FIAMA

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
ISO 9001

USER'S MANUAL AND MAINTENANCE

POSITIONING UNIT SERVO.D

Manual purpose
This manual has been designed by the manufacturer to provide the necessary information regarding the unit SERVO.D to those who are authorized to carry out safely its installation, maintenance, dismantling and disposal. All the necessary information for the buyers and planners can be found in the Sales catalogue. Other than adopting good technical construction methods, the information should be read carefully and strictly applied. Inobservance of 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. A responsible person in an ideal place must keep this manual in good conditions 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 quoting the manual's code. This manual reflects the state of skill 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 giving any reason to hold the present manual inadequate.

Identification of the equipment
The identification plate represented is applied on the instrument.
To find out the identification code of the instrument, consult the sales catalogue.

Environmental conditions
Temperature setting: min. 0°C, max. + 50°C.
It is forbidden to use the instrument other than its specific use and in potentially explosive conditions or where anti- explosive elements are used.

Storage
Here below are some references to be followed for the storage of the device.
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 packing.

Conformity declaration and EC marking
The instrument answers to the following Communitarian Directives:
2014/30/EU Electromagnetic compatibility, 2011/65/EU RoHS.

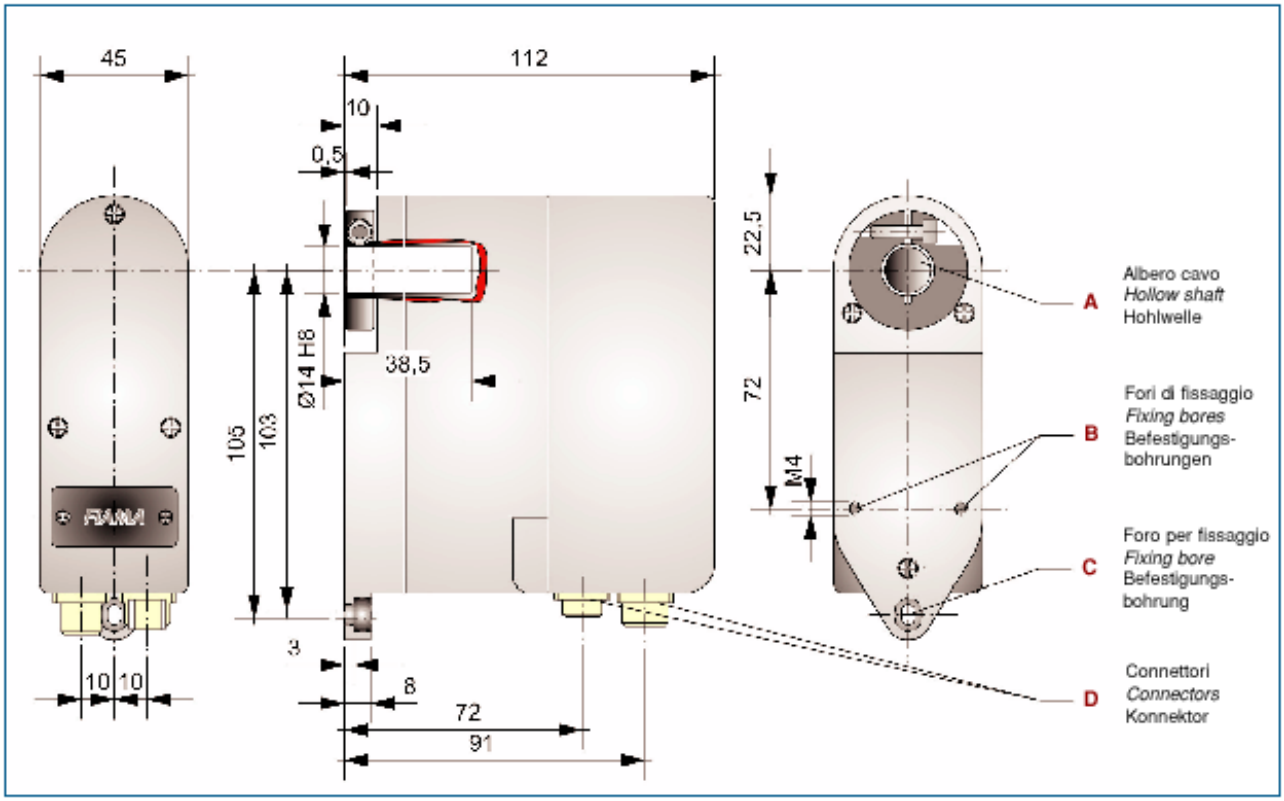
Maintenance
The instrument does not need a particular maintenance except cleaning to do only with a soft cloth dampen with ethylic alcohol or water. Do not use hydrocarbon solvents (petrol, diluents, etc.): the using of these products could affect the proper functioning of the instrument.
Reparations should be done only and exclusively at the FIAMA technical assistance centre.

Assistance request procedure
For any kind of technical assistance request, contact the sales department of the Manufacturer directly indicating the information given on the identification plate, 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 the national safety and accident-prevention laws.
• Wrong installation, inobservance or wrong procedures of 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 done by qualified staff.
• The configurations provided in the manual are the only ones permitted.
• Do not try to use it anyway contrary to the indications provided.
• The instructions in this manual do not substitute but accomplish the obligations of the current legislation regarding the safety laws.

Description

The positioning unit SERVO.D is made of a geared brushless motor in direct current with microprocessor control of the driving gear and of an absolute (precision potentiometer) assembled on the output shaft with interface for field bus. It realises in a single and compact device a complete system for the control of axis being able to receive by bus a dimension to reach and start with the positioning by a control type PID.
The SERVO.D unit has a hollow shaft output to enable a simple assembling and a versatile use, even with pre-existent manual motion machines that have to be automated. Therefore it is suitable for a large number of applications in machinery within industries such as printing, packaging, woodworking,
marble, plastic, etc. A simple linking and layout are guaranteed by a supervisor (PC, PLC), the system interfaces with a bus-field to control the positioning and enable the modifications of the control parameters (present quota, speed, state).
The communication record can be MODBUS RTU, CANopen, PROFIBUS DP.
The electric connection is made by the means of 3 connectors M12x1 for power supply and field bus.



Installation

Before installing the instrument, read the following warnings:
a) Connect the instrument strictly following the instructions of the manual.
b) Carry out the connections using the correct wires within the limits of the tension and power supply as indicated in the technical data.
c) The instrument does not have an ON/OFF switch, hence it comes on when connected to the power supply. For safety reasons, the equipment connected permanently to the power supply requires a bi-phase selector switch which should be within easy reach of the operator.
d) If the instrument is connected to any apparatus not isolated electrically, carry out an earth connection to avoid it being connected directly through the structure of the machine.
e) It is the responsibility of the user to check, before using , the correct settings of the parameters of the instrument to avoid damage to persons or things.
f) The instrument cannot function in a dangerous environment (inflammable or explosive). It can be connected to elements that operate in the same atmosphere only through appropriate interfaces, according to the current safety
regulations.
g) Avoid dust, humidity, corrosive gases, heat sources.

Power supply

a) Before connecting the unit, check that the power supply tension is within the permitted limits and that it corresponds to the one indicated on the tag.
b) Carry out the electrical connections with the instrument disconnected.
c) For the power line to instruments and sensors, a power supply line separate from that of the power is required : it is necessary to use an isolating transformer.
d) The power line should provide a device that separates the set fuses of the instruments and should not be used to regulate relays, contactors, etc.
e) If the network tension is very disordered (ex. from the change-over of the power units, motors, inverters, welders, etc.), use the appropriate filters of the network.
f) If an earth connection is needed, ensure that the plant has a good earth system: tension between neutral and earth <1V and the resistance <6 Ohm.

Connections entries and exits

Physically separate the entry wires from those of the power supply, the exits, and the power connections; use twined and shielded wires with the display connected to the earth only at one point.

Avoid dust, humidity, corrosive gases, heat sources.
Turn by hand the gear-reducer shaft using the locknut (pressed on hollow shat) only if really necessary.
Do not overpass allowed torque values.
Do not disassemble and do not open the unit, in particular the part of reducer
Do not bore/modify case or hollow shaft.

Gear motor assembly

To assemble the unit correctly adhere to the following instructions:
Set out a threaded bore M4 at distance from 103 to 105 mm from control shaft for fixing of anti-rotation screw. Two M4 screws can be used moreover, that can be screwed in the two brass inserts M4x12 : this is in case the servo motor has to make many manoeuvres or is used continuously.
The unit is therefore inserted through the hollow shaft of diameter Ø14 millimetre (38,5mm deep) on the driving shaft of the machine. Ensure that the hollow shaft is perpendicular to the support base.
Block the hollow shaft on the machine shaft using the bolt screw M4 on the clamping metal ring.

N.B. = The gear motor does not have parts that need maintenance or oiling.

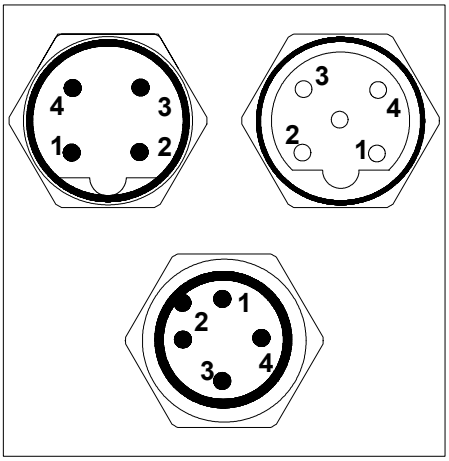
Before assembling the SERVO, it is fundamental to place the shaft of the machine and the shaft of the SERVO in the correct position, for example half way or towards the end, in a way that there is correlation between the position of the SERVO and that of the machine. To do that, the motion of the hollow shaft of the SERVO should be serially commanded by the control unit (PLC, PC, etc): do not rotate the shaft by hand.
The calculation of the number of turns that the hollow shaft has to finish to develop the total motion of the machine is determined by multiplying the reduction ratio of the reducer of the potentiometer by the number of turns of the potentiometer itself (total reduction ratio = R).
In case that the maximum number of allowed rotations by the shaft is exceeded, a mechanical friction intervenes to safeguard the potentiometer transducer.
NB: the SERVO is provided with the hollow shaft and the potentiometer positioned half way.

ELECTRICAL CONNECTION

Disconnect from power supply before connecting/disconnecting the equipment/machinery.
The connecting cables must be kept separate from the power lines or from electromagnetic interference sources.
Pay careful attention to the electrical connections: any failure caused by a faulty connection will render the guarantee null and void.
The power supply must be in the permitted range, a higher range could damage the equipment.

PROFIBUS RS485 CONNECTOR
M12x1 MALE
1 = not connected
2 = PROFIBUS A, – RS485
3 = not connected
4 = PROFIBUS B, + RS485

CANOPEN CONNECTOR
M12x1 MALE
1 not connected
2 not connected
3 = CAN_GND
4 = CAN_H
5 = CAN_L

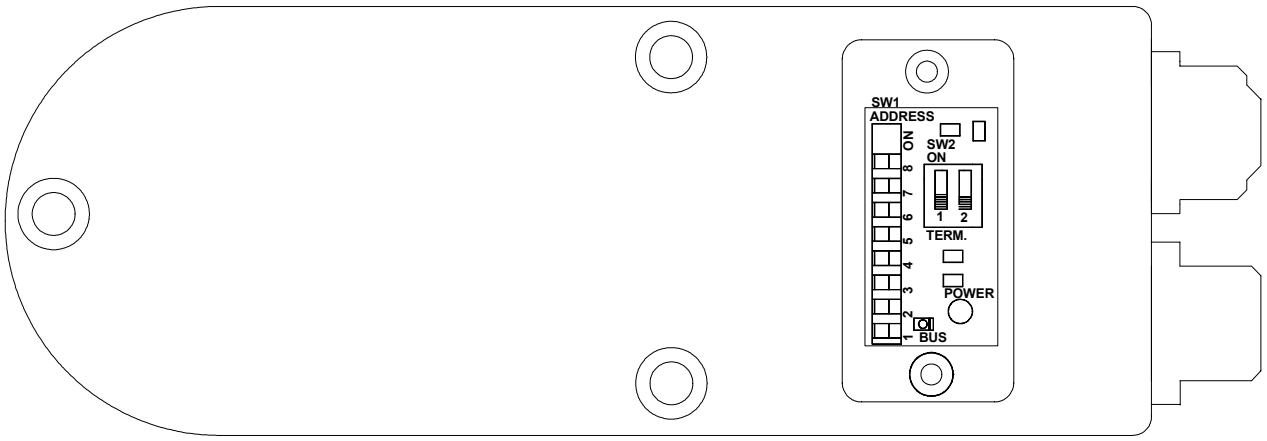


POWER SUPPLY M12x1
MALE CONNECTOR
24VDC
1 – 2 = +24VDC
3 – 4 = GND

PROFIBUS RS485 CONNECTOR
M12x1 FEMALE
1 = not connected
2 = PROFIBUS A, – RS485
3 = not connected
4 = PROFIBUS B, + RS485

CANOPEN CONNECTOR
M12x1 FEMALE
1 not connected
2 not connected
3 = CAN_GND
4 = CAN_H
5 = CAN_L

It is advisable to connect the shield of the field-bus cable on the metallic case of bus connectors (see instructions assembling of connectors).
To enter to configuration dip-switch of address and of baud rate, screw–off the two fixing screws of cover with FIAMA logo.



Set address and baud rate using dip-switch **SW1- SW3** as per following table:

MODBUS RTU

SW1								ADDRESS
1	2	3	4	5	6	7	8	
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	2
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	3
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	4
ecc……								ecc……

SW3		BAUD RATE
1	2	(Baud)
OFF	OFF	2400
ON	OFF	4800
OFF	ON	9600
ON	ON	19200

By changing of address or baud rate is necessary to switch off and turn on the Servo.

CANopen

Transmission speed of serial communication (baud rate: 10, 20, 50, 100, 125, 250, 500, 1000kbaud).
The setting of baud rate is made by 2 dip-switch of **SW3** and with dip 8 of **SW1** the address is set with dip 1-7 of **SW1** (set in factory at **1**). Valid addresses 1-127.
By changing of address and baud rate is necessary to switch off and turn on the Servo

SW1								ADDRESS
1	2	3	4	5	6	7	8	
ON	OFF	OFF	OFF	OFF	OFF	OFF	-	1
OFF	ON	OFF	OFF	OFF	OFF	OFF	-	2
ON	ON	OFF	OFF	OFF	OFF	OFF	-	3
OFF	OFF	ON	OFF	OFF	OFF	OFF	-	4
ecc……								ecc……

SW1	SW3		BAUD RATE
8	1	2	(Kbaud)
OFF	OFF	OFF	1000
OFF	ON	OFF	1000
OFF	OFF	ON	800
OFF	ON	ON	500
ON	OFF	OFF	250
ON	ON	OFF	125
ON	OFF	ON	50
ON	ON	ON	20

PROFIBUS DP

Valid address from 1 to 127. The speed is measured automatically.

SW1								ADDRESS
1	2	3	4	5	6	7	8	
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	2
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	3
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	4
ecc……								ecc……

If the SERVO is the last node of net, set at **ON** the dip-switch **SW2** (both switches 1 and 2 at ON) to plug in the ending resistance of line.
IMPORTANT: during this phase it is advisable to pay very attention to not damage the dip-switch and the electronic components on card-board.

Technical characteristics

Motor	brushless 24VDC
Power Supply	24Vdc ±20%
Nominal power	50W
Nominal current	2A (4A max)
Hollow shaft	Ø14mm H7
Torque/speed	1,5Nm/100RPM, 4Nm/80RPM (non continuous)
Transducer	precision potentiometer transducer
Resolution	16000 points
Number of turns/ linearity	340°/1% - 3 turns /0,25% - 5 turns /0,25% - 10 turns /0,15%
Potentiometer reducer reductions	1/1; 3,3/1; 10/1; 24/1; 30/1; 90/1, others on request
Electric wiring	Connector M12x1 4 poles
Protection grade	IP54 (IP66 on request)
Temperature	0-60°C
Relative humidity	10-85%
Directive: 2014/30/EU Electromagnetic compatibility, 2011/65/EU RoHS	

Manufacturer
All communications to the manufacturer should be addressed to:
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FIAMA srl is not responsible for any damage to persons or things caused by tampering and wrong use and in any case that are not consistent with the features of the instrument.