

MODULES

Protocol drivers

Modbus, Siemens S7, OMRON, DNP3, IEC 104, IEC 61850, MQTT, OPC UA client, simulator — what each supports.

Online: mergenhub.envest.com.tr/docs/drivers

ON THIS PAGE

Channel and device limits

Choosing timeouts and scan rates

Writes

Redundancy and recovery

Diagnostics

All drivers ship in every installation; there is nothing to buy or enable. Each driver has an *Address hints* panel in the tag editor and a help page inside the application.

DRIVER	TRANSPORT	HIGHLIGHTS	DETAIL PAGE
Modbus	TCP, UDP, RTU/ASCII serial, Ethernet encapsulation	FC01-04 reads, FC05/06/15/16/22 writes, zero/one-based addressing, Modicon 5/6-digit, word/bit order, per-area max block size, one socket per channel	Modbus
Siemens S7	ISO-on-TCP (102)	S7-300/400/1200/1500, DB/M/I/Q/T/C areas, optimised PDU packing, 64-bit types	Siemens S7
OMRON	FINS/TCP, EtherNet/IP CIP	CS/CJ/CP FINS memory areas, NJ/NX symbolic tags (CIP), bit and word access	OMRON
DNP3	TCP	Integrity/event polls, unsolicited, SBO/Direct Operate, Secure Authentication, time sync, file control, redundancy	DNP3
IEC 60870-5-104	TCP	General interrogation, single/double commands, setpoints, time sync, redundancy, RTU compatibility modes	IEC 104
IEC 61850	MMS	SCL/ICD import, LN-level reads, control model (SBO/direct), reports, VMD addresses	IEC 61850
MQTT	TCP/TLS	Broker per channel, topic devices, JSON/XML/CSV/key-value payload parsing, discovery, arrival watchdog liveness	MQTT
OPC UA client	opc.tcp	Connect to other UA servers (PLC, gateway, another MergenHub); channel = session, device = subscription, browse for tags	—
Simulator	—	Ramp, sine, random, static functions for testing screens, alarms and logging without hardware	—

Channel and device limits

Every driver limits the number of channels it can open and the number of devices in one channel. The values match the limits documented by the industry-standard OPC server for each driver, with channels additionally capped at 1024. The limit is **per driver**, not per project — channels of different drivers add up beyond it.

DRIVER	MAX CHANNELS	MAX DEVICES PER CHANNEL
Modbus TCP/IP Ethernet	1024	8192
Modbus RTU Serial	1024	255
Modbus ASCII Serial	100	247
DNP3 Client Ethernet	1024	1024
IEC 60870-5-104 Client	1024	1024
IEC 61850 MMS Client	256	256
MQTT Client	60	1024
OMRON FINS Ethernet	512	32
OMRON NJ Ethernet	256	1024
Siemens S7 TCP/IP	1024	1024
OPC UA client	256	256
Simulator	1024	999

- Limits are checked only when **adding** (UI, REST API, AI assistant, copy, import). When a limit is reached the operation is rejected and the project is left unchanged; an import is rejected as a whole, never partially applied.
- A saved project is never rejected or trimmed when it loads.
- Every value was exercised at the limit itself against a running MergenHub with protocol simulators, including all drivers at their limits **at the same time** (7,584 channels): every tag stayed Good and kept updating.
- A channel polls its devices **one after another**, so a crowded channel has a longer cycle (in testing, 8,192 Modbus TCP devices in one channel refreshed about every 40 s). Split devices that need fast updates across several channels — channels run in parallel.

Choosing timeouts and scan rates

- Start with the driver defaults and the device's documented response time. A scan rate lower than the device round-trip only creates back-pressure.
- Serial and GSM/radio links: longer request timeout (2–5 s), fewer retries, and demand-driven scanning so idle devices do not keep the link busy.
- Large Modbus devices: keep *max block size* below what the device supports (many RTUs reset above 64 registers).

Writes

Writes are executed **immediately**, ahead of the scan queue, and are verified: the driver checks the device acknowledged the write (Modbus exception codes, S7 return codes, DNP3/104 command responses). Failed writes are reported to the caller (OPC UA StatusCode / REST error) and logged in the audit log with user and value.

Redundancy and recovery

Every channel runs under a supervisor. Broken sockets are reopened, dead workers are recreated, and quarantine/back-off prevents a flapping device from flooding the log. DNP3 and IEC 104 support dual-address redundancy.

Diagnostics

Select a device › **Diagnostics** to see the raw frames (TX/RX hex), byte counters and last error. For cache-based protocols (DNP3, 104, 61850) the packet tap shows the real link traffic, not the cached values. See

[Troubleshooting](#).