WEBER 360

# Software and Hardware Development Services

## For Compressor Life Cycle Testing Systems

### 1. Introduction

This document outlines the **scope**, **deliverables**, and **approach** of software and hardware development services provided by Weber360 LLC for the creation of a Compressor Life Cycle Testing System. The system is intended to **automate**, **monitor**, **log**, and **analyze** the performance and endurance of compressors under various load, thermal, and operational conditions throughout their life span.

### 2. Objective

The objective of this project is to develop a complete test rig that enables:

- Automated cycling of **compressor operation**.
- Measurement of **performance parameters** (pressure, temperature, current, voltage, vibration, etc.).
- Data **logging** and **reporting**.
- Fault detection and long-duration **reliability testing**.

### 3. Scope of Work

#### 3.1 Hardware Development:

- Test Controller Unit (**Microcontroller** or **Industrial PC-based**)
- Sensor Integration (**Temperature**, **Pressure**, **Vibration**, **Voltage**, **Current**)
- Relay/Contactor Controls for compressor **ON/OFF cycling**
- Cooling Fan/Pump **Control Units**
- Safety Systems (**Emergency Stop**, **Overheat/Overpressure Cutoffs**)
- Data Acquisition **Board**
- Industrial **Enclosure Design**

**3.2 Software Development:**

- Embedded Firmware: Sensor reading, Control logic, Fault detection, Data communication
- PC/Cloud Software: UI for configuration, Real-time monitoring, Data logging/reporting, Alarm/event log
- Connectivity: USB, Ethernet, Wi-Fi, or RS485 Modbus

## 4. Deliverables

Deliverables include:

- System Design Documents (Schematics, PCB, Wiring)
- Embedded Software (Documented firmware)
- PC Application (Installer, Manuals)
- Bill of Materials (BoM)
- Enclosure Design Files (CAD/STL)
- Testing and Validation Report
- Training and Support materials

## 5. Timeline

Estimated Duration:

- Requirement Finalization: 1 Week
- Hardware Design & Fabrication: 3-4 Weeks
- Firmware Development: 3 Weeks
- Software Development: 4 Weeks
- Integration & Testing: 2 Weeks
- Deployment & Handover: 1 Week

**Total:** 10-12 Weeks

## 6. Tools and Technologies

- Microcontrollers: STM32 / ESP32 / PLCs
- Sensors: Industrial-grade (Temp, Pressure, Vibration, Current)
- Software: C/C++, Python, C#, SQLite
- UI: Qt, Electron, Web Dashboards
- Communication: UART, Modbus, MQTT, TCP/IP

## 7. Optional Features

- Cloud Dashboard with **remote access**
- Predictive maintenance with **AI/ML**
- MES/SCADA **Integration**
- Remote Firmware **Update (OTA)**

## 8. Warranty and Support

- 12-month warranty on **system design**
- 6-month **bug-fix software support**
- Optional annual **maintenance contract**

## 9. Costing

A detailed quotation will be provided based on final requirements and selected options.