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ServoALL

SERVOALL AXIS POSITIONING UNIT

INSTALL AND MAINTENANCE MANUAL

Manual purpose

This manual has been designed by the Manufacturer to provide the necessary information regarding the Servo.ALL to those who are authorized to carry out safely its installation, maintenance, removal and disposal. All the necessary information for the buyers and planners can be found in the Sales documentation. In addition to adopting good technical construction practices, the information should be read carefully and strictly applied. Failure to observe this information could cause risks for the health and safety of people and economical damage. This information, provided by the Manufacturer in the original language (Italian) is also available in other languages to satisfy legislative and/or commercial needs. This manual must be kept in good conditions by a responsible person in an ideal place so that it is always available for consultation. In case this manual is lost or deteriorates, a replacement should be requested directly from the manufacturer indicating the manual's code. This manual reflects the state of the instrument at the time of input on the market: however, the manufacturer reserves the right to make changes, add or improve the manual without further notice.

Identification of the equipment

The identification label is applied on the instrument.

To determine the identification code of the instrument, consult the sales documentation.

Environmental conditions

Temperature range: min. 0°C, max. + 50°C.

It is forbidden to use the instrument other than for its specific use and in potentially explosive conditions or where anti-explosive elements are required.

Storage

Here below are some references to be followed for the storage of the instrument:

Avoid environments with excessive humidity and those exposed to bad weather (avoid open areas).

Avoid putting the instrument directly on the ground.

Store the instrument in its original packaging.

Conformity declaration and EC marking

The instrument respects the following Communitarian Directives:

2014/30/EU Electromagnetic compatibility, 2011/65/EU RoHS.

Maintenance

The instrument does not need particular maintenance except cleaning, only with a soft cloth dampened with ethyl alcohol or water. Do not use hydrocarbon solvents (petrol, thinners, etc.): the use of these products could affect the proper function of the instrument.

Repairs should be done only and exclusively at the FIAMA technical assistance centre.

Calibrations and tests

It is advisable to calibrate the instrument periodically, once every working year.

To conduct calibration, follow the calibration procedure described in the present manual.

Technical Support

For any kind of technical assistance, contact the sales department of the Manufacturer directly indicating the information given on the identification label, the number of hours used and the type of defect.

Manufacturer's responsibility

The manufacturer declines any responsibility in case of:

- Using the instrument contrary to applicable national safety and accident-prevention laws.
- Incorrect installation, inobservance of, or incorrect procedures in contrast with the instructions provided in the present manual.
- Defective electrical power supply.
- Modifications or tampering.
- Operations carried out by untrained or unqualified staff.

The safety of the instrument also depends on the strict observance of the procedures indicated in the manual: always operate the instrument in its functioning capacity and carry out a careful routine maintenance.

- All phases of inspection and maintenance should be carried out by qualified staff.
- The configurations indicated in the manual are the only ones permitted.
- Do not attempt to use the instrument in anyway which is contrary to the indications provided.
- The instructions in this manual do not substitute but are a complement to the obligations of the current legislation regarding safety laws.

Installation

Before installing the instrument, heed the following warnings:

- a) Connect the instrument strictly following the instructions of the manual.
- b) It is the responsibility of the user to check, before using, the correct setting of all parameters of the instrument to avoid damage to persons or things.
- c) The instrument CANNOT function in a hazardous environment (flammable or explosive).
- d) The unit contains parts sensitive to electrostatic charge, therefore handling of the internal electronic cards has to be carried out with appropriate care to avoid permanent damage.

Description

The ServoALL positioning unit consists of a servo motor moving a rotary axis, characterised by ultra compact design, a small footprint, and easy assembly.

ServoALL is a single device, but works as a complete system for decentralised axis control thanks to its features which include a hollow output shaft gearmotor, a measurement transducer, a drive, a controller, a display, and a serial interface to the field bus. After setting a position, the ServoALL reaches it automatically moving in accordance with a number of settable parameters (e.g. fast speed, slow speed, acceleration/deceleration ramp time, etc.).

The servomotor case is built as an aluminium alloy and anodised piece machined out of a solid block: it houses the direct current motor, the gear motor, the position transducer, control electronics, and the interface to the field bus.

Made of precision gears and protected by a Pronox surface treatment, the gear motor is designed for very low noise motion, high efficiency and long service life.

The magnetic encoder for position control is tapered directly to the hollow output shaft, which helps avoid mechanical plays and fulfil accurate position control. A buffer battery is installed to help the axis stay in position even when power fails. The electronic board controlling the motor communicates with other equipment through field buses such as Profinet, EthernetIP, PowerLink, and EtherCat: it is designed to control the position, the speed, the torque and all the position parameters of the axis, to provide protection against overtemperature and overcurrent, and to prevent the axis from reaching the end of its stroke, etc.

Its ultra compact dimensions and easy assembly make the ServoALL eligible for application in the most diversified types of industrial machinery - especially for size change in the packaging industry -, in other words it can be used to automate all adjustments that are currently made manually by the operator.

The backlit LCD display has two lines: the first line shows the current position of the machine and the second line shows a message with the current status of the device.

After set-up, all the ServoALL movements can be controlled in: Manual, Semi-automatic, and Automatic mode.

Manual mode When in manual mode, the buttons featured on the display can be used directly to set/control a positioning movement.

Semi-Automatic mode When in semi-automatic mode, control buttons are featured on the bus to set the speed and direction of rotation.

Automatic mode When in automatic mode, the system moves to the pre-set target position independently by pressing the relevant control button on the bus. If, while in automatic mode, problems arise (e.g. problems with forward movement or excessive motor temperature), the system stops and displays the cause of the malfunction.

Manual mode

As an alternative to the PLC, the ServoALL can be controlled using the buttons featured near the display. Switching to manual mode requires entry of a password.

NOTE: when in manual mode, control words given using the buttons prioritise over control words received from the network controller!

Access for password entry is gained by pressing and holding down the button at the centre (○) until the wording "PAS" appears on the display. Now, press the button again: 3 zeroes appear and the first on the right is blinking. Use the button ▲ (increase figure) and button ◀ (select figure) to set the password for manual mode and press the button at the centre (○) to confirm. If the entered password is incorrect, the system exits the current mode.

The password for manual mode is: **273**.

When in this mode, the ServoALL can only be jogged; the torque and current limits are not active.

Description of buttons

- ▲ This button is pressed to increase the numbers when entering the password and to move the ServoALL via a *Jog forward* command. This movement is performed at the same speed as Low speed (ref. *Acyclic communication* section).
- ○ This button is pressed to access the password entry page and to confirm the entered password.
- ◀ This button is pressed to select the numbers when entering the password and to move the ServoALL via a *Jog backward* command. This movement is performed at the same speed as Low speed (ref. *Acyclic communication* section).

There are two different ways to exit manual mode:

- access the password entry page again and set the password **000**. Wait 1 minute, without pressing any button.

Web server

The web server is reached using the IP address of the unit. We recommend resorting to one of the applications listed in the "Utility" section to identify and set up the desired address.

The web server is used to set up all the ServoALL parameters. In the DOC section it is also possible to find the instrument User Manuals and the set-up files (XML/EDS).

Utility

The IP address and the "device name" must be set up in order for the unit to operate correctly. To do so, you can use the free software by Siemens, [Proneta](#), or alternatively the [Profinet Commander](#) or [HMS Ipconfig](#) software.

Battery

The battery status is indicated by the icon on the display and is also available in the dedicated fieldbus registers.

Note: the battery status indicators (display icon and fieldbus value) are updated only when the instrument is powered exclusively by the battery, without external power supply.

Battery replacement

The battery ensures the storage and updating of the position in the absence of external power supply for at least 6–8 years, depending on operating conditions (when the instrument is powered, there is no battery consumption).

When the battery icon appears on the display, or when the low-battery signal is shown on the fieldbus, replacement must be carried out within 15 days.

The replacement procedure is as follows:

- Power the instrument with external supply (to avoid losing the machine's position). If it is necessary to disconnect the 24V supply, subsequently perform the position calibration.
- Unscrew the four screws and remove the cover of the servomotor (opposite side to the hollow shaft).
- Remove the depleted battery.
- Insert the new ½ AA 3.6V battery, making sure to respect the polarity indicated on the device.
- Reclose the cover.

Display

The backlight LCD display has two lines: the first line shows the current position of the machine and the second line shows a message with the current status of the device.

| DISPLAY | ServoALL STATUS | |
|------------|-----------------|--|
| Stb | STANDBY | ServoALL ready and waiting for control words. This condition is achieved if the network master is connected and in operation and the control word is zero. |
| JOG | JOG | The ServoALL unit is involved in a manual or semi-automatic positioning movement. |
| POS | POSITIONING | The ServoALL unit is involved in an automatic positioning movement. |
| Err | ERROR | The ServoALL unit is stuck due to an error. It must be reset via the relevant bit of the control word. |
| BLH | BLOCK | The ServoALL unit is in thermal block condition. |
| rEC | PLAY RECOVERY | The ServoALL unit is involved in play recovery during an automatic positioning movement. |
| rSt | RESET | The ServoALL unit is waiting for the network master to be connected. NOTE: the control word needs to be zero for the system to be operational (STB). |

LED



The meaning of the “NET” and “Mod” LEDs changes significantly depending on the communication protocol used. For a more detailed explanation, please refer to the corresponding manuals.

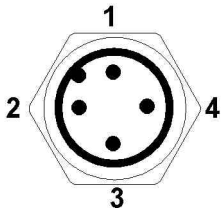
| LED Net | Descrizione | Commento |
|----------------|-------------|---|
| Off | Offline | <ul style="list-style-type: none"> No operating voltage No connection |
| Green | Online | <ul style="list-style-type: none"> Online Connection established |
| Red | Error | <ul style="list-style-type: none"> Internal error |
| LED Mod- | Descrizione | Commento |
| Off | Offline | <ul style="list-style-type: none"> No operating voltage |
| Green | Online | <ul style="list-style-type: none"> Network module active |
| Red | Error | Errore interno |
| LED Link-A | Descrizione | Commento |
| Off | Offline | <ul style="list-style-type: none"> No operating voltage No connection |
| Green | Link | <ul style="list-style-type: none"> Connection established but no activity – PORT 0 |
| Green flashing | Activity | <ul style="list-style-type: none"> Connection established and activity– PORT 0 |
| LED Link-B | Descrizione | Commento |
| Off | Offline | <ul style="list-style-type: none"> No operating voltage No connection |
| Green | Link | <ul style="list-style-type: none"> Connection established but no activity – PORT 1 |
| Green flashing | Activity | <ul style="list-style-type: none"> Connection established and activity– PORT 1 |

PORT 0: right connector when viewed from the connector side

PORT 1: left connector when viewed from the connector side

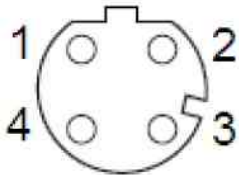
Connection diagram

24VDC POWER CONNECTOR
M12x1 Male, 4 poles, code A

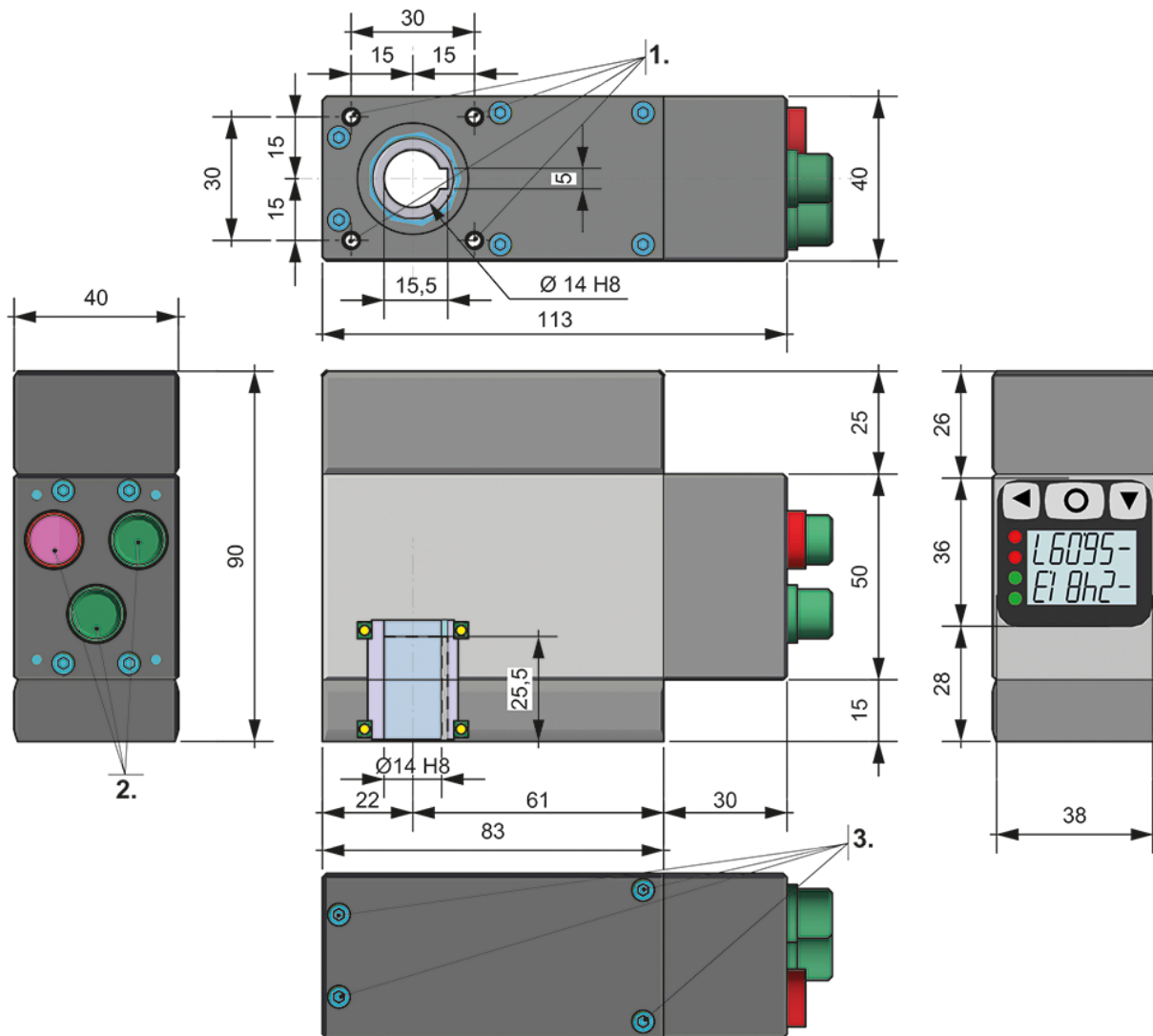


| PIN | DESCRIPTION |
|-----|-----------------|
| 1 | GND Power/Logic |
| 2 | GND Power/Logic |
| 3 | +24VDC Power |
| 4 | +24VDC Logic |

PROFINET/ETHERNET CONNECTORS
M12x1 Female, 4 poles, code D



| PIN | DESCRIPTION |
|------|-------------|
| 1 | TX DATA + |
| 2 | RX DATA + |
| 3 | TX DATA - |
| 4 | RX DATA - |
| CASE | SHIELD |

Overall dimensions

Technical specifications

| | |
|---|---|
| Power voltage | 24Vdc \pm 20% |
| No-load speed | 90 RPM |
| Torque, speed, absorbed current, duty cycle | 4Nm, 75 RPM, 2,5A, 50% 6.5Nm, 65 RPM, 3.5A, 20% 9Nm, 55RPM, 5.5A, 10% |
| Max. current absorption | 6 A |
| Hollow output shaft | Ø14mm, H7, with 5mm lowered key |
| Position transducer | Magnetic encoder, 1000 pulses/rev, tapered to output shaft |
| Buffer battery for encoder | 3.6V, format ½ AA Service life 6 to 8 years (depending on conditions of use) |
| Field bus | Profinet, EthernetIP, PowerLink, EtherCat |
| Electrical connection | M12 connectors for power line and field bus |
| Weight | 800 gr |
| Protection rating | IP54 |
| Working temperature | 0 to 60°C |
| Relative humidity | 10-85% |
| Electromagnetic compatibility | 2014/30/EU |
| RoHS | 2011/65/EU |

Manufacturer

All correspondence with the manufacturer shall be sent to:

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