



# Weatherford®

Production Optimization

## *SP32 Series Programmable Logic Controllers*

Weatherford offers the SP32 series of programmable logic controllers (PLCs). The PLCs are more powerful than 16-bit controllers and offer high performance, built-in Ethernet, 8 Mb of SDRAM and a wide range of analog and digital input/output (I/O) options. The products offer Modbus® remote terminal unit (RTU), Modbus ASCII and DNP 3 native protocols and are remotely programmable through a choice of flexible programming languages. The controllers are based on multiprocessor architecture with a coprocessor used for handling on-board input/output channels.



### *Overview*

**Compact and Powerful**—the SP32 series of PLCs provide RTU functionality with flexible programming options. The units are programmable in relay ladder logic, IEC 61131-3 and multitasking C/C++ languages and provide an unlimited number of proportional-integral-derivative (PID) controllers for use in feedback control applications. The products provide an integrated power supply, four digital/counter inputs and a status output. They also offer a flexible set of on-board mixed process I/Os and are externally expandable to accept up to forty I/O modules.

**Flexible Communications**—the controllers provide three RS-232 and one RS-232/485 serial communication ports running both Modbus RTU and Modbus ASCII communication protocols and DNP 3. For applications using an Ethernet LAN or WAN, a fully integrated Ethernet port is also included. For those challenging remote applications a fully integrated, license-free spread spectrum wireless module is available at 900 MHz and 2.4 GHz. The PLCs also support external radios and modems using Hayes AT commands, and can be programmed using powerful C/C++ tools for application specific protocols.





## *SP32 Series Programmable Logic Controllers*

### *Features, Advantages and Benefits*

- 32-bit reduced instruction set computer (RISC) processor, 8 Mb SDRAM, 4 Mb FLASH
- Built-in Ethernet port
- Three RS-232, one RS-232/485 and one Ethernet port
- Optional integrated spread spectrum radio
- UL Class I, Division 2, Groups A, B, C and D for use in Hazardous Locations
- Two, four or ten run custody transfer flow computer
- Three-year warranty on parts and labor

### *Applications*

As a stand-alone product, these 32-bit controllers, with their 32-bit wide memory, offer the performance needed for those applications requiring real-time communications using multiple protocols and short program loop times. The controllers can be used in either master or slave configurations. Real-time communications using industry standard Modbus protocols simplify integration with SCADA software, man machine interfaces (MMIs), distributed control systems (DCSs), intelligent instrumentation and remote I/O control applications.

With their compact footprint and high level of integration, the PLCs are a natural choice for applications where a large number of process I/O and/or control loops are required. As a cost effective solution, these products can be applied to demanding applications including compressor controls, multirun gas flow computation and electrical distribution. With a real-time clock calendar providing time of day operations and alarms, and a hardware watchdog timer protecting against application program failures, the controllers can be used in a wide range of critical processes. Having onboard Ethernet and four multifunctional serial ports, the controllers can also be used in high performance data concentration and network traffic management applications.

The SP32 series of PLCs are fabricated with conformal coatings, gold-plated machined sockets and zinc plated steel system components. Regardless of the specific need, the controllers can provide reliable and compact stand-alone performance in the hazardous environments so often found in SCADA applications.





## SP32 Series Programmable Logic Controllers

### Specifications

#### P4A (Integrated 5604 I/O board)

Controller	
Processor	CPU: 32-bit CMOS, 120 MHz clock, integrated watchdog timer
Memory	8 Mb SDRAM, 4 Mb FLASH, 1 Mb CMOS RAM
Non-Volatile RAM	CMOS RAM with lithium battery retains contents for two years with no power

I/O	
Analog Inputs	Eight, user selectable 0 to 10 V (15-bit) or 0 to 20 mA (14-bit) One, 0 to 32.678 Vdc (15-bit)
Analog Outputs	Two with optional 5305 analog output module, output range 0 to 20 mA
Digital Inputs	Four on controller board: three digital input/counter, one interrupt with optical isolation
Digital Outputs	One, 30 V/60 mA (used as a status output)
Digital I/O (5604 I/O board)	Thirty two configurable as input or output (1 Amp DC max output/dry contact input)

Communications	
Serial Port COM1	Configurable RS-232 or RS-485, two-wire half duplex or four-wire full/half duplex
Serial Ports COM2, COM4	RS-232, DTE, eight-pin modular jack, full or half duplex with RTS/CTS control Implemented Td, Rd, CTS, RTS, DCD, DTR, +5 V
Serial Port COM3	Located on 5604 I/O module, same specifications as COM2 and COM4
Baud Rates COM1, COM2, COM4	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200
Baud Rate COM3	1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200
Serial Protocols	Modbus RTU, Modbus ASCII, DNP 3, DF1, PPP
Ethernet Port	RJ45, 10BaseT
Network Protocols	IP: ARP, TCP, TFTP, UDP and ICMP
Ethernet Port Protocols	Modbus TCP, Modbus RTU in UDP, Modbus ASCII in UDP, DNP in TCP, DNP in UDP
Wireless <sup>1</sup>	Spread spectrum radio at 900 MHz <sup>2</sup> and 2.4 GHz <sup>2</sup>

General	
I/O Terminations	Six, eight, nine and ten pole, removable terminal blocks, 12 to 22 AWG, 15 A contacts
Dimensions	8.40 in. (213 mm.) wide, 6.13 in. (155 mm.) high, 2.80 in. (72 mm.) deep
Packaging	Corrosion resistant zinc-plated steel with white enamel paint
Environment	5% RH to 95%, non-condensing, -40° to 158°F (-40° to 70°C)
Power Input	11 to 30 Vdc, 4.3 W typical (10.8 W full I/O capacity in use)
Warranty	Three years on parts and labor

<sup>1</sup>Available only with optional integrated wireless modules or with stand-alone wireless modules.  
<sup>2</sup>Not applicable in all countries.





## SP32 Series Programmable Logic Controllers

### Specifications (continued)

#### P4 (Integrated 5601A I/O board)

Controller	
Processor	CPU: 32-bit CMOS, 120 MHz clock, integrated watchdog timer
Memory	8 Mb SDRAM, 4 Mb FLASH, 1 Mb CMOS RAM
Non-Volatile RAM	CMOS RAM with lithium battery retains contents for two years with no power

I/O	
Analog Inputs	Eight, user selectable 0 to 5 V (15-bit) or 0 to 20 mA (14-bit)
Analog Outputs	Two with optional 5305 analog output module, output range 0 to 20 mA
Digital Inputs	Four on controller board: three digital input/counter, one interrupt with optical isolation Sixteen on 5601A I/O module: 6.5 mA typical at 24 V and 3.5 mA typical at 115 V
Digital Outputs	One on controller board: 30 V/60 mA (used as a status output) Twelve on 5601A I/O module, sealed mechanical relay: <ul style="list-style-type: none"> <li>• 0.4 A at 125 Vrms, 2 A at 30 V resistive loads</li> <li>• 1.0 A at 30 V, 0.2 A at 125 Vrms inductive load with pf=0.4, L/R=7ms</li> <li>• 250 Vrms, 220 V maximum operating voltage</li> </ul>

Communications	
Serial Port COM1	Configurable RS-232 or RS-485, two-wire half duplex or four-wire full/half duplex
Serial Ports COM2, COM4	RS-232, DTE, eight-pin modular jack, full or half duplex with RTS/CTS control Implemented Td, Rd, CTS, RTS, DCD, DTR, +5 V
Serial Port COM3	Located on 5604 I/O module, same specifications as COM2 and COM4
Baud Rates COM1, COM2, COM4	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200
Baud Rate COM3	1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200
Serial Protocols	Modbus RTU, Modbus ASCII, DNP 3
Ethernet Port	RJ45, 10BaseT
Network Protocols	IP: ARP, TCP, TFTP, UDP and ICMP
Ethernet Port Protocols	Modbus TCP, Modbus RTU in UDP, Modbus ASCII in UDP
Wireless <sup>1</sup>	Spread spectrum radio at 900 MHz <sup>2</sup> and 2.4 GHz <sup>2</sup>

General	
I/O Terminations	Six, eight, nine and ten pole, removable terminal blocks, 12 to 22 AWG, 15 A contacts
Dimensions	8.40 in. (213 mm.) wide, 6.13 in. (155 mm.) high, 2.80 in. (72 mm.) deep
Packaging	Corrosion resistant zinc-plated steel with white enamel paint
Environment	5% RH to 95%, non-condensing, -40° to 158°F (-40° to 70°C)
Power Input	11 to 30 Vdc, 3.5 W typical all relays off, 6.5 W typical all relays on
Warranty	Three years on parts and labor

<sup>1</sup>Available only with optional integrated wireless modules or with stand-alone wireless modules.

<sup>2</sup>Not applicable in all countries.

