PRICE LIST 2015/2016

IPCS

INTEGRATED PACKAGE CONTROL SOLUTIONS

GENSET CONTROLLERS | SYNCHRONIZERS | PROTECTION RELAYS

POWER GENERATION AND DISTRIBUTION EXPERTS

WOODWARD

GENSET CONTROLLERS

SYNCHRONIZERS & LOAD SHARE CONTROLLERS

AUTOMATIC TRANSFER SWITCH CONTROLLERS

PROTECTION RELAYS

ACCESSORIES & SERVICES

General terms and conditions

This Price List will be valid from 1st. October 2015 until a new Price List is published. All previous price lists shall no longer be valid. In case of exceptionally moving market prices, we reserve the right to align prices as well. All prices are quoted in US $. We supply and ship in accordance with our General terms and conditions. These as well as our warranty and repair conditions are available on request.

This list covers all products from the Woodward product segment Power Generation & Distribution, with standard technical values. For different values and special devices we will be pleased to receive your enquiry.

All prices are subject to the statutory value incl. package added tax (VAT) and added shipping and handling which will be invoiced separately at the currently applicable rate. Any discounts granted shall not be applicable to our general technical service or any additional services.

Prices marked with "+" are additional prices.

This price list subjects to modifications and errors. The illustrations are not binding.

Please Note: The instructions for the use of the listed products are provided ONLY electronically (no print version). A computer with CD-ROM drive and pdf-Reader is required. A pdf-Reader can e.g. be downloaded from www.adobe.com.

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WOODWARD WORLDWIDE

Woodward may have a global presence, but we have a local mindset. That means our customers benefit from prompt support wherever in the world they're located. But they also can count on our understanding of local issues and our commitment to the communities in which we live and work.

Our internal teams are comprised of employees from many locations as well – encouraging fresh ideas, offering a variety of views on how to meet new challenges, and providing our employees the opportunity to make a worldwide impact. Woodward's plants, offices, and service centers span the globe:

North and Central America, South America, Europe, Middle East and Africa, Russia, China, India, ASEAN and Oceania.

Our global presence allows us to respond quickly to the needs of our customers. Customers and the industry at large recognize our people as a competitive advantage through their diverse representation of the global community. Additionally, as a company and as employees, we respond to the needs of our local communities by donating our time, talent, and money.

DISTRIBUTORS & SERVICE

Woodward has an international network of distributors and service facilities. For distributor information, visit us at:

>> *www.woodward.com/directory*

GENSET CONTROLLERS

The **easYgen-3000 Series** is an exceptionally versatile genset control and protection package with all the flexibility and features needed to fit a wide range of power generation applications. It allows the user to standardize on a single, affordable control for many uses – from standalone emergency generators to isochronous parallel operation of up to 32 gensets. Common applications include emergency standby, cogeneration, marine ship/shore power, island prime power or utility paralleling with peak shaving, and import/export control.

EASYGEN-3000 SERIES

The **easYgen-2000 Series** is a compact, affordable genset control and protection package for load sharing up to 16 gensets in island operation, or parallel operation of a single unit with a utility. Its integrated load-dependent start/stop programming allows you to define how gensets are brought on- and off-line to support changing load demands. It even works with a mix of different sized engines, so you can maintain the spinning reserve you need while optimizing fuel efficiency.

EASYGEN-2000 SERIES

The innovative features of the **easYgen-1000 Series**, including flexible breaker configuration and start/stop logic, real and reactive power sensing, and remote-start capability make it the intelligent choice for specialized mobile power and emergency standby applications.

EASYGEN-1000 SERIES

EASYGEN SERIES
FEATURE OVERVIEW

Genset Controllers

		3500			
		P1	P2	Marine	Rental
MEASURING	**ANSI**				
Generator voltage (3-phase/4-wire)		•	•	•	•
Generator current (3x true r.m.s.)		•	•	•	•
Mains voltage (3-phase/4-wire)		•	•	•	•
Mains or ground current (1x true r.m.s.)		•	•	•	•
Busbar voltage (1-phase/2-wire)		•	•	•	•
CONTROL					
Breaker control logic (open and closed transition) *FlexApp™*		3	3	3	3
Number of supported Woodward LS-5 units		16	16	16	16
Automatic, Manual, Stop, and test operating modes		•	•	•	•
Single and multiple-unit operation		•	•	•	•
Paralleling operation (up to 32 units)		•	•	•	•
AMF (auto mains failure) and stand-by operation		•	•	•	•
Critical mode operation		•	•	•	•
GCB and MCB synchronization (slipping / phase matching)		•	•	•	•
GGB (Generator group breaker) control		•	•	•	•
Run-up synchronization		•	•	•	•
Interchange (import / export control)		•	•	•	•
Load-dependent start/stop		•	•	•	•
n/f, V, P, Q, and PF remote control via analog input or interface		•	•	•	•
Load/var sharing for up to 32 gensets		•	•	•	•
Freely configurable PID controllers		3	3	3	3
HMI					
Color Display with Softkey operation *DynamicsLCD™*		•	•	•	•
Start/stop logic for diesel / gas engines		•	•	•	•
Counters for operating hours / starts / maintenance / active/reactive energy		•	•	•	•
Counter for period of use					•
Configuration via PC		•	•	•	•
Event recorder entries with real time clock (battery backup)		300	300	300	300
PROTECTION					
Generator: voltage / frequency	59 / 27 / 81O / 81U	•	•	•	•
Generator: overload, reverse/reduced power	32 / 32R / 32F	•	•	•	•
Generator: unbalanced load	46	•	•	•	•
Generator: instantaneous overcurrent	50	•	•	•	•
Generator: time-overcurrent (IEC 255 compliant)	51	•	•	•	•
Generator: ground fault	50G	•	•	•	•
Generator: power factor	55	•	•	•	•
Generator: rotation field		•	•	•	•
Engine: overspeed / underspeed	12 / 14	•	•	•	•
Engine: speed / frequency mismatch		•	•	•	•
Engine: D+ auxiliary excitation failure		•	•	•	•
Engine: Cylinder temperature		•	•	•	•
Mains: voltage / frequency	59 / 27 / 81O / 81U	•	•	•	•
Mains: phase shift / rotation field / df/dt (ROCOF)	78	•	•	•	•
I/OS					
External switch for parameter set selection (1 of 4)					•
Speed input (magnetic / switching; Pickup)		•	•	•	•
Discrete alarm inputs (configurable)		12 (9)	23 (20)	12 (10)	12 (10)
Discrete outputs (configurable) *LogicsManager™*		max. 12	max. 22	max. 12	max. 12
External discrete inputs / outputs via CANopen (maximum)		32 / 32	16 / 16	32 / 32	32 / 32
Analog inputs (configurable) *FlexIn™*		3	10	3	3
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)		2	5	2	2
External analog inputs / outputs via CANopen (maximum)		16 / 4		16 / 4	16 / 4
Display and evaluation of J1939 analog values (supported SPNs)		100	100	100	100
CAN bus communication interfaces *FlexCAN™*		3	3	3	3
RS-232/485 Modbus RTU Slave interface(s)		1 / 1	1 / 1	1 / 1	1 / 1



3400				3200		3100	
P1	P2	Marine	Rental	P1	P2	P1	P2
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
3	3	3	3	2	2	2	2
16	16	16	16				
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
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3	3	3	3		3		3
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•	•	•	•	•	•	•	•
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•	•	•	•	•	•	•	•
300	300	300	300	300	300	300	300
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•	•	•	•	•	•	•	•
12 (9)	23 (20)	12 (10)	12 (10)	12 (10)	12 (10)	12 (10)	12 (10)
max. 12	max. 12	max. 12	max. 12	max. 12	max. 12	max. 12	max. 12
32 / 32	16 / 16	32 / 32	32 / 32	32 / 32	32 / 32	32 / 32	32 / 32
3	10	3	3	3	3	3	3
2	5	2	2	2	2	2	2
16 / 4		16 / 4	16 / 4		16 / 4		16 / 4
100	100	100	100	100	100	100	100
3	3	3	3	2	2	2	2
1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1

EASYGEN SERIES
FEATURE OVERVIEW

Genset Controllers

		2500		2300	
		P1	Rental	P1	P2
MEASURING	**ANSI**				
Generator voltage (3-phase/4-wire)		•	•	•	•
Generator current (3x true r.m.s.)		•	•	•	•
Mains voltage (3-phase/4-wire)		•	•	•	•
Mains or ground current (1x true r.m.s.)		•	•		
CONTROL					
Different breaker operation modes		•	•	•	•
Automatic, Manual, Stop, and test operating modes		•	•	•	•
Single unit mains parallel operation		•	•	•	•
Multiple-unit island parallel operation (up to 16 units)		•	•	•	•
AMF (auto mains failure)		•	•	•	•
Stand-by operation		•	•	•	•
Critical mode operation		•	•	•	•
GCB and MCB synchronization (slipping / phase matching)		•	•	•	•
Open (break-before-make) and closed (make-before-break) transition		•	•	•	•
Interchange (import / export control)		•	•	•	•
Load-dependent start/stop		•	•	•	•
n/f, V, P, Q, and PF remote control via analog input or interface		•	•	•	•
Load/var sharing for up to 16 gensets		•	•	•	•
HMI					
Soft keys (advanced LC display)		•	•	•	•
Start/stop logic for diesel / gas engines		•	•	•	•
Generator kWh meter		•	•	•	•
Operating hours/start/maintenance counter		•	•	•	•
Counter for period of use			•		
Configuration via PC		•	•	•	•
Event recorder entries with real time clock (battery backup)		300	300	300	300
PROTECTION					
Generator: voltage / frequency	59 / 27 / 81O / 81U	•	•	•	•
Generator: overload, reverse/reduced power	32 / 32R / 32F	•	•	•	•
Generator: unbalanced load	46	•	•	•	•
Generator: instantaneous overcurrent	50	•	•	•	•
Generator: time-overcurrent (IEC 255 compliant)	51	•	•	•	•
Generator: ground fault	50G	•	•	•	•
Generator: power factor	55	•	•	•	•
Generator: rotation field		•	•	•	•
Engine: overspeed / underspeed	12 / 14	•	•		• (via ECU)
Engine: speed / frequency mismatch		•	•		•
Engine: D+ auxiliary excitation failure		•	•	•	•
Mains: voltage / frequency	59 / 27 / 81O / 81U	•	•	•	•
Mains: phase shift / rotation field / df/dt (ROCOF)	78	•	•	•	•
I/OS					
External switch for parameter set selection (1 of 4)			•		
Speed input (magnetic / switching; Pickup)		•	•		
Discrete alarm inputs (configurable)		10	10	8	8
Discrete outputs (configurable) *LogicsManager™*		11	11	6	6
External discrete inputs / outputs via CANopen (maximum)		16/16	16/16	16/16	16/16
Analog inputs (configurable) *FlexIn™*		4	4	3	3
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)		4	4	2	2
CAN bus communication interfaces *FlexCAN™*		2	2	1	2
RS-485 Modbus RTU Slave interface		1	1	1	
Service Port (USB or RS-232) - Woodward DPC cable required		•	•	•	•

2200		1500
P1	P2	
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8	8	max. 8
6	6	max. 8
16 / 16	16 / 16	
3	3	2
1	1	
1	2	•
		1 / 0
•	•	•

EASYGEN SERIES
PRICES

Genset Controllers

easYgen-3000 Series for Complex Breaker Applications

		Type	Part Number (P/N)
EASYGEN-3500	*product spec 37523*		
Package P1		5 A	8440-1934
		1 A	8440-1935
Package P2		5 A	8440-1936
		1 A	8440-1937
Asynchron KIT-3000	*product spec 37568*	5 A	8923-2073
Marine Package P1	*product spec 37533*	5 A	8440-2047
		1 A	8440-2046
Rental Package	*product spec 37553*	5 A	8440-2030
		1 A	8440-2095
EASYGEN-3400	*product spec 37523*		
Package P1		5 A	8440-1945
		1 A	8440-1956
Package P2		5 A	8440-2078
		1 A	8440-2079
Marine Package P1	*product spec 37533*	5 A	8440-2045
		1 A	8440-2044
Rental Package	*product spec 37553*	5 A	8440-2163
		1 A	8440-2162
EASYGEN-3200	*product spec 37258*		
Package P1		5 A	8440-2050
		1 A	8440-2049
Package P2		5 A	8440-2052
		1 A	8440-2051
EASYGEN-3100	*product spec 37258*		
Package P1		5 A	8440-2054
		1 A	8440-2055
Package P2		5 A	8440-2056
		1 A	8440-2057

easYgen-2000 Series for Multiple Unit Operation

		Type	Part Number (P/N)
EASYGEN-2500	*product spec 37548*		
Package P1		5 A	8440-1884
		1 A	8440-1860
Asynchron KIT-2000	*product spec 37568*	5 A	8923-2074
Rental Package	*product spec 37553*	5 A	8440-2029
		1 A	8440-2096
EASYGEN-2300	*product spec 37548*		
Package P1		5 A	8440-2080
Package P2		5 A	8440-2058
EASYGEN-2200	*product spec 37548*		
Package P1		5 A	8440-1855
		1 A	8440-1856
Package P2		5 A	8440-1857
		1 A	8440-1858

easYgen-1000 Series for Single Unit Operation

		Type	Part Number (P/N)
EASYGEN-1500	*product spec 37180*		
		5 A	8440-1809
		1 A	8440-1810

RELATED DEVICES

The **LS-511/521** circuit breaker control and protection device is designed to enable complex power management applications with multiple segments and bus breakers in combination with easYgen-3400/3500-equipped genset controllers. The LS-5 devices manage synchronization, loading and unloading on each bus segment, and send the required voltage and frequency references via CAN bus to the easYgen-3400/3500 genset controllers. It can be used as a sync-check relay in stand-alone mode without easYgens.

LS-5 SERIES

The **RP-3000** is a remote control and annunciation panel for use with the back-panel mounted easYgen-3100/3400 or door-mounted easYgen-3200/3500 genset controllers. The RP-3000 is an ideal solution for door-mounted applications, providing control from the front panel with greatly reduced wiring to the access door, while keeping high-voltage connections located safely on the back panel. The RP-3000 allows remote control and visualization.

RP-3000

The **easYlite-100** is designed to remotely display the status of a generator control system through a CAN BUS Interface. The easYlite-100 may be used where an additional status display is required, which is directly controlled by the generator control unit.

EASYLITE-100

The **IKD 1** is an I/O expansion board. It allows an additional eight discrete inputs and eight relay outputs to be connected via CAN bus to the Woodward generator set controllers series GCP-30 and easYgen. It is possible to connect multiple IKD 1 cards to each of the genset controllers. The IKD1 will be programmed via a PC configuration tool. Configuration of text name for the I/O, alarm classes, Normally Open (NO) and Normally Closed (NC) relay contact configuration and delay timers are possible. The I/O will be displayed in clear text messages on the genset controllers HMI and can be used for further processing.

IKD 1

The **Load Share Gateway (LSG)** is a communication converter specifically designed to operate the easYgen-2000 / easYgen-3000 Series and any other industrial legacy devices in a load share network. You are able to connect any analog load share controller to the easYgen genset controllers. This feature supports you for retrofit business by expanding your existing load share technology by our genset controller lines. Due to the flexibility in our software you are also able to maintain basic-load-dependent start/stop sequences, if needed.

LSG

RELATED DEVICES
PRICES

LS-5 Series Feature Overview

		LS-521		LS-511	
		-	Marine	-	Marine
CONTROL	ANSI				
Automatic, Manual, Stop, and test operating modes		•	•	•	•
GCB and MCB synchronization (slipping / phase matching)		•	•	•	•
HMI					
Color Display / Softkey operation *DynamicsLCD™*		•	•		
Configuration via PC		•	•	•	•
Event recorder entries with real time clock (battery backup)		•	•	•	•
PROTECTION					
Generator: voltage / frequency	59 / 27 / 810 / 81U	•	•	•	•
Mains: voltage / frequency	59 / 27 / 810 / 81U	•	•	•	•
Mains: phase shift / rotation field / df/dt (ROCOF)	78	•	•	•	•
I/OS					
Discrete alarm inputs (configurable)		8	8	8	8
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)		6	6	6	6
CAN bus communication interfaces *FlexCAN™*		1	1	1	1
RS-485 Modbus RTU Slave interface		•	•	•	•

LS-5 Series Circuit Breaker Control & Protection

		Type	Part Number (P/N)
LS-521	*product spec 37522*		
		5 A	8440-1947
		1 A	8440-1952
Marine	*product spec 37545*	5 A	8440-2075
		1 A	8440-2074
LS-511	*product spec 37522*		
		5 A	8440-1946
		1 A	8440-1951
Marine	*product spec 37545*	5 A	8440-2077
		1 A	8440-2076

RP-3000 Remote Panel

		Type	Part Number (P/N)
RP-3000	*product spec 37446*		
		easYgen-3100/3200	8446-1048
		easYgen-3400/3500	
		easYgen-3400/3500 Marine	8446-1046
		easYgen-3500-P1-K32	8446-1059

RELATED DEVICES
PRICES

Genset Controllers

easYlite-100 Remote Annunciator

		Type	Part Number (P/N)
EASYLITE-100	*product spec 37279*		
			8446-1023

actiVgen

		Type	Part Number (P/N)
ACTIVGEN	*product spec 03419*		
		-	8440-2100

LSG Load Share Gateway

		Type	Part Number (P/N)
LSG	*product spec 37451*		
		Active Power (P)	8444-1075
		Reactive Power (Q)	8444-1074

Other Related Devices

		CLICK FOR MORE INFORMATION
RELATED DEVICES WOODWARD		
ESENET Ethernet Gateway	*Application Note 37576*	>>
ESEPRO Profibus Gateway	*Application Note 37577*	>>
EPU-100 Remanence Voltage Converter for Asynchronous Generators	*product spec 37562*	>>
IKD 1 Digital I/O Expansion Board	*product spec 37171*	>>
DPC Direct Configuration Cable		>>
IXXAT USB-TO-CAN Converter		>>
Power Generation Learning Module	*product spec 03412*	>>
CAN-Fiber Optic Gateways	*Application Note 37598*	>>
RELATED DEVICES OTHER SUPPLIERS		
NETBITER Remote Communication Gateway - HMS		>>
Thermocouple Scanner - Axiomatic		>>
Analog Expansion Card - Phoenix		>>
POWER GENERATION SMALL PARTS		>>

SYNCHRONIZERS & LOAD SHARE CONTROLLERS

The **DSLC-2 control** is a microprocessor-based synchronizer and load control designed for use on three-phase AC generators. The DSLC-2 control combines synchronizer, load sensor, load control, dead bus closing system, var, power factor and process control, all integrated into one powerful package. Applications allow up to 32 generators to be precisely paralleled and controlled. A dedicated Ethernet system provides seamless communications between DSLC-2 and MSLC-2 units. A second Ethernet port is provided for customer remote control and monitoring capability using Modbus TCP allowing easy DCS and PLC interfacing. Modbus RTU is available through a separate RS-485 port.

DSLC-2

The **MSLC-2 control** is a microprocessor-based load control designed for three-phase electric power generation sites equipped with the DSLC-2 digital synchronizer and load control. The original MSLC has been blended with another decade of application experiences to develop the new MSLC-2. The MSLC-2 is a synchronizer, a utility load sensor, an import/export load level control, a power factor control, and a master process control. Applications include power systems which operate in parallel with the utility with single or multiple utility feeds as well as new capabilities for multiple segment and intertia breaker control.

MSCL-2

Woodward's **SPM-A** speed and phase matching synchronizer provides automatic frequency and phase matching when used with 2301, 2301A, and EPG (Electrically Powered Governor) electric load sharing control systems.

SPM-A

Woodward makes models of its **Load Sharing Module** for use with engines equipped with speed controls that accept a ±3 Vdc speed setting input, a 0.5 to 4.5 Vdc input, or a PWM (pulse-width-modulated) input. The Load Sharing Module allows use of Woodward power generation accessories and allows load sharing between engines equipped with speed controls that are not manufactured by Woodward and engines controlled with Woodward electronic controls, or controls using other Woodward load sharing modules.

LSM

The **SPM-D10 Series** are microprocessor-based synchronizers designed for use on threephase AC generators equipped with Woodward or other compatible speed controls and automatic voltage regulators. The SPM-D10 Series synchronizers provide automatic frequency, phase, and voltage matching using either analog or discrete output bias signals.

SPM-D10 SERIES

SYNCHRONIZER & LOAD SHARE CONTROLLERS
FEATURE OVERVIEW & PRICES

Synchronizers & Load Share Controllers

	DSLC-2	MSLC-2
I/OS		
Discrete inputs	23	23
Relay outputs	12	12
Analog inputs	3	3
Analog outputs	2	
RS-232 Interface	1	1
RS-485 Interface	1	1
Ethernet Interfaces (10/100 Mbit/s)	2	2
LED 1	CPU OK	CPU OK
LED 2	Sync Enable	Sync Enable

DSLC-2 Digital Synchronizer and Load Control

	Type	Part Number (P/N)
DSLC-2 *product spec 37493*		
	5 A	8440-1878
	1 A	8440-1978

MSLC-2 Master Synchronizer and Load Control

	Type	Part Number (P/N)
MSLC-2 *product spec 37494*		
	5 A	8440-1877
	1 A	8440-1977

SPM-A Analog Load Share Module

	Type	Part Number (P/N)
SPM-A *product spec 82383*		
Analog speed and phase synchronizer	no voltage match	9907-028
Analog speed and phase synchronizer	1% voltage match	9907-029
Analog speed and phase synchronizer	5% voltage match	9905-003

LSM Analog Load Sharing Modules

	Type	Part Number (P/N)
LSM *product spec 82686*		
Load sharing module with isochronous and droop load-sharing capability	115/230 Vac +/-3 Vdc bias output	9907-173
Load sharing module with isochronous and droop load-sharing capability	24 Vdc Caterpillar PWM bias output	9907-838 (replaces 9907-175)
Load sharing module with isochronous and droop load-sharing capability	24 Vdc 0.5- 4.5 Vdc bias output	9907-252

AGLC Automatic Generator Load Control

	Type	Part Number (P/N)
AGLC		
	-	9905-096

SPM-D10 Series Feature Overview

	SPM-D10					
	-	N	X	XN	YB	NYB
MEASURING/DISPLAY						
Generator voltage, 2phase	•	•	•	•	•	•
Busbar voltage, 2phase	•	•	•	•	•	•
CONTROL						
Breaker	1	1	1	1	1	1
Synchronization, 2phase	•	•	•	•	•	•
Enhanced dead bus start functionality					•	•
Isolated operation	•	•	•	•	•	•
CONTROLLER						
Discrete raise/lower: speed	•	•	•	•	•	•
Discrete raise/lower: voltage	•	•	•	•	•	•
Analog output: speed			•	•		
Analog output: voltage			•	•		
PMW output: speed			•	•		
Active power setpoint: 0/4 to 20 mA						
Load/var sharing						

SPM-D10 Series Synchronizer

		Type	Part Number (P/N)
SPM-D10	*product spec 37297*		
		100 Vac[1]	5448-890
		400 Vac	8440-1019
Package X		100 Vac[1]	5448-893
		400 Vac	8440-1301
Package N		100 Vac[1]	8440-1432
		400 Vac	8440-1433
Package XN		100 Vac[1]	8440-1667
		400 Vac	8440-1668
Package YB	*product spec 37298*	100 Vac[1]	5448-906
		400 Vac	8440-1021
Package NYB		100 Vac[1]	8440-1434
		400 Vac	8440-1435

[1] Adjustable to 120 Vac

A form, fit and function successor will be available soon.

AUTOMATIC TRANSFER SWITCH CONTROLLERS

The **DTSC-200** is the ultimate control for new ATS (automatic transfer switch) builds and retro-fits. A complete measurement and protection package, it easily configures to utility-togenerator, generator-to-generator, or utility-to-utility systems for open-, delayed- or closedtransition transfer with sync-check to ensure the smoothest possible transfer.

DTSC-200

The **DTSC-50** digital transfer switch controller is an economical controller for open-transition (break before make) automatic transfer switch (ATS) control for emergency standby applications with a single generator. When it detects a utility failure it commands the generator to start and transfers the load to the emergency source. When utility power is restored it performs an open-transition retransfer and allows the engine to cool down before stopping. It can be utilized in 1Ph2W, 1Ph3W, 3Ph3W, and 3Ph4W systems.

DTSC-50

DTSC-200 I DTSC-50
FEATURE OVERVIEW

		DTSC-200	DTSC-50
MEASURING	ANSI		
Source voltage (3phase/4-wire)	rated 69/120 Vac	•	
- True R.M.S.	max. 86/150 Vac	•	
- FlexRangeTM	rated 277/480 Vac	•	•
	max. 346/600 Vac	•	•
Load current (3phase/4-wire, true RMS)	../1 A or ../5 A	•	
BREAKER CONTROL			
Open transition (break-before-make)		•	•
Delayed transition (break-before-make) + timed neutral position		•	
Closed transition (make-before-break)		•	
APPLICATION			
Utility to generator		•	•
Utility to utility		•	
Generator to generator (2 start signals)		•	
FEATURES			
Programmable elevator pre-signal		•	
Programmable motor load disconnect signal		•	
Transfer commit		•	
Test modes		•	
Transfer mode selector		•	
Load shed		•	
Shunt trip enable		•	
Extended parallel time		•	
Automated display backlight shutdown selectable		•	
Daylight saving time		•	
Source priority selection		•	
Vector group adjustment for in-phase monitoring		•	
Fully adjustable timers		•	
Status LEDs for source availability and breaker state		•	
ACCESSORIES			
Soft-keys (advanced LC display) *DynamicsLCD™*		•	•
Configuration via PC		•	•
Event recorder with real time clock (battery backup)		300	
Flush-mounting (screw or clamp fastening)		•	
MONITORING			
Source: voltage	59/27	•	•
Source: frequency	810/81U	•	•
Source: voltage asymmetry	47	•	•
Source: Phase rotation error			•
Source: rotation field		•	
Engine : Start fail monitoring			•
Engine : Unintended Stop monitoring			•
Load: overload	32	•	
Load: overcurrent	50/51	•	
Switch: Open/close failure detection			•
Switch: plausible switch position		•	
Switch: transition failure		•	
Battery: voltage		•	
Synch check (inphase monitoring)	25	•	
Parallel time monitoring		•	
I/OS			
Discrete inputs (configurable)		12	2
Discrete outputs (configurable) *LogicsManager™*		9	3
Direct configuration interface		•	•
CANopen communication bus (isolated)		•	
RS-485 Modbus RTU Slave full/half-duplex (isolated)		•	

DTSC-200 I DTSC-50
PRICES

Automatic Transfer Switch Controllers

DTSC-200 Automatic Transfer Switch Controller

		Type	Part Number (P/N)
DTSC-200	*product spec 37398*		
		5 A	8440-1868
		1 A	8440-1867

DTSC-50 Automatic Transfer Switch Controller

		Type	Part Number (P/N)
DTSC-50	*product spec 37455*		
		-	8440-1894

Related Devices DTSC-200

	CLICK FOR MORE INFORMATION	
RELATED DEVICES WOODWARD		
ESENET Ethernet Gateway	*Application Note 37576*	>>
ESEPRO Profibus Gateway	*Application Note 37577*	>>
IKD 1 Digital I/O Expansion Board	*product spec 37171*	>>
DPC Direct Configuration Cable		>>
IXXAT USB-TO-CAN Converter		>>
CAN-Fiber Optic Gateways	*Application Note 37598*	>>
RELATED DEVICES OTHER SUPPLIERS		
NETBITER Remote Communication Gateway - HMS		>>
Analog Expansion Card - Phoenix		>>
CAN FO Redundant Communication Device - eks Engel		>>
POWER GENERATION SMALL PARTS		>>

PROTECTION RELAYS

With the **HighPROTEC Line** Woodward offers an outstanding solution for the reliable protection of distribution and generator applications. The innovative device handling and PC tool with plausibility check and internal fault simulator, combined with high flexible hardware minimized commissioning, training costs and setting failures. With the focus to an optimized menu overview not relevant functions could be hidden. The line is easily applicable for generator differential protection, directional and non directional feeder transformer differential protection, and motor protection. The all in one protection concept for the different application guaranties an high availability of your electrical equipment and your GRID.

HIGHPROTEC-2 LINE

The **MCA4** is designed for the protection and control of mid-range voltage feeders. In addition to numerous protection functions for feeder protection and the utility connection point, the switch control can be fully monitored and controlled by the MCA4 by remote control or on location.

The **MRA4** is specifically tailored to the protection of incoming and outgoing feeders in MV systems and can be used for grid and generator protection.

The **MRI4** is a non-directional overcurrent and earth fault relay. The relay is used for incoming and outgoing feeder applications. The relay can also be used as backup protection for differential protection systems.

The **MRU4** is designed to protect electrical equipment from dangerous voltage and frequency fluctuations, and is used for busbar, generator and feeder protection.

The **MRM4** is designed for the protection of engines. All the protection functions based on current, as well as monitoring functions, such as motor star-up and incomplete start-up sequence for motor protection are covered by the MRM4.


HIGHPROTEC LINE

Compared with the MRM4, the **MRMV4** also features voltage measurement and is therefore able to monitor power, voltage and frequency.

The high precision generator differential protection relay **MCDGV4** is designed for the protection of medium and large generators. The step-up transformer can be integrated into the protection zone (unit protection). In addition to the differential protection package the device offers a broad interconnection package (FRT, QV, Reconnection Release) as well as full packages for phase, earth, voltage, frequency and power protection and many more.

The **MCDTV4** is a transformer protection device with phase and earth differential protection and with a large backup protection package. The device is specially designed to protect middle and big HV / MV / LV transformers in distribution systems. The MCDTV4 is additional equipped with GRID coupling functions for Distributed Energy Resources, especially for generator power plants.

The **MRDT4** is a transformer differential relay designed to protect two winding transformers. The relay can also be used as a generator differential protection and also incorporates backup protection functions.

HighPROTEC-2 LINE
FEATURE OVERVIEW

NEW FEATURES

Protection Relays

PROTECTION FUNCTIONS	ANSI	MCA4-2	MRA4-2
Phase current stages (non-directional)	50/51		
Phase current stages (non-directional and directional)	50/51/67	6	6
Voltage restrained current protection	51V	•	•
Voltage controlled current function	51C	•	•
Earth current stages (non-directional)	50N/51N		
Earth current stages (non-directonal and directional)	50N/51N/67N	•	•
Negative sequence stages (current)	46	2	2
Overload protection with thermal replica	49	•	•
Voltage stages	27/59	6	6
Residual voltage stages	59N	2	2
Frequency stages	81 U/O	6	6
Inrush detection IH2 (2nd harmonic)		•	•
Voltage transformer supervision	60FL	•	•
Current transformer supervision	60L	•	•
Auto reclosing	79	•	•
Negative / positive sequence stages (voltage)	47	6	6
Lockout function	86	•	•
Circuit breaker failure protection	62BF/52BF	•	•
Trip circuit supervision	74TC	•	•
Frequency gradient df/dt (ROCOF)	81R	•	•
Vector surge	78	•	•
Power protection: P, Q, Qr, S, Pr	32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R	6	6
Power factor cos (ϕ)	55	2	2
QU protection (undervoltage- directional reactive power protection)		•	•
Synchro check	25	•	•
UFLS (non-discriminating active power direction depending load shedding)		•	•
Cold load pick up	37	•	•
Switch onto fault		•	•
LVRT (low voltage ride through)		•	•
Protection parameter sets		4	4
Reverse interlocking		•	•
Event/fault/disturbance recorder		•	•
Start-/trend recorder		•	•
CONTROL			
Control functionality up to 6 switchgears		•	
Control functionality of 1 switchgear			•
Logic (up to 80 equations)		•	•
MEASURING FUNCTIONS			
Currents: IL1, IL2, IL3, IE, I0, I1, I2,		•	•
IL1H2, IL2H2, IL3H2, IEH2		•	•
Overload ϑ		•	•
Voltages: VL1, VL2, VL3, VL12, VL23, VL31, VE, V0, V1, V2		•	•
Frequency f		•	•
Power: P, Q, S, Pr, PF (cos ϕ), Wp+, Wp-, Wq+, Wq-		•	•
HARDWARE			
Number of binary output relays		7[1]/13[1]	7[1]/13[1]
Number of digital inputs		8[1]/16[1]	8[1]/16[1]
Number of analogue in- and outputs[1]			
COMMUNICATION			
IEC61850 (RJ45 interface)		○	○
MODBUS RTU (via fibre optic (FO) or RS485)		○	○
IEC60870-5-103 (via fibre optic (FO) or RS485)		○	○
Modbus TCP (RJ45 interface)		○	○
Profibus DP (via LWL or RS485)		○	○
IRIG-B interface (time synchronization)		•	•

● = standard ○ = optional [1] = depends on type of device [2] = information on availability on request




MRI4-2	MRU4-2	MRMV4-2	MRM4-2
6		6	6
		•	
		•	
4		4	4
2		2	2
•		•	•
	6	6	
	2	2	
	6	6	
•			
	•	•	
•		•	•
•			
	6	6	
•	•	•	•
•	•	•	•
•	•	•	•
	•	•	
	•	•	
		6	
		2	
	•		
•			
•		•	•
	•		
4	4	4	4
•		•	•
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•
•		•	•
•		•	•
•		•	
	•	•	
	•	•	
		•	
6	6	7[1]/13[1]	6[1]/4[1]
8	8	8[1]/8[1]	8[1]/4[1]
		0+4	0+1[1]
o	o	o	o
o	o	o	o
o	o	o	o
o	o	o	o
o	o	o	o
•	•	•	•

HighPROTEC-2 LINE
FEATURE OVERVIEW

NEW FEATURES

		MCDGV4-2
PROTECTION FUNCTIONS	**ANSI**	
Generator differential Protection	87G	2
Generator- Transformer diffential protection	87GT	2
Transformer differential protection (2 windings)	87T	
Ground differential protection (high stabilized)	87N (64REF)	2
Overexcitation V/Hz	24	•
Loss of excitation	40	•
100% Stator earth fault protection with 3 Harmonics	59TN/27TN	•
Phase current stages (non-directional)	50/51	
Phase current stages (non-directional and directional)	50/51/67	6
Voltage restrained current protection	51V	•
Voltage controlled current function	51C	•
Earth current stages (nondirectional)	50N/51N	
Earth current stages (non-directonal and directional)	50N/51N/67N	4
Negative sequence stages (current)	46	2
Overload protection with thermal replica	49	•
Voltage stages / residual voltage stages	27/59 / 59N	6 / 2
Frequency stages	81 U/O	6
Inrush detection IH2 (2nd harmonic)		•
Voltage transformer supervision	60FL	•
Current transformer supervision	60L	•
Auto reclosing	79	
Negative / positive sequence stages (voltage)	47	6
Lockout function	86	•
Circuit breaker failure protection	50 BF	•
Trip circuit supervision	74TC	•
Frequency gradient df/dt (ROCOF)	81R	•
Vector surge	78	•
Power protection: P, Q, Qr, S, Pr	32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R	6
Power factor cos (ϕ)	55	2
QU protection (undervoltage - directional reactive power protection)		•
Synch-Check	25	•
UFLS (non-discriminating active power direction depending load shedding)		
Inadvertent energization	50/27	1
Cold load pick up	37	•
Switch onto fault		•
LVRT (low voltage ride through)		•
Protection parameter sets		4
Reverse interlocking		•
Event/fault/disturbance recorder		•
Start-/trend recorder		•
CONTROL		
Control functionality up to 6 switchgears		•
Control functionality of 2 switchgear		
Logic (up to 80 equations)		•
MEASURING FUNCTIONS		
Currents: IL1, IL2, IL3, IE, I0, I1, I2, IL1H2, IL2H2, IL3H2, IEH2		•
Overload ϑ		•
Voltages: VL1, VL2, VL3, VL12, VL23, VL31, VE, V0, V1, V2		•
Frequency f		•
Power: P, Q, S, Pr, PF (cos ϕ), Wp+, Wp-, Wq+, Wq-		•
HARDWARE		
Number of binary output relays [1]		11[1]/11[1]/11[1]/16[1]
Number of digital inputs [1]		16[1] /8[1]/24[1]/16[1]
Number of analogue inputs and outputs [1]		0[1] /2[1] +2[1]/0[1]/0[1]
COMMUNICATION		
IEC61850 (RJ45 or fibre optic (FO) LC)		○
MODBUS RTU (via fibre optic (FO) ST or RS485)		○
MODBUS TCP (RJ45 or fibre optic (FO) LC)		○
IEC60870-5-103 (via fibre optic (FO) ST or RS485)		○
PROFIBUS DP (via fibre optic (FO) ST or RS485)		○
DNP3.0 RTU (via fibre optic (FO) ST or RS485)		○
DNP3.0 TCP (RJ45 or fibre optic (FO) LC)		○
IRIG-B interface (time synchronization)		•

● = standard ○ = optional [1] = depends on type of device [2] = information on availability on request

MCDTV4-2	MRDT4-2
2	2
2	2
•	
	6
6	
•	
•	
	4
4	
2	2
•	•
6 / 2	
6	
•	•
•	
•	•
6	
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•	•
•	•
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6	
2	
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•	•
•	
4	4
•	•
•	•
•	•
•	
	•
•	•
•	•
•	
•	
•	
11[1]/11[1]	7[1]/13[1]
16[1]/8[1]	8[1]/16[1]
0[1]/2[1]+2[1]	
o	o
o	o
o	o
o	o
o	o
o	o
o	o
•	•

HighPROTEC LINE
FEATURE OVERVIEW

Protection Relays


PROTECTION FUNCTIONS	ANSI	MCA4	MRA4
Phase current stages (non-directional)	50/51		
Phase current stages (non-directional and directional)	50/51/67	6	6
Voltage restrained current protection	51V	•	•
Voltage controlled current function	51C	•	•
Earth current stages (nondirectional)	50N/51N		
Earth current stages (non-directonal and directional)	50N/51N/67N	•	•
Negative sequence stages (current)	46	2	2
Overload protection with thermal replica	49	•	•
Voltage stages	27/59	6	6
Residual voltage stages	59N	2	2
Frequency stages	81 U/O	6	6
Inrush detection IH2 (2nd harmonic)		•	•
Voltage transformer supervision	60FL	•	•
Current transformer supervision	60L	•	•
Auto reclosing	79	•	•
Negative / positive sequence stages (voltage)	47	6	6
Lockout function	86	•	•
Circuit breaker failure protection	62BF/52BF	•	•
Trip circuit supervision	74TC	•	•
Frequency gradient df/dt (ROCOF)	81R	•	•
Vector surge	78	•	•
Power protection: P, Q, Qr, S, Pr	32F, 37F, 32Q, 37Q, 7QR, 32S, 37S, 37R	6	6
Power factor cos (ϕ)	55	2	2
QU protection (undervoltage-directional reactive power protection)		•	•
Synch-Check	25	•	•
Cold load pick up	37	•	•
Switch onto fault		•	•
LVRT (low voltage ride through)		•	•
Protection parameter sets		4	4
Reverse interlocking		•	•
Event/fault/disturbance recorder		•	•
Start-/trend recorder		•	•
CONTROL			
Control functionality up to 6 switchgears		•	
Control functionality of 1 switchgear			•
Logic (up to 80 equations)		•	•
MEASURING FUNCTIONS			
Currents: IL1, IL2, IL3, IE, I0, I1, I2,		•	•
IL1H2, IL2H2, IL3H2, IEH2		•	•
Overload ϑ		•	•
Voltages: VL1, VL2, VL3, VL12, VL23, VL31, VE, V0, V1, V2		•	•
Frequency f		•	•
Power: P, Q, S, Pr, PF (cos ϕ), Wp+, Wp-, Wq+, Wq-		•	•
HARDWARE			
Number of binary output relays		7[1]/13[1]	7[1]/13[1]
Number of digital inputs		8[1]/16[1]	8[1]/16[1]
Number of analogue in- and outputs[1]			
COMMUNICATION			
IEC61850 (RJ45 interface)		○	○
MODBUS RTU (via fibre optic (FO) or RS485)		○	○
IEC60870-5-103 (via fibre optic (FO) or RS485)		○	○
Modbus TCP (RJ45 interface)		○	○
Profibus DP (via LWL or RS485)		○	○
IRIG-B interface (time synchronization)		•	•

● = standard ○ = optional [1] = depends on type of device [2] = information on availability on request




MRI4	MRU4	MRMV4	MRM4
6		6	6
		•	
		•	
4		4	4
2		2	2
•		•	•
	6	6	
	2	2	
	6	6	
•			
	•	•	
•		•	•
•			
	6	6	
•	•	•	•
•	•	•	•
•	•	•	•
	•	•	
	•	•	
		6	
		2	
	•		
•			
•		•	•
	•		
4	4	4	4
•		•	•
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•
•		•	•
•		•	•
•		•	
	•	•	
	•	•	
		•	
6	6	7[1]/13[1]	6[1] /4[1]
8	8	8[1]/8[1]	8[1] /4[1]
		0+4	0+1[1]
o	o	o	o
o	o	o	o
o	o	o	o
o	o	o	o
o	o	o	o
•	•	•	•

HighPROTEC LINE
FEATURE OVERVIEW

PROTECTION FUNCTIONS	ANSI	MCDGV4
Generator differential Protection	87G	2
Generator- Transformer diffential protection	87GT	2
Transformer differential protection (2 windings)	87T	
Ground differential protection (high stabilized)	87N (64REF)	2
Overexcitation V/Hz	24	•
Loss of excitation	40	•
100% Stator earth fault protection with 3 Harmonics	59TN/27TN	•
Phase current stages (non-directional)	50/51	
Phase current stages (non-directional and directional)	50/51/67	6
Voltage restrained current protection	51V	•
Voltage controlled current function	51C	•
Earth current stages (nondirectional)	50N/51N	
Earth current stages (non-directonal and directional)	50N/51N/67N	4
Negative sequence stages (current)	46	2
Overload protection with thermal replica	49	•
Voltage stages / residual voltage stages	27/59 / 59N	6 / 2
Frequency stages	81 U/O	6
Inrush detection IH2 (2nd harmonic)		•
Voltage transformer supervision	60FL	•
Current transformer supervision	60L	•
Auto reclosing	79	
Negative / positive sequence stages (voltage)	47	6
Lockout function	86	•
Circuit breaker failure protection	50 BF	•
Trip circuit supervision	74TC	•
Frequency gradient df/dt (ROCOF)	81R	•
Vector surge	78	•
Power protection: P, Q, Qr, S, Pr	32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R	6
Power factor cos (ϕ)	55	2
QU protection (undervoltage - directional reactive power protection)		•
Synchrocheck	25	•
Inadvertent energization	50/27	1
Cold load pick up	37	•
Switch onto fault		•
LVRT (low voltage ride through)		•
Protection parameter sets		4
Reverse interlocking		•
Event/fault/disturbance recorder		•
Start-/trend recorder		•
CONTROL		
Control functionality up to 6 switchgears		•
Control functionality of 2 switchgear		
Logic (up to 80 equations)		•
MEASURING FUNCTIONS		
Currents: IL1, IL2, IL3, IE, I0, I1, I2, IL1H2, IL2H2, IL3H2, IEH2		•
Overload ϑ		•
Voltages: VL1, VL2, VL3, VL12, VL23, VL31, VE, V0, V1, V2		•
Frequency f		•
Power: P, Q, S, Pr, PF (cos ϕ), Wp+, Wp-, Wq+, Wq-		•
HARDWARE		
Number of binary output relays [1]		11[1]/11[1]
Number of digital inputs [1]		16[1]/8[1]
Number of analogue inputs and outputs [1]		0[1]/2[1]+2[1]
COMMUNICATION		
IEC61850 (RJ45 interface)		o
MODBUS RTU (via fibre optic (FO) or RS485)		o
IEC60870-5-103 (with fibre optic (FO) or RS485)		o
Modbus TCP (RJ45 interface)		o
Profibus DP (with LWL or RS485)		o
IRIG-B interface (time synchronization)		•

● = standard O = optional [1] = depends on type of device [2] = information on availability on request

MCDTV4	MRDT4
2	2
2	2
•	
	4
6	
•	
•	
	4
4	
2	2
•	•
6 / 2	
6	
•	•
•	
•	•
6	
•	•
•	•
•	•
•	
•	
6	
2	
•	
•	
•	•
•	•
•	
4	4
•	•
•	•
•	•
•	
	•
•	•
•	•
•	
•	
•	
$11^1/11^1$	$7^1/13^1$
$16^1/8^1$	$8^1/16^1$
$0^1/2^1+2^1$	
o	o
o	o
o	o
o	o
o	o
•	•

HighPROTEC-2 LINE
PRICES

NEW FEATURES

Protection Relays

MCA4-2 Directional Feeder Protection

Product Spec DOK-FLY-MCA4-2

				MCA4	-2				
				Version 2 with USB, enhanced communication and user options					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY						
8	7	B2	x	**A**					
16	13	B2	x	**D**					
HARDWARE VARIANT 2									
Phase current 5 A/1 A, Ground Current 5 A/1 A					**0**				
Phase current 5 A/1 A, Sensitive Ground Current 5 A/1 A					**1**				
HOUSE AND MOUNTING									
Door mounting						**A**			
Door mounting 19” (flush mounting)						**B**			
COMMUNICATION PROTOCOL									
Without protocol							**A**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*							**B**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**C**[1]		
Profibus-DP I *optic fiber/ST-connector*							**D**[1]		
Profibus-DP I *RS485/D-SUB*							**E**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*							**F**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*							**G**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*							**H**[1]		
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**I**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**K**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**L**[1]		
HARSH ENVIRONMENT OPTION									
None								**A**	
Conformal Coating								**B**	
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

ANSI: 50, 51, 67, 51C, 51V, 25, 50N, 51N, 67N, 50Ns, 51Ns, 67Ns, 46, 49, 27, 59, 59N, 51Q, 81U/O, 60FL, 79, 86, 50BF, 74TC, 81R, 78, 47, 60FL, 60L, 32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R, 55, 51C, LVRT, Q->V

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control functions for up to 6 switchgears and logic up to 80 equations.
To design the Single Line diagram please ask our sales service or sales.

MCA4 Directional Feeder Protection

Product Spec DOK-FLY-MCA4

			MCA4				
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY				
8	7	B2	x	**A**			
16	13	B2	x	**D**			
HARDWARE VARIANT 2							
Phase current 5 A/1 A, Ground Current 5 A/1 A					**0**		
Phase current 5 A/1 A, Sensitive Ground Current 5 A/1 A					**1**		
HOUSE AND MOUNTING							
Door mounting						**A**	
Door mounting 19” (flush mounting)						**B**	
COMMUNICATION PROTOCOL							
Without protocol							**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*							**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*							**C**
Profibus-DP I *optic fiber*							**D**
Profibus-DP I *RS485/D-SUB*							**E**
Modbus RTU, IEC60870-5-103 I *optic fiber*							**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*							**G**
IEC61850 I *Ethernet 100MB/RJ45*							**H**
AVAILABLE MENU LANGUAGES							
Standard English/German/Russian/Polish/Portuguese/French							

ANSI: 50, 51, 67, 51C, 51V, 25, 50N, 51N, 67N, 50Ns, 51Ns, 67Ns, 46, 49, 27, 59, 59N, 51Q, 81U/O, 60FL, 79, 86, 50BF, 74TC, 81R, 78, 47, 60FL, 60L, 32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R, 55, 51C, LVRT, Q->V

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control functions for up to 6 switchgears and logic up to 80 equations.
To design the Single Line diagramm please ask our sales service or sales.

NEW FEATURES

Protection Relays

MRA4-2 Directional Feeder Protection

Product Spec DOK-FLY-MRA4-2

				MRA4	-2				
				Version 2 with USB, enhanced communication and user options					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY						
8	6	B2	-	**A**					
16	13	B2	-	**D**					
HARDWARE VARIANT 2									
Phase current 5 A/1 A, Ground Current 5 A/1 A					**0**				
Phase Current 5 A/1 A, Sensitive Ground Current[*2] 5 A/1 A					**1**				
HOUSE AND MOUNTING									
Door mounting						**A**			
Door mounting 19” (flush mounting)						**B**			
COMMUNICATION PROTOCOL									
Without protocol							**A**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*							**B[1]**		
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**C[1]**		
Profibus-DP I *optic fiber/ST-connector*							**D[1]**		
Profibus-DP I *RS485/D-SUB*							**E[1]**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*							**F[1]**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*							**G[1]**		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*							**H[1]**		
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**I[1]**		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**K[1]**		
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**L[1]**		
HARSH ENVIRONMENT OPTION									
None									**A**
Conformal Coating									**B**
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

[2] = Please ask for availability

ANSI: 50, 51, 67, 51C, 51V, 50N, 51N, 67N, 46, 49, 27, 59, 59N, 81U/O, 60FL, 79, 86, 50BF, 74TC, 81R, 78, 47, 60FL, 60L, 32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R, 55, 51C, LVRT, Q->V

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

HIGHPROTEC LINE
PRICES

MRA4 Directional Feeder Protection

Product Spec DOK-FLY-MRA4

		MRA4					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY				
8	6	B2	-	**A**			
16	13	B2	-	**D**			
HARDWARE VARIANT 2							
Phase current 5 A/1 A, Ground Current 5 A/1 A					**0**		
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A					**1**		
HOUSE AND MOUNTING							
Door mounting						**A**	
Door mounting 19” (flush mounting)						**B**	
COMMUNICATION PROTOCOL							
Without protocol							**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*							**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*							**C**
Profibus-DP I *optic fiber*							**D**
Profibus-DP I *RS485/D-SUB*							**E**
Modbus RTU I *IEC60870-5-103, optic fiber*							**F**
Modbus RTU I *IEC60870-5-103, RS485/D-SUB*							**G**
IEC61850 I *Ethernet 100MB/ RJ45*							**H**
AVAILABLE MENU LANGUAGES							
Standard English/German/Russian/Polish/Portuguese/French							

ANSI: 50, 51, 67, 51C, 51V, 50N, 51N, 67N, 46, 49, 27, 59, 59N, 81U/O, 60FL, 79, 86, 50BF, 74TC, 81R, 78, 47, 60FL, 60L, 32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R, 55, 51C, LVRT, Q->V

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

NEW FEATURES

Protection Relays

MRI4-2 Non-directional Feeder Protection

Product Spec DOK-FLY-MRI4-2

				MRI4	-2				
				Version 2 with USB, enhanced communication and user options					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY						
8	6	B1	-	**A**					
HARDWARE VARIANT 2									
Phase Current 5 A/1 A, Ground Current 5 A/1 A					**0**				
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A					**1**				
HOUSE AND MOUNTING									
Door mounting						**A**			
Door mounting 19” (flush mounting)						**B**			
COMMUNICATION PROTOCOL									
Without protocol							**A**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*							**B**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**C**[1]		
Profibus-DP I *optic fiber/ST-connector*							**D**[1]		
Profibus-DP I *RS485/D-SUB*							**E**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*							**F**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*							**G**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*							**H**[1]		
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**I**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**K**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**L**[1]		
HARSH ENVIRONMENT OPTION									
None								**A**	
Conformal Coating								**B**	
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

ANSI: 50, 51, 50N, 51N, 46, 49, 60L, 79, 86, 50BF, 74TC

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

MRI4 Non-directional Feeder Protection

Product Spec DOK-FLY-MRI4

				MRI4				
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY					
8	6	B1	-	**A**				
HARDWARE VARIANT 2								
Phase Current 5 A/1 A, Ground Current 5 A/1 A					**0**		
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A					**1**		
HOUSE AND MOUNTING							
Door mounting						**A**	
Door mounting 19” (flush mounting)						**B**	
COMMUNICATION PROTOCOL							
Without protocol							**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*							**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*							**C**
Profibus-DP I *optic fiber*							**D**
Profibus-DP I *RS485/D-SUB*							**E**
Modbus RTU, IEC60870-5-103 I *optic fiber*							**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*							**G**
IEC61850 I *Ethernet 100MB/ RJ45*							**H**
AVAILABLE MENU LANGUAGES							
Standard English/German/Russian/Polish/Portuguese/French							

ANSI: 50, 51, 50N, 51N, 46, 49, 60L, 79, 86, 50BF, 74TC

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

NEW FEATURES

MRU4-2 Voltage and Frequency Supervision

Product Spec DOK-FLY-MRU4-2

				MRU4	-2				
				Version 2 with USB, enhanced communication and user options					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY						
8	6	B1	-	**A**					
HARDWARE VARIANT 2									
Standard					**0**				
HOUSE AND MOUNTING									
Door mounting						**A**			
Door mounting 19” (flush mounting)						**B**			
COMMUNICATION PROTOCOL									
Without protocol							**A**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*							**B**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**C**[1]		
Profibus-DP I *optic fiber/ST-connector*							**D**[1]		
Profibus-DP I *RS485/D-SUB*							**E**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*							**F**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*							**G**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*							**H**[1]		
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**I**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**K**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**L**[1]		
HARSH ENVIRONMENT OPTION									
None								**A**	
Conformal Coating								**B**	
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

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

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

MRU4 Voltage and Frequency Supervision

Product Spec DOK-FLY-MRU4

				MRU4			
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY				
8	6	B1	-	**A**			
HARDWARE VARIANT 2							
Standard					**0**		
HOUSE AND MOUNTING							
Door mounting						**A**	
Door mounting 19” (flush mounting)						**B**	
COMMUNICATION PROTOCOL							
Without protocol							**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*							**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*							**C**
Profibus-DP I *optic fiber*							**D**
Profibus-DP I *RS485/D-SUB*							**E**
Modbus RTU, IEC60870-5-103 I *optic fiber*							**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*							**G**
IEC61850 I *Ethernet 100MB/ RJ45*							**H**
AVAILABLE MENU LANGUAGES							
Standard English/German/Russian/Polish/Portuguese/French							

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

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

HighPROTEC-2 LINE
PRICES

NEW FEATURES

Protection Relays

MRDT4-2 Transformer Differential Protection

Product Spec DOK-FLY-MRDT4-2

				MRDT4	-2				
				Version 2 with USB, enhanced communication and user options					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY						
8	7	B2	-	**A**					
16	13	B2	-	**D**					
HARDWARE VARIANT 2									
Phase Current 5 A/1 A, Ground Current 5 A/1 A					**0**				
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, W2 Gr. Curr. 5 A/1 A					**1**				
Phase Current 5 A/1 A, W1 Gr. Curr. 5 A/1 A, W2 Sen. Gr. Curr. 5 A/1 A					**2**				
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, Sen. Gr. Curr. 5 A/1 A					**3**				
HOUSE AND MOUNTING									
Door mounting						**A**			
Door mounting 19" (flush mounting)						**B**			
COMMUNICATION PROTOCOL									
Without protocol							**A**		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*							**B**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**C**[1]		
Profibus-DP I *optic fiber/ST-connector*							**D**[1]		
Profibus-DP I *RS485/D-SUB*							**E**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*							**F**[1]		
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*							**G**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*							**H**[1]		
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*							**I**[1]		
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**K**[1]		
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*							**L**[1]		
HARSH ENVIRONMENT OPTION									
None								**A**	
Conformal Coating								**B**	
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

ANSI: 50, 51, 50N, 51N, 46, 49T, 60FL, 86, 50BF, 74TC, 60L, 64REF, 87G, 87T

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 2 switchgears and logic up to 80 equations.

MRDT4 Transformer Differential Protection

Product Spec DOK-FLY-MRDT4

				MRDT4			
DIGITAL INPUTS	BINARY OUTPUT RELAYS	HOUSING	LARGE DISPLAY				
8	7	B2	-	**A**			
16	13	B2	-	**D**			
HARDWARE VARIANT 2							
Phase Current 5 A/1 A, Ground Current 5 A/1 A					**0**		
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, W2 Gr. Curr. 5 A/1 A					**1**		
Phase Current 5 A/1 A, W1 Gr. Curr. 5 A/1 A, W2 Sen. Gr. Curr. 5 A/1 A					**2**		
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, Sen. Gr. Curr. 5 A/1 A					**3**		
HOUSE AND MOUNTING							
Door mounting						**A**	
Door mounting 19" (flush mounting)						**B**	
COMMUNICATION PROTOCOL							
Without protocol							**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*							**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*							**C**
Profibus-DP I *optic fiber*							**D**
Profibus-DP I *RS485/D-SUB*							**E**
Modbus RTU, IEC60870-5-103 I *optic fiber*							**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*							**G**
IEC61850 I *Ethernet 100MB/ RJ45*							**H**
AVAILABLE MENU LANGUAGES							
Standard English/German/Russian/Polish/Portuguese/French							

ANSI: 50, 51, 50N, 51N, 46, 49T, 60FL, 86, 50BF, 74TC, 60L, 64REF, 87G, 87T

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 2 switchgears and logic up to 80 equations.

NEW FEATURES

MCDTV4-2 Directional Transformer Differential Protection

Product Spec DOK-FLY-MCDTV4-2

					MCDTV4	-2			
					Version 2 with USB, enhanced communication and user options				
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY					
16	11	0/0	B2	X	**A**				
8	11	2/2	B2	X	**B**				
HARDWARE VARIANT 2									
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**			
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, W2 Gr. Curr. 5 A/1 A						**1**			
Phase Current 5 A/1 A, W1 Gr. Curr. 5 A/1 A, W2 Sen. Gr. Curr. 5 A/1 A						**2**			
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, Sen. Gr. Curr. 5 A/1 A						**3**			
HOUSE AND MOUNTING									
Door mounting							**A**		
Door mounting 19” (flush mounting)							**B**		
COMMUNICATION PROTOCOL									
Without protocol								**A**	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*								**B**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*								**C**[1]	
Profibus-DP I *optic fiber/ST-connector*								**D**[1]	
Profibus-DP I *RS485/D-SUB*								**E**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*								**F**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*								**G**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*								**H**[1]	
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*								**I**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*								**K**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*								**L**[1]	
HARSH ENVIRONMENT OPTION									
None									**A**
Conformal Coating									**B**
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

ANSI: 87T, 87N (64REF), 24, 50, 51, 67, 51V, 51C, 50N, 51N, 67N, 50Ns, 51Ns, 67Ns, 46, 49, 27, 59, 59N, 81U/O, 81R, 78, 47, 32, 55, 60FL, 86, 50BF, 74TC, 25, 37

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control functions for up to 6 switchgears and logic up to 80 equations.

MCDTV4 Directional Transformer Differential Protection

Product Spec DOK-FLY-MCDTV4

		MCDTV4						
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY				
16	11	0/0	B2	X	**A**			
8	11	2/2	B2	X	**B**			
HARDWARE VARIANT 2								
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**		
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, W2 Gr. Curr. 5 A/1 A						**1**		
Phase Current 5 A/1 A, W1 Gr. Curr. 5 A/1 A, W2 Sen. Gr. Curr. 5 A/1 A						**2**		
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, Sen. Gr. Curr. 5 A/1 A						**3**		
HOUSE AND MOUNTING								
Door mounting							**A**	
Door mounting 19” (flush mounting)							**B**	
COMMUNICATION PROTOCOL								
Without protocol								**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*								**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*								**C**
Profibus-DP I *optic fiber*								**D**
Profibus-DP I *RS485/D-SUB*								**E**
Modbus RTU I *IEC60870-5-103, optic fiber*								**F**
Modbus RTU I *IEC60870-5-103, RS485/D-SUB*								**G**
IEC61850 I *Ethernet 100MB/ RJ45*								**H**
AVAILABLE MENU LANGUAGES								
Standard English/German/Russian/Polish/Portuguese/French								

ANSI: 87T, 87N (64REF), 24, 50, 51, 67, 51V, 51C, 50N, 51N, 67N, 50Ns, 51Ns, 67Ns, 46, 49, 27, 59, 59N, 81U/O, 81R, 78, 47, 32, 55, 60FL, 86, 50BF, 74TC, 25, 37

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control functions for up to 6 switchgears and logic up to 80 equations.

NEW FEATURES

Protection Relays

MRMV4-2 Motor Protection with Voltage /Frequency

Product Spec DOK-FLY-MRMV4-2

					MRMV4	-2			
					Version 2 with USB, enhanced communication and user options				
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY					
8	6	0/4	B2	-	**A**				
8	13	0/4	B2	-	**C**				
HARDWARE VARIANT 2									
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**			
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A						**1**			
HOUSE AND MOUNTING									
Door mounting							**A**		
Door mounting 19" (flush mounting)							**B**		
COMMUNICATION PROTOCOL									
Without protocol								**A**	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*								**B**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*								**C**[1]	
Profibus-DP I *optic fiber/ST-connector*								**D**[1]	
Profibus-DP I *RS485/D-SUB*								**E**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*								**F**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*								**G**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*								**H**[1]	
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*								**I**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*								**K**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*								**L**[1]	
HARSH ENVIRONMENT OPTION									
None									**A**
Conformal Coating									**B**
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

ANSI: 46, 49M, 49R, 49S, 50J, 37, 50, 51, 50N, 51N, 50Ns, 51Ns, 27, 59, 59N, 47, 32, 55, 81U/O, 81R, 78, 60FL, 86, 50BF, 74TC, 38

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations

MRMV4 Motor Protection with Voltage /Frequency

Product Spec DOK-FLY-MRMV4

		MRMV4						
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY				
8	6	0/4	B2	-	**A**			
8	13	0/4	B2	-	**C**			
HARDWARE VARIANT 2								
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**		
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A						**1**		
HOUSE AND MOUNTING								
Door mounting							**A**	
Door mounting 19" (flush mounting)							**B**	
COMMUNICATION PROTOCOL								
Without protocol								**A**
Modbus RTU, IEC60870-5-103 I RS485/terminals								**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*								**C**
Profibus-DP I *optic fiber*								**D**
Profibus-DP I *RS485/D-SUB*								**E**
Modbus RTU I *IEC60870-5-103, optic fiber*								**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*								**G**
IEC61850 I *Ethernet 100MB/ RJ45*								**H**
AVAILABLE MENU LANGUAGES								
Standard English/German/Russian/Polish/Portuguese/French								

ANSI: 46, 49M, 49R, 49S, 50J, 37, 50, 51, 50N, 51N, 50Ns, 51Ns, 27, 59, 59N, 47, 32, 55, 81U/O, 81R, 78, 60FL, 86, 50BF, 74TC, 38

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations

NEW FEATURES

MRM4-2 Motor Protection

Product Spec DOK-FLY-MRM4-2

					MRM4 -2				
					Version 2 with USB, enhanced communication and user options				
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY					
8	6	0/0	B1	-	**A**				
4	4	0/1	B1	-	**B**				
HARDWARE VARIANT 2									
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**			
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A						**1**			
HOUSE AND MOUNTING									
Door mounting							**A**		
Door mounting 19” (flush mounting)							**B**		
COMMUNICATION PROTOCOL									
Without protocol								**A**	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*								**B**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*								**C**[1]	
Profibus-DP I *optic fiber/ST-connector*								**D**[1]	
Profibus-DP I *RS485/D-SUB*								**E**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*								**F**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*								**G**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*								**H**[1]	
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*								**I**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*								**K**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*								**L**[1]	
HARSH ENVIRONMENT OPTION									
None									**A**
Conformal Coating									**B**
AVAILABLE MENU LANGUAGES									
Standard English/German/Spanish/Russian/Polish/Portuguese/French									

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

ANSI: 46, 49M, 49R, 49S, 50J, 37, 50, 51, 50N, 51N, 60L, 86, 50BF, 74TC

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

MRM4 Motor Protection

Product Spec DOK-FLY-MRM4

		MRM4						
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY				
8	6	0/0	B1	-	**A**			
4	4	0/1	B1	-	**B**			
HARDWARE VARIANT 2								
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**		
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A						**1**		
HOUSE AND MOUNTING								
Door mounting							**A**	
Door mounting 19" (flush mounting)							**B**	
COMMUNICATION PROTOCOL								
Without protocol								**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*								**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*								**C**
Profibus-DP I *optic fiber*								**D**
Profibus-DP I ***RS485/D-SUB***								**E**
Modbus RTU, IEC60870-5-103 I *optic fiber*								**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*								**G**
IEC61850 I *Ethernet 100MB/ RJ45*								**H**
AVAILABLE MENU LANGUAGES								
Standard English/German/Russian/Polish/Portuguese/French								

ANSI: 46, 49M, 49R, 49S, 50J, 37, 50, 51, 50N, 51N, 60L, 86, 50BF, 74TC

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control function for 1 switchgear and logic up to 80 equations.

NEW FEATURES

Protection Relays

MCDGV4-2 Generator Protection with Differential

Product Spec DOK-FLY-MCDGV4-2

					MCDGV4	-2				
					Version 2 with USB, enhanced communication and user options					
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY	VOLTAGE INPUTS					
16	11	0/0	B2	X	0-800 V	**A**				
8	11	2/2	B2	X	0-800 V	**B**				
24	11	0/0	B2	X	0-300 V	**C**				
16	16	0/0	B2	X	0-300 V	**D**				
HARDWARE VARIANT 2										
Phase Current 5 A/1 A, Ground Current 5 A/1 A							**0**			
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A							**1**			
HOUSE AND MOUNTING										
Door mounting								**A**		
Door mounting 19” (flush mounting)								**B**		
COMMUNICATION PROTOCOL										
Without protocol									**A**	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/terminals*									**B**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*									**C**[1]	
Profibus-DP I *optic fiber/ST-connector*									**D**[1]	
Profibus-DP I *RS485/D-SUB*									**E**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *optic fiber/ST-connector*									**F**[1]	
Modbus RTU, IEC60870-5-103, DNP3.0 RTU I *RS485/D-SUB*									**G**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100MB/RJ45*									**H**[1]	
IEC60870-5-103, Modbus RTU, DNP3.0 RTU I *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP I *Ethernet 100 MB/RJ45*									**I**[1]	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*									**K**[1]	
Modbus TCP, DNP3.0 TCP/UDP I *Optical Ethernet 100MB/LC duplex connector*									**L**[1]	
HARSH ENVIRONMENT OPTION										
None										**A**
Conformal Coating										**B**
AVAILABLE MENU LANGUAGES										
Standard English/German/Spanish/Russian/Polish/Portuguese/French										

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

ANSI: 87G, 87GT, 87N (64REF), 24, 40, 59TN/27TN, 50, 51, 67, 51V, 51C, 50N, 51N, 67N, 50Ns, 51Ns, 67Ns, 46, 49, 27, 59, 59N, 81U/O, 81R, 78, 47, 32, 55, 60FL, 86, 50BF, 74TC, 25, 37, LVRT, Q->V

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control functions for up to 6 switchgears and logic up to 80 equations.

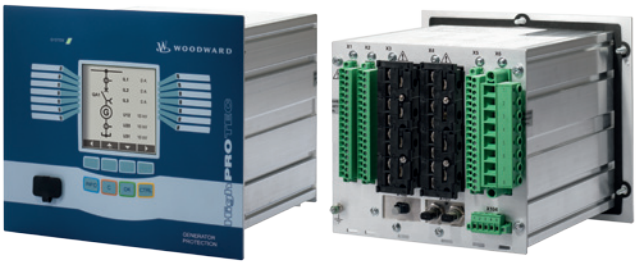
MCDGV4 Generator Protection with Differential

Product Spec DOK-FLY-MCDGV4

		MCDGV4						
DIGITAL INPUTS	BINARY OUTPUT RELAYS	ANALOG INPUTS- / OUTPUTS	HOUSING	LARGE DISPLAY				
16	11	0/0	B2	X	**A**			
8	11	2/2	B2	X	**B**			
HARDWARE VARIANT 2								
Phase Current 5 A/1 A, Ground Current 5 A/1 A						**0**		
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A						**1**		
HOUSE AND MOUNTING								
Door mounting							**A**	
Door mounting 19" (flush mounting)							**B**	
COMMUNICATION PROTOCOL								
Without protocol								**A**
Modbus RTU, IEC60870-5-103 I *RS485/terminals*								**B**
Modbus TCP I *Ethernet 100 MB/RJ45 connector*								**C**
Profibus-DP I *optic fiber*								**D**
Profibus-DP I *RS485/D-SUB*								**E**
Modbus RTU, IEC60870-5-103 I *optic fiber*								**F**
Modbus RTU, IEC60870-5-103 I *RS485/D-SUB*								**G**
IEC61850 I *Ethernet 100MB/ RJ45*								**H**
AVAILABLE MENU LANGUAGES								
Standard English/German/Russian/Polish/Portuguese/French								

ANSI: 87G, 87GT, 87N (64REF), 24, 40, 59TN/27TN, 50, 51, 67, 51V, 51C, 50N, 51N, 67N, 50Ns, 51Ns, 67Ns, 46, 49, 27, 59, 59N, 81U/O, 81R, 78, 47, 32, 55, 60FL, 86, 50BF, 74TC, 25, 37, LVRT, Q->V

The parameterizing- and disturbance analyzing Software Smart view is included in delivery of HighPROTEC devices.
With control functions for up to 6 switchgears and logic up to 80 equations.



HighPROTEC Services

	HPTCON
Creating of the device configuration for the protection in house according to customer data based on check lists per variation and device typ. Programming of the device configuration in house is included	**01**
Creating of the device configuration for the protection, logic and single line in house. The configuration will be effected after customer clarification according to customer data based per variation and device type. Programming of the device configuration in house is included	**02**
Programming of the device configuration per device in house	**03**

HighPROTEC Communication & Accessories

	COMRS232Nullm
RS232 ZERO MODEM CABLE WITH HANDSHAKE (3 M)[1]	
Cable for PC – device communication	

	USB2RS232ADAP
INTERFACE CONVERTER[1]	
from USB 2.0 to RS232 (without galvanic isolation)	

[1] No supply voltage required

	5450-1946	
CABLE - STANDARD USB TO 5-POLE		
USB-B Mini Male 1.8 M (EDS)		

	HPTDF1	
HIGHPROTEC DISTANCE FRAME		
Frame for B1 housing 60 mm depth		**1**
Frame for B2 housing 60 mm depth		**2**

	URTD	
UNIVERSAL RESISTOR TEMPERATURE BOX (FOR HIGHPROTEC DEVICES)		
Up to 12 sensors, PT100, Ni100, Ni120, Cu10, 48-240 VAC / 48-250 VDC		**01**
Up to 12 sensors, PT100, Ni100, Ni120, Cu10, 24- 48 VDC		**02**

	HPTURTDCON	
FIBRE OPTIC CABEL URDT		
Fibre optic cable 5 m		**5M**
Fibre optic cable 10 m		**10M**
Fibre optic cable 25 m		**25M**

The fibre optic cabel is necessary to connect the URDT box with the HighPROTEC devices.

	HPTTERMKIT	
TERMINAL KITS HIGHPROTEC FOR PRE WIRING		
For devices MRI4 / MRM4		**1**
For device MRU4		**2**
For devices MRA4D / MRMV4A / MCA4D		**3**
For devices MRDT4		**4**
For devices MCDGV4A / MCDGV4B / MCDTV4A / MCDTV4B		**5**

	3061-2866
PLEASE USE THE PDF TEMPLATE ON THE PRODUCT CD FOR LED TEXT INFORMATION	
Transparent Front Foil for Inserts	3061-2866

easYprotec Low Voltage Protection Relay

	Type	Part Number (P/N)
EASYPROTEC		
	100 Vac[1]	8441-1160
	690 Vac	8441-1161

[1] Adjustable to 120 Vac

ACCESSORIES & SERVICES

Woodward provides various high quality accessories dedicated to your application.

Highly qualified staff members in our international offices guarantee customer service at the highest level worldwide. They give information on warranties, downtimes, spare parts, repairs, orders and technical training.

Apart from quality, there are growing expectations in terms of customer care. Maximum availability and operational reliability rank first in the requirements catalogue.

Woodward provides maximum service support worldwide.

ACCESSORIES
PRICES

Power Generation Related Devices Woodward

	Type	Part Number (P/N)
ESENET ETHERNET GATEWAY	*Application Note 37576*	
ESENET		8445-1044
ESEPRO PROFIBUS GATEWAY	*Application Note 37577*	
ESEPRO		8445-1046
EPU-100	*product spec 37562*	
EPU-100		8445-1045
IKD 1	*product spec 37171*	
IKD 1		8440-2028
Configuration tool for IKD	V1.0002	9927-2094
DPC - DIRECT CONFIGURATION CABLE		
DPC-USB Direct configuration cable	USB connector	5417-1251
DPC-RS-232 Direct configuration cable	RS-232 connector	5417-557
IXXAT USB-TO-CAN CONVERTER		
IXXAT USB-to-CAN converter		8445-1023
CAN FIBER OPTIC GATEWAYS	*Application Note 37598*	
CAN-Fiber Optic System (Redundant)	DL-CAN-R	8445-1048
CAN-Fiber Optic System	DL-CAN	8445-1049

[1] Adjustable to 120 Vac

Power Generation Related Devices Other Supplier

	Type	Part Number (P/N)
NETBITER REMOTE COMMUNICATION GATEWAY		
The Netbiter EasyConnect 250 gateway is available through HMS sales networks. For sales and support enquiries please visit *www.netbiter.com/contact*		
THERMOCOUPLE SCANNER - AXIOMATIC		
The Thermocouple Scanner is available through Axiomatic sales networks. For sales and support enquiries please contact *sales@axiomatic.com*		
ANALOG EXPANSION CARD - PHOENIX		
The Analog Expansion Card is available through Phoenix sales networks. For sales and support enquiries please visit *www.phoenixcontact.com*		

Power Generation Software

	Type	Part Number (P/N)
ToolKit Developer License	*product spec 03366*	8928-5016
Power Generation Learning Module	*product spec 03412*	8447-1012

Power Generation Small Parts

Type	Part Number (P/N)
BRACKETS[1]	
APRANORM housing Type E (Height 72 mm), delivered in a set of two (DIN rail mounting)	8923-1023
DIN Rail mounting metal housing	8923-1746
FIXING CLAMPS	
For all APRANORM housing types (one piece)	LR01543
TERMINAL STRIP KITS	
Kit-Plug Set for easYgen-3100, -3200 and -3500 series	8923-1314
Kit-Plug Set for easYgen-3400	8928-7371
Kit-Plug Set for easYgen-2200/-2300 and LS-521 (door mount)	8928-7286
Kit-Plug Set for easYgen-3400 P2 (black, with 8 plugs)	8923-1919
Kit-Plug Set for easYgen-3500 P2 (green, with 8 plugs)	8923-1918
Kit-Plug Set for easYgen-2500	8928-7297
Kit-Plug Set for easYgen-1000	8923-1055
Kit-Plug Set for LS-511 (back-pan mount)	8928-7336
Kit-Plug Set for DTSC-200	8923-1805
Kit-Plug Set for DSLC-2	8923-1806
Kit-Plug Set for SPM-D	8923-1032
Kit-Plug Set for MFR-300 and easYprotec	8923-2139
GASKETS[2]	
Housing Type D (144x72 mm, e.g. SPM-D, etc.)	8923-1037

[1] Note: The kit consists of 2× brackets, 2× level adjuster, 4× self-drilling screws, 4× back-plate screws, and 1× installation notes.
[2] Note: Using the gasket improves the protection to IP54 (from front).

Battery Charging Units Power Supply and Battery Charging Unit

	BL18	BL20
DIN rail	•	•
Rated output current	18 A	20 A
Parallel operation	•	•
3-phase supply (400 V)	•	•
1-phase supply (230 V)	•	
12 V / 24 V (switchable)		•
12 V or 24 V	•	
Analogue output for measuring signals (U and I)		•
Power Charging/normal charging		•
NiCd – batteries		•
Pb – batteries	•	•
IU –Standard characteristic		•
Power supply operation	•	•

BL18 Power Supply and Battery Charging Unit

	BL18		
Output current	18 A		
Input voltage	230 V, 1-phase 400 V, 3-phases	**230** **400**	
Output voltage	12 V (12 - 13.75 V DC) 24 V (24 - 27.5 V DC)		**12** **24**

BL20400 Power Supply and Battery Charging Unit

	Type	Part Number (P/N)
Output current Mains supply voltage Rated output voltage switchable Charging according to IU-Characteristics Conservation of charge and balance charge Thermal overload protection 2 analogue outputs 0-10 V for measuring signal from output voltage and -current Applicable for NiCd and lead-batteries	20 A 400 V AC 3-phase 50/60 Hz 12/24 V DC (Power Charging)	BL20400

Trainings

	Location	Duration
POWER GENERATION		
easYgen-3500 + LS-5 product training	see Training Calender	4 1/2 days
DSLC-2/MSLC-2	see Training Calender	3 days

For schedule of classes and to register, please visit *www.woodward.com/producttraining*

APPROVALS AND CERTIFICATIONS

		CE	UL	c UL us LISTED	CSA	KEMA
		Conformité Européenne	Under-writers Laborato-ries	Canadian Under-writers Laboratorie	Canadian Standards Association	KEMA Typetest IEC 60255
GENSET CONTROLLERS						
easYgen-3000	Genset controller	•	•	•	•	
easYgen-3000 Marine	Genset controller	•	•	•	•	
easYgen-2000	Genset controller	•	•	•		
easYgen-1500	Genset controller for single unit operations	•	•	•		
EXPANSION MODULES						
LS-5	Circuit breaker control and protection	•	•	•		
LS-5 Marine	Circuit breaker control and protection	•	•	•	•	
RP-3000	Remote panel					
RP-3000 Marine	Remote panel					
easYlite-100	Remote annunciator	•	•	•		
IKD 1	Digital I/O expansion board	•	•	•		
LSG	Load share gateway	•				
SYNCHRONIZERS						
DSLC-2	Digital synchronizer and load control	•	•	•	•	
MSLC-2	Master synchronizer and load control	•	•	•	•	
SPM-D	Synchronizer	•	•	•		
AUTOMATIC TRANSFER SWITCH CONTROLLERS						
DTSC-50	Automatic transfer switch controller		•	•		
DTSC-200	Automatic transfer switch controller	•	•	•		
PROTECTION RELAYS						
HighPROTEC						
MCA4 / MCA4-2	Incoming and outgoing feeder protection	•	•	•	•	•
MCDGV4 / MCDGV4-2	Generator differential protection	•	•	•	•	
MCDTV4 / MCDTV4-2	Transformer differential protection	•	•	•	•	
MRA4 / MRA4-2	Incoming and outgoing feeder protection	•	•	•	•	•
MRDT4 / MRDT4-2	Non-directional transformer differential protection	•	•	•	•	•
MRI4 / MRI4-2	Combined overcurrent time protection and earth fault protection	•	•	•	•	•
MRM4 / MRM4-2	Motor protection relay	•	•	•	•	
MRMV4 / MRMV4-2	Motor protection relay with voltage	•	•	•	•	
MRU4 /	AC voltage and frequency relay	•	•	•	•	•
Multifunction Relays						
easYprotec	Low voltage protection relay	•				

[1] Approvals/Certifications are not available for every type. Details can be found in the corresponding manuals.

KEMA									
KEMA IEC 61850	EAC	Energy Network Association	CEI 0-16	BDEW TR3/TR8	VDE-AR-N 4105	Lloyd's Register-LR (Marine)	German Lloyd-GL (Marine)	American Bureau of Shipping-ABS (Marine)	Det Norske Veritas-DNV (Marine)
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INDEX
WEIGHT AND DIMENSIONS

Unit	Description	Unit incl. package		Page
		Weight (g)	Dimension WxHxD (mm)	
actiVgen	Electronic engine speed controller	540	149 x 52 x 153	14
Asynchron KIT-2000	Genset controller + EPU-100 for asynchron applications	1,100	219 x 171 x 61	11
Asynchron KIT-3000	Genset controller + EPU-100 for asynchron applications	1,850	282 x 217 x 99	10
BL18	Power supply and battery charging unit	2,000	145 x 100 x 110	53
BL20400	Power supply and battery charging unit; 400 V	4,000	145 x 100 x 110	53
COMRS232NullM	RS232 zero modem cable with Handshake (3 m)		[1]	49
DSLC-2	Digital synchronizer and load control	1,900	250 x 227 x 84	16
DTSC-50	Automatic transfer switch controller	450	158 x 158 x 40	20
DTSC-200	Automatic transfer switch controller	800	219 x 171 x 61	20
easYgen-1500	Genset controller for single unit operations	800	219 x 171 x 61	11
easYgen-2200	Genset controller for multiple unit operations - plastic housing	800	219 x 171 x 61	11
easYgen-2300	Genset controller for multiple unit operations - plastic housing with display	800	219 x 171 x 61	11
easYgen-2500	Genset controller for multiple unit operations - plastic housing with display	1,100	219 x 171 x 98	11
easYgen-3200 P1	Genset controller for multiple unit operation - plastic housing with display	1,850	282 x 217 x 99	10
easYgen-3200 P2	Genset controller for multiple unit operation - plastic housing with display	2,170	282 x 217 x 99	10
easYgen-3100 P1	Genset controller for multiple unit operation - metal housing	1,750	250 x 227 x 84	10
easYgen-3100 P2	Genset controller for multiple unit operation - metal housing	2,270	250 x 227 x 84	10
easYgen-3400	Genset controller for complex breaker application – metal housing	1,750	282 x 217 x 99	10
easYgen-3500	Genset controller for complex breaker application – plastic housing with display	1,850	250 x 227 x 84	10
easYlite-100	Remote annunciator	300	158 x 158 x 40	14
easYprotec	Low voltage protection relay	300	146 x 128 x 50	49
EPU-100	Remanence voltage converter for asynchronous generators		30 x 55 x 75	51
IKD 1	Digital I/O expansion board	360	168 x 128 x 51	51
LS-5	Circuit breaker control and protection	840	219 x 171 x 61	13
LSG	Load Share Gateway	280	141 x 98,5 x 21	14
MCA4	Directional feeder protection	4,000	250 x 240 x 200	31
MCA4-2	Directional feeder protection	4,000	250 x 240 x 200	30
MCDGV4	Generator differential protection	4,500	250 x 240 x 200	47
MCDGV4-2	Generator differential protection	4,500	250 x 240 x 200	46
MCDTV4	Directional transformer differential protection	4,500	250 x 240 x 200	41
MCDTV4-2	Directional transformer differential protection	4,500	250 x 240 x 200	40
MRA4	Directional feeder protection	4,000	250 x 240 x 200	33
MRA4-2	Directional feeder protection	4,000	250 x 240 x 200	32
MRDT4	Non-directional transformer differential protection	4,000	250 x 240 x 200	39
MRDT4-2	Non-directional transformer differential protection	4,000	250 x 240 x 200	38
MRI4	Combined time overcurrent and earth fault relay	2,900	250 x 150 x 200	35
MRI4-2	Combined time overcurrent and earth fault relay	2,900	250 x 150 x 200	34
MRM4	Motor protection relay	2,900	250 x 150 x 200	45
MRM4-2	Motor protection relay	2,900	250 x 150 x 200	44
MRMV4	Motor protection relay with voltage and frequency	4,000	250 x 240 x 200	43
MRMV4-2	Motor protection relay with voltage and frequency	4,000	250 x 240 x 200	42
MRU4	Voltage and Frequency supervision	2,400	250 x 150 x 200	37
MRU4-2	Voltage and Frequency supervision	2,400	250 x 150 x 200	36
MSLC-2	Master Synchronizer and Load Control	1,900	250 x 227 x 84	16
RP-3000	Remote Panel	2,800	365 x 305 x 120	13
SPM-D	Synchronizer	800	144 x 72 x 122	17
USB2RS232ADAP	Interface converter (USB to RS232)		130 x 155 x 70	49

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Note

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