

## PGM40 Series Service Manual



WARNING: This is a controlled document. It is your responsibility to deliver this information to the end user of the DESTACO CAMCO product. Failure to deliver this could result in your liability for injury to the user or damage to the machine. For copies of this manual, call your Customer Service Representative at 1-800-645-5207.

# PGM SERIES

## Service Manual

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**Note:** According to Machinery Directive 2006/42/EC, this product is classified as incomplete machine.  
Hence in this entire manual the term Unit is used instead of Machine.

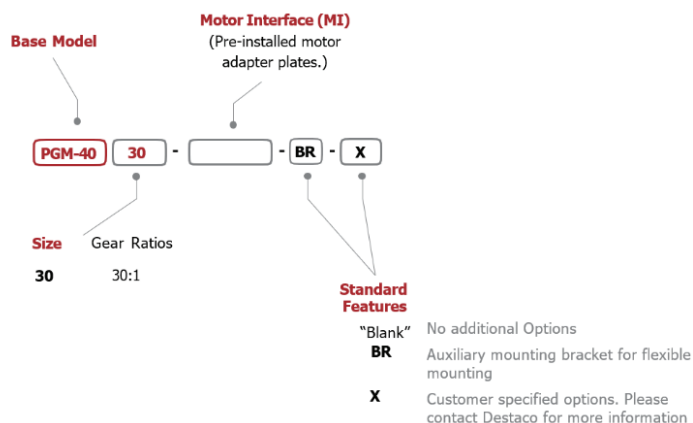
- Accessories for motor mounting (bushing\*, plug, clamp collar, clamp collar screws, motor mounting screws#)
- Instruction manual
- Warranty card

\* When "0" is listed in the MI code end, Bushing is not required.

# Will be provided If motor is ordered along with the unit

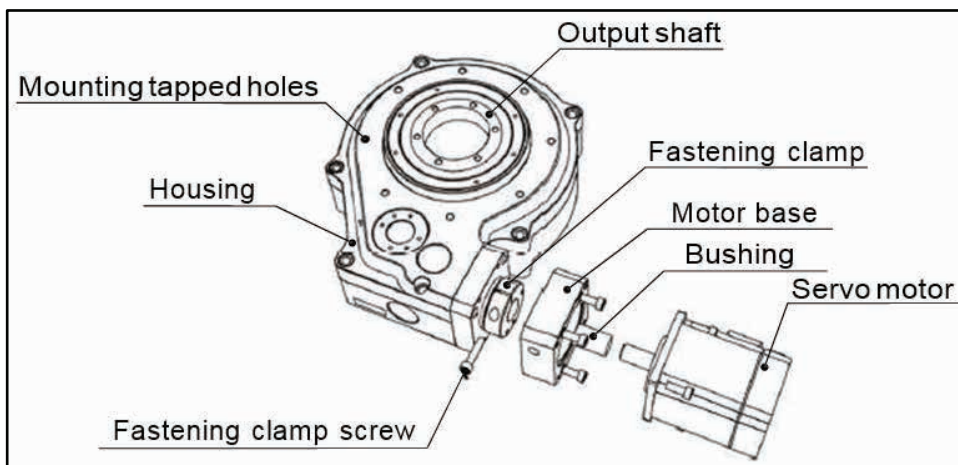
## 2. Confirm Product Code

Make sure that the product code on the nameplate is correct with the product specification you purchased.



## 3. Name of each Part

In order to realize high precision and high rigidity positioning, this product incorporates proprietary preload cam mechanism inside.



# PGM SERIES

## Service Manual

Manufacturer: DESTACO CAMCO PRODUCTS  
Street: 1444 SOUTH WOLF ROAD  
City: WHEELING, ILLINOIS 60090 USA  
Tel.: +1-847-459-5200  
Fax: +1-847-459-3064  
E-mail: [marketing@destaco.com](mailto:marketing@destaco.com).  
Internet: <http://www.destaco.com>  
After-Sales Service address: [camco@destaco.com](mailto:camco@destaco.com) / [europe@destaco.com](mailto:europe@destaco.com)  
Unit designation: SERVO POSITIONER ROTARY TABLE  
Type designation: PGM40  
Serial No.: SEE NAME PLATE  
Year of construction: 2017  
Product No.: SEE NAME PLATE  
P.O. No.:  
Order No.:  
Sales: DESTACO Europe GmbH  
Hiroshimastraße 2  
61440 Oberursel  
Germany  
Manufacturer, Sales: DESTACO Camco Products  
Industrial Motion Control, LLC  
1444 South Wolf Road  
Wheeling, IL 60090  
USA

## 5. Product Documentation

Version: 1.0  
Creation date: IV 2018  
Last revision: NA  
Product Model No.: PGM40  
Serial No.:  
Year of construction: 2018

### 6. Justification for classification in accordance with the Machinery Directive

The products from the Automation division are divided into the following classes:

- Index drive models.

In accordance with the Machinery Directive 2006/42/EC, the above-mentioned products are classified as incomplete machines according to Article 2g). This results in the necessity to produce the technical documentation in accordance with Annex VII B and the declaration of incorporation in accordance with Annex II B.

Justification for classification as an incomplete machine:

- The machine as such does not fulfil a function.
- The pneumatic/hydraulic/electric control system is not included in the scope of supply.
- The machine is intended for incorporation into other machines or to be assembled with them.
- There are no elementary protection devices at the man-machine interface.

## 2. Instructions for Use

### 1. Purpose of the document

The operating manual is intended to help user familiarize with the unit and its intended application possibilities. The operating manual contains important information on the safe, proper operation of the unit. Observation of this information will help avoid hazards, reduce repair costs and downtimes and increase the reliability and service life of the unit.

Notes on precautionary measures to be taken by the unit owner:

- Employ only personnel with the necessary qualifications to operate the unit.
- Define clear responsibilities and authorities for the operating and maintenance personnel.
- Supplement the operating manual with rules derived from the national occupational health and safety and environmental protection regulations (e.g., work organization).
- Instruct the personnel to read the operating manual and its additions, and check compliance from time to time. Have one copy of the operating manual available at the place of operation of the unit always!
- Operate the unit only when it is in a technically safe condition and take measures to maintain this safety.

In addition to the operating manual, the binding accident prevention regulations applicable in the country of operation and at the place of work must also be observed. In addition, the acknowledged engineering rules for safe and proper working must be observed.

### 2. Target Groups

The owner as superordinate legal entity is responsible for the intended use of the unit and for the training and employment of the authorized persons. He lays down the binding competencies and authorities of the authorized persons for his company.

According to the latest Machinery Directive, the operating personnel are the people responsible for installation, operation, set-up, maintenance, cleaning, repair, or transport of machines.

A specialist is a person who, thanks to their technical expertise, know-how and experience, is able to assess the assigned duties and to recognize potential hazards. Furthermore, this person has know-how of the applicable regulations. Only qualified specialists or such people considered by the owner to be capable are to be employed.

Trained/instructed persons are persons who have been instructed and possibly trained in the assigned duty and in the potential dangers associated with improper behavior. The person has also been instructed about the necessary protective devices and safety measures. Persons undergoing training, instruction or familiarization and persons undergoing general training may only work under the constant supervision of an experienced person.

### 3. Liability and warranty

All information and tips given in this operating manual are given to the best of our knowledge and

belief and based on our experience and findings till date. The original version of this operating manual was drawn up in English and was examined technically by us. The translation in the respective national/contract language was produced by an acknowledged translation agency.

This operating manual was compiled with the greatest care. Should you discover any gaps and/or errors, however, please inform us accordingly in writing. Your suggestions for improvements will help us in producing a user-friendly operating manual.

### 4. Recorders and Copyright

Further copies of this operating manual can be ordered from the address shown under "Identification" in chapter 1. Please note that further copies are subject to payment.

All rights are explicitly reserved. Duplication or notification to third parties in whatever form is not permitted without our written approval.

### 3. Product Safety

A basic precondition for the safe handling and trouble-free operation of this unit is thorough knowledge of the fundamental safety precautions.

#### Organizational Measures

Keep the operating manual available at the place of operation of the unit and in a legible condition always!

- a) Supplement the operating manual to include provisions to cover specific company aspects (e.g., supervisory and reporting obligations, work organization, work processes, personnel employed, and fire alarm and firefighting possibilities, operation of fire extinguishers).

Supplement the operating manual to include binding local provisions on accident prevention and environmental protection (e.g., handling of hazardous substances, disposal of operating and/or ancillary media, provision/wearing of personal protective equipment)!

Instruct all personnel to keep the operating manual handy!

If the personnel discover faults or hazards, the owner or representative must be informed immediately.

#### Technically Safe Condition

- a) Keep all safety and hazard signs on and around the unit complete and in a clearly visible!

Do not make any modifications, attachments or alternations to the unit that could impair safety without consultation/agreement with the manufacturer/supplier. This applies also to the installation and setting of safety devices and valves, and for welding on load-bearing parts.

Do not make any program changes to the software of programmed control systems without first consulting the appropriately trained personnel/experts!

#### NOTICE

Major modifications to the unit and/or Program changes should not affect the Declaration of Conformity as it is not within the scope of the unit's design and intended purpose.

Observe intervals prescribed by law or in the operating manual for recurring tests/inspections and the replacement intervals for safety-critical components!

Spare parts must satisfy the technical requirements stipulated by the manufacturer. This is always guaranteed with OEM spare parts.




Be sure to have appropriate workshop equipment available for carrying out independent service and maintenance work. In addition to this operating manual, the information and tips contained in the suppliers' documentation (see Annex) must also be observed!

### 3.1 Training of the Personnel

#### Personnel selection and qualification

- a) Employ only qualified or trained personnel. Give the necessary instructions and check from time to time that only authorized personnel are working on/with the unit!
- b) Work on and with the unit may only be carried out by authorized, trained personnel. Observe the statutory minimum working age!
- c) Clearly define the responsibilities and authorities of the personnel for operation, set-up, maintenance, and repair!
- d) Allow persons undergoing training, instruction, or an apprenticeship to work on the unit only under the supervision of an experienced person.
- e) Work on the electrical equipment of the unit may only be carried out by an electrician or by trained persons under the instruction and supervision of an electrician. For safety reasons, the rules of electrical engineering must be observed.
- f) Work on gas and heating installations may only be carried out by appropriately qualified personnel.
- g) Only experienced and qualified personnel may be allowed to work on hydraulic and pneumatic installations!

### 3.2 Presentation of Safety Precautions






HAZARD SYMBOLS	
SYMBOL	DEFINITION
 <b>DANGER</b>	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	Indicates a situation which, if not avoided, could result in damage to the unit, equipment, or environment.

### 3.3 Symbols on the Unit

	<b>Electric Shock Hazard</b>
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### 3.4 Personal Protective Equipment (PPE)

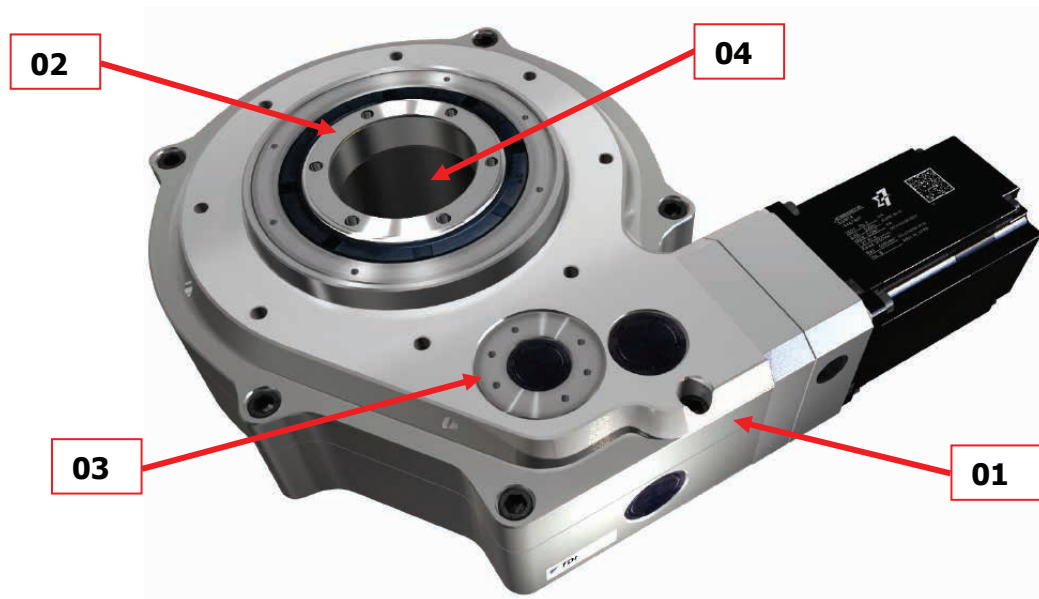
The personal protective equipment (PPE) described below must be provided by the unit owner and be worn by the responsible operating personnel when working with the unit.

	<b>Wear Protective Gloves</b>
	<b>Wear Safety Shoes</b>
	<b>Wear Ear Protectors</b>
	<b>Wear a Safety Helmet</b>
	<b>Wear Safety Goggle</b>

## 4. Unit Description

### 4.1 Presentation and Identification

#### General View of the Unit



**Figure 1: UNIT**

The unit consists of the following main components (FIGURE 1)

- 01 Housing:** Machined Housing Casting (Top & Bottom)
- 02 Output Assembly:** Parallel Gear, Output bearing
- 03 Input Assembly:** Parallel Cam, Bevel Gear Set
- 04 Center-Bore:** Allows passage of wires, robotics, and various tooling through unit.

### Identification of the Unit

The following information can be found on the unit rating plate:



### Company name with full address

DESTACO CAMCO PRODUCTS  
1444 SOUTH WOLF ROAD  
WHEELING, ILLINOIS 60090 USA

**Article No.:** PGM40

Year of construction: 2017

### 4.2 Intended Use

The unit has been built within the factory limits to the state-of-the-art and in accordance with the acknowledged general safety engineering rules. Nevertheless, hazards can arise during its use for the life and limb of the operator or third parties and for impairment to the unit and other assets.

The unit may only be operated for its intended use when it is in a technically safe condition, considering safety and the potential hazards, in accordance with the operating manual! Have all malfunctions remedied immediately, those which could impair safety.

The unit is intended exclusively for the purpose described in chapter 4.5 "Description of function". Any other or further use constitutes an improper use. The manufacturer/supplier assumes no liability for injury or damage resulting from such use. This risk must be borne solely by the owner.

#### NOTICE

The intended use also includes observance of the operating manual and compliance with the inspection and maintenance conditions.

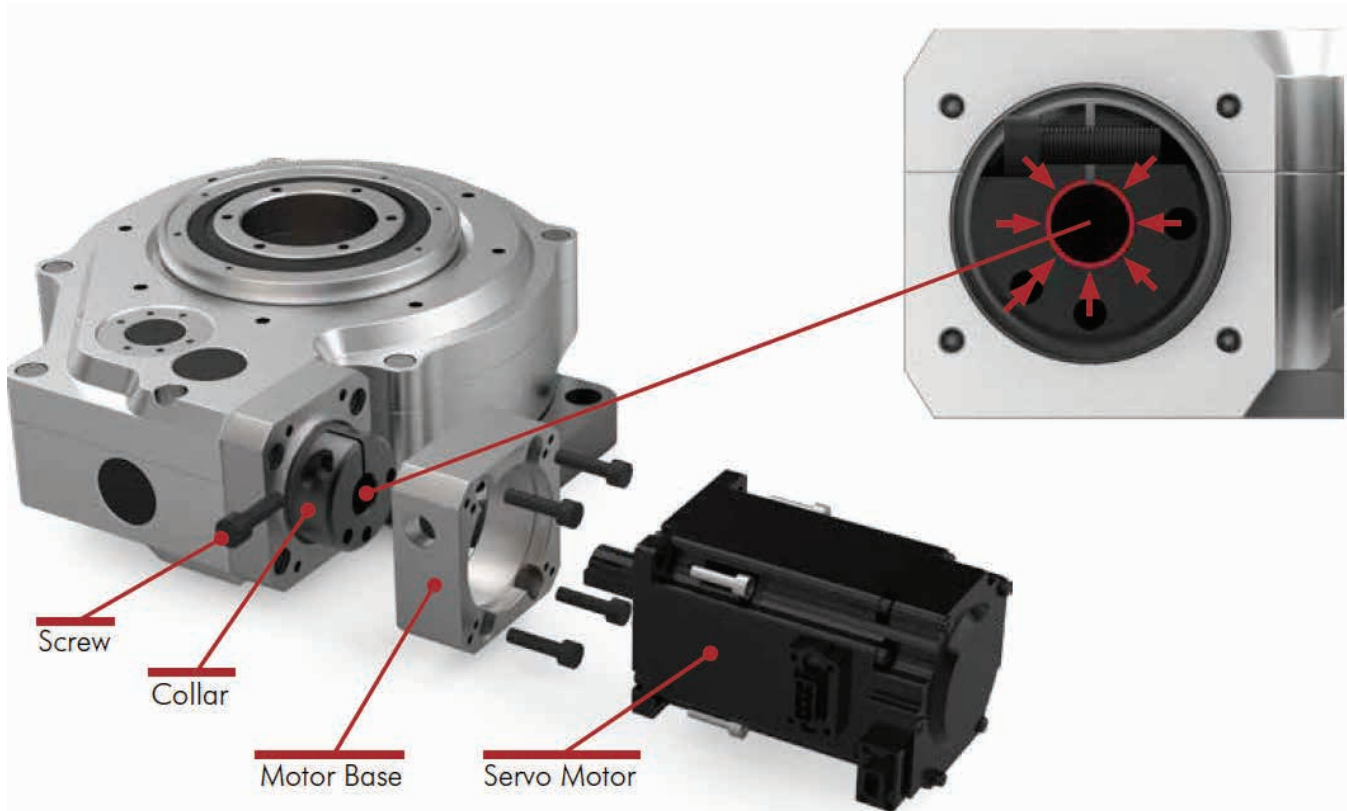
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### 4.3 Foreseeable improper usage

Any use, setting, application or alteration of the unit beyond the stated terms in section 4.5 is defined as improper and prohibited.

### 4.4 Design and components of the unit



Please contact the manufacturer for detailed components or replacement parts.

### 4.5 Description of function

The PGM40 Parallel Gear servo positioner is an accurate and rigid pre-loaded-parallel Cam indexing rotary table designed to precisely move heavy loads at a predetermined number of stations with zero-backlash. This unit is exactly defined as incomplete machinery that has no specific function / output until incorporated into a complete unit.

### 4.6 Places of work of the operating personnel

The PGM40 Parallel Gear Servo positioner rotary table is designed for integration into complete units. Safe operation and control are the responsibility of the unit builder and the unit operator.

### 4.7 Hazard Zones

### Electrical Energy

- a) Use only original fuses with the prescribed amperage! In the event of faults in the electric power supply, switch off the unit immediately!
- b) Work on electrical installations or equipment may only be carried out by an experienced electrician or by trained persons under the instruction and supervision of an electrician.
- c) Parts of units and installations on which inspection, maintenance and repair work is being carried out on the electrical equipment must – if prescribed – be isolated and secured to prevent restarting. First check that the isolated parts are no longer live, then earth and short-circuit and isolate adjacent live parts.
- d) The electrical equipment of the unit must be inspected and checked at regular intervals. Faults such as loose connections or scorched cables must be remedied immediately.
- e) If work is necessary on live parts, have a second person standing by who can turn off the master switch or emergency stop switch in the event of an emergency. Cordon off the working area with a red/white safety chain and a warning sign. Use only insulated tools and equipment!
- f) When work in confined spaces, observe any applicable national regulations! (e.g., have a second person standing by for a fast rescue)
- g) When working on high voltage assemblies, switch off the power supply, connect the supply cable to earth and short-circuit the components, e.g., capacitors with a ground rod.

### Hydraulic/Pneumatics

- a) Work on this equipment may only be carried out by persons with specialist know-how and experience!
- b) Inspect all lines, hoses, and screw fittings at regular intervals for leaks and obvious signs of damage! Repair damage immediately! Escaping oil can lead to injuries and fires.
- c) Depressurize system sections and pressure lines to be opened in accordance with the descriptions of the assemblies before starting the repair work!
- d) Lay and install hydraulic and compressed air lines correctly! Do not interchange connections. Fittings, lengths, and qualities of the hoses must comply with the requirements.

### Noise

- a) Soundproofing installations on the unit must be functional during operation.
- b) Wear the prescribed personal protective equipment (ear protectors)!

### Greases and other chemical substances

- a) Process media must be used and disposed of in accordance with the instruction of the manufacturers of these substances.
- b) Pay attention with hot process media (risk of burns and scalding)!

### Gas, dust, steam, fumes

- a) Carry out welding, flame cutting and grinding work on the unit only when this is permitted. There is a risk of fire and explosion!
- b) Before starting welding, flame cutting and grinding work, clean the unit and its environment of dust and inflammable substances and ensure adequate ventilation (explosion hazard)!
- c) Inspect fume extraction and ventilation systems at regular intervals and check for proper function!
- d) When working in confined spaces, observe any applicable national regulations! (e.g., have a second person standing by for a fast rescue)

### 4.8 Safety and Monitoring Installations

- No safety or monitoring equipment is included with this unit.
- All safety and monitoring installations, as well as their legal compliance with relevant ordinances, fall under the responsibility of the end-user/owner.

### 4.9 Warning Devices

- No warning devices are included with this unit.
- All warning devices, as well as their legal compliance with relevant ordinances, fall under the responsibility of the end-user/owner.

### 4.10 Technical Data

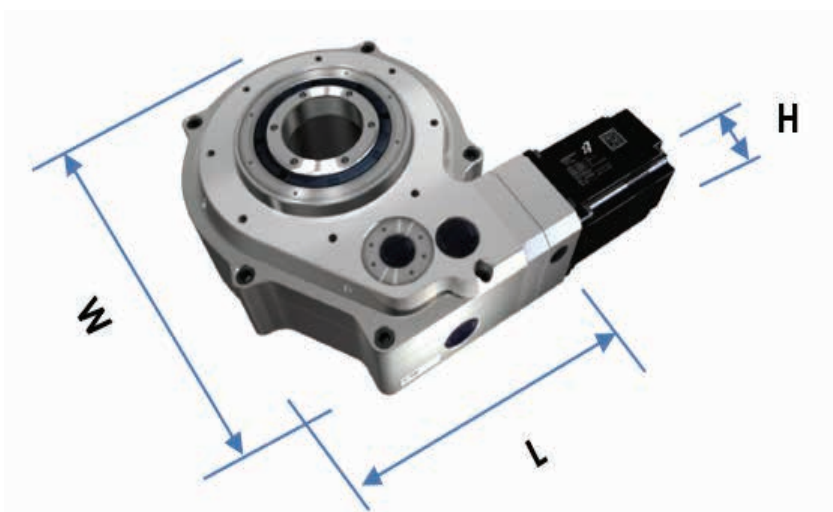
The PGM unit is shipped with grease lubricated.

#### Dimensions and Weights:

Dimensions (LxWxH) [mm]

##### High Geared Type:

MODEL	L	W	H
PGM40	223	190.5	72.5



Weight [kg]: Approximate weight of PGM model without drive motor

MODEL	WEIGHT (Kg)
PGM40	6.7

### Power supply, interfaces, connections:

#### Electrical Equipment

Rated voltage: 100-115V/ 50-60Hz/ 1PH/ N + PE  
200-230V/ 50-60Hz/ 3PH/ N + PE

Control voltage: 24 V

Rated current: SEE MOTOR NAME PLATE

Installed load: SEE MOTOR NAME PLATE

#### Lubrication

See Section 7. Maintenance

#### Process media

See data and information in the annex Supplier documentation and annex Safety data sheets

The technical data in the annexed supplier documentation and safety data sheets.  
must also be observed!



The technical data in the annexed supplier documentation and safety data sheets must also be observed!

### 5. Product Installation





#### 5.1 Installation safety protocol

The unit must be installed on a firm, low-vibration surface in a dry, frost-free, ventilated room.

<b>NOTICE</b>	Good accessibility to the unit must be ensured always to permit simple and safe operation of the unit. The unit footprint and space requirements indicated in the technical data must be noted.
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<b>NOTICE</b>	The unit may only be operated in an environment having adequate lighting in accordance with the ergonomic regulations.
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Before the respective energy and media supplies are connected, the corresponding shut-off device must be closed and secured to prevent unauthorized opening!

 <b>WARNING</b>	<b>Improperly sized equipment introduces the hazard of failure. Make sure all equipment is properly sized and selected.</b>
 <b>CAUTION</b>	<b>A new, foreign object introduces the hazard of tripping/entanglement to the general, everyday workflow of the area. Make sure installation and transportation area is well marked and restricted.</b>
 <b>CAUTION</b>	<b>Cumbersome objects introduce the hazard of awkward positions. Ensure all staff are properly trained on lifting and position techniques.</b>
 <b>CAUTION</b>	<b>Unguarded unit introduces the hazard of sharp edges. Ensure sharp edges are clearly marked and visible to personnel.</b>
<b>NOTICE</b>	<b>Ensure transportation route/area is completely clear to avoid collision of package/unit with external objects.</b>

### 5.2 Installation Prerequisite

- a) Permits/Legal Documentation
- b) Be sure to comply with all local standards, ordinances, and legal requirements.
- c) Building/Installation Site Integrity: Be sure the conditions comply with requirements of parent and unit documentation requirements. Unit will be mounted to an anchored base plate.
- d) Base plate is anchored with floor bolts of the same size or larger than the mounting bolts for the unit.
- e) Base plate is compliant within required 0.1 mm of flatness.
- f) Leveling is critical. Mounting on an uneven surface will cause housing distortion.
- g) Unit Position: Ensure that the unit is properly accessible in its position of incorporation.
- h) Cam-Box cover should be easily accessible.
- i) Motor should be easily accessible
- j) Seal Integrity: Ensure integrity of input and output assembly seals.
- k) Exercise caution while using units in abrasive (metal debris, chips etc.,) environment, seals should be protected from atmospheric conditions.

### 5.3 Installation of Unit

#### Operating Media / Auxiliary Media / Tools

- Torque wrench
- Set of screwdrivers
- Screw adhesive: LOCTITE\*
- Commercial solvents
- High-strength (size) screws
- Fixture-anchors
- Electric/Pneumatic bolt gun

#### Installation Environment

The environment in which the product is installed should strictly satisfy the following:

- Environment temperature +5 degrees Celsius (41 Fahrenheit) to +40 degrees Celsius (104 Fahrenheit)
- Humidity under 85% (no condensation)
- Non-vacuum or extreme pressure
- No exposure to water, oil, chemicals, dusts, etc. directly on the unit
- No existence of explosive gas, other hazardous gas, or radioactive materials
- No direct sunlight
- Excessive shock or force should not be applied (must follow application datasheet).
- Grounded from electric current.
- Minimum electromagnetic noise (be cautious on welding units)
- Easy to carry out maintenance and check oil level and oil cap where applicable.

### Caution

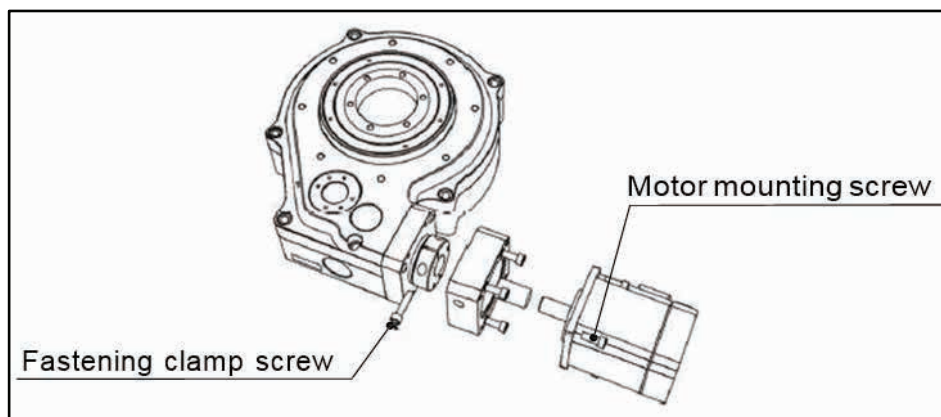
- Please tighten screws with proper tightening torque by using torque wrench. Apply LOCTITE 243 equivalent agent when tightening screws to avoid being loosened during operation. (See Tables 1 and 2)

**Table 1:** Tightening torque table  
Motor mounting flange screws (Aluminum alloy)

Screw Size	Tightening Torque (DIN) 6.8 [Nm]
M3	0.9
M4	2.1
M5	4.4
M6	7.5
M8	18.5
M10	36.0
M12	63.0

**Table 2:** Tightening torque table.  
Output table, housing screws (Steel alloy)

Screw Size	Tightening Torque (DIN) 10.9 [Nm]
M4	4.3
M5	8.6
M6	14.7
M8	35.6
M10	70.6
M12	123.0



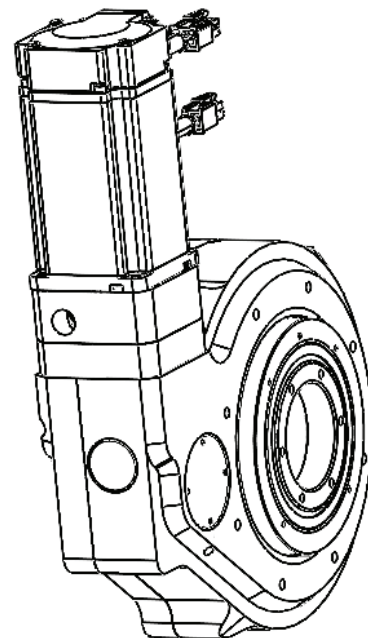
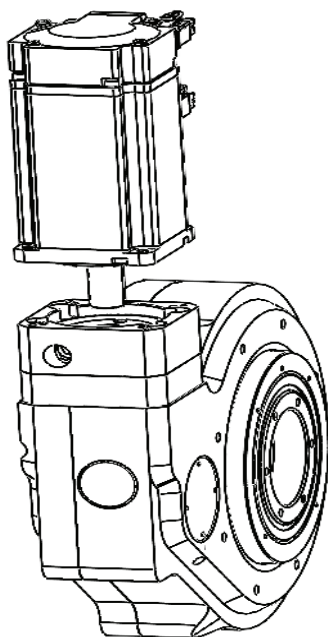
# PGM SERIES

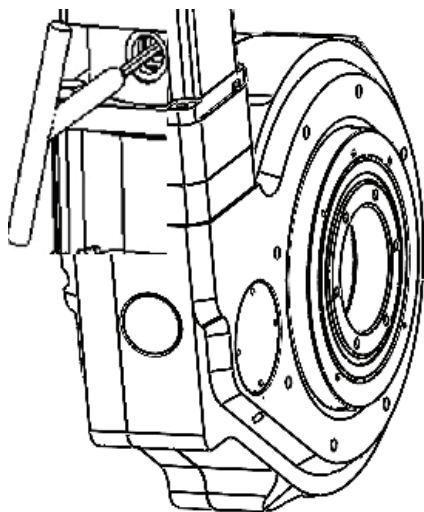
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1. Check whether it is at the position where a screw can access from the access hole of the motor mounting flange. (If the position does not match, apply torque to the output table, rotate the input shaft and move it to a position where the screw can be accessed.)

2. Insert the motor shaft into the coupling hole.  
The motor shaft must be removing flat and oiled beforehand and should be free of dirt or debris.





3. Insert the wrench from the access hole of the motor mounting flange and tighten the fastening screw of the coupling.

Follow these steps if you are removing the motor from the unit.

1. Remove the access hole plug.
2. Turn the coupling screws towards the access hole of the motor mounting flange.  
(Use the JOG operation mode of the motor)
3. Remove the coupling screws
4. Remove the motor mounting screws
5. Remove the motor

### 6. Connection and Operation

#### 6.1 Motor and connection setting

Please connect a servo motor, servo driver and controller exactly according to the instruction manual. When the connection is complete, please program it with appropriate parameter setting depending on operating conditions (speed, load factor, driving pattern). The method of setting and the program, should adhere to standards of servo motor function and instruction manual of the controller.

#### 6.2 Operation check

After completion of installation, check if there is any interference or abnormal noise with other equipment at low-speed operation. If the output system is forcibly driven without interference, overload may be applied to the motor, possibly leading to temperature rise and burnout. Please stop driving as soon as it does not work even if you start the operation.

#### Caution

- Please perform gain adjustment so that unit does not perform a servo oscillation (vibration). The servo oscillation (vibration) after the gain adjustment will damage the unit substantially.

#### 6.3 Normal operation

Perform start and stop by control signals such as a controller, a PC, the touch panel. Please refer to the instruction manual of a motor and the controller for details of the control method.

#### Caution

- Do not perform start and stop of unit by power supply. Follow proper start up and power down procedures whenever needed.
- Oscillating operation under 10 degrees can lead to fretting on the surface of input cam. For small angle oscillating application use, please contact us.

#### 6.4 Position maintenance of the output table when the motor is off.

Because the unit has very high torque transmission properties, there is no self-lock performance. If it is necessary to hold the stop position when the motor power is lost because of excessive torque applied to the output table, use a motor with a brake or apply output locking safety equipment which agrees to design standards and safety standards.

#### Important

- When it is necessary to maintain an output position of the table during power off, please use measures such as brakes, the clamp etc.

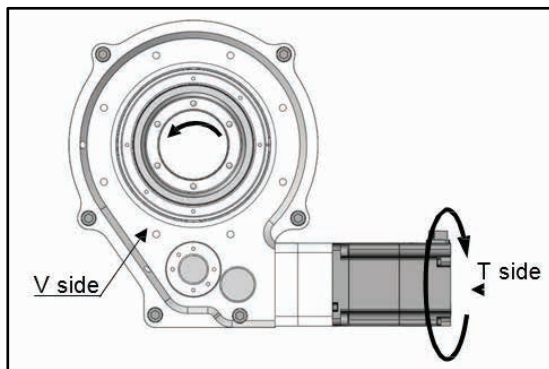
#### 6.5 Operation when the temperature is low.

In the low environment (the winter season, cold districts), viscous resistance of the grease increases, and the motor may would experience higher resistance to rotate.

In this case, please perform warm-up operation. Perform a warm-up until the main unit temperature reaches around 15 degrees Celsius (60 Fahrenheit). If the operation speed is forcibly increased while the viscosity of the grease is in high condition, motor may face overload, resulting in abnormal temperature rise and burnout.

### 6.6 Input/output rotation direction

The rotation direction of the output table with respect to the direction of rotation of the input (servomotor) is as shown in the figure below when looking from the T side. (See Table 5).



**Table 5:** Input/Output Rotation Direction

Rotation Direction	
Input (Servo Motor)	Output Table
CW	CCW

CW: Clockwise, CWW: Counter clockwise

※ Be sure to check the direction of rotation before operation. Rotating in an unexpected direction may result in damage of equipment or injury.

When the input (servomotor) is rotated in the opposite direction to this figure, the output table rotation direction is also reversed.

### 6.7 Operating conditions

Please use the PGM40 within the performance range stated in the catalog or within the range of the rated torque and the maximum speed specified in the usage notice/application datasheet. Using the unit under unreasonable conditions may cause damage to the unit or lower accuracy or may significantly bring down the life of the unit.

#### 6.7.1 Starting Operation

After completing installation of all parts, connect the input system. Make sure that it works smoothly by servo JOG operation. Check operation timing, positioning accuracy, friction torque, smoothness of rotation and so on. This confirms whether the unit is in normal operating condition or not by the servo motor's low speed operation.

#### Caution

Please do not touch the moving part or put your hands on the unit while the unit is in operation.

### 6.7.2 Power Operation

Perform power driving after the confirmation that it is normal state by start driving. (The stop button, please have me in a state to be able to push anytime.)

To start with, drive the unit at low speed and increase speed to application setting speed progressively. Next, check the temperature of the unit and observe for any abnormal noise and vibration.

If unit is found to be functioning normally, increase speed of unit to application needs per datasheet.

### 7. Maintenance

The cam system which the PGM 40 has built-in can maintain performance extremely for a long time when used in a proper environment and following all of the periodic maintenance procedures as required.

Please periodically check the following items for safety and quality maintenance.

#### 7.1 Periodic inspection

Please periodically check the following items for safety and quality maintenance.

- Check for loose screws.
- abnormal noise and abnormal heat
- Abrasion of oil seals.

#### 7.2 Lubricating Grease

Replacement of grease is not necessary.

(If you have any questions about lubrication, please contact to us)

Used lubricating grease: Mobil Mobilux EP 0

### 8.Troubleshooting

If this product does not operate properly, please check the following items.

Condition	Check Items
It does not work even if you operate the startup	<ul style="list-style-type: none"> <li>• Are the motor, driver, and controller connected correctly?</li> <li>• Are the parameter setting of the driver and controller correct?</li> <li>• Are the motor, driver, controllers not out of order?</li> </ul>
Slow rotational speed	<ul style="list-style-type: none"> <li>• Are the clamp collar and the coupling tightened correctly?</li> <li>• Is the ambient temperature low?</li> <li>• Is the servo parameter setting incorrect?</li> <li>• Is the output system in contact with other equipment?</li> <li>• Is there a load more than expected?</li> </ul>
Overshoot is large	<ul style="list-style-type: none"> <li>• Is the setting for the servo motor load correct?</li> <li>• Is there a load more than expected?</li> <li>• Are the clamp collar and the coupling tightened correctly?</li> </ul>
Output is vibrating Settling time is long Drive sound is noisy	<ul style="list-style-type: none"> <li>• Is the servo motor gain set correctly?</li> </ul>
The device is operating differently than the setting	<ul style="list-style-type: none"> <li>• Does strong magnetic noise influencing from outside?</li> <li>• Are the motor, driver, controllers compatible?</li> </ul>
Unit is inclined	Check that there are no obstacles matter or abrasion on the body mounting surface.
Backlash exists on the output mounting parts.	Check tightening condition of output parts
Red or black powder occur in the mounting part	Check whether the fretting corrosion (micro-abrasion) between the fitting does not occur.
Too big output error	Check whether eccentricity installation error of the output mounting parts is not large
Sound observed around the output parts	Check interference with the mounting parts and peripheral equipment
At the time of starting, movement is heavy and hard to turn.	Check that oil viscosity is not high due to the influence of ambient temperature decrease
The output is vibrating (1)	Check whether output load bigger agrees to datasheet. Is the output load firmly held?

Please contact your dealer or us if you require additional trouble shooting.

### 9. Service and Warranty

- In the case where DESTACO confirms that a defect of the Product was caused due to DESTACO design or manufacture within the Warranty Period of the Product, DESTACO shall repair or replace such defective Product at its cost. The Warranty Period shall be from the delivery of the Product by DESTACO Inc. or its distributor to you ("Customer") until the end of one (1) year thereafter, or the end of two thousand (2,000) hours running of the Product installed into Customer's equipment, whichever comes earlier.
- Unless otherwise agreed between the parties in writing, the warranty obligations for the Product shall be limited to the repair or replacement set forth herein. OTHER THAN AS PROVIDED HEREIN, THERE ARE NO WARRANTIES ON THE PRODUCT, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PURPOSE
- No compensation will be provided for the number of man-hours required for demounting and remounting the product from the unit, transportation expenses for re-delivery, warehousing and other incidental expenses, the lost opportunities or any other type of loss due to a shutdown of operation that was caused by a defect in the product.
- The warranty obligation under the Section 1 above shall not apply if:
  - the defect was caused due to the use of the Product deviated from the Specifications or the working conditions provided by DESTACO;
  - the defect was caused due to exposure to any hazardous environment or contamination lubricant or spare part other than the ones approved by DESTACO was used in the Product;
  - the Product was used in an unusual environment (such as high temperature, high humidity, a lot of dust, corrosive/volatile/inflammable gas, pressurized/depressurized air, under water/liquid or others except for those expressly stated in the Specifications);
  - the Product was disassembled, re-assembled, repaired or modified by anyone other than DESTACO; the defect was caused due to the equipment into which the Product was installed;
  - the defect was caused due to an accident such as fire, earthquake, lightning, flood or others; or the defect was due to any cause other than the design or manufacturing of the Product.
- The warranty period for the repaired/replaced Product/part under the Section 1 above shall be the rest of the initial Warranty Period of the defective Product subjected to such repair/replace.

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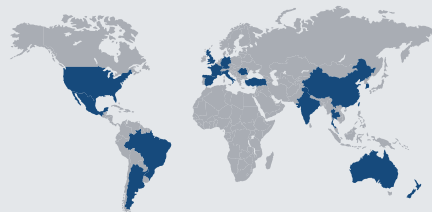


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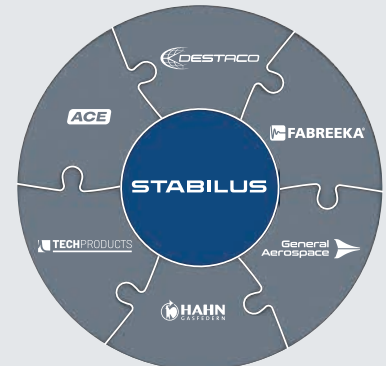
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