CELLmatic 1502 Control Unit

Screw Compressor Control Unit.

The CELLmatic 1502 series of computers is a control system.

► Specially for the control, regulation and monitoring of screw compressors to ensure their optimized operation.

►The computer is the key to thoroughly optimized control of the compressor.

►The CELLmatic Software for screw compressors, is based on a wealth of development experience obtained through many years active work with the program.

►In essence, the 3 main functions of the CELLmatic 1502 computer is:

►To ensure optimized economic operation irrespective of the compressor's operating conditions.

►For monitoring, display operating states, give alarms and undertake a controlled shutdown of the compressor in the event of an undesirable operating situation.

►Communication via Profibus FDL Network.

►The CELLmatic 1502 computer system fulfils all these requirements.

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Operating Description:

The computer system can be connected up for MASTER/SLAVE operation
This means that the compressors are started up in sequence depending on the load on the system.
As a result the system will always operate with the number of compressors needed to maintain a given temperature.
CELL computers are adapted to ready programmed software.

The software is matched to the specific compressor, hereby ensuring continuity between the various compressors.
All compressors have a built-in facility for calculating temperatures from a given pressure.

Automatic adjustment of the output in accordance with the suction pressure or brine temperature setting.
2 settings are possible, for example day/night operation.

Similarly there are functions with limits on the intake pressure, condenser temperature and amperage, thereby improving the reliability considerably.

Individual parameters adapted to the particular system while the compressor is operating, it can be set on the CELLmatic computer.

All operating data are recorded and shown on the display in the event of a pre-alarm/ malfunction, so that the user is in control of the compressors at all times.

The CELLmatic 1502 computers can be hard wired connected to operate in a MASTER/SLAVE chain without any additional equipment.

CELL computers guarantee reliable, efficient and economic operation of the compressors. All CELLmatic 1502's are supplied in cabinets which meet the pending/current EC regulations relating to high EMC (electromagnetic compatibility) immunity/radiation.

Where several CELL units are intended to function together the CELL system can be connected to the Profibus FDL network.
This means that communication with external equipment is possible.

On a Simatic PLC the facility exists for reading/amending any parameter, which is defined on the CELLmatic 1502 computer, by means of Profibus FDL.

This results in a flexible operating system in which MASTER/SLAVE, alarm/cut-out and also the analogue signals can be received, processed and stored on an overriding control.

A CELLmatic 1502 Computer is equipped with keyboard and back light 8x40 character LCD display.

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Standard compressor programs:

Compressor With 3 output stages.
The capacity output of the booster compressor is automatically adjusted in 3 stages (50%, 75%, 100%) whilst the volumetric ratio is fixed.

Compressor With fixed Vi.
The output of the compressor with fixed Vi is automatically adjusted between 10 and 100% whilst the volumetric ratio is fixed.

Compressor With 3 Vi stages.
The capacity output of the 3-stage compressor is automatically adjusted between 25% and 100%.
The volumetric ratio can also be adjusted in 3 stages (2.2 - 3.5 - 5.0), i.e. the compressor will select one of the 3 possible volumetric ratios, a ratio which best matches the pressure ratio of the cooling system.
The computer will constantly calculate this and thereby adjust the compressor so that an optimized ratio is maintained.

Compressor With variable Vi
The capacity output of the compressor with variable Vi is adjusted from 10% to 100%.
In addition there is a well-designed regulating system for adjusting the volumetric ratio (Vi) in the range 2.5 - 5.0.
This means that the compressor will at all times adjust itself to the correct Vi ratio for the system pressure ratio.
Since the compressor Vi ratio is variable, this means that unnecessary power consumption due to under compression or over compression is avoided.
By means of this control the optimum efficiency can be maintained over a large pressure range, even when the pressure ratios deviate from the normal operating conditions.
Standard programmes are currently available for compressors from:
GRAM
Howden
Aerzen

We have a great experience in adapting the program to customers' requirements to cater for demands for many types of compressors.
As examples can be mentioned types with frequency converter on the main motor and units driven from diesel motors.

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CELLmatic 1502 Technical Specifications.

Function
Monitoring and control of screw compressors.

Cabinet
The casing is of stainless steel. The colour is grey. The CELLmatic 1502 is housed in a metal cabinet in order to achieve a high level of Electro Magnetic Compatibility.
The cabinet is equipped with screw termination fore al the external wirings.
Dimension: 460x320x170 mm³
Weight: 15 Kg
Sealing: IP63

Ambient temperature range
0° - 55°C

Power supply
220 VAC + 10%, 50/60 Hz
Max. fuse 10A

Operator Interface
Is equipped with a backlight 8 x 40 character LCD and supplied with an 8 function numeric keypad.

Input / Output characteristics

Digital Input
24 DC supply from CELLmatic 1502, 8 times DI.

Digital output
12 TRIAC outputs for solenoid
valves on the compressor. Max. loading 50W 24-220 V AC per channel.
12 Outputs for relays of the voltage free contact type. Max. loading of the contacts: 10A 250V AC, NC, NO

Analog Input
8 x 4-20 mA
6 x Pt100
2 x 0-1700 Ohm.

Analog Output
2 x 4-20 mA

EMC characteristics
The panel is tested to pending EC directives relating to EMC requirements for electronics used in industry.
Radiation in the narrow band, interference i the frequency range 0.15 to 1000 Mhz:
DS 5101 Class P1. VDE 087 1 Limit B.
Immunity of electrical equipment from line transients:
DS 5103 (IEC 804-4).
Immunity of electrical equipment from voltage fluctuations and voltage failure:
DS 5104 Class P1.1.

Immunity of electrical equipment from radiation field in the frequency range:
0.15 to 1000 Mhz DS 106 (IEC 806-3).

Immunity of electrical equipment from electrostatic discharge.

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General signals in a standard program.

Digital outputs - volt free contacts:
Oil pump
Compressor start / stop
Heating element
Common alarm
Common fault
Max. Output
Booster start / stop
Master/Slave signals in hard wired operation
Ready to operate

Solenoid valves:
Capacity
Volume – on compressors with variable Vi
Economiser
Liquid Injection
Cooling
Power kit
Oil solenoid valves

Digital input:
Start compressor when controlled from external
Compressor motor in operation
Master/Slave signals in hard wired operation
Oil level separator
External fault

Analogue output:
Select able operational parameters can be connected.

Analogue and resistance input:
Suction pressure
Discharge pressure
Oil pressure
Motor ampere consumption
Oil filter pressure
Brine temperatures
Suction temperature
Discharge pipe temperature
Oil separator temperature
Oil compressor temperature
Changing of settings from/ to 1 or 2.
Position of volume slide.
Position of capacity slide.

Data bus communication:
With the CELL 566 communications card fitted, can the CELLmatic 1502 be connected to the Profibus FDL data bus.

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