



TPS TRANSPORTER® SWITCH SERIES MAGNETS INSTALLATION & OPERATION MANUAL

Pneumatically actuated MAGNET without controls

OPERATING PRINCIPLE

Transporter® Switch Series Magnets are ideal for use where vacuum cups and grippers are typically used for lifting and moving steel sheets, blanks, stamped parts and complete assemblies.

Powerful Rare Earth Magnets positively hold the parts during transfer, greatly reducing the chance of slipping and shifting of the part due to oil or other coatings.

The TPS Lifting System is a **Magnet Lifting Pod** consisting of a magnet, housing and actuation cylinder. The cylinder, upon receiving an air signal from a control valve, moves the magnet within the housing. By stroking the cylinder out, the cylinder moves the magnet toward the housing face and into the grip position. By stroking the cylinder in, the cylinder moves the magnet away from the housing face and into the release position.



OPTIONAL CONFIGURATIONS

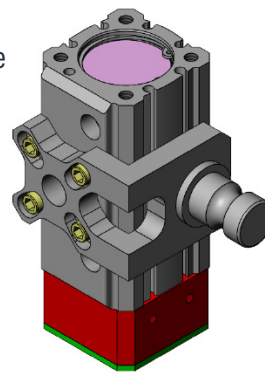
The TPS Transporter® can be configured in multiple sizes with varied lifting capacities. Available options include:

- » No-mar contact surface to protect the finish of the items to be lifted.
- » Alternate mounting provisions can be attached including an 'Apple Core' Mount, Ball Mount or 3/8" NPT Flange Mount (hardware is included with mounting option kits).
- » V-brackets to retain rounds or 90° shapes centered on the magnet.

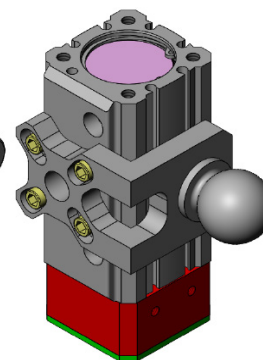
Custom Lift Assist Assemblies

IMI Cylinder Actuated Magnets can be configured in combination with multiple coordinated units mounted on common framework.

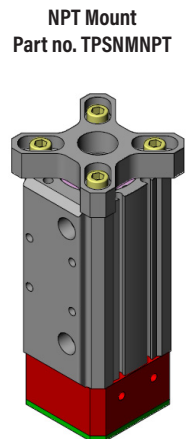
These Lift Assist (LA) assemblies can be custom designed to suit the load and part geometry for specific applications. Contact IMI Automation Group for Lift Assist Design and Engineering support.



Apple Core Mount
Part no. TPSAMNT



Ball Mount
Part no. TPBMNT



NPT Mount
Part no. TPSNMNPT



HEALTH AND SAFETY WARNINGS

GENERAL



Please be advised that in and around the application of magnetic equipment, there are potential safety concerns that can arise with sensitive medical devices:



- » Pacemaker behavior can be affected when they are near strong magnetic fields
- » Medical implants and external fixation systems can be influenced by magnetic fields
- » Hearing aid behavior may be affected when exposed to strong magnetic fields

Any individual that carries the above equipment or other sensitive medical devices should use caution when they are around or handling magnets. For more specific information the wearer should contact their physician.



Beware of pinch points from sudden attraction and unexpected movement between magnets and ferrous metal equipment components or tools.

Keep feet and other extremities out from beneath a lifted load.

OTHER PRECAUTIONS & SAFETY MEASURES

The greatest effectiveness of any magnetic lift is achieved when the magnet face(s) makes complete contact with the load. Therefore, it is recommended to:

- » Keep the contact surface of the magnet clear of debris. Wipe the surface of the magnet with a shop rag with the magnet in the release mode and when the magnet is not in service.
- » Keep the material to be lifted clean and free of chips, oil, slag, welding beads, dirt, etc. Clear any foreign material from the parts before setting magnet on the parts.
- » Periodically check the condition of the magnetic contact face(s) to ensure that it is flat and has not been inadvertently damaged during its time in use.
- » DO NOT lift a load weighing more than the holding capacity of the magnet or the sum of the magnets contacting the load.
- » DO NOT release the load before it is properly positioned and supported.
- » DO NOT perform welding operations in close proximity to the magnet(s).
- » DO NOT use the magnet lift system as part of the welding system ground circuit.
- » DO NOT leave suspended loads unattended.
- » DO NOT operate the magnet with missing parts or damaged or malfunctioning components.
- » DO NOT remove or obscure any product labeling.
- » ALWAYS use the entire contact surface of the magnets whenever possible.
- » ALWAYS keep magnet contact face perfectly flat and parallel to the surface of the load.



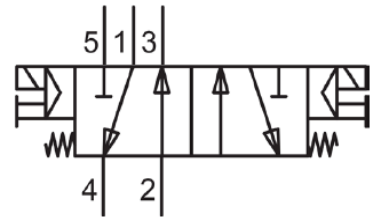
INSTALLATION INSTRUCTIONS

MECHANICAL

- » The standard magnet housing is supplied with drilled and tapped holes for mounting.

PNEUMATIC

- » The magnet requires a control valve (supplied by others) to actuate the cylinder. The valve should be a 5-way, 2 position unit with a coefficient of Flow (Cv) of 2.0 or greater. The valve can be solenoid or air pilot operated or manually actuated dependent upon the control scheme chosen by the user.
- » The valve cylinder ports are to be plumbed to the cylinder inlets using adequately sized tubing or hard piping; minimum recommended size is 1/4" OD with 0.040" wall thickness.
- » Any switches or pilot valves used to operate the control valve are to be furnished by others.
- » Supply pressure must not exceed 80 PSI at the TPS ports.
- » Operating at pressures above 80 PSI will lead to premature failure of the magnet.



Air must be clean, dry and non-lubricated.

- » Distance between manifold and filter/regulator should be as short possible and of the largest line possible - 3/8" or 1/2" hard black pipe is optimal.

Manifold to Magnet Line Size			Pressure required (psi) when used with Cv-2.0 valve
Tubing length	Tubing O.D.	Number of PS units per manifold	
8 ft	3/8"	2	20
		4	24
		6	28
		8	30
	1/2"	2	20
		4	24
		6	28
		8	30
Flow required per TPS unit is 0.01 SCFM			



NOTE: TPS units require a minimum of 1/4" O.D. tubing to magnet.



OPERATING INSTRUCTIONS

MAGNET PLACEMENT ON PART

- » To ensure optimum magnetic hold on the part, place the magnet on a flat location on the part where the magnet face can be positioned in full contact with the part.
- » Avoid areas where part will flex or bounce and peel away from the face of the magnet.
- » Try to distribute the weight of the part equally between the magnets on the tooling arm.
- » Inspect magnet units for damage to magnet housing and proper operating condition.
- » Clean magnet face at least daily with a rag or gloved hand to minimize collected tramp metal.
- » It is recommended that magnet performance be tested on an annual basis. Test methods may vary depending on the application; contact IMI for information and options for testing.

PNEUMATIC

- » Air directed to the top port actuates the magnet into the grip/on state.
- » Air directed to the bottom port actuates the magnet into the release/off state.

Pressure should never be applied to the lower Transporter® TPS port during a transfer cycle while a part is present as this will cause the unit to release the part.



Timing of the valve actuations may need to be adjusted for certain applications to prevent undesirable shifting of the part during the Grip and/or Release cycle to maintain precise part orientation.

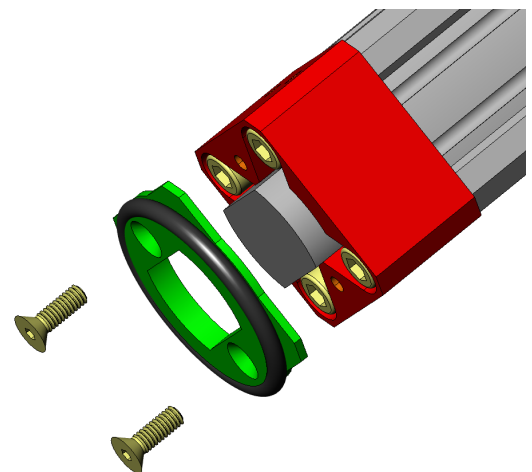
Actuating the valve prematurely in order to reduce cycle times could cause the part to jump, shift or drop in a manner that is not desired.

NON-MARRING KIT INSTALLATION

To convert a TPS unit from a standard configuration to a Non-Marring unit:

ref: *TPS25NMK Non-Marring Kit*

1. Remove the two countersunk flat head screws from the face of the unit using a 3/32" hex key (Allen wrench).
2. Remove the standard faceplate and replace it with the non-marring faceplate.
3. Re-install the two flat head fasteners.





PULL FORCE SPECIFICATIONS

The following table indicates pull force (lbs) for various steel thickness:

Thickness of Steel			TPS25	TPS25NM	TPS32	TPS32NM	TPS40	TPS40NM
Ga	inch	mm						
26	0.018	0.5	6.1	5.2	10.8	8.7	12.1	12.6
22	0.030	0.8	10.5	9.5	17.1	14.7	20.1	20.8
18	0.048	1.2	20.3	18.4	31.8	29.0	40.1	41.0
16	0.060	1.5	24.5	22.0	37.7	34.9	48.5	9.8
14	0.075	1.9	29.6	25.4	46.8	42.8	64.6	66.8
12	0.105	2.7	32.8	27.0	58.0	49.8	96.2	100.2
	0.188	4.8	34.8	26.4	60.9	49.5	119.1	121.1
	0.250	6.4	34.8	26.8	60.5	49.2	121.6	124.9
	3.0	76.2	34.4	26.4	57.5	49.0	122.5	124.3

NOTES:

- 1) NM designation indicates non-mar surface option
- 2) Pull force listed is NOT derated. Proper design must include no less than 3:1 design safety factor.
- 3) Values in shaded cells indicate that the magnet will not destack material of the specified thickness.

MAINTENANCE

MECHANICAL

- » Inspect magnet units for damage to magnet housing
- » Inspect magnet unit mounting. Look for loose fasteners.
- » Check for damaged, cracked or bent mounts, fasteners or fittings.
- » Clean magnet face at least daily with a rag or gloved hand to minimize collected tramp metal.
- » It is recommended that magnet performance be tested on an annual basis. Test methods may vary depending on the application; contact IMI for information and options for testing.

PNEUMATIC

- » Inspect for tubing damage (nicks/cuts).
- » Periodically check valving for wear/leakage.



TROUBLESHOOTING

If magnets will not cycle from one mode to the other:

- » Check air pressure at source and at magnet. Pressure must match that shown on equipment drawing.
- » If proper air pressure is present, perform the following check:
 - » Place magnet in Release mode then remove to a service area.
 - » Place magnet in Grip mode.
 - » Pass a piece of scrap steel fastened to a non-ferrous stick or rod under each magnet.

Warning: Do not hold the scrap steel in your hand. Injury may result.



- » Working magnets will readily attract the scrap. Non-working magnets will not attract the scrap.
- » Inspect each magnet cylinder.
- » Remove the non-working magnet for servicing. Consult IMI for replacement parts or disassembly advice.

If magnets will not release the sheet, plate or parts:

- » Check for voltage if solenoid type, or for air flow restrictions.
- » Check for proper valve operation and tubing connections.
- » Check line sizes throughout the system (1/4" minimum).
- » Check line length and make sure all Transporter line lengths are equal for the same tooling (no more than 8 ft long).
- » Check air pressure at each magnet.
- » Check part for surface coatings. Sticky coatings may cause lightweight parts to adhere to the magnet face.

COMMENTS OR CONCERNS?

We believe Industrial Magnetics, Inc. offers the finest Lifting Magnets available today. Great pride has gone into the design and manufacture of this unit. Any comments or concerns should be directed to our Customer Service Department at 1-888-582-0823.

We appreciate the opportunity to serve you!