



DRAWER-IN-HOUSINGS - CONTINUOUS CLEAN INSTALLATION MANUAL

INSTALLATION

Magnetic separation devices use a magnetic field to attract, separate, and capture ferromagnetic particles from a non-ferromagnetic material.

The Drawer-in-Housing must be installed to allow sufficient space for preventive maintenance and tramp metal removal. Allowance must be made for the drawer movement during the cleaning cycle.

The top and bottom flanges allow for the unit to be welded or bolted into the product flow. If the unit is to be bolted into place, stainless steel bolts are required. If the flanges have not been pre-drilled for bolt installation, any drill bit suitable for 304 stainless steel will do a quality job. **A minimum 3/8" diameter bolt is recommended.** Final Magnets are magnetic separation devices which are designed to be installed at the last possible point in a food handling process. This should be immediately preceding a process step which will render it un-flowable or immediately before the packaging process. Final magnets should be installed upstream of metal detectors and X-Ray equipment and downstream of pumps, augers or other machinery which could generate or proliferate ferromagnetic particles.

----- Continuous Clean Specific -----

The continuous-clean, Drawer-in-Housing allows removal of tramp metal from the product stream while the product is flowing through the magnet. The enclosed guard assembly reduces the amount of product and dust released to the surrounding area. The cylinder-actuated drawers open and close on an adjustable, timed cycle to clean tramp metal from the magnetic tubes. Tramp metal is collected in a catch pan located below the drawers.

The air-actuated, continuous-clean, Drawer-in-Housing magnetic assembly comes ready to install.

Pneumatic - The magnet requires clean, dry, shop air compressed to 80-100 PSI and a 120VAC power source. Air is connected to a common point on the magnet. The pipe size is 1/4NPT, 3/8NPT or 1/2NPT depending upon the size of the drawers. Consult the magnet drawing for your application to determine the actual pipe size.

Electrical - The furnished solenoid valves and limit switches are factory connected to a junction box on the side of the magnet. A control enclosure is shipped loose for installation near the magnet. The controller is to be connected to the magnet junction box with a control cable or conduit and wire supplied by the user. Consult the electrical and pneumatic schematics elsewhere in this manual for more detail.

Two solenoid valves are provided. Typical specifications are as follows:

The cable from the solenoid contains three conductors: black, white & green. To be connected as follows:

Black or Brown - Connected to **switched** leg of 120 VAC supply circuit

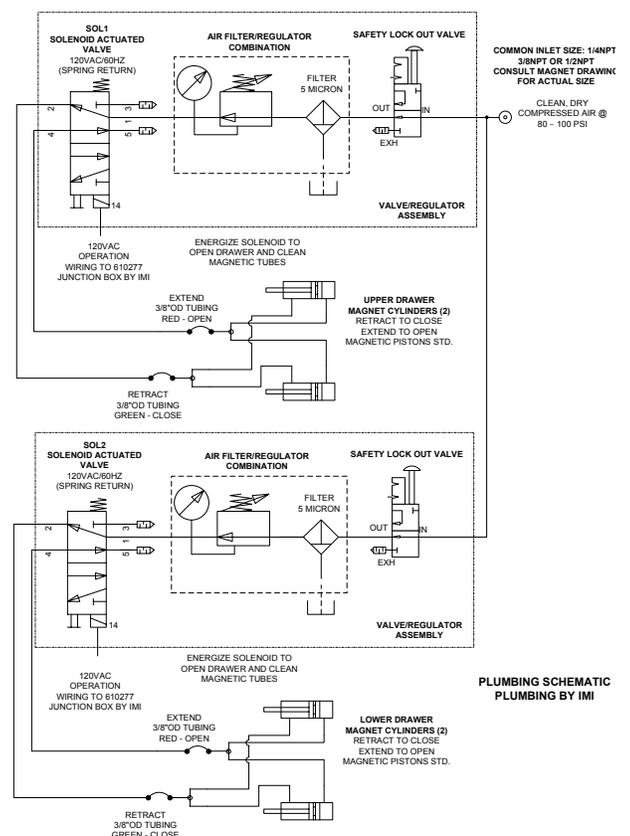
White or Blue - Connected to **neutral** leg of 120 VAC supply circuit

Green or Green/Yellow - Connected to **ground** bus of circuit

Solenoid Specifications: Coil -120V/60 Hz - 110V/50 Hz, 4.0-4.8 VA, Rated for continuous duty at 85%-105% of rated voltage. Enclosure rated for NEMA 6P/ IP67. Molded with three pin plug-in 11mm mini-DIN connector. Cable - 6 ft (2 m) lg., 18GA/3 conductor cord, 0.27 in Dia. (2.9 mm) O.D. PVC Jacket

Coil Resistance: 7.9 KOhms cold, DC resistance, Measure with a Digital Multimeter (DMM) connected to black & white leads

CONTINUOUS CLEAN PNEUMATIC SCHEMATICS





OPERATING PRINCIPLE & MAGNET DEGRADATION

The Drawer-in-Housing has been designed to allow the product to cascade through 1 to 4 banks of tubes, depending on the unit size. Tube spacing and banks vary according to the product being cleaned and the degree of cleaning required. Captured tramp metal is held on the tubes until cleaning is activated.

The force of a permanent magnet can degrade over time and when subjected to external influences. The most common factors for loss of performance or failure include:

- » Blunt force impact such as dropping or banging on a magnet which can cause fractures
- » Temperatures exceeding the range of the magnet material
- » Exposure to electrical fields, like generators, lightning or welding ground circuits, can result in loss of magnetism

It is recommended that magnetic devices are audited annually. IMI can provide a Magnet Audit and Plant Survey to evaluate magnetic equipment performance and assist with compliance to global industry standards.

CONTROL OVERVIEW

The control system for the typical, two-drawer, Continuous Clean Drawer-In-Housing, consists of two separate enclosures, one being a control panel, and the second, a junction box.

Control panel -

NEMA 4X fiberglass enclosure containing time delay, pulse counter and control relays and a terminal block. This panel is shipped loose for remote installation by the user. Requires 120VAC/60 Hz, hard-wired, power connection. The user is also to furnish an appropriate cable or conductors in conduit (16awg, 9 conductors) to connect the control panel to the junction box. The two time-delay relays are user adjustable according to observed tramp metal contamination and product flow rates. One of the time delay relay dials controls the cycle time between upper drawer cleanings (minutes to hours), the second dial determines the length of time the solenoid energizes to open the top drawer (seconds). The timer/counter relay counts how many times (typical is 3 cycles) the top-drawer cycles open then closed before the bottom drawer is allowed to open. The counter relay also has a time delay function that is used to determine the length of time (seconds) the solenoid energizes to open the bottom drawer.

Junction box -

NEMA 4X fiberglass enclosure containing a terminal strip. This junction box is factory installed on the magnet housing. The cables from the drawer valve solenoids (2) and cylinder reed limit switches (4) are factory wired to this strip using liquid tight cord grip/strain reliefs.

Cylinder Limit switches -

Furnished to signal drawer open & close positions. The upper drawer closed position is used to increment the counter relay. The closed limit switches are used, in conjunction with control relays, to lock out the drawer opening function. This is to prevent both drawers from being open at the same time. The upper drawer closed switch is interlocked in the lower drawer control circuit and the lower drawer closed switch is interlocked in the upper drawer control circuit.

OPERATION

To initiate the cleaning cycle, apply power to the control panel. The cycle will commence with a time delay (TDR1, t1), drawers closed. At the end of the delay, the top drawer will open for a time period (TDR1, t2) just long enough to allow complete opening of the top drawer. The drawer will then close. Upon closing, the counter (TDC) is incremented. The drawers will remain closed according to the next time cycle (again determined by TDR1, t1). The top drawer may cycle open and close several times. Upon reaching a pre-determined number of counts (TDC, c1), TDC will initiate a drawer open sequence of the bottom drawer (duration determined by TDC, t1). This time is to be just long enough to allow complete opening of the bottom drawer. Interlocks (CR1 and CR2) will keep both drawers from opening at the same time. Upon the closing of the bottom drawer, TDR1 will re-commence the cycle for the drawers.



Troubleshooting – refer to schematic, sheet 1 and 2, attached.

Top Drawer will not open even with power to control panel

Cord connector on solenoid connector illuminated?

- Yes – Ensure air supply is connected to magnet or air flow to magnet or cylinders is not impeded.
- No – Check that pilot lamp on CR2 is illuminated?
- Yes – Verify proper time setting on TDRI. Refer to adjustment information on schematic, sheet 2.
- No – LS2C reed switch not adjusted or not connected in junction box. Check adjustment or verify wiring connections
- No – Bottom drawer (LS2C reed switch) not closing completely – Check for internal obstruction (product or tramp metal build-up) or inspect cylinders for damage
 - Verify proper supply pressure on regulator-mounted gage – should be 80 – 100 PSI

Bottom Drawer will not open even with power to control panel

Cord connector on solenoid connector illuminated?

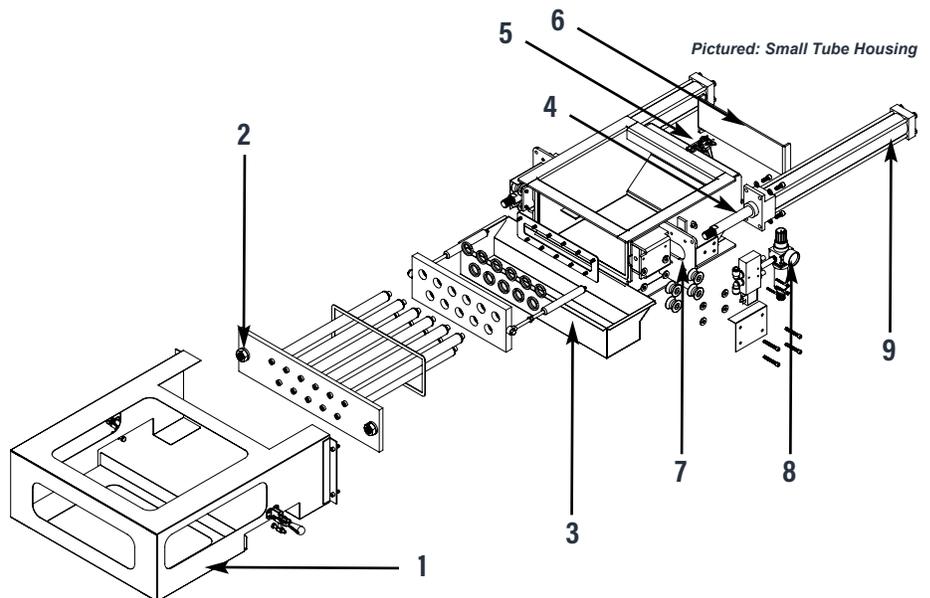
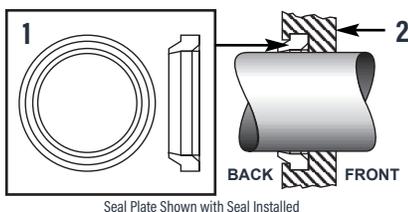
- Yes – Ensure air supply is connected to magnet or air flow to magnet or cylinders is not impeded.
- No – Check that pilot lamp on CR1-B is illuminated?
- Yes – Verify proper time setting on TDRC. Refer to adjustment information on schematic, sheet 2.
- No – LS1C reed switch not adjusted or not connected in junction box. Check adjustment or verify wiring connections
- No – Top drawer (LS1C reed switch) not closing completely – Check for internal obstruction (product or tramp metal build-up) or inspect cylinders for damage

Verify proper supply pressure on regulator-mounted gage – should be 80 – 100 PSI

ILLUSTRATION & PARTS

----- Continuous Clean -----

1. Guard Assembly (SC Only)
2. Cylinder Bolts (SC Only)
3. Catch Pan
4. Cylinder Rods (SC Only)
5. Rear Door Clamp
6. Rear Access Door
7. Cylinder Mount
8. Air Valve / Regulator Set (SC Only)
9. Cylinder (SC Only)





CLEANING GUIDELINES

It is recommended that cleaning frequency is scheduled such that magnetic build-up does not exceed 1mm of fines on up to 50% of a magnetic surface. The recommended cleaning interval is at least twice in an 8-hour shift. Note: Cleaning frequency is dependent on the amount of tramp metal being separated from the product; if heavy concentrations of tramp metal are detected additional cleaning is necessary. When cleaning, ensure that the product flow has been shut off and that the magnetic assembly is empty.

WIPER SEAL REPLACEMENT

Wiper seals should be inspected for normal wear every three to six months to ensure the integrity of the seal is intact.

To replace worn out or damaged washer seals:

----- Continuous Clean Procedures -----

1. Remove *Guard Assembly (14)*.
2. Activate *Air Cylinders (13)* to open the drawer until it stops. Fasteners have been installed using thread locker. The use of a heat gun may be required to break loose the fastener.
3. For safety, turn off air supply to *Regulator Valve Assembly (22)*. Disconnect supply tubing from all cylinder ports.
4. Remove the *Spring Shocks (12)* from the *Seal Plate (2)*.
5. Remove the *Cylinder Bolts (6)* from *Tube Front Plate (8)*. This separates the drawer assembly from the housing. Fasteners have been installed using thread locker. The use of a heat gun may be required to break loose the fastener.
6. Set the drawer assembly on a non-ferrous work surface and unbolt the *Tube Assembly Bolts (7)* and remove the *Tube Front Plate (8)* from the tubes.
7. Slide the *Seal Plate (2)* off of the tubes. Magnet tubes may repel or attract each other when seal plate is removed. Use extreme caution to avoid injury. Place a non-ferrous spacer between rows and wrap tubes with wire ties or duct tape.
8. Push the worn out or damaged *Wiper Seals (1)* out of the *Seal Plate (2)*.
9. Gently push new *Wiper Seals (1)* in.
10. After new seals are installed in the *Seal Plate (2)*, reassemble the unit carefully, and check drawer travel to assure proper operation. Note: Magnet tubes are intended to have some movement to prevent binding. Apply temporary thread locker on the *Tube Assembly Shoulder Bolt (7)*, snug them up to the *Tube Front Plate (12)*, then loosen them each 1/4 of a turn. This will allow slight movement of the tube to prevent binding.

GENERAL HEALTH AND SAFETY WARNING

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.

COMMENTS OR CONCERNS?

We believe Industrial Magnetics, Inc. offers the finest Drawer-in-Housing 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 1-888-582-0821. **We appreciate the opportunity to serve you!**

