

# Configuration Frame and Parameter Assignment Frame for the ET 200M

# 1

You **don't** need the information contained in this chapter if you configure and parameterize the ET 200M with *STEP 7* or with *COM PROFIBUS*.

You **don't** need the information contained in this chapter if you integrate the device master file of the IM 153-x in your configuration tool, and then configure and parameterize the ET 200M using the configuration tool.

You only **need** the information in the following cases:

- If you don't use a configuration tool to create the configuration and parameter assignment frames.
- If you want to monitor the configuration and parameter assignment frames with a bus monitor.

## Chapter overview

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## Declaration

In the following, IM 153-x stands for the IM 153-1, IM 153-2/-2 FO and IM 153-3.

## Scope of validity

This information is valid for the following IM 153-x:

IM 153-1	as of 6ES7153-1AAx2-0XB0, version 01
IM 153-2	as of 6ES7153-2AA02-0XB0, version 01 as of 6ES7153-2BA00-0XB0, version 01 as of 6ES7153-2BAx1-0XB0, version 01 as of 6ES7153-2BAx2-0XB0, version 01
IM 153-2 FO	as of 6ES7153-2AB01-0XB0, version 01 as of 6ES7153-2BB00-0XB0, version 01
IM 153-3	as of 6ES7153-3AA01-0XB0, version 01

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## 1.1 Structure of the Configuration Frame

### Structure of the configuration frame

The length of the configuration frame is dependent on the number of S7-300 modules connected to an ET 200M.

Table 1-1 Structure of the configuration frame

Slot	Byte				
	n	n + 1	n + 2	n + 3	n + 4
1st slot – power supply (n = 0)	04	00	00	AD	C4
2nd slot – • IM 153-1/-2/-3 (n = 5)	04	00	00	8B	41
3rd slot (reserved) (n = 10)	04	00	00	8F	C0
4th slot – 1st S7-300 module (n = 15)	See device master file				
5th slot – 2nd S7-300 module (n = 20)					
...					
15th slot – 12th S7-300 module (n = 70)					

### Identifiers of the modules

You can find the identifiers in the device master file of each IM 153-x.

You can find the current device master files on the Internet at

<http://support.automation.siemens.com>

Search for the entry with the number 113498

For example, you will find the following entry in the device master file for the SM 321; DI 8 × AC 120/230V digital input module:

6ES7321-1FF01-0AA0 8DE: 43 00 00 9F C1<sub>H</sub>

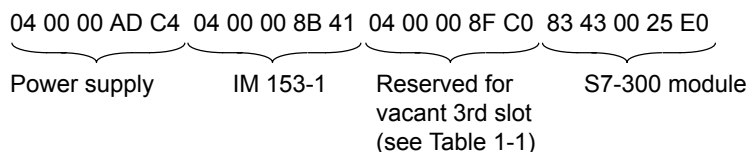
In a configuration with the "Module change during operation" function, a **vacant slot** has the identifier 04 00 00 8F C0<sub>H</sub>.

### Example of a configuration frame

An ET 200M configuration might comprise:

- A power supply
- An IM 153-1
- An S7-300 module (order number 6ES7332-5RD00-0AB0).

The configuration frame thus consists of 20 bytes and has the following structure:



## 1.2 Structure of the Parameter Assignment Frame

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### Definition: Parameter assignment frame

The parameter assignment frame contains all the parameterizable values of a DP slave.

The length of the parameter assignment frame is

- 178 bytes max. for IM 153-1, IM 153-2Ax0x, IM 153-3
- 244 bytes max. for IM 153-2Bx00, IM 153-2BAx1, IM 153-2BAx2

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### Note

If you configure the ET 200M (IM 153-2BAx2) with a GSD file, the length of the parameter assignment frame (maximum 244 bytes) can lead to limitations in the number of assignable modules.

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### Definition: Channel group

The input and output channels of digital and analog modules are combined to form channel groups. Consequently, you can only parameterize the channels in groups.

There are fixed channel/channel group assignments, depending on the type of the digital/analog module. These assignments are listed in the *Module Specifications Reference Manual*.

### Parameters you can set

In this section you can find **all** the parameters that can be set for the modules.

**Before** you assign parameters, check which of these parameters you can set for each of your modules (see the *Module Specifications* and *Intrinsically Safe I/O Modules Reference Manuals*)

Generally the following applies: Activate a parameter by setting the corresponding bit to "1" (unless otherwise specified).

### Structure of the parameter assignment frame

The length of the parameter assignment frame depends on the number of **parameterizable** modules in an ET 200M:

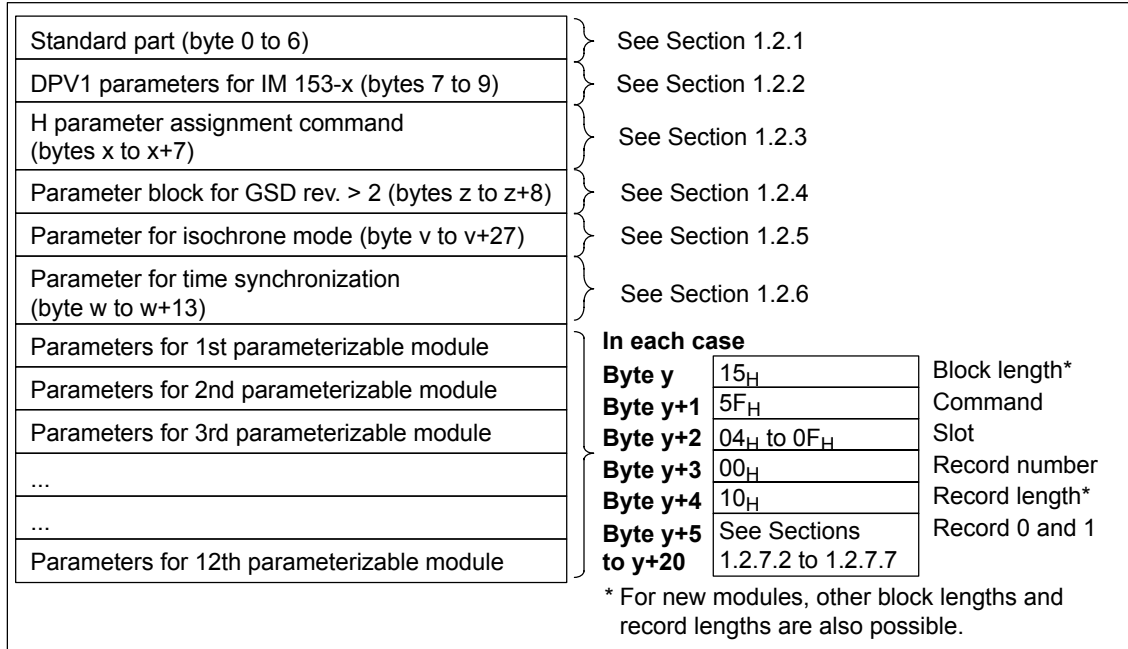


Figure 1-1 Structure of the parameter assignment frame

For the IM 153-2Bx00, IM 153-2BAx1 and IM 153-2BAx2 there are blocks for parameterizing cycle synchronism and clock synchronism, provided that these functions are being used. Due to their complexity, these blocks cannot be parameterized by the user. They will only be displayed as an overview.

## Enabling interrupts

Diagnostic and process interrupts are enabled hierarchically.

You must enable the diagnostic and process interrupts in both the IM 153-x (byte 8) and the modules (record 0 and 1).

If you do not wish to evaluate any diagnostic, process, module removal or module insertion interrupts, the enables for the diagnostic interrupt, process interrupt and module removal/insertion interrupt of the IM 153-x must be set to "0".

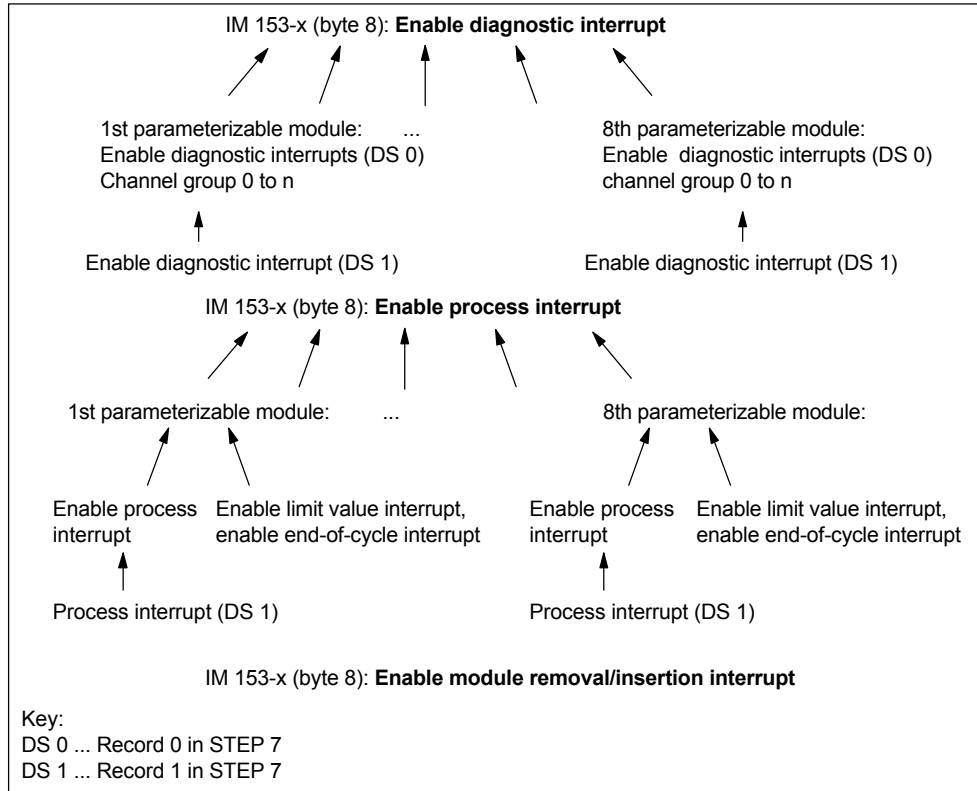


Figure 1-2 Enabling interrupts

## 1.2.1 Standard Part of the Parameter Assignment Frame

### Standard part

The first 7 bytes of the parameter assignment frame are standardized to IEC 61784-1:2002 Ed1 CP 3/1 and have the following contents for the IM 153-x (example):

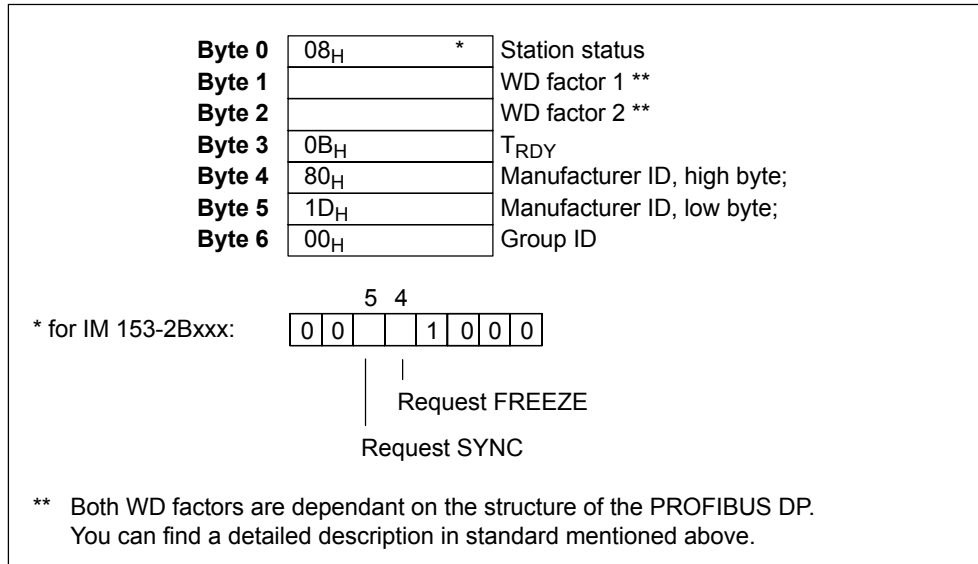


Figure 1-3 Standard part of the parameter assignment frame

## 1.2.2 DPV1 Parameters for the IM 153-x

### Structure of the DPV1 parameters for the IM 153-x

The parameters for the IM 153-x have a length of 3 bytes. The default assignment for these 3 bytes is:

- 40<sub>H</sub> 60<sub>H</sub> 00<sub>H</sub> with GSD rev. 2
- 80<sub>H</sub> 00<sub>H</sub> 08<sub>H</sub> with GSD rev. > 2

**Note:** If you enable the diagnostic interrupts and the process interrupts for the modules (see Sections 1.2.7.2 to 1.2.7.7), you must also enable them for the IM 153-x (see Figure 1-4)!

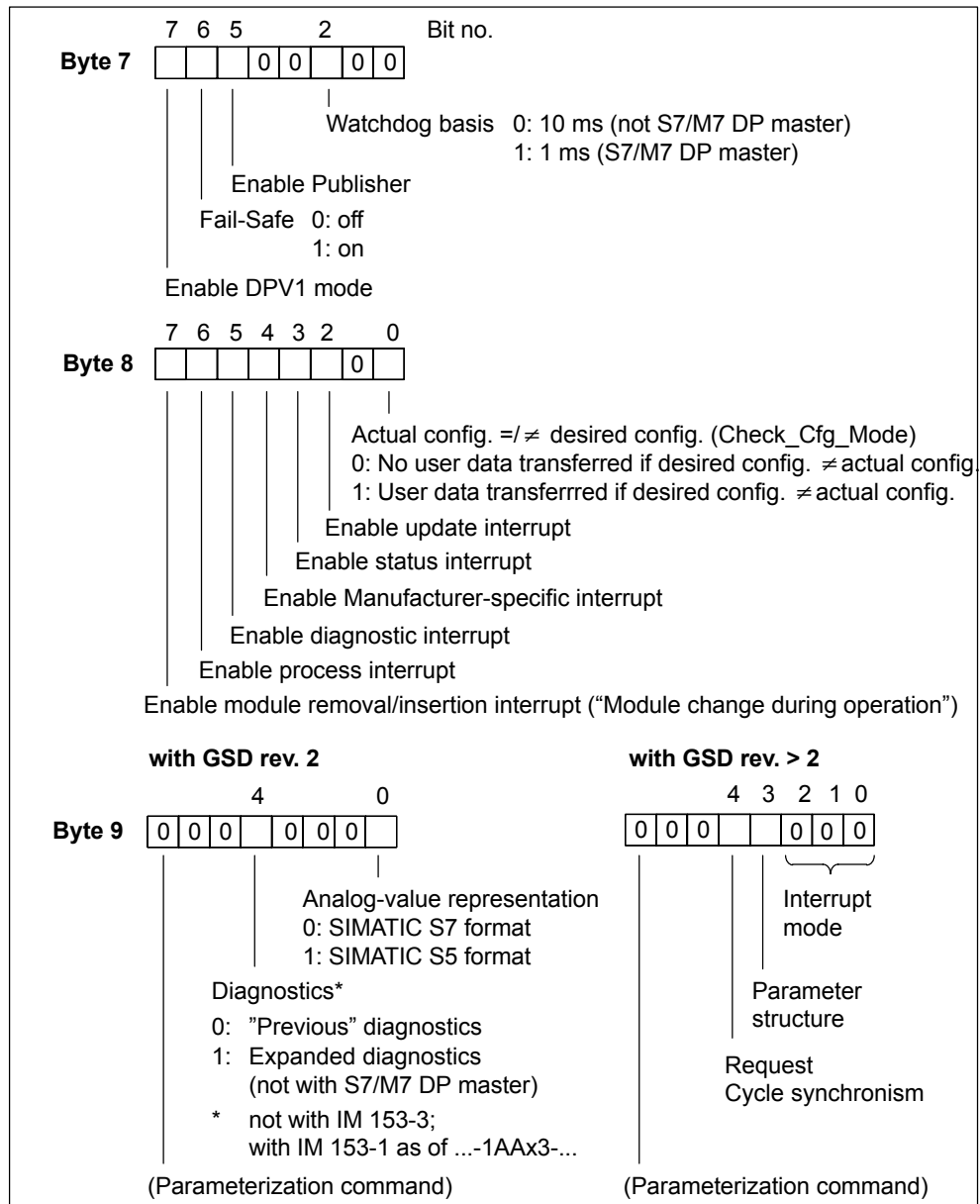


Figure 1-4 Parameters for the IM 153-x



## Dependencies

- The following bits must be set for the “module change during operation” function:
  - Bit 8.0 Actual configuration  $\neq$  desired configuration (Check\_Cfg\_Mode)
  - Bit 8.7 Enable module removal/insertion interrupt
- The redundancy mode requires the following:
  - Bits 9.7 (parameterization command) and 7.6 (fail safe) must be set.
  - The H parameter assignment command must be present (see Section 1.2.3).
  - Bits 0.4 (request FREEZE) and 0.5 (request SYNC) must not be set (see Section 1.2.1).

## Analog-value representation in SIMATIC S5

In a SIMATIC S5 programmable logic controller, the analog values of the S7-300 modules can be represented in SIMATIC S5. In other words, bit numbers 0, 1 and 2 in the low byte of the analog value refer to the X (irrelevant bits), F (error) and Ü (overflow) bits.

The representation of the analog values may be parameterized (see Figure 1-4).

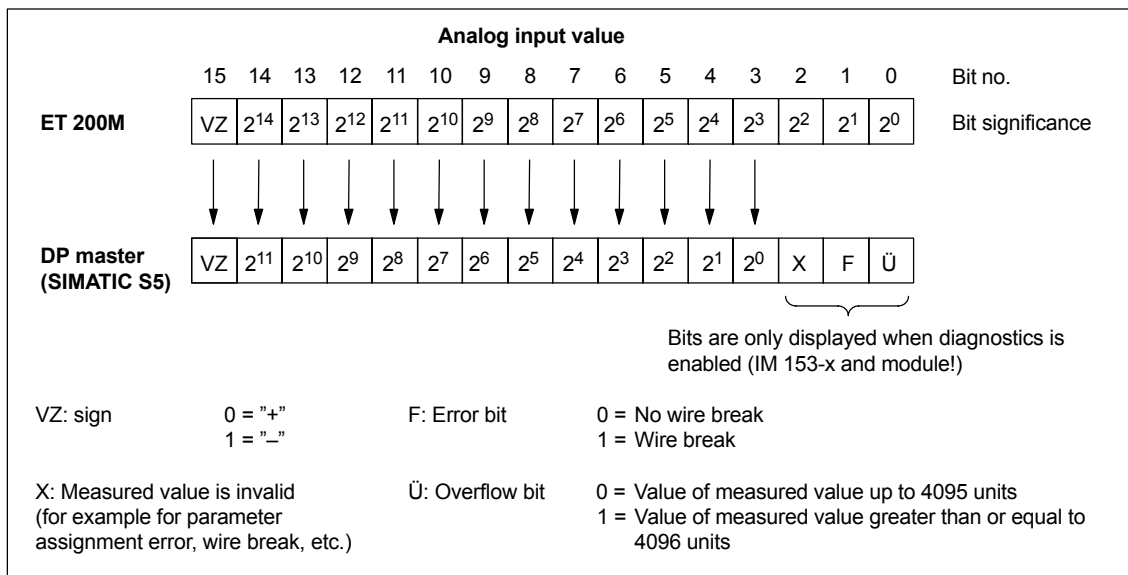


Figure 1-5 Analog-value representation in SIMATIC S5

### 1.2.3 H Parameter Assignment Command

The H parameter assignment command is only a part of the parameter assignment frame if you operate the ET 200M on a redundant standard master and have imported the GSD file of the IM 153-2 (GSD rev. 5) into the configuration tool.

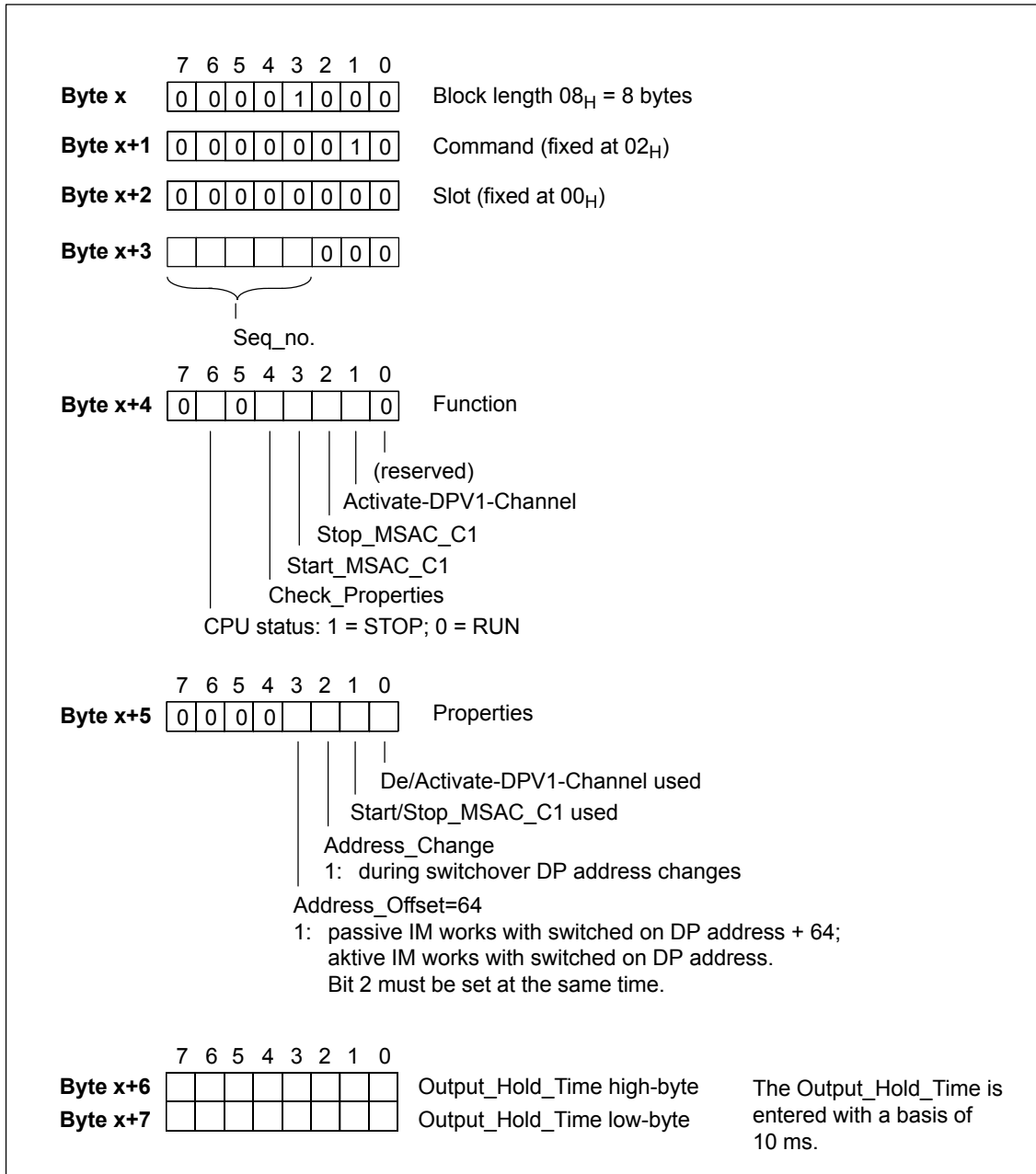


Figure 1-6 H parameter assignment command

### 1.2.4 Parameter Block for GSD rev. > 2

This block is only a component of the parameter assignment frame for the GSD rev. > 2.

It has the following lengths:

- 8 byte for GSD rev. > 2
- 9 byte as of GSD rev. 5

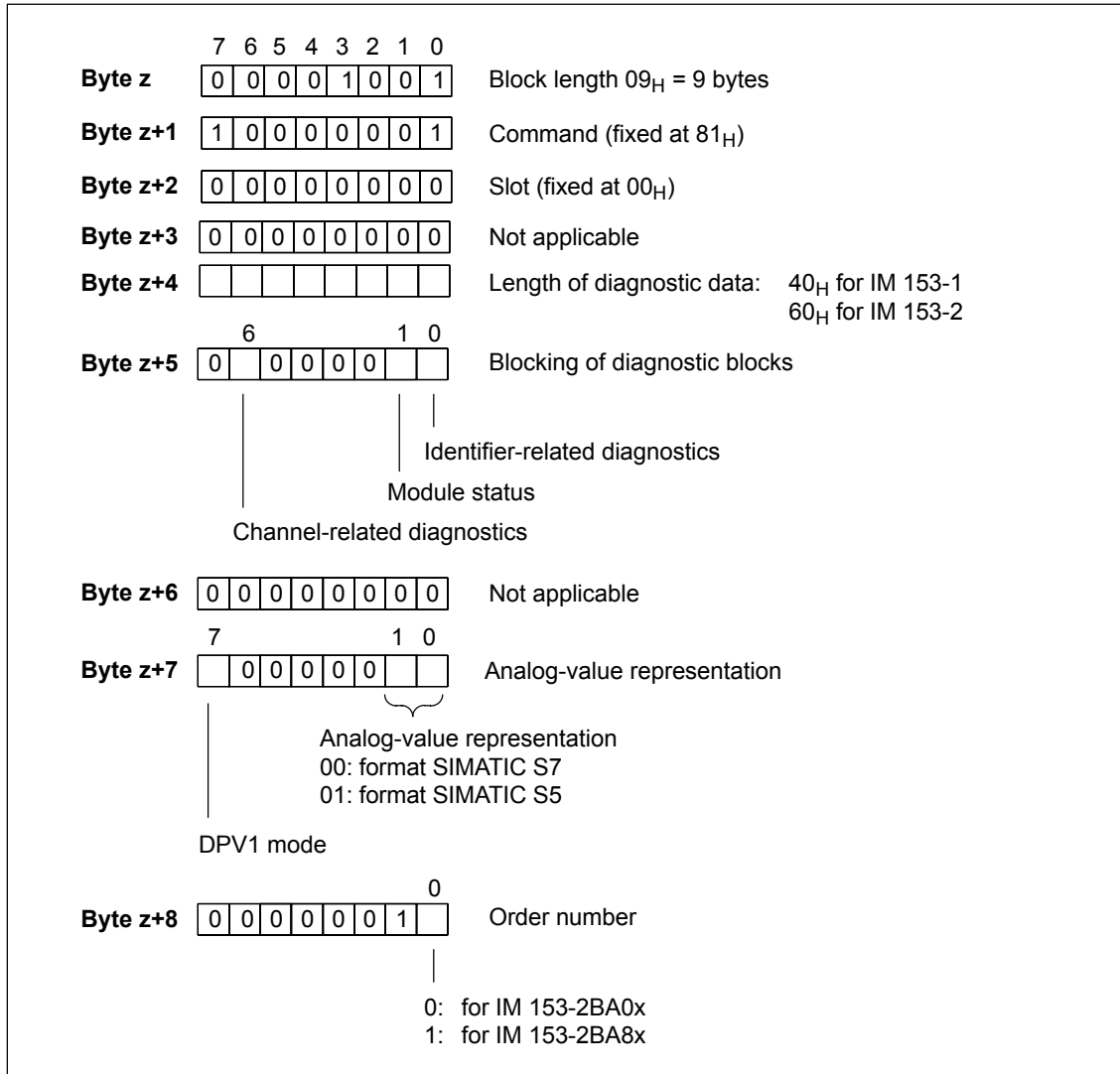


Figure 1-7 Parameter block for GSD rev. >2

### 1.2.5 Parameter for Isochrone Mode

This block is part of the parameter assignment frame, if you want to work the ET 200M in isochrone mode.

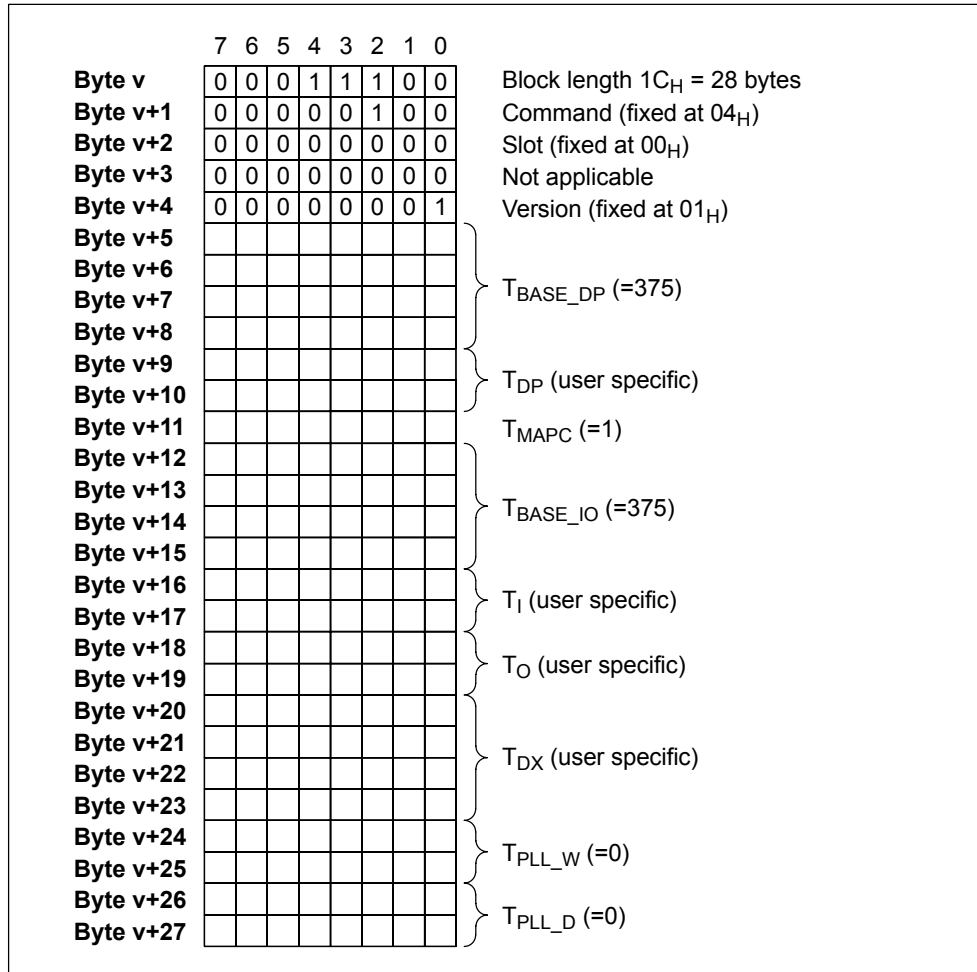


Figure 1-8 Parameters for isochrone mode

The user specific values of the parameter for isochrone mode can be determined for a certain configuration, with a calculation table on the "Result M" page.

The table can be found on the Internet under the address:

<http://support.automation.siemens.com/WW/view/de/23876584>

### 1.2.6 Parameter for Time Synchronization

This block is part of the parameter assignment frame, if

- you want to time stamp the input signals with IM 153-2,
- you want to synchronize the time on the I/O bus.

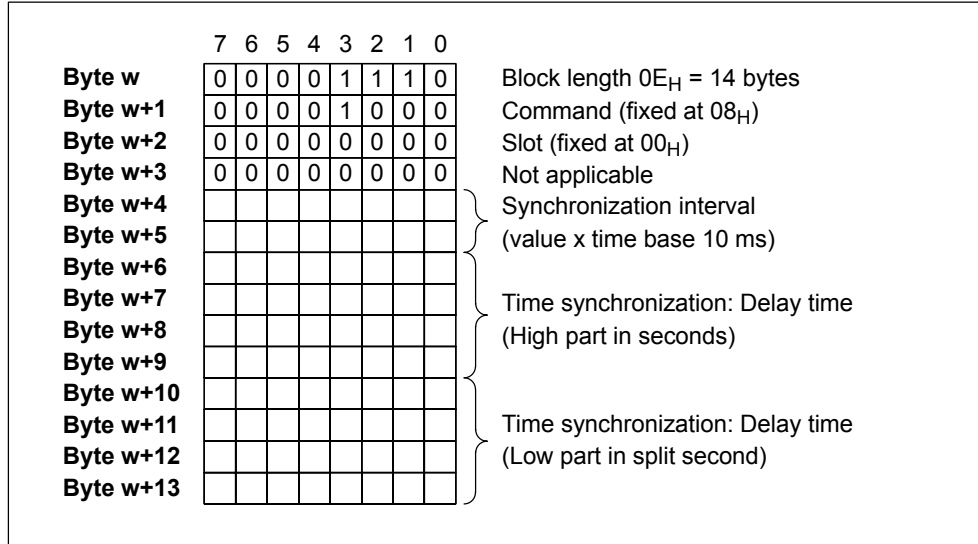


Figure 1-9 Parameters for time synchronization

## 1.2.7 Parameters for Distributed Modules

### 1.2.7.1 Overview for the Structure of Parameter Blocks

The parameter blocks for the parameterizable modules have the following structure:

<b>Byte y</b>	15 <sub>H</sub>	Block length
<b>Byte y+1</b>	5F <sub>H</sub>	Command
<b>Byte y+2</b>	04 <sub>H</sub> to 0F <sub>H</sub>	Slot (4 ... 15)
<b>Byte y+3</b>	00 <sub>H</sub>	Record number (= 0, because parameterization for the specified slot)
<b>Byte y+4</b>	10 <sub>H</sub>	Record length
<b>Byte y+5 to y+20</b>	*	slot related, module dependant parameters

* Parameters for Digital input modules	See Section 1.2.7.2
Parameters for Digital output modules	See Section 1.2.7.3
Parameters for Digital input/output modules	See Section 1.2.7.4
Parameters for Analog input modules	See Section 1.2.7.5
Parameters for Analog output modules	See Section 1.2.7.6
Parameters for Analog input/output modules	See Section 1.2.7.7

Figure 1-10 Overview for the Structure of Parameter Blocks

### 1.2.7.2 Parameters for Digital Input Modules

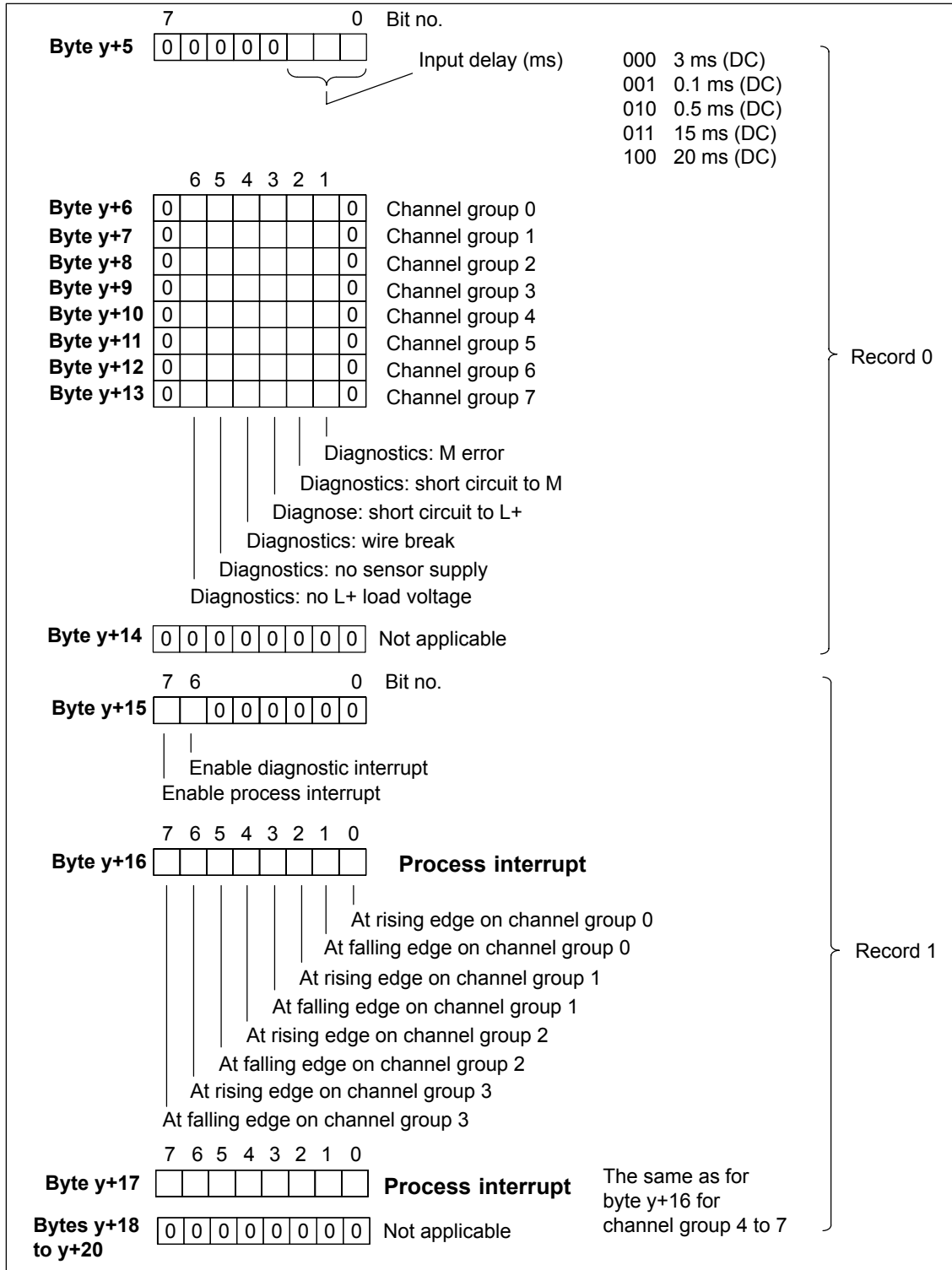


Figure 1-11 Parameters of the digital input modules (records 0 and 1)

### 1.2.7.3 Parameters for Digital Output Modules

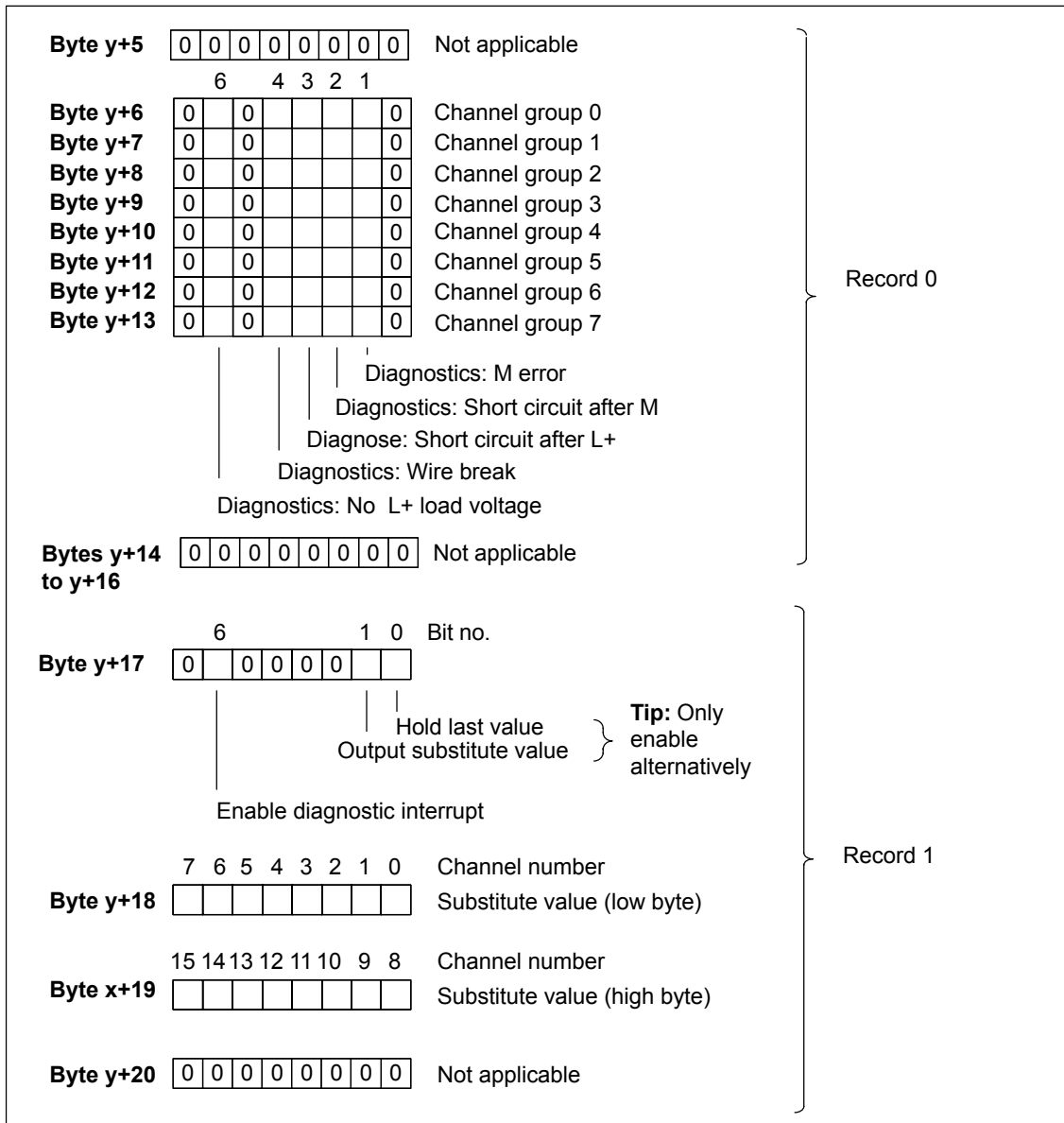


Figure 1-12 Parameters of the digital output modules (records 0 and 1)



### 1.2.7.4 Parameters for Digital Input/Output Modules

#### Structure of record 0

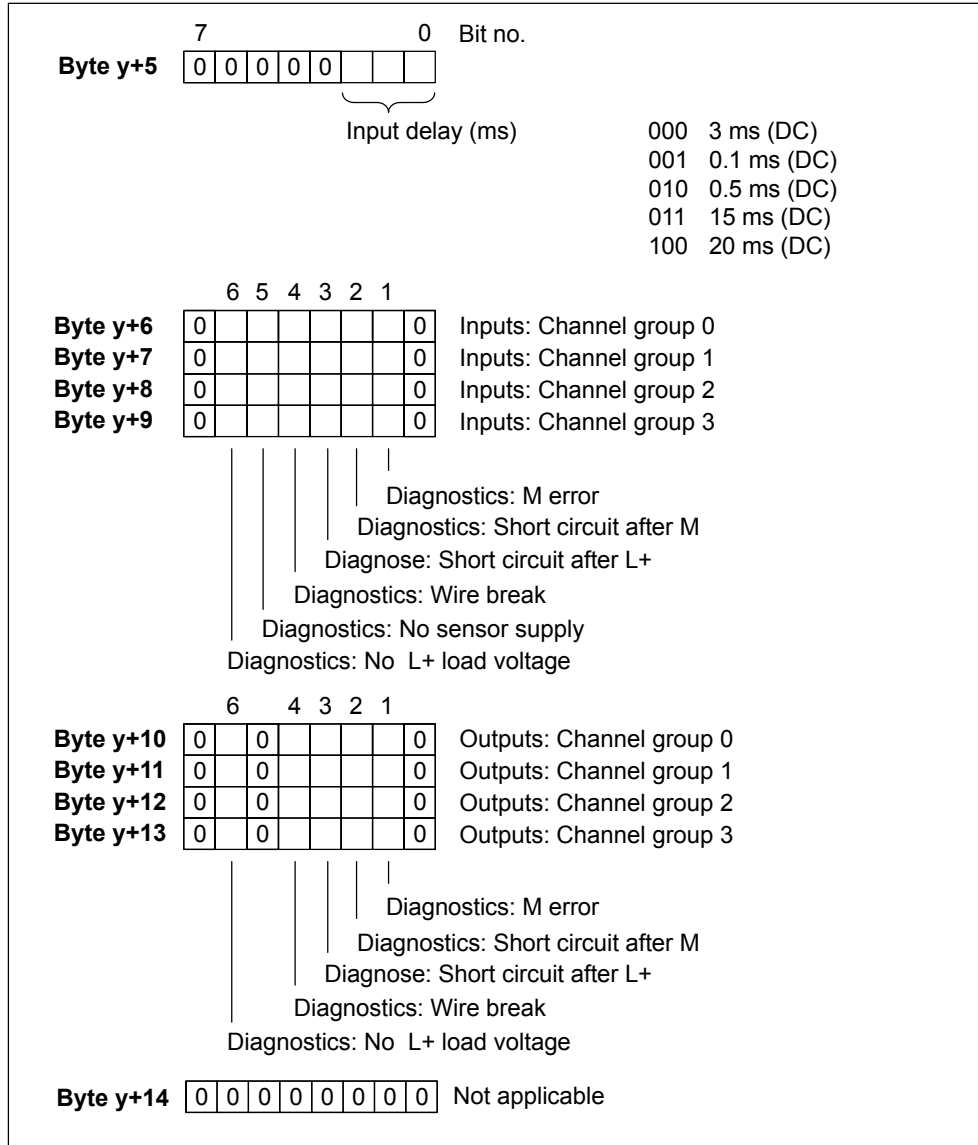


Figure 1-13 Parameters of the digital input/output modules (record 0)

Structure of record 1

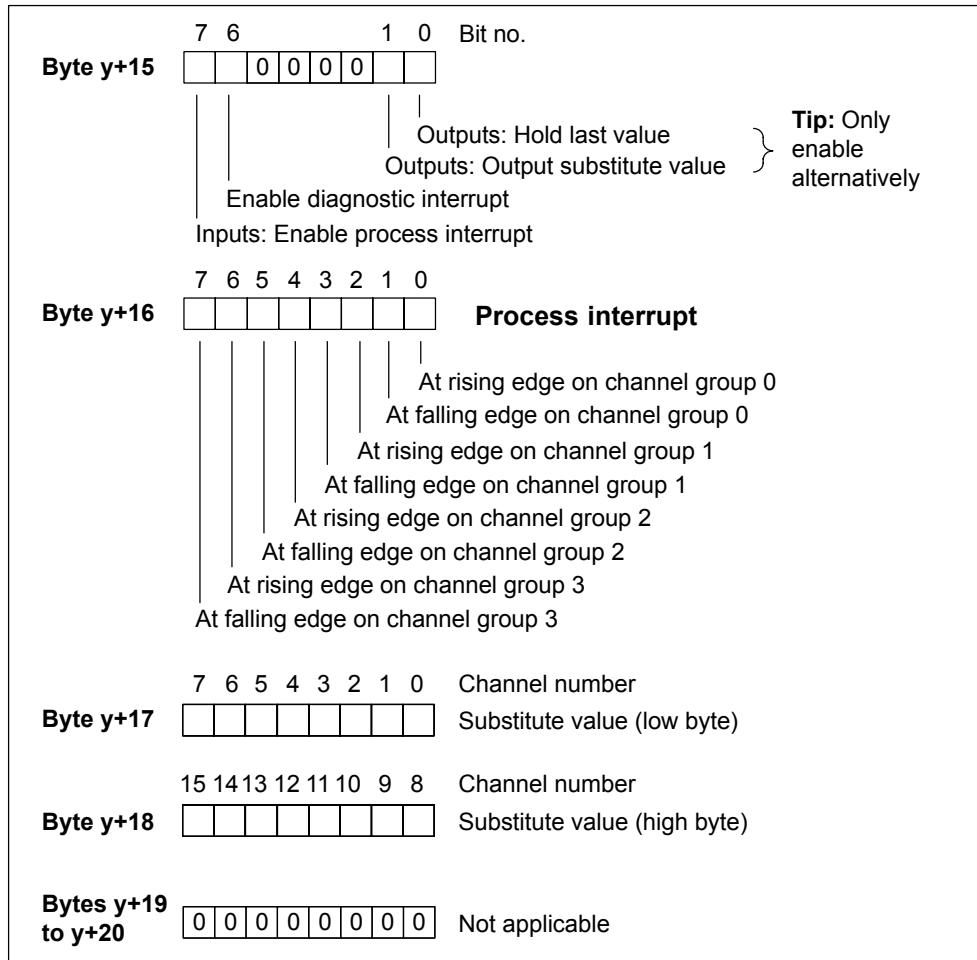


Figure 1-14 Parameters of the digital input/output modules (record 1)

### 1.2.7.5 Parameters for Analog Input Modules

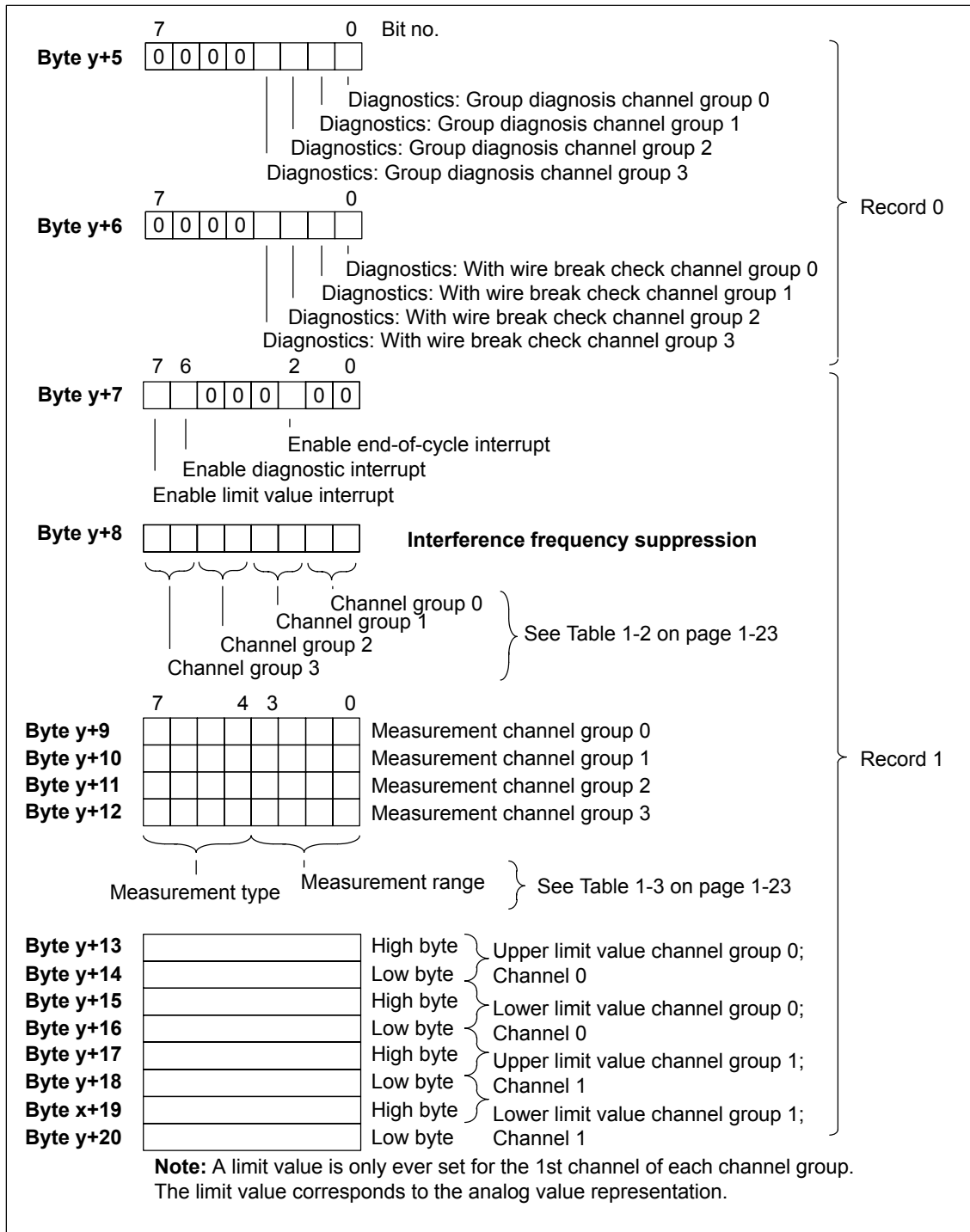


Figure 1-15 Parameters of the analog input modules (records 0 and 1)

### 1.2.7.6 Parameters for Analog Output Modules

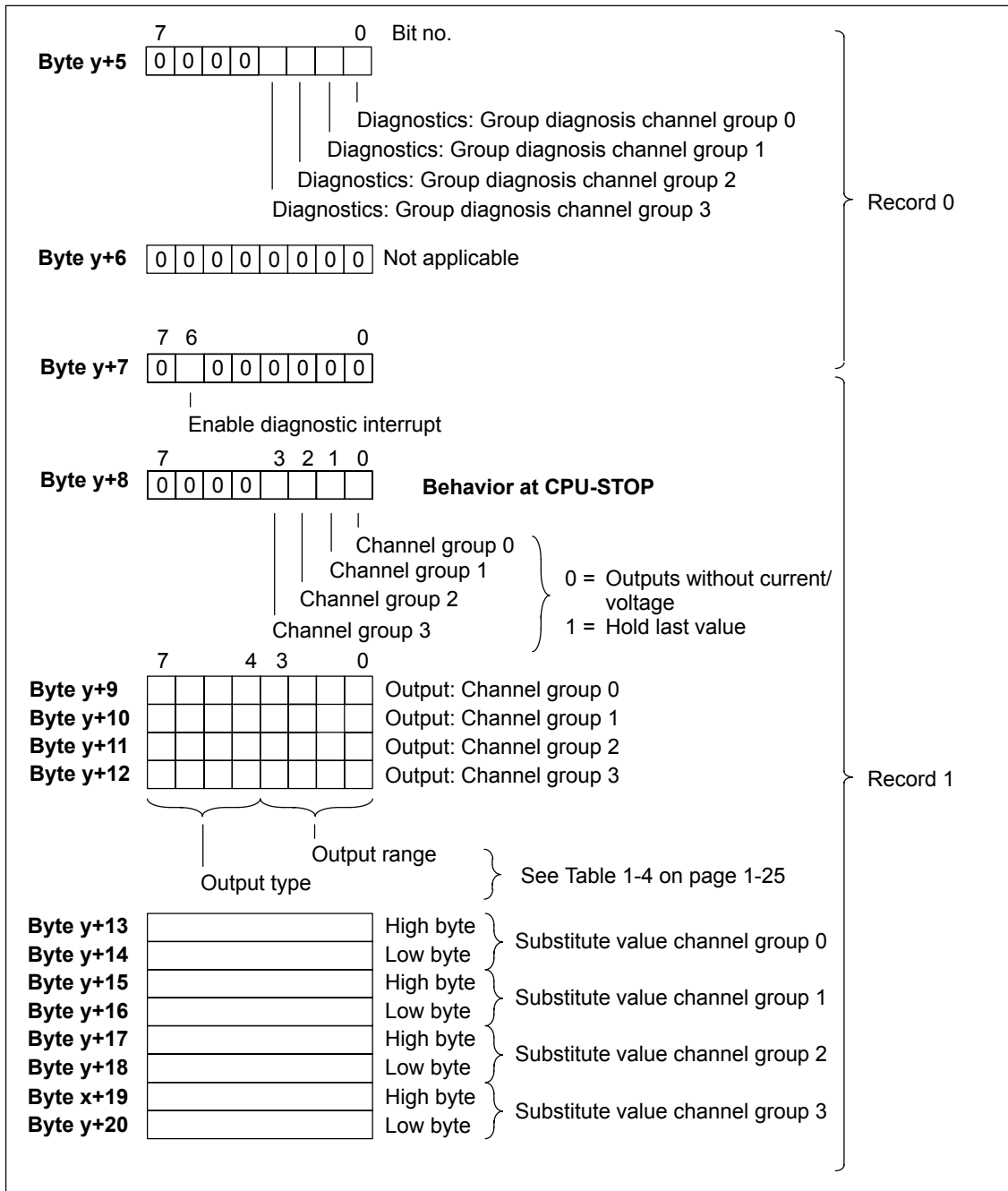


Figure 1-16 Parameters of the analog output modules (records 0 and 1)

### 1.2.7.7 Parameters for Analog Input/Output Modules

#### Structure of record 0

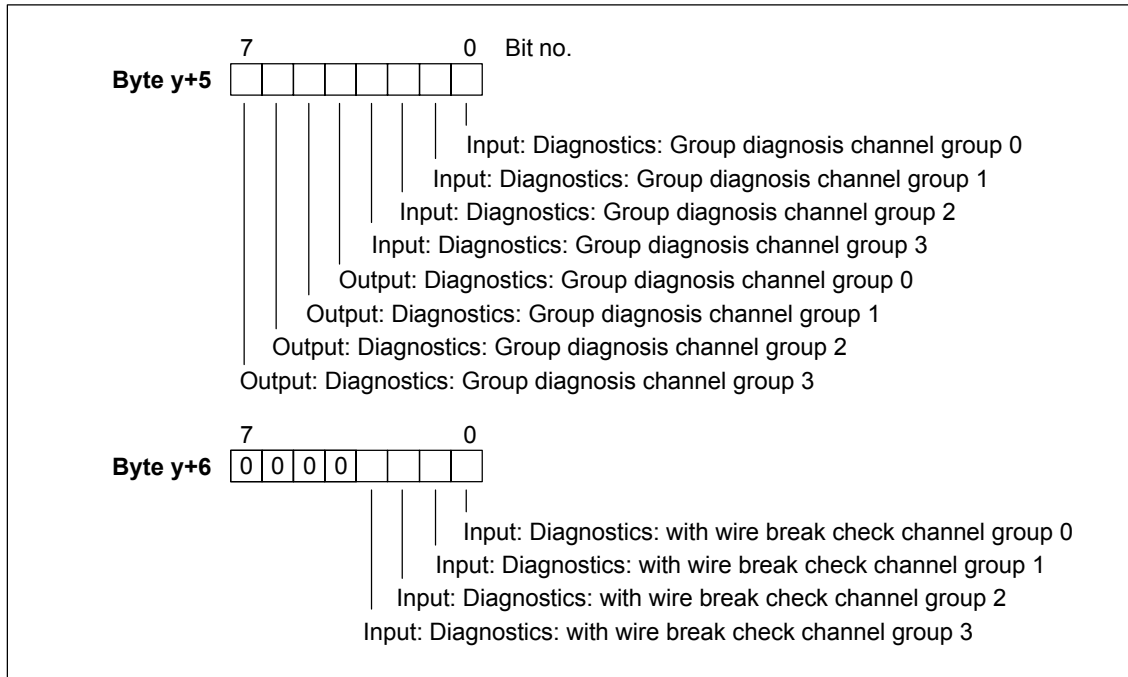


Figure 1-17 Parameters of the analog input/output modules (record 0)

Structure of record 1

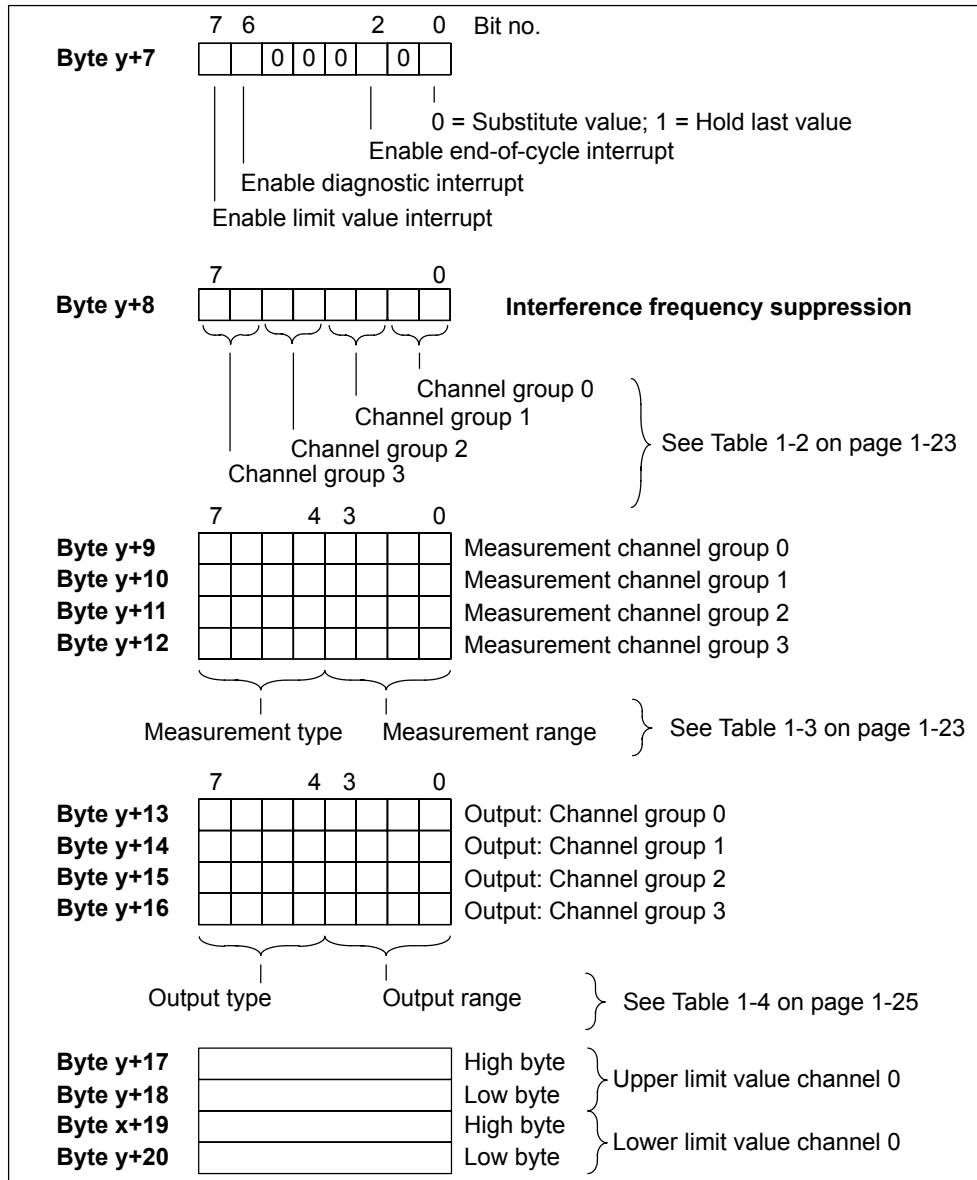


Figure 1-18 Parameters of the analog input/output modules (record 1)

### 1.2.7.8 Measurement and Output Range of the Analog Modules

#### Interference frequency suppression

Table 1-2 shows the codes for the various frequencies that you can enter in byte y+8 of record 1 (see Figures 1-15 and 1-18). You must calculate the resulting integration time for each channel!

Table 1-2 Codes for interference frequency suppression of the analog input modules

Interference frequency suppression	Integration time	Code
400 Hz	2.5 ms	2#00
60 Hz	16.7 ms	2#01
50 Hz	20 ms	2#10
10 Hz	100 ms	2#11

#### Measurement type and measurement range

Table 1-3 shows all the measurement ranges of the analog input modules. It also contains the codes for the measurement type and the respective measurement range. You must enter these codes in the bytes y+9 to y+12 of record 1, depending on the measurement range you want to set (see Figures 1-15 and 1-18).

#### Note

Do not forget that depending on the measurement range you may have to rearrange a measurement range module on the analog input module.

Table 1-3 Codes for the measurement ranges of the analog input modules

Measurement type	Code (Bits 4 to 7)	Measurement range	Code (Bits 0 to 3)
Deactivated	2#0000	Deactivated	2#0000
Voltage	2#0001	± 80 mV ± 250 mV ± 500 mV ± 1 V ± 2.5 V ± 5 V 1 to 5 V ± 10 V ± 25 V ± 50 V	2#0001 2#0010 2#0011 2#0100 2#0101 2#0110 2#0111 2#1001 2#1010 2#1011

Table 1-3 Codes for the measurement ranges of the analog input modules, continued

Measurement type	Code (Bits 4 to 7)	Measurement range	Code (Bits 0 to 3)
4-wire measuring transducer	2#0010	± 3.2 mA ± 10 mA 0 to 20 mA 4 to 20 mA ± 20 mA ± 5 mA	2#0000 2#0001 2#0010 2#0011 2#0100 2#0101
2-wire measuring transducer	2#0011	4 to 20 mA	2#0011
Resistance 4-wire connection	2#0100	150 Ω 300 Ω 600 Ω	2#0010 2#0100 2#0110
Resistance 4-wire connection; 100 Ω compensation	2#0110	52 to 148 Ω 250 Ω 400 Ω 700 Ω	2#0001 2#0011 2#0101 2#0111
Thermal resistance + linearization 4-wire connection	2#1000	Pt 100 climatic Ni 100 climatic Pt 100 standard range Pt 200 standard range Pt 500 standard range Pt 1000 standard range Ni 1000 standard range Pt 200 climatic Pt 500 climatic Pt 1000 climatic Ni 1000 climatic Ni 100 standard range	2#0000 2#0001 2#0010 2#0011 2#0100 2#0101 2#0110 2#0111 2#1000 2#1001 2#1001 2#1001 2#1011
Thermocouples internal comparison	2#1010	Type B [PtRh – PtRh] Type N [NiCrSi – NiSi]	2#0000 2#0001
Thermocouples external comparison	2#1011	Type E [NiCr – CuNi] Type R [PtRh – Pt] Type S [PtRh – Pt]	2#0010 2#0011 2#0100
Thermocouples + linearization internal comparison	2#1101	Type J [Fe – CuNi IEC] Type L [Fe – CuNi] Type T [Cu – CuNi]	2#0101 2#0110 2#0111
Thermocouples + linearization external comparison	2#1110	Type K [NiCr – Ni] Type U [Cu – Cu Ni]	2#1000 2#1001



## Output type and output ranges

Table 1-4 shows all the output ranges of the analog output modules. It also contains the codes for the output type and the respective output range. You must enter these codes in the corresponding bytes of record 1, depending on the output range you want to set (see Figures 1-16 and 1-18).

Table 1-4 Codes for the output ranges of the analog output modules

Output type	Code (Bits 4 to 7)	Output range	Code (Bits 0 to 3)
Deactivated	2#0000	Deactivated	2#0000
Voltage	2#0001	1 to 5 V 0 to 10 V $\pm 10$ V	2#0111 2#1000 2#1001
Current	2#0010	0 to 20 mA 4 to 20 mA $\pm 20$ mA	2#0010 2#0011 2#0100

