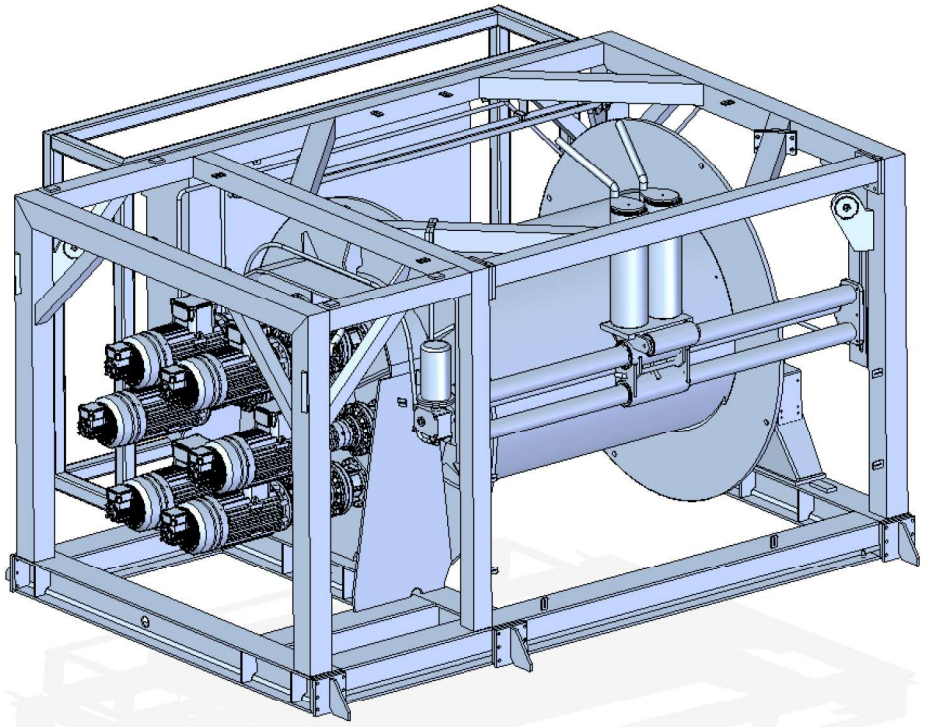
Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Winch – Basic specification



Drawing no. :

Dimensions

Design factor psi	:	2	
Design Temperature	:	T_D -20° to +40°C.	
Overall dimensions (preliminary values)	:	Depth	4160 mm
		Height (transport)	2810 mm
		Length	5200 mm
Drum dimensions	:	Core length	2400 mm
		Core diameter	1600 mm
		Flange diameter	2600 mm
Weight	:	Approx. 26 ton excl. umbilical and slip ring	

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

WINCH with 3300 m. Ø44.4 Umbilical.

Cable capacity	:	3300 m cable Ø 44.4 mm in 10 layers.		
SWL	:	215 kN		
Pull/speed	:	Pull is at 690V, 50 Hz Net Continuous performance		
	:	Pull on top layer Speed on top layer	150 0-41	kN m/min
	:	Pull on first layer Speed on first layer	215 0-29	kN m/min
AHC Performance	:	NA		
Power consumption	:	690V, 50 Hz Net, 180 Amps.		

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Construction

General	:	Self-contained all steel welded construction with drum, level wind and drive motors.
Bearings	:	Housed ferrous roller bearings.
Surface treatment	:	Degreasing Sandblasting to ISO8501-1 SA 2,5 1 x Zinc primer 70 my 1 x Priming epoxy coat 130 my 2 x Top coat polyurethane à 40 my total 80 my Total layer thickness 280 my Colour RAL - TBA Layer thickness regarded as minimum values
Level wind	:	Adjustable with APP 240 mm rollers Horizontal +/- 8 degree. Electric driven spooling gear. A stainless steel encoder is placed on the level wind trapeze guiding spindle. A motor and gear drives the spindle. Together with the encoder placed on the winch drum a PLC controls the cable spooling.
Motors	:	The winch is driven by six horizontal oriented electrical motors trough planetary gears driving a ring gear.
Brake	:	"Fail safe" hydraulic brakes mounted on winch. Hydraulic OFF / spring ON. Brake force according to DNV requirements for ROV handling.
HPU	:	Small HPU to supply pressure to brake system.
Sacrificial sea fastening clamps	:	1 set (6 off) of sea fastening clamps for welding to deck. Bolts for fastening brackets to winch foundation included.

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Electrical system, components and control system

Main switch board	:	Separate item in stainless steel AISI316L, IP56 for mounted on back of winch protected by crash frame. Cabinet equipped with special air ventilation system. No water cooling required. Three frequency converters, make Danfoss, for winch motor drives with encoder feedback card for closed loop vector control. Frequency converters installed in separate part of the cabinet isolated from the PLC and rest of control system. Frequency converter, make Danfoss, for level wind system. One PLC, make Siemens S7-1200/1500 for winch control. Easy "on-site" recovery of PLC via provided SD card containing program backup. Backup is valid for the supplied winch, installation of the backup on other winches prohibited. Level wind is controlled via PLC, programmed to suit actual cable diameter. The PLC receives pulses from encoders placed on drum and level wind and thereby calculates the necessary movement of level wind to match the movement of the drum.
Brake resistor	:	Separate unit in stainless steel AISI 304/316L mounted back on winch inside crash frame. Brake resistor air cooled, temperature monitoring in brake resistor with PT100 sensor, connected to alarm in control system. Temperature displayed in HMI. Brake resistor divided in sections. Each section supports one frequency converter. Each section can easily be replaced in case of malfunction without affecting the other sections.
Electrical drive motors	:	Six electrical motors 4 poled, make CEMP. Cast iron motor and junction box for 690@50 HZ frequency controlled operation 0-50 Hz, 22 kW, each. IP56. Forced cooling for low speed operation 0 Hz. Anti-condensation heating 230V. 3 x PTC in winding. Encoder for closed loop frequency control.
Motor supervision	:	Motor mounted with PT100 sensor connected to alarm in control system. The sensors also control the cooling fan on the motors. The start/stop temperature is adjustable. Read out of temperature in HMI.
AHC functionality	:	NA
Anti-drifting during AHC	:	NA
Launch & recovery during AHC	:	NA

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Motor redundancy	:	Switches for emergency drive with fail on one of the main motors, brakes or frequency converters are placed on main switch board door. It is possible to operate the winch with two or one motor / frequency drives out of operation, but at reduced torque.
Safety on winch	:	Protection around moving parts on winch. Flashing lamp indicating remote control of winch, incl. 20m cable and magnetic foundation.
Constant tension “latched” (low tension)	:	Torque control. – When the TMS/ROV is latched to the A-frame and the strain on the cable is relived, it is possible to switch to low constant tension, and the winch will follow the movement of the A-frame. If the TMS/ROV drops out of the latch, the control system will detect the failure and switch to full torque, thereby preventing dropping of the stack.
Joystick scale	:	To avoid the TMS to “tip over” because of too high launch speed, the launch speed can be adjusted from 50-100% via the HMI.
Ethernet	:	Ethernet port on PLC and frequency converters. Enable remote reading and programming online, access provided by customer.
Main controls	:	Stainless steel AISI316L, IP56 box for open deck location, including: - PLC operator panel in 9” color touch screen with: Winch status Set-up winch/level wind, Alarms - All operation of the winch is on the touch screen, including handshake function for transferring command to remote control. - Joystick - Emergency stop - Cable 15 mtr. - Pedestal in stainless steel for deck mounting of control box - HMI controlled feature at protected high user level for raising torque to 125%, intended for load testing of termination.
Heating	:	Main switch board, motors and junction boxes (if possible) are equipped with electrical heating. During storage, an external supply of 220-240VAC, 50/60HZ is needed to maintain the heat function.

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Slip ring installation

Slip ring	:	Prepared for Focal type 176 slip ring.
Inside junction box	:	Prepared for 2 pcs. Max. Height 160 mm.
Outside junction box	:	Prepared for 1 pc. Max. Height 160 mm.
Umbilical installation	:	Mechanical steel clamp machined to fit the umbilical armor. + cable clamps supporting the stripped umbilical at winch drum. Support for one extra round of umbilical to make sure re-termination is possible. Auto stop with 8 turns back on drum.

Documentation

FAT	:	SH Group A/S standard FAT according to DNVGL´s Standard, May 2016. Standard for offshore and platform lifting appliances DNVGL-ST-0378.
Manuals	:	One Fabrication record book. One System documentation. One User manual. Two Electronic versions on USB stick. Delivered in English.

Electrical installation

Motor cable, control cable, earthing, marking etc.	:	According to DNV´s Electrical Installations, July 2015. Offshore Standard DNVGL-OS-D201.

Design

System design	:	The system is designed according to DNVGL´s Standard, May 2016. Standard for offshore and platform lifting appliances DNVGL-ST-0378.
Lifting design	:	Lifting devices on winch frame are designed, tested and prepared to meet requirements for certification according to DNV 2.7.3 Type A Class R30. Lifting devices are frame, pad eyes and lifting sling. Lifting sling included in delivery.
Quality Assurance	:	SH Group A/S operates a DS/EN ISO 9001-2008 certified quality assurance system.

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Winch – Options

Options are additional and not included in the winch basic price. Options are listed according to levels. Level 1 will be invoiced together with the winch. Level 2,3… will be invoiced separately upon completion of each job.

Level 1 – Options installed on winch prior to FAT

Certification options

1.1	**DNV lifting appliances: DNVGL-ST-0378**	
1.2	**DNV 2.7-1 for max gross mass < 25 T**	
1.3	**DNV 2.7-3 for max gross mass > 25 T**	
1.4	**Custom specified certification**	

Additional design features and equipment

1.5	**Umbilical cooling - external** Spray beam over drum for umbilical cooling.	
1.6	**Umbilical cooling - internal** The drum is fitted with internal plumbing and a water slip ring for dynamic water cooling of umbilical. Equipped with 3 x 5-7 spray nozzles.	

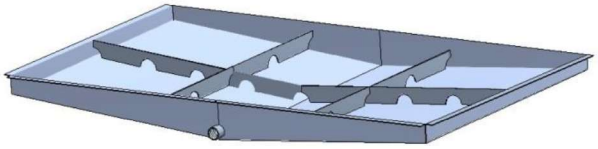
Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

1.7 Water-catch tray
V-shaped AISI 304 stainless steel tray with 2" outlet placed under drum.



1.8 Lebus shell
For optimal spooling lebus shell is always recommendable. Drum machined for tight fit. Bolt on design.

1.9 Central lubrication
By leading all grease points from level wind, pin bolts on band brake and drive wheels for gear drive to 2 pcs. Central placed "easy to reach" manifolds. Servicing is made easy and no hard to reach spots are "forgotten". High pressure grease hoses are used and lead to the level wind trolley in an energy chain. Fittings are mild steel but wrapped with Densyl tape.

1.10 Emergency recovery panel (separate)
Emergency recovery function controlled from separate panel.
In case of failure in the control system (PLC) it is possible to recover the load.
Switch for pay in/out, level wind left/right and emergency stop.
Switches are hardwired directly to the frequency converters.

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

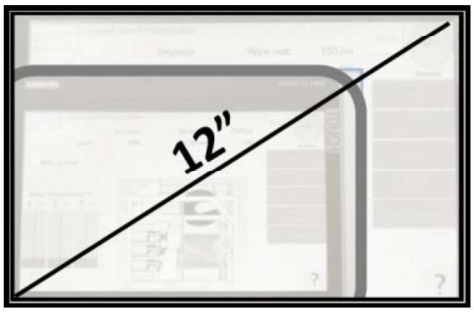
FOR INFORMATION ONLY

1.11 Remote control for bridge, 9” screen

19” rack remote control for indoor use. The control consists of a 9” colour touch screen, a joystick and an emergency stop.
All operations of the winch are controllable from the panel, like all alarms and status are visible.
Additional info:
- Control cable 50 mtr.
- Panel in RAL colour 9005

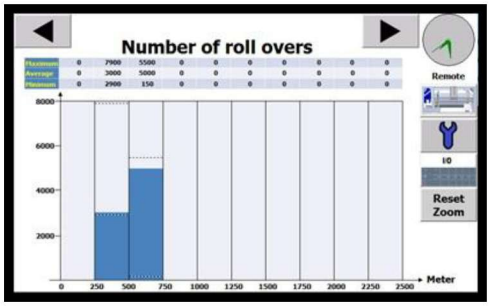
1.12 Touch screen size upgrade from 9 to 12”

Additional for option 1.11.
Touch screen on main control cabinet and remote control gets upgraded from 9 to 12”.



1.13 Umbilical lifetime monitoring

Deploying TMS at same depth increases wear of the umbilical. This feature enables the user to identify the mostly used area on the umbilical and thereby take that into account, when the next deploying is being done. By clicking on a column the view will be zoomed in, giving the operator a more detailed view.



Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

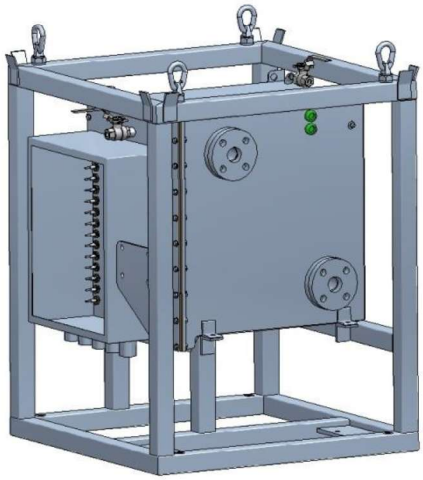
Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

1.14 Radio remote control
For wireless control. Able to handle both winch and A-frame at same time. See appendix for more info.

1.15 Water separation filter
Mounted on cooling HPU or brake HPU one filter pr. Unit. Filter keeps oil clean and avoids water in the oil coming from condensation.

1.16 Brake resistor – fresh water
Liquid cooled, for fresh water use.
Requires 200 l/min. at a max temperature of 30°C.
Water supply to be provided by ship. Max water pressure 0,5 bar.



Data Sheet

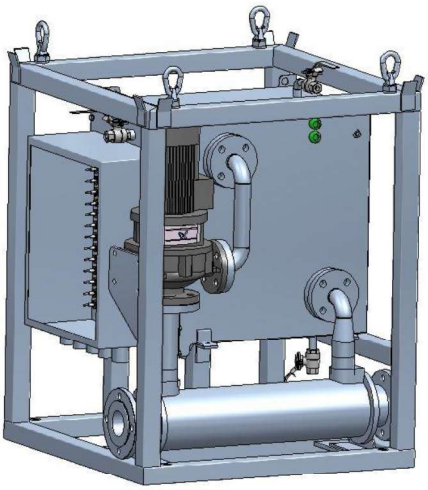
Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

1.17 Brake resistor – sea water

Liquid cooled, for sea water use. The resistor is connected to a heat exchanger in a closed loop. Sea water does not get in contact with resistor elements. Requires 200 l/min. at a max temperature of 30°C.
Water supply to be provided by ship.



1.18 Hydraulic band brake and brake HPU

"Fail safe" model mounted on winch drum. Providing redundancy in the brake system. (Not mandatory feature for ROV handling according to DnV). Band brake is powered by included small HPU.
Brake system upgraded to meet DNV rules for offshore cranes when this option is selected.

1.19 MRU

Only for AHC winch.
Kongsberg MRU new type H-V including junction box, for client to mount on a suitable and stable location. Cabling between junction box and winch to be provided by client. Can handle 2 launch points.

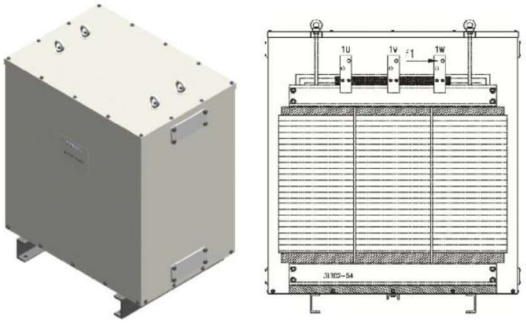
Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

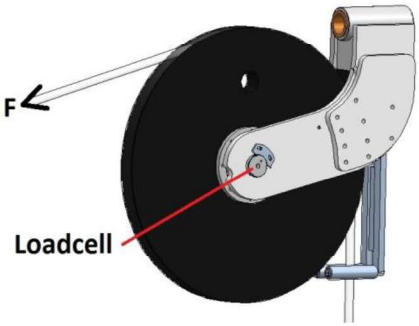
FOR INFORMATION ONLY

1.20 Step Down Transformer for AHC winch
An independently housed transformer sized to handle a 690VAC input. IP 23 for indoor mounting.



1.21 Active THD filter
Recommended for generator <1500kW
Active filter Danfoss AHF 005.THID reduced from app. 20% to less than 5%
THD can be assessed upon receipt of filled out questionnaire covering Generator and power grid data.
Filter is delivered as loose item and must be placed in a sheltered area.

1.22 Load cell in RA level wind
Load sensing able by integrated load cell in cable sheave. Adjustment of load cell according to umbilical outlet angle.



Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

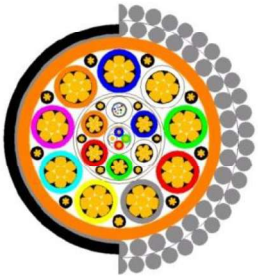
FOR INFORMATION ONLY

Level 2 – Options installed on winch after FAT

Umbilical options

2.1 Delivery of slip ring
Standard Focal 176.

2.2 Delivery of umbilical



2.3 Slip ring installation
Termination and installation of free issued slip ring including Sepro delivery of junction boxes.
Boxes Aisi 316 IP66 Make Tranberg size 10 and 15 for the rotating boxes and size 40 for the stationary box.

2.4 Spooling
Spooling of free issued umbilical onto winch with tension. The job is done with a tension machine as pictured. Tension speed and length is logged and a spooling certificate issued.
Note: Test certificate for the umbilical must be provided prior to spooling!

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

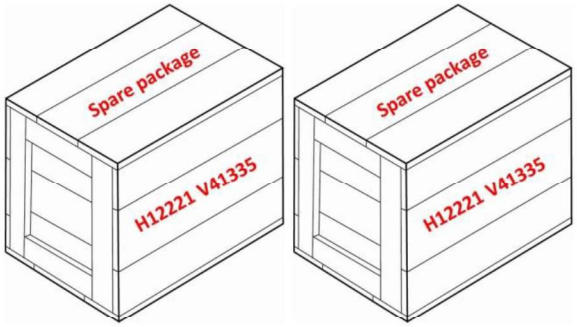
FOR INFORMATION ONLY

Level 3 – Options delivered after FAT

Spare part options

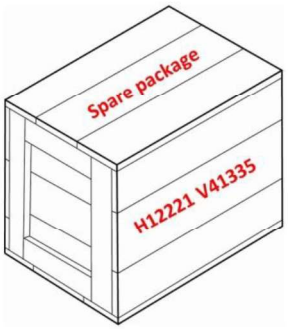
3.1 Full spare package

The full spare package contains spares for replacement offshore as well as onshore. An offshore spare applies to the maintenance, able to be carried out at sea. Onshore parts are those who require heavy lifting gear and will normally be used in service of the equipment.



3.2 Reduced spare package

The reduced spare package is basically containing spares for the maintenance to be carried out at sea.



Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Level 4 - Option delivered after FAT

Preservation and storage option

4.1 Preservation and storage

Preservation and storage of winch up to 6 months from FAT. Insurance not included.
- Emitters are placed in all electrical cabins and small junction boxes.
- All outer surfaces are protected with surface protection.
- Moisture absorbing units is placed evenly distributed inside the unit.
- The entre unit is carefully wrapped with UV resistant shrinking film.
- The outer protection film is inspected every third month for damage or cracks, if any then repaired.

Level 5 - Options delivered after FAT

Shipping options

5.1 Loading

Loading of equipment.
FCA - according to incoterms 2010.

5.2 Delivery

Loading and delivery of equipment.
Location to be agreed, delivery according to DAP – Incoterms 2010.

Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Level 6 - Option delivered after FAT

Commissioning and installation

6.1 Support

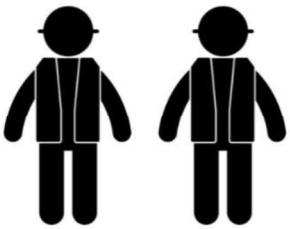
Support during installation and/or commissioning by 2 service engineers for 5 days.
The price is excluding travel and accommodation cost:
Travel and accommodation costs will be invoiced as cost price +10%.

Level 7 - Option delivered after FAT

SAT support

7.1 SAT support

Participation in Sea Acceptance Test by 2 service engineers for 5 days
The price is excluding travel and accommodation cost:
Travel and accommodation costs will be invoiced as cost price +10%.



Data Sheet

Ocean Master – Non AHC Winch
Type OM-4000-A6-4
With front spooling

Specification	:
Revision	:
Date	:
Page	:
Prepared by	:
Checked by	:
Approved by	:

FOR INFORMATION ONLY

Level 8 - Options delivered after FAT

Training options

8.1 **Training course – 1 day**
Training course with Operator for 6 persons for 1 day.
Training course will be held at our facilities located in Svendborg.

8.2 **Training course – 3 days**
Training course with Supervisor for 6 persons for 3 days.
Training course will be held at our facilities located in Svendborg.

List of deviations and exceptions
As a minimum we have the following deviations.

Item	Description
1	Source code is not part of delivery.

Date	Alteration of conditions or requirements	Initials
05-07-2017	Spec updated. Size and power is main changes	MB