HIGH PERFORMANCE CONTROL
IN A VERSATILE, MODULAR SYSTEM

High performance, high accuracy, high functionality in an I/O system that provides cost effective access to a wide range of advanced functions including PID control with auto tuning and gain scheduling.

Designed to communicate with Modbus RTU, Profibus®, DeviceNet®, or Modbus TCP/IP masters, it can be used for signal conditioning, alarm monitoring, remote data acquisition, or devolved control for systems such as the Eurotherm® Visual Supervisor, PC-based SCADA packages, and PLCs.

Devolved Control
Eight PID blocks, provide an extensive range of control strategies. Each block offers one-shot auto tuning to optimize control performance without the need for specialist knowledge. Every PID block may be a Single PID, Cascade, Ratio or Override controller, each providing the choice of analog, time proportioned, or valve position output.

Mounting Flexibility
Six base sizes are available to take from 2 to 16 I/O modules each. Up to 16 bases may be daisy chained to provide acquisition and multi-loop control solutions with up to 128 I/O per base.

DIN rail mounting allows the 2500 to be located where the control action is required, minimizing the cost of the cable used, as only the communications need be taken to the User Interface. The 2500 may also be mounted on part of the machine, saving the cost of centralized control cubicles.

Easy Configuration
A friendly Windows configurator package, ‘iTools,’ is used to set up the 2500. iTools parameterizes and commissions the I/O points, the Toolkit, and PID function blocks and interconnects the different variables, alarms, function blocks, and I/O. ‘Toolkit blocks’ provide local combinational logic and mathematical calculation.

Summary
The Foxboro PAC System enables secure and reliable process control and information recording with complete redundancy options for maximum availability.

Part of the InFusion Enterprise Control System, the PAC System is ideally suited both for stand-alone applications and for integration into a wider ArchestrA-based control solution.

Business Value
Nonstop control and data acquisition is essential in today’s competitive manufacturing environment. Ensuring your process runs continuously without data loss, regardless of the state of the surrounding environment, can mean the difference between a successful production run and expensive scrap.
GENERAL
Sample rate: 110mSec / Nominal 9Hz
Supply voltage range: 1.8 to 28.8V dc, 30V dc damage may occur
Non Replaceable Fuse: 4A time lag
Rating:
IOC power consumption:
Modbus 1.5W max
Profibus 2W max
Devicenet 2W max
Ethernet (Modbus-TCP) 2W max
I/O Module power consumption:
See module specification below
ECM
Emissions:
EN50081-2: 1994
Immunity:
EN50082-2: 1992
Vibration:
EN60068-2, test FC
Safety
Safety:
EN61010-1: 1993/A2: 1995 Installation cat II, Pollution degree 2 Safety earth and are made to clearly marked earth screen connections: terminals at the bottom of the base
Environmental
Operating Temperature: 0 to 55°C
Storage Temperature: -20 to 70°C
Relative Humidity: 5 to 95 % non-condensing
2500B - BASE UNIT
The base consists of an aluminium extrusion, the internal I/O bus interconnection PCB and mounting supports. The base is designed to be DIN rail mounted, within an enclosure. However, if preferred it can be directly fixed to a bulkhead or mounting plate. Both base and modules can be fixed horizontally or vertically.
Bases are available in several standard sizes to suit the number of modules required in a particular system. The dimensions and weights of the different size bases are detailed in the table below.
Mechanical
Module Capacity
0 2 4 8 10 12 16
Width (mm): 47 87 137 239 289 340 442
Weight Kg (No modules): 0.1 0.25 0.35 0.65 0.7 0.9 1.2
Weight Kg (all modules): 0.25 0.5 1.0 1.9 2.25 2.7 3.6
Mounting:
DIN rail or Bulkhead, can be mounted horizontally or vertically
DIN rail: Use symmetrical DIN rail to EN50022-35 X 7.5 or 35 X 15
Casing:
Without additional protection IP20
Ventilation Space: 25mm free space above and below
Module
I/O Module Sample Rate
IOC Type
2500E
2500E SYSIO
Analog Input and Output
110mSec / Nominal 9Hz
55mSec / Nominal 18Hz
Digital Input and Output
110mSec / Nominal 9Hz
55mSec / Nominal 18Hz
Diagnostic LEDs
Diagnostic LEDs indicate module diagnostic status.
All modules:
A green LED at the top indicates the module is powered
2500C controller module:
3 Yellow LEDs show configuration or standby status, and communications activity.
A red LED indicates failure of the internal self diagnostic routines.
2500M Analog module:
Have red LEDs for each channel to indicate channel failure
2500M Digital module:
Have Yellow LEDs for each channel to indicate the channel state
Live Plug-in
The live plug-in feature means that I/O modules can be replaced under power without any disturbance to the field wiring or other inputs and outputs, reducing downtime and minimizing disturbance to other signal conditioning strategies.
Termination Assemblies
The I/O modules are mounted on the base using terminal assemblies. Terminal assemblies provide the interface between the input and output signals and the I/O modules. Terminal assemblies and I/O modules are keyed to inhibit insertion of the incorrect module; this prevents damage to both equipment and plant.
Test Disconnect / Fuse Units
Terminal assemblies have an optional fuse or a link (isolator or disconnect). This provides a series of connections between the customer terminals and the I/O module, permitting pluggable fuse or link units to be placed in series with the signal. Fuse and link units are not interchangeable. Terminal assemblies that do not have disconnect, have a dummy cover in the same position, providing space for a label to indicate the circuit or cable tag name.
COMMUNICATIONS
iTools is used to set up the type, range linearization and scaling of analog inputs, the PID control type and parameters, and all other functions and features within the 2500.
Soft Wiring
Available on all 2500’s; soft wiring enables interconnection between inputs, Alarms, Maths and Logic ‘Toolkit Blocks’, PID, and Outputs.
Saving and Documenting your Configuration
Once the configuration has been completed the application can be saved as a ‘clone’ file for repeat application. Clone files can be loaded, copied, saved and edited both on and off-line.
2500E – Control module for a base unit
The Input Output Controller (IOC) is the Central Processing Unit of the 2500 DIN rail controller. Each 2500 base has an IOC module mounted in the extreme left-hand position. The control module communicates with the I/O modules via the internal I/O bus. Module interconnection is via the Base Unit PCB. This PCB also provides the internal power required by the I/O modules.

Control Blocks
Control Loops: Up to 8 control blocks
Control modes: On/Off, single PID, Cascaded PID, Ratio
Control outputs: Analog, Time Proportioned or Motorized
Cooling algorithms: Cooling: Linear, Water, Fan, Oil
Tuning: One-shot Auto tuning or Manual.
Number of PID sets: Three
Auto/Manual control: Bumpless transfer or forced manual O/P available

CONTROL
PID and User Alarms
All Analog inputs and outputs share a common, comprehensive alarm capability in addition to the I/O alarms.

Number of user alarms: 4 per PID block plus 4 additional user alarms
Alarm types: High absolute, Low absolute, Deviation high, Deviation low, Deviation band, Rate of change
Alarm modes: Latching or non-latching, Blocking, Energized or de-energized in alarm

2500 Remote I/O (Modbus, DeviceNet or Profibus)
The modularity of the 2500 makes it easier to create I/O blocks with just the correct mix of Inputs and Outputs, enabling you to distribute the acquisition equipment geographically saving the cost of expensive multi-core or compensation cables. Up to sixteen 2500 base units may be daisy chained to provide complex distributed multi-loop control or acquisition applications. These are easily linked to an operator interface unit, SCADA package or supervisory PLC. They can also share the communications bus with other external devices such as discrete controllers, indicators, chart recorders, or drives.

2500 Intelligent Alarm Monitor
Alarm Outputs (contact trips) may be triggered, based on sensed or calculated values. Calculated values can be derived from a comprehensive library of maths and Boolean functions. Alarms can be triggered upon violation of high or low threshold, deviation from a constant or sensed input, and from calculated values. Rate of change alarms are also available.

Process Alarming
Thresholds, Deviation or rate of change

Plug-in I/O Modules
Hot swap
Cost effective
Optional Keys
Software configured

I/O Module Types
2 channel universal analog input
3 channel high bias analog input
4 channel universal analog input
2 channel analog output
4 channel digital input
6 channel AC input
8 channel digital input
4 channel logic output
4 channel relay output

I/O Bases
From 2 to 16 Modules

Toolkit Block
‘Toolkit blocks’ provide the mathematical or logical expressions required in creating an application. The functions are wired together using ‘drag and drop’ techniques simplifying complex applications. The Toolkit block variables are parameterized using pull down lists or by direct data entry.

User variables: 16 real values per base
Analog function blocks: 32 function blocks per base; Add, Subtract, Multiply, Divide, Absolute difference, Maximum, Minimum, Hot swap, Sample and hold, Power, Square root, Log, Ln, Exponential, Select Logic
Digital function blocks: 32 function blocks per base; AND, OR, XOR, Latch, Equal, Not equal, Greater than, Less than, greater than or equal to, less than or equal to
Timing functions: 8 Timers 8 Totalizers 8 Counters

2500 Signal Conditioning
The 2500 signal conditioning "solution provider" for multiple signal inputs offers the answer to complex signal conditioning challenges. The different base sizes and I/O structure enables users to match I/O modules to suit the precise needs of individual applications. Used as a signal-conditioning unit the 2500 can be configured to solve complex signal conditioning problems. It enables easy link access to analog and digital inputs and outputs while still offering high speed industrial standard serial communication, to suit your data acquisition requirements.

Humidity Function Block
A special Humidity function block calculates the relative humidity or dew point (Process Value) using the wet and dry bulb measurement technique. Pressure compensation can be measured via a transmitter and soft wired to the block from an input or can be set as a fixed parameter.

Zirconia Function Block
This feature is used to measure carbon potential, furnace dew point or oxygen concentration.

Communications
The IOC module optionally supports Modbus RTU, DeviceNet or Modbus TCP communications.

Modbus RTU:
- 3-wire RS232, RJ11 (Normally used for configuration)
- 4-wire RS485 (Field comm's configuration) Connectors 2 x RJ45

DeviceNet:
- Jumper selectable 2 or 4-wire RS485 (Field comm's configuration) Connectors 2 x RJ45

Modbus TCP/IP:
- CAN - 500kb "Open" connector
- 10baseT, RJ45

Profibus DP:
- High speed RS485. Up to 12Mbits Connectors 9 pin D connector or 2 x RJ45

Supported probes:
- Bosch Carbon, AAC, Drayton, Accucarb, SSI, MacDhui, Oxygen, Log Oxygen, Bosch, Dewpoint.

Supported algorithms:
- Linear, Water, Fan, Oil
- Valve control with or without feedback compensator, Pressure compensation technique
- Wet and dry bulb measurement using AACC, Drayton, Accucarb, SSI, MacDhui, Oxygen, Log Oxygen, Bosch, Dewpoint.
2500MF-A: Two Channel Analog Input

This analog input module is used to monitor analog signals from a wide range of plant sensors. The mA and TC inputs each require the appropriate terminal unit. The second channel of the AI2 has a special high impedance range for use with zirconia probe inputs.

No of channels: 2
Input types: TC, RTD, Volts, mA, mV, Potentiometer, Pyrometer, Zirconia probe
mA range: -150mA to +150mA at input impedance >100MΩ
mV range: -22mA to +22mA with 5Ω burden in the terminal unit
Volts range: -10.2V to +10.2V at input impedance 303kΩ
RTD support: Support for 2, 3 and 4 wire resistance thermometer devices
Hi Ohms range: 0 to 6000 2, 3 or 4 wire lead compensation
Pot range: 0-100% rotation (100Ω to 7kΩ pot)
Resolution: Better than 0.001% of range
Linearity: Better than 0.003% of range
Input filtering: OFF to 999.9 seconds
Input accuracy: Electrical input factory calibrated to better than 0.1% of reading
System isolation: Reinforced, 264V ac maximum
Channel isolation: Reinforced, 264V ac maximum between thermocouple channels
Functional: 264V ac maximum between RTD, volts and mA
Series mode rejection: 60dB (50-60Hz)
Common mode rejection: 120dB (50-5kHz)
Power consumption: 2W maximum

TC Input Specification
Linearization types: J, K, L, R, B, N, T, S, C, PL2, PT100, Linear, SqRoot, plus custom
CJC system: Measured by RTD fitted on terminal unit
Initial CJC accuracy: ±0.5°C typical (±1°C maximum)
CJC rejection: Better than 30:1 over -10°C to +70°C

Note: User calibration options can improve performance, limited only by noise and non-linearity.

2500MF-C: Three Channel Analog Input

Provides three isolated current input channels specifically designed to meet the requirements of modern two wire transmitters. Each channel has its own isolated 24V supply for transmitter excitation. Each channel's 24V dc supply is protected against short circuit and utilizes a sophisticated trip and try system in which the module senses over current and cuts the power. After a period the circuit checks for continued circuit malfunction. The module can be optionally fitted with disconnects to allow isolation of an individual input and allow work on the loop to continue safely.

No of channels: 3
Input range: -28mA to +28mA
Resolution: Better than 1μA (16 bits with 1.6 sec filter time)
Linearity: Better than 0.1μA
Initial accuracy: Factory calibrated to better than ±0.1% of reading
Input filtering: OFF to 999.9 seconds
Burden resistance: 60Ω nominal, 50mA max current
Channel PSU: 22-25V dc, current limited 30mA nominal, self-resetting
System isolation: Reinforced, 264V ac maximum
Channel isolation: Functional, 50V ac maximum
Power consumption: 4W maximum

Notes:
1. User calibration options can improve performance, limited only by noise and non-linearity.
2. Total burden can be increased to 250Ω or HART by cutting a link track on the terminal unit.

AI2 – ORDER CODE

Module
2500M/AI2UNIV Two Channel - isolated universal input
Terminal Unit
2500T/AI2/TC/NONE Terminal unit for TC with CJC
2500T/AI2/DC/NONE Terminal unit for mA, V, PT100, HI inputs
2500T/AI2/DC/SHUNT Terminal unit for 5 ohm shunt fitted for mA

AI3 – ORDER CODE

Module
2500M/AI3UNIV Three channel - isolated 4-20mA analog input w/isolated 24V Tx PSU
Terminal Unit
2500T/AI3/UNIV/NONE Terminal unit with dummy cover fitted
2500T/AI3/UNIV/DCONNECT Terminal unit with disconnect

2500MF-D: Four Channel Analog Input
This analog input module is used to monitor analog signals from a wide range of plant sensors. The mA and TC inputs each require the appropriate Terminal Unit.

- No of channels: 4
- Input types: TC, mV, mA, Pyrometer mV range: -150 - +150 mV at input impedance >100MΩ, mA range: -22 - +22 mA with 5Ω burden in the terminal unit
- Resolution: Better than 0.001% of range
- Input filtering: OFF to 999.9 seconds
- Initial input accuracy: Electrical Input Factory Calibrated to better than 0.1% of reading with 5Ω burden in the terminal units, better than 0.2% of reading
- System Isolation: Reinforced, 264V ac maximum
- Channel isolation: Functional, 264V ac maximum separating Ch1 and Ch2 from Ch3 and Ch4
- Series mode rejection: 60dB (50-60Hz, 1mA rms)
- Common mode rejection: Better than 30:1 over -10°C to +70°C
- Power consumption: 2W maximum

TC Input Specification
- CJC system: Measured by RTD fitted on terminal unit
- Initial CJC accuracy: ±0.5°C typical ±1°C maximum
- CJC rejection: Better than 30:1 over -10°C to +70°C

Notes:
1. User calibration options can improve performance, limited only by noise and non-linearity.
2. Wiring care and sensor choice should be used to prevent ground loops when using non-isolated TCs.

2500MF-E: Two Channel Analog Output
This analog output module provides two isolated analog output channels. Each output can be independently configured for current or voltage mode. The module can be optionally fitted with disconnects for isolation of an individual output to allow work on the individual loop to continue safely.

- No of channels: 2
- Current output: -0.1 to 20.5 mA; 10V dc max. Compliance with total burden less than 500Ω
- Voltage output: 0 to 10.1 V dc; 20mA max. compliance with total load greater than 500Ω
- Voltage output: 0 to 10.5 V dc; 8mA max. compliance with total load greater than 1500Ω
- System Isolation: Reinforced, 264V ac
- Channel isolation: Functional, 264V ac
- Power consumption: 2.2W maximum

AI4 – ORDER CODE
Module 2500M/AI4/UNIV Four channel – T/C, mV, mA input
Terminal Unit 2500T/AI4/TC/NONE Terminal unit for 4 channel TC with CJC
2500T/AI4/mV/NONE Terminal unit for 4 channel mV
2500T/AI4/mA/NONE Terminal unit for 4 channel mA

AO2 – ORDER CODE
Module 22500M/AO2UNIV Two channel isolated mA, volts
Terminal Unit 2500T/22500M/AO2UNIV/NONE Terminal unit
2500T/22500M/AO2UNIV/DCONNECT Terminal unit with disconnect
2500MF-L/-M: Eight Channel Logic/Contact Input

This eight channel digital input module accepts eight logic inputs and is available in two factory option formats for voltage or contact closure input.

**No of channels:** 8

**Input functions:** On/Off pulse and de-bounce inputs with input invert

**System isolation:** Reinforced, 264V ac maximum

**Channel isolation:** 50V ac functional isolation, 4 pairs of channels

**Power consumption Logic:** 1W maximum

**Contact Variant**

- **ON state:** Input resistance threshold 100Ω (<1KΩ typical)
- **OFF state:** Input resistance threshold 10KΩ (>7KΩ typical)

**Wetting current:** 4mA typical

**Logic Variant**

- **ON state:** Input voltage threshold >10.8V dc, 30V max.
- **OFF state:** Input voltage threshold <5.0V dc non-overlapping

**Input impedance:** 5KΩ approx. (> 3mA drive required for ‘ON’)

2500MF-G: Four Channel Digital Input

This digital input module accepts four logic inputs, and can be wired either for voltage input (either polarity) or for contact closure.

**No of channels:** 4

**Input functions:** On/Off, pulse and de-bounce

**System isolation:** Reinforced, 264V ac

**Channel isolation:** Channels share a common connection

**Power consumption:** 0.45W maximum

**‘Contact’ Variant**

- **ON state:** Input resistance threshold 100Ω (<1KΩ typical)
- **OFF state:** Input resistance threshold 10KΩ (>7KΩ typical)

**Wetting current:** >8mA

**Logic Variant**

- **ON state:** Input voltage threshold >10.8V dc, 30V max.
- **OFF state:** Input voltage threshold <5.0V dc non-overlapping

**Input impedance:** >3mA drive required for ‘ON’

2500MF-K: Six Channel AC Voltage Input

The six channel digital input module accepts AC voltage inputs and is available in two factory options optimized for 115V ac or 230V ac ranges.

**No of channels:** 6

**Input functions:** On/Off or de-bounce

**Frequency:** 47Hz-63Hz

**System isolation:** Reinforced, 264V ac maximum

**Channel isolation:** Functional, 264V ac maximum

**Power consumption:** 0.45W maximum

**‘115V ac’ Variant**

- **Active ON state:** >95V ac rms, 132V ac rms maximum
- **Inactive OFF state:** <30V ac rms
- **Min input current:** More than 2mA required for ‘ON’
- **Maximum input current:** 8mA

**‘230V ac’ Variant**

- **Active ON state:** >180V ac rms, 264V ac rms maximum
- **Inactive OFF state:** <60V ac rms
- **Min input current:** More than 2mA required for ‘ON’
- **Maximum input current:** 9mA

INADVERTENT USE OF THE WRONG RANGE
115V type on 230V ac No damage will result. Power dissipation will be higher than desirable for continued use on all 6 channels simultaneously. THIS IS NOT A RECOMMENDED MODE OF OPERATION

V-I curve for 115V ac operation

V-I curve for 230V ac operation

DI8 – ORDER CODE

**Module**

- 2500M/DI8/logic/NONE: Eight channel - non isolated Logic
- 2500M/DI8/contact/NONE: Eight channel - non isolated Connect

**Terminal Unit**

- 2500T/DI8/UNIV/NONE: Terminal unit
- 2500T/DI8/UNIV/CONNECT: Terminal unit with disconnects

DI6 – ORDER CODE

**Module**

- 2500M/DI6HVAC/230V: Six channel high voltage 230 volt ac logic
- 2500M/DI6HVAC/115V: Six channel high voltage 115 volt ac logic

**Terminal Unit**

- 2500T/DI6/UNIV: Terminal unit with dummy cover fitted
- 2500T/DI6/UNIV/CONNECT: Terminal unit with disconnects
2500MF-G Four Channel Logic Output
This digital output module provides four logic outputs and is available in two factory option formats for standard or high-current output.

- **No of channels:** 4
- **System isolation:** Reinforced, 264V ac max
- **Current consumption:** 100mA max
- **Output functions:** TPO and VP in module

**‘Logic’ Variant**
- **Voltage supply:** 18 < Vs < 30V dc
- **Output current:** >8mA high drive per channel (Current limited)
- **Output Voltage:** At least Voltage supply (Vs) -3V switch drop

**‘24’ Variant**
- **External supply:** 12 < Vs < 30V dc
- **Output current:** 100mA maximum high drive per channel (Current & Temperature limited)
- **Output Voltage:** At least Voltage supply (Vs) -3V switch drop

2500MF-F: Four Channel Relay Output
This digital output module provides four relay outputs. The relay contacts are all fitted with removable snubber circuits to reduce contact arcing and prolong contact life.

- **No of channels:** 4 (3 normally open + 1 changeover)
- **Max current rating:** 2A at up to 240V ac; 0.5A at 200V dc, increasing to 2A at 50V dc (resistive)
- **Min ratings:** AgCdO contacts offer best operating life switching more than 100mA 12V
- **Fuse (option):** 3.15A, 20mm ceramic, time lag (T), in terminal unit
- **System isolation:** Reinforced, 264V ac maximum
- **Channel isolation:** Functional, 264V ac maximum
- **Contact life:** >10million operations @ 250V ac; 1A rms
- **De-rating:** >600,000 operations @ 250V ac, 2A rms
- **Power consumption:** 1.1W maximum

**Relay De-rating**
**AC Voltage**
As the AC load becomes more “difficult” a more significant de-rating factor is required. The graph opposite shows the derating to be applied in terms of contact life, assuming the load requirement is predefined.

- **F1:** Worst case
- **F2:** Typical

**DC Voltage**
DC operation is also limited for difficult loads, particularly where there is significant inductance. Here the working current must be limited as shown, where the load time constant (L/R, in ms) is the significant factor.

**RLY4 - ORDER CODE**

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500M/DO4LOGIC/EXTPWR</td>
<td>Four channel digital logic output 10mA max</td>
</tr>
<tr>
<td>2500M/DO424V/EXTPWR</td>
<td>Four channel digital 24d switched output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500T/DO4/UNIV/NONE</td>
<td>Terminal unit with dummy cover fitted</td>
</tr>
<tr>
<td>2500T/DO4/UNIV/DCONNECT</td>
<td>Terminal unit with disconnects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500M/RLY4</td>
<td>Four channel isolated relay output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500T/RL4/NOFUSE</td>
<td>Terminal unit</td>
</tr>
<tr>
<td>2500T/RL4/FUSE2A</td>
<td>Terminal unit with four 3.15a fuses</td>
</tr>
</tbody>
</table>
### ORDERING CODES

<table>
<thead>
<tr>
<th>7-22</th>
<th>Module and Terminations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A12-TC</td>
<td>2 ch. isolated universal analog I/P with CJC</td>
</tr>
<tr>
<td>A12-DC</td>
<td>2 ch. isolated universal analog I/P for PT100, Hz and volts</td>
</tr>
<tr>
<td>A12-MA</td>
<td>2 ch. isolated universal analog I/P - 5 ohm shunt fitted for mA</td>
</tr>
<tr>
<td>A13</td>
<td>3 ch. isolated 4-20mA analog I/P with 24V dc Tx PSU</td>
</tr>
<tr>
<td>A13-DT</td>
<td>3 ch. isolated 4-20mA analog I/P with 24V dc Tx PSU - Disconnects</td>
</tr>
<tr>
<td>A14-TC</td>
<td>4 ch. non isolated T/C, with CJC</td>
</tr>
<tr>
<td>A14-MV</td>
<td>4 ch. non isolated mV I/P</td>
</tr>
<tr>
<td>A14-MA</td>
<td>4 ch. non isolated mA I/P</td>
</tr>
<tr>
<td>A02</td>
<td>2 ch. isolated analog O/P mA, volts</td>
</tr>
<tr>
<td>A02-DT</td>
<td>2 ch. isolated analog O/P mA, volts with disconnects</td>
</tr>
<tr>
<td>D1424</td>
<td>4 ch. 24V dc digital I/P</td>
</tr>
<tr>
<td>D1424-DT</td>
<td>4 ch. 24V dc digital I/P with disconnects</td>
</tr>
<tr>
<td>D16-230V</td>
<td>6 ch. 230V ac logic I/P</td>
</tr>
<tr>
<td>D16-115V</td>
<td>6 ch. 115V ac logic I/P</td>
</tr>
<tr>
<td>D18L</td>
<td>8 ch. non isolated digital I/P (logic I/P only)</td>
</tr>
<tr>
<td>D18C</td>
<td>8 ch. non isolated digital I/P (contact I/P only)</td>
</tr>
<tr>
<td>D04L-DT</td>
<td>4 ch. digital O/P logic O/P 10mA max with disconnects</td>
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<tr>
<td>D0424</td>
<td>4 ch. digital O/P 24V dc switched O/P</td>
</tr>
<tr>
<td>D0424-DT</td>
<td>4 ch. digital O/P 24V dc switched O/P with disconnects</td>
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<tr>
<td>RLY4</td>
<td>4 ch. relay O/P module</td>
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<tr>
<td>RLY4-FUSE</td>
<td>4 ch. relay O/P module with fuses</td>
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<tr>
<td>BLANK</td>
<td>Blank terminal unit</td>
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<tr>
<td>NONE</td>
<td>No terminal unit or blank fitted</td>
</tr>
</tbody>
</table>

### Communications Protocol
- MODBUS: No extension memory fitted
- DEVICENET: DeviceNet Comms
- PROFIBUS: Profibus Comms
- PBUS DPV1: Profibus DPV1 Comms
- ENET MBUS: Modbus TCP/Ethernet

### Communications Connector Type
- RJ45: RJ45 connector for Modbus or Profibus
- 9DTYPE: 9 pin D connector for Profibus
- DN: Standard DeviceNet screw connector
- EN: Ethernet communications

### Application
- NONE: No application loaded
- YYYYXX*: Pre-configured application loaded

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*Y = Alphanumeric Character, X = Numeric Character