



Data Concentrator TELEM-AGC

User Manual

Martem AS
2018

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1. Introduction

TELEM-AGC is designed for use in electrical networks as an communication concentrator and as a 4G modem.

Main applications of TELEM-AGC are:

- To operate as 4G modem with or without Data Concentrator software with possibility for direct protocol translation from IEC 60870-5-101 to IEC 60870-5-104 and vice versa
- Cross-referencing of data exchange protocols
- Creating transparent TCP/IP to serial channels for remote connections to various equipment (for remote handling of various equipment)
- Comprehensive integration of different devices
- Full scale data exchange between substation devices and substation control system including setting values, measurement values, registered fault parameter values, changes of state with associated time markings etc.



2. Features

- Transparent TCP/IP connections via Ethernet and serial ports
- Various data exchange protocols via Ethernet and serial ports
- Cross-referencing of data exchange protocols
- Automatic protocol conversion from IEC 60870-5-101 to IEC 60870-5-104 without description of data objects.
- Firewall functionality
- OpenVPN, IPsec, L2TP and SSH connections
- SNMP (Simple Network Management Protocol)
- SDN (Software Defined Networking)
- DPI (Deep Packet Inspection)
- Syslog
- Graphic Web Server
- A user-friendly free configuration tool
- Configurable remotely over communication line
- Configuration export to ASCII, CSV format files
- TELEM RTU devices can be remotely configured via TELEM-AGC
- Logical operations between digital and analog signals
- Data sending with time and quality stamp
- Console port
- Several time synchronization options (possible to synchronize from multiple control centers. TELEM-AGC is used to synchronize substation devices by protocol)
- GPS input
- NTP client and server
- All ports are galvanically isolated from case and power circuit
- 1-wire sensor port (up to 10 sensors) e.g. for temperature sensor
- Real-time clock with back-up capacitor

3. Technical Data

Data communication protocols

To higher level systems:

- IEC 60870-5-104
- IEC 60870-5-101 unbalanced and balanced,

To lower level devices:

- IEC 60870-5-104,
- IEC 60870-5-103,
- IEC 60870-5-101 Unbalanced,
- Modbus-RTU,
- Modbus-TCP,
- IEC 62056-21 (IEC 1107),
- SPA-Bus

Communication ports

Communication ports may be freely configured for upper or lower level communication

Base board

- 2 x Ethernet connection with RJ45 port. 1,5kV isolation
- 3 x RS-232 with RJ12 connector, galvanically isolated. 15 kV surge protection
- 2 x RS-485/232. RJ45 connector for RS-232 and screw terminals for RS-485, galvanically isolated. 15 kV surge protection
- 1 x Console mini USB port
- 1 x optical RS232 or GPS port
- 1-wire for environmental sensors

Expansion modules

- Module D
 - 8 optically isolated dry contact digital inputs (connected to dry contacts)
 - 3 double digital outputs (relay contacts max. 0.3A 110VDC, 2A 30VDC, 0.5A 125VAC)

- Module E (2 IO cards)
 - 16 optically isolated dry contact digital inputs (connected to dry contacts)
 - 6 double digital outputs (relay contacts max. 0.3A 110VDC, 2A 30VDC, 0.5A 125VAC)
- Module L 3 x RJ45 Eth.
- Module O 2 x Optical Eth. + RJ45 Eth.

Serial data communication parameters

- 1 start bit
- Odd, even or no parity
- Communication rates from 300 to 115200 bit/sec

Electrical characteristics of isolated input

- Dielectric withstand IEC 60255-5
- Withstand to static discharge IEC 61000-4-2
- Withstand to surges, bursts IEC 61000-4-4, 61000-4-5

Mechanical parameters

- Degree of protection IP 31
- Dimensions W x H x D (without connectors) 67 x 148 x 190 mm
- Ambient temperature in operation -40°C...+70°C
- Weight 900 g
- Mounting DIN rail
- Relative humidity 95% non-condensing

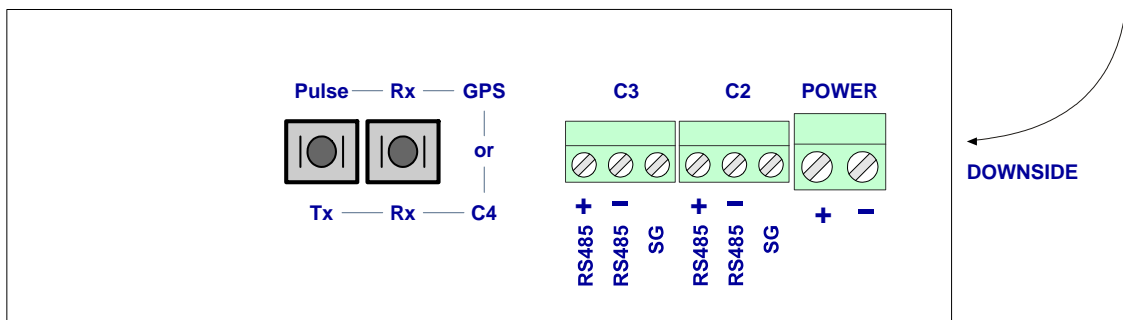
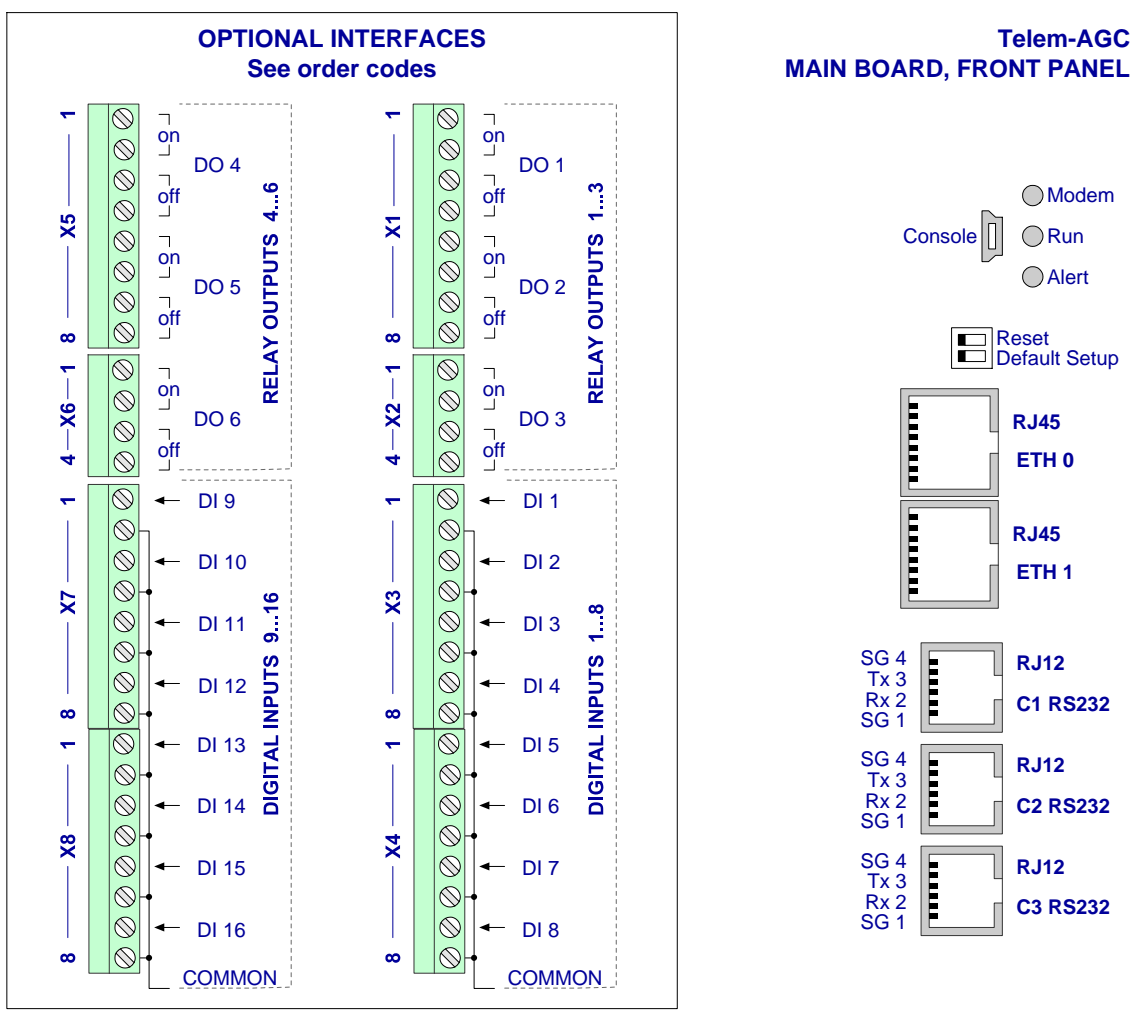
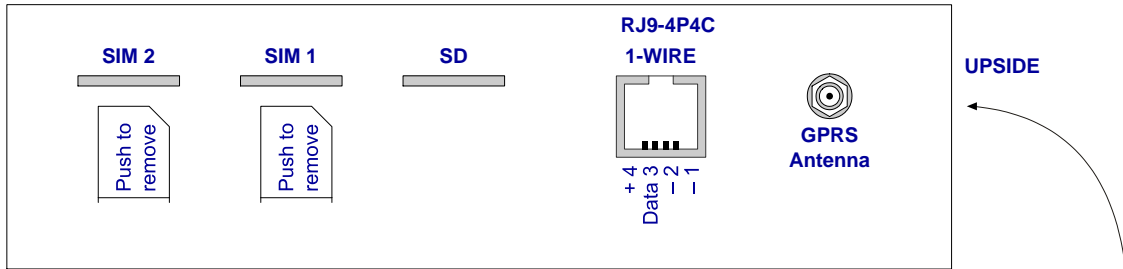
Radio frequency compatibility

- RF emission IEC 55022 Class A
- Immunity to RF fields IEC 61000-4-3, 61000-4-6

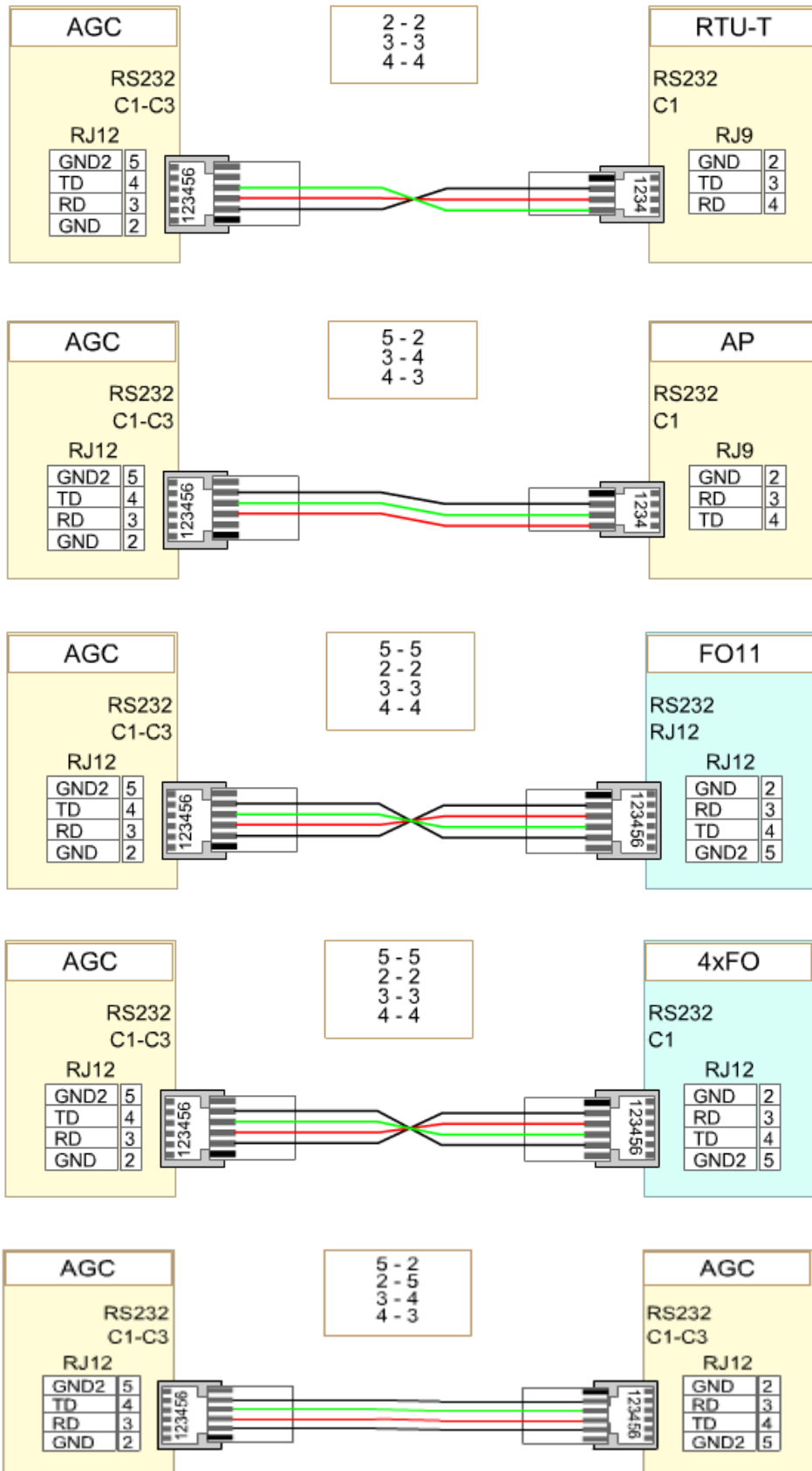
Power supply

- Supply voltage range 11...33 or 20...60 V DC
- Power consumption < 7 W, < 18 W with optical Eth.

4. Terminal Connectors



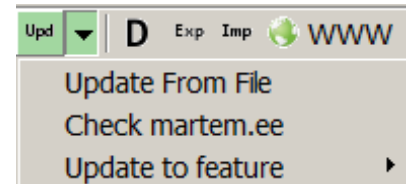
5. Communication cables



6. Firmware update

NB! Before updating to new firmware read the setup from your device, and make a backup.

- Run **GWS.exe** and set up SSH connection with the device
- Press the **Upd▼** button next to **R W C** buttons
- If you have compressed .7z firmware update file (provided by Martem AS) choose **Update From File**
- If you do not have .7z firmware update file choose **Check martem.ee** to refresh existing firmware versions list for this AGC-L device
- Press **Update to feature** and choose needed firmware version. Download is starting...
- After firmware is downloaded **Confirm** window appears. Press **Yes** button, the update process starts
- Wait until the device resumes to its normal operation state (**RUN** LED will start slow blinking again)
- Firmware update is complete.



Checking results of the firmware update operation:

- Press **R** button to read back the device setup data
- Check the **Version** from **GWS Status** tab

7. DIP switches

Reset: Switch RESET to ON state and then back to OFF state for Reset operation

Dft. Set: To apply default setup:

1. Switch DFT. SET to ON state

*Alert indication LED starts blinking within 5 seconds

*Alert indication LED will blink for 2 seconds

2. Switch DFT. SET back to OFF state when the alert indication LED **is blinking** to apply default setup

*If DFT. SET is switched back to OFF state when the alert indication LED is not blinking, default setup will NOT be applied

8. Indication LED-s

MODEM – green LED – indicates the 4G (3G) modem network connection

RUN – green LED – blinking green indicates that the program is running

ALERT – red LED – failure

Green LED-s for serial communication ports for RX, TX indication.

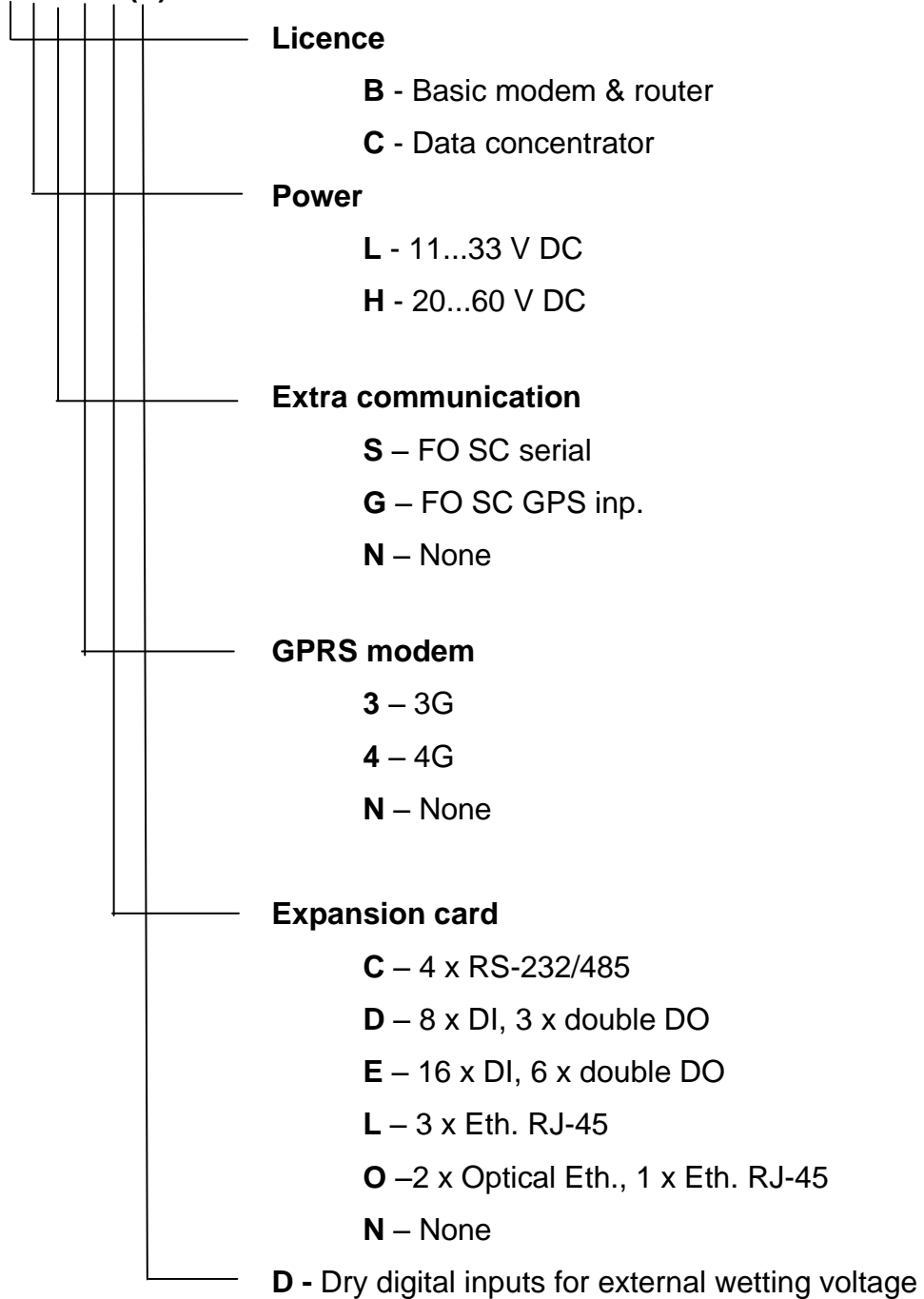
9. Configuration tool

The Telem-AGC device is configured with Telem-GWS software.

The configuration process is described in Telem-GWS software manual

10. Order code

TELEM-AGC-XX-XX-X(X)



11. Open-source software information

This device produced by Martem Ltd. includes open-source components. The most up to date info of exact software used by Martem's build system and licensing info of used software can be found from <http://phobos.martem.ee/shr/br-sources/>