M4016-G (-A, -K, -L)
Universal Registration and Control Unit
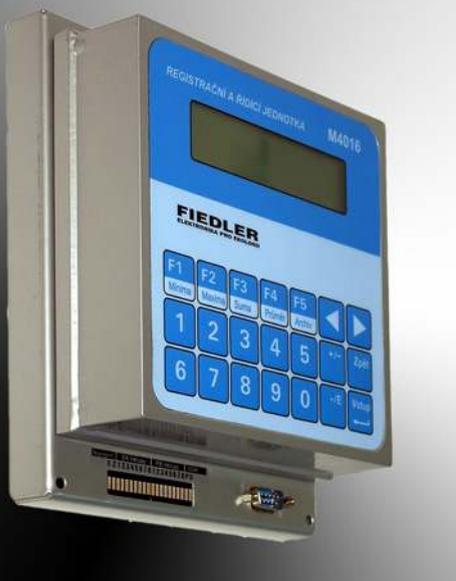
- **Water & Waste Controll**
- **Flow Rate Monitoring**
- **Pump Stations Monitoring**
- **Water Level Recorder**
- **Telemetric Stations**
- **Warning System in GSM Network**
- **Weather Stations**
- **Field Data Loggers**
- **Monitoring of Water Level in Sewer Systems**
- **Encapsulated GSM Module**
- **Robust Enclosure with High Protection IP66**

FIEDLER

**Reliable,
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Technology control

Monitoring

Telemetry

Open channels
flow meters

Water level indicators

PH-meters

Oxymeters

Data loggers

**Water Supply
Hydro-meteorology
Science & Research**

Basic describtion

Registration and control unit M4016 is the next step in more then 12 years development of similar devices in FIEDLER-MAGR Company. Two important water-supply companies took place in the development and the result is a device with wide use in various kinds of applications.

Fully furnished unit M4016 includes universal data logger, telemetric station with encapsulated GSM module, programmable control automat and multiple open channel flow meters if connected to ultrasonic or pressure level sensor. User keeps at disposition 16 dynamically engaged record channels for measuring and archiving of flow, levels, pressures and many other quantities. Actions and failures of pumping device or generally state of contacts can be monitored via 40 binary channels.

Great number of analog, pulse and digital inputs enables to connect various types of sensors. Probes with digital output can be connected via RS485 interface. The unit consists pre-defined consumption equations of the most common profiles and enables flow metering in open channels. It also enables detailed table setting of consumption curve or flow calculation in compound flumes. The channels set for flow metering enable consecutive calculation of daily and monthly flow volumes. These data can be sent via SMS too.

According to actual input values, 2 in-house relays and as much as 12 relays in external switch units SP06 can be controlled. Each relay can be set for several logical or time conditions for switching.

Programmable consumption control of connected sensors, encapsulated GSM module and low unit self-consumption based on modern RISC processor and 3.3V logic enable to put the unit on a place where no line voltage is available.

Applications

The unit M4016-G is designed for the data acquisition and for the technology control of water-supply and sawe-water companies. It can be also used for monitoring and control in energetics, industry, during the data acquisition for research and scientific purposes or during the building-up of warning systems of water level stations. For each application is possible to select suitable version according to the type of connecting board and the way of communication (RS232, GSM, GPRS and Ethernet).

Transferring and processing of data

Registering units M4016 can be provided in a basic implementation with one communication port RS232 or with encapsulated modules enabling GSM (data + SMS) or TCP/IP communication (Ethernet, GPRS).

Unit parameter setting or transfer of measured values into PC and their subsequent processing is done via MOST 2.0 or MOSTNET 2.0 programs. Apart from table display of measured values, these programs enable also their graphical display, averaging, searching of threshold limits, calculation of flow amount or print of measured data in convenient format.

Price List (Selection of Basic Version)

M4016-G1 (16 Inputs Station)
DPD connecting bord; RS232 .... **24.400,-CZK**

M4016-G3 (Telemetric Station)
DPD connecting bord;
GSM/GPRS+SMS **30.400,-CZK**

16 analogue channels

Regular recording of measured values acquired from current, voltage, frequency, pulse or digital signals. Resolution is 16 bits (range 0.000 - 65535).

40 binary channels

Recording of binary states with the time resolution 1 sec (actions and failures of pumps, security guard, etc.). Each channel has a counter of hours for monitoring of connected machine run time.

1 text channel

Event recording (phone numbers and content of SMS, recording of failures, realized data transfer, etc.)

The unit M4016 supports measure of these physical quantities: level, flow, volume, temperature, RV, pH, redox, dissolved oxygen, conductivity, pressure, residual chlorine, rainfalls, current, voltage, frequency, pulses, and radiation.

Each measured quantity can be assigned to a specified name, specific unit, number of decimal places, measure method, number of inputs, manner of display, limit values for alarms and many other parameters.

Archiving interval can be set from 1 minute to 24 hours independently for each channel. The unit M4016 supports switching to more frequent recording of selected quantities after overrun of one of set limit (limit alarm) or after a fast value change (gradient alarm).

Standard functions of M4016

- Automatic searching of daily minimums, maximums and daily total flows in the data memory. The step can be set on days.
- Calculating over measuring channels (trend, sum, running sum or average, difference, correction by a multinomial of the second order) with the output to an independent channel and to SMS.
- Working hours (set on, set off, error on measuring channel).
- Control of sampler in 4 operational modes.
- Limit and gradient alarm for each channel.
- Limit parameters for control up to 20 relays (logical and time control at extra cost).
- Parameters for control of 16 output current loops 4-20 mA.
- SW support for an installation of level ultrasonic sensors.

SMS Communication Parameters

- Phonebook for 16 recipients, grouping enabled.
- 8 pre-set SMS messages (blackout and supply recovery, condition of accumulator, insufficient credit balance, …).
- 32 adjustable **warning SMS** messages (arbitrary text, automatic including of actual value, various launching conditions with operating period, hysteresis).
- Possibility to compound **informative SMS** messages (actual values, daily and monthly total flow, maximums and minimums including time, remaining credit balance, accumulator voltage,…). Time of informative SMS delivery is adjustable in daily, weekly and monthly interval or on demand.
- Confirmed and indexed SMS communication between stations M4016 can compensate for cable conduit (e.g. between pump station and water tank).

TECHNICAL PARAMETERS

Inputs: (Digital Connecting Board DPD)

- DAV1-DAV6: Combined Digital-Analog Inputs: DCL (ASCII), Analog signal 4-20 mA and Frequency signal 0-50 kHz
- AV7: Voltage Differential Input, adjustable gain 20 mV-2,5V
- DV7-DV8: Digital Inputs (oxymeter M2001-EK, pH-meter M2001-EP or Ultrasonic Transducers US1000 via DCL)
- PV1-PV8: Pulse-Binary Inputs, pulse > 5 mS, Rz<1 kOhm
- RS485: Intelligent measuring probe and add-on module connection via FINET protocol. Connecting 2 modules of type JDV16 enables to increase overall binary inputs up to 40.

Version M4016-Ax contain analog connecting board APD, which has 15 programmable differential inputs. These inputs enable for example direct connection of temperature-sensitive elements Pt100. All inputs and outputs have over voltage protections.

Outputs: (Digital Connecting Board DPD)

- 2 Relays switching contact 48VDC/4A and other 12 relays in external modules DV2 (230VAC/4A)
- RS485 enables to connect and control up to 16 modules MAV 420/DIN with galvanically separated output current loop 4-20mA.

Recording Channels: 16 analog, 40 binary, 1 text
Storage Capacity: 2MB, 250 000 - 450 000 values
Resolution: 16 bits, 0-3 decimal point
Real Time Clock: maximal deviation 160 sec/year
Display: alphanumeric 2x16 symbols 9mm, controlled contras
Keyboard: 21 fingerboards, mechanical response to a pressing
Supply Voltage: external voltage 13.8 VDC for recharging of inbuilt gel accumulator 12V/7,2Ah (alt. 6V/12Ah)
Power Consumption of Control Unit:
   type: 4 mA during the operation, 50 uA idle (PV inputs active)
   type: 220 mA when the display is lighted on
**Power Consumption of GSM module:**
   typ.16 mA on receiving, 250 mA on transmission
Supply of Connected Sensors: switched +17VDC (max. 250mA)
Working temperature limits: -30 .. +55 ºC
Dimension (h x w x d): 320 x 215 x 195 mm
Weight: 3,5 kg including accumulator
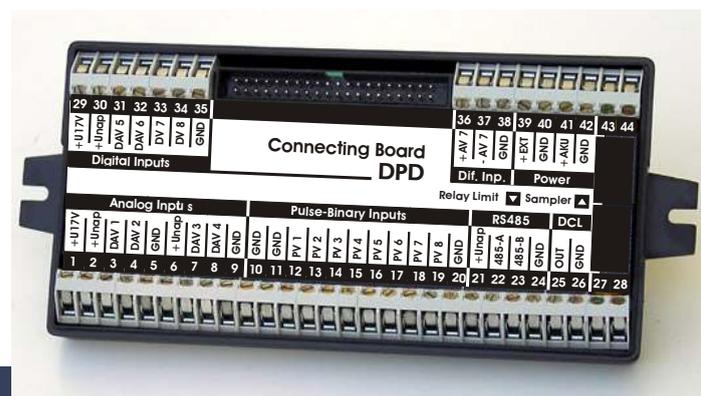
Versions of M4016 Unit:

According to the connecting board:
- **M4016-Lx:** limited number of Inputs: 4x DAV, 2x PV, 1x RS485, 1x relé
- **M4016-Gx:** Digital board DPD
- **M4016-Ax:** Analog board APD

According to the communication:
- **M4016-x1:** RS232 only
- **M4016-x2:** GSM (DATA + SMS)
- **M4016-x3:** GSM/GPRS + SMS