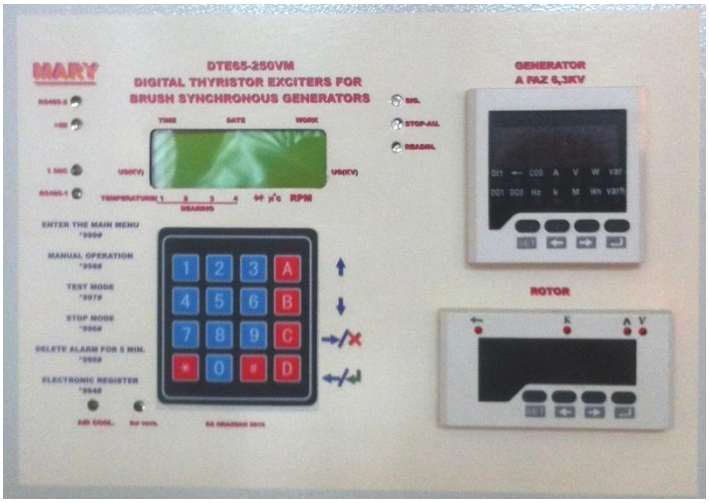
2016

DTE65-260VM



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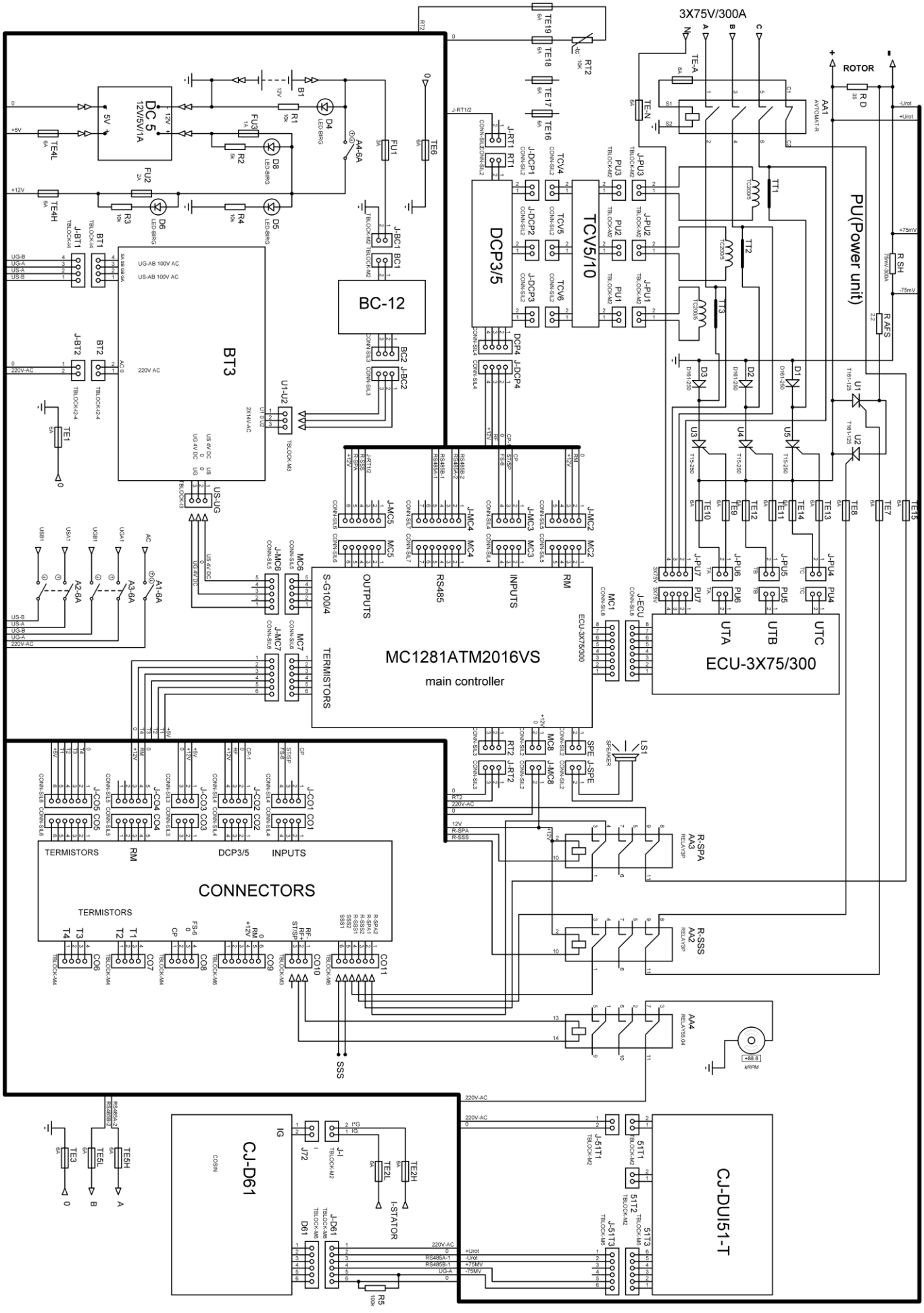
DTE65-260 Functional block diagram



Main electrical parameters

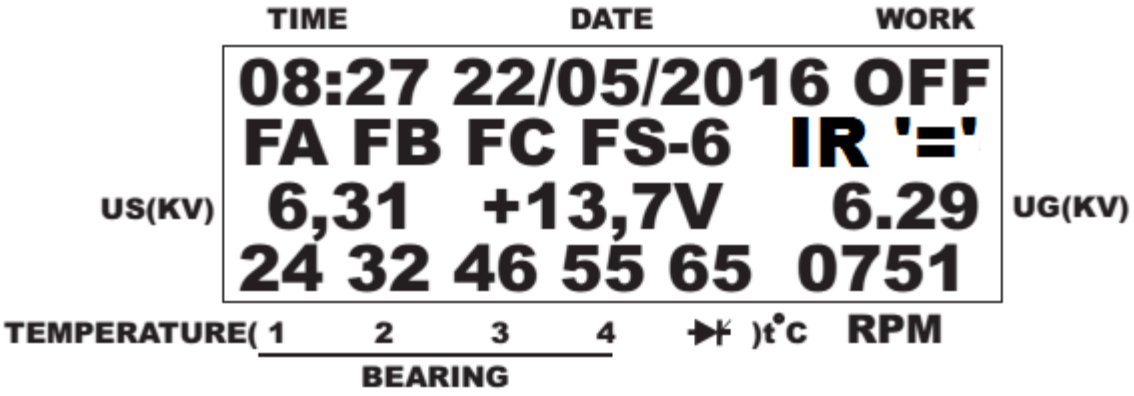
Main power supply voltage	-	AC(3 phase) 3x75v/50Hz
Main power phase current	-	>= 300A
Hardware supply voltage	-	AC 220v/50Hz
Hardware max power	-	20W
Rotor supply voltage	-	Nom. 60v, Max. 75v
Rotor supply current	-	Nom. 260A, Max. 300A
Internal battery	-	12v/1A
Input voltage (UGA1-UGB1)	-	100v (corresponding 6KV Gen.)
Input voltage (USA1-USB1)	-	100v (corresponding 6KV Sys.)

Functionality

- Turbine speed meter, warning and alarm signal
- Bearing and thyristors temperature meter, warning and alarm signal
- System voltage meter, warning and alarm signal
- Generator voltage meter, warning and alarm signal
- Generator frequency meter, warning and alarm signal
- Cosf meter, warning signal
- U/F value warning signal
- Battery voltage meter, warning signal
- External RS485 port with ModBus RTU

Getting Started

For started put ON switches A1,A2,A3,A4. Display is turned on and system enters in operating mode. The records ‘AA1-OFF’ and ‘FS-6’ in display will blink. If there is no alarm, out ON switch AA1. After this in display, instead record ‘AA1-OFF’ will be ‘FA FB FC’. If blink ‘FA’, ‘FB’ or ‘FC’, so these phase voltage is missing.



This system have 3 working mode

1. Auto (main)
2. Test (tracking)
3. Manual

Modes 2 and 3 are used to check the operation of the generator.

For work in mode 2 or 3, will need enter appropriate code (see tab. 1), open the water flow to rotate the turbine. When rotate value will equal setting ‘Rotor start RPM’ or ‘Rotor track RPM ‘value, system will enter appropriate mode (Tracking or Menual), You can see working mode in display ‘WORK’ section and tab. 2.

In ‘Test’ mode system will work setting ‘Tracking Time’ period and then will automated go ‘OFF’ mode.

In ‘Manual’ mode system will work until we will enter code for manual ‘OFF’ (see tab. 1).

Tab 1

Code for enter	Operation
*994#	Enter electronic register
*995#	Delete alarm for 5 minutes
*996#	STOP, ‘OFF’ mode
*997#	Enter ‘Test’ mode
*998#	Enter ‘Manual’ mode
*999#	Enter the main menu

Tab 2

In display	working mode
OFF	System is off
GUP	Generator U(Voltage) up
UGS	U(Voltage) Generator Stabilization
QsN	Qs (reactive power) is Negative
PsL	Ps (Active power) is Low
UFS	U(Voltage) cosF Stabilization
TRK	Test (Tracking) mode
MNU	Manual mode

For working in ‘Auto’ mode, don’t need enter any code. In ‘OFF’ mode open the water flow to rotate the turbine. When rotate value will equal setting ‘Rotor start RPM’ value, system automatic will enter in first step ‘Auto’ mode – ‘GUP’. In this step, the current of Rotor gradually rises for your nominal value within 15-20 seconds. Then it enter in second step – ‘UGS’. In this step generator voltage value will equal (stabilized) with electrical network voltage value and will wait in this mode until synchronization in finished. When synchronization in finished, stops blinking record ‘FS-6” in display. It means, that generator is connected to the electrical network. System entered in active and reactive power values stabilization mode, until generator output active power will be more minimal threshold power (‘QsN’,’PsL’). When active power is more then setting minimal threshold power, system enter in your main mode, Cosf value stabilization ‘UFS’.

For manual stopped system will need enter OFF code (see tab.1)

In case of alarm, system is stopped automatically. When system is going to stop, in first deactivated Rotor current then activated rotor electric field automatic absorber.

Data for starting, stopping, alarms registered in the electronic journal.

Before alarms, system give warning record in display. Warnings not registered in electronic journal. In alarms and warnings system give different signal in buzzer. All alarms and warnings are numbered (see tab. 3).

Tab 3

Alarms		Signal, on/off sec	Warnings		Signal, on/off sec
Code	Description		Code	Description	
01	Rotor_I > I_Max Alarm	0.5/0.5	40	Rotor_I > I_Max Warning	0.5/3
02	Rotor_I < I_Min Alarm	0.5/0.5	41	Rotor_I < I_Min Warning	0.5/3
03	Stator_I > I_Max Alarm	0.5/0.5	42	Rotor_U > U_Max Warning	0.5/3
04	System_U > U_Max Alarm	0.5/0.5	43	Rotor_U < U_Min Warning	0.5/3
05	System_U < U_Min Alarm	0.5/0.5	44	Stator_I > I_Max Warning	0.5/2
06	Gen._U > U_Max Alarm	0.5/0.5	45	Gen._F > F_Max Warning	0.5/2
07	Gen._U < U_Min Alarm	0.5/0.5	46	Gen._F < F_Min Warning	0.5/2
08	Gen._F > F_Max Alarm	0.5/0.5	47	Rotor_RPM > RPM_Max Warning	0.5/3
09	Gen._F < F_Min Alarm	0.5/0.5	48	Rotor_RPM < RPM_Min Warning	0.5/3
10	Rotor_RPM > RPM_Max Alarm	0.5/0.5	49	Cosf < Cosf_Min Warning	0.5/3
11	Rotor_RPM < RPM_Min Alarm	0.5/0.5	50	U/F value > U/F_Max Warning	0.5/3
12	Thiristor T > T_Max Alarm	0.5/0.5	51	U/F value < U/F_Min Warning	0.5/3
13	Bearing_1 T > T_Max Alarm	0.5/0.5	52	Ubatt < 11.0v	0.5/5
14	Bearing_2 T > T_Max Alarm	0.5/0.5	53	Thiristor T > T_Max Warning	0.5/5
15	Bearing_3 T > T_Max Alarm	0.5/0.5	54	Bearing_1 T > T_Max Warning	0.5/5
16	Bearing_4 T > T_Max Alarm	0.5/0.5	55	Bearing_2 T > T_Max Warning	0.5/5
17	Thiristor ICP is set	0.5/0.5	56	Bearing_3 T > T_Max Warning	0.5/5
18	Phase FA missing	0.5/0.5	57	Bearing_4 T > T_Max Warning	0.5/5
19	Phase FB missing	0.5/0.5			
20	Phase FC missing	0.5/0.5			
21	Phase FS_6 missing	0.5/0.5			
22	CDJ61 Rs485 error	0.5/0.5			
23	Sensor T1 is missing	0.5/0.5			
24	Sensor T2 is missing	0.5/0.5			
25	Sensor T3 is missing	0.5/0.5			
26	Sensor T4 is missing	0.5/0.5			
27	Sensor T th. is missing	0.5/0.5			

Working with menu

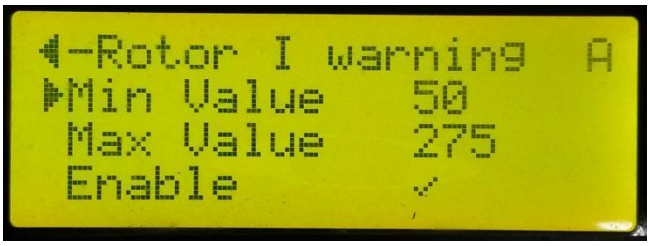
For enter in main menu will need enter code *999#. Then you can list menu with buttons ‘A,’B’. To enter in submenu will need enter button ‘C’. In submenu go up, down with buttons ‘A,’B’ and for enter new value press ‘C’. The cursor will blink. Enter new value and press ‘D’. If value valid for this item blink cursor is stopped. If value is invalid entered number is cleaned and will need enter new value. Valid value for each item can see in Tab 4.

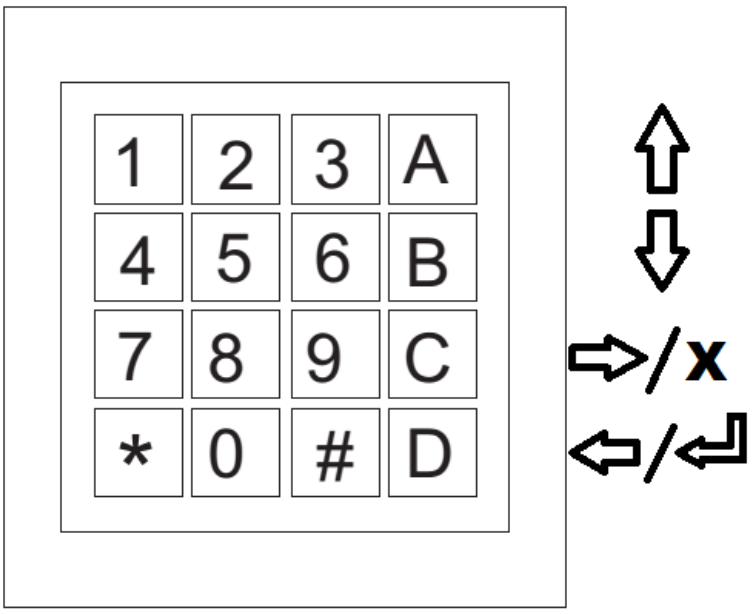
Main screen

for enter code

Main menu

Submenu





Press ‘D’ for exit from submenu to main menu or from main menu to main screen.

Valid values in menu Tab 4

N	Parameter	Min. Value range		Max. Value range		Nominal Value	
		lower value	upper value	lower value	upper value	lower value	upper value
01	Rotor start RPM	-	-	-	-	500	1100
02	Rotor track RPM	-	-	-	-	500	1100
03	Tracking U	-	-	-	-	0.5	7.5
04	Tracking Time	-	-	-	-	10	999
05	Cos stabil.	-	-	-	-	0.5	0.99
06	Gen. Power	-	-	-	-	250	2500
07	Power thresholt	-	-	-	-	9	15
08	Rotor I warning	30	150	265	280	-	-
09	Rotor I alarm	25	140	280	300	-	-
10	Rotor U warning	10	30	65	90	-	-
11	Stator I warning	-	-	230	280	-	-
12	Stator I alarm	-	-	240	300	-	-
13	System U alarm	5,5	5,7	7,0	7,5	-	-
14	Gen. U alarm	5,5	5,7	7,0	7,5	-	-
15	Gen. F warning	47	49	52	53	-	-
16	Gen. F alarm	46	48	53	55	-	-
17	Rotor RPM warning	735	740	770	800	-	-
18	Rotor RPM alarm	720	735	800	825	-	-
19	Thyr. T warning	-	-	55	75	-	-
20	Thyr. T alarm	-	-	65	95	-	-
21	Bearing T warn.	-	-	55	75	-	-
22	Bearing T alarm	-	-	65	95	-	-
23	Cosf warning	0.7	0.9	-	-	-	-
24	U/F warning	100	120	120	140	-	-
25	Set cooling T	30	60	Min_Val	80	-	-

External RS485 / ModBus RTU protocol

External RS485 parameters

- RS485 communication port: asynchronous semi duplex model
- Communication speed: 38400bps
- Byte carry format: 1 bit is a first bit, 8 bit data bit, no parity

DTE65-260 supply serial asynchronous semi duplex RS485 communication port, adopt ModBus-RTU agreement. In one line circuit can connect up to 32pcs DTE65-260 at same time, but each will be have different communication address, setting in main menu.

This is a Data frame ModBUs-RTU message

Address	Function code	Data code	Checkout code
1 Byte	1 Byte	N Byte	2 Byte

Address code: 1 – 247 (setting in main menu).

Function code: support 2 codes,

03 – Read data register value

06 – Write single register value

Checkout code: 16bit CRC

Enquiry data frame, example

Address	Command	Origination register address (High)	Origination register address (Low)	Register quantity (High)	Register quantity (Low)	CRC16 (Low)	CRC16 (High)
0CH	03H	00H	2BH	00H	03H	74H	DEH

Respond data frame, example

Address	Command	Data lenght	Data 1 2 3 4 5 6	CRC16 (Low)	CRC16 (High)
0CH	03H	06H	13H 80H 13H 90H 13H 70H	72H	E5H

ModBus address message Table

Add	Item	Description	Byte	Explain
1	Rotor start RPM	System start Rotor RPM value	1,2	Value (500-1100)
2	Rotor track RPM	Tracking start Rotor RPM value	3,4	Value (500-1100)
3	Tracking U	Tracking voltage	5,6	U = Rx / 10, Value (5-75)
4	Tracking Time	Tracking duration in minutes	7,8	Value (10-999)
5	Cosf stabil.	Stabilizing value Cosf	9,10	Cosf=Rx/100,Value (5-99)
6	Gen. Power	Power of generator station	11,12	Value (250-2500)
7	Power thresholt	Power percent	13,14	Value (9-15)
8	Rotor I warning Min	Minimum warning Rotor current	15,16	Value (30-150)
9	Rotor I warning Max	Maximum warning Rotor current	17,18	Value (265-280)
10	Rotor I warning En	Enable Rotor current warning	19,20	‘1’-enable, ‘0’-disable
11	Rotor I alarm Min	Minimum alarm Rotor current	21,22	Value (25-140)
12	Rotor I alarm Max	Maximum alarm Rotor current	23,24	Value (280-300)
13	Rotor I alarm En	Enable Rotor current alarm	25,26	‘1’-enable, ‘0’-disable
14	Rotor U warning Min	Minimum warning Rotor voltage	27,28	Value (10-30)
15	Rotor U warning Max	Maximum warning Rotor voltage	29,30	Value (65-90)
16	Rotor U warning En	Enable Rotor voltage warning	31,32	‘1’-enable, ‘0’-disable
17	Stator I warning Max	Maximum warning Stator current	33,34	Value (230-280)
18	Stator I warning En	Enable warning Stator current	35,36	‘1’-enable, ‘0’-disable
19	Stator I alarm Max	Maximum alarm Stator current	37,38	Value (240-300)
20	Stator I alarm En	Enable alarm Stator current	39,40	‘1’-enable, ‘0’-disable
21	System U alarm Min	Minimum alarm System voltage	41,42	Value (55-57)
22	System U alarm Max	Maximum alarm System voltage	43,44	Value (70-75)
23	System U alarm EN	Enable System voltage alarm	45,46	‘1’-enable, ‘0’-disable
24	Gen. U alarm Min	Minimum alarm Generator voltage	47,48	Value (55-57)
25	Gen. U alarm Max	Maximum alarm Generator voltage	49,50	Value (70-75)
26	Gen. U alarm En	Enable Generator voltage alarm	51,52	‘1’-enable, ‘0’-disable
27	Gen. F warning Min	Minimum warning Generator freq.	53,54	Value (47-49)
28	Gen. F warning Max	Maximum warning Generator freq.	55,56	Value (52-53)
29	Gen. F warning En	Enable Generator frequence warning	57,58	‘1’-enable, ‘0’-disable
30	Gen. F alarm Min	Minimum alarm Generator freq.	59,60	Value (46-48)
31	Gen. F alarm Max	Maximum alarm Generator freq.	61,62	Value (53-55)
32	Gen. F alarm En	Enable Generator frequence alarm	63,64	‘1’-enable, ‘0’-disable
33	Rotor RPM warning Min	Minimum warning Rotor RPM	65,66	Value (735-740)
34	Rotor RPM warning Max	Maximum warning Rotor RPM	67,68	Value (770-800)
35	Rotor RPM warning En	Enable Rotor RPM warning	69,70	‘1’-enable, ‘0’-disable
36	Rotor RPM alarm Min	Minimum alarm Rotor RPM	71,72	Value (720-735)
37	Rotor RPM alarm Max	Maximum alarm Rotor RPM	73,74	Value (800-825)
38	Rotor RPM alarm En	Enable Rotor RPM alarm	75,76	‘1’-enable, ‘0’-disable
39	Thyr. T warning Max	Maximum warning Temp. thyristors	77,78	Value (55-75)
40	Thyr. T warning En	Enable warning Temp. thyristors	79,80	‘1’-enable, ‘0’-disable
41	Thyr. T alarm Max	Maximum alarm Temp. thyristors	81,82	Value (65-95)
42	Thyr. T alarm En	Enable alarm Temp. thyristors	83,84	‘1’-enable, ‘0’-disable
43	Bearing T warn. Max	Maximum warning Temp. bearings	85,86	Value (55-75)
44	Bearing T warn. En	Enable warning Temp. bearings	87,88	‘1’-enable, ‘0’-disable
45	Bearing T alarm Max	Maximum alarm Temp. bearings	89,90	Value (65-95)
46	Bearing T alarm En	Enable alarm Temp. bearings	91,92	‘1’-enable, ‘0’-disable
47	Cosf warning Min	Minimum warning Cosf value	93,94	Value (7-9)
48	Cosf warning En	Enable warning Cosf	95,96	‘1’-enable, ‘0’-disable
49	U/F warning Min	Minimum warning U/F value	97,98	Value (100-120)
50	U/F warning Max	Maximum warning U/F value	99,100	Value (120-140)
51	U/F warning En	Enable U/F value warning	101,102	‘1’-enable, ‘0’-disable

52	Set cooling Temp Min	Minimum temp for cooling OFF	103,104	Value (30-60)
53	Set cooling Temp Max	Maximum temp for cooling ON	105,106	Value (Min-80)
54	Set cooling Temp En	Enable cooling	107,108	‘1’-enable, ‘0’-disable
55	Hour	System hour	109	Value (0-23)
	Minute	System minute	110	Value (0-59)
56	Day	System day	111	Value (1-31)
	Month	System month	112	Value (1-12)
57	Year	System year	113,114	Value (2000-2099)
58	Motohour	System working time	115,116	Read only
59			117,118	
60	State	System working state	119,120	Read only 0 – OFF 1 – GUP 2 – UGS 3 – QsN 4 – PsL 5 – UFS 6 – TRK 7 - MNU
61	Fa	Phase A impuls	121,122	Read only ‘0’ - False, ‘1’ - True
62	Fb	Phase A impuls	123,124	Read only ‘0’ - False, ‘1’ - True
63	Fc	Phase A impuls	125,126	Read only ‘0’ - False, ‘1’ - True
64	Fs	Feedback signel	127,128	Read only ‘0’ - False, ‘1’ - True
65	US	System voltage	129,130	Read only US = Rx * 10
66	UG	Generator voltage	131,132	Read only UG = Rx * 10
67	Ubatt	Battery voltage	133,134	Read only Ubatt = Rx / 10
68	Temp-1	Temperature of bearing 1	135,136	Read only
69	Temp-2	Temperature of bearing 2	137,138	Read only
70	Temp-3	Temperature of bearing 3	139,140	Read only
71	Temp-4	Temperature of bearing 4	141,142	Read only
72	Temp-T	Temperature of Thyristors	143,144	Read only
73	N rpm	Speed	145,146	Read only
74	Gen_U_CJD	U_Gen from external meter	147,148	Read only Gen_U_CJD = Rx * 10
75	Gen_I_CJD	I_Gen from external meter	149,150	Read only Gen_I_CJD = Rx * 10
76	Gen_F	F_Gen from external meter	151,152	Read only
77	Gen_Cosf	Cosf_Gen from external meter	153,154	Read only Gen_Cosf = Rx / 100
78	Rotor_U	U Rotor from external meter	155,156	Read only
79	Rotor_I	I_Rotor from external meter	157,158	Read only
80				
81				
82				