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PROJECT NAME		VOC POWER PACK			
PRODUCT		DIESEL MOTORS, GENERATORS AND SWITCHBOARDS			
PURCHASE AGREEMENT NO.		OL0410-OSL-PD-0001 / OL0420-OSL-PD-0001			
EQUIPMENT TAG NO.		82-EN-001 & 82-EL-001			
DOCUMENT CODE		6.2			
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DATA SHEET, LOW VOLTAGE SWITCHBOARD					
DOC. NO.			EM0077-AAAL		Rev.
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					Z1
					06

	LOW VOLTAGE SWITCHBOARD DATA SHEET	Navion VOC
	NORSOK E-001 EDS-005 Rev.2, Jan 1996	Page 2 of 6

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Functional Requirements

Power System

1.01	Rated System Voltage	V	:	440/230
1.02	Rated System Frequency	Hz	:	60
1.03	No. of Phases		:	3
1.04	System Earthing		:	II
1.05	Earth Fault Current	A	:	
1.06	Control Voltage Supply	V	:	230 AC

Construction

1.07	Degree of Protection	IP	:	43
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Environmental Conditions

1.08	Hazardous Area Classification		:	Non hazardous
1.09	Ambient Temp.	°C	:	Min. -7, max. +40
1.10	Location		:	Indoor
1.11	Humidity	%	:	95
1.12	Altitude above sea level	m	:	<1000

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Project Requirements

2.01	Tag No.	:	82-EN-001/82-EL-001
2.02	Unit	:	Switchboard
2.03	Service	:	Normal
2.04	Supplier	:	Aker Elektro
2.05	Manufacturer	:	Aker Elektro
2.06	Type	:	CUBIC
2.07	Location / Module	:	
2.08	Job. No.	:	
2.09	Inquiry No.	:	
2.10	Quote No.	:	
2.11	P.O. No	:	

Nominal Ratings

2.12	Rated System Voltage	V	:	440/230 (switchgear rating)
2.13	Rated System Frequency	Hz	:	60
2.14	Rated Current	A	:	1000 min. busbars at 40°C

Short Circuit Ratings

2.15	Short-Time Withstand CkA for 1sec.	:	16,2	
2.16	System Asymmetric Pea	kA	:	41,2
2.17	System RMS Symmetric	kA	:	

Main Connection

2.18	Entry	Bottom/Top/Other	:	Bottom/top
2.19	Type	Cables/Busbar	:	Cable

Auxiliary Cables Connection

2.20	Entry	Bottom/Top/Other	:	Bottom/top
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Switchboard Construction

2.21	Arrangement; Single Front/Back-to-E	:	Single front	
2.22	Motor Heating	Internal/External	:	NA

Max Transport Sections

2.23	Dimensions L x W x H	mm	:	1728
2.24	Weight	kg	:	

Space Heaters

2.25	Heaters Required	Yes/No	:	No
2.26	Power Rating	kW	:	NA
2.27	Voltage	V	:	NA

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Vendor Switchboard Data

3.01	Manufacturer	:	Aker Elektro as
3.02	Type	:	Cubic

Switchboard Construction

3.03	Fixing Accessories	:	
3.04	Lifting Eye Bolts	Yes/No	: Yes
3.05	Handling Truck Required	Yes/No	: Yes
<i>Minimum Clearance Required :</i>			
3.06	In Front of Switchboard	mm	: 800
3.07	At Back of Switchboard	mm	: 0
3.08	At Side of Switchboard	mm	: 0
3.09	Above Switchboard	mm	: 0
3.10	Dimensions L x W x H	mm	: 2688 x 576 x 2216
3.11	Total Weight of Switchboard	kg	: 1400
3.12	Degree of Protection	IP	: 43
3.13	No. of Cubicles	:	4
3.14	Service access	Front/Back	: Front
3.15	Arrangement; Single Front/Back-to-b	:	Single front

Bus Bars

<i>Main Bus Bar :</i>			
3.16	The switchboard Rating at 40°C	A	: 1200
3.17	Cross Section	mm ²	: 600
3.18	Completely Insulated	Yes/No	: No
3.19	Short circuit rating	kA	: 22
<i>Earth Bus Bar :</i>			
3.20	Rating	A	: 500
3.21	Cross Section	mm ²	: 200

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Vendor Switchboard Data

Max Transport Sections

3.01	Dimensions L x W x H	mm	:	1728
3.02	Weight	kg	:	NA

Bus Trunk

3.03	Bus Trunk Section A/B	Yes/No	:	NA
3.04	Bus Trunk Interface	Top/Bottom/Other	:	NA

Arc Test

3.05	Duration of Arc	sec.	:	
3.06	Max. current	kA	:	
3.07	Name of Testing Authority		:	

Space Heaters

3.08	Heaters Required	Yes/No	:	No
3.09	Power Rating	kW	:	NA
3.10	Voltage	V	:	NA

Heat Losses

3.11	Total Heat Losses at 3/4	kW	:	0.3
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Vendor Circuit Data			
	<i>Type of Circuit:</i>		
4.01	Incoming Cubicle (3 Pole, Busbar)		
1pc	Circuit breaker	:	<u>MERLIN GERIN M10</u>
1pc	Earth fault relay	:	<u>MEGACON KPM161</u>
3pcs	Current Transformers	:	<u>Holec DEIF MAK90/61</u>
1pcs	Ammeter	:	<u>CELSA EQ96</u>
	Ammeter selector switch		<u>NA</u>
1pcs	Voltmeter	:	<u>CELSA EQ96C3V</u>
	Voltmeter selector switch	:	<u>NA</u>
21pcs	Pushbuttons	:	<u>TELEMECHANIQUE XB4</u>
	Miniature circuit breakers	:	<u>MERLIN GERIN C60H/C</u>
7pcs	Motor circuit breaker	:	<u>TELEMECHANIQUE GV2-M</u>
4.02	MCCB Feeders		
	Compact	:	<u>NA</u>
	NS compact	:	<u>MERLIN GERIN NS100N/NS160N/NS400N</u>
	Earth fault relay	:	<u>MEGACON KPM161</u>
	Ammeter	:	<u>CELSA EQ96</u>
	Ammeter selector switch		<u>NA</u>
	Pushbuttons	:	<u>NA</u>
4.03	Motor Starters		
	Short circuit protection	:	<u>MERLIN GERIN NS</u>
	Contactors	:	<u>TELEMECHANIQUE LC1</u>
	Motor protection relay	:	<u>TELEMECHANIQUE GV2, LR2</u>
	Earth fault relay	:	<u>NA</u>
	Auxiliary relay	:	<u>TELEMECHANIQUE RXN</u>
	Miniature circuit breaker	:	<u>MERLIN GERIN C60</u>


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CUSTOMER		NAVION ASA			
PROJECT NAME		VOC POWER PACK			
PRODUCT		DIESEL MOTORS, GENERATORS AND SWITCHBOARDS			
PURCHASE AGREEMENT NO.		OL0410-OSL-PD-0001 / OL0420-OSL-PD-0001			
EQUIPMENT TAG NO.		80-EH-001			
DOCUMENT CODE		5.7			
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EQUIPMENT DATASHEET, HIGH VOLTAGE SWITCHBOARD					
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Items marked with an * are company requirements. Vendor to fill in remaining items and confirm relevant company requirements.

1. GENERAL

* 1.01	Tag no.	:	80-EH-001
* 1.02	Description	:	High voltage switchboard
* 1.03	P O. no. / Inquiry no	:	
1.04	Vendor	:	Aker Elektro /GEC
1.05	Manufacturer	:	Aker Elektro
* 1.06	Location area	:	Electrical container

2. SERVICE CONDITION

* 2.01	Ambient temperature, (°C min. / max.)	:	5 °C / 35 °C
* 2.02	Environment condition	:	Indoor in mech Ventilated area
* 2.03	Relative humidity, min. / max., (%)	:	28 / 100 %
* 2.04	Area classification, (Zone 1 / Zone 2 / Zone 3 / Non haz.)	:	Non hazardous

3. SUPPLY DATA

* 3.01	Nominal voltage, (kV)	:	6,6 kV
* 3.02	Nominal frequency, (Hz)	:	60 Hz
* 3.03	Auxiliary voltage and frequency, (V / Hz)	:	230 V / 60 Hz
* 3.04	System earthing	:	Isolated
* 3.05	Minimum rated current for bus bar, (A)	:	630 A
* 3.06	Initial symmetrical short circuit current, I ^{sc} (kA)	:	25kA
* 3.07	Peak short circuit current, i _p (kA)	:	63kA
* 3.08	DC component time constant, (ms)	:	200 ms
* 3.09	Maximum earth fault current, (A)	:	NA

4. ENCLOSURE

* 4.01	Degree of protection in accordance to IEC 529, IP	:	IP 32
* 4.02	Main supply, (cable / bus duct)	:	Cable
* 4.03	Entry main supply, (top / bottom)	:	Bottom
* 4.04	Entry consumer / aux. cables, (top / bottom)	:	Top
4.05	Dimensions, overall L x W x H, (mm)	:	3428 X 1600 X 2393mm (Ref dwg & specifications.)
4.06	Weight, overall, (kg)	:	3740 Kg
* 4.07	Thermographic inspection possibility, (yes/no)	:	No, (Termostrip on Bus Bar.)
4.08	Minimum maintenance and security clearance, front	:	1200mm
4.09	Minimum maintenance and security clearance, back	:	800mm (Only for motor starter cubicles)
4.10	Minimum maintenance and security clearance, sides	:	0mm
4.11	Minimum maintenance and security clearance, above	:	500mm
4.12	Enclosure paint	:	RAL 7032

**5. SWITCHGEAR DATA**

* 5.01	Bus bar conductor material, (copper / aluminium)	:	Copper
5.02	Rated current, main bus bar, (A at specified temp.)	:	630 A at amb.
5.03	Rated current, vertical bus bar, (A at specified temp.)	:	630 A at amb.
5.04	Rated short time withstand current, rms, (kA, sec)	:	25 kA, 1 sec
5.05	Rated asymmetric peak withstand current, (kA)	:	63 kA
5.06	Rated symmetric breaking current, rms, (kA)	:	25 kA
5.07	Rated insulation level, continuously / 1min. / impulse (kV)	:	12 / 28 / 75 kV
5.08	Arc test in accordance to standard	:	IEC 298
5.09	Duration of arc, (sec.)	:	25 kA / 1 sec.
5.10	Name of testing authorities	:	SATS / BSTS
5.11	Maximum auxiliary power consumption, (VA)	:	2000 VA
5.12	NA	:	NA
5.13	Total heat loss, (kW)	:	3
* 5.14	Internal space heaters, (yes / no)	:	Yes

6. EARTHING switches

6.01	Manufacturer / type	:	ABB, OJWN-12/100 A
6.02	Manual / motor operated	:	Manual
6.03	Electrically / Mechanically interlock	:	Electro / Mechanical interlock
6.04	Rated making capacity, (kA)	:	63 kA
6.05	Rated short time withstand current, rms, (kA/sec)	:	25 kA / 1 sec.
6.06	Rated insulation level, continuously / 1min. / impulse (kV)	:	12 / 28 / 75 kV

7. GENERATOR INCOMER CUBICLE - CIRCUIT BREAKER DATA

7.01	Manufacturer	:	Melin Gerin
7.02	Type	:	Fluarc LF1, SF6
7.03	Rated voltage, (kV)	:	7,2 Kv
7.04	Rated current, (A)	:	630 A
7.05	Rated frequency, (Hz)	:	60 Hz
* 7.06	Closing (motor charged spring / solenoid / manual)	:	Motor charged spring
* 7.07	Opening (motor charged spring / solenoid / manual)	:	Motor charged spring
* 7.08	Tripping (shunt release / undervoltage / manual)	:	Undervoltage
7.09	Rated short circuit making capacity at 6,6 kV, (kA _{peak})	:	63 kA
7.10	Rated short circuit breaking capacity at 6,6 kV, (kA _{rms})	:	25 kA
7.11	Rated breaking capacity of DC-component, (%)	:	30%
7.12	Short time withstand current, 3 sec., (kA)	:	25 kA
7.13	Rated insulation level, continuously / 1min. / impulse (kV)	:	7,2 / 20 / 60 kV
7.14	Rated breaking time, (msec)	:	65 msec
7.15	Opening time, (msec)	:	48 msec
7.16	Closing time, (msec)	:	65 msec
7.17	Rated transient recovery voltage for terminal faults (kV/μs)	:	0,34 kV / μs

**8. GENERATOR INCOMER CUBICLE - MEASURING TRANSFORMERS**

8.01	Current transformers, manufacturer / type	:	Messwandler Bau, AS 12 / 150 b
8.02	Current transformers, no of.	:	3
8.03	Current transformers, ratio prim : sec1 (A)	:	250/ 5 A
8.04	Current transformers, core1, rating (VA) / class (purpose)	:	20 VA 5P20 (Protection and metering)
8.05	Current transformers, rated short time therm current, (A_{rms})	:	25 kA, 1 sec.
8.06	Current transformers, rated dynamic current, (A_{peak})	:	63 kA
8.07	Current transformers, rated insulation level, (kV)	:	12 / 28 / 75 kV
8.08	Voltage transformers, manufacturer / type	:	Messwandler Bau / VSZ12
8.09	Voltage transformers, no of.	:	3
8.10	Voltage transformers, ratio prim : sec1-sec2, (V)	:	$\frac{11000V}{\sqrt{3}} : \frac{110V}{\sqrt{3}} : \frac{110V}{3}$
8.11	Voltage transformers, core 1, rating (VA) / class (purpose)	:	25 VA, Cl. 0,5, metering/protection
8.12	Voltage transformers, core 2, rating (VA) / class (purpose)	:	2A-8h, Cl. 3P, Protection
8.13	Voltage transformers, rated insulation level, (kV)	:	12 / 28 / 75 kV
8.14	Earth fault current transformer, manufacturer / type	:	NA
8.15	Earth fault current transformer, ratio prim : sec, (A)	:	NA
8.16	Earth fault current transformer, rating (VA) / class	:	NA
8.17	Earth fault CT, rated short time thermal current, (A_{rms})	:	NA
8.18	Earth fault CT, rated dynamic current, (A_{peak})	:	NA

9. GENERATOR INCOMER CUBICLE - PROTECTION & METERING DEVICES

9.01	Short circuit protection, type	:	Merlin Gerin, Sepam 2000, G17
9.02	Overcurrent protection, type	:	Merlin Gerin, Sepam 2000, G17
9.03	Directional earth fault protection, type	:	Merlin Gerin, Sepam 2000; G17
9.04	Undervoltage protection, type	:	Merlin Gerin, Sepam 2000, G17
9.05	Overvoltage protection, type	:	Merlin Gerin, Sepam 2000, G17
9.06	Differential protection, type	:	Merlin Gerin, Sepam 2000, G17
9.07	Rotor earth fault protection, type	:	To be delivered by generator supplier
9.08	Negative phase sequence protection, type	:	Merlin Gerin, Sepam 2000, G17
9.09	Reverse real power protection, type	:	Merlin Gerin, Sepam 2000, G17
9.10	Reverse reactive power protection, type	:	Merlin Gerin, Sepam 2000, G17
9.11	Loss of excitation protection, type	:	To be delivered by generator supplier
9.12	Check synch relay, manufacturer / type	:	Megacon KSQ 331
9.13	Ampere meter, manufacturer / type / class	:	Included in Sepam
* 9.14	Ampere meter, input range / scale, (A / A)	:	NA
9.15	Current transducer, manufacturer / type / class	:	DEIF / TAC-311DG / NA
* 9.16	Current transducer, input / output range, scale (A / mA, A)	:	0 – 5A / 4-20 mA, 0A to 250A
9.17	Voltmeter, manufacturer / type / class	:	Included in Sepam
* 9.18	Watt meter, manufacturer / type / class	:	Included in Sepam
9.19	Watt meter, input range / scale, (A, V / MW)	:	NA
* 9.20	Watt transducer, manufacturer / type / class	:	DEIF / TAS-331DG / NA
9.21	Watt transducer, input, output range / scale (A, V, mA / MW)	:	0 – 5A, 0 – 110V, 4-20mA / 0MW to 3,3MW
* 9.22	VAr meter, manufacturer / type / class	:	Included in Sepam
9.23	Freq. meter, manufacturer / type / class	:	Megacon/Celsa, FD 96, Cl. 1,5
* 9.24	Freq. meter, input range / scale, (Hz / Hz)	:	55-65 Hz / 55-65 Hz



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10. MOTOR STARTER CUBICLES - GENERAL

10.01	Cubicle model / type	:	GEC HMC 1172 / Metal clad
10.02	Fuse base, manufacturer / type	:	GEC Alsthom
10.03	Fuses, manufacturer / type / rated current (A)	:	GEC Alsthom, K81SDX
10.04	Load switch, manufacturer / type	:	NA
10.05	Contactor, manufacturer / type	:	GEC Alsthom, DVS 72
10.06	Contactor, rated voltage, (kV)	:	7,2 kV
10.07	Contactor, rated insulation level, cont. / 1 min. / imp (kV)	:	7,2 / 20 / 60 kV
10.08	Contactor, rated current, (A)	:	400 A
10.09	Contactor, rated breaking capacity, (A)	:	6000 A
10.10	Contactor, rated short time withstand current, (A / sec)	:	9000 A, 1 sec
10.11	Contactor, aux power consumption 230 VAC, (VA)	:	615 VA Closing, 115 VA Holding
10.12	Contactor, overvoltage restriction, manufacturer / type	:	NA
10.13	Earthing switch, manufacturer / type	:	GEC Alsthom
10.14	Earthing switch, manual / motor operated	:	Manual
10.15	Earthing switch, electrically / mechanically interlock	:	Electrical/ Mechanically
10.16	Earthing switch, rated making capacity, (kA)	:	NA, Mech. Interlocked. (fused)
10.17	Earthing switch, rated short time withstand current, rms, (kA/sec.)	:	NA

11. MOTOR STARTER CUBICLES - MEASURING TRANSFORMERS

11.01	Current transformers, manufacturer / type	:	STABILIZED TRANSFORMERS LTD
11.02	Current transformers, no of.	:	3
11.03	Current transformers, ratio prim : sec (A)	:	150/5 A
11.04	Current transformers, rating (VA) / class (purpose)	:	7,5VA/5P20 (Protection and metering)
11.05	Current transformers, rating (VA) / class (purpose)	:	NA
11.06	Current transformers, rated short time thermal current, (A_{rms})	:	Toroid
11.07	Current transformers, rated dynamic current, (A_{peak})	:	Toroid
11.08	Current transformers, rated insulation level, (kV)	:	7,2kV
11.09	Voltage transformers, manufacturer / type	:	NA
11.10	Voltage transformers, no of.	:	NA
11.11	Voltage transformers, ratio prim : sec, (V)	:	NA
11.12	Voltage transformers, rating (VA) / class	:	NA
11.13	Voltage transformers, rated insulation level, (kV)	:	NA
11.14	Earth fault current transformer, manufacturer / type	:	NA
11.15	Earth fault current transformer, ratio prim : sec, (A)	:	NA
11.16	Earth fault current transformer, rating (VA) / class	:	NA
11.17	Earth fault CT, rated short time thermal current, (A_{rms})	:	NA
11.18	Earth fault CT, rated dynamic current, (A_{peak})	:	NA



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12. MOTOR STARTER CUBICLES - PROTECTION & METERING DEVICES

12.01	Overcurrent protection, manufacturer / type	:	Merlin Gerin, Sepam 1000+, M20
12.02	Earth fault protection, manufacturer / type	:	NA
12.03	Stalled rotor protection, manufacturer / type	:	Merlin Gerin, Sepam 1000+, M20
12.04	No. of start attempts protection, manufacturer / type	:	Merlin Gerin, Sepam 1000+, M20
12.05	Negative sequence protection, manufacturer / type	:	Merlin Gerin, Sepam 1000+, M20
12.06	Overtemp. detection RID, high temp., manuf. / type	:	NA
12.07	Overtemp. detection RID, hi-hi temp. manuf. / type	:	NA
12.08	Amperemeter, manufacturer / type / class	:	Included in Sepam
* 12.09	Amperemeter, input range / scale, (A / A)	:	NA
12.10	Current transducer, manufacturer / type / class	:	DEIF TAC-311DG
* 12.11	Current transducer, input / output range, scale (A / mA, A)	:	0 -5A / 4-20 mA, 0-150A
12.12	Watt transducer, manufacturer / type / class	:	NA
* 12.13	Watt transducer, input / output range, scale (A, V / mA, kW)	:	NA

13. FEEDER TO 6,6 / 0,44 KV TRANSFORMER - CIRCUIT BREAKER DATA

13.01	Cubicle model / type	:	GEC HMC 1172 / Metal clad
13.02	Fuse base, manufacturer / type	:	GEC Alsthom
13.03	Fuses, manufacturer / type / rated current (A)	:	GEC Alsthom, K81SDX
13.04	Load switch, manufacturer / type	:	NA
13.05	Contacto, manufacturer / type	:	GEC Alsthom, DVS 72
* 13.06	Contacto, rated voltage, (kV)	:	7,2 kV
* 13.07	Contacto, rated insulation level, cont / 1 min. / imp. (kV)	:	7,2 / 20 / 60 kV
* 13.08	Contacto, rated current, (A)	:	400 A
13.09	Contacto, rated breaking capacity, (A)	:	6000 A
13.10	Contacto, rated short time withstand current, (A / sec)	:	9000 A, 1 sec.
13.11	Contacto, aux. power consumption 230 VAC, (VA)	:	615 VA Closing, 115 VA Holding
13.12	Contacto, overvoltage restriction, manufacturer / type	:	NA
13.13	Earthing switch, manufacturer / type	:	GEC Alsthom
13.14	Earthing switch, manual / motor operated	:	Manual
13.15	Earthing switch, electrically / mechanically interlock	:	Electrical/ Mechanically
13.16	Earthing switch, rated making capacity, (kA)	:	NA, Mech. Interlocked. (fused.)
13.17	Earthing switch, rated short time withstand current, rms, (kA/sec)	:	NA

**14. FEEDER TO 6,6 / 0,44 KV TRANSFORMER - MEASURING TRANSFORMERS**

14.01	Current transformers, manufacturer / type	:	STABILIZED TRANSFORMERS LTD
14.02	Current transformers, no of.	:	3
14.03	Current transformers, ratio prim : sec (A)	:	70/5 A
14.04	Current transformers, rating (VA) / class (purpose)	:	7,5VA/5P20 (Protection and metering)
14.05	Current transformers, rating (VA) / class (purpose)	:	NA
14.06	Current transformers, rated short time thermal current, (A_{rms})	:	Toroid
14.07	Current transformers, rated dynamic current, (A_{peak})	:	Toroid
14.08	Current transformers, rated insulation level, (kV)	:	7,2kV
14.09	Voltage transformers, manufacturer / type	:	NA
14.10	Voltage transformers, no of	:	NA
14.11	Voltage transformers, ratio prim : sec, (V)	:	NA
14.12	Voltage transformers, rating (VA) / class	:	NA
14.13	Voltage transformers, rated insulation level, (kV)	:	NA
14.14	Earth fault current transformer, manufacturer / type	:	NA
14.15	Earth fault current transformer, ratio prim : sec, (A)	:	NA
14.16	Earth fault current transformer, rating (VA) / class	:	NA
14.17	Earth fault CT, rated short time thermal current, (A_{rms})	:	NA
14.18	Earth fault CT, rated dynamic current, (A_{peak})	:	NA

15. FEEDER TO 6,6 / 0,44 KV TRANSFORMER - PROTECTION & METERING DEVICES

15.01	Overcurrent protection, manufacturer / type	:	Merlin Gerin, Sepam 1000+, S20
15.02	Earth fault protection, manufacturer / type	:	NA
15.03	Stalled rotor protection, manufacturer / type	:	NA
15.04	No. of start attempts protection, manufacturer / type	:	NA
15.05	Negative sequence protection, manufacturer / type	:	NA
15.06	Overtemp. detection RID, high temp, manuf / type	:	NA
15.07	Overtemp. detection RID, hi-hi temp. manuf. / type	:	NA
15.08	Amperemeter, manufacturer / type / class	:	Included in Sepam
* 15.09	Amperemeter, input range / scale, (A / A)	:	NA
15.10	Current transducer, manufacturer / type / class	:	DEIF TAC-311DG
* 15.11	Current transducer, input / output range, scale (A / mA, A)	:	0 -5A / 4-20 mA, 0-70A
15.12	Watt transducer, manufacturer / type / class	:	NA
* 15.13	Watt transducer, input / output range, scale (A, V / mA, kW)	:	NA

**16. BUS BAR METERING / EARTHING CUBICLES - MEASURING TRANSFORMERS**

16 01	Voltage transformers, manufacturer / type	:	Messwandler Bau / VSZ12
16 02	Voltage transformers, no of.	:	3
16 03	Voltage transformers, ratio prim : sec1-sec2, (V)	:	$\frac{11000V}{\sqrt{3}} : \frac{110V}{\sqrt{3}} : \frac{110V}{3}$
16 04	Voltage transformers, core 1, rating (VA) / class (purpose)	:	25 VA, Cl. 0,5, metering/protection
16 05	Voltage transformers, core 2, rating (VA) / class (purpose)	:	2A-8h, Cl. 3P, Protection
16 06	Voltage transformers, rated insulation level, (kV)	:	12 / 28 / 75 kV

17. BUS BAR METERING / EARTHING CUBICLES - PROTECTION & METERING DEVICES


17 01	Undervoltage protection, type	:	Merlin Gerin, Sepam 1000+, B21
17 02	Arc detection relay, type / no. of detectors	:	NA
17 03	Voltmeter, manufacturer / type / class	:	Included in Sepam
* 17 04	Voltmeter, input range / scale, (V / V)	:	NA
17 05	Voltage transducer, manufacturer / type / class	:	DEIF / TAV-311DG
* 17 06	Voltage transducer, input, output range / scale (V / mA, V)	:	0 – 110V, 4-20 mA / 0 – 6600V
17 07	Freq. meter, manufacturer / type / class	:	Included in Sepam
* 17 08	Freq. meter, input range / scale, (Hz/ Hz)	:	NA
17 09	Freq. transducer, manufacturer / type / class	:	DEIF / TAS-311DG
* 17 10	Freq. transd., input, output range / scale (Hz, mA / Hz)	:	0 – 110V, 4-20 mA / 55-65 Hz

18. CONSUMER DATA

18.01	230V / 60 Hz (VA)	2000VA
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19. NOTES

- 19.01 The calculated fault currents are based on estimated values. Selection of equipment with respect to breaking and withstand capabilities, shall consider that the fault level can increase. The DC component value is considered to decrease exponentially from the stated initial value at a time constant of 100-200 msec.

Z1	14.03.03	AS BUILT	ToMa	ToMa	JLa
Z	24.10.02	AS BUILT	ToMa	ToMa	JLa
01	07.01.02	ISSUED FOR ACCEPTANCE	ToMa	ToMa	JLa
Rev.	Date	Description	Exec. by	Checked by	Appr. by
Space reserved for document status label					
Supplier's logo					
 Aker Maritime Aker Elektro AS					
CUSTOMER		NAVION ASA			
PROJECT NAME		VOC POWER PACK			
PRODUCT		DIESEL MOTORS, GENERATORS AND SWITCHBOARDS			
PURCHASE AGREEMENT NO.		OL0410-OSL-PD-0001 / OL0420-OSL-PD-0001			
EQUIPMENT TAG NO.		80-ET-001, 80-ET-002, 82-ET-001			
DOCUMENT CODE		6.2			
DOC.TITLE					Scale
DATA SHEET, TRANSFORMERS					
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EM0077-AAAT					Z1
					7

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Project Requirements

2.01 Tag No.	:	
2.02 Unit	:	
2.03 Service	:	
2.04 Supplier	:	NORATEL
2.05 Manufacturer	:	NORATEL
2.06 Model	:	3HT630-23 (5-032-000038)
2.07 Location / Module	:	
2.08 Job No.	:	
2.09 Inquiry No.	:	
2.10 Quote No.	:	
2.11 P.O. No	:	

Electrical

2.12 Rated Power, Sn	AN/AF	kVA :	630
2.13 Rated Primary Voltage		V :	6600
2.14 Rated Secondary Voltage (No load)		V :	
2.15 Cooling Method		AN/AF :	AN
2.16 Short Circuit Impedance Uz		% :	5
2.17 Short Circuit Level (RMS/Peak)		kA :	16,54/23,3
2.18 Test Voltages acc. IEC 60076		kV/List 1/List 2 :	10/3
2.19 Degree of Protection		IP :	23
2.20 Winding Insulation Class		:	Min. F

Primary Terminations

2.21 Type of Termination	Busbar/Other :	CU BARS
2.22 Busbar Dimensions H x W	mm :	
2.23 Number of Power Cables	:	TBA
2.24 Power Cable Size	n x mm ² :	TBA
2.25 Power Cable Outer Diameter	mm :	TBA
2.26 Entry	Top/Bottom :	Bottom
2.27 Entry Type	MCT/Gland/Other :	Open bottom entry with cable clamp support
2.28 Inspection/Earthing Openings	Hinged/Bolted :	Bolted side walls

Secondary Terminations

2.29 Type of Termination	Busbar/Cables/Other :	
2.30 Busbar Dimensions H x W	mm :	
2.31 Number of Power Cables	:	TBA
2.32 Power Cable Size	n x mm ² :	TBA
2.33 Power Cable Outer Diameter	mm :	TBA
2.34 Entry	Top/Bottom :	Bottom
2.34 Entry Type	MCT/Gland/Other :	Open bottom entry with cable clamp support
2.35 Inspection/Earthing Openings	Hinged/Bolted :	Bolted side walls

Neutral Termination

2.36 Cable Size	n x mm ² :	
2.37 Cable Outer Diameter	mm :	
2.38 Entry	Top/Bottom :	Bottom
2.39 Entry Type	MCT/Gland/Other :	Open bottom entry with cable clamp support
2.40 Inspection/Earthing Openings	Hinged/Bolted :	Bolted side walls

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Vendor Data

3.01	Manufacturer	:	NORATEL
3.02	Type	:	3HI630-23
3.03	Serial No.	:	5-032-000038

Electrical

3.04	Rated Power	AN/AF	kVA :	630	
3.05	Rated Primary Voltage		V :	6600	
3.06	Rated Secondary Voltage (No load)		V :	441,7	
3.07	Secondary Voltage Full Load PF 0.8		V :	430	
3.08	Rated Primary Current	AN/AF	A :	57	
3.09	Rated Secondary Current	AN/AF	A :	827	
3.10	Inrush Current		A :	741	
3.11	Inrush Current Half Peak Value Time		sec :	0,4	
3.12	No Load Losses		kW :	1,5	
3.13	Full Load Losses	AN/AF	kW :	6,9	Fe+Cu
3.14	Efficiency at 1/1 and 3/4 Load	AN/AF	% :	98,5	98,9
3.15	Short-Circuit Reactance U _x		% :	4,5	
3.16	Short-Circuit Resistance U _r		% :	0,9	
3.17	Short-Circuit Impedance U _z		% :	5	

Neutral Earthing Resistor

3.18	Type and Manufacturer	:	NA
3.19	Resistance	ohm :	
3.20	Resistor Rating	A for sec. :	
3.21	Degree of Protection	IP :	
3.22	Cable Entry	Bottom/Top/Side :	

Construction

3.23	Degree of Protection	IP :	23
3.24	Temp. Rise Dielectric	K :	NA
3.25	Temp. Rise Winding	K :	90
3.26	Sound Pressure Level at 1 meter, with Sinus Load	L _p dB(A) :	75
3.27	Total Length	mm :	1820
3.28	Total Height	mm :	1180
3.29	Total Width	mm :	1648
3.30	Total Weight	kg :	1900
3.31	Winding Temp. Sensor Type	Type / No. of :	NA
3.32	Winding Material	Primary/Secondary :	CU/CU
3.33	Winding Insulation Material	Primary/Secondary :	I BA
3.34	Inspection/Earthing Openings	Hinged/Bolted :	bolted
3.35	Type of terminal for earthing apparatus	:	

Notes

1.11	Temp. sensors	3x2PT 100 to terminals inside of transformer

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Package no.:	Doc. no.:	Rev.
	EM0077-AAAT	Z1

Project Requirements

2.01	Tag No.	:	
2.02	Unit	:	
2.03	Service	:	
2.04	Supplier	:	NORATEL
2.05	Manufacturer	:	NORATEL
2.06	Model	:	3LT40-23 (3-020-000107)
2.07	Location / Module	:	
2.08	Job No.	:	
2.09	Inquiry No.	:	
2.10	Quote No.	:	Q13052A
2.11	P.O. No	:	

Electrical

2.12	Rated Power, Sn	AN/AF	kVA	: 40
2.13	Rated Primary Voltage		V	: 440
2.14	Rated Secondary Voltage (No load)		V	: 228
2.15	Cooling Method		AN/AF	: AN
2.16	Short Circuit Impedance Uz		%	: Suppliers stnd
2.17	Short Circuit Level (RMS/Peak)		kA	: 2,5/3,62
2.18	Test Voltages acc. IEC 60076		kV/List 1/List 2	:
2.19	Degree of Protection		IP	: 23
2.20	Winding Insulation Class			: Min. F

Primary Terminations

2.21	Type of Termination	Busbar/Other	:	Terminals
2.22	Busbar Dimensions H x W	mm	:	35mm2
2.23	Number of Power Cables		:	
2.24	Power Cable Size	n x mm ²	:	
2.25	Power Cable Outer Diameter	mm	:	
2.26	Entry	Top/Bottom	:	Bottom
2.27	Entry Type	MCT/Gland/Other	:	Open bottom entry with cable clamp support
2.28	Inspection/Earthing Openings	Hinged/Bolted	:	Bolted side walls

Secondary Terminations

2.29	Type of Termination	Busbar/Cables/Other	:	Terminals
2.30	Busbar Dimensions H x W	mm	:	35mm2
2.31	Number of Power Cables		:	
2.32	Power Cable Size	n x mm ²	:	
2.33	Power Cable Outer Diameter	mm	:	
2.34	Entry	Top/Bottom	:	Bottom
2.34	Entry Type	MCT/Gland/Other	:	Open bottom entry with cable clamp support
2.35	Inspection/Earthing Openings	Hinged/Bolted	:	Bolted side walls

Neutral Termination

2.36	Cable Size	n x mm ²	:	Terminals
2.37	Cable Outer Diameter	mm	:	150mm2
2.38	Entry	Top/Bottom	:	Bottom
2.39	Entry Type	MCT/Gland/Other	:	Open bottom entry with cable clamp support
2.40	Inspection/Earthing Openings	Hinged/Bolted	:	Bolted side walls

