SEG electronics

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRU4 | VOLTAGE AND FREQUENCY RELAY

NEW FEATURES – RELEASE 3.7

- VDE-AR-N 4110; VDE-AR-N 4120
- G99 Issue 1 Amendment 6
- Improved frequency and ROCOF precision
- Improved design of the PC tools
- Configurable SCADA protocols:
- Modbus, Profibus, IEC 60870-5-103/-104, DNP3

All HighPROTEC devices have been type tested and certified by KEMA Laboratories (IEC 60255-1:2009).

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 without extra charge
- Parameter setting and evaluation software
- Disturbance record 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

SIX ELEMENTS VOLTAGE ASYMMETRY SUPERVISION

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

ADDITIONAL HIGHLIGHTS

- Two Elements Residual Voltage Protection VE>
- Flexible Fourth Voltage measuring input 2 elements VE> or VX (for Synchrocheck)
- Sliding-Mean-Square Supervision , adjustable (VDE-AR 4105)
- FRT (LVRT), adjustable LVRT-profiles, optionally AR-controlled
- Synchrocheck: Generator-to-System, System-to-System, options to switch onto dead bus bars
- 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 Control pages
- SCADApter to re-assign datapoints for Retrofit projects: Modbus, Profibus, IEC 60870-5-103/ -104

CONTROL

- 1 breaker
- Breaker wear

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
- Integrated fault simulator
- Graphical display of tripping characteristics
- 8 languages selectable within the relay

COMMUNICATION OPTIONS

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

CYBER SECURITY

- Menu for the activation of security settings (e. g. hardening of interfaces)
- Security Logger
- Centralized Security Logs (Syslog)
- Encrypted Connection Smart view – Device
- Device specific certificates (No man in the middle attacks)

LOGIC

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

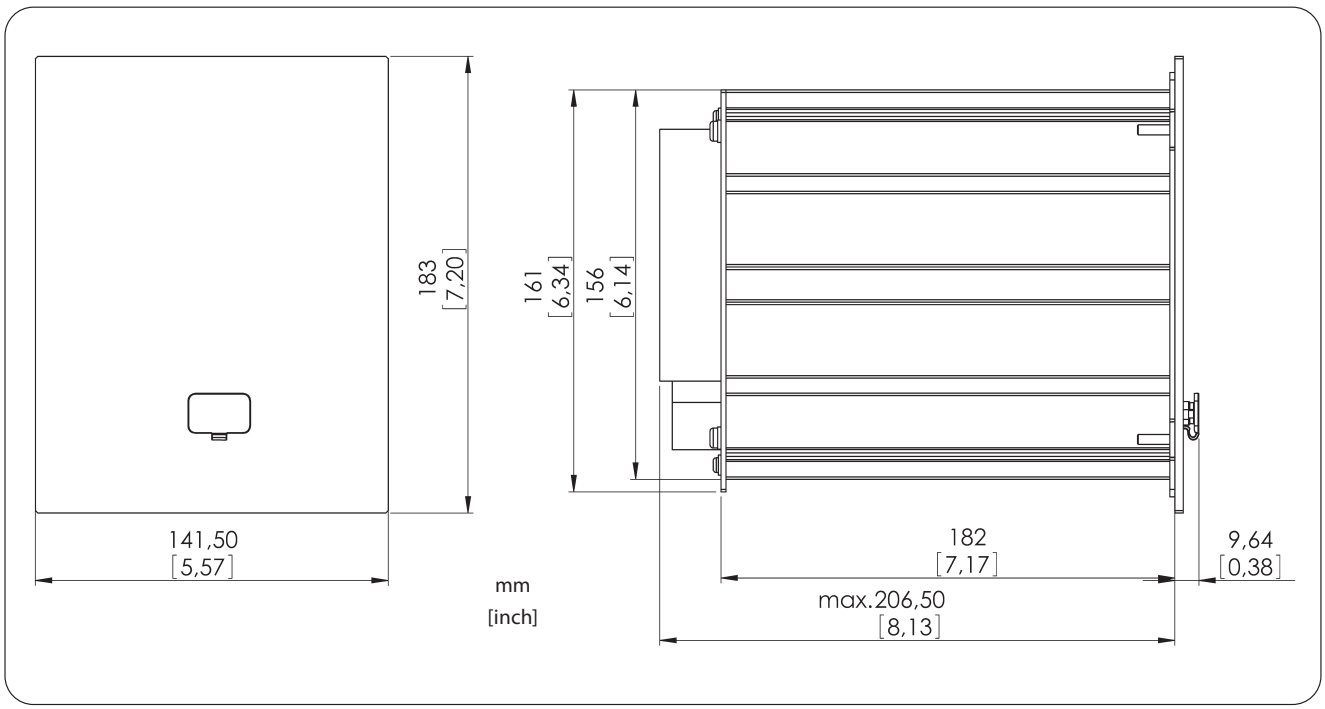
TIME SYNCHRONISATION

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

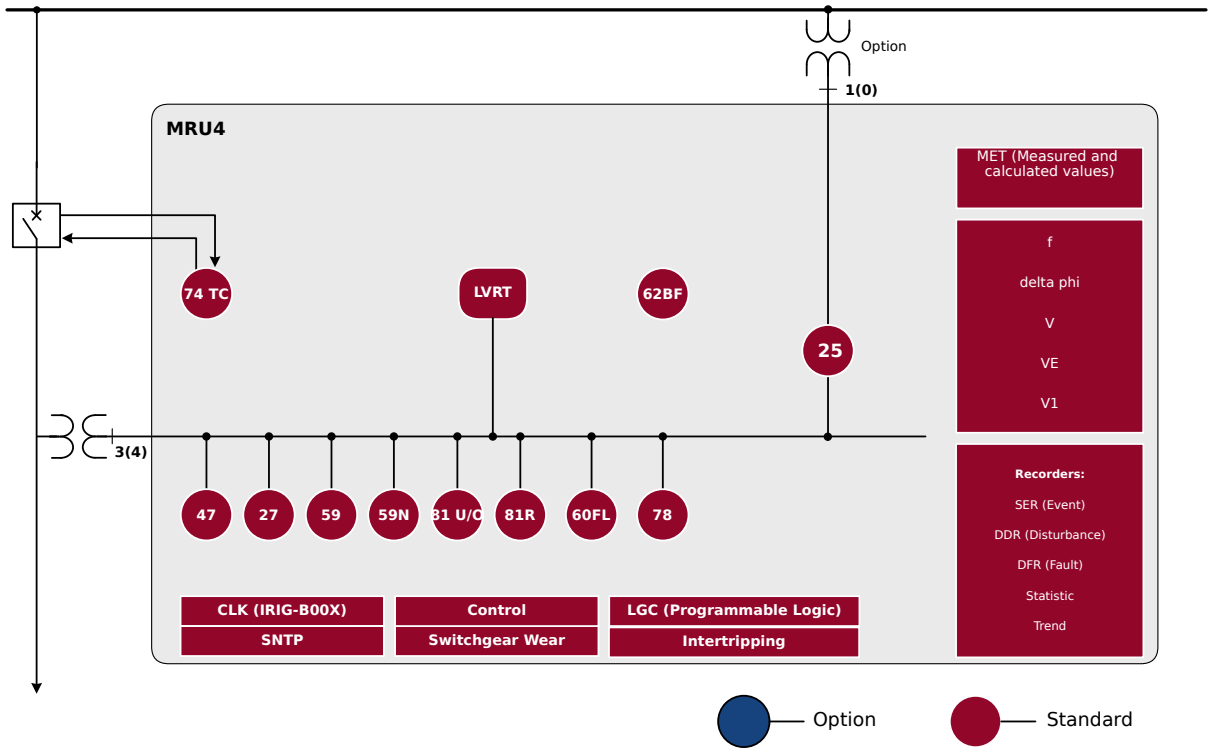
FUNCTIONAL OVERVIEW

	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 V2, overvoltage in negative phase sequence system	6	47
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		

DIMENSIONS OF THE DEVICE VARIANT FOR DOOR MOUNTING



FUNCTIONAL OVERVIEW IN ANSI / IEEE C37.2 FORM



APPROVALS / STANDARDS

certified regarding UL508
(Industrial Controls)

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

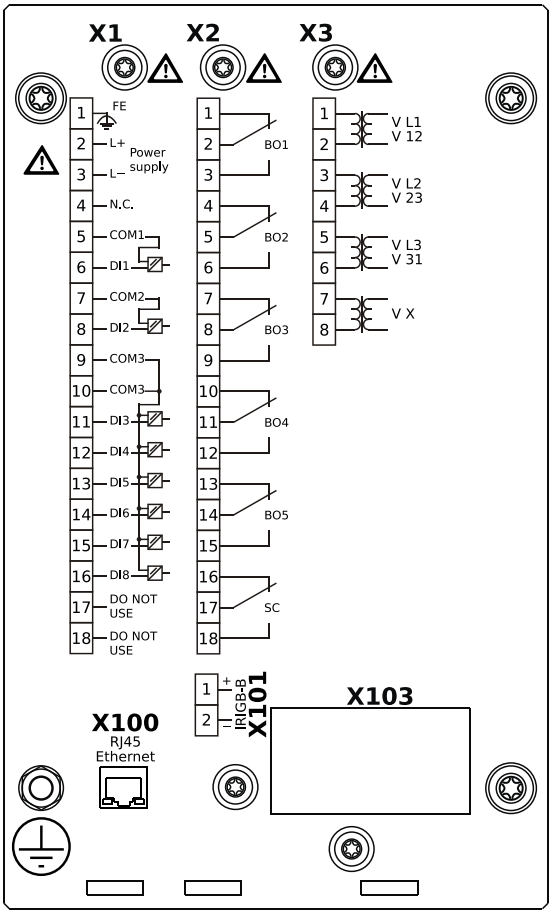
certified by EAC
(Eurasian Conformity)

Type tested and certified by KEMA Laboratories in accordance with the complete type test requirements of IEC 60255-1:2009.

Component certificate regarding the German grid code standard VDE-AR-N 4110 (2018-11)
Component certificate regarding the German grid code standard VDE-AR-N 4120 (2018-11)

KESCO
동일성 선언서
(Declaration of Identity)

CONNECTIONS (EXAMPLE)



Complies with "Engineering Recommendation G99 Issue 1 Amendment 6 - March 2020".
Complies with IEEE 1547-2003.
Amended by IEEE 1547a-2014.
Complies with ANSI C37.90-2005.

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							
Housing suitable for door mounting				A			
Housing suitable for 19" rack 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* Modbus TCP, DNP 3.0 TCP/UDP, IEC60870-5-104 | *Ethernet 100 MB/RJ45*					I*		
IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 | *Optical Eth. 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* IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC60870-5-104 | *Ethernet 100 MB/RJ45*					T*		
Harsh Environment Option							
None						A	
Conformal Coating						B	
Special Standards-Related Packages							
None							
G99 Type-Tested Variant (based on a special EREC-G99-adapted Release 3.6)							+G
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)	
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	
Type of enclosure (Front)	IP54	
Dimensions of housing (W x H x D)	19" flush mounting:	141.5 mm × 173 mm × 208 mm 5.571 in. × 6.811 in. × 8.228 in.
	Door mounting:	141.5 mm × 183 mm × 208 mm 5.571 in. × 7.205 in. × 8.228 in.
Weight (max. components)	approx. 2.4 kg / 5.29 lb	

19 " Variants Available! **

https://docs.SEGelectronics.de/hpt-2

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