N1200 / N1200HC

Communication Protocol – V2.0x A

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 = $\overline{D}$: 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, 19200, 38400, 57600 or 115200 bps.
- Data Bits: 8
- Parity: None, Even or Odd.
- 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*

16 - *Preset Multiple Registers* (Block write to multiple holding registers)

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.

PrtY: Paraty.

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 SP	Read: Active control SP (main SP, from ramp and soak or from remote SP). Write: to main SP Range: from **SPLL** to **SPHL**.
0001	PV	Read: Process Variable. Write: Not allowed. Range: Minimum value is the one configured in **SPLL** and the maximum value is the one configured in **SPHL**. Decimal point position depends on **dPPo** value. In case of temperature reading, the value read is always multiplied by 10, independently of **dPPo** value.
0002	MV	Read: Output Power in automatic or manual mode. Write: Not allowed. See address 28. Range: 0 to 1000 (0.0 to 100.0%).
0003	Remote SP type	Read/Write: Selected input type for remote SP. Range: 0 to 3
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: XXYYh, where: XX→menu cycle number (check item 4 - INSTALLATION/CONNECTIONS) 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: 48 (30h) – N1200; 18 (12h) – N1200HC; 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 9999 (0.00 to 99.99)
0012	**dt**	Derivative Time (in seconds). Range: 0 to 3000 (0.0 to 300.0)
0013	**Pb**	Proportional Band (in percentage) Range: 0 to 5000 (0.0 to 500.0)
0014	**Prtb**	Read/Write: Time base for the ramp and soak programs. Range: 0 – 1 (seconds/minutes)
0015	**ct**	Cycle Time (PWM, in seconds) Range: 5 to 1000 (0.5 to 100.0)
0016	**FrEQ**	Read/Write: Mains frequency. Range: 0 – 1 (60/50Hz)
0017	**HYSt**	On/Off Control Hysteresis (in selected type engineering unit). Range: 0 to **SPHL** - **SPLL**
0018	**FLtr**	Read/Write: PV digital filter gain. Range: 0 – 20
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	Reserved	Internal use.
0022	Reserved	Internal use.

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 *Setpoint* (Prompt *Setpoint*). Range: from **SPLL** to **SPHL**.
0026	**SPLL**	*Setpoint* Low limit. Range: minimum value depends on the input type selected in **tYPE** (see Table 1) to **SPHL**.
0027	**SPHL**	*Setpoint* High limit. Range: minimum value is **SPLL** and maximum depends on the input type selected in **tYPE** (see Table 1).
0028	Reserved	Internal use.
0029	**oFFS**	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	**SP.A1**	Alarm 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	**SP.A2**	
0033	**SP.A3**	
0034	**SP.A4**	
0035	**FuA1**	Alarm Function. Range: 0 to 10 0→**oFF**; 1→ **lErr**; 2→**rS** 3→**Lo**; 4→**H I** 5→**d IF**; 6→**d IFL**; 7→**d IFH** 8→**HbL**; 9→**HbH**; 10→**HbLH**
0036	**FuA2**	
0037	**FuA3**	
0038	**FuA4**	
0039	**HYA1**	Alarm Hysteresis. Range: 0 to 9999 (0.00 to 99.99%)
0040	**HYA2**	
0041	**HYA3**	
0042	**HYA4**	
0043	**tYPE**	PV input type Range: 0 to 22. See operation manual.
0044	**Addr**	Communication slave address Range: 1 to 247
0045	**bAud**	*Communication Baud-Rate*. Range: 0 to 7 0→1200 1→2400 2→4800 3→9600 4→19200 5→32400 6→57600 7→115200
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	**Atun**	Auto tune enable. Range: 0→no; 1→yes.
0050	**bLA1**	Alarm power-up inhibit. Range: 0→no; 1→yes.
0051	**bLA2**	
0052	**bLA3**	
0053	**bLA4**	

0054	Key	Key press remote action. Range: 0 to 9 1: key P 2: key ∧ (UP) 4: key ∨ (DOWN) 8: key < (BACK) 9: key P and <
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**	I/O Function. Refer to operation manual for more details.
0058	**Io 2**	
0059	**Io 3**	
0060	**Io 4**	
0061	**Io 5**	
0062	**A It1**	Alarm 1 Time 1. Range: 0 to 6500s Refer to operation manual for more details.
0063	**A It2**	Alarm 1 Time 2 (in seconds) Range: same as in **A It 1**.
0064	**A2t 1**	Alarm 2 Time 1 (in seconds) Range: same as in **A It 1**.
0065	**A2t2**	Alarm 2 Time 2 (in seconds) Range: same as in **A It 1**.
0066	**SFSt**	Soft-Start time (in seconds) Range: 0 to 9999
0067	**un It**	Temperature unit. Range: 0 to 1 0→°C; 1→°F.
0068	**bIAS**	Bias. Range: -100 to +100%.
0069	Reserved	Internal use
0070	R&S Segment	Ramp and Soak segment being executed (read only). Range: 0 to 9
0071	**Pr n**	Ramp and Soak segment to be viewed or edited. Range: 1 to 20
0072	**E Pr**	Ramp and Soak segment to be executed Range: 0 to 20
0073	Remaining time R&S	Indicates the remaining time of the Ramp and Soak segment.
0074	**SQrt**	Square root of a linear input. Range: 0->Disable;1->Enable.
0075	Calibration PV Low	Enter the low input value currently applied in the PV input for calibration purposes.
0076	Calibration PV High	Enter the high input value currently applied in the PV input for calibration purposes.
0077	Calib. remote SP Low	Enter the low input value currently applied in the remote setpoint input for calibration purposes.
0078	Calib. remote SP High	Enter the high input value currently applied in the remote setpoint input for calibration purposes.
0079	**rtLL**	Retransmission low limit
0080	**rthL**	Retransmission high limit

0081	FLSh	Enables the top display blinking as a function of the selected alarm. Range: 0 to 15. Check instruction manual for further details.
0082	A3t 1	Time 1 of the alarm 3 timing (in seconds) Range: same as in **A 1t 1**.
0083	A3t2	Time 2 of the alarm 3 timing (in seconds) Range: same as in **A 1t2**.
0084	A4t 1	Time 1 of the alarm 4 timing (in seconds) Range: same as in **A 1t 1**.
0085	A4t2	Time 2 of the alarm 4 timing (in seconds) Range: same as in **A 1t2**.
0086	rStr	Restores original default calibration. Range: 0 to 1; 0-> do not restore; 1-> restore calibration
0087	PASS	Allows defining a new access password, always different from zero. Read: 0
0088	Prot	Password protection level. Range: 1 to 7. Check instruction manual for further details.
0089	PrtY	Serial communication parity. Range: 0 to 2. 0-> no parity; 1 - > even parity; 2 - >odd parity;
0090	Reserved	Internal use
0091	Reserved	Internal use
0092	Reserved	Internal use
0093	Reserved	Internal use
0094	Reserved	Internal use
0095	Reserved	Internal use
0096	Reserved	Internal use
0097	Reserved	Internal use
0098	ErSP	Enables remote setpoint. Range: 0 to 1. 0 - > Remote setpoint depends on I/O configuration 1 - > Force remote setpoint
0099	Reserved	Internal use
0100	PE 1	Segment 1 Event of R&S Program 1. Range: 0 to 15. Check table 6 of the instruction manual.
0101	PE2	Segment 2 Event of R&S Program 1. Range: same as in *PE 1*
0102	PE3	Segment 3 Event of R&S Program 1. Range: same as in **PE 1**.
0103	PE4	Segment 4 Event of R&S Program 1. Range: same as in **PE 1**.
0104	PE5	Segment 5 Event of R&S Program 1. Range: same as in **PE 1**.
0105	PE6	Segment 6 Event of R&S Program 1. Range: same as in **PE 1**.
0106	PE7	Segment 7 Event of R&S Program 1. Range: same as in **PE 1**.
0107	PE8	Segment 8 Event of R&S Program 1. Range: same as in **PE 1**.
0108	PE9	Segment 9 Event of R&S Program 1. Range: same as in *PE 1*.
0109	PE 1	Segment 1 Event of R&S Program 2. Range: same as in **PE 1** of Program 1.
0110	PE2	Segment 2 Event of R&S Program 2. Range: same as in **PE 1**.
0111	PE3	Segment 3 Event of R&S Program 2. Range: same as in **PE 1**.
0112	PE4	Segment 4 Event of R&S Program 2. Range: same as in **PE 1**.
0113	PE5	Segment 5 Event of R&S Program 2. Range: same as in **PE 1**.
0114	PE6	Segment 6 Event of R&S Program 2. Range: same as in **PE 1**.
0115	PE7	Segment 7 Event of R&S Program 2. Range: same as in **PE 1**.
0116	PE8	Segment 8 Event of R&S Program 2. Range: same as in **PE 1**.
0117	PE9	Segment 9 Event of R&S Program 2. Range: same as in **PE 1**.
0119	PE 1	Segment 1 Event of R&S Program 3. Range: same as in **PE 1** of Program 1.
0120	PE2	Segment 2 Event of R&S Program 3. Range: same as in **PE 1**.
0118	PE3	Segment 3 Event of R&S Program 3. Range: same as in **PE 1**.
0121	PE4	Segment 4 Event of R&S Program 3. Range: same as in **PE 1**.
0122	PE5	Segment 5 Event of R&S Program 3. Range: same as in **PE 1**.
0123	PE6	Segment 6 Event of R&S Program 3. Range: same as in **PE 1**.
0124	PE7	Segment 7 Event of R&S Program 3. Range: same as in **PE 1**.
0125	PE8	Segment 8 Event of R&S Program 3. Range: same as in **PE 1**.
0126	PE9	Segment 9 Event of R&S Program 3. Range: same as in **PE 1**.
0127	PE 1	Segment 1 Event of R&S Program 4. Range: same as in **PE 1** of Program 1.
0128	PE2	Segment 2 Event of R&S Program 4. Range: same as in **PE 1**.
0129	PE3	Segment 3 Event of R&S Program 4. Range: same as in **PE 1**.
0130	PE4	Segment 4 Event of R&S Program 4. Range: same as in **PE 1**.
0131	PE5	Segment 5 Event of R&S Program 4. Range: same as in **PE 1**.

0132	PE6	Segment 6 Event of R&S Program 4. Range: same as in **PE 1**.
0133	PE7	Segment 7 Event of R&S Program 4. Range: same as in **PE 1**.
0134	PE8	Segment 8 Event of R&S Program 4. Range: same as in **PE 1**.
0135	PE9	Segment 9 Event of R&S Program 4. Range: same as in **PE 1**.
0136	PE 1	Segment 1 Event of R&S Program 5. Range: same as in **PE 1** of Program 1.
0137	PE2	Segment 2 Event of R&S Program 5. Range: same as in **PE 1**.
0138	PE3	Segment 3 Event of R&S Program 5. Range: same as in **PE 1**.
0139	PE4	Segment 4 Event of R&S Program 5. Range: same as in **PE 1**.
0140	PE5	Segment 5 Event of R&S Program 5. Range: same as in **PE 1**.
0141	PE6	Segment 6 Event of R&S Program 5. Range: same as in **PE 1**.
0142	PE7	Segment 7 Event of R&S Program 5. Range: same as in **PE 1**.
0143	PE8	Segment 8 Event of R&S Program 5. Range: same as in **PE 1**.
0144	PE9	Segment 9 Event of R&S Program 5. Range: same as in **PE 1**.
0145	PE 1	Segment 1 Event of R&S Program 6. Range: same as in **PE 1**.
0146	PE2	Segment 2 Event of R&S Program 6. Range: same as in **PE 1**.
0147	PE3	Segment 3 Event of R&S Program 6. Range: same as in **PE 1**.
0148	PE4	Segment 4 Event of R&S Program 6. Range: same as in **PE 1**.
0149	PE5	Segment 5 Event of R&S Program 6. Range: same as in **PE 1**.
0150	PE6	Segment 6 Event of R&S Program 6. Range: same as in **PE 1**.
0151	PE7	Segment 7 Event of R&S Program 6. Range: same as in **PE 1**.
0152	PE8	Segment 8 Event of R&S Program 6. Range: same as in **PE 1**.
0153	PE9	Segment 9 Event of R&S Program 6. Range: same as in **PE 1**.
0154	PE 1	Segment 1 Event of R&S Program 7. Range: same as in **PE 1** for Program 1.
0155	PE2	Segment 2 Event of R&S Program 7. Range: same as in **PE 1**.
0156	PE3	Segment 3 Event of R&S Program 7. Range: same as in **PE 1**.
0157	PE4	Segment 4 Event of R&S Program 7. Range: same as in **PE 1**.
0158	PE5	Segment 5 Event of R&S Program 7. Range: same as in **PE 1**.
0159	PE6	Segment 6 Event of R&S Program 7. Range: same as in **PE 1**.
0160	PE7	Segment 7 Event of R&S Program 7. Range: same as in **PE 1**.
0161	PE8	Segment 8 Event of R&S Program 7. Range: same as in **PE 1**.
0162	PE9	Segment 9 Event of R&S Program 7. Range: same as in **PE 1**.
0163	PE 1	Segment 1 Event of R&S Program 8. Range: same as in **PE 1** of Program 1.
0164	PE2	Segment 2 Event of R&S Program 8. Range: same as in **PE 1**.
0165	PE3	Segment 3 Event of R&S Program 8. Range: same as in **PE 1**.
0166	PE4	Segment 4 Event of R&S Program 8. Range: same as in **PE 1**.
0167	PE5	Segment 5 Event of R&S Program 8. Range: same as in **PE 1**.
0168	PE6	Segment 6 Event of R&S Program 8. Range: same as in **PE 1**.
0169	PE7	Segment 7 Event of R&S Program 8. Range: same as in **PE 1**.
0170	PE8	Segment 8 Event of R&S Program 8. Range: same as in **PE 1**.
0171	PE9	Segment 9 Event of R&S Program 8. Range: same as in **PE 1**.
0172	PE 1	Segment 1 Event of R&S Program 9. Range: same as in **PE 1** of Program 1.
0173	PE2	Segment 2 Event of R&S Program 9. Range: same as in **PE 1**.
0174	PE3	Segment 3 Event of R&S Program 9. Range: same as in **PE 1**.
0175	PE4	Segment 4 Event of R&S Program 9. Range: same as in **PE 1**.
0176	PE5	Segment 5 Event of R&S Program 9. Range: same as in **PE 1**.
0177	PE6	Segment 6 Event of R&S Program 9. Range: same as in **PE 1**.
0178	PE7	Segment 7 Event of R&S Program 9. Range: same as in **PE 1**.
0179	PE8	Segment 8 Event of R&S Program 9. Range: same as in **PE 1**.
0180	PE9	Segment 9 Event of R&S Program 9. Range: same as in **PE 1**.
0181	PE 1	Segment 1 Event of R&S Program 10. Range: same as in **PE 1** of Program 1.

0182	PE2	Segment 2 Event of R&S Program 10. Range: same as in **PE 1**.
0183	PE3	Segment 3 Event of R&S Program 10. Range: same as in **PE 1**.
0184	PE4	Segment 4 Event of R&S Program 10. Range: same as in **PE 1**.
0185	PE5	Segment 5 Event of R&S Program 10. Range: same as in **PE 1**.
0186	PE6	Segment 6 Event of R&S Program 10. Range: same as in **PE 1**.
0187	PE7	Segment 7 Event of R&S Program 10. Range: same as in **PE 1**.
0188	PE8	Segment 8 Event of R&S Program 10. Range: same as in **PE 1**.
0189	PE9	Segment 9 Event of R&S Program 10. Range: same as in **PE 1**.
0190	PE 1	Segment 1 Event of R&S Program 11. Range: same as in **PE 1** of Program 1.
0191	PE2	Segment 2 Event of R&S Program 11. Range: same as in **PE 1**.
0192	PE3	Segment 3 Event of R&S Program 11. Range: same as in **PE 1**.
0193	PE4	Segment 4 Event of R&S Program 11. Range: same as in **PE 1**.
0194	PE5	Segment 5 Event of R&S Program 11. Range: same as in **PE 1**.
0195	PE6	Segment 6 Event of R&S Program 11. Range: same as in **PE 1**.
0196	PE7	Segment 7 Event of R&S Program 11. Range: same as in **PE 1**.
0197	PE8	Segment 8 Event of R&S Program 11. Range: same as in **PE 1**.
0198	PE9	Segment 9 Event of R&S Program 11. Range: same as in **PE 1**.
0199	PE 1	Segment 1 Event of R&S Program 12. Range: same as in **PE 1** of Program 1.
0200	PE2	Segment 2 Event of R&S Program 12. Range: same as in **PE 1**.
0201	PE3	Segment 3 Event of R&S Program 12. Range: same as in **PE 1**.
0202	PE4	Segment 4 Event of R&S Program 12. Range: same as in **PE 1**.
0203	PE5	Segment 5 Event of R&S Program 12. Range: same as in **PE 1**.
0204	PE6	Segment 6 Event of R&S Program 12. Range: same as in **PE 1**.
0205	PE7	Segment 7 Event of R&S Program 12. Range: same as in **PE 1**.
0206	PE8	Segment 8 Event of R&S Program 12. Range: same as in **PE 1**.
0207	PE9	Segment 9 Event of R&S Program 12. Range: same as in **PE 1**.
0208	PE 1	Segment 1 Event of R&S Program 13. Range: same as in **PE 1** of Program 1.
0209	PE2	Segment 2 Event of R&S Program 13. Range: same as in **PE 1**.
0210	PE3	Segment 3 Event of R&S Program 13. Range: same as in **PE 1**.
0211	PE4	Segment 4 Event of R&S Program 13. Range: same as in **PE 1**.
0212	PE5	Segment 5 Event of R&S Program 13. Range: same as in **PE 1**.
0213	PE6	Segment 6 Event of R&S Program 13. Range: same as in **PE 1**.
0214	PE7	Segment 7 Event of R&S Program 13. Range: same as in **PE 1**.
0215	PE8	Segment 8 Event of R&S Program 13. Range: same as in **PE 1**.
0216	PE9	Segment 9 Event of R&S Program 13. Range: same as in **PE 1**.
0217	PE 1	Segment 1 Event of R&S Program 14. Range: same as in **PE 1** of Program 1.
0218	PE2	Segment 2 Event of R&S Program 14. Range: same as in **PE 1**.
0219	PE3	Segment 3 Event of R&S Program 14. Range: same as in **PE 1**.
0220	PE4	Segment 4 Event of R&S Program 14. Range: same as in **PE 1**.
0221	PE5	Segment 5 Event of R&S Program 14. Range: same as in **PE 1**.
0222	PE6	Segment 6 Event of R&S Program 14. Range: same as in **PE 1**.
0223	PE7	Segment 7 Event of R&S Program 14. Range: same as in **PE 1**.
0224	PE8	Segment 8 Event of R&S Program 14. Range: same as in **PE 1**.
0225	PE9	Segment 9 Event of R&S Program 14. Range: same as in **PE 1**.
0226	PE 1	Segment 1 Event of R&S Program 15. Range: same as in **PE 1** of Program 1.
0227	PE2	Segment 2 Event of R&S Program 15. Range: same as in **PE 1**.
0228	PE3	Segment 3 Event of R&S Program 15. Range: same as in **PE 1**.
0229	PE4	Segment 4 Event of R&S Program 15. Range: same as in **PE 1**.
0230	PE5	Segment 5 Event of R&S Program 15. Range: same as in **PE 1**.
0231	PE6	Segment 6 Event of R&S Program 15. Range: same as in **PE 1**.

0232	PE7	Segment 7 Event of R&S Program 15. Range: same as in PE 1.
0233	PE8	Segment 8 Event of R&S Program 15. Range: same as in PE 1.
0234	PE9	Segment 9 Event of R&S Program 15. Range: same as in PE 1.
0235	PE 1	Segment 1 Event of R&S Program 16. Range: same as in PE 1 of Program 1.
0236	PE2	Segment 2 Event of R&S Program 16. Range: same as in PE 1.
0237	PE3	Segment 3 Event of R&S Program 16. Range: same as in PE 1.
0238	PE4	Segment 4 Event of R&S Program 16. Range: same as in PE 1.
0239	PE5	Segment 5 Event of R&S Program 16. Range: same as in PE 1.
0240	PE6	Segment 6 Event of R&S Program 16. Range: same as in PE 1.
0241	PE7	Segment 7 Event of R&S Program 16. Range: same as in PE 1.
0242	PE8	Segment 8 Event of R&S Program 16. Range: same as in PE 1.
0243	PE9	Segment 9 Event of R&S Program 16. Range: same as in PE 1.
0244	PE 1	Segment 1 Event of R&S Program 17. Range: same as in PE 1 of Program 1.
0245	PE2	Segment 2 Event of R&S Program 17. Range: same as in PE 1.
0246	PE3	Segment 3 Event of R&S Program 17. Range: same as in PE 1.
0247	PE4	Segment 4 Event of R&S Program 17. Range: same as in PE 1.
0248	PE5	Segment 5 Event of R&S Program 17. Range: same as in PE 1.
0249	PE6	Segment 6 Event of R&S Program 17. Range: same as in PE 1.
0250	PE7	Segment 7 Event of R&S Program 17. Range: same as in PE 1.
0251	PE8	Segment 8 Event of R&S Program 17. Range: same as in PE 1.
0252	PE9	Segment 9 Event of R&S Program 17. Range: same as in PE 1.
0253	PE 1	Segment 1 Event of R&S Program 18. Range: same as in PE 1 of Program 1.
0254	PE2	Segment 2 Event of R&S Program 18. Range: same as in PE 1.
0255	PE3	Segment 3 Event of R&S Program 18. Range: same as in PE 1.
0256	PE4	Segment 4 Event of R&S Program 18. Range: same as in PE 1.
0257	PE5	Segment 5 Event of R&S Program 18. Range: same as in PE 1.
0258	PE6	Segment 6 Event of R&S Program 18. Range: same as in PE 1.
0259	PE7	Segment 7 Event of R&S Program 18. Range: same as in PE 1.
0260	PE8	Segment 8 Event of R&S Program 18. Range: same as in PE 1.
0261	PE9	Segment 9 Event of R&S Program 18. Range: same as in PE 1.
0262	PE 1	Segment 1 Event of R&S Program 19. Range: same as in PE 1 of Program 1.
0263	PE2	Segment 2 Event of R&S Program 19. Range: same as in PE 1.
0264	PE3	Segment 3 Event of R&S Program 19. Range: same as in PE 1.
0265	PE4	Segment 4 Event of R&S Program 19. Range: same as in PE 1.
0266	PE5	Segment 5 Event of R&S Program 19. Range: same as in PE 1.
0267	PE6	Segment 6 Event of R&S Program 19. Range: same as in PE 1.
0268	PE7	Segment 7 Event of R&S Program 19. Range: same as in PE 1.
0269	PE8	Segment 8 Event of R&S Program 19. Range: same as in PE 1.
0270	PE9	Segment 9 Event of R&S Program 19. Range: same as in PE 1.
0271	PE 1	Segment 1 Event of R&S Program 20. Range: same as in PE 1 of Program 1.
0272	PE2	Segment 2 Event of R&S Program 20. Range: same as in PE 1.
0273	PE3	Segment 3 Event of R&S Program 20. Range: same as in PE 1.
0274	PE4	Segment 4 Event of R&S Program 20. Range: same as in PE 1.
0275	PE5	Segment 5 Event of R&S Program 20. Range: same as in PE 1.
0276	PE6	Segment 6 Event of R&S Program 20. Range: same as in PE 1.
0277	PE7	Segment 7 Event of R&S Program 20. Range: same as in PE 1.
0278	PE8	Segment 8 Event of R&S Program 20. Range: same as in PE 1.
0279	PE9	Segment 9 Event of R&S Program 20. Range: same as in PE 1.
0280	PtoL	R&S Program 1 Tolerance Range: From 0 to (SPPL - SPLL).
0281	PtoL	R&S Program 2 Tolerance Range: From 0 to (SPPL - SPLL).

0282	PtoL	R&S Program 3 Tolerance Range: From 0 to (SPHL - SPLL).
0283	PtoL	R&S Program 4 Tolerance Range: From 0 to (SPHL - SPLL).
0284	PtoL	R&S Program 5 Tolerance Range: From 0 to (SPHL - SPLL).
0285	PtoL	R&S Program 6 Tolerance Range: From 0 to (SPHL - SPLL).
0286	PtoL	R&S Program 7 Tolerance Range: From 0 to (SPHL - SPLL).
0287	PtoL	R&S Program 8 Tolerance Range: From 0 to (SPHL - SPLL).
0288	PtoL	R&S Program 9 Tolerance Range: From 0 to (SPHL - SPLL).
0289	PtoL	R&S Program 10 Tolerance Range: From 0 to (SPHL - SPLL).
0290	PtoL	R&S Program 11 Tolerance Range: From 0 to (SPHL - SPLL).
0291	PtoL	R&S Program 12 Tolerance Range: From 0 to (SPHL - SPLL).
0292	PtoL	R&S Program 13 Tolerance Range: From 0 to (SPHL - SPLL).
0293	PtoL	R&S Program 14 Tolerance Range: From 0 to (SPHL - SPLL).
0294	PtoL	R&S Program 15 Tolerance Range: From 0 to (SPHL - SPLL).
0295	PtoL	R&S Program 16 Tolerance Range: From 0 to (SPHL - SPLL).
0296	PtoL	R&S Program 17 Tolerance Range: From 0 to (SPHL - SPLL).
0297	PtoL	R&S Program 18 Tolerance Range: From 0 to (SPHL - SPLL).
0298	PtoL	R&S Program 19 Tolerance Range: From 0 to (SPHL - SPLL).
0299	PtoL	R&S Program 20 Tolerance Range: From 0 to (SPHL - SPLL).
0300	LP	R&S Program 1 Link Range: 0 to 20
0301	LP	R&S Program 2 Link Range: 0 to 20
0302	LP	R&S Program 3 Link Range: 0 to 20
0303	LP	R&S Program 4 Link Range: 0 to 20
0304	LP	R&S Program 5 Link Range: 0 to 20
0305	LP	R&S Program 6 Link Range: 0 to 20
0306	LP	R&S Program 7 Link Range: 0 to 20
0307	LP	R&S Program 8 Link Range: 0 to 20
0308	LP	R&S Program 9 Link Range: 0 to 20
0309	LP	R&S Program 10 Link Range: 0 to 20
0310	LP	R&S Program 11 Link Range: 0 to 20
0311	LP	R&S Program 12 Link Range: 0 to 20
0312	LP	R&S Program 13 Link Range: 0 to 20
0313	LP	R&S Program 14 Link Range: 0 to 20
0314	LP	R&S Program 15 Link Range: 0 to 20
0315	LP	R&S Program 16 Link Range: 0 to 20
0316	LP	R&S Program 17 Link Range: 0 to 20
0317	LP	R&S Program 18 Link Range: 0 to 20
0318	LP	R&S Program 19 Link Range: 0 to 20
0319	LP	R&S Program 20 Link Range: 0 to 20
0320	Pt 1	Time 1 of Program 1. Range: 0 to 9999 minutes.
0321	Pt2	Time 2 of Program 1. Range: 0 to 9999 minutes.
0322	Pt3	Time 3 of Program 1. Range: 0 to 9999 minutes.
0323	Pt4	Time 4 of Program 1. Range: 0 to 9999 minutes.
0324	Pt5	Time 5 of Program 1. Range: 0 to 9999 minutes.
0325	Pt6	Time 6 of Program 1. Range: 0 to 9999 minutes.
0326	Pt7	Time 7 of Program 1. Range: 0 to 9999 minutes.
0327	Pt8	Time 8 of Program 1. Range: 0 to 9999 minutes.
0328	Pt9	Time 9 of Program 1. Range: 0 to 9999 minutes.
0329	Pt 1	Time 1 of Program 2. Range: 0 to 9999 minutes.
0330	Pt2	Time 2 of Program 2. Range: 0 to 9999 minutes.
0331	Pt3	Time 3 of Program 2. Range: 0 to 9999 minutes.
0332	Pt4	Time 4 of Program 2. Range: 0 to 9999 minutes.
0333	Pt5	Time 5 of Program 2. Range: 0 to 9999 minutes.
0334	Pt6	Time 6 of Program 2. Range: 0 to 9999 minutes.
0335	Pt7	Time 7 of Program 2. Range: 0 to 9999 minutes.
0336	Pt8	Time 8 of Program 2. Range: 0 to 9999 minutes.
0337	Pt9	Time 9 of Program 2. Range: 0 to 9999 minutes.
0338	Pt 1	Time 1 of Program 3. Range: 0 to 9999 minutes.
0339	Pt2	Time 2 of Program 3. Range: 0 to 9999 minutes.
0340	Pt3	Time 3 of Program 3. Range: 0 to 9999 minutes.
0341	Pt4	Time 4 of Program 3. Range: 0 to 9999 minutes.
0342	Pt5	Time 5 of Program 3. Range: 0 to 9999 minutes.

0343	Pt6	Time 6 of Program 3. Range: 0 to 9999 minutes.
0344	Pt7	Time 7 of Program 3. Range: 0 to 9999 minutes.
0345	Pt8	Time 8 of Program 3. Range: 0 to 9999 minutes.
0346	Pt9	Time 9 of Program 3. Range: 0 to 9999 minutes.
0347	Pt 1	Time 1 of Program 4. Range: 0 to 9999 minutes.
0348	Pt2	Time 2 of Program 4. Range: 0 to 9999 minutes.
0349	Pt3	Time 3 of Program 4. Range: 0 to 9999 minutes.
0350	Pt4	Time 4 of Program 4. Range: 0 to 9999 minutes.
0351	Pt5	Time 5 of Program 4. Range: 0 to 9999 minutes.
0352	Pt6	Time 6 of Program 4. Range: 0 to 9999 minutes.
0353	Pt7	Time 7 of Program 4. Range: 0 to 9999 minutes.
0354	Pt8	Time 8 of Program 4. Range: 0 to 9999 minutes.
0355	Pt9	Time 9 of Program 4. Range: 0 to 9999 minutes.
0356	Pt 1	Time 1 of Program 5. Range: 0 to 9999 minutes.
0357	Pt2	Time 2 of Program 5. Range: 0 to 9999 minutes.
0358	Pt3	Time 3 of Program 5. Range: 0 to 9999 minutes.
0359	Pt4	Time 4 of Program 5. Range: 0 to 9999 minutes.
0360	Pt5	Time 5 of Program 5. Range: 0 to 9999 minutes.
0361	Pt6	Time 6 of Program 5. Range: 0 to 9999 minutes.
0362	Pt7	Time 7 of Program 5. Range: 0 to 9999 minutes.
0363	Pt8	Time 8 of Program 5. Range: 0 to 9999 minutes.
0364	Pt9	Time 9 of Program 5. Range: 0 to 9999 minutes.
0365	Pt 1	Time 1 of Program 6. Range: 0 to 9999 minutes.
0366	Pt2	Time 2 of Program 6. Range: 0 to 9999 minutes.
0367	Pt3	Time 3 of Program 6. Range: 0 to 9999 minutes.
0368	Pt4	Time 4 of Program 6. Range: 0 to 9999 minutes.
0369	Pt5	Time 5 of Program 6. Range: 0 to 9999 minutes.
0370	Pt6	Time 6 of Program 6. Range: 0 to 9999 minutes.
0371	Pt7	Time 7 of Program 6. Range: 0 to 9999 minutes.
0372	Pt8	Time 8 of Program 6. Range: 0 to 9999 minutes.
0373	Pt9	Time 9 of Program 6. Range: 0 to 9999 minutes.
0374	Pt 1	Time 1 of Program 7. Range: 0 to 9999 minutes.
0375	Pt2	Time 2 of Program 7. Range: 0 to 9999 minutes.
0376	Pt3	Time 3 of Program 7. Range: 0 to 9999 minutes.
0377	Pt4	Time 4 of Program 7. Range: 0 to 9999 minutes.
0378	Pt5	Time 5 of Program 7. Range: 0 to 9999 minutes.
0379	Pt6	Time 6 of Program 7. Range: 0 to 9999 minutes.
0380	Pt7	Time 7 of Program 7. Range: 0 to 9999 minutes.
0381	Pt8	Time 8 of Program 7. Range: 0 to 9999 minutes.
0382	Pt9	Time 9 of Program 7. Range: 0 to 9999 minutes.
0383	Pt 1	Time 1 of Program 8. Range: 0 to 9999 minutes.
0384	Pt2	Time 2 of Program 8. Range: 0 to 9999 minutes.
0385	Pt3	Time 3 of Program 8. Range: 0 to 9999 minutes.
0386	Pt4	Time 4 of Program 8. Range: 0 to 9999 minutes.
0387	Pt5	Time 5 of Program 8. Range: 0 to 9999 minutes.
0388	Pt6	Time 6 of Program 8. Range: 0 to 9999 minutes.
0389	Pt7	Time 7 of Program 8. Range: 0 to 9999 minutes.
0390	Pt8	Time 8 of Program 8. Range: 0 to 9999 minutes.
0391	Pt9	Time 9 of Program 8. Range: 0 to 9999 minutes.
0392	Pt 1	Time 1 of Program 9. Range: 0 to 9999 minutes.
0393	Pt2	Time 2 of Program 9. Range: 0 to 9999 minutes.
0394	Pt3	Time 3 of Program 9. Range: 0 to 9999 minutes.
0395	Pt4	Time 4 of Program 9. Range: 0 to 9999 minutes.
0396	Pt5	Time 5 of Program 9. Range: 0 to 9999 minutes.
0397	Pt6	Time 6 of Program 9. Range: 0 to 9999 minutes.
0398	Pt7	Time 7 of Program 9. Range: 0 to 9999 minutes.
0399	Pt8	Time 8 of Program 9. Range: 0 to 9999 minutes.
0400	Pt9	Time 9 of Program 9. Range: 0 to 9999 minutes.
0401	Pt 1	Time 1 of Program 10. Range: 0 to 9999 minutes.
0402	Pt2	Time 2 of Program 10. Range: 0 to 9999 minutes.
0403	Pt3	Time 3 of Program 10. Range: 0 to 9999 minutes.
0404	Pt4	Time 4 of Program 10. Range: 0 to 9999 minutes.
0405	Pt5	Time 5 of Program 10. Range: 0 to 9999 minutes.
0406	Pt6	Time 6 of Program 10. Range: 0 to 9999 minutes.
0407	Pt7	Time 7 of Program 10. Range: 0 to 9999 minutes.
0408	Pt8	Time 8 of Program 10. Range: 0 to 9999 minutes.
0409	Pt9	Time 9 of Program 10. Range: 0 to 9999 minutes.
410	Pt 1	Time 1 of Program 11. Range: 0 to 9999 minutes.
411	Pt2	Time 2 of Program 11. Range: 0 to 9999 minutes.
412	Pt3	Time 3 of Program 11. Range: 0 to 9999 minutes.
413	Pt4	Time 4 of Program 11. Range: 0 to 9999 minutes.
414	Pt5	Time 5 of Program 11. Range: 0 to 9999 minutes.
415	Pt6	Time 6 of Program 11. Range: 0 to 9999 minutes.
416	Pt7	Time 7 of Program 11. Range: 0 to 9999 minutes.
417	Pt8	Time 8 of Program 11. Range: 0 to 9999 minutes.
418	Pt9	Time 9 of Program 11. Range: 0 to 9999 minutes.
419	Pt 1	Time 1 of Program 12. Range: 0 to 9999 minutes.
420	Pt2	Time 2 of Program 12. Range: 0 to 9999 minutes.
421	Pt3	Time 3 of Program 12. Range: 0 to 9999 minutes.
422	Pt4	Time 4 of Program 12. Range: 0 to 9999 minutes.
423	Pt5	Time 5 of Program 12. Range: 0 to 9999 minutes.
424	Pt6	Time 6 of Program 12. Range: 0 to 9999 minutes.
425	Pt7	Time 7 of Program 12. Range: 0 to 9999 minutes.
426	Pt8	Time 8 of Program 12. Range: 0 to 9999 minutes.
427	Pt9	Time 9 of Program 12. Range: 0 to 9999 minutes.
428	Pt 1	Time 1 of Program 13. Range: 0 to 9999 minutes.
429	Pt2	Time 2 of Program 13. Range: 0 to 9999 minutes.
430	Pt3	Time 3 of Program 13. Range: 0 to 9999 minutes.
431	Pt4	Time 4 of Program 13. Range: 0 to 9999 minutes.
432	Pt5	Time 5 of Program 13. Range: 0 to 9999 minutes.
433	Pt6	Time 6 of Program 13. Range: 0 to 9999 minutes.
434	Pt7	Time 7 of Program 13. Range: 0 to 9999 minutes.
435	Pt8	Time 8 of Program 13. Range: 0 to 9999 minutes.
436	Pt9	Time 9 of Program 13. Range: 0 to 9999 minutes.
437	Pt 1	Time 1 of Program 14. Range: 0 to 9999 minutes.
438	Pt2	Time 2 of Program 14. Range: 0 to 9999 minutes.

439	Pt3	Time 3 of Program 14. Range: 0 to 9999 minutes.
440	Pt4	Time 4 of Program 14. Range: 0 to 9999 minutes.
441	Pt5	Time 5 of Program 14. Range: 0 to 9999 minutes.
442	Pt6	Time 6 of Program 14. Range: 0 to 9999 minutes.
443	Pt7	Time 7 of Program 14. Range: 0 to 9999 minutes.
444	Pt8	Time 8 of Program 14. Range: 0 to 9999 minutes.
445	Pt9	Time 9 of Program 14. Range: 0 to 9999 minutes.
446	Pt 1	Time 1 of Program 15. Range: 0 to 9999 minutes.
447	Pt2	Time 2 of Program 15. Range: 0 to 9999 minutes.
448	Pt3	Time 3 of Program 15. Range: 0 to 9999 minutes.
449	Pt4	Time 4 of Program 15. Range: 0 to 9999 minutes.
450	Pt5	Time 5 of Program 15. Range: 0 to 9999 minutes.
451	Pt6	Time 6 of Program 15. Range: 0 to 9999 minutes.
452	Pt7	Time 7 of Program 15. Range: 0 to 9999 minutes.
453	Pt8	Time 8 of Program 15. Range: 0 to 9999 minutes.
454	Pt9	Time 9 of Program 15. Range: 0 to 9999 minutes.
455	Pt 1	Time 1 of Program 16. Range: 0 to 9999 minutes.
456	Pt2	Time 2 of Program 16. Range: 0 to 9999 minutes.
457	Pt3	Time 3 of Program 16. Range: 0 to 9999 minutes.
458	Pt4	Time 4 of Program 16. Range: 0 to 9999 minutes.
459	Pt5	Time 5 of Program 16. Range: 0 to 9999 minutes.
460	Pt6	Time 6 of Program 16. Range: 0 to 9999 minutes.
461	Pt7	Time 7 of Program 16. Range: 0 to 9999 minutes.
462	Pt8	Time 8 of Program 16. Range: 0 to 9999 minutes.
463	Pt9	Time 9 of Program 16. Range: 0 to 9999 minutes.
464	Pt 1	Time 1 of Program 17. Range: 0 to 9999 minutes.
465	Pt2	Time 2 of Program 17. Range: 0 to 9999 minutes.
466	Pt3	Time 3 of Program 17. Range: 0 to 9999 minutes.
467	Pt4	Time 4 of Program 17. Range: 0 to 9999 minutes.
468	Pt5	Time 5 of Program 17. Range: 0 to 9999 minutes.
469	Pt6	Time 6 of Program 17. Range: 0 to 9999 minutes.
470	Pt7	Time 7 of Program 17. Range: 0 to 9999 minutes.
471	Pt8	Time 8 of Program 17. Range: 0 to 9999 minutes.
472	Pt9	Time 9 of Program 17. Range: 0 to 9999 minutes.
473	Pt 1	Time 1 of Program 18. Range: 0 to 9999 minutes.
474	Pt2	Time 2 of Program 18. Range: 0 to 9999 minutes.
475	Pt3	Time 3 of Program 18. Range: 0 to 9999 minutes.
476	Pt4	Time 4 of Program 18. Range: 0 to 9999 minutes.
477	Pt5	Time 5 of Program 18. Range: 0 to 9999 minutes.
478	Pt6	Time 6 of Program 18. Range: 0 to 9999 minutes.
479	Pt7	Time 7 of Program 18. Range: 0 to 9999 minutes.
480	Pt8	Time 8 of Program 18. Range: 0 to 9999 minutes.
481	Pt9	Time 9 of Program 18. Range: 0 to 9999 minutes.
482	Pt 1	Time 1 of Program 19. Range: 0 to 9999 minutes.
483	Pt2	Time 2 of Program 19. Range: 0 to 9999 minutes.
484	Pt3	Time 3 of Program 19. Range: 0 to 9999 minutes.
485	Pt4	Time 4 of Program 19. Range: 0 to 9999 minutes.
486	Pt5	Time 5 of Program 19. Range: 0 to 9999 minutes.
487	Pt6	Time 6 of Program 19. Range: 0 to 9999 minutes.
488	Pt7	Time 7 of Program 19. Range: 0 to 9999 minutes.
489	Pt8	Time 8 of Program 19. Range: 0 to 9999 minutes.
490	Pt9	Time 9 of Program 19. Range: 0 to 9999 minutes.
491	Pt 1	Time 1 of Program 20. Range: 0 to 9999 minutes.
492	Pt2	Time 2 of Program 20. Range: 0 to 9999 minutes.
493	Pt3	Time 3 of Program 20. Range: 0 to 9999 minutes.
494	Pt4	Time 4 of Program 20. Range: 0 to 9999 minutes.
495	Pt5	Time 5 of Program 20. Range: 0 to 9999 minutes.
496	Pt6	Time 6 of Program 20. Range: 0 to 9999 minutes.
497	Pt7	Time 7 of Program 20. Range: 0 to 9999 minutes.
498	Pt8	Time 8 of Program 20. Range: 0 to 9999 minutes.
499	Pt9	Time 9 of Program 20. Range: 0 to 9999 minutes.
500	PSP0	Setpoint 0 of Program 1. Range: From SPLL to SPHL.
501	PSP 1	Setpoint 1 of Program 1 (R&S) Range: same as in PSP0.
502	PSP2	Setpoint 2 of Program 1 (R&S) Range: same as in PSP0.
503	PSP3	Setpoint 3 of Program 1 (R&S) Range: same as in PSP0.
504	PSP4	Setpoint 4 of Program 1 (R&S) Range: same as in PSP0.
505	PSP5	Setpoint 5 of Program 1 (R&S) Range: same as in PSP0.
506	PSP6	Setpoint 6 of Program 1 (R&S) Range: same as in PSP0.
507	PSP7	Setpoint 7 of Program 1 (R&S) Range: same as in PSP0.
508	PSP8	Setpoint 8 of Program 1 (R&S) Range: same as in PSP0.
509	PSP9	Setpoint 9 of Program 1 (R&S) Range: same as in PSP0.
510	PSP0	Setpoint 0 of Program 2. Range: From SPLL to SPHL.
511	PSP 1	Setpoint 1 of Program 2 (R&S) Range: same as in PSP0.
512	PSP2	Setpoint 2 of Program (R&S) Range: same as in PSP0.
513	PSP3	Setpoint 3 of Program 2 (R&S) Range: same as in PSP0.
514	PSP4	Setpoint 4 of Program 2 (R&S) Range: same as in PSP0.
515	PSP5	Setpoint 5 of Program 2 (R&S) Range: same as in PSP0.
516	PSP6	Setpoint 6 of Program 2 (R&S) Range: same as in PSP0.
517	PSP7	Setpoint 7 of Program 2 (R&S) Range: same as in PSP0.

518	PSP8	Setpoint 8 of Program 2 (R&S) Range: same as in PSP0.
519	PSP9	Setpoint 9 of Program 2 (R&S) Range: same as in PSP0.
520	PSP0	Setpoint 0 of Program 3. Range: From SPLL to SPHL.
521	PSP 1	Setpoint 1 of Program 3 (R&S) Range: same as in PSP0.
522	PSP2	Setpoint 2 of Program 3 (R&S) Range: same as in PSP0.
523	PSP3	Setpoint 3 of Program 3 (R&S) Range: same as in PSP0.
524	PSP4	Setpoint 4 of Program 3 (R&S) Range: same as in PSP0.
525	PSP5	Setpoint 5 of Program 3 (R&S) Range: same as in PSP0.
526	PSP6	Setpoint 6 of Program 3 (R&S) Range: same as in PSP0.
527	PSP7	Setpoint 7 of Program 3 (R&S) Range: same as in PSP0.
528	PSP8	Setpoint 8 of Program 3 (R&S) Range: same as in PSP0.
529	PSP9	Setpoint 9 of Program 3 (R&S) Range: same as in PSP0.
530	PSP0	Setpoint 0 of Program 4. Range: From SPLL to SPHL.
531	PSP 1	Setpoint 1 of Program 4 (R&S) Range: same as in PSP0.
532	PSP2	Setpoint 2 of Program 4 (R&S) Range: same as in PSP0.
533	PSP3	Setpoint 3 of Program 4 (R&S) Range: same as in PSP0.
534	PSP4	Setpoint 4 of Program 4 (R&S) Range: same as in PSP0.
535	PSP5	Setpoint 5 of Program 4 (R&S) Range: same as in PSP0.
536	PSP6	Setpoint 6 of Program 4 (R&S) Range: same as in PSP0.
537	PSP7	Setpoint 7 of Program 4 (R&S) Range: same as in PSP0.
538	PSP8	Setpoint 8 of Program 4 (R&S) Range: same as in PSP0.
539	PSP9	Setpoint 9 of Program 4 (R&S) Range: same as in PSP0.
540	PSP0	Setpoint 0 of Program 5. Range: From SPLL to SPHL.
541	PSP 1	Setpoint 1 of Program 5 (R&S) Range: same as in PSP0.
542	PSP2	Setpoint 2 of Program 5 (R&S) Range: same as in PSP0.
543	PSP3	Setpoint 3 of Program 5 (R&S) Range: same as in PSP0.
544	PSP4	Setpoint 4 of Program 5 (R&S) Range: same as in PSP0.
545	PSP5	Setpoint 5 of Program 5 (R&S) Range: same as in PSP0.
546	PSP6	Setpoint 6 of Program 5 (R&S) Range: same as in PSP0.
547	PSP7	Setpoint 7 of Program 5 (R&S) Range: same as in PSP0.
548	PSP8	Setpoint 8 of Program 5 (R&S) Range: same as in PSP0.
549	PSP9	Setpoint 9 of Program 5 (R&S) Range: same as in PSP0.
550	PSP0	Setpoint 0 of Program 6. Range: From SPLL to SPHL.
551	PSP 1	Setpoint 1 of Program 6 (R&S) Range: same as in PSP0.
552	PSP2	Setpoint 2 of Program 6 (R&S) Range: same as in PSP0.
553	PSP3	Setpoint 3 of Program 6 (R&S) Range: same as in PSP0.
554	PSP4	Setpoint 4 of Program 6 (R&S) Range: same as in PSP0.
555	PSP5	Setpoint 5 of Program 6 (R&S) Range: same as in PSP0.
556	PSP6	Setpoint 6 of Program 6 (R&S) Range: same as in PSP0.
557	PSP7	Setpoint 7 of Program 6 (R&S) Range: same as in PSP0.
558	PSP8	Setpoint 8 of Program 6 (R&S) Range: same as in PSP0.
559	PSP9	Setpoint 9 of Program 6 (R&S) Range: same as in PSP0.
560	PSP0	Setpoint 0 of Program 7. Range: From SPLL to SPHL.
561	PSP 1	Setpoint 1 of Program 7 (R&S) Range: same as in PSP0.
562	PSP2	Setpoint 2 of Program 7 (R&S) Range: same as in PSP0.
563	PSP3	Setpoint 3 of Program 7 (R&S) Range: same as in PSP0.
564	PSP4	Setpoint 4 of Program 7 (R&S) Range: same as in PSP0.
565	PSP5	Setpoint 5 of Program 7 (R&S) Range: same as in PSP0.
566	PSP6	Setpoint 6 of Program 7 (R&S) Range: same as in PSP0.
567	PSP7	Setpoint 7 of Program 7 (R&S) Range: same as in PSP0.

568	PSP8	Setpoint 8 of Program 7 (R&S) Range: same as in PSP0.
569	PSP9	Setpoint 9 of Program 7 (R&S) Range: same as in PSP0.
570	PSP0	Setpoint 0 of Program 8. Range: From SPLL to SPHL.
571	PSP1	Setpoint 1 of Program 8 (R&S) Range: same as in PSP0.
572	PSP2	Setpoint 2 of Program 8 (R&S) Range: same as in PSP0.
572	PSP3	Setpoint 3 of Program 8 (R&S) Range: same as in PSP0.
574	PSP4	Setpoint 4 of Program 8 (R&S) Range: same as in PSP0.
575	PSP5	Setpoint 5 of Program 8 (R&S) Range: same as in PSP0.
576	PSP6	Setpoint 6 of Program 8 (R&S) Range: same as in PSP0.
577	PSP7	Setpoint 7 of Program 8 (R&S) Range: same as in PSP0.
578	PSP8	Setpoint 8 of Program 8 (R&S) Range: same as in PSP0.
579	PSP9	Setpoint 9 of Program 8 (R&S) Range: same as in PSP0.
580	PSP0	Setpoint 0 of Program 9. Range: From SPLL to SPHL.
581	PSP1	Setpoint 1 of Program 9 (R&S) Range: same as in PSP0.
582	PSP2	Setpoint 2 of Program 9 (R&S) Range: same as in PSP0.
583	PSP3	Setpoint 3 of Program 9 (R&S) Range: same as in PSP0.
584	PSP4	Setpoint 4 of Program 9 (R&S) Range: same as in PSP0.
585	PSP5	Setpoint 5 of Program 9 (R&S) Range: same as in PSP0.
586	PSP6	Setpoint 6 of Program 9 (R&S) Range: same as in PSP0.
587	PSP7	Setpoint 7 of Program 9 (R&S) Range: same as in PSP0.
588	PSP8	Setpoint 8 of Program 9 (R&S) Range: same as in PSP0.
589	PSP9	Setpoint 9 of Program 9 (R&S) Range: same as in PSP0.
590	PSP0	Setpoint 0 of Program 10. Range: From SPLL to SPHL.
591	PSP1	Setpoint 1 of Program 10 (R&S) Range: same as in PSP0.
592	PSP2	Setpoint 2 of Program 10 (R&S) Range: same as in PSP0.
593	PSP3	Setpoint 3 of Program 10 (R&S) Range: same as in PSP0.
594	PSP4	Setpoint 4 of Program 10 (R&S) Range: same as in PSP0.
595	PSP5	Setpoint 5 of Program 10 (R&S) Range: same as in PSP0.
596	PSP6	Setpoint 6 of Program 10 (R&S) Range: same as in PSP0.
597	PSP7	Setpoint 7 of Program 10 (R&S) Range: same as in PSP0.
598	PSP8	Setpoint 8 of Program 10 (R&S) Range: same as in PSP0.
599	PSP9	Setpoint 9 of Program 10 (R&S) Range: same as in PSP0.
600	PSP0	Setpoint 0 of Program 11. Range: From SPLL to SPHL.
601	PSP1	Setpoint 1 of Program 11 (R&S) Range: same as in PSP0.
602	PSP2	Setpoint 2 of Program 11 (R&S) Range: same as in PSP0.
603	PSP3	Setpoint 3 of Program 11 (R&S) Range: same as in PSP0.
604	PSP4	Setpoint 4 of Program 11 (R&S) Range: same as in PSP0.
605	PSP5	Setpoint 5 of Program 11 (R&S) Range: same as in PSP0.
606	PSP6	Setpoint 6 of Program 11 (R&S) Range: same as in PSP0.
607	PSP7	Setpoint 7 of Program 11 (R&S) Range: same as in PSP0.
608	PSP8	Setpoint 8 of Program 11 (R&S) Range: same as in PSP0.
609	PSP9	Setpoint 9 of Program 11 (R&S) Range: same as in PSP0.
610	PSP0	Setpoint 0 of Program 12. Range: From SPLL to SPHL.
611	PSP1	Setpoint 1 of Program 12 (R&S) Range: same as in PSP0.
612	PSP2	Setpoint 2 of Program 12 (R&S) Range: same as in PSP0.
613	PSP3	Setpoint 3 of Program 12 (R&S) Range: same as in PSP0.
614	PSP4	Setpoint 4 of Program 12 (R&S) Range: same as in PSP0.
615	PSP5	Setpoint 5 of Program 12 (R&S) Range: same as in PSP0.
616	PSP6	Setpoint 6 of Program 12 (R&S) Range: same as in PSP0.
617	PSP7	Setpoint 7 of Program 12 (R&S) Range: same as in PSP0.

618	PSP8	Setpoint 8 of Program 12 (R&S) Range: same as in PSP0.
619	PSP9	Setpoint 9 of Program 12 (R&S) Range: same as in PSP0.
620	PSP0	Setpoint 0 of Program 13. Range: From SPLL to SPHL.
621	PSP1	Setpoint 1 of Program 13 (R&S) Range: same as in PSP0.
622	PSP2	Setpoint 2 of Program 13 (R&S) Range: same as in PSP0.
623	PSP3	Setpoint 3 of Program 13 (R&S) Range: same as in PSP0.
624	PSP4	Setpoint 4 of Program 13 (R&S) Range: same as in PSP0.
625	PSP5	Setpoint 5 of Program 13 (R&S) Range: same as in PSP0.
626	PSP6	Setpoint 6 of Program 13 (R&S) Range: same as in PSP0.
627	PSP7	Setpoint 7 of Program 13 (R&S) Range: same as in PSP0.
628	PSP8	Setpoint 8 of Program 13 (R&S) Range: same as in PSP0.
629	PSP9	Setpoint 9 of Program 13 (R&S) Range: same as in PSP0.
630	PSP0	Setpoint 0 of Program 14. Range: From SPLL to SPHL.
631	PSP1	Setpoint 1 of Program 14 (R&S) Range: same as in PSP0.
632	PSP2	Setpoint 2 of Program 14 (R&S) Range: same as in PSP0.
633	PSP3	Setpoint 3 of Program 14 (R&S) Range: same as in PSP0.
634	PSP4	Setpoint 4 of Program 14 (R&S) Range: same as in PSP0.
635	PSP5	Setpoint 5 of Program 14 (R&S) Range: same as in PSP0.
636	PSP6	Setpoint 6 of Program 14 (R&S) Range: same as in PSP0.
637	PSP7	Setpoint 7 of Program 14 (R&S) Range: same as in PSP0.
638	PSP8	Setpoint 8 of Program 14 (R&S) Range: same as in PSP0.
639	PSP9	Setpoint 9 of Program 14 (R&S) Range: same as in PSP0.
640	PSP0	Setpoint 0 of Program 15. Range: From SPLL to SPHL.
641	PSP1	Setpoint 1 of Program 15 (R&S) Range: same as in PSP0.
642	PSP2	Setpoint 2 of Program 15 (R&S) Range: same as in PSP0.
643	PSP3	Setpoint 3 of Program 15 (R&S) Range: same as in PSP0.
644	PSP4	Setpoint 4 of Program 15 (R&S) Range: same as in PSP0.
645	PSP5	Setpoint 5 of Program 15 (R&S) Range: same as in PSP0.
646	PSP6	Setpoint 6 of Program 15 (R&S) Range: same as in PSP0.
647	PSP7	Setpoint 7 of Program 15 (R&S) Range: same as in PSP0.
648	PSP8	Setpoint 8 of Program 15 (R&S) Range: same as in PSP0.
649	PSP9	Setpoint 9 of Program 15 (R&S) Range: same as in PSP0.
650	PSP0	Setpoint 0 of Program 16. Range: From SPLL to SPHL.
651	PSP1	Setpoint 1 of Program 16 (R&S) Range: same as in PSP0.
652	PSP2	Setpoint 2 of Program 16 (R&S) Range: same as in PSP0.
653	PSP3	Setpoint 3 of Program 16 (R&S) Range: same as in PSP0.
654	PSP4	Setpoint 4 of Program 16 (R&S) Range: same as in PSP0.
655	PSP5	Setpoint 5 of Program 16 (R&S) Range: same as in PSP0.
656	PSP6	Setpoint 6 of Program 16 (R&S) Range: same as in PSP0.
657	PSP7	Setpoint 7 of Program 16 (R&S) Range: same as in PSP0.
658	PSP8	Setpoint 8 of Program 16 (R&S) Range: same as in PSP0.
659	PSP9	Setpoint 9 of Program 16 (R&S) Range: same as in PSP0.
660	PSP0	Setpoint 0 of Program 17. Range: From SPLL to SPHL.
661	PSP1	Setpoint 1 of Program 17 (R&S) Range: same as in PSP0.
662	PSP2	Setpoint 2 of Program 17 (R&S) Range: same as in PSP0.
663	PSP3	Setpoint 3 of Program 17 (R&S) Range: same as in PSP0.
664	PSP4	Setpoint 4 of Program 17 (R&S) Range: same as in PSP0.
665	PSP5	Setpoint 5 of Program 17 (R&S) Range: same as in PSP0.
666	PSP6	Setpoint 6 of Program 17 (R&S) Range: same as in PSP0.
667	PSP7	Setpoint 7 of Program 17 (R&S) Range: same as in PSP0.

668	PSP8	Setpoint 8 of Program 17 (R&S) Range: same as in PSP0.
669	PSP9	Setpoint 9 of Program 17 (R&S) Range: same as in PSP0.
670	PSP0	Setpoint 0 of Program 18. Range: From SPLL to SPHL.
671	PSP1	Setpoint 1 of Program 18 (R&S) Range: same as in PSP0.
672	PSP2	Setpoint 2 of Program 18 (R&S) Range: same as in PSP0.
673	PSP3	Setpoint 3 of Program 18 (R&S) Range: same as in PSP0.
674	PSP4	Setpoint 4 of Program 18 (R&S) Range: same as in PSP0.
675	PSP5	Setpoint 5 of Program 18 (R&S) Range: same as in PSP0.
676	PSP6	Setpoint 6 of Program 18 (R&S) Range: same as in PSP0.
677	PSP7	Setpoint 7 of Program 18 (R&S) Range: same as in PSP0.
678	PSP8	Setpoint 8 of Program 18 (R&S) Range: same as in PSP0.
679	PSP9	Setpoint 9 of Program 18 (R&S) Range: same as in PSP0.
680	PSP0	Setpoint 0 of Program 19. Range: From SPLL to SPHL.
681	PSP1	Setpoint 1 of Program 19 (R&S) Range: same as in PSP0.
682	PSP2	Setpoint 2 of Program 19 (R&S) Range: same as in PSP0.
683	PSP3	Setpoint 3 of Program 19 (R&S) Range: same as in PSP0.
684	PSP4	Setpoint 4 of Program 19 (R&S) Range: same as in PSP0.
685	PSP5	Setpoint 5 of Program 19 (R&S) Range: same as in PSP0.
686	PSP6	Setpoint 6 of Program 19 (R&S) Range: same as in PSP0.
687	PSP7	Setpoint 7 of Program 19 (R&S) Range: same as in PSP0.
688	PSP8	Setpoint 8 of Program 19 (R&S) Range: same as in PSP0.
689	PSP9	Setpoint 9 of Program 19 (R&S) Range: same as in PSP0.
690	PSP0	Setpoint 0 of Program 1. Range: From SPLL to SPHL.
691	PSP1	Setpoint 1 of Program 1 (R&S) Range: same as in PSP0.
692	PSP2	Setpoint 2 of Program 1 (R&S) Range: same as in PSP0.
693	PSP3	Setpoint 3 of Program 1 (R&S) Range: same as in PSP0.
694	PSP4	Setpoint 4 of Program 1 (R&S) Range: same as in PSP0.
695	PSP5	Setpoint 5 of Program 1 (R&S) Range: same as in PSP0.
696	PSP6	Setpoint 6 of Program 1 (R&S) Range: same as in PSP0.
697	PSP7	Setpoint 7 of Program 1 (R&S) Range: same as in PSP0.
698	PSP8	Setpoint 8 of Program 1 (R&S) Range: same as in PSP0.
699	PSP9	Setpoint 9 of Program 1 (R&S) Range: same as in PSP0.
700	Reserved	Internal use

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 0 – I/O 5 (0- inactive; 1- active) bit 5 – Input 1 – I/O 3 (0- inactive; 1- active) bit 6 – Input 2 – I/O 4 (0- inactive; 1- active) bit 7 – Reserved bit 8 – Hardware detection value bit 9 – Hardware detection value bit 10 – Hardware detection value bit 11 – Hardware detection value bit 12 – Reserved bit 13 – Reserved bit 14 – Reserved bit 15 – Reserved
Status Word 2	bit 0 – Automatic (0- manual; 1- automatic) bit 1 – Run (0-stop; 1-run) bit 2 – Control Action (0-direct; 1-reverse) 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 – Cold Junction out of range (0-no; 1-yes) bit 7 – Reserved 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)

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

Table 4 – Exception response error codes

1.4 CONFIGURAÇÃO DOS PARÂMETROS DE I/O

Controlador N1200

Função de I/O	**Código**		**Tipo de I/O**
Sem Função	**0**	oFF	Saída
Saída de Alarme 1	**1**	A1	Saída
Saída de Alarme 2	**2**	A2	Saída
Saída de Alarme 3	**3**	A3	Saída
Saída de Alarme 4	**4**	A4	Saída
Saída da função LBD - *Loop break detection*	**5**	Lbd	Saída
Saída de Controle (Relé ou Pulso Digital)	**6**	ctrL	Saída
Alterna modo Automático/Man	**7**	MAn	Entrada Digital
Alterna modo Run/Stop	**8**	run	Entrada Digital
Seleciona SP Remoto	**9**	rSP	Entrada Digital
Congela programa	**10**	HPrG	Entrada Digital
Seleciona programa 1	**11**	Pr 1	Entrada Digital
Saída de Controle Analógica 0 a 20mA	**12**	C.0.20	Saída Analógica
Saída de Controle Analógica 4 a 20mA	**13**	C.4.20	Saída Analógica
Retransmissão de PV 0 a 20mA	**14**	P.0.20	Saída Analógica
Retransmissão de PV 4 a 20mA	**15**	P.4.20	Saída Analógica
Retransmissão de SP 0 a 20mA	**16**	S.0.20	Saída Analógica
Retransmissão de SP 4 a 20mA	**17**	S.4.20	Saída Analógica

Tabela 5 - Códigos para os parâmetros de I/O (N1200)

Controlador N1200HC

Função de I/O	**Código**		**Tipo de I/O**
Sem Função	**0**	oFF	Saída
Saída de Alarme 1	**1**	A1	Saída
Saída de Alarme 2	**2**	A2	Saída
Saída de Alarme 3	**3**	A3	Saída
Saída de Alarme 4	**4**	A4	Saída
Saída da função LBD - *Loop break detection*	**5**	Lbd	Saída
Saída de Controle **1** (Relé ou Pulso Digital)	**6**	Ctr1	Saída
Saída de Controle **2** (Relé ou Pulso Digital)	**7**	Ctr2	Saída
Alterna modo Automático/Man	**8**	MAn	Entrada Digital
Alterna modo Run/Stop	**9**	run	Entrada Digital
Seleciona SP Remoto	**10**	rSP	Entrada Digital
Congela programa	**11**	HPrG	Entrada Digital
Seleciona programa 1	**12**	Pr 1	Entrada Digital
Saída de Controle 1 Analógica 0 a 20mA	**13**	C.0.20	Saída Analógica
Saída de Controle 1 Analógica 4 a 20mA	**14**	C.4.20	Saída Analógica
Saída de Controle 2 Analógica 0 a 20mA	**15**	C.0.20	Saída Analógica
Saída de Controle 2 Analógica 4 a 20mA	**16**	C.4.20	Saída Analógica
Retransmissão de PV 0 a 20mA	**17**	P.0.20	Saída Analógica
Retransmissão de PV 4 a 20mA	**18**	P.4.20	Saída Analógica
Retransmissão de SP 0 a 20mA	**19**	S.0.20	Saída Analógica
Retransmissão de SP 4 a 20mA	**20**	S.4.20	Saída Analógica

Tabela 6 - Códigos para os parâmetros de I/O (N1200HC)