



Bharatiya Vidya
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(Founded in 1938 by Kulapati Dr. K. M. Munshi with the blessings of Mahatma Gandhi)

आ नो भद्राः क्रतवो यन्तु विश्वतः।

Let noble thoughts come to us from every side

SARDAR PATEL INSTITUTE OF TECHNOLOGY

(Autonomous Institute)

Bhavan's Campus, Munshi Nagar, Andheri (west), Mumbai - 400058, India

E mail: principal@spit.ac.in website: www.spit.ac.in

Memorandum of Understanding

This memorandum of Understanding (MOU) is signed on day of **16th Jan 2018**, between:

Riddhi Heatron, RIDDHI HEATRON, 05, Rainbow Industrial Premises, Next to Floral Deck Plaza, Road No. 23, M.I.D.C. Andheri (e), Mumbai - 400 093.

And

Sardar Patel Institute of Technology, (SPIT), Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust.

Riddhi Heatron: Background and Credentials:- Riddhi Heatron is a Mumbai based proprietary company working since last fifteen years and is a pioneer OEM company to make electric furnaces for jewelry industry. The company has ventured into nationally and internationally also and growing steadily towards customer satisfaction and innovative products. The major company products are BURNOUT ELECTRIC FURNACE, DUST BURNOUT FURNACE, ASSAYING BURNOUT FURNACE, GOLD MELTING FURNACE and ELECTROPOLISHER, etc.

Sardar Patel Institute of Technology: Background and Credentials

Sardar Patel Institute of Technology (SPIT) is an AICTE recognized college spread over a campus of 47 acres and is an Autonomous College affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organization in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government and Industry.

Alliance Objective

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. Riddhi Heatron and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.
2. RIDDHI HEATRON agrees to offer internship towards the student community of SPIT that is mutually beneficial.
3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by RIDDHI HEATRON, SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

Current Project Statement

RIDDHI HEATRON is currently looking for the Design and development of a digital controller for induction casting application. (Annexure-1: Specifications)

In this context through this MOU, SPIT will develop the system within a span of 4-months. The hardware cost of the control PCB is included in the project cost. SPIT project team shall work on designing a digital controller circuit and validate the design on an experimental set-up supplied from Riddhi Heatron.

The hardware cost of the material means Inverter Bridge assembly, driver board , HF Transformer, CTs, Test Load, etc. shall be provided by RIDDHI HEATRON. SPIT team shall purchase discrete components for the control-board at their end, as and when required in the consultation with RIDDHI HEATRON. The project -team will raise the necessary bill against the invoice submitted to RIDDHI HEATRON.

PCB Art work design will be the job of SPIT team, this is in their scope of work SPI team will handover all the necessary PCB design files during TOT for future modifications, if any.

Project Implementation Schedule and Commercial

Specifications: As per Annexure-1

Title: Design and development of a digital controller suitable for a 10kW Induction casting machine with all the necessary annunciation, communication and protection as per industry standards.

The proposed board is air cooled, high conversion efficiency, safety, protection, temp, shock and vibration, as per adequate standard (CE and ISI).



This board shall have output short circuit, over temperature, over and under voltage protection with relevant feedback mechanism and relays.

Control : The controller is a Micro-processor based phase shifted-PWM controller with a capability of auto-tracking the resonance condition depending on change in the coil and work-piece suitable for induction casting machine.

Schedule:

(a) This is a **Four months** project having total three phases (b) The **First Phase** is of **two months** and executes following task: Design of schematic design, mechanical design and PCB design with the aid of literature survey, computer simulation, Ordering and assembling components and subsystems, etc.

(c) The **second phase** would be of another **one month** required for: Hardware testing, programming firmware and integrated testing, fine-tuning the parameters for desired specifications.

(d) The **third stage** is a Final stage of **one-month** duration utilized for : final testing, packaging and field testing. Preparation of report / design documents, etc as per various test parameters. Handover of TOT documents.

Financial: All the PCB hardware and component cost is included in the project. The final testing facility and its related cost should be borne by RIDDHI HEATRON

The total estimated hardware prototype cost is Rs. 20,000, including development boards, PCB design and manufacturing cost for all the iterations excluding government taxes if any. The HR cost is Rs. 0.80 Lacs. The total project cost is Rs. 1,00,000, including the cost of proto-type boards and HR but excluding the Govt. taxes on all the relevant hardware material being procured during prototyping. RIDDHI Heatron will deduct TDS on the HR cost as per the govt. rules on the basic cost.

Payment Schedule: Advance: Rs: 20k, First Phase: 20k, Second Phase:30k, Last Phase: 30k

(a) Rs. 20,000 at the start of the projects, at the time of signing MOU

(b) Rs. 20,000+Govt. Taxes after the completion of first step of two months and submission of PCB Schematic, Board design files & BOM to RIDDHI HEATRON.

(c) Rs. 30,000 +Govt. Taxes, after the completion of second stage of one month.

(d) Rs. 30,000 + Govt. Taxes, after completion of third stage of one month, which includes field trial and handing over the TOT documents etc.

(All the payments should be made in favor of Principal, SPIT, Allied Division after signing an MOU between both the parties).

SPIT PROJECT TEAM:

Principal Investigator:

(1) Dr. Rajendra R Sawant
Professor,
Department of Elect. and Telecommunication Engg.
Sardar Patel Institute of Technology,
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022-26708520/2628 7250 (Ext: 390).
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Co- Principal Investigators: Dr. Y S Rao (EXTC) and Prof. Govind Haldankar (Elex), SPIT Mumbai

RIDDHI HEATRON PROJECT TEAM:

Mr. Parag Gandhi, Proprietor and Director


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Annexure-1: Specifications

Product:	Digital Controller for Induction Casting Machine
Controller Type:	Auto-frequency tracking and Input side power control for Temp control
Rating:	10kW
Input: AC	425 V AC/50Hz, Max. upto 450V
operating Temp.:	0 to +55 °C
Cooling:	Water cooling / Air Cooling
Output Voltage:	40V AC at 15-20KHz
Output Current:	Total current : 1000 Amps
Efficiency:	≥85 % at half load & ≥ 92 % at full load for 475 V to 550 V DC
Protections:	output over voltage Trip @ 135 V output short circuit protection Thermal Trip for Transformer and Water Thermal Trip for Power Devices
Front Panel Control:	Heat ON - OFF switch, Fault Reset push button, Error Reporting with Error codes, Temperature Adjustment, Power Adjustment
Front Panel indications:	Heat ON - OFF, Fault Reset push button, Error Reporting with Error codes, Temperature Adjustment, Power Adjustment Push Button for Fault Reset Detachable - should work on serial protocol LCD Display for parameter setting Fault diagnosis of input under / over voltage output short circuit Thermal shutdown output over voltage

RTC setting & other parameter setting via key pad

Interface module: command for Data Down load

LCD & Keypad : for Fault Data download with Time: 500 records minimum
Date & Time of Fault start and end, Fault value must be recorded

Other Tests: **Insulation resistance Test**
HV Test - 1500 V AC rms for 1 minute
Surge Test - as per IEC60571

HF Transformer: Natural cooled, with H class Transformer .
Temperature of Transformers shall not exceed 100°C when corrected to 55 degree

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Mutual Obligation

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.
2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.
3. This agreement may not be amended without the prior written consent of both the parties.
4. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.
5. SPIT will sign a Non-Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.
6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict time-line for project completion without violating NDA document terms.
7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any Riddhi Heatron proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by Riddhi Heatron hereunder will not be transferred from Riddhi Heatron to the Institute on account of use of the same as part of any work under this MoU and shall always remain with Riddhi Heatron.

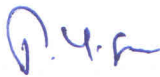
Summary

Riddhi Heatron recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. **Riddhi Heatron** proposes to provide an opportunity to the **SPIT** faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: 16th Jan 2019




Principal,

**Sardar Patel Institute of
Technology,**

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Email : parag@riddhiheatron.com

Signed By

Mrs. Dr. Prachi Gharpure

For SPIT, Mumbai

Signed By

Mr. Parag Gandhi

For Riddhi Heatron, Mumbai