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### DGDPTENDER NO: 221.462.22

### DATED: 06 OCTOBER 2022

**TECHNICAL SPECIFICATION OF SURVEY THEODOLITE**

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| Serial | Description | Technical Specification |
| Part-1: | General Specification |  |
| 1 | Nomenclature | Survey Theodolite Total Station. Detail nomenclature to be mentioned |
| 2 | Make and Model | Latest version as on tender date to be mentioned with certification |
| 3 | Country of Origin/ Country of Manufacture/Assembly for Main Item | Group A Countries |
| 4 | a. Name, Address, Contact Number, Website/E-maiI Address of the  Manufacturer | Details to be mentioned |
|  | b. Name, Address, Contact Number, Website/ E-mail Address of the  Principal | Details to be mentioned |
|  | c. Name, Address, Contact Number, Website/E-mail Address of the Local  Agent | Details to be mentioned |
| 5 | Year of Manufacture | Not before the contacted year |
| 6 | System Configuration | Each Survey Theodolite must have the following sub- system components:  a. Servo with Robotic Total Station with detachable/ remote control unit for integrated survey.  b. GPS RTK Base & Rover System with built in UHF Radio/ Modem (BTRC approved frequency).  c. Positioning Accuracy of RTK shall be 8 mm+1Pp  d. Tribrach.  e. Tripod.  f. Built in Laser Range Finder.  G .Prism with Tribrach, Adapter and  tripod in case pole.  h. Post processing software for the date download, Edit network adjustment for Both Total Station and GPS data.  i. Mini prism - range up to 1000 m with mini prism in DR Mode (if applicable). Should have illuminating light for night operation. |
| 7 | Main Theodolite | The Total Station should be a multipurpose digital surveying instrument which is capable of measuring horizontal, vertical and slope distance, angle, vertical height differences, three dimensional coordinates and a number of other positional features of topography. The components of the instrument must be according to the following specification and related accessories:  a. The total station should have integrated RTK (Real Time Kinematic) GPS system with Base and rover station or smart station to be provided.  b.The total station should have servo drive with robotic mechanism with rotation speed/second to be mentioned for robotic operation.  c.The total station should have min 02 display units with colour touch screen and data must be visible under sunlight.  d.The angle accuracy should be minimum 2".  e.The total station should have integral USB and data transfer accessories.  f.The Total Station should have the capability to taka Geo referenced images.  g.The Total Station should have Touch Pen.  h.Touch screen must function smoothly upto maximum operating temperature +55° C |
| 8. | GPS RTK System | The details of the modules in the GPS. To be mentioned:  a. Accurate position by RTK GPS must be incorporated  b. General. GPS set(Base and Rover) should be available with the total station for integrated survey. The GPS receiver should be interchangeable as Base or Rover.  c. Positionin Ag gguracy. Minimum 8 mm + 1ppm for GPS RTK.  d. Initialization Time. To be mentioned.  e. Satellite. GPS should have minimum 200 channels capable of Tracking GPS, Glonass, Beidou (Chinese), and Galileo satellite signals.  f. Flash Data Storaqe Device. To be provided Memory to be mentioned.  g. Connection. The GPS system should have minimum Three method to connect with total station:  (1) Bluetooth.  (2) Cable.  (3) Wi-Fi.  h. Field Controller. GPS should be controlled with the display unit provided with total station. Details to be mentioned.  j. Network. GPS (base and rover) should use GSM/Radio Communication (BTRC approved).  k. The GPS should have built in UHF Radio with tmnsmit and receive option to work in RTK as both Base and Rover.  I. The Processing Software should be capable of processing GPS, Glonass, Galileo and Beidou signals. It must have customizable coord system defined by user to support any map system in the world. |
| 9 | Laser Range Finder | a. General. Should be available within total station.  b. Accuracy. 2mm + 2ppm under Direct Refléx Measurement.  1mm + 2ppm for prism measurement.  c. Measurement Range.  (1) Reflector Less: 02 to 1000 m.  (2) Reflector Sheet: 02 to 1000m.  (3) Prism (1800 and 360’).  Minimum 5000 m.  d. Class. The Measuring beam laser should be Class- 1 Eye safe in accordance with EN 60825-1, IEC 60825- 1.  e. Details to be mentioned |
| 10. | Tribrach | Compatible with the main Total Station and the Tripod  supplied. Scale: Minimum 02 for each total station. |
| 11. | Tripod | a. Construction. Made of Aluminum Alloy or better.  b. Weioht. To be mentioned.  c. Should have standard plumb bob including provision of hanging slot/option.  d. Should have provision of Centering Rod.  e. Main theodolite should have laser beam/centering laser at its base to point center of the instrument on the surface. |
| 12. | Prism with Carrier | Details to be mentioned |
| 13. | Necessary Software | Following survey options must be available(Softcopy of  original software including operation manual should be provided in CD/DVD/Flash Drive and also installed in the laptop):  a. Traverse.  b. Triangulation.  c. Intersection.  d. Resection.  e. Area survey.  f. Capable of processing GPS, Glonass, Galileo and Beidou signals in conjunction with RTK system. |
| 14. | Minimum Scale Reading | 1 sec/sub or user selectable. |
| 15. | Telescope Magnification | The telescope of the instrument should be fully tmnsiting, coaxial sighting and distance measuring optic including the following facilities:  a. Magnification: 30 x (Minimum).  b. Resolving Power: 2.5 (Maximum).  c. Optical Aperture: 40 mm -45 mm.  d. Minimum Focus: <1.3 m. |
| 16. | Shortest Distance | <1.3 m |
| 17. | Compensator Accuracy | Batter than 0.5" (Dual Axis) |
| 18. | Plate level sensitivity | To be mentioned |
| 19. | Angel Measurement Accuracy:  Standard Deviation | Not more than 02" |
| 20. | Minimum Focusing Range | 1.3 mm |
| 21. | Working Range | a. With prism (180° and 360°) minimum 5 km (for upper).  b. Without prism minimum 1000 m. |
| 22. | CoWmation | Auto collimation with correction applied to Horizontal and vertical angle |
| 23. | Storage of Data | Backup memory for displayed horizontal angle should be provided so that the last horizontal and vertical angle and the distance on the display is retained in backup memory when the power saving function shuts off the  power, so it does not interrupt the work |
| 24. | Power Supply Unit | a. General. Should be able to run with batteries plus provision for power from external AC/DC source plus provision of charging / recharging the batteries. Details of power source and batteries to be mentioned  b. Omeratin\_q Hours of Full Charqed Batteries with GPS Switched on and Switched Off. To be mentioned  c. Power Consumption and Output. To be mentioned |
| 25. | Total Weight | Total weight plus individual weight of the various equipment(including accessories): To be mentioned |
| 26. | Dimension/Height | Dimension of total equipment including tripod and excluding tripod to be mentioned. (Height should be adjustable depending on the operator’s height) |
| 27. | Centering Tripod with Carrying Case | Details to be mentioned |
| 28. | Lighting System | Details to be mentioned |
| 29. | Manual Lock System for Vertical and Horizontal Lock on the Point of Lay | Details to be mentioned |
| 30. | Eyepieces Lens | To be mentioned including standard numbers |
| 31. | Angle Eyepiece for Zenith and Solar/Sun Observation | To be mentioned |
| 32. | Eyepiece Filters for Sun Observation | Colour, numbers and other details to be mentioned |
| 33. | Lens Protecting Cap | To be provided |
| 34. | Carrying Case and Water Proof Cover | To be provided |
| 35. | Desiccating Compound | Details to be mentioned |
| 36. | Fungicide Compound | Details to be mentioned |
| 37. | Sun Shade | Details to be mentioned |
| 38. | Environmental Compatibility (Military Standard of the Equipment 810 G) | For Total Station.  a. Dust and water protection: IP 66/67.  b. Humidity: 95% condensing.  c. Op Temp: -5° C to +55° C.  **For GPS.**  a. Water Proof. Minimum 5 minutes in 2 meter depth.  b. Protection from Shock. To survive drop from 2 meter height on concrete.  c. Operatinq Temperature. -5° C to + 55° C.  d. Storacte Temperature. - 5° C to +55° C.  e. Humidity Tolerance. 95%.  f. Vibration Tolerance. To be mentioned (not below the standard of ISO 9022-36-08).  (Please specifically mention the different parts of the total equipment has different environmental sustenance  condition). |
| 39. | Night Operation Capability | Must be capable of operating at night. Prism should have lightinq option for illuminating at night. |
| 40. | Tilt Sensors | Should be incorporated |
| 41. | Technical, Maintenance and User’s/Operation Manual | Should be provided one/equipment |
| 42. | List of Accessories and Spare Parts | For each set of Total Station:  a. Battery.  (1) For total station: 02 nos.  (2) For GPS: 02 Nos.  (3) Charger: 01 (for each type).  b. AC Adapter. 01.  c. Power Cable. 01.  d. CD, Documentation Content. 01.  e. Reference Manual. 01.  f. USB Cable Host. 01.  g. Post Processino Software. 01  (Licensed copy).  h. Laptop. 01xLaptop for each set (Minimum core i3 processor of latest generation, 128 GB SSD (6 GB/s), minimum 1 TB HDD). |
| 43. | Backlight of Keyboard Facility | The total station should have bacMight keyboard for operating manually during night |
| 44. | Language of Marking/ Writing | All writing/marking on the equipment/paneYdisplay should be in English |
| 45. | Model Validity/Spare Parts/ Accessories Validity and Availability Period | To be mentioned |
| 46. | Built in Test Equipment (BITE) | Details to be mentioned if available |
| 47. | Mean Time between Failure (MTBF) | To be mentioned |
| 48. | Guarantee/ Warranty | Minimum 01 (one)year after final acceptance of all items |
| 49. | List of Items of each Complete Set | To be mentioned |
| **PART3:** | **Traininq Requirement** |  |
| 50 | a. Operation, repair and maintenance training | Not required |
|  | b. Inventory control & management aspect training | Not required |
| **PART4:** | **Repair and Maintenance Requirement Less List of Spares** | |
| 51. | a. Fast and slow moving spare parts | List to be provided (As per requirement of Electrical and Mechanical Engineers Directorate) |
|  | b. Special Service Tools (SST) | List to be provided (As per requirement of Electrical and Mechanical Engineers Directorate) |
|  | c. Special Service Materials(SSM) | List to be provided (As per requirement of Electrical and Mechanical Engineers Directorate) |
|  | **d. Books &PubIication** |  |
|  | (1) Owner's manual in English  (Complete Book type)  (2) Updated workshop/repair  manual in English (Complete  (3) Spare parts catalogue in English (Complete Book type).Book type).  (4) Spare parts price catalogue in English (Complete Book type). | List to be provided (As per requirement of Electrical and Mechanical Engineers Directorate)  List to be provided (As per requirement of Electrical and Mechanical Engineers Directorate)  List to be provided (As per requirement of Electrical and Mechanical Engineers Directorate) |
| **PART5:** | **List of spares** | |
| 52. | List of spare | To be provided |
| **PART6:** | **Tools list for different level of maintenance** | |
| 53. | Tools list for different level of maintenance | To be provided |
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