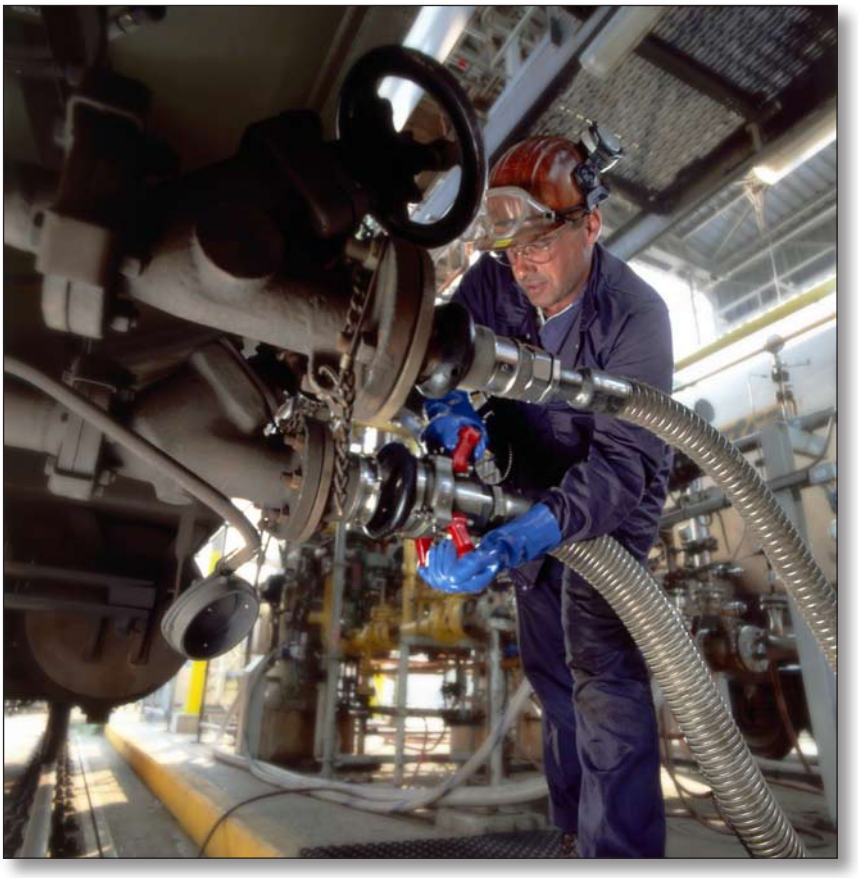
TODO®
A Gardner Denver Product

TODO-MATIC® & TODO-GAS Instructions

Installation & Operating advice

Better by Design

Index



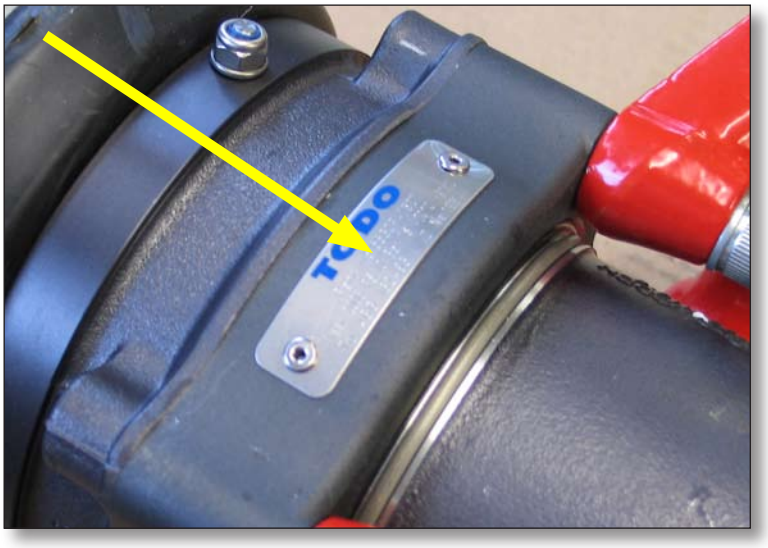
Operating advice

This advice is supplementary to your standard terminal operational procedures.

Todo-Matic & Todo-Gas couplings are designed specifically for the bulk transfer of liquids and vapours. The materials of construction, including the seals should already be confirmed as compatible prior to installation. If in doubt, check before operation.

All Todo-Matic & Todo-Gas couplings are marked with a maximum pressure rating that should not be exceeded.

With careful use and regular maintenance they will give safe, trouble free operation for many years.



Service instructions are available for Todo-Matic and Todo-Gas couplings upon request.

The life expectancy and maintenance frequency of the couplings is dependent upon many variables such as cycles / day, pressures, contaminates etc., but the most significant factor after correct specification is correct use.

The following information is designed to assist in your care of the couplings and associated equipment.

Operating advice

1. Daily inspection.

The hose coupler should be briefly inspected at the start of each day's operation.

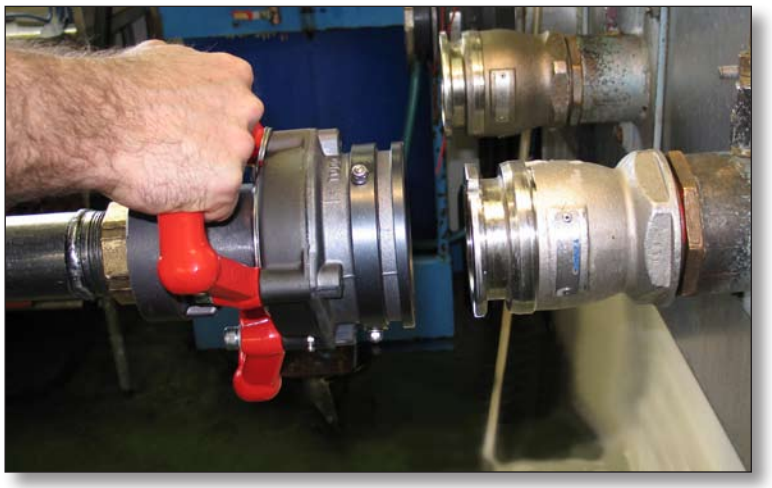
- Inspect the coupling surface for cleanliness and corrosion.
- Inspect the tank and hose unit for damage and external signs of leakage.
- Look inside the connection socket.
- Check that the three rollers are not obviously damaged.
- Check that the connection socket area is free from dirt and foreign objects.
- Check for signs of seal damage (for example you may see a cut seal or small pieces of rubber coming from the piston area).
- Check that the coupler rotates freely about the hose swivel.
- On the first operation, check for leakage and smooth operation.
- Any signs of component degradation must be acted upon immediately. Faulty components should be investigated and replaced. A functional test must be done to secure safe operation of the units after each service of the couplings.

Each tank adaptor on the truck should also be briefly checked prior to use. Check for dirt, seal damage and any obvious physical damage (such as impacts, etc.). Further information on isolation valve - connecting see chapter 2e.

2. Making a connection & disconnection.

a) Check that all relevant isolation valves are closed (as per your standard operating procedure) and that no pumping pressure is present at the hose coupler. We appreciate that not all loading points have individual pumping systems that can be switched off. Where a common pumping system is used, the isolation valve directly up stream of the hose coupler should be closed. All liquid valves on the vehicle should be closed.

b) Lift the hose coupler & hose into position to start the connection. Take care to support the hose end assembly so as to present the coupler to the adaptor in the correct orientation.
It is important to ensure the coupler is not supporting the full weight of the hose assembly during the connection process.

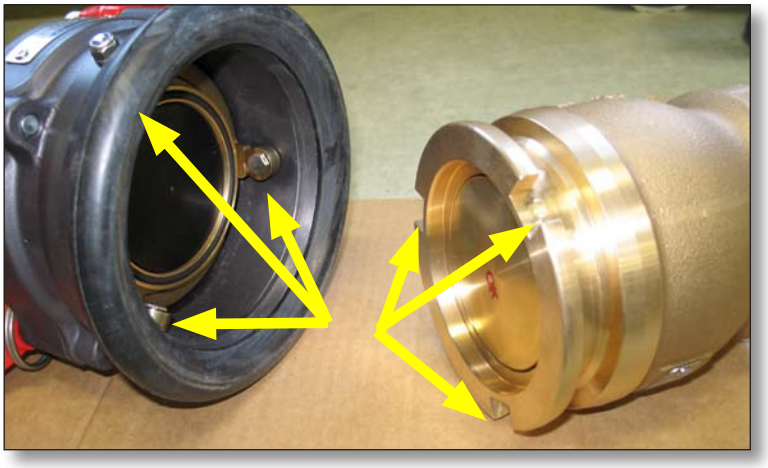


Loading arms should be balanced to a neutral condition in the connection phase. Once connected, the coupler is secure to the adaptor and able to accommodate all reasonable axial strain.

The handles have no operating purpose other than providing handling assistance, thus do not use tools, pipes etc. to assist connection.

Operating advice

c) When correctly supported, the hose coupler should slide easily over the adaptor. The three rollers engage in the three slots in any one of three positions at 120 degree centers.



To allow the coupler to locate to the adaptor, and still supporting the hose assembly, rotate the coupler whilst gently pushing towards the adaptor. You will feel the coupler move forward about 1” (25mm).

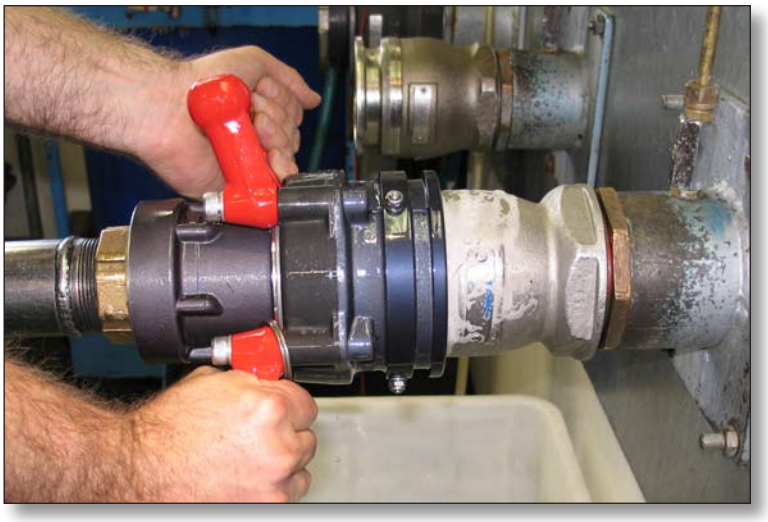
d) Still supporting the hose assembly, rotate the coupler clockwise about 100 degrees. At the start of rotation you will feel some resistance. The level of resistance is dependent upon the static line and tank pressure.
The higher the pressure, the greater the effort necessary to connect the coupling. At the completion of the 100 degree turn you will feel a definite stop.
Do not attempt to rotate the unit further. Further rotation does not tighten the connection or open the valves more, it causes unnecessary damage.
The coupling valves are now open and the loading process can start.

Operating advice

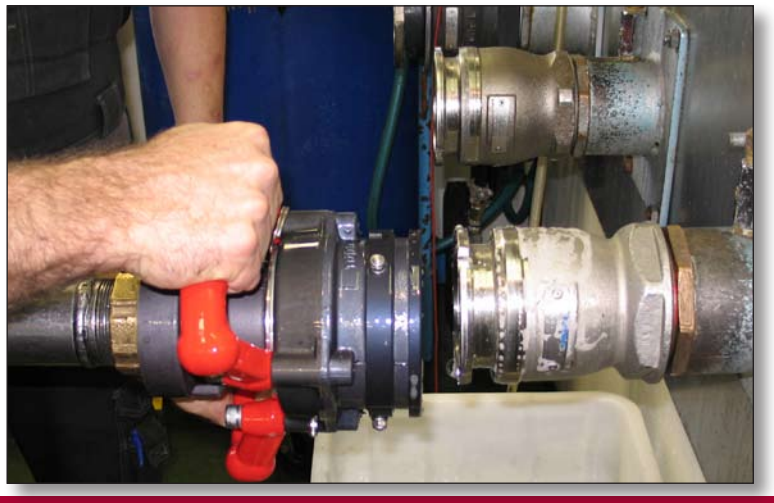
e) The sequence of isolation valve and / or pump operation should be taken from your operating procedures, however it is preferable for the vehicle isolation valve to be the last valve opening in the sequence and for the pump to be switched off. This reduces the possible surge effect on the coupling seals often associated with automatically actuated valve systems. In cases where the compartment between the tank unit or hose unit and isolation valve is completely filled with a liquid it could be the case that it is hard to couple, especially if the isolation valve is close to either the hose unit of tank unit. This is called trapped liquid and the difficulty to couple is due to the fact that the liquid is highly incompressible and has nowhere to escape. If this happens the isolation valve behind the hose unit or the tank unit must be opened first or an adaptor with a specialised pressure relief valve must be installed.

f) The disconnection procedure is similar to the connection procedure but in reverse.
Before any attempt is made to disconnect the coupling, all isolation valves should preferably be closed and, where possible, the pumps switched off.
Where a common pumping system is in use, all flow through the coupling should be stopped using the isolation valves and **not** the coupling. Same as with the adaptor, should it be that the coupler is hard to disconnect due to the trapped liquid the valve behind the coupler should be the last one to be closed.
Closing the vehicle isolation valve first is preferred according to reasons in section (e) so long as this is compatible with your standard operating procedures.

g) Whilst supporting the hose assembly, turn the coupler anti-clockwise through approx. 100 degrees. You may feel a slight “pop off” effect at the end of the rotation travel when transferring liquids with an elevated vapour pressure.
This is normal.
Do not attempt to rotate the coupler further.
This will not further loosen the connection or secure the seal, it causes unnecessary damage.



h) Still supporting the hose assembly, pull the coupler away from the adaptor. You may feel a small resistance due to seal vacuum.
Correctly supported, the coupler will come away from the adaptor with ease



Operating advice

j) The hose assembly should be stowed in a manner so as to avoid physical damage. Do not drop the hose end assembly or stow on the floor.
The dust plug provided should always be fitted.

k) Ensure the tank unit cap (if fitted) is replaced and secure.
For Todo pressure tight caps, see separate operating advice.

l) **<u>Do not</u>** use anything other than the handles provided to operate the couplings.
The handles are specifically designed to provide sufficient assistance in operation.

Should the couplings become stiff or difficult to operate then something is wrong and they should be inspected prior to further use.

Under no circumstances should the couplings be subjected to excessive force.
The use of damaged or faulty equipment may have serious safety consequences.

Correct installation and maintenance

All Todo-Matic & Todo-Gas couplings are designed for trouble free operation in a wide range of applications and operating conditions.
Reliable and safe operation is dependent upon the correct installation and handling of the equipment.
Regular and appropriate maintenance is essential to ensure both safety and reliability over the life of the equipment. The following guidelines are designed to assist engineers in the creation of effective preventative maintenance programs and to ensure correct specification, installation and handling of the equipment.

Specifications
Before you install any Todo-Matic or Todo-Gas equipment it is essential to check that the material and performance specifications are acceptable for your specific application.
The pressure ratings and primary materials of construction are clearly indicated on the identification plate of each Todo product. A drawing showing the materials of construction relating to each individual component is available upon request.
Todo is always happy to provide guidance on material suitability. Our data is taken from published chemical resistance information as well as our own application experiences. Specification checks should always be carried out before the product is supplied, but if unsure, ask!

Do not assume that a Todo-Matic or Todo-Gas product supplied for one specific application will automatically be suitable for other similar applications. Many variables affect the performance of materials. Should you wish to use a Todo-Matic or Todo-Gas product for a different application than the one originally specified, check with Todo to ensure compatibility before installation.
Please remember, the application details should include all media transferred through the coupling, not just the primary transferred media.

As with all equipment, a check should be made to ensure the installation fulfils the requirements of applicable prevailing industry, local, national and international standards.
Particular attention should be paid to pressure ratings, safety factors and the position of upstream and downstream affiliated closures.

Correct installation and maintenance

Installation

The correct installation of all Todo-Matic & Todo-Gas equipment is essential to ensure safe and satisfactory operation. Checks should be made to ensure that the fitting of Todo-Matic & Todo-Gas equipment does not interfere with the correct operation of affiliated equipment (i.e. isolation valve, excess flow valves, etc.). Before securing the flange or thread connection to mating equipment (i.e. hose, loading arm, storage tank) ensure that no foreign objects, dirt, grit, etc. are present in the coupling. All flange and thread connections should be made without imparting excessive strain to the equipment and pressure checked at least to 1.5 times the maximum application working pressure prior to use.

All gaskets and sealing materials used to make the permanent connection should be of suitable material and able to operate at least up to the maximum parameters of the Todo-Matic & Todo-Gas equipment. When installing Todo-Matic & Todo-Gas equipment to new pipe work, tanks, etc., ensure the system is free from debris that may be transferred through the coupling. Where the hose or loading arm assembly is the primary static dissipation or earth route, the electrical continuity value of the assembly should be checked to ensure regulatory compliance.

Special attention should be paid to the balancing of loading arms.

The weight of the coupling plus transfer media should be taken into account at the specification stage. It is usual for loading arm balance settings to account for weight variations due to differences in the full / empty cycle. The loading arm should be set to balance in the condition present at the time of connection. For example, should the loading arm be empty at the time of connection then it should be balanced in the empty condition.

Each Todo-Matic & Todo-Gas coupling is designed to take reasonable axial and radial loads associated with good handling practice but is not designed to accept continuous excessive load values associated with mal-adjustment or poor installation. Continuous excessive strain will equate to increased component wear and possibly premature failure if not corrected.

When Todo-Matic & Todo-Gas equipment is used with hoses, attention should be paid to hose length to ensure correct handling characteristics. The hose assembly should be designed such that the minimum hose length is supported by the coupling or the operator. Hoses should be of sufficient length to ensure operation well within the stipulated hose minimum bend radius up to the maximum operation envelope.

Once all the above elements are satisfactory, a function check should be carried out to prove the system. The hose unit or coupler should connect and disconnect without physical interference or difficulty. Please remember that the higher the static pressure, the greater the effort needed to make a connection. The Todo technical department is happy to advise on this subject at the specification stage.

Correct installation and maintenance

Maintenance
All Todo-Matic & Todo-Gas products should be visually checked for damage, etc. on a daily or shift basis according to the handling instructions. Any evidence of damage or operating difficulty should be reported and acted upon at the earliest opportunity.
Do not continue to use any equipment that is not operating satisfactorily as continued use will cause further deterioration and possible equipment failure.

All Todo-Matic & Todo-Gas equipment is designed such that all regular service components are contained within the repair or service kit. During normal operation, transferring media that has no or little component degradation, the application of the repair kit will return the equipment to full function.
We recommend that the coupling is fully inspected, tested and serviced at least once a year. It must be accepted that some applications cause a greater level of component degradation either by chemical attack or by arduous physical / environmental conditions. In such circumstances a more frequent regime of inspection and service may be required. We recommend that in such applications a three monthly inspection should be carried out with automatic replacement of the hose coupler piston seals and carrier seals.

Futher actions at three month service:

- Exterior cleaning of the coupling halves with a neutral cleanser.
- Careful "daily inspection" of cleaned units.
- Lubricate the ball bearing on the hose unit with TODO recommended grease. See "TODO lubrication instructions" (www.todo.se / download / technical info) or contact TODO for information regarding correct type of grease.

All other service parts and key components should also be checked. In addition to the three monthly inspection and primary seal replacement the hose coupler shall have the full repair kit applied every year irrespective of component condition. After a representative period of time it may be possible to move to a six or twelve monthly service / inspection interval but only against a background of satisfactory operation.

There are service instructions complete with photographs available for Todo-Matic & Todo-Gas couplings. These instructions show the service method as well as tools required and parts identification. Todo-Matic & Todo-Gas couplings are designed such that they can be serviced in a number of ways. Some Todo distributors are trained and accredited by Todo to carry out service of Todo-Matic & Todo-Gas couplings.
Todo are always happy to service Todo-Matic & Todo-Gas couplings directly at any Todo facility. We are also happy to offer training ether on or off site to customers' engineers who wish to carry out servicing themselves.

Under no circumstances should Todo-Matic or Todo-Gas equipment be serviced by untrained personnel.