

Model eP4

21/06 - Code: ISTR_U_eP4_E_02_--

User Manual

Contents

- Characteristics;
- Function Codes used by the module;
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APPLICABLE STANDARDS

The eP4 module is suited for the Modbus-IDA Organization protocol [1] and implements a subset of it, as explained in the text. Modbus is a registered trademark of Schneider Automation Inc.

Characteristics

General

Power supply	24 Vdc (-15... +25%)
Power consumption	12 VA
Dimensions	W x H x D: 108 x 110 x 60 mm (6 DIN module)
Weight:	512 g
Safety regulations	Compliance to EN 61131-2 Isolation class II (50 Vrms), EN61010-1
CE marking	EN61326-1: Electrical equipment for measurement, control and laboratory use. EMC requirements, UL (pending)

Environment

	Operating	Storage
Temperature	-20... 50°C (-4... 122°F)	-40... 70°C (-40... 158°F)
Relative Humidity	5... 85% non condensing. Appropriate measures must be taken against humidity >85%	5... 95% non condensing. For a short period, slight condensation may appear on the housing
Mounting	Vertical, free air on Omega DIN A rail	
Protection degree	IP20	
Vibrations (3 axes)	10... 57 Hz 0.0375 mm, 57... 150 Hz 0.5 G	
Shock (3 axes)	15 G, 11 ms half sine	

Communications port

Serial Communication ports (COM1)

Feature	Description
Isolation	800 V between analogue inputs, analogue outputs, digital I/Os, power supply and each other (optional)
Terminal connector	X4

I/O characteristics

Digital Channels (D01... D16)

D01... D16 are the Digital I/O that can be configured during offline-setup with the Wizard tool program.

Feature	Description
Type	Configurable as Digital Input (OFF = 0... 3 V, ON = 5... 30 V) or Digital Output (24 Vdc, 0.7 A each)
Isolation	800 V channels/power supply 800 V channels/logic components
Compliance	IEC/EN 61131-2 (type 1)
Terminal connectors	X6 and X7

Fast Counter Digital Input (CNT1... CNT2)

Feature	Description
Type	Fast digital pulse count
Isolation	800 V channels/power supply 800 V channels/logic components
Compliance	IEC/EN 61131-2 (type 1)
Terminal connectors	X6 at terminals CNT1 and CNT2

Modbus I/O expansion module Model eP4



8 AI configurable for:

- 0/4... 20 mA, 0/1... 5 V, 0/2... 10 V, TC (J, K, L, N, R, S, T), PT100 (2 wires), PT1000, NTC, Potentiometer

4 AO configurable for:

- 0/4... 20 mA, 0/1... 5 V, 0/2... 10 V

Up to 16 configurable digital I/O

- Digital Input/Output

2 Fast count inputs

4 Relays/SSR Outputs



The product described in this manual should only be installed, operated and maintained by qualified application programmers and software engineers who are familiar with automation safety concepts and applicable national standards.

Specific Digital Outputs (OP1... OP4)

OP1 to OP4 are designed to be Digital Outputs only: the type can be selected from the ordering code as Relay (code **R**), SSR drive (code **S**) or Mixed (code **M**).

OP1... OP4 relay outputs with 2A SPST-NO

Feature	Description
Contact configuration	SPST-NO (Single Pole, Single Throw, Normally Open)
Contact rate	2 A (for resistive loads)
Isolation	3 kV between channel and Power Supply and between channel and main electronics
Output connectors	X2 and X3

OP1... OP4 as 0/12 Vdc outputs SSR drive for external SSR

Feature	Description
Power output	10 mA, 12 Vdc
Isolation	None
Output connectors	X2 and X3

Universal Analogue Inputs (AI1... AI8)

AI1... AI8 are Universal Analogue Inputs that can be configured during offline-setup with the Wizard tool program.

Feature	Description
Type of input	0/4... 20 mA, 0/1... 5 V, 0/2... 10 V, Thermocouple (type J, K, L, N, R, S, T), PT100 (2 wires), PT1000, NTC (Semitec 103AT-2), Potentiometer or 5 V Ratiometric
Resolution	16 bit
Accuracy	0.1 % of span (linear inputs)/0.2% (Temperature)
Input impedance	120 kΩ (V), < 200 Ω (mA)
Isolation	800 V between analogue outputs, power supply, digital I/Os and communication ports (when isolated)
Input connectors	X8 and X9

Analogue Output (AO1... AO4)

AO1... AO4 are the Analogue Outputs that can be configured during offline-setup with the Wizard tool program.

Feature	Description
Type of Output	0/1... 5 V, 0/2... 10 V, 0/4... 20 mA
Load	< 500 Ω (mA), > 1 kΩ (V)
Resolution	12 bit
Accuracy	0.1% full scale
Isolation	800 V between analogue outputs, power supply, digital I/Os and communication ports (when isolated)
Connector	X11 and X12

Function Codes used by the module

				Functions (hex)	
Data access	Bit access	Internal Bits or Physical Digital output	Read Coil status	01	01
			Write Multiple Coils	15	0F
	Word access	Physical Input Registers	Read Input Register	04	04
		Internal Registers or Physical Output Registers	Read Holding Registers	03	03
			Write Multiple Registers	16	10

The function codes provided for all the modules are a subset of the "Public Function Codes", validated by the Modbus-IDA Organization.

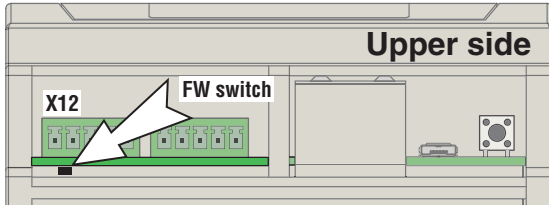
Function 01 can be used to read both digital outputs and digital inputs.

Function 03, Function 04 can be used to read both output and input registers.

Firmware Update

The eP4 Firmware Update can be made only through the USB <-> PC connection.

1. Power OFF the unit;
 2. Press the small **FW button** located under the **X12** terminal block;
 3. **Keep pressed the FW button** and **power ON** the unit: the **PWR** LED only should be **steady ON**;
 4. Plug in the micro **USB** cable type into the unit: on the PC the unit will be recognized as a **MASS STORAGE** device (**AT_EP4**);
- ⚠ Make sure that the USB cable IS NOT PLUGGED to the device BEFORE it is powered ON!**
5. Navigate to the **AT_EP4** folder and **delete** the **fwup.hex** file from the folder;
 6. **Copy** now the specific new firmware file (**fwdown.hex**) into the same folder;
 7. Wait until the copy operation is completed (about 5 seconds);
 8. Power OFF the unit and unplug the USB cable;
 9. Power ON the unit and wait until the **PWR** and **RUN** LEDs will be **steady ON** for normal operations.



Diagnostics

Modbus Exception Responses

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave)
02	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Modbus Address Map organisation

Writing and reading data length limits:

Number of Digital Outputs to be written in a single message	max. 32;
Number of Digital I/O to be read in a single message	max. 32;
Number of Output Registers to be written in a single message	max. 40;
Number of I/O Registers to be read in a single message	max. 40.

Hardware Setup

The RS485 communications port could be configured to adapt to different needs. In order to change the default communication parameters, the user should:

1. By using the Wizard tool, prepare the desired hardware configuration;
2. Export it as **sys_conf.bin** on an USB key in a folder called **cnfg_sys**;
3. Insert the USB memory key in the eP4 module and power it;
4. Wait until the white LED starts blinking and press the Sytem Push Button at least for 1 second;
5. Once the Upgrade Procedure is finished (the PWR, RUN and USB LEDs become steady light), perform a Modbus COM reset command or a Power cycle in order to make the new parameters active.

The communications parameters are:

Modbus address	Name	Type	Command	Access
4000	COMM_COMMANDS	WORD	Cumulative com.s commands	R/W
4000.0	COMM_RESET	BOOL	Communication ports reset	R/W
4001	NODE_ADDR	USINT	Expansion node address	R/W
4002	BAUD_RATE	USINT	Expansion baudrate	R/W
4003	DATA LENGHT	USINT	Expansion data lenght	R/W
4004	DATA_PARITY	USINT	Expansion data parity	R/W
4005	STOP_BITS	USINT	Expansion data stop bits	R/W
4006	COMM_TOUT	UINT	Expansion com.s timeout x100 ms	R/W

The Communications parameter settings are:

Parameter	Values (default value)
NODE_ADDR	1... 247 (default value: 201).
BAUD_RATE	0 2.4 kbps; 1 4.8 kbps; 2 9.6 kbps; 3 19.2 kbps; 4 38.4 kbps (default value); 5 57.6 kbps.
DATA LENGHT	7/8 (default value: 8).
DATA_PARITY	0 None (default value); 1 Even; 2 Odd.
STOP_BITS	1/2 (default value: 1).
COMM_TOUT	0... 65535 (default value: 50).

Common parameters

Universal analogue input status

Modbus address	Name	Status values	Access
0120	Ch. 01 Universal Analogue Input Status	0 Signal OK; 1 Underrange; 2 Overrange;	R
...	...	4 Not configured; 8 Invalid measure.	R
0127	Ch. 08 Universal Analogue Input Status		R

Universal analogue output status

Modbus address	Name	Status values	Access
0128	Ch. 01 Universal Analogue Output Status	0 Signal OK; 1 Underrange; 2 Overrange;	R/W
...	...	4 Not configured; 8 Invalid measure.	R/W
0131	Ch. 04 Universal Analogue Output Status		R/W

Input Type Configuration

Modbus address	Name	Status values	Access
0004	Ch. 01 Universal Analogue Input Config	See the "Input Type Table"	R
...	...		R
0011	Ch. 08 Universal Analogue Input Config		R

Input Type Table

Value	Unit	Description	Range
0	V	0... 5 Volt	0.0... 5.5 V
1	V	1... 5 Volt	0.6... 5.4 V
2	V	0... 10 Volt	0.0... 11.0 V
3	V	2... 10 Volt	1.2... 10.8 V
4	mA	0... 20 mA	0.0... 22.0 mA
5	mA	4... 20 mA	2.4... 21.6 mA
6	°C	Thermocouple J	-245.25... +1235.5°C
7	°C	Thermocouple K	-249.3... +1411.3°C
8	°C	Thermocouple L	-220.0... +620.00°C
9	°C	Thermocouple N	-32.5... +1332.5°C
10	°C	Thermocouple R	-40.0... +1640.0°C
11	°C	Thermocouple S	-44.0... +1804.0°C
12	°C	Thermocouple T	-215.0... +415.0°C
13	°C	PT100 (2 wires)	-232.3... +882.7°C
14	°C	PT1000	-232.3... +882.7°C
15	Ω	Potentiometer	0... 1.0 MΩ
16	°C	NTC SEMITEC 103AT-2	-56.5... +141.5°C

Output Type Configuration

Modbus address	Name	Status values	Access
0022	Ch. 01 Analogue Output Config	See the "Output Type Table"	R
...	...		R
0025	Ch. 04 Analogue Output Config		R

Output Type Table

Value	Unit	Description	Range
0	V	0... 5 Volt	0... 100%
1	V	1... 5 Volt	
2	V	0... 10 Volt	
3	V	2... 10 Volt	
4	mA	0... 20 mA	
5	mA	4... 20 mA	

Engineering Unit Indication

Modbus address	Name	Status values	Access
0012	Ch. 01 AI Engineering Unit Config	0 = Celsius; 1 = Kelvin; 2 = Fahrenheit.	R
...	...		R
0015	Ch. 04 AI Engineering Unit Config		R

Special DI Configuration

Modbus address	Name	Status values	Access
0020	Ch. 01 Std/Freq./Counter DI Config	0 = Standard; 1 = Counter.	R
0021	Ch. 02 Std/Freq./Counter DI Config		R

Modbus Map summary

Modbus address	Type	Description	Access
0000	DWORD	DIG Type [mask x.0... x.15] : 0 = DO, 1 = DI	R
0002	DWORD	DI Mode [mask x.0... x.15] : 0 = DI, 1 = Cnt	R
0004	USINT	Ch. 01 Universal Analogue Input Config	R
0005	USINT	Ch. 02 Universal Analogue Input Config	R
0006	USINT	Ch. 03 Universal Analogue Input Config	R
0007	USINT	Ch. 04 Universal Analogue Input Config	R
0008	USINT	Ch. 05 Universal Analogue Input Config	R
0009	USINT	Ch. 06 Universal Analogue Input Config	R
0010	USINT	Ch. 07 Universal Analogue Input Config	R
0011	USINT	Ch. 08 Universal Analogue Input Config	R
0012	USINT	Ch. 01 Universal Analogue Input Engineering Unit	R
0013	USINT	Ch. 02 Universal Analogue Input Engineering Unit	R
0014	USINT	Ch. 03 Universal Analogue Input Engineering Unit	R
0015	USINT	Ch. 04 Universal Analogue Input Engineering Unit	R
0016	USINT	Ch. 05 Universal Analogue Input Engineering Unit	R
0017	USINT	Ch. 06 Universal Analogue Input Engineering Unit	R
0018	USINT	Ch. 07 Universal Analogue Input Engineering Unit	R
0019	USINT	Ch. 08 Universal Analogue Input Engineering Unit	R
0020	USINT	Ch. 01 Std/Freq./Counter Input Configuration	R
0021	USINT	Ch. 02 Std/Freq./Counter Input Configuration	R
0022	USINT	Ch. 01 Universal Analogue Output Configuration	R
0023	USINT	Ch. 02 Universal Analogue Output Configuration	R
0024	USINT	Ch. 03 Universal Analogue Output Configuration	R
0025	USINT	Ch. 04 Universal Analogue Output Configuration	R
0026	USINT	Cold Junction - Universal Analogue Input Engineering Unit	R
0100	REAL	Cold Junction NTC1	R
0102	REAL	Cold Junction NTC2	R
0104	REAL	Ch. 1 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0106	REAL	Ch. 2 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0108	REAL	Ch. 3 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0110	REAL	Ch. 4 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0112	REAL	Ch. 5 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0114	REAL	Ch. 6 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0116	REAL	Ch. 7 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0118	REAL	Ch. 8 Analogue Input - Ohm [RTD]/mV [TC]/mA/Volt	R
0120	BYTE	Ch. 01 Universal Analogue Input Status	R
0121	BYTE	Ch. 02 Universal Analogue Input Status	R
0122	BYTE	Ch. 03 Universal Analogue Input Status	R
0123	BYTE	Ch. 04 Universal Analogue Input Status	R
0124	BYTE	Ch. 05 Universal Analogue Input Status	R
0125	BYTE	Ch. 06 Universal Analogue Input Status	R
0126	BYTE	Ch. 07 Universal Analogue Input Status	R
0127	BYTE	Ch. 08 Universal Analogue Input Status	R
0128	BYTE	Ch. 1 High level Analogue Output Status	R
0129	BYTE	Ch. 2 High level Analogue Output Status	R
0130	BYTE	Ch. 3 High level Analogue Output Status	R
0131	BYTE	Ch. 4 High level Analogue Output Status	R
0132	BYTE	Digital I/Os Overall Status	R
0133	BYTE	Ch. 1 Freq/Counter Analogue Input Status	R
0134	BYTE	Ch. 2 Freq/Counter Analogue Input Status	R
0200	REAL	Ch. 1 Analogue Input Value	R
0202	REAL	Ch. 2 Analogue Input Value	R
0204	REAL	Ch. 3 Analogue Input Value	R
0206	REAL	Ch. 4 Analogue Input Value	R
0208	REAL	Ch. 5 Analogue Input Value	R
0210	REAL	Ch. 6 Analogue Input Value	R
0212	REAL	Ch. 7 Analogue Input Value	R
0214	REAL	Ch. 8 Analogue Input Value	R
0216	REAL	Ch. 01 Frequency Value - Engineering Units	R
0218	REAL	Ch. 02 Frequency Value - Engineering Units	R
0220	UINT	Ch. 01 Counter Value - Pulse Counts	R
0222	UINT	Ch. 02 Counter Value - Counts	R
0224	UDINT	Ch. 1 Digital Input Counter	R
0226	UDINT	Ch. 2 Digital Input Counter	R
0228	UDINT	Ch. 3 Digital Input Counter	R

Modbus address	Type	Description	Access
0230	UDINT	Ch. 4 Digital Input Counter	R
0232	UDINT	Ch. 5 Digital Input Counter	R
0234	UDINT	Ch. 6 Digital Input Counter	R
0236	UDINT	Ch. 7 Digital Input Counter	R
0238	UDINT	Ch. 8 Digital Input Counter	R
0240	UDINT	Ch. 9 Digital Input Counter	R
0242	UDINT	Ch. 10 Digital Input Counter	R
0244	UDINT	Ch. 11 Digital Input Counter	R
0246	UDINT	Ch. 12 Digital Input Counter	R
0248	UDINT	Ch. 13 Digital Input Counter	R
0250	UDINT	Ch. 14 Digital Input Counter	R
0252	UDINT	Ch. 15 Digital Input Counter	R
0254	UDINT	Ch. 16 Digital Input Counter	R
0256	WORD	DI Status [mask x.0... x.15]	R
0257	WORD	Std/Freq./Counter Status [mask x.0... x.1]	R
0258	WORD	Reset Button State [0 = Unpushed, 1 = Pushed]	R
0259	WORD	DI Counter Overflow [mask x.0... x.15]	R/W
0260	WORD	Special Channels Counter Overflow [mask x.0... x.1]	R/W
0500	REAL	Ch. 01 High level Analogue Output	R/W
0502	REAL	Ch. 02 High level Analogue Output	R/W
0504	REAL	Ch. 03 High level Analogue Output	R/W
0506	REAL	Ch. 04 High level Analogue Output	R/W
0508	REAL	Ch. 01 Analogue Output ERROR VALUE	R
0510	REAL	Ch. 02 Analogue Output ERROR VALUE	R
0512	REAL	Ch. 03 Analogue Output ERROR VALUE	R
0514	REAL	Ch. 04 Analogue Output ERROR VALUE	R
0516	WORD	OP RELAY Command [mask xx.0... xx.3]	R/W
0517	WORD	DO Command [mask xx.0... xx.15]	R/W
0518	WORD	ERROR VALUE OP RELAY Command [mask xx.0... xx.3]	R
0519	WORD	ERROR VALUE DO Command [mask xx.0... xx.15]	R
1000	UDINT	Reset Value for Ch. 01 Counter Value - Pulse Counts	R/W
1002	UDINT	Reset Value for Ch. 02 Counter Value - Pulse Counts	R/W
1004	WORD	Reset CTN Input (Special Inputs) [mask x.0... x.1]	R/W
1005	UDINT	Reset Value for Ch. 1 Digital Input Counter	R/W
1007	UDINT	Reset Value for Ch. 2 Digital Input Counter	R/W
1009	UDINT	Reset Value for Ch. 3 Digital Input Counter	R/W
1011	UDINT	Reset Value for Ch. 4 Digital Input Counter	R/W
1013	UDINT	Reset Value for Ch. 5 Digital Input Counter	R/W
1015	UDINT	Reset Value for Ch. 6 Digital Input Counter	R/W
1017	UDINT	Reset Value for Ch. 7 Digital Input Counter	R/W
1019	UDINT	Reset Value for Ch. 8 Digital Input Counter	R/W
1021	UDINT	Reset Value for Ch. 9 Digital Input Counter	R/W
1023	UDINT	Reset Value for Ch. 10 Digital Input Counter	R/W
1025	UDINT	Reset Value for Ch. 11 Digital Input Counter	R/W
1027	UDINT	Reset Value for Ch. 12 Digital Input Counter	R/W
1029	UDINT	Reset Value for Ch. 13 Digital Input Counter	R/W
1031	UDINT	Reset Value for Ch. 14 Digital Input Counter	R/W
1033	UDINT	Reset Value for Ch. 15 Digital Input Counter	R/W
1035	UDINT	Reset Value for Ch. 16 Digital Input Counter	R/W
1037	WORD	Reset Digital Input Counter [mask xx.0... xx.15]	R/W
1100	WORD	Custom Cold Junction Enabled for Analogue Input [mask xx.0... xx.7]	R
1101	REAL	Custom Cold Junction Value for Ch. 1 Analogue Input	R/W
1103	REAL	Custom Cold Junction Value for Ch. 2 Analogue Input	R/W
1105	REAL	Custom Cold Junction Value for Ch. 3 Analogue Input	R/W
1107	REAL	Custom Cold Junction Value for Ch. 4 Analogue Input	R/W
1109	REAL	Custom Cold Junction Value for Ch. 5 Analogue Input	R/W
1111	REAL	Custom Cold Junction Value for Ch. 6 Analogue Input	R/W
1113	REAL	Custom Cold Junction Value for Ch. 7 Analogue Input	R/W
1115	REAL	Custom Cold Junction Value for Ch. 8 Analogue Input	R/W
1500	WORD	System Error Flags	R/W
1501	WORD	Operational Error Flags	R/W
1600... 1624	WORD*25	Production String	R
1700... 1711	WORD*12	HW String	R

Modbus address	Type	Description	Access
1800	BYTE	HW Major	R
1801	BYTE	HW Revision	R
1802	BYTE	FW Major	R
1803	BYTE	FW Minor	R
4000	BYTE	Save and/or Reset: bit0: Only Reset bit1: Save and Reset	R/W
4001	DWORD	DIG Type [mask x.0... x.15] : 0 = DO, 1 = DI (sys_file)	R/W
4003	DWORD	DI Mode [mask x.0... x.15] : 0 = DI, 1 = Cnt (sys_file)	R/W
4005	USINT	Ch. 01 Std/Freq./Counter Input Configuration (sys_file)	R/W
4006	USINT	Ch. 02 Std/Freq./Counter Input Configuration (sys_file)	R/W
4007	USINT	Ch. 01 Universal Analogue Input Config (sys_file)	R/W
4008	USINT	Ch. 02 Universal Analogue Input Config (sys_file)	R/W
4009	USINT	Ch. 03 Universal Analogue Input Config (sys_file)	R/W
4010	USINT	Ch. 04 Universal Analogue Input Config (sys_file)	R/W
4011	USINT	Ch. 05 Universal Analogue Input Config (sys_file)	R/W
4012	USINT	Ch. 06 Universal Analogue Input Config (sys_file)	R/W
4013	USINT	Ch. 07 Universal Analogue Input Config (sys_file)	R/W
4014	USINT	Ch. 08 Universal Analogue Input Config (sys_file)	R/W
4015	USINT	Custom Cold Junction Enabled for Analogue Input [mask xx.0... xx.7] (sys_file)	R/W
4016	USINT	Ch. 01 Universal Analogue Output Config (sys_file)	R/W
4017	USINT	Ch. 02 Universal Analogue Output Config (sys_file)	R/W
4018	USINT	Ch. 03 Universal Analogue Output Config (sys_file)	R/W
4019	USINT	Ch. 04 Universal Analogue Output Config (sys_file)	R/W
4020	USINT	Baudrate (sys_file)	R/W
4021	USINT	Parity (sys_file)	R/W
4022	USINT	Stop Bit (sys_file)	R/W
4023	USINT	No. of bits (sys_file)	R/W
4024	USINT	Slave Address (sys_file)	R/W
4025	USINT	Enable Rotary Switches	R/W
4026	USINT	USB – Waiting Time (sys_file)	R/W
4027	USINT	USB – User Btn Waiting Time (sys_file)	R/W
4028	USINT	System and AI Channels EU Type (sys_file)	R/W
4029	USINT	Initial Values Enabled (sys_file)	R/W
4030	WORD	OP RELAY Command [mask xx.0... xx.3] – Initial Value (sys_file)	R/W
4031	WORD	DO Command [mask xx.0... xx.15] – Initial Value (sys_file)	R/W
4032	REAL	Ch. 01 Analogue Output – Initial Value (sys_file)	R/W
4034	REAL	Ch. 02 Analogue Output – Initial Value (sys_file)	R/W
4036	REAL	Ch. 03 Analogue Output – Initial Value (sys_file)	R/W
4038	REAL	Ch. 04 Analogue Output – Initial Value (sys_file)	R/W
4040	UINT	Communication Timeout (sys_file)	R/W
4041	BYTE	Emergency Behaviours (sys_file): bit0: Safe State Enabled bit1: Input Emergency Enable bit2: Output Alarm Enable bit3: 0: Output alarm on D16 1: Output alarm on RL1 (only valid if b2 is High)	R/W
4042	WORD	OP RELAY Command [mask xx.0... xx.3] – SafeState (sys_file)	R/W
4043	WORD	DO Command [mask xx.0... xx.15] – SafeState (sys_file)	R/W
4044	REAL	Ch. 01 Analogue Output – SafeState (sys_file)	R/W
4046	REAL	Ch. 02 Analogue Output – SafeState (sys_file)	R/W
4048	REAL	Ch. 03 Analogue Output – SafeState (sys_file)	R/W
4050	REAL	Ch. 04 Analogue Output – SafeState (sys_file)	R/W

Reference documents

The user should refer to the following list of documents:

[1] Modbus.ORG: Modbus Application Protocol Specification V1.1b3, April 2012

Accessories, Spare Parts and Warranty

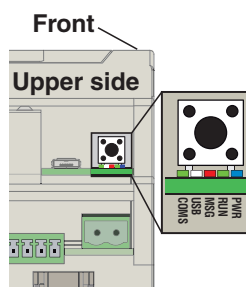
Power Supply 75W 24Vdc 3A APS2ALDR75-24
Power Supply 120W 24Vdc 5A APS2ALDR12024

Warranty: 18 months excluding improper use defects

Modbus Coils

Modbus Coil	Description	Access
1	D01 Digital I/O Status	R/W
...	...	...
15	D16 Digital I/O Status	R/W
16	RL01 Relay Output Command	R/W
...	...	...
19	RL04 Relay Output Command	R/W
20	Reserved	-
...	...	...
31	Reserved	-
32	CH1 Std/Freq./Counter Status	R
33	CH2 Std/Freq./Counter Status	R
34	Reserved	-
...	...	...
47	Reserved	-
48	D01 Digital type (0 = DO, 1 = DI)	R
...	...	...
63	D16 Digital type (0 = DO, 1 = DI)	R
64	D01 Digital Input Mode (0 = DI, 1 = CNT)	R
...	...	...
79	D16 Digital Input Mode (0 = DI, 1 = CNT)	R
80	D01 Counter Overflow	R/W
...	...	...
95	D16 Counter Overflow	R/W
96	CH1 Special Channels Counter Overflow	R/W
97	CH2 Special Channels Counter Overflow	R/W
98	Reserved	-
...	...	...
111	Reserved	-
112... 115	AI Ch. 1 Universal Analogue Input Status	R
116... 119	AI Ch. 2 Universal Analogue Input Status	R
120... 123	AI Ch. 3 Universal Analogue Input Status	R
124... 127	AI Ch. 4 Universal Analogue Input Status	R
128... 131	AI Ch. 5 Universal Analogue Input Status	R
132... 135	AI Ch. 6 Universal Analogue Input Status	R
136... 139	AI Ch. 7 Universal Analogue Input Status	R
140... 143	AI Ch. 8 Universal Analogue Input Status	R
144	E01 System Error Flag	R/W
...	...	...
159	E16 System Error Flag	R/W
160	E01 Operational Error Flags	R/W
...	...	...
175	E16 Operational Error Flags	R/W

Diagnostic LEDs functions and behaviours



LED	Status	Meaning
PWR	ON	Power Supply present
RUN LED while normal CPU or Bootloader operations		
	OFF	Bootloader - Work in progress
	ON	Configuration session ended
	Blinking	Configuration session in progress
MSG LED while normal CPU or Bootloader operations		
	OFF	No Errors
	ON	An error occurred
USB LED while normal CPU or Bootloader operations		
	OFF	Reserved
	ON	USB Host key present
	Blinking	Wait for PB button to USB files management
COMS LED while normal CPU or Bootloader operations		
	OFF	No communications
	ON	Communication in progress

Note: As the ON/OFF sequence of the LEDs has a specific meaning, it is important that the user recognizes each LED status:

Sequence	Meaning
OFF	The LED is not lit
Steady ON	The LED is lit in a stable way
Blinking	The LED blinks at a frequency of 2.5 Hz (slow)
Single flash	The LED lits once for at least 200 ms
Double flash	The LED lits twice with pulses of 200 ms each
Triple flash	The LED lits three times with pulses of 200 ms each