User Manual

09/10 MN05013005Z-EN
replaces 03/05 AWB2528-1401GB

EASY204-DP
PROFIBUS-DP Slave Interface

Powering Business Worldwide

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Original Operating Instructions
The German-language edition of this document is the original operating manual.

Translation of the original operating manual
All editions of this document other than those in German language are translations of the original German manual.

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See revision protocol in the "About this manual" chapter

Production: Thomas Kracht, Barbara Petrick
Translation: Terence Osborn

Danger!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Follow the engineering instructions (AWA) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.

- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).

Contents

About This Manual

List of revisions

The following significant amendments have been introduced since the previous issue:

Publication date	page/ chapter	Key word	New	Change
08/02	45	Section "PROFIBUS certification"	✓	
05/03	All	EASY800/MFD	✓	
07/04	All	easy700	✓	
03/05	chapter10, 11, 12	easy600/700/800, MFD with DPV1 protocol	✓	
02/08	155	„Effect on easy-Link"		✓
	48	Table 3		✓
	chapter9	New function blocks DG, JC, MX, PO, SP, SR, TB	✓	
	chapter12		✓	
09/10	All	Changeover to Eaton designations	✓	

Target group

This manual has been produced for automation technicians and engineers. A thorough knowledge of the PROFIBUS-DP fieldbus and the programming of a PROFIBUS-DP master is required. You should also be familiar with the operation of the easy control relay and MFD multi-function display.

Other manuals on the device

The following operating manuals should be followed:

- "easy412, easy600 control relays" (MN05013004Z-EN; previous description AWB2528-1304GB)
- "easy700 control relays" (MN05013003Z-EN; previous description AWB2528-1508GB)
- "easy800 control relays" (MN04902001Z-EN; previous description AWB2528-1423GB)
- "MFD-Titan multi-function display" (MN05002001Z-EN; previous description AWB2528-1480GB).

All manuals are available on the Internet for download as PDF files. In order to find the document quickly go to http://www.eaton.com/moeller and enter the document number as a search term.

Device designation

This manual uses the following short names for device types, as far as the description applies to all of these types:

- easy600 for
  - EASY6…-AC-RC(X)
  - EASY6..-DC.-.C(X)
- easy700 for
  - EASY719-AB…
  - EASY719-AC…
  - EASY719-DA…
  - EASY719-DC…
  - EASY721-DC…
- easy800 for
  - EASY819-…
  - EASY820-…
  - EASY821-…
  - EASY822-…

- MFD-CP8… for
  - MFD-CP8-ME
  - MFD-CP8-NT
- MFD-…-CP8/CP10 for
  - MFD-CP8…
  - MFD-CP10…
- MFD-CP10… for
  - MFD-CP10-ME
  - MFD-CP10-NT
- easy-AB for
  - EASY719-AB…
- easy-AC for
  - EASY6..-AC-RC(X),
  - EASY719-AC
  - EASY8..-AC-…
- easy-DC for
  - easy6…-DC-…
  - EASY719-DC-…
  - EASY8…-.DC-…
- easy-DA for
  - EASY719-DA…

Abbreviations

This manual uses abbreviations with the following meaning:

hex: Hexadecimal (number system with base 16)
dec: Decimal (number system with base 10)
bcd: Binary coded decimal code

VR: **Value r**ange

PC: **P**ersonal **C**omputer

len: **len**gth

Writing conventions

In order to provide a clear layout, the chapter title is shown in the header on left-hand pages, and the current section on right-hand pages. Exceptions are at the first pages of chapters and empty pages at the end of chapters.

▶ indicates actions to be taken.

Caution!
Warns of a hazardous situation that could result in damage to the product or components.

Warning!
Warns of the possibility of serious damage and slight injury.

Danger!
warns of the possibility of serious damage and slight injury or death.

Draws your attention to interesting tips and supplementary information.

1 EASY204-DP

The EASY204-DP communication module was developed for automation tasks using the PROFIBUS-DP fieldbus.
The EASY204-DP is a gateway and can only be used in conjunction with the easy600, easy700, easy800 control relays or MFD basic devices. The easy control relay and MFD device with a PROFIBUS-DP gateway always work as a slave station on the network.

System overview

The "easy" PROFIBUS-DP slaves are integrated in a PROFIBUS-DP system.

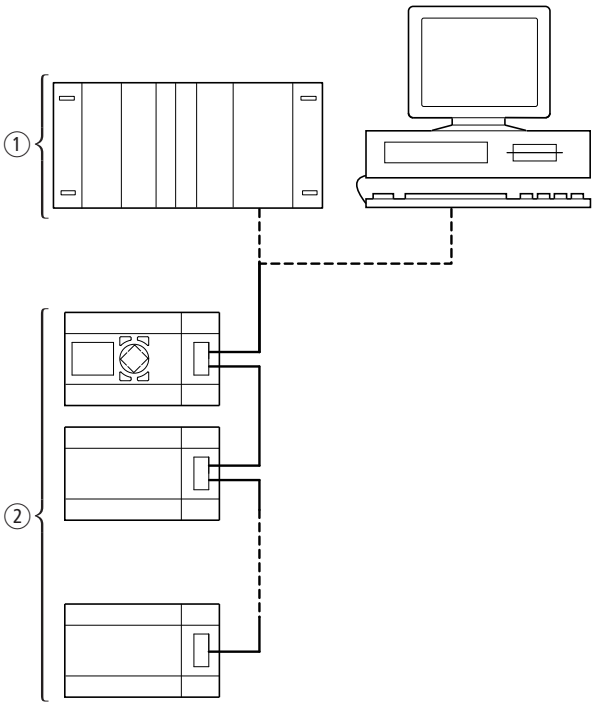


Figure 1: Integration of EASY204-DP in the DP network

① Master area, PLC or PC

② Slave area, e.g. easy /MFD with DP interface

Structure of the unit

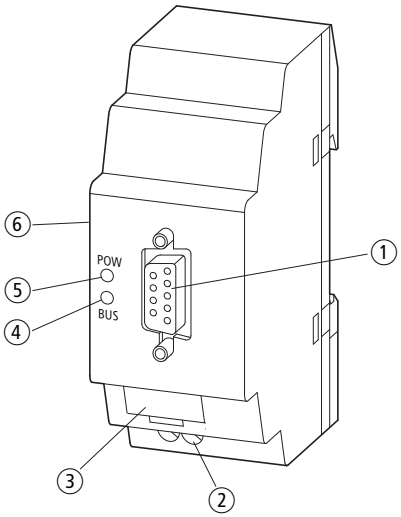


Figure 2: Device view

① PROFIBUS-DP connection, 9-pole SUB-D socket
② 24 V DC supply voltage
③ Device label
④ BUS communication LED
⑤ POW operation LED
⑥ EASY-LINK socket

Device function description

The EASY204-DP module allows the easy and MFD series devices to be connected to a PROFIBUS-DP communication network. The following data can be transferred by selecting the appropriate I/O modules and by using the DPV1 "Read" and "Write" services (from device version 07):

easy600/700/800, MFD-CP8…

- S1 to S8
  Output data of the basic unit, RUN/STOP
  (read, as viewed from PROFIBUS-DP master)
- R1 to R16
  Input data of the basic unit, RUN/STOP
  (write, as viewed from PROFIBUS-DP master)
- All function relay data
  (read, as viewed from the PROFIBUS-DP master)
  - Timer relay
  - Counter relay
  - Time switch
  - Analog value comparator
  - Weekday, time, summer/winter time (DST)
  - All states of the easy600 contacts.

- The setpoints of the function relays
  (write, as viewed from PROFIBUS-DP master)
  - Timer relay
  - Counter relay
  - Time switch
  - Analog value comparator
  - Weekday, time, summer/winter time (DST)

easy800/MFD-CP8…

- All markers and easyNet data
- Function blocks
  (read/write, as viewed from the master)
  - Arithmetic function blocks
  - Frequency counters, high-speed counters, incremental encoder counters
  - Weekly timer and year time switch
  - Hours-run counter
  - PID Controller
  - PWM (pulse width modulation)
  - Real-time clock

Hardware and operating system preconditions

The EASY204-DP expansion device operates with the easy600, easy700, easy800 and MFD basic units from the following operating system versions:

Basic unit		**EASY204-DP expansion device**	
Device version	OS version	Device version ≦ 04	Device version ≧ 05
easy600			
≧ 04	From 2.4	×	×
easy700			
≧ 01	From 1.10.xxx	–	×
easy800			
≧ 04	From 1.10.xxx	–	×
MFD-CP8…			
≧ 01	From 1.10.xxx	–	×
MFD-CP10…			
≧ 01	From 1.00	–	×

The device version of the respective basic or expansion unit is stated on the right-hand side of the enclosure. Example: EASY204-DP: 03-228xxxxxxx (03 = device version)
The operating system version (OS) of the respective basic device can be read via the EASY-SOFT. On the easy700, easy800 and MFD-CP8.. devices it is possible to read out the information directly on the device. Refer to the respective manual for information.

List of modifications

Modifications from version 04 to version 05:

- Extension of the EASY-LINK protocol for connection to easy800.
- 1 byte module added to cyclical data transfer.

Modifications from version 05 to version 06:

- Extension of the EASY-LINK protocol for connection to easy700.
- Cyclical data transfer (3-byte module) adapted in Byte 0 (see also Chapter "What Happens If …?" on page 467.

Modifications from version 06 to version 07:

- Addition of DPV1 services "Read" and "Write".
- Addition of modules for additional I/O data for easy800.

Improper use

easy must not be used as a replacement for safety PLCs such as

- burner,
- Emergency switching off,
- crane controls or
- two-hand safety controls.

2 Installation

The same installation procedures are used on easy600, easy700, easy800 and MFD basic units with expansion devices.

Connecting EASY204-DP to the basic unit

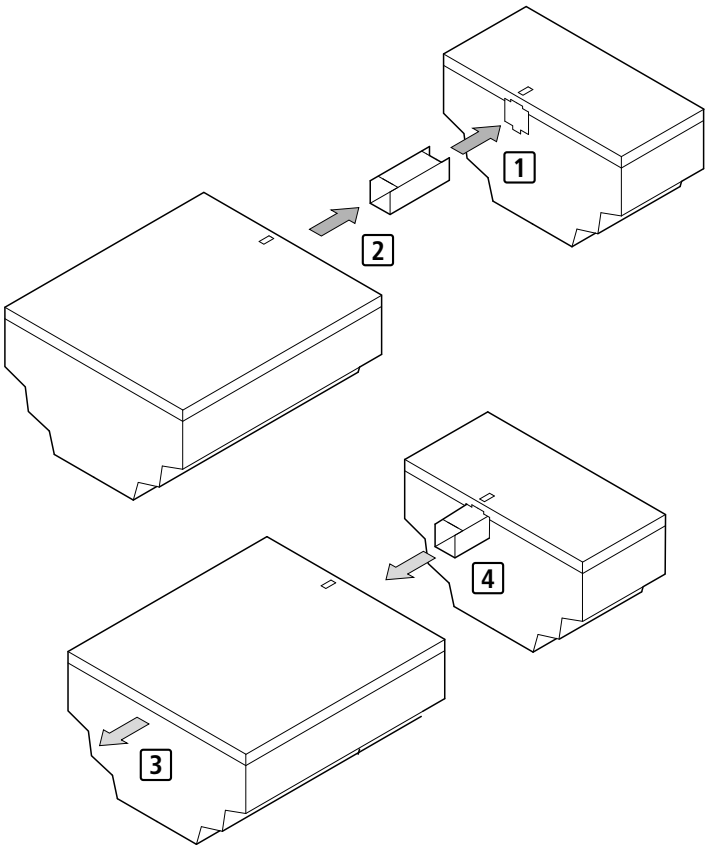


Figure 3: Fitting or removing the EASY204-DP to the basic unit 1 + 2 3 + 4

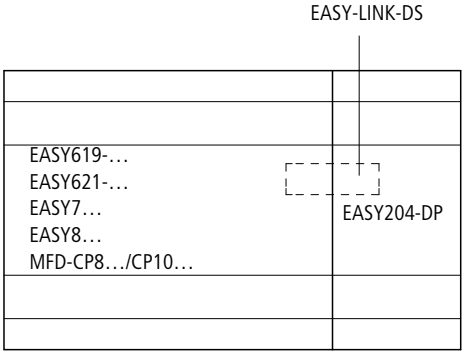


Figure 4: Connection between basic unit and EASY204-DP

Connecting the power supply

The EASY204-DP unit is run on a 24 V DC power supply (→ section "Technical data" from page 473).

Danger!
Ensure a reliable electrical isolation of the low voltage (SELV) for the 24 V supply.

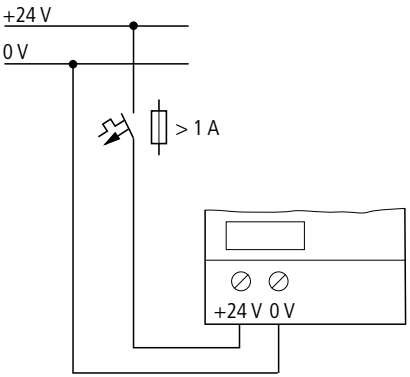
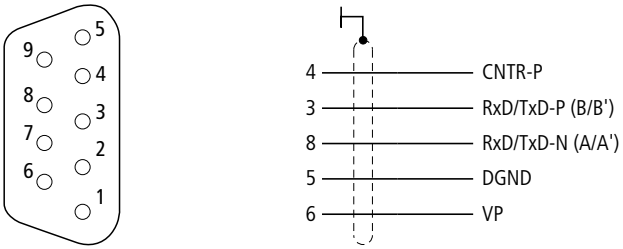


Figure 5: Standard connection

Connect PROFIBUS-DP

Use a 9 pole SUB-D plug to connect the PROFIBUS-DP interface to the PROFIBUS-DP fieldbus. For this use the special PROFIBUS-DP plug and the special PROFIBUS-DP cable available from the Eaton range of accessories. The type of cable has an influence on the maximum available length of the bus line and thus on the data transfer rate.

Connection assignment PROFIBUS-DP



Pin	Signal name	Designation
1	Not used	-
2	Not used	-
3	RxD/TxD-P (B Line)	Receive/Send data P
4	CNTR-P/RTS	Request to Send
5	DGND	Data ground
6	VP	+5V DC for external bus connection
7	Not used	-
8	RxD/TxD-N (A-Line)	Receive/Send data P
9	Not used	-

Connections 3, 8 and the shield are sufficient for data transfer.

Terminal resistors

The first and last station in a bus segment must be connected to the bus with the bus terminating resistor switched on. The bus terminating resistor is switched externally. This external switch function can either be implemented as a separate bus terminating resistor or with a special Sub-D plug with an integrated bus termination.

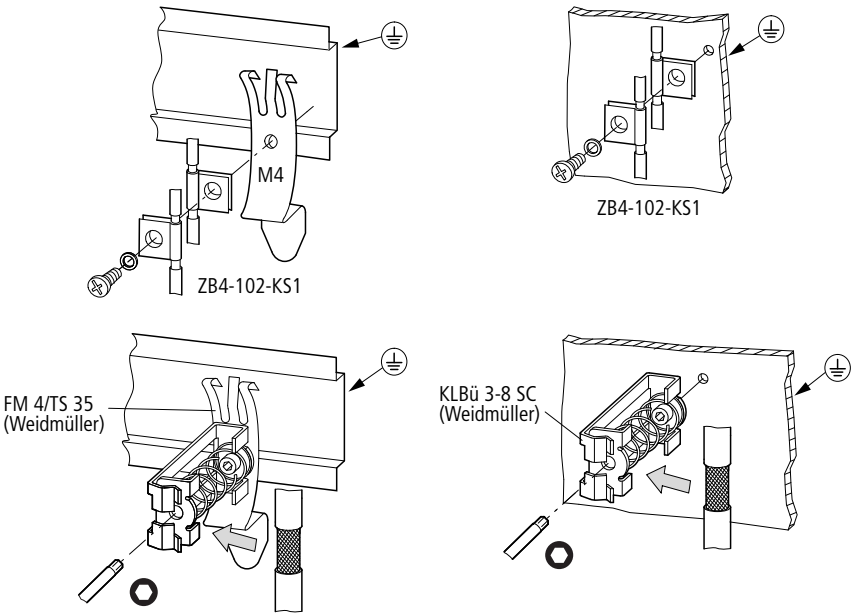
Eaton's PROFIBUS-DP data plug enables both bus terminating resistors to be switched on and off.

EMC-conformant wiring of the network

Electromagnetic interference may have adverse effects on the communication fieldbus. This can be minimized beforehand by the implementation of suitable EMC measures. These include:

- System design in accordance with EMC requirements,
- EMC compliant cable installation and
- measures which do not allow potential differences to occur,
- correct installation of the PROFIBUS system (cables, connection of the bus connectors …).

The effects of electromagnetic interference can be significantly reduced by fitting the shield. The following two figures illustrate how to fit the shield.



Potential isolation

The following electrical isolation should be provided for the interfaces of the EASY204-DP:

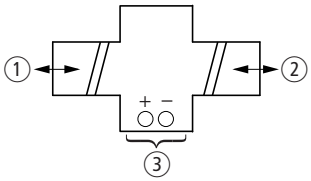


Figure 6: Potential isolation between supply voltage and outputs

① Safe isolation of EASY-LINK 240 V AC
② Simple isolation of PROFIBUS-DP
③ 24 V DC supply voltage

Data transfer rates – automatic baud rate detection

The EASY204-DP module automatically detects the baud rate used in the communication network after it is switched on. However, this requires that at least one station sends valid telegrams in the network.

The following baud rates are supported:

- 9.6 Kbit/s to 12000 Kbit/s

Maximum distances/bus cable lengths

Two types of bus cable are specified in IEC 61158. Cable type B should no longer be used with new applications because it has been discontinued. Cable type A allows all transfer rates up to 12000 Kbit/s to be used. Cables for burial in the ground, festoon suspension and drum cables are also available.

The cable parameters are as follows:

Parameters	Cable type A
Surge impedance in Ω	135 … 165 at 3 … 20 MHz
Effective capacitance (pF/m)	< 30
Loop resistance (Ω/km)	< 110
Conductor diameter (mm)	> 0.64
Core cross-section (mm^2)	> 0.34

The following bus segment lengths result from specified cable parameters.

Distance between stations when using Type A cable to IEC 61158:

Baud rate [kBit/s]	Max. cable length Type A cable [m]
9.6	1200
19.2	1200
93.75	1200
187.5	1000
500	400
1500	200
3000	100
6000	100
12000	100

Distance between two stations when using Type B cable to IEC 61158:

Baud rate [kBit/s]	Max. cable length Type B cable [m]
9.6	1200
19.2	1200
93.75	1200
187.5	1000
500	400
1500	–

3 Device operation

Initial starting

- ▶ Before you switch on the device, verify that it is properly connected to the power supply, to the bus connector and to the basic unit.
- ▶ Switch on the power supply to the basic unit and the PROFIBUS-DP expansion unit.

The Power LED of the EASY204-DP is lit. The BUS LED is off (no communication via PROFIBUS-DP).

The GW message (intelligent station connected) is displayed on the basic unit.

Basic unit	Device version	GW display
easy600	04	Static
easy700	From 01	Flashing
easy800	04	Static
	From 05	Flashing
MFD-CP8…	01	Static
	From 02	Flashing
MFD-CP10…	01	Flashing

As soon as the device is integrated in the PROFIBUS-DP network, the BUS LED is continuously lit ("static") and the GW message is statically displayed, also on devices with a flashing GW message.

→ Valid data is only transferred via PROFIBUS-DP to the basic unit if the GW is displayed statically.

If the PROFIBUS-DP unit is factory set, the station address of the PROFIBUS-DP station must be set.

Setting the PROFIBUS-DP station address

Every PROFIBUS-DP station requires a unique address in the PROFIBUS-DP structure. There are two ways of setting the PROFIBUS-DP addresses on the EASY204-DP:

- Using the integrated display and keypad on the easy or MFD-Titan basic device
- Using EASY-SOFT Version 3.01 or higher on the PC.

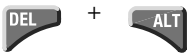
Address range: 001 to 126

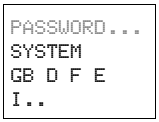
Setting the address on the basic unit with a display

Basic requirements:

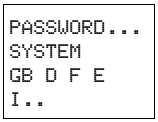
- The basic device (easy600, easy700, easy800 or MFD-Titan) and the EASY204-DP expansion unit must be fed with power.
- The basic unit has been unlocked (no password activated).
- The basic unit has a valid operating system version (→ page 19).
- The basic unit must be in STOP mode.
- The EASY204-DP is not communicating with the PROFIBUS-DP master (Bus LED is off).

▶ Enter the System menu by pressing DEL + ALT simultaneously.





▶ Use cursor buttons ∧ or ∨ to select CONFIGURATOR

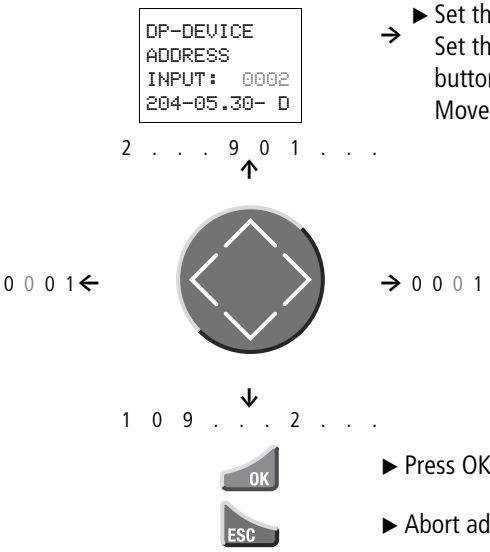


▶ Confirm your entry with OK

▶ With easy800/MFD devices select LINK...

▶ Confirm with OK.

easy600 and easy 700 devices show the following dialog immediately:

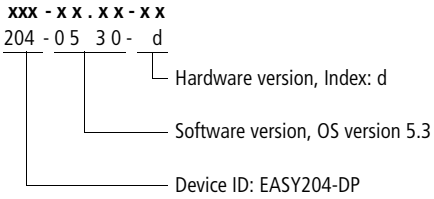


→ ▶ Set the address:
Set the value of the current digit with ∧ or ∨ buttons.
Move to the next digit with 〈 or 〉.

▶ Press OK to accept the address or

▶ Abort address entry.

Information on the 4th display line:



Setting the address using EASY-SOFT

With EASY-SOFT, version 3.1
‹Menu → Online → Configure Expansion Devices›

From EASY-SOFT version 4.01 or higher:
Choose → Communication → Configuration → Expansion Devices → EASY204-DP.

→ The menu is only available in Communication View, therefore activate the Communication tab.

LED status indication

The EASY204-DP expansion unit has two LEDs.

POW LED, Function

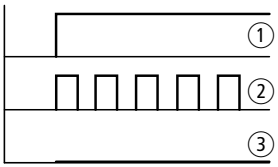


Figure 7: Function of the POW LED

① LED continuously lit:
- Power supply present
- Communication with the basic unit aborted

② LED flashing:
- Power supply present
- Communication with the basic unit correct

③ LED not lit:
- No power supply present
- Communication with the basic unit aborted

BUS-LED, function

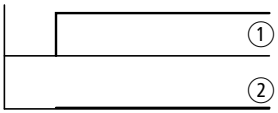


Figure 8: Function of the BUS LED

① LED continuously lit:
- PROFIBUS-DP communication correct

② LED not lit:
- No PROFIBUS-DP communication present

Cycle time of EASY basic unit

Communication between the basic unit and EASY204-DP via EASY-LINK increases the cycle time of the basic unit.

In extreme cases the cycle time may increase by 40 ms.

This should be taken into account for the reaction times of the basic unit.

4 PROFIBUS-DP Functions

Configuration of the DP master, class 1

The following steps are required to configure the central DP master:

- ▶ Addition of the GSD file "Moe4d10.gsd" (from device version 07) and "Moel4d10.gsd" (up to device version 06) in the GSD database of the configuration tool of your DP master.
- ▶ Addition of an EASY204-DP station to the topology of the bus segment to be configured.
- ▶ Assign this slave with the intended slave address.
- ▶ Selection for this station of up to 5 of the proposed modules for cyclical data transfer, → section "Slave modules".
- ▶ Repetition of steps 2 to 4 for each of the EASY204-DP stations to be added to the topology.
- ▶ Save the configuration.
- ▶ Transfer the configuration to the DP master.

→ Refer to the documentation of the DP master when carrying out this configuration.

Slave modules

The EASY204-DP expansion module is a PROFIBUS-DP slave in compliance with IEC 61158.

You can select the following EASY204-DP slave modules via the PROFIBUS-DP Configurator in the master PLC by using the appropriate GSD file. The modules are described in detail in the following chapters.

Module designation	Inputs (Byte)	Outputs (Byte)	Inputs/outputs (byte)	Service	Supported devices	Code in GSD file	→ Page
Control level							
1: Easy 600 control commands	–	–	7	• Time • Image • Function Blocks	easy600	0xB6	59
2: Easy700/800 control commands	–	–	9	• Real-time clock • Image • Function Blocks	EASY700, EASY800, MFD-CP8…, MFD-CP10…	0xB8	101
Input/output level							
3: Inputs, 3 bytes	3	–	–	• Read data: S1 – S8 • Operating Mode	easy600, easy700, easy800, MFD-CP8…, MFD-CP10…	0x92	48
4: Outputs, 3 bytes	–	3	–	• Write data: R1 – R8, R9 – R16 • Operating Mode		0xA2	50
5: Inputs, 1 byte	1	–	–	• Read data: S1 – S8		0x90	50
6: Outputs, 1 byte	–	1	–	• Write data: R1 – R8		0xA0	54

Module designation	Inputs (Byte)	Outputs (Byte)	Inputs/outputs (byte)	Service	Supported devices	Code in GSD file	→ Page
Additional I/O data (from device version 07)							
7: Easy 800 additional inputs, 4 bytes	4	–	–	• Read data: MD63	easy800	0x13	57
8: Easy 800 additional inputs, 8 bytes	8	–	–	• Read data: MD63 – MD64		0x17	57
9: Easy 800 additional inputs, 12 bytes	12	–	–	• Read data: MD63 – MD65		0x1B	57
10: Easy 800 additional inputs, 16 bytes	16	–	–	• Read data: MD63 – MD66		0x1F	57
11: Easy 800 additional outputs, 4 bytes	–	4	–	• Write data: MD59		0x23	58
12: Easy 800 additional outputs, 8 bytes	–	8	–	• Write data: MD59 – MD60		0x27	58
13: Easy 800 additional outputs, 12 bytes	–	12	–	• Write data: MD59 – MD61		0x2B	58
14: Easy 800 additional outputs, 16 bytes	–	16	–	• Write data: MD59 – MD62		0x2F	58
Without function							
15: Empty space[1)]	–	–	–	–	easy600, easy700, easy800, MFD-CP8…, MFD-CP10…	0x00	–

1) The EASY204-DP provides slots in the PROFIBUS-DP configurator that you can assign with the required modules for your application. Unused slots can be assigned an "Empty Space" module.

Observe the requirements of the operating system specified on page 19!

The following rules must be observed for configuring the modules:

- Use no more than one module from the "Control level" section.
- Use no more than one input and one output module from the "I/O level" section.
- Use no more than one input and one output module (from device version 07) from the "Additional I/O data" section.

Diagnostic data

Besides the standard DP diagnostics, the EASY204-DP supplies additional diagnostics information that appears in a Class 1 DPV0 master as device specific diagnostics, and in a Class 1 DPV1 master from device version 07 as status diagnostics.

Diagnostics information format

The diagnostics are read directly by means of the DP diagnostics commands or by means of the diagnostics bytes of the DP master defined in the PROFIBUS-DP configuration. Refer to the documentation of the master device.

With a DPV0 master 8 octets are read in as diagnostics and 11 octets on a DPV1 master. They contain the following information:

Table 1: Address position of the diagnostics information in a DPV0 or DPV1 master

Diagnostics-position	Designation	
	DPV0 master	DPV1 master
Octet 1		
Bit 0	Station does not exist	
bit1	Station not ready	
Bit 2	Configuration error	
Bit 3	Additional diagnostics information	
Bit 4	Function not supported	
Bit 5	Invalid DP slave response	
Bit 6	Parameterization error	
Bit 7	Master already present	
Octet 2		
Bit 0	Parameterization request	
bit1	Static diagnostics	
Bit 2	Not used	
Bit 3	Response monitoring activated	
Bit 4	Freeze mode active	
Bit 5	Sync mode active	
Bit 6	Not used	
Bit 7	Slave deactivated	
Octet 3		
Bit 0 - 6	Not used	
Bit 7	Overflow of additional diagnostics information	
Octet 4	DP master station address	
Octets 5 and 6	Ident no. DP slave	
Octet 7	Length of additional diagnostics information	

Diagnostics-position	Designation	
	DPV0 master	DPV1 master
Octet 8		Status type
Bit 0	Easy Link communication error	–
Bit 1 - 7	Not used	–
Octet 9	–	Slot Number
Octet 10	–	Status specifier
Octet 11	–	
Bit 0	–	Easy Link communication error
bit1	–	Invalid command for easy operating mode
Bit 2	–	Additional I/O data not yet available
Bit 3 - 7	–	Not used

→ When accessing the "Ident number" diagnostics data, observe the Motorola coding format used in PROFIBUS-DP (octet N: High byte, octet N+1: Low byte) for data in WORD format. If the data processing format in your DP master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

Meaning of the diagnostics information

The read diagnostics information has the following meaning:

Table 2: Data contents of the diagnostics information

Designation	Meaning	Explanation/remedy
Response monitoring activated	The response monitoring in the EASY204-DP was activated properly.	Set state
Freeze mode active	The DP master has activated the synchronous reading of data inputs of several slaves.	Desired user action
Function not supported	The DP master has requested a function not supported by the EASY204-DP.	Check the configuration of the DP master
Ident no. DP slave	Contains the Ident number of the EASY204-DP: 4D10hex	
Easy Link communication error	Communication between EASY204-DP and easy/MFD interrupted	Check the connection between EASY204-DP and easy/MFD.
Configuration error	The DP master has sent an invalid configuration telegram to the EASY204-DP (e.g. incorrect length of the data inputs and/or data outputs)	Check the configuration of the DP master
Length of additional diagnostics information	Contains the length of the additional diagnostics information: 02_{hex} with DPV0 05hex with DPV1	
Master already present	The EASY204-DP is assigned by another DP master.	
Not used	Does not contain information to be evaluated	
Parameterization request	The EASY204-DP is waiting for the parameter telegram of the DP master.	Temporary status
Parameterization error	The DP master has sent an invalid parameter telegram to the EASY204-DP.	Check the configuration of the DP master.

Designation	Meaning	Explanation/remedy
Slave deactivated	The DP master has removed (deactivated) the EASY204-DP from its cyclical processing.	Desired user action
Slot Number	Contains the slot number, from which the additional diagnostics information (status) originates: 00_{hex}	
Station not ready	The EASY204-DP is not yet ready for the communication (Initialization phase).	Temporary status
Station does not exist	No slave responds at the station address used.	Check the configuration of the DP master. Check the address setting on the EASY204-DP.
DP master station address	Contains the station address of the DP master.	
Static diagnostics	Communication between EASY204-DP and EASY/MFD interrupted.	Check the connection between EASY204-DP and EASY/MFD.
Status specifier	The EASY204-DP is not transferring an "Incoming/outgoing" message for the sent diagnostics information (Status): 00_{hex}	
Status type	The EASY204-DP uses the status type "Status message": 01_{hex}	
Sync mode active	The DP master has activated the synchronous output of data outputs to several slaves.	Desired user action
Overflow of additional diagnostics information	The additional diagnostics data (status) are greater than the memory space reserved for it in the DP master.	Check the configuration of the DP master.
Invalid DP slave response	The EASY204-DP has sent an invalid response.	Check the cabling and the interference prevention measures.

Designation	Meaning	Explanation/remedy
Invalid command for easy operating mode	An impermissible bit combination was selected for easy operating mode in the cyclical output data.	Observe the information in the documentation and adapt your application program accordingly.
Additional diagnostics information	The EASY204-DP has sent additional diagnostics information (Status).	Set state
Additional I/O data not yet available	The EASY204-DP is still in the initialization phase and has not yet received any valid additional input data from the easy800.	Temporary status during startup

GSD file

A PROFIBUS-DP GSD file is required for selecting the device and for running it on the PROFIBUS-DP communication bus. The GSD file contains standard PROFIBUS station descriptions and is contained in the Appendix of this manual.

You can download the files "Moe4d10.gsd" (from device version 07) and "Moel4d10.gsd" (up to device version 06) at the following Internet addresses:

- Eaton.com/Support
- Eaton.com/Downloadcenter-Software → Software →easySoft
- https://es-assets.eaton.com/EASY/GSD-FILES/

Follow the links on these pages.

User modules

All easy600 functions that are available via the EASY204-DP are supported by Eaton PLCs PS4-341, PS416, XControl and the Siemens S7 PLC. The following PLC application modules offer a convenient option for implementing the data exchange between the EASY control relay and the master PLC.

The following application modules are available:

Control	Application module Application note	File	
		German	English
Eaton PLCs			
PS4-341 and PS416			
easy600	S40-AM-K6-D/GB	s40amk6d.exe	s40amk6g.exe
EASY800/MFD	AN2700K21D/GB	an27k21d.exe	an27k21g.exe
XC PLCs			
easy600	S40-AM-K6-D/GB	xs-easydp_d.exe	xs-easydp_g.exe
Siemens PLCs			
SIMATIC S7-300			
easy600	S7-AM-K6-D/GB	s7amk6d.exe	s7amk6g.exe

Both the application modules and application notes listed in the table and other modules for the user-friendly configuration of easy800 and MFD-Titan functions can be downloaded from the following Internet address:

https://es-assets.eaton.com/AUTOMATION

https://es-assets.eaton.com/AUTOMATION/APPLICATION_MODULES

https://es-assets.eaton.com//AUTOMATION/APPLICATION_NOTES

PROFIBUS certification

EASY204-DP was certified as a PROFIBUS-DP slave by the PROFIBUS Users' Organisation. EASY204-DP contains the PROFIBUS SPC3 interface (from device version 07) and VPC3+ (up to device version 06).

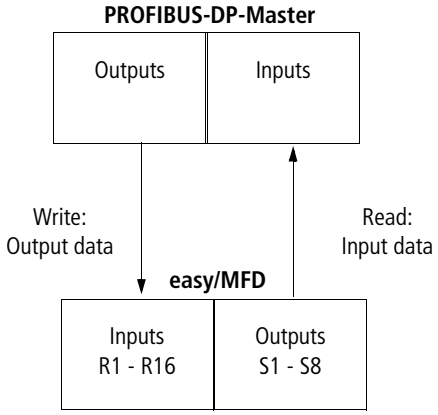
→ When operating EASY204-DP devices up to device version 04 uncontrolled behaviour may occur under the following circumstances:

- When Class I and Class II DP masters in a multimaster system with parameter or configuration data access the slave at the same time (highly unlikely).
- Or if other masters based on PROFIBUS layer 2 are connected.

5 Inputs/Outputs, easy600/700/800/ MFD Operating Mode

The appropriate module must be selected in the slave configuration in order for I/O data to be transferred between the EASY204-DP slave and a PROFIBUS-DP master.

→ The terms "input data" and "output data" are used from the point of view of the PROFIBUS-DP master.



"Inputs 3 bytes" module: operating mode, S1 – S8

The normal PROFIBUS-DP master data exchange with the EASY204-DP slave is via input data bytes 0, 1, 2.

Byte	Meaning	Value
0	Operating mode scan	→ table 3
1	Scan status of the easy outputs S1 to S8	→ table 4
2	Not used	00_{hex}

Requirement:
The "Inputs, 3 bytes" module must have been selected.

→ The output data and control commands can now only be used if you have selected the appropriate modules as well.

The master reads bytes 0, 1, 2 for the following data:

Table 3: Byte 0: Operating mode

"easy" operating mode	Bit							
	7	6	5	4	3	2	1	0 Stop/Run
without input delay	0	0	0	1	0	0	0	0/1
with input delay	0	0	1	0	0	0	0	0/1

Example:

Value 21_{hex} "easy"/MFD is in Run mode and is working with input debounce.

Table 4: Byte 1: Status of S1 to S8 on the basic unit

Output	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
S1								0/1
S2							0/1	
S3						0/1		
S4					0/1			
S5				0/1				
S6			0/1					
S7		0/1						
S8	0/1							

Example:

Value 19_{hex} S5, S4 and S1 are active.

Attention!
If control commands and I/O data are used at the same time:

- Whilst the control command is being executed, the inputs will remain in the state before the control command was called.
- After the "Control commands" data exchange has been completed, the input bytes are refreshed.

"Inputs 1 byte" module: S1 – S8

When this module is selected, the master only receives 1 byte (coil output data S1 to S8) via PROFIBUS.

Byte	Meaning	Value
0	Scan status of the easy outputs S1 to S8	→ table 4 on page 49

Requirement:
The "Inputs, 1 byte" module must have been selected.

→ The output data and control commands can now only be used if you have selected the appropriate modules as well.

"Outputs 3 bytes" module: operating mode, R9 – R16, R1 – R8

The normal PROFIBUS-DP master data exchange with the EASY204-DP slave is provided with output data bytes 0, 1, 2.

Byte	Meaning	Value
0	Specifying the control mode	→ table 5
1	Setting/resetting of the easy/MFD inputs R9 to R16	→ table 6
2	Setting/resetting of the easy/MFD inputs R1 to R8	→ table 7

Requirement:
The "Outputs; 3 bytes" module must have been selected.

→ The output data and control commands can now only be used if you have selected the appropriate modules as well.

The master reads bytes 0, 1, 2 for the following data:

Table 5: Byte 0: Operating mode

easy operating mode	**Bit**							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Index for setting the basic unit to the safety state	0	0	0	0	0	0	0	0
Index for transferring valid data	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**
RUN command	0	0	1	1	0	1	0	0
STOP command	0	1	0	0	0	1	0	0

0 = status "0" 1 = status "1"

Explanation

Value $34_{hex} = 00110100_{bin}$:
This value sets the easy/MFD status from STOP to RUN. It is only interpreted as command and therefore does not permit an additional transfer of data. The index value 14_{hex} must be used in this situation.

Value $44_{hex} = 01000100_{bin}$:
This value sets the easy/MFD status from RUN to STOP. It is also used only as a command and therefore works in the same way as the RUN command.

This should be observed without fail up to device version 05!:

Value $14_{hex} = 00010100_{bin}$:
Byte 0 must always contain this value if data is to be written to the easy/MFD basic unit via the EASY204-DP gateway.

Even if the I/O of a control relay can be assigned directly to a specific memory area of the master PLC, the correct data structure format (e.g.: input data byte 0 = 14 hex must nevertheless still be observed.

From version 06 this is no longer necessary.

Table 6: Byte 1: Write status of R9 to R16

EASY6.. Input	Bit 7	6	5	4	3	2	1	0
R9								0/1
R10							0/1	
R11						0/1		
R12					0/1			
R13				0/1				
R14			0/1					
R15		0/1						
R16	0/1							

Example:

Value 19_{hex} R13, R12 and R9 should be active.

Table 7: Byte 2: Write status of R1 to R8

EASY6.. Input	Bit 7	6	5	4	3	2	1	0
R1								0/1
R2							0/1	
R3						0/1		
R4					0/1			
R5				0/1				
R6			0/1					
R7		0/1						
R8	0/1							

Example:

Value $2B_{hex}$ R6, R4, R2 and R1 should be active.

Attention!
If control commands and I/O data are used at the same time:

- Whilst the control command is being executed, the inputs will remain in the state before the control command was called.
- After the "Control commands" data exchange has been completed, the output bytes are refreshed.

"Outputs 1 byte" module: R1 – R8

When this module is selected, the master only sends 1 byte (coil output data S1 to S8) via PROFIBUS.

Byte	Meaning	Value
0	Status of R1 to R8	→ table 7 on page 53

Requirement:
The "Outputs, 1 byte" module must have been selected.

→ The input data and control commands can now only be used if you have selected the appropriate modules as well.

Note on using the 1 byte modules
The 1 byte modules are not available in all device combinations. If any problems occur in handling, first check the state of the GW message in the status display of the basic unit:

GW static:	The 1-byte mode can be used
GW flashing:	Check the device version of the EASY204-DP and the basic unit. If these are valid, check the configuration in the PROFIBUS network and the Configurator.

Table 8: Possible device combinations for using the 1-byte mode

Basic device	**Easy204-DP**
easy600	Version 05 or 06
easy700	Version 06
easy800	
Version ≦ 04:	Version 05 or 06
Version ≧ 05:	Version 06
MFD-…-CP8	
Version ≦ 02:	Version 05 or 06
Version ≧ 03:	Version 06
MFD-CP10…	
Version ≧ 01:	Version 06

If 1-byte mode cannot be used, please use the 3-byte mode and ensure that the value = 0x14 is entered in byte 0. Without this additional entry, the basic device will not recognize any valid values. As soon as the device is ready for operation and the data communication is active, this is indicated by a static GW in the display of the basic device.

6 Additional Input/Output Data easy800/MFD

When connected to an easy800/MFD, the EASY204-DP from device version 07 offers input/modules for 4, 8,12 and 16 byte data for the cyclical transfer of large data volumes. This data is assigned to the marker range of the easy800/MFD.

→ This data is transferred in contiguous bytes.

The following tables show the address location of the input and output data of these modules.

Table 9: Address location of the module input data in a DP master

				Data position	Designation
Module "EASY800 additional inputs, 16 bytes"				Octet 1	MD63 first byte (low)
				Octet 2	MD63 second byte
				Octet 3	MD63 third byte
				Octet 4	MD63 fourth byte (high)
				Octet 5	MD64 first byte (low)
				Octet 6	MD64 second byte
				Octet 7	MD64 third byte
				Octet 8	MD64 fourth byte (high)
				Octet 9	MD65 first byte (low)
				Octet 10	MD65 second byte
				Octet 11	MD65 third byte
				Octet 12	MD65 fourth byte (high)
				Octet 13	MD66 first byte (low)
				Octet 14	MD66 second byte
				Octet 15	MD66 third byte
				Octet 16	MD66 fourth byte (high)

Table 10: Address location of the module output data in a DP master

				Data position	Designation
Module "EASY800 additional inputs, 16 bytes"	Module "EASY800 additional inputs, 12 bytes"	Module "EASY800 additional inputs, 8 bytes"	Module "EASY800 additional inputs, 4 bytes"	Octet 1	MD59 first byte (low)
				Octet 2	MD59 second byte
				Octet 3	MD59 third byte
				Octet 4	MD59 fourth byte (high)
				Octet 5	MD60 first byte (low)
				Octet 6	MD60 second byte
				Octet 7	MD60 third byte
				Octet 8	MD60 fourth byte (high)
				Octet 9	MD61 first byte (low)
				Octet 10	MD61 second byte
				Octet 11	MD61 third byte
				Octet 12	MD61 fourth byte (high)
				Octet 13	MD62 first byte (low)
				Octet 14	MD62 second byte
				Octet 15	MD62 third byte
				Octet 16	MD62 fourth byte (high)

7 Control Commands for easy600 (DPV0)

Data exchange procedure

The "Control commands, 7 bytes" module allows extended data exchange of the easy600 on the PROFIBUS-DP communication bus. This allows you to transfer services from the following areas:

- „Date and time, Summer/winter time",
- „Read/write function blocks" and
- „Read/write image".

A data exchange procedure is required in order to ensure the safe exchange of data via PROFIBUS-DP from master to slave and vice versa.

A special command code in byte 0 is used to activate the services required. Data bytes 1 to 6 are used to write or read the values concerned.

Caution!

Whilst the control command is being executed, the input and output data will remain in the state before the control command was called. Only after the "Control commands" data exchange has been completed will the I/O data be refreshed.

Caution!
Only those values specified for the command code should be used.
Check the values that you write in order to avoid malfunctions.

Requirement:
The "Control commands, 7 bytes" module must have been selected.

Data can only be written if the "easy" basic unit with the LCD display is showing the Status display.

The master initiates the data exchange of the control commands and the addressed slave responds.

During the communication 7 bytes of data are transferred on PROFIBUS.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6

Byte 0, Toggle byte
Byte 0 contains the Toggle bit and the command. It is used to activate the sending of a control command.

Byte 0, Toggle byte								
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	0/1	x	x	x	x	x	x	x
	Toggle bit	Command						

Procedure

- To send a command, bit 7 must be toggled, i.e. set either from 1 to 0 or from 0 to 1.
- Then poll the toggle bit for the coupling modules response until it has the same status as the toggle bit sent. This status indicates to the master that the response to the sent command is valid.
- Do not send a new command until you have received a response (changing of the toggle bit), otherwise the response of the previous command will be overwritten before it can be read.

→ In order to use input/output data and control commands simultaneously:

Only after the "Control commands" data exchange has been completed will the I/O bytes be refreshed.

Date and time, Summer/winter time **Telegram structure**

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	Read	3C	–	0/1	0	1	1	1	1	0	0
	Write	2A	–	1/0	0	1	0	1	0	1	0
	Response[1]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Write successful	–	C1/41	1/0	1	0	0	0	0	0	1
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Day of week										
	Read operation	00	→ table 11								
	For write operation	→ table 11	00								
2	Hour										
	Read operation	00	→ table 12								
	For write operation	→ table 12	00								
3	Minute										
	Read operation	00	→ table 13								
	For write operation	→ table 13	00								
4	Summer-/winter switchover										
	Read operation	00	→ table 14								
	For write operation	→ table 14	00								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 11: Byte 1: Weekday (value range 00 to 06)

Day of week	Bit							
	7	6	5	4	3	2	1	0
Monday = 0	0	0	0	0	0	0	0	0
Tuesday = 1	0	0	0	0	0	0	0	1
Wednesday = 2	0	0	0	0	0	0	1	0
Thursday = 3	0	0	0	0	0	0	1	1
Friday = 4	0	0	0	0	0	1	0	0
Saturday = 5	0	0	0	0	0	1	0	1
Sunday = 6	0	0	0	0	0	1	1	0

Table 12: Byte 2: Hour (value range 00 to 23)

Value (bcd)	Value 10 Bit				Value 1 Bit			
	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
…								
9	0	0	0	0	1	0	0	1
…								
14	0	0	0	1	0	1	0	0
…								
23	0	0	1	0	0	0	1	1

Table 13: Byte 3: Minute (value range 00 to 59)

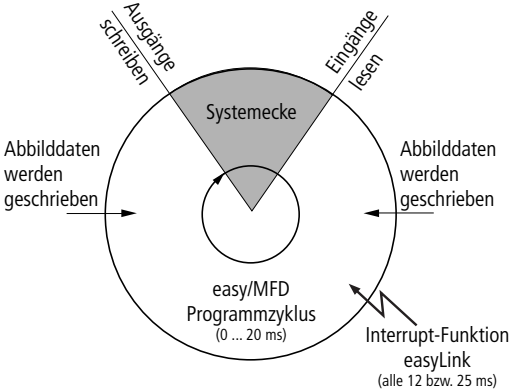
Value (bcd)	Value 10 Bit				Value 1 Bit			
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
…								
10	0	0	0	1	0	0	0	0
…								
21	0	0	1	0	0	0	0	1
…								
42	0	1	0	0	0	0	1	0
…								
59	0	1	0	1	1	0	0	1

Table 14: Byte 4: Winter/summer time (value range 00 to 01)

Value (bcd)	Value 10 Bit				Value 1 Bit			
Function	7	6	5	4	3	2	1	0
Winter time	0	0	0	0	0	0	0	0
Daylight Saving Time	0	0	0	0	0	0	0	1

Read/write image

General information on working with image data



When writing to image data, it must be remembered that an image (e.g. inputs, outputs,...) used in the easy800/MFD program is also written cyclically by the actual program. The only image data that is unchanged is the data that is not used in the program and is therefore not overwritten in the program cycle. This operating principle also means that an image written via EASYLINK, such as output data is only then output at the physical outputs of the easy800/MFD when the control relay is in Run mode.

Overview

Operands	Meaning	Read/ write	Command	Page
M1 – M16, Q1 – Q8, D1 – D8	„Read status of markers, digital outputs and text display markers"	Reading	40	65
P1 – P4, ESC/OK/DEL/ALT	„Read status of P buttons and operating buttons"	Reading	3E	68
T1 - T8, C1 - C8, ⏲1 - ⏲4, A1 - A8,	„Read status of timing relays, counter relays, time switches and analog value comparators"	Reading	3F	69

Read status of markers, digital outputs and text display markers

The following command will read the logical state of all markers M1 to M16, digital outputs Q1 to Q7, text display markers D1 to D8.

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	Read	40	–	1/0	1	0	0	0	0	0	0
	Response[1]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Status of markers M1 to M8	00	→ table 15								
2	Status of markers M9 to M16	00	→ table 16								
3	Status of digital outputs Q1 to Q8	00	→ table 17								
4	Status of text markers D1 to D8	00	→ table 18								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 15: Byte 1: Status of markers M1 to M8

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
M1								0/1
M2							0/1	
M3						0/1		
M4					0/1			
M5				0/1				
M6			0/1					
M7		0/1						
M8	0/1							

Table 16: Byte 2: Status of markers M9 to M16

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
M9								0/1
M10							0/1	
M11						0/1		
M12					0/1			
M13				0/1				
M14			0/1					
M15		0/1						
M16	0/1							

Table 17: Byte 3: Status of digital outputs Q1 to Q8

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Q1								0/1
Q2							0/1	
Q3						0/1		
Q4					0/1			
Q5				0/1				
Q6			0/1					
Q7		0/1						
Q8	0/1							

Table 18: Byte 4: Status of text display markers D1 to D8

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
D1								0/1
D2							0/1	
D3						0/1		
D4					0/1			
D5				0/1				
D6			0/1					
D7		0/1						
D8	0/1							

Read status of P buttons and operating buttons

The following command is used to read the logical state of the digital pushbutton inputs P1 to P4.

The status of the pushbuttons is only displayed if

- a P button is used in the circuit diagram and
- the pushbuttons are activated on the device.

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	Read	3E	–	1/0	0	1	1	1	1	1	0
	Response[1]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Status of timing relay	00	→ table 19								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 19: Byte 1: Status of pushbuttons

Meaning	Bit							
	7	6	5	4	3	2	1	0
Status P1								0/1
Status P2							0/1	
Status P3						0/1		
Status P4					0/1			
ESC not actuated/actuated				0/1				
OK not actuated/actuated			0/1					
DEL not pressed/pressed		0/1						
ALT not actuated/actuated	0/1							

Read status of timing relays, counter relays, time switches and analog value comparators

The following command reads the logic state of all timing relays, counters, time switches and analog value comparators.

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	Read	3F	–	1/0	0	1	1	1	1	1	1
	Response[1]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Status of timing relay	00	→ table 20								
2	Counter relay status	00	→ table 21								
3	Time switch status	00	→ table 22								
4	Analog value comparator status	00	→ table 23								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 20: Byte 1: Status of timing relays

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
T1								0/1
T2							0/1	
T3						0/1		
T4					0/1			
T5				0/1				
T6			0/1					
T7		0/1						
T8	0/1							

Table 21: Byte 2: Status of the counter relays

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
C1								0/1
C2							0/1	
C3						0/1		
C4					0/1			
C5				0/1				
C6			0/1					
C7		0/1						
C8	0/1							

Table 22: Byte 3: Status of time switches

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
1								0/1
2							0/1	
3						0/1		
4					0/1			
				0				
			0					
		0						
	0							

Table 23: Byte 4: Status of analog value comparators

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
A1								0/1
A2							0/1	
A3						0/1		
A4					0/1			
A5				0/1				
A6			0/1					
A7		0/1						
A8	0/1							

Read/write function blocks — Overview

Operands	Meaning	Command	Page
A1 - A8	„Write analog value comparators (function, comparator values)"	$22_{hex} – 29_{hex}$	73
C1 - C8	„Read counter relay actual value"	$49_{hex} – 50_{hex}$	76
	„Write counter relay setpoint"	$09_{hex} – 10_{hex}$	78
I1 - I16	„Read analog and digital inputs (I7, I8, I1 to I16)"	$3D_{hex}$	81
T1 - T8	„Read timing relay actual value (time base, actual value, switch function)"	$41_{hex} – 48_{hex}$	84
	„Write timing relay actual value (time base, setpoint, switch function)"	$01_{hex} – 08_{hex}$	87
⏲1 - ⏲4	„Read time switch (channel, ON time, OFF time)"	$2B_{hex} – 3A_{ex}$	94
	„Write time switch (channel, ON time, OFF time)"	$12_{hex} – 21_{hex}$	98

Write analog value comparators (function, comparator values)

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	A1	22	–	0	0	1	0	0	0	1	0
	A2	23	–	0	0	1	0	0	0	1	1
	A3	24	–	0	0	1	0	0	1	0	0
	A4	25	–	0	0	1	0	0	1	0	1
	A5	26	–	0	0	1	0	0	1	1	0
	A6	27	–	0	0	1	0	0	1	1	1
	A7	28	–	0	0	1	0	1	0	0	0
	A8	29	–	0	0	1	0	1	0	0	1
	Response[1)]										
	Write successful	–	C1/41	1/0	1	0	0	0	0	0	1
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Comparator	→ table 39	invalid								
2	Comparison value for comparison with constant	→ table 40									

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

The comparison values and the function are part of an "*.eas file". If these values are changed, the original "*.eas file" will no longer match the file in EASY6...

Remember this feature when uploading, downloading or comparing "easy" circuit diagrams with EASY-SOFT.

When downloading from the PC the latest version of the "*.eas" is overwritten.

The comparison shows that the circuit diagrams are not identical.

Table 24: Byte 1: Control byte analog value comparator: Comparator

Meaning	Bit							
	7	6	5	4	3	2	1	0
Compare: "≧"								0
Compare: "≦"								1
I7 with I8						0	0	
I7 with constant						0	1	
I8 with constant						1	0	
Fixed			0	0	0			
Does not appear in the Parameters menu		1						
Appears in the Parameters menu		0						
Edit	1							

Table 25: Byte 2: Comparison value for comparison with constant

Value (hex)	Bit							
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
63	0	1	1	0	0	0	1	1

Example
The analog value comparator A8 has the following settings:

- Compare I7 < 4.7 V

The master initiates the command to reduce the comparison value to 4.2 V.

Byte	Meaning	Value (hex)	Bit							
			7	6	5	4	3	2	1	0
0	Command: A8	29	0	0	1	0	1	0	0	1
	Response: Write successful	–	0	1	0	0	0	0	0	1
1	Comparator	→	1	0	0	0	0	0	1	1
2	Comparison value for comparison with constant	2A	0	0	1	0	1	0	1	0

The slave responds with the following telegram:

Byte	Meaning	Value (hex)	Bit							
			7	6	5	4	3	2	1	0
0	Response: Write successful	41	0	1	0	0	0	0	0	1
1	Comparator	invalid								
2	Comparison value for comparison with constant	00								

Read counter relay actual value

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	C1	49	–	1/0	1	0	0	1	0	0	1
	C2	4A	–	1/0	1	0	0	1	0	1	0
	C3	4B	–	1/0	1	0	0	1	0	1	1
	C4	4C	–	1/0	1	0	0	1	1	0	0
	C5	4D	–	1/0	1	0	0	1	1	0	1
	C6	4E	–	1/0	1	0	0	1	1	1	0
	C7	4F	–	1/0	1	0	0	1	1	1	1
	C8	50	–	1/0	1	0	1	0	0	0	0
	Response[1]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	invalid	00	→	x	x	x	x	x	x	x	x
2	Counter relay actual value (low byte)	00	→ table 26								
3	Counter relay actual value (high byte)	00	→ table 27								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 26: Byte 2: Counter relay actual value (low byte)

Value (hex)	Bit							
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
FF	1	1	1	1	1	1	1	1

Table 27: Byte 3: Counter relay actual value (high byte)

Value (hex)	Bit							
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
FF	1	1	1	1	1	1	1	1

Example

The master initiates the command for reading counter relay C5:

Byte	Meaning	Value (hex)	Bit							
			7	6	5	4	3	2	1	0
0	Command: C5	4D	1	1	0	0	1	1	0	1
1 - 6		00								

The slave responds with the following values:

Byte	Meaning	Value (hex)	Bit							
			7	6	5	4	3	2	1	0
0	Response: Read successful	42	1	1	0	0	0	0	1	0
1	invalid		x	x	x	x	x	x	x	x
2	Counter relay actual value (low byte)	67	0	1	1	0	0	1	1	1
3	Counter relay actual value (high byte)	12	0	0	0	1	0	0	1	0

Actual value of counter relay C5: 4711
(value $1267_{hex} = 4711_{dec}$)

Write counter relay setpoint

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	C1	09	–	1/0	0	0	0	1	0	0	1
	C2	0A	–	1/0	0	0	0	1	0	1	0
	C3	0B	–	1/0	0	0	0	1	0	1	1
	C4	0C	–	1/0	0	0	0	1	1	0	0
	C5	0D	–	1/0	0	0	0	1	1	0	1
	C6	0E	–	1/0	0	0	0	1	1	1	0
	C7	0F	–	1/0	0	0	0	1	1	1	1
	C8	10	–	1/0	0	0	1	0	0	0	0
	Response[1)]										
	Write successful	–	C1/41	1/0	1	0	0	0	0	0	1
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Parameter menu	→ table 28	00								
2	Setpoint value (low byte)	→ table 29	00								
3	Setpoint value (high byte)	→ table 30	00								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Value range of the counter values: 0000 to 9999

→ Keep within the value range.

The value is part of an "*.eas file". If these values are changed, the original "*.eas file" will no longer match the file in EASY6...

Remember this feature when uploading, downloading or comparing "easy" circuit diagrams with EASY-SOFT.

When downloading from the PC the latest version of the "*.eas" is overwritten.

The comparison shows that the circuit diagrams are not identical.

Table 28: Byte 1: Counter relay control byte

Meaning	Bit							
	7	6	5	4	3	2	1	0
Not used			0	0	0	0	0	0
Does not appear in the Parameters menu		1						
Appears in the Parameters menu		0						
Edit	1							

Table 29: Byte 2: Counter value (low byte)

Value (hex)	Bit							
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
FF	1	1	1	1	1	1	1	1

Table 30: Byte 3: Counter value (high byte)

Value (hex)	Bit							
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
FF	1	1	1	1	1	1	1	1

Example: Change counter relay setpoint
The master initiates the command to change the setpoint value of counter relay C8 to 1542:

Byte	Meaning	Value (hex)	Bit							
			7	6	5	4	3	2	1	0
0	Command: C8	10	0	0	0	1	0	0	0	0
1	Appears in the Parameters menu	→ Bit value	1	0	0	0	0	0	0	0
2	Setpoint value (low byte)	06	0	0	0	0	0	1	1	0
3	Setpoint value (high byte)	06	0	0	0	0	0	1	1	0

$0606_{hex} = 1542_{dec}$

The slave responds with the following telegram:

Byte	Meaning		Bit							
		Slave	7	6	5	4	3	2	1	0
0	Response: Write successful	41	0	1	0	0	0	0	0	1
1 – 3		00								

Read analog and digital inputs (I7, I8, I1 to I16)

The following command is used to read the values of both analog inputs I7, I8 (only EASY...-DC-..) and the logical states of the digital inputs I1 to I16.

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command[1)]										
	Read	3D	–	0	0	1	1	1	1	0	1
	Response[1)]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Analog value of I7	00	→ table 31								
2	Analog value of I8	00	→ table 32								
3	Status of inputs I1 to I8	00	→ table 33								
4	Status of inputs I9 to I12, I15, I16	00	→ table 34								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 31: Byte 1: Analog value I7

Analog value I7(hex)	Bit 7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
…	…	…	…	…	…	…	…	…
64	0	1	1	0	0	1	0	0

Examples: $0A_{hex}$ = 1 V, 32_{hex} = 5 V, 64_{hex} = 10 V

Table 32: Byte 2: Analog value I8

Analog value I8 (hex)	Bit 7	6	5	4	3	2	1	0
00_{hex}	0	0	0	0	0	0	0	0
…	…	…	…	…	…	…	…	…
64_{hex}	0	1	1	0	0	1	0	0

Examples: $0A_{hex}$ = 1 V, $3C_{hex}$ = 6 V, $5A_{hex}$ = 9 V

Table 33: Byte 3: Status of inputs I1 to I8

Value	Bit 7	6	5	4	3	2	1	0
I1								0/1
I2							0/1	
I3						0/1		
I4					0/1			
I5				0/1				
I6			0/1					
I7		0/1						
I8	0/1							

Value 0 = switched off, Value 1 = switched on

Table 34: Byte 4: Status of inputs I9 to I12, I15, I16

Value	Bit							
	7	6	5	4	3	2	1	0
I9								0/1
I10							0/1	
I11						0/1		
I12					0/1			
I13				0				
I14			0					
I15		0/1						
I16	0/1							

Value 0 = switched off, Value 1 = switched on

→ I13 = 0, I14 = 0
If I14 = 1, EASY204-DP has disconnected from the basic unit.

I15, I16 are the short-circuit signals for EASY...-DC-.. transistor versions.

Read timing relay actual value (time base, actual value, switch function)

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	T1	41	–	1/0	1	0	0	0	0	0	1
	T2	42	–	1/0	1	0	0	0	0	1	0
	T3	43	–	1/0	1	0	0	0	0	1	1
	T4	44	–	1/0	1	0	0	0	1	0	0
	T5	45	–	1/0	1	0	0	0	1	0	1
	T6	46	–	1/0	1	0	0	0	1	1	0
	T7	47	–	1/0	1	0	0	0	1	1	1
	T8	48	–	1/0	1	0	0	1	0	0	0
	Response[1)]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Timing relay, time base, control status	00	→ table 35								
2	Time actual value (low byte)	00	→ table 36								
3	Time actual value (high byte)	00	→ table 37								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 35: Byte 1: Timing relay function, time base, control status

Meaning	Bit							
	7	6	5	4	3	2	1	0
On-delayed						0	0	0
Off-delayed						0	0	1
On time with random switching						0	1	0
Off-delayed with random switching						0	1	1
Single pulse						1	0	0
Flashing						1	0	1
s time base				0	0			
M:S time base				0	1			
Time base "H:M"				1	0			
Not used			0					
Appears in the Parameters menu		0						
Does not appear in the Parameters menu		1						
Timing relay not processed by operating system	0							
Timing relay processed by operating system	1							

Table 36: Byte 2: Time actual value (low byte)

Value (hex)	Bit							
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
FF	1	1	1	1	1	1	1	1

Table 37: Byte 3: Time actual value (high byte)

Value (hex)	Bit 7	6	5	4	3	2	1	0
00_{hex}	0	0	0	0	0	0	0	0
FF_{hex}	1	1	1	1	1	1	1	1

Example

The master initiates the command for reading timing relay T1:

Byte	Meaning	Value (hex)	Bit 7	6	5	4	3	2	1	0
0	Command: T1	41	1	1	0	0	0	0	0	1
1 - 3		00								

The slave responds with the following values:

Byte	Meaning	Value (hex)	Bit 7	6	5	4	3	2	1	0
0	Response: Read successful	C2	1	1	0	0	0	0	1	0
1	Trigger coil activated, M:S time base, on-delayed, Parameter display +	→	1	0	0	0	1	0	0	0
2	Time actual value (low byte)	10	0	0	0	1	0	0	0	0
3	Time actual value (high byte)	0E	0	0	0	0	1	1	1	0

Value of set time = $0E10_{hex}$ = 3600

3600 s = 60:00 M:S

Write timing relay actual value (time base, setpoint, switch function)

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command [1]										
	T1	01	–	1/0	0	0	0	0	0	0	1
	T2	02	–	1/0	0	0	0	0	0	1	0
	T3	03	–	1/0	0	0	0	0	0	1	1
	T4	04	–	1/0	0	0	0	0	1	0	0
	T5	05	–	1/0	0	0	0	0	1	0	1
	T6	06	–	1/0	0	0	0	0	1	1	0
	T7	07	–	1/0	0	0	0	0	1	1	1
	T8	08	–	1/0	0	0	0	1	0	0	0
	Response[1)]										
	Write successful	–	C1/41	1/0	1	0	0	0	0	0	1
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Timing relay function, time base, Parameters menu	→ table 38	invalid								
2	Time value "--.xx" with time base "S"	→ table 39									
3	Time value "xx.--" with time base "S" or "--:xx" with time base M:S	→ table 40									
4	Time value "xx.--" with time base "M:S" or "--:xx" with time base "H:M"	→ table 41									
5	Time value "xx.--" with time base "H:M"	→ table 42									
6	Hour value in days	00	→ table 43								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

→ Time values over 60 s are converted to minutes.
Time values over 60 min. are converted to hours.
Time values over 24 h are converted to days.

The value range of the times and the timing relay setpoint are part of an "*.eas file". If these values are changed, the original "*.eas file" will no longer match the file in EASY6...

Remember this feature when uploading, downloading or comparing "easy" circuit diagrams with EASY-SOFT.

When downloading from the PC the latest version of the "*.eas" is overwritten.

The comparison shows that the circuit diagrams are not identical.

Value range of the time values

- "S" 00.00 to 99.99
- "M:S" 00:00 to 99:59 (M = 00 to 99, S = 00 to 59)
- "H:M" 00:00 to 99:59 (H = 00 to 99, M = 00 to 59)

→ Only the bytes reserved for the required time base should be used.

Table 38: Byte 1: Timing relay control byte

Meaning	Bit							
	7	6	5	4	3	2	1	0
On-delayed						0	0	0
Off-delayed						0	0	1
On time with random switching						0	1	0
Off-delayed with random switching						0	1	1
Single pulse						1	0	0
Flashing						1	0	1
Time base "S"				0	0			
M:S time base				0	1			
Time base "H:M"				1	0			
Not used			0					
Does not appear in the Parameters menu		1						
Appears in the Parameters menu		0						
Edit	1							

Table 39: Byte 2: Time value "--.xx" time base "S"

Value (bcd)	Value --.x- Bit				Value --.x- Bit			
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
05	0	0	0	0	0	1	0	1
17	0	0	0	1	0	1	1	1
42	0	1	0	0	0	0	1	0
99	1	0	0	1	1	0	0	1

Table 40: Byte 3: Time value "xx.--" Time base "S"
Time value "xx.--", Time base "M:S"

Value (bcd)	Value x-.-- "S" Value --:x- "-:S" Bit				Value x-.-- "S" Value --:x- "-:S" Bit			
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
05	0	0	0	0	0	1	0	1
17	0	0	0	1	0	1	1	1
42	0	1	0	0	0	0	1	0
99	1	0	0	1	1	0	0	1

Table 41: Byte 4: Time value "xx.--" Time base "M:S"
Time value "--:xx", Time base "H:M"

Value (bcd)	Value x-.-- "M:-" Value --:x- "-:M" Bit				Value x-.-- "M:-" Value --:x- "-:M" Bit			
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
05	0	0	0	0	0	1	0	1
17	0	0	0	1	0	1	1	1
42	0	1	0	0	0	0	1	0

Table 42: Byte 5: Time value "xx:--" Time base "H:M"

Value (bcd)	Value -x:-- "H:-" Bit				Value -x:-- "H:-" Bit			
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
05	0	0	0	0	0	1	0	1
17	0	0	0	1	0	1	1	1

Table 43: Byte 6: Time value in days

Value (bcd)	Bit				Days value Bit			
	7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
04	0	0	0	0	0	1	0	0

Example 1: timing relay
The master initiates the command for writing timing relay T8 with the following values:

Switch function	On-delayed
Time range	"s"
Setpoint time	50

T8 is to be assigned the time base "M:S" and the setpoint time 30 minutes, 25 seconds.

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Command: T8	08_{hex}	0	0	0	0	1	0	0	0
1	Timing relay function, time base, Parameters menu	→ Bit value	1	0	0	0	1	0	0	0
2	Time value "--.xx" with time base "S"	→ Bit value	0	0	0	0	0	0	0	0
3	Time value "xx.--" with time base "S" or "--:xx" with time base M:S	25_{bcd}	0	0	1	0	0	1	0	1
4	Time value "xx.--" with time base "M:S" or "--:xx" with time base "H:M"	30_{bcd}	0	0	1	1	0	0	0	0
5	Time value "xx.--" with time base "H:M"	→ Bit value	0	0	0	0	0	0	0	0
6	Hour value in days	→ Bit value	0	0	0	0	0	0	0	0

The slave responds with the following values:

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Response: Write successful	$C1_{hex}$	0	1	0	0	0	0	0	1
1	invalid	→ Bit value	x	x	x	x	x	x	x	x
2 - 6	Same content as with master									

Example 2: timing relay

The master initiates the write command for timing relay T1 with the following values:

Switch function	Off-delayed
Time range	"M:S"
Setpoint time	10:30

T1 is to be assigned the time base "H:M" and the setpoint time 95 hours, 53 minutes. 95 hours = 3 days, 19 hours

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Command: T1	01_{hex}	1	0	0	0	0	0	0	1
1	Timing relay function, time base, Parameters menu	→ Bit value	1	0	0	1	0	0	0	1
2	Time value "--.xx" with time base "S"	→ Bit value	0	0	0	0	0	0	0	0
3	Time value "xx.--" with time base "S" or "--:xx" with time base "M:S"	25_{bcd}	0	0	0	0	0	0	0	0
4	Time value "xx.--" with time base "M:S" or "--:xx" with time base "H:M"	53_{bcd}	0	1	0	1	0	0	1	1
5	Time value "xx.--" with time base "H:M"	23_{bcd}	0	0	1	0	0	0	1	1
6	Hour value in days	03_{bcd}	0	0	0	0	0	0	1	1

The slave responds with the following values:

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Response: Write successful	$C1_{hex}$	1	1	0	0	0	0	0	1
1	invalid	→ Bit value	x	x	x	x	x	x	x	x
2 - 6	Same content as with master									

Read time switch (channel, ON time, OFF time)

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command[1)]										
	1 Channel A	2B	–	1/0	0	1	0	1	0	1	1
	1 Channel B	2C	–	1/0	0	1	0	1	1	0	0
	1 Channel C	2D	–	1/0	0	1	0	1	1	0	1
	1 Channel D	2E	–	1/0	0	1	0	1	1	1	0
	2 Channel A	2F	–	1/0	0	1	0	1	1	1	1
	2 Channel B	30	–	1/0	0	1	1	0	0	0	0
	2 Channel C	31	–	1/0	0	1	1	0	0	0	1
	2 Channel D	32	–	1/0	0	1	1	0	0	1	0
	3 Channel A	33	–	1/0	0	1	1	0	0	1	1
	3 Channel B	34	–	1/0	0	1	1	0	1	0	0
	3 Channel C	35	–	1/0	0	1	1	0	1	0	1
	3 Channel D	36	–	1/0	0	1	1	0	1	1	0
	4 Channel A	37	–	1/0	0	1	1	0	1	1	1
	4 Channel B	38	–	1/0	0	1	1	1	0	0	0
	4 Channel C	39	–	1/0	0	1	1	1	0	0	1
	4 Channel D	3 A	–	1/0	0	1	1	1	0	1	0
	Response[1)]										
	Read successful	–	C2/42	1/0	1	0	0	0	0	1	0
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	invalid	00	→ Bit value	x	x	x	x	x	x	x	x
2	Weekday, Parameters menu display	00	→ table 44								
3	Minute (switch point ON)	00	→ table 45								
4	Hour (switch point ON)	00	→ table 46								
5	Minute (switch point OFF)	00	→ table 47								
6	Hour (switch point OFF)	00	→ table 48								

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

Table 44: Byte 2: Weekday, starting, ending, Parameters menu

	Bit							
	7	6	5	4	3	2	1	0
ON day								
None set						0	0	0
Monday						0	0	1
Tuesday						0	1	0
Wednesday						0	1	1
Thursday						1	0	0
Friday						1	0	1
Saturday						1	1	0
Sunday						1	1	1
OFF day								
None set			0	0	0			
Monday			0	0	1			
Tuesday			0	1	0			
Wednesday			0	1	1			
Thursday			1	0	0			
Friday			1	0	1			
Saturday			1	1	0			
Sunday			1	1	1			
Switch Time								
ON > OFF		1						
ON < OFF		0						
Appears in the Parameters menu								
No	1							
yes	0							

Table 45: Byte 3: Minute (ON time)

Value (bcd)	Bit 7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
…	…	…	…	…	…	…	…	…
59	0	1	0	1	1	0	0	1

Table 46: Byte 4: Hour (ON time)

Value (bcd)	Bit 7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
…	…	…	…	…	…	…	…	…
23	0	0	1	0	0	0	1	1

Table 47: Byte 5: Minute (OFF time)

Value (bcd)	Bit 7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
…	…	…	…	…	…	…	…	…
59	0	1	0	1	1	0	0	1

Table 48: Byte 6: Hour (OFF time)

Value (bcd)	Bit 7	6	5	4	3	2	1	0
00	0	0	0	0	0	0	0	0
…	…	…	…	…	…	…	…	…
23	0	0	1	0	0	0	1	1

Example
The master initiates the command to read the values of channel "A" of ⏲4:

Byte	Meaning	Value (hex)	Bit							
			7	6	5	4	3	2	1	0
0	Command: ⏲4 Channel A	37	0	0	1	1	0	1	1	1
1 - 6		00								

The slave responds with the following values:

- Day: Monday (001) to Friday (101)
- ON: 19:00
- OFF: 06:30
- Switch time ON > OFF (1)
- Channel appears in the Parameters menu

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Response: Read successful	42	0	1	0	0	0	0	1	0
1	invalid		x	x	x	x	x	x	x	x
2	Weekday, Parameters menu display	69_{bcd}	0	1	1	0	1	0	0	1
3	Minute (switch point ON)	00_{bcd}	0	0	0	0	0	0	0	0
4	Hour (switch point ON)	19_{bcd}	0	0	0	1	1	0	0	1
5	Minute (switch point OFF)	30_{bcd}	0	0	1	1	0	0	0	0
6	Hour (switch point OFF)	06_{bcd}	0	0	0	0	0	1	1	0

Write time switch (channel, ON time, OFF time)

Telegram structure

Byte	Meaning	Value (hex), sent by		Bit							
		Master	Slave	7	6	5	4	3	2	1	0
0	Command[1)]										
	1 Channel A	12	–	1/0	0	0	1	0	0	1	0
	1 Channel B	13	–	1/0	0	0	1	0	0	1	1
	1 Channel C	14	–	1/0	0	0	1	0	1	0	0
	1 Channel D	15	–	1/0	0	0	1	0	1	0	1
	2 Channel A	16	–	1/0	0	0	1	0	1	1	0
	2 Channel B	17	–	1/0	0	0	1	0	1	1	1
	2 Channel C	18	–	1/0	0	0	1	1	0	0	0
	2 Channel D	19	–	1/0	0	0	1	1	0	0	1
	3 Channel A	1A	–	1/0	0	0	1	1	0	1	0
	3 Channel B	1B	–	1/0	0	0	1	1	0	1	1
	3 Channel C	1C	–	1/0	0	0	1	1	1	0	0
	3 Channel D	1D	–	1/0	0	0	1	1	1	0	1
	4 Channel A	1E	–	1/0	0	0	1	1	1	1	0
	4 Channel B	1F	–	1/0	0	0	1	1	1	1	1
	4 Channel C	20	–	1/0	0	1	0	0	0	0	0
	4 Channel D	21	–	1/0	0	1	0	0	0	0	1
	Response[1)]										
	Write successful	–	C1/41	1/0	1	0	0	0	0	0	1
	Command rejected	–	C0/40	1/0	1	0	0	0	0	0	0
1	Weekday, Parameters menu display	00	→ table 44								
2	Minute (switch point ON)	00	→ table 45								
3	Hour (switch point ON)	00	→ table 46								
4	Minute (switch point OFF)	00	→ table 47								
5	Hour (switch point OFF)	00	→ table 48								
6	not used										

1) Observe the byte 0 Bit 7 data exchange procedure, → page 59.

The values for minute and hour of the switch points are part of an "*.eas file". If these values are changed, the original "*.eas file" will no longer match the file in EASY6...

Remember this feature when uploading, downloading or comparing "easy" circuit diagrams with EASY-SOFT.

When downloading from the PC the latest version of the "*.eas" is overwritten.

The comparison shows that the circuit diagrams are not identical.

Example
The master initiates the command to write the following data to channel "C" 2:

- Day: Tuesday (010) to Saturday (110)
- ON: 10:00
- OFF: 17:30
- Switch point ON < OFF (0)
- Channel does not appear in the Parameters menu (1)

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Command: 2 Channel C	18_{hex}	0	0	0	1	1	0	0	0
1	Weekday, Parameters menu display	$B2_{hex}$	1	0	1	1	0	0	1	0
2	Minute (switch point ON)	00_{bcd}	0	0	0	0	0	0	0	0
3	Hour (switch point ON)	10_{bcd}	0	0	0	1	0	0	0	0
4	Minute (switch point OFF)	30_{bcd}	0	0	1	1	0	0	0	0
5	Hour (switch point OFF)	17_{bcd}	0	0	0	1	0	1	1	1
6	not used									

The slave responds with the following telegram:

Byte	Meaning	Value	Bit							
			7	6	5	4	3	2	1	0
0	Response: Write successful	41_{hex}	0	1	0	0	0	0	0	1
1 – 6		00								

8 Control Commands for easy700 (DPV0)

Data exchange procedure

The "Control commands 9 bytes" module allows extended data exchange of the easy700 on the PROFIBUS-DP communication bus. This allows you to transfer services from the following areas:

- „Read/write date and time" (page 104)
- „Read/write image data" (page 108) and
- „Read/write function block data" (page 131).

A data exchange procedure is required in order to ensure the safe exchange of data via PROFIBUS-DP from master to slave and vice versa.

Caution!

Whilst a control command is being executed, the input and output data will remain in the state before the control command was called. Only after the "Control commands" data exchange has been completed will the I/O data be refreshed.

Caution!
Only those values specified for the command code should be used.

Check the values that you write in order to avoid malfunctions.

Requirement:
The "Control commands 9 byte" module must have been selected.

The master initiates the data exchange of the control commands and the addressed slave responds.

During communication 9 data bytes (byte 0 = toggle byte, bytes 1 to 8 information bytes) are sent via PROFIBUS.

The basic telegram structure is shown in the following diagram.

Byte 0	bytes1	Byte 2	bytes3	bytes4	bytes5	bytes6	bytes7	Byte 8

Byte 0 – Toggle byte
Byte 0 is used to activate the sending of a control command with the toggle function.

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
$01_{hex}/81_{hex}$	0/1	0	0	0	0	0	0	1
	Toggle bit	Fix						

Procedure

- ▶ To send a command, bit 7 must be toggled, i.e. set either from 1 to 0 or from 0 to 1.
- ▶ Then poll the toggle bit for the coupling modules response until it has the same status as the toggle bit sent. This status indicates to the master that the response to the sent command is valid.
- ▶ Do not send a new command until you have received a response (changing of the toggle bit), otherwise the response of the previous command will be overwritten before it can be read.

In order to use input/output data and control commands simultaneously:

Only after the "Control commands" data exchange has been completed will the I/O data be refreshed.

All specified commands and parameters must be transferred in hexadecimal format.

The following tables show the different control commands possible. These essential control commands fall into three essential categories – real-time clock, image and function blocks.

Read/write date and time

→ Please also note the relevant description of the real-time clock provided in the easy700 manual (MN05013003Z-EN; previous description AWB2528-1508GB).

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command		
	Read	93	–
	Write	B3	–
	Response		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Len	05	05
3	Index	0 - 2[1)]	0 - 2[1)]
4 - 8	Data 1 – 4	depending on index, → table 49	

1) 0 = Time/date, → table 49
1 = Summer time, → table 50
2 = Winter time, → table 51

Table 49: Index 0 – date and time of real-time clock

Byte	Contents	Operand		Value (hex)
4	Data 1	Hour	0 up to 23	0x00 to 0x17h
5	Data 2	Minute	0 up to 59	0x00 to 0x3Bh
6	Data 3	Day	Day (1 to 28; 29, 30, 31 ; depending on month and year)	0x01 to 0x1Fh
7	Data 4	Month	1 up to 12	0x01 to 0x0Ch
8	Data 5	Year	0 to 99 (same as 2000-2099)	0x00 to 0x63h

Table 50: Index 1 – Summer time

Byte	Contents		Value (hex)
4	Data 1	Area	
		None	00
		Rule	01
		Automatic EU	02
		Automatic GB	03
		Automatic US	04
for "Area" = "Rule":			
5	Data 2	Summer time switching rule	→ table 52
6	Data 3		
7	Data 4		
8	Data 5		

Table 51: Index 2 – Winter time
(only valid if Area = "Rule" selected)

Byte	Contents		Value (hex)
4	Data 1	Area = Rule	01
5 – 8	Data 2 – 5	Winter time switching rule	→ table 52

Switching rule bit array

→ Please also read the detailed description in the easy700 manual (MN05013003Z-EN; previous description AWB2528-1508GB).

The following table shows the composition of the corresponding data bytes.

Table 52: Switching rule bit array

	Data 5	Data 5 / Data 4	Data 4	Data 4 / Data 3	Data 3	Data 2	Data 2	Data 2
Bit	**31 30 29 28**	**27 26 25 24 23 22**	**21 20 19 18 17**	**16 15 14 13**	**12 11 10 9 8**	**7 6**	**5 4 3**	**2 1 0**
	Difference	**Time of time change**		**Month**	**Day**	**Rule_2**	**Day**	**Rule_1**
	0: 00:30h	Minute: 0 to 59	Hour: 0 to 23	0 up to 11	0 up to 30	0: of	0: Su	0: am
	1: 1:00h					1: after the	1: Mo	1: on the first
	2: 1:30h					2: before the	2: Tu	2: on the second
	3: 2:00h						3: We	3: on the third
	4: 2:30h						4: Th	4: on the fourth
	5: 3:00h						5: Fr	5: on the last

Read/write image data

Please also observe the relevant description of possible image data provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

The current issue of the manual is available as a PDF file from the Internet:
http://www.eaton.com/moeller → **Support**

→ Search term: MN05013003Z-EN

The information provided in Section "General information on working with image data" on page 64 also applies to easy700.

Overview

Operands	Meaning	Read/ write	Type (hex)	Page
A1 - A16	„Analog value comparators/threshold comparators: A1 – A16“	Reading	8B	110
C1 - C16	„Counters: C1 – C16“	Reading	EE	111
D1 - D16	„Text function blocks: D1 – D16“	Reading	94	112
I1 - I16	„Local inputs: I1 – I16“	Reading	84	113
IA1 – IA4	„Local analog inputs: IA1 – IA4“	Reading	8C	115
M1 – M16, N1 – N16	„Markers: M1 – M16/N1 – N16“	Writing	86/87	117
M1 – M16, N1 – N16	„Markers: M1 – M16/N1 – N16“	Reading	86/87	119
O1 – O4	„Operating hours counters: O1 – O4“	Reading	EF	121
P1 - P4	„Local P buttons: P1 – P4“	Reading	8A	122
Q1 – Q8	„Local outputs: Q1 – Q8“	Reading	85	124
R1 – R16/ S1 – S8	„Inputs/outputs of EASY-LINK: R1 – R16/ S1 – S8“	Reading	88/89	125
T1 - T16	„Timing relays: T1 – T16“	Reading	ED	127
Y1 - Y4	„Year time switch: Y1 – Y8“	Reading	91	128
Z1 – Z3	„Master reset: Z1 – Z3“	Reading	93	129
H1 – H4	"7-day time switch": ⏲1 - ⏲8“	Reading	90	130

Analog value comparators/threshold comparators: A1 – A16

The following commands are used to read the logic state of the individual analog value comparators A1 to A16.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	8B	8B
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 53
6	Data 2 (Low Byte)	00	→ table 53
7 - 8	Data 3 – 4	00	00

1) Possible causes → page 150

Table 53: Byte 5 to 6: Data 1 to 2

Data 1	Bit	7	6	5	4	3	2	1	0
A1									0/1
A2								0/1	
…					…				
A8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
A9									0/1
A10								0/1	
…					…				
A16		0/1							

Counters: C1 – C16

The following commands are used to read the logic state of the individual counters C1 – C16.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	EE	EE
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 63
6	Data 2 (Low Byte)	00	→ table 63
7 - 8	Data 3 – 4	00	00

1) Possible causes → page 150

Table 54: Byte 5 to 6: Data 1 to 2

Data 1	Bit	7	6	5	4	3	2	1	0
C1									0/1
C2								0/1	
…					…				
C8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
C9									0/1
C10								0/1	
…					…				
C16		0/1							

Text function blocks: D1 – D16

The following commands are used to read the logic state of the individual text function blocks (D markers).

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	94	94
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 55
6	Data 2 (High Byte)	00	→ table 55
7 - 8	Data 3 – 4	00	00

1) Possible causes → page 150

Table 55: Byte 5 to 6: Data 1 to 2

Data 1	Bit	7	6	5	4	3	2	1	0
D1									0/1
D2								0/1	
…					…				
D8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
D9									0/1
D10								0/1	
…					…				
D16		0/1							

Local inputs: I1 – I16

This command string enables you to read the local inputs of the easy700 basic unit. The relevant input word is stored in Intel format.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	02	02
3	Part No	84	84
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 56
6	Data 2 (High Byte)	00	→ table 56
7 - 8	Data 3 – 4	00	00

1) Possible causes → page 150

Table 56: Byte 5 to 6: Data 1 to 2

Data 1	Bit	7	6	5	4	3	2	1	0
I1									0/1
I2								0/1	
…					…				
I8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
I9									0/1
I10								0/1	
…					…				
I16		0/1							

Local analog inputs: IA1 – IA4

The analog inputs on the easy700 basic unit (I7, I8, I11, I12) can be read directly via PROFIBUS-DP. The 16-bit value is transferred in Intel format (Low Byte first).

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	02	02
3	Part No	8C	8C
4	Index	00 - 03[2)]	00 - 03[2)]
5	Data 1 (Low Byte)	00	→ table 57
6	Data 2 (High Byte)	00	→ table 57
7 - 8	Data 3 – 4	00	00

1) Possible causes → page 150

2) 00 = Analog input I7
01 = Analog input I8
02 = Analog input I11
03 = Analog input I12

Example:
A voltage signal is present at analog input 1. The corresponding telegrams for reading the analog value are as follows:

Table 57: Example telegram for reading the value at the analog input "1"

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response: Read successful	–	C2
2	Len	02	02
3	Part No	8C	8C
4	Index	02[1)]	02[1)]
5	Data 1	00	4B
6	Data 2	00	03
7	Data 3	00	00
8	Data 4	00	00

1) 02 = Analog input I11

Byte 5 – Data 1 (Low Byte): $4B_{hex}$
Byte 6 – Data 2 (High Byte): 03_{hex}
→ corresponding 16-bit value: $034B_{hex} = 843$

The value 843 corresponds to the IO bit value of the analog converter. The following conversion is required for the actual analog value:

$$\frac{10\ V}{1023} \times \text{IO bit value} \quad => \quad \frac{10\ V}{1023} \times 843 = 8.24\ V$$

Markers: M1 – M16/N1 – N16

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Write	8C	–
	Response:		
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Len	01	01
3	Type[2)]		
	With M marker	86	86
	With N marker	87	87
4	Index[2]	00 – 0F	00 – 0F
5	Data 1 (Low Byte)[3)]	00/01	00/01
6 - 8	Data 2 – 4	00	00

1) Possible causes → page 150

2) There are 16 M markers and 16 N markers.
The markers are addressed by Type and Index:
Use Type to select the M or N marker.
Use Index to select the marker number.

3) The marker is set if a value other than zero is written to the data byte. The marker is reset accordingly if the value 0 is written to the Data 1 data byte.

Example:
Marker M13 is set.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Write	8C	–
	Response:		
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No		
	M marker	86	86
4	Index	0C	0C
5	Data 1	01	00
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Markers: M1 – M16/N1 – N16

Unlike the write operation, the marker read operation reads the entire marker area of a particular marker type (M or N) is read.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No		
	M marker	86	86
	N Marker	87	87
4	Index[2)]	00	00
5	Data 1 (Low Byte)	00	→ table 58
6	Data 2 (Low Byte)	00	→ table 58
7 – 8	Data 3 – 4	00	00

1) Possible causes → page 150

2) There are 16 M markers and 16 N markers.
The markers are addressed by Type and Index:
Use Type to select the M or N marker.
Use Index to select the marker number.

Table 58: Byte 5 to 6: Data 1 to 2

Data 1		Bit	7	6	5	4	3	2	1	0
M	**N**									
M1	N1									0/1
M2	N2								0/1	
…	…					…				
M8	N8		0/1							
Data 2		**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
M9	N9									0/1
M10	N10								0/1	
…	–					…				
M16	N16		0/1							

Example: The N markers are read:

Byte	Meaning	Value (hex), sent by	
		Master	**Slave**
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No		
	N Marker	87	87
4	Index	00	00
5	Data 1 (Low Byte)	00	04
6	Data 2 (Low Byte)	00	84
7 – 8	Data 3 – 4	00	00

1) Possible causes → page 150

The markers N3, N11 and N16 are set.

Operating hours counters: O1 – O4

The following commands are used to read the logic state of the operating hours counters O1 – O4.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	EF	EF
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 59
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Table 59: Byte 5: Data 1

Data 1	Bit 7	6	5	4	3	2	1	0
O1								0/1
O2							0/1	
O3						0/1		
O4					0/1			
…	…	…	…	…				

Local P buttons: P1 – P4

The local P buttons are the display cursor buttons of the easy700 basic device. You can scan the buttons in both RUN and STOP mode.

→ Ensure that the P buttons are also activated via the System menu (in the basic device).

Only one byte has to be transferred for the P buttons.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	8A	8A
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 60
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Table 60: Byte 5: Data 1

Data 1	Bit 7	6	5	4	3	2	1	0
P1								0/1
P2							0/1	
P3						0/1		
P4					0/1			
–				0				
–			0					
–		0						
–	0							

Example:
Data 1 = 2_{hex} → P3 is active.

Local outputs: Q1 – Q8

The local outputs can be read directly via the PROFIBUS-DP fieldbus.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	85	85
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 61
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Table 61: Byte 5: Data 1

Data 1	Bit 7	6	5	4	3	2	1	0
Q1								0/1
Q2							0/1	
…				…				
Q8		0/1						

Example:
Data 1 = 52_{hex} → Q2, Q5 and Q7 are active.

Inputs/outputs of EASY-LINK: R1 – R16/S1 – S8

This service allows you to read the local R and S data and the data of the NET stations (1 – 8) transferred via EASYLINK, again from the relevant easy700 image.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No		
	for R data	88	88
	for S data	89	89
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 62
6	Data 2 (Low Byte)	00	→ table 62
7 – 8	Data 3 – 4	00	00

1) Possible causes → page 150

Table 62: Byte 5 to 6: Data 1 to 2

Data 1		Bit	7	6	5	4	3	2	1	0
RW	**SW**									
R1	S1									0/1
R2	S2								0/1	
…	…					…				
R8	S8		0/1							
Data 2		**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
R9	–									0/1
R10	–								0/1	
…	–					…				
R16	–		0/1							

Timing relays: T1 – T16

The following commands are used to read the logic state of the individual timers T1 - T16.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	ED	ED
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 63
6	Data 2 (Low Byte)	00	→ table 63
7 – 8	Data 3 – 4	00	00

1) Possible causes → page 150

Table 63: Byte 5 to 6: Data 1 to 2

Data 1	Bit	7	6	5	4	3	2	1	0
T1									0/1
T2								0/1	
…					…				
T8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
T9									0/1
T10								0/1	
…					…				
T16		0/1							

Year time switch: Y1 – Y8

The following commands are used to read the logic state of the individual year time switches.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	91	91
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 64
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Table 64: Byte 5: Data 1

Data 1	Bit 7	6	5	4	3	2	1	0
HY1								0/1
HY2							0/1	
HY3						0/1		
HY4					0/1			
HY5				0				
HY6			0					
HY7		0						
HY8	0							

Example:
Data 1 = 1_{hex} → HY2 is active

Master reset: Z1 – Z3

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	93	93
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 65
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Table 65: Byte 5: Data 1

Data 1	Bit 7	6	5	4	3	2	1	0
Z1 for Q outputs								0/1
Z2 for M markers							0/1	
Z3 for outputs and markers						0/1		
…	0	0	0	0	0			

7-day time switch: 1 – 8

The following commands are used to read the logic state of the individual weekly timers.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command: Read	88	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0[1)]
2	Len	01	01
3	Part No	90	90
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 66
6 – 8	Data 2 – 4	00	00

1) Possible causes → page 150

Table 66: Byte 5: Data 1

Data 1	Bit 7	6	5	4	3	2	1	0
HW1								0/1
HW2							0/1	
HW3						0/1		
HW4					0/1			
HW5				0				
HW6			0					
HW7		0						
HW8	0							

Example:
Data 1 = 2_{hex} → 3 is active.

Read/write function block data

→ Please also observe the relevant description of the function blocks provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the EASY-SOFT Help.

General notes

Always note the following when working with function blocks:

- The relevant data is transferred in Intel format. In other words, the first byte is the low byte (Byte 5) and the last byte (byte 8) the high byte.
- The maximum data length is 4 bytes. All values must be transferred in hexadecimal format.

Overview

Operands	Meaning	Read/ write	Part No	Page
A1 - A16	„Analog value comparator/threshold comparator: A1 – A16“	Read/write	8D	132
C1 - C16	„Counter relays: C1 – C16“	Read/write	8F	135
O1 – O4	„Operating hours counters: O1 – O4“	Read/write	92	138
T1 - T16	„Timing relays: T1 – T16“	Read/write	8E	140
Y1 - Y8	„Year time switch: Y1 – Y8“	Read/write	A2	144
1 - 8	"7-day time switch: 1 - 8“	Read/write	A1	147

Analog value comparator/threshold comparator: A1 – A16

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command:		
	Read	89	–
	Write	8D	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Part No	8D	8D
3	Instance[2)]	00 – 0F	00 – 0F
4	Index	→ table 67	
5 – 8	Data 1 – 4	depending on index, → table 68	

1) Possible causes → page 150

2) easy provides 16 analog comparators A1 to A16 for use as required. These can be addressed using the instance (0 – F).

Table 67: Operand overview

Index (hex)	Operand		Read	Write
00	Parameters → table 68		×	
01	Control byte → table 69		×	
02	Comparison value 1	I1[2)]	×	c[1)]
03	Comparison value 2	I2[2)]	×	c[1)]
04	Gain factor for I1 (I1 = F1 × I1)	F1[2)]	×	c[1)]
05	Gain factor for I2 (I2 = F2 × I2)	F2[2)]	×	c[1)]
06	Offset for value I1 (I1 = OS + actual value at I1)	OS[2]	×	c[1)]
07	Switching hysteresis for value I2	HY[2]	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

2) In the data bytes Data 1 – Data 2 a 16-bit value is transferred. It must be ensured that the Low byte is kept in Data 1 (byte 5) and the High byte in Data 2 (Byte 8).
Example: $5327_{dec} = 14CF_{hex}$ → Data 1 = 0xCF, Data 2 = 0x14

Table 68: Index 00 – Parameters

Meaning	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Appears in the Parameters menu																	
Yes/no																	0/1
Compare																	
FB not used														0	0	0	
EQ (=)														0	0	1	
GE (≧)														0	1	0	
LE (≦)														0	1	1	
GT (>)														1	0	0	
LT (<)														1	0	1	
Use as constant and therefore can be written to																	
I1= Constant													0/1				
F1= Constant												0/1					
I2= Constant											0/1						
F2 = Constant										0/1							
OS = Constant									0/1								
HY = Constant								0/1									
Not used		0	0	0	0	0	0										

Example:
Data 1 (Byte 5) = 0xA3, Data 2 (Byte 6) = 0x03
→ Resulting 16-bit value = $03A3_{hex}$

Meaning: HY, OS, F2, F1 are assigned a constant; I1, I2 are assigned to a variable such as I7, I8 C2...etc., appears in the Parameters menu;

The output of the analog value comparator is active for as long as the comparison (I1 × F1) + OS = (I2 × F2) + HY is fulfilled.

Table 69: Index 01 – Control byte

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q1[1)]

1) Status 1 if comparison condition is fulfilled.

Counter relays: C1 – C16

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command:		
	Read	89	–
	Write	8D	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Part No	8F	8F
3	Instance[2)]	00 – 0F	00 – 0F
4	Index	→ table 70	
5 - 8	Data 1 – 4	depending on index, → table 71	

1) Possible causes → page 150

2) easy provides 16 counters C1 to C16 for use as required. These can be addressed using the instance (0 – F).

Table 70: Operand overview

Index (hex)	Operand		Read	Write
00	Parameters → table 71		×	
01	Control byte → table 72		×	
02	Actual value	S1[2)]	×	c[1)]
03	Counter setpoint 2	S2[2)]	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

2) In the data bytes Data 1 – Data 2 a 16-bit value is transferred. Be aware that the Low byte is kept in Data 1 and the High byte in Data 2.

Table 71: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Yes/no									0/1
Counter mode									
FB not used							0	0	
Up/down counter (N)							0	1	
High-speed up/down counter (H)							1	0	
Frequency counter (F)							1	1	
Use as constant and therefore can be written to									
Counter setpoint S1						0/1			
Unused bits		–	–	–	–				

Example:
Data 1 (Byte 5) = 0x07

Meaning:
The values appear in the Parameters menu. The counter is used in the mode of the frequency counter. The counter setpoint S1 is not assigned to a constant and cannot therefore be written to.

Table 72: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	C[4)]	RE[3)]	D[2)]	Q1[1)]

1) Contact type
2) Count direction: 0 = up counting,
   1 = down counting
3) Reset, the timing relay is reset (Reset coil)
4) Count coil, counts on every rising edge

Example:
the actual value of C3 is to be read:

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Command: Read	89	–
	Response: Read successful	–	C2
1	Part No	8F	8F
2	Instance	02	02
3	Index	02	02
4	Data1	00	12
5	Data 2	00	03
6	Data 3	00	00
7	Data 4	00	00

Explanation:

Data 1 = 12
Data 2 = 03
→ resulting 16-bit value = $0312_{hex} = 786_{dec}$

Counter status = 786

Operating hours counters: O1 – O4

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command:		
	Read	89	–
	Write	8D	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Part No	92	92
3	Instance[2)]	00 - 03	00 - 03
4	Index	→ table 73	
5 - 8	Data 1 – 4	depending on index, → table 74	

1) Possible causes → page 150

2) easy provides 4 operating hours counters O1 to O4. These can be addressed via the instance (0 - 3)

Table 73: Operand overview

Index (hex)	Operand		Read	Write
00	Parameters → table 74		×	
01	Control byte → table 75		×	
02	Actual value	S1[2)]	×	c[1)]
03	Counter setpoint 2	S2[2)]	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

2) In the data bytes Data 1 – Data 4 a 32-bit value is transferred. Be aware that the Low byte is kept in Data 1 and the High byte in Data 4.

Table 74: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Yes/no									0/1
Use in the program									
Setpoint S1								0/1	
Unused bits		–	–	–	–	–	–		

Example:
Data 1 (Byte 5) = 0x01

Meaning:
The values appear in the Parameters menu.

Table 75: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	–	RE[3]	EN[2]	Q1[1]

1) Contact type
2) Enable, the timing relay is started (Trigger coil)
3) Reset, the timing relay is reset (Reset coil)

Example:
Index 02/03

Transferred values: Data 1 0x21
Data 2 0x23
Data 3 0x40
Data 4 0x00

Resulting value: $00402321_{hex} = 4203297_{dec}$

Timing relays: T1 – T16

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command:		
	Read	89	–
	Write	8D	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Part No	8E	8E
3	Instance[2)]	00 – 0F	00 – 0F
4	Index	→ table 76	
5 – 8	Data 1 – 4	depending on index, → table 77	

1) Possible causes → page 150

2) easy provides 16 timing relays T1 to T16 for use as required. These can be addressed using the instance (0 – F).

Table 76: Operand overview

Index (hex)	Operand		Read	Write
00	Parameters → table 77		×	
01	Control byte → table 78		×	
02	Actual value 1	T	×	c[1)]
03	Time setpoint 1	S1[2)]	×	c[1)]
04	Time setpoint 2	S2[2)]	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

2) In the data bytes Data 1 – Data 2 a 16-bit value is transferred. Be aware that the Low byte is kept in Data 1 and the High byte in Data 2.

Table 77: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Yes/no									0/1
Timer mode									
On-delayed						0	0	0	
Off-delayed						0	0	1	
On-delayed with random setpoint						0	1	0	
Off-delayed with random setpoint						0	1	1	
On and off delayed (two time setpoints)						1	0	0	
On and off delayed each with random setpoint (two time setpoints)						1	0	1	
Pulse transmitter						1	1	0	
Flashing relay (two time setpoints)						1	1	1	
Time base									
FB not used				0	0				
Millisecond: S				0	1				
Second: M:S				1	0				
Minute: H:M				1	1				
Use as constant and therefore can be written to									
Time setpoint S1			0/1						
Time setpoint S2		0/1							

Example:
Data 1 (Byte 5) = 0xAC

Meaning:
The values appear in the Parameters menu. The timer is used in the pulse generator mode with the "Second" time base. The time setpoint S1 is assigned a constant and the time setpoint S2 is assigned a variable such as I7, I8 C2...etc.

Table 78: Index 01 – Control byte

	Bit	7	6	5	4	3	2	1	0
FB input/output Data 3		–	–	–	–	ST[4]	RE[3]	EN[2]	Q1[1]

1) Contact type
2) Enable, the timing relay is started (Trigger coil)
3) Reset, the timing relay is reset (Reset coil)
4) Stop, the timing relay is stopped (Stop coil)

Example:
The time setpoint 1 is to be read:

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Command: Read	89	–
	Response: Read successful	–	C2
1	Part No	8E	8E
2	Instance	00	00
3	Index	03	03
4	Data1	00	4C
5	Data 2	00	06
6	Data 3	00	00
7	Data 4	00	00

Explanation:

Data 1 = 4C
Data 2 = 06
→ resulting 16-bit value = $064C_{hex} = 1612_{dec}$

Meaning depending on set time base:

Millisecond	S	16120 ms	16.12 s
Second	m:s	1620 s	26:52 Minutes
Minute	H:M	1612 min	67:04 Hours

Year time switch: Y1 – Y8

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command:		
	Read	89	–
	Write	8D	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Part No	A2	A2
3	Instance[2)]	00 - 07	00 - 07
4	Index	→ table 79	
5 – 8	Data 1 – 4	depending on index, → table 80	

1) Possible causes → page 150

2) easy provides 8 year time switches Y1 to Y8 for use as required. These can be addressed using the instance (0 – 7).

Table 79: Operand overview

Index (hex)	Operand	Read	Write
00	Parameters → table 80	×	
01	Control byte → table 81	×	
	Channel A	×	c[1)]
11	ON time	×	c[1)]
12	OFF time	×	c[1)]
	Channel B	×	c[1)]
21	ON time	×	c[1)]
22	OFF time	×	c[1)]
	Channel C	×	c[1)]
31	ON time	×	c[1)]
32	OFF time	×	c[1)]
	Channel D	×	c[1)]
41	ON time	×	c[1)]
42	OFF time	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

Table 80: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Channel A									0/1
Channel B								0/1	
Channel C							0/1		
Channel D						0/1			
Unused bits		–	–	–	–				

Example:
Data 1 (Byte 5) = 0x03 → The values of the year time switch of channel A and B appear in the Parameters menu.

Table 81: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	–	–	–	Q1[1)]

1) Status 1, if the count condition is fulfilled.

Channel A, Index 11/12

Index 0x11 channel A ON time
Index 0x12 channel A OFF time
Data 1 (Byte 5) – Day
Data 2 (Byte 6) – Month
Data 3 (Byte 7) – Year

Example:
The year time switch channel A is required to activate on 21.04.2004.

Index = 0x11
Data 1 = 0x15
Data 2 = 0x04
Data 3 = 0x04

The year time switch channel B is required to switch off on 05.11.2012.

Index = 0x22
Data 1 = 0x05
Data 2 = 0x0B
Data 3 = 0x0C

7-day time switch: 1 - 8

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 102	
1	Command:		
	Read	89	–
	Write	8D	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0[1)]
2	Part No	A1	A1
3	Instance[2)]	00 - 07	00 - 07
4	Index	→ table 82	→ table 82
5 – 8	Data 1 – 4	depending on index, → table 83	

1) Possible causes → page 150

2) easy provides 8 seven-day time switches 1 to 8 use as required. These can be addressed using the instance (0 – 7).

Table 82: Operand overview

Index (hex)	Operand		Read	Write
00	Parameters → table 83		×	
01	Control byte → table 84		×	
11	Channel A	Day on/off	×	c[1)]
12		On time	×	c[1)]
13		Off time	×	c[1)]
21	Channel B	Day on/off	×	c[1)]
22		On time	×	c[1)]
23		Off time	×	c[1)]
31	Channel C	Day on/off	×	c[1)]
32		On time	×	c[1)]
33		Off time	×	c[1)]
41	Channel D	Day on/off	×	c[1)]
42		On time	×	c[1)]
43		Off time	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

2) In the data bytes Data 1 – Data 4 a 16-bit value is transferred. Be aware that the Low byte is kept in Data 1 and the High byte in Data 2.

Table 83: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Channel A									0/1
Channel B								0/1	
Channel C							0/1		
Channel D						0/1			
Unused bits		–	–	–	–				

Example:
Data 1 (Byte 5) = 0x03

Significance:
The values for the weekly timer WH... of channels A and B appear in the parameter menu.

Table 84: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	–	–	–	Q1[1)]

1) Status 1, if the count condition is fulfilled.

Channel A, Index 11/12/13
Index 0x11 channel A Weekday on/off
Data 1 (Byte 5) – Weekday on
Data 2 (Byte 6) – Weekday off
0x01 = Sunday ... 0x07 = Saturday

The 16-bit value equals 0x00 if the channel is not used.

Index 0x12 – On time (2 Byte)
Index 0x13 – Off time (2 Byte)
Data 1 (Byte 5) – Hour
Data 2 (Byte 6) – Minute

Example: On time at 13:43 p.m.
Data 1 = 0x0D
Data 2 = 0x2B

Analysis – error codes via easyLink

The easy700 basic unit will return a defined error code in the event of an incorrectly selected operating mode or an invalid telegram. The error code transferred has the following structure:

Telegram structure

Byte	Meaning	Slave transmits (value hex)
0	Toggle byte	→ page 102
1	Response	
	Command rejected	C0
2	Part No	00
3	Instance	00
4	Index	00
5	Failure code	→ table 85

Table 85: Error codes

Failure code	Description
0x01	Unknown telegram transmitted.
0x02	Unknown object transmitted.
0x03	Unknown command transmitted.
0x04	Invalid instance transmitted.
0x05	Invalid parameter set transmitted.
0x06	An attempt was made to write to a variable that is not a constant.
0x0C	The device is in an invalid device mode. STOP → RUN or RUN → STOP
0x0D	Invalid display access. Exit the menu level so that the status display is showing in the display. The clock cannot be written to.
0xF0	Attempt made to control an unknown parameter.
0xF1	Impermissible value

9 Control Commands for easy800/MFD (DPV0)

Data exchange procedure

The Control commands 9 bytes module allows extended data exchange of the easy800 and the MFD-Titan on the PROFIBUS-DP communication bus. This allows you to transfer services from the following areas:

- „Read/write date and time“ (page 156)
- „Read/write image data“ (page 160) and
- „Read/write function block data“ (page 181).

A data exchange procedure is required in order to ensure the safe exchange of data via PROFIBUS-DP from master to slave and vice versa.

Caution!

Whilst a control command is being executed, the input and output data will remain in the state before the control command was called. Only after the "Control commands" data exchange has been completed will the I/O data be refreshed.

Caution!
Only those values specified for the command code should be used.

Check the values that you write in order to avoid malfunctions.

Requirement:
The "Control commands 9 byte" module must have been selected.

The master initiates the data exchange of the control commands and the addressed slave responds.

During communication 9 data bytes (byte 0 = toggle byte, bytes 1 to 8 information bytes) are sent via PROFIBUS.

The basic telegram structure is shown in the following diagram.

Byte 0	bytes1	Byte 2	bytes3	bytes4	bytes5	bytes6	bytes7	Byte 8

Byte 0 – Toggle byte

Byte 0 is used to activate the sending of a control command with the toggle function.

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
$01_{hex}/81_{hex}$	0/1	0	0	0	0	0	0	1
	Toggle bit	Fix						

Procedure

- ▶ To send a command, bit 7 must be toggled, i.e. set either from 1 to 0 or from 0 to 1.
- ▶ Then poll the toggle bit for the coupling modules response until it has the same status as the toggle bit sent. This status indicates to the master that the response to the sent command is valid.
- ▶ Do not send a new command until you have received a response (changing of the toggle bit), otherwise the response of the previous command will be overwritten before it can be read.

→ In order to use input/output data and control commands simultaneously:

Only after the "Control commands" data exchange has been completed will the I/O data be refreshed.

All specified commands and parameters must be transferred in hexadecimal format.

The following tables show the different control commands possible. These essential control commands fall into three essential categories – real-time clock, image and function blocks.

Version history

The following table provides an overview of modifications and new features of the different easy800 device versions:

Effect on easy-Link	easy800, device version			
	From 02	From 04	From 05	From 07
Support for complete PDO access				
R data writable	✓	✓	✓	✓
j	✓	✓	✓	✓
Function blocks				
Function Blocks	–	Read		
	–	–	–	DG, JC, MX, PO, SP, SR, TB
Image data				
Read	–	IW, IA, ID, QW, QA, P, RW, SW, M, MB, MW, MD		
Write	–	Rule option for winter/ summer (DST) time change	M, MB, MW, MD	
Clock functions	–	✓	✓	✓
Rule option for winter/summer (DST) time change	–	–	✓	✓

Read/write date and time

→ Please also note the relevant description of the real-time clock provided in the easy800 manual.

The latest edition of the manual is available as a PDF file from the Internet at: http://www.eaton.com/moeller → **Support** → Search Term: MN04902001 Z-EN

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command		
	Read	93	–
	Write	B3	–
	Response		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Len	05	05
3	Index	00	00
4 – 8	Data 1 – 5		
	Read operation	00	→ table 86
	For write operation	→ table 86	00

Table 86: Byte 4 – 8: Data 1 – 5

Byte	Contents		Value (hex)
4	Data 1	Hour (0 to 23)	00 - 17
5	Data 2	Minute (0 to 59)	00 – 3B
6	Data 3	Day (1 to 28; 29, 30, 31; depending on month and year)	01 – 1F
7	Data 4	Month (1 to 12)	01 – 0C
8	Data 5	Year (0 – 99, same as 2000 – 2099)	00 - 63

Winter/summer time, DST

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command		
	Read	93	–
	Write	B3	–
	Response		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Len	05	05
3	Index	01	01
4 – 8	Data 1 – 5		
	Read operation	00	→ table 87
	For write operation	→ table 87	00

Table 87: Byte 4 – 8: Data 1 – 5

Byte	Contents		Value (hex)
4	Data 1	Area	
		None	00
		Manual	01
		Automatic EU	02
		Automatic GB	03
		Automatic US	04
5	Data 2[1)]	Set summer time day (1 to 28, 29, 30, 31 depending on month and year)	00 – 3B
6	Data 3[1)]	Set Summer time month (1 to 12)	01 – 1F
7	Data 4[1)]	Set winter time day (1 to 28, 29, 30, 31 depending on month and year)	01 – 0C
8	Data 5[1)]	Set winter time month (1 to 12)	00 - 63

1) The additional parameters Data 2 to Data 5 for automatic DST change are only relevant if you have set the "Manual" parameter for Data 1.

Example
The real-time clock of the easy800 is required to be set on Friday 23.05.2003, 14:36 pm.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	81	80
1	Command: Write	B3	–
	Response: Write successful	–	C1
2	Len	05	05
3	Index	00	00
4	Data 1	0E	00
5	Data 2	24	00
6	Data 3	17	00
7	Data 4	05	00
8	Data 5	03	00

All values must be transferred as hexadecimal values.

Read/write image data

Please also observe the relevant description of possible image data provided in the easy800 manual or in the EASY-SOFT Help.

The current issue of the manual is available as a PDF file from the Internet: http://www.eaton.com/moeller → **Support** → Search Term: MN04902001Z-EN

The information provided in Section "General information on working with image data" on page 64 also applies to easy800.

Overview

Operands	Meaning	Read/ write	Command	Page
IW0	„Read local inputs IW0"	Reading	01	161
IW1 – IW8	„Read inputs of the stations IW1 to IW8"	Reading	01	163
IA1 – IA4	„Read local analog inputs IA1 to IA4"	Reading	02	164
ID1 – ID16	„Read local diagnostics ID1 to ID16"	Reading	03	166
QW0, QW1 – QW8	„Read and write local QW0 outputs/ outputs of the stations QW1 to QW8"	Read/write	04	168
QA1	„Read and write local analog output QA1"	Read/write	05	170
P1 - P4	„Read local P buttons"	Reading	06	171
R1 - R16 S1 - S8	„Read RW.. inputs/SW.. outputs from EasyLink"	Reading	07/09	173
RN1 – RN32 SN1 – SN32	„Read receive data network RN1…RN32/ send data network SN1…SN32"	Reading	08/0A	175
M…	„Read and write markers"	Read/write	0B – 0E	177

Read local inputs IW0

This command string enables you to read the local inputs of the easy800/MFD. The relevant input word is stored in Intel format.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	02	02
3	Part No	01	01
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 88
6	Data 2 (High Byte)	00	→ table 88
7 – 8	Data 3 – 4	00	00

Table 88: Byte 5 to 6: Data 1 to 2

Data 1	Bit	7	6	5	4	3	2	1	0
I1									0/1
I2								0/1	
…					…				
I8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
I9									0/1
I10								0/1	
…					…				
I16		0/1							

Example: Read local inputs IW0

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	81	80
1	Command: Read	91	–
	Response: Read successful	–	C2
2	Len	02	02
3	Part No	01	01
4	Index	00	00
5	Data 1	00	C4
6	Data 2	00	02
7	Data 3	00	00
8	Data 4	00	00

→ All values must be transferred as hexadecimal values.

The values Data 1 = C4 and Data 2 = 02 indicate that the inputs I8, I7, I3 and I10 have been set to 1.

Read inputs of the stations IW1 to IW8

The easy800 and MFD devices can be remotely expanded very simply using the EASYNET. The service offered here makes it possible to implement read access to the inputs of individual NET stations.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	02	02
3	Part No	01	01
4	Index	01 - 08[1)]	01 - 08[1)]
5	Data 1 (Low Byte)	00	→ table 88 on page 161.
6	Data 2 (High Byte)	00	
7 – 8	Data 3 – 4	00	00

1) Corresponds to address of network station

Read local analog inputs IA1 to IA4

The analog inputs on the easy800 and MFD basic units can be read directly via PROFIBUS-DP. The 16-bit value is transferred in Intel format (Low Byte first).

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	02	02
3	Part No	02	02
4	Index	01 - 04[1)]	01 - 04[1)]
5	Data 1 (Low Byte)	00	See example
6	Data 2 (High Byte)	00	See example
7 – 8	Data 3 – 4	00	00

1) 01 = Analog input I7
02 = Analog input I8
03 = Analog input I11
04 = Analog input I12

Example

A voltage signal is present at analog input 1. The appropriate telegrams for reading the analog value are as follows:

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	81	80
1	Command: Read	91	–
	Response: Read successful	–	C2
2	Len	02	02
3	Part No	02	02
4	Index	01[1)]	01[1)]
5	Data 1	00	D9
6	Data 2	00	02
7	Data 3	00	00
8	Data 4	00	00

1) 01 = Analog input 1

Byte 5 – Data 1 (Low Byte): $D9_{hex}$

Byte 6 – Data 2 (High Byte): 02_{hex}

→ corresponding 16-bit value: $02D9_{hex}$ = 729 (7.29 V)

Read local diagnostics ID1 to ID16

The local diagnostics (ID1 – ID8) bytes indicate the status of the individual NET stations. The connection to the remote station (only MFD) is indicated via ID9.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	02	02
3	Part No	03	03
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 89
6	Data 2 (High Byte)	00	→ table 89
7 – 8	Data 3 – 4	00	00

Table 89: Byte 5 to 6: Data 1 to 2

Data 1	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
ID1									0/1
ID2								0/1	
…					…				
ID8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
ID9									0/1
–								1	
…					…				
–		1							

0/1= active/inactive NET station, –= not assigned

Example

Data 1 = F8, Data 2 = FF → In the easy-NET network, the three stations are present with the NET IDs 1, 2, 3.

Read and write local QW0 outputs/outputs of the stations QW1 to QW8

The local outputs can be read and written directly via PROFIBUS-DP. However, the outputs are only switched externally if the device is in Run mode and the addressed output is not being used in the circuit diagram.
→ section "Read/write image data" on page 160.

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command		
	Read	91	–
	Write	B1	–
	Response		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Len	02	02
3	Part No	04	04
4	Index[1)]	00/01 - 08	00/01 - 08
5	Data 1		
	Read operation	00	→ table 89
	For write operation	→ table 90	00
6 – 8	Data 2 – 4	00	00

1) 00 = Local output
01 – 08 = Outputs of network stations 1 – 8

Table 90: Byte5: Data

Data 1	Bit 7	6	5	4	3	2	1	0
Q1								0/1
Q2							0/1	
Q3						0/1		
Q4					0/1			
Q5				0				
Q6			0					
Q7		0						
Q8	0							

Read and write local analog output QA1

The commands provided can be used to access the local analog output of the easy800 or MFD basic unit. When writing to the analog output, however, the value will only be output externally if the device concerned is in RUN mode and the image concerned has not been overwritten by the actual program. → section "Read/write image data" on page 160.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command		
	Read	91	–
	Write	B1	–
	Response		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Len	02	02
3	Part No	05	05
4	Index	00	00
5 – 6	Data 1 – 2		
	Read operation	00	See example
	For write operation	See example	00
7 - 8	Data 3 – 4	00	00

Example

The analog output is to output a value of approx. 5 V.

500 = $01F4_{hex}$ Byte 5 – Data 1 (LowByte) : $F4_{hex}$
Byte 6 – Data 2 (HighByte): 01_{hex}

Read local P buttons

The local P buttons are the display cursor buttons of the easy800/MFD basic unit. You can scan the buttons in both Run and Stop mode.

→ Ensure that the P buttons are also activated via the SYSTEM menu (in the basic unit).

Only one byte has to be transferred for the P buttons.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	02	02
3	Part No	06	06
4	Index	00	00
5	Data 1 (Low Byte)	00	→ table 91
6 – 8	Data 2 – 4	00	00

Table 91: Byte 5: Data

Data 1	Bit 7	6	5	4	3	2	1	0
P1								0/1
P2							0/1	
P3						0/1		
P4					0/1			
–				0				
–			0					
–		0						
–	0							

Read RW.. inputs/SW.. outputs from EasyLink

This service allows you to read the local R and S data and the data of the NET stations (1 – 8) transferred via EASYLINK, again from the relevant easy800/MFD image.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	02	02
3	Part No	For RW: 07	For RW: 07
		For SW: 09	For SW: 09
4	Index	00/01 - 08[1)]	00/01 - 08[1)]
5	Data 1 (Low Byte)	00	→ table 92
6	Data 2 (High Byte)	00	→ table 92
7 – 8	Data 3 – 4	00	00

1) 00 = Local input/output
01 – 08 = Address of network station (NET-ID 1 – 8)

Table 92: Byte 5 to 6: Data 1 to 2

Data 1		Bit	7	6	5	4	3	2	1	0
RW	**SW**									
R1	S1									0/1
R2	S2								0/1	
R3	S3							0/1		
R4	S4						0/1			
R5	S5					0/1				
R6	S6				0/1					
R7	S7			0/1						
R8	S8		0/1							
Data 2		**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
R9	–									0/1
R10	–								0/1	
R11	–							0/1		
R12	–						0/1			
R13	–					0/1				
R14	–				0/1					
R15	–			0/1						
R16	–		0/1							

Read receive data network RN1…RN32/send data network SN1…SN32

EASYNET allows a point-to-point connection to be implemented between the individual NET stations. The RN and SN data is used for the data exchange (see the easy800 manual).

→ The RN SN data of the local device (Index = 0) to which the EASY204-DP is fitted cannot be scanned. In this case the command would be denied with the $0C_{hex}$ signal.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	91	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Len	04	04
3	Part No	For RN1 – RN32: 08	
		For SN1 – SN32: 0A	
4	Index	01 - 08[1)]	01 - 08[1)]
5 – 8	Data 1 – 4	00	→ table 93

1) Corresponds to NET-ID

Table 93: Byte 5 to 8: Data 1 to 4

Data 1	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
RN1 SN1					…				0/1
…								0/1	
RN8 SN8		0/1							
Data 2	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
RN9 SN9									0/1
…					…				
RN16 SN16		0/1							
Data 3	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
RN17 SN17									0/1
…					…				
RN24 SN24		0/1							
Data 4	**Bit**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
RN25 SN25									0/1
…					…				
RN32 SN32		0/1							

Read and write markers

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command		
	Read	91	–
	Write	B1	–
	Response		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Len	→ table 94	→ table 94
3	Part No		
4	Index		
5 – 8	Data 1 – 4		
	Read operation	00	→ „Example 1" on page 179
	For write operation	→ „Example 2" on page 180	00

Table 94: Byte 2 – 4: Len, Type, Index

Operand			Len	Part No	Index
Bit Marker	M1 …	M96	01_{hex}	$0B_{hex}$	01 to 60_{hex}
Marker Byte	MB1 …	MB96	01_{hex}	$0C_{hex}$	01 to 60_{hex}
Marker word	MW1 …	MW96	02_{hex}	$0D_{hex}$	01 to 60_{hex}
Marker double word	MD1 …	MD96	04_{hex}	$0E_{hex}$	01 to 60_{hex}

If required, refer to the more detailed description of the marker allocation in the easy800 manual. Only a small extract of this manual is shown at this point in order to illustrate the allocation principle.

Attention!
The function blocks and DW markers (32-bit values) of easy800/MFD operate with signed values.

Applies to MD, MW, MB, M	Left = Most significant bit, byte, word			Right = Least significant bit, byte, word
32 Bit	MD1			
16 bits	MW2		MW1	
8 Bit	MB4	MB3	MB2	MB1
1-bit	M32 to M25	M24 to M17	M16 to M9	M8 to M1
32 Bit	MD2			
16 bits	MW4		MW3	
8 Bit	MB8	MB7	MB6	MB5
1-bit	M64 to M57	M56 to M49	M48 to M41	M40 to M33

The relevant marker values are transferred in Intel format. In other words, the first byte is the low byte (Byte 5) and the last byte the high byte.

Example 1
Read marker bit M62

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	81	80
1	Command: Read	91	–
	Response: Read successful	–	C2
2	Len	01	01
3	Part No	0B	0B
4	Index	3E	3E
5	Data 1	00	01
6	Data 2	00	00
7	Data 3	00	00
8	Data 4	00	00

Result: Data 1 = 01_{hex} → M62 was set

Example 2
Write marker word MW32 with 823

$823_{dec} = 337_{hex} \rightarrow$ Data 1 = 37_{hex}, Data 2 = 03_{hex}

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	81	80
1	Command: Write	B1	–
	Response: Write successful	–	C1
2	Len	02	02
3	Part No	0D	0D
4	Index	20	20
5	Data 1	37	00
6	Data 2	03	00
7	Data 3	00	00
8	Data 4	00	00

Read/write function block data

Please also note the relevant description of the function blocks provided in the easy800 manual.

The current issue of the manual is available as a PDF file from the Internet: http://www.eaton.com/moeller → **Support** → Search Term: MN04902001Z-EN

General notes

Always note the following when working with function blocks:

- The relevant data is transferred in Intel format. In other words, the first byte is the low byte (Byte 5) and the last byte (byte 8) the high byte.
- The maximum data length is 4 bytes. All values must be transferred in hexadecimal format.
- All 32-bit values are treated as signed values. When transferring 32-bit values, ensure that the appropriate value range is suitable for long integers, i.e. signed.
  32-bit value: –2147483648 .. 0 .. +2147483647

Overview

Operands	Meaning	Read/write	Type (hex)	Page
A01 - A32	„Analog value comparators A01…A32"	Read/write	11	184
AR01 – AR32	„Arithmetic function blocks AR01…AR32"	Read/write	12	186
BC01 – BC32	„Block compare function blocks BC01…BC32"	Read/write	25	188
BT01 – BT32	„Block transfer function blocks BT01…BT32"	Read/write	26	190
BV01 – BV32	„Booelan operation BV01…BV32"	Read/write	13	192
C01 - C32	„Counters C01…C32"	Read/write	14	194
CF01 – CF04	„Frequency counters CF01…CF04"	Read/write	15	196
CH01 – CH04	„High-speed counters CH01…CH04"	Read/write	16	198
CI01 – CI02	„Incremental encoder counters CI01…CI02"	Read/write	17	200
CP01 – CP32	„Comparators CP01…CP32"	Read/write	18	202
D01 - D32	„Text output function blocks D01…D32"	Read/write	19	204
DB01 – DB32	„Data function blocks DB01…DB32"	Read/write	1A	207
DC01 – DC32	„PID controllers DC01…DC32"	Read/write	27	209
DG01 - DG16	„DG01…DG16 diagnostics"	Read/write	39	212
GT01 – GT32	„Signal smoothing filters FT01…FT32"	Read/write	28	214
HW01 – HW32	„Receipt of network data GT01…GT32"	Reading	1B	216
HY01 – HY32	„Comparator CP01…CP32"	Reading	1C	218
LS01 – LS32	„Year time switch HY01…HY32"	Reading	1D	221
MR01 – MR32	„Conditional jump JC01…JC32"	Reading	2F	224
NC01 – NC32	„Receive network data function blocks GT01…GT32"	Read/write	29	226
MR01 - MR32	„Master reset MR01…MR32"	Reading	0F	228
PT01 – PT32	„Data Multiplexer MX01…MX32"	Read/write	31	230
NC01 - NC32	„Numerical Converter NC01…NC32"	Read/write	2A	232

Operands	Meaning	Read/write	Type (hex)	Page
OT01 - OT04	„Operating hours counters OT01…OT04“	Read/write	1E	234
PO01 - PO04	„Pulse width modulation: PW01…PW02“	Read/write	32	236
T01 – T32	„Value scaling function blocks LS01…LS32“	Reading	1F	239
PW01 - PW02	„Pulse width modulation PW01…PW02“	Read/write	2B	241
SC01	„Synchronize clock SC01“	Reading	20	243
SP01 - SP32	„Serial output SP01…SP32“	Reading	35	244
SR01 - SR32	„Send network data function blocks PT01…PT32“	Read/write	33	246
ST01	„Set cycle time ST01“	Read/write	2C	248
T01 - T32	„Timing relays T01…T32“	Read/write	21	250
TB01 - TB32	„Timing relays T01…T32“	Read/write	32	253
VC01 - VC32	„Value limitation VC01…VC32“	Read/write	2D	255

Analog value comparators A01…A32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	11	11
3	Instance	01 - 20	01 - 20
4	Index	→ table 95	→ table 95
5 – 8	Data 1 – 4	00	depending on index, → table 96, 97

Table 95: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 96		×	
01	Mode, → table 97		×	
02	Comparison value 1	I1	×	c[1)]
03	Gain factor for I1 (I1 = F1 × Value)	F1	×	c[1)]
04	Comparison value 2	I2	×	c[1)]
05	Gain factor for I2 (I2 = F2 × Value)	F2	×	c[1)]
06	Offset for the value I1	OS	×	c[1)]
07	Switching hysteresis for value I2 (the value of HY is for both positive and negative hysteresis.)	HY	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 7 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 96: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	CY[1)]	Q1[2)]

1) Status 1 if the value range is exceeded

2) Status 1 if the condition is fulfilled (e.g. I1 < I2 with LT mode)

Table 97: Index 1 - Mode

Data 1 (hex)		
00	LT	Less than (I1 < I2)
01	EQ	Equal to (I1 = IGT)
02	GT	Greater than (I1 > I2)

Arithmetic function blocks AR01…AR32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	12	12
3	Instance	01 - 20	01 - 20
4	Index	→ table 98	→ table 98
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 99, 100
	Write operation	depending on index, → table 99, 100	00

Table 98: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 99		×	
01	Mode, → table 100		×	
02	First operand	I1	×	c[1)]
03	Second operand	I2	×	c[1)]
04	Result	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 4 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 99: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1
FB output Data 3		–	–	–	–	–	ZE[1)]	CY[1)]

1) Status 1 if the value of the function block output QV (the calculation result) equals zero
2) Status 1 if the value range is exceeded

Table 100: Index 1 - Mode

Data 1 (hex)		
00	ADD	Add (I1 + I2 = QV)
01	SUB	Subtract (I1 - I2 = QV)
02	MUL	Multiply (I1 × I2 = QV)
03	DIV	Divide (I1 : I2 = QV)

Block compare function blocks BC01…BC32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	25	25
3	Instance	01 - 20	01 - 20
4	Index	→ table 101	→ table 101
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 102, 103
	Write operation	depending on index, → table 102, 103	00

Table 101: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 102		×	
01	Mode, → table 103		×	
02	Source range 1	I1	×	c[1]
03	Target range 2	I2	×	c[1]
04	Number of elements to compare: 8 (max. 192 bytes)	NO	×	c[1]

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 4 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 102: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1]
FB output Data 3		–	–	–	–	EQ[2]	E3[3]	E2[4]	E1[5]

1) Activates the function block on status 1.

2) Status 1 if the data ranges are equal; status 0 if not equal

Error outputs

3) Status 1 if the number of elements exceeds the source or target range.

4) Status 1 if the source and target range overlap.

5) Status 1 if the source or target range are outside of the available marker range (offset error)

Table 103: Index 1 - Mode

mode	Data 1 (hex)	Operating Mode
	02	Compare (internal easy status signal for Block Compare mode)

Block transfer function blocks BT01…BT32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	26	26
3	Instance	01 - 20	01 - 20
4	Index	→ table 104	→ table 104
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 105, 106
	Write operation	depending on index, → table 105, 106	00

Table 104: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 105		×	
01	Mode, → table 106		×	
02	Source range 1	I1	×	c[1)]
03	Target range 2	I2	×	c[1)]
04	Number of elements to compare: max. 192 bytes	NO	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 and 3 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte .. Data 2 - High Byte).

Table 105: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1)]
FB output Data 3		–	–	–	–	–	E3[2)]	E2[3)]	E1[4)]

1) Transfer of the source address specified at I1 to the target address specified at I2 on rising edge.

Error outputs

2) Status 1 if the number of elements exceeds the source or target range.
3) Status 1 if the source and target range overlap.
4) Status 1 if the source or target range are outside of the available marker range (offset error)

Table 106: Index 1 - Mode

Data 1 (hex)	Operating Mode
00	INI: Initializes the target range with a byte value stored at the source address.
01	CPY: Copies a data block from a source to a target range. Data block size is specified at NO.

Booelan operation BV01…BV32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	13	13
3	Instance	01 - 20	01 - 20
4	Index	→ table 107	→ table 107
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 108, 109
	Write operation	depending on index, → table 108, 109	00

Table 107: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 108		×	
01	Mode, → table 109		×	
02	First operand	I1	×	c[1)]
03	Second operand	I2	×	c[1)]
04	Result of the association	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 4 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 108: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1
FB output Data 3		–	–	–	–	–	–	ZE[1)]

1) Status 1 if the value of the function block output QV (the operation result) equals zero

Table 109: Index 1 - Mode

Data 1 (hex)		
00	AND	AND operation
01	OR	OR operation
02	XOR	Exclusive OR operation
03	NET	Inverts the individual bits of the value at I1. The inverted value is represented as a signed decimal value.

Counters C01…C32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	14	14
3	Instance	01 - 20	01 - 20
4	Index	→ table 110	→ table 110
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 111
	Write operation	depending on index, → table 111	00

Table 110: Operand overview

Index (hex)	Operand		Value	Reading	Writing
00	Bit IO		→ table 111	×	
01	Mode/Parameter		–	–	–
02	Upper setpoint	SH	In integer range from –2147483648 to +2147483647	×	c[1]
03	Lower setpoint	SL		×	c[1]
04	Preset actual value	SV		×	c[1]
05	Actual value in Run mode	QV		×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 5 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 111: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	SE[1]	D[2]	C[3]	RE[4]
FB output Data 3		–	–	–	–	ZE[5]	CY[6]	FB[7]	OF[8]

1) With a rising edge transfer the preset actual value
2) Count direction: 0 = up counting, 1 = down counting
3) Count coil, counts on every rising edge
4) Reset the actual value to zero
5) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero
6) Carry: Status 1 if the value range is exceeded
7) Fall below: Status 1 if the actual value ≦ lower setpoint
8) Overflow: Status 1 if the actual value ≧ upper setpoint

Frequency counters CF01…CF04

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	15	15
3	Instance	01 - 04	01 - 04
4	Index	→ table 112	→ table 112
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 113
	Write operation	depending on index, → table 113	00

Table 112: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 113		×	
01	Mode/Parameter		–	–
02	Upper setpoint	SH	×	c[1)]
03	Lower setpoint	SL	×	c[1)]
04	Actual value in Run mode	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 4 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 113: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	ZE[2)]	FB[3)]	OF[4)]

1) Enable for counter function block
2) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero
3) Fall below: Status 1 if the actual value ≦ lower setpoint
4) Overflow: Status 1 if the actual value ≧ upper setpoint

High-speed counters CH01…CH04

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	16	16
3	Instance	01 - 04	01 - 04
4	Index	→ table 114	→ table 114
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 114
	Write operation	depending on index, → table 114	00

Table 114: Operand overview

Index (hex)	Operand		Value	Reading	Writing
00	Bit IO		→ table 115	×	
01	Mode/Parameter		–	–	–
02	Upper setpoint	SH	In integer range from –2147483648 to +2147483647	×	c[1]
03	Lower setpoint	SL		×	c[1]
04	Preset actual value	SV		×	c[1]
05	Actual value in Run mode	QV		×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 5 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 115: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	EN[1]	SE[2]	D[3]	RE[4]
FB output Data 3		–	–	–	–	ZE[5]	CY[6]	FB[7]	OF[8]

1) Enable for counter function block
2) With a rising edge transfer the preset actual value
3) Count direction: 0 = up counting, 1 = down counting
4) Reset the actual value to zero
5) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero
6) Carry: Status 1 if the value range is exceeded
7) Fall below: Status 1 if the actual value ≦ lower setpoint
8) Overflow: Status 1 if the actual value ≧ lower setpoint

Incremental encoder counters CI01…CI02

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	17	17
3	Instance	01 - 02	01 - 02
4	Index	→ table 116	→ table 116
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 117
	Write operation	depending on index, → table 117	00

Table 116: Operand overview

Index (hex)	Operand		Value	Reading	Writing
00	Bit IO		→ table 117	×	
01	Mode/Parameter		–	–	–
02	Upper setpoint	SH	In integer range from –2147483648 to +2147483647	×	c[1]
03	Lower setpoint	SL		×	c[1]
04	Preset actual value	SV		×	c[1]
05	Actual value in Run mode	QV		×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 5 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 117: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	EN[1]	SE[2]	RE[3]
FB output Data 3		–	–	–	–	ZE[4]	CY[5]	FB[6]	OF[7]

1) Enable for counter function block
2) With a rising edge transfer the preset actual value
3) Reset the actual value to zero
4) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero
5) Carry: Status 1 if the value range is exceeded
6) Fall below: Status 1 if the actual value ≦ lower setpoint
7) Overflow: Status 1 if the actual value ≧ lower setpoint

Comparators CP01…CP32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	18	18
3	Instance	01 - 20	01 - 20
4	Index	→ table 118	→ table 118
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 119
	Write operation	depending on index, → table 119	00

Table 118: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 119		×	
01	Mode/Parameter		–	–
02	Comparison value	I1	×	c[1)]
03	Comparison value	I2	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 and 3 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 119: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1
FB output Data 3		–	–	–	–	GT[1)]	EQ[2)]	LT[3)]

1) greater than: Status 1 if the value at I1 is greater than value at I2 (I1 > I2)
2) equal: Status 1 if the value at I1 is equal to value at I2 (I1 = I2)
3) less than: Status 1 if the value at I1 is less than value at I2 (I1 < I2)

Text output function blocks D01…D32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	19	19
3	Instance	01 – 20	01 – 20
4	Index	→ table 120	→ table 120
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 121
	Write operation	depending on index, → table 121	00

Table 120: Operand overview

Index (hex)	Operand	Reading	Writing
00	Bit IO, → table 121	×	
01	Mode/Parameter	–	–
02	Text line 1, column 1 - 4	×	
03	Text line 1, column 5 - 8	×	
04	Text line 1, column 9 - 12	×	
05	Text line 1, column 13 - 16	×	
06	Text line 2, column 1 - 4	×	
07	Text line 2, column 5 - 8	×	
08	Text line 2, column 9 - 12	×	
09	Text line 2, column 13 - 16	×	
10	Text line 3, column 1 - 4	×	
11	Text line 3, column 5 - 8	×	
12	Text line 3, column 9 - 12	×	
13	Text line 3, column 13 - 16	×	
14	Text line 4, column 1 - 4	×	
15	Text line 4, column 5 - 8	×	
16	Text line 4, column 9 - 12	×	
17	Text line 4, column 13 - 16	×	
18	Variable 1	×	c[1)]
19	Variable 2	×	c[1)]
20	Variable 3	×	c[1)]
21	Variable 4	×	c[1)]
22	Scaling minimum value 1	×	
23	Scaling minimum value 2	×	
24	Scaling minimum value 3	×	
25	Scaling minimum value 4	×	
26	Scaling maximum value 1	×	

Index (hex)	Operand	Reading	Writing
27	Scaling maximum value 2	×	
28	Scaling maximum value 3	×	
29	Scaling maximum value 4	×	
30	Control information line 1	×	
31	Control information line 2	×	
32	Control information line 3	×	
33	Control information line 4	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The variables 1 to 4 (index 18 to 21) are transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 121: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Text function block enable
2) Status 1 if the number of elements exceeds the source or target range.

Data function blocks DB01…DB32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	1A	1A
3	Instance	01 - 20	01 - 20
4	Index	→ table 122	→ table 122
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 123
	Write operation	depending on index, → table 123	00

Table 122: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 123		×	
01	Mode/Parameter		–	–
02	Input value: value that is transferred to the QV output when the FB is triggered.	I1	×	c[1)]
03	Output value	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 and 3 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 123: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1)]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Transfer of the value present at I1 when there is a rising edge.
2) Status 1 if the trigger signal is 1.

PID controllers DC01…DC32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	27	27
3	Instance	01 – 20	01 – 20
4	Index	→ table 124	→ table 124
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 125, 126
	Write operation	depending on index, → table 125, 126	

Table 124: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 125		×	
01	Mode, → table 126		×	
02	Setpoint: –32768 to +32767	I1	×	c[1)]
03	Actual value: –32768 to +32767	I2	×	c[1)]
04	Proportional Gain [%], Value range: 0 to 65535	KP	×	c[1)]
05	Reset time [0.1 s], Value range: 0 to 65535	TN	×	c[1)]
06	Rate time [0.1 s], Value range: 0 to 65535	TV	×	c[1)]
07	Scan time = Time between function block calls. Value range: 0.1s to 6553.5s. If 0 is entered as the value, the scan time will be determined by the program cycle time.	TC	×	c[1)]
08	Manual manipulated variable, value range: –4096 to +4095	MV	×	c[1)]
09	Manipulated variable • Mode: UNI, value range: 0 to +4095 (12 bit) • Mode: BIP, value range: –4096 to +4095 (13 bit)	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 and 9 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte .. Data 2 - High Byte).

Table 125: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	SE[1)]	ED[2)]	EI[3)]	EP[4)]	EN[5)]
FB output Data 3		–	–	–	–	–	–	–	LI[6)]

1) Transfer of manual manipulated variable on status 1
2) Activation of D component on status 1
3) Activation of I component on status 1
4) Activation of P component on status 1
5) Activates the function block on status 1.
6) Status 1 if the value range of the manipulated variable was exceeded

Table 126: Index 1 - Mode

Data 1	Operating Mode
UNP unipolar	The manipulated variable is output as a unipolar 12-bit value. Corresponding value range for QV 0 to 4095.
BIP bipolar	The manipulated variable is output as a bipolar 13-bit value. Corresponding value range for QV –4096 to 4095.

DG01…DG16 diagnostics

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	39	39
3	Instance	01 - 10	01 - 10
4	Index	00 - 03	00 - 03
5 – 8	Data 1 - 4 Read operation	00	depending on index, → table 127, 128

Table 127: Operand overview

Index (hex)	Data	Data 1 Data 3 Data 4	Data 2	Read/Write
0	Bit IO	→ table 128	–	R
2	Diagnostics-Register QV	DWORD or UDINT[1)]		R
3	Output states ON	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

Table 128: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		Q8[2)]	Q7[2)]	Q6[2)]	Q5[2)]	Q4[2)]	Q3[2)]	Q2[2)]	Q1[2)]
FB output Data 4		–	–	–	–	–	–	–	QC[3)]

1) Reset coil: Status 1 resets the counter actual value to zero.

2) 1 is set if the selected safety function block has the selected state.

3) 1 is set if one of the outputs Q1 to Q8 is set to 1.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Signal smoothing filters FT01…FT32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	**Slave**
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	28	28
3	Instance	01 – 20	01 – 20
4	Index	→ table 129	→ table 129
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 130
	Write operation	depending on index, → table 130	00

Table 129: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 130		×	
01	Mode/Parameter		–	–
02	Input value, value range: –32768 to +32767	I1	×	c[1)]
03	Recovery time [0.1 s], Value range: 0 to 65535	TG	×	c[1)]
04	Proportional Gain [%], value range: 0 up to 65535	KP	×	c[1)]
05	Delayed output value, value range: –32768 to +32767	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

Table 130: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

Receipt of network data GT01…GT32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	92	–
	Response:		
	Read successful	–	C2
	Command-rejected	–	C0
2	Part No	1B	1B
3	Instance	01 – 20	01 – 20
4	Index	→ table 131	
5 – 8	Data 1 – 4	00	depending on index, → table 132, 133

Table 131: Operand overview

Index (hex)	Operand	Reading	Writing
00	Bit IO, → table 132	×	
01	Mode/Parameters, → table 133	×	–
02	Output value: actual value from the network QV	×	

→ The data for index 2 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 132: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q[1)]

1) Status 1 if a new value is present that is transferred from the NET network.

Table 133: Index 1 – Mode/Parameters (designation of PUT FB with data to be received)

mode	Data 1	NET-ID[1)]	
		0	NET-ID 1
		…	…
		7	NET-ID 8
Parameters	**Data 3**	**Instance[2)]**	
		0	PT01
		…	…
		31	PT32

1) Number of station transmitting the value. Possible station numbers: 01 to 08

2) Send FB (e.g. PT 20) of the sending NET station. Possible function block number: 01 to 32

Comparator CP01…CP32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	92	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Part No	1C	1C
3	Instance	01 – 20	01 – 20
4	Index	→ table 134	
5 – 8	Data 1 – 4	00	depending on index, → table 135

Table 134: Operand overview

Index (hex)	Operand	Reading	Writing
00	Bit IO, → table 135	×	
01	Mode/Parameter	–	–
02	Parameters → table 136	×	
	Channel A		
03	Channel B		
04	Channel C		
05	Channel D		

Table 135: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q[1)]

1) Status 1 if the switch-on condition is fulfilled.

The data in the following table is shown in the Motorola format although it is actually transferred in Intel format.

Table 136: Index 2 – 5, Parameter channels A – D

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 2								**Date 1**							
ON	d4	d3	d2	d1	d0	h4	h3	h2	h1	h0	m5	m4	m3	m2	m1	m0
	Day of week					**Hour**					**Minute**					

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 4								**Date 3**							
OFF	d4	d3	d2	d1	d0	h4	h3	h2	h1	h0	m5	m4	m3	m2	m1	m0
	Day of week					**Hour**					**Minute**					

m5 up to m0: Minute (0 up to 59)
h4 up to h0: Hour (0 up to 23)
d5 to d0: Weekday (0 = Sunday to 6 = Saturday)

Example
The channel A parameters of 7-day switch HW19 are to be read.

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	81	80
1	Command: Read	92	–
	Response: Read successful	–	C2
2	Part No	1C	1C
3	Instance	13	13
4	Index	02	02
5	Data 1	00	62
6	Data 2	00	0B
7	Data 3	00	7B
8	Data 4	00	25

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Date 2 = $0B_{hex}$								**Date 1 = 62_{hex}**							
ON	0	0	0	0	1	0	1	1	0	1	1	0	0	0	1	0
	Day of week					**Hour**					**Minute**					

Switch-on time:
Weekday = 01_{hex} ..
Hour = $0D_{hex}$…13 h
Minute = 22_{hex} .. 34 minutes

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Date 4 = 25_{hex}								**Date 3 = $7B_{hex}$**							
OFF	0	0	1	0	0	1	0	1	0	1	1	1	1	0	1	1
	Day of week					**Hour**					**Minute**					

Switch-off time:
Weekday = 04_{hex} .. Thursday
Hour = 15_{hex}…21 h
Minute = 59_{hex} .. 34 minutes

Year time switch HY01…HY32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	92	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Part No	1D	1D
3	Instance	01 – 20	01 – 20
4	Index	→ table 137	
5 – 8	Data 1 – 4	00	depending on index, → table 138

Table 137: Operand overview

Index (hex)	Operand	Reading	Writing
00	Bit IO, → table 138	×	
01	Mode/Parameter	–	–
02	Parameters → table 139	×	
	Channel A		
03	Channel B		
04	Channel C		
05	Channel D		

Table 138: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q[1)]

1) Status 1 if the switch-on condition is fulfilled.

The data in the following table is shown in the Motorola format although it is actually transferred in Intel format.

Table 139: Index 2 – 5, Parameter channels A – D

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 2								Date 1							
ON	y6	y5	y4	y3	y2	y1	y0	m3	m2	m1	m0	d4	d3	d2	d1	d0
	Year								Month				Day			

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 4								Date 3							
OFF	y6	y5	y4	y3	y2	y1	y0	m3	m2	m1	m0	d4	d3	d2	d1	d0
	Year								Month				Day			

d4 … d0: Day (1 .. 31), m3 … m0: Month (1 .. 12), y6 … y0: Year (0: 2000 .. 99: 2099)

Example

The channel A parameters of year time switch HY14 are to be written.

Index 2 – 5, Parameter channels A – D

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 2								Date 1							
ON	0	0	0	0	0	1	1	0	1	1	0	0	1	1	1	0
	Year								Month				Day			

Switch-on time:
Day = 14 = $0E_{hex}$ = 0000 1110b
Month = 6 (June) = 06_{hex} = 0000 0110b
Year = 2003 = 03_{hex} = 0000 0011b

Index 2 – 5, Parameter channels A – D

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Date 2								**Date 1**							
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Date 4								**Date 3**							
OFF	y6	y5	y4	y3	y2	y1	y0	m3	m2	m1	m0	d4	d3	d2	d1	d0
	Year							**Month**				**Day**				

Switch-off time:
Day = 3 = 03_{hex} = 0000 0011b
Month = 10 (October) = $0A_{hex}$ = 0000 1010b
Year = 2012 = $0C_{hex}$ = 0000 1100b

Resulting telegram:

Byte	**Meaning**	**Value (hex), sent by**	
		Master	**Slave**
0	Toggle byte	81	80
1	Command: Write	B2	–
	Response: Write successful	–	C1
2	Part No	1D	1D
3	Instance	0E	0E
4	Index	02	02
5	Data 1	8E	00
6	Data 2	06	00
7	Data 3	43	00
8	Data 4	19	00

Further information is available in the S40 Application Note AN27K21g.exe "EASY800/MFD-DP Data Handling Function Block for PS416 and PS4-341".

Conditional jump JC01…JC32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	2F	2F
3	Instance	01 – 20	01 – 20
4	Index	00	00
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 140, 141
	Write operation	depending on index, → table 140, 141	00

Table 140: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/Write
0	Bit IO	→ table 141	–	→ table 141	–	R

Table 141: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	E1[2)]

1) When 1, the program branches to the associated jump label.

2) 1 is set if the associated jump label is not found.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Receive network data function blocks GT01…GT32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	29	29
3	Instance	01 – 20	01 – 20
4	Index	→ table 142	→ table 142
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 143
	Write operation	depending on index, → table 143	

Table 142: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 143		×	
01	Mode/Parameter		–	–
02	Input value, value range: 32 bit	I1	×	c[1)]
03	Interpolation point 1, X co-ordinate, value range: 32 bit	X1	×	c[1)]
04	Interpolation point 1, Y co-ordinate, value range: 32 bit	Y1	×	c[1)]
05	Interpolation point 2, X co-ordinate, value range: 32 bit	X2	×	c[1)]
06	Interpolation point 2, Y co-ordinate, value range: 32 bit	Y2	×	c[1)]
07	Output value: contains the scaled input value	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

Table 143: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

Master reset MR01…MR32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	92	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Part No	0F	0F
3	Instance	01 – 20	01 – 20
4	Index		
	Bit IO	00	00
	mode	01	01
5 – 8	Data 1 – 4	00	depending on index, → table 144, 145

Table 144: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1)]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Trigger coil. The appropriate Reset is executed if the coil is triggered (with a rising edge).

2) Status 1 if the trigger coil MR..T is 1.

Table 145: Index 1 - Mode

Data 1 (hex)		
00	Q	The outputs Q.., *Q.., S.., *S.., *SN.., QA01 are reset to 0. * depending on the NET-ID
01	M	The marker range MD01 to MD48 is reset to 0.
02	ALL	Reset of Q and M.

Data Multiplexer MX01…MX32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	31	31
3	Instance	01 – 20	01 – 20
4	Index	00 – 0B	00 – 0B
5 – 8	Data 1 – 4		
	Read operation	00	dep. on index → table 146, 147
	Write operation	depending on index, → table 146, 147	00

Table 146: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/Write
0	Bit IO	→ table 147	–	R
2	Channel selection: 0 up to 7	DWORD or UDINT[1)]		R/W[2)]
3	Input value channel 1	DWORD or UDINT[1)]		R/W[2)]
4	Input value channel 2	DWORD or UDINT[1)]		R/W[2)]
5	Input value channel 3	DWORD or UDINT[1)]		R/W[2)]
6	Input value channel 4	DWORD or UDINT[1)]		R/W[2)]
7	Input value channel 5	DWORD or UDINT[1)]		R/W[2)]
8	Input value channel 6	DWORD or UDINT[1)]		R/W[2)]
9	Input value channel 7	DWORD or UDINT[1)]		R/W[2)]
A	Input value channel 8	DWORD or UDINT[1)]		R/W[2)]
B	Output value QV	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte
2) The value can only be written if it is assigned to a constant in the program.

Table 147: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	E1[2)]

1) When 1 is set, the selected input value is entered in the output value.
2) 1 is set if the channel selection is invalid.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Numerical Converter NC01…NC32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	2A	2A
3	Instance	01 – 20	01 – 20
4	Index	→ table 148	→ table 148
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 149, 150
	Write operation	depending on index, → table 149, 150	00

Table 148: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 149		×	
01	Mode, → table 150		×	
02	Input value: operand to be converted	I1	×	c[1)]
03	Output value: contains the conversion result	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 and 3 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte .. Data 2 - High Byte).

Table 149: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

Table 150: Index 1 - Mode

Data 1 (hex)		
00	BCD	Converts a BCD-coded decimal value to an integer value
01	BIN	Converts an integer value to a BCD coded decimal value

Operating hours counters OT01…OT04

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	1E	1E
3	Instance	01 – 04	01 – 04
4	Index	→ table 151	→ table 151
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 152
	Write operation	depending on index, → table 152	00

Table 151: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 152		×	
01	Mode/Parameter		–	–
02	Read successful	I1	×	c[1)]
03	Actual value of the operating hours counter	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

Table 152: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	RE[1)]	EN[2)]
FB output Data 3		–	–	–	–	–	–	–	Q1[3)]

1) Reset coil, status 1 resets the counter actual value to zero.
2) Enable coil
3) Status 1 if the setpoint is reached (greater/equal).

→ The data for index 2 and 3 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Pulse width modulation: PW01…PW02

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	32	32
3	Instance	01 – 02	01 – 02
4	Index	00 – 0A	00 – 0A
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 153, 154
	Write operation	depending on index, → table 153, 154	00

Table 153: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/ Write
0	Bit IO	→ table 154	–	R
2	Pulse count in positioning mode I1: 0 to 2147483647	DWORD or UDINT[1)]		R/W[2)]
3	Start frequency FS: 0 bis 5000 Hz	DWORD or UDINT[1)]		R/W[2)]
4	Operating frequency FO: 0 bis 5000 Hz	DWORD or UDINT[1)]		R/W[2)]
5	Frequency change in acceleration ramp RF: 0 to 65535 mHz	DWORD or UDINT[1)]		R/W[2)]
6	Frequency change in brake ramp BF: 0 to 65535 mHz	DWORD or UDINT[1)]		R/W[2)]
7	Number of steps in jog mode P1: 0 up to 65535	DWORD or UDINT[1)]		R/W[2)]
8	Frequency in jog mode PF: 0 up to 5000 Hz	DWORD or UDINT[1)]		R/W[2)]
9	Actual step number QV	DWORD or UDINT[1)]		R
A	Actual frequency QF	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 154: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	TP[1)]	BR[2)]	ST[3)]	EN[4)]
FB output Data 3		–	–	–	–	–	–	E1[5)]	AC[6)]

1) Jog mode is started with a rising edge.
2) The positioning job is aborted with a rising edge.
3) The positioning job is started with a rising edge.
4) Reset coil: Status 1 resets the counter actual value to zero.
5) 1 is set if the parameter entry is invalid.
6) 1 is set if a positioning job is active.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Value scaling function blocks LS01…LS32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	1F	1F
3	Instance	01 – 20	01 – 20
4	Index	00 – 02	00 – 02
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 155, 156
	Write operation	depending on index, → table 155, 156	00

Table 155: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
0	Bit IO	→ table 156	–	→ table 156	–	R
2	Setpoint value QV for the network	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

Table 156: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1]
FB output Data 3		–	–	–	–	–	E1[2]	AC[3]	Q1[4]

1) Trigger coil. The value is provided on the NET if the coil is triggered (with a rising edge).
2) 1 is set if the send job was aborted due to an error.
3) 1 is set if the trigger coil is triggered. 0 is set if the send job was successfully completed or aborted due to an error.
4) Status 1 if the status of the trigger coil is also 1.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Pulse width modulation PW01…PW02

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	2B	2B
3	Instance	01 – 02	01 – 02
4	Index	→ table 157	→ table 157
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 158
	Write operation	depending on index, → table 158	00

Table 157: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 158		×	
01	Mode/Parameter		–	–
02	Manipulated variable, value range: 0 to 4095 (12 bit)	SV	×	c[1)]
03	Period duration [ms], Value range: 0 up to 65535	PD	×	c[1)]
04	Minimum on duration [ms], Value range: 0 up to 65535	ME	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

Table 158: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	E1[2)]

1) Activates the function block on status 1.

2) Status 1 if below the minimum on duration or minimum off duration

Synchronize clock SC01

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	
1	Command: Read	92	–
	Response:		
	Read successful	–	C2
	Command rejected	–	C0
2	Part No	20	20
3	Instance	01	01
4	Index	→ table 159	
5 – 8	Data 1 – 4	00	depending on index, → table 160

Table 159: Operand overview

Index (hex)	Operand	Reading	Writing
00	Bit IO, → table 160	×	
01	Mode/Parameter	–	–

Table 160: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1)]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Trigger coil. If the coil is triggered with a rising edge, the current date, weekday and time of the transmitting station is automatically sent to the NET network.

2) Status 1 if the state of the trigger coil SC01T_ is also 1.

Serial output SP01…SP32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	35	35
3	Instance	01 – 20	01 – 20
4	Index	00	00
5 – 8	Data 1 - 4 Read operation	00	depending on index, → table 161, 162

Table 161: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/Write
0	Bit IO	→ table 162	–	→ table 162	–	R

Table 162: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	T[1)]	EN[2)]
FB output Data 3		–	–	–	–	–	–	E1[3)]	AC[4)]

1) The send job is triggered on a rising edge.
2) Reset coil: Status 1 resets the counter actual value to zero.
3) 1 is set if an error occurred during the send job.
4) 1 is set if the send job is active.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Send network data function blocks PT01…PT32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	33	33
3	Instance	01 – 20	01 – 20
4	Index	00 – 0B	00 – 0B
5 – 8	Data 1 – 4		
	Read operation	00	depending on index,→ table 163 , 173, 174
	Write operation	depending on index,→ table 163 , 173, 174	00

Table 163: Operand overview

Index (hex)	Data	Data 1	Data 2 Data 4	Data 3	Read/ Write
0	Bit IO	→ table 173	–	→ table 173	R
1	mode	→ table 174	–	–	R
2	Data input forwards I1	DWORD or UDINT[1)]			R/W[2)]
3	Data input backwards I2	DWORD or UDINT[1)]			R/W[2)]
4	Data output 1 (D1)	DWORD or UDINT[1)]			R
5	Data output 2 (D2)	DWORD or UDINT[1)]			R
6	Data output 3 (D3)	DWORD or UDINT[1)]			R
7	Data output 4 (D4)	DWORD or UDINT[1)]			R
8	Data output 5 (D5)	DWORD or UDINT[1)]			R
9	Data output 6 (D6)	DWORD or UDINT[1)]			R
A	Data output 7 (D7)	DWORD or UDINT[1)]			R
B	Data output 8 (D8)	DWORD or UDINT[1)]			R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Set cycle time ST01

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	2C	2C
3	Instance	01	01
4	Index	→ table 164	→ table 164
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 165
	Write operation	depending on index, → table 165	00

Table 164: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 165		×	
01	Mode/Parameter		–	–
02	Cycle time in ms, value range: 0 – 1000	I1	×	c[1)]

1) The value can only be written if it is assigned to a constant in the program.

Table 165: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

Timing relays T01…T32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	**Slave**
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	21	21
3	Instance	01 – 20	01 – 20
4	Index	→ table 166	→ table 166
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 167, 168
	Write operation	depending on index, → table 167, 168	

Table 166: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 167		×	
01	Mode/Parameters, → table 168		×	
02	Setpoint value 1: Time setpoint 1	I1	×	c[1)]
03	Setpoint value 2: Time setpoint 2 (with timing relay with 2 setpoint values):	I2	×	c[1)]
04	Actual value: Time elapsed in RUN mode	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

→ The data for index 2 to 4 is transferred as a 32-bit value in Intel format (Data 1 – Low Byte to Data 4 – High Byte).

Table 167: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	ST[1)]	EN[2)]	RE[3)]
FB output Data 3		–	–	–	–	–	–	–	Q1[4)]

1) Stop, the timing relay is stopped (Stop coil)
2) Enable, the timing relay is started (Trigger coil)
3) Reset, the timing relay is reset (Reset coil)
4) Switching contact

Table 168: Index 1 – Mode/Parameter

mode	Data 1	Operating Mode
	0	On-delayed
	1	On-delayed with random setpoint
	2	Off-delayed
	3	Off-delayed with random setpoint
	4	On and off delayed (two time setpoints)
	5	On and off delayed each with random setpoint (two time setpoints)
	6	Pulse transmitter
	7	Flashing relay (two time setpoints)
	8	Off-delayed, retriggerable (easy600 mode)
	9	Off-delayed with random setpoint, retriggerable (easy600 Mode)
Parameters	**Data 3**	**Operating Mode**
	0	S (Milliseconds)
	1	M:S (Seconds)
	2	H:M (Minutes)

Timing relays T01…T32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0		→ page 154	
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	34	34
3	Instance	01 – 20	01 – 20
4	Index	00 – 04	00 – 04
5 – 8	Data 1 – 4		
	Read operation	–	depending on index, → table 169, 170
	Write operation	depending on index, → table 169, 170	00

Table 169: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/ Write
0	Bit IO	→ table 170	–	R
2	Input value I1 for table of TB…	DWORD or UDINT[1)]		R/W[2)]
3	Output value PV from table of TB…	DWORD or UDINT[1)]		R
4	Number of entries QN in table of TB…	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 170: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	RE[1]	RL[2)]	RF[3)]	WP[4)]	EN[5)]
FB output Data 3		–	–	–	–	–	–	TF[6)]	TE[7)]

1) On receipt of a rising edge, all entries are removed from the table. The number of table entries QN is set to 0.
2) On receipt of a rising edge the newest entry in the table is output at output QV and removed from the table. The number of table entries QN is decremented by one.
3) On receipt of a rising edge the oldest entry in the table is output at output QV and removed from the table. The number of table entries QN is decremented by one.
4) On receipt of a rising edge, the value of I1 is transferred to the table and the number of table entries QN is incremented by one, as long as the maximum number of entries is not exceeded. In this case, the value of I1 is output at the output QV.
5) Reset coil: Status 1 resets the counter actual value to zero.
6) 1 is set if the table is full.
7) 1 is set if the table is empty.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Value limitation VC01…VC32

Telegram structure

Byte	Meaning	Value (hex), sent by	
		Master	Slave
0	Toggle byte	→ page 154	→ page 154
1	Command:		
	Read	92	–
	Write	B2	–
	Response:		
	Read successful	–	C2
	Write successful	–	C1
	Command rejected	–	C0
2	Part No	2D	2D
3	Instance	01 – 20	01 – 20
4	Index	→ table 171	→ table 171
5 – 8	Data 1 – 4		
	Read operation	00	depending on index, → table 172
	Write operation	depending on index, → table 172	

Table 171: Operand overview

Index (hex)	Operand		Reading	Writing
00	Bit IO, → table 172		×	
01	Mode/Parameter		–	–
02	Input value	I1	×	c[1)]
03	Read successful	SH	×	c[1)]
04	Lower limit value	SL	×	c[1)]
05	Output value: outputs the value present at input I1 within the set limits.	QV	×	

1) The value can only be written if it is assigned to a constant in the program.

Table 172: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

Table 173: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	BD[1]	FD[2]	RE[3]	BP[4]	FP[5]	EN[6]
FB output Data 3		Q8[7]	Q8[7]	Q6[7]	Q5[7]	Q4[7]	Q3[7]	Q2[7]	Q1[7]

1) Input bit value for the backward shift operation in BIT mode.
2) Input bit value for the forward shift operation in BIT mode.
3) If 1 is set, the function block is reset.
4) On receipt of a rising edge in BIT mode, the value of BD is entered in the last register field Q8 and the original contents of the register fields are moved one field in the direction of the lower field numbers. On receipt of a rising edge in DW mode, the value of I2 is entered in the last register field D8 and the original contents of the register fields are moved by one field in the direction of the lower field numbers.
5) On receipt of a rising edge in BIT mode, the value of FD is entered in the first register field Q1 and the original contents of the register fields are moved one field in the direction of the higher field numbers. On receipt of a rising edge in DW mode, the value of I1 is entered in the first register field D1 and the original contents of the register fields are moved by one field in the direction of the higher field numbers.
6) Reset coil: Status 1 resets the counter actual value to zero.
7) Status of the eight fields of the bit shift register

Table 174: Index 1 - Mode

Data 1 (hex)		
00	BIT	Mode: shift bit
01	DW	Mode: shift double word

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

10 Process Data for easy600 (DPV1)

The PROFIBUS-DPV1 functionality of the EASY204-DP (from device version 07) enables you to access the following data areas of an easy600 from a Class 1 or Class 2 DPV1 master without any extensive programming required:

- Identification
- Operating Mode
- Image
- Function Blocks
- Date and time
- DST

The data from these ranges is located in Process Data Objects (data records) and can be read and/or written with the DPV1 "Read" and "Write" services.

Object overview

The following overview shows all the objects contained in the EASY204-DP that are available for a connected easy600.

→ The attributes API, Slot Number and Index form the address information for the DP master in order to access an object. Refer to the following section for further information about this.

Table 175: Process data objects in the EASY204-DP for easy600

Object name	API	Slot Number	Index	Data length (octets)	Read (R) Write (W)	→ page
Easy operating mode	0	0	100	1	R/W	265
Easy identification	0	1	100	50	R	263
Image data						
EASY 600 inputs (I1 – I16)	0	0	197	4	R	267
EASY 600 outputs and markers (Q1 – Q8, M1 – M16, D1 – D8)	0	0	198	4	R	269
EASY 600 function relays (T1 – T8, C1 – C8, O1 – O4, A1 – A8)	0	0	199	4	R	272
Easy600 pushbuttons	0	0	200	1	R	275
Easy Link input data (R1 – R16)	0	0	98	2	R/W	277
Easy Link output data (S1 – S8)	0	0	99	1	R	279
Function blocks						
EASY 600 parameters Timing relays T1 to T8	0	0	211 - 218	6 Read 5 Write	R/W	281
EASY 600 parameters Counters C1 to C8	0	0	221 - 228	2 Read 3 Write	R/W	286
EASY 600 parameters Analog value comparators A1 – A8	0	0	231 - 238	3	R/W	289

Object name	API	Slot Number	Index	Data length (octets)	Read (R) Write (W)	→ page
EASY 600 Parameter 7-day time switch 1channel A	0	0	239	8	R/W	291
…			…			
EASY 600 Parameter 7-day time switch 1 channel D	0	0	242	8	R/W	291
EASY 600 Parameter 7-day time switch 2 channel D	0	0	243	8	R/W	291
…			…			
EASY 600 Parameter 7-day time switch 2 channel D	0	0	246	8	R/W	291
EASY 600 Parameter 7-day time switch 3 channel D	0	0	247	8	R/W	291
…			…			
EASY 600 Parameter 7-day time switch 3 channel D	0	0	250	8	R/W	291
EASY 600 Parameter 7-day time switch 4 channel D	0	0	251	8	R/W	291
…			…			
EASY 600 Parameter 7-day time switch 4 channel D	0	0	254	8	R/W	291
Easy clock	0	0	97	8	R/W	294
EASY 600 DST setting	0	0	210	1	R/W	297

Accessing objects

Access to the Process Data Objects in the EASY204-DP via the Read and Write DPV1 services is implemented with the help of the functions provided by the DP master system. Refer to the documentation of the manufacturer. Normally function blocks are provided for the access. In IEC 61131-3 based systems, the RDREC (Read) and WRREC (Write) function blocks defined by the PROFIBUS user organization in specification 2.182 are offered, which enable optimum access to complex data structures.

The following is required to access the objects:

- The address of the local DPV1 master interface
- The station address of the EASY204-DP to be accessed
- The identifier of the application (API) in the EASY204-DP (specification required only with Class 2 DPV1 master)
- The module to be addressed in EASY204-DP (Slot Number)
- The address (Index) of the required Process Data Object in the addressed EASY204-DP module
- The data length of the required Process Data Object
- A defined variable (memory range) in the local application that is to be assigned to the read data or containing the data to be written.

Refer to the topology of your master system for the address of the local DPV1 master interface. Refer to the PROFIBUS topology for the station address of the EASY204-DP.

For EASY204-DP all Process Data Objects of the API (specification only with Class 2 DPV1 master required) must be defined as 0.

The following sections show the slot number, the index, the data length and an example variable definition (declaration) for an IEC 61131-3 based system for each process data object provided in the EASY204-DP for a connected easy600.

Read identification

"Easy identification" object

This object contains the device identification of the EASY204-DP and the basic unit connected (ASCII string).

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to obtain the identification of the device:

- Type of easy basic device
- Firmware version of the easy basic unit
- Build number of the firmware of the easy basic unit
- Type of communication module
- Firmware version of the communication module.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 100.

Length of the object
The data to be read is 50 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_Ident	STRUCT
Part No	ARRAY [1..14] OF CHAR or STRING [14]
SW_Version	ARRAY [1..10] OF CHAR or STRING [10]
SW_Build	ARRAY [1..10] OF CHAR or STRING [10]
Modul_Type	ARRAY [1..10] OF CHAR or STRING [10]
Modul_SW_Version	ARRAY [1..6] OF CHAR or STRING [6]

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 176: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_Ident.Type	Octet 1 – 14	Type of easy basic device
Easy_Ident.SW_Version	Octet 15 – 24	Firmware version of the easy basic unit1)
Easy_Ident.SW_Build	Octet 25 – 34	Firmware version build number of the easy basic unit2)
Easy_Ident.Modul_Type	Octet 35 – 44	Type of communication module
Easy_Ident.Modul_SW_Version	Octet 45 – 50	Firmware version of the communication module.

1) Cannot be determined for easy800/MFD. The text "n.a." (not available) is therefore output in the corresponding octets.

2) Cannot be determined for easy600/800/MFD. The text "n.a." (not available) is therefore output in the corresponding octets.

All data contents are coded as ASCII strings.

Read/write mode

"Easy mode" object

This object contains the current operating mode of an easy basic unit (Run/Stop).

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query (Read) the current operating mode (Run/Stop) of the easy basic unit or transfer a new operating mode (Write) to the easy basic unit.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 100.

Length of the object
The length of the data to be read or written is 1 octet. When calling the "Write" service do not enter any other length or enter a small length for the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_Mode	BYTE or USINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 177: Address location and meaning of the data

Variable access (example)	Data position	Designation
Easy_Mode	Octet 1	Operating mode of the easy basic unit → table 178

Table 178: Coding of the operating mode

Operating mode code (hex)	Meaning
00	"Stop" mode
01	"Run" mode

Read/write image

"Easy 600 inputs" object

This object contains the current status of the easy600 inputs.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the digital inputs (I1 to I16) and the current analog value inputs I7 and I8 of the easy600.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 197.

Length of the object
The data to be read is 4 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_600_Inputs	STRUCT
Analog_7	BYTE or USINT
Analog_8	BYTE or USINT
Digital	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 179: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_600_Inputs.Analog_7	Octet 1		Analog value of I7
Easy_600_Inputs.Analog_8	Octet 2		Analog value of I8
Easy_600_Inputs.Digital[1]	Octet 3	Bit 0	Status I1
Easy_600_Inputs.Digital[2]		bit1	Status I2
Easy_600_Inputs.Digital[3]		Bit 2	Status I3
Easy_600_Inputs.Digital[4]		Bit 3	Status I4
Easy_600_Inputs.Digital[5]		Bit 4	Status I5
Easy_600_Inputs.Digital[6]		Bit 5	Status I6
Easy_600_Inputs.Digital[7]		Bit 6	Status I7
Easy_600_Inputs.Digital[8]		Bit 7	Status I8
Easy_600_Inputs.Digital[9]	Octet 4	Bit 0	Status I9
Easy_600_Inputs.Digital[10]		bit1	Status I10
Easy_600_Inputs.Digital[11]		Bit 2	Status I11
Easy_600_Inputs.Digital[12]		Bit 3	Status I12
		Bit 4	Not used
		Bit 5	Not used
Easy_600_Inputs.Digital[15]		Bit 6	Status I15
Easy_600_Inputs.Digital[16]		Bit 7	Status I16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 600 outputs and M markers" object

This object contains the current status of the outputs, markers and text markers of the easy600.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the digital outputs (Q1 to Q8), the markers (M1 to M16) and the text markers (D1 to D8) of the easy600.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 198.

Length of the object
The data to be read is 4 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_600_Marker_Outputs	ARRAY [1..32] OF BOOL or ARRAY [1..4] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 180: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_600_Marker_Outputs[1]	Octet 1	Bit 0	Status M1
Easy_600_Marker_Outputs[2]		bit1	Status M2
Easy_600_Marker_Outputs[3]		Bit 2	Status M3
Easy_600_Marker_Outputs[4]		Bit 3	Status M4
Easy_600_Marker_Outputs[5]		Bit 4	Status M5
Easy_600_Marker_Outputs[6]		Bit 5	Status M6
Easy_600_Marker_Outputs[7]		Bit 6	Status M7
Easy_600_Marker_Outputs[8]		Bit 7	Status M8
Easy_600_Marker_Outputs[9]	Octet 2	Bit 0	Status M9
Easy_600_Marker_Outputs[10]		bit1	Status M10
Easy_600_Marker_Outputs[11]		Bit 2	Status M11
Easy_600_Marker_Outputs[12]		Bit 3	Status M12
Easy_600_Marker_Outputs[13]		Bit 4	Status M13
Easy_600_Marker_Outputs[14]		Bit 5	Status M14
Easy_600_Marker_Outputs[15]		Bit 6	Status M15
Easy_600_Marker_Outputs[16]		Bit 7	Status M16
Easy_600_Marker_Outputs[17]	Octet 3	Bit 0	Status of Q1
Easy_600_Marker_Outputs[18]		bit1	Status of Q2
Easy_600_Marker_Outputs[19]		Bit 2	Status of Q3
Easy_600_Marker_Outputs[20]		Bit 3	Status of Q4
Easy_600_Marker_Outputs[21]		Bit 4	Status of Q5
Easy_600_Marker_Outputs[22]		Bit 5	Status of Q6
Easy_600_Marker_Outputs[23]		Bit 6	Status of Q7
Easy_600_Marker_Outputs[24]		Bit 7	Status of Q8

Variable access (example)	Data position		Meaning
Easy_600_Marker_Outputs[25]	Octet 4	Bit 0	Status D1
Easy_600_Marker_Outputs[26]		bit1	Status D2
Easy_600_Marker_Outputs[27]		Bit 2	Status D3
Easy_600_Marker_Outputs[28]		Bit 3	Status D4
Easy_600_Marker_Outputs[29]		Bit 4	Status D5
Easy_600_Marker_Outputs[30]		Bit 5	Status D6
Easy_600_Marker_Outputs[31]		Bit 6	Status D7
Easy_600_Marker_Outputs[32]		Bit 7	Status D8

→ A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 600 function relay" object

This object contains the current status of the easy600 function relays.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object in order to obtain information on the actual status of the timing relays (T1 to T8), the counters (C1 to C8), the 7-day time switches (1 to 4) and the analog comparators (A1 to A8) of the easy600.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 199.

Length of the object
The data to be read is 4 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_600_Function_Relay	ARRAY [1..32] OF BOOL or ARRAY [1..4] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 181: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_600_Function_Relay[1]	Octet 1	Bit 0	Status T1
Easy_600_Function_Relay[2]		bit1	Status T2
Easy_600_Function_Relay[3]		Bit 2	Status T3
Easy_600_Function_Relay[4]		Bit 3	Status T4
Easy_600_Function_Relay[5]		Bit 4	Status T5
Easy_600_Function_Relay[6]		Bit 5	Status T6
Easy_600_Function_Relay[7]		Bit 6	Status T7
Easy_600_Function_Relay[8]		Bit 7	Status T8
Easy_600_Function_Relay[9]	Octet 2	Bit 0	Status C1
Easy_600_Function_Relay[10]		bit1	Status C2
Easy_600_Function_Relay[11]		Bit 2	Status C3
Easy_600_Function_Relay[12]		Bit 3	Status C4
Easy_600_Function_Relay[13]		Bit 4	Status C5
Easy_600_Function_Relay[14]		Bit 5	Status C6
Easy_600_Function_Relay[15]		Bit 6	Status C7
Easy_600_Function_Relay[16]		Bit 7	Status C8
Easy_600_Function_Relay[17]	Octet 3	Bit 0	Status T_1
Easy_600_Function_Relay[18]		bit1	Status T_2
Easy_600_Function_Relay[19]		Bit 2	Status T_3
Easy_600_Function_Relay[20]		Bit 3	Status T_4
		Bit 4	Not used
		Bit 5	Not used
		Bit 6	Not used
		Bit 7	Not used

Variable access (example)	Data position		Meaning
Easy_600_Function_Relay[25]	Octet 4	Bit 0	Status A1
Easy_600_Function_Relay[26]		bit1	Status A2
Easy_600_Function_Relay[27]		Bit 2	Status A3
Easy_600_Function_Relay[28]		Bit 3	Status A4
Easy_600_Function_Relay[29]		Bit 4	Status A5
Easy_600_Function_Relay[30]		Bit 5	Status A6
Easy_600_Function_Relay[31]		Bit 6	Status A7
Easy_600_Function_Relay[32]		Bit 7	Status A8

→ A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 600 pushbuttons" object

This object contains the current status of the easy600 push-buttons.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the pusbuttons (P1 to P4, ESC, DEL, ALT, OK) of the easy600.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 200.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_600_Pushbuttons	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 182: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_600_Pushbuttons[1]	Octet 1	Bit 0	Status P1
Easy_600_Pushbuttons[2]		bit1	Status P2
Easy_600_Pushbuttons[3]		Bit 2	Status P3
Easy_600_Pushbuttons[4]		Bit 3	Status P4
Easy_600_Pushbuttons[5]		Bit 4	Status ESC
Easy_600_Pushbuttons[6]		Bit 5	Status OK
Easy_600_Pushbuttons[7]		Bit 6	Status DEL
Easy_600_Pushbuttons[8]		Bit 7	Status ALT

→ A set bit corresponds to an actuated (depressed) push-button, an unset bit corresponds to an unactuated push-button.

"Easy Link input data" object

This object contains the current status of the input data on the Easy-Link of an easy basic unit.

This object can be read and written. It can only be addressed by a Class 2 DPV1 master.

Use
Use this object to

- to query the status of the Easy-Link input data (R1 to R16) that is transferred by the class 1 DP master in the cyclical DP data
- transfer new input data on the Easy-Link to the connected easy basic unit.

You can only write to this object if there is **no** class 1 DP master is running a cyclical data exchange with the addressed EASY204-DP.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 98.

Length of the object
The length of the data to be read or written is 2 octets. Ensure that you do not enter any other length when calling the Write service or a smaller length when calling the Read service, as an error message will otherwise be output.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_Link_Inputs	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 183: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_Link_Inputs[1]	Octet 1	Bit 0	Status R1
Easy_Link_Inputs[2]		bit1	Status R2
Easy_Link_Inputs[3]		Bit 2	Status R3
Easy_Link_Inputs[4]		Bit 3	Status R4
Easy_Link_Inputs[5]		Bit 4	Status R5
Easy_Link_Inputs[6]		Bit 5	Status R6
Easy_Link_Inputs[7]		Bit 6	Status R7
Easy_Link_Inputs[8]		Bit 7	Status R8
Easy_Link_Inputs[9]	Octet 2	Bit 0	Status R9
Easy_Link_Inputs[10]		bit1	Status R10
Easy_Link_Inputs[11]		Bit 2	Status R11
Easy_Link_Inputs[12]		Bit 3	Status R12
Easy_Link_Inputs[13]		Bit 4	Status R13
Easy_Link_Inputs[14]		Bit 5	Status R14
Easy_Link_Inputs[15]		Bit 6	Status R15
Easy_Link_Inputs[16]		Bit 7	Status R16

→ A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy Link output data" object

This object contains the current status of the output data on the Easy-Link of an easy basic unit.

This object can only be read. It can only be addressed by a Class 2 DPV1 master.

Use
Use this object to query the current status of the Easy-Link output data (S1 to S8) that is transferred by the class 1 DP master in the cyclical DP data.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 99.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_Link_Outputs	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 184: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_Link_Outputs[1]	Octet 1	Bit 0	Status S1
Easy_Link_Outputs[2]		bit1	Status S2
Easy_Link_Outputs[3]		Bit 2	Status S3
Easy_Link_Outputs[4]		Bit 3	Status S4
Easy_Link_Outputs[5]		Bit 4	Status S5
Easy_Link_Outputs[6]		Bit 5	Status S6
Easy_Link_Outputs[7]		Bit 6	Status S7
Easy_Link_Outputs[8]		Bit 7	Status S8

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

Read/write function block data

"Easy 600 timing relay parameters T1 to T8" objects

These 8 objects contain the parameters of the 8 timing relays of the easy600.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- query the current parameters of the timing relays (T1 to T8) of an easy600
- transfer new parameters for the timing relays of an easy600.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 211 to 218 for the timing relays T1 to T8.

Length of objects
The data to be read is 6 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

The data to be written is 5 octets in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system in order to read the parameters of a timing relay:

Name	Data Type
Easy_600_Timer_Act_Val	STRUCT
Function	BYTE or USINT
Time range	BYTE or USINT
Parameter_menu	BYTE or USINT
Control status	BYTE or USINT
Act_Val	WORD or UINT

Declare the following variable (data function block) in an IEC 61131-3 based system in order to write the parameters of a timing relay:

Name	Data Type
Easy_600_Timer_Setpoint	ARRAY [1..5] OF BYTE or ARRAY [1..5] OF USINT

Data contents of the objects

The following tables shows the address location and meaning of the data contents of the objects when reading the parameters of a timing relay. It also illustrates in an example how to access the data using the defined variable.

Table 185: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_600_Timer_Act_Val.Function	Octet 1	Function of the timing relay → table 187
Easy_600_Timer_Act_Val.Time_Range	Octet 2	Time range of the timing relay → table 188
Easy_600_Timer_Act_Val.Parameter_Menu	Octet 3	Timing relay in the Parameters menu → table 189
Easy_600_Timer_Act_Val.Controlstatus	Octet 4	Control status of the timing relay → table 190
Easy_600_Timer_Act_Val.TimeValue	Octet 5, 6	Time value of the timing relay [1/100 s] with a time range in seconds [s] with a time range in minutes: seconds [min] with a time range in hours: minutes

→ When accessing the data of the "timing relay time value" observe the Motorola coding format (octet N: High byte, octet N+1: Low byte) used in PROFIBUS-DP. If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

The following tables shows the address location and meaning of the data contents of the objects when writing the parameters of a timing relay. It also illustrates in an example how to access the data using the defined variable.

Table 186: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_600_Timer_Setpoint[1]	Octet 1	Function of the timing relay → table 187
Easy_600_Timer_Setpoint[2]	Octet 2	Time range of the timing relay → table 188
Easy_600_Timer_Setpoint[3]	Octet 3	Timing relay in the Parameters menu → table 189
Easy_600_Timer_Setpoint[4]	Octet 4	Time setpoint of the timing relay → table 191
Easy_600_Timer_Setpoint[5]	Octet 5	

Table 168 shows the coding of the data contents for the function of the timing relay.

Table 187: Function of the timing relay

Value (hex)	Function
00	On-delayed
01	Off-delayed
02	On time with random switching
03	Off-delayed with random switching
04	Single pulse
05	Flashing

Table 188: Time range of the timing relay

Value (hex)	Time range
00	Seconds
01	Minutes:Seconds
02	Hours:Seconds

Table 189: Parameters menu of the timing relay

Value (hex)	Parameters menu
00	Timing relay appears in the Parameters menu
01	Timing relay does not appear in the Parameters menu

Table 190: Control status of the timing relay

Value (hex)	Control status
00	Timing relay not used by operating system
01	Timing relay used by operating system

Table 191: Time setpoint of the timing relay

Data position		Meaning	Explanation
Octet 4	Bit 4 to 7	Value of less significant unit, tens digit	1/100 seconds (00 to 99) with seconds time range; Seconds (00 to 59) with minutes time range:Seconds; Minutes (00 to 59) with hours time range:hours minutes
	Bit 0 to 3	Value of less significant unit, ones digit	
Octet 5	Bit 4 to 7	Value of more significant unit, tens digit	Seconds (00 to 99) with seconds time range; Minutes (00 to 99) with minutes:seconds time range; Hours (00 to 99) with hours:minutes time range
	Bit 0 to 3	Value of more significant unit, ones digit	

"Easy 600 counters C1 to C8 parameters" objects

These 8 objects contain the parameters of the 8 counters of the easy600.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- query the current parameters of the counters (C1 to C8) of an easy600
- transfer new parameters for the counters of an easy600

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 221 to 228 for the counters C1 to C8.

Length of objects
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

The data to be written is 3 octets in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system in order to read the parameters of a counter:

Name	Data Type
Easy_600_Counter_Act_Val	WORD or UINT

Declare the following variable (data function block) in an IEC 61131-3 based system in order to write the parameters of a counter:

Name	Data Type
Easy_600_Counter_Setpoint	STRUCT
Counter value	WORD or UINT
Parameter_menu	BYTE or USINT

Data contents of the objects

The following tables shows the address location and meaning of the data contents of the objects when reading the parameters of a counter. It also illustrates in an example how to access the data using the defined variable.

Table 192: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_600_Counter_Act_Val	Octets 1 and 2	Counter actual value

→ When accessing the data of the "timing relay time value" observe the Motorola coding format (octet N: High byte, octet N+1: Low byte) used in PROFIBUS-DP. If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

The following tables shows the address location and meaning of the data contents of the objects when writing the parameters of a counter. It also illustrates in an example how to access the data using the defined variable.

Table 193: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_600_Counter_Setpoint.CounterValue	Octets 1 and 2	Setpoint of the counter
Easy_600_Counter_Setpoint.Parameter_Menu	Octet 3	Counter in the Parameters menu → table 194

→ When accessing the data of the "timing relay time value" observe the Motorola coding format (octet N: High byte, octet N+1: Low byte) used in PROFIBUS-DP. If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

Table 194: Parameters menu of the counter

Value (hex)	Parameters menu
00	Counter in the Parameters menu
01	Counter should not appear in the Parameters menu

"Easy 600 analog value comparator A1 to A8 parameter" objects

These 8 objects contain the parameters of the 8 analog value comparators of the easy600.

These objects can only be written. They can be addressed by a Class 1 and/or Class 2 DPV1 master

Use
Use these objects to transfer new parameters for the analog value comparators of an easy600

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 231 to 238 for the analog value comparators A1 to A8.

Length of objects
The data to be written is 3 octets in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system in order to write the parameters of an analog value comparator:

Name	Data Type
Easy_600_AnalogVal_Cmp	ARRAY [1..3] OF BYTE or ARRAY [1..3] OF USINT

Data contents of the objects

The following tables shows the address location and meaning of the data contents of the objects when writing the parameters of an analog value comparator. It also illustrates in an example how to access the data using the defined variable.

Table 195: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_600_AnalogVal_Cmp[1]	Octet 1	Function of the analog value comparator → table 196
Easy_600_AnalogVal_Cmp[2]	Octet 2	Comparison value
Easy_600_AnalogVal_Cmp[3]	Octet 3	Analog value comparator in the Parameters menu → table 197

Table 196: Function of the analog value comparator

Value (hex)	Function
00	Comparison between I7 ≦ I8
01	Comparison between I7 ≧ I8
02	Comparison between I7 ≦ comparison value
03	Comparison between I7 ≧ comparison value
04	Comparison between I8 ≦ comparison value
05	Comparison between I8 ≧ comparison value

Table 197: Parameters menu of the analog value comparator

Value (hex)	Parameters menu
00	Counter in the Parameters menu
01	Counter should not appear in the Parameters menu

"Easy 600 Parameters for 7-day time switch 1 channel A to 7-day time switch 4 channel D" objects

These 16 objects contain the parameters of each of the 4 channels of the 4 7-day time switches of the easy600.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- obtain information about the actual parameters of the channels of the 7-day time switches (1 to 4) of an easy600
- transfer new parameters for the channels of the 7-day time switches of an easy600.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index equals 239 to 242 for channel A to channel D of the 7-day time switch 1
- Index equals 243 to 246 for channel A to channel D of the 7-day time switch 2
- Index equals 247 to 250 for channel A to channel D of the 7-day time switch 1
- Index equals 251 to 254 for channel A to channel D of the 7-day time switch 1.

Length of objects
The length of the data to be read or written is 8 octets. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

In an IEC 61131-3-based system, declare the following variable (data function block) for reading and writing the parameters of a channel:

Name	Data Type
Easy_600_Channel_TimeSwitch	ARRAY [1..8] OF BYTE or ARRAY [1..8] OF USINT

Data contents of the objects

The following table shows the address location and meaning of the data content of the objects when reading or writing the parameters of a channel of a 7-day time switch. This also shows an example of how you access this data content using the defined variable as an example.

Table 198: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_600_Channel_TimeSwitch[1]	Octet 1		Weekday starting → table 199
Easy_600_Channel_TimeSwitch[2]	Octet 2		Weekday ending → table 199
Easy_600_Channel_TimeSwitch[3]	Octet 3	Bit 4 to 7	Minute On switch tens digit
		Bit 0 to 3	Minute On switch ones digit
Easy_600_Channel_TimeSwitch[4]	Octet 4	Bit 4 to 7	Hour On switch tens digit
		Bit 0 to 3	Hour On switch ones digit
Easy_600_Channel_TimeSwitch[5]	Octet 5	Bit 4 to 7	Minute Off switch tens digit
		Bit 0 to 3	Minute Off switch ones digit
Easy_600_Channel_TimeSwitch[6]	Octet 6	Bit 4 to 7	Hours Off switch tens digit
		Bit 0 to 3	Hours Off switch ones digit
Easy_600_Channel_TimeSwitch[7]	Octet 7		Switch time → table 200
Easy_600_Channel_TimeSwitch[8]	Octet 8		Channel of the time switch in the Parameters menu → table 201

Table 199: Week day of the channel of a 7-day time switch

Value (hex)	Meaning
00	None set
01	Monday
02	Tuesday
03	Wednesday
04	Thursday
05	Friday
06	Saturday
07	Sunday

Table 200: Switch time of the channel of a 7-day time switch

Value (hex)	Meaning
00	Switch time On < Off
01	Switch time On > Off

Table 201: Parameters menu of the channel of a 7-day time switch

Value (hex)	Meaning
00	Channel of the time switch appears in the Parameters menu
01	Channel of the time switch does not appear in the Parameters menu

Read/write date and time

"Easy clock" object

This object contains date and time of the real-time clock of an easy basic unit.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- read out the current time and the current date of an easy600
- set the time and date of an easy600.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 97.

Length of the object
The length of the data to be read or written is 8 octets. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system in order to read and write the parameters of the real-time clock:

Name	Data Type
Easy_Clock	DATE_AND_TIME

Data content of the object

The following table shows the address location and meaning of the data contained in the object when reading and writing. It also illustrates in an example how to access the data using the defined variable.

Table 202: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_Clock	Octet 1 – 8	Time and date of easy → table 203

Table 203: BCD coding of the time and date data

Data position		Meaning	Explanation
Octet 1	Bit 4 to 7	Year number, tens digit	Value 90 same as 1990 Value 99 same as 1999 Value 00 same as 2000 Value 89 same as 2089
	Bit 0 to 3	Year number, ones digit	
Octet 2	Bit 4 to 7	Month number, tens digit	
	Bit 0 to 3	Month number, ones digit	
Octet 3	Bit 4 to 7	Day number, tens digit	
	Bit 0 to 3	Day number, ones digit	
Octet 4	Bit 4 to 7	Hour number, tens digit	
	Bit 0 to 3	Hour number, ones digit	
Octet 5	Bit 4 to 7	Minute number, tens digit	
	Bit 0 to 3	Minute number, ones digit	
Octet 6	Bit 4 to 7	Seconds number, tens digit	
	Bit 0 to 3	Seconds number, ones digit	

Data position		Meaning	Explanation
Octet 7	Bit 4 to 7	Millisecond number, hundreds digit	
	Bit 0 to 3	Millisecond number, tens digit	
Octet 8	Bit 4 to 7	Millisecond number, ones digit	
	Bit 0 to 3	Day of week	Value 1 corresponds to Sunday Value 2 corresponds to Monday …. Value 7 corresponds to Saturday

→ The time in the easy600 does not internally use year, month, day and milliseconds. The corresponding data fields are therefore assigned with "0" when the object is read. The values in these data fields are ignored when the object is written.

Read/write DST

Easy 600 DST setting objects

This object contains the DST setting of the easy600.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- read the current DST setting of an easy600 clock.
- set the current DST setting of an easy600 clock.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 210.

Length of the object
The length of the data to be read or written is 1 octet. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system in order to read and write the DST setting:

Name	Data Type
Easy_600_Clock_Setting	Byte

Data content of the object

The following table shows the address location and meaning of the data contained in the object when reading and writing. It also illustrates in an example how to access the data using the defined variable.

Table 204: Address location and meaning of the data

Variable access (example)	Data position	Designation
Easy_600_Clock_Setting	Octet 1	Setting of the easy clock to DST → table 205

Table 205: Coding of the easy600 DST setting

Value (hex)	Effect
00	Easy is / will be set to winter time
01	Easy is / will be set to summer time

11 Process Data for easy700 (DPV1)

The PROFIBUS DPV1 functionality of the EASY204-DP (from device version 07) enables you to access the following data areas of an easy700 from a Class 1 or Class 2 DPV1 master:

- Identification
- Operating Mode
- Image
- Function Blocks
- Date and time
- Summer-/winter switchover

The data from these ranges is located in Process Data Objects (data records) and can be read and/or written with the DPV1 "Read" and "Write" services.

Object overview

The following overview shows all the objects contained in the EASY204-DP that are available for a connected easy700.

→ The attributes API, Slot Number and Index form the address information for the DP master in order to access an object. Refer to the following section for further information about this.

Table 206: Process data objects EASY204-DP for easy700

Object name	API	Slot Number	Index	Data length (octets)	Read (R) Write (W)	→ Page
Easy operating mode	0	0	100	1	R/W	265
Easy identification	0	1	100	50	R	263
Image data						
EASY 700/800 inputs I1 – I16)	0	1	250	2	R	304
Easy 700/800 analog inputs IA1 to IA4	0	1	197 – 200	2	R	306
Easy 700/800 outputs (Q1 – Q8)	0	1	251	1	R	308
Easy700/800 pushbuttons	0	1	249	1	R	310
Easy 700 analog value comparators	0	2	1	2	R	312
Easy 700 7-day time switches	0	2	2	1	R	314
Easy 700 year time switches	0	2	3	1	R	316
Easy 700 master reset	0	2	4	1	R	318
Easy 700 text function blocks	0	2	5	2	R	320
Easy 700 timing relays	0	2	6	2	R	322
Easy 700 counters	0	2	7	2	R	324
Easy 700 operating hours counters	0	2	8	1	R	326

Object name	API	Slot Number	Index	Data length (octets)	Read (R) Write (W)	→ Page
Easy 700 actual value M markers	0	2	11	2	R	328
Easy 700 actual value N markers	0	2	12	2	R	330
Easy 700 new value markers M1 to M16	0	2	101 – 116	1	W	334
Easy 700 new value markers N1 to N16	0	0	117 – 132	1	W	334
Easy Link input data (R1 – R16)	0	0	98	2	R/W	277
Easy Link output data (S1 – S8)	0	0	99	1	R	279
Function blocks						
Easy 700/800 write data function block	0	1	97	8	W	341
Easy 700/800 selection of the data function block	0	1	99	4	W	337
Easy 700/800 read data function block	0	1	98	4	R	339
Easy clock	0	0	97	8	R/W	294
Easy 700 DST setting	0	2	9	16	R/W	356

Accessing objects

Access to the Process Data Objects in the EASY204-DP via the Read and Write DPV1 services is implemented with the help of the functions provided by the DP master system. Refer to the documentation of the manufacturer. Normally function blocks are provided for the access. In IEC 61131-3 based systems, the function blocks RDREC (Read) and WRREC (Write) function blocks defined by the PROFIBUS user organization in specification 2.182 are offered which enable optimum access to complex data structures.

The following is required to access the objects:

- The address of the local DPV1 master interface
- The station address of the EASY204-DP to be accessed
- The identifier of the application (API) in EASY204-DP (specification only required for Class 2 DPV1 master)
- The module to be addressed in EASY204-DP (Slot Number)
- The address (Index) of the required Process Data Object in the addressed EASY204-DP module
- The data length of the required Process Data Object
- A defined variable (memory range) in the local application that is to be assigned to the read data or containing the data to be written.

Refer to the topology of your master system for the address of the local DPV1 master interface. Refer to the PROFIBUS topology for the station address of the EASY204-DP.

The API must be defined with 0 for all process data objects of the EASY204-DP (only required with Class 2 DPV1 master).

- The following sections show the slot number, the index, the data length and an example variable definition (declaration) for an IEC 61131-3 based system for each process data object provided in the EASY204-DP for a connected easy700.

Read identification

"Easy identification" object

The description of this object is identical to the easy600 (DPV1), → page 263.

Read/write mode

"Easy mode" object

The description of this object is identical to the easy600 (DPV1), → page 265.

Read/write image

"Easy 700/800 inputs" object

This object contains the current status of the inputs of an easy700 or an easy800/MFD.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the digital inputs (I1 to I16) of an easy700 or easy800/MFD.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 250.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_Inputs	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 207: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_800_Inputs[1]	Octet 1	Bit 0	Status I1
Easy_700_800_Inputs[2]		bit1	Status I2
Easy_700_800_Inputs[3]		Bit 2	Status I3
Easy_700_800_Inputs[4]		Bit 3	Status I4
Easy_700_800_Inputs[5]		Bit 4	Status I5
Easy_700_800_Inputs[6]		Bit 5	Status I6
Easy_700_800_Inputs[7]		Bit 6	Status I7
Easy_700_800_Inputs[8]		Bit 7	Status I8
Easy_700_800_Inputs[9]	Octet 2	Bit 0	Status I9
Easy_700_800_Inputs[10]		bit1	Status I10
Easy_700_800_Inputs[11]		Bit 2	Status I11
Easy_700_800_Inputs[12]		Bit 3	Status I12
Easy_700_800_Inputs[13]		Bit 4	Status I13
Easy_700_800_Inputs[14]		Bit 5	Status I14
Easy_700_800_Inputs[15]		Bit 6	Status I15
Easy_700_800_Inputs[16]		Bit 7	Status I16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700/800 analog inputs IA1 to IA4" objects

These objects contain the current status of the analog inputs of an easy700 or an easy800/MFD.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to query the current status of the analog inputs (IA1 to IA4) of an easy700 or easy800/MFD.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 197 to 200 for the analog inputs IA1 to IA4.

Length of objects
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_Analog_I	Word or UINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 208: Address location and meaning of the data of the objects

Variable access (example)	Data position	Meaning
Easy_700_800_Analog_I	Octets 1 and 2	Value of the analog input IA

→ When accessing the data of the "value of the analog input IA" observe the Motorola coding format (octet N: High byte, octet N+1: Low byte) used in PROFIBUS-DP. If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

"Easy 700/800 outputs" objects

This object contains the current status of the outputs of an easy700 or an easy800/MFD.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the digital outputs (Q1 to Q8) of an easy700 or easy800/MFD.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 251.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_Outputs	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 209: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_800_Outputs[1]	Octet 1	Bit 0	Status of Q1
Easy_700_800_Outputs[2]		bit1	Status of Q2
Easy_700_800_Outputs[3]		Bit 2	Status of Q3
Easy_700_800_Outputs[4]		Bit 3	Status of Q4
Easy_700_800_Outputs[5]		Bit 4	Status of Q5
Easy_700_800_Outputs[6]		Bit 5	Status of Q6
Easy_700_800_Outputs[7]		Bit 6	Status of Q7
Easy_700_800_Outputs[8]		Bit 7	Status of Q8

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700/800 pushbuttons" object

This object contains the current status of the pushbuttons of an easy700 or an easy800/MFD.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the pushbuttons (P1 to P4) of an easy700 or easy800/MFD.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 249.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_Pushbuttons	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 210: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_800_Pushbuttons[1]	Octet 1	Bit 0	Status P1
Easy_700_800_Pushbuttons[2]		bit1	Status P2
Easy_700_800_Pushbuttons[3]		Bit 2	Status P3
Easy_700_800_Pushbuttons[4]		Bit 3	Status P4
		Bit 4	Not used
		Bit 5	Not used
		Bit 6	Not used
		Bit 7	Not used

A set bit corresponds to an actuated (depressed) push-button, an unset bit corresponds to an unactuated push-button.

"Easy 700 analog value comparators" object

This object contains the current status of the analog value comparators of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the analog value comparators (A1 to A16) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 1.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_AnalogVal_Cmp	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 211: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_AnalogVal_Cmp[1]	Octet 1	Bit 0	Status A1
Easy_700_AnalogVal_Cmp[2]		bit1	Status A2
Easy_700_AnalogVal_Cmp[3]		Bit 2	Status A3
Easy_700_AnalogVal_Cmp[4]		Bit 3	Status A4
Easy_700_AnalogVal_Cmp[5]		Bit 4	Status A5
Easy_700_AnalogVal_Cmp[6]		Bit 5	Status A6
Easy_700_AnalogVal_Cmp[7]		Bit 6	Status A7
Easy_700_AnalogVal_Cmp[8]		Bit 7	Status A8
Easy_700_AnalogVal_Cmp[9]	Octet 2	Bit 0	Status A9
Easy_700_AnalogVal_Cmp[10]		bit1	Status A10
Easy_700_AnalogVal_Cmp[11]		Bit 2	Status A11
Easy_700_AnalogVal_Cmp[12]		Bit 3	Status A12
Easy_700_AnalogVal_Cmp[13]		Bit 4	Status A13
Easy_700_AnalogVal_Cmp[14]		Bit 5	Status A14
Easy_700_AnalogVal_Cmp[15]		Bit 6	Status A15
Easy_700_AnalogVal_Cmp[16]		Bit 7	Status A16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 7-day time switches" object

This object contains the current status of the weekly timers of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the counters (C71 to C78) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 2.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_weekly timer	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 212: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_weekly timer[1]	Octet 1	Bit 0	Status 1
Easy_700_weekly timer[2]		bit1	Status 2
Easy_700_weekly timer[3]		Bit 2	Status 3
Easy_700_weekly timer[4]		Bit 3	Status 4
Easy_700_weekly timer[5]		Bit 4	Status 5
Easy_700_weekly timer[6]		Bit 5	Status 6
Easy_700_weekly timer[7]		Bit 6	Status 7
Easy_700_weekly timer[8]		Bit 7	Status 8

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 year time switches" objects

This object contains the current status of the year time switches of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the year time switches (Y1 to Y8) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 3.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Year_TimeSwitch	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 213: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_Year_TimeSwitch[1]	Octet 1	Bit 0	Status Y1
Easy_700_Year_TimeSwitch[2]		bit1	Status Y2
Easy_700_Year_TimeSwitch[3]		Bit 2	Status Y3
Easy_700_Year_TimeSwitch[4]		Bit 3	Status Y4
Easy_700_Year_TimeSwitch[5]		Bit 4	Status Y5
Easy_700_Year_TimeSwitch[6]		Bit 5	Status Y6
Easy_700_Year_TimeSwitch[7]		Bit 6	Status Y7
Easy_700_Year_TimeSwitch[8]		Bit 7	Status Y8

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 master reset" object

This object contains the current status of the master reset of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the master reset (M1 to M4) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 4.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Master_Reset	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 214: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_Master_Reset[1]	Octet 1	Bit 0	Status Z1
Easy_700_Master_Reset[2]		bit1	Status Z2
Easy_700_Master_Reset[3]		Bit 2	Status Z3
Easy_700_Master_Reset[4]		Bit 3	Status Z4
		Bit 4	Not used
		Bit 5	Not used
		Bit 6	Not used
		Bit 7	Not used

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 text function blocks" object

This object contains the current status of the text function blocks of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the text function blocks (D1 to D16) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 5.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_TextFB	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 215: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_TextFB[1]	Octet 1	Bit 0	Status D1
Easy_700_TextFB[2]		bit1	Status D2
Easy_700_TextFB[3]		Bit 2	Status D3
Easy_700_TextFB[4]		Bit 3	Status D4
Easy_700_TextFB[5]		Bit 4	Status D5
Easy_700_TextFB[6]		Bit 5	Status D6
Easy_700_TextFB[7]		Bit 6	Status D7
Easy_700_TextFB[8]		Bit 7	Status D8
Easy_700_TextFB[9]	Octet 2	Bit 0	Status D9
Easy_700_TextFB[10]		bit1	Status D10
Easy_700_TextFB[11]		Bit 2	Status D11
Easy_700_TextFB[12]		Bit 3	Status D12
Easy_700_TextFB[13]		Bit 4	Status D13
Easy_700_TextFB[14]		Bit 5	Status D14
Easy_700_TextFB[15]		Bit 6	Status D15
Easy_700_TextFB[16]		Bit 7	Status D16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 timing relays" objects

This object contains the current status of the timing relays of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the timing relays (T1 to T16) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 6.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Timers	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 216: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_Timer[1]	Octet 1	Bit 0	Status T1
Easy_700_Timer[2]		bit1	Status T2
Easy_700_Timer[3]		Bit 2	Status T3
Easy_700_Timer[4]		Bit 3	Status T4
Easy_700_Timer[5]		Bit 4	Status T5
Easy_700_Timer[6]		Bit 5	Status T6
Easy_700_Timer[7]		Bit 6	Status T7
Easy_700_Timer[8]		Bit 7	Status T8
Easy_700_Timer[9]	Octet 2	Bit 0	Status T9
Easy_700_Timer[10]		bit1	Status T10
Easy_700_Timer[11]		Bit 2	Status T11
Easy_700_Timer[12]		Bit 3	Status T12
Easy_700_Timer[13]		Bit 4	Status T13
Easy_700_Timer[14]		Bit 5	Status T14
Easy_700_Timer[15]		Bit 6	Status T15
Easy_700_Timer[16]		Bit 7	Status T16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 counters" object

This object contains the current status of the counters of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the counters (C1 to C16) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 7.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Counter	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 217: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_Counter[1]	Octet 1	Bit 0	Status C1
Easy_700_Counter[2]		bit1	Status C2
Easy_700_Counter[3]		Bit 2	Status C3
Easy_700_Counter[4]		Bit 3	Status C4
Easy_700_Counter[5]		Bit 4	Status C5
Easy_700_Counter[6]		Bit 5	Status C6
Easy_700_Counter[7]		Bit 6	Status C7
Easy_700_Counter[8]		Bit 7	Status C8
Easy_700_Counter[9]	Octet 2	Bit 0	Status C9
Easy_700_Counter[10]		bit1	Status C10
Easy_700_Counter[11]		Bit 2	Status C11
Easy_700_Counter[12]		Bit 3	Status C12
Easy_700_Counter[13]		Bit 4	Status C13
Easy_700_Counter[14]		Bit 5	Status C14
Easy_700_Counter[15]		Bit 6	Status C15
Easy_700_Counter[16]		Bit 7	Status C16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 operating hours counters" object

This object contains the current status of the operating hours counters of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the operating hours counters (O1 to O4) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 8.

Length of the object
The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Hours_of_Operation	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 218: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_Hours_of_Operation[1]	Octet 1	Bit 0	Status O1
Easy_700_Hours_of_Operation[2]		bit1	Status O2
Easy_700_Hours_of_Operation[3]		Bit 2	Status O3
Easy_700_Hours_of_Operation[4]		Bit 3	Status O4
		Bit 4	Not used
		Bit 5	Not used
		Bit 6	Not used
		Bit 7	Not used

→ A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 actual value M markers" object

This object contains the current status of the M markers of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the M markers (M1 to M16) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 11.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_M_Marker	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 219: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_M_Marker[1]	Octet 1	Bit 0	Status M1
Easy_700_M_Marker[2]		bit1	Status M2
Easy_700_M_Marker[3]		Bit 2	Status M3
Easy_700_M_Marker[4]		Bit 3	Status M4
Easy_700_M_Marker[5]		Bit 4	Status M5
Easy_700_M_Marker[6]		Bit 5	Status M6
Easy_700_M_Marker[7]		Bit 6	Status M7
Easy_700_M_Marker[8]		Bit 7	Status M8
Easy_700_M_Marker[9]	Octet 2	Bit 0	Status M9
Easy_700_M_Marker[10]		bit1	Status M10
Easy_700_M_Marker[11]		Bit 2	Status M11
Easy_700_M_Marker[12]		Bit 3	Status M12
Easy_700_M_Marker[13]		Bit 4	Status M13
Easy_700_M_Marker[14]		Bit 5	Status M14
Easy_700_M_Marker[15]		Bit 6	Status M15
Easy_700_M_Marker[16]		Bit 7	Status M16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 actual value N markers" object

This object contains the current status of the N markers of an easy700.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the N markers (N1 to N16) of an easy700.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 12.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_N_Marker	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 220: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_700_N_Marker[1]	Octet 1	Bit 0	Status N1
Easy_700_N_Marker[2]		bit1	Status N2
Easy_700_N_Marker[3]		Bit 2	Status N3
Easy_700_N_Marker[4]		Bit 3	Status N4
Easy_700_N_Marker[5]		Bit 4	Status N5
Easy_700_N_Marker[6]		Bit 5	Status N6
Easy_700_N_Marker[7]		Bit 6	Status N7
Easy_700_N_Marker[8]		Bit 7	Status N8
Easy_700_N_Marker[9]	Octet 2	Bit 0	Status N9
Easy_700_N_Marker[10]		bit1	Status N10
Easy_700_N_Marker[11]		Bit 2	Status N11
Easy_700_N_Marker[12]		Bit 3	Status N12
Easy_700_N_Marker[13]		Bit 4	Status N13
Easy_700_N_Marker[14]		Bit 5	Status N14
Easy_700_N_Marker[15]		Bit 6	Status N15
Easy_700_N_Marker[16]		Bit 7	Status N16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 700 new value markers M1 to M16" objects

These objects enable the status of the M markers of an easy700 to be controlled.

These objects can only be written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to control the current status of the M markers (M1 to M16) of an easy700.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 101 to 116 for the markers M1 to M16.

Length of objects
The data to be written is 1 octet in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Setp_M_Marker	BYTE or USINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 221: Address location and meaning of the data of the objects

Variable access (example)	Data position	Meaning
Easy_700_Setp_M_Marker	Octet 1	Setpoint for M markers: 00 = FALSE FF = TRUE

"Easy 700 new value markers N1 to N16" objects

These objects enable the status of the N markers of an easy700 to be controlled.

These objects can only be written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to control the current status of the N markers (N1 to N16) of an easy700.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 117 to 132 for the markers N1 to N16.

Length of objects
The data to be written is 1 octet in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_Setp_N_Marker	BYTE or USINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 222: Address location and meaning of the data of the objects

Variable access (example)	Data position	Meaning
Easy_700_Setp_N_Marker	Octet 1	Setpoint for N markers: 00 = FALSE FF = TRUE

"Easy Link input data" object

The description of this object is identical to the easy600 (DPV1), → page 277.

"Easy Link output data" object

The description of this object is identical to the easy600 (DPV1), → page 279.

Read/write function block data

Procedure

The following generic objects simplify the reading and writing of function block data:

- "Easy 700/800 select data function block"
- "Easy 700/800 read data function block"
- "Easy 700/800 write data function block".

Two object accesses are required in order to read the data of a function block:

- Selection of the required function block data for the subsequent read operation:
  → "Easy 700/800 function block data selection" object , page 337.
- Reading of the selected function block data:
  → "Easy 700/800 read function block data" object , page 339.

Only one object access is required in order to write the data of a function block. The selection of the required function block data and the transfer of the new values for this are executed simultaneously.

→ "Easy 700/800 write function block data" object , page 341.

"Easy 700/800 function block data selection" object

This object is used to select the data of an easy700 function block that you later wish to read.

This object can only be written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to select the required data of an easy700 function block for one or several subsequent read accesses with the "Easy 700/800 read function block data" object. The selection is valid for all subsequent read accesses until you have selected new data by writing to the "Easy 700/800 function block data selection" object.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 99.

Length of the object
The data to be written is 4 octets in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_Addr_FB_Read	ARRAY [1..4] OF BYTE or ARRAY [1..4] OF USINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 223: Address location and meaning of the data

Variable access (example)	Data position	Meaning	
Easy_700_800_Ad_FB_Read[1]	Octet 1	Command	8Dhex for easy700
			$B2_{hex}$ for easy800/MFD
Easy_700_800_Ad_FB_Read[2]	Octet 2	Part no.	→ Function Block Description
Easy_700_800_Ad_FB_Read[3]	Octet 3	Instance	
Easy_700_800_Ad_FB_Read[4]	Octet 4	Index	

Octet 2 to octet 4 (Type, Instance, Index) identify which function block data is to be read using the "Easy 700/800 read function block data" object. This information is specific for the function block data concerned and can be obtained from the function block description.

"Easy 700/800 read function block data" object

This object is used to read the required data of an easy700 function block.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to read the required data of an easy700 function block.

→ You must have selected the required data beforehand by writing the "Easy 700/800 select function block data" object.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 98.

Length of the object
The data to be read is 8 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_FB_Read	ARRAY [1..8] OF BYTE or ARRAY [1..8] OF USINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 224: Address location and meaning of the data

Variable access (example)	Data position	Meaning	
Easy_700_800_FB_Read[1]	Octet 1	Command	89_{hex} for easy700
			92hex for easy800/MFD
Easy_700_800_FB_Read[2]	Octet 2	Part no.	→ Function Block Description
Easy_700_800_FB_Read[3]	Octet 3	Instance	
Easy_700_800_FB_Read[4]	Octet 4	Index	
Easy_700_800_FB_Read[5]	Octet 5	Data 1	
Easy_700_800_FB_Read[6]	Octet 6	Data 2	
Easy_700_800_FB_Read[7]	Octet 7	Data 3	
Easy_700_800_FB_Read[8]	Octet 8	Data 4	

Octet 2 to octet 4 (type, instance, index) identify which function block data was read.

→ This information is the same as the selection you have made by writing the "Easy 700/800 select function block data" object.

Octet 5 to octet 8 (Data 1 to Data 4) contain the actual value of the read function block data. The structure and meaning of these values are specific for the read function block data. Refer to the relevant description of the function block about this (from page 343).

"Easy 700/800 write function block data" object

Use this object to select the required data of an easy700 function block and transfer new values to it.

This object can only be written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to assign new values to the required data of an easy700 function block.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 97.

Length of the object
The data to be written is 8 octets in length. Do not enter any different length when calling the "Write" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_700_800_FB_Write	ARRAY [1..8] OF BYTE or ARRAY [1..8] OF USINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 225: Address location and meaning of the data

Variable access (example)	Data position	Meaning	
Easy_700_800_FB_Write[1]	Octet 1	Command	$8D_{hex}$ for easy700
			$B2_{hex}$ for easy800/MFD
Easy_700_800_FB_Write[2]	Octet 2	Part no.	→ Function Block Description
Easy_700_800_FB_Write[3]	Octet 3	Instance	
Easy_700_800_FB_Write[4]	Octet 4	Index	
Easy_700_800_FB_Write[5]	Octet 5	Data 1	
Easy_700_800_FB_Write[6]	Octet 6	Data 2	
Easy_700_800_FB_Write[7]	Octet 7	Data 3	
Easy_700_800_FB_Write[8]	Octet 8	Data 4	

Octet 2 to octet 4 (type, instance, index) identify which function block data is to be written. The corresponding information is specific for the function block data concerned and is explained in the following sections of the relevant function block.

Octet 5 to octet 8 (Data 1 to Data 4) contain the actual value of the function block data to be written. The structure and meaning of these values are specific for the function block data concerned and are explained in the following sections of the relevant function block. Note the information given in these section concerning which function block data can be written under which conditions.

Analog value comparator/threshold comparator: A1 – A16

Operand selection	Value (hex)
Part No	8D
Instance[1)]	00 – 0F
Index	00 - 07, → table 226

1) The value 00_{hex} selects the analog value comparator A1, the value 0Fhex the analog value comparator A16.

Table 226: Operand overview

Index	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Parameters	→ table 227		–	–	R
01	Control byte	–		→ table 228	–	R
02	Comparison value I1	WORD or UINT1[1)]		–	–	R/W[2)]
03	Comparison value I2	WORD or UINT[1)]		–	–	R/W[2)]
04	Gain factor for F1 (I1 = F1*I1)	WORD or UINT[1)]		–	–	R/W[2)]
05	Gain factor for I2 (I2 = F2*I2)	WORD or UINT[1)]		–	–	R/W[2)]
06	Offset OS (I1 = OS + actual value at I1)	WORD or UINT[1)]		–	–	R/W[2)]
07	Switching hysteresis HY for value I2	WORD or UINT[1)]		–	–	R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 2 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 227: Index 00 – Parameters

Meaning	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Appears in the Parameters menu																	
Yes/no																	0/1
Compare																	
FB not used														0	0	0	
EQ (=)														0	0	1	
GE (≧)														0	1	0	
LE (≦)														0	1	1	
GT (>)														1	0	0	
LT (<)														1	0	1	
Use as constant and therefore can be written to																	
I1= Constant													0/1				
F1= Constant												0/1					
I2= Constant											0/1						
F2 = Constant										0/1							
OS = Constant									0/1								
HY = Constant								0/1									
Not used		0	0	0	0	0	0										

Table 228: Index 01 – Control byte (Data 3)

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q1[1)]

1) Status 1 if comparison condition is fulfilled.

→ Further information on this function block is provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

Counters C1 – C16

Operand selection	Value (hex)
Part No	8F
Instance[1)]	00 – 0F
Index	00 - 0, → table 2293

1) The value 00_{hex} selects the counter C1, the value $0F_{hex}$ the counter C16.

Table 229: Operand overview

Index	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Parameters	→ table 230		–	–	R
01	Control byte	→ table 231		–	–	R
02	Actual value	WORD or UINT[1)]		–	–	R/W[2)]
03	Counter setpoint 2	WORD or UINT[1)]		–	–	R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 2 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 230: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Yes/no									0/1
Counter mode									
FB not used							0	0	
Up/down counter (N)							0	1	
High-speed up/down counter (H)							1	0	
Frequency counter (F)							1	1	
Use as constant and therefore can be written to									
Counter setpoint S1						0/1			
Unused bits		–	–	–	–				

Table 231: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	C[4)]	RE[3)]	D[2)]	Q1[1)]

1) Contact type
2) Count direction: 0 = up counting, 1 = down counting
3) Reset, the timing relay is reset (Reset coil)
4) Count coil, counts on every rising edge

→ Further information on this function block is provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

Operating hours counters O1 – O4

Operand selection	Value (hex)
Part No	92
Instance[1)]	00 – 03
Index	00 -– 03, → table 232

1) The value 00_{hex} selects the operating hours counter O1, the value 03_{hex} the operating hours counter O4.

Table 232: Operand overview

Index	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Parameters	→ table 233		–	–	R
01	Control byte	→ table 234		–	–	R
02	Actual value	WORD or UINT[1)]		–	–	R/W[2)]
03	Counter setpoint 2	WORD or UINT[1)]		–	–	R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 2 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 233: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Yes/no									0/1
Use in the program									
Setpoint S1								0/1	
Unused bits		–	–	–	–	–	–		

Table 234: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	–	RE[3]	EN[2]	Q1[1]

1) Contact type
2) Enable, the timing relay is started (Trigger coil)
3) Reset, the timing relay is reset (Reset coil)

→ Further information on this function block is provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

Timing relays T1 – T16

Operand selection	Value (hex)
Part No	92
Instance[1)]	00 – 0F
Index	00 - 04, → table 235

1) The value 00_{hex} selects the timing relay T1, the value $0F_{hex}$ the timing relay T16.

Table 235: Operand overview

Index	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Parameters	→ table 236		–	–	R
01	Control byte	→ table 237		–	–	R
02	Actual value 1	WORD or UINT[1)]		–	–	R/W[2)]
03	Time setpoint 1	WORD or UINT[1)]		–	–	R/W[2)]
	Time setpoint 2	WORD or UINT[1)]		–	–	R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 2 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 236: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Yes/no									0/1
Timer mode									
On-delayed						0	0	0	
Off-delayed						0	0	1	
On-delayed with random setpoint						0	1	0	
Off-delayed with random setpoint						0	1	1	
On and off delayed (two time setpoints)						1	0	0	
On and off delayed each with random setpoint (two time setpoints)						1	0	1	
Pulse transmitter						1	1	0	
Flashing relay (two time setpoints)						1	1	1	
Time base									
FB not used				0	0				
Millisecond: S				0	1				
Second: M:S				1	0				
Minute: H:M				1	1				
Use as constant and therefore can be written to									
Time setpoint S1			0/1						
Time setpoint S2		0/1							

Table 237: Index 01 – Control byte

	Bit	7	6	5	4	3	2	1	0
FB input/output Data 3		–	–	–	–	ST[4]	RE[3]	EN[2]	Q1[1]

1) Contact type
2) Enable, the timing relay is started (Trigger coil)
3) Reset, the timing relay is reset (Reset coil)
4) Stop, the timing relay is stopped (Stop coil)

→ Further information on this function block is provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

Year time switches Y1 – Y8

Operand selection	Value (hex)
Part No	A2
Instance[1)]	00 - 07
Index	→ table 238

1) The value 00_{hex} selects the year time switch Y1, the value 07hex the year time switch Y8.

Table 238: Operand overview

Index (hex)	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Parameters	→ table 239	–	–	–	R
01	Control byte → table 240	→ table 240	–	–	–	R
	Channel A					
11	ON time	Day[1)]	Month[1)]	Year2[)]	–	R/W[3)]
12	OFF time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]
	Channel B					
21	ON time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]
22	OFF time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]
	Channel C					
31	ON time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]
32	OFF time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]
	Channel D					
41	ON time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]
42	OFF time	Day[1)]	Month[1)]	Year[2)]	–	R/W[3)]

1) Value is transferred in hexadecimal code

2) Value transferred in hexadecimal code; 00 stands for the year 2000

3) The value can only be written if it is assigned to a constant in the program.

Table 239: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Channel A									0/1
Channel B								0/1	
Channel C							0/1		
Channel D						0/1			
Unused bits		–	–	–	–				

Table 240: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	–	–	–	Q1[1)]

1) Status 1, if the count condition is fulfilled.

Further information on this function block is provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

Weekly timers ⏲1 to ⏲8

Operand selection	Value (hex)
Part No	A1
Instance[1)]	00 - 07
Index	→ table 241

1) The value 00_{hex} for the instance selects the comparator function block ⏲1, the value 07_{hex} the comparator function block ⏲8.

Table 241: Operand overview

Index (hex)	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Parameters	→ table 242	–	–	–	R
01	Control byte	→ table 243	–	–	–	R
	Channel A					
11	Day on/off	Day on[1)]	Day off[1)]	–	–	R/W[3)]
12	On time	Hour[2)]	Minute[2)]	–	–	R/W[3)]
13	Off time	Hour[2)]	Minute[2)]	–	–	R/W[3)]
	Channel B					
21	Day on/off	Day on[1)]	Day off[1)]	–	–	R/W[3)]
22	ON time	Hour[2)]	Minute[2)]	–	–	R/W[3)]
23	OFF time	Hour[2)]	Minute[2)]	–	–	R/W[3)]
	Channel C					
31	Day on/off	Day on[1)]	Day off[1)]	–	–	R/W[3)]
32	ON time	Hour[2)]	Minute[2)]	–	–	R/W[3)]
33	OFF time	Hour[2)]	Minute[2)]	–	–	R/W[3)]

Index (hex)	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
	Channel D					
41	Day on/off	Day off[1)]	Month[1)]	–	–	R/W[3)]
42	ON time	Minute[2)]	Month[1)]	–	–	R/W[3)]
43	OFF time	Minute[2)]	Month[1)]	–	–	R/W[3)]

1) Value is transferred in hexadecimal code, 01 corresponds to Sunday … 07 corresponds to Saturday
2) Value is transferred in hexadecimal code
3) The value can only be written if it is assigned to a constant in the program.

Table 242: Index 00 – Parameters

Meaning	Bit	7	6	5	4	3	2	1	0
Appears in the Parameters menu									
Channel A									0/1
Channel B								0/1	
Channel C							0/1		
Channel D						0/1			
Unused bits		–	–	–	–				

Table 243: Index 01 – Control byte

Data 1	Bit	7	6	5	4	3	2	1	0
FB output		–	–	–	–	–	–	–	Q1[1)]

1) Status 1, if the count condition is fulfilled.

→ Further information on this function block is provided in the easy700 manual (MN05013003Z-EN, previous description AWB2528-1508GB) or in the easySoft Help.

Read/write date and time

"Easy clock" object

The description of this object is identical to the easy600 (DPV1), → page 294.

Read/write DST

"Easy 700 DST setting" objects

This object contains the DST setting of the easy700.

This object can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- transfer the current DST setting of an easy700 clock.
- transfer a new DST setting of an easy700 clock.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 2
- Index is 9.

Length of the object
The length of the data to be read or written is 16 octets. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system in order to read and write the DST setting:

Name	Data Type
Easy_700_Clock_DSTSetting	ARRAY [1..16] OF BYTE or ARRAY [1..16] OF USINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object when reading and writing. It also illustrates in an example how to access the data using the defined variable.

Table 244: Address location and meaning of the data

Variable access (example)	Data position	Meaning	Value range (decimal)
Easy_700_Clock_ DST[1]	Octet 1	Changeover condition → table 245	0 up to 4
Easy_700_Clock_ DST[2]	Octet 2	Rule 1 for changeover to summer time → table 246	0 up to 5
Easy_700_Clock_ DST[3]	Octet 3	Weekday for changeover to summer time → table 247	0 up to 6
Easy_700_Clock_ DST[4]	Octet 4	Rule 2 for changeover to summer time → table 248	0 up to 2
Easy_700_Clock_ DST[5]	Octet 5	Day of changeover for change to summer time	1 to 31 BCD coding
Easy_700_Clock_ DST[6]	Octet 6	Month of changeover for change to summer time	1 to 12 BCD coding
Easy_700_Clock_ DST[7]	Octet 7	Hour of changeover for change to summer time	0 to 23 BCD coding
Easy_700_Clock_ DST[8]	Octet 8	Minute of changeover for change to summer time	0 to 59 BCD coding
Easy_700_Clock_ DST[9]	Octet 9	Time Difference → table 249	0 up to 5

Variable access (example)	Data position	Meaning	Value range (decimal)
Easy_700_Clock_ DST[10]	Octet 10	Rule 1 for changeover to winter time → table 246	0 up to 4
Easy_700_Clock_ DST[11]	Octet 11	Weekday for changeover to winter time → table 247	0 up to 5
Easy_700_Clock_ DST[12]	Octet 12	Rule 2 for changeover to winter time → table 248	0 up to 6
Easy_700_Clock_ DST[13]	Octet 13	Day of changeover for change to winter time	1 to 31 BCD coding
Easy_700_Clock_ DST[14]	Octet 14	Month of changeover for change to winter time	1 to 12 BCD coding
Easy_700_Clock_ DST[15]	Octet 15	Hour of changeover for change to winter time	0 to 23 BCD coding
Easy_700_Clock_ DST[16]	Octet 16	Minute of changeover for change to winter time	0 to 59 BCD coding

Octet 1 contains the changeover condition for the summer/winter changeover, Table 245 shows the possible changeover options.

Table 245: Changeover conditions for DST change

Value (hex)	Meaning	Note
00	No changeover	Octets 2 to 16 have no meaning
01	Changeover is according to: • Octet 2 to 9 for changeover to summer time • Octet 9 to 16 for changeover to winter time	
02	Changeover according to rules for EU	Octets 2 to 16 have no meaning
03	Changeover according to rules for GB	
04	Changeover according to rules for USA	

If the value 0 is entered in octet 1, there is not DST time change. When the values 2 to 4 are selected, the time change is automatic according to the legal requirements for the selected country.

If the value 1 is entered in octet 1, the DST changeover takes place according to the user-defined rules entered in octet 2 to 16.

Octet 2 contains the first rule for the changeover to summer time, octet 10 the rule for the changeover to winter time. Table 246 indicates the possible rules.

Table 246: Rule 1 for DST changeover

Value (hex)	Meaning	
00	The changeover takes place at the time defined in…	… • Octet 5 to 8 for changeover to summer time • Octet 13 to 16 for changeover to winter time In this case without meaning: • Octet 3 to 4 for changeover to summer time • Octet 11 to 12 for changeover to summer time
01	The changeover takes place on the first weekday defined in…	… • Octet 3 for changeover to summer time • Octet 11 for changeover to winter time in conjunction with the defined rule 2 in: • Octet 4 for changeover to summer time • Octet 12 for changeover to winter time
02[1)]	The changeover takes place on the second weekday defined in…	
03[1)]	The changeover takes place on the third weekday defined in…	
04[1)]	The changeover takes place on the fourth weekday defined in…	
05[1)]	The changeover takes place on the last weekday defined in…	

1) Rule 2, the meaning "in" must be entered. Rule 2 is defined in:

- Octet 4 for changeover to summer time
- Octet 12 for changeover to winter time

If octet 2 or octet 10 contains one of the values 1 to 5, the second rule must be defined for the changeover to summer time (octet 4) or winter time (octet 12). Table 247 indicates the possible rules.

Table 247: Rule 2 for DST changeover

Value (hex)	Meaning	Note
00[1)]	Changeover takes place **on** the defined weekday and month	The weekday is defined in: • Octet 3 for changeover to summer time • Octet 11 for changeover to winter time Month and date are defined in: • Octet 5 to 6 for changeover to summer time • Octet 13 to 14 for changeover to winter time
01	Changeover takes place on the defined weekday **after** the defined date	
02	Changeover takes place on the defined weekday **before** the defined date	

1) In this case without meaning:

- Octet 5 for changeover to summer time
- Octet 13 for changeover to winter time

Table 248: Coding of the weekday

Value (hexadecimal)	Meaning
00	Sunday
01	Monday
02	Tuesday
03	Wednesday
04	Thursday
05	Friday
06	Saturday

Table 249: Coding of the time difference (octet 9)

Value (hexadecimal)	Time difference of the change is
00	30 minutes
01	1 hour
02	90 minutes
03	2 hours
04	150 minutes
05	3 hours

12 Process Data for easy800/MFD (DPV1)

The PROFIBUS-DPV1 functionality of the EASY204-DP (from device version 07) allows you to access the following data areas of an easy800/MFD from a Class 1 or Class 2 DPV1 master without any extensive programming required:

- Identification
- Operating Mode
- Image
- Function Blocks
- Date and time
- DST

The data from these ranges is located in Process Data Objects (data records) and can be read and/or written with the DPV1 "Read" and "Write" services.

Object overview

The following overview shows all the objects contained in the EASY204-DP that are available for a connected easy800/MFD.

→ The attributes API, Slot Number and Index form the address information for the DP master in order to access an object. Refer to the following section for further information about this.

Table 250: Process data objects in EASY204-DP for easy800/MFD

Object name	API	Slot Number	Index	Data length (octets)	Read/ Write	→ page
Easy operating mode	0	0	100	1	R/W	265
Easy identification	0	1	100	50	R	263
Image data						
Easy 700/800 inputs (I1 – I16)	0	1	250	2	R	304
Easy 700/800 analog inputs IA1 to IA4	0	1	197 – 200	2	R	306
Easy 700/800 outputs (Q1 – Q8)	0	1	251	1	R	308
Easy700/800 pushbuttons	0	1	249	1	R	310
Easy 800 analog output (QA1)	0	1	252	2	R	367
Easy 800 local diagnostics (ID1 - ID16)	0	1	253	2	R	370
Easy 800 inputs network stations IW1 to IW8	0	1	211 – 218	2	R	372
Easy 800 Link inputs network stations RW1 to RW8	0	1	221 – 228	2	R	374
Easy 800 outputs network stations QW1 to QW8	0	1	231 – 238	1	R	376
Easy 800 Link outputs network stations SW1 to SW8	0	1	241 – 248	1	R	378
Easy 800 receive data network stations RNW1 to RNW8	0	0	201 – 208	4	R	380

Object name	API	Slot Number	Index	Data length (octets)	Read/ Write	→ page
Easy 800 send data network SNW1 to SNW8	0	1	201 – 208	4	R	382
Easy 800 bit markers M1 to M96	0	0	1 – 96	1	R/W	384
Easy 800 byte markers MB1 to MB96	0	0	101 – 196	1	R/W	386
Easy 800 word markers MW1 to MW96	0	1	1 – 96	2	R/W	388
Easy 800 double word markers MD1 to MD96	0	1	101 – 196	4	R/W	390
Easy 800 8 byte data	0	1	229	8	R/W	392
Easy 800 16 byte data	0	1	230	16	R/W	394
Easy 800 32 byte data	0	1	239	32	R/W	396
Easy 800 64 byte data	0	1	240	64	R/W	399
Easy Link input data (R1 – R16)	0	0	98	2	R/W	277
Easy Link output data (S1 – S8)	0	0	99	1	R	279
Function blocks						
Easy 700/800 write data function block	0	1	97	8	W	341
Easy 700/800 select function block data	0	1	99	4	W	337
Easy 700/800 read data function block	0	1	98	4	R	339
Easy clock	0	0	97	8	R/W	294
EASY 800 DST setting	0	0	209	20	R/W	458

Accessing objects

Access to the Process Data Objects in the EASY204-DP via the Read and Write DPV1 services is implemented with the help of the functions provided by the DP master system. Refer to the documentation of the manufacturer. Normally function blocks are provided for the access. In IEC 61131-3 based systems, the RDREC (Read) and WRREC (Write) function blocks defined by the PROFIBUS user organization in specification 2.182 are provided which allow an optimum access to the complex data structures.

The following is required to access the objects:

- The address of the local DPV1 master interface
- The station address of the EASY204-DP to be accessed
- The identifier of the application (API) in the EASY204-DP (definition only required with Class 2 DPV1 master)
- The module to be addressed in EASY204-DP (Slot Number)
- The address (Index) of the required Process Data Object in the addressed EASY204-DP module
- The data length of the required Process Data Object
- A defined variable (memory range) in the local application that is to be assigned to the read data or containing the data to be written.

Refer to the topology of your master system for the address of the local DPV1 master interface. Refer to the PROFIBUS topology for the station address of the EASY204-DP.

For the EASY204-DP the API must be specified as 0 for all Process Data Objects (only required for Class 2 DPV1 master).

- The following sections show the slot number, the index, the data length and an example variable definition (declaration) for an IEC 61131-3 based system for each process data object provided in the EASY204-DP for a connected easy800/MFD.

Read identification

"Easy identification" object

The description of this object is identical to the easy600 (DPV1), → page 263.

Read/write mode

"Easy mode" object

The description of this object is identical to the easy600 (DPV1), → page 265.

Read/write image

"Easy 700/800 inputs" object

The description of this object is identical to the easy700 (DPV1), → page 304.

"Easy 700/800 analog inputs IA1 to IA4" objects

The description of this object is identical to the easy700 (DPV1), → page 306.

"Easy 700/800 outputs" objects

The description of this object is identical to the easy700 (DPV1), → page 308.

"Easy 700/800 pushbuttons" object

The description of this object is identical to the easy700 (DPV1), → page 310.

"Easy 800 analog output" object

This object contains the current status of the analog output of an easy800/MFD.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use

Use this object to query the current status of the analog output (QA1) of an easy800/MFD.

Addressing the object

Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 252.

Length of the object

The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_Analog_Output	Word or UINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 251: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_Analog_Output	Octets 1 and 2	Analog value of QA1

When accessing the data of the "analog value of QA1" observe the Motorola coding format (octet N: High byte, octet N+1: Low byte) used in PROFIBUS-DP. If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

"Easy 800 local diagnostics" object

This object contains the current diagnostics of the NET connections of an easy800/MFD.

This object can only be read. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to query the current status of the NET stations of an easy800/MFD and the status of the connection to the remote station (only MFD).

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 253.

Length of the object
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Diag	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 252: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Diag[1]	Octet 1	Bit 0	Status ID1 (Status Net Station 1)
Easy_800_NET_Diag[2]		bit1	Status ID2 (Status Net Station 2)
Easy_800_NET_Diag[3]		Bit 2	Status ID3 (Status Net Station 3)
Easy_800_NET_Diag[4]		Bit 3	Status ID4 (Status Net Station 4)
Easy_800_NET_Diag[5]		Bit 4	Status ID5 (Status Net Station 5)
Easy_800_NET_Diag[6]		Bit 5	Status ID6 (Status Net Station 6)
Easy_800_NET_Diag[7]		Bit 6	Status ID7 (Status Net Station 7)
Easy_800_NET_Diag[8]		Bit 7	Status ID8 (Status Net Station 8)
Easy_800_NET_Diag[9]	Octet 2	Bit 0	Status ID9 (Remote Connection MFD)
Easy_800_NET_Diag[10]		bit1	Not used
Easy_800_NET_Diag[11]		Bit 2	Not used
Easy_800_NET_Diag[12]		Bit 3	Not used
Easy_800_NET_Diag[13]		Bit 4	Not used
Easy_800_NET_Diag[14]		Bit 5	Not used
Easy_800_NET_Diag[15]		Bit 6	Not used
Easy_800_NET_Diag[16]		Bit 7	Not used

→ A set bit corresponds to the status "Station present". A unset bit corresponds to the status "Station not present".

"Easy 800 inputs network stations IW1 to IW8" objects

These objects contain the current status of the inputs of an EASYNET station.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to query the current status of the inputs (I1 to I16) of an EASYNET station.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 211 to 218 for the EASYNET station 1 to 8

Length of objects
The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Inputs	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 253: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Inputs[1]	Octet 1	Bit 0	Status I1
Easy_800_NET_Inputs[2]		bit1	Status I2
Easy_800_NET_Inputs[3]		Bit 2	Status I3
Easy_800_NET_Inputs[4]		Bit 3	Status I4
Easy_800_NET_Inputs[5]		Bit 4	Status I5
Easy_800_NET_Inputs[6]		Bit 5	Status I6
Easy_800_NET_Inputs[7]		Bit 6	Status I7
Easy_800_NET_Inputs[8]		Bit 7	Status I8
Easy_800_NET_Inputs[9]	Octet 2	Bit 0	Status I9
Easy_800_NET_Inputs[10]		bit1	Status I10
Easy_800_NET_Inputs[11]		Bit 2	Status I11
Easy_800_NET_Inputs[12]		Bit 3	Status I12
Easy_800_NET_Inputs[13]		Bit 4	Status I13
Easy_800_NET_Inputs[14]		Bit 5	Status I14
Easy_800_NET_Inputs[15]		Bit 6	Status I15
Easy_800_NET_Inputs[16]		Bit 7	Status I16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 800 Link inputs network stations RW1 to RW8" objects

These objects contain the current status of the Link inputs of an EASYNET station.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use

Use these objects to query the current status of the Link inputs (R1 to R16) of an EASYNET station.

Addressing the objects

Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 221 to 228 for the EASYNET station 1 to 8

Length of objects

The data to be read is 2 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Link_Inputs	ARRAY [1..16] OF BOOL or ARRAY [1..2] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 254: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Link_Inputs[1]	Octet 1	Bit 0	Status R1
Easy_800_NET_Link_Inputs[2]		bit1	Status R2
Easy_800_NET_Link_Inputs[3]		Bit 2	Status R3
Easy_800_NET_Link_Inputs[4]		Bit 3	Status R4
Easy_800_NET_Link_Inputs[5]		Bit 4	Status R5
Easy_800_NET_Link_Inputs[6]		Bit 5	Status R6
Easy_800_NET_Link_Inputs[7]		Bit 6	Status R7
Easy_800_NET_Link_Inputs[8]		Bit 7	Status R8
Easy_800_NET_Link_Inputs[9]	Octet 2	Bit 0	Status R9
Easy_800_NET_Link_Inputs[10]		bit1	Status R10
Easy_800_NET_Link_Inputs[11]		Bit 2	Status R11
Easy_800_NET_Link_Inputs[12]		Bit 3	Status R12
Easy_800_NET_Link_Inputs[13]		Bit 4	Status R13
Easy_800_NET_Link_Inputs[14]		Bit 5	Status R14
Easy_800_NET_Link_Inputs[15]		Bit 6	Status R15
Easy_800_NET_Link_Inputs[16]		Bit 7	Status R16

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 800 outputs network station SW1 to SW8" objects

These objects contain the current status of the outputs of an EASYNET station.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use

Use these objects to query the current status of the outputs (Q1 to Q8) of an EASYNET station.

Addressing the objects

Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 231 to 238 for the EASYNET station 1 to 8

Length of objects

The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Outputs	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 255: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Outputs[1]	Octet 1	Bit 0	Status of Q1
Easy_800_NET_Outputs[2]		bit1	Status of Q2
Easy_800_NET_Outputs[3]		Bit 2	Status of Q3
Easy_800_NET_Outputs[4]		Bit 3	Status of Q4
Easy_800_NET_Outputs[5]		Bit 4	Status of Q5
Easy_800_NET_Outputs[6]		Bit 5	Status of Q6
Easy_800_NET_Outputs[7]		Bit 6	Status of Q7
Easy_800_NET_Outputs[8]		Bit 7	Status of Q8

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 800 Link outputs network station SW1 to SW8" objects

These objects contain the current status of the Link outputs of an EASYNET station.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use

Use these objects to query the current status of the Link outputs (S1 to S8) of an EASYNET station.

Addressing the objects

Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 241 to 248 for the EASYNET station 1 to 8

Length of objects

The data to be read is 1 octet in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Link_Outputs	ARRAY [1..8] OF BOOL or BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 256: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Link_Outputs[1]	Octet 1	Bit 0	Status S1
Easy_800_NET_Link_Outputs[2]		bit1	Status S2
Easy_800_NET_Link_Outputs[3]		Bit 2	Status S3
Easy_800_NET_Link_Outputs[4]		Bit 3	Status S4
Easy_800_NET_Link_Outputs[5]		Bit 4	Status S5
Easy_800_NET_Link_Outputs[6]		Bit 5	Status S6
Easy_800_NET_Link_Outputs[7]		Bit 6	Status S7
Easy_800_NET_Link_Outputs[8]		Bit 7	Status S8

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 800 receive data network stations RNW1 to RNW8" objects

These objects contain the current status of the receive data of an EASYNET station.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to query the current status of the receive data (RN1 to RN32) of an EASYNET station.

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 201 to 208 for the EASYNET station 1 to 8

Length of objects
The data to be read is 4 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Receive_Data	ARRAY [1..32] OF BOOL or ARRAY [1..4] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 257: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Receive_Data[1]	Octet 1	Bit 0	Status RN1
Easy_800_NET_Receive_Data[2]		bit1	Status RN2
…		…	…
Easy_800_NET_Receive_Data[7]		Bit 6	Status RN7
Easy_800_NET_Receive_Data[8]		Bit 7	Status RN8
Easy_800_NET_Receive_Data[9]	Octet 2	Bit 0	Status RN9
Easy_800_NET_Receive_Data[10]		bit1	Status RN10
…		…	…
Easy_800_NET_Receive_Data[15]		Bit 6	Status RN15
Easy_800_NET_Receive_Data[16]		Bit 7	Status RN16
Easy_800_NET_Receive_Data[17]	Octet 3	Bit 0	Status RN17
Easy_800_NET_Receive_Data[18]		bit1	Status RN18
…		…	…
Easy_800_NET_Receive_Data[23]		Bit 6	Status RN23
Easy_800_NET_Receive_Data[24]		Bit 7	Status RN24
Easy_800_NET_Receive_Data[25]	Octet 4	Bit 0	Status RN25
Easy_800_NET_Receive_Data[26]		bit1	Status RN26
…		…	…
Easy_800_NET_Receive_Data[31]		Bit 6	Status RN31
Easy_800_NET_Receive_Data[32]		Bit 7	Status RN32

→ A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 800 send data network SNW1 to SNW8" objects

These objects contain the current status of the send data of an EASYNET station.

These objects can only be read. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use

Use these objects to query the current status of the send data (SN1 to SN32) of an EASYNET station.

Addressing the objects

Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 201 to 208 for the EASYNET station 1 to 8

Length of objects

The data to be read is 4 octets in length. Do not enter a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_NET_Senddata	ARRAY [1..32] OF BOOL or ARRAY [1..4] OF BYTE

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 258: Address location and meaning of the data

Variable access (example)	Data position		Meaning
Easy_800_NET_Senddata[1]	Octet 1	Bit 0	Status SN1
Easy_800_NET_Senddata[2]		bit1	Status SN2
…		…	…
Easy_800_NET_Senddata[7]		Bit 6	Status SN7
Easy_800_NET_Senddata[8]		Bit 7	Status SN8
Easy_800_NET_Senddata[9]	Octet 2	Bit 0	Status SN9
Easy_800_NET_Senddata[10]		bit1	Status SN10
…		…	…
Easy_800_NET_Senddata[15]		Bit 6	Status SN15
Easy_800_NET_Senddata[16]		Bit 7	Status SN16
Easy_800_NET_Senddata[17]	Octet 3	Bit 0	Status SN17
Easy_800_NET_Senddata[18]		bit1	Status SN18
…		…	…
Easy_800_NET_Senddata[23]		Bit 6	Status SN23
Easy_800_NET_Senddata[24]		Bit 7	Status SN24
Easy_800_NET_Senddata[25]	Octet 4	Bit 0	Status SN25
Easy_800_NET_Senddata[26]		bit1	Status SN26
…		…	…
Easy_800_NET_Senddata[31]		Bit 6	Status SN31
Easy_800_NET_Senddata[32]		Bit 7	Status SN32

A set bit corresponds to the On state. An unset bit corresponds to the Off state.

"Easy 800 bit markers M1 to M96" objects

These objects contain the current status of the bit markers of an easy800/MFD.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- query the current status of the bit markers M1 to M96 of the easy800 (Read)
- or to transfer to the easy800 a new setpoint for the bit markers M1 to M96 (write).

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 1 to 96 for the bit markers M1 to M96.

Length of objects
The length of the data to be read or written is 1 octet. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_Bit_Marker	BYTE or USINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 259: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_Bit__Marker	Octet 1	Value of bit marker: 00_{hex} = FALSE FF_{hex} = TRUE

"Easy 800 byte markers MB1 to MB96" objects

These objects contain the current status of the byte markers of an easy800/MFD.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- query the current status of the byte markers MB1 to MB96 of the easy800 (Read)
- or to transfer to the easy800 a new setpoint for the byte markers MB1 to MB96 (write).

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 101 to 196 for the byte markers MB1 to MB96.

Length of objects
The length of the data to be read or written is 1 octet. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_Byte_Marker	BYTE or USINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 260: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_Byte__Marker	Octet 1	Value of byte marker

"Easy 800 word markers MW1 to MW96" objects

These objects contain the current status of the word markers of an easy800/MFD.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- query the current status of the word markers MW1 to MW96 of the easy800 (Read)
- or to transfer to the easy800 a new setpoint for the word markers MW1 to MW96 (write)

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 1 to 96 for the word markers MW1 to MW96.

Length of objects
The length of the data to be read or written is 2 octets. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_Word_Marker	WORD or UINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 261: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_Word_Marker	Octets 1 and 2	Value of word marker

→ When accessing the data content of "value word markers" remember the Motorola coding format used in PROFIBUS-DP (octet N: high byte, octet N+1: low byte). If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

"Easy 800 double word markers MD1 to MD96" objects

These objects contain the current status of the double word markers of an easy800/MFD.

These objects can be read and written. They can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use these objects to

- query the current status of the double word markers MD1 to MD96 of the easy800 (Read)
- or to transfer to the easy800 a new setpoint for the double word markers MD1 to MD96 (write)

Addressing the objects
Use the following information to address the objects:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 101 to 196 for the double word markers MD1 to MD96.

Length of objects
The length of the data to be read or written is 4 octets. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the objects

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_Double_Word_Marker	DWORD or UDINT

Data contents of the objects

The following table shows the address location and meaning of the data contained in the objects. It also illustrates in an example how to access the data using the defined variable.

Table 262: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_Double_Word_Marker	Octet 1 – 4	Value of double word marker

When accessing the data content of "value double word markers" remember the Motorola coding format used in PROFIBUS-DP (octet N: high byte, octet N+1: low byte). If the data processing format in your DPV1 master system is different to this, and the DP access commands are not converted automatically, the necessary conversion must be implemented in the user program. Refer to the documentation of your DP master system concerning this.

"Easy 800 8 byte data" object

This object is used to exchange up to 8 bytes of application-related data between a PROFIBUS-DPV1 master and an easy800/MFD.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- read up to 8 bytes of application-related data (content of double word markers MD67 and MD68) from the easy800 (Read)
- transfer up to 8 bytes of application-related data (content of double word markers MD67 and MD68) to the easy800 (Write)

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 229.

Length of the object
The maximum length of the data to be read or written is 8 octets. You can also specify a smaller length (1 to 7 octets) when calling the "Read" or "Write" services if you do not wish to use the entire data range.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_8_Byte_Data	Application-related, e.g. ARRAY [1..8] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 263: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_8_Byte_Data[1]	Octet 1	Value MD 67 Byte 1
Easy_800_8_Byte_Data[2]	Octet 2	Value MD 67 Byte 2
Easy_800_8_Byte_Data[3]	Octet 3	Value MD 67 Byte 3
Easy_800_8_Byte_Data[4]	Octet 4	Value MD 67 Byte 4
Easy_800_8_Byte_Data[5]	Octet 5	Value MD 68 Byte 1
Easy_800_8_Byte_Data[6]	Octet 6	Value MD 68 Byte 2
Easy_800_8_Byte_Data[7]	Octet 7	Value MD 68 Byte 3
Easy_800_8_Byte_Data[8]	Octet 8	Value MD 68 Byte 4

"Easy 800 16 byte data" object

This object is used to exchange up to 16 bytes of application-related data between a PROFIBUS-DPV1 master and an easy800/MFD.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use

Use this object to

- read up to 16 bytes of application-related data (content of double word markers MD69 to MD72) from the easy800 (Read)
- or transfer up to 16 bytes of application-related data (content of double word markers MD69 and MD72) to the easy800 (Write)

Addressing the object

Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 230.

Length of the object

The maximum length of the data to be read or written is 16 octets. You can also specify a smaller length (1 to 15 octets) when calling the "Read" or "Write" services if you do not wish to use the entire data range.

Variable definition (example) of the object

Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_16_Byte_Data	Application-related, e.g. ARRAY [1..16] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 264: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_16_Byte_Data[1]	Octet 1	Value MD 69 Byte 1
Easy_800_16_Byte_Data[2]	Octet 2	Value MD 69 Byte 2
Easy_800_16_Byte_Data[3]	Octet 3	Value MD 69 Byte 3
Easy_800_16_Byte_Data[4]	Octet 4	Value MD 69 Byte 4
Easy_800_16_Byte_Data[5]	Octet 5	Value MD 70 Byte 1
Easy_800_16_Byte_Data[6]	Octet 6	Value MD 70 Byte 2
Easy_800_16_Byte_Data[7]	Octet 7	Value MD 70 Byte 3
Easy_800_16_Byte_Data[8]	Octet 8	Value MD 70 Byte 4
Easy_800_16_Byte_Data[9]	Octet 9	Value MD 71 Byte 1
Easy_800_16_Byte_Data[10]	Octet 10	Value MD 71 Byte 2
Easy_800_16_Byte_Data[11]	Octet 11	Value MD 71 Byte 3
Easy_800_16_Byte_Data[12]	Octet 12	Value MD 71 Byte 4
Easy_800_16_Byte_Data[13]	Octet 13	Value MD 72 Byte 1
Easy_800_16_Byte_Data[14]	Octet 14	Value MD 72 Byte 2
Easy_800_16_Byte_Data[15]	Octet 15	Value MD 72 Byte 3
Easy_800_16_Byte_Data[16]	Octet 16	Value MD 72 Byte 4

"Easy 800 32 byte data" object

This object is used to exchange up to 32 bytes of application-related data between a PROFIBUS-DPV1 master and an easy800/MFD.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- read up to 32 bytes of application-related data (content of double word markers MD73 to MD80) from the easy800 (Read)
- or transfer up to 32 bytes of application-related data (content of double word markers MD73 and MD80) to the easy800 (Write)

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 239.

Length of the object
The maximum length of the data to be read or written is 32 octets. You can also specify a smaller length (1 to 31 octets) when calling the "Read" or "Write" services if you do not wish to use the entire data range.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_32_Byte_Data	Application-related, e.g. ARRAY [1..32] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 265: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_32_Byte_Data[1]	Octet 1	Value MD 73 Byte 1
Easy_800_32_Byte_Data[2]	Octet 2	Value MD 73 Byte 2
Easy_800_32_Byte_Data[3]	Octet 3	Value MD 73 Byte 3
Easy_800_32_Byte_Data[4]	Octet 4	Value MD 73 Byte 4
Easy_800_32_Byte_Data[5]	Octet 5	Value MD 74 Byte 1
Easy_800_32_Byte_Data[6]	Octet 6	Value MD 74 Byte 2
Easy_800_32_Byte_Data[7]	Octet 7	Value MD 74 Byte 3
Easy_800_32_Byte_Data[8]	Octet 8	Value MD 74 Byte 4
Easy_800_32_Byte_Data[9]	Octet 9	Value MD 75 Byte 1
Easy_800_32_Byte_Data[10]	Octet 10	Value MD 75 Byte 2
Easy_800_32_Byte_Data[11]	Octet 11	Value MD 75 Byte 3
Easy_800_32_Byte_Data[12]	Octet 12	Value MD 75 Byte 4
Easy_800_32_Byte_Data[13]	Octet 13	Value MD 76 Byte 1
Easy_800_32_Byte_Data[14]	Octet 14	Value MD 76 Byte 2
Easy_800_32_Byte_Data[15]	Octet 15	Value MD 76 Byte 3
Easy_800_32_Byte_Data[16]	Octet 16	Value MD 76 Byte 4
Easy_800_32_Byte_Data[17]	Octet 17	Value MD 77 Byte 1
Easy_800_32_Byte_Data[18]	Octet 18	Value MD 77 Byte 2
Easy_800_32_Byte_Data[19]	Octet 19	Value MD 77 Byte 3
Easy_800_32_Byte_Data[20]	Octet 20	Value MD 77 Byte 4
Easy_800_32_Byte_Data[21]	Octet 21	Value MD 78 Byte 1
Easy_800_32_Byte_Data[22]	Octet 22	Value MD 78 Byte 2
Easy_800_32_Byte_Data[23]	Octet 23	Value MD 78 Byte 3
Easy_800_32_Byte_Data[24]	Octet 24	Value MD 78 Byte 4

Variable access (example)	Data position	Meaning
Easy_800_32_Byte_Data[25]	Octet 25	Value MD 79 Byte 1
Easy_800_32_Byte_Data[26]	Octet 26	Value MD 79 Byte 2
Easy_800_32_Byte_Data[27]	Octet 27	Value MD 79 Byte 3
Easy_800_32_Byte_Data[28]	Octet 28	Value MD 79 Byte 4
Easy_800_32_Byte_Data[29]	Octet 29	Value MD 80 Byte 1
Easy_800_32_Byte_Data[30]	Octet 30	Value MD 80 Byte 2
Easy_800_32_Byte_Data[31]	Octet 31	Value MD 80 Byte 3
Easy_800_32_Byte_Data[32]	Octet 32	Value MD 80 Byte 4

"Easy 800 64 byte data" object

This object is used to exchange up to 64 bytes of application-related data between a PROFIBUS-DPV1 master and an easy800/MFD.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- read up to 64 bytes of application-related data (content of double word markers MD81 to MD97) from the easy800 (Read)
- or transfer up to 64 bytes of application-related data (content of double word markers MD81 and MD96) to the easy800 (Write)

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 1
- Index is 240.

Length of the object
The maximum length of the data to be read or written is 64 octets. You can also specify a smaller length (1 to 63 octets) when calling the "Read" or "Write" services if you do not wish to use the entire data range.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system:

Name	Data Type
Easy_800_64_Byte_Data	Application-related, e.g. ARRAY [1..64] OF BYTE

Data content of the object

The following table shows the address location and meaning of the data contained in the object. It also illustrates in an example how to access the data using the defined variable.

Table 266: Address location and meaning of the data

Variable access (example)	Data position	Meaning
Easy_800_64_Byte_Data[1]	Octet 1	Value MD 81 Byte 1
Easy_800_64_Byte_Data[2]	Octet 2	Value MD 81 Byte 2
Easy_800_64_Byte_Data[3]	Octet 3	Value MD 81 Byte 3
Easy_800_64_Byte_Data[4]	Octet 4	Value MD 81 Byte 4
Easy_800_64_Byte_Data[5]	Octet 5	Value MD 82 Byte 1
Easy_800_64_Byte_Data[6]	Octet 6	Value MD 82 Byte 2
Easy_800_64_Byte_Data[7]	Octet 7	Value MD 82 Byte 3
Easy_800_64_Byte_Data[8]	Octet 8	Value MD 82 Byte 4
Easy_800_64_Byte_Data[9]	Octet 9	Value MD 83 Byte 1
Easy_800_64_Byte_Data[10]	Octet 10	Value MD 83 Byte 2
Easy_800_64_Byte_Data[11]	Octet 11	Value MD 83 Byte 3
Easy_800_64_Byte_Data[12]	Octet 12	Value MD 83 Byte 4
Easy_800_64_Byte_Data[13]	Octet 13	Value MD 84 Byte 1
Easy_800_64_Byte_Data[14]	Octet 14	Value MD 84 Byte 2
Easy_800_64_Byte_Data[15]	Octet 15	Value MD 84 Byte 3
Easy_800_64_Byte_Data[16]	Octet 16	Value MD 84 Byte 4
Easy_800_64_Byte_Data[17]	Octet 17	Value MD 85 Byte 1
Easy_800_64_Byte_Data[18]	Octet 18	Value MD 85 Byte 2
Easy_800_64_Byte_Data[19]	Octet 19	Value MD 85 Byte 3
Easy_800_64_Byte_Data[20]	Octet 20	Value MD 85 Byte 4
Easy_800_64_Byte_Data[21]	Octet 21	Value MD 86 Byte 1
Easy_800_64_Byte_Data[22]	Octet 22	Value MD 86 Byte 2
Easy_800_64_Byte_Data[23]	Octet 23	Value MD 86 Byte 3
Easy_800_64_Byte_Data[24]	Octet 24	Value MD 86 Byte 4

Variable access (example)	Data position	Meaning
Easy_800_64_Byte_Data[25]	Octet 25	Value MD 87 Byte 1
Easy_800_64_Byte_Data[26]	Octet 26	Value MD 87 Byte 2
Easy_800_64_Byte_Data[27]	Octet 27	Value MD 87 Byte 3
Easy_800_64_Byte_Data[28]	Octet 28	Value MD 87 Byte 4
Easy_800_64_Byte_Data[29]	Octet 29	Value MD 88 Byte 1
Easy_800_64_Byte_Data[30]	Octet 30	Value MD 88 Byte 2
Easy_800_64_Byte_Data[31]	Octet 31	Value MD 88 Byte 3
Easy_800_64_Byte_Data[32]	Octet 32	Value MD 88 Byte 4
Easy_800_64_Byte_Data[33]	Octet 33	Value MD 89 Byte 1
Easy_800_64_Byte_Data[34]	Octet 34	Value MD 89 Byte 2
Easy_800_64_Byte_Data[35]	Octet 35	Value MD 89 Byte 3
Easy_800_64_Byte_Data[36]	Octet 36	Value MD 89 Byte 4
Easy_800_64_Byte_Data[37]	Octet 37	Value MD 90 Byte 1
Easy_800_64_Byte_Data[38]	Octet 38	Value MD 90 Byte 2
Easy_800_64_Byte_Data[39]	Octet 39	Value MD 90 Byte 3
Easy_800_64_Byte_Data[40]	Octet 40	Value MD 90 Byte 4
Easy_800_64_Byte_Data[41]	Octet 41	Value MD 91 Byte 1
Easy_800_64_Byte_Data[42]	Octet 42	Value MD 91 Byte 2
Easy_800_64_Byte_Data[43]	Octet 43	Value MD 91 Byte 3
Easy_800_64_Byte_Data[44]	Octet 44	Value MD 91 Byte 4
Easy_800_64_Byte_Data[45]	Octet 45	Value MD 92 Byte 1
Easy_800_64_Byte_Data[46]	Octet 46	Value MD 92 Byte 2
Easy_800_64_Byte_Data[47]	Octet 47	Value MD 92 Byte 3
Easy_800_64_Byte_Data[48]	Octet 48	Value MD 92 Byte 4
Easy_800_64_Byte_Data[49]	Octet 49	Value MD 93 Byte 1
Easy_800_64_Byte_Data[50]	Octet 50	Value MD 93 Byte 2
Easy_800_64_Byte_Data[51]	Octet 51	Value MD 93 Byte 3
Easy_800_64_Byte_Data[52]	Octet 52	Value MD 93 Byte 4

Variable access (example)	Data position	Meaning
Easy_800_64_Byte_Data[53]	Octet 53	Value MD 94 Byte 1
Easy_800_64_Byte_Data[54]	Octet 54	Value MD 94 Byte 2
Easy_800_64_Byte_Data[55]	Octet 55	Value MD 94 Byte 3
Easy_800_64_Byte_Data[56]	Octet 56	Value MD 94 Byte 4
Easy_800_64_Byte_Data[57]	Octet 57	Value MD 95 Byte 1
Easy_800_64_Byte_Data[58]	Octet 58	Value MD 95 Byte 2
Easy_800_64_Byte_Data[59]	Octet 59	Value MD 95 Byte 3
Easy_800_64_Byte_Data[60]	Octet 60	Value MD 95 Byte 4
Easy_800_64_Byte_Data[61]	Octet 61	Value MD 96 Byte 1
Easy_800_64_Byte_Data[62]	Octet 62	Value MD 96 Byte 2
Easy_800_64_Byte_Data[63]	Octet 63	Value MD 96 Byte 3
Easy_800_64_Byte_Data[64]	Octet 64	Value MD 96 Byte 4

"Easy Link input data" object

The description of this object is identical to the easy600 (DPV1), → page 277.

"Easy Link output data" object

The description of this object is identical to the easy600 (DPV1), → page 279.

Read/write function block data

Procedure

The following generic objects simplify the reading and writing of function block data:

- "Easy 700/800 select data function block"
- "Easy 700/800 read data function block"
- "Easy 700/800 write data function block".

Two object accesses are required in order to read the data of a function block:

- Selection of the required function block data for the subsequent read operation:
  → "Easy 700/800 function block data selection" object , page 337.
- Reading of the selected function block data:
  → "Easy 700/800 read function block data" object , page 339.

Only one object access is required in order to write the data of a function block. The selection of the required function block data and the transfer of the new values for this are executed simultaneously.

→ "Easy 700/800 write function block data" object , page 341.

Analog value comparators A1 to A32

Operand selection	Value (hex)
Part No	11
Instance1)	01 - 20
Index	00 - 07, → table 267

1) The value 01_{hex} selects the analog value comparator A1, the value 20_{hex} the analog value comparator A32.

Table 267: Operand overview

Index	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 268	–	R
01	mode	→ Tab. 269	–	–	–	R
02	Comparison value I1	DWORD or UDINT1)				R/W2)
03	Gain factor for F1 (I1 = F1*Value)	DWORD or UDINT1)				R/W2)
04	Comparison value I2	DWORD or UDINT1)				R/W2)
05	Gain factor for I2 (I2 = F2*Value)	DWORD or UDINT1)				R/W2)
06	Offset OS for I1	DWORD or UDINT1)				R/W2)
07	Switching hysteresis HY for value I2	DWORD or UDINT1)				R/W2)

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 268: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	CY[1)]	Q1[2)]

1) Status 1 if the value range is exceeded
2) Status 1 if the condition is fulfilled (e.g. I1 < I2 with LT mode)

Table 269: Index 1 - Mode

Data 1 (hex)		
00	LT	Less than (I1 < I2)
01	EQ	Equal to (I1 = IGT)
02	GT	Greater than (I1 > I2)

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Arithmetic function blocks AR1 to AR32

Operand selection	Value (hex)
Part No	12
Instance[1)]	01 - 20
Index	00 - 04, → table 270

1) The value 01_{hex} for the instance selects the arithmetic function block AR1, the value 20_{hex} the arithmetic function block AR32.

Table 270: Operand overview

Index	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 271	–	R
01	mode	→ Tab. 272	–	–	–	R
02	First operand I1	DWORD or UDINT[1)]				R/W[2)]
03	Second operand I2	DWORD or UDINT[1)]				R/W[2)]
04	Result QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 271: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1
FB output Data 3		–	–	–	–	–	ZE[1)]	CY[1)]

1) Status 1 if the value of the function block output QV (the calculation result) equals zero
2) Status 1 if the value range is exceeded

Table 272: Index 1 - Mode

Data 1 (hex)		
00	ADD	Add (I1 + I2 = QV)
01	SUB	Subtract (I1 - I2 = QV)
02	MUL	Multiply (I1 × I2 = QV)
03	DIV	Divide (I1 : I2 = QV)

Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Block Compare function blocks BC1 to BC32

Operand selection	Value (hex)
Part No	25
Instance[1)]	01 - 20
Index	00 - 04, → table 273

1) The value 01_{hex} for the instance selects the Block compare function block BC1, the value 20_{hex} the Block compare function block BC32.

Table 273: Operand overview

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 274	–	→ Tab. 274	–	R
01	mode	→ Tab. 275	–	–	–	R
02	Source range I1	DWORD or UDINT[1)]				R/W[2)]
03	Destination range I2	DWORD or UDINT[1)]				R/W[2)]
04	Number of elements to compare NO (max. 192 bytes)	DWORD or UDINT[1)]				R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 274: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	EQ[2)]	E3[3)]	E2[4)]	E1[5)]

1) Activates the function block on status 1.

2) Status 1 if the data ranges are equal; status 0 if not equal

Error outputs

3) Status 1 if the number of elements exceeds the source or target range.

4) Status 1 if the source and target range overlap.

5) Status 1 if the source or target range are outside of the available marker range (offset error)

Table 275: Index 1 - Mode

mode	Data 1 (hex)	Operating Mode
	02	Compare (internal easy status signal for Block Compare mode)

Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Block Transfer function blocks BT1 to BT32

Operand selection	Value (hex)
Part No	26
Instance[1)]	01 - 20
Index	00 - 04, → table 276

1) The value 01_{hex} for the instance selects the Block transfer function block BT1, the value 20_{hex} the Block transfer function block BT32.

Table 276: Operand overview

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 277	–	→ Tab. 277	–	R
01	mode	→ Tab. 278	–	–	–	R
02	Source range I1	DWORD or UDINT[1)]				R/W[2)]
03	Destination range I2	DWORD or UDINT[1)]				R/W[2)]
04	Number of elements to be transferred NO (max. 192 bytes)	DWORD or UDINT[1)]				R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 277: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1]
FB output Data 3		–	–	–	–	–	E3[2)]	E2[3)]	E1[4)]

1) Transfer of the source address specified at I1 to the target address specified at I2 on rising edge.

Error outputs

2) Status 1 if the number of elements exceeds the source or target range.
3) Status 1 if the source and target range overlap.
4) Status 1 if the source or target range are outside of the available marker range (offset error)

Table 278: Index 1 - Mode

Data 1 (hex)	Operating Mode
00	INI: Initializes the target range with a byte value stored at the source address.
01	CPY: Copies a data block from a source to a target range. Data block size is specified at NO.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Boolean operation modules BV1…BV32

Operand selection	Value (hex)
Part No	13
Instance[1)]	01 - 20
Index	00 - 04, → table 279

1) The value 01_{hex} for the instance selects the Boolean operation function block BC1, the value 20_{hex} the Boolean operation function block BC32.

Table 279: Operand overview

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 280	–	R
01	mode	→ Tab. 281	–	–	–	R
02	First operand I1	DWORD or UDINT[1)]				R/W[2)]
03	Second operand I2	DWORD or UDINT[1)]				R/W[2)]
04	Result QV	DWORD or UDINT[1)]				R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 280: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1
FB output Data 3		–	–	–	–	–	–	ZE[1)]

1) Status 1 if the value of the function block output QV (the operation result) equals zero

Table 281: Index 1 - Mode

Data 1 (hex)		
00	AND	AND operation
01	OR	OR operation
02	XOR	Exclusive OR operation
03	NET	Inverts the individual bits of the value at I1. The inverted value is represented as a signed decimal value.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Counters C1 – C32

Operand selection	Value (hex)
Part No	14
Instance[1)]	01 - 20
Index	00 - 05, → table 282

1) The value 01_{hex} for the instance chooses the counter function block C1, the value 20_{hex} the counter function block C32.

Table 282: Operand significance

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 283	–	→ Tab. 283	–	R
02	upper setpoint value SH	DWORD or UDINT[1)]				R/W[2)]
03	lower setpoint value SL	DWORD or UDINT[1)]				R/W[2)]
04	preset actual value SV	DWORD or UDINT[1)]				R/W[2)]
05	Current actual value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 283: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	SE[1)]	D[2]	C[3]	RE[4)]
FB output Data 3		–	–	–	–	ZE[5)]	CY[6)]	FB[7)]	OF[8)]

1) With a rising edge transfer the preset actual value
2) Count direction: 0 = up counting, 1 = down counting
3) Count coil, counts on every rising edge
4) Reset the actual value to zero
5) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero
6) Carry: Status 1 if the value range is exceeded
7) Fall below: Status 1 if the actual value ≦ lower setpoint
8) Overflow: Status 1 if the actual value ≧ upper setpoint

Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Frequency counters CF1 – CF4

Operand selection	Value (hex)
Part No	15
Instance[1)]	01 - 04
Index	00 - 04, → table 284

1) The value 01_{hex} for the instance chooses the frequency counter function block CF1, the value 04_{hex} the frequency counter function block CF4.

Table 284: Operand overview

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 285	–	→ Tab. 285	–	R
02	upper setpoint value SH	DWORD or UDINT[1)]				R/W[2)]
03	lower setpoint value SL	DWORD or UDINT[1)]				R/W[2)]
04	Current actual value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 285: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	ZE[2)]	FB[3)]	OF[4)]

1) Enable for counter function block

2) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero

3) Fall below: Status 1 if the actual value ≦ lower setpoint

4) Overflow: Status 1 if the actual value ≧ upper setpoint

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

High-speed counter CH1…CH4

Operand selection	Value (hex)
Part No	16
Instance[1)]	01 - 04
Index	00 - 05, → table 286

1) The value 01_{hex} for the instance chooses the high-speed counter function block CH1, the value 04_{hex} the high-speed counter function block CH4.

Table 286: Operand overview

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 287	–	→ Tab. 287	–	R
02	upper setpoint value SH	DWORD or UDINT[1)]				R/W[2)]
03	lower setpoint value SL	DWORD or UDINT[1)]				R/W[2)]
04	preset actual value SV	DWORD or UDINT[1)]				R/W[2)]
05	Current actual value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 287: Index 0: Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	EN[1)]	SE[2)]	D[3]	RE[4)]
FB output Data 3		–	–	–	–	ZE[5)]	CY[6)]	FB[7)]	OF[8)]

1) Enable for counter function block
2) With a rising edge transfer the preset actual value
3) Count direction: 0 = up counting, 1 = down counting
4) Reset the actual value to zero
5) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero
6) Carry: Status 1 if the value range is exceeded
7) Fall below: Status 1 if the actual value ≦ lower setpoint
8) Overflow: Status 1 if the actual value ≧ lower setpoint

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Incremental counter CI1…CI4

Operand selection	Value (hex)
Part No	17
Instance[1)]	01 - 04
Index	00 - 05, → table 288

1) The value 01_{hex} for the instance chooses the incremental counter function block CI1, the value 04_{hex} the incremental counter function block CI4.

Table 288: Operand overview

Index (hex)	Data	Data 1, Data 3	Data 2, Data 4	Read/Write
00	Bit IO	→ table 289	–	R
02	upper setpoint value SH	DWORD or UDINT[1)]		R/W[2)]
03	lower setpoint value SL	DWORD or UDINT[1)]		R/W[2)]
04	preset actual value SV	DWORD or UDINT[1)]		R/W[2)]
05	Current actual value QV	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 289: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	EN[1)]	SE[2)]	RE[3)]
FB output Data 3		–	–	–	–	ZE[4)]	CY[5)]	FB[6)]	OF[7)]

1) Enable for counter function block

2) With a rising edge transfer the preset actual value

3) Reset the actual value to zero

4) Zero: Status 1 if the value of the function block output QV (the counter status) equals zero

5) Carry: Status 1 if the value range is exceeded

6) Fall below: Status 1 if the actual value ≦ lower setpoint

7) Overflow: Status 1 if the actual value ≧ lower setpoint

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Comparators CP1…CP32

Operand selection	Value (hex)
Part No	18
Instance[1)]	01 - 20
Index	00 - 03, → table 290

1) The value 01_{hex} for the instance chooses the comparator function block CP1, the value 20_{hex} the comparator function block CP32.

Table 290: Operand overview

Index	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 291	–	R
02	Comparison value I1	DWORD or UDINT[1)]				R/W[2)]
03	Comparison value I2	DWORD or UDINT[1)]				R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte
2) The value can only be written if it is assigned to a constant in the program.

Table 291: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1
FB output Data 3		–	–	–	–	GT[1)]	EQ[2)]	LT[3)]

1) greater than: Status 1 if the value at I1 is greater than value at I2 (I1 > I2)
2) equal: Status 1 if the value at I1 is equal to value atI2 (I1 = I2)
3) less than: Status 1 if the value at I1 is less than value at I2 (I1 < I2)

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

D1 to D32 text output function blocks

Operand selection	Value (hex)
Part No	19
Instance[1)]	01 – 20
Index	00 – 33

1) The value 01_{hex} for the instance selects the text output function block D1, the value 20_{hex} the Block compare function block D32.

Table 292: Operand overview

Index (hex)	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 293	–	→ Tab. 293	–	R
02	Text line 1, column 1…4	DWORD or UDINT[1)]				R
03	Text line 1, column 5…8	DWORD or UDINT[1)]				R
04	Text line 1, column 9…12	DWORD or UDINT[1)]				R
05	Text line 1, column 13…16	DWORD or UDINT[1)]				R
06	Text line 2, column 1…4	DWORD or UDINT[1)]				R
07	Text line 2, column 5…8	DWORD or UDINT[1)]				R
08	Text line 2, column 9…12	DWORD or UDINT[1)]				R
09	Text line 2, column 13…16	DWORD or UDINT[1)]				R
10	Text line 3, column 1…4	DWORD or UDINT[1)]				R
11	Text line 3, column 5…8	DWORD or UDINT[1)]				R
12	Text line 3, column 9…12	DWORD or UDINT[1)]				R
13	Text line 3, column 13…16	DWORD or UDINT[1)]				R
14	Text line 4, column 1…4	DWORD or UDINT[1)]				R
15	Text line 4, column 5…8	DWORD or UDINT[1)]				R
16	Text line 4, column 9…12	DWORD or UDINT[1)]				R
17	Text line 4, column 13…16	DWORD or UDINT[1)]				R
18	Variable 1	DWORD or UDINT[1)]				R/W[2)]

Index (hex)	Operand	Data 1	Data 2	Data 3	Data 4	Read/ Write
19	Variable 2	DWORD or UDINT[1]				R/W[2]
20	Variable 3	DWORD or UDINT[1]				R/W[2]
21	Variable 4	DWORD or UDINT[1]				R/W[2]
22	Scaling minimum value 1	DWORD or UDINT[1]				R
23	Scaling minimum value 2	DWORD or UDINT[1]				R
24	Scaling minimum value 3	DWORD or UDINT[1]				R
25	Scaling minimum value 4	DWORD or UDINT[1]				R
26	Scaling maximum value 1	DWORD or UDINT[1]				R
27	Scaling maximum value 2	DWORD or UDINT[1]				R
28	Scaling maximum value 3	DWORD or UDINT[1]				R
29	Scaling maximum value 4	DWORD or UDINT[1]				R
30	Control information line 1	DWORD or UDINT[1]				R
31	Control information line 2	DWORD or UDINT[1]				R
32	Control information line 3	DWORD or UDINT[1]				R
33	Control information line 4	DWORD or UDINT[1]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 293: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1]
FB output Data 3		–	–	–	–	–	–	–	Q1[2]

1) Text function block enable

2) Status 1 if the number of elements exceeds the source or target range.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Boolean operation function blocks BV1 to BV32

Operand selection	Value (hex)
Part No	1A
Instance[1)]	01 – 20
Index	00 – 03, → table 294

1) The value 01_{hex} for the instance selects the Boolean operation function block BV1, the value 20_{hex} the Boolean operation function block BV32.

Table 294: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 295	–	→ Tab. 295	–	R
02	Input value I1	DWORD or UDINT[1)]				R/W[2)]
03	Output value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 295: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Transfer of the value present at I1 when there is a rising edge.

2) Status 1 if the trigger signal is 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

PID controllers DC1…DC32

Operand selection	Value (hex)
Part No	27
Instance[1)]	01 - 20
Index	00 - 09, → table 296

1) The value 01_{hex} for the instance selects the counter function block C1, the value 20_{hex} the counter function block C32.

Table 296: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 297	–	→ Tab. 297	–	R
01	mode	→ Tab. 298	–	–	–	R
02	Setpoint I1: -32768 … +32767	DWORD or UDINT[1)]				R/W[2)]
03	Actual value I2: -32768 … +32767	DWORD or UDINT[1)]				R/W[2)]
04	Proportional gain KP [%], Value range: 0 to 65535	DWORD or UDINT[1)]				R/W[2)]
05	Reset time TN [0.1 s], Value range: 0 to 65535	DWORD or UDINT[1)]				R/W[2)]
06	Rate time TV [0.1 s], Value range 0 to 65535	DWORD or UDINT[1)]				R/W[2)]
07	Scan time TC Value range 0.1s to 65535.5s Value 0: time corresponds to the program cycle	DWORD or UDINT[1)]				R/W[2)]
08	Manual manipulated variable MV, value range –4096 to +4095	DWORD or UDINT[1)]				R/W[2)]
09	Manipulated variable QV Mode UNI, value range 0 to +4095 (12-bit) Mode BIP, value range -4096 to +4095 (13-bit)	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 297: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	SE[1]	ED[2]	EI[3]	EP[4]	EN[5]
FB output Data 3		–	–	–	–	–	–	–	LI[6]

1) Transfer of manual manipulated variable on status 1
2) Activation of D component on status 1
3) Activation of I component on status 1
4) Activation of P component on status 1
5) Activates the function block on status 1.
6) Status "1" if the value range of the medium-voltage was exceeded

Table 298: Index 1 - Mode

Data 1	Operating Mode
UNP unipolar	The manipulated variable is output as a unipolar 12-bit value. Corresponding value range for QV 0 to 4095
BIP bipolar	The manipulated variable is output as a bipolar 13-bit value. Corresponding value range for QV –4096 to 4095

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

DG01…DG16 diagnostics

Operand selection	Value (hex)
Part No	39
Instance[1)]	01 - 10
Index	00 - 03
Data 1 – 4	depending on index, → table 299

1) The value 01hex for the instance selects the numerical converter DG01, the value 10hex the numerical converter DG32.

Table 299: Operand overview

Index (hex)	Data	Data 1 Data 3 Data 4	Data 2	Read/Write
0	Bit IO	→ table 300	–	R
2	Diagnostics-Register QV	DWORD or UDINT[1)]		R
3	Output states ON	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

Table 300: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		Q8[2)]	Q7[2)]	Q6[2)]	Q5[2)]	Q4[2)]	Q3[2)]	Q2[2)]	Q1[2)]
FB output Data 4		–	–	–	–	–	–	–	QC[3)]

1) Reset coil: Status 1 resets the counter actual value to zero.
2) 1 is set if the selected safety function block has the selected state.
3) 1 is set if one of the outputs Q1 to Q8 is 1.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Signal smoothing filters FT1…FT32

Operand selection	Value (hex)
Part No	28
Instance[1)]	01 - 20
Index	00 - 05, → table 301

1) The value 01_{hex} for the instance chooses the signal smoothing filter FT1, the value 20_{hex} the signal smoothing filter FT32.

Table 301: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 302	–	R
02	Input value I1: -32768 … +32767	DWORD or UDINT[1)]				R/W[2)]
03	Recovery time TG [0.1 s], Value range: 0 to 65535	DWORD or UDINT[1)]				R/W[2)]
04	Proportional gain KP [%], Value range 0 to 65535	DWORD or UDINT[1)]				R/W[2)]
05	Delayed output value QV, Value range: –32768 to +32767	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 302: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

GT1 to GT32 get network data function blocks

Operand selection	Value (hex)
Part No	1B
Instance[1)]	01 - 20
Index	00 - 02, → table 303

1) The value 01hex for the instance chooses the get network data function block GT1, the value 20hex the get network data function block GT32.

Table 303: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 304	–	R
01	Mode/Parameter	→ Tab. 305	–	→ Tab. 305	–	R
02	Actual value from the network QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

Table 304: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q[1)]

1) Status 1 if a new value is present that is transferred from the NET network.

Table 305: Index 1 – Mode/Parameters (designation of PUT FB with data to be received)

Mode (Data 1)	**NET-ID[1]**	
	0	NET-ID 1
	…	…
	7	NET-ID 8
Parameter (Data 3)	**Instance2[)]**	
	0	PT01
	…	…
	31	PT32

1) Number of station transmitting the value. Possible station numbers: 01 to 08

2) Send FB (e.g. PT 20) of the sending NET station. Possible function block number: 01 to 32

Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Comparators CP1 to CP32

Operand selection	Value (hex)
Part No	1C
Instance[1)]	01 - 20
Index	00 - 05, → table 306

1) The value 01hex for the instance selects the comparator function block CP1, the value 20hex the comparator function block CP32.

Table 306: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ table 307	–	R
02	Parameters channel A	→ table 308				R
03	Parameters channel B	→ table 308				R
04	Parameters channel C	→ table 308				R
05	Parameters channel D	→ table 308				R

Table 307: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q[1)]

1) Status 1 if the switch-on condition is fulfilled.

The data in the following table is shown in the Motorola format although it is actually transferred in Intel format.

Table 308: Index 2 – 5, Parameter channels A – D

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Date 2								**Date 1**							
ON	d4	d3	d2	d1	d0	h4	h3	h2	h1	h0	m5	m4	m3	m2	m1	m0
	Day of week					**Hour**					**Minute**					

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Date 4								**Date 3**							
OFF	d4	d3	d2	d1	d0	h4	h3	h2	h1	h0	m5	m4	m3	m2	m1	m0
	Day of week					**Hour**					**Minute**					

m5 up to m0: Minute (0 up to 59)
h4 up to h0: Hour (0 up to 23)
d5 to d0: Weekday (0 = Sunday to 6 = Saturday)

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Year time switches HY1…HY32

Operand selection	Value (hex)
Part No	1D
Instance[1)]	01 - 20
Index	00 - 05, → table 309

1) The value 01_{hex} for the instance chooses the year time switch HY1, the value 20_{hex} the year time switch HY32.

Table 309: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 310	–	R
02	Parameters channel A	→ Tab. 311				R
03	Parameters channel B	→ Tab. 311				R
04	Parameters channel C	→ Tab. 311				R
05	Parameters channel D	→ Tab. 311				R

Table 310: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	Q[1)]

1) Status 1 if the switch-on condition is fulfilled.

The data in the following table is shown in the Motorola format although it is actually transferred in Intel format.

Table 311: Index 2 – 5, Parameter channels A – D

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 2								**Date 1**							
ON	y6	y5	y4	y3	y2	y1	y0	m3	m2	m1	m0	d4	d3	d2	d1	d0
	Year								**Month**				**Day**			

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Date 4								**Date 3**							
OFF	y6	y5	y4	y3	y2	y1	y0	m3	m2	m1	m0	d4	d3	d2	d1	d0
	Year								**Month**				**Day**			

d4 … d0: Day (1 .. 31), m3 … m0: Month (1 .. 12), y6 … y0: Year (0: 2000 .. 99: 2099)

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Conditional jump JC01…JC32

Operand selection	Value (hex)
Part No	2F
Instance[1)]	01 - 20
Index	00
Data 1 – 4	depending on index, → table 312

1) The value 01hex for the instance selects the numerical converter JC01, the value 20hex the numerical converter JC32.

Table 312: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/Write
0	Bit IO	→ table 313	–	→ table 313	–	R

Table 313: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	E12[2)]

1) When 1, the program branches to the associated jump label.

2) 1 is set when the associated jump label is not found.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

LS1 to LS32 value scaling function blocks

Operand selection	Value (hex)
Part No	29
Instance[1)]	01 - 20
Index	00 - 07, → table 314

1) The value 01_{hex} for the instance chooses the value scaling function block LS1, the value 20_{hex} the value scaling function block LS32.

Table 314: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 315	–	R
02	Input value I1, value range: 32 bit	DWORD or UDINT[1)]				R/W[2)]
03	Interpolation X1: (X co-ordinate) value range: 32 bit	DWORD or UDINT[1)]				R/W[2)]
04	Interpolation point Y1: (Y co-ordinate) value range 32 bit	DWORD or UDINT[1)]				R/W[2)]
05	Interpolation point 2x: (X co-ordinate) value range 32 bit	DWORD or UDINT[1)]				R/W[2)]
06	Interpolation point 2: (Y co-ordinate) value range 32 bit	DWORD or UDINT[1)]				R/W[2)]
07	Scaled input value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 315: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Master reset MR1 – MR32

Operand selection	Value (hex)
Part No	0F
Instance[1)]	01 – 20
Index	00 – 01, → table 316

1) The value 01_{hex} for the instance chooses the master reset function block MR1, the value 20_{hex} the master reset function block MR32.

Table 316: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
0	Bit IO	→ Tab. 317	–	→ Tab. 317	–	R
1	Mode/Parameter	→ Tab. 318	–	–	–	R

Table 317: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Trigger coil. The appropriate Reset is executed if the coil is triggered (with a rising edge).

2) Status "1" if the trigger coil MR..T is "1".

Table 318: Index 1 - Mode

Data 1 (hex)		
00	Q	the outputs Q.., *Q.., S.., *S.., *SN.., QA01 are reset to "0" depending on the NET-ID
01	M	The marker range MD01 to MD48 is reset to 0.
02	ALL	Reset of Q and M.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Data Multiplexer MX01…MX32

Operand selection	Value (hex)
Part No	31
Instance[1)]	01 - 20
Index	00 – 0B
Data 1 – 4	depending on index, → table 319

1) The value 01hex for the instance selects the numerical converter MX01, the value 20hex the numerical converter MX32.

Table 319: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/Write
0	Bit IO	→ table 320	–	R
2	Channel selection: 0 up to 7	DWORD or UDINT[1)]		R/W[2)]
3	Input value channel 1	DWORD or UDINT[1)]		R/W[2)]
4	Input value channel 2	DWORD or UDINT[1)]		R/W[2)]
5	Input value channel 3	DWORD or UDINT[1)]		R/W[2)]
6	Input value channel 4	DWORD or UDINT[1)]		R/W[2)]
7	Input value channel 5	DWORD or UDINT[1)]		R/W[2)]
8	Input value channel 6	DWORD or UDINT[1)]		R/W[2)]
9	Input value channel 7	DWORD or UDINT[1)]		R/W[2)]
A	Input value channel 8	DWORD or UDINT[1)]		R/W[2)]
B	Output value QV	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte
2) The value can only be written if it is assigned to a constant in the program.

Table 320: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	E1[2)]

1) When 1 is set, the selected input value is entered in the output value.

2) 1 is set if the channel selection is invalid.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Numerical Converter NC1 – NC32

Operand selection	Value (hex)
Part No	2A
Instance[1)]	01 - 20
Index	00 - 03, → table 321

1) The value 01_{hex} for the instance chooses the numerical converter function block NC1, the value 20_{hex} the numerical converter function block NC32.

Table 321: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 322	–	R
01	mode	→ Tab. 323	–	–	–	R
02	Input value I1	DWORD or UDINT[1)]				R/W[2)]
03	Output value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 322: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

Table 323: Index 1 - Mode

Data 1 (hex)		
00	BCD	Converts a BCD-coded decimal value to an integer value
01	BIN	Converts an integer value to a BCD coded decimal value

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Operating hours counters OTO1…OTO4

Operand selection	Value (hex)
Part No	1E
Instance[1)]	01 - 04
Index	00 - 03, → table 324

1) The value 01_{hex} for the instance chooses the operating hours counter OT1, the value 04_{hex} the operating hours counter OT4.

Table 324: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 325	–	→ Tab. 325	–	R
02	Upper threshold value I1	DWORD or UDINT[1)]				R/W[2)]
03	Actual value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 325: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	RE[1)]	EN[2)]
FB output Data 3		–	–	–	–	–	–	–	Q1[3)]

1) Reset coil, status 1 resets the counter actual value to zero.

2) Enable coil

3) Status 1 if the setpoint is reached (greater/equal).

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Pulse width modulation: PW01 – PW02

Operand selection	Value (hex)
Part No	32
Instance[1)]	01 - 02
Index	00 - 0A
Data 1 – 4	depending on index, → table 326

1) The value 01hex for the instance selects the numerical converter PO01, the value 02hex the numerical converter PO02.

Table 326: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/ Write
0	Bit IO	→ table 327	–	R
2	Pulse count in positioning mode I1: 0 to 2147483647	DWORD or UDINT[1)]		R/W[2)]
3	Start frequency FS: 0 bis 5000 Hz	DWORD or UDINT[1)]		R/W[2)]
4	Operating frequency FO: 0 bis 5000 Hz	DWORD or UDINT[1)]		R/W[2)]
5	Frequency change in acceleration ramp RF: 0 to 65535 mHz	DWORD or UDINT[1)]		R/W[2)]
6	Frequency change in brake ramp BF: 0 to 65535 mHz	DWORD or UDINT[1)]		R/W[2)]
7	Number of steps in jog mode P1: 0 up to 65535	DWORD or UDINT[1)]		R/W[2)]
8	Frequency in jog mode PF: 0 up to 5000 Hz	DWORD or UDINT[1)]		R/W[2)]
9	Actual step number QV	DWORD or UDINT[1)]		R
A	Actual frequency QF	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte.

2) The value can only be written if it is assigned to a constant in the program.

Table 327: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	TP1)	BR[2)]	ST[3)]	EN[4)]
FB output Data 3		–	–	–	–	–	–	E1[5)]	AC6[6)]

1) Jog mode is started with a rising edge.
2) The positioning job is aborted with a rising edge.
3) The positioning job is started with a rising edge.
4) Reset coil: Status 1 resets the counter actual value to zero.
5) 1 is set when the parameter entry is invalid.
6) 1 is set if a positioning job is active.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Put network data function blocks PT1 to PT32

Operand selection	Value (hex)
Part No	1F
Instance[1)]	01 - 20
Index	00 - 02
Data 1 – 4	depending on index, → table 328

1) The value 01_{hex} for the instance chooses the function block PT1, the value 20_{hex} the function block PT32.

Table 328: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/Write
0	Bit IO	→ Tab. 329	–	R
2	Setpoint QV for the network	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

Table 329: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1]
FB output Data 3		–	–	–	–	–	E1[2)]	AC[3)]	Q1[4)]

1) Trigger coil. The value is provided on the NET if the coil is triggered (with a rising edge).
2) 1 is set if the send job was aborted due to an error.
3) 1 is set if the trigger coil is triggered. 0 is set if the send job was successfully completed or aborted due to an error.
4) Status 1 if the status of the trigger coil is also 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Pulse width modulation PW01 – PW02

Operand selection	Value (hex)
Part No	2B
Instance[1)]	01 - 02
Index	00 - 04, → table 330

1) The value 01_{hex} for the instance chooses the pulse width modulation function block PW1, the value 02_{hex} the value scaling function block PW2.

Table 330: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/Write
00	Bit IO	→ Tab. 331	–	R
02	Manipulated variable SV value range: 0 to 4095 (12 bit)	DWORD or UDINT[1)]		R/W[2)]
03	Period duration PD [ms] Value range: 0 to 65535	DWORD or UDINT[1)]		R/W[2)]
04	Minimum on duration ME [ms], Value range: 0 to 65535	DWORD or UDINT[1)]		R/W[2)]

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 331: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	EN[1)]
FB output Data 3		–	–	–	–	–	–	–	E1[2)]

1) Activates the function block on status 1.

2) 1 is set if the value is below the minimum on time or minimum off time

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

SC1 synchronize clock function block

Operand selection	Value (hex)
Part No	20
Instance	01
Index	00 → table 332

Table 332: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	→ Tab. 333	–	→ Tab. 333	–	R

Table 333: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	–	T[1]
FB output Data 3		–	–	–	–	–	–	–	Q1[2)]

1) Trigger coil. If the coil is triggered with a rising edge, the current date, weekday and time of the transmitting station is automatically sent to the NET network.

2) Status 1 if the state of the trigger coil SC01T_ is also 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Serial output SP01…SP32

Operand selection	Value (hex)
Part No	35
Instance[1)]	01 - 20
Index	00
Data 1 – 4	depending on index, → table 334

1) The value 01hex for the instance selects the numerical converter NC01, the value 20hex the numerical converter NC32.

Table 334: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/Write
0	Bit IO	→ table 335	–	→ table 335	–	R

Table 335: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	–	T[1]	EN[2)]
FB output Data 3		–	–	–	–	–	–	E1[3)]	AC[4)]

1) The send job is triggered with a rising edge.
2) Reset coil: Status 1 resets the counter actual value to zero.
3) 1 is set if an error occurred during the send job.
4) 1 is set if the send job is active.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Send network data function blocks PT01…PT32

Operand selection	Value (hex)
Part No	33
Instance[1)]	01 – 20
Index	00 – 0B
Data 1 – 4	depending on index, → table 336

1) The value 01hex for the instance selects the numerical converter SR01, the value 20hex the numerical converter SR32.

Table 336: Operand overview

Index (hex)	Data	Data 1	Data 2 Data 4	Data 3	Read/ Write
0	Bit IO	→ table 337	–	→ table 337	R
1	mode	→ table 338	–	–	R
2	Data input forwards I1	DWORD or UDINT[1)]			R/W[2)]
3	Data input backwards I2	DWORD or UDINT[1)]			R/W[2)]
4	Data output 1 (D1)	DWORD or UDINT[1)]			R
5	Data output 2 (D2)	DWORD or UDINT[1)]			R
6	Data output 3 (D3)	DWORD or UDINT[1)]			R
7	Data output 4 (D4)	DWORD or UDINT[1)]			R
8	Data output 5 (D5)	DWORD or UDINT[1)]			R
9	Data output 6 (D6)	DWORD or UDINT[1)]			R
A	Data output 7 (D7)	DWORD or UDINT[1)]			R
B	Data output 8 (D8)	DWORD or UDINT[1)]			R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 337: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	BD[1]	FD[2]	RE[3]	BP[4]	FP[5]	EN[6]
FB output Data 3		Q8[7]	Q8[7]	Q6[7]	Q5[7]	Q4[7]	Q3[7]	Q2[7]	Q1[7]

1) Input bit value for the backward shift operation in BIT mode.
2) Input bit value for the forward shift operation in BIT mode.
3) If 1 is set, the function block is reset.
4) On receipt of a rising edge in BIT mode, the value of BD is entered in the last register field Q8 and the original contents of the register fields are moved one field in the direction of the lower field numbers. On receipt of a rising edge in DW mode, the value of I2 is entered in the last register field D8 and the original contents of the register fields are moved by one field in the direction of the lower field numbers.
5) On receipt of a rising edge in BIT mode, the value of FD is entered in the first register field Q1 and the original contents of the register fields are moved one field in the direction of the higher field numbers. On receipt of a rising edge in DW mode, the value of I1 is entered in the first register field D1 and the original contents of the register fields are moved by one field in the direction of the higher field numbers.
6) Reset coil: Status 1 resets the counter actual value to zero.
7) Status of the eight fields of the bit shift register

Table 338: Index 1 - Mode

Data 1 (hex)		
00	BIT	Mode: shift bit
01	DW	Mode: shift double word

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

ST1 set cycle time function block

Operand selection	Value (hex)
Part No	2C
Instance	01
Index	00 - 02, → table 339

Table 339: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
0	Bit IO	–	–	→ Tab. 340	–	R
2	Cycle time in [ms], value range 0 – 1000	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

Table 340: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Timing relays T1 – T32

Operand selection	Value (hex)
Part No	21
Instance[1)]	01 - 20
Index	00 - 04, → table 341

1) The value 01_{hex} for the instance chooses the timing relay T1, the value 20_{hex} the timing relay T32.

Table 341: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
0	Bit IO	→ Tab. 342	–	→ Tab. 342	–	R
01	Mode/Parameter	→ Tab. 343	–	→ Tab. 343	–	R
02	Time setpoint 1	DWORD or UDINT[1)]				R/W[2)]
03	Time setpoint 2	DWORD or UDINT[1)]				R/W[2)]
04	Elapsed time	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 342: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	–	–	ST[1)]	EN[2)]	RE[3)]
FB output Data 3		–	–	–	–	–	–	–	Q1[4)]

1) Stop, the timing relay is stopped (Stop coil)

2) Enable, the timing relay is started (Trigger coil)

3) Reset, the timing relay is reset (Reset coil)

4) Switching contact

Table 343: Index 1 – Mode/Parameter

mode	Data 1	Operating Mode
	0	On-delayed
	1	On-delayed with random setpoint
	2	Off-delayed
	3	Off-delayed with random setpoint
	4	On and off delayed (two time setpoints)
	5	On and off delayed each with random setpoint (two time setpoints)
	6	Pulse transmitter
	7	Flashing relay (two time setpoints)
	8	Off-delayed, retriggerable (easy600 mode)
	9	Off-delayed with random setpoint, retriggerable (easy600 Mode)
Parameters	**Data 3**	**Operating Mode**
	0	S (Milliseconds)
	1	M:S (Seconds)
	2	H:M (minutes)

Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Timing relays T01 .. T32

Operand selection	Value (hex)
Part No	34
Instance[1)]	01 - 20
Index	00 - 04
Data 1 – 4	depending on index, → table 344

1) The value 01hex for the instance selects the numerical converter TB01, the value 20hex the numerical converter TB32.

Table 344: Operand overview

Index (hex)	Data	Data 1 Data 3	Data 2 Data 4	Read/ Write
0	Bit IO	→ table 345	–	R
2	Input value I1 for table of TB…	DWORD or UDINT[1)]		R/W[2)]
3	Output value PV from table of TB…	DWORD or UDINT[1)]		R
4	Number of entries QN in table of TB…	DWORD or UDINT[1)]		R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 345: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB input Data 1		–	–	–	RE[1)]	RL[2)]	RF[3)]	WP[4)]	EN[5)]
FB output Data 3		–	–	–	–	–	–	TF[6)]	TE[7)]

1) On receipt of a rising edge, all entries are removed from the table. The number of table entries QN is set to 0.
2) On receipt of a rising edge the newest entry in the table is output at output QV and removed from the table. The number of table entries QN is decremented by one.
3) On receipt of a rising edge the oldest entry in the table is output at output QV and removed from the table. The number of table entries QN is decremented by one.
4) On receipt of a rising edge, the value of I1 is transferred to the table and the number of table entries QN is incremented by one, as long as the maximum number of entries is not exceeded. In this case, the value of I1 is output at the output QV.
5) Reset coil: Status 1 resets the counter actual value to zero.
6) 1 is set if the table is full.
7) 1 is set if the table is empty.

→ Further information on this module is provided in the easy800 manual (MN04902001Z-EN; previous description AWB2528-1423GB) or in the easySoft Help.

Value limitation VC1 to VC32

Operand selection	Value (hex)
Part No	2D
Instance[1)]	01 - 20
Index	00 - 05, → table 346

1) The value 01_{hex} for the instance selects the value limitation function block VC1, the value 20_{hex} the value limitation function block VC32.

Table 346: Operand overview

Index (hex)	Data	Data 1	Data 2	Data 3	Data 4	Read/ Write
00	Bit IO	–	–	→ Tab. 347	–	R
02	Input value I1	DWORD or UDINT[1)]				R/W[2)]
03	Upper limit value SH	DWORD or UDINT[1)]				R/W[2)]
04	Lower limit value SL	DWORD or UDINT[1)]				R/W[2)]
05	Output value QV	DWORD or UDINT[1)]				R

1) Value transferred in Intel format: Data 1 contains Low byte, Data 4 contains High byte

2) The value can only be written if it is assigned to a constant in the program.

Table 347: Index 0 – Bit IO

	Bit	7	6	5	4	3	2	1	0
FB output Data 3		–	–	–	–	–	–	–	EN[1)]

1) Activates the function block on status 1.

→ Further information on this function block is provided in the easy800 manual (MN04902001Z-EN, previous description AWB2528-1423GB) or in the easySoft Help.

Read/write date and time

"Easy clock" object

The description of this object is identical to the easy600 (DPV1), → page 294.

Read/write DST

"Easy 800 DST setting" objects

This object contains the DST setting of the easy800/MFD.

This object can be read and written. It can be addressed by a Class 1 and/or Class 2 DPV1 master.

Use
Use this object to

- read the current DST setting of an easy800/MFD clock.
- transfer a new DST setting of an easy800/MFD clock.

Addressing the object
Use the following information for addressing the object:

- API equals 0 (only required for Class 2 DPV1 master)
- Slot number is 0
- Index is 209.

Length of the object
The length of the data to be read or written is 20 octets. Do not enter any different length when calling the "Write" service, or a smaller length when calling the "Read" service, otherwise this will generate an error message.

Variable definition (example) of the object
Declare the following variable (data function block) in an IEC 61131-3 based system in order to read and write the DST setting:

Name	Data Type
Easy_800_Clock_DSTSetting	ARRAY [1..20] OF BYTE or ARRAY [1..20] OF USINT

Data content of the object

The following table shows the address location and meaning of the data contained in the object when reading and writing. It also illustrates in an example how to access the data using the defined variable.

Table 348: Address location and meaning of the data

Variable access (example)	Data position	Meaning	Value range (decimal)
Easy_800_Clock_ DST[1]	Octet 1	Changeover condition → table 349	0 up to 5
Easy_800_Clock_ DST[2]	Octet 2	Day of the changeover to summer time (the time change occurs at 2.00 a.m. and changes to 3.00 a.m.)	1 to 31 BCD coding
Easy_800_Clock_ DST[3]	Octet 3	Month of changeover for change to summer time	1 to 12 BCD coding
Easy_800_Clock_ DST[4]	Octet 4	Day of the changeover to winter time (the time change occurs at 3.00 a.m. and changes to 2.00 a.m.)	1 to 31 BCD coding
Easy_800_Clock_ DST[5]	Octet 5	Month of changeover for change to winter time	1 to 12 BCD coding
Easy_800_Clock_ DST[6]	Octet 6	Rule 1 for changeover to summer time → table 350	0 up to 5
Easy_800_Clock_ DST[7]	Octet 7	Weekday for changeover to summer time → table 352	0 up to 6
Easy_800_Clock_ DST[8]	Octet 8	Rule 2 for changeover to summer time → table 351	0 up to 2
Easy_800_Clock_ DST[9]	Octet 9	Day of changeover for change to summer time	1 to 31 BCD coding
Easy_800_Clock_ DST[10]	Octet 10	Month of changeover for change to summer time	1 to 12 BCD coding
Easy_800_Clock_ DST[11]	Octet 11	Hour of changeover for change to summer time	0 to 23 BCD coding
Easy_800_Clock_ DST[12]	Octet 12	Minute of changeover for change to summer time	0 to 59 BCD coding

Variable access (example)	Data position	Meaning	Value range (decimal)
Easy_800_Clock_ DST[13]	Octet 13	Time Difference	0 up to 5
Easy_800_Clock_ DST[14]	Octet 14	Rule 1 for changeover to winter time → table 350	0 up to 5
Easy_800_Clock_ DST[15]	Octet 15	Weekday for changeover to winter time → table 352	0 up to 6
Easy_800_Clock_ DST[16]	Octet 16	Rule 2 for changeover to winter time → table 351	0 up to 2
Easy_800_Clock_ DST[17]	Octet 17	Day of changeover for change to winter time	1 to 31 BCD coding
Easy_800_Clock_ DST[18]	Octet 18	Month of changeover for change to winter time	1 to 12 BCD coding
Easy_800_Clock_ DST[19]	Octet 19	Hour of changeover for change to winter time	0 to 23 BCD coding
Easy_800_Clock_ DST[20]	Octet 20	Minute of changeover for change to winter time	0 to 59 BCD coding

Table 349: Changeover conditions for DST change

Value (hex)	Meaning	Note
00	No changeover	Octets 2 to 20 have no meaning
01	The changeover is carried out according to octet 2 and 3 for the change to summer time octet 4 and 5 for the change to winter time	Octets 6 to 20 have no meaning
02	Changeover according to rules for EU	Octets 2 to 20 have no meaning
03	Changeover according to rules for GB	Octets 2 to 20 have no meaning
04	Changeover according to rules for USA	Octets 2 to 20 have no meaning
05	The changeover is carried out according to octet 6 to 13 for the change to summer time octet 13 to 20 for the change to winter time	Octets 2 to 5 have no meaning

If the value 0 is entered in octet 1, there is no DST time change. When the values 2 to 4 are selected, the time change is automatic according to the legal requirements for the selected country.

If the value 1 is entered in octet 1, the DST changeover takes place according to the user-defined rules entered in octet 2 to 5.

If the value 1 is entered in octet 5, the DST changeover takes place according to the user-defined rules entered in octet 6 to 20.

Octet 6 contains the first rule for the changeover to summer time, octet 14 the rule for the changeover to winter time. Table 350 indicates the possible rules.

Table 350: Rule 1 for DST changeover

Value (hex)	Meaning	
00	The changeover takes place at the time defined in…	… • Octet 9 to 12 for changeover to summer time • Octet 17 to 20 for changeover to winter time In this case without meaning: • Octet 7 to 8 for changeover to summer time • Octet 15 to 16 for changeover to summer time
01	The changeover takes place on the first weekday defined in…	… • Octet 7 for changeover to summer time • Octet 15 for changeover to winter time in conjunction with the defined rule 2 in: • Octet 8 for changeover to summer time • Octet 16 for changeover to winter time
02[1)]	The changeover takes place on the second weekday defined in…	
03[1)]	The changeover takes place on the third weekday defined in…	
04[1)]	The changeover takes place on the fourth weekday defined in…	
05[1)]	The changeover takes place on the last weekday defined in…	

1) Rule 2, the meaning "in" must be entered. Rule 2 is defined in:

- Octet 8 for changeover to summer time
- Octet 16 for changeover to winter time

If octet 6 or octet 14 contains one of the values 1 to 5, the second rule must be defined for the changeover to summer time (octet 8) or winter time (octet 16). Table 351 indicates the possible rules.

Table 351: Rule 2 for DST changeover

Value (hex)	Meaning	Note
00[1)]	Changeover takes place **on** the defined weekday and month	The weekday is defined in: • Octet 7 for changeover to summer time • Octet 15 for changeover to winter time Month and date are defined in: • Octet 9 to 10 for changeover to summer time • Octet 17 to 18 for changeover to winter time
01	Changeover takes place on the defined weekday **after** the defined date	
02	Changeover takes place on the defined weekday **before** the defined date	

1) In this case without meaning:

- Octet 9 for changeover to summer time
- Octet 17 for changeover to winter time

Table 352: Coding of the weekday

Value (hexadecimal)	Meaning
00	Sunday
01	Monday
02	Tuesday
03	Wednesday
04	Thursday
05	Friday
06	Saturday

Table 353: Coding of the time difference (octet 13)

Value (hexadecimal)	Time difference of the change is
01	30 minutes
02	1 hour
03	90 minutes
04	2 hours
05	150 minutes
06	3 hours

DPV1 error messages

The EASY204-DP generates DPV1 error messages shown in the following table.

Table 354: DPV1 error messages

Error message/code	Meaning	Explanation/remedy
Access denied (Code B6 hexadecimal)	The addressed object is disabled for the DP master type	You have addressed with a Class 1 DP master an object which can only be addressed by a Class 2 DPV1 master. Refer to the object description.
	The addressed object is disabled for the selected service.	You have either accessed an object with a "Write" service that can only be read or accessed an object with a "Read" service that can only be written. Observe the requirements of the object.
	The connected Easy/MFD has generated an error code for the selected service	Observe the requirements of the object.
Invalid index (Code B0 hexadecimal)	The index specified in the "Read" or "Write" service is invalid for the EASY204-DP	Use the index specified in the object description
Invalid parameter (Code B8 hexadecimal)	The data length used with the "Read" service is smaller than the data length of the addressed object	Use the data length specified in the object description
	The parameters used for connecting the Class 2 DPV1 master do not match those of the EASY204-DP	For the connection establishment, the Class 2 DPV1 master must set the Features Supported parameters to 1 and the Profile Ident Number to 0
Invalid range (Code B7 hexadecimal)	An impermissible value was used for a data content with the "Write" service	Observe the value ranges of the data contents specified in the object description

Error message/code	Meaning	Explanation/remedy
Invalid slot (Code B2 hexadecimal)	The slot specified in the "Read" or "Write" service is invalid for the EASY204-DP	Use the slot specified in the object description
Resource unavailable (Code C3 hexadecimal)	The addressed object is currently not available since the communication between EASY204-DP and the connected Easy/MFD is faulty	Check the connection between the devices
Write length error (Code B1 hexadecimal)	The data length used with the "Write" service does not match the data length of the addressed object	Use the data length specified in the object description

Appendix

What Happens If …?

Event	Explanation	Remedy
POW LED not lit	No supply voltage	Connect and switch on power supply
POW LED flashing	Data transfer via EASY-LINK OK	
BUS LED not lit	No PROFIBUS-DP data communication	Connect and start PROFIBUS-DP
BUS LED lit	Data transfer via PROFIBUS-DP OK	
Slave not signalling	– No slave address set – No bus terminating resistor present – Cable, plug faulty – No supply voltage	– Set slave address – Set bus terminating resistors – Check connection – Provide power supply to device
Write command rejected	– Command not permissible – EASY display not on the Status display	– Change command – Show Status display
Actual value is zero	No actual value present	Function relay does not have an actual value or not triggered

Overview of commands

easy600

The commands are sorted in ascending order:

Command value hex	
01	Write T1 timing relay setpoint
02	Write T2 timing relay setpoint
03	Write T3 timing relay setpoint
04	Write T4 timing relay setpoint
05	Write T5 timing relay setpoint
06	Write T6 timing relay setpoint
07	Write T7 timing relay setpoint
08	Write T8 timing relay setpoint
09	Write C1 counter relay setpoint
0A	Write C2 counter relay setpoint
0B	Write C3 counter relay setpoint
0C	Write C4 counter relay setpoint
0D	Write C5 counter relay setpoint
0E	Write C6 counter relay setpoint
0F	Write C7 counter relay setpoint
10	Write C8 counter relay setpoint
12	Write time switch 1 channel A
13	Write time switch 1 channel B
14	Write time switch 1 channel C
15	Write time switch 1 channel D
16	Write time switch 2 channel A
17	Write time switch 2 channel B
18	Write time switch 2 channel C
19	Write time switch 2 channel D
1A	Write time switch 3 channel A

Command value hex	
1B	Write time switch 3 channel B
1C	Write time switch 3 channel C
1D	Write time switch 3 channel D
1E	Write time switch 4 channel A
1F	Write time switch 4 channel B
20	Write time switch 4 channel C
21	Write time switch 4 channel D
22	Write analog value comparator A1
23	Write analog value comparator A2
24	Write analog value comparator A3
25	Write analog value comparator A4
26	Write analog value comparator A5
27	Write analog value comparator A6
28	Write analog value comparator A7
29	Write analog value comparator A8
2A	Write time
2B	Read time switch 1 channel A
2C	Read time switch 1 channel B
2D	Read time switch 1 channel C
2E	Read time switch 1 channel D
2F	Read time switch 2 channel A
30	Read time switch 2 channel B
31	Read time switch 2 channel C
32	Read time switch 2 channel D
33	Read time switch 3 channel A
34	Read time switch 3 channel B
35	Read time switch 3 channel C
36	Read time switch 3 channel D

Command value hex	
37	Read time switch 4 channel A
38	Read time switch 4 channel B
39	Read time switch 4 channel C
3A	Read time switch 4 channel D
3C	Read time
3D	Read status of analog and digital inputs
3E	Read status of P buttons and operator buttons
3F	Read status of timing relays, counter relays, time switches and analog value comparators
40	Read status of markers, digital outputs and text display markers
41	Read T1 actual value
42	Read T2 actual value
43	Read T3 actual value
44	Read T4 actual value
45	Read T5 actual value
46	Read T6 actual value
47	Read T7 actual value
48	Read T8 actual value
49	Read C1 counter relay actual value
4A	Read C2 counter relay actual value
4B	Read C3 counter relay actual value
4C	Read C4 counter relay actual value
4D	Read C5 counter relay actual value
4E	Read C6 counter relay actual value
4F	Read C7 counter relay actual value
50	Read C8 counter relay actual value

EASY800/MFD

Date and time	Byte 1 Command (hex)	Byte 2 Len[1] (hex)	Byte 3 Index (hex)
Read/write date and time	93/B3	05	00
Winter/summer time, DST			01

Image data	Byte 1 Command (hex)	Byte 2 Len[1] (hex)	Byte 3 Type (hex)	Byte 4 Index (dec)
Read/write image data	91/B1			
„Local inputs: I1 – I16"		2	01	0
„Read inputs of the stations IW1 to IW8"				1 - 8
„Read local analog inputs IA1 to IA4"			02	1 - 4
„Read local diagnostics ID1 to ID16"			03	0
„Read and write local QW0 outputs/outputs of the stations QW1 to QW8"			04	0/1 - 8
„Read and write local analog output QA1"			05	0
„Read local P buttons"		1	06	0
„Read RW.. inputs/SW.. outputs from EasyLink"		2	07/09	0
„Read receive data network RN1…RN32/send data network SN1…SN32"				1 - 8
„Read receive data network RN1…RN32/send data network SN1…SN32"		4	08/0A	1 - 8
Marker bit M1 .. M96		1	0B	1 - 96
Marker byte MB1 .. MB96			0C	1 - 96
Marker word MW1 .. MW96		2	0D	1 - 96
Marker double word MD1 .. MD96		4	0E	1 - 96

1) Len… stands for the number of data bytes to be sent.

Function Blocks	Byte 1 Command (hex)	Byte 2 Type (hex)	Byte 3 Instance (hex)
Read/write function blocks	92/B2		
„Receipt of network data GT01…GT32"		0F	1 - 20
„Analog value comparators A01…A32"		11	1 - 20
„Arithmetic function blocks AR01…AR32"		12	1 - 20
„Booelan operation BV01…BV32"		13	1 - 20
„Counters C01…C32"		14	1 - 20
„Frequency counters CF01…CF04"		15	1 - 20
„High-speed counters CH01…CH04"		16	1 - 4
„Incremental encoder counters CI01…CI02"		17	1 - 2
„Comparators CP01…CP32"		18	1 - 20
„Text output function blocks D01…D32"		19	1 - 20
„Data function blocks DB01…DB32"		1A	1 - 20
„Receipt of network data GT01…GT32"		1B	1 - 20
„Comparator CP01…CP32"		1C	1 - 20
„Year time switch HY01…HY32"		1D	1 - 20
„Operating hours counters OT01…OT04"		1E	1 - 4
„Value scaling function blocks LS01…LS32"		1F	1 - 20
„Synchronize clock SC01"		20	1
„Set cycle time ST01"		21	1 - 20
„Block compare function blocks BC01…BC32"		25	1 - 20
„Block transfer function blocks BT01…BT32"		26	1 - 20
„PID controllers DC01…DC32"		27	1 - 20
„Signal smoothing filters FT01…FT32"		28	1 - 20
„Receive network data function blocks GT01…GT32"		29	1 - 20
„Numerical Converter NC01…NC32"		2A	1 - 20
„Pulse width modulation PW01…PW02"		2B	1 - 2

Function Blocks	Byte 1 Command (hex)	Byte 2 Type (hex)	Byte 3 Instance (hex)
„Set cycle time ST01"		2C	1
„Value limitation VC01…VC32"		2D	1 - 20
„Conditional jump JC01…JC32"		2F	1 - 20
„Data Multiplexer MX01…MX32"		31	1 - 20
„Pulse width modulation: PW01…PW02"		32	1 - 2
„Send network data function blocks PT01…PT32"		33	1 - 20
„Timing relays T01…T32"		33	1 - 20
„Serial output SP01…SP32"		34	1 - 20
„DG01…DG16 diagnostics"		39	1 - 10

Technical data

General

Standards	EN 55011, EN 55022, IEC/EN 61-4, IEC 60068-2-27, IEC 61158
Dimensions (W × H × D)	35.5 × 90 × 56.5
Weight	150 g
Mounting	Top-hat rail to DIN 50022, 35 mm Screw fixing with fixing brackets ZB4-101-GF1 (accessories)

Ambient temperatures

Operating ambient temperature Installed horizontally/vertically	Cold to IEC 60068-2-1 Heat to IEC 60068-2-2	–25 to 55 °C
Condensation		Prevent condensation by means of suitable measures
Storage/transport temperature		–40 to +70 °C
Relative humidity	IEC 60068-2-30	5 to 95 %, non-condensing
Air pressure (in operation)		795 to 1080 hPa
Corrosion resistance	IEC 60068-2-42 IEC 60068-2-43	SO_2 10 cm^3/m^3, 4 days H_2S 1 cm^3/m^3, 4 days

Ambient mechanical conditions

Pollution degree		2
Protection type	EN 50178 IEC 60529 VBG4	IP20
Vibrations	IEC 60068-2-6	10 to 57 Hz (constant amplitude 0.15 mm) 57 to 150 Hz (constant acceleration 2 g)
Shocks	IEC 60068-2-27	18 shocks (semi-sinusoidal 15 g/11 ms)
Drop	IEC 60068-2-31	Drop height 50 mm
Free fall, packaged	IEC 60068-2-32	1 m

Electromagnetic compatibility (EMC)

Electrostatic discharge	IEC/EN 61000-4-2, degree of severity 3	8 kV air discharge, 6 kV contact discharge
Electromagnetic fields	IEC/EN 61000-4-3	Field strength 10 V/m
Radio interference suppression	EN 55011, EN 55022	Limit class A
Burst	IEC/EN 61000-4-4, degree of severity 3	2 kV supply lines, 1 kV signal lines
High-energy pulses (surge)		
EASY…-DC…	IEC/EN 61000-4-5, degree of severity 2	0.5 kV power cable symmetrical
Conducted RFI	IEC/EN 61000-4-6	10 V

Insulation resistance

Clearance in air and creepage distances	EN 50178, UL 508, CSC C22.2 No 142
Insulation resistance	EN 50178

Tools and cable cross-sections

solid	
min.	0.2 mm^2, AWG 22
max.	4 mm^2, AWG 12
Flexible with ferrule	
min.	0.2 mm^2, AWG 22
max.	2.5 mm^2, AWG 12
Slot-head screwdriver, width	3.5 × 0.8 mm
Tightening torque max.	0.5 Nm

Current supply

Rated voltage	
Nominal value	24 V DC, –15 %, +20 %
Permissible range	20.4 to 28.8 V DC
Ripple	< 5 %
Input current at 24 V DC	Normally 200 mA
Voltage dips (IEC/EN 61131-2)	10 ms
Heat dissipation at 24 V DC	Normally 4.8 W

LED indicators

Power LED (POW)	green
PROFIBUS-DP LED (BUS)	green

PROFIBUS-DP

Device connection	SUB-D 9-pole, socket
Potential isolation	Bus to power supply (simple) Bus and power supply to "easy" basic unit (safe isolation)
Function	PROFIBUS-DP slave
Interface	RS485
Bus protocol	PROFIBUS-DP
Baud rates	Automatic search up to 12 MBd
Bus Terminating Resistors	Connectable via plug
Bus addresses	1 to 126 addressable via "easy" basic unit with display or EASY-SOFT
Services	
Inputs module	All data S1 to S8 (EASY6..)
Outputs module	All data R1 to R16 (EASY6..)
Control commands module	Read/Write Time, day, summer/winter time (DST) All parameters of the EASY function relays

Dimensions

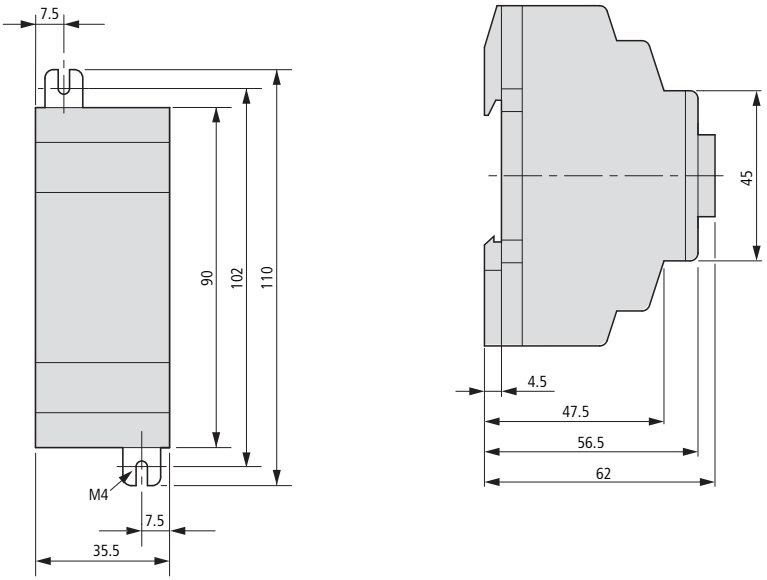


Figure 9: Dimensions EASY204-DP

Glossary of terms

This glossary refers to subjects relating to PROFIBUS-DP.

Terminal resistor	Resistor at the beginning and end of a bus line for preventing disturbance caused by signal reflections and for adapting bus cables. Bus terminating resistors must always be the last unit at the end of a bus segment.
Acknowledge	Acknowledgement returned by the receiving station after having received a signal.
Address	Number, for example, for identifying a memory location, a system or a module within a network.
Addressing	Assignment or setting of an address such as for a module in a network.
Active metal component	Conductor or conductive component that is live when in operation.
Automation device	Control device with inputs and outputs that is connected to a technical process. Programmable controllers (PLCs) are a special group of automation devices.
Analogue	Value, such as voltage, that is infinitely variable and proportional. Analog signals can acquire any value within specific limits.
Baud	Unit for the data transfer rate. One baud corresponds to the transmission of one bit per second (bit/s).
Baud rate	Unit of measure of the data transmission speed in bit/s.
Electrical equipment	All objects that are used for the generation, conversion, transfer, distribution and use of electric power, such as conductors, cables, machines, controlgear.
Reference ground	Ground potential in the area of grounding devices. Unlike "ground", which always has zero potential, it may have any potential except zero.
Reference potential	Represents a reference point for measuring and/or visualizing the voltage of any connected electrical circuits.
Bidirectional	Operation in both directions.

Lightning protection	Represents all measures for preventing system damage due to overvoltage caused by lightning strike.
Bus	Bus cable system for data exchange between CPU, memory and I/O level. A bus can consist of several parallel segments, such as the data bus, address bus, control bus and power supply bus.
Bus line	Smallest unit connected to the bus. Consists of the PLC, a module and a bus interface for the module.
Bus system	The entirety of all units which communicate across a bus.
Bus cycle time	Time interval in which a master will serve all slaves or stations in a bus system, i.e. writes their outputs and reads their inputs.
CPU	Abbreviation for "Central Processing Unit". Central unit for data processing, which represents the core element of a computer.
Digital	A value, for example voltage, that can only be represented by a certain number of states within a defined range, usually defined as 0 and 1.
DIN	Abbreviation for "Deutsches Institut für Normungen e. V." (German standards institute).
EMC	Abbreviation for "Electromagnetic Compatibility". The ability of electrical equipment to function trouble-free within a particular environment without a negative effect on the environment concerned.
EN	Abbreviation for "European Norm" or European standard.
Earth	In electrical engineering the name for conductive grounding with an electrical potential at any point equal to zero. In the environment of grounding devices, the electrical ground potential may not equal zero. This is called a "reference ground".
ground (verb)	Represents the connection of an electrically conductive component to the equipotential earth via a grounding device.
Ground connection	One or several components that have a direct and good contact with the ground.

ESD	Abbreviation for "Electrostatic Discharge".
Fieldbus	Data network on the sensor/actuator level. The fieldbus interconnects the devices at field level. Characteristic feature of the fieldbus is their highly reliable transfer of signals and real-time response.
Field supply	Voltage supply to field devices as well as signal voltage.
Galvanic coupling	A galvanic coupling occurs when two circuits use the same cable. Typical sources of interference are, for example, starting motors, static discharges, clocked devices, and a potential difference between the housing of components and the common power supply.
GND	Abbreviation for "GROUND" (0 potential).
GSD	The device master data files (GSD) contain standardized PROFIBUS station descriptions. They are used to simplify the configuration of the DP master and DP slaves.
hexadecimal	Number system with base 16. Counting from 0 to 9 and then with the letters A, B, C, D, E and F.
I/O	Abbreviation for "Input/Output".
Impedance	Apparent resistance that a component or circuit of several components has for an alternating current at a particular frequency.
Low impedance connection	Connection with low alternating-current resistance.
Inactive metal parts	Conductive parts that cannot be touched and which are insulated from active metal parts. They can, however, carry voltage in the event of a fault.
Inductive coupling	Inductive (magnetic) coupling occurs between two current carrying conductors. The magnetism produced by the currents induces an interference voltage. Typical interference sources are, for example transformers, motors, mains cables installed parallel and RF signal cables.
Capacitive coupling	Capacitive (electrical) coupling develops between two conductors carrying different potentials. Typical interference sources are, for example parallel signal cables, contactor relays and static discharge.

Coding element	Two-part element for the unambiguous allocation of electronic and basic module.
Command-capable modules	Command-capable modules are modules with an internal memory that are capable of executing particular commands (such as output substitute values).
Configure	Systematic arrangement of the I/O modules of a station.
short-circuit proof	Property of electrical equipment. Short-circuit-proof equipment has the ability to withstand the thermal and dynamic loads that may occur at the location of installation on account of a short-circuit.
LSB	Abbreviation for "Least Significant Bit". Bit with the least significant value.
Common	Entirety of all interconnected inactive equipment parts that do not have any contact voltage, even in the event of a fault.
Ground strap	Flexible conductor, mostly braided. Interconnects inactive parts of equipment, e.g. the doors of a control panel and the switch cabinet body.
Master	Station or node in a bus system that controls communication between the other stations of the bus system.
Master-slave mode	Operating mode in which a station or node of the system acts as master that controls communication on the bus.
mode	Operating mode.
Module bus	Represents the internal bus of an XI/ON station. Used by the XI/ON modules for communication with the gateway. Independent of the fieldbus.
MSB	Abbreviation for "Most Significant Bit". Bit with the most significant value.
Multimaster mode	Operating mode in which all stations or nodes of a system have equal rights for communicating on the bus.

Namur	Abbreviation for "Normen-Arbeitsgemeinschaft für Mess- und Regeltechnik" (Standards Committee for Measurement and Control Technology). Namur actuators are special types of two-wire actuators. They are highly resistant to interference and reliable due to their special construction, e.g. low internal resistance, few components and short design.
Overhead	System management time required in the system in each transmission cycle.
Parameter Definition	Assignment of parameters in the configuration software of the DP master for the individual stations on the bus and their modules.
Potential equalization	Adaptation of the electrical level of the body of electrical equipment and auxiliary conductive bodies by means of an electrical connection.
Potential-free	Galvanic isolation between the reference potentials of the control and load circuit of I/O modules.
Common potential	Electrical interconnection of the reference potentials of the control and load circuit of I/O modules.
PROFIBUS-DP	PROFIBUS bus system with the DP protocol. DP stands for "decentralized periphery". PROFIBUS-DP is based on DIN 19245 Part 1+4, and was integrated in the European fieldbus standard EN 50170. It is used for high-speed data exchange between the central DP master and the decentralized peripheral devices, the DP slaves. The comprehensive use is implemented by means of a multi-master concept.
PROFIBUS-DP address	Each PROFIBUS-DP station is assigned an unambiguous PROFIBUS-DP address by means of which it can be addressed by the master.
PROFIBUS-DP master	The PROFIBUS-DP master is the central station and controls the PROFIBUS access of all PROFIBUS-DP slaves.
PROFIBUS-DP slave	PROFIBUS-DP slaves are addressed by the PROFIBUS-DP master and exchange data with it at its request.

Response time	In a bus system the time interval between the sending of a read job and the receipt of the response. Within an input module, it represents the time interval between the signal change at an input and its output to the bus system.
Repeater	Amplifier for signals transferred across a bus.
RS 485	Serial interface in accordance with the EIA standard for high-speed data transmission via several transmitters.
Shield	Term that describes the conductive covering of cables, cubicles and cabinets.
Screen earth kit	All measures and equipment used for connecting system parts with the shield.
Protective conductor	A conductor required for the protection against dangerous currents, designated by the letters PE (abbreviation of "Protective Earth").
Serial	Describes an information transfer technique. Data is transferred in a bit-stream across the cables.
Slave	Station in a bus system that is subordinate to the master.
PLC	Abbreviation for Programmable Logic Controller.
Station	Function unit or module, consisting of several elements.
Radiated coupling	Radiated coupling occurs when an electromagnetic wave makes contact with a conductor structure. The impact of the wave induces currents and voltages. Typical interference sources are, for example ignition circuits (spark plugs, commutators of electrical motors) and transmitters (e.g. radio-operated devices), which are operated near the corresponding conductor structure.
SUB-D connector	9-pole plug for connecting the fieldbus.
Topology	Geometric structure of a network or circuit arrangement.
UART	Abbreviation for "Universal Asynchronous Receiver/Transmitter". A "UART" is a logic circuit used for converting an asynchronous serial data sequence into a bit-parallel data sequence or vice versa.
Unidirectional	Working in one direction.

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