

N1500FT

MODBUS COMMUNICATION MANUAL

INTRODUCTION

All equipment configurations, as well as the input channels reading, are made through Modbus protocol.

This manual has all needed information to read data from **N1500FT** using any software that has Modbus RTU communication (master) abilities.

Further details about the implementation of a network of Modbus devices over RS485 can be found in the *RS485 & RS422 Basics* file, available for download in the www.novusautomation.com website.

SERIAL COMMUNICATION

The optional serial interface RS485 allows to address up to 247 indicators in a network communicating remotely with a host computer or master controller.

RS485 Interface

- Compatible signals with RS485 standard
- 2 wire connection from master to up to 31 slaves indicators in a multidrop bus. It is possible address 247 nodes with multiple outputs converters.
- Maximum communication distance: 1000 meters
- The RS485 signals are:
 - D1: Bidirectional data line.
 - D0: Bidirectional inverted data line.
 - GND: Optional connection which left communication better.

General Characteristics

- Optically isolated serial interface.
- Programmable baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200bps.
- Data bits: 8
- Parity: None, odd or even.
- Stop Bits: 1

MODBUS COMMANDS

The following listed Modbus commands (functions) are implemented. In order to get more information about each one and about Modbus protocol in general, access the website:

<http://www.modbus.org>

READ HOLDING REGISTERS – 03H

This command can be used to read one or more holding registers, as listed in a table in the next chapter.

WRITE SINGLE COIL – 05H

This command can be used to activate or deactivate the output relays. First coil refers to relay 1, second coil refers to relay 2 and son on.

Important Note: In order to be set by this command, relays must not be assigned to any enabled alarms.

WRITE SINGLE REGISTER – 06H

This command can be used to write in one holding register, as listed in a table in the next chapter.

WRITE MULTIPLE REGISTERS – 16H

This command can be used to write in a block of holding registers, as listed in a table in the next chapter.

HOLDING REGISTERS TABLE

The specified addresses are related to the low-level physical addresses, where zero (0) means the PLC address 40001. Minimum and Maximum columns have the valid range for each parameter. R/W column indicates whether the parameter is writable (R/W) or read-only (R). *SuperView Mnemonic* informs what is the register mnemonic in the SuperView software.

Address	Description	Minimum	Maximum	R/W	SuperView Mnemonic
0	Instantaneous flow rate (floating point – word high)	-3,4e+38	+3,4e+38	R	
1	Instantaneous flow rate (floating point – word low)				
2	Total flow rate (floating point – word high)	-3,4e+38	+3,4e+38	R	
3	Total flow rate (floating point – word low)				
4	Non-resettable total flow rate (floating point – word high)	-3,4e+38	+3,4e+38	R	
5	Non-resettable total flow rate (floating point – word low)				
6	Auxiliary 4 to 20 mA input (floating point – word high)	-3,4e+38	+3,4e+38	R	
7	Auxiliary 4 to 20 mA input (floating point – word low)				
8	Maximum instantaneous flow rate (floating point – word high)	-3,4e+38	+3,4e+38	R	
9	Maximum instantaneous flow rate (floating point – word low)				
10	Minimum instantaneous flow rate (floating point – word high)	-3,4e+38	+3,4e+38	R	
11	Minimum instantaneous flow rate (floating point – word low)				
12	Instantaneous flow rate (integer x 10)	-32768	32767	R	InstantFlow
13	Total flow rate (word 3 – MSB)	0	65535	R	TotalFlow_3
14	Total flow rate (word 2 – MSB)	0	65535	R	TotalFlow_2
15	Total flow rate (word 1 – MSB)	0	65535	R	TotalFlow_1
16	Total flow rate (word 0 – LSB)	0	65535	R	TotalFlow_0
17	Non-resettable total flow rate (word 3 – MSB)	0	65535	R	GrandTotalFlow_3
18	Non-resettable total flow rate (word 2 – MSB)	0	65535	R	GrandTotalFlow_2
19	Non-resettable total flow rate (word 1 – MSB)	0	65535	R	GrandTotalFlow_1
20	Non-resettable total flow rate (word 0 – LSB)	0	65535	R	GrandTotalFlow_0
21	Auxiliary 4 to 20 mA input (integer x 10)	-32768	32767	R	AuxInput
22	Maximum instantaneous flow rate (integer x 10)	-32768	32767	R	MaxInstantFlow
23	Minimum instantaneous flow rate (integer x 10)	-32768	32767	R	MinInstantFlow
24	Number of times that the total non-resettable reaching maximum and restarted totalization	0	65535	R	GrandTotalRollOvers
100	Instantaneous flow multiplying factor (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
101	Instantaneous flow multiplying factor (floating point – word low)				
102	Total flow multiplying factor (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
103	Total flow multiplying factor (floating point – word low)				
104	Input lower limit 4 to 20 mA (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
105	Input lower limit 4 to 20 mA (floating point – word low)				
106	Input higher limit 4 to 20 mA (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
107	Input higher limit 4 a 20 mA (floating point – word low)				
108	Retransmission lower limit 4 to 20 mA (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
109	Retransmission lower limit 4 to 20 mA (floating point – word low)				
110	Retransmission higher limit 4 to 20 mA (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
111	Retransmission higher limit 4 to 20 mA (floating point – word low)				
112	Instant flow rate unit tag	0	65535	R/W	
113		0	65535	R/W	
114		0	65535	R/W	
115	Total flow rate unit tag	0	65535	R/W	
116		0	65535	R/W	
117		0	65535	R/W	
118	Instant flow rate unit	0	3	R/W	
119	Instant flow rate Input type	0	4	R/W	
121	Totalization reset	0	1	R/W	ResetTotal

Address	Description	Minimum	Maximum	R/W	SuperView Mnemonic
122	Configuration of the main screen	0	11	R/W	
123	Configuration of F key function	0	4	R/W	
124	Digital input function configuration	0	4	R/W	
125	4 to 20 mA input filter configuration	0	20	R/W	
127	Enable 4 to 20 mA root square	0	1	R/W	
128	Enable 4 to 20 mA auxiliary read	0	1	R/W	
129	4 to 20 mA output error	0	1	R/W	
130	Width of the retransmission pulse (ms)	0	32000	R/W	
131	Manual operation mode enable	0	1	R/W	
132	4 to 20 output mA in manual mode (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
133	4 to 20 output mA in manual mode (floating point – word low)				
134	Pulse output status in manual mode	0	1	R/W	
135	Relay 1 status in manual mode	0	1	R/W	
136	Relay 2 status in manual mode	0	1	R/W	
137	Relay 3 status in manual mode	0	1	R/W	
138	Relay 4 status in manual mode	0	1	R/W	
139	Enable user calibration	0	1	R/W	
140	Value applied to the input of 4 to 20mA for calibration range start (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
141	Value applied to the input of 4 to 20mA for calibration range start (floating point – word low)				
142	Value applied to the input of 4 to 20mA for calibration range end (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
143	Value applied to the input of 4 to 20mA for calibration range end (floating point – word low)				
144	Readed value of the input of 4 to 20mA for calibration range start (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
145	Readed value of the input of 4 to 20mA for calibration range start (floating point – word low)				
146	Readed value of the input of 4 to 20mA for calibration range end (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
147	Readed value of the input of 4 to 20mA for calibration range end (floating point – word low)				
148	Restores factory calibration	0	1	R/W	
149	Password input	0	9999	R/W	
156	Pulse output type	0	2	R/W	
157	Alarm 1 function	0	4	R/W	
158	Alarm 2 function	0	4	R/W	
159	Alarm 3 function	0	4	R/W	
160	Alarm 4 function	0	4	R/W	
161	Alarm 1 setpoint (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
162	Alarm 1 setpoint (floating point – word low)				
163	Alarm 2 setpoint (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
164	Alarm 2 setpoint (floating point – word low)				
165	Alarm 3 setpoint (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
166	Alarm 3 setpoint (floating point – word low)				
167	Alarm 4 setpoint (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
168	Alarm 4 setpoint (floating point – word low)				
169	Hysteresis Alarm 1 (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
170	Hysteresis Alarm 1 (floating point – word low)				
171	Hysteresis Alarm 2 (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
172	Hysteresis Alarm 2 (floating point – word low)				
173	Hysteresis Alarm 3 (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
174	Hysteresis Alarm 3 (floating point – word low)				

Address	Description	Minimum	Maximum	R/W	SuperView Mnemonic
175	Hysteresis Alarm 4 (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
176	Hysteresis Alarm 4 (floating point – word low)				
177	Block Alarm 1	0	1	R/W	
178	Block Alarm 2	0	1	R/W	
179	Block Alarm 3	0	1	R/W	
180	Block Alarm 4	0	1	R/W	
181	Alarm 1 Timer 1	0	32000	R/W	
182	Alarm 1 Timer 2	0	32000	R/W	
183	Alarm 2 Timer 1	0	32000	R/W	
184	Alarm 2 Timer 2	0	32000	R/W	
185	Alarm 3 Timer 1	0	32000	R/W	
186	Alarm 3 Timer 2	0	32000	R/W	
187	Alarm 4 Timer 1	0	32000	R/W	
188	Alarm 4 Timer 2	0	32000	R/W	
189	Enable flash display on alarm	0	1	R/W	
190	Cutoff frequency (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
191	Cutoff frequency (floating point – word low)				
192	Serial communication parity	0	2	R/W	
193	Serial communication Baud Rate	0	7	R/W	
194	Modbus slave address	0	247	R/W	
195	Protection level HMI	0	9	R/W	
198	Volume of a volumetric pulse	1	32000	R/W	
199	Frequency retransmission divider	2	32000	R/W	
200	Enable input linearization	0	1	R/W	
201	Input 1 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
202	Input 1 linearization (floating point – word low)				
203	Input 2 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
204	Input 2 linearization (floating point – word low)				
205	Input 3 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
206	Input 3 linearization (floating point – word low)				
207	Input 4 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
208	Input 4 linearization (floating point – word low)				
209	Input 5 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
210	Input 5 linearization (floating point – word low)				
211	Input 6 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
212	Input 6 linearization (floating point – word low)				
213	Input 7 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
214	Input 7 linearization (floating point – word low)				
215	Input 8 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
216	Input 8 linearization (floating point – word low)				
217	Input 9 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
218	Input 9 linearization (floating point – word low)				
219	Input 10 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
220	Input 10 linearization (floating point – word low)				
221	Input 11 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
222	Input 11 linearization (floating point – word low)				
223	Input 12 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
224	Input 12 linearization (floating point – word low)				
225	Input 13 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
226	Input 13 linearization (floating point – word low)				
227	Input 14 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
228	Input 14 linearization (floating point – word low)				

Address	Description	Minimum	Maximum	R/W	SuperView Mnemonic
229	Input 15 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
230	Input 15 linearization (floating point – word low)				
231	Input 16 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
232	Input 16 linearization (floating point – word low)				
233	Input 17 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
234	Input 17 linearization (floating point – word low)				
235	Input 18 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
236	Input 18 linearization (floating point – word low)				
237	Input 19 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
238	Input 19 linearization (floating point – word low)				
239	Input 20 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
240	Input 20 linearization (floating point – word low)				
241	Input 21 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
242	Input 21 linearization (floating point – word low)				
243	Input 22 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
244	Input 22 linearization (floating point – word low)				
245	Input 23 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
246	Input 23 linearization (floating point – word low)				
247	Input 24 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
248	Input 24 linearization (floating point – word low)				
249	Input 25 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
250	Input 25 linearization (floating point – word low)				
251	Input 26 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
252	Input 26 linearization (floating point – word low)				
253	Input 27 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
254	Input 27 linearization (floating point – word low)				
255	Input 28 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
256	Input 28 linearization (floating point – word low)				
257	Input 29 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
258	Input 29 linearization (floating point – word low)				
259	Input 30 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
260	Input 30 linearization (floating point – word low)				
261	Output 1 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
262	Output 1 linearization (floating point – word low)				
263	Output 2 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
264	Output 2 linearization (floating point – word low)				
265	Output 3 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
266	Output 3 linearization (floating point – word low)				
267	Output 4 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
268	Output 4 linearization (floating point – word low)				
269	Output 5 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
270	Output 5 linearization (floating point – word low)				
271	Output 6 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
272	Output 6 linearization (floating point – word low)				
273	Output 7 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
274	Output 7 linearization (floating point – word low)				
275	Output 8 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
276	Output 8 linearization (floating point – word low)				
277	Output 9 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
278	Output 9 linearization (floating point – word low)				
279	Output 10 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
280	Output 10 linearization (floating point – word low)				

Address	Description	Minimum	Maximum	R/W	SuperView Mnemonic
281	Output 11 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
282	Output 11 linearization (floating point – word low)				
283	Output 12 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
284	Output 12 linearization (floating point – word low)				
285	Output 13 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
286	Output 13 linearization (floating point – word low)				
287	Output 14 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
288	Output 14 linearization (floating point – word low)				
289	Output 15 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
290	Output 15 linearization (floating point – word low)				
291	Output 16 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
292	Output 16 linearization (floating point – word low)				
293	Output 17 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
294	Output 17 linearization (floating point – word low)				
295	Output 18 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
296	Output 18 linearization (floating point – word low)				
297	Output 19 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
298	Output 19 linearization (floating point – word low)				
299	Output 20 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
300	Output 20 linearization (floating point – word low)				
301	Output 21 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
302	Output 21 linearization (floating point – word low)				
303	Output 22 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
304	Output 22 linearization (floating point – word low)				
305	Output 23 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
306	Output 23 linearization (floating point – word low)				
307	Output 24 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
308	Output 24 linearization (floating point – word low)				
309	Output 25 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
310	Output 25 linearization (floating point – word low)				
311	Output 26 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
312	Output 26 linearization (floating point – word low)				
313	Output 27 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
314	Output 27 linearization (floating point – word low)				
315	Output 28 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
316	Output 28 linearization (floating point – word low)				
317	Output 29 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
318	Output 29 linearization (floating point – word low)				
319	Output 30 linearization (floating point – word high)	-3,4e+38	+3,4e+38	R/W	
320	Output 30 linearization (floating point – word low)				
600	Serial number (word high)	1200	9999	R	SerialNumber_H
601	Serial number (word low)	0	9999	R	SerialNumber_L
602	Firmware version	0	999	R	FirmwareVersion
603	Product identifier	80	80	R	
628	Status word 1	0	65535	R	Status_1
629	Status word 2	0	65535	R	Status_2
630	Status word 3	0	65535	R	Status_3

DETAILS ABOUT SOME REGISTERS

REGISTERS 112 TO 114 – TEXT STRING FOR THE INSTANT FLOW RATE UNIT

Text string for the instant flow rate unit (ASCII - UTF8). The first character is in HIGH byte of the first register. The next character is the LOW byte of the same register, and so on. The last character indicates the time base and can only assume the values 's', 'm', 'h' or 'd', respectively, for "second", "minute", "hour" or "day".

REGISTERS 115 TO 117 – TEXT STRING FOR THE TOTAL FLOW RATE UNIT

Text string for the total flow rate unit (ASCII - UTF8). The first character is in HIGH byte of the first register. The next character is the LOW byte of the same register, and so on. Characters can be chosen from those available.

REGISTERS 600 AND 601 – SERIAL NUMBER

Device serial number. The register 600 has the number corresponding to the first four digits of the serial number, while the register 601 has the number corresponding to the last four digits.

REGISTER 602 – FIRMWARE VERSION

Indicates the firmware version of the device, as the following examples:

If the version is "1:00" will read the value "100". If the version is "2:04" will read the value "204".

REGISTERS 628 TO 630 – STATUS AS TABLE BELOW

Status word 1	Bit 0	Alarm status 1
	Bit 1	Alarm status 2
	Bit 2	Alarm status 3
	Bit 3	Alarm status 4
Status word 2	Bit 0	Analog input signal above the maximum allowed
	Bit 1	Analog input signal below the minimum allowed
	Bit 2	Open analog input
Status word 3	Bit 0	Relay status 1
	Bit 1	Relay status 2
	Bit 2	Relay status 3
	Bit 3	Relay status 4
	Bit 4	Digital input state

FLOATING POINT FORMAT USED

N1500FT uses floating point values in single precision (32 bit) format as described in standard **IEEE-754** (IEEE Standard for Floating-Point Arithmetic).