Monitoring System

Controller can be connected with a local or remote supervisory PC, a GSM or traditional modem and the most spread BMS (Modbus, Bacnet, Lonworks). To be used, the listed functions require the installation of optional cards (RS485, RS232, LON) or Gateways (device able to interpret different communication protocols).

Building Management System (BMS)

The connection with the BMS supervisory systems is executed in different ways.
Lonworks: insert the additional card into the "Serial card" port (PCO10LFTTL / PCO10L485L) and connect as prescribed in the instruction sheet. Enable LON function on the LCD terminal
Modbus: insert the RS485 additional card; the card only is required since the program manages this protocol by itself.
Bacnet: insert the RS485 additional card and connect it with gateway code GATEWAYBN0 by Rs485 line.
Owners' BMS: has developed many other Gateways for interfacing with less spread BMS, i.e. OTE.

Hardware Setup

The local connection between controller board and a supervisory PC requires the insertion of the RS485 additional card into the "serial card" port.

Connection between controller boards in a network is carried out using an AWG20/22 shielded cable, twisted pair plus shield. The boards are connected in parallel. Maximum cable length that linkage in one network is 1000 metres.

Pay ATTENTION to the network polarity: Rx/Tx+ on one board must be connected to Rx/Tx+ on the other boards; the same is true for Rx/Tx- and GND.

The master unit of controller need to be connected to the supervisory PC using a RS485-USB converter from the "serial card" port on master controller to PC. (optional)

The existing protocol that provided by the existing controller is Carel or Modbus.

The wiring connection for the BMS is shown on Figure 2.0.

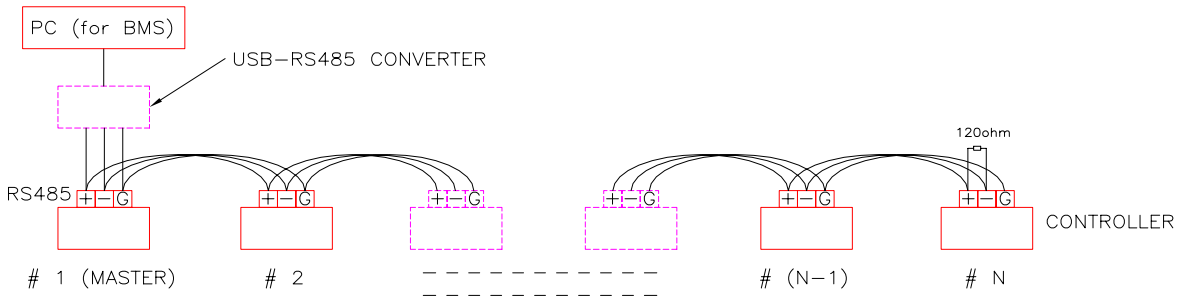

Figure 2.0 : Wiring Connection for the BMS

Software Setup

There are few parameters need to be set at software Level 2, BMS Setup.
The parameters are as below:

i) BMS Enable - set to Yes
ii) Protocol Type - set to Modbus (already built in the standard program)
iii) Baud Rate - set according to the user's system baud rate (1200 / 2400 / 4800 / 9600 / 19200)
iv) Identity - set accordingly

Variable Database

A specific communication database is featured that includes all the more important program variables, from the values read by the probes to the parameters set on the screens. The following table describes the database, divided into digital, integer and analogue variables, indicating for each its description, address and type, that is read only (R) or modifitable from the supervisor (R/W). Also, the equivalent address and type of parameters for Modbus protocol shown in the table.

Modbus protocol has been developed using as reference the following documentation:
GOULD Electronics: PI-MBUS-300 Rev A
Gould Modicon - Gould Inc. Programmable Control Division
Date November 1983

Modbus uses RTU mode.
Communication parameters: 8 data bit, 2 stop bit, no parity, speed from 1200 to 19200 baud rate

DIGITAL VARIABLE → 功能码2

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
1	BMS on off	R/W	1	Coil
2	Compressor 1 status	R	2	Coil
3	Compressor 2 status	R	3	Coil
4	Cooling on	R	4	Coil
5	Dehumidify on	R	5	Coil
6	Digital heating	R	6	Coil
7	Critical alarm	R	7	Coil
8	Heating on	R	8	Coil
9	Heater 1 status	R	9	Coil
10	Heater 2 status	R	10	Coil
11	Humidifier enable	R	11	Coil
12	Alarm high current	R	12	Coil
13	Fan on / Unit on	R	13	Coil
14	Alarm air flow fail	R	14	Coil
15	Alarm filter block	R	15	Coil
16	Alarm high humidity	R	16	Coil
17	Alarm high temperature	R	17	Coil
18	Alarm comp. 1 high pressure	R	18	Coil
19	Alarm comp. 2 high pressure	R	19	Coil
20	Alarm Klixon tripped	R	20	Coil
21	Alarm low humidity	R	21	Coil
22	Alarm low temperature	R	22	Coil
23	Alarm comp. 1 low pressure	R	23	Coil
24	Alarm comp. 2 low pressure	R	24	Coil
25	Alarm unit health check	R	25	Coil

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
26	Alarm pLAN disconnected	R	26	Coil
27	Alarm unit run expired	R	27	Coil
28	Alarm water on floor	R	28	Coil
29	Alarm drip tray full	R	29	Coil
30	Alarm high conductivity	R	30	Coil
31	Alarm low production	R	31	Coil
32	Drain alarm	R	32	Coil
33	Alarm cylinder full	R	33	Coil
34	Warning pre-exhaustion cyl.	R	34	Coil
35	Warning foam presence	R	35	Coil
36	Warning cylinder exhaustion	R	36	Coil
37	Warning high conductivity	R	37	Coil
38	Auxilliary alarm 1	R	38	Coil
39	Auxilliary alarm 2	R	39	Coil
40	Auxilliary alarm 3	R	40	Coil
41	Alarm low current	R	41	Coil
42	Unit 1 present in LAN	R	42	Coil
43	Unit 2 present in LAN	R	43	Coil
44	Unit 3 present in LAN	R	44	Coil
45	Unit 4 present in LAN	R	45	Coil
46	Unit 5 present in LAN	R	46	Coil
47	Unit 6 present in LAN	R	47	Coil
48	Unit 7 present in LAN	R	48	Coil
49	Unit 8 present in LAN	R	49	Coil
50	Alarm water in high temperature	R	50	Coil
51	Alarm lack water	R	51	Coil
52	Reset alarm	R/W	52	Coil
53	Reset sirence	R/W	53	Coil
54	Erase alarm history	R/W	54	Coil
55	Compressor 1 stop by alarm	R	55	Coil
56	Compressor 2 stop by alarm	R	56	Coil
57	3P Valve open	R	57	Coil
58	3P Valve close	R	58	Coil
59	Compressor sequence (LIFO/FIFO)	R/W	59	Coil
60	Disable cylinder warning	R/W	60	Coil
61	Disable drain due to s.p. decrease	R/W	61	Coil
62	Disable drain due to extended inactivity	R/W	62	Coil
63	Enable BMS on off	R/W	63	Coil
64	Compressor 1 enabled	R/W	64	Coil
65	Compressor 2 enabled	R/W	65	Coil

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
66	Enable dehum.	R/W	66	Coil
67	Enable humidity control	R/W	67	Coil
68	Enable remote on off	R/W	68	Coil
69	Enable schedule on off	R/W	69	Coil
70	Stop unit when water on floor alarm	R/W	70	Coil
71	Stop unit when drip tray full	R/W	71	Coil
72	Enable periodic flushing (cylinder)	R/W	72	Coil
73	Cylinder maintenance mandatory	R	73	Coil
74	Cylinder maintenance recommended	R	74	Coil
75	Previous alarm event (webgate)	R/W	75	Coil
76	Next alarm event (webgate)	R/W	76	Coil
77	Last alarm event (webgate)	R/W	77	Coil
78	Alarm high discharge pressure 1	R	78	Coil
79	Alarm high discharge pressure 2	R	79	Coil
80	Warning high discharge pressure 1	R	80	Coil
81	Warning high discharge pressure 2	R	81	Coil
82	Alarm return air temperature sensor failed	R	82	Coil
83	Alarm return air humidity sensor failed	R	83	Coil
84	LED On Off	R	84	Coil
85	Alarm pressure probe 1 failed	R	85	Coil
86	Alarm pressure probe 2 failed	R	86	Coil
87	Dehum interlock with RAT	R/W	87	Coil

ANALOGUE VARIABLE → 功能3

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
1	Dehum. demand	R	1	Register
2	Return air humidity	R	2	Register
3	Return air temperature	R	3	Register
4	Cooling demand	R	4	Register
5	Heating demand	R	5	Register
6	Humidity demand	R	6	Register
7	Cooling dead zone	R/W	7	Register
8	% of cooling to enable dehum.	R/W	8	Register
9	Cooling proportional band	R/W	9	Register
10	Dehum. dead zone	R/W	10	Register
11	Valve opening when dehum.	R/W	11	Register
12	Dehum. proportional band	R/W	12	Register
13	Heating dead zone	R/W	13	Register
14	Heating proportional band	R/W	14	Register
15	Humidity alarm band	R/W	15	Register

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
16	Return air humidity calibration	R/W	16	Register
17	Retrun air temperature calibration	R/W	17	Register
18	Humidity set point	R/W	18	Register
19	Temperature set point	R/W	19	Register
20	Temperature alarm band	R/W	20	Register
21	Water in temperature (^{o}C)	R	21	Register
22	3P Valve Opening (%)	R	22	Register
23	Humidity dead zone	R/W	23	Register
24	Humidity proportional band	R/W	24	Register
25	Steam production (kg/h)	R	25	Register
26	Current (A)	R	26	Register
27	Discharge pressure 1	R	27	Register
28	Discharge pressure 2	R	28	Register
29	Water out temperature (^{o}C)	R	29	Register
30	Differential temperature (^{o}C)	R/W	30	Register

INTEGER VARIABLE

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
1	Day	R	129	Register
2	Day week	R	130	Register
3	Hour	R	131	Register
4	Last history alarm event read	R	132	Register
5	History alarm event	R	133	Register
6	History day	R	134	Register
7	History hour	R	135	Register
8	History minute	R	136	Register
9	History month	R	137	Register
10	History year	R	138	Register
11	Minute	R	139	Register
12	Month	R	140	Register
13	Unit address	R	141	Register
14	Year	R	142	Register
15	Unit status	R	143	Register
16	Analogue output 1 type	R	144	Register
17	Conductivity (uS/cm)	R	145	Register
18	default	R/W	146	Register
19	default	R/W	147	Register
20	default	R/W	148	Register

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
21	default	R/W	149	Register
22	Cooling type	R/W	150	Register
23	Rotation day	R/W	151	Register
24	Delay time off fan (s)	R/W	152	Register
25	Delay time on fan (s)	R/W	153	Register
26	Derivative time (s)	R/W	154	Register
27	Function delay time (s)	R/W	155	Register
28	Heating stage	R/W	156	Register
29	Heating type	R/W	157	Register
30	Rotaion time hour change (time zone)	R/W	158	Register
31	Flushing interval time (hours)	R/W	159	Register
32	Inactivity drain interval time (days)	R/W	160	Register
33	Humidity sensor type	R/W	161	Register
35	Integral time (s)	R/W	163	Register
36	Low pressure run delay time (s)	R/W	164	Register
37	Low pressure start delay time (s)	R/W	165	Register
38	Maximum steam production (%)	R/W	166	Register
39	Minimum off time between comp. (s)	R/W	167	Register
40	Comp. minimum off time (s)	R/W	168	Register
41	Comp. minimum on time (s)	R/W	169	Register
42	Rotation time minute change (time zone)	R/W	170	Register
43	No. of comp.	R/W	171	Register
44	Rotation type	R/W	172	Register
45	Monday off hour (A) (Sch. on off)	R/W	173	Register
46	Monday off minute (A) (Sch. on off)	R/W	174	Register
47	Tuesday off hour (A) (Sch. on off)	R/W	175	Register
48	Tuesday off minute (A) (Sch. on off)	R/W	176	Register
49	Wednesday off hour (A) (Sch. on off)	R/W	177	Register
50	Wednesday off minute (A) (Sch. on off)	R/W	178	Register
51	Thursday off hour (A) (Sch. on off)	R/W	179	Register
52	Thursday off minute (A) (Sch. on off)	R/W	180	Register
53	Friday off hour (A) (Sch. on off)	R/W	181	Register
54	Friday off minute (A) (Sch. on off)	R/W	182	Register
55	Saturday off hour (A) (Sch. on off)	R/W	183	Register
56	Saturday off minute (A) (Sch. on off)	R/W	184	Register
57	Sunday off hour (A) (Sch. on off)	R/W	185	Register
58	Sunday off minute (A) (Sch. on off)	R/W	186	Register
59	Monday on hour (A) (Sch. on off)	R/W	187	Register
60	Monday on minute (A) (Sch. on off)	R/W	188	Register

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
61	Tuesday on hour (A) (Sch. on off)	R/W	189	Register
62	Tuesday on minute (A) (Sch. on off)	R/W	190	Register
63	Wednesday on hour (A) (Sch. on off)	R/W	191	Register
64	Wednesday on minute (A) (Sch. on off)	R/W	192	Register
65	Thursday on hour (A) (Sch. on off)	R/W	193	Register
66	Thursday on minute (A) (Sch. on off)	R/W	194	Register
67	Friday on hour (A) (Sch. on off)	R/W	195	Register
68	Friday on minute (A) (Sch. on off)	R/W	196	Register
69	Saturday on hour (A) (Sch. on off)	R/W	197	Register
70	Saturday on minute (A) (Sch. on off)	R/W	198	Register
71	Sunday on hour (A) (Sch. on off)	R/W	199	Register
72	Sunday on minute (A) (Sch. on off)	R/W	200	Register
73	Rotation hour (automatic rotation)	R/W	201	Register
74	Temperature sensor type	R/W	202	Register
75	Unit 1 rotation configuration	R/W	203	Register
76	Unit 2 rotation configuration	R/W	204	Register
77	Unit 3 rotation configuration	R/W	205	Register
78	Unit 4 rotation configuration	R/W	206	Register
79	Unit 5 rotation configuration	R/W	207	Register
80	Unit 6 rotation configuration	R/W	208	Register
81	Unit 7 rotation configuration	R/W	209	Register
82	Unit 8 rotation configuration	R/W	210	Register
83	No. of stand-by units	R/W	211	Register
84	3P Valve run time	R/W	212	Register
85	Monday off hour (B) (Sch. on off)	R/W	213	Register
86	Monday off minute (B) (Sch. on off)	R/W	214	Register
87	Tuesday off hour (B) (Sch. on off)	R/W	215	Register
88	Tuesday off minute (B) (Sch. on off)	R/W	216	Register
89	Wednesday off hour (B) (Sch. on off)	R/W	217	Register
90	Wednesday off minute (B) (Sch. on off)	R/W	218	Register
91	Thursday off hour (B) (Sch. on off)	R/W	219	Register
92	Thursday off minute (B) (Sch. on off)	R/W	220	Register
93	Friday off hour (B) (Sch. on off)	R/W	221	Register
94	Friday off minute (B) (Sch. on off)	R/W	222	Register
95	Saturday off hour (B) (Sch. on off)	R/W	223	Register
96	Saturday off minute (B) (Sch. on off)	R/W	224	Register
97	Sunday off hour (B) (Sch. on off)	R/W	225	Register
98	Sunday off minute (B) (Sch. on off)	R/W	226	Register
99	Monday on hour (B) (Sch. on off)	R/W	227	Register
100	Monday on minute (B) (Sch. on off)	R/W	228	Register

CITEC			MODBUS	
Address	**Description**	**Type**	**Address**	**Type**
101	Tuesday on hour (B) (Sch. on off)	R/W	229	Register
102	Tuesday on minute (B) (Sch. on off)	R/W	230	Register
103	Wednesday on hour (B) (Sch. on off)	R/W	231	Register
104	Wednesday on minute (B) (Sch. on off)	R/W	232	Register
105	Thursday on hour (B) (Sch. on off)	R/W	233	Register
106	Thursday on minute (B) (Sch. on off)	R/W	234	Register
107	Friday on hour (B) (Sch. on off)	R/W	235	Register
108	Friday on minute (B) (Sch. on off)	R/W	236	Register
109	Saturday on hour (B) (Sch. on off)	R/W	237	Register
110	Saturday on minute (B) (Sch. on off)	R/W	238	Register
111	Sunday on hour (B) (Sch. on off)	R/W	239	Register
112	Sunday on minute (B) (Sch. on off)	R/W	240	Register

NOTE FOR INTEGER VARIABLE

Address	Assigned Integer	Description
5	0	History deleted
	1	Compressor 1 high pressure trip
	2	Compressor 2 high pressure trip
	3	Compressor 1 low pressure trip
	4	Compressor 2 low pressure trip
	5	High temperature
	6	Low temperature
	7	High humidity
	8	Low humidity
	9	Filter blocked
	10	Klixon tripped
	11	Airflow failed
	12	Water on floor
	13	Drip tray full
	14	Auxilliary alarm 1
	15	Auxilliary alarm 2
	16	Auxilliary alarm 3
	17	High conductivity alarm
	18	High conductivity warning
	19	High current
	20	Low current
	21	Lack water
	22	Low production
	23	Drain alarm
	24	Cylinder full
	25	Pre-exhaustion cylinder
	26	Foam presence
	27	Exhaustion cylinder
	28	Cylinder Maint. Mandatory
	29	Cylinder Maint. Recommended
	30	LAN Error
	31	Unit health check
	32	Unit run expired
	33	Water in high temperature
	34	Aalrm high discharge P1
	35	Aalrm high discharge P2
	36	Warning high discharge P1
	37	Warning high discharge P2
	38	Alarm RAT sensor failed
	39	Alarm RAH sensor failed
	40	Pressure probe 1 failed
	41	Pressure probe 2 failed

NOTE FOR INTEGER VARIABLE

Address	Assigned Integer	Description
15	0	Unit On
	1	Off by alarm
	2	Off by supervisory
	3	Off by schedule
	4	Off by remote input
	5	Off by keyboard
	6	Manual procedure
	7	Standby
16	0	Disable
	1	Cooling
	2	Heating
22	1	DX
	2	CW
	3	Combicool
29	0	None
	1	Digital
	2	0-10V
33	0	0-1V
	1	0-10V
	2	4-20mA
44	0	Automatic rotation
	1	Timezones rotation
74	0	NTC
	1	PT1000
75-82	0	Present/Rotation
	1	Present/No Rotation
	2	Absent