

Short-circuit and earth fault indicators



Function	Rotor indicator	Fluid Indicator	Opto F 3.0 / Opto F+E 3.0	Alpha M / Alpha E	Sigma 2.0 Sigma 2.0 AC/DC Sigma L	Sigma F+E 2.0 Sigma F+E 2.0 AC/DC Sigma F+E L	Sigma F+E 3 2.0 Sigma F+E 3 2.0 AC/DC Sigma F+E 3 L	Sigma D	Sigma D+	Sigma D++	Sigma Dm	ComPass A	ComPass A 2.0	ComPass B	ComPass B 2.0	ComPass Bs 2.0	ComPass D	Earth Zero	Earth Zero Typ Flag	Earth 4.0		
Short-circuit indication / earth short-circuit indication	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Earth fault indication	-	-	-/■	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Directional indication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Monitoring	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Control function and programmable logic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Neutral Earthing System																						
Short-term / low-impedance earthed	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Isolated earthed	-	-	-	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Resonant earthed (with Petersen coil)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Short-circuit trip current values																						
↳ Short-circuit trip current / earth short-circuit trip current	150–2,000 A (fixed settings)	400, 600, 1,000 A (fixed settings)	400, 600, 800 or 1,000 A	400, 600, 800, 1,000 A	200, 300, 400, 600, 800, 1,000, 2,000 A, Self-adjustment	200, 300, 400, 600, 800, 1,000, 2,000 A, Self-adjustment	200, 300, 400, 600, 800, 1,000, 2,000 A, Self-adjustment	DIP: 200, 300, 400, 600, 800, 2,000 A, Self-adjustment SW: 50–2,000 A	DIP: 200, 300, 400, 600, 800, 2,000 A, Self-adjustment SW: 50–2,000 A	DIP: 200, 300, 400, 600, 800, 2,000 A, Self-adjustment SW: 50–2,000 A	DIP: 400, 800, 1,000, 2,000 A, Self-adjustment SW: 50–2,000 A	20–2,000 A	10–2,000 A, Self-adjustment	50–2,000 A	10–2,000 A, Self-adjustment	10–2,000 A Self-adjustment	10–2,000 A Self-adjustment	-	-	-		
↳ Response delay	100 ms	200 ms	40, 60, 80, 100, 200, 300 or 500 ms	100 ms	40, 80 ms	40, 80 ms	40, 80, 200, 300 ms	DIP: 40, 80 ms, SW: 40 ms–60 s	DIP: 40, 80 ms, SW: 40 ms–60 s	DIP: 40, 80 ms, SW: 40 ms–60 s	DIP: 40, 80 ms, SW: 40 ms–60 s	40 ms–60 s	20 ms–60 s	40 ms–60 s	20 ms–60 s	20 ms–60 s	20 ms–60 s	-	-	-		
Earth fault detection methods																						
IE> Earth fault trip current	-	-	10, 20, 40 or 80 A / 40, 80, 120 or 160 A	-	-	20, 40, 60, 80, 100, 120 or 160 A	20, 40, 60, 80, 100, 120 or 160 A	DIP: off, 20, 40, 60, 80, 100, 120, 160 A, SW: 20–1,000 A	DIP: off, 20, 40, 60, 80, 100, 120, 160 A, SW: 20–1,000 A	DIP: off, 20, 40, 60, 80, 100, 120, 160 A, SW: 20–1,000 A	SW: 20–1,000 A	20–1,000 A	10–1,000 A	20–1,000 A	10–1,000 A	10–1,000 A	10–1,000 A	10–1,000 A	25, 50, 75, 100 A	25, 50, 75, 100 A	25, 50, 60, 80 A	
IEP> Active residual current cos φ	-	-	-	-	-	-	-	5–200 A	5–200 A	5–200 A	1–200 A	-	-	1–200 A	1–200 A	1–200 A	1–200 A	1–200 A	-	-		
IEQ> Reactive current sin φ	-	-	-	-	-	-	-	5–200 A	5–200 A	5–200 A	1–200 A	-	-	1–200 A	1–200 A	1–200 A	1–200 A	1–200 A	-	-		
IET> Transient earth fault method	-	-	-	-	-	-	-	10–100 A	10–500 A	10–500 A	10–500 A	-	-	-	10–500 A	10–500 A	10–500 A	10–500 A	-	-		
VNE> Neutral point displacement voltage (permanent earth fault)	-	-	-	-	-	-	-	-	-	-	1–100%	-	-	0–100%	1–100%	1–100%	1–100%	1–100%	-	-		
IE> Pulse (stroke)	-	-	-	-	-	-	-	1–100 A	1–100 A	1–100 A	1–100 A	-	1–200 A	-	1–200 A	1–200 A	1–200 A	1–200 A	-	-		
Response delay	-	-	60, 100 or 200 ms (F+E 3.0)	-	-	80, 200 ms	60, 80, 200 or 300 ms	DIP: 80, 160 ms, SW: 40 ms–60 s	DIP: 80, 160 ms, SW: 40 ms–60 s	DIP: 80, 160 ms, SW: 40 ms–60 s	SW: 40 ms–60 s	40 ms–60 s	40 ms–60 s	40 ms–60 s	40 ms–60 s	40 ms–60 s	40 ms–60 s	80, 160 ms	80, 160 ms	80, 160 ms		
Reset																						
Manual / Remote	■/-	-	■/■	■/-	■/■	■/■	■/-	■/■	■/■	■/-	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	
Automatic time reset	-	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Current- / voltage- / auxiliary supply restoration	-	-	-/■/■	-	-/-/-	-/■/■	-/■/■	-	-/■/■	-/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	■/■/■	
Test																						
Manual (button) / Remote	-	-	■/■	■/-	■/■	■/■	■/-	■/■	■/■	■/-	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	■/■	
Communication																						
Relay contacts (bistable)	-	-	1	2	1	1	-	2	2	-	3	3	-	4	4	4	4	4	4	3		
Ethernet / IEC 60870-5-104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
RS485 / Modbus RTU	-	-	-	-	-	-	-	-	-	-	-	-	-	■	■	■	■	■	■	-		
USB port	-	-	-	-	-	-	-	LoRaWAN modem	-	-	LoRaWAN modem	■	■	■	■	■	■	■	■	-		
Radio 868 MHz / LoRaWAN protocol	-	-	-	-	-	-	-	■	-	-	■	-	-	-	-	-	-	-	-	-		
Parameter setting																						
Manual (DIP switch) / remote / software via USB	-	-	■/-/-	■/-/-	■/-/-	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	■/-/■	
Power supply																						
Long-life lithium cell / capacitor	-/-	-/-	■/-	■(E)/-	■/-	-/■	-/■	■/-	-/■	-/■	■/-	-/■	-/■	■/-	■/-	■/-	■/-	■/-	■/-	■/-	■/-	
CT powered	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
External auxiliary supply [V AC/DC]	-	-	24–60 V AC, 12–110 V DC	-	-	24–230	24–230	-	24–230	24–230	-	24–230	24–230	24–230	24–230	24–230	24–230	24–230	-	-		
Number of current transformers (CT) / current sensor (S)																						
Phase current / summation current	-	-	3/- (CT)	3/1 (CT)	3/- (CT)	3/- (S)	3/- (S)	3/- (S)	3/- (S)	3/- (S)	3/- (S)	3/1, opt. 3/- (S)	3/-, opt. 3/1 (S)	3/- (S)	3/- (S)	2/1, opt. 3/- for IE> 10 A (S)	3/-, opt. 3/1 or 2/1 (S)	3/-, opt. 3/1 or 2/1 (S)	3/-, opt. 3/1 or 2/1 (S)	-/1 (CT)	-/1 (CT)	-/1 (CT)
Voltage coupling																						
Capacitive / resistive	-	-	-	-	-	-	-	-	■/-	■/-	■/-	■/-	-	-	■/-	■/■	■/■	■/■	-	-		

In case of any questions, please do not hesitate to contact us:



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Product matrix

Short-circuit and earth fault indicators

Remote monitoring

Voltage detectors and detecting systems

Integrated voltage detecting systems



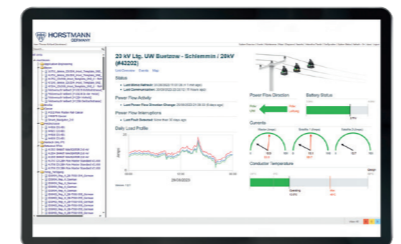
Function	Wega 1	Wega 1 V	Wega 2	Wega 2 V	Wega 1 LV	Wega T1
3 phase VDIS according to IEC 62271-213	■	■	■	■	—	—
Capacitive voltage coupling for ComPass B series and Sigma D series	■	■	■	■	■	Connection to transformer
Overvoltage indication	■	■	■	■	—	■
Integrated permanent maintenance test	■	■	■	■	■	■
Integrated display test (without auxiliary supply)	■	■	■	■	■	■
Fully enclosed electronics	■	■	■	■	■	■
Adjustable C2 capacity	—	■	—	■	—	Vario variant
Assembly set for retrofit	—	■	—	—	—	■
Nominal voltage / nominal frequency						
Nominal voltage of switchgear	from 1kV	from 1kV	from 1kV	from 1kV	400-700 V	from 1kV
Nominal frequency 50 Hz / 60 Hz	■	■	■	■	50 Hz	■
Display						
LCD display / LED indication	■/—	■/—	■/■	■/■	■/—	■/—
Display powered by measured voltage	■	■	■	■	■	■
LCD symbols						
Voltage present	■	■	■	■	■	■
Threshold value: 0.1 – 0.45 x Vnom	■	■	■	■	■	■
Voltage present integrated maintenance test passed	■	■	■	■	■	■
Voltage present integrated maintenance test passed	■	■	■	■	—	■
Voltage signal too high (overvoltage)	■	■	■	■	■	■
Voltage not present	■	■	■	■	■	■
Interface						
Front accessible, fully featured LRM interface, also in compliance with LRM system according to IEC 61243-5	■	■	■	■	■	Test point
Earth socket	■	■	■	■	■	■
Communication						
Relay contacts	—	—	■	■	—	—
Connections						
Flat connector	■	■	■	—	■	■
System connector (AMP)	■	■	■	■	■	Vario variant
Power supply						
External auxiliary supply	—	—	■	■	—	—

Remote monitoring solutions



Function	Reporter 3.0	Reporter 4.0
SCADA	■	■
iHost	■	■
Data source		
Short-circuit and earth fault indicator	■	■
Information		
Short-circuit and earth fault indication	■	■
Monitoring	—	■
Communication		
Inputs		
Analogue	2 (4–20 mA)	8 (4–20 mA)
Digital	16	16
Modbus	—	47 Modbus (digital) 60 Modbus (analogue)
Interfaces / Protocol	—	RS-485 / Modbus-RTU
Mobile network	4G / 2G	4G / 2G
Power supply		
External auxiliary supply	—	■ (100–240 V AC)
Back-up battery (rechargeable)	—	■
Long-life lithium cell	■	—
Housing		
Material	Glas fibre reinforced polycarbonate	Glas fibre reinforced polyester
Degree of protection	IP66	IP66
Dimensions (W x H x D)	136 x 245 x 88 mm	291 x 362 x 186 mm
Cable ducts	3	4
Lock	Screws	Padlock
Mounting	Wall	Wall
Temperature range	-30 °C to +70 °C	-20 °C to +65 °C

iHost – Monitor your entire grid 24/7



Data concentrator for short-circuit and earth fault indicators

- ▶ Bundles and processes all data received from remote field devices
- ▶ Provides data access at any time in various ways and devices

Central management of all field devices

- ▶ Grid monitoring: system overview, data analysis, function check
- ▶ Configuration and firmware updates

Data on demand

- ▶ Customised visualisation of data and alarms
- ▶ Individual notifications, generated automatically

Embedded database

- ▶ Grid data available from day one of installation
- ▶ Flexible data provision for asset management, planning, engineers and further user

Full control over your own data with on-premise installation

- ▶ Data to be stored in Horstmann cloud
- ▶ On premise installation with SCADA connection over IEC 60870-5-101 / -104 or DNP3 serial / IP
- ▶ Same user interface in all variants simplifies the transition and reduces familiarisation period

Voltage detectors / Phase comparators



Function	FL-I	Comet BL-1 / Comet BL-A	Comet BK-1 / Comet BK-A	Comet BS-1 / Comet BS-A	BO-A 2.0	BO-A AC / DC	Compare 2.0	PG II
Environmental conditions								
Indoor*	■	BL-I: ■	BK-I: ■	BS-I: ■	■	■	■	■
Indoor and outdoor**	—	BL-A: ■	BK-A: ■	BS-A: ■	■	■	■	—
Signalling								
Visual	■	■	■	■	■	■	■	■
Visual and audible	—	■	■	■	■	■	—	—
Further functions								
Self-test	—	■	■	■	■	■	■	—
Test principle: capacitive / resistive	■/—	■/—	■/—	■/—	■/—	—/■	■/—	—/■
Voltage detection for overhead lines AC / DC	■/—	■/—	■/—	■/—	■/—	■/■	■/—	■/—
Nominal voltage [kV]**								
0,1–3	—	—	—	—	—	■	—	—
5	—	■	—	—	—	—	—	■
6	■	■	—	—	—	—	—	■
10	—	■	—	—	—	—	—	■
11	—	■	—	—	■	—	—	—
15	—	—	—	—	—	—	—	—
20	—	■	—	—	—	—	—	■
25	—	—	—	—	■	—	—	—
30	—	■	—	—	—	—	—	—
5–10	—	—	—	■	—	—	■	—
6–10	—	■	■	—	—	—	—	—
10–20	—	■	■	■	—	—	■	—
20–30	—	■	—	—	■	—	—	■
20–36	—	—	—	—	—	—	—	—
Voltage range selectable	—	—	—	■	—	—	■	—
Technical data								
Length [mm]****	1,270–1,370	1,270–1,570	900–955	1,570	1,111–4,700	1,100–4,700	1,420	1,220–1,420
Weight [g]****	700–1,000	700–1,000	750–850	850–1,000	3,340	3,800–4,060	900	1,600

* Can be used outside, but not under wet conditions!

** Can be used under wet conditions.

*** Other voltage ranges on request.

**** Length and weight vary depending on the version.