

N1100/N2000/N3000

Communication Protocol – V2.0x

1. SERIAL COMMUNICATION

1.1 COMMUNICATION INTERFACE

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

RS485 Interface

- Compatible line 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 = D: Bidirectional data line.
 - D0 = \bar{D} : Bidirectional inverted data line.
 - C = GND: Optional connection which left communication better.

General Characteristics

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

Communication Protocol

The MOSBUS RTU slave is implemented, available in most SCADA softwares in the market.

All configurable parameters can be accessed (for reading or writing) through the Registers Table. Broadcast commands are supported as well (address 0).

The available Modbus commands are:

- 03 - Read Holding Register
- 05 - Force Single Coil (Force Digital Output state)
- 06 - Preset Single Register

The registers are arranged in a table in such a way that several registers can be read in the same request.

1.2 CONFIGURATION OF SERIAL COMMUNICATION PARAMETERS

Two parameters must be configured in the device for serial communication:

bAud: Baud rate. All devices with same baud rate.

Addr: Device communication address. Each device must have an exclusive address.

1.3 REGISTERS TABLE

Equivalent to the registers referenced as 4XXXX.

The holding registers are basically a list of the internal indicator parameters. All registers above address 12 can be read or written. The registers up to this address in more are read only. Please verify each case. Each table parameter is a 16 bits two complement signed word.

Holding Registers	Parameter	Register Description
0000	Active SV	Read: Active control SV (main SV, from ramp and soak or from remote SV). Write: to main SV Range: from SPLL to SPHL .
0001	PV	Read: Process Variable Write: not allowed. Range: From SPLL to SPHL . The dPPo prompt gives the decimal point position.
0002	MV	Read: Output Power in automatic or manual mode. Write: not allowed. See address 29. Range: 0 to 1000 (0.0 to 100.0%).
0003	-	Reserved.
0004	Display value	Read: Current value shown on display. Write: Current value shown on display. Range: -1999 to 9999. The range depends on the displayed parameter.

0005	Prompt index	Read: Current prompt position in the parameters flowchart. Write: not allowed. Range: 0000h to 060Ch Prompt number format: XYYh, where: XX→menu cycle number (see operation manual) YY→prompt number (index).
0006	Status Word 1	Read: Status bits. See table 2 Write: not allowed.
0007	Software Version	Read: The firmware version of controller. If V1.00, the read value will be 100. Write: not allowed.
0008	ID	Read: controller identification number. Write: not allowed. Values: 1 – N1100; 2 - N2000; 3 - N1500. Other values: special instruments.
0009	Status Word 2	Read: Status bits. See table 2. Write: not allowed.
0010	Status Word 3	Read: Status bits. See table 2. Write: not allowed.
0011	Ir	Integral Rate (in repetitions/min) Range: 0 to 3000 (0.00 to 30.00)
0012	dt	Derivative Time (in seconds). Range: 0 to 250
0013	Pb	Proportional Band (in percentage) Range: 0 to 5000 (0.0 to 500.0)
0014	-	Reserved.
0015	ct	Cycle Time (PWM, in seconds) Range: 5 to 1000 (0.5 to 100.0)
0016	-	Reserved.
0017	HYS	On/Off Control Hysteresis (in selected type engineering unit). Range: 0 to SPHL - SPLL
0018	-	Reserved.
0019	ouLL	Output Low Limit (minimum output power) Range: 0 to 1000 (0.0 to 100.0%).
0020	ouHL	Output High Limit (minimum output power) Range: 0 to 1000 (0.0 to 100.0%).
0021	AuEn	N2000 only. Auto/Man key Enable – <input type="checkbox"/> 1→ Key enabled 0 → Key disabled
0022	FFunc	N2000 only. F key function. 0 → Not used. 7 → Controller start/stop. 8 → Select remote SP. 9 → Ramp and soak hold. 10 → Enable ramp and soak profile 1.
0023	Serial number H	Serial Number High (Upper display). Range: 0 to 9999. Read only
0024	Serial number L	Serial Number Low (Lower display). Range: 0 to 9999. Read only
0025	SV	Control <i>Setpoint</i> (Prompt <i>Setpoint</i>). Range: from SPLL to SPHL .
0026	SPLL	<i>Setpoint</i> Low limit. Range: minimum value depends on the input type selected in LYPE (see op. Manual) to SPHL .
0027	SPHL	<i>Setpoint</i> High limit. Range: minimum value is SPLL and maximum depends on the input type selected in LYPE (see op. Manual).
0028	Manual MV	Manual output power (in percentage) Range: 0 to 1000 (0.0 to 100.0%)
0029	oFF5	PV offset Range: from SPLL to SPHL .
0030	dPPo	PV decimal point position Range: 0 to 3 0→0.000; 1→00.00; 2→000.0; 3→0000
0031	SPR1	Alarm 1 Setpoint. Range: The minimum value is at SPLL for non-differential alarm or SPLL - SPLH for differential alarm The maximum value is at SPHL for non-differential alarm or at SPHL - SPLL for differential alarm.
0032	SPR2	Alarm 2 Setpoint. Range: same as in SPR1 .
0033	SPR3	Alarm 3 Setpoint. Range: same as in SPR1 .
0034	SPR4	Alarm 4 Setpoint. Range: same as in SPR1 .
0035	FuR1	Alarm 1 Function. Range: 0 to 8 0→oFF; 1→iErr; 2→r5; 3→rFAI; 4→Lo; 5→HI; 6→dIFL; 7→dIFH; 8→dIF.
0036	FuR2	Alarm 2 Function. Range: same as in FuR1 .
0037	FuR3	Alarm 3 Function. Range: same as in FuR1 .
0038	FuR4	Alarm 4 Function. Range: same as in FuR1 .
0039	HYR1	Alarm 1 Hysteresis. Range: 0 to 9999 (0.00 to 99.99%)
0040	HYR2	Alarm 2 Hysteresis. Range: same as in HYR1 .
0041	HYR3	Alarm 3 Hysteresis. Range: same as in HYR1 .
0042	HYR4	Alarm 4 Hysteresis. Range: same as in HYR1 .

0043	TYPE	PV input type Range: 0 to 18. See operation manual.
0044	Addr	Communication slave address Range: 1 to 247
0045	bAud	Communication Baud-Rate. Range: 0 to 4 0→1200;1→2400;2→4800;3→9600; 4→19200
0046	Auto	Control Mode. Range: 0→manual; 1→automatic.
0047	run	Enable control. Range: 0→no; 1→yes.
0048	Act	Control action. Range: 0→direct; 1→reverse.
0049	Autun	Auto tune enable. Range: 0→no; 1→yes.
0050	blA1	Alarm 1 power-up inhibit. Range: 0→no; 1→yes.
0051	blA2	Alarm 2 power-up inhibit Range: same as in blA1 .
0052	blA3	Alarm 3 power-up inhibit Range: same as in blA1 .
0053	blA4	Alarm 4 power-up inhibit Range: same as in blA1 .
0054	Key	Key press remote action. Range: 0 to 9 1→; 2→; 4→; 8→; 9→ e .
0055	rSLl	Remote Setpoint Low limit Range: Minimum value depends on the input type selected in TYPE , and maximum value is in rSHL .
0056	rSHL	Remote Setpoint High limit Range: Minimum value is in rSLl , and maximum depends on the input type selected in TYPE .
0057	io 1	IO 1 Function. Range: 0 to 5 Refer to operation manual for more details.
0058	io 2	IO 2 Function. Range: 0 to 5 Refer to operation manual for more details.
0059	io 3	IO 3 Function. Range: 0 to 10 Refer to operation manual for more details.
0060	io 4	IO 4 Function. Range: 0 to 10 Refer to operation manual for more details.
0061	io 5	IO 5 Function. Range: 0 to 16 Refer to operation manual for more details.
0062	Alk1	Alarm 1 Time 1. Range: 0 to 6500s Refer to operation manual for more details.
0063	Alk2	Alarm 1 Time 2 (in seconds) Range: same as in Alk1 .
0064	Alk1	Alarm 2 Time 1 (in seconds) Range: same as in Alk1 .
0065	Alk2	Alarm 2 Time 2 (in seconds) Range: same as in Alk1 .
0066	SFSk	Soft-Start time (in seconds) Range: 0 to 9999
0067	unit	Temperature unit. Range: 0 to 1 0→°C; 1→°F.
0068	bIAS	Bias. Range: -100 to +100%.
0069	io 6	N2000 only. IO 6 Function. Allowed values: 0, 6, 7, 8, 9 and 10. Refer to operation manual for more details.
0070	R&S Segment	Ramp and Soak segment being executed (read only). Range: 0 to 4
0071	Pr n	Ramp and Soak segment to be viewed or edited. Range: 1 to 4
0072	Pr n	Ramp and Soak segment to be executed Range: 0 to 4
0073	PE 1	Segment 1 Event of R&S Program 1. Range: 0 to 15. See op. Manual.
0074	PE2	Segment 2 Event of R&S Program 1. Range: same as in PE 1 .
0075	PE3	Segment 3 Event of R&S Program 1. Range: same as in PE 1 .
0076	PE4	Segment 4 Event of R&S Program 1. Range: same as in PE 1 .
0077	PE5	Segment 5 Event of R&S Program 1. Range: same as in PE 1 .
0078	PE6	Segment 6 Event of R&S Program 1. Range: same as in PE 1 .
0079	PE7	Segment 7 Event of R&S Program 1. Range: same as in PE 1 .
0080	PE 1	Segment 1 Event of R&S Program 2. Range: 0 to 15. See op. Manual.
0081	PE2	Segment 2 Event of R&S Program 2. Range: same as in PE 1 .
0082	PE3	Segment 3 Event of R&S Program 2. Range: same as in PE 1 .
0083	PE4	Segment 4 Event of R&S Program 2. Range: same as in PE 1 .
0084	PE5	Segment 5 Event of R&S Program 2. Range: same as in PE 1 .
0085	PE6	Segment 6 Event of R&S Program 2. Range: same as in PE 1 .

0086	PE7	Segment 7 Event of R&S Program 2. Range: same as in PE 1 .
0087	PE 1	Segment 1 Event of R&S Program 3. Range: 0 to 15. See op. Manual.
0088	PE2	Segment 2 Event of R&S Program 3. Range: same as in PE 1 .
0089	PE3	Segment 3 Event of R&S Program 3. Range: same as in PE 1 .
0090	PE4	Segment 4 Event of R&S Program 3. Range: same as in PE 1 .
0091	PE5	Segment 5 Event of R&S Program 3. Range: same as in PE 1 .
0092	PE6	Segment 6 Event of R&S Program 3. Range: same as in PE 1 .
0093	PE7	Segment 7 Event of R&S Program 3. Range: same as in PE 1 .
0094	PE 1	Segment 1 Event of R&S Program 4. Range: 0 to 15. See op. Manual.
0095	PE2	Segment 2 Event of R&S Program 4. Range: same as in PE 1 .
0096	PE3	Segment 3 Event of R&S Program 4. Range: same as in PE 1 .
0097	PE4	Segment 4 Event of R&S Program 4. Range: same as in PE 1 .
0098	PE5	Segment 5 Event of R&S Program 4. Range: same as in PE 1 .
0099	PE6	Segment 6 Event of R&S Program 4. Range: same as in PE 1 .
0100	PE7	Segment 7 Event of R&S Program 4. Range: same as in PE 1 .
0101	PE 1	Segment 1 Event of R&S Program 5. Range: 0 to 15. See op. Manual.
0102	PE2	Segment 2 Event of R&S Program 5. Range: same as in PE 1 .
0103	PE3	Segment 3 Event of R&S Program 5. Range: same as in PE 1 .
0104	PE4	Segment 4 Event of R&S Program 5. Range: same as in PE 1 .
0105	PE5	Segment 5 Event of R&S Program 5. Range: same as in PE 1 .
0106	PE6	Segment 6 Event of R&S Program 5. Range: same as in PE 1 .
0107	PE7	Segment 7 Event of R&S Program 5. Range: same as in PE 1 .
0108	PE 1	Segment 1 Event of R&S Program 6. Range: 0 to 15. See op. Manual.
0109	PE2	Segment 2 Event of R&S Program 6. Range: same as in PE 1 .
0110	PE3	Segment 3 Event of R&S Program 6. Range: same as in PE 1 .
0111	PE4	Segment 4 Event of R&S Program 6. Range: same as in PE 1 .
0112	PE5	Segment 5 Event of R&S Program 6. Range: same as in PE 1 .
0113	PE6	Segment 6 Event of R&S Program 6. Range: same as in PE 1 .
0114	PE7	Segment 7 Event of R&S Program 6. Range: same as in PE 1 .
0115	PE 1	Segment 1 Event of R&S Program 7. Range: 0 to 15. See op. Manual.
0116	PE2	Segment 2 Event of R&S Program 7. Range: same as in PE 1 .
0117	PE3	Segment 3 Event of R&S Program 7. Range: same as in PE 1 .
0118	PE4	Segment 4 Event of R&S Program 7. Range: same as in PE 1 .
0119	PE5	Segment 5 Event of R&S Program 7. Range: same as in PE 1 .
0120	PE6	Segment 6 Event of R&S Program 7. Range: same as in PE 1 .
0121	PE7	Segment 7 Event of R&S Program 7. Range: same as in PE 1 .
0122	PEtol	R&S Program 1 Tolerance Range: 0 to valor de (SPHL - SPLL).
0123	LP	Program 1 Link Range: 0 to 7
0124	PE 1	Time 1 of Program 1. Range: 0 to 9999 minutes.
0125	PE2	Time 2 of Program 1. Range: 0 to 9999 minutes.
0126	PE3	Time 3 of Program 1. Range: 0 to 9999 minutes.
0127	PE4	Time 4 of Program 1. Range: 0 to 9999 minutes.
0128	PE5	Time 5 of Program 1. Range: 0 to 9999 minutes.
0129	PE6	Time 6 of Program 1. Range: 0 to 9999 minutes.

0130	Pt 7	Time 7 of Program 1. Range: 0 to 9999 minutes.
0131	PSP0	Setpoint 0 of Program 1. Range: From SPLL to SPHL .
0132	PSP1	Setpoint 1 of Program 1 Range: same as in PSP0 .
0133	PSP2	Setpoint 2 of Program 1 Range: same as in PSP0 .
0134	PSP3	Setpoint 3 of Program 1 Range: same as in PSP0 .
0135	PSP4	Setpoint 4 of Program 1 Range: same as in PSP0 .
0136	PSP5	Setpoint 5 of Program 1 Range: same as in PSP0 .
0137	PSP6	Setpoint 6 of Program 1 Range: same as in PSP0 .
0138	PSP7	Setpoint 7 of Program 1 Range: same as in PSP0 .
0139	PtoL	R&S Program 2 Tolerance Range: 0 to valor de (SPHL - SPLL).
0140	LP	Program 2 Link Range: 0 to 7
0141	Pt 1	Time 1 of Program 2. Range: 0 to 9999 minutes.
0142	Pt 2	Time 2 of Program 2. Range: 0 to 9999 minutes.
0143	Pt 3	Time 3 of Program 2. Range: 0 to 9999 minutes.
0144	Pt 4	Time 4 of Program 2. Range: 0 to 9999 minutes.
0145	Pt 5	Time 5 of Program 2. Range: 0 to 9999 minutes.
0146	Pt 6	Time 6 of Program 2. Range: 0 to 9999 minutes.
0147	Pt 7	Time 7 of Program 2. Range: 0 to 9999 minutes.
0148	PSP0	Setpoint 0 of Program 2. Range: From SPLL to SPHL .
0149	PSP1	Setpoint 1 of Program 2 Range: same as in PSP0 .
0150	PSP2	Setpoint 2 of Program 2 Range: same as in PSP0 .
0151	PSP3	Setpoint 3 of Program 2 Range: same as in PSP0 .
0152	PSP4	Setpoint 4 of Program 2 Range: same as in PSP0 .
0153	PSP5	Setpoint 5 of Program 2 Range: same as in PSP0 .
0154	PSP6	Setpoint 6 of Program 2 Range: same as in PSP0 .
0155	PSP7	Setpoint 7 of Program 2 Range: same as in PSP0 .
0156	PtoL	R&S Program 3 Tolerance Range: 0 to (SPHL - SPLL).
0157	LP	Program 3 Link Range: 0 to 7
0158	Pt 1	Time 1 of Program 3. Range: 0 to 9999 minutes.
0159	Pt 2	Time 2 of Program 3 Range: same as in Pt 1 .
0160	Pt 3	Time 3 of Program 3 Range: same as in Pt 1 .
0161	Pt 4	Time 4 of Program 3 Range: same as in Pt 1 .
0162	Pt 5	Time 5 of Program 3 Range: same as in Pt 1 .
0163	Pt 6	Time 6 of Program 3 Range: same as in Pt 1 .
0164	Pt 7	Time 7 of Program 3 Range: same as in Pt 1 .
0165	PSP0	Setpoint 0 of Program 3. Range: from SPLL to SPHL .
0166	PSP1	Setpoint 1 of Program 3 Range: same as in PSP0 .
0167	PSP2	Setpoint 2 of Program 3 Range: same as in PSP0 .
0168	PSP3	Setpoint 3 of Program 3 Range: same as in PSP0 .
0169	PSP4	Setpoint 4 of Program 3 Range: same as in PSP0 .
0170	PSP5	Setpoint 5 of Program 3 Range: same as in PSP0 .
0171	PSP6	Setpoint 6 of Program 3 Range: same as in PSP0 .
0172	PSP7	Setpoint 7 of Program 3 Range: same as in PSP0 .
0173	PtoL	R&S Program 4 Tolerance Range: 0 to (SPHL - SPLL).
0174	LP	Program 4 Link Range: 0 to 7
0175	Pt 1	Time 1 of Program 4 Range: 0 to 9999 (in minutes)

0176	Pt 2	Time 2 of Program 4 Range: same as in Pt 1 .
0177	Pt 3	Time 3 of Program 4 Range: same as in Pt 1 .
0178	Pt 4	Time 4 of Program 4 Range: same as in Pt 1 .
0179	Pt 5	Time 5 of Program 4 Range: same as in Pt 1 .
0180	Pt 6	Time 6 of Program 4 Range: same as in Pt 1 .
0181	Pt 7	Time 7 of Program 4 Range: same as in Pt 1 .
0182	PSP0	Setpoint 0 of Program 4. Range: from SPLL to SPHL .
0183	PSP1	Setpoint 1 of Program 4 Range: same as in PSP0 .
0184	PSP2	Setpoint 2 of Program 4 Range: same as in PSP0 .
0185	PSP3	Setpoint 3 of Program 4 Range: same as in PSP0 .
0186	PSP4	Setpoint 4 of Program 4 Range: same as in PSP0 .
0187	PSP5	Setpoint 5 of Program 4 Range: same as in PSP0 .
0188	PSP6	Setpoint 6 of Program 4 Range: same as in PSP0 .
0189	PSP7	Setpoint 7 of Program 4 Range: same as in PSP0 .
0190	PtoL	R&S Program 5 Tolerance Range: 0 to (SPHL - SPLL).
0191	LP	Program 5 Link Range: 0 to 7
0192	Pt 1	Time 1 of Program 5 Range: 0 to 9999 (in minutes)
0193	Pt 2	Time 2 of Program 5 Range: same as in Pt 1 .
0194	Pt 3	Time 3 of Program 5 Range: same as in Pt 1 .
0195	Pt 4	Time 4 of Program 5 Range: same as in Pt 1 .
0196	Pt 5	Time 5 of Program 5 Range: same as in Pt 1 .
0197	Pt 6	Time 6 of Program 5 Range: same as in Pt 1 .
0198	Pt 7	Time 7 of Program 5 Range: same as in Pt 1 .
0199	PSP0	Setpoint 0 of Program 5. Range: from SPLL to SPHL .
0200	PSP1	Setpoint 1 of Program 5 Range: same as in PSP0 .
0201	PSP2	Setpoint 2 of Program 5 Range: same as in PSP0 .
0202	PSP3	Setpoint 3 of Program 5 Range: same as in PSP0 .
0203	PSP4	Setpoint 4 of Program 5 Range: same as in PSP0 .
0204	PSP5	Setpoint 5 of Program 5 Range: same as in PSP0 .
0205	PSP6	Setpoint 6 of Program 5 Range: same as in PSP0 .
0206	PSP7	Setpoint 7 of Program 5 Range: same as in PSP0 .
0207	PtoL	R&S Program 6 Tolerance Range: 0 to (SPHL - SPLL).
0208	LP	Program 6 Link Range: 0 to 7
0209	Pt 1	Time 1 of Program 6 Range: 0 to 9999 (in minutes)
0210	Pt 2	Time 2 of Program 6 Range: same as in Pt 1 .
0211	Pt 3	Time 3 of Program 6 Range: same as in Pt 1 .
0212	Pt 4	Time 4 of Program 6 Range: same as in Pt 1 .
0213	Pt 5	Time 5 of Program 6 Range: same as in Pt 1 .
0214	Pt 6	Time 6 of Program 6 Range: same as in Pt 1 .
0215	Pt 7	Time 7 of Program 6 Range: same as in Pt 1 .
0216	PSP0	Setpoint 0 of Program 6. Range: from SPLL to SPHL .
0217	PSP1	Setpoint 1 of Program 6 Range: same as in PSP0 .

0218	PSP2	Setpoint 2 of Program 6 Range: same as in PSP0 .
0219	PSP3	Setpoint 3 of Program 6 Range: same as in PSP0 .
0220	PSP4	Setpoint 4 of Program 6 Range: same as in PSP0 .
0221	PSP5	Setpoint 5 of Program 6 Range: same as in PSP0 .
0222	PSP6	Setpoint 6 of Program 6 Range: same as in PSP0 .
0223	PSP7	Setpoint 7 of Program 6 Range: same as in PSP0 .
0224	PtOL	R&S Program 7 Tolerance Range: 0 to (SPHL - SPLL).
0225	LP	Program 7 Link Range: 0 to 7
0226	Pt1	Time 1 of Program 7 Range: 0 to 9999 (in minutes)
0227	Pt2	Time 2 of Program 7 Range: same as in Pt1 .
0228	Pt3	Time 3 of Program 7 Range: same as in Pt1 .
0229	Pt4	Time 4 of Program 7 Range: same as in Pt1 .
0230	Pt5	Time 5 of Program 7 Range: same as in Pt1 .
0231	Pt6	Time 6 of Program 7 Range: same as in Pt1 .
0232	Pt7	Time 7 of Program 7 Range: same as in Pt1 .
0233	PSP0	Setpoint 0 of Program 7. Range: from SPLL to SPHL .
0234	PSP1	Setpoint 1 of Program 7 Range: same as in PSP0 .
0235	PSP2	Setpoint 2 of Program 7 Range: same as in PSP0 .
0236	PSP3	Setpoint 3 of Program 7 Range: same as in PSP0 .
0237	PSP4	Setpoint 4 of Program 7 Range: same as in PSP0 .
0238	PSP5	Setpoint 5 of Program 7 Range: same as in PSP0 .
0239	PSP6	Setpoint 6 of Program 7 Range: same as in PSP0 .
0240	PSP7	Setpoint 7 of Program 7 Range: same as in PSP0 .

Status Word 2	bit 0 – Automatic (0- manual; 1- automatic) bit 1 – Run (0-stop; 1-run) bit 2 – Control Action (0- reverse; 1 - direct) bit 3 – Reserved bit 4 – Auto-tune (0-no; 1-yes) bit 5 – Alarm 1 power-up inhibit (0-no; 1-yes) bit 6 – Alarm 2 power-up inhibit (0-no; 1-yes) bit 7 – Alarm 3 power-up inhibit (0-no; 1-yes) bit 8 – Alarm 4 power-up inhibit (0-no; 1-yes) bit 9 – Unit (0-°C; 1-°F) bit 10 – Reserved bit 11 – Output 1 status bit 12 – Output 2 status bit 13 – Output 3 status bit 14 – Output 4 status bit 15 – Output 5 status
Status Word 3	bit 0 – Very low PV conversion (0-no; 1-yes) bit 1 – Negative conversion after calibration (0-no; 1-yes) bit 2 – Very high PV conversion (0-no; 1-yes) bit 3 – Exceeded linearization limit (0-no; 1-yes) bit 4 – Very high Pt100 cable resistance (0-no; 1-yes) bit 5 – Self zero conversion out of range (0-no; 1-yes) bit 6 – Self span conversion out of range (0-no; 1-yes) bit 7 – Cold junction conversion out of range (0-no; 1-yes) bit 8 – Reserved bit 9 – Reserved bit 10 – Reserved bit 11 – Reserved bit 12 – Reserved bit 13 – Reserved bit 14 – Reserved bit 15 – Reserved

Table 2: Values of Status Words

Writing to an output bit is only possible if the output has no function assigned to it (the output is configured to OFF in Alarm Cycle).

Coil Status	Output description
1	Output 1 Status (I/O1)
2	Output 2 Status (I/O2)
3	Output 3 Status (I/O3)
4	Output 4 Status (I/O4)
5	Output 5 Status (I/O5)

Register	Value format
Status Word 1	bit 0 – Alarm 1 (0-inactive; 1-active) bit 1 – Alarm 2 (0-inactive; 1-active) bit 2 – Alarm 3 (0-inactive; 1-active) bit 3 – Alarm 4 (0-inactive; 1-active) bit 4 – Input – I/O 5 (0- inactive; 1- active) bit 5 – Input – I/O 3 (0- inactive; 1- active) bit 6 – Input – I/O 4 (0- inactive; 1- active) (N1100) - Input – I/O 6 (0- inactive; 1- active) (N2000) bit 7 – Reserved bit 8 – Hardware type bit 9 – Hardware type bit 10 – Reserved bit 11 – Reserved bit 12 – Reserved bit 13 – Reserved bit 14 – Reserved bit 15 – Reserved

Exception Responses – Error Conditions

The MODBUS RTU protocol checks the CRC in the data blocks received.

Reception errors are detected by the CRC, causing the controller to discard the packet, not sending any reply to the master.

After receiving an error-free packet, the controller processes the packet and verifies whether the request is valid or not, sending back an exception error code in case of an invalid request. Response frames containing error codes have the most significant bit of the Modbus command set.

If a WRITE command sends an out-of-range value to a parameter, the controller will clamp the value to the parameter range limits, replying with a value that reflects these limits (maximum or minimum value allowed for the parameter).

The controller ignores broadcast READ commands; the controller processes only broadcast WRITE commands.

Error Code	Error Description
01	Invalid Command
02	Invalid Register Number or out of range
03	Invalid Register Quantity or out of range