

Controllers

Model 353 Process Automation Controller

Introduction

Features & Benefits

- ▶ Affords easy integration with and migration to existing systems
- ▶ Multiple loop capabilities for indication, control, logic, or sequencing accommodate comprehensive process control needs
- ▶ Scalable hardware provides lower entry costs, without limiting future needs
- ▶ Full configuration capability via front faceplate push-buttons allows quick field changes without requiring additional tools
- ▶ Ethernet networking option provides higher speed, peer-to-peer communications.
- ▶ RS485 MODBUS® network connection allows multi-drop wiring for operation, monitoring, troubleshooting, or configuration from a system workstation
- ▶ Local Instrument Link (LIL) networking option provides integration with existing systems
- ▶ Front panel PC connection accommodates local configuration, monitoring, or troubleshooting using the graphical configuration software
- ▶ Removable Real Time Clock/Configuration Board (RTC/CB) option minimizes maintenance and complexity via a simple board replacement technique that stores a complete copy of the control strategy configuration
- ▶ Factory Configured Options (FCOs) facilitate fast configuration for common applications
- ▶ Password protection provides individual security for various plant personnel
- ▶ Hardware designed to support emerging fieldbus technologies for both field and network connections ensures smooth plant integration
- ▶ Graphical Configuration Software provides a choice of function block or ladder logic configuration
- ▶ Short case design allows mounting in 12" deep cabinets
- ▶ Coated circuit boards ensure reliable operation and environmental integrity

Description

The Model 353 Process Automation Controller is a stand-alone, microprocessor-based industrial controller designed for a broad range of process applications. It can serve as a simple single-loop controller or as a multi-loop controller with complete control and logic functions for a small unit batch or continuous process. The Model 353's fieldbus and networking options enable it to function



as an integral element in a plant system. Loops are configured for control, sequence, or logic as needed within the Model 353. Each configured loop can have a virtual operator display that is viewed locally using the LOOP button on the faceplate and is mapped to network communication for a plant operator station. Alarm management is handled using the L (Loop) & S (Station) indicator lights along with the priority assignments and flashing options of each alarm.

User defined pushbuttons in each loop can be used for traditional functions, such as Console/Local, External/Internal Switching or individual user requirements, such as Start, Stop or Jog. Multiple variables are displayed on the operator faceplate and viewed using the D button. User defined units assigned to each variable are displayed via the UNITS button. Complete configuration of the Model 353 is available using buttons located behind the flipdown ID door.

A built-in library of preconfigured control strategies (FCOs) enable selection of common basic controller types for quick field set-up. A large selection of reusable function blocks enables simple changes to FCOs or the design of a custom control strategy to meet the needs of specific process control application. The Model 353 Graphical Configuration Software accommodates design, downloading, uploading, and on-line monitoring capabilities for improved management of controller configurations. In addition, sequencer/logic loops can be configured and monitored on-line in ladder diagram format for those more familiar with this language.

Controllers

Model 353 Process Automation Controller

Technical data

Specifications

Electrical & Environmental

Power Supply

Standard: 120/240 Vac (85 to 264 Vac); 47 to 63 Hz
Optional: 24 Vdc, +20%, -15%

Power Requirements

25 Watts, 40 VA (max.)

2-Wire Transmitter Power

Voltage: 25 Vdc \pm 3V
Current: 120 mA, short circuit protected

Hazardous Area Approvals

FM/CSA: Class I, Division 2, Groups A, B, C & D
ABS
CE

(Consult Siemens for current approvals)

Ambient Temperature Range

Operating: 32 to 122°F (0 to 50°C)
Storage: -40 to 185°F (-40 to 85°C)

Climate Conditions - IEC654-1

Class B3 - Standard Mounting
Class D1 - Installed per instructions in Class D1 enclosure

Electrostatic Discharge

IEC 801-2

RFI Protection

IEC 801-3

Electrical Transients

IEC 801-4

Net Weight

6 lbs.

Heat Dissipation

80 BTU/Hr.

Scan Time

Varies with configuration: 20 msec (minimum)

Inputs

Analog Inputs (non-isolated)

1-5 Vdc, 4-20 mA with included 250 resistor
MPU Controller Board: Qty 3
I/O Expander Board: Qty 1

Digital Inputs (isolated)

0-1 Vdc OFF, 15-30 Vdc ON
MPU Controller Board: Qty 3
I/O Expander Board: Qty 1

Analog Input, Universal (isolated)

Thermocouple: J, K, T, E, S, R, B & N
RTD: DIN 43760, US (NBS126), JIS C-1604
Slidewire: 500-5000
Ohms: 0-5000
Millivolt: Narrow: -19.0 to 19.0 mV; Wide:-30.0 to 77.0 mV
I/O Expander Board: Qty 2

Digital/Frequency Input, Universal (isolated)

Frequency Range: 0 to 25,000 Hz
Minimum Operating Frequency: 0.05 Hz
ON Voltage: 4-30 Vdc
OFF Voltage: 0-1 Vdc
Input Current: <5 mA @ 30 Vdc
I/O Expander Board: Qty 2

Outputs

Analog Outputs (non-isolated)

4-20 mA into 800 ohms (max.)
MPU Controller Board: Qty 2
I/O Expander Board: Qty 1

Digital Outputs (non-isolated)

Open Collector Transistor (emitter @ station common)
Load Voltage: 30Vdc (maximum)
Load Current: 100 mA (maximum)
Off State Leakage Current: <200 μ A @ 30 Vdc
MPU Controller Board: Qty 2

Relay Outputs (SPDT)

Contact Rating: 5A @ 120 Vac, 2.5 A @ 230 Vac, Resistive Load
Minimum Current: 100 mA @ 10 mVdc; 150 mA @ 50 mVac
I/O Expander Board: Qty 2

Optional Boards

Local I/O Expander
Local Instrument Link Network
Real Time Clock/Removable Configuration Board
Ethernet Communications

Standard Configuration

Nine of the most common control strategies have been stored in a built-in library and can be selected with a single pushbutton entry. These control strategies, which can be customized to accommodate individual needs, are:

- ▶ Single-Loop Controller with Tracking Setpoint
- ▶ Single-Loop Controller with Fixed Setpoint
- ▶ Ratio Set Controller with Operator Setpoint Limits
- ▶ Single-Loop Controller with Operator Setpoint Limits
- ▶ Cascade Loop Controller
- ▶ Cascade Loop Controller with Operator Setpoint Limits
- ▶ External Set Controller with Tracking Setpoint
- ▶ External Setpoint with Fixed Setpoint
- ▶ Dual Loop controller

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Function Blocks

Control strategies within the Model 353 are configured using the following function blocks, which are stored in memory. The total number and type of I/O function blocks available in the Model 353 depend on the installed hardware, and when available, can be used as needed within a configured loop. Loop function blocks can be used in the quantities indicated within each loop. Each configured loop can contain one operator display block & one controller block*.

Station Hardware I/O

- AIN1-4 - Analog Input
- AINU1-2 - Analog Input Universal
- AOUT1-3 - Analog Output
- DIN1-4 - Digital Input
- DINU1-2 - Digital Input, Universal
- DOU1-2 - Digital Output
- ROUT1-2 - Relay Output

Ethernet Peer-To-Peer I/O

- AIE01-32 - Analog Input Ethernet
- AOE01-32 - Analog Output Ethernet
- AWE01-32 - Analog Write Ethernet
- CIE01-32 - Coil Input Ethernet
- CWE01-32 - Coil Write Ethernet
- DIE01-32 - Digital Input Ethernet
- DOE01-32 - Digital Output Ethernet
- DWE01-32 - Digital Write Ethernet

LIL Peer To Peer Global Data I/O

- AIL01-99 - Analog Input_LIL
- AOL01-99 - Analog Output_LIL
- DIL01-99 - Discrete Input_LIL
- DOL01-99 - Discrete Output_LIL

Loop Function Blocks

- A/M - Auto/Manual
- ACS01-99 - ARC Cosine
- ADD01-99 - Addition
- AGA3 - Orifice Metering of Natural Gas
- AGA7 - Measurement of Gas by Turbine Meters
- AGA8 - Compressibility Factors of Natural Gas
- ALARM - Alarm
- AND01-99 - AND Logic
- ASN01-99 - ARC Sine
- ATD01-05 - Analog Trend Display
- ATN01-09 - Arc Tangent
- BATOT - Batch Totalizer
- BATSW - Batch Switch
- BIAS - Bias
- CHR01-99 - Characterizer
- CMP01-99 - Comparator
- COS01-99 - Cosine
- DAM01-99 - Deviation Amplifier
- DIV01-99 - Division
- DNC01-99 - Divide by N Counter
- DTM01-99 - Dead Time Table
- DYT01-99 - Delay Timer

- E/I - External/Internal Transfer
- ESL - Event Sequence Logger
- EXP01-99 - Natural Exponentiation
- EXT01-99 - Exponentiation
- FTG01-99 - Falling Edge Trigger
- GB01-99 - Gain & Bias
- HLD01-99 - Hold
- ID* - ID Controller
- LL01-99 - Lead/Lag
- LMT01-99 - Limit
- LN01-99 - Natural Logarithm
- LOG01-99 - Logarithm Base 10
- MTH01-99 - Math
- MUL01-99 - Multiplication
- NND01-99 - NAND Logic
- NOR01-99 - NOR Logic
- NOT01-99 - NOT Logic
- ODC* - Operator Display for Controllers
- ODS* - Operator Display for Sequencers
- ODA* - Operator Display for Analog
- ODD* - Operator Display for Discrete
- ODP* - Operator Display for Pushbutton
- ONOFF* - ON OFF Controller
- OR01-99 - OR Logic
- ORSL - Override Selector
- OST01-99 - One Shot Timer
- PB1SW - PB1 Switch
- PB2SW - PB2 Switch
- PB3SW - PB3 Switch
- PCOM - Phase Communication
- PD* - PD Controller
- PID* - PID Controller
- PIDAG* - PIDAG Controller
- PRSEQ - Program Sequencer
- QHD01-99 - Quickset Hold
- RATIO - Ratio
- RCT01-99 - Repeat Cycle Timer
- RLM01-99 - Rate Limiter
- ROT01-99 - Retentive On Timer
- RSF01-99 - RS Flip-Flop
- RTG01-99 - Rising Edge Trigger
- RTT01-99 - Real Time Clock Trip
- SCL01-99 - Scaler
- SEL01-99 - Signal Selector
- SETPT - Setpoint
- SIN01-99 - Sine
- SPLIM - Setpoint Limit
- SRF01-99 - SR Flip-Flop
- SRT01-99 - Square Root
- SUB01-99 - Subtraction
- TAN01-99 - Tangent
- TH01-99 - Track & Hold
- TOT01-99 - Totalizer
- TSW01-99 - Transfer Switch
- XOR01-99 - Exclusive OR Logic

NOTE:

Each configured loop can have one operator display block and one controller block.

Controllers

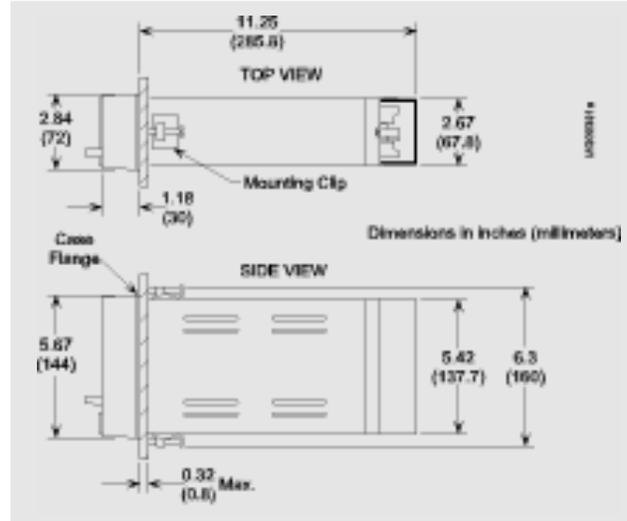
Model 353 Process Automation Controller

Accessories

Accessories

- ▶ Graphical Configuration Software (P/N i|config™ Vx.xx¹, Consult Siemens for latest version) Windows® 95/NT™/2000/XP software for configuration of the Model 353 and creation of the function block diagram. Configurations can be transferred using the built-in front panel connector, the Modbus network, or the LIL network connection or Ethernet.
- ▶ Transmitter Power Supply (P/N 15124-1) - Acopian Model B24G210M 24 Vdc 2.0 Amp Power Supply.
- ▶ Blank Filler Panel (P/N 15738-168) -Blank unit panel for uniform control room appearance when panel includes space for future controllers.

Mounting Dimensions



1) x.xx specifies the software's revision number. This will be defined by Siemens as the latest version.

Controllers

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Ordering data

Model Number	Order No.
Process Automation Controller	353-
MPU Controller Board	■ ■ ■ ■ - ■ ■ ■ ■ ■ ■ ■ ■
<ul style="list-style-type: none"> • 120/240 Vac (85-264 Vac); 47-63 Hz • 24 Vdc, +20%, -15% 	↑ ↑ ↑ ↑
Mounting Case	A
<ul style="list-style-type: none"> • Standard Terminals with Ethernet Connection 	D
Operator's Display Panel	4
<ul style="list-style-type: none"> • Fixed Analog & Digital Displays 	F
Expansion Board	N
<ul style="list-style-type: none"> • Not Required • Local I/O Expander (T/C, RTD, Frequency, Relay, ..) 	1
Option Board A-1 (Remote I/O Communications)	N
<ul style="list-style-type: none"> • Not Required 	N
Option Board A-2	N
<ul style="list-style-type: none"> • Not required 	N
Option Board B-1 (Network Communications)	E
<ul style="list-style-type: none"> • Ethernet • Not Required • Local Instrument Link (LIL) 	N
	L
	L
Option Board B-2	N
<ul style="list-style-type: none"> • Not Required • Real Time clock/ Configuration Board 	T
Modification Options	N
<ul style="list-style-type: none"> • Not Required • Controller Modified as detailed in order bill of material 	X
Reserved for Future Use	N
<ul style="list-style-type: none"> • Reserved for Future Use 	N
Design Level	A
<ul style="list-style-type: none"> • Design Level A 	A
Electrical Approval	N
<ul style="list-style-type: none"> • Not required • FM/CSA Class I, Div. 2, Groups A, B, C, D & CE Compliant 	4
<ul style="list-style-type: none"> • FM/CSA Class I, Div. 2, Groups A, B, C, D & CE Compliant & ABS Approved 	W

*Consult Siemens for current approvals.