

THE ISRAEL ELECTRIC CORP. LTD.
Substation Planning Sector

STR-1858
Appendix to Annexure "C"

THE ISRAEL ELECTRIC CORPORATION LTD.
ENGINEERING PLANNING DIVISION SUBSTATION PLANNING SECTOR

STR-1858
SPECIFICATION FOR
SUBSTATION CONTROL AND PROTECTION SYSTEM

APPENDIX TO ANNEXURE "C"

SUMMARY OF EQUIPMENT

Summary of equipment for substations included in STR – 1858

Table No.	Description
C0	Summary of equipment for the Station-Level (for each of the Substations , except for special stations specified in table c0-1) to be supplied by the contractor
C0-1	Summary of equipment for the special Station-Level (JERUSALEM, HEFER , MORASHA) to be supplied by the contractor
CA1-1	Summary of relays for A1 Stations to be supplied by others
CA1-2	Summary of relays (HV) for A1 Stations to be supplied by the contractor
CA1-3	Summary of relays (MV) for A1 Stations to be supplied by the contractor
CA1-4	Summary of relays (EXTRA MV) for A1 Stations to be supplied by the contractor
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CA2-3	Summary of relays (MV) for A2 Stations to be supplied by the contractor
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CB1-1	Summary of relays for B1 Stations to be supplied by others
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CB3-3	Summary of relays (MV) for B3 Stations to be supplied by the contractor
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CB4-3	Summary of relays (MV) for B4 Stations to be supplied by the contractor
CB4-4	Summary of relays (EXTRA MV) for B4 Stations to be supplied by the contractor
CC1-1	Summary of relays for C1 Stations to be supplied by others
CC1-2	Summary of relays (HV) for C1 Stations to be supplied by the contractor
CC1-3	Summary of relays (MV) for C1 Stations to be supplied by the contractor
CC1-4	Summary of relays (EXTRA MV) for C1 Stations to be supplied by the contractor
CC2-1	Summary of relays for C2 Stations to be supplied by others
CC2-2	Summary of relays (HV) for C2 Stations to be supplied by the contractor
CC2-3	Summary of relays (MV) for C2 Stations to be supplied by the contractor
CC2-4	Summary of relays (EXTRA MV) for C2 Stations to be supplied by the contractor
CP-1	Summary of relays for substation P to be supplied by others
CP-2	Summary of relays for substation P to be supplied by the contractor
CD-1	Summary of relays for Switching Station ROKACH to be supplied by others

CD-2	Summary of relays (HV) for Switching Station ROKACH to be supplied by contractor
CD-3	Summary of relays (MV) for Switching Station ROKACH to be supplied by the contractor
CD-4	Summary of relays (EXTRA MV) for Switching Station ROKACH to be supplied by the contractor
CE-1	Summary of relays for Switching Station JERUSALEM to be supplied by others
CE-2	Summary of relays for (EHV+HV) Switching Station JERUSALEM to be supplied by the contractor
CE-3	Summary of relays for (MV) Switching Station JERUSALEM to be supplied by the contractor
CE-4	Summary of relays (EXTRA MV) for Switching Station JERUSALEM to be supplied by the contractor
CF-1	Summary of relays for Switching Station Hefer to be supplied by others
CF-2	Summary of relays for (EHV+HV) Switching Station Hefer to be supplied by the contractor
CF-3	Summary of relays for (MV) Switching Station Hefer to be supplied by the contractor
CF-4	Summary of relays for (EXTRA MV) Switching Station Hefer to be supplied by the contractor
CG-1	Summary of relays for Switching Station MORASHA to be supplied by others
CG-2	Summary of relays for (EHV+HV) Switching Station MORASHA to be supplied by the contractor
CG-3	Summary of relays for (MV) Switching Station MORASHA to be supplied by the contractor
CG-4	Summary of relays for (EXTRA MV) Switching Station MORASHA to be supplied by the contractor

General Station
Summary of equipment for Station-Level to be supplied by the supplier
Table No. C0

Type
CCU1 – NNC1
CCU2 – NNC2
HMI Work-Station + Display
General Alarm System
Annunciator & indicators unit
GPS system
Substation Main Distribution Monitoring System (MDMS).
Communication System **

** Includes all the components that comprise the communication system (Servers, Stationbus, Switches, Gateway to remote center, Protocol-converters where required, etc.), and communication links between components of the SCPS in the cubicles and between adjacent cubicles.

** Do not include FO cables between separated systems and cubicles

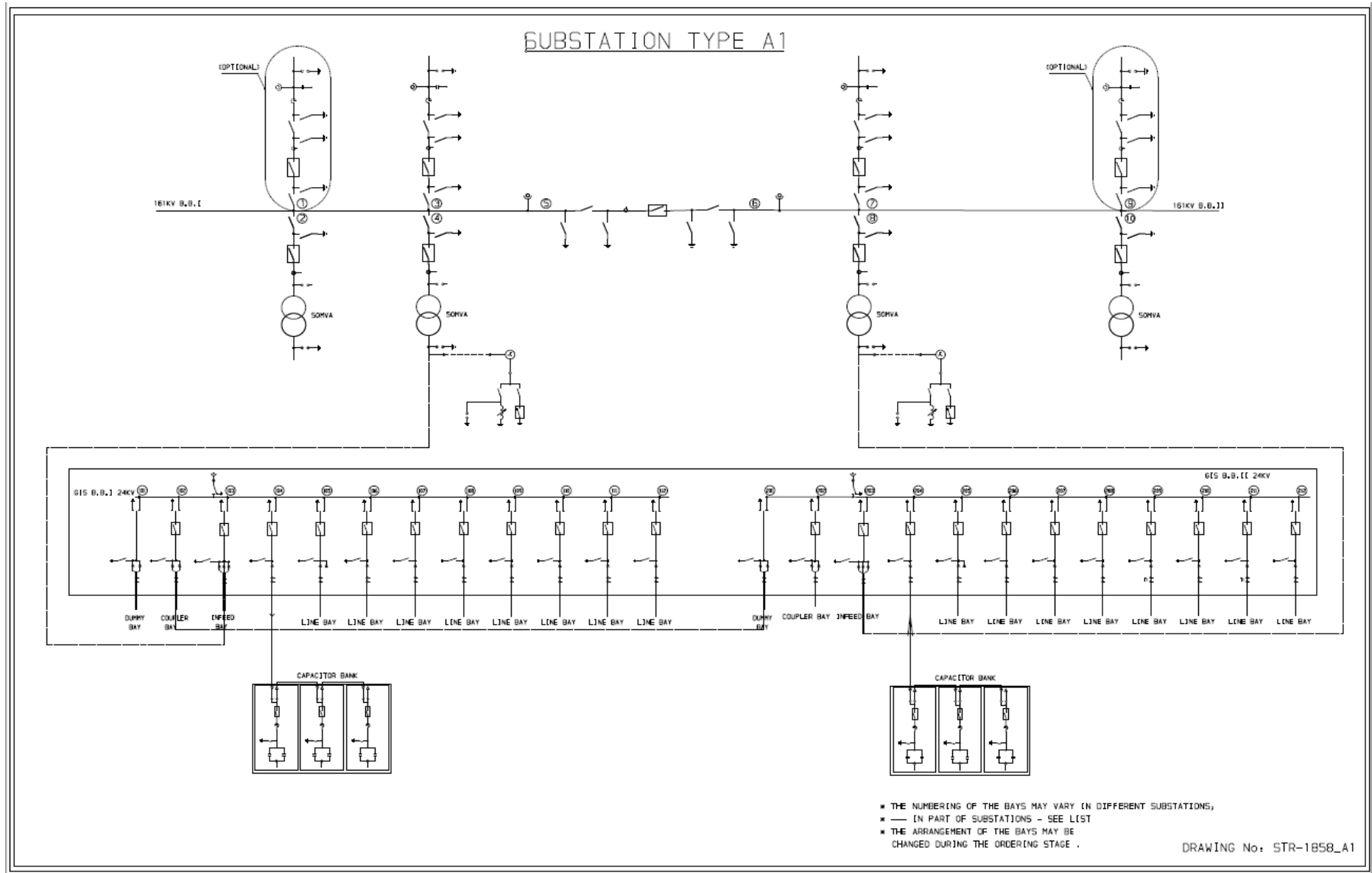
General Station
Summary of equipment for special Station-Level to be supplied by the supplier
Table No. C0-1
(this table is intended for the following stations: JERUSALEM, HEFER , MORASHA)

Type
CCU1 – NNC1
CCU2 – NNC2
CCU3 – NNC1
CCU4 – NNC2
HMI Work-Station + Display
General Alarm System (X2)
Annunciator & indicators unit (X2)
GPS system
Substation Main Distribution Monitoring System (MDMS). (X2)
Communication System **

** Includes all the components that comprise the communication system (Servers, Stationbus, Switches, Gateway to remote center, Protocol-converters where required, etc.), and communication links between components of the SCPS in the cubicles and between adjacent cubicles.

** Do not include FO cables between separated systems and cubicles

A1 stations



A1 stations
Summary of relays for A1 Stations to be supplied by others
Table No. CA1-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	3, 7	2
HV Line 2 Protection #2	****	****	IEC - 61850	3, 7	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 8, 10	8
HV BBP+BFP	****	****	IEC - 61850		1
HV BBP	****	****	IEC - 61850		1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 8, 10	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 8, 10	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

A1 stations
Summary of HV relays for substations A1 to be supplied by the supplier
Table No. CA1-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	3, 7	2
HVCU for Transformer	IEC - 61850	2, 4, 8, 10	4
HVCU for Coupler	IEC - 61850	5/6	1
HVCU for Busbar Measuring	IEC - 61850	--	1
Total amount for HV control relays			8

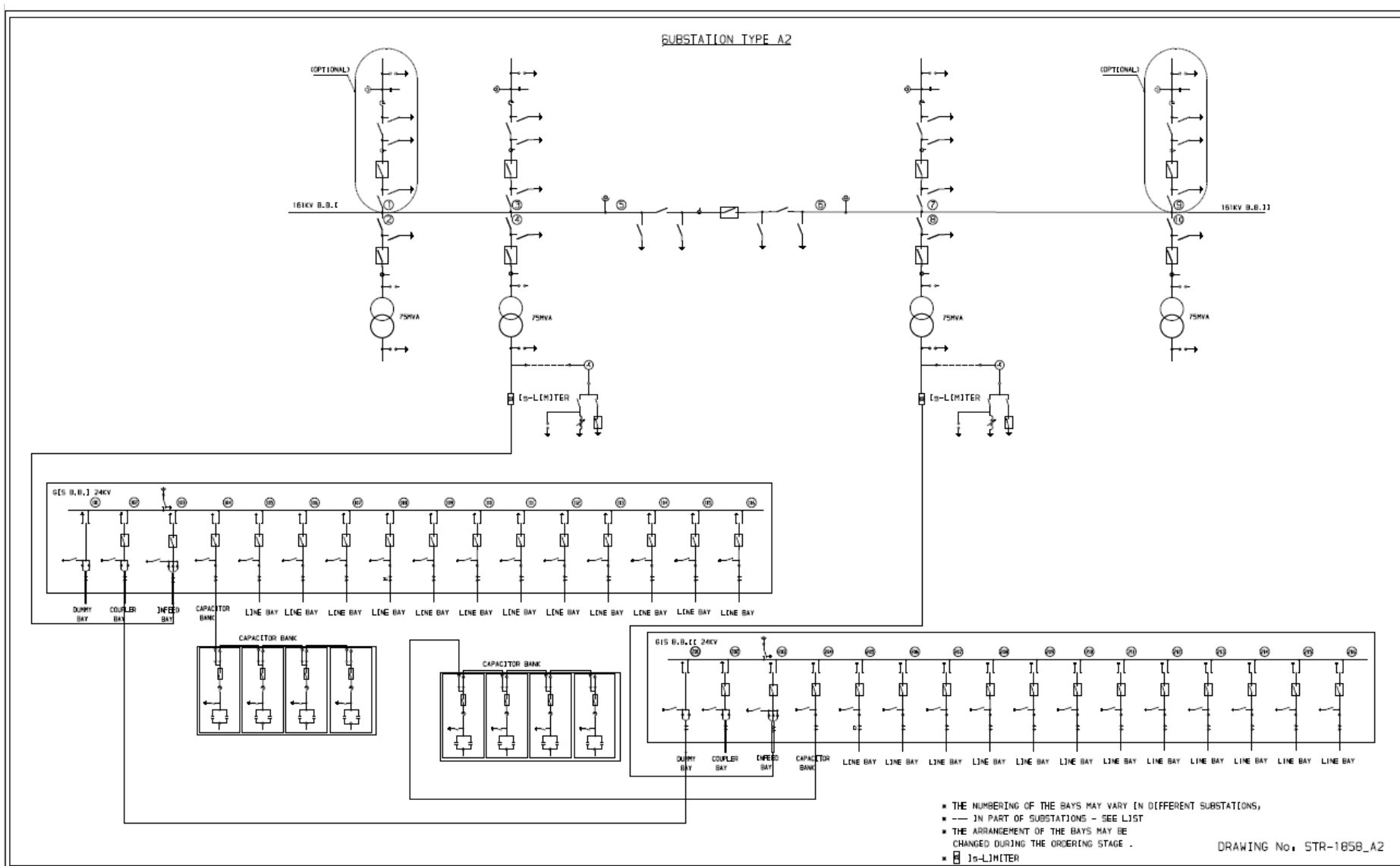
Summary of MV relays for substations A1 to be supplied by the supplier
Table No. CA1-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103,203	2
MVCPU for Feeder bay	IEC - 61850	105-112, 205-212	16
MVCPU for Coupler bay	IEC - 61850	102,202	2
MVCPU for Capacitor Bank bay	IEC - 61850	104,204	2
Total amount for MV control and protection relays			22

Summary of EXTRA MV relays for substations A1 to be supplied by the supplier
Table No. CA1-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			3

SUBSTATION TYPE A2



Summary of relays for A2 Stations to be supplied by others
Table No. CA2-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	3, 7	2
HV Line 2 Protection #2	****	****	IEC - 61850	3, 7	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 8, 10	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 8, 10	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 8, 10	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

A2 stations
Summary of HV relays for substations A2 to be supplied by the supplier
Table No. CA2-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	3, 7	2
HVCU for Transformer	IEC - 61850	2, 4, 8, 10	4
HVCU for Coupler	IEC - 61850	5/6	1
HVCU for Busbar Measuring	IEC - 61850	--	1
Total amount for HV control relays			8

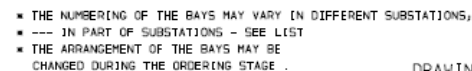
Summary of MV relays for substations A2 to be supplied by the supplier
Table No. CA2-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103, 203	2
MVCPU for Feeder bay	IEC - 61850	105-116, 205-216	24
MVCPU for Coupler bay	IEC - 61850	102 , 202	2
MVCPU for Capacitor Bank bay	IEC - 61850	104, 204	2
Total amount for MV control and protection relays			30

Summary of EXTRA MV relays for substations A2 to be supplied by the supplier
Table No. CA2-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Is-Limiter relay	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			5

B1 stations



Summary of relays for B1 Stations to be supplied by others
Table No. CB1-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	1, 5	2
HV Line 2 Protection #2	****	****	IEC - 61850	1, 5	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 6, 8	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 6, 8	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 6, 8	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

B1 stations
Summary of HV relays for B1 Stations to be supplied by others
Table No. CB1-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 5	2
HVCU for Transformer	IEC - 61850	2, 4, 6, 8	4
HVCU for Coupler	IEC - 61850	3	1
HVCU for Busbar Measuring	IEC - 61850	7	1
Total amount for HV control relays			8

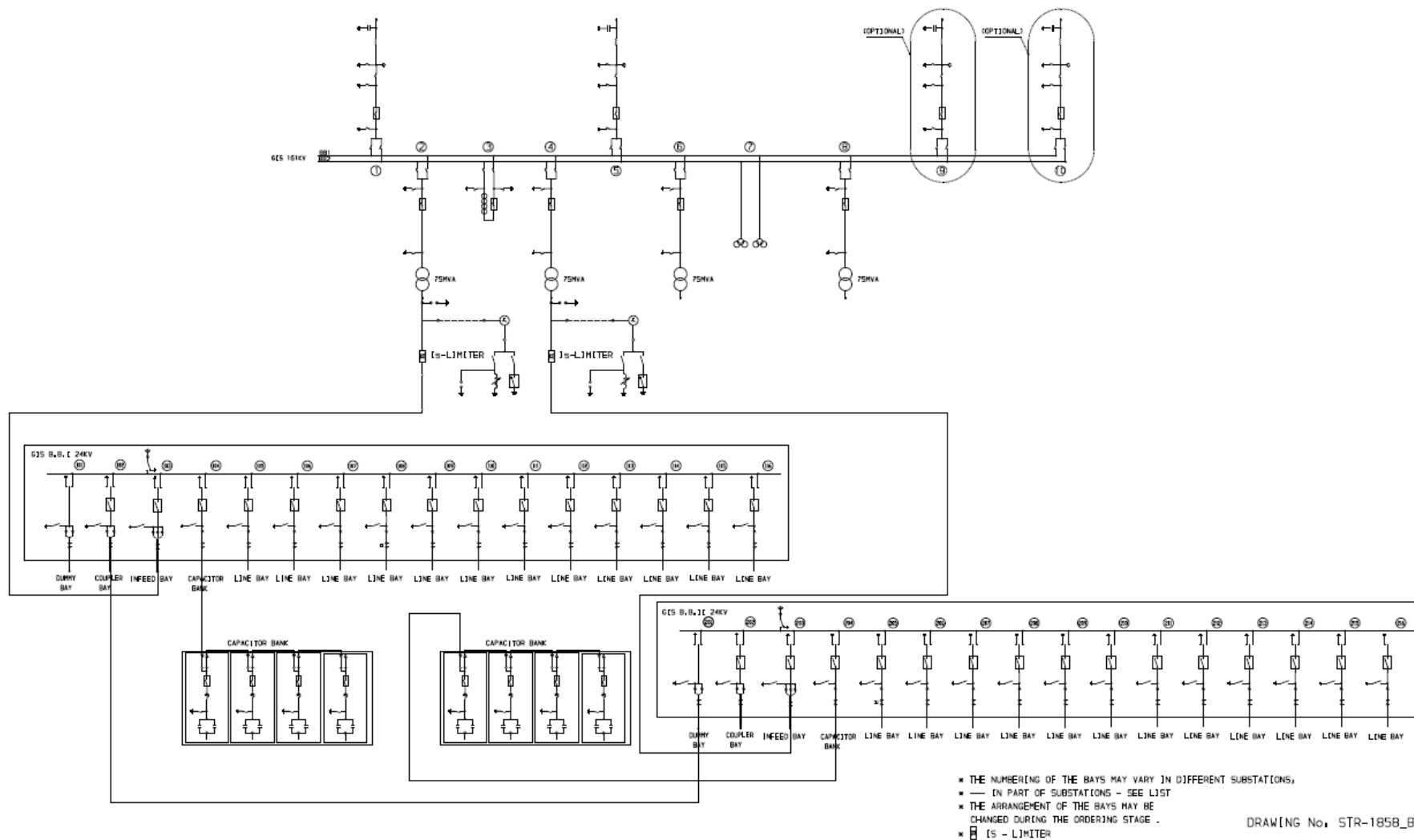
Summary of MV relays for substations B1 to be supplied by the supplier
Table No. CB1-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103, 203	2
MVCPU for Feeder bay	IEC - 61850	105-112, 205-212	16
MVCPU for Coupler bay	IEC - 61850	102, 202	2
MVCPU for Capacitor Bank bay	IEC - 61850	104, 204	2
Total amount for MV control and protection relays			22

Summary of EXTRA MV relays for substations B1 to be supplied by the supplier
Table No. CB1-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			3

SUBSTATION TYPE B2



Summary of relays for B2 Stations to be supplied by others
Table No. CB2-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	1, 5	2
HV Line 2 Protection #2	****	****	IEC - 61850	1, 5	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 6, 8	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 6, 8	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 6, 8	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

B2 stations
Summary of HV relays for B2 Stations to be supplied by others
Table No. CB2-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 5	2
HVCU for Transformer	IEC - 61850	2, 4, 6, 8	4
HVCU for Coupler	IEC - 61850	3	1
HVCU for Busbar Measuring	IEC - 61850	7	1
Total amount for HV control relays			8

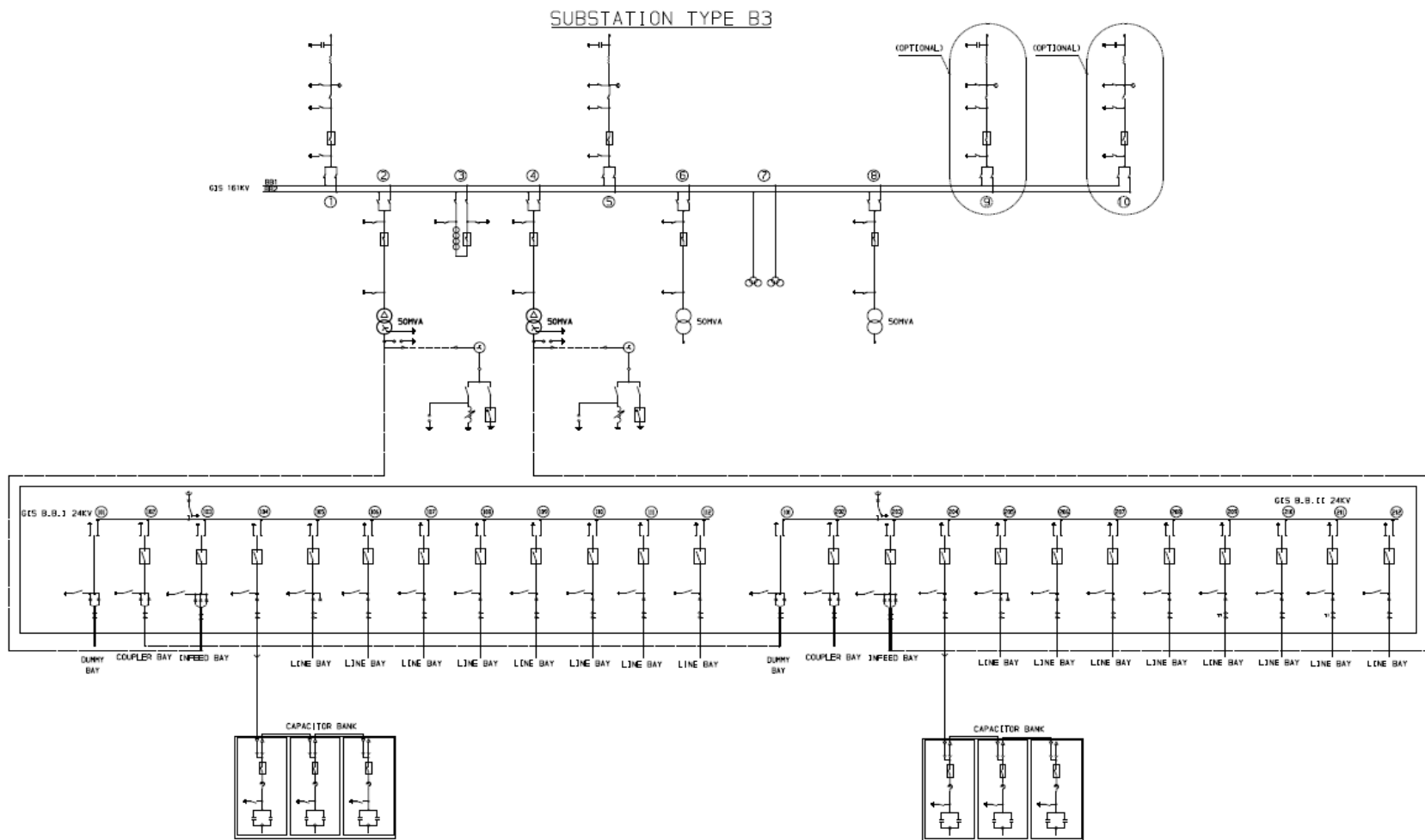
B2 stations
Summary of MV relays for substations B2 to be supplied by the supplier
Table No. CB2-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103, 203	2
MVCPU for Feeder bay	IEC - 61850	105-116, 205-216	24
MVCPU for Coupler bay	IEC - 61850	102 , 202	2
MVCPU for Capacitor Bank bay	IEC - 61850	104, 204	2
Total amount for MV control and protection relays			30

B2 stations
Summary of EXTRA MV relays for substations B2 to be supplied by the supplier
Table No. CB2-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Is-Limiter relay	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			5

B3 stations



- * THE NUMBERING OF THE BAYS MAY VARY IN DIFFERENT SUBSTATIONS,
- * — IN PART OF SUBSTATIONS - SEE LIST
- * THE ARRANGEMENT OF THE BAYS MAY BE
CHANGED DURING THE ORDERING STAGE .

DRAWING

DRAWING No: STR-1858_B3

Summary of relays for B3 Stations to be supplied by others
Table No. CB3-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	1, 5	2
HV Line 2 Protection #2	****	****	IEC - 61850	1, 5	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 6, 8	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 6, 8	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 6, 8	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

B3 stations
Summary of relays for substations B3 to be supplied by the supplier
Table No. CB3-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 5	2
HVCU for Transformer	IEC - 61850	2, 4, 6, 8	4
HVCU for Coupler	IEC - 61850	3	1
HVCU for Busbar Measuring	IEC - 61850	7	1
Total amount for HV control relays			8

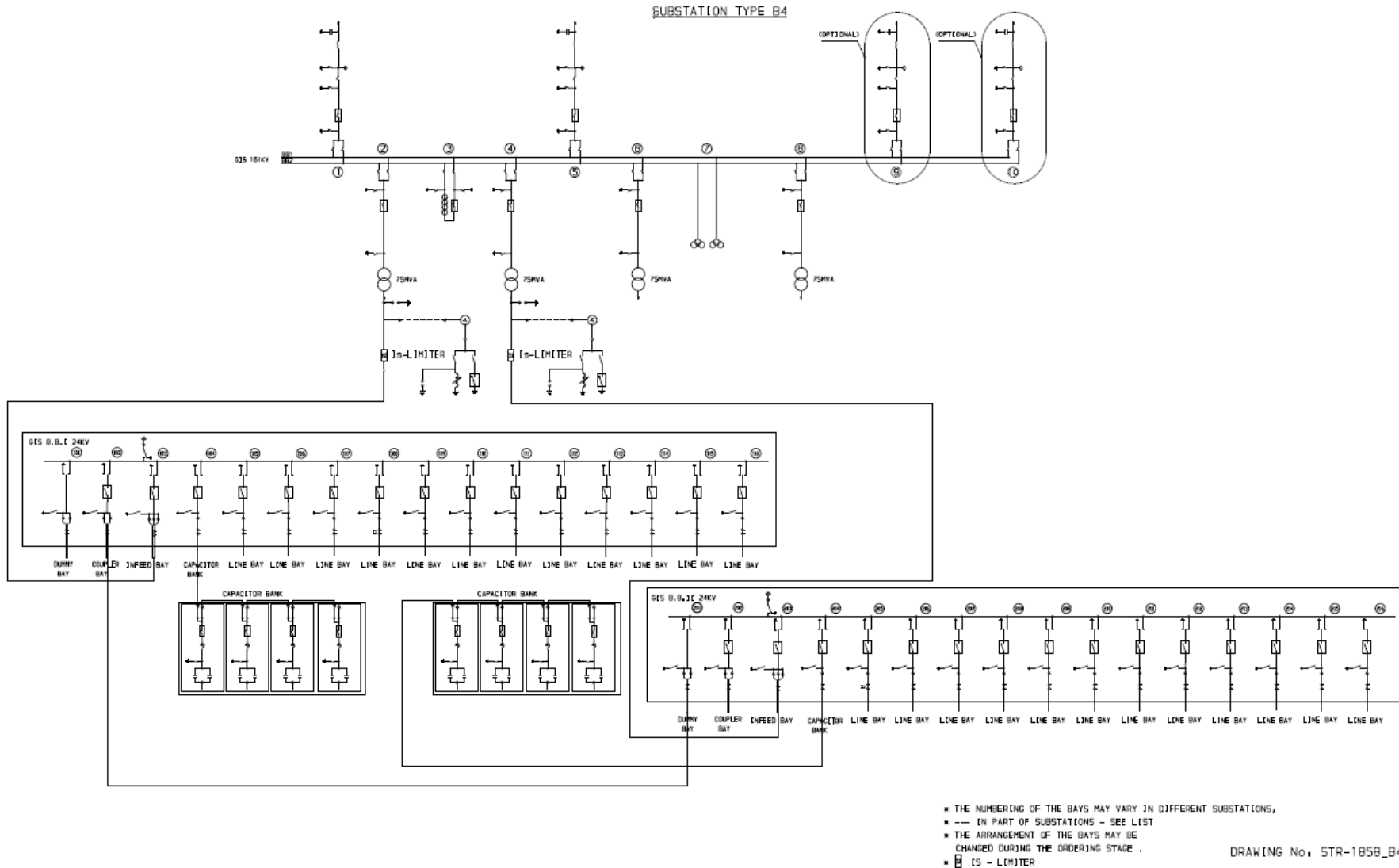
Summary of MV relays for substations B3 to be supplied by the supplier
Table No. CB3-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103, 203	2
MVCPU for Feeder bay	IEC - 61850	105-112, 205-212	16
MVCPU for Coupler bay	IEC - 61850	102, 202	2
MVCPU for Capacitor Bank bay	IEC - 61850	104, 204	2
Total amount for MV control and protection relays			22

B3 stations
Summary of EXTRA MV relays for substations B3 to be supplied by the supplier
Table No. CB3-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			3

SUBSTATION TYPE B4



Summary of relays for B4 Stations to be supplied by others
Table No. CB4-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	1, 5	2
HV Line 2 Protection #2	****	****	IEC - 61850	1, 5	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 6, 8	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 6, 8	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 6, 8	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

B4 stations
Summary of HV relays for substations B4 to be supplied by the supplier
Table No. CB4-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 5	2
HVCU for Transformer	IEC - 61850	2, 4, 6, 8	4
HVCU for Coupler	IEC - 61850	3	1
HVCU for Busbar Measuring	IEC - 61850	7	1
Total amount for HV control relays			8

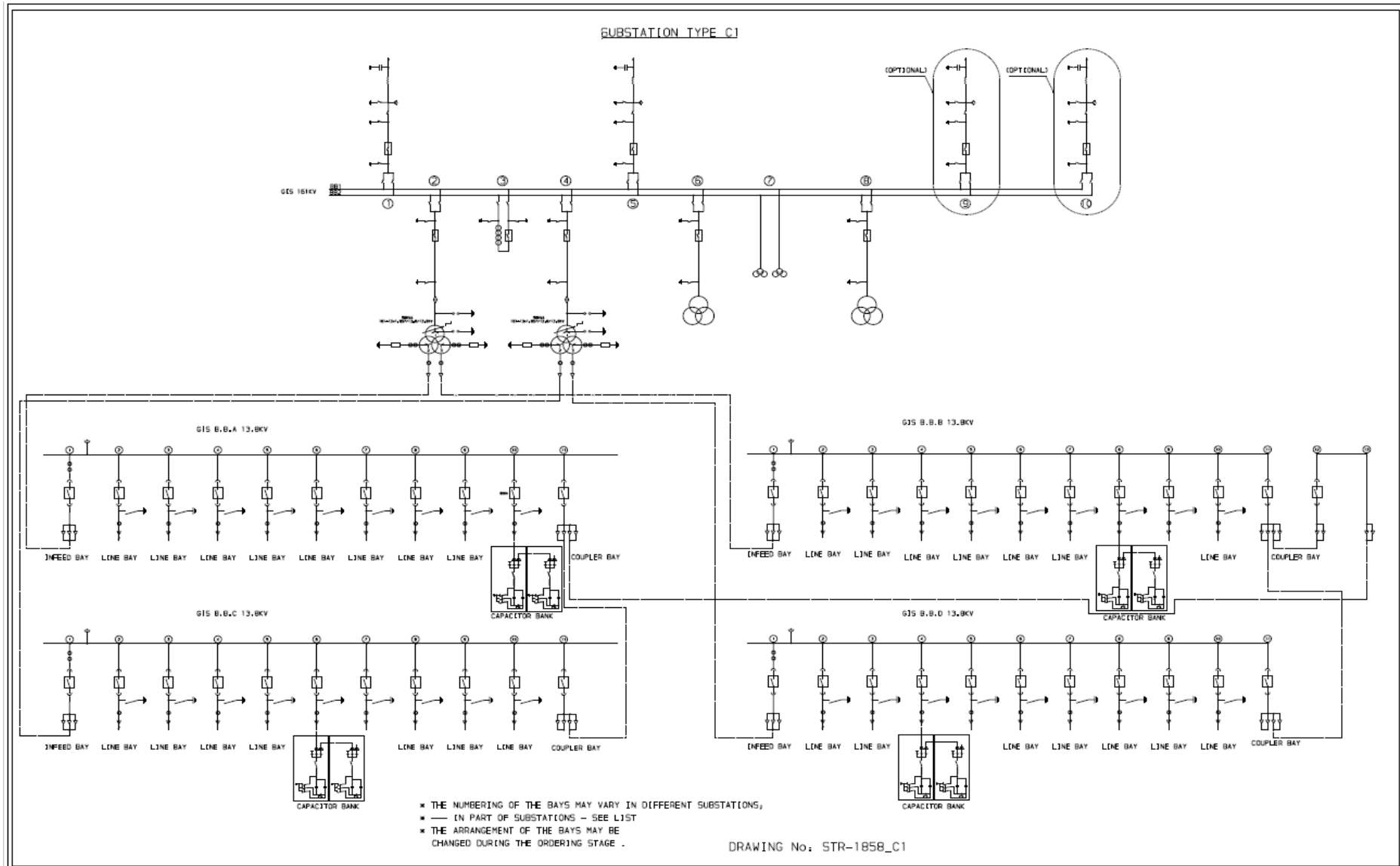
Summary of MV relays for substations B4 to be supplied by the supplier
Table No. CB4-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103, 203	2
MVCPU for Feeder bay	IEC - 61850	105-116, 205-216	24
MVCPU for Coupler bay	IEC - 61850	102 , 202	2
MVCPU for Capacitor Bank bay	IEC - 61850	104, 204	2
Total amount for MV control and protection relays			30

Summary of EXTRA MV relays for substations B4 to be supplied by the supplier
Table No. CB4-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Is-Limiter relay	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			5

C1 stations



Summary of relays for C1 Stations to be supplied by others
Table No. CC1-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	1, 5	2
HV Line 2 Protection #2	****	****	IEC - 61850	1, 5	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 6, 8	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 6, 8	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 6, 8	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

C1 stations
Summary of HV relays for C1 Stations to be supplied by supplier
Table No. CC1-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 5	2
HVCU for Transformer	IEC - 61850	2, 4, 6, 8	4
HVCU for Coupler	IEC - 61850	3	1
HVCU for Busbar Measuring	IEC - 61850	7	1
Total amount for HV control relays			8

C1 stations
Summary of MV relays for substations C1 to be supplied by the supplier
Table No. CC1-3
B.B. A

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-9	8
MVCPU for Coupler bay	IEC - 61850	11	1
MVCPU for Capacitor Bank bay	IEC - 61850	10	1

C1 stations
Summary of MV relays for substations C1 to be supplied by the supplier
Table No. CC1-3
B.B. B

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-7,9-10	8
MVCPU for Coupler bay	IEC - 61850	11-12	1
MVCPU for Capacitor Bank bay	IEC - 61850	8	1

C1 stations
Summary of MV relays for substations C1 to be supplied by the supplier
Table No. CC1-3
B.B. C

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-5,7-10	8
MVCPU for Coupler bay	IEC - 61850	11	1
MVCPU for Capacitor Bank bay	IEC - 61850	6	1

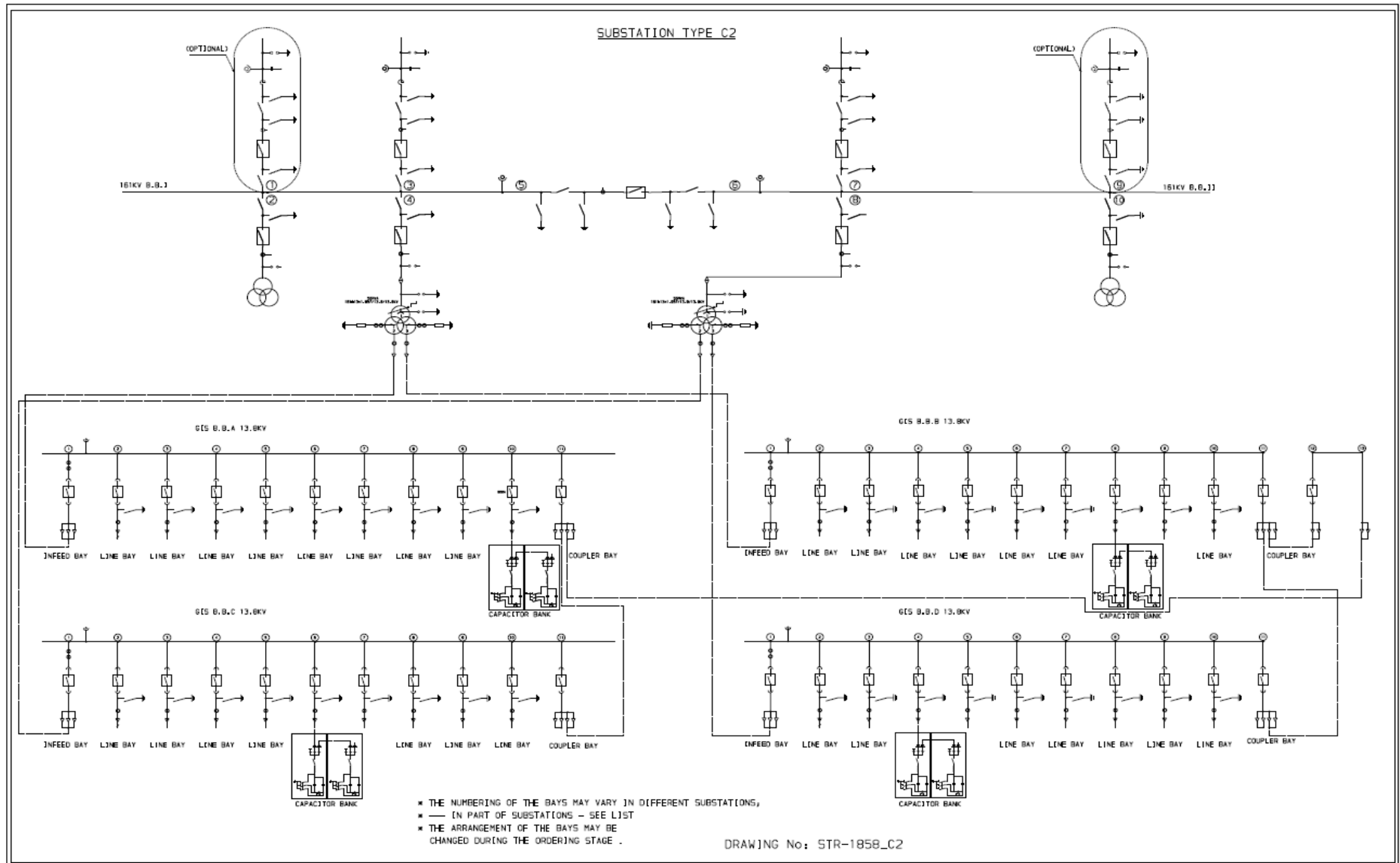
C1 stations
Summary of MV relays for substations C1 to be supplied by the supplier
Table No. CC1-3
B.B. D

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-3,5-10	8
MVCPU for Coupler bay	IEC - 61850	11	1
MVCPU for Capacitor Bank bay	IEC - 61850	4	1
Total amount for MV control and protection relays			44

Summary of EXTRA MV relays for substations C1 to be supplied by the supplier
Table No. CC1-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			3

C2 stations



Summary of relays for C2 Stations to be supplied by others
Table No. CC2-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	3, 7	2
HV Line 2 Protection #2	****	****	IEC - 61850	3, 7	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 8 , 10	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 8 , 10	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 8 , 10	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

C2 stations
Summary of HV relays for substations C2 to be supplied by the supplier
Table No. CC2-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 3	2
HVCU for Transformer	IEC - 61850	2, 4, 8 , 10	4
HVCU for Coupler	IEC - 61850	5/6	1
HVCU for Busbar Measuring	IEC - 61850	--	1
Total amount for HV control relays			8

C2 stations
Summary of MV relays for substations C2 to be supplied by the supplier
Table No. CC2-3
B.B. A

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-9	8
MVCPU for Coupler bay	IEC - 61850	11	1
MVCPU for Capacitor Bank bay	IEC - 61850	10	1

C2 stations
Summary of MV relays for substations C2 to be supplied by the supplier
Table No. CC2-3
B.B. B

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-7,9-10	8
MVCPU for Coupler bay	IEC - 61850	11-12	1
MVCPU for Capacitor Bank bay	IEC - 61850	8	1

C2 stations
Summary of MV relays for substations C2 to be supplied by the supplier
Table No. CC2-3
B.B. C

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-5,7-10	8
MVCPU for Coupler bay	IEC - 61850	11	1
MVCPU for Capacitor Bank bay	IEC - 61850	6	1

C2 stations
Summary of MV relays for substations C2 to be supplied by the supplier
Table No. CC2-3
B.B. D

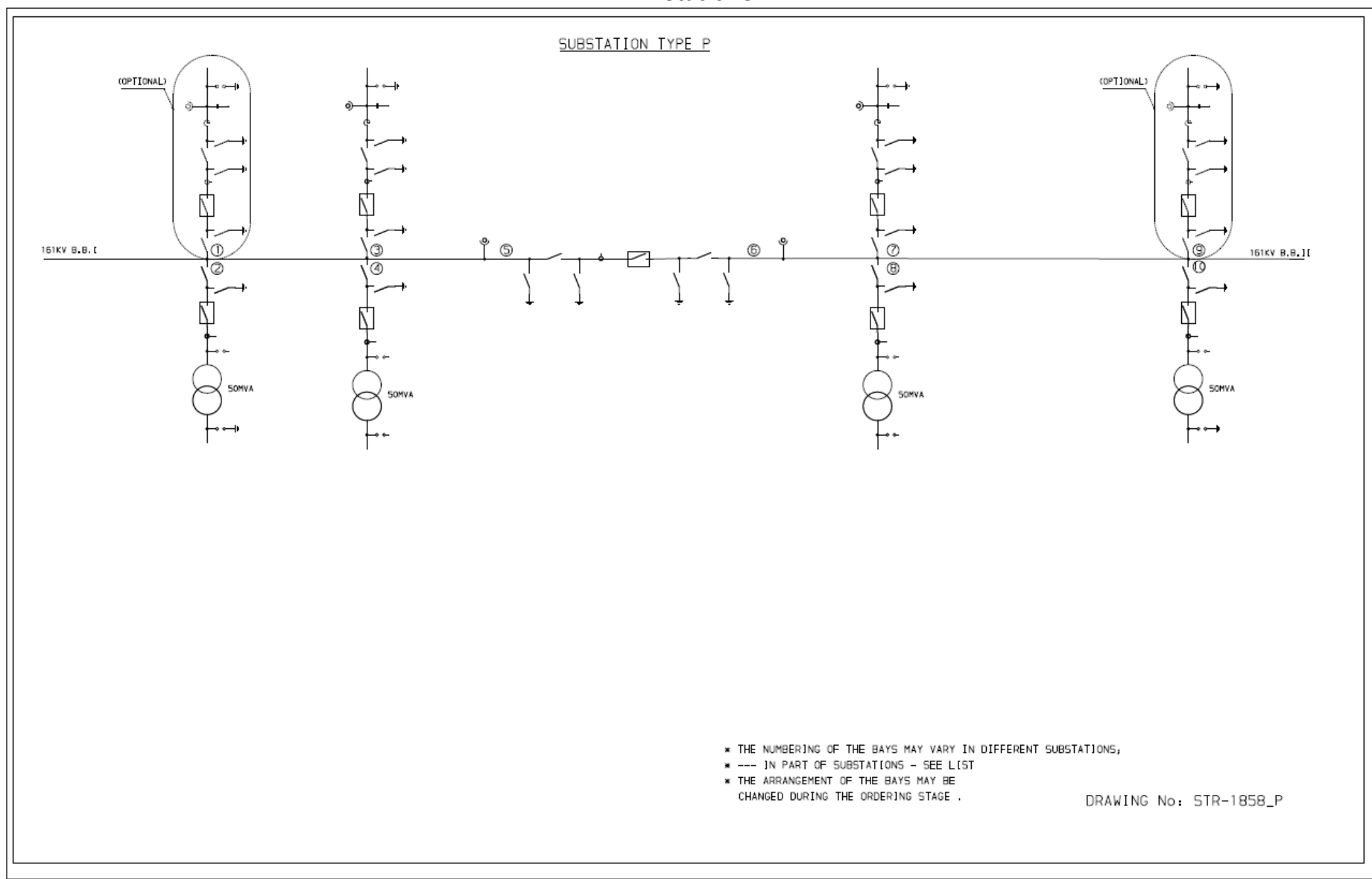
Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	1	1
MVCPU for Feeder bay	IEC - 61850	2-3,5-10	8
MVCPU for Coupler bay	IEC - 61850	11	1
MVCPU for Capacitor Bank bay	IEC - 61850	4	1
Total amount for MV control and protection relays			44

Summary of EXTRA MV relays for substations C2 to be supplied by the supplier

Table No. CC2-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			3

P stations



Summary of relays for P Stations to be supplied by others
Table No. CP-1

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	3, 7	2
HV Line 2 Protection #2	****	****	IEC - 61850	3, 7	2
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	2, 4, 8, 10	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
Total amount for HV Protection relays					14

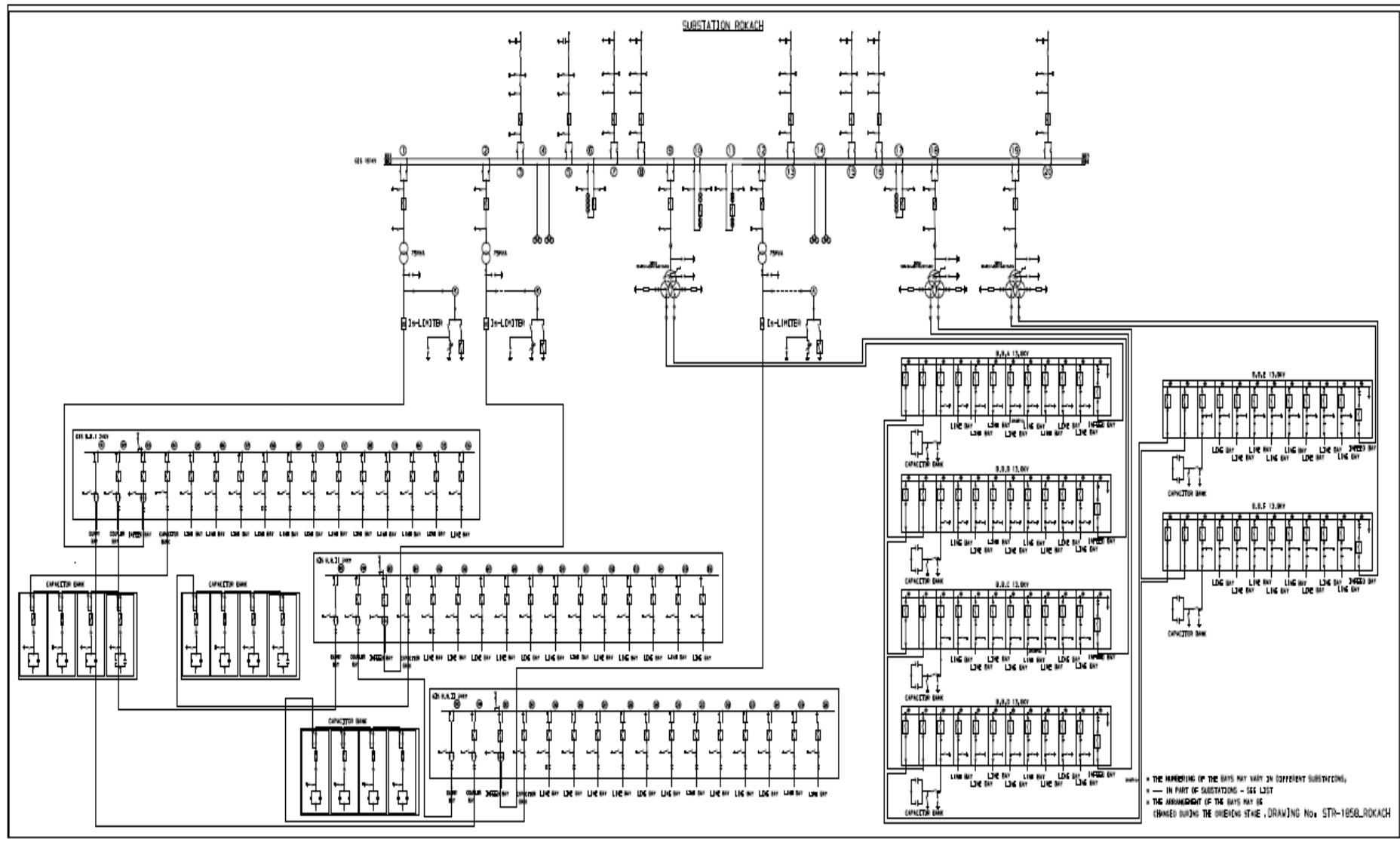
Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	2, 4, 8, 10	4
Petersen coil controller	****	****	IEC - 61850	2, 4, 8, 10	4
Total amount of relays					8

Manufacturer and/or type will be known in a later stage

P stations
Summary of relays for substations P to be supplied by the supplier
Table No. CP-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1, 3	2
HVCU for Transformer	IEC - 61850	2, 4, 8, 10	4
HVCU for Coupler	IEC - 61850	5/6	1
HVCU for Busbar Measuring	IEC - 61850	--	1
Total amount for HV control relays			8

ROKACH Switching stations



ROKACH HV Switching stations
Summary of relays for ROKACH HV Switching Stations to be supplied by others
Table No. CD-1
161KV

HV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	3,5,7,8,13, 15,16,20	8
HV Line 2 Protection #2	****	****	IEC - 61850	3,5,7,8,13, 15,16,20	8
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	1,2,9,12 18,19	12
Total amount for HV Protection relays					30

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	1,2,9,12 18,19	6
Petersen coil controller	****	****	IEC - 61850	1,2,9,12 18,19	6
Total amount of relays					12

ROKACH HV Switching stations
Summary of HV relays for ROKACH HV Switching Stations to be supplied by supplier
Table No. CD-2

Type	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	3,5,7,8,13,15,16,20	8
HVCU for Transformer	IEC - 61850	1,2,9,12,18,19	6
HVCU for Coupler	IEC - 61850	6,10,11,17	4
HVCU for Busbar Measuring	IEC - 61850	4,14	2
Total amount for HV control relays			20

ROKACH MV Switching stations
Summary of MV relays for Switching stations ROKACH MV to be supplied by the supplier
Table No. CD-3
13.8KV

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	101,201,301, 401,501,601	6
MVCPU for Feeder bay	IEC - 61850	102-109, 202-209, 302-309, 402-409, 502-509, 602-609	48
MVCPU for Coupler bay	IEC - 61850	111-112, 211-212, 311-312, 411-412, 511-512, 611-612	12
MVCPU for Capacitor Bank bay	IEC - 61850	110,210,310, 410,510,610	6
Total amount for MV control and protection relays			72

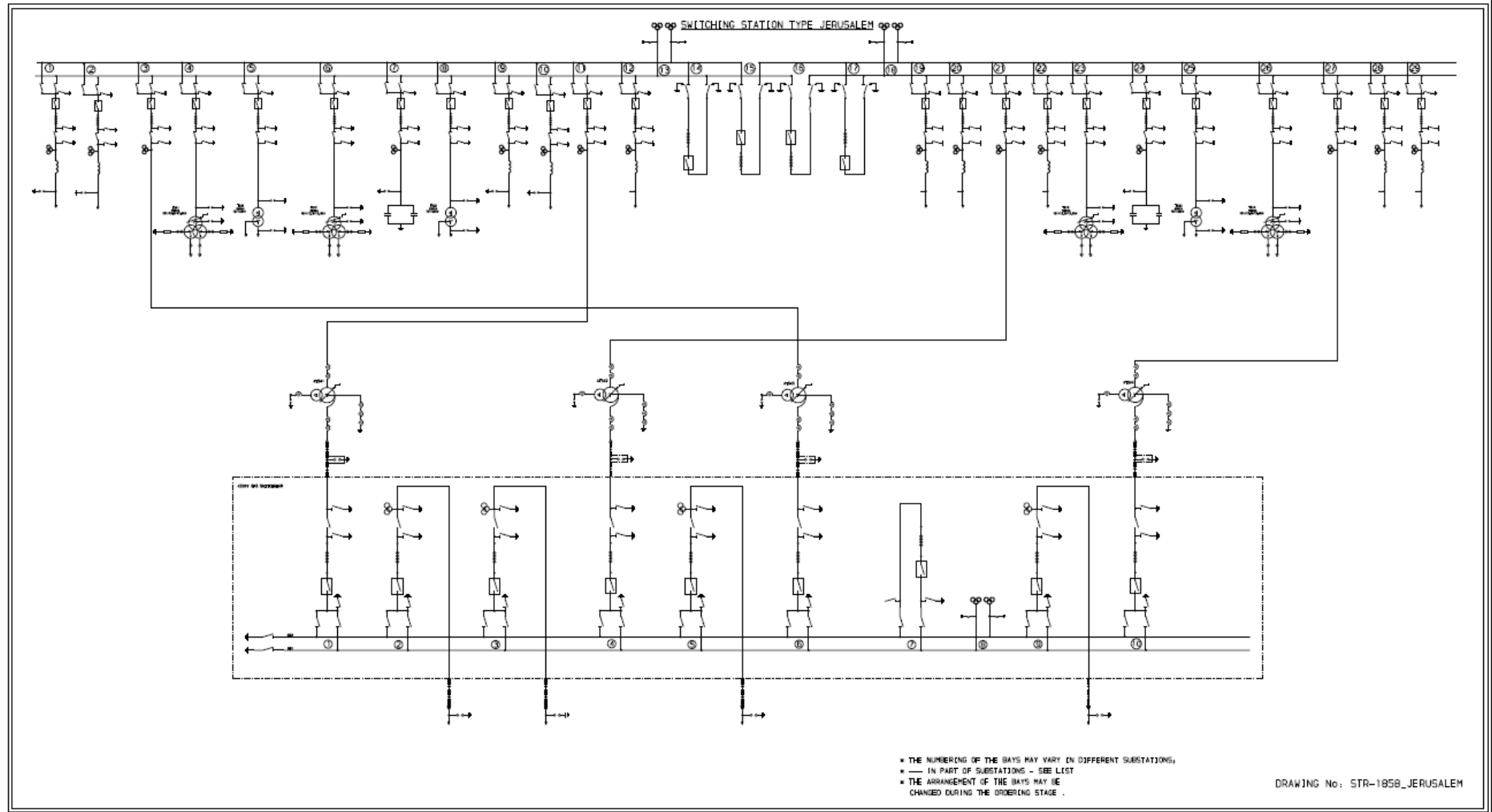
ROKACH MV Switching stations
Summary of MV relays for Switching stations ROKACH to be supplied by the supplier
Table No. CD-3
24KV

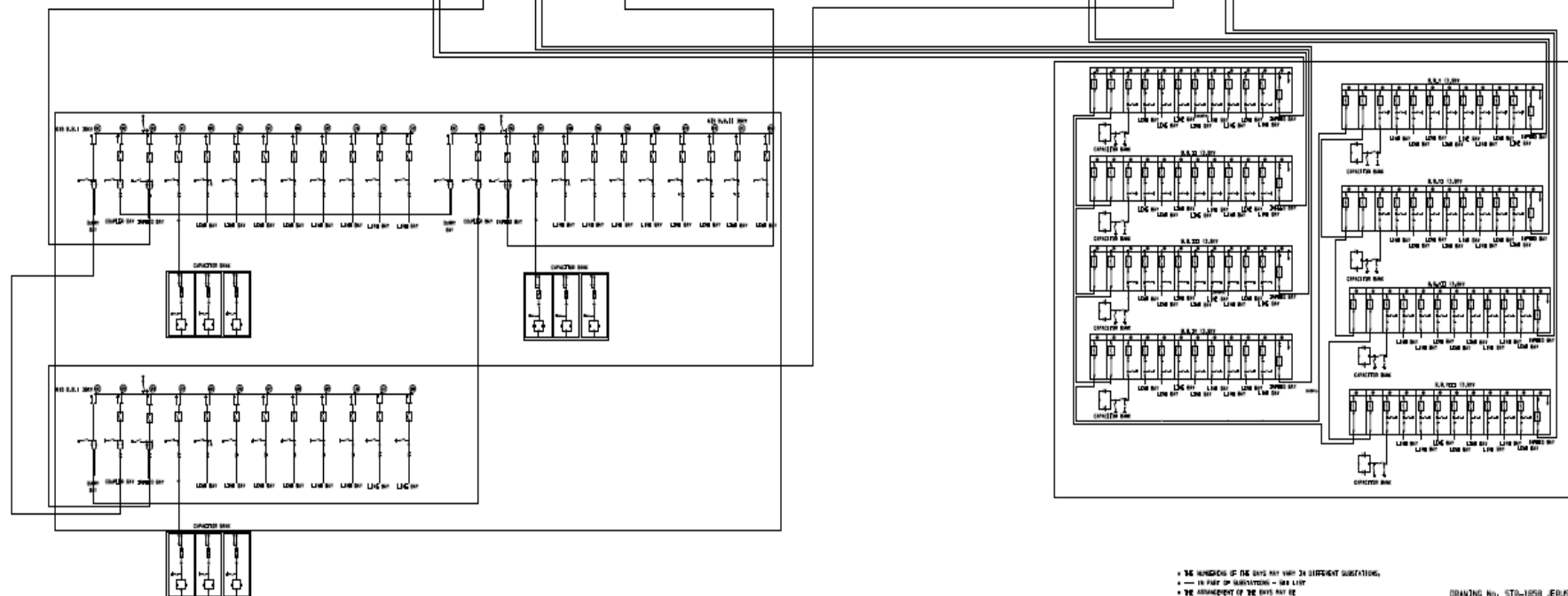
Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103,203,303	3
MVCPU for Feeder bay	IEC - 61850	105-116, 205-216, 305-316	36
MVCPU for Coupler bay	IEC - 61850	102,202,302	3
MVCPU for Capacitor Bank bay	IEC - 61850	104,204,304	3
Total amount for MV control and protection relays			45

Summary of EXTRA MV relays for substations ROKACH to be supplied by the supplier
Table No. CD-4

Type	Communication protocol	Bay number	Total Quantity
Is-Limiter relay	IEC - 61850	--	3
Under-frequency relay	IEC - 61850	--	2
Modular capacitor bank	IEC - 61850	--	3
Total amount for EXTRA MV control and protection relays			8

JERUSALEM Switching stations - 400/161KV





- **THE MEMBERS OF THE BAYS MAY HAVE 24 DIFFERENT SUBSTITUTIONS**
- **— IN PART OF SUBSTITUTIONS — SEE LIST**
- **THE ADJUSTMENT OF THE BAYS MAY BE CHANGING DURING THE COORDINATING STAGE**

DRAWING No. STR-1858_JERUSALEM_1

Summary of EHV relays for JERUSALEM Switching Stations to be supplied by others
Table No. CE-1

EHV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
EHV Line Distance Protection #1	****	****	IEC - 61850	2,3,5,9	4
EHV Line Differential Protection #2	****	****	IEC - 61850	2,3,5,9	4
400/161KV Auto-Transformer Protection O/C+DIFF	****	****	IEC - 61850	1,4,6,10	8
EHV BBP+BFP	****	****	IEC - 61850	--	1
EHV BBP	****	****	IEC - 61850	--	1
Total amount for EHV Protection relays					18

EHV Monitoring Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator for 400/161 KV Auto- Transformer	****	****	IEC - 61850	1,4,6,10	3
Total amount for EHV Monitoring relays					3

JERUSALEM Switching stations
Summary of HV relays for JERUSALEM Switching Stations to be supplied by others
Table No. CE-1

HV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	1,2,9,10 ,12,19,20, 22,28,29	10
HV Line 2 Protection #2	****	****	IEC - 61850	1,2,9,10 ,12,19,20, 22,28,29	10
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	4,5,6,8,24, 25,26	7
HV for Capacitor Bank bay Protection	****	****	IEC - 61850	7,24	2
Total amount for HV Protection relays					31

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	4,5,6,8,24, 25,26	7
Petersen coil controller	****	****	IEC - 61850	4,5,6,8,24, 25,26	7
Total amount of relays					14

JERUSALEM Switching stations
Summary of EHV+HV relays for JERUSALEM Switching Stations to be supplied by supplier
Table No. CE-2

EHV Control Relays	Communication protocol	Bay number	Total Quantity
EHVCU for Line bay	IEC - 61850	2,3,5,9	4
EHVCU for Auto-Transformer	IEC - 61850	1,4,6,10	4
EHVCU for Coupler	IEC - 61850	7	1
EHVCU for bus measuring	IEC - 61850	8	1
Total amount for EHV control relays			10

HV Control Relays	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	1,2,9,10 ,12,19,20, 22,28,29	10
HVCU for Auto-Transformer	IEC - 61850	3,11,21,27	4
HVCU for Transformer	IEC - 61850	4,5,6,8,24, 25,26	7
HVCU for Coupler	IEC - 61850	14,15,16, 17	4
HVCU for bus measuring	IEC - 61850	13,18	2
HVCU for Capacitor Bank bay	IEC - 61850	7,24	2
Total amount for HV control relays			29

JERUSALEM Switching stations
Summary of MV relays for switching stations JERUSALEM to be supplied by the supplier
Table No. CE-3
13.8kV

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	101,201,301, 401,501,601 ,701,801	8
MVCPU for Feeder bay	IEC - 61850	102-109, 202-209, 302-309, 402-409, 502-509, 602-609, 702-709, 802-809,	64
MVCPU for Coupler bay	IEC - 61850	111-112, 211-212, 311-312, 411-412, 511-512, 611-612, 711-712, 811-812	16
MVCPU for Capacitor Bank bay	IEC - 61850	110,210,310, 410,510,610, 710,810	8
Total amount for MV control and protection relays			96

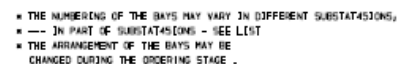
JERUSALEM Switching stations
Summary of MV relays for switching stations JERUSALEM to be supplied by the supplier
Table No. CE-3
36KV

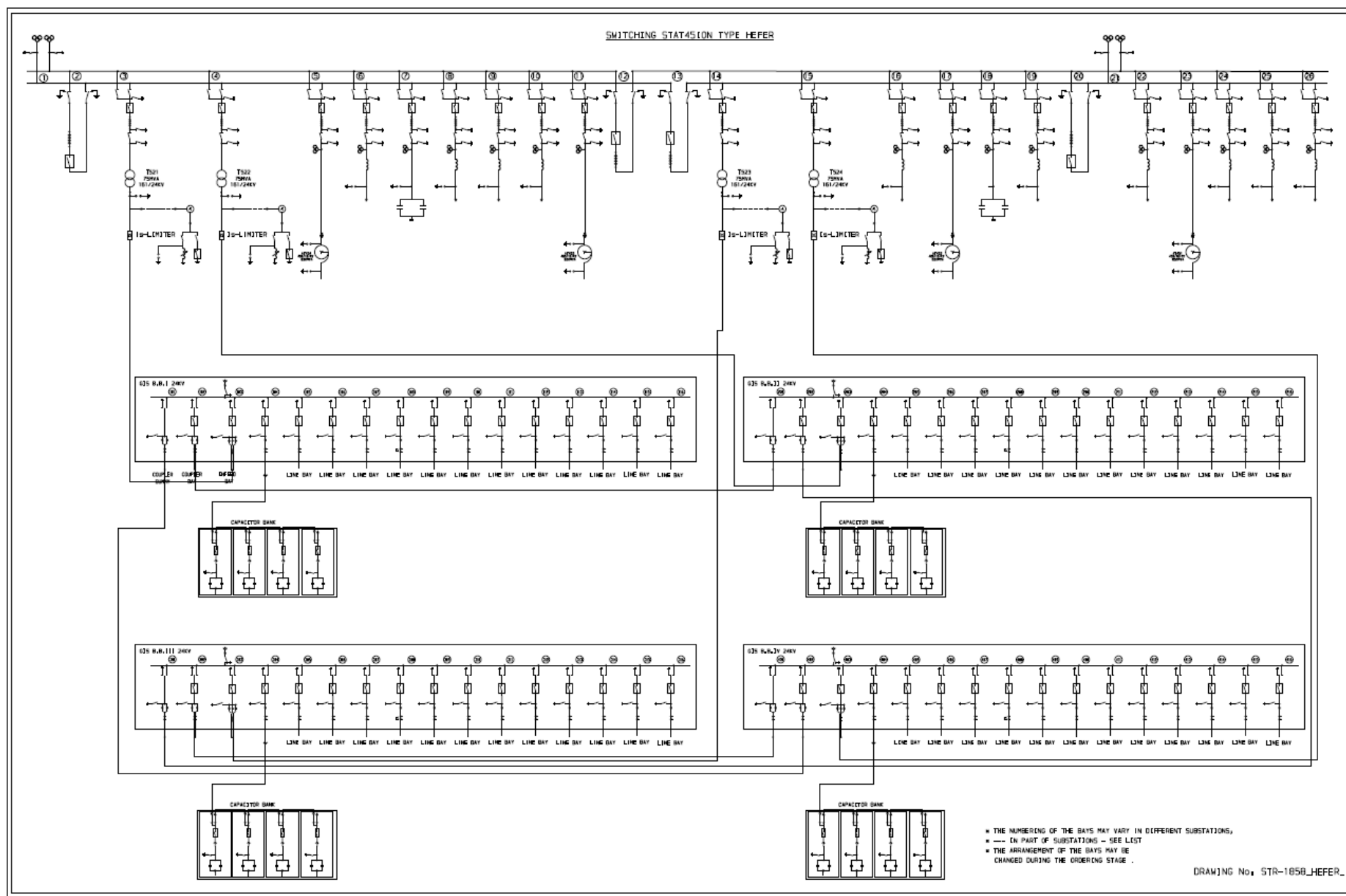
Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103,203,303	3
MVCPU for Feeder bay	IEC - 61850	105-112, 205-212, 305-312	24
MVCPU for Coupler bay	IEC - 61850	102,202,302	3
MVCPU for Capacitor Bank bay	IEC - 61850	104,204,304	3
Total amount for MV control and protection relays			33

Summary of EXTRA MV relays for substations JERUSALEM to be supplied by the supplier
Table No. CE-4

Type	Communication protocol	Bay number	Total Quantity
Under-frequency relay	IEC - 61850	--	2
Modular capacitor bank	IEC - 61850	--	3
Total amount for EXTRA MV control and protection relays			5

SWITCHING STAT45ION TYPE REFER





Summary of EHV relays for HEFER Switching Stations to be supplied by others
Table No. CF-1

EHV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
EHV Line Distance Protection #1	****	****	IEC - 61850	2,6,8,9	4
EHV Line Differential Protection #2	****	****	IEC - 61850	2,6,8,9	4
400/161KV Auto-Transformer Protection O/C+DIFF	****	****	IEC - 61850	1,4,7,10	8
EHV BBP+BFP	****	****	IEC - 61850	--	1
EHV BBP	****	****	IEC - 61850	--	1
Total amount for EHV Protection relays					18

EHV Monitoring Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator for 400/161 KV Auto- Transformer	****	****	IEC - 61850	2,6,8,9	4
Total amount for EHV Monitoring relays					4

HEFER Switching stations
Summary of HV relays for HEFER Switching Stations to be supplied by others
Table No. CF-1

HV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	6,8,9,10,16,19,22,24,25,26	10
HV Line 2 Protection #2	****	****	IEC - 61850	6,8,9,10,16,19,22,24,25,26	10
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	3,4,14,15	8
HV for Capacitor Bank bay Protection	****	****	IEC - 61850	7,18	2
Total amount for HV Protection relays					32

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	3,4,14,15	4
Petersen coil controller	****	****	IEC - 61850	3,4,14,15	4
Total amount of relays					8

HEFER Switching stations
Summary of EHV+HV relays for HEFER Switching Stations to be supplied by supplier
Table No. CF-2

EHV Control Relays	Communication protocol	Bay number	Total Quantity
EHVCU for Line bay	IEC - 61850	2,6,8,9	4
EHVCU for Auto-Transformer	IEC - 61850	1,4,7,10	4
EHVCU for Coupler	IEC - 61850	5	1
EHVCU for bus measuring	IEC - 61850	3	1
Total amount for EHV control relays			10

HV Control Relays	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	6,8,9,10,16,19,22,24,25,26	10
HVCU for Auto-Transformer	IEC - 61850	5,11,17,23	4
HVCU for Transformer	IEC - 61850	3,4,14,15	4
HVCU for Coupler	IEC - 61850	2,12,13,20	4
HVCU for bus measuring	IEC - 61850	1,21	2
HVCU for Capacitor Bank bay	IEC - 61850	7,8	2
Total amount for HV control relays			26

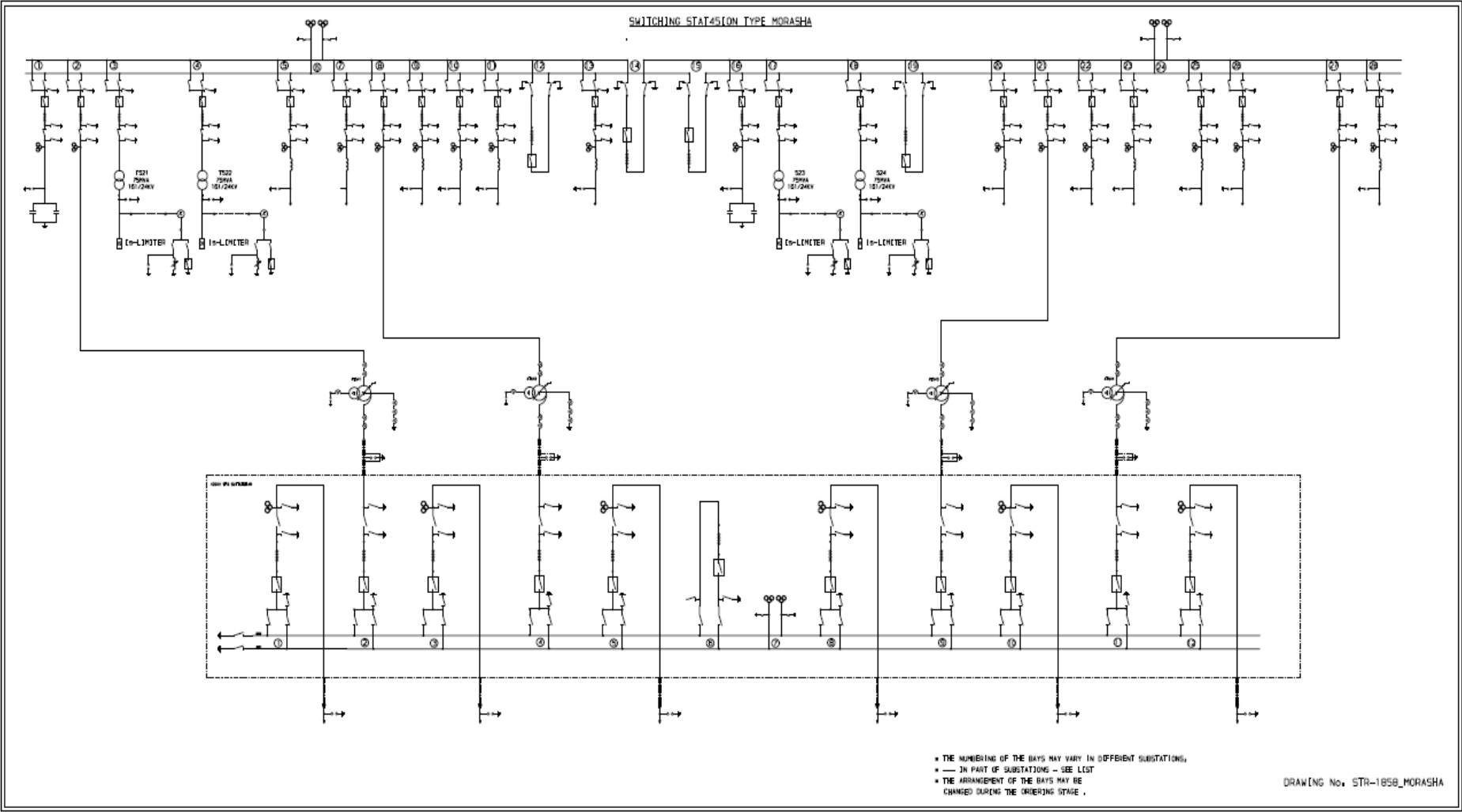
HEFER Switching stations
Summary of MV relays for Switching stations HEFER to be supplied by the supplier
Table No. CF-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103,203,303,403	4
MVCPU for Feeder bay	IEC - 61850	105-116, 205-216, 305-316, 405-416	48
MVCPU for Coupler bay	IEC - 61850	102,202,302,402	4
MVCPU for Capacitor Bank bay	IEC - 61850	104,204,304,405	4
Total amount for MV control and protection relays			60

Summary of EXTRA MV relays for substations HEFER to be supplied by the supplier
Table No. CF-4

Type	Communication protocol	Bay number	Total Quantity
Is-Limiter relay	IEC - 61850	--	4
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			7

MORASHA





Summary of EHV relays for MORASHA Switching Stations to be supplied by others
Table No. CG-1

EHV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
EHV Line Distance Protection #1	****	****	IEC - 61850	1,3,5,8,10,12	6
EHV Line Differential Protection #2	****	****	IEC - 61850	1,3,5,8,10,12	6
400/161KV Auto-Transformer Protection O/C+DIFF	****	****	IEC - 61850	2,4,9,11	4
EHV BBP+BFP	****	****	IEC - 61850	--	1
EHV BBP	****	****	IEC - 61850	--	1
Total amount for EHV Protection relays					18

EHV Monitoring Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator for 400/161 KV Auto- Transformer	****	****	IEC - 61850	2,4,9,11	4
Total amount for EHV Monitoring relays					4

MORASHA Switching stations
Summary of HV relays for MORASHA Switching Stations to be supplied by others
Table No. CG-1

HV Protection Relays	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
HV Line Distance Protection #1	****	****	IEC - 61850	5,7,9,10,11,13,20,22,23,25,26,28	12
HV Line 2 Protection #2	****	****	IEC - 61850	5,7,9,10,11,13,20,22,23,25,26,28	12
HV BBP+BFP	****	****	IEC - 61850	--	1
HV BBP	****	****	IEC - 61850	--	1
HV Transformer Protection O/C+DIFF	****	****	IEC - 61850	3,4,17,18	8
HV for Capacitor Bank bay Protection	****	****	IEC - 61850	1,16	2
Total amount for HV Protection relays					36

Type	Manufacturer	Type	Communication protocol	Bay number	Total Quantity
Voltage regulator	****	****	IEC - 61850	3,4,17,18	4
Petersen coil controller	****	****	IEC - 61850	3,4,17,18	4
Total amount of relays					8

Summary of EHV+HV relays for MORASHA Switching Stations to be supplied by supplier
Table No. CG-2

EHV Control Relays	Communication protocol	Bay number	Total Quantity
EHVCU for Line bay	IEC - 61850	1,3,5,8,10,12	6
EHVCU for Auto-Transformer	IEC - 61850	2,4,9,11	4
EHVCU for Coupler	IEC - 61850	6	1
EHVCU for bus measuring	IEC - 61850	7	1
Total amount for EHV control relays			12

HV Control Relays	Communication protocol	Bay number	Total Quantity
HVCU for Line bay	IEC - 61850	5,7,9,10,11,13,20,22,23,25,26,28	12
HVCU for Auto-Transformer	IEC - 61850	2,8,21,27	4
HVCU for Transformer	IEC - 61850	3,4,17,18	4
HVCU for Coupler	IEC - 61850	12,14,15,19	4
HVCU for bus measuring	IEC - 61850	6,24	2
HVCU for Capacitor Bank bay	IEC - 61850	1,16	2
Total amount for HV control relays			28

MORASHA Switching stations
Summary of MV relays for Switching stations MORASHA to be supplied by the supplier
Table No. CG-3

Type	Communication protocol	Bay number	Total Quantity
MVCPU for Infeed bay	IEC - 61850	103,203,303,403	4
MVCPU for Feeder bay	IEC - 61850	105-116, 205-216, 305-316, 405-416	48
MVCPU for Coupler bay	IEC - 61850	102,202,302,402	4
MVCPU for Capacitor Bank bay	IEC - 61850	104,204,304,405	4
Total amount for MV control and protection relays			60

Summary of EXTRA MV relays for substations MORASHA to be supplied by the supplier
Table No. CG-4

Type	Communication protocol	Bay number	Total Quantity
Is-Limiter relay	IEC - 61850	--	4
Under-frequency relay	IEC - 61850	--	1
Modular capacitor bank	IEC - 61850	--	2
Total amount for EXTRA MV control and protection relays			7