Reference Manual

qdos hose connector kits

Reference manual — for use with qdos pumps which have already been installed

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1 Preface

1.1 Disclaimer

The information contained in this document is believed to be correct but Watson-Marlow accepts no liability for any errors it contains and reserves the right to alter specifications without notice.

If the product is used in a way that is not intended or described in these instructions, the protection, performance, and/or lifespan may be negatively affected.

1.2 Translation of the original instructions

This instruction handbook has originally been written in English. Other language versions of this instruction handbook are a translation of the original instructions.

1.3 Trademarks

Watson-Marlow®, and qdos® are registered trademarks of Watson-Marlow Limited.

Table of Contents

2 Introduction to the document

This document is the qdos hose connector kit reference manual, for use with qdos pumps which have already been installed.

qdos hose connector kits, may be installed either as a straight length or with a bend. When a bend is required, the hose must not, at any time be bent below a minimum bend radius of 76 mm (3”). In order to avoid bending the hose below the minimum bend radius, it may be necessary to uninstall and re-mount a qdos pump, prior to installing a qdos hose connector kit. For this reason full information on the mounting of a qdos pump is provided (see section 8).

For installations, where a qdos pump is not yet installed, do not use this document, follow the qdos pump reference manual where qdos hose connector kit information is provided when relevant.

2.1 Information types

Specific non-safety information is presented throughout these instructions in the following format:

Information type	Explanation
Bold	Words in **bold** are glossary items
Note	A note is a piece of additional information to consider. A note is indicated by a superscript . Example: **NOTE** [1] Body text of note

2.2 Responsibility

This manual is for reference by a **responsible person** competent in their area of expertise, during the products **lifecycle**.

A responsible person must use these instructions to:

- Ensure the product is within scope of Intended Use (see section 4.2)
- Prior to a task, such as installation, cleaning, maintenance, or decommissioning.
    - Do a risk assessment.
    - Determine suitable personal protective equipment (PPE) for the task
- Train an operator to clean the product or do maintenance tasks, as required by the users organisation
- Approve water as a cleaning agent for use if required (see section 10)

3 Safety

3.1 Safety symbols

The following safety symbol is used on the product:

Symbol	Name	Description
	Potential hazard	This symbol identifies that an appropriate safety instruction should be followed or a potential hazard exists

3.2 Safety signals

Signals indicate a possible **hazard**. Signals are used in these instructions when immediately relevant to the information, task or procedure.

3.2.1 Signals: With risk of personal injury

Signals indicating risk of a personal injury are presented when relevant to a task in this format:

WARNING

The WARNING signal word indicates a hazard. Risk of serious injury or death exists if the hazard is not avoided. Equipment or property damage may also occur.

A safety symbol indicates a hazard with personal injury risk.

Hazard information—Information to explain:

- Hazard type or nature of hazard
- What could happen
- How to avoid hazard

CAUTION

The CAUTION signal word indicates a hazard. Risk of minor or moderate injury exists if the hazard is not avoided. Equipment or property damage may also occur.

A safety symbol indicates a hazard with personal injury risk.

Hazard information—Information to explain:

- Hazard type or nature of hazard
- What could happen
- How to avoid hazard

3.2.2 Signals: With risk of equipment or property damage only

Signals indicating risk of equipment or property damage only are presented when relevant to a task in this format:

NOTICE

The NOTICE signal word indicates a hazard. Risk of equipment or property damage only.

Hazard information—Information to explain:

- Hazard type or nature of hazard
- What could happen
- How to avoid hazard

3.3 Permeating chemicals

Certain chemicals may permeate through the Polytetrafluoroethylene (PTFE) hose liner. In addition, chemicals containing halides, may permeate through the hose and form an acid on the exterior surfaces from exposure to moisture in the atmosphere.

In either case the permeating chemicals or the acid created may:

- Attack the exterior materials of construction of the product or qdos pump the hose installed on
- Become a chemical hazard on the exterior surfaces of the product or qdos pump the hose installed on

See section 14.2 for full information

3.4 Flammable liquids

The product is prohibited from installation or operation in explosive atmospheres. If the product is to be used for the pumping of flammable liquids, a responsible person must do a risk assessment to ensure an explosive atmosphere could not occur by any activity involving: installation, operation, maintenance or decommissioning of the product.

The risk assessment should consider all risks, including:

- Permeation of certain chemicals through the PTFE liner, see section 14.2 for full information
- Leaks or spillage of the flammable liquid during:
  - Installation of all components of the fluid path
  - Removal of the fluid path, or other decommissioning activity.
- Operating the pump to the point of qdos connector kit hose failure, such as an overpressure event, resulting in:
  - Flow of flammable liquid into the operating environment.
  - Chemical incompatibility with pump materials of construction becoming exposed to the flammable liquid
  - Flow of flammable liquid through the pumphead safety overflow, into the process safety overflow system
- Ignition and spread of fire due to a leak, spillage, or other escape of the flammable liquid into the process area.

The above list is not exhaustive. Its purpose is to provide additional guidance which a person unfamiliar with the product, may not otherwise consider.

3.5 Product damage — Remove from service

In the event of product damage. The product must be removed from service by a responsible person. See section 11.2.2

3.5.1 Chemical contact with exterior surfaces of the product

The exterior surfaces of the product must be examined for harmful effects, in the event of a chemicals coming into contact due to :

- Spillage of the wetted fluid
- Permeation of chemicals through the PTFE hose liner
- Operating environment

In the event of product damage due to chemical incompatibility. The product must be removed from service by a responsible person. See section 11.2.2

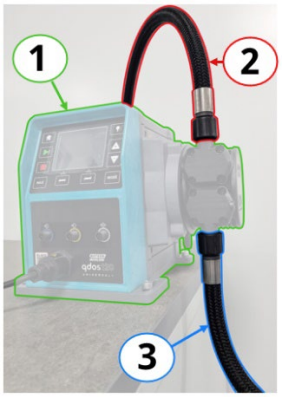
4 Product overview

4.1 Product introduction

The qdos hose connector kit is an official qdos accessory for connecting the pump to the fluid path system. Key benefits are:

- Flexible and robust hose
- Supplied ready to connect to a Qdos pump and process line.
- Fully crimped and hydrostatically pressure tested solution
- Handles ambient temperature fluctuation

A qdos hose connector kit installed on a qdos pump is illustrated by the table below:

Number	Item	Picture
1	**Qdos pump**	
2	**Qdos Hose Connector Kit:** Installed on discharge side of pump	
3	**Qdos Hose Connector Kit**: Installed on inlet side of pump	

4.2 Intended use

All model variants of the product are designed for attachment to qdos pumps for controlled chemical metering [1], in ordinary safe locations, except those fluids or applications listed below:

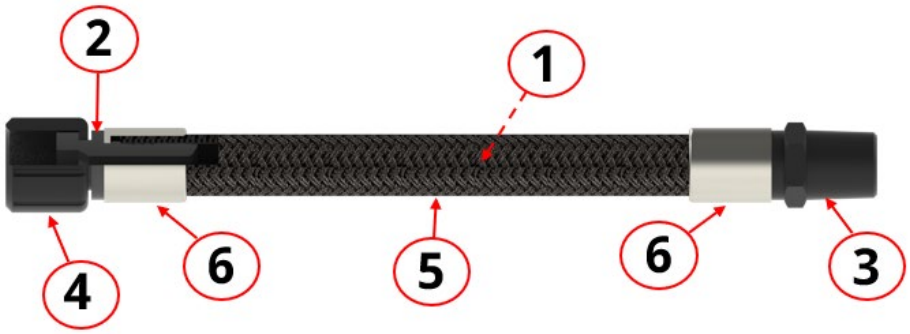
4.2.1 Prohibited use:

- Environments that require explosion proof certification
- Installations, environmental or operating conditions which are beyond the specifications provided in these instructions
- Applications with are directly life sustaining
- Applications within a Nuclear Island
- All radioactive applications involving high energy radiation, including gamma radiation

NOTE [1]	A chemical compatibility procedure is provided in section 14.

4.3 General arrangement

A qdos hose connector kit has the following general arrangement:



Item	Description	Material of construction
1	Hose: Inner	Polytetrafluoroethylene (PTFE) [1]
2	qdos pumphead connector internal connector	Polytetrafluoroethylene (PTFE) [1]
3	½" BSPT or ½" NPT [2], fluid path connector (male)	Polytetrafluoroethylene (PTFE) [1]
4	qdos pumphead connection nut (female)	Polypropylene (PP)
5	Hose: Outer braid	Polypropylene (PP)
6	Ferrule [3]	Stainless steel (304 1.4301) or Hastelloy (C276)

NOTE [1]	All PTFE material is anti-static
NOTE [2]	Either a ½" BSPT or ½" NPT connection is installed on the qdos hose connector kit, depending on product code. See section 4.4.
NOTE [3]	The ferrule material is dependent on selected product code

4.4 Model variations, product code and weight

The selection variables which form the hose product code are:

- Length [1]: of required hose connector kit (0.75 m or 1.5 m)
- Fluid path connection thread type: (1/2" BSPT or ½" NPT)
- Ferrule material: Stainless steel (304, 1.4301) or Hastelloy (C276)

NOTE [1]

The hose length measurement is shown in the illustration.

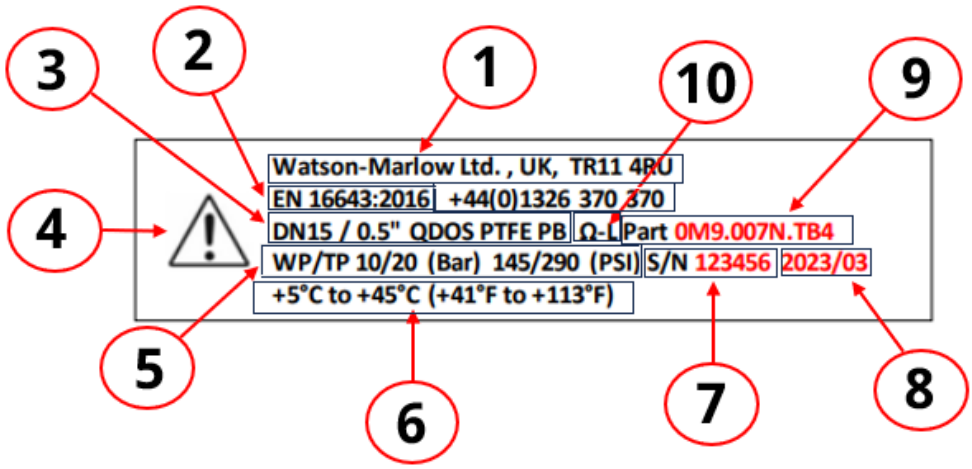
Model	Product code	Unpacked weight	
		grams	lbs
0.75 m (29.5") long qdos PTFE-lined hose connector kit (Stainless Steel ferrules) with ½" NPT male connector	0M9.007N.TB4	270.45	0.596
0.75 m (29.5") long qdos PTFE-lined hose connector kit (Stainless Steel ferrules with ½" BSPT male connector	0M9.007B.TB4	270.45	0.596
1.5 m (59.1") long qdos PTFE-lined hose connector kit (Stainless Steel ferrules) with ½" NPT male connector	0M9.006N.TB4	385.13	0.849
1.5 m (59.1") long qdos PTFE-lined hose connector kit (Stainless Steel ferrules) with ½" BSPT male connector	0M9.006B.TB4	385.13	0.849
1.5 m (59.1") long qdos PTFE-lined hose connector kit (Hastelloy ferrules) with ½" NPT male connector	0M9.006H.TB4	381.63	0.841
1.5 m (59.1") long qdos PTFE-lined hose connector kit (Hastelloy ferrules) with ½" BSPT male connector	0M9.006K.TB4	385.13	0.849

4.5 Food applications

Qdos hose connector kits are not certified for use in food applications.

4.6 Ferrule etching

The hose ferrule is etched with the following information:



Number	Explanation
1	Watson-Marlow address and telephone number
2	European standard of product manufacturing
3	Product description (Hose bore and material)
4	Safety symbol: Follow a safety instruction in these instructions
5	Pressure: WP (maximum Working Pressure) / TP (Test Pressure), shown in Bar and PSI
6	Temperature range (shown in Centigrade and Fahrenheit)
7	Serial number
8	Year of manufacture/quarter of year
9	Product code (part number)
10	Electrical properties: (Ω-L) Static-dissipative lining without electrical bonding

NOTE [1]	The information for items 7, 8 and 9 differ with either the individual product or product code.

4.7 Specification

4.7.1 Pressure

Pressure	Maximum Limit	
Inlet pressure	Inlet pressure (gauge)	-0.9 bar.g (-13.05 PSI.g)
	Inlet pressure (absolute)	0.10 bar.a (1.45 PSI.a)
Discharge pressure	Working pressure (gauge)	10 bar.g (145 PSI.g)
	Test pressure (gauge)	20 bar.g (290 PSI.g)

4.7.2 Environmental and operating conditions

Qdos hose connector kits have the same environmental and operating conditions as qdos pumps

Item	Specification
Ambient temperature range	5 °C to 45 °C (41 °F to 113 °F)
Humidity (non-condensing)	80 % up to 31 °C (88 °F), decreasing linearly to 50 % at 40 °C (104 °F)
Maximum altitude	2,000 m, (6,560 ft)
Pollution degree of the intended environment	2
Maximum fluid temperature [1]	Pumphead: Maximum fluid temperature ReNu SEBS: 40 °C (104 °F) ReNu Santoprene: 45 °C (113 °F) ReNu PU: 45 °C (113 °F) CWT EPDM: 40 °C (104 °F) CWT FKM: 40 °C (104 °F)
Environment	Indoor and limited outdoor [2]
Ingress protection	IP66, NEMA4X

NOTE [1]	Chemical compatibility is dependent on temperature. A procedure for checking chemical compatibility is provided in section 14.
NOTE [2]	Under certain conditions the product is suitable for limited outdoor use. Extended exposure to UV of the external black braid material (polypropylene) of the qdos hose connector kit can lead to discolouration of the braid and weakening of the material. Contact your Watson-Marlow representative for advice.

5 Storage

5.1 Storage conditions

qdos hose connector kits have the same storage conditions as the qdos pump range:

- Storage temperature range: -20 °C to 70 °C (-4 °F to 158 °F)
- Indoors
- Not in direct sunlight
- Humidity (non-condensing): 80 % up to 31 °C (88 °F), decreasing linearly to 50 % at 40 °C (104 °F)

5.2 Shelf life

The qdos hose connector kit shelf life is 5 years when stored in the original packaging within the storage conditions provided in the section above.

6 Unpacking

6.1 Components supplied

The product will come with the following items included within the packaging

- Chosen model of product
- Safety information leaflet with QR code to these instructions
- A combined Pressure Test Certificate and Declaration of Conformance (ISO/IEC 17050-1)

6.2 Unpacking, inspection and packaging recycling or disposal

1. Carefully remove all parts from the packaging.
2. Check that all components in "6.1 Components supplied" are present
3. Inspect components for damage in transit.
4. If anything is missing or damaged, contact your Watson-Marlow representative immediately.
5. Recycle or dispose of the packaging according to local procedures.

Packaging item	Material
Outer carton	Cardboard
Hose end caps	High density polyethylene (HDPE)
Document and hose protection bag	Polyethylene (PE)

7 Installation—Overview

7.1 Installation chapter sequence

Installation is provided in the following sequence:

1. Installation—Chapter 1: Location and mounting of pump
2. Installation—Chapter 2: Installation of qdos hose connector kits

Follow the sequence above. This is to ensure the pump will be suitably located and mounted ready for installation of the qdos hose connector kits.

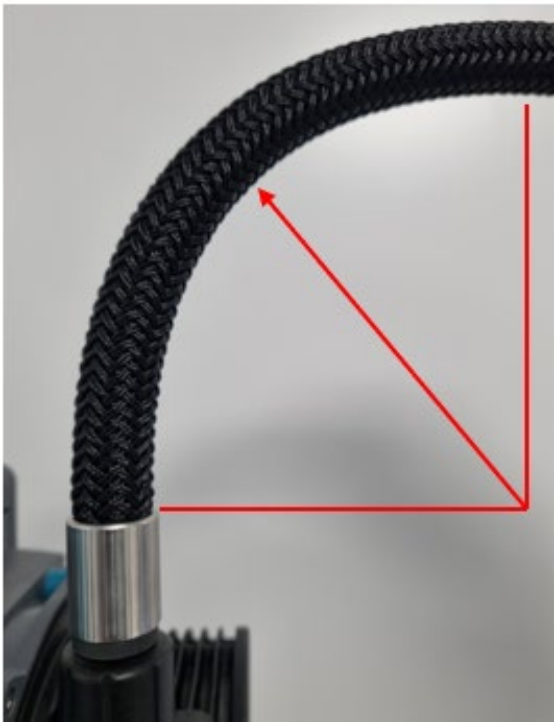
7.2 Installation chapter structure

Each of the installation chapters are divided into two main parts:

1. Part 1: Installation requirements, specification, and information for the chapter
2. Part 2: Installation procedures for the chapter

8 Installation — Chapter 1: Location and mounting of pump

qdos hose connector kits may be installed either as a straight length or with a bend. When a bend is required, the hose must not, at any time be bent below a minimum bend radius of 76 mm (3”). The measurement points for the bend radius are provided in the following picture.



In order to avoid bending the hose below the minimum bend radius, it may be necessary to uninstall and re-mount a qdos pump, prior to installing a qdos hose connector kit.

For this reason, full information on mounting of a qdos pump is provided is provided in Part 1 of this installation chapter.

8.1 Part 1: Chapter installation requirements, specification, and information

8.1.1 Location: Environmental and operating conditions

qdos hose connector kits have the same environmental and operating conditions as qdos pumps. Qdos hose connector kits must be installed such that no part of the product may exceed the environment limits provided below:

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Ambient temperature range</td><td>5 °C to 45 °C (41 °F to 113 °F)</td></tr>
<tr><td>Humidity (non-condensing)</td><td>80 % up to 31 °C (88 °F), decreasing linearly to 50 % at 40 °C (104 °F)</td></tr>
<tr><td>Maximum altitude</td><td>2,000 m, (6,560 ft)</td></tr>
<tr><td>Pollution degree of the intended environment</td><td>2</td></tr>
<tr><td>Maximum fluid temperature [1]</td><td>
<table>
<tr><th>Pumphead</th><th>Maximum fluid temperature</th></tr>
<tr><td>ReNu SEBS</td><td>40 °C (104 °F)</td></tr>
<tr><td>ReNu Santoprene</td><td>45 °C (113 °F)</td></tr>
<tr><td>ReNu PU</td><td>45 °C (113 °F)</td></tr>
<tr><td>CWT EPDM</td><td>40 °C (104 °F)</td></tr>
<tr><td>CWT FKM</td><td>40 °C (104 °F)</td></tr>
</table>
</td></tr>
<tr><td>Environment</td><td>Indoor and limited outdoor [2]</td></tr>
<tr><td>Ingress protection</td><td>IP66, NEMA4X</td></tr>
</table>

NOTE [1]	Chemical compatibility is dependent on temperature. A procedure for checking chemical compatibility is provided in section 14.
NOTE [2]	Under certain conditions the product is suitable for limited outdoor use. Extended exposure to UV of the external black braid material (polypropylene) of the qdos hose connector kit can lead to discolouration of the braid and weakening of the material. Contact your Watson-Marlow representative for advice.

8.1.2 Intended pump mounting

8.1.2.1 Inlet side of pumphead

If a qdos hose connector kit will be used on the inlet side of the pump (bottom connection), the pump will need to be installed based upon one of the 3 methods below:

Mounting method		
1: On a plinth	**2: Access hole in surface**	**3: Near edge of surface**
		
Minimum clearance		
The pump must be located upon a plinth with a minimum height of 180 mm (7.09”) to the bottom of the pumphead fluid connection	The hose must be installed through an access hole with a minimum diameter of 50.8 mm (2.0”) to avoid vibration / chafing damage.	The pump must be placed close to the edge of a surface with a 19 mm (3/4”) minimum clearance between the hose and edge of the shelf.

8.1.2.2 Discharge side of pumphead

If the pump will be mounted where the height above the pumphead will be restricted, or a bend in the hose is required, then a minimum clearance of 180 mm (7.09”) will be required from the top of the pumphead fluid connector port.

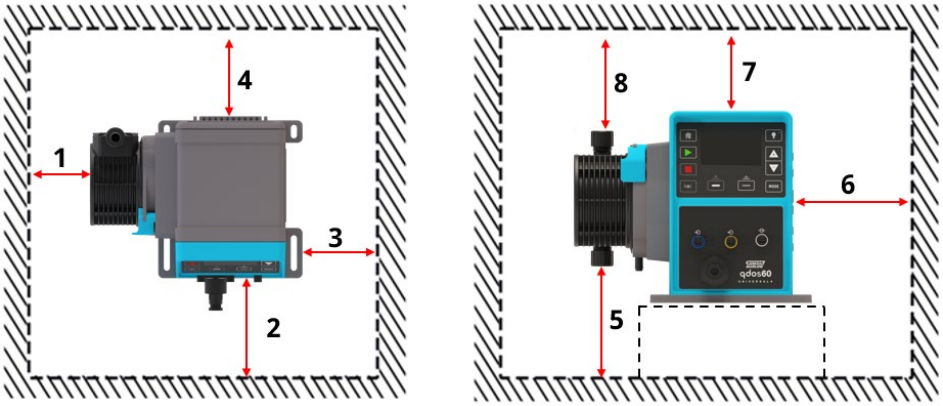
8.1.3 Remounting of a qdos pumps

The information in this section is provided, for reference if the qdos pump must be uninstalled and re-mounted in order to achieve the minimum clearances provided in sections 8.1.2 and 8.1.3.1

8.1.3.1 Area around the product

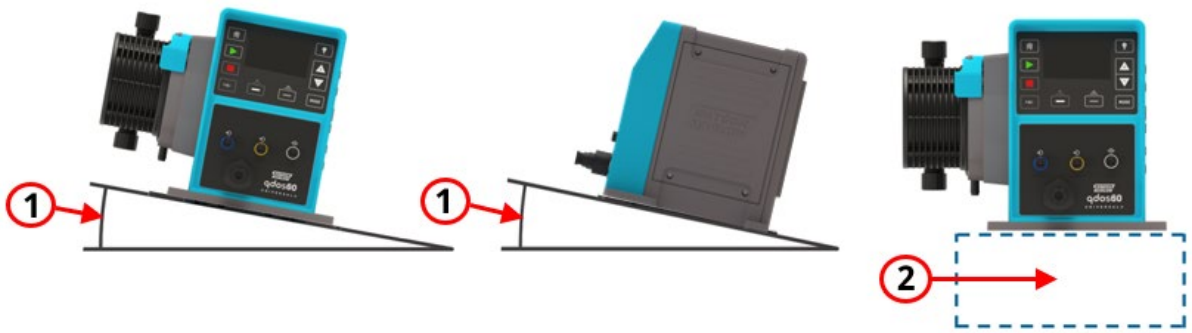
The pump must always be accessible to facilitate additional installation, operation, maintenance, and cleaning. Access points must not be obstructed or blocked.

Installation clearances are provided in the illustrations and explanation table below:



Number	Minimum clearance	Explanation
1	200 mm (7.87”)	Install and remove the pumphead (left hand pumphead mounting shown)
2	120 mm (4.72”)	The clearance is based upon a pump with the optional HMI screen cover accessory installed Additional clearance maybe required for the: • Installation of control cables
3	100 mm (3.94”)	Access pump mounting bolts
4	1000 mm (39.37”)	Access the back of the pump for: • Information (serial number, product name) • Carry out an Earth bond test
5	Varies – see explanation	The depth will depend on mounting option: See minimum clearance provided in section 8.1.2.1
6	User to define for relay module mode.	The minimum clearance is based on: • Bend radius of user cables • Room to install and remove control cables for relay module
7	120 mm (4.72”)	Clearance for opening and closing HMI cover accessory if fitted
8	180 mm (7.09”)	The clearance is based upon a pump with a Qdos Hose Connector Kit installed on the discharge side of the pump, which requires a minimum radius bend in the hose. .

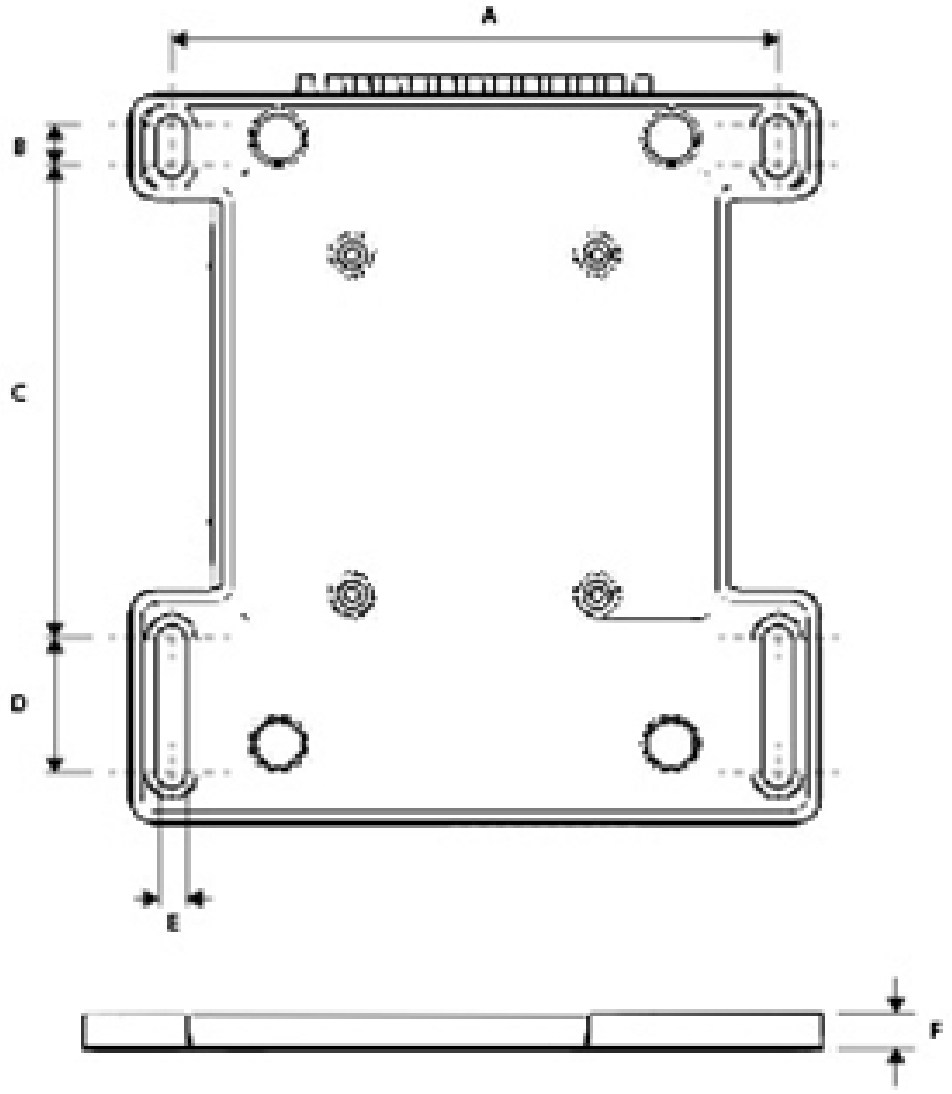
8.1.3.2 Surface and orientation



Number	Information
1	Install the pump on a level surface. **NOTICE** A mounting slope can cause poor lubrication, resulting in damage to the pump though accelerated wear. Install the pump on a level surface
2	With a surface mounting (such a plinth): • Suitable to ensure that the fluid path inlet connections has adequate space to be installed and removed. • Suitable to ensure that the pump is at a comfortable height for operation • Rated to support full weight of complete assembly and pumped product • Chemically compatible with the fluids being pumped • Free of vibration **NOTICE** Excessive vibration can cause poor lubrication, resulting in damage to the pump though accelerated wear. Install the pump on a surface free from excessive vibration.

8.1.3.3 Anchorage (bolting down the pump)

A qdos pump must be anchored to a surface. The dimensions of the baseplate for anchorage is provided in the picture and table below.



Item	Dimension
A	173.0 mm (6.81”)
B	10.0 mm (0.39”)
C	140.0 mm (5.51”)
D	39.8 mm (1.57”)
E	8.2 mm (0.32”)
F	10.0 mm (0.39”)

8.2 Part 2: Chapter installation procedures

8.2.1 Chapter pre-installation checklist

Carry out the following pre-installation checklist prior to following the installation procedure below:

1. Review all requirements of part 1 of this chapter.
2. Determine if the qdos pump which is already been installed, must be un-installed and re-mounted in order to achieve the minimum clearances in section 8.1.2 and 8.1.3.1

   If this is necessary

   - Obtain a new pumphead, which will be required during re-mounting of the pump.

     The reason for this is the pump cannot be moved with the pumphead attached. Once the pumphead has been removed, the pumphead cannot be used again as will contain residual chemicals. When installing a pumphead onto the drive, part of the procedure involves starting the pump to check the pumphead has been located correctly. This could result in the pumping out of residual chemicals, without the fluid path connected which could be a chemical hazard.

   - Follow the procedures in section 8.2.2

8.2.2 Procedure: Removal and re-mounting of qdos pump

Prior to starting the procedure(s):

- Read the procedure in full
- Do a risk assessment and determine suitable PPE
- Wear suitable PPE

8.2.2.1 Procedure on removal of pump from mounting area

1.	Isolate the pump from its mains power supply
2.	Carefully release any pressure, and drain the fluid from the system to which the hoses are attached in accordance with your organisations procedure.
3.	Remove the fluid path from the pumphead in accordance with your organisations procedures.

WARNING

Beware of any residual chemicals which remain in the fluid path upon disconnection of either end from the pumphead. Carefully drain any residual chemicals into a suitable container to avoid risk of an injury.

4. Determine if the pumphead safety overflow system will need to be removed in order to remove the pump. If required, follow your organisations procedures.

5. Remove pumphead by following this step 5A to 5F.

CAUTION

Do not move the pump without first removing the pumphead.

- Certain pumphead to drive combinations may result in the pump becoming unstable and toppling over.
- The pumphead may disengage when moved

Always remove the pumphead prior to moving a pump.

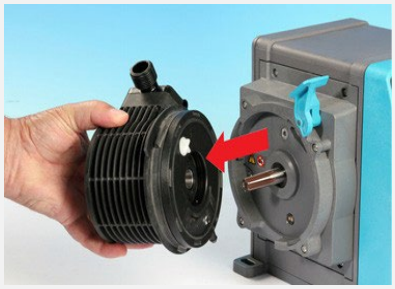
5A Release the pumphead locking lever

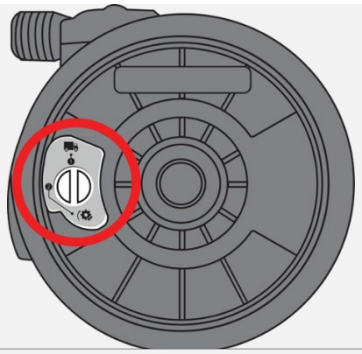
5B To disengage the pumphead from the drive, rotate it in a clockwise direction by approximately 15°.

5C Remove the pumphead and drain any residual chemicals remaining in the pumphead ports into a suitable container.

WARNING

Beware of any residual chemicals which remain in the pumphead upon removal. Carefully drain any residual chemicals into a suitable container to avoid risk of an injury.



	5D	Rotate the pressure valve in the pumphead back to the 'transport position' (This specific step is not required for CWT models).	
	5E	Dispose of the pumphead in accordance with local regulations.	
	5F	Check the leak detect sensor and driveshaft are clean and free from process chemical. If any evidence of chemical residue is found, remove the pump from service and contact your local Watson-Marlow representative for advice.	
6.	Remove the control cables in accordance with your organisations procedure.		
7.	Remove the pump from the pump mounting area.		

CAUTION

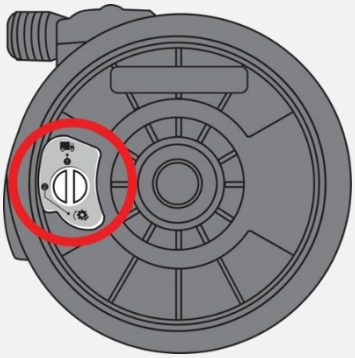
Do not place or move the drive, by holding the driveshaft. The driveshaft has edges which may cause an abrasion.

8.2.3 Procedure on re-installation of pump to mounting area

1.	Prepare the mounting area to ensure the required clearances provided in section 8.1.2.1 and 8.1.3.1 for pump mounting
2.	Place the drive on the surface to be mounted.
3.	Tighten anchorage fixings evenly until the drive is securely fixed. Do not overtighten.
4	Check the drive is mounted securely and cannot be moved easily.

CAUTION

Do not place or move the drive, by holding the driveshaft. The driveshaft has edges which may cause an abrasion.

5	Install a new pumphead pumphead using steps 5A to 5I **WARNING**  Do not reuse the pumphead. The pumphead will contain residual chemicals. Steps 5F to 5I of this procedure require the pump to be started to check the pumphead is properly engaged. This could result in an injury due to residual chemicals being pumped directly from the pumphead.	
	5A	Check pumphead and pumphead mounting area are both clean.
	5B	Turn pressure valve on pumphead to the 'in use' position (not specific step is not required for CWT models). 
	5C	Align the new pumphead with the pump drive shaft and slide into position on the pump housing.
	5D	Rotate the pumphead in an anti-clockwise direction by approximately 15° to engage the retaining lugs.
	5E	Lock the pumphead into position using the pumphead locking lever.
	5F	Reconnect the electrical power to the pump
	5G	Confirm which pumphead has been fitted using the keys on the HMI
	5H	Press start and run the pumphead for a few revolutions
	5I	Stop the pump and isolate it from the power supply • Check the locking lever is in the locked position. • Check the pumphead is secured to the drive
6	Reconnect the pumphead safety overflow system if removed during removal of the pump, in accordance with your organisations procedures.	
7	Reconnect the control system in accordance with your organisations procedures	
8	Proceed to the next installation chapter to install the qdos hose connector kit.	

9 Installation—Chapter 2: Qdos hose connector kit

The purpose of this chapter is to provide information on the installation of a qdos hose connector kits to a pump which has already been mounted in accordance with the previous installation chapter.

9.1 Part 1: Chapter installation requirements, specification, and information

9.1.1 Fluid connections

A qdos hose connector kit has two different fluid connections.

Connector name		Picture of connector	Type	Corresponding connection
1	Pumphead connector		Female	Designed only for connection to a qdos pumphead [1].
2	Fluid path connector		Male, ½" BSPT or ½" NPT depending on product code	Designed for connection to female taper threaded connections of the corresponding size, using PTFE tape.

NOTE [1]	The pumphead connector is designed to only be connected to a qdos pumphead, which contains a proprietary sealing system for a safe connection to be made. Do not attempt to connect the qdos pumphead connector to any other piece of equipment than a qdos pumphead.

9.1.1.1 Internal diameter of fluid connections and hose

Item	Internal diameter
Fluid connectors	5.55 mm +/- 0.05 mm (0.219" +/- 0.002")
Hose	13.55 mm +/- 0.05 mm (0.533" +/- 0.002").

9.1.2 Connecting hoses together

qdos hose connector kits are not designed to be connected together (daisy chained). Do not attempt to connect qdos hose connector kits together to make a longer hose.

Connecting hose connector kits together would require a special adapter and sealing system, which is not a piece of equipment for sale by Watson-Marlow.

9.1.3 Pressure

Qdos hose connector kits have a working pressure rating the same as the maximum for the qdos range (qdos 30 Santoprene, intermittent use only = 10 bar (145 PSI)).

Full information on maximum limits is provided in the table below

Pressure	Maximum Limit	
Inlet pressure	Inlet pressure (gauge) Inlet pressure (absolute)	-0.9 bar.g (-13.05 PSI.g) 0.10 bar.a (1.45 PSI.a)
Discharge pressure	Working pressure (gauge) Test pressure (gauge)	10 bar.g (145 PSI.g) 20 bar.g (290 PSI.g)

9.1.4 Earth bonding

PTFE may generate static charge in the bore of the hose when electrically non-conductive fluids (e.g. solvents, fuels) are flowing through the hose.

The PTFE hose liner and PTFE fittings are static dissipative. However, the fluid path connector must be connected to electrically bonded (earthed) system pipework to fully dissipate electrical charge.

Alternatively, either metallic crimp ferrule can be used for a connection to electrical bonding (earthing).

9.2 Part 2: Chapter installation procedures

9.2.1 Safety – after product installation

NOTICE

After installation of the hose connector kits, do not move the pump, this could damage the hose if the minimum bend radius is not maintained at all times. If the pump must be moved, remove the qdos hose connector kit in accordance with procedure 11.2.2.1.

CAUTION

After installation of the hose connector kits, do not lift or move the pump by holding the qdos hose connector kit. This will create stress on the hose fittings and create unsafe handling conditions of the pump. If the pump must be moved, remove the qdos hose connector kit in accordance with procedure 11.2.2.1

9.2.2 Chapter pre-installation checklist

Prior to installing the qdos hose connector kits:

- Pump has been installed or re-installed in accordance with installation chapter 1
- All requirements of part 1 of this chapter have been met
- All items and tools for connection of the pump to the fluid path are to hand

If there is a problem with any of the pre-installation checklist items, do not proceed to the installation procedures in this chapter, until the matter is resolved.

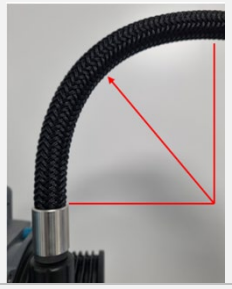
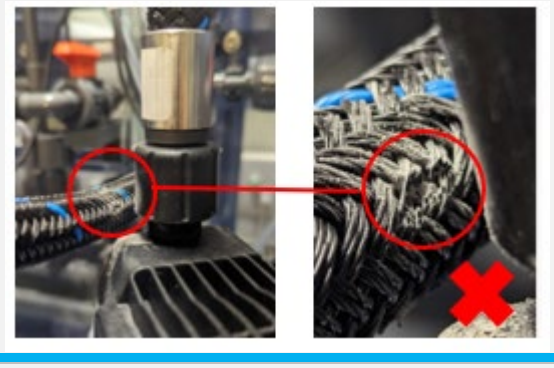
9.2.3 Procedure: Install the qdos hose connector kits onto a qdos pumphead

The procedure for installation of a qdos hose connector kit is the same for both the discharge and inlet side of the pump. Steps 2 to 7 should be repeated for each hose which will be connected on the inlet or discharge side of the pump.

Prior to starting the procedure:

- Read the procedure in full
- Do a risk assessment and determine suitable PPE
- Wear suitable PPE

1.	Isolate the pump from the power supply.	
2.	Connect the male fluid connector to the fluid path first, by following step A to E. A. Apply minimum 8 wraps of PTFE tape to thread. B. Turn hose into a tapered female connector, keeping control of the free end of the hose to prevent hose whip, until hand tight **CAUTION** Ensure free end of hose is controlled during installation to avoid hose whip and personal injury. C. Tighten further with a 24 mm – 15/16" spanner (wrench), ½ of a turn. Do not overtighten as fitting is made from PTFE D. If any twist in the hose has taken place, during steps A to C, ensuring control of the hose, allow the hose to untwist. E. Check the electrical bonding between the system pipework and hose ferrule is sufficient.	 
3.	Route the hose to the pump	
4.	Check the pumphead port seal is in place as shown by the picture and not damaged.	  (qdos 20, 60, 120 and CWT model shown, qdos 30 differs slightly in appearance)

5.	Place the Qdos Hose Connector Kit on to the pumphead and hand tighten.	 
6.	Ensure that any bend radius of the hose exceeds the 76 mm (3”) minimum requirement. 	 
7.	Check the full length and routing of the hose to be sure there are no twists, kinks or rubbing of the hose against itself (for example when looped) or against another surface (for example: the edge of the access hole or a shelf). **NOTICE** Abrasion of the hose braid can be caused by high frequency rubbing against vibrating components on a pump, or other equipment Install the hose avoiding contact with itself and other surfaces. 	
8.	Repeat steps 2 to 7 for a qdos hose connector kit if also used on the other side of the pump to the side which has just been installed.	
9.	Bring pump back into service	
10.	During pump operation, check the qdos hose connector kits which have been installed, to ensure that they do not rub against either them selves or another item (for example: the edge of the access hole or a shelf.)	
11.	Check for leaks from any connection. If leaks are present. Stop the pump, isolate from the power supply, tighten connections further, then repeat steps 9 to 11.	

10 Cleaning

Watson-Marlow confirm that fresh water is compatible with all exposed qdos hose connector kit surfaces. No other cleaning agents or chemicals are approved for use.

Responsible person must:

- Do a risk assessment to approve fresh water as suitable cleaning agent. Consider potential compatibility with:
    - process chemicals
    - residue or other material deposits on pump surfaces and installation area.
- Create a specific procedure for your application, using the general procedure provided below as guidance.

10.1 General procedure for guidance

Prior to starting the procedure:

- Read the procedure in full
- Do a risk assessment and determine suitable PPE
- Wear suitable PPE

1. Stop the pump
2. Isolate from power supply
3. Clean the product by wiping all exposed surfaces with a dry cloth or cloth dampened with water (as approved). Repeat until all residue has been removed.
4. Allow any remaining water to evaporate from surfaces
5. Reconnect the power supply
6. Bring pump back into operation
   If pump is not operating as intended after cleaning:
    1. Stop the pump
    2. Isolate power supply
    3. Instruct a responsible person to remove pump from service.

11 Maintenance

qdos hose connector kits are not serviceable or repairable items, they may only be replaced as a complete item.

11.1 Inspection of hose kits

11.1.1 Inspection for Earth bonding

Inspection of the effectiveness of earth bonding of the hose to the system pipework, should take place periodically as required, by the users organisations inspection schedule.

11.1.2 Inspection for damage

Inspection of the product for damage, should take place periodically as required, by the users organisations inspection schedule.

Product damage may be caused by :

- Abrasion due to vibration, incorrect installation or operating
- Twists or bends
- Leaking connectors
- Spillage of wetted fluid
- Permeation of chemicals through the hose (see section 14.2)
- Chemicals in the operating environment

In the event of product damage, the product must be removed from service by a responsible person.

11.2 Replacement of qdos hose connector kits

11.2.1 Replacement product codes

Model	Product code
0.75 m (29.5”) long qdos PTFE-lined hose connector kit (Stainless Steel ferrules) with ½” NPT male connector	0M9.007N.TB4
0.75 m (29.5”) long qdos PTFE-lined hose connector kit (Stainless Steel ferrules with ½” BSPT male connector	0M9.007B.TB4
1.5 m (59.1”) long qdos PTFE-lined hose connector kit (Stainless Steel ferrules) with ½” NPT male connector	0M9.006N.TB4
1.5 m (59.1”) long qdos PTFE-lined hose connector kit (Stainless Steel ferrules) with ½” BSPT male connector	0M9.006B.TB4
1.5 m (59.1”) long qdos PTFE-lined hose connector kit (Hastelloy ferrules) with ½” NPT male connector	0M9.006H.TB4
1.5 m (59.1”) long qdos PTFE-lined hose connector kit (Hastelloy ferrules) with ½” BSPT male connector	0M9.006K.TB4

11.2.2 Replacement procedure

11.2.2.1 Procedure: Remove installed qdos hose connector kit

The procedure for removal of a qdos hose connector kit is the same for both the discharge and inlet side of the pump. Steps 2 to 6 should be repeated for each hose which will be connected on the inlet or discharge side of the pump.

Prior to starting the procedure:

- Read the procedure in full
- Do a risk assessment and determine suitable PPE
- Wear suitable PPE

1. Isolate the pump from its mains power supply

2. Carefully release any pressure, and drain the fluid from the system to which the hoses are attached in accordance with your organisations procedure.

WARNING

Fluids listed in section 14.2 can permeate the PTFE liner and form a chemical hazard on the exterior of the hose. Wear appropriate PPE for the chemical hazard.

3. Disconnect the rotating connector end from pumphead first. Prepare to catch any residual chemicals that may remain within the hose after draining of the fluid path into a suitable container.

CAUTION

Beware of any pre-load in the hose (bend or twist). Ensure loose ends of hose are controlled during hose removal on to avoid hose whip and personal injury.

WARNING

Beware of any residual chemicals which remain in the hose upon disconnection of either end of the hose assembly. Carefully drain any residual chemicals into a suitable container to avoid risk of an injury.

4.	Disconnect the fixed end connector (male) from fluid path. Use a 24 mm [15/16” spanner (wrench) to loosen the connector. Prepare to catch any residual chemicals that may remain within the hose after draining of the fluid path into a suitable container **CAUTION** Beware of any pre-load in the hose (bend or twist). Ensure loose ends of hose are controlled during hose removal on to avoid hose whip and personal injury. **WARNING** Beware of any residual chemicals which remain in the hose upon disconnection of either end of the hose assembly. Carefully drain any residual chemicals into a suitable container to avoid risk of an injury.	
5.	Remove any residual PTFE tape from fluid path female connector. Inspect female connector to ensure it is suitable for a replacement hose connector kit	
6.	Ensure hose is drained of any residual chemicals into a suitable container then dispose of removed hose in accordance with local regulations. See section 13 for further information	
7.	Repeat steps 2 to 6 for a qdos hose connector kit if also used on the other side of the pump to the side which has just been installed	

11.2.2.2 Install replacement qdos hose connector kit

To install a replacement qdos hose connector kit on either the inlet or discharge side of the pump, follows the same procedure provided during the fluid path installation chapter. See section 9.2.3

12 Troubleshooting, technical support, and warranty

This section will provide information on troubleshooting. If the problem cannot be solved, information on how to seek technical support along with our comprehensive warranty is provided at the end of this section.

12.1 Troubleshooting

The troubleshooting information below relates to the qdos hose connector kits only. Full troubleshooting of a qdos pump or flow in a qdos pump application is the full qdos pump reference manual.

Problem	Possible cause	Solution
Reduced fluid flow	Leakage from fluid connectors	• Check fluid connectors are suitable for the connection (size, chemical compatibility) • Check fluid connector tightness • Check pumphead end connection seals
Short hose life	Chemical incompatibility	Check chemical compatibility of pumped fluid with tubing or element material
	Discharge pressure too high	• Increase fluid path bore • Decrease fluid path length • Decrease fluid viscosity • Check for fluid path restriction
	Wear of hose due to abrasion/vibration	• Ensure hose cannot touch itself or any other item of equipment. • Check fluid connectors are secure

12.2 Failure reporting

If any unexpected faults or failures are experienced report them to your Watson-Marlow representative.

12.3 Technical support

Should you be unable to resolve a problem, or have another query please contact us your Watson-Marlow representative for technical support.

12.3.1 Manufacturer

This product is manufactured by Watson-Marlow. For guidance or support of this product please contact:

Watson-Marlow Limited
Bickland Water Road
Falmouth, Cornwall
TR11 4RU
United Kingdom

Phone: +44 1326 370370
Website: https://www.wmfts.com/

12.3.2 Authorised EU Representative

Johan van den Heuvel
Managing Director
Watson Marlow Bredel B.V.
Sluisstraat 7
Delden
Netherlands
PO Box 47
Telephone: +31 74 377 0000

12.4 Warranty

Watson-Marlow Limited ("Watson-Marlow") warrants this product to be free from defects in materials and workmanship for two years from the date of shipment, under normal use and service.

Watson-Marlow's sole responsibility and the customer's exclusive remedy for any claim arising out of the purchase of any product from Watson-Marlow is, at Watson Marlow's option: repair, replacement or credit, where applicable.

Unless otherwise agreed in writing, the foregoing warranty is limited to the country in which the product is sold.

No employee, agent or representative of Watson-Marlow has the authority to bind Watson-Marlow to any warranty other than the foregoing unless in writing and signed by a director of Watson-Marlow. Watson-Marlow makes no warranty of the fitness of its products for a particular purpose.

In no event:

i. shall the cost of the customer's exclusive remedy exceed the purchase price of the product;

ii. shall Watson-Marlow be liable for any special, indirect, incidental, consequential, or exemplary damages, however arising, even if Watson-Marlow has been advised of the possibility of such damages.

Watson-Marlow shall not be liable for any loss, damage, or expense directly or indirectly related to or arising out of the use of its products, including damage or injury caused to other products, machinery, buildings, or property. Watson-Marlow shall not be liable for consequential damages, including, without limitation, lost profits, loss of time, inconvenience, loss of product being pumped, and loss of production.

This warranty does not obligate Watson-Marlow to bear any costs of removal, installation, transportation, or other charges which may arise in connection with a warranty claim.

Watson-Marlow shall not be responsible for shipping damage of returned items.

12.4.1 Conditions

- Products must be returned by pre-arrangement to Watson-Marlow, or a Watson-Marlow approved service centre.
- All repairs or modifications must have been made by Watson-Marlow Limited, or a Watson-Marlow approved service centre or with the express permission in writing of Watson-Marlow, signed by a manager or director of Watson-Marlow.
- Any remote control or system connections must be made in accordance to Watson-Marlow recommendations.
- All PROFIBUS systems must be installed or certified by a PROFIBUS approved installation engineer.
- All EtherNet/IP systems must be installed or certified by a EtherNet/IP approved installation engineer.
- All PROFINET systems must be installed or certified by a PROFINET approved installation engineer.

12.4.2 Exceptions

- Consumable items including tubing and pumping elements are excluded.
- Pumphead rollers are excluded.
- Repairs or service necessitated by normal wear and tear or by lack of reasonable and proper maintenance are excluded.
- Products which, in the judgement of Watson-Marlow, have been abused, misused, or subjected to malicious or accidental damage or neglect are excluded.
- Failure caused by electrical surge is excluded.
- Failure caused by incorrect or sub-standard system wiring is excluded.
- Damage by chemical attack is excluded.
- Ancillaries such as leak detectors are excluded.
- Failure caused by UV light or direct sunlight.
- All ReNu pumpheads are excluded.
- Any attempt to disassemble a Watson-Marlow product will invalidate the product warranty.

Watson-Marlow reserves the right to amend these terms and conditions at any time.

12.4.3 Returning product

Before returning products, they must be thoroughly cleaned/decontaminated. A decontamination declaration, confirming this must be completed and returned to us in advance of the item being shipped.

You are required to complete and return a decontamination declaration stating all fluids that have been in contact with the equipment being returned to us.

On receipt of the declaration, a Returns Authorisation Number will be issued. Watson-Marlow reserves the right to quarantine or refuse any equipment that is not displaying a Returns Authorisation Number.

Please complete a separate decontamination declaration for each product and use the correct form that denotes the location you wish to return the equipment to.

To obtain a decontamination declaration document for completion, contact your local Watson-Marlow representative.

13 Product end of life and disposal

Qdos hose connector kits will reach their end of life due to:

- Overpressure—As a result of being subjected to a pressure greater than the maximum working pressure of the product
- Chemical incompatibility—As a result of being used or exposed to chemicals which are incompatible with the product
- Wear— It has reached its normal end of life point due to wear from abrasive fluids or vibration.
- Incorrect installation of the product

Once the product has reached its end of life, a responsible person must remove the product from service to enable disposal. See section 11.2.2.1

The qdos hose connector kit must not be disassembled. It must be disposed of according to local procedures. Where possible it should be taken to an approved recycling centre for recycling of the materials.

The materials of construction of the product are provided in section 14.1 for reference during recycling.

14 Chemical compatibility

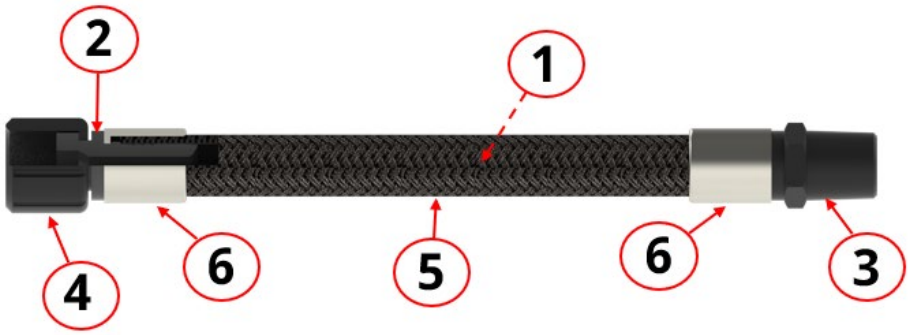
Chemical incompatibility with product materials of construction, could result in failure of the qdos hose connector kit and/or the creation of a chemical hazard which would affect a qdos pump, personnel or the operating environment.

A responsible person, must follow the chemical compatibility procedure in section 14.3 to determine if the product is suitable for the intended application in accordance with the user organisations policies and risk control methods.

Sections 14.1 and 14.2 introduce important concepts for reference during the chemical compatibility procedure in section 14.3

14.1 Materials of construction of a qdos hose connector kit

A qdos hose connector kit has the following materials of construction:



Item	Description	Material of construction
1	Hose: Liner	Polytetrafluoroethylene (PTFE) [1]
2	qdos pumphead connector internal connector	Polytetrafluoroethylene (PTFE) [1]
3	½" BSP or ½" NPT, fluid path connector (male)	Polytetrafluoroethylene (PTFE) [1]
4	qdos pumphead connection nut (female)	Polypropylene (PP)
5	Hose: Outer braid	Polypropylene (PP)
6	Ferrule [2]	Stainless steel (304 1.4301) or Hastelloy (C276)

NOTE [1]	All PTFE material is anti-static. For the purposes of the chemical compatibility analysis (see step 2, in procedure 14.3), PTFE and anti-static PTFE are interchangeable
NOTE [2]	The ferrule material is dependent on selected product code

14.2 Permeating chemicals

Certain chemicals may permeate through the PTFE hose liner. In addition, permeating chemicals which contain **halides**, may form an acid on the exterior surfaces of the qdos hose connector kit from chemical reaction with moisture in the atmosphere.

The permeating chemicals or the acid created by the permeating chemicals may:

- Attack the exterior materials of construction of the product, resulting in product failure
- Create a chemical hazard to a qdos pump, personnel or the operating environment

These events will be considered further during the chemical compatibility procedure.

14.2.1 List of permeating chemicals

A list of known permeating chemicals through the PTFE liner is provided below.

Not all of these chemicals are suitable for use with the qdos pump range.

Glacial Acetic Acid
Alk-Tri
Antimony Pentachloride
Benzene
Brake Fluid – Vegetable (wagner 21)
Bromine (gas, liquid or bromine water)
(Chlorobenzene, MCB)
Butadiene Monomer
Butane
Butanediol
Butyl Bromide
1-Butylene (liquid or gas)
not
Butylene Glycol
Caprolactam
Carbon Tetrachloride
Carbonyl Chloride (Phosgene)
Chlorinated Phenol (Disinfectant)
Mirbane)
Chlorine Dioxide
Chlorine (gas, liquid or chlorine water)
Chlorobenzene
Chlorofluorocarbon
Chloroform
Chlorothene
Chlorine Trifluoride
Crude Oil (Petroleum)
(Note: Sour Crude Oil contains Hydrogen Sulfide
– see below)
Dichlorethane
Dichlorobenzene (o and p)
Dichlorodifluoromethane
Dichloroethane
Methyl Chloroform
Methylene Bromide
Methylene Chloride
Methyl Ethyl Ketone
Methyl Methacrylate
Monochlorobenzene
Monochlorodifluoromethane
Monochlorotrifluoromethane
Monofluorotrichloromethane (F-11)
Naphtha (Petroleum, Crude)
Note: Coal Tar based Naphtha may
permeate
Naphthalene
n-Hexane
Nitric Acid - Fuming
Nitrobenzene (AKA Oil of
Nitromethane
Orthodichlorobenzene
Orthoxylene
Paraxylene
Perchloroethylene
Phenol
Phosgene (Gas & Liquid)
Potassium (Molten 63°C)
Propane
Propylene Oxide (1,2 Epoxy Propane)
Prussic Acid
Radioactive Materials (or Enviroments)
Sodium (Molten 98°C)
Sodium Hypochlorite

Sulphur Trioxide
Sulfuric Acid – Fuming (Sulphuric Acid – Fuming)
Dichloromethane
Dichlorotetrafluoroethane
Tetrachlorodifluoroethane

Diethyl Ether
Tetrachloroethylene

Dimethyl Benzene
Dimetyldichlorosilane
Ethyl Benzene
Ethyl Ether
Ethylene Bromide
Ethylene Chloride
Ethylene Dibromide
Ethylene Dichloride
Ferric Chloride
Fluorine
Freons (all types)
Fuming Nitric Acid
Fuming Sulphuric Acid
Gasohol (containing 10% Methanol)
Hexane
Hydrobromic Acid
Hydrochloric Acid
Hydrofluoric Acid
Hydrofluosilicic Acid (Hydrofluorosilicic Acid)
Hydrogen Gas (H_2)
Hydrogen Bromide
Hydrogen Chloride (HCl)
Hydrogen Cyanide
Hydrogen Fluoride (HF)
Hydrogen Sulfide (Hydrogen Sulphide)
Iodine
Isocyanates
Lithium Chloride
Lithium (Molten 181°C)
Methane
Methyl Benzene
Methyl Bromide
Methyl Chloride
Tin (Molten 232°C)
Toluene
Trichloro-1, 1, 2 Ethane
Trichloroethane
Trichloroethylene
Trichlorofluoromethane
(Trichloromonofluoromethane)
Trichloromethane

Trichlorotrifluoroethane
Trimethyl Propane
Vinyl Chloride Monomer
Vinylidene Chloride
Xylene

14.3 Chemical compatibility procedure

A responsible person must complete all steps of this procedure.

1 Make a list of materials of construction (see section 14.1) of the selected product code [1] for use in an intended application, versus the applicable scenarios in the table below:

Scenario number	Scenario explanation	Item from section 14.1
S1	Interior surfaces, normally wetted by chemicals in the fluid path	Item 1, 2 and 3
S2	If applicable (see section 14.2), The exterior product surfaces, wetted by permeating chemicals in the fluid path.	Item 4, 5 and 6
S3	If applicable (see section 14.2), the exterior product surfaces, wetted by an acid created by permeating chemicals containing halides, on the exterior surfaces	Item 4, 5 and 6
S4	Exterior product surfaces, wetted by spillage or leakage of chemicals in the fluid path	Item 4, 5 and 6
S5	Exterior product surfaces, wetted chemicals (liquid or gas) in the operating environment	Item 4, 5 and 6

NOTE [1]	The ferrule material is dependent on selected product code

2 Use the Watson-Marlow Chemical Compatibility Guide to analyse the chemical compatibility of the list of materials versus scenarios prepared in step 1.
https://www.wmfts.com/en/support/chemical-compatibility-guide/

3 Do a risk assessment to determine the affect, and risk control methods a responsible person may take based upon, the chemical compatibility analysis from step 2 in the following applicable events.

Event number	Event explanation
E1	Chemical incompatibility with the materials of construction of the product, resulting in product failure and the resulting impact of this failure on a qdos pump, personnel or the operating environment, such as a: • Chemical hazard from release of chemicals • Physical hazard from the release of pressure or material fragments • Explosion, or fire hazard from release of flammable liquids • Other hazards not listed here
E2	If applicable (see section 14.2), A chemical hazard, on a qdos pump, personnel or the operating environment as a result of the exterior product surfaces of the hose being wetted by an acid created by permeating chemicals containing halides

4 Using the hazard analysis and identified risk control methods in step 3, In accordance with the users organisations policies, a responsible person must decide if the product is suitable for the intended application.

15 Standards

15.1 Product

Standard number	Title of standard
BS EN 16643:2016	Rubber and plastics hoses and hose assemblies — Non-bonded fluoroplastic lined (e.g. PTFE) hoses and hose assemblies for liquid and gaseous chemicals — Specification
BS EN IEC UL 61010-1:2010+A1:2019	Safety requirements for electrical equipment for measurement, control, and laboratory use

15.2 Additional testing

Standard number	Title of standard
BS EN ISO 8031:2020	Rubber and plastics hoses and hose assemblies Determination of electrical resistance and conductivity
BS EN 1402:2021 clause 8.1 “Proof Hold Test”	Rubber and plastics hoses and hose assemblies. Hydrostatic testing

15.3 Documentation

Standard number	Title of standard
ISO/IEC 17050-1:2004 [1]	Conformity assessment — Supplier's declaration of conformity — Part 1: General requirements
BS EN 10204:2004, 3.1 [2]	Metallic Products: Types of Inspection Documents

NOTE [1]	A combined Pressure Test Certificate and Declaration of Conformance (ISO/IEC 17050-1) is provided in the box with the product.
NOTE [2]	Upon request, a 3.1 material certificate, is available in electronic form (PDF), for each component. Contact your local Watson-Marlow representative for more information.

16 Glossary

Term	Definition
Responsible person	A person, competent in their area of expertise, in or acting on behalf of the users organisation responsible for: Product application selection, installation, safe use of the product by operators, cleaning, maintenance, troubleshooting or decommissioning.
Halide	Binary chemical compound, of which one part is a halogen atom and the other part is an element or radical that is less electronegative (or more electropositive) than the halogen, to make a fluoride, chloride, bromide, iodide, astatide, or theoretically tennesside compound.
Hazard	Source of potential harm.
Lifecycle	The full life of the product from date of delivery of the product to disposal.