expansion 5 Expansion 6		
	Expansion "X": When communications are lost between the TDB controller and the selected Expansion board the Output will go on after the has elapsed.	input "(Expansion 7	eout	"



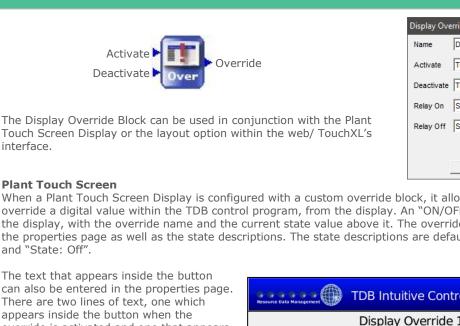
Please ensure all power is switched off before installing or maintaining this product.

Display Cascade Block





Display Override Block



Display Override 1 X		
Name	Display Override 1	
Activate	Turn On	
Deactivate	Turn Off	
Relay On	State: On	
Relay Off	State: Off	
	Von-volatile	
	OK Cancel	

Plant Touch Screen

When a Plant Touch Screen Display is configured with a custom override block, it allows the user to override a digital value within the TDB control program, from the display. An "ON/OFF" button appears on the display, with the override name and the current state value above it. The override name is entered in the properties page as well as the state descriptions. The state descriptions are defaulted to "State: On" and "State: Off".

can also be entered in the properties page. There are two lines of text, one which appears inside the button when the override is activated and one that appears when the override is deactivated, these are defaulted to "Turn On" and "Turn Off".

Pressing the override box changes the status of the override output and alters the text accordingly. In the above example (which is the default setting), initially the display will show the override name (Display Override 1 in this case) and "State: Off". The text inside the button will be "Turn On" and the output of the block will be 'Off'.



When the button is pressed, the description will change to "State: On" changing the output of the block to 'On' and the text inside the button will be "Turn Off"

Blocks Digital Inputs

The Display Override Block can also be activated and deactivated by triggering (switching from 'Off' to 'On') the 'activate' and 'deactivate' digital inputs on the block. Priority is given to the latest trigger input whether it is from the touch screen or the Display Override Block inputs.

Non-Volatile Option

With this option unchecked', if the device receives a reset, the block will resort to its default state. When the option is 'checked' and the device is reset, it will return to the state it was in. Note: when implementing a strategy, take into considerations any settings/ logic going into override block.

Layout Setup

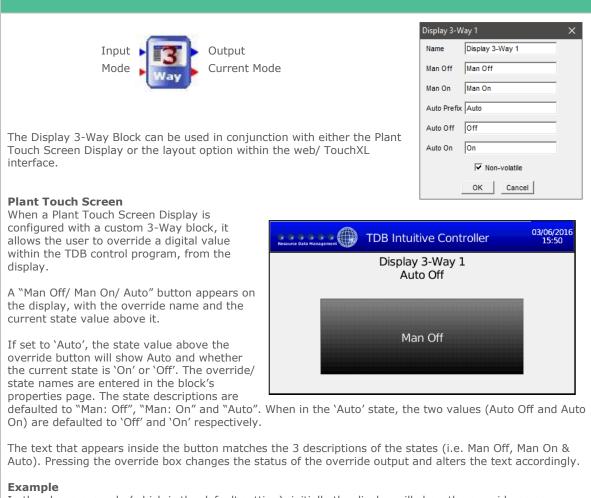
When the Display Override block is used in conjunction with the Layout setup, it will look similar to the image below. This will be on both the web interface and the TouchXL display (if fitted). Please see Layout Setup section for details of configuration. In the layout, both buttons will be visible. The highlighted button (in the example 'Turn Off'), will represent the current state of the override. By selecting 'Turn On', it will change the State to 'On' and highlight the button.





Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product.

Display 3-Way Block



In the above example (which is the default setting), initially the display will show the override name (Display 3-Way 1), the current state (Auto Off) and the override button will show "Man Off". Similar to the image above.

- Pressing the button will override it to "Man Off", updating the current state and the button will
 update to "Man On"
- Press the button again, will override it to "Man On", updating the current state and the button will then show "Auto".
- Pressing the button once more, will override it to "Auto", updating the current state and the button will then show "Man Off".

Digital 3-Way Block's IO

The Digital **'Input**' to the block is the **'output**' value when the block is set to 'Auto'. When a numerical value is given to the Analogue **'Mode**' Input, it activates/ deactivates the states of the block.

Enter a '1' and the output will go to "Man Off".

Enter a '2' and the output will go to "Man On".

Enter a '3' and the output will go to "Auto On" or "Auto Off" and follows the digital 'Input'.

Note: A '0' can also be entered into the Analogue 'Mode' input. This may be useful when using both the layout/ mimic and the Mode parameter methods.

The '**Current Mode**' Analogue Output will be one of three values; 1 - when output is "Man Off", 2 - when output is "Man On" and 3 - when output is "Auto".

Note: Priority is given to the latest trigger input whether it is from the touch screen or the Display Override Block inputs.



Non-Volatile Option

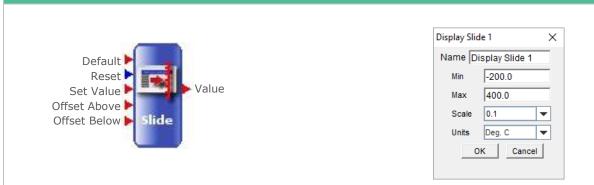
The block has the option of saving the last override activation in non-volatile memory. With this option 'unchecked', if the device receives a reset, the block will resort to its default state. When the option is 'checked' and the device is reset, it will return to the state it was in. **Note**: when implementing a strategy, take into considerations any settings/ logic going into override block as they may also be saved in non-volatile memory.

Layout Setup

When the Display 3-Way Override block is used in conjunction with the Layout setup, it will look similar to the image to the right. Please see <u>Layout Setup</u> section for details of configuration. In the layout, all three buttons (representing the 3 states) will be visible. The highlighted button (in the example 'Auto'), will represent the current state of the override. By selecting 'Man On' or 'Man Off', will change the State to match and highlight that button.

• TDB Intuitive Controller		Resource Data Management
	Display 3-Way 1 Auto OFF	
	Man Off	
	Man On	
	Auto	
	<i>ф</i> ,	•
		09:08 06/06/2016





The Display Slide Block can be used in conjunction with either the Plant Touch Screen Display or the layout option within the web/ TouchXL interface.

Plant Touch Screen

When a Plant Touch Screen Display is configured with a custom slide block, it allows the user to override an analogue value within the TDB control program, from the display. A slider icon will appear (Similar to right) on the touch display, with a pointer. The pointer can be moved up and down using the touch screen, which will alter an analogue output value attached to the display slider block.

Resource Data Management	TDB Intuitive Controller	03/06/2016 16:26
	Display Slide 1	
	25.0	
	18.0	
	°C	

Default Reset Set Value Offset Above Offset Below

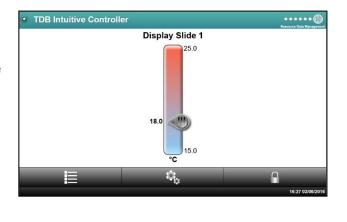
This is the default analogue value that the block will use when the 'reset' is activated. When this is activated the block will return to its default setting. The base value to which the 'above' and 'below' offsets are referenced. The highest value above the 'set value' that the slide on the touch screen can set. The lowest value below the 'set value' that the slide on the touch screen can set.

Example

With the Set Value set to 20 and the Offset above and below both set to 5, the slide appears on the display with a maximum and minimum of 25 and 15. By sliding the pointer up or down, the analogue output (Value) of the block will follow what the pointer is moved to by the user. With the upper and lower setting being set by whoever compiled the program.

Layout Setup

When the Display Slide block is used in conjunction with the Layout setup, it will look similar to the image to the right. Please see <u>Layout Setup</u> section for details of configuration. It will work in the same way as detailed above, with the Plant USB touch display.





Diagnostic blocks

Analogue Display Block

Icon	Properties		
-	This block gives a visual display of an analogue value within a TDB program using online or simulation mode and has the option of assigning <u>units</u> (the units can also be manually inserted if required).		Analog Display Block
	Internal	If the Internal option is ticked then this value will remain within TDB program. If un- ticked, the Analogue display will appear as a value in the output section of the device "Control Summary".	Min -200.0 Max 400.0 Scale 0.1 ▼ Units Deg.C ▼ OK Cancel
	Input	If the Input option is ticked the Anthe input section of the IO list.	nalogue display will appear as a value in
	Broadcast	the IP network to which the devic	alue in the block to be 'broadcast' over e is on. The value can be picked up from it. For more information see <u>Peer to Peer</u>

Digital Display Block

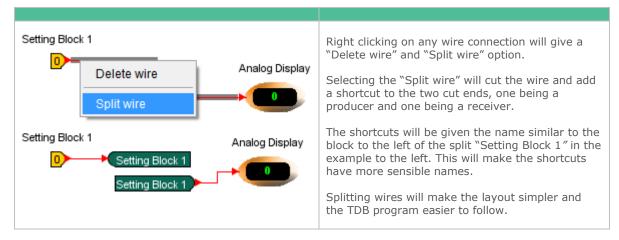
Icon	Properties		
value within a TDB progr simulation mode. Internal If the Int ticked th remain v If un-tick display v in the out	es a visual display of a digital TDB program using online or de.	Digital Display 1	
	Internal	If the Internal option is ticked then this value will remain within TDB program. If un-ticked then the Digital display will appear as a value in the output section of the device "Control Summary".	 ✓ Internal ☐ Input ☐ Broadcast OK Cancel
	Input	If the Input option is ticked the input section of the IO list.	Digital display will appear as a value in the
	Broadcast	the IP network to which the dev	e value in the block to be 'broadcast' over rice is on. The value can be picked up from ve it. For more information see <u>Peer to Peer</u>



Shortcut Block

Icon	Properties
	Probe 1 Shortcut blocks can be used throughout the users program to `de-clutter' the canvas from multiple wires linked across the entire program. While selected, by clicking on the canvas it will place the block. Editing the properties will allow the user to `bridge' wires between blocks. The below example will outline the basic setup.
	Air On Probe Air On Probe Name Air On Probe Type Receiver OK Cancel

Split Wire





Settings Block

Icon	Properties		
5	Setting blocks can be created to give permanent values or allow end users to set specific values when the program is in use. For example changeable set points in an 'Air Conditioning Application'. Setting blocks can be made 'Digital' or 'Analogue', each providing properties to set;		
	Heating Override	Digital When set to 'Digital' the setting icon will automatically set itself to be blue, making it easier to recognise it as a digital setting block as oppose to analogue (yellow). Within the properties box, along with the type, the block can be named and the desired 'default' value is selectable. Internal Option Dictates whether the setting block will be visible on the devices web page and/ or DM device list. If checked, the settings block is only set-able within the TDB Editor.	
	Cut In Setpoint Cut In Setpoint Value: Value: 22.5 Max 30.0 Scale 0.1 Units Deg. C OK	 Analogue While set for 'Analogue' the settings shown on the left will be visible. The Internal and Broadcast options are identical to that above. The example shows a setting block configured as 'Cut In Setpoint, given a default value of 22.5°C. The block can be configured from the I/O list of the program and can be set no higher than 30.0°C and no lower than 15.0°C. 	

Units

Within analogue input, output and parameter blocks the option to add a 'unit' is visible as a drop down menu. Many pre-set units are available, for example; DegC, Bar, %, Lux, kW/hr, m³/sec. Users can also manually type in their own if required. Furthermore, superscripting text is also possible to suit the 'unit'. For example, for the controller to display "**cm³/sec**", the user types in "**cm^3/sec**". The `^' symbol preceding the character instructs it to be superscripted.

Show Names

Right click on the workspace and from the sub-menu select "Show Names". All TDB blocks will have their names shown above them.



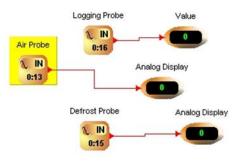
Find/Replace

Finding an Item

Right clicking on an unused area of the workspace brings up a sub menu shown on the right, select "Find/Replace".

Find/Replace		×
Find Re	eplace	
	Crphans Only	
Find what:	Air Probe	•
		Find Next





Enter the name of the item you want to find, ("Air Probe" in the example) and click "Find Now".

The item being searched for will be highlighted in yellow as shown.

If the "Orphans \mbox{Only}'' box is ticked then only items with no wires attached will be found.

Replacing an Item

Select the "Replace" tab and enter the name of the item you want to find. Enter the name you want to replace it with.

Selecting the "Replace" button will highlight the target in yellow, clicking the "Replace" button again will change the item's description.

If there are several items with the same name you can replace them all with another name by selecting the "Replace All" button.

Note: Only the item's name will be changed, all other settings will remain the same.

×
ohans Only obe
ff Probe
Replace All Replace Find Next

Running a Simulation

The application can be simulated by clicking on the Run Simulation icon in the toolbox. When running, the toolbox changes to give similar options shown to the right.

Hovering the mouse pointer over outputs and inputs will show the value. Diagnostic analogue or digital displays are also a useful way to observe data flow through the application.

Values can be changed dynamically while simulating by clicking the item and then changing its value.





Peer to Peer Communication

Peer to peer communication allows one TDB device, to share data with a number of other devices running TDB, operating on the same IP network.

Firstly configure the Input, Output, Setting or Diagnostic block you wish to broadcast. Shown on the right is an example Analogue Input block configured as a probe. Probe 1 is being used to measure the Ambient Air Temperature of a room. Tick the Broadcast option to share this temperature with other TDB devices. Click OK to save any changes.

TDB Intuitive Controller	Resource Data Management
Settings for interface eth0: Current Address: Current Netmask:	
Current Default Gateway:	0.0.0.0
Static Address:	10.2.2.76
Static Netmask:	255.255.255.0
Static Default Gateway:	
Name servers:	
Controller name:	TDB Intuitive Controller
う () () () () () () () () () ()	
	09:55 14/04/2016

Analog Input 1 X
Name Ambient Air Temp Internal
Min -200.0 V Broadcast
Max 400.0
Scale 0.1
Units Deg. C 💌
Input Mapping Type Fixed Board: 0 Intuitive Controller Input: Probe 1 Probe 1 Probe: PT1000 Note: Fixed Inputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block
Simulation Settings
Value 0.0
OK Cancel

Note: any TDB device which is set to broadcast data must be given a unique controller name (blank by default). This is done via the Network page as shown on the left. Assign the device a suitable designation via the "Controller Name" field and click Set Network.

IN	Net Ana	alog In 1 X	Now
T	Name	Networked Ambient Air	the
	Min	-200.0	the the
	Max	400.0	
	Scale	0.1	Tick
	Units	Deg. C 💌	Dev
		acast Settings Broadcast Device: TDB Intuitive Controller /alue: Ambient Air Temp OK Cancel	Valu

Now edit the TDB program in the TDB device you wish to receive the analogue value. Insert a Network Analogue Input block into the program and view the properties for this block as shown on the left.

IN

Tick the broadcast option.

evice: Enter the name of the TDB device you wish to receive the value from e.g. TDB Intuitive Controller. Note: This text is case sensitive.
 alue: Enter the name of the block you wish to receive data

from, for example "Ambient Air Temp". Click 'ok' to save changes. The analogue value has now been mapped.

Multiple TDB devices can receive the same broadcast value, setup these devices using the same method outlined above. A similar process should be followed for digital inputs and setting blocks.



Office Temp

Min

Max

Scale

Units

Output M

Туре

Device: PLANT1

Value: Eng Office Temp

ок

Note: Fixed outputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block

Cancel

office Temr

LOUT

NET

Analog Input 1

N IN

0:1

Receiving Analogue Values from a Data Manager TDB Program

A simple Data Builder PLC program, running on a Data Manager, is shown on the left. The temperature of a room is being measured from probe 1 on the Data Manager's analogue input board and is being mapped to an analogue output. By right-clicking on the "Analogue Output" block, in the Data Manager TDB program, the properties window on the left is shown. This block has to be configured so that values can be sent to a TDB controller.

- Select "Network" from the drop down menu. Type:
- Device: Enter the controller name as it appears in the Data Manager's device list.
- Value: Enter the name, of the Network Analogue input, as it appears exactly in the controller's PLC Program created e.g. "Eng Office Temp".

Log the controller onto the Data Manager running the Data Builder program. Ensure a Network Analogue input on the controller is configured and that it is entitled "Eng Office Temp". Now, the analogue input from the Data Manager has been mapped to the controller Data Builder program.

Receiving Digital Values from a Data Manager TDB Program

Once the TDB controller is logged onto a Data Manager, Data Builder programs running within the Data Manager can be used to map digital values to the controller. Refer to the Data Manager Data Builder user guide for further details.

	Digital Output 1
	Name Digital Output 1
Digital Output 1	Output Mapping Type Network Device: HCON00 Value: Production GP Til Note: Fixed outputs are only selectable if they do not conflict with DM / DD settings and are not being used by another IO block
	OK Cancel

Shown on the left is a simple software manual override. This has been generated in a Data Builder program running on a Data Manager. By right-clicking on the "Digital Output" block the properties window on the left is shown.

- This must be set to "Network". Type:
- Device: Enter the controller's device name as it appears in the DM's device list.
- Value: Enter the name, of the network digital input, as it appears exactly in the TDB controller PLC Program created e.g. "Production GP Timer Input".

Once the Data Manger Data Builder program is running and the TDB controller is logged on to the Data Manger then the status of the digital output running in the Data Manager PLC program will be mapped to the controller network digital input named "Production GP Timer Input".



GP Timer (mapping from a Data Manager GP Timer)

Mapping a Data Manager's GP Timer to a digital input on the TDB controller is similar to <u>receiving digital values</u> from the Data Manager.

The TDB controller must be logged on to the Data Manger to utilise this setup. Then the GP timer channel must be configured to send values to the network digital input. An example is shown below. For the full GP timer setup instructions please refer to the Data Manager commissioning guide found on the RDM website.

Ch	annel Typ	e	Master					
Ch	annel Nan	Produ	uction Gnd	Fir Boiler	Contrl			
Inp	ut Type		Jnused					
Ou	tput Type	•	General	Outpu	t Mask H		itput Chan	nel 2
Inv	ert Output			Run-C	n	A	llowed	
S	chedule							
		Re	move All	Rer	nove	Add Scl	hedule	
	•		une	,		_		Key
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
			1	2	3	4	5	Daily
		7	8	9	10	11	12	Veekly Yearly
	13	14	15	16	17	18	19	Once
	20	21	22	23	24	25	26	
	27	28	29	30				
	Period 1		08.35	- 17:30				
)		2.10		
	08:35		2 14 14	os' 'to' 't2'	W W W	20 22 2	17:30)
	Period 2	00.00						
	Set Channel							

Output Type:	This should be set to "General".	
Output Mask:	Enter the TDB's controller name as it appears on the "Device List", e.g. HCON00.	
Output Channel:	This value is derived from the order in which the network digital inputs appears on the values page, for the TDB controller, once it is logged onto a Data Manager.	
Below shows a TD	B controller logged on with the alias HCON00.	
Example 1 : To 'hit' the network digital input item on the TDB controller called "Production GP Timer Input" the GP timer field (Output Channel) must be set to 2.		

Note: The value 2 is used since the digital input, "Production GP Timer Input", appears third in the output table list. Output ordering is counted from 0, 1, 2...8, 9 etc.

Example 2: To hit "Marketing Suite GP Timer Input" the "Output Channel" field would have to be set to 1.

Example 3: To hit "Boiler Run Sig" the "Output Channel" field would have to be set to 8.



HCON00 - Ground Floor Boiler Control Online since 14:50 31/05/16

Name	Value	Unit
Production Temp	25.0	
Kitchen Temp	30.2	°C
Current Marketing Setpoint	19.0	°C
Marketing Suite Temp	22.8	°C
Toilets Gnd Flr Temp	22.9	°C
Valve Z1-4 Open	Off	
Outside Temp	0.0	°C
Marketing Suite GP Timer Input	On	
Production GP Timer Input	On	
Valve kitchen	Off	
Valve Production	Off	
Valve ToiletsGnd	Off	
Network Digital In 1	Off	
Outside Air Temp (Net)	21.6	°C
Boiler Run Sig	Off	
Valve Marketing Suite	Off	
Net Test 1	30.2	°C
Net Test 2	25.0	°C
Net Test 3	25.4	°C
Net Test 4	26.8	°C





Technical Specification

General

	Intuitive PR0650-TDB	Intuitive PR0652-TDB (x2 stepper output)
Operating temperature range	-10°C to 60°C (14°F to 140°F)	-10°C to 60°C (14°F to 140°F)
Storage temperature range	-20°C to 65°C (-4°F to 149°F)	-20°C to 65°C (-4°F to 149°F)
Environmental	Indoor use at altitudes up to 2000m, pollution degree 1, installation category II. Voltage fluctuations not to exceed ±10% of nominal voltage.	Indoor use at altitudes up to 2000m, pollution degree 1, installation category II. Voltage fluctuations not to exceed $\pm 10\%$ of nominal voltage.
Size (H x W x D)	122mm (4.8in) x 280mm (11in) x 67mm (2.6in)	122mm (4.8in) x 280mm (11in) x 67mm (2.6in)
Weight	750g (1.65lbs)	905g (2lbs)
Safety	EN61010-1	EN61010-1
EMC	EN61326: 2013	EN61326: 2013
Ventilation	There is no requirement for forced cooling ventilation	There is no requirement for forced cooling ventilation
Disposal	Please observe local legislation with regards to electrical products.	Please observe local legislation with regards to electrical products.
Origins	Product designed in the UK manufactured in Taiwan.	Product designed in the UK manufactured in Taiwan.

Power Requirements

	Intuitive PR0650-TDB	Intuitive PR0652-TDB (x2 stepper output)
Supply Voltage Range	24 Vac ±10% OR 24 Vdc ±10%	24 Vac ±10% OR 24 Vdc ±10%
Supply Frequency	50 - 60 Hz	50 - 60 Hz
Maximum supply current	<1 Amp	<1 Amp (excluding motor supply)
Typical supply current	0.3 Amps	0.3 Amps

Insulation and Fuse Requirements

	Intuitive PR0650-TDB	Intuitive PR0652-TDB (x2 stepper output)
Class 2 Insulation	No protective Earth is required and none should be fitted	No protective Earth is required and none should be fitted
Supply Fuse	Built in fuse holder, fuse 2A 240Vac Ant surge (T) HRC conforming to IEC60127, 32 x 6.3mm	Built in fuse holder, fuse 2A 240Vac Ant surge (T) HRC conforming to IEC60127, 32 x 6.3mm
Or MCB	2A, 240 VAC Type D conforming to BS EN 60898 (Note: controller has integral 2A fuse)	2A, 240 VAC Type D conforming to BS EN 60898 (Note: controller has integral 2A fuse)
Relay Fuse	10A 240Vac Ant surge (T) HRC conforming to IEC60127, 32 x 6.3mm	10A 240Vac Ant surge (T) HRC conforming to IEC60127, 32 x 6.3mm

Relay Specification

	Intuitive PR0650-TDB	Intuitive PR0652-TDB (x2 stepper output)
Mechanical Relay		
Max current	10A Resistive (Cos \emptyset = 1) 5A Inductive (Cos \emptyset = 0.4)	10A Resistive ($\cos \emptyset = 1$) 5A Inductive ($\cos \emptyset = 0.4$)
Max voltage	250Vac. 30V dc	250Vac. 30V dc
Relay Spacing	Relays 1-6 are spaced to allow the use of mains or low voltage on any relay.	Relays 1-6 are spaced to allow the use of mains or low voltage on any relay.
	Relays 7-12 must be either all mains or all low voltage	Relays 7-9 must be either all mains or all low voltage.
Solid State Relay (SSR)		
Max Current	1A	1A
Voltage	12-240Vac only, will not switch dc	12-240Vac only, will not switch dc



Stepper Outputs

	Intuitive PR0650-TDB	Intuitive PR0652-TDB (x2 stepper output)
Power Supply		A 24V AC or DC power supply must be connected to the Stepper board input "Stepper Power" to operate the stepper outputs.
Stepper Rating		The type of Stepper motor used with the Stepper Board must conform to the following: - Bipolar Chopper Drive - Max 825mA or 8W
Current Protection		RDM advise the use of a suitable external over-current protection device

Note: The use of centre tapped to earth transformers is not allowed. This is to prevent damage to the transformer and/or controller.

The host equipment must provide adequate protection against contact to hazardous live parts.

RDM advise the use of a suitable external over-current protection on the Controller.

Warranty may be invalidated due to excess current being unlimited if there are no fuses/circuit breakers installed on the Plant Controller.

Status Inputs

0 volt return or 24 Vac (24 Vac must be the same as the supply 24 Vac).
If a 24Vac signal is being sourced from the controller power supply then do not ground the Status Input common rail, this is grounded internally, only a 24Vac signal taken from the controller power supply as an input is required.
If using an external 24Vac signal i.e. not obtained from the controller power supply then it is necessary to supply the 24Vac signal as well as the 0 Volt for the status input common from the external power supply.

Analogue Inputs

4-20mA	4-20mA current loop, use the 12 Vdc output to feed the 4-20mA device.
0-10V	Connect a 0-10Vdc signal.

Communications

Ethernet10/100baseT	Single port for connection to an IP network
CANbus Interface	A maximum of 10 expansion boards can be connected to a single
	Intuitive/Plant controller to expand the available IO. Please see
	Connecting an Expansion Board to an Intuitive or Plant Controller for
	further details.



Analogue Outputs

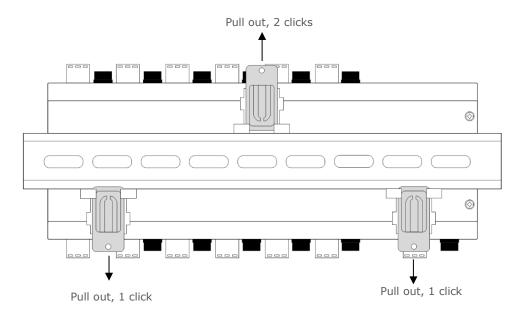
0 to 10 Volts DC or 4-20mA. (Selected in the properties box of the output block)
Note 1: The 4-20mA output will not operate correctly if the target device input impedance is > 75Ω
Note 2 : The 0-10V output will not operate correctly if the target device input impedance is $< 10 \text{K}\Omega \text{ A}$ 50mA fuse is recommended for this output.
Note 3 : On the intuitive variant, when using the universal 0-10V output to drive an inductive load such as a relay coil, a back e.m.f. protection diode must be fitted. The cathode should connect to the output terminal and the Anode to GND/Return terminal. The maximum load current that can be supplied from these outputs is 38mA. The mercury plant cannot be used to drive a relay coil.

Surge Protection

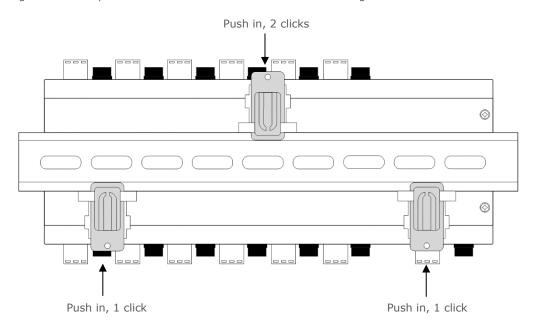
Installations subject to high levels of electrical transients (Voltage spikes/lightning strikes) may require the fitting of protection devices to the external wiring of device's Mains supply input, RS485 ports, CAN port, or Ethernet ports. Please refer to document DM & Network Surge Protection for information on suitable devices and their application. Refer to the device manufacturers directions for detailed fitting instructions.



Installation Mounting on to a DIN rail, Intuitive Controller



The Intuitive controller has three DIN rail mounting feet which can slide in and out to three different positions, sliding into each position is accompanied by a "click" which locks the foot into that position. To install the controller onto a DIN mounting rail, from the fully pushed in position slide the top mounting foot out by 2 clicks so that the foot is clear of the DIN rail channel. Slide the bottom two feet out by one click so that they are protruding slightly into the DIN rail channel. The controller can now be inserted onto the DIN rail by inserting the bottom lip of the DIN rail behind the two bottom mounting feet



The controller can now be pushed flat onto the DIN rail and the top foot pushed in 2 clicks to hold the controller in place. Finally, push the bottom two feet in by one click to secure the controller.

The mounting feet also have M3 holes for direct mounting where DIN rail is not being used.



Clearances

The controller must have 10mm clearance above the top and 15mm clearance from the sides. Clearance at the front and rear is dependent on the site wiring.

There is no requirement for forced cooling ventilation

Cleaning

Do not wet the controller when cleaning. Clean the front by wiping with a slightly damped lint free cloth.

Terms of Use

Software running on this equipment is licensed for use. In using this equipment you are agreeing to Resource Data Management Ltd.'s standard Terms and Conditions for Software Licensing. To obtain a copy of the Terms and Conditions please visit our website <u>www.resourcedm.com</u> and select Technical Documentation.

Web Services

Below is a list of currently supported web services. Web services can be used to obtain data from the Controller or make changes to certain items.

GetAlarmList GetGPTimerChannel GetGPTimerChannels GetLogDataInline GetLogItem GetLogItemInline GetSlave GetSyslog GetTDBInfo GetVersion SetGPTimerChannel SetSlave

To view the controller Web Services interface and find further details browse to the following address: -

http://????????/cgi-bin/cgi.cgi?WSDL

Where ???????????????? is the IP address of the controller.

For full details on web services please contact RDM Technical support.

Controller Power Supply Unit: PR0625

PR0625 is a Meanwell 24V 2.5A Din Mountable Power Supply Unit (Model DR-60-24) used with the controller. The user document for DR-60-24 can be found under Support on the RDM website.



Appendix 1: Comfort Index

Apparent Temperature for Values of Room Temperature and Relative Humidity (shown in Degree F)

	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%
115	117.1	118.0	119.0	119.9	120.8	121.6	122.5	123.5	124.4								
110	111.1	112.0	113.0	113.9	114.8	115.6	116.5	117.5	118.4	119.3	120.1						
105	105.1	106.0	107.0	107.9	108.8	109.6	110.5	111.5	112.4	113.3	114.1	115.0	116.0				
100	99.2	100.1	101.0	101.9	102.8	103.7	104.6	105.5	106.4	107.3	108.2	109.1	110.0	110.9	111.8		
95	93.1	94.0	95.0	95.9	96.8	97.6	98.5	99.5	100.4	101.3	102.1	103.0	104.0	104.9	105.8	106.6	107.5
90	87.1	88.0	89.0	89.8	90.7	91.6	92.5	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.5
85	81.1	82.0	83.0	83.9	84.8	85.6	86.5	87.5	88.4	89.3	90.1	91.0	92.0	92.9	93.8	94.6	95.5
80	75.1	76.0	77.0	77.9	78.8	79.6	80.5	81.5	82.4	83.3	84.1	85.0	86.0	86.9	87.8	88.6	89.5
75	69.2	70.1	71.0	71.9	72.8	73.7	74.6	75.5	76.4	77.3	78.2	79.1	80.0	80.9	81.8	82.7	83.5
70	63.1	64.0	65.0	65.8	66.7	67.6	68.5	69.5	70.3	71.2	72.1	73.0	74.0	74.8	75.7	76.6	77.5

Apparent Temperature for Values of Room Temperature and Relative Humidity (Shown in Degree C)

	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%
46.1	47.3	47.8	48.3	48.8	49.3	49.8	50.3	50.8	51.3								
43.3	43.9	44.4	44.9	45.1	45.9	46.4	46.9	47.4	47.9	48.4	48.9						
40.6	40.7	41.2	41.7	42.2	42.7	43.2	43.7	44.2	44.7	45.2	45.7	46.2	46.7				
37.8	37.3	37.8	38.3	38.8	39.3	39.8	40.3	40.8	41.3	41.8	42.3	42.8	63.3	43.8	44.3		
35.0	34.0	34.5	35.0	35.5	36.0	36.5	37.0	37.5	38.0	38.5	39.0	39.5	40.0	40.5	41.0	41.5	42.0
32.2	30.6	31.1	31.6	32.1	32.6	33.1	33.6	34.1	34.6	35.1	35.6	36.1	36.6	37.1	37.6	38.1	38.6
29.4	27.2	27.7	28.2	28.7	29.2	29.7	30.2	30.7	31.2	31.7	32.2	32.7	33.2	33.7	34.2	34.7	35.2
26.7	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0
23.9	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1	24.6	25.1	25.6	26.1	26.6	27.1	27.6	28.1	28.6
21.1	17.3	17.8	18.3	18.8	19.3	19.8	20.3	20.8	21.3	21.8	22.3	22.8	23.3	23.8	24.3	24.8	25.3



Appendix 2: Supply & Status Input Wiring

Method 1

Uses the 24Vac of the transformer supplying the input voltage; which is returned via a switch (or relay) to the status input signal line. No OV is required at the status connector.

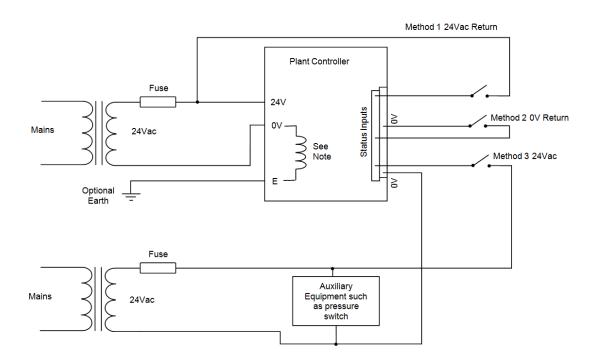
Method 2

Uses a 0V return (from the status connector) to the status signal input.

Method 3

Uses a 24Vac signal derived from another transformer (supplying an auxiliary piece of kit) to feed the status input signal line. Note the auxiliary transformer must be referenced to the Plant Controller supply transformer.

All transformers that have a connection to the Plant Controller must have their primaries connected to the same phase. Transformer should have fuse fitted in line with 24V input as per diagram.



Note: Current versions of Plant hardware have 0V and Earth linked internally via an inductor, this is recognisable by Status LED. See diagram on page 9 for location of status LED

The use of centre tapped to earth transformers is not allowed. This is to prevent damage to the transformer and/or controller.



Appendix 3: Stepper Rate (Frequency Hz)

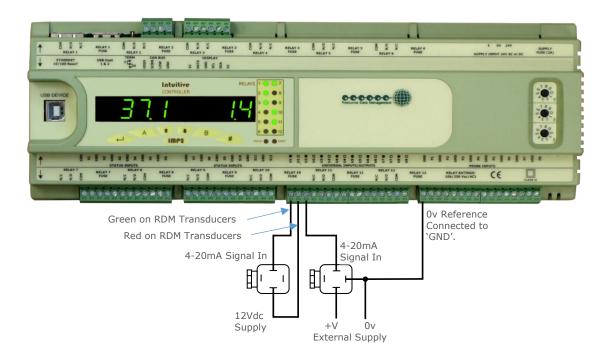
When configuring the Rate (Hz) for a Stepper output the following table applies.	
--	--

Rate Entered	Speed Set (Hz)	Rate Entered	Speed Set (Hz)
500 and above	500	86 to 90	90
251 to 333	333	81 to 85	85
201 to 250	250	76 to 80	80
167 to 200	200	71 to 75	75
144 to 166	166	66 to 70	70
126 to 143	143	61 to 65	65
112 to 125	125	56 to 60	60
101 to 111	111	51 to 55	55
96 to 100	100	50 and below	50
91 to 95	95		

Please confirm with the Stepper valve manufacturer datasheets to select the correct step frequency. Note hardware manufactured before 2015 will not provide a holding current. In a small number of applications this may be required to ensure the correct operation.

Appendix 4: Typical 4-20mA Input Connection

When using a 4-20mA input device (such as a pressure transducer), the controller supplies a 12vdc supply to power the device and measures the 4-20mA current level being returned by the device, the connections for this setup are shown below on the below left, connected to universal IO1. If the 4-20mA device utilises its own power supply then the 12vdc supply from the controller is not required and should not be connected, only a 4-20mA signal input and 0v (or GND.) reference should be connected. This setup is shown below on the right, connected to universal IO2:



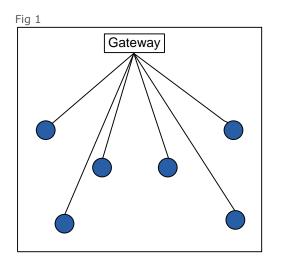


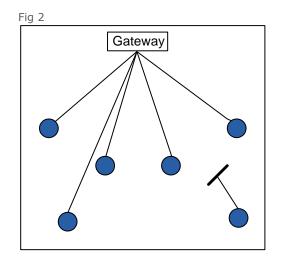
Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product.

Appendix 5: Wireless Mesh Technology

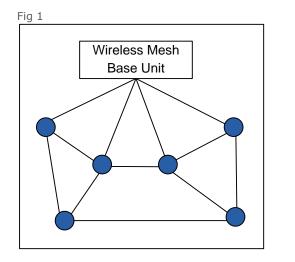
Typical Non Wireless Mesh Network

Shown below is a typical wireless network. As per Fig 1, each wireless device communicates directly to a central point, which is the gateway. Any data provided by a device on the wireless network is relayed via this gateway.

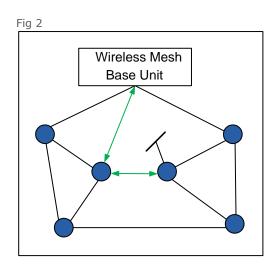




If any wireless device loses direct communication with the gateway, e.g. a structure is erected in front of the unit as seen in Fig 2, then the wireless device would be unable to send/ receive any data to/ from the gateway. This results in having to either move the wireless device, the obstruction or the gateway to restore communication.



Shown below is the RDM Wireless Mesh System



With the RDM wireless mesh system wireless devices 'talk' to each other and if a device doesn't have direct communication with the wireless mesh base unit, which is the gateway, then its data can be forwarded via one of the other wireless mesh devices which is in range of the wireless mesh base unit as shown in Fig 2.

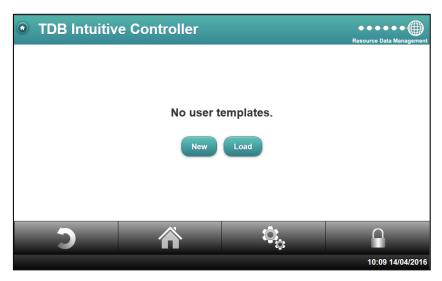


Appendix 6: Type Editor User Guide

Before any template can be added to the controller the feature must be enabled using part number PR0655-TYP. Multiple user type 'slots' can be added using the same part number. It can either be ordered when purchasing the controller, or later activated by RDM tech support. If the controller is not remotely accessible then using the '<u>Add Feature'</u> menu, an activation code can be given.

Note: Before using this feature, a full understanding of Modbus and the 3rd party unit is required. RDM tech support will not offer assistance out with the bounds of our product.

The Editor



Opening the Type Editor will result in the above page. At this point there are only two options, to either start a new 'template' or load a previously created one.

New template

Having clicked on 'New' it will launch the below;



As shown, there are four tabs to select from; Details, Inputs, Scales and Exit. **Note**: With 'OEM' enabled, there will be two additional tabs; Outputs & Parameters. For more information please consult RDM Technical Support. When using parameters, their aliases must be unique and not conflict with any other points.

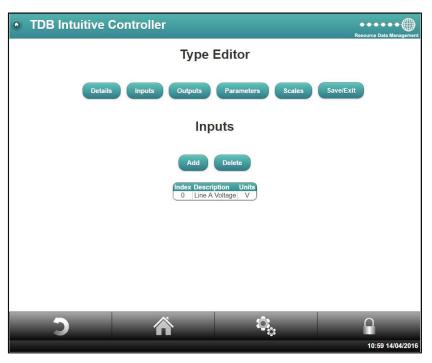


Details Tab

This allows general information relating to the template's description, date, creator's name along with the option to insert a password. Leave blank if no password is necessary.

Inputs Tab

The input section is where the viewable IO of the device is listed and configured with the corresponding Modbus register, type etc.



By either using the 'Add' button to add a new item, or by double clicking on the item already listed it will open a window to change the item's details.

						Resource Data Management
		Туре	Edito	r		
	Item	Unext Outputs Line A Voltage V 999,260,3	Param High 10	eters Scales Edit 99999 Cancel	Save/Ex	kit
5		Â		¢,		11:00 14/04/2016



Description

This is the text string that is shown to identify the item.

Units

Inset the unit type associated to the value. E.g. V, A, kwHr, Lux etc.

Туре

The type will either be 'numeric' or 'string'.

When set to numeric it will simply show the number from the register. The high and low fields should be used to indicate the potential limits to the value.

If set to 'string' it will associate the text (inserted in the fields) to the numerical value in the register. By using the fields at the bottom of the window, beginning at 0000, enter the text you want to appear in the field next to it. Pressing the 'Return' key will create a new field with a '0001' next to it. Again, enter the text to be associated to the value.

E.g. having the following inserted; '0000' – Off; '0001' – On. When the register reads either a 0 or a 1, it will show in the IO list either, 'Off' or 'On'.

Scale

Provides the option of scaling the register value by dividing or multiplication.

Tag

The 'tag' requires all the details of how to read the Modbus register and the type of data it holds so it can be translated to the relevant information when extracted;

• TDB Intuitive Con				Resource Data Management
	Ту	pe Edi	itor	
Details				Save/Exit
Tag				
Read		-		
Register Write	999	Туре	03 - Read holding registers 🔻	
Register Format		Туре	01 - Read coils 🔹	
Item type	IEEE 754 ▼	✓ Invert	Extend	
Mask	0	Sense	Swap	
• Scaling	None			
0	Fixed Variable	Multiply by v		
	ок		Cancel	
		, 		
5			Û,	
				11:00 14/04/2016

Register

Insert the register number for the template to look at.

Туре

Select the Modbus function to read from the register. The editor only supports functions 01 to 04. For writable functions, please consult RDM tech support.



Please ensure all power is switched off before installing www.resourcedm.com or maintaining this product.

Item type

Select the type of data that the Modbus register holds. The options are;

- Word reads 16bits
- DWord reads x2 16bit registers (32 bits)
- IEEE 754 reads x2 16bit registers and treats as a 32 bit floating point number
- Coil reads a single bit
- None no type selected.
- Large-64 reads a 64bit register but only uses the lower 32bits
- Large-64/x reads a 64bit register, divides by x but only uses the lower 32bits

Note: when using any of the 'large-64' item types, it reads in all 64 bits but can only use the lower 32bits.

Mask

Insert the mask required. For example this may be required if the Modbus register holds individual bits to be read from a register containing a word. For example if a register (16 bits) returned 1111 0000 101**0 1**000, to read bit 3, insert the mask '8' (decimal). To read bit 4, enter 16 etc.

Invert

Refers to how the byte data is read from the register. Whether it is big-endian or little-endian. It can be used in either 16 or 32 bit registers. For example;

Example 1 – 16 bits If the returned data is in the byte sequence: AA BB

With Invert off it will be read as: BBAA

With Invert on it will be read as: AABB

Example 2 – 32 bits If the returned data is in the byte sequence: AA BB CC DD

With Invert off it will be read as: DDCCBBAA

With Invert on it will be read as: AABBCCDD

Extend

If the value read can be a negative value then tick this box, for example, a signed integer. When ticked, it will use Two's Complement to decipher if the number is negative or not. If unticked, it will assume the full word/ register is positive.

Sense

Inverts the 'sense' of a binary value. I.e. when ticked, it interprets a returned '0' value as 'on', '1' as 'off'. Normally only used with coils or 'masked' values reading single bits.



Swap

The 'Swap' function can only be used with 32bit registers. When checked, it will swap the ordering of the returned 'words'. For example;

Example 1

If the returned data is in the byte sequence: AA BB CC DD

With Swap off it will be read as: DDCCBBAA

With Swap on it will be read as: BBAADDCC

If required, both Invert and Swap functions can be used, for example;

Example 2 If the returned data is in the byte sequence: AA BB CC DD

With Invert Off Swap Off it will be read as: DDCCBBAA

With Invert Off Swap On it will be read as: BBAADDCC

With Invert On Swap Off it will be read as: AABBCCDD

With Invert On Swap On it will be read as: CCDDAABB

Scaling

Scaling has 3 types; None, Fixed or Variable.

- **None**: No scaling will be applied to the value.
- **Fixed**: Choose between 'multiply' or 'divide' by the value entered.
- Variable: Used in conjunction with the '<u>Scales'</u> section. In the field the variables; \$V, \$0, \$1, \$2.... \$N can be used to manipulate the value. \$V refers to the value taken from the register. \$0, \$1, \$2...\$N refer to the indexed scale registers (in Scale Tab) where index 0 is \$0, index 1 is \$1, index 2 is \$2 and so on.

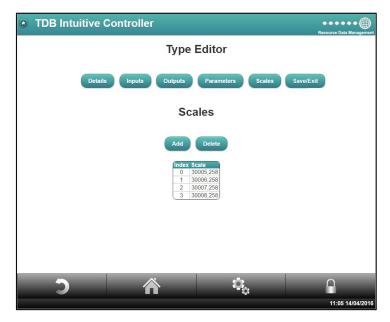
The operands; `+' (plus); `-' (minus); `*' (multiply); `/' (divide); `%' (mod); `&' (bitwise and); `^' (bitwise xor) `eq'; `pow'; 'log''log 10'; `exp' and `sqrt' can be used in the `variable' field.

E.g. with the variable scale set to " V^{0} " it will multiply the value in the register by that of the value in the scaling register 0^{0} .



Scales Tab

In some devices, there are dedicated registers advising of the scale applied to the values in other registers. In this section insert the details of how to read these registers. It uses the same format as the input section to define the registers.



Once created, the scaling values taken can be applied to the values by using the method described in the variable scaling section. The scales, as mentioned can be referred to by using \$0, \$1, \$2, \$3.

Save/ Exit Tab

Once the template is complete, click the 'Exit' button, this will confirm the save. It will also offer the options to exit without saving or 'cancel' the exit. The template will be saved and accessible through the Type Editor menu:

• TDB Intuitive C	ontroller			Resource Data Management
		User template	S.	
	User Template Energy Meter 1	Edit	Save Delete	
	L	J ,		
C			¢,	
				11:07 14/04/2016

Following the creation, the template can be saved to a local PC, using the 'Save' button. The format will be saved as an xxxx.typ. When saved, the template can be re-used on other devices as long as the User Template feature is activated.



Load

The 'Load' feature can be used to utilise a previously generated (and saved) type file on another device. When clicked, navigate to the saved type file on your local PC and load it on.

Now that the type file has been generated it can be used to communicate with the third party device. Using the method outlined in <u>Add Modbus Device</u> section, the type will be in the drop down menu to select. Once added, it will be viewable:

	Description	Network	Status
ENERGY		Modbus	Normal
Meter1	Enviro ENV900	Modbus	Normal
RC00-1	Wireless Monitor I/O	Wireless	Normal
RC00-2	Wireless Monitor	Wireless	Normal
WPR000	Wireless Probe	Wless Probe	Normal
WPR001	Wireless Probe	Wless Probe	Normal
WPR002	Wireless Probe	Wless Probe	Normal
WPR003	Wireless Probe	Wless Probe	Normal
WPR004	Wireless Probe	Wless Probe	Normal
	~	â	0





Mimic – Semi Gauge

Appendix 7: Mimic Details

Extended	Gauge value Digital Value Min Max Low High Low Colour Main Colour High Colour	Analogue Input or Output valueAnalogue Input or Output valueAnalogue Setting block valueAnalogue Setting block valueAnalogue Setting block valueAnalogue Setting block valueBlue in exampleGreen in exampleRed in example
Mimic – Round Gauge	Field	Туре
Control Temp (°C)	Gauge value Digital Value Min Max Low High Low Colour Main Colour High Colour	Analogue Input or Output valueAnalogue Input or Output valueAnalogue Setting block valueAnalogue Setting block valueAnalogue Setting block valueAnalogue Setting block valueBlue in exampleGreen in exampleRed in example
Mimic – Value	Field	Туре
Control Temp -0.1 °C	Value	Analogue Input, Output, State or Setting block value
Mimic – Thermometer	Field	Туре
Hudine Centraler	Value	Analogue Input or Output value
	Min	Analogue Setting block value
Consulting	Max Alert	Analogue Setting block value Alarm block. Note : if no alarm block is assigned the colouring of the thermometer will be defined by the min and max limits.
Barabara.		
Mimic – Override	Field	Туре
TDB Inflative Controller	Override	Select from Override blocks used in TDB program Please consult <u>TDB block</u> for more details on setup
	Field	Туре
Mimic – 3-Way	3-Way	Type Select from 3-Way blocks used in TDB program Please consult <u>TDB block</u> for more details on setup

Field

Туре



Mimic – Alarms	Field	Туре
	N/A	Lists recent alarm activity
• Infutive Controller		
Alterna Decoursed Elevand Dece tary structure (1749 SC character (1747 El an concentre		
Control employation in the substantial of the first of the substantial Control temperature in 1/2010 Control (* / 1/1054 (* Control Control temperature in 2010 / 1/2010 (* 1/2010) (* 1/2010)		
E Store and States		

Mimic – Slide	Field	Туре
TDB Intuitive Controller Display Slide 1	Slide	Select from Slide blocks used in TDB program
110 000		Please consult <u>TDB block</u> for more details on setup
€ \$ 130 E \$ 100 N/ MARCIN		

Mimic – Graph	Field	Туре
	Red Trace	Analogue or Digital Input or Output
· Inturine Contrology	Green Trace	Analogue or Digital Input or Output
	Blue Trace	Analogue or Digital Input or Output
	Yellow Trace	Analogue or Digital Input or Output
_ 	Min	Analogue Setting block value
	Max	Analogue Setting block value
	Period	Graph update frequency
	Absolute/ Relative	select

Mimic – Bar	Field	Туре
	Red Trace	Analogue or Digital Input or Output
· warve Controlor	Green Trace	Analogue or Digital Input or Output
	Blue Trace	Analogue or Digital Input or Output
	Yellow Trace	Analogue or Digital Input or Output
ال	Min	Analogue Setting block value
E China Chin	Max	Analogue Setting block value

Mimic – Status	Field	Туре
	Value	Digital Input or Output value
	Off/ On	Select colour to associate the value's state
Valve Lights		
Case Fans Defrost		
E Sh B		



Disclaimer

The specifications of the product detailed in this document may change without notice. RDM Ltd shall not be liable for errors or omissions, for incidental or consequential damages, directly or indirectly, in connection with the furnishing, performance or misuse of this product or document.

Revision History

15/02/2012 1.22 01 Alarms can now be sent up to 6 different modem destinations 03 R407F added to available gases in the P to T block 04 Ability to e-mail alarms 05 Ability to e-mail alarms 06 Name server support added (DNS) 07 Uses 5 layer touch display 08 New blocks added; NW Param; GP Timer 3; Suction 0 pitmisation; Mercury 2 Display; Match Date; Date Time Block 03 Drop Down Box added in properties for Scale 14/01/2013 1.25 010/7/2013 1.25 010/7/2013 1.26 010/7/2013 1.28 010/7/2013 1.28 010/7/2013 1.28 010/7/2013 1.28 010/7/2013 1.28 010/7/2013 1.28 010/7/2014 1.286 011 Added support for broadcasting. 21/02/2014 1.286 011 Added support added 11/03/2014 1.286 011 Added support dated 25/07/2014 2.00 11/03/2014 1.286 011 Added support for broadcasting. 21/02/2014 1.280 011 Added support dated 12/02/2014	Date	Revision	Update No	Changes
03 R407F added to available gases in the P to T block 04 Ability to automatically export log data 05 Ability to automatically export log data 06 Name server support added (DNS) 07 Uses 5 layer touch display 08 New blocks added; Nw Param; GP Timer 3; Suction 0ptimisation; Mercury 2 Display; Match Date; Date Time Block 24/04/2012 1.23 01 Two-Way Switch Block added 03 Drop Down Box added in properties for Scale 14/01/2013 1.25 01 R410A Gas type added 30/04/2013 1.26 11.28 01 01/07/2013 1.28 11/03/2014 1.28 01 Added support for broadcasting. 21/02/2014 1.28 01 Added support for broadcasting. 21/02/2014 1.28 01 Net eaddet On We Param block regarding finite use. 25/07/2014 2.00 11/03/2014 1.28 01 CANbus description clarified. 11/1/2014 2.01	15/02/2012	1.22		Alarms can now be sent up to 6 different modem destinations
04 Ability to e-mail alarms 05 Ability to automatically export log data 07 Uses 5 layer touch display 08 New blocks added; Nw Param; GP Timer 3; Suction Optimisation; Mercury 2 Display 3: Match Date; Date Time Block Digital Edge; Analogue Edge; Syslog; Display 3-Way Override Block. 24/04/2012 1.23 01 Two-Way Switch Block added 03 Drop Down Box added in properties for Scale 14/01/2013 14/01/2013 1.25 01 R410A Gas type added 30/04/2013 1.27 01 New features added to the Algebra block; Round; Ceil & Floor. 01/07/2013 1.28 01 Added support for broadcasting. 21/02/2014 1.28b 01 Twilight description clarified. 11/03/2014 1.28b 01 Twilight description clarified. 12/01/2014 1.28b 01 SR relay ratings added. 12/02/2014 1.28b 01 SR relay ratings added. 11/03/2014 1.28c 01 Note added to Nw Param block regarding finite use. 12/04/2015 2.00 01 Page 37, allowable characters clarified.			02	
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02 Added Display functionality for using text	15/04/2016	3.0	01	
			03	New Clock Display functionality
04 CT monitoring block				



		05	Added display functionality
		06	Added new units; m ³ /sec, m ³ /min, m ³ /hr, Kg/m ³ , L/sec, L/min,
			L/hr
		07	Added function for users to enter `units' with superscript text
15/06/2016	3.1.0	01	State Block can be selected as a state, input or output
		02	Unrecognised block icon
		03	mini CAN board support
		04	New push text block
		05	New drop down list block
		06	Enhancements to web page mimic animation
		07	some blocks updated to allow 'override'
		08	update to web services function GetSlave and GetInLineData
		09	iOS enhancements
10/00/0010	2.1.2	10	fix parameter menu visibility
12/08/2016	3.1.0a	01	Confirmation of maximum number of bits the type editor can
05/12/2016	3.1.0b	01	read Description of Drop Text block updated
03/12/2010	5.1.00	01	cannot change values using the PR0615 Touch Display
20/12/2016	3.1.0c	02	Update to specification page
25/08/2016	3.2.0	01	TouchXL compatibility added
23/08/2010	5.2.0	01	Screen Alarms menu
		02	Update to mimic setup with appendix
15/09/2016	3.2.1	01	Enhanced security protection
12/01/2017	3.3.0	01	New Humidistat 2 block
12/01/2017	5.5.0	01	New pump block
		02	Wi-Fi SSID scanner and signal strength
		04	Alarm test buttons
		05	Force CGI log in
		06	update to graph mimic to allow digital I/Os
		07	TouchXL status page
		08	BACnet/ RDM-485 setup page
		09	mimic overrides authorisation function
		10	GP channel next buttons added
		11	Https export support added
19/01/2017	3.3.1	01	Update to alarms using http or https
10,01,201,	0.012	02	New retry delay added for automatic exports
14/02/2017	3.3.1a	01	Added ECA approval
02/03/2017	3.3.2	01	Override page available without the need of BACnet enablement.
, ,			Enhancements to mimics
05/05/2017	3.4.0	01	Added support to turn off Web Services
		02	BACnet object instances are now based on item order
		03	Ability to view graphs without having to log in
26/05/2017	3.4.1	01	Support added for automatic restart following a TDB upload
		02	Updated Stepper image
14/07/2017	3.4.1a	01	New documentation format
14/08/2017	3.4.1b	01	BACnet object ID description added
13/10/2017	3.5.0	01	New support for Mini IO board: 4xRelays, 4xAnalogue In
		02	Update to available templates
		03	Update to Analogue Input Block Custom Define: Added "Auto"
			and "Clear" buttons.
		04	New Light sensor probe type option in Analogue Input
		05	New Analogue Input Sensor Block
		06	New feature to auto-populate devices and items with Analogue
			In, Analogue Device In, Digital In, Network Analogue In,
		07	Network Digital In and Network Parameter New Broadcast Receive List
		07	
		08	New CT Monitor 2 block
		09	New DOF2/ ROF2 blocks
		10	Added feature where app does not run Analogue or Digital output
		11	blocks for 10 seconds after start up. Mimic Value allows states to be selected
		11	
		12	Mimic: Add ability to set which is the default mimic page
		13	Mimic: New option to control thermometer Probe mercury colour
		14	using the state of an alarm block New Occupation 2 block
		14	
		15	Options added to Override and Three Way blocks to allow Non- volatile saving of values



		17	Added option to Pump Block where it can be set to ignore run-
			proof
		18	New RPID2/ PID2 blocks
		19	Support added for CANbus comms of Humidistat 2
		20	Time block can now work to a second resolution
		21	Enhanced Type Editor to show scaled Low and High values
		22	Update to save/ Exit button on Type Editor
		23	Web Services now permits values to be returned with 2 decimal
		20	places
		24	Analogue In block Min/Max Limits with default values
03/11/2017	3.5.0a	01	Update to pump block description
18/01/2018	3.5.3	01	optimisation of memory allocation to exports
		02	optimisation of memory allocation to blocks
23/03/2018	3.6.0	01	Update to BACnet library
			Enhanced protection to uploading programs
			Optimisation of memory allocation to exports
			Optimisation of memory allocation to blocks
			Ability for manually entering limit values for mimics
			Enhancements to remote XML option
			LED operation on TouchXL display changed to match plant touch
			Up to 3 Optimisation blocks now permitted per plc
			Update to P2T blocks when setting via DM.
			Remote XML option permitted for WiFi
			Update to web services for scaling hrs:min
31/05/2018	V3.7.0	01	Update to BACnet protocol to permit BBMD setup
		02	Compatibility update to optimisation block in older DMs
		03	Enhancements to Modbus comms
		04	Support for PWM's on V2 expansion boards.
12/06/2018	V3.7.2	01	Update to Version page to show BACnet version
		02	Update to Analogue Sensor block
25/06/2018	V3.7.3	01	Update to mail setup
26/07/2018	V3.7.5	01	Enhanced language support.
		02	Improved support added for reading a Modbus Coil.
20/09/2018	V3.7.6	01	Update to Web Services handling of different time zones
		02	Added BTL approved BACnet stack.
22/10/2018	V3.7.6a	01	Block aliases of Occupancy and Optimisation updated.
		02	Description of Humidistat 2 block updated
05/11/2018	V3.7.6b	01	End of line termination description added
09/11/2018	V3.7.7	01	Support added for new Mini IO expansion board
		02	Support added for new Stepper IO Auto-close expansion board
		03	Update to RDM USA group address details



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