MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

353A4F1NNNNNNA4

PROCESS AUTOMATION CONTROLLER

Used with the applicable Model 353 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens 353A4F1NNNNNNA4

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 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 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 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.

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 ±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
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

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
DOUT1-2 - 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

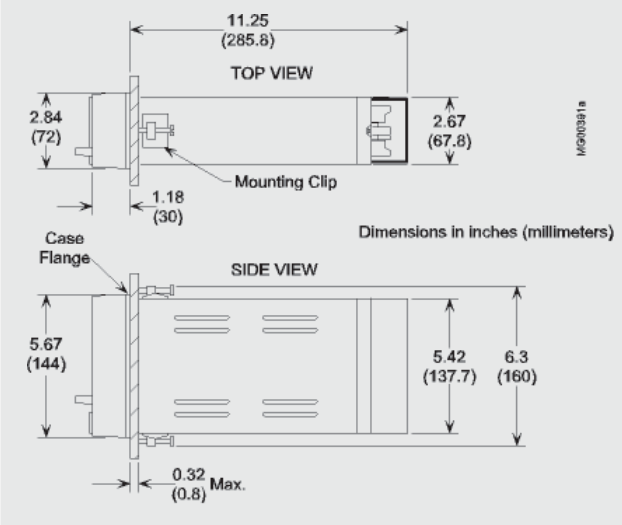
NOTE:
Each configured loop can have one operator display block and one controller block.

Accessories

Accessories

- Graphical Configuration Software (P/N i|config™ Vx.xx[1], 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.

Model Number

Order No.

Process Automation Controller

353- ■■■■ - ■■■■■■■■■

MPU Controller Board
- 120/240 Vac (85-264 Vac); 47-63 Hz — A
- 24 Vdc, +20%, -15% — D

Mounting Case
- Standard Terminals with Ethernet Connection — 4

Operator's Display Panel
- Fixed Analog & Digital Displays — F

Expansion Board
- Not Required — N
- Local I/O Expander (T/C, RTD, Frequency, Relay, ..) — 1

Option Board A-1 (Remote I/O Communications)
- Not Required — N

Option Board A-2
- Not required — N

Option Board B-1 (Network Communications)
- Ethernet — E
- Not Required — N
- Local Instrument Link (LIL) — L

Option Board B-2
- Not Required — N
- Real Time clock/ Configuration Board — T

Modification Options
- Not Required — N
- Controller Modified as detailed in order bill of material — X

Reserved for Future Use
- Reserved for Future Use — N

Design Level
- Design Level A — A

Electrical Approval
- Not required — N
- FM/CSA Class I, Div. 2, Groups A, B, C, D & CE Compliant — 4
- FM/CSA Class I, Div. 2, Groups A, B, C, D & CE Compliant & ABS Approved — W

*Consult Siemens for current approvals.