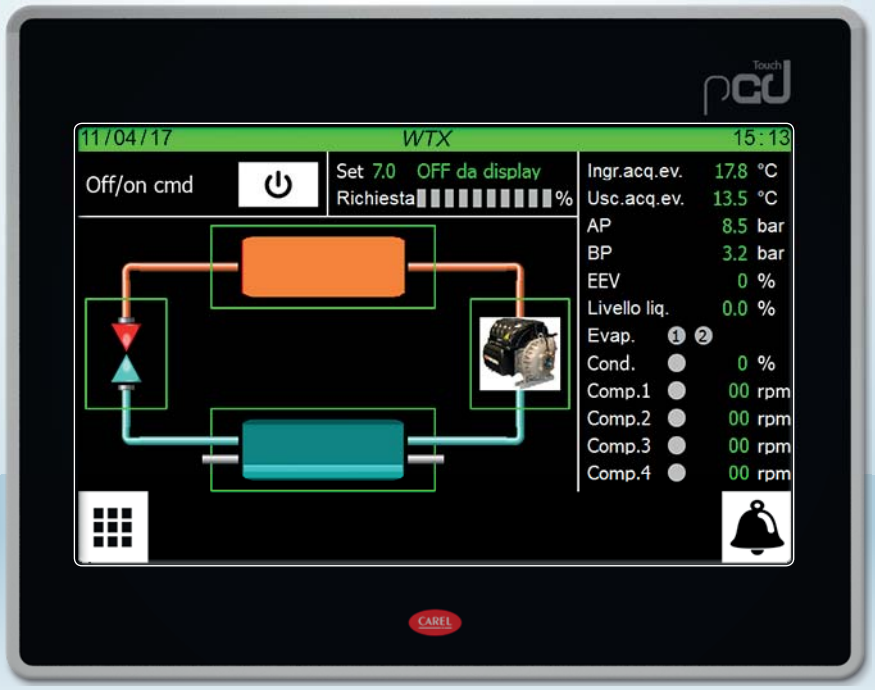
AERMEC



Manuale per creazione BMS - BMS manual

Connessione tramite Internet

ModBus
Compatibile con il protocollo ModBus

Controllo centralizzato

WTX

IT EN

AERMEC
COMPANY QUALITY SYSTEM
ICIM
ISO 9001:2008 - Cert. n° 0128
CISQ IQNet
AERMEC S.P.A.

CE

5009100_00 - 1705

INDICE

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EN **ENGLISH:**

IT

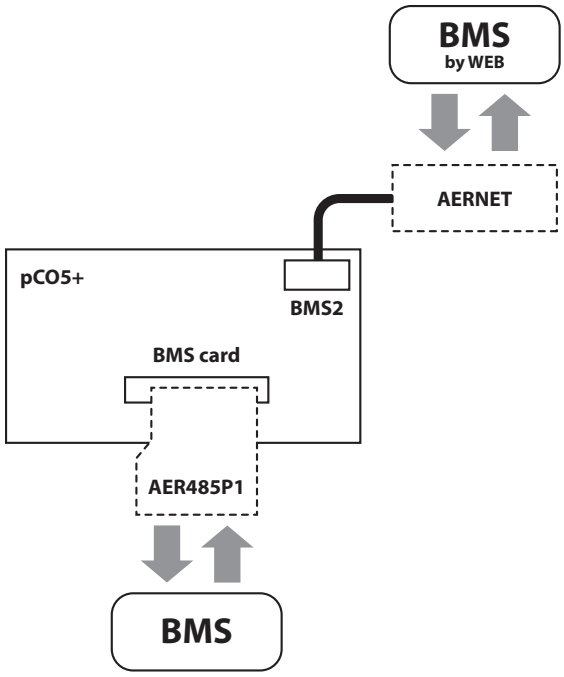
CREAZIONE DI UN SISTEMA BMS

Collegamento Modbus RTU su RS485

La scheda di controllo pCO5+ può comunicare, utilizzando il protocollo Modbus RTU su standard elettrico RS485, con un sistema BMS esterno; per poter realizzare questo collegamento la scheda ha bisogno di accessori specifici:

- **AER485P1:** nel caso in cui si voglia collegare la scheda pCO5+ al sistema BMS tramite collegamento via cavo (per maggiori informazioni sulla tipologia di cavo fare riferimento alla documentazione dell'accessorio AER485P1);
- **AERNET:** nel caso in cui si voglia collegare la scheda pCO5+ al sistema BMS tramite collegamento ethernet (per maggiori informazioni fare riferimento alla documentazione dell'accessorio AERNET);

Il collegamento tra la scheda pCO5+ e i sistemi BMS è riassunto nello schema riportato a fianco;



Variabili di default BMS Card

Modo di comunicazione	**Modbus RTU**
Tipo di comunicazione	**RS485 standard, asincrono, 1 bit di start**
Velocità di comunicazione	**19200 baud**
Stop bit	**2 stop bit**
Parity mode	**Nessuna parità**
Base adress	**Protocol addresses (Base 0)** **Gli indirizzi partono da zero.** **Esempio per lettura del registro = 1:** **01 03 00 01 00 0A 94 0D**

Variabili ANALOGICHE

R = Codice comando Modbus = 3
R/W = Codice comando Modbus = 6

BMS Address	Descrizione	UOM	Min	Max	Read/Write
1	U5 - Uscita acqua evaporatore	°C	-999,9	999,9	R
2	U4 - Ingresso acqua evaporatore	°C	-999,9	999,9	R
3	IGV Compressore 1	%	0.0	110.0	R
4	IGV Compressore 2	%	0.0	110.0	R
5	Temperatura inverter Compressore 1	°C	-999,9	999,9	R
6	Temperatura inverter Compressore 2	°C	-999,9	999,9	R
7	U1 – Alta pressione	bar	-999,9	999,9	R
8	U2 – Bassa Pressione	bar	-999,9	999,9	R
9	Rapporto compressione calcolato come U1/U2	---	0	99,9	R
10	Versione software X.Y (il termine finale .Z indirizzo intero 51)	---	0	99,9	R
12	Temperatura mandata compressore 1	°C	-10	999,9	R
13	Temperatura mandata compressore 2	°C	-10	999,9	R
14	U9 - Temperatura liquido uscita condensatore	°C	0	999,9	R
15	U10 - Temperatura liquido ingresso valvola termostatica	°C	0	999,9	R
16	Temperatura Aspirazione compressore 1	°C	-999,9	999,9	R
17	Temperatura Aspirazione compressore 2	°C	-999,9	999,9	R
18	U3 – Uscita acqua evaporatore comune	°C	-999,9	999,9	R
19	U7 - Ingresso analogico multifunzione	---	0	999,9	R
23	Livello liquido	%	0,0	100,0	R
24	Potenza richiesta Compressore 1 (kW)	KW	0	1000.0	R
25	Potenza richiesta Compressore 2 (kW)	KW	0	1000.0	R
26	Potenza assorbita Compressore 1	KW	0	1000.0	R
27	Potenza assorbita Compressore 2	KW	0	1000.0	R
28	Superheat compressore 1	K	-999,9	999,9	R
29	Superheat compressore 2	K	-999,9	999,9	R
30	U8 WTX - Temperatura uscita acqua condensatore	°C	-999,9	999,9	R
31	IGV Compressore 3	%	0	110.0	R
32	IGV Compressore 4	%	0	110.0	R
33	Temperatura inverter Compressore 3	°C	-999,9	999,9	R
34	Temperatura inverter Compressore 4	°C	-999,9	999,9	R
35	Temperatura mandata compressore 3	°C	-999,9	999,9	R
36	Temperatura mandata compressore 4	°C	-999,9	999,9	R
37	Temperatura Aspirazione compressore 3	°C	-999,9	999,9	R
38	Temperatura Aspirazione compressore 4	°C	-999,9	999,9	R
39	Potenza richiesta Compressore 3 (kW)	KW	0	1000.0	R
40	Potenza richiesta Compressore 4 (kW)	KW	0	1000.0	R
41	Potenza assorbita Compressore 3	KW	0	1000.0	R
42	Potenza assorbita Compressore 4	KW	0	1000.0	R
43	Superheat compressore 3	K	-999,9	999,9	R
44	Superheat compressore 4	K	-999,9	999,9	R
46	U6 WTX - Temperatura ingresso acqua condensatore	°C	-999,9	999,9	R
191	Setpoint attuale ventilatori/pompa condensatore	bar	0	999,9	R
192	Differenziali attuale ventilatori/pompa condensatore	bar	-999,9	999,9	R
193	Setpoint livello liquido (0.0 … 100.0%)	%	0.0	100.0	R/W
197	Differenziale impianto attivo	°C	-999,9	999,9	R
198	Set point impianto attuale	°C	-999,9	999,9	R
202	Differenziale impianto	°C	0	999,9	R/W
204	Set point 1, freddo	°C	-999,9	999,9	R/W

BMS Address	Descrizione	UOM	Min	Max	Read/Write
205	Set point 2, freddo	°C	-999,9	999,9	R/W

Variabili INTERE

R = Codice comando Modbus = 3
R/W = Codice comando Modbus = 6

BMS Address	Carel address	Descrizione	UOM	Min	Max	Read/Write
5002	1	Modo chiller (0=Comfort;1=ECONOMY;2=DA FASCE;)	---	0	2	R/W
5003	2	Stato procedura partenza compressori (USO INTERNO AERMEC)	---	0	9999	R
5004	3	Stato compressore 1 (0=off, 1=lockout state, 2=resetting, 3=ramping up, 4=partially closed, 5=normal state, 6=maxflow, 7=min IGV, 8=interlock open, 9=fault waiting, 10=high temp stop, 11=loading up)	---	0	99	R
5005	4	Stato compressore 2 (0=off, 1=lockout state, 2=resetting, 3=ramping up, 4=partially closed, 5=normal state, 6=maxflow, 7=min IGV, 8=interlock open, 9=fault waiting, 10=high temp stop, 11=loading up)	---	0	99	R
5006	5	Velocita' compressore 1 [0...48000]/10 RPM	rpm	0	9999	R
5007	6	Velocita' compressore 2 [0...48000] /10 RPM	rpm	0	9999	R
5008	7	Contaore pompa 2 impianto, parte alta	migliaia_h	0	999	R
5009	8	Contaore pompa 1 impianto, parte alta	migliaia_h	0	999	R
5010	9	Contaore pompa 1 impianto, parte bassa	h	0	999	R
5011	10	Contaore pompa 2 impianto, parte bassa	h	0	999	R
5012	11	Limite richiesta freddo	%	0	100	R/W
5013	12	Contaore parte alta, comp.1	migliaia_h	0	999	R
5014	13	Contaore parte bassa, comp.1	h	0	999	R
5015	14	Contaore parte alta, comp.2	migliaia_h	0	999	R
5016	15	Contaore parte bassa, comp.2	h	0	999	R
5017	16	Richiesta termostatica	%	0	100	R
5018	17	Limite richiesta termostatica (da ingr. multif. U7 limitazione potenza)	%	0	100	R
5020	19	Limite richiesta Turbocor 1	%	0	100	R
5021	20	Limite richiesta Turbocor 2	%	0	100	R
5025	24	Richiesta totale impianto	%	0	100	R
5026	25	Potenza richiesta Compressore 1 (%)	%	0	100	R
5027	26	Potenza richiesta Compressore 2 (%)	%	0	100	R
5028	27	Velocita' ventilatori/pompa condensatore	%	0	100	R
5029	28	EEV_A, apertura valvola elettronica liquido A (stp)	steps	0	500	R
5030	29	EEV_A, apertura valvola elettronica liquido A (%)	%	0	100	R
5031	30	Potenza attuale compressore 1	%	0	100	R
5032	31	Potenza attuale compressore 2	%	0	100	R
5033	32	Corrente compressore 1	A	0	999	R
5034	33	Corrente compressore 2	A	0	999	R
5035	34	Tensione compressore 1	V	0	999	R
5036	35	Tensione compressore 2	V	0	999	R
5037	36	Velocità minima [0...48000]/10 compressore 1	rpm	0	4800	R
5038	37	Velocità minima [0...48000]/10 compressore 2	rpm	0	4800	R
5039	38	Velocità massima [0...48000]/10 compressore 1	rpm	0	4800	R
5040	39	Velocità massima [0...48000]/10 compressore 2	rpm	0	4800	R
5048	47	Contaore parte alta, comp.3	migliaia_h	0	999	R
5049	48	Contaore parte bassa, comp3	h	0	999	R
5050	49	Contaore parte alta, comp.4	migliaia_h	0	999	R
5051	50	Contaore parte bassa, comp.4	h	0	999	R

BMS Address	Carel address	Descrizione	UOM	Min	Max	Read/Write
5052	51	Versione software Z (parte finale)	--	0	9	R
5071	70	Configuratore – Sigla chiller (0=TBX,1= WTX)	---	0		R
5072	71	Configuratore WTX– Taglia	---	0		R
5073	72	Configuratore WTX – Efficienza	---	0		R
5074	73	Configuratore WTX – Scambiatore	---	0		R
5075	74	Configuratore WTX – Versione	---	0		R
5076	75	Configuratore WTX – Alimentazione	---	0		R
5102	101	Stato compressore 3 (0=off, 1=lockout state, 2=resetting, 3=ramping up, 4=partially closed, 5=normal state, 6=maxflow, 7=min IGV, 8=interlock open, 9=fault waiting, 10=high temp stop, 11=loading up)	---	0	99	R
5103	102	Stato compressore 4 (0=off, 1=lockout state, 2=resetting, 3=ramping up, 4=partially closed, 5=normal state, 6=maxflow, 7=min IGV, 8=interlock open, 9=fault waiting, 10=high temp stop, 11=loading up)	---	0	99	R
5104	103	Velocita' compressore 3 [0...48000]/10 RPM	rpm	0	4800	R
5105	104	Velocita' compressore 4 [0...48000]/10 RPM	rpm	0	4800	R
5106	105	Limite richiesta Turbocor 3	%	0	100	R
5107	106	Limite richiesta Turbocor 4	%	0	100	R
5108	107	Potenza richiesta Compressore 3 (%)	%	0	100	R
5109	108	Potenza richiesta Compressore 4 (%)	%	0	100	R
5110	109	Potenza attuale compressore 3	%	0	100	R
5111	110	Potenza attuale compressore 4	%	0	100	R
5112	111	Corrente compressore 3	A	0	999	R
5113	112	Corrente compressore 4	A	0	999	R
5114	113	Tensione compressore 3	V	0	999	R
5115	114	Tensione compressore 4	V	0	999	R
5116	115	Velocità minima [0...48000]/10 compressore 3	rpm	0	4800	R
5117	116	Velocità minima [0...48000]/10 compressore 4	rpm	0	4800	R
5118	117	Velocità massima [0...48000]/10 compressore 3	rpm	0	4800	R
5119	118	Velocità massima [0...48000]/10 compressore 4	rpm	0	4800	R
5206	205	Stato unità (1=On,2=Alarm,3=Reboot,4=off BMS, 5=off scheduler, 6=off DIN, 7=off touch, 8=non usato, 9=non usato)	---	0	9	R
6240	1239	EEV_B, apertura valvola elettronica liquido B (%)	%	0	100	R
6241	1240	EEV_B, apertura valvola elettronica liquido B (stp)	steps	0	500	R

Variabili DIGITALI

R = Codice comando Modbus = 1
R/W = Codice comando Modbus = 5

Address	Descrizione	Read/Write
1	On/Off Unita'	R
2	Reset allarmi (1= reset)	R/W
4	ID1 ingresso digitale off/on (0=chiuso, 1=aperto)	R
10	On/Off impianto da Superv.	R/W
13	Allarme compressore 1	R
14	Allarme compressore 2	R
30	NO1 - Pompa 1 evaporatore	R
31	NO14 - Pompa 2 evaporatore	R
32	NO2 - Resistenza antigelo	R
33	NO4 - Consenso valvola EEV	R
34	NO5 - Consenso economizzatore	R
35	NO7 - I/BLOCCO 1 - Consenso turbocor 1	R
36	Compressore 1 ON	R
37	Compressore 2 ON	R
38	NO12 - I/BLOCCO 2 - Consenso turbocor 2	R
42	NO3 – Ventilatore/pompa condensatore	R
43	Solenoide inverter turbocor 1	R
44	Solenoide inverter turbocor 2	R
45	Solenoide motore turbocor 1	R
46	Solenoide motore turbocor 2	R
49	NO13 - I/BLOCCO 3 - Consenso turbocor 3	R
50	NO15 - I/BLOCCO 4 - Consenso turbocor 4	R
51	Compressore 3 ON	R
52	Compressore 4 ON	R
53	Solenoide inverter turbocor 3	R
54	Solenoide inverter turbocor 4	R
55	Solenoide motore turbocor 3	R
56	Solenoide motore turbocor 4	R
78	AL108 - Turbocor2 SCR phase	R
79	AL109 - Turbocor2 Offline	R
80	AL110 - Turbocor2 Startup failed	R
81	AL111 - EVD Offline	R
82	AL112 - EVD Errore Sonda S1	R
83	AL113 - EVD Errore Sonda S2	R
84	AL114 - EVD Errore motore EEV	R
85	AL115 - EVD Eeprom error	R
86	AL116 - Basso Livello Liquido	R
87	AL117 - Alto Livello Liquido	R
88	AL118 - Modbus master sconnesso (comunicazione con Turbocor)	R
89	AL119 - Termico compressore 2	R
90	AL120 - EEV, Batteria scarica	R
93	AL123 - Fuga Gas (ID16 Open)	R
100	Somma di tutti gli allarmi	R
101	AL001 - Da ingresso digitale	R
102	AL002 - Monitore di tensione o fase	R
103	AL003 - Antigelo Evaporatore	R
104	AL004 - Termica compressore 1	R
105	AL005 - Flussostato impianto	R
106	AL006 - Da ingresso digitale, EEV	R

Address	Descrizione	Read/Write
107	AL007 - Alta Pressione pressostato	R
108	AL008 - Alta Pressione trasduttore	R
109	AL009 - Bassa Pressione pressostato	R
110	AL010 - Bassa Pressione trasduttore	R
111	AL011 - Bassa pressione grave	R
112	AL012 - Termica ventilatore/pompa condensatore	R
113	AL013 - Termica pompa 1 impianto	R
114	AL014 - Termica pompa 2 impianto	R
115	AL015 - Manutenzione pompa 1 impianto	R
116	AL016 - Manutenzione pompa 2 impianto	R
117	AL017 - Manutenzione Compressore 1	R
118	AL018 - Manutenzione Compressore 2	R
119	AL019 - Sonda U1 guasta o scollegata	R
120	AL020 - Sonda U2 guasta o scollegata	R
121	AL021 - Sonda U3 guasta o scollegata	R
122	AL022 - Sonda U4 guasta o scollegata	R
123	AL023 - Sonda U5 guasta o scollegata	R
124	AL024 - Sonda U6 guasta o scollegata	R
125	AL025 - Sonda U7 guasta o scollegata	R
126	AL026 - Sonda U8 guasta o scollegata	R
127	AL027 - Sonda U9 guasta o scollegata	R
128	AL028 - Sonda U10 guasta o scollegata	R
129	AL029 - Turbocor1 Alta Temperatura Gas premente	R
130	AL030 – Turbocor2 Alta Temperatura Gas premente	R
131	AL031 - Turbocor1 Inverter temp.	R
132	AL032 - Turbocor1 Discharge temp	R
133	AL033 - Turbocor1 Suction press.	R
134	AL034 - Turbocor1 Discharge press.	R
135	AL035 - Turbocor1 Rotor Lock	R
136	AL036 - Turbocor1 Phase current	R
137	AL037 - Turbocor1 Cavity temp.	R
138	AL038 - Turbocor1 overcurrent	R
139	AL039 - Turbocor1 Compressor ratio	R
140	AL040 - Turbocor1 DC Low Voltage	R
141	AL041 - Turbocor1 SCR temp.	R
142	AL042 - Turbocor1 System Locked out	R
143	AL043 - Turbocor1 Calibration failed	R
144	AL044 - Turbocor1 Startup failed	R
145	AL045 - Turbocor1 Axial displacement	R
146	AL046 - Turbocor1 Axial static load	R
147	AL047 - Turbocor1 Front radial disp X	R
148	AL048 - Turbocor1 Front radial disp Y	R
149	AL049 - Turbocor1 Front radial load X	R
150	AL050 - Turbocor1 Front radial load Y	R
151	AL051 - Turbocor1 Back radial disp X	R
152	AL052 - Turbocor1 Back radial disp Y	R
153	AL053 - Turbocor1 Back radial load X	R
154	AL054 - Turbocor1 Back radial load Y	R
155	AL055 - Turbocor1 Single phase Overcurrent	R
156	AL056 - Turbocor1 DC High voltage	R
157	AL057 - Turbocor1 High current	R
158	AL058 - Turbocor1 Sensors error	R

Address	Descrizione	Read/Write
159	AL059 - Turbocor1 IGBT error	R
160	AL060 - Turbocor1 High winding temp.	R
161	AL061 - Turbocor1 Bearing error	R
162	AL062 - Turbocor1 Superheat	R
163	AL063 - Turbocor1 Inverter error signal	R
164	AL064 - Turbocor1 AVC data missing	R
165	AL065 - Turbocor1 Motor Back EMF low	R
166	AL066 - Turbocor1 EEprom error	R
167	AL067 - Turbocor1 Generator mode	R
168	AL068 - Turbocor1 SCR phase	R
169	AL069 - Turbocor1 Offline	R
170	AL070 - Turbocor1 Startup failed	R
171	AL071 - Turbocor2 Inverter temp.	R
172	AL072 - Turbocor2 Discharge temp.	R
173	AL073 - Turbocor2 Suction press.	R
174	AL074 - Turbocor2 Discharge press.	R
175	AL075 - Turbocor2 Rotor Lock	R
176	AL076 - Turbocor2 Phase current	R
177	AL077 - Turbocor2 Cavity temp.	R
178	AL078 - Turbocor2 overcurrent	R
179	AL079 - Turbocor2 Compressor ratio	R
180	AL080 - Turbocor2 DC Low Voltage	R
181	AL081 - Turbocor2 SCR temp.	R
182	AL082 - Turbocor2 System Locked out	R
183	AL083 - Turbocor2 Calibration failed	R
184	AL084 - Turbocor2 Startup failed	R
185	AL085 - Turbocor2 Axial displacement	R
186	AL086 - Turbocor2 Axial static load	R
187	AL087 - Turbocor2 Front radial disp X	R
188	AL088 - Turbocor2 Front radial disp Y	R
189	AL089 - Turbocor2 Front radial load X	R
190	AL090 - Turbocor2 Front radial load Y	R
191	AL091 - Turbocor2 Back radial disp X	R
192	AL092 - Turbocor2 Back radial disp Y	R
193	AL093 - Turbocor2 Back radial load X	R
194	AL094 - Turbocor2 Back radial load Y	R
195	AL095 - Turbocor2 Single phase Overcurrent	R
196	AL096 - Turbocor2 DC High Voltage	R
197	AL097 - Turbocor2 High current	R
198	AL098 - Turbocor2 Sensors error	R
199	AL099 - Turbocor2 IGBT error	R
200	AL100 - Turbocor2 High winding temp	R
201	AL101 - Turbocor2 Bearing error	R
202	AL102 - Turbocor2 Superheat	R
203	AL103 - Turbocor2 Inverter error signal	R
204	AL104 - Turbocor2 AVC data missing	R
205	AL105 - Turbocor2 Motor Back EMF low	R
206	AL106 - Turbocor2 EEprom error	R
207	AL107 - Turbocor2 Generator mode	R
225	AL125 - Manutenzione Compressore 3	R
226	AL126 - Manutenzione Compressore 4	R
227	AL127 – Reset parametri… Riavviare scheda!	R

Address	Descrizione	Read/Write
228	AL128 – Turbocor3 Alta Temperatura Gas premente	R
229	AL129 – Turbocor4 Alta Temperatura Gas premente	R
230	Allarme compressore 3	R
231	Allarme compressore 4	R
232	AL130 - Termica compressore 3	R
233	AL131 - Termica compressore 4	R
251	AL151 - Turbocor3 Inverter temp.	R
252	AL152 - Turbocor3 Discharge temp.	R
253	AL153 - Turbocor3 Suction press.	R
254	AL154 - Turbocor3 Discharge press.	R
255	AL155 - Turbocor3 Rotor Lock	R
256	AL156 - Turbocor3 Phase current	R
257	AL157 - Turbocor3 Cavity temp.	R
258	AL158 - Turbocor3 overcurrent	R
259	AL159 - Turbocor3 Compressor ratio	R
260	AL160 - Turbocor3 DC Low Voltage	R
261	AL161 - Turbocor3 SCR temp.	R
262	AL162 - Turbocor3 System Locked out	R
263	AL163 - Turbocor3 Calibration failed	R
264	AL164 - Turbocor3 Startup failed	R
265	AL165 - Turbocor3 Axial displacement	R
266	AL166 - Turbocor3 Axial static load	R
267	AL167 - Turbocor3 Front radial disp X	R
268	AL168 - Turbocor3 Front radial disp Y	R
269	AL169 - Turbocor3 Front radial load X	R
270	AL170 - Turbocor3 Front radial load Y	R
271	AL171 - Turbocor3 Back radial disp X	R
272	AL172 - Turbocor3 Back radial disp Y	R
273	AL173 - Turbocor3 Back radial load X	R
274	AL174 - Turbocor3 Back radial load Y	R
275	AL175 - Turbocor3 Single phase Overcurrent	R
276	AL176 - Turbocor3 DC High Voltage	R
277	AL177 - Turbocor3 High current	R
278	AL178 - Turbocor3 Sensors error	R
279	AL179 - Turbocor3 IGBT error	R
280	AL180 - Turbocor3 High winding temp	R
281	AL181 - Turbocor3 Bearing error	R
282	AL182 - Turbocor3 Superheat	R
283	AL183 - Turbocor3 Inverter error signal	R
284	AL184 - Turbocor3 24Vdc fault	R
285	AL185 - Turbocor3 Motor Back EMF low	R
286	AL186 - Turbocor3 EEprom error	R
287	AL187 - Turbocor3 Generator mode	R
288	AL188 - Turbocor3 SCR phase	R
289	AL189 - Turbocor3 Offline	R
290	AL190 - Turbocor3 Startup failed	R
291	AL191 - Turbocor4 Inverter temp.	R
292	AL192 - Turbocor4 Discharge temp.	R
293	AL193 - Turbocor4 Suction press.	R
294	AL194 - Turbocor4 Discharge press.	R
295	AL195 - Turbocor4 Rotor Lock	R
296	AL196 - Turbocor4 Phase current	R

Address	Descrizione	Read/Write
297	AL197 - Turbocor4 Cavity temp.	R
298	AL198 - Turbocor4 overcurrent	R
299	AL199 - Turbocor4 Compressor ratio	R
300	AL200 - Turbocor4 DC Low Voltage	R
301	AL201 - Turbocor4 SCR temp.	R
302	AL202 - Turbocor4 System Locked out	R
303	AL203 - Turbocor4 Calibration failed	R
304	AL204 - Turbocor4 Startup failed	R
305	AL205 - Turbocor4 Axial displacement	R
306	AL206 - Turbocor4 Axial static load	R
307	AL207 - Turbocor4 Front radial disp X	R
308	AL208 - Turbocor4 Front radial disp Y	R
309	AL209 - Turbocor4 Front radial load X	R
310	AL210 - Turbocor4 Front radial load Y	R
311	AL211 - Turbocor4 Back radial disp X	R
312	AL212 - Turbocor4 Back radial disp Y	R
313	AL213 - Turbocor4 Back radial load X	R
314	AL214 - Turbocor4 Back radial load Y	R
315	AL215 - Turbocor4 Single phase Overcurrent	R
316	AL216 - Turbocor4 DC High Voltage	R
317	AL217 - Turbocor4 High current	R
318	AL218 - Turbocor4 Sensors error	R
319	AL219 - Turbocor4 IGBT error	R
320	AL220 - Turbocor4 High winding temp	R
321	AL221 - Turbocor4 Bearing error	R
322	AL222 - Turbocor4 Superheat	R
323	AL223 - Turbocor4 Inverter error signal	R
324	AL224 - Turbocor4 24Vdc fault	R
325	AL225 - Turbocor4 Motor Back EMF low	R
326	AL226 - Turbocor4 EEprom error	R
327	AL227 - Turbocor4 Generator mode	R
328	AL228 - Turbocor4 SCR phase	R
329	AL229 - Turbocor4 Offline	R
330	AL230 - Turbocor4 Startup failed	R

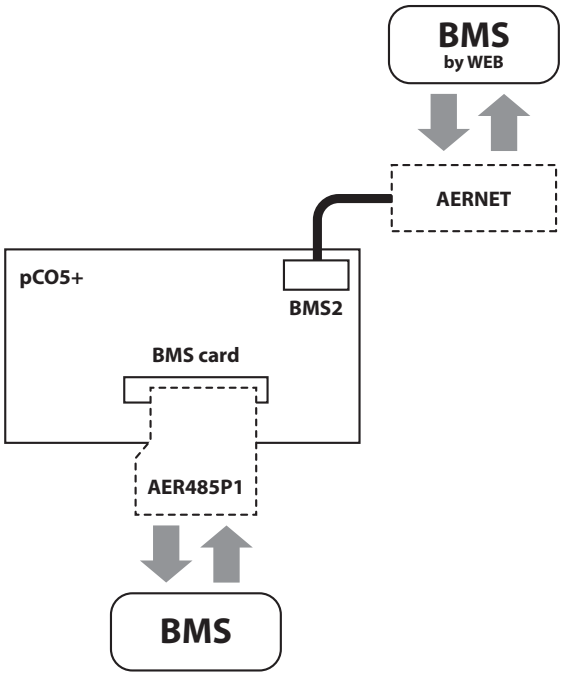
CREATING A BMS SYSTEM

Modbus RTU connection to RS485

The pCO5 + control card can communicate, using the RS485 RS485 Modbus RTU protocol, with an external BMS system; In order to make this connection the card needs specific accessories:

- **AER485P1:** If you want to connect the pCO5 + card to the BMS system by cable connection (refer to the AER485P1 accessory documentation for more information on the cable type);
- **AERNET:** If you want to connect the pCO5 + card to the BMS system via an ethernet connection (for more information, refer to the AERNET accessory documentation);

The connection between the pCO5 + card and the BMS systems is summarized in the diagram below;



Default BMS Card Variables

Communication mode	**Modbus RTU**
Communication type	**RS485 standard, asynchronous, 1 bit start**
Communication speed	**19200 baud**
Stop bit	**2 stop bit**
Parity mode	**No parity**
Base adress	**Protocol addresses (Base 0)** **The addresses start from zero.** **Example for reading the log = 1:** **01 03 00 01 00 0A 94 0D**

ANALOGUE VARIABLES

R = Modbus command code = 3
R / W = Modbus command code = 6

BMS Address	Description	UOM	Min	Max	Read/Write
1	U5 - Evaporator water outlet	°C	-999,9	999,9	R
2	U4 - Evaporator water inlet	°C	-999,9	999,9	R
3	IGV Compressor 1	%	0.0	110.0	R
4	IGV Compressor 2	%	0.0	110.0	R
5	Compressor inverter temperature 1	°C	-999,9	999,9	R
6	Compressor inverter temperature 2	°C	-999,9	999,9	R
7	U1 - High pressure	bar	-999,9	999,9	R
8	U2 - Low Pressure	bar	-999,9	999,9	R
9	Compression ratio calculated as U1 / U2	---	0	99,9	R
10	Software version X.Y (the final term .Z full address 51)	---	0	99,9	R
12	Compressor delivery temperature 1	°C	-10	999,9	R
13	Compressor delivery temperature 2	°C	-10	999,9	R
14	U9 - Condenser outlet liquid temperature	°C	0	999,9	R
15	U10 - Liquid thermostatic valve input temperature	°C	0	999,9	R
16	Compressor suction temperature 1	°C	-999,9	999,9	R
17	Compressor suction temperature 2	°C	-999,9	999,9	R
18	U3 - Common evaporator water outlet	°C	-999,9	999,9	R
19	U7 - Analog multifunction input	---	0	999,9	R
23	Liquid level	%	0,0	100,0	R
24	Required power Compressor 1 (kW)	KW	0	1000.0	R
25	Required power Compressor 2 (kW)	KW	0	1000.0	R
26	Power Consumption Compressor 1	KW	0	1000.0	R
27	Power Consumption Compressor 2	KW	0	1000.0	R
28	Superheat Compressor 1	K	-999,9	999,9	R
29	Superheat compressor 2	K	-999,9	999,9	R
30	U8 WTX - Condenser water outlet temperature	°C	-999,9	999,9	R
31	IGV Compressor 3	%	0	110.0	R
32	IGV Compressor 4	%	0	110.0	R
33	Compressor inverter temperature 3	°C	-999,9	999,9	R
34	Compressor inverter temperature 4	°C	-999,9	999,9	R
35	Compressor delivery temperature 3	°C	-999,9	999,9	R
36	Compressor delivery temperature 4	°C	-999,9	999,9	R
37	Compressor suction temperature 3	°C	-999,9	999,9	R
38	Compressor suction temperature 4	°C	-999,9	999,9	R
39	Required power Compressor 3 (kW)	KW	0	1000.0	R
40	Required power Compressor 4 (kW)	KW	0	1000.0	R
41	Absorbed Power Compressor 3	KW	0	1000.0	R
42	Power Consumption Compressor 4	KW	0	1000.0	R
43	Superheat compressor 3	K	-999,9	999,9	R
44	Superheat compressor 4	K	-999,9	999,9	R
46	U6 WTX - Condenser Water Inlet Temperature	°C	-999,9	999,9	R
191	Current setpoint fan / condenser pump	bar	0	999,9	R
192	Current Differentials fans / condenser pump	bar	-999,9	999,9	R
193	Liquid level setpoint (0.0 ... 100.0%)	%	0.0	100.0	R/W
197	Active plant differential	°C	-999,9	999,9	R
198	Current plant set point	°C	-999,9	999,9	R
202	Differential plant	°C	0	999,9	R/W
204	Set point 1, cold	°C	-999,9	999,9	R/W

BMS Address	Description	UOM	Min	Max	Read/Write
205	Set point 2, cold	°C	-999,9	999,9	R/W

INTEGER VARIABLES

R = Modbus command code = 3
R / W = Modbus command code = 6

BMS Address	Carel address	Description	UOM	Min	Max	Read/Write
5002	1	Chiller Mode (0 = Comfort; 1 = ECONOMY; 2 = FROM BUTTON;)	---	0	2	R/W
5003	2	Compressor start procedure status (INTERNAL USE AERMEC)	---	0	9999	R
5004	3	Compressor state 1 (0 = off, 1 = lockout state, 2 = resetting, 3 = ramping up, 4 = partially closed, 5 = normal state, 6 = maxflow, 7 = min IGV, 8 = interlock open, 9 = fault waiting , 10 = high temp stop, 11 = loading up)	---	0	99	R
5005	4	Compressor status 2 (0 = off, 1 = lockout state, 2 = resetting, 3 = ramping up, 4 = partially closed, 5 = normal state, 6 = maxflow, 7 = min IGV, 8 = interlock open, 9 = fault waiting , 10 = high temp stop, 11 = loading up)	---	0	99	R
5006	5	Compressor Speed 1 [0 ... 48000] / 10 RPM	rpm	0	9999	R
5007	6	Compressor speed 2 [0 ... 48000] / 10 RPM	rpm	0	9999	R
5008	7	Pump pump 2 plant, top part	migliaia_h	0	999	R
5009	8	Pump counter 1 plant, top part	migliaia_h	0	999	R
5010	9	Pump pump 1 plant, lower part	h	0	999	R
5011	10	Pump pump 2 plant, lower part	h	0	999	R
5012	11	Cold demand limit	%	0	100	R/W
5013	12	Upper part counters, comp.1	migliaia_h	0	999	R
5014	13	Lower part counters, comp.1	h	0	999	R
5015	14	Upper part counters, comp.2	migliaia_h	0	999	R
5016	15	Lower part counters, comp.2	h	0	999	R
5017	16	Thermostatic request	%	0	100	R
5018	17	Thermostatic demand limit (from multiplier U7 power limitation)	%	0	100	R
5020	19	Required Limit Turbocor 1	%	0	100	R
5021	20	Required Limit Turbocor 2	%	0	100	R
5025	24	Total plant request	%	0	100	R
5026	25	Required power Compressor 1 (%)	%	0	100	R
5027	26	Required Power Compressor 2 (%)	%	0	100	R
5028	27	Speed fans / condenser pump	%	0	100	R
5029	28	EEV_A, liquid electronic valve opening A (stp)	steps	0	500	R
5030	29	EEV_A, liquid electronic valve opening A (%)	%	0	100	R
5031	30	Current Compressor Power 1	%	0	100	R
5032	31	Current compressor power 2	%	0	100	R
5033	32	Compressor Current 1	A	0	999	R
5034	33	Compressor Current 2	A	0	999	R
5035	34	Compressor Voltage 1	V	0	999	R
5036	35	Compressor Voltage 2	V	0	999	R
5037	36	Minimum speed [0 ... 48000] / 10 compressor 1	rpm	0	4800	R
5038	37	Minimum speed [0 ... 48000] / 10 compressor 2	rpm	0	4800	R
5039	38	Maximum speed [0 ... 48000] / 10 compressor 1	rpm	0	4800	R
5040	39	Maximum speed [0 ... 48000] / 10 compressor 2	rpm	0	4800	R
5048	47	Upper part counters, comp.3	migliaia_h	0	999	R
5049	48	Lower compute, comp3	h	0	999	R
5050	49	Upper part counters, comp.4	migliaia_h	0	999	R
5051	50	Lower compass, comp.4	h	0	999	R

BMS Address	Carel address	Description	UOM	Min	Max	Read/Write
5052	51	Software version Z (final part)	--	0	9	R
5071	70	Configurator - Chiller Signal (0 = TBX, 1 = WTX)	---	0		R
5072	71	WTX-Size Configurator	---	0		R
5073	72	WTX Configurator - Efficiency	---	0		R
5074	73	WTX Configurator - Exchanger	---	0		R
5075	74	WTX Configurator - Version	---	0		R
5076	75	WTX Configurator - Power	---	0		R
5102	101	Compressor state 3 (0 = off, 1 = lockout state, 2 = resetting, 3 = ramping up, 4 = partially closed, 5 = normal state, 6 = maxflow, 7 = min IGV, 8 = interlock open, 9 = fault waiting , 10 = high temp stop, 11 = loading up)	---	0	99	R
5103	102	Compressor state 4 (0 = off, 1 = lockout state, 2 = resetting, 3 = ramping up, 4 = partially closed, 5 = normal state, 6 = maxflow, 7 = min IGV, 8 = interlock open, 9 = fault waiting , 10 = high temp stop, 11 = loading up)	---	0	99	R
5104	103	Compressor speed 3 [0 ... 48000] / 10 RPM	rpm	0	4800	R
5105	104	Compressor speed 4 [0 ... 48000] / 10 RPM	rpm	0	4800	R
5106	105	Required Limit Turbocor 3	%	0	100	R
5107	106	Required Limit Turbocor 4	%	0	100	R
5108	107	Required power Compressor 3 (%)	%	0	100	R
5109	108	Required power Compressor 4 (%)	%	0	100	R
5110	109	Current compressor power 3	%	0	100	R
5111	110	Current compressor power 4	%	0	100	R
5112	111	Compressor Current 3	A	0	999	R
5113	112	Compressor Current 4	A	0	999	R
5114	113	Compressor Voltage 3	V	0	999	R
5115	114	Compressor Voltage 4	V	0	999	R
5116	115	Minimum speed [0 ... 48000] / 10 compressor 3	rpm	0	4800	R
5117	116	Minimum speed [0 ... 48000] / 10 compressor 4	rpm	0	4800	R
5118	117	Maximum speed [0 ... 48000] / 10 compressor 3	rpm	0	4800	R
5119	118	Maximum speed [0 ... 48000] / 10 compressor 4	rpm	0	4800	R
5206	205	Units Status (1 = On, 2 = Alarm, 3 = Reboot, 4 = Off BMS, 5 = Off Scheduler, 6 = Off DIN, 7 = Off Touch, 8 = Not Used, 9 =	---	0	9	R
6240	1239	EEV_B, liquid electronic valve opening B (%)	%	0	100	R
6241	1240	EEV_B, liquid electronic valve opening B (stp)	steps	0	500	R

DIGITAL VARIABLES

R = Modbus command code = 1
R / W = Modbus command code = 5

Address	Description	Read/Write
1	On / Off Units'	R
2	Reset alarms (1 = reset)	R/W
4	ID1 digital input off / on (0 = closed, 1 = open)	R
10	On / Off plant by Superv.	R/W
13	Compressor Alarm 1	R
14	Compressor Alarm 2	R
30	NO1 - Pump 1 evaporator	R
31	NO14 - Pump 2 evaporator	R
32	NO2 - Antifreeze resistance	R
33	NO4 - EEV valve suction	R
34	NO5 - Conservation Consent	R
35	NO7 - I / LOCK 1 - Turbocharger Consent 1	R
36	Compressor 1 ON	R
37	Compressor 2 ON	R
38	NO12 - I / BLOCK 2 - Turbocharger Consent 2	R
42	NO3 - Fan / condenser pump	R
43	Turbocharger Solenoid Inverter 1	R
44	Turbocharger solenoid 2	R
45	Solenoid turbocharger engine 1	R
46	Solenoid turbocharger 2	R
49	NO13 - I / BLOCK 3 - Turbocharger Consent 3	R
50	NO15 - I / BLOCK 4 - Turbocharger Consent 4	R
51	Compressor 3 ON	R
52	Compressor 4 ON	R
53	Turbocharger Solenoid Inverter 3	R
54	Turbocharger solenoid inverter 4	R
55	Solenoid turbocharger 3	R
56	Turbocharged solenoid engine 4	R
78	AL108 - Turbocor2 SCR phase	R
79	AL109 - Turbocor2 Offline	R
80	AL110 - Turbocor2 Startup failed	R
81	AL111 - EVD Offline	R
82	AL112 - EVD Probe S1 error	R
83	AL113 - EVD Probe S2 Error	R
84	AL114 - EVD Engine Error EEV	R
85	AL115 - EVD Eeprom error	R
86	AL116 - Low Liquid Level	R
87	AL117 - High Liquid Level	R
88	AL118 - Disconnected Modbus master (communication with Turbocor)	R
89	AL119 - Thermal compressor 2	R
90	AL120 - EEV, Battery Low	R
93	AL123 - Fuga Gas (ID16 Open)	R
100	Sum of all alarms	R
101	AL001 - Digital input	R
102	AL002 - Voltage or phase monitor	R
103	AL003 - Evaporator Antifreeze	R
104	AL004 - Compressor Thermal 1	R
105	AL005 - Plant Flow Switch	R
106	AL006 - Digital input, EEV	R

Address	Description	Read/Write
107	AL007 - Pressure High Pressure	R
108	AL008 - High Pressure Transducer	R
109	AL009 - Low Pressure Pressure Switch	R
110	AL010 - Low Pressure Transducer	R
111	AL011 - Low pressure	R
112	AL012 - Fan heat / condenser pump	R
113	AL013 - Heat pump 1 plant	R
114	AL014 - Heat pump 2 plant	R
115	AL015 - Maintenance of pump 1 plant	R
116	AL016 - Maintenance of pump 2 plant	R
117	AL017 - Compressor Maintenance 1	R
118	AL018 - Compressor Maintenance 2	R
119	AL019 - Probe U1 faulty or disconnected	R
120	AL020 - Probe U2 faulty or disconnected	R
121	AL021 - Probe U3 faulty or disconnected	R
122	AL022 - Probe U4 faulty or disconnected	R
123	AL023 - Probe U5 faulty or disconnected	R
124	AL024 - Probe U6 faulty or disconnected	R
125	AL025 - Probe U7 faulty or disconnected	R
126	AL026 - Probe U8 faulty or disconnected	R
127	AL027 - Probe U9 faulty or disconnected	R
128	AL028 - Probe U10 faulty or disconnected	R
129	AL029 - Turbocor1 High Temperature Gas Pressed	R
130	AL030 - Turbocor2 High Pressure Gas Temperature	R
131	AL031 - Turbocor1 Inverter temp.	R
132	AL032 - Turbocor1 Discharge temp	R
133	AL033 - Turbocor1 Suction press.	R
134	AL034 - Turbocor1 Discharge press.	R
135	AL035 - Turbocor1 Rotor Lock	R
136	AL036 - Turbocor1 Phase current	R
137	AL037 - Turbocor1 Cavity temp.	R
138	AL038 - Turbocor1 overcurrent	R
139	AL039 - Turbocor1 Compressor ratio	R
140	AL040 - Turbocor1 DC Low Voltage	R
141	AL041 - Turbocor1 SCR temp.	R
142	AL042 - Turbocor1 System Locked out	R
143	AL043 - Turbocor1 Calibration failed	R
144	AL044 - Turbocor1 Startup failed	R
145	AL045 - Turbocor1 Axial displacement	R
146	AL046 - Turbocor1 Axial static load	R
147	AL047 - Turbocor1 Front radial disp X	R
148	AL048 - Turbocor1 Front radial disp Y	R
149	AL049 - Turbocor1 Front radial load X	R
150	AL050 - Turbocor1 Front radial load Y	R
151	AL051 - Turbocor1 Back radial disp X	R
152	AL052 - Turbocor1 Back radial disp Y	R
153	AL053 - Turbocor1 Back radial load X	R
154	AL054 - Turbocor1 Back radial load Y	R
155	AL055 - Turbocor1 Single phase Overcurrent	R
156	AL056 - Turbocor1 DC High voltage	R
157	AL057 - Turbocor1 High current	R
158	AL058 - Turbocor1 Sensors error	R

Address	Description	Read/Write
159	AL059 - Turbocor1 IGBT error	R
160	AL060 - Turbocor1 High winding temp.	R
161	AL061 - Turbocor1 Bearing error	R
162	AL062 - Turbocor1 Superheat	R
163	AL063 - Turbocor1 Inverter error signal	R
164	AL064 - Turbocor1 AVC data missing	R
165	AL065 - Turbocor1 Motor Back EMF low	R
166	AL066 - Turbocor1 EEprom error	R
167	AL067 - Turbocor1 Generator mode	R
168	AL068 - Turbocor1 SCR phase	R
169	AL069 - Turbocor1 Offline	R
170	AL070 - Turbocor1 Startup failed	R
171	AL071 - Turbocor2 Inverter temp.	R
172	AL072 - Turbocor2 Discharge temp.	R
173	AL073 - Turbocor2 Suction Press.	R
174	AL074 - Turbocor2 Discharge press.	R
175	AL075 - Turbocor2 Rotor Lock	R
176	AL076 - Turbocor2 Phase current	R
177	AL077 - Turbocor2 Cavity temp.	R
178	AL078 - Turbocor2 overcurrent	R
179	AL079 - Turbocor2 Compressor ratio	R
180	AL080 - Turbocor2 DC Low Voltage	R
181	AL081 - Turbocor2 SCR temp.	R
182	AL082 - Turbocor2 System Locked out	R
183	AL083 - Turbocor2 Calibration failed	R
184	AL084 - Turbocor2 Startup failed	R
185	AL085 - Turbocor2 Axial displacement	R
186	AL086 - Turbocor2 Axial static load	R
187	AL087 - Turbocor2 Front radial disp X	R
188	AL088 - Turbocor2 Front radial disp Y	R
189	AL089 - Turbocor2 Front radial load X	R
190	AL090 - Turbocor2 Front radial load Y	R
191	AL091 - Turbocor2 Back radial disp X	R
192	AL092 - Turbocor2 Back radial disp Y	R
193	AL093 - Turbocor2 Back radial load X	R
194	AL094 - Turbocor2 Back radial load Y	R
195	AL095 - Turbocor2 Single phase Overcurrent	R
196	AL096 - Turbocor2 DC High Voltage	R
197	AL097 - Turbocor2 High current	R
198	AL098 - Turbocor2 Sensors error	R
199	AL099 - Turbocor2 IGBT error	R
200	AL100 - Turbocor2 High winding temp	R
201	AL101 - Turbocor2 Bearing error	R
202	AL102 - Turbocor2 Superheat	R
203	AL103 - Turbocor2 Inverter error signal	R
204	AL104 - Turbocor2 AVC data missing	R
205	AL105 - Turbocor2 Motor Back EMF low	R
206	AL106 - Turbocor2 EEprom error	R
207	AL107 - Turbocor2 Generator mode	R
225	AL125 - Compressor Maintenance 3	R
226	AL126 - Compressor Maintenance 4	R
227	AL127 - Reset Parameters ... Reboot Card!	R

Address	Description	Read/Write
228	AL128 - Turbocor3 High Temperature Gas Pressed	R
229	AL129 - Turbocor4 High Temperature Gas Pressed	R
230	Compressor Alarm 3	R
231	Compressor Alarm 4	R
232	AL130 - Compressor Thermal 3	R
233	AL131 - Compressor Thermal 4	R
251	AL151 - Turbocor3 Inverter temp.	R
252	AL152 - Turbocor3 Discharge temp.	R
253	AL153 - Turbocor3 Suction Press.	R
254	AL154 - Turbocor3 Discharge press.	R
255	AL155 - Turbocor3 Rotor Lock	R
256	AL156 - Turbocor3 Phase current	R
257	AL157 - Turbocor3 Cavity temp.	R
258	AL158 - Turbocor3 overcurrent	R
259	AL159 - Turbocor3 Compressor ratio	R
260	AL160 - Turbocor3 DC Low Voltage	R
261	AL161 - Turbocor3 SCR temp.	R
262	AL162 - Turbocor3 System Locked out	R
263	AL163 - Turbocor3 Calibration failed	R
264	AL164 - Turbocor3 Startup failed	R
265	AL165 - Turbocor3 Axial displacement	R
266	AL166 - Turbocor3 Axial static load	R
267	AL167 - Turbocor3 Front radial disp X	R
268	AL168 - Turbocor3 Front radial disp Y	R
269	AL169 - Turbocor3 Front radial load X	R
270	AL170 - Turbocor3 Front radial load Y	R
271	AL171 - Turbocor3 Back radial disp X	R
272	AL172 - Turbocor3 Back radial disp Y	R
273	AL173 - Turbocor3 Back radial load X	R
274	AL174 - Turbocor3 Back radial load Y	R
275	AL175 - Turbocor3 Single phase Overcurrent	R
276	AL176 - Turbocor3 DC High Voltage	R
277	AL177 - Turbocor3 High current	R
278	AL178 - Turbocor3 Sensors error	R
279	AL179 - Turbocor3 IGBT error	R
280	AL180 - Turbocor3 High winding temp	R
281	AL181 - Turbocor3 Bearing error	R
282	AL182 - Turbocor3 Superheat	R
283	AL183 - Turbocor3 Inverter error signal	R
284	AL184 - Turbocor3 24Vdc fault	R
285	AL185 - Turbocor3 Motor Back EMF low	R
286	AL186 - Turbocor3 EEprom error	R
287	AL187 - Turbocor3 Generator mode	R
288	AL188 - Turbocor3 SCR phase	R
289	AL189 - Turbocor3 Offline	R
290	AL190 - Turbocor3 Startup failed	R
291	AL191 - Turbocor4 Inverter temp.	R
292	AL192 - Turbocor4 Discharge temp.	R
293	AL193 - Turbocor4 Suction Press.	R
294	AL194 - Turbocor4 Discharge press.	R
295	AL195 - Turbocor4 Rotor Lock	R
296	AL196 - Turbocor4 Phase current	R

Address	Description	Read/Write
297	AL197 - Turbocor4 Cavity temp.	R
298	AL198 - Turbocor4 overcurrent	R
299	AL199 - Turbocor4 Compressor ratio	R
300	AL200 - Turbocor4 DC Low Voltage	R
301	AL201 - Turbocor4 SCR temp.	R
302	AL202 - Turbocor4 System Locked out	R
303	AL203 - Turbocor4 Calibration failed	R
304	AL204 - Turbocor4 Startup failed	R
305	AL205 - Turbocor4 Axial displacement	R
306	AL206 - Turbocor4 Axial static load	R
307	AL207 - Turbocor4 Front radial disp X	R
308	AL208 - Turbocor4 Front radial disp Y	R
309	AL209 - Turbocor4 Front radial load X	R
310	AL210 - Turbocor4 Front radial load Y	R
311	AL211 - Turbocor4 Back radial disp X	R
312	AL212 - Turbocor4 Back radial disp Y	R
313	AL213 - Turbocor4 Back radial load X	R
314	AL214 - Turbocor4 Back radial load Y	R
315	AL215 - Turbocor4 Single phase Overcurrent	R
316	AL216 - Turbocor4 DC High Voltage	R
317	AL217 - Turbocor4 High current	R
318	AL218 - Turbocor4 Sensors error	R
319	AL219 - Turbocor4 IGBT error	R
320	AL220 - Turbocor4 High winding temp	R
321	AL221 - Turbocor4 Bearing error	R
322	AL222 - Turbocor4 Superheat	R
323	AL223 - Turbocor4 Inverter error signal	R
324	AL224 - Turbocor4 24Vdc fault	R
325	AL225 - Turbocor4 Motor Back EMF low	R
326	AL226 - Turbocor4 EEprom error	R
327	AL227 - Turbocor4 Generator mode	R
328	AL228 - Turbocor4 SCR phase	R
329	AL229 - Turbocor4 Offline	R
330	AL230 - Turbocor4 Startup failed	R

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