TECHNICAL

DATA SHEET

مـونـکـو ایــران
Monenco Iran

MONENCO – IRAN CONSULTING ENGINEERS COMPANY

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No. of Section	Description	Status
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Note 1 (*): For Sections 1, 2, and 3, there is no need to fill out any offer data.

Note 2: N.A: Not Applicable

PROTECTION, CONTROL AND METERING
TECHNICAL DATA SHEET

DOCUMENT REVISIONS									
A3									
A2									
A1									
A0	FIRST ISSUE	---	---	RNR	00.10.25	AKS	00.10.25	DHF	00.10.25
Rev.	**DESCRIPTION**	**DRAWN**	**DATE**	**DESIG.**	**DATE**	**VRF.**	**DATE**	**CHKD.**	**DATE**

ITEM	DESCRIPTION	UNIT	REQUIRED DATA	OFFERED DATA
1	**General**			
1.1	Applicable standard		Acc. to Protection, control and metering system Technical Specification	
			(Section 2, Codes and Standards)	
1.2	Nominal system frequency	Hz	50	50
1.3	Nominal current transformers secondary current	A	1	1
1.4	Rated voltage transformers secondary voltage	V	110	110
1.5	Auxiliary DC	V	110	110
1.6	Variation of Aux. DC	%	-15 , +10	-15 , +10
1.7	Auxiliary AC	V	400 / 230	400 / 230
1.8	Type of system grounding		400/230/63kV: Solid	
			20kV: GROUNDED BY GT	
1.9	Accuracy class of CTs for protection and metering equipment		Acc. to Attached Drawing & relay requirement	
1.10	Accuracy class of CVTs for protection and metering		Acc. to Attached Drawing	
1.11	**Control and metering system**			
1.11.1	All sub-division of control and metering system such as operating system, interlocking, synchronizing, alarm annunciation, automatic and manual voltage control, metering and indication instruments, event and fault recorder, PMU (as required) and relays setting and configuration integrated control system		Acc. to Protection, control and metering system Technical Specification	
			(Section 4, Control and Metering System)	
1.12	**Protection system**			

ITEM	DESCRIPTION	UNIT	REQUIRED DATA	OFFERED DATA
1.12.1	All sub-division of protection system such as protection design criteria, protection relays requirement, common circuit breaker protection, transmission line protection, sub-transmission line protection, power transformer protection, short transmission line protection, short sub-transmission line protection, bus section protection, reactor protection, load shedding and busbar protection		Acc. to Protection, control and metering system Technical Specification	
			(Section 5, Protection system)	
1.13	**Packing, transportation and storage**		Acc. to Protection, control and metering system Technical Specification	
			(Section 6, Packing, transportation and storage)	
1.14	**Supervision over installation and erection procedure**		Acc. to Protection, control and metering system Technical Specification	
			(Section 7, Supervision over installation & erection procedure)	
1.15	**Inspection and test**		Acc. to Protection, control and metering system Technical Specification	
			(Section 8, Inspection and test)	
2	**Panel**			
2.1	Manufacturer :			
a.	Name			
b.	Country			

ITEM	DESCRIPTION	UNIT	REQUIRED DATA	OFFERED DATA
2.2	Type of panels construction		Acc. to Protection, control and metering system Technical Specification	
			(Section 3, Protection, Control and Metering Panel)	
2.2	Degree of protection of panels:			
	Indoor		IP42	IP42
	Outdoor		IP54	IP54
2.3	Color of Panel:			
	Indoor		RAL7035	RAL7035
	Outdoor		RAL7032	RAL7032
2.4	Thickness of Panel color	Micron	between 80 and 120	between 80 and 120
2.5	Minimum thickness of steel panels	mm	2	2
2.6	Overall dimensions :			
	protection & Relay panels	mm*mm*mm	800*800*2200	800*800*2200
	Control panels	mm*mm*mm	800*800*2200	800*800*2200
	AVR panel	mm*mm*mm	800*800*2200	800*800*2200
2.7	Size of wires :			
	CT & CVT circuits	mm2	4/2.5	4/2.5
	control circuit	mm2	1.5	1.5
2.8	Voltage rating of wirings	V		
2.9	Terminal blocks :			

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Manufacturer / Name / Country					
	Type designation					
	Spare	%	10		10	
2.10	Earthquake protection coefficient					
2.11	Lighting, door switch, heater, thermostat	yes/no	yes		yes	
2.12	DC supervision for relay and control panel	yes/no	yes		yes	
2.13	Type of mounting					
2.14	Other requirement		Acc. to Protection, control and metering system Technical Specification			
			(Section 3, Protection, Control and Metering Panel)			
*	**Over Head Line Protection**					
1	**Distance Protection (Main Protection)**		**400/230kV**	**132/63kV**	**400/230kV**	**132/63kV**
1.1	Manufacturer :					
	Name					
	Country					
	Type designation					
1.2	Applicable standard					
1.3	Type	Static/ Microprocessor based				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.4	Rated current					
1.5	Rated voltage					
1.6	Rated auxiliary DC					
1.7	Method of starting					
1.8	Number of zones :					
	Forward reach					
	Reverse reach					
1.9	Mounting arrangement					
1.10	Maximum zone 1 operating time					
1.11	Time setting range for :					
	Zone 2					
	Zone 3					
1.12	power swing blocking provided	yes/no				
1.13	Dielectric test voltage					
1.14	Type of relay characteristics					
1.15	Type of characteristics for phase-ground and three phase faults					
1.16	Number of measuring units					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.17	Type of impedance measuring characteristic for phase to ground faults /setting range / step					
	Zone 1					
	Zone 2					
	Zone 3					
1.18	Type of impedance measuring characteristic for phase to phase faults /setting range / step					
	Zone 1					
	Zone 2					
	Zone 3					
1.19	Method of ensuring correct discrimination for three phase close up faults					
1.20	Fault locator feature built in	yes/no				
1.21	Built in directional overcurrent/ earth fault relay	yes/no				
1.22	Built in disturbance Recorder	yes/no				
1.23	Built in DTT	yes/no				
1.24	Built in SOTF	yes/no				
1.25	Mutual compensation provided	yes/no				
1.26	internal Fuse failure blocking provided	yes/no				
1.27	Filtering against CVT transients provided	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.28	Current carrying /making/breaking capacity for trip contacts	A				
1.29	Weak-end in feed trip feature provided	yes/no				
1.30	Current reversal logic (for double lines) provided	yes/no				
2	**Directional EF Relay (Included Main Distance)**		**400/230kV**	**132/63kV**	**400/230kV**	**132/63kV**
2.1	Manufacturer :					
	Name					
	Country					
	Type designation					
2.2	Applicable standard					
2.3	Rated zero sequence current	A				
2.4	Rated zero sequence polarizing voltage	V				
2.5	Whether the following characteristics provided :					
2.6	Normal inverse /Very inverse / Extremely inverse					
2.7	Whether instantaneous unit provided	yes/no				
2.8	Mounting arrangement					
2.9	Current setting range in inverse charactristic / step	A				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
2.10	Current setting range in instantaneous/ definite charactristic / step	A				
2.11	Time setting range / step	Sec				
2.12	Relay characteristic angle	deg				
2.13	Drop-off / pick-up ratio					
2.14	Hand reset operation indicator	yes/no				
2.15	Power consumption	VA				
2.16	Inrush current blocking	yes/no				
2.17	Transient over reach	yes/no				
2.18	Current reversal logic (for parallel lines) provided	yes/no				
2.19	Echo feature for tele-protection provided	yes/no				
3	**Directional Over Current Relay (Backup Protection)**					**132/63kV**
3.1	Manufacturer :					
	Name					
	Country					
	Type designation					
3.2	Applicable standard					
3.3	Rated current	A				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
3.4	Rated polarizing voltage	V				
3.5	Whether the following characteristics provided :					
3.6	Normal inverse /Very inverse / Extremely inverse					
3.7	Whether instantaneous unit provided	yes/no				
3.8	Mounting arrangement					
3.9	Current setting range in inverse charactristic / step	A				
3.10	Current setting range in instantaneous/ definite charactristic / step	A				
3.11	Time setting range / step	Sec				
3.12	Relay characteristic angle	deg				
3.13	Drop-off / pick-up ratio					
3.14	Hand reset operation indicator	yes/no				
3.15	Power consumption	VA				
3.16	Inrush current blocking	yes/no				
3.17	Transient over reach	yes/no				
3.18	Current reversal logic (for parallel lines) provided	yes/no				
3.19	Echo feature for tele-protection provided	yes/no				
4	**Directional Earth Fault Relay (Backup Protection)**					**132/63kV**

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
4.1	Manufacturer :					
	Name					
	Country					
	Type designation					
4.2	Applicable standard					
4.3	Rated zero sequence current	A				
4.4	Rated zero sequence polarizing voltage	V				
4.5	Whether the following characteristics provided :					
4.6	Normal inverse /Very inverse / Extremely inverse					
4.7	Whether instantaneous unit provided	yes/no				
4.8	Mounting arrangement					
4.9	Current setting range in inverse charactristic / step	A				
4.10	Current setting range in instantaneous/ definite charactristic / step	A				
4.11	Time setting range / step	Sec				
4.12	Relay characteristic angle	deg				
4.13	Drop-off / pick-up ratio					
4.14	Hand reset operation indicator	yes/no				
4.15	Power consumption	VA				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
4.16	Inrush current blocking	yes/no				
4.17	Transient over reach	yes/no				
4.18	Current reversal logic (for parallel lines) provided	yes/no				
4.19	Echo feature for tele-protection provided	yes/no				
5	**Under & Over Voltage Relay**				**Under Voltage**	**Over Voltage**
5.1	Manufacturer :					
	Name					
	Country					
	Type designation					
5.2	Applicable standard					
5.3	Rated voltage	V				
5.4	Rated auxiliary DC voltage	V				
5.5	Resetting ratio					
5.6	Time delay setting range / step	sec				
5.7	Time characteristic					
5.8	voltage Setting range / step	V				
5.9	Power consumption	VA				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
5.10	Mounting arrangement					
5.11	Hand reset operation indicator	yes/no				
5.12	Manual blocking possibility	yes/no				
6	**Autorecloser with Check synchro relay**					
6.1	Manufacturer :					
	Name					
	Country					
	Type designation					
6.2	Applied standard					
6.3	number of auto recloser shots					
6.4	Relay type	Static/ Microprocessor based	microprocessor	microprocessor		
6.5	whether operation indicator provided	yes/no				
6.6	provision for blocking and switching in the relay from :	Hz				
6.7	control / relay panel	yes/no				
6.8	remote control	yes/no				
6.9	range of dead time adjustment / step	sec				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
6.10	range of reclaim time adjustment / step	sec				
6.11	closing pulse time	sec				
6.12	Method of blocking auto recloser					
6.13	when circuit breaker is open					
6.14	when closing into a fault					
6.15	Single and 3 pole reclosing	yes/no				
6.16	whether operation counter provided	yes/no				
6.17	whether following features provided for safe closing					
6.18	synchronizing check in live bus / live line	yes/no				
6.19	live line / dead bus	yes/no				
6.20	live bus / dead line	yes/no				
6.21	dead bus / dead line	yes/no				
6.22	Time details (rag etc):					
	Number of timer					
	Auxiliary voltage	V				
	Timing range	sec				
6.23	Number of phases					
6.24	Range of voltage difference in percent of Un					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
6.25	Range of phase angle difference					
6.26	Range of frequency difference					
6.27	Limiting Short time thermal withstand value					
6.28	Values of Auxiliary DC and its permissible variation	V				
6.29	DC consumption	W				
6.30	Contact data:					
	Number					
	Continuous rating at 110VDC	A				
6.31	Mounting position	flush/Surface/etc				
6.32	Accessories (if essential to relay performance) provided	yes/no				
6.33	Hand reset operation indicator with inscription provided	yes/no				
6.34	Burden	VA				
6.35	Manual close inhibit timer					
7	**Breaker Failure Protection (with Short zone)**					
7.1	Manufacturer :					
	Name					
	Country					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Type designation					
7.2	Applied standard					
7.3	Rated Value of Current					
7.4	Setting range & accuracy class of characteristic quantity					
7.5	Drop out current as % of pick up current					
7.6	Pick up time	ms				
7.7	Resetting time	ms				
7.8	Frequency	Hz				
7.9	Burden					
7.10	Time details (rag etc):					
	Number of timer					
	Auxiliary voltage	V				
	Timing range	sec				
7.11	Number of phases					
7.12	Limiting Short time thermal withstand value					
7.13	Values of Auxiliary DC and its permissible variation	V				
7.14	DC consumption	W				
7.15	Contact data:					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Number					
	Continuous rating at 110VDC	A				
7.16	Mounting position	flush/Surface/etc				
7.17	Accessories (if essential to relay performance) provided	yes/no				
7.18	Hand reset operation indicator with inscription provided	yes/no				
7.19	Burden	VA				
7.20	Dielectric test voltage	KV/sec				
7.21	IEC 61850 communication protocol support	yes/no				
8	**STUB Protection**				**400kV**	**230kV**
8.1	Manufacturer					
	Name					
	Country					
	Type designation					
8.2	Applicable standard					
8.3	Rated current					
8.4	Current setting range					
8.5	Manuting arrang ment					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
8.6	Number of phases	ms				
8.7	Rated aux DC voltage	ms				
8.8	Hand reset operation indicator	Hz				
8.9	Time settting range					
8.10	Burden					
8.11	IEC 61850 communication protocol support					
*	**Power Transformer Protection**	**63/20kV**				
1	**Biased Differential Protection Relay**		**HV**	**LV**	**HV**	**LV**
1.1	Manufacturer :					
	Name					
	Country					
	Type designation					
1.2	Applicable standard					
1.3	Relay type	Static/ Microprocessor based	microprocessor	microprocessor		
1.4	Rated current	A				
1.5	Rated auxiliary DC voltage	V				
1.6	Bias setting range	(%)				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.7	Mounting arrangement					
1.8	Hand reset operation indicator provided	yes/no				
1.9	Method of preventing tripping during magnetizing inrush current					
1.10	Maximum through fault current for which the relay is stable	A				
1.11	Rated value of the auxiliary DC voltage	V				
1.12	Fifth harmonic restrain feature	yes/no				
2	**Restricted Earth Fault Relay**		**HV SIDE**	**LV SIDE**	**HV SIDE**	**LV SIDE**
2.1	Manufacturer :					
	Name					
	Country					
	Type designation					
2.2	Relay type	Static/ Microprocessor based	microprocessor	microprocessor		
2.3	Hand reset operation indicator provided	yes/no				
2.4	Rated auxiliary DC voltage	V				
2.5	Mounting arrangement					
2.6	Current setting range	A				
2.7	Voltage setting range	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
2.8	Time setting range	sec				
2.9	Resetting ratio	(%)				
3	**Over Current Protection Relay**		**HV SIDE**	**LV SIDE**	**HV SIDE**	**LV SIDE**
3.1	Manufacturer :					
	Name					
	Country					
	Type designation					
3.2	Applicable standard					
3.3	Rated current	A				
3.4	Current setting range in inverse charactristic / step	A				
3.5	Current setting range in instantaneous/ definite charactristic / step	A				
3.6	Time setting range / step	Sec				
3.7	Number of contacts					
3.8	Mounting arrangement					
3.9	Number of phases					
3.10	Rated auxiliary DC voltage	V				
3.11	Hand reset operation indicator	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
3.12	Current setting range of instantaneous unit	A				
3.13	Second harmonic blocking feature	yes/no				
3.14	Minimum pick-up time	ms				
4	**Neutral point Earth Fault Relay**				**Power Tr**	
4.1	Manufacturer :					
	Name					
	Country					
	Type designation					
4.2	Applicable standard					
4.3	Rated current	A				
4.4	Current setting range in inverse charactristic / step	A				
4.5	Current setting range in instantaneous/ definite charactristic / step	A				
4.6	Time setting range / step	Sec				
4.7	Number of contacts					
4.8	Mounting arrangement					
4.9	Number of phases					
4.10	Rated auxiliary DC voltage	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
4.11	Hand reset operation indicator	yes/no				
4.12	Current setting range of instantaneous unit	A				
4.13	Second harmonic blocking feature	yes/no				
4.14	Minimum pick-up time	ms				
5	**Aux/Earthing Trans OC & EF Protection Relay**		**OC**	**EF**	**OC**	**EF**
5.1	Manufacturer :					
	Name					
	Country					
	Type designation					
5.2	Applicable standard					
5.3	Rated current	A				
5.4	Current setting range in inverse charactristic / step	A				
5.5	Current setting range in instantaneous/ definite charactristic / step	A				
5.6	Time setting range / step	Sec				
5.7	Number of contacts					
5.8	Mounting arrangement					
5.9	Number of phases					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
5.10	Rated auxiliary DC voltage	V				
5.11	Hand reset operation indicator	yes/no				
5.12	Current setting range of instantaneous unit	A				
5.13	Second harmonic blocking feature	yes/no				
5.14	Minimum pick-up time	ms				
6	**Under & Over Voltage Relay**		**Under Voltage**	**Over Voltage**	**Under Voltage**	**Over Voltage**
6.1	Manufacturer :					
	Name					
	Country					
	Type designation					
6.2	Applicable standard					
6.3	Rated voltage	V				
6.4	Rated auxiliary DC voltage	V				
6.5	Resetting ratio					
6.6	Time delay setting range / step	sec				
6.7	Time characteristic					
6.8	voltage Setting range / step	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
6.9	Power consumption	VA				
6.10	Mounting arrangement					
6.11	Hand reset operation indicator	yes/no				
6.12	Manual blocking possibility	yes/no				
7	**Over Flux Relay**					
7.1	Manufacturer :					
	Name					
	Country					
	Type designation					
7.2	Applicable standard					
7.3	Rated voltage	V				
7.4	Rated auxiliary DC voltage	V				
7.5	Resetting ratio					
7.6	Time delay setting range / step	sec				
7.7	Time characteristic					
7.8	voltage Setting range / step	V				
7.9	Power consumption	VA				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
7.10	Mounting arrangement					
7.11	Hand reset operation indicator	yes/no				
7.12	Manual blocking possibility	yes/no				
8	**Thermal over load Protection Relay**					
8.1	Manufacturer :					
	Name					
	Country					
	Type designation					
8.2	Applicable standard					
8.3	Rated current	A				
8.4	Rated auxiliary DC voltage	V				
8.5	Power consumption	VA				
8.6	Mounting arrangement					
8.7	Hand reset operation indicator	yes/no				
8.8	Current setting range of inverse unit / step					
8.9	Number of phases					
8.10	fifth harmonic blocking feature	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
8.11	Current setting range / step of instantaneous unit					
8.12	type of charactristic					
9	**Current Load Shedding Relay**					
9.1	Manufacturer :					
	Name					
	Country					
	Type designation					
9.2	Applicable standard					
9.3	Rated current	A				
9.4	Current setting range in inverse charactristic / step	A				
9.5	Current setting range in instantaneous/ definite charactristic / step	A				
9.6	Time setting range / step	Sec				
9.7	Number of contacts					
9.8	Mounting arrangement					
9.9	Number of phases					
9.10	Rated auxiliary DC voltage	V				
9.11	Hand reset operation indicator	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
9.12	Current setting range of instantaneous unit	A				
9.13	Second harmonic blocking feature	yes/no				
9.14	Minimum pick-up time	ms				
9.15	Number of stage					
9.16	Number of contact in each stage					
10	**Aux/Earthing Transformer Sensitive Earth Fault Protection Relay**					
10.1	Manufacturer :					
	Name					
	Country					
	Type designation					
10.2	Applicable standard					
10.3	Rated current	A				
10.4	Current setting range in inverse charactristic / step	A				
10.5	Current setting range in instantaneous/ definite charactristic / step	A				
10.6	Time setting range / step	Sec				
10.7	Number of contacts					
10.8	Mounting arrangement					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
10.9	Number of phases					
10.10	Rated auxiliary DC voltage	V				
10.11	Hand reset operation indicator	yes/no				
10.12	Current setting range of instantaneous unit	A				
10.13	Second harmonic blocking feature	yes/no				
10.14	Minimum pick-up time	ms				
11	**Breaker Failure Protection (with Short zone)**		**HV Side**	**LV Side**	**HV Side**	**LV Side**
11.1	Manufacturer :					
	Name					
	Country					
	Type designation					
11.2	Applied standard					
11.3	Rated Value of Current					
11.4	Setting range & accuracy class of characteristic quantity					
11.5	Drop out current as % of pick up current					
11.6	Pick up time	ms				
11.7	Resetting time	ms				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
11.8	Frequency	Hz				
11.9	Burden					
11.10	Time details (rag etc):					
	Number of timer					
	Auxiliary voltage	V				
	Timing range	sec				
11.11	Number of phases					
11.12	Limiting Short time thermal withstand value					
11.13	Values of Auxiliary DC and its permissible variation	V				
11.14	DC consumption	W				
11.15	Contact data:					
	Number					
	Continuous rating at 110VDC	A				
11.16	Mounting position	flush/Surface/etc				
11.17	Accessories (if essential to relay performance) provided	yes/no				
11.18	Hand reset operation indicator with inscription provided	yes/no				
11.19	Burden	VA				
11.20	Dielectric test voltage	KV/sec				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
11.21	IEC 61850 communication protocol support	yes/no				
12	**AVR Relay**					
12.1	Manufacturer :					
	Name					
	Country					
	Type designation					
12.2	Applicable standard					
12.3	Relay rated current	A				
12.4	Relay rated voltage	V				
12.5	Rated auxiliary DC voltage	Vdc				
12.6	Current circuit power consumption	VA				
12.7	Voltage circuit power consumption	VA				
12.8	Rated frequency range	Hz				
12.9	Regulating voltage setting range / step	V				
12.10	Dead band voltages setting / step	V				
12.11	Initial time delay setting / step :					
	Inverse					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Definite					
12.12	Inter tap delay					
12.13	Under voltage setting /step	V				
12.14	Over voltage setting / step	V				
12.15	Load over current setting / step	A				
12.16	Circulating current setting /step					
12.17	Line drop compensation setting / step :					
	Reactive setting					
	Reactive setting					
12.18	Out-put contacts :					
	Number					
	Type	NO/NC				
	Rated breaking capacity	VA				
	Rated continuous current	A				
12.19	Mounting arrangement					
12.20	Hand reset operation indicator	yes/no				
12.21	IEC 61850 communication protocol support	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1	**Frequency Load Shedding Relay**					
1.1	Manufacturer :					
	Name					
	Country					
	Type designation					
1.2	Applicable standard					
1.3	Applicable standard	Hz				
1.4	Rated auxiliary DC voltage	V				
1.5	Resetting ratio					
1.6	Time delay range / step for Over frequency	sec				
1.7	Time delay range / step for Under frequency	sec				
1.8	Setting range / step for Under frequency	Hz				
1.9	Setting range / step for Over frequency	Hz				
1.10	Characteristic of frequency -time curve for over frequency unit					
1.11	Power consumption	VA				
1.12	Mounting arrangement					
1.13	Hand reset operation indicator	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
*	**General Relays**					
1	**Self Reset Trip Relay**		**Heavy Duty**	**High Speed**	**Heavy Duty**	**High Speed**
1.1	Manufacturer :					
	Name					
	Country					
	Type designation					
1.2	Number of contacts					
1.3	Pick-up time	msec				
1.4	Voltage in percent of rated voltage for :					
	Pick-up					
	Reset					
1.5	Continuous current carrying capacity of already					
1.6	closed contacts	A				
1.7	Current breaking capacity (L/R >10 msec)	A				
1.8	Current making capacity (L/R >10 msec)	A				
1.9	Mounting arrangement					
2	**Fuse Failure relay**					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
2.1	Manufacturer :					
	Name					
	Country					
	Type designation					
2.2	Applicable standard					
2.3	Operating time	ms				
2.4	Rated voltage	V				
2.5	Mounting voltage					
2.6	Monitoring fuse fail of 1, 2 or 3 phase	yes/no				
2.7	Hand reset operation indicator	yes/no				
2.8	setting range					
3	**Close Relay**					
3.1	Manufacturer :					
	Name					
	Country					
	Type designation					
3.2	Number of contacts					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
3.3	Pick-up time	msec				
3.4	Voltage in percent of rated voltage for :					
	Pick-up					
	Reset					
3.5	Closed contacts continuous current capacity	A				
3.6	Current breaking capacity (L/R >10 msec)	A				
3.7	Current making capacity (L/R >10 msec)	A				
3.8	Mounting arrangement					
4	**Lockout Relay**					
4.1	Manufacturer :					
	Name					
	Country					
	Type designation					
4.2	Number of contacts					
4.3	Pick-up time	msec				
4.4	Voltage in percent of rated voltage for :					
	Pick-up					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Reset					
4.5	Continuous current carrying capacity of already					
4.6	closed contacts	A				
4.7	Current breaking capacity (L/R >10 msec)	A				
4.8	Current making capacity (L/R >10 msec)	A				
4.9	Hand reset operation indicator	yes/no				
4.10	Mounting arrangement					
5	**TCS & CCS relay**				**TCS**	**CCS**
5.1	Manufacturer :					
	Name					
	Country					
	Type designation					
5.2	Rated auxiliary DC voltage	V				
5.3	Supervision of CB open and close position	yes/no				
5.4	Hand reset operation indicator provided	yes/no				
5.5	Mounting arrangement					
5.6	Circuit breaker trip coil current	mA				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
5.7	Pick-up time	msec				
5.8	Continuous current carrying for closed contacts	A				
6	**Auxiliary Relay With Flag**					
6.1	Manufacturer :					
	Name					
	Country					
6.2	Type designation					
6.3	Number of contacts					
6.4	Pick-up time	msec				
6.5	Voltage in percent of rated voltage for :					
	Pick-up					
	Reset					
6.6	Continuous current carrying capacity of already					
6.7	closed contacts	A				
6.8	Current breaking capacity (L/R >10 msec)	A				
6.9	Current making capacity (L/R >10 msec)	A				
6.10	Hand reset operation indicator	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
6.11	Mounting arrangement					
7	**Auxiliary relay (self reset)**					
7.1	Manufacturer :					
	Name					
	Country					
	Type designation					
7.2	Rated voltage	VDC				
7.3	Targets	yes/no				
7.4	Number of contacts					
7.5	Pick up time :					
	Make Contact (NO)	ms				
	Break contact (NC)	ms				
7.6	Pickup / drop off ratio					
7.7	Permitted ambient temperature - indoor	°c				
7.8	Permitted ambient temperature - outdoor	°c				
7.9	Contacts detail:					
	rated voltage (ac/dc)	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Maximum system voltages					
7.10	Current carrying capacity:					
	short time	A				
	continuously	A				
	Making and conducting capacity	A				
	Breaking Capacity	A				
7.11	Type of Mounting					
8	**High Speed Auxiliary Relay (self reset)**					
8.1	Manufacturer :					
	Name					
	Country					
	Type designation					
8.2	Rated voltage	VDC				
8.3	Targets	yes/no				
8.4	Number of contacts					
8.5	Pick up time:					
	Make Contact (NO)	ms				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Break contact (NC)	ms				
8.6	Pickup/ drop off ratio					
8.7	Permitted ambient temperature - indoor	°c				
8.8	Permitted ambient temperature - outdoor	°c				
8.9	Contacts detail:					
	rated voltage (ac/dc)	V				
	Maximum system voltages					
8.10	Current carrying capacity:					
	short time	A				
	continuously	A				
	Making and conducting capacity					
	Breaking Capacity					
8.11	Type of Mounting					
9	**Time Delay Relay**					
9.1	Manufacturer :					
	Name					
	Country					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Type designation					
9.2	Rated voltage	VDC				
9.3	Output contact function					
9.4	Reset time					
9.5	Target provided					
9.6	Number of contacts					
9.7	Consistency in operate time					
9.8	Principle of operation					
9.9	Permitted ambient temperature - indoor	°c				
9.10	Permitted ambient temperature - outdoor	°c				
9.11	Type of mounting					
9.12	Setting range					
10	**Protection Relay Test Block**					
10.1	Manufacturer :					
	Name					
	Country					
10.2	Type designation					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
10.3	Rated voltage	V				
10.4	Rated Current	A				
10.5	short circuit current capacity	A/s				
10.6	Number of contacts					
10.7	Type of mounting					
10.8	number of current contacts					
10.9	secondary CT contacts are shorted	yes/no				
10.10	stoage/ working temprature range					
10.11	impulse witstand voltage	kV				
10.12	test plug type designation					
*	**Control System Equipment**					
1	**Synchronizing Equipment**					
1.1	Manufacturer :					
	Name					
	Country					
	Type designation					
1.2	Applicable standard					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.3	Rated auxiliary DC voltage	V				
1.4	Rated frequency	Hz				
1.5	Rated CVT secondary voltage	V				
1.6	Mounting arrangement					
1.7	Maximum slip frequency at which CB closes	Hz				
1.8	Maximum phase difference at which CB closes					
1.9	Accuracy					
1.10	Continuous over voltage rating	V				
1.11	Short time rating					
2	**Double voltmeter:**					
2.1	Manufacturer :					
	Name					
	Country					
	Type designation					
2.2	Setting Range / step					
2.3	Overall dimensions	mm*mm				
2.4	Type of mounting					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
2.5	Method of mounting					
2.6	Total deflection angle					
2.7	Total scale length					
2.8	Burden					
2.9	Accuracy					
3	**Double frequency meter:**					
3.1	Manufacturer :					
	Name					
	Country					
	Type designation					
3.2	Range					
3.3	Overall dimensions					
3.4	Type of mounting					
3.5	Method of mounting					
3.6	Total deflection angle					
3.7	Total scale length					
3.8	Burden					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
3.9	Accuracy					
3.10	Synchronoscope:					
3.11	Overall dimensions					
3.12	Type of mounting					
3.13	Method of mounting					
4	**Synchro-scope meter:**					
4.1	Manufacturer :					
	Name					
	Country					
	Type designation					
4.2	Type and manufacturer					
4.3	Rated voltage / frequency					
4.4	Voltage difference setting range					
4.5	Phase angle difference setting range					
4.6	Frequency difference setting range (slip)					
	Paralleling					
	Synchronizing					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
4.7	Operating time					
4.8	Resetting time					
4.9	Duration of output signal					
4.10	Dead voltage limit					
4.11	Live voltage limit					
4.12	Over load capacity					
4.13	Pick-up to drop-off ratio					
4.14	Duration of output signal					
5	**Synchronizing relay**					
5.1	Manufacturer :					
	Name					
	Country					
	Type designation					
5.2	Applied standard					
5.3	number of auto recloser shots					
5.4	Relay type (microprocessor)	V				
5.5	whether operation indicator provided	yes/no				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
5.6	provision for blocking and switching in the relay from :	Hz				
5.7	control / relay panel	yes/no				
5.8	remote control	yes/no				
5.9	range of dead time adjustment	sec				
5.10	range of reclaim time adjustment	sec				
5.11	closing pulse time	sec				
5.12	Method of blocking auto recloser					
5.13	when circuit breaker is open					
5.14	when closing into a fault					
5.15	whether operation counter provided	yes/no				
5.16	whether following features provided for safe closing					
5.17	synchronizing check in live bus / live line	yes/no				
5.18	live line / dead bus	yes/no				
5.19	live bus / dead line	yes/no				
5.20	dead bus / dead line	yes/no				
5.21	Time details (rag etc):					
	Number of timer					
	Auxiliary voltage	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Timing range	sec				
5.22	Number of phases					
5.23	Limiting Short time thermal withstand value					
5.24	Values of Auxiliary DC and its permissible variation	V				
5.25	DC consumption	W				
5.26	Contact data:					
	Number					
	Continuous rating at 110VDC	A				
5.27	Mounting position	flush/Surface/etc				
5.28	Accessories (if essential to relay performance) provided	yes/no				
5.29	Hand reset operation indicator with inscription provided	yes/no				
5.30	Burden	VA				
5.31	Dielectric test voltage	KV/sec				
*	**Annunciators**					
1	**DC Operated**					
1.1	Manufacturer :					
	Name					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Country					
	Type designation					
1.2	Applicable standard					
1.3	Rated auxiliary DC supply voltage					
1.4	Speed of operation msec					
1.5	Dimensions of each window mm					
1.6	Type of reset	manual / auto				
1.7	Urgent and non-urgent alarm discrimination	yes/no				
1.8	Type of audible alarm for :					
	Urgent cases					
	Non-Urgent cases					
1.9	Whether suitable for normally open contacts	yes/no				
1.10	Type (solid state/digital type)	solidstate/ digitaltype				
1.11	Total power consumption per alarm point :					
	Normal condition	W				
	Flashing condition	W				
	Steady condition	W				
1.12	Number of windows :					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.13	On each control panel					
1.14	Total					
1.15	10% spare windows provided	yes/no				
1.16	Suitable for normally open contacts	yes/no				
1.17	Whether lamp test , acknowledge , accept and reset push button is provided for each panel	yes/no				
*	**Metering and Measuring equipments**					
1	**Ammeter (Separate from MC)**					
1.1	Manufacturer :					
	Name					
	Country					
	Type designation					
1.2	Applicable standard					
1.3	Type	digital				
1.4	Range	A				
1.5	Accuracy class					
1.6	Rated frequency					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.7	CT secondary current	A				
1.8	Total deflection angle					
1.9	Continuous overload rating of current coil in Percent of rated current					
1.10	Mounting arrangement					
1.11	Dimensions	mm*mm				
2	**Voltmeters (Separate from MC)**					
2.1	Manufacturer :					
	Name					
	Country					
	Type designation					
2.2	Applicable standard					
2.3	Type	Moving coil / digital				
2.4	Range	kV				
2.5	Accuracy class					
2.6	Rated frequency					
2.7	PT secondary voltage V					
2.8	Total deflection angle Degree					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
2.9	Continuous over voltage rating of voltage coil in percent of rated voltage					
2.10	Mounting arrangement					
2.11	Dimensions	mm*mm				
*	**Transducer**					
1	**MW/MVAR**					
1.1	Make and type					
1.2	Compliance with IEC 60688					
1.3	Auxiliary power voltage range	V				
1.4	Combined or separate units					
1.5	Service conditions (temperature & RH)					
1.6	Connections (eg two voltage & two current)					
1.7	Input voltage range	V				
1.8	Input current range	A				
1.9	Output current	A				
1.10	Accuracy class					
1.11	Burden	VA				
1.12	Overload	%				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
1.13	Case or rack mounted					
2	**Voltage**					
2.1	Make and type					
2.2	Compliance with IEC 69688					
2.3	Auxiliary power voltage range	V				
2.4	Service conditions (temperature & RH)					
2.5	Input current Amps	A				
2.6	Output current Amps	A				
2.7	Accuracy class	%				
2.8	Burden	VA				
2.9	Overload	%				
2.10	Case or rack mounted					
3	**Current**					
3.1	Make and type					
3.2	Compliance with IEC 60688					
3.3	Auxiliary power voltage range	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
3.4	Service conditions (temperature & RH)					
3.5	Input current range	A				
3.6	Output current	A				
3.7	Accuracy class	%				
3.8	Burden	VA				
3.9	Overload	%				
3.10	Case or rack mounted					
4	**Frequency**					
4.1	Make and type					
4.2	Compliance with IEC 60688					
4.3	Auxiliary power voltage rang Watts	W				
4.4	Service conditions (temperature e& RH)					
4.5	Input frequency range (eg nominal = 5%)	Hz				
4.6	Output current Amps	A				
4.7	Accuracy class	%				
4.8	Burden	VA				
4.9	Overload	%				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
4.10	Case or rack mounted					
5	**Auxiliary relay (self reset)**					
5.1	Manufacturer					
5.2	Type					
5.3	Rated voltage	Vdc				
5.4	Targets	yes/no				
5.5	Number of contacts					
5.6	Pick up time :					
	Make Contact (NO)	ms				
	Break contact (NC)	ms				
5.7	Pickup / drop off ratio					
5.8	Permitted ambient temperature - indoor	°c				
5.9	Permitted ambient temperature - outdoor	°c				
5.10	Type of Mounting					
5.11	Utilization category					
5.12	Contacts detail:					
	rated voltage (ac/dc)	V				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Maximum system voltages	V				
	Current carrying capacity	A				
	short time	A				
	continuously	A				
	Making and conducting capacity	A				
	Breaking Capacity	A				
6	**Time Delay Relay**					
6.1	Manufacturer/Country					
6.2	Type					
6.3	Rated voltage	Vdc				
6.4	Output contact function					
6.5	Reset time					
6.6	Target provided					
6.7	Number of contacts					
6.8	Consistency in operate time					
6.9	Principle of operation					
6.10	Permitted ambient temperature - indoor	°c				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
6.11	Permitted ambient temperature - outdoor	°c				
6.12	Type of mounting					
6.13	Setting range / step					
*	**Control Panel Accessories**					
1	**Discrepancy Control Switches :**					
1.1	Manufacturer :					
	Name					
	Country					
1.2	Type designation for :					
	CB control switch					
	DS control switch					
1.3	Rating of contacts :					
	Voltage	V				
	Continuous current carrying	A				
	Make current	A				
	Break current	A				
1.4	Dimensions :					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	CB control switch	mm*mm				
	DS control switch	mm*mm				
2	**Position indicators**					
2.1	Manufacturer :					
	Name					
	Country					
	Type designation					
3	**Selector Switches**					
3.1	Manufacturer / name / country for :					
	Voltmeter switch					
	Ammeter switch					
	Autoreclose on / off switch					
	Local supervisory switch					
3.2	Rating of contacts :					
	Voltage	V				
	Make current	A				

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
	Break current	A				
3.3	Sub/Scada switch for each CB provided	yes/no				
4	**Indicating lamps**					
4.1	Manufacturer					
	Name					
	Country					
4.2	Type					
4.3	Voltage	V				
4.4	Consumption	W				
4.5	Whether series resistors provided	yes/no				
4.6	Permissible voltage variation	%				
4.7	Type of mounting					
5	**Push buttons**					
5.1	Manufacturer					
	Name					
	Country					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
5.2	Type					
5.3	No of NC contacts					
5.4	No of NO contacts					
5.5	Rating of contacts :					
	Voltage	V				
	Make current	A				
	Break current	A				
	Carry continously	A				
6	**Current Test Block**					
6.1	Manufacturer :					
	Name					
	Country					
6.2	Type designation					
6.3	Rated voltage	V				
6.4	Rated Current	A				
6.5	short circuit current capacity	A/s				
6.6	Number of contacts					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
6.7	Type of mounting					
6.8	number of current contacts					
6.9	secondary CT contacts are shorted	yes/no				
6.10	stoage/ working temprature range					
6.11	impulse witstand voltage	kV				
6.12	test plug type designation					
7	**Voltage Test Block**					
7.1	Manufacturer :					
	Name					
	Country					
7.2	Type designation					
7.3	Rated voltage	V				
7.4	Rated Current	A				
7.5	short circuit current capacity	A/s				
7.6	Number of contacts					
7.7	Type of mounting					
7.8	number of current contacts					

ITEM	DESCRIPTION	UNIT	REQUIRED DATA		OFFERED DATA	
7.9	secondary CT contacts are shorted	yes/no				
7.10	stoage/ working temprature range					
7.11	impulse witstand voltage	kV				
7.12	test plug type designation					