MAQ®20
Industrial Data Acquisition & Control System

- Test and Measurement
- Factory and Process Automation
- Control and Machine Automation
- Environmental Monitoring
- Diagnostic, Repair, and Quality Monitoring
- Research and Analysis
- Automotive
- Military and Aerospace
- Power and Energy
- Oil and Gas
- Semiconductor and Process Equipment
Encompassing more than 30 years of design excellence in the test and measurement and control industry, the MAQ20 family consists of high performance, DIN rail mounted, programmable, multi-channel, industrially rugged signal conditioning I/O and communications modules.

The modules mount on industry standard 35x7.5mm gull-wing DIN rails. A backbone within the rail provides power and communication interconnections between the communications modules and each I/O module.

The MAQ20 interfaces directly to industrial sensors and transducers. It provides input protection, noise filtering, amplification, CJC and linearization, shunt calibration, and data logging.

**Instrument Class® Performance**
- Industry’s Most Affordable Price per Channel
- ±0.035% Accuracy
- Industry Leading ±0.3°C CJC Accuracy Over Full Operating Temperature Range
- 1500Vrms Channel-to-Bus Isolation
- Up to 240Vrms Continuous Field I/O Protection
- 4000V Input Transient Protection
- Wide Range 7-34VDC Power
- –40°C to +85°C Industrial Operating Temperature
- CE Compliant, UL/CUL Listing and ATEX Compliance Pending

**Industry Leading Functionality**
- Up to 24 I/O Modules – 384 Analog or 480 Digital Channels – per System, per 19” Rack Width
- Per-Channel Configurable for Range and Alarms
- Load Share Power Supply Modules for Expansion, Standby and Redundant Power
- System Can Operate Remotely Without Host PC Intervention
- System Can Operate as Standalone Data Logger
- System Can Be Accessed Over the Internet from Anywhere

**Distributed Processing**
- Output Modules Programmable for User-Defined Waveforms
- Discrete I/O Modules Offer 7 High Level Functions:
  - Pulse/Frequency Counter
  - Pulse/Frequency Counter with De-bounce
  - Waveform Measurement
  - Time Between Events
  - Frequency Generator
  - PWM Generator
  - One-Shot Pulse Generator

**Intuitive Graphical Control Software, Integral PID Control, Software Tools**
- ReDAQ® Shape Graphical HMI Design & Runtime Solution
  - Up to 32 PID Loops With Auto-Tune
- IPEmotion Advanced Features & Multi-Language Solution
  - Formulas, Data Logger, TEDS, PID, Scripting
- Software Tools
  - Python API, OPC Server, LabVIEW VIs

Disclaimer: IPEmotion, Python, OPC Server, and Labview are registered trademarks.
The Modules: Compact, Flexible, Powerful

Communications Modules
- Manage System I/O and Run PID Control
- Communicate to Host Using Ethernet, USB, RS-485, RS-232
- Use Modbus TCP or RTU Protocols
- Interface to up to 24 I/O Modules to Create a 384-Analog Channel or 480-Digital Channel System
- Automatically Register I/O Modules

Analog Input Modules

Process Voltage & Process Current Input Modules
- Interface to Volt, Millivolt, Milliamp Sensors and Equipment
- 8-Channel Differential or 16-Channel Single-Ended Input
- All Channels Individually Configurable for Range, Alarms, Averaging

Isolated Process Voltage & Process Current Input Modules
- 8 Input Channels with Multiple Ranges and High Resolution Conversion
- Precise Measurement of Voltage and Current Signals
- All Channels Individually Configurable for Range, Alarms, Averaging, High-Speed Burst Scan
- 300Vrms Channel-to-Channel Isolation

Thermocouple Input Modules
- Interface to Types J, K, T, R and S Sensors
- 8-Channel Differential Input
- All Channels Individually Configurable for Range, Alarms, Averaging

RTD and Potentiometer Input Modules
- Interface to 2-Wire, 3-Wire and 4-Wire Sensors
  - 6 Input Channels for 2-Wire or 3-Wire Sensors
  - 5 Input Channels for 4-Wire Sensors
- Interface to 1000 Pt, 1200 Ni RTDs, and up to 5kΩ Potentiometers
- All Channels Individually Configurable for Sensor, Range, Alarms, Averaging

Strain Gage Input Module
- Interface to Full, Half, and Quarter Bridge Sensors
- 4 Input Channels for 4-Wire or 6-Wire Sensors
- All Channels Individually Configurable for Range, Alarms, Averaging
- Burst Mode for Fast Event Capture
- Programmable, Excitation, Shunt Calibration, Remote Sense

Frequency Input Module
- 8 Input Channels
- 50mV Sensitivity
- Input Range 1Hz to 1MHz plus State Change
- All Channels Individually Configurable for Range and Alarms

Analog Output Process Voltage & Process Current Modules
- 8 Isolated Voltage or Current Output Channels
- All Channels Individually Configurable for Range and Programmable Output
- User-Defined Default Output and Output Waveform
- 300Vrms Channel-to-Channel Isolation

Discrete Input/Output Modules
- 4 or 5 Isolated Input and Output Channels
- User-Defined Default Output and Output Waveform
- 7 High Performance Special Functions
- 300Vrms Channel-to-Channel Isolation

High Density Input Modules with or without Compliance Voltage
- Interface to 10-120VDC/VAC Signals (MAQ20-DIV20)
- 24VDC Compliance Voltage for Interface to Devices Requiring Excitation (MAQ20-DIVC20)
- 20 Discrete Input Channels

High Density Isolated Discrete Output Module
- 20 Isolated Discrete Output Channels with User Configurable Default Output States
- Channels Switch up to 60VDC Signals and Sink up to 3A Current
- Channels Switched Individually or in Blocks
- 150Vrms Channel-to-Channel Isolation

Discrete Relay Output Module
- 20 Isolated SPST Latching Relay Output Channels
- Channels Switch Between 2A at 30V and 0.4A at 150V
- Contact State Readback on Each Channel
- Relays Controlled Individually or in Blocks
- 150Vrms Channel-to-Channel Isolation

All MAQ20 I/O Modules
- 1500Vrms Field-to-Bus Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Overload and Reverse Protection on Power Input Terminals
- -40°C to +85°C Industrial Operating Temperature
- Designed for Installation in Class I, Division 2 Hazardous Locations

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ReDAQ® Shape Software for MAQ20

- One-Time Low-Cost License Fee
- Ideal for Data Acquisition, Monitoring and Control Applications
- 3 Easy Steps to Create Customized Applications
- 65 Toolbox Tools Simplify Project Creation
- No Setup Required to Acquire and Analyze Data
- Create, Save, Open GUI Projects for Test, Process, Data Collection, Data Analysis
- Supports Any Graphical File Format
- Most Efficient Way to Configure and Run MAQ20 Systems

IPEmotion Software for MAQ20

- Advanced, Intuitive Data Acquisition / Test & Measurement Software
- Automatic Recognition of Connected Devices
- Automatic Configuration of All Channels
- Automatic Start of Measuring
- Instant Visualization of All Measurement Values
- Live Data Display, Recording, Online and Offline Math and Logic Functions
- Live Adjustment
  - Analyze and Verify Measurements During Active Data Acquisition
  - GUI Adaptation During Active Measurement and Storage
- Post Processing and Report Generation
- Easy Drag and Drop HMI Creation
- High Speed Recording to 1000 Samples/s
- Communication with MAQ20 via Plug-In Driver
- Import and Export Recorded Data Using Standard File Formats
- Scripting Option with VB or Python Software
- Available in 7 Languages
  - English, German, French, Italian, Chinese, Korean, Japanese

Advanced PID Control

- Integral in Both ReDAQ Shape for MAQ20 and IPEmotion Software
- Up to 32 PID Control Loops with ReDAQ Shape for MAQ20
  - Controller Runs in Real Time
  - Controller Accessed through Faceplates
- Unlimited PID Control Loops with IPEmotion
  - Controller Runs in Windows
- Typical PID Applications
  - Steam, Water, and Chemical Flow Control
  - Tank Level Control
  - Heat-Exchanger / Reactor Temperature Control
  - Pressure Control

Software Tools

- Python API
  - Object Oriented Programming
- OPC Server
  - Interface to SCADA, HMI, or Custom Software
- LabVIEW VIs
  - Simplified Communication in LabVIEW Environment

Leading-Edge PID Loop Control