TorqPlus™
Electric Valve Actuators and Controls
**Multi-Turn Operation**

Option allows for multiple revolution on non-rising stem devices.

**Electrical Mechanical Motor Brake**

Available for all actuator models. Brakes are employed to eliminate motor run-on and to insure that the actuator and driven device maintain their position. Recommended applications include: all resilient seated valves, valves with high flow rates, all modulating services and any time in which increased position control is needed.

**Three Position Control**

Typically used for multiported valves, operation can be set for 0°-45°-90° or 0°-90°-180° with a stop at mid position from one extreme or both.

**Potentiometers**

Mechanically linked to the actuators output to provide a resistance signal proportional to the actuator’s and driven device’s position. Used to give continuous feedback to control panels, modulating position control and other closed loop devices.

**Torque/Current Trip Module**

(for DC Motors)

- Protects the valve and actuator from excessive torque conditions by comparing the motor current with a factory adjustable trip value.
- Provides dynamic braking, in order to improve positioning accuracy at both mid and end of travel stop points. *(Caution: A mechanical brake should also be used in conjunction with the dynamic brake feature, for applications that require the valve to be held in place after stopping.)*

**Control Latching Relay**

- Allows the actuator to run full travel upon receiving a non-maintained control signal, ranging from 0-240VAC or 0-110VDC.

**Control Relay**

- Provides a means of opening and closing a valve with a variety of standard AC or DC maintained control signals, such as 120 VAC, 24 VAC, 12 or 24 VDC.
- Can be used for a fail close (or open) application upon loss of the control signal. An internal coil (designed to be continuously energized) maintains the open signal to the actuator. When the signal is removed, the coil de-energizes, causing the actuator to close.

**Additional Control Options**

- Up to 6 SPDT aux. limit switches
- Electronic Transmitters (4-20mA output from a DC transmitter or 4-20mA, 0-10V output from an AC transmitter)
- Dual 1k ohm potentiometers
- Two speed operation (pulse timer package)
- Unidirectional controls (up to 30 rotations)
- Control stations including buttons, lights, selector switches
- 3-phase motor controls
- Three position operation (such as 0-45-90 or 0-90-180 degrees)
- Torque seating for multi-turn and quarter turn
- Torque switch trip indication
Control Stations are available in a variety of standard weatherproof wall-mounted and close-coupled configurations using the following 5-digit code system:

CS – 1st 2nd 3rd 4th 5th
1st indicates the number of pushbuttons
2nd indicates the number of lights
3rd indicates the number of positions on the first selector switch (such as Local-Remote)
4th indicates the number of positions on a second selector switch (such as Open-Stop-Close)
5th indicates close-coupled (C) or wall-mount (W)

CS-0223C would indicate 0-buttons, 2-lights, 2-position selector switch (usually Local-Remote), 3-position selector switch (usually Open-Stop-Close), Close-coupled to the actuator.

Standard configurations include:

- CS-0003*
- CS-0223*
- CS-3220*
- CS-0023*
- CS-0203*

(* C for closed-coupled or W for wall-mount)
The Bettis Electric C1397 and C1415 Servo Positioners are proportional motor controllers for actuator modulating applications. The C1397 is for actuators with AC powered split phase motors. The C1415 is for use with 12 or 24VDC powered actuators. These controls are designed to proportionally position an actuator and the driven device by comparison of a varying external input command and a mechanically linked potentiometer. Input commands can be 0-10V, 1-5V, or 4-20mA. The servo also allows for three responses to command signal loss (1-5V and 4-20mA only); fail in place, fail to full clockwise (CW) position, or fail to full counterclockwise (CCW) position.

Features and Benefits

- Pushbutton programming - eliminates Span and Zero pots
- 10-bit resolution
- Off-line calibration - eliminates the need for loop calibrators

Available in multiple power supply configurations:
- AC 120/230V; DC 12/24V

Onboard manual jog buttons

AC controller includes speed control

DC controller includes:
- Torque trip with relay output
- Dynamic braking for accurate stopping

Signal Wiring
### Power Supply
- **C1397S**: 115VAC ± 10% 50/60Hz
- **C1397D**: 230VAC ± 10% 50/60Hz
- **C1415**: 12/24VDC Jumper configurable

### Signal Inputs
All signal inputs are digitized to 10 bits of resolution.

- **0-10 VDC Compound Input**: 200kohm input impedance.
- **1-5 VDC Command Input**: 100kohm input impedance. Loss of signal threshold is 75% of low signal.
- **4-20mA Command Input**: 250ohm input impedance. Loss of signal threshold is 75% of low signal.

### Feedback Input
5 VDC excitation voltage. 1Mohm input impedance. Use with 1000ohm potentiometer.

- **4-20mA Output**: 300ohm maximum load impedance. 10-bit A/D.

### Motor Outputs
- **C1397**: When mounted in accordance with guidelines below, outputs will supply a maximum locked rotor load current (LRA) of 5A with less than 5/10mA (115/230VAC) of leakage current.
- **C1415**: Continuous current 3A; Peak 5A.

### External Fuses
- **C1397**: Employ fusing per actuator motor LRA to a maximum of 5A.
- **C1415**: Employ fusing per actuator motor LRA to a maximum of 5A. Consult factory for additional application details on DC powered units.

### Environmental
- **Operating temperature**: +32°F to +158°F (0°C - 70°C)
- **Storage temperature**: -40°F to +185°F (-40°C - 85°C)
- **Relative humidity**: 0 to 90% non-condensing

### SPECIFICATIONS

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Important: Due to Emerson’s continuing commitment to engineered product advancement, data presented herein is subject to change. Certified dimensional drawings and wiring diagrams are available on request. Consult factory with model designation and serial number.

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