January 2015.

Products Designs and Technical know-how available with Core Technologies.

The Products and Solutions:

Founded in the year 1988, Core Technologies is an R&D company actively engaged in developing solutions and products in the following areas:

A. Dynamic Weighing Controllers and accessories.

B. Speciality Data Loggers for Pharmaceutical Applications,

C. Sequence of Events Recorders (SER) for power distribution utilities and for Process plant diagnostics.

D. Analog Isolation Modules for use in Process Industry.

E. Automation of Engineering Test Rigs.

F. Projects for Defence and Railways.

G. Servo Valve Characterization System for Aero Space Industry

About Core Technologies

The company is owned, promoted and operated by M.G.Phadnis, the legendary Electronic and Technology Scientist with over 50 years experience in R&D and Teaching at BARC, IIT, Mumbai University and Engineering colleges in Mumbai.

The Mission

At the time of founding Core Technologies, Mr. Phadnis committed himself to the mission of Excellence in Electronics which he pursued with uncompromising devotion through the past two and half decades. Needless to say, that all the products and solutions developed at Core Technologies are original in concepts and designs pioneered by Mr. Phadnis. Some of the design ideas successfully embedded in the products developed at Core Technologies, could easily have been patented, but true to his temperament as a scientist he did not pursue the commercial angle much through his endeavours. However, the uniqueness of concepts, designs, circuit schemes, algorithms and codes implemented by Mr. Phadnis have resulted in product specifications and features well above what is available with the generated technical knowhow and product performances well above the traditional designs.

An innovative approach to R&D

In order to test and evaluate his concepts and designs Mr. Phadnis used his innovative skills to develop a flexible and modular packaging strategy which he called "Universal Controller Modules". In the implementation of this strategy he also developed a proprietary back plane and an 8 bit data and control bus. This approach has facilitated development of different function modules with inter-changeability and upward design mobility. Hence at the current state of development, this strategy has facilitated several diverse applications using a common hardware platform.

The basic theme in this approach has been to prove the R&D, and focus later on converting the designs for adaption to miniaturization and mass production. This stage has now arrived and transition to sleek packaging schemes is a natural next step. This process will also include porting the R&D to latest generation of Micro-Controllers and device technologies. This will require further investments and is easily do-able.

A departure from this strategy has been permitted in respect of development of certain accessories and products requiring power handling (Vibratory Feeder Drivers) and involving extreme environmental conditions (Wind Alarm Control system for Konkan Railway Corporation Limited).

Product Knowhow available for technology transfer:

1. **Analog Isolation Module (AIM-100):** About 125 variants catering to various sensors and I-O specifications of AIM-100 are available. **Status:** Production worthy as it is**. Further Possibilities:** Repackaging in smaller size Core Technologies has developed and fully tested, characterized and specified Analog Isolation modules matching best of the similar products available in the international market. The product specifications are comparable with Data Forth's isolation modules at approximately half the price in low volumes and at a much lower price if the volumes are scaled up. Using the principle of type 2 servo, Mr. Phadnis has developed an altogether different scheme to achieve isolation with signal bandwidth that may be extended to 10 KHz. The technique gives superior noise and linearity specifications. Core Technologies has designs of AIM modules which can transform signals from diverse sensors such as RTD Pt-100, Strain Gauge Bridges, Various Thermocouples, Current loops, mV, Volts etc. Output options available are 4-20 mA, Volts.

2. **Vibratory Feeder Drives:**

These are based on control of firing angle of a SCR (Thyrister) to manipulate feed rate of a vibratory feeders in various material handling applications. Core Technologies entered this area in the course of developing total solution for the control of weighing head of FFS pouch filling machines. In a wider industrial context, this application area requires control of vibratory feeders from small, medium to very large feeders, with power requirement ranging from 10 to 250VA for small feeders up to few tens of KW for large and and few 100's of KW for very large feeders. Core Technologies has developed controllers for small feeders. The technology can be scaled to higher power ratings. The innovative part

of this design renders better linearity and wider firing angle range (from 10 to 90%) and better immunity from EMI /RFI.
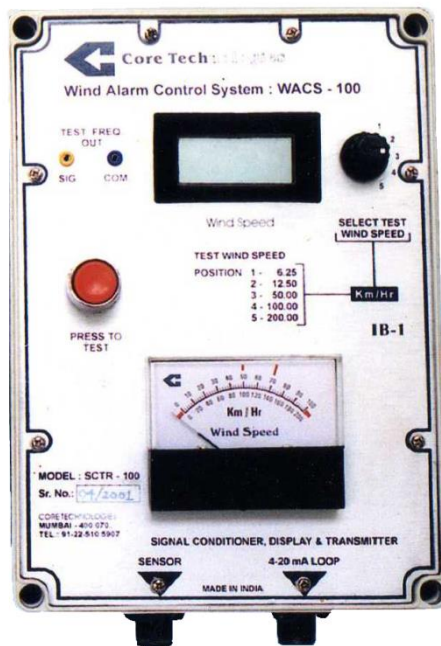
This technical knowhow offers variants as under:

1. Rhythm 100 – with Thumb Wheel Switch digital power setting.*
2. Rhythm 101 – with PWM firing angle pulse derived from Core Technologies' dedicated Weighing and Filing Controller UC-605, 606 and Marathon 5616.*
3. Rhythm 201 – with PWM firing angle information derived from 4-20 mA loop and control from a PLC.*
4. Rhythm 301 – with PWM firing angle pulse derived from a PLC or a PC through an RS485 multi-drop serial port.[@]
5. Rhythm 102 – with Analog 270 degree pot to define power setting. [@]

   Product status: (*) =In production at Core Technologies,
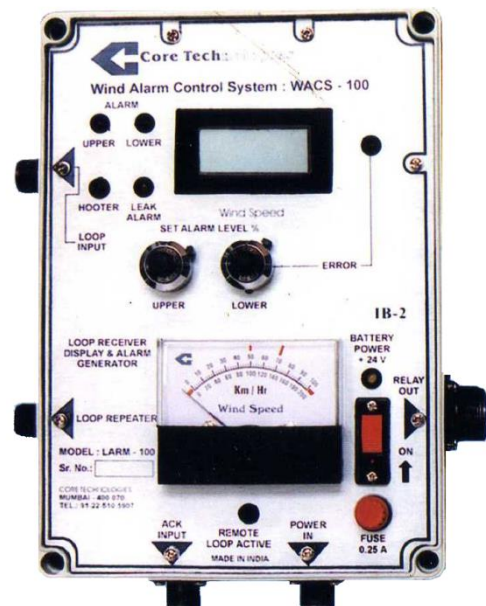
   ([@]) = Proto type developed.

3. **Wind Alarm Control System:**

This product is a rail safety device mandatory for bridges over certain length and height. Whenever alarm condition caused by excessive wind at the bridge occurs, it generates alarm and simultaneously prevents passage of trains by interlocking the Block Relay. This is a two part system operating from 24 Volt battery supply. The Part IB1 is required to be installed on the bridge along with a 3-cup anemometer sensor. IB 1 is a loop powered instrument. IB2 the second part is installed in the control cabin or station masters office. The instruments have 100% redundancy and fail safe features built in the design. The two parts may be separated from each other up to 15 Km and are packaged in ABS plastic enclosure complying with IP66. The product has immense potential for commercialization. Possible bulk users would be Kashmir Railway, N-E Railway. The product may even be used for Tower Cranes, Tall

structures, Long jetties etc.

Product Status: Fully developed mature Product in use by Konkan Railway since the year 2002.

Getting the RDSO approval will open market with other railways may fold.

4. Data Loggers for Pharmaceutical Industry:

We have identified and met special needs of Pharmaceutical Industry, particularly, Clinical Research, formulation manufacturing and warehousing.

The critical, statutory features required of data loggers and report generation software for Pharmaceutical industry are:

A. Tamper resist data acquisition and reporting.

B. Fully traceable Audit trails.

C. Secure and zero data loss long duration operations.

i. Besides these, keeping in mind the requirements of QA and Instrument Engineers in Pharmaceutical industry, Core Technologies has added few more features to make their life simple.

We have identified two distinct requirements:

A. Short duration data logging required in validation of sterilization equipment such as DHS, Autoclave, Tunnels, etc. as well as Stability chambers, incubators etc.

B. Long duration data logging required in Room Mapping of the manufacturing facilities, Ware houses and Deep freezers, refrigerators etc. in CRO.

i. In order to satisfy these requirements, we have developed two different models of data loggers, Pharma-LOG for long duration and Vali-DAQ for short duration applications. Some of the unique features of these models are:
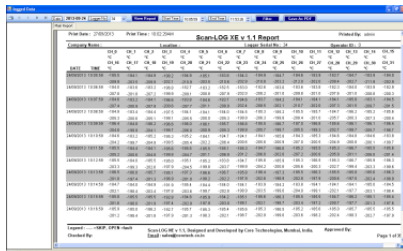
a) The data loggers as a standalone instruments are US FDA Regulation 21 CFR part 11 compliant.

b) The supporting software Vali-DAQ RGS for the Vali-DAQ logger and Scan-LOG RGS for Pharma-LOG logger are independently 21 CF compliant.

c) The data loggers have detachable termination scheme. This feature gives extra long life to the logger as the screw terminations which often get damaged in normal use can be replaced at a lower cost instead repairing the main logger instrument. It also facilitates redeployment of the logger with ease and in short time.

d) Application templates for quick configuration of the data logger from its key board as well as from the supporting
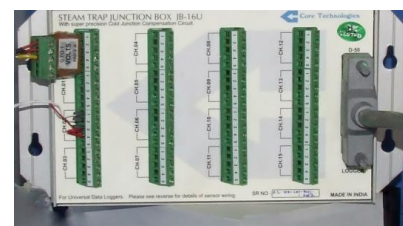
software Vali-DAQ RGS for the Vali-DAQ logger and Scan-LOG RGS for Pharma-LOG.

e)   Both these loggers are truly "Universal" allowing interfacing any channel anywhere without riders.

f)   Modular design helps field servicing.

5.   Dynamic Weighing Products:

Dynamic Weighing refers to estimation of weight of a product in process with controlled movement along the production line. Compared to Static Weighing this technology is highly complex requiring good understanding of process, material handling machinery and physics of weighing of product in motion.

Core Technologies has mastered this technology over the past twenty years experience in designing weighing and bagging machine controls over machine variants manufactured by over half a dozen reputed Indian OEMs of bagging machines.

We manufacture weighing and filling machine controllers as under:

A.   Bulk Bagging Machine controllers for weighing range 25 to 100 Kg.

B.   Bulk Bagging Machine controllers for weighing range 5 to 25 Kg.

C.   Small Pouch filling machines manual or Auto FFS operation in the weighing range of 50 g to 1.0 Kg and 250g to 5.00Kg.

D.   Bulk Bagging Machine controllers for weighing range 50 to 2 MT.(Jumbo bag Packing using Multi Dump scheme.

E.   Bulk Bagging Machine controllers for weighing range 25 to 100 Kg. with Serial interface for PC and Windows based software for Plant Performance Report Generation.

F.   Weighing and Batching Controller for mixing of 6 components.

G.   Check –Weigher controller for various capacities.