CURVETECH

TECHNICAL MANUAL

COMPENSATOR - 1 PINT

SMD P/N'S: EV_4002-XX ONWARDS

REVISION 0 / SEPTEMBER 2016

SMD

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REVISION ** APPROVAL

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CHANGE LOG

The table below details the changes made to the document revision.

Description	Date	Created by	Checked by	Approved by	Revision
					6
					5
					4
					3
					2
					1
Initial Release	September 2016	MJ	PM	MvZ	0
TITLE	Compensator-1 Pint SMD P/N's: EV_4002-XX Onwards				
ID	8101-1241622				

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DESCRIPTION

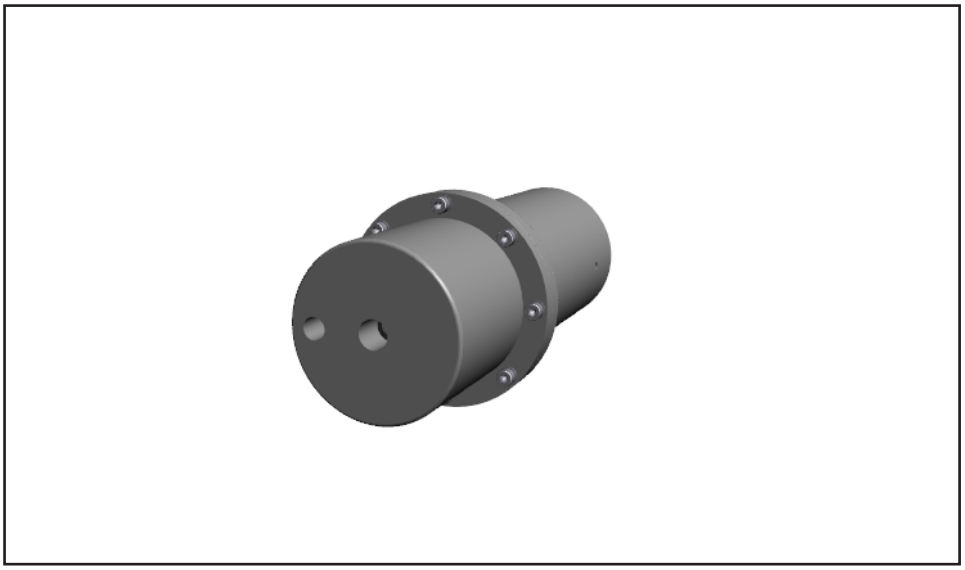


Figure 1 - 1 Pint Compensator

(3D Model. Click to Activate)

Within a subsea hydraulic system, oil volume changes as a result of pressure and temperature. Compensators are included in these closed systems to account for this volume change. As the system volume lowers, the compensator piston can move. Typical uses of compensator are:

- Compensation of electrical boxes (ie. valve packs, electrical junction boxes, electrical terminations).
- Compensation of enclosed cavities such as bearing housings and seal cavities.
- Reservoirs as part of open and closed loop hydraulic systems.

Important considerations required in the use of compensators in subsea hydraulic systems:

- Correct compensator size for the oil volume under compensation. The main parameters that affect oil volume are pressure and temperature. If required, SMD can advise further on compensator sizings.
- Relief valve included to limit system maximum internal pressure (see accessories section).
- Mounting is secure (see accessories section).
- Space is available for the lower piston guide to move through its full range. Mounting is protected from inadvertent damage of components. Component is readily accessible for maintenance purposes.

⚠ CAUTION:

Compensator shall be fitted with a relief valve sized in accordance with installation. Pressure rating of the relief valve shall be in accordance with installation but shall be no greater than 30psi.

SPECIFICATION

- Type: Rolling diaphragm with internal spring.
- Oil Volume: 0.57L (1 imperial pint).
- Maximum Working Pressure: 2 Bar / 30psi (relative to atmosphere).
- Spring: 316 Stainless steel.
- Diaphragm: Fabric Reinforced Nitrile Rubber.
- Diameter#: 114mm.
- Length# (Empty): 258mm.
- Length# (Full): 378mm.
- Recommended Oil Types:
  - HVI type hydraulic mineral oils (ie. Shell Tellus, Mobil DTE 10).
  - Transformer type oils (ie. Mobilect 39).
  - Environmental/HEES Oils (ie. Panolin HLP Synth, Panolin Atlantis).

Note: The above oils are regularly used by SMD in their products. For different oil types, SMD recommends additional due diligence.

General									
Compensator Variant (EV_4002 -XX MK2)	1	2	3	4	5	7	8	9	10
Pressure at Max. Volume*	0.7 bar (10 psi)	0.14 bar (2 psi)	0.7 bar (10 psi)	0.14 bar (2 psi)	1 bar (15 psi)	0.35 bar (5 psi)	0.35 bar (5 psi)	0.35 bar (5 psi)	0.7 bar (10 psi)
Hydraulic Connections	1 x ¼" BSP 1 x ⅜" BSP	1 x ¼" BSP 1 x ⅜" BSP	2 x SAE #6	1 x ¼" BSP 1 x ⅜" BSP	1 x ¼" BSP 1 x ⅜" BSP	2 x SAE #4	1 x ¼" BSP 1 x ⅜" BSP	1 x ¼" BSP 1 x ⅜" BSP	1 x ¼" BSP 1 x ⅜" BSP
Materials of Construction									
Body	Acetal	Aluminium	Acetal	Acetal	Acetal	Acetal	Acetal	Aluminium	Aluminium
Weights									
Weight In Air (Empty)*	1.75kg	2.3kg	1.65kg	1.65kg	1.65kg	1.65kg	1.65kg	2.3kg	2.3kg
Weight In Air (Oil Filled)*	2.5kg	2.8kg	2.1kg	2.1kg	2.1kg	2.1kg	2.1kg	2.8kg	2.8kg
Weight In Sea Water (Oil Filled)*	0.75kg	1.45kg	0.8kg	0.8kg	0.8kg	0.8kg	0.8kg	1.45kg	1.45kg

* Values are engineering estimates and may vary between units.

See approved general arrangement drawing for component layout. Please request latest copy from SMD sales.

MOUNTING ARRANGEMENT

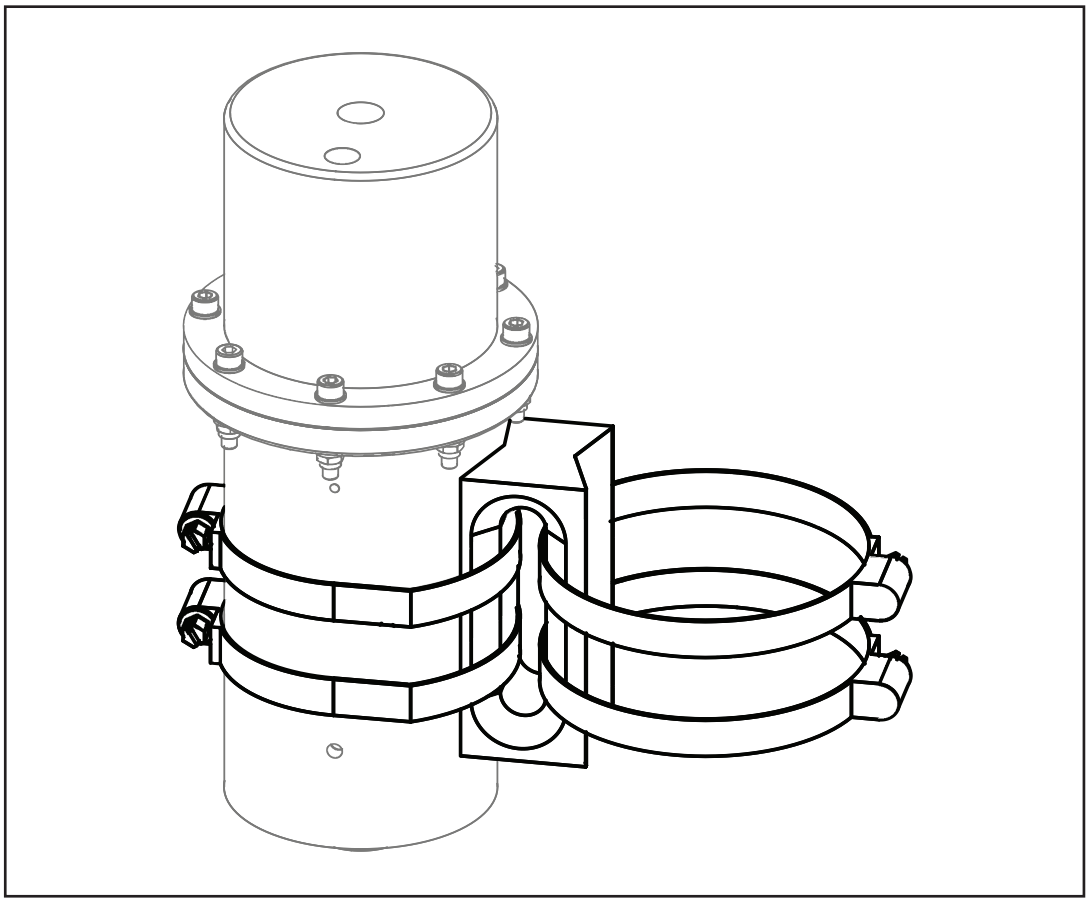


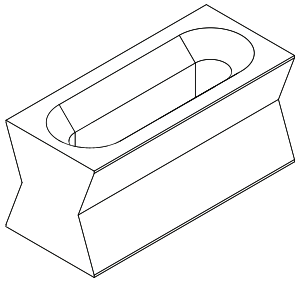
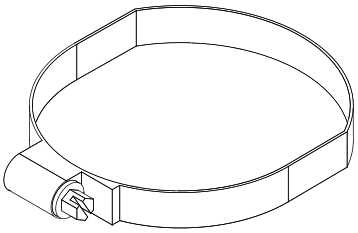
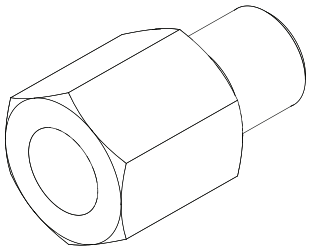
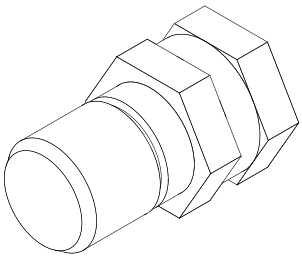
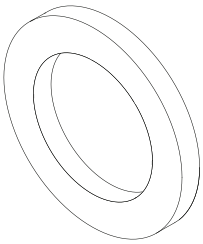
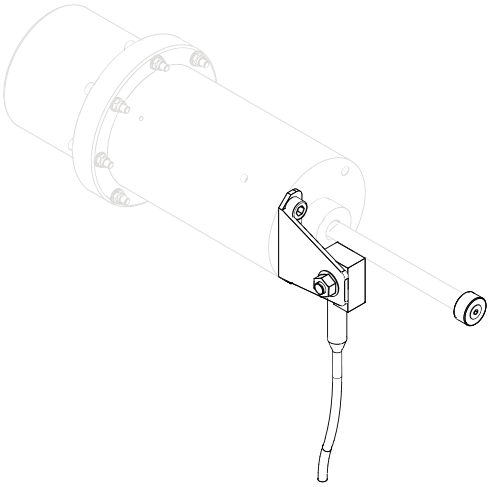
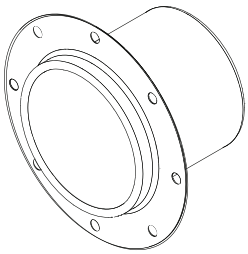
Figure 2 - 1 Pint Compensator Mounting Arrangement

The compensator is best mounted vertically. Standard procedure is to strap it to an appropriate vertical member.

Mounting holes are also provided on the base of the unit which can be used to directly mount the compensator to the vehicle. See the relevant general arrangement drawing.

The mounting arrangement should ensure that the compensator has suitable seawater drainage via the holes provided in the lower housing. Also, the central guide requires room to extend as the compensator is filled.

ACCESSORIES

Mounting Block AD9334 and 2x Jubilee Clips PA0054.	 AD9334  PA0054
15psi Pressure Relief Valve Kit 1 x ⅜" BSP AA3125, PD8370, WA1077. 30psi Pressure Relief Valve Kit 1 x ⅜" BSP AA3125, AA7425, WA1077.	 AA3125  PD8370 / AA7425  WA1077
Electric Empty Sensor EV_4012-1.	 EV_4012-1
Seals Kit EV_4002-SP MK2 (Diaphragm and O-Ring Seals).	 EV_4002-SP MK2

MAINTENANCE

DAILY / PRE AND POST DIVE CHECKS

- Visual inspection of unit. Confirmation that unit fixings and hoses are secure. Confirmation that oil level is correct and no evidence of leaks.

WEEKLY

- No specific actions.

MONTHLY

- Thorough visual inspection. Removal of any vehicle components to aid this inspection.
- Oil contamination check - Particle count (NAS level or ISO level), oil water content and oil condition (if required).
- Confirm relief valve is free to move.

YEARLY

- No specific actions.

EVERY 2 YEARS (AFTER HEAVY USE)

- Full strip and inspect. Replace rolling diaphragm.

FILLING COMPENSATOR

⚠ CAUTION:

Uncontrolled filling or filling at high flow rates may over-pressurise the compensator and cause damage and injury.

- Always fill the compensator in a slow and controlled manner.
- Monitor the fill level at all times to prevent overfilling. It's recommended to fill to 80-90% maximum volume to leave room for some expansion.
- Fill the system through a check-valve or quick-release coupling. Once filled, the system pressure is raised above atmospheric pressure.
- After filling, leave the system to settle and bleed trapped air from system.
- Monitor system oil levels during operation to prevent leaks and protect against component failures.

REPLACING THE ROLLING DIAPHRAGM

To replace the rolling diaphragm, please follow the instructions below. The relevant general assembly drawing should also be used for reference. If in doubt, stop and contact SMD for assistance.

⚠ WARNING:

Internal spring remains compressed even with unit empty. If this is not restrained, as noted below, the parts can separate with sufficient force to cause a major injury.

- Carefully remove 6 off M6 nuts and bolts to detach the spring housing from the body.
- Loosen the final two bolts. Prior to removing these bolts, manually take internal spring pressure using a press or an assistant. Remove final two bolts and carefully separate components until the spring pressure is released.
- Remove the M5 bolt and washer from the piston assembly and remove the diaphragm securing cap. Remove the old diaphragm.
- Clean any residue from inside the piston housing and check the condition of the O-rings. If in doubt replace the O-rings.
- Apply a light coat of Molykote 111 to the fabric side of the diaphragm.
- Place the diaphragm over the piston, checking that the O-rings are correctly seated.
- Fix the diaphragm securing cap in position with the M5 bolt and washer.
- Using a press, or an assistant, clamp the spring housing to the main body with 8 off M5 nuts, washers and bolts. Take care to ensure the spring locates correctly in the base of the spring housing.

CLEANING

ⓘ NOTICE:

Only clean using warm water with weak soap solution. Other chemicals may reduce the appearance and service life of plastic and rubber components.

STORAGE

For storage, the following actions should be taken:

- Unit cleaned externally. Full strip, clean and rebuild if use may have caused particles to enter internal cavities.
- Unit drained of oil. If oil is contaminated (dirt or water content), the unit should be flushed with clean oil.
- All ports blanked.
- Store at relatively constant temperature (+5°C to +25°C) and out of direct sunlight.

DISPOSAL / SCRAPPAGE

In the event that the unit is no longer required, it should be stripped down and cleaned to remove oil and other contaminants. The constituent parts should be sent to dedicated local waste disposal units or appropriate recycling facilities.

Waste oil must always be disposed of in appropriate facilities. If in doubt, contact your local oil supplier.

If in doubt, contact SMD who can arrange environmentally acceptable scrappage.

SERVICE AND SPARE PARTS

SERVICE RETURN PROCEDURE

Standard return procedure is:

- Compensator should be suitably packaged and returned to SMD freight paid after advising SMD of the required service work.
- A maintenance/failure report by the customer is required.
- A quotation for service/repair will be provided by SMD.
- An order to service/repair the unit is required before work can commence.

SPARE PARTS

Refer to the GA Drawing for part numbers. Ordering by SMD part number reduces the risk of wrong parts being provided.

Use of non-approved SMD parts will invalidate the warranty.

DISTRIBUTORS

Contact SMD Limited for a current list of distributors:

Telephone:	++44 (0) 191 234 2222
Fax:	++44 (0) 191 234 8599
E-mail:	info@smd.co.uk
Web Site:	http://www.smd.co.uk
Address:	Soil Machine Dynamics Limited
	Turbinia Works
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	United Kingdom
	NE28 6UZ

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