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SVSU

SHRI VISHWAKARMA SKILL UNIVERSITY
(Enacted Under Government of Haryana, Act No. 25 of 2016)

Date: 20th March 2020, Technical Corrigendum No 1: Tender for Supply and Installation of Advance Electrical Lab (Tender No. SVSU/2020/DA/T002, Dated: 12/02/2020)

With reference to the captioned subject matter, SVSU has issued Corrigendum to the Tender document, details are as under: -

Technical Corrigendum No 1:

S. No.	Clause/Section/Reference/ Page/Paragraph		Existing clause	Corrigendum (Clause to be read as)
1.	Section 4 - Technical Specification and Compliance Sheet	Point 23. BLDC Drive System		Additional Specification: DC machine should be capable of loading the BLDC machine while it is operating as generator.
2.	Section 4 - Technical Specification and Compliance Sheet	Point 14. Power Analyzer		Please find below the updated Technical specification and of Power Analyzer (Annexure – A)

ANNEXURE – A

Power Analyzer

Specifications

Vertical	
Frequency response - dc coupled - **dc to 40 MHz (-3 dB) without probes** Frequency response - ac coupled (lf roll off) **<10 Hz (-3 dB)** Rise time, excluding probes, test leads ---- **<8.75 ns** Input impedance ----- **1 MΩ//20 pF** Sensitivity---- **5 mV to 200 V/div** Analog bandwidth limiter ----**10 kHz** Display modes ----**A, -A, B, -B** Max. input voltage A and B --- **600 Vrms CAT IV, 750 Vrms maximum voltage,** Max. floating voltage, from any terminal to ground --- **600 Vrms CAT IV, 750 Vrms up to 400Hz** **Horizontal** Scope modes ---**Normal, Single, Roll** Ranges (Normal) --- **Equivalent sampling 10 ns to 500 ns/div, Real time sampling 1 µs to 5 s/div** Sampling rate (for both channels simultaneously) Equivalent sampling (repetitive signals) **up to 4 GS/s**	
with 1:1 shielded test leads	DC to 12.5 MHz (-3 dB) / dc to 20 MHz (-6 dB)
with 10:1 Probe without probes and test leads	dc to 40 MHz (-3 dB) <10 Hz (-3 dB)
with 1:1 shielded test leads	<10 Hz (-3 dB)
with 120	1 MΩ//24 pF
with 1:1 shielded test leads	1 MΩ//230 pF
with 10:1 Probe 5 MΩ//15.5 pF 5 mV to 200 V/div 10 kHz A, -A, B, -B direct, with test leads, or with VP41 Probe 600 Vrms CAT IV, 750 Vrms maximum voltage.	
with 600 Vrms 600 Vrms CAT IV, 750 Vrms up to 400Hz	

Normal, Single, Roll Equivalent sampling 10 ns to 500 ns/div	
Real time sampling	1 µs to 5 s/div
Single (real time)	1 µs to 5 s/div
Roll (real time) Equivalent sampling (repetitive signals)	1s to 60 s/div up to 4 GS/s
Real time sampling 1 µs to 60 s/div	40 MS/s

Trigger

Screen update -- Free run, on trigger

Source ---A, B

Sensitivity A and B

@ DC to 5 MHz 0.5 divisions or 5 mV
@ 40 MHz ----1.5 divisions
@ 60 MHz -----4 divisions

Slope ---- **Positive, negative**

Advanced scope functions

Display modes

Normal	Captures up to 25 ns glitches and displays analog-like persistence waveform.
Smooth	Suppresses noise from a waveform.
Glitch off	Does not capture glitches between samples
Envelope	Records and displays the minimum and maximum of waveforms over time

Auto set

Continuous fully automatic adjustments of amplitude, time base, trigger levels, trigger gap, and hold-off. Manual override by user adjustment of amplitude, time base, or trigger level.

Dual input meter

The accuracy of all measurements is within ± (% of reading + number of counts) from 18 °C to 28 °C. Add 0.1x (specific accuracy) for each °C below 18 °C or above 28 °C. For voltage measurements with 10:1 probe, add probe uncertainty +1 %. More than one waveform period must be visible on the screen.

Input A and input B

DC voltage (VDC)**Ranges 500 mV, 5 V, 50 V, 500 V, 750 V**
Accuracy ± (0.5 % +5 counts)
Common mode rejection (CMRR) **>100 dB @ dc, >60 dB @ 50, 60, or 400 Hz**
Full scale reading **5000 counts**

True-rms voltages (V ac and V ac+dc)

Ranges
Accuracy for 5 % to 100 % of
range (DC coupled)---
DC to 60 Hz (V ac+dc) = ± (1 % +10 counts)
1 Hz to 60 Hz (V ac) = ± (1 % +10 counts)
Accuracy for 5 % to 100 % of
range (AC or dc coupled) ---
60 Hz to 20 kHz = ± (2.5 % +15 counts)
DC rejection (only VAC) **>50 dB**
Common mode rejection (CMRR) --
>100 dB @ dc, >60 dB @ 50, 60, or 400 Hz
Full scale reading ---**5000 counts, reading is independent of any signal crest factor**

Peak Modes-- **Max peak, Min peak, or pk-to-pk**

Ranges ---**500 mV, 5 V, 50 V, 500 V, 2200 V**

Accuracy
Accuracy Max peak or Min peak 5 % of full scale, Accuracy Peak-to-Peak 10 % of full scale
Full scale reading --**500 counts**
Frequency (Hz)
Ranges ---**1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz, 10 MHz, and 70 MHz**

Accuracy @1 Hz to 1 MHz -- ± (0.5 % +2 counts)
Full scale reading --**10 000 counts**
RPM
Max reading -- **50.00 kRPM**
Accuracy --- **± (0.5 % +2 counts)**
Duty cycle (PULSE)
Range --**2 % to 98 %**
Frequency range --**15 Hz (1 Hz) to 30 MHz in continuous autoset**
Pulse width (PULSE)
Frequency range----15 Hz (1 Hz) to 30 MHz in continuous autoset

Amperes (AMP) -- With current clamp	Ranges	same as V dc, V ac, V ac+dc, or Peak
	Scale factors	0.1 mV/A, 1 mV/A, 10 mV/A, 100 mV/A, 400 mV/A, 1 V/A, 10 mV/mA
	Accuracy	same as V dc, V ac, V ac+dc, or Peak

Phase

Modes ---- A to B, B to A Range --- 0 to 359 degrees Resolution --- 1 degree

Configurations-- **1 phase / 3 phase 3 conductor balanced loads (3 phase: fundamental component only, AUTOSET mode only)**

Power factor (PF)

Ratio between watts and VA range - 0.00 to 1.00

VA = Vrms x Arms

VA reactive (var) --- $\sqrt{((VA)2-W2)}$

Ohm (Ω)

Ranges ---- 500 Ω , 5 kΩ, 50 kΩ, 500 kΩ, 5 MΩ, 30 MΩ

Accuracy **± (0.6 % + 5 counts) 50 Ω ±(2 % + 20 counts)**

Continuity (Cont) Beep <(30 Ω ± 5 Ω) in 50 Ω range

Diode Measurement voltage @0.5 mA >2.8 V, @open circuit <4 V

Capacitance (CAP) ---- Ranges 50 nF, 500 nF, 5 µF, 50 µF, 500 µF

Cursor Readout

Sources - **A, B**

Single vertical line -- **Average, min and max readout**

Dual vertical lines **--- Peak-peak, time distance and reciprocal time distance readout**

Dual horizontal lines ---- **High, low and peak-peak readout**

Recorder

The recorder captures meter readings in Meter Recorder mode or continuously captures waveform samples in Scope Recorder mode. The information is stored on internal memory or on optional SD card.

The results should be displayed as Chart recorder display that plots a graph of min and max values of Meter measurements over time or as a waveform recorder display that plots all the captured samples.

Meter readings

Measurement Speed -- Maximum 2 measurements/s

Record Size (min, max, average) --2 M readings for 1 channel

Recorded Time Span -- 2 weeks

Maximum number of events ---1024

Waveform record
Maximum sample rate ---400 K sample/s
Size Internal memory --- 400 M samples Recorded Time

Readings --- Watt, VA, var, PF, DPF, Hz
Watt, VA, var ranges (auto) - 250 W to 250 MW, 625 MW, 1.56 GW
DPF --- 0.00 to 1.00
PF ---- 0.00 to 1.00, ± 0.04
Frequency range 10.0 Hz to 15.0 kHz
Number of Harmonics DC to 51
Readings / Cursor readings (fundamental 40 Hz to 70 Hz) ---- V rms / A rms /Watt --- each harmonic from fundamental maybe selected for individual readings

Display

Type	5.7-inch color active matrix TFT
Resolution	640 x 480 pixels

Waveform Display

Vertical	10 div of 40 pixels
Horizontal	12 div of 40 pixels

Power

External	via Power Adapter with input 230V AC
Input voltage	10 V DC to 21 V DC
Power consumption	5 W typical
Input connector	5 mm jack
Internal	via Battery Pack
Battery power	Rechargeable Li-Ion 10.8 V
Operating time	7 hours with 50 % backlight brightness
Charging time	4 hours with test tool off, 7 hours with test tool on
Allowable ambient temp	0 to 40 °C (32 to 104 °F) during charging

Memory

Internal memory can store 20 data sets (screen waveform and setup)	Micro SD card slot with optional SD card (max size of 32 GB)

Interface

Optically isolated	Transfer screen copies (bitmaps), settings and data
USB to PC/laptop	optically isolated USB adapter/cable, using proper software for Windows®.

Environmental MIL-PRF-28800F, Class 2

Temperature

Battery Operation	0 to 40 °C (32 to 104 °F)
Power Adapter Operation	0 to 50 °C (32 to 122 °F)
Storage	-20 to 60 °C (-4 to 140 °F)

Humidity (Operating)

@ 0 to 10 °C (32 to 50 °F)	noncondensing
@ 10 to 30 °C (50 to 86 °F)	95 %
@ 30 to 40 °C (86 to 104 °F)	75 %
@ 40 to 50 °C (104 to 122 °F)	45 %

EMC electromagnetic compatibility

International	IEC 61326-1: Industrial, CISPR 11:Group 1, Class A

Enclosure protection ---**IP51, ref: EN/IEC60529**

Safety

General	IEC 61010-1: Pollution Degree 2
Measurement	IEC 61010-2-033: CAT IV 600 V/CAT III 750 V

Max. input voltage input A and B

Direct on input or with leads	600 Vrms CAT IV for derating
With Banana-to BNC Adapter B120	600 Vrms for derating
Max. floating voltage from any terminal to ground	600 Vrms CAT IV, 750 Vrms up to 400 Hz

Functions

Full function dual input scope and meter · · ·
Oscilloscope bandwidth 40 MHz .....
Meter and Scope Recorder · · ·
Scope cursor measurements · ·
Power and harmonics measurements

Included accessories

10:1 voltage probe · ·
AC Current Clamp