

# EMA60

## Multi Instrument

EMA 60 is a multi-instrument with a capacity to operate in a wide variety of industrial applications including supervision of temperature, pressure, flow, level, etc.

The instrument has a multitude of function blocks which can be combined to solve numerous problems.

EMA 60 features:

- Analog and digital inputs/outputs
- Arithmetic and logic functions
- Deviation alarm
- Absolute alarms
- Serial Communication
- Time measurement
- Counter
- Stiction compensation
- Configuration from front or PC
- Short sample time (30 ms)

To simplify configurations, EMA60 has six predefined configurations:

- Triple-indicator
- Double indicator with integrator
- Manual loader
- Ratio unit
- Bias unit
- On/off controller

These configurations can be adjusted and supplemented as needed.



### Operation

The ergonomic design makes the instrument easy to use. All functions, including configuration, can be accessed from the controller front.

Configuration is also possible by means of a Personal Computer running DOX6, a configuration software package.

### Configuration

Configuration can be set during operation. The instrument is factory pre-configured, enabling immediate use. An intuitive structure removes the need for most documentation. There are no codes to memorize, and all the user needs to know is shown on the full graphical LCD display in English.

## Function Blocks

EMA60 has a wide array of function blocks to manipulate both analog and digital signals.

The function blocks can be combined as needed to create powerful solutions to complex problems.

### Alarms

Two different types of alarm blocks (Absolute and Deviation) are available. The alarm limit indications are selectable and it is possible to connect the alarms to external devices.

### Linearization

Any signal can be linearized in ten (10) segments by the linearization block. Two common examples of use; volume measurement of cylindrical tanks and temperature measurement with non-standard transmitters.

### Powerful Integrator

The integrator block totalizes an analog signal and produces a pulsed signal. An overrun pulse output as well as hold and reset inputs are available on this block.

Full graphical backlit LCD display

Configuration keys

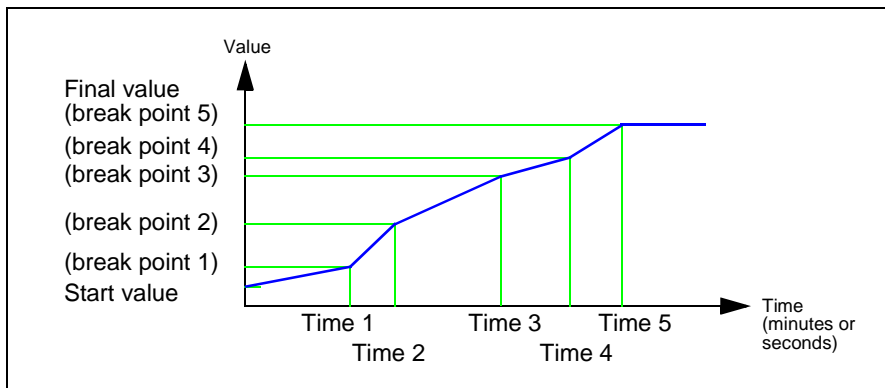
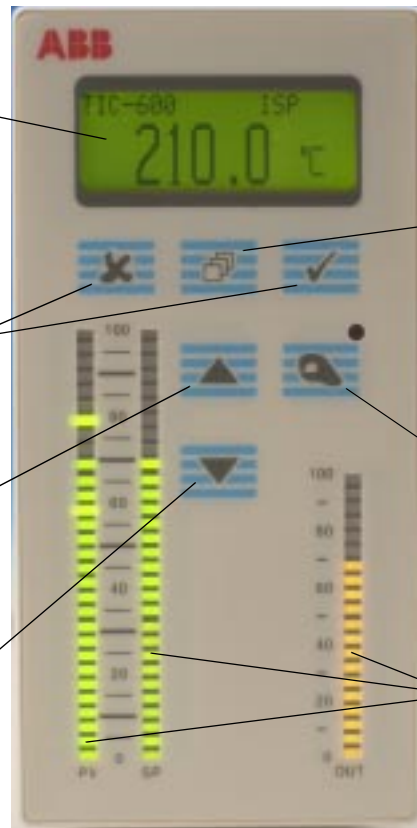
Increase key SP, out, etc.

Decrease key SP, out, etc.

Page key

Hand key

LED bargraphs



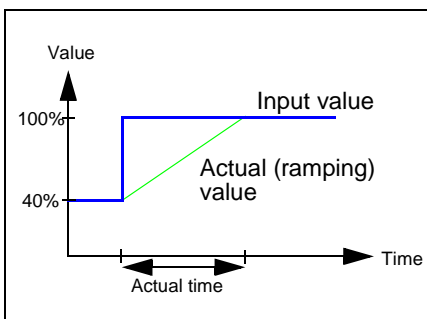
Ramp

### Ramp

Some batch processes use a controller following a ramp function. For this application, the EMA60 can generate a (set point) ramp with up to 5 break points.

### On/Off Control

The Level Detector block can function as an on/off controller. This block may also be used as an alarm block.



Rate limiter

### Indications

The design of EMA60 has been focused on indication and computation.

Each bargraph may be reversed and displayed as either bar or dot. Any alarm (absolute and deviation) may be displayed on any bargraph. When an alarm is activated, the corresponding alarm limit flashes.

The value of any bargraph signal may be displayed on the LCD display for accurate reading.

### Compensation

A powerful block is available for measuring gas and steam flow with compensation for temperature and pressure.

### Rate Limiter

A simple but powerful ramp function can be achieved with the Rate Limiter block. Any rapidly changing signal can be smoothed with this block.

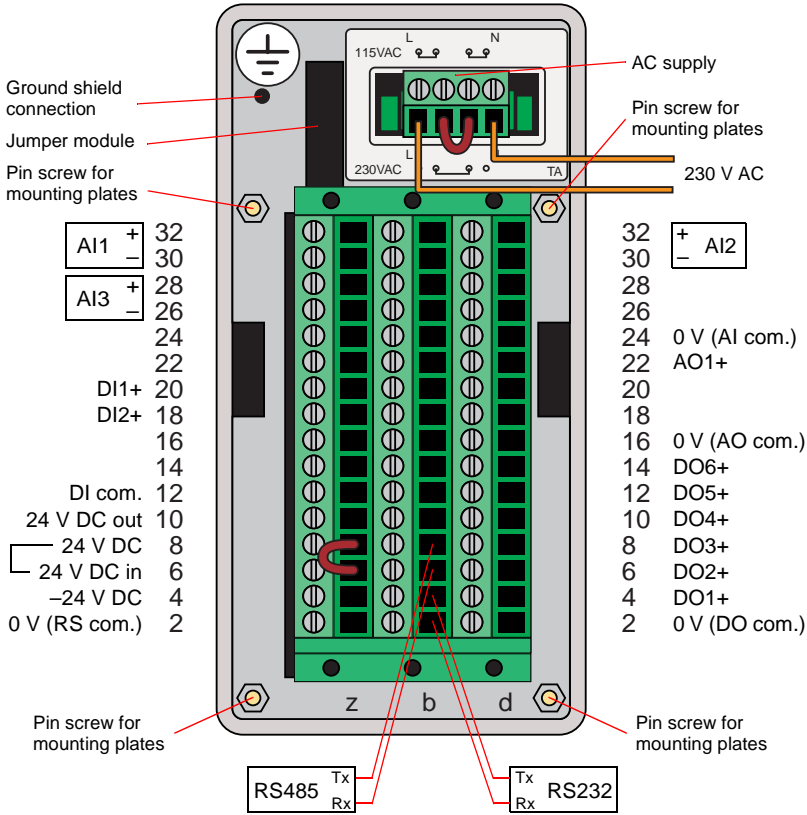
## Overview

Hardware	
Analog inputs	3
Analog outputs	1
Digital inputs	2
Digital outputs	6
RS232	x
RS485	x

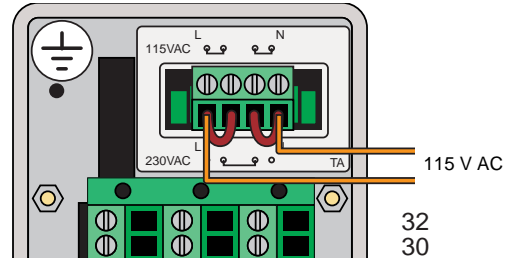
Function blocks	
Analog Input	3
Analog input communication	4
Analog user	4
Digital input	2
Digital input communication	4
Digital user	4
Operator	1
PV alarm	1
Deviation alarm	1
Arithmetic	8
Logic	8
Other	4
Control	-
Analog output	1
Analog output communication	4
Digital output	6
Digital output communication	4
System	1

# Connection and Strapping

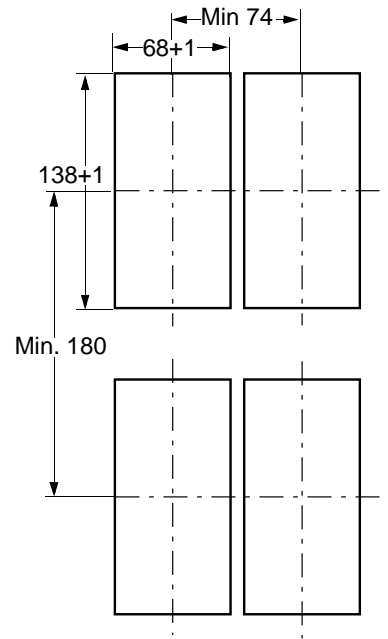
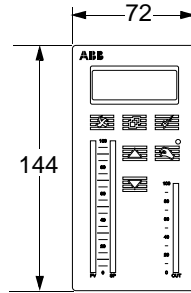
## 230 V AC



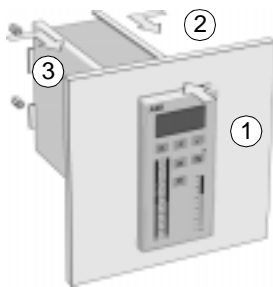
## 115 V AC



## Mounting

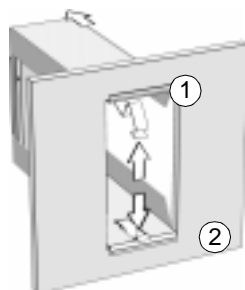


### Panel mounting



- ① Insert the controller into the opening
- ② Place the mounting plates on both sides of the controller
- ③ Mount the nuts at the rear of the controller

### Cassette mounting



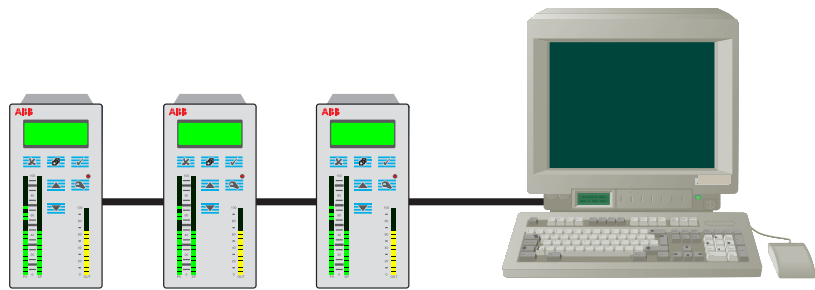
- ① Insert the cassette into the opening
- ② Snap springs into place
- ③ Insert the controller into the cassette



All dimensions are given in mm.

## Communication

EMA60 can communicate with a supervisory system using the COMLI or MODBUS RTU protocol. Both real-time data and configuration information can be transferred via the communication link. The Baud rate is adjustable.



## Technical Data

<b>Analog Inputs</b>		<b>Digital Inputs</b>	
Input ranges	0–20 mA, 4–20 mA, 0–5 V, 1–5 V, 0–10 V, 2–10 V.	Type	24 V DC, common digital input ground, current sink, opto-isolated
Input types	Differential or single ended (jumper selectable).	Voltage	Max. 35 V, min. -0.5 V.
Input impedance	Current 250 Ω. Voltage 200 kΩ.	Logic levels	0 < 3 V (IEC 1131-2, type 1) 1 > 15 V (IEC 1131-2, type 1).
Alarm function for out-of-range signal	Yes, for 4–20 mA, 1–5 V and 2–10 V, when the signal drops below the lower limit.	<b>Digital Outputs</b>	
Functions	First-order software filter, linear / square root.	Type	24 VDC, current source.
Resolution	12 bits	Load current	Max. 250 mA per output, max. 500 mA total.
Inaccuracy	Max. ± 0.2% of FS within 5–55°C.	Short-circuit current	Max. 500 mA transient current during 1 μs.
Temperature stability	0.01% FS per °C within 5–55°C.	<b>Power supply</b>	
<b>Analog Outputs</b>		AC	115/230 V AC ± 10%, 50–60 Hz, 20 VA or 19 V AC ± 10%, 50–60 Hz, 1 A.
Output ranges	0–20 mA, 4–20 mA.	DC	24 V DC ± 10%
Type	Current source	Protection	Secondary side of transformer and direct supply fused via thermo type fuse.
Max. output current	22 mA	Transmitter supply	Max. 24 V DC/150 mA.
Load resistance on current output	Max. 650 Ω	<b>Environmental specifications</b>	
Short circuit protection	Yes	Operating temperature	+5 to +55°C (IEC 68-2-1/2).
Resolution	12 bits	Non-operating temperature	-25 to +70°C (IEC 68-2-1/2).
Output signal break detection	Yes	Non-operating damp heat steady state	93% relative humidity at +40°C (IEC 68-2-3).
Inaccuracy	Max. ± 0.2% of FS within 0–50°C.	Protection class	IP20 generally. IP65 for front. IP65 for front against IP65 compliant panel with panel mounting kit.
<b>Communication</b>		<b>Electrical environment</b>	
Number of ports	2, RS232 and RS485 (2-wire).	Size	Fulfills ElectroMagnetic Compatibility, EMC, directive 89/336/EEC W 72 x H 144 x L 235
Bus system, communication protocol	COMLI or MODBUS RTU	<b>Weight</b>	
Speed of transfer	Max. 38.4 Kbaud.	EMA	1.5 kg
<b>Sample time</b>		Mounting kit A	0.8 kg
30–500 ms		Mounting kit B	1.0 kg
<b>Operator Interface</b>		<b>Order codes</b>	
Display	Backlit LCD with 120 x 32 pixels.	Mounting kit	EMA 60–0000
Bargraphs	Three LED bargraphs; two of 30 segments and one of 20 segments.	A) Mounting plates with terminal blocks	492-8905-01
Keys	Six keys: Cancel, Page, OK, Hand, Increase and Decrease.	B) Cassette	492-8576-02
Presentation	Values of bargraph signals can be displayed on LCD display. Alarms limits can be indicated on any bargraph. Computer/local status indicated on LCD display		



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