



DCCouplings

Dry Cryogenic Couplings



Operating Manual

1" – 6"



Foreword

This operating manual applies to the persons using the Dry Cryogenic Couplings.

It is very important to read and understand this operation manual before use of this coupling. Become familiar with the unit's operation, applications and limitations. Be particularly aware of its specific hazards. Store this manual in a clean area and always at a readily available location. Additional copies at no charge can be obtained through written requests.

IMPORTANT!! READ THE COMPLETE DOCUMENTATION

The base for this manual follows the EC-Directive:

Pressure Equipment Directive
97/23/EG of the 29th of May 1997

- Do not make modifications that are not authorized by the manufacturer.
- Read and respect all warnings and instructions provided to you.
- Use only original Mann Teknik spare parts for maintenance.

Summary of revisions

Date of change	Description
2013-11-29	First issue
2014-02-17	Modified service instructions

Table of Contents

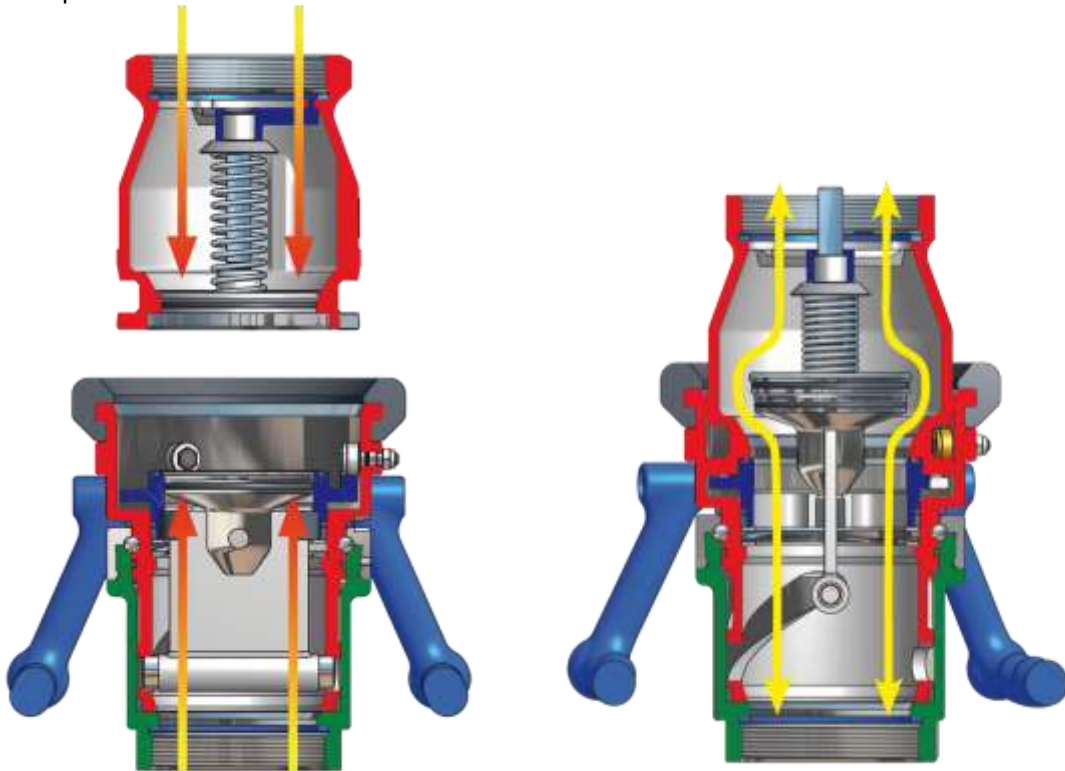
FOREWORD	2
SUMMARY OF REVISIONS	2
TABLE OF CONTENTS	3
1 INTRODUCTION	4
1.1 INTENDED USE	4
1.2 PRODUCT SPECIFICATION	5
1.3 IDENTIFICATION PLATE e.g. for DCC 3"-3"NPT.....	5
1.4 SCOPE OF DELIVERY	5
2 GENERAL SAFETY RULES	6
2.1 SAFETY INSTRUCTIONS	6
3 TRANSPORT AND STORAGE	7
3.1 DELIVERY CHECK	7
3.2 COMPLAINTS / RETURN OF GOODS.....	7
3.3 STORAGE	7
4 INSTALLATION	7
4.1 INITIAL OPERATION	7
4.2 INSTALLATION.....	8
5 OPERATION	8
5.1 GENERAL NOTES.....	8
5.2 DAILY VISUAL INSPECTION	9
5.3 PREPARATION FOR CONNECTION	9
5.4 MAKING CONNECTION/DISCONNECTION	10
5.5 IMPROPER USE	11
6 MAINTENANCE AND REPAIR	11
6.1 GENERAL INFORMATION	11
6.2 MAINTENANCE AND SERVICE INSTRUCTION.....	11
6.3 DISASSEMBLY.....	11
7 APPLICABLE DOCUMENTS	12
7.1 DECLARATION OF CONFORMITY	12

1 INTRODUCTION

1.1 INTENDED USE

Dry Cryogenic Couplings (DCCs) are designed for use wherever it is necessary to connect and disconnect hoses and pipelines under moderate pressure, quickly and without spillage. They are designed primarily for use with cryogenics where reliability and safety are of prime concern.

All Mann Tek products 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. Take care that the product is only used inside the limits of the following product specification.



Operation is single action (see chapter 5.4), using a straight forward turning motion to connect the couplings and open a flow path. An initial push and turn action on the hose unit causes engagement with the tank unit, thus locking and sealing the two units together. Further rotation causes the internal valves to open, thereby allowing flow with minimum pressure drop.

The connection and valve mechanism is interlocked such that fully engaging and sealing the hose unit on its matching tank unit can only open the valve. On disconnection the valve fully close before the coupling separate and spillage therefore is negligible.

Operating Manual

Dry Cryogenic Couplings



1.2 PRODUCT SPECIFICATION

Product name: Dry Cryogenic Coupling
 Sizes: 1", 2", 2½", 3", 4" and 6"
 Thread Connection: NPT-Thread ANSI B1.20.1
 Flange Connection: Flange EN 1092, ANSI B16.5
 Other Connection: On request
 Material: EN 10272 – 1.4401/1.4404+AT
 ASTM A479 – S31603 (316L)

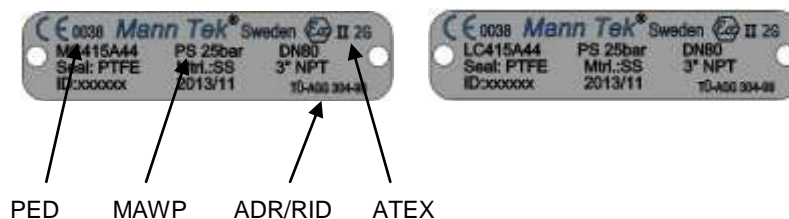
Working pressure and classification according to PED 97/23/EC:

Size	Pressure rate (MAWP)	Weight HU NPT (6"FL)	Weight TU NPT (4"+6"FL)
1" (DN 25)	PN 25 SEP	1,8 kg / 4.0 lbs	0,7 kg / 1.5 lbs
2" (DN 50)	PN 25 cat.2	2,8 kg / 6.2 lbs	1,2 kg / 2.6 lbs
2½" (DN 65)	PN 25 cat.2	7,2 kg / 15.9 lbs	3,1 kg / 6.8 lbs
3" (DN 80)	PN 25 cat.2	9,3 kg / 20.5 lbs	4,0 kg / 8.8 lbs
4" (DN 100)	PN 25 cat.2	14,7 kg / 32.7 lbs	8,7 kg / 19.2 lbs
6" (DN 150)	PN 16 cat.2	42,5 kg / 93.7 lbs	20,0 kg / 44.1 lbs

Maximum burst pressure: 125 bar (6" = 80 bar) / 1800 psi (6" = 1160 psi)
 Temperature range: -196°C to +80°C / -320°F to +175°F

1.3 IDENTIFICATION PLATE e.g. for DCC 3"-3"NPT

	Hose unit (Coupler)	Tank unit (Adapter)
Article no:	MC415A44*	LC415A44*
Size:	3" – 3" NPT	3" – 3" NPT
Working Pressure PS:	25 bar	25 bar
Material:	Stainless Steel	Stainless Steel
Seal:	PTFE (Teflon®)	PTFE (Teflon®)



*For key of article no. please ask for explanation list.

1.4 SCOPE OF DELIVERY

1 pcs	MC415A44	DCCoupling 3" Hose unit with 3" NPT thread and/or
1 pcs	LC415A44	DCCoupling 3" Tank unit with 3" NPT thread

In case of flange connection gaskets and bolts to mount the coupling into the application is not part of the delivery. For NPT thread use PTFE tape 19mm x 0,2 mm for sealing.

2 GENERAL SAFETY RULES

For a safe operation, read this manual completely before operating this product.

Failure to follow the warnings may result in serious personal injury, environmental impact or property damage caused by leakage or unexpected separation.

Before you install any Mann Tek 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 the couplings are clearly indicated on the identification plate of each Mann Tek product. A drawing showing the materials of construction relating to each individual component is available upon request. Specification checks should always be carried out before the product is supplied, but if unsure, ask!

As with all equipment, a check should be made to ensure that 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.

2.1 SAFETY INSTRUCTIONS



Wear proper safety clothing consists of thermal gloves, full face shield approved for cryogenic use and solid shoes capable to withstand cryogenic spill whenever operating Dry Cryogenic Couplings.



Make sure the operating space is clear to avoid accidental contact with others and the coupling interface is clean and dry. Use dry air or nitrogen to blow out the coupling interface.



Do not use the DCCoupling in any way, not described in the specification. The user is responsible to comply with all applicable federal, state and local laws and regulations.



Do not operate the DCCoupling if there is any visible damage. Stop immediately if leakage occurs.



Make sure that there is no trapped liquid or excessive pressure behind the tank unit when connecting. Do not use external tools to make a connection.



Authorized and qualified personnel must carry out all assembly and maintenance operations as described in this operating manual.

3 TRANSPORT AND STORAGE

The product may only be transported or stored absolutely clean. Suitable protection must be used for both openings to ensure no damage occurs to the surfaces/sealed areas. The storage location must guarantee adequate protection from corrosion or extreme temperatures.

3.1 DELIVERY CHECK

- Check for any transportation damage. If so report this immediately to the forwarder.
- Check that the products and quantities are in accordance with the delivery note.

3.2 COMPLAINTS / RETURN OF GOODS

- If returning goods please contact Mann Teknik AB to receive a Complaint Report form.
- Complete the form with as much details as possible.
- Return the goods with the Complaint Report attached on the outside of the package!

3.3 STORAGE

Store coupling in a dry, dust free, dark place, in ambient temperature.

4 INSTALLATION

4.1 INITIAL OPERATION

The correct installation of all Mann Tek products is essential to ensure safe and satisfactory operation. Checks should be made to ensure that the fitting of Mann Tek products does not interfere with the correct operation of affiliated equipment (i.e. isolation valve, excess flow valves, etc). Before securing the flange or thread connections to mating equipment (i.e. hose, loading arm and storage tank) ensure that no foreign objects, dirt, grit, water (moisture) etc. are present in the coupling.

All flange and thread connections should be made without imparting excessive strain to the equipment. All gaskets and sealing materials used to make the permanent connection should be of suitable material.

Each Mann Tek product is designed to take reasonable axial loads associated with good handling practice but is not designed to accept continuous excessive load values associated with maladjustment or poor installation. Continuous excessive strain will equate to increased component wear and possibly premature failure if not corrected.

When Mann Tek 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 to make a connection.

4.2 INSTALLATION

When installing Mann Tek 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 shall be checked to ensure regulatory compliance. Special attention should be paid to the balancing of loading arms. It is usual for loading arm balance settings to account of 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.



Before mounting the DCCoupling ensure that trapped liquid never can occur in the installation. In combination with a Break-Away or Emergency Release Coupling / Emergency Shut Down Valve measures shall be taken to ensure that no liquid can be trapped in any operating mode.

Then the DCCoupling can be installed directly in the product line and is ready for use after removing the transport protection. The installation is as follows:

- Remove the packaging.
- Check the coupling for damages before mounting.
- Ensure that the product line is empty and all valves are closed before you assemble the coupling into the line.
- To prevent damages during mounting a suitable wrench should be used for the intended nut flats on the coupling (threaded connection) or the bolts (flanged connection).

The start-up may take place only when the DCCouplings has been mounted as instructed and the necessary function tests and leak tests have been conducted by the approved authorities.

5 OPERATION

5.1 GENERAL NOTES

Operators are obliged to provide qualified and trained personnel familiar with the handling of supply pipes, safety couplings, any fluid being pumped as well as its danger potential. Such staff must also be

familiar with the applicable safety regulations and the regulations of the employer's liability association. Notice also our safety instructions (see chapter 2.1).

5.2 DAILY VISUAL INSPECTION

All couplings should be briefly inspected before each operation.

Inspect the coupling to be dry, clean and free of corrosion. Check for dirt and any obvious physical damage (such as impacts, etc.).

Inspect the hose unit swivel for free rotation.

Inspect the tank- and hose unit for faultlessness and external signs of seizure.

5.3 PREPARATION FOR CONNECTION



Make sure the operating space is clear to avoid accidental contact with others and the coupling interface is clean and dry. Use dry air or nitrogen to blow out the coupling interface.



Before making the connection, make sure that there is no trapped liquid or excessive pressure behind the tank unit when connecting.



If required by the application, be sure to connect the ground cable.



Take off the protection cap from the tank unit and the plug from the hose unit.



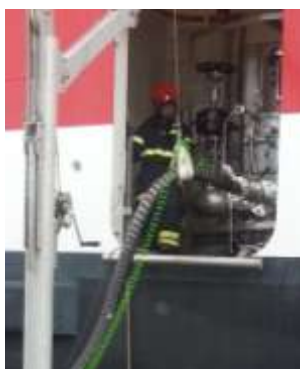
Blow out both couplings with dry compressed air or nitrogen to clear off any moisture or snow.



Do not connect!
Snow shall be blown off!



OK to connect



Lift the hose unit and hose into position to start the connection. Take care to support the hose end assembly so as to fit the hose unit to the tank unit in the correct orientation.

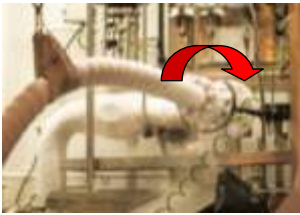
It is important to ensure the hose unit is not supporting the full weight of the hose assembly during the connection process. Once connected, the hose unit is secure to the tank unit and able to accommodate all reasonable axial strain.



When correctly supported, the hose unit should slide easily over the tank unit.

The three rollers on the hose unit engage in the three slots on the tank unit in any one of three positions at 120 degree centre.

5.4 MAKING CONNECTION/DISCONNECTION



Rotate the hose unit clockwise about 100 degrees whilst gently pushing towards the tank unit. 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 is the effort necessary to connect the coupling. At the completion of the 100 degree turn you will feel a definite stop.

Further rotation does not tighten the connection or open the valves more, it only causes unnecessary damage. The hose unit valve is now open and the loading process can start.

The sequence of isolation valve and/or pump operation should be taken from your operating procedures.

The disconnection procedure is similar to the connection procedure but in reverse. Closing the vehicle isolation valve first is preferred so long as this is compatible with your standard operating procedures. The most regulations are recommending boiling off the line from liquid and maybe purging the line with an inert gas if flammable liquids have been handled.

Whilst supporting the hose unit assembly, turn the hose unit anti-clockwise approximately 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 hose unit further. This will not further loosen the connection or secure the seal, it only causes unnecessary damage.



After disconnection the plug shall always be fitted to the hose unit and the cap to the tank unit immediately. This avoids moisture inside the connection interface. Condense water is a risk for ice building during the next loading operation, which can cause a leakage or blocking the interface connection after cooling down.

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.

5.5 IMPROPER USE

The equipment should never be used in the case of visible damage or where there is prior knowledge of damage that may lead to malfunction.

6 MAINTENANCE AND REPAIR

6.1 GENERAL INFORMATION

The operator is solely responsible for the installation, operation and maintenance of the coupling. Mann Teknik AB accepts no responsibility for damages due to faulty installation, faulty handling, as well as negligent or incorrect maintenance.

Maintenance tasks shall be performed only by trained personnel authorized by Mann Teknik AB. All measures necessary for inspection, maintenance and repair must be carried out in accordance with the national regulations of the country where the system is installed. Notice also our safety instructions (see chapter 2.1).

6.2 MAINTENANCE AND SERVICE INSTRUCTION

6.2.1 Maintenance plan

Depending on the application, the wear on the single components can be very different. Every operator has to make a risk analyze before the installation of Dry Cryogenic Couplings in his process. Outcome of this risk analyze should be a maintenance plan for the entire equipment. Mann Tek can give some support based on the experience with other similar applications.

These are the service steps, recommended by Mann Tek:

1. Replace sealings, bearings and washers.
2. Replace worn or damaged components.
3. Do not use any grease



6.3 DISMANTLING

When the DCCoupling are taken out of service, the risk of liquid or gas spurting out should be taken into consideration. Special protective measures such as personal protection equipment must therefore be adopted.

How to dismantle:



Wear proper safety clothing consists of thermal gloves, full face shield approved for cryogenic use and solid shoes capable to withstand cryogenic spill whenever disassembling Dry Cryogenic Couplings from the installation.



Make sure that the coupling is depressurized and empty.



Unscrew coupling (threaded connection) or bolts (flanged connection) with a wrench, fit for purpose.

Couple the repaired unit to a serviceable hose or tank unit as appropriate and check for correct operation of the valve actuating and bayonet locking mechanism. Couple and uncouple the unit(s) several times.

7 APPLICABLE DOCUMENTS

EC Guideline 97/23/EC PED, 94/9/EC ATEX

International Transport of Dangerous Goods ADR, RID, IMDG

Test standards EN12266, ISO5208

Thread standards ANSI B1.20.1 - Flange standards EN 1092, ANSI B16.5

For use in other countries:

Respective national requirements and guidelines

7.1 DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY:
Pressure Equipment Directive 97/23/EC

Mann Teknik AB of Strandvägen 16, SE-543 31 Skanstad, Sweden hereby declares that the products listed comply with the essential requirements of the Pressure Equipment Directive 97/23/EC.

Pressure equipment:
DDCouplings (STANAG), DGCouplings, DACouplings (ISO45) and BBCouplings

Conformity assessment procedure followed:
no CE-marking**
CE 0038
CE 0035

Article 3 section 2*
Module A
Module D†

For piping intended for gases, liquefied gases, gases dissolved under pressure, etc. according to article 3 paragraph 4.2 (a) (Annex II Table E)

	A1		B		C2	
DN25	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN40	PN16	SCC*†	PN16	SCC*†	PN25	SCC*†
DN50	PN16	SCC*†	PN16	SCC*†	PN25	SCC*†
DN65	PN16	SCC*†	PN16	SCC*†	PN25	SCC*†
DN80	PN16	SCC*†	PN16	SCC*†	PN25	SCC*†
DN100	PN16	SCC*†	PN16	SCC*†	PN25	SCC*†
DN150	PN16	SCC*†	PN16	SCC*†	PN25	SCC*†

For piping intended for liquids according to article 3 paragraph 1.3 (b) (Annex II Table E)

	A1		B		C2	
DN25	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN40	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN50	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN65	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN80	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN100	PN16	SCC*	PN16	SCC*	PN25	SCC*
DN150	PN16	SCC*	PN16	SCC*	PN25	SCC*

**According to Article 7 section 1, the products designed and manufactured in accordance with the British engineering practice (BS29) must not bear the CE marking. Unauthorized product modifications lead to an invalid declaration.
†Indicates if the coupling is Ex-marked for ATEX classification.

Notified Body:
Ident/Notif number 0238
Lloyd's Register Certification Ltd.
71 Fenchurch Street
EC3M 4BS London
United Kingdom

Signed: *[Signature]*
Name: Tony Mann
Title: General Manager
Date: 27 February 2012

97/23/EC PED – Conformity Declaration

DECLARATION OF CONFORMITY:
EC-Directive 94/9/EC (ATEX)

Mann Teknik AB of Strandvägen 16, SE-543 31 Skanstad, Sweden, hereby declares that the products listed comply with the essential requirements of the ATEX EC Directive 94/9/EC.

Product models listed:
DDCouplings (STANAG), DGCouplings, DACouplings (ISO45)

The following harmonized standards are applicable:

- EN 1127-1
Explosion prevention and protection
- EN 13463-1
Non electrical equipment for potentially explosive atmospheres, task method and requirements
- EN 13463-5
Non electrical equipment for potentially explosive atmospheres, protection by constructional safety

Marking: **Ex II 2G**

The manufacturer attests, that the DDCouplings, DGCouplings and DACouplings satisfy the stated requirements and may therefore be used in category 2, group II.

Technical file receipt:
Storage No. 9035/ATEX/MAN064017

Notified body:
Ident/Notif number 0238
Lloyd's Register Certification Limited
71 Fenchurch Street
EC3M 4BS London
United Kingdom

Signed: *[Signature]*
Name: Tony Mann
Title: General Manager
Date: 27 January 2011

Mann Teknik AB is a notified 020001 company

94/9/EC ATEX – Conformity Declaration

Operating Manual

Dry Cryogenic Couplings



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Mann Teknik AB is a certified
ISO9001-company.