Constructor 5™ **Operators Manual**	KYSTDESIGN AS www.kystdesign.no
Volume 5 – Power Distribution Unit	*File ref.:* Volume 05 Power Distribution Unit *Date of issue:* 21.08.2015

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1 Introduction

The PDU consists of two panels, and is designed to control 4 transformers, providing full overload and short circuit protection for these:

1 230 KVA HV transformer
1 23 KVA HV transformer
2 10 KVA HV transformer

Supply should be 3~ 670–710VAC, capable of delivering 230A. Supply should not exceed 10kA of IK 3Pmax.

Supply data may be monitored on power analyser +A-P16, which provides all relevant characteristics via menus, and gives additional overload protection (warning to central control and shutdown, adjustable limits).
Phase sequence is checked and gives an alarm if incorrect.
Voltage, current and frequency for all 3 phases are transmitted on the Compact Fieldpoint controller (cFP).

Two modes of operation are provided, remote and local. In remote mode, the transformers are controlled through the cFP system, while in local mode each transformer may be started and stopped by manual push-buttons.

Insulation resistance is continuously monitored (DC-injection principle) on each transformer, with shutdown if below threshold (may be overridden by the operator in remote mode).
In addition, voltage and current on each HV transformer is monitored and transmitted to the operator.

The HV panel is interlocked with main panel by door switches. When the door is opened, the switch is operated, and all power out from main panel is interrupted and the HV panel is left dead. All cabinets and breakers can be locked with keys.

In case of overload/short circuit of any of the transformers, power is interrupted, and status signals transmitted on the operator.

An emergency stop button is provided, which interrupts all power out from the main panel, except local 230VAC supply.

Manufacturer	Jatec AS
Model code	PDU
Serial No	2151712
Voltage	690V
Frequency	50/60 Hz

2 Certificates

No	Component	Certificate Type	Reference	Issued By
1	Power distribution unit	Declaration of Conformity	325D	Jatec
2		Mechanical Completion Record	326D1	
3		Fuselist	Fuselist	
4	Transformers	Certificate	10kVA	Noratel
5			23kVA	
6			230kVA	
7	Measuring Transformers	Test report Measuring Transformers	MS 9540 3phase	Lanne
8			MS12217 3phase	
9			TM-96 1phase	Karsten Moholt
10	Earthing points - 10 Pole Earthing Rod JSFB	Manufacturers Declaration	96620	Maxeta
			JSFB	

3 Cable List

No	Ref Interconnection diagram	Equipment	Manufacturer	Model	Info/Ex-Cert.
1	PDU-311 to 323	LV Cable	Huber+Suhner	Radox 125	
2	PDU-310, 311, 313, 314	HV Cable	Huber+Suhner	Radox 9 GKW-AX	
3	PDU-310,311,313,314	LV Cable	Huber+Suhner	Radox 4 GKW-AX	

4 Settings

Breakers and sensors can be adjusted to fit the load. The table below represents the default values for the system.

Component	Settings
F0	Io=230 Ir=1 Isd=3
Q1	Io=200 Ir=1 Isd=3
Q2	32A
Q3	40A
Q4	32A
Q6	1,5A
Q10	1,5A
P5, P10, P13, P15	Warning=500k delay 1-2s, Alarm=300k delay 1s
P18, 19, 20, P11, P14	Current transmitter = 5A
P1, P2, P3	Current transmitter = 50A
P6,P7,P8	Current transmitter = 10A
P16	Digital out 1 = 250A(Shutdown signal) A L1 delay 1s ND
	Digital out 2 = 230A (Warning) A L1 delay 1s ND
	Analog A0 = VL1-2; out = 20-100%; in = 0-710V
	Analog A1 = VL2-3; out = 20-100%; in = 0-710V
	Analog B0 = VL3-1; out = 20-100%; in = 0-710V
	Analog B1 = Hz; out = 20-100%: in = 0-70hz

5 Drawings

Doc.	Description
2151712-6010M01	PDU Layout
2151712-6010M02	HVP Layout
2151712-6011E01	PDU - HVP Cable diagram
2151712-6011E02	PDU - HVP Single line diagram
2151712-6011E03 page 1	PDU Main supply
2151712-6011E03 page 2	PDU - HVP Main T1 - T2
2151712-6011E03 page 3	PDU - HVP Main T3 - T4 - T5
2151712-6011E03 page 4	PDU - HVP Control current
2151712-6011E03 page 5	PDU - HVP Component supply
2151712-6011E03 page 6	PDU - HVP Control current, digital signals
2151712-6011E03 page 7	PDU - HVP Control current, analog signals
3-080-000714-CD	Connection Diagram Trafo-10kVA
3-080-000714-GA	Gen. Arr. Trafo-10kVA
3-010-001767-CD	Connection Diagram Trafo-23kVA
3-010-001767-GA	Gen. Arr. Trafo-23kVA
3-030-002620-CD	Connection Diagram Trafo-230kVA
3-030-002620-GA	Gen. Arr. Trafo-230kVA

6 Data Sheets / Component list

NR:	Tag nr.	Equipment	Manufacturer	Model
1	-A1	Ethernet module	National Inst.	NI cRIO-9075
	-A2	Digital input	National Inst.	NI cRIO-9425
	-A3	Digital output	National Inst.	NI cRIO-9472
	-A4	Analog input	National Inst.	NI cRIO-9208
	-A5	Analog input	National Inst.	NI cRIO-9208
2	CHK-1	High voltage Adaptors	Megacon	CH163/5
	CHK-2	High voltage Adaptors	Megacon	CH163/3,6
	CHK-3	High voltage Adaptors	Megacon	CH163/3,6
	CHK-4	High voltage Adaptors	Megacon	CH163/3,6
3	-d1	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d2	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d3	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d4	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d5	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d6	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d7	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d8	Support Relay	Phoenix	PLC-RSC-24DC/21
	-d10	Support Relay	Phoenix	PLC-RSC-230UC/21
	-d11	Rele/sokkel	Schneider Electric	RXM4AB2P7/RXZE1M2C
	-d12	Support Relay	Phoenix	PLC-RSC-230UC/21
4	-F0	Breaker Supply	Schneider Electric	NSX400N
5	-F1	Fuse	Schneider Electric	C60H-C2
6	-F3	Fuse 24VDC	Phoenix	HESI T2,5A
	-F4	Fuse 24VDC	Phoenix	HESI T2,5A
	-F5	Fuse 24VDC	Phoenix	HESI T2,5A
	-F6	Fuse 24VDC	Phoenix	HESI T2,5A
	-F7	Fuse 230V	Phoenix	HESI T0,5A
	-F8	Fuse 230V	Phoenix	HESI T0,5A
7	-F16	Phase sequence relay	Carlo gavazzi	DPA51CM44
8	-H1	Alarmlamp	Schneider Electric	XB5AVM4
	-H2	Statuslamp	Schneider Electric	XB5AVM5
	-H3	Statuslamp	Schneider Electric	XB5AVM3
	-H4	Statuslamp	Schneider Electric	XB5AVM3
	-H5	Statuslamp	Schneider Electric	XB5AVM3
	-H6	Statuslamp	Schneider Electric	XB5AVM3
	-H9	Statuslamp	Schneider Electric	XB5AVM3
9	-H7	Hourcounter 24V	Kübler	H57.44 10-30 VDC
	-H8	Hourcounter 24V	Kübler	H57.44 10-30 VDC

10	-K1	Contactor	Schneider Electric	LC1F330
	-K2	Contactor	Schneider Electric	LC1D32P7
	-K3	Contactor	Schneider Electric	LC1D38P7
	-K4	Contactor	Schneider Electric	LC1D32P7
11	-P1	Current Transmitter	Carlo gavazzi	E83-2050
	-P2	Current Transmitter	Carlo gavazzi	E83-2050
	-P3	Current Transmitter	Carlo gavazzi	E83-2050
	-P6	Current Transmitter	Carlo gavazzi	E83-2050
	-P7	Current Transmitter	Carlo gavazzi	E83-2050
	-P8	Current Transmitter	Carlo gavazzi	E83-2050
	-P11	Current Transmitter	Carlo gavazzi	E83-2050
	-P14	Current Transmitter	Carlo gavazzi	E83-2050
	-P18	Current Transmitter	Carlo gavazzi	E83-2050
	-P19	Current Transmitter	Carlo gavazzi	E83-2050
	-P20	Current Transmitter	Carlo gavazzi	E83-2050
12	-P4	Voltage transmitter	Carlo gavazzi	CPTDINAV63LA3AX
	-P9	Voltage transmitter	Carlo gavazzi	CPTDINAV63LA3AX
	-P12	Voltage transmitter	Carlo gavazzi	CPTDINAV61LA1AX
	-P17	Voltage transmitter	Carlo gavazzi	CPTDINAV61LA1AX
13	-P5	Insulation resistance	Megacon	KPM163F 5 kV
	-P10	Insulation resistance	Megacon	KPM163F 3,6 kV
	-P13	Insulation resistance	Megacon	KPM163F 3,6 kV
	-P15	Insulation resistance	Megacon	KPM163F 3,6 kV
14	-P16	Power Quality anlyser	Carlo gavazzi	WM3-96/ AD1016H/ AQ1018/ AP1020/ AO1026/ AO1035
15	-Q1	Breaker T1	Schneider Electric	NSX400N
16	-Q2	Breaker T2	Siemens	3RV1431-4EA10
	-Q3	Breaker T3	Siemens	3RV1431-4FA10
	-Q4	Breaker T4	Siemens	3RV1431-4EA10
17	-Q6	Breaker T6 (Local)	Schneider Electric	GV2ME063
	-Q10	Breaker P16, F16 17	Schneider Electric	GV2ME063
18	-S1	Emergency stop	Schneider Electric	XB4BT42
	-S2	Mode selector	Schneider Electric	XB4BD25
	-S3	Local start	Schneider Electric	XB4BA31
	-S4	Local start	Schneider Electric	XB4BA31
	-S5	Local start	Schneider Electric	XB4BA31
	-S6	Local start	Schneider Electric	XB4BA31
	-S8	Local stop	Schneider Electric	XB4BA42
	-S9	Local stop	Schneider Electric	XB4BA42
	-S10	Local stop	Schneider Electric	XB4BA42
	-S11	Local stop	Schneider Electric	XB4BA42

19	-S12	Safety Switch HVP	Schneider Electric	XCKD2145P16
	-S13	Safety Switch HVP	Schneider Electric	XCKD2145P16
20	-T6	Transformer Local Supply	Noratel	SUL120C
21	-T7	Current transformer	Carlo Gavazzi	CTD-3X.400.5A.XXX
	-T8	Current transformer	Carlo Gavazzi	CTD-3X.400.5A.XXX
	-T9	Current transformer	Carlo Gavazzi	CTD-3X.400.5A.XXX
22	-T10	24VDC supply 3A	Schneider Electric	ABL8REM24030
23	-T11	Voltage transformer	Lanne Trafo	Smelzer MS12217 3x4,5kV
	-T12	Voltage transformer	Karsten Moholt	TM-96/45-2,5/30
	-T13	Voltage transformer	Lanne Trafo	Smelzer MS09540 3x3,3kV
	-T14	Voltage transformer	Karsten Moholt	TM-96/45-2,5/30
24	-X3	Terminals from transfor.	Phoenix	UHSK/S 2000 / TP-UK
	-X4	Terminals to rov.	Phoenix	UHSK/S 2000 / TP-UK
	-X5	Terminal signal	Weidmuller	WDU 2,5
	-X6	Terminal signal	Weidmuller	WDU 2,5
25	-SEP 1-10	Safety earthing points Isolator	Maxeta	97202KA24 RSGA3 3kV
		Earthing Rod HVP	Maxeta	P120-JSFB-24
		Earth-cable HVP	Maxeta	P120-1POL35mm2 7KA-1sek