

## **TEMPLATE FOR THE TERMS OF REFERENCE FOR THE R&D PROJECTS**

*(Refer to the Guidelines on R&D Projects issued vide note SCMD/R&D dated xx-09-23)*

### **1. Title of the Project: Study of Safety and Performance parameters of Electrical timer relays for industrial purposes - Pneumatic, Motorised and Electronic**

#### **2. Background:**

- Pneumatic systems, utilizing compressed air, are commonly employed in industrial automation. They are known for their reliability, simplicity, and ability to deliver precise control in diverse applications, ranging from manufacturing processes to machinery operation.
- Motorized timer relays are designed to control electric motors. These relays ensure that motors are activated or deactivated at the right time, contributing to efficiency, energy savings, and overall safety of industrial operations.
- Electronic timer relays have become essential in modern industrial settings due to their accuracy, versatility, and adaptability. They are employed in various applications, such as manufacturing processes, equipment control, and automated systems, where precise timing is crucial.
- There is an Indian standard IS 5834 Series (Part 1,2 & 3):1994 “Electrical timer relays for industrial purposes - Pneumatic, Motorised & Electronic”. These standard covers pneumatic, , Motorised & Electronic timer relays employed for providing steplessly adjustable time delay to control various types of industrial circuits of nominal system voltage not exceeding 1000V. These standard can be accessed from <https://standardsbis.bsbedge.com/>.
- This project is geared towards enhancing the existing specification of electrical timer relays (Pneumatic, Motorised & Electronic ) for industrial purposes by incorporating new performance parameters. Specifically, the focus will be on improvement in line with the latest technological advancements. The objective is to ensure that these timer relays meet the evolving needs of industrial applications, providing enhanced efficiency, safety, and compatibility with modern industrial systems."

#### **Objective**

The project aims to systematically gather technical data and scientific evidence concerning the safety and performance parameters of 'Electrical timer relays for industrial purposes - Pneumatic, Motorised & Electronic .' This comprehensive approach involves a literature review/desktop study, on-site industry visits, analysis of testing results from samples, and solicitation of feedback from end-users. By synthesizing information from diverse sources, the objective is to obtain a holistic understanding of the reliability and functionality of these timer relays in industrial settings.

### 3. Scope for R&D:

- a. **Literature Survey** - Conduct an extensive study and comparative analysis of existing literature, research papers, international standards, and any other published information related 'Electrical timer relays for industrial purposes - Pneumatic, Motorised & Electronic.
- b. **Manufacturing Facility** - Evaluate the standard of manufacturing bases in the country to understand the capabilities and quality of production facilities including testing of 3 random samples and its testing for generation of test data for important safety and performance requirements .
- c. **Study of Import – Export data-** Analyse import and export data of Electrical timer relays for industrial purposes - Pneumatic, Motorised & Electronic in India to gather insights into market trends, demand, and potential for growth.
- d. **Testing Infrastructure** - Assess the testing infrastructure in the country to determine the availability and adequacy of facilities for conducting product testing and quality assurance.
- e. **Visits to Manufacturing facilities:** Visit at least two manufacturing facilities for each category (small, medium, and large) of 'Electrical timer relays for industrial purposes - Pneumatic, Motorised & Electronic' available in the country to observe the production processes, technology used, and overall manufacturing capabilities.  
The study will focus on understanding important parameters:
  - i. Types of Raw materials/components used.
  - ii. Varieties/grades manufactured
  - iii. Quality parameters (Performance requirements )
  - iv. Manufacturing process,
  - v. Safety requirements
  - vi. In process quality checks
  - vii. Test facilities and test methods used
  - viii. Marking and labelling being done
  - ix. Packaging requirement
  - x. Tests being undertaken
  - xi. Testing facilities in the plant
- f. **Visits to Laboratory facilities:** Visit two laboratory facilities available in the country to examine their testing equipment, capabilities, and expertise in relation to 'Electrical timer relays for industrial purposes - Pneumatic, Motorised & Electronic'. Preference shall be given to BIS (Bureau of Indian Standards) labs where feasible.
- g. **Collection of User feedback-** Visit the users of the product and collect data as mentioned in the scope through a questionnaire.

- h. **Study of Sustainability Aspects:** The focus of this study is to collect feedback regarding energy efficiency aspects, use of renewable energy sources, recycling of materials, waste disposal process, and management.
- i. Prepare a comprehensive project report incorporating the points mentioned above.

#### **4. Research Methodology:**

The project will involve the following research methodologies:

1. Study the literature and analyse the findings.
2. Visit the manufacturing unit and
  - a. observe the manufacturing process,
  - b. examine in-process control measures,
  - c. conduct focussed group discussion with quality personnel
  - d. collect the data as mentioned in the scope through a questionnaire.
  - e. Inhouse testing of samples
3. Visit laboratories and make report on
  - a. test equipment required
  - b. test method being used
  - c. testing charges
  - d. testing time required.
4. Visit the identified importers and exporters and collect data as mentioned in the scope through a questionnaire
5. Visit the users of the product and collect data as mentioned in the scope through a questionnaire
6. Analyse the data and test reports from diverse sources and include the same in the project report.

#### **5. Expected Deliverables:**

- a) A detailed analytical report covering all the aspects refereed in the scope.
- b) Questionnaire, discussion, visit reports, test reports to be appended with the final project report.

#### **6. Timeline and Method of Progress Review:**

The duration of the project is 5 months from the date of award of the project. The proposed indicative timeline stage-wise is given below:

Sr No	Stage	Time from date of award of project (cumulative)
1	Literature review and identification of manufacturing base, testing laboratories, user/user industry, and discussion with BIS for the finalization of sampling plan	1 month
2	Visit to manufacturers, testing laboratories, users and importers and exporters and data collection	3 months
3	Preparation and submission of first draft report to BIS	4 months
4	Submission of final project report	5 months

**7. Support BIS will Provide:**

- BIS will provide access to latest editions of standards, required for the project.
- Access to testing facility available at BIS laboratories, if available.