ACT100 Control Logic Card

Application

The ACT100 Control Logic card is designed for use in single phase AC voltage or DC voltage GE electric actuators, utilizing either an internal potentiometer or quadrature linear encoder technology for precise positioning of rotary or linear actuators.

This card also facilitates Modbus 485 communication network use, and allows for two wire, single-channel monitoring and control of up to 256 devices. The ACT100 is powered by 10 VDC to 24 VDC supervisory voltage, with a maximum current limit of 30mA at 24 VDC. Automatic Calibration is provided which eliminates the need for loop tuning, and can be initiated either locally or by remote command. All operating parameters can be set as registers in the Modbus communications map. Four supervisory inputs which can be used for travel and/or auxiliary limit switch settings, or for force open/close signals for ESD applications.

Features

- Modbus* 485 communications capabilities
- DeviceNet* communication (optional)
- High resolution position input for up to 0.1% accuracy
- 4-120/240VAC inputs for open and closed limit switches and 2 general purpose inputs
- Simple 2-wire Modbus-485 communication network includes supervisory power
- Robust communication, up to 500m cable length
- Pluggable terminal strips for easy field installation
- Direct mounting within the actuator
- Login function
- Unit can be pulled by Modbus even when it is driven by analog signals
- Low power consumption; does not require ventilation
- Electronic overload protection with built-in current monitoring optional
- High power outputs can directly drive small motors
- LED indicators on inputs, outputs and communication channel
- Automatic calibration using local push button or remote command
- Multi-vendor PLC support through the standard Modbus communication module
- Enable/disable Modbus locally or remotely

Specifications

<table>
<thead>
<tr>
<th>Actuator</th>
<th>Voltage</th>
<th>120/240VAC 1ø</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24VAC</td>
<td>24VDC</td>
</tr>
<tr>
<td>Current</td>
<td>10A (2 minute 25% duty-cycle)</td>
<td></td>
</tr>
<tr>
<td>Fuse</td>
<td>GMA 4 replaceable</td>
<td></td>
</tr>
<tr>
<td>Supervisory</td>
<td>Voltage</td>
<td>10 to 25VDC</td>
</tr>
<tr>
<td>Current</td>
<td>30mA @ 24VDC</td>
<td></td>
</tr>
<tr>
<td>Auxiliary Inputs</td>
<td>Voltage</td>
<td>120/240VAC</td>
</tr>
<tr>
<td>Current</td>
<td>min 10mA / max 20mA</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Standard</td>
<td>Modbus-RS485 differential</td>
</tr>
<tr>
<td>Distance</td>
<td>500m (1,640ft.)</td>
<td></td>
</tr>
<tr>
<td>Input Load</td>
<td>12K ohm, standard</td>
<td></td>
</tr>
<tr>
<td>Termination</td>
<td>120Ω balanced line</td>
<td></td>
</tr>
<tr>
<td>Position</td>
<td>Resolution</td>
<td>12 bit (1 part in 4096)</td>
</tr>
<tr>
<td></td>
<td>Accuracy</td>
<td>0.1% full scale</td>
</tr>
<tr>
<td>Potentiometer</td>
<td>1000 Ω typical (500 to 10k Ω)</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Temperature</td>
<td>-40°C to +90°C (-40°F to +203°F)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>0 to 95% non-condensing</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>Length</td>
<td>96mm (3.75 in)</td>
</tr>
<tr>
<td></td>
<td>Width</td>
<td>70mm (2.75 in)</td>
</tr>
<tr>
<td></td>
<td>Height</td>
<td>36mm (1.40 in)</td>
</tr>
<tr>
<td>Approvals</td>
<td>Certifications</td>
<td>UL/CSA</td>
</tr>
</tbody>
</table>
Typical Applications

• Blending of bulk materials
• Petroleum products and other liquids flow control
• Closed loop actuator control

Accessories

mBA085 Bus Arbiter:
Connects a maximum of 100 ACT100s, on up to 8 drops, to a RS232 Modbus Master RS232 process controller. Includes redundant power supply input and drop fault alarms.

Commands, Process Values and Configurable Parameters

**Commands:**
- Seek To Position
- Full Open
- Full Close
- Stop
- Calibrate
- Remote Reset
- Default Parameter Reload
- Parameter Protect On
- Parameter Protect Off

**Process Values:**
- Current Position
- Average Load
- Peak Load (optional)
- Idle Load (optional)
- Raw Position
- Raw Load (optional)
- Last Seek Value
- Current Jog On Time
- Log Time Interval

**Configurable Parameters:**
- Zero Offset
- Span
- Seek Tolerance
- Open Limit Tolerance
- Close Limit Tolerance
- Calibrate To
- Max Load
- Idle Load
- Com Fault Position
- Jog Move Tolerance
- Load Zero Offset (optional)
- Load Span (optional)
- Command Fault Time
- Com Fault Timeout
- Jog Wait Time
- Jog Open Time
- Run Load Fault Time (optional)
- Idle Load Fault Time (optional)
- Serial Port Speed
- Minimum Jog On Time
- Maximum Jog On Time
- Pseudo Limit Options
- Force Options
- Seek Options
- Modbus Address

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*DeviceNet is a trademark of Open DeviceNet Vendor Association, Inc.
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GEA31514C (07/2016)
Application

The SCC-05 EASC (Electric Actuator Smart Controller) card is a cost-effective means for accurate and precise positioning control of RCS actuators utilizing an analog input signal. The EASC “One-Switch” setup system eliminates the need for external meters, dip switches, trimming potentiometers, or a display screen on the module. Simply set the full open and full closed positions, and the microprocessor technology does the rest. For control applications requiring an input-only control requirement, the SCC-05 provides excellent performance and a variety of standard features suitable for today’s challenging automation and control requirements.

Features

- Mounts internally in RCS actuator models: MAR-10, MAR-50, MAR-90, MAR-100, MAR-160, MAR-250, MAR-800 & all SurePowr models.
- Simple single switch setup allows complete control of controller configuration
- One step selection of input/output ranges including 4-20 mAdc, 1-5 Vdc, 2-10 Vdc and 0-10 Vdc, or virtually any custom range required
- “Learns while it runs” tuning makes configuration simple
- Selectable fail options
- Intelligent positioning reduces motor cycling, increases motor life and extends the actuator duty
- Optional Modbus RTU remote control over a RS-485 network. Complete access to all controller functions from your factory automation system
- Quick disconnect terminal strips facilitate fast and easy actuator maintenance and troubleshooting
- Always wires the same; no need to determine rotation direction during installation; rotation is selected at setup
- Robust power switching components, designed specifically for actuator motors, virtually eliminate field failures

Specifications

**Power Requirements**
Model SCC05-115/230 A:
Single phase, 115 or 230 VAC 50/60 Hz. (Jumper selectable)

**Input Command Signal**
Menu selectable factory defaults:
- 4-20 mADC
- 1 -5 VDC
- 2-10 VDC
- 0-10 VDC

Infinite adjustment during System

**Signal Impedance**
Input: 250Ω current, 200KΩ voltage

**Power Output**
Solid state, isolated from the input command signal and rated at:
- 5 amps continuous at 115 VAC
- 5 amps continuous at 230 VAC

All ratings assume the EASC is mounted on the actuator base plate

**Sensitivity**
Full scale sensitivity adjustable from 0% to 9%

**Dead Band**
Automatic deadband system with manual override.

**Zero Span Adjustment**
Simple setup, just set the fully closed position and fully open positions and input calibration is automatically adjusted.

**Split Range**
Settable within the span range using at least 1.5VDC or 3mA of input.

**Remote Control**
Optional Modus RTU control of all controller functions over a RS-485 multi-drop network

**Ambient Temperature**
-40°F (with heater) to +150°F (-40°C to +65°C)

**Action on Loss of Command Signal**
Factory default:
- Fail in last position (no movement)
- For a setting of ZERO input signal, the system fails to minimum signal position

Additional settings available at setup:
- Fail open (maximum signal value)
- Fail closed (minimum signal value)
- Fail to a preset position

**Size**
3.5 x 1.63 x 4 in.
D.C. Analog - EASC SCC-10

Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC10-15/230V</td>
<td>115 or 230 Volt A.C. Actuators</td>
</tr>
<tr>
<td>SCC10-24 VAC</td>
<td>24 Volt A.C. Actuators</td>
</tr>
</tbody>
</table>

EASC (Micro-Processor Based Analog Controller)

The Electric Actuator Smart Controller (EASC SCC-10) card provides accurate positioning control of electric motor actuators using an analog input signal. Setup and calibration is greatly simplified using microprocessor based technology. There are no dip switches to set or trim pots to adjust. Setup is quick and easy using the EASC menu viewed on an LED display. No external meters are required, even for potentiometer setup. Once the initial menu settings are chosen, the EASC performs a self-calibration routine, applying the menu selections to actual actuator performance. Calibration values are then stored in permanent non-volatile memory.
Profibus D.P.

<table>
<thead>
<tr>
<th>Model</th>
<th>12 or 24 Volt D.C. Actuators</th>
<th>115 Volt A.C. Actuators</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPC-100</td>
<td>DPC-120</td>
<td></td>
</tr>
</tbody>
</table>

**Features**
- Two wire control reduces installation and start up time compared to multi-cable wiring
- Automatic calibration cuts down on start up time
- No deadband eliminates need for field adjustment.
- On line configuration of 36 operational parameters using generic Profibus software
- Low power consumption; does not require ventilation
- Electronic overload protection with built-in current monitoring
- LED indicators for input, outputs and communication channel
- Automatic calibration with local pushbutton or remote command
- Dynamic breaking eliminates overshooting
- Robust power switching components, designed specifically for actuator motors, virtually eliminates field failures

**Specifications**
- **Power Supply**
  - DPC-100: 24/12 VDC
  - DPC-120: 120 VAC

- **Communication Interface**
  - Profibus Standard

- **Protocol**
  - Profibus DP (Distributed Process)

- **Feedback**
  - Potentiometer 1000 Ohms/Optical Encoder

- **Position Input Accuracy**
  - 1.0% full scale standard, Maximum 0.1%

- **Temperature**
  - -40°C to +70°C (-40°F to +158°F)

- **Relative Humidity**
  - 0 to 90% non-condensing

- **Dimensions**
  - DPC-100: 4.0 x 1.5 x 2.5 in.
  - DPC-120: 4.25 x 1.75 x 3.75 in.

**The DPC-100 & DPC-120 provide the following status and fault signals:**
- Valve full closed
- Valve full open
- Percentage of open
- Valve seeking position
- Motor running
- Valve closing
- Valve opening
- Motor thermostat tripped
- Incomplete travel
- Valve opening or closing manually
- Valve jammed/current limiting
- Motor still energized after stop or end of travel
- Controller self-test (detects problems)
- Communication failure
- Average running current load
- Peak running current load
- Idle current load
**Devicenet™**

Models

<table>
<thead>
<tr>
<th>DNET115</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 Volt A.C. Actuators</td>
</tr>
</tbody>
</table>

**Application**

For on/off or positioning control of motorized valves. DeviceNet™ is a type of communication network that allows up to 63 field devices to be linked together with a single five-conductor cable. DeviceNet™ is a product of Allen-Bradley and is an open, non-proprietary, bus network. Typically, a DeviceNet™ system is used with the Allen-Bradley PLC5 and SLC series of programmable logic controllers. A standard DeviceNet™ Scanner interface is available for both types. Devices in the field are connected via a drop line to a 5-conductor trunk-line that is then routed to the scanner card.

**Features**

- Provides open/stop/close or positioning control with limit switch status feedback
- Provides instantaneous motor reversal protection
- Command and end-of-travel verification alarm
- Conforms to ODVA standard
- Easy-to-see LED indicators for all control outputs, status inputs and diagnostic alarm
- ESD functions for ‘go open’, ‘stay put’, or ‘go closed’

**Specifications**

**Hardware Specifications**

<table>
<thead>
<tr>
<th>Supply Power:</th>
<th>2W @ 24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature:</td>
<td>-20°C – 70°C</td>
</tr>
<tr>
<td>Storage Temperature:</td>
<td>-40°C – 80°C</td>
</tr>
<tr>
<td>Humidity:</td>
<td>90% Non Condensing</td>
</tr>
<tr>
<td>Solid State Outputs:</td>
<td>(2) Isolated 600VAC 15A</td>
</tr>
<tr>
<td>Digital Inputs:</td>
<td>(8) Dry Contacts</td>
</tr>
<tr>
<td>Analog Inputs:</td>
<td>(2) Channels (see below)</td>
</tr>
<tr>
<td>Processor:</td>
<td>Temic 89C51CC01</td>
</tr>
<tr>
<td>RAM:</td>
<td>1K</td>
</tr>
<tr>
<td>Flash:</td>
<td>32K</td>
</tr>
<tr>
<td>EEPROM:</td>
<td>32K</td>
</tr>
</tbody>
</table>

**Serious Interfaces**

One CAN 2.0 port.

**Network Communication Protocols**

Module Supports DeviceNet™ Group 2 Slave.

**Analog Inputs Specification**

- **Resolution:** 10bit
- **Accuracy:** 1% of FS.
- **Linearity:** 1% of FS.
- **Temperature Drift:** 2% of FS.
- **Range:** 0 to 5V or 0-20mA input for AI1 1-5K Potentiometer for the Position Feedback.

**Environmental**

- **Temperature Range:**
  - Storage: -40°C to +90°C
  - Operating: -20°C to +80°C
- **Humidity Range:** 5% to 95% at 25°C non-condensing
- **Vibration:** IEC 6B-2-6 1G @ 40-50 Hz., 0.012p-p @ 10-40 Hz.

**Technical Summary of DeviceNet™**

- **Network Size:** Up to 64 nodes (including scanner)
- **Network Length:** Up to 1,640 ft. at 125 Kbps.
- **Data Packets:** 0-8 bytes
- **Bus Topology:** Trunkline/Dropline
- **Cable:** 5-Conductor cable (2 for power, 2 for communication, and 1 for ground).
- **Thick Trunk Lines:** Belden 3082A or 3083A
- **Thin Drop Lines:** Belden 3084A or 3085A
- **Drop Lines:** Max. drop length is 20 ft. with cumulative drop length of 512 ft.
- **Repeaters:** Not currently, but expected in future revisions of specifications.

**Input/Output Listing**

**Digital Input Status:**

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Communication Loss</td>
</tr>
<tr>
<td>1</td>
<td>Reserved</td>
</tr>
<tr>
<td>2</td>
<td>Loss of Position Signal</td>
</tr>
<tr>
<td>3</td>
<td>Motor Stall</td>
</tr>
<tr>
<td>4</td>
<td>Limit Calibration Incorrect</td>
</tr>
<tr>
<td>5</td>
<td>Thermostat Trip</td>
</tr>
<tr>
<td>6</td>
<td>Manual Operation</td>
</tr>
<tr>
<td>7-15</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

**Digital Output Command:**

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Open Command</td>
</tr>
<tr>
<td>1</td>
<td>Close Command</td>
</tr>
<tr>
<td>2</td>
<td>Stop Command</td>
</tr>
<tr>
<td>3</td>
<td>ESD Command</td>
</tr>
<tr>
<td>4-7</td>
<td>Future</td>
</tr>
</tbody>
</table>
Modbus

Application

The Modbus is an application specific controller, designed for positioning electric actuators using rotary feedback. Typical devices include rotary and linear actuators. Feedback may be via a potentiometer or a quadrature optical encoder. Controller outputs can drive small electric motors or motor starters directly.

A Modbus-485 communication network allows up to 100 devices on a single channel. The Modbus is powered by 24VDC and provides four supervisory inputs, configurable as limit switches or force open/close signals.

Automatic calibration is provided which requires no loop tuning. All operating parameters can be set as registers in the Modbus communications map.

Features

- High resolution position input for up to 0.1% accuracy
- 4-120/240VAC inputs for open and closed limit switches and 2 general purpose inputs
- Simple 4-wire Modbus-485 communication network includes supervisory power
- Robust communication, up to 500m cable length
- Pluggable terminal strips for easy field installation
- Direct mounting within the actuator
- Low power consumption; does not require ventilation
- Electronic overload protection with built-in current monitoring optional
- High power outputs can directly drive small motors
- LED indicators on inputs, outputs and communication channel
- Automatic calibration using local push button or remote command
- Multi-vendor PLC support through the standard Modbus communication module

Typical Applications

- Blending of bulk materials
- Petroleum products and other liquids flow control
- Level control for maintaining process supply

Specifications

**Actuator**

- Voltage: 120/240VAC 1Ø
- Current: 4A (2 minute 25% duty-cycle)
- Fuse: GMA 4 replaceable

**Supervisory**

- Voltage: 10 to 25VDC
- Current: 30mA @ 24VDC

**Auxiliary Inputs**

- Voltage: 120/240VAC
- Current: min 10mA / max 20mA

**Communication**

- Standard Modbus-RS485 differential
- Distance: 500m (1,640ft.)
- Input Load: 12K ohm, standard
- Termination: 120Ω balanced line

**Position**

- Resolution: 12 bit (1 part in 4096)
- Accuracy: 0.1% full scale
- Potentiometer: 1000Ω typical (500 to 10kΩ)
- Quadrature
- Optical Encoder: 1000 to 4096 pulses

**Environment**

- Temperature: -40°C to +70°C (-40°F to +158°F)
- Relative Humidity: 0 to 95% non-condensing

**Dimensions**

- Length: 96mm (3.75 in)
- Width: 70mm (2.75 in)
- Height: 36mm (1.40 in)