NMC MODBUS Protocol

Revision History			
Protocol Revision	Date	Author	Remark
V1.0	2018-01-10	Lilinhua	
			1.

NMC TCP Modbus only support RTU mode

➢ GENERAL TABLE DATA AREA DEFINITION

Data	Based address index	Length in Word	Format	Information	MODBUS/JBUS Functions
IDENTIFIERS	0x0000	80	BYTE	See related chapter	3 (read)
WARNINGS	0x0060	6	BIT	Warnings	3 (read)
STATUS	0x0070	10	BYTE	items	3 (read)
MEASUREMENTS	0x0080	80	WORD	Measurements	3 (read)
CONFIGURATIONS	0x00E0	16	WORD	Configurations	3 (read)

⌦ DENTIFIERS FRAME

Base address index = 0x0000, length in word 64.

Item No	Address index(Hex)	Unit	Data representation	Explanation
1	0x0000 – 0x000F	*char	Manufacturer	ASCII maximum 31 characters
2	0x0010 – 0x002F	*char	UPS Model	ASCII maximum 63 characters
3	0x0030 – 0x0037	*char	UPS FirmwareVersion	ASCII maximum 15 characters
4	0x0038 – 0x003F	*char	UPS SerialNumber	ASCII maximum 15 characters
5	0x0040 - 0x0047	*char	NMC Version	ASCII maximum 15 characters

Note：* All these string are represented by character. A character with an ASCII code less than ASCII 32(space) or greater than ASCII 123 (“z”), is not valid.
If string is not exist, or string can’t fill all register, the remains bytes of registers will fill with 0.

Example:
Manufacturer: abc123

Address index(Hex)	Byte	value	Ascii characters
0x0000	High	0x61	a
	Low	0x62	b
0x0001	High	0x63	c
	Low	0x31	1
0x0002	High	0x32	2
	Low	0x33	3
0x0003-0x000F	High	0x00	\0
	Low	0x00	

⌦ WARNING CODE AREA

Base address index = 0x0060, length in word 6.

Warning No.	warning	Description	The value while warning is occurred(Hex)
Address index(Hex): 0x0060			
1	upsEPowerFail	WARNING: Utility power not available.	0x8000
2	upsELowBattery	SEVERE: The UPS batteries are low and will soon be exhausted.	0x4000
3	upsEFailed	SEVERE: The UPS is not working fine.	0x2000
4	upsEOnBattery	WARNING: The UPS has switched to battery backup power.	0x1000
5	upsETestInProgress	INFORMATION: The testing is going on ups.	0x0800
6	upsEBypassOn	INFORMATION: The UPS has enabled bypass.	0x0400
7	upsECommunicationLost	SEVERE: Communication to the UPS has been lost.	0x0200
8	upsEGoingShutdown	WARNING: The UPS is going to shutdown output.	0x0100
9		Reserved	0x0080
10		Reserved	0x0040
11	upsESleeping	INFORMATION: UPS has entered sleep mode and power to load has been cut off.	0x0020
12	upsEOverTemperature	WARNING: The UPS temperature is over the setting limit.	0x0010
13	upsEOverLoad	WARNING: The UPS load is over the setting limit.	0x0008
14	upsEModuleInserted	WARNING: UPS module or charger module plug-in.	0x0004
15	sensorTemperatureTooHigh	WARNING: Sensor Temperature over high Set point.	0x0002
16	sensorTemperatureTooLow	WARNING: Sensor Temperature under low Set point.	0x0001
Address index(Hex): 0x0061			
17	sensorHumidityTooHigh	WARNING: Sensor Humidity over high Set point.	0x8000
18	sensorHumidityTooLow	WARNING: Sensor Humidity under low Set point.	0x4000
19	contactAlarm1Active	WARNING: Contact Alarm-1 activated.	0x2000
20	contactAlarm2Active	WARNING: Contact Alarm-2	0x1000

		activated.	
21	upsEInternalwarning	WARNING: Internal warning.	0x0800
22	upsEEPOActive	WARNING: EPO Active.	0x0400
23	upsEModuleUnlock	WARNING: Module Unlock.	0x0200
24	upsEMain1Neutralloss	WARNING: Main 1 Neutral loss.	0x0100
25	upsEMain1phaseerror	WARNING: Main 1 phase error.	0x0080
26	upsESitefault	WARNING: Site fault.	0x0040
27	upsEBypassAbnormal	WARNING: Bypass Abnormal.	0x0020
28	upsEBypassPhaseError	WARNING: Bypass Phase Error.	0x0010
29	upsEBatteryOpen	WARNING: Battery Open.	0x0008
30	upsEBatteryOverCharge	WARNING: Battery Over Charge	0x0004
31	upsEBatteryReverse	WARNING: Battery Reverse.	0x0002
32	upsEOverloadforewarning	WARNING: Overload forewarning.	0x0001
Address index(Hex): 0x0062			
33	upsEOverloadWarning	WARNING: Overload Warning.	0x8000
34	upsEFanLock	WARNING: Fan Lock.	0x4000
35	upsEMaintaincoverisopen	WARNING: Maintain cover is open.	0x2000
36	upsEChargerfault	WARNING: Charger fault.	0x1000
37	upsEModulelocationerror	WARNING: Module location error.	0x0800
38	upsETurnonabnormal	WARNING: Turn on abnormal.	0x0400
39		Reserved	0x0200
40	upsEHotSwapActived	WARNING: Hot Swap Active.	0x0100
41	upsEBatteryInform	WARNING: Battery Inform.	0x0080
42	upsEInspectionInform	WARNING: Inspection Inform.	0x0040
43	upsEGuaranteeInform	WARNING: Guarantee Inform.	0x0020
44	upsETemperatureLow	WARNING: Temperature Low.	0x0010
45	upsETemperatureHigh	WARNING: Temperature High.	0x0008
46	upsEBatteryOverTemperature	WARNING: Battery Over Temperature.	0x0004
47	upsEFanMaintainInform	WARNING: Fan Maintain Inform.	0x0002
48	upsEBusCapacitanceMaintain Inform	WARNING: Bus Capacitance Maintain Inform.	0x0001
Address index(Hex): 0x0063			
49	upsESystemOverCapacity	WARNING: System Over Capacity.	0x8000
50		Reserved	0x4000
51		Reserved	0x2000
52		Reserved	0x1000
53		Reserved	0x0800
54		Reserved	0x0400
55	upsOutputOff	WARNing: UPS output is off	0x0200
56		Reserved	0x0100
57		Reserved	0x0080
58		Reserved	0x0040
59		Reserved	0x0020
60		Reserved	0x0010
61		Reserved	0x0008
62	upsEBelowCapacityLimit	SEVERE: The UPS batteries capacity is lower than setting limit.	0x0004

63	upsEBelowRemainTimeLimit	SEVERE: The UPS batteries backup time is below the setting limit.	0x0002
64	upsELoadSegment1Off	WARNING: Load segment 1 is off.	0x0001
Address index(Hex): 0x0064			
65	upsELoadSegment2Off	WARNING: Load segment 2 is off.	0x8000
66-80		Reserved	
Address index(Hex): 0x0065, Reserved			

Note: If one warning is not supported by the device, the default value is 0.

For example: if the value of register 0x0060 is 0xC000, this mean the UPS have following events:

WARNING: Utility power not available.
SEVERE: The UPS batteries are low and will soon be exhausted.

⌦ STATUS DATA AREA

Base address index = 0x0070, length in word 10.

Address Index(Hex)	Byte	UPS status / System mode	Explanation
0x0070	High	UPS Type	1- SYS_OFFLINE, 0-SYS_ONLINE
	Low	The indication of UPS system status	power-on (1) , stand-by(2) , by-pass (3) ,line(4) , battery (5) , battery-test (6) , fault (7) ,converter (8) , eco (9) , shutdown (10) , on-booster (11) , on-reducer (12) , other(13)
0x0071	High	The number of input phase utilized is this device	1..3
	Low	The number of metered output phases	1..3
0x0072	High	The status of UPS battery, a value of batteryLow indicates that the battery-low status bit has been set from device. A value of batteryDepleted indicates that the UPS will be unable to sustain the present load when and if the utility power is lost (including the possibility that the utility power is mandatoryly absent and the UPS is unable to sustain	unknown (1) , batteryNormal (2) , batteryLow (3) , batteryDepleted (4) , batteryDischarging (5) , batteryFailure (6)

		the output	
	Low	the test result of battery.	idle (1) , processing (2) , noFailure (3) , failureOrWarning (4) , notPossible (5) , testCancel (6)
0x0073	High	The present external source of input power.	Valid value is from 1 to 2
	Low	The number of bypass phases	Valid value is from 1 to 3
0x0074	High	This object indicate the cell number of each set.	
	Low	The status of ABM.	charge (1) , float (2) , rest (3) , discharge (4) , disable (5)
0x0075-0x0079		Reserved	

Note: if some data is not supported by device, the default value is 0xFF.

For example: if the value of register 0x0071 is 0x0301, this mean the UPS have three input phases and one output phase.

⌦ MEASUREMENT DATA AREA

Base address index = 0x0080, length in word 80.

Item No.	Address Index(Hex)	Data Name	Unit	Description
1	0x0080	The temperature of UPS	0.1C	If the highest bit of this value is 1, the temperature is negative, for example: 0x81c8 is -45.6C, otherwise the temperature is positive, for example: 0x01c8 is 45.6C upsESystemTemperature
2	0x0081	The measured phase R input frequency from the UPS meters	0.1Hz	upsESystemInputFrequency
3	0x0082	The measured phase S input frequency from the UPS meters	0.1Hz	
4	0x0083	The measured phase T input frequency from the UPS meters	0.1Hz	
5	0x0084	The measured phase R input voltage from the UPS meters	0.1V	upsESystemInputVoltage
6	0x0085	The measured phase S input voltage from the UPS meters	0.1V	
7	0x0086	The measured phase T input voltage from the UPS meters	0.1V	
8	0x0087	The measured line RS input voltage from the UPS meters	0.1V	

9	0x0088	The measured line ST input voltage from the UPS meters	0.1V	
10	0x0089	The measured line TR input voltage from the UPS meters	0.1V	
11	0x008A	The measured phase R input current from the UPS meters	0.1A	upsESystemInputCurrent
12	0x008B	The measured phase S input current from the UPS meters	0.1A	
13	0x008C	The measured phase T input current from the UPS meters	0.1A	
14	0x008D	The measured phase R input real power	100W	upsESystemInputWatts
15	0x008E	The measured phase S input real power	100W	
16	0x008F	The measured phase T input real power	100W	
17	0x0090	The measured phase R output frequency from the UPS meters	0.1Hz	upsESystemOutputFrequency
18	0x0091	The measured phase S output frequency from the UPS meters	0.1Hz	
19	0x0092	The measured phase T output frequency from the UPS meters	0.1Hz	
20	0x0093	The measured phase R output voltage from the UPS meters	0.1V	upsESystemOutputVoltage
21	0x0094	The measured phase S output voltage from the UPS meters	0.1V	
22	0x0095	The measured phase T output voltage from the UPS meters	0.1V	
23	0x0096	The measured line RS output voltage from the UPS meters	0.1V	
24	0x0097	The measured line ST output voltage from the UPS meters	0.1V	
25	0x0098	The measured line TR output voltage from the UPS meters	0.1V	
26	0x0099	The measured phase R output current from the UPS meters	0.1A	upsESystemOutputCurrent
27	0x009A	The measured phase S output current from the UPS meters	0.1A	
28	0x009B	The measured phase T output current from the UPS meters	0.1A	
29	0x009C	The measured phase R output real power in watts	100W	upsESystemOutputWatts
30	0x009D	The measured phase S output real power in watts	100W	
31	0x009E	The measured phase T output	100W	

		real power in watts		
32	0x009F	The measured phase R output real complex power in VA	100VA	upsESystemOutputVA
33	0x00A0	The measured phase S output real complex power in VA	100VA	
34	0x00A1	The measured phase T output real complex power in VA	100VA	
35	0x00A2	The UPS phase R output load in percent of rated capacity	%	upsESystemOutputLoad
36	0x00A3	The UPS phase S output load in percent of rated capacity	%	
37	0x00A4	The UPS phase T output load in percent of rated capacity	%	
38	0x00A5	An estimate of the time to battery charge depletion under the present load conditions if the utility power is off and remains off, or if it were to be lost and remain off.	Minute	upsEBatteryEstimated-MinutesRemaining
	0x00A6		second	
39	0x00A7	If the unit is on battery power, the elapsed time since the UPS last switched to battery power, or the time since the network management subsystem was last restarted, whichever is less. 0 shall be returned if the unit is not on battery power	Minute	upsESecondsOnBattery
	0x00A8		second	
40	0x00A9	An estimate of the battery charge remaining expressed as a percent of full charge	%	upsEBatteryEstimated-ChargeRemaining
41	0x00AA	The magnitude of the present positive battery voltage	0.1V	upsEPositiveBatteryVoltage
42	0x00AB	The magnitude of the present negative battery voltage	0.1V	upsENegativeBatteryVoltage
43	0x00AC	The ambient temperature at or near the UPS Battery casing in 0.1 degree	0.1C	If the highest bit of this value is 1, the temperature is negative, for example: 0x81c8 is -45.6C, otherwise the temperature is positive, for example: 0x01c8 is 45.6C upsEBatteryTemperature
44	0x00AD	The measured bypass phase R frequency from the UPS meters	0.1Hz	upsESystemBypassFrequency
45	0x00AE	The measured bypass phase S frequency from the UPS meters	0.1Hz	

46	0x00AF	The measured bypass phase T frequency from the UPS meters	0.1Hz	
47	0x00B0	The measured bypass phase R voltage from the UPS meters	0.1V	upsESystemBypassVoltage
48	0x00B1	The measured bypass phase S voltage from the UPS meters	0.1V	
49	0x00B2	The measured bypass phase T voltage from the UPS meters	0.1V	
50	0x00B3	The measured bypass line RS voltage from the UPS meters	0.1V	
51	0x00B4	The measured bypass line ST voltage from the UPS meters	0.1V	
52	0x00B5	The measured bypass line TR voltage from the UPS meters	0.1V	
53	0x00B6	The measured bypass phase R current from the UPS meters	0.1A	upsESystemBypassCurrent
54	0x00B7	The measured bypass phase S current from the UPS meters	0.1A	
55	0x00B8	The measured bypass phase T current from the UPS meters	0.1A	
56	0x00B9	The measured bypass phase R input real power.	100W	upsESystemBypassWatts
57	0x00BA	The measured bypass phase S input real power.	100W	
58	0x00BB	The measured bypass phase T input real power.	100W	
59	0x00BC	UPS Shutdown Delay	Second	upsEControlOutputOffDelay
60	0x00BD	UPS Sleep Time	Minute	upsEControlOutputOnDelay
61-78	0x00BE-0x00CF	Reserved		

Note: if some data is not supported by the device, the default value is 0xFFFF.

⌦ CONFIGUREATION DATA AREA

Base address index = 0x00E0, length in word: 16.

Item No.	Address Index(Hex)	Data item	Unit	Description
1	0x00E0	Nominal input voltage	0.1V	upsESystemConfig-InputVoltage
2	0x00E1	The magnitude of the nominal Volt-Amp rating	100VA	upsESystemConfigOutputVA
3	0x00E2	The nominal Battery voltage	0.1V	ConfigBatteryVolt
4	0x00E3	The nominal input frequency	0.1Hz	upsESystemConfig-InputFrequence

5	0x00E4	the nominal output voltage	0.1V	upsESystemConfig-OutputVoltage
6	0x00E5	The nominal output frequency	0.1Hz	upsESystemConfig-OutputFrequency
7	0x00E6	The magnitude of the nominal true power rating	100W	upsESystemConfig-OutputPower
8	0x00E7	The maximum output load allowed before the load is too high for □UPS operation	%	upsESystemConfig-OutputLoadHighSetPoint
9	0x00E8	The maximum temperature allowed before the UPS operation temperature is too high	0.1C	If the highest bit of this value is 1, the temperature is negative, for example: 0x81c8 is -45.6C, otherwise the temperature is positive, for example: 0x01c8 is 45.6C, upsESystemConfig-OverTemperatureSetPoint
10	0x00E9	The UPS batteries capacity(%) limit for shutdown	%	upsESystemConfig-BelowCapacityLimit
11	0x00EA	The UPS batteries backup time(minute) limit for shutdown	Minute	upsESystemConfig-BelowRemainTimeLimit
12-16	0x00EB-0x00EF	Reserved		

Note: if some configure data is not supported by the device, the default value is 0xFFFF.