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Faint, illegible text in Kannada script, possibly a letter or official communication.

ಇದನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ಓದಿ ಮತ್ತು ಅರ್ಥೈಸಿ.



Licensor", which expression shall whenever the context so requires or admits, mean and include its successors in office and/ or permitted assigns) on the first part

AND

ProstarM Info Systems Ltd, a company established under the laws of India, having its registered Office at PROSTARM INFO SYSTEMS LTD, S. No. 321, Patil Nagar, Bavdhan Budruk, Near Lalani Quantum, Tal.: Mulshi, Dist.: Pune - 411 021 (Hereinafter referred to as "**Company or Licensee**", which expression shall whenever the context so requires or admits, mean and include its successors in office, and/or permitted assigns) on the second part

"ARAI" and "Company" are individually referred to as "Party" and jointly as "Parties, or "Licensor" and "Licensee", as the contexts may require.

RECITALS

WHEREAS, ARAI, is the leading automotive R&D organization of the country under the Administrative control of the Ministry of Heavy Industries and Public Enterprises, Government of India and during the course of its research activities it has developed and is absolute owner of Battery Management System technology for Low voltage and High voltage Application (as later defined herein) (Hereinafter referred to as the "Technology") and needs further adaptations as per the application.

WHEREAS, ARAI desires to have the Technology developed and commercialized to benefit the public and is willing to grant a license details associated with Technology.

WHEREAS, Company approached ARAI for grant of License of its Technology for manufacturing for UPS and Inverter applications. And Whereas, pursuant to the discussions between the parties, ARAI submitted its proposal with the Company which was agreed by company by issuing its Purchase Order No. MH/21-22/004 for HV BMS and MH/21-22/005 for LV BMS dated 25th May 2021.

WHEREAS, Company has represented to ARAI, to induce ARAI to enter into this Agreement, that Company shall commit itself to a thorough, vigorous and diligent program of exploiting the developed Technology for the fields of use defined hereafter so that public utilization shall result therefrom; and



WHEREAS, Company desires to obtain a license from ARAI for its developed Technology to manufacture Licensed Products (as defined below) upon the terms and conditions hereinafter set forth. (hereinafter referred to as the "Manufacturing License")

NOW, THEREFORE, ARAI and Company hereby agree as follows:

1. DEFINITIONS.

- 1.1 **"Affiliate"** shall mean any legal entity (including, but not limited to, a corporation, partnership, or limited liability company) that is controlled by Company. For the purposes of this definition, the term "control" means (i) beneficial ownership of at least fifty percent (50%) of the voting securities of a corporation or other business organization with voting securities or (ii) a fifty percent (50%) or greater interest in the net assets or profits of a partnership or other business organization without voting securities.
- 1.2 **"Fields of Use"** shall mean UPS and Inverter application for Lithium Ion battery packs.
- 1.3 **"Licensed Product"** shall mean any product that, in whole or in part:
- (i) is manufactured by using a Licensed Technology or that, when used, practices a Licensed Technology.
- 1.4 **"Licensed Technology"** shall mean Battery Management System (BMS) for Low voltage and high voltage application for lithium ion battery packs, developed and owned by ARAI.
- 1.5 **"Deliverables"** shall be as per attached Annexure-I
- 1.6 **"Net Sales"** shall mean the gross amount billed by Company and its Affiliates for Licensed Products, less the following:
- (i) customary trade, quantity, or cash discounts to the extent actually allowed and taken;
 - (ii) amounts repaid or credited by reason of rejection or return;



- (iii) to the extent separately stated in purchase orders, invoices, or other documents of sale, any taxes or other governmental charges levied on the production, sale, transportation, delivery, or use of a Licensed Product which is paid by or on behalf of Company; and
- (iv) outbound transportation costs prepaid or allowed and costs of insurance in transit.

No deductions shall be made for commissions paid to individuals whether they be with independent sales agencies or regularly employed by Company or its Affiliates and on their respective payrolls, or for cost of collections. Net Sales shall occur on the date of billing for a Licensed Product. If a Licensed Product is distributed at a discounted price that is substantially lower than the customary price charged by Company or its Affiliates, or distributed for non-cash consideration (whether or not at a discount), Net Sales shall be calculated based on the non-discounted amount of the Licensed Product charged to an independent third party during the same Reporting Period or, in the absence of such sales, on the fair market value of the Licensed Product. Non-monetary consideration shall not be accepted by Company or any Affiliate for any Licensed Products without the prior written consent of ARAI

- 1.7 **"Financial Year"** shall begin on the first day of April of each calendar year and end on the last day of March of next calendar year.
- 1.8 **"Term"** shall mean the term of this Agreement, which shall commence on the License commencement date of this agreement and shall remain in effect until Five (05) years, unless earlier terminated in accordance with the provisions of this Agreement.
- 1.9 **"Territory"** shall mean INDIA.
- 1.10 **"Timeline"** shall be as per attached Annexure-I

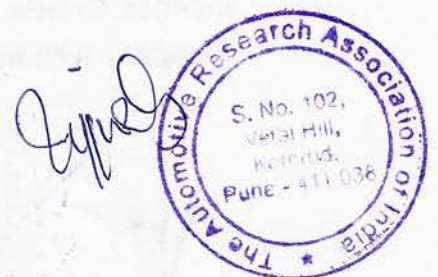
2. GRANT OF RIGHTS.

- 2.1 **License Grants.** Subject to the terms of this Agreement, ARAI hereby grants to Company with effect from license commencement date for the Term of five (05)



years a royalty-bearing, non-exclusive, non-transferable license to use the Licensed Technology in UPS and Inverter BMS applications for Lithium Ion battery packs (the "Fields of Use") to, make, manufacture, have manufactured, use, sell, offer for sale, promote, advertise, distribute, test or service, products embodying or comprised of (in whole or in part) the Licensed Technology in the Territory. It is agreed by both parties that after expiry of 5 years of grant of license, Company shall not manufacture Licensed product. However, parties may decide to extend this agreement subject to mutually agreed terms. Neither Company nor its Affiliates shall have the right to enter into sub-licensing agreements.

- 2.2 **No Additional Rights.** Nothing in this Agreement shall be construed to confer any rights upon Company by implication, estoppel, or otherwise as to any technology or patent rights of ARAI or any other entity other than the Licensed Technology Rights, regardless of whether such technology or patent rights shall be dominant or subordinate to any Technology Rights.
- 2.3 In the course of its normal research and development, if ARAI come across facts, which lead to incremental improvements to the Licensed Technology, the same will be shared with Company. However, should the nature of the Licensed Technology be changed to bring about a new product, the same shall be offered to Company by ARAI on its sole discretion and the commercial aspects will be renegotiated to mutual acceptance.
- 2.4 Company acknowledges and agrees that the Company shall not own (i) any and all Derivative Technology made or developed by ARAI, alone or jointly with others, during the term and within the Fields of Use, and (ii) any and all intellectual property and proprietary rights in such Derivative Technology in the Fields of Use, including without limitation the worldwide patents for such Derivative Technology and all subsidiary rights in such Derivative Technology.
- 2.6 Company agrees that; it shall not sub-license its rights hereunder to its any customer or client or third party as the case may be.



3. COMPANY DILIGENCE OBLIGATIONS.

- 3.1 **Diligence Requirements.** Company declares that it has done its due-diligence on the Licensed Technology and has fully satisfied itself before entering into this Agreement and shall not seek refund of any type of Fees from ARAI under any circumstances.
- 3.2 Company shall use diligent efforts and shall cause its Affiliates to use diligent efforts, to manufacture Licensed Products and to introduce Licensed Products into the commercial market; thereafter, Company or its Affiliates shall make Licensed Products reasonably available to the public.

4. CONSIDERAION AND PAYMENT TERMS.

- 4.1 **Consideration for Grant of Rights.**
- (a) Licensing Fee for Licensed Technology. **INR 28 lakhs+ applicable taxes**
 - (b) These considerations are nonrefundable.

- 4.2 **Payment Terms.**
Detailed payment terms are as mentioned in attached Annexure-I

- 4.3 **Running Royalties.**

Company shall pay to ARAI a running royalty as mentioned below over and above licensing fee mentioned in 4.1 above. Running royalties shall be payable for each Financial Year and shall be due to ARAI within forty-five (45) days of the end of each Financial Year.

- (a) In case of, Low voltage BMS manufacturing license Company agrees to pay ARAI **INR100 per product or INR 1,00,000/- per annum**, whichever is higher as royalty fee after sale of 1500 Units or after 2nd Anniversary of licensing, whichever is earlier.
- (b) In case of, High voltage BMS manufacturing license Company agrees to pay ARAI **INR 1000 per 100kWh per pack and thereafter INR 10 per KWh or INR 2,00,000/-per annum**, whichever is higher after sale of 1500 units (cumulative



units inclusive Master and Slave) or after 2nd Anniversary of licensing, whichever is earlier.

4.4 Technical Assistance Fee.

Company shall pay to ARAI **Rs. 50,000/- (Rupees Fifty Thousand Only)** for each additional 10 man hours technical assistance over and above agreed 40 hours.

4.5 The above all considerations mentioned are net and exclusive of any Government levies such as GST, which will be applicable at the time of billing. At present applicable GST is 18%. Further, ARAI is exempted u/s 197 of the I.T. Act, 1961. Hence, TDS is not to be deducted when releasing payment to ARAI. TDS Exemption Certificate will be provided by ARAI.

4.6 Payments.

- (a) Method of Payment. All payments under this Agreement should be made through bank transfer as per ARAI Payment Instructions. Each payment should have reference of this Agreement to identify the obligation under this Agreement that the payment satisfies.
- (b) Late Payments. Any payments by Company that are not paid on or before the date such payments are due under this Agreement shall bear interest, to the extent permitted by law, at two percentage points above the Prime Rate of interest as reported by the State Bank of India on the last business day of the calendar quarterly reporting period to which such royalty payments relate.

5. REVIEWES, REPORTS AND RECORDS.

5.1 Review of Progress.

ARAI and Company shall jointly review at the end of every month viability of the outcome of the progress of exploitation of Licensed Technology w.r.t. Licensed Product, etc. License Technology, at every month to decide future course of action.



5.2 **Frequency of Reports.**

Upon First Commercial Sale of a Licensed Product, Company shall report to ARAI the date of first commercial sale of a Licensed Product within sixty (60) days of its occurrence.

5.3 **Financial Statements.** On or before the ninetieth (90th) day following the close of Company's fiscal year, Company shall provide ARAI with Company's financial statements for the preceding fiscal year including, at a minimum, a balance sheet and an income statement, certified by Company's treasurer or chief financial officer or by an independent auditor.

5.4 **Records.** Company shall maintain, and shall cause its Affiliates to maintain, complete and accurate records relating to the rights and obligations under this Agreement and any amounts payable to ARAI in relation to this Agreement, which records shall contain sufficient information to permit ARAI to confirm the accuracy of any reports delivered to ARAI and compliance in other respects with this Agreement. The relevant party shall retain such records for at least five (5) years following the end of the financial year to which they pertain, during which time ARAI, or ARAI's appointed representatives, shall have the right, at ARAI's expense, to inspect such records during normal business hours to verify any reports and payments made or compliance in other respects under this Agreement. In the event that any audit performed under this Section reveals an underpayment in excess of five percent (5%), Company shall bear the full cost of such audit and shall remit any amounts due to ARAI within thirty (30) days of receiving notice thereof from ARAI.

6. CONFIDENTIALITY.

6.1 Company shall take all necessary measures to ensure that the Licensed Technology shall not passed on, disclosed, or given access to, except to such of their Directors, Officers and employees and their subcontractors to whom it is necessary to pass on, disclose or give access to, for the purpose of execution or manufacture of the Licensed Product. Company hereby accepts full responsibility for any of their Directors, Officers and Employees and their subcontractors to maintain confidentiality and undertakes to fully compensate ARAI in that regard.



6.2 In addition to above, for the purpose of this Agreement, the Parties commits & binds themselves to respect the confidentiality of the Information, as per the Non-Discloser Agreement" dated 4th of March 2021, signed between the parties.

7. INFRINGEMENT.

7.1 **Notification of Infringement.** Company shall inform ARAI promptly in writing of any alleged infringement of the Licensed Technology Rights by a third party and of any available evidence thereof.

7.2 **Right to Prosecute.** ARAI shall have the right, but shall not be obligated, to prosecute at its own expense all infringements of the Licensed Technology Rights and, in furtherance of such right, Company hereby agrees that ARAI may include Company as a party plaintiff in any such suit, without expense to Company. The total cost of any such infringement action commenced or defended solely by ARAI shall be borne by ARAI, and ARAI shall keep any recovery or damages derived therefrom, whether compensatory for past infringement or punitive.

7.3 **Cooperation.** In any infringement suit which ARAI may institute to enforce the Licensed Technology Rights pursuant to this Agreement, Company shall, at ARAI's expense, cooperate in all respects and, to the extent possible, have its employees testify when requested and make available relevant records, papers, information, samples, specimens, and the like.

8. INDEMNIFICATION AND INSURANCE.

8.1 **Indemnification.**

(a) **Indemnity.** each Party ("Indemnifying Party") shall defend, indemnify and hold harmless the other Party and such other Party's directors, key managerial personnel, employees and officers (jointly "Indemnified Party") of, from and against any Claims or Losses suffered or incurred by such Indemnified Party arising out of or relating to (a) breach or non-fulfilment of any provision as set forth in this Agreement including any Claim, brought by a third party asserting matters which, if true, would result in such a breach



or non-fulfilment (b) any fraud, negligence, willful misconduct, intentional acts or omissions of the Indemnifying Party or Indemnifying Party's personnel as finally adjudicated by the court of competent jurisdiction

- (b) Procedures. The Indemnifier agree to provide Indemnified Party with prompt written notice of any claim, suit, action, demand, or judgment for which indemnification is sought under this Agreement. Indemnifier agrees, at its own expense, to provide attorneys reasonably acceptable to Indemnified Party to defend against any such claim. The Indemnified Party shall cooperate fully with Indemnifier in such defense and will permit Indemnifier to conduct and control such defense and the disposition of such claim, suit, or action (including all decisions relative to litigation, appeal, and settlement); provided, however, that the Indemnified Party shall have the right to retain its own counsel, at the expense of Indemnifier, if representation of such Indemnified Party by the counsel retained by Indemnifier would be inappropriate because of actual or potential differences in the interests of such Indemnified Party and any other party represented by such counsel. Indemnifier agrees to keep Indemnified Party informed of the progress in the defense and disposition of such claim and to consult with Indemnified Party with regard to any proposed settlement.

8.2 **Insurance**. Company shall obtain and carry in full force and effect commercial general liability insurance, including product liability and errors and omissions insurance which shall protect Company and ARAI with respect to events covered by Section 8.1 (a) above. Company shall provide ARAI with Certificates of Insurance evidencing compliance with this Section. Company shall continue to maintain such insurance or self-insurance after the expiration or termination of this Agreement during any period in which Company or any Affiliate continues to make, use, or sell a product that was a Licensed Product under this Agreement, and thereafter for a period of five (5) years.

8.3 Company is solely responsible for maintaining the quality of the Licensed Product and in case of any complaint/claim regarding Licensed Product manufactured by Company, ARAI shall in no way be held responsible in any manner, and shall remain indemnified.



- 8.4 Company shall provide the maintenance, repair and all necessary life cycle support to the User for Licensed Product.
- 8.5 In no event shall either Party be liable to the other for any (i) incidental, special, punitive, consequential, or indirect damages, or (ii) damages resulting from loss of sale, business, profits, anticipated savings, opportunity, or goodwill.

9. NO REPRESENTATIONS OR WARRANTIES.

ARAI makes no representations or warranties of any kind concerning the Licensed Technology and hereby disclaims all representations and warranties, express or implied, including without limitation warranties of merchantability, fitness for a particular purpose, non-infringement of intellectual property rights of ARAI or third parties, validity, enforceability, and scope of patent rights, if any, and the absence of latent or other defects, whether or not discoverable.

In no event shall ARAI, its members, directors, officers, employees and affiliates be liable for incidental or consequential damages of any kind, including economic damages or injury to property and lost profits, regardless of whether ARAI shall be advised, shall have other reason to know, or in fact shall know of the possibility of the foregoing.

The Technology shall be transferred in "As is where is" basis.

10. ASSIGNMENT.

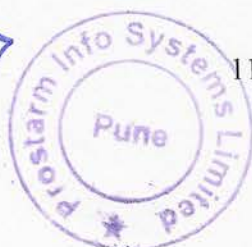
This Agreement is personal to Company and no rights or obligations may be assigned by Company without the prior written consent of ARAI.

11. GENERAL COMPLIANCE WITH LAWS

- 11.1 **Compliance with Laws.** Company shall use reasonable commercial efforts to comply with all commercially material local, state, National, and international laws and regulations relating to the development, manufacture, use, and sale of Licensed Products.



Handwritten initials "MS" with an arrow pointing towards the Profarm Info Systems Limited stamp.



11.2 Non-Use of ARAI Name. Company shall not use the name of "ARAI" or any variation, adaptation, or abbreviation thereof, or of any of its trustees, officers, faculty, employees, or agents, or any trademark owned by ARAI, or any terms of this Agreement in any promotional material or other public announcement or disclosure without the prior written consent of ARAI, which consent ARAI may withhold in its sole discretion.

12. TERMINATION.

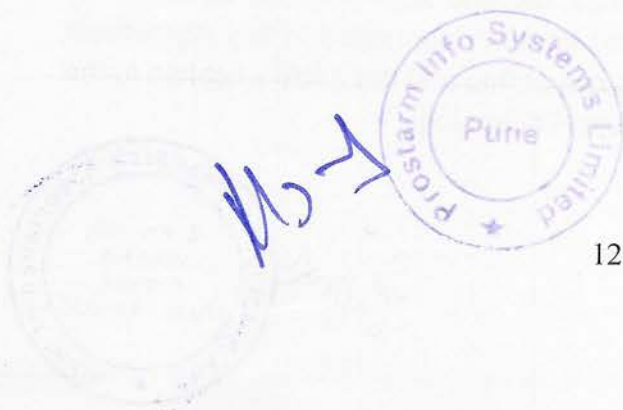
12.1 Cessation of Business. If Company ceases to carry on its business related to this Agreement, ARAI shall have the right to terminate this Agreement immediately upon written notice to Company.

12.2 Termination for Default.

(a) Nonpayment. In the event Company fails to pay any amounts due and payable to ARAI hereunder, and fails to make such payments within thirty (30) days after receiving written notice of such failure, ARAI may terminate this Agreement immediately upon written notice to Company.

(b) Material Breach. In the event Company commits a material breach of its obligations under this Agreement, except for breach as described in Section 12.2 (a), and fails to cure that breach within sixty (60) days after receiving written notice thereof, ARAI may terminate this Agreement immediately upon written notice to Company.

12.3 ARAI may terminate this Agreement for cause if Company (i) becomes Insolvent/Bankrupt (ii) upon a purchase of a majority of Company's outstanding voting securities in a single transaction by a third party.



12.3 Effect of Termination.

- (a) Survival. The following provisions shall survive the expiration or termination of this Agreement:
- (“Definitions”);
 - (“Indemnification and Insurance”);
 - (“No Representations or Warranties”);
 - (“Dispute Resolution”);
 - (“Confidentiality”);
 - (“Intellectual Property Rights”)
 - (“Miscellaneous”);
 - (“Records”);
 - (“Compliance with Laws”);
 - (“Effect of Termination”).
- (b) Pre-termination Obligations. In no event shall termination of this Agreement release Company, Affiliates, from the obligation to pay any amounts that became due on or before the effective date of termination.
- (c) After termination all Rights of Company with respect to this Agreement shall be revoked. However, in case of revocation, ARAI shall give an opportunity to Company to reply to the revocation notice. In case of revocation, “Company” will have no claim whatsoever on Fees paid to ARAI before the Revocation.
- (d) Company shall return all Confidential/proprietary information shared by ARAI including but not limited to technical specifications, literatures, documents, papers, diagrams, recipes, formulae’s etc.

13. Intellectual Property Rights

- I. All IPR in the ARAI’s Licensed Technology, are and shall continue to be owned by ARAI. Notwithstanding anything to the contrary contained in this Agreement or otherwise, nothing shall affect ARAI’s ownership and the ARAI’s license to the Intellectual Property Rights in the Licensed Technology.



- II. ARAI further specifically represents, warrants and specifically confirms that the ARAI is an absolute sole owner of the Licensed Technology free of all encumbrances and any third-party rights/claims and the Company upon execution of this Agreement shall receive clear and unencumbered license of the Licensed Technology from ARAI.
- III. All rights, title and interest to the Improvements by company, including all rights, title and interest to any Intellectual Property Rights in the Improvements, whether statutorily protected or not, to the Licensed Technology, are and shall be owned by jointly by the parties.
- IV. Where the Licensed Technology will be further improved by Parties jointly, both the Parties shall have the joint ownership on such improvement/s.

14. Dispute Resolution.

14.1 Mandatory Procedures. The parties agree that any dispute arising out of or relating to this Agreement shall be resolved solely by means of the procedures set forth in this Article, and that such procedures constitute legally binding obligations that are an essential provision of this Agreement. If either party fails to observe the procedures of this Article, as may be modified by their written agreement, the other party may bring an action for specific performance of these procedures in Pune court.

14.2 Equitable Remedies. Although the procedures specified in this Article are the sole and exclusive procedures for the resolution of disputes arising out of or relating to this Agreement, either party may seek a preliminary injunction or other provisional equitable relief if, in its reasonable judgment, such action is necessary to avoid irreparable harm to itself or to preserve its rights under this Agreement.

14.3 Dispute Resolution Procedures.

In event of any dispute or difference between the Parties hereto, such disputes and differences shall be resolved amicably by mutual consultation. If such resolution is not possible within thirty (30) days of such dispute, then, the unresolved dispute and difference shall be referred to arbitration of the Sole Arbitrator to be appointed mutually. The provisions of Arbitration and Conciliation Act, 1996 shall be applicable to the arbitration under this clause. The venue of such arbitration shall be at Pune and the language of arbitration proceedings shall be English. The arbitrator shall make a reasoned award (the "Award"), which shall



be final and binding on the Parties. The expenses of the arbitration shall be borne equally by the parties, but each party shall be responsible for its own counsel fees and expenses.

14.4 Performance to Continue. Each party shall continue to perform its undisputed obligations under this Agreement pending final resolution of any dispute arising out of or relating to this Agreement; provided, however, that a party may suspend performance of its undisputed obligations during any period in which the other party fails or refuses to perform its undisputed obligations. Nothing in this Article is intended to relieve Company from its obligation to make undisputed payments pursuant this Agreement.

15. MISCELLANEOUS.

15.1 Notice. Any notices required or permitted under this Agreement shall be in writing, shall specifically refer to this Agreement, and shall be sent by hand, recognized national overnight courier, confirmed facsimile transmission, confirmed electronic mail, or registered or certified mail, postage prepaid, return receipt requested, to the following addresses or facsimile numbers of the parties:

If to **ARAI:**

The Automotive Research Association of India,
Survey No. 102, Vetal Hill, Off Paud Road,
Kothrud, Pune – 411 038, INDIA
Attention: Director
Email: director@araiindia.com
Tel: +91-20-6762 1101
Fax: +91-20-6762 1104

If to **Company:**

PROSTARM INFO SYSTEMS LTD
S. No. 321, Patil Nagar, Bavdhan Budruk
Near Lalani Quantum, Tal.: Mulshi
Dist.: Pune - 411 021
Attention: CEO
Tel / Mobile: 91589 80000
Email: ram@prostarm.com
Fax:

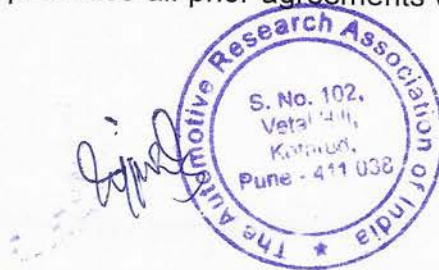
All notices under this Agreement shall be deemed effective upon receipt. A party may change its contact information immediately upon written notice to the other party in the manner provided in this Section.



15 of 22






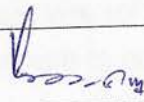


- 15.2 Governing Law.** This Agreement and all disputes arising out of or related to this Agreement, or the performance, enforcement, breach or termination hereof, and any remedies relating thereto, shall be construed, governed, interpreted and applied in accordance with the laws of INDIA, without regard to conflict of laws principles. Courts in Pune shall have exclusive jurisdiction over any claims arising under this Agreement.
- 15.3 Force Majeure.** Neither party will be responsible for delays resulting from causes beyond the reasonable control of such party, including without limitation fire, explosion, flood, war, pandemic, epidemic, strike, or riot, provided that the nonperforming party uses commercially reasonable efforts to avoid or remove such causes of nonperformance and continues performance under this Agreement with reasonable dispatch whenever such causes are removed.
- 15.4 Amendment and Waiver.** This Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both parties. Any waiver of any rights or failure to act in a specific instance shall relate only to such instance and shall not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.
- 15.5 Severability.** In the event that any provision of this Agreement shall be held invalid or unenforceable for any reason, such invalidity or unenforceability shall not affect any other provision of this Agreement, and the parties shall negotiate in good faith to modify the Agreement to preserve (to the extent possible) their original intent. This Agreement shall be construed as if such provision were deleted by agreement of the parties.
- 15.6 Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the parties and their respective permitted successors and assigns.
- 15.7 Headings.** All headings are for convenience only and shall not affect the meaning of any provision of this Agreement.
- 15.8 Entire Agreement.** This Agreement constitutes the entire agreement between the parties with respect to its subject matter and supersedes all prior agreements or



understandings between the parties except NDA mentioned hereinabove relating to its subject matter.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives.

Signed for and on behalf of 'ARAI' The Automotive Research Association of India 	Signed by on and behalf of 'COMPANY' "Prostarm Info Systems Ltd" 
By: 	By: 
Name : Dr. Reji Mathai	Name : Mr Ram Agarwal
Title: Director	Title: CEO
Date :	Date :
Witness	
By: 	By: 
Name: Mr. Nitin B Dhande	Name: RADHARISHNAN NAIR
Title: Sr. Deputy Director	Title: JV Partner
Date :	Date: 11.08.2021.

Agarwal

BDCP

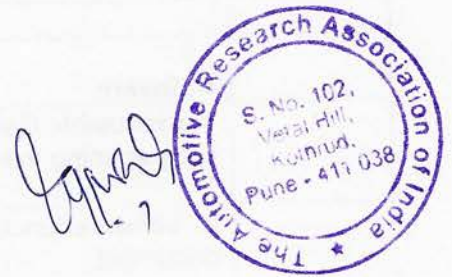
ANNEXURE-I
A: Delivery, Timelines and Payment Schedule

Milestone	Deliverable	Payment	Timeline	M1	M2	M3	M4
M1	Signing of LA	Rs. 6,00,000/- for LV BMS and Rs. 12,00,000/- for HV BMS within 30 days of signing of LA					
M2	LV-48 V BMS	Rs. 5,00,000/- within 30 days after completion of activities					
	Hardware		3 Months				
	Design Documents inclusive of 1. Bill of Material, Schematics, artwork and gerber files for BMS and PDU board 2. Hardware Evaluation Reports						
	Software		3 Months				
	1. executable files for flash programming the BMS						
	2. software functionality document						
	3. Software configuration document						
	Samples:						
	5 Numbers of 48 V BMS along with PDU						

M3	High Voltage BMS	Rs. 5,00,000/- within 30	4 Months				
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	Hardware	days after completion of activities						
	Design Documents inclusive of							
	1. Bill of Material, Schematics, artwork and gerber files for BMS and PDU board							
	2. Hardware Evaluation Reports							
	Software		4					
	1. executable files for flash programming the BMS		Months					
	2. software functionality document							
	3. Software configuration document							
	Samples:							
	1 sample unit inclusive of 1 master and 4 slave units							



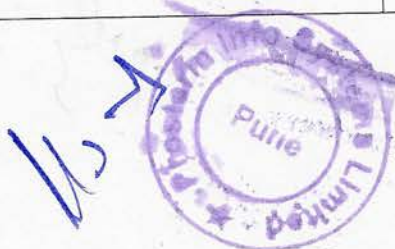
B: Technical Specifications of 48 V BMS

Sr No.	BMS functionality	Specification
1	BMS Topology	Single Board Master-Slave + PDU
2	BMS Functionality	<ul style="list-style-type: none"> ➤ Cell / Pack Voltage Monitoring ➤ Temperature Monitoring ➤ Passive Cell Balancing with current up to 100 mA ➤ Safety Interlock like under/over voltage/ over current/ Over temp ➤ SoC, SoH estimation ➤ SoP Estimation
3	Architecture	Stackable architecture
4	Configuration	Master slave configuration
5	Cell Protection	Each cells of every module
6	Battery Pack voltage	48 V
7	Pack Chemistry	Li-ion inclusive of different chemistries viz. LFP, NMC, LTO, NCA
8	No of Cells Series	9-16 cells
9	Max Cell Voltage	1-5VDC
10	Temperature Monitoring	Supports up to 6 10kΩ NTC external Temperature Sensors.
11	Current sensor	PDU On-board Hall Effect current sensor 150 A
12	Current Measurement	Accuracy +- 2 % of Full Scale and resolution of 0.1 A
13	Cell balancing	Internal Passive cell balancing up to 100mA @ 4.2V
14	Continuous Current Rating	65A up to 55 °C
15	Peak Current Rating	120 A for 10s up to 55 °C
16	GPIO	4 Digital Inputs including 1 isolated 4 Digital Outputs including 1 isolated
17	Data logging	Support for up to 64 Gb Micro SD Card. Includes event based logging as well as fixed interval data logging at 1 Hz.
18	Communication Protocol	CAN, Bluetooth, RS 485
20	PDU control	Pre-charge, Charging & Discharging
21	Operating temperature	0°C to 85°C
22	System Configuration	User Friendly Configuration Utility provided
23	Test Compliance	AIS004 Part3 as applicable



C: Technical Specifications of HV BMS

Sr No.	BMS functionality	Specification
1	BMS Topology	Stackable and Scalable Architecture with Master slave configuration
2	Battery Chemistry	Multiple Li-ion chemistry
3	Battery Protection	Over voltage and under voltage protection Over current protection Over temperature protection Insulation Monitoring Reverse polarity detection
4	Performance Parameters	State of Charge (SoC) Depth of Discharge (DoD) State of Health (SoH) SoP Estimation
5	Operating Parameters	BMS Operating Voltage: 15 to 60 VDC. (For Master) Operating Temperature: 0 to 85°C
6	User Interface	GUI for Configuration and Calibration
7	Battery Pack voltage	Up to 1000V
8	Cell voltage range	1 to 5V
9	Current sensor	Support both Hall Effect and Shunt resistor.
10	Temperature Measurements	Support up to 5 Temperature sensors per slave Sensor Type supported : NTC 10kΩ Temperature Measurement range: -20 to 125°C Accuracy ±1°C
11	Cell balancing	Internal Passive cell balancing (up to 100mA at 4.2V)
Other Parameters		
1	GPIO	5 channels (TTL) one of the input lines can be configured for enclosure lid monitoring
2	HV Contactor/Relay drives	4 with 2A continuous current rating and connection status feedback signal.
3	Insulation resistance monitoring	Supported
4	Sleep Mode and Wake up	Wake up through: HW Interrupt based wake up
5	Contactor Weld Detection	Monitoring relay contacts
6	Fault Management	Fault recognition system used for indicating warnings and alarm / errors related to battery / cell voltage, current, temperature and communication.



7	On Board Memory	Support up to 64 Gb micro SD card
Communication		
1	CAN	1 channel
2	RS 485	1 RS 485 port
3	Others	Bluetooth
Compliance		
1	Test Compliance	AIS004 Part3 as applicable.

D: Company Responsibility

- Pack Integration and Testing
- Calibration on the physical battery pack and further on to the specified application
- Performance testing on the physical battery pack and final application
- Durability testing on the physical battery pack
- Diagnostic evaluation on the physical battery pack
- Battery pack certification testing as per applicable standards
- BMS adaptation on the battery pack

E. Exclusions

- Customization as per Company requirement.
- Integration on pack and on final application
- All testing for performance evaluation, development is excluded from ARAI scope of work and the same can be carried out by ARAI as an additional scope as separate project if required
- Manufacturing of BMS



Year	Value
2010	1000
2011	1200
2012	1500
2013	1800
2014	2000
2015	2200
2016	2500
2017	2800
2018	3000
2019	3200
2020	3500

The following table shows the results of the survey conducted in the year 2020. The data is presented in the form of a table. The first column shows the year and the second column shows the value. The values are as follows:

2010: 1000
 2011: 1200
 2012: 1500
 2013: 1800
 2014: 2000
 2015: 2200
 2016: 2500
 2017: 2800
 2018: 3000
 2019: 3200
 2020: 3500

