



Elettra Sincrotrone Trieste

The **ESS** WS OFE and Cabling
Milestone

Sandi Grulja

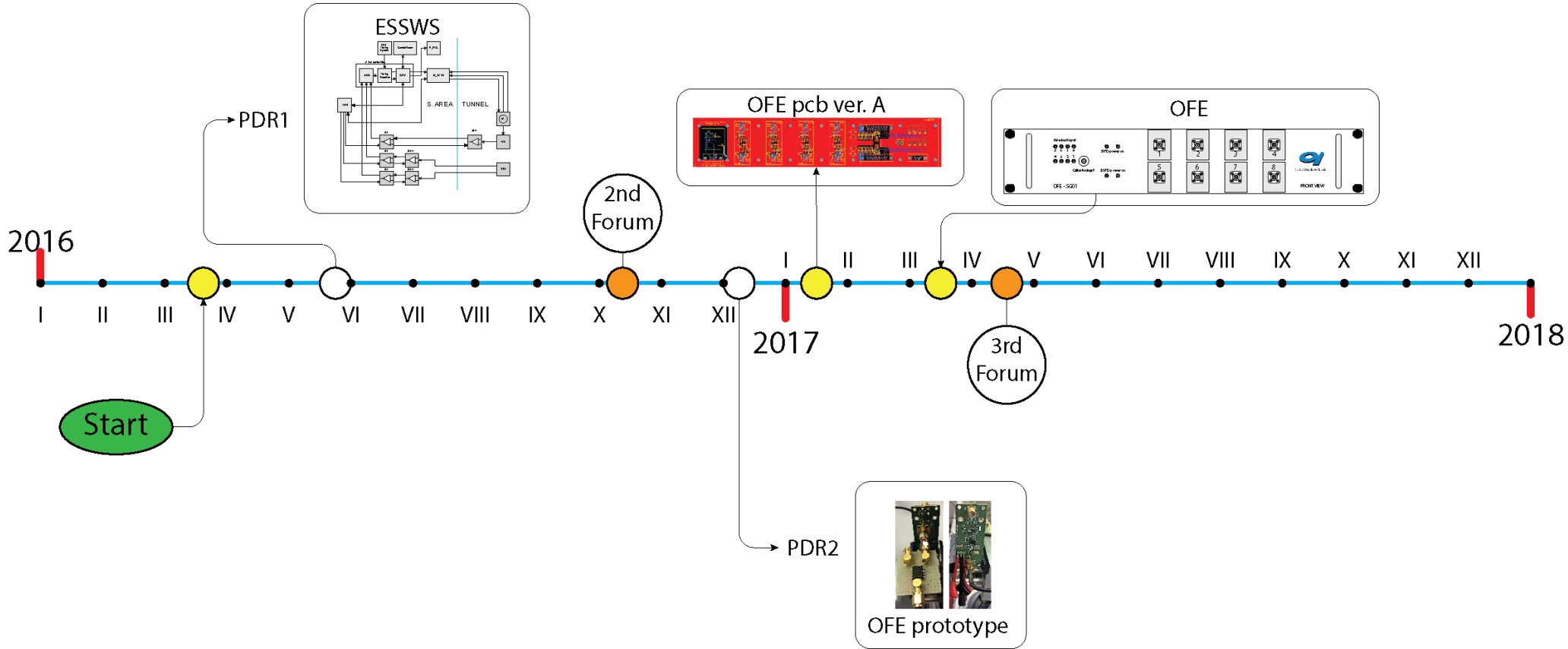
Main view of presentation:

- OFE and Cabling milestone
- OFE electronics update
- Cabling



Elettra
Sincrotrone
Trieste

OFE and Cabling in time view



3rd BI Forum - Trieste

Sandi Grulja, Apr 26. – 4. 2017



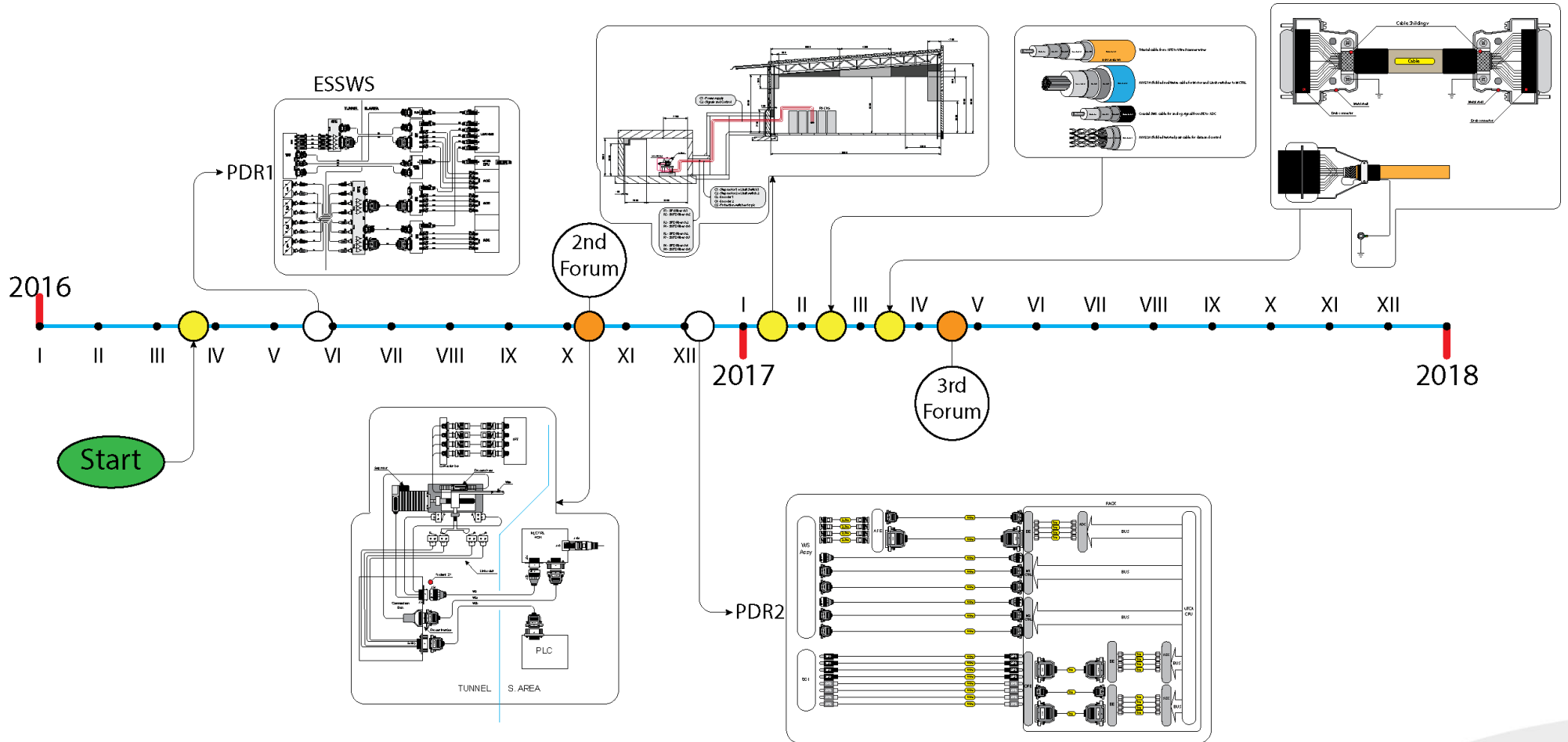
3

OHSAS 18001



Elettra
Sincrotrone
Trieste

OFE and cabling in time view



3rd BI Forum - Trieste

Sandi Grulja, Apr 26. – 4. 2017



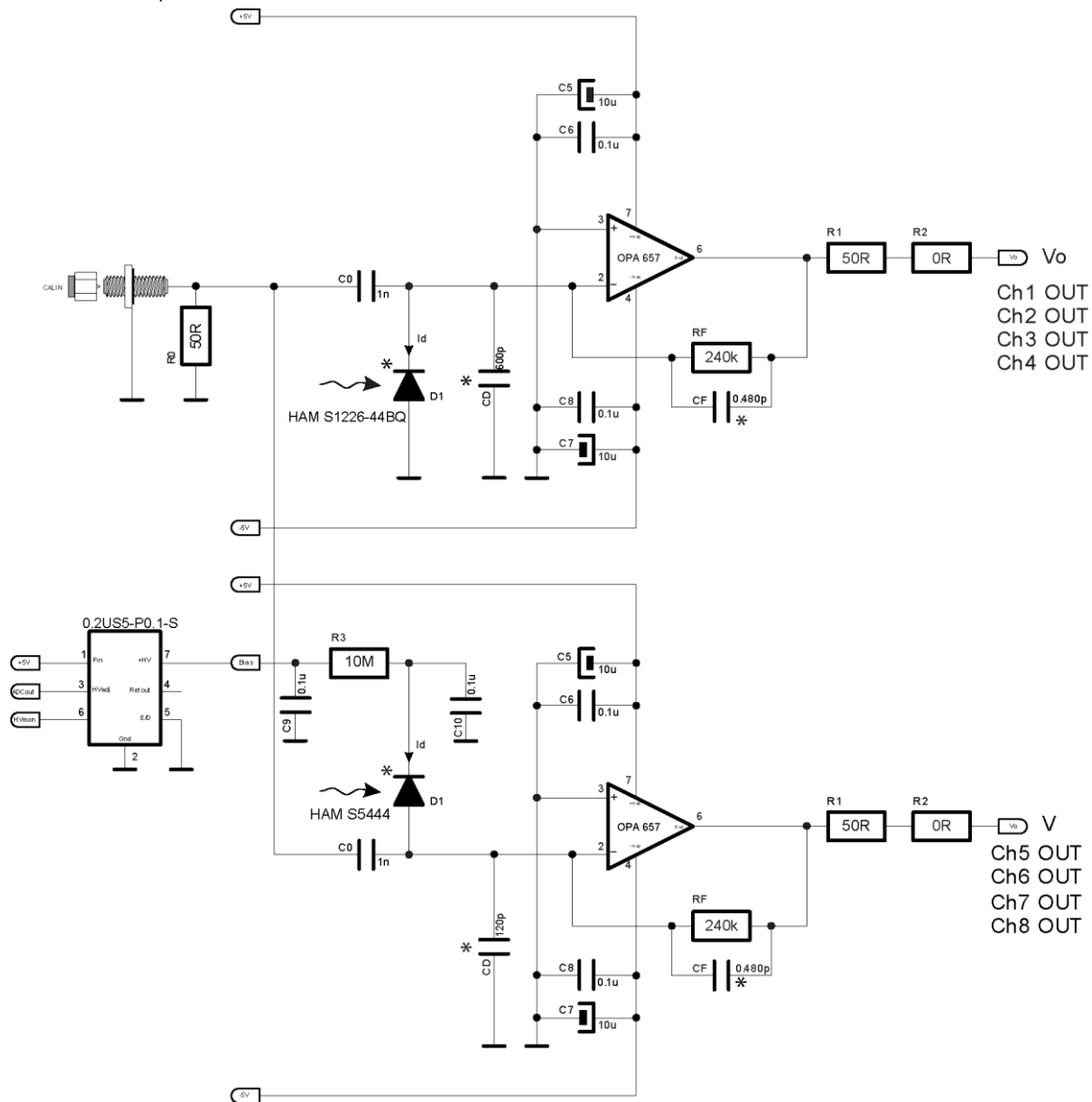


Eletra
Sincrotrone
Trieste

OFE electronics update



OFE analog input electronic part



3rd BI Forum - Trieste

Sandi Grulja, Apr 26. – 4. 2017

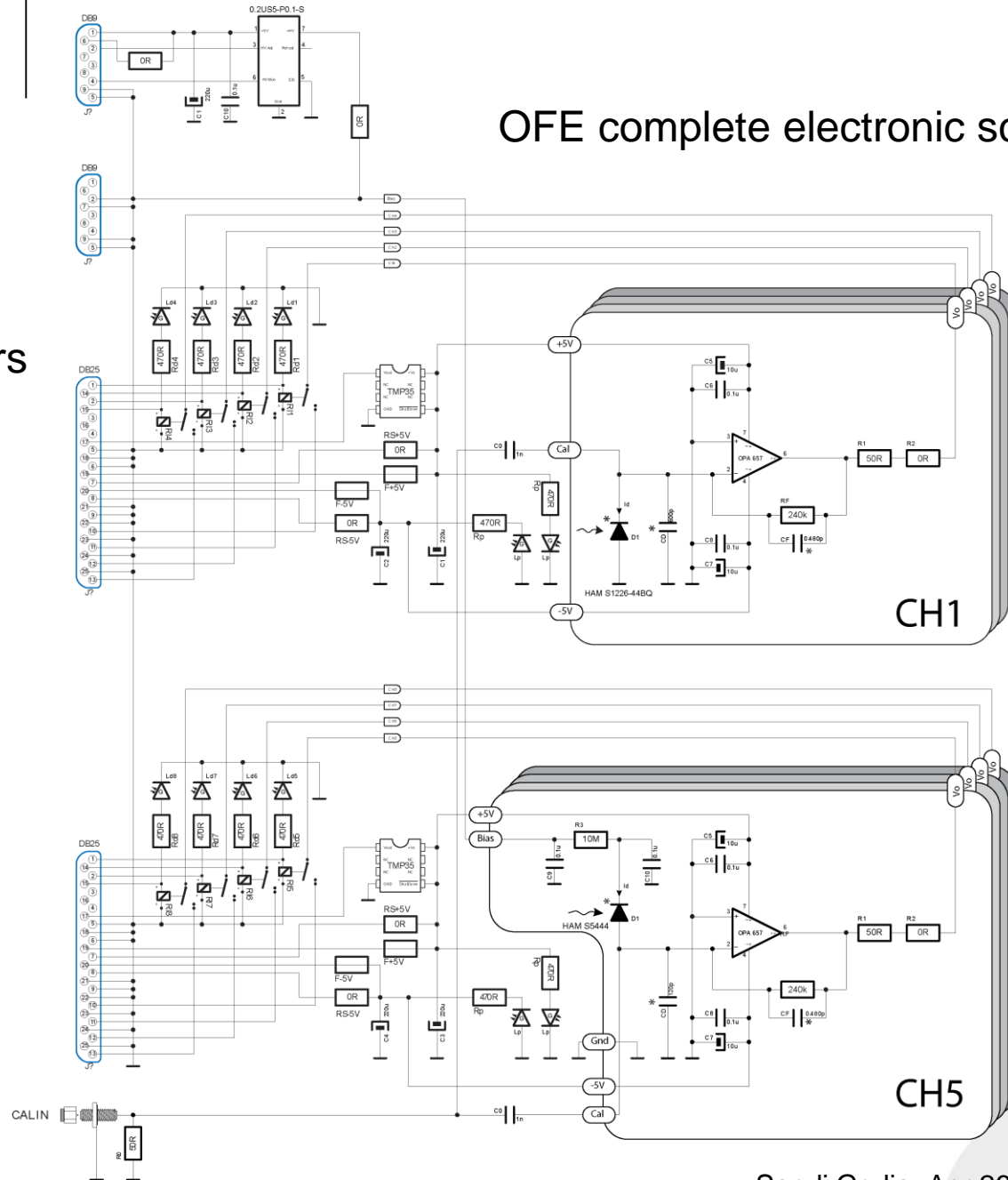




OFE electronics update

- Single pcb design
- Temperature sensors
- Input selector with led indicators
- Power supply led indicators
- Calibration input for test or calibration

OFE complete electronic schematic



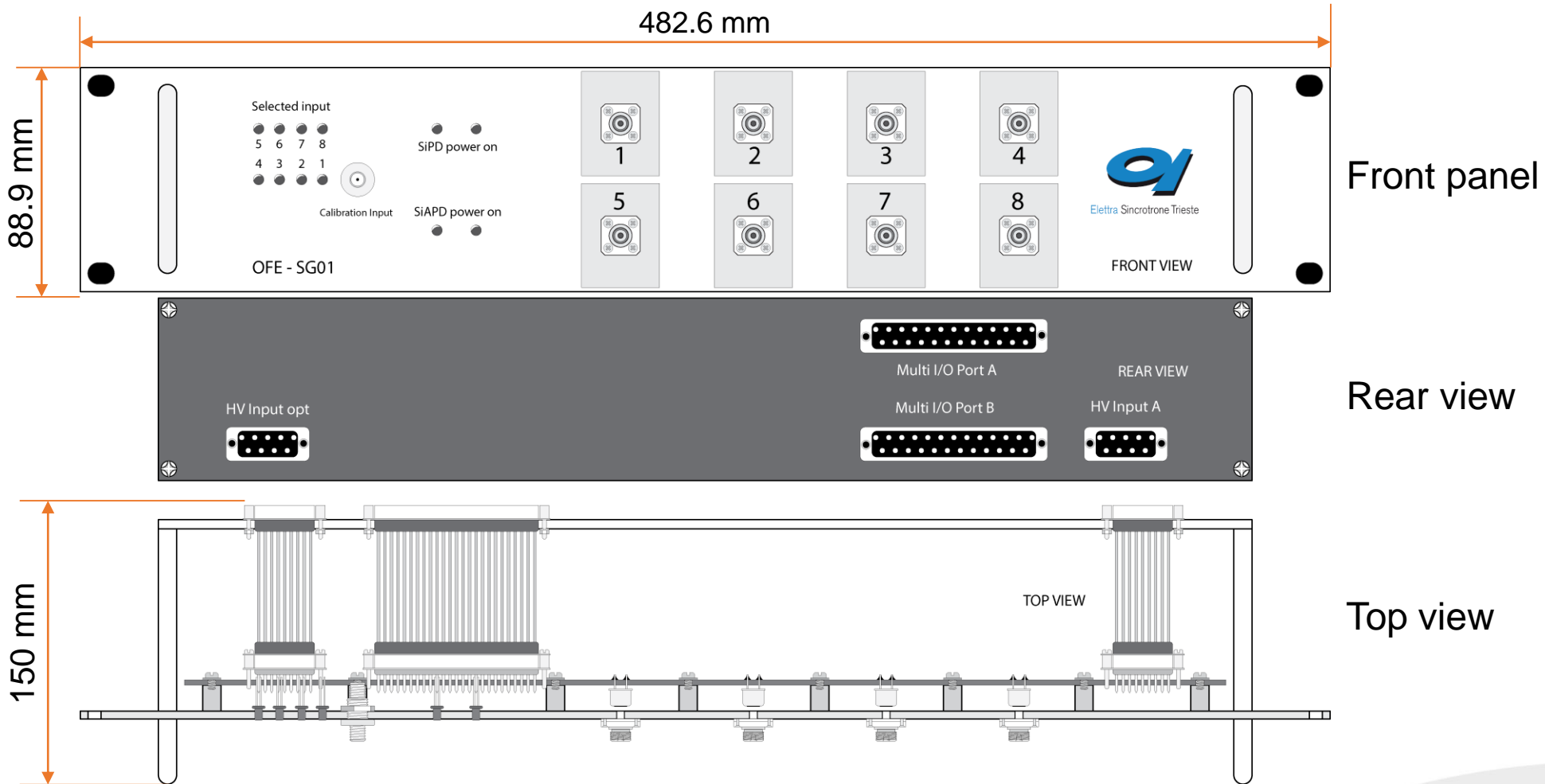


Elettra
Sincrotrone
Trieste

OFE

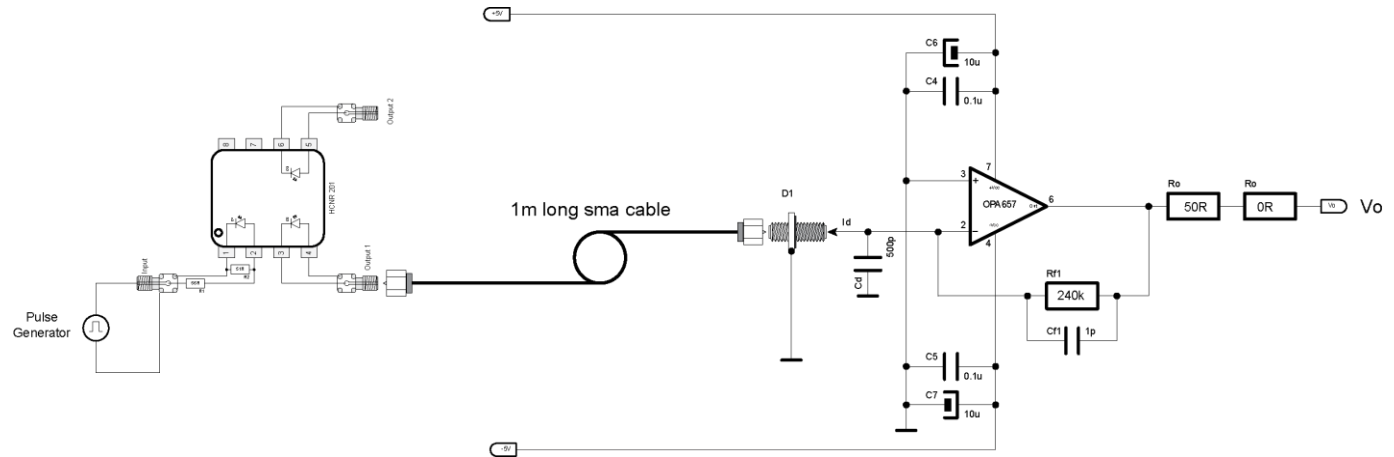


2U 19" rack mount cabinet



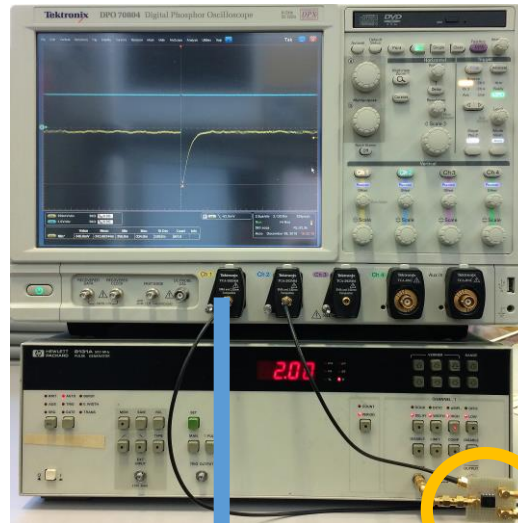


Electrical test layout



DPO70804

HP8131A



1m long sma cable

Photo diode input

Rear

Front

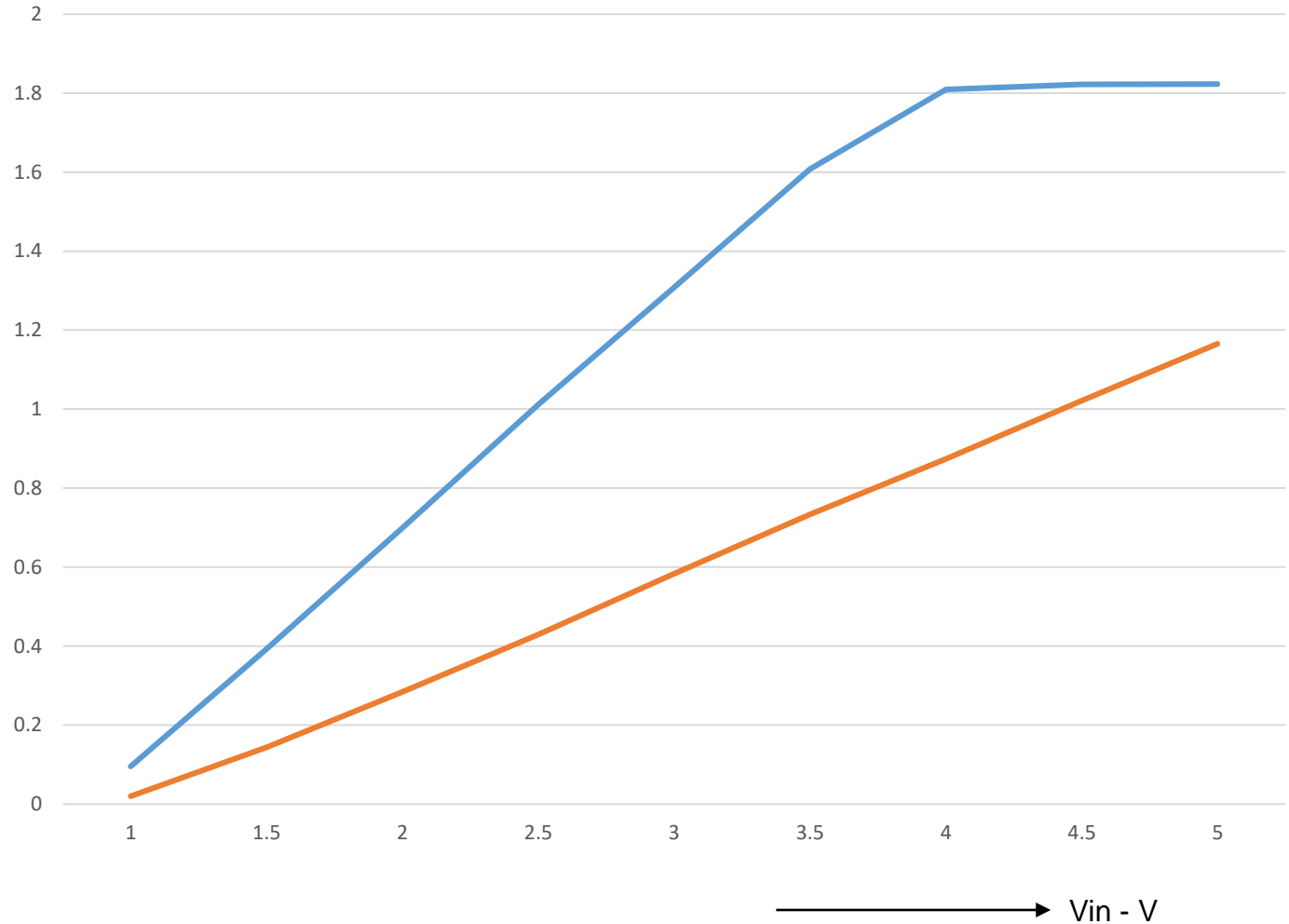
OFE prototype



Photo Current Generator

Prototype measurement results

Vin	Vout100	Vout50	Vout V
1	0.095	0.02	
1.5	0.393	0.144	
2	0.699	0.284	
2.5	1.011	0.429	
3	1.308	0.583	
3.5	1.608	0.733	
4	1.809	0.874	
4.5	1.822	1.021	
5	1.823	1.165	



50Hz pulses to photo diode current generator



Pulse width 100ns

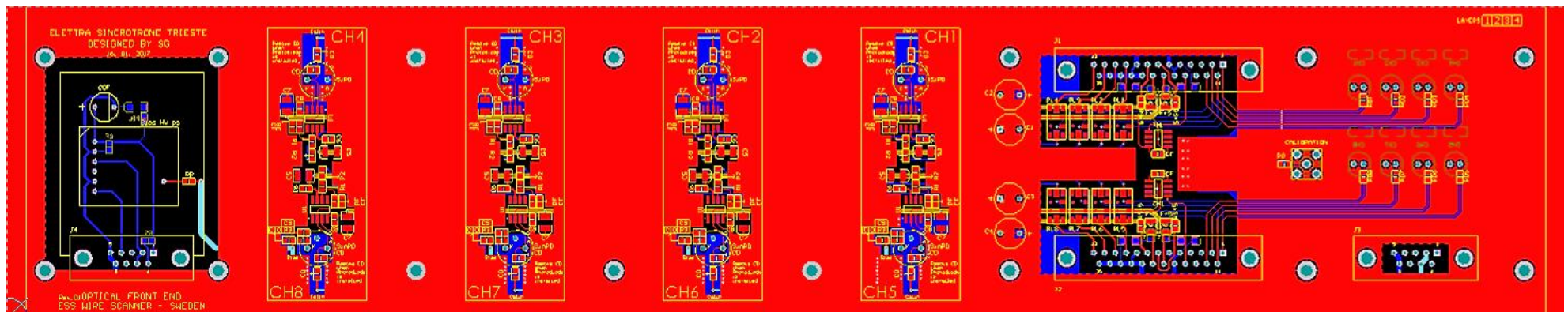


Pulse width 50ns



Single pcb design

Dim W 400 mm H 80 mm
4 layers
Black solder mask



HV source optional

Inputs

Power supply
Input selector
Temp sensors
Output

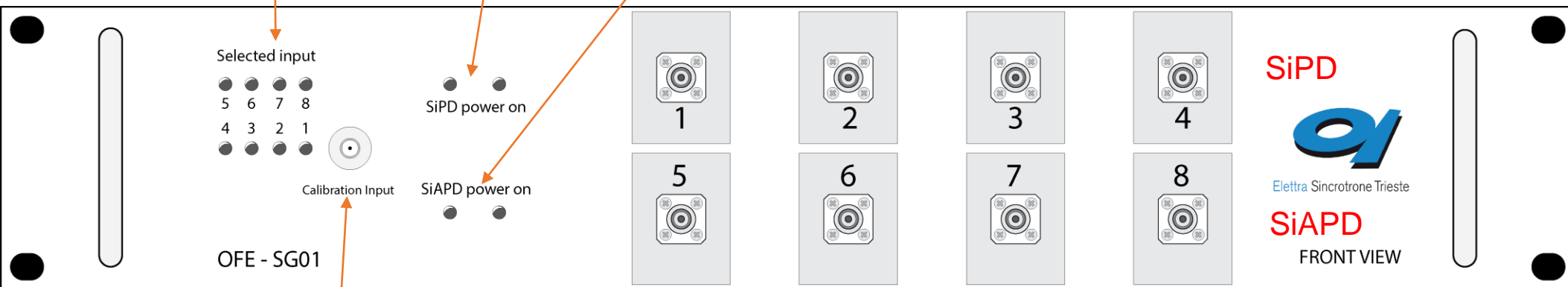
HV input

Front panel of OFE

Power supply indicator for SiPD inputs

Input selector indicator

Power supply indicator for SiAPD inputs



Calibration input

Inputs



Elettra Sincrotrone Trieste

The ESS WS Cabling

Sandi Grulia

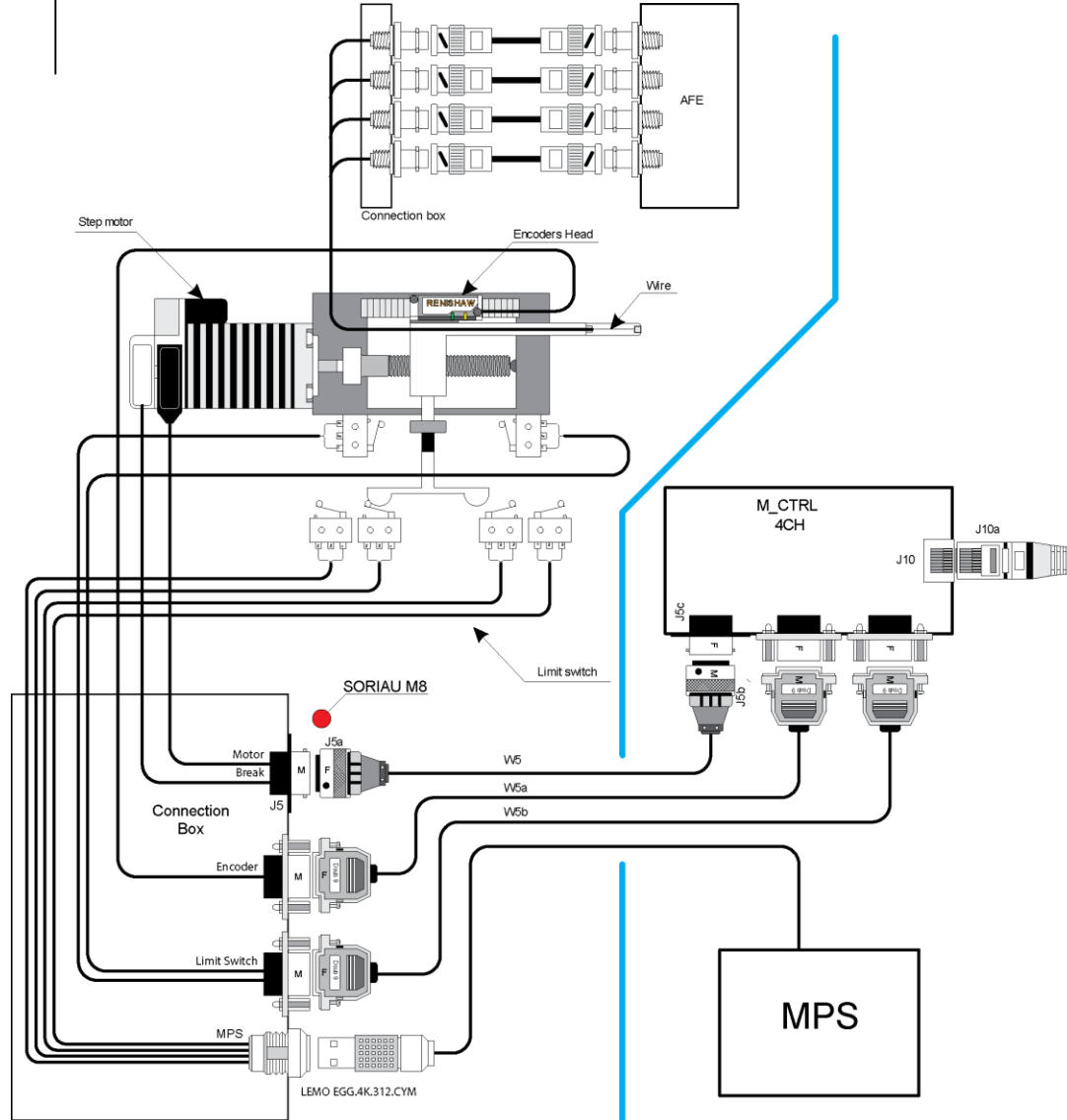


Elettra
Sincrotrone
Trieste

The ESS WS Motion Cabling



Updated



TUNNEL

S. AREA



3rd BI Forum - Trieste

Sandi Grulja, Apr 26. – 4. 2017



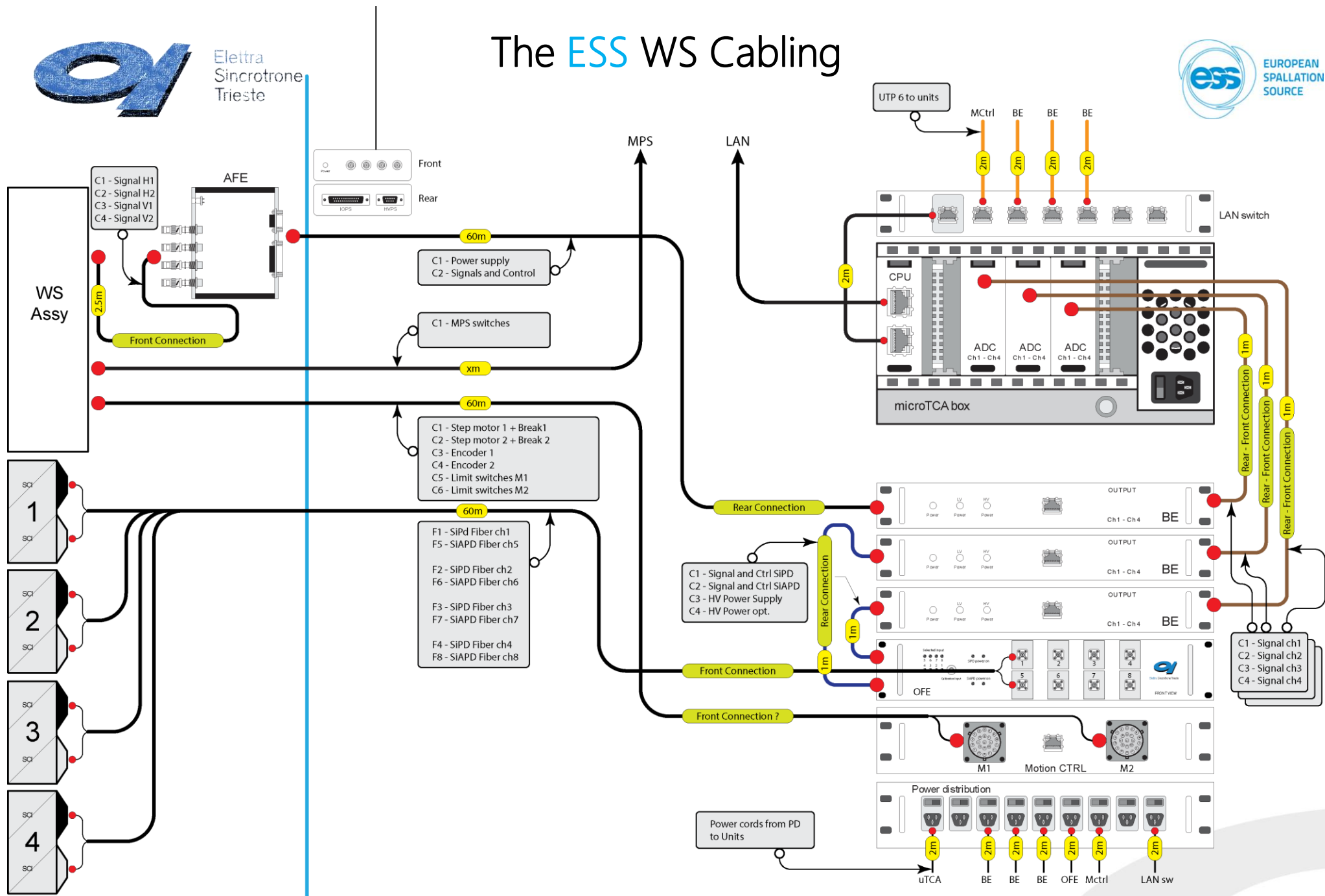
13

OHSAS 18001



Elettra Sincrotrone Trieste

The ESS WS Cabling



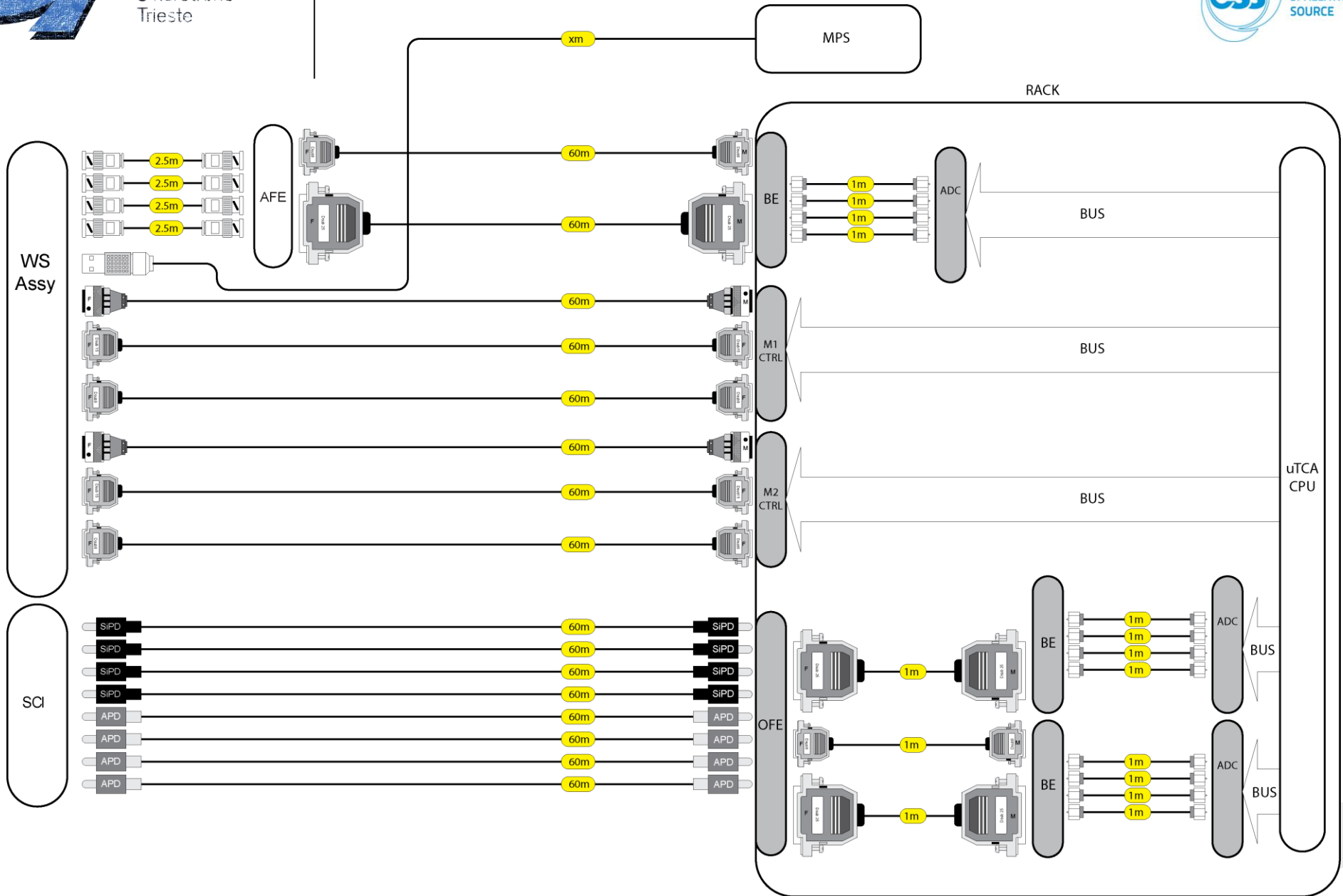
TUNNEL S. AREA
3rd BI Forum - Trieste

Sandi Grulja, Apr 26. – 4. 2017



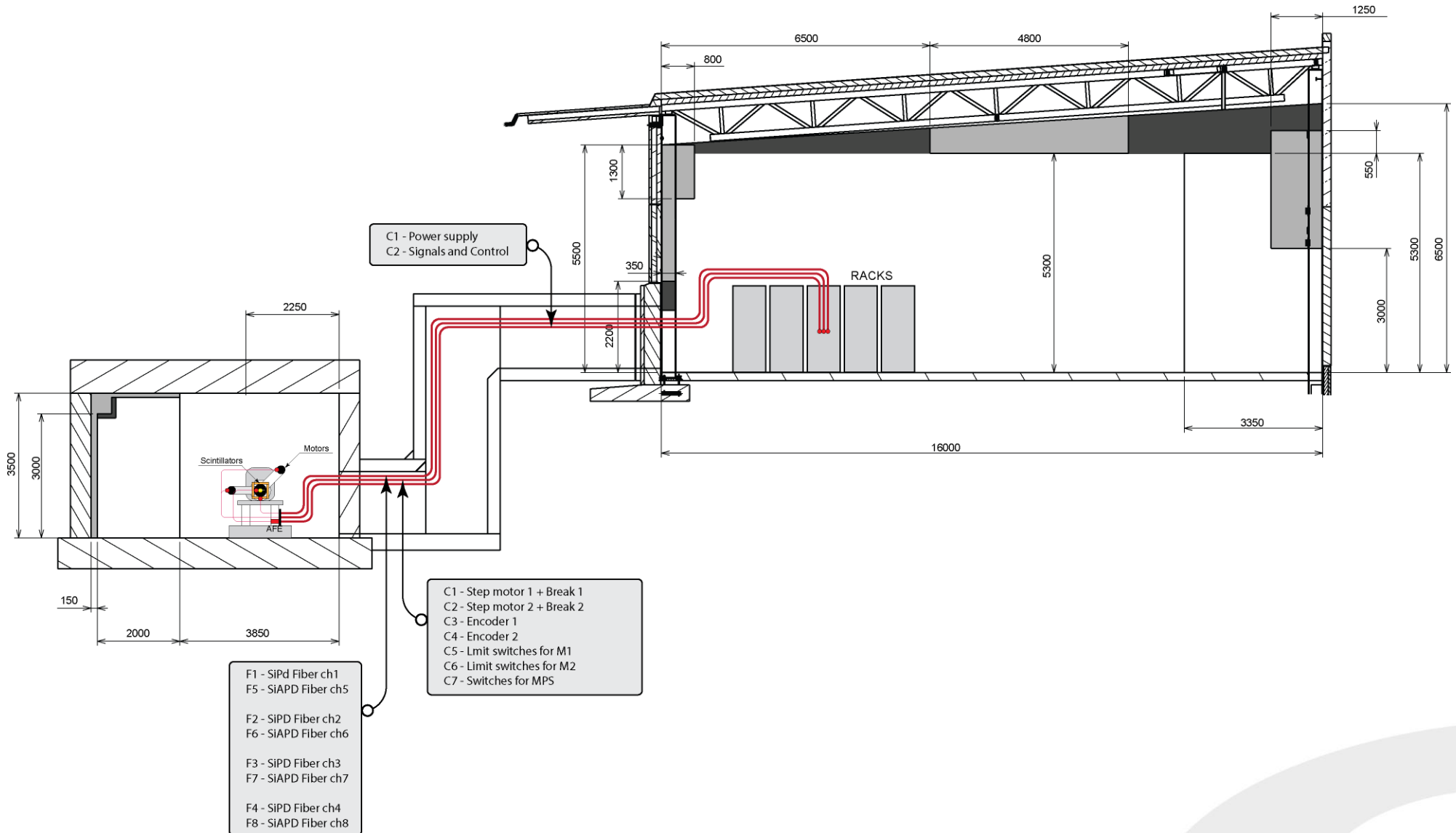


Cabling and connections



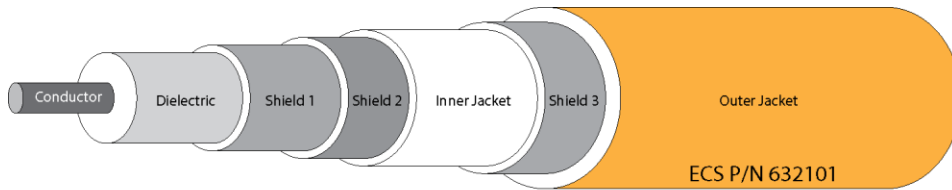


ESS layout with cable path

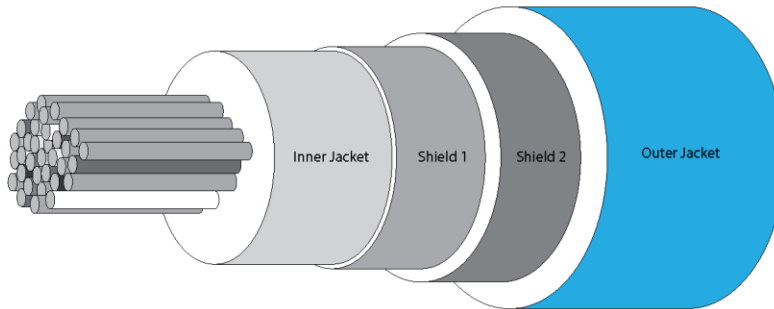




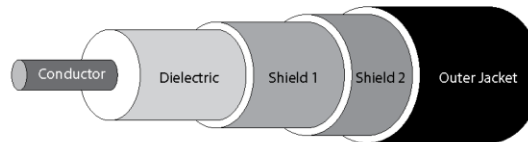
Cables



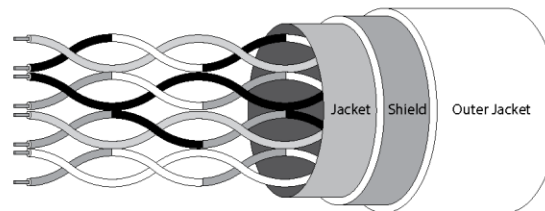
Triaxial cable from AFE to Wire Scanner wires



AWG 18 Shilded multiwire cable for Motor and Limit switches to MCTRL



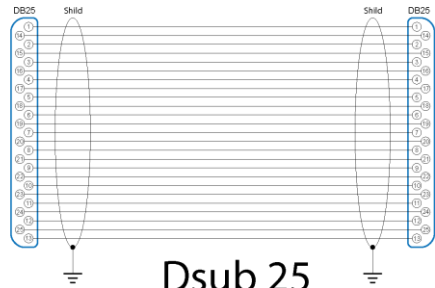
Coaxial SMA cable for analog signal from BE to ADC



AWG 20 Shilded twisted pair cable for data and control

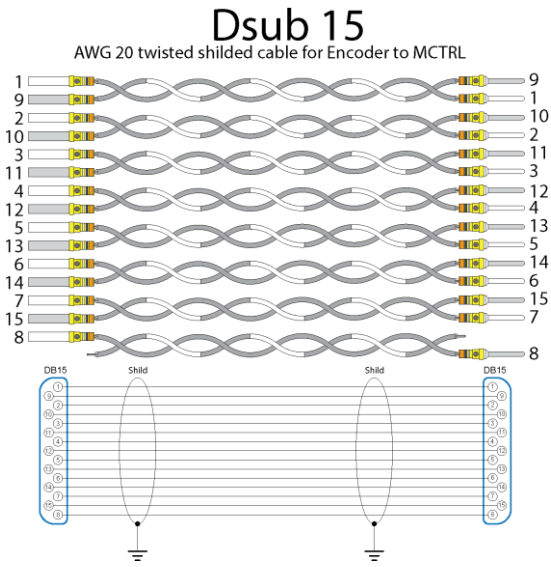
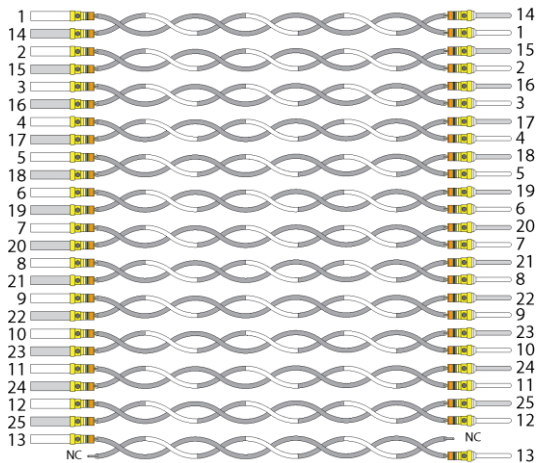


All cables have pin to pin connected connectors.



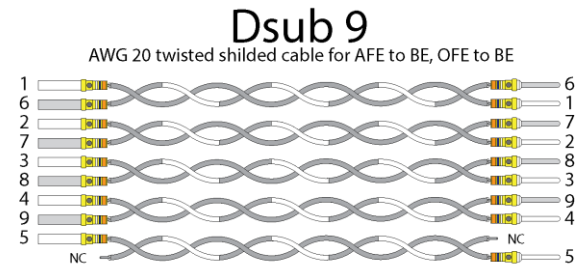
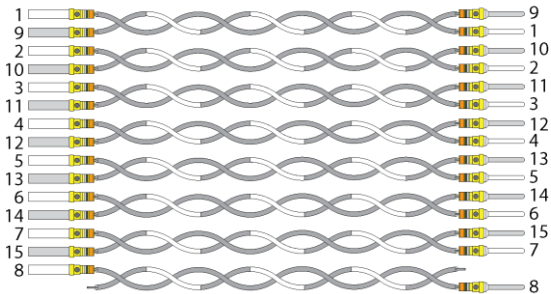
Dsub 25

AWG 20 twisted shielded cable for AFE to BE, OFE to BE



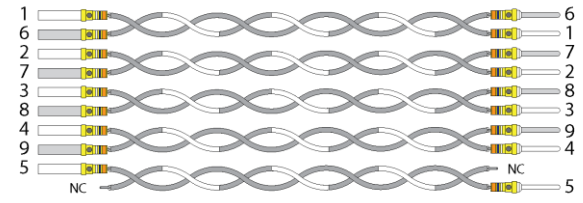
Dsub 15

AWG 20 twisted shielded cable for Encoder to MCTRL



Dsub 9

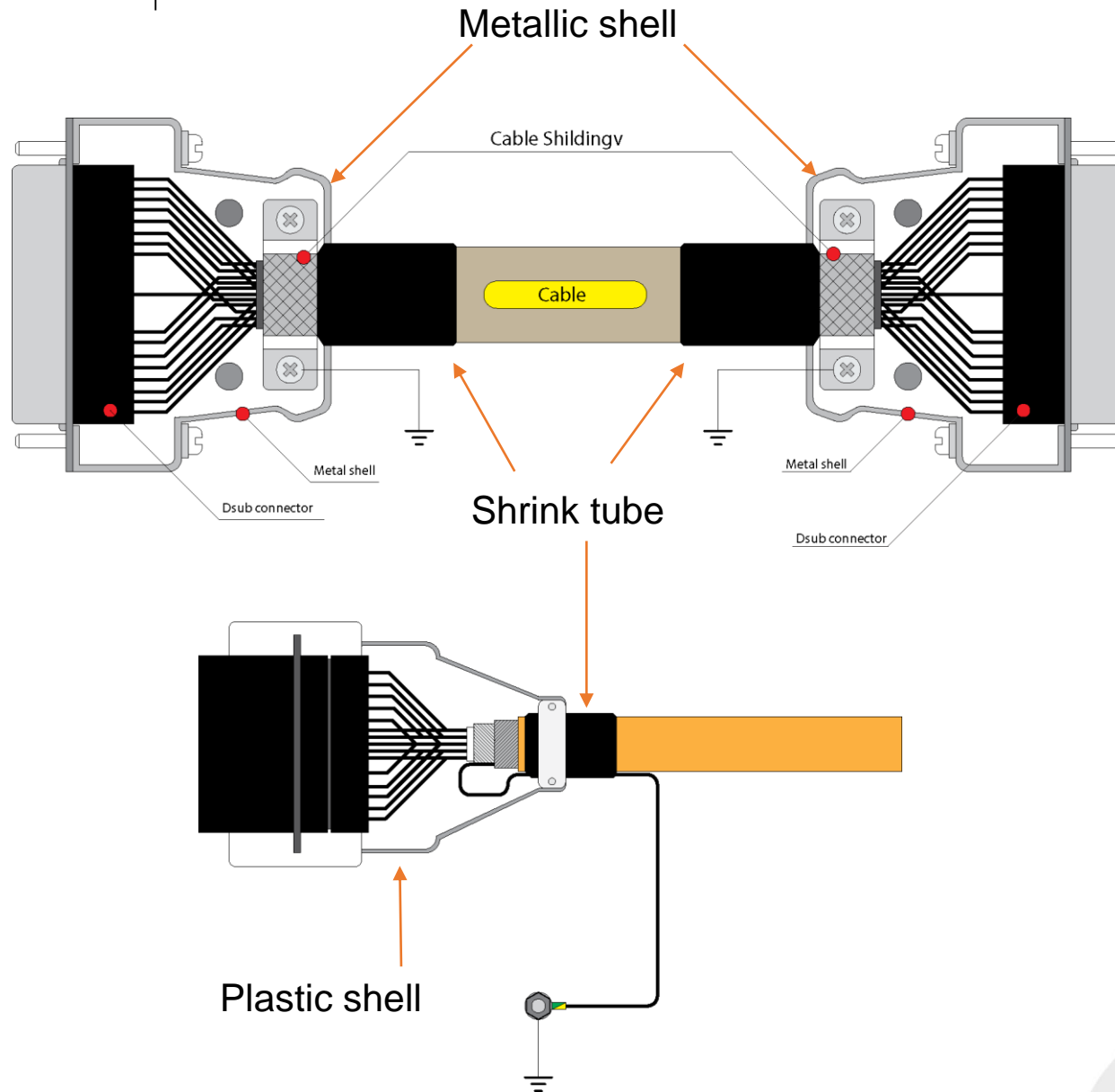
AWG 20 twisted shielded cable for AFE to BE, OFE to BE



All pin to pin connected cables.



Assembly





Elettra
Sincrotrone
Trieste

Tools for assembly

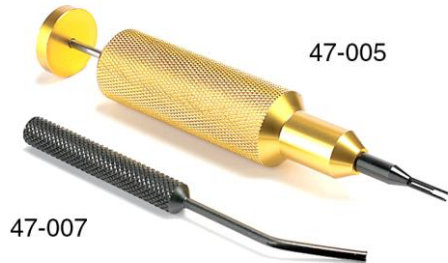
NO SOLDERING



Dsub connector assembly tool



Trident connector assembly tool



Dsub pin extractor tool



Trident pin extractor tool



Cables and connection table

Device A	Device Name A	Connection	Connector Type side A	Cable type	Cable Name	Cable Length	ESS Cable Code	Connector Type side B	Device Name B	Device B		
WS Assy	ESS-WSM-Instpos-Number	AFE to WS wire H1	Triaxial BNC	triaxial		2.5m	ESS-WSAFE-WH1	Triaxial BNC	ESS-WSAFE-instpos-number	AFE		
		AFE to WS wire H2	Triaxial BNC	triaxial		2.5m	ESS-WSAFE-WH2	Triaxial BNC				
		AFE to WS wire V1	Triaxial BNC	triaxial		2.5m	ESS-WSAFE-WV1	Triaxial BNC				
		AFE to WS wire V2	Triaxial BNC	triaxial		2.5m	ESS-WSAFE-WV2	Triaxial BNC				
AFE	ESS-WSAFE-instpos-number	AFE to BE Power	D-sub 9 F	5 twisted pair AWG 20		60m	ESS-WSAFE-P1	D-sub 9 M	ESS-WSAFE-Instpos-Number	AFE- BE Back End		
		AFE to BE Signal and Control	D-sub 25 F	14 twisted pair AWG 20		60m	ESS-WSAFE-S/C	S-dub 25 M				
AFE BE - Back End * - optional	ESS-WSBE-Instpos-Number	BE Power to 220V AC 50Hz	VDE	Power cable 3 x 1.5mm2		2m	ESS-WSBE-PD1	Schuko	ESS-WSPD-instpos-number	Power Distribution		
		* BE to ADC	D - sub 9 M	5 twisted pair AWG 24		1m	ESS-WSBE-ADC-C1		ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C1	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C1	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C1	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C1	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to LAN	RJ45	UTP cat6		2m	ESS-BE-LAN1	RJ45	ESS-WSSW-instpos-number	BE LSW BOX		
WS Assy	ESS - WSM- Instpos-Number	WS motion to MCTRL		twisted pair AWG 18		60m	ESS-MCTRL-P1		ESS-WSM-Instpos-Number	Motion CTRL		
		WS Limit Switches to MCTRL		twisted pair AWG 20		60m	ESS-MCTRL-LS1					
		WS Encoder to MCTRL		Twisted pair AWG 20		60m	ESS-MCTRL-E1					
		WS Signals to MCTRL PLC		Twisted pair AWG 20		60m	ESS-MCTRL-PLC1					
		MCTRL Power to 220V AC 50Hz	VDE	Power cable 3 x 1.5mm2		2m	ESS-WSBE-PD1	Schuko			ESS-WSPD-instpos-number	Power Distribution
OFE	ESS-WSOFE-instpos-number	OFE SIAPD to BE1 Signal and Control	D-sub 25 F	14 twisted pair AWG 20		60m	ESS-WSAFE-S/C	S-dub 25 M	ESS-WSOFE-Instpos-Number	OFE- BE1 - Back End		
		OFE SIAPD to BE2 Power	D-sub 9 F	5 twisted pair AWG 20		60m	ESS-WSAFE-P1	D-sub 9 M	ESS-WSOFE-Instpos-Number	OFE- BE2 - Back End		
		OFE SIAPD to BE2 Signal and Control	D-sub 25 F	14 twisted pair AWG 20		60m	ESS-WSAFE-S/C	S-dub 25 M				
		OFE SIAPD to Scint 1	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S1	APC 1mm dia	ESS-WSSCI1-instpos-number	SCINTILLATOR 1		
		OFE SIAPD to Scint 1	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S1	APC 1mm dia				
		OFE SIAPD to Scint 2	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S2	APC 1mm dia	ESS-WSSCI2-instpos-number	SCINTILLATOR 2		
		OFE SIAPD to Scint 2	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S2	APC 1mm dia				
		OFE SIAPD to Scint 3	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S3	APC 1mm dia	ESS-WSSCI3-instpos-number	SCINTILLATOR 3		
		OFE SIAPD to Scint 3	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S3	APC 1mm dia				
		OFE SIAPD to Scint 4	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S4	APC 1mm dia	ESS-WSSCI4-instpos-number	SCINTILLATOR 4		
		OFE SIAPD to Scint 4	APC 1mm dia	Optic fiber 1mm dia		60m	ESS-WSSIAPD-S4	APC 1mm dia				
		OFE BE1 - Back End * - optional	ESS-WSBE-Instpos-Number	BE Power to 220V AC 50Hz	VDE	Power cable 3 x 1.5mm2		2m	ESS-WSBE-PD1	Schuko	ESS-WSPD-instpos-number	Power Distribution
				BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C2	SMA	ESS-WSADC-instpos-number	ADC Board
				BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C2	SMA	ESS-WSADC-instpos-number	ADC Board
BE to ADC	SMA			coaxial		1m	ESS-WSBE-ADC-C2	SMA	ESS-WSADC-instpos-number	ADC Board		
BE to ADC	SMA			coaxial		1m	ESS-WSBE-ADC-C2	SMA	ESS-WSADC-instpos-number	ADC Board		
* BE to ADC	D - sub 9 M			5 twisted pair AWG 24		1m	ESS-WSBE-ADC-C2		ESS-WSADC-instpos-number	ADC Board		
BE to LAN	RJ45			UTP cat6		2m	ESS-BE-LAN2	RJ45	ESS-WSSW-instpos-number	BE LSW BOX		
OFE BE2 - Back End * - optional	ESS-WSBE-Instpos-Number	BE Power to 220V AC 50Hz	VDE	Power cable 3 x 1.5mm2		2m	ESS-WSBE-PD1	Schuko	ESS-WSPD-instpos-number	Power Distribution		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C3	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C3	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C3	SMA	ESS-WSADC-instpos-number	ADC Board		
		BE to ADC	SMA	coaxial		1m	ESS-WSBE-ADC-C3	SMA	ESS-WSADC-instpos-number	ADC Board		
		* BE to ADC	D - sub 9 M	5 twisted pair AWG 24		1m	ESS-WSBE-ADC-C3		ESS-WSADC-instpos-number	ADC Board		
		BE to LAN	RJ45	UTP cat6		2m	ESS-BE-LAN3	RJ45	ESS-WSSW-instpos-number	BE LSW BOX		



Elettra
Sincrotrone
Trieste

Thank you !

www.elettra.eu