MODBUS/JBUS protocol for MS-MF-MC-XE-XS-XP XF-QF-QP-QD controllers series and JM/JT indicators series

USER INSTRUCTION MANUAL
M.I.U. CS5 - 1/96.10
Cod. J31 - 152 - CS2 IE

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INTRODUCTION

Since communication represents a fundamental element for ASCON instruments, we feel that it is important to provide a systematic definition of the communication functions and as detailed a description as possible of how communication takes place.
ASCON instruments can be equipped with serial communication using both the ASCON protocol and the Modbus/Jbus protocol. This type of protocol is unique and standard on instruments of the QF - QP and QD series.
The aim of this document is to give all the necessary data about Modbus/Jbus serial communication provided on instruments of the MS - MF - MC - XE - XS - XP - XF - QF - QP - QD and JM - JT Series.

CONTENTS

1 • MODBUS & JBUS

1.1 DIFFERENCES BETWEEN MODBUS AND JBUS

The only difference between the two protocols is that MODBUS decrements the address in the tables shown later on by one, so if a variable is located at address 1, variable 1 will be requested with JBUS and variable 0 with MODBUS. In addition, the possible MODBUS addresses start from 0 while the JBUS addresses start from 1.

1.2 REFERENCES

GOULD Gould Modbus Protocol Reference Guide (PI-MBUS-300 Rev. B)
APRIL JBUS Specification

1.3 THE MODBUS PROTOCOL

The MODBUS protocol defines the format and method of communication between a "master" which controls the system and one or more "slaves" which respond to commands sent by the master. It defines how the master and slaves establish and terminate communication, how the transmitter and receiver are identified, how messages are exchanged and how errors are detected.
There may be one master and up to 247 slaves on a common line; this is the protocol's logical limit, the physical interface may limit the number of devices further, for example, the ASCON interface APALS handles a maximum of 64 slaves connected to the line.
All transactions are started by the master. A transaction may be a direct question/answer to a single slave or a broadcast in which the message is sent to all the devices on the line and no answer is given. A transaction consists of a single question/single answer frame or a single broadcast message/no answer frame.
Some of the characteristics of the protocol are not defined. These are: standard interface, baud rate, parity, number of stop bits. The protocol also enables the user to choose between two communication "modes", ASCII and RTU (binary). Only the RTU mode is implemented on ASCON instruments as it is more efficient. The JBUS protocol is functionally identical to MODBUS and differs from it in how the addresses are numbered: with MODBUS, the addresses are numbered starting from zero (0000 = 1st address) while with JBUS, they start from one (0001 = 1st address) and this difference is maintained throughout all addresses. From here on, unless explicitly specified, even though reference is made to MODBUS, the description is valid for both

2 • MESSAGE FORMAT

For communication to take place between the two devices, the message must be put in a "packet". The packet leaves the transmitter through a "port" and is "carried" along the line to a similar "port" on the receiver. MODBUS establishes the format of this packet which includes, for both the master and the slave:

- The address of the device with which the master has established the connection (address 0 corresponds to a broadcast message sent to all slave devices).
- The code of the function that is to be or has been performed.
- The data that is to be exchanged.
- The error check based on the CRC16 algorithm.

If a device detects an error in the message received (in the format, parity or CRC16) the message is considered invalid and rejected, a slave that detects an error in the message will therefore not take any action or answer the question, such as when the address does not correspond to a device on the line.

2.1 THE ADDRESS

As mentioned above, MODBUS transactions always involve the master, which handles the line, and one slave at a time (except in the case of broadcast messages). To identify the user to whom the message is sent, the first character sent is a byte containing the numeric address of the selected slave device. Each of the slaves will therefore be assigned a different address that identifies it uniquely. The valid addresses range from 1 to 247, while address 0, which cannot be assigned to a slave, set at the start of the message sent by the master indicates that the message is to be "broadcast", that is, sent to all the slaves at the same time. Broadcast messages are exclusively those that do not require an answer to carry out their function, i.e. assignments only.

2.2 THE FUNCTION CODE

The second character in the message identifies the function that is to be performed in the message sent by the master, to which the slave answers by sending back the same code to indicate that the function has been performed. On ASCON instruments, a subset of the MODBUS functions has been implemented as follows:

- 01 Read Coil Status
- 02 Read Input Status
- 03 Read Holding Registers
- 04 Read Input registers

- 05 Force Single Coil
- 06 Preset Single register
- 07 Read Status
- 15 Force multiple Coils
- 16 Preset Multiple Registers

In the implementation for ASCON instruments, functions 01 and 02 are functionally identical and interchangeable, as are functions 03 and 04. For a full and detailed description of the functions, see chapter 3.

2.3 THE CRC 16 ALGORITHM

The last two characters in the message contain the Cyclic Redundancy Check based on the CRC16 algorithm. To calculate these two characters, the message (address, function code and data without the start, stop and parity bits) is considered as a single continuous binary number whose most significant bit (MSB) is sent first. The message is first multiplied by x16 (shifted to the left by 16 bits) and then divided by x16+x15+x2+1 expressed as a binary number (1100000000000101). The integer part of the quotient is then rejected and the 16 bit remainder (initialized at FFFFh at the start to avoid messages consisting exclusively of zeros) is added on to the end of the message sent. The resulting message, when divided by the same polynomial (x16+x15+x2+1) by the receiving device must give zero as a remainder if no errors occurred (the receiving device recalculates the CRC).
In reality, as the device that converts the data to be sent into serial form (UART) sends the least significant bit (LSB) first instead of the MSB as it should do for the CRC calculation, the CRC is carried out by inverting the polynomial. In addition, as the MSB of the polynomial only affects the quotient and not the remainder, the remainder is eliminated, thus giving 1010000000000001.
The step by step procedure for the CRC16 calculation is as follows:

1 Load a 16-bit register with FFFFh (all bits set to 1).
2 Execute the exclusive OR of the first character with the high order byte in the register and place the result in the register.
3 Shift the register to the right by one bit.
4 If the bit that left the register on the right (flag) is a 1, execute the exclusive OR of the polynomial 1010000000000001 with the register.
5 Repeat steps 3 and 4 eight times.
6 Execute the exclusive OR of the next character with the high order byte in the register and place the result in the register.
7 Repeat steps 3 to 6 for all the characters in the message.
8 The contents of the 16 bit register are the CRC code that is to be added to the message.

2.4 MESSAGE SYNCHRONIZATION

Message synchronization between the transmitter and the receiver is obtained by inserting a pause of at least 3.5 times the time of one character

between the messages. If the receiving device does not receive for the time required for 3 characters, it considers the previous message completed and concludes that the next byte received will be the first of a new message and, consequently, an address.

3 • THE MODBUS FUNCTIONS

This section provides a detailed description of the MODBUS functions implemented on ASCON instruments.

3.1 READ OUTPUT STATUS (01)

This function is used for requesting the ON or OFF status of binary logical variables. Broadcast mode is not allowed.

Question
In addition to the address of the slave and the function code (01), the message contains the starting address expressed in two bytes and the number of bits to be read, also occupying two bytes. Address numbering starts from zero (bit1 = 0) for MODBUS, or one (bit1 = 1) for JBUS.

Example: Request for slave 17 to read bits 0004 to 0015.

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA bit # HI	DATA bit # LO	CRC HI	CRC LO
11	01	00	03	00	0C	CE	9F

Answer
In addition to the address of the slave and the function code (01), the message comprises a character containing the number of data bytes and the characters containing data. The data are compacted, so one byte contains the status of 8 bits, the least significant bit of the first byte must contain the bit corresponding to the starting address and so on. If the number of bits to be read is not a multiple of 8, the last character must be completed with zeros in the most significant bits.

Example: Answer to the request indicated above.

ADDR	FUNC	DATA Byte Count	DATA bit 04..11	DATA bit 12..15	CRC HI	CRC LO
11	01	02	CD	0B	6D	68

3.2 READ INPUT STATUS (02)

This function works in exactly the same way as the previous one.

3.3 READ OUTPUT REGISTERS (03)

This function is used for requesting the value of 16-bit (word) registers containing numeric variables. Broadcast mode is not allowed.

Question
In addition to the address of the slave and the function code (03), the message contains the starting address expressed in two bytes and the number of words to be read, also occupying two bytes. The maximum number of words that may be read is 125. Address numbering starts from zero (word1 = 0) for MODBUS, or one (word1 = 1) for JBUS.

Example: Request for slave 25 to read registers 069 to 0071.

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA word # HI	DATA word # LO	CRC HI	CRC LO
19	03	00	44	00	03	46	06

Answer
In addition to the address of the slave and the function code (03), the message comprises a character containing the number of data bytes and the characters containing data. The registers require two bytes each, the first of which contains the most significant byte.

Example: Answer to the request indicated above.

ADDR	FUNC	DATA Byte Count	DATA word 69 HI	DATA word 69 LO	DATA word 70 HI	DATA word 70 LO	DATA word 71 HI	DATA word 71 LO	CRC HI	CRC LO
19	03	03	02	2B	00	00	00	64	AF	7A

3.4 READ INPUT REGISTERS (04)

This function works in exactly the same way as the previous one.

3.5 FORCE SINGLE COIL (05)

This function is used for forcing the status of a single binary variable ON or OFF. Broadcast mode is allowed.

Question
In addition to the address of the slave and the function code (05), the message contains the address of the variable to be forced in two bytes and two characters of which the first is set to FFh (255) to force it ON and 00h to force it OFF, while the second is always set to zero. Address numbering starts from zero (bit1 = 0) for MODBUS, from one (bit1 = 1) for JBUS.

Example: Request to force bit 4 on slave 47 ON.

ADDR	FUNC	DATA bit # HI	DATA bit # LO	DATA ON/OFF	DATA (zero)	CRC HI	CRC LO
2F	05	00	03	FF	00	7A	74

Answer
The answer consists in retransmitting the message received once the variable has been changed.

Example: Answer to request mentioned above.

ADDR	FUNC	DATA bit # HI	DATA bit # LO	DATA ON/OFF	DATA (zero)	CRC HI	CRC LO
2F	05	00	03	FF	00	7A	74

3.6 PRESET SINGLE REGISTER (06)

This function is used for setting the value of a single 16-bit register. Broadcast mode is allowed.

Question
In addition to the slave and the function code (06), the message contains the address of the variable expressed in two bytes and the value to be assigned. Address numbering starts from zero (word1 = 0) for MODBUS, from one (word1 = 1) for JBUS.

Example: Request to force address 26 of slave 38 to 926.

ADDR	FUNC	DATA bit # HI	DATA bit # LO	DATA WORD HI	DATA WORD LO	CRC HI	CRC LO
26	06	00	19	03	9E	DF	82

Answer
The answer consists in retransmitting the message received once the variable has been changed.

Example: Answer to request indicated above.

ADDR	FUNC	DATA bit # HI	DATA bit # LO	DATA WORD HI	DATA WORD LO	CRC HI	CRC LO
26	06	00	19	03	9E	DF	82

3.7 READ STATUS (07)

This function is used for reading the status of eight predetermined bits with a compacted message. Broadcast mode is not allowed.

Question

The message consists only of the slave address and the function code (07).

Example: Request of the status of slave 25.

ADDR	FUNC	CRC HI	CRC LO
19	07	4B	E2

Answer

In addition to the address of the slave and the function code (07), the message comprises a character containing the status bits.

Example: Answer to the request indicated above.

ADDR	FUNC	DATA Status Byte	CRC HI	CRC LO
19	07	6D	63	DA

3.8 FORCE MULTIPLE COILS (15)

This function is used for forcing the status of each binary variable in a consecutive block. Broadcast mode is allowed.

Question

In addition to the address of the slave and the function code (15), the message contains the starting address expressed in two bytes, the number of bits to be written, the number of bytes containing the data and the data characters. The data are compacted, so one byte contains the status of 8 bits, the least significant bit of the first byte must contain the bit corresponding to the starting address and so on. If the number of bits to be written is not a multiple of 8, the last character must be completed with zeros in the most significant bits. Address numbering starts from zero (bit1 = 0) for MODBUS, from one (bit1 = 1) for JBUS.

Example: Request to force 4 bits starting from address 1 on slave 12. Bits 1 and 4 forced to "1" and the others to "0".

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA bit # HI	DATA bit # LO	DATA Byte Count	DATA bit 1..4	CRC HI	CRC LO
0C	0F	00	00	00	04	01	09	3F	09

Answer
In addition to the address of the slave and the function code (15), the message contains the starting address and the number of bits written.

Example: Answer to request indicated above.

ADDR	FUNC	DATA	DATA	DATA	DATA	CRC	CRC
		start	start	bit #	bit #		
		Addr HI	Addr LO	HI	LO	HI	LO
0C	0F	00	00	00	04	55	15

3.9 PRESET MULTIPLE REGISTERS (16)

This function is used for setting the value of a consecutive block of 16-bit registers. Broadcast mode is allowed.
Question.
In addition to the address of the slave and the function code (16), the message contains the starting address, the number of words to be written, the number of bytes that contain data and the data characters. Address numbering starts from zero (word1 = 0) for MODBUS, from one (word1 = 1) for JBUS.

NOTE: In the ASCON implementation, this function is present for compatibility but does not permit more than one word to be assigned (word number = 1).

Example: Request to set 1 word to value 268 at address 35 on slave 17.

ADDR	FUNC	DATA	DATA	DATA	DATA	DATA	DATA	DATA	CRC	CRC
		start	start	word #	word #	Byte	word	word		
		AddrHI	AddrLO	HI	LO	Count	35 HI	35 LO	HI	LO
11	10	00	22	00	01	02	01	0C	6c	87

Answer
In addition to the address of the slave and the function code (16), the message contains the starting address and the number of words written.

Example: Answer to the request indicated above.

ADDR	FUNC	DATA	DATA	DATA	DATA	CRC	CRC
		start	start	word #	word #		
		Addr HI	Addr LO	HI	LO	HI	LO
11	10	00	22	00	01	A3	53

In MODBUS there are two types of errors, handled in different ways: transmission errors and operating errors. Transmission errors are errors that change the format of the message, the parity (if used) or the CRC16. A device that detects errors of this type in the message treats it as invalid and gives no answer. When the format of the message is correct but the function requested cannot be executed for some reason, an operating error has occurred. When it detects this kind of error, the slave device answers by sending an error message. This message consists of the address, the code of the function requested, an error code and the CRC. To indicate that the answer is an error message, the function code is returned with the most significant bit set to "1".

Example: Request for slave 10 to read bit 1185.

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA bit # HI	DATA bit # LO	CRC HI	CRC LO
0A	01	04	A1	00	01	AC	63

Answer
The request is for the contents of bit 1185, which is not present on the slave. The slave answers by sending error code "02" (ILLEGAL DATA ADDRESS) and returns the function code 81h (129).

Example: Error code in response to the request indicated above.

ADDR	FUNC	DATA Except. Code	CRC HI	CRC LO
0A	81	02	B0	53

4.1 ERROR CODES

Although the MODBUS standard uses 8 error codes, the ASCON implementation of the protocol uses only four:

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received does not correspond to a function allowed on the addressed slave.
02	ILLEGAL DATA ADDRESS	The address to which the data field refers is not an address allowed on the addressed slave.
03	ILLEGAL DATA VALUE	The value to be assigned, specified in the data field, is not allowed for this address.
07	NAK - NEGATIVE ACKNOWLEDGEMENT	The function cannot be performed under the current operating conditions or an attempt has been made to write in a read-only address.

5 • MODBUS ON THE ASCON INSTRUMENTS

5.1 SERIAL COMMUNICATIONS PARAMETERS

The parameters relative to serial communication are the same as those present on the standard models, with a different set up field:

Parameter	Parameter Code	Set up Field
Address	Addr	0..63 (Ascon), 1..247 (Modbus/Jbus)
Communication Speed	SEbr	0..4
Parity (and Protocol)	SEPA	0..4

If the ASCON protocol is used the address has a 0..63 set up field. If the MODBUS/JBUS protocol is used the value is 1..247.
The communication speed also allows you to set code 0 (9600 baud) both for the MODBUS protocol and ASCON protocol:

Index	Baud Rate
0	9600
1	4800
2	2400
3	1200
4	600

The third parameter, other than having the function which allows selection of the character format and parity control, which are already contained within the ASCON protocol, selects the communication protocol using two additional indexes.

Index	Parity and Protocol
0	ASCON 8 bit, no parity (None)
1	ASCON 7 bit, odd parity (Odd)
2	ASCON 7 bit, even parity (Even)
3	MODBUS 8 bit no parity
4	JBUS 8 bit no parity

5.1.1 "Q..." SERIES SERIAL COMMUNICATIONS PARAMETERS

The serial comms parameters are located in the fifth group of parameters for the QP and QD controllers (fourth group for QF), they are:

Code	Functions	Parameters index
SE.1	SCI enabling, protocol, speed and mode	0...24
Addr.	SCI address	1...247

The operating conditions of the serial comms are defined by the indexes as listed in the following table:

Valore	Protocols	Speed	Mode
0	–	–	Disabled SCI
1	MODBUS	9600	Read only
2		4800	
3		2400	
4		1200	
5	JBUS	9600	
6		4800	
7		2400	
8		1200	
9	MODBUS	9600	Read / Write
10		4800	
11		2400	
12		1200	
13	JBUS	9600	
14		4800	
15		2400	
16		1200	
17	MODBUS	9600	Local / Host
18		4800	
19		2400	
20		1200	
21	JBUS	9600	
22		4800	
23		2400	
24		1200	

The address can be set from 1 to 247 and must be different from the one of any other device on the net.

5.1.2 SERIAL COMMUNICATIONS OPERATING MODES

The serial comms operating modes of the ASCON "Q" series instruments can be selected between the following ones depending upon the SE.1 index::

Read only The serial comms can only read, no one value can be assigned. The configuration and the parameters assignments can only be performed by means of the keyboard. The command assignments can only be performed by

means of the keyboard and/or by the digital inputs.

Read / Write The serial comms can read and assign values (on the addresses where it is permitted). The assignments of the serial comms work simultaneously with the assignments of the keyboard. The same value can be assigned by both the serial comms and the keyboard, the last value received is the the active one.

Local / Host The serial comms assignment is an alternative to the keyboard assignment.
The parameter and commands value assignment of the instrument has two operating modes:

Local This mode is equal to the read only mode. The serial comms can only read while the keyboard is operating. The main menu shows, as first code, SUP. , By pressing the ▷ key the Supervisor mode is selected. The SCI LED is off, when a communication takes place the SCI LED flashes.

Host The serial comms can read and assign values (on the addresses where it is permitted). The keyboard is inhibited except for the pages visualization (see chapter 8) and for the switching to the local mode.
By pressing the F key the code LOC. , appears, the local mode is reached by pressing the ▷ key. The SCI LED is on, when a communication takes place the SCI LED flashes.

5.2 COMMUNICATIONS TIME

The messages, as described in Chapter 2.4, must be exchanged with an internal pause that is less than 3 times the time required for a character to be exchanged, otherwise it would be interpreted as the end of the message. The ASCON instruments with the MODBUS protocol are able to receive and transmit characters without an interval. Between a master message and the following reply on the part of the instrument there is a latent time lapse necessary for the completion of the function. This is connected to the fact that, once a command has been received, the instrument responds only after having completed the requested function. To evaluate the lapse in time for different functions reference can be made to the following expressions:

Request: $T_L \cong 3T_C + T_S$
where:
T_L = Elapsed time.
T_C = Time of a character.
T_S = Variable time from 0 to 10mS which is dependent on the internal processes.

Assignment: $T_L \cong 3T_C + T_S + T_W$

where:

T_L = Elapsed time.

T_C = Time of a character.

T_S = Variable time from 0 to 10mS which is dependent on the internal processes.

T_W = Multiple time of 25mS which is dependent on the number of bytes to be written. For assignment of words, this time can be 0, 25 or 50 mS depending on whether both one or none of the two bytes is equal to the preceding value; for the assignment of bit T_W, it can be a value from 0 to 100mS.

5.3 DATA BASE

The ASCON instrument variables available for serial communication through the MODBUS protocol are contained in two distinct sections: the bit zone and the word zone.

5.4 BIT ZONE

The bit zone is made up of 16 addressable bits that contain information on the functioning status of the instruments. With some instruments, certain bits are not used; the status request for these bits with the 01 and 02 functions is permitted but returns a fixed value of 0; these bits are indicated in the tables by the presence of a hyphen "-". The assignment of the bit status with the 05 and 15 functions is only allowed on addresses in which this is possible, which condition is indicated by "R/W".

5.5 WORD ZONE

The word zone is made up of 128 addressable words that contain control variables and the instrument parameters. With some instruments certain words are not used; the request for the values of these words with the 03 and 04 functions is permitted but returns a fixed value of 0; these words are indicated in the table by the presence of a hyphen "-". The assignment of the word value with the 06 and 16 functions is only allowed on addresses in which this is possible, which condition is indicated by "R/W". The variables and parameters are coded as integer numbers with a plus or minus sign (two's complement) without taking into account the decimal point in the representation (for example: the Proportional Band displayed on the screen with a decimal digit "25.0" is transmitted as 250). Assignment is only allowed within the values assigned to each parameter, any attempt to assign a value outside of those permitted within the field, will cause the instrument to respond with an error message and a an exception code equal to 3, and the assignment will not be carried out.

The word zone is further subdivided into three pages: the first two contain 50 addresses each, and the third 28:

Page	Addresses	Contents
1	1...50	Parameters and control variables
2	51...100	Program parameters (for instruments on which the program is present)
3	101...128	Configuration and identification codes

5.5.1 THE WORD ZONE IN INSTRUMENTS OF THE "Q" SERIES

The word zone is made up of 150 addressable words that contain the control variables and instrument parameters. Certain words are not used on some instruments so, although the value of these words can be requested using functions 03 and 04, a fixed value of 0 is returned; these words are marked with a hyphen "-" in the tables. The assignment of the word value using functions 06 and 16 is only allowed with the addresses marked "R/W". The variables and parameters are coded as integers with a plus or minus sign (two's complement) without taking the decimal point into account in the representation (for example, the Proportional Band displayed on the screen with a decimal number "25.0" is transmitted as 250). Assignment is only allowed within a specific range of values for each parameter and any attempt to assign a value outside this range will cause the instrument to respond with an error message and an exception code of 3, and the assignment will not be carried out.
The word zone is further subdivided into three pages of 50 addresses each:

Page	Addresses	Contents
1	1...50	Parameters and control variables
2	51...100	Parameters and control variables
3	101...150	Configuration and identification codes

6 • ELECTRICAL CONNECTIONS

6.1 GENERAL DESCRIPTION

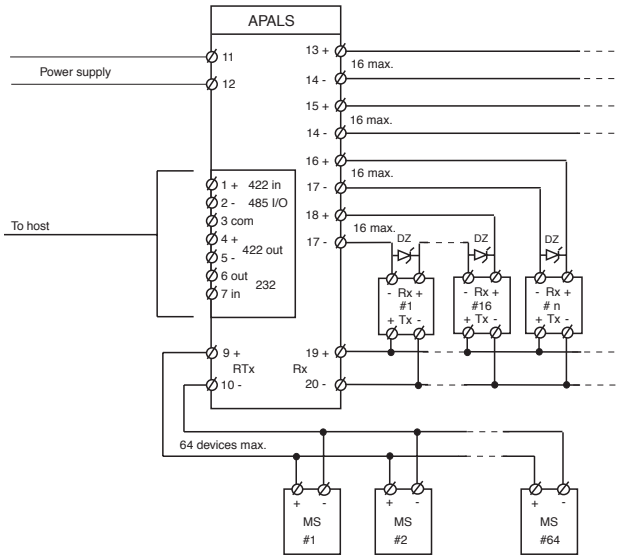
The APALS traffic concentrator was designed to set up an interface between an ASCON serial line of the "Parallel Current Loop" type(for connection to instruments of the X, XE, XS, XP, XF, JM and JT series) and/or of the SC12 type (for connection to instruments of the M# series) and a line with a selectable RS232C, RS422 and RS485 interface standard to a supervisor. APALS enables the connection of up to 64 instruments, freely distributed between the two ASCON lines. The choice of the supervisor interface standard can be made during installation by setting a number of microswitches; finally, five indicators located on the terminal board signal the correct functioning or the occurrence of errors on the line.
On request, instruments of the "Q#" series may be fitted with an RS-485 communication port offering a 2 or 4-wire connection.

6.2 COMMUNICATIONS CABLE LAYING RECOMMENDATIONS

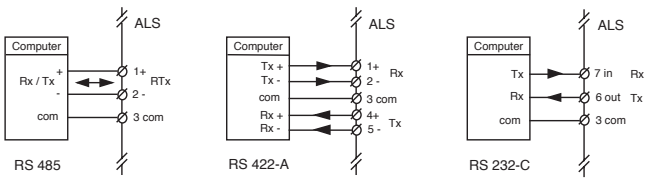
In order to minimize interference caused by the external environment to serial communication, and thus obtain maximum efficiency between the supervisor and the instruments, a few essential technical precautions must be taken.
The most important and easiest to implement of all is to separate the power or power supply lines from the communication lines and lay them as far as possible from remote-controlled switches, electromagnets, powerful motors, etc. The same rule applies to the control panel in that it is pointless to cable the control panel perfectly and then haphazardly "throw" the cables into the channel or vice versa. If the communication cables are extended to another control panel or other equipment, leave a space in the terminal board, isolated from all the other cables (normally towards the sides).
The type of cable used is of fundamental importance for the functioning of the entire system. The most important condition to be respected is the cable's capacity per meter (pF/m). The lower the capacity of the cable is the longer the line can be. Consequently, power cables, shielded coaxial cables and general channel cables are to be avoided under all circumstances in that they have an extremely high capacity per metre. In addition, to ensure high interference rejection, the cables must be twisted and preferably provided with a metal shield to be connected to an efficient ground socket (on one side only).

Two examples of cables with suitable characteristics produced by Belden are indicated below:
A) Belden code 9729 Z = 100 Ω pF/m = 41
B) Belden code 9502 Z = 150 Ω pF/m = 98

6.3 INSTRUMENTS WITH A "CURRENT LOOP" INTERFACE



6.3.1 DETAIL DRAWING OF CONNECTIONS BETWEEN APALS AND THE SUPERVISOR



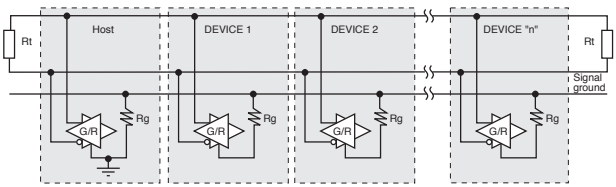
For further information about the connections and setting of the 3 types of interface available, see the user manual of the APALS traffic concentrator of the M.I.U. series - APALS - 2 /96.01

6.4 INSTRUMENTS WITH AN RS-485 INTERFACE (2 WIRE)

The hardware must be RS-485 compatible.
The line must be made up of a twisted cable with a characteristic impedance of about 120 W. On the power supply board of the instruments of the "Q" series, there are three jumpers, S1, S2 and S3, with 2 positions that have the following functions:

Jumper	Function of pos. 1	Function of pos. 2
S1	None	120 Ω termination
S2	None	Polarization [1]
S3	None	Polarization [1]

The standard positions of the switches are indicated in grey.
The S1 pos. 2 termination function is strongly recommended for the two devices located at the two ends of the line, as shown in the following basic diagram:



Note 1. The two-wire transception line can be polarized using jumpers S2 and S3. The polarization must only be carried out on 1 device on the line and both jumpers must be set to position 2.

G = Generatore
R = Ricevitore
G/R = Combinazione Generatore Ricevitore
Rt = Resistenza di terminazione: un driver può pilotare 32 ricevitori più 2 resistenze da 120 Ω.
Rg = Resistenza da 100 Ω.

6.4.1 REFERENCES

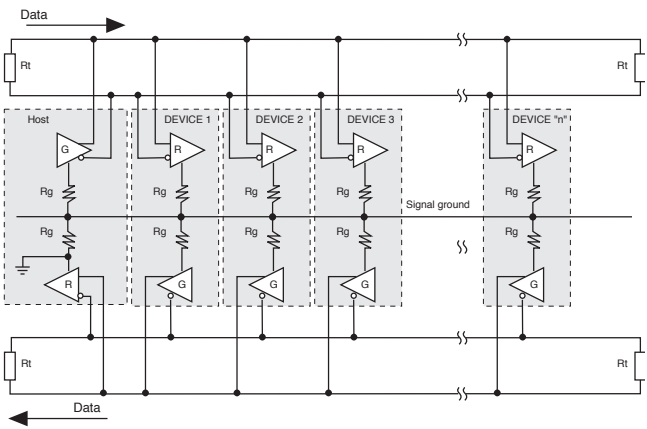
GOULD Gould Modbus Protocol Reference Guide (PI-MBUS-300 Rev. B)
APRIL JBUS Specification
GLOBAL ENG. DOC. EIA STANARD RS -485

6.5 INSTRUMENTS WITH AN RS-485 INTERFACE (4-WIRE)

The hardware must be RS-485 compatible.
The line must be made up of a twisted cable with a characteristic impedance of about 120 W. On the boards of the instruments of the "Q" series, there are 4 jumpers, S1, S2, S3 and S7, with 2 positions that have the following functions:

Jumper	Function of pos. 1	Function of pos. 2	Note
S1	None	120 Ω termination reception line	
S2	None	Polarizzazione	[1]
S3	None	Polarizzazione	[1]
S7	120 Ω termination reception line	None	

The standard positions of the switches are indicated in grey.
The S1 pos. 2 and S7 pos. 1 termination function is strongly recommended for the two devices located at the two ends of the transmission and reception lines, as shown in the diagram on the following page:



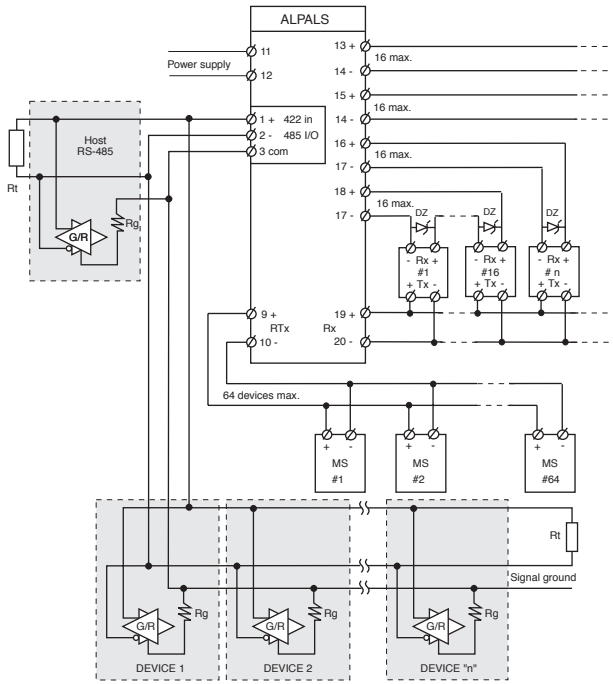
Note 1

The two-wire transception line can be polarized using jumpers S2 and S3. The polarization must only be carried out on 1 device on the line and both jumpers must be set to position 2.

G = Generator
R = Riceiver
G/R = Combinazione Generatore Ricevitore
Rt = Termination resistor: one driver can drive 32 receivers plus two 120 Ω resistors
Rg = 100 Ω resistor

6.6 MIXED CONNECTION WITH INSTRUMENTS HAVING AN RS-485 AND CURRENT LOOP INTERFACE

This type of connection can only be made by means of a 2-wire RS-485 connection. The connection concept does not differ from the previous cases.
The assembly represented by the APALS concentrator and all the instruments connected to it represent a single device on the RS-485 line. (See the diagram on the following page).



A maximum of 128 instruments can be connected to the traffic concentrator. 64 instruments distributed over 4 branches in current loop and 64 other instruments at the SC12 port (only instruments of the "M#" series can be connected to the SC12 port). This is possible because the Modbus/Jbus protocol is capable of addressing up to 247 instruments. Alternatively, an RS-485 connection can be made with a maximum of 32 APALS to which any number of instruments up to the maximum allowed by the protocol (247) is connected.

7.1 BIT ZONE

Address	Variable	Type	Note
1	-	-	
2	-	-	
3	-	-	
4	-	-	
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R	
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R	
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

7.2 READ STATUS

Function 07 (Read Status returns an eight bit status with the following meaning:

BIT	Address	Variable
1 (LSB)	-	0
2	-	0
3	-	0
4	-	0
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)
7	7	Out of Range (0 = Normal operation, 1 = Safety)
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)

7.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R(/W on WL)	[1]
3	Main output Y1		R	
4	WT Target Set point		R	
5	WL Local Set point		R/W	
6	Proportional Band (Hysteresis ON - OFF)	Pb. (HY)	R/W	[2]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Cycling time	t.c.	R/W	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.hi	R	
13	Alarm 2 Set point	Y2SP	R/W	
14	Alarm 3 Set point	Y3SP	R/W	
15	Hysteresis alarm 2	Y2HY	R/W	
16	Hysteresis alarm 3	Y3HY	R/W	
17	Cool Proportional Band	Pb. 2	R/W	
18	-	-	-	
19	-	-	-	
20	Dead Band Heat/Cool action	db.	R/W	
21	Cool Out Cycling time	t.c. 2	R/W	
22	-	-	-	
23	-	-	-	
24	-	-	-	
25	-	-	-	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	-	-	-	
30	Set point limit high	SPL.I	R/W	
31	Set point limit low	SPLh	R/W	
32	-	-	-	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh. 2	R/W	
35	Slope up Set point	S l. u	R/W	
36	Slope down Set point	S l. d	R/W	
37	Measurement Filter	tF.I	R/W	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	Rtu.	R/W	
40	Parameters Password Access	RPar	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPa	R/W	
44	-	-	-	

Address	Variable	Parameter Code	Type	Note
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

7.4 WORD ZONE - PAGE 2

The XE instrument does not have any parameters on page 2; any reading in this page returns a fixed value of 0, any writing gives an error 3.

7.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con1	R/W	
102	Second part of configuration	Con2	R/W	
103	-	-	-	
104	-	-	-	
105	-	-	-	
106	-	-	-	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc.lo	R/W	
110	End Scale Value	Sc.h1	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory code (600 for Ascon)		R	
122	Instrument Code (22597 = "XE")		R	[3]
123	Instrument Code(8224 = " ")		R	[3]
124	First part of release code		R	[3]
125	Second part of release code		R	[3]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 Assignment of the Set Point to address 2 writes the Local Set Point (address 5).

Note 2 In the case of ON - OFF output (configuration code E = 0), at this address the Proportional Band is substituted by the output hysteresis.

Note 3 The 122 + 123 and 124 + 125 addresses contain strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

8.1 BIT ZONE

Address	Variable	Type	Note
1	Remote Set Point/Local (0 = Local, 1 = Remote)	R/W	
2	Automatic/Manual (0 = Automatic, 1 = Manual)	R/W	
3	Memorized Set point change (with bit 4)	W	[1]
4	Memorized Set point change (with bit 3)	W	[1]
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R	
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R	
7	Out of Range (0 = Normal operation, 1 = Safety) R		
8	Self Tuning (0 = Off, 1 = Run)	R	[2]
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety) R		
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

8.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Remote Set Point/Local (0 = Local, 1 = Remote)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	-	0	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON))	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	[5]

8.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R (W on WL)	[3]
3	Main output Y1		R(W in Man.)	[4]
4	WT Target Set point		R	
5	WL Local Set point		R/W	
6	Proportional Band (Hysteresis ON - OFF)	Pb. (HY)	R/W	[5]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Cycling time	t.c.	R/W	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.hi	R	
13	Alarm 2 Set point	Y2SP	R/W	
14	Alarm 3 Set point	Y3SP	R/W	
15	Hysteresis alarm 2	Y2HY	R/W	
16	Hysteresis alarm 3	Y3HY	R/W	
17	Cool Proportional Band	Pb. 2	R/W	
18	Cool Integral time	t.i 2	R/W	
19	Cool Derivative time	t.d 2	R/W	
20	Dead Band Heat/Cool action	db.	R/W	
21	Cool Out Cycling time	t.c. 2	R/W	
22	-	-	-	
23	Approach low	AP. 1	R/W	
24	Approach high	AP. h	R/W	
25	Feed Forward	FF.	R/W	
26	1st Memorized Set point	SP. 1	R/W	
27	2nd Memorized Set point	SP. 2	R/W	
28	3rd Memorized Set point	SP. 3	R/W	
29	4th Memorized Set point	SP. 4	R/W	
30	Set point limit high	SPL.1	R/W	
31	Set point limit low	SPLh	R/W	
32	-	-	-	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh. 2	R/W	
35	Slope up Set point	SLu	R/W	
36	Slope down Set point	SLd	R/W	
37	Measurement Filter	tFil	R/W	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	At.tu	R/W	
40	Parameters Password Access	At PAr	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPA	R/W	
44	-	-	-	

Address	Variable	Parameter Code	Type	Note
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

8.4 WORD ZONE - PAGE 2

The XS instruments that are not programmed do not have parameters on page 2; any reading in this page returns a fixed value of 0, any writing gives an error 3.

8.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con.1	R/W	
102	Second part of configuration	Con. 2	R/W	
103	Main output Y1 beginning scale calibration	Y1 3	R/W	
104	Main output Y1 end scale calibration	Y1 4	R/W	
105	Aux output Y4 beginning scale calibration	Y4 3	R/W	
106	Aux output Y4 end scale calibration	Y4 4	R/W	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc.lo	R/W	
110	End Scale Value	Sc.h1	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory Code (600 for Ascon)		R	
122	Instrument Code (22611 = "XS")		R	[6]
123	Instrument Code(12320 = " 0 ")		R	[6]
124	First part of release code		R	[6]
125	Second part of release code		R	[6]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 To set as Set Point one of the four Set Points memorised, assign simultaneously the addresses 3 and 4 with the following code:

bit3	bit4	To set...
0	0	Set point 1
1	0	Set point 2
0	1	Set point 3
1	1	Set point 4

Reading of these addresses returns zero.

Note 2 The bit at address 7 is set to 1 in order to indicate that the Auto - Tune is active and that the Expert - Tune is active.

Note 3 Assignment of the Set Point to address 2 writes the Local Set Point (address 5).

Note 4 A value can be assigned to address 3 only if the instrument is in manual mode.

Note 5 In the case of ON - OFF output (configuration code G = 0), at this address the Proportional Band is substituted by the output hysteresis.

Note 6 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

9 • XS CONTROLLER (with programme option)

9.1 BIT ZONE

Address	Variable	Parameter Code	Type	Note
1	Local Set point/Programme Set point (0=Local, 1=Programme)		R/W	[1]
2	Automatic/Manual (0 = Automatic, 1 = Manual)		R/W	
3	Program wait (0 = Run, 1 = Wait)		R/W	[2]
4	Next segment (Write 1)		W	
5	Alarm condition Y2 (0 = OFF, 1 = ON)		R	
6	Alarm condition Y3 (0 = OFF, 1 = ON)		R	
7	Out of Range (0 = Normal operation, 1 = Safety)		R	
8	Self Tuning (0 = Off, 1 = Run)		R	
9	-		-	
10	Out of Range (0 = Normal operation, 1 = Safety)		R	
11	-	-		
12	-	-		
13	-	-		
14	-	-		
15	-	-		
16	-	-		

9.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Local Set point/Programme Set point (0=Local, 1=Programme)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	3	Program wait (0 = Run, 1 = Wait)	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

9.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R (/W on WL)	[3]

Address	Variable	Parameter Code	Type	Note
3	Main output Y1		R(W in Man.)	[4]
4	WT Target Set point		R	
5	WL Local Set point		R/W	
6	Proportional Band (Hysteresis ON - OFF)	Pb. (HY)	R/W	[5]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Cycling time	t.c	R/W	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.hi	R	
13	Alarm 1 Set point	AL1P	R/W	
14	Alarm 2 Set point	AL2P	R/W	
15	Hysteresis alarm 1	AL1H	R/W	
16	Hysteresis alarm 2	AL2H	R/W	
17	Cool Proportional Band	Pb.2	R/W	
18	Cool Integral time	t.i.2	R/W	
19	Cool Derivative time	t.d.2	R/W	
20	Dead Band Heat/cool action	db.	R/W	
21	Cool Out Cycling time	t.c.2	R/W	
22	-	-	-	
23	Approach low	AP.1	R/W	
24	Approach high	AP.h	R/W	
25	Feed Forward	FF.	R/W	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	-	-	-	
30	Minimum value of Set point assignable	SPL.1	R/W	
31	Maximum value of Set point assignable	SPLh	R/W	
32	-	-	-	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh.2	R/W	
35	Slope up Set point	SLu	R/W	
36	Slope down Set point	SLd	R/W	
37	Measurement Filter	tF.1	R/W	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	AtU.	R/W	
40	Parameters Password Access	APAr	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPA	R/W	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

9.4 WORD ZONE - PAGE 2 PROGRAMME

Address	Variable	Parameter Code	Type	Note
51	Number of automatic repetitions of the program	Pr.cY	R/W	
52	Number of segments constituting the program	Pr. n	R/W	
53	Target Set point of segment " 0 "	0-SP	R/W	
54	Duration of segment " 0 " in minutes	0-du	R/W	
55	State of outputs Y2-Y3 in segment " 0 "	0-Lo	R/W	
56	Maximum tolerable deviation	0-Er	R/W	
57	Target Set point of segment " 1 "	1-SP	R/W	
58	Duration of segment " 1 " in minutes	1-du	R/W	
59	State of outputs Y2-Y3 in segment " 1 "	1-Lo	R/W	
60	Maximum tolerable deviation	1-Er	R/W	
61	Target Set point of segment " 2 "	2-SP	R/W	
62	Duration of segment " 2 " in minutes	2-du	R/W	
63	State of outputs Y2-Y3 in segment " 2 '	2-Lo	R/W	
64	Maximum tolerable deviation	2-Er	R/W	
65	Target Set point of segment " 3 "	3-SP	R/W	
66	Duration of segment " 3" in minutes	3-du	R/W	
67	State of outputs Y2-Y3 in segment " 3"	3-Lo	R/W	
68	Maximum tolerable deviation	3-Er	R/W	
69	Target Set point of segment " 4 "	4-SP	R/W	
70	Duration of segment " 4 " in minutes	4-du	R/W	
71	State of outputs Y2-Y3 in segment " 4 "	4-Lo	R/W	
72	Maximum tolerable deviation	4-Er	R/W	
73	Target Set point of segment " 5 "	5-SP	R/W	
74	Duration of segment " 5 " in minutes	5-du	R/W	
75	State of outputs Y2-Y3 in segment " 5 "	5-Lo	R/W	
76	Maximum tolerable deviation	5-Er	R/W	
77	Target Set point of segment " 6"	6-SP	R/W	
78	Duration of segment " 6" in minutes	6-du	R/W	
79	State of outputs Y2-Y3 in segment " 6 "	6-Lo	R/W	
80	Maximum tolerable deviation	6-Er	R/W	
81	Target Set point of segment " 7"	7-SP	R/W	
82	Duration of segment " 7" in minutes	7-du	R/W	
83	State of outputs Y2-Y3 in segment " 7"	7-Lo	R/W	
84	Maximum tolerable deviation	7-Er	R/W	
85	Target Set point of segment " 8"	8-SP	R/W	
86	Duration of segment " 8" in minutes	8-du	R/W	
87	State of outputs Y2-Y3 in segment " 8"	8-Lo	R/W	
88	Maximum tolerable deviation	8-Er	R/W	
89	Target Set point of segment " 9"	9-SP	R/W	
90	Duration of segment " 9" in minutes	9-du	R/W	
91	State of outputs Y2-Y3 in segment " 9"	9-Lo	R/W	
92	Maximum tolerable deviation	9-Er	R/W	
93	Target Set point of segment " F "	F-SP	R/W	
94	Duration of segment " F " in minutes	F-du	R/W	

Address	Variable	Parameter Code	Type	Note
95	State of outputs Y2-Y3 in segment " "	F-Lo	R/W	
96	Maximum tolerable deviation	F-Er	R/W	
97	Repetition number program running		R	[6]
98	Number of segments running		R	[6]
99	Remaining time to end of the segment		R	[6]
100	-	-	-	

9.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con1	R/W	
102	Second part of configuration	Con2	R/W	
103	Main output Y1 beginning scale calibration	Y1 3	R/W	
104	Main output Y1 end scale calibration	Y1 4	R/W	
105	Aux output Y4 beginning scale calibration	Y4 3	R/W	
106	Aux output Y4 end scale calibration	Y4 4	R/W	
107	-	-	-	
108	Decimal	Scdd	R/W	
109	Beginning Scale value	Sc.lo	R/W	
110	End Scale Value	Sch i	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory code (600 for Ascon)		R	
122	Instrument Code (22611 = "XS")		R	[7]
123	Instrument Code(20512 = " P ")		R	[7]
124	Prima parte codice release		R	[7]
125	Second part of release code		R	[7]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 It is not possible to set this address to 1 to start the program if the instrument is in manual mode.

Note 2 It is not possible to set this address to 1 to suspend the program if the program is not active.

Note 3 Assignment of the Set Point to address 2 writes the Local Set Point (address 5).

Note 4 A value can be assigned to address 3 only if the instrument is in manual mode.

Note 5 In the case of ON - OFF output (configuration code G = 0), at this address the Proportional Band is substituted by the output hysteresis.

Note 6 Reading of these variables returns zero if the program is not active.

Note 7 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the product code, the least significant byte contains the ASCII code of the release code.

10 · XP CONTROLLER (WITHOUT PROGRAMME OPTION)

10.1 BIT ZONE

Address	Variable	Type	Note
1	Remote Set Point/Local (0 = Local, 1 = Remote)	R/W	
2	Automatic/Manual (0 = Automatic, 1 = Manual)	R/W	
3	Memorized Set point change (with bit 4)	W	[1]
4	Memorized Set point change (with bit 3)	W	
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R	
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R	
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	[2]
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety) R		
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

10.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Remote Set Point/Local (0 = Local, 1 = Remote)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	-	0	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	[2]

10.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R (W su WL)	[3]
3	Main output Y1		R(W in Man.)	[4]

Address	Variable	Parameter Code	Type	Note
4	WT Target Set point		R	
5	WL Local Set point		R/W	
6	Proportional Band	Pb.	R/W	
7	0000		R	
8	Integral time	t. i	R/W	
9	Derivative time	t.d.	R/W	
10	Cycling time	cY.	R/W	
11	Beginning Scale value	Sc.lo	R	
12	Ens Scale value	Sc.h i	R	
13	Alarm 2 Set point	Y2SP	R/W	
14	Alarm 3 Set point	Y3SP	R/W	
15	Hysteresis alarm 2	Y2HY	R/W	
16	Hysteresis alarm 3	Y3HY	R/W	
17	-	-	-	
18	-	-	-	
19	-	-	-	
20	-	-	-	
21	-	-	-	
22	Servomotor rotation time	t.Y	R/W	
23	Approach low	AP. l	R/W	
24	Approach high	AP. h	R/W	
25	-	-	-	
26	1st Memorized Set point	SP. 1	R/W	
27	2nd Memorized Set point	SP. 2	R/W	
28	3rd Memorized Set point	SP. 3	R/W	
29	4th Memorized Set point	SP. 4	R/W	
30	Set point limit high	SPL. l	R/W	
31	Set point limit low	SPLh	R/W	
32	-	-	-	
33	-	-	-	
34	-	-	-	
35	Slope up Set point	S l. u	R/W	
36	Slope down Set point	S l. d	R/W	
37	Measurement Filter	t.F i l	R/W	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	AtU.	R/W	
40	Parameters Password Access	APar	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPa	R/W	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

10.4 WORD ZONE - PAGE 2

The XP instruments that are not programmed do not have parameters on page 2; any reading in this page returns a fixed value of 0, any writing gives an error 3.

10.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con1	R/W	
102	Second part of configuration	Con2	R/W	
103	-	-	-	
104	-	-	-	
105	Aux output Y4 beginning scale calibration	Y4 3	R/W	
106	Aux output Y4 end scale calibration	Y4 4	R/W	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc.in	R/W	
110	End Scale Value	Sc.fu	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory Code (600 for Ascon)		R	
122	Instrument Code (22608 = "XP")		R	[5]
123	Instrument Code (12320 = "0 ")		R	[5]
124	First part of release code		R	[5]
125	Second part of release code		R	[5]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 To set as Set Point one of the four Set Points memorised, assign simultaneously the addresses 3 and 4 with the following code:

bit3	bit4	To set...
0	0	Set point 1
1	0	Set point 2
0	1	Set point 3
1	1	Set point 4

Reading of these addresses returns zero.

Note 2 The bit at the address 8 is set to 1 to indicate that the Auto - Tune is active and that the Expert - Tune is active.

Note 3 Assignment of the Set Point to address 2 writes the Local Set Point (address 5).

Note 4 Address 3 can be assigned with a value only if the instrument is in manual mode. Any positive value assigned will command the opening of the servo-motor, any negative value will command the closure, a zero value will stop it.

Note 5 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and the release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

11 • XP CONTROLLER (WITH PROGRAMME OPTION)

11.1 BIT ZONE

Address	Variable	Type	Note
1	Local Set point/Program Set point (0 = Local, 1 = Program)	R/W	[1]
2	Automatic/Manual (0 = Automatic, 1 = Manual)	R/W	
3	Program wait (0 = Run, 1 = Wait)		[2]
4	Next segment (Write 1)	W	
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R	
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R	
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

11.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

Address	Variable	Type	Note
1 (LSB)	1	Local Set point/Program Set point (0 = Local, 1 = Program)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	3	Program wait (0 = Run, 1 = Wait)	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

11.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R (W on WL)	[3]
3	Main output Y1		R (W in Manual)	[4]

Address	Variable	Parameter Code	Type	Note
4	WT Target Set point		R	
5	WL Local Set point		R/W	
6	Proportional Band	Pb.	R/W	
7	0000		R	
8	Integral time	t. i	R/W	
9	Derivative time	t.d.	R/W	
10	Cycling time	cY.	R/W	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.h i	R	
13	Alarm 2 Set point	Y2SP	R/W	
14	Alarm 3 Set point	Y3SP	R/W	
15	Hysteresis alarm 2	Y2HY	R/W	
16	Hysteresis alarm 3	Y3HY	R/W	
17	-	-	-	
18	-	-	-	
19	-	-	-	
20	-	-	-	
21	-	-	-	
22	Servomotor rotation time	tY	R/W	
23	Approach low	AP. l	R/W	
24	Approach high	AP. h	R/W	
25	-	-	-	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	-	-	-	
30	Set point limit low	SPL.l	R/W	
31	Set point limit high	SPLh	R/W	
32	-	-	-	
33	-	-	-	
34	-	-	-	
35	Slope up Set point	S l. u	R/W	
36	Slope down Set point	S l. d	R/W	
37	Measurement Filter	tF i l	R/W	
38	Input Shift	inSh	R/W	
39	Enabled Tuning	AtU.	R/W	
40	Parameters Password Acces	APAr	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPA	R/W	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

11.4 WORD ZONE - PAGE 2 PROGRAM

Address	Variable	Parameter Code	Type	Note
51	Number of automatic repetitions of the program	Pr.cY	R/W	
52	Number of segments constituting the program	Pr. n	R/W	
53	Target Set point of segment " 0 "	0-SP	R/W	
54	Duration of segment " 0" in minutes	0-du	R/W	
55	State of outputs Y2-Y3 in segment " 0"	0-Lo	R/W	
56	Maximum tolerable deviation	0-Er	R/W	
57	Target Set point of segment " 1 "	1-SP	R/W	
58	Duration of segment " 1 " in minutes	1-SP	R/W	
59	State of outputs Y2-Y3 in segment " 1 "	1-Lo	R/W	
60	Maximum tolerable deviation	1-Er	R/W	
61	Target Set point of segment " 2 "	2-SP	R/W	
62	Duration of segment " 2 " in minutes	2-du	R/W	
63	State of outputs Y2-Y3 in segment " 2 "	2-Lo	R/W	
64	Maximum tolerable deviation	2-Er	R/W	
65	Target Set point of segment " 3 "	3-SP	R/W	
66	Duration of segment " 3 " in minutes	3-du	R/W	
67	State of outputs Y2-Y3 in segment " 3 "	3-Lo	R/W	
68	Maximum tolerable deviation	3-Er	R/W	
69	Target Set point of segment " 4 "	4-SP	R/W	
70	Duration of segment " 4 " in minutes	4-du	R/W	
71	State of outputs Y2-Y3 in segment " 4 "	4-Lo	R/W	
72	Maximum tolerable deviation	4-Er	R/W	
73	Target Set point of segment " 5 "	5-SP	R/W	
74	Duration of segment " 5 " in minutes	5-du	R/W	
75	State of outputs Y2-Y3 in segment " 5 "	5-Lo	R/W	
76	Maximum tolerable deviation	5-Er	R/W	
77	Target Set point of segment " 6 "	6-SP	R/W	
78	Duration of segment " 6 " in minutes	6-du	R/W	
79	State of outputs Y2-Y3 in segment " 6 "	6-Lo	R/W	
80	Maximum tolerable deviation	6-Er	R/W	
81	Target Set point of segment " 7 "	7-SP	R/W	
82	Duration of segment " 7 " in minutes	7-du	R/W	
83	State of outputs Y2-Y3 in segment " 7 "	7-Lo	R/W	
84	Maximum tolerable deviation	7-Er	R/W	
85	Target Set point of segment " 8 "	8-SP	R/W	
86	Duration of segment " 8 " in minutes	8-du	R/W	
87	State of outputs Y2-Y3 in segment " 8 "	8-Lo	R/W	
88	Maximum tolerable deviation	8-Er	R/W	
89	Target Set point of segment " 9 "	9-SP	R/W	
90	Duration of segment " 9 " in minutes	9-du	R/W	
91	State of outputs Y2-Y3 in segment " 9 "	9-Lo	R/W	
92	Maximum tolerable deviation	9-Er	R/W	
93	Target Set point of segment " F "	F-SP	R/W	
94	Duration of segment " F " in minutes	F-du	R/W	

Address	Variable	Parameter Code	Type	Note
95	State of outputs Y2-Y3 in segment " F "	F-Lo	R/W	
96	Maximum tolerable deviation	F-Er	R/W	
97	Repetition number program running		R	[5]
98	Number of segments running		R	[5]
99	Remaining time to end the segment		R	[5]
100	-	-	-	

11.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con1	R/W	
102	Second part of configuration	Con2	R/W	
103	-	-	-	
104	-	-	-	
105	Aux output Y4 beginning scale calibration	Y4 3	R/W	
106	Aux output Y4 end scale calibration	Y4 4	R/W	
107	-	-	-	
108	Decimal	Scdd	R/W	
109	Beginning Scale value	Sc.lo	R/W	
110	End Scale Value	Sch i	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory Code (600 for Ascon)		R	
122	Instrument Code (22608 = "XP")		R	[6]
123	Instrument Code (20512 = "P ")		R	[6]
124	First part of release code		R	[6]
125	Second part of release code		R	[6]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 It is not possible to set to 1 this address in order to start up the program if the instrument is in manual mode.

Note 2 It is not possible to set this address to 1 in order to suspend the program if the program is not running.

Note 3 Assignment of the Set Point to address 2 writes the Local Set Point (address 5).

Note 4 Address 3 can be assigned with a value only if the instrument is in manual mode. Any positive value assigned will command the opening of the servomotor, any negative value will command the closure, a zero value will stop it.

Note 5 Reading of these variables returns zero if the program is not running.

Note 6 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

12.1 BIT ZONE

Address	Variable	Type	Note
1	Remote Set Point/Local (0 = Local, 1 = Remote)	R/W	
2	Automatic/Manual (0 = Automatic, 1 = Manual)	R/W	
3	Memorized Set point change (with bit 4)		[1]
4	Memorized Set point change (with bit 3)	W	[1]
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R	
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R	
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

12.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Remote Set Point/Local (0 = Local, 1 = Remote)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	-	0	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

12.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R (/W on WL)	[2]
3	Main output Y1		R(/W in Manual)	[3]
4	WT Target Set point		R	

Address	Variable	Parameter Code	Type	Note
5	WL Local Set point		R/W	
6	Proportional Band (Hysteresis ON - OFF)	Pb. (HY.)	R/W	[4]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Cycling time (minimum output variation)	t.c.(dY)	R/W	[5]
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.hi	R	
13	Alarm 2 Set point	Y2SP	R/W	
14	Alarm 3 Set point2	Y3SP	R/W	
15	Hysteresis alarm 2	Y2HY	R/W	
16	Hysteresis alarm 3	Y3HY	R/W	
17	Relative cool gain	rcr	R/W	
18	-	-	-	
19	-	-	-	
20	Dead Band Heat/Cool action	db.	R/W	
21	Cool Out Cycling time	t.c. 2	R/W	
22	Servomotor time course	t.Y	R/W	
23	-	-	-	
24	-	-	-	
25	-	-	-	
26	1st Memorized Set point	SP. 1	R/W	
27	2nd Memorized Set point	SP. 2	R/W	
28	3rd Memorized Set point	SP. 3	R/W	
29	4th Memorized Set point	SP. 4	R/W	
30	Set point limit low	SPL.l	R/W	
31	Set point limit high	SPL.h	R/W	
32	Main output Y1 minimum value	YL.	R/W	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh. 2	R/W	
35	Slope up Set point	S l. u	R/W	
36	Slope down Set point	S l. d	R/W	
37	Measurement Filter	t.F .1	R/W	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	AtU.	R/W	
40	Parameters Password Access	APar	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLP3	R/W	
44	Local/Local+Remote selection	SPr.1	R/W	
45	Remote Set point Ratio	SPr.2	R/W	
46	Remote Set point Gain	SPr.3	R/W	
47	Fuzzy intensity	F.Int	R/W	
48	Fuzzy error	FErr	R/W	
49	Fuzzy change in error	FdEr	R/W	
50	Sampling time	tSam	R/W	

12.4 WORD ZONE - PAGE 2

Function 07 (Read Status) returns an eight bit status with the following meanings:

12.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con1	R/W	
102	Second part of configuration	Con2	R/W	
103	Main output Y1 beginning scale calibration	Y1 3	R/W	
104	Main output Y1 end scale calibration	Y1 4	R/W	
105	Aux output Y4 beginning scale calibration	Y4 3	R/W	
106	Aux output Y4 end scale calibration	Y4 4	R/W	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc.lo	R/W	
110	End Scale Value	Sc.h1	R/W	
111	°C / °F range unit	C-F	R/W	
112	Safety Y1	SAY1	R/W	
113	Safety Y2	SAY2	R/W	
114	Safety Y3	SAY3	R/W	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory code (600 for Ascon)		R	
122	Instrument Code (22598 = "XF")		R	[6]
123	Instrument Code (8224 = " ")		R	[6]
124	First part of release code		R	[6]
125	Second part of release code		R	[6]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 To set as Set Point one of the four Set Points memorised, assign simultaneously the addresses 3 and 4 with the following code:

bit3	bit4	To set...
0	0	Set point 1
1	0	Set point 2
0	1	Set point 3
1	1	Set point 4

Reading of these addresses returns 0.

Note 2 Assignment of the Set Point to address 2 writes the Local Set Point (address 5).

Note 3 Address 3 can be assigned with a value only if the instrument is in manual mode. Any positive value assigned will command the opening of the servomotor, any negative value will command the closure, a zero value will stop it.

Note 4 In the case of ON - OFF output (configuration code G = 0), at this address the Proportional Band is substituted by the output hysteresis.

Note 5 In the case of servomotor output (configuration code G = 5), at this address the time cycle is substituted by the minimum output variation.

Note 6 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

13.1 BIT ZONE

Address	Variable		Type	Note
1	Alarm condition Y1 (0 = OFF, 1 = ON)	R		
2	Alarm condition Y2 (0 = OFF, 1 = ON)	R		
3	Alarm condition Y3 (0 = OFF, 1 = ON)	R		
4	Alarm condition Y4 (0 = OFF, 1 = ON)	R		
5	Acknowledge alarm Y1 (0 = Acknowledge, 1 = On)		R/(W)	[1-2]
6	Acknowledge alarm Y2 (0 = Acknowledge, 1 = On)		R/(W)	[1-2]
7	Out of Range (0 = Normal operation, 1 = Safety)	R/W	[2]	
8	Acknowledge alarm Y3 (0 = Acknowledge, 1 = On)		R/(W)	[1-2]
9	Acknowledge alarm Y4 (0 = Acknowledge, 1 = On)		R/(W)	[1-2]
10	Out of Range (0 = Normal operation, 1 = Safety)	R		
11	-		-	
12	-		-	
13	-		-	
14	-		-	
15	-		-	
16	-		-	

13.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Alarm condition Y1 (0 = OFF, 1 = ON)	
2	2	Alarm condition Y2 (0 = OFF, 1 = ON)	
3	3	Alarm condition Y3 (0 = OFF, 1 = ON)	
4	4	Alarm condition Y4 (0 = OFF, 1 = ON)	
5	5	Acknowledge alarm Y1 (0 = Acknowledge, 1 = On)	[1]
6	6	Acknowledge alarm Y2 (0 = Acknowledge, 1 = On)	[1]
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8+9	Acknowledge alarm Y3+Y4 (0 = Acknowledge, 1 = On)	[1-4]

13.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	Alarm Set point Y1	SP. 1	R	
3	Alarm Set point Y2	SP. 2	R	

Address	Variable	Parameter Code	Type	Note
4	Alarm Set point Y3	SP. 3	R	
5	Alarm Set point Y4	SP. 4	R	
6	Alarm condition Y1		R	[5]
7	Alarm condition Y2		R	[5]
8	Alarm condition Y3		R	[5]
9	Alarm condition Y4		R	[5]
10	-	-	-	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sch1	R	
13	Alarm Set point Y1	SP. 1	R/W	
14	Alarm Set point Y2	SP. 2	R/W	
15	Alarm hysteresis Y1	HY. 1	R/W	
16	Alarm hysteresis Y2	HY. 2	R/W	
17	Alarm Set point Y3	SP. 3	R/W	
18	Alarm Set point Y4	SP. 4	R/W	
19	Alarm hysteresis Y3	HY. 3	R/W	
20	Alarm hysteresis Y4	HY. 4	R/W	
21	Hold function index	HoLd	R/W	
22	Storing time of measurement	tHLd	R/W	
23	Resolution index of indication	dd.	R/W	
24	Delay at alarm action	tdP1	R/W	
25	Square root index	SQrt.	R/W	
26	Alarm configuration index Y1	Co.Y1	R/W	
27	Alarm configuration index Y2	Co.Y2	R/W	
28	Alarm configuration index Y3	Co.Y3	R/W	
29	Alarm configuration index Y4	Co.Y4	R/W	
30	Start value of retransmission Y5Y5	Y5 lo	R/W	
31	End value of retransmission Y5	Y5h1	R/W	
32	-	-	-	
33	-	-	-	
34	-	-	-	
35	-	-	-	
36	-	-	-	
37	Measurement Filter	tF 1	R/W	
38	Input Shift	InSh	R/W	
39	-	-	-	
40	Parameters Password Access	APAr	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPA	R/W	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

13.4 WORD ZONE - PAGE 2

The JM/JT instruments do not have parameters on page 2; any reading in this page returns a fixed value of 0, any writing gives an error 3.

13.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con1	R/W	
102	Second part of configuration	Con2	R/W	
103	Retransmission Y5 beginning scale calibration	Y5 1	R/W	
104	Retransmission Y5 end scale calibration	Y5 h	R/W	
105	-	-	-	
106	-	-	-	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc.lo	R/W	
110	End Scale Value	Sc.h i	R/W	
111	-	-	-	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory code (600 per Ascon)		R	
122	Instrument Code (19021 = "JM")		R	[6]
123	Instrument Code (8224 = " ")		R	[6]
124	First part of release code		R	[6]
125	Second part of release code		R	[6]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 Active only if the alarm is configured with the ISA A sequence. The status of this bit, combined with the corresponding bit that gives the alarm status, means:

bit1..4	bit5..8	Meaning
0	0	Normal situation
1	1	Alarm active and not acknowledged
1	0	Alarm active and acknowledged
0	1	Stored alarm

Note 2 The writing to this address is permitted only if the related alarm is configured

as ISA A. By writing 1, the corresponding alarm is acknowledged.

Note 3 Writing to this address does not produce any effect, however, it allows all alarms to be acknowledged with one writing operation.

Note 4 This bit reports the acknowledgement status of both the Y3 and Y4 alarms, and returns 1 if Y3 and/or Y4 wait for acknowledgement.

Note 5 The value of this address is the status of the corresponding alarm:
0 Normal situation
1 Alarm active and not acknowledged
2 Stored alarm
3 Alarm active and acknowledged

Note 6 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

14.1 BIT ZONE

Address	Variable	Type	Note
1	-	-	
2	-	-	
3	-	-	
4	-	-	
5	Acknowledge alarm Y2 (0 = Acknowledge, 1 = On)	R	
6	-	-	
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

14.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	-	0	
2	-	0	
3	-	0	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	-	0	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

14.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R	
3	Main output Y1		R	

Address	Variable	Parameter Code	Type	Note
4	WT Target Set point		R/W	[1]
5	WL Working Set point		R	
6	Proportional Band (Hysteresis ON-OFF)	Pb. (HY)	R/W	[2]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d.	R/W	
10	Cycling time	t.c.	R/W	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.hi	R	
13	Alarm Set point Y2	Y2SP	R/W	
14	-	-	-	
15	Hysteresis alarm Y2	Y2HY	R/W	
16	-	-	-	
17	Relative cooling ratio	rcr.	R/W	
18	-	-	-	
19	-	-	-	
20	Dead Band Heat/Cool action	db.	R/W	
21	Cool Out Cycling time	t.c. 2	R/W	
22	-	-	-	
23	-	-	-	
24	-	-	-	
25	-	-	-	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	-	-	-	
30	Set point limit high	SPL.H	R/W	
31	Set point limit low	SPL.L	R/W	
32	-	-	-	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh. 2	R/W	
35	Slope Set point	SLOP	R/W	
36	Slope Set point	SLOP	R/W	
37	-	-	-	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	AtU.	R/W	
40	Parameters Password Access	APAr	R/W	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPA	R/W	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	-	-	-	
48	-	-	-	
49	-	-	-	
50	-	-	-	

14.4 WORD ZONE - PAGE 2

The MS instruments do not have parameters on page 2; any reading in this page returns a fixed value of 0, any writing gives an error 3.

14.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con.F	R/W	
102	-	-	-	
103	-	-	-	
104	-	-	-	
105	-	-	-	
106	-	-	-	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc.in	R/W	
110	End Scale Value	Sc.fu	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory code (600 for Ascon)		R	
122	Instrument Code (19795 = "MS")		R	[3]
123	Instrument Code (12336 = "00")		R	[3]
124	First part of release code		R	[3]
125	Second part of release code		R	[3]
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 The assignment of the Set Point to address 4 writes the Local Set Point (address 5).

Note 2 In the case of ON - OFF output (configuration code E = 0) at this address the Proportional Band is substituted by the output hysteresis.

Note 3 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

15.1 BIT ZONE

Address	Variable	Type	Note
1	-	-	
2	-	-	
3	-	-	
4	-	-	
5	Acknowledge alarm Y2 (0 = Acknowledge, 1 = On)	R	
6	-	-	
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	-	-	
12	-	-	
13	-	-	
14	-	-	
15	-	-	
16	-	-	

15.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	-	0	
2	-	0	
3	-	0	
4	-	0	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	-	0	
7	7	Out Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

15.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R	
3	Main output Y1		R	

Address	Variable	Parameter Code	Type	Note
4	WT Target Set point		R/W	[1]
5	WL Working Set point		R	
6	Proportional Band (Hysteresis ON-OFF)	Pb. (HY.)	R/W	[2]
7	0000		R	
8	Integral time	t. i	R/W	
9	Derivative time	t.d.	R/W	
10	Cycling time	t.c.	R/W	
11	Beginning Scale value	Sc.lo	R	
12	End Scale value	Sc.h i	R	
13	Alarm Set point Y2	Y2SP	R/W	
14	-	-	-	
15	Hysteresis alarm Y2	Y2HY	R/W	
16	-	-	-	
17	Relative cooling ratio	r c r.	R/W	
18	-	-	-	
19	-	-	-	
20	Dead Band Heat/Cool action	db.	R/W	
21	Cool Out Cycling time	t.c. 2	R/W	
22	-	-	-	
23	-	-	-	
24	-	-	-	
25	-	-	-	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	-	-	-	
30	Set point limit high	SPL. I	R/W	
31	Set point limit low	SPLh	R/W	
32	-	-	-	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh. 2	R/W	
35	Slope Set point	SLOP	R/W	
36	Slope Set point	SLOP	R/W	
37	-	-	-	
38	Input Shift	InSh	R/W	
39	Enabled Tuning	AtU.	R/W	
40	-	-	-	
41	Address	Addr	R/W	
42	Baud Rate	SLbr	R/W	
43	Protocols and Parity	SLPA	R/W	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	Fuzzy intensity	Fnt	R/W	
48	Fuzzy error	FErr	R/W	
49	Fuzzy change in error	FdEr	R/W	
50	Sampling time	tSAn	R/W	

15.4 WORD ZONE - PAGE 2

The MF and MC instruments do not have parameters on page 2; any reading in this page returns a fixed value of 0, any writing gives an error 3.

15.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	First part of configuration	Con. F	R/W	
102	-	-	-	
103	-	-	-	
104	-	-	-	
105	-	-	-	
106	-	-	-	
107	-	-	-	
108	Decimal	Sc.dd	R/W	
109	Beginning Scale value	Sc. in	R/W	
110	End Scale Value	Sc.h i	R/W	
111	°C / °F range unit	C-F	R/W	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	
116	-	-	-	
117	-	-	-	
118	-	-	-	
119	-	-	-	
120	-	-	-	
121	Factory code (600 for Ascon)		R	
122	Instrument Code (19782 = "MF")			
	Instrument Code (19779 = "MC")		R	[3]
123	Instrument Code (12336 = "00")		R	[3]
124	First part of release code		R	[3]
125	Second part of release code		R	
126	Special Execution Code Number		R	
127	-	-	-	
128	-	-	-	

Note 1 The assignment of the Set Point to address 4 writes the Local Set Point (address 5).

Note 2 In the case of ON - OFF output (configuration code E = 0) at this address the Proportional Band is substituted by the output hysteresis.

Note 3 The 122 + 123 and 124 + 125 addresses contain the strings (of 4 characters) for the product and release codes: each address represents two characters, the most significant byte in the word contains the ASCII code of the first, the least significant byte contains the ASCII code of the second.

16.1 BIT ZONE

Address	Variable	Type	Note
1	Local Set point/Remote (0 = Local, 1 = Remote)	R/W	[1]
2	Automatic/Manual (0 = Automatic, 1 = Manual) R/W	[1]	
3	Stored Set point (with bit 4)	R/W	[2-1]
4	Stored Set point (with bit 3)	R/W	[2-1]
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R(W)	[3]
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R(W)	[3]
7	Out of Range (0 = Normal operation, 1 = Safety) R		
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	-	-	
12	-	-	
13	Alarm condition Y4 (0 = OFF, 1 = ON)	R(W)	[4-5]
14	Alarm condition Y5 (0 = OFF, 1 = ON)	R(W)	[4-5]
15	-	-	
16	-	-	
17	Input logic state #1	R	
18	Input logic state #2	R	
19	Input logic state #3	R	
20	Switch on 2nd group of P.I.D. parameters	R/W	[1]
21	Lock keyboard	R/W	[1]
22	Fixed bit to “1”	R	
23	Model (“0” = QF, “1” = QP)	R	
24	Model (fixed to “0”)	R	
25	Model (0 = Ascon, 1 = EB)	R	
26	Retransmission Y6 option inside	R	
27	Custom input option inside	R	
28	Virtual position for servomotor option inside	R	
29	-	-	
30	-	-	

16.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Local Set point/Remote (0 = Local, 1 = Remote)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	3	Stored Set point (with bit 4) 2	
4	4	Stored Set point (with bit 3) 2	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

16.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R/W	[6]
3	Main output Y1		R (W in Man.)	[7]
4	WT Target Set point		R	[8]
5	WL Local Set point		R/W	
6	Proportional band (Hysteresis ON - OFF)	Pb (HY)	R/W	[9]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Y1 Cycling time	t.c (dY)	R/W	[10]
11	Beginning scale value	C. in	R	
12	Full scale value	C. fs	R	
13	Y2 Alarm Set point	Y2SP	R/W	
14	Y3 Alarm Set point	Y3SP	R/W	
15	Y3 Hysteresis alarm	Y2HY	R/W	
16	Y3 Hysteresis alarm	Y3HY	R/W	
17	Relative Cool Gain	r.cr	R/W	
18	-	-	-	
19	-	-	-	
20	Dead band Heat / Cool action	db	R/W	
21	Y1 Cool Cycling time	t.c C	R/W	
22	Servomotor rotation time	t.Y	R/W	
23	Manual reset	r.Y	R/W	
24	-	-	-	
25	-	-	-	
26	Stored Set point #1	SP 1	R/W	
27	Stored Set point #2	SP 2	R/W	
28	Stored Set point #3	SP 3	R/W	
29	-	-	-	
30	Minimum value of Set point assignable	SPLi	R/W	
31	Maximum value of Set point assignable	SPLh	R/W	
32	Main output Y1 minimum value	YL	R/W	
33	Main output Y1 maximum value	Yh	R/W	

Address	Variable	Parameter Code	Type	Note
34	Cool main output Y2 maximum value	YH.C.	R/W	
35	Slope up Set point	SI.uP.	R/W	
36	Slope down Set point	SL.dn.	R/W	
37	Measurement Filter	tF.it.	R/W	
38	Input shift	in.SH.	R/W	
39	Enabled Auto-Tune	AtuN.	R/W	
40	Parameters password access	APAr.	R/W	
41	SCI Address	Addr.	R/W	
42	Enabled SCI port	SCI	R/W	
43	-	-	-	
44	-	-	-	
45	Bias Remote Set point	SPrb.	R/W	
46	Ratio Remote Set point	SPrr	R/W	
47	Fuzzy intensity	F.int.	R/W	
48	Fuzzy error	FErr.	R/W	
49	Fuzzy change in error	FdEr.	R/W	
50	Sampling time	t.Sam.	R/W	

16.4 WORD ZONE - PAGE 2 PARAMETERS

Address	Variable	Parameter Code	Type	Note
51	-	-	-	
52	-	-	-	
53	Virtual position for servomotor option		R	[11]
54	-	-	-	
55	-	-	-	
56	-	-	-	
57	-	-	-	
58	-	-	-	
59	-	-	-	
60	-	-	-	
61	-	-	-	
62	-	-	-	
63	Y4 Alarm Set point	Y4SP.	R/W	[4]
64	Y5 Alarm Set point	Y5SP.	R/W	[4]
65	Y4 Hysteresis alarm	Y4HY.	R/W	[4]
66	Y5 Hysteresis alarm	Y5HY.	R/W	[4]
67	Proportional band 2nd set PID	Pb. 2	R/W	[4]
68	Integral time 2nd set PID	t.i 2	R/W	[4]
69	Derivative tie 2nd set PID	t.d. 2	R/W	[4]
70	Relative cool gain 2nd set PID	r.c.r.2	R/W	[4]
71	Manual reset 2nd set PID	r.y. 2	R/W	[4]
72	Y1 Programmed value	y1Pr.	R/W	[4]
73	-	-	-	
74	Y1 Safety value	SAy1	R/W	

Address	Variable	Parameter Code	Type	Note
75	Y2 Safety index	SAY2	R/W	
76	Y3 Safety index	SAY3	R/W	
77	Y4 Safety index	SAY4	R/W	[4]
78	Y5 Safety index	SAY5	R/W	[4]
79	-	-	-	
80	-	-	-	
81	-	-	-	
82	-	-	-	
83	-	-	-	
84	-	-	-	
85	-	-	-	
86	-	-	-	
87	-	-	-	
88	-	-	-	
89	Max slope up main output Y1	Y5L.u.	R/W	
90	Max slope down main output Y1	Y5L.d.	R/W	
91	-	-	-	
92	-	-	-	
93	-	-	-	
94	-	-	-	
95	-	-	-	
96	-	-	-	
97	-	-	-	
98	-	-	-	
99	-	-	-	
100	-	-	-	

16.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	-	-	-	
102	-	-	-	
103	Algorythm and control action	C.Con.	R/W	[12]
104	Set point type	C. SP.	R/W	[12]
105	Input type ad scale range	C.In.t	R/W	[12]
106	Temperature unit selection and cool junction compensation	C. Sc.	R/W	[12]
107	Cool junction compensation	C. C.J.	R/W	[12]
108	Decimal point	C.dd.	R/W	[12]
109	Beginning scale value	C. Io.	R/W	[12]
110	Full scale value	C. F.s.	R/W	[12]
111	-	-	-	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	

Address	Variable	Parameter Code	Type	Note
116	-	-	-	
117	Logic input function #1	FL.i1	R/W	[12]
118	Logic input function #2	FL.i2	R/W	[12]
119	Logic input function #3	FL.i3	R/W	[12]
120	-	-	-	
121	Factory code (600 for Ascon)		R(W)	[13]
122	Series code (“QF”, “QP” or “63”)		R	[14]
123	Series code (“ ” or “6 ” or “P ”)		R	[14]
124	First part of release code		R	[14]
125	Second part of release code		R	[14]
126	Special version code		R	
127	-	-	-	
128	-	-	-	
129	-	-	-	
130	-	-	-	
131	Remote Set point input type	F.inr.	R/W	[12]
132	Y1 Main output mode	F. Y1	R/W	[12]
133	Y1 Main output range	Fu.Y1	R/W	[12]
134	Y2 Alarm type	F. Y2	R/W	[12]
135	Y3 Alarm type	F. Y3	R/W	[12]
136	Y4 Alarm type	F. Y4	R/W	[12]
137	Y5 Alarm type	F. Y5	R/W	[12]
138	Y6 Retransmission type	F. Y6	R/W	[12]
139	Y6 Output range	Fu.Y6	R/W	[12]
140	Calibration value of beginning scale Y1 mA	0Y.1A	R/W	
141	Calibration value of full scale Y1 mA	FY.1A	R/W	
142	Calibration value of beginning scale Y6 mA	0Y6A	R/W	
143	Calibration value of full scale Y6 mA	FY6A	R/W	
144	Calibration value of beginning scale Y1 Volt	0Y.1U	R/W	
145	Calibration value of full scale Y1 Volt	FY.1U	R/W	
146	Calibration value of beginning scale Y6 Volt	0Y6U	R/W	
147	Calibration value of full scale Y6 Volt	FY6U	R/W	
148	-	-	-	
149	-	-	-	
150	-	-	-	

Note 1 The write operation is possible if the corresponding bit is not forced by the logical addresses.

Note 2 During writing and assignment operations, the status of bits 3 and 4, if the Set point is configured as local + 3 stored, has the following meaning:

bit3	bit4	Set point
0	0	Local set point
1	0	Stored set point #1
0	1	Stored set point #2
1	1	Stored set point #3

Note 3 The write operation is only possible if the alarm is disabled.

Note 4 Only for QP series.

Note 5 The write operation is only possible if the alarm is disabled.

Note 6 The assignment of the Set point to address 2 writes the Set point from the computer, identified by a letter "C" appearing on display N

Note 7 A value may only be assigned to address 3 if the instrument is in manual mode. For the output for servomotors, the assignment of a value of over zero activates it when open, a value of under zero activates it when closed and the value zero stops it.

Note 8 When configured for ratio control, the address 4 is equal to address 2.

Note 9 If there is an ON-OFF algorithm at this address, the Proportional Band is replaced by the output hysteresis.

Note 10 If there is a servomotor output at this address, the cycle time is replaced by the minimum output variation.

Note 11 For the output for servomotors, this address indicates the calculated position of the servomotor

Note 12 All the configuration parameters are accepted, if valid, but not brought into effect. To execute the reconfiguration procedure and bring the changes into effect, the code 55AAh must be written at address 121.

Note 13 Address 121 is read only, but if the code 55AAh (21930d) is written at this address, the configuration is brought into effect.

Note 14 Addresses 122 + 123 and 124 + 125 contain the strings (4-character) of the code produced and the release coded in this way: each address represents two characters, the top byte of the word contains the ASCII code of the first and the bottom byte contains the ASCII code of the second.

17 • QP CONTROLLER (WITH PROGRAMME OPTION)

17.1 BIT ZONE

Address	Variable	Type	Note
1	Local Set point/Programmed (0 = Local, 1 = Programmed)	R/W	[1]
2	Automatic/Manual (0 = Automatic, 1 = Manual) R/W	[1]	
3	Hold program (1 = hold)	R/W	[1]
4	Reset program (1 = Reset)	R/W	[1]
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R(W)	[2]
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R(W)	[2]
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Auto-Tune (0 = Inattivo, 1 = Attivo)	R	
9	Local mode / Supervisor (0 = Local, 1 = Supervisor)	R/W	[3]
10	Out of Range (0 = Normal operation, 1 = Safety) R		
11	Jump to next segment	W	
12	Back to the beginning of dwell segment	W	
13	Alarm condition Y4 (0 = OFF, 1 = ON)	R(W)	[4]
14	Alarm condition Y5 (0 = OFF, 1 = ON)	R(W)	[4]
15	Stato uscita logica Y7 (0 = OFF, 1 = ON)	R	
16	Stato uscita logica Y8 (0 = OFF, 1 = ON)	R	
17	Input logic state #1	R	
18	Input logic state #2	R	
19	Input logic state #3	R	
20	-	-	
21	Lock keyboard	R/W	[1]
22	Fixed bit to “1”	R	
23	Model (fixed to “0”)	R	
24	Model (fixed to “1”)	R	
25	Model (0 = Ascon, 1 = EB)	R	
26	Retransmission Y6 option inside	R	
27	Custom input option inside	R	
28	Virtual position for servomotor option inside	R	
29	-	-	
30	-	-	

17.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Local Set point / Programmed (0 = Local, 1 = Programmed)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	3	Hold programme (1 = hold)	
4	4	Reset programme (1 = Reset)	
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

17.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	X Variable		R	
2	W Set point		R/W	[5]
3	Main output Y1		R (/W in Manual)	[6]
4	WT Target Set point		R	
5	WL Local Set point		R/W	
6	Proportional band (Isteresi ON - OFF)	Pb (HY)	R/W	[7]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Y1 Cycling time	t.c (dY)	R/W	[8]
11	Beginning scale value	C. in	R	
12	Full scale value	C. fs	R	
13	Y2 Alarm Set point	Y2SP	R/W	
14	Y3 Alarm Set point	Y3SP	R/W	
15	Y2 Hysteresis alarm	Y2HY	R/W	
16	Y2 Hysteresis alarm	Y3HY	R/W	
17	Relative Cool Gain	r.cr	R/W	
18	-	-	-	
19	-	-	-	
20	Dead band Heat / Cool action	db	R/W	
21	Y1 Cool Cycling time	t.cC	R/W	
22	Servomotor rotation time	t.M	R/W	
23	Manual reset	rM	R/W	
24	-	-	-	
25	-	-	-	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	-	-	-	
30	Minimum value of Set point assignable	SPLi	R/W	
31	Maximum value of Set point assignable	SPLh	R/W	
32	Main output Y1 minimum value	YL	R/W	
33	Main output Y1 maximumvalue	Yh	R/W	

Address	Variable	Parameter Code	Type	Note
34	Cool main output Y2 maximum value	YH.C.	R/W	
35	Slope up Set point	SI.u.	R/W	
36	Slope down Set point	SI.d.	R/W	
37	Measurement Filter	tF.I.	R/W	
38	Input shift	In.Sh.	R/W	
39	Enabled Auto-Tune	AtU.	R/W	
40	Parameters password access	APAr.	R/W	
41	Parameters password access	Addr.	R/W	
42	Enabled SCI port	SCI	R/W	
43	-	-	-	
44	-	-	-	
45	-	-	-	
46	-	-	-	
47	Fuzzy intensity	F.Int.	R/W	
48	Fuzzy error	FErr.	R/W	
49	Fuzzy change in error	FdEr.	R/W	
50	Sampling time	tSAm.	R/W	

17.4 WORD ZONE - PAGE 2 PARAMETERS

Address	Variable	Parameter Code	Type	Note
51	-	-	-	
52	-	-	-	
53	Servomotor virtual position		R	[9]
54	-	-	-	
55	-	-	-	
56	-	-	-	
57	-	-	-	
58	-	-	-	
59	-	-	-	
60	-	-	-	
61	-	-	-	
62	-	-	-	
63	Y4 Alarm Set point	Y4SP.	R/W	
64	Y5 Alarm Set point	Y5SP.	R/W	
65	Y4 Hysteresis alarm	Y4HY.	R/W	
66	Y5 Hysteresis alarm	Y5HY.	R/W	
67	Proportional band 2nd set PID	Pb. 2	R/W	
68	Integral time 2nd set PID	t. I 2	R/W	
69	Derivative tie 2nd set PID	td. 2	R/W	
70	Relative cool gain 2nd set PID	r.c.r.2	R/W	
71	Manual reset 2nd set PID	rY. 2	R/W	
72	Y1 Programmed value	Y1PP.	R/W	
73	-	-	-	
74	Y1 Safety value	SAY1	R/W	

Address	Variable	Parameter Code	Type	Note
75	Y2 Safety index	SAY2	R/W	
76	Y3 Safety index	SAY3	R/W	
77	Y4 Safety index	SAY4	R/W	
78	Y5 Safety index	SAY5	R/W	
79	-	-	-	
80	-	-	-	
81	-	-	-	
82	-	-	-	
83	-	-	-	
84	-	-	-	
85	-	-	-	
86	-	-	-	
87	-	-	-	
88	-	-	-	
89	Max slope up main output Y1	Y5 Su.	R/W	
90	Max slope down main output Y1	Y5 Sd.	R/W	
91	-	-	-	
92	-	-	-	
93	-	-	-	
94	-	-	-	
95	-	-	-	
96	-	-	-	
97	-	-	-	
98	-	-	-	
99	-	-	-	
100	-	-	-	

17.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	-	-	-	
102	Identification code	tAb	R/W	
103	Algorythm and control action	CAon.	R/W	[10]
104	Programme type	C. Pr.	R/W	[10]
105	Input type ad scale range	C. In.1	R/W	[10]
106	Temperature unit selection and cool junction compensation	C. Sc.	R/W	[10]
107	Cool junction compensation	C. CJ.	R/W	[10]
108	Numero di cifre decimali ingresso	C.dd.	R/W	[10]
109	Beginning scale valuesso	C. Lo.	R/W	[10]
110	Full scale value	C. hi.	R/W	[10]
111	-	-	-	
112	-	-	-	
113	-	-	-	
114	-	-	-	
115	-	-	-	

Address	Variable	Parameter Code	Type	Note
116	-	-	-	
117	Logic input function #1	[illegible]	R/W	[10]
118	Logic input function #2	[illegible]	R/W	[10]
119	Logic input function #3	[illegible]	R/W	[10]
120	-	-	-	
121	Factory code (600 for Ascon)		R(W)	[11]
122	Series code (“QP ” or “63P ”)		R	[12]
123			R	
124	Release code 12		R	[12]
125			R	
126	Special version code		R	
127	-	-	-	
128	-	-	-	
129	-	-	-	
130	-	-	-	
131	Remote Set point input type	[illegible]	R	
132	Y1 Main output mode	[illegible]	R/W	[10]
133	Y1 Main output ran	[illegible]	R/W	[10]
134	Y2 Alarm type	[illegible]	R/W	[10]
135	Y3 Alarm type	[illegible]	R/W	[10]
136	Y4 Alarm type	[illegible]	R/W	[10]
137	Y5 Alarm type	[illegible]	R/W	[10]
138	Y6 Retransmission type	[illegible]	R/W	[10]
139	Y6 Output range	[illegible]	R/W	[10]
140	Calibration value of beginning scale Y1 mA	[illegible]	R/W	
141	Calibration value of full scale Y1 mA	[illegible]	R/W	
142	Calibration value of beginning scale Y6 mA	[illegible]	R/W	
143	Calibration value of full scale Y6 mA	[illegible]	R/W	
144	Calibration value of beginning scale Y1 Volt	[illegible]	R/W	
145	Calibration value of full scale Y1 Volt	[illegible]	R/W	
146	Calibration value of beginning scale Y6 Volt	[illegible]	R/W	
147	Calibration value of full scale Y6 Volt	[illegible]	R/W	
148	-	-	-	
149	-	-	-	
150	-	-	-	

17.6 WORD ZONE - PAGE 4 PROGRAMME

Address	Variable	Parameter Code	Type	Note
151	Select programme		R/(W)	[13]
152	Running programme		R	[14]
153	Running segment		R	[14]
154	Residue time of the segment		R	[14]
155	Residue cycle		R	[14]
156	Segment state	-	R	[15-14]

Address	Variable	Parameter Code	Type	Note
157	-	-	-	
158	Insert / Delete code		W	[16]
159	Edit programme		R/W	
160	Edit segment		R/W	
161	Segment Set point	nn5P.	R/W	
162	Segment time	nndu.	R/W	
163	Deviation error	nnEr.	R/W	
164	Logic condition Y2	nnY2	R/W	
165	Logic condition Y3	nnY3	R/W	
166	Logic condition Y4	nnY4	R/W	
167	Logic condition Y5	nnY5	R/W	
168	Logic condition Y7	nnY7	R/W	
169	Logic condition Y8	nnY8	R/W	
170	Parameters set of the segment	nnPR	R/W	
171	Memorized cycle number	PrCy.	R/W	
172	-	-	-	
173	Programme segment number		R	
174	Free segment		R	
175	-	-	-	
176	-	-	-	
177	-	-	-	
178	-	-	-	
179	-	-	-	
180	-	-	-	
181	-	-	-	
182	-	-	-	
183	-	-	-	
184	-	-	-	
185	-	-	-	
186	-	-	-	
187	-	-	-	
188	-	-	-	
189	-	-	-	
190	-	-	-	
191	-	-	-	
192	-	-	-	
193	-	-	-	
194	-	-	-	
195	-	-	-	
196	-	-	-	
197	-	-	-	
198	-	-	-	
199	-	-	-	
200	-	-	-	

Note 1 The write operation is possible if the corresponding bit is not forced by the logical addresses.

Note 2 The write operation is only possible if the alarm is disabled.

Note 3 Only if SCI parameter index is equal to any value from 17 to 24 (local/host mode).

Note 4 The write operation is only possible if the relay is not used for the main output and so the alarm is present but disabled.

Note 5 The assignment of the Set point to address 2 writes the Set point from the computer, identified by a letter "C" appearing on display N.

Note 6 A value may only be assigned to address 3 if the instrument is in manual mode. For the output for servomotors, the assignment of a value of over zero activates it when open, a value of under zero activates it when closed and the value zero stops it.

Note 7 If there is an ON-OFF algorithm at this address, the Proportional Band is replaced by the output hysteresis.

Note 8 If there is a servomotor output at this address, the cycle time is replaced by the minimum output variation.

Note 9 For the output for servomotors, this address indicates the calculated position of the servomotor.

Note 10 All the configuration parameters are accepted, if valid, but not brought into effect. To execute the reconfiguration procedure and bring the changes into effect, the code 55AAh must be written at address 121.

Note 11 Address 121 is read only, but if the code 55AAh (21930d) is written at this address, the configuration is brought into effect.

Note 12 Addresses 122 + 123 and 124 + 125 contain the strings (4-character) of the code produced and the release coded in this way: each address represents two characters, the top byte of the word contains the ASCII code of the first and the bottom byte contains the ASCII code of the second.

Note 13 The write operation is possible only if the program external selection is not active.

Note 14 If the controller is operating with the local Set point the reading at this address, come back 0 value.

Note 15 Read only address. The reading has the following meanings:
1 A slope up program is running
0 A dwell program is running
-1 A slope down program is running

Note 16 Write only address (reading is 0). The write operation can have only the following legal values:

1 Adds a segment after the one selected by the address 160

-1 Deletes the segment selected by the address 160

When the write value is different or if it is not possible to perform the operation the instrument answers with the error code 03 (ILLEGAL DATA VALUE).

18.1 BIT ZONE

Address	Variable	Type	Note
1	Local Set point/Remote (0 = Local, 1 = Remote)	R/W	[1]
2	Automatic/Manual (Master or loop “a”) (0=Automatic, 1=Manual)	R/W	[1]
3	Stored Set point (with bit 4)	R/W	[2-1]
4	Stored Set point (with bit 3)	R/W	[2-1]
5	Alarm condition Y2 (0 = OFF, 1 = ON)	R(W)	[3]
6	Alarm condition Y3 (0 = OFF, 1 = ON)	R(W)	[3]
7	Out of Range (0 = Normal operation, 1 = Safety)	R	
8	Self Tuning (0 = Off, 1 = Run)	R	
9	-	-	
10	Out of Range (0 = Normal operation, 1 = Safety)	R	
11	Out of range input #2 (0 = Normal operation, 1=Safety)	R	[4]
12	Automatic/Manual Slave or loop “b” (0=Automatic,1=Manual)	R/W	[5]
13	Alarm condition Y4 (0 = OFF, 1 = ON)	R(W)	[6]
14	Alarm condition Y5 (0 = OFF, 1 = ON)	R(W)	[6]
15	-	-	
16	-	-	
17	Input logic state #1	R	
18	Input logic state #2	R	
19	Input logic state #3	R	
20	Switch on 2nd group of P.I.D. parameters	R/W	[1]
21	Lock keyboard	R/W	[1]
22	Fixed bit to “1”	R	
23	Model (fixed to “1”)	R	
24	Model (fixed to “1”)	R	
25	Model (0 = Ascon, 1 = EB)	R	
26	Retransmission Y6 option inside	R	
27	Custom input option inside	R	
28	Virtual position for servomotor option inside	R	
29	-	-	
30	-	-	
...			
101	-	-	
102	Automatic/Manual Slave or loop “b” (0=Automatic, 1=Manual)	R/W	[5]
103	-	-	
104	-	-	
105	Alarm condition Y4 (0 = OFF, 1 = ON)	R(W)	[6]

Address	Variable	Type	Note
106	Alarm condition Y5 (0 = OFF, 1 = ON)	R(W)	[6]
107	-	-	
108	-	-	
109	-	-	
110	Out of range input #2 (0 = Normal operation, 1=Safety)	R	[4]

18.2 READ STATUS

Function 07 (Read Status) returns an eight bit status with the following meanings:

BIT	Address	Variable	Note
1 (LSB)	1	Local Set point/Remote (0 = Local, 1 = Remote)	
2	2	Automatic/Manual (0 = Automatic, 1 = Manual)	
3	3	Stored Set point (with bit 4)	[2]
4	4	Stored Set point (with bit 3)	[2]
5	5	Alarm condition Y2 (0 = OFF, 1 = ON)	
6	6	Alarm condition Y3 (0 = OFF, 1 = ON)	
7	7	Out of Range (0 = Normal operation, 1 = Safety)	
8 (MSB)	8	Self Tuning (0 = Off, 1 = Run)	

18.3 WORD ZONE - PAGE 1 PARAMETERS

Address	Variable	Parameter Code	Type	Note
1	See table			
2				
3				
4				
5				
6	Proportional band (Hysteresis ON - OFF)	Pb (HY)	R/W	[7]
7	0000		R	
8	Integral time	t.i	R/W	
9	Derivative time	t.d	R/W	
10	Y1 Cycling time	t.c. (dY)	R/W	[8]
11	Beginning scale value	C. Lo	R	
12	Full scale value	C. Hi	R	
13	Y2 Alarm Set point	Y2SP.	R/W	
14	Y3 Alarm Set point	Y3SP.	R/W	
15	Y2 Hysteresis alarm	Y2HY.	R/W	
16	Y3 Hysteresis alarm	Y3HY.	R/W	
17	Relative Cool Gain	r.c.r.	R/W	
18	-	-	-	
19	-	-	-	
20	Dead band Heat / Cool action	db.	R/W	
21	Y1 Cool Cycling time	t.c.C.	R/W	

Address	Variable	Parameter Code	Type	Note
22	Servomotor rotation time	t.M	R/W	
23	Manual reset	r.M	R/W	
24	-	-	-	
25	-	-	-	
26	Stored Set point #1	SP. 1	R/W	
27	Stored Set point #2	SP. 2	R/W	
28	Stored Set point #3	SP. 3	R/W	
29	-	-	-	
30	Minimum value of Set point assignable	SPL.1	R/W	
31	Maximum value of Set point assignable	SPLh.	R/W	
32	Main output Y1 minimum value	YL.	R/W	
33	Main output Y1 maximum value	Yh.	R/W	
34	Cool main output Y2 maximum value	Yh.C.	R/W	
35	Slope up Set point	SL. u.	R/W	
36	Slope down Set point	SL. d.	R/W	
37	Measurement Filter	tF iL.	R/W	
38	Input shift	InSh.	R/W	
39	Enabled Auto-Tune	AtU.	R/W	
40	Parameters password access	APAr.	R/W	
41	SCI Address	Addr.	R/W	
42	Enabled SCI port	SCI	R/W	
43	-	-	-	
44	-	-	-	
45	Bias Remote Set point	SPrb.	R/W	
46	Ratio Remote Set point	SPrr	R/W	
47	Fuzzy intensity	F.Int.	R/W	
48	Fuzzy error	FErr.	R/W	
49	Fuzzy change in error	FdEr.	R/W	
50	Sampling time	tSAn.	R/W	

18.4 WORD ZONE - PAGE 2 PARAMETERS

Address	Variable	Parameter Code	Type	Note
51, 501	See table			
52, 502				
53, 503				
54, 504				
55, 505				
56, 506	Proportional band loop slave (loop “b”)	Pb. S. (Pb. b)	R/W	
57, 507	-	-	-	
58, 508	Integral time loop slave (loop “b”)	t. I S (t. I b)	R/W	
59, 509	Derivative time loop slave (loop “b”)	td S. (td b)	R/W	
60, 510	Y1 Cycling time loop “b”	tc. b	R/W	
61, 511	Beginning scale value X2	C2Lo.	R	
62, 512	Full scale value X2	C2h I.	R	

Address	Variable	Parameter Code	Type	Note
63, 513	Y4 Alarm Set point	Y4SP.	R/W	
64, 514	Y5 Alarm Set point	Y5SP.	R/W	
65, 515	Y4 Hysteresis alarm	Y4HY	R/W	
66, 516	Y5 Hysteresis alarm	Y5HY	R/W	
67, 517	Proportional band 2nd set PID	Pb. 2	R/W	
68, 518	Integral time 2nd set PID	t. I 2	R/W	
69, 519	Derivative tie 2nd set PID	t.d. 2	R/W	
70, 520	Relative cool gain 2nd set PID	r.c.r.2	R/W	
71, 521	Manual reset 2nd set PID	r.y. 2	R/W	
72, 522	Y1 Programmed value	Y 1PP r.	R/W	
73, 523	Manual reset loop slave (loop “b”)	r.y. 5. (r.y. b)	R/W	
74, 524	Y1 Safety value	SAY 1	R/W	
75, 525	Y2 Safety index	SAY2	R/W	
76, 526	Y3 Safety index	SAY3	R/W	
77, 527	Y4 Safety index	SAY4	R/W	
78, 528	Y5 Safety index	SAY5	R/W	
79, 529	Safety value output loop “b”	SAYb	R/W	
80, 530	Minimum value of Set point assignable loop slave (loop “b”)	SP. Lb	R/W	
81, 531	Maximum value of Set point assignable loop slave (“b”)	SPHb	R/W	
82, 532	Main output Y1 minimum value loop “b”	YL. b	R/W	
83, 533	Main output Y1 maximum value loop “b”	YH. b	R/W	
84, 534	-	-	-	
85, 535	Slope up Set point loop “b”	SLUb	R/W	
86, 536	Slope down Set point loop “b”	SLdb	R/W	
87, 537	Measurement Filter input X2	t.F I.2	R/W	
88, 538	Input shift of input X2	InS2	R/W	
89, 539	Max slope up main output Y1	YSLU.	R/W	
90, 540	Max slope down main output Y1	YS Id.	R/W	
91, 541	-	-	-	
92, 542	-	-	-	
93, 543	-	-	-	
94, 544	-	-	-	
95, 545	Bias Set point slave	SPSb.	R/W	
96, 546	Ratio Set point slave	SPSr.	R/W	
97, 547	-	-	-	
98, 548	-	-	-	
99, 549	-	-	-	
100, 550	-	-	-	

18.5 WORD ZONE - PAGE 3 CONFIGURATION

Address	Variable	Parameter Code	Type	Note
101	-	-	-	
102	-	-	-	
103	Algorythm and control action	C.Con.	R/W	[9]
104	Set point type	C. SP.	R/W	[9]
105	Input type ad scale range of input #1	C.In.1	R/W	[9]
106	Temperature unit selection and cool junction compensation of input #1	C. Sc.	R/W	[9]
107	Cool junction compensation of input #1	C. C.J.	R/W	[9]
108	Decimal point of input #1	C. dd.	R/W	[9]
109	Beginning scale value of input #1	C. lo.	R/W	[9]
110	Full scale value of input #1	C. h.1	R/W	[9]
111	Input type ad scale range of input #2	C.In2	R/W	[9]
112	Temperature unit selection and cool junction compensation of input #2	C.2Sc.	R/W	[9]
113	Cool junction compensation of input #2	C.2C.J.	R/W	[9]
114	Decimal point of input #2	C.2dd.	R/W	[9]
115	Beginning scale value of input #2	C.2 lo.	R/W	[9]
116	Full scale value of input #2	C.2h.1	R/W	[9]
117	Logic input function #1	C.L.i1	R/W	[9]
118	Logic input function #2	C.L.i2	R/W	[9]
119	Logic input function #3	C.L.i3	R/W	[9]
120	-	-	-	
121	Factory code (600 for Ascon)		R(W)	[10]
122	Series code (“QD” or “63”)		R	[11]
123	Series code (“ ” or “D ”)		R	[11]
124	First part of release code		R	[11]
125	Second part of release code		R	[11]
126	Special version code		R	
127	-	-	-	
128	-	-	-	
129	-	-	-	
130	-	-	-	
131	Remote Set point input type	C.inr.	R/W	[9]
132	Y1 Main output mode	C. Y1	R/W	[9]
133	Y1 Main output range	C.Y1	R/W	[9]
134	Y2 Alarm type	C. Y2	R/W	[9]
135	Y3 Alarm type	C. Y3	R/W	[9]
136	Y4 Alarm type	C. Y4	R/W	[9]
137	Y5 Alarm type	C. Y5	R/W	[9]
138	Y6 Retransmission type	C. Y6	R/W	[9]
139	Y6 Output range	C.Y6	R/W	[9]
140	Calibration value of beginning scale Y1 mA	CY.1A	R/W	

Address	Variable	Parameter Code	Type	Note
141	Calibration value of full scale Y1 mA	F.Y.1A	R/W	
142	Calibration value of full scale Y6 mA	0.Y.6A	R/W	
143	Valore di calibrazione Fondo Scala Y6 in mA	F.Y.6A	R/W	
144	Calibration value of beginning scale Y1 Volt	0.Y.1U	R/W	
145	Calibration value of full scale Y1 Volt	F.Y.1U	R/W	
146	Calibration value of beginning scale Y6 Volt	0.Y.6U	R/W	
147	Calibration value of full scale Y6 Volt	F.Y.6U	R/W	
148	-	-	-	
149	-	-	-	
150	-	-	-	

18.6 SPECIFIC VARIABLES

SIMPLE P.I.D.

Address	Variable	Type	Note
1	X Variable	R	
2	W Set point	R/W	[12]
3	Main output Y1	R (W in Manual)	[13-14]
4	WT Target Set point	R	
5	WL Local Set point	R/W	
51, 501	-	-	
52, 502	-	-	
53, 503	-	-	
54, 504	Virtual position for servomotor option	R	[15]
55, 505	-	-	

CASCADE P.I.D.

Address	Variable	Type	Note
1	X Variable	R	
2	W Set point	R/W	[16]
3	Main output Y1	R (W in Man. Ma.)	[17]
4	WT Target Set point	R	
5	WL Local Set point	R/W	
51, 501	X2 Slave variable	R	
52, 502	W2 Slave Set point	R (W in Man. Ma.)	[17]
53, 503	Main output Y2 Slave	R (W in Man. Sl.)	[13-18]
54, 504	Virtual position for servomotor option	R	[15]
55, 505	W2 Slave Set point	R (W in Man. Ma.)	[18]

RATIO P.I.D.

Address	Variable	Type	Note
1	Ratio value X1÷X2 (o X2÷X1)	R	
2	Ratio Set point K	R/W	[12]
3	Main output Y Y	R (W in Manuale)	[13-14]
4	Engineering unit of target Set point	R	
5	Local Set point ratio K	R/W	
51, 501	Engineering unit value input 1	R	
52, 502	Engineering unit value input 2	R	
53, 503	-	-	
54, 504	Virtual position for servomotor option	R	[15]
55, 505	-	-	

DUAL LOOP P.I.D.

Address	Variable	Type	Note
1	Variable loop “a” X1	R	
2	Set point loop “a” W	R/W	[19]
3	Main output loop “a” YA	R (W in Manual)	[13-20]
4	Target Set point loop “a” WT	R	
5	Local Set point loop “a” WL	R/W	
51, 501	Variable loop “b” X2	R	
52, 502	Set point loop “b” WB	R/W	[21]
53, 503	Main output loop “b” YB	R (W in Manual)	[22]
54, 504	Target Set point loop “b” WTB	R	
55, 505	Local Set point loop “b” WLB	R/W	

Note 1 The write operation is possible if the corresponding bit is not forced by the logical addresses.

Note 2 During writing and assignment operations, the status of bits 3 and 4, if the Set point is configured as local + 3 stored, has the following meaning:

bit3	bit4	Set point
0	0	Local Set point
1	0	Stored Set point #1
0	1	Stored Set point #2
1	1	Stored Set point #3

Note 3 The write operation is only possible if the alarm is disabled.

Note 4 The status of this bit is only significant if input X2 is used.

Note 5 The status of this bit is only significant if an algorithm that includes the second loop is configured (Cascade or Dual Loop).

Note 6 The write operation is only possible if the relay is not used for the main output and so the alarm is present but disabled.

Note 7 If there is an ON-OFF algorithm at this address, the Proportional Band is replaced by the output hysteresis.

Note 8 If there is a servomotor output at this address, the cycle time is replaced by the minimum output variation.

Note 9 All the configuration parameters are accepted, if valid, but not brought into effect. To execute the reconfiguration procedure and bring the changes into effect, the code 55AAh must be written at address 121.

Note 10 Address 121 is read only, but if the code 55AAh (21930d) is written at this address, the configuration is brought into effect.

Note 11 Addresses 122 + 123 and 124 + 125 contain the strings (4-character) of the code produced and the release coded in this way: each address represents two characters, the top byte of the word contains the ASCII code of the first and the bottom byte contains the ASCII code of the second.

Note 12 The assignment of the Set point to address 2 writes the Set point from the computer, identified by a letter "C" appearing on display N.

Note 13 For the output for servomotors, this address indicates the value read by the position potentiometer.

Note 14 A value may only be assigned to address 3 if the instrument is in manual mode. For the output for servomotors, the assignment of a value of over zero activates it when open, a value of under zero activates it when closed and the value zero stops it.

Note 15 For the output for servomotors, this address indicates the calculated position of the servomotor.

Note 16 The assignment of the Set point to address 2 writes the Set point from the Computer for the Master loop, identified by a letter "C" appearing on display N.

Note 17 The assignment of this variable is only possible if the Master loop is in Manual mode.

Note 18 A value may only be assigned to this address if the Slave loop is in manual mode. For the output for servomotors, the assignment of a value of over zero activates it when open, a value of under zero activates it when closed and the value zero stops it.

Note 19 The assignment of the Set point to address 2 writes the Set point, from the Computer, of loop "a", identified by a letter "C" appearing on display N.

Note 20 A value may only be assigned to address 3 if loop "a" is in manual mode. For the output for servomotors, the assignment of a value of over zero activates it when open, a value of under zero activates it when closed and the value zero stops it.

Note 21 The assignment of the Set point to address 2 writes the Set point, from the computer, of loop "b", identified by a letter "C" appearing on display N.

Note 22 This variable can only be assigned if loop "b" is in manual mode.

protocols.