

**OPERATIONS AND MAINTENANCE MANUAL, SUBSEA -  
INTERVENTION/TIE-IN, ROV TOOL, STAB 6L, 207 BAR, STANDARD  
DOCUMENT**

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Summary:

This Operation and Maintenance Manual (OMM) is a standard document which provides the user with the necessary information to understand how the Stabs (6 line, 207 Bar) function. It also provides sufficient information to operate and maintain the equipment in a safe and efficient manner.



**This document is defined as an FMC Standard Document and is usually supplied as an attachment to a Project-specific Document.**

**NOTE**

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## Table of Contents

Section	Title	Page
<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>6</b>
1.1	PURPOSE OF MANUAL .....	6
1.2	CONTACT ADDRESSES .....	7
1.3	SYMBOLS AND CONVENTIONS .....	7
1.4	SAFETY NOTES .....	8
1.4.1	Mechanical .....	8
1.4.2	Electrical .....	8
1.4.3	Hydraulic .....	9
1.5	REFERENCE DOCUMENTS .....	10
<b>2.0</b>	<b>TECHNICAL DESCRIPTION .....</b>	<b>11</b>
<b>3.0</b>	<b>TECHNICAL DATA.....</b>	<b>13</b>
3.1	OVERALL DIMENSIONS .....	13
3.2	WEIGHTS.....	13
3.3	MECHANICAL DATA .....	14
3.4	ELECTRICAL DATA.....	14
3.5	HYDRAULIC DATA .....	14
3.6	INTERFACES.....	15
3.7	DESIGN DATA.....	15
<b>4.0</b>	<b>LIFTING INSTRUCTIONS.....</b>	<b>16</b>
<b>5.0</b>	<b>TRANSPORT / TRANSPORT .....</b>	<b>17</b>
5.1	TRANSPORT INSTRUCTIONS / INSTRUKS FOR TRANSPORT .....	17
<b>6.0</b>	<b>PRESERVATION .....</b>	<b>18</b>
6.1	GENERAL .....	18
6.2	EQUIPMENT SPECIFIC.....	18

<b>7.0</b>	<b>STORAGE.....</b>	<b>19</b>
<b>8.0</b>	<b>MAINTENANCE.....</b>	<b>20</b>
8.1	PREVENTIVE MAINTENANCE FOR EQUIPMENT IN STORAGE.....	20
8.2	PREPARATION FOR SHIPPING OFFSHORE .....	21
8.3	PRE OPERATIONAL PROCEDURE.....	21
8.4	POST OPERATIONAL PROCEDURE .....	21
8.5	FAULTFINDING .....	22
8.6	REPAIR.....	22
8.6.1	Repair of Paintwork .....	22
8.6.2	Repair of Components .....	22
8.7	TEST AFTER REPAIR.....	22
<b>9.0</b>	<b>HOOK-UP AND FUNCTION TEST .....</b>	<b>23</b>
9.1	TEST PROCEDURES .....	23
9.1.1	Mechanical Data.....	23
9.1.2	Pre-test Procedure .....	24
9.1.3	Function Test.....	24
9.1.4	Post-test Procedure.....	26
<b>10.0</b>	<b>ATTACHMENTS .....</b>	<b>29</b>
10.1	TEST DATA SHEET.....	29

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## List of Figures

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<b>Figures</b>	<b>Page</b>
Figure 1: Stab 6L, General Arrangement, Typical .....	27
Figure 2 Equipment Hook-up, Typical.....	28

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## Abbreviations

The following abbreviations are used throughout this procedure:

Abbreviation	Description
FMC	FMC Technologies
HPU	Hydraulic Power Unit
N/A	Not Applicable
P/N	Part Number (Previous denotation of Material Number)
QD	Quick Disconnect
RH	Relative Humidity
ROV	Remotely Operated Vehicle
WP	Working Pressure

## 1.0 INTRODUCTION

This manual is for the following equipment supplied by FMC Technologies (FMC):

FMC Part Number (P/N) / Part	Description
100032226	ROV Tool, Stab 6L, 207 Bar, (incl. Hoses & Box)
100032077	ROV Tool, Stab 6L, 207 Bar, (excl. Hoses & Box)
P6000034925	ROV Tool, Stab 6L, 207 Bar, (excl. Hoses, Box & Receptacle)

A Stab, 6 line, 207 Bar is used to supply hydraulic fluid. A description of the stabs is contained in Section 2.0.



The information contained in this document applies to either of the stabs (P/N 100032226, P/N 100032077 and P/N P6000034925) unless explicitly stated otherwise.

**NOTE**



For project-specific details, please refer to the Project-specific Documentation (the Project Scope of Supply which is identical to the Customer's Master Document Register (CMDR)). Alternatively; use the links set up in SAP/TCE.

**NOTE**

See also Section 1.5 for further information.

## 1.1 PURPOSE OF MANUAL

This manual provides the user with the necessary information to understand how the stabs function, together with sufficient information to operate and maintain the equipment in a safe and efficient manner.

The information contained in this document applies to any of the stabs listed in Section 1.0 unless explicitly stated otherwise.

The manual is intended used by competent, trained personnel.

## 1.2 CONTACT ADDRESSES

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**The Department of Customer Support provides 24 hours telephone support.**

### NOTE

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## 1.3 SYMBOLS AND CONVENTIONS

The following words and symbols found throughout this manual mark special messages to alert the operator of specific information concerning the PERSONNEL, the EQUIPMENT or the PROCESS.



**Text set off in this manner provides warning notice that failure to follow these directions in this WARNING can result in bodily harm or loss of life and/or extensive damage to equipment.**

### WARNING

---



**Text set off in this manner provides warning notice that failure to follow these directions in this CAUTION can result in damage to equipment.**

### CAUTION

---



Text set off in this manner present clarifying information or specific instructions pertinent to the immediate instruction.

**NOTE**

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## 1.4 SAFETY NOTES



FMC's and the Customer's health and safety systems must be adhered to at all times.

**NOTE**

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### 1.4.1 Mechanical



Never use an item of equipment that is damaged or has defective parts.

**CAUTION**



Handle the Remote Operated Vehicle (ROV) tools with care and avoid subjecting them to excessive shocks or vibration.

**CAUTION**



Ensure that slings, cables and hoses and so on, are kept clear of all moving parts to prevent snagging.

**CAUTION**

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### 1.4.2 Electrical

Not Applicable (N/A)

**1.4.3 Hydraulic**

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**Never attempt to connect, disconnect or tighten a leaking hydraulic fitting while pressurized.**

**WARNING**

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**Personal protection must be worn when there is a possibility of contact with hydraulic fluid.**

**WARNING**

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**Armoured hoses are valid for a maximum Working Pressure (WP) of 240 bars.**

**WARNING**

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**Hydraulic equipment must be protected against dirt and moisture ingress during testing and maintenance.**

**CAUTION**

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## 1.5 REFERENCE DOCUMENTS



**Always use the latest revision of any document.**

**NOTE**



**The reference documents are listed in the CMDR and are also available via links to the Part Number and the Document Bill of Material (BOM) in TCE / SAP.**

**This standard manual is usually supplied as a part of (an attachment to) a Project-specific Operation and Maintenance Manual (OMM) Manual / Amendment Document.**

**NOTE**

**All relevant reference documents will be compiled in this Project-specific OMM.**

<b>FMC / Sub-supplier's Doc. No.</b>	<b>Title</b>
XD-0001006551	ROV Tool, Stab 6L, 207 Bar, (incl. Hoses & Box), GA
XX-0001005795	ROV Tool, Stab 6L, 207 Bar, (incl. Hoses & Box), Assy
XX-0001005792	ROV Tool, Stab 6L, 207 Bar, (excl. Hoses & Box)
DA600025962	ROV Tool, Stab 6L, 207 Bar, (excl. Hoses, Box & Receptacle)

## 2.0 TECHNICAL DESCRIPTION

The purpose of a Stab 6L, 207 Bar is to supply hydraulic fluid to subsea users.

The Stab 6L, 207 Bar will fit into 6-Line/4-Line Receptacles, typically used on ROV Tools or into 2L Receptacles normally used on permanent subsea equipment for hydraulic supply or seal test purposes.

The Stab 6L, 207 Bar is designed to be installed, operated or retrieved using a Work ROV Manipulator (or by hand). The hydraulic fluid is supplied from either the ROV or an available Hydraulic Power Unit (HPU) via flexible hoses.



**The Stabs 6L, 207 bar are only for use as an ROV tool. It must not be used as a permanent stab connection.**

### NOTE

The Stabs 6L, 207 Bar consists of:

- ROV Handle
- Flexible Joint
- Male Stab Body
- Docking Indicator
- Set of O-rings
- Dummy Parking/Protection Receptacle (P/N 100032226 and P/N 100032077)
- Transportation Box (P/N 100032226 only)

The ROV Handle is connected to the male stab via a Flexible Joint to allow for flexibility when operated by the ROV Manipulator. The male Stab Body is a stepped bore type, which is a sliding interface to the Receptacle. The stepped bore insures axial alignment prior to engaging the elastomer seals and to minimize the length engaged seals must travel. Mating/unmating of the Stab is by a straight push/pull. Proper docking is done when leading edge of the Docking Indicator in flush with the Receptacle.

A Dummy Parking/Protection Receptacle (P/N 100032226 and P/N 100032077) is a cover for protection of the O-rings. It may also be mounted on the ROV and used for temporary parking of the Stab 6L, 207 Bar during a subsea operation.

The Transportation Box (P/N 100032226 only) protects the Stab 6L, 207 Bar from shocks during normal transportation, from dust and humidity during long term storage, and has special compartments for the tool, technical manuals and consumable spare parts.

### 3.0 TECHNICAL DATA

#### 3.1 OVERALL DIMENSIONS

Item	Data
Stab 6L, 207 Bar:	
Length	438 mm (17.2")
Maximum diameter	140 mm (5.5")
Female Receptacle (P/N 100032226 and P/N 100032077):	
Length	150 mm (5.9")
Equipment and Transportation Box (P/N 100032226 only):	
Length	582 mm (22.9")
Height	400 mm (15.7")
Width	382 mm (15")
Weight	5,3 kg (11,7 lbs)

#### 3.2 WEIGHTS

Item	In Air	In Water
Stab 6L, 207 Bar	4.5 kg (9.9 lbs)	3.5 kg (7.7 lbs)
Female Receptacle (P/N 100032226 and P/N 100032077)	3 kg (6.6 lbs)	2.3 kg (5 lbs)

**3.3 MECHANICAL DATA**

Item	Data
Number of ports:	6
Fittings:	7/16" x 20 JIC male
Insertion/Removal force (straight push/pull):	250 N (Stab 4L) 300 N (Stab 6L)
Maximum misalignment on entry:	
Axial:	15°
Radial:	25 mm

**3.4 ELECTRICAL DATA**

N/A

**3.5 HYDRAULIC DATA**

Item	Data
Operational Limitations:	
Working Pressure	207 Bar
Design Pressure	380 Bar
Flow Capacity	Max. 30 l/min
Service Fluids:	
Hydraulic Oil	Shell Tellus or Equivalent
Water Based Fluid	Marston Bentley HW540 or Equivalent

### 3.6 INTERFACES

Item	Data
Hydraulic Interfaces	Hydraulic hoses connected to 6 off 7/16" x 20 JIC male hydraulic fittings (A, B, C, D, E and F):  - A pressure and B return (or visa versa) - C pressure and D return (or visa versa) - E pressure and F return (or visa versa)
Interfaces (general)	Female Receptacle for Seal Test, ROV tools  Female Receptacle on Subsea structures  Stab 4L, 345 Bar, Female Receptacle  Stab 6L, 345 Bar, Female Receptacle

### 3.7 DESIGN DATA

Item	Data
Design Life	20 years
Ambient Temperature Ranges:	
Storage	-30° to +55°C
Transport	-20° to +40°C
Air Temperature Offshore	-18° to +40°C
Sea Temperature	+2° to +30°C
Operational Water Depth	Max. 2.500 m
FMC Part Number (P/N)'s	
Dedicated Transportation Box	200013230 for P/N 100032226 only

## 4.0 LIFTING INSTRUCTIONS

Due to the low weight of the Stabs and associated equipment, they can be lifted manually.

Weight of the equipment is as follows:

- Stab 6L, 207 Bar Incl. receptacle 7.5 kg (16.5 lbs)

## 5.0 TRANSPORT / TRANSPORT

### 5.1 TRANSPORT INSTRUCTIONS / INSTRUKS FOR TRANSPORT

Before transporting the equipment, ensure that:		Sjekk ut følgende punkter før enheten kommer i transportfasen:	
1	Ensure that the equipment is preserved and protected in accordance with Section 6.0 Preservation, Storage and Maintenance.	1	Verifiser at utstyret er preservert og beskyttet i henhold til kapittel 6.0 - Preservation, Storage and Maintenance.
2	Wrap the Stab 6L, 207 Bar in plastic.	2	Pakk Stab 6L, 207 Bar i plast.
3	Store and secure the Stab 6L, 207 Bar (P/N 100032226 only) in the dedicated Transportation Box (P/N: 200013230).	3	Lagre og sikre Stab 6L, 207 Bar (bare P/N 100032226) i den dedikerte transportkassen (P/N: 200013230).
4	Always ensure that equipment is protected from the elements. If necessary, cover with waterproof covering (tarpaulin or equivalent) to protect from rain, snow, dust, sand and solar radiation.	4	Påse alltid at utstyret er beskyttet mot elementene. Hvis nødvendig, dekkes utstyret til med vantett presenning eller lignende, Utstyret skal beskyttes mot regn, snø, støv, sand og solstråling.

## 6.0 PRESERVATION

### 6.1 GENERAL

1. Carry out a thorough, visual inspection of the ROV Tool. Check for loose damaged components and report any defects found.
2. If necessary, hose down the ROV Tool with fresh water to remove all traces of salt. Remove excess water using compressed air.
3. Protect External Surfaces with plastic mesh, electrical tape or other protection to prevent damage.
4. Non-metallic materials and corrosion resistant materials such as Xylan, Inconel, Stainless Steel, Al-Bronze, etc. are not to be coated with any preservatives unless specifically instructed.
5. Arrange the parts to prevent direct metal-to-metal contact of surfaces with other parts.
6. Repair any damaged to painted surfaces in accordance with project specific specification/procedures.
7. Do not remove preservatives until just prior to use, unless for inspection purposes. Any preservatives removed should be replaced, using the appropriate procedure.

### 6.2 EQUIPMENT SPECIFIC

The specific preservation and protection procedure for the Stab 6L, 207 Bar is as follows:

1. After use, clean the Stab with fresh water to remove any traces of salt and then thoroughly dry the unit.
2. Clean the pressure seals and check for wear and damage, grease the O-rings with Molycote 111.
3. Protect all unprotected surfaces, machined surfaces and threads by applying a liberal quantity of WD-40 or equivalent light lubricating oil.
4. Place the Stab 6L 207 bar (P/N 100032226 only) in its designated Transportation Box (P/N: 200013230).

## 7.0 STORAGE

The ROV Tool must be preserved, as described in Section 6.0, to protect it from rain, snow, ice, sea spray, dust, direct solar radiation or sand:

- Storage area: In a controlled area not exposed to rain, snow, sea-spray or excessive dust
- Storage temperature: -30°C to +55°C
- Maximum air humidity: 95% Relative Humidity (RH)

The following general instructions apply for storage:

- Inspect the ROV Tool for signs of physical damage, debris and defects upon receipt
- Ensure that any recommended preservatives are in good condition. Re-apply as necessary and wipe off any excess preservative from non-metallic surfaces
- If required, clean the external surfaces using diesel
- Blank off the FMC Female Receptacle fittings with caps.
- Store the Stab 6L 207 bar (P/N 100032226 only) in its Transportation Box (P/N: 200013230)
- Do not remove preservatives until just prior to use
- At regular intervals during the storage period, preventive maintenance must be carried out as described in Section:8.1.

## 8.0 MAINTENANCE

Preventive maintenance of the ROV Tool is an on-going process, from inspection on receipt, through to preservation (including preservation maintenance) and storage after use. Observation of the maintenance schedules provided in this section will prevent the majority of malfunctions or failures.

The following consumables will be required for preservation and repair:

- Shell Tellus
- Diesel
- Fresh water
- Self adhesive tape
- Plastic mesh

Preventive maintenance is required during storage and while in use, as described in the following sections.

### 8.1 PREVENTIVE MAINTENANCE FOR EQUIPMENT IN STORAGE

At six monthly intervals, visually inspect the ROV Tool for:

- Loose or damaged components
- Damage to paintwork
- Cleanliness and moisture
- Corrosion, etc
- Perform a Function Test according to Section 9.0 Stab 6L, 207 Bar, Hook-up and Function Test
- Protect all unprotected surfaces, machined surfaces and threads by applying a liberal quantity of WD-40 or equivalent light lubricating oil

Make a written report on abnormal observations, and correct all divergences from normal.

## 8.2 PREPARATION FOR SHIPPING OFFSHORE

STEP	DESCRIPTION	TIME	SIGN
1.	Remove weather protection, i.e. tarpaulins, plastic sheeting, etc.	.....	.....
2.	Lift the ROV Tool from its Transportation Box and lay the ROV Tool on the work bench.	.....	.....
3.	Clean off all preservatives.	.....	.....
4.	Make a thorough visual inspection of the ROV Tool. Particularly look for damaged components, coating damage etc., and for corrosion, cleanliness and moisture. Repair as necessary.	.....	.....
5.	Prepare ROV Tool for use in accordance with Section 9.0 Stab 6L, 207 Bar, Hook-up and Function Test.	.....	.....
6.	Preserve the ROV Tool as per Section: 6.0: Preservation above, and return to storage, as per Section: 7.0: Storage above, prior to shipment offshore.	.....	.....
7.	Make a written report on any defects observed, and correct any divergences from normal as required.	.....	.....

## 8.3 PRE OPERATIONAL PROCEDURE

1. Inspect for loose or damaged components. Repair as necessary.
2. Inspect for paint damage and corrosion etc. then, for future reference and correction, make a written report on any abnormal observations made
3. Carry out a Hook-up and Functional test, as described in Section 9.0.

## 8.4 POST OPERATIONAL PROCEDURE

1. Hose down the ROV Tool with fresh water to remove all traces of salt.
2. Remove excess water using compressed air.
3. Carry out post test procedures for ROV Tool in accordance with Section 9.0 Stab 6L, 207 Bar, Hook-up and Function Test.

4. Preserve the ROV Tool, as described in Section 6.0, and return to storage, as described in Section: 7.0.
5. Make a written report on any defects observed, and correct any divergences from normal as required.

## **8.5 FAULTFINDING**

Because the stab is so simple, no special faultfinding procedures are necessary.

## **8.6 REPAIR**

Repair, which is described in subsequent paragraphs, is limited to:

- Repair of paintwork
- Repair of components
- Test after repair

### **8.6.1 Repair of Paintwork**

Repair any damage to painted surfaces in accordance with project specific specification/procedures.

### **8.6.2 Repair of Components**

Repair components by replacing them with new or re-conditioned components.

In cases where replacement requires considerable expertise and product knowledge only FMC personnel or their approved representatives are to carry out the work. FMC or their approved representatives are to be consulted, prior to any repair, to discuss appropriate course of action.

If considered necessary function testing of the ROV Tool can be carried out, as per Section 8.2.

Repair any damaged painted surfaces in accordance with project specific specification/procedures.

## **8.7 TEST AFTER REPAIR**

After repair, perform a Functional Test as described in Section 9.0.

## 9.0 HOOK-UP AND FUNCTION TEST

Required equipment for test:

Equipment Name:	FMC P/N:	Remark
Stab 6L, 207 Bar	100032226 100032077 P6000034925	
<b>Additional equipment for Hook-up:</b>		
6 off 1/4" hoses, 4m with 7/16" x 20 JIC female (both ends)	N/A	Required only for 100032077
6 off 1/4" hoses, 4m with 7/16" x 20 JIC female (both ends) and Stab Receptacle with blind ports.	N/A	Required only for P6000034925
HPU, 207 Bar (Tellus oil or similar), including - Valve Panel, inc. 3 off 4/3 way Valves with output ports 7/16" x 20 JIC male	N/A	
Additional hoses: 2 off, with Quick Disconnect (QD) Coupler to interface HPU and Valve Panel	N/A	

## 9.1 TEST PROCEDURES



**Never attempt to connect, disconnect or tighten a leaking hydraulic fitting while pressurised.**

**WARNING**



**Personal protection must be worn when there is a possibility of contact with hydraulic fluid.**

**WARNING**

### 9.1.1 Mechanical Data

- Stab Ports : 7/16" x 20 JIC male
- 50 psi Check Valve Ports : 7/16" x 20 JIC male (applicable only for 100032226)

- Number of ports : 6 ports
  - - Port A: Supply and Port B: Return (or visa versa)
  - - Port C: Supply and Port D: Return (or visa versa)
  - - Port E: Supply and Port F: Return (or visa versa)

**9.1.2 Pre-test Procedure**

The pre-operational checks for the Stabs 6L, 207 Bar are as follows:

1. Carry out a visual inspection of the Tool to ensure that no damage has occurred since unpacking and de-preservation. Report any defects found and do not proceed until all unacceptable conditions are rectified.
2. Clean off all preservatives and check the condition of the parts. Report any defects.

**9.1.3 Function Test**

STEP	DESCRIPTION	TIME	SIGN
1.	Hook-up to equipment as shown in Figure 2:	.....	.....
	 <b>Place the Stab into a suitable can to prevent any oil spillage.</b>		
<b>NOTE</b>			
2.	Install female receptacle onto ROV 5 function manipulator (parking position).	.....	.....
3.	Check for proper hose connections.	.....	.....
4.	Adjust the HPU to min. output pressure.	.....	.....
5.	Activate the Valve to apply fluid through Stab Port A.	.....	.....
6.	Observe fluid passing through.	.....	.....
7.	Repeat steps 5 - 6 for Stab Ports B, C, D, E and F.	.....	.....
8.	Install stab into blind receptacle and activate Port A.	.....	.....
9.	Pressurize to 207 bars.	.....	.....
10.	Verify no leakage.	.....	.....

STEP	DESCRIPTION	TIME	SIGN
11.	Repeat steps 9 - 10 for Stab Ports B, C, D, E and F.	.....	.....
12.	Vent pressure and remove the stab.	.....	.....

#### 9.1.4 Post-test Procedure

1. Remove the hydraulic Hoses.
2. Wash down the Tool and Hoses with fresh water and dry.
3. Inspect the Tool and Hoses for any damage.
4. Inspect the O-rings for scratches or damage, replace if necessary.
5. If the Stab 6L 207 bar (P/N 100032226) is to be stored, then store it in its dedicated Transportation Box (P/N: 200013230).

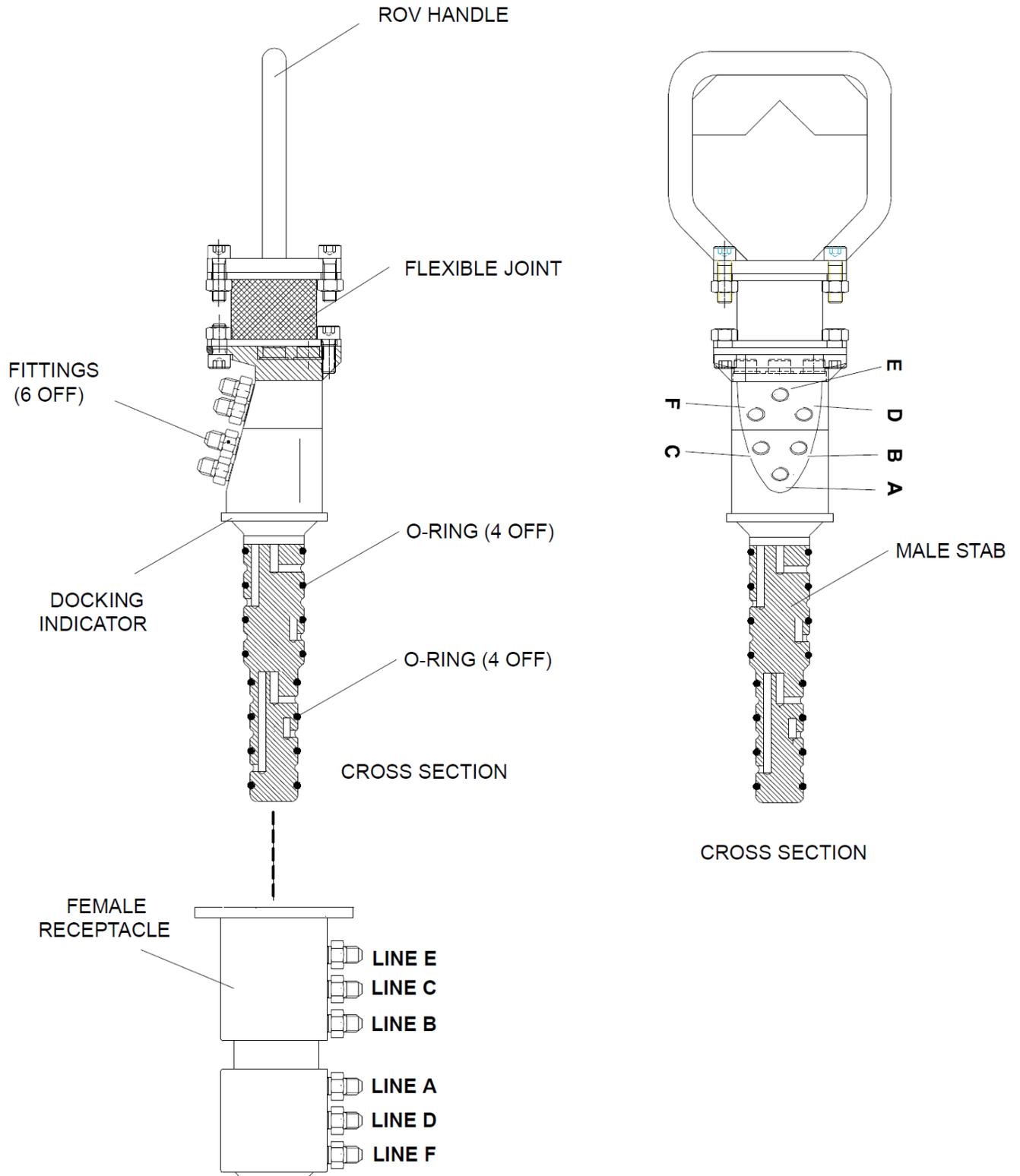
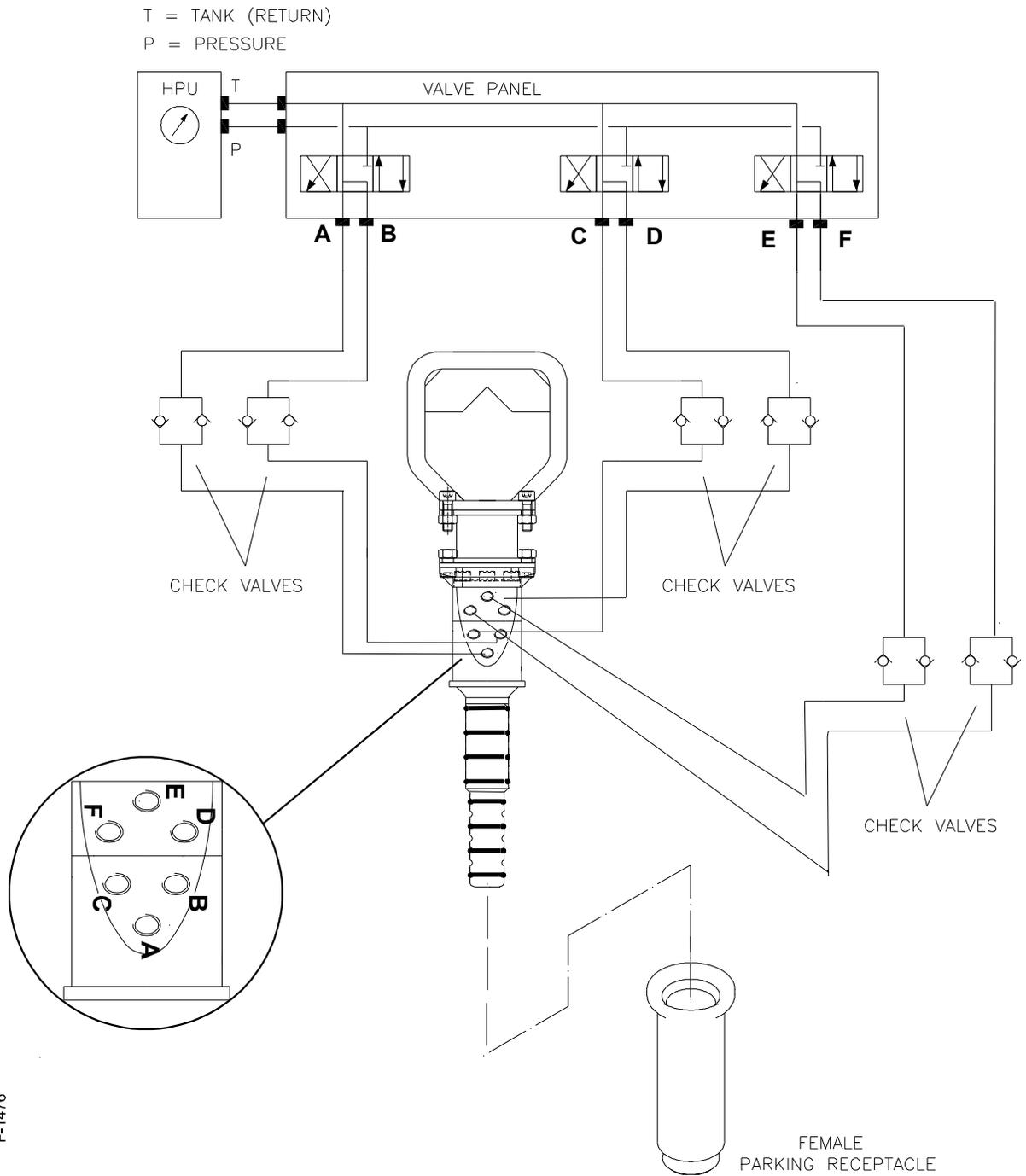


Figure 1: Stab 6L, General Arrangement, Typical



F-1476

Figure 2 Equipment Hook-up, Typical

## 10.0 ATTACHMENTS

### 10.1 TEST DATA SHEET

Equipment Id	FMC P/N	Serial No.	Test Date

Equipment Id	FMC P/N	Setting