net-line FW-50
scalable RTU

Outstanding performance on limited space

The net-line FW-50 modular telecontrol system provides powerful solutions for telecontrol, station control and automation applications. With its compact size and the performance of the series5e range of products, it is made for extremely simple use and fast integration due to a comprehensive set-up, but ensures high IT-security complying with BDEW Whitepaper.

The RTU offers a high degree of flexibility in three different module frames, thanks to the large selection of plug-in communication interfaces and input and output modules. In this way, the FW-50 can be used as a simple communication router or as a telecontrol station with small, medium or large I/O capacity. The system can be installed in any infrastructure thanks to the choice of DIN rail, wall or rear wall mounting and the 19" mounting bracket.

Typical fields of use
- Station and bay controller
  in MV and HV switching stations
- Gateway and communication router
  between station buses, field bus and control systems
- Monitoring and control device
  for utilities, waste disposal and industrial sectors
- Data acquisition and communication system
  in transport and infrastructure applications

net-line FW-50 overview

Scalable field device for modular assembly with interfaces and input/output cards at 4, 7 or 14 I/O slots. Direct contact of process signals, commands, metered values, measurands, set points, transformer taps, 1-of-n command termination and flexible data routing/cross connection within the network. Cascadable up to 16 racks. Up to 6 separate Ethernet network segments with individual VPN-tunnel, integrated switches each with 4 x 10/100BaseTx or fibre optic 100BaseFx with IEC 61850 station bus, IEC 60870-5-104 control centre link, DNP3, SyM² meter read out. Up to 4 serial interfaces with IEC 60870-5-10x protocol, IEC 60870-5-103 protective equipment, IEC 62056-21 meter link or external field devices with DSfG, field bus, Profibus DP, Modbus and MPI. DIN rail, 19", wall and rear wall mounting.

net-line FW-50 hardware

The modular system can be expanded according to individual requirements and has impressive functionality while being simple to use:

- CPU series5e with 1200 MIPS, 1 GB memory
  (512 MB SDRAM, 512 MB SLC Flash)
- High performance for integration complying with BDEW Whitepaper IT-security
- Large selection of expansion modules
  - Communication modules
  - Signal/command modules
  - Measurement/set point modules
- Compatible with expansion modules of previous versions
- LAN integration up to 6 separate network segments
- High noise immunity, high insulation class
- Cascadable up to 16 racks to form a logic station
- Up to 28 protective equipment connections via integrated FO star coupler
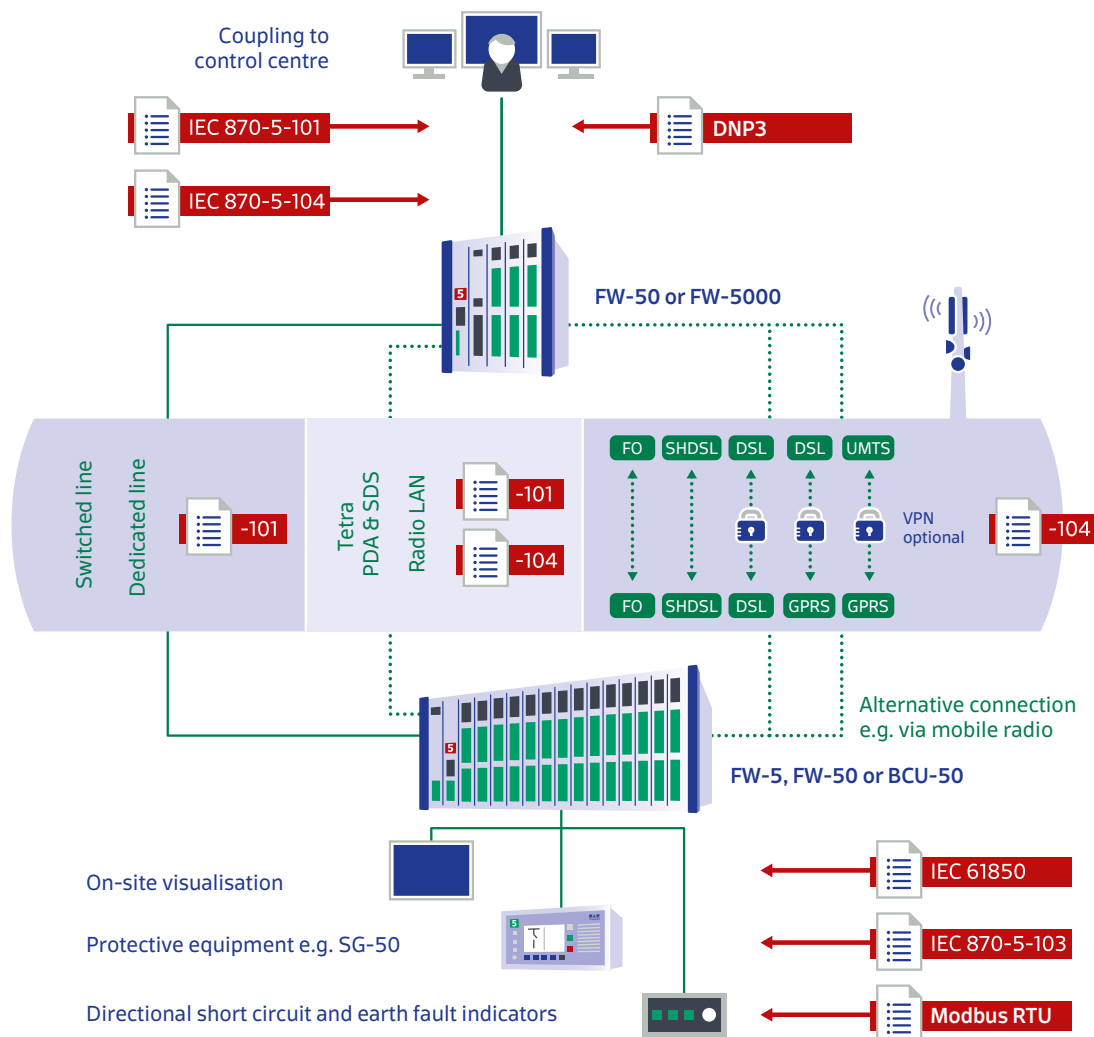
Ideal handling

All components can be accessed and pulled out from the front. The operating state can be assessed quickly via the status LEDs.

- High speed download, secure even via the internet
- Memory stick for rapid setup or updates
- Backup of configuration, system and archives on SD card allows fast replacement of hardware
- Archive memory expansion up to 8 GB via SD card
- Diagnostics and download via browser
- Area roll-out due to optional address allocation in browser
- Easy implementation of high IT security

Communication routes

A particular strength of the series5 lies in the large selection of communication possibilities and the redundant backup of routes, stations or process points.

Links can be realised via numerous protocols directly to the control system or in a controlled manner with an interconnected telecontrol master station.

Coupling to control centre

IEC 870-5-101

DNP3

IEC 870-5-104

FW-50 or FW-5000

Switched line
Dedicated line
-101

Tetra
PDA & SDS
Radio LAN
-101
-104

FO SHDSL DSL DSL UMTS
VPN optional
FO SHDSL DSL GPRS GPRS
-104

FW-5, FW-50 or BCU-50

Alternative connection e.g. via mobile radio

On-site visualisation

Protective equipment e.g. SG-50

Directional short circuit and earth fault indicators

IEC 61850

IEC 870-5-103

Modbus RTU

net-line FW-50 software

Our innovative and well-established setIT parameterisation software allows exceptionally fast setup. The integrated codeIT soft PLC offers additional flexibility and allows many kinds of PLC programs to be implemented. A link to the OPC server can be realised by connectIT. The perfect solutions for station control systems, telecontrol technology or plant automation can be provided in this way.

Intuitive parameterisation:

Convenient integration of complex features:
- Syntax checks to prevent input errors
- Fault analysis by click and link to inaccurate entry
- Practical copy functions
- Context-sensitive online help
- Calculation values and logic functions
- Extensive diagnostic features
- Integrated project documentation

set IT   code IT   connect IT

Module communication

Dedicated line

SWI1-5	4-port Ethernet switch 10/100BaseTx, 4 * RJ-45, port mirroring auto negotiation, auto-MDIX, Isolation 1.5 kV AC
SWI1-6	FO/optical fibre 100BaseFx, Multimode SC/ST, port mirroring + 10/100BaseTx, RJ-45, auto neg., auto-MDIX, Isol. 1.5 kV AC
SWI1-7	Same as SWI1-6 but FO Singlemode SC/ST up to 32 km
SWI2-1	Additional LAN-segment via internal USB link 4-port Ethernet switch such as SWI1-5
SWI2-2	Additional LAN-segment via internal USB link FO/optical fibre and 1-port Ethernet switch such as SWI1-6
SWI2-3	Same as SWI2-2 but FO Singlemode SC/ST up to 32 km
TETRA-1	TETRA radio data transmission, PDA multislot/SDS
RS-485-2	EIA-485 symmetrical, max. 115 kbit/s, 1.2 km
RS-485-3	EIA-485 symmetrical, max. 115 kbit/s, 1.2 km, self-keying
RS-422-2	EIA-422 symmetrical, max. 115 kbit/s, 1.2 km
BBM-1	Baseband max. 19.2 kbit/s, 10 km, up to 8 users
WT12	VFT modem, R&TTE, FSK 1,2 kbit/s, max. 30 km, up to 17 users
WT96	VFT-comp., 9.6 kbit/s, 2-/4-wire max. 20 km, up to 17 users
V24-2	EIA/RS-232, max. 57.6 kbit/s, point-to-point
V24-3	RS-232 redundancy multipoint-to-point, max. 115 kbit/s
V24-4	RJ-45 to ETSI EN 392-300-5, max. 115 kbit/s, point-point
DPM-1	Profibus DP master, 1.2 km, 1 kbytes max. up to 31 users
DPS-1	Profibus DP slave, 1.2 km 386 bytes max.
FO-2	Star coupler serially with 2 FO media converters each, 38.4 kbit/s

Dial-up line

WM336-3	PSTN modem analogue max. 33.6 kbit/s (V.34/V42.bis), 1.5 kV AC
WM336-4	PSTN modem analogue max. 33.6 kbit/s (V.34/V42.bis)
ISDN-1	ISDN terminal adapter B-channel 64 kbit/s (EDSS1, X.31b)
GSM-2	GSM/GPRS Quad-Band, 9600 bit/s /115 kbit/s (V.32/V.110)

Measurand/set point value cards

Measurand inputs

8AE8-2	8 analogue inputs, 8 bit, 0(4) to 20 mA / 0 to 2.5 mA / 0 to 10 V common root, Isolation 3 kV DC
8AE8-3-1	8 analogue inputs, 8 bit, 0(4) to 20 mA / 0 to 10 V, isolated separately, Isolation 3 kV DC
8AE16-3	8 analogue inputs, 16 bit, multi-range ±20/±10/±2,5 mA per channel overflow/underrun ± 110 %, isolated separately, Isol. 3 kV DC

Set point outputs

8AA8-1	8 analogue outputs, 8 bit, 0(4) to 20 mA / 0 to 10 V, common root, insulation 1.5 kV
8AA16	8 analogue outputs, 16 bit, 0(4) to 20 mA or 0 to 10 V, selection by output separately, Isolation 3 kV DC

Signal/command cards

Optocoupler inputs

16OE-5	16 wide range inputs 18...72 V DC/60...130 V DC/150...240 V DC
16OE-6	16 inputs für links to power brakers, wide range inputs 24...60 V DC / 110 V DC / 220 V DC treshold ON at 80%, 5 kV surge pulse signal/logik (S/L) acc. to IEC 61850-3 (h) & EN 60870-2-1 class VW3
16IE-5	16 fast wide range inputs detection 250 µs 18...72 V DC/48 ...130 V DC
CNT1-3	8 meter inputs 10 kHz, 24 V DC
CNT1-5	8 meter inputs 1 kHz, 18...72 V DC/48...130 V DC
8OE-4-110	8 optocoupler inputs, 110 V AC/ DC
8OE-4-230	8 optocoupler inputs, 230 V AC/220 V DC

Relay outputs

16RA-1	16 relay outputs 230 V AC, 1 A, common root
16RA-3	16 relay outputs, 250 V AC, 1 A, isolated separately
16OA-1	16 optocoupler outputs, 24 V DC, 100 mA, insulation 1.5 kV
16OA-3-1	16 FET outputs, 250 V, 130 mA, isolated separately
16OA-3-2	16 FET outputs, 100 V, 320 mA, isolated separately
12RA-1	12 Power relays 220 V DC, 1000 VA ON, 5 A cont., 30 A 0.5 s 5 kV surge pulse signal/logik (S/L), protection class II

Combination and special cards

OERA-5	8 optocoupler inputs, 18...72 V DC, 8 relay outputs, 230 V AC, 1A, common root
EVU2-I	Check-back card for command termination with EVU-2-O Wide range inputs 18...72 V DC/60...110 V DC/220 V DC, common root
EVU2-O-1	1.5-pole command termination with 1-of-n monitoring, 16 single/8 double commands, command and release relays, channel-by-channel coil resistance, tolerance, post command lag time, suppression of imperfection, ext. meas. circuit: 100 - 20 kΩ
EVU2-O-2	2-pole command termination with 1-of-n monitoring 8 single/4 double commands, command and release relays, channel-by-channel coil resistance, tolerance, post command lag time, suppression of imperfection , ext. meas. circuit: 100 - 20 kΩ
EVU2-O-3	Same as EVU-2-O-1 with external measurement circuit: 1 kΩ - 100 kΩ
EVU2-O-4	Same as EVU-2-O-2 with external measurement circuit: 1 kΩ -100 kΩ
EVU-X	Utility expansion card for cascading a utility command group over several module frames, release and locking via closed ring, ½ card format

Isolation 2.5 kV AC signal/logik accord. IEC 60870-2-1 VW3 unless otherwise noted. Isolation 5 kV surge signal/earth via rack.

Technical data: net-line FW-50

Construction	Modular station control, telecontrol and automation system plastic/V2a/alloy module frame with 4/7/14 slots
Configuration	Example: Max. input/output expansion 14 I/O slots (up to 224 dedicated I/O), 2 Ethernet 10/100BaseTx auto-MDIX Example: Max. communication 6 switches integrated with 4 RJ-45 10/100 Mbit/s or FO ST/SC 100 Mbit/s + RJ45 4 serial interfaces, 28 FO linking serially as star coupler 1 communication component e.g. field bus
Input/output	Selection of 50 plug-in cards for: Single-point, double-point, transformer tap signals, measurands and metered values, single/double commands (1.5/2-pole), command termination, 1-of-n monitoring, transformer tap commands, set points, metered value outputs
Protocols	IEC 61850 · IED and protective device coupling IEC 60870-5-101 · telecontrol technology, station control technology IEC 60870-5-103 · protective device coupling IEC 60870-5-104 · TCP/IP coupling to control centre DNP3 server · serial (IP from setIT V5.4) IEC 62056-21 · meter connection (IEC 1107) SML · SyM² meter connection via Ethernet DSfG · interface for natural gas equipment Profibus-DP · master/slave Modbus RTU/TCP · master/slave, MPI/3964R/RK512 · field bus SNMP · network management, NTP/SNTP/DCF clock synchronisation VPN-Tunnel · IPsec [IKEv1/IKEv2] , OpenVPN from setIT V5.4
PLC programming	IEC 61131-3 compatible via codeIT, 128 kb program memory
CPU-5E series5e	RISC processor Cortex-A8, 1200 MIPS@800MHz, FPU, watchdog, real-time clock 1GB memory (512 MB SDRAM, 512 MB SLC Flash)
Memory expansion	optional SD card up to 8 GB, 1 GB up to setIT V5
Real-time clock	Errors max. ±20 ppm over entire temperature range, maintenance-free buffer, Daylight savin changeover, leap year correction
Status displays	CPU: 12 LEDs in front panel, green, red I/O cards: card error, status LED of process data (binary) Interfaces: Send and momentary contact signals depending on card type
Operational controls	PLC switch in front panel RUN/STOP USB pushbutton for configuration/backup/recovery
Programming interface	Ethernet LAN 10/100BaseTx, auto-MDIX, USB device, USB 2.0 host 12 Mbit/s (configuration/archive via memory stick)
Power supply	+24 V DC, +20 %/-15 %, max. 50 W, rated current approx. 200 mA (CPU only), power fail management, failure buffering min. 20 ms, 24 / 48 / 60 V DC to I/O slot (optional value range power adapter) 110 / 220 VB DC / 230 V AC, UPS and external redundant supply
Dielectric strength	5 kV surge, acc. to DIN EN 60870-2-1 class VW3 2.5 kV surge, supply to measurands, EIA / RS-232, USB
Standards	EMC: EN61000-6-2 (03/2000), EN61000-6-4 (03/2000), EN55022, Insulation: DIN EN 60870-2-1, IEC 60255-5 R&TTE: ETSI EN 300328, EN 301489, NSRL: DIN EN 60950
Housing	FW-50 module frame, plastic V0 metal, IP20, width (mm) BGT-M: 228 /BGT-L: 432 /BGT-S: 152, height 173 mm, depth 135 mm
Installation	DIN rail, wall, rear wall, 19" installation rack
Terminals	MSTB screw-type terminal or Combicon spring terminal, 0.2 to 2.5 mm²
Ambience	−20° to +70ºC, others on request, relative humidity < 95% without condensation

Product variants

FW-50-4
4 slots
64 digital I/O*
32 analogue I/O*

FW-50-7
7 slots
112 digital I/O*
56 analogue I/O*

FW-50-14
14 slots
224 digital I/O*
112 analogue I/O*

* Max. values only apply to limited extent, as some extensions use identical resources.

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