

	I/O COUNT				Annexure -[B] of PY 56216	
	PLCs [BOP PLC + UB BMS PLC + HRSG BMS PLC]				Rev 00	
	Project: STEAM AND POWER GENERATION PACKAGE, RFCL					

[A] HRSG BMS PLC - I/O Count

S. No	Signal description	Signal type	Actual quantity [I]	20% Engg Spare [II]	Base Qty (No's) ([I]+[II])	Barriers	Inter Posing Relays (IPR)	Remarks
1	Analog Inputs,4-20mA (Process)	Intrinsic safe [IS]	22	5	27	27	NA	Note-(8) & Barriers with Dual output - 6 No's
2	Analog Inputs,4-20mA (Process)	Non Intrinsic safe [Non-IS]	10	2	12	NA	NA	
3	Analog Inputs,4-20mA (Elec)	Non-IS	0	0	0	NA	NA	
4	Analog Outputs,4-20mA (Process)	IS	0	0	0	0	NA	Note-(8)
5	Analog Outputs,4-20mA (Process)	Non-IS	0	0	0	NA	NA	
6	RTD inputs	IS	0	0	0	0	NA	Note-(8)
7	RTD inputs	Non-IS	0	0	0	NA	NA	
8	Thermocouple inputs	Non-IS	0	0	0	NA	NA	
9	Digital Inputs	IS	90	18	108	108	NA	Note-(8) & (9)
10	Digital Inputs	Non-IS	108	22	130	NA	130	Note-(8)
11	Digital Outputs	IS	43	9	52	64	NA	Note-(8) & Barriers with Dual output - 15 No's
12	Digital Outputs	Non-IS	100	20	120	NA	120	Note-(8)
13	HMS connectivity	-	To be calculated by bidder as per AI & AO count and EIL Doc. No: A747-400-16-51-SK-01 Rev 0			NA	NA	Note-(8)
14	Number of SOE points	-	48	10	58	NA	NA	Note-(8)

[B] UB BMS PLC - I/O Count

S. No	Signal description	Signal type	Actual quantity [I]	20% Engg Spare [II]	Base Qty (No's) ([I]+[II])	Barriers	Inter Posing Relays (IPR)	Remarks
1	Analog Inputs,4-20mA (Process)	Intrinsic safe [IS]	23	5	28	28	NA	Note-(8) & Barriers with Dual output - 6 No's
2	Analog Inputs,4-20mA (Process)	Non Intrinsic safe [Non-IS]	18	4	22	NA	NA	
3	Analog Inputs,4-20mA (Elec)	Non-IS	3	1	4	NA	NA	
4	Analog Outputs,4-20mA (Process)	IS	0	0	0	0	NA	Note-(8)
5	Analog Outputs,4-20mA (Process)	Non-IS	0	0	0	NA	NA	
6	RTD inputs	IS	0	0	0	0	NA	Note-(8)
7	RTD inputs	Non-IS	0	0	0	NA	NA	
8	Thermocouple inputs	Non-IS	0	0	0	NA	NA	
9	Digital Inputs	IS	64	13	77	77	NA	Note-(8) & (9)
10	Digital Inputs	Non-IS	75	15	90	NA	90	Note-(8)
11	Digital Outputs	IS	29	6	35	35	NA	Note-(8)
12	Digital Outputs	Non-IS	66	14	80	NA	80	Note-(8)
13	HMS connectivity	-	To be calculated by bidder as per AI & AO count and EIL Doc. No: A747-400-16-51-SK-01 Rev 0			NA	NA	Note-(8)
14	Number of SOE points	-	48	10	58	NA	NA	Note-(8)

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[C] BOP PLC - I/O Count

S. No	Signal description	Signal type	Actual quantity [I]	20% Engg Spare [II]	Base Qty ([I]+[II])	Barriers	Inter Posing Relays (IPR)	Remarks
1	Analog Inputs,4-20mA (Process)	Intrinsic safe [IS]	27	6	33	33	NA	Note-(8)
2	Analog Inputs,4-20mA (Process)	Non Intrinsic safe [Non-IS]	142	29	171	NA	NA	
3	Analog Inputs,4-20mA (Elec)	Non-IS	18	4	22	NA	NA	
4	Analog Outputs,4-20mA (Process)	IS	0	0	0	0	NA	Note-(8)
5	Analog Outputs,4-20mA (Process)	Non-IS	0	0	0	NA	NA	
6	RTD inputs	IS	0	0	0	0	NA	Note-(8)
7	RTD inputs	Non-IS	0	0	0	NA	NA	
8	Thermocouple inputs	Non-IS	0	0	0	NA	NA	
9	Digital Inputs	IS	20	4	24	24	NA	Note-(8) & (9)
10	Digital Inputs	Non-IS	123	25	148	NA	148	Note-(8)
11	Digital Outputs	IS	10	2	12	12	NA	Note-(8)
12	Digital Outputs	Non-IS	64	13	77	NA	77	Note-(8)
13	HMS connectivity	-	To be calculated by bidder as per AI & AO count and EIL Doc. No: A747-400-16-51-SK-01 Rev 0			NA	NA	Note-(8)
17	Number of SOE points	-	128	26	154	NA	NA	Note-(8)

SPAREs CALCULATION :: of all PLCs shall be as per below

S. No	Signal description	Requirement	Remarks
1	Installed Spares	System spares : Bus capacity – 40% & Number of nodes – 30%	All the installed spares shall be supplied with fully wired up.
2		For I/O cards : 20% of base quantity given in above Tables	
3		Marshalling : 20% [this includes isolators, terminals, cable glands, etc.]	
4		Power supply : 30% for each variety [like feeders & other sub-components]	
5	Spare space	I/O level: 15%	[Internal wiring up to I/O terminals shall be completed with all necessary hardware. Installation of only I/O cards should make this spare space usable].
6		Marshalling level : 15%	
7	Spare in Communication bus	The communication sub-system shall have sufficient capability to take care of system expansions as mentioned above without degrading the system performance.	

NOTES ::

- Redundancy shall be as per PY56216 and SIL-3 requirement
- The above mentioned I/O count is exclusively for process control requirement. Any I/Os required for the operational requirements of the PLC system in line with specifications shall be taken care by the Vendor. (For example, Panel temperature monitoring signals, all fan failure alarms, PLC system diagnostic alarms, etc).
- All analog input signals [IS & non-IS] shall be wired to Purchaser IAMS System as per EIL Doc.No: A747-400-16-51-SK-01 Rev 0.
- Erection & Commissioning spares – as required to be added to above count.
- Interrogation voltages of MCC DI / DO's, SOVs, Field transmitters shall be provided during order execution.

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6 Guidelines for Spares calculations:

- 6.1 I/O Count shall be as per above tables. While calculating the I/O module quantity, decimal values shall be rounded off to next I/O module qty.
- 6.2 Installed spares - to be calculated on hardware for actual rounded off to next module qty.

Spare slots/space - to be calculated on (actual rounded off module qty/used space + installed spares rounded off module qty/ space for installed spares + installed commissioning rounded off module qty/ space for installed commissioning spares). Spare slots shall be fully wired upto-marshalling TB including intermediate accessories like Barriers, interposing relays etc.
- 6.4 Commissioning spares - Items used during E&C of system to replace the faulty one. Such item shall be supplied without any commercial implications.
- 6.5 Mandatory spares - to be calculated on (actual rounded off module qty + installed spares rounded off module qty).
- 6.6 Spare capacities for processor/power supply - Spare capacity of processor shall be calculated on total installed hardware for future additional I/O's for which spare slots are available.
- 7 Erection & commissioning spares shall be considered by bidder as required by the system
- 8 Installed spares shall also be considered while calculating the quantity of Barriers, IPRs, Number of SOW points & HMS connectivity items.
- 9 All DI barriers shall be of Proximity converters with Barriers.
- 10 All barriers shall be single output type except as indicated in remarks of above I/O counts