

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRU4 | VOLTAGE AND FREQUENCY RELAY

NEW FEATURES - Release 3.6

- VDE-AR-N 4110
- Wattmetric Ground Fault Protection
- IEC 60870-5-104
- SCADApter for Retrofit
- Usability improvements
- IT Security
- Improved Frequency and ROCOF precision*

APPLICATION

The MRU4 is a protection relay which uses the latest Dual-Core-Processor Technology to provide precise and reliable protective functions and is very easy to operate. It is designed to protect electrical equipment from dangerous voltage fluctuations. For example protection against under voltages caused by mains shortcircuits, or overvoltages due to load shedding or failure of a generator voltage controller. Its compact design makes the MRU4 ideal for installation within the LV terminal compartments of compact SF6-insulated MV systems. The protection functions of the MRU4 have been adapted to comply with the requirements of the VDE-AR-N-4110:2018.

ALL INCLUSIVE:

- All protection features inclusive
- Parameter setting software
- Disturbance analysis software

COMPREHENSIVE FREQUENCY PROTECTION PACKAGE

Each of the six elements can be used as:

- f< or f> (over- and underfrequency supervision)
- df/dt (ROCOF) Rate of change of frequency
- (f< and df/dt) or (f> and df/dt) Combination of over-, under- and rate of change of frequency (ROCOF)
- (f< and DF/DT) or (f> and DF/DT) Combination of over-, under- and increase of frequency
- Delta Phi (Vector surge)

SIX ELEMENTS VOLTAGE PROTECTION

- Under- and overvoltage
- Programmable time dependent undervoltage tripping characteristic
- Wattmetric Ground Fault Protection

SLIDING-MEAN-SQUARE SUPERVISION

- Adjustable (VDE-AR 4105)

FRT (LRVT)

- Adjustable LRVT-profiles
- Optionally AR-controlled

FLEXIBLE FOURTH VOLTAGE MEASURING INPUT

- 2 elements VE> or VX (for Synch Check)

*5 mHz from 45-55 Hz

SYNCH CHECK

- Generator-to-System, System-to-System
- Options to switch onto dead bus bars

TWO ELEMENTS RESIDUAL VOLTAGE PROTECTION

- VE>

SIX ELEMENTS VOLTAGE ASYMMETRY SUPERVISION

- Under- and overvoltage in positive phase sequence system, overvoltage in negative phase sequence system

POWER QUALITY

- THD-protection

SUPERVISION

- Voltage transformer supervision
- Trip circuit supervision
- CBF via position indicators

RECORDERS

- Disturbance recorder: 120 s non volatile
- Fault recorder: 20 faults
- Event recorder: 300 events
- Trend recorder: 4000 non volatile entries

PC TOOLS

- Setting and analyzing software Smart view for free
- Including page editor to design own pages

LOGIC

- Up to 80 logic equations for protection, control and monitoring



COMMISSIONING SUPPORT

- USB connection
- Customizable Display (Single-Line, ...)
- Customizable Inserts
- Copy and compare parameter sets
- Configuration files are convertible
- Forcing and disarming of output relays
- Fault simulator
- Graphical display of tripping characteristics
- 8 languages selectable within the relay

COMMUNICATION OPTIONS

- IEC 61850, IEC 60870-5-103, Profibus DP
- IEC60870-5-104
- Modbus RTU and/or Modbus TCP
- DNP 3.0 (RTU, TCP, UDP)
- SCADApter for Retrofit

IT SECURITY

- Menu for the activation of BDEW-Whitepaper-compliant security settings (e.g. hardening of interfaces)
- IT Security Logger
- Syslog (to centralized server)
- Encrypted connection with Smart view

ADDITIONAL HIGHLIGHTS

- Plausibility checks
- Status display
- Comprehensive measured values and statistics
- Masking of unused functions
- Multi-Password-Level

CONTROL

- One breaker
- Breaker wear

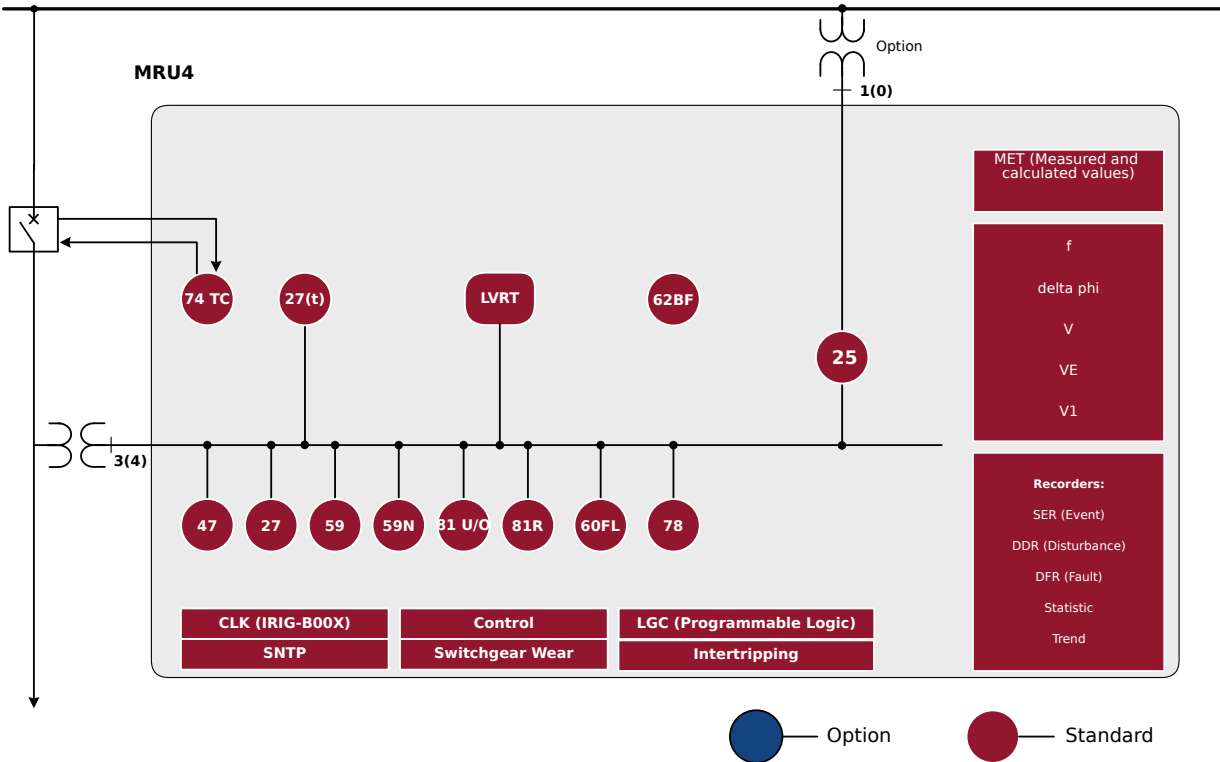
TIME SYNCHRONISATION

- SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC 60870-5-103/-104

FUNCTIONAL OVERVIEW

	Elements	ANSI
Protective Functions		
V _{>} , V _{<} , V _{<(t)} under- and overvoltage protection, programmable time dependent undervoltage tripping characteristic	6	27, 59
FRT (optional coordination with AR-feature)	1	27 (t, AR)
Synchronism check	1	25
Each of the six frequency protection elements can be used as:	6	
→ f _{<} or f _{>} (over- and under frequency supervision)		81U/O
→ df/dt rate of change of frequency (ROCOF)		81R
→ (f _{<} and df/dt) or (f _{>} and df/dt) combination of over-, under- and rate of change of frequency (ROCOF)		
→ (f _{<} and DF/DT) or (f _{>} and DF/DT) combination of over-, under- and increase of frequency		
→ Delta Phi (Vector surge)		78
VE, residual voltage protection	2	59N
Voltage asymmetry supervision (V012)		
V1, under and overvoltage in positive phase sequence system	6	47
V2, overvoltage in negative phase sequence system		
Exp, External alarm and trip functions	4	
10-Minutes-Mean-Square-Sliding Supervision: adjustable according to VDE-AR 4105		
Control and Logic		
Control: Position indication, supervision time management and interlockings for 1 breaker		
Logic: Up to 80 logic equations, each with 4 inputs, selectable logical gates, timers and memory function		
Supervision Functions		
CBF, circuit breaker failure protection (via position indicators)	1	62BF
TCS, trip circuit supervision	1	74TC
VTS, voltage transformer supervision by comparing phase and residual voltages	1	60FL
VTS, fuse failure protection via digital input	1	60FL
THD supervision		

FUNCTIONAL OVERVIEW IN ANSI FORM



APPROVALS



certified regarding UL508 (Industrial Controls)



certified regarding CSA-C22.2 No. 14 (Industrial Controls)



certified by EAC (Eurasian Conformity)



Type tested (and certified) regarding IEC60255-1



(Declaration of Identity)

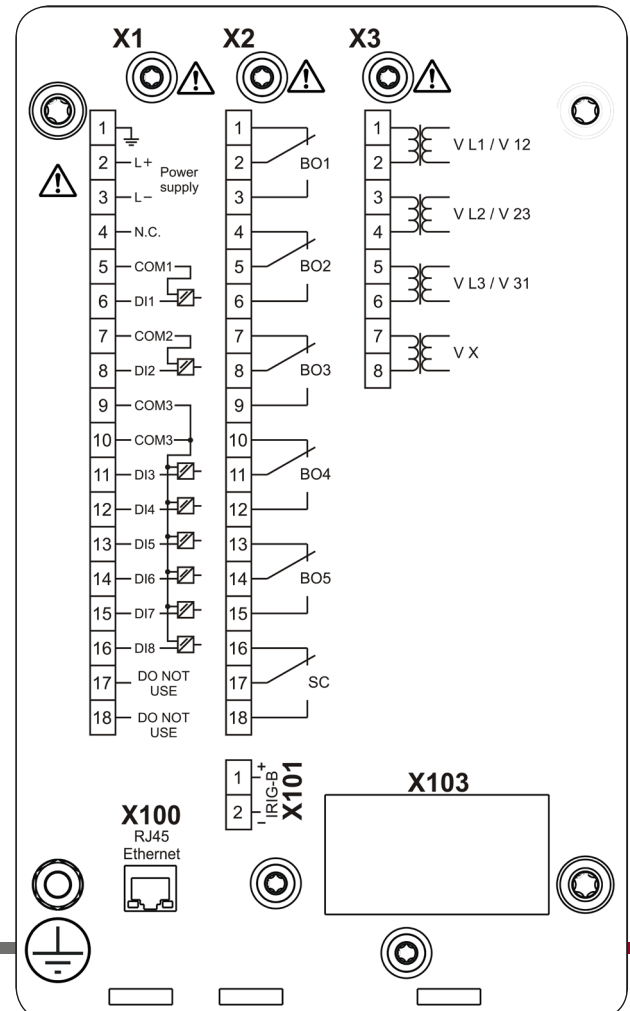


Type Approval Certificate from CQC China

Complies with IEEE 1547-2003
Amended by IEEE 1547a-2014
Complies with ANSI C37.90-2005

Complies with „Engineering Recommendation G59 Issue 3 Amendment 4 - July 2018“

CONNECTIONS (EXAMPLE)



ORDER FORM MRU4

Voltage and Frequency supervision				MRU4	-2	A	0			
Version 2 with USB, enhanced communication and user options										
Digital Inputs	Binary output relays	Housing	Large display							
8	6	B1	-							
Hardware variant										
Standard										
Housing and mounting										
Door mounting									A	
Door mounting 19" (flush mounting)									B	
Communication protocol										
Without protocol									A	
Modbus RTU, IEC 60870-5-103, DNP3.0 RTU RS485/terminals									B*	
Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 Ethernet 100 MB/RJ45									C*	
Profibus-DP optic fiber/ST-connector									D*	
Profibus-DP RS485/D-SUB									E*	
Modbus RTU, IEC 60870-5-103, DNP 3.0 RTU optic fiber/ST-connector									F*	
Modbus RTU, IEC 60870-5-103, DNP 3.0 RTU RS485/D-SUB									G*	
IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 Ethernet 100MB/RJ45									H*	
IEC 60870-5-103, Modbus RTU, DNP 3.0 RTU RS485/terminals									I*	
Modbus TCP, DNP 3.0 TCP/UDP, IEC60870-5-104 Ethernet 100 MB/RJ45										
IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 Optical Ethernet 100MB/LC duplex connector									K*	
Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 Optical Ethernet 100MB/LC duplex connector									L*	
IEC 60870-5-103, Modbus RTU, DNP 3.0 RTU RS485/terminals										T*
IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC60870-5-104 Ethernet 100 MB/RJ45										
Harsh Environment Option										
None									A	
Conformal Coating									B	
Available menu languages (in every device)										
English / German / Spanish / Russian / Polish / Portuguese / French / Romanian										

* Within every communication option only one communication protocol is usable. Smart view can be used in parallel via the Ethernet interface (RJ45).

The parameterizing- and disturbance analyzing software Smart view is included in the delivery of HighPROTEC devices.

Voltage inputs	4 (0–800 V) with automatic CT Disconnect
Digital inputs	Switching thresholds adjustable via software
Power supply	Wide range power supply 24 V _{DC} – 270 V _{DC} / 48 V _{AC} – 230 V _{AC} (–20/+10%)
Terminals	All terminals plug type
Mounting	Door mounting
Type of enclosure (Front)	IP54
Dimensions of housing (W × H × D)	19" flush mounting: 141.5 mm × 173 mm × 209 mm 5.571 in. × 6.811 in. × 8.228 in. Door mounting: 141.5 mm × 183 mm × 209 mm 5.571 in. × 7.205 in. × 8.228 in.
Weight (max. components)	approx. 2.4 kg

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