

# Telecontrol- Interface-Module

## Type REG-Pcs

- As 19" rack version



## 1. Application

The REG-P operates as a coupling-device or protocol bridge between field devices – IEDs, Voltage regulators etc. and a local RTU or directly to a control centre. The REG-P also operates as a communications processor that supports almost all important telecontrol protocols.

### 1.1 Features

The REG-P...

- is conform to BDEW-Whitepaper and supports full Cybersecurity
- supports RBAC and RADIUS
- supports many serial & Ethernet Telecontrol Protocols including:
  - IEC 870-5-101, 103 and 104
  - DNP 3:00
  - SPABus
  - ModBus
  - ELAN-Extension via Ethernet
  - NTP/PTP to DCF Time Synch Feature
  - SNMPv3
- multiple choices for connection such as copper, RS 485 and RS 232 or fibre-optics, (ST and SMA Connectors), Ethernet port is:
  - copper RJ45 (10/100 Mbit autoswitching)
  - supports multiple choices for serial connection such as fibre optics, RS 485 and RS 232
  - settings may be changed online at any time
  - boots itself after power-on

### 1.2 Specification

The REG-P board is equipped with a telecontrol-dedicated microcontroller and represents an independent computer with an on-board flash memory of 4 GB (EMMC).

The CPU runs at a speed of 454 MHz The board has a capacity of 128MB as working memory.

Depending on the size of the used micro-SD-card storage capacity for saving system device data, logging and manuals is up to 256 GB flash memory.

All twenty-four hardware-timers are required for the real-time Linux used.

Both of the processor-included UART - modules turn the two asynchronous V.24-interfaces. Each of these interfaces have their own baud rate timers.

Serial interface 1 is able to work from 100 Bd. up to 921600 Bd. and serial interface 2 from 300 Bd. up to 921600 Bd.

For serial coupling in pulse-width-modulation (pulse-duration-modulation) 100 Bd. up to 2400 Bd. are available.

Despite the functions running by different software branches on REG-P, there are general functions in order to protect the REG-P module against malfunctions. These functions are realized by hardware supplements and by software parts.

We take care of it.

### 1.3 Interfaces

The REG-P module offers the following interfaces for communication with parametrizing PC and for connection with serial communication partners:

- 1 10/100 Mbit Ethernet interface with RJ45-connector
- 1 serial interface to the control centre or bay controller
- 1 serial interface to PCM or PWM coupling partners
- 1 serial interface RS485
- 1 serial interface fibre optic ST or SMA-type (optional)
- All transmitters and receivers are galvanically isolated by optocouplers
- All drivers are able to work as V24 or optionally 10-20 mA current loop

Interfaces for serial communication are connected via rackmount connector. They include control lines for hardware handshaking as well as data lines. With the help of software parameters you can adjust the inversion of the all signals. The status of each channel is shown on the 3 LEDs on the front panel.

### 1.4 Socket Connections on the Front

On the left hand side of front panel you see a micro-USB-socket. This is used as a serial port to a standard-PC in order to supply parametrizing data called "Param". Via this connection you can easily parametrize REG-P online at any time with a software tool.

## 2. General Functions

Beside the functions, running by different software applications, there are main functions protecting against mal-functions of the device. These functions are realized by hardware-implementations and by software-routines.

### 2.1 Reset

There are four possibilities to trigger a reset on a REG-P. A proper restart of REG-P is guaranteed in each case:

- By pressing "RESET" on the front panel
- Watchdog runs up
- Reconnection and return of power supply
- Reset by monitoring software module

### 2.2 Watchdog

Watchdog is a hardware-supplement to monitor the smooth process of the software. It consists of a timer that has to be triggered continuously by a background software program. Lack of retriggering leads to a hardware-reset. The correct status of watchdog is displayed by a green LED on the front panel.

### 2.3 Contact Positions for Serial Interfaces

Pin	d	b	z
2	COM1-RXD	COM1-GND	COM1-TXD
4	COM1-CTS	COM1-GND	COM1-RTS
6	PE-COM1	PE-COM1	PE-COM1
8			
10	PE-CPU	PE-CPU	PE-CPU
12	VCC 5V	VCC 5V	VCC 5V
14	GND	GND	GND
16	Fibre-Receiver		Fibre-Sender
18			
20	485-P		485-N
22	PE-485	PE-485	PE-485
24			
26	PE-COM2	PE-COM2	PE-COM2
28			
30	COM2-RXD	COM2-GND	COM2-TXD
32	COM2-CTS	COM2-GND	COM2-RTS

### 3. Technical Data

<b>Processor</b>	i.MX28
Processor technology	CMOS
Memory	128 MBit RAM
Operation system	realtime, Linux
<b>Serial interfaces</b>	max. 3
Input-resistance	1000 Ohm
Output-resistance	120 Ohm
Input voltage	± 3 ... 24 V
<b>Power supply</b>	+ 5 V ± 10 % 0.4 A max.

**Reference conditions during operation in a 19" rack:**

Temperature:	- 10... + 55 °C
Relative humidity:	max. 85 % at 25 °C

**Reference conditions during storage:**

Temperature:	- 25... + 65 °C
Relative humidity:	max. 80 % at 25 °C

#### 3.1 Parametrizing REG-P

An edited file is transferred via serial interface or web server from a standard PC into REG-P. Data is kept in flash memory.

#### 3.2 Applied Rules and Standards

- IEC 61010-1 / EN61010-1
- IEC 60255-22-1 / EN 60255-22-1
- IEC 60529 / EN 60529
- ICE 60068-1 / EN 60068-1
- ICE 61000-6-2 / EN 61000-6-2
- ICE 61000-6-4 / EN 61000-6-4

#### 3.3 Mechanical Construction

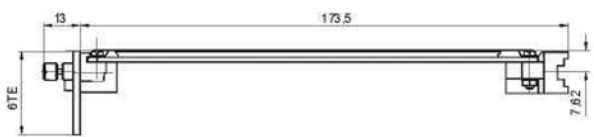
Front panel	ALU, RAL 7035
Height, width	3U, 6T (129 mm, 30 mm)
Weight	≤ 0.4 kg

**Protection class**

Plug-in device	IP 00
Terminal block	IP 00

**Mounting** according to DIN 41494 Part 5/DIN 41612

Connector block



Picture 1: Dimensions plug-in module

#### 3.4 Data Programming Cable

Cable has to be shielded and may not be longer than 1.5 m.

PC-USB	Meaning	REG-P Micro-USB
1	VCC	1
2	D-	2
3	D+	3
4	GND	4
	GND	5

#### 3.5 Housing

Terminal screws with self-locking protection; clip on connector block

#### 3.6 Operating Modes

The processing modes RS 232, RS 485 and fibre optic are set by software parameters.

#### 3.7 Commissioning of the Card

There is a commissioning guidance available, a quick guide and a detailed commissioning and parameterization description.



We take care of it.

## 4. Electric Security

Protection class I  
Grade of pollution 2

Overvoltage category, rated isolation voltage

Name	Overvoltage	Max. Overvoltage
Aux. voltage	II	15 V
Serial interfaces	II	5 kV

**Transient voltage** 5 kV, 1.2/50 ms, 0.5 Ws

### Strength immunity

Electrostatic discharge Air load 8 kV  
Contact load 4 kV  
Electromagnetic fields 80 MHz...1000 MHz 10 V/m  
900 MHz  $\pm$  5 MHz 10 V/m  
pulse modulated

### Rapid transient disturbance quantities (Bursts)

Power supply AC 230 V: 2 kV

**Contacted RF-disturbance factors** 0,15 MHz...80 MHz  
 $U_{eff} = 10$  V

**50 Hz- magnetic field** 30 A / m

**Disturbance emission** Group 1 /limit class A

### 4.1 Scope of Application

The telecontrol card REG-P is able to process the following telecontrol protocols:

- IEC 870-5-101, 103 and 104
- DNP 3.0
- ELAN-Extension via Ethernet
- NTP/PTP to DCF Time Synch Feature
- TCP/IP (typical application: COM-Server)
- COM Server
- Modbus RTU
- SPABUS
- IEC 61850 (MMS&GOOSE)
- PTP+NTP

The telecontrol connection is made with RS 232, RS 485 or fibre optics (ST or FSMA).

The parameters are set with the help of the supplied software running under Microsoft Windows® called WinConfig as well as via Web Server or SSH scripts. For standard users the parameterization is done in a common part, where baud rate and device addresses can be entered.

Advanced users can use an advanced part of the software, where deeper protocol specific parameters can be modified: Addresses of data points, timeout settings, scaling and thresholds of analogue values, etc.

## 5. Special features starting from Version 2.3

In RS485 mode, it is possible from this version on to switch between push-pull and open-drain operation via software configuration in WinConfig. In addition, two DIP switches ("SW1", "SW2") are available on the board to the left of the DIN-C connector, which allow active termination on the RS485 line to be switched on and off.

To switch the idle position in FO operation, there are two DIP switches ("SW3", "SW4") next to the processor module, which are additionally marked "RX invert" for the receiving side and "TX invert" for the transmitting side. This allows a separate switching of the rest position = *light off* and rest position = *light on*. If both switches are in the ON position, the idle position is *light on*. In the OFF position (inverted in the direction of the label RX /TX) the rest position is *light off*.

**Note:**

**New REG-P hardware „TK28-4“ with RJ45**

Please pay attention to the following:

- The new hardware version *TK28-4* has the a-eberle article number 111.9016.13, the article number is indicated on the side of the rating plate of the REG-P.
- The new version has additionally to the already existing interfaces a micro-USB-Connector on the front. This new REG-P enables the access at the internal micro-SD-card.
- Please use the new REG-P commissioning files with version TK28-4, using the new data from the provided REG-P commissioning CD.
- For commissioning support please contact:  
[comms-support@a-eberle.de](mailto:comms-support@a-eberle.de) or (+49) (0) 911 628108 0.

We take care of it.

## Ordering Details

- Only one code of the same capital letter is possible
- When the capital letter is followed by number 9, further details are necessary
- The code can be omitted when the capital letter is followed by zero

Telecontrol Interface Module with Cyber Security		
Characteristic		Code
<b>Protocol interface unit (6PU, 3HU)</b> for connection of REGSys™ devices to a SCADA system for serial Protocols like IEC 103 <b>Note:</b> REG-P can also be used as COM-Server.		<b>REG-P</b>
<b>Design</b> Plug-in unit Wall mounting version (2OTE, 3HE) wired; incl. wiring for power supply Installation with other REGSys™ components		B01 B02 B09
<b>With IT-Security - feature is mandatory at TK28-4-type.</b>		I1
<b>Usage of board</b> COM-Server only telecontrolling of a REG-D(A) telecontrolling of a REG-DP(A) telecontrolling of a EOR-D telecontrolling of a DMR-D telecontrolling of a PQI-D for connection of combinations of REG-D/DP, EOR-D, PQI-D... <b>Note:</b> L9 can only be used with Z15...Z19, Z91, Z31, Z92		L0 L1 L2 L3 – L5 L9
<b>Type of connection:</b> <b>Standard</b> RJ 45 1 x RS 232 RS 485; two-wire operation only		– V10 V11
<b>Note:</b> V13 ... V19 only in combination with B2 or B9. <b>For all other cases choose a suitable fibre optic module.</b>		
<b>Fibre optic; connection with FSMA for ..101/..103/Modbus/Spabus (incl. module mounting)</b> Glass (wavelength 800...900 nm, distance < 2000 m) Plastic (wavelength 620...680 nm, distance < 50 m)		V13 V15
<b>Fibre optic; connection with ST for ..101/..103/Modbus/Spabus (incl. module mounting)</b> Glass (wavelength 800...900 nm, distance < 2000 m) Plastic (wavelength 620...680 nm, distance < 50 m)		V17 V19

<b>Design of Ethernet Ports</b> 1x RJ45 10/100 Mbit 1x glass fiber (rear connection, Multimode, ST, needs FTR100 option) 1x glass fiber (rear connection, Multimode, LC, needs FTR100 option) 1x glass fiber (front connection, Multimode, LC) Cost of module mounting see tab "Racks Interf." of topical prize list, fiber speed fixed to 100 Mbit, Gbit only with REG-PED <sup>SV</sup>		DO D09 D91 D92
<b>Protocol</b> IEC 60870-5-103 for ABB IEC 60870-5-103 for Alstom / Schneider-Electric IEC60870-5-103 for Siemens (ex SAT: 1703) IEC 60870-5-103 for Siemens (LSA/SAS) IEC 60870-5-103 for Sprecher Automation IEC 60870-5-103 for others IEC 60870-5-101 for ABB IEC 60870-5-101 for IDS IEC 60870-5-101 for SAT IEC 60870-5-101 for Siemens (LSA/SAS) IEC 60870-5-101 for others DNP 3.0 (connection V10 or V11) COM Server DNP 3.00 via Ethernet (connection V00 or V12) SPABUS MODBUS RTU MODBUS TCP/IP IEC 61850 IEC 60870-5-104		Z10 Z11 Z12 Z13 Z14 Z90 Z15 Z17 Z18 Z19 Z91 Z20 Z09 Z21 Z22 Z23 Z24 Z31 Z92

## Notes

---

---

---

---

---

---

---

---

---

---

**A. Eberle GmbH & Co. KG**

Frankenstraße 160

D-90461 Nürnberg

Tel +49 (0) 911 / 62 81 08-0

Fax +49 (0) 911 / 62 81 08-96

info@a-eberle.de

www.a-eberle.de

Copyright 2020 A. Eberle GmbH & Co. KG

All data may be subject to change without prior notice.

Telecontrol-Interface-Module – REG-P

Presented by:

---