

Magnescale

Tool Setter

TS40L2 / TS41L2 / TS42L2

Instruction Manual

Read all the instructions in the manual carefully before use and strictly follow them. Keep the manual for future references.




Safety Precautions

Magnescale Co., Ltd. products are designed in full consideration of safety. However, improper handling during operation or installation is dangerous and may lead to fire, electric shock or other accidents resulting in serious injury or death. In addition, these actions may also worsen machine performance.

Therefore, be sure to observe the following safety precautions in order to prevent these types of accidents, and to read these "Safety Precautions" before operating, installing, maintaining, inspecting, repairing or otherwise working on this unit.



Warning Indication Meanings

The following indications are used throughout this manual, and their contents should be understood before reading the text.

Symbols requiring attention	Symbols prohibiting actions
 CAUTION	 DO NOT DISASSEMBLE
 ELECTRICAL SHOCK	


Warning

Failing to follow the precaution items given below may lead to severe injury or death.

-  Do not damage, modify, excessively bend, pull on, place heavy objects on or heat the cable, as this may damage the cable and result in fire or electric shock.
-  Do not disassemble or modify the unit, as this may result in injury or electric shock. These actions may also damage the internal circuitry.

Caution

Failing to follow the precaution items given below may lead to injury or damage to surrounding objects.

-  The unit does not have an explosion-proof structure. Therefore, do not use the unit in an atmosphere charged with inflammable gases as this may result in fire.

General precautions

- Before and during operations, be sure to check that our products function properly.
- Provide adequate safety measures to prevent damages in case our products should develop malfunctions.
- Use outside indicated specifications or purposes and modification of our products will void any warranty of the functions and performance as specified of our products.
- When using our products in combination with other equipment, the functions and performances as noted in this manual may not be attained, depending on operating and environmental conditions.

[For U.S.A. and Canada]

THIS CLASS A DIGITAL DEVICE COMPLIES WITH PART15 OF THE FCC RULES AND THE CANADIAN ICES-003. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS.

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDERSIGNED OPERATION.

CET APPAREIL NUMÉRIQUE DE LA CLASSE A EST CONFORME À LA NORME NMB-003 DU CANADA.

日本からの輸出時における注意

本製品(および技術)は輸出令別表第1の16の項(外為令別表16の項)に該当します。キャッチオール規制による経済産業省の許可要否につきましては、輸出者様にてご確認ください。

For foreign customers

Note: This product (or technology) may be restricted by the government in your country. Please make sure that end-use, end user and country of destination of this product do not violate your local government regulation.

Magnescale Co., Ltd.

45 Suzukawa, Isehara-shi, Kanagawa 259-1146, Japan

TS40L2 / TS41L2 / TS42L2
2-A02-069-1C

2020.6
Printed in Japan
©2016 Magnescale Co., Ltd.

Overview

This product is a tool setter for a vertical machining center.

Features

- It employs a non-contact sensor to ensure a low measuring force and to maintain stable sliding for long periods of time with no deterioration of the contact point.
- When air is injected from the air intake, the air is vented from the air pipe to the tool measurement surface, enabling to clean the tool measurement surface. Air is also supplied to the inside of the movable barrel, which helps to prevent the entry of coolant, chips and other foreign matter to the moving parts.
 - * Air injection also has the auxiliary function of raising up the tool measurement surface.
 - Air type : Dry air
 - Supply range: 0.2 to 0.7 MPa

Model Name

TS4 □ L2 - ○ ▽ 1 G

▽	Conduit cable length
1	1 m
2	2 m
3	3 m
4	4 m
5	5 m
○	Cable length
2	2 m
3	3 m
4	4 m
5	5 m
6	6 m
7	7 m
8	8 m
9	9 m
A	10 m
□	Air pipe position*Specification reference
0	Right
1	Center
2	Left

Note: Select a conduit length that is shorter than the cable length.

Notes on Installation

When mounting the tool setter on a machine, manufacture a bracket and take care for the parallelism relative to the machine guide and the perpendicularity relative to the main shaft. When mounting the bracket on a guide, etc., ensure sufficient rigidity and install the bracket so that there is no deflection due to gravity or the measuring force. Install the bracket with an approximate parallelism and perpendicularity of 0.005 mm or less. The parallelism between the mounting surface of this tool setter and the tool measurement surface is guaranteed to 0.005 mm or less.

When mounting the main unit on the bracket, check that there is no dirt, chips or other foreign matter clasped between the installation surface and the main unit before fixing the unit in place. Use a fixing screw tightening torque of 0.8 to 1.5 N·m.

Be sure to turn off the power switch before you connect or disconnect the wire between the tool setter and electrical control unit.

Locate the measuring unit at least 100 mm away from a strong magnetic source. (such as magnetic or electromagnetic chucks) If a strong magnetic field exists in the vicinity of the product while the product is in use, the repeatability may be compromised. In this case, repeat the reference point acquisition operating.

Wire the output cable separately from power lines.

When coupling relays, solenoids, motors or other devices to this unit, be sure to take measures to prevent noise.

The bending radius of the cable is shown below. Note that exceeding these values may cause disconnection or other failures.

Minimum bending radius Cable portion (non-conduit portion) : 20 mm
Conduit portion : 30 mm

Notes on Use

When the tool measurement surface of this tool setter is pressed in by 1 mm, the reference point signal is output. When pressed in further by 5 mm, the overtravel (OT) signal is output. Use within the range where the OT signal is not detected when measuring tools.

Always use a constant speed when contacting the tool to the tool measurement surface. If measurement is performed with varying speed, the measurement position may become unstable due to the electrical response speed performance of the machine.

When returning the tool measuring surface (a tip) to the original position from its pushed end, be sure not to rapidly returning it nor returning by the lateral movement. By its reaction the unit may be damaged or cause malfunction. Also avoid returning the tip rapidly while you mount or clean the unit.

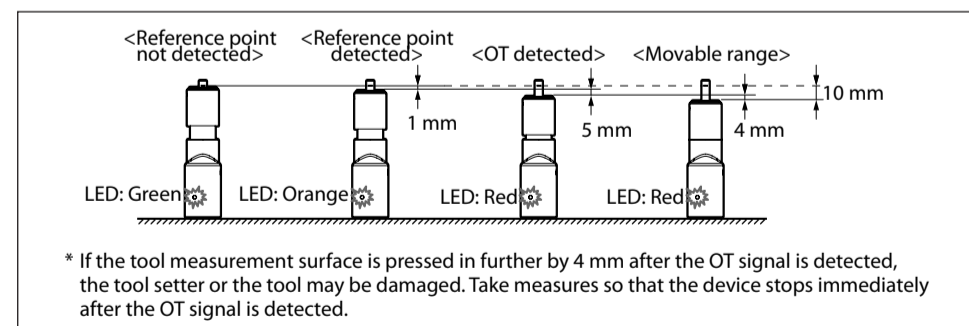
When coolant, chips or other foreign matter stick to the tool measurement surface and cannot be removed by air, this may result in measurement error. In these cases, clean the tool measurement surface directly with alcohol, etc.

Reference point signal: Perform tool measurement using this signal. (LED: lighted orange)

OT signal : Operating limit signal. Pressing in the tool measurement surface further after this signal is output may result in damage to the machine, the tool and the tool setter main unit. (LED: lighted red)

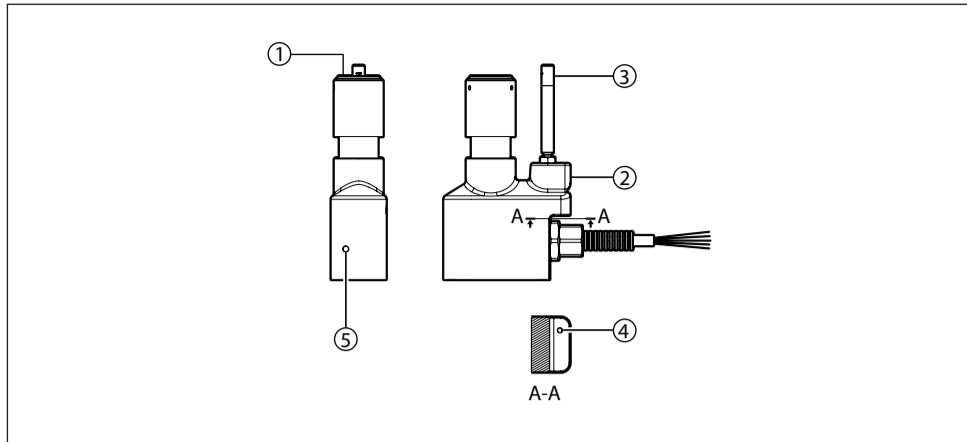
To prevent malfunction or damage to the machine and the tool setter main unit, take measures so that the OT signal is used to emergency stop the device.

The tool measurement surface has a movable range of approx. 10 mm from the upper end.



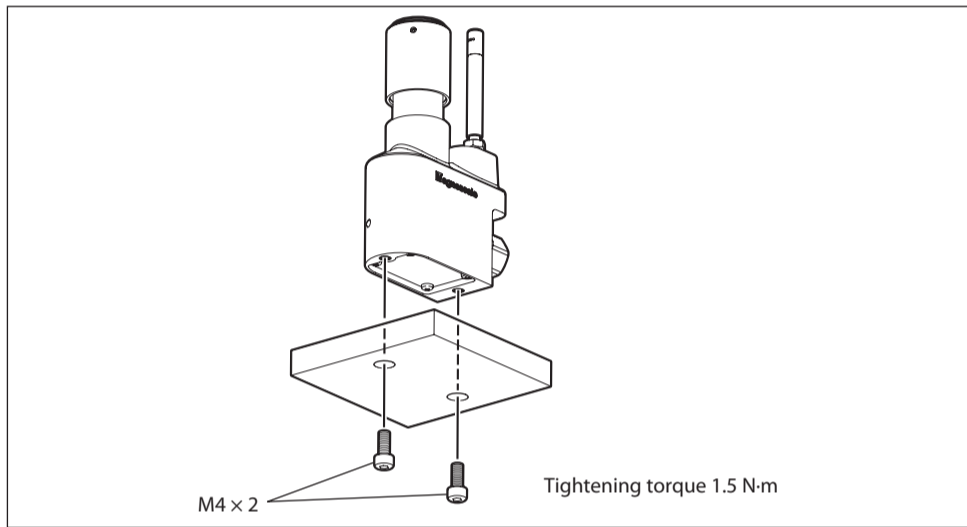
* If the tool measurement surface is pressed in further by 4 mm after the OT signal is detected, the tool setter or the tool may be damaged. Take measures so that the device stops immediately after the OT signal is detected.

Name and Function of Each Part



- ① **Tip**
Tool measurement surface
- ② **Air intake**
Air intake to air pipe and drain hole (R 1/8).
- ③ **Air pipe**
Vents air to tool measurement surface.
- ④ **Drain hole**
Cutting oil and similar substances that penetrate the inside of the movable barrel are discharged from this hole.
- ⑤ **LED indicator**
- | | |
|--------------------------|--------|
| Nothing detected | Green |
| Reference point detected | Orange |
| OT detected | Red |

Mounting



Specifications

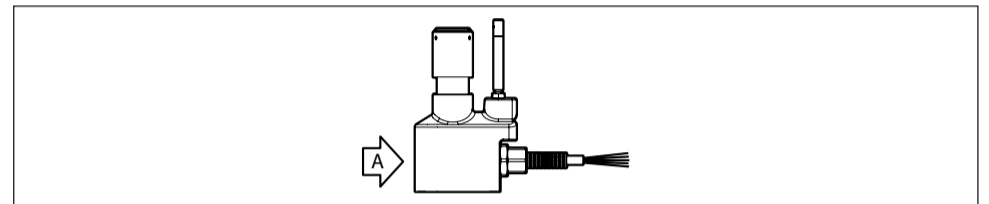
Model name	TS40L2	TS41L2	TS42L2
Movable length	10.5 ± 0.5 mm		
Reference point position	1.0 ± 0.5 mm		
OT position (overtravel)	5.0 mm ± 0.5 mm from reference point position		
Reference point repeatability (20 °C)	1 μm or less		
Operating voltage range	12 to 24 VDC		
Power consumption	0.5 W		
Inrush current	0.5 A max. (When the power supply rise time is 10 ms)		
Output specifications	Transistor output (photocoupler isolation) between Output-COM: MAX 200 V, 0.5 mA to 0.1 A		
Position detection available speed	5 to 3000 mm/min		
Measuring force (20 °C, reference point position)	0.6 ± 0.2 N		
Protection grade	IP67 (main unit only)		
Number of strokes ^{*1}	5 million strokes		
Air pipe position ^{*2}	Right	Center	Left
Cable length ^{*3}	2 to 10 m (1 m pitch)		
Conduit cable length ^{*3}	1 to 5 m (1 m pitch)		
Operating temperature	0 to +50 °C (No condensation)		
Storage temperature and humidity	-15 to +65 °C (90%RH max.)		
Mass	230 g (cable not included)		
Accessories	Instruction Manual		

*1 : Depends on the evaluation test defined by Magnescale Co., Ltd.

*2 : Air pipe position: When seen from the A direction in the below figure

*3 : Total length of conduit from main unit

Conduit cable length = Cable length - (1 m or more)



Cable Specifications

Cable color	Signal
Purple	12 to 24 VDC
Black	0 V
Blue	Reference point signal (+)
Yellow	Reference point signal (-)
Orange	OT signal (+)
Gray	OT signal (-)
Shielded wire	Connected to main unit

Optional Accessories

<Replacement parts>

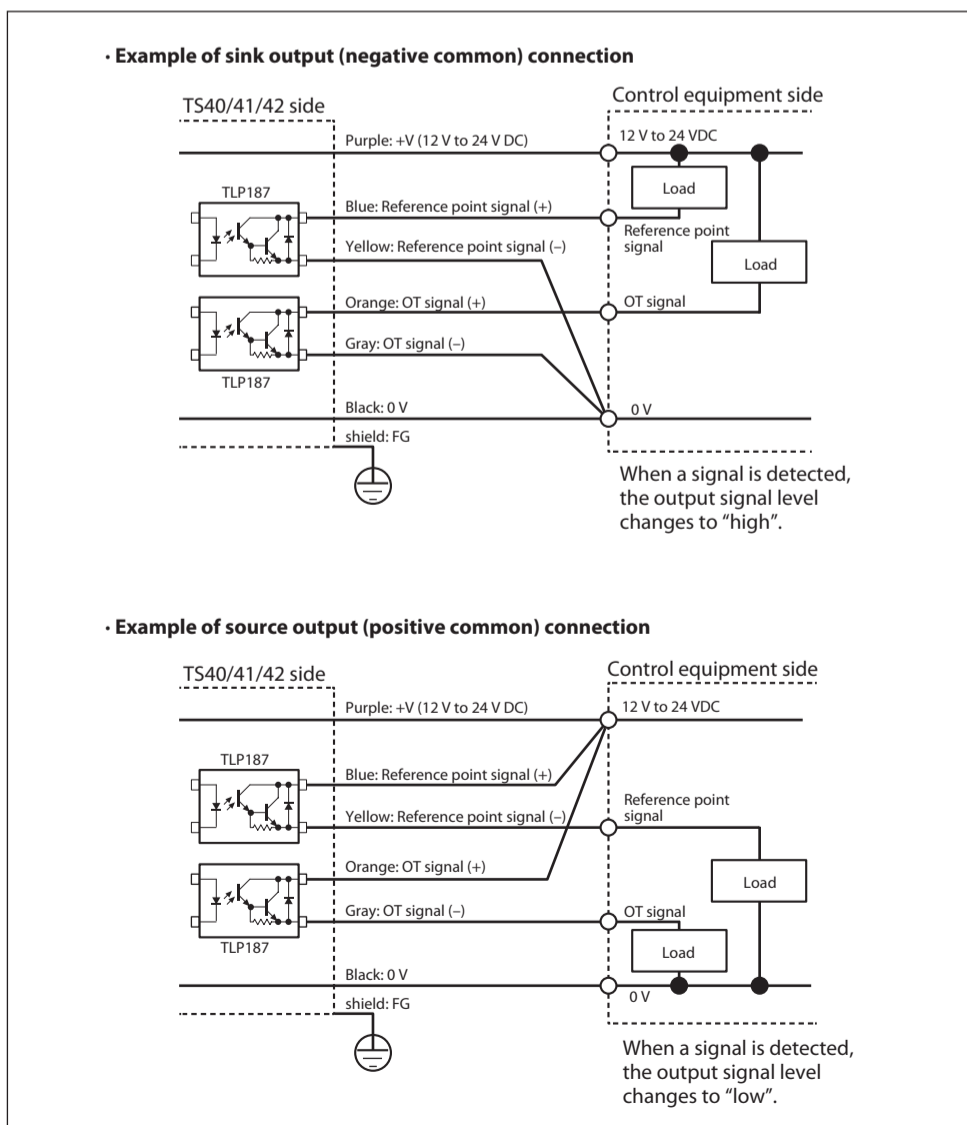
- TZ40 tip set : Replacement tip for tool surface measurement × 1
Fixing screw HSS2 × 2 (conical tip) × 3
Hex wrench (opposite side 0.9 mm)
- TZ41 pipe set: Replacement air pipe × 1
Fixing nut N4 (mounted on the air pipe) × 1

Connecting to the Control Equipment

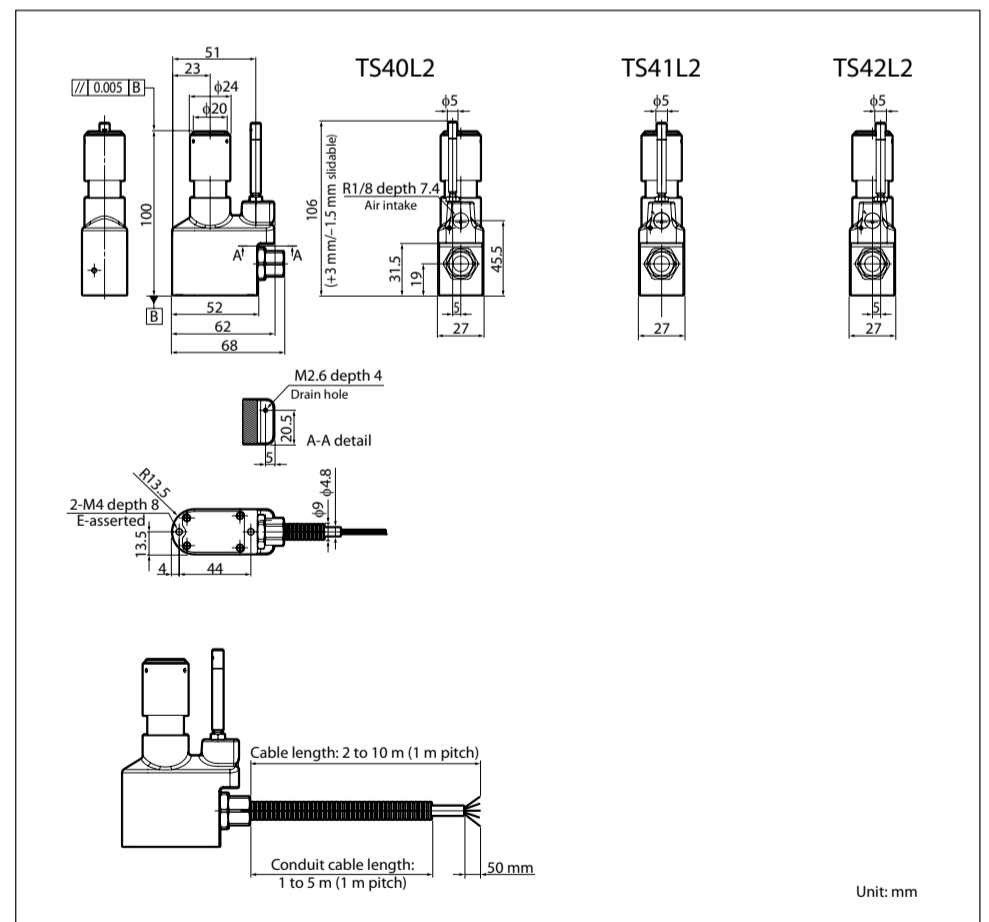
This product with transistor type output needs to be connected with the control equipment in accordance with its input current direction.

Be aware that incorrect wiring may cause malfunction.

Be sure to turn off the power before you connect or disconnect the wires between the tool setter and electrical control equipment.



Dimensions



Unit: mm