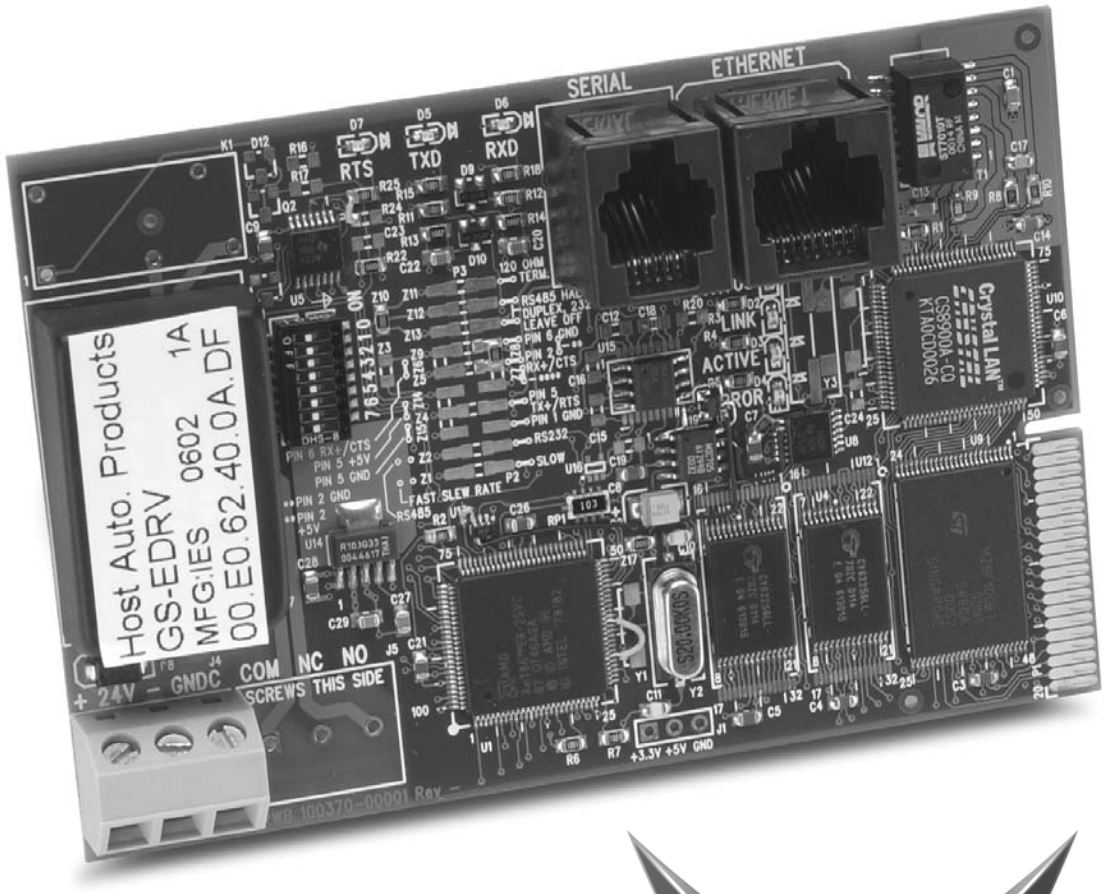
GS Accessories

GS Series AC Drive Ethernet Interface

User Manual



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GS Series AC Drive
Ethernet Interface
USER MANUAL

Please include the Manual Number and the Manual Issue, both shown below, when communicating with Technical Support regarding this publication.

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Publication History		
Issue	**Date**	**Description of Changes**
First Edition	8/02/02	Original
First Edition, Rev. A	3/14/03	Added Input WORD functions
First Edition, Rev. B	8/12/05	Website publication only; Corrected Output Word Map & Warnings

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Manual Overview

Overview of this Publication

The GS AC Drive Ethernet Interface User Manual describes the installation, configuration, and operation of the GS AC Drive Ethernet Interface card.

Who Should Read This Manual

This manual contains important information for those who will install, maintain, and/or operate any GS Series AC Drive Ethernet Interface card.

Supplemental Publications

The **Ethernet Remote Master Module Manual** (H24-ERM-M) is available from **AutomationDirect** and may be useful for your application.

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GS AC Drive Ethernet Interface Overview

The Ethernet Interface for GS Series AC Drives (GS-EDRV) provides a low-cost, high-performance 10BaseT Ethernet link between a PLC-based Control system and GS Series AC Drive. The GS-EDRV mounts on DIN rail and communicates through cable connections to the AC drive and Ethernet hub/switch.

The function of the interface is to:

- process input signals from the AC drive
- format signals to conform to the Ethernet standard
- transmit signals to the PLC-based controller
- receive and translate output signals from the PLC-based Control software
- sends the output signals to the drive

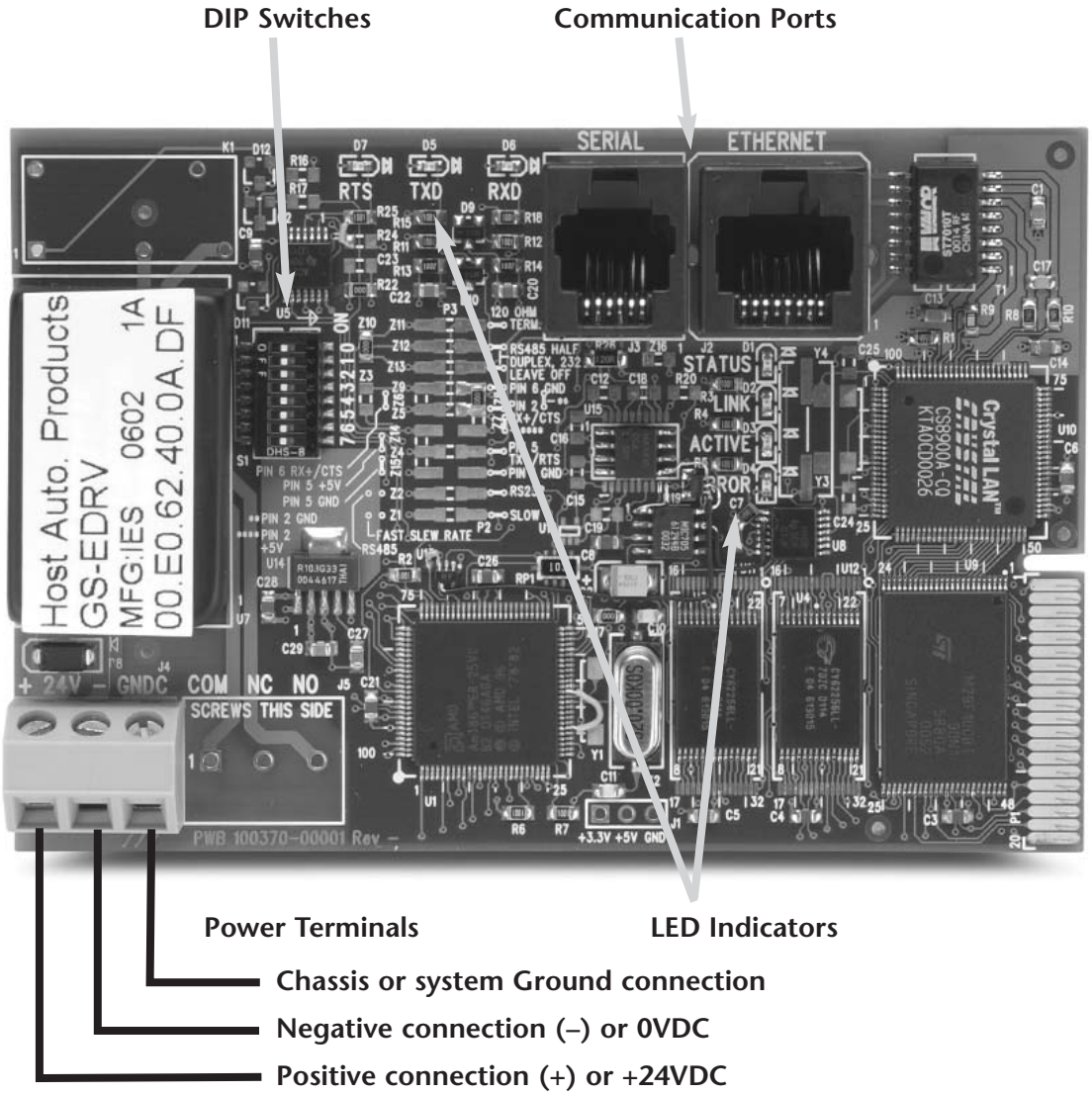
The control function is not performed by the interface. The control function is performed by the PLC–based control system. The I/O mapping function is performed by an H2(4)-ERM module (purchased separately) and the ERM Workbench Utility which is part of the ***Direct***SOFT32 PLC programming software.

Package Contents

After receiving the GS-EDRV, please check for the following:

- Make sure that the part number indicated on the package corresponds with the part number of your order.
- Make sure that the package includes a GS AC Drive Ethernet Interface card, one piece of **SNAP**TRACK™, two DIN mounting clips, and one serial connection cable.
- Inspect the contents to insure they were not damaged during shipment.

GS-EDRV Board Layout



Power Terminals

Power for the GS-EDRV is connected directly to the card using a nominal 24VDC supply (+24VDC, –0VDC). The GNDC terminal is for a chassis or system Ground.

Input Voltage

18-33 VDC with a 24VDC nominal supply

Input Current

90-135 mA

Communication Ports

Two comm ports are provided to make a connection from a GS Series AC drive (Serial port) to an Ethernet device or network (Ethernet port)

DIP Switches

The DIP Switches are used to set the Module ID for the GS-EDRV card

LED Indicators

STATUS Indicator

The green STATUS LED is steady on when the GS-EDRV is connected to a GS Series AC drive and communications have been established.

LINK

The green LINK LED is steady on when the GS-EDRV is correctly connected to an active device on the network. The LINK LED verifies that the proper cables are connected, and the card is functioning correctly. If a mismatch with the 10BaseT connections occurs this LED will not be illuminated.

ACTIVE

The green ACTIVE LED flashes to indicate that the card sees data travelling on the network. If any network device is sending or receiving data, the ACTIVE LED will be illuminated. In idle mode (no network traffic) this LED is OFF. During heavy communication loads this LED will be steady on.

ERROR Indicator

If the GS-EDRV's red Error (ERROR) indicator is flashing or steady on, a fatal error has occurred. The error may be in the card itself, or a network problem may be causing this symptom. The ERROR indication can be caused by a faulty ground, an electrical spike or other types of electrical disturbances. Cycle power to the system to attempt clearing the error.

RTS

The green RTS LED indicates the GS-EDRV is ready to send information to the AC drive.

TXD

The green TXD LED flashes to indicate that the card sees data travelling to the AC drive. During heavy communication loads, this LED will be steady on.

RXD

The green RXD LED flashes to indicate that the card sees data traveling from the AC drive. During heavy communication loads this LED will be steady on.

Setting the GS-EDRV Address

Each GS-EDRV must have an identification (ID) or address in order to be recognized on the network, and each ID must be unique. Duplicate IDs on the same network will cause unpredictable results and must be avoided.

WARNING: Duplicate IDs on the same network will cause unpredictable results and must be avoided.

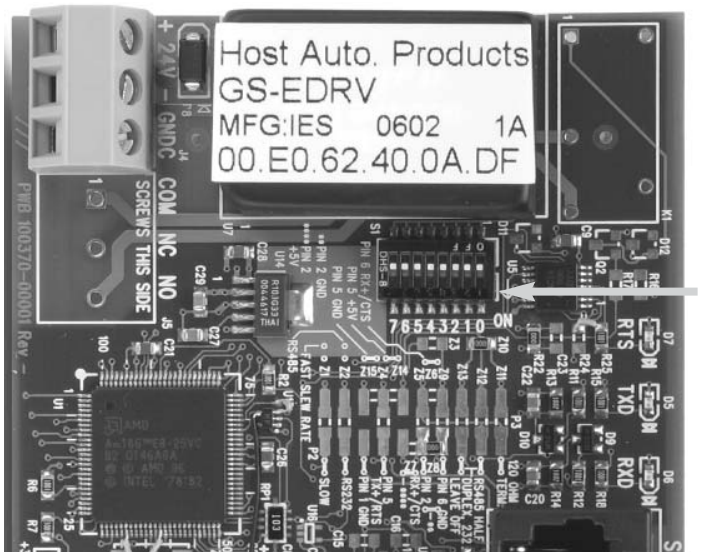
Setting Module ID with DIP Switches

You can use the DIP switch to set the ID to a number from one to sixty-three. Do not use ID "0" for communications.

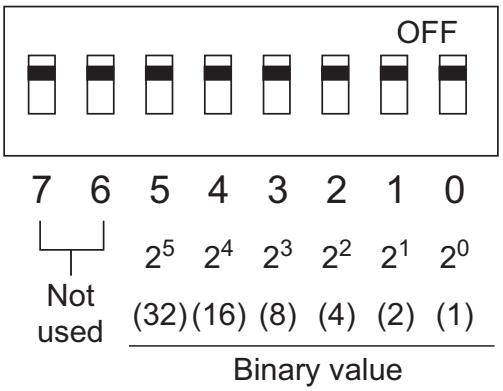
If the DIP switch is set to a number greater than 0, the software tools are disabled from setting the ID. Again, the software tools will only allow changes to the ID if the DIP switch setting is 0 (zero, all switches OFF).

Note: The DIP switch settings are read only at power-up. You must cycle power if you change the DIP switches.

The GS-EDRV DIP switch contains eight individual switches, but only six of these are active. You will find that the printed circuit board is labeled 0 (zero) through 7. The numbers on the printed circuit board indicate the power of 2 represented by each individual switch. For example, switch 0 represents 2^0 (or 1), switch 1 is 2^1 (or 2), switch 2 is 2^2 (or 4), and so on.

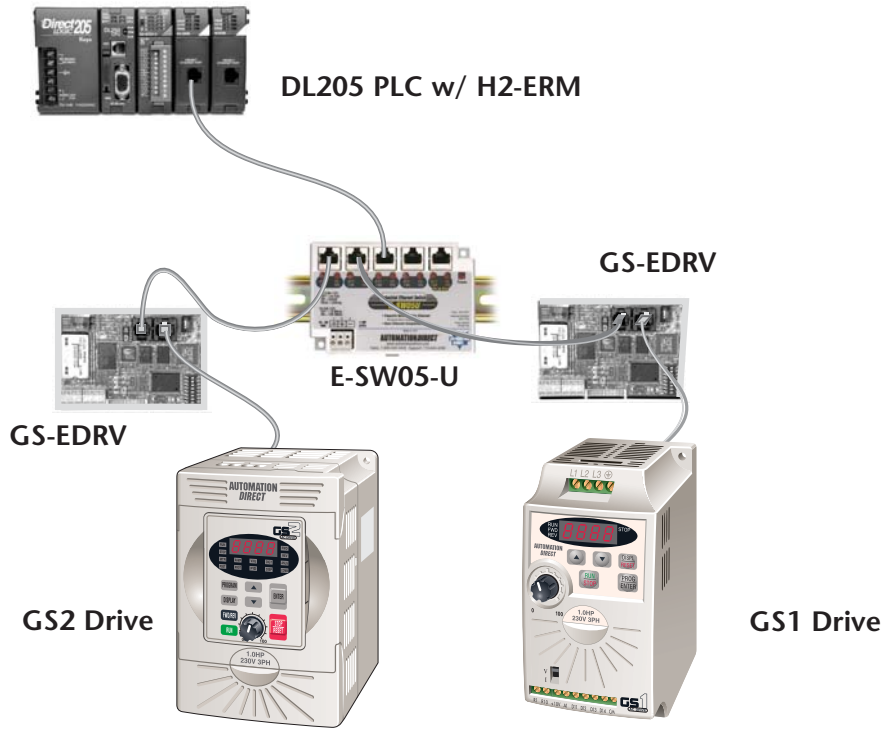


DIP Switches



The ID equals the sum of the binary values of the slide switches set in the ON position. For example, if you set slide switches 1, 2, and 3 to the ON position, the ID will be 14. This is found by adding 8+4+2=14. The maximum value you can set on the DIP switch is 32+16+8+4+2+1=63. This is achieved by setting switches 0 through 5 to the ON position.

Network Connections



10BaseT Connections

The GS-EDRV Ethernet port has an eight-pin modular jack that accepts RJ45 connector plugs. UTP (Unshielded Twisted-Pair) cable is rated according to its data-carrying ability (bandwidth) and is given a "category" number. We strongly recommend using a category 5 cable for all Ethernet 10BaseT connections. For convenient and reliable networking, we recommend that you purchase commercially manufactured cables (cables with connectors already attached).

To connect an GS-EDRV (or PC) to a hub, switch, or repeater, use a patch cable (sometimes called a straight-through cable). The cable used to connect a PC or an H2(4)-ERM directly to an GS-EDRV or to connect two hubs is referred to as a crossover cable.

Patch (Straight-through) Cable

EDRV			HUB
TD+ 1	OR/WHT	OR/WHT	1 RD+
TD- 2	OR	OR	2 RD-
RD+ 3	GRN/WHT	GRN/WHT	3 TD+
4	BLU	BLU	4
5	BLU/WHT	BLU/WHT	5
RD- 6	GRN	GRN	6 TD-
7	BRN/WHT	BRN/WHT	7
8	BRN	BRN	8
RJ45			RJ45

Crossover Cable

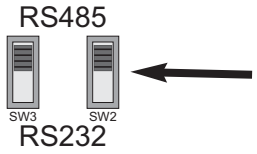
EDRV			PC
TD+ 1	OR/WHT	GRN/WHT	1 TD+
TD- 2	OR	GRN	2 TD-
RD+ 3	GRN/WHT	OR/WHT	3 RD+
4	BLU	BLU	4
5	BLU/WHT	BLU/WHT	5
RD- 6	GRN	OR	6 RD-
7	BRN/WHT	BRN/WHT	7
8	BRN	BRN	8
RJ45			RJ45

This diagram illustrates the standard wire positions in the RJ45 connector. We recommend all Ethernet 10BaseT cables to be Category 5, UTP cable.

GS-EDRV to GS Series AC Drive Connection

A serial connection cable (2 ft. in length) is provided with the GS-EDRV to make an RS-485 connection with a GS Series AC Drive.

*Note: When using the **GS2** Series AC Drive , DIP Switch 2 and 3 (SW2 and SW3) must be set to RS485.*



Switches SW2 and SW3 must be set to RS485 for an RS-485 connection (GS2 Series Only).

Setting the GS Series AC Drive Parameters

The following parameters need to be set in the GS Series AC Drive in order to operate properly with the GS-EDRV interface card.

P 3.00: 03 or 04 – Operation Determined by RS232C/RS485 interface. Keypad STOP is enabled (03) or disabled (04).

P 4.00: 05 – Frequency determined by RS232/RS485 communication interface

P 9.00: xx – Communication address 1-254 (unique for each device)

P 9.01: 01 – 9600 baud data transmission speed

P 9.02: 05 – MODBUS RTU mode <8 data bits, odd parity, 1 stop bit>

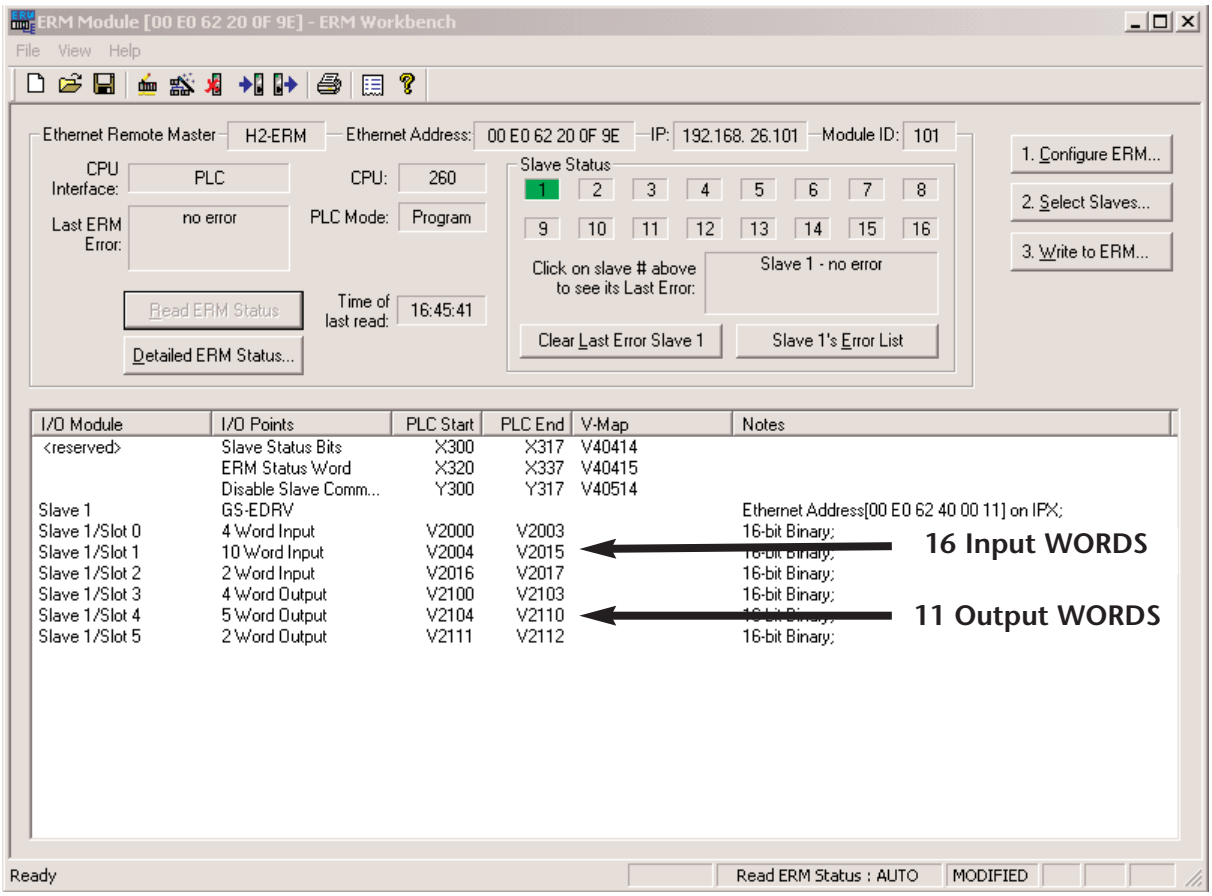
Note: The previous list of parameter settings is the minimum required to communicate with a GS Series AC Drive through a GS-EDRV interface card. There may be other parameters that need to be set to meet the needs of your application.

Connecting the GS-EDRV to an ERM Module

The GS-EDRV interface card can be added to any H2(4)-ERM module using the ERM Workbench Utility. For more details on selecting and configuring slaves for the ERM module, see CHAPTER 4 of the H24-ERM-M.

Reserved PLC Memory for the GS-EDRV

Once the GS-EDRV is added the ERM module, 16 WORD inputs and 11 WORD outputs are mapped back to the PLC. The assigned PLC addresses are shown in the ERM Workbench Utility.



Input/Output Word Map

The Input and Output WORDS for the GS-EDRV are mapped to specific parameters and functions in the GS Series AC Drives. The following tables show the Input and Output WORDS and their functions.

Input WORD Map

Input Word	Parameter Reference	Function
1	N/A	Present Output Frequency
2	N/A	Present Output Current
3	P 9.29	External Fault (0=No Fault, 1=External Fault)
4	N/A	Status Monitor 1 displays error codes from AC Drive. Error Codes: 00: No fault occurred 01: Over-current(oc) 02: Over-voltage(ov) 03: Overheat (oH) 04: Overload (oL) 05: Overload 1 (oL1) 06: Overload 2 (oL2) 07: External Fault (EF) 08: CPU failure 1 (CF1) 09: CPU failure 2 (CF2) 10: CPU failure 3 (CF3) 11: Hardware Protection Failure (HPF) 12: Over-current during accel (OCA) 13: Over-current during decel (Ocd) 14: Over-current during steady state (Ocd) 15: Ground fault or fuse failure (GFF) 16: Low voltage (Lv) 17: Input power 3-phase loss 18: External Base-Block (bb) 19: Auto adjust accel/decel failure (cFA) 20: Software protection code (codE)
5	P 9.16	Block Transfer Parameter 6 - User defined read value
6	P 9.17	Block Transfer Parameter 7 - User defined read value
7	P 9.18	Block Transfer Parameter 8 - User defined read value
8	P 9.19	Block Transfer Parameter 9 - User defined read value
9	P 9.20	Block Transfer Parameter 10 - User defined read value
10	P 9.21	Block Transfer Parameter 11 - User defined read value
11	P 9.22	Block Transfer Parameter 12 - User defined read value
12	P 9.23	Block Transfer Parameter 13 - User defined read value
13	P 9.24	Block Transfer Parameter 14 - User defined read value
14	P 9.25	Block Transfer Parameter 15 - User defined read value
15	Read/Write Response	Response to a read/write request (Output Word 10) Bit: 00-07 = Memory Reference 08-11 = Memory type number (0 to 9 for P0 to P9) 12-13 = Operation: 00=NOP, 01=Read, 10=Write, 11=Undefined 14 = If set, an error has occurred. Error Code is stored in Word 15.
16	Read Request Value	If Input Word 14 is a Read response, the value is stored here. If Input Word 14 is and Error response, the error code is stored here. Error Codes: 0x8010 HEIE_INVALID_REQUEST 0s8090 HEIE_NOT_INITIALIZED 0x8096 HEIE_INVALID_OPERATION 0x006F HEIE_INVALID_TYPE 0x0091 HEIE_INVALID_MODE 0x008C HEIE_INVALID_ADDRESS 0x0085 HEIE_RANGE_ERROR 0x006D HEIE_SIZE_ERROR

Output WORD Map		
Output Word	**Parameter Reference**	**Function**
1	P 9.27	RUN Command
2	P 9.26	RS485 Speed Reference
3	P 9.28	Direction Command (0=Forward, 1=Reverse)
4	P 9.30	Serial Comm Fault Reset
5	P 9.11	Block Transfer Parameter 7 - User defined write value
6	P 9.12	Block Transfer Parameter 8 - User defined write value
7	P 9.13	Block Transfer Parameter 9 - User defined write value
8	P 9.14	Block Transfer Parameter 10 - User defined write value
9	P 9.15	Block Transfer Parameter 11 - User defined write value
10	Read/Write Request	Response to a read/write request (Output Word 10) Bit: 00-07 = Memory Reference 08-11 = Memory type number (0 to 9 for P0 to P9) 12-13 = Operation: 00=NOP, 01=Read, 10=Write, 11=Undefined 14 = Undefined for request
11	Write Request Value	If Output Word 10 is a Write request, the value to be written is placed here.

Word Outputs 10 and 11 are used in conjunction with WORD Inputs 14 and 15 to Read/Write AC drive parameters that are not mapped to other Input and Output WORDS.

Example

To read P 0.00, you would write value 0x1000 into Output Word 10, and the value 0x9000 would come back in Input Word 14. The value read from P 0.00 would be in Input Word 15.
To read P 9.42, you would write value 0x192A into Output Word 10, and the value 0x992A would come back into Input Word 14. The value read from P 9.42 would be in Input Word 15.

By using Output Word 10 and 11 and Input Words 14 and 15, you have the ability to read/write most AC drive parameters.

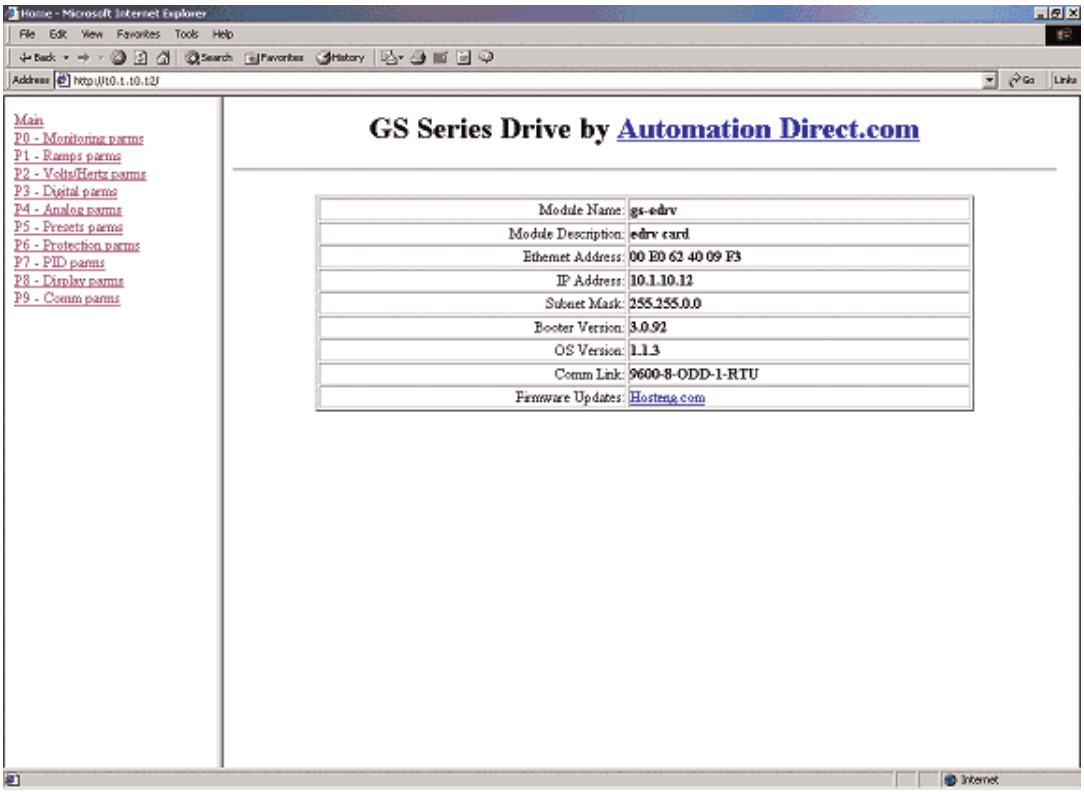
Note: The Communication Parameters (P 9.xx range) cannot be written by using these Input/Output Words. However, the values from these parameters can be read..

Built-in Web Server

The GS-EDRV interface card has a built-in Web Server that allows you to access AC drive data with your favorite Web browser. In order to access the internal Web Server, you must first assign an IP address to the GS-EDRV card. The IP address can be assigned by using the NetEdit utility. You can then access the GS-EDRV card by typing the IP address into your Web browser.

Example

If the IP address is 192.168.10.12, just enter **http://192.168.10.12** into the address field of your browser and press the **Enter** key. The browser will then access the built-in GS-EDRV Web Server. The available parameter groups are shown on the left and the parameter options are shown on the right.



Troubleshooting

Troubleshooting help for the ERM module and its slaves is available in CHAPTER 6 of the Ethernet Remote Master User Manual (H24-ERM-M).

GS-EDRV-MP~

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