

General Specifications

ASTMAC Overview and Base Types NT105xJ, NT110xJ, NT120xJ, NT130xJ, and NT182AJ



GS 34P02A03-01E

■ GENERAL

ASTMAC (*1) is software based on object-oriented technologies and helps configure production line control systems, for example, for providing production orders, operating and monitoring production lines or processes, and acquiring process data. ASTMAC has the following features.

*1: ASTMAC is Japanese domestic market only (Not for sales overseas).

■ FEATURE

1. Progressive Openness

Running under the Microsoft Windows 2000 operating system, ASTMAC is equipped with a wealth of network functions, suitable for developing applications that require preemptive multitasking, and is easy to connect to information systems. Besides, it has the industrial standard OPC interface.

2. Object-oriented Software

The data server that performs data processing and exchange between devices and application forms executing applications such as HMI is built based on object-oriented technologies, allowing applications to link I/O data with ease. An application can be developed by simply assembling objects, thus minimizing programming time.

3. Versatile VBA Implemented

As an application descriptive language, Visual Basic Application Edition (VBA) is implemented on application forms and data servers. This allows direct access from applications to I/O data and sophisticated development environment of VBA facilitates programming and debugging.

4. Powerful Functions Support System Configuration

Sophisticated application parts including historical trend and report functions are provided to flexibly support diverse applications.

5. High Scalability

ASTMAC offers scalability for a broad range of systems, from the minimum system consisting of a PC and a programmable logic controller (PLC) to the maximum system of four master station PCs and thirty-two controllers. ASTMAC software is offered in several models to allow the most suitable choice for the number of I/O points and the style of your system.

6. Security Functions

Security functions allow restriction of access according to operator privilege level, and automatic generation of operation logs, thus assuring system and data security.

This enables you to build systems which comply with "FDA (U. S. Food and Drug Administration), 21 CFR Part 11 – rules concerning electronic record-keeping and electronic signatures that are acceptable as equivalent to paper records.

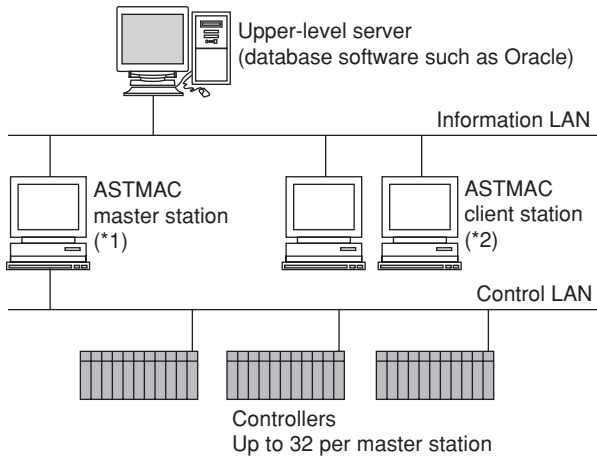
■ SYSTEM SPECIFICATIONS

An ASTMAC system consists of PC/AT-compatible computers, networks (Ethernet), and controllers such as programmable logic controllers. Master stations (see the figure below) perform data exchange with controllers and data processing, and are used for operation and monitoring. Client stations link to a master station via a LAN and are used for operation and monitoring remotely.

Item	Specification
Master stations	Up to 16 (*1) per control LAN
Client stations	Up to 4 (*1) can be connected to each master station
Controllers and I/O devices	Up to 32 can be connected to each master station
Control objects (tags)	Up to 5000

*1: Consult Yokogawa about the feasibility of connecting more. ^{T01E.EPS}

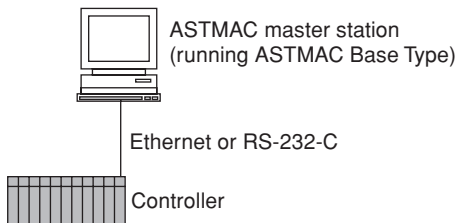
■ SYSTEM CONFIGURATIONS



*1: Running ASTMAC Base Type
Up to 4 per system
*2: Running ASTMAC Viewer Client Type

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Figure Large-scale System



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Figure Minimum System

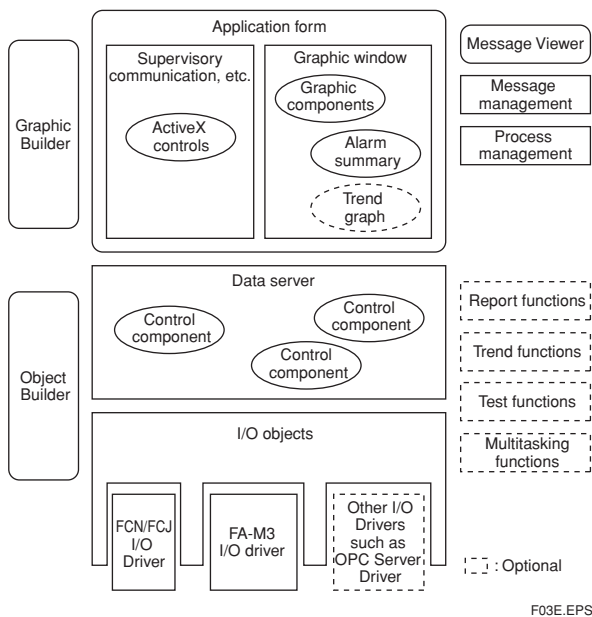
■ SYSTEM REQUIREMENTS

Item	Specification
Personal computer	PC/AT-compatible computer
CPU	Pentium III 400 MHz or better (Pentium III 700 MHz or better recommended)
RAM	256 MB or more (512 MB or more recommended)
Hard disk	At least 1 GB of free space is required (5 GB or more recommended).
USB or parallel (Centronics) port	Required to install an ID module.
Ethernet adapter	An Ethernet adapter that is supported by the operating system specified at the bottom of this table is required at installation.
CD-ROM drive	A CD-ROM drive that is supported by the operating system specified at the bottom of this table is required.
Printer	A laser printer or color printer for A4-size paper (that is supported by the operating system specified at the bottom of this table) is required. An ESC/P code-enabled serial printer is required for alarm printing.
Peripheral devices	An MO, digital audio tape, CD-RW or other removable storage drive supported by the operating system specified at the bottom of this table is required for backup. Sound card and loudspeaker are required for voice output.
Display	1024 x 768 pixels or more, 256 colors or more (800 x 600 pixels acceptable for maintenance)
Operating system	Windows 2000 Professional SP4 Windows XP Professional SP1, SP2

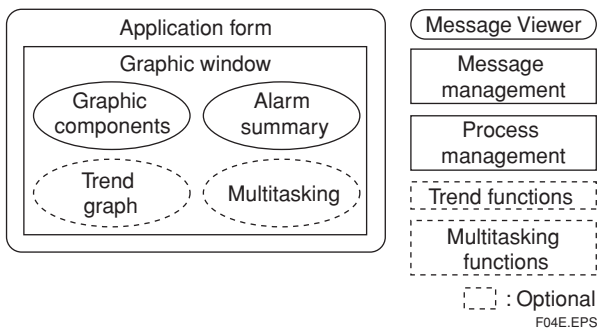
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■ SOFTWARE CONFIGURATION

● ASTMAC Base Type



● ASTMAC Viewer Client



■ APPLICATION FORM

An application form is a container in which ActiveX controls are to be embedded and implemented. Embedding sophisticated ActiveX controls provided with ASTMAC as well as ActiveX controls available in the market(*1) will implement a graphic window and application program as desired. ASTMAC allows a multi-tasking application in which multiple application forms execute while interlining to each other to be built, thus enabling a high-performance system to be materialized.

*1: Use of a commercially available ActiveX control requires it to be installed in all computers that may implement it.

● Graphic Builder

Graphic Builder presents a concise environment to develop application forms, and has the following features:

- Enables graphics to be drawn with ease.
- Allows animations to be created.
- Provides sophisticated graphical ActiveX controls.
- Browses objects in a data server to realize data links with those objects when an application form will be run.
- Implements VBA.

Controls Provided As Standard

ActiveX controls:

- RSData:** Basic data presentation; displays a data value as a number or characters.
 - RSWheel:** Panel-mounted thumb wheel emulator; displays an increment/decrement switch.
 - RSVessel:** Displays a desired, enclosed graphic shape and allows color fill control.
 - RSGauge:** Graphical data presentation; displays a data value in various gauge-like forms.
 - RSSlider:** Presentation of a graphical data setting element; displays a potentiometer-like slider for data setting.
 - RSCmpare:** Compares multi-status data; displays desired graphics depending on the comparison result.
 - RSButton:** Displays a switch in various forms including a pushbutton and toggle switch.
 - AlarmFsX2:** Alarm summary display
 - MsgHistX:** Displays message log file contents.
 - YfsClock:** Interval timer or specific-time timer
 - PDemand:** Displays power demand graph.
 - RunAsDialog:** Dialog box for logging on as a different user when accessing security
 - FacePlateX2:** Displays an instrument faceplate.
 - YfslsamMt:** Allows an indexed sequential access method (ISAM) file to be imported, exported, and restored.
- VBA controls: Frame, Label, CommandButton, TextBox, ListBox, ComboBox, CheckBox, OptionButton, ToggleButton, ScrollBar, TabStrip, SpinButton, Image
- FacePlateX3:** Displays an instrument faceplate for a PAS POU of FCN/FCJ.
 - FacePlateX4:** Displays an instrument faceplate for a PAS POU of FCN/FCJ. (for Batch set block)

■ DATA SERVER FUNCTIONS

A data server and I/O object comprise the data server functions and they are configured using Object Builder.

● Data Server

Using the I/O object, the data server exchanges data with I/O devices and controllers, and performs various processes for field data. The acquired field data and processing results can be accessed from application programs outside the data server such as application forms and Visual Basic applications.

● Control Objects

A control object controls a set of data such as inputs and outputs and corresponds to what is generally called a tag. The number of data that can be handled by a control object varies with the object type. Up to 5000 control objects (*2) can be defined in the data server. The user can group two or more control objects comprising a particular unit of functions into one and make a copy of each group. Programs outside the data server can easily access data in individual control objects via OPC Data Access 2.0 interfaces or OLE Automation interfaces.

*2: An object that can control data exceeding 128 bytes in size is not counted as one object but is counted as the number incremented by 1 for each 128 bytes when assessing the capacity. For example, a single object handling 32,768 bytes is counted as 256 objects because 32,768 divided by 128 is 256. The objects contained in each group of objects are also counted individually when it comes to capacity.

The control objects are largely divided into three kinds.

Device tag objects

A device tag reads and writes data from/to controllers and I/O devices using an I/O driver, and carries out I/O processing including various data conversions and alarm detection.

Application support objects

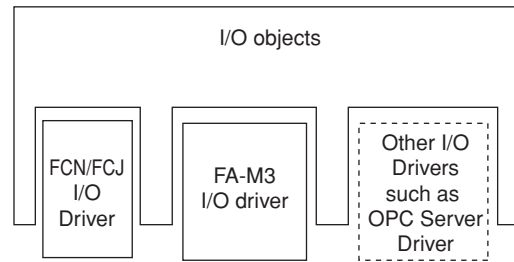
An application support object features functions for supporting actions by an application, such as generating a time trigger.

● Visual Basic Applications Edition (VBA)

The data server implements VBA, allowing functions provided with each control object to be enhanced and multiple control objects to interlink with each other. (The number of control objects VBA programs on the data server can handle is limited to 2000; nevertheless, application forms and VB application programs can access up to a total of 5000 control objects.)

● I/O Object

The I/O object is a component for linking various controllers and I/O devices. In response to input/output requests from each control object on the data server, the I/O object performs communication with the specified controller or I/O device. An I/O driver is prepared for each controller or I/O device model, and plugging a proper driver into the I/O object establishes a connection to the intended controller or device. A total of up to 32 drivers can be plugged into the I/O object.



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I/O drivers encapsulate the unique interface required for each field device and allow the data server and an application program to access the various field devices via a common interface. An I/O driver provides the following functions:

- Data input/output
- Reception of asynchronous events from a controller
- Control of controller's inherent functions

The following I/O drivers are included as standard:

Models Supported	Interface	Functions
FCN/FCJ autonomous controllers	Ethernet TCP/IP	Reads and writes control data, and receives alarms.
FA-M3 controllers	Ethernet (UDP/IP) or RS-232-C (*1)	Reads and writes sequence element values/statuses, receives asynchronous data, and sets the date and time.

T13E.EPS

*1: If you use RS-232-C/RS-485 converter for I/O device which has RS-485 interface, RS-232-C/RS-485 converter which has the echo back function is unusable as an adapter.

● Object Builder

Object Builder presents an integrated environment in which the user can make settings for the data server and perform debugging, and provides intuitive interfaces for the user to:

- Define the I/O object.
- Define control objects.
- Define alarms.
- Develop and debug VBA programs.
- Run Security Builder.
- Run Historical Data Acquisition Builder and Report Builder (available as the optional Trend Package and Report Package, respectively).
- Make settings for simulation functions (available as the optional Test Function Package).

SYSTEM SUPPORT FUNCTIONS

● Message Management

Message management performs integrated management of error and alarm messages occurring in the ASTMAC system programs, connected controllers and devices, and application programs as well as user operation records and process event messages. The table below summarizes messages that can be handled by message management.

Message Type		Description
System messages		Messages generated by an ASTMAC system program
Application messages	User messages	Messages of general information generated by an application program, such as user operation records and event data. User messages do not require the user for acknowledgement.
	User alarms	Messages of an alarm generated by an application program. User alarms require the user for acknowledgement.
Control object messages	Process messages	Messages notifying an operation record of a user action to a control object
	Process alarms	Messages of an alarm pertaining to a control object. Process alarms require the user for acknowledgement.

T03E.EPS

Message management stores these messages to a rotary file referred to as the message log file, which can contain up to 5000 messages. One or more of the following actions take place for individual messages:

- Display in the alarm summary
- Logging to the message log file
- Logging to a text file
- Display in a dialog box
- Voice output
- Printing using a serial printer
- Notification to an application program
- Logging to an Oracle database

● Process Management

Process management performs integrated management of the ASTMAC system programs and application programs, allowing automatic start and shutdown of the system. In particular, process management can:

Mode	Description
Operation Mode	Starting up system program and registered Application form/VB application automatically. Performing usual operation and debug.
Development Mode	Starting up only basic system program such as message management program. Development mode that includes building of data server (etc.).
Shutdown Mode	Status the system program or Application form/VB application is stopped. Mode for back up work.

T04E.EPS

- Manage and control ASTMAC's operation mode.
- Start and shut down the ASTMAC system.
- Start the desired application program.
- Issue an advance notice for a shutdown of data server to an application program.

● ISAM (Indexed Sequential Access Method) File

The ISAM is a scheme for decreasing the time necessary to locate a data record within a large database, given a key value (index) that identifies the record. An ISAM file allows easy access from a Application form and a VB application by using a key and is ideal for quick search of production data. Microsoft ADO (ActiveX Data Objects) is the interface for access.

Item	Description
Max. number of opened file	255 per system
Max. number of files can be handled	32 per process
Max. length of record	4096 bytes
Max. number of record	500000 records
Field type	16-Bit Signed Integer Data (Array is definable)
	32-Bit Signed Integer Data (Array is definable)
	Single-precision Actual Number (Array is definable)
	Double-precision Actual Number (Array is definable)
	Text (character string)
Record type	Fixed length
File type	Standard/Hybrid/Memory

T05E.EPS

● Security

The users can be divided into groups and the ranges of permissible operations can be set differently for each group. The log of actions performed by each user during runtime can be saved for recording. These prevent problems such as operation mistakes and ensure system security.

Operational restriction settings for each user group

The ranges of permissible operations can be predefined for each user group:

- Access to control objects via an application form or VB application
- Alterations to archived long-term data files of historical data acquired
- Running of system programs (builders, tools, etc.)
- Access to tuning windows
- Switching of ASTMAC's operation mode
- Changes to security log definitions
- Alarm acknowledgment
- Deleting messages in the message history file, changing the number of stored messages

Security logs

For each item that is operated, the log of actions performed by each user during runtime can be saved for recording.

● VB Property Link

Data link with other Visual Basic applications is made easy with this function.

Note: VB Property Link is available in Visual Basic Version 6. Not available in Version 7 (VB.Net).
"OPC Data Link Package for .NET" (refer to GS 34P02H51-01E if you need) is available in .NET framework including VB .NET.

■ SOFTWARE OFFERINGS

ASTMAC is offered as basic models and optional software packages.

● Basic Models

ASTMAC requires each computer in a system to run an ASTMAC basic model, which is offered as a base type or the viewer client type.

Base types

Each base type offers all the fundamental functions of ASTMAC such as running a data server and application forms. There are five base types that differ in data server capacity (i.e., the maximum number of implementable objects): SS, S, M, L, and LL. In addition, each type is further available in two versions: full-time version and runtime version.

Full-time version

Has both development and runtime environments and can be used for all purposes from configuring a system, developing and debugging applications, to running the developed applications.

Run-time version

Offers only the runtime environment. The full-time version is required for development such as configuring a system, and developing and debugging applications.

Upgrade kits

For such needs as increasing control objects for a system expansion, upgrade kits are available. A kit for upgrading a base type from the SS size to S, however, is not available.

Viewer client type

The viewer client type needs to be run on each client station linked to a master station via LAN. It offers only the environment to implement application forms and does not offer a development environment, so none of various builder programs can run with it. For development such as developing and debugging applications, use the full-time version of a base type.

● **Optional Software**

The table below shows optional software offered for adding functions. A software license is required for each computer that runs the corresponding optional software. For a package offered in two versions, the full-time version can run under only the full-time version of an ASTM MAC base type and the runtime version can run under only the runtime version of an ASTM MAC base type. Only the Web monitoring package presents both development and runtime environments even under the runtime version of an ASTM MAC base type. For further details, see the respective documentation.

Optional Package			Basic Model			Reference Document
			Base Type		Viewer Client Type	
			Full-time Ver.	Run-time Ver.		
Name	Model	Models NT105FJ NT110FJ NT120FJ NT130FJ NT140FJ	Models NT105RJ NT110RJ NT120RJ NT130RJ NT140RJ	Model NT182AJ		
Report Package	Full-time version	NT301AJ	√			GS 34P02H01-01E
	Runtime version	NT301RJ		√		
Trend Package	Full-time version	NT302AJ	√			GS 34P02H02-01E
	Runtime version	NT302RJ		√	√	
Test Package	Full-time version	NT303AJ	√			GS 34P02M01-01E
	Runtime version	NT303RJ		√		
Multi-task Package	Full-time version	NT304AJ	√			GS 34P02H04-01E
	Runtime version	NT304RJ		√	√	
Extended Security Package		NT320AJ	√	√	√	GS 34P02H07-01E
Operation Shield Package		NT321AJ	√	√	√	GS 34P02H08-01E
Custom Driver Interface		NT341AJ	√	√		GS 34P02H41-01E
MELSEC Driver		NT351AJ	√	√		GS 34P02G01-01E
SYSMAC Driver		NT356AJ	√	√		GS 34P02G06-01E
OPC Server Driver		NT358AJ	√	√		GS 34P02G08-01E
DARWIN Driver		NT365AJ	√	√		GS 34P02H05-01E
Power Monitor Driver		NT366AJ	√	√		GS 34P02H06-01E
OPC Data Link Package for .NET		NT336AJ	√	√	√	GS 34P02H51-01E

T06E.EPS

■ **STYLES OF SOFTWARE SUPPLY**

Software Medium

Programs and user's manuals for ASTM MAC basic models and optional software are supplied as a CD-ROM, and hence a CD-ROM drive is needed to install them in a PC. To run a program you need a license ID and ID module.

Order ID Sheet

An order ID sheet with the order ID and password entries comes with each ASTM MAC basic model license or license for optional software. Access the specified Web site of Yokogawa and enter the order ID and password. Then, the respective license IDs for the supplied software titles will be given. To use the software, the given license IDs need to be registered with the ID module.

ID Module

An ID module (hardware) that comes with each ASTM MAC basic model license needs to be installed to a USB port or Centronics printer port of the PC to run a data server and/or HMI server using the basic model.

■ **NOTICE FOR THIRD-PARTY PRODUCTS**

ASTMAC is software that makes the most of commercial-off-the-shelf (COTS) software, so third-party products meeting the specifications required by ASTM MAC are myriad. Yokogawa, however, does not guarantee correct operation of all such products. The pieces of software described in the General Specifications and User's Manuals of ASTM MAC, such as the Windows operating system and Microsoft Excel, will operate correctly to the extent of the specifications. Correct operation of the system cannot be guaranteed if any other third-party software is installed and used with an ASTM MAC product.

Yokogawa has conducted combination tests on third-party products that many want to use with the ASTM MAC. These tests will also be performed on new third-party products as required. Nevertheless, these tests simply check the basic operations in combination with the ASTM MAC and do not mean to assure correct operations. The up-to-date results of these tests will be available to those who have concluded a support contract.

MODEL AND SUFFIX CODES

● Software Media

		Description
Model	NT201AJ	VDS/ASTMAC software media
Suffix Codes	-P	Programs (including electronic documentation)
	C	CD-ROM
	1	Always 1
	1	Always 1
	E	English version

T07E.EPS

● Basic Model

Base Type License

		Description
Models	NT105FJ	SS-size Base Type, full-time version
	NT105RJ	SS-size Base Type, run-time version
	NT110FJ	S-size Base Type, full-time version
	NT110RJ	S-size Base Type, run-time version
	NT120FJ	M-size Base Type, full-time version
	NT120RJ	M-size Base Type, run-time version
	NT130FJ	L-size Base Type, full-time version
	NT130RJ	L-size Base Type, run-time version
	NT140FJ	LL-size Base Type, full-time version
	NT140RJ	LL-size Base Type, run-time version
	Suffix Codes	-L
U		ID module for USB port
P		ID module for printer (Centronics) port
1		Always 1
1		Always 1
E		English version

T08E.EPS

		Description
Model	NT182AJ	Viewer client type
Suffix Codes	-L	License
	U	ID module for USB port
	P	ID module for printer (Centronics) port
	1	Always 1
	1	Always 1
	E	English version

T09E.EPS

Type	Model	Implementable Objects	Description
Base Type	SS	NT105□J	Up to 100
	S	NT110□J	Up to 200
	M	NT120□J	Up to 1000
	L	NT130□J	Up to 2000
	LL	NT140□J	Up to 5000
Viewer Client Type	NT182AJ	–	The same as Table T01E.ESP in GS34P02A03-01E

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Note: A control object controls a set of data such as inputs and outputs and corresponds to what is generally called a tag. The number of data that can be handled by a control object varies with the object type.

● Upgrade Kits

		Description
Model	NT231AJ	Upgrade kit M (from S to M), full-time version
	NT231RJ	Upgrade kit M (from S to M), runtime version
	NT232AJ	Upgrade kit L (from M to L), full-time version
	NT232RJ	Upgrade kit L (from M to L), runtime version
	NT233AJ	Upgrade kit LL (from L to LL), full-time version
	NT233RJ	Upgrade kit LL (from L to LL), runtime version
Suffix Codes	-L	License
	F	A floppy disk containing the license ID to be supplied (for system R1.01 to R3.02)
	W	An order ID sheet to be supplied
	1	Always 1
	1	Always 1
	A	Standard

T11E.EPS

● Optional Accessories

		Description
Model	NT221AA	ID module for USB port
	NT222AA	ID module for printer (Centronics) port

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■ ORDERING INSTRUCTIONS

Specify the model and suffix codes.

■ TRADEMARKS

- STARDOM is a trademark of Yokogawa Electric Corporation.
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