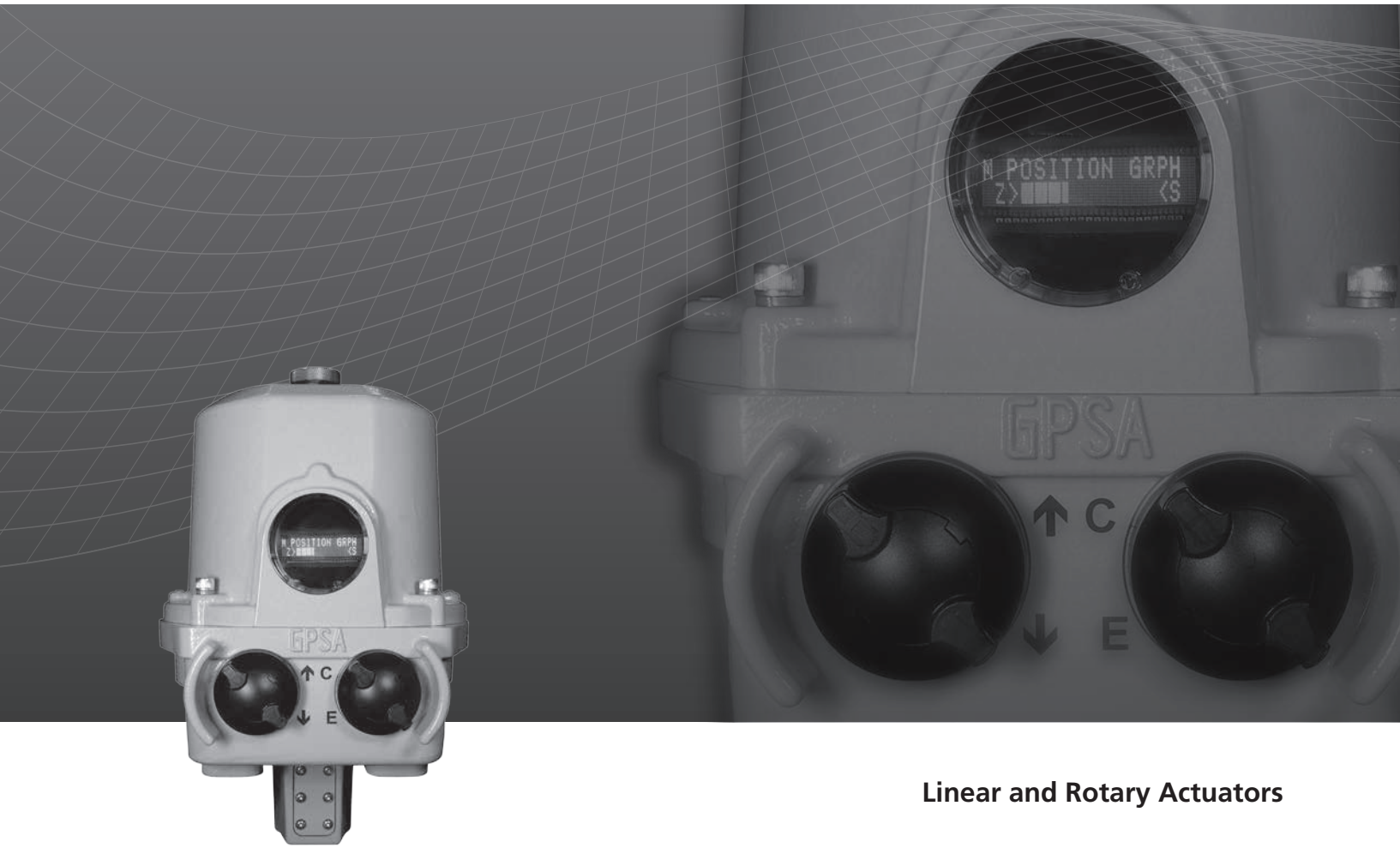
rotork®

Process Controls

GPSA Series

Instruction Manual



Linear and Rotary Actuators

Redefining Flow Control

Contents

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Process Controls

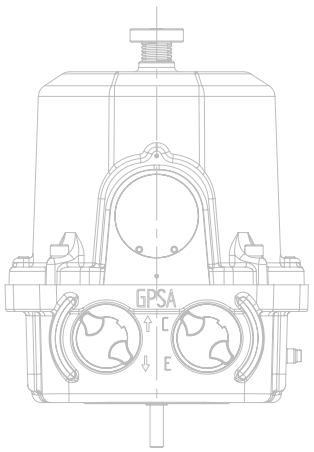
THIS MANUAL CONTAINS IMPORTANT SAFETY INFORMATION. PLEASE ENSURE IT IS THOROUGHLY READ AND UNDERSTOOD BEFORE INSTALLING, OPERATING OR MAINTAINING THE EQUIPMENT.

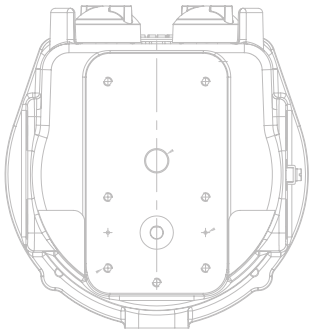
Introduction

Rotork Process Controls designs, manufactures, and tests its products to meet many national and international standards. For these products to operate within their normal specifications, they must be properly installed and maintained.

The following instructions must be followed and integrated with your safety program when installing and using RPC products:

- Read and save all instructions prior to installing, operating and servicing this product.
- If you don't understand any of the instructions, contact Rotork Process Controls for clarification.
- Follow all warnings, cautions and instructions marked on, and supplied with, the product.
- Inform and educate personnel in the proper installation, operation and maintenance of the product.
- Install equipment as specified in Rotork Process Controls installation instructions and per applicable local and national codes. Connect all products to the proper electrical sources.
- To ensure proper performance, use qualified personnel to install, operate, update and maintain the unit.
- When replacement parts are required, ensure that the qualified service technician uses replacement parts specified by Rotork Process Controls. Substitutions may result in fire, electrical shock, other hazards, or improper equipment operation.
- Keep all product protective covers in place (except when installing, or when maintenance is being performed by qualified personnel), to prevent electrical shock, personal injury or actuator damage.
- Operation of actuator in an inappropriate fashion may cause harm or damage to unit or other equipment surroundings.





DUE TO WIDE VARIATIONS IN THE TERMINAL NUMBERING OF ACTUATOR PRODUCTS, ACTUAL WIRING OF THIS DEVICE SHOULD FOLLOW THE PRINT SUPPLIED WITH THE UNIT.

General Information

INTRODUCTION

Rotork Process Controls designs, manufactures, and tests its products to meet national and International standards. For these products to operate within their normal specifications, they must be properly installed and maintained. The following instructions must be followed and integrated with your safety program when installing, using, and maintaining Rotork Process Controls products:

Read and save all instructions prior to installing, operating, and servicing this product. If any of the instructions are not understood, contact your Rotork Process Controls representative for clarification.

Follow all warnings, cautions, and instructions marked on, and supplied with, the product. Inform and educate personnel in the proper installation, operation, and maintenance of the product.

Install equipment as specified in Rotork Process Controls installation instructions and per applicable local and national codes. Connect all products to the proper electrical sources. To ensure proper performance, use qualified personnel to install, operate, update, tune, and maintain the product.

When replacement parts are required, ensure that the qualified service technician uses replacement parts specified by Rotork Process Controls. Substitutions may result in fire, electrical shock, other hazards, or improper equipment operation.

WARNING

Before installing the actuator, make sure that it is suitable for the intended application. If you are unsure, consult Rotork Process Controls prior to proceeding.

WARNING - SHOCK HAZARD

Installation and servicing must be performed only by qualified personnel.

WARNING ELECTROSTATIC DISCHARGE

This electronic control is static-sensitive. To protect the internal components from damage, never touch the printed circuit cards without using electrostatic discharge (ESD) control procedures.

GENERAL ACTUATOR DESCRIPTION

The MV-GPSA is a high precision linear actuator. It is capable of producing 200 pounds of force over its 1.38 inch stroke length at a speed of up to .13 inches per second. At a speed of .25 inches per second the unit is capable of producing 100 pounds of thrust.

SM-GPSA is a high precision rotary actuator capable of producing 125 in. lbs. of torque over 5 turns at 3.3 RPM.

The GPSA (linear or rotary) can utilize up to three input signals, independently configurable as either current (4-20 mA) or voltage (1-5 V) for control. Two dry contact inputs are

available and may be configured to energize or de-energize on fault. The actuator provides three output relays which are configurable as to their trigger and to act as NO or NC. A position feedback signal is provided via a 4-20 mA transmitter, which is configurable as either internally powered or externally loop powered.

A two line, 16 character VFD display and rotary switches comprise the actuators HMI. This provides access for viewing and modifying changeable parameters and data feedback.

RECEIVING / INSPECTION

Carefully inspect for shipping damage. Damage to the shipping carton is usually a good indication that it has received rough handling. Report all damage immediately to the freight carrier and Rotork Process Controls, Inc.

Unpack the product and information packet - taking care to save the shipping carton and any packing material should return be necessary. Verify that the items on the packing list or bill of lading agree with your own.

STORAGE

If the product will not be installed immediately, it should be stored in a clean, dry area where the ambient temperature is -13 to 131 °F (-25 to 55 °C). The actuator should be stored in a non-corrosive environment. The actuator is not sealed to NEMA 4 until the conduit entries are properly connected.

General Information

EQUIPMENT RETURN

A Returned Goods authorization (RG) number is required to return any equipment for repair. This must be obtained from Rotork Process Controls. (Telephone: 414/461-9200) The equipment must be shipped, freight prepaid, to the following address after the RG number is issued:

Rotork Process Controls, Inc.
5607 West Douglas Avenue
Milwaukee, Wisconsin 53218
Attn: Service Department

To facilitate quick return and handling of your equipment, include:

1. RG Number on outside of box
2. Your Company Name, Contact Name, Phone/Fax
3. Address
4. Repair Purchase Order Number
5. Brief description of the problem

IDENTIFICATION LABEL

An identification label is attached to each actuator. When ordering parts, requesting information or service assistance, please provide all of the label information. **You must supply the serial number with all enquiries.**

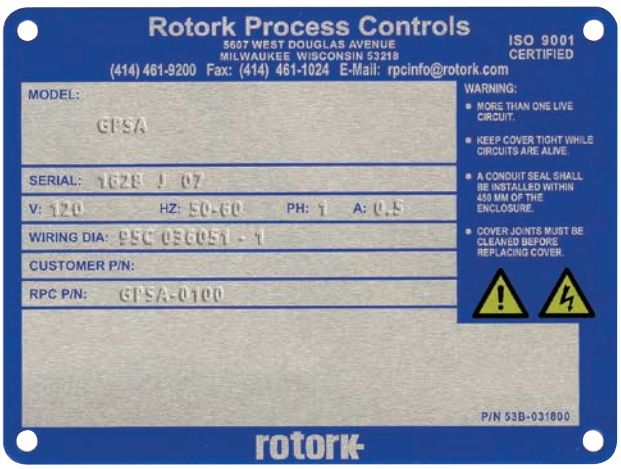


Figure 1.1. Actuator identification label.

ABBREVIATIONS USED IN THIS MANUAL

A	Ampere
AC	Alternating Current
°C	Degrees Celsius
CW	Clockwise
ACW	Anti-clockwise
CCW	Counter-clockwise
DC	Direct Current
°F	Degrees Fahrenheit
G	Earth Ground
Hz	Hertz
in. lbs	Inch Pounds
kg	Kilogram
L	Line (power supply)
lbs	Pounds Force
LVDT	Linear Variable Differential Transformer
mA	Milliamp
mfd	Microfarad
mm	Millimeters
N	Newton (force)
NEMA	National Electrical Manufacturing Association
Nm	Newton Meter
NPT	National Pipe Thread
PCB	Printed Circuit Board
PH	Phase
PL	Position Limit switch
RPM	Revolutions per Minute
SEC	Second
SPDT	Single Pole Double Throw
TL	Torque Limit Switch
V	Volts
VA	Volt Amps
VAC	Volts AC
VDC	Volts DC
VFD	Vacuum Fluorescent Display
VR	Variable Resistance
W	Watt

WARRANTY INFORMATION

Warranty: Subject to the following, Rotork Process Controls expressly warrants the products manufactured by it as meeting the applicable Rotork Process Controls product specifications and that such products are free from defects in material and workmanship for a period of one (1) year from the date of delivery. The foregoing is the sole and exclusive warranty made by Rotork Process Controls with respect to the products. Rotork Process Controls makes no other warranties, either express or implied (including, without limitation, warranties as to merchantability or fitness for a particular purpose). The purchaser retains responsibility for the application and functional adequacy of the offering. See Rotork Process Controls's General Conditions of Sale - Product, for complete warranty information.

Specifications

- **Input Voltage:** 100 - 250 VAC @ 83 VA
  47 - 66 Hz, 1-Phase
- **Power:** 24 VDC @ 47 VA
- **Command Signal Inputs:** 4-20 mA, 1-5 VDC
- **Position Feedback Signal:** 4-20 mA
- **Field Wiring Terminations:** Plugable terminal block, wire size range 26-14 AWG
- **Command Signal Monitor:** If the command signal drops below 3.7 mA or above 20.3 mA the actuator can be programed to either lock in place or run to a position (user selectable).
- **Current Limit:** Automatic adjustment of the motor current limit (internal to servo control).
- **Linear Speed/Thrust:** 0.25 in./sec. at 100 lbs. thrust
- **Stroke:** Up to 1.38 in. (35 mm).
  Adjustable within full range.
- **Rotary Torque/Speed:** 125 in.lbs at 3 RPM
  350 in.lbs at 0.6 RPM
- **Weight:** 23 lbs. (10.4 kg)
- **Conduit Entry:** 3/4 NPT (4) or M25
- **Handwheel:** Push to engage, spring return on release.
- **Temperature Limits:** -22 to 150 °F (-30 to 65 °C)
- **Enclosure:** Explosion-proof for Class I, Division 1, Groups C and D. Dust ignition-proof for Class II, Division 1, Groups E, F and G. Type 4, indoor or outdoor
- **Duty Cycle:** Continuous unrestricted modulating duty
- **Position Accuracy:** 5% of full range.

PHYSICAL INSTALLATION

ELECTRICAL SUPPLY REQUIREMENTS

- An overcurrent protective device is required for the supply power. Size the overcurrent device per requirements of actuator for 125% of maximum rated load.
- Disconnect for the supply power is to be supplied by the customer.
- Wire conductor type and size should match Rotork Process Controls requirements, wiring diagrams and follow local codes.

MAINTENANCE

- Rotork Process Controls actuators are maintenance free. It is recommended that you remove the cover and visually inspect the actuator for any irregularities on an annual basis.

SPARE PARTS

- Spare parts and spare parts lists can be obtained by contacting the Rotork Process Controls Service Department.

Installation Wiring

GENERAL

The electrical installation, maintenance and use of these actuators should be carried out in accordance with the National Legislation and Statutory Provisions relating to the safe use of this equipment, applicable to the site of installation.

For the UK: Electricity at Work Regulations 1989 and the guidance given in the applicable edition of "IEE Wiring Regulations" should be applied. Also the user should be fully aware of his duties under the Health and Safety act 1974.

For USA: NFPA70, National Electrical Code® is applicable.

The basic wiring diagram is shown on page 12, however the actual wiring must follow the print supplied with the actuator.

INPUT POWER

Input power, (100 - 250 VAC), terminates at TB1 on the power supply board. Live and Neutral must be connected to terminals 1 and 3 respectively. The power supply is auto-sensing therefore no switch settings are required for selection of input voltage range. The incoming power supply earth ground must be securely connected to the ground screw terminal located inside the actuator base.

COMMAND WIRING

The analog input signals are used for automatic positioning of the actuator. The assignment of each channel is as follows:

Proportional: J3-1 (+ve) and J3-2 (-ve)

Process Variable: J3-3 (+ve) and J3-4 (-ve)

Remote Setpoint or Remote Ratio: J3-5 (+ve) and J3-6 (-ve)

Consult 'Control Setup' section of this document for more information. The input signal may be configured for voltage (1-5 V) or current (4-20 mA) and is achieved by use of slide switches S1 – S3, see section titled 'Setting the Dip Switches'. Each analog input channel is fully isolated.

RELAYS

The GPSA provides 3 user configurable relays for position or monitoring indication. The relays may be configured to energize or de-energize on the assigned condition. The contacts are rated at 5 A, 120 VAC or 30 VDC. The relays will de-energize under loss of power.

The connections are as follows:

Relay 1: J1-7 Normally Closed
J1-8 Normally Open
J1-9 Common

Relay 2: J1-4 Normally Closed
J1-5 Normally Open
J1-6 Common

Relay 3: J1-1 Normally Closed
J1-2 Normally Open
J1-3 Common.

CONTACT INPUTS

The Contact Inputs provide an additional pair of isolated inputs for specific control purposes, (see 'Start-up Information' section of this document). These inputs are activated by connecting the corresponding pair of terminals together. Input SW should be wired to terminals J2-3 and J2-4. The override switch is wired to J2-5 and J2-6.

Information regarding the configuration of these switches can be found in the 'Start-up Information' section of this document.

TRANSMITTER

A current loop transmitter provides a 4-20 mA signal that corresponds to the measured position. This may be either loop powered or internally powered, (see the section titled 'Setting the Dip Switches').

In the internally powered mode, the feedback signal wires connect to terminals 2 (+ve) and 1 (-ve) of J2 respectively. In the loop powered mode however, the signal wires connect to terminals 1 (+ve) and 2 (-ve) of J2 respectively. The transmitter is fully isolated.

SETTING THE DIP SWITCHES

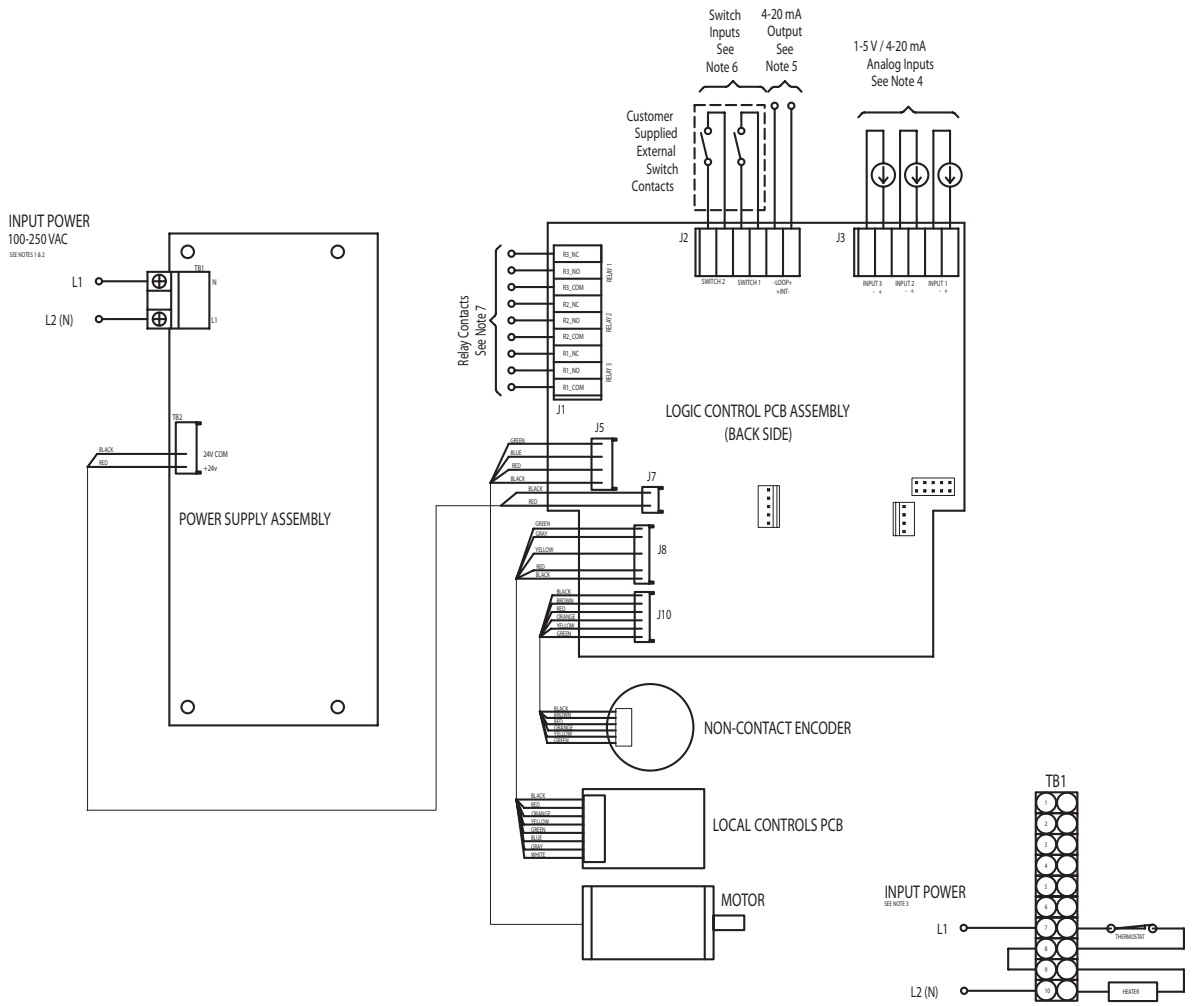
There are four dip switches situated on the main logic PCB that are used for actuator configuration. They are located behind the display near the display board standoffs. Switches S1 – S3 determine the type of command signal, (voltage or current) used by the actuator, for analog inputs 1 – 3 respectively. Switch S4 is used to select between a loop powered or internally powered current transmitter.

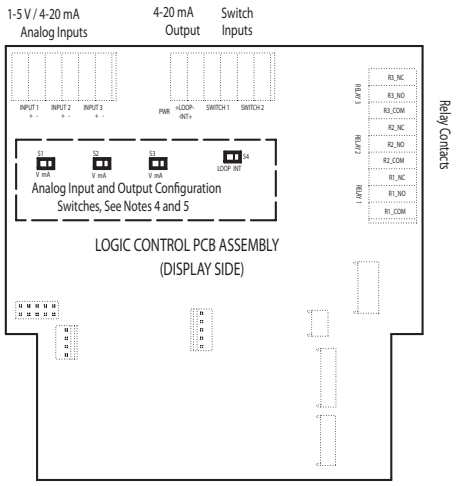
It should be noted that the orientation of the transmitter's terminals is different for the two modes.

DIP Switch Chart

Switch	Switch Position	Function
S1	On (slide to the right)	Current input selected for INPUT1
	Off (slide to the left)	Voltage input selected for INPUT1
S2	On (slide to the right)	Current input selected for INPUT2
	Off (slide to the left)	Voltage input selected for INPUT2
S3	On (slide to the right)	Current input selected for INPUT3
	Off (slide to the left)	Voltage input selected for INPUT3
S4	On (slide to the right)	Internally powered transmitter
	Off (slide to the left)	Externally loop powered transmitter

Wiring Diagram





NOTES:

1. INPUT POWER: 100 to 250 VAC, 47 to 66 Hz.
2. GROUNDING: The case of the actuator must be connected to a bonded earth ground. A ground screw is provided on the bottom of the housing. All wiring should comply with local codes.
3. HEATER: AC input required to the heater for condensation protection of the actuator. Input power is to be specified at time of order. Refer to nameplate for correct voltage.
4. ANALOG INPUTS: Isolated analog input channels are used for positioning of actuator. Consult instruction manual for description of channels' function in each control strategy. Inputs 1, 2 and 3 are preset for 4-20 mA but may be changed to 1 - 5 V operation via switches S1, S2 and S3 respectively.
5. ISOLATED TRANSMITTER: Isolated 4-20 mA position transmitter is preset as internally powered but may be reconfigured for loop power via switch S4. Reference Fig.1 for correct wiring in each case.
6. SWITCH INPUTS: Two isolated inputs available for contact closure only. Refer to instruction manual for configuration via HMI.
7. RELAY CONTACTS: 5 A, 120 VAC, or 30 VDC. Refer to instruction manual for configuration via HMI.

DUE TO WIDE VARIATIONS IN THE TERMINAL NUMBERING OF ACTUATOR PRODUCTS, ACTUAL WIRING OF THIS DEVICE SHOULD FOLLOW THE PRINT SUPPLIED WITH THE UNIT.

Actuator Setup

USER INTERFACE

A display and two selector knobs are used for a non-intrusive customer interface to the actuator. The unit provides a menuing system to access run modes, parameters, diagnostics and alarms. The ↑ and ↓ selections are used to scroll through the menu choices and status/parameter lists. These parameters are arranged in a tree structure which is traversed using the ↑ and ↓ knob selections.

Selecting the ↓ option will scroll down one entry in the parameter listing. The next parameter will be shown on the top line of the display. Selecting ↑ will scroll back up to the previous parameter in the list. Each menu listing is circular. The menu listings contain parameters and access to additional menus of parameters. Menus are distinguished by using only the top line of the display. When a menu is shown, selecting Enter takes the operator to that menu and again the ↑ / ↓ selections are used to traverse it. Cancel moves back to the previous menu.

Parameters use both display lines. A parameter's name is shown on the top line and its current value is shown on the bottom line. When a parameter is shown (if it is updateable), selecting Enter will put that parameter in the update mode. This is denoted by a "U" in the upper left hand corner of the display. The ↑ / ↓ selections are now used to modify the parameter value. If the parameter has discrete settings, ↑ / ↓ will cycle through the circular list of those settings. If the parameter is numeric, the ↑ / ↓ knob selections will increment or decrement the parameter respectively.

When updating a numeric parameter value, holding a knob selection (↑ or ↓) will increase the amount of increment (↑) or decrement (↓) in use. Initially a parameter is updated through its least significant digit. Holding the knob selection through ten changes will advance the update one position to the left for an additional ten updates. This process continues until the knob is released. All numeric parameters have minimum and maximum limits. The update of parameters is circular. For example, incrementing a parameter past its maximum value will cause the value to loop around to its minimum value and continue updating from that point.

Updating a parameter causes the unit to enter Manual Mode. The unit will remain in Manual Mode until the operator returns it to Automatic mode via the "AUTO/MAN CTRL" parameter.

GENERAL

POWER

Unit automatically senses 100 to 250 VAC input power.

COMMAND CALIBRATION

Unit is factory calibrated for input commands of both 4-20 mA and 1-5 V. There is no need for the customer calibration of the input signals.

PARAMETER STORAGE

Parameter settings are saved in both active and backup memory (EEPROM). EEPROM values are restored to active memory on power up. When an active memory parameter is modified, that change is also written to EEPROM and verified. Should the write fail, "EE WRITE FAIL" instead of "SAVED" will be shown on the display. The GPSA will continue to operate properly using the active parameters. However, if power is removed, active parameters are lost and any changes that were not successully saved to EEPROM will NOT be restored to active memory properly. This may cause unexpected actuator operation. Contact Service for asisstance.

AUTO/MANUAL

The unit can be operated in Manual or Automatic modes. See the Menu Hierarchy for the location of this user settable selection.

CALIBRATION

The unit may be calibrated in one of two modes (Zero/Span or Characterize).

ZERO/SPAN

This option provides a 2-point calibration of the unit. This calibration is performed under the VALVE POS menu via the following steps:

1. Update the MAX POSITION parameter to reflect the value of the maximum output position of the actuator. (ex. 100%)
2. Select the CAL POINT 1 parameter. Use the ↑ / ↓ knob to run the actuator to the desired ZERO position. Select Enter to save the current physical position of actuator as its ZERO point.
3. Continue to the CAL PT 1 VAL parameter and select it for update. This is the numeric value that is to be associated with the ZERO point (ex. 0%). Update and select Enter to save this value
4. Continue to the CAL POINT 2 parameter. Use the ↑ / ↓ knob to run the actuator to the desired SPAN position. Select Enter to save the current physical position of actuator as its SPAN point.
5. Continue to the CAL PT 2 VAL parameter and note that it is automatically set to the MAX POSITION setting of step 1. This is the numeric value that is associated with the SPAN point (ex 100%). In a two-point calibration this value is not updateable by the user.
6. The two-point calibration of the actuator is now completed.

Actuator Setup

CHARACTERIZATION

This option provides for a 2 to 11 point calibration of the unit in order to characterize its output. This calibration is performed under the **VALVE POS** menu via the following steps:

1. Update the **MAX POSITION** parameter to reflect the value of the maximum output position of the actuator. (ex. 100%)
2. Select the **CAL POINT 1** parameter. Use the ↑ / ↓ knob to run the actuator to the desired **ZERO** position. Select Enter to save the current physical position of actuator as its **ZERO** point.
3. Continue to the **CAL PT 1 VAL** parameter and select it for update. This is the numeric value that is to be associated with the **ZERO** point (ex 0%). Update and select Enter to save this value
4. Continue to the **CAL POINT 2** parameter. Use the ↑ / ↓ knob to run the actuator to the desired position. Select Enter to save the current physical position of actuator as the second calibration point.
5. Continue to the **CAL PT 2 VAL** parameter and select it for update. This is the numeric value that is associated with the second calibration point (ex 10%).
6. Continue to the **CAL POINT 3** parameter. Use the ↑ / ↓ knob to run the actuator to the desired position. Select Enter to save the current physical position of actuator as the third calibration point.
7. Continue to the **CAL PT 3 VAL** parameter and select it for update. This is the numeric value that is associated with the third calibration point (ex 20%).
8. Calibration points (up to 11) will be automatically available until the **CAL PT X VAL** parameter is set equal to the **MAX POSITION** parameter value set in step 1. When this occurs, calibration is considered complete; no additional calibration points are provided.

TRANSMITTER

The unit may be configured to use either an internally powered transmitter (S4 slid to the right, in line with the painted line) or as externally loop powered (S4 slid to the left, not in line with the painted line) The transmitter is factory calibrated. User calibration is not required.

LOSS OF COMMAND ACTION

The unit may be configured to perform one of four actions when a loss of the command input signal occurs while running under the automatic operation of the Open Loop control mode:

LOCK - Locks the unit in place at its current position

DRIVE to ZERO - The unit will drive to the **ZERO** position set in calibration

DRIVE to SPAN - The unit will drive to the **SPAN** position set in calibration

DRIVE to POS - The unit will drive to a user position specified by the **CMD LOS POS** parameter.

LOSS OF PROCESS VARIABLE INPUT ACTION

The unit may be configured to perform one of four actions when a loss of the process variable input signal occurs under the automatic operation of the Closed Loop control mode:

LOCK - Lock the unit in place at its current position

DRIVE to ZERO - The unit will drive to the ZERO position set in calibration

DRIVE to SPAN - The unit will drive to the SPAN position set in calibration

DRIVE to **POS** - The unit will drive to a user position specified by the **PV LOS POS** parameter.

*** This parameter is displayed based on the settings of other parameters and modes.**

Menu Overview

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Software Setup

CONFIGURATION

6.1 BASIC PARAMETERS

6.1.1 DEADBAND

This adjustment establishes the servo sensitivity. It is factory set but may be adjusted, if necessary, in the field. If the actuator begins to oscillate (rapidly adjusting around a single point) the sensitivity can be decreased. Increase the deadband parameter until the oscillation no longer occurs. Oscillation will reduce the life of the unit.

6.1.2 SPEED

LINEAR SPEED

This is the speed at which the unit moves in a linear direction. It may be set to either 0.13 or 0.25 inches/second.

ROTARY SPEED

This is the selection to set the rotary speed of the actuator. It is fixed at 3.2 RPM.

6.1.3 ACTUATOR TYPE

This parameter configures the unit as linear or rotary.

6.1.4 CAL POINT 1

Position feedback for characterization point 1.

6.1.5 CAL POINT 2

Position feedback for characterization point 2.

6.1.6 CMD LOS ACT

This is the action taken when the input command is lost. It may be configured:

LOCK – Actuator locks in place at its current position

DTZ – Actuator drives to ZERO position

DTS – Actuator drives to SPAN position

DTP – Actuator drives to a user selected position

6.1.7 CMD LOS POS*

This is the position to which the actuator will drive when in Open Loop Control and the CMD LOS ACT parameter is set to Drive To Position and the signal is lost.

6.1.8 FAULT HISTORY

This is a circular listing of the last 10 faults that have occurred in the actuator. The faults messages are preceded with a number indicating where in the history each fault occurred. 0 indicates the most recent error; a 1 is the error that occurred before error 0 and so on. The numbers increase as one looks back into the fault history of the unit. A total of 10 faults are stored. If this capacity is exceeded, the oldest error is removed from the list and the most recent is added to it.

6.1.9 ACTUATOR TYPE

This parameter configures the unit as linear or rotary.

6.2 CONTROL SETUP

6.2.1 CONTROL MODE SELECTION

This selects the control mode that the actuator uses to determine its output position:

OPEN LOOP: *(See diagram, Section 14, Control Schemes)*

In this mode the output position is directly proportional to the input command provided on input terminal pair #1.

See 6.2.2 for instructions

CLOSED LOOP: *(See diagram, Section 14, Control Schemes)*

This strategy is integral based and adjusts the output position of the actuator based on the difference between a desired local or remote Set Point (terminal pair #3) and the actual Process variable signal on terminal pair #2. The amount of the correction is continually calculated/updated.

See 6.2.3 for instructions

FEED FORWARD: *(See diagram, Section 14, Control Schemes)*

This mode combines the control strategies of proportional and process variable control mentioned above. The output setting is adjusted in proportion to the input command on terminal pair #1 and a correction factor is applied which is derived from the error between the desired local or remote Set Point (terminal pair #3) and the actual input signal on input terminal pair #2.

See 6.2.4 for instructions

6.2.2 OPEN LOOP CONTROL PARAMETERS*

6.2.2.1 CMD UNITS

This is a four character label that will be displayed with the input command and it's associated parameters. It is entirely configurable by the operator. When selected for update, the first of the four characters is highlighted. The ↑ / ↓ selections are used to scroll through the available characters: A-Z, a-z, space, -, % and /. Selecting Enter will set the displayed character and continue to the next. When all four characters have been set, the label is saved. At anytime prior to the final character being set, Cancel may be selected and no change to the label will be made.

6.2.2.2 CMD MAX

This is the input reading that is to be associated with the maximum input signal of 20 mA or 5 V.

6.2.2.3 CMD MIN

This is the input reading that is to be associated with the minimum input signal of 4 mA or 1 V.

6.2.2.4 CMD DAMP

Dampening is the amount of time over which the command input signal is averaged. The setting may range from 0 seconds (no dampening) to 25 seconds. This is used to smooth out rapid fluctuations of the input signal.

6.2.2.5 CMD LO ALRM

This is the level that signifies a low input command. When the input command falls below this level, an alarm is generated.

6.2.2.6 CMD ALRM DB

This parameter determines when the CMD LO ALRM is cleared. The input command reading must rise above the alarm level by this amount in order for the system to clear an existing low command alarm. The parameter may be set from 0.3% to 25% of the Input command range.

6.2.2.7 CMD LOS ACT

This is the action taken when the input command is lost. It may be configured as:

LOCK – Actuator locks in place at its current position

DTZ – Actuator drives to the Zero position

DTS – Actuator drives to the Span position

DTP – Actuator drives to a user selected position

6.2.2.8 CMD LOS POS*

This is the position to which the actuator will drive when the CMD LOST ACT parameter is set to Drive To Position and the signal is lost.

6.2.2.9 LOC/REM RATIO

This parameter configures whether the RATIO multiplier of the system is obtained locally when set to LOCAL, or if it is obtained from the input signal (on input pair number 3) when set to REMOTE.

6.2.2.10 RATIO SET*

This parameter is the local Ratio Multiplier that is applied to the input command signal. It ranges from .2 to 2. A setting of 1 results in no change to the input command signal.

6.2.3 CLOSED LOOP CONTROL PARAMETERS*

6.2.3.1 PV UNITS

This is a four character label that will be displayed with the process variable and it's associated parameters. It is entirely configurable by the operator. When selected for update, the first of the four characters is highlighted. The ↑ / ↓ selections are used to scroll through the available characters: A-Z, a-z, space, -, % and /. Selecting Enter will set the displayed character and continue to the next. When all four characters have been set, the label is saved. At anytime prior to the final character being set, Cancel may be selected and no change to the label will be made.

6.2.3.2 PV MAX

This is the Process Variable reading that is to be associated with the maximum input signal of 20 mA or 5 V, and the local setpoint.

6.2.3.3 PV MIN

This is the Process Variable reading that is to be associated with the minimum input signal of 4 mA or 1 V, and the local setpoint.

6.2.3.4 PV DAMP

Dampening is the amount of time over which the Process Variable input signal is averaged. The setting may range from 0 seconds (no dampening) to 25 seconds. This is used to smooth out rapid fluctuations of the input signal.

6.2.3.5 PV HI ALARM

This is the Alarm level that signifies that the Process Variable signal is too high. When the process variable input rises above this level an alarm is generated.

6.2.3.6 PV LO ALARM

This is the Alarm level that signifies a Process Variable signal is too low. When the Process Variable input falls below this level an alarm is generated.

6.2.3.7 PV ALARM DB

This parameter determines when the Process Variable High and Low Alarms are cleared. The Process Variable signal must rise above the Low Alarm level by the Deadband amount in order to clear a Process Variable Low Alarm. The Process Variable signal must fall below the Process Variable High Alarm level by this amount to clear a Process Variable High Alarm. The parameter may be set from 0.3% to 25% of the Process Variable signal range.

6.2.3.8 PV LOS ACTION

This is the action taken when the Process Variable input signal is lost. It may be configured as:

LOCK – actuator locks in place at its current position

DTZ – actuator drives to the Zero position

DTS – actuator drives to the Span position

DTP – actuator drives to a user selected position

6.2.3.9 PV LOS POS*

This is the position to which the actuator will drive when the PV LOS ACTION parameter is set to Drive To Position and that signal is lost.

6.2.3.10 PROPER GAIN

This is the gain applied in the PI control loop of the Process Variable control scheme. It tells the actuator what percentage of the difference between the Set Point and the Process Variable signals to use as the step up or down. The percentage is equal to 100 divided by the setting. It may be set from 0 - 225%. A gain setting of 100% results in the step up or down being equal to the difference of the two signals.

6.2.3.11 INTEGRAL GAIN

This is the gain that is applied to the summation over time of the error between the process variable and the setpoint.

6.2.3.12 LOC/RMT SP

This parameter configures whether the Process Variable Set Point of the system is obtained locally (SP) when set to **LOCAL**, or if it is obtained from the input signal (on input pair number 3) when set to **REMOTE**.

6.2.3.13 SET POINT*

When **LOC/RMT SP** is set to **LOCAL**, this is the Local Set Point Parameter that the system uses. It is only available when **LOC/REM SP** is set to **LOCAL**.

6.2.3.14 SET POINT DEV ALRM

This is the percentage of the Process Variable Signal by which the Set Point and the Process Variable signal may differ before an alarm is triggered.

6.2.4 FEED FORWARD CONTROL PARAMETERS*

6.2.4.1 CMD UNITS

This is a four character label that will be displayed with the input command and it's associated parameters. It is entirely configurable by the operator. When selected for update, the first of the four characters is highlighted. The ↑ / ↓ selections are used to scroll through the available characters: A-Z, a-z, space, -, % and /. Selecting Enter will set the displayed character and continue to the next. When all four characters have been set, the label is saved. At anytime prior to the final character being set, Cancel may be selected and no change to the label will be made.

6.2.4.2 CMD MAX

This is the input reading that is to be associated with the maximum input signal of 20 mA or 5 V.

6.2.4.3 CMD MIN

This is the input reading that is to be associated with the minimum input signal of 4 mA or 1 V.

6.2.4.4 CMD DAMP

Dampening is the amount of time over which the command input signal is averaged. The setting may range from 0 seconds (no dampening) to 25 seconds. This is used to smooth out rapid fluctuations of the input signal.

6.2.4.5 CMD LO ALRM

This is the level that signifies a low input command. When the input command falls below this level, an alarm is generated.

6.2.4.6 CMD ALRM DB

This parameter determines when the CMD LO ALRM is cleared. The input command reading must rise above the alarm level by this amount in order for the system to clear an existing low command alarm. The parameter may be set from 0.3% to 25% of the Input command range.

6.2.4.7 CMD LOS ACT

This is the action taken when BOTH input signals are lost. It It may be configured as:

LOCK – actuator locks in place at its current position

DTZ – actuator drives to the Zero position

DTS – actuator drives to the Span position

DTP – actuator drives to a user selected position

6.2.4.8 CMD LOS POS*

This is the position to which the actuator will drive when the CMD LOST ACT parameter is set to Drive To Position and BOTH input signals are lost.

6.2.4.9 PV UNITS

This is a four character label that will be displayed with the process variable and it's associated parameters. It is entirely configurable by the operator. When selected for update, the first of the four characters is highlighted. The ↑ / ↓ selections are used to scroll through the available characters: A-Z, a-z, space, -, % and /. Selecting Enter will set the displayed character and continue to the next. When all four characters have been set, the label is saved. At anytime prior to the final character being set, Cancel may be selected and no change to the label will be made.

6.2.4.10 PV MAX

This is the Process Variable reading that is to be associated with the maximum input signal of 20 mA or 5 V, and the local set point.

6.2.4.11 PV MIN

This is the Process Variable reading that is to be associated with the minimum input signal of 4 mA or 1 V, and the local set point.

6.2.4.12 PV DAMP

Dampening is the amount of time over which the Process Variable input signal is averaged. The setting may range from 0 seconds (no dampening) to 25 seconds. This is used to smooth out rapid fluctuations of the input signal.

6.2.4.13 PV HI ALARM

This is the Alarm level that signifies that the Process Variable signal is too high. When the process variable input rises above this level an alarm is generated.

6.2.4.14 PV LO ALARM

This is the Alarm level that signifies a Process Variable signal is too low. When the Process Variable input falls below this level an alarm is generated.

6.2.4.15 PV ALARM DB

This parameter determines when the Process Variable High and Low Alarms are cleared. The Process Variable signal must rise above the Low Alarm level by the Deadband amount in order to clear a Process Variable Low Alarm. The Process Variable signal must fall below the Process Variable High Alarm level by this amount to clear a Process Variable High Alarm. The parameter may be set from 0.3% to 25% of the Process Variable signal range.

6.2.4.16 PROPOR GAIN

This is the gain applied in the PI control loop of the Process Variable control scheme. It tells the actuator what percentage of the difference between the Set Point and the Process Variable signals to use as the step up or down. The percentage is equal to 100 divided by the **PROPOR GAIN** setting. It may be set from 0 - 225%. A gain setting of 100% results in the step up or down being equal to the difference of the two signals.

6.2.4.17 INTEGRAL GAIN

This is the gain that is applied to the summation over time of the error betwen the process variable and the setpoint.

6.2.4.18 CMD DEADBAND

This is the amount the command may change without causing the system to accumulate any errror due to the input command.

6.2.4.19 LOC/RMT SP*

This parameter configures whether the Process Variable Set Point of the system is obtained locally (SP) when set to **LOCAL**, or if it is obtained from the input signal (on input pair number 3) when set to **REMOTE**.

6.2.4.20 SET POINT*

When **LOC/RMT SP** is set to **LOCAL**, this is the Local Set Point Parameter that the system uses. It is only available when **LOC/REM SP** is set to **LOCAL**.

6.2.4.21 SET POINT DEV ALRM

This is the percentage of the Process Variable Signal by which the Set Point and the Process Variable signal may differ before an alarm is triggered.

6.3 OUTPUT RELAYS

The actuator has three output relays that are configurable by the user. They may be set to trigger on any one of several fault/alarm or actuator conditions. They may also be configured as **ENERG ON FLT** or **DEENERG ON FLT**.

6.3.1 R1 ASSIGN

The Relay may be triggered upon any one of the following conditions:

FAULT	Process Variable Low
LOCAL	Process Variable High
REMOTE	Set Point Deviation Low
MANUAL	Set Point Deviation High
AUTO	Command Low
STALL	ZERO
	SPAN
	POS
	COMMS CTRL

6.3.2 R1 POS*

The position at or above which the relay will be triggered when R1 Assign is set to POS.

6.3.3 R1 CONFIG

The output relay may be configured as **ENERG ON FLT** (energized on fault), relay closes on the fault condition or **DEENERG ON FLT** (de-energized on fault) relay opens on fault condition.

6.3.4 R2 ASSIGN

See Relay 1 Assignment, this operates in the same fashion but on the second output relay.

6.3.5 R2 POS*

See R1 Pos, this operates in the same fashion but on the second output relay.

6.3.6 R2 CONFIG

See Relay 1 Configuration, this operates in the same fashion but on the second output relay.

6.3.7 R3 ASSIGN

See Relay 1 Assignment, this operates in the same fashion but on the third output relay.

6.3.8 R3 POS*

See R1 Pos, this operates in the same fashion but on the third output relay.

6.3.9 R3 CONFIG

See Relay 1 Configuration, this operates in the same fashion but on the third output relay.

6.4 CONTACT INPUTS

The actuator is equipped with two contact inputs that may be configured by the operator.

6.4.1 INPUT SW ACTIVE

Setting this parameter to **YES** enables Input Switch 1. When active, the **INPUT CONFIG** and **INPUT SW SET** parameters are also made accessible to the operator. If **INPUT SW ACTV** is set to **NO**, no other Input Switch 1 parameters are accessible (not displayed) and switch 1 input is not used.

6.4.2 INPUT CONFIG*

When Input switch 1 is enabled this configures whether action is taken when the contact is closed (energize on fault) or when it is open (de-energize on fault).

6.4.3 INPUT SW SET*

This is the action taken when the input switch is activated. It may be configured as:

LOCK- actuator locks in place at its current position

DTZ – actuator drives to the Zero position

DTS – actuator drives to the Span position

DTP – actuator drives to a user selectable position

6.4.4 INPUT SW POS*

This is the position to which the actuator will drive when the input switch is activated and the **INPUT SW SET** has been configured as Drive to Position.

6.4.5 OVRIDE SW ACT

Setting this parameter to **YES** enables the Override Switch. When active, the Override Switch configuration is also made accessible to the operator. If **OVRIDE SW SET** is set to **NO**, the Override Switch configuration parameters are not accessible and the Override Switch input is not used.

6.4.6 OVRIDE CONFIG*

When the Override switch is enabled this configures whether action is taken when the contact is closed (energize on fault) or when it is open (de-energize on fault).

6.4.7 OVRIDE SW SET*

This is the action taken when the Override Switch is activated. It may be configured as:

LOCK - actuator locks in place at its current position

DTZ - actuator drives to the Zero position

DTS - actuator drives to the Span position

DTP - actuator drives to a user selectable position

6.4.8 OVRIDE SW POS*

This is the position to which the actuator will drive when the Override Switch is activated and the **OVRIDE SW SET** has been configured as Drive to Position.

6.5 VALVE POS

The output position of the unit can be calibrated by the user. This calibration can be anywhere from two to eleven points. The actuator linearly interpolates between adjacent calibration points to determine the setting for the output.

6.5.1 UNITS

This is a four character label that will be displayed with the output position and it's associated parameters. It is entirely configurable by the operator. When selected for update, the first of the four characters is highlighted. The ↑ / ↓ selections are used to scroll through the available characters: A-Z, a-z, space, -, % and /. Selecting Enter will set the displayed character and continue to the next. When all four characters have been set, the label is saved. At anytime prior to the final character being set, Cancel may be selected and no change to the label will be made.

6.5.2 MAX POSITION

This is the maximum output position of the system, or the highest desired output of the system.

6.5.3 CALIBRATE OPT

This parameter selects between a 2 point linear (Zero-Span) calibration and an up to eleven point (Characterize) calibration of the unit.

6.5.4 ZERO-SPAN CARACTERIZE

Calibration menu selected by parameter 6.5.3.

6.5.4.1 CAL PT 1 VAL

This is the unit value associated with the **ZERO** position of the valve. The ↑ / ↓ selections are used to adjust it. When the desired value is shown select Enter to save that value.

6.5.4.2 CAL POINT 2

This is the actual position of the output shaft at the second calibration point in A/D counts. In a 2-point calibration this would be the Span position. When calibrating, adjust the output (using the ↑ / ↓ selections) to the desired position and then select Enter.

6.5.4.3 CAL PT 2 VAL

This is the unit value associated with the second calibration point of the valve.

6.5.4.4 CAL POINT 3-11

These are the actual positions of the output shaft at additional calibration points.

6.5.4.5 CAL PT 3-11 VAL

These are the unit values associated with the additional calibration points.

6.6 COMMUNICATIONS

6.6.1 COMMS OPT

Used to select the comunications format (if any) that will be used. The choices are NONE, HART, PROFIBUS and FIELDBUS. Other parameters will be accessible depending on which communications options is selected. Note that the unit must be fitted with the appropriate communication card in order to support the selected communications format.

6.6.2 COMMS LOS TO*

This is the amount of time the internal communications between the logic board and communication card must be lost in order to trigger the COM LOS Act. It may be between 0 and 60 seconds.

6.6.3 COMMS LOS ACT*

This is the action that the actuator will take should it have a loss of communications. The selections are:

NONE - No action is taken

LOCK - The actuator stops in its current position.

DRIVE TO SPAN - The actuator runs to the fully open (SPAN) position.

DRIVE TO ZERO - The actuator runs to the fully closed (ZERO) position.

DRIVE TO POS - The actuator runs to a preset position, set by the Comms LOS POS parameter.

6.6.4 COMMS LOS POS*

This is the position in percent to which the actuator will run if communications are lost and the COMMS LOS Act is set to DRIVE TO POS. This position may be set anywhere between and including the ZERO and SPAN settings.

6.6.5 CONTROL MECH*

When a communications format is active, this parameter determines whether the actuator is being controlled via commands recieved over the comms channel (COMMUNICATION) or by the Analog input signal (ANALOG).

6.6.6 HART ADDR*

This is the address assigned to the device on the HART network. It may range from 0 - 63.

6.6.7 PROFI ADDR*

This is the address assigned to the device on the Profibus network. It may range from 1 - 127.

6.7 REMOTE I/O

The actuator may have been fitted with a Remote I/O option card that will provide three additional output relays that are configurable by the user. They may also be set to trigger on any one of thirteen fault/alarm or actuator conditions. They may also be configured as **ENERG ON FLT** or **DEENERG ON FLT**.

6.7.1 AUX OUT RELAYS

6.7.1.1 AR1 ASSIGN

The Relay may be triggered upon any one of the following conditions:

FAULT	Process Variable Low
LOCAL	Process Variable High
REMOTE	Set Point Deviation Low
MANUAL	Set Point Deviation High
AUTO	Command Low
STALL	ZEROS
	PAN
	POS
	COMMS CTRL

When assigned to NONE, the relay will not trigger but is set to the state that was set up by the R1 CONFIG parameter.

6.7.1.2 AR1 POS*

The position at or above which the relay will be triggered when AR1 ASSIGN is set to POS.

6.7.1.3 AR1 FORM

The output relay may be configured as **ENERG ON FLT** (energized on fault), relay closes on the fault condition or **DEENERG ON FLT** (de-energized on fault) relay opens on fault condition.

6.7.1.4 AR2 ASSIGN

See AR1 ASSIGN, this operates in the same fashion button the second output relay.

6.7.1.5 AR2 POS*

See AR1 POS, this operates in the same fashion but on the second auxilliary relay.

6.7.1.6 AR2 FORM

See AR1 FORM, this operates in the same fashion but on the second output relay.

6.7.1.7 AR3 ASSIGN

See AR1 ASSIGN, this operates in the same fashion but on the third output relay.

6.7.1.8 AR3 POS*

See AR1 POS, this operates in the same fashion but on the third auxilliary relay.

6.7.1.9 AR3 FORM

See AR1 FORM, this operates in the same fashion but on the third output relay.

6.7.2 AUX DRY CTCTS

The Remote I/O option card is equipped with three dry contact inputs. The functions of these Auxiliary contacts are not configurable; they are assigned the following tasks: Aux Dry Contact 1 is manual/auto selection. Aux Dry Contact 2 is used for the INCrement request. Aux Dry Contact 3 is used for the DECrement request. The Remote I/O board sets a bit in the control byte when the corresponding dry contact is closed and clears it when it is open.

The GPSA determines how the Aux Dry Contacts are configured, normally opened or normally closed. Using the returned control request of the Aux Dry Contacts and how they have been configured, the GPSA takes the appropriate action when under DIGITAL control mode. The requested action will be taken as long as the DRY Contacts remain in their current state.

6.7.2.1 IN CONF AUX1

This configures whether the switch is normally open (NORM OPEN), action is taken when the contact closes or normally closed (NORM CLOSED), action is taken when the contact opens.

6.7.2.2 IN CONF AUX2

See IN CONF AUX 1 description.

6.7.2.3 IN CONF AUX3

See IN CONF AUX 1 description.

6.8 DEFAULTS

6.8.1 SET CUST DEFS

This option saves the current set up of the actuator to permanent memory. The user may then at a later time load these setting back into the actuator. Selecting Enter when the YES option is displayed will save the current settings as the customer defaults.

6.8.2 LOAD CUST DEFS

This allows the user to load the actuator with the last settings of the customer defaults stored in memory.

6.8.3 LOAD FACT DEFS

This enables the user to return the actuator settings to the values they had when the actuator left the RPC factory.

Selecting Enter when the Yes option is displayed will load the Default Factory settings.

6.8.4 PASS PROTECT

This parameter enables and disables the unit's password protection. When password control is enabled, set to YES, a password is required to change any parameter settings.

The password is a 4-letter code entered through use of the knob ↑ / ↓ and Enter.

Without the proper password, parameters are only viewable. Once a valid password is entered, the actuator will accept a change. If more than one parameter is to be modified, the next parameter must be accessed within 30 seconds of storing the previous parameter or the password will need to be reentered. Setting this parameter to NO disables the password protection.

6.8.5 SET PASS

This allows the customer to set their own password on the unit through the knobs. The password is a four letter code.

Each of the four code letters may be set from A to Z by using the ↑ / ↓ selector to scroll through choices and then selecting Enter to lock in the selection. As the new password is entered it is shown on the screen so the user can verify that they have entered it correctly.

6.8.6 ENCODER INIT

Note this procedure invalidates the position configuration of the actuator. If performed improperly or incompletely the changes will allow the actuator to run out of its expected range which could cause damage to the actuator and/or to the devices to which it is connected. This procedure should only be run in the event that the control board or feedback device has been replaced.

Software Setup

The GPSA is a precision actuator using a feedback device to determine its position. The feedback devices are individually calibrated to the actuator in which they are used during production at our factory. In the unlikely event that the control board or feedback encoder needs to be replaced, they will need to be recalibrated as a pair. It is a simple procedure but it is important to ensure that once performed, the output position of the actuator is also recalibrated to ensure safe and proper operation on the unit.

Selecting Enter will start the encoder recalibration procedure. The operator will then be asked if they want to recalibrate the encoder. If Enter is selected, the user will then be asked "ARE YOU CERTAIN". Again, selecting Enter will proceed with the calibration. The user is then directed to run the actuator to its center position. The arrow knob will position the actuator. The plate covering the output shaft should be removed by unscrewing the 6 screws which hold it in place. Adjust the actuator so that the position indicator knob on the output shaft aligns with the middle two screw holes that held the cover plate in place. Up until this point (before this selection of Enter), Cancel may be selected and no change will be made to the actuator. Once the unit is positioned properly selecting Enter will calibrate the encoder to the actuator's center position. A flashing message is then displayed to remind the operator that they must recalibrate the output position of the unit. The encoder is now calibrated and the cover plate should be replaced.

IMPORTANT: It is now required to recalibrate the actuators output position via either the Zero-Span or Characterize calibration procedures. Failure to recalibrate the actuators output position could cause damage to the actuator and/or to the equipment to which it is connected.

6.8.7 INVERT DISP

This parameter allows the display to be "inverted" should the actuator be installed in a way that would result in the display being upside down. Setting this parameter to YES will rotate the display 180 degrees.

6.8.8 LANG SELECT

This parameter selects the display language used by the actuator. A selection of English, Spanish, French or German may be chosen.

7 STATUS

7.1 ALARMS

There are several conditions which will trigger an alarm on the actuator. An alarm state is denoted by the icon of a bell being displayed in the lower left hand corner of the display. All alarms are self clearing. Should the condition that caused the alarm no longer exist, the bell icon will be erased.

To see the specific alarm(s) in effect, the user looks at this menu. When this menu is displayed selecting Enter will expand the display to show the current alarms on the lower line of the display. The upper line of the display will now read **ACTIVE ALARMS**. If no alarms are active the lower line of the display will show **NONE**. However, if an alarm is active, the name of the alarm is shown. It is possible that more than one alarm may be active. Use the ↑ / ↓ knob to scroll through the list of active alarms. Possible alarms that may occur are:

- Stall
- Loss of Remote Set Point Signal
- Loss of Feedback Position Signal
- Loss of Command Signal
- Loss of Process Variable Signal
- Process Variable High
- Process Variable Low
- Set Point Deviation High
- Set Point Deviation Low
- Command Low

7.2 FAULT HISTORY

This is a circular listing of the last 10 faults that have occurred in the actuator. The faults messages are preceded with a number indicating where in the history each fault occurred. 0 indicates the most recent error; a 1 is the error that occurred before error 0 and so on. The numbers increase as one looks back into the fault history of the unit. A total of 10 faults are stored. If this capacity is exceeded, the oldest error is removed from the list and the most recent is added to it.

7.3 AMP TEMP

This is the current temperature of the unit in degrees °C

7.4 ACT STATUS

This is a code to show the current state of the actuator.

7.5 ACT STARTS

This is the number of times since the last power up cycle that the actuator has been moved in either direction. This value is not stored in permanent memory and is reset to zero upon each amplifier power cycle.

7.6 AMP STARTS

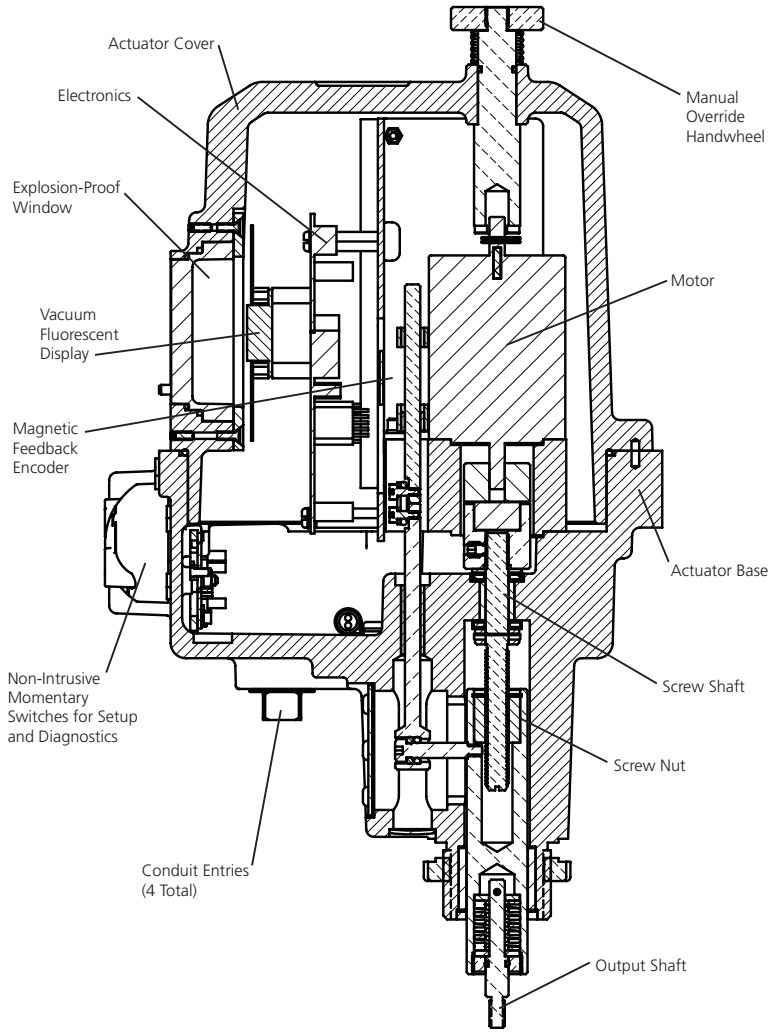
This is the number of times that the amplifier has been powered up. This count is saved in permanent memory.

7.7 SOFTWARE VER

This is the version number of the software that is currently loaded into the actuator. It is not user adjustable.

Linear Component Identification

LINEAR COMPONENT IDENTIFICATION

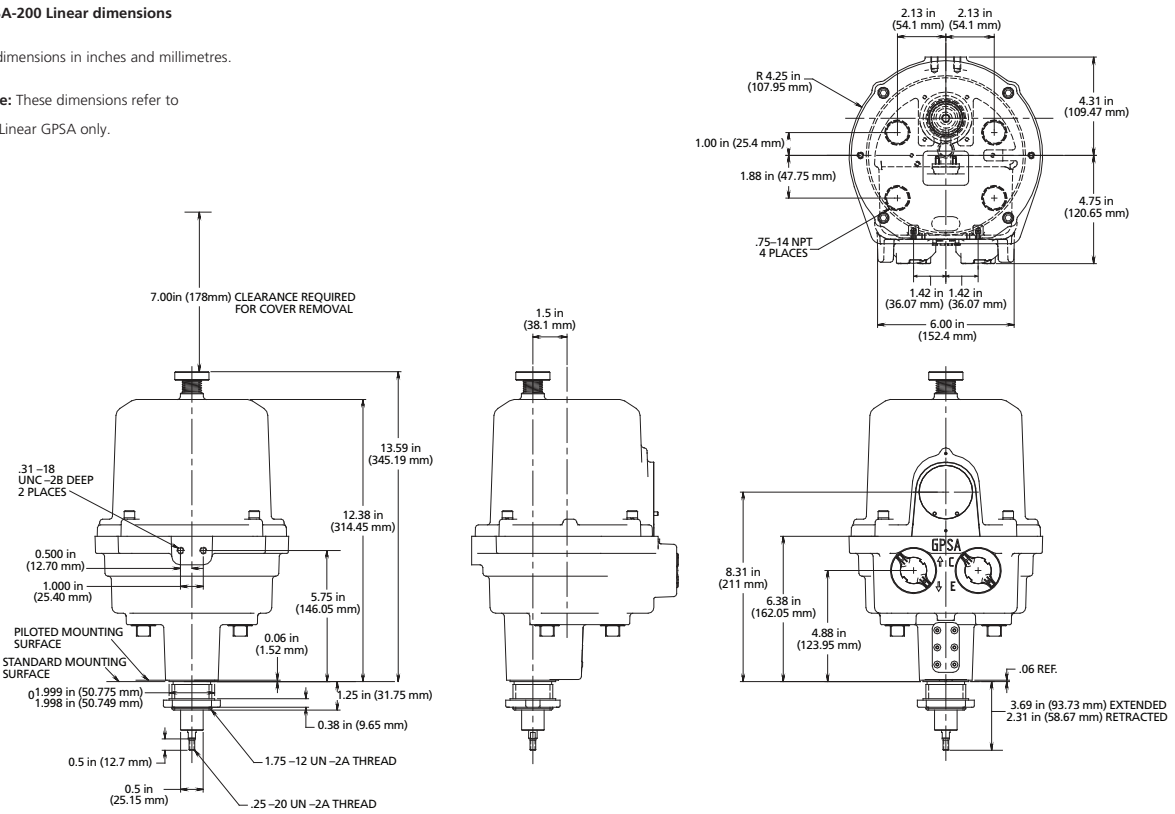


Linear Dimensions

GPSA-200 Linear dimensions

All dimensions in inches and millimetres.

Note: These dimensions refer to the Linear GPSA only.



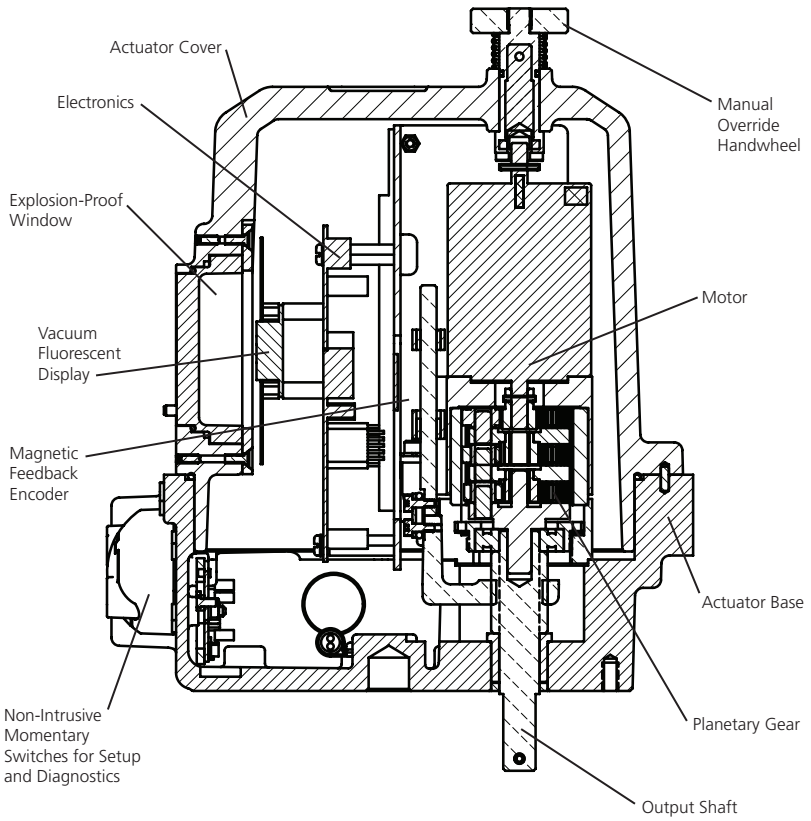
These dimensions are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. For current installation manuals and other product information, see www.rotork.com

Specifications

Model	Single Phase Voltage	Motor Type	DC	Enclosure Certification	Max Force/ Torque	Min Force/ Torque	Speed	Stroke Length/ Rotation	Manual Override	Operating Temp.	Weight
GPSA-200 Linear	120/240	Stepper	Y	IP65; ATEX; FM	200 lbf. (890 N)	100 lbf. (445 N)	0.25"/sec (6.35 mm/sec)	1.375" (35 mm)	Yes	-4 to 150 ºF (-20 to 65 ºC)	16 lbs. (7.25 kg)

Rotary Component Identification and Dimensions

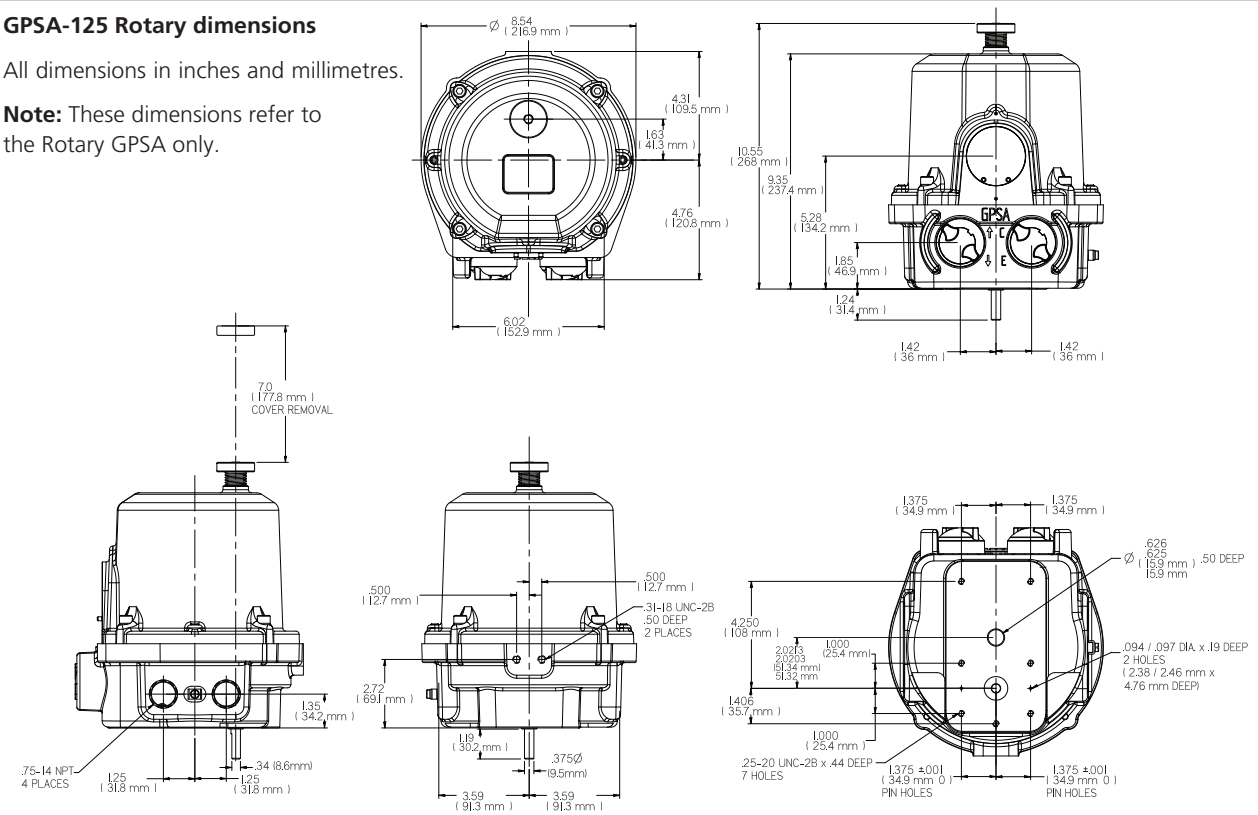
Rotary Component Identification



GPSA-125 Rotary dimensions

All dimensions in inches and millimetres.

Note: These dimensions refer to the Rotary GPSA only.



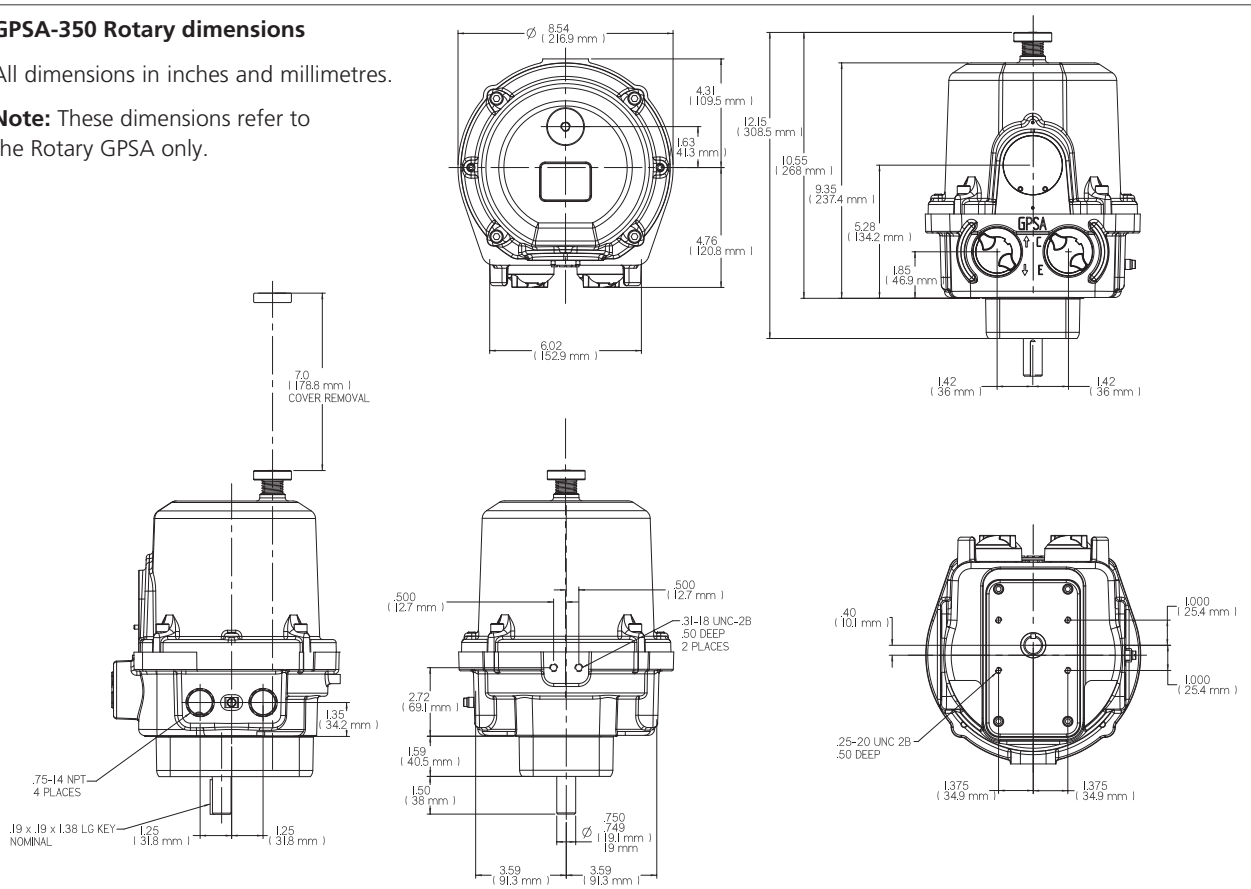
rotork® Process Controls

Rotary Dimensions

GPSA-350 Rotary dimensions

All dimensions in inches and millimetres.

Note: These dimensions refer to the Rotary GPSA only.

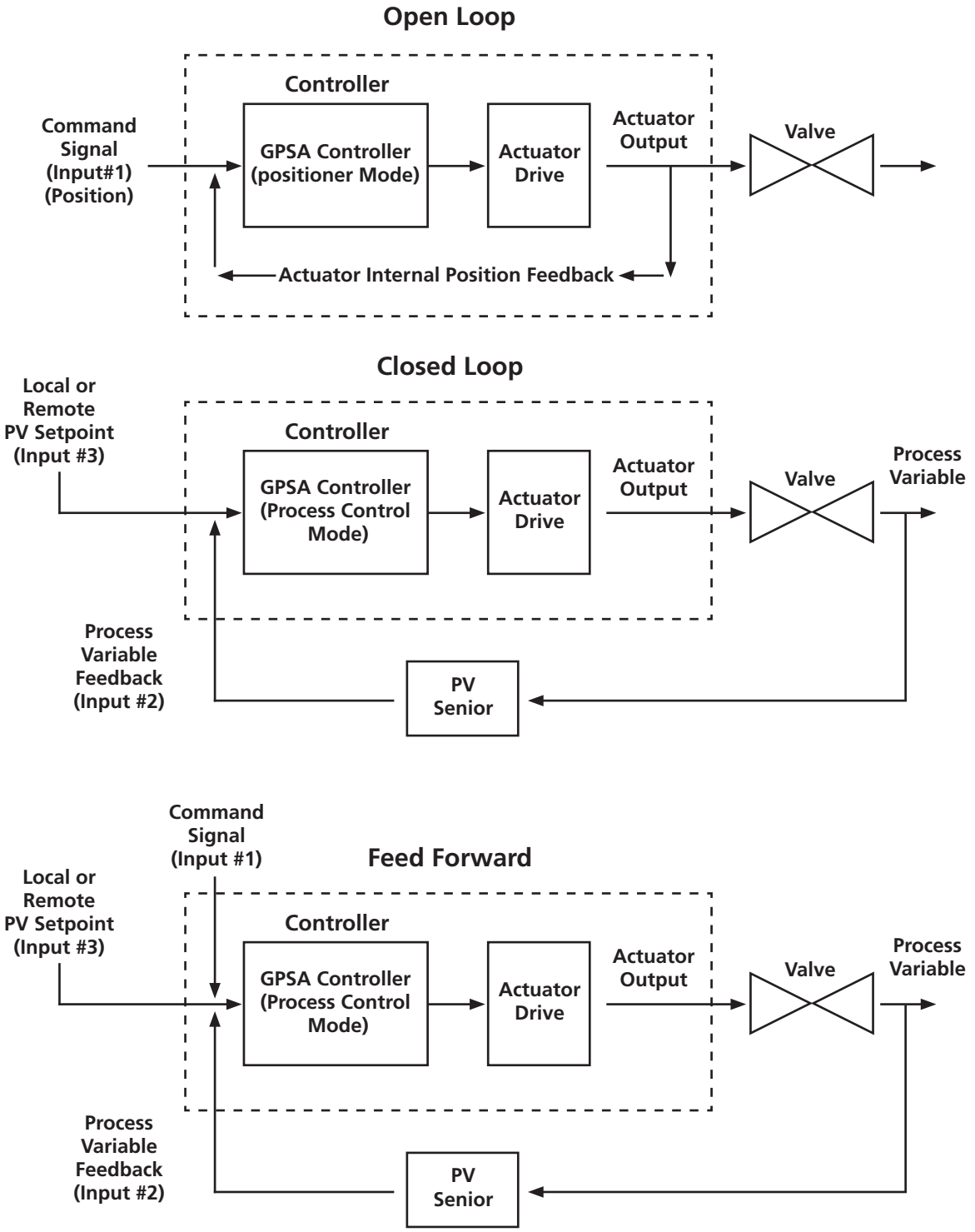


These dimensions are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. For current installation manuals and other product information, see www.rotork.com

Specifications

Model	Single Phase Voltage	Motor Type	DC	Enclosure Certification	Max Force/ Torque	Min Force/ Torque	Speed	Stroke Length/ Rotation	Manual Override	Operating Temp.	Weight
GPSA-125 Rotary	120/240	Stepper	Y	IP65; ATEX; FM	125 lbf.in (14.1 Nm)	85 lbf.in (10 Nm)	3 RPM	20 turns	Yes	-4 to 150 °F (-20 to 65 °C)	16 lbs. (7.25 kg)
GPSA-350 Rotary	120/240	Stepper	Y	IP65; ATEX; FM	350 lbf.in (40 Nm)	85 lbf.in (10 Nm)	0.6 RPM	4.25 turns	Yes	-4 to 150 °F (-20 to 65 °C)	16 lbs. (7.25 kg)

Control Schemes



Faults & Troubleshooting

Trouble	Possible Cause	Remedy
Actuator will not power up. No display.	a. No or low input power. b. Unit wired incorrectly.	a. Verify input power is between 100 and 250 VAC. b. Reference wiring diagram and ensure unit is wired properly.
Unit will not respond to command input.	a. Command is wired to incorrect input. b. Command signal is configured incorrectly. c. Incorrect control mode is selected.	a. Ensure command is wired to appropriate input. b. Ensure proper command signal is configured (mA or Volts) through S1-S3. c. Ensure the correct control mode is selected.
Unit will not stroke to desired location.	a. Incorrect command signal sent. b. Calibration of actuator is incorrect. c. Actuator is physically prevented from moving to desired location.	a. Verify that the correct command signal is being sent. b. Repeat calibration procedure to ensure proper calibration. c. Ensure there are no mechanical interfaces within the valve.
Actuator chatters in operation.	Approaching the maximum output thrust of the actuator.	Determine the cause of the excessive load and remove.
Actuator hunts in operation.	a. Command signal is oscillating. b. Noise is present on command signal. c. Process variable is driving changing actuator position.	a. Verify command signal is not oscillating. Determine cause if present. b. Verify proper shielding is present, check for noise on command signal. c. Monitor the process variable feedback to determine if it is inducing the change.
Actuator delays before responding to a command change.	CMD DAMP parameter is set too high.	Verify the CMD DAMP parameter is set correctly.
Relay signal not received at control.	a. Relay not configured to trip on desired event. b. Wiring to relay is incorrect. c. Unit is not in condition to trigger event.	a. Verify proper software event configuration. b. Verify correct wiring. c. Verify unit is in condition to trigger event.
Inputs not responding to discrete signals.	a. Input not configured to trip desired event. b. Wiring to input is incorrect. c. Input not present.	a. Verify proper trigger event for input. b. Verify unit is wired correctly. c. Verify input is present.
Position transmitter is not functioning.	a. Loop/Internal power mode is incorrectly configured. S4 is incorrectly set. b. Unit is wired incorrectly.	a. Verify proper power mode is configured through S4. b. Reference wiring diagram and ensure unit is wired properly.

Hazardous Locations

NOTE: This section covers actuator installation in Hazardous locations. All guidelines must be followed except when specifically noted.

WARNING - SHOCK HAZARD

- EXPLOSION PROOF and DUST-IGNITION PROOF ACTUATORS are not explosion proof or dust-ignitionproof until final installation is complete. Hazardous location enclosures must be installed in accordance with The National Electric Code requirements as well as state and local codes.
- Actuators must be installed in accordance with IEC/EN 60079-14, Electrical apparatus for explosive atmospheres, Part 14. Electrical installations in hazardous areas (other than mines).
- Do not open while energized.
- Do not open while in flammable gas or dust atmosphere.

ENVIRONMENT

Standard Voltages:

100 - 250 VAC @ 43 VA
24 VDC @ 36 VA

Temperature Limits:

-22 to 140 °F (-30 to 60 °C)

Vibration Limits:

4 - 15 Hz @ 0.5 ± 0.1 mm amplitude max.

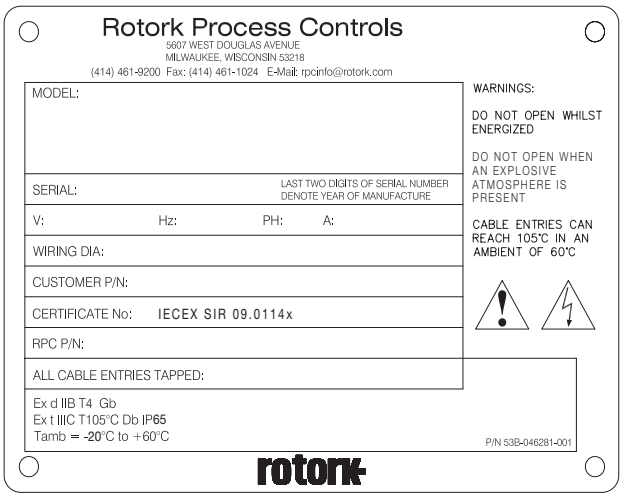
Altitude:

Up to 16,404 ft. (5000ww m) above mean sea level.

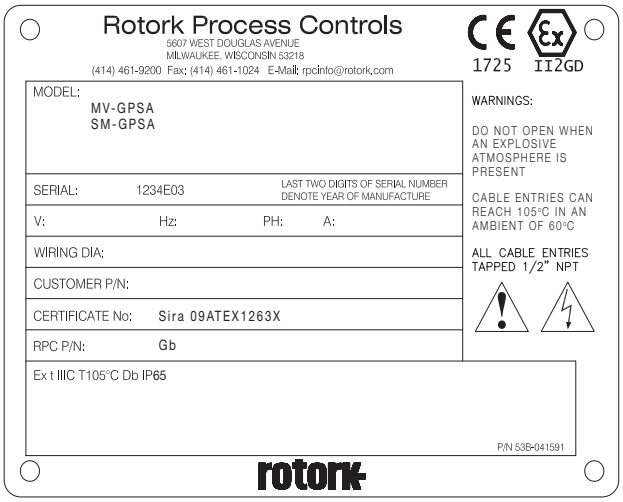
IDENTIFICATION LABEL

An identification label is attached to each actuator. When ordering parts, requesting information or service assistance, please provide all of the label information.

IECEX LABEL



ATEx LABEL



Hazardous Locations

HAZARDOUS RATINGS

ATEX Ⓔx II 2 GD

Ex dIIB T4 Gb, Ex tIIIC T105 °C Db IP65
(Ta = -20 to 60 °C)

IECEx- IP65

Ex dIIb T4 Gb

Ex tIIIC T 105 °C Db IP65

Tamb -20 to 60 °C

Actuator Characteristics relating to the hazardous environment:

- The actuator was designed in accordance to 94/9/EC
- The actuators are manufactured from aluminium alloy with stainless steel shafts and oilite bronze bushes and carbon steel fasteners.
- The lid securing screws must be steel quenched and tempered SAE grade 8 or optional stainless steel. Stainless steel property class A4-80.
- All external seals are manufactured from Nitrile which is suitable for use in an ambient temperature range of -40 to +85 °C.
- The user must insure that the operating environment and any materials surrounding the actuator cannot lead to a reduction in the safe use of, or the protection afforded by, the actuator.
- Where appropriate, the user must ensure the actuator is suitably protected against its operating environment.
- The window had passed the Resistance to Impact test at a value related to the low risk of mechanical danger. This shall be taken into account by the user during installation and the equipment shall only be installed where there is a low risk of mechanical danger.

INSTALLATION

Installation should be carried out by a competent person in accordance with IEC/EN 60079-14, Electrical apparatus for explosive atmospheres, part 14 (electrical installations in hazardous areas other than mines).

- Where cables enter the unit, suitably certified and appropriate cable glands or conduit entries must be used.
- All unused cable entry points must be sealed with a suitable certified and appropriate blanking element.
- Must use certified cable or conduit entries. Also the blanking of unused cable entry points must be done with suitable certified blanking elements.
- The lid securing screws must be steel quenched and tempered SAE grade 8 or optional stainless steel. Stainless steel property class A4-80.

MAINTENANCE

- Rotork Process Controls actuators are maintenance free. It is recommended that you remove the cover and visually inspect the actuator on an annual basis.
- Maintenance must be performed only by qualified personnel. Voltages hazardous to your health are applied to these actuators. De-energize all sources of power before removing actuator cover. Failure to follow these precautions may result in serious injury or death. ATEX approved actuators must be repaired and overhauled in accordance with IEC/EN 60079-19, Electrical apparatus for explosive atmospheres, Part 19. Repair and overhaul for apparatus used in explosive atmospheres (other than mines).
- Lubrication: The gearing is permanently lubricated. Re-lubrication is only required during repairs to the power gearing. The bronze bushings are lubricated with a few drops of SAE-10 or 20 NON-DETERGENT oil. Re-lubricate when repairs are made.

In accordance with Clause 5.1 of IEC EN60079-1, the critical dimensions of the flame paths are:

	Models (Rotary or Linear)	Maximum Gap (in.)	Maximum Gap (mm)	Minimum Length (in.)	Minimum Length (mm)
Enclosure Lid / Base	Both	0.006	0.15	1.069	27.15
Output Shaft / Bushing	Linear Rotary	0.003 0.003	0.08 0.08	0.620 0.720	15.75 18.29
Powered Handknob Shaft / Bushing	Both	0.003	0.08	0.620	15.75
Powered Handknob Bushing / Enclosure Lid	Both	-0.0005	-0.01	0.492	12.50
Output Shaft Bushing / Base	Linear Rotary	-0.0005 -0.0005	-0.01 -0.01	0.620 0.617	15.75 15.67
Non-Powered Handknob Shaft / Enclosure Lid	Both	0.003	0.08	0.820	20.83
Feedback Shaft / Bushing	Linear	0.003	0.08	1.120	28.45
Feedback Bushing / Base	Linear	-0.0005	-0.01	1.120	28.45

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A full listing of our worldwide sales and service network is available on our website.

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