

Controllers

Model 353 Process Automation Controller

with Ethernet Communication (Design Level B)

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 communication is standard, providing peer-to-peer communications.
- ▶ RS485 MODBUS® network connection allows multi-drop wiring for operation, monitoring, troubleshooting, or configuration from a system workstation
- ▶ Front panel PC connection accommodates local configuration, monitoring, or troubleshooting using the graphical configuration software
- ▶ Real Time Clock provides status output based on time of day. Removeable configuration media stores a complete backup 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
- ▶ Graphical configuration program 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 standard Ethernet communication enables 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 enable simple changes to FCOs or the design of a custom control strategy to meet the needs of specific process control application. The Model 353 Configuration Utility 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.

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Technical data

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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 Pending

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 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

Communication

Front configuration port: RS232 MODBUS
Rear port: RS485 MODBUS
Ethernet: MODBUS/TCP

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

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.

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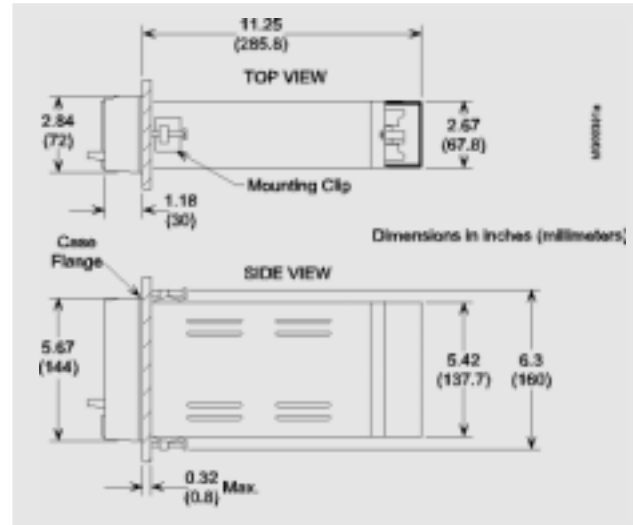
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Accessories

Accessories

- ▶ Graphical Configuration Software (TGX:ICONFIG-V4.00, 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 Multi Media card.
- ▶ 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



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Ordering data

Model Number

Process Automation Controller
w/Ethernet Communication

TGX: 353

Controller Board

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

Mounting Case

- Standard Case with Ethernet Connector
- High Shock & Vibration Case w/ Ethernet Connector

Operator's Display Panel

- Fixed Analog & Digital Displays

Expander Board

- Not Required
- Local I/O Expander (T/C, RTD, Frequency, Relay, ..)

Multi Media Card

- MMC

Modification Option

- Not required
- Controller modified as detailed in order Bill of Material)

Design Level

- Design Level B

Electrical Approval

- Not required
- FM/CSA Class I, Div. 2, Groups A, B, C, D suitable for non-incendive (CE Compliant)
- FM/CSA Class I, Div. 2, Groups A, B, C, D suitable for non-incendive (CE Compliant & ABS Approved)

Sample Model Number

TGX:353

Order No.

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1

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X

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4

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