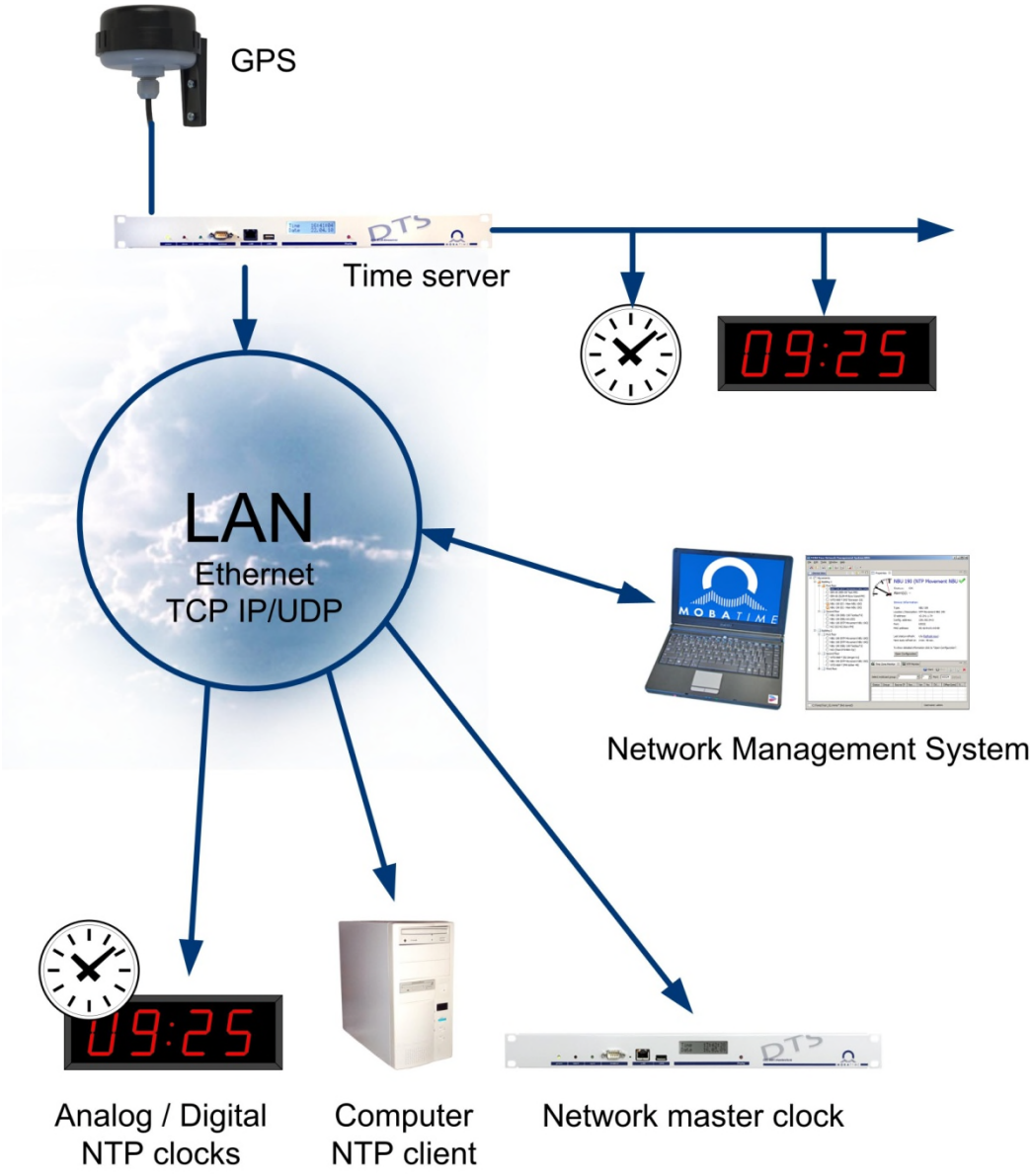
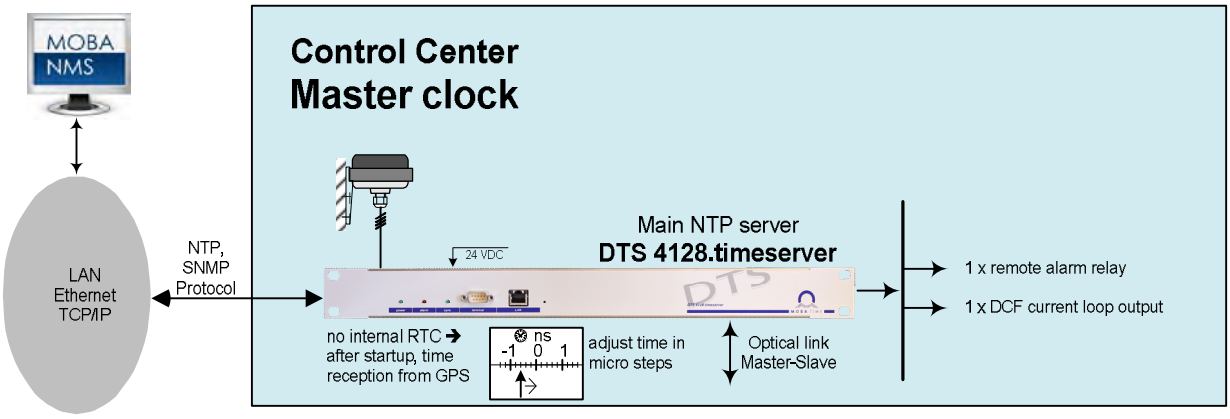
# Network Time Server Overview

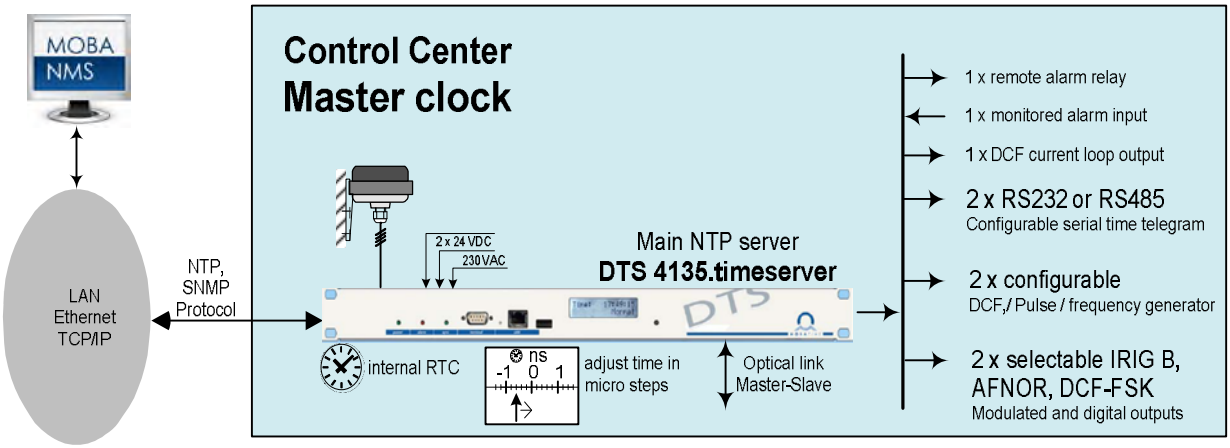
## Time synchronization over networks



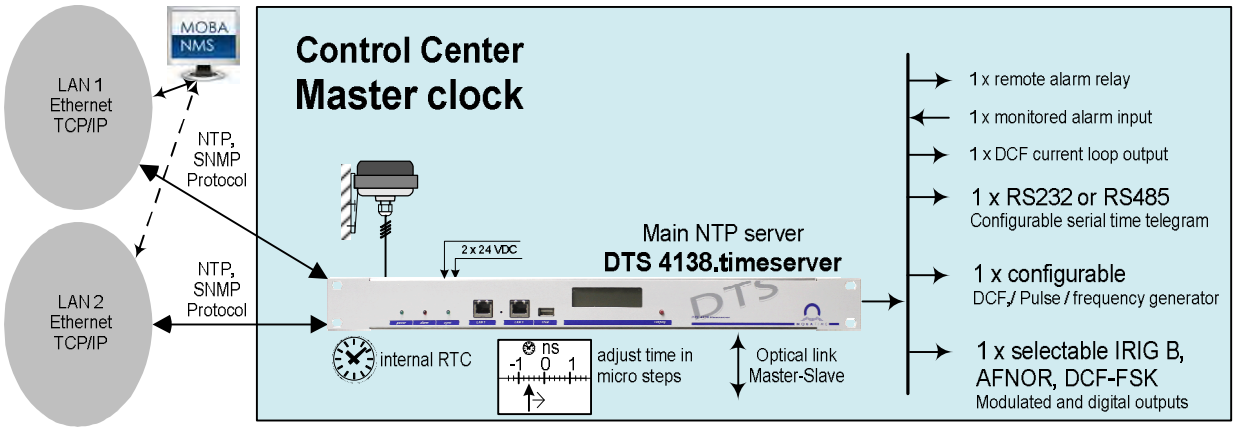
# 1 Time server for technical applications and NTP time systems




Application examples: high accurate time server for IT applications, e.g. banks, industries, airports, OCCs, universities…

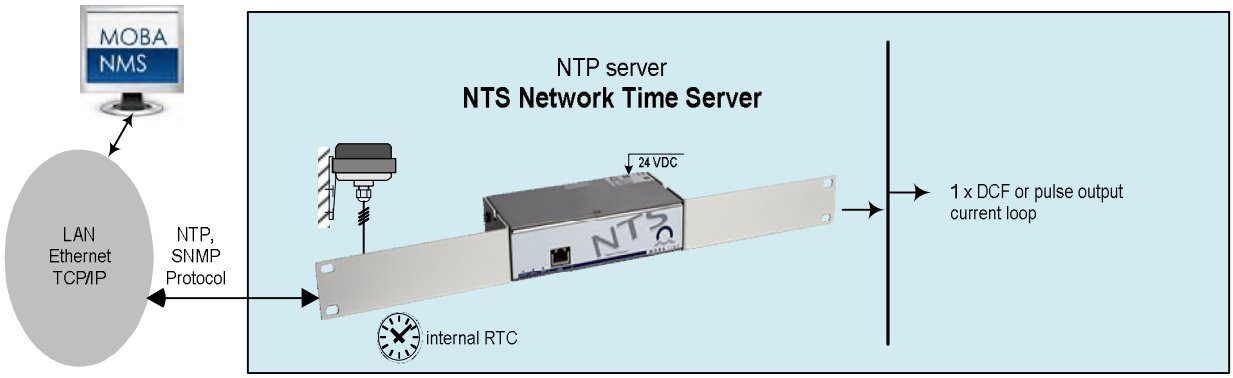



Application examples: high accurate time server for technical applications, e.g. power stations, OCCs, hospitals, …

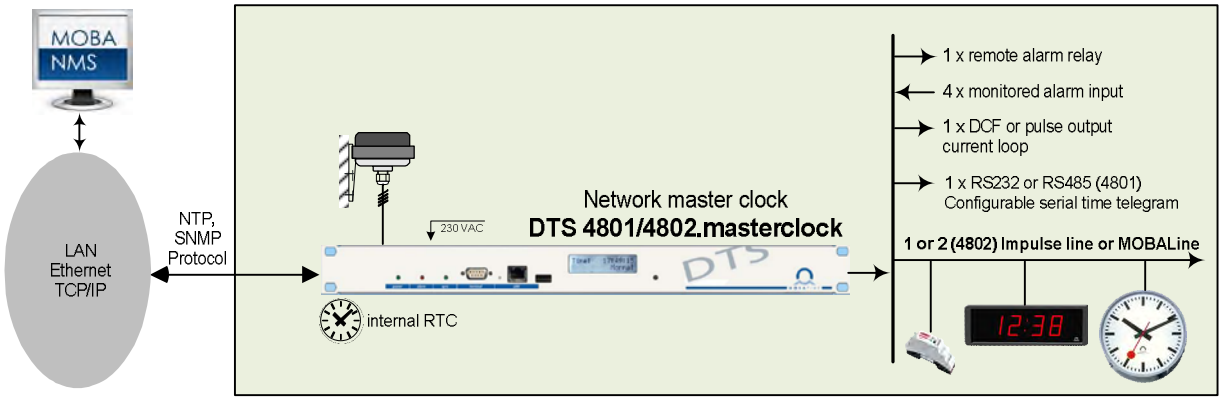



Application examples: high accurate time server for technical applications, where devices in two isolated networks need to be synchronized, e.g. power stations, OCCs, IT applications,…

# 2 Time server or network master clocks



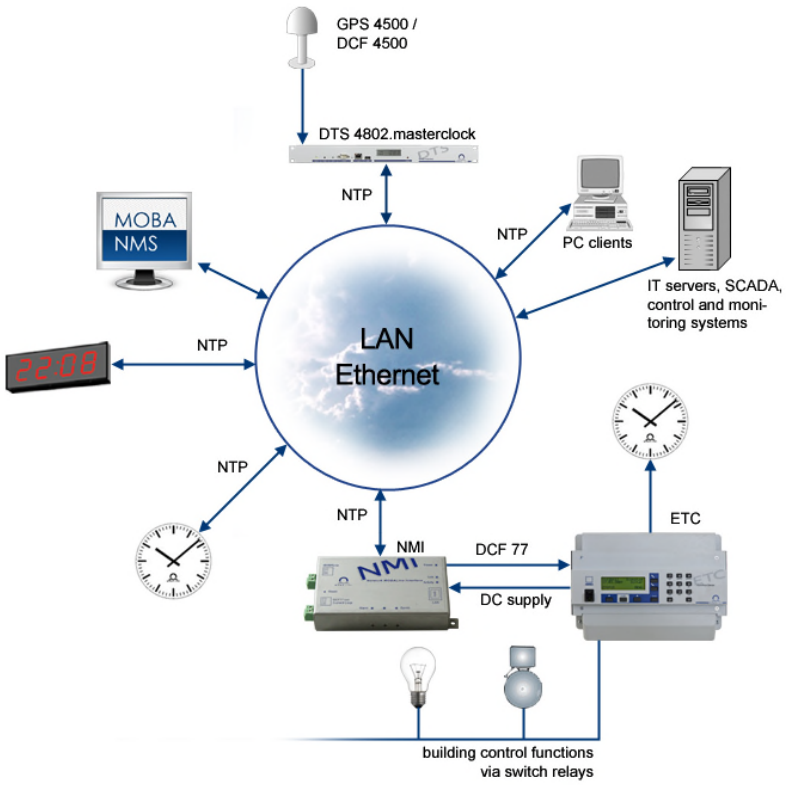

Application examples: accurate time server for IT applications, e.g. banks, industries, airports, OCCs, universities…




Application examples: accurate network master clock and time server, e.g. banks, industries, schools, railway stations, universities…

Functions:
- Drives clocks via MOBALine
- Drives old impulse clocks
- Controles NTP clocks

(see comparison table)



# 3 Comparison table for time server selection

| Group | Description | NTS | DTS 4128. timeserver | DTS 4801/ 4802. masterclock | DTS 4135. timeserver | DTS 4136. timeserver | DTS 4138. timeserver |
|---|---|---|---|---|---|---|---|
| Time signal outputs | Ethernet Network interface (RJ45) | 1 | 1 | 1 | 1 | 1 | 2 |
| | Optical link for NTP master-slave operation | | ✓ | | ✓ | ✓ | ✓ |
| | MOBALine / Impulse / DCF active clock line | | | 1 / 2 | | | |
| | IRIG-B, AFNOR or DCF-FSK channels, consist of:<br>IRIG-B12x, AFNOR or DCF-FSK modulated<br>IRIG-B00x, AFNOR digital (RS 422, TTL)<br>IRIG-B00x, AFNOR digital (current loop passive) | | | | 2 (Ind) | 2 (Ind) | 1 |
| | DCF, synch. pulses, frequency channels, consist of:<br>DCF, synch. pulses, frequency (RS 422, TTL)<br>DCF, synch. pulses, frequency (current loop pass.) | | | | 2 (ind) | 2 (ind) | 1 |
| | DCF, synch. pulses, (current loop passive) | 1 | | 1 | | | |
| | DCF output (current loop passive) | | ✓ | | ✓ | ✓ | ✓ |
| | Configurable serial interface RS232 / 485 | | | 4801: 1 | 2 (ind) | 2 (ind) | 1 |
| | | | | | | | |
| External time source | DCF, GPS 4500 (DCF corrent loop) input | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | IRIG-B12x input | | | | ✓ | ✓ | ✓ |
| | NTP / SNTP servers | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | | | | | | |
| Network services | NTP, SNTP (Server, Client, Multicast, Unicast) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | SNMP Notification, Get , Put | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | IP V6 support | ✓ | | ✓ | ✓ | ✓ | ✓ |
| | Telnet, SSH, FTP | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | | | | | | |
| Accuracy with syn. | GPS (DCF input) to NTP Server typically: < +/- | 0.5ms | 0.1ms | 0.5ms | 0.1ms | 0.1ms | 0.1ms |
| | GPS (DCF input) to DCF output typically: < +/- | 1ms | 10µs | 1ms | 10µs | 10µs | 10µs |
| | GPS to IRIG modulated output typically: < +/- | | | | 200µs | 200µs | 200µs |
| | GPS to IRIG DC level output typically: < +/- | | | | 10µs | 10µs | 10µs |
| | NTP to internal time typically: < +/- | 0.5ms | 0.1ms | 0.5ms | 0.1ms | 0.1ms | 0.1ms |
| | Internal time to RS232/485 output typically: < +/- | | | 10ms | 10ms | 10ms | 10ms |
| | | | | | | | |
| [1)]Holdover free run accuracy | At 20°C +/- 5°C, after 24 hours of no synch: < +/- | 0.1s | 10ms | 0.1s | 10ms | 1ms | 10ms |
| | At const. Temp., after 24 hours of no synch: < +/- | | 1ms | | 1ms | 1ms | 1ms |
| | At 20°C +/- 5°C, after 24 hours power off: < +/- | 0.5s | 250ms | 0.5s | 250ms | 250ms | 250ms |
| | | | | | | | |
| Output Load | MOBALine / Impulse line, up to 100 slave clocks | | | 700mA | | | |
| | IRIG-B, up to 150 slave clocks, or more per line (depending on clock type) | | | | 2 Veff / 50 Ω | 2 Veff / 50 Ω | 2 Veff / 50 Ω |
| | | | | | | | |

Legend: ind: individual and independent channels (outputs), galvanically separated
[1)]: values measured after at least 24h of synchronization from GPS

# 4 Comparison table for technical data of the time server

| Time server Overview  | | NTS | DTS 4128.timeserver | DTS 4801.masterclock / DTS 4802.masterclock | DTS 4135.timeserver | DTS 4136.timeserver | DTS 4138.timeserver |
|---|---|---|---|---|---|---|---|
| **Housing** | 19", 1 HE | √ (option) | √ | √ | √ | √ | √ |
| | Table case | √ | | | | | |
| **Time signal outputs** | | | | | | | |
| | IRIG, AFNOR DCF-FSK | | | option / - (built in IF 488) | 2 precison output, 50 Ohms | 2 precison output, 50 Ohms | 1 precison output, 50 Ohms |
| | NTP slave clocks + timezone server | 1 | 1 | 1 | 1 | 1 | 1 |
| | DCF 77 CL (current loop) passive output | 1 | 1 | 1 | 1 | 1 | 1 |
| | Precision pulse/frequency/DCF output on RS422 and CL | | | 1 | 2 | 2 | 1 |
| | Serial outputs with configurable time telegrams | | | 1 / 0 RS 232/422/485 RS 422: output only | 2 RS 232/422/485 RS 422: output only | 2 RS 232/422/485 RS 422: output only | 1 RS 232/422/485 RS 422: output only |
| | MOBALine or polarized Impulses (Impulse line) | | | 1 / 2 | | | |
| **Network services** | | | | | | | |
| | NTP client | √ | √ | √ | √ | √ | √ |
| | NTP V4 (V3 compatibel) | √ | √ | √ | √ | √ | √ |
| | NTP modes: Server, Peer, Broadcast, Multicast | √ | √ | √ | √ | √ | √ |
| | SNTP | √ | √ | √ | √ | √ | √ |
| | TIME, DAYTIME | √ | √ | √ | √ | √ | √ |
| | NTP MD5 authentication | √ | | √ | √ | √ | √ |
| | Telnet, SSH, FTP - disengageable | √ | √ | √ | √ | √ | √ |
| | SNMP Notifications | V2c/V3 | V2c/V3 | V2c/V3 | V2c/V3 | V2c/V3 | V2c/V3 |
| | SNMP Get, Put | √ | √ | √ | √ | √ | √ |
| | IP V6 support | √ | | √ | √ | √ | √ |
| **Network interface** | | 1 | 1 | 1 | 1 | 1 | 2 |
| | 10BaseT | √ | √ | √ | √ | √ | √ |
| | 100BaseTX | √ | √ | √ | √ | √ | √ |
| **IP configuration** | | | | | | | |
| | DHCP | √ | √ | √ | √ | √ | √ |
| | static IP | √ | √ | √ | √ | √ | √ |
| **USB** | for update | | | √ | √ | √ | √ |
| **GBIC-Link** | for redundant operation, with master - slave negotiation | | √ | | √ | √ | √ |
| **External time source** | | | | | | | |
| | NTP / SNTP servers | √ | √ | √ | √ | √ | √ |
| | DCF 77 (DCF 450, DCF 4500) | √ | √ | √ | √ | √ | √ |
| | GPS 4500 | √ | √ | √ | √ | √ | √ |
| | IRIG-B | | | | √ | √ | √ |
| **Accuracy** | | | | | | | |
| | GPS (DCF input) to NTP Server | typ. < +/- 0.5ms | typ. < +/- 0.1ms | typ. < +/- 0.5ms | typ. < +/- 0.1ms | typ. < +/- 0.1ms | typ. < +/- 0.1ms |
| | GPS (DCF input) to DCF output | typ. < +/- 1ms | typ. < +/- 0.01ms | typ. < +/- 1ms | typ. < +/- 0.01ms | typ. < +/- 0.01ms | typ. < +/- 0.01ms |
| | Hold over (after >24h synchronisation) @ 20°C+/- 5°C | < +/- 100ms/d | < +/- 10ms/d | < +/- 100ms/d | < +/- 10ms/d | < +/- 1ms/d | < +/- 10ms/d |
| | Master to slave (redundant operation) | | typ. < +/- 0.001ms | | typ. < +/- 0.001ms | typ. < +/- 0.001ms | typ. < +/- 0.001ms |
| | TCXO Quartz Oscillator | √ | √ | √ | √ | | √ |
| | OCXO Quartz Oscillator | | | | | √ | |
| | IRIG (modulated) to GPS (DCF input) | | | Opt.: typ. < +/- 15ms | < 0.1ms | < 0.1ms | < 0.1ms |
| | IRIG (digital) to GPS (DCF input) | | | | < 0.01ms | < 0.01ms | < 0.01ms |
| **RTC** | Real Time Clock (disengageable) | 1 | | 1 | 1 | 1 | 1 |
| **Display** | 2 lines, 16 character each | | | √ | √ | √ | √ |
| **Operation control** | | | | | | | |
| | MOBA-NMS | √ | √ | √ | √ | √ | √ |
| | Telnet | √ | √ | √ | √ | √ | √ |
| | SSH | √ | √ | √ | √ | √ | √ |
| | RS 232 (PC-Terminal) | | √ | √ | √ | √ | |
| | SNMP (V2c/V3 Get, Put) | √ | √ | √ | √ | √ | √ |
| **Alarm output** | | | | | | | |
| | Relais | | √ | √ | √ | √ | √ |
| | SNMP Notifications | V2c/V3 | V2c/V3 | V2c/V3 | V2c/V3 | V2c/V3 | V2c/V3 |
| | Mail | √ | √ | √ | √ | √ | √ |
| **Alarm input** | (control inputs) | | | 4 (control inputs) | 1 | 1 | 1 |
| **Power supply** | | √ | √ | √ | √ | √ | √ |
| | Redundant power supply (mains/DC or DC/DC) | | | dual PS | √ | √ | √ |
| | Mains | Ext. PS included | | 85..265 VAC | 85..265 VAC | 85..265 VAC | |
| | DC | 1 x 22..29 VDC | 1 x 22..29 VDC | 2 x 22..29 VDC | 2 x 22..29 VDC | 2 x 22..29 VDC | 2 x 22..29 VDC |

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