HIGH PERFORMANCE CONTROL
IN A VERSATILE, MODULAR SYSTEM

The T2550 Programmable Automation Controller (PAC) is a high performance solution with cost effective redundancy options. The control unit and I/O system form the basis of a complete distributed control and recording environment capable of continuous analog, logic, and sequential control, combined with secure data recording at point of measurement – all designed to maximize your return on investment.

Maximize Process Uptime
Using the T2550 PAC reduces engineering costs and its high availability maximizes process uptime. Controller redundancy is automatically commissioned – simply plug the additional processor module into the redundant base and press synchronize – no special cabling or engineering is required. Changeover to a secondary controller is automatic, with uninterrupted control and bumpless transfer of communications and process I/O. Replacement of a processor or I/O module, for any reason, can be done with the power on – and initialization is automatic. These powerful features combine with the high MTBF of the system’s I/O and passive backplanes to provide extremely high system availability.

The T2550 PAC also supports online reconfiguration and online monitoring for all continuous and logic control functions. With support for adding and hot swapping I/O modules, active strategy components can be modified to support system enhancements without the need for a shutdown.

Redundant Data Recording
The T2550 PAC provides secure data recording at point of measurement. This powerful feature is offered with redundancy simply by plugging in the additional processor module. Again, no additional engineering is required as the system synchronizes itself. The data is held in non-volatile memory and is in a secure format to inhibit tampering. If your data has value to you, this simplest of offerings is the most powerful in the market place.
Autonomous and Integrated, Scalable, and Distributed
The T2550 PAC provides a comprehensive standalone solution or a powerful addition to a wider system. Communicating over 10/100baseT Ethernet (ELIN), its peer-to-peer communications system can be used for interlocking, signal conditioning, alarm monitoring, remote data acquisition, or devolved control. The T2550 PAC supports Modbus TCP, serial Modbus RTU (both as master or slave), Profinet slave, simple customer specific protocols, and OPC. The T2550 PAC can be used in conjunction with other systems such as PC based SCADA packages, Programmable Logic Controllers, and Eycon Visual Supervisor, or can provide an effective standalone solution.

A range of DIN rail mounting base sizes is available for I/O modules and serial communication interfaces. Multiple bases can be easily interconnected so processors can share interlocking, acquisition, and multi-loop control solutions in distributed and larger scale applications.

Scalable Control Units Match Process Hierarchy
The modular nature and seamless interaction of ELIN based control units allow both physical distribution and adoption of a structured control methodology.

T2550 Programmable Automation Controller
Each T2550 PAC base is capable of analog, logic, and sequence control and is self-contained up to a capacity of 128 I/O points. Larger systems can be easily implemented by interconnecting multiple T2550 PAC base units to form a distributed system utilizing the peer-to-peer communications.

Alternative Ethernet and serial communications protocols are available to facilitate simple connection to other equipment.

Devices supporting their own serial protocol can be connected to the T2550 PAC using the open communications (raw communications) option.

T2550 PAC Unit Supervisor
Large systems or complex sequence and batch applications are treated in a ‘layered’ fashion by decoupling the front-end, closedloop control and its associated I/O and control modules (logical devices) from the main strategy. This follows the S88.01 standard for batch control and is achieved by assigning the role of strategy coordination to the ‘short’ version of the T2550 PAC. This T2550 PAC, which uses the same processor as the standard controller has no I/O and provides coordination and sequence control of the lower level elements.

Redundant Processing
Using the T2550 PAC as a redundant controller pair automatically protects your process against controller or communications failure. If external or field I/O communications to the active controller, or the active controller itself fail, then the secondary controller automatically takes over, providing uninterrupted control and bumpless transfer of the communications, process I/O, and data historian. An alarm warns the operator that the changeover event has occurred.

A processor can be replaced for any reason with the power on. Commissioning a redundant capable processor is simple: Plug the second processor into a redundant base unit and press synchronize – all the rest is automatic. No special cabling is required.

Continuous and Logic Control
The T2550 PAC supports the level of block structuring normally only found in advanced DCS systems. The continuous strategy is built up by interconnection of function blocks from a rich library of analog and logic elements.

Sequence Control
Sequences act in a supervisory role relative to the continuous database and can be loaded and unloaded independently. This is increasingly important for batch sequences, which relate to the process rather than the physical equipment, as these must be changed to meet the requirement of flexible plants. The capacity of the local filing system allows storage of a large number of sequences. Their operation is controlled through specialized blocks in the continuous database.

ELIN System Architecture
ELIN is Ethernet based Local Instrument Network. The ELIN control network is the backbone of the control and data acquisition network that provides peer-to-peer communications between control nodes and seamless access to all data by operator and configuration workstations.

All nodes appear as part of a coherent distributed database. The database in any networked element is accessible to any other network element, allowing complete flexibility in strategy interconnection.

ELIN supports OPC with a readily available server for direct connection to operator and configuration workstations. It also supports the Eycon visual supervisor and other Eurotherm control and logging units in which standalone or panel-mounted display and control is needed. Remote monitoring, diagnostics, and application enhancement is available via secure off site communications.
**Configuration**

At the heart of the system is the LINtools configuration and engineering station. LINtools is a comprehensive set of configuration, test, documentation, and commissioning tools for strategy elements distributed over the LIN control backbone.

The LINtools suite includes graphical configuration of block structured continuous control, sequence control SFCs, ladder, and graphics for any LIN based product. View and Online reconfiguration modes allow dynamic monitoring and editing of running databases and flow charts.

LINtools follows the IEC 61131-3 standard for sequence configuration, while adopting a decoupling of continuous and sequential strategy appropriate to complex process control.

LINtools is designed for simplicity and productivity. Online help, free-format text annotation, and area editing are included to make LINtools easy to use. LINtools runs on a standalone or networked PC.

**Continuous Control**

Continuous strategies are configured graphically on screen using ‘block structured’ techniques implemented across the system. The control configurator supports a comprehensive library of functions together with powerful editing and compound definition facilities. Merging allows the re-use of similar sections of databases, avoiding duplication of effort. Free text can be placed on the screen or attached to function blocks for simple production of descriptive documentation. Context-sensitive help reduces the need of referring to manuals.

**Sequence**

Sequences are configured graphically using Sequential Function Charts (SFCs) following the IEC 61131-3 standard. Steps initiate Actions which may be Structured Text statements (ST) or nested SFCs. Transitions determine when control passes from one step to the next. By accessing the continuous control strategy this configurator presents the available points through a menu system thus eliminating the need to remember the names of points and reducing the likelihood of typing errors.

The sequence configurator supports text annotation and context sensitive help. A combination of mapping lists and generic Sequential Function Charts are available to easily duplicate identical SFC models on different units (tags).

**Action Block**

Action blocks in the continuous control strategy have their functionality defined in Ladder diagrams or Structured Text (ST) within a standard template. These are particularly useful for implementation of plant control modules.

**Documentation**

LINtools provides an electronic documentation facility including the graphical representation of the control strategy and a listing of the block parameters and connections. This can be transferred across the network and output can be to a printer, Postscript, or AutoCAD compatible format. Free-format user annotations can be added to complete your documentation requirements.

**Multi-Setpoint Programmer**

Many applications need to vary the process value over time: Temperature control is one such application in which it is very common to ‘ramp’ the process value from one level to another over a set time period using a setpoint program.

The PAC provides support for multiple setpoint programs that can be run simultaneously. Each program is capable of profiling up to eight channels, with up to 32 segments per profiled channel. In addition to controlling the setpoint during each segment of the profile, the controllers can also be used to activate up to 16 digital events during a segment.

The setpoint program feature enables an operator to select and run a pre-configured setpoint program. A preview facility allows the operator to view the selected program before running it. Once the program is running, the setpoint and achieved process values are both plotted on the trend screen.
**Setpoint Program Wizard**
For ease of use, LINtools incorporates a wizard for creating a setpoint program. By following the on screen prompts and editing the parameters as required, a setpoint program can be simply and quickly created with all required blocks automatically created and added to the database.

**Setpoint Program Editor**
In addition to the setpoint program wizard, programs can be created or edited off-line using the setpoint program editor supplied with LINtools. As an ActiveX, this tool can be inserted into any of your visualization packages.

**Redundant Recording and Archiving**
Programmable Automation Controllers (PACs) have internal non-volatile flash memory for secure tamper resistant data storage, and providing for redundant data logging. In addition all PAC processors support Ethernet connectivity. As such, data stored within the internal flash memory can be configured to periodically archive to primary, secondary, and tertiary FTP servers. Archiving files to FTP servers provides a secure, infinite archiving capacity.

**Data Historian**
Data historian is used to store PVs, message and alarm information in the internal flash memory in order to generate historical data in the form of a set of secure, tamper resistant history files. The following example provides estimated memory duration based on an 8-way base logging 16 Parameters to a single group:

<table>
<thead>
<tr>
<th>Recording Interval</th>
<th>Estimated Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Update A)</td>
<td>Min/Max Off</td>
</tr>
<tr>
<td>1s</td>
<td>60 hrs</td>
</tr>
<tr>
<td>5s</td>
<td>12 days</td>
</tr>
<tr>
<td>10s</td>
<td>25 days</td>
</tr>
<tr>
<td>20s</td>
<td>50 days</td>
</tr>
<tr>
<td>60s</td>
<td>150 days</td>
</tr>
</tbody>
</table>

**FTP Push**
For efficiency, historical data files are automatically deleted on a first in first out (FIFO) basis from the internal flash memory of the PAC (7Mb for history). In order to ensure longevity of data the PAC is able to push historical data files (.uhh) to primary, secondary, or tertiary FTP servers at user defined intervals. Thus, depending on the archive strategy chosen, data is never lost.

**Data Archiving**
Data archiving is used to copy selected parts of the history, i.e. one or more history files (.uhh) to primary, secondary, or tertiary FTP Servers.

**Historian Store and Forward**
‘Store and Forward’ is a self healing 21 CFR Part 11 data archiving system which automatically stores data during a communication failure in the T2550 PAC hardware and then forwards this data to the configured data historian server once communication is reinstated.

The T2550 PAC provides dual redundant data acquisition using Secure (.uhh) files created at the local level, which results in a secure electronic recording system with total data integrity.

**Alarm Management**
Alarms are managed and collected within the T2550 PAC to provide features such as alarm status and priority, acknowledgement, date, and time stamping at the source, as well as suppression and local message historian storage.

**Open Communications**
The PAC provides a special function block to define any simple serial communications protocol. This function block can be used to integrate many 3rd party devices which use ASCII communications, such as bar code readers and particle counters. Direct control over transmit and receive also allows multi-node connections.

**HMI Reports**
HMI Reports provides an intuitive reporting package to develop and print reports using the secure data from the T2550 PAC. The package includes a report studio for configuring report projects and a run-time execution module to generate and print reports in many different formats to printers, file servers, and via e-mail. HMI Reports is also optionally available as a web portal.
### 255BF: BASE UNIT

The base unit is fitted with the T2550 PAC I/O controller modules plus additional I/O modules. These modules plug onto terminal units, which provide the wiring interface between the plant or machine and the I/O modules. Bases are available in 5 sizes to suit the number of modules required in a particular system.

Communication between the I/O modules and the processor is effected by the use of a passive internal module I/O bus running the width of the base.

Each module position is tracked separately for additional security during live replacement of I/O modules.

The base consists of an aluminium extrusion, the internal I/O bus, and mounting supports. It is designed to be DIN rail mounted or directly fixed to a bulkhead or mounting plate. Both base and modules can be installed horizontally or vertically.

### Mechanical

<table>
<thead>
<tr>
<th>I/O Module Capacity</th>
<th>0</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width (mm)</td>
<td>36</td>
<td>164</td>
<td>214</td>
<td>264</td>
<td>467</td>
</tr>
<tr>
<td>Weight Kg (No modules)</td>
<td>0.2</td>
<td>0.45</td>
<td>0.6</td>
<td>0.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Weight Kg (all modules)</td>
<td>0.5</td>
<td>1.3</td>
<td>1.7</td>
<td>2.1</td>
<td>3.7</td>
</tr>
<tr>
<td>Height</td>
<td>180mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>102.9-132.9mm with retaining lever raised</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>DIN rail or Bulkhead, can be mounted horizontally or vertically</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN rail</td>
<td>Use symmetrical DIN rail to EN50022-35 x 7.5 or 35 x 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing</td>
<td>Without additional protection IP20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilation space</td>
<td>25mm free space above and below</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Termination Units

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 to prevent damage to both equipment and plant.

Individual termination units provide for easy module replacement leaving the field wiring connected. Modules are inserted and removed from the termination unit using a unique, tool-less, locking lever system.

### Test Disconnect Units

Terminal assemblies have an optional fuse or 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.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>POWER ON SELF TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power On self tests:</td>
</tr>
</tbody>
</table>

### ENVIRONMENTAL

<table>
<thead>
<tr>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature:</td>
</tr>
<tr>
<td>Storage temperature:</td>
</tr>
<tr>
<td>Relative humidity:</td>
</tr>
</tbody>
</table>

### RFI

<table>
<thead>
<tr>
<th>RFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC emissions:</td>
</tr>
<tr>
<td>EMC immunity:</td>
</tr>
</tbody>
</table>

### Safety

<table>
<thead>
<tr>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS EN61010-1/A2:19931995 Installation cat II, Pollution degree 2</td>
</tr>
</tbody>
</table>

### Vibration

<table>
<thead>
<tr>
<th>Vibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN60068-2 test FC</td>
</tr>
<tr>
<td>IEC1131-2 section 2.1.3</td>
</tr>
<tr>
<td>0.075mm peak amplitude 10-57Hz; 1g, 57-150Hz</td>
</tr>
</tbody>
</table>

### Shock

<table>
<thead>
<tr>
<th>Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>20g static shock</td>
</tr>
</tbody>
</table>

### Diagnostic LEDs

Diagnostic LEDs indicate module diagnostic status.

<table>
<thead>
<tr>
<th>Diagnostic LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>All modules:</td>
</tr>
<tr>
<td>PAC analog modules:</td>
</tr>
<tr>
<td>PAC digital modules:</td>
</tr>
</tbody>
</table>

### Processor Module

Primary processor and communications diagnostics are available from the LEDs on the front of the processor module. More advanced diagnostics are available remotely using LINtools monitor online over Ethernet to review the diagnostic blocks.

| PAC Controller module: | A green LED at the top indicates the module is powered and operating correctly |
| Internal diagnostics: | A red LED indicates failure of the internal self diagnostic routines |
| Battery (if installed): | A green LED indicates battery health |
| Serial communications: | A yellow LED indicates communications activity |
| Primary/Standby: | Indicates inter processor communications |
| IP address: | Two LEDs indicate status information |
| Ethernet: | A yellow LED indicates if the unit has resolved its IP address for Ethernet communications |
| Link speed: | Two LEDs indicate link activity |
| Power On self tests: | On power up the T2550 PAC automatically performs Power On Self Tests. These are a series of diagnostic tests used to assess the instrument. The above LEDs indicate module |

### ORDNER CODE – Redundant Base

<table>
<thead>
<tr>
<th>ORDER CODE – Redundant Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>255BF-16R/C16/CDM/-/-</td>
</tr>
<tr>
<td>255BF-08R/C08/CDM/-/-</td>
</tr>
<tr>
<td>255BF-06R/C06/CDM/-/-</td>
</tr>
<tr>
<td>255BF-04R/C04/CDM/-/-</td>
</tr>
<tr>
<td>255BF-16R/NON/CDM/-/-</td>
</tr>
<tr>
<td>255BF-08R/NON/CDM/-/-</td>
</tr>
<tr>
<td>255BF-06R/NON/CDM/-/-</td>
</tr>
<tr>
<td>255BF-04R/NON/CDM/-/-</td>
</tr>
<tr>
<td>255BF-005/NON/CDM/-/-</td>
</tr>
</tbody>
</table>
CPU Redundancy
Processor redundancy is available for continuous, logic, and sequence control. A pair of processors operate in primary/secondary configuration with a high-speed data link between them providing exact tracking of the control, logic, and sequence databases. Transfer from the primary to secondary processor is bumpless. The non-active processor can be replaced while the system is running and on synchronization it loads its strategy from the active primary processor.

Redundant: < 0.6s bumpless transfer for processor and I/O
Changeover time: dependent on application size
Synchronisation time: dependent on application size

Processor Switchover
During a processor switchover all outputs remain at the last value. The new primary processor begins executing application from precisely the same point as the original processor. Each processor has its own Ethernet IP address and each redundant pair uses two neighboring node addresses on the ELIN network. This enables the system to communicate with the primary while still continuously testing communications to both processors. On processor switchover the ELIN node address is dynamically swapped to allow SCADA applications to display and log uninterrupted data. Switchover amongst LIN nodes is transparent.

The following conditions can cause the processor to switchover:

Hardware Failure: Failure of primary controller internal health checks.

Hardware Removal: Removing the primary processor will cause the secondary to take immediate control. Removing the secondary will have no effect on control but will cause a system alarm on redundant configured systems.

Internal Communications: Primary and secondary controllers continually monitor the communications to the I/O on the local base. Should the primary controller not be able to communicate with the I/O and the secondary can still communicate with the I/O switchover will occur. If the secondary processor observes a fault in the primary communications or can see more I/O modules the processor will request a switchover.

External Communications: Monitors external controller communications. Should the primary controller not be able to communicate with other declared nodes on the LIN network and the secondary can still communicate with the declared nodes a switchover will occur. If the secondary processor observes that it can see more declared nodes, the secondary processor will request a switchover.

Manual Request: A user can request a switchover if a secondary processor is running, synchronized, and healthy.

Removable SD Memory Card: The storage of the cold start application files, the processor firmware and software licence code is on a secure SD flash card to enable easy transfer from one processor to a replacement.

Physical
- CPU: Motorola MPC852T
- Bus size: 32 bit
- System clock: 66 MHz
- Removable Flash card size: 32 Mbytes

Control Switches
- Processor front panel Watchdog reset.
- Processor synchronization/push button switches: Switchover. Processor resynchronization.

Power Supply Connection
The duplex terminal unit supports dual power supply connection. In the event of a single power supply failure both processors are still supplied allowing redundant operation to continue uninterrupted.

To facilitate hot start of the processors. A super capacitor maintains memory for up to 1 hour in the event of complete power failure. An external battery can be fitted to extend this backup time on the redundant system.

Super cap (Processor): Maintains memory/real time clock and enables hot start for up to 1 hour in absence of battery backup input
Simplex (O base): Battery support for data in SRAM and the Real-Time Clock for a minimum of 72 hours continuous (5 year intermittent use)

Redundant: Additional terminals for an external battery connection to support SRAM and the Real-Time Clock

External rechargeable battery: Retains memory and real-time clock chip in absence of main supply to extend Warm start capacity > 1 hour.

Watchdog Relays
Each processor is fitted with a single watchdog relay.
- Contact rating (resistive): 24V ac/dc at 0.5A
- Isolation: 30V ac rms or 60V dc

Live Plug-in
Processors and I/O modules can be replaced while powered without any disturbance to the field wiring or other inputs and outputs - reducing downtime and minimizing disturbance to other signal conditioning strategies.

T2550 PAC—Order Code
Basic product

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2750 BBA</td>
<td>Backup Battery Assembly - includes Charger and Battery</td>
</tr>
<tr>
<td>T2750 BBB</td>
<td>Backup Battery Spare / Replacement Battery</td>
</tr>
<tr>
<td>T2750 BBC</td>
<td>Backup Battery Spare Charger</td>
</tr>
</tbody>
</table>

T2550F
Programmable Automation Controller

1 - IOC and software L = Standard License D = Data Logging

<table>
<thead>
<tr>
<th>Foundation</th>
<th>Control</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>L10/D10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>L20/D20</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>L30/D30</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>L40/D40</td>
<td>Unbounded</td>
<td>12</td>
</tr>
<tr>
<td>L50/D50</td>
<td>Unbounded</td>
<td>16</td>
</tr>
<tr>
<td>L60/D60</td>
<td>Unbounded</td>
<td>24</td>
</tr>
<tr>
<td>L70/D70</td>
<td>Unbounded</td>
<td>32</td>
</tr>
<tr>
<td>L80/D80</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
<tr>
<td>L90/D90</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
</tbody>
</table>

2 - Flash Card Size

<table>
<thead>
<tr>
<th>F32</th>
<th>32M Flash card (standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>None fitted</td>
</tr>
</tbody>
</table>

3 - Ethernet Communications Protocol

| ELIN | Ethernet Local Instrument Network (LIN) peer-to-peer |
| MBTM | Modbus-TCP Master communications (includes LIN peer-to-peer) |

4 - Serial Communications Protocol

| SER0 | HMI communications (non isolated) |
| MOD0 | Modbus master communications (non isolated) and Raw communications |
| PBUS | Profibus DP slave communications (9 pin D connector) |
Control Specifications

Continuous Database Resources
Maximum database size .................................. default max values 210k bytes

<table>
<thead>
<tr>
<th>Database Resources</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of database blocks</td>
<td>630</td>
</tr>
<tr>
<td>Number of database templates</td>
<td>50</td>
</tr>
<tr>
<td>Number of template libraries</td>
<td>32</td>
</tr>
<tr>
<td>Number of external databases</td>
<td>32</td>
</tr>
<tr>
<td>Number blocks in local Dbase cached elsewhere</td>
<td>1260</td>
</tr>
<tr>
<td>Number blocks in remote Dbase cached locally</td>
<td>315</td>
</tr>
<tr>
<td>Number of server tasks</td>
<td>6</td>
</tr>
<tr>
<td>Number of Field-to-field connections</td>
<td>1260</td>
</tr>
</tbody>
</table>

Sequence Control Resources
Sequence memory Program data .................................. 105k bytes

SFC Resources
Number of root SFCs loadable .................................. 31
Number of steps loadable .................................. 420
Number of ‘wires’ permitted going into and out of step .................................. 1407
Number of transitions .................................. 630
Number of ‘wires’ permitted going into .................................. 840
Number of action associations .................................. 1680
Number of actions .................................. 840

User Tasks
Multiple tasks are available to the user to tune the update rate of I/O response and the control performance

User Tasks .................................. 4

User Task Update Rates
Task 1 – Synchronous to Fast I/O .................................. 10ms or N*10ms
Task 2 – Auxiliary task to task1 .................................. 10ms or N*10ms
Task 3 – Synchronous to Standard I/O .................................. 110ms or N*110ms
All analog and digital I/O types can be assigned to this task
Task 4 – Auxiliary task to task3 .................................. 110ms or N*110ms

Supported I/O Module Types
The T2550 PAC shares I/O modules with the T2750 PAC and 2500 I/O.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Maximum Update Speed</th>
<th>Original Version Modules 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI2</td>
<td>Analog Input 2 channels (all I/O types)</td>
<td>110ms</td>
<td></td>
</tr>
<tr>
<td>AI3</td>
<td>Analog Input 3 channels (mA + Tx PSU)</td>
<td>110ms</td>
<td></td>
</tr>
<tr>
<td>AI4</td>
<td>Analog Input 4 channels (TC, mA, V)</td>
<td>10ms</td>
<td></td>
</tr>
<tr>
<td>AC2</td>
<td>Analog Output 2 channels (mA or V)</td>
<td>110ms</td>
<td>110ms/10ms*</td>
</tr>
<tr>
<td>DI4</td>
<td>Digital Input 4 channels (logic)</td>
<td>110ms</td>
<td></td>
</tr>
<tr>
<td>DI6, MV</td>
<td>Digital Input 6 channels (115V ac ms)</td>
<td>110ms</td>
<td></td>
</tr>
<tr>
<td>DI6, HV</td>
<td>Digital Input 6 channels (230V ac ms)</td>
<td>110ms</td>
<td></td>
</tr>
<tr>
<td>DI8, LG</td>
<td>Digital Input 8 channels (logic)</td>
<td>110ms</td>
<td>10ms</td>
</tr>
<tr>
<td>DI8, CO</td>
<td>Digital Input 8 channels (contact)</td>
<td>110ms</td>
<td>10ms</td>
</tr>
<tr>
<td>DO4, LG</td>
<td>Digital Output 4 channels (10mA)</td>
<td>110ms</td>
<td>10ms</td>
</tr>
<tr>
<td>DO4, 24</td>
<td>Digital Output 4 channels (100mA)</td>
<td>110ms</td>
<td>10ms</td>
</tr>
<tr>
<td>RLY4</td>
<td>Relay Output 4 channels (3 V, 1 c/o)</td>
<td>110ms</td>
<td>10ms</td>
</tr>
<tr>
<td>DO8</td>
<td>Digital Output 8 channels (1A per ch)</td>
<td>10ms</td>
<td></td>
</tr>
<tr>
<td>FI2</td>
<td>Frequency Input 2 channels</td>
<td>10ms</td>
<td></td>
</tr>
<tr>
<td>Z1</td>
<td>Zirconia Input Module</td>
<td>110ms</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
† The T2550 only supports the original (Version 1) modules in simplex operation.
* Version 2 Analog Output modules can be run at the 10ms task on 4 or 6-way bases.

Continuous Strategy Function Blocks Categories
F = Foundation, S = Standard, C = Control, A = Advanced

<table>
<thead>
<tr>
<th>SOFTWARE LICENSE</th>
<th>CATEGORY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI/UIO, AO/UIO</td>
<td>✓</td>
<td>Universal I/O &amp; Time-proportioning O/P</td>
</tr>
<tr>
<td>DI/UIO, DO/UIO</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>FI/UIO, MOD/UIO</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MOD/UIO, MOD/UIO</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>TPO/UIO, VP/UIO</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CAL/UIO</td>
<td>✓</td>
<td>Analog calibration</td>
</tr>
</tbody>
</table>

Communications
GW_CON, GWPROFS_CON | ✓ | Gateway configuration block |
GW_TBL | ✓ | Gateway table block |
RAW_COM | ✓ | Open communication |

Control
AN_CONN, DG_CONN | ✓ | Analog & Digital connection block |
ANMS, DGMS | ✓ | Analog & Digital manual stations |
SIM | ✓ | Simulation |
SETPOINT | ✓ | Setpoint |
TC_SEL | ✓ | Thermocouple Select |
TC_LIFE | ✓ | Thermocouple Life |
MAN_STAT | ✓ | Manual station |
MODE | ✓ | Mode block |
PID_LNK, TUNE_SET | ✓ | PID linking block, Tune set block |
PID_3_TERM_LOOP_PID | ✓ | ✓ |

Timing
TIMER,TIMEDATE | ✓ | Timer & Time/date event |
DELAY | ✓ | Delay |
TPO | ✓ | ✓ |
RATE_ALM | ✓ | ✓ |
RATE_LMT | ✓ | ✓ |
TOTAL,TOTAL2,TOT_CON | ✓ | ✓ |
DTYME | ✓ | Dead-time |
SEQE | ✓ | ✓ |
SEQ | ✓ | Sequence |
Selector
ALC | ✓ | Alarm collection |
SELECT,SWITCH | ✓ | Select, Switch |
2OF3VOTE | ✓ | ✓ |
Ratio
PULSE,LATCH, COUNT | ✓ | Pulse & Latch & Count block |
AND, OR, XOR NOT | ✓ | ✓ |
AND, OR, Exclusive-OR, NOT | ✓ | ✓ |
COMPARE | ✓ | Compare |
Maths
ADD2, SUB2, MUL2, DIV2 | ✓ | Add, Subtract, Multiply, Divide |
EXPR, ACT_2A2W3T | ✓ | Expression |
ACTION, DIGACT | ✓ | ✓ |
ACT1SAXW,ACT1U818 | ✓ | ✓ |

Control Module
VLV1N, VL2N, VL3WAY | ✓ | Valve control modules |
MRX3IN | ✓ | Control module |
DUTYSTRY, AN_ALM_2 | ✓ | Control module |
Diagnostic
ALL Diag Blocks | ✓ | Diagnostic block |
Recorder
RGROUP | ✓ | Recording group |
Programmer
PROGCHAN, SEGMENT | ✓ | ✓ |
PROGCTRL | ✓ | ✓ |
SPP, RAMP | ✓ | ✓ |
Trends
RECORD, DISCREP | ✓ | Record & Discrepancy block |
SFC_MON, SFC_DISP | ✓ | ✓ |
SFC_CON | ✓ | ✓ |

Notes:
† The T2550 only supports the original (Version 1) modules in simplex operation.
* Version 2 Analog Output modules can be run at the 10ms task on 4 or 6-way bases.

Setpoint programmer (V5.0 or higher) Resources (max no.)
Programs Limited by available database memory
Profiled Channels per Program | 8 |
Digital Events per Program | 128 |
User Values per Program | 32 |
Segments per Program | 32 |

<table>
<thead>
<tr>
<th>No. of Programs</th>
<th>No. of Channels</th>
<th>No. of Digital Events</th>
<th>No. of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Program</td>
<td>8</td>
<td>128</td>
<td>32</td>
</tr>
<tr>
<td>2 Programs</td>
<td>4</td>
<td>64</td>
<td>16</td>
</tr>
<tr>
<td>4 Programs</td>
<td>2</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>8 Programs</td>
<td>1</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>
Communications

Ethernet Communications

The PAC supports Ethernet LIN (ELIN) protocol that provides secure peer-to-peer communications between bases and to other Ethernet devices over 10/100baseT Ethernet from each processor. Simultaneously it can support Modbus-TCP Master or Slave to other Modbus-TCP devices.

ELIN port

Connectors: Shielded RJ45 connector per processor
Network medium: Ethernet Cat5
Network type: LIN over Ethernet
Speed: 10/100baseT
Network topology: Star connection to a switch
Line length (maximum): 100 metres, extendible by repeater
Allocation of IP address: Fixed, DHCP, Link-Local, BootP
Broadcast storm protection: Integrated in the processor
LIN address: 8-way switch-bank – Duplex (bits SW2-8)
10-way switch-bank – Simplex
Max numbers of slaves: 16 Modbus TCP slaves

Serial communications

Third-party devices such as PLCs supporting Modbus can be readily integrated into the ELIN based architecture by direct connection to T2550 PAC control units. The Modbus communications allows a T2550 PAC to be used as a gateway providing access to database elements in any ELIN node.

RS422/485 serial communications

Connector: 2x RJ45 connector
Comms medium: RS422 (5-wire) or RS485 (3-wire), jumper select
Line impedance: 120Ω-240Ω twisted pair
Line length: 1220m maximum at 9600 bits/sec
Units per line: 16 maximum (electrical loading) expandable by use of buffers
Max number of slaves: 64 serial slave devices

Note: Use of a communications buffer/isolator is recommended.

Modbus/J-BUS

Protocol: Modbus/J-BUS RTU configurable master or slave
Data rate: Selectable 600-38.4k bits/sec
Data format: 8 bit, selectable parity 1/2 stop bits
Modbus data tables: 64, configurable as registers or bits
Maximum table length: 200 registers or 999 bits
Redundancy: Modbus communications are supported by the PAC in simplex and redundant mode 3 GWF may be run simultaneously
1x Modbus TCP master
1x TCP slave
1x Modbus RTU slave or master
Max (GWF) file size: 20k bytes

Profibus

Physical medium: 2-wire RS485
Connectors: Single 9-way D-type
Data rate: Determined by Profibus master, 12MB max.
Isolation: 50V dc, 30V ac

Open communication

Protocol: Device driven
Data rate: 1200 to 38.4k bits/sec
Data format: 7 or 8 data bits, none/odd/even parity
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
mV range: -150mV to +150mV at input impedance >100MΩ
mA 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
Ohms range: 0 to 640Ω 2, 3 or 4-wire lead compensation
Hi Ohms range: 0 to 5kΩ 2, 3 or 4-wire lead compensation
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 1uA (16 bits with 1.6 sec filter time)
Linearity: Better than 10uA
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: 22-23V 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 removing a link track on the terminal unit.

AI2 – ORDER CODE

Module
2500MF-A000 Two Channel – isolated universal input

Terminal Unit
2500TF-AT00 Terminal unit for TC with CJC
2500TF-AT00 Terminal unit for Mv, V, PT100, Hz inputs
2500TF-AT20 Terminal unit for 5 ohm shunt fitted for mA

AI3 – ORDER CODE

Module
2500MF-C000 Three channel – isolated 4-20mA analog input with Isolated 24V Tx PSU

Terminal Unit
2500TF-DU00 Terminal unit with dummy cover fitted
2500TF-DU30 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 to +150mV at input impedance >100MΩ
  mA range: -22 to +22mA 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.
  mA range with 5Ω burden in the terminal unit, 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: 120dB (50-5kHz, 50V rms)
- 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 to allow isolation of an individual output and allow work on the individual loop to continue safely.

- No of channels: 2
- Current output: -0.1 to 20.5mA; 10V dc max.
  Compliance with total burden less than 500Ω
- Voltage output: -0.1V to 10.1V dc;
  20mA max. compliance with total load greater than 500Ω
  -0.3 to 10.3 V dc;
  8mA max. compliance with total load greater than 150Ω
- Resolution: Better than 1 part in 10,000 (15 bit typical)
- System isolation: Reinforced, 264V ac
- Channel isolation: Functional, 264V ac maximum
- Power consumption: 2.2W maximum

AI4 – ORDER CODE

<table>
<thead>
<tr>
<th>Module</th>
<th>Terminal Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500MF-D000</td>
<td>2500TF-FT00</td>
<td>Four channel - T/C, mV, mA input</td>
</tr>
<tr>
<td>2500MF-FM00</td>
<td>2500TF-FV00</td>
<td>Terminal unit for 4 channel TC with CJC</td>
</tr>
<tr>
<td>2500TF-FT00</td>
<td>2500TF-FM00</td>
<td>Terminal unit for 4 channel mA</td>
</tr>
</tbody>
</table>

AO2 – ORDER CODE

<table>
<thead>
<tr>
<th>Module</th>
<th>Terminal Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500MF-E000</td>
<td>2500TF-NU00</td>
<td>Two channel isolated mA, volts</td>
</tr>
<tr>
<td>2500TF-NU30</td>
<td>2500TF-NU30</td>
<td>Terminal unit with disconnect</td>
</tr>
</tbody>
</table>
**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

- **External supply:** 18-30V dc wetting power required
- **Contact closure:**
  - **ON state:** Input resistance threshold 100Ω (<1KΩ typical)
  - **OFF state:** Input resistance threshold 10KΩ (>7KΩ typical)
- **Wetting current:** >8mA
- **Wetting voltage:** >9V, 12V typical measured open-circuit

### 'Logic' Variant

- **Logic inputs:**
  - **ON state:** Input voltage threshold >10.8V dc, 30V max
  - **OFF state:** Input voltage threshold <5.0V dc non-overlapping
- **Input impedance:** 4KΩ approx. (>3mA drive required for 'ON')

**DI4 – ORDER CODE**

<table>
<thead>
<tr>
<th>Module</th>
<th>Terminal Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500MF-GE00</td>
<td>2500TF-JU00</td>
</tr>
<tr>
<td>Four channel – input</td>
<td>Terminal unit with dummy cover fitted</td>
</tr>
</tbody>
</table>

---

**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:** 2.5W maximum

### 'Contact' Variant

- **Contact closure:**
  - **ON state:** Input resistance threshold 100Ω (<1KΩ typical)
  - **OFF state:** Input resistance threshold 10KΩ (>7KΩ typical)
- **Wetting current:** 4mA typical

### 'Logic' Variant

- **Logic inputs:**
  - **ON state:** Input voltage threshold >10.8V dc, 30V max.
  - **OFF state:** Input voltage threshold <5.0V dc non-overlapping
- **Input impedance:** 5KΩ approx. (>2mA drive required for 'ON')

**DI8 – ORDER CODE**

<table>
<thead>
<tr>
<th>Module</th>
<th>Terminal Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500MF-L000</td>
<td>2500TF-MU00</td>
</tr>
<tr>
<td>Eight channel – Logic input</td>
<td>Terminal unit with dummy cover fitted</td>
</tr>
<tr>
<td>2500MF-M000</td>
<td></td>
</tr>
</tbody>
</table>
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
- Transient immunity: EN50082
- 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
- Main 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

2500MF-JE & HE: Four Channel Logic Output
This digital output module provides four logic outputs and is available in two factory option formats for standard or high output.

- No. of channels: 4
- System isolation: Reinforced, 264V ac max
- Channel isolation: Channels share a common connection
- Current assumption: 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

**DI6 — ORDER CODE**
**Module**
- 2500MF-KA00: Six channel high voltage 230 volt ac logic
- 2500MF-KB00: Six channel high voltage 115 volt ac logic

**Terminal Unit**
- 2500TF-LU00: Terminal unit

**D04 — ORDER CODE**
**Module**
- 2500MF-JE00: Four channel digital logic output 10mA max
- 2500MF-HE00: Four channel digital 24d switched output

**Terminal Unit**
- 2500TF-RU00: Terminal unit with dummy cover fitted
- 2500TF-RU30: Terminal unit with disconnects

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
2500MF-N: Eight Channel Digital Output Module

The DO8 provides higher packing density and lower cost per channel. The eight digital output module provides eight logic outputs which are typically used for control, alarms, or events outputs.

Each channel has a 24V output with 0.75A capability (subject to a maximum of 4A total per module) and can be used for driving solenoids, relays, lamps, fans, thyristor units, single phase Solid State Relays (SSRs), or some three phase SSRS.

Voltage supply (external): 18-30V dc
Leakage current off state: <0.1mA
Current output:
- Channel maximum: 0.75A/channel
- Module maximum: 4A total (500mA/channel, all channels ON)
System isolation: Reinforced, 264V ac maximum
Channel isolation: Channels share a common connection
Power consumption: 0.6W maximum

**DO8 – ORDER CODE**

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500MF-NE00</td>
<td>Eight channel digital output 1A/channel; Max 4A/module</td>
</tr>
<tr>
<td>Terminal Unit</td>
<td>2500TF-S000 Terminal unit with dummy cover fitted</td>
</tr>
</tbody>
</table>

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
>600,000 operations @ 250V ac, 2A rms
De-rating: The above ratings summarize the performance with resistive loads. With complex loads further derating may be required
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>2500MF-F000</td>
<td>Four channel isolated relay output</td>
</tr>
<tr>
<td>Terminal Unit</td>
<td>2500TF-T000 Terminal unit</td>
</tr>
<tr>
<td>2500TF-T040</td>
<td>Terminal unit with four 3.15a fuses</td>
</tr>
</tbody>
</table>
2500MF-P: Two Channel Frequency Input
Provides two isolated frequency input channels and selectable voltage output for loop wetting current or sensor supply. Each input channel may be independently configured for magnetic, voltage, current, or contact sensor types.

- **No of channels:** 2
- **Channel isolation:** Functional, 100V ac maximum
- **System isolation:** Reinforced, 264V ac maximum
- **Power consumption:** 3.6W maximum

**Frequency measurements**
- **Range:**
  - Logic: 0.01Hz-40KHz, debounce off
  - Magnetic: 10Hz-40KHz
- **Accuracy:** ±100ppm, reference, ±160ppm overall ±0.05% drift over 5 years

**Pulse counting**
- **Range:**
  - Logic: dc- 40KHz, debounce off
  - Magnetic: 10Hz-40KHz

**Magnetic sensor input specification**
- **Input range:** 10mV - 80V p-p
- **Absolute maximum input:** ±100V
- **Input impedance:** >30KΩ

**Logic input specification**
- **Range:** 0-20V
- **Absolute maximum input:** 50V
- **Input impedance:** >30KΩ
- **Threshold:** 0-20V (0.5V steps), ±0.2V hysteresis
- **Accuracy:** 5V = ±0.4V accuracy, >5V = ±0.7% accuracy
- **Sensor break level:** 50-350mV
- **Sensor short circuit:** N/A

**CURRENT Input range:**
- **Absolute maximum input:** 30mA
- **Input impedance:** 1KΩ
- **Threshold:** 0-20mA (0.5mA steps), ±0.2mA hysteresis
- **Accuracy:** 5mA = ±0.4V accuracy, >5mA = ±0.7% accuracy
- **Sensor break level:** 0.05-0.350mA
- **Sensor short circuit detect:** when <100Ω; restored when >350Ω

**CONTACT Input range:**
- **Absolute maximum input:** N/A
- **Input impedance:** 5KΩ
- **Threshold:** 0-20V (0.5V steps), ±0.2V hysteresis
- **Accuracy:** 5V = ±0.4V accuracy, >5V = ±0.7% accuracy
- **Debounce:** 5, 10, 20, 50ms

**Note:** with debounce on, max frequency is limit and resolution is 600ppm

**Output specification**
- **Voltage:** Selectable, 8, 12, or 24V dc
- **Current:** 25mA
- **Voltage drop at full load:** 1V @ 25mA
- **Accuracy:** ±20%

---

2500M-R: Zirconia Input

- **Input Types:** Analog voltage, Channel 1 - mV (TC), and Channel 2 - 2V (Zirconia probe)

**Thermocouple Input Specification (Ch1 ONLY)**
- **Input Range:** -77mV to +100mV
- **Calibration Accuracy:** ±0.1% of electrical input, ±10μV
- **Noise:** 5μV p-p with 1.6s Filter
- **Resolution:** <2μV with 1.6s Filter
- **Sensor Break Detect:** 250mA break high, low or off
- **Input Impedance:** 10MΩ

**Cold Junction Sensor Specification (Ch1 ONLY)**
- **Temperature Range:** -10°C to +70°C
- **CJ Rejection:** < 30:1
- **CJ Accuracy:** ±1.3°C, ±0.5°C typ. (‘Automatic’ cold junction compensation)

**Zirconia Input Specification (Ch2 ONLY)**
- **Input Range:** -10mV to +1800mV
- **Calibration Accuracy:** ±0.2% of electrical input
- **Noise:** 0.1mV p-p with 1.6s Filter
- **Resolution:** <50μV with 1.6s Filter
- **Sensor Impedance Measurement:** 0.1kΩ to 100kΩ ± 2%
- **Input Impedance:** >500MΩ
- **Input Leakage Current:** ≤4.0nA, max ±1nA typical

**General Specifications**
- **Power consumption:** 1.8W maximum
- **Common mode rejection:** >80db, 48 - 62Hz
- **Series mode rejection:** >60db, 48 - 62Hz
- **Isolation channel - channel:** Functional (basic insulation), 264V ac max
- **Isolation to system:** Reinforced (double insulation), 264V ac max

---

**FI2 ORDER CODE**

**Module**
- 2500MF-P000 Two channel digital Frequency input

**Terminal Unit**
- 2500TF-U000 Terminal unit with dummy cover fitted

---

**ZI ORDER CODE**

**Module**
- 2500MF-R000 Zirconia Input

**Terminal Unit**
- 2500TF-Z000 Terminal unit
### Basic Product
- **255RF**: Dual processor - redundant capable base and I/O
- **255SF**: Single processor - redundant ready base and I/O

### Basic Size
- **A**: 2 IOC position for redundant operation 16 I/O module position
- **C**: 2 IOC position for redundant operation 8 I/O module position
- **F**: 2 IOC position for redundant operation 6 I/O module position
- **G**: 2 IOC position for redundant operation 4 I/O module position
- **E**: 2 IOC position for redundant operation 0 I/O module position

### Earthing System
- **0**: Two earth clamps fitted
- **2**: Earthing clamp for a 16 I/O module base
- **1**: Earthing clamp for an 8 I/O module base
- **3**: Earthing clamp for a 6 I/O module base
- **4**: Earthing clamp for a 4 I/O module base

### IOC and software (standard license)/(data logging)
- **Foundation**: A/U Unbounded
- **Control**: B/L Unbounded
- **Advanced**: C/M Unbounded

### Ethernet communications protocol
- **LIN peer-to-peer**: D/N Unbounded

### Serial communications protocol
- **Modbus-TCP master comm**: E/P Unbounded

### Terminal unit connector
- **Modbus**: F/Q Unbounded

### Module and Terminations
- **2 ch — isol universal analog I/P with CJC for T/C**: G/R Unbounded
- **2 ch — isol universal analog I/P with 24V Tx PSU**: H/S Unbounded

### Application
- **No application loaded**: A Blank terminal unit

### Language
- **N/A**: N/A

### Ordering Codes

<table>
<thead>
<tr>
<th>Basic Product</th>
<th>Module and Terminations</th>
</tr>
</thead>
<tbody>
<tr>
<td>255RF</td>
<td>B 2 ch — isol universal analog I/P with CJC for T/C</td>
</tr>
<tr>
<td>255SF</td>
<td>C 2 ch — isol universal analog I/P for PT100, Hz inputs</td>
</tr>
<tr>
<td></td>
<td>D 2 ch — isol universal analog I/P - 5 shunt fitted for mA inputs</td>
</tr>
<tr>
<td></td>
<td>E 3 ch — isol 4-20mA analog I/P with 24V Tx PSU</td>
</tr>
<tr>
<td></td>
<td>F 3 ch — isol 4-20mA analog I/P with 24V Tx PSU with disconnects</td>
</tr>
<tr>
<td></td>
<td>G 4 ch — non isol T/C, with CJC</td>
</tr>
<tr>
<td></td>
<td>H 4 ch — non isol mV/I/P</td>
</tr>
<tr>
<td></td>
<td>J 4 ch — non isol mA I/P</td>
</tr>
<tr>
<td></td>
<td>K 2 ch — isol analog O/P mA, volts</td>
</tr>
<tr>
<td></td>
<td>L 2 ch — isol analog O/P mA, volts with disconnects</td>
</tr>
<tr>
<td></td>
<td>M 4 ch — digital I/P</td>
</tr>
<tr>
<td></td>
<td>N 4 ch — digital I/P with disconnects</td>
</tr>
<tr>
<td></td>
<td>P 6 ch — 230 volt ac logic I/P</td>
</tr>
<tr>
<td></td>
<td>Q 6 ch — 115 volt ac logic I/P</td>
</tr>
<tr>
<td></td>
<td>R 8 ch — non isol digital I/P (logic I/P only)</td>
</tr>
<tr>
<td></td>
<td>S 8 ch — non isol digital I/P (contact I/P only)</td>
</tr>
<tr>
<td></td>
<td>T 2 ch — frequency I/P</td>
</tr>
<tr>
<td></td>
<td>U 2 ch — frequency I/P with disconnects</td>
</tr>
<tr>
<td></td>
<td>V 4 ch — digital O/P logic O/P 10mA max</td>
</tr>
<tr>
<td></td>
<td>W 4 ch — digital O/P logic O/P 10mA max with disconnects</td>
</tr>
<tr>
<td></td>
<td>X 4 ch — isol relay O/P rated 2A ac</td>
</tr>
<tr>
<td></td>
<td>Y 4 ch — isol relay O/P rated 2A ac, with 4 off 3.15A fuses</td>
</tr>
<tr>
<td></td>
<td>Z 8 ch — digital O/P rated 1A per channel, max 4A per module</td>
</tr>
<tr>
<td></td>
<td>A Blank terminal unit</td>
</tr>
</tbody>
</table>

### Manuals
- **0 CD with manuals |
- **1 Manuals on processor flash card |
- **2 Paper copy of manuals |

### Language
- **N/A**: N/A

### Application
- **No application loaded** | Pre-configured application loaded
## ORDERING CODES, continued

### PAC series license upgrade coding

<table>
<thead>
<tr>
<th>Code</th>
<th>Basic Product</th>
<th>IOC existing license</th>
<th>IOC required new license</th>
<th>Required new communications license</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>L10/D10</td>
<td>Unbounded</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L20/D20</td>
<td>Unbounded</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L30/D30</td>
<td>Unbounded</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L40/D40</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L50/D50</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L60/D60</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L70/D70</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L80/D80</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L90/D90</td>
<td>Unbounded</td>
<td>Unbounded</td>
</tr>
</tbody>
</table>

### PAC series base unit coding

<table>
<thead>
<tr>
<th>Code</th>
<th>Basic Product</th>
<th>IOC existing license</th>
<th>Base Size</th>
<th>Earthing System</th>
<th>Manuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>255BF</td>
<td>Programmable Automation Controller (PAC) base unit</td>
<td>DEFAULT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Programmable Automation Controller (PAC) base unit</td>
<td>DEFAULT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>