

Maximum Demand Power Control System Design Status of PEFP

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1. Introduction

The purpose of maximum demand power control system is to not exceed the limit of the maximum demand pre-defined. To limit the maximum demand, non-critical loads are controlled or disconnected when the limit is about to be exceeded. Maximum demand power generally occurs during summer; especially cooling period in each building (from 10 am to 4 pm). At this period, possible electric load should be controlled or disconnected to save electric energy while not affect the main processes.

In this paper, we described maximum demand power control system designed status of PEFP.

2. Maximum Demand Power Control System

Not to exceed the pre-defined maximum electric demand, maximum demand power control system should be installed. To limit maximum electric demand, maximum demand power control system, one way is to disconnect non-critical load which does not affect main processes, such as lights, air conditioners, etc. Another way is to reduce maximum demand by adopting ice storage system for the HVAC system. Fig. 1 described an effect of maximum demand control.

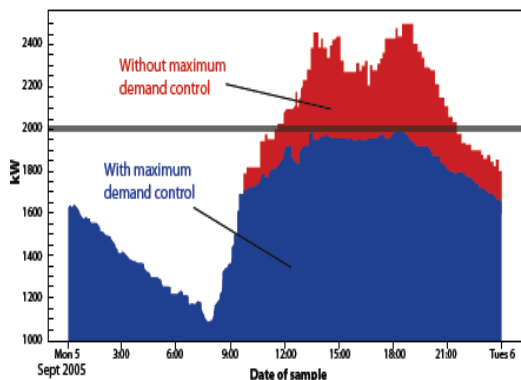


Fig. 1 Maximum Demand Control Example

In general, all machines that do not affect the main production process or that are not essential can be disconnected. Possible loads to be disconnected are ; lights, compressors, air-conditioning systems, pumps, fans and extractors, packaging machines, etc.

Main equipments of maximum demand control system are energy managers and maximum demand equipment during a given time period (usually 15 minutes). Energy manager obtains information from electric units connected to it via communications or

impulse signals. These impulses may come from unit alarms or may come from energy meters, such as water, light, gas meters that supply the installation's energy consumption data. When obtained electric power consumption is higher than set value of the maximum, possible electric load should be controlled or disconnected.

3. Maximum Demand Power Control System for PEFP

3.1 Lighting Control System of PEFP

Main purpose of monitoring system in lighting control system is to observe on/off status of lighting system for effective operation of lighting system. Fig. 2 describes lighting control system of PEFP.

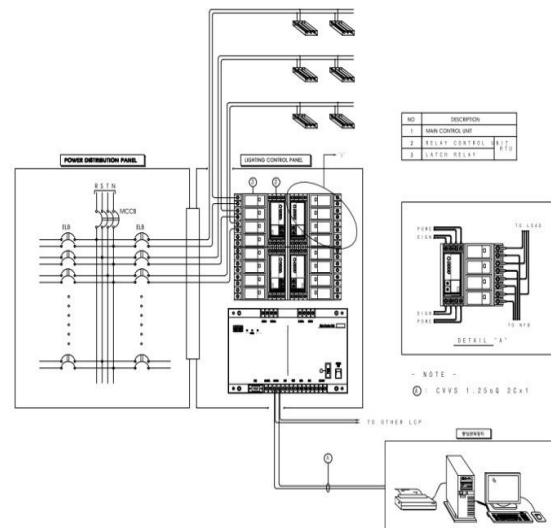


Fig 2. Lighting Control System of PEFP

In PEFP, by control system, parts of lighting circuits for lightings of machine rooms/electrical rooms can be disconnected by lighting system.

3.2 Ice Storage System of PEFP

Chilled water system in PEFP is composed of; chilled water system for accelerator component, for HVAC system including ice storage system. Fig. 3 describes the example of chilled water system of PEFP. As described in Fig. 3, ice storage system is included in chilled water system. Ice storage system is the system of using a chiller to build ice during off-peak hours to serve part of or all on-peak cooling requirement.

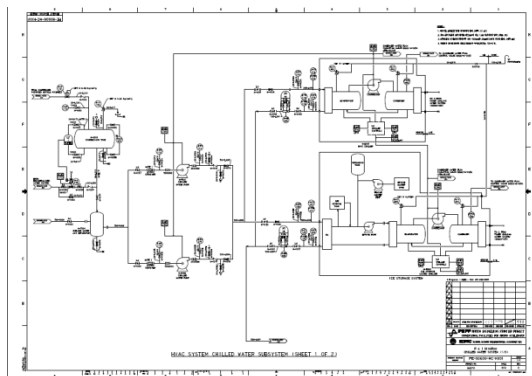


Fig 3. Chilled Water System of PEFP

3.3 Heating and Cooling Load Control of PEFP

Main reasons for considering an electric heater are ; high efficiency, quiet operating system, easy to maintain, space efficient and safe operation. For heating system of PEFP, electric heater and electric water heater system in HVAC are adopted. HVAC system of PEFP, including electric heater, is described in Fig. 4.

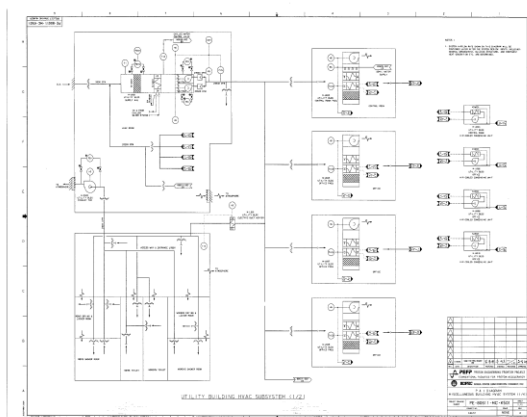


Fig. 4 HVAC system of PEFP (including electric heater)

Also, electric water heater system is installed in Accelerator & Beam Application Building and Utility Building.

3. Conclusions

In this paper, we described maximum demand power control system of PEFP. The purpose of maximum demand power control system is to not exceed the limit of the maximum demand pre-defined. To limit the maximum electric demand, lighting control system, ice storage system and electric heater/electric water heater are adopted.

REFERENCES

[1] "Lighting control System" [JoongAng Control, 2012]