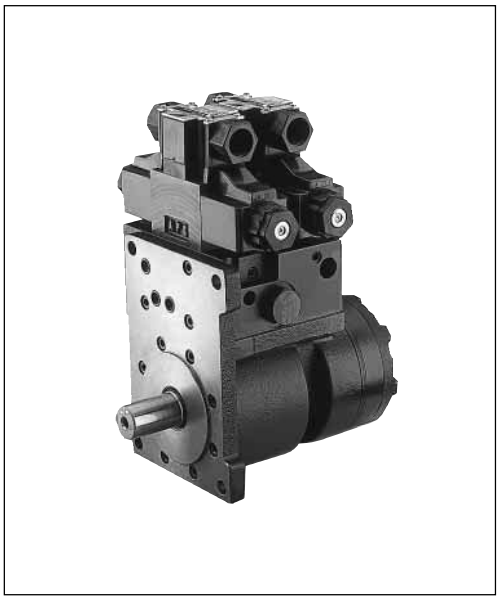
# Positioning motor (TM series)



**< Applications >**

Machining center ATC system
NC lahte's edged tool base
Auto-loader Pallet changer
Steady dimension's forwarding device

## Features

- **Oil hydraulic mechanism**
  The system deciding a revolution's position of hydraulic mechanism developed by our own technologies based on the orbit motor of low speed with high torque and low noise.
- **Small & compact**
  Built in the mechanism concerning to a revolution, reducing speed and deciding position of revolution. The small sized unit that all components are integrated into one equipment without piping.
- **Indexing shorten time**
  With the good response of the built-up process and with the adoption of the reduction speed cam and the mechanic valve, the precise speed reduction can be obtained. Accordingly, the shock-less cease can be done in a short time without miss-index.
- **High accuracy positioning**
  There are three kinds indexing number 1/rev, 2/rev, 3/rev, while there are two kinds of groove shapes for positioning, V groove with high accuracy (±0.1°) and R groove with loose angle for an auxiliary positioning urpose.
- **Simple control & Simple handling**
  Since it is actuated only by ON/OFF of solenoid valve, the control and handling is vary simple.
- **Any choice of forwarding pitch**
  The any choice of forwarding pitch makes it possible to carry out a smooth pitch forwarding.

## Nomenclature

| TM | ** | * | * | - | * | * | * | * | - | ** | * | * | - | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | | 12 |

**(1) Model No.**
TM : TM positioning motor

**(2) Motor capacity**
05 : 54cm³/rev
10 : 96cm³/rev
13 : 129cm³/rev
19 : 184cm³/rev

**(3) Flange**
A : SAE A
B : SAE B
F : Flange piping

**(4) Shaft diameter**
S : $\phi$20.0 (key width: 6.00 mm) ★1
M : $\phi$25.0 (key width: 7.00 mm)
I : $\phi$25.4 (key width: 6.35 mm)

**(5) Indexing number**
1 : 1 index/rev.
2 : 2 index/rev.
3 : 3 index/rev.

**(6) Cam groove**
R : R groove (auxiliary positioning with loose angle)
V : V groove (positioning accuracy: ±0.1°)

**(7) Control port**
0 : None
2 : With UN, CL
3 : With UN, CL, CO

**(8) Operating pressure**
1 : 3.5 MPa {35kgf/cm²} or less
2 : 3.6~5 MPa {36~50kgf/cm²}
3 : 5.1~7 MPa {51~70kgf/cm²}

**(9) Solenoid operated valve method ★2**

| Mark | For revolution | For pulling out pins |
|---|---|---|
| AT | KSO-G02-2CA-30-EN | KSO-G02-9CA-30-EN |
| AF | KSO-G02-2CA-30-CE | KSO-G02-9CA-30-CE |
| BT | KSO-G02-2CB-30-N | KSO-G02-9CB-30-N |
| PT | KSO-G02-2CP-30-EN | KSO-G02-9CP-30-EN |
| XT | LS-G02-2CA-20-EN | LS-G02-9CA-20-EN |
| XF | LS-G02-2CA-20-CE | LS-G02-9CA-20-CE |

**(10) CL-port throttling mark**
0 : $\phi$1.0 1 : $\phi$2.0
2 : $\phi$1.2 3 : $\phi$2.2
4 : $\phi$1.4 5 : $\phi$2.4
6 : $\phi$1.6
8 : $\phi$1.8 N : None

**(11) Proximity switch**
K : Provided
N : None
S : None (with detection rod)

**(12) Design number (the design number is subject to change)**

Note) ★1 Shaft diameter : S is only applied for TM05.
★2 Refer to LS-G02 (page 27) and KSO-G02 (page 29) for the specifications of solenoid operated valves.

## Specifications

| Model No. | | TM05 | | | TM10 | | | TM13 | | | TM19 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Motor capacity | $cm^3/rev$ | 54 | | | 96 | | | 129 | | | 184 | | |
| Max. load (GD2: $N \cdot m^2\{kgf \cdot m^2\}$) | $kg \cdot m^2$ | 0.125 (5 {0.5}) | | | 0.50 (20 {2}) | | | 0.75 (30 {3}) | | | 1.25 (50 {5}) | | 1 (40 {4}) |
| Index number | $rev^{-1}$ | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Max. revolution speed | $min^{-1}$ | 200 | | 150 | 200 | | 150 | 150 | | | 100 | | |
| Required oil volume | L/min | 13 | | 10 | 22 | | 17 | 22 | | | 21 | | |
| Index time | s ★3 | 0.50 | 0.35 | 0.30 | 0.70 | 0.50 | 0.40 | 0.80 | 0.60 | 0.50 | 1.00 | 0.70 | 0.60 |
| Speed reduction signal emitting angle | | 120° on this side. | | 100°on this side. | 120° on this side. | | 100°on this side. | 120° on this side. | | 100°on this side. | 90° on this side. | | |
| Rated pressure | MPa {$kgf/cm^2$} | 1st type : 3.5 {35} | | | 2nd type : 5 {50} | | | 3rd type : 7 {70} | | | | | |
| Permissible back pressure | MPa {$kgf/cm^2$} | 1 {10} | | | | | | | | | | | |
| Rated flow rate | L/min | 20 | | | | | | | | | | | |
| Indexing accuracy | | ±0.1° | | | | | | | | | | | |
| loose angle | | R groove: ±0.1° V groove: 0° | | | | | | | | | | | |
| Radial load | kN {kgf} | 2.25 {225} | | | 4.5 {450} | | | | | | | | |
| Thrust load | kN {kgf} | 2.25 {225} | | | 3.5 {350} | | | | | | | | |
| Lowest operating pressure | MPa {$kgf/cm^2$} | 1.5 {15} | | | | | | | | | | | |
| Holding torque | $N \cdot m$ {$kgf \cdot m$} | 160 {16} | | | | | | | | | | | |

Note) ★3 The index time is the one at the pressure 3.5MPa {35$kgf/cm^2$}.