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DESIGN,
MANUFACTURE,
MAINTENANCE OF
OILFIELD EQUIPMET

Remote Control and Monitoring (RCM)

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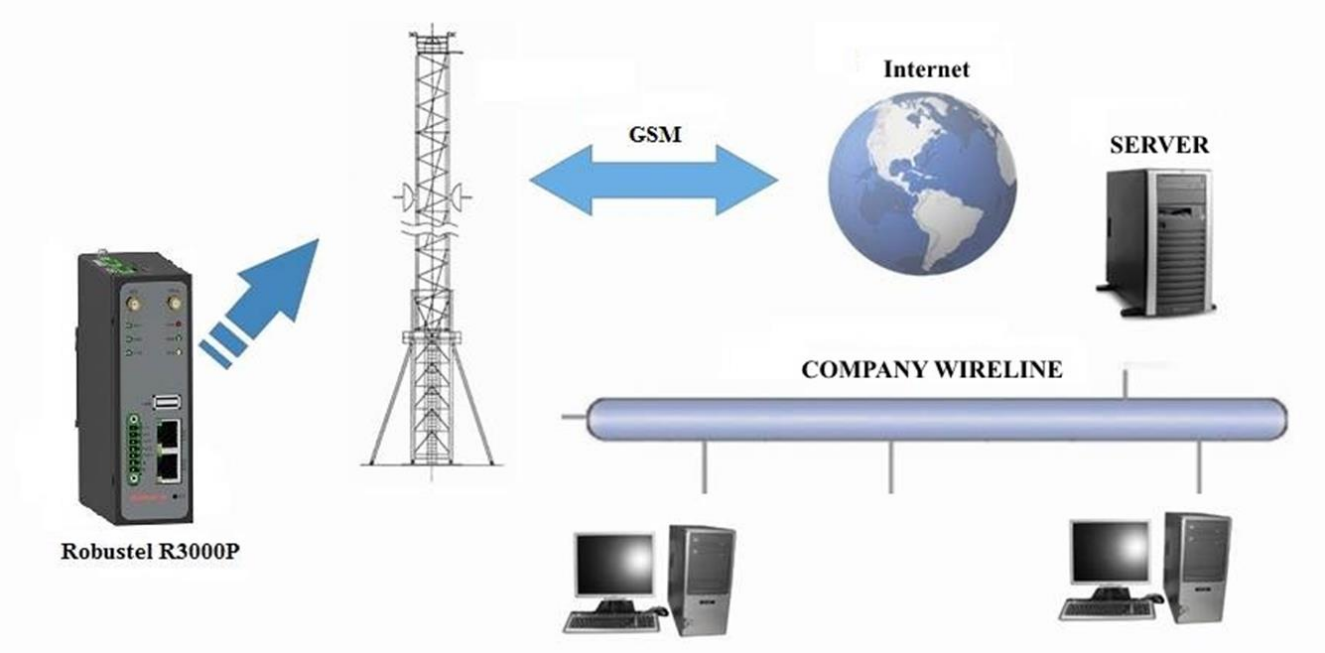
Remote Control and Monitoring (RCM) is hard and software complex that provides ongoing transmission of VSD technological parameters. It records events, sends notifications of unacceptable deviations of parameters, alerts, provides data archiving, generates reports.



Application

- **Functions:**
- - Registration of VSD parameters
- - Visual representation of altered parameters
- - Archiving of measured parameters, viewing of archived data
- - Warning color alarm
- - Failure color alarm
- - Archiving of failures
- - Archiving of technological parameters alterations
- - Access to the system is limited by passwords
- - Generation and print of reports of the required form
- - Internet access to the system
- - Remote control of technological parameters

Implementation Options

- - **Cloud version** (on VDS-server): data is sent to a dedicated server via 3G networks. RCM is available at dedicated IP address. It is possible to connect and view data from any device that has Internet connection.
- - **Local version**: is installed in Customer's local network, data transmission is configured for 'internal network' mode and transferred through local network as a rule through sector antennas. External connection is available only through VPN or through access to remote desktop.

Structure of RCM

- - **Level 1**: Industrial Router Robustel polls the the VSD controller (via Modbus RTU protocol) using given register card via the serial port, and also polls electricity counter via proprietary protocol. And sends data to specified server address.
- - **Level 2**: Server receives data and places it in the data warehouse
- - **Level 3**: Collected information is processed and displayed in user friendly way. Access is available through the web-interface of workstation.

Workstation

For the best perception, all data in the system is structured and displayed in the interface in graphical and text forms in the so-called “display areas”. Depending on the type of the displayed information and on the input / output data, the following types of areas are available:

1. Navigation of VFDs under observation, hierarchy Company – Oilfield – Cluster – Well, color status of VSD operation
2. Summary data – summary table with the display of VSD identification data, VDS status, failures and warnings, and main parameters of VSD operation with date and time of last polling.
3. Reports – tool for generating reports of requested parameters with possibility of further export to Excel
4. Well data – extended information of values of all parameters and VSD setups with the ability to change settings if access allows.
5. Charts – graphical representation of archived VSD parameters
6. Daily reports – reports of chosen parameters during the day of operation
7. Electricity counter – current and archived value of the electricity counter, archived data can be displayed in the chart
8. Start / Stop – is used for remote start and stop of VSD. Available for appropriate access permission

Access Permission

- **Field Engineer**

- Preview
- Add notes
- Unload of reports

- **Application Engineer**

-Preview
- Add notes
- Unload of reports
- Remote control of VSD
- Edit sections “Parameters” and “History”

- **Administrator**

- Full access to the functionality

Intervals of polling

Each VSD can be adjusted individually – it is Robustel configuration parameter. It is not recommended to set it less than once every two minutes – as the data storage will overflow. Each device can be individually configured for polling interval – for example the electricity counter does need to be polled more that once a day without request.

Main parameters monitored by RCM

- intake pressure
- discharge pressure
- intake temperature
- motor temperature
- vibrations
- voltage
- current leakage
- motor amperage
- ESP frequency
- VSD output voltage
- surface amperage
- tubing head pressure
- vent line pressure
- start and stop counter
- system status (running or down)