

## Series 2601 Automation Controller

### Full Featured, Ultra-compact Controller



The 2601 Automation Controller is a high performance control system whose small size conceals a range of resources and capabilities usually found only in much larger and more costly systems. A few of this controller's unusual features:

- Multitasking, with up to 28 parallel tasks running simultaneously.
- 16 digital inputs and 16 digital outputs
- Fast State Language programming using Quickstep™.
- 988 storage registers, including 500 non-volatile registers.
- A Data Table capable of storing over 8000 numbers in a two-dimensional array.
- Two Integrated RS-232 communications ports.
- Internal counters which may be software-linked to any input.

These capabilities combine to allow you to build additional power into machines which in the past could not cost-justify a controller of this caliber. For example:

- Run a diagnostic routine in parallel with your main program, catching problems before they occur.
- Collect production data and communicate it to a computer, for logging or display.
- Connect an operator interface to a serial port, and have full interactive control of machine parameters.

These are just a few of the ideas which can add value to your control application without adding significant cost.

Programming the 2601 is accomplished using Quickstep™, a powerful automation language which dramatically reduces programming time. Software capabilities include the ability to simultaneously run up to 28 independent tasks, and the instruction set includes time delay, input monitoring, math and data manipulation commands. These commands make full use of such internal resources as the controller's non-volatile and volatile registers, user-definable Data Table, input-linkable counters and 32 flags.

The 2601 offers strong communications capabilities, including computer-based data collection, programming, and configuration, as well as the ability to actively transmit messages to displays and other remote subsystems. Because these messages can contain live data from the controller's registers, you have the necessary tools to create fully interactive operator controls using inexpensive LCD displays or remote terminals.



### Instructions Supported

Cancel other tasks  
 Clear flag  
 Count down  
 Count up  
 Delay  
 Disable counter  
 Do (multitasking)  
 Done  
 Enable counter  
 Goto  
 If  
 Monitor (flags, inputs)  
 Reset counter  
 Rotate flags  
 Set flag  
 Shift flags  
 Start counter  
 Stop (controller)  
 Store (data movement & math)  
 Test and set flag

### Typical Performance Characteristics

- Sense input, jump to new step, change output - .25 ms
- Perform multiplication (between volatile registers) - .5 ms
- Time delay duration:  
 10 ms programmed - 10.2 ms  
 1 sec programmed - 1.0002 sec
- Internal count rate:  
 up to 2 inputs being counted - 3500 Hz  
 3 to 4 inputs being counted - 2000 Hz  
 5 to 8 inputs being counted - 1000 Hz

Performance characteristics shown are with one task running. RS-232 communications may degrade count rate by up to 10%.

### For More Information

Further detailed information about Control Tech. products and the Quick-step™ language may be obtained from our staff of Systems Specialists — call the number below for further information.

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### Absolute Maximum Ratings

	Min	Typ	Max	
Ambient temperature operating	0		50	°C
storage	-20		80	°C
Applied power supply voltage ( $V_{PS}$ )	18	24	27	VDC
Applied output voltage (Note 2)	0		$V_{PS}$	VDC
Output Current				
Single output			500	mA DC
Total limit			5	Amp DC
Processor clock speed		18.432		MHz

### Specifications

	Min	Typ	Max	
Current requirement ( $V_{PS} = 24 V$ )	50	100	210	mA
User memory capacity (10 year battery backed RAM)			24K	Bytes
Input off voltage ( $I_{in} = 0 mA$ )		$V_{PS}$		VDC
Input on current ( $V_{in} = 0 V$ , with $V_{PS} = 24 V$ )		-2.3	-3.00	mA DC
Input on current threshold ( $V_{PS} = 24 V$ )		-1.35	-1.75	mA DC
Input off current (typical leakage allowed)			-250	$\mu A$ DC
Output on voltage ( $I_o = 500 mA$ )	0.6	0.8	1.2	VDC
Output off leakage (applied $V = 24 v$ )	.01		.75	$\mu A$ DC

### Notes:

1. Under normal operation, no external input voltage should be applied - inputs should be externally switched to the input common.
2. An onboard protection diode returns to +24 V from each output.
3. All power requirements are worst case, with all inputs and outputs activated.

### Programming Resources

- 488 Volatile Registers – for the temporary storage of numeric data, 32-bit capacity (integers in the range of -2,147,483,648 to +2,147,483,647).
- 500 Nonvolatile Registers – similar to the above, except with indefinite retention of data during power-down.
- 8000+ Element nonvolatile Data Table – a two-dimensional array of numbers, capable of storing numbers in the range of 0 to +65,535.
- 8 Input-linkable Counters – each may be programmed to automatically monitor any three inputs to perform “count-up”, “countdown” and “reset” functions, at rates to 3500 Hz.
- 32 Flags – bistable (“set” or “clear”) memory elements used to store events or communicate between tasks. Instructions “shift” and “rotate” also allow their use as shift registers.
- Unlimited Timers – fixed or variable time delays down to 10 ms level.
- Message Transmitting – of stored messages, with data, via RS-232 port.
- Group I/O Access – inputs and outputs may be accessed as 8-bit or 16-bit binary words.
- Millisecond Counter – free-running, user-resettable timer useful for timing operations or cycles to millisecond levels.
- Indirect Addressing – I/O and registers may be indirectly addressed for iterative access.
- 1024 Program Steps – each step defines the state of the process for a period of time. This is unlike the far more limited definition of “step” used by other systems.
- 28 Simultaneous Tasks – each task may be an independent sequence of steps, running asynchronous to any other tasks in operation.
- Super Task – allows high priority to a defined task.
- 2 High-speed Outputs – two outputs may be individually programmed for output “on” time and period, at rates up to 3500 hz.