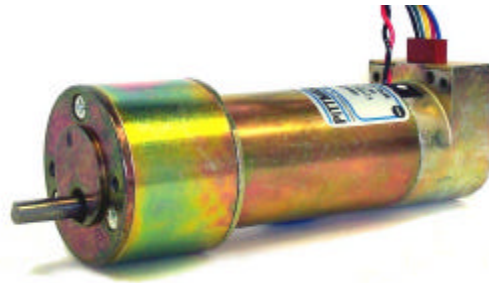


# GM9236S015

Lo-Cog® DC Servo Gearmotor



| Assembly Data                         | Symbol           | Units                                     | Value   |            |
|---------------------------------------|------------------|---|---------|------------|
| Reference Voltage                     | E                | V   | 24      |            |
| No-Load Speed                         | S <sub>NL</sub>  | rpm (rad/s)                               | 790     | (82.7)     |
| Continuous Torque (Max.) <sup>1</sup> | T <sub>C</sub>   | oz-in (N-m)                               | 48      | (3.4E-01)  |
| Peak Torque (Stall) <sup>2</sup>      | T <sub>PK</sub>  | oz-in (N-m)                               | 286     | (2.0E+00)  |
| Weight                                | W <sub>M</sub>   | oz (g)                                    | 22.7    | (644)      |
| Motor Data                            |                  |   |         |            |
| Torque Constant                       | K <sub>T</sub>   | oz-in/A (N-m/A)                           | 6.49    | (4.58E-02) |
| Back-EMF Constant                     | K <sub>E</sub>   | V/krpm (V/rad/s)                          | 4.80    | (4.58E-02) |
| Resistance                            | R <sub>T</sub>   | Ω   | 2.49    |            |
| Inductance                            | L                | mH  | 2.63    |            |
| No-Load Current                       | I <sub>NL</sub>  | A   | 0.16    |            |
| Peak Current (Stall) <sup>2</sup>     | I <sub>P</sub>   | A   | 9.64    |            |
| Motor Constant                        | K <sub>M</sub>   | oz-in/√W (N-m/√W)                         | 4.11    | (2.90E-02) |
| Friction Torque                       | T <sub>F</sub>   | oz-in (N-m)                               | 0.80    | (5.6E-03)  |
| Rotor Inertia                         | J <sub>M</sub>   | oz-in-s <sup>2</sup> (kg-m <sup>2</sup> ) | 1.0E-03 | (7.1E-06)  |
| Electrical Time Constant              | τ <sub>E</sub>   | ms  | 1.06    |            |
| Mechanical Time Constant              | τ <sub>M</sub>   | ms  | 8.5     |            |
| Viscous Damping                       | D                | oz-in/krpm (N-m-s)                        | 0.053   | (3.5E-06)  |
| Damping Constant                      | K <sub>D</sub>   | oz-in/krpm (N-m-s)                        | 12.5    | (8.5E-04)  |
| Maximum Winding Temperature           | θ <sub>MAX</sub> | °F (°C)                                   | 311     | (155)      |
| Thermal Impedance                     | R <sub>TH</sub>  | °F/watt (°C/watt)                         | 56.3    | (13.5)     |
| Thermal Time Constant                 | τ <sub>TH</sub>  | min                                       | 13.5    |            |
| Gearbox Data                          |                  |   |         |            |
| Reduction Ratio                       |                  |   | 5.9     |            |
| Efficiency <sup>3</sup>               |                  |   | 0.90    |            |
| Maximum Allowable Torque              |                  | oz-in (N-m)                               | 300     | (2.12)     |
| Encoder Data                          |                  |   |         |            |
| Channels                              |                  |   | 3       |            |
| Resolution                            |                  | CPR                                       | 500     |            |

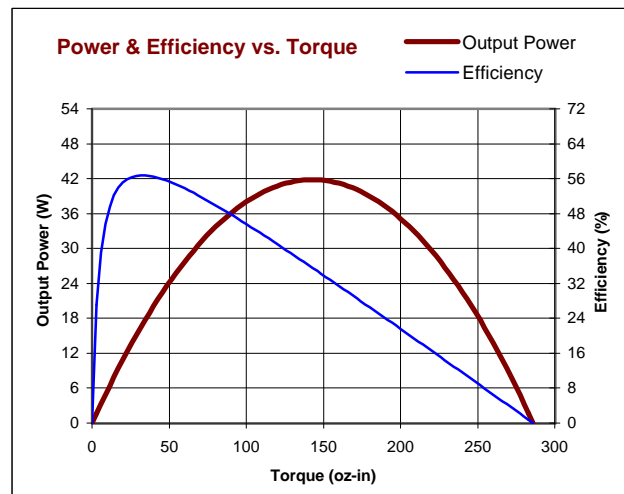
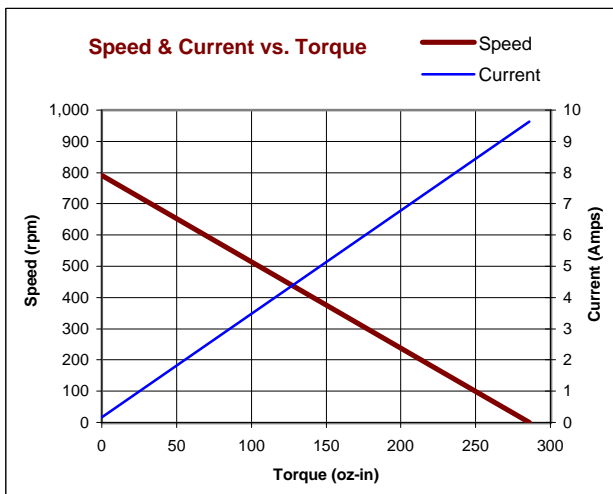
1 - Specified at max. winding temperature at 25°C ambient without heat sink. 2 - Theoretical values supplied for reference only.  
3 - Effective gearbox efficiency for this unit improved by use of ball bearings.

## Included Features

- 2-Pole Stator
- Ceramic Magnets
- Heavy-Gauge Steel Housing
- 7-Slot Armature
- Silicon Steel Laminations
- Stainless Steel Shaft
- Copper-Graphite Brushes
- Diamond Turned Commutator
- Motor Ball Bearings
- Output Ball Bearing
- High Torque Gears

## Customization Options

- Alternate Winding
- Sleeve or Ball Bearings
- Modified Output Shaft
- Custom Cable Assembly
- Special Brushes
- EMI/RFI Suppression
- Alternate Gear Material
- Special Lubricant
- Optional Encoder
- Fail-Safe Brake



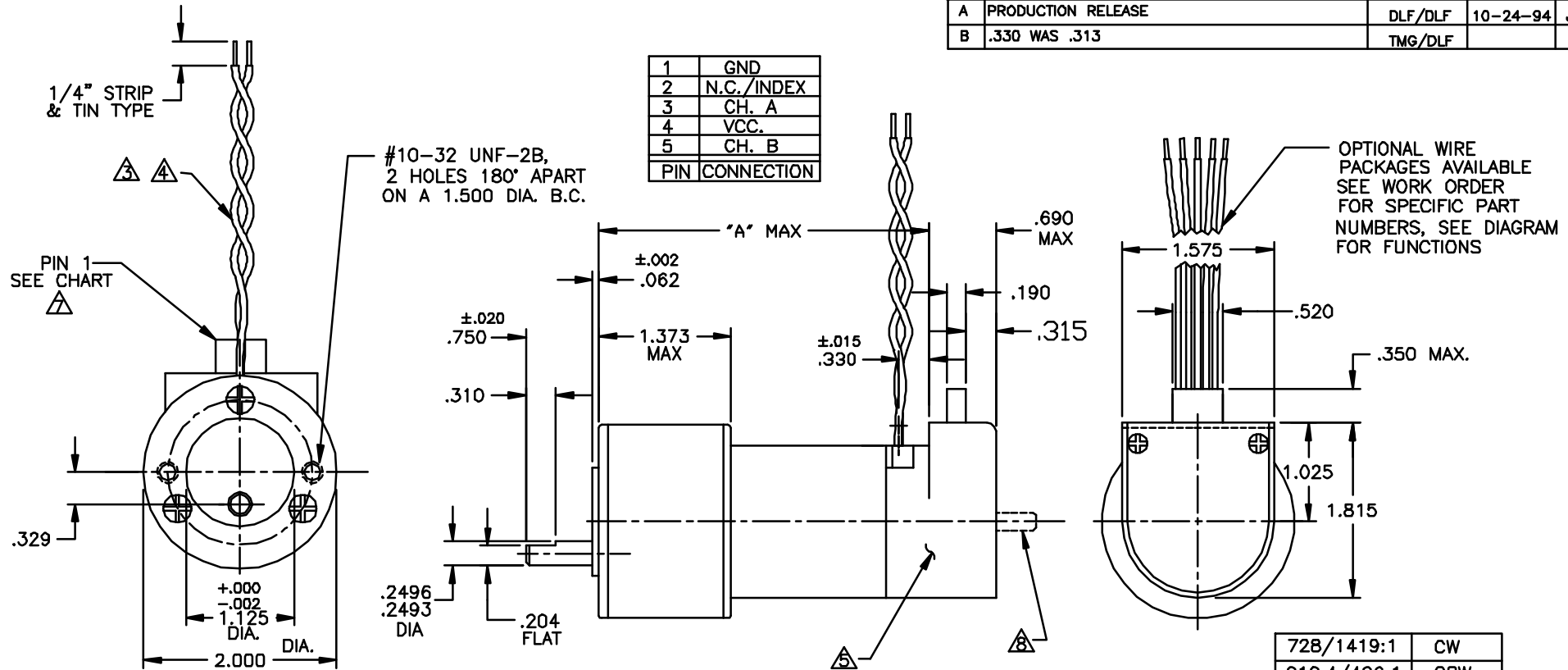
All values are nominal. Specifications subject to change without notice. Graphs are shown for reference only.

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| REVISIONS |                    |           |          |      |
|-----------|--------------------|-----------|----------|------|
| LTR       | DESCRIPTION        | DRFT/ENGR | DATE     | APPR |
| A         | PRODUCTION RELEASE | DLF/DLF   | 10-24-94 | JRM  |
| B         | .330 WAS .313      | TMG/DLF   |          |      |

|                |            |
|----------------|------------|
| 1              | GND        |
| 2              | N.C./INDEX |
| 3              | CH. A      |
| 4              | VCC.       |
| 5              | CH. B      |
| PIN CONNECTION |            |



- NOTES:
- OUTPUT SHAFT ROTATION IS PER CHART, FIGURED WHILE VIEWING MOUNTING END WITH (+) POSITIVE VOLTAGE APPLIED TO RED MOTOR WIRE.
  - ENDPLAY .020 MAX. ON OUTPUT SHAFT, .015 MAX. ON MOTOR SHAFT.
  - STANDARD LEADS ARE 22 AWG. (7X30), PVC INSULATION, UL STYLE 1569/1007 ONE LEAD IS RED, ONE BLACK.
  - STANDARD LEAD LENGTH IS 18 ± 1/2".
  - ENCLOSED IS A HEDS-91X0 OPTICAL ENCODER MODULE. INDEX PULSE OPTIONAL. SEE DATA SHEET FOR LINE COUNT.
  - MAX TORQUE GEARBOX IS TO 175 oz.in. STANDARD GEARING, 300 oz.in. HIGH-TORQUE GEARING, AND 500 oz.in. WIDE FACE GEARING.
  - MOLEX CENTER CRIMP TERMINAL HOUSING 2695 SERIES, WILL ACCEPT MOLEX MATING TERMINALS 2759, PITTMAN P/N: 81-54-1.
  - OPTIONAL REAR SHAFT EXTENSION AVAILABLE (.1564/.1561 DIA.).

|           |         |
|-----------|---------|
| GM92X6    | 4.289   |
| GM92X5    | 3.939   |
| GM92X4    | 3.639   |
| GM92X3    | 3.439   |
| GM92X2    | 3.064   |
| MODEL No. | "A" MAX |

|              |                |
|--------------|----------------|
| 728/1419:1   | CW             |
| 218.4/426:1  | CCW            |
| 65.5/127.7:1 | CW             |
| 19.7/38.3:1  | CCW            |
| 5.9/11.5:1   | CW             |
| GEAR RATIO   | SHAFT ROTATION |

|   |                               |
|---|-------------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:<br>FRACTION DECIMAL ANGLES<br>±1/84 ±.015 ±15 | FILE: 150\413                 |
| BREAK ALL SHARP EDGES   | DRAFTED BY DLF DATE 15 AUG 94 |
| MATERIAL:   | ENGINEERED BY DLF 15 AUG 94   |
| FINISH:   | APPROVED BY JR MELA 10-24-94  |
|   | NEXT ASSY:                    |
|   | USED ON:                      |

**PITTMAN**  
A Division of Penn Engineering & Manufacturing Corp.  
2000 West Chester Pike, P.O. Box 1000, West Chester, PA 19380

**TITLE: OUTLINE & MOUNTING DIMENSIONS GM9200 SERIES MOTOR WITH H.P. ENCODER MODULE 9100**

DWG. NO. **B- 150-413** REV. **B**

SCALE: NONE SHEET 1 OF 1