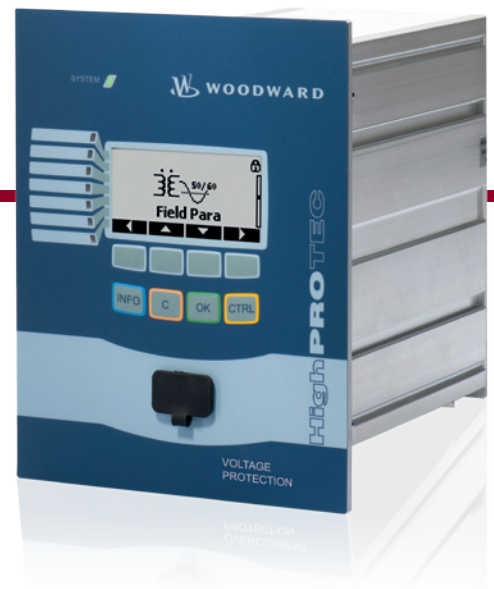


# HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

## MRU4 | VOLTAGE AND FREQUENCY RELAY



### 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.

### ALL INCLUSIVE:

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

### COMPREHENSIVE FREQUENCY PROTECTION PACKAGE

Each of the six stages 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 STAGES VOLTAGE PROTECTION

- Under- and overvoltage
- Programmable time dependent undervoltage tripping characteristic

### SLIDING-MEAN-SQUARE SUPERVISION

- Adjustable (VDE-AR 4105)

### FRT (LRVT)

- Adjustable LRVT-profiles
- Optionally AR-controlled

### FLEXIBLE FOURTH VOLTAGE MEASURING INPUT

- 2 stages VE> or VX (for synch-check)

### SYNCHRO-CHECK

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

### TWO STAGES RESIDUAL VOLTAGE PROTECTION

- VE>

### SIX STAGES 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

### ADDITIONAL HIGHLIGHTS

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

### RECORDERS

- Disturbance recorder, 120 s non volatile
- Fault recorder
- Event recorder
- Trend recorder: 4000 non volatile entries

### COMMISSIONING SUPPORT

- Copy and compare parameter sets
- Configuration files are convertible
- Forcing and disarming of output relays
- Fault simulator

### COMMUNICATION OPTIONS

- IEC61850
- Profibus DP
- Modbus RTU or Modbus TCP
- IEC60870-5-103

### CONTROL

- one switchgear
- Switchgear wear

### LOGIC

- Up to 80 logic equations

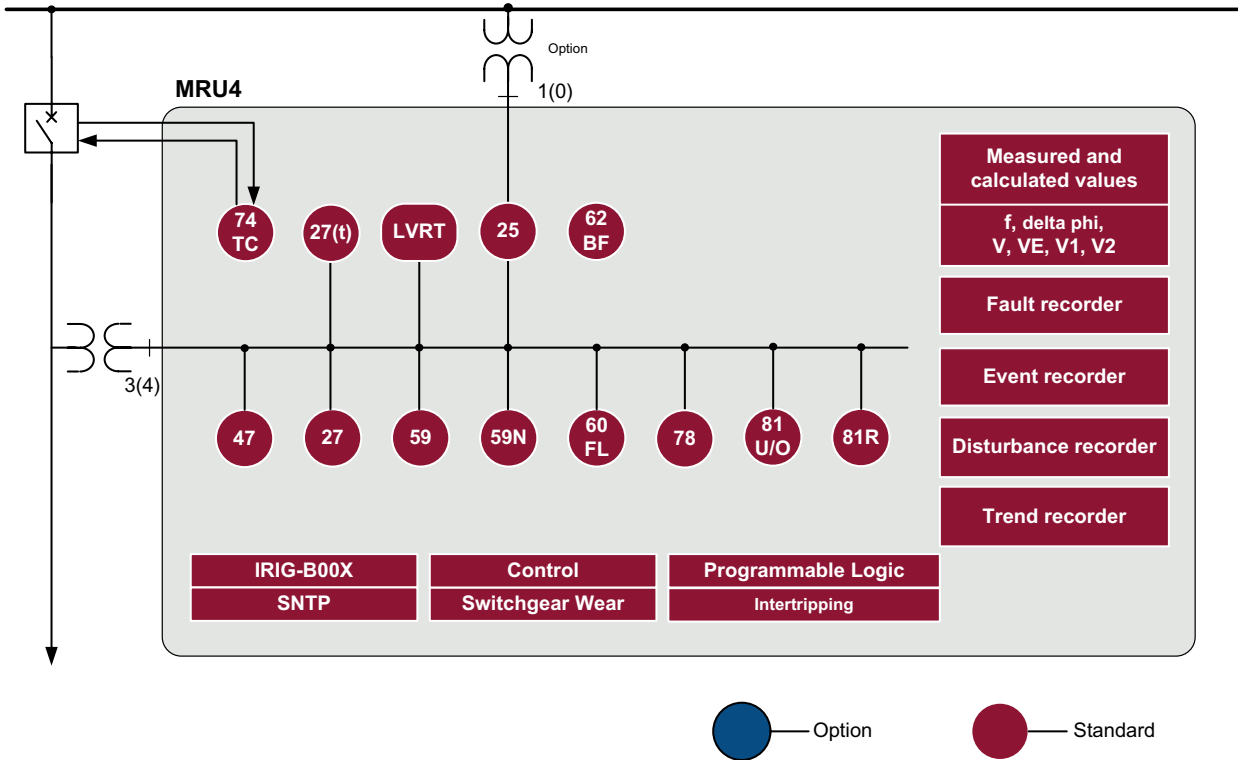
### TIME SYNCHRONISATION

- SNTP or IIRIG-B00X

**FUNCTIONAL OVERVIEW**

	Elements	ANSI
<b>Protective Functions</b>		
V <sub>&gt;</sub> , V <sub>&lt;</sub> , V <sub>&lt;(t)</sub> 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 stages can be used as:	6	
→ f <sub>&lt;</sub> or f <sub>&gt;</sub> (over- and under frequency supervision)		81U/O
→ df/dt rate of change of frequency (ROCOF)		81R
→ (f <sub>&lt;</sub> and df/dt) or (f <sub>&gt;</sub> and df/dt) combination of over-, under- and rate of change of frequency (ROCOF)		
→ (f <sub>&lt;</sub> and DF/DT) or (f <sub>&gt;</sub> 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		
<b>Control and Logic</b>		
Control: Position indication, supervision time management and interlockings for 1 switchgear		
Logic: Up to 80 logic equations, each with 4 inputs, selectable logical gates, timers and memory function		
<b>Supervision Functions</b>		
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)

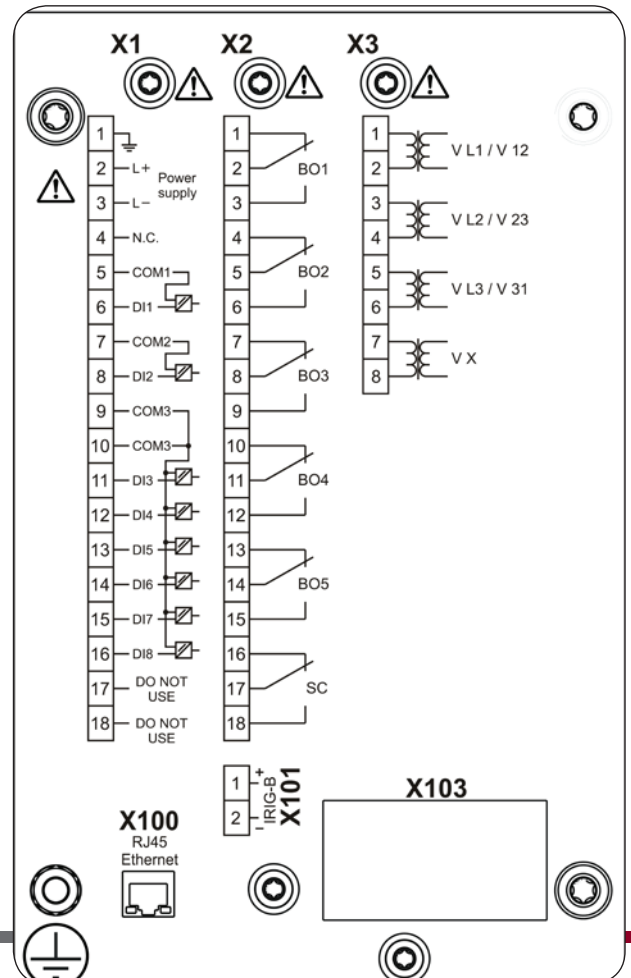


certified by EAC  
(Eurasian Conformity)



Type tested (and certified)  
regarding IEC60255-1

## CONNECTIONS



**ORDER FORM MRU4**

Voltage and Frequency supervision			MRU4			
Digital Inputs	Binary output relays	Housing				
8	6	B1	A			
<b>Hardware variant 2</b>						
Standard				0		
<b>Housing and mounting</b>						
Door mounting					A	
Door mounting 19" (flush mounting)					B	
<b>Communication protocol</b>						
Without protocol					A	
Modbus RTU, IEC60870-5-103, RS485/terminals					B	
Modbus TCP, Ethernet 100 MB/RJ45					C	
Profibus-DP, optic fibre					D	
Profibus-DP, RS485/D-SUB					E	
Modbus RTU, IEC60870-5-103, optic fiber					F	
Modbus RTU, IEC60870-5-103, RS485/D-SUB					G	
IEC61850, Ethernet 100MB/ RJ45					H	
<b>Presetting of available menu languages</b>						
English/German/Russian/Polish/Portuguese/French						

All devices are equipped with IRIG-B interface.

ANSI: 27, 59, 59N, 62BF, 81U/O, 60FL, 47, 86, 74TC, 81R, 78, ROCOF, LVRT

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

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



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