

# Final Documentation



**Damcos™**

## **Final Documentation Damcos**

Astilleros de Murueta S.A

Newb.No. 307

Damcos Order No. 131985



**EMERSON™**  
Process Management



Specification

General Valve System Information

Actuators

Accessories

Instructions

**Final Documentation**

Astilleros de Murueta

Newb.No. 307

DKMS No. 131985

**Specification**

Specification

131985-1

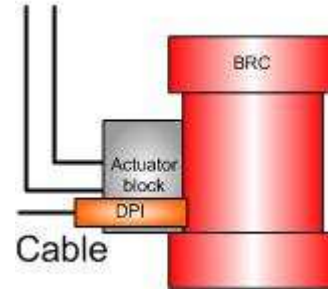
## Item 10 (1.01) BFV Control - WF DN150 BRC 125

- 2 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN150, PN10, (3 bar) Type;  
Torque 120Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |  |
|---|--|
| 1 | ACTUATOR BRC 125 B1  |
| 1 | Standard Coating (SP-I 8)                                      |
| 1 | Steel adaptation BRC/BRCF 125                                  |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)              |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the block |

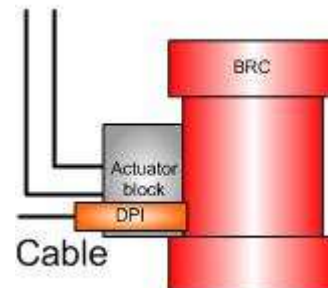
## Item 20 (1.02) BFV Control - WF DN350 BRC 1000

- 1 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN350, PN10, (3 bar) Type;  
Torque 950Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |  |
|---|--|
| 1 | ACTUATOR BRC 1000 B1   |
| 1 | Standard Coating (SP-I 8)                                      |
| 1 | Steel adaptation BRC/BRCF 1000                                 |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)              |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the block |



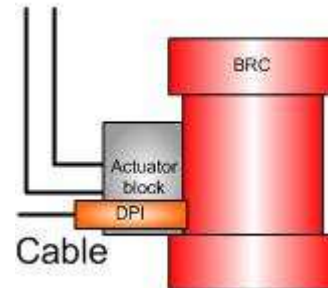
## Item 30 (1.03) BFV Control - WF DN300 BRC 500

- 4 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN300, PN10, (3 bar) Type;  
Torque 490Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |  |
|---|--|
| 1 | ACTUATOR BRC 500 B1  |
| 1 | Standard Coating (SP-I 8)                                      |
| 1 | Steel adaptation BRC/BRCF 500                                  |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)              |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the block |

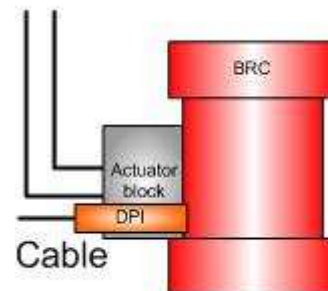
## Item 40 (1.04) BFV Control - WF DN400 BRC 2000

- 2 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN400, PN10, (3 bar) Type;  
Torque 1900Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |   |
|---|---|
| 1 | ACTUATOR BRC 2000 B1  |
| 1 | Standard Coating (SP-I 8)                                     |
| 1 | Steel adaptation BRC/BRCF 2000                                |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)             |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the bloc |

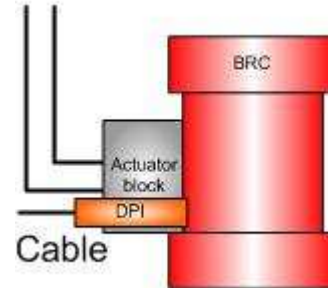
## Item 50 (1.05) BFV Control - DF DN200 BRC 250

- 12 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN200, PN10, (3 bar) Type;  
Torque 240Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |  |
|---|--|
| 1 | ACTUATOR BRC 250 B1  |
| 1 | Standard Coating (SP-I 8)                                      |
| 1 | Steel adaptation BRC/BRCF 250                                  |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)              |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the block |

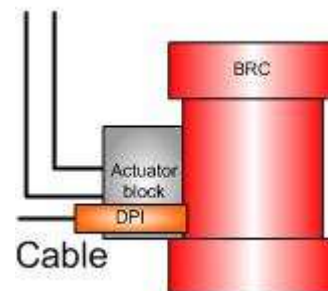
## Item 60 (1.06) BFV Control - DF DN250 BRC 500

- 1 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN250, PN10, (3 bar) Type;  
Torque 490Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |  |
|---|--|
| 1 | ACTUATOR BRC 500 B1  |
| 1 | Standard Coating (SP-I 8)                                      |
| 1 | Steel adaptation BRC/BRCF 500                                  |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)              |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the block |

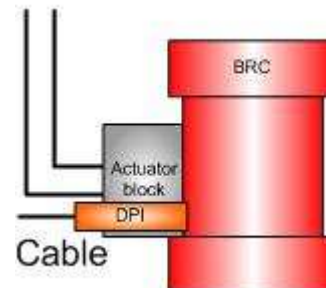
## Item 70 (1.07) BFV Control - DF DN350 BRC 1000

- 2 Double acting BRC Actuator w/block and direct feedback DPI On/Off, each consisting of below parts.

Valve; DN350, PN10, (3 bar) Type;  
Torque 950Nm Maker;

Above valve is Yard supply, delivered with none or yard certificate and Standard supplier coating

The Control is connected to the Solenoid Valve Cabinet through pipe/cable supplied and installed by the Yard.



### Parts list:

- |   |  |
|---|--|
| 1 | ACTUATOR BRC 1000 B1   |
| 1 | Standard Coating (SP-I 8)                                      |
| 1 | Steel adaptation BRC/BRCF 1000                                 |
| 1 | DPI-E (M20) (On/Off type) Direct indication (DPI)              |
| 1 | CONTROL BLOCK CB 2-PCV-R-T-H-E w/Quick connection on the block |

## 3.01 Portable hand pump

- 1 Portable hand pump - 5 L each equipped as below.



### Parts list:

- |   |                             |
|---|-----------------------------|
| 1 | Portable hand pump - 5 L    |
| 1 | Hand Pump Hose (2 x 4m)     |
| 1 | Portable hand pump approval |

**Final Documentation**

Astilleros de Murueta

Newb.No. 307

DKMS No. 131985

**General Valve System Information****Valve Configuration List**

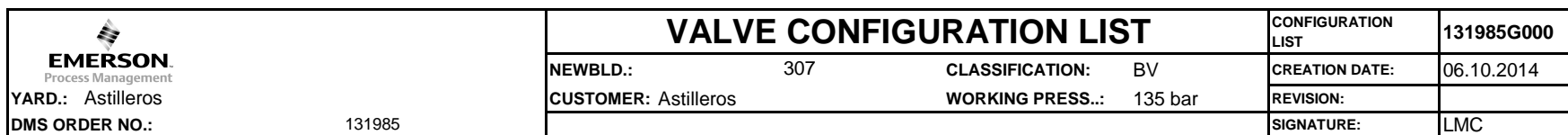
Valve Configuration List	131985G000
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**Hydraulic Diagram**

BRC / CB2 Block/DPI-E Butterfly Valve	hyd.diagram	131985G001
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**Flushing**

Flushing, Remote Valve Control System	data sheet	SI 0001-5E04
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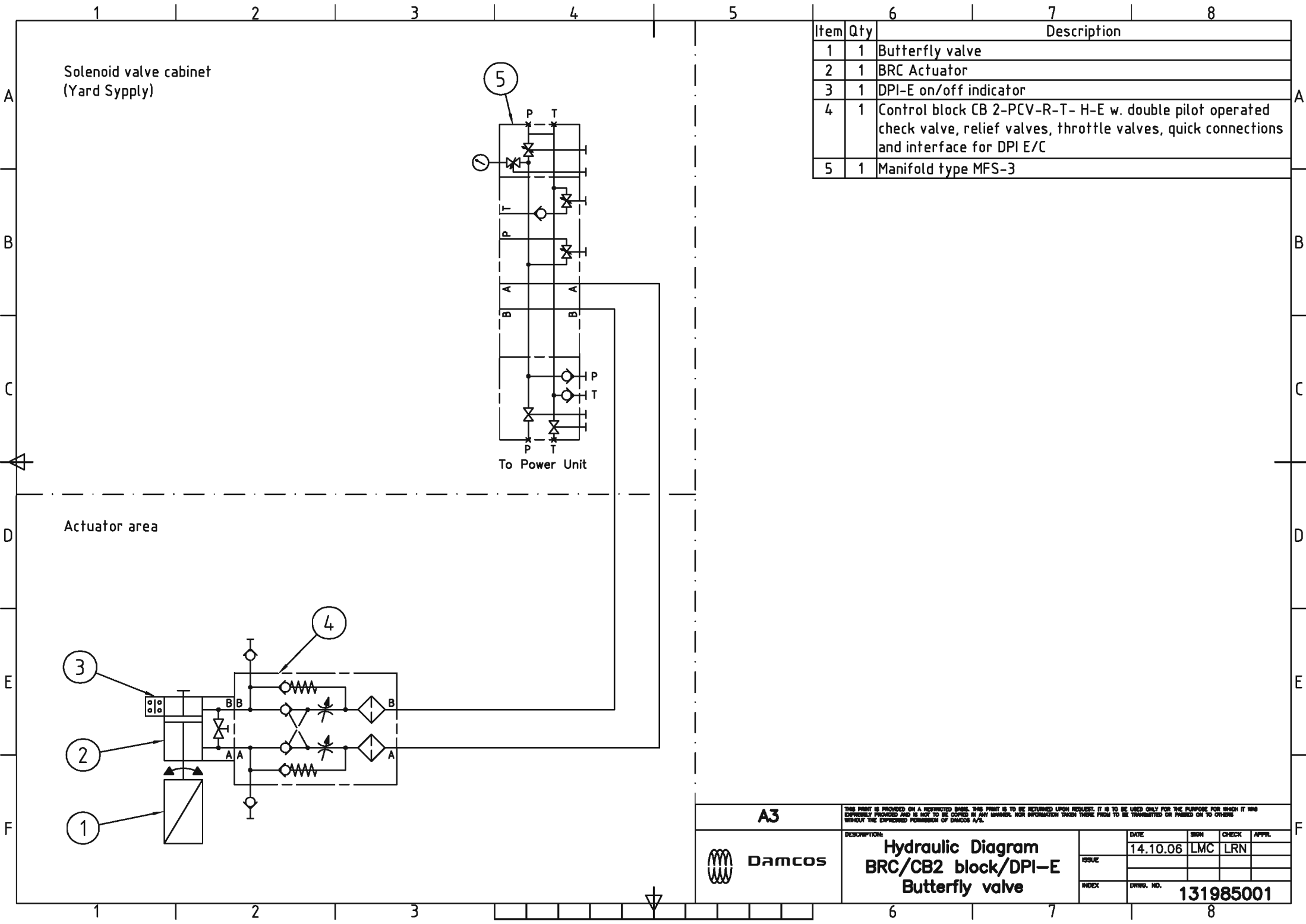
Printed 03-02-2015, 12:20

 <b>EMERSON</b> Process Management YARD.: Astilleros DMS ORDER NO.: 131985	<b>VALVE CONFIGURATION LIST</b>				CONFIGURATION LIST	131985G000
	NEWBLD.: 307		CLASSIFICATION: BV		CREATION DATE:	06.10.2014
	CUSTOMER: Astilleros		WORKING PRESS.: 135 bar		REVISION:	
					SIGNATURE:	LMC


DMS ITEM	QTY	ND	TYPE	PN	SUPPLIER	ACTUATOR	VALVE LOCATION	VALVE INDICATION	BLOCKS ACCESSORIES	DRAWING / DIAGRAM	SOLENOID VALVE	TAG NUMBER	REMARKS

**Other equipment**

DMS ITEM	DESCRIPTION	DRAWING / DIAGRAM	



Item	Qty	Description
1	1	Butterfly valve
2	1	BRC Actuator
3	1	DPI-E on/off indicator
4	1	Control block CB 2-PCV-R-T- H-E w. double pilot operated check valve, relief valves, throttle valves, quick connections and interface for DPI E/C
5	1	Manifold type MFS-3

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	DESCRIPTION:	DATE	SIGN	CHECK
		14.10.06	LMC	LRN
	INDEX	OWNER NO.	131985001	

# Flushing, Remote Valve Control System

## Instruction

### Scope

This instruction states the guidelines that must be followed in order to assure that a system is flushed to a degree that makes it comply with the cleanliness class Damcos A/S requires in order to assure that the system components will work satisfactorily.





**WARNING!**

**Failure to follow safe installation and service guidelines could result in death or serious injury.**

Make sure only qualified personnel perform the installation or service.

Do not perform any service other than those contained in this manual unless you are qualified and authorized to do so.

Always observe local environmental, safety and health regulations.

Use only certified instruments and tools appropriate for the area classification.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Use only original spare parts from Marine Tank Management. Any replacement with non-recognized spare parts can jeopardize the intrinsic safety and the function of the product.

Always follow safety guidelines when handling heavy equipment. The weight of the equipment is noted on the drawings.

## Implementation

### Flushing Considerations

All Damcos A/S components are cleaned before shipment and therefore they do not require flushing. Some types of components will be damaged if system flushing is done through these components, and other components will make flushing impossible because flushing cannot be done through them. Therefore in the event that this is not possible, all Damcos A/S components must be by-passed during flushing. The only exception from this rule is the control blocks with flush system security.

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**Caution!** If the above required precautions are not taken and the Damcos A/S components are not by-passed and hence flushed against the recommendation the Guarantee will be withdrawn.

---

### Flushing Procedure

Piping system must be flushed before it is connected to Damcos A/S components. Each individual customer (yard) is free to choose which flushing method that is preferred, as long as one of the internationally recognized flushing standards are adhered to. A separate flushing unit with its own flushing oil must be used for the flushing.

---

**Caution!** Select a flushing oil compatible with the oil used in the system. Using incompatible oils might result in malfunction or utterly damaging the equipment.  
For more information please refer to ISO-28521!

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### Sampling

Minimum two samples of minimum 10 cc must be taken from flushing unit before the return filter.

### Acceptance Criteria

For systems equipped with IS or EEXd solenoid valves, the cleanliness class must be ISO 17/15/12 or better, with reference to ISO 4406. (Equivalent to NAS Class 6).

For systems not equipped with IS or EEXd solenoid valves, cleanliness class must be ISO 18/16/13 or better, with reference to ISO 4406. (Equivalent to NAS Class 7).

Oil samples must be analyzed by a laboratory adequately equipped for the purpose and results of the analysis must be stated on Damcos A/S analysis form or similar form giving the same information.

---

**Caution!** Missing analysis, or non-compliance with the cleanliness class will cause withdrawal of the Guarantee.

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A comparison of the ISO 4406 Solid Contamination Code compared with other commonly used Cleanliness Classes is shown in the table on next page.

## Approximate Equivalents of other Contamination Classes

ISO S C Code	Def std 05/42		NAS 1638 Class	SAE 749 Class
	Table A	Table B		
13/11/8	-	-	2	-
14/12/9	-	-	3	9
15/13/10	-	-	4	1
16/14/9	-	400F	-	-
6/14/11	-	-	5	2
17/15/9	400	-	-	-
17/15/10	-	800F	-	-
17/15/12	-	-	6	3
18/16/10	800	-	-	-
18/16/11	-	1300F	-	-
18/16/13	-	-	7	4
19/17/11	1300	2000F	-	-
19/17/14	-	-	8	5
20/18/12	2000	-	-	-
20/18/13	-	4400F	-	-
20/18/15	-	-	9	6
21/19/13	4400	6300F	-	-
21/19/16	-	-	10	-
22/20/13	6300	-	-	-
22/20/17	-	-	11	-
23/21/14	15000	-	-	-
23/21/18	-	-	12	-
24/22/15	21000	-	-	-
25/23/17	100000	-	-	-

## Flushing Procedure Recommendations

### Purpose

The purpose is as follows:

1. To check that A and B are mounted correctly on the connection block.
2. To remove particles, where it is difficult to flush, from the pipes, e.g. in tanks and similar. This especially applies to sand, after sandblasting.

During flushing it is important to aim to achieve Reynold's figures.

### Precautions

During pipe mounting it is important to plug pipe ends and care for that as few particles as possible are in the pipes after shortening.

Dismount pipe from connection block (A and B) on actuator and make a by-pass on the hydraulic pipes. Then dismount the same pipes on manifold in the solenoid valve cabinet and connect the flushing unit.

It is recommendable at pipe lengths exceeding totally 90 meters to flush all pipes with nitrogen into the open; i.e. without connection of pipes at actuator.

Flushing with nitrogen is carried out at approximately 20-25 bar for about ½-1 minute, dependent on the pipe length.

### Flushing Procedure

Start the flushing unit and at return of the oil, shut off the return pipe with the ball valve. Then carry out a pressure test on the pipes. (System pressure 1.5 - if not otherwise stated).

During pressure test possible leakages can be detected. Hereafter flushing can be carried out, taking the following factors into consideration: L/min., viscosity in c St., pipe length, inside pipe diameter.

Oil samples can periodically be taken of the return pipe at the flushing unit, and thus a time schedule on the flushing time according to given pipe lengths can quickly be made. If the oil sample can be approved according to supplier's specification, the pipe connections at actuator and manifold can be re-established. Repeat the procedure on all units connected to the hydraulic system.

## Appendix - Test Report

Test Report: Oil Sample

### Test Report

Particle counting, Acid number and Water content

Test report no.:	<input type="text"/>
Report date:	<input type="text"/>
Signed:	<input type="text"/>
Contact information:	<input type="text"/>

### Oil sample

Oil type	Machine no.	Division	Place	Sample Date	

Test procedure:

Test standard:

Test equipment:

Other:

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Test Report: Oil Sample

Test Result

Particle counting:

> 4 μ (my)	> 6 μ (my)	> 14 μ (my)	> 21 μ (my)	> 30 μ (my)	> 50 μ (my)	> 70 μ (my)	

ISO code	Maximum

Acid number:

Water content:

Other:

Test performed by:

Please, send report to:

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[www.EmersonProcesss.com/mtm](http://www.EmersonProcesss.com/mtm)

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**Actuators**

**Damcos BRC Series**

BRC Hydraulic double-acting balanced rotary actuator 90°	data sheet	SD 0100-2E03
BRC – Torque survey	data sheet	SD 0100-0E02

**Actuator BRC 125**

BRC 125 Hydraulic double-acting balanced rotary actuator 90°	data sheet	SD 0102-2E06
Actuator BRC 125 B1	psm.list	160N1097
Set of seals for BRC 125 B1	psm.list	160N1259
BRC 125	ass.drawing	160N9050

**Actuator BRC 250**

BRC 250 Hydraulic double-acting balanced rotary actuator 90°	data sheet	SD 0103-2E06
Actuator BRC 250 B1	psm.list	160N1098
Set of seals for BRC 250 B1	psm.list	160N1260
BRC 250	ass.drawing	160N9046

**Actuator BRC 500**

BRC 500 Hydraulic double-acting balanced rotary actuator 90°	data sheet	SD 0104-2E06
Actuator BRC 500 B1	psm.list	160N1099
Set of seals for BRC 500 B1	psm.list	160N1261
BRC 500	ass.drawing	160N9047

**Actuator BRC 1000**

BRC 1000 Hydraulic double-acting balanced rotary actuator 90°	data sheet	SD 0105-2E06
Actuator BRC 1000 B1	psm.list	160N1100
Set of seals for BRC 1000 B1	psm.list	160N1262
BRC 1000	ass.drawing	160N9048

**Actuator BRC 2000**

BRC 2000 Hydraulic double-acting balanced rotary actuator 90°	data sheet	SD 0106-2E06
Actuator BRC 2000 B1	psm.list	160N1101
Set of seals for BRC 2000 B1	psm.list	160N1263
BRC 2000	ass.drawing	160N9045



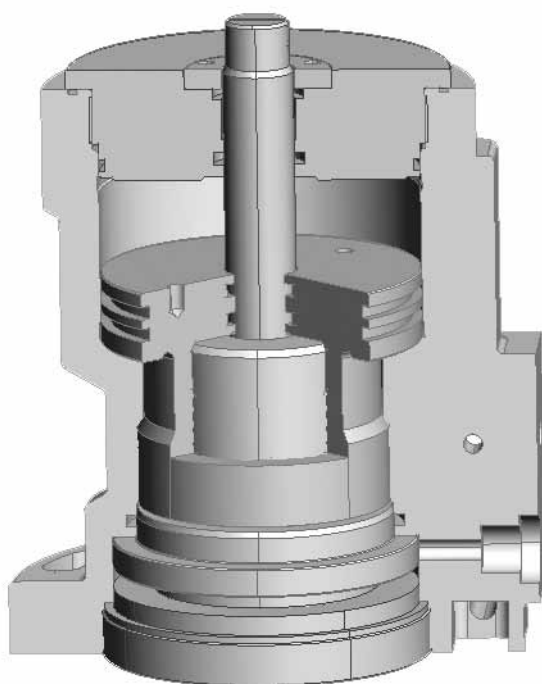
## Product Data Sheet

SD 0100-2E03

September 2011

# Damcos® BRC Series

Hydraulic double-acting balanced rotary actuator  
90° quarter-turn



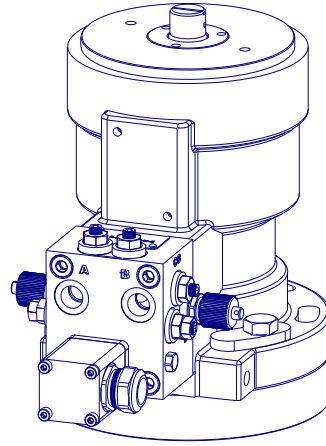
**Damcos®**

  
**EMERSON™**  
Process Management

# Damcos® BRC Series

## The BRC actuator for operation of quarter-turn valves

- Unique and simple design with built-in crossover valve.
- Compactness and high-torque output.
- Reliable and rugged, with more than 30 years service records on basic design.
- Balanced rotary principle eliminates side forces and/or bending of valve spindle.
- Will operate in sea air as well as sea water.
- Easy adaption to all well-known quarter-turn valves.
- Unlimited mounting positions and with built-in adjustments for end stops of rotary movement.
- Prepared for direct built-on modular control functions.



*Actuator mounted with control block and EI indicator*

## Standard optionals

- Hydraulic on/off indication (bypass).
- EI on/off or continuous indication IP 68.
- Connection block with e.g. filter.
- Double pilot operated non-return valve.
- Double release valve.
- Double throttle valve.
- Quick connection for emergency operation with portable hand pump.
- Built-on emergency operation hand pump.
- Submersion cover.
- Epoxy coating.

On request spec. features as:

- Flushing valve built into the connection block making it possible to flush the system without disconnection of pipes.
- Safety equipment as mechanical locking device of actuator in closed position.

## Actuator mounted control equipment

See separate data sheet for the whole range of control blocks and other actuator mounted control components.

(Interface for Cetop 3 valves).

## Manufacture

The BRC actuators are manufactured in accordance with the guidelines for quality system stated in the ISO standard.

After assembly each actuator is flushed according to ISO 4406 21/19/16 standard and plugged. Flushing according to ISO 4406 18/16/13 standard can be performed on request.

## Product Data Sheet

SD 0100-2E03

September 2011

Damcos® BRC Series

## Classification

Meets the requirements from the major classification and approval authorities like:

- Det Norske Veritas
- Lloyd's Register of Shipping
- American Bureau of Shipping
- RINA
- Russian Register of Shipping
- Bureau Veritas
- Germanischer Lloyd
- U.S. Coast Guard

## Main data

Temperature range:	-20°C to +80°C, seals NBR (other temp. ranges on request)
Housing:	GGG 40
Piston:	GGG 40
Output shaft:	SS 2142
Indicator shaft:	AISI 316
Intermediate flange:	St 52-3/AISI 316/GGG40
Adapter:	SS 2142
Coating:	Primer: Min. 40 micron, type Hempel EE 13140 Top coat: min. 25 micron alkyd, red no. 51320

## Operating restrictions

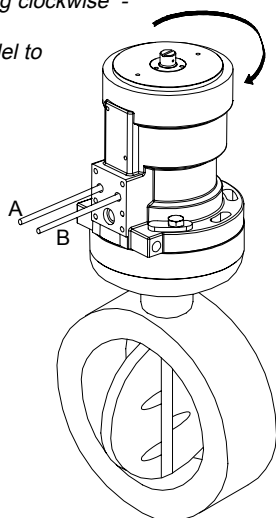
Please observe specific rules and demands from the classification societies and authorities concerning operating pressure and temperature range.

(Example - ABS: Max. operating pressure = 20% of burst pressure).

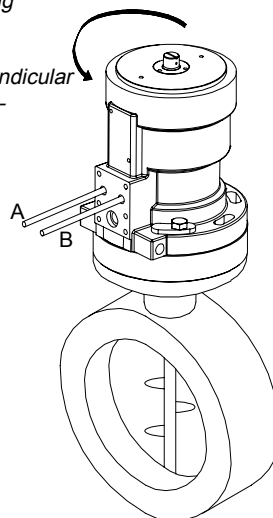
For extreme cycle speeds, loads and lifetime expectations please consult manufacturer.

## Turning direction in relation to “A” and “B”

Pressure on “A” -  
Indicator slot is moving clockwise -  
Valve closed and  
indicator slot is parallel to  
mounting area.



Pressure on “B” -  
Indicator slot is moving  
counter clockwise -  
Valve open and  
indicator slot is perpendicular  
to the mounting area -



# Damcos® BRC Series

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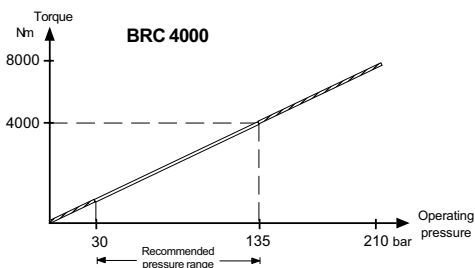
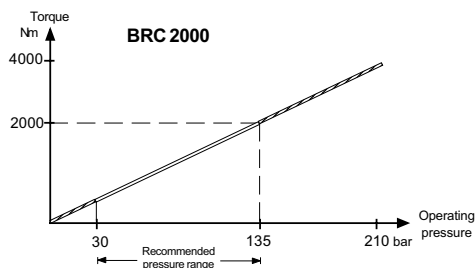
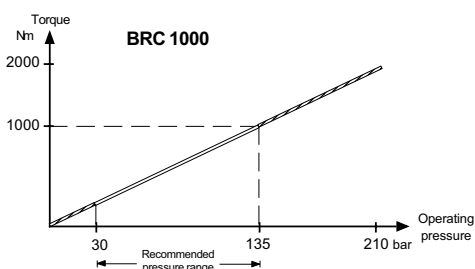
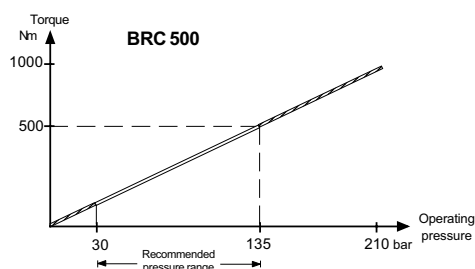
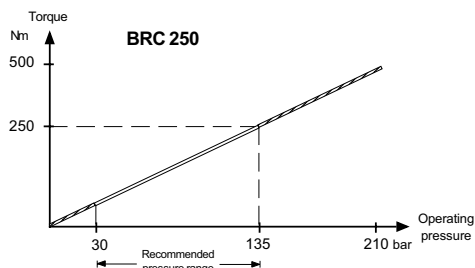
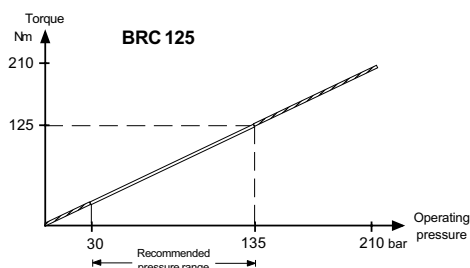
## Product Data Sheet

SD 0100-0E02

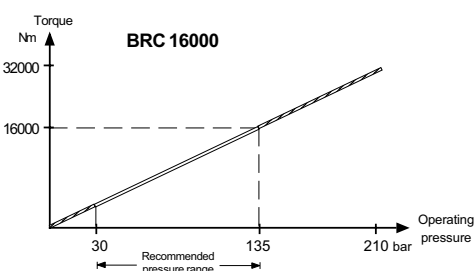
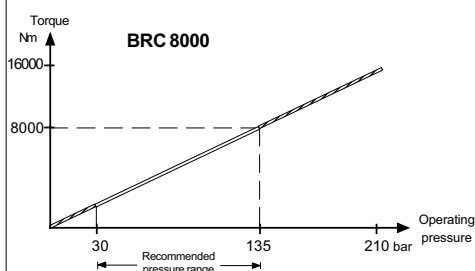
July 2008

Damcos® BRC

# Torque survey



Note: BRC 8000 and BRC 16000 to be introduced in 2003.

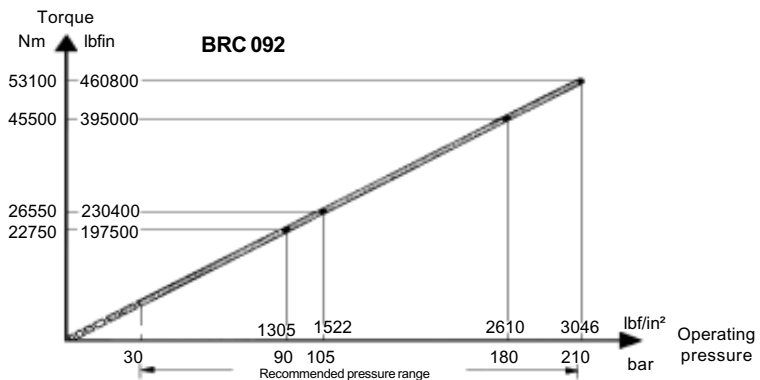
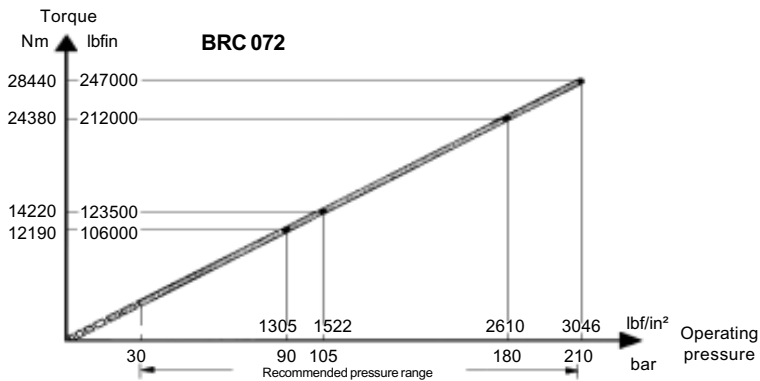
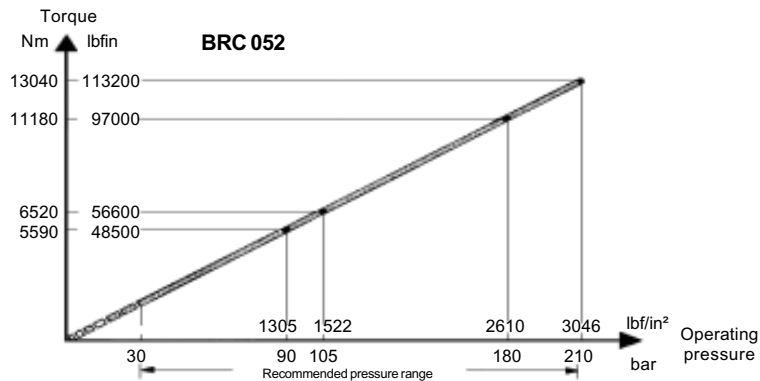


Note: 1 Nm = 8.85 lbf in

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Process Management

# Damcos® BRC



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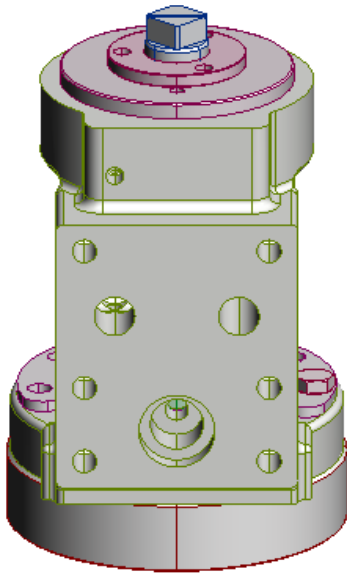
This product is developed and managed by:  
Emerson Process Management

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DK-4700 Naestved  
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For global contacts:  
[www.EmersonProcess.com/marine](http://www.EmersonProcess.com/marine)

# **Damcos™ BRC 125**

Hydraulic double-acting balanced rotary actuator  
90° (Quarter-turn)



## Main Data

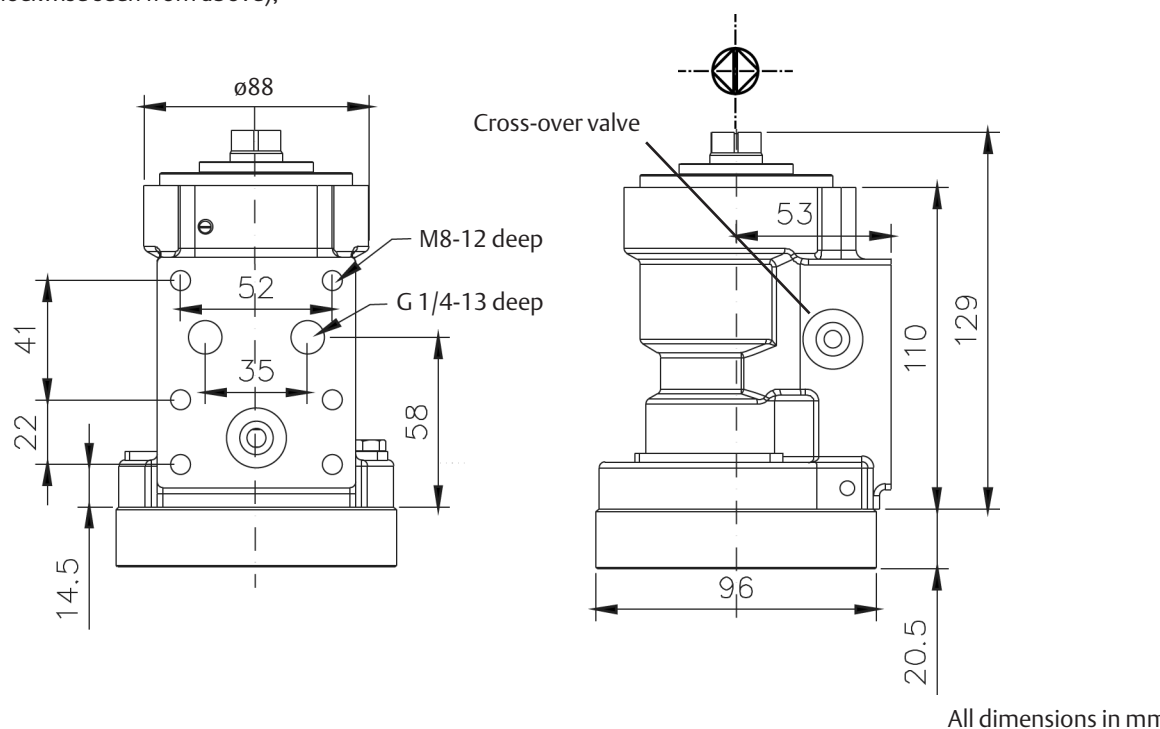
Recommended working pressure range	30 to 135 bar
Burst test	675 bar
Total dry weight incl. mounting set (1.4 kg)	5.3 kg
Oil displacement	0.026 l
Temperature range	Normal application: -25°C to +80°C (NBR Seal set) High temperature application: -20°C to +120°C (Viton® Seal set) Low temperature application: -45°C to +40°C (T.L.T. NITRIL Seal set)
Rotation	90° ± 1°
Hydraulic media and viscosities	We recommend acid-free hydraulic oil. Viscosity range: 15-200 cSt. For recommended brands and for other media than oil please refer to separate data sheet.

## Main Dimensions

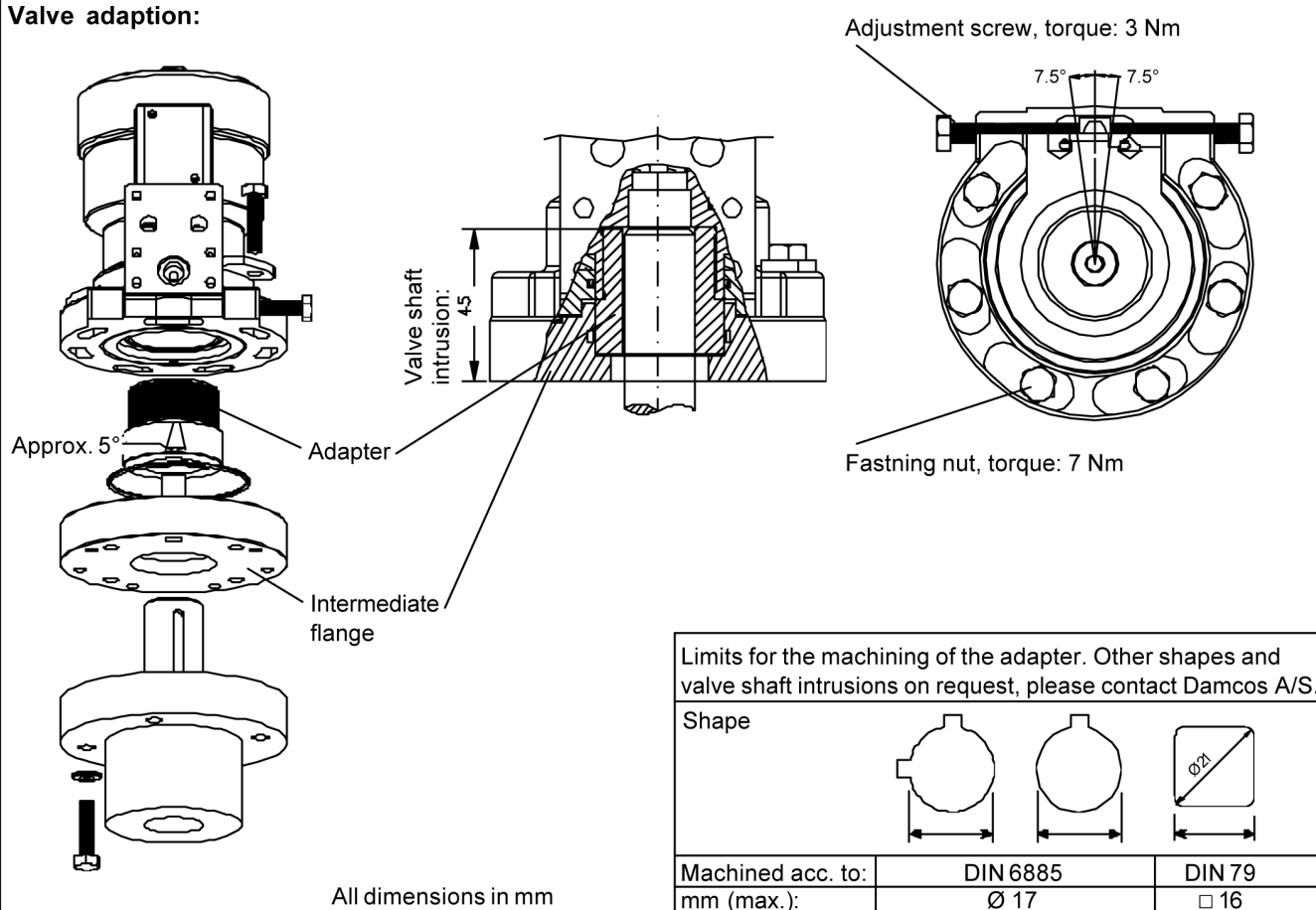
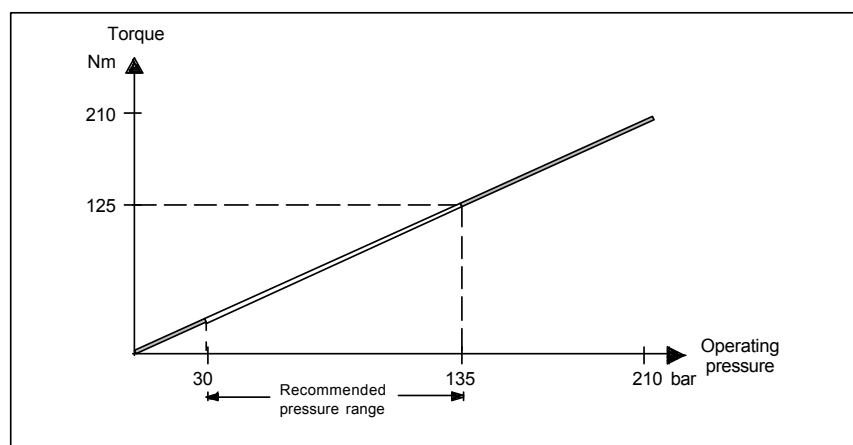
Actuator shown in closed position.

A port: Close (clockwise seen from above),

B port: Open.





**Valve adaption:****Performance**

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PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version <b>ACTUATOR BRC 125 B1</b> Material no.: <b>160N1097</b> Alt.: 1				Page 1 of 2	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.					
Document numbers referred to: 160N9050					
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0001		HOUSING BRC 125 GGG40 (W.no.0.7040)	A05	1,000	PC
0002		PISTON BRC 125 GGG40 (W.no.0.7040)	A10	1,000	PC
0003	160N0625	TOP PART BRC 125 GGG40 (W.no.0.7040)	A10	1,000	PC
0004	160N0781	POS.SHAFT BRC 125 B1 X5CrNiMo17 12 2 (W.no.1.4401)	F20	1,000	PC
0005	160N0782	Splined shaft BRC 125 B1 20MnV6 (W.no.1.5217)	B54	1,000	PC
0006	160N0628	Bottom cover BRC 125 GGG40 (W.no.0.7040)	A10	1,000	PC
0007	160N0840	TOP PART COVER-BRC 125BRC/BRCF X5CrNiMo17 13 3 (W.no.1.4436)		1,000	PC
0008	160N0632	WASHER BRC 125_R 9SMnPb28 (W.no.1.0718)	B 10	1,000	PC
0009		X-RING Ø18,72X2,62 PD 85	PD	3,000	PC
0010		X-RING Ø36.17*2.62 NBR 80	NBR	1,000	PC
0011		X-RING Ø42.52*2.62 NBR 80	NBR	1,000	PC
0012		X-RING Ø45.69*2.62 NBR 80	NBR	2,000	PC
0013		O-RING Ø18,1X1,6 NBR 70	NBR	1,000	PC

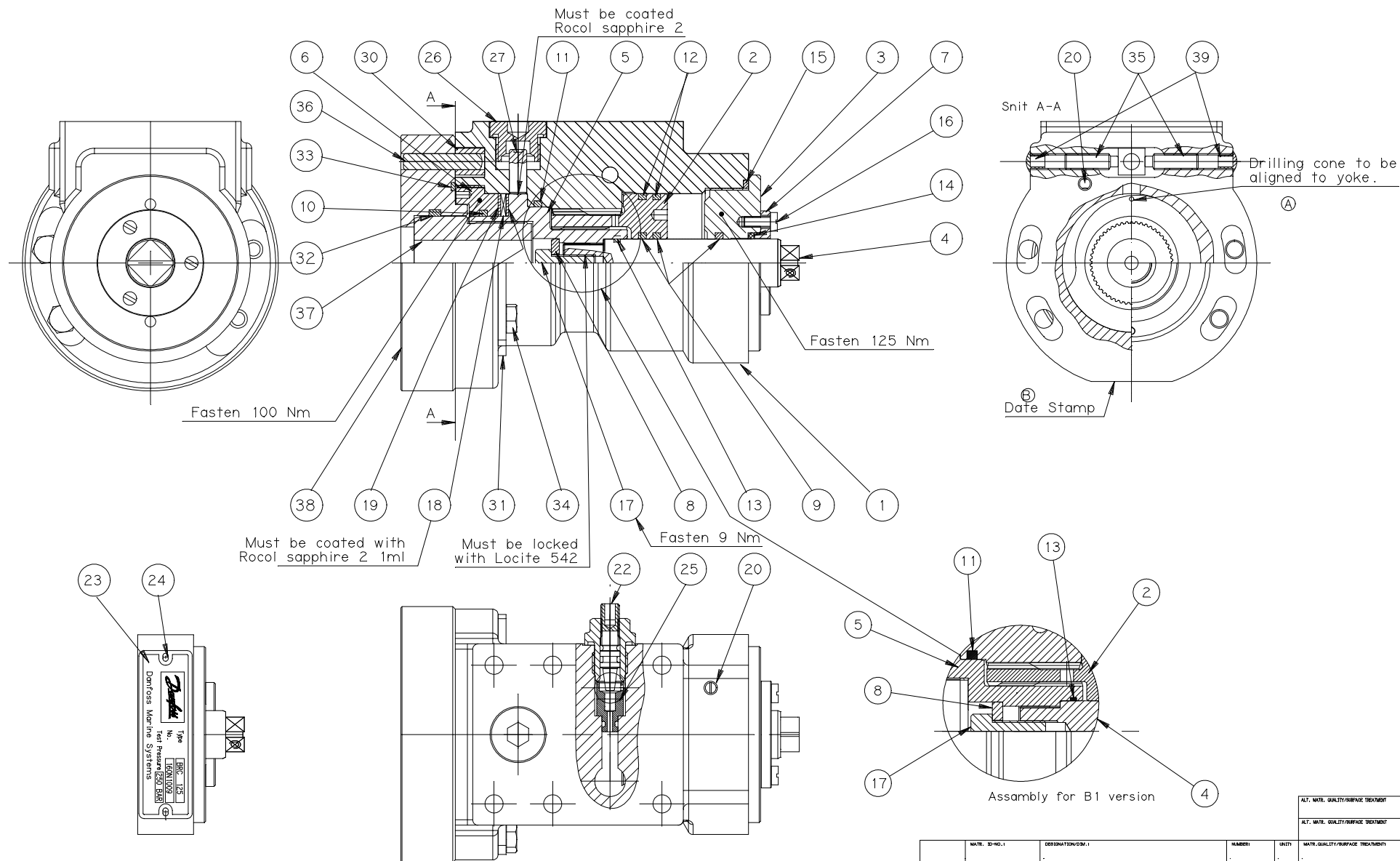
PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Næstved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version ACTUATOR BRC 125 B1 Material no.: 160N1097 Alt.: 1				Page 2 of 2	
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0014		O-RING Ø18,72X2,62 NBR 70	NBR	1,000	PC
0015		O-RING Ø56,82X2,62 NBR 70	NBR	1,000	PC
0016	251-1529	SCREW M4X12 X5CrNiMo18 12 (W.no.1.4436)	7A4	3,000	PC
0017	251-0081	SCREW M6X16	08.8	1,000	PC
0018	390-0007	THRUST CAGE D35 UST.13 (W.no.1.0333)	POL	1,000	PC
0019	390-0107	THRUST WASHER D35 100Cr6 (W.no.1.3505)	ROL	2,000	PC
0020		SEALING PLUG 5/4,3X5,5		1,000	PC
0022	160G2280	STOP VALVE D4		1,000	PC
0023		NAME PLATE FOR BRC 125 B1 160N1097	F90	1,000	PC
0024		RIVET D1,9X5	5/A4	2,000	PC
0025	160N1049	VALVE SEAT		1,000	PC
0026	160G5044	PLUG 3/8 INCH WG		1,000	PC
0027	160B4500	YOKE F. DPI BRC 125 - 250, L=18,0		1,000	PC
	160N1082	PAINT PLUG 1/4 INCH F.BRC		2,000	PC
SPARE	----->	160N1259 Set of seals for BRC 125 POS.9,10,11,12,13,14,15,25,33.		1,000	PC
INFO	----->	160N1169 COMMON PART 125 POS.30,31,32,33,34,35,36.		1,000	PC
INFO	----->	160N1193 COMMON PART BRC/F 125 STAINLESS Pos. 30, 31, 32, 33, 34, 35, 36		1,000	PC
INFO	----->	INSTRUCTION 160R2174-2176-2178		1,000	PC

PARTS-, SPARE & MATERIAL LIST		Emerson Process Management Marine Tank Management Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272
Component: type & version  SET OF SEALS FOR BRC 125 B1  Material no.:  160N1259  Bom usage: Production. Alt.:1		

Page 1 of 1

Notes: All items with stated material number can be purchased as spare parts.  
When ordering spare parts: please state material number.

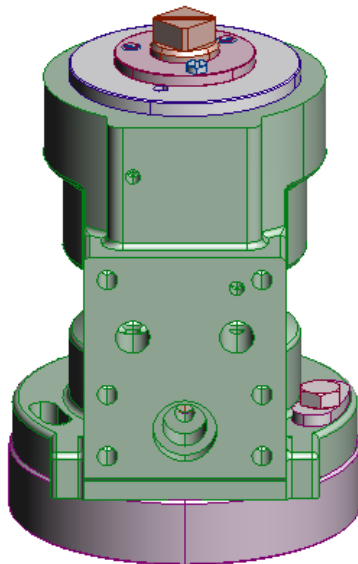
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0009		X-RING Ø18,72X2,62 PD 85	PD	3,000	PC
0010		X-RING Ø36.17*2.62 NBR 80	NBR	1,000	PC
0011		X-RING Ø42.52*2.62 NBR 80	NBR	1,000	PC
0012		X-RING Ø45.69*2.62 NBR 80	NBR	2,000	PC
0013		O-RING Ø18,1X1,6 NBR 70	NBR	1,000	PC
0014		O-RING Ø18,72X2,62 NBR 70	NBR	1,000	PC
0015		O-RING Ø56,82X2,62 NBR 70	NBR	1,000	PC
0025		O-RING Ø3,1X1,6 NBR 70	NBR	1,000	PC
0033		O-RING Ø53.64*2.62 NBR 70	NBR	1,000	PC
0033		O-RING Ø56,74X3,53 NBR 70	NBR	1,000	PC



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0.5- 8					010417 UHC HGL
8- 30					5462 010816 HGL HGL
30- 100					6152 041108 HGL HGL
100- 315					6304 050526 HGL HGL
315-1000					6874 090901 SJO KBE
					7142 120306 KBE KBE
COMPLETION IN DM. 10-NO. 1	DESCRIPTION:	TOTAL WEIGHT	A	B	C4
DM. 10-NO. 1	DESCRIPTION:	KG			
DAMCOS ASSEMBLY DRAWING BRC 125					
PAID / DM. NO. 160N9050					

# **Damcos™ BRC 250**

Hydraulic double-acting balanced rotary actuator  
90° (Quarter-turn)



## Main Data

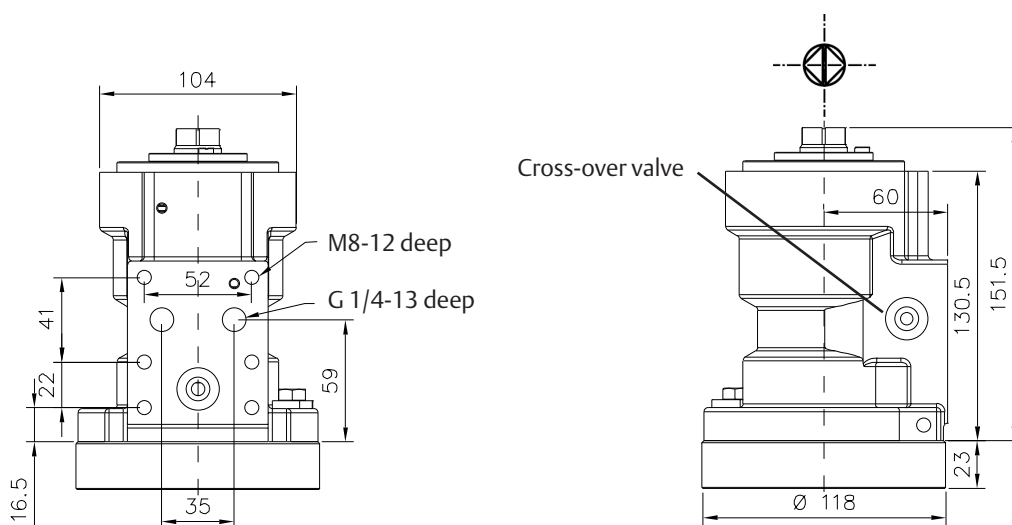
Recommended working pressure range	30 - 135 bar
Burst test	675 bar
Total dry weight incl. mounting set (2.4 kg)	8.3 kg
Oil displacement	0.050 l
Temperature range	Normal application: -25°C to +80°C (NBR Seal set) High temperature application: -20°C to +120°C (Viton® Seal set) Low temperature application: -45°C to +40°C (T.L.T. NITRIL Seal set)
Rotation	90° ± 1°
Hydraulic media and viscosities	We recommend acid-free hydraulic oil. Viscosity range: 15-200 cSt. For recommended brands and for other media than oil please refer to separate data sheet.

## Main Dimensions

Actuator shown in closed position.

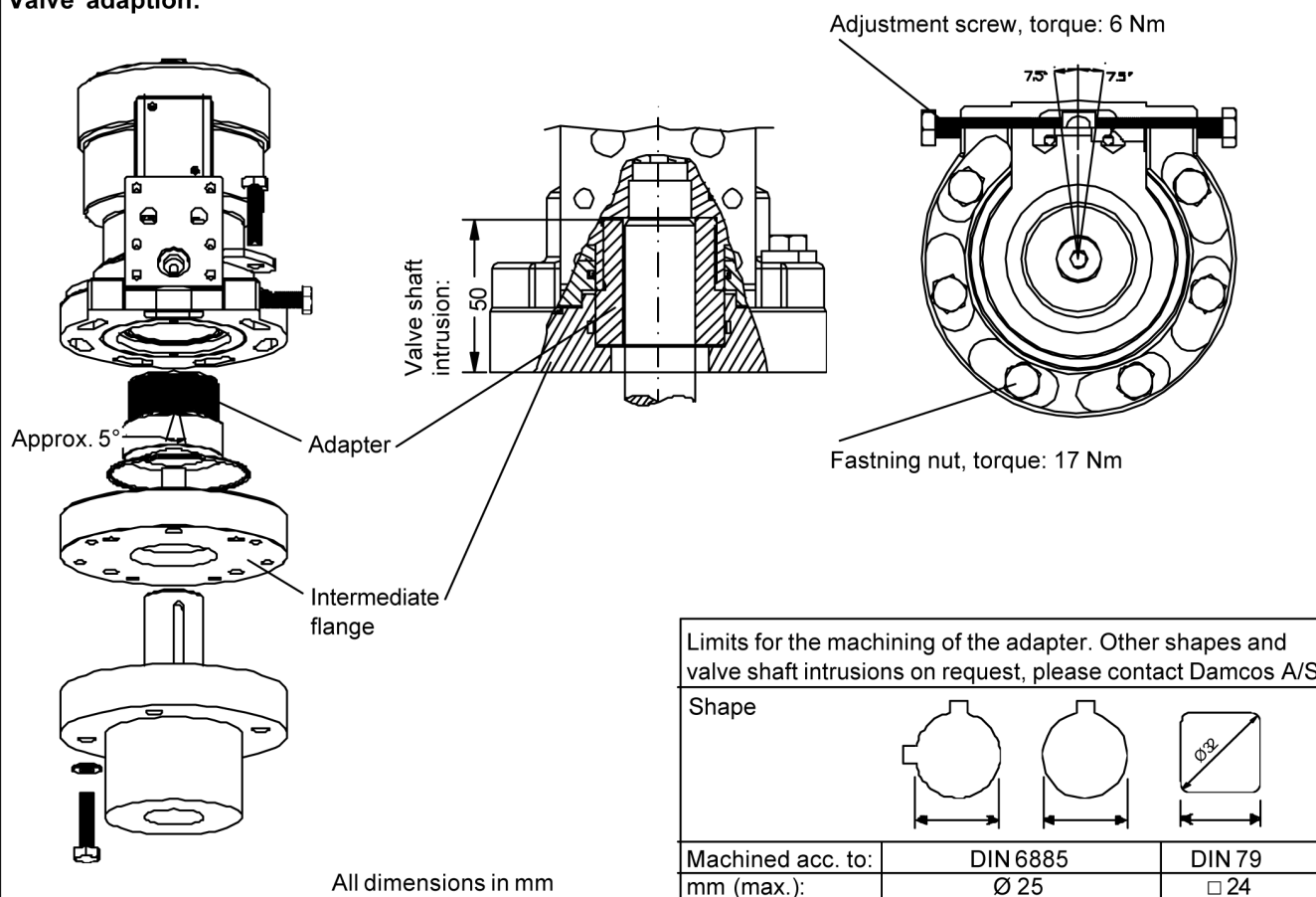
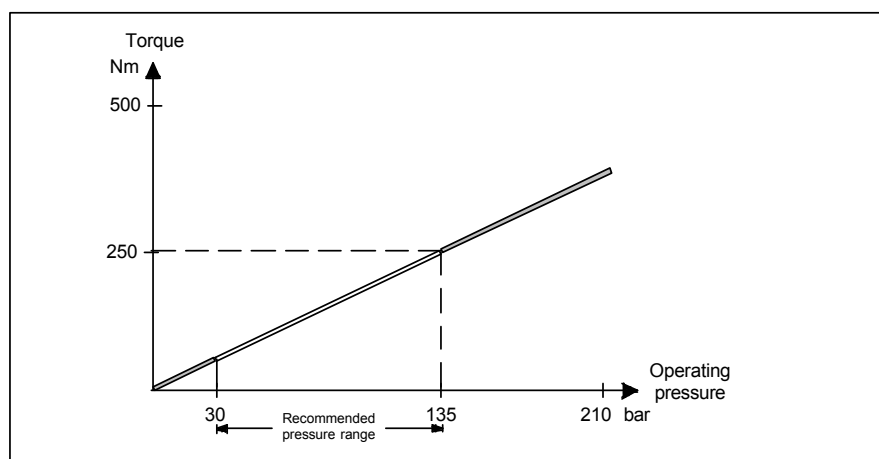
A port: Close (clockwise seen from above),

B port: Open.



All dimensions in mm



**Valve adaption:****Performance**

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Component: type & version ACTUATOR BRC 250 B1 Material no.: 160N1098 Alt.: 1				Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Page 1 of 2					
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.					
Document numbers referred to: 160N9046					
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0001		HOUSING BRC 250 GGG40 (W.no.0.7040)	A05	1,000	PC
0002		PISTON BRC 250 GGG40 (W.no.0.7040)	A10	1,000	PC
0003	160N0551	TOP PART BRC 250 GGG40 (W.no.0.7040)	A10	1,000	PC
0004	160N0783	POS.SHAFT BRC 250 B1 X5CrNiMo17 12 2 (W.no.1.4401)	F20	1,000	PC
0005	160N0784	Splined shaft BRC 250 B1 20MnV6 (W.no.1.5217)	B54	1,000	PC
0006	160N0557	Bottom cover BRC 250 GGG40 (W.no.0.7040)	A10	1,000	PC
0007	160N0841	TOP PART COVER BRC 250 X5CrNiMo17 13 3 (W.no.1.4436)		1,000	PC
0008	160N0559	WASHER BRC 250 9SMnPb28 (W.no.1.0718)	B 10	1,000	PC
0009		X-RING Ø23,39X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø45.69*2.62 NBR 80	NBR	1,000	PC
0011		X-RING Ø56,75*3,53 NBR 80	NBR	3,000	PC
0013		O-RING Ø23,52X1,78 NBR 70	NBR	1,000	PC
0014		O-RING Ø23,4X3,53 NBR 70	NBR	1,000	PC

PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S	
Component: type & version ACTUATOR BRC 250 B1 Material no.: 160N1098 Alt.: 1				Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Page 2 of 2					
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0015		O-RING Ø69,52*2.62 NBR 70	NBR	1,000	PC
0016	251-1529	SCREW M4X12 X5CrNiMo18 12 (W.no.1.4436)	7A4	3,000	PC
0017	251-0103	SCREW M8X20	08.8	1,000	PC
0018	390-0009	THRUST CAGE D45 USt.13 (W.no.1.0333)	P0L	1,000	PC
0019	390-0109	THRUST WASHER D45 100Cr6 (W.no.1.3505)	ROL	2,000	PC
0021		SEALING PLUG D6/5.3X6.5		1,000	PC
0022	160G2280	STOP VALVE D4		1,000	PC
0023		NAME PLATE FOR BRC 250 B1 160N1098	F90	1,000	PC
0024		RIVET D1,9X5	5/A4	2,000	PC
0025	160N1049	VALVE SEAT		1,000	PC
0026	160G5044	PLUG 3/8 INCH WG		1,000	PC
0027	160B4500	YOKE F. DPI BRC 125 - 250, L=18,0 POM-C	P01	1,000	PC
	160N1082	PAINT PLUG 1/4 INCH F.BRC		2,000	PC
SPARE	----->	160N1260, SET OF SEALS FOR BRC 250 POS.9,10,11,13,14,15,25,33.		1,000	PC
INFO	----->	160N1170 COMMON PART BRC 250 POS.30,31,32,33,34,35,36.		1,000	PC
INFO	----->	160N1194 COMMON PARTS BRC 250 STAINLESS POS.30,31,32,33,34,35,36.		1,000	PC

**PARTS-, SPARE & MATERIAL LIST**

Component: type &amp; version

SET OF SEALS FOR BRC 250 B1

Material no.:

160N1260

Bom usage: Production. Alt.:1

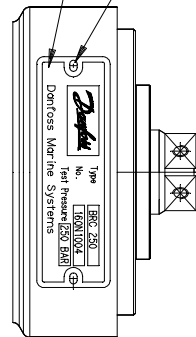
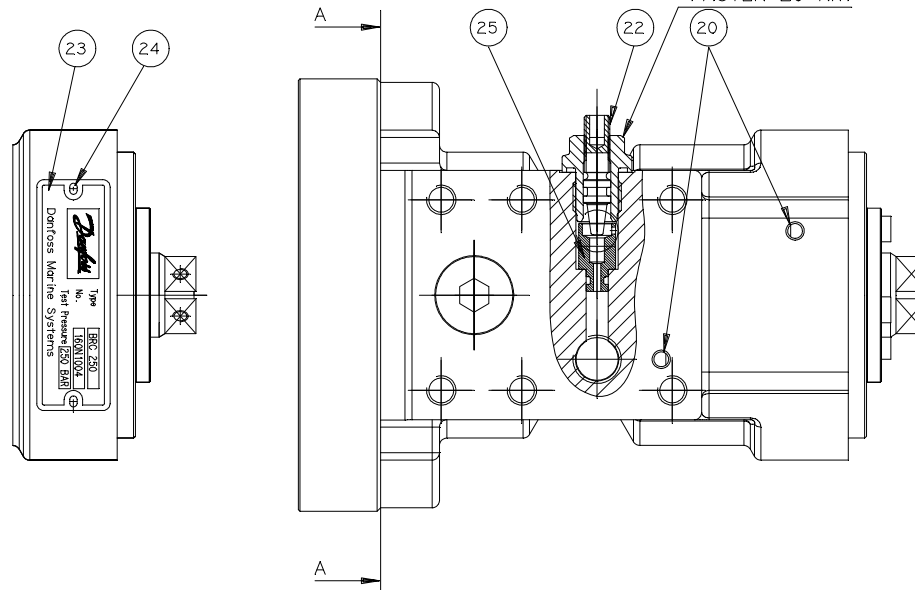
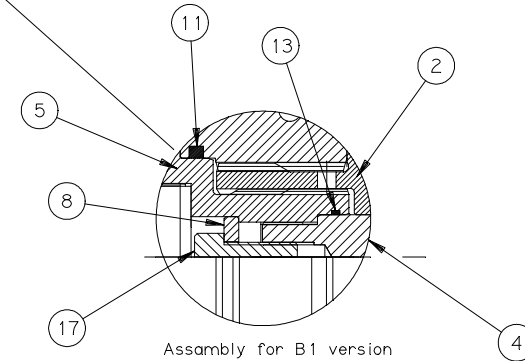
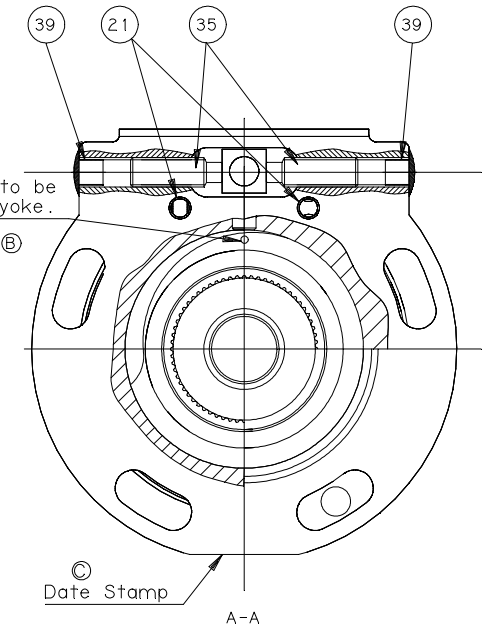
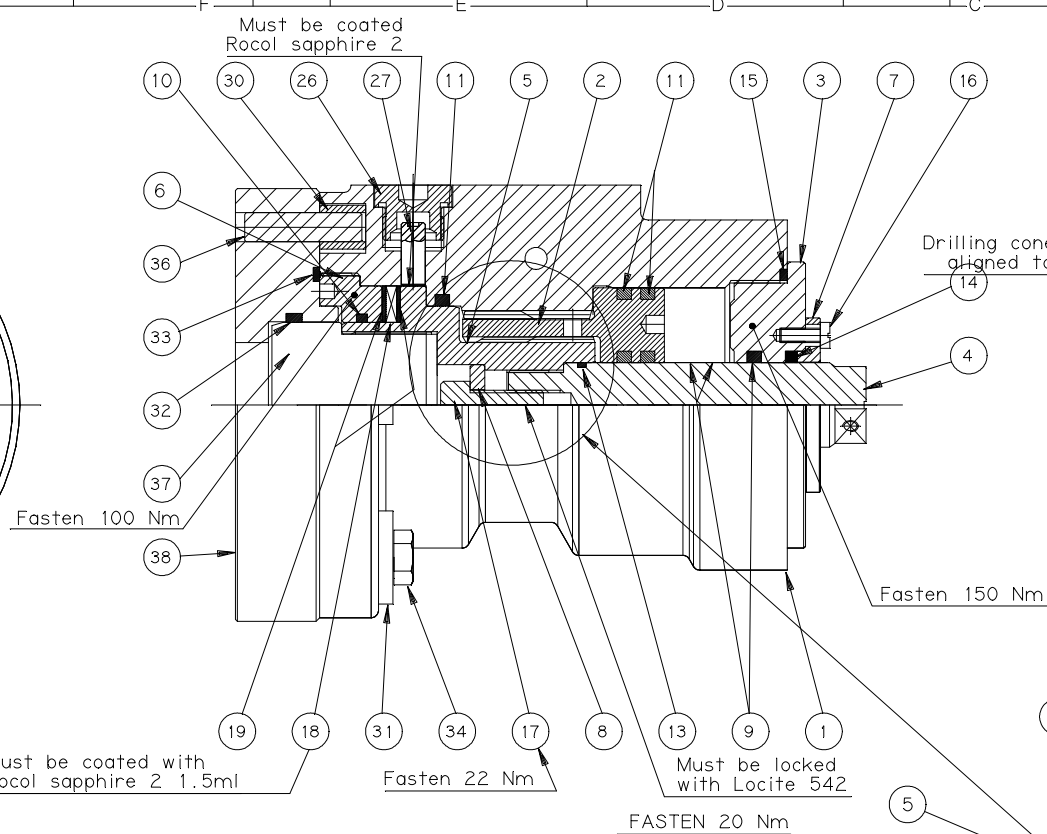
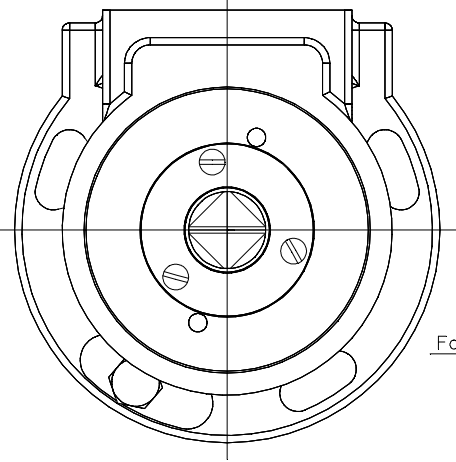
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Page 1 of 1

Notes: All items with stated material number can be  
purchased as spare parts.

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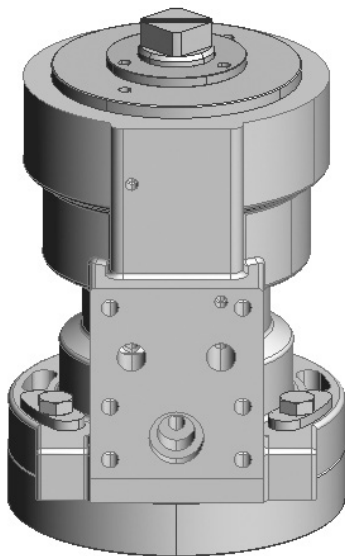
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0009		X-RING Ø23,39X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø45.69*2.62 NBR 80	NBR	1,000	PC
0011		X-RING Ø56,75*3,53 NBR 80	NBR	3,000	PC
0013		O-RING Ø23,52X1,78 NBR 70	NBR	1,000	PC
0014		O-RING Ø23,4X3,53 NBR 70	NBR	1,000	PC
0015		O-RING Ø69,52*2.62 NBR 70	NBR	1,000	PC
0025		O-RING Ø3,1X1,6 NBR 70	NBR	1,000	PC
0033		O-RING Ø67,95*2,62 NBR 70	NBR	1,000	PC
0033		O-RING Ø66,04X5,33 NBR 70	NBR	1,000	PC



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NOMINAL DIM.		TOLERANCE ISO 2768		SURFACE FINISH Rg =		FIRST ANGLE PROJECTION		1:1		REPLACES		HGL		FRI		UHC		HGL		HGL							
0.5 - 8		± 0.1		0.1																							
8 - 30		± 0.2		0.2																							
30 - 100		± 0.3		0.3																							
100 - 315		± 0.5		0.5																							
315 - 1000		± 0.8		0.8																							
DESIGNED IN				ID-NO.		TOTAL RESIST		KG		A		D3		6740		080516		KBF		KBF							
DRAWN IN										B				6874		090901		SJO		KBF							
CHECKED IN										C		B4		7142		120306		KBF		KBF							
STATE																											
DESCRIPTION																											
DAMCOS																											
ASSEMBLY DRAWING																											
BRC 250																											
PAGE				REV. NO.1																							

# **Damcos™ BRC 500**

Hydraulic double-acting balanced rotary actuator  
90° (Quarter-turn)



## Main Data

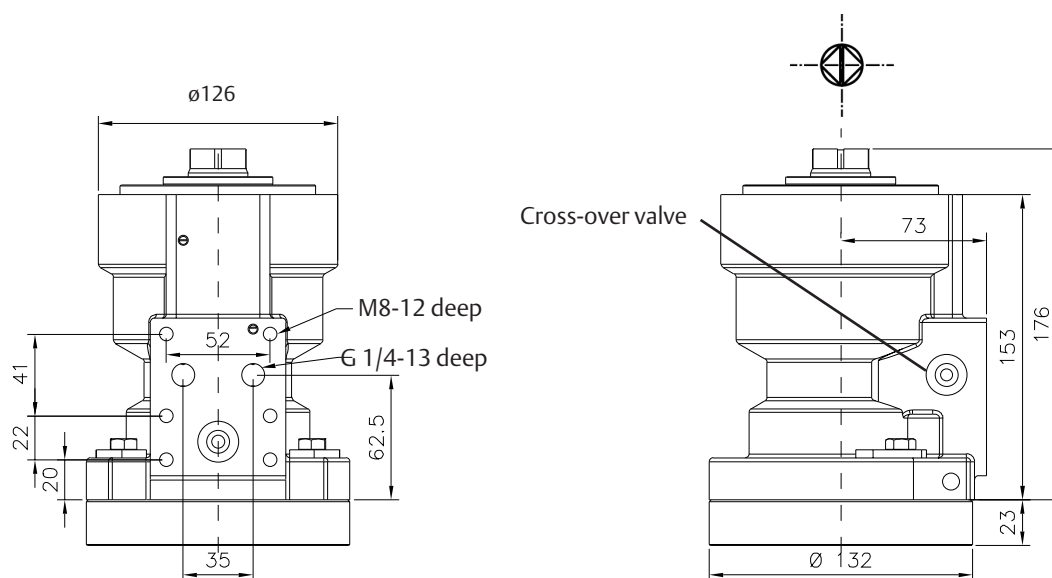
Recommended working pressure range	30 - 135 bar
Burst test	675 bar
Total dry weight incl. mounting set (3.1 kg)	13.0 kg
Oil displacement	0.102 l
Temperature range	Normal application: -25°C to +80°C (NBR Seal set) High temperature application: -20°C to +120°C (Viton® Seal set) Low temperature application: -45°C to +40°C (T.L.T. NITRIL Seal set)
Rotation	90° ± 1°
Hydraulic media and viscosities	We recommend acid-free hydraulic oil. Viscosity range: 15-200 cSt. For recommended brands and for other media than oil please refer to separate data sheet.

## Main Dimensions

Actuator shown in closed position.

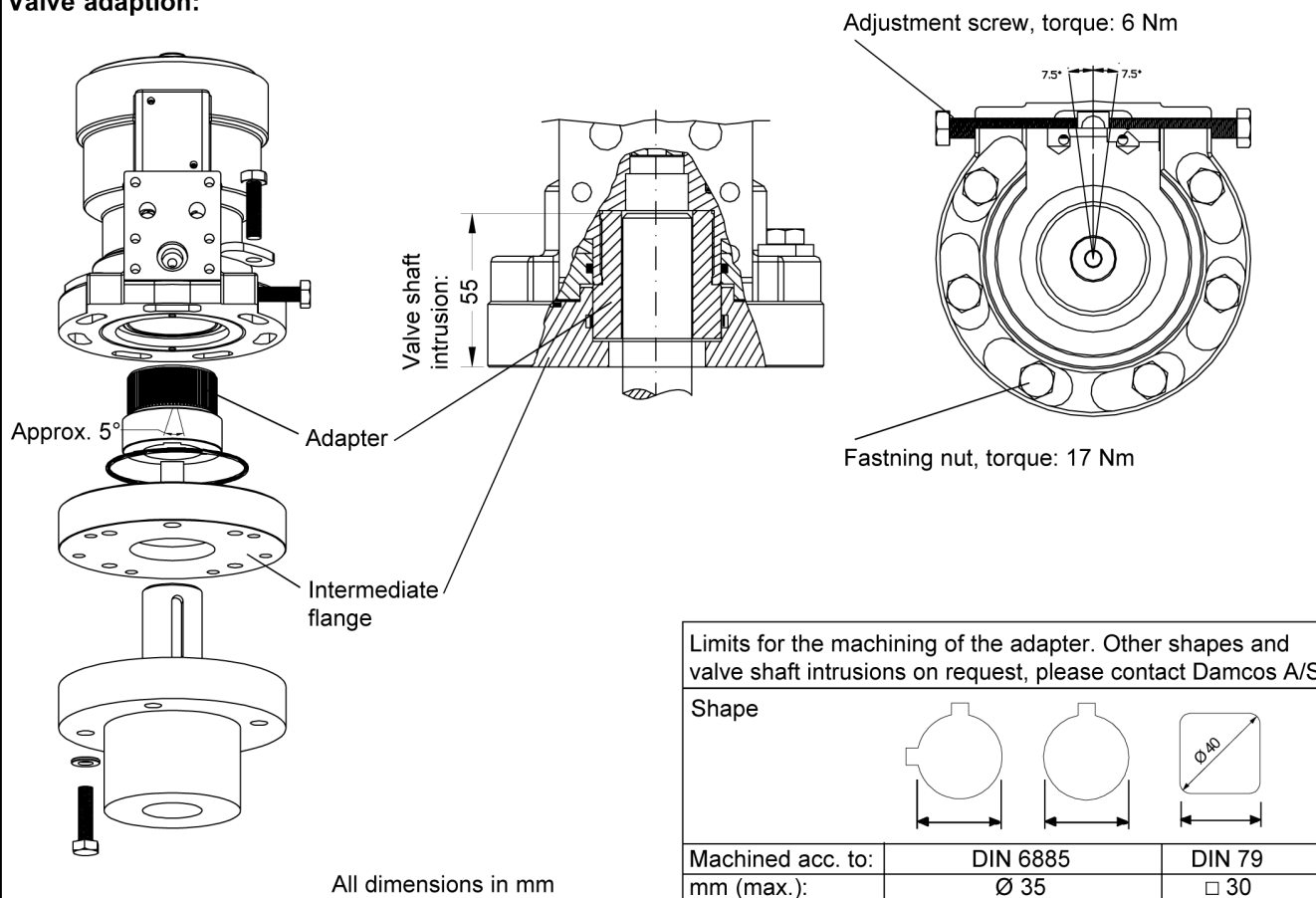
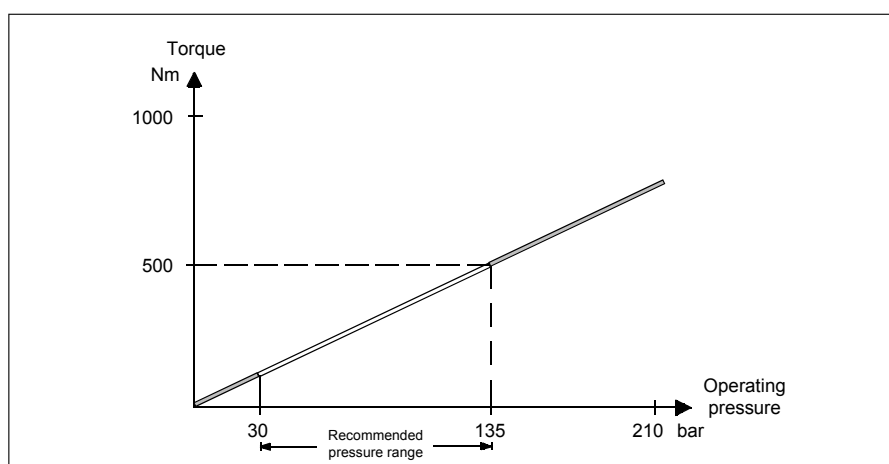
A port: Close (clockwise seen from above),

B port: Open.



All dimensions in mm



**Valve adaption:****Performance**

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Component: type & version ACTUATOR BRC 500 B1 Material no.: 160N1099 Alt.: 1				Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.				Page 1 of 2	
Document numbers referred to: 160N9047					
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0001		HOUSING BRC 500 GGG40 (W.no.0.7040)	A05	1,000	PC
0002		PISTON BRC 500 GGG40 (W.no.0.7040)	A10	1,000	PC
0003	160N0583	TOP PART BRC 500 GGG40 (W.no.0.7040)	A10	1,000	PC
0004	160N0785	POS.SHAFT BRC 500 B1 X5CrNiMo17 12 2 (W.no.1.4401)	F20	1,000	PC
0005	160N0786	Splined shaft BRC 500 B1 20MnV6 (W.no.1.5217)	B54	1,000	PC
0007	160N0842	TOP PART COVER BRC 500 X5CrNiMo17 13 3 (W.no.1.4436)		1,000	PC
0008	160N0596	WASHER BRC 500 9SMnPb28 (W.no.1.0718)	B 10	1,000	PC
0009		X-RING Ø31,34X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø55,25*2,62 NBR 80	NBR	1,000	PC
0011		X-RING Ø63.09*3.53 NBR 80	NBR	1,000	PC
0012		X-RING Ø75.79*3.53 NBR 90	NBR	2,000	PC
0013		O-RING Ø30.3*2.4 NBR 70	NBR	1,000	PC
0014		O-RING Ø31,34X3,53 NBR 70	NBR	1,000	PC

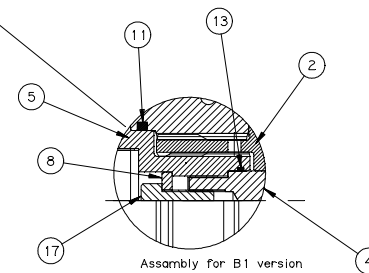
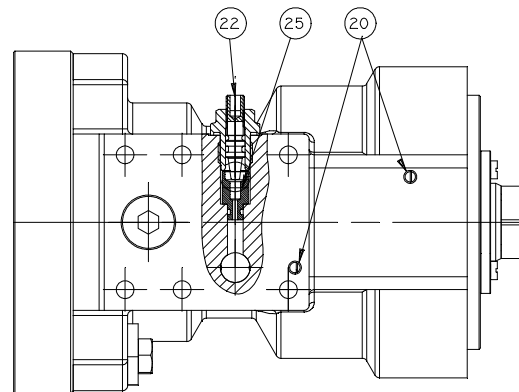
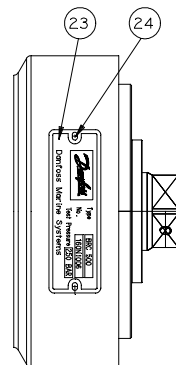
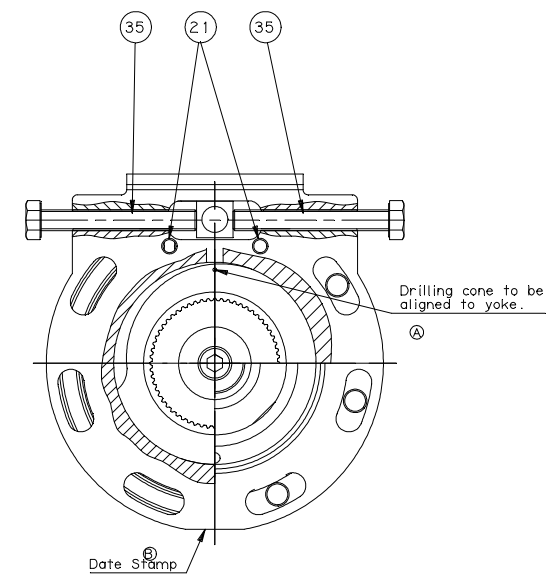
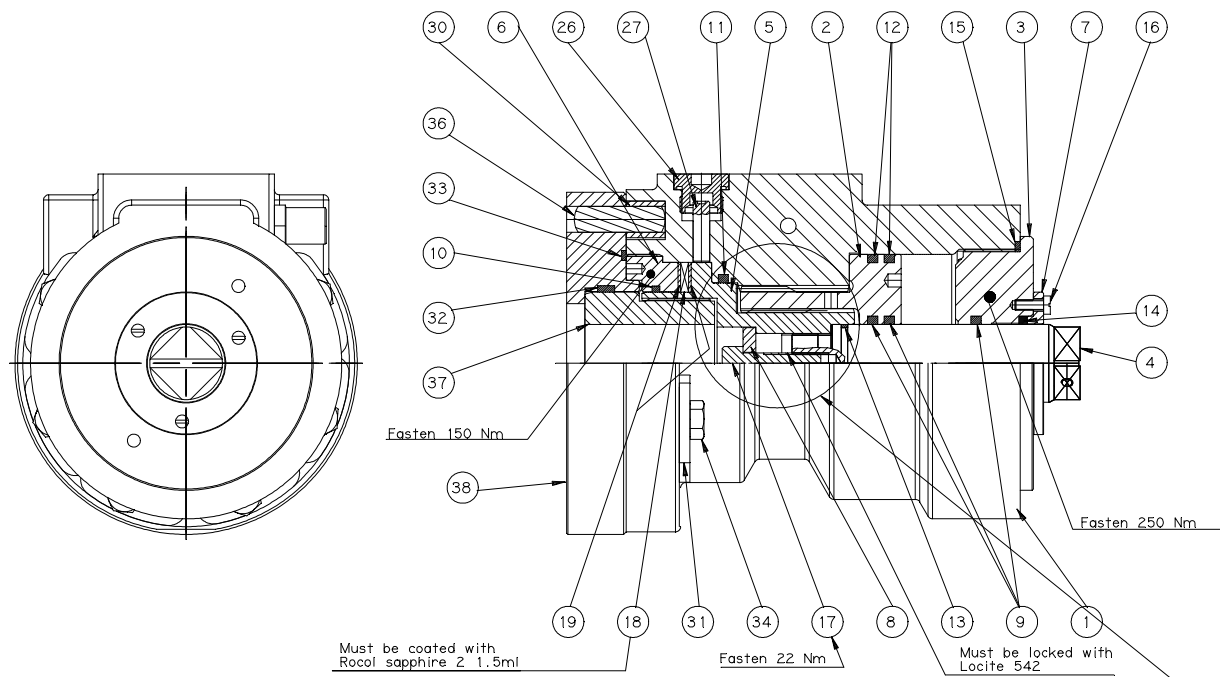
PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S	
Component: type & version ACTUATOR BRC 500 B1 Material no.: 160N1099 Alt.: 1				Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Page 2 of 2					
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0015		O-RING Ø88,57X2,62 NBR 70	NBR	1,000	PC
0016	251-1529	SCREW M4X12 X5CrNiMo18 12 (W.no.1.4436)	7A4	3,000	PC
0017	251-0106	SCREW M8X30	08.8	1,000	PC
0018	390-0011	THRUST CAGE D55		1,000	PC
0019	390-0111	THRUST WASHER D55		2,000	PC
0021		SEALING PLUG D6/5.3X6.5		1,000	PC
0022	160G2280	STOP VALVE D4		1,000	PC
0023		NAME PLATE FOR BRC 500 B1 160N1099_R	F90	1,000	PC
0024		RIVET D1,9X5	5/A4	2,000	PC
0025	160N1049	VALVE SEAT		1,000	PC
0026	160G5044	PLUG 3/8 INCH WG		1,000	PC
0027	160B4501	YOKE F. DPI BRC 500, L=24,50 POM-C	P01	1,000	PC
	160N1082	PAINT PLUG 1/4 INCH F.BRC CuZn39Pb3 (W.no.2.0401)	L05	2,000	PC
SPARE	----->	160N1261, SET SEALS FOR BRC 500 B1 POS.9,10,11,12,13,14,15,25,33.		1,000	PC
INFO	----->	160N1171 COMMON PART BRC 500 POS.30,31,32,33,34,35,36.		1,000	PC
INFO	----->	160N1195 COMMON PARTS BRC 500 STAINLESS POS.30,31,32,33,34,35,36.		1,000	PC

PARTS-, SPARE & MATERIAL LIST		Emerson Process Management Marine Tank Management Damcos A/S  Aæderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272
Component: type & version SET OF SEALS FOR BRC 500 B1 Material no.: 160N1261 Bom usage: Production. Alt.:1		

Page 1 of 1

Notes: All items with stated material number can be purchased as spare parts.  
When ordering spare parts: please state material number.

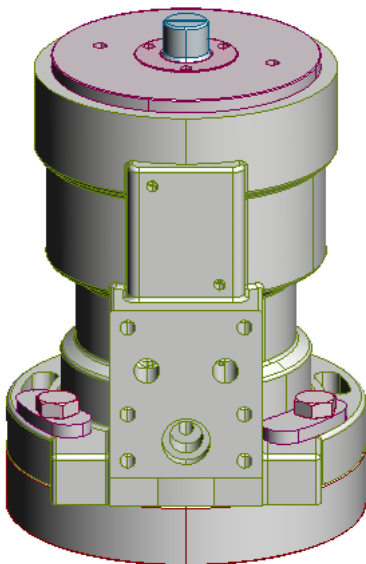
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0009		X-RING Ø31,34X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø55,25*2,62 NBR 80	NBR	1,000	PC
0011		X-RING Ø63.09*3.53 NBR 80	NBR	1,000	PC
0012		X-RING Ø75.79*3.53 NBR 90	NBR	2,000	PC
0013		O-RING Ø30.3*2.4 NBR 70	NBR	1,000	PC
0014		O-RING Ø31,34X3,53 NBR 70	NBR	1,000	PC
0015		O-RING Ø88,57X2,62 NBR 70	NBR	1,000	PC
0025		O-RING Ø3,1X1,6 NBR 70	NBR	1,000	PC
0033		O-RING Ø82,22X2,62 NBR 70	NBR	1,000	PC
0033		O-RING Ø78,74X5,33 NBR 70	NBR	1,000	PC



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		REV. NO. 001-00000000000000000000	
ITEM NO. 001-00000000000000000000		DESCRIPTION 1	
QUANTITY		REVISION	
THIS PART IS PROVIDED ON A REQUESTED BASIS THIS PART IS TO BE RETURNED WITHIN 90 DAYS OF THE DATE OF THE ORDER. IF THE PART IS NOT RETURNED WITHIN 90 DAYS, THE PART WILL BE CONSIDERED AS A LOSS. THE PART IS TO BE RETURNED WITHIN 90 DAYS OF THE DATE OF THE ORDER. IF THE PART IS NOT RETURNED WITHIN 90 DAYS, THE PART WILL BE CONSIDERED AS A LOSS.		REV. NO. 001-00000000000000000000	
IF ORDER IS PLACED BEFORE 10:00 AM, SHIPMENT		REV. NO. 001-00000000000000000000	
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# **Damcos™ BRC 1000**

Hydraulic double-acting balanced rotary actuator  
90° (Quarter-turn)



## Main Data

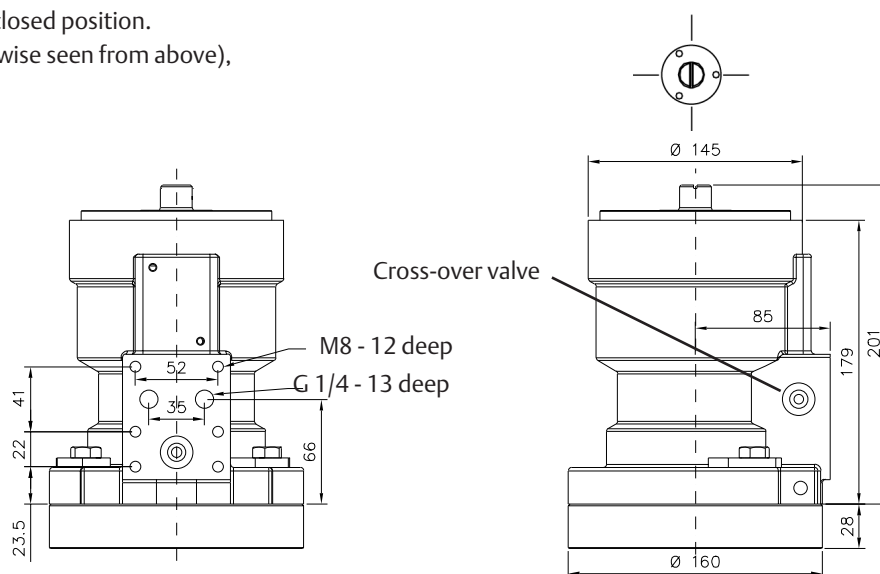
Recommended working pressure range	30 to 135 bar
Burst test	675 bar
Total dry weight incl. mounting set (5.5 kg)	19.9 kg
Oil displacement	0.209 l
Temperature range	Normal application: -25°C to +80°C (NBR Seal set) High temperature application: -20°C to +120°C (Viton® Seal set) Low temperature application: -45°C to +40°C (T.L.T. NITRIL Seal set)
Rotation	90° ± 1°
Hydraulic media and viscosities	We recommend acid-free hydraulic oil. Viscosity range: 15-200 cSt. For recommended brands and for other media than oil please refer to separate data sheet.

## Main Dimensions

Actuator shown in closed position.

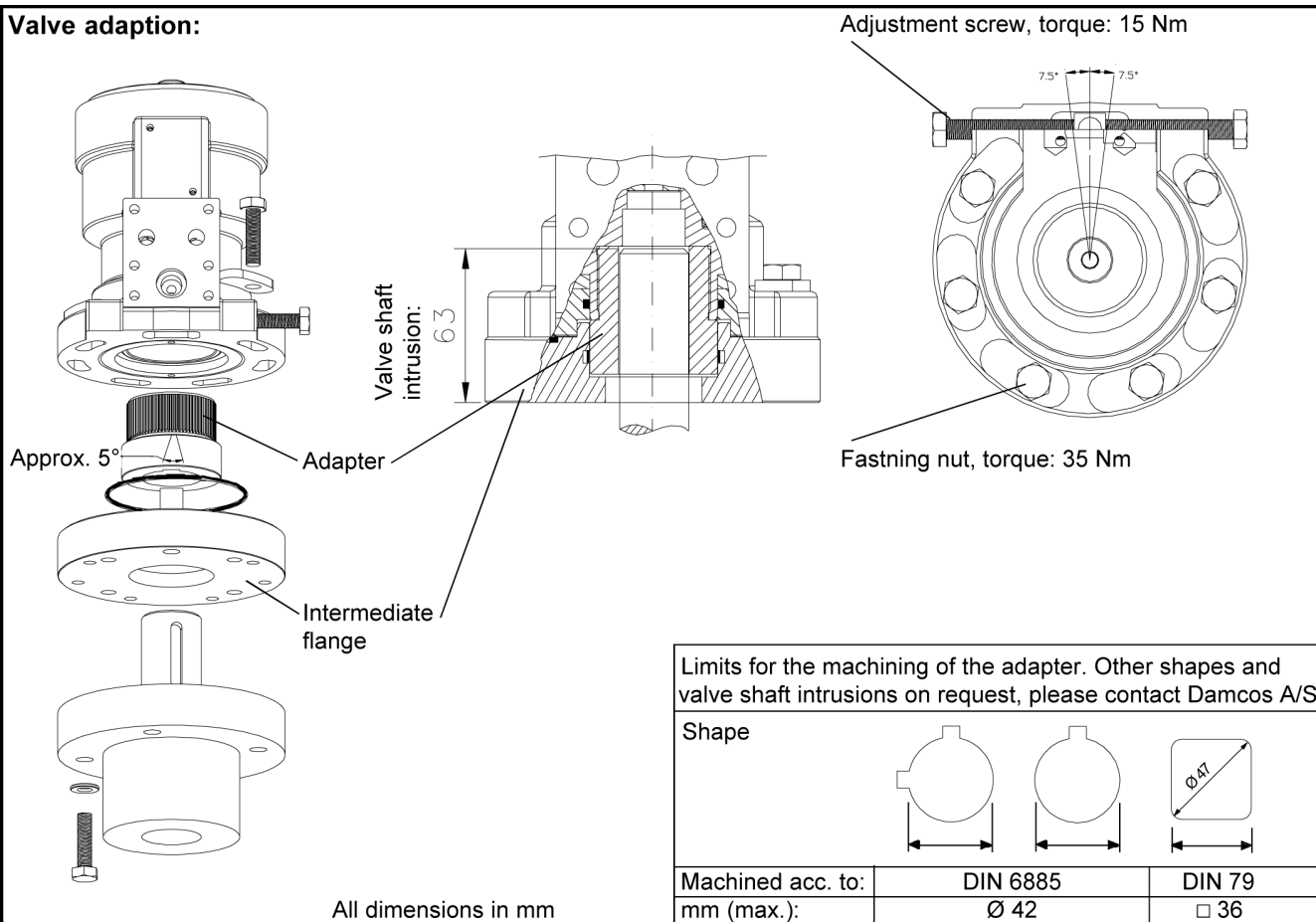
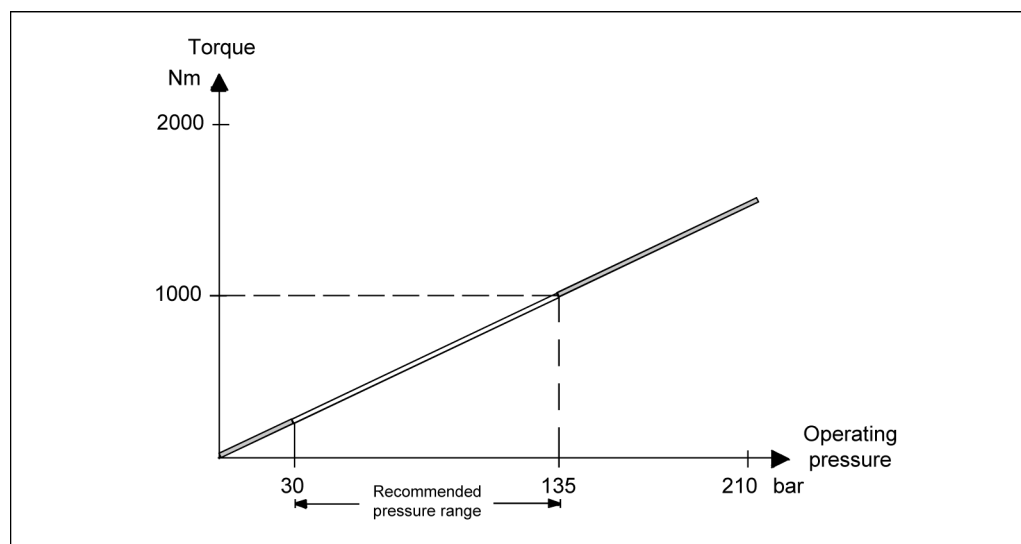
A port: Close (clockwise seen from above),

B port: Open.



All dimensions in mm



**Valve adaption:****Performance**

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[www.EmersonProcesss.com/mtm](http://www.EmersonProcesss.com/mtm)

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PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version <b>ACTUATOR BRC 1000 B1</b> Material no.: <b>160N1100</b> Alt.: 1				Page 1 of 3	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.					
Document numbers referred to: 160N9048					
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0001		HOUSING BRC 1000 GGG40 (W.no.0.7040)	A05	1,000	PC
0002		PISTON BRC 1000 GGG40 (W.no.0.7040)	A10	1,000	PC
0003	160N0601	TOP PART BRC 1000 GGG40 (W.no.0.7040)	A10	1,000	PC
0004	160N0787	POS.SHAFT BRC 1000 B1 X5CrNiMo17 12 2 (W.no.1.4401)	F20	1,000	PC
0005	160N0788	Splined shaft BRC 1000 B1 20MnV6 (W.no.1.5217)	B54	1,000	PC
0006	160N0605	Bottom cover BRC 1000 GGG40 (W.no.0.7040)	A10	1,000	PC
0007	160N0843	TOP PART BRC 1000-2000-4000-8000-16000 X5CrNiMo17 13 3 (W.no.1.4436)		1,000	PC
0009		X-RING Ø21,82X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø71,12*2.62 NBR 80	NBR	1,000	PC
0011		X-RING Ø82,14*3.53 NBR 80	NBR	1,000	PC
0012		X-RING Ø91,67*3.53 NBR 90	NBR	2,000	PC
0013		O-RING Ø22,3X2,4 NBR 70	NBR	1,000	PC
0014		O-RING Ø21,82*3,53 NBR 70	NBR	1,000	PC

PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Næstved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version <b>ACTUATOR BRC 1000 B1</b>  Material no.: <b>160N1100</b>  Alt.: 1				Page 2 of 3	
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0015		O-RING Ø114,02*1.78 NBR 70	NBR	1,000	PC
0016		O-RING Ø94,92*2,62 NBR 70	NBR	1,000	PC
0017	251-1531	SCREW M4X16		3,000	PC
0018	267-0014	SNAP RING EXTERNAL Ø17		1,000	PC
0019	390-0014	THRUST CAGE D70 USt.13 (W.no.1.0333)	POL	1,000	PC
0020	390-0114	THRUST WASHER D70 100Cr6 (W.no.1.3505)	ROL	2,000	PC
0021		SEALING PLUG D6/5.3X6.5		1,000	PC
0023	160G2280	STOP VALVE D4		1,000	PC
0024		NAME PLATE FOR BRC 1000 B1 160N1100_R F90		1,000	PC
0025		RIVET D1,9X5 5/A4		2,000	PC
0026	160N1049	VALVE SEAT NBR 70	NBR	1,000	PC
0027	160G5044	PLUG 3/8 INCH WG CuZn39Pb3 (W.no.2.0401)	L05	1,000	PC
0028	160B4503	YOKE F. DPI BRC 1000 - 2000 L=27,75 POM-C	P01	1,000	PC
	160N1082	PAINT PLUG 1/4 INCH F.BRC		2,000	PC
SPARE	----->	160N1262, SET OF SEAL FOR BRC 1000 POS.9,10,11,12,13,14,15,16,26,35.		1,000	PC
INFO	----->	160N1172, COMMON PART BRC 1000 POS.32,33,34,35,36,37,38.		1,000	PC
INFO	----->	160N1196 COMMON PARTS BRC 1000 STAINLESS			

PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version ACTUATOR BRC 1000 B1 Material no.: 160N1100 Alt.: 1					
				Page 3 of 3	
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
		POS.32,33,34,35,36,37,38.		1,000	PC

## PARTS-, SPARE & MATERIAL LIST

Component: type & version

SET OF SEALS FOR BRC 1000 B1

Material no.:

160N1262

Bom usage: Production. Alt.:1

Emerson Process Management  
Marine Tank Management  
Damcos A/S

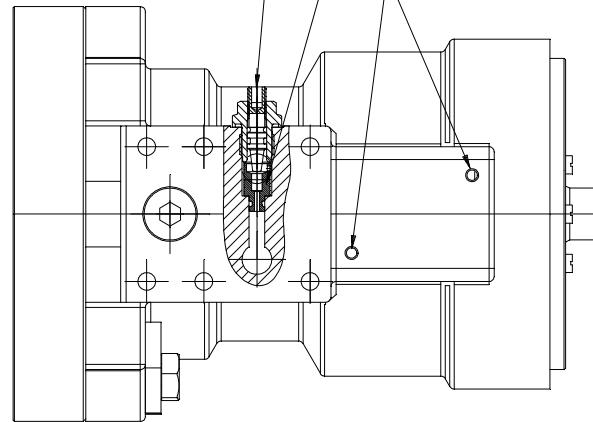
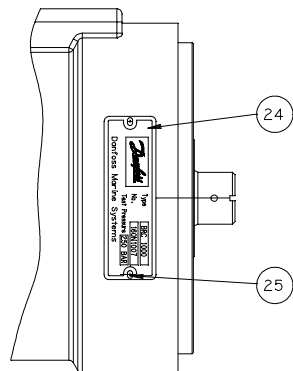
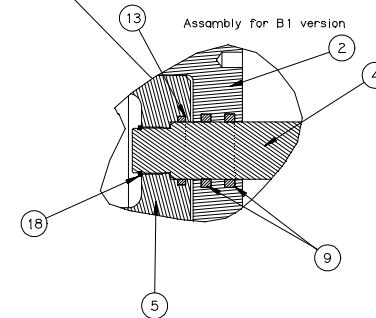
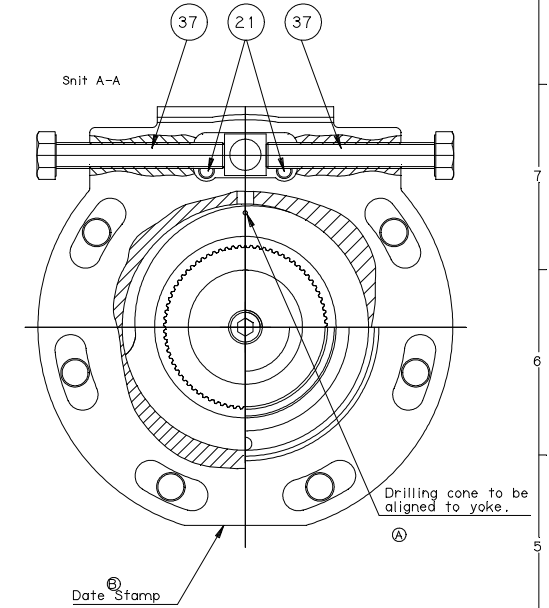
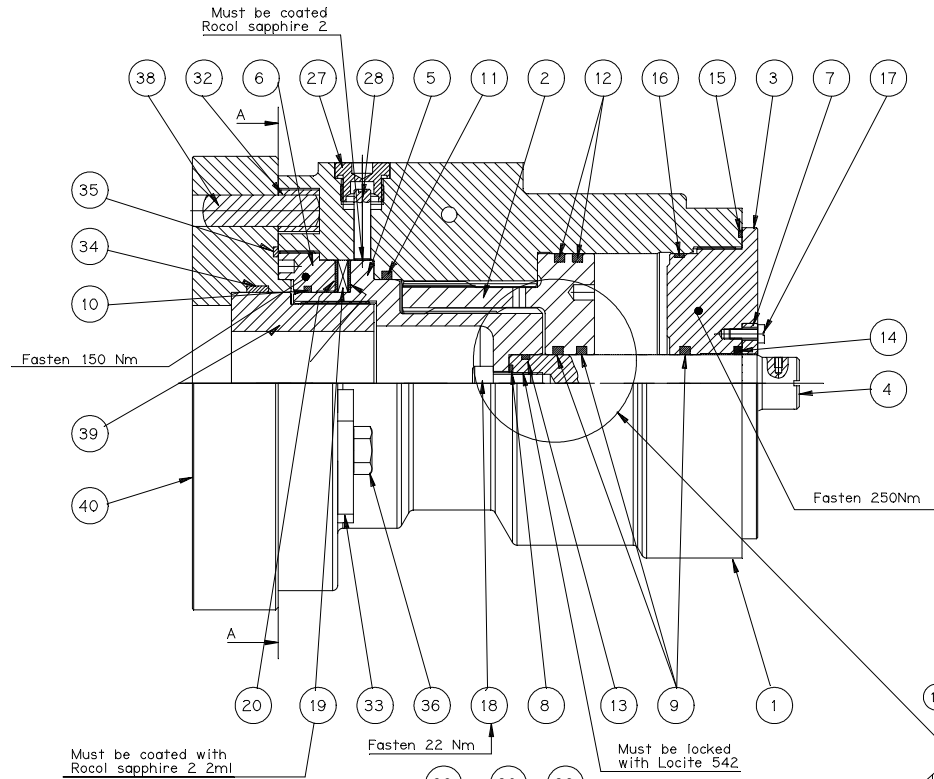
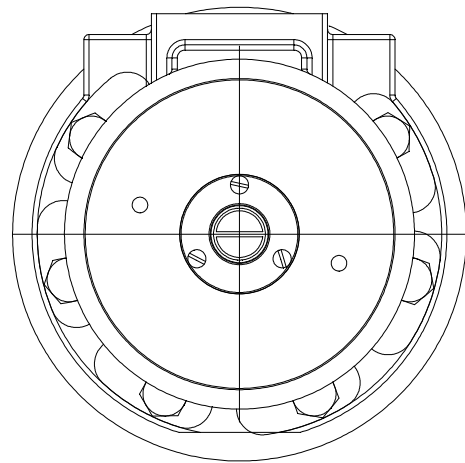
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Page 1 of 1

Notes: All items with stated material number can be  
purchased as spare parts.

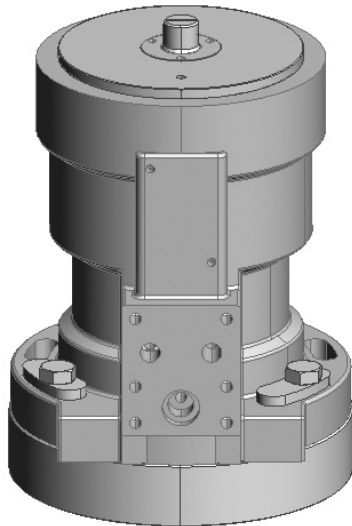
When ordering spare parts: please state material number.

Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0009		X-RING Ø21,82X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø71,12*2.62 NBR 80	NBR	1,000	PC
0011		X-RING Ø82,14*3.53 NBR 80	NBR	1,000	PC
0012		X-RING Ø91,67*3.53 NBR 90	NBR	2,000	PC
0013		O-RING Ø22,3X2,4 NBR 70	NBR	1,000	PC
0014		O-RING Ø21,82*3,53 NBR 70	NBR	1,000	PC
0015		O-RING Ø114,02*1.78 NBR 70	NBR	1,000	PC
0016		O-RING Ø94,92*2,62 NBR 70	NBR	1,000	PC
0026		O-RING Ø3,1X1,6 NBR 70	NBR	1,000	PC
0035		O-RING Ø94,92*2,62 NBR 70	NBR	1,000	PC
0035		O-RING Ø97,79X5,33 NBR 70	NBR	1,000	PC

[illegible]

# **Damcos™ BRC 2000**

Hydraulic double-acting balanced rotary actuator  
90° (Quarter-turn)





## Main Data

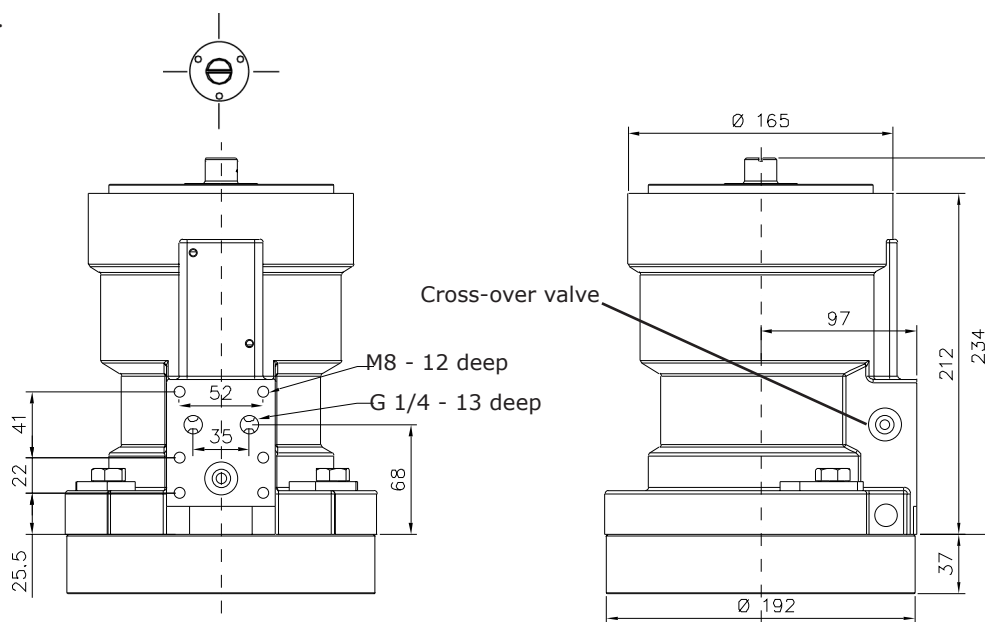
Recommended working pressure range	30 to 135 bar
Burst test	675 bar
Total dry weight incl. mounting set (10.1 kg)	33.1 kg
Oil displacement	0.400 l
Temperature range	Normal application: -25°C to +80°C (NBR Seal set) High temperature application: -20°C to +120°C (Viton® Seal set) Low temperature application: -45°C to +40°C (T.L.T. NITRIL Seal set)
Rotation	90° ± 1°
Hydraulic media and viscosities	We recommend acid-free hydraulic oil. Viscosity range: 15-200 cSt. For recommended brands and for other media than oil please refer to separate data sheet.

## Main Dimensions

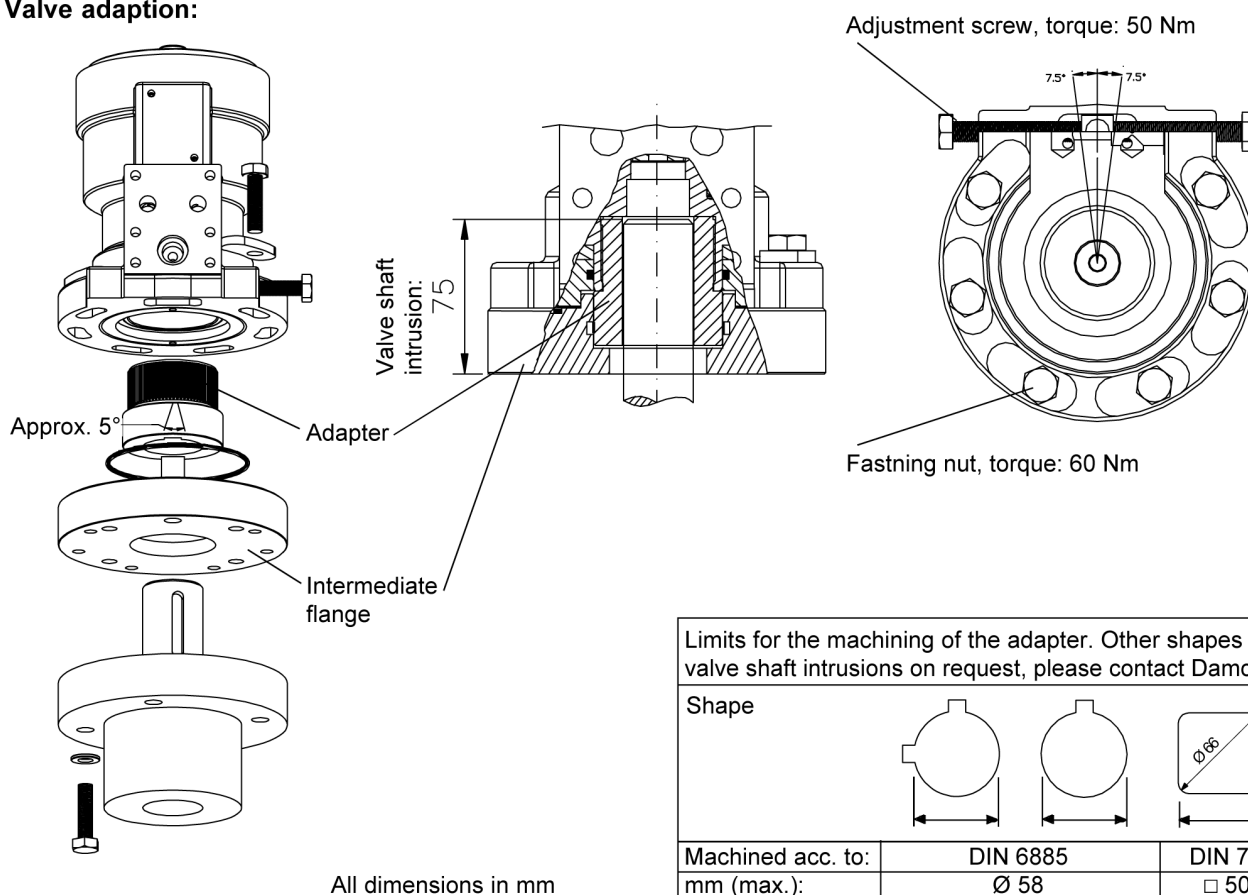
Actuator shown in closed position.

A port: Close (clockwise seen from above),

B port: Open.

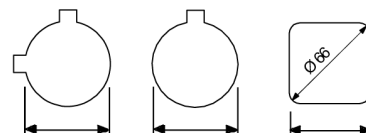


All dimensions in mm

**Valve adaption:**

Limits for the machining of the adapter. Other shapes and valve shaft intrusions on request, please contact Damcos A/S.

Shape



Machined acc. to:

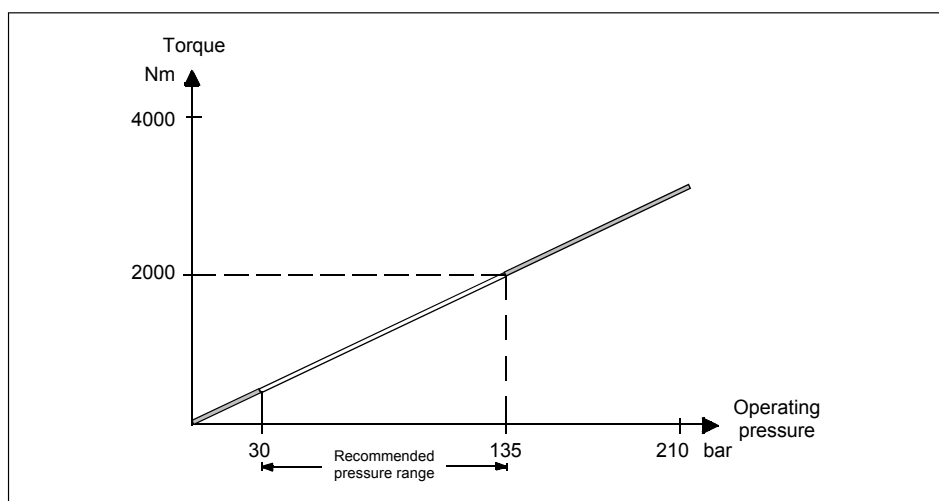
DIN 6885

DIN 79

mm (max.):

Ø 58

□ 50

**Performance**

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PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version <b>ACTUATOR BRC 2000 B1</b> Material no.: <b>160N1101</b> Alt.: 1				Page 1 of 2	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.					
Document numbers referred to: 160N9045					
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0001		HOUSING BRC 2000 GGG40 (W.no.0.7040)	A05	1,000	PC
0002		Piston BRC 2000 GGG40 (W.no.0.7040)	A10	1,000	PC
0003	160N0562	TOP PART BRC 2000 GGG40 (W.no.0.7040)	A10	1,000	PC
0005	160N0790	Splined shaft BRC 2000 B1 20MnV6 (W.no.1.5217)	B54	1,000	PC
0006	160N0566	Bottom cover BRC 2000 GGG40 (W.no.0.7040)	A10	1,000	PC
0007	160N0843	TOP PART BRC 1000-2000-4000-8000-16000 X5CrNiMo17 13 3 (W.no.1.4436)		1,000	PC
0009		X-RING Ø21,82X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø94,92*2,62 NBR 80	NBR	1,000	PC
0011		X-RING Ø104,37*3,53 NBR 80	NBR	1,000	PC
0012		X-RING Ø113,89*3,53 NBR 90	NBR	2,000	PC
0013		O-RING Ø22,3X2,4 NBR 70	NBR	1,000	PC
0014		O-RING Ø21,82*3,53 NBR 70	NBR	1,000	PC
0015		O-RING Ø133.07*1.78 NBR 70	NBR	1,000	PC

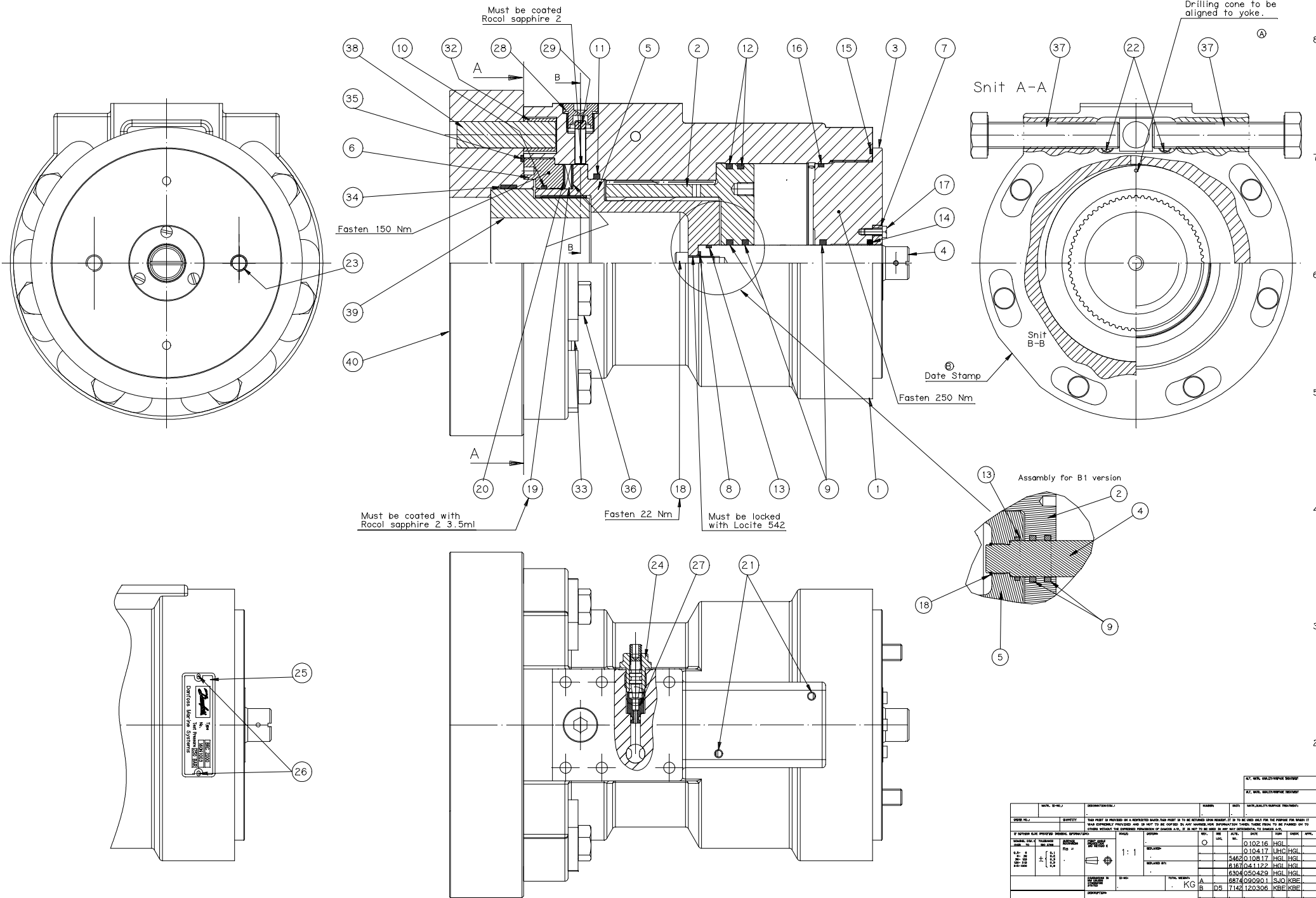
PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Component: type & version ACTUATOR BRC 2000 B1 Material no.: 160N1101 Alt.: 1				Page 2 of 2	
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0016		O-RING Ø113.97*2.62 NBR 70	NBR	1,000	PC
0017	251-1531	SCREW M4X16 X5CrNiMo18 12 (W.no.1.4436)	7A4	3,000	PC
0018	267-0014	SNAP RING EXTERNAL Ø17 W.no.1.1248	Y05	1,000	PC
0019	390-0018	THRUST CAGE D90 USt.13 (W.no.1.0333)	POL	1,000	PC
0020	390-0118	THRUST WASHER D90 100Cr6 (W.no.1.3505)	ROL	2,000	PC
0021		SEALING PLUG D6/5.3X6.5		1,000	PC
0023		SET SCREW/CUP POINT M10X30 X5CrNiMo17 12 2 (W.no.1.4401)	7A4	2,000	PC
0024	160G2280	STOP VALVE D4		1,000	PC
0025		NAME PLATE FOR BRC 2000 B1 160N1101	F90	1,000	PC
0026		RIVET D1,9X5	5/A4	2,000	PC
0027	160N1049	VALVE SEAT		1,000	PC
0028	160G5044	PLUG 3/8 INCH WG		1,000	PC
0029	160B4503	YOKE F. DPI BRC 1000 - 2000 L=27,75 POM-C	P01	1,000	PC
	160N1082	PAINT PLUG 1/4 INCH F.BRC		2,000	PC
SPARE	----->	160N1263, SET OF SEALS FOR BRC 2000 POS. 9, 10, 11, 12, 13, 14, 15, 16, 27, 35.		1,000	PC
INFO	----->	160N1173, COMMON PART BRC 2000 POS. 32, 33, 34, 35, 36, 37, 38.		1,000	PC
INFO	----->	160N1197 COMMON PARTS BRC 2000 STAINLESS POS. 32, 33, 34, 35, 36, 37, 38.		1,000	PC

PARTS-, SPARE & MATERIAL LIST		Emerson Process Management Marine Tank Management Damcos A/S  Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272
Component: type & version  SET OF SEALS FOR BRC 2000 B1  Material no.:  160N1263  Bom usage: Production. Alt.:1		

Page 1 of 1

Notes: All items with stated material number can be purchased as spare parts.  
When ordering spare parts: please state material number.

Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0009		X-RING Ø21,82X3,53 PD 85	PD	3,000	PC
0010		X-RING Ø94,92*2,62 NBR 80	NBR	1,000	PC
0011		X-RING Ø104,37*3,53 NBR 80	NBR	1,000	PC
0012		X-RING Ø113,89*3,53 NBR 90	NBR	2,000	PC
0013		O-RING Ø22,3X2,4 NBR 70	NBR	1,000	PC
0014		O-RING Ø21,82*3,53 NBR 70	NBR	1,000	PC
0015		O-RING Ø133.07*1.78 NBR 70	NBR	1,000	PC
0016		O-RING Ø113.97*2.62 NBR 70	NBR	1,000	PC
0027		O-RING Ø3,1X1,6 NBR 70	NBR	1,000	PC
0035		O-RING Ø120,32X2,62 NBR 70	NBR	1,000	PC
0035		O-RING Ø120,02X5,33 NBR 70	NBR	1,000	PC



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**Accessories**

**Damcos Block System**

Cartridge based control block system BRC and BRCF actuators	data sheet	SD 3000-0E03
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**CB-E Control Block**

CB-E Control Block	data sheet	SD 3002-2E03
Control block CB 2-PCV-R-T-H-E	psm.list	160G2257
Assembly drawing, Control block CB 2-PCV-R-T-H-E	ass.drawing	160G9302

**Damcos DPI-C and DPI-E Position Indicators**

DPI-C and DPI-E position indicators	data sheet	SD 2000-0E06
DPI-E-68 indicator (NO) M20 gland	psm.list	160B4171
DPI-E-68	ass.drawing	160B9045

**Damcos PHP 25-05 Portable Hand Pump 5L**

Portable Hand Pump Unit 5L	data sheet	SD 6601-2E04
Portable Hand Pump 5L-4M	psm.list	160U7520
Hand Pump Unit 5L	ass.drawing	160U6160



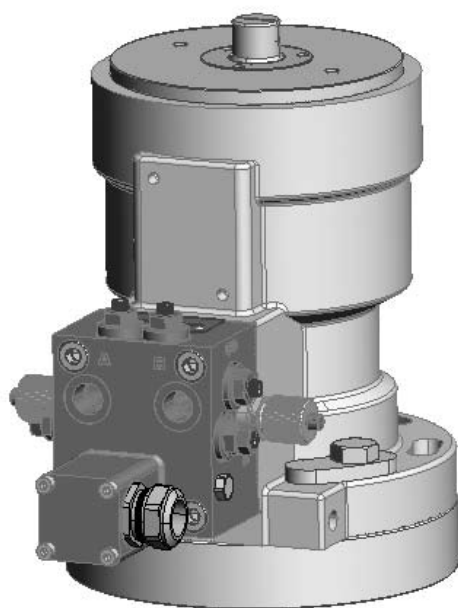
## Product Data Sheet

SD 3000-0E03

August 2008

# Damcos® Block System

Cartridge based control block system BRC and BRCF actuators



**Damcos®**

  
**EMERSON™**  
Process Management

# Damcos® Block System

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## Description

The control block is designed for mounting on, or close to the BRC or BRCF actuator. For use of other actuator types or if the actuator is submerged or placed in hazardous area the block can be connected to the pilot line by means of the B-block.

The control block system consist of 5 standard houses. Each standard house is divided in two separate parts. The top part has all the hydraulic functions and it is also divided in two parts - one for open- and one for close- function, (A port: hydr. closing and B port: hydr. opening). The bottom part has the connection for direct position indication - either electrical (on/of or potentiometer) or hydraulic (on/of).

## Operation

The pilot-operated check valve is to, hydraulically lock the piston on the actuator and prevent the actuator from moving when it is required to be held stationary.

Double pilot check valves are tested to ensure zero leakage, but care must be taken to ensure that the hydraulic oil in the system is free from any foreign particles that may cause damage to the seats or the hydraulic sealing ring in the pilot piston.

The relief valve secures that the oil pressure do not rise above the DPCV open pressure.

The throttle valve controls the speed of the actuator. It allows regulation of flow in both directions. The

Furthermore each standard block has several combination possibilities.

### Hydraulic functions:

- Pilot line connection
- Flush system
- Last chance filter
- Throttle/stop valve
- Pilot-operated check valve
- Relief valve
- Quick connections
- By-pass hydraulic on/off indication

All hydraulic functions/connections can be used or plugged of.

throttle/stop valve is used to isolate the actuator if emergency operation is required.

The throttle valve and the throttle/stop valve are not compensated for pressure or temperature variations.

The quick connections are used for emergency operation by means of the DMS's portable hand pump.

The quick connections can be replaced with an adaptor (max. 19 AF) if operation is to be elsewhere than on the actuator.

The CETOP 3 block interface is according to ISO 4401/NG6 DIN 24340 except that the oil canals is  $\varnothing 7$  instead of max.  $\varnothing 6.3$ .

By-pass indication - DPI-B: please see separate data sheet.

## Product Data Sheet

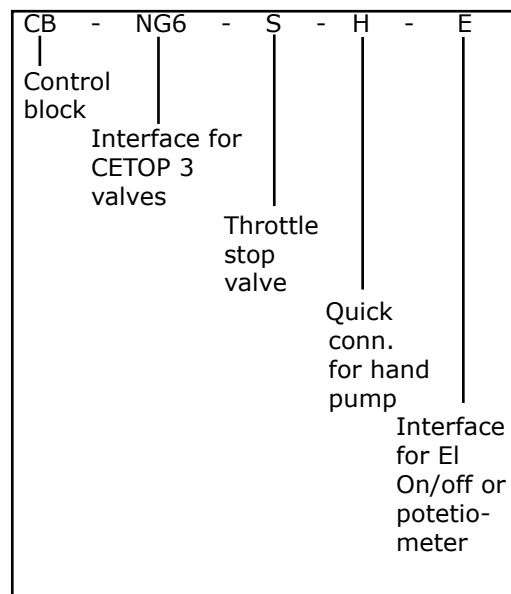
SD 3000-0E03

August 2008

# Damcos® Block System

## Type codes

CB: Control Block  
2: 2-line actuator (BRC...)  
1: 1-line actuator (BRCF...)  
1A: 1-line actuator (BRCF... Fail open)  
S: Throttle/Stop valve  
PCV: Pilot operated Check valve  
R: Relief valve  
T: Throttle valve  
H: Quick connection for hand pump  
E: Interface for EL on/off or potentiometer, 0-100%  
B: By-pass hydraulic on/off indication  
NG6: Interface for CETOP 3 valves  
CBF: CB + Flush system



Example

## Main materials

Block:	Brass - CuZn39Pb3
Valve parts:	Brass - CuZn39Pb3/ acid proof steel
Screws:	Acid proof steel
Seals:	NBR/teflon

# Damcos® Block System

## Main specifications

Working pressure:	135 bar	
Test pressure:	210 bar	
Burst pressure:	600 bar	
Relief crack pressure:	150-250 bar	
Check valve ratio:	3:1	
Max. flow:	6 L/min.	
Min.flow with use of throttle valve	120-180 ml/min.	
Temperature range:	-20° C to +80° C	
Hydraulic media:	Acidfree hydraulic oil	
Viscosity range:	15-200 cSt	
Filtration (ISO):	18/16/13	
Max. weight for each standard block:	Type:	Weight (kg)
	CB	1.75
	CB-E	2.75
	CB-B	2.3
	CB-NG6	2.8
	CBF	2.8
	E-block	1.5
	B-block	2.0
	Adaptor	1.75

Further information about each standard block  
please see separate data sheets.

### Note:

All H: Quick connection for portable hand pump. Can  
also be remotely installed.

For continuous or on/off indication - (DPI-C, DPI-E or  
DPI-B) please see separate data sheets.

For further information please contact DMS.

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This product is developed and managed by:  
**Emerson Process Management**

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For global contacts:  
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# CB-E Control Block

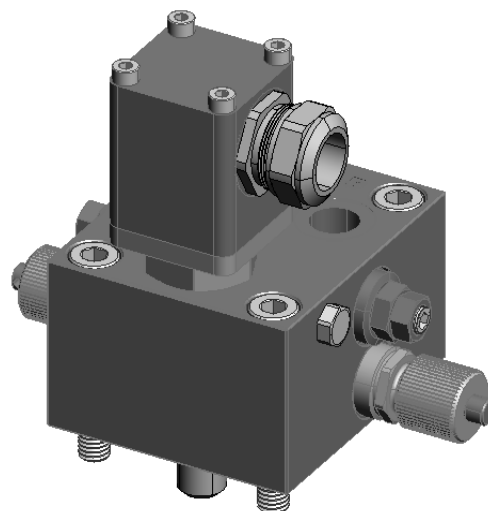
## Presentation

CB-E:

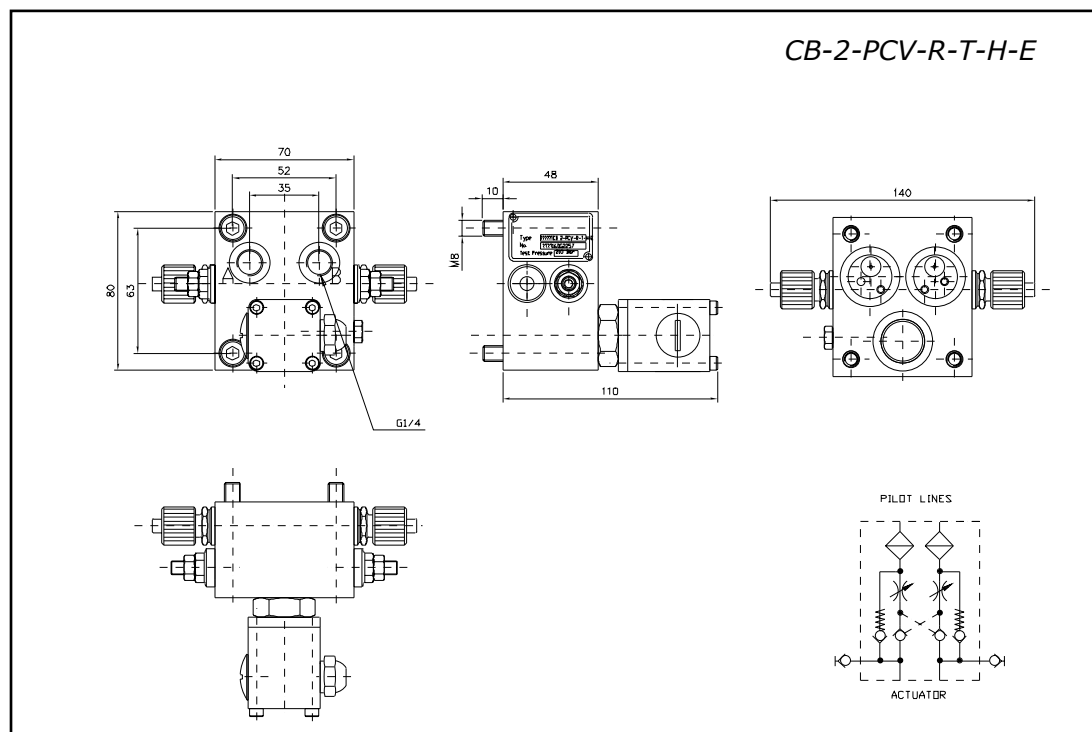
Control block for mounting on 1-line and 2-line actuators. It is mounted with interface for EL on/off or potentiometer. It is prepared for mounting of pilot operated check valve, relief valve and throttle valve, stop valve and hand pump quick connections.

## Available types

- CB 2-PCV-R-T-H-E
- CB 2-PCV-R-T-E
- CB 2-S-H-E
- CB 2-S-E
- CB 1-S-H-E
- CB 1A-S-H-E



## Main dimensions



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**For global contacts:**  
**[www.EmersonProcess.com/marine](http://www.EmersonProcess.com/marine)**

PARTS-, SPARE & MATERIAL LIST					Emerson Process Management Marine Solutions Damcos A/S	
Component: type & version CONTROL BLOCK CB 2-PCV-R-T-H-E *P Material no.: 160G2257 Alt.: 1					Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.					Page 1 of 2	
Document numbers referred to: 160G9302						
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit	
		BLOCK CB-E CuZn39Pb3 (W.no.2.0401)		1,000	PC	
02.1		NON RETURN VALVE		2,000	PC	
0001		HOUSING AlMgSi1,0 (W.no.3.2315)	K10	1,000	PC	
0002		BUSHING CuZn39Pb3 (W.no.2.0401)	L05	1,000	PC	
0003		COMPRESSION SPRING Ø3,6/0,3X8	N06	1,000	PC	
0004		O-RING Ø6X2 NBR 70	NBR	1,000	PC	
0005		BALL Ø5 100Cr6 (W.no.1.3505)	ROL	1,000	PC	
02.2		PISTON 9SMnPb28 (W.no.1.0718)	B 10	1,000	PC	
02.3		DISC CuZn39Pb3 (W.no.2.0401)	L05	2,000	PC	
02.4		PISTON SEALING Ø8/7,2X1,2 PTFE	PF2	1,000	PC	
02.5		O-RING Ø5X1,VITON FPM 70	FPMO	1,000	PC	
02.6	231-2157	SPRING Ø5.0/Ø0.80*12, W.no.1.1200	Stece 11660 N06	2,000	PC	
0003	160G5094	QUICK CONNECTION MALE (051-0722) *P*		1,000	PC	
0004	160G5094	QUICK CONNECTION MALE (051-0722) *P*		1,000	PC	
0005	160G5001	THROTTLE VALVE Ø4 *P*		1,000	PC	

PARTS-, SPARE & MATERIAL LIST					Emerson Process Management Marine Solutions Damcos A/S	
Component: type & version <b>CONTROL BLOCK CB 2-PCV-R-T-H-E      *P</b> Material no.: <b>160G2257</b> Alt.: 1					Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
					Page 2 of 2	
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr	
0006	160G5001	THROTTLE VALVE Ø4      *P*		1,000	PC	
0007	160G2236	RELIEF VALVE		1,000	PC	
0008	160G2236	RELIEF VALVE		1,000	PC	
0012		O-RING Ø19,6X2,4 NBR 70	NBR	1,000	PC	
0013	345-8008	FILTER Ø11,0 X 8,0, 20 MY		1,000	PC	
0014	345-8008	FILTER Ø11,0 X 8,0, 20 MY		1,000	PC	
0017		PLATE FOR BLOCK, ID.NR.160G2257	F90	1,000	PC	
0018		RIVET D1,9X5	5/A4	2,000	PC	
0019	250-1670	SCREW M6X10 X5CrNiMo17 12 2(W.no.1.4401)	7A4	1,000	PC	
0020	252-1640	SET SCREW/CUP POINT M6X6 X5CrNiMo17 12 2(W.no.1.4401)	7A4	1,000	PC	
0021	160G2543	LOCK PA 6	P05	1,000	PC	
0009	160G4531	PLUG G 1/4 with EO-ring CuZn39Pb3 (W.no.2.0401)	L05	1,000	PC	
0010	160G4531	PLUG G 1/4 with EO-ring CuZn39Pb3 (W.no.2.0401)	L05	1,000	PC	
0011		O-RING Ø24,5X3 NBR 70	NBR	3,000	PC	
0015	251-1610	SCREW M8X50 X5CrNiMo18 12 (W.no.1.4436)	7A4	4,000	PC	



- Ⓜ M8 NV 6 (17 Nm)  
 Ⓜ THROTTLE VALVE NV 13 (20 Nm)  
 Ⓜ QUICK CONN. NV 17 (20 Nm)

A CLOSING LINE 1/4" BSP MAX NV30  
 B OPENING LINE 1/4" BSP MAX NV30

LOCK SCREW NV 3 (5 Nm)  
 PLUG NV 10 (10 Nm)

RELIEF VALVE

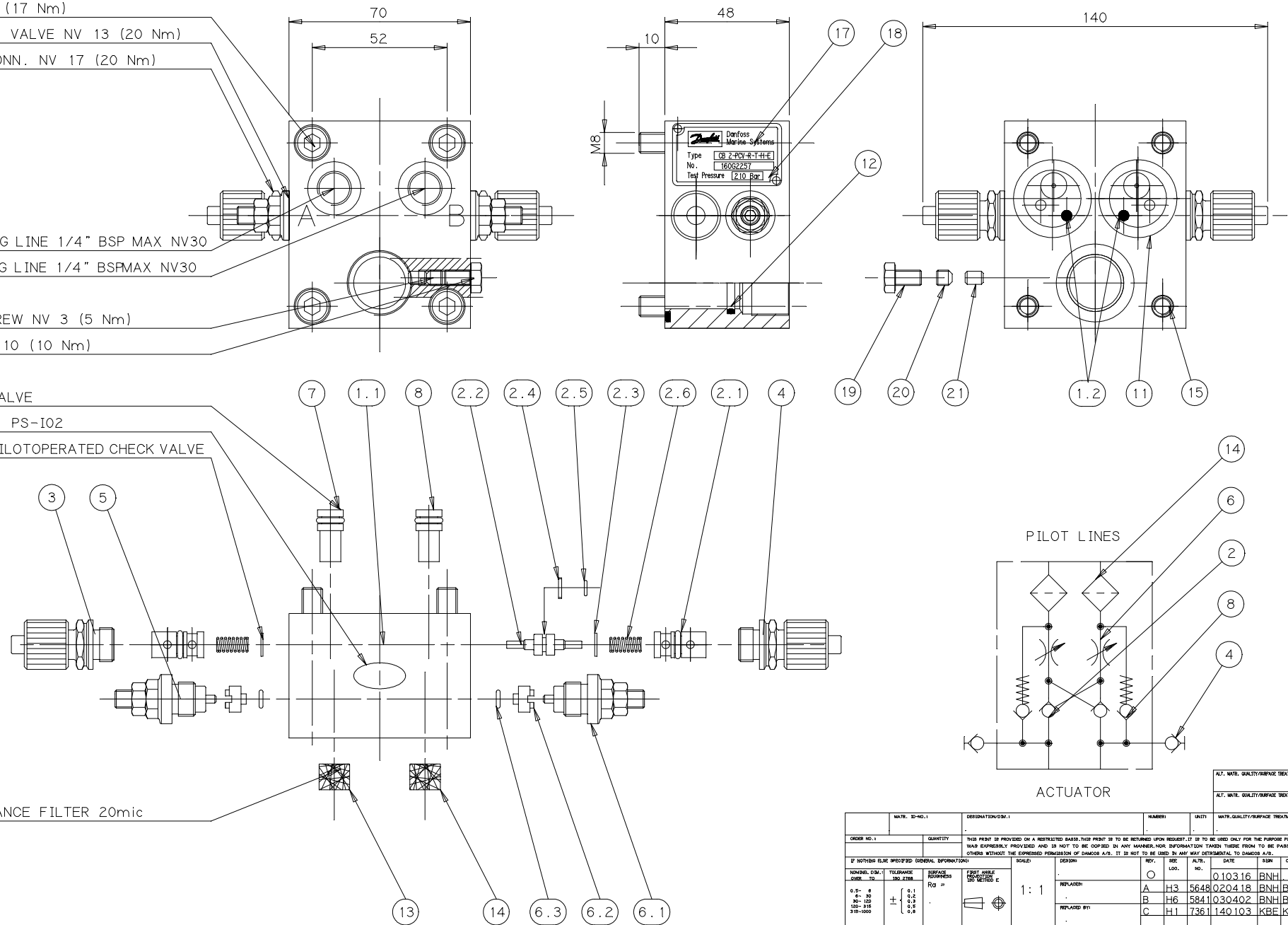
Ⓐ CODE No. PS-I02

DOUBLE PILOT OPERATED CHECK VALVE

LAST CHANCE FILTER 20mic

©

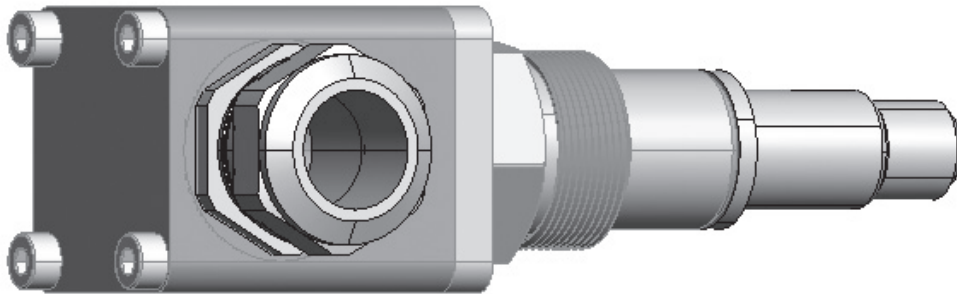
For stainless steel blocks the stainless steel parts must be lubricated at threads with ROCOL FOODLUBE MULTIPASTE before assembly



MATERIAL		DESIGNATION/REV.		NUMBER		UNIT		MATERIAL QUALITY/SURFACE TREATMENT	
ORDER NO. 1		QUANTITY		THIS PRINT IS PROVIDED ON A RESTRICTED BASIS. THIS PRINT IS TO BE RETURNED UPON REQUEST. IT IS TO BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS EXPRESSED, IF PROVIDED AND IS NOT TO BE COPIED IN ANY MANNER, NOR INFORMATION THEREFROM TO BE PASSED ON TO OTHERS WITHOUT THE EXPRESSED PERMISSION OF DANFOS A/S. IT IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO DANFOS A/S.				ALT. MATE. QUALITY/SURFACE TREATMENT	
IF NOTHING ELSE SPECIFIED GENERAL INFORMATION:		SCALE		DESIGN		REV.		DATE	
NOMINAL DIM. TOLERANCE		SURFACE FINISH		1:1		O		010316	
0.5- 8		0.1		REPLACES		A		5648	
8- 30		0.2		REPLACES BY:		B		020418	
30- 150		0.3				C		030402	
150- 315		0.5						140103	
315-1000		0.6						7361	
DIMENSIONS IN MM UNLESS STATED		10-NO.		TOTAL WEIGHT					
		160G2257/5235		KG					
		DESCRIPTION							
		CONTROL BLOCK							
		CB2-PCV-R-T-H-E							
		PART		/		DRAW. NO.		160G9302	

# Damcos DPI-C and DPI-E

## Position Indicators



## Description

The DPI is designed to fit DMS quarterturn valve actuators BRC and BRCF for use within the temperature range from -20° C to +80° C.

The DPI range consists of the DPI-E (ON/ OFF/switches), DPI-C (Continuous/potential-meter) and the hydraulic DPI-B (By-pass).

For further information about the DPI-B, please see separate data sheet.

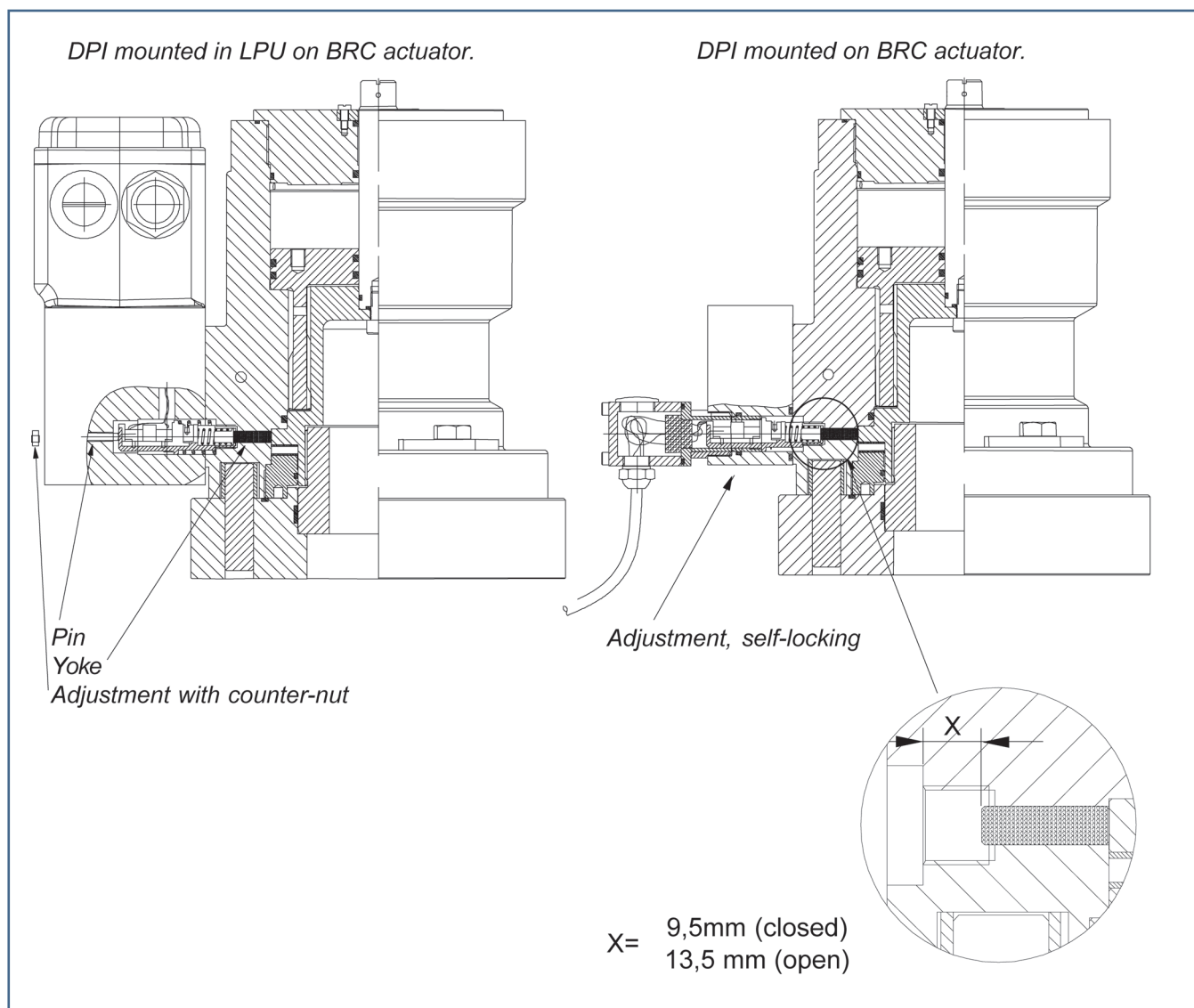
## Basic Design

The DPI-E and -C can be mounted in different mounting blocks or in LPU, with only internal wiring.

Valve/actuator position is indicated by means of a precision potentiometer or 2 micro-switches.

Resistance (commonly used  $\Omega$  output) increases during opening and decreases during closing the valve/actuator.

Set point adjustment is performed without dismounting the DPI or cable from the LPU or block.



## Mounting and Adjustment

When mounting the DPI-C/-E be sure not to press the DPI too far towards the actuator. Several misadjustments of the DPI may cause destruction of the DPI.

When the valve/actuator is closed you may adjust the DPI by screwing it towards the actuator until

DPI-C: - potentiometer reaches the desired 300  $\Omega$  (1500  $\Omega$ )

DPI-E: - CLOSED switch closes (opens if NC configuration)

and then adjust the desired overlap (1° - 5°).

Check the indicator signal in open position.

When DPI is mounted in a block, make sure that the locking screw is tightened sufficiently to prevent the DPI from turning.

When mounted in LPU remember to tighten the counter-nut.

If correct adjustment is not possible - check the yoke distance "X" (see enlargement), and the presence of the yoke.

## Enclosure

### When mounted in block

Cavity seals are designed to fulfil demands of enclosure rating IP 68.

#### Note!

In case of installation where a larger enclosure rating than IP 67 is required, the connection house should be filled with silicone after wire mounting and test of function.

With each actuator comes a yoke, fit to transfer the mechanical signal from the actuator to the DPI.

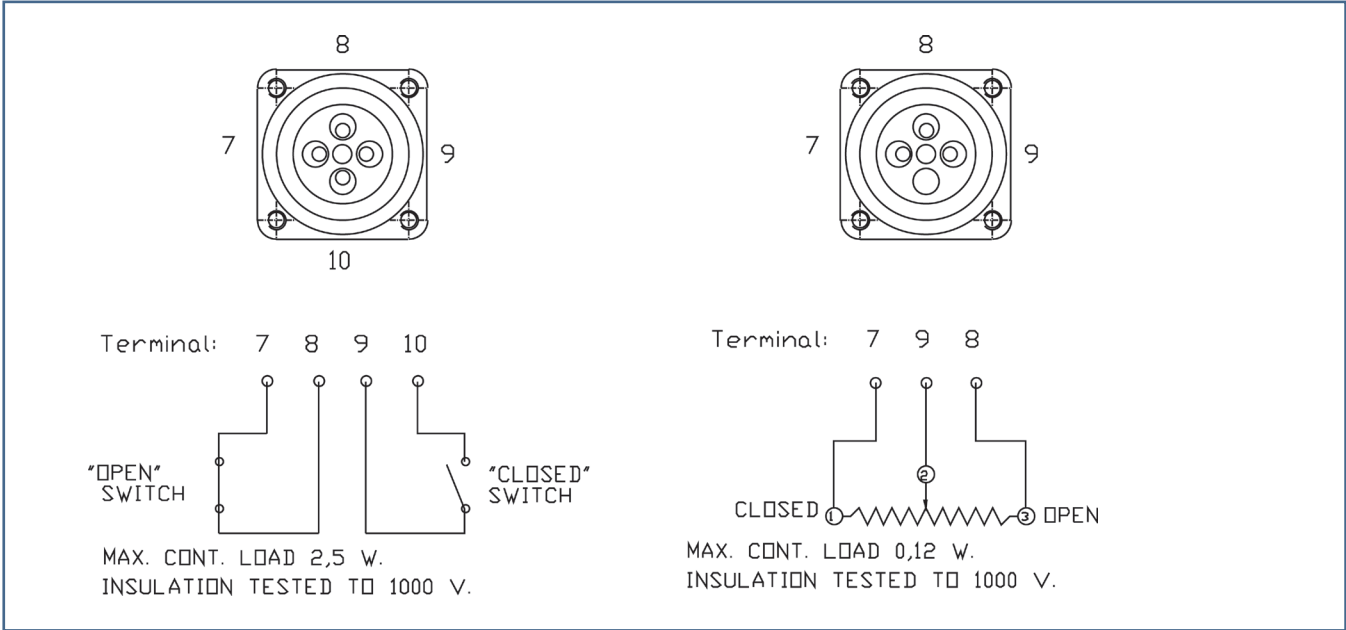
## Potentiometer

The potentiometer incorporated in the DPI-C is a high quality potentiometer that is extremely reliable as long as the following ratings are observed:

Max. continuous load	0.12 W (VA)	
Max. peak load	1 W(VA)	
The normal output range is at:	1 k $\Omega$	0-500 $\Omega$ for 0-90° rotation *
	2 k $\Omega$	300-1400 $\Omega$ for 0-90° rotation *
	10 k $\Omega$	1500-7000 $\Omega$ for 0-90° rotation *

*Approx. adjustment for open (1400/7000) and close (300/1500) set point.*

# Terminal Layout



## Analogue signal processing

LPU is equipped with signal conditioning, with a 2-wire 4 - 20 mA signal output. We recommend the PR 4114 isolation amplifier for transforming the potentiometer signal into a standard 4 - 20 mA signal.

Generally we recommend using the potentiometer as voltage divider, rather than a variable resistance.

The output can be displayed visually by means of the DMS meter PQ 48 measuring 48 x 48 mm and scaled: "closed, 1/4, 1/2, 3/4, open".

## Materials

Housing	Brass, MS 58 (CuZn39Pb3)
Screws	AISI 304
Seals	NBR ~ Acrylonitrile Butadiene
Fixture	PPS

## Cable gland data

Cable outer diameter	ø 6-10.5 or ø 8-15 mm
Ingress protection	IP 68
Thread	M 16 or M 20
Material	Nickel plated brass
Seal material	Perbunan and NBR

## Cable quality/connection

Wiring to the terminal: Cross sections 0.5-1.5 mm<sup>2</sup> (AWG 22 - 16).

The IP tightness is based on correct and careful mounting.

Observe that water intrusion into the terminal housing can take place through the cable - even through each individual wire.

## Potentiometer

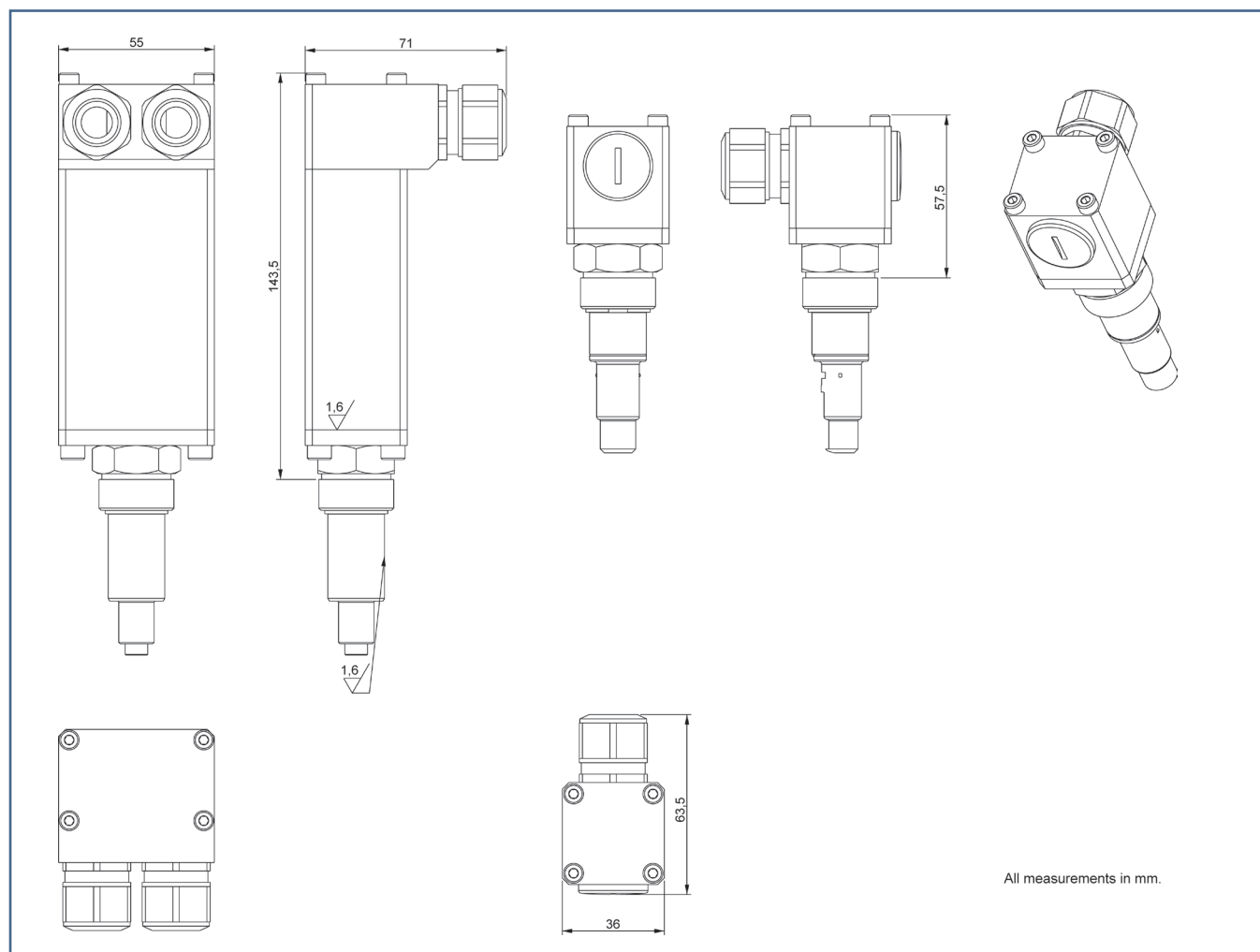
Standard resistance values	1k $\Omega$ , 2k $\Omega$ , 10k $\Omega$
Total resistance tolerance	Precision class $\pm 20\%$
Independent linearity tolerance	Precision class $\pm 5\%$
Resolution	Essentially infinite
Output smoothness	Below 0.1% against input voltage
Insulation resistance	Over 50 M $\Omega$ at 500 V DC
Dielectric strength	1 minute at 500 V AC
Resistance temperature coefficient	$\pm 400$ p.p.m./ $^{\circ}\text{C}$
Operating temperature range	-55 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
Temperature cycle: - Total resistance value variation - No mechanical damage	5 cycles under -55 $^{\circ}\text{C}$ to 125 $^{\circ}\text{C}$ Below $\pm 10\%$ .
Exposure at low temperature: - Total resistance value variation - No mechanical damage	24 hours at -55 $^{\circ}\text{C}$ Below $\pm 5\%$ .
Exposure at high temperature: - Total resistance value variation - No mechanical and electrical damage	1,000 hours at 105 $^{\circ}\text{C}$ Below $\pm 10\%$ .
Vibration: - Total resistance value variation - No mechanical and electrical damage	10 Hz to 2,000 Hz 20 G Below $\pm 2\%$ .
Shock: - Total resistance value variation - No mechanical and electrical damage	50 G 7 mS Below $\pm 1\%$
Moisture resistance: - Total resistance value variation - Insulation resistance	40 $^{\circ}\text{C}$ 95% RH 120 hours Below $\pm 10\%$ Over 10 M $\Omega$
Life expectancy	500,000 cycles
Total resistance value variation	Below $\pm 10\%$ against initial value

## Switches

Contact resistance	Max. 100 m $\Omega$
Switching current	Max. 100 mA at 30 V DC resistive load
Dielectric strength	1500 V AC to ground 1 minute
Life expectancy	Min. 100,000 operations
Insulation resistance	100 M $\Omega$ at 500 V DC
Humidity	Max. 85%

## Weight and Dimensions

DPI	420 g
DDPI	1760 g



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PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S	
Component: type & version DPI-E-68 INDICATOR (NO) M20 GLAND Material no.: 160B4171 Alt.: 1				Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.				Page 1 of 2	
Document numbers referred to: 160B9045					
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0001		ACTUATOR F. POSITION INDICATOR, PPS		1,000	PC
0002		COMPRESSION SPRING Ø2,5/Ø0,4*13		1,000	PC
0003		COMPRESSION SPRING Ø8/Ø1*22,5		1,000	PC
0004		SPRING STOP F. POSITION INDICATOR, PPS		1,000	PC
0005		FIXTURE F. POSITION INDICATOR, PPS		1,000	PC
0008		SCREW Ø1.8 * 9 for plastics		4,000	PC
		MICRO SWITCH		2,000	PC
0010		PIN CuZn39Pb3 (W.no.2.0401)	L05	4,000	PC
0011		CONTACT CARRIER POM-C	P01	1,000	PC
0012		SET SCREW/CUP POINT M3X4 X5CrNiMo17 12 2 (W.no.1.4401)	7A4	4,000	PC
0013		O-RING Ø27,3X2,4 NBR 70	NBR	1,000	PC
0018	160B4497	UNION NUT FOR POSITION INDICATOR CuZn39Pb3 (W.no.2.0401)		1,000	PC
0019		LOCKING RING Ø20 W.no.1.1248	Y05	1,000	PC
0005		HOUSING F. POSITION INDICATOR CuZn39Pb3 (W.no.2.0401)	L05	1,000	PC
0021		O-RING Ø19,1X1,6 NBR 70	NBR	1,000	PC



**PARTS-, SPARE & MATERIAL LIST**Emerson Process Management  
Marine Solutions  
Damcos A/S

Component: type &amp; version

DPI-E-68 INDICATOR (NO) M20 GLAND

Material no.:

160B4171

Alt.: 1

Aaderupvej 41  
DK-4700 Naestved  
Denmark

T +45 5578 7200

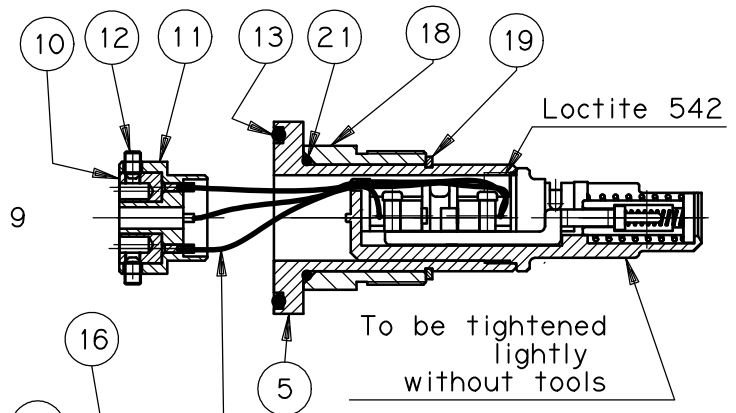
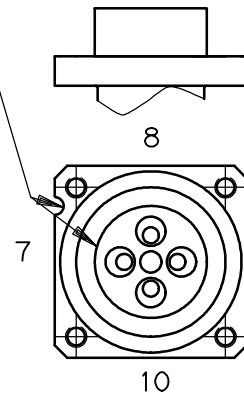
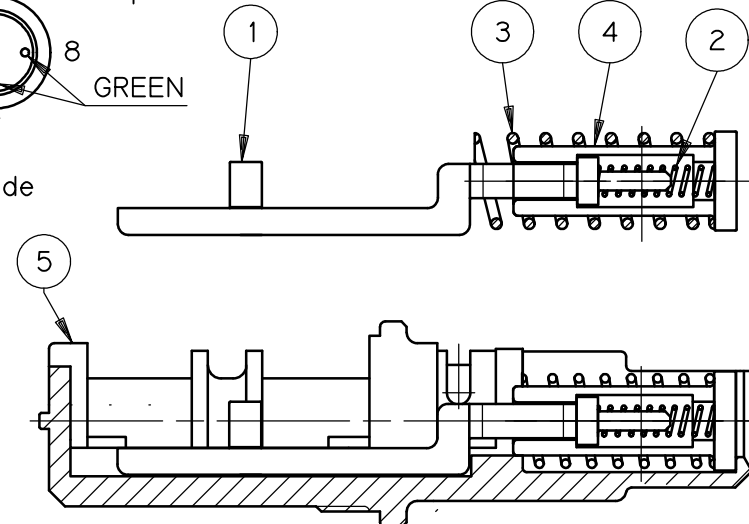
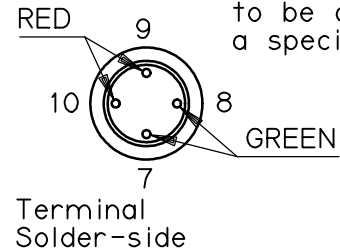
F +45 5578 7272

Page 2 of 2

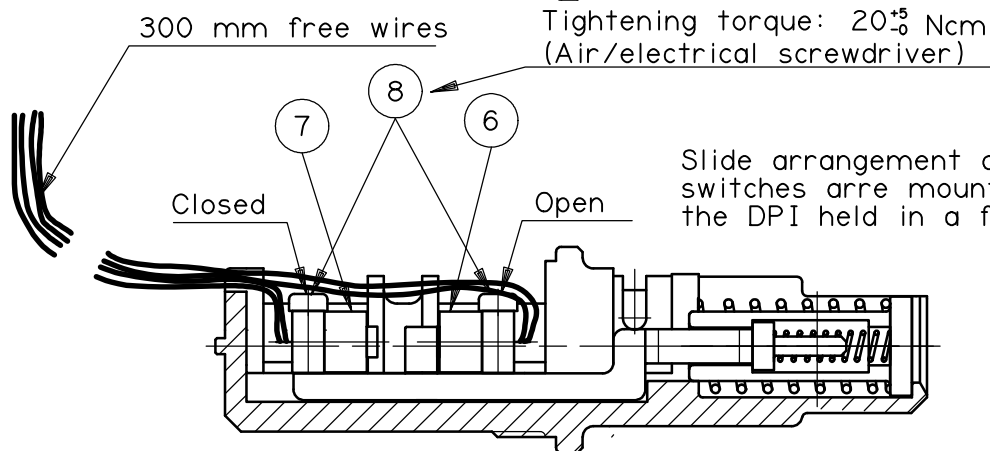
Refnr	Material	Description/ Compound	CTM No.	Quantity	Unmsr
0014	160B4495	CONNECTION HOUSING		1,000	PC
0015	251-1538	SCREW M4X40 X5CrNiMo18 12 (W.no.1.4436)	7A4	4,000	PC
0016		PLUG M16*1.5 MS	8717.08	1,000	PC
0017	355-0971	CABLE GLAND M20*1.5,8-15MM	1000.20	1,000	PC
0030		PLATE FOR INDICATION, 27*34		1,000	PC

Slide arrangement  
to be assembled in  
a special tool.

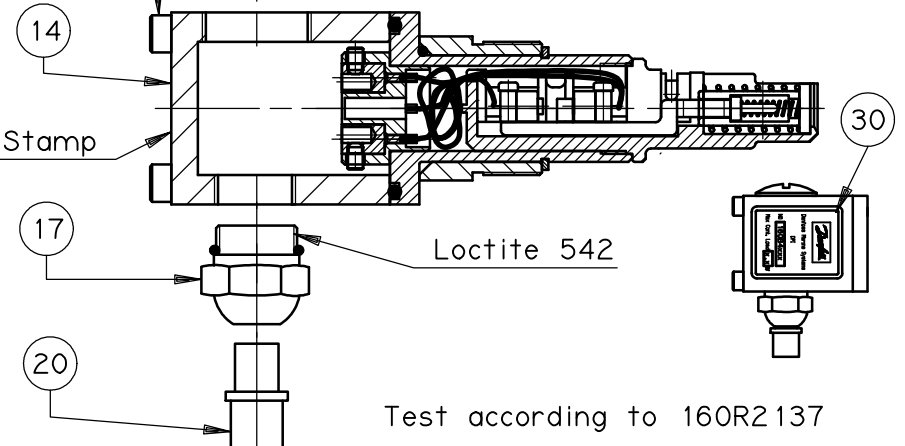
NOTE orientation of  
the Contact carrier



Wires are shortened the most,  
so soldering is still possible.

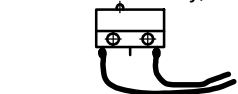


Date Stamp

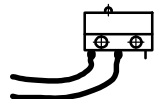


NO og NC versions:

(OPEN and CLOSED switches are always  
connected identically)



Normally  
Closed



Normally  
Open

Terminal: 7 8 9 10

Green

Red

"OPEN"  
SWITCH

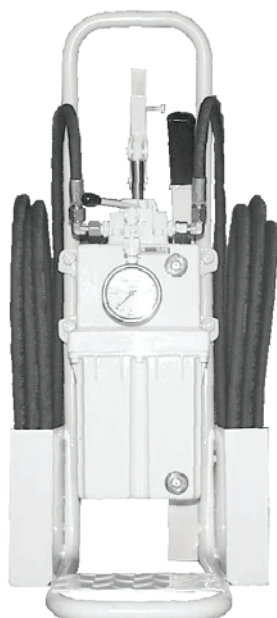
"CLOSED"  
SWITCH

MAX. CONT. LOAD 2,5 W.  
INSULATION TESTED TO 1000 V.

		MATR. ID-NO.:		DESIGNATION/DIM.:				NUMBER:		UNIT:		MATR. QUALITY/SURFACE TREATMENT:					
ORDER NO.:		QUANTITY		THIS PRINT IS PROVIDED ON A RESTRICTED BASIS. THIS PRINT IS TO BE RETURNED UPON REQUEST. IT IS TO BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS EXPRESSLY PROVIDED AND IS NOT TO BE COPIED IN ANY MANNER, NOR INFORMATION TAKEN THERE FROM TO BE PASSED ON TO OTHERS WITHOUT THE EXPRESSED PERMISSION OF DAMCOS A/S. IT IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO DAMCOS A/S.													
IF NOTHING ELSE SPECIFIED (GENERAL INFORMATION):				SCALE:		DESIGN:		REV.	SEE LOC.	ALTR. NO.	DATE		SIGN	CHECK	APPR.		
NOMINAL DIM. OVER TO		TOLERANCE ISO 2768		SURFACE ROUGHNESS Ra =		FIRST ANGLE PROJECTION ISO METHOD E		.	O			010808		UDA	UDA		
0.5 - 6		± { 0.1		.		2:1		REPLACES:				010913		UDA	UDA		
6 - 30		0.2				(1:1)		.				020409		UDA	UDA		
30 - 120		0.3						REPLACED BY:				040720		UDA	UDA		
120 - 315		0.5										050912		UDA	UDA		
315 - 1000		0.8										6409		051129	UDA	UDA	
				DIMENSIONS IN MM UNLESS OTHERWISE STATED		ID-NO:		TOTAL WEIGHT:				6409		051129		UDA	UDA
								KG									
				DESCRIPTION:		Position Indicator DPI-E assembly											
						PAGE: /											
						DRWG. NO.: 160B9045											

# **Damcos PHP 25-05**

Portable hand pump unit 5 l



## General description

Double-acting portable hand pump incl. 5 l. reservoir and built-in 4/3-way pilot valve for opening and closing of valves mounted with actuators or LPU.

The pump is mounted with female screw connections, which fit the male part mounted on LPU connection or mounting blocks.

This hand pump can be used in different ways:

As portable, where it can operate actuators and LPUs in different areas of the vessel.

As firmly mounted, with tank mounted on the bulkhead - specially for large actuators, for more details contact Emerson Process Management.

As filling device for LPUs and Actuators.

## Operation for Actuators

### In a 2-line system (double acting)

Opening of valve:

- Close the stop valves on the control block mounted on the actuator.
- Connect the hoses "B" and "A" to the emergency control block (e.g. CB-block) mounted on the actuator.
- Turn the pilot valve on the hand pump to "open" position and continue to pump until the actuator or pressure gauge for nominal working pressure 135 bar.
- The valve is prevented from closing when the pilot valve is placed in centre position.

Closing of valve:

- Turn the pilot valve on the handpump to "closed" position - otherwise as above.

### In a 1-line system (single acting)

Opening of valve:

- Only hose "B" is used - otherwise as above.

Closing of valve:

- Turn the pilot valve on the hand pump to "closed" position. The actuator/valve closes without pumping.

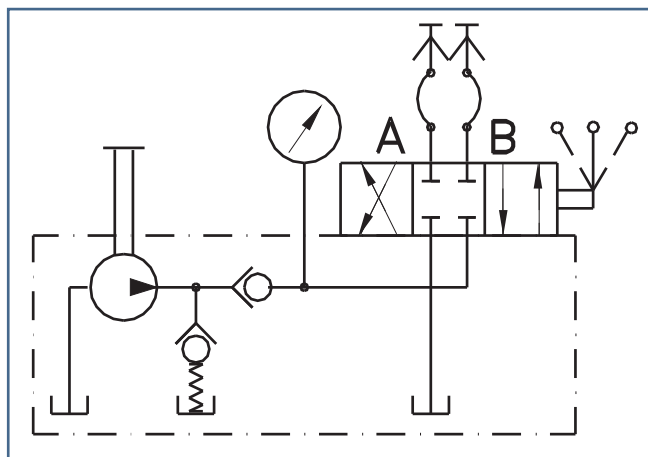
#### Note!

After operation disconnect the hoses from the control block on the actuator and open the stop valves again.

## Main Data

Max. system working pressure:	135 bar - 1960 lbf/in <sup>2</sup>
Max. system test pressure:	205 bar - 2970 lbf/in <sup>2</sup>
Max. hand pump pressure:	300 bar - 4300 lbf/in <sup>2</sup>
Safety valve settings:	180 bar
Weight with 5 l. oil:	20 kg - 44 lbs
Material:	aluminium, painted steel and rubber hoses
Oil displacement per double stroke:	25 cm <sup>3</sup> - 1.525 in <sup>3</sup>
Oil viscosity range:	15 - 300 cSt
Temperature range:	-15°C to 80°C - 5°F to 176°F
Recommended oil filtration:	Should meet or be better than NAS 1638/10 or ISO Solid contaminant code 21/19/16
Standard hose:	4 m, other hoses on request

## PHP Hydraulic Diagram



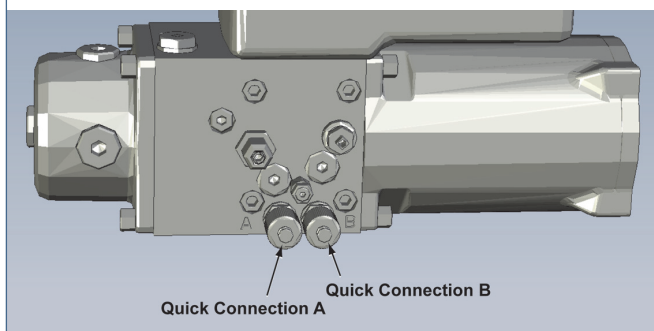
## Oil Filling

Only cleaned oil must be added to the hand pump.

For more details, see our oil filling instructions.

## Operation for LPU/Actuator

### Manual / Emergency operation of double acting LPU/Actuator



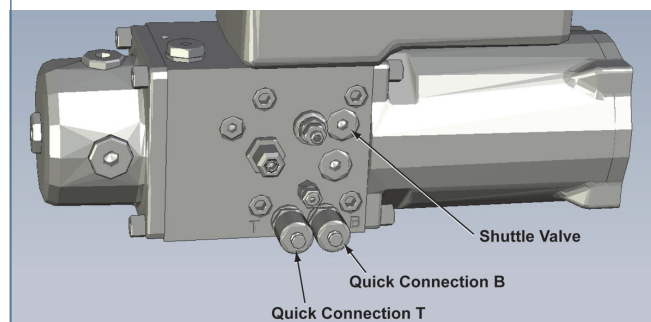
#### OPEN:

1. Connect hand pump B hose with B-line quick connection at the LPU.
2. Connect hand pump A hose with A-line quick connection at the LPU.
3. Turn the pilot valve on hand pump to "open" position and continue until the actuator or pressure gauge for nominal working pressure 135 bar.
4. Valve is prevented from closing when the pilot valve is placed in center position.

#### CLOSE:

1. Turn the pilot valve on the hand pump to "closed" position - otherwise as mentioned above.

### Manual / Emergency operation of single acting LPU/ Actuator



#### OPEN:

1. Connect hand pump B hose with B-line quick connection at the LPU.
2. Connect hand pump A hose with T-line quick connection at the LPU. With suction to T and pressure to B the shuttle valve will change over and prevents the oil from flowing to tank.
3. Turn the pilot valve on hand pump to "open" position and continue until the actuator or pressure gauge for nominal working pressure 135 bar.
4. Valve is prevented from closing when the pilot valve is placed in center position.

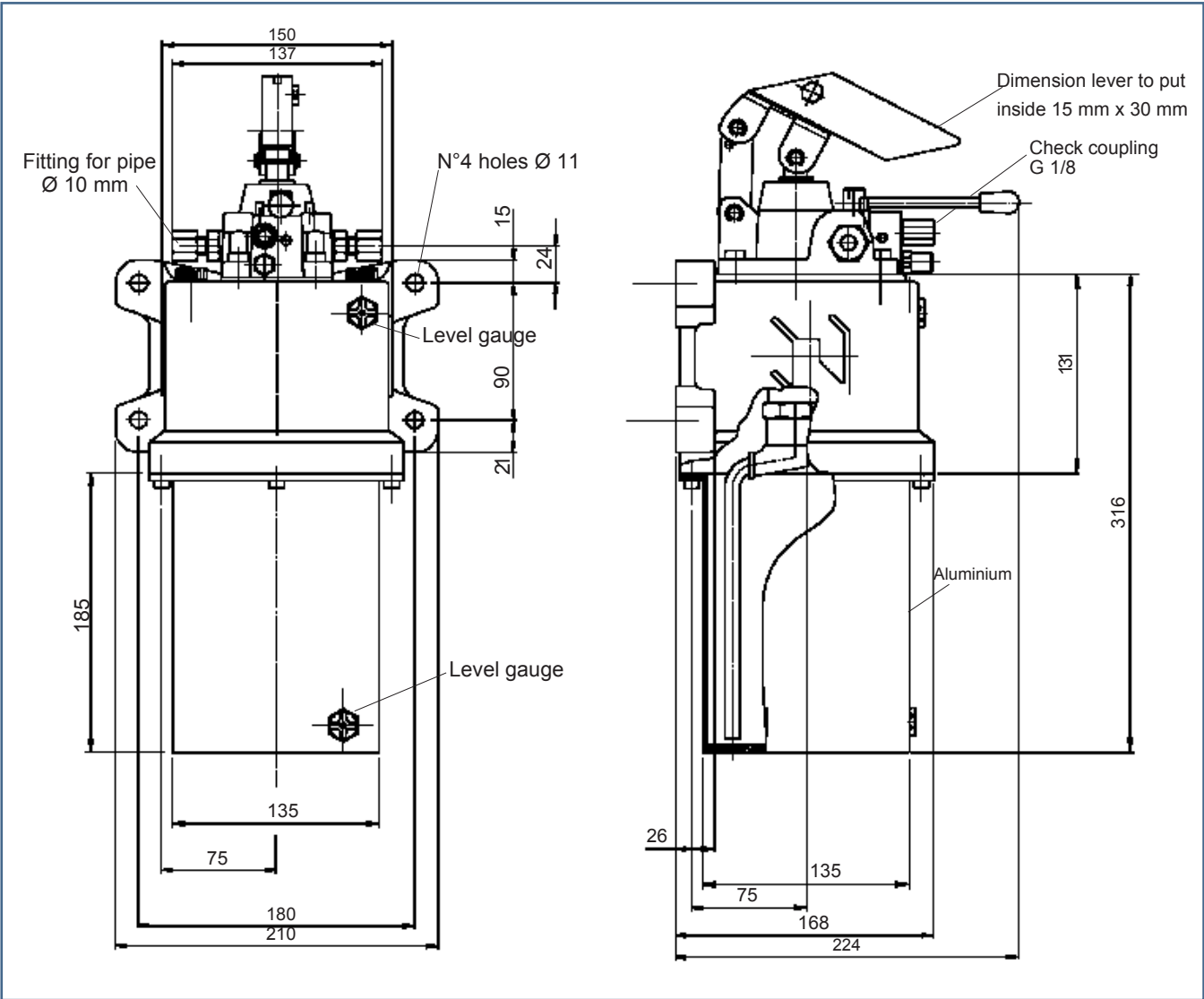


#### CLOSE:

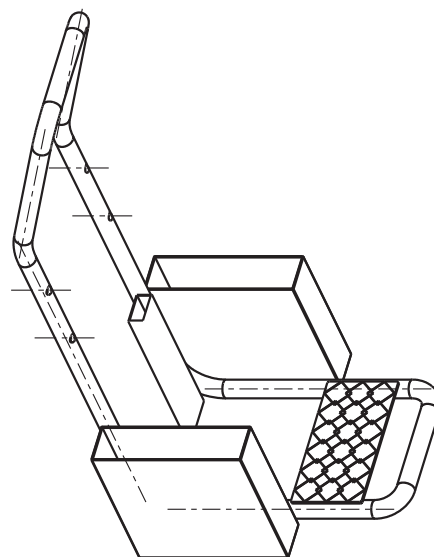
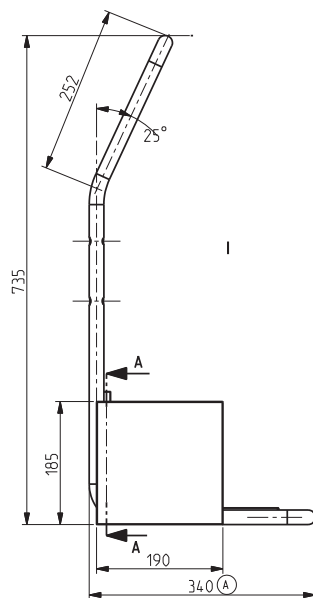
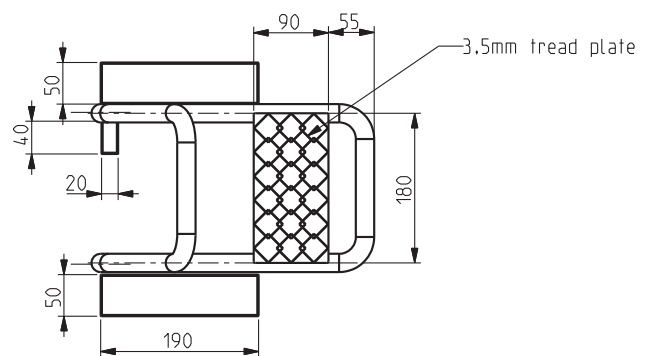
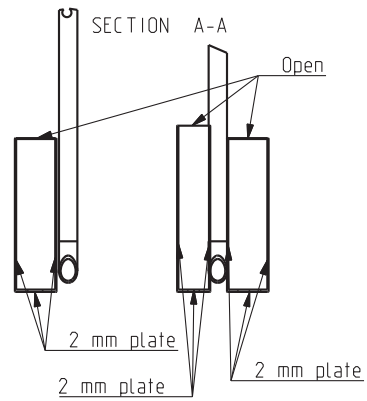
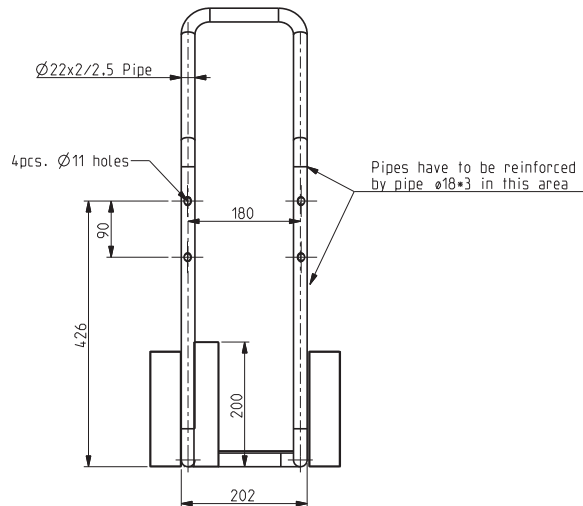
1. Hose could be removed or handle placed in "remote" position.
2. To close - open the bypass valve on the actuator.
3. Close the bypass valve after operation and remove the hose if not already done.

# Main Dimensions

## Hand pump



## Console



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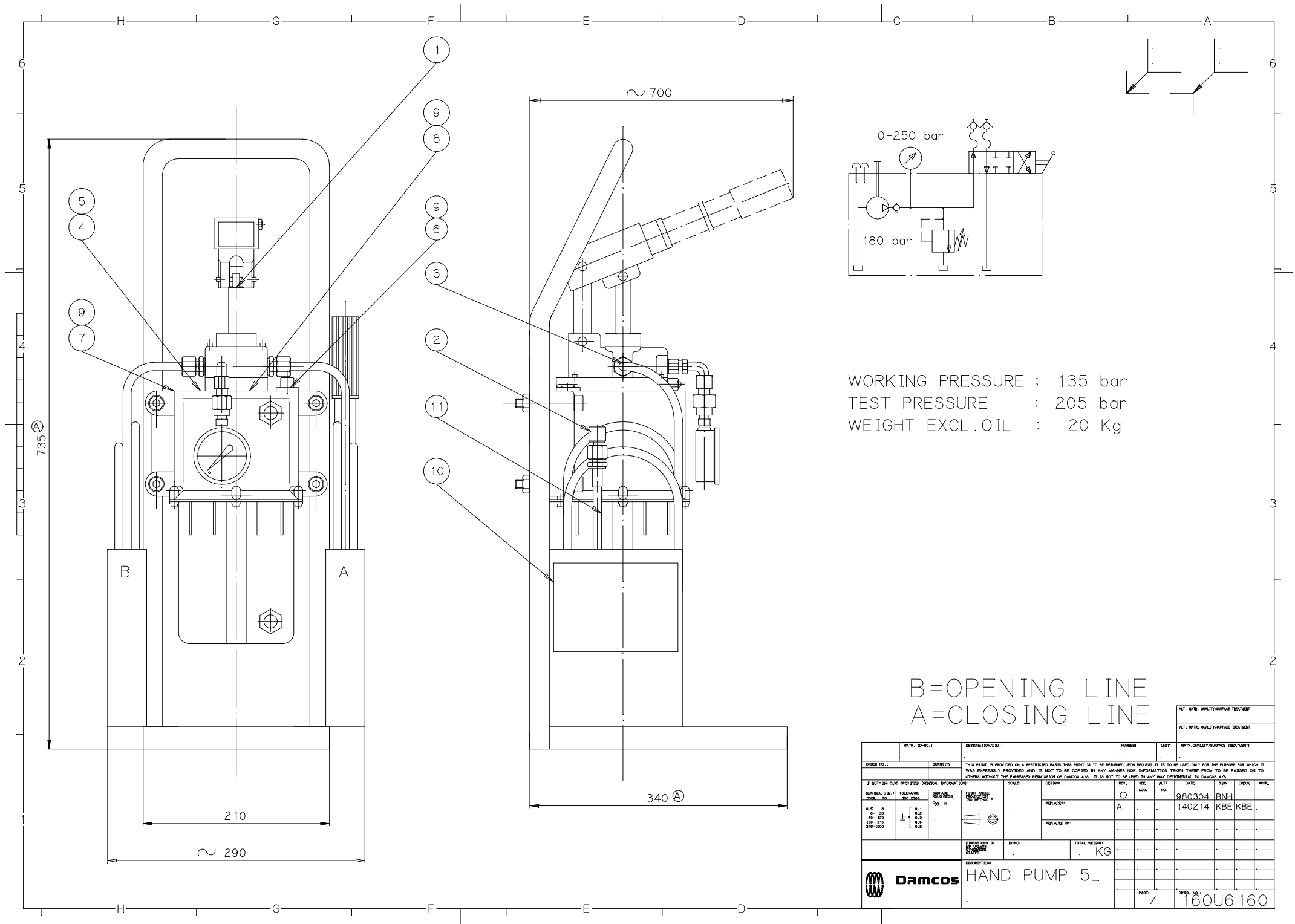
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PARTS-, SPARE & MATERIAL LIST				Emerson Process Management Marine Solutions Damcos A/S	
Component: type & version <b>PORTABLE HANDPUMP 5L-4M</b> Material no.: <b>160U7520</b> Alt.: 1				Aaderupvej 41 DK-4700 Naestved Denmark T +45 5578 7200 F +45 5578 7272	
Notes: All items with stated material number can be purchased as spare parts. When ordering spare parts: please state material number.				Page 1 of 1	
Document numbers refered to:				160U6160	
Posnr	Material	Description/ Compound	CTM No.	Quantity	Unit
0000	160U5230	COMMON PARTS 5L HP W. STATIV	*P	1,000	PC
0011	160U7521	HYDR. HOSE 1/4 INCH *4M		2,000	PC

Printed 18.07.2014



## **Final Documentation**

Astilleros de Murueta

Newb.No. 307

DKMS No. 131985

### **Instructions**

#### **Instructions for Actuators**

Emergency operation of BRC – BRCF actuators

instruction

160R2174

BRC Dismounting Instruction

instruction

160R2176

# Instruction 160R2174

## Emergency operation of BRC - BRCF actuators

Oil pressure loss necessitates emergency operation of the actuator.

The actuators are divided into 2 groups.

BRC 125 – BRC 500 can be opened by emergency operation key.

BRC 1000 - BRC 16000 shall be emergency operated by hand pump.

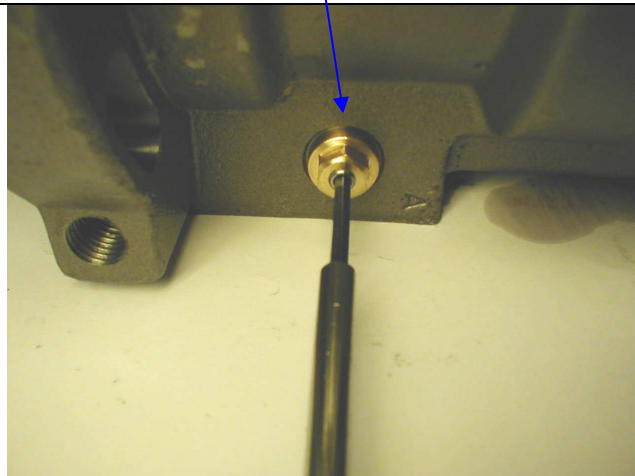
Emergency operation of BRC 125 – BRC 500 by emergency operation key.



Open the crossover valve by turning .  
counter-clockwise.



Use the emergency operation key for opening  
the crossover valve.



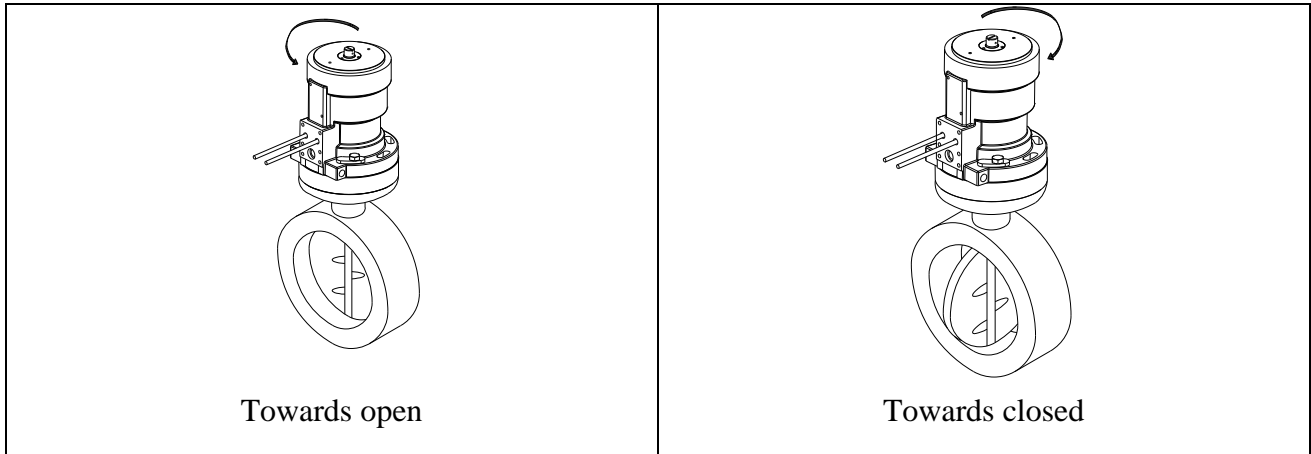
Opening the crossover valve



Emergency operation key on actuator.

Now the actuator can be emergency operated.

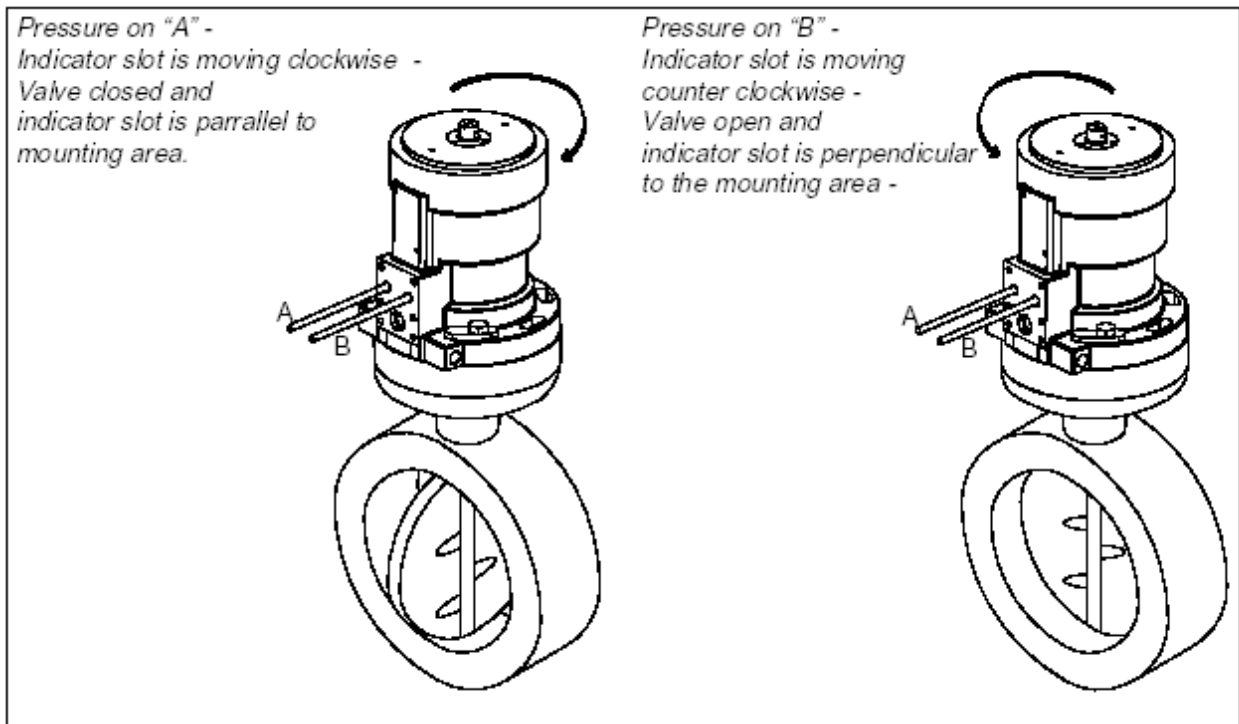
## Instruction 160R2174



Fix the emergency operation key on the end of the shaft for turning it.  
After emergency operation by key the crossover valve is closed.

### Emergency operation by hand pump BRC 1000 – BRC 16000

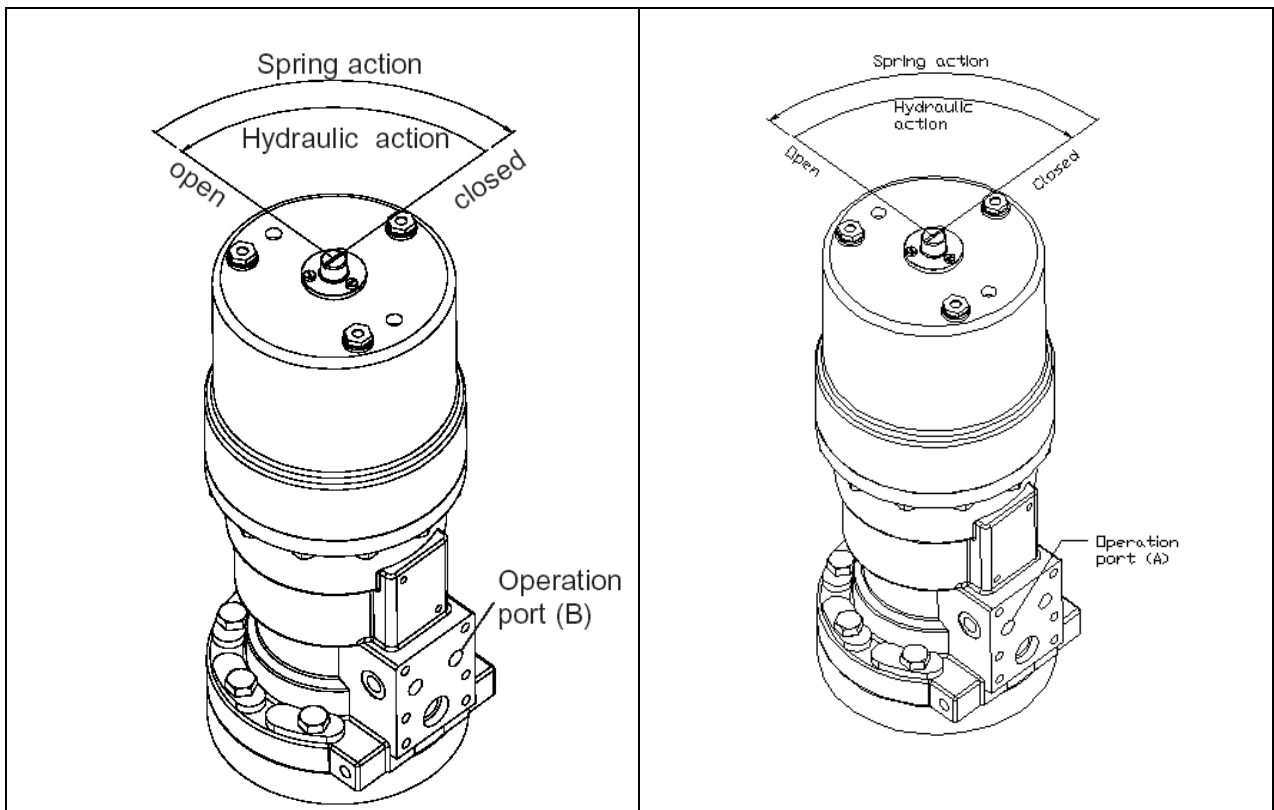
Connect the hoses, via quick connections, A to port A and B to port B.  
Select on the hand pump whether to operate towards open or closed.  
Pump with the hand pump until the required position is reached.



## Emergency operation by hand pump

The BRCF actuator closes when operation port is not pressurized.  
The BRCF actuator shall be emergency opened by hand pump.  
From the hand pump the hose marked B is connected to port B via quick connections.  
The pump is operated until the required position is reached.  
The hose on port B is dismantled to maintain the position.

BRCF xxxx FO and BRCF xxxx FOMLO are connected to port A.



Hose marked B is connected to port B.

Hose marked A is connected to port A.

Standard BRCF xxxx spring closing.

BRCF FO, FOMLO spring opening..

# Instruction 160R2176

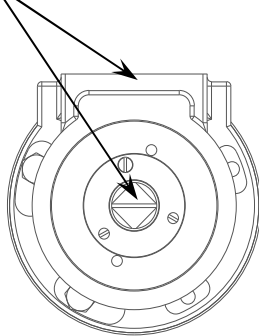
## BRC Dismounting Instruction

Before disassembly the actuator is emptied of oil.

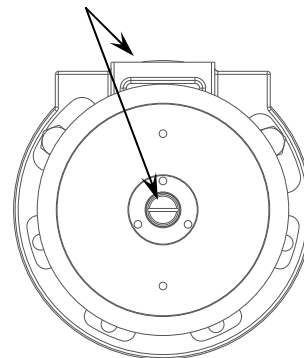
Empty the actuator of oil by turning it a few times into open and closed position.  
On small sizes a key is used, and on the large actuators compressed air is used for turning the actuator.

Before disassembly the actuator is turned into closed position; i.e. the groove on the shaft has to be parallel to the port surface. See pictures.

Shall be parallel for closed pos.



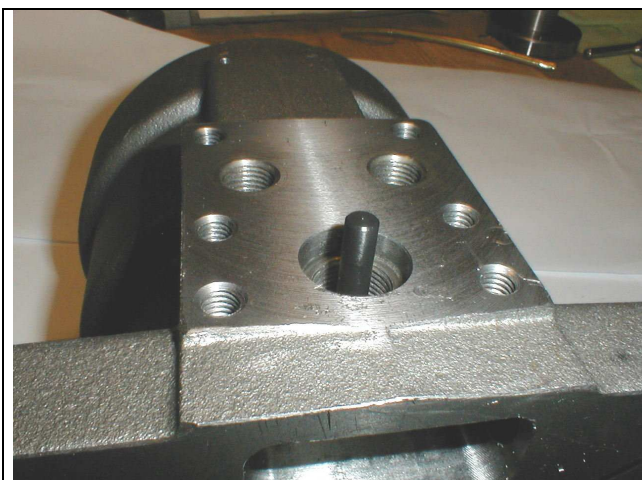
Shall be parallel for closed pos.



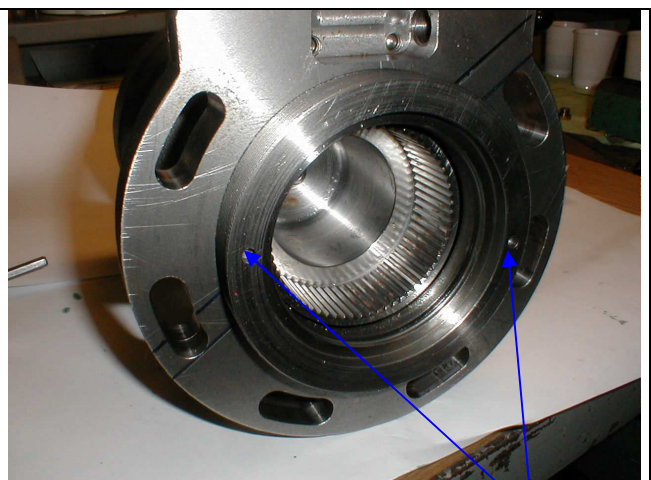
BRC 125 – BRC 500 are operated by key.

BRC 1000 – BRC 16000 are operated by compressed air.

## Disassembly of actuator



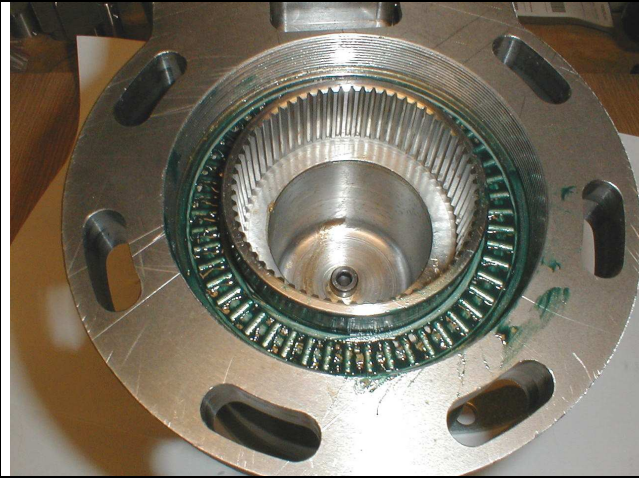
Yoke is dismantled.



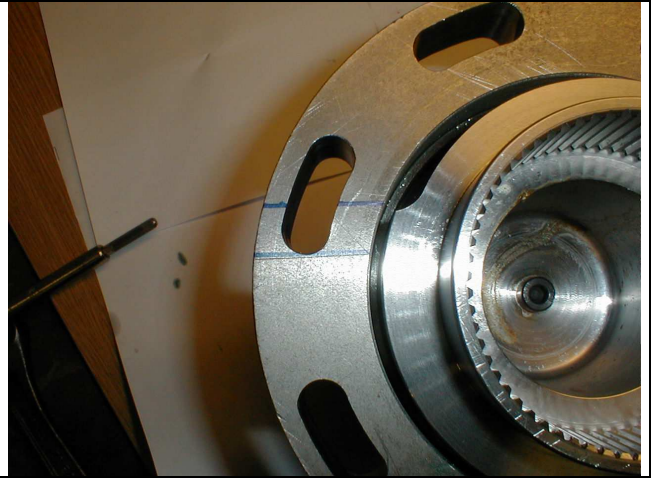
The bottom cover is dismantled.  
Use special tools or 2 pins fitting the holes in the bottom part.  
Turn counter-clockwise to loosen the bottom part.



## Instruction 160R2176



The spline shaft incl. Thrust gage is dismounted.



The spline shaft is dismounted by knocking the pos. shaft with a nylon hammer.  
The spline shaft and the housing are marked.



The spline shaft is dismounted.



The top part is dismounted.  
Use special tools or 2 pins fitting the holes in the top part.  
Note: Turn clockwise to loosen the top part.



# Instruction 160R2176

## Specially for B1 version

The actuators have been modified and so there is also a spline connection in BRC/BRCF 1000 to BRC/BRCF 16000.

BRC/BRCF 125 to 500 are assembled with screws as always.

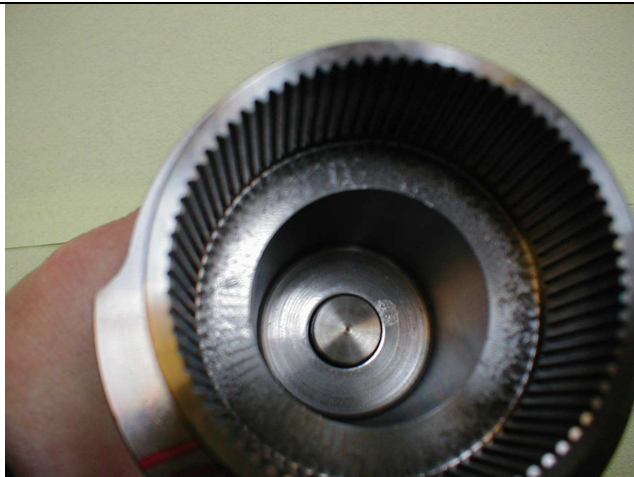
BRC/BRCF 1000 to 16000 are assembled with locking ring.



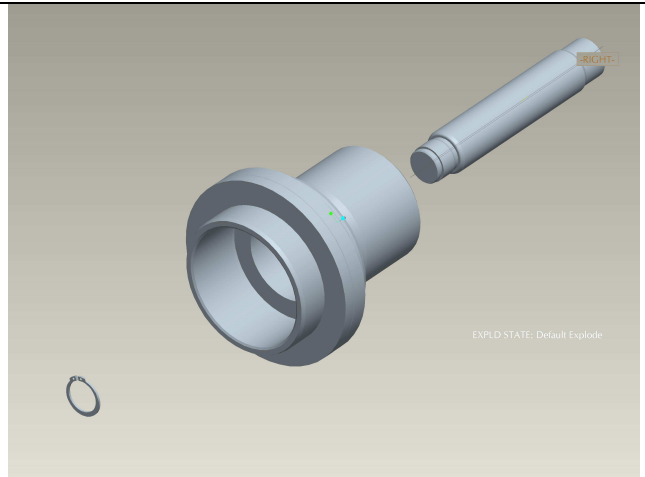
New spline connection.



The large actuators are locked with Seeger ring.



Pos. shaft, mounted in splined shaft.  
Ready for Seeger ring mounting.

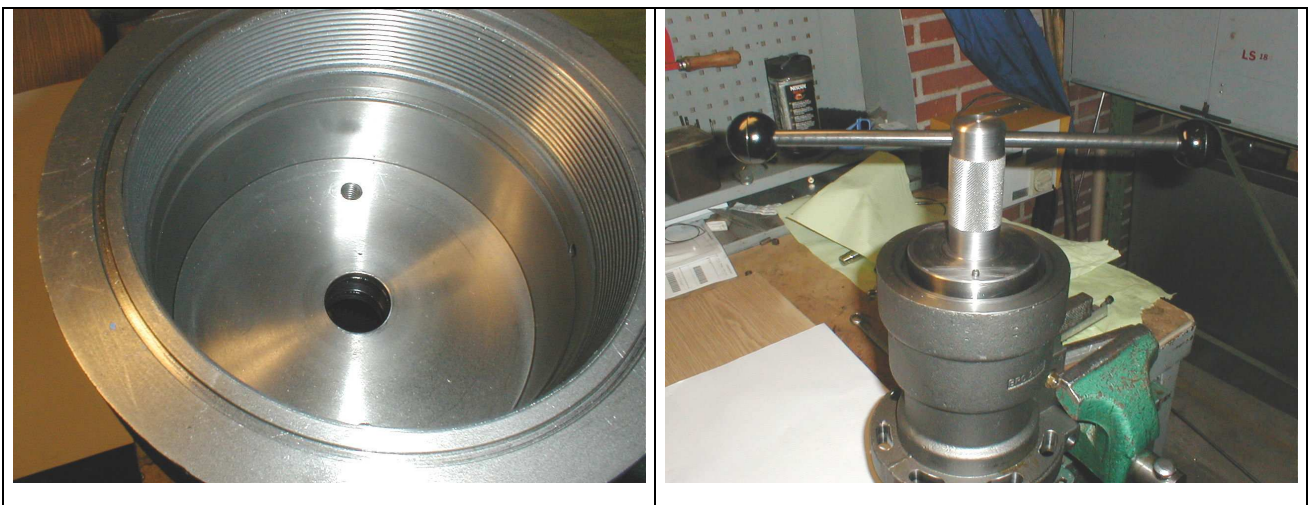


Pos. shaft is mounted in splined shaft.  
Seeger ring is mounted.  
Remember positioning of splined/pos. shaft.  
(160R2177 page 6 and 7).

## Instruction 160R2176



The top part cover is removed for replacement of O-ring.

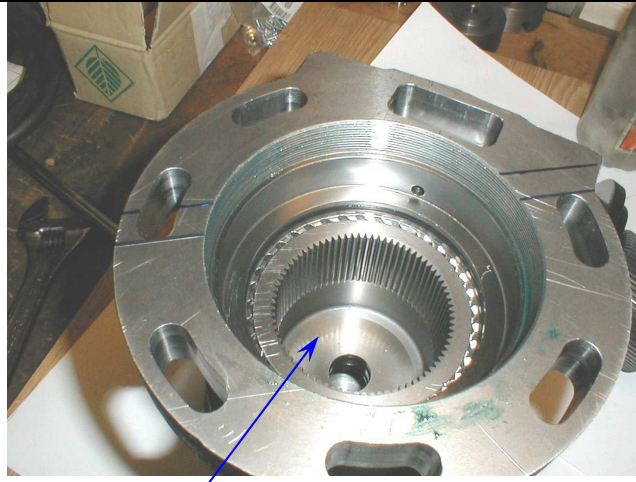


The piston is dismounted.

The piston can be dismounted with special tools  
or by knocking the bottom with a cylindrical  
pipe.  
Turn the piston counter-clockwise.



## Instruction 160R2176

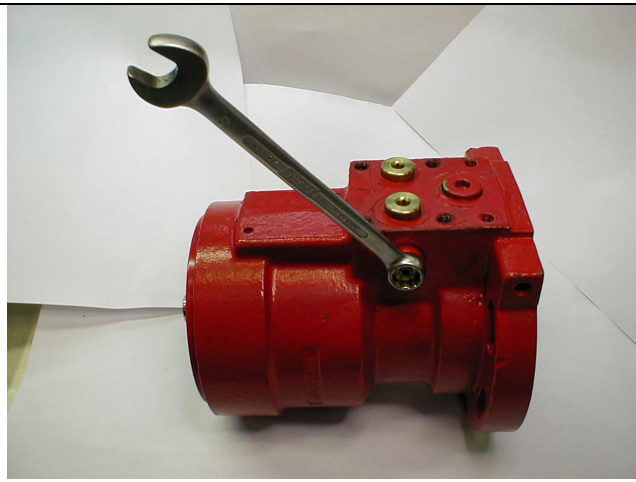


Knock as indicated to dismount the piston.  
The piston and housing are marked.

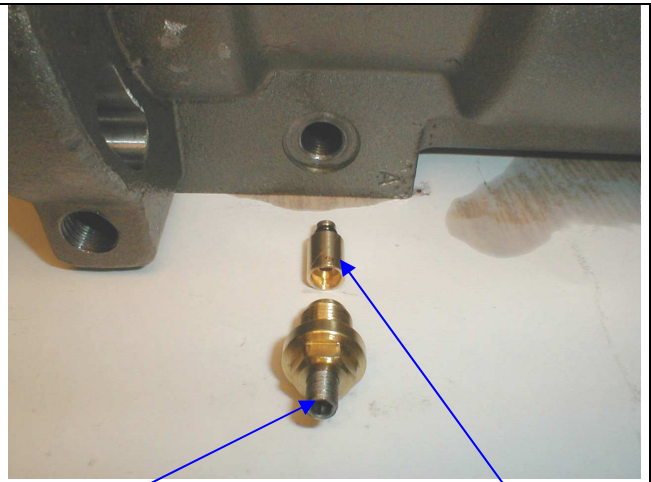


The piston is dismounted.

### Dismounting of crossover valve



The crossover valve is dismounted..



The spindle shall be tightened for the valve seat  
to be drawn out at dismounting.  
Note: If the valve seat does not come out the first  
time, the housing is mounted again and the  
spindle is tightened whereupon the housing is  
unscrewed together with the valve seat.

For mounting see Instruction 160R2177 Danish / 160R2178 English