



Elettra Sincrotrone Trieste

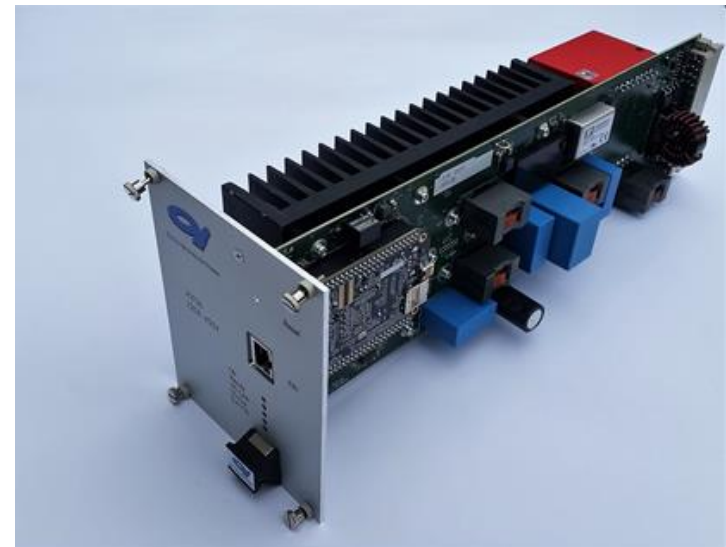
LWU Magnet Power Converters

R. Visintini

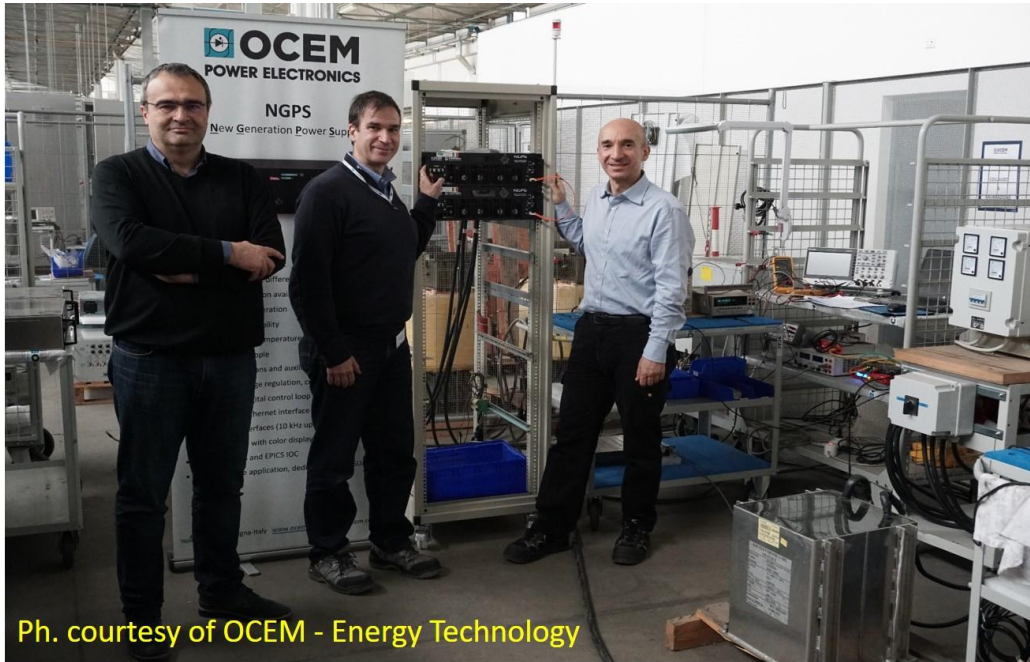
Elettra WU Coordinator for AIK 17.2
Head of the Power Supplies Laboratory

LWU Magnet Power Converters (PCs):

- **133** x Quadrupole PCs, 50 V / 200 A – OCEM's "NGPS" model
- **6** x Big Quadrupole PCs, 50 V / 400 A – 2 x NGPS in parallel
- **1**x Dipole PC, 100 V / 400 A – 4 x NGPS "Special" (100 V / 100 A) in parallel
- **144** x Corrector Power Converters – Elettra's "A2720" (± 20 V / ± 20 A)

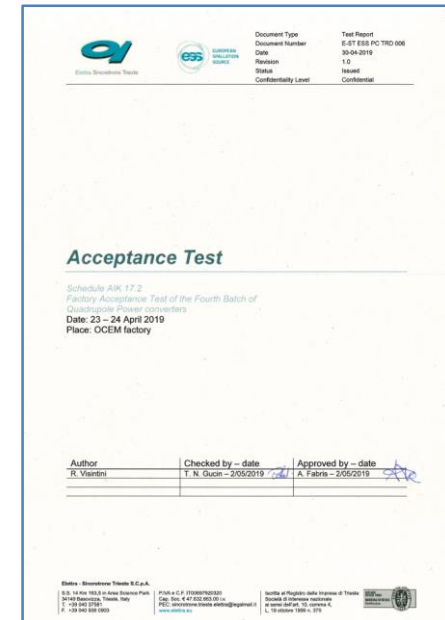
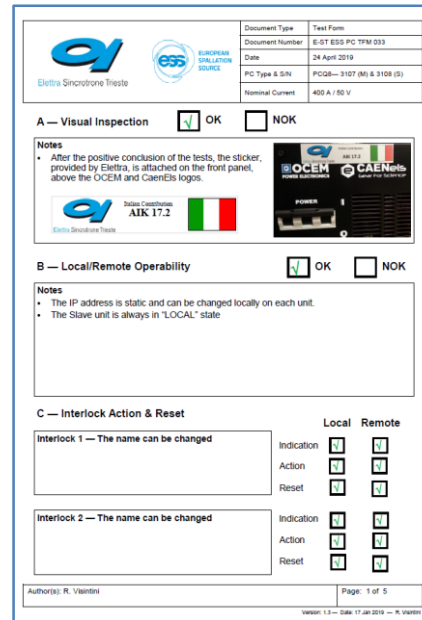
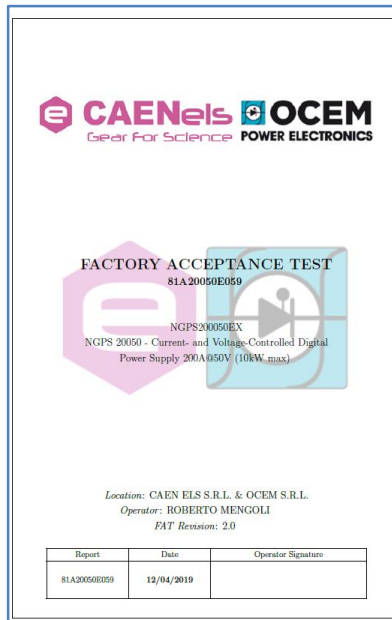
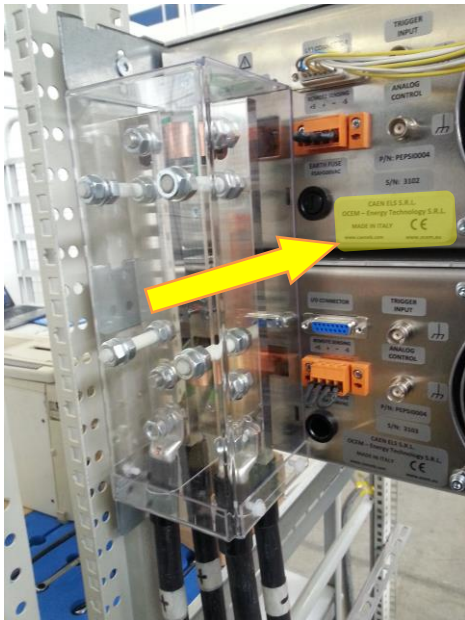
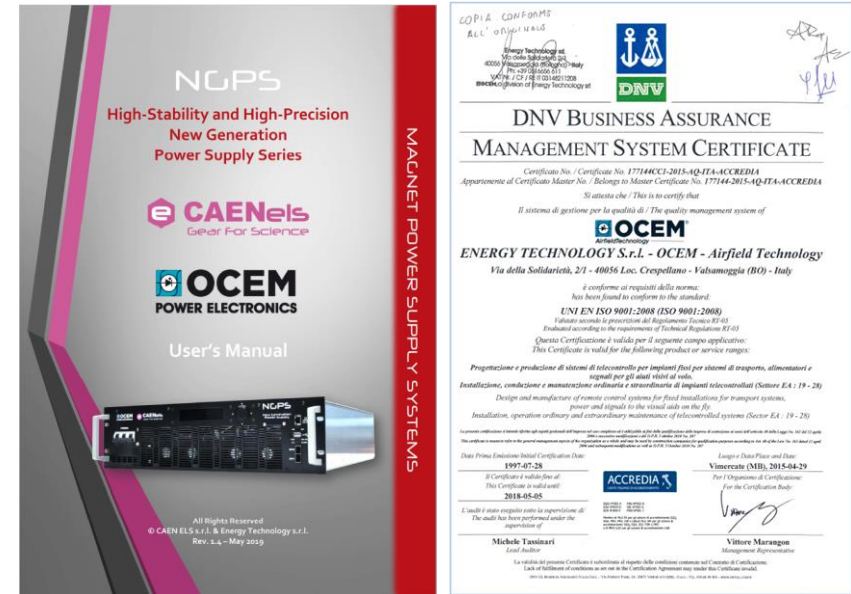


NGPS: Industrial Product



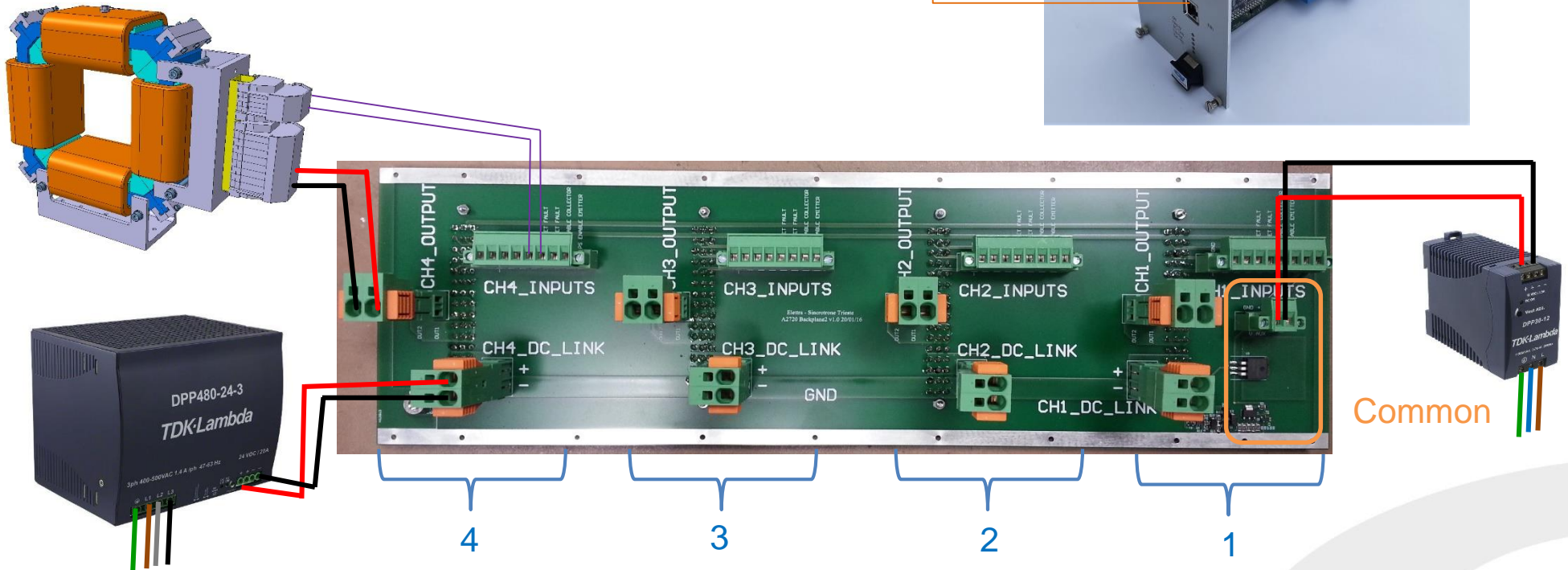
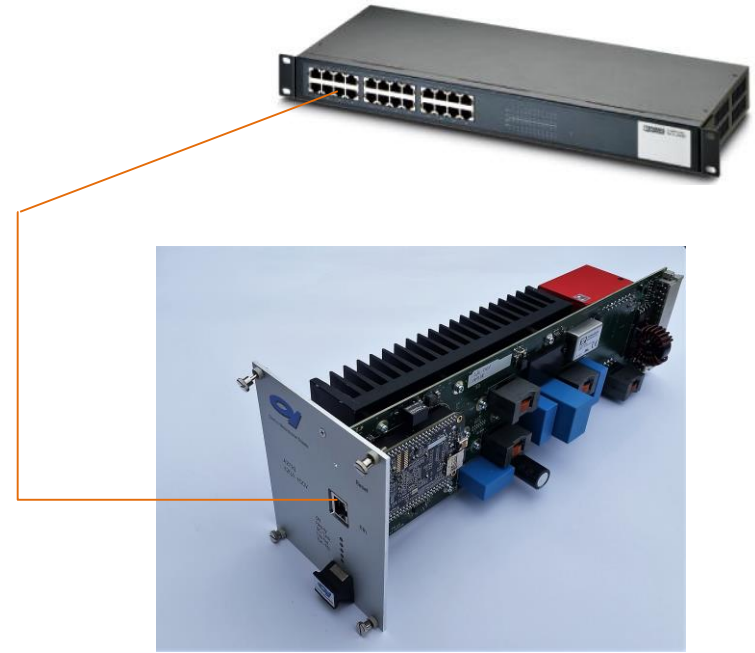
NGPS: Quality Assurance

- Full Documentation (Manuals & Drawings)
- ISO 9001:2008
- CE Marking
- Factory Test protocols and reports
- FAT by Elettra on >25% of PCs
(PCD1 + 5 out 6 PCQ8 + 27 out 133 PCQx)





A2720: The System



A2720: Certification



- CE certification process started and running
- Industrial AC/DC units
- Low DC voltage (Max 24 VDC)
- Full Documentation (Test reports, Manuals and Drawings)

Test Report for A2720 Crate S/N 01: A2720 S/N 001-002-003-004

Schedule AIK 17.2
Calibration and Stability Test of the A2720
bipolar Power converters
Date: 23 July 2019
Place: Elettra, Power Supplies Laboratory

Author	Checked by - date	Approved by - date
R. Visintini	M. Caletto -	A. Fabris -

Technical Data

All specifications are typical at nominal line, full load, 25°C; Unless otherwise noticed.



Inrush Current
400/500Vac
< 20A

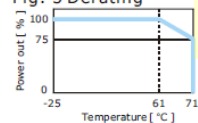
Output Specification

Output Accuracy..... -0%, +1%
Line Regulation..... +/- 1%
Load Regulation..... +/- 1% for single mode
 ± 5% for parallel mode
Ripple & Noise..... 100 mV
Voltage Trim Range..... 22.5 ~ 28.5 Vdc for 24V model
 47 ~ 56 Vdc for 48V model
DC ON Indicator..... Green LED
DC LOW Indicator..... Red LED
Parallel Operation..... 2 unit max.
Turn on time..... <1000ms
Fall time..... <150ms
Rise time..... <150ms
Hold Up Time..... >20ms
Case material..... Metal

Control And Protection
Input Internal Fuse..... T3.15A / 500 Vac internal / phase
Output Short Circuit..... Continuous : Fold Forward
 Discontinuous : Delay 3S shut-down,
 After 30S Auto-restart

Output Over Load..... 110 % ~ 135 %
Approvals And Standard
UL / cUL..... UL 508 Listed, UL 60950-1 Recognized
TUV..... EN 60950-1
CE..... EN 61000-6-3, EN 55022 class B
 EN 61000-3-2, EN 61000-3-3
 EN 61000-6-2, EN 55024
 EN 61000-4-2, -3, -4, -5, -6, -8, -11
 EN 61204-3

Fig. 5 Derating



Input Specification

Rated Input Voltage..... 3Ø 400 - 500 Vac
Input Voltage Range..... 3Ø 340 ~ 575 Vac
Rated Input Current..... 1.4A
Line Frequency..... 47 - 63 Hz
Power Factor..... 0.6

TDK-Lambda DRB Series

15W to 100W Single Output
DIN Rail Mount Power Supplies

Features: Compact Footprint, Low Stand-by Power, Efficiency up to 91%, EMI Compliant Design, Green LED, Green LED, Red LED, 2 unit max.

Benefits: Lower Stand-by Power, Higher Efficiency, Better 'Environmental Footprint', Better 'Environmental Footprint'.

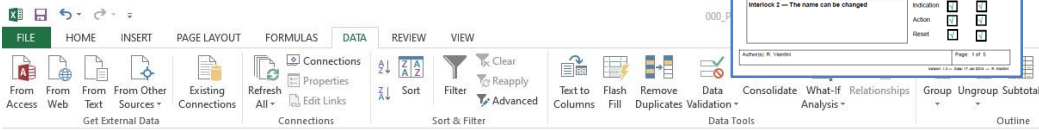
Model	DRB15	DRB24	DRB36	DRB48
AC Input Voltage Range	85-264 (withstand 300VAC for 5 sec)			
Input Frequency	47-63			
DC Input Voltage	5VDC			
Inrush current (typ)	35A	40A	55A	40A
Power factor (typ) (100/230VAC)	0.950-0.91	0.950-0.91	0.905-0.85	0.905-0.85
Input current (typ)	0.27/0.17	0.35/0.33	0.45/0.35	0.45/0.35
Output Voltage	24	32/24	3.3/32/24/48	24
Output current	A	0.6/0	0.6/0.4/1.1/1.0/0.5	0.2
Line regulation	240	120/240	50/150/240/480	240
Load regulation	mV	240	120/240	240
Ripple & noise (typ) (mV)	mV	40/20	30/20/30/40	30
Over current protection	Hi-Z with auto-recovery			
Over-voltage protection (V)	5V: 115%~135%, 12V: 125%~150%, 24V: 125%~140%, 48V: 112%~142% (peak mode)			
Hold up time (230VAC)	ms			
Efficiency (typ) (230VAC)	%	80	80/80/80/81	81
Average efficiency (230VAC)	%	88	87/88	87
No load power	W	<0.3	<0.3	<0.5
Parallel operation	Not available			
Serial operation	Possible			
LED indicators	DC ON signal - green			
Operating temperature (2, 3, 9)	°C			
Storage temperature	°C			
Operating humidity	5-95% RH (non-condensing)			
Operating altitude	m			
Casing (H)	Convection			
Withstand voltage	Input-Output: 3.0kVAC (20mA); Input-FG: 1.5kVAC (20mA); Output-FG: 300VAC (100mA); 1 min.			
Isolation resistance	MO			
Vibration	Input-FG, Input-Output & Output-FG: Min 100Hz (100VDC) at 20°C and 100Hz/100Hz Non-resonance (50-2000Hz) for 1 hour (100 Hz and 2000 Hz Constant, 1/2 Z shock 10g)			
Shock	2000m/s² (2000G) 1ms half sine			
Safety agency approvals (UL)	UL 60950-1, CE, CB, CCC, VDE, EN 60950-1, UL 508			
Enclosures	EN60522, CE, CEPR22 class B			
Immunity	EN61000-4-2, -4, -5, -6, -8, -11			
Weight (kg)	85			
Size (W x H x D)	mm			
Case material	Flame Retardant Polyphosphazene (UL94 V-0)			
Warranty	3			

Notes: 1 Output all divisions, inrush test required (power off then on)
2 For CEEM derating preparation which is recommended at temperature
3 Low Temperature (Min -40°C typical)
4 Refer to actual drawing codes
5 For installation preparation which is recommended for mounting installation
6 Consult Sales Office for low voltage DC input conditions

LWU Magnet PCs: Docs from Elettra

97 Technical Docs (so far)

- PDR & CDR
- Tech Specs for C4T
- Test Forms & Reports



Document Type: Test Form
 Document Number: E-ST ESS-PC TRD 001
 Date: 15-09-2019
 PC Type & Size: PDR - 197 80 x 198 00
 Number Control: K04 - 10 V

A - Visual Inspection [OK] [NOK]

Notes
 After the positive conclusion of the tests, the driver, provided to Elettra, is returned on the field panel, above the OCSEM and C4TSS logo.

B - Local/Remote Operability [OK] [NOK]

Notes
 The IP address is static and can be changed locally on each unit.
 The slave unit is always in "LOCAL" state.

C - Interlock Action & Reset Local Remote

Interlock 1 - The name can be changed

Initiation	OK
Reset	OK
Action	OK

Interlock 2 - The name can be changed

Initiation	OK
Reset	OK
Action	OK

Document Type: Test Report
 Document Number: E-ST ESS-PC TRD 005
 Date: 15-09-2019
 PC Type & Size: PDR - 197 80 x 198 00
 Number Control: K04 - 10 V

Acceptance Test

Subserie 008 172
 Location: Elettra Sincrotrone Trieste - Area 4
 Date: 15-09-2019
 Place: OCSEM factory

Notes
 The IP address is static and can be changed locally on each unit.
 The slave unit is always in "LOCAL" state.

Author: R. Visintini
 Checked by: G. M. Castoro
 Approved by: G. M. Castoro

Technical specification of the DC Power Converters for Quadrupole Magnets Q5, Q6, Q7, Q8, and Dipole Magnets D1 (PCQ5, PCQ6, PCQ7, PCQ8, and PCD1)

Schedata AN: 172
 CDR Meeting regarding Quadrupole and Vertical Dipole Magnet Power Converters
 Date: 20 September 2019
 Place: Elettra and ESS via Valbio via conferencing

Author: R. Visintini
 Checked by: G. M. Castoro
 Approved by: G. M. Castoro

Report of the CDR 2 & 3

Schedata AN: 173
 CDR Meeting regarding Quadrupole and Vertical Dipole Magnet Power Converters
 Date: 20 September 2019
 Place: Elettra and ESS via Valbio via conferencing

Author: R. Visintini
 Checked by: G. M. Castoro
 Approved by: G. M. Castoro

A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Title	Author	Document Type	Code	Revis	Date	Note		Title	Author	Document	Code	
1	CDR-1 Bipolar Power Converters for Corrector Magnets								FA1 Test Reports for the Corrector, Quadrupole, and Vertical Dipole Power				
2	1 CDR of Bipolar Power Converters for Corrector Magnets: List of Documents	R. Visintini (Elettra)	List of Document	E-ST ESS-PC DPD 001	0	13-09-2018		55	Test Results on Bulk Power Supplies (TDK-Lambda DFP480-243)	M. Castoro, T.N. Gush (Elettra)	Test Report	E-ST ESS-PC TRD 004	
3	2 Critical Design Review (CDR) for ESS HQ Power Converters for LWU Corrector Magnets. Charge for C. Marinis (ESS)	R. Visintini (Elettra)	Generic Document	ESS-000004	1	25/04/2016	Preliminary Comments from RW, no reply at 02/05/2016	56	Factory Acceptance Test of the First Batch of Dipole and Quadrupole Power Converters	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 005	
4	3 CDR of Bipolar Power Converters for Corrector Magnets: System Description	R. Visintini (Elettra)	Technical Report	E-ST ESS-PC CDR 001	0	13-09-2018		57	Test of the First Batch of Bipolar Power Converters for corrector magnets	M. Castoro (Elettra)	Test Report	E-ST ESS-PC TRD 006	
5	4 CDR of Bipolar Power Converters for Corrector Magnets: Interface to ESS	R. Visintini (Elettra)	Interface to ESS	E-ST ESS-PC ICD 001	0	13-09-2018		58	Factory Acceptance Test of the Second Batch of Quadrupole Power Converters	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 007	
6	5 CDR of Bipolar Power Converters for Corrector Magnets: Contract Management and Quality Control	R. Visintini (Elettra)	Quality Control	E-ST ESS-PC QCD 001	0	00/09/1900	To be sent later according to ESS template	59	Factory Acceptance Test of the Third Batch of Quadrupole Power Converters	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 008	
7	6 CDR of Bipolar Power Converters for Corrector Magnets: Safety Information	R. Visintini (Elettra)	Safety Information	E-ST ESS-PC SCD 001	0	13-09-2018		60	Factory Acceptance Test of the Fourth Batch of Quadrupole Power Converters	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 009	
8	7 CDR of Bipolar Power Converters for Corrector Magnets: FPM	R. Visintini (Elettra)	FPM	E-ST ESS-PC GPD 006	0	13-09-2018		61	Test Report for A2720 Crane SM 01: A2720 SM 001-002-003-004	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 010	
9	8 CDR of Bipolar Power Converters for Corrector Magnets: Time Schedule	R. Visintini (Elettra)	Time Schedule	E-ST ESS-PC TSC 001	0	13-09-2018		62	Test Report for A2720 Crane SM 02: A2720 SM 005-006-007-008	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 011	
10	9 CDR of Bipolar Power Converters for Corrector Magnets: Procurement Strategy	R. Visintini (Elettra)	Procurement Strategy	E-ST ESS-PC GPD 006	0	13-09-2018		63	Test Report for A2720 Crane SM 03: A2720 SM 009-008-010-011	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 012	
11	10 CDR of Bipolar Power Converters for Corrector Magnets: Risk Register	R. Visintini (Elettra)	Risk Register	E-ST ESS-PC GPD 006	0	13-09-2018		64	Test Report for A2720 Crane SM 04: A2720 SM 013-014-016-018	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 013	
12	PH1-1 Pulsed Power Converters for Quadrupole Magnets							65	Test Report for A2720 Crane SM 05: A2720 SM 017-018-019-020	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 014	
13	14 PH1-1 Pulsed Power Converters for Quadrupole Magnets: List of Documents	R. Visintini (Elettra)	List of Document	E-ST ESS-PC GPD 001	0	13-09-2018		66	Test Report for A2720 Crane SM 06: A2720 SM 021-022-023-024	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 015	
14	15 Preliminary Design Review (PDR) ESS Pulsed Power Converters for Quadrupole Magnets. Charge for C. Marinis (ESS)	R. Visintini (Elettra)	Generic Document	ESS-000004	1	25/03/2016	Preliminary Comments from RW, no reply at 02/05/2016	67	Test Report for A2720 Crane SM 07: A2720 SM 025-026-027-028	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 016	
15	16 PDR of Pulsed Power Converters for Quadrupole Magnets: System Description	M. Castroro, R. Visintini (Elettra)	Technical Report	E-ST ESS-PC PDR 001	0	13-09-2018		68	Test Report for A2720 Crane SM 08: A2720 SM 029-030-031-032	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 017	
16	17 PDR of Pulsed Power Converters for Quadrupole Magnets: Interface to ESS	R. Visintini (Elettra)	Interface to ESS	E-ST ESS-PC ICD 002	0	13-09-2018		69	Test Report for A2720 Crane SM 09: A2720 SM 033-034-035-036	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 018	
17	18 PDR of Pulsed Power Converters for Quadrupole Magnets: Contract Management and Quality Control	R. Visintini (Elettra)	Quality Control	E-ST ESS-PC QCD 002	0	13-09-2018	To be sent later according to ESS template	70	Test Report for A2720 Crane SM 10: A2720 SM 037-038-039-040	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 019	
18	19 PDR of Pulsed Power Converters for Quadrupole Magnets: Safety Information	R. Visintini (Elettra)	Safety Information	E-ST ESS-PC SCD 002	0	13-09-2018		71	Test Report for A2720 Crane SM 11: A2720 SM 041-042-043-044	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 020	
19	20 PDR of Pulsed Power Converters for Quadrupole Magnets: FPM	R. Visintini (Elettra)	FPM	E-ST ESS-PC GPD 006	0	13-09-2018		72	Test Report for A2720 Crane SM 12: A2720 SM 045-046-047-048	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 021	
20	21 PDR of Pulsed Power Converters for Quadrupole Magnets: Time Schedule	R. Visintini (Elettra)	Time Schedule	E-ST ESS-PC TSC 002	0	13-09-2018		73	Test Report for A2720 Crane SM 13: A2720 SM 049-050-051-052	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 022	
21	22 PDR of Pulsed Power Converters for Quadrupole Magnets: Procurement Strategy	R. Visintini (Elettra)	Procurement Strategy	E-ST ESS-PC GPD 006	0	13-09-2018		74	Test Report for A2720 Crane SM 14: A2720 SM 053-054-055-056	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 023	
22	23 PDR of Pulsed Power Converters for Quadrupole Magnets: Risk Register	R. Visintini (Elettra)	Risk Register	E-ST ESS-PC GPD 006	0	13-09-2018		75	Test Report for A2720 Crane SM 15: A2720 SM 057-058-059-060	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 024	
23	PDR-2 DC Power Converters for Quadrupole Magnets							76	Test Report for A2720 Crane SM 16: A2720 SM 061-062-063-064	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 025	
24	24 PDR-2 of DC Power Converters for Quadrupole Magnets: List of Documents	R. Visintini (Elettra)	List of Document	E-ST ESS-PC GPD 006	0	29/03/2017		77	Test Report for A2720 Crane SM 17: A2720 SM 065-066-067-068	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 026	
25	25 PDR-2 of DC Power Converters for Quadrupole Magnets: Inflation and Required Documents	C. Marinis (ESS)	PDR	E-ST ESS-PC PDR 006	0	16/03/2017		78	Test Report for A2720 Crane SM 18: A2720 SM 069-070-071-072	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 027	
26	26 PDR-2 of DC Power Converters for Quadrupole Magnets: Extended Technical Specification	R. Visintini (Elettra)	Technical Report	E-ST ESS-PC PDR 006	0	29/03/2017		79	Test Report for A2720 Crane SM 19: A2720 SM 073-074-075-076	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 028	
27	27 PDR-2 of DC Power Converters for Quadrupole Magnets: Survey of COTS-like Products	R. Visintini (Elettra)	Survey	E-ST ESS-PC GPD 006	0	29/03/2017		80	Test Report for A2720 Crane SM 20: A2720 SM 077-078-079-080	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 029	
28	28 PDR-2 of DC Power Converters for Quadrupole Magnets: Interface to ESS	P. Tosi (ESS)	Interface to ESS	E-ST ESS-PC ICD 003	0	12/07/2016		81	Test Report for A2720 Crane SM 21: A2720 SM 081-082-083-084	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 030	
29	29 PDR-2 of DC Power Converters for Quadrupole Magnets: Time Schedule	R. Visintini (Elettra)	Time Schedule	E-ST ESS-PC TSC 003	0	29/03/2017		82	Test Report for A2720 Crane SM 22: A2720 SM 085-086-087-088	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 031	
30	PH1-2 DC Power Converters for Dipole 3 and Quadrupole 6							83	Test Report for A2720 Crane SM 23: A2720 SM 089-090-091-092	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 032	
31	30 PH1-2 of DC Power Converters for Quadrupole Magnets: List of Documents	R. Visintini (Elettra)	List of Document	E-ST ESS-PC GPD 001	0	20/06/2017		84	Test Report for A2720 Crane SM 24: A2720 SM 093-094-095-096	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 033	
32	31 PH1-2 of DC Power Converters for Quadrupole Magnets: Inflation and Required Documents	C. Marinis (ESS)	PDR	E-ST ESS-PC PDR 006	0	10/06/2017	NON Pervenuto	85	Test Report for A2720 Crane SM 25: A2720 SM 097-098-099-100	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 034	
33	32 PH1-2 of DC Power Converters for Quadrupole Magnets: Extended Technical Specification	R. Visintini (Elettra)	Technical Report	E-ST ESS-PC PDR 006	0	20/06/2017		86	Test Report for A2720 Crane SM 26: A2720 SM 101-102-103-104	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 035	
34	33 PH1-2 of DC Power Converters for Quadrupole Magnets: Interface to ESS	R. Visintini (Elettra)	Interface to ESS	E-ST ESS-PC ICD 006	0	10/06/2017	NON Pervenuto	87	Test Report for A2720 Crane SM 27: A2720 SM 105-106-107-108	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 036	
35	34 PH1-2 of DC Power Converters for Quadrupole Magnets: Procurement and Time Schedule	R. Visintini (Elettra)	Time Schedule	E-ST ESS-PC TSC 004	0	20/06/2017		88	Test Report for A2720 Crane SM 28: A2720 SM 109-110-111-112	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 037	
36	C4T Call for Tender of PCQ5, PCQ6, PCQ7, PCQ8 & PCD1							89	Test Report for A2720 Crane SM 29: A2720 SM 113-114-115-116	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 038	
37	35 Call for Tender of PCQ5, PCQ6, PCQ7, PCQ8, and PCD1	R. Visintini (Elettra)	Technical specification	E-ST ESS-PC TSD 001	16	13-09-17		90	Test Report for A2720 Crane SM 30: A2720 SM 117-118-119-120	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 039	
38	36 Call for Tender of PCQ5, PCQ6, PCQ7, PCQ8, and PCD1	R. Visintini (Elettra)	Valutazione tecnico-prezzo offer	E-ST ESS-PC GPD 002	12	20/08/2017		91	Test Report for A2720 Crane SM 31: A2720 SM 121-122-123-124	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 040	
39	37 Call for Tender of PCQ5, PCQ6, PCQ7, PCQ8, and PCD1	R. Visintini (Elettra)	Valutazione tecnico-prezzo offer	E-ST ESS-PC GPD 002	12	20/08/2017		92	Test Report for A2720 Crane SM 32: A2720 SM 125-126-127-128	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 041	
40	38 Call for Tender of PCQ5, PCQ6, PCQ7, PCQ8, and PCD1	R. Visintini (Elettra)	Valutazione tecnico-prezzo offer	E-ST ESS-PC GPD 002	12	20/08/2017		93	Test Report for A2720 Crane SM 33: A2720 SM 129-130-131-132	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 042	
41	39 Technical specification for the supply of the Power Converters for Corrector Magnets C5, C6, and C7 (PCQ5, PCQ6, PCQ7, PCQ8)	M. Castroro (Elettra)	Technical specification	E-ST ESS-PC TSD	5.3	13-09-17		94	Test Report for A2720 Crane SM 34: A2720 SM 133-134-135-136	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 043	
42	40 Summary Full System	M. Castroro (Elettra)	Summary	Summary Full System	10	13-09-17		95	Test Report for A2720 Crane SM 35: A2720 SM 137-138-139-140	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 044	
43	41 BOM Sub-Rack	M. Castroro (Elettra)	Bill Of Material	BOM Sub-Rack	10	13-09-17		96	Test Report for A2720 Crane SM 36: A2720 SM 141-142-143-144	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 045	
44	42 BOM backplane v2.1	M. Castroro (Elettra)	Bill Of Material	BOM backplane	2.1	13-09-17		97	Test Report for A2720 Crane SM 37 (gate only)	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 046	
45	43 BOM A2720 v3.0	M. Castroro (Elettra)	Bill Of Material	BOM A2720	3.0	13-09-17		98	Test Report for A2720 Crane SM 38 (gate only)	R. Visintini (Elettra)	Test Report	E-ST ESS-PC TRD 047	
46	44 BOM bridge v1.0	M. Castroro (Elettra)	Bill Of Material	BOM bridge	1.0	13-09-17							
47	45 Hardware A2720	M. Castroro (Elettra)	CAD drawing	Hardware A2720	1.0	13-09-17							
48	46 A2720 Panel v3.0 - view	M. Castroro (Elettra)	CAD drawing	A2720 Panel	3.0	13-09-17							
49	CDR-2 CDR for the Quadrupole and Vertical Dipole Power Converters												
50	47 Agenda of CDR-2 and CDR-3 for Quadrupole and Dipole Power Converters	C. Marinis (ESS)	Meeting Agenda		0	15-09-18							
51	48 Critical Design Review (CDR-2 and CDR-3) for Quadrupole and Dipole Power Converters - LWU	R. Visintini (Elettra)	Generic Document	ESS-000004	1	13-09-18							
52	49 Quadrupole Power Converters type PCQ5, PCQ6, PCQ7, Quadrupole Power Converters type PCQ8 and Dipole Power Converters type PCD1, Charge the CDR	R. Visintini (Elettra)	Technical Report	E-ST ESS-PC CDR 001	0	13-09-18							
53	50 Communication Scheme	R. Visintini (Elettra)	Presentation		0	20-09-18							
54	51 CDR-2.3: Quadrupole PCs Presentation, DRAFT	P. Bruni (ET-C), E. Braldotti	Presentation		0	20-09-18							
55	52 Technical Construction File for the PSUs for Quadrupoles Q5, Q6, Q7, Q8 and Dipole D1 for ESS	P. Bruni (ET-C), E. Braldotti	Technical Construction File	UT-TR-0660	0	13-Aug-18							
56	53 Time Schedule	R. Visintini (Elettra)	Presentation		0	20-09-18							
57	54 CDR-2.3: CDR for Quadrupole & Dipole Power Converters - Closeout	J.G. Weisend (ESS, Chairman)	Technical Document		0	20-09-18							
58	55 CDR-2.3: Comments to Recommendations	J.G. Weisend (ESS, Chairman)	Technical Document	UT-NT-0528	1	01-Oct-18							
59	56 Report of the Critical Design Reviews 2 & 3 for the Quadrupole and Vertical Dipole Magnet Power	C. Marinis (ESS, Head of Accelerator Project)	Review Report	ESS-043223	1	18-Oct-18							
60	57 Report of the CDR 2 & 3	R. Visintini (Elettra)	Technical Design Report	E-ST ESS-PC TDR 001	1	16-Oct-18							





Elettra
Sincrotrone
Trieste

...any Question?



Archivio Barcolana/StudioBorlenghi



LWU Magnet Power Converters, Elettra

Roberto Visintini, October 15th, 2019