



Hydraulic grab – 6400 cm<sup>2</sup>

12.500

Manual

**KC** Denmark A/S

Research Equipment  
Limnology • Oceanography • Hydrobiology

## Hydraulic Grab – 6400 cm<sup>2</sup>



**This hydraulic grab is very dangerous in unskilled hands, and you must take serious precautions to avoid accidents.**


**KC Denmark A/S is not, and cannot be held, responsible for any damage(s) made to equipment or to operators who ignore safety precautions or because of misuse or wrong operation.**




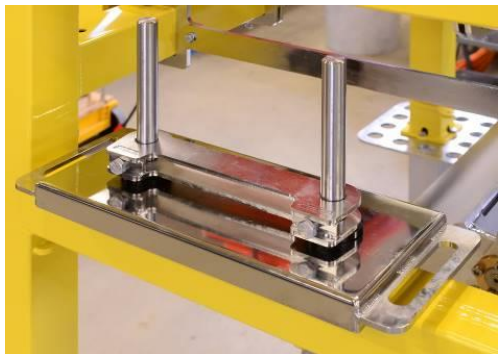
**The open construction does not allow adding security measures so you must keep a safe distance to all movable parts when operating or testing the grab.**


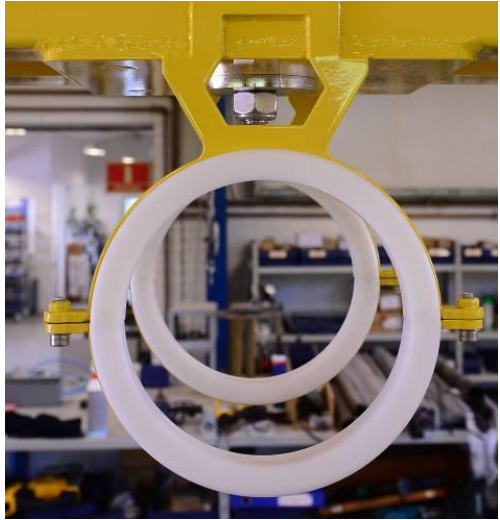
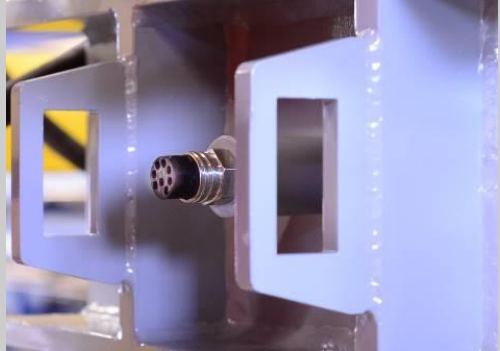
**Persons charged with operating the grab and its accessories shall be trained specially for the purpose with special abilities and experience in this area as well as being equipped with the appropriate tools and individual safety equipment. Failure to meet these requirements constitutes a risk to personal health and safety and economic damages.**

**When working on the unit in areas, which are difficult to access or hazardous, ensure that you take adequate safety precautions for the operator and others in compliance with the provisions of law on health and safety at work.**

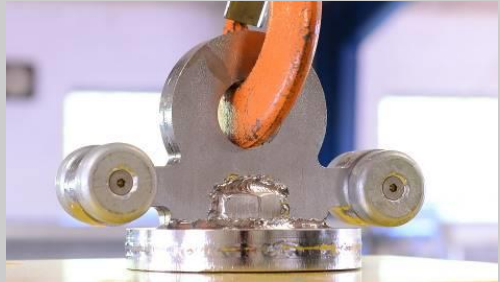
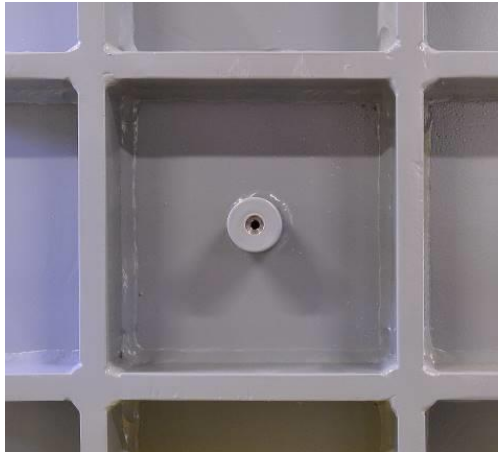
**Never walk under the grab, when lifted by the winch.**

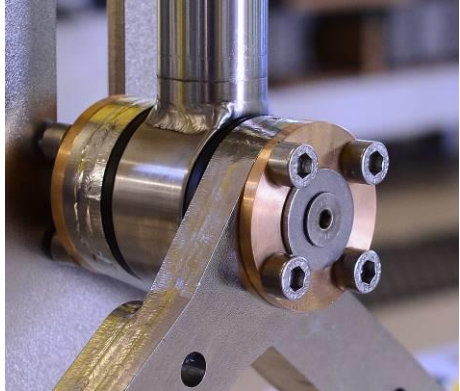
Item	Preparation	
1	<p>Check that the setting of the voltage switch on the charger's underside corresponds to actual AC power supply, see item 2. As standard, it is preset for 230 V AC.</p> <p>The charger can be used for 115/230 V AC.</p> <p>The microprocessor-controlled charger provides you with a fully automatic, hands-off charging you will never need to fear overcharging or undercharging.</p> <p>Grease all connectors with Molykote 44 Medium before every mating; see page 20-22 for more details.</p>	


2	Voltage switch for 115/230 V AC.	
3	The grab comes with 2 deep-sea batteries, 24 V/40 Amp/h each. The batteries are connected in parallel to achieve a higher capacity.	
4	<p>Charge the two deep-sea batteries one by one. Each battery has its own Subconn connector; unplug the Subconn and connect it to the charger.</p> <p>Grease all connectors with Molykote 44 Medium before every mating; see page 19-22 for more details.</p>	
5	Add a suitable qty. of lead weights, each 50 kg and secure them by means of the bracket.	

6	<p>The frame has several brackets for adding lamps, camera or other accessories.</p>	
7	<p>The grab has POM brackets for adding the Nexus system.</p>	
8	<p>The internal wiring of the Subconn corresponds to MacArtney's Nexus system and has connections for the open/close functionality of the grab.</p> <p>Please refer to the schematic, page 6.</p> <p>Grease all connectors with Molykote 44 Medium before every mating; see page 19-22 for more details.</p>	



9	The frame has more zinc anodes for reducing corrosion when used in salt water.	
10	If you open the chamber for the hydraulic pump, please refill the chamber with Argon or a similar inactive gas. A valve is located on the rear of the chamber; remove the screw and refill via the valve.	

<b>Storing and Maintenance</b>		
11	Before storing rinse with fresh water and you may apply a thin oil, WD-40 or like to all moveable part and bronze bushings.	

<b>Storing and Maintenance</b>	
<p>All parts of the item can be rinsed using salt water or fresh water. Before storing, we recommend a thoroughly cleaning with fresh water.</p> <div data-bbox="110 1703 224 1833">  <p><b>Caution</b></p> </div> <p>All maintenance, inspection and repairs must only be done by an expert maintenance technician fully familiar with the attendant hazards.</p>	

## **Safety Regulations**

KC Denmark A/S is not, and cannot be held, responsible for any damage(s) made to equipment or to operators who ignore safety precautions or because of misuse or wrong operation.

An expert maintenance technician fully familiar with the attendant hazards must only do all maintenance, inspection and repairs.

When working with the unit in areas, which are difficult to access or hazardous, ensure to take adequate safety precautions for the operator and others in compliance with the provisions of law on health and safety at work.

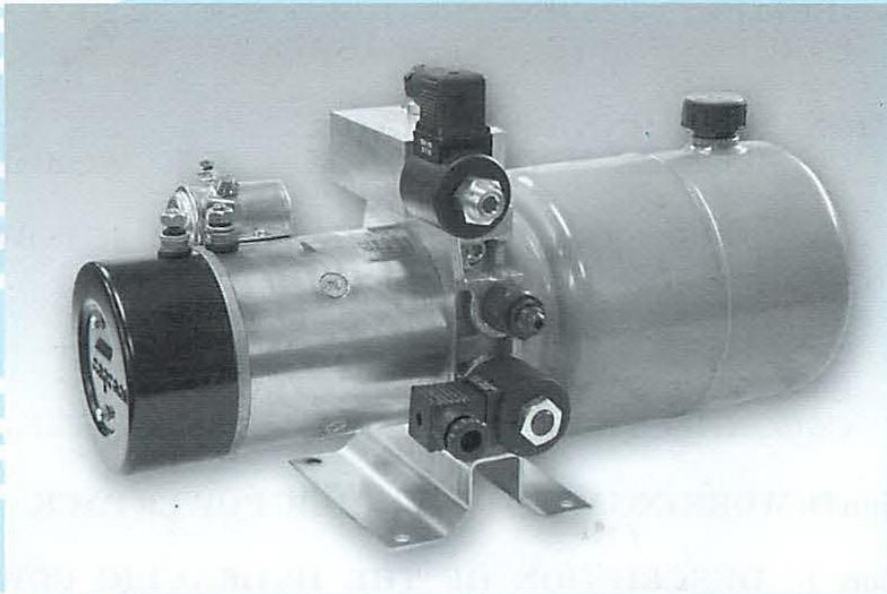
Replace worn component with original spare parts.





**Machine** Hydraulic Power Packs  
type HPP-M... and MPP-M...

## **OPERATION MANUAL**



**Attention!** Before putting the Hydraulic Power Pack into operation it is necessary to get acquainted with all the recommendations included in this Manual. The producing company does not bear any responsibility for damages occurred because of improper operation of the hydraulic power pack or constructive changes.



## CONTENTS:

### **Section A: GENERAL DATA**

- A1 PRODUCER
- A2 INTRODUCTION
- A3 CORRESPONDENCE
- A4 TYPE LABEL
- A5 FIELD OF APPLICATION
- A6 PRODUCTION CONDITIONS AND REQUIREMENTS
- A7 TECHNICAL CHARACTERISTICS
- A8 NOISE CHARACTERISTICS
- A9 WORKING LIQUID

### **Section B: SAFETY TECHNICS**

- B1 RULES FOR TECHNICAL SAFETY

### **SECTION C: MACHINE ASSEMBLY**

- C1 REQUIREMENTS TOWARDS THE WORKING AREA
- C2 TRANSPORTATION OF THE HYDRAULIC POWER PACK
- C3 DEPRESERVATION OF THE POWER PACK
- C4 SCHEMES OF THE CONNECTING PORTS
- C5 CONNECTION TO THE ELECTRIC NET
- C6 CONNECTING OF THE HYDRAULIC SCHEME

### **Section D: WORKING WITH HYDRAULIC POWER PACK**

### **Section E: DESCRIPTION OF THE HYDRAULIC POWER PACK**

- E1 TECHNOLOGICAL PART
- E2 ELECTRICAL PART

### **Section F: MAINTENANCE OF THE HYDRAULIC POWER PACK**

- F1 CLEANING OF THE POWER PACK
- F2 PRESSURE ADJUSTMENT
- F3 USUAL DEFECTS AND WAY FOR THEIR ELIMINATION



## **Section A: GENERAL DATA**

### **A1. PRODUCER CAPRONI JSC**

Bulgaria, 6100 Kazanlak; "General Stoletov" Str. Nr.45  
tel. +35943162229 fax. +35943162230  
www.caproni.bg E- mail: caproni@caproni.bg

### **A2. INTRODUCTION**

The present Operation Manual is intended for users of hydraulic power packs. It contains the necessary information for assembly, initial putting into exploitation, maintenance, correct and safety work with the hydraulic power packs.

During the compiling of this Manual the experience of the producing company and its specialists are taken into consideration. With especial responsibility it is recommended our indications to be followed up in the part treating the safety precautions during the work with the machine.

The operations requesting dismantling and assembly of the power pack and electric elements have to be implemented only by qualified and authorized specialists! The repair works and adjustments that are not included in this Manual should not be carried out!

### **A3. CORRESPONDENCE**

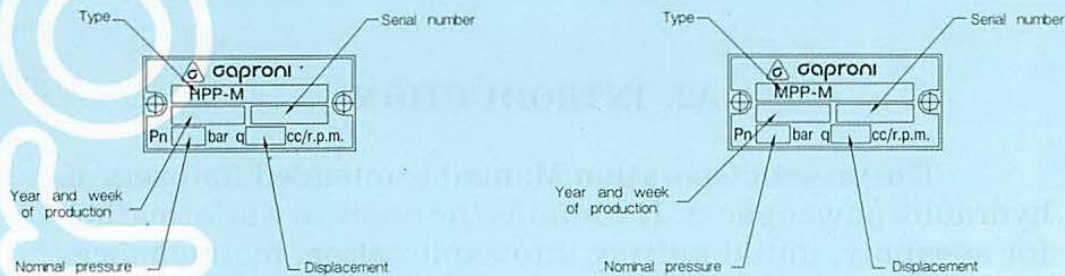
In case that a technical problem occurs, please, refer to producing factory. After correspondence or phone call with us regarding the bought power pack, please, give us the following information:

- factory Nr. of the mini-power pack
- working voltage and current frequency
- working pressure
- displacement of the pump
- date of production
- detailed description of the fault
- detailed description of the fulfilled processing
- summed continuity as hours of exploitation



#### A4. TYPE LABEL

The technical data of the power pack are marked on the labels at its valve block.



#### A5. SCOPE OF APPLICATION

The hydraulic power pack is intended for integration in hydraulic systems of construction building, transport machines, automobiles, manually operated lifting equipments and technological Equipment.

#### A6. PRODUCTION CONDITIONS AND REQUIREMENTS

The hydraulic power pack is intended to be used in covered premises as well as at open area at ambient temperature of -20 to +40°C. Air humidity up to 80%.

## **A7. TECHNICAL PERFORMANCE**

The power packs are designed and accomplished so that they produce a flow rate from 1.5 l/min to 18 l/min depending on the choice of the el. motor and pump displacement. The pressure that can be reached is from 0 to 225 bar.

## **A8. NOISE CHARACTERISTICS**

The hydraulic power pack does not emit noise higher than 85 dB in accordance to EN 60034-9.

## **A9. WORKING LIQUID**

Hydraulic oils at mineral or synthetic base with viscosity rate from 15 to 68 cSt at temperature of 40°C. Class of filtration - 9 NAS 1638.

## **Section B: SAFETY TECHNICIS**

### **B1. RULES FOR TECHNICAL SAFETY**

To work with the power pack it could be allowed only personnel that is acknowledged with the rules for exploitation of electrical equipments and equipments working under pressure.

For safety functioning of the hydraulic power pack it is necessary to be kept the following rules:

- it is not allowed an exploitation of the power pack with replaced cap of the terminal connecting box of the motor or using connectors on the coils of the solenoid valves that are not of the same type like these with which the power pack is accomplished.



- The connection has to be done from a qualified el. technician. During the connection it should be observed the direction of rotation of the electric motor (the arrow at the cover of the el. motor indicates the correct direction of rotation).
- When the hydraulic scheme is connected it should be observed its correctness. At the outlets of the power pack there are symbols - P (pressure port) and T (drain port)).
- The selection of the pipelines must be complied with the system pressure.
- The tube connectors must be fixed tightly. It should not be allowed any fluid leakage at the outer surfaces.
- It is now permitted the replacement of the air breather with plug.
- It is not permitted valves' readjustment to the higher pressure.
- The power pack must be fixed to a basement or to a stable frame.
- It is not allowed the power pack use in explosion-hazardous ambient.
- Exploitation with not enough quantity of oil may cause a damage of the pump

## **Section C: Power pack Assembly**

### **C1. REQUIREMENTS TOWARDS THE WORKING AREA**

The working area around the power pack must be free and an access to the oil filler, to the valves and the unloading throttle has to be ensured. The power packs must not be placed in closed areas that may break its cooling.

### **C2. TRANSPORTATION OF THE POWER PACK**

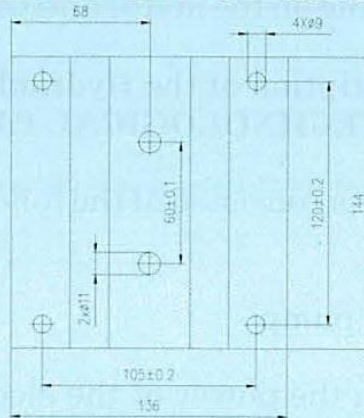
The power pack can be transported with any kind of covered transport. At its transporting it should be observed the recommendations on the carton.



### C3. POWER PACK DEPRESERVATION

The hydraulic power pack is taken out of the carton. The polyethylene packing is removed of it. The safety plugs are replaced of the supply ports.

### C4. SCHEMES OF THE CONNECTING PORTS



### C5. CONNECTING THE HYDRAULIC SYSTEM

The pipelines from the power pack are connected to the implementing organs of the machine. The hydraulic scheme is in **Application 1**. Each Power pack is attached by **Application 1**. After the final installation of the power pack, the working liquid is poured in the tank to the indicated level.

### C6. CONNECTING TO THE ELECTRIC POWER NET

The cap of the motor terminal connecting box is removed. The nuts of the terminals are unscrewed. The cable shoes are connected to the terminals. Then the nuts are screwed and reliably tighten. The motor is nullified. The cap is placed at the terminal connecting box. The coils of the solenoid valves

The connecting of the power pack to the electrical power net should be done by a certified electrician as the rules for safety work with electrical equipments should be observed.

The schemes of connecting are in **Application 2**.



## **Section D: Working with the Power pack**

The Power pack work is determined by the machine at which it is integrated. At work with the Power pack it is not allowed the presence of leakage of working fluid on the outside surfaces. The power pack is switched when the motor is supplied with the necessary voltage. The control is effected by proper combination of switching on the motor and the solenoid valves.

## **Section E: Description of the Hydraulic Power Pack**

### **E1. TECHNOLOGICAL PART**

The power pack is consisted of the following elements:

- electric motor
- valve block
- hydraulic gear pump
- tank

At switching on the power of the electric motor, it drives the gear pump by means of hard compensating connector type Oldham. The pump suctions the working liquid from the tank and directs it to the valve block and from there to the implementing organs of the machine. The pressure in the system is regulated by the valve RV08-2A(RV06-2A). By the solenoid valve EV09-2B (EV58-2B) the pressure is released and the working liquid passes through it and through the flow regulator and returns to the tank. Other hydraulic blocks can be assembled to the power pack by which the desired hydraulic scheme can be achieved.

### **E2. ELECRICAL PART**

The hydraulic power pack is assembled with:

- electric motor
- solenoid valves

The el. motor is asynchronous three phase type or mono-phase, normal implementation B14 type or constant current version without front shield. With working voltages of 12 and 24 V DC. For front shield of these motors serves the valve block.

The solenoid elements are cartridge type. Their coils can be with working voltages of 12; 24 V DC and 110; 220 V RAC. The connectors are made under DIN 43650.





## **Section F: Maintenance of the Power Pack**

### **F1. CLEANING OF THE POWER PACK**

The cleaning of the power pack is made by textile cloth without using any cleaning substances or solvents. The cloth should not left any filaments on the treated surfaces. Once yearly it is necessary the oil to be changed in the tank and the tank to be cleaned. The oil changing is done in the following way:

The pressure is unloaded in the system. The power pack is switched off from the electric installation. The pipelines are dismantled. The screws by which the power pack is fixed to the basement are unscrewed. The power pack is placed vertically on the tank and the fixing screws are unscrewed and also the tank brackets are replaced. The electric motor is placed outside together with the central block and the pump. The old oil is poured out and the internal surface of the tank is cleaned. The suction filter is also cleaned.

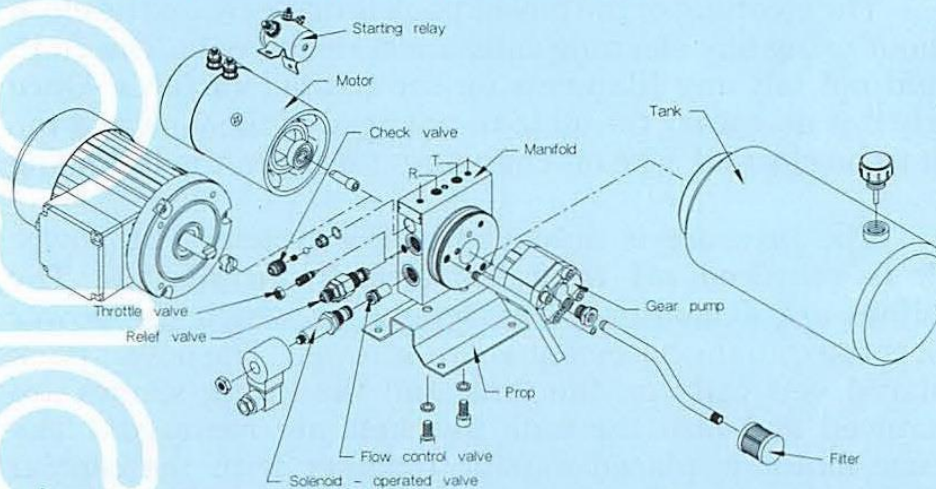
After cleaning of the electric motor with the central block they are placed on the tank. The fixing screws and the brackets are screwed. The assembled power pack is installed on its working position. The working liquid is poured up to the indicated level on the stick. The air breather must be closed firmly. The pipelines are assembled and the power pack is connected to el. net in accordance to the way of application.

**The work with dirty oil sharply decreases the time of exploitation!**



## F2. PRESSURE ADJUSTMENT

The pressure adjustment in the hydraulic power pack is realized by means of the valve RV08-2A. The pressure adjustment is effected in the following order:



A pressure gauge is installed at port „P”. The nut of the adjusting screw is unlocked. The adjusting screw is unscrewed up to its end.

The hydraulic power pack is switched on and the adjusting screw is activated until it reaches the desired pressure. Then the nut is locked.

**Attention!** The recommended pressure must not be exceeded.

## F3. USUAL DEFECTS AND WAY FOR THEIR ELIMINATION

DEFECT	REASON	Method of elimination
1. Insufficient pressure	<ul style="list-style-type: none"> <li>- Lack of oil in the tank</li> <li>- Damaged relief valve</li> <li>- Damaged solenoid operated valve</li> <li>- Damaged pump</li> </ul>	<p>The oil is filled up</p> <p>Readjustment</p> <p>Replaced with a new one</p> <p>Replaced with a new one</p> <p>Replaced with a new one</p>



2. Non-performance of the function	<ul style="list-style-type: none"> <li>- The solenoid operated valve is damaged</li> <li>- The check valve is damaged.</li> <li>- Damaged pressure relief valve</li> <li>- Damaged pump</li> </ul>	The damaged element is replaced with a new one
3. The hydro motor work is not uniform	<ul style="list-style-type: none"> <li>- Air presence in the system</li> <li>- Lack of oil in the tank</li> </ul>	Exhaust of the air  Filling up of oil

### Guarantee conditions

The producer guarantees the conformance of the product to the standard and technical documentation and its working capacity at exploitation complied with the present Manual.

**The guarantee period is 12 months since the date of putting into operation, but not more than 18 months since the purchase date.**

The producer undertakes to eliminate the defects, occurred because of his fault.

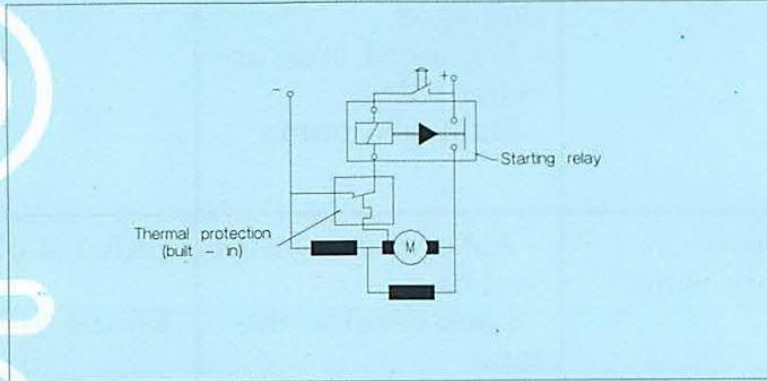
The guarantee conditions are not be carried out, if the user has made a repair work without permission and has not kept the clauses of the present Manual.

The guarantee engagements of the producer will be implemented in his factory or in authorized by him services.

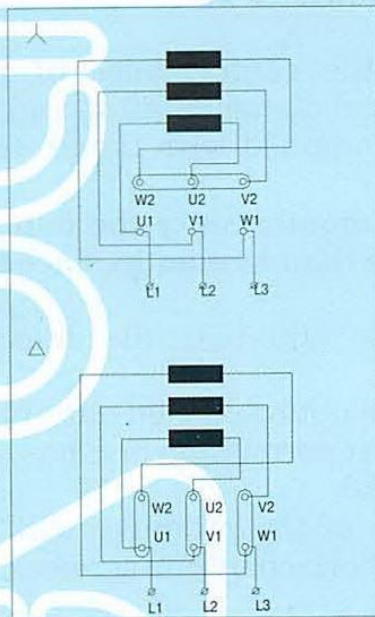
**Claims are accepted only in cases of returned products in unchanged condition.**

## Application 2

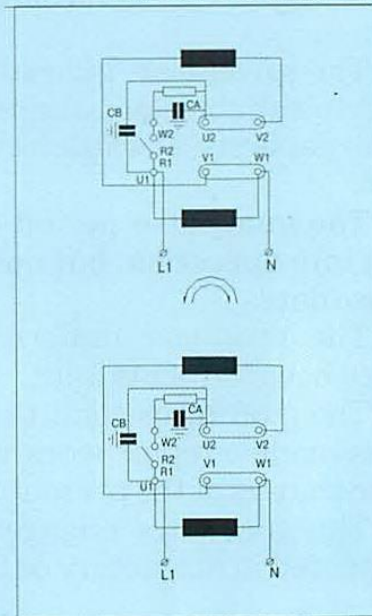
DC Motor circuit diagram



AC Motor circuit diagram 220/380V



AC Motor circuit diagram 220V



April 2013



# SubConn® handling instructions

Follow these instructions carefully to ensure correct use of your SubConn® connectors.

## Handling

- Always apply grease before mating (see next page)
- Disconnect by pulling straight, not at an angle
- Do not pull on the cable and avoid sharp bends at cable entry
- When using a bulkhead connector, ensure that there are no angular loads
- Do not over-tighten the bulkhead nuts
- SubConn® connectors should not be exposed to extended periods of heat or direct sunlight. If a connector becomes very dry, it should be soaked in fresh water before use

## Untagged cable and pigtail colour coding

### 2 - 25 pin connectors (excluding 3 pin connectors):

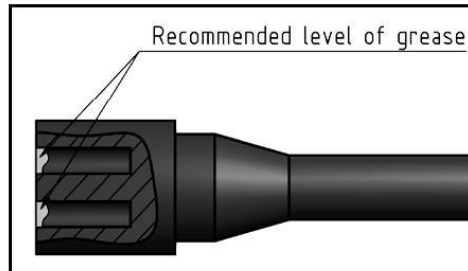
1 Black	7 White / Black	13 Red / White
2 White	8 Red / Black	14 Green / White
3 Red	9 Green / Black	15 Blue / White
4 Green	10 Orange / Black	16 Black / Red
5 Orange	11 Blue / Black	17-25 Tagged numbering
6 Blue	12 Black / White	

### 3 pin connectors:

1 Black	2 White	3 Green
---------	---------	---------

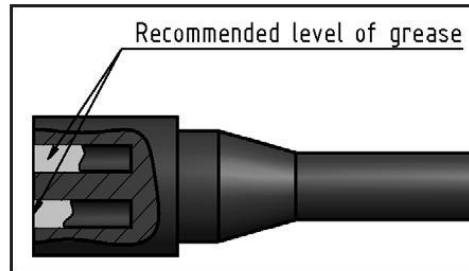


## Greasing and mating above water (dry mate)



- Connectors must be greased with Molykote 44 Medium before every mating
- A layer of grease corresponding to minimum 1/10 of socket depth should be applied to the female connector
- The inner edge of all sockets should be completely covered, and a thin transparent layer of grease left visible on the face of the connector
- After greasing, fully mate the male and female connector in order to secure optimal distribution of grease on pins and in sockets
- To confirm that grease has been sufficiently applied, de-mate and check for grease on every male pin. Then re-mate the connector

## Greasing and mating under water (wet mate)



- Connectors must be greased with Molykote 44 Medium before every mating
- A layer of grease corresponding to approximately 1/3 of socket depth should be applied to the female connector
- All sockets should be completely sealed, and transparent layer of grease left visible on the face of the connector
- After greasing, fully mate the male and female connector and remove any excess grease from the connector joint

## Cleaning

- General cleaning and removal of any accumulated sand or mud on a connector should be performed using spray based contact cleaner (isopropyl alcohol)
- New grease must be applied again prior to mating

Scan to access  
SubConn® greasing  
and cleaning  
instruction videos



## Bulkhead Connectors

### Tightening force

Type	Material	Rec. Torque - Nm
3/8" - 24 UNF	Brass, Aluminium	4,0
	Stainless Steel, Titanium	6,0
	Non-metallic (Peek)	2
7/16" - 20 UNF	Brass, Aluminium	10,0
	Stainless Steel, Titanium	14,0
	Non-metallic (Peek)	4,2
1/2" - 20 UNF	Brass, Aluminium	15,0
	Stainless Steel, Titanium	21,0
	Non-metallic (Peek)	5,2
5/8" - 18 UNF	Brass, Aluminium	29,0
	Stainless Steel, Titanium	41,0
	Non-metallic (Peek)	10,0
3/4" - 16 UNF	Brass, Aluminium	44,0
	Stainless Steel, Titanium	63,0
	Non-metallic (Peek)	15
7/8" -14 UNF	Brass, Aluminium	60
	Stainless Steel, Titanium	80
	Non-metallic (Peek)	20

### Use of Loctite

- Always use Loctite 5910 to lock non-metallic (Peek) connectors
- For locking metallic connectors, the use of Loctite 243 is recommended

For further support and advice, please contact your local SubConn® distributor or MacArtney ([www.macartney.com](http://www.macartney.com))

07-2013

<b>Technical Specifications</b>	
<b>Item</b>	<b>Description</b>
Frame with grab:	Square tube, 100 x 100 x 4 mm, AISI 316 stainless steel.
Rack, supporting wagon:	Square tube, 100 x 100 x 4 mm, AISI 316 stainless steel.
Wagon for sediment sample:	Content: 400 L. Manufactured from 2 mm AISI 316 stainless steel plate with reinforcements for adding 4 wheels.
Shovel	10 mm AISI 316 stainless steel. 40 mm pivot AISI 316 stainless steel.
<b>Hydraulics</b>	
Hydraulic pump station:	24 V DC/2 kW. Max. pressure: 175 bar.
Hydraulic cylinders:	2 pcs, Ø63/40 mm, length 557 mm. Performance 2 x 5000 kg at 175 bar.
Pressure stable housing for hydraulic pump station:	390 x 390 x 650 mm, rated for 6000 m.
<b>Batteries and charger</b>	
Type:	Sea Battery Power Module SB-24/40.
Capacity:	2 x 40 Amp/h.
Depth rating:	11000 m.
Charger:	Interacter 24 V/8 A.
<b>Dimensions and weight:</b>	
Frame, without rack for the wagon:	Without steering fin: L x W x H: 183 x 183 x 215 cm + spikes (20 cm). With steering fin: L x W x H: 280 x 183 x 215 cm + spikes (20 cm).
Rack for the wagon:	L x W x H: 160 x 185 x 55 cm.
Wagon:	L x W x H: 120 x 128 x 48 cm, inclusive handles and wheels.
Weight:	Frame with grab: 1150 kg approx.
<b>Painting</b>	
Pre-treatment:	SA 3 according to ISO 12944-4.
Filling:	2 component Polyester filling.
Sanding:	Grade 120.
Degreasing:	Degreaser for silicone.
Priming:	Percotex LA Primer, thickness 60 µm.
Drying:	Air drying, 16 hours, temperature 20 °C or 60 min. at 60 °C.
Sanding:	Grade P220-280.
Degreasing:	Degreaser for silicone.
Filler:	Percotex LA-filler, thickness 30 µm.
Lacquering:	2 component acrylic/polyurethane lacquer, thickness 60 µm.
Overall finish:	Minimum thickness of finish is 140 µm.

Rev.: December 14, 2021 - lkj



**KC** Denmark A/S

Research Equipment  
Limnology • Oceanography • Hydrobiology

E-mail: [sales@kc-denmark.dk](mailto:sales@kc-denmark.dk) website: <http://www.kc-denmark.dk/>

Holmbladsvej 17-19, DK 8600 Silkeborg, Denmark. Tel. +45 86 82 83 47

Bank: Sydbank. SWIFT: SYBKDK22 - IBAN DK5070460000104832

VAT no. DK 29 61 96 62