CROSS WORLD POWER LTD.

Cross-world
Ensuring Power Since 1983

Date: 30/05/2021

Rangs Electronics Ltd.
335/B, Tejgaon, Dhaka.

Work Details: Supply, Installation & Commissioning of BBT Work at **Rangs Electronics Ltd.**

COMPLETION CERTIFICATE

Cross World Power Ltd. have completed the Supply & Installation and Commissioning of BBT at **Rangs Electronics Ltd** as per scope of works mentioned in the work order dated on 30/05/**2021** & found satisfactory performance in all respect thus tested it as per OEM manual in presence of your representative.

Cross World Power Ltd. have also explained your operator of how to conduct daily, weekly, monthly as well as all other Inspections /Services as called for in the OEM manual for smooth and trouble free operation of this equipment's. We shall cover warranty as per terms and conditions during sales.

If you disagree with us and have any other query, please inform Cross World Power Ltd as soon as possible. If we do not hear from you within next 7 (seven) days, contrary to what we have stated above, we shall consider that the plant has been received by you in a satisfactory condition.

For and on behalf of

Cross World Power Ltd.

CROSS WORLD POWER LTD. DHAKA

For and on behalf of

Rangs Electronics Ltd.

Plot - 1/B, Road - 90, Gulshan -2, Dhaka-1212, Bangladesh | Phone: (880 2) 58811858, 9891442 | Fax: (880 2) 58815160 | E-mail: info@cross-world.com

CROSS WORLD POWER LTD.

Ensuring Power Since 1983

Date: 30/05/2021

Sales Ref. : CWPL-BBT/0087/19F

Project Name: Rangs Electronics Ltd.

WARRANTY CERTIFICATE

Cross World Power Ltd. have been completed the Supply, Installation and Commissioning of all BBT work's as per scope of works mentioned in the work order dated on **18/12/2020** & found satisfactory performance in all respect thus tested it as per OEM manual in presence of your representative.

Cross World Power Ltd. have also explained your operator of how to conduct daily, weekly, monthly as well as all other Inspections /Services as called for in the OEM manual for smooth and trouble free operation of this equipment's. We shall cover warranty for the next 12 (Twelve) months from the date of its delivery, as per sales contract.

If any query raises, please inform Cross World Power Ltd. as soon as possible.

For and on behalf of

Cross World Power Ltd.

Received By.

Rangs Electronics Ltd.

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COMMISSONING CHECK LIST

Customers Name / Company	Rangs Electronics Ltd.
Site Address with location	335/B, Tejgaon, Dhaka.
Site Contact persons	Mr. Shajib Talukder
Contact Number	+880 1725126211
Inspection Date	30/05/2021

BUSBAR TRUNKING SYSTEM DETAILS - (ELECTRICAL)

S/L	DESCRIPTION	DETAILS				
01	BBT Information	Customer Identification: CWPL-BBT/0087/19F				
02	BBT Type (Aluminum /Cupper)	POWER-BBT -☐	VERTICAL -☐ HORIZONTAL -☐	LIGHTING -☐	M/C-BBT- ☐	TROLLEY-☐
03	Year of Manufacture	--------2021---(Years)				
04	Model Number	KX, KOA				
05	Backup CB Capacity	---------4000A, 600A to 160A-----(Ampere)				
	Panel Type	X-Former- ☐	LT- ☐	ATS- ☐	MDB-☐	DB-☐
06	Voltage Level	HIGH VOLTAGE - ☐	MEDIUM VOLTAGE- ☐	LOW VOLTAGE- ☑		
07	LT Panel Rating	----------(Ampere)				
08	Commissioning Date	31/05/2021				

VISUAL INSPECTION

01	Visual Inspection	✓ MARKING				
		Color Changed				
		☐Yes		☐No		
02	Hanging Arrangement	☑Yes	☐No	Seismic	☐Yes	☑No
03	Water Protected	☑Yes	☐No	Tap off Box Checked	☑Yes	☐No
04	Cleanliness	☑Yes	☐No	Trolley BBT Checked	☑Yes	☐No

• Installation Check List		Status Check	
01	Checking elements: •Inspect all elements on receipt and ensure that neither the conductors nor their insulation have been damaged during handling and/or storage.	☑ Yes	☐ Not

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02	Correct installation sequence: ●Install the elements in accordance with the planned layout as indicated in the installation drawings supplied.	☑ Yes	☐ Not
03	Connecting elements: ●Ensure that the spacing between adjoining elements is correct. ●Establish the electrical connection between the conductors; do not place the covers on the junction yet.	☑ Yes	☐ Not
04	Checking the assembled elements: ●Check the insulation resistance of the layout. No other equipment (tap-off units, end feed units, etc.) must be connected at this time.	☑ Yes	☐ Not
05	Closing the Junctions: ●Place the covers on the mechanical junctions (see Connecting units)	☑ Yes	☐ Not
06	BBT connection with DB/LT/Transformer/Generator: ● Sufficient capacity Busbar used and tighten ●Vibration and other safety measure checked	☑ Yes	☐ Not
07	● TAP- OFF Box and Joint boxes installed and tighten as recommended ● All tap-off boxes are good condition and checked operation ● BBT not bended after tap-off boxes installation	☑ Yes	☐ Not
08	● All BBT potion joint tight done as recommended ● No water of AC pipe available which can affect BBT	☑ Yes	☐ Not
09	●Earthing connection done as recommended and earthing resistance is equal to or less than 01 ohm. ● Necessary protection available (CB rating ~~4000A~~) for BBT	☑ Yes	☐ Not

INSULATIONTEST

Measurement of Resistance (Use:------500V & 1000V----------Voltage) ✓

BBT REF.	BBT Capacity	IR VALUE (MΩ)						
		L1-L2	L2-L3	L1-L3	L1-N	L2-N	L3-N	N-PE
Substation-	1600A	330 MΩ	270 MΩ	440 MΩ	247 MΩ	128 MΩ	130 MΩ	00 MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ

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		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ
		MΩ	MΩ	MΩ	MΩ	MΩ	MΩ	MΩ

NB for insulation testing:

- There must be no loads connected when the insulation resistance is tested!!
- The insulation resistance must be at least 1 mega ohm!!
- System design: **4-pole ❒ 5-pole ❒ 6-pole ❒**
- Check Earthing connection

LOAD TEST

❒ - Required **❒ - Not Required**

S/L	DETAILS									
NO LOAD TEST										
	BBT START POINT (Volts)									
01	**BBT Ref. Area.**	**L1-L2**	**L1-L3**	**L2-L3**	**L1-N**	**L2-N**	**L3-N**	**L1-E**	**L2-E**	**L3-E**	**N-PE**

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	BBT START POINT (Current)										
	BBT Ref. Area.	L1-L2	L1-L3	L2-L3	L1-N	L2-N	L3-N	L1-E	L2-E	L3-E	N-PE

BBT STARTPOINT

02	BBT Ref. Area.	L1- Max.	L1-Avg.	L2- Max.	L2-Avg.	L3- Max.	L3-Avg.	N	PE

	BBT END POINT (Volts)										
03	BBT Ref. Area.	L1-L2	L1-L3	L2-L3	L1-N	L2-N	L3-N	L1-E	L2-E	L3-E	N-PE

	BBT END POINT (Current)										
	BBT Ref. Area.	L1-L2	L1-L3	L2-L3	L1-N	L2-N	L3-N	L1-E	L2-E	L3-E	N-PE

04	BBT - Temperature (°C)	Position-1:	Position-2:	Position-3:	Position-4:	Position-5:	Position-6:
05	Ambient Temperature(°C)	Position-1:	Position-2:	Position-3:	Position-4:	Position-5:	Position-6:

FULL LOAD TEST

01	BBT Ref. Area.	L1-L2	L1-L3	L2-L3	L1-N	L2-N	L3-N	L1-E	L2-E	L3-E	N-PE

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BBT START POINT (Current)

BBT Ref. Area.	L1-L2	L1-L3	L2-L3	L1-N	L2-N	L3-N	L1-E	L2-E	L3-E	N-PE

BBT START POINT (Current)

02	BBT Ref. Area.	L1- Max.	L1-Avg.	L2- Max.	L2-Avg.	L3- Max.	L3-Avg.	N	PE

BBT END (Volts)

03	BBT Ref. Area.	L1-L2	L1-L3	L2-L3	L1-N	L2-N	L3-N	L1-E	L2-E	L3-E	N-PE

BBT END (Current)

BBT Ref. Area.	L1- Max.	L1-Avg.	L2- Max.	L2-Avg.	L3- Max.	L3-Avg.	N	PE

04	BBT - Temperature (°C)	Position-1: Position-2: Position-3: Position-4: Position-5: Position-6:
05	Ambient Temperature (°C)	Position-1: Position-2: Position-3: Position-4: Position-5: Position-6:

Customer Comments:

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Recommendation or notes:

Customer Representative:	CWPL Representative:	CWPL Representative (office use)
Name: MJ. Shajib Talukder	Name: Md. Fahim Muntasir	Head of the department
Designation: Executive	Designation:	Signature:
Signature:	Signature:	Date:

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General Recommendation of BBT operation

1. Safety precautions of busway system operation and handling:

- Only qualified electrical maintenance personnel should install, operate, service or maintain this equipment.
- Turn off power to the busway before installing, removing, or working on this equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- The successful operation of this equipment depends upon proper handling, installation, operation, and maintenance.
- **Failure to follow these instructions may result in serious injury or death**

2. WARNING during storing and installation

- Protect this equipment from containments such as water, salts, concrete and other corrosive environments before and during installation.
- Outdoor equipment is not weather resistant until completely and properly installed.
- Do not sit, walk or stand on this equipment.
- **Failure to follow these instructions may result in equipment damage, serious injury or death.**

3. Installation recommendations:

- Before installing the busway, conduct an insulation resistance test on each busway device to check for possible damage or contamination during shipment or storage. With an insulation resistance tester rated at 1000 volts, ensure the phase-to-phase, phase-to-neutral, and phase-to-ground isolation.
- Ambient temperature limits are –10◦C through +40◦C. Verify that temperatures of the operating environment are within this range. If not, please apply the de-rating factors indicated in the product catalogues.
- Provide sufficient horizontal and vertical clearance from the walls and ceilings to provide easy access to joints.
- Level and align busways (vertically and horizontally) before the final tightening of all joints.
- Ensure that all joint surfaces are free of containments.
- Align the busbar ends of adjoining sections, verifying proper busbar alignment, before sliding sections together.
- Verify that the system phasing matches the busway phasing.

4. Before energizing the busway precaution checks are necessary which are:

- Carry out a visual check on the conformity of tightening, at the joints and the connections to the transformers and switchboards. All VISI-TITE bolts should have the double-headed bolts broken off. Shutters of the tap-off outlets not used should be closed.

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- Ensure that the protective devices are correctly rated (current, breaking capacity) with respect to the loads supplied, or in accordance with the specification drawings.
- Check that all the tap-off units are disconnected or isolated (doors open) : offload position.
- Conduct an Insulation Resistance Test between phase-to-phase, phase-toneutral and phase-to-ground and record the readings.
  - Open the circuit by disconnecting the trunking from the transformer or by opening the circuit in the switchboard.
  - Use an Insulation Resistance Tester of 1000V DC to megger between each live conductor, and between the live conductors and the metal casing (PE).
  - The value of insulation resistance must read at least 1 MΩ with a rated voltage of 1000V.
- Check the equi-potential of the protective circuit.
- Verify the phase rotation of the busway matches the system phasing before reconnecting to the transformers, switchboards etc..

5. **Recommendations and ways for ENERGIZING the busway system:**

- When the equipment is energized for the first time, qualified electrical personnel should be present. If short-circuits and ground faults caused by damage or poor installation practices have not been detected in the pre-energization checks procedure, serious damage can result when the power is turned-on.
- The busway should have no electrical load on it when it is energized. As busways typically extends through several rooms and floors, ensure that all devices fed from the busway are in the OFF position.
- Energize the equipment in sequence by starting at the source end and working towards the load end. In other words, energize the main devices, then the feeder devices, and then the branch-circuit devices. Turn the devices to the "ON" position with a firm positive motion.
- After all overcurrent devices have been turned on, loads such as lighting circuits, contactors, heaters and motors may be turned on.
- Busways, when operating correctly, will have a moderate hum. Excessive noise may be an indication of hardware that has not been tightened correctly or of metal parts that have been improperly assembled.
- Occurrence of sparking at any point along the busway is not normal condition. Deenergize the busway immediately. Correct the cause of the sparking condition. Then, conduct an insulation resistance test again before attempting to energize again.
- Faults caused by short circuits must trigger the protective device for the feeder unit in the manner prescribed by the official regulations. You must ensure that the system is De- energized before you eliminate the cause of the fault.
- Observe the five safety rules:
  - Disconnect;
  - Safeguard against restart;
  - Ensure the system is de-energized
  - Earth and short circuit;
  - Cover and safeguard neighboring live parts. Etc.

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6. **MAINTENANCE of busway system:**

- Hydrocarbon spray propellants and hydrocarbon-based sprays or compounds will cause degradation of certain plastics. Before using products to clean, dry or lubricate components during installation or maintenance, consult with us as required.
- **Schedule inspection and maintenance as per following guide lines**:
  1. Inspect the busway ***once a year for stable load*** and good ambient condition.
  2. Inspect busway ***2 times a year for fluctuating loads*** & ambient out of standard limit.
  3. Inspect busway ***after any severe electrical short circuit or ground fault***.

  Perform the following maintenance procedures:

  - Carefully inspect all visible electrical joints and terminals. **Do not remove joint covers.**
  - Verify that the bolts and nuts are correctly tightened.
  - Check the torque on joint bolts using a torque wrench.

- If any joints or terminations are badly discoloured, corroded or pitted, or if they show evidence of having been subjected to high temperatures, the devices must be replaced with new factory-built devices
- Ensure that the mechanisms are in satisfactory operational condition. Lubricate the moving parts of the various mechanisms, if necessary. Similarly, remove any surplus lubrication to prevent the accumulation of any un-wanted foreign bodies.
- Check the insulation resistance before re-energizing the busway. It is recommended to keep a permanent record of resistance readings. If readings decrease appreciably with time, deterioration is occurring. Conduct the insulation resistance test
- Energize the equipment again following the instructions
- After performing all the above inspections and necessary repairs, it may be desirable to perform an infra-red temperature test on all the electrical connections. Conduct this test after the busway is re-energized and reaches a stabilized operating temperature.

7. **Remarks (specify and any special recommendations and issues of the project):**

Customer Representative:	**CWL Representative**	**CWL (office use)**
Name: Md. Shajib Talukder	Name:	**Head of the department**
Designation: Executive	Designation:	Signature:
Signature:	Signature:	Date:

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