

Medical Industry



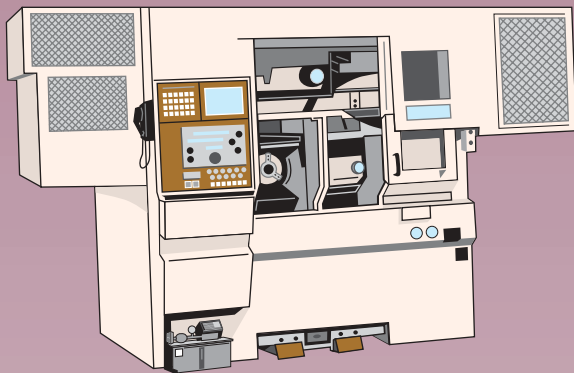
Aviation Industry



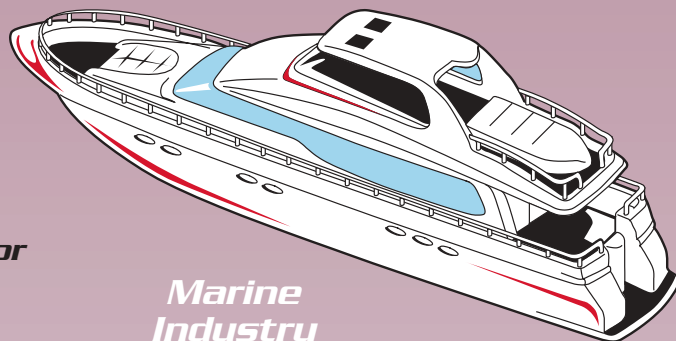
Amusement Industry



Animation Industry



*Industrial Machines
Market Place*



*Marine
Industry*

Specializing in Your Requirements for

- Position Sensors
- Position Control Devices
- Position Control Systems
- Position Feedback Cylinders
1/2 Bore & Larger
- Custom Engineering

Custom Actuator Products, Inc.

2500 Niagara Lane • Plymouth, MN 55447

Phone: (763) 525-0844 • Fax: (763) 525-0845

Electronic Motion Control Division



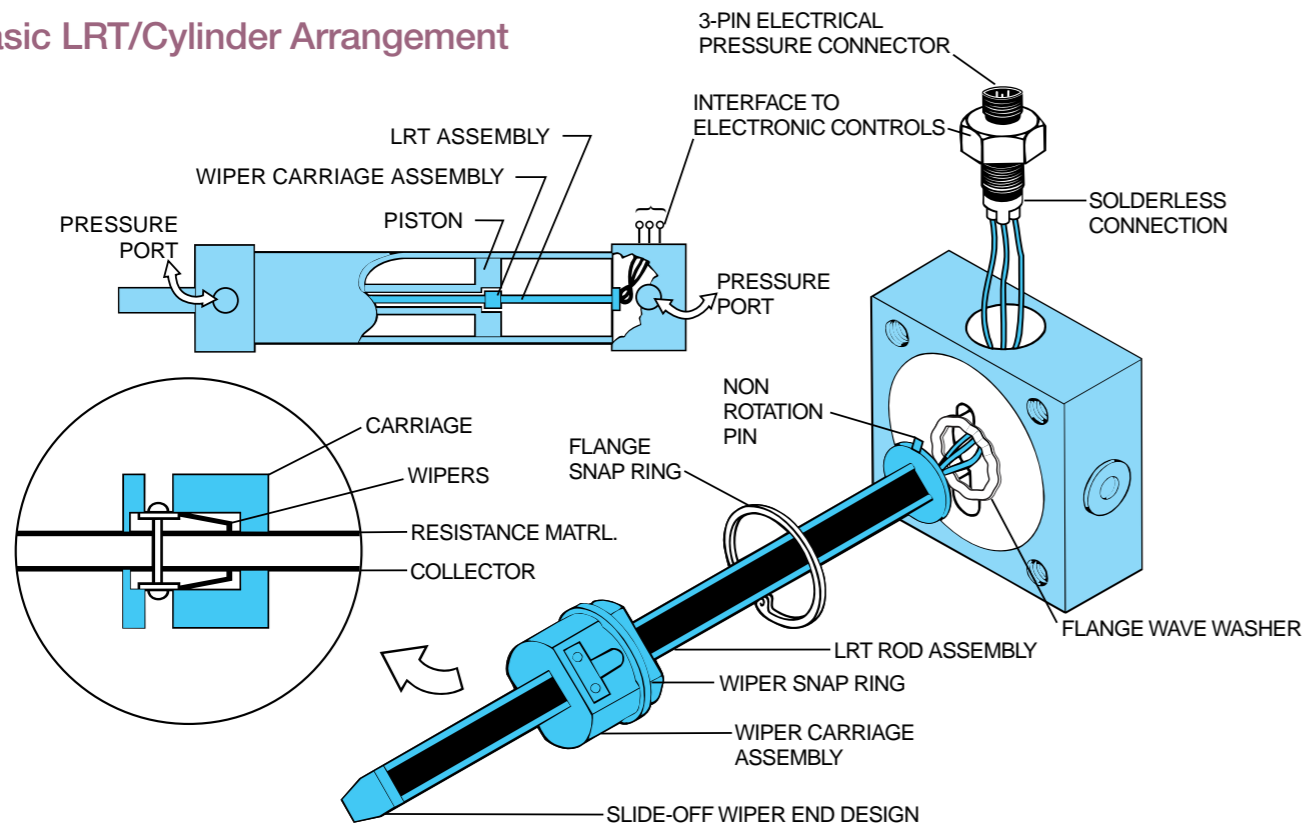
Linear Resistance Transducers Internal cylinder position feedback devices



The CAP LRT is a uniquely designed, 3-wire, position sensing device manufactured in the USA that uses a simple resistive element and wiper to provide an analog output signal of a cylinder's position. The CAP LRT can be installed in a cylinder or used externally to meet your most demanding application. There are a number of LRT styles. The two primary family types are:

- The Mini-LRT for small bore / small rod cylinders
- The LRT for larger rod cylinders

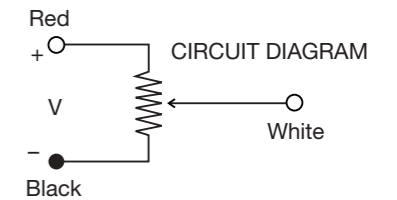
Basic LRT/Cylinder Arrangement



Standard LRT 7500 Series pictured

7500 LRT Specifications

Fluids	Hydraulic or Pneumatic (Must be non-water based)	Min. Rod Size	7/8" dia.
Repeatability001" (Dependent on stroke)	Piston Rod Drill	1/2" dia.
Life	500 Million Inches Travel	Velocity	H= 30" per sec. P= 50" Per sec.
Non-Linearity	0.1% (48" Max.) 1% (120" Max.)	Signal Output*	Analog
Max. Stroke	120"	Excitation Voltage	5 to 50 VDC
Pressure Rating	5000 psi	Resistance	800 ohms/inch +/- 20%
Impedance Interface	Greater than 250k Ohms	Resolution	Essentially infinite
Temp	Std 160°F Hi-Temp 300°F	Wire leads	22 AWG Teflon®



Only the CAP Motion Control Division can provide these advantages.

- System electronics that can be connected through any end-cap port position to allow all cylinder mounting styles.
- An LRT that adds as little as 1" to the length of a standard cylinder.
- Stroke lengths to 120" available in 1/8" increments.
- Mini-LRT transducers that fit into piston rods as small as 5/16" diameter.
- Complete "Smart" cylinders in bore sizes from 1/2" and larger.
- Designs for every style cylinder; mobile, industrial, marine, hydraulic and pneumatic.
- Delivery on most transducers in 7 days or less.

Features Include:

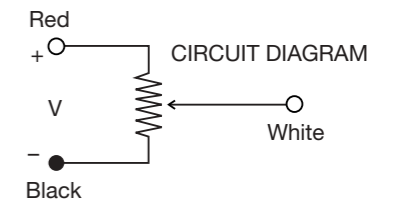
- Slide-off piston wiper carriage.
- Solderless electronic pressure connectors. See page 7 for complete descriptions.
- Long life materials.
- All mounting accessories.
- Analog output that is not affected by temperature changes.



Standard MLRT 7316 Series pictured

7316 MLRT Specifications

Fluids	Hydraulic or Pneumatic (Must be non-water based)	Min. Rod Size	5/16" dia.
Repeatability001" (Dependent on stroke)	Piston Rod Drill	3/16" dia.
Life	500 Million Inches Travel	Velocity	H= 30" per sec. P= 50" Per sec.
Non-Linearity	1% (18" Max.)	Signal Output*	Analog
Max. Stroke	18"	Excitation Voltage	5 to 50 VDC
Pressure Rating	5000 psi	Resistance	1000 ohms/inch +/- 20%
Impedance Interface	Greater than 500k Ohms	Resolution	Essentially infinite
Temp	Std 160°F Hi-Temp 300°F	Wire leads	26 AWG Teflon®



*SIGNAL OUTPUT—The Linear Resistance Transducer accepts a DC excitation voltage and provides a linear output. In and of itself, the LRT/MLRT does not provide a scaled output. There will be some dead zone at the retract end and some dead zone at the extend end. To receive a perfect 0-10 vdc or 4-20mA output, some control device must be introduced to the system such as the 5000 series units.



Linear Resistance Transducers

Internal cylinder position feedback devices



Standard LRT 7500 Series Flange Options

B1	.750 Dia	used for smaller bore cylinders	1 1/2" to 3 1/4" bore
B2	1.180 Dia	used for midsize bore cylinders	4" to 6" bore
B3	2.180 Dia	used for larger bore cylinders	8" and up
B2HD	1.180 D x 1.0"	used for longer stroke midsize bore cylinders	48" stroke and up
B3HD	2.180D x 1.0"	used for longer stroke large bore cylinders	48" stroke and up

Mounting accessories provided include the Wavewasher and Snap Ring.



Model LRT 7500-XXY-MSSW

Designed to install into the same cylinder modification as the magnetostrictive style position sensors. Flange has 3/4 - 16 thread with "O" ring seal. Flange body extends 2 inches outside the cylinder face. There are several wiper options including .984" and 1.29" diameter. The null zone dimension is optional. The two standards are 1.50" and 2.00". This unit seals hydraulic pressure at the flange. The plug interface is the Custom Actuator BH series.



Model LRT 7500-XXY-CAT

Features a smaller flange than the MS style. Flange has 1/2-20 thread with "O" ring seal. Flange body extends only 1 inch outside the cylinder face. The null zone dimension is optional. The electrical connection is three blunt end 22 AWG wires. The wire gauge is optional. This unit seals hydraulic pressure at the flange.



Model LRT 7500-XXY-TJB

Features a flange arrangement that is installed from the inside of the cylinder end cap eliminating any extension outside the rear cylinder face. Flange has 1/2-20 thread with "O" ring seal. The electrical connection is three blunt end 28 AWG wires. The wire gauge is optional. This unit seals hydraulic pressure at the flange.



Model LRT 7500-XXY-CAP1

Features a flange arrangement that is installed from the inside of the cylinder end cap by using a set screw. This method of installation eliminates the extension out the back of the cylinder. The flange head is .984 diameter with a length of 1.26 inches. The deadband is flexible but typically .240 inches. Unit is supplied with wiper, snap ring and flange O-ring/Back Up Seal. The electrical connection is three blunt end 22 AWG wires. The wire gauge is optional. This unit seals hydraulic pressure at the flange.



Model LRT 7500-XXY-SUN

Features a flange arrangement that is installed from the inside of the cylinder end cap by using a set screw. The flange head is .998 diameter with a flange length of only .93 inches. This unit requires a pressure connector on the surface of the cylinder as it does not seal pressure.



Model MLRT 7316-XXY-NANO

Designed primarily for low pressure applications 150psi or less. MLRT is installed through the back end cap of the cylinder. The flange has a thread of 5/16-18 and is a .375 Hex. The electrical connection is three blunt end 26 gauge wires. This unit is ideal for design applications where space is at a premium and economics is a must.

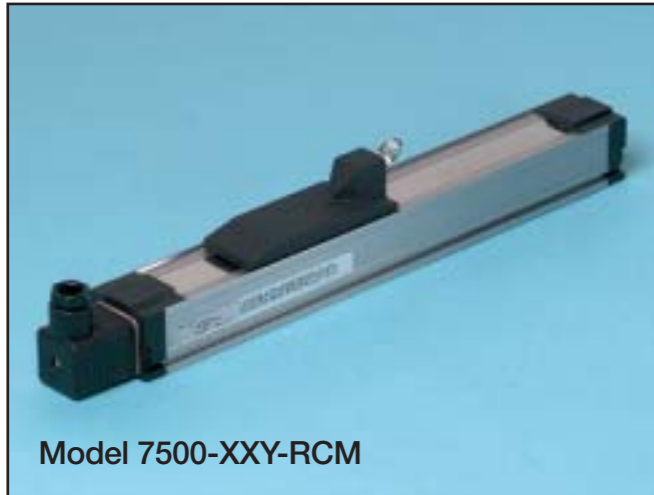
Ordering Information

LRT 7500-XXY-BISW is a typical cap position sensor.
 LRT is the family style
 7500 indicates the size of rod gundrill required to install the transducer
 The XX is the whole inches of stroke.
 The Y is the fractional inches of stroke in 1/8" increments.
 The BI is the flange style for cylinder installation.
 The SW indicates the standard slide-off wiper arrangement.

There are many options not shown here. Contact customer service for additional models, installation information, dimensional information and technical specifications. We are also available to assist you in your unique project requirements.



XLRT Externally Mounted Transducers



Model 7500-XXY-RCM

Rodless Cylinder Mount XLRT

A linear resistance transducer in a protective cover for mounting within the envelope of a rodless cylinder. Unit has integral connector for output to control unit or other analog electronic device.

Features

- Ball coupling on carriage to avoid side loads
- Adjustable mounting feet
- Linearity better than 0.1%
- Strokes from 4" to 120"
- 1.5" square housing



Model 7500-XXY-ECM

Traditional Mount XLRT

A linear resistance transducer designed in an environmentally protected housing. Designed for mounting outside a cylinder when internal modification is not possible. XLRTs are excellent solutions to retrofit applications where position control is desired.

Features

- Adjustable mounting feet
- Pivoting sleeve bearing on rod end
- Linearity better than 0.1%
- Strokes from 3" to 36"
- 1.25" square housing



Model 7316-XXY-ECM

Miniature External Mount XLRT

A specially designed linear resistance transducer for use where space is at a premium.

Features

- Ball coupling on rod to eliminate side forces
- Adjustable mounting feet
- Linearity better than 0.2%
- Strokes from 1" to 4"
- 3/4" square housing



Model 7500-XXY-ETE

Spherical Eye Mount XLRT

An external linear resistance transducer designed for more robust applications.

Features

- Spherical eyes both ends
- Wide angle of free movement +/-12.5 degrees
- Linearity better than 0.1%
- Strokes from 3" to 30"
- 1.4" diameter housing



Electronic Pressure Connectors & Cables



Solderless electronic pressure connector

- Model #S/EPC-HYSQSN
- BH cable interface
- 5000 psi
- No solder connections required when installing LRT
- Unit is 1" square and is provided with 4 bolts



Solderless electronic pressure connector

- Model #S/EPC-HYMS
- 3-pin military interface
- 5000 psi
- No solder connections required when installing LRT
- Unit has 9/16-18 thread



Solderless electronic pressure connector

- Model #S/EPC-HYSN-RECT
- BH cable interface
- 5000 psi
- No solder connections required when installing LRT
- Unit is 0.75" by 1.25" and is provided with 4 bolts



Mini electronic pressure connector

- Miniature 3-pin connector interface
- Model #EPC-Mini-SQ
- NH cable interface
- 5000 psi
- Soldered connection to MLRT required
- Used for 1/2" bore smart cylinders
- Unit is 0.760 square



Solderless electronic pressure connector

- Model #S/EPC-HY
- BH cable interface
- 5000 psi
- No solder connections required when installing LRT
- Unit has 9/16-18 thread



Mini electronic pressure connector

- Miniature 3-pin male connector interface
- Model #EPC-Mini
- NH cable interface
- 5000 psi
- Soldered connection to MLRT required
- Used for 3/4", 1", and 1 1/4" bore cylinders
- Unit has SAE3 thread



Solderless electronic pressure connector with conduit threads

- Model #S/EPC-HYC
- BH cable interface
- 5000 psi
- No solder connections required when installing LRT
- Unit has 9/16-18 thread



Mini electronic pressure connector

- Model #EPC-NH
- NH cable interface
- Soldered connection to MLRT required
- Used on applications where pressure is sealed elsewhere



LRT/EPC interface cables

- 3-pin female, 6', 12' and 20' lengths standard
- Straight Order #BH06, BH12, BH20
- Right Angle Order #BHR06, BHR12, BHR20
- Standard wire gauge is 22 AWG
- Additional lengths also available



XLRT interface cable

- 3-pin female
- 6', 15', 20' lengths standard
- Interfaces with ECM and RCM model XLRT
- Order #XL06, XL15, XL20



MLRT/EPC mini-interface cables

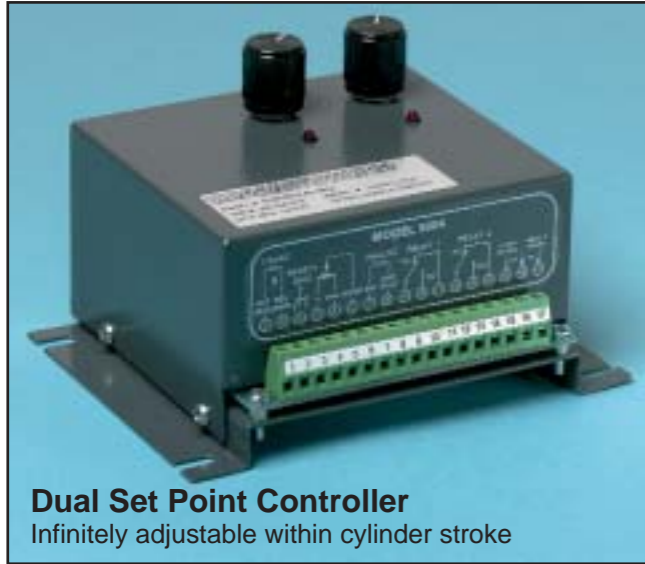
- 3-pin female, 6', 15' and 20' lengths standard
- Straight Order #NH06, NH15, NH20
- Right Angle Order #NHR06, NHR15, NHR20
- Standard wire gauge is 24 AWG



Electronic pressure connector—waterproof

- Miniature 3-wire
- Used for all cylinder bore sizes
- Order #EPC3-Mini-H20
- 3-wires available for termination to electronics
- Can be ordered with strain relief
- Unit has SAE3 thread

SERIES 5000 Open Loop Control Devices



Dual Set Point Controller
Infinitely adjustable within cylinder stroke



Scalable Analog Output Controller
For continuous position output

The Cyclon Series 5000 open loop controllers provide either an analog position output signal or two trip points when combined with a Custom Actuator Products Linear Position Transducer. The small size of the Series 5000 and simple electrical hook-up make this linear position control device very easy to install and operate. Each unit is provided with an Installation manual.

The Set Point model offers the advantage of infinitely adjustable, dual trip points anywhere along the stroke of the cylinder rather than only two fixed points as provided by end-of-stroke models. The set-point model is available with either 2-Triac, 2-relay or 2-transistor outputs. Control units are designed with either a single turn, set-point potentiometer or an optional multi-turn potentiometer for applications that require more resolution. Series 5000 also has a non-scalable, 0-10 Vdc analog output.

The Analog Position Indicator model offers you a scalable output that can be passed to a meter, PLC or other device. Standard outputs are -10 to +10Vdc, 0 to +10Vdc, and 4 to 20mA. A variety of AC and DC power input options are available. The system's output is scalable over the stroke of the cylinder providing a full scale linear position output between two points. A unique feature of this control system provides for scaling between two selected points that do not need to be end-of-stroke.

Order No.	Output Type	Set Adjustment	Input Power
5001	Relay	Standard Pot.	+15Vdc
5002	Relay	High Precision Pot.	+15Vdc
5003	Relay	Standard Pot.	115Vac
5004	Relay	High Precision Pot.	115Vac
5005	Triac	Standard Pot.	+15Vdc
5006	Triac	High Precision Pot.	+15Vdc
5007	Triac	Standard Pot.	115Vac
5008	Triac	High Precision Pot.	115Vac
5009	Transistor	Standard Pot.	+15Vdc
5010	Transistor	High Precision Pot.	+15Vdc
5011	Transistor	Standard Pot.	115Vac
5012	Transistor	High Precision Pot.	115Vac

Order No.	Output	Input Power
5019	0 to +10Vdc	+9Vdc to +36Vdc
5020	-10 to +10Vdc	+15 and -15Vdc
5021	-10 to +10Vdc	115Vac
5022	0 to +10Vdc	+15 and -15Vdc
5023	0 to +10Vdc	115Vac
5024	4 to 20mA	115Vac
5025	4 to 20mA	+15 and -15Vdc
5026	-5 to +5Vdc	+15 and -15Vdc
5027	-5 to +5Vdc	115Vac
5028	-10 to +10Vdc	+24 and -24Vdc
5029	4 to 20mA	+9Vdc to +36Vdc

Note: For strokes of 2 inches or less please order the short stroke model by adding an S to the model code.

SERIES 5000 Open Loop Control Devices



Scalable Analog Output Controller with Digital Meter

Provides convenient digital display of scaled output signal. Display can be either 0-10Vdc or 4-20mA. Meter is 0.875" x 2.000". To order indicate an M after the Standard Model code.



Scalable Analog Output and Dual Set Point Controller

Combines most of the features of the Standard Dual Set Point Controller and Scalable Analog Output Controller into one convenient package.

Series 5000-5012 and 5019-5029 Specifications

OUTPUT SPECIFICATION-SET POINT:

RELAY (2)	3 AMP @ 28VDC 5 AMP @ 115VAC
TRIAC (2)	2 AMP (60-115VAC)
TRANS. (2)	10mA

OUTPUT SPECIFICATION-ANALOG OUTPUT:

0 to 10V, 1mA max. output current (10K ohm impedance MIN.)
-10 to +10V, 1mA MAX. output current (10K ohm impedance MIN.)
4 to 20mA, into 500 ohm impedance MAX.

POWER INPUT REQUIREMENTS:

AC (all units)	115V 60Hz .1 AMP
DC (set-point systems)	+15VDC .1 AMP
DC (indicator systems)	+15VDC and -15VDC 40mA each supply 4 to 20mA SYSTEM +15VDC and -15VDC 50mA each supply

ENCLOSURE DIMENSIONS: 3" H X 5 5/8" W X 4" D

MOUNTING HOLES: 3 9/16" X 4 7/8" ctr to ctr 4 places

SHIPPING WEIGHT: WITH METER

2 lbs. 3 lbs.

INPUT FUSE: .250 AMP

ELECTRONICS TEMPERATURE OPERATING RANGE:

40 ° F to 130 ° F

IMPORTANT NOTE:

The series 5000 unit or similar device has 2 features that are important to the long life and accuracy of your feedback system. 1) It provides a regulated dc voltage to the LRT/MLRT and 2) It provides a high impedance interface of 1 Megaohm limiting the current draw through the wiper contacts.

Model 5013-5016 Specifications

ENCLOSURE DIMENSIONS: 1.31" H x 5.50"W x 3.25"D

SHIPPING WEIGHT: .80 lbs.

POWER INPUT REQUIREMENTS:

(AC MODELS)	120Vac 60 Hz.1 AMP
(DC MODELS)	12 or 24Vdc .1 AMP

INPUT FUSE: .250 AMP

OUTPUT SPECIFICATION - SET POINT:

RELAY (2)	6 AMP @ 30 VDC
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OUTPUT SPECIFICATIONS - ANALOG:

0 to 10Vdc, 10mA MAX output current
4 to 20mA @ 500 ohm MAX loop resistance
MAXIMUM ZERO OFFSET: 50% of cylinder stroke
MINIMUM SPAN RANGE: 50% of cylinder stroke

ELECTRONICS TEMPERATURE OPERATING RANGE: 40 F to 130 F

MODEL NUMBER	INPUT POWER	SCALABLE OUTPUT
5013	12-24 VDC	0-10 VDC
5014	12-24 VDC	4-20 mA
5015	120 VAC	0-10 VDC
5016	120 VAC	4-20 mA
5017	115VAC	0 to (-)10 VDC

SERIES 5030 Closed Loop Control

The CAP 5030 series signal tracking controllers (STC) are designed to provide accurate hydraulic or pneumatic, closed loop motion control. The STC requires a 4 to 20mA or a 0 to 10Vdc analog signal to track. A 0 to 10Vdc or 4 to 20mA analog signal is available for transmission to a PLC or other host device. The STC system includes a proportional valve and a position feedback cylinder to give you a complete closed loop package. Units can be ganged for multiple-axis applications.

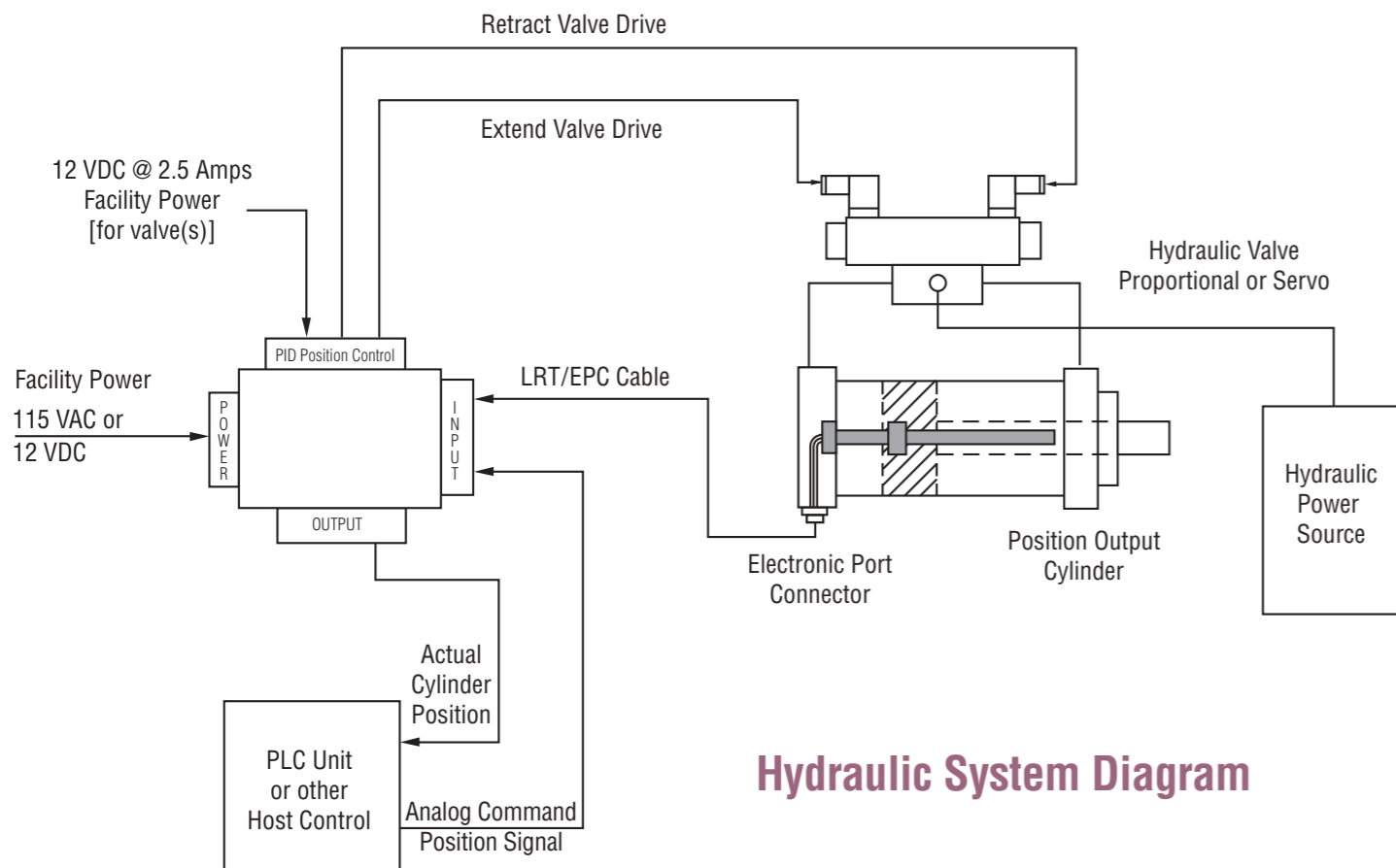
The STC 5030 series is perfect for closing the loop from an output on a PLC or other host device where continuous position control and information is desired.

When ordering a complete closed-loop, signal tracking, internal position feedback transducer package, specify the following:

- Cylinder's psi rating and mounting style
- STC 5030 series model number
- Proportional valve's model number
- Cable length from smart cylinder to electronics.



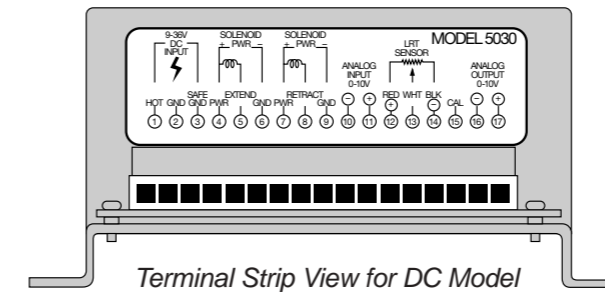
Series 5030 Controller



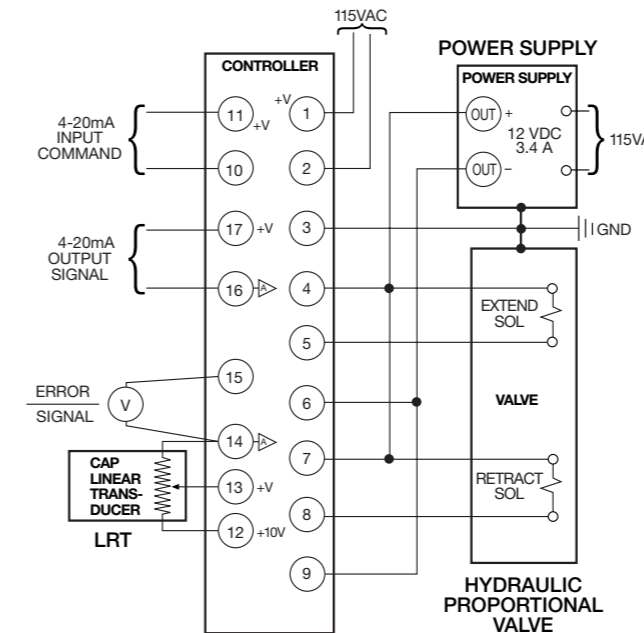
Hydraulic System Diagram

SERIES 5030 Signal Tracking Controls

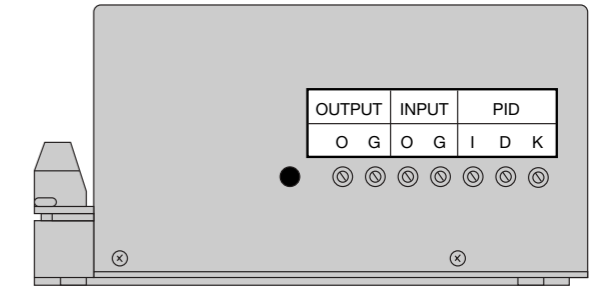
Easy to Install



Example of Typical 5033 System Configuration



Simple to Program



Program Access Side

You program the CAP 5030 series by simply adjusting a set of 25-turn potentiometers. No computer programming knowledge is needed to operate the Series 5030 controller.

- Output : Offset (O)** Sets minimum stroke for positioned output
- Output : Gain (G)** Sets maximum point for positioned output
- Input : Offset (O)** Calibrates minimum point for transducer input
- Input : Gain (G)** Calibrates maximum point for transducer input
- PID : Integral (I)** Seeks target point in pneumatic systems
- PID : Derivative (D)** Responds to acceleration and deceleration
- PID : Gain (K)** Adjusts amount of cylinder response to input signal change

Series 5030 Ordering information

Model No.	Input Power	Input Signal	Output Signal	Hyd. Pneu.
5030	9 to 36Vdc	0 to 10Vdc	0 to 10Vdc	H
5031	115Vac	0 to 10Vdc	0 to 10Vdc	H
5032	9 to 36Vdc	4 to 20mA	4 to 20mA	H
5033	115Vac	4 to 20mA	4 to 20mA	H
5034	9 to 36Vdc	0 to 10Vdc	0 to 10Vdc	P
5035	115Vac	0 to 10Vdc	0 to 10Vdc	P
5036	9 to 39Vdc	4 to 20mA	4 to 20mA	P
5037	115Vac	4 to 20mA	4 to 20mA	P



Proportional Valves

Hydraulic 12Vdc
NG3-Mini Valve
DO3/NG6
DO5/NG10



Pneumatic 12Vdc
1/8"
3/8"

Custom Actuator Products, Inc.

Electronic Motion Control Division



Electronic Motion Control Division

- Linear Position Transducers
- Open Loop Control Modules
- Closed Loop Control Modules
- Closed Loop Systems
- Custom Designed Products
- Position Transducers provided in any stroke increment desired
- Interface Cables
- Underwater Cables
- Electronic Pressure Connectors to 5000 psi

Cylinder Division

- Small Bore Cylinders 1/2" & greater
- Small Bore Position Feedback Cylinders 1/2" & greater
- Hydraulic Cylinders to 5000 psi
- Pneumatic Cylinders
- Stainless Steel Cylinders
- Aluminum Cylinders
- Welded Cylinders
- Titanium Cylinders
- Miniature Valve Pad Cylinders
- Custom Designed Cylinders

About Custom Actuator Products

Custom Actuator Products is based in Minneapolis, MN. We are innovators in electronic motion control devices. We are experts in miniature hydraulic & pneumatic positioning systems. Our products have been utilized in every market segment, including

- Military
- Medical
- Injection Molding
- Agriculture
- Automotive
- Marine
- Animation
- Off-Road Equipment

We design and manufacture our own family of linear position transducers. We design and manufacture our own family of control modules. We design and manufacture our own family of cylinders. All our primary products are designed and manufactured by CAP Personnel in the U.S.A.