



Item	Item-No.
DNP3-Master RT	00024216-63
DNP3-Outstation RT	00024219-63
DNP3-Master/Outstation RT	00024329-63
DNP3 Internet Download	00024216-90

DNP3 Master und Outstation

Distributed Network Protocol

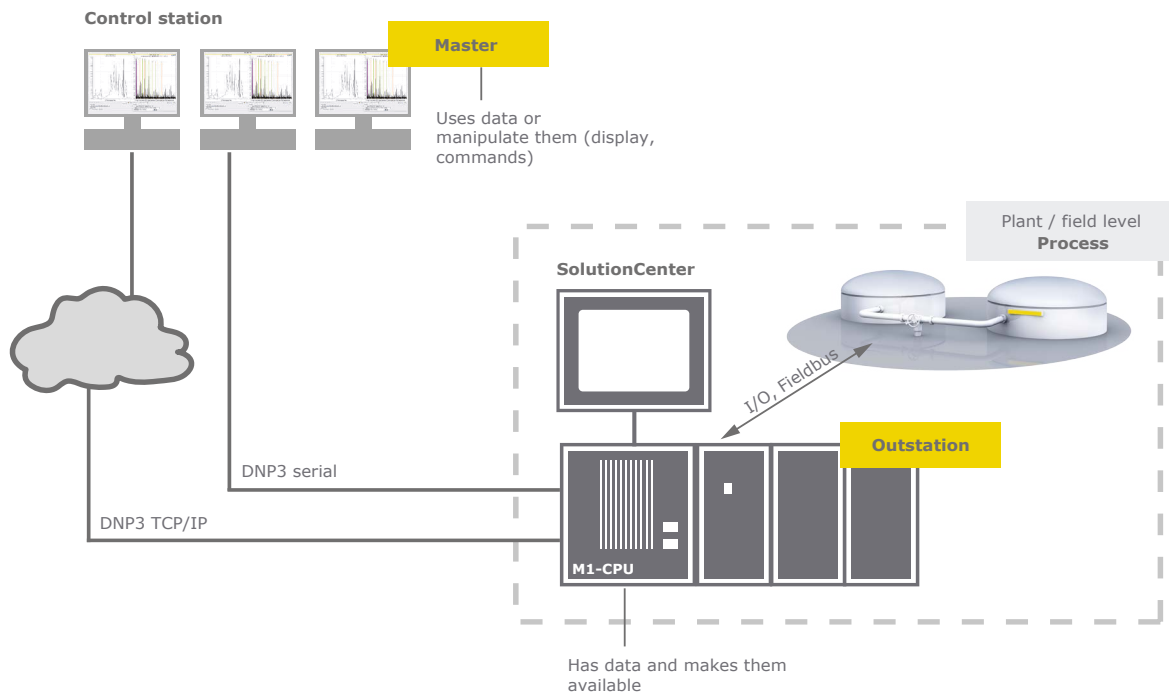
Application areas

DNP3 is a telecontrol protocol according to IEEE 1815, and it is used for data exchange in the area of power plants, grid, and other public infrastructure. DNP3 uses Ethernet or serial connections as physical layer.

Product features

The DNP3 service for the M1 controller is a pure software solution that uses the Ethernet and COM ports on the controller so that no additional hardware is required. Depending on the configuration and license, the service enables the operation of a DNP3 master, a DNP3 outstation or both operating modes at the same time. The set of available services and functions is conform to DNP3 level 2.

Data objects can be generated on the M1 outstation and linked with the process variables of the controller software. To transfer actual values to the master (monitoring direction), there are the possibilities event polling, the polling of static data, the activation of an automatic transfer (unsolicited responses) as well as explicit read accesses. In control direction, the outstation can receive the commands (controls) of the master in order to accept setpoints, commands and parameters.



When run as a DNP3 master, the M1 can read and write values from standard compliant DNP3 outstation devices. Operation via the user program is as simple here as setting a local digital output. Through the configuration of the master, a logical IO module in accordance with the Unified Fieldbus Model (UFB) can be generated for each outstation. These UFB modules can be operated immediately in the SolutionCenter diagnostic tool or in a visualization. The values in the PLC are made available to the user program in the process image. Alternatively, an event-driven response can also be implemented to new actual values from the outstation.

Details on supported object groups, variations and function codes of the outstation are provided in the device profile document. In DNP3 there is no corresponding document for the master. However, its features largely correspond to the possibilities of the outstation.

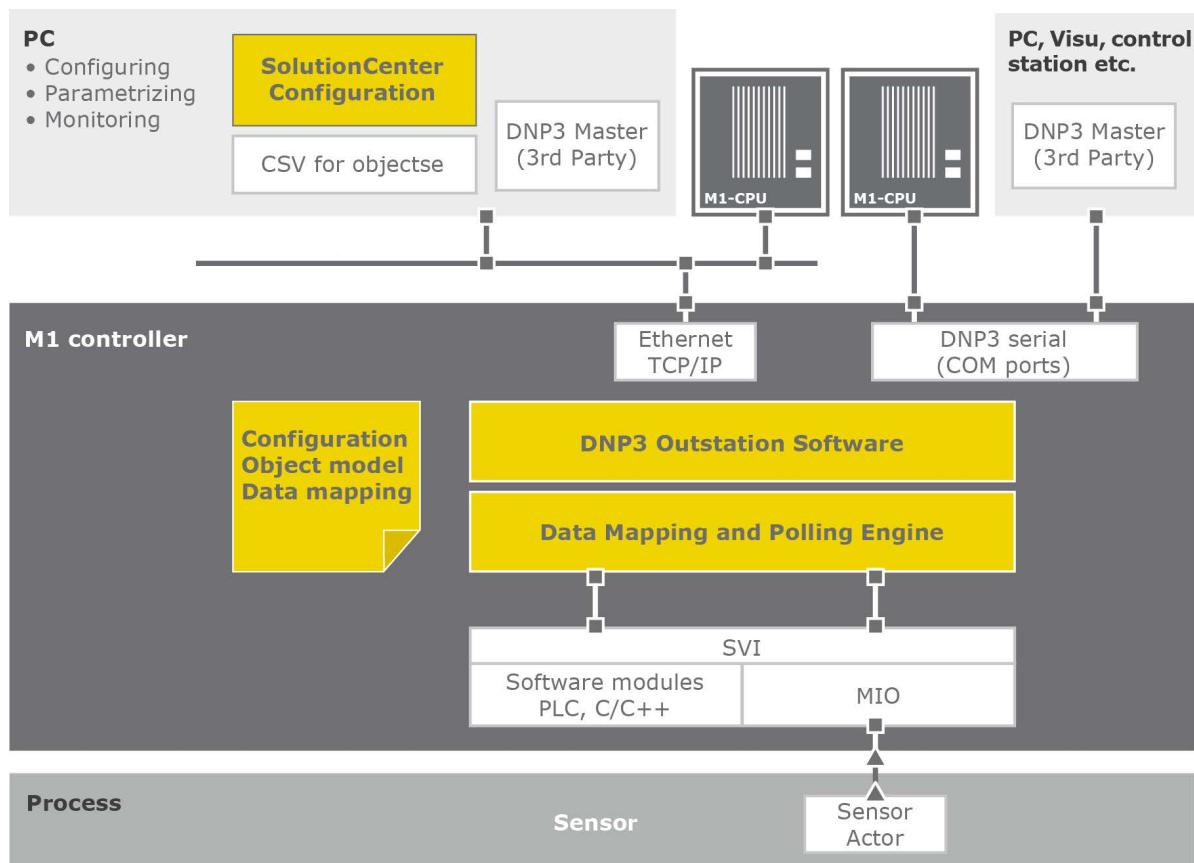
DNP3 service for master and outstation

- Complies with Level 2 with some extensions from Level 3 and 4
- Requires for operation on the controller a license file for master, outstation or both simultaneously

- Uses the Ethernet ports and/or serial COM ports of the controller
- Support for unsolicited responses
- Support for time synchronization via DNP3

DNP3 outstation

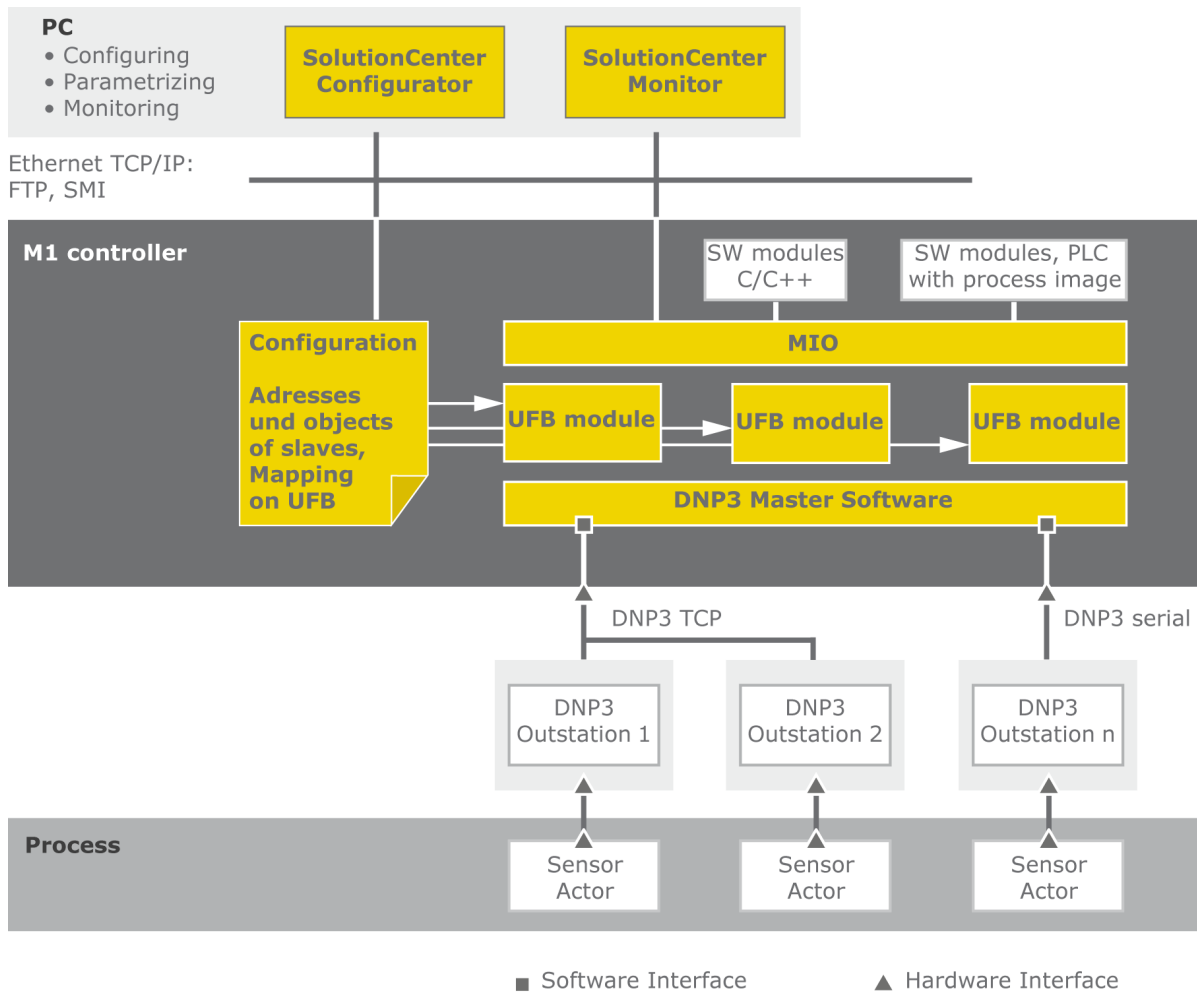
- Configuration of data objects via CSV file
- Linking of data objects with existing process variables
- Parallel connection with several masters possible (requires the configuration of several instances)
- Automatic deadband calculation (threshold value filtering) of analog actual values to reduce the data volume
- Time stamp of value changes implicit via the service
- Formation of quality information (flags) implicit via the service, can be set additionally by the application via a quality variable.
- Quality ensured by standardized certification tests



Block diagram DNP3-Outstation

DNP3 master

- Access to data objects of the outstation via logical UFB modules
- The currently received values are provided in the process image
- All events with flags and time stamp can be read via the function
- Event-driven handling of received actual values possible



Block diagram DNP3-Outstation

DNP3	
General product features	
Type	Licensable service for Bachmann M1 controllers (pure software solution, subsequently installable) with configuration interface. Requires a valid license file for operation.
Object groups (telegram types)	Complies with DNP3 Level 2, additionally some groups of Level 3 and 4; For details see Device Profile Document
Variations (representation formats)	Complies with DNP3 Level 2, additionally some variations of Level 3 and 4; For details see Device Profile Document
Data types	Automatic conversion of data types between process variables (SVI) and DNP3 objects
Connection diagnostics	Diagnostic variables show the connection status and statistics, can be used for tools, HMI and application programs
Log messages	Clear text messages in the log book, detail level changeable at runtime
Outstation product features	
Multi master operation	Possible by configuring several instances of the outstation with different TCP port numbers
Assignment to event classes	Selectable per data point in the CSV file
Preferred variation	Selectable per data point in the CSV file
Addressing	Standard compliant by configuring master address and outstation address; With TCP an IP address and port number of the slave is also required for the master
Source time stamping	Implicit via the service
Quality marking (flags)	Implicit via the service, additional setting possible via the application using quality variable. Analog values outside of the configured min./max. range are automatically marked with OVER_RANGE
Unsolicited responses	Can be selected by the configuration; must be activated by the master
Threshold value filter	Deadband value configurable to reduce value changes per data object in the CSV file. Can also be changed by the master via DNP3.
Remote/local status	Integrated in the token offered by M1 Access Control for write accesses. When the token is taken, LOCAL status is displayed, write accesses are denied. The local or remote status can also be set by means of a function.
Rights control	Integration in M1 Access Control to control access rights to the process variables, for the prioritization of token assignments and for the authorization of controller reboot
Access logging	Write accesses of the master are recorded in the security log of the M1
Limiting of the master	Configurable permitted master IP. Connection attempts by other masters are denied
Time synchronization	NEED_TIME request to the master can be configured once for the start, cyclically or never
Master product features	
Integrity poll	Configurable cycle for triggering a class 0 poll (integrity poll)
Event poll	Free wheeling cycle for polling event classes 1, 2, 3
Connection monitoring	Connection status detectable via diagnostic variable
Receipt of unsolicited responses	Can be selected by the configuration: The master can activate and receive the unsolicited responses of the outstations, and assign the values to the process image.

DNP3	
Master product features	
API for incoming actual values	The values of event polls and integrity polls are provided as channel values in the process image. Full information incl. flags and time stamp can be read by a function call. Additionally, an attach feature allows event-driven reaction on incoming data.
Network configuration on the master	One UFB module per outstation; one UFB channel per data object. Data objects for which no UFB channel is configured are not shown but can still be received.
Time synchronization	Is executed on request of the outstation
Installation	
Delivery form	Separately installable product (service); supplied as download
Licensing	Runtime license for operation on a controller, irrespective of the number of connections or information objects. Different licenses can be purchased for master, outstation or combination.
License protection	Hardware-dependent software key
Configuration of service and instance	Via SolutionCenter
Configuration of the data objects	Via CSV file
Connection with process variables	Mapping to the SVI variables of the controller software (IEC 61131-3, C/C++) as well as directly to IO and fieldbus values via a CSV file
System requirements for the controller	
Device	All M1 CPU series (MH200, MC200, MPC200, MX200) except for ME203
System version	M-Base 3.90 or better
Physical Ethernet interfaces	Ethernet ports of the controller CPUs or of the EM213 modules; Operation with other TCP/IP-based protocols on the same interface is possible
Physical serial interfaces	Serial COM ports of the M1 CPU or of the RS204 modules in operating modes RS232, RS422 and RS485. The parallel operation of several protocols on the same COM port is not possible
System requirements for the PC	
SolutionCenter	SolutionCenter from version 1.90 (M-Base 3.90), processor requirements see SolutionCenter product data sheet

Order codes		
Item	Item no.	Description
DNP3-Master RT	00024216-63	License to operate the DNP3 master on one control CPU. Provides communication over the ethernet or serial interfaces with standards-compliant servers (outstations) using the DNP3 protocol in accordance with the compatibility documentation.
DNP3-Outstation RT	00024219-63	License to operate the DNP3 outstation (Slave) on one controller CPU. Provides communication over the ethernet or serial interface with standards-compliant clients (masters) using the DNP3 protocol in accordance with the compatibility documentation.
DNP3-Master/ Outstation RT	00024329-63	License to operate the DNP3 master and outstation on one controller CPU. Provides communication over the ethernet or serial interface with standards-compliant clients (masters) using the DNP3 protocol in accordance with the compatibility documentation.
DNP3 Download	00024216-xx	Installation media for DNP3 client (master) software (Download). Without a valid Runtime License the DNP3 client runs only temporarily for 2h in demo mode.