312-4745

The Mitsubishi Alpha Controller

α

A new concept in control solutions, designed for simplicity.

Overview

Do you need control? Do you
Have a building services process
to automate?
Welcome to the α series controller
from Mitsubishi, The Tiny Giant.
The a has been designed to provide
flexible supervisory Control around
factories, buildings and offices, and
In particular in refrigeration.
In fact almost anywhere.
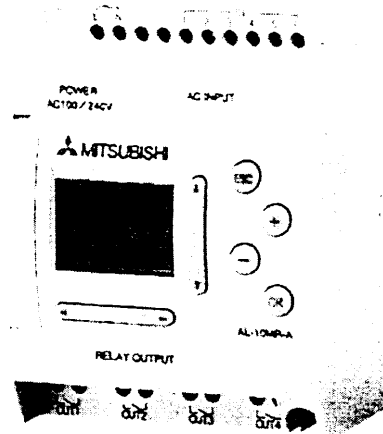
α has a number of very powerful
features packed in its tiny Frame –
Real time clock, high current output switching relays,
Analogue inputs, password protection, 100hours memory backup,
All in a range of sizes to meet your needs. But what truly separates
The a from other products is its size and ease of use.

The windows based Visual Logic Software (VLS) is the most user-friendly way
To program a controller for any level of user.
The function block programming lets you select from a pre-made set of inputs
Outputs, and function blocks.
You simply drag and drop, point, and click their way to a complete program.
There is a teaching wizard to guide you through.

Alternatively you can buy α as a pre-programmed device, for a head pressure
controller, or fan speed controller.

Fingertip programming allows program updates from the front panel, thus
making time/temperature changes simple and easy.

Initial range

| Model	Power Supply	Input		Output		Dimensions	Weight
		Type	Number	Type	Number	mm	kg
AL-6MR-A	100-240V AC	100-240V-AC	4	Relay	2	71 x 90 x 55	0.2
AL-10MR-A			6	Relay	4		
AL-10MR-D	24V DC	24V DC S/S	6	Relay	4		
AL-10MT-D			6	Transistor	4		
AL-20MR-A	100-240V AC	100-240V AC	12	Relay	8	125 x 90 x 55	TBA
AL-20MR-D	24V DC	24V DC S/S	12	Relay	8		
Al-20MT-D			12	Transistor	8		

Note: 20i/o due Oct 99

The combination of a small size, and DIN rail or crew type mounting capability enhances α's ability to be installed wherever necessary. A goes where you need it!

The a is packed with greatest level of functionality in its class. The experienced user will find a powerful range of options to satisfy most advanced requirements, Whist the new user will find the wizards a great help when starting out.

The simulation function even allows you test your program without the need to connect to your outside hardware.

Powerful, User Friendly. Price competitive – The a is ready to solve problems for you!
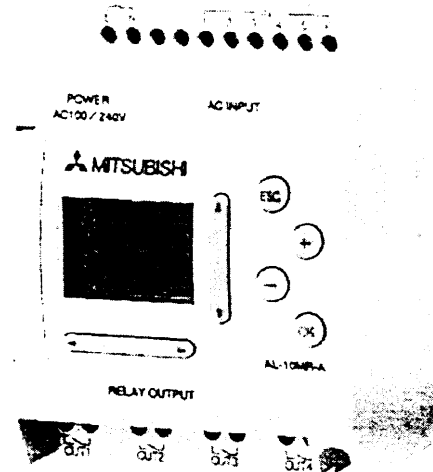
VLS Software

Visual Logic Software (VLS)

What makes the VLS software easy to use?
The VLS software uses a special, simple method of programming called Function Block.
Function Blocks are small pre-programmed building blocks of software that process input data and then turn outputs ON or OFF providing the control you need.

Pre-made icons (Inputs, Outputs, Function Blocks) can be placed on screen, connected with the click of the mouse, and you have a complete program.


The Function Block Diagram (FBD) Board has squares already labelled in which to place your Inputs - (switches, sensors, etc) and Outputs (motors, fans, lamps etc) while the function blocks can be applied anywhere on the green board.

Timer values, ON/OFF patterns, counters, calendar date, and elapsed time can be optimised for specific applications, By simply clicking the function block and entering the data in the options setting.
Every part of you program appears On the screen with interconnecting lines.
The ability to see relationships between various sections of your system make both programming and troubleshooting quick and easy.
You can add comments to each function block, thus make identification simple.
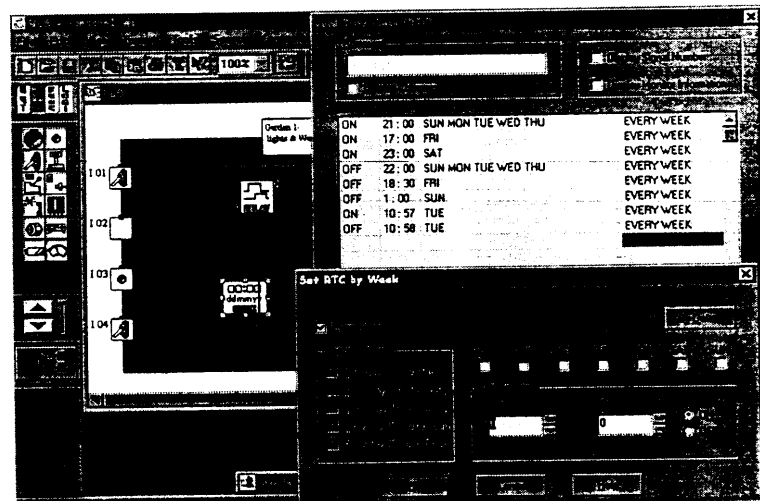
After the program is complete VLS lets
You simulate your program in 'run' mode
Without the need for external hardware,
Or connections.
Create your program, click on simulation
Click on an Input to turn it ON and OFF
And watch the wires change colour, and
The Output device turn ON and OFF.

All debugging can be done on your P.C.

What could be easier!
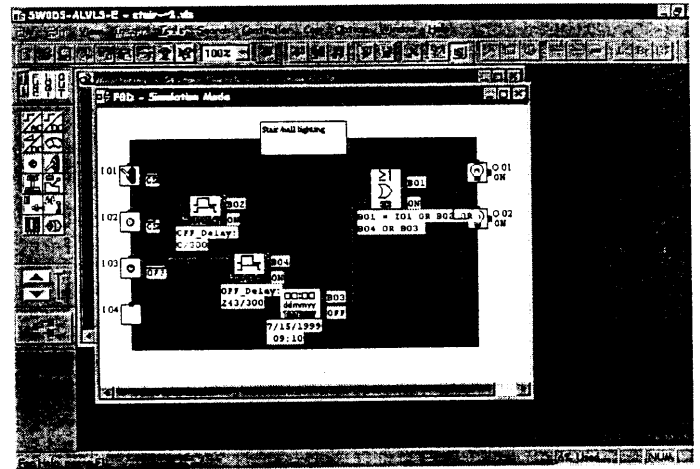
Features

Real time clock

The a has upto 160 entries for Real Time Clock functions. Begin applications
based on a calendar date, or daily, weekly, or monthly schedule. It is fully
Year 2000 compliant.

Front Panel Programming

Do you need to change time, temperature, pressure etc values? The front
panel buttons enable you to change these to suit each application. It is simple
and easy, and can be done on site without the need of a computer.

1500Byte EEPROM Memory

The a provides enough memory for most advanced applications. Up to 64
function blocks or 15500 bytes of memory can be stored in an internal
EEPROM, with additional programs being stored in pug in EEPROMS.
No batteries to worry about!

HMI (Human Machine Interface)

The screen on the front provides the user with detailed information about the
unit, or the application.
Each screen can provide 4 lines of 10 characters of information for example –
Hours run, time, temperature, alarms, names, etc.
Each screen is simply inserted in the program.

General Specification

Operations

Function Block Capabilities

**Boolean Logic (AND,
OR, NOT, NAND,
XOR, NOR) -**
Set up your Outputs to
run ON or OFF
by any logical combination
of Input signal.

Set / Reset -
Latch Outputs ON or OFF
from you Input data.

One shot –
Copy a single pulse or
specify your pulse.
Delay times and a reset
trigger give this Operation
maximum flexibility.

Delay –
Delay your output pulse
from starting or stopping
(or both) with the delay function.
Keep a light turned ON, or OFF
for a time.

Pulse –
Configure and send
pulses dependent on
Up or Down triggers
or both.

Alternate –
Alternate turning your output ON or OFF
From the same input.

Real Time Clock (RTC)
This year 2000 compliant RTC can control
160 time/date combinations.

Flicker –
Design a series of ON and OFF Output
Patterns, e.g. have the light go on for
60 seconds while the horn blasts for 10.
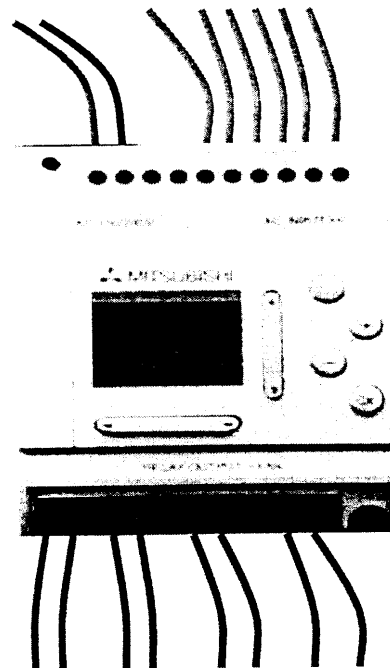
Counter –
Keep track of the number of times an
Operation takes place for information
Or to control your outputs.

Compare –
Compare data, current elapsed time,
Analogue values or direct input values

Zone compare –
Check same date as compare function
This time checks your data to a range
Of values.

Offset gain –
Adjust the slope of the offset of an
Analogue value to obtain best results.

Schmidt trigger –
Turn Outputs ON and OFF based upon
A range of values.
For example: Turn fan on when temperature
Reaches 110 degrees C and OFF when it
Reaches 90 degrees C.
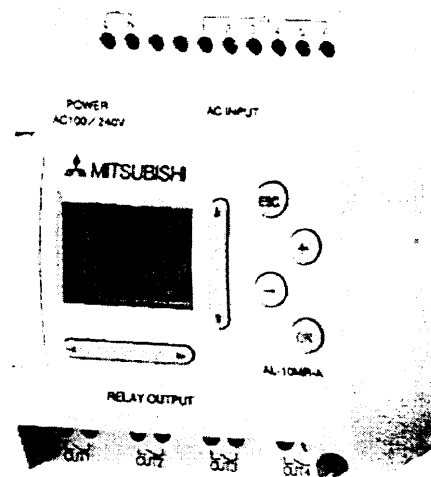
Technical Specification

Maximum I/O~	20 points

Inputs~

AC same phase and voltage as power supply
DC can be used as digital or analogue
      a) digital - hardware selected sink or
         source input - nominal 24V DC
      b) analogue - S/W selected
         10V input 8 bits resolution,
         max 8 points

Outputs~

Transistor, 24V DC 1A (source output)
Relay upto 250V AC or 30V DC
100,000 cycles @ 8A 240V AC
30,000 cycles @ 10A 110V AC

Program environment ~

Alpha can be switched in to English, French,
German, Spanish, Italian and Japanese
programming modes

Program capacity   64 FBD/1500bytes

Program storage   built in EEPROM
Built in RTCC~   all models as standard

Variable/RTCC back up~   100Hrs back up support is by capacitor

Number of FBD functions   14 (and increasing!?)

Number of Logical FBDs~ 6 (And, Or, Not, Nand, Xor, Nor)

Security function~   Locks user out of programmer

Display function~   LCD display can be used as
                      text HMI

Comm's~   Modem dial up/ dial out feature
             Optional networking on 20 I/O (ASI)

Analogue inputs~   Optional configurable analogue input, 8 bit

Typical Applications

Building Services

Refrigeration

Air conditioning

Lighting

Doors

Gates
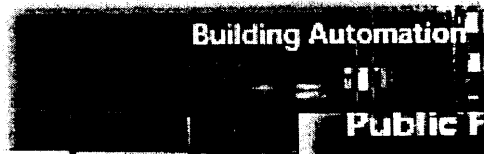
Public Facilities

Airports

Train stations

Road signs

Hospitals
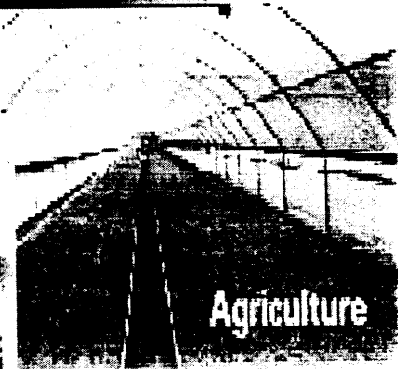
Agriculture

Farms

Greenhouses

Watering

Feeding

Home Automation

Lighting

ON/OFF electrical appliances

Security

Commerce

Parking

Shops

Golf Courses

Signal Accessories Toolbar

The accessories toolbar will be displayed by pressing OUT, IN, FUNC, and LOGIC tab button.
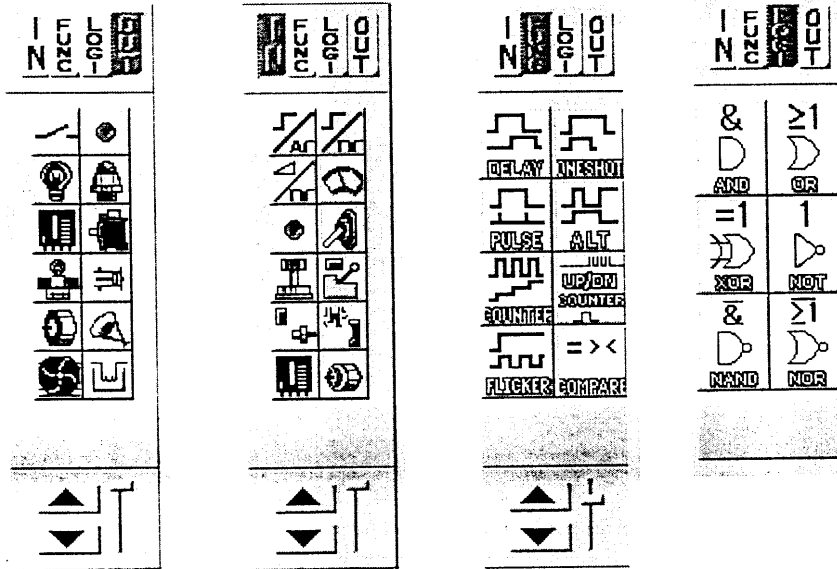
In addition to the above icons, user can add his own icons (User defined Signals) to output, input, and functions accessories toolbar through Option-
User defined icons menu option.

The signals can be scrolled up/down by pressing scroll button, which is provided, at the bottom of the accessories toolbar.

Input Signals

Input signal can be of DIGITAL or ANALOG type. The following is the list of input signals, which are supported by the application.

Icon	Signal
	BINARY INPUT AC
	BINARY INPUT DC
	ANALOG INPUT DC
	ANALOG INPUT
	INPUT S
	TOGGLE SWITCH
	PUSH SWITCH
	LIMIT SENSOR
	HOTLINE SENSOR
	HUMAN SENSOR
	RELAY POINT
	ROTARY ENCODE
	PULSE GENERATOR
	BATTERY

In the list given above, ANALOG INPUT and ANALOG INPUT DC is Analogue signals and all others are Digital signals. When Input signal (digital or analogue) is placed in Fbd window's IO-rectangle, then device code of signal will be 'I'.

Analogue Input signals can not be placed in Fbd wiring area. If a digital input signal is placed in the Fbd wiring area or in System sketch window, then the device code of signal will be 'B'.

In Simulation or Monitor/Test mode, for digital signals, the icon state changes automatically when user clicks on the icon. The state of the analogue input signal can be changed in Simulation and Monitor/Test mode by setting its analogue value. The Analogue Value of analogue input signals could be set in the Analogue input dialog.

Special Input Signals

Special Signal are digital. The device code and device number for each of these signals is as follows.

SIGNAL NAME	DEVICE CODE	DEVICE NUMBER	BITMAP
CONTINUOUS ON	M	01	
CONTINUOUS OFF	M	02	
1 SECOND CLOCK	M	03	
TIME SWITCH ERROR	M	04	
SUMMER TIME STATUS	M	05	
ENTER KEY	K	01	
ESC KEY	K	02	
+ KEY	K	03	
- KEY	K	04	
UP KEY	K	05	
DOWN KEY	K	06	
RIGHT KEY	K	07	
LEFT KEY	K	08	

When the special signal is placed in the Fbd or System sketch window, the device code of the signal will be 'M' or 'K'. The special signal has only one output pin and one input pin. The Device and Device number of these signals are always fixed.

The signal M01 is continuous ON signal (power supply).
The signal M02 is continuous OFF signal (Ground).
The signal M03 is a flicker with On time = 5 and Off time = 5 (Total On and Off time is 1 sec).
The signal M04 is a Time Switch status signal, which will be ON when Time Switch is broken during Monitoring mode.
The signal M05 is a Summer Time/Daylight Saving Time Status signal, which will be ON when internal clock changes to Summer Time mode.

The signals from K01 to K08 are KEY INPUT signals. During Simulation or Monitor/Test mode, the icon state (ON/OFF) of these signals can be changed using mouse left button clicks.

These signals are added into Input accessories toolbar. These signals can not be placed into input terminals. These signals can be placed in only inside of the Fbd window and System sketch window.

Output Signals

Output signals are of digital type only. The device code of output signal is 'O'. When the output signal is placed in the Fbd or System sketch window the device code of the signals will be 'B'. The output signal has one input pin and one output pin.

Currently Controller does not support Analogue Output signals. The following Digital Output signals are supported by the application.

	BINARY OUTPUT
	OUTPUT S
	LIGHT
	LED
	RELAY COIL
	MAGNETIC CONTACTOR
	ELECTRO MAGNETIC BULB
	CYLINDER
	MOTOR
	BUZZER
	VENTILATION FAN
	HEATER
	ELECTRO MAGNETIC CLUTCH

Functions

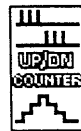|	Function	Description
ALT	Alt	Alternates the digital output signal on each rising edge of digital input
BOOLEAN	Boolean	Can be used to create logic equations between connected variables.
=> COMPARE	Compare	Compares two analogue or digital values, activates the digital output if the equation is verified.
COUNTER	Counter	Counter incremented on each rising edge of the digital input, optional reset. Preset value can be assigned.
UP/DN COUNTER	Up-Down Counter	Up count or down count. preset digital value can be assigned
DELAY	Delay	Delay ON or OFF on rising or falling edge or both.
FLICKER	Flicker	Sends a pulse train according to different modes, counting ON/OFF cycles, Counting time, or continuos.
GAIN	Gain	Used to convert analogue value by changing scale and offset, Gain numerator, gain denominator, offset, Up/low conversion limits
ONESHOT	One Shot	Sends an adjustable pulse signal, Conditions for clearing the digital output, end of time delay, or reset.
SET RESET	Set Reset	Bistable memory, Priority either SET or RESET.
PULSE	Pulse	Sends a pulse from a rising edge, a falling edge or both.
SCHMITT	Schmitt Trigger	Defines an activation zone with hysteresis for digital output.
ZON CMP	Zone Compare	Defines a range A or D in which ON or OFF of the digital output depends on the values being used.
00:00 HH:MM H-METER	Hour Meter	Counts the time during each activation of a digital input. Memorises the elapsed time.
00:00 ddmmyy TIMESW	Time Switch	RTC, Activates ON /OFF with upto 350 cycles per program
DISPLAY	Display	Display if digital / analogue date, 4x10 characters HMI

Simple Drag and Drop to program your application
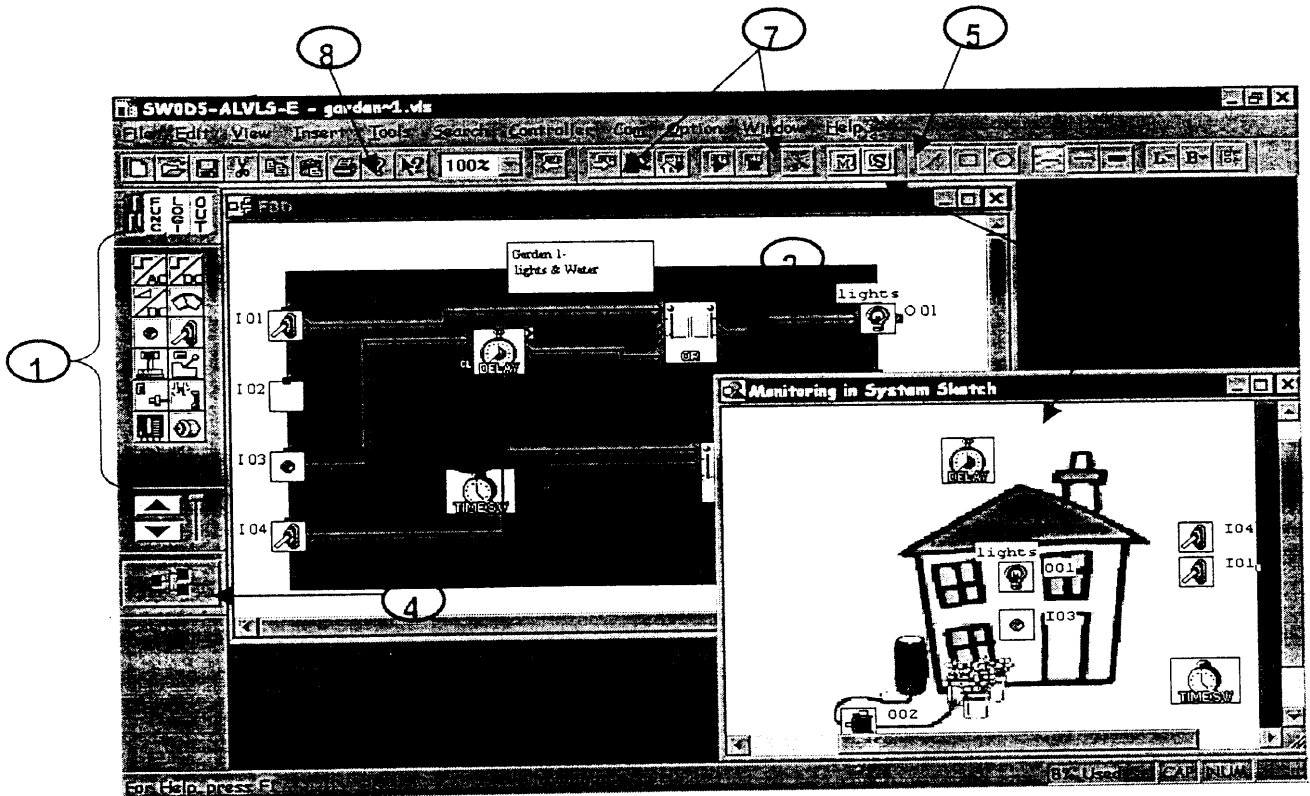
It's as simple as 1, 2, 3, just 'Drag & Drop'.

1 - Select the icon for the input, output, function, and logic.

2 - Drag and Drop it onto the program area.

3 - Select and define set points, Time, counts etc.

4 - Draw and make your connections.

5 - Test and simulate your circuit.

6 - Monitor your application with the Monitoring sketch.

7 - Transfer your program to the Alpha controller.

8 - Print out your entire program, including diagrams, reference list.

The MITSUBSIHI αlpha

Setting NEW standards in control