

## FORUM MALL, BANGALORE

The Forum, developed and brought to Bangalore by Prestige Group, is one of the largest shopping malls in the country. The mall has everything one wants to buy; from shoes to fitness equipment, from home furnishings to electronic goods, from books to video games, thus providing complete shopping experience to its visitors. With its huge food court, eclectic cuisines, and fast food brands like Transit, KFC, Pizza Hut and Mac Donald's on a platter, it can cater to almost every taste bud in the world! One can shop for numerous Global brands like Westside, Soch, Isis, Mustard, Weekender, Provogue and Benetton and Tommy Hilfiger all below one roof. The Forum houses a multiplex, PVR, with 11 screens with stadium seating, wall-to-wall screens and mind blowing sound. The building management systems, close circuit security, computerized parking management systems, ATM machines, 100% generator backup, centralized air conditioning and line-in-music completes the loop, to offer a world-class 'view of the future' ambience.

The complete Building Automation System of this massive three hundred and fifty thousand square feet edifice features control systems from Trend, helping ensure a comfortable environments to thousands of shoppers who come by and at the same time designed to keep energy consumption as low as possible.



**DETAILS OF FORUM MALL**

- 350,000 Sq.ft. of people spread
- 300,000 Sq.ft. of parking
- Dual Entrance
- Shoppertainment - Ground + 4 Floors
- Parking: Basement, Surface + multi-level parking
- Each parking level has direct access to respective floors.
- Premium Finishes
- Centrally Air-conditioned
- 100% generator backup
- Wide walk ways
- Valet parking
- Visitor comfort zones on each floor
- State of the art vertical transportation
- Uniform visibility
- Staff comfort zones
- Over 800 car parks
- Intelligent Parking System
- Facilities Management System
- Floor to ceiling height of 3.9 m
- Flat slab construction
- Information Kiosks
- Tele-connectivity
- Specific parking for autos and tour buses
- Piped music
- Round the clock security
- Efficient freight handling
- Managed indoor air quality

**PROJECT SUMMARY**

- HVAC Interface
  - Chiller: 4 x 350 Tr
  - PHE & PHE Pumps – 03 Nos
  - Thermal Storage System – 03 Nos
  - Primary Pumps – 05
  - Secondary Pumps – 07 Nos
  - Condenser Pumps – 05 Nos
- Cooling Tower – 05 Nos
- AHU's – 123 Nos & FCU's – 28 Nos
- Ventilation Blowers – 18 Nos
- Third Party System Interface
  - BACnet Integration for Chiller
  - Energy Meter Interface (MODBUS RTU) for tenant billing – 270 Nos
  - BTU Meters for tenant billing – 34 Nos ranging from 300 dia – 50 dia

**RESULTS ACHIEVED**

- Improved operational efficiency of the entire system with energy savings of 8 to 10%
- IKW/TR maintained at 0.82 to 0.85.

**PROJECT DETAILS**

Complete automation of HVAC system, water management, lighting control and emergency evacuation have been realized through Trend's Ethernet based advanced building management controls. The facility has 4 Chillers each 300 TR and 130 AHU's integrated through Trend BMS

The Building Management system has 1500 I/O points where 25 nos. of DDC Controllers are networked and connected to Graphic Central PC Here microcomputer controllers receive signals from field devices and according to their programmed operating parameters, take action to control plant equipment.

Management of data such as trend logs, consumption records and operating set points are held within the controller so that access from any location uses the same base data. In addition, all operating parameters and control strategies can be accessed and changed either locally or remotely allowing design changes during a project-often without hardware alteration-as well as later improvements in performance in line with changing user needs.

Trend Control Systems has successfully deployed the electronic Tenant Billing System through BTU meters and Energy Meters where tenants are billed on:

- actual consumption of power as measured through multi-data meters installed in their respective outgoing feeders
- Power costs for common area and common utilities shared commensurate with respective tenant plinth areas.
- Actual cost of BTUs consumed (in case of BTU metered tenants) or apportioned cost of BTUs (in case of non-BTU monitored tenants)
- Apportioned cost of BTUs in common areas shared commensurate with respective tenant plinth areas.

In the multi-storey car park beneath the shopping centre, there are several Trend controllers controlling eighteen ventilation fans. Part of their function is to monitor the status of fans and bring on additional fans into operation in the event of maintenance of any of the main in-line fans. They also monitor status of generator room, STP room, 16 toilet ventilation fans; status of staircase pressurization and 14 kitchen exhaust fans and provide run time reports for these equipments

Third Party system Integration with Chillers & energy meters are achieved with BMS as per details below

- Energy Meters – JBUS units (Protocol - RS485)
- Chiller Interface – BACnet unit
- Fire Alarm Interface – Esser unit

Monitoring and control of systems such as Thermal Storage and Occupancy Sensing has been achieved through Trend's high end network and efficient protocols

