Chapter – 24 Compressor and System Controls

The modern compressor unit is equipped with a control panel as a standard. This control panel is a microprocessor type panel. It might actually a computer with display and keyboard. This type of control panel can provide all the major control and monitoring functions for the compressor or refrigeration system. The major control functions are listed as the following:

(1) To provide automatic control for continuous safe operation of the compressor or the refrigeration system.

(2) To maintain suction pressure or leaving process fluid temperature automatically at a predetermined set point.

(3) To control and adjust automatically the capacity controller such as sliding vane, or internal volume ratio in case of screw compressor, or inlet guide vane if centrifugal compressor, to meet the process load demand at any given time and any partial load operating conditions that are within the design scope.

(4) The control panel shall be able to do self-diagnoses and self-check constantly and continuously against the pre-set safety operation set points of the compressor unit. Also display the status of all the operating conditions at any given time.

(5) The control panel should be able to perform pre-alarm and display on a first out bases. The unit will be still in operation after the pre-alarm until the cutout preset point is reached.

(6) The display monitor of the control panel should be able to display the information of cutout and the safety functions of the compressor or the refrigeration unit. Shut-down records and freezes operating conditions at each time of shut-down are to be on first out bases.

(7) The control panel shall be pre-programmable and for new data entering; it shall be able to be programmed for automatic start-up and shutdown on time schedules. The control panel shall be able to communicate with any major building or facility automation systems.

(8) The control panel shall have other features such as:

Security identification.
Real-time clock to report time, day, date and year.
Motor overload protection.

Emergency stop.
Battery back-up.

The control panel should have display for the individual safety function, pre-alarm and shutdown as shown in Table 24.1 as the following:

Table 24.1 Safety display, pre-alarm and shut-down

	Display	Pre-Alarm	Shut-Down
Low suction pressure	x	x	x
High discharge pressure	x	x	x
High discharge temperature	x	x	x
Low oil pressure	x	x	x
High oil pressure	x	x	x
High oil temperature	x	x	x
Low oil temperature	x	x	x
High oil filter differential	x	x	
Oil heater	x	x	x
High motor current	x	x	x
Freezing temperature	x	x	x
Annunciators	x	x	x

Control panel should be able to include other control functions such as hot gas bypass and liquid injection; oil still and oil return control and even automatic pump-down if so desired.