

Product Manual 35107 (Revision B, 7/2022) Original Instructions



# **Electric Linear Actuator - ELA28**

**Installation and Operation Manual** 



General Precautions Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



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**Proper Use** 

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.



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# **Warnings and Notices**

### **Important Definitions**



This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- DANGER Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
- WARNING Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
- **CAUTION** Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
- NOTICE Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT** Designates an operating tip or maintenance suggestion.

# **MARNING**

Overspeed /
Overtemperature /
Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.



# Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.



Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

# **Regulatory Compliance**

#### **European Compliance for CE Marking:**

These listings are limited only to those units bearing the CE Marking

EMC Directive: Declared to 2014/30/EU COUNCIL DIRECTIVE of 26 February 2014 on the

approximation of the laws of the Member States relating to electromagnetic

compatibility.

ATEX - Potentially Declared to 2014/34/EU COUNCIL DIRECTIVE of 26 February 2014 on the

**Explosive** approximation of the laws of the Member States concerning equipment and **Atmospheres** protective systems intended for use in potentially explosive atmospheres.

**Directive:** Zone 2: II 3 G, Ex ec IIC T3 Gc

### Other European Compliance:

Compliance with the following European Directives or standards does not qualify this product for application of the CE Marking:

ATEX: Exempt from the non-electrical portion of the ATEX Directive 2014/34 due to no

potential ignition sources per EN ISO 80079-36:2016 for Zone 2 installation.

Machinery Compliant as partly completed machinery with Directive 2006/42/EC of the

**Directive:** European Parliament and the Council of 17 May 2006 on machinery.

RoHS Directive: Restriction of Hazardous Substances 2011/65/EU:

Woodward Turbomachinery Systems products are intended exclusively for sale and use only as a part of Large Scale Fixed Installations per the meaning of Art.2.4(e) of directive 2011/65/EU. This fulfills the requirements stated in Art.2.4(c) and as such the product is excluded from the scope of RoHS2.

### **Other International Compliance:**

**IECEx:** Certified for use in hazardous locations

IECEx CSA 18.0038X Ex ec IIC T3 Gc

#### **North American Compliance:**

These listings are limited only to those units bearing the CSA mark.

CSA: CSA Certified for Class I, Division 2, Groups A, B, C, & D, T3 at 121°C Ambient.

For use in Canada and the United States. Certificate 70010175



Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

**Explosion Hazard** 

Substitution of components may impair suitability for Class 1 Division 2 or Zone 2 applications.



Risque d'explosion

Ne pas enlever les couvercles, ni raccorder / débrancher les prises électriques, sans vous en assurez auparavant que le système a bien été mis hors tension; ou que vous situez bien dans une zone non explosive.

La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe 1, Division 2 et/ou Zone 2.

### **Special Conditions for Safe Use**

Wiring must be in accordance with North American Class I, Division 2, or European or other international Zone 2, Category 3 wiring methods as applicable, and in accordance with the authority having jurisdiction.

Use supply wires suitable for at least 10°C above surrounding ambient. Cables supplied through Woodward fulfill this requirement.

Compliance with the Machinery Directive 2006/42/EC noise measurement and mitigation requirements is the responsibility of the manufacturer of the machinery into which this product is incorporated.

In order to ensure that the actuator meets the Ingress Protection rating that is appropriate for its application, the User/Installer shall fit the receptacles with mating connectors; in addition, these connectors must be ones recommended by this manual.

The equipment shall only be used in an area of pollution degree 2, as defined in IEC 60664-1.

Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.

# Chapter 1. General Information

The ELA21 actuation system consists of an electronically controlled linear actuator and a digital electronic positioner (DVP) for position control on industrial turbine applications. The digital positioner and actuator combination are capable of precisely positioning the actuator to follow the setpoint signal from the turbine control system. The actuator position is controlled by regulating current to a 3-phase brushless DC motor, which converts the rotary motion to linear motion via a gear reduction system and lead-screw.

Redundant resolver rotary position transducers are used to sense motor shaft position for commutation and velocity feedback to the digital positioner. Should one resolver fail, the positioner will revert to the working sensor to maintain operation.

The Woodward Electric Linear Actuator (ELA) includes the following major sub-assemblies:

- A highly reliable brushless DC motor
- A high load capacity roller screw, driven by a spur gear train
- Dual motor resolvers for motor commutation and primary position feedback
- An LVDT for independent positioning verification

The Woodward ELA design offers the following benefits to the purchaser in comparison to other electric actuators:

- The actuator and model-based controller provide the accuracy, bandwidth and slew times required for precise control of the guide vanes. No dynamic tuning is necessary during installation or operation.
- The highly capable electronic positioner provides comprehensive diagnostic and communication functions. These features minimize installation and replacement times, and improve system maintainability.
- The Woodward actuator is designed to provide high force consistent with heavy industrial equipment.
   All power train and electronic components are designed with conservative design margins for high reliability. The simple and robust design is capable of consistent performance for extended periods in challenging environments.
- The actuator and digital positioner have been designed to achieve extended Mean Time Between Overhaul goals. These targets have been reached through the conservative rating of parts and the careful analysis of individual component and system performance.
- Integrated into each actuator is an Identification Module (ID module). This ID module holds unit
  specific information for the actuator assembly (i.e. stroke, gear ratio, motor characteristics, and
  position transducer calibration). The digital positioner electronically queries the ID module every time
  it is powered up. This provides for quick and error free initialization of a new actuator or digital
  positioner.
- The electronic position controller provides for dual power inputs, and options for redundant digital interfaces for improved reliability.

The ELA21 actuation system documentation consists of three manuals

- ELA21 Electric Linear Actuator Installation and Operation Manual 35107
  - Contains information relevant to the ELA21 Electric Linear Actuator including specifications, installation requirements, and maintenance requirements.
- DVP Installation and Operation Manual 26329
  - o Contains information relevant to the DVP including specifications, requirements, installation and wiring instructions, CANopen settings, and troubleshooting.
- Service Tool (Software) Manual 26912
  - Contains information relevant to the service tool including fault status information, alarm settings, position filtering, and DVP software configuration.

# Chapter 2. **Specifications**

Table 2-1. ELA Specifications

Model Name	ELA 21
Туре	Electric Mechanical Actuator (EMA)
Duty Cycle	Continuous
Stroke Range	120.95mm
Peak Force (0.5 seconds) *	21kN (4,720 lbf)
Stall Force (1.0 second hold) *	21kN (4,720 lbf)
Continuous Application Force *	12.2kN (2,750 lbf)
Speed Under Opposing Load	3.5sec. (5%-95% with 0%-100% Command), 4.0 sec (0%-100% full stroke)
Max Speed @ Zero Force	3.5sec. (5%-95% with 0%-100% Command), 4.0 sec (0%-100% full stroke)
Max Motor Input Current Rating (Controlled by DVP)	12A
Input Voltage (to DVP)	90-150 VDC absolute min/max *Loss of performance below 118 VDC
Input Current (to DVP)	8A maximum for 10 seconds, 3A continuous (2A typical)
Accuracy	+/- 0.25 mm
Repeatability Range	+/- 0.25 mm
Dynamic Bandwidth**	>2.4Hz with +/- 2% Amplitude, -3dB, <90 degree phase loss
Design Life	20 Years with overhauls at 48,000 hrs. (annual lubrication required)
MTBF	122,550 hours with 90% confidence at rated load with 0.06 Hz ± 0.015mm (0.006inch) demand and annual maintenance
Fail-safe Actuation	Loss of demand signal: Position to 0% Loss of motor power on both actuators: Free (no mechanical spring return, or internal brake)
Rated Ambient Operating Temperature	-40 to 121°C (-40 to 250°F)
Normal Ambient Operating Temperature	-18 to 121°C (0 to 250°F)
Storage Ambient Temperature	-40 to 121°C (-40 to 250°F)
Rated Operating Elevation	3000 m (9843 ft.)
IP Rating (per IEC 60529, IEC 60079-0)	IP55
Altitude Rating (per IEC 61010-1)	3000 m (9843 ft)
Vibrations (validation)	MIL-STD 810F, M514.5A, Cat. 4, Truck/Trailer tracked-restrained cargo, Fig. 514.5-C1 .015G²/Hz 10-500 Hz 1.04 2 Hrs/axis. Transverse level for all three axis.
Shock (validation)	MIL-STD 810F, Method 516.5, Procedure 1., 10 G Peak, 11 ms
Envelope and Mounting	See Installation Drawings
Actuator Weight	135 lbs.

<sup>\*</sup> Actuator output forces will be reduced below normal ambient operating temperature range due to increased grease viscosity at cold temperatures
\*\* Dynamic performance can be influenced by the customer filter settings. Values assume additional

customer settings are turned off

# **DVP Specifications**

The ELA requires the Digital Valve Positioner (DVP). Refer to DVP manual 26329 for specifications and additional information on the operation and configuration of the DVP.

# Chapter 3. Installation Requirements

### Introduction



External fire protection is not provided in the scope of this product. It is the responsibility of the user to satisfy any applicable requirements for their system.

External Fire Protection



Do not connect/disconnect electrical connectors unless power is off or the area is known to be non-hazardous.

**Explosion Hazard** 



Due to typical noise levels in turbine (or engine) and environments, wear hearing protection when working on or around the ELA.

**Hearing Protection** 

This chapter provides the general information for mounting location selection, installation, and wiring of the ELA actuator. For DVP installation instructions, see the DVP manual 26329.

## **Mechanical Installation Requirements**

### Unpacking

Use care when unpacking the ELA. Abuse can damage seals, installation surfaces, and factory adjustments. Notify the shipper and Woodward when you find damage.

Check for and remove all manuals, connectors, mounting screws, and other items before discarding the shipping box.

### Lifting



**Crushing Hazard** 

Carefully review the lifting diagram (Figures 3-1 and 3-2) for lift locations, weight, and center of gravity before moving the ELA. Do not lift or handle the actuator by electrical connections. The significant weight of the actuator poses a crushing hazard that could result in personal injury or death.

Woodward recommends lifting straps around the base of the motor and the large cylinder. See Figures 3-1 and 3-4 for location of center of gravity.



PROTECT ELECTRICAL CONNECTORS. Electrical connector damage is the most common damage that occurs during lifting and installation of the ELA.

**Note:** Do not place any force or lift by the LVDT rod housing, or the LVDT cover bracket. Damage will occur when lifted at these locations.

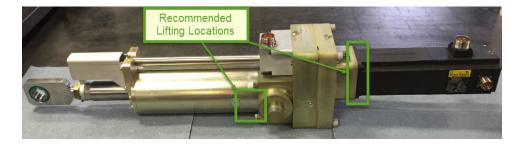


Figure 3-1. Recommended Lifting Strap Locations



Figure 3-2. LVDT Rod Housing and LVDT Cover Bracket

### Mounting

- 1. Once the ELA is moved to the turbine frame, it should be placed in the final location using a crane or other suitable lifting equipment connected to the lifting straps
- 2. Lower the ELA carefully into position, until the trunnion mount is centered in all directions. Make all connections to the trunnion mount.
- 3. Move the ELA shaft spherical bearing mounting point to align with the turbine linkage and/or adjust the turbine linkage as necessary until the upper connecting pin fits easily in the bearing mount.
- 4. When the actuator is securely mounted, remove the lifting brackets and fasteners prior to use.

The actuator is shipped in the fully retracted 0% command position as shown in Figures 3-4 and 3-6 for ease in assembly.

**Note:** When first turned on and reset the actuator will home to its fully retracted hard stop then move to the position commanded by the user through the settings in the DVP.

### **Drawings**

The figures that follow show dimensions of the actuator.

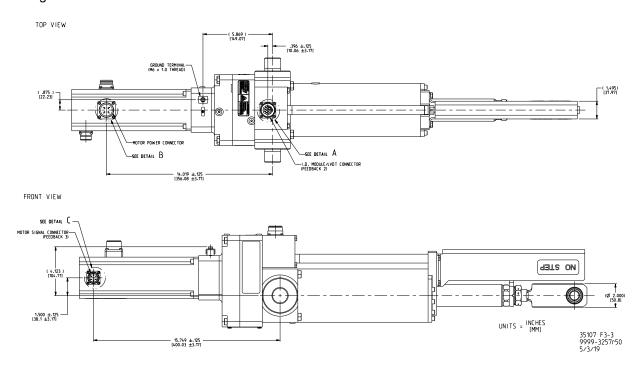


Figure 3-3. Outline Drawing Part 1 of 4

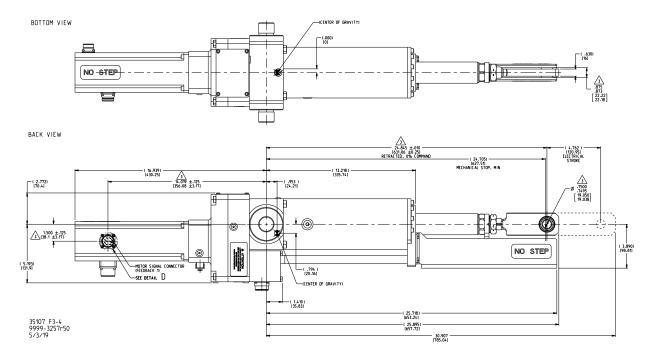


Figure 3-4. Outline Drawing Part 2 of 4

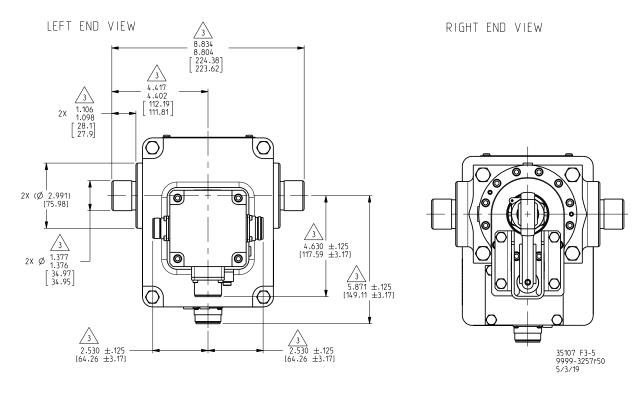


Figure 3-5. Outline Drawing Part 3 of 4

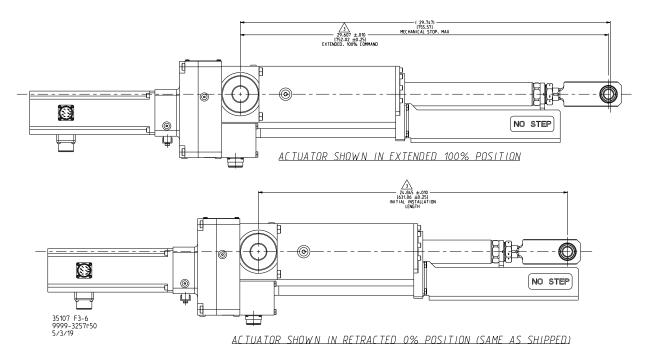


Figure 3-6. Outline Drawing Part 4 of 4

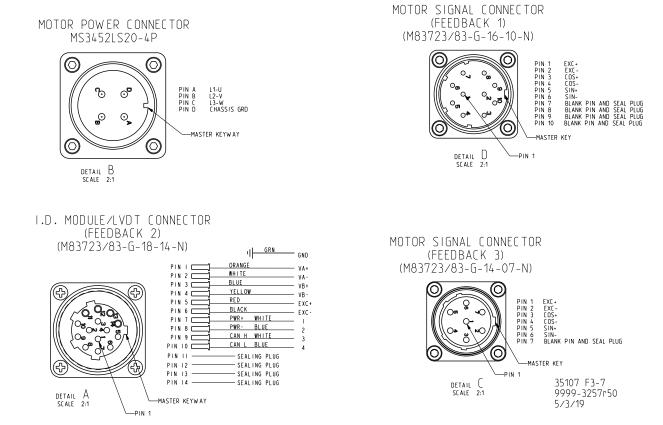


Figure 3-7. Cable Connectors

## **Electrical Installation Requirements**



**DVP Instructions** 

Refer to DVP manual 26329 for critical installation instructions and warnings that may pertain to its EMC or Hazardous Locations certifications. The following instructions are specific to this actuator only and are meant as a supplement to the general DVP10000 instructions. Failure to do so may result in poor performance, personal injury, or death.

Install all threaded MIL connector cables in accordance with Figure 3-7. Fully tighten (by hand) all mating electrical connectors on the ELA. Loose or cross-threaded connectors may lead to poor electrical connection and impair the IP rating listed in the specification section.

### Shielding Requirements

See DVP manual 26329.

#### Cables

Woodward has prefabricated cables, which can be used, or the customer can manufacture cables to the same standards. The figures below show the cable requirements and Woodward part numbers. Contact Woodward for other cable configuration availability (connectors on both ends, either straight or 90 degree backshell options).

#### Wiring

Connect all wires and protective earth grounds as shown in the wiring diagram (Figure 3-13). The DVP is shipped with mating connectors for all input and output connections. Contact Woodward for availability of DVP with keyed circular connectors.



Protective Earth Grounds

The ELA must be suitably grounded through both the motor power connector to the DVP chassis and the external grounding terminal before power is supplied to the unit. See the installation drawing and wiring diagram (Figures 3-3 and 3-13) as well as manual 26239. Improper grounding may result in a shock hazard on the ELA chassis and any equipment connected, resulting in personal injury or death.

### **Cable Drawings**

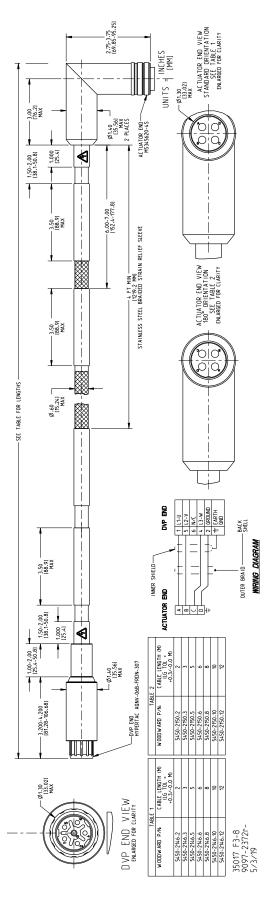


Figure 3-8. Motor Power Cable

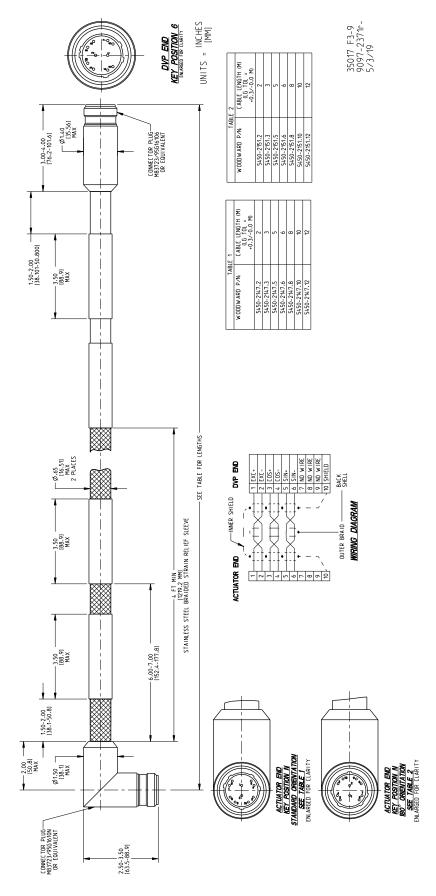


Figure 3-9. Feedback 1 Cable

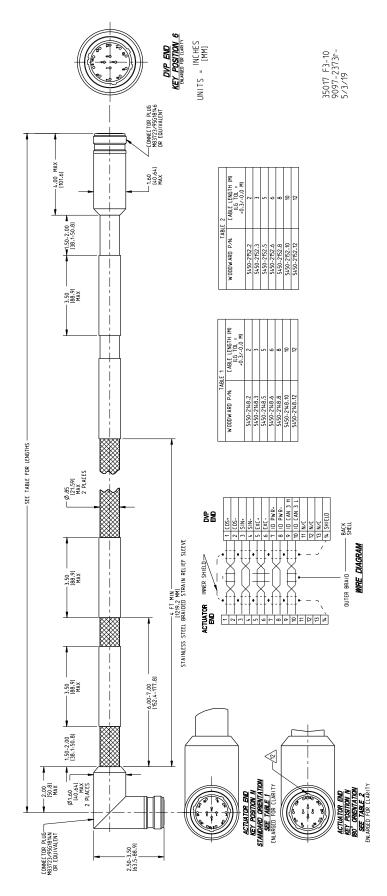


Figure 3-10. Feedback 2 Cable

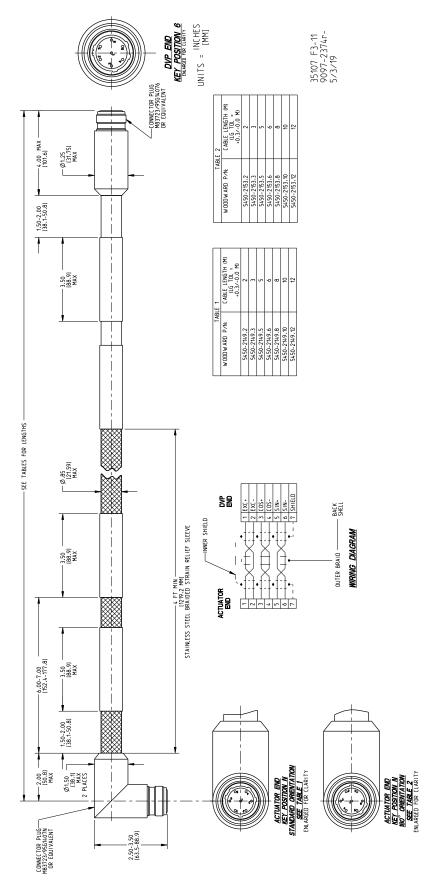


Figure 3-11. Feedback 3 Cable

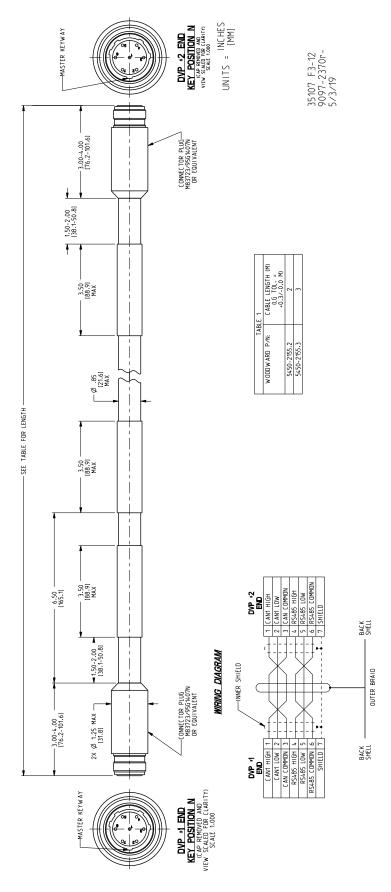


Figure 3-12. DVP to DVP Interlink Cable

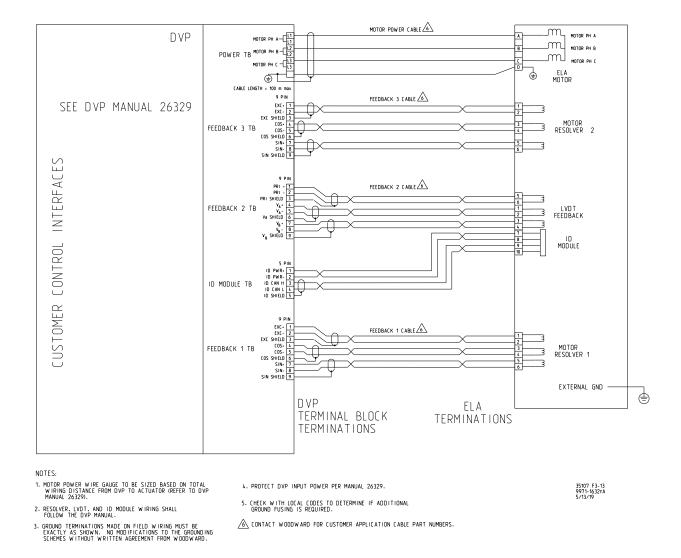


Figure 3-13. Control Wiring and Cable Connections

## **Installation and Commissioning Checks**

Every actuator installation should include, as a minimum, the recommended checks outlined in Table 3-1 below. All prime mover OEM recommendations and all required plant safety checks must always be followed and supersede any recommended actions. It is the responsibility of the end user to ensure all procedures are carried out in a safe manner.

Table 3-1. Installation Checklist (before applying power to the system)

Wiring	Physical/Mechanical Installation	Turbine Control Integration
Protective Earth Grounds /	Actuator and DVP mounting -	Verify independent overspeed
Connectors	torque, vibration isolation	system
Shielding and shield termination	Verify actuator and DVP rating (Environment , Listings)	
Point to point verification	Verify actuator and DVP	
Foint to point verification	protective earth ground	
Wire rating / gauge/ type /		
Impedance		
Wire routing / length/ network		
topology		
Power source—voltage / current		
Power redundancy		
Verify power wire isolation		
Hazardous Location compliance		
CAN termination applied		
correctly		
Communication redundancy		

Table 3-2. Pre-operational Checklist (before actuator installation onto turbine)

- 1. Verify actuator stroke is correctly configured.
- 2. Configure DVP for control system.
- 3. Verify communication of demand and service tool operability.
- Verify fault and diagnostic behavior.
- 5. Visual check of correct actuator movement and stroke length.
- 6. Stroke the actuator to verify demand and feedback from 0–100%.
- 7. Stroke the actuator on the backup demand signal from TCS to verify demand and feedback from 0-100% are same as primary.
- 8. Verify internal shutdown operation and annunciation.
- 9. Verify independent shutdown function and annunciation.
- 10. Recommend demand is 0% at shutdown.
- 11. Verify low demand signal noise.
- 12. Verify voltage at DVP within limits during full actuator step.
- 13. Verify shutdown from safety system including overspeed.
- 14. Document and archive DVP configuration settings.

# **Chapter 4. PC Service Tool Operation**



An unsafe condition could occur with improper use of these software tools. Only qualified personnel should use these tools to modify or monitor the DVP or ELA functions.

Improper Use of Software

The DVP Service Tool is used to configure, monitor, and troubleshoot the DVP and ELA system. For detailed instructions on how to set-up and use the service tool, refer to the service tool manual 26912.

# Chapter 5. Set-up and Operation

### Setting up the DVP and ELA

# NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.



During set-up and verification, it is imperative that the prime mover be shut down and secured. Do not perform set-up or verification on a machine, which is not properly locked out.

Abide by all local codes and plant safety procedures regarding instrument verification and check out prior to operation on the machine.



**DVP Instructions** 

Refer to DVP manual 26329 for critical installation instructions and warnings that may pertain to its EMC or Hazardous Locations certifications. The following instructions are specific to this actuator only and are meant as a supplement to the general DVP instructions. Failure to do so may result in poor performance, personal injury, or death.



Before you begin, install the DVP Service Tool on a laptop or desktop computer. THE DVP SERVICE TOOL MUST BE INSTALLED TO CONFIGURE THE DVP DRIVER.

## **Setting up the DVP and Actuator**

For additional instructions and information regarding the DVP and Service Tool set-up, refer to DVP manual 26329 and Service Tool manual 26912.

## **Pre-start and Operational Checks**

Every actuator installation should include, as a minimum, the recommended checks outlined in Table 5-1 below. All prime mover OEM recommendations and all required plant safety checks must always be followed and supersede any recommended actions. It is the responsibility of the end user to ensure all procedures are carried out in a safe manner.

Table 5-1. Installation, Pre-operational, Pre-start, and Operational Checks

Installation		
	Bef	ore fuel or power is applied to system
		1. Connectors
		Shielding and shield termination
		3. Point to point verification
Wiring		4. Wire rating / gage/ Type
		5. Wire routing / length
		6. Power source - voltage / current
		7. Verify power wire isolation
		<ul><li>8. Power redundancy</li><li>1. Actuator and DVP mounting - torque, vibration isolation</li></ul>
Physical/Mochanical Installati	ion	<b>3</b> 1 /
Physical/Mechanical Installati	IUII	<ol> <li>Verify product rating (Force, Environment, Listings)</li> <li>Verify Actuator and DVP protective earth ground</li> </ol>
Turbine Control Integration		Verify independent overspeed system
Turbine Control Integration		Pre-Operational Checks
		Before Stroking Actuator
Physical/Mechanical	Vei	rify actuator stroke is correctly configured
Installation	• • •	ny dotadior otroko lo oorrootty oormgarou
	1.	Configure DVP for control system
	2.	Verify communication of demand and service tool operability
	3.	Verify fault and diagnostic behavior
	4.	Demand and feedback loop check 0-100%
	5.	Visual check of correct actuator movement and stroke length
	6.	Stroke the actuator to verify demand and feedback from 0-100%
	7.	Stroke the actuator on the backup demand signal from TCS to verify
Turbine Control Integration		demand and feedback from 0-100% are same as primary
		Verify internal shutdown operation and annunciation
		Verify independent shutdown function and annunciation
		Recommend demand is 0% at shutdown
		Verify low demand signal noise
		Verify voltage at DVP within limits during full actuator step
		Verify shutdown from safety system including overspeed
	14.	Document and archive DVP configuration settings
Pre-start  Before Turbine Lightoff		
9	1.	Verify internal shutdown operation and annunciation
	2.	Verify independent shutdown function and annunciation
Turbine Control Integration	3.	Verify shutdown from safety system including overspeed
	4.	Verify actuator current levels are within baseline range
		Operational
Physical/Mechanical	1.	Verify operating temperatures, Actuator and DVP
Installation	2.	Verify maintenance schedule for greasing actuators
	1.	Verify transient performance
<b>Turbine Control Integration</b>	2.	Verify low demand signal noise and DVP input filter setting
-	3.	Verify actuator schedule and emissions compliance

# Chapter 6. Diagnostics



Switch off power prior to removing covers or connect/disconnect electrical connectors or the area is to be non-hazardous.

**Explosion Hazard** 

Substitution of components may impair suitability for Class 1, Division 2, or Zone 2.



Follow all local plant and safety instructions/precautions before proceeding with Troubleshooting the DVP Control.

Electrical Shock Hazard

For a complete listing of DVP diagnostics, see the Digital Valve Positioner manual, part number 26329. For additional information also refer to Service Tool manual 26912

# Chapter 7. Maintenance and Hardware Replacement

### **Maintenance**

The only maintenance required for the ELA is lubricating the roller screw, gears, and bearings 12 months, in accordance with the descriptions below.

At 48,000 hours of run time, remove the actuator from service and return to the factory to have the actuator overhauled. Internal components are not serviceable in the field.

Should the actuator become inoperative, refer to Chapter 8 for return instructions. Do not attempt to service any part of the unit. Please refer to the below service programs when returning products.



Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous

**Explosion Hazard** 

Substitution of components may impair suitability for Class 1, Division 2 or Zone 2 applications.



To prevent possible serious personal injury, or damage to equipment, be sure all electric power, hydraulic pressure, and gas pressure have been removed from the actuator before beginning any maintenance.



Lift or handle the actuator only by using the specific lifting locations as noted on the installation drawing. The product weight is stated in the Specifications Section.



Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the Electric Actuator.



Never put your hands near the output shaft. There are moving components with sharp edges, tight clearances, and large closing forces. Actuator position should only be verified by using the visual position indicator on the side of the actuator clevis.



The surface of this product can become hot enough or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.

To facilitate field replacement of items, spare parts should be kept on-site. See the outline drawings for the locations of items. Contact Woodward for a complete list of field-replaceable parts and additional instructions for their replacement.

## **Lubrication Procedure**



Use only Woodward-approved grease to lubricate the roller screw, gears and bearing in this actuator. Use of any other grease will reduce performance and reliability. Woodward lubrication kits are available.

See B35128 for lubrication instructions

# Chapter 8. Product Support and Service Options

### **Product Support Options**

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see "How to Contact Woodward" later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

**OEM or Packager Support:** Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

**Woodward Business Partner Support:** Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An Authorized Independent Service Facility (AISF) provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.

A current list of Woodward Business Partners is available at www.woodward.com/directory.

## **Product Service Options**

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

**Replacement/Exchange:** Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

**Flat Rate Repair:** Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

**Flat Rate Remanufacture:** Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in "like-new" condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

### **Returning Equipment for Repair**

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- Return authorization number
- Name and location where the control is installed
- Name and phone number of contact person
- Complete Woodward part number(s) and serial number(s)
- Description of the problem
- Instructions describing the desired type of repair

### Packing a Control

Use the following materials when returning a complete control:

- Protective caps on any connectors
- Antistatic protective bags on all electronic modules
- Packing materials that will not damage the surface of the unit
- At least 100 mm (4 inches) of tightly packed, industry-approved packing material
- A packing carton with double walls
- A strong tape around the outside of the carton for increased strength



To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules.

## **Replacement Parts**

When ordering replacement parts for controls, include the following information:

- The part number(s) (XXXX-XXXX) that is on the enclosure nameplate
- The unit serial number, which is also on the nameplate

## **Engineering Services**

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

**Technical Support** is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

**Product Training** is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

**Field Service** engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website: www.woodward.com.

## **Contacting Woodward's Support Organization**

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory at <a href="https://www.woodward.com">www.woodward.com</a>, which also contains the most current product support and contact information.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used in		
<b>Electrical Power Systems</b>		
FacilityPhone Number		
Brazil+55 (19) 3708 4800		
China +86 (512) 8818 5515		
Germany:+49 (711) 78954-510		
India+91 (124) 4399500		
Japan+81 (43) 213-2191		
Korea+82 (32) 422-5551		
Poland+48 (12) 295 13 00		
United States+1 (970) 482-5811		

Engine Systems		
FacilityPhone Number		
Brazil+55 (19) 3708 4800		
China +86 (512) 8818 5515		
Germany +49 (711) 78954-510		
India+91 (124) 4399500		
Japan+81 (43) 213-2191		
Korea+ 82 (32) 422-5551		
The Netherlands+31 (23) 5661111		
United States+1 (970) 482-5811		

Products Used in

Products Used in Industrial Turbomachinery Systems
FacilityPhone Number
Brazil+55 (19) 3708 4800
China+86 (512) 8818 5515
India+91 (124) 4399500
Japan+81 (43) 213-2191
Korea+ 82 (32) 422-5551
The Netherlands+31 (23) 5661111
Poland+48 (12) 295 13 00
United States+1 (970) 482-5811

## **Technical Assistance**

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General	
Your Name	
Site Location	
Phone Number	
Fax Number	
Prime Mover Information	
Manufacturer	
Turbine Model Number	
Type of Fuel (gas, steam, etc.)	
Power Output Rating	
Application (power generation, marine, etc.)	
Control/Governor Information	
Control/Governor #1	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Control/Governor #2	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Control/Governor #3	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Symptoms	
Description	

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

# Chapter 9. Long-Term Storage Requirements

Units that will not be put into service within twelve months should be packaged for long-term storage as described in Woodward manual 25075, Commercial Preservation Packaging for Storage of Mechanical-Hydraulic Controls.

Woodward recommends performing the Roller Screw and Bearing Lubrication procedures (see Chapter 7) prior to installing the unit for optimum performance.

# **Revision History**

### Revision B—

• Updated DoC and Dol in Declarations section

#### Revision A—

- Revised ATEX PED in Regulatory Compliance section
- Added RoHS Directive to Regulatory Compliance section
- Removed IP55 from IECEx in Regulatory Compliance section
- Added IEC 60079-0 to IP Rating in Table 2-1
- Replaced Declarations

## **Declarations**

#### EU DECLARATION OF CONFORMITY

EU DoC No.: 00517-EU-02-03

Manufacturer's Name: WOODWARD INC.

Manufacturer's Contact Address: 1041 Woodward Way

Fort Collins, CO 80524 USA

Model Name(s)/Number(s): ELA2

The object of the declaration described above is in conformity with the following relevant Union harmonization legislation:

Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive

atmospheres

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating

to electromagnetic compatibility (EMC)

Markings in addition to CE marking:

(Ex) II 3 G, Ex ec IIC T3 Gc

Applicable Standards:

EN 60079-0 :2018 - Explosive atmospheres - Part 0: Equipment - General

requirements

EN 60079-7:2015/A1:2018 - Explosive atmospheres - Part 7: Equipment

protection by increased safety "e'

EN 61000-6-4:2007/A1:2011 - Electromagnetic compatibility (EMC) - Part 6-4:

Generic Standards - Emissions for Industrial Environments

EN 61000-6-2:2005 - Electromagnetic compatibility (EMC) - Part 6-2: Generic

Standards - Immunity for Industrial Environments

This declaration of conformity is issued under the sole responsibility of the manufacturer We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

MANUFACTURER

Signature

Annette Lynch

**Full Name** 

**Engineering Manager** 

Position

Woodward, Fort Collins, CO, USA

Place

Date

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### DECLARATION OF INCORPORATION Of Partly Completed Machinery 2006/42/EC

File name: 00517-EU-02-01

Manufacturer's Name: WOODWARD INC.

Manufacturer's Address: 1041 Woodward Way

Fort Collins, CO 80524 USA

Model Names: ELA28, ELA21

This product complies, where

applicable, with the following

Essential Requirements of Annex I: 1.1, 1.3, 1.4, 1.5, 1.6, 1.7

The relevant technical documentation is compiled in accordance with part B of Annex VII. Woodward shall transmit relevant information if required by a reasoned request by the national authorities. The method of transmittal shall be agreed upon by the applicable parties.

The person authorized to compile the technical documentation:

Name:

Dominik Kania, Managing Director

Address:

Woodward Poland Sp. z o.o., ul. Skarbowa 32, 32-005 Niepolomice, Poland

This product must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of this Directive, where appropriate.

The undersigned hereby declares, on behalf of Woodward, Inc. of Loveland and Fort Collins, Colorado that the above referenced product is in conformity with Directive 2006/42/EC as partly completed machinery:

MANUFACTURER

Signature

Annette Lynch

Full Name

Engineering Manager

Position

Woodward Inc., Fort Collins, CO, USA

Place

Date

Document: 5-09-1182 (rev. 16)

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#### Released

We appreciate your comments about the content of our publications.

Send comments to: <a href="mailto:icinfo@woodward.com">icinfo@woodward.com</a>

Please reference publication 35107.





PO Box 1519, Fort Collins CO 80522-1519, USA 1041 Woodward Way, Fort Collins CO 80524, USA Phone +1 (970) 482-5811

Email and Website—www.woodward.com

Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world.

Complete address / phone / fax / email information for all locations is available on our website.