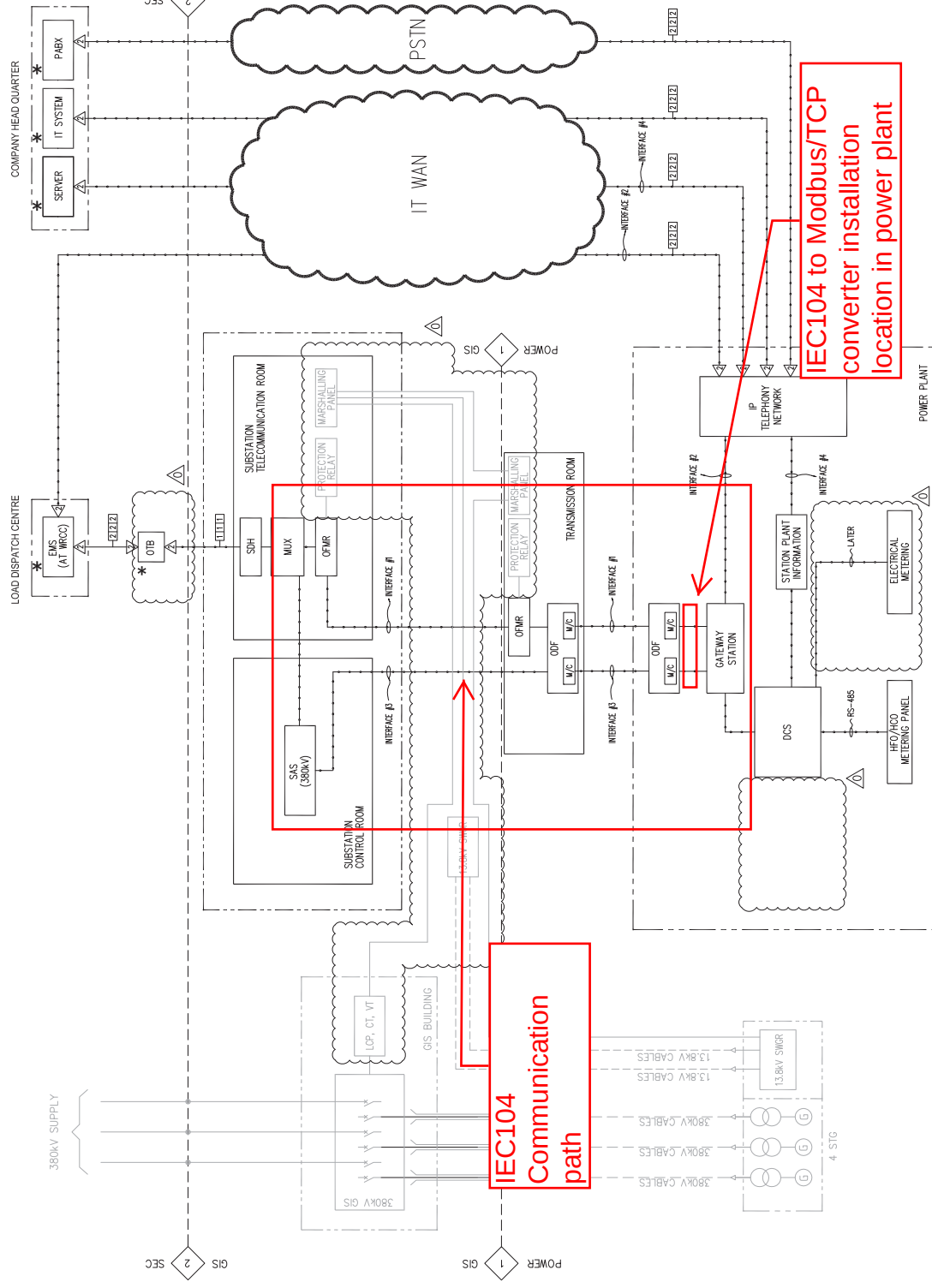


INTERFACE DESIGN INFORMATION DIAGRAM FOR I&C SYSTEM



INTERFACE DESIGN INFORMATION DIAGRAM FOR I&C SYSTEM

INTERFACE #1

ITEM	DESCRIPTION	REMARK
FROM / TO	POWER PLANT GATEWAY STATION / LDC	
MEDIA	F.O. CABLE (MULTI MODE)	
PROTOCOL	IEC-60870-5-104	
INTERFACE	MAX. POSSIBLE ACTIVE POWER OUTPUT MIN. POSSIBLE ACTIVE POWER OUTPUT PRIMARY RESPONSE MARGIN. SECONDARY RESPONSE MARGIN. MAX. POSSIBLE MW RATE OF POWER CHANGE(UP/DOWN) ACTIVE POWER PRODUCED BY THE GENERATOR REACTIVE POWER PRODUCED BY THE GENERATOR GENERATOR TERMINAL VOLTAGE GENERATOR STEP-UP TRANSFORMER TAP POSITION MVAR RESERVE MARGIN FREQUENCY TURBINE AVAILABLE/NOT AVAILABLE TURBINE IN OPERATION YES/NO TURBINE TRIP GATEWAY STATION -> LDC	
	- AGC ON/OFF - ACTIVE POWER SET POINT [C] - REACTIVE POWER/POWER FACTOR SET POINT	LDC -> GATEWAY STATION

INTERFACE #2

ITEM	DESCRIPTION	REMARK
FROM / TO	POWER PLANT GATEWAY STATION / LDC	
MEDIA	F.O. CABLE (MULTI MODE)	
PROTOCOL	ICDP	
INTERFACE	MAX. POSSIBLE ACTIVE POWER OUTPUT MIN. POSSIBLE ACTIVE POWER OUTPUT PRIMARY RESPONSE MARGIN. SECONDARY RESPONSE MARGIN. MAX. POSSIBLE MW RATE OF POWER CHANGE(UP/DOWN) ACTIVE POWER PRODUCED BY THE GENERATOR REACTIVE POWER PRODUCED BY THE GENERATOR GENERATOR TERMINAL VOLTAGE GENERATOR STEP-UP TRANSFORMER TAP POSITION MVAR RESERVE MARGIN FREQUENCY TURBINE AVAILABLE/NOT AVAILABLE TURBINE IN OPERATION YES/NO TURBINE TRIP GATEWAY STATION -> LDC	
	- AGC ON/OFF - ACTIVE POWER SET POINT [C] - REACTIVE POWER/POWER FACTOR SET POINT	LDC -> GATEWAY STATION

INTERFACE #3

ITEM	DESCRIPTION	REMARK
FROM / TO	POWER PLANT GATEWAY STATION / GIS SAS	
MEDIA	F.O. CABLE (MULTI MODE)	
PROTOCOL	IEC-60870-5-104(TO BE FINALIZED LATER)	
INTERFACE	1. GENERAL - BUSBAR VOLTAGES OF EACH SECTION 2. FOR EACH GENERATOR FEEDER VOLTAGE OF EACH LINE SIDE PHASE FOR INDICATION ACTIVE POWER REACTIVE POWER FREQUENCY	SAS -> GATEWAY STATION

SAS -> GATEWAY STATION

INTERFACE #4

ITEM	DESCRIPTION	REMARK
FROM / TO	STATION PLANT INFORMATION / COMPANY'S HEADQUARTER	
MEDIA	LATER	
PROTOCOL	LATER	
INTERFACE	POWER PLANT OPERATING INFORMATION	STATION PLANT INFORMATION -> COMPANY'S HEADQUARTER

Communication Interface for LDC (LDC <-> Power plant Interface)

TCP/IP Communication using IEC-60870-5-104 protocol

The parameter and address map should be matched between master and slave, to communicate according to IEC 60870-5-104 protocol.

We will set the parameter and address map to communicate master(and slave) as follow. So, the opposite communication module must match them as follow.

1) General Set-up Parameter which recommended by DCS

Layer	Item	Sub item	LDC IEC 104	Power plant IEC 104	Result (Note 1)
1	Primary Slave	IP Address	182.16.160.xxx	182.16.160.xxx	
		Port No.	2404	2404	
	Secondary Slave	IP Address	182.17.160.xxx	182.16.160.xxx	
		Port No.	2404	2404	
	Primary Master	IP Address	182.16.160.xxx	182.16.160.xxx	
		Port No.	2414	2414	
	Secondary Master	IP Address	182.17.160.xxx	182.17.160.xxx	
		Port No.	2414	2414	
2	Application Layer	Common Address of ASDU	2 Octet	2 Octet	
		Address	10	20	
		Address of Information Object	3 Octets	3 Octets	
		Cause of Transmission	2 Octet	2 Octet	

Note : 1. Fill-up if follow recommend set-up data "OK" , else please fill up your value on this column

2) Address Map

No.	Type Identification	Code	Start Address	End Address
1	Single Point Information with time tag CP56Time2a	M_SP_TB_1	10000	14999
2	Double Point Information with time tag CP56Time2a	M_DP_TB_1	15000	19999
3	Measured Value, normalized value	M_ME_NA_1	20000	24999

Communication Interface for LDC (LDC <-> Power plant Interface) Communication using ICCP(IEC-60870-6/TASE.2) protocol

The parameter and address map should be matched between master and slave, to communicate according to IEC 60870-5-104 protocol.
We will set the parameter and address map to communicate master(and slave) as follow. So, the opposite communication module must match them as follow.

1) General Set-up Parameter which recommended by DCS

Layer	Item	Sub item	LDC ICCP	Power plant ICCP	Result (Note 1)
1	Primary Slave	IP Address	To be developed		
		Port No.			
	Secondary Slave	IP Address			
		Port No.			
	Primary Master	IP Address			
		Port No.			
	Secondary Master	IP Address			
		Port No.			
2	Common Address of ASDU	No. of Octets			
		Address			
	Address of Information Object	No. of Octets			
		Cause of Transmission			

Note : 1. Fill-up if follow recommend set-up data "OK" , else please fill up your value on this column

2) Address Map

No.	Type Identification	Code	Start Address	End Address
1	Single Point Information with time tag CP56Time2a	M_SP_TB_1	10000	14999
2	Double Point Information with time tag CP56Time2a	M_DP_TB_1	15000	19999
3	Measured Value, normalized value	M_ME_NA_1	20000	24999

[illegible]

COMMUNICATION POINT LIST FOR LOAD DISPATCH CENTER

SIGNAL DESCRIPTION			IEC-104 MMS MASTER / SLAVE (B) ASSIGNMENT		IEC-104 INFORMATION											SIGNAL MANAGEMENT BY POWER PLANT					
			Power	LDC	ASDU TYPE (SIGNAL TYPE)	LINK ADDRESS (Polling Address)	ASDU ADDRESS (Station Address)	INFORMATION OBJECT (Signal ID)	BIT COMBINATION (COB ONLY)				UNIT (PA ONLY)	RAW VALUE (MW ONLY)		ENGINEERING VALUE (MW ONLY)		DEAD BAND (% OF FULL RANGE)	Remarks		
									00 DDI 0 SDI	01 DDI 1 SDI	10 DDI	11 DDI		MIN	MAX	MIN	MAX				
STGH2 TERMINAL VOLTAGE			S	M	M_ME_NA_1				20028	-	-	-	-	kV	0	1	0	22	0.22		
STGH2 STEP-UP TRANSFORMER TAP POSITION			S	M	M_ME_NA_1				20029	-	-	-	-		0	1	1	25	0.5		
STGH2 IWAR RESERVE MARGIN			S	M	M_ME_NA_1				20030	-	-	-	-	MVAR/h	0	1	0	800	8		Manual Input on HMI
STGH2 FREQUENCY			S	M	M_ME_NA_1				20031	-	-	-	-	Hz	0	1	0	70	0.7		
STGH2 ACTIVE POWER CONTROL LOCAL/REMOTE			S	M	M_SP_TB_1				10009	LOCAL	REMOTE										
STGH2 REACTIVE POWER FACTOR CONTROL REMOTE/LOCAL			S	M	M_SP_TB_1				10010	LOCAL	REMOTE										
STGH2 PRIMARY CONTROLLER FREQ RESPONSE ON/OFF			S	M	M_SP_TB_1				10011	OFF	ON										
STGH2 TURBINE AVAILABLE/NOT AVAILABLE			S	M	M_SP_TB_1				10012	NOT AVAIL	AVAIL										Manual Input on HMI
STGH2 TURBINE IN OPERATION YES/NO			S	M	M_SP_TB_1				10013	NO	YES										
STGH2 TURBINE TRIP			S	M	M_SP_TB_1				10014	NORMAL	TRIPPED										
STGH2 AGC ON/ OFF			M	S	M_SP_TB_1				10015	OFF	ON										PW Control ON from LDC
STGH2 AVR ON/ OFF			M	S	M_SP_TB_1				10127	OFF	ON										AVR Control ON from LDC
STGH2 REACTIVE POWER SET POINT			M	S	M_ME_NA_1				20152	-	-	-	-	MVar/h	0	1	0	800	8		Reactive Power Set point from LDC
STG #3																					
STGH3 MAXIMUM POSSIBLE ACTIVE POWER OUTPUT			S	M	M_ME_NA_1				20033	-	-	-	-	MW/h	0	1	0	800	8		Manual Input on HMI, Default value : XX MW/h
STGH3 MINIMUM POSSIBLE ACTIVE POWER OUTPUT			S	M	M_ME_NA_1				20034	-	-	-	-	MW/h	0	1	0	800	8		Manual Input on HMI, Default value : XX MW/h
STGH3 PRIMARY RESPONSE MARGIN			S	M	M_ME_NA_1				20035	-	-	-	-	MW/m	0	1	0	20	0.2		Fixed Value : XX MW/h
STGH3 SECONDARY RESPONSE MARGIN			S	M	M_ME_NA_1				20036	-	-	-	-	MW/m	0	1	0	20	0.2		Fixed Value : XX MW/h
STGH3 MAXIMUM POSSIBLE MW RATE OF POWER CHANGE (UP, DOWN)			S	M	M_ME_NA_1				20037	-	-	-	-	%	0	1	0	10	0.1		
STGH3 ACTIVE POWER			S	M	M_ME_NA_1				20038	-	-	-	-	MW/h	-1	1	-800	800	8		
STGH3 REACTIVE POWER			S	M	M_ME_NA_1				20039	-	-	-	-	MVAR/h	-1	1	-800	800	8		
STGH3 TERMINAL VOLTAGE			S	M	M_ME_NA_1				20040	-	-	-	-	kV	0	1	0	22	0.22		
STGH3 STEP-UP TRANSFORMER TAP POSITION			S	M	M_ME_NA_1				20041	-	-	-	-		0	1	1	25	0.5		
STGH3 IWAR RESERVE MARGIN			S	M	M_ME_NA_1				20042	-	-	-	-	MVAR/h	0	1	0	800	8		Manual Input on HMI
STGH3 FREQUENCY			S	M	M_ME_NA_1				20043	-	-	-	-	Hz	0	1	0	70	0.7		
STGH3 ACTIVE POWER CONTROL LOCAL/REMOTE			S	M	M_SP_TB_1				10016	LOCAL	REMOTE										
STGH3 REACTIVE POWER FACTOR CONTROL REMOTE/LOCAL			S	M	M_SP_TB_1				10017	LOCAL	REMOTE										
STGH3 PRIMARY CONTROLLER FREQ RESPONSE ON/OFF			S	M	M_SP_TB_1				10018	OFF	ON										Manual Input on HMI
STGH3 TURBINE AVAILABLE/NOT AVAILABLE			S	M	M_SP_TB_1				10019	NOT AVAIL	AVAIL										
STGH3 TURBINE IN OPERATION YES/NO			S	M	M_SP_TB_1				10020	NO	YES										
STGH3 TURBINE TRIP			S	M	M_SP_TB_1				10021	NORMAL	TRIPPED										
STGH3 AGC ON/ OFF			M	S	M_SP_TB_1				10022	OFF	ON										PW Control ON from LDC
STGH3 AVR ON/ OFF			M	S	M_SP_TB_1				10128	OFF	ON										AVR Control ON from LDC
STGH3 REACTIVE POWER SET POINT			M	S	M_ME_NA_1				20153	-	-	-	-	MVar/h	0	1	0	800	8		Reactive Power Set point from LDC
STG #4																					
STGH4 MAXIMUM POSSIBLE ACTIVE POWER OUTPUT			S	M	M_ME_NA_1				20045	-	-	-	-	MW/h	0	1	0	800	8		Manual Input on HMI, Default value : XX MW/h
STGH4 MINIMUM POSSIBLE ACTIVE POWER OUTPUT			S	M	M_ME_NA_1				20046	-	-	-	-	MW/h	0	1	0	800	8		Manual Input on HMI, Default value : XX MW/h

COMMUNICATION POINT LIST FOR LOAD DISPATCH CENTER

SIGNAL DESCRIPTION			IEC-104 MASTER/SLAVE (B)		IEC-104 INFORMATION										Remarks		SIGNAL MANAGEMENT by POWER PLANT				
			Power	LDC	ASDU TYPE (SIGNAL TYPE)	LINK ADDRESS (Polling Address)	ASDU ADDRESS (Station Address)	INFORMATION OBJECT (Signal ID)	BIT COMBINATION (COB ONLY)				UNIT (% ONLY)	RAW VALUE (% ONLY)					ENGINEERING VALUE (% ONLY)	DEAD BAND (% MAX RANGE)	
										00 DDI 0 SDI	01 DDI 1 SDI	10 DDI	11 DDI	MIN	MAX	MIN	MAX		Reference DCS TAG No.	Technical Note	Remarks
STGH14 MAXIMUM POSSIBLE MW RATE OF POWER CHANGE (UP, DOWN)			S	M	M_ME_NA_1				20049	-	-	-	-	%	0	1	0	10			
STGH14 ACTIVE POWER			S	M	M_ME_NA_1				20050	-	-	-	-	MW/h	-1	1	-800	800			
STGH14 REACTIVE POWER			S	M	M_ME_NA_1				20051	-	-	-	-	MVAR/h	-1	1	-800	800			
STGH14 TERMINAL VOLTAGE			S	M	M_ME_NA_1				20052	-	-	-	-	kV	0	1	0	22			
STGH14 STEP-UP TRANSFORMER TAP POSITION			S	M	M_ME_NA_1				20053	-	-	-	-		0	1	1	25			
STGH14 AVR RESERVE MARGIN			S	M	M_ME_NA_1				20054	-	-	-	-	MVAR/h	0	1	0	800		Manual Input on HMI	
STGH14 FREQUENCY			S	M	M_ME_NA_1				20055	-	-	-	-	Hz	0	1	0	70			
STGH14 ACTIVE POWER CONTROL LOCAL/REMOTE			S	M	M_SP_TB_1				10023	LOCAL	REMOTE										
STGH14 REACTIVE POWER FACTOR CONTROL REMOTE/LOCAL			S	M	M_SP_TB_1				10024	LOCAL	REMOTE										
STGH14 PRIMARY CONTROLLER FREQ RESPONSE ON/OFF			S	M	M_SP_TB_1				10025	OFF	ON									Manual Input on HMI	
STGH14 TURBINE AVAILABLE/NOT AVAILABLE			S	M	M_SP_TB_1				10026	NOT AVAILABLE	AVAILABLE										
STGH14 TURBINE IN OPERATION YES/NO			S	M	M_SP_TB_1				10027	NO	YES										
STGH14 TURBINE TRIP			S	M	M_SP_TB_1				10028	NORMAL	TRIPPED										
STGH14 AGC ON/ OFF			M	S	M_SP_TB_1				10029	OFF	ON									MW Control ON from LDC	
STGH14 AVR ON/ OFF			M	S	M_SP_TB_1				10129	OFF	ON									AVR Control ON from LDC	
STGH14 REACTIVE POWER SET POINT			M	S	M_ME_NA_1				20154	-	-	-	-	MVar/h	0	1	0	800		Reactive Power Set point from LDC	

